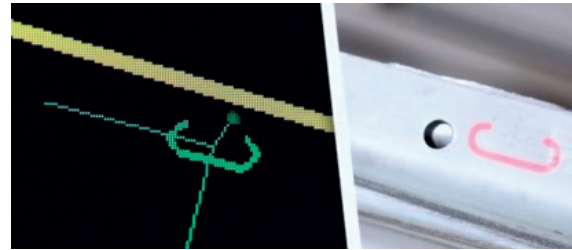
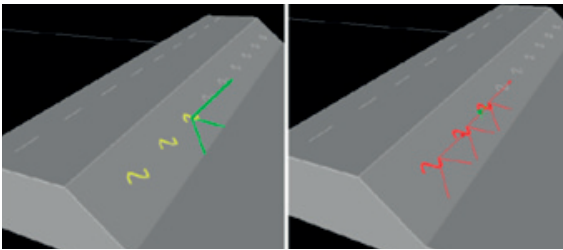


ScanControlUnit- Software Functionality

The user software of the ScanControlUnit (SCU) is a powerful tool which addresses all requirements of remote laser processing. The user is provided with the following functionality.

- Scanner system setup
- Programming and parameter settings for processing jobs
- Verification and cycle time optimization of programs
- Program execution and process control
- Monitoring of safety-related system states
- Communication with automation peripherals (such as vision systems)

An intuitive GUI and clear, easy to understand, control concepts ensure that operation of using the system can be easily learned. Comprehensive visualization and support functions allow for effective implementation of complex applications and optimal utilization of the welding system's potential.

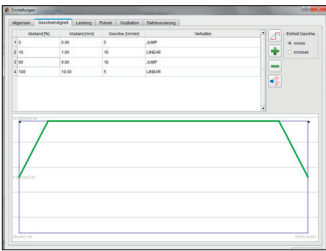


CAD based programming:

The SCU offers the ability to implement programming tasks quickly and precisely on the basis of CAD files. Processing contours can be created directly from CAD component edge information. The positions of the components can be compared with the desired situation through best-fit positioning.

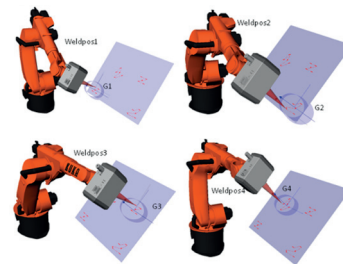
Teaching (robot interface):

The SCU features a teach mode. This teach mode lets you position a scan figure on the component easily and intuitively by moving the controlling machine - such as an industrial robot - and lets you verify correct positioning.



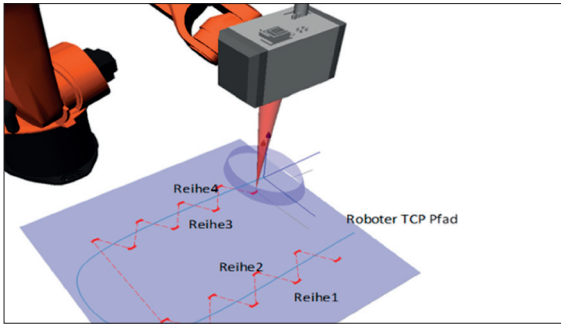
Parameter control:

You can use the SCU software to adjust and monitor the laser power, feed rate, defocus, oscillation and pulse duration parameters along the scan figure according to your requirements and have full control of the process at all times



Static processing:

Static applications can be processed effectively with the SCU. In these cases the scanner is either mounted in a fixed position in the space, or the scanner is moved by the robot and the scan processing takes place after a time delay. This method optimizes positional accuracy and ease of operation.



On the fly (optional):

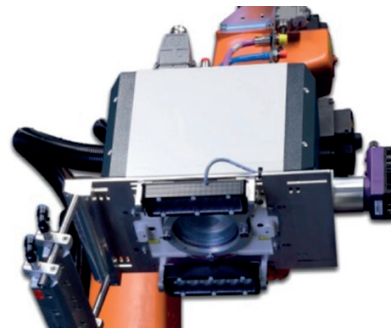
The SCU can also be used for processing of dynamic jobs in addition to the static applications. Unlike the static processing case, here the robot movement takes place in sync with the process.

On the fly processing makes it possible to achieve maximum process efficiency with minimized cycle times.



Marking (optional):

The SCU can also be used for marking components with information such as serial numbers, timestamp or ID information. This option is only available for static applications. The SCU obtains the corresponding data for every component from a web server. This option eliminates additional marking steps on external stations.



Interfacing to sensor systems (optional)

The SCU software supports linking of image processing and monitoring system. One has to distinguish between the following cases:

- Seam position correction (pre-process): An image of the component section is taken prior to the welding process. This image is analyzed automatically to determine the position of the weld seam, and any required translation and rotation information required for accurate welding is implemented. Position-critical weld seams on flat components (e.g. tube bundle heat exchangers) can be produced accurately and efficiently in this manner.
- Seam tracking (in process): The weld seam target position is determined by a camera at a high sampling rate (~100 Hz) during processing, and deviations are corrected by the scanning system in real-time. With regard to the achievable cycle times for lap fillet welds in sheet metal, this system allows for an unparalleled combination of precision and speed.
- Process monitoring: Our solutions also offer tailored interfaces to process monitoring systems. The optical and mechanical interfaces are coordinated with the respective manufacturer so that optimal operation is ensured. Supported systems include those from the manufacturers Precitec, Lessmüller, Plasmio and 4D. Time-critical control of the QS systems can also be implemented on a project-specific basis by the SCU software.

Further detailed information is available upon request.