Connect

01

March
2026

40 JAHRE MINITEC • MENSCHEN • IDEEN • VERBINDUNGEN • 40

EXACT SCREW CONNECTIONS

Practical add-on for MiniTec SmartAssist

___ page 16

AUTOMATION

MiniTec optimised cleaning system for industrial parts

___ page 18

40 YEARS' MINITEC

A SUCCESS STORY "MADE IN GERMANY"

___ page 8

MiniTec
THE ART OF SIMPLICITY

PRETTY FLEXIBLE

TRULY FLEXIBLE

No production environment is too specialized for us.
With our modular profile system, we equip manual workstations according to your individual requirements – ergonomic, efficient and future-ready. MiniTec's connection technology eliminates the need for drilling and makes every work environment scalable and ready for digital expansion.
» www.minitec.de/richtig-flexibel

MiniTec
THE ART OF SIMPLICITY

DEAR READERS,

For MiniTec, 2026 is an anniversary year! Four decades ago, my father, Bernhard Bauer, founded MiniTec. At that time he was a white-collar employee in a good position in a supplier company and his head was full of ideas for his own business. As a family man with a wife and three children! Everything began on a small scale, but the “new company” soon took on considerable dimensions for us children. As a rented two-bedroom flat was largely converted into a warehouse, it finally also became clear to us children that our father was serious about the “new company”. Faced daily with miniature linear guides, a clattering telex in the flat and our mother, who did the office work for many years, MiniTec became a permanent feature in our life. The business grew very quickly and the first company building was built in the Palatine town of Waldmohr and later the present day headquarters in Schönenberg-Kübelberg. How often did we ask ourselves whether it wasn’t all too large and overdimensioned. But my father always proved to have the right feel for the market and an astonishing foresight.

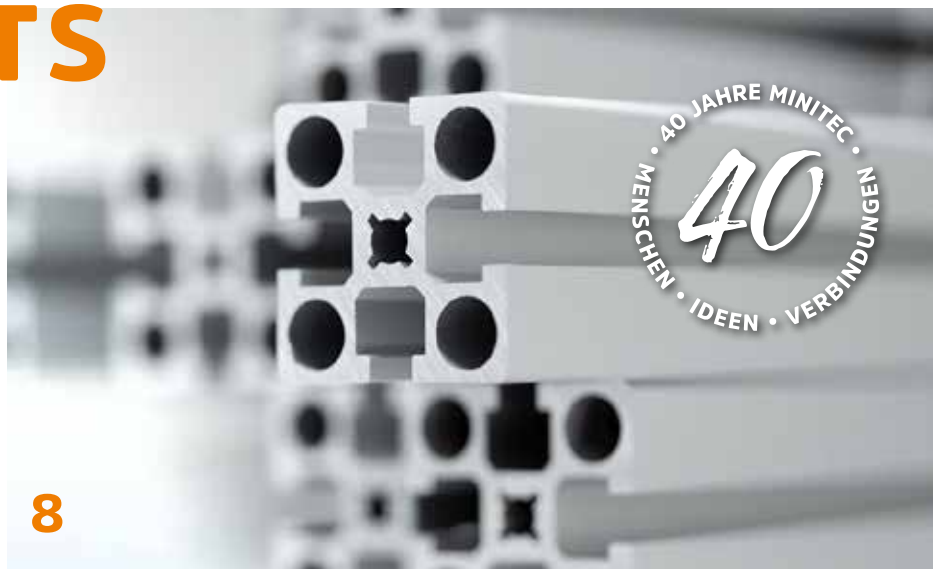
Today, in my position as managing director, I know that the success of MiniTec is based on bold decisions (even in difficult times), innovative products and services, as well as motivated employees. We have also always understood crises to be opportunities and always continued to develop. Even if our core product is still our modular profile system, we always aim to find the best solutions for our customers, for example, in automation. Many successful projects demonstrate our innovational strength, always with regard to our company motto “The Art of Simplicity”.

We will continue to think and plan long-term, develop MiniTec and bank on our terrific, motivated team to deliver the best products and solutions to all customers.

Yours

Sandra Geyer-Altenkirch
Managing Director

CONTENTS



COVER STORY
40 YEARS' MINITEC: A SUCCESS STORY "MADE IN GERMANY"

From a two-man firm to a globally operating medium-sized company: MiniTec began in 1986 as a small sales company for linear guides and developed into a supplier of profile and linear systems as well as a plant and machinery installer. This March, MiniTec celebrates its 40-year anniversary.

EXACT SCREW CONNECTIONS

The MiniTec Worker Assistance System can now be expanded with the new "Nutrunner link" module. With it, users of MiniTec SmartAssist can integrate screwing operations with industrial nutrunners in assembly processes.

AUTOMATION OF THE FIRST WATER

To improve its ability to respond to fluctuating order volumes, the specialist HMT got MiniTec to increase automation of its cleaning system for industrial parts – with obvious success.

TRADE FAIRS IN THE FIRST HALF OF THE YEAR

In 2026, MiniTec will be represented at numerous trade fairs. One thematic focus is automation, a core competency of MiniTec.

all about automation
Exhibitions with regional character and with industrial automation as their main topic.

Here, automation users find solution partners to help them on their way to flexible automation and smart production. We will be showing our latest automation solutions and MiniTec SmartAssist, the innovative worker assistance system. The exhibitions with regional character take place in different locations:

- **all about automation Fredrichshafen from 10 to 11 March 2026, Hall B3, Stand 236**
- **all about automation Straubing from 10 to 11 June 2026, Hall M, Stand 441**

daaap conference, Munich
Network meeting of the daaap partners (daaap - Digitale Assistenzsysteme am Arbeitsplatz (digital assistance systems in the workplace)).

The focus is on digital worker assistance systems and how these can ensure greater participation in work life for the disabled. As in the previous year, MiniTec will be there with MiniTec SmartAssist: We will be showing our flexible, modular solutions for accessible and ergonomic workplaces, which can be individually adapted to the needs of different workshop areas.

21 to 22 April 2026, Lebenshilfe Werkstatt Munich

RETTmobil 2026, Fulda
International leading exhibition for rescue and mobility.

The focus is on the MiniTec industry solutions for emergency services organisations and individual vehicle fitout.

6 to 8 May 2026, Messe Galerie Fulda, Hall D, Stand 1010

Interschutz 2026, Hanover
Interschutz is the world's leading trade fair for fire and rescue services and civil protection.

Flexibility and reliability are needed when it comes to fitting out special vehicles and workshops for fire services and rescue organisations. The requirements in these areas could hardly be more different. The MiniTec modular system is used by fire services and rescue organisations as the perfect basis for this. Whether mobile container racks, vehicle fitout or breathing apparatus workshop – the system has the right components for every purpose. And at the same time, offers the greatest possible flexibility.

1 to 6 June 2026, Messe Hannover, Hall 27, Stand B45

An up-to-date overview of all trade fairs can be found at **www.minitec.de/service/messen-events**

MINITEC INVITES ALL TO ATTEND ITS INHOUSE AND FUTURE DAY

MiniTec InHouse comes around again: The popular in-house trade fair, again combined with the Future Day, will be held at the company's headquarters in Schönenberg-Kübelberg on 26 March 2026. The focal topic will be process optimisation.

For many customers, partners and interested parties, the MiniTec InHouse has now become a fixed date in their calendar. At 9:00 on 26 March 2026, we will once again be opening our doors and inviting them all to come to our in-house trade fair at our Schönenberg-Kübelberg location. Visitors can look forward to a day full of insights, innovations and in-person discussions.

This year's in-house trade fair is dedicated to the topic of process optimisation. In talks and discussions, experts will inform visitors how industrial companies achieve more efficiency through automation and robotics.

The topic of automation is more current and present than ever before. Production companies especially are looking for solutions that reorganise their production to make it more efficient and profitable. This needs providers of automation concepts such as MiniTec who understand different disciplines and technologies and, based on this, can offer complete solutions. With 40 years' experience in automation and different areas, MiniTec is a good choice.

Experts with longstanding industrial experience will provide advice on many topics.

A look behind the scenes

In spite of the wealth of information and products, the InHouse also provides the opportunity for a tour of the company and to hold technical discussions with the specialists in various fields and to make new contacts.

Future Day – Training Day

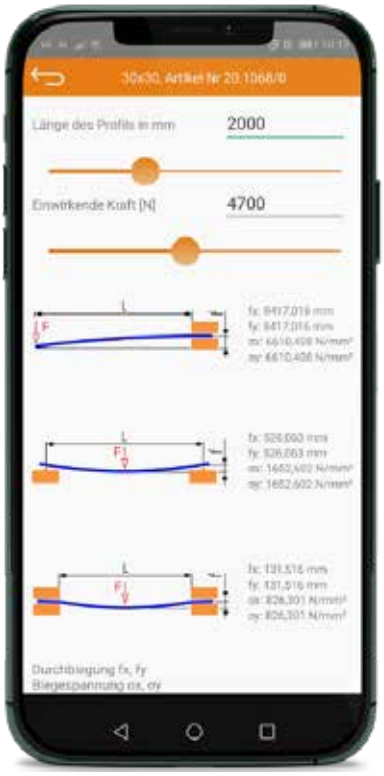
Numerous opportunities are opened up for qualified young people at MiniTec: Whether in the technical environment as a mechatronics technician, industrial mechanic, cutting machine operator or technical product designer or in the commercial area. Talented young people can find out what the occupations entail at the Future Day from 14:00 to 17:00. It is possible to find out about the different training routes offered by MiniTec. Straight from the horse's mouth, as the current trainees will be actively involved and will pass on their experiences directly to anyone interested.

FURTHER INFO AND FREE REGISTRATION:

www.minitec.de/InHouse2026

www.minitec.de/minitec future day 2026

DEFLECTION CALCULATOR AVAILABLE AGAIN AS AN APP



When it comes to choosing the right aluminium profile for a specific intended use, load capacity and the associated deflection play an integral role. The MiniTec website therefore has a convenient online calculator with which the planned length and force in Newtons can be entered for every profile. The deflection for different load scenarios is then visible immediately.

The calculation program therefore shows the user whether the profile used is suitable for the application. If the deflection exceeds the allowable limits, a stronger component is selected from the MiniTec modular system.

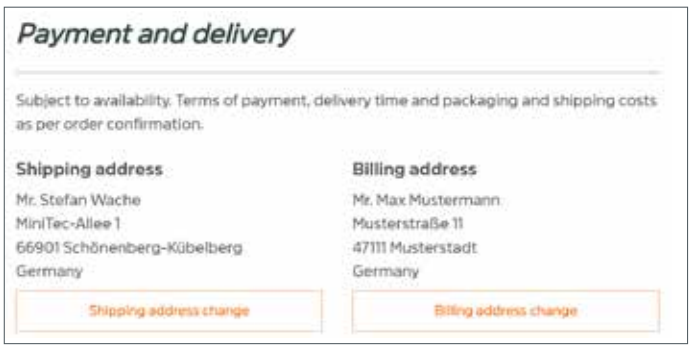
In addition to online access, access by app for mobile devices is also important for many MiniTec customers. This option is now available again; with immediate effect, the MiniTec deflection calculation is available as a convenient app for smartphones and tablets in the Google Play Store (for Android) and in the Apple App Store (for iOS).

MORE INFO AND DOWNLOAD

www.minitec.de/ Deflection calculator

DELIVERY AND INVOICE ADDRESSES CHANGEABLE IN THE WEBSHOP

The MiniTec webshop is becoming increasingly popular. Last year, there were well over 1,000 new registrations, and the number is still rising. Many of these are larger companies with multiple locations. They repeatedly expressed the wish for an option to create different delivery and invoice addresses. This is now available: If the user has finished adding items to their trolley, separate addresses for the delivery and invoice are displayed in the “Payment and delivery” information window, which can be easily changed with a click. The new addresses are of course saved and are available for future orders.



The webshop now offers even more flexibility.

ACTIVATION AND USE

To use the MiniTec shop, you must be registered as a business customer. All info can be found here: www.minitec.de/webshop

40 YEARS MINITEC: A SUCCESS STORY "MADE IN GERMANY"

From a two-man firm to a globally operating medium-sized company: MiniTec began in 1986 as a small sales company for linear guides and developed into a supplier of profile and linear systems as well as a plant and machinery installer. The company's steady growth and international success are based on smart products, intelligent complete solutions and good customer service.
This March, MiniTec celebrates its 40-year anniversary.

A good idea, a lot of courage and a large portion of entrepreneurial spirit. With these ingredients, on 7 March 1986, Bernhard Bauer together with the engineer Gernot Conrad, started MiniTec GmbH in Bensheim, southern Hesse. This year, MiniTec celebrates its 40-year anniversary. The entrepreneurial success story of MiniTec began in 1986, at the foot of the southern Hessian mountain road with its vineyard slopes and castles. Bernhard Bauer, at that time still employed by a German supplier company, had entrepreneurial spirit and several ideas for his own business. And MiniTec GmbH was born. The small sales company initially imported high-precision, tiny linear guides from Japan. Thus giving rise to the name MiniTec. However, success failed to materialise initially, which caused the partners to separate amicably. Managing Director Bauer moved the company to Waldmohr in the western Palatinate region and ventured the new start with an expansion of the product range to include ball bushings and miniature ball bearings. From then on significantly more successful, as the first million turnover was soon achieved.

Our own profile system

By 1989, the range had already been extended to include aluminium profiles and MiniTec technicians were working on their own products. They had established that all the profile systems available on the market at the time required special bolts and nuts for assembly. For users, this meant that these had to be available continuously and the assembly of constructions was cumbersome and time-consuming. MiniTec set itself the goal of changing this with a new system. The new development was to make the assembly more efficient with DIN bolts, nuts M8 and a single tool – while at the same time saving costs. At the end of this development, four profile cross-sections were available in the grid size 45 and were the basis of today's company slogan: "The Art of Simplicity".

Initially, the sales and marketing activities of MiniTec were unconventional: The first 20 brochures were produced in the kitchen by a three-person team with scissors and paste and duplicated with the photocopier. Bernhard's wife, Sonja Bauer, was always there, energetically supporting the founder of the company while also taking care of the family.

A PATENTED CONNECTOR WORKS WONDERS

And so success was not long in coming: "To our surprise, several customers were interested immediately as the new system convinced them right away", remembers the company's founder, Bernhard Bauer, with a smile. Only the access hole for the assembly was initially still a hindrance. After numerous attempts with the most adventurous approaches, a solution

MiniTec Schönenberg Kübelberg

was developed that was to establish the further success of the still young company: A profile connector that requires no machining whatsoever. MiniTec had its clever development patented, and the modular profile system is still based on it to this day. This innovation contributes to the success of MiniTec to this day and it is what makes the profile system so special.

A patented connector

The first presentation at the Fameta exhibition in Nuremberg in 1991 showed that a great success had been achieved. The success was so great that the production capacities had to be enlarged and a factory building was erected in Waldmohr. This was to be the starting shot for a rapid success story.

We create connections!

Sandra Geyer-Altenkirch

is the Commercial Director of MiniTec.

After her school-leaving exam and training as a travel agent, Sandra Geyer-Altenkirch took a "dual" (sandwich) course in business studies. At MiniTec she worked in all departments for her on the job training and then took on the setting up and running of the management accounting ("controlling") department. As the Head of Purchasing, she eventually followed Ulrich Wigand as the Commercial Director. Mrs Geyer-Altenkirch is married with two sons and two stepdaughters.

Which developments or milestones had the greatest influence on you personally at MiniTec?

The challenges of recent years have clearly shown me the strengths that can result from crises. I have a great team that closed ranks with me and with which I can find solutions and ways.

In your opinion, how has MiniTec changed over the years?

Technologically, we were always flexible and open-minded. Digitalisation has become increasingly important for us too – both for our products and in our internal processes. The culture within the company must also increasingly adapt to generational change. We are proud that older and younger generations engage with each other so appreciatively and benefit from each other.

What still motivates you to push MiniTec further forward each day?

On the one hand, of course, my family bond with the company. It is my parents' lifework, I grew up with it. On the other hand, the team. We have very many very committed and loyal employees who do everything they can each and every day so that we progress.

The milestones of the following years show the breathtaking speed with which the company grew: In 1993, MiniTec began its own CNC production and in 1994 an extension building was necessary as a result of the growth. Further ones followed in 2001 and 2004. In 1995, customers were presented a further innovation with the first version of the CADmenu design software, which made the work of designers and buyers significantly easier. Since then, the software has been developed continuously and is now in widespread use as the iCAD Assembler. 1998 also was also added as a further milestone in the company's history, as since then, MiniTec has offered complete solutions for factory automation.

Successful expansion

Brisk demand from abroad at trade fairs in the nineties was proof that the MiniTec products and solutions were not only in demand in the German-speaking markets. This prompted Managing Director Bauer to establish companies in France, the UK and USA. Later these were followed, among others, by Slovenia, Spain and China. Today, MiniTec is represented with 420 employees in ten locations worldwide as well as in 60 countries with sales and service partners.

Over the years, MiniTec has not only increased turnover consistently, the workforce was also enlarged – from 30 employees in 1996 to 100 in 2002 and 136 employees in 2006.

Locally loyal and tied to our roots

MiniTec always kept an eye on its home market, which also developed so well in the 2000s that space at the company's headquarters in Waldmohr was soon no longer enough. A new location was sought meticulously and work pushed ahead on the planning and design of a modern building complex. In 2009, after a construction period of only nine

Trade fair model production cell

The first catalogue

months, MiniTec moved into a representative headquarters in Schönenberg-Kübelberg, not far from the old company headquarters. The site included a production hall and administration building built using low-energy construction methods. State-of-the-art production machines for the profile machining were installed in the new building complex and all processes were optimised.

At the Waldmohr headquarters, another future project became reality: In 2010, the Solar Thermal Competence Center (STCC) opened here for the further development of solar collectors and the associated production technology. MiniTec also supports collector manufacturers, from the planning to the setting up of a production facility through to certification and production start. A unique service in this industry. In 2011, MiniTec was even the global leader for laser welding units for solar thermal energy and now has 180 employees. However, in light of political decisions and the markets, this business area did not develop as hoped for initially. But, as the founder of the company knows, you also learn from setbacks.

Bernhard Bauer

is the founder and for many years was the Managing Director of MiniTec. In 2011, together with his wife Sonja Bauer, he established a foundation which supports social projects both in the local region and in Africa.

How did the company name "MiniTec" come about?

At that time we were importing tiny high-precision linear guides from Japan, from which we derived "MiniTec".

What distinguishes MiniTec?

As a family business we have always pursued very long-term goals, even when it was sometimes difficult. But you learn from setbacks and wrong decisions!

In 2015, you retired from active management of the company. What does your 'retirement' look like?

I provide support and advice to the company and the active management and still follow events with great interest. Together with my wife Sonja, I take care of our foundation.

Music was always very important to me and I have played wind instruments in various bands for many years. Besides that, I like to spend time with my grandchildren of my three daughters.

Bernhard Bauer at the awarding of Germany's Order of Merit.

Andreas Böhnlein

is the Technical Director of MiniTec.

After his school-leaving exam, he took a degree in automation engineering in Kaiserslautern. During his dissertation work, he was already in contact with MiniTec. Completion of his degree was followed by work placement and he was then taken on as an engineer at MiniTec. He worked in the projects, design and engineering departments and in 2001 was granted general commercial power of representation and has been in the management since 2015.
Andreas Böhnlein (58) is married and has two children. In his leisure time he is an enthusiastic restorer of young and old timers, with which he also likes to go out for a ride. In sports, the football club 1 FC Kaiserslautern holds a special place in his heart.

Which developments or milestones had the greatest influence on you personally at MiniTec?
Above all internationalisation! I have spent and do spend a lot of time travelling internationally. My work with our worldwide sales partners is interesting and inspiring.

In your opinion, how has MiniTec changed over the years?
Technologically, our change from a modular system supplier to a full service provider, which also masters even the most complicated tasks. Digitalisation in almost all areas of work. We work together across generations and that is good. The older employees pass on their knowledge, the younger ones often convince with new ideas. An ideal complement.

What still motivates you to push MiniTec further forward each day?
That it is not only a job or my job, but rather that many committed and creative people pull together as colleagues and friends. And that, with the diversity of tasks, we fight, achieve goals and grow together.

From high-precision steel shafts to machine components
Today, Waldmohr is the home of our CNC production. The range of precision steel shaft services extends from simple cuts to completely manufactured drive shafts. Thanks to modern machinery, MiniTec offers all lathe, drilling and milling work as used, for example, in linear technology. This enables the production of prototypes and individual parts with small series through to lot sizes of several thousand parts.

Passing of the baton to the new management
In 2015, the founder, Bernhard Bauer, retired from the company, and has been active in an advisory capacity ever since. He was succeeded by Ulrich Wigand as Chairman of the Executive Board, Tobias Doll (Director of Production) and Andreas Böhnlein (Director of Engineering). Ulrich Wigand was one of the original employees and held important positions until his retirement in 2017. He was succeeded by Sandra Geyer-Altenkirch, the daughter of Bernhard Bauer, who has since been in charge of the commercial management.
"We remain positive about the qualities of the German location. We have well-trained and motivated employees and good contacts with the Universities of Kaiserslautern and Saarbrücken", emphasises Sandra Geyer-Altenkirch. Consequently, in 2016 MiniTec received the "Attractive Employer Rhineland-Palatinate" award. In the 30th year of its existence, MiniTec had 240 employees in Germany and a total of 360 worldwide. Further awards followed: "Hidden Champion" (2021), Ergonomics Innovation Prize (2023), Germany's Order of Merit for Bernhard Bauer (2024).

INTERNATIONAL AND NEVERTHELESS TIED TO OUR ROOTS

Visit of the Minister-President of Rhineland Palatinate, Alexander Schweitzer.

Popular amongst customers and partners – the "InHouse" trade fair.

Startup for assistance systems

Another milestone in the company's history is the establishment of a workplace system based on the modular profile system. MiniTec Smart Solutions GmbH was formed in 2017 to supplement this system. The core objective is the development and marketing of an innovative assistance system for manual work tasks in the industrial environment. MiniTec SmartAssist was presented to the market in 2022 and has been very successfully sold since then. Both in industry and in workshops for the disabled, the assistance system supports the training of new employees, with assembly activities and with quality control, as well as order picking.

Focus on expansion and customer service

MiniTec continued to expand in the ensuing years: The Berlin location was developed further and the takeover of the Schulz Fördertechnik company, with plenty of experience in steel conveyor systems and alternative markets (such as food producers) ensued.

Yet the success was not only based on products and solutions, the understanding and expertise in the industries that the company serves are also a sound basis. Consequently, today, automation solutions are an important mainstay of sales. Alongside the motto "The Art of Simplicity" customer service has played an important role to this day: Competent advice, short delivery times in combination with a well-stocked warehouse and easy ordering processes, among other things with a modern webshop, are all positives appreciated by our customers. And this will remain so, emphasised the management. MiniTec has stood for this for 40 years and will continue to do so in the future.

Tobias Doll

is the Director of Production and has been at MiniTec for 30 years.

After vocational training as a machinist and master craftsman, he took a mechanical engineering degree and graduated as an industrial engineer. At MiniTec he worked in the shaft production, assembly and production departments before being appointed to the management in 2015.
Tobias Doll (51) is married and has a son. He likes to spend his free time with his family, in nature and as a farmer as his second job.

Which developments or milestones had the greatest influence on you personally at MiniTec?
The continuous growth and extensions at the Waldmohr site from 1995–2009. My appointment to the management in 2015.

In your opinion, how has MiniTec changed over the years?
Although we develop many special solutions for our customers, we were nonetheless able to automate our internal processes further. MiniTec has established itself in the area of software solutions with important products. Culturally, we have managed to remain a family business despite our enormous growth.

What still motivates you to push MiniTec further forward each day?
Our fantastic and innovative products. A super team in the company. It is a positive task to overcome new challenges and develop optimum solutions each day.

MINITEC MILESTONES

Established in Bensheim, grown out of the start in a 3-room flat with stores in the garage, MiniTec now has 420 employees worldwide.

1986 **Formation of MiniTec GmbH in Bensheim**
by Gernot Conrad and Bernhard Bauer

1987 Move to Waldmohr/Rhineland-Palatinate

1989 Aluminium profiles expand the portfolio

1990 **Development and patenting of the MiniTec power-lock fastener**

Until the successful market launch, MiniTec stayed afloat by selling Japanese ball bushings and precision steel balls

1991 Construction of a factory building in Waldmohr

8 employees in Germany

1992 First large order for 300,000 DM:
Handling system for large flat elements for Pecolit in Schifferstadt

1993 Start of CNC production

1994 First extension in Waldmohr

1995 First version of the CADmenu design software

1996 Certified to EN ISO 9001

First participation in the HMI and MOTEK trade fairs

Production area increased by 1000 m^2

Development of assembly line for photovoltaic modules

30 employees in Germany

1997 Formation of the first subsidiary:
MiniTec SNC in Sarreguemines/France
First CNC machine in Waldmohr

1998 First complete solutions in factory automation

1999 Formation of MiniTec Framing Systems in Canandaigua NY, USA

2000 Formation of MiniTec Zirndorf/Bavaria

2001 Second extension in Waldmohr

70 employees in Germany

2002 **100 employees in Germany**

2003 Development of the iCAD Assembler application

2004 Third extension in Waldmohr for the linear centre and logistics

2005 Formation of MiniTec UK in Basingstoke near London

2006 Formation of MiniTec Slovakia in Rabca

136 employees in Germany

2007 Formation of MiniTec Slovenia in Grize

2008 Formation of MiniTec España S.L.U.

2009 **Foundation stone laid for the new company building in Schönenberg-Kübelberg**

Move into the new building with 12,000 m^2 production space and 3,000 m^2 office space

1990

WE CREATE CONNECTIONS

Development and patenting of the MiniTec power-lock fastener

2009

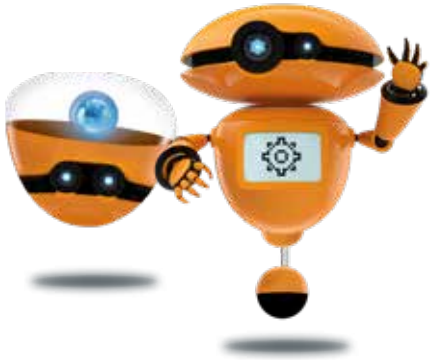
WE SURPASS OURSELVES

Move into the new company building in Schönenberg-Kübelberg

2022

WE ARE SMART

MiniTec SmartAssist is launched.



2024

WE MAKE OURSELVES FIT FOR THE FUTURE

At the first Future Day, MiniTec informed about “dual” (sandwich) courses and training opportunities within the company.

SOCIAL COMMITMENT: THE SONJA UND BERNHARD BAUER FOUNDATION

The Sonja und Bernhard Bauer Foundation founded in 2011
Mainly supports projects in the Western Palatinate region. The focal points of support are early musical education in daycare centres and schools, foreign language classes as well as financial support for language trips and youth work in sports clubs.

Beyond regional youth support, for many years, MiniTec has been an important sponsor of a large training project in the Soweto slum in Nairobi, Kenya. There the Steyler missionaries run an all-day school for 400 children.
The goal is to provide qualified vocational education for all.

2011	Establishment of the Sonja and Bernhard Bauer Foundation
	Takeover of MiniTec Schweiz AG in Zürich
	Development of automatic laser welding machines for solar absorbers
	World market leader for laser welding systems for solar-thermal collectors
	First fully-automated frame press for PV modules and market launch of the flasher with integrated safety test for highly efficient module production
	180 employees in Germany
	First international sales meeting
2012	Formation of MiniTec System Technology Co. Ltd. in PR China
2016	**10 locations worldwide, representation in 60 countries**
	"Attractive Employer Rhineland-Palatinate" award
	240 employees in Germany
	360 employees worldwide
2017	**Formation of MiniTec Smart Solutions**
2018	Formation of MiniTec Berlin GmbH
	Soldering technology added to the product range
	MiniTec Framing (US) moves into its own plant
2020	New sales partners for Sweden & North Africa
	280 employees in Germany,
	420 employees worldwide
2021	**Award as a Hidden Champion**
2022	**MiniTec SmartAssist**
	Mini conveyor belt
	New configurators
2023	MiniTec Berlin moves to new location
	Production cells as new solution concept
	Award of the Ergonomics Innovation Prize
	New sales partner in South-Africa
2024	**MiniTec Webshop**
	Takeover of Schulz-Fördertechnik
	Germany's Order of Merit for Bernhard Bauer
2025	New sales partner in Mexico
	Participation in the Mellow research project
2026	**40 YEARS' MINITEC**

EXACT SCREW CONNECTIONS

An important component for making assembly processes more effective and improving and documenting the quality of connections is the integration of nutrunners. The MiniTec Worker Assistance System can now be expanded with the new “Nutrunner link” module. With it, users of MiniTec SmartAssist can integrate screwing operations with industrial nutrunners in assembly processes.

Bolts and screws are the most frequently used machine elements. In assembly technology, screw connections and bolted joints are characterised by their high load capacity, the reusability of the parts and the option of undoing the connection at any time by non-destructive means. The most important use case in bolting/screwing in assembly technology lies in applying a defined holding force. To this end, electrical or pneumatic nutrunners are very often used for automated assembly processes. In the industrial environment, intelligent screw systems, so-called industrial nutrunners, are increasingly being used. With these, a central control unit is responsible for managing all screwing operations. It can be used to control different devices and diverse screw/bolt cases can be stored in which parameters such as torque, angle of rotation or the number of screws/bolts to be fixed are exactly defined. Such industrial nutrunners offer enormous flexibility and at the same time ensure the quality of the screwing operations.

Nutrunner link for MiniTec SmartAssist

MiniTec has been equipping industrial companies with tailored workplaces for many years. These are not off the shelf solutions, but instead the solutions specifically deal with the

assembly requirements. With the new “Nutrunner link” module, users of the MiniTec SmartAssist worker assistance system can now also integrate screwing operations using industrial nutrunners into the assembly processes.

To this end, MiniTec has developed the “Nutrunner link” module. It makes it possible to initiate a screwing operation via such systems as part of an assembly process. To do this, the control devices of the screwing systems used must first be stored in MiniTec SmartAssist. Specific screwing operations can then be integrated in the Editor via the respective systems in the assembly recipes.

In the assembly process, the required assembly tools and attachments are requested in the appropriate place later in the assistance system via the control of the industrial nutrunner and the bolting/screwing is carried out by the worker. This can be both individual bolting and group sequences.

Quality assurance for industrial assembly processes

The results (OK/NOK) are reported back to the assistance system. Whether a result is assessed as “NOK” depends on the customer’s specifications and their settings for this in the control unit. This can be the exceeding of a certain number of turning attempts or tilted screws/bolts or incorrect positioning of the tool can lead to a negative report. Different follow-up actions for the respective results can be defined in the Editor. For example, that the screwing operation should be restarted in case of NOK. Or that the worker should first check which bolting/screwing led to the failure and then consult their line manager.

With the new module, screwing operations can be controlled via the assistance system and follow-up actions can be triggered on the basis of the results.

The worker receives precise details of the respective screwing operation in MiniTec SmartAssist.

Markus Kaiser, the developer responsible for MiniTec SmartAssist, is convinced of the advantages of the new module: “The nutrunner link makes a substantial contribution to quality assurance in industrial assembly processes. Including with regard to documentation and traceability, as it gives customers the opportunity to prove correct completion of screwing operations in the event of complaints.”

Example of an industrial nutrunner system consisting of control unit and nutrunner (Photo: Atlas Copco)

AUTOMATION OF THE FIRST WATER

To improve its ability to respond to fluctuating order volumes, the specialist HMT got MiniTec to increase automation of its cleaning system for industrial parts – with obvious success.

“Not just clean, but deep-down clean” was the promise of a well-known detergent advert. HMT – Häseler Metalltechnik GmbH in St. Georgen, has a similar claim when it comes to the cleaning of technical components. Formed in 1983, the company is a specialist for punching and forming technology as well as very high technical cleanliness requirements. Its customers are mainly in the automotive sector. The workpieces are mostly punched components, which come into contact with electrical components and printed boards.

Joachim Hölzl, Technical Director of the company, speaks of an all-in-one solution that HMT offers here: “We have stamping and cleaning covering an area of 12,500 sqm completely under one roof. Our range of products and services extends from punching, forming and deep-drawing through to parts cleaning – including residual dirt analysis in our own laboratory.” As a result, HMT is able to meet virtually every customer’s wish. This is based on its own toolmaking, modern machinery and committed employees with sound detailed knowledge. The processes and procedures meet the highest automotive standards.

Fluctuating orders in hand as a challenge

At HMT, two cleaning systems are in use. At normal capacity utilisation, work is carried out in two-shift operation, which enables around 40 million components per year to be passed through. Previously, many cleaning process activities

were carried out by employees. Yet the general labour shortage became increasingly noticeable. Cooperation with temping agencies failed to provide a satisfactory solution. The reason was the volatile weekly changes to the orders in hand, Hölzl said: "This made sensible resource planning difficult – and also to respond to new circumstances at short notice. One week demand rises and until you have integrated the capacities through the personnel the week is almost finished."

For the future, Hölzl would like to be able to plan and control far more reliably and to respond to capacity fluctuations more flexibly. This goal is to be achieved by greater automation – the focus was in equipping the transport racks with the components for the cleaning operation and their subsequent removal from the system.

Automation for more flexibility

They initially sat down with their own in-house specialists – under the leadership of Tobias Seemann, team leader of the automation department at HMT. They worked up an ABC analysis of the components and discussed potential solutions. "We built our own internal laboratory and started the first trials with a training robot. The results were very impressive", explained Hölzl and added: "We contacted Yaskawa, who provided us with one of their robots for the further steps. As we were eventually certain regarding the feasibility, we got together with MiniTec as a system integrator. We presented our visions to the automation expert Peter Müller and discussed with him what our system could look like, based on our requirements and functional specifications. He then developed a concept for realisation of the concept and this was implemented."

AUTOMATION FOR MORE FLEXIBILITY

The result was a highly complex system in which removal of the cleaned components and their storage and retrieval take place fully automatically. The configuration with two identical removal areas ensures sufficient capacity. There, a total of eight robots take care of removing parts from the parts carriers. All this is coupled with a fully automatic storage system. With a size of 20 m x 10 m, the system has considerable extents.

The racks equipped with the components move via an overhead conveyor track into the cleaning system.

After cleaning, the racks automatically move to the right removal area.

Optimised workflow

The customers' components to be cleaned reach HMT in different types of packaging (pallet cages, wooden crates, cardboard boxes, etc.). At the pickup position – today still manually – they are taken out of the containers and fixed on the cleaning racks.

The system then fetches the racks from the buffer storage. They pass through different cleaning zones over a length of 60 m via an overhead conveyor track. From there, the parts are moved into the drying room, then into the cooling room and on to the cleanroom. Depending on the technical specification of the components, the cleaning rack then either remains there for removal of the parts or moves into the cleanliness zone where the removal places with the robots are located.

Because the components can still move during the cleaning process, when they are removed by the robots, differences can occur from one grip to the other. A camera inspection is therefore performed here, which determines the coordinates so that the components can be correctly placed in the small load carriers (SLC). This ensures that the order of these components is not lost when they are forwarded to other departments.

Well-conceived control

When equipping the cleaning racks, a barcode provides the information about which parts they are and to which removal station they must move. At the removal area, the item-specific information is transferred between the cleaning system and the robot cells via an interface. “In this way, the robot knows precisely which component is coming, the quantity and that it has to remove this quantity. And if a component has been lost, it calculates the set number minus 1. We therefore always have the correct removed quantity”, explained Hölzl.

“TODAY WE CAN ALSO ADJUST CAPACITIES AT ANY TIME, EVEN AT SHORT NOTICE.”

Joachim Hölzl
Technical Director

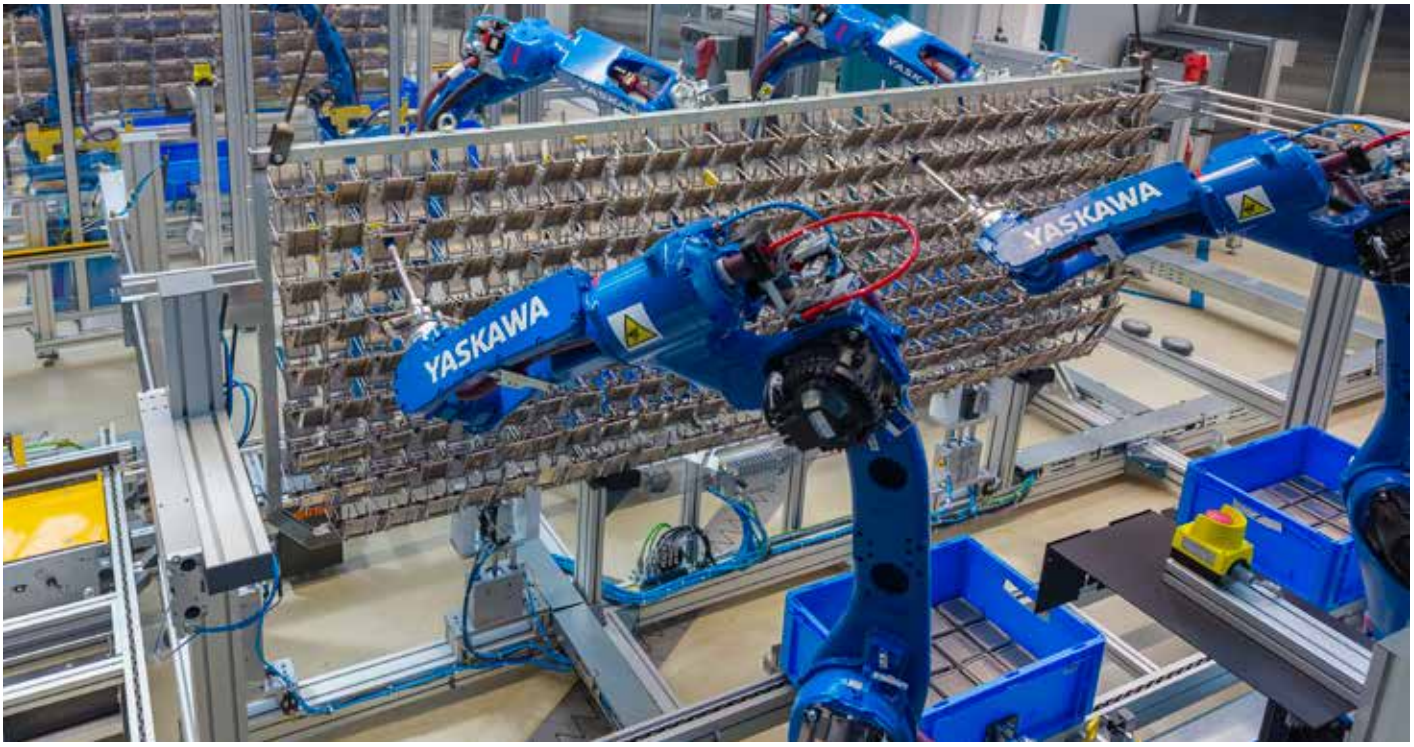
MiniTec conveyor technology

Each robot has an SLC in front of it. It takes the components off the cleaning rack and places them properly in the box. When it has reached the predefined quantity, the SLC moves out automatically and the robot is provided with a new empty box.

The filled SLC now moves automatically via a conveyor station to a storage shelf. The conveyor technology is a MiniTec FMS system. I.e., a transfer system that transports the boxes through curves or turntables. A special feature of the HMT version is that the otherwise usual workpiece carriers (pallets) are not used; instead the SLCs are driven directly by the roller chains.

Storage and retrieval by shuttle

On the storage shelf there is a storage control device (shuttle), also developed by MiniTec. This takes care of the automatic storage of the SLCs and to this end moves to and fro. It also transports components to the visual inspection. This area has a control station on which the employees can see which components are in the storage system. They can then request the parts to be inspected via a control panel. As a result, the shuttle starts



Robots remove the components and place them in SLCs.

the retrieval and provides the SLCs for visual inspection via conveyor technology. There the parts are examined according to the customers' failure catalogues. If they are OK, they are packed in the customer-specific packaging.

EFFECTIVE AUTOMATION THROUGH SIMULATIONS AND OPTIMISED CYCLE TIMES

Flexibility increased significantly

Hölzl recognised the advantages of the system right after the first startup period: "The great benefit is the flexibility. Today, we have the decisive advantage of being able to increase capacities at any time, even at short notice."

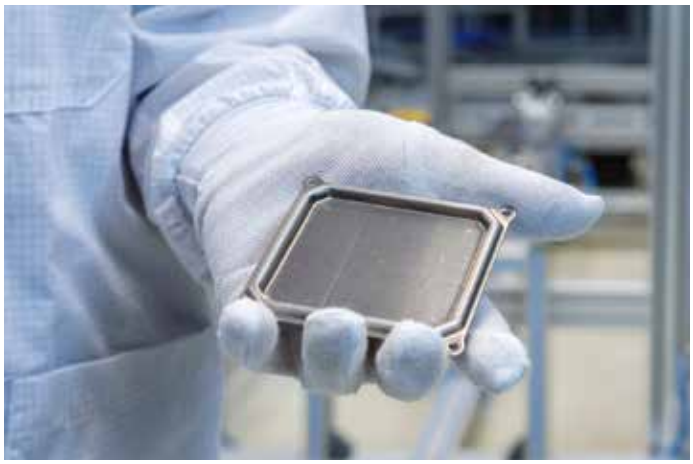
Hölzl was also satisfied with the project process itself: "The cooperation in this team of three with MiniTec, Yaskawa and HMT worked very well and ultimately led to an outstanding result. As mentioned, Yaskawa supported us by providing us with a robot. But as the system integrator, MiniTec also provided intensive support. Simulations, cycle times, such topics. It was an absolutely good cooperation, especially with Peter Müller. His experience in the project business and his technical expertise provided enormous added value for us. The combination of Tobias Seemann and Peter Müller was also very constructive. Equally, Marcel Therre and Phillip von Ehr of MiniTec also made very positive contributions, all absolute teamplayers. In addition, I also very much valued the communication and project preparation and planning as well as the experience of MiniTec." Many ideas were also developed during the project and possibilities for small improvements were found repeatedly, which were then quickly implemented.

Further development of automation

In general, the HMT boss is very open to the topic of automation. He is already thinking about changing over from manual to robot equipping of the cleaning racks. Another topic is the removal of the components in the cleanroom. "We have many starting points here, not only in production. There are also numerous opportunities for automation in the administration, several of which we have already implemented. In future, in all areas, we want to consider which processes can be automated in order to minimise the influences of human error as far as possible."

A camera inspection during the removal makes sure that the components can be placed correctly in the small load carriers.

The fully-automatic storage system additionally optimises the workflows.



The components to be cleaned mainly come from the automotive sector.

Accordingly, the automation department has now grown to four people. And thanks to the positive experiences, Yaskawa and MiniTec will again be on board.

EFFICIENT DOOR PRODUCTION THANKS TO WELL-CONCEIVED CONVEYOR TECHNOLOGY

At the door specialist Hörmann, a modern transport system from Schulz Fördertechnik ensures efficient material flows and maximum process safety in the door leaf production.

The Hörmann Group is one of the leading European suppliers of doors. In a total of 38 specialised factories in Europe, North America and Asia, more than 6,000 employees produce a wide range of doors, frames and drives for private and commercial use. One of the most traditional locations is in Freisen in Saarland, where Hörmann has been represented since 1962. High-quality multi-purpose, fire, smoke control, security and soundproof doors made of steel are produced here – a complex production process in which modern conveying technology plays a central role.

Conveyor technology as the backbone of door leaf production

In the Freisen factory, two conveyor systems of Schulz Fördertechnik, part of the MiniTec Group since 2024, are used on two door leaf lines. The systems transport the door leaf components and the door leaves. Very many different conveyor modules are used – from classic roller conveyors to cross conveyor units through to complex angle transfers, with and without side stops.

Investment in the first systems was made more than ten years ago. The trigger at that time was a new door leaf development that could only be implemented with process engineering. “We were no longer able to map the new requirements with the existing systems. We needed new production technology – and thus a modern conveyor solution too”, remembers Simon Schäfer, Head of Technical Project Execution at the Freisen location.

Schulz Fördertechnik was chosen – not only because of its regional proximity, but also on the recommendation of various industry partners. At that time, for Hörmann it was the first project with Schulz, and the course of the project was convincing from end to end. “The project was completed extremely speedily and purposefully”, reported Schäfer. “Our contact, Turan Ilginer, supported us

optimally with his technical knowledge and experience. Many details, which are now obvious, wouldn't have been implemented in the same way at that time without his tips and information."

Technical challenges and intelligent solutions

The systems are roller conveyors and belt conveyors – with special attachments such as flaps, transfer and turning stations. All was coordinated and implemented for the specific customer. An important challenge was the careful handling of the solid door leaves with a weight of up to 200 kg. The sensitive surface must not be damaged at all during the various positioning and conveying actions. Another focus was on compliance with the Machinery Directive and the safety of the employees.

With regard to the design implementation, Schulz had a convincing and innovative proposal: Instead of the welded steel racks usually used to date, bolted racks were used. "Initially we were sceptical", said Schäfer, "today we know that it was a very good decision – the racks are lighter and more cost-effective." In addition, they are easier to maintain due to the techniques used to drive the rollers and belt conveyors.

Integration in the overall control system

While Schulz supplied the mechanical conveyor technology including the drive units, the control was implemented by a specialised partner company in the region. Both systems were merged and commissioned in Freisen.

In the robust systems, attention was paid to a high degree of ease of maintenance.

In the production of doors, among other things, robust roller conveyors from Schulz are used.

ROBUST TECHNOLOGY WITH A HIGH DEGREE OF EASE OF MAINTENANCE

In constant communication with a higher-level process control system, the control coordinates the transport and positioning movements within the interlinked production line. The combined movements in particular – for example, during longitudinal and cross transport or during lifting and lowering – are reliably handled by a precise control regime.

Today, around 50 Schulz conveyor units handle the material flows on both door leaf lines. The systems have been operating extremely reliably and with low maintenance for more than a decade. "In all those years we had virtually no failures", emphasised Schäfer. "The well-conceived ease of maintenance is particularly positive. Wearing parts can be replaced quickly and easily – this is not always the case, especially for belt conveyors." For example, the timing belts of the drives can be easily changed, the change system was especially developed for Hörmann at that time. The conveyor systems of Schulz Fördertechnik make a considerable contribution to ensuring that efficient, safe and high-quality door production takes place at the Hörmann location. The project impressively shows how well-conceived mechanical solutions, practical advice and high engineering competence can interact to create lasting production advantages – an example of successful industrial cooperation based on partnership in the interests of efficiency and quality.

New prospects for the future

Following the positive experiences, Hörmann can well imagine implementing future projects with Schulz Fördertechnik too. With the takeover of the company by MiniTec, new prospects also result: "We consider the integration in the MiniTec Group to be a clear advantage", said Schäfer. "This means that in future, mechanics, control technology and automation can come from a single source – which would make the whole process even more efficient for us."

AI-BASED PROCESS OPTIMISATION FOR THE SHOE INDUSTRY

The German shoe industry is part of global value-added networks. In order to improve international cooperation and optimise the production processes, the MELLOW research project was initiated – with MiniTec as one of five innovative partners.

Due to increasing relocation of production, the shoe industry in Germany is facing major challenges. In order to stay competitive, many manufacturers are opting for close collaborations with partners elsewhere in Europe. This collaboration is decisive in order to establish common standards for quality, sustainability and fair working conditions.

In the optimisation of production processes within the value-added chain, above all it is digital solutions that are needed. Against this background, the MELLOW project ("Smart collaborative workflow development in the shoe industry") was launched. Together with application partners, AI-enabled assistance systems are being developed and trialled. At the same time, new ideas for more effective collaboration in the value-added networks are being developed in so-called collaboration islands.

The objective is to achieve improved work, process and product quality in international factory networks. This is based on the development of a digital assistant, which records sensor-supported and AI-based work processes in diverse locations. This data is transferred into process mapping, which is revised together in the collaboration islands. The AI-enabled MELLOW assistance with technologies such as activity detection and process mining is intended to help to detect errors early, to improve product quality and to relieve workers during their manual work.

MiniTec workstations and assistance system

Five partners are involved in the MELLOW project, including MiniTec. The other participants are the ITA Kaiserslautern (Institute for Technology and Work), the DFKI Saarbrücken (German Research Centre for Artificial Intelligence) and two companies in the shoe industry, Wildling Shoes in Engelskirchen and SOLOR in Pirmasens.

MiniTec has two major remits in the MELLOW project. The first task is the design and manufacture of the workstations, which will be fitted with instruments together with the German Research Centre for Artificial Intelligence, and installed and operated by the application partners. The sensors provided by MiniTec include the intervention detection of the pick-to-light modules supplied. Other sensors will be contributed by the German Research Centre for Artificial Intelligence.

The second task consists of extending the MiniTec SmartAssist to include a data interface and thus aggregate the sensor data and, following evaluation, to import it into the enhanced MiniTec SmartEdi editor through process mining technologies. With the help of this, the collaboration islands can optimise the recorded processes and then visualise them on the assistance system of the workstations.

The "Smart collaborative workflow development in the Shoe Industry – MELLOW" project is funded as part of the "Future of work" programme (funding reference 02L23B040 to 02L23B044) by the German Federal Ministry of Research, Technology and Space (BMFTR) and the European Union through the European Social Fund Plus (ESF Plus), and support is provided by the lead partner Karlsruhe (PTKA). The authors are responsible for the content. For further info, visit: **www.minitec.de/mellow**

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15 YEARS' MINITEC FIREFIGHTING TECHNOLOGY

For 15 years, MiniTec has been developing tailor-made solutions for fire services and other emergency services (BOS). An important factor for success was the setting up of a reliable dealer network. The specialist dealers function as competent local contacts, when it comes to use of the MiniTec profile system and solutions developed from it in the emergency services sector.

To mark the anniversary, at the end of January, MiniTec invited all specialist dealers to attend the "InHouse112" at its company headquarters. Items on the agenda included joint exchange and project presentations, discussions and tours of the premises. The response was remarkable and showed the importance attached to cooperation with MiniTec even on the side of the dealers.
MiniTec Head of Sales Benjamin Renno, himself active in the fire service for many years and the initiator of the "MiniTec Firefighting Technology" division, was pleased with the successful event: "With the InHouse 112, we have set an important impetus for the joint future and successful continuation of our activities with our dealers."

At the end of January, MiniTec sent out invitations to the "InHouse 112" at the company's headquarters.

MECHANICAL PRECISION MEETS MINITEC ADAPTATION

MiniTec France has developed a chain-driven conveyor section used to transport electric motor rotors. The aim was to enable precise placement of the parts between two unused rollers and thus ensure robustness, fluent and safe handling. A one hundred-percent tailor-made project, which was developed hand in hand with an industrial customer, from the definition of the brief through to the final delivery.

“This conveyor belt perfectly illustrates our MiniTec DNA: to design modular, efficient solutions perfectly adapted to every industrial environment”, emphasised Patrick Jaeck, Head of MiniTec France.

Chain-driven conveyor sections for the transport of electric motor rotors.

NEW MINITEC SALES PARTNER IN MEXICO

Strengthening our market presence on the American continent

MiniTec is continuing to expand its presence on the American continent: With CSI Control System Integrators, it was able to acquire a new sales partner for the Mexican market.

Since 1992, CSI has been active as an automation specialist and implements intelligent solutions for the optimisation of inter-sector industrial production processes 1992. The company has extensive experience in control technology, image processing and turnkey automation.

Company headquarters in Querétaro

“The Mexican market is of high strategic importance to us. Numerous international companies – including many from Germany – are represented there”, explained Benjamin Renno, Head of Sales at MiniTec. “With CSI, we have acquired a high-achieving partner in a country that has deep technical knowledge and a strong local network. We look forward to the cooperation and are convinced of its success”

Horacio Jiménez, General Manager of CSI Mexico, also sees great potential for the shared future: “Our orientation and expertise are an excellent match for the MiniTec portfolio. We therefore have the ideal preconditions to serve the Mexican market with the MiniTec profile and linear system and, based on this, to implement customised machines and systems.”

Horacio Jiménez
General Manager of CSI Mexico

LONG-SERVICE EMPLOYEES AT MINITEC

MiniTec is not the only one to have a significant anniversary this year – numerous employees also recently celebrated a personal milestone in their service with the company. In a dynamic work environment, long-term attachment cannot be taken for granted. All the more reason for us to value the unremitting commitment and high motivation of our fellow workers.

- Andreas Böhnlein (Director of Engineering): 30 years
- Yvonne Rühr (Sales Assistant): 25 years
- Heiko Bier (Head of Assembly): 15 years
- Christian Dupont (Shaft machining): 15 years
- Sergej Hofmann (Engineering): 15 years
- Thomas Trenz (Engineering): 15 years
- Johann Boger (Caretaker): 10 years
- Melanie Braun (Warehouse): 10 years
- Silke Dörr-Zöllner (Warehouse): 10 years
- Marco Filippelli (Engineering): 10 years
- Bernd Hein (Assembly): 10 years
- Jochen Hellbrück (Head of Innovation): 10 years
- Michael Schütz (Assembly): 10 years

In December, Tobias Doll (left) congratulated his fellow director Andreas Böhnlein (right) on his 30-year anniversary.

"The only way to do good work is to love what you do."

Yvonne Rühr

"15 years of experience, many challenges and teamwork – still with enthusiasm."

Sergej Hofmann

"I look back with pride on a decade full of interesting products. I look forward to everything that is yet to come."

Bernd Hein

MiniTec
THE ART OF SIMPLICITY

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THE ART OF SIMPLICITY

NICE TRY.

If your production requires clear specifications rather than creative freedom, our worker assistance system provides reliable support.

MiniTec SmartAssist reduces error rates and increases your productivity by guiding employees step by step through standardized processes. This ensures consistent quality, relieves the workload of your skilled workers, and makes your production future-proof.

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