CONCRETE PRO
LASER PROJECTION SYSTEMS
for the manufacture of prefabricated concrete parts

PLACEMENT ON PALLETS.
QUICK AND PRECISE WITH A LASER.

LAP LASER
CONCRETE PRO is a laser system for the projection of line segments and outlines on work surfaces and workpieces, e.g. on circulating pallets or objects placed on these. The projected laser lines are based on your technical drawings (CAD data). The outlines are reproduced on the work surface on a one-to-one scale.

With CONCRETE PRO, you can optimise the process sequence and your production quality. In the manufacture of practically all prefabricated concrete parts, you can work faster, more flexibly and more precisely than with mechanical templates, colour plotters or other aids for measuring and positioning. Utilise projection “at the speed of light” instead of time-consuming alignment using straight edges, angles or stops.

In contrast to plotters, with which you must mark all the operations on the pallet at one time, you can call up and then process projection files on a step-by-step basis using a remote-control unit. Thanks to LAP Multicolour, it is possible to project images in different colours for different or important steps in the process. Or you can project the outline of an object onto the pallet in green and, for verification purposes, project the profile of the positioned element on its upper surface in red. After production of the concrete part, it is no longer necessary to clean the colour marks off the pallet, since the lasers do not leave any traces behind.

CONCRETE PRO is the digital laser template for prefabricated parts

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A complex projection can be limited to one or more subregions. The sections highlighted in this manner are selected on the PC using the mouse.

APPLICATION: better visibility of important locations.

Projection files are not only distributed according to the geometric arrangement of the projectors, but also automatically distribute the projection load capacity wherever projection regions overlap.

APPLICATION: to consistently project as fast as possible.
The production of prefabricated concrete parts is very demanding: architecture requires ever more complex geometries, delivery times are getting shorter, last-minute modifications are more frequent and the price must be right. Nevertheless, the dimensional accuracy and quality of the elements must be guaranteed. At Bürkle, based in Sasbach (Baden-Württemberg, Germany), they have been using LAP laser projection systematically since 2007. The projected laser contours mark cut-outs and mounting parts with millimetre accuracy on the formwork table and replace colour plotters and templates. With LAP laser technology, the company saves the time needed for plotting and removal of the drawings. In contrast to applied drawings, the laser lines can work in several planes; the items populating the pallet can either be marked on the upper surface or at the foot. At Bürkle, an additional installation supplies the precise pattern for a final check of the fully populated pallets before casting. This way, any possible defects are discovered and can quickly be corrected. Bürkle confirms that time is saved using laser projection and that the company’s high quality standards can be assured. Thus, the laser solution is much more cost-effective than using a plotter.

CONCRETE PRO – DEVELOPED FOR PERFECT RESULTS AND TESTED UNDER HARSH, EVERYDAY CONDITIONS

The Bürkle Group in Sasbach produces individually planned basements with one of the most modern and high-performance facilities for prefabricated parts in all of Europe.

An accurate projection requires a precise point of reference. For this purpose, reflectors, also referred to as targets, are fitted at precisely calibrated positions. The projector’s laser beam is steered onto the target, and the target’s position is recorded in terms of two angles. For precise projection, at least four targets are required per projector. Depending on the size of the projection surface, further targets can be useful or necessary. The targets can be recorded manually, semi-automatically or fully automatically. Manual recording is only necessary during system installation and, after any four targets have been recorded, the system switches to automatic recording. Semi-automatic recording is used for movable installations; here a maximum of four targets is prescribed. For systems that are fixed in space, the calibrations are fully automatic after the system has been installed. In the case of projection systems in a fixed installation, the targets can be mounted on floor stands to protect them from contamination and so as not to restrict the transport of the pallets, or other work surface. If the shapes and sizes of the pallets are very different, it can be useful to attach the targets directly onto the pallets. The exact position of each target is recorded photogrammetrically. Alternatively, a purely manual calibration without targets is possible.

PRECISE CALIBRATION – PRECISE PROJECTION

CALIBRATE WITH NO LOSS OF TIME, FULLY AUTOMATICALLY OR SEMI-AUTOMATICALLY – TARGETS ARE INSTALLED IN FIXED OR MOVABLE POSITIONS DEPENDING ON THE APPLICATION.

PRECISION IS EXTREMELY IMPORTANT FOR BÜRKLE. HERE IS AN EXAMPLE OF LEADERSHIP IN PRACTICE: THE FLOATING BASEMENT.
LAP has delivered laser-based projection and measuring systems for different applications all over the world since 1984. Thousands of LAP lasers are proving their capabilities every day – sometimes under very difficult working conditions. This experience is put into every LAP product and makes our systems incomparably reliable and precise.

CONCRETE PRO IS RELIABLE AND EXTREMELY PRECISE

We have developed the CONCRETE PRO Software together with engineers from prefabricated parts production. The focus is on ease of operation and avoiding operating errors. The computer screen displays the current working state as an outline drawing. If projection is underway, a changeover between contours or contracts is made with the production-standard remote-control or by using the PC. The software provides compatibility with the most important 2-D and 3-D CAD data (e.g. also for UNITECHNIK). Production data can be archived and assigned to contracts.

Performance features:
- Compatible with all CAD data formats commonly used in the field (UNITECHNIK, dxf, c4d, ...)
- Visualisation of projected shapes and process sequences
- Depiction of process operations with status recorder for production times
- Recorder for production sequences
- Documentation and archiving of projects with process operations, status, checking operations, time data, users...
- User administration
- Calibration that is adaptable to the specific situation (fully automatic, semi-automatic or manual)
- Currently the fastest automatic calibration available for fixed-location systems
- Operating elements that correspond to the complexity of the task: a remote control can be used for working on the workpiece while a keyboard and mouse can be used for more complex tasks

LAP Multicolour enables three-colour projection. The colours can be used for alerts, information or defining groups of items.

LAP Speedswitch enables colours and/or shapes to be changed in real time. There are no disruptive dwell times.
TECHNICAL DATA FOR LASER-PROJECTOR

<table>
<thead>
<tr>
<th>Laser type</th>
<th>Red: Diode, 635 nm</th>
</tr>
</thead>
<tbody>
<tr>
<td>LAP Multicolour</td>
<td>Green: DPSS (solid body), 532 nm</td>
</tr>
<tr>
<td></td>
<td>Yellow: Superposed projection of red and green</td>
</tr>
<tr>
<td>Accuracy*</td>
<td>± 0.1 mm/m**</td>
</tr>
<tr>
<td>Repeatability**</td>
<td>± 0.025 mm/m**</td>
</tr>
<tr>
<td>Beam width*</td>
<td>0.5 mm FWHM</td>
</tr>
<tr>
<td>Max. projection angle</td>
<td>80° x 80°</td>
</tr>
<tr>
<td>Laser power (output)</td>
<td>5 mW</td>
</tr>
<tr>
<td>Laser Class</td>
<td>2M (JR, 3B)</td>
</tr>
<tr>
<td>Protection Class</td>
<td>IP 54</td>
</tr>
<tr>
<td>Conditions for use</td>
<td>0–40 °C, 35–85 % rel. humidity, non-condensing</td>
</tr>
<tr>
<td>Power Supply</td>
<td>24 VDC, max. 3 A</td>
</tr>
<tr>
<td>Connection</td>
<td>RS 485, Ethernet via Interface</td>
</tr>
<tr>
<td>Dimensions (L × W × H)</td>
<td>300 × 110 × 110 mm</td>
</tr>
</tbody>
</table>
| Weight                | approx. 3 kg      **mm per m separation distance between projector and surface.

*within ± 30° range of projection, beam projected at right angles to the surface; equipment optimally focussed and calibrated; at least 30 minutes warm-up time.
CONCRETE PRO,
A QUALITY SYSTEM FROM LAP

For more than 30 years, LAP has been developing, manufacturing and distributing laser measurement systems, line lasers and laser template projectors for industrial and medical applications. LAP products are high-precision devices Made in Germany.

Using LAP laser systems, our customers improve performance and increase the quality of their products as well as the effectiveness of their processes.

As a result of continuous product innovation, LAP has become a world leader in lasers for projection and measurement. LAP products are setting the standards in a wide range of markets from manufacturing to heavy industrial environments and medical applications.

Environmental protection is important to us. We use solar panels, green electricity and roofs planted with grass. Our production is planned by standards of sustainability.

Quality has always been part of our commitment. We are content if you are. We know your high demands. To meet your requirements, the quality management of LAP is certified by DIN EN ISO 9001:2008 for industrial products and by EN ISO 13485:2007 for medical engineering products.

www.lap-laser.com/CONCRETE