



intelliSCAN FT and the

ScaVis camera system

Blackbird's ScannerVision solution

- For particularly demanding welding tasks
- Coaxial camera system with a large field of view
- Detection of component positions and seam positioning
- Flexible detection algorithms for difficult lighting situations



System solution
2D scanner
Machine vision

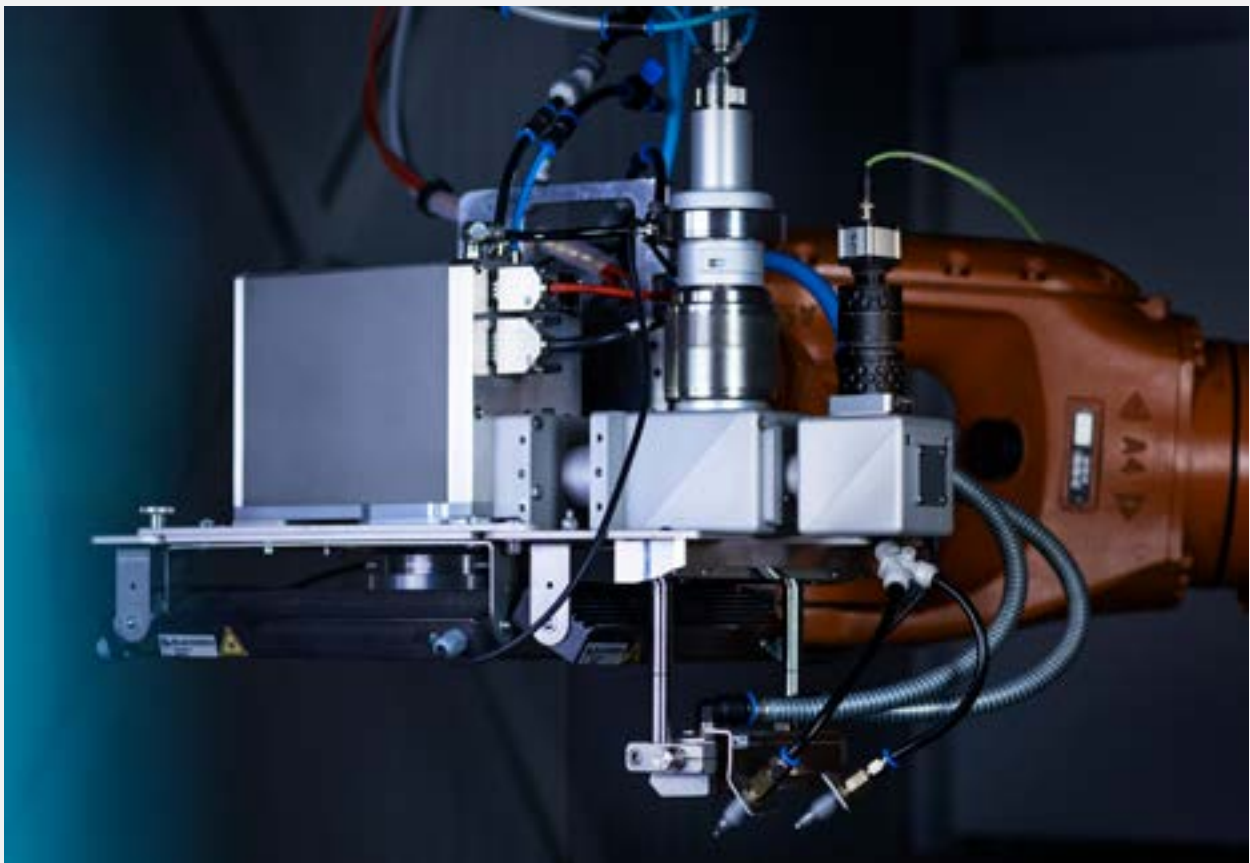
Machine Vision – The solution for particularly demanding welding tasks

For several years the topic of electromobility and the technologies associated with it have been gaining in importance and everyday life would be unimaginable without them. In this area, the efficiency and variability

of remote laser welding has led to scanners becoming the industry standard.

Depending on the component being produced tightness, conductivity or cleanliness must be guaranteed even with a large number of items. As a result, there are different demands from the industry on the laser scan systems and their peripherals.

A capability which guarantees particularly high process quality in this environment is machine vision. The technology is made possible with the combination of hardware and custom-made software, which is achieved by Blackbird by combining its proven scanner controls with the ScaVis camera system.



The e-mobility standard – the intelliSCAN FT with the ScaVis camera system

Common applications of the ScaVis camera system are:

- Welding hairpins during stator production
- Contacting conductive copper elements in power electronics
- Busbars of round or prismatic battery cells
- Electrical components for white goods
- Heat exchangers
- Bipolar plates

ScaVis – The Blackbird camera system for demanding welding tasks

Precise alignment of the laser beam requires an upstream and precise detection of the actual component position. By using a coaxial camera, an image of the working area can be created from the point of view of the scanner.

In the subsequent image processing step, relevant features are automatically captured and the true position of the component is determined.

The weld seam is then offset to the correct position relative to the recognized component features. ScaVis can be used with all Blackbird scanners and consists

of various components that Blackbird has individually optimized to meet the requirements of laser welding:

1

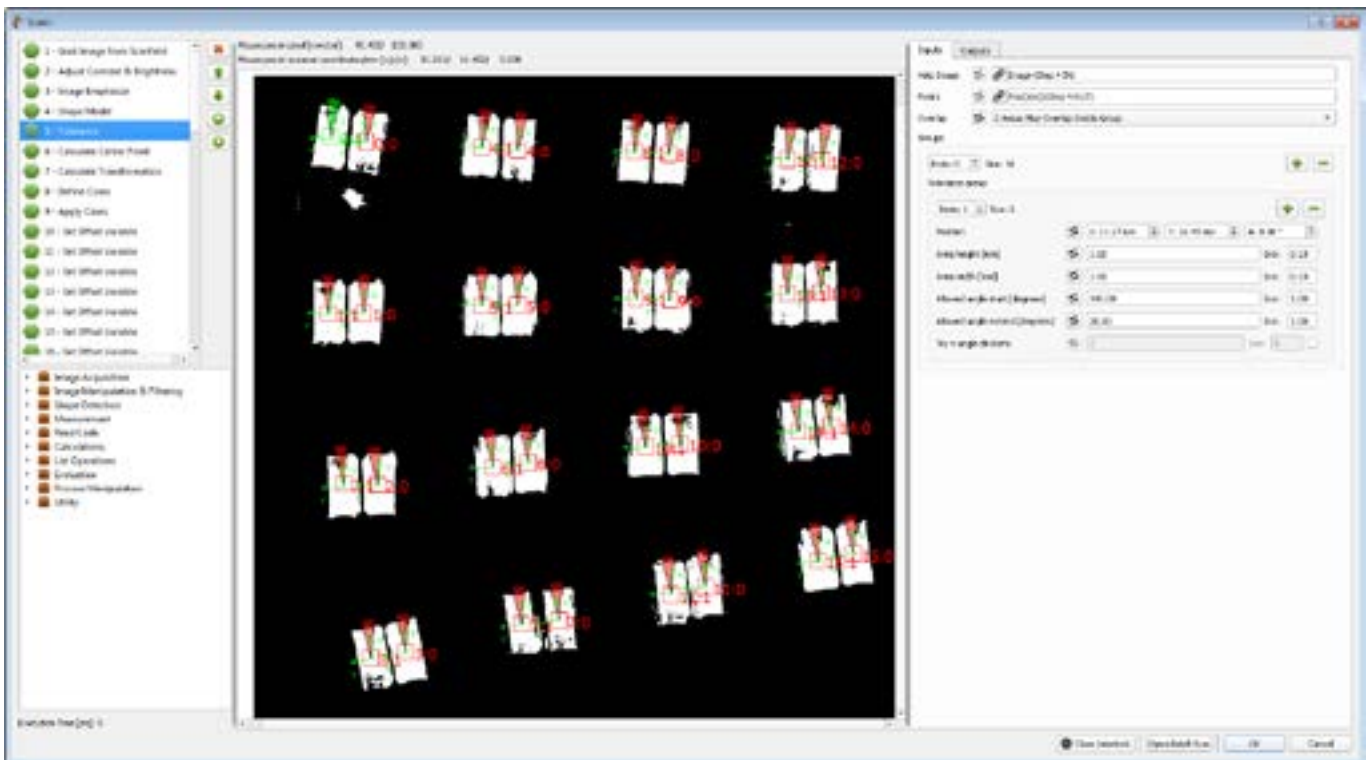
Extension of the RSU User Software
with integrated ScaVis functionality

2

Coaxial attachment
of a high-resolution camera

3

Process-specific lighting
using bar modules or a ring light



Exemplary workflow of the ScaVis image processing with multiple hairpin pairs

The ScaVis camera system is as flexible as laser welding itself. The lighting elements can be selected and flexibly controlled depending on the process. Different image processing algorithms enable a targeted and time-optimized detection of the relevant features of the part.

A selection of integrated processing steps:

- Edge extraction
- Line and individual shape recognition
- Tolerance window
- Case distinctions

The subsequent image processing chain can be parameterized individually by the user.

In the event that ScaVis identifies a component misalignment, an operator interaction can be started automatically.

In this case, the user can view a picture of the component to decide for themselves whether the process has to be aborted or whether the seam to be welded should be positioned manually.



Hairpin welding during stator production – a common process in e-mobility

The e-mobility solution – ScaVis in combination with the intelliSCAN FT

The 2D scan system with F-Theta optics and mechanically adjustable collimation is suitable both for static welding applications and for on-the-fly operation with linear axes.

The flexible choice between two different collimation and three different focusing options makes it possible to create a wide variety of spot diameters. A compact design that supports 90-degree collimators simplifies integration into machines with limited space and allows for an additional extension with the use of a beam splitter.

This allows the ScaVis camera system as well as other sensor components to be attached and used at the same time. A typical application is intelligent coaxial seam positioning with ScaVis and optical process monitoring via sensors.

With the proven combination of a Crossjet, process nozzles, a fume protection module and a supply of purged air, the buildup of process fumes and particles on optical components can be prevented and the service life of your scan system can be maximized.

Technical specifications

for intelliSCAN FT with ScaVis under the e-mobility standard

Focal length collimation	132 mm
Focal length focusing	255 mm
Optical magnification	1 : 1.93
Wavelength range	1030 - 1085 nm + NIR
Working area	170 mm × 105 mm
Working distance	397 mm
Avg. Image acquisition and processing time (ScaVis)	45 ms
Single frame size (ScaVis)	10 mm × 10 mm
Resolution (pixel size on part, ScaVis)	12.6 μm

