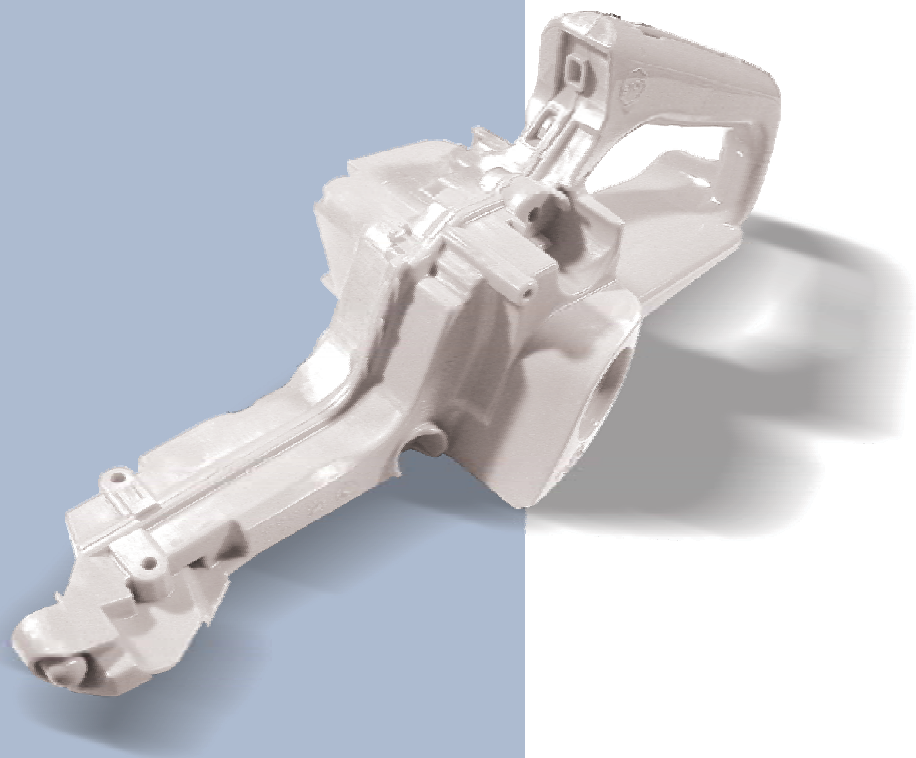




Complete Process Control  
Linear Vibration Welder



**KLN Ultraschall**  
A Crest Group Company



PLASTICS WELDING TECHNOLOGY  
Thermo · Ultrasonic · Vibration · Spin Welding



# V I B R A T I O N   W E L D I N G

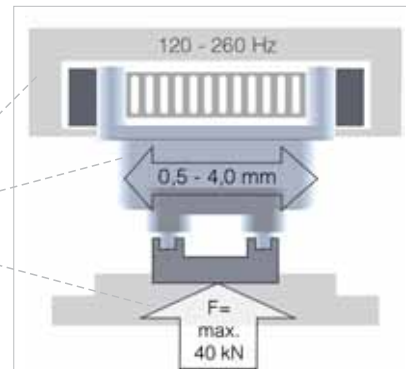
## The LVW-Series

In vibration welding the welding surfaces are heated up and melted by a friction movement. Like in all other welding procedures they are welded under pressure. The important parameters are:

frequency -----

amplitude -----

welding pressure -----



The welding process consists of 4 phases. Optimum welding conditions are achieved with the CPC technology submitted for patent application (please see CPC).



### Typical applications

in the automotive industry: e.g. spoilers, instrument panels, glove boxes, deposit shelves, motor covers, servo-oil reservoirs, filters, trim strips and shock absorbers, suction pipes.

in the home appliances industry: e.g. for washing machine parts, base plates of tumble driers, door reinforcements.

General technical products: e.g. motor saw housings, siphon traps for water drains, gas counters, printer cartridges etc.



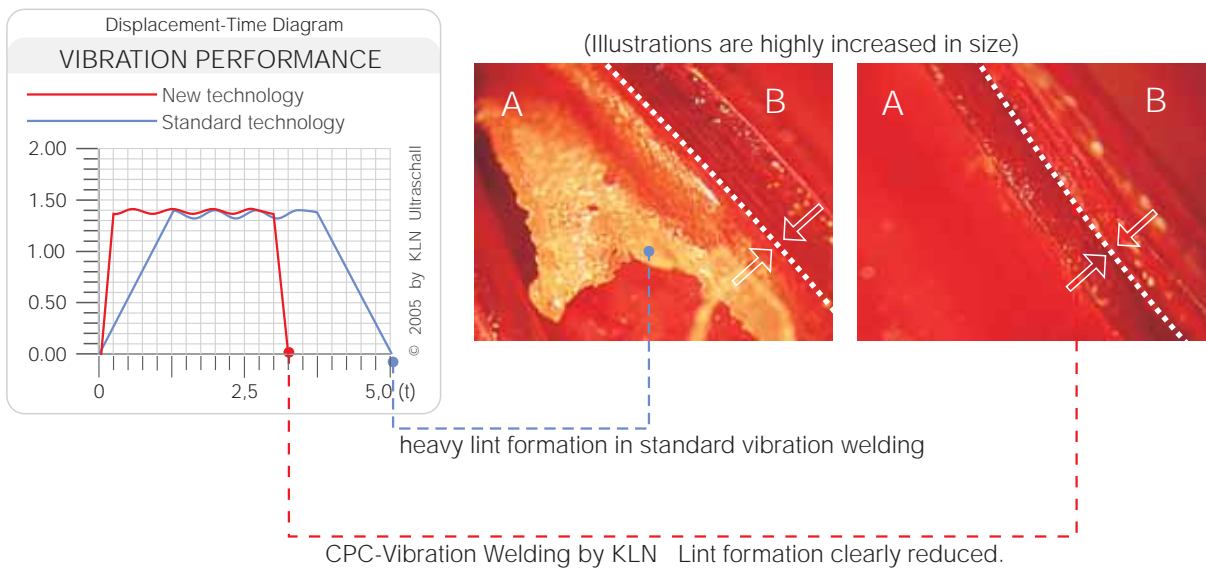
## Quality control

and process data monitoring by normative/actual value comparison. During each welding operation a touch panel (TP) displays additionally, graphically or in a description field, the actual value of each welding parameter set by the operator (e.g. pressure, amplitude, displacement and time). The system controls and compares simultaneously the entered data with the actual values while the entered data is considered as a limiting value.

In the case of this value falling below or exceeding the TP displays an error message. A restart is possible only after acknowledging the error. Error messages may also be collected automatically via a printer (interface RS 232 on the TP). The parameter protocol can be printed either for each welded part or e.g. after a number of 10 or 100 parts. In practice it is frequently started with a print after each 10<sup>th</sup> part which is increased to each 100<sup>th</sup> part in the failure-free production phase. The settings can vary between 1 and 999 parts.

## CPC Complete Process Control

Direct comparison between standard systems and the innovative CPC technology by KLN.



CPC - Complete Process Control guarantees a controlled vibration startup under load and an active braking with 60 ms as well as optimum vibration performance during the whole welding process. In combination with the two-coil technology an increase in efficiency by more than 50 % in comparison with standard vibration technology is achieved. The customer benefits from shorter welding process periods of approx. 30 - 40 % and a reduction of lint formation. Above this the active braking reduces the mechanical stress of the welding seam during the cooling phase.



# The LVW-Series

## Frequency

up to max. 260 Hz. makes short friction welding times possible and increases productivity. All models are also available with low frequency of approx. 120 Hz and increased amplitude up to approx. 4 mm.

## Amplitude control:

As standard the machine is fitted with a new amplitude control (in connection with the time-pressure levels). With this technology the amplitude is automatically modified during the different welding phases.

## Welding power

to be selected in up to 8 steps, analogously to the weld and time profiles with actual value acquisition and parameterization. Pressure display as actual value in N (power).

## Lifting table:

Displacement measuring system for lifting table with actual value acquisition and parameterization. Particularly important for the application of various tools (data saved in the tool program).

## Control of welding displacement

with high-precision laser technology as actual value acquisition and parameterization, to be selected in up to 8 steps.

## Energy control

as actual value acquisition with parameterization in J (Joule)

**Operating modes:** The standard version with SPS and TP offers the following modes:

- **time welding.**  
control of the weld displacement parameters
- **displacement welding - total stroke**  
control of the weld time parameters
- **travel welding - welding depth**  
The displacement measurement is realized by means of the latest laser technology. Tolerance +/- 0.05 mm.  
In order to avoid measurement errors by vibrations the measurement takes place inside the oscillating system (head bridge, clamping table).

## Automatic frequency resonance control (AFRC):

Automatic single search run in connection with the CPC, approx. 1 s, in case of tool exchange or commissioning of a new tooling.

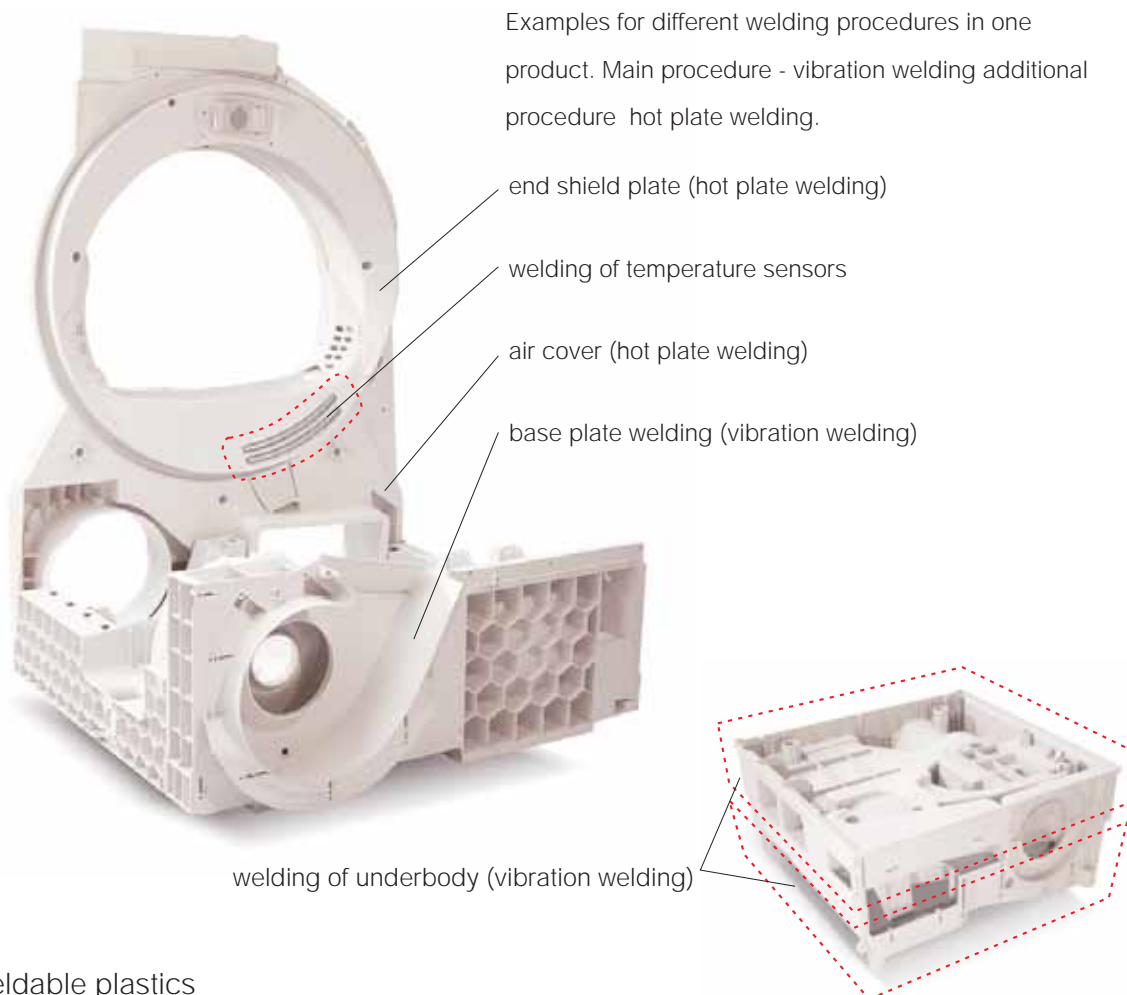


# The LVW-Series

Principal advantages of the vibration welding technology:

- Welding of a continuous seam also in large parts, like the welding of air channels in I-panels
- Principle of local heating up due to friction only at the welding surfaces
- Low energy consumption
- Very short welding times in a range of seconds
- Extensive material range for almost all thermoplastics

In this way critical thermoplastics like polyamides and different thermoplastics like PMMA with PC and ABS can also be easily combined. Apart from this a solid combination can also be achieved with different materials like composite wood material with thermoplastics.



## Weldable plastics

Semi-crystalline, non-reinforced or reinforced materials are of particular importance, e.g. in all polyamides also with glass fiber portion and other reinforcement components in PE, non-reinforced or with reinforcement components like e.g. talcum. Additionally all important material for the manufacturing of machined parts, like e.g. ABS, SAN, PC, PMMA, PBT and blends like e.g. PP/EPDM, PC + PBT, PPE + PA or welding of plastics with other materials like textile and resin bound fiber material as well as composite wood material.



### Operating device

In its basic version the machine is equipped with a SIEMENS touch panel TP 270 (6 or 10" screen). The parameters which are relevant for the welding quality are shown as a graphic after each welding cycle for each part. The graphic can be printed by means of the serial interface.

On a display the parameters, the trouble shooting and the operating instructions are shown in plain text. Apart from this the manual functions can be selected via the operating device. The parameters can be modified by the integrated operational and numerical keys. In addition, they can be saved as a 5-digit code number.



### Electrical control

The freely programmable PLC Siemens S7 is installed in a standardized electrical cabinet. This can either be flanged to the machine or placed separately. In automatic production lines for example this separate placement is recommended.

### Noise protection cabin

consisting of cassette elements with mineral wool, thickness approx. 100 mm.

To facilitate the assembly procedure, the noise protection housing is divided and equipped with a quick-locking mechanism. For maintenance purposes the rear side is provided with a lockable double-wing door with safety switches. The complete equipment is placed free-standing on the floor.

The operator's side is equipped with a vertically movable pneumatically operated protective door with integrated safety bar. The safety bar stops the closing movement upon contact.

With the CPC system the noise level is reduced to lower than 78 dB according to the German standard DIN 45 635. The protection door is equipped with a window made of double safety glass.



# The LVW-Series



## Tooling

State-of-the-art tooling design for all applications taking into account sensitive visible surfaces, like lacquered, leathered, fine-grained or foamed surfaces.

Manufacturing and optimization according to customer CAD data.

## The Models of the LVW-Series



Modell	LVW 2020	LVW 2046/40	LVW 2046/50
Frequency of vibration head (Hz)	260	260	260
Amplitude (mm)	0,35 - 2,0	0,35 - 2,0	0,35 - 2,0
Welding surface (cm <sup>2</sup> )	up to 110	up to 200	up to 300
Dimensions of lifting table (LxW mm)	520 x 520	1000 x 500	1000 x 500
Max. welding pressure (kN)	4,7	19,8	19,8
Weight of upper tooling (kg) max.	15	40	50
Touchpanel - Unit (Zoll)	6 "	6 "	6 "
Option: 10 "			

Modell	LVW 2061	LVW 2261	LVW 2371
Frequency of vibration head (Hz)	260	240	100 - 180
Amplitude (mm)	0,35 - 2,0	0,35 - 2,00	0,35 - 2,00
Welding surface (cm <sup>2</sup> )	up to 300	up to 450	up to 600
Dimensions of lifting table (LxW mm)	1550 x 500	1550 x 560	1800 x 600
Max. welding pressure (kN)	31,4	40	40
Weight of upper tooling (kg) max.	50	120	180
Touchpanel - Unit (Zoll)	6 "	10 "	10 "

All models are also available with low frequency of approx. 120 Hz and increased amplitude up to approx. 4 mm.



Founded in 1947

by the physicist Dr. Lehfeld and known since 1972 as KLN Ultraschall, we are today one of the leading European manufacturers of machines and equipment for welding thermoplastic parts and ultrasonic cleaning technology in Europe.

In January 2000 KLN Ultraschall has joined the Crest Ultrasonics Corp., USA/Trenton, New Jersey, a group with international activities. All over the world a staff of more than 1,000 employees works on 20 locations in 12 countries. The complex technologies of plastics welding and ultrasonic cleaning are the main activities of the Crest Group. Currently at the German locations in Heppenheim and Fürth an expert team of 160 employees works on complex customer projects.

### Plastic welding technology

Standard machines for ultrasonic welding, ultrasonic multi-head machines, ultrasonic continuous welding for aluminum foil or thermoplastics, special machines, vibration welders, spin welders, hot plate welders, processing machines for plastics fuel tanks.

### Ultrasonic cleaning technology

Ultrasonic vibration tanks, compact machines with drying feature, special machines, modular tank systems with agitation, rinsing, drying and rust inhibiting.

### Special brochures

Additional brochures on our product range can be downloaded from our homepage or be ordered by e-mail ([info@kln.de](mailto:info@kln.de)).