

**Servo motor-driven
self-piercing riveting
system**



One technology Two self-piercing riveting systems Three versions

Our portfolio has included self-piercing riveting systems for decades. Production requirements are diverse and change constantly. Of course, production processes need innovations just as much as optimisation of the equipment.

As a well-known provider of solutions, we offer our servo motor-driven self-piercing riveting systems as an innovative supplement to previous self-piercing riveting solutions in semi- and fully automated production.

Especially developments in digitisation hold far-reaching potentials for networking and quality control. Our servo motor-driven systems and the software developed by our in-house IT specialists will help you to boost efficiency, cost-effectiveness, reliability and transparency in the joining technology used in your production processes.

Our two servo motor-driven self-piercing riveting systems are designed for stationary or mobile use on a robot. We are aware of the diverse requirements that can arise in production, which is why we developed three different versions with extensive functions for each of the self-piercing riveting systems. **BasicLine**, **TrendLine** and **HighLine** fulfil the majority of application requirements, eliminating the need for custom systems. The modular concept makes use of identical parts to facilitate implementation of configuration options and offers a combination of multiple advantages.

Not least of all it is the software-based visualisation of the integrated process monitoring that makes our systems intuitive-to-operate and maintenance-friendly production units.

You, too, can benefit from our expertise!

Target sectors



Joins that last

- Processing of self-piercing rivets with C, P, J, K and U rivet geometries in the dimensions $\varnothing 3.3 \times 3.5$ to 6.0 mm and $\varnothing 5.3 \times 4.0$ to 9.0 mm
- Up to four different rivets of the same nominal size can be processed with one self-piercing riveting system (such as the HighLine).

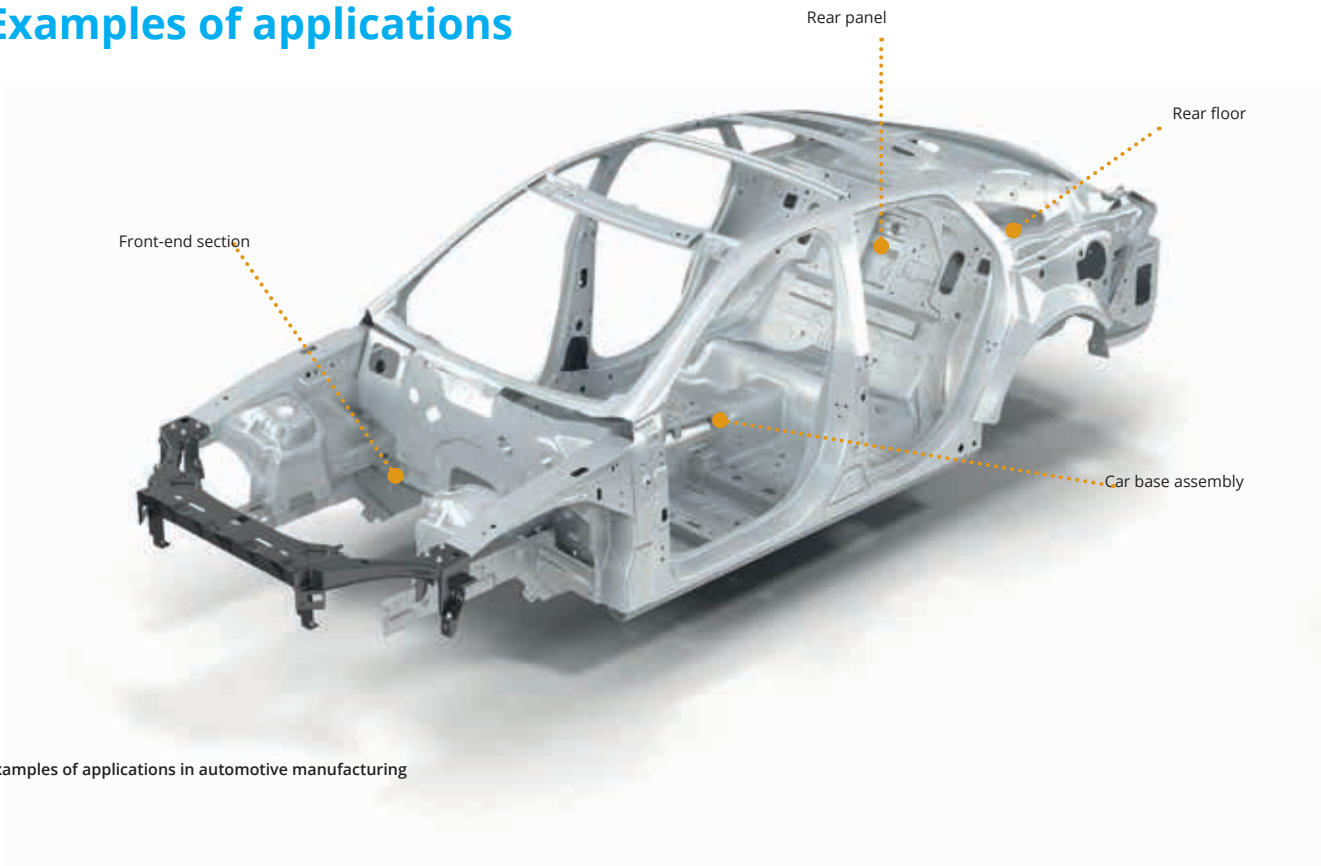


ECKOLD®

The sheet metal connection

- Decades of competence in numerous technologies
- Self-piercing riveting technology since 2000
- Clinching technology since 1981
- Punching technology since 1974
- Forming technology since 1936

Examples of applications



Examples of applications in automotive manufacturing



Rolling, sectional and garage doors



Traffic signs



In-vehicle equipment

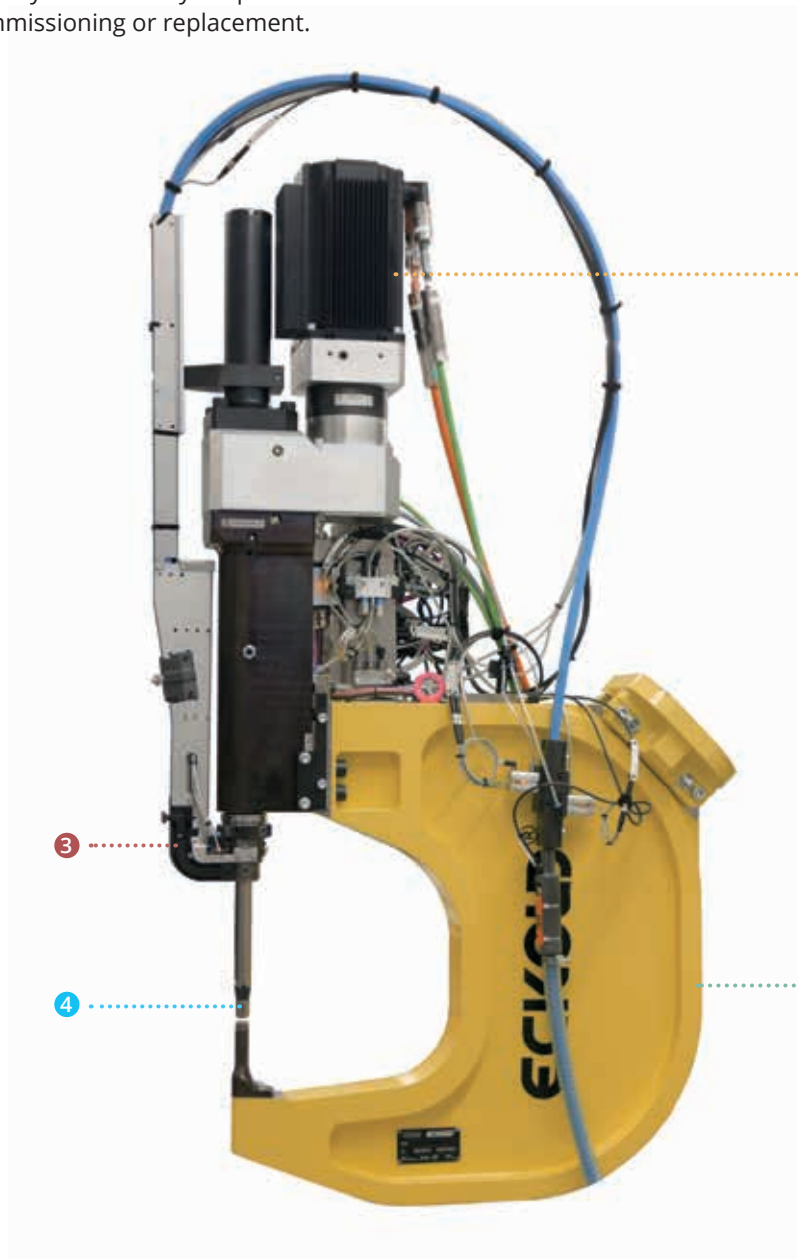




Rivet clamp

The rivet clamp is the core assembly of a self-piercing riveting system, which feature many positive properties for achieving good joining results. The flexibility of the rivet clamp is especially important for the accessibility of components. Our rivet clamps have an integrated memory module for your process data and counter readings. This facilitates commissioning or replacement.

- 1 C-frame
- 2 Drive unit
- 3 Curved rivet feeder
- 4 Nosepiece · punch



Die

You can continue to use the same types of rivets. The system can process self-piercing rivets and dies from well-known manufacturers. In addition, we also offer our own ECKOLD dies.



Control cabinet

Universal control cabinet for various technologies



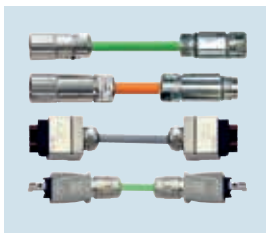
Connection	380–480 V · 3 PH · 50-60 Hz
Rated current	8-10 A
Power rating	3.5 kW

Communication interfaces

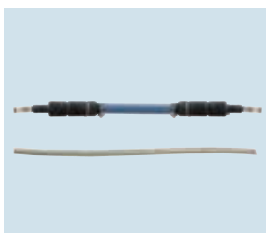
Bus systems	ProfiNet, Ethernet/IP and various others
Data interfaces	OPC UA, Ethernet

Connecting lines

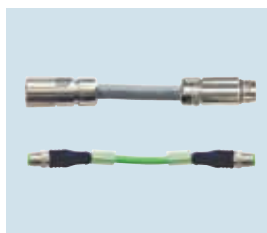
They include



Cable harness (control cabinet - rivet clamp)



Pneumatic hoses



Cable harness (control cabinet - rivet feed station)

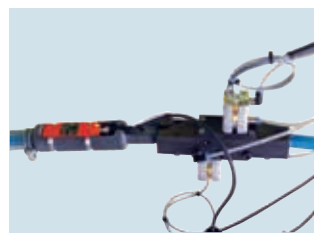
Rivet feeding

There are different rivet feeding methods for the different systems.

Self-piercing rivet magazine system

Rivet magazine changing station

- Magazines for respective rivet diameters
- Capacity: 30 rivets per track



Self-piercing rivet blow feed system

Rivet stop

- Reduces feeding time and therefore the overall cycle time

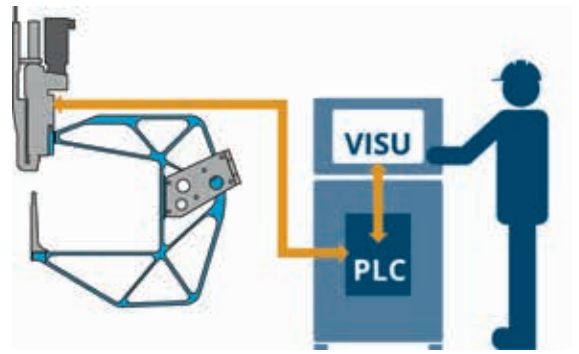


Visualisation

ECKOLD VISU makes it easy to visualise technical systems and complex processes in order to ensure digital quality assurance and process monitoring at the highest level. Changing processes or changed process parameters are then detected early on for the purpose of predictive maintenance.

This is achieved reliably by both the programmable logic controller (PLC) and the ECKOLD visualisation software VISU. Our innovative in-house software solution is based closely on user requirements and we can implement optimisations or custom adaptations, if desired.

**1
ONE
FOR
ALL**

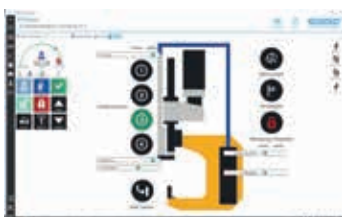


If multiple technologies such as clinching and self-piercing riveting are used within a production cell, **only one** ECKOLD visualisation is necessary, and it also communicates with multiple control cabinets as required.

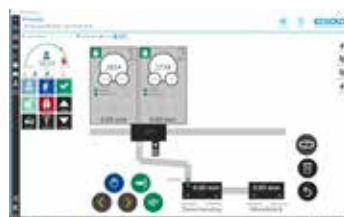


Features and benefits

- Modern and functional design
- Intuitive user interface
- Password protected access levels
- Component-specific profile display
- Process monitoring with different methods such as window or envelope technique
- Import function for joining tasks
- Archiving of measurements, saving of data on the PLC or the system computer
- Support archive and remote access
- Interfaces to customer cloud / databases, etc.
- PLC updates via VISU
- Drag and drop function for VISU updates
- Custom input masks, also with special functions, to be implemented by the manufacturer
- No installation of additional operating system components necessary



A graphic display of the status provides a clear overview at all times.



Connected rivet feeding stations are also monitored.



Summaries and analyses for predictive maintenance

Rivet feeding station

The rivet feeding station is configured based on the features of the respective version.

BasicLine

- No rivet length detection
- No digital display
- No removal of incorrect rivets
- Cover lock included
- Fill level monitoring included

TrendLine

- Rivet length detection included
- No digital display (available as option)
- Removal of incorrect rivets
- Standard features include one rivet feeding unit (max. two as option)
- Cover lock included
- Fill level monitoring included
- Covers included

HighLine

- Rivet length detection included
- Digital display
- Removal of incorrect rivets
- Standard features include two rivet feeding units (max. four as option)
- Cover lock included
- Fill level monitoring included
- Covers included



- Capacity of a rivet feeding unit is 2,000 rivets of the maximum length and diameter
- Sensor for monitoring of fill level
- Rivet length detection with removal function prevents use of incorrect rivets, e.g. by mixing different rivets



Two systems – each with three versions

The requirements of our customers have shown us that the applications and features of self-piercing riveting systems are always similar.

On the basis of this knowledge we created three standard configuration variants, which fulfil the majority of requirements.

Part variants, complexity, vulnerabilities, maintenance intensity and costs are therefore minimised, which reduces the need for special systems.

Self-piercing rivet blow feed system

The self-piercing rivet blow feed system is used primarily for stationary installed rivet clamps.



	BasicLine	TrendLine	HighLine
Rivet clamp	•	•	•
C-frame	•	•	•
Drive unit	•	•	•
Adjustable curved rivet feeder	–	<i>optional</i>	•
Nosepiece	•	•	•
Punch	•	•	•
Die	•	•	•
Control cabinet	•	•	•
PLC software	•	•	•
Connecting lines	•	•	•
Visualisation software (VISU)	•	•	•
Rivet feeding	•	•	•
Rivet feeding hose 1	•	•	•
Rivet stop	–	<i>optional</i>	•
Rivet feeding hose 2	–	<i>optional</i>	•
Rivet feeding station	•	•	•
Frame	•	•	•
Rivet feeding unit	1 x	1 x <i>opt. max. 2 x</i>	2 x <i>opt. max. 4 x</i>
Display	–	<i>optional</i>	•
Rivet length detection	–	•	•
Rivet transfer unit with removal of incorrect rivets	–	•	•

Technical data

	BasicLine	TrendLine	HighLine		
Maximum force	85 kN	85 kN	85 kN	Feed motion speed	max. 200 mm/s
Nominal stroke	100 or 150 mm	100 · 150 · 200 mm	150 or 200 mm	Rivet setting speed	max. 100 mm/s
Throat	150 - 800 mm	150 - 800 mm	150 - 800 mm	Holding force	max. 6.0 kN
				Curved rivet feeder	270° rotatable
				Process time	partially < 1.3 s*

* The processing time depends on the application and may be longer due to the force stroke length or auxiliary process times such as rivet feeding, robot handling or part positioning. The specified process time refers to a self-piercing rivet magazine system with robot installation using a rivet with a rivet diameter of 5.3 mm and a rivet length of 4.0 mm.

Self-piercing rivet magazine system

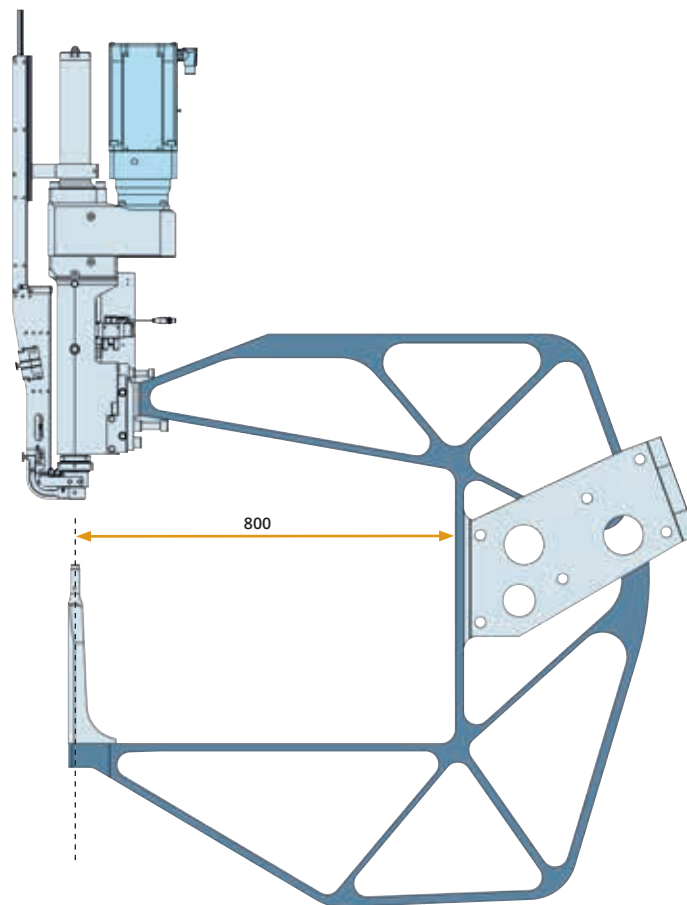
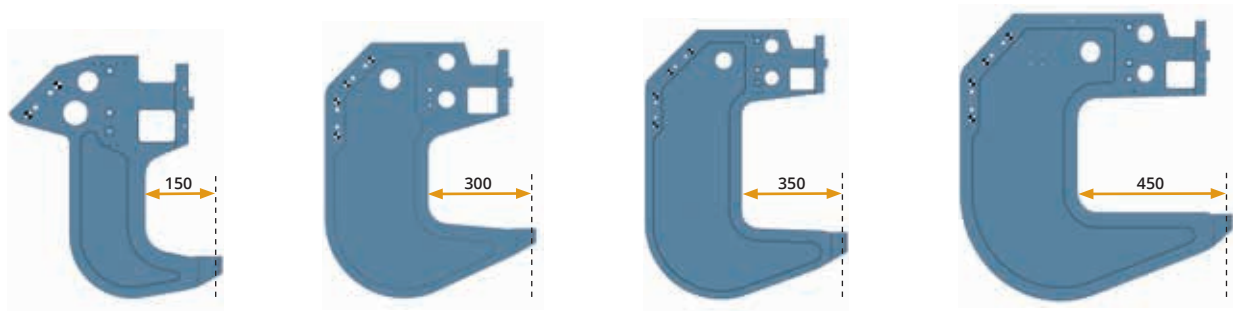
The self-piercing rivet magazine system is used primarily for mobile, robot-guided rivet clamps.



	BasicLine	TrendLine	HighLine
Rivet clamp	•	•	•
C-frame	•	•	•
Drive unit	•	•	•
Adjustable curved rivet feeder	–	<i>optional</i>	•
Nosepiece	•	•	•
Punch	•	•	•
Die	•	•	•
Control cabinet	•	•	•
PLC software	•	•	•
Connecting lines	•	•	•
Visualisation software (VISU)	•	•	•
Rivet feeding	•	•	•
Rivet feeding hose 1	•	•	•
Rivet magazine changing station	•	•	•
Rivet magazine	•	•	•
Separator for rivet magazine	•	•	•
Rivet feeding hose 2	•	•	•
Rivet feeding station	•	•	•
Frame	•	•	•
Rivet feeding unit	1 x	1 x <i>opt. max. 2 x optional</i>	2 x <i>opt. max. 4 x optional</i>
Display	–	•	•
Rivet length detection	–	•	•
Rivet transfer unit with removal of incorrect rivets	–	•	•

Throat variants and weight optimisation

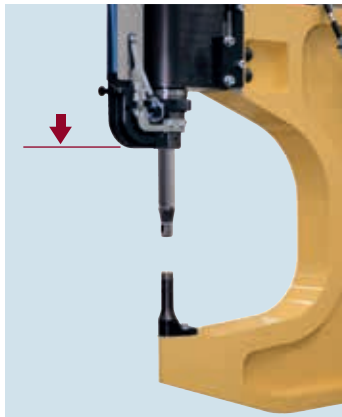
The modular concept enables fast and uncomplicated selection of the correct C-frame for the application. In addition, C-frames that are optimised for the topology enable further reduction of weight. This makes it possible to use smaller robots or robots with a lower load-bearing capacity, which reduces production costs.



Throats from 150 to 800 mm

Maximum component accessibility

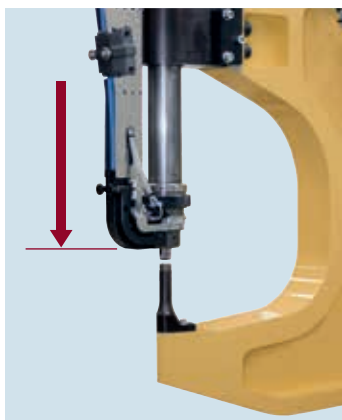
and short process times due to variable curved rivet feeder



Position 1*



Position 2*



Position 3*



Position 1

270° turnable



Position 2



* does not apply to BasicLine version

Solutions and benefits

What do we have to offer you?

We deliver systems that fulfil every requirement. From the basic version that features basic functional technology to the “self-monitoring system” with extensive analysis and monitoring functions. Our profile also includes intelligent modular frame concepts or individual solutions based on customer requirements.

We have a solution for virtually every joining problem. Take advantage of our many years of experience. For decades we have been developing and delivering machines and systems for large-scale production, and today we are the established tier 1 supplier for our partners and customers. We have understood the Industry 4.0 concept, and our highly flexible systems help to achieve the ambitious requirements and goals of our customers.

Eckold offers innovative solutions. We provide support with:

- Individual consultation by phone or in person
- Production of samples and documentation of the results
- Feasibility analyses and 3D models for accessibility check by the customer
- Concept support · non-binding preparation of offers
- Engineering and production
- Training · Commissioning · After-sales service

How do you benefit?

Everything from a single source – regardless of the joining technique, or the punching or forming process – creates synergies and benefits. As a planner you can rely on competent advice, no matter which process you use, to help you save time and money.

We offer semi-tubular self-piercing riveting for high-strength joints and brittle cast materials or – where sufficient – less expensive, low-maintenance clinching technology. If multiple technologies are used, commissioning from a single source also enhances efficiency and economy.

The standardised ECKOLD VISU software minimises the time needed to train operators and maintenance personnel, since the basic functions and configuration of parameters are identical or similar, regardless of the technology.

Benefits of the ECKOLD self-piercing riveting system

- Unique component accessibility
Variable curved rivet feeder adjustment allows excellent component accessibility and short cycle times. The curved rivet feeder is designed to rotate 270° – the height or axial position can be fixed in three different positions.
- Outstanding, innovative in-house software solution ECKOLD VISU
Modern design, intuitive user interface, reduced to content that is relevant for the user. Read-out of all comprehensive and in-depth information by an intelligent software solution.
Digital traceability of the results therefore allows documentation of the quality.
Support archive, remote access, import function for joining tasks are just a few of the many features.
- Excellent accessibility ensures a standardised modular system for different areas of application
The use of our standard system components reduces the need for custom solutions.
- No need to switch rivet suppliers
Our system processes the common rivet geometries of other rivet manufacturers.
- Support/maintenance for different technologies from **one** company
Advantages in stocking of spare parts, standard visualisation software for maintenance-friendly control of the system.



Service von A-Z

- Tests and analyses for our customers
- Creation of sample sheets/components
- Preparation of feasibility studies for the design of tools
- Concept development and constructive realisation of the technical solution
- Production in our own factory
- Commissioning at the customer's premises
- Carrying out regular maintenance
- Support with optimisations in the customer's process
 - Support with the robot position teaching process
 - Micrograph creation / evaluation of the joining point quality
 - Online support
- Start-up support after commissioning up to SOP
- Training of system operators/maintenance staff/experts

Data and facts

- Founded in 1936
- Products in use in over 100 countries
- Over 25 sales partners worldwide
- Sales companies in Great Britain, Hungary, USA
- Certified according to ISO 9001:2015
- Certified according to ISO 14001:2015

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