

BRANSON



HyLine-2 Series
Model VW-8H-2
Linear Vibration Welder

HyLine-2 Model VW-8H-2 Linear Vibration Welder



GENERAL DESCRIPTION: Branson, the pioneer in vibration welding with over 40 years of real-life production experience, introduces an enhanced version of its popular HyLine Series linear vibration welders. Branson's HyLine-2 Series welders are complete assembly systems designed to weld large or irregularly-shaped parts.

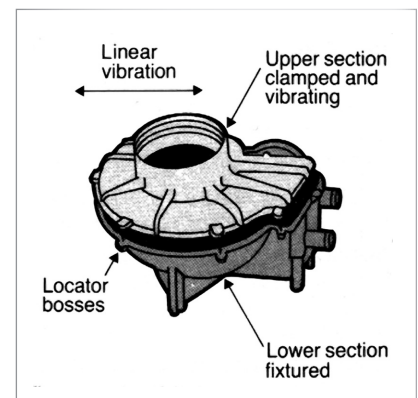
The VW-8H-2 handles parts up to 58" by 22" (1473 by 559 mm), or multiple smaller parts.

The VW-8H-2 has 17.4 kW power supplies and has an adjustable vibrating frequency range of 180 to 240 Hz. Modular construction allows the individual components, i.e., vibrator assembly and power supply/controller, to be adapted to automated or custom systems.

Process Description

Vibration welding is a proven friction welding technique 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 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 58"/1473 mm long or 22"/559 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 technique 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, polyethylene, 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

The primary markets and applications for vibration welding include the following (also see photo below right):

Automotive

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

Medical

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

Appliance

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

Business/Consumer Electronics

- Toner cartridges
- Door stiffeners
- Display assemblies
- Circuit board encapsulation

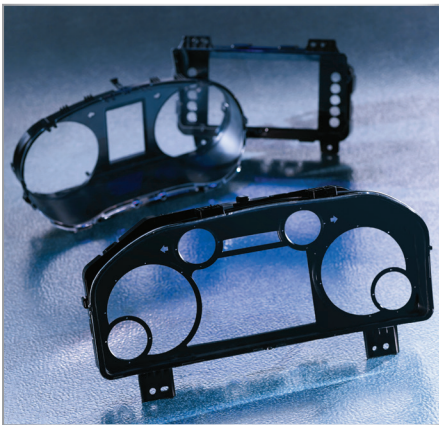
Packaging

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

Vibration Welding

Standard Machine Description

- **Machine Frame** - Welded construction of steel tubing and profiles incorporates four height-adjustable rubber mounts to allow both machine leveling and absorption of mechanical vibrations.
- **Vibrator Housing** - A rigid steel welded assembly houses the individual vibrator components; the main assembly areas are precision machined.
- **Vibrator** - The electromagnetic principle of Branson's vibrator assembly is patented and operates in a linear mode. The vibrator assembly consists of a set of laminations and four cantilever springs suspended from the vibrator housing. Electromagnets mounted in the housing act directly upon the mechanical suspension producing a peak-to-peak reciprocating displacement of 0.040 to 0.070 inch (1.02 to 1.8 mm) at 240 Hz. The springs return the vibrator to the precisely-aligned position when the electromagnets are de-energized, ensuring final part alignment.
- **Sound Protection Cabinet** - The sound protection cabinet is lined with sound absorbing material. An automatic vertical sliding access door with acoustic lining is incorporated in the front of the cabinet. For operator safety, the door automatically retracts if the start buttons are released before the door is closed.
- **Door Drive** - The two major components for the door drive are an air cylinder and specially designed and selected plastic and steel elements to provide smooth and consistent movement.
- **Rear Access Door** - The rear panel of the machine is fitted with a full-size, interlocked door to allow full access to the internal machine components.
- **Hydraulic Clamp Power System** - completely self-contained with drip pan, is located inside the rear access door.



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. 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 24" 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 hook up a computer and log the weld parameters over a period of time. The data can then be manipulated 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 0.040" and 0.070" (1.02-1.8 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 hold force to secure the parts as they cool after welding.
- **Amplitude profiling** - Four programmable amplitudes are available for controlling welding.
- **Six outputs and three inputs** are available for tooling functions. An additional 32 I/Os are optional.

ORDERING INFORMATION

Branson EDP No.

Model VW-8H-2 300-101-097

Available Options

- Light curtain
- External work light
- Special paint
- Duplex electrical outlet (120 V) exterior mount
- Dual lift cylinders (provides 21"/533 mm stroke and table opening depth of 12.5"/317 mm)

Specifications

VW-8H-2

MECHANICAL

Weight	Approx. 6,500 lbs. (2,720 kg)
Overall Dimensions	99" wide x 73.5" high x 46" deep (2515 x 1867 x 1168 mm)
Lift table	
Overall	58" long x 23" wide (1473 x 584 mm)
Central opening	50" long x 11.5" wide x 1.75" deep (1270 x 292 x 44.4 mm)
Drive platen	
Overall	52" long x 18" wide (1321 x 457 mm)
Central opening	43" long x 12" wide x 8" deep (1092 x 305 x 203 mm)
Front opening	61" wide x 25" high (1550 x 635 mm)
Variable stroke	20" (508 mm) maximum
Noise level	83 dBA standard
Drive power	17.4 kW
Air Requirement	80 psi minimum
Table to Spring Distance	24" (610 mm)
Head Lift Option	3" (76.2" mm)

ELECTRICAL

Power requirements	480 VAC, 30 amps, 3 phase, 50/60 Hz
Output frequency	180 - 240 Hz variable
Ambient temp	32 - 105° F (0 - 40° C)

PERFORMANCE

Driven platen fixture weight capacity	110 lbs. (50 kg) recommended (120 lbs. (54.4 kg) maximum)
Max. clamp force	6,000 lbs. (26.7 kN)
Amplitude range	0.040" to 0.070" (1.0 to 1.8 mm)
Lift table speed	10"/sec. (254 mm/sec.)
Total dry cycle time (without welding)	5.0 sec. (at 20" [508 mm max.] stroke)

Americas

Branson Ultrasonics Corp.
41 Eagle Road
Danbury, CT 06810, USA
T: 203-796-0400
F: 203-796-0450
www.bransonultrasonics.com

Europe

Branson Ultraschall
Niederlassung der Emerson
Technologies GmbH & Co. OHG
Waldstrasse 53-55
63128 Dietzenbach, Germany
T: +49-6074-497-0
F: +49-6074-497-199
www.branson.eu

Asia

Branson Ultrasonics (Shanghai) Co., Ltd.
758 Rong Le Dong Road
Song Jiang, Shanghai, PRC, 201613
T: 86-21-3781-0588
F: 86-21-5774-5100
www.branson-china.com

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-2 Vibration Welder Model VW-8H-2 is warranted to be free from defects two years for parts and one year for labor from the date of shipment.