

**BRANSON**



## HyLine-2i Series

Models VW-4i1 H, VW-6i2 H (-i3), and VW-8i4 H (-i5, -i6)  
Linear Vibration Welders

## HyLine-2i Series Models VW-4i1 H, VW-6i2 H (-i3), and VW-8i4 H (-i5, -i6) Linear Vibration Welders

**GENERAL DESCRIPTION:** Branson, the pioneer in vibration welding with over 35 years of production experience is proud to offer the enhanced version of our popular HyLine 2 Series linear vibration welder. Featuring the all-new I-Class weld heads, Branson's HyLine-2i Series welders are complete assembly systems designed to weld parts of various sizes and/or irregular shapes.

The **I-Class weld heads** offer multiple benefits including: increased tool weight capacities, increased tool weight to frequency ratios, higher power drives (more plastic joining capacity), PPL technology (see Machine Description section), interchangeable/common parts across weld head models, global commonality, and lower noise output.

Six models, VW-4i1 H, VW-6i2 H (-i3), and VW-8i4 H (-i5, -i6) are available to handle parts up to 58" by 22" (1473 by 559 mm), or multiple smaller parts.

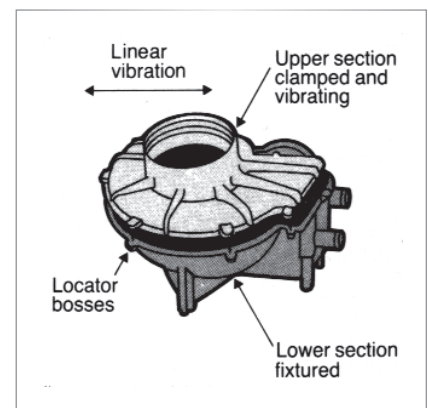
The Branson power supplies that drive the weld heads have an adjustable vibrating frequency range of 180 to 240 Hz. Modular construction allows the individual vibrator assembly and power supply / controller components to be adapted to automated or custom systems.



### Process Description

Vibration welding is a proven welding technology capable of producing strong, pressure tight joints in thermoplastic parts.

Frictional heat is generated by pressing the surfaces of two plastic parts together and vibrating one of the parts through a small linear displacement in the plane of the joint. When a molten state is reached at the joint interface, vibration is stopped and the parts are automatically aligned. Clamping pressure is maintained briefly while the molten plastic solidifies to form a bond approaching or equal to the strength of the parent material.



## Process Advantages

The major advantage of vibration welding lies in its application to large (up to 60"/1524 mm long or 24"/610 mm wide), irregularly-shaped parts. Even cross ribs which create separate compartments can be sealed. The process also works with multi-plane and curved surfaces.

The technology offers the capability of welding more than one part at a time; it also readily lends itself to automation.

## Material Compatibility

Almost all thermoplastics can be vibration welded, regardless of whether they have been injection molded, extruded, foamed, or thermoformed. This process, when compared with ultrasonic assembly, is particularly advantageous for semi-crystalline resins such as acetal, nylon, thermoplastic polyester, and polypropylene; also polyvinyl chloride, cellulose, and elastomers, filled and reinforced resins, as well as those exhibiting hygroscopic properties.

## Machine Sequence

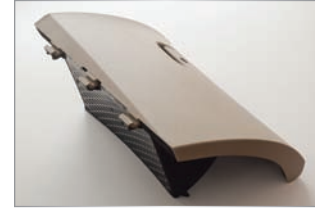
The operator manually loads the parts to be welded. The automatic sequence is initiated by activating the start buttons:

- Sound door closes.
- Lift table moves to weld position and applies pressure.
- Weld and hold times sequence.
- Lift table moves to home position.
- Sound door opens.
- Part manually unloaded.

## Markets/Applications

### Automotive

- Instrument panels
- Clusters
- Door panels
- Lighting
- Reservoirs
- HVAC ducts
- Intake manifolds
- Glove boxes



*Glove Box*

- Bumpers
- Air resonators

### Medical

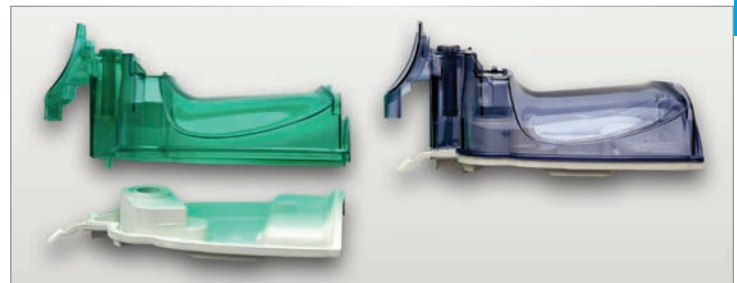
- Chest drainage units
- Filters
- I-V units
- Surgical instruments
- Insulated food trays
- Cassettes



*Medical Fluid Meter*

### Appliance

- Pumps
- Shelving
- Liquid dispensers
- Small/large power tools
- Ducts
- Spray arms
- Fill funnels
- Water reservoirs
- Vacuum cleaner housings
- Vacuum cleaner accessories



*Steam-Iron Reservoir*

### Business/Consumer Electronics

- Toner housings
- Display assemblies
- Door stiffeners
- Circuit board encapsulation
- Ink-jet cartridges

### Packaging

- Pallets
- Display stands/shelves
- Point of purchase display blisters



# Vibration Welding

## Key Features

- **Controls system** using an Allen Bradley Compact Logix PLC. All system parameters are set through an Allen Bradley Panelview Plus 700 (optional 1000). The PLC system monitors the welding parameters and controls all functions of the machine including: frequency (direct reading in Hz), weld time, melt distance (collapse), hold time, amplitude, weld clamp forces, and hold clamp forces.
- **Storage of up to twenty sets of weld parameters.** By calling up one of these presets, the operator automatically programs the machine to the setpoints for that particular application.
- The system also provides **process verification during each weld cycle.** This verification is a live reading of the actual amplitude, force, weld time, and melt distance occurring during that cycle.
- **Linear displacement transducer** for table positioning and meltdown. The transducer provides a positioning repeatability of 0.001" over the length of the transducer and a meltdown resolution of 0.0005". This ensures tight control of the pre-weld stack-up height and precise meltdown capabilities, as well as the ability to set the table loading height.
- **SPC capabilities.** The PLC program can provide a data stream to a communications port to enable the user to connect to a computer and log the weld parameters over a period of time. The data can then be processed by the user's program to provide a printout in any number of forms: bar charts, histograms, range charts, etc.
- **Diagnostic program** which allows the machine to be compared against a known set of conditions. This enhances troubleshooting capabilities by matching the unit's current outputs with a standard set of values recorded during initial setup.
- **Digital power supply** provides increased starting power and better control of the weld process.
- **Self-tuning frequency program.** Pressing a button on the interface will allow the machine to automatically find and store the resonant frequency of the upper tooling mass. This known value can then be saved in a preset or manually input the next time the same upper tool is installed for production. The frequency range of the unit is variable between 180 Hz and 240 Hz.
- **Precise amplitude input and control** in a range between 0.020" and 0.70" (0.5 - 1.8 mm). The peak-to-peak welding amplitude can be set at the keypad in 0.001" increments.
- **Simple maintenance-free electromechanical vibrator** with only one moving part and no bearing surfaces to lubricate or wear.
- **Hydraulic lift/clamp system** includes two proportional valves to control the speed of the lift table and the clamp force applied to the parts.
- **Force profiling** - The HyLine control has up to four programmable weld forces to provide more accurate control of weld meltdown velocity. It also has one programmable hold force.
- **Amplitude profiling** - Four programmable amplitudes are available for controlling welding.
- **Configurable user I/O is available for tooling functions** - Up to 32 I/O's are optional.

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## Some Available Options

- Light curtain
- Light curtain protection guards
- Duplex electrical outlet (120 V)
- Dual lift cylinders (provides 21"/533 mm stroke and table opening depth of 12.5"/317 mm)
- Panel-mounted resettable cycle counter
- Exterior overhead light
- Air system for part eject from tools
- Air system for vacuum in upper tool
- Air system for slides in bottom tool
- Electrical tooling quick disconnect block (Turck) – 8-port
- Electrical tooling quick disconnect – HAN connector
- Pneumatic tooling quick disconnect manifold – 8-port
- Ext. PLC programming port
- Three-color light tower
- PLC window in electrical cabinet
- Light in e-box
- E-box fan
- E-box heat exchanger
- Custom color
- Machine crating, if required
- Hydraulic quick change clamping on lower table
- ECPL lockout tags



## Specifications

	VW-4i1 H	VW-6i2 H (-i3)	VW-8i4 H (-i5, -i6)
<b>MECHANICAL</b>			
<b>Weight:</b>	Approx. 4,500 lbs. (2,040 kg)	Approx. 5,000 lbs. (2,268 kg)	Approx. 6,500 lbs. (2,720 kg)
<b>Overall Dimensions:</b>	76" wide x 77.5" high x 48" deep (1930 x 1969 x 1220 mm)	88" wide x 77.5" high x 48" deep (2235 x 1969 x 1220 mm)	100" wide x 77.5" high x 48" deep (2540 x 1969 x 1220 mm)
<b>Lift table:</b>			
<b>Overall:</b>	33.5" long x 21" deep (851 x 534 mm)	46" long x 21.5" wide (1168 x 546 mm)	58" long x 23" wide (1473 x 584 mm)
<b>Central opening:</b>	23.5" long x 11.5" wide x 1.3" deep (597 x 292 x 33 mm)	38" long x 11.5" wide x 1.75" deep (965 x 292 x 44.4 mm)	50" long x 11.5" wide x 1.75" deep (1270 x 292 x 44.4 mm)
<b>Drive platen:</b>			
<b>Overall:</b>	<b>i1 H</b> 15.4" long x 14.8" wide (390 x 376 mm)		
	<b>i2 H, i3 H</b>	34.6" long x 14.8" wide (880 x 376 mm)	
	<b>i4 H, i5 H, i6 H</b>		50.2" long x 14.8" wide (1276 x 376 mm)
<b>Front opening:</b>	39" wide x 25" high (991 x 635 mm)	51" wide x 25" high (1295 x 635 mm)	63" wide x 25" high (1600 x 635 mm)
<b>Variable stroke:</b>	20" (508 mm) maximum	20" (508 mm) maximum	20" (508 mm) maximum
<b>Noise level:</b>	83 dBA standard	83 dBA standard	83 dBA standard
<b>Drive power:</b>	15 kW	15 kW / 30 kW	30 kW
<b>ELECTRICAL</b>			
<b>Power requirements:</b>	480 VAC, 20 amps, 3 phase, 50/60 Hz	480 VAC, 20 amps, 3 phase, 50/60 Hz	480 VAC, 20 amps, 3 phase, 50/60 Hz
<b>Output frequency:</b>	180 - 240 Hz variable	180 - 240 Hz variable	180 - 240 Hz variable
<b>Ambient temp:</b>	32 - 105° F (0 - 40° C)	32 - 105° F (0 - 40° C)	32 - 105° F (0 - 40° C)
<b>PERFORMANCE</b>			
<b>Driven platen fixture weight capacity:</b>	<b>i1 H</b> 44-88 lbs. (20-40 kg)		
	<b>i2 H, i3 H</b>	i2 H: 77-143 lbs. (35 - 65 kg) i3 H: 88-154 lbs. (40 - 70 kg)	
	<b>i4 H, i5 H, i6 H</b>		i4 H: 121-188 lbs. (55 - 85 kg) i5 H: 132-200 lbs. (60 - 90 kg) i6 H: 132-200 lbs. (60 - 90 kg)
<b>Max. clamp force:</b>	4,000 lbs. (17.8 kN)	6,000 lbs. (26.7 kN)	6,000 lbs. (26.7 kN)
<b>Amplitude range:</b>	0.020" to 0.070" (0.5 to 1.8 mm)	0.020" to 0.070" (0.5 to 1.8 mm)	0.020" to 0.070" (0.5 to 1.8 mm)
<b>Lift table speed:</b>	10"/sec. (254 mm/sec.)	10"/sec. (254 mm/sec.)	10"/sec. (254 mm/sec.)
<b>Total dry cycle time (without welding):</b>	5.0 sec. (at 20" [508 mm max.] stroke)	5.0 sec. (at 20" [508 mm max.] stroke)	5.0 sec. (at 20" [508 mm max.] stroke)

## BRANSON

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

**Warranty:** The HyLine-2i Vibration Welder Models VW-4i1 H, VW-6i2 H (-i3), and VW-8i4 H (-i5, -i6) are warranted to be free from defects two years for parts and one year for labor from the date of shipment.