



A B O U T U S



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 180 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).



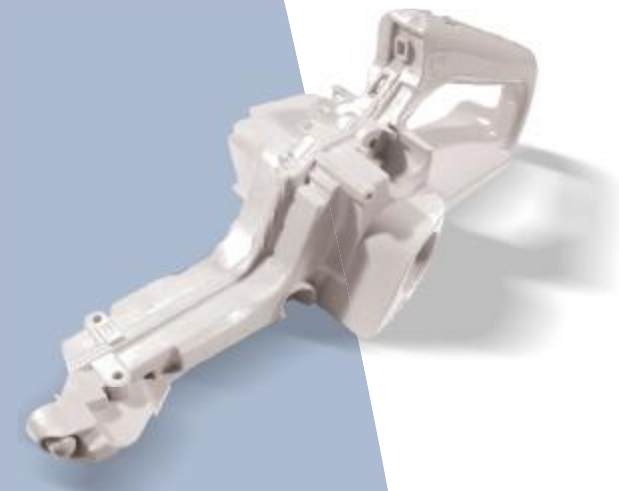
F r i c t i o n - W e l d i n g



Linear Vibration Welding
LVW - Series
Complete Process Control



Spin Welding





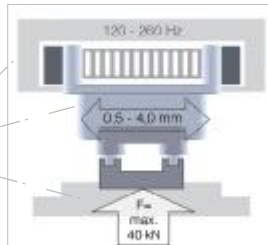
V I B R A T I O N W E L D I N G

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 ————
- peak to peak ————
- 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.

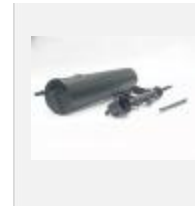
in the home appliances industry: e.g. for washing machine parts, base plates of tumble driers, door reinforcements.

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



S P I N W E L D I N G

spin welding machines in two standard sizes



Typ Omega III MCRI BLS72



Picture for small application (Omega)

Typ REK / B



Pic: standard machine with increased torque

The spin welding technology is also available as a module and thus can be used in flexible cells or special machines.



The LVW-Series

Special machines on request

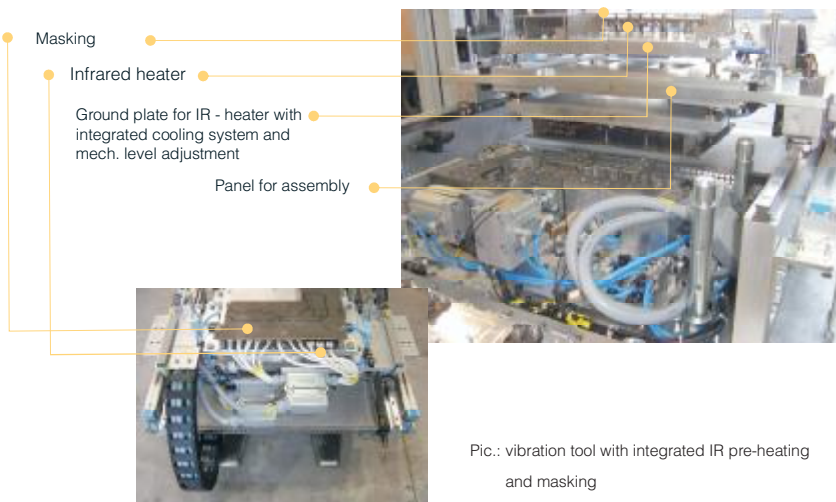
- linear vibration welder with integrated turn-table for quick loading and unloading.
- or belt-conveyor machines for loading and unloading

Vibration welders with integrated turn table.



Vibration welders with integrated infrared pre heating.

KLN offers the possibility to integrate infrared technology in all machines, or tools for minimisation of abrasion during the solid matter friction phase by pre-heating with short or medium waves.



Pic.: vibration tool with integrated IR pre-heating and masking

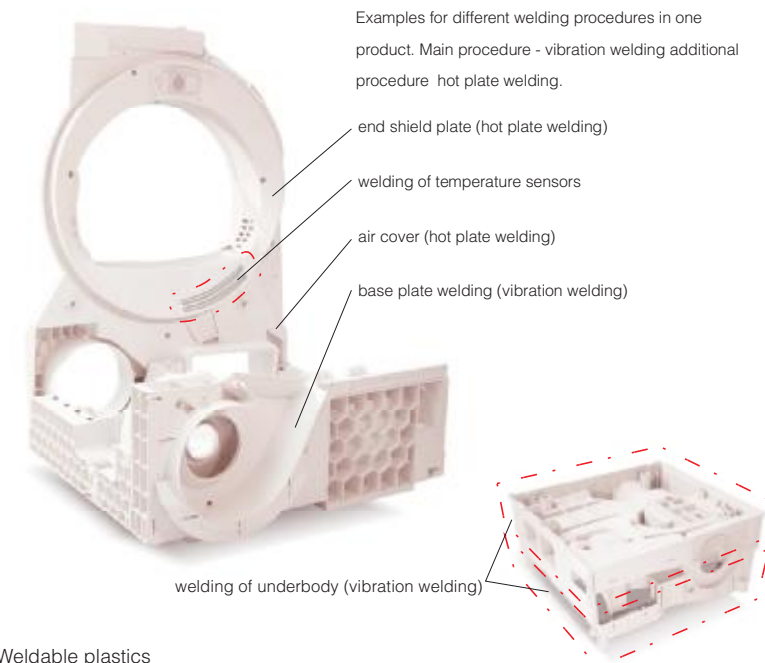


The LVW-Series

Principal advantages of the vibration welding technology:

- Welding of a continuous seam also in large parts, like the welding of air ducts 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 or amorphous materials, 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.



The LVW-Series

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	LVW2032	LVW2046	LVW2346	LVW2261
Frequency of vibration head (Hz)	-260	-260	-240	-240
Amplitude (mm)	0,35 - 1,0	0,35 - 1,0	0,35 - 1,0	0,35 - 1,0
Welding surface (cm ²)	~300	~300	~500	~500
Dimensions of lifting table (LxW mm)	800 x 500	1000 x 500	1200 x 600	1550 x 560
Max. welding pressure (kN)	12	19,8	30	30
Weight of upper tooling (kg) max.	0-40	0-50	0-80	0-80 [120]
Touchpanel - Unit (Zoll)	7 "	7 "	7 "	12 "
Drive System	Hydraulic	Hydraulic	Hydraulic	Hydraulic

Modell	LVW2261se	LVW2371	LVW2371se	LVW2871
Frequency of vibration head (Hz)	-240	100-150	100-150	100-150
Amplitude (mm)	0,35 - 1,0	0,35 - 1,80	0,35 - 1,80	0,35 - 1,80
Welding surface (cm ²)	~500	~ 600	~ 600	~ 600
Dimensions of lifting table (LxW mm)	1550 x 560	1800 x 600	1800 x 600	1800 x 700
Max. welding pressure (kN)	30	47	40	47
Weight of upper tooling (kg) max.	0-80 [120]	0-220	0-220	0-240
Touchpanel - Unit (Zoll)	12 "	12 "	12 "	12 "
Drive System	Servo.	Hydraulic	Servo.	Hydraulic

All machines are fitted with optimised frequency and amplitude regulation (starting and end phase lower than 50 ms).



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. 2 mm.

All machines are independent of the tool weight through automatic frequency adjustment

Amplitude control:

As standard the machine is fitted with an amplitude control (in connection with the time-pressure levels).

Depending on the various pressure ranges also the system amplitude may be modified during the vibration time.

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.

With this system the vibration starting phase as well as the vibration end phase can be significantly reduced. This has a positive minimising effect on abrasion and lint formation. The shortened vibration end phase improves the solidity of the welding joint.



The LVW-Series

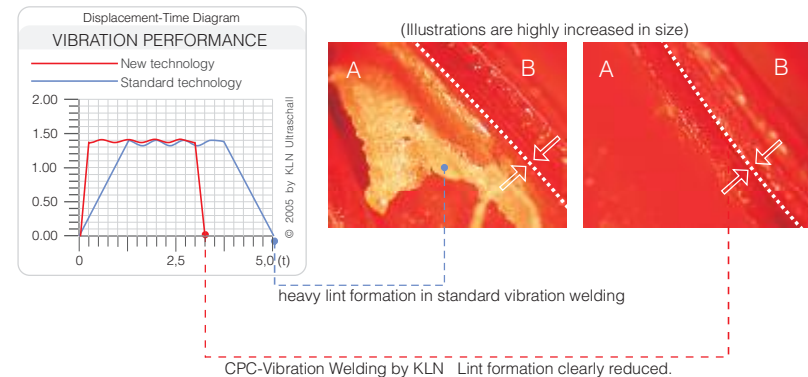
Quality control

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 10th part which is increased to each 100th 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.

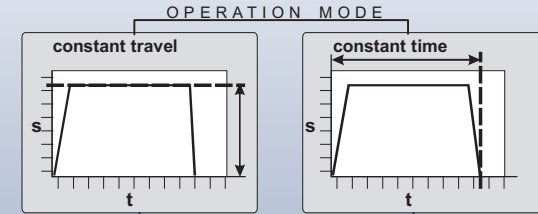
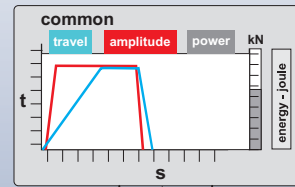
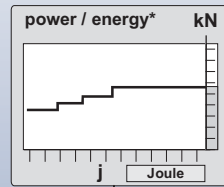
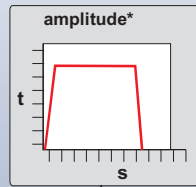
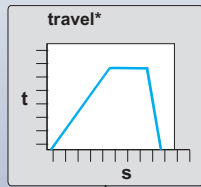


CPC - Complete Process Control guarantees a controlled vibration startup under load and an active braking with 60 ms as well as optimum vibration performance during the whole welding process. By this in combination with increased current feed capacity an increase in efficiency of approx. 50 % in comparison 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.



VIBRATION WELDING with COMPLETE PROCESS CONTROL; Automatic frequency control

Control and monitoring of frequency - amplitude - time - travel - power - energy



*Travel, power and amplitude control to be selected for up to 8 welding steps.

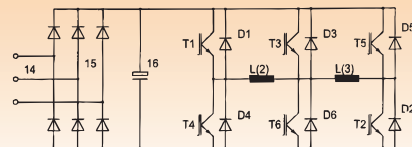
Vibration characteristics

CPC - Complete Process Control
Patent no. 10347345.9
New dimension of vibration welding. Based on a patented control for the magnetic current feed with the following positive features:

Automatic frequency control during the complete welding process with optimal adaptation on the viscosity characteristics of the plastic.
RESULT: Shorter welding times and improved quality of joints.

Regulated, shortened start of vibration in approx. 60 ms. RESULT: Shorter cold friction phase in connection with a reduction of lint formation.

Regulated braking in approx. 60 ms. RESULT: Improvement of joint quality by avoiding fissures in the welding seam.



Scheme of the digital CPC control technology



Noise protection

Substantial reduction of the noise level to lower than 75 dB using standard noise protection cabins

Lifting table and hydraulic system

Hydraulic lifting table with travel control system. Measuring of actual values and limit values. Measuring of the total stroke and of the weld travel. State-of-the-art technology with adjustment of weight to find out the advancing power and setting of the real welding power in KN. Huge exactness by laser measuring system for the weld travel. Hydraulic aggregate with short reaction times to control the welding power during the welding process.

Tools

Automatic frequency control of the tool also after tooling exchange in max. 1 s, independent of the tooling weight. ADVANTAGE: Quick, optimal adaptation and protection of the vibration system.

Automation & accessories

- Tools
- Rotary tables
- Sliding tables
- Curve control
- Combination with other procedures (e.g. ultrasonic welding)
- Robot and handling systems
- Noise protection cabins in special design
- Robot and PC interface
- Tooling quick-change systems
- Tooling transport trolleys
- Connection for IR pre-heating
- Pre-heating systems
- Leakage test
- Special lacquering