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Ultrasonic Assembly Systems

2000 Series Integrated Ultrasonic Plastic Welders

IW+ – 1100, 2200 & 3300 Watts

EMERSON™
Industrial Automation

2000 Series Integrated Ultrasonic Plastic Welders IW+ – 1100, 2200 & 3300 Watts

Branson's 2000 Series IW+ Integrated Welder is a self-contained ultrasonic plastics assembly system that combines a power supply module, process controls, and welding stand in a compact bench unit to conserve work space, ease setup, simplify operation, facilitate relocation, and make service convenient. The integrated welder is the ideal value-based system for new users of ultrasonic technology and those with lower production requirements. Available with power output of 1100, 2200 or 3300 watts, the integrated welder IW+ Model features digital controls for accurate and repeatable setups and enables distance welding in either collapse or absolute modes with limits. When using the welder, the assembly operation is characterized by simplicity, speed, and efficiency. Once the system is programmed for a particular workpiece, no further adjustments are required.

Key Features

- **Line / Load Regulation** - corrects for variations due to power line fluctuations and varying load conditions through Branson's proprietary closed-loop amplitude control. Output amplitude is maintained with a variation of only + 2% with line voltage fluctuations of +10%, regardless of load. It ensures constant power in welding and provides greater weld consistency and reliability.

- Line Regulation
- Load Regulation
- Auto Seek with Memory
- High Amplitude Converter

- **2000 Series 20 kHz converter** - produces 20% higher output amplitude than its 900 Series predecessor for faster weld cycles; in addition, this converter is more rugged and has higher power capacity.
- **Auto Seek** - automatically measures stack frequency and stores it in memory. Three selectable Auto Seek choices are available:

  1. On power up, setting memory for the initial weld.
  2. Depressing "test" switch.
  3. By once/minute timer to track heating, cooling, and other effects.

- **Operating modes** - IW+ model features welding in time; ultrasonics and force are applied to parts for a precise, preset time, and parts are held under force for a precise hold time; adjustable afterburst delay and duration times may be set, if required. Display of time and afterburst parameters is digital. The IW+ model gives the choice of time or distance modes (either absolute or collapse). In absolute, the weld

is terminated at a predetermined point in the stroke, measured from the top of the stroke. In collapse, the weld is terminated at a predetermined point in the stroke after the horn contacts the part and the trigger switch is activated. The position display is digital. With position modes, upper and lower limit ranges may be selected.

- **Digital parameter entry with autoranging** - when entering parameters gives precise settings for repeatable accuracy. The autoranged values enable fine resolution and setup accuracy.
- **A linear optical encoder** - measures weld "distance." The resolution on the encoder is 0.0001 inch (0.0025 mm).
- **Afterburst with variable delay and duration** - is available to dislodge a part or material adhering to the horn face.
- **Individual select keys** - allow easy selection of parameters to be modified. Active choice is lighted.
- **Sequence of operation** - is displayed in the digital LED window during the welding cycle.
- **Self-diagnostics and cycle monitoring** - features and capabilities provide fast, accurate troubleshooting and minimize downtime. During initial power-up, the unit completes a self-check and identifies any fault conditions or parameter errors before indicating that the system is "ready" for operation.
- **Visual and audible alarms, and external outputs** - identify overload, machine faults and setup errors (e.g., emergency stop engaged).
- **Fast-response LED storage meter** - displays power loading in 5% increments, and provides storage of the peak power achieved during the weld cycle as well as better visibility; 100% of rated output of the power supply is delivered at full meter reading.
- **Peak power reading** - from the last welding cycle is available on the digital LED display by depressing the "reset" switch. Similarly, power in the tuning mode is digitally displayed when the "test" switch is depressed.
- **LED readouts display parameter settings** - during setup and operation for easy reference and monitoring. LEDs are large and easy to read in most light conditions.
- **Lockout of front panel switches** - is provided by and internal dip switch, preventing unauthorized parameter changes to the setup.
- **Nonvolatile storage of cycle parameters** - provides storage of last-used cycle parameters even if the system is shut off or a power interruption occurs.

2000 Series Equipment Standard Features

- **Autotune plus Memory (AT/M)** - Provides fully-automatic tuning in a range of + 500 Hz centered around 19.950 kHz for 20 kHz horns and stores horn frequency at the end of each weld cycle.
- **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 feature are to avoid equipment failures and to provide greater weld accuracy and repeatability.
- **Automatic pretriggering** - is available to provide pretriggering without a mechanical switch to wear, adjust, or fail.
- **Dynamic Triggering** - provides consistent weld quality by initiating (triggering) ultrasonic vibrations after a preset force, ranging from 15-200 lbs. (67 - 890 N), is applied to the part. As melting of the plastic occurs, dynamic follow-through ensures the smooth, efficient transmission of ultrasonic energy into the part by maintaining horn/part contact and force. The range of dynamic follow-through is from 15 - 200 lbs. (67 N to 890 N). The Dynamic Trigger mechanism of the 2000 Series includes a 48 position control dial for greater accuracy and con-

trol, and a self-contained optical switch for accurate repeatability and long-term reliability.

- **Rugged construction and durability** - Rigidity and consistent, precise alignment of the horn and parts during welding is provided by linear ball bearing slides. The slide system incorporates a rail in linear motion guides with four sets of preloaded, permanently pre-lubricated bearings. This design ensures long-term reliability (less wear, less binding) and allows smooth linear motion and well-balanced stiffness against loads applied from any direction. (For applications involving severe side loading, check with Branson before operation.) Preload is built into the bearings and does not depend on actuator assembly. The 1100-Watt model has a 2.5" cylinder, and the 2200 and 3300-Watt model has a 3" cylinder.
- **Ease of setup and changeover** - The converter/booster/horn stack is easily installed and removed from the front of the carriage assembly without repositioning the actuator. The stack may be rotated a full 360° in the carriage for horn alignment with the workpiece.
- **Versatility** - 2000 Series Integrated Welders are capable of welding, staking, inserting, swaging, spot welding, and degating thermoplastics and can also seal synthetic fabrics, films, and other thin thermoplastic materials. A 4" stroke (102 mm) accommodates parts with deep cavities. The welding head can be rotated on the column; height is adjusted by turning a handwheel on the side of the unit. The system is compatible with automated systems and most material handling devices.
- **Adjustable 20 threads-per-inch locking mechanical stop** - with an adjustment knob. When properly set, the stop prevents the horn from touching the fixture or nest when no workpiece is in place.
- **Upper limit switch** - causes the power supply to produce a "ready" signal when the carriage has fully retracted. The ready signal is used as a safety interlock switch on automated systems to prevent the movement of material handling equipment (indexing) when the horn is down or the welder is in error. An optical switch is used to provide reliable, wear-free operation.
- **Stroke indicator** - allows quick identification of the operating stroke length.
- **Convenient Pneumatic Controls**
  - **Flush-mounted 2" diameter pressure gauge** - provides excellent visibility for ease of setup; calibration is in both USCS (English) and metric (SI) units.
  - **High-precision regulator** - provides accuracy and repeatability. Included is a locking feature—pull to set, push to lock—that enables consistency of operation once the unit is set up.
  - **Calibrated flow control valve** - for downspeed gives accuracy, consistency and repeatability machine to machine. A locking mechanism is built in.
  - **"Horn down" key** - on front panel facilitates setup allowing alignment of the horn with parts during setup without activating ultrasonics.
- **Base with ergonomic low-force palm button** - built-in emergency stop button. Mounting holes provided for attaching welder to work bench. Bolt holes for fixture mounting have M10 x1.5 metric threads. An optional self-leveling fixture plate for use with Branson Ergo base speeds setup and simplifies changeover of tooling. For automation or close mounting of welders, an optional mounting hub is available.
- **Molded thermoplastic structural foam housing** (Noryl®) - all internal electronic components are enclosed in a housing that is durable, compact, lightweight, non-conducting, and non-corrosive; single door access is provided to most internal components.

Automation Interfacing

Branson's 2000 Series Integrated Welders can be interfaced with external devices and controls (e.g., PLCs). This will require both a J971 alarm cable and a J911 start cable (optional). A user I/O is built in.

- **Select faults or weld errors sensed by the system can be communicated** - outside the welder for monitoring and sorting suspect parts. Front panel or external reset access is provided.
- **General alarm and weld on outputs** - are available for customer access through 24V DC negative logic devices. The ready signal is both a 24V DC and isolated contact closure.
- **External reset** - is available for customer access as a 24V DC input. A w source is provided by the welder.

Amplitude Control Kit

Allows the user to set the ultrasonic weld amplitude between 50% an 100% of the maximum. Variable amplitude ensures the optimal energy and power is applied to the weld.

Electrical Specifications

Power requirements:	**1100 Watts***	**2200 Watts**	**3300 Watts**
Line voltage:	100-120V AC	200-240V AC	200-240V AC
	50/60 Hz, 1Ø	50/60 Hz, 1Ø	50/60 Hz, 1Ø
Input current:	13 amps	14 amps	20 amps
Electrical connection:			
100-120V models:	NEMA 5-15P plug provided; requires NEMA 5-15R receptacle		
200-240V models:	Supplied by user		
Output power:	1100 watts*	2200 watts	3300 watts
Frequency:	20 kHz	20 kHz	20kHz
Parameter ranges:	**Range****	**Increment/step**	
Weld & hold time range:	50-1,000 milliseconds (1 sec.)	1 millisecond	
	1-10 seconds	10 milliseconds	
Afterburst delay and duration:	"Off " or 50-1,000 milliseconds (1 sec.)	1 millisecond	
	1-10 seconds	10 milliseconds	
Position:	0.0001"- 4.0" (0.0025 - 101.6 mm)	Slow up/down key: 0.0001"(0.0025 mm) Fast up/down key: 0.01"(0.25 mm)	
Ambient temperature - The following signals are available:			
Ready signal	41-122° F (5-50° C) Both 24V DC and dry (clean) contact closure available		
General alarm	24V DC, negative logic		
Weld on	25 mA max.		
External reset	+24V DC, 25 mA max.		

*Note: 1100-Watt model also available in 200-240 V; contact Branson, Danbury, for information.

** Note: With autoranging, the power supply will automatically display settings in the next range with the appropriate increments when the extremes of a range are reached.

Mechanical Specifications

Pneumatic requirement:	Clean (5 micron, filtered), dry, non-lubricated air at 100 psi (690 kPa)
Maximum force on part:	1100W models: 440 lbs. at 100 psig (1.96 kN at 690 kPa)(2.5" cyl.); 2200W models: 630 lbs. at 100 psig (2.8 kN at 690 kPa)(3" cyl.); 3300W models: 630 lbs. at 100 psig (2.8 kN at 690 kPa)(3" cyl.)
Dynamic Triggering range:	15-200 lbs. (67-890 N) max.
Dynamic Follow-through range:	15-200 lbs. (67-890 N) max.
Stroke length:	4" (102 mm)
Cycle rate:	65 CPM at 1" stroke length, 50 psig (345 kPa), 50 ms weld, 50 ms hold
Weight:	145 lbs. (66 kg)
Base width and depth:	16.25" and 27.5"

Global Technologies. Local Solutions.

Branson's unmatched global resources ensure optimal solutions for the most challenging materials joining and precision cleaning applications.

With 1600+ employees in over 70 sites worldwide, we can rapidly respond to our customers' needs, wherever they are located. Branson understands local markets and regulations, and the open collaboration among our global offices and extensive staff of application specialists quickly produces solutions for customers. We partner with companies of every size and scope to help resolve critical issues ranging from market changes, product quality/life cycles and production costs, to employee safety and environmental compliance. And, Branson's commitment to the publicly funded industrial collective research initiative and cooperation with various research centers have produced widespread innovations in plastics joining technology that are benefiting companies everywhere.

Branson is a leading innovator in the Industrial Automation division of Emerson, a diversified global manufacturing and technology company. Emerson is a progressive company working to develop products and processes to resolve global issues, including energy supply and distribution, information and networking, climate and environment, manufacturing efficiency, and product performance. Emerson is dedicated to the pursuit of breakthrough technology developments never before envisioned.

Branson brings exceptional quality, fast delivery and competitive prices for you tooling needs. Contact your nearest regional center today.

To learn more about the 2000IW+ Ultrasonic Assembly System, contact your Branson representative or call the Branson office in your area.

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All specifications are subject to change without notice. All dimensions are nominal.
All units are NRTL and comply with FCC regulations governing radio frequency interference.
All actuators and 200-240V AC power supplies are CE.
Note: All sales shall be subject to the Supplier's terms and conditions of sale in Branson's quotations and sales contracts.

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