

# BRANSON

## 2000 SERIES

# Ultrasonic Assembly Systems

## 2000d/aed

### GENERAL DESCRIPTION

Branson introduces the 2000d/aed ultrasonic assembly systems, setting a new standard for users operating in the distance, time, energy, energy compensation, or peak power welding modes. Multiple modes are valuable for applications requiring a high level of process control and weld quality.

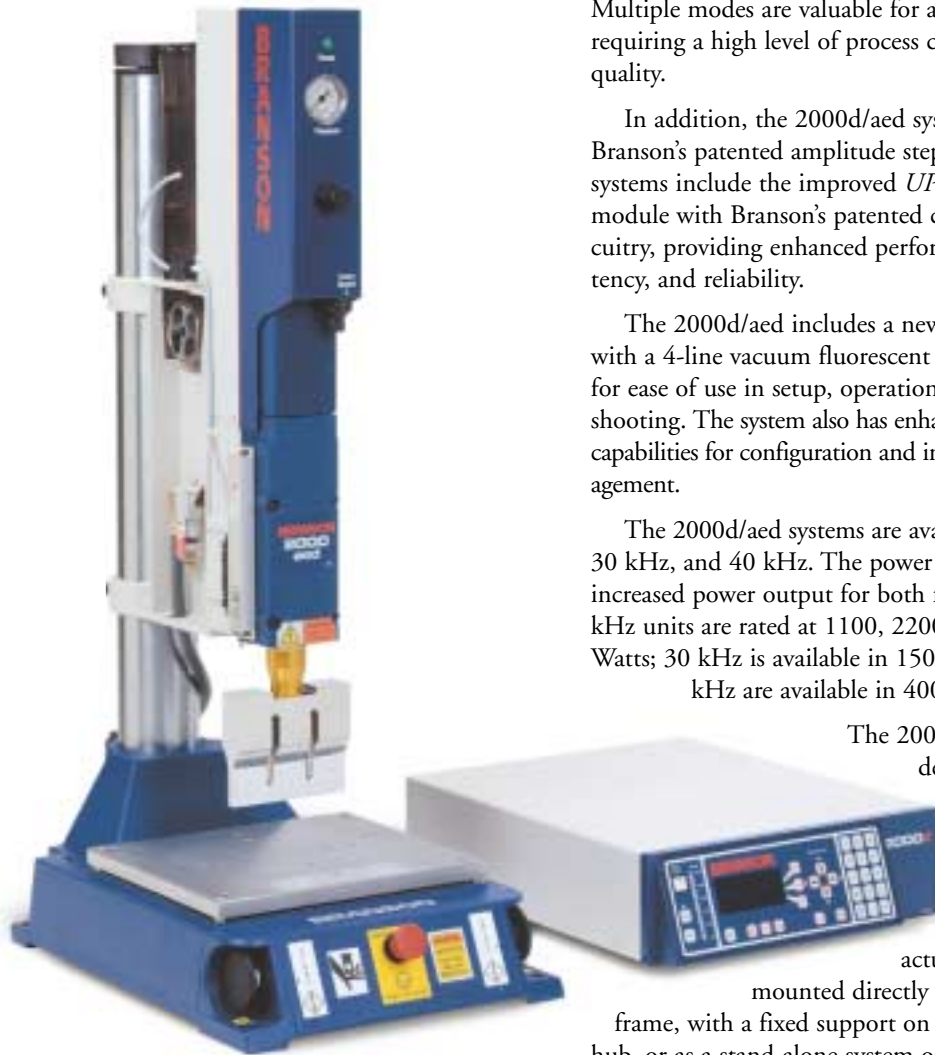
In addition, the 2000d/aed systems feature Branson's patented amplitude stepping. These systems include the improved *UPS* power supply module with Branson's patented closed loop circuitry, providing enhanced performance, consistency, and reliability.

The 2000d/aed includes a new user interface with a 4-line vacuum fluorescent display designed for ease of use in setup, operation, and troubleshooting. The system also has enhanced data capabilities for configuration and information management.

The 2000d/aed systems are available in 20 KHz, 30 kHz, and 40 kHz. The power supplies have increased power output for both frequencies: 20 kHz units are rated at 1100, 2200, and 3300 Watts; 30 kHz is available in 1500 Watts; and 40 kHz are available in 400 and 800 Watts.

The 2000d/aed system is designed for use in manual, semi-automated, or fully automated environments. The actuator may be mounted directly to a machine frame, with a fixed support on a column and hub, or as a stand-alone system on a base with ergonomic light-force palm button switches.

- ✓ *Enhanced Performance*
- ✓ *Weld by Distance*
- ✓ *Amplitude Stepping*
- ✓ *Force Measurement*
- ✓ *Calibration*
- ✓ *Data Management*
- ✓ *Multiple Language Choices*



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## KEY FEATURES

*Note:* items in blue are unique to the 2000d/aed systems.

### User Interface/Process Controls

- User interface featuring 4-line vacuum fluorescent (VF) display makes setup, operation, diagnostics, and troubleshooting easier.
- 1 ms sampling rate of data provides superior performance, consistency, and finer control.
- Multiple welding modes including distance (collapse and absolute), time, energy, peak power, and ground detect. Distance can be set in increments of 0.0001 inch. Energy is settable in increments of 0.1 joule. Peak power can be set in increments of 0.1%.
- Force measurement capability — set trigger force, and measure force for consistency and troubleshooting.
- User calibratable force and pressure.
- Controllable velocity provides readout and graphs of velocity for cycle monitoring and weld consistency.
- Amplitude Stepping — Branson's patented real-time process control provides increased strength, control of flash, reduction of particulate, and reduced residual stress.
- Expanded process control limits, including distance (absolute and collapse, and trigger range), energy compensation, provide more choices in application setup. Total collapse limits are included for weld or hold.
- Expanded quality monitoring limits to identify both "suspect" and "reject" parts.
- Built-in digital amplitude control - for fine tuning of critical applications, because amplitude is the most important variable in ultrasonic welding. The setting has a range of 10% to 100%.
- True alarm messages for ease of troubleshooting, with links to additional information.
- Self-diagnostics and monitoring - visual, audible, and logic output alarms.
- Built-in frequency and memory bargraph diagnostics for simplified troubleshooting of the converter/booster/ horn stack.
- Nonvolatile storage of cycle parameters.
- Alarm and cycle counters are built in for tracking production; works via a real time clock.
- Built-in ground detect with scrub time to increase tooling and converter life in cut and seal applications.
- Choice of language for message display and printout—English, French, German, Italian, or Spanish—for ease of use in worldwide operations and multilingual workplaces.
- Sixteen nameable presets for ease of setup and changeover of applications.
- Selectable pretriggering — including pretrigger by distance.
- Printing capability - Provides a record for future comparison and validation. Printout of last 50 cycle weld history. Power, frequency, amplitude, distance, velocity, and force graphs can be printed. Includes drivers for ESC/P and HPL and ASCII output data.
- Password protection feature for lock-out of unauthorized process changes once the equipment is set up for a specific application.



- Data management — RS232 serial port provided for terminal, CompuWeld, or ASCII weld data. ASCII output data available in comma, space, and tab separated formats
- Optional terminal for ease of setup and cycle information display.

### Power Supply

- Line / Load Regulation - Corrects for variations due to power line fluctuations and varying load conditions through Branson's patented closed-loop amplitude control. Output amplitude is maintained with a variation of only  $\pm 2\%$  with line voltage fluctuations of  $\pm 10\%$ , regardless of load. It ensures constant power in welding, and provides greater weld consistency and reliability.
- Autotune plus Memory (AT/M) - Provides fully-automatic tuning in a range of  $\pm 500$  Hz centered around 19.950 kHz for 20 kHz horns,  $\pm 750$  Hz centered around 30 kHz for 30 kHz horns, and  $\pm 1000$  Hz around 39.900 kHz for 40 kHz horns, and stores horn frequency at the end of each weld.
- Selectable Starting Ramp - Four selectable start rates—10, 35, 80, 105 milliseconds—to accommodate starting characteristics of a wide range of horns. This feature makes it easier to start more difficult horns or enables faster cycle rates.
- Auto Seek automatically measures stack frequency and stores it in memory. Four selectable Auto Seek choices are available:
  1. Externally with automation controller
  2. Depressing "test" switch
  3. By once/minute timer to track heating, cooling, and other effects
  4. Post weld seek.
- System Protection Monitor (SPM) Five levels of power supply protection are provided:
  - 1) phasing, 2) over voltage, 3) over current, 4) over temperature, and 5) power. The benefits of this circuitry are to avoid equipment failures, and to provide greater weld accuracy and repeatability.

2000d/aed

## 2000 SERIES PRODUCT/PERFORMANCE ENHANCEMENTS

The following chart gives a comparison of the new 2000d/aed system with 900 Series products. Benefits of the new features are highlighted.

<b>900MA/AES</b>	<b>2000d/aed</b>	<b>Benefits</b>
<i>Power levels:</i>	<i>Increased power levels:</i>	
20 kHz - 1000, 2000, 3000 Watts	20 kHz - <b>increased</b> to 1100, 2200, 3300 Watts	Higher available power for faster weld cycles
40 kHz - 700 Watts	40 kHz - <b>increased</b> to 400, 800 Watts	Higher power available for faster weld cycles
	30 kHz - <b>new frequency</b> , 1500 Watts	Higher power at higher frequencies; expands application range for delicate parts.
Single line VF display	<b>Four-line</b> VF display	More information visible; easier setup
Printing: setup and single line data	Printing: <b>expanded</b> setup and single line data	Easier setup and troubleshooting
Power, velocity, and force graphs	Power, velocity, force, frequency, amplitude, and distance graphs	Easier troubleshooting
20 presets	<b>16 nameable</b> presets	Ease of setup
Process alarm limits	Part monitoring limits: <b>suspect and reject</b>	Enhanced process monitoring
Alarm messages	<b>Additional</b> alarm messages, with <b>specific support</b> support information	More specific information for easier troubleshooting and corrective action
Optional amplitude stepping	<b>Built-in</b> patented amplitude stepping	Increased strength of welds, control of flash, reduction of particulate, reduced residual stresses.
Weld by distance (absolute, collapse)	Distance mode: absolute, collapse, <b>step</b> amplitude at a distance	Enhanced use of distance function, enhanced process control
Trigger force setting thru interface	Trigger force setting through interface	Helps ensure weld consistency
Multi-turn down speed control	<b>Single-turn</b> downspeed control with <b>setscrew lock</b>	Easier to set up, easier to duplicate prior setup
	Digital amplitude setting with range of 10-100%	Fine tuning of critical applications
	Single 20 kHz converter at all power levels with 20% higher converter output amplitude	Eliminates setup errors, faster weld cycles.
	Reporting of weld force	<b>Additional</b> weld data
	<b>Built-in</b> force and pressure calibration capability	Satisfies agency requirements (e.g., FDA)
	User configurable password protection	Lock out unauthorized process changes
	Choice of language for message display and printout	Ease of use in worldwide operations and multilingual workplaces.
	External selection of presets via PLC	More precise setup and limits; manufacturing flexibility
	ASCII data output	External data logging and graphing

- **Automation interface** is available for direct hookup with PLCs and PCs. Required automation I/O's are provided through a 24V DC logic interface. Signals include weld on, general alarm, and external reset. **Fifteen** externally selectable presets are available. Systems without an actuator may be operated via a simplified interface to a PLC.

### Actuator

- **Linear optical encoder** measures weld "distance" enabling welding by specific part collapse (melt-down), or to a finished part height (absolute). Resolution on the encoder is 0.0001 inch.
- A **force transducer** provides digital setting of the Dynamic Trigger and allows the user to print out force data and graphs for performance evaluation and troubleshooting.



- **Pressure transducer** accurately monitors and displays air pressure and allows accurate and repeatable setting of weld force.
- A **single 20 kHz converter** is used for all 20 kHz power supplies. This converter produces 20% higher output amplitude for faster weld cycles.
- **Converter cooling** - Cooling air is directed into the converter during each operating cycle.
- **Five air cylinder sizes** are available for better control of clamp force. Sizes include: 1.5, 2.0, 2.5, 3.0, and 3.25 inches.
- **Custom single-turn flow control** provides for more accurate setting of velocity/downspeed, and easier resetting during application changeover.
- **Stroke indicator**
- **Calibratable pressure gauge**
- **"Horn down"** function enables ease of horn/fixture alignment.

**2000d/aed**

# BRANSON

## SPECIFICATIONS

Most units are CE compliant, and comply with FCC rules and regulations governing radio frequency interference. Contact Branson, Danbury, for information.

<b>2000d Power Supply</b>	<b>20:1.1</b>	<b>20:2.2</b>	<b>20:3.3</b>	<b>30:1.5</b>	<b>40:0.4</b>	<b>40:0.8</b>
Output power:	1100 Watts	2200 Watts	3300 Watts	1500 Watts	400 Watts	800 Watts
Line voltage:	117 V AC * 50/60 Hz, 1ph.	200-240 V AC 50/60 Hz, 1ph.	200-240 V AC 50/60 Hz, 1ph.	117 V AC * 50/60 Hz, 1ph.	117 V AC * 50/60 Hz, 1ph	117 V AC * 50/60 Hz, 1ph
Max. current:	14 amps max.	14 amps max.	17 amps max.	20 amps max.	6 amps max.	12 amps max.
Receptacle required:	NEMA 5-15R	NEMA L6-20R	NEMA L6-20R	NEMA 5-20R	NEMA 5-15R	NEMA 5-15R
Frequency:	20 kHz	20 kHz	20 kHz	30 kHz	40 kHz	40 kHz
Max. cycle rate:	80 cpm **					
Ambient temp. range:	41-122° F (5-50°C)					
External inputs/outputs:	9-pin start connector; 44-pin user I/O connector					
<b>Actuator Model</b>	<b>aed1.5</b>	<b>aed2.0</b>	<b>aed2.5</b>	<b>aed3.0</b>	<b>aed3.2</b>	
Max. clamp force on part (at 100 psig/ 690 kPa)	140 lbs. 623 N	270 lbs. 1.2 kN	440 lbs. 1.96 kN	650 lbs. 2.89 kN	770 lbs. 3.42 kN	
Dynamic Triggering range:	5-140 lbf. 22.24-623 N	5-270 lbf. 22.24 N-1.2 k N	5-440 lbf. 22.24 N-1.96 kN	5-636 lbf. 22.24 N-2.83 kN	5-725 lbf. 22.24 N-3.22 k N	
Dynamic Follow-through range:	5-140 lbf. 22.24-623 N	5-270 lbf. 22.24 N-1.2 kN	5-400 lbf. 22.24 N-1.78 kN	5-400 lbf. 22.24 N-1.78 kN	5 lbf. -400 lbf. 22.24 N-1.78 kN	
Stroke length:	4" (101.6 mm)					
Pneumatic requirement:	Clean (5 micron, filtered), dry, non-lubricated air at 100 psi (690 kPa)					
* 200-240 V AC optional.			<i>All specifications subject to change without notice. All dimensions are nominal.</i>			
** Application dependent.						

## AVAILABLE OPTIONS

- ▶ **Leveling fixture** - base-mounted plate for horn/fixture alignment.
- ▶ **Dump valve** - for release of cylinder pressure for ease of setup.
- ▶ **Solid mount boosters**
- ▶ **Longer columns** - 4' to 6' lengths
- ▶ **Printer with cable** - printing of setup and cycle information for comparison and troubleshooting.
- ▶ **Terminal with cable** - for screen-driven setup
- ▶ **Ground detect cable**

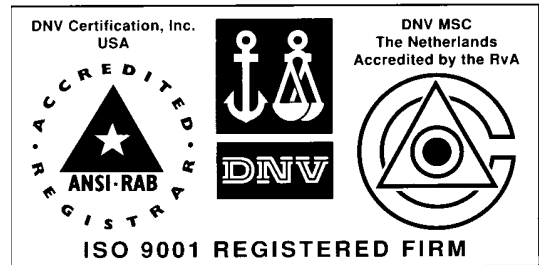
*Note: All sales shall be subject to the Supplier's terms and conditions of sale as described in Branson's quotations and sales contracts.*

## REGIONAL TECHNICAL CENTERS

Headquarters:	Toll free: 888-BUC-JOIN (888-282-5646)	
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Atlanta:	770-962-2111	Fax: 770-962-3720
Los Angeles:	909-305-2080	Fax: 909-305-2060
Dallas:	972-484-9228	Fax: 972-484-9976
Detroit (Automotive):	248-299-0400	Fax: 248-299-9343
Rochester, NY:	585-624-8000	Fax: 585-624-1262
Toronto, Canada:	905-201-4633	Fax: 905-201-4637
Mexico City (Groupo Stevi):	011-52-555-670-4470	Fax: 011-52-555-670-7885

## WARRANTY

The Branson 2000 Series d/aed ultrasonic assembly systems carry a three-year warranty on materials or workmanship. Note: This warranty applies to equipment purchased and operated in North America. For warranty information on units purchased and/or operated outside the U.S. contact your local representative.



## Branson Worldwide Headquarters

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