BRANSON

2000 SERIES

Ultrasonic Assembly Systems

2000 IW/IW+

2000 Series Integrated Ultrasonic Plastic Welders IW/IW+ – 1100 and 2200 Watts

General Description

Branson's 2000 Series Integrated Welders are self-contained ultrasonic plastics assembly systems that combine 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 "entry level" system for new users of ultrasonic technology and those with lower production requirements.

2000 Series Integrated Welders include the proven technology of the 2000 Series power supply module and converter, which set the standard in ultrasonic equipment. Available with power output of 1100 or 2200 Watts, the integrated welder Models IW and IW+ feature digital controls for accurate and repeatable setups. In addition, the IW+ models enable 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 patented 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.
- 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 models feature 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. IW+ models give 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.

- ✓*Line Regulation*
- ✓*Load Regulation*
- ✓*Auto Seek with Memory*
- ✓*High Amplitude Converter*
- ✓*All Units CE Compliant*

Applied Technologies Group

41 Eagle Road
Danbury, CT
06813-1961
(203) 796-0349
fax (203) 796-9838
e-mail: info@bransonultrasonics.com

- A linear optical encoder (IW+ models only) 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.

Standard 2000 Series Equipment 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 control, 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-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 tpi 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 buttons, 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 and isolated contact closure.
- External reset is available for customer access as a 24V DC input. A 24V source is provided by the welder.

Electrical Specifications

Power requirements:	1100 Watts	2200 Watts
Line voltage:	100-120V AC 50/60 Hz, 1∅	200-240 V AC 50/60 Hz, 1∅
Input current:	13 amps	14 amps
Electrical connection:		
100-120 V models:	NEMA 5-15P plug provided; requires NEMA 5-15R receptacle.	
200-240 V models:	Supplied by user.	

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

Output power:	1100 watts	2200 watts
Frequency:	20 kHz	20 kHz
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 milli-seconds (1 sec.)	1 millisecond
	1-10 seconds	10 milliseconds
Position (IW+ only):	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: 41-122° F (5-50° C)

External inputs/outputs:

The following signals are available:

Ready signal	Both 24V DC and dry (clean) contact closure available.
General alarm, Weld on	24V DC, negative logic 25 mA max.
External reset	+24V DC, 25 mA max.

The Branson 2000 Series IW/IW+ Integrated Welders comply with FCC rules and regulations governing radio frequency interference. All models are CE compliant.

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* *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.

All units are CE compliant and comply with FCC rules and regulations governing radio frequency interference.

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.)

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: IW = 90 CPM, IW+ = 65 CPM at 1" stroke length, 50 psig (345kPa), 50 ms weld, 50 ms hold.

Weight: 145 lbs. (66 kg)

Note: All specifications subject to change without notice.

Warranty

Branson 2000 Series Integrated Welders carry a three-year warranty on all parts and workmanship. *Note:* this warranty applies to welders purchased and operated in the United States, Canada, and Mexico. For warranty information on units purchased and/or operated outside North America, contact your local representative.

BRANSON The following chart gives a comparison of the 2000IW/IW+ systems with 900 Series IW/IW+ systems.

900 IW/IW+	2000 IW/IW+	Benefits
Power levels (Watts):1000, 2000	Power levels (Watts): 1100, 2200	Faster weld cycles.
Autotune	Autotune plus Memory	Consistency and improved performance; less likely to require manual adjustment.
Power transformer (req.tap selection)	No power transformer	Easier setup (no tap selection required).
	Line/load regulation	Consistency and improved performance; can use less force and amplitude and lower gain booster (lower stress).
	AutoSeek automatically tracks horn frequency and compensates for temperature variations	Consistent and trouble-free operation.
	Single high-amplitude converter for all models	20% higher output amplitude for faster weld cycles; more rugged, with higher power capacity. Proven 2000 Series technology.
	All units CE approved	All available for worldwide usage.
	Built-in harness kit for use with external devices and controls	Easier setup for automation.
	2000 Series power supply module	Proven technology with improved reliability.

Ordering Information

2000 Series Integrated Welders – on base; include converter and choice of aluminum booster.

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

	Branson EDP No.
Model 2000 IW, 1100 Watts, 100-120V, 50/60 Hz	101-162-116
Model 2000 IW+, 1100 Watts, 100-120V, 50/60 Hz	101-162-117
Model 2000 IW, 2200 Watts, 200-240V, 50/60 Hz	101-162-118
Model 2000 IW+, 2200 Watts, 200-240V, 50/60 Hz	101-162-115
Model 2000 IW, 1100 Watts, 200-240V, 50/60 Hz (option)	101-162-120
Model 2000 IW+, 1100 Watts, 200-240V, 50/60 Hz (option)	101-162-119

Note: All models available with 1.5" cylinder or 2" cylinder (factory installed only). Contact Branson, Danbury, to order.

Optional Columns–Integrated welders include a 40" long column with 1/4" wall, standard. (*Note:* longer columns should be factory installed.) Longer columns will increase overall height.

	Branson EDP No.
3.5" O.D., 4' (1/2" wall)*	100-028-004
3.5" O.D., 5' (1/2" wall)*	100-028-008
3.5" O.D., 6' (1/2" wall)*	100-028-005

**Note: When ordering 1/2" wall columns, spacer EDP No. 100-094-107 is required and must also be ordered.*

Hub - Used in automation with column in place of base assembly. 101-063-071

Converter (one included with welder) Model CJ20: 101-135-059

Boosters	Horn End Drill and Tap 1/2-20	3/8-24*
Aluminum		
1:0.6 (Purple)	101-149-055	101-149-090
1:1 (Green)	101-149-051	101-149-093
1:1.5 (Gold)	101-149-052	101-149-092
1:2 (Silver)	101-149-053	101-149-094
Titanium		
1:0.6 (Purple)	101-149-060	---
1:1 (Green)	101-149-056	---
1:1.5 (Gold)	101-149-057	---
1:2 (Silver))	101-149-058	---
1:2.5 (Black)	101-149-059	101-149-091

*IMPORTANT: Use with 1100-Watt models only. With 2200-Watt models, use 1/2-20 boosters (preferred for all units).

Other System Cables

Start Cable, J911	8'	101-240-020
(Requires Product	15'	101-240-015
Liability Agreement)	25'	101-240-010
Alarm, J971	8'	101-240-021
	15'	101-240-016
	25'	101-240-011

Options and Accessories

Ground detect kit (for IW only) 101-063-343

Self-leveling fixture plate for use with Branson Ergo base, speeds setup and simplifies changeover of tooling.

USCS (inch) model 101-063-358

Metric model 101-063-444

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Branson 41 Eagle Road Danbury, CT 06813-1961
(203) 796-0349 • FAX (203) 796-9838 • E-mail: info@bransonultrasonics.com