SYNESSO S200 & S300

TECHNICAL MANUAL VERSION 2018.2

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SYNESSO

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INTRODUCTION

Congratulations on the purchase of your Synesso espresso machine. Please read this Owner's Manual and retain it in a safe location for future reference. If you have any questions about your machine, please contact Synesso and our knowledgeable staff will assist you

Factory Contract Information:
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Please WRITE your Serial Number & Offset Information here. This can be found on the 2nd & 3rd Menu Levels of the Display Controller. Have this available BEFORE calling for service or technical support.

S/N: _____

The offsets for this machine are:

BG1: _____°F / BG2:_____°F / BG3:_____°F

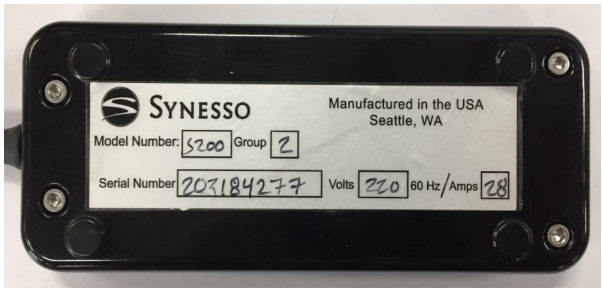
Steam Tank:_____°F

Included in the package with this machine you will find the following:

- Thumb Drive containing the Owner's Manual and other technical documents
- Pump/Motor Combination + hoses (3/8" compression fittings on all hoses)
- 8' Long metal reinforced ¾" ID drain hose + hose clamp (attached)
- Fitting, 1/4" male NPT x 90° x 3/8" Compression (if not CE/C-Tick)
- Accessory Package: Portafilters (per customer specification), blind basket, Synesso 3 oz. (90ml) shot glass, JoeGlo cleaning kit, and a 58.4mm tamper.
- Electrical plugs are ONLY included on CSA Certified machines (Canada). For all other machines, the owner of the machine must purchase an appropriate plug end for their machine. Please see the installation instructions starting on page 11 for more information.

Serial Number

Your espresso machine has a unique serial number, this number can be found on the serial number label located on the back side of the handheld display controller. The number can also be read on the display during start-up. Please have this serial number available for reference when contacting the factory.



This manual applies to Synesso models S200 and S300. "S Series" machines are fully volumetric with up to 2-6 programmable dispensed volumes, depending on settings. The S series machines have an external pump and motor.

SAFETY WARNINGS

IMPORTANT Information for Synesso Espresso Machines: **DISCONNECT FROM POWER BEFORE SERVICING.**

- Read the entire manual before operating this machine.
- Steam and condensation from the steam wand discharge are very hot and may cause burns.
- The steam wand tips and bases become hot during use: do not touch these surfaces.
- Cover the steam wand tip or submerge in a filled pitcher to safely divert the steam before opening the steam valve.
- Never remove the steam wand from the product that is being heated when the valve is open.
- Never remove the portafilter from the machine during the active brewing process.
- Keep water and moisture away from any electrical device or live power.
- Steam tank water is heated to 260°F (126°C) or more; Use caution near steam tank.
- The brew groups deliver water as hot as 210°F (99°C). Avoid exposure to this water.
- The hot water mix valve can be adjusted to deliver water as hot as 212°F (100°C), which can cause severe burns: please use caution when activating this water source.

Safety Label Locations:

Synesso complies with UL regulations by posting the following labels on its machines:

Electrical Box:

WARNING: Disconnect from power supply before servicing

AVERTISSEMENT: Couper l'alimentation avant l'entretien et le depannage.

California only:

CALIFORNIA PROPOSITION 65 WARNING
WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. (California law require this warning to be given to customers in the State of California)

Electrical cord:

The conductors of the power supply cord are marked "L1", "L2" for the ungrounded ("hot") supply conductors and "G" for an equipment grounding lead.

Warning: Risk of Fire. Use UL Listed Grounding Type Plug rate for 220 Volts, _____ Amperes, _____ Phase, #_____ Wire. Plug to be Selected and Installed only by Qualified Service Personnel.

Behind drain tray:

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

Materials information for Synesso machines:

- All stainless steel coming into contact with the water supply is 300 series
- All brass fittings are low lead per the CA360 specifications or better
- All electronic devices are lead free
- All gaskets are made from food-contact safe material

Test Information

- Brew (coffee) tanks are hydrostatically tested to 375 psi
- Steam tanks are pressure tested to 75 psi
- The electrical system is subject to an electrical withstand test of:

  1.20 kvac, at 5.00 mA, for 1 second

BREW & STEAM TANK SAFETY

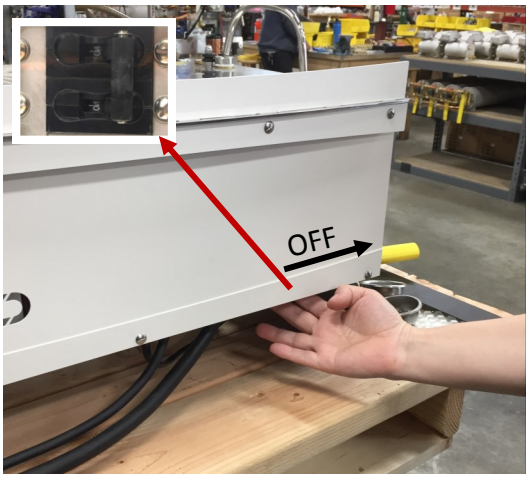
Espresso machines have numerous potential hazards, and it is of paramount importance to Synesso that people servicing our machines take all necessary precautions to ensure their personal safety. When working on the machine's boilers (unless otherwise instructed in the directions):

- Turn the machine off and shut off the incoming water supply.
- Depressurize the boilers as shown below.

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.

Depressurizing the Steam Tank:

1. Turn off the element circuit breaker located under the machine



2. Open the steam valve by moving the steam actuator lever forward



3. The steam tank is depressurized when the steam gauge reads zero. Note: the steam gauge is rated @ 0-60 psi

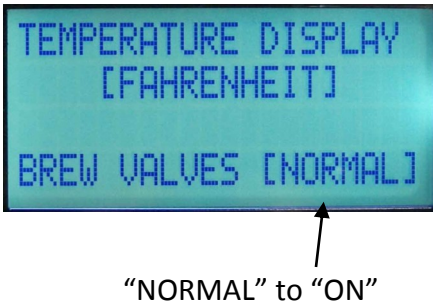


Depressurizing the Brew Tanks:

1. Turn off the element circuit breaker located under the machine.
2. Also turn off the water supply to the machine.



3. In the second level menu, change the brew valves from "Normal" to "ON" this will bleed the pressure.

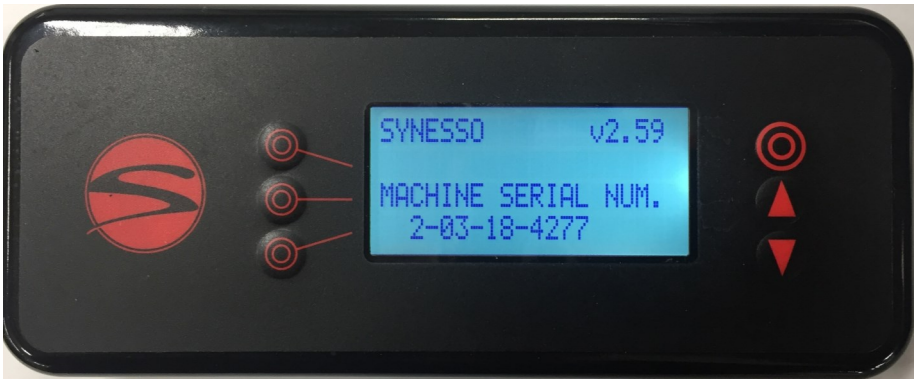


"NORMAL" to "ON"

4. The brew tanks are depressurized once the pressure gauge reads zero. Note – the brew gauges are rated at 0-300 psi



START UP SCREEN



When power is turned on, this screen is shown, displaying the software version and serial number.

The serial number contains important information:
2—is the number of brew groups on this machine
03—is the month the machine was built
18—is the last 2 digits of the year it was built
4277—is the machine sequence number

RECOMMENDED TOOLS & SUPPLIES

Tools and recommended items required to fully diagnose, service and maintain Synesso espresso machines.

- Multi Meter – reads volts, amps and ohms (The Fluke T5-600 is recommended)
- 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 (Super Lube) 1.8600
- Tube Bender for 1/4”, 5/16”, and 3/8” Tube
- Flare Tool - 45°
- Tube Cutter
- Brass Bristle Wire Brush
- 3/8” Drive Socket Wrench with 7/16”, 1/2” and 9/16” “Deep Sockets”
- Hammer Medium Size Ball Peen
- Wire Stripper / Crimper
- Small Punch and Chisel
- 3/8” ID rubber tube for draining
- Small Files – Round and Triangular
- Picks – Straight and Curved, an Ice Pick is great for replacing portafilter gaskets
- Dies: 1/8” NPT, 1/4” NPT, and 1/8” BSPP
- Taps: 8-32, 10 - 32, 3/8 – 16, and M6 x 1 bottoming Tap
- Allen Wrenches: 3/32”, 1/8”, 9/64”, 5/32, 3/16”, 1/4” (steam valve seat)
- Wrenches: 2x11/32, 1/4, 5/16, 3/8, 2x7/16, 1/2, 2x9/16 , 5/8, 11/16, 3/4, 12mm & 17mm
- Adjustable wrenches: Medium size 1 1/4” opening and Small for tight spots
- Pliers: Channel Lock, Standard pliers and Side Cutters
- Philips Head Screwdrivers: #2 short, #2 long and #1
- Flat Head Screwdrivers: #2 short, #2 medium length, #1 medium, #0 medium
- A large flat head screwdriver (or small flat nail puller) to use as a pry bar or wedge.
- Pen and paper
- Hand cleaner and Towels

WARRANTY & WATER STANDARDS

Limited 2 Year Plus Warranty

Synesso Inc. and/or your Distributor warrants to the original purchaser that Synesso espresso machines are free from defects in materials and workmanship under normal use and service for the period commencing upon the date of shipping and continuing for 24 months from the original date of shipment. Synesso will make a good faith effort for prompt correction or other adjustment with respect to any non-wearing part that proves to be defective within the limited warranty period. This Limited Warranty is conditional upon proper use of the machine by the purchaser.

This Limited Warranty does not cover defects or damage resulting from: accident, misuse, abuse, shipping damage, neglect, unusual physical, electrical or electromechanical stress, unauthorized customer modifications or improper water filtration.

The 2 Year Plus Warranty* will cover all non-wearing parts including:

- Universal Brew Tank
- Steam Tank
- Marathon Motor
- Fluid-o-Tech Pump
- Pressure Relief Valve
- 1/4” Check Valves
- Thermal Overload Switch with Manual Reset
- Brew and Water Control Valves

In addition to the standard 2 Year Plus Warranty*, Synesso will cover the following items under a Limited 5 year Warranty:

- Group Head Assemblies
- Steam Valve Actuator
- Machine Body
- Machine Frame
- Sight Glass
- Heating Elements
- Wire Harness
- Flow Meters
- Copper Tubes
- Brass Fittings
- Temperature Probes

Wearing parts not included in the 2 Year Plus Warranty* are:

- Portafilter Gaskets
- Portafilter Baskets
- Portafilter Springs
- Group Diffuser Screens
- Vacuum Breaker
- Steam Valve Seals
- O-Rings or Seals
- Gauges
- Body Panels - One Year Warranty
- Purge Buttons - One Year Warranty

***To obtain the 2 Year &/or 5 Year Plus Warranty, the annual Preventative Maintenance Guide and checklist must be completed by a qualified Synesso Technician. After twelve months from the original date of shipment, the completed checklist must be emailed to the Synesso Technical Support Department. [Tech@Synesso.com] Checklists must be received before the thirteenth month from the original date of shipment in order to be valid.**

See page 28 for the Annual Preventative Maintenance Checklist.

WARRANTY & WATER STANDARDS

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 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	3 to 5 grains (divide ppm by 17.1 to get grains)
pH	6.5 pH to 7.5 pH
Chloride	5-15 ppm – any Chlorides can be corrosive and harmful
Total Alkalinity	Less than 100 ppm
Chlorine	0 ppm
Iron	0 ppm

In Synesso's experience, Everpure Claris and Cirqua formulator systems can damage the Synesso stainless steel tanks. Use of either system is highly discouraged and will void the water related parts of the machine warranty.

Any part which is determined to be defective in materials or workmanship should be returned to Synesso or to an authorized service location, shipping costs prepaid, as Synesso designates. Synesso may repair or replace the product or part with new or factory refurbished equipment at Synesso's sole discretion. If the product or part is determined to be defective and in compliance with the Limited Warranty conditions, the replacement part or product will be returned to the purchaser with shipping prepaid **.

Many jurisdictions have codes and regulations governing sales, construction, installation, and/or use of products for certain purposes, which may vary from area to area. While Synesso attempts to assure that its products comply with such codes, it cannot guarantee compliance and cannot be responsible for how the product is used or installed.
Synesso's liability is limited to the purchase price of the product and shall not be held liable for damages that extend beyond the product itself. Synesso's liability of consequential, incidental damages, indirect or direct damages for personal injury, inability to properly use this product, loss of business profits or interruption to business is expressly disclaimed.

** Regarding equipment sold or residing outside the United States: purchaser maybe required to pay for the shipping and associated costs for warranty parts, repairs and services. Please contact your local distributor to resolve the issue regionally, if possible.

INSTALLATION & WORK STATION

To maintain the 2 year warranty, an authorized or certified espresso service representative must perform the installation of this espresso machine.

Site Preparation - See Diagrams p.10-11. The machine must be placed on a level horizontal surface that can be easily cleaned and is capable of supporting a minimum of 300 lbs.

The counter top requires a depth of 28”, which provides a minimum clearance of 1” behind and 3” in front of the machine.

The height of the surface can vary to suit the operator.

Make a 2 ½” minimum diameter hole through the counter top located according to the diagrams on pages 10 and 11. The hoses, drain tube, and electrical lines will all pass through this hole.

A 3/8” min. diameter cold water supply line from the filter with a shut off valve is required within 5’ of the machine. The valve should be easily accessed for machine service.

The machine supply hose and pump fittings are 3/8” tube compression fittings.

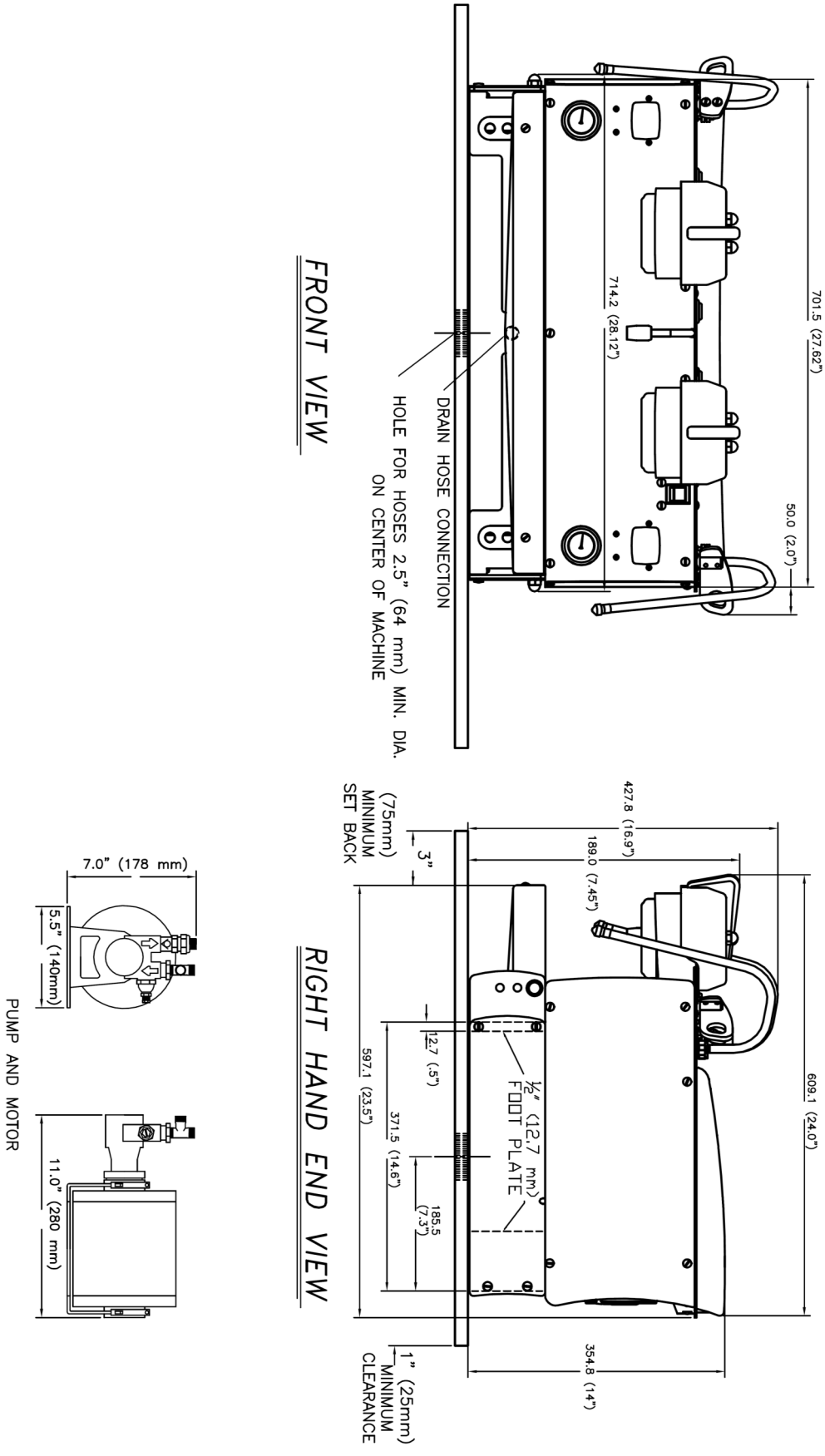
A proper water filtration or softening system must be installed on the incoming water supply. Water treatment requirements will vary, and it is important to use a system designed to match the needs of your specific area. Water filtration systems require periodic maintenance, including cartridge or filter replacement. Proper filtration and service is vital to the function of the machine and the quality of the espresso served. Follow the instructions provided by your water treatment system for proper installation.

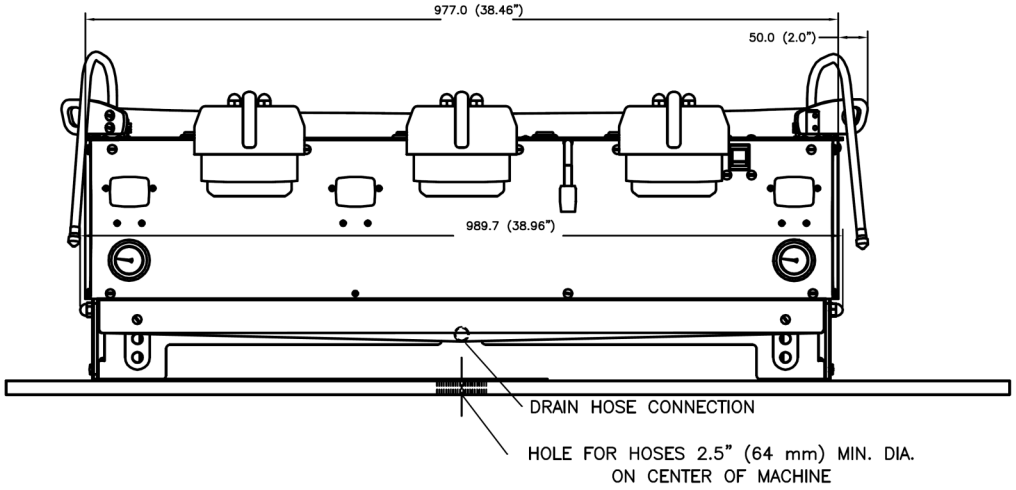
Note: Improper water filtration can result in severe damage to the machine including scale deposits and corrosion. **DAMAGE CAUSED BY IMPROPER WATER TREATMENT WILL NOT BE COVERED BY THE MACHINE WARRANTY.** See page 7.

There must be adequate room under the counter to locate the motor and pump. The pump must be easily accessible for adjustment, and the motor must have a minimum of 3” clearance on all sides for air flow.

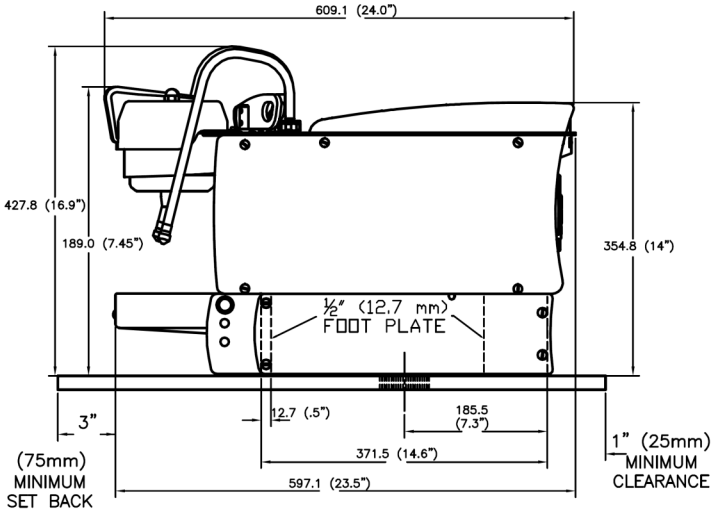
A floor drain or sink must be available. The best location is directly under the machine. The 3/4” drain hose should descend as vertically as possible for optimal drainage. An air gap is required between the end of the drain hose and the highest water position of a clogged drain. This is to prevent the possibility of drain water backing up into the machine.

INSTALLATION & WORK STATION

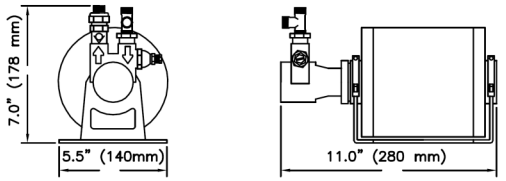




FRONT VIEW



RIGHT HAND END VIEW



PUMP AND MOTOR

PLUMBING REQUIREMENTS

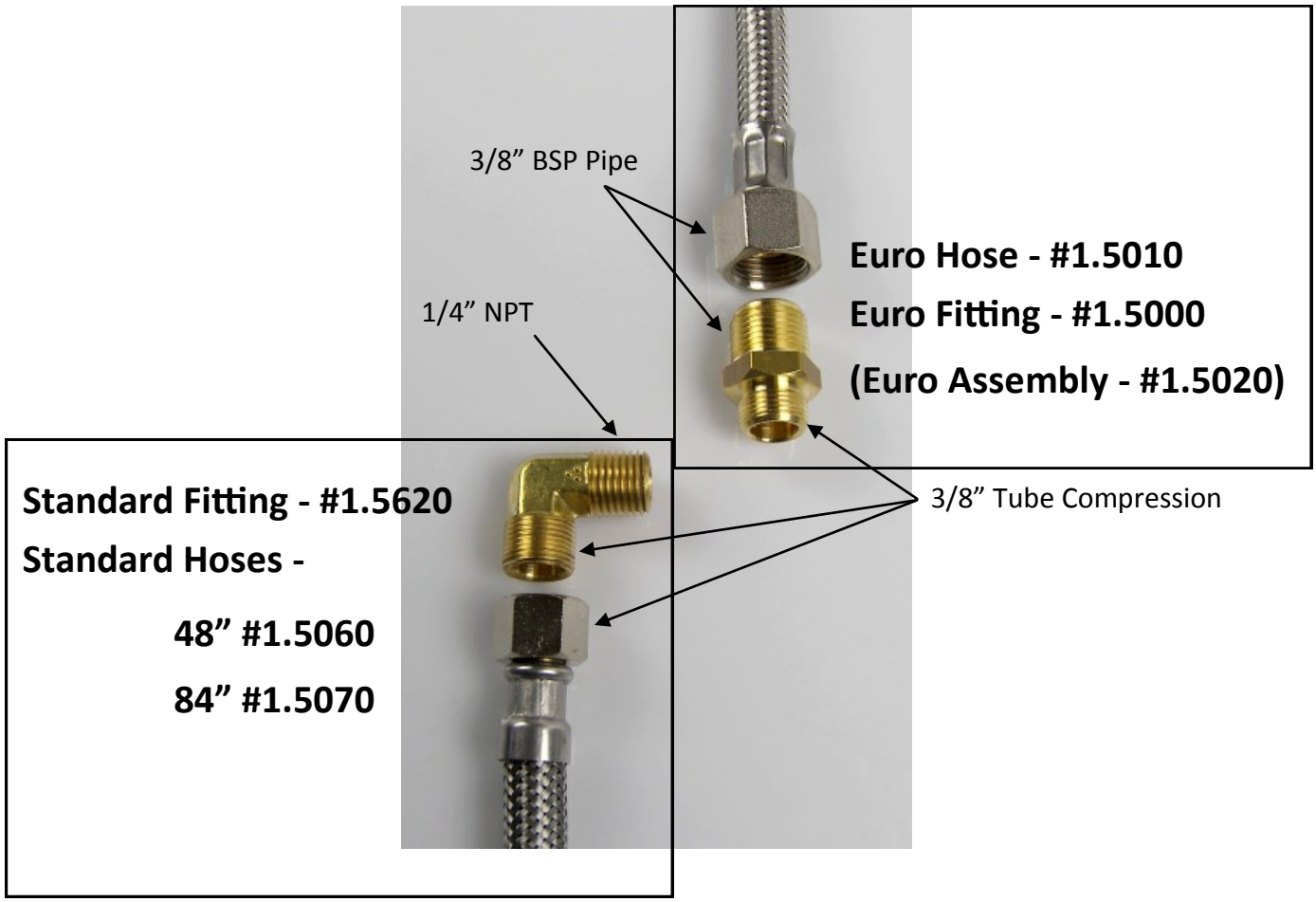
This equipment must be installed to comply with the applicable federal, state or local plumbing codes. WATER TREATMENT IS REQUIRED TO PRESERVE THE FULL MACHINE WARRANTY. Please ensure that the incoming water complies with the warranty requirements listed on page 7.

Using the provided stainless steel braided hose, connect the pump to the shutoff valve on the filtered cold water line. Fittings on the hoses and pumps are 3/8" tube compression. Thread sealant or Teflon tape is not necessary. Make connections snug, but do not over tighten.

Turn incoming water ON and check for leaks.

Synesso machines require a minimum of 50 PSI (3.5 bar) of line pressure at 30gal (120L) per hour to have the auto-fill system, for the steam tank functioning properly. Please ensure that the incoming water meets this requirement or contact Synesso for alternative methods of boosting water pressure.

NOTE: Synesso sells a "Euro-hose" adaptor hose and fitting (part number is 1.5020) which converts from a 3/8" tube fitting to a pipe fitting, suitable for most non-US plumbing. Please refer to the picture below to identify the differences between the standard and Euro-style fittings and hoses.



ELECTRICAL REQUIREMENTS

All Synesso machines are rated to operate on 220v / 60 Hz or 230v / 50 Hz frequency, single phase. Machines will operate between 208v and 240v.

Listed amp ratings are all measured at 220v. Incorrect voltage can cause malfunction or damage to the machine. **Plug or means of isolation must be easily accessible.**

An electrical socket and matching plug, rated at the proper voltage and amperage are required within three feet of the machine. Plug ends are NOT included with the machine unless required by CSA or other certification.

Model	Cord Plug Rating (UL Listed)	Machine Max Amp Draw	Machine Max Watts
S200	30 amp	28 amp , 220v / 60 Hz	5956 Watts, 230v / 50 Hz
S300	40 amp	36 amp , 220v / 60 Hz	7656 Watts, 230v / 50 Hz

North American Wire Color		**Worldwide Wire Color**	
Green	Ground	Green and Yellow	Ground (Earth)
White	110v Line 1	Brown	230v
Black	110v Line 2	Blue	Neutral

Attach the plug end per manufacturer's instructions.

Make sure that the electronics switch and the heating element breaker are in the OFF position, then plug the power cord into the receptacle.

OPTIONAL: If recovery time is slow, or voltage is low, you may install an In-Line Buck-Boost transformer. Buck-boost transformers come in different sizes. Please choose the appropriate one for your machine if required. Machines require a 1.0 KVA transformer.

SPECIAL ELECTRICAL INFORMATION FOR EMC-COMPLIANT MACHINES

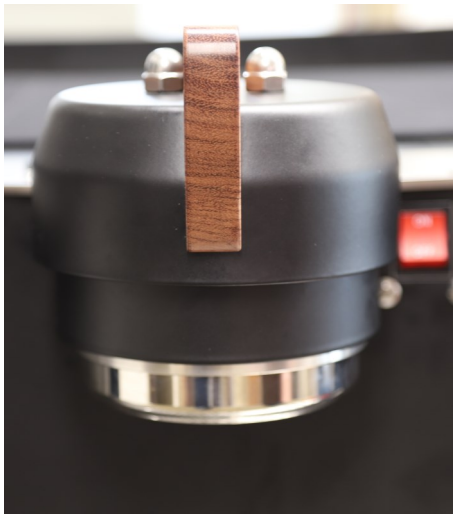
(C-TICK FOR AUSTRALIA, CE FOR EUROPE AND OTHER LOCATIONS)

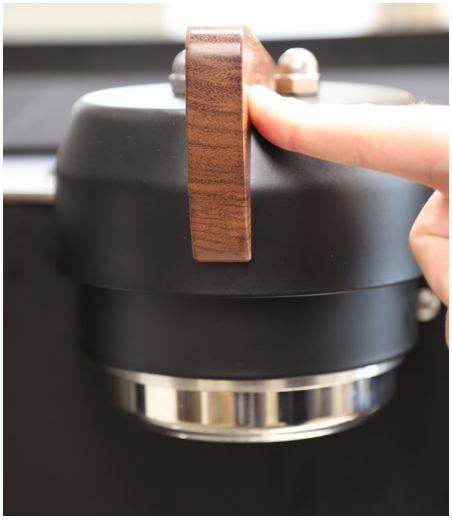
To comply with EMC (Electromagnetic Compatibility) regulations, Synesso is required to install a capacitor in the electronics box across the main power IN. **To avoid an electric shock from the charge held in the capacitor, unplug or isolate the machine with the electronics ON/OFF red rocker switch in the ON position.**

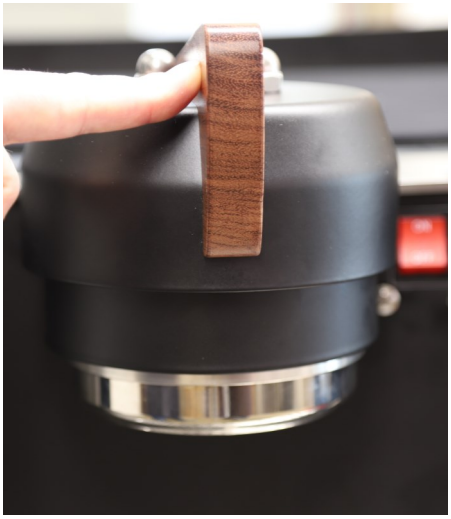
START UP

First Time Start-Up Instructions

1. To fill the machine, connect the water lines, connect the drain hose and turn the water ON.
2. Switch the red electronics On/Off switch to ON. This activates the machine's electronics, but NOT the heating elements. This also allows the steam tank to begin to fill.
3. Bleed the air from the group heads by running each group until water flows without sputtering.
4. When the steam tank has stopped filling, set the heating element breaker to the ON position. The machine can now control the temperature of all tanks.
5. To set the pump pressure to 9 bar, locate the pump adjusting screw on the right side of the brass pump housing. Loosen the lock nut and turn the screw with a screwdriver (Clockwise to INCREASE pressure, Counterclockwise to DECREASE pressure). Make adjustments while running the shot programs to see the current pump pressure. Once the desired pressure is reached, retighten the lock nut.
6. Please allow at least 30 minutes of "warm up" time before using your Synesso espresso machine to brew shots or steam milk. The steam gauge (the left hand gauge) should read 1.3 Bar when the steam temperature is 250F.







OPERATION

Prepare a Portafilter

1. For best results, use fresh coffee. Ground coffee should be brewed as soon as possible after grinding.
2. Select the correct spout and basket configuration. Single, double and bottomless portafilters are available through Synesso . Baskets are available in 7, 14, 18, and 21 gram sizes and are all compatible with any of our portafilters.
3. Fill the portafilter basket just above level and wipe off the excess. Using a scale to measure grounds can improve consistency over visual estimation.
4. Press straight down evenly on top of the grounds with the tamper until the puck stops compressing.
5. Wipe the basket rim before engaging portafilter into group head.

NOTE: When not in use, keep the portafilter engaged in the group head to keep it warm.

OPERATION

Espresso Brewing

1. Engage the prepared portafilter into the brew group that has the correct temperature setting for this espresso roast and pull handle firmly to the right to set the seal.
2. Shift the group head either to the left to run the left program or to the right to run the right program.
3. The program will preinfuse the puck for the set time, then engage the pump.
4. Once the set amount of water has been dispensed, the shot will end automatically.
5. You may change the preinfusion time and shot volume by using the handheld controller. Make changes between shots, not while brewing.
6. To stop a shot early, shift the handle in either direction or press the purge button.
7. After the shot, remove the portafilter, tap out your spent puck, and clean the basket.
8. The S200 and S300 have purge buttons, which will dispense a timed pulse of full pressure water to aid in cleaning the group between shots. Set the duration of the purge in the handheld controller.

Milk Steaming

1. Fill the pitcher halfway with fresh, cold milk. Smaller pitchers are recommended for drink sizes less than 10 oz. Steamed, unused milk should be discarded.
2. Activate the steam handle to blow the wand clear of accumulated condensed water before steaming.
3. Insert the tip of the steam wand deep into the milk pitcher. This will prevent milk from splashing.
4. Open the steam valve by pulling the handle towards you.
5. Place one hand on the side of the steam pitcher to feel the rising temperature of the milk.
6. While the milk is still cold, lower the pitcher to allow the steam jets to push a small amount of air beneath the surface, then raise the pitcher to lower the tip of the wand to the center of the milk. This will continue the heating process and prevent over-frothing.
7. Heat milk to approximately 150F to 170F (65°C to 76°C). If you are using your hand, it will feel about as hot as you can stand without burning yourself. Milk thermometers are also an excellent way to determine the temperature of the milk.

Caution: Do not overheat the milk and scald it. Scalded milk should not be used.

8. Remove the wand from the milk, purge with steam, and wipe wand clean immediately after each use.

NOTE: Although Synesso steam wands are made with a proprietary double-walled process that helps to keep the outer wall cooler, the tip and base can become **very hot** and caution must be used.

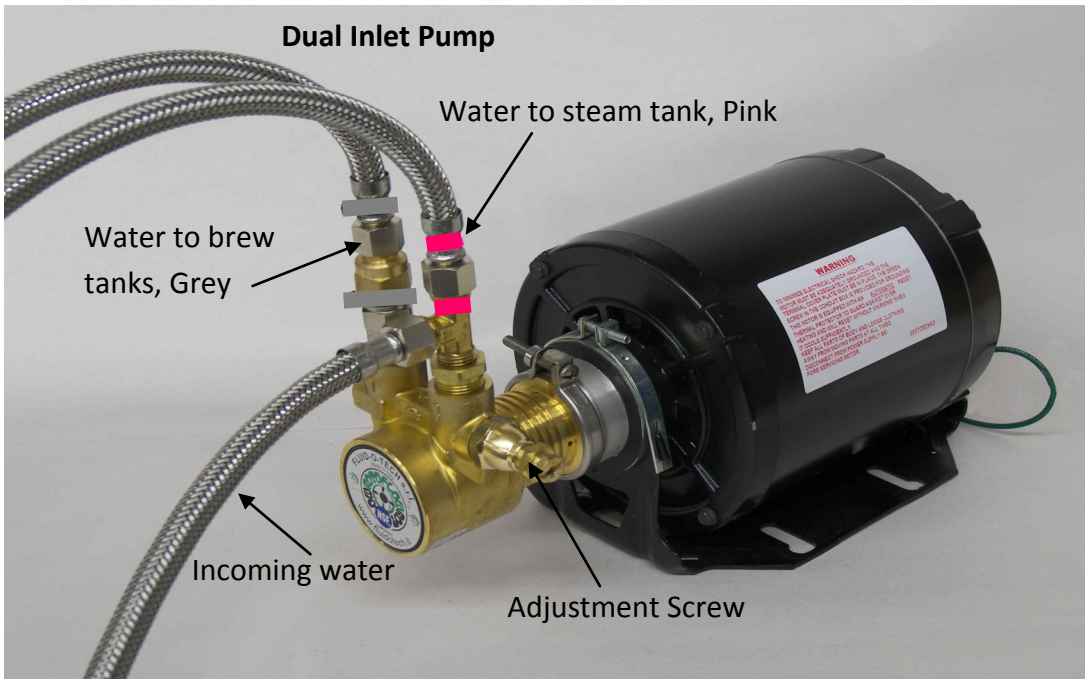
NOTE: Many varieties of dairy, and non dairy milk products exist. Many require different techniques to foam properly. Practice steaming the milks you will be serving before providing them to customers.

HYDRAULIC SYSTEM

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 components.

Synesso™ utilizes 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 connect to the water treatment system. The water then passes to the pump and motor.

On S series machines, water for the brew boiler goes through the pump and the water for the steam boiler travels through a separate line to the steam tank fill valve.

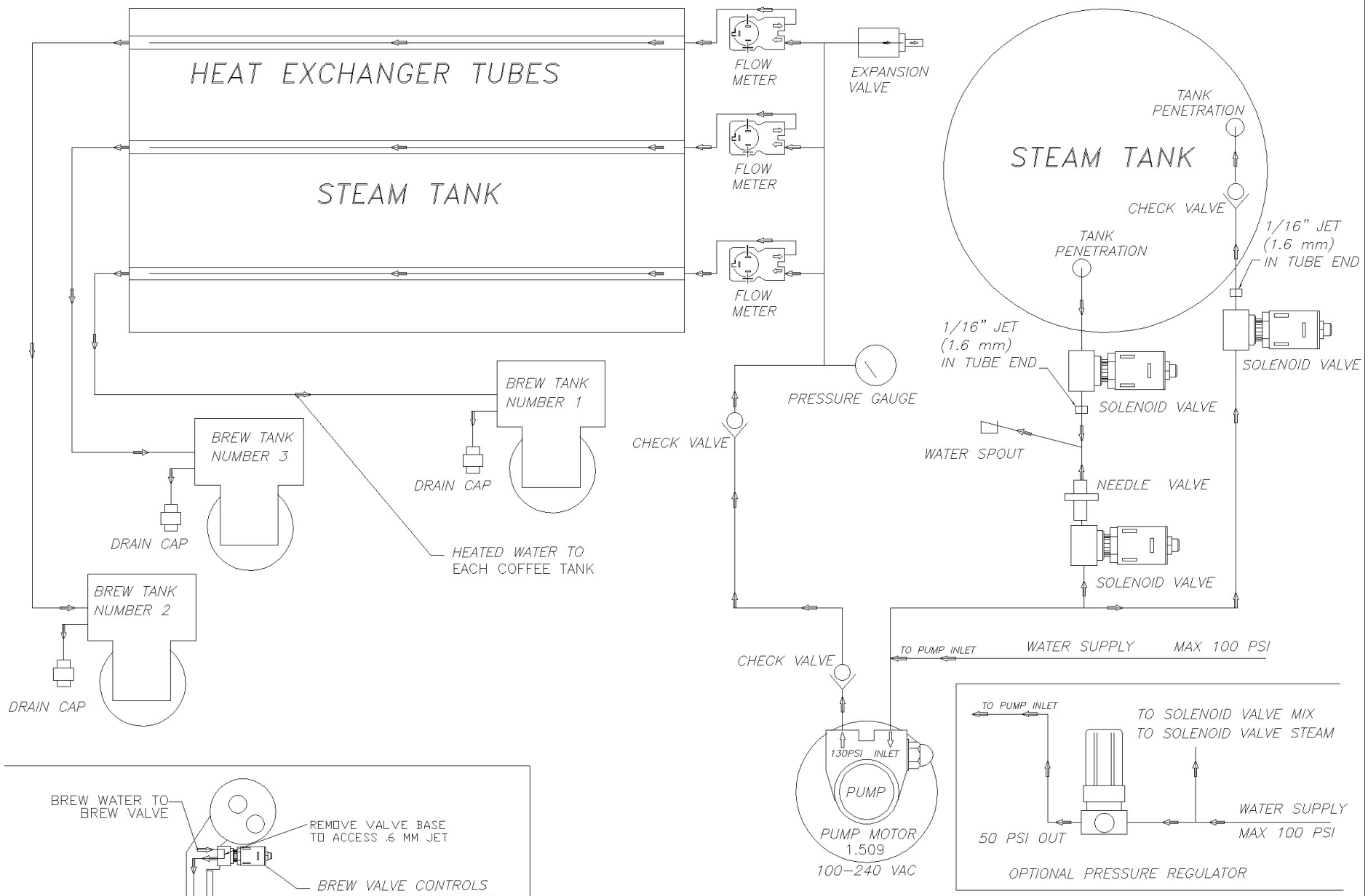


Pump and Motor:

Synesso™ uses a Fluid-o-Tech rotary vane pump which boosts incoming water pressure to 9 bar when the motor is activated. Pressure can be a adjusted by loosening the nut on the right side fitting and then turning the adjustment screw:

Clockwise - Increase pressure

Counter-clockwise - Decrease pressure



PROPRIETARY INFORMATION
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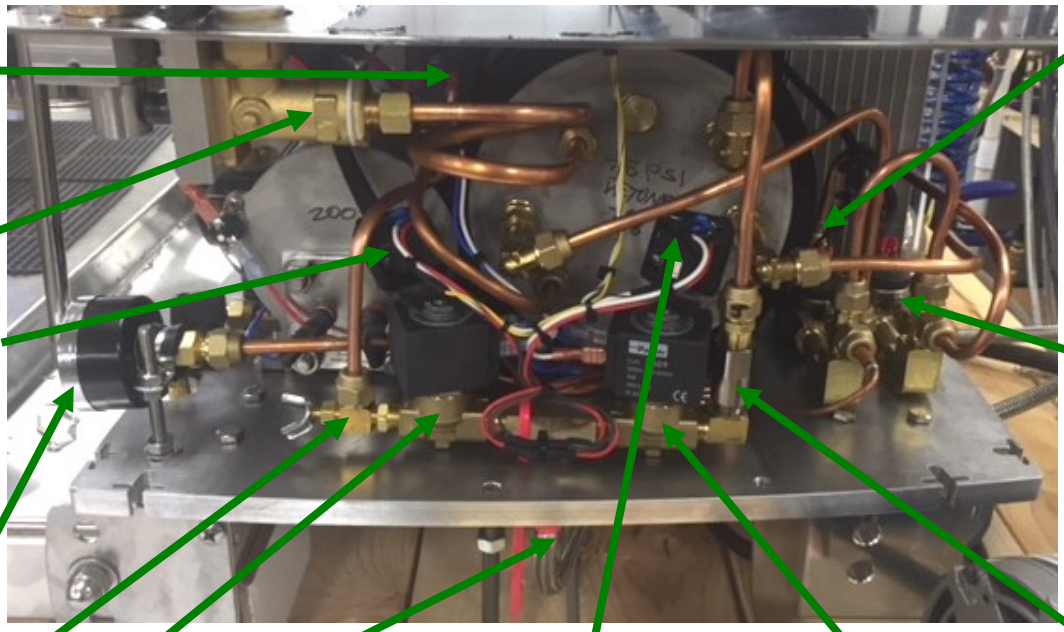
ALL DIMENSIONS IN MILLIMETERS

DRAWN BY:	DATE:	SCALE	DWG. NO.
MB	10-03-18	NOT	1.200300

WATER PATH LAYOUT S200 AND S300

HYDRAULIC SYSTEM

RIGHT SIDE COMPONENTS



Components Explained: (counterclockwise)

Hot Water Valve: Allows hot water to flow to the spout when the hot water solenoid switch is activated.

Steam Valve: When the pin is compressed, the valve allows steam to pass from the tank to the wand.

Solenoid Switch: Low wattage solid state relay controlled by the power board, used to turn valves on/off.

Brew Gauge: The brew gauge shows pressure in the brew system. There is one gauge for the entire brew system, all brew groups are under the same pressure. The gauge can be commonly seen from 3-5 bar (line pressure) to 9 bar (brewing pressure) and up to 12 bar (expansion pressure) at which point the expansion valve releases the excess pressure.

Hot Water Tap Mix Valve: Restricts water from the cold water valve, allowing adjustment of the tap temperature.

Cold Water Valve: Allows line water to flow to the tap, through the mix valve.

Steam Tank Inlet Hose: Input of line pressure water not affected by the pump.

Steam Tank Fill Valve: Allows line water to flow into the steam tank, through the check valve.

Steam Inlet Check Valve: Prevents steam tank water and steam from flowing back into the inlet plumbing.

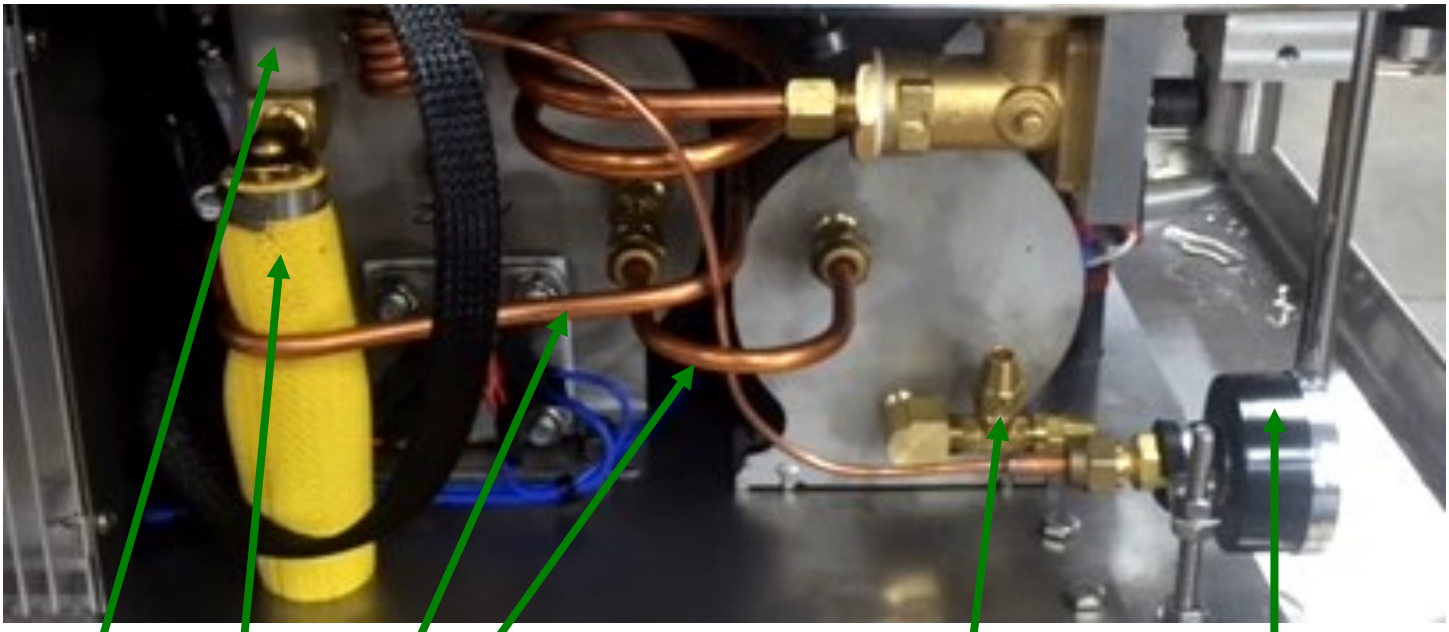
Flowmeters: Use a spinning fan and magnets to measure water flow volume. A central part of the volumetric system.

Brew Tank Check Valve: (Behind flowmeters) Check valves are one-way valves which ensure that pressurized water cannot overwhelm the incoming water pressure and exit the machine through the inlet lines.

Brew Inlet Hose: (Behind flowmeters) Supplies the brew system with water from the pump. This will usually be marked with a grey zip.

HYDRAULIC SYSTEM

LEFT SIDE COMPONENTS



Vacuum Breaker

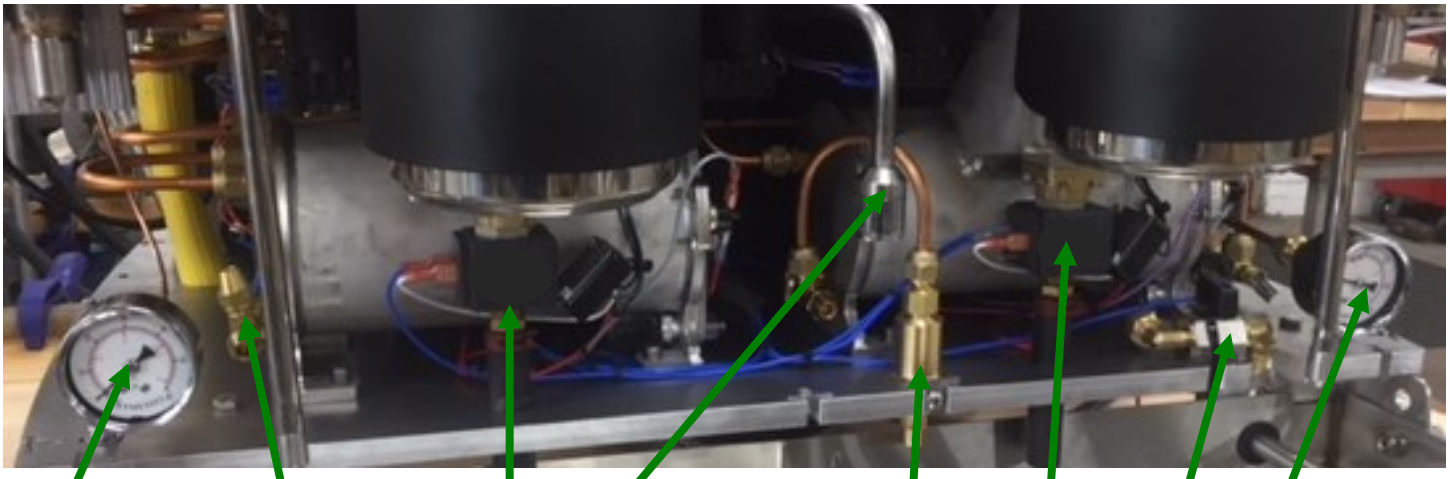
Pressure Relief Valve (inside yellow tube)

Brew Inlet Tubes

Brew Tank Drain Assembly

Steam Tank Pressure Gauge

FRONT SIDE COMPONENTS



Steam Tank Pressure Gauge

Brew Tank Drain Assembly

Hot Water Tap

Expansion Valve

Brew Valves

Steam Tank Drain Ball Valve

Brew Gauge

HYDRAULIC SYSTEM

Components Explained: (Left and Front Sides)

Vacuum Breaker: Prevents steam tank from drawing a vacuum when cooling. Will discharge some steam on heat-up before the valve seals. S Series machines control splatter with a silicone cover.

Pressure Relief Valve: Vents steam tank pressure if it exceeds a safe threshold. May also discharge if tank overfills. Synesso uses a heat resistant (yellow) hose to direct the discharge away from internal components.

Brew Inlet Tubes: Transport water from the heat exchangers to the brew tanks.

Brew Tank Drain: Capped tube connections allow the brew tank to be drained for service or storage.

Steam Tank Pressure Gauge: Indicates the pressure in the steam tank. Should read 1.3 bar at 250F.

Hot Water Tap: dispenses a mix of water from the hot and cold water valves. The aerator is removable.

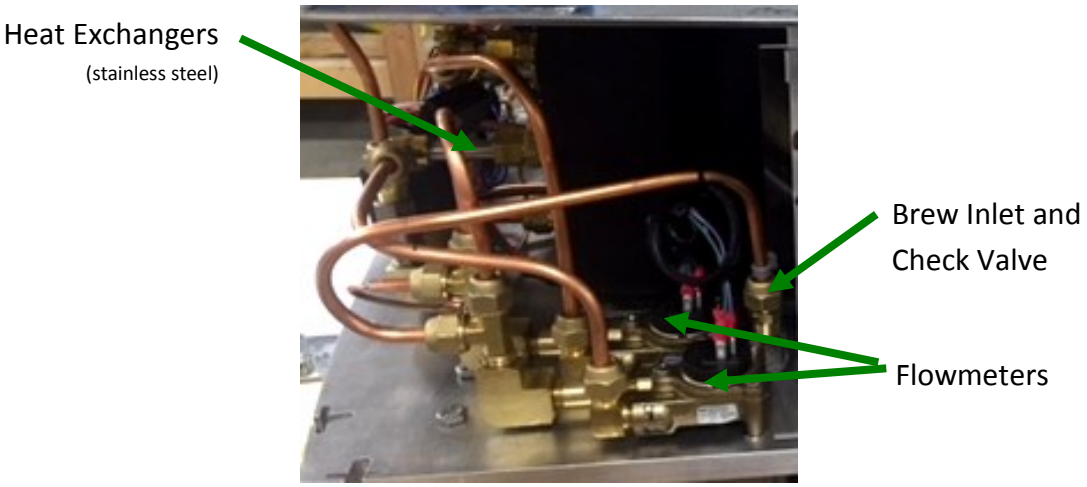
Brew Valves: When open, they allow water to flow from the brew tank to the diffuser. When closed, they vent the diffuser to the brew drain line.

Expansion Valve: Prevents the brew system from generating more than 12 bar water pressure.

Steam Tank Drain Ball Valve: Capped ball valve. Allows the steam tank to be drained for service or storage.

Brew Gauge: indicates current brew system pressure.

REAR COMPONENTS

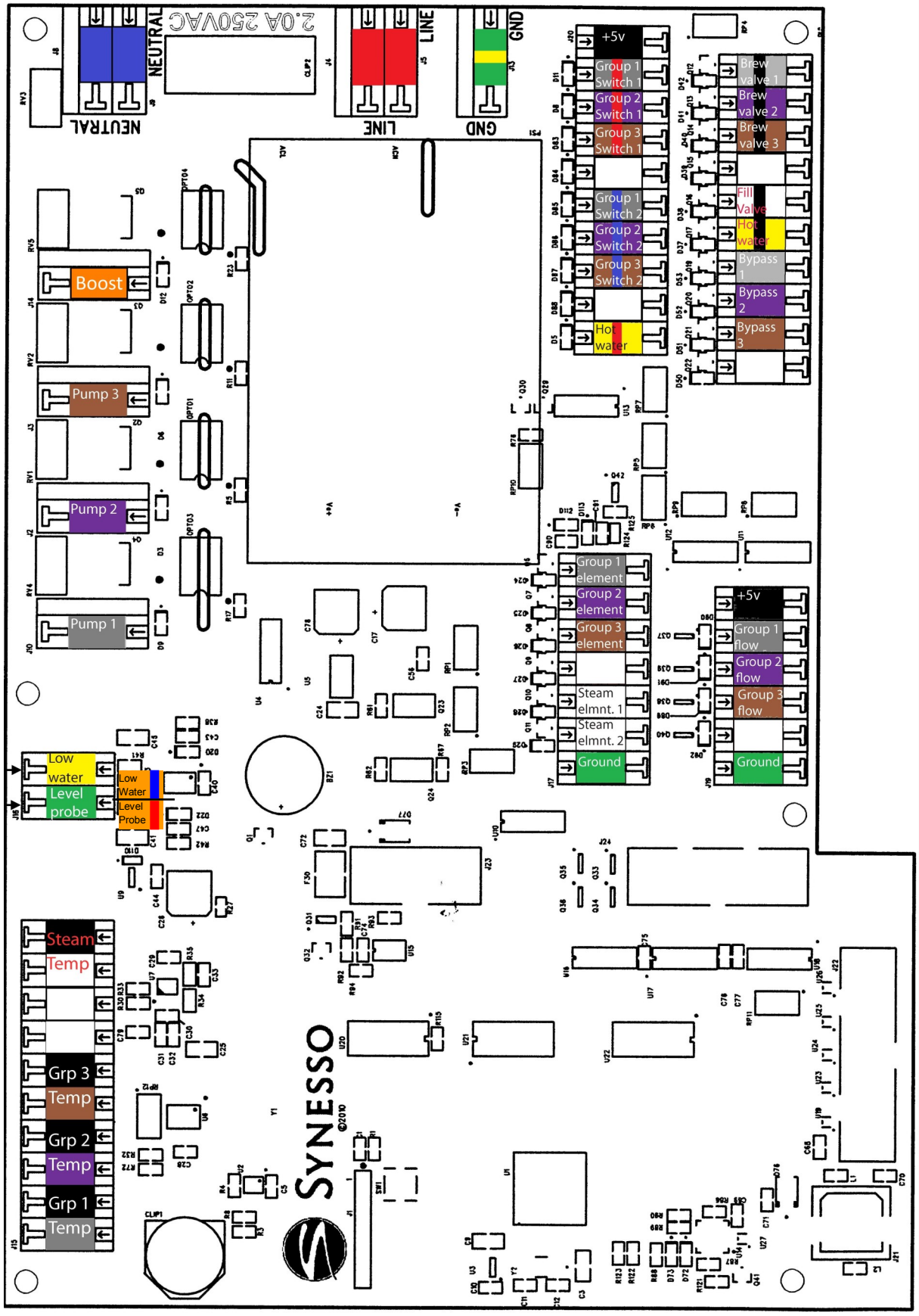


Heat Exchangers: Pre-heats brew water using steam tank heat. Teflon detuning tube is inside, reducing the capacity and increasing stability.

Brew inlet check valve: Allows water to flow from the filter and pump to the flowmeters, but not in the reverse direction. This is important for safety and sanitation.

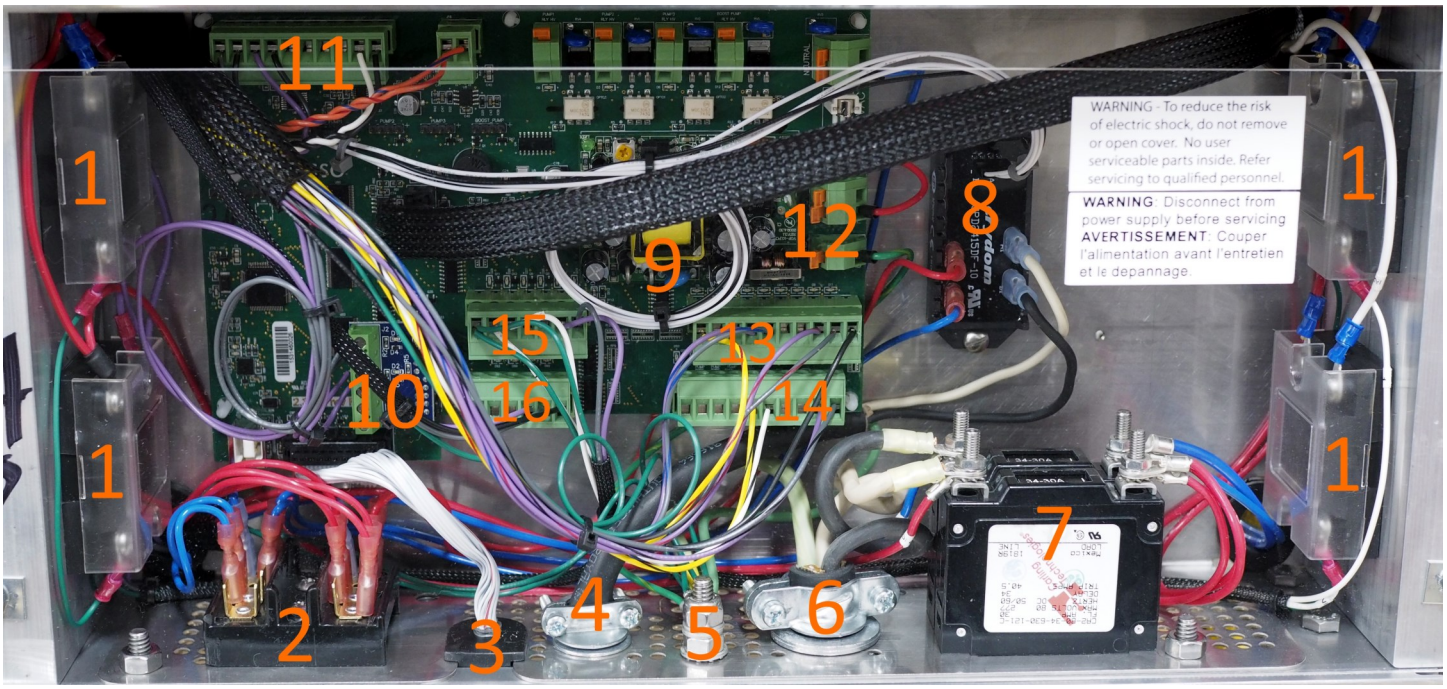
ELECTRICAL SYSTEM

Main Electronics Board



ELECTRICAL SYSTEM - Electrical Panel

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

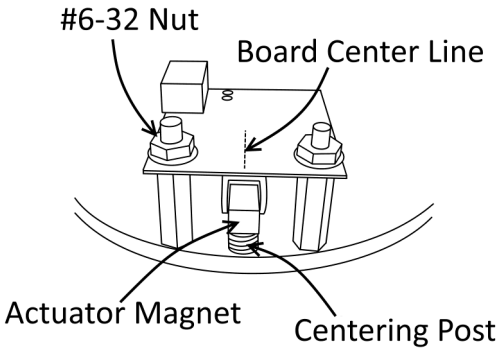


1. **Element Relays:** Relays switch high voltage onto the tank heating elements. Brew on the left, steam on the right. S300 machines have a 3rd brew relay on an overhanging platform (not shown).
2. **Common Junction Block:** A distribution point for un-switched red and blue 220v wires.
3. **Wired Controller Cord:** Secure strain relief prevents ribbon cable separating from power board.
4. **Pump Cord:** The machine provides switched power to run the pump motor. See #8.
5. **Grounding Post:** For all earth ground connections.
6. **Power Cord:** USA configuration shown. 10/3 or 8/3 SOO cord.
7. **Element Breaker:** Disconnects voltage from all heating elements. (shown without c-tick capacitor)
8. **Pump Relay:** Switch high voltage onto the pump motor.
9. **Main Electronics Board:** Controls all automated systems throughout the machine.
10. **Purge Button Board**: Add-on board that allows use of purge buttons on S series machines
11. **Temperature Probe Wires**: As temperature increases, so does the resistance along these lines.
12. **Power Inputs**: 220v power and ground inputs. Fuse is under the black wire bundle.
13. **5v Switch Inputs**: Wires from switches that allow the power board to receive user input.
14. **5v Solenoid Outputs**: wires out to solenoid switches that activate water control and brew valves.

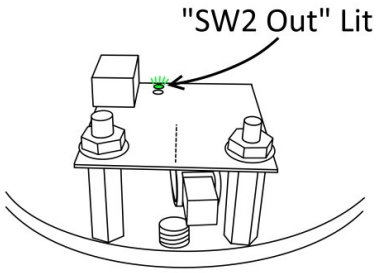
ELECTRICAL SYSTEM

Hall Effect Board Replacement Guide:

1. Turn off machine.
2. Unplug 4-pin connector from back of board.
3. Remove two #6-32 nuts and two #6 washers.
4. Lift board off of mounting posts.
5. Lower replacement board over posts.
6. Replace washers and loosely thread on nuts.
7. Rotate actuator until Actuator Magnet is perfectly centered over Centering Post.

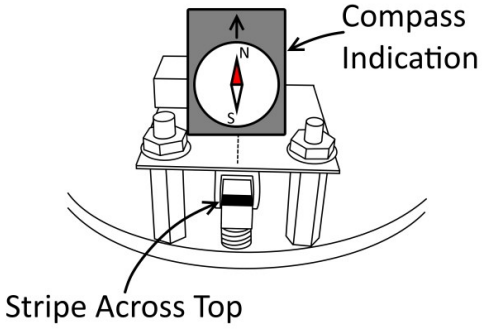


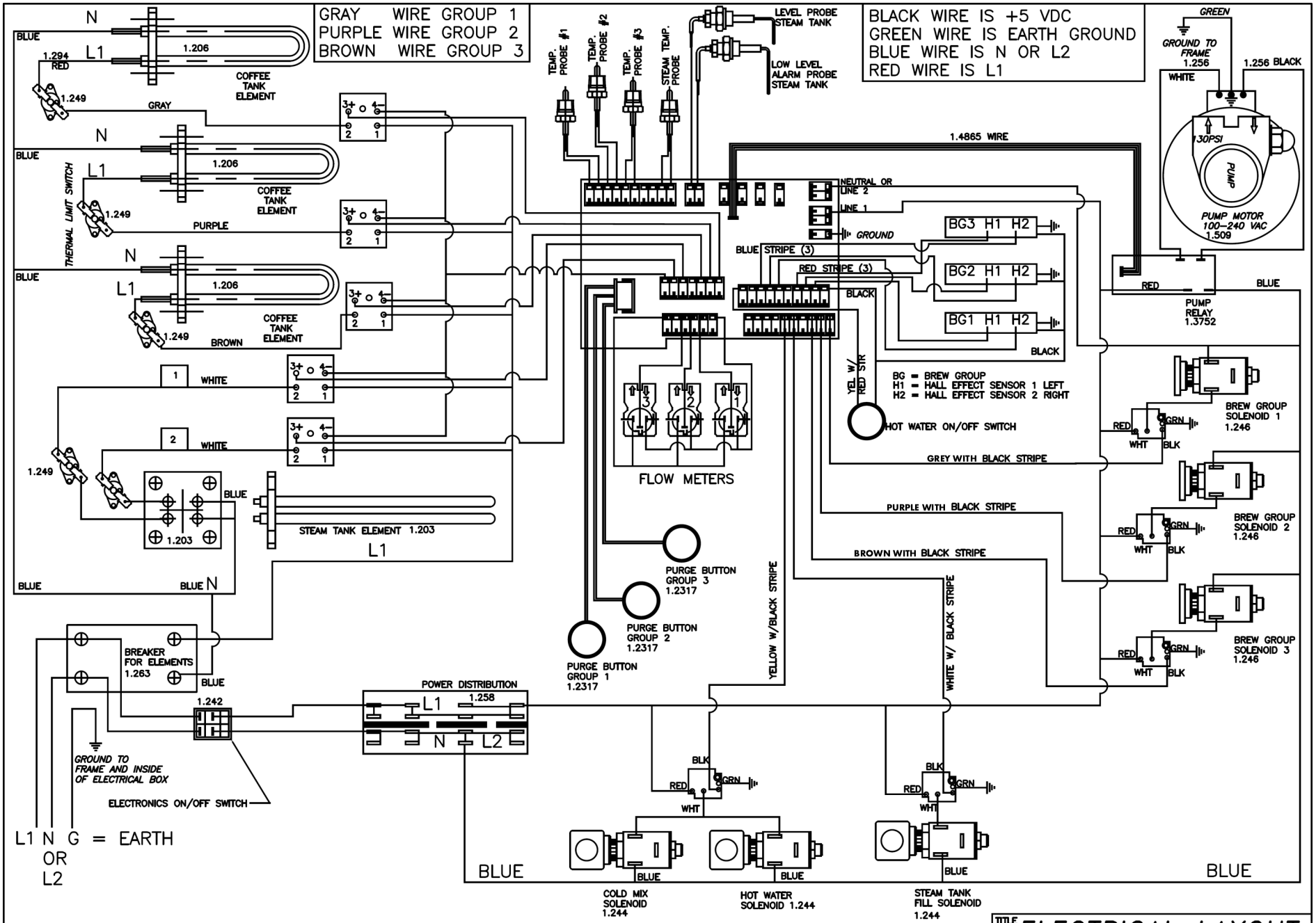
8. Align Board Center Line mark with Actuator Magnet center as closely as possible.
9. Tighten nuts.
10. Reconnect 4-pin connector to new board.
11. Turn machine back on and test trip points as follows:
    a. Very slowly turn actuator clockwise, watching the “SW1 Out” LED towards the back of the board. The LED should light at some point before the actuator magnet reaches the far left position.
    b. Slowly allow the actuator to return to center. The “SW1 Out” LED should turn back off before the actuator reaches its center resting position (note that the actuator will never quite return to the exact center on its own, though it should get fairly close.)
    c. Slowly turn the actuator counter-clockwise, watching the “SW2 Out” LED. The LED should light at some point before the actuator magnet reaches the far right position.
    d. Slowly allow the actuator to return to center. The “SW2 Out” LED should turn back off before the actuator reaches its center resting position.



Actuator Magnet Replacement Note:

For the Hall Effect Board to read the Actuator Magnet position, the magnet must be oriented properly. Replacement magnets will come marked with a solid stripe on the top face of the magnet. Magnet orientation can also be verified with a compass as shown to the right.





REVISION	DESCRIPTION	DATE:	BY

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DRAWN BY:	DATE:	SCALE	DWG. NO.
MB	08-08-18	N/A	1.200300

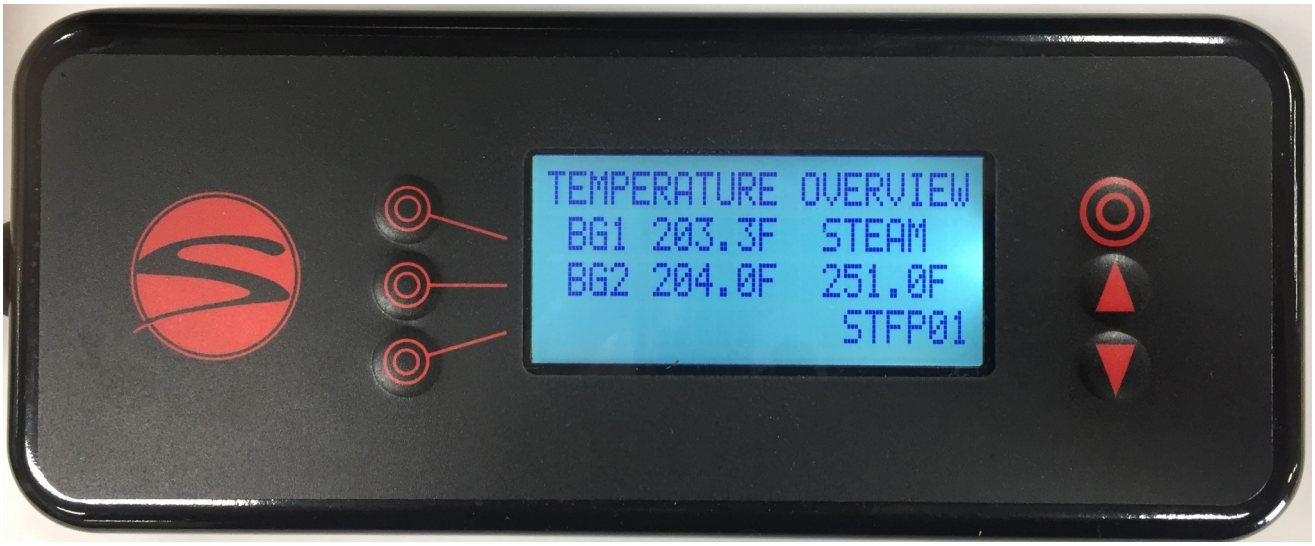
TITLE: ELECTRICAL LAYOUT S200 AND S300

PROGRAMMING

S Series machines have a handheld (wired) controller, pictured below, to allow the user to comfortably view and change the machine settings.

To change settings on these screens, first press the line button on the left side of the display associated with the setting you wish to change. The value will flash once selected. Press the up or down buttons until the desired value is displayed. Press the line button again to confirm the change. The value will stop flashing. Use this procedure to change any variables in the controller menus.

Menu: Temperature Overview



The top line of every screen indicates the title. In this case, Temperature Overview.

You can return to this screen at any time by pressing the home button at the top right of the controller. The machine will also return to this screen automatically after a short time.

Lines 2,3,and 4 may contain information or settings, many of which can be changed by the operator. This screen provides the current temperatures for each brew group along with the steam tank. The most recent error will also be shown in the lower right corner. No settings can be changed on this screen.

In some circumstances, numeric temperatures will not be shown. If a tank is reading 'LOW', this indicates that tank is below the temperature probe's effective range of measurement (170F-270F / 76.6C-132.2C). Readings above the effective range will show as 'HIGH'.

The programmable temperature range for a brew group is from 180F (82.2C) up to 220F (104.4C). The factory set temperature is 203F (95C). To change brew group set temperatures, refer to page 20.

The steam tank is set by the factory to a default setting of 250F (121.1C). To change this temperature, see page 21.

The [STFP01] on the right hand side of line 4 is indicating that the last error detected by the control system was a Steam Tank Fill Probe error. Consult page 23 for more information on error codes. If you see [OK] instead of an error code, the machine has been error-free since the error log was last cleared.

To cycle to the next display screen, press the down arrow button. (You may press the up arrow instead to travel back to the previous screen.)

PROGRAMMING

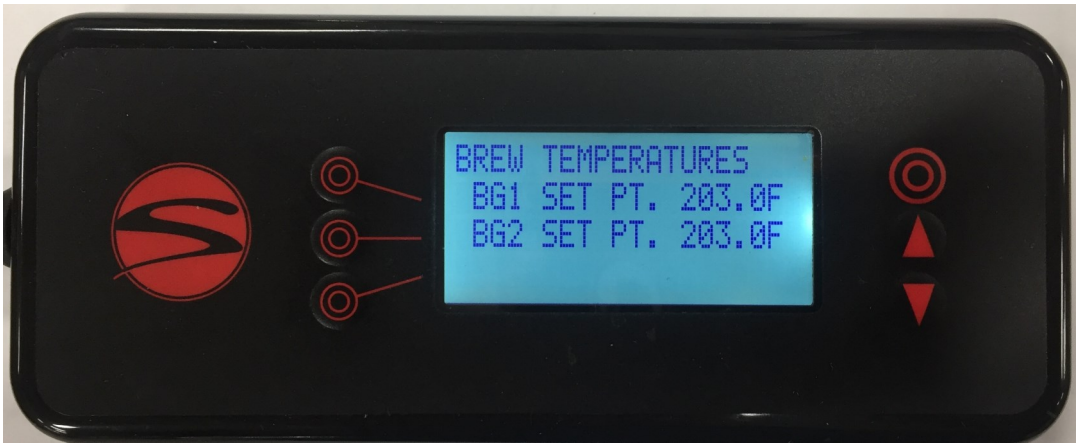
Factory Settings:

The factory settings for your machine are as follows:

Brew Group Temperature	203°F
Steam Tank Temperature	250°F
Program Mode	Universal (2 programs)
Temperature Units	Fahrenheit

Left program:		Right program:	
Pre-Infusion	4 seconds	Pre-Infusion	4 seconds
Total Water Count	280	Total Water Count	380

Menu: Brew Temperatures



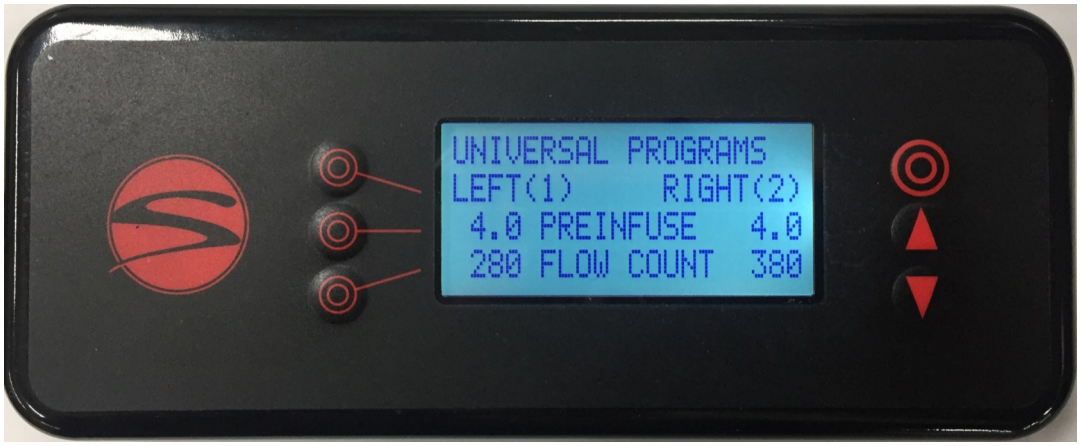
The set point is a goal temperature for the brew tank. The tank will heat to reach the set point, then use a PID based algorithm to remain stable and balanced at that temperature when in use.

Allow 10-15 minutes for a brew group to adjust to a large set point change. Smaller changes take less time to restabilize.

To cycle to the next display screen, press the down button.

PROGRAMMING

Menu: Programs



If the machine has been set to universal program mode, you will be able to change the “Left” and “Right” program, setting the preinfusion time and water count for each. Each brew group will use these programs. This is the default mode.

If the machine has been set to individual program mode, there will be a separate page for the left and right programs on each brew group. This allows the groups to use different programs. This mode can be selected in the 2nd level menu. (See page 30)

To cycle to the next display screen, press the down button.

Menu: Steam Tank and Hot Water Tap



Line 1 shows the current reading of the steam tank temperature probe (250.8F in this example). Once this temperature reaches the set point, the digital display will continuously adjust in small increments as the electronics balance the temperature.

Line 2 is indicating the set point of 250.0F (121.1C). The adjustable set range for the steam tank is between 200F and 265F (93.3C and 129.4C).

Line 3 is showing the hot water tap run time. To avoid excess water use, set this as low as you can.

To cycle to the next display screen, press the down button.

PROGRAMMING

Menu: Purge Button Time



Line 2 indicates the adjustable amount of time that the purge will run before shutting off. This setting is used for all purge buttons.

To cycle to the next display screen, press the down button.

Menu: Auto Backflush



Auto backflush can be activated by pressing the line button associated with the group you want to flush. Set the value to “ready”, then place a portafilter equipped with a blind basket into the selected brew group. Shift left on the group head. The selected group will run the brew valve and motor for 10 seconds, followed by 10 seconds off. This will repeat 5 times. The shot timer will count up to 10 to let you know when it is running. Upon completion, the timer will read 10. Remove the portafilter and thoroughly clean the diffuser screen.

If you have used soap or other cleanser during the backflush, run the backflush process a second time with no soap or chemicals to rinse the internal tubing and brew valve. Failure to rinse after a soap backflush can leave soap residue in the brew valve affecting taste and/or machine behavior.

Any number of brew groups can use the auto backflush feature at the same time. The auto backflush can be interrupted mid-cycle by moving the brew head to either side, pressing the purge button, or by turning the setting on the controller back to “off”.

To cycle back to the temperature overview screen, press the down button.

PROGRAMMING

Menu: Brew System Error Codes



In an effort to prevent damage to machines and to help operators troubleshoot issues, Synesso has engineered several safeguards into the programming. By understanding these codes, operators can remedy issues more quickly. The most recent error can be found on the temperature overview screen at the lower right corner. An error found there is not necessarily happening currently.

BR - Brew System Codes	GROUP 1	GROUP 2	GROUP 3	CODE DESCRIPTION
BV - Brew valve	BRBV01	BRBV02	BRBV02	Brew Valve has been on for 5 consecutive minutes
OT - Over Temp	BROT01	BROT02	BROT02	Over Temperature (220°F)
UT - Under Temp	BRUT01	BRUT02	BRUT02	Group reads < 180°F for 1 minute while reheating
ST - Steam System Codes				
LOW H2O	LOW H2O			Low level probe not in contact with water (audible alarm)
LW - Low Water Probe	STLW00			Indicates past LOW H2O warning
FP - Fill Probe	STFP00			Fill Probe is not in contact with water for 1 minute
FV - Fill Valve	STFV00			Fill Valve has been on for 5 consecutive minutes.
OT - Over Temp	STOT00			Over Temperature (270°F)
VM - Volumetric System Codes				
UF - Unexpected Flow	VMUF01	VMUF02	VMUF02	Unexpected flow detected while group is off

PROGRAMMING

There are 3 levels of menus a technician can access through the wired controller:

Menu level 1 described on pages 14-18 contain settings relevant to the day-to-day operation of the machine-.

Menu level 2 contains settings relevant to technicians and machine owners.

To access menu level 2:

1. **Press the home button (upper right) to return to the temperature overview screen**
2. **Press and hold the home button.**
3. **Press and release the lower left button, then release the home button.**

Menu Level 2: Program Mode



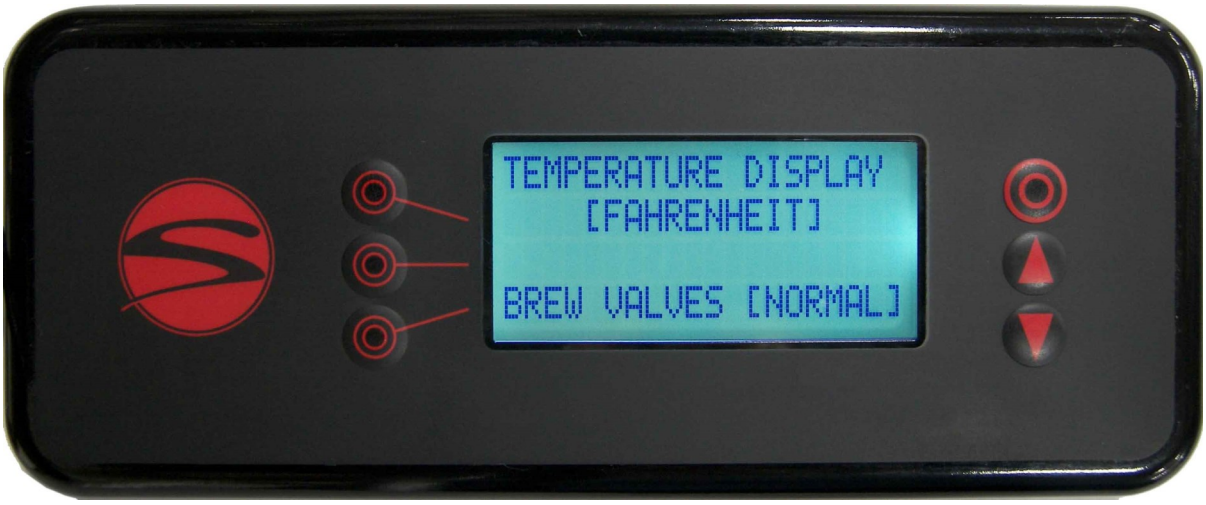
This is the first screen of the 2nd level of menus, the Program Mode select screen.

Line 2 toggles between universal program mode and individual program mode.

In universal mode, the “Left” programs on both groups are the same. Both the “Right” programs are the same as well.

In individual program mode, the “Left” and “Right” programs on group 1 are not tied to group 2’s programs.

Menu Level 2: Temperature (F or C)



This is the temperature display screen.

Line 2 indicates the temperature scale that you are currently in (Fahrenheit or Celsius).

Line 4 indicates the operation status of the machine’s brew valves.

PROGRAMMING

Note on Brew Valve Setting

Setting the brew valve function to [ON] will activate all the brew valves, allowing the pressure to be bled from the brew tanks. Before draining the tanks, turn off the heating element breaker. Once the pressure has dropped, turn the brew valve setting back to [NORMAL] and attach the appropriate drain hose to the brew group's drain fitting. Turn the brew valve setting back [ON] once the drain hoses are securely attached. This will allow the water in the brew groups to fully drain in approximately 5 minutes. When the brew groups are finished draining, set the Brew Valve indicator back to the [NORMAL] setting. If the draining process takes longer than 5 minutes, the machine's safety programming will automatically turn the brew Valve indicator to the [NORMAL] setting while exiting back to the temperature overview screen. If more time is needed, return to the Temperature Display screen and set the Brew Valve display back to the [ON] position to finish the procedure. Once finished with the draining procedures, make sure the Brew Valve indicator is set back to the [NORMAL] position.

Menu Level 2: Line Pressure Boost



If the machine has an optional line pressure boost pump installed, you will see this menu screen, otherwise it will not be shown.

"AUTO" is the setting on line 2 for normal operation. In "AUTO" mode, whenever a brew valve or water control valve is activated, the power board will also trigger a pump relay to run a line pressure generating pump and motor package. If this is set to "OFF", the line boost motor will not activate. The "ON" setting will run the boost motor constantly. This is factory set to "OFF" to protect the boost pump from running without water.

PROGRAMMING

Menu Level 2: Brew Offset



Line 2 indicates the measured water temperature at the selected brew group's temperature probe.

Line 3 indicates the temperature adjustment made at the Synesso factory, in order to match the measured temperature with the temperature desired inside the puck.

The Synesso Temperature Testing Method

Using a bottomless portafilter, dispense 16-18 grams of coffee into a 14 gram basket with a thermal probe inserted 1/8th of an inch from the surface and in the middle of the puck, packing and tamping the grounds in the basket as usual.

The thermal probe is then wired to a calibrated FLUKE thermometer to relay the actual temperature of the water flowing through the puck while pouring a 25 second, 2 ounce shot. This process is repeated a minimum of 3 times per brew group in order to get the most accurate readings. The difference between the measured puck temperature and the raw tank temperature becomes the brew offset

This offset should not be altered without thoroughly testing the puck temperature, as described.

PROGRAMMING

Menu Level 2: Steam Offset

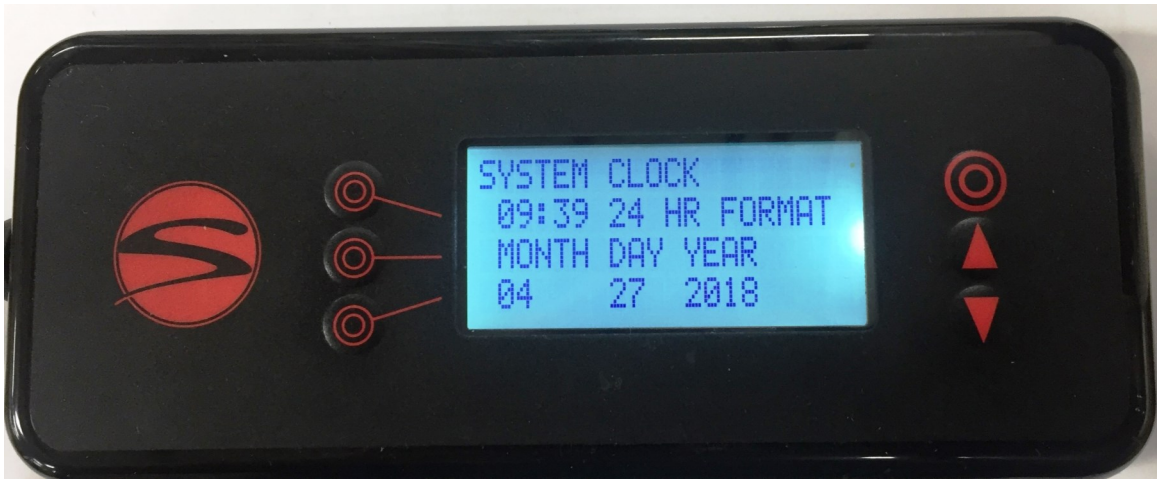


Line 2 indicates the measured steam temperature at the steam tank temperature probe.

Line 3 is the offset used to calibrate the steam tank temperature and pressure so that when the steam tank is set at 250f, there is about 1bar pressure on the gauge.

Line 4 of this display screen is showing a 5 second delay. The fill probe will wait this long before turning the steam tank fill valve on or off. Add time here if the machine is in an unstable installation such as a food truck or catering cart. There is no need to drop this time below 5 seconds.

Menu Level 2: System Clock



This is the system clock screen.

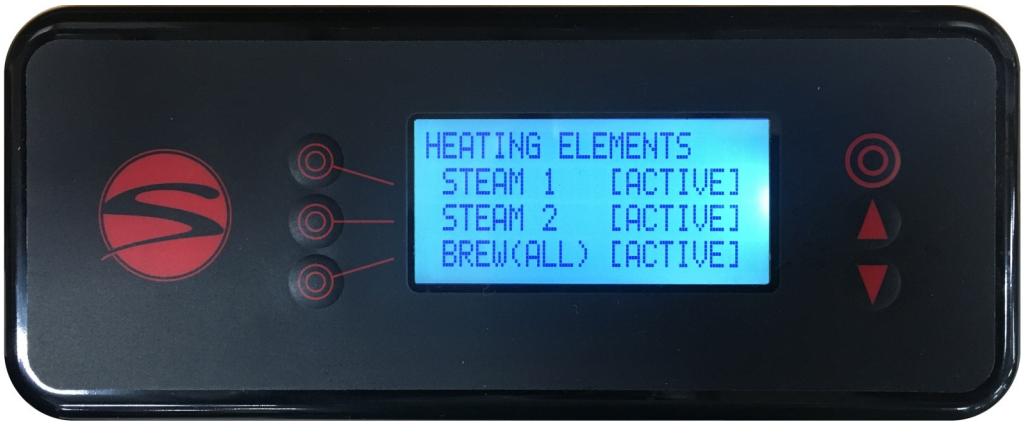
Line 2 allows the operator to set the local time in a 24 hour format.

Line 3 and 4 allow the operator to set the current date.

The date and time are used for the error log. A small battery on the power board should keep the clock and calendar running if the machine loses power, but it will need to be replaced eventually. Refer to the markings on the battery for replacement info.

PROGRAMMING

Menu Level 2: Heating Elements



The steam element requires a lot of power to heat. We split the load onto 2 parallel circuits, each with their own relay, which can be deactivated independently here. This is useful for some troubleshooting.

Leave both lines in ACTIVE mode unless circumstances warrant.

You may also turn off the brew elements. This is helpful when cooling the machine or troubleshooting. Leave the brew elements active under normal circumstances.

Menu Level 2: Error Log



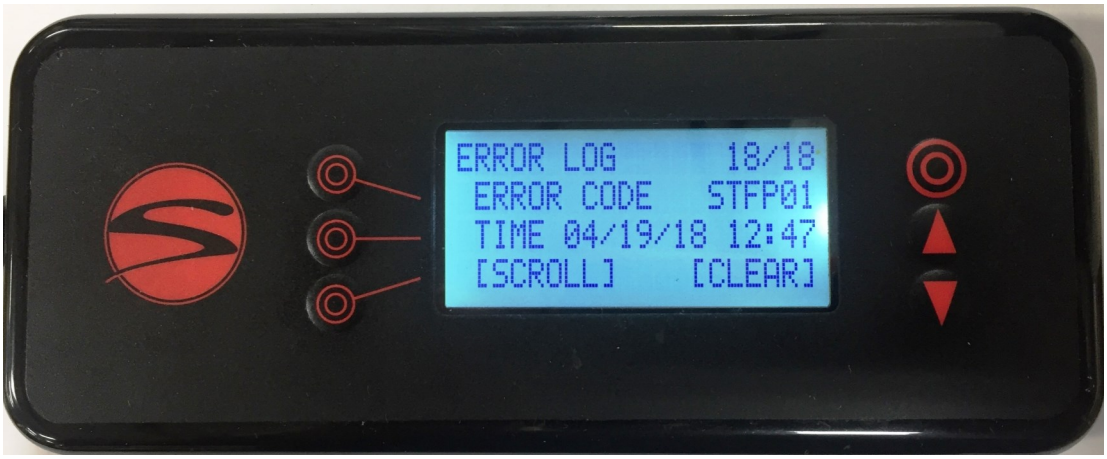
Line 1 of the error log screen shows how many errors the machine has recorded, up to the 35 most recent errors, and which of these you are currently viewing. This example is showing the second of two errors.

Line 2 indicates the error code. If the error log is clear, this line will simply read ‘NO ERRORS’

Line 3 indicates the date and time that the last error has occurred. If no error has occurred, this line will be blank.

Line 4 gives the option to scroll through or clear the error log. To view older errors, press the 4th line button once, which will make [SCROLL] flash. Use the up and down buttons to change the viewed error. Press the 4th line button again and [CLEAR] will begin flashing instead of [SCROLL]. Press the 4th line button again to deselect both options.

Menu Level 2: Error Log



To clear the Error Log, press the 4th line button 2 times so that [CLEAR] is flashing. Press an arrow button to select clear. The 4th line will ask you to confirm clearing the error log as shown below.

Change the flashing [NO] to [YES] to immediately clear the log. Press the 4th line button with [NO] still flashing to exit without clearing the log.

See **page 29** for descriptions of the error codes you may see.

Menu Level 2: Return to Operations



This is the last screen in the second level of menus.

Pressing the 3rd line button will take you back to the temperature overview screen in the 1st level of menus.

Access to the 3rd level of menus is only available from this screen.

Menu level 3 contains machine configuration settings which do not change over the life of the machine. Technicians will need to access this level only if some major modification has been preformed, or if the main electronics board has been replaced.

To access menu level 3, press and hold the home button. Press and release the 4th line button, then release the home button.

MAINTENANCE

MAINTENANCE SCHEDULE

Daily

1. Backflush each brew group without detergent throughout the day.

2. Backflush with an espresso industry approved detergent during the final cleaning of the night (or after a busy period), and then again without detergent to rinse. **Do not remove screens until after backflush**. **Running a backflush without screens in place can cause the group to be clogged**.

3. Wipe down the entire machine with a soft cloth.

4. Remove portafilters, baskets and springs, and drip grate to clean thoroughly. These items are all dishwasher safe.

5. Slowly pour a pitcher of hot water down the drain to clear grounds debris and prevent blockage.

Weekly

1. Soak portafilters and the removed filter baskets in an approved espresso industry detergent and water solution overnight. Rinse thoroughly before reassembling and using your portafilters.

2. After backflushing, carefully remove screens from each brew group using a short handled screwdriver and soak overnight in a similar solution as the portafilters.

3. 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.

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.

Synesso recommends that you contact your distributor or service agent for periodic maintenance. The frequency of maintenance visits will depend on a variety of factors including how much use the machine receives, but at least one preventative maintenance visit a year is required to maintain the extended warranty. See page 39. During this yearly service, all body panels must be removed and all connections both electrical and hydraulic must be inspected. Small problems can become large if not caught early.

MAINTENANCE

DAILY MAINTENANCE

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

Backflushing

This process forces water through the inlet tube and drain system. This should be performed on EACH brew group daily.

To Backflush:

1. Replace the filter basket with the 'blind' basket, which has no filter holes.

2. Engage the portafilter, then follow the instructions on **page 17** to use the auto backflush function.

3. When using an approved espresso industry detergent during backflushing, follow the manufacturer's instructions. It is extremely important to thoroughly rinse the blind filter basket and repeat backflushing several times with clean water to clear the system of any detergent residue. Failure to rinse can cause valve problems and bad flavor.

NOTE: NEVER remove the screen and screw when backflushing. Remove and clean them after backflushing is complete. Do not forget to reinstall.

General machine cleaning

1. Clean the surface of the machine using a soft damp cloth. Avoid using abrasive cleaners or cleansing pads. A "micro-fiber" towel is recommended to avoid scratches.

2. Make sure the steam wands and tips are free of milk build-up. It is always best to clean the steam wand and tip after each use. Approved espresso industry cleaners can be used to dissolve milk build-up. Tips can be removed to soak.

3. The drip tray, drip tray grate, and portafilters should be removed and cleaned every day. If you clean the portafilters in the dishwasher, first remove the filter baskets and springs before washing.

Wood and Water

Wood accents should be wiped down with a damp rag to clean. Do not soak or soap wood. Never place wood products in the dishwasher! Treat wood with food safe oil or wax quarterly or more often if the surface appears dry.

Quarterly Preventative Maintenance Guide

- **Replace portafilter gaskets**
  - 8.4mm - 1.3440 (standard size)
  - 9.0mm - 1.3430 (for older handles with worn ears)
- **Inspect and replace group diffuser screens if worn or damaged**
  - Synesso reinforced screen - 1.3292
- **Inspect portafilter baskets for wear or damage. Replace if necessary**
  - 14 gram basket - 1.7000
  - 18 gram basket - 1.7090
  - 21 gram basket - 1.7170
- **Inspect and rebuild or steam valves if signs of leaking. Clean and lubricate wand pivot ball and pusher face**
  - Rebuild kit - 1.7320
  - Complete valve - 1.4501
  - Remove and clean steam tips
- **Check flow rate at each brew group. Minimum 2oz in 6-8 seconds**
- **Check that expansion valve does not leak at 9 bar. 11-12 bar is the factory standard setting**
  - Expansion valve - 1.4070
- **Check line, bypass, and pump pressures**
- **Inspect steam tank vacuum breaker. Replace if signs of leaking**
  - Vacuum breaker - 1.4265
- **Inspect steam tank pressure relief valve (dark spots may indicate leaking). Replace if signs of leaking**
  - Pressure relief valve - 1.4100
- **Depressurize steam and brew systems, check that gauges return to zero. Replace if not accurate**
  - 0-60psi steam gauge - 1.4083
  - 0-300psi brew gauge - 1.3373
- **Remove and inspect level probes. Clean scale if necessary**
  - Upper level probe (fill probe) - 1.4111
  - Lower (safety) probe - 1.4112
- **Inspect drain hose for clogs or leaks**
- **Check steam handles for grit, friction, or contacts. Lubricate and adjust as needed**
- **Test handheld controller for proper operation. All buttons react as normal**

Annual Warranty Checklist

To qualify for the Synesso 2 and 5 year warranty, this checklist must be returned the Synesso within 30 days of 1 year in service.

☐ **Replace portafilter gaskets**

8.4mm	1.3440 (standard size)
9.0mm	1.3430 (for older handles with worn ears)

☐ **Replace group diffuser screens**

Synesso reinforced screen	1.3292

☐ **Inspect portafilter baskets for wear or damage. Replace if necessary**

14 gram basket	1.7000
18 gram basket	1.7090
21 gram basket	1.7170

☐ **Rebuild or replace steam valves. Clean and lubricate wand pivot ball and pusher face**

Rebuild kit	1.7320
Complete valve	1.4501
Remove and clean steam tips	

☐ **Remove side and splash panels, inspect tanks, copper tubes, and all fittings for leaks**

☐ **Inspect and replace all ruby flow restrictors and brew valves**

Ruby jet replacement kit	1.3191
Brew valve	1.2460

☐ **Check flow rate at each brew group. 2oz water in 6-8 seconds**

☐ **Test consistency and accuracy of volumetrics across all groups**

☐ **Check that expansion valve does not leak at 9bar. 11-12 bar is the factory standard setting**

Expansion valve	1.4070

☐ **Check line, bypass, and pump pressures**

☐ **Replace steam tank vacuum breaker**

Vacuum breaker	1.4265

☐ **Inspect steam tank pressure relief valve (dark spots may indicate leaking). Replace if signs of leaking**.

Pressure relief valve	1.4100

☐ **Depressurize steam and brew systems, check that gauges return to zero. Replace if not accurate.**

0-60psi steam gauge	1.4083
0-300psi brew gauge	1.3373

☐ **Remove and inspect level probes. Clean scale build up if necessary**

Upper level probe (fill probe)	1.4111
Lower (safety) probe	1.4112

☐ **Inspect drain hose for clogs or leaks**

☐ **Check element gaskets for signs of leaking, tighten if needed**

☐ **Test handheld controller for proper operation. All buttons react as normal**

☐ **Test steam tank element set points. Cycle each loop of element**

TROUBLESHOOTING GUIDE

This is a guide for some of the common issues that operators might encounter. For more detailed assistance with technical issues, contact your distributor or a local service agent.

The machine may be reset by powering off for 30 seconds.

The shot is too slow:

- Tamp pressure was too firm
- Too much coffee is in the basket
- The grind is too fine
- Diffusion screens are clogged; clean or replace
- Pump pressure is too low. Ensure that it is set between 8-9.5 bar
- Ruby brew jet is clogged; when operating properly, 60ml should flow out within 8 seconds

The shot is too fast:

- Tamp pressure is too light
- Not enough coffee in the basket
- Grind is too coarse
- Portafilter baskets are worn or cracked; replace
- Brew temperature is too cold

Crema is thin with large bubbles and tastes astringent:

- Coffee is old
- Grinder burrs are dull
- Brew temperature may be set too low

Diffuser screen is loose

- Too much coffee in the basket has distorted the screen. Remove it and readjust or replace.
- Screw is loose. Remove and clean screw, check hole for coffee grounds.

No (or low) pump pressure when water flows from the group:

- The pump does not run during preinfusion, check that the preinfusion time is correct
- Check that the expansion valve is not discharging water while the pump runs. If it does, adjust or replace the expansion valve.
- Water filter may be clogged / old.
- Motor, Pump, or motor relay may have failed, further troubleshooting is required.

The pump engages, produces pressure but no water is dispensed:

- Soap residue not fully flushed after cleaning has glued the valve closed (tap the valve body gently).
- Flow restrictor jet is clogged
- Brew valve has failed

TROUBLESHOOTING

Readout for Brew Water Temperature Varies by a Few Degrees:

- The energy from the heating element and the tube for the preheated incoming water are within 1” or 25mm from the location of the temperature sensing probe in the coffee tank. The water 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. Meaning, the readout can show a temperature of a few degrees above your set point, and may fluctuate due to the heat from the element or heat exchanger, but your brew water is actually at the set point.

Shot stops early:

- Check set volume. Adding ~4.5 counts will add about 1ml (1g) to the shot output.
- If expansion valve or brew valves leak during a shot, total shot volume will drop as well.

Shot runs too long or does not stop:

- Check set volume.
- Flowmeters may be malfunctioning, clean or replace.

All temperatures read LOW:

- Check to make sure the element breaker is ON. Tanks will read low until the temperature in that tank reaches 175° F. Please allow 20-30 minutes to heat up initially.

Drip at the Steam Wand Tip:

- Steam valve seal is worn. Replace by installing steam valve rebuilt kit.
- Steam valve is filled with milk residue. Disassemble steam valve and clean.

Wand is Hard to Move or Sticky:

- Remove wand at the nut, clean and lubricate moving parts with food grade grease

Sudden loss of steam pressure:

- Check the element breaker underneath the machine to make sure the heating elements are ON.
- Hot water tap has been overused. Allow the machine time to recover pressure.
- Check temperature settings to make sure they are high enough for your application.
- If machine is also beeping, check the steam tank water level.

Steam Tank is overfilling:

- Debris caught in the water control valve or worn out valve.
- Calcium deposits on the fill probe are preventing the probe from detecting the water level.

Steam Valve Stem Seals Leak:

- Replace O-rings. Purchase Rebuild Kit

Category	Symptom	Possible Reasons & Solutions
Brew Pressure or Flow	Brew Gauge Reads 11 to 12 Bar when Machine is Not Brewing	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.
	Brew Pressure is Low	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. 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. Check pump to make sure pressure is properly set. Water supply hose to the pump may be kinked Water filter may be plugged. Check and replace if necessary

Category	Symptom	Possible Reasons & Solutions
Brew Pressure or Flow	No Brew Pressure, Pump Motor is Running	Failed pump, needs to be replaced
		The line between the pump and the water supply may be collapsed or kinked.
		Water filter may be clogged and should be changed
		Brew valve may have timed out.(BRBV0#) Turn brew group off to reset.
	No Brew Pressure, Pump Motor is NOT Running	Brew Solenoid is stuck closed (may be caused by soap residue not fully flushed after cleaning)
		Brew Solenoid coil may have failed. Check that coil magnetizes when group is in preinfuse and brew positions.
		Jet may be plugged. See Jet Clearing Procedure
		Water filter may be plugged. Check and Replace if necessary
		Brew valve may have timed out.(BRBV0#) Turn brew group off to reset
	Slow Water Flow (more than 10 seconds to pour 2 ounces of water)	Debris is stuck in the water flow restrictor jet. See Jet Cleaning Procedure.
		Water filter may be clogged and should be changed
	Brew Gauge Flutters or Vibrates	Water is in the gauge or tube. Remove the gauge and tube, blow out the water, and reinstall.
Brew Temperature	Readout for Brew Water Temperature Varies by a Few Degrees	Water and steel both take a short time to absorb and distribute heat. This allows the electronics to show readings that fluctuate around the set point. The temperature probe is in a volatile part of the tank in order to notice changes in temp as early as possible. 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

Category	Symptom	Possible Reasons & Solutions
Brew Temperature	Brew Temperature Reads Low (error: BRUT0#)	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.
		Check that the element breaker is in the ON position
		Check that the fuse on the power board, as well as the relay, are both functioning properly
		Check that the brew tank thermal overload switch has not been tripped
		Check that the connection to the temperature probe is intact and secure
		Make sure the set point has not been changed
	Brew Temperature Reads High (error: BROT0#)	Display temperature will climb during brewing as hot 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
		Make sure the set point has not been changed
		Check that the relay is functioning properly
		Brew tank may be leaking. Check brew valve and fittings
Steam Pressure	Steam Pressure is set for 1.8 Bar or Higher	Pressure over 2.0bar is possible, 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 for the preheated brew water to be too hot and cause some erratic brew temperature spikes.
	Sudden loss of Steam Pressure	Too much hot water has been used for Tea, Americano, rinsing, or warming cups while still steaming milk. Allow the machine to recover. Watch steam gauge, when pressure drops, allow the heating elements to heat the cold water being introduced into the steam tank
		Check to make sure all Set points, especially steam tank settings, are accurate and functioning
		Check that the element breaker on the electrical box is in the ON position
	Steam Tank is not filling (error: STFP01)	Check for STFV01 error, which indicates the tank has been filling for over 5 minutes. If so, power cycle machine, check inlet hoses for kinks/pinches, check filter
		Debris caught in the water control valve or worn out valve

Category	Symptom	Possible Reasons & Solutions
Steam Pressure		Water level probe needs to be de-scaled or cleaned. This probe is located behind the left side panel
		Make sure level probe is working. See Test Level Probe
	Steam Valve Stem Seals Leak	Replace O-Rings. Purchase Rebuild Kit. See Steam Valve Rebuild instructions for more info
	Auto Fill Valve (Solenoid) is turning OFF and On without Filling the Steam Tank	Check that the water to the machine has not been cut off or restricted
		Confirm that auto fill delay is set to at least 5 seconds.
		See Programming Guide
		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
		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
		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
	Water Level in the Steam Tank is either too High or too Low	Water level probe (auto fill) needs to be de-scaled or cleaned. This probe is located behind the left side panel
		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

Category	Symptom	Possible Reasons & Solutions
		Machine is not level. Check to make sure the surface that holds the machine is level.
		Debris is stuck in the water control fill valve. See Water Control Valves
	Steam Tank is Slow to Recover Pressure	Test first steam loop (S1) functionality: • Turn off Loop 2 so only Loop 1 is active • Turn up steam set point by a few degrees and confirm that the temperature rises to the new set point. • If the temperature has risen, then S1 is functioning properly
		Test S2 functionality. See S1 test above for instructions
		If either zone is not working properly, then see “Cold Zone” and “Tanks will Not Heat to Full Temperature” in the Electronics section
		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
Steam Wand	Drip at the Steam Wand Tip	Steam valve seal is worn. Replace by installing steam valve rebuilt kit
		Steam valve handle needs to be adjusted. See Steam Valve Handle Adjustment
		Steam valve is filled with milk residue. Disassemble steam valve and clean
	Water bubbles out around wand pivot ball	Wand ball o-ring is worn, replace with new Teflon o-ring from steam valve rebuild kit
	Wand is Hard to Move or Sticky	Remove wand mounting nut, clean and lubricate wand ball with food grade grease, replace wand ball o-ring
	Steam Valve does not Open Fully	Steam valve handle needs to be adjusted. See Steam Valve Handle Adjustment
Hot Water Tap	No Water Flows When the Switch is On	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
	Only Cold Water Flows when Switch is On	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
	Only Hot Water Flows when Switch is On	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
		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

Category	Symptom	Possible Reasons & Solutions
Electronics	All tanks read LOW	Check to make sure the element breaker is ON. Tanks will read LOW until the temperature in that zone reaches 175° F (79.4 C)
	An individual tank reads LOW	Test the connections at the temperature probe and power board
		Test thermal overload (over temperature) switch
		[DISCONNECT POWER TO THE MACHINE FOR THIS TEST] Test continuity from the heating element posts to ground, and the resistance between the posts
		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
	An Individual tank reads high, but the tank is cooling	Test the connections to the probe
		Test probe for failure with ohm meter and compare reading to neighboring probe
	Tanks will Not Heat to Full Temperature	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
	Handheld Display is Blank	Power cycle the machine. If that does not fix the display, open the display casing and re-seat the ribbon cable, then power cycle the machine again.
Heating Elements	Testing Heating Elements	**DISCONNECT MACHINE FROM POWER SUPPLY BEFORE TESTING**
		Test with an ohm meter across the element posts:

Voltage	Wattage	Ohms
220v	700	64 to 72
220v	4000	23 to 26 each loop
220v	5000	18 to 22 each loop

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

Category	Symptom	Possible Reasons & Solutions
Leaks	Hot Water Tap	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
		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
	Steam Wand	A small amount of water will accumulate in the steam wand between uses. This is normal for any machine. Make a habit of purging the steam wand before and directly after steaming a pitcher of milk
		If the steam wand constantly drips and is warm to the touch even after an extended time without use, obtain and install a steam valve rebuild kit from your dealer, service representative, or the Synesso™factory
		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.
		If water leaks from the steam valve pushrod into the machine, o-rings on the pushrod are worn and need to be replaced. These o-rings are included in the steam valve rebuild kit.
	Brew Groups	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
		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
	General	Dirty / brown water under the machine indicates the drain box is clogged or overloaded. Remove the drip tray 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
		A small amount of water may splash onto 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
		Clean water under the machine or on top of the electrical box may indicate an internal leak. Remove the outer panels until the source of the water is determined. Contact your dealer, service representative, or the Synesso™factory for more info on fixing any specific leak.

Category	Symptom	Possible Reasons & Solutions
	Vacuum Breaker	It is normal for the VB to sputter until the steam tank is near full pressure. If leaking continues more than 1 minute, replace the VB.
General	Coffee Crema is Thin with Large Bubbles & Tastes Astringent	Grinder burrs are dull. Replace immediately
		Coffee is old
		Brew temperature may be set too low
	Beeping Machine	Low Water error (STLW01). Steam tank is not filling correctly. Cycle power to clear 5 minute time out if required
	Portafilter	Portafilter “ears” will wear over time allowing the handle to swing further before the basket is fully engaged. Use of taller gaskets (9.0mm) will extend the usable life of the portafilter. Ask your dealer, service provider, or the Synesso™factory for more info
	Diffuser Screen is Loose	Often caused by over filling the portafilter basket. The expanding coffee puck then pushes against and distorts the screen. If this becomes a problem, try a larger basket or fewer grounds.
		DO NOT OVERTIGHTEN OR CROSS-THREAD SCREW!