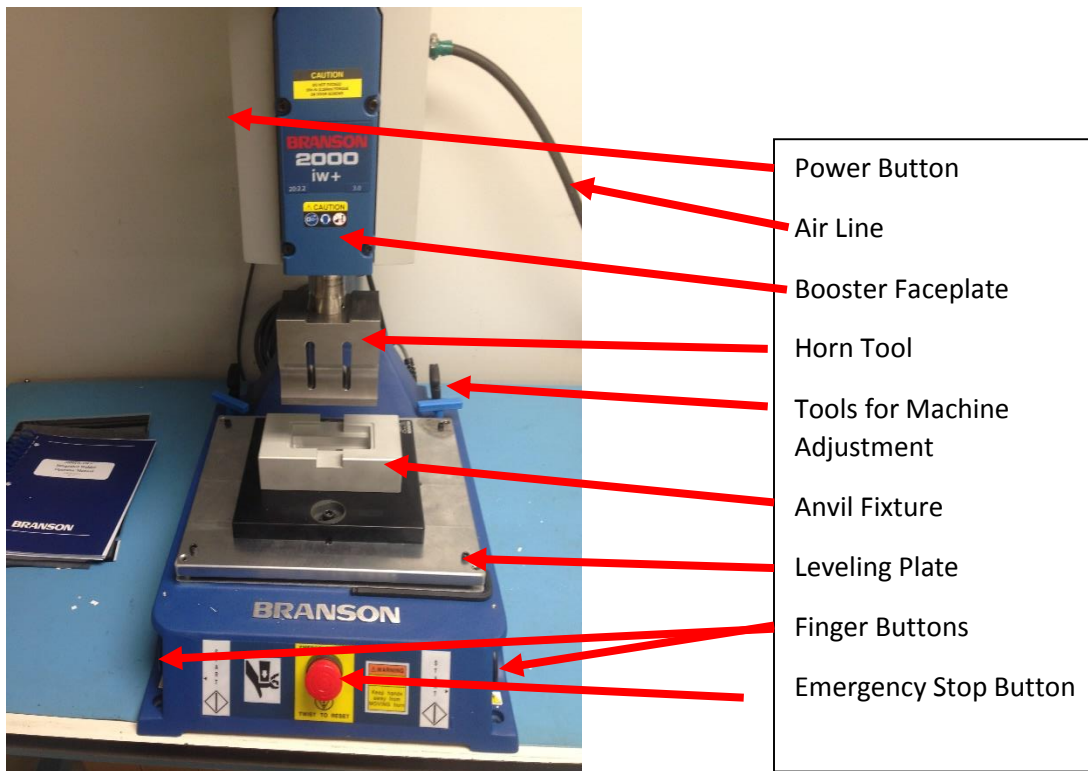




Ecovent Systems
Power Core Ultrasonic Welding
Work Instruction



Revision Control:

Author	Revision	Date
Pentecost	Initial Release	1.30.16

Equipment Setup

1. Locate and use ear and eye protection. If you cannot find the appropriate equipment, stop and contact engineering. Notify nearby coworkers who may also want to utilize ear protection.
2. Check electrical cables and pneumatic hoses are securely connected. If any connections are damaged or unsafe, stop and contact engineering.



3. Power on the Ultrasonic Welder on the left of the machine as shown.
4. Verify that the Welder powered up correctly with no error codes shown. The digital display should read "ready". If it does not, stop and contact engineering.



5. Verify that the correct fixture is installed: 109-156-6316 // ATG 504 // BUC 942999
6. Verify that the correct horn tooling is installed: 109-163-2461 // ATG 505 // BUC 942999

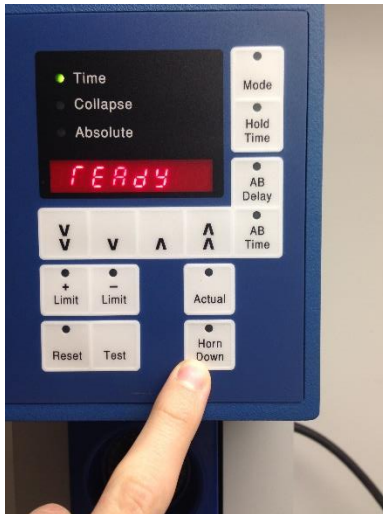


7. Verify that the horn tooling is retracted fully upward in the 'home' position.



Horn is retracted in the home position

8. Verify that the horn is properly aligned to the fixture.
- Place an empty sample workpiece into the lower fixture as shown.
 - Press the "Horn Down" button. The screen will update to 0.0000". If it does not, stop and contact engineering.



- c. Actuate the weld head by simultaneously pressing the buttons on the sides of the machine.



Sample piece is in the anvil fixture

Simultaneously press the buttons on the sides to actuate the weld head

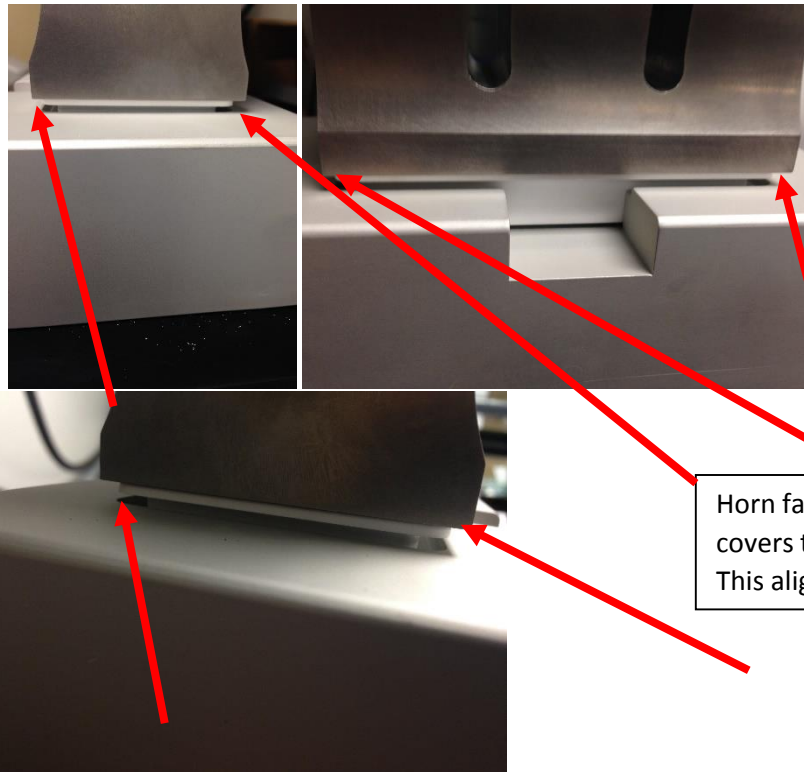
- d. The weld head will move down to contact the workpiece.
- e. The digital display will update with a reading of the travel distance – it should be between 2 and 3 inches. Record this value in the provided setup sheet. If this value deviates from the previous 10 recorded values by more than ± 0.1000 ", stop and contact engineering.



Travel Distance read should be between 2.000" and 3.000".

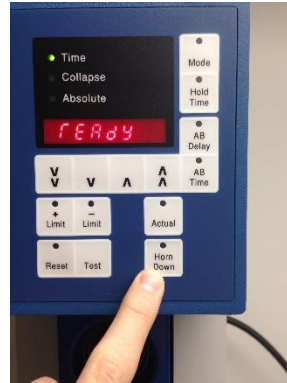
Record the value in the log sheet under "travel distance"

- f. Inspect the top tool for orientation with respect to the workpiece. The tool should be aligned to the workpiece such that the powercore faceplate is fully covered by the tool face. If the tool is rotated or skewed, or if the faceplate is not uniformly covered by the weld tool, stop and contact engineering.

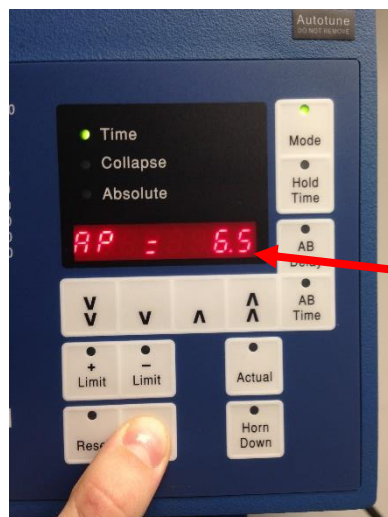


Horn face completely covers the faceplate. This alignment is good!

- g. If the orientation of the weld tool is good, continue with the equipment setup. Return the weld head to “home” position by pressing the “Horn Down” button again.



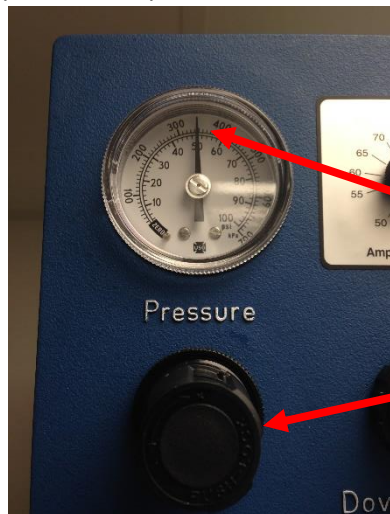
9. Verify the ultrasonic power dissipated in air by the stack. Make sure you have your ear protection in use – a high frequency ultrasonic sound will be heard. Press the ‘Test’ button and hold for 4-6 seconds until a value is shown on the screen. Record the value on the log sheet. If the value recorded deviates from the previous 10 records by more than ± 2.0 , stop and contact engineering.



Record this value in the setup sheet under “Ultrasonic Power Test”

10. Prepare the machine to check leveling.
- Adjust the machine parameters for the leveling test (parameters listed below).
 - To adjust the input pressure: Pull the knob (toward you) to unlock the knob and allow adjustment. Turn clockwise to increase the pressure. Turn counterclockwise to decrease the pressure. Turning the knob counterclockwise might not yield a decrease in the pressure gauge reading due to remaining pressure in the cylinder. To release the remaining pressure, press the “horn down” button and actuate the finger buttons. The pressure gauge reading will stabilize again to the current system pressure, and the setpoint adjustment can be made. Once the desired setpoint is reached, press the knob

away from you (towards the machine) to lock the pressure setpoint. If the desired pressure setpoint cannot be met, stop and contact engineering.



Pull this knob towards you to adjust the pressure. Turn clockwise to increase the pressure. Turn counter clockwise to decrease the pressure. Record the final setpoint value in the setup sheet under "Input pressure" (psi)

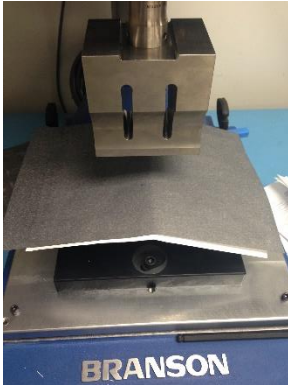
- c. To adjust the welding parameters, use the arrow keys as shown. The up arrows will increase the setpoint, while the down arrows will decrease the setpoint. Use the double arrow buttons for coarse adjustment (large changes) to the setpoint and use the single arrow buttons for fine adjustment (small changes) to the setpoint

Powercore Ultrasonic Welding LEVELING SETUP Settings	
Input Pressure	50 +/- 2 psig
Trigger Force	4
Weld Time	.100 sec
Hold Time	.500 sec



Use these arrows to adjust the welding parameters for weld time and hold time.

- d. Locate carbon paper and a blank sheet of white paper.
- e. Locate a sample work piece and place it in the lower fixture as shown. First, load the housing. Note the orientation of the housing with respect to the cutout in the fixture. The part must always be loaded such that the prong locations are on the right side as shown. Next, load the faceplate onto the powercore.
- f. Place the white sheet of paper on top of the workpiece.
- g. Place the carbon paper on top of the white sheet of paper.



Carbon Paper Setup



Good Leveling



Bad Leveling

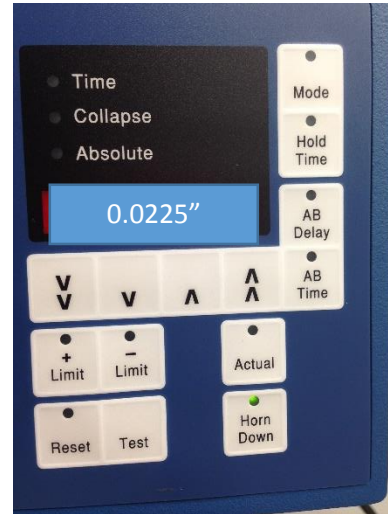
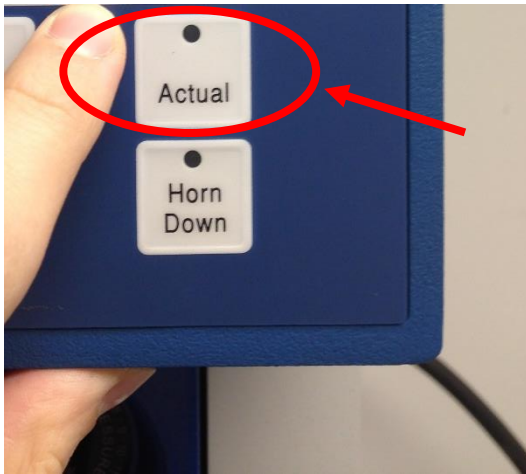
- h. Execute a weld by simultaneously pressing the buttons on either side of the machine.
- i. Remove the carbon paper and inspect the white sheet for an imprint of the part. Compare the imprint to the visual aids above. The imprint of the faceplate cover should be uniform around the entire perimeter of the part, indicating that there is even pressure across the entire face. If there are any voids or areas of low or light coloration, this indicates bad leveling setup. If the imprint is good, record leveling record in the provided log sheet by writing "OK" in the column labeled "Leveling Test Record" and continue with the setup process. If the imprint is bad, stop and contact engineering.
- j. Retain the imprint of the carbon paper and white sheet. Staple the carbon paper to the white sheet and label the white sheet with the production lot number, date, time, and operator's initials. Provide this record to engineering for storage and quality purposes.

11. Return the welder to the desired production settings using the instructions above.
12. Record the production settings used in the appropriate columns in the setup sheet.

Powercore Ultrasonic Welding PRODUCTION Settings	
Input Pressure	30.0 +/- 2.0 psig
Trigger Force	4
Weld Time	.180 sec
Hold Time	.300 sec

13. Locate a sample workpiece from the supplied components bin designated "Use for Setup"

14. Load the part into the fixture. First, load the housing. Note the orientation of the housing with respect to the cutout in the fixture. The part must always be loaded such that the prong locations are on the right side as shown.
15. Simultaneously press the buttons on either side of the machine to perform one weld using the setup piece.
16. Record the “Actual” collapse measured by the machine in the setup sheet. To determine this value, press the “Actual” button on the machine face two times until a reading in inches is shown. **The value must be between .018” and .025” . If it is outside of these limits, stop and contact engineering.**



17. Remove the part from the fixture and inspect.
 - a. Faceplate must be securely seated to the housing with no warpage or bowing observed. Apply force to attempt to remove the faceplate cover from the housing. No movement or cracking should be felt or observed.
 - b. Inspect the weld seam. No flash should be protruding from the weld joint. The appearance of the weld seam should be uniform around the entire perimeter of the assembly. See provided visual aids. If the appearance of the weld seam is acceptable, write “OK” in the column on the setup sheet labeled “Setup Part – Visual Inspection”. **If the appearance of the weld seam is unacceptable, stop and contact engineering.**
 - c. Measure the weld seam gap using feeler gages. Use the provided feeler gages to determine the weld gap between the housing and the faceplate. Start with a .010” thick gage and insert it between the housing and the faceplate cover around the entire perimeter of the device.
 - i. If the gage can fit into the gap, try the next size larger gage until it can no longer consistently fit into the gap around the entire perimeter of the device.
 - ii. If the first .010” gage used cannot fit into the gap, try the next smallest size, until the gage can consistently fit into the gap around the entire perimeter of the device.

- iii. Record the largest size gage that can fit into the gap on the setup sheet under the column "Feeler Gage Measurement"



Feeler gage measures the gap between the housing and the faceplate cover



Record the largest size feeler gage that can fit in this gap

- 18. Verify that the setup sheet record in the provided log sheet is complete, with no entries missing or outside of the control limits. If any entries are missing or outside of the control limits, stop and contact engineering. Sign your initials as the responsible person for this setup record and continue with the production lot.

Power Core Welding Production Process

1. Verify Setup Procedure was followed and the setup record is recorded in the log sheet provided.
2. Setup procedure must be performed and recorded in the setup sheet at the following intervals:
 - a. At the beginning of each shift
 - b. Every 4 hours
 - c. After machine maintenance
 - d. After downtime exceeding one hour
 - e. After any engineering testing
 - f. At any additional intervals at the discretion of Sanmina or Ecovent engineering
3. Retain all setup parts in a labeled plastic bag with the production lot number and date for identification. Setup parts and carbon paper/white sheet leveling records must be retained for one year from date of manufacture.
4. On a weekly basis, transfer the setup records in the setup sheet to digital record and submit to Ecovent engineering for review. Statistical process control will be used to monitor weld collapse over time.
5. Powercores must be 100% tested for 5V Power and GND Test. See appropriate work instruction for detailed procedure
6. Powercores must be sample basis tested for 1500VAC HiPot in accordance with the ANSI statistical sampling guideline below based on the powercore lot size:

ANSI/ASQ Z1.4

Lot Size and General Inspection Sampling Plan

<u>Lot Size</u>	<u>Sample Size</u>
2 to 8	2
9 to 15	3
16 to 25	5
26 to 50	8
51 to 90	13
91 to 150	20
151 to 280	32
281 to 500	50
501 to 1200	80
1201 to 3200	125
3201 to 10000	200
10001 to 35000	315
35001 to 150000	500
150001 to 500000	800
500001 and over	1250

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