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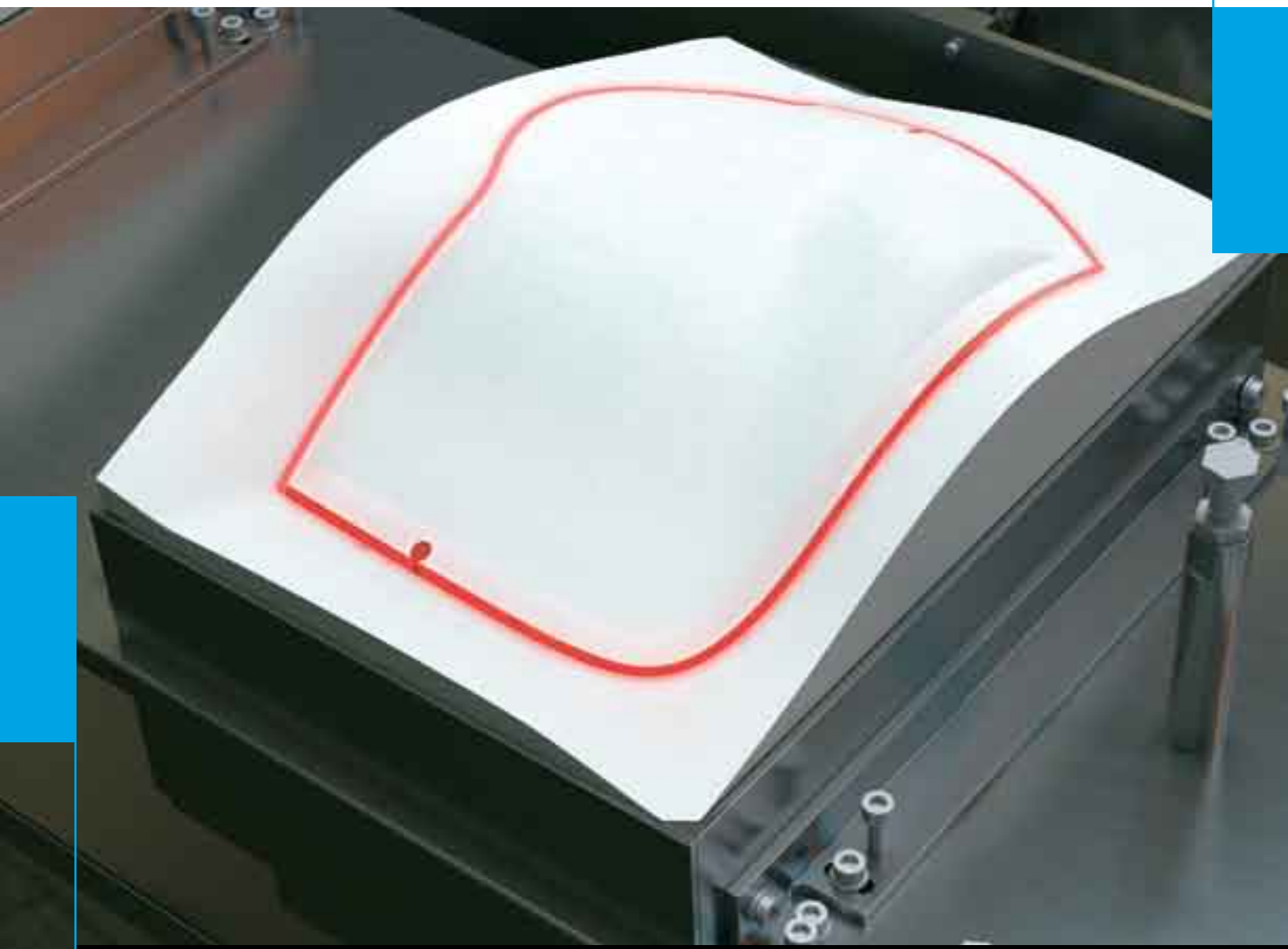


Clean Vibration Technology

For Parts Demanding Particulate-free and Aesthetically Clean Plastic Weld Joints

EMERSON
Industrial Automation

BRANSON Clean Vibration Technology (CVT)

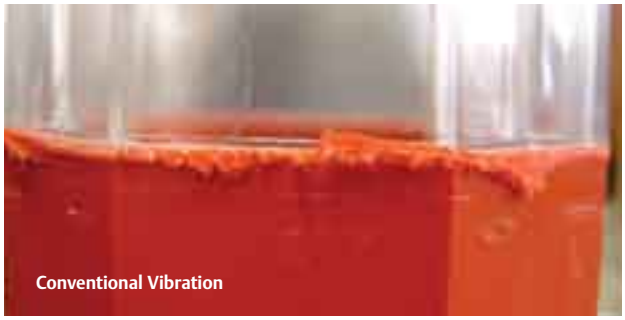
Vibration Welding with IR Preheat

Important trends in the plastics industry have raised the standards for plastic weld joints. The increasing use of low-viscous polymers, high-temperature formulations, functional fillers, and the need for superior bonding of unlike materials have added complexity to the plastic assembly process. Designers are demanding parts with particulate-free, visible weld lines, giving them design flexibility, part integrity, and manufacturing efficiency in their products.

A metal-foil filament imbedded in ceramic preheats the weld lines before vibration begins, allowing the two parts to be joined without the effects from dry solid-solid vibration.

BRANSON CVT answers the challenges of a changing industry:

- **Clean, clear, weld-bead aesthetics –** Welds are virtually free of the particulates and "angel hair" that can undermine aesthetics, require downstream manufacturing to remove flake-off, or compromise end-product performance.
- **Engineering design flexibility –** With such clean optical joint welds, engineers can incorporate the weld lines into their product designs, including complex 2D and 3D moldings.
- **Range of tool configurations and options –** A wide range of tool weights and other options include additional infrared zones, part present sensing, centering slides and bar code scanning.
- **Maximum energy efficiency –** The CVT process uses "wavelength matched" metal-foil IR emitters that provide optimum energy with the same absorption characteristics of typical technical polymers; this produces a faster, more efficient melt, thus saving time and energy used in the joining process.
- **A range of applications:** CVT is ideal for clean, precision joining of such parts as automobile taillights, fluid reservoirs, or any part or product that requires a clean weld that maximizes aesthetics, integrity, or functionality.



Conventional Vibration

Clean Vibration

How Clean Vibration Technology Works

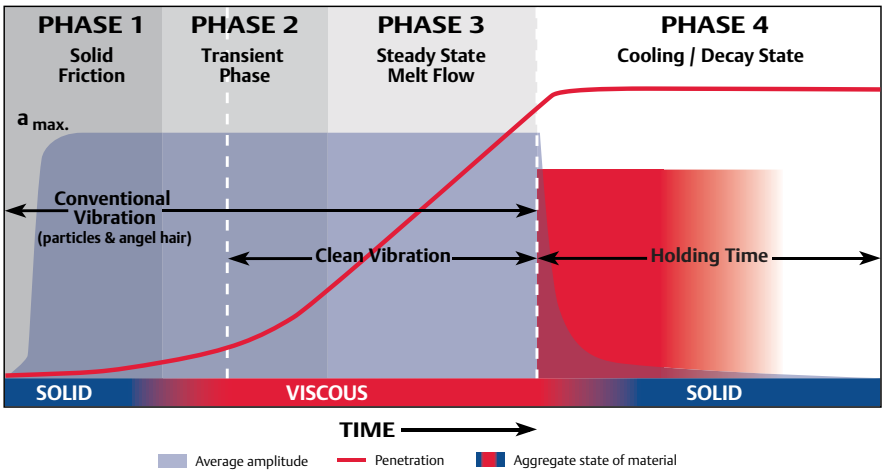
CVT Process Overview

A ceramic fixture houses a metal-foil infrared emitter that conforms precisely to the joint lines of the two parts to be assembled.

Parts to be joined are positioned above and below the emitter and brought close to it without touching.

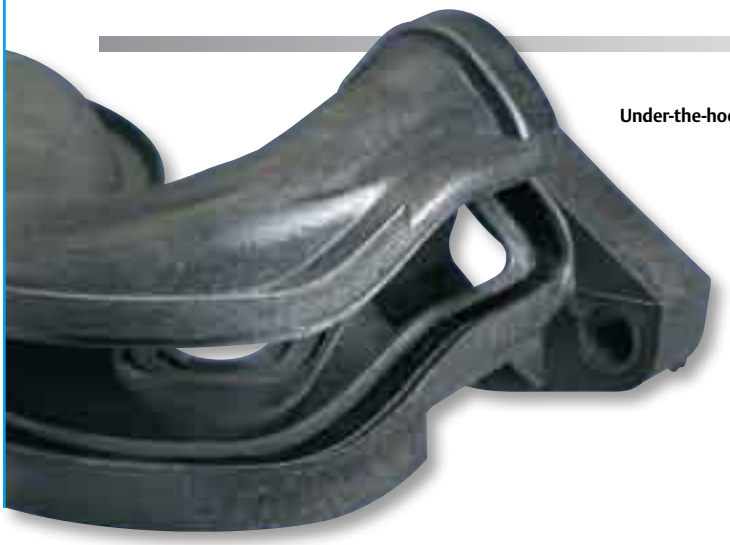
The metal-foil emitter heats the joint planes along the weld lines, and once plasticization occurs, the emitter is removed, the two parts are brought together under pressure, and vibration begins.

The vibration weld process with non-contact plasticization allows joining of molten layers of plastic with no solid-solid friction, ensuring uniform material flow while preventing particulate generation.



Once optimal weld depth is reached, vibration stops and joined parts cool into a single, clean-vibration joint, with no “angel hair” by-product and with excellent mechanical properties.

Preheating allows delay of vibration until the viscous stage, avoiding the particulates that result from friction of dry solid-solid vibration.



Under-the-hood part

Close-up of under-the-hood part showing molten edge ready to be sealed.

User Interfaces Provide Advanced Process Control and Monitoring

To ensure a clean plastics weld, the CVT Manual and Automatic User Interfaces allow for a comprehensive array of adjustments with multiple settings in nearly every phase of operation, including the following:

- Adjustments to part position
- Adjustments to infrared emitter position and distance to joint plane
- Increase or decrease in infrared heating time
- Increase or decrease in infrared heating intensity
- All adjustments common to vibration weld process
- Amplitude, weld time, meltdown depth, etc.

Welding Controller VC 100

The Branson Controller VC 100 provides features for the full range of process requirements, from melt parameters, machine cycle and manual functions, to welding, tuning, shutdown, special functions, database, and more.

Manual Functions

The Manual Functions Interface features settings for manual operation of welder motions, tool movement, lift table settings, and vibration amplitude.

Welding Parameters and Machine Cycle

The Parameter Monitoring interface allows users to adjust and monitor IR current, voltage and heating time, vibration weld time, force, amplitude, and weld depth. The Machine Cycle interface allows total control over automatic cycle configuration and sequencing.

Proven in Applications Requiring Superior Aesthetics and Rugged Performance

The clean, clear joint lines in taillight assemblies allow designers to incorporate weld lines into the taillight lens design.

Taillight Close-up

CVT clean-joining technology virtually eliminates particulates and contaminants in air, fuel, oil, and water reservoirs and conduits.

True Global Support & Service

Every BRANSON CVT installation is backed by our proven commitment to providing superior global technology, support, and customer service through a worldwide network of 70 offices. Branson is part of the Industrial Automation division of Emerson, a diversified international manufacturing and technology company committed to developing technological breakthroughs that enhance the performance of a wide range of products and processes.

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The Branson Advantage

Specifications

	VW-6i2 HRi (-6i3 HRi) For parts with weld area up to 300 cm² (PP, .5 MPa)		M-624 HRi For parts with weld area up to 500 cm² (PP, .5 MPa)	
MECHANICAL				
Weight	Approx. 5,000 lbs. (2,268 kg)		Approx. 13,000 lbs. (5,893 kg)	
Dimensions	**Inches**	**Millimeters**	**Inches**	**Millimeters**
Machine	88" W x 77.5" H x 72" D	2235 x 1969 x 1829 mm	108" W x 88" H x 87" D	2743 x 2235 x 2210 mm
Lift Table	46" L x 21.5" W	1168 x 546 mm	52.4" L x 23.1" W	1330 x 540 mm
Lift Table Variable Stroke	20" max.	508 mm max.	19.7" max.	500 mm max.
Weld Head Drive Platen	34.6" L x 14.8" W	880 x 376 mm	36.2" L x 21.3" W	920 x 540 mm
Open Height (Table to Weld Head)	24.2" max. 4.2" min.	615 mm max. 107 mm min.	29.5" max. 9.8" min.	750 mm max. 250 mm min.
Lift Table Center Opening	38" L x 11.5" W x 1.75" D	965 x 292 x 44.4 mm	33.3" L x 9.8" W x 4.2" D	846 x 250 x 106 mm
Machine Front Door Opening	51" W x 25" H	1295 x 635 mm	53" W x 30" H	1345 x 766 mm
ELECTRICAL				
Power Requirements	480 VAC, 50 A, 3 phase, 50/60 Hz		480 VAC, 50 A, 3 phase, 50/60 Hz	
Output Frequency	200 to 240 Hz variable		200 to 240 Hz variable	
Weld Head Drive Power	15/30 kW		30 kW	
Ambient Temperature	32 to 105°F (0 to 40°C)		32 to 105°F (0 to 40°C)	
PERFORMANCE				
Weld Head Weight Capacity	i2: 77 to 143 lbs. (35 to 65 kg) i3: 88 to 154 lbs. (40 to 70 kg)		77 to 143 lbs. (35 to 65 kg)	
Typical Weld Area Capacity (PP, Press=.5 MPa)	i2: 23 in.² (150 cm²) i3: 47 in.² (300 cm²)		78 in.² (500 cm²)	
IR Heaters	2 @ 30 A (up to 8 optional)		4 @ 30A (up to 10 optional)	
Maximum Part Clamp Force	6,000 lbs. (26.7 kN)		6,000 lbs. (26.7 kN)	
Weld Head Amplitude Range	0.040" to 0.070" (1.0 to 1.8 mm)		0.040" to 0.070" (1.0 to 1.8 mm)	
Lift Table Speed	10"/sec. (254 mm/sec.)		10"/sec. (254 mm/sec.)	
Noise Level	85 dBA TWA		85 dBA TWA	
Total Dry Cycle Time (w/o IR heating or vib. welding)	12 sec. (at 20" [508 mm max.] stroke)		12 sec. (at 20" [508 mm max.] stroke)	

Branson is committed to not only engineering and supplying CVT equipment to meet your needs, but also to providing applications support, employee training, troubleshooting, and ongoing customer service so that your equipment continually operates as expected. To learn more about Clean Vibration Technology, contact your BRANSON representative or call the BRANSON office in your area.

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

All specifications subject to change without notice. All dimensions are nominal.
Note: All sales shall be subject to the Supplier's terms and conditions of sale as described in Branson's quotations and sales contracts.

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