



DVS
TECHNOLOGY
GROUP

PRÄWEMA

PRÄWEMA ANTRIEBSTECHNIK GMBH

MANUFACTURING SOLUTIONS FOR DRIVE TECHNOLOGY

System Provider for Soft and Hard-fine Machining

PRAEWEMA.COM
DVS-TECHNOLOGY.COM



Contents



04 The Company

PRÄWEMA, located in Eschwege, is a leading manufacturer of high-precision machine tools for machining gears, synchronizer parts, and vehicle transmission shafts.

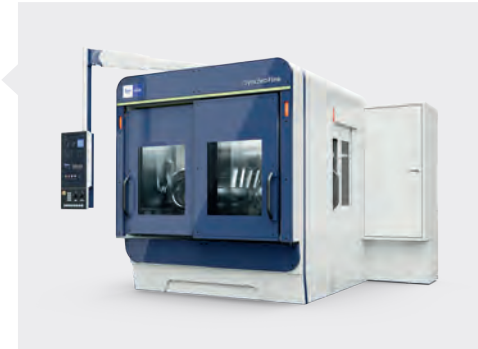
20 SynchroFormV

SynchroFormV enables the flexible, precise production of geared drive components with economical cycle times and a variety of technology modules for turnkey machining.



08 SynchroFine

A compact machine with directly driven tool and workpiece spindles for backlash-free drive, self-loading function and expandable digital operating parameter logging for optimum process control.



32 PRÄWEMA TOOLS

Our team of experts specializes in gear cutting tools for honing and skiving machines as well as special machines from the DVS TECHNOLOGY GROUP.





PRÄWEMA ANTRIEBSTECHNIK

At the Eschwege site in northern Hesse, PRÄWEMA Antriebstechnik GmbH develops and produces machines for machining and producing gears. The company specializes in gears, synchronous parts, and shafts that ensure proper torque in vehicle transmissions.

In addition to gear skiving and gear honing, PRÄWEMA's technology portfolio also includes the milling of latching grooves, backings, and gearings, but also taper cutting.

PRÄWEMA further developed the technology of gear honing to make it competitive on the market. Today, it is the world-wide market and technology leader in this segment with over 1000 machines sold.

In particular, the global vehicle industry relies on high-precision machine tools from PRÄWEMA.

A DVS TECHNOLOGY GROUP COMPANY

The DVS TECHNOLOGY GROUP is a group of experienced companies engaged in the machining technologies of turning, gear cutting, grinding and honing.

The DVS TECHNOLOGY GROUP employs more than 1050 staff worldwide and is considered a leading system provider of machines, tools, and manufacturing solutions for the soft and hard-fine machining of components.

The DVS TECHNOLOGY GROUP includes the following divisions:

DVS Machine:

Manufacture and sale of high-precision machine tools and automation systems

DVS International Sales & Service:

Local DVS partners for sales and service in international markets.

DVS Services & Tools:

Customer-specific development, manufacturing, and sale of machine components, tools and abrasives and related services.

FOCUS ON CORE TECHNOLOGIES



GEAR HONING



SKIVING



DEBURRING



MILLING



CHAMFERING



BACKTAPERING

1908

Company foundation

Foundation of the company as
"Berliner Werkzeugfabrik Fleck und Co."
in Berlin-Siemensstadt, manufacture of
precision tools



**Berliner Präzisions Werkzeug- und
Maschinenfabrik Fleck & Co.,
W 57, Bülowstr. 66. T. VI. 7396. Inh. Alfred
Rothschild u. Richard Fleck.**

1936

Change of name to **PRÄWEMA**
**PRäzisionsWERkzeug-
MAschinenfabrik KG**

**Präwema u/a
—Präwema Berliner Präzisions-Werkzeug- u.
Maschinenfabrik Dr.-Ing. Wilhelm Scholz R.-G.,
Siemensstr. Ronnenburg 4 T. 30 13 28 u. 34 60 37.**



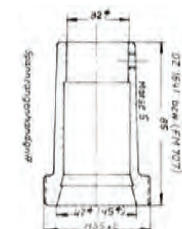
1943

Relocation of
the company to
Eschwege



1947

Start of the
clamping device
construction

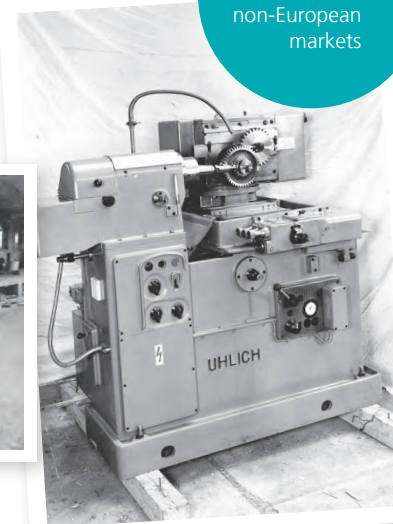


1957

Development of the first
packaging machines for the
cigarette industry
*Tobacco company
Tabacalera (Spain)*

1960

Takeover of the company
by the packaging
machine manufacturer
Schmermund
(Gevelsberg)



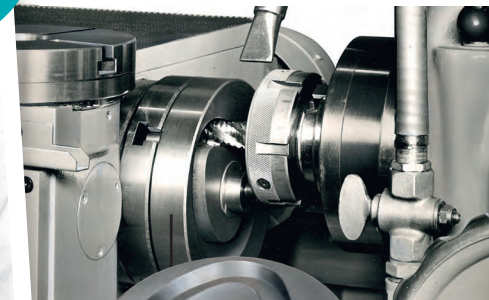
1971

Relocation to newly built factory halls
on Hessenring, launch of the
special machine program



1964

Expansion
of sales to
non-European
markets

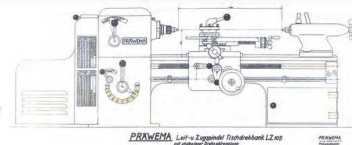


1975

Start of production of the
NC-controlled cam-type
milling and grinding machine

1920

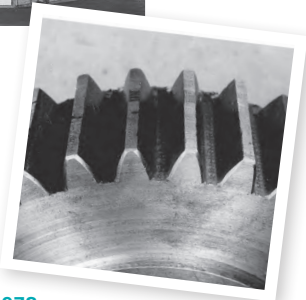
Expansion of the product range
to include turret lathes, tool maker
lathes, master lathes and draw
spindle lathes



1980
Construction of
the first large
transfer plants



1984
Delivery of the product
range to all continents,
500 employees



1978
NC versions and new milling
methods added to the
range of gear edge milling
machines

1985-1989
Death of the company owner
Mr. Schmermund

Bankruptcy and takeover by
PITTLER AG, own training facilities

Sale of the surface grinding
machine division, development of
two new machine concepts and
presentation of the new
PRÄWEMA at EMO

1982
Addition of the
production branch
flat grinding machines

1990

Concentration on
gear machining
machines and
cam production ->
**Market launch
SynchroForm**



1994
Konkurs im Zuge
der Werkzeug-
maschinenkrise



1995

Takeover by the
Rothen-berger Group,
market launch
**PRÄWEMA SynchroFine
Single-spindle machine**

2001

Integration into the
DVS TECHNOLOGY GROUP



2007

Market launch
**PRÄWEMA
SynchroFine
Double spindles**



2013
Tool
system VSD

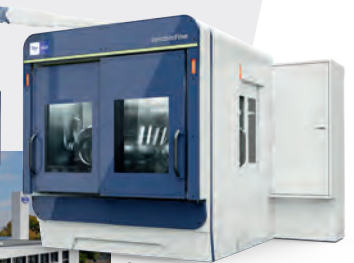


2019

Sale of
of the 1000th
milling machine



2018
Construction of
the tool shop



Sale of the 1000th
honing machine

2024

VarioCrossHoning
to improve the
surface roughness

2016



Optimized tool costs thanks to flexible VSD dressing strategy

Every VSD® is refined with LaserCut Technology and dressed with a geometrically determined cutting edge. The result is a homogeneous structure of the surface edge and a profile shape accuracy of $\pm 1 \mu\text{m}$.

Efficient direct drive

therefor extremely fast movement sequences, no maintenance, maximum precision, zero backlash, no mechanical transmission elements, shortest non-productive times, lower downtimes, best machining results and high gear quality

Honing ring clamping in micro accuracy

Radial, no dressing of used honing rings required

Newly developed binding system

Tool technology: Tool Ring Pro

Performance increase up to 70% thanks to optimized number of grains; Significant increase in the number of workpieces per dressing cycle

Large variety of automation concepts

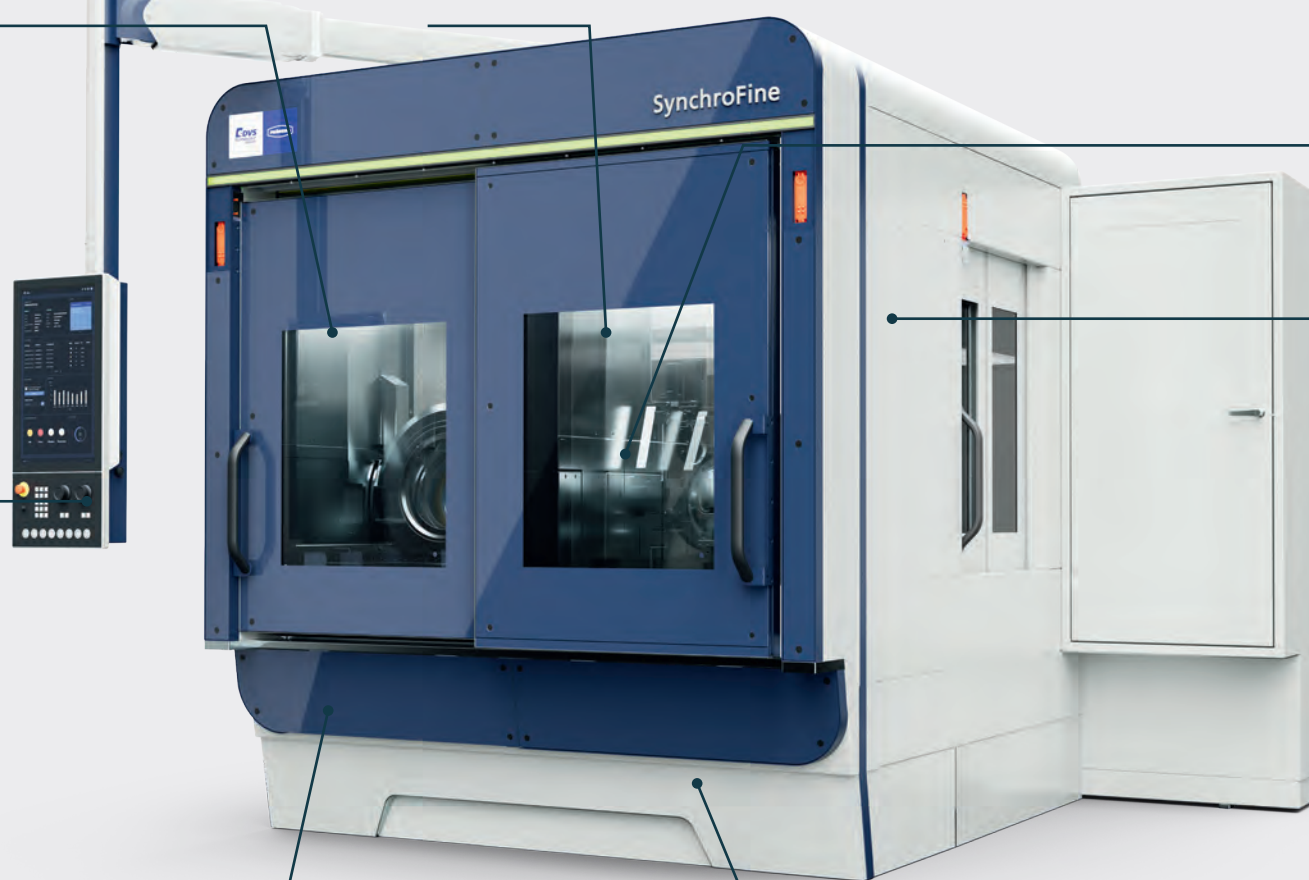
Portal loader handles loading and unloading functions, highly flexible loading systems such as robotic or palletizing systems

Compact machine

Single or double spindle machine, can be quickly converted for small and large batch sizes

Stable machine bed made of natural granite

High rigidity, vibration dampening, and optimal thermal properties



SynchroFine

More refinement needed?

The SynchroFine is a compact machine with a natural granite bed for optimal thermal and vibration-damping characteristics. It uses digital, directly driven tool and workpiece spindles to ensure a backlash-free drive. The machine is self-loading and can be equipped with various automation solutions. Digital logging of operating parameters is standard and can be expanded for process optimization.

SOPHISTICATED PROCESS RELIABILITY WITH SHORT CYCLE TIMES



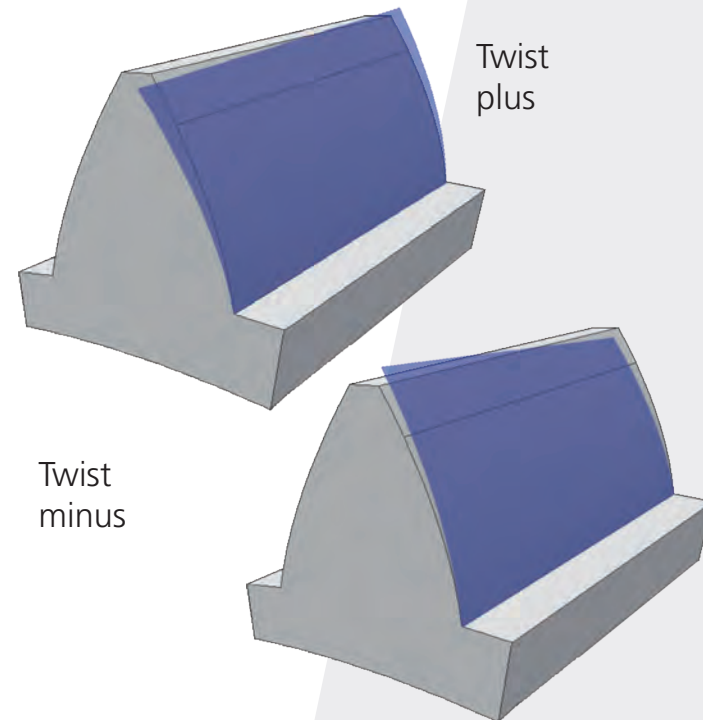
Machining Scope

Gear Cutting – Hardening – PräwemaHoning®

In recent years, gear honing has become established as an economical and powerful hard-finishing process for the production of gears or toothed shafts. Honed gear surfaces are important for lower noise levels and reduced wear on components in modern vehicle transmissions. Thanks to the consistent further development at PRÄWEMA, the technology has established itself as a standard in most parts of the international vehicle industry.

GEARING

- Interlock free or targeted interlocking
- Induced residual compressive stress prevents pitting
- No risk of grinding burns
- Noise reducing microstructure
- Shoulder processing possible



ADVANTAGES

- High cost-effectiveness thanks to a short process chain
- Pioneering gear quality
- Best machining results regardless of the pre-processing quality
- Superior process reliability with short cycle times
- Universal application of the process for straight and helical gears, shafts, and wheels
- Extremely low tool costs thanks to flexible VSD dressing strategy

Hobbing/skiving
chamfering and deburring

Hardening

Präwema Honing®

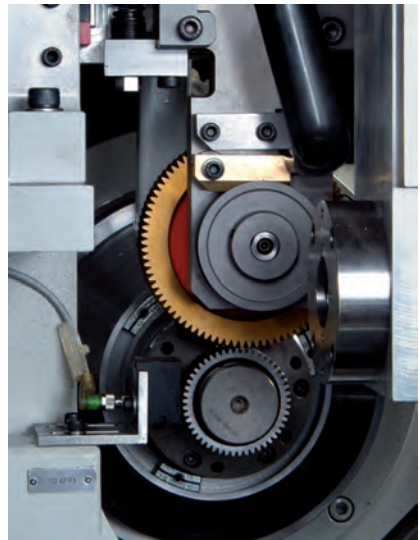
Gear installation

**VERY HIGH QUALITY
EXTREMELY QUIET
LOW UNIT COSTS
REDUCED CONSUMPTION / CO2**



ROLL CHECKER

- Dimension control on the raw part
- Ball size check before and after machining (selectable)
- Detect type of error (runout and damage)
- Data history of the preparatory work

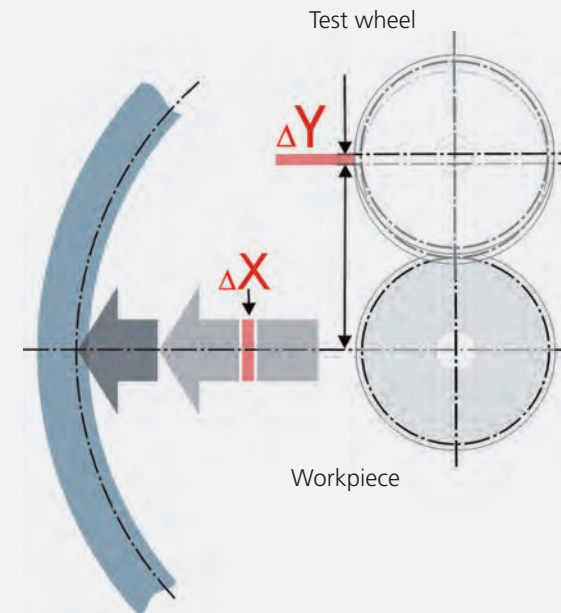


Smart honing

To shorten the cycle time, the allowance is measured on the raw part using a center distance test before and after machining. Depending on the measurement, the rapid feed is adjusted so that inefficient processing paths are avoided.

Key:

- ΔY = Fluctuation in dimensions compared to the previous component
- ΔX = Optimization of landing path in comparison to the previous component
- $\Delta X = \Delta Y$



Superfinishing

A specially developed oscillation process during the honing process ensures a further reduction in surface roughness and thus additional increase in the surface quality of geared components. This innovation – with which PRÄWEMA once again sets new quality

standards for gear surfaces – allows gear manufacturers to further reduce the friction losses of gear pairs. Moreover, the geared gear components are subjected to less wear, which increases their service life.

VarioSpeedDressing®

The latest generation of gear honing machines (PRÄWEMA SynchroFine®) is optionally equipped with so-called VSD technology. “VSD” stands for VarioSpeedDressing® and describes a dressing process in which only the front, continuously defined cutting edge of the dressing tool engages in the honing ring. Compared to dressing with conventional diamond dressing gears, the new VSD technology offers unprecedented flexibility in terms of the profile and flank line.



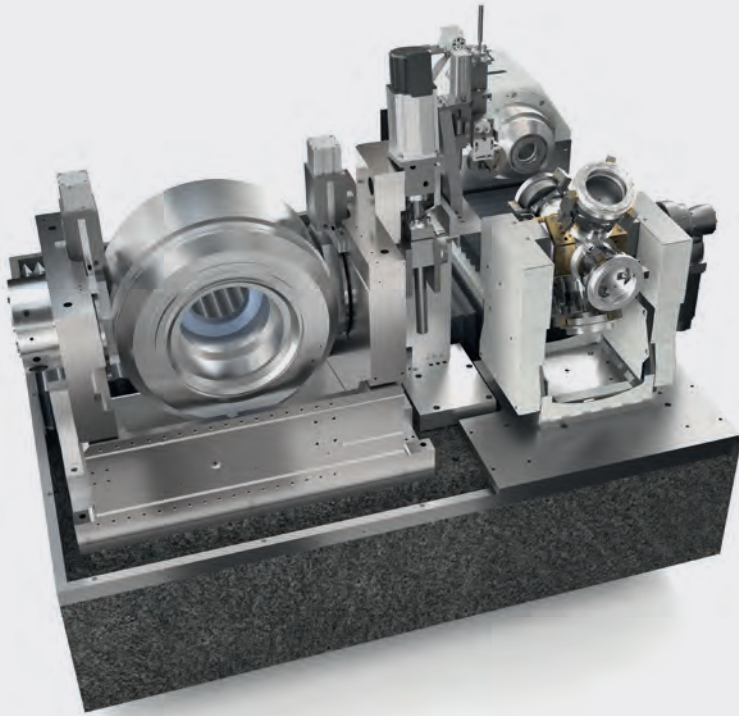
VARIOSPEEDRESSER®



VARIOSPEEDRESSERi®

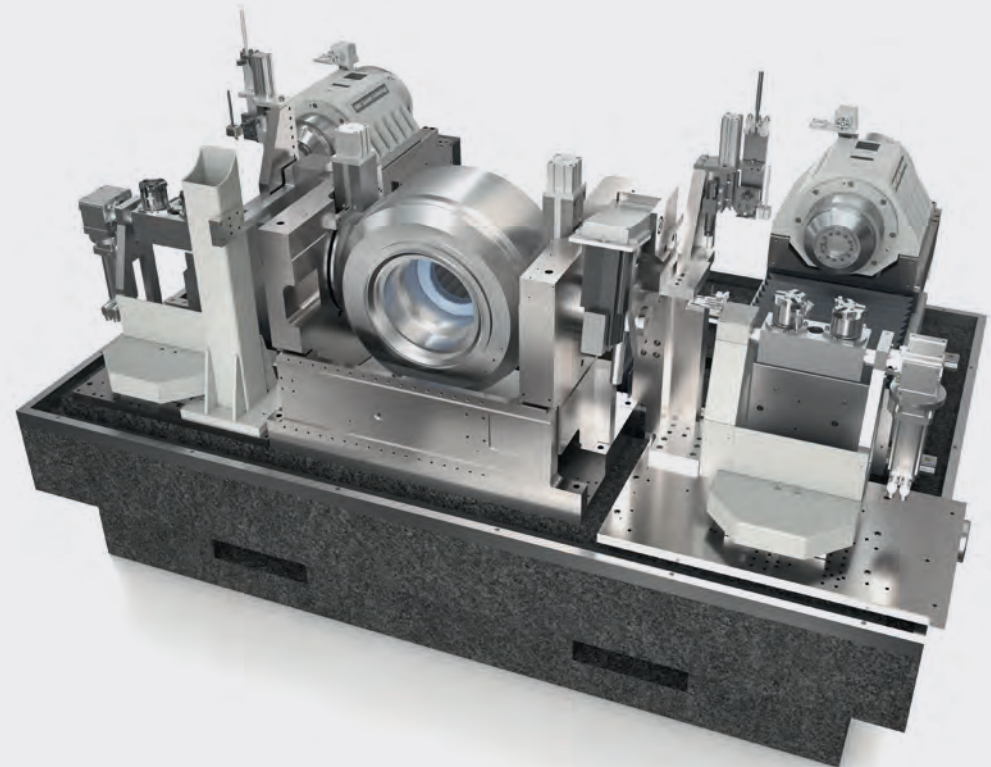


The Construction Concepts



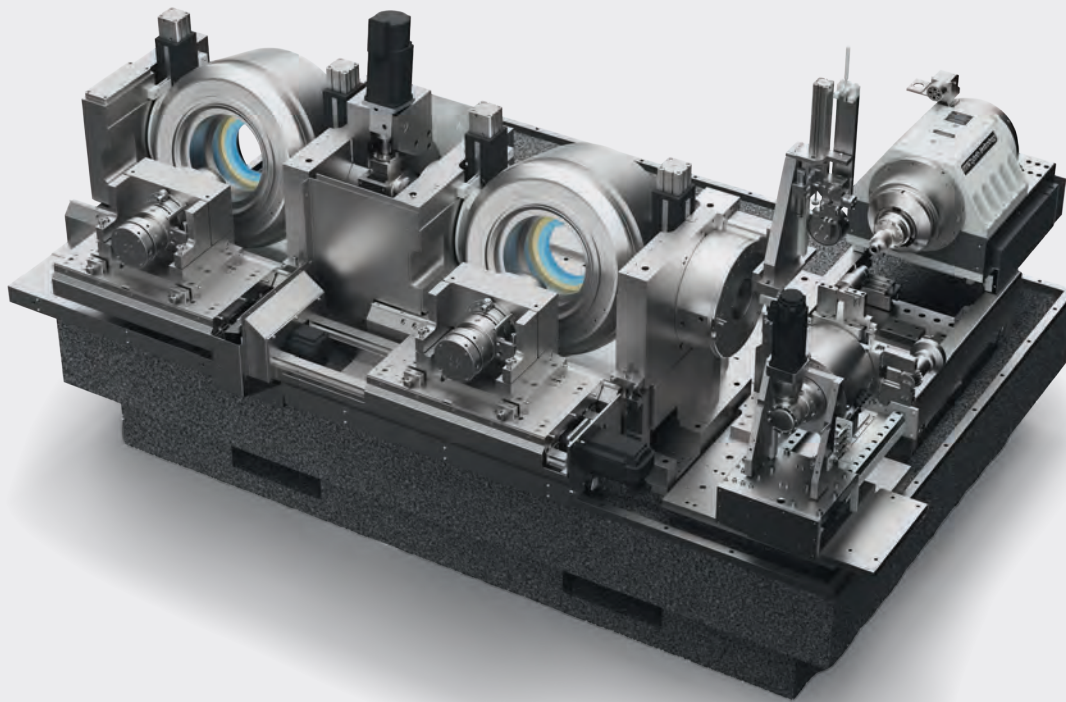
Single spindle model

The “pickup” design of the machine enables the straightforward implementation of automation concepts. A portal loader handles loading and unloading function of both the workpieces and the dressing tools.



Two-spindle model

Even the single spindle SynchroFine achieves extremely short cycle times. With Präwema's decades of experience in the production of machines with two or more spindles, the SynchroFinetype is also used for the two-spindle PräwemaHoning®. This reduces the non-productive time to three seconds.



SynchroFine DUO

The SynchroFine DUO was developed for maximum flexibility and process reliability in the precision machining of gears. Based on the proven machine concept of the SynchroFine, it combines all the advantages of the natural granite bed – such as excellent thermal stability and optimal vibration damping – with a new, modular machining architecture.

At the heart of the system is a two-stage process in which workpieces are first rough-honed and then fine-honed or polished. Two completely independent machining units enable separate tools to be used for each process step. The central arrangement of both tools relative to the swivel axis ensures maximum precision without the need for time-consuming corrections due to eccentricity. Both units have their own change intervals – a clear advantage in terms of maintenance and process planning.

Two gears in one steps

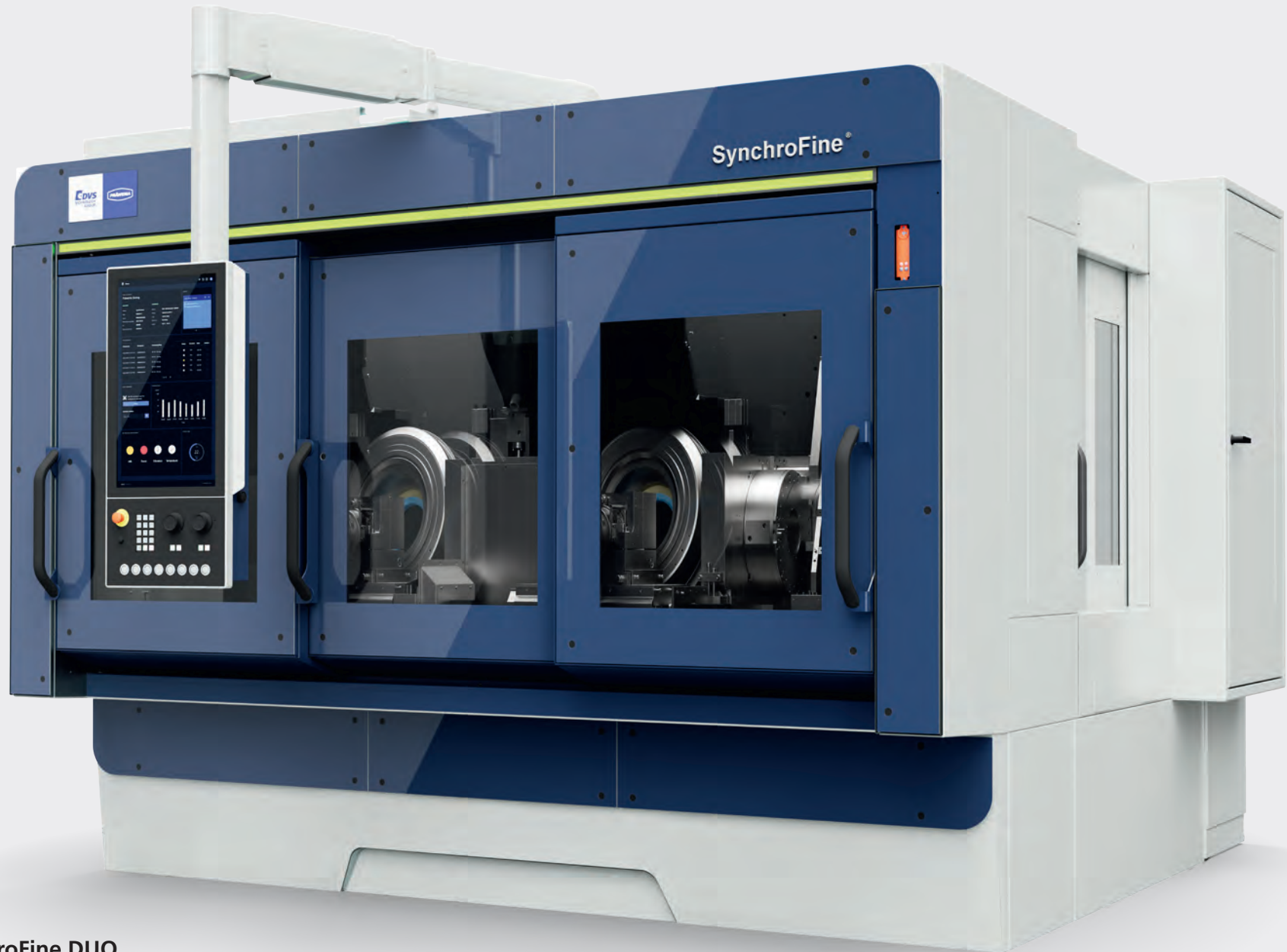
This machine design also opens up the possibility of machining workpieces with two different tooth profiles in a single clamping. Complex geometries such as stepped planets for planetary gears, including the increasingly required timing between the gear teeth, can thus be realized reliably and efficiently.

One gear in two steps

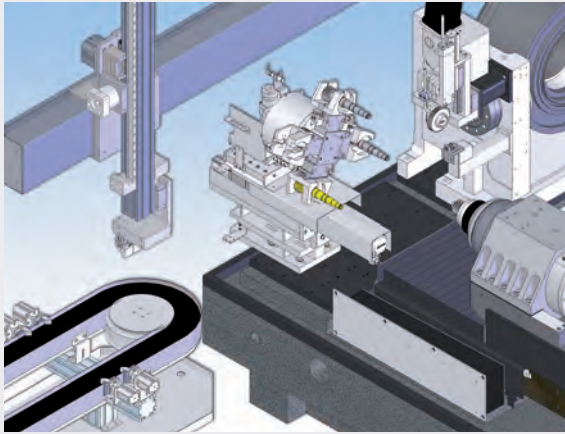
The DUO offers great potential for process optimization. By separating the process into a rough pre-honing process and a high-precision finish honing process, both machining time and tool costs can be significantly reduced. Pre-honing is performed with a powerful tool that does not initially require tight tolerances. This results in shorter cycle times, longer dressing cycles, and reduced dressing time. During the subsequent fine honing process, the reduced allowance enables high-precision finishing with shorter cycle times and optimized tool life.

Like all machines in the SynchroFine series, the DUO is equipped with directly driven tool and workpiece spindles. This guarantees a backlash-free drive for maximum process stability. Digital recording of all relevant operating parameters is integrated as standard and offers extended options for process monitoring and optimization.

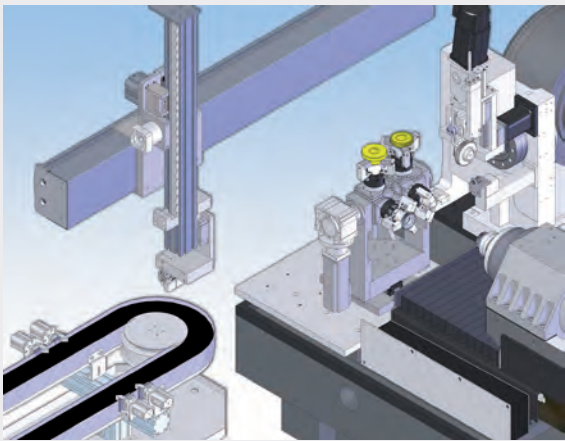
Outlook: The modular design of the SynchroFine DUO will enable the integration of additional machining processes in the future, allowing further steps in the value chain to be mapped in a single clamping cycle.



SynchroFine DUO



Shaft loading



Wheel loading

Workpiece handling

We offer a wide range of automation solutions for workpiece feeding into the machine. The automation unit can be put together individually by our customers depending on their capacity requirements or available installation space. The integration of external robot or palletizing systems as well as outfeeds to special conveyor belts can be easily implemented.



Technical Data

	SynchroFine 205	SynchroFine 305		SynchroFine 205	SynchroFine 305
WORKPIECE			TOOL SPINDLE		
Max. workpiece diameter (mm)	150	225	Rated power (kW)	30	
Max. workpiece length (mm)	600		Rated torque	150	
Additional workpiece dimensions subject to technical clarification			Mount/interface	Hydraulic expansion clamping system	
COMPOUND SLIDES			DIMENSIONS / WEIGHT	Single spindle machine	Double spindle machine
X-axis travel (mm)	1200		Width (mm)	2200	3000
Y-axis travel (mm) (WKZ option)	Loading portal: 850		Depth (mm)	2800	
Z-axis travel (mm)	560		Height (mm)	2350	
WORKPIECE SPINDLE			Total net weight (kg)	12000	15000
Drive power 100% duty cycle (kW)	35		AUTOMATION	Manual loading	
Torque 100% duty cycle (Nm)	112			Conveyor belt	
Max. speed (rpm)	6000			Robot directly in M/C	
				Robot on intermediate storage	

Flexible automation solutions
thanks to various integration options
for loading systems

Quality assurance
HRI Smart Connect® analyzes and
detects potential damage and errors
before they occur

Stable processes
through monitoring and wear
detection

Modular machine
as a single or double spindle machine,
for the series production of transmission
components, high-precision machining
results, versatile range of technologies for
precise soft and hard machining

Can be implemented flexibly
and in accordance with the
number of pieces with one or
two workpiece spindles



SynchroFormV

Modularity has a Name

The SynchroFormV machine series can be modularly adapted for the production of geared drive components. As a single or two-spindle machine, it plays to its strengths in series production with extremely economical cycle times and high-precision machining results. With the diverse technology modules efficient turnkey machining can be realized for all aspects of gearing in soft and hard fine machining.

SOPHISTICATED PROCESS RELIABILITY WITH SHORT CYCLE TIMES



Reliable Technologies

Tailored to your Application

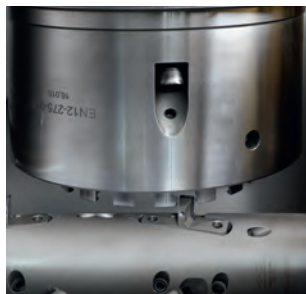
The reliable coordination of technological solutions is imperative for precision and efficiency in manufacturing. With a diverse range of technologies for precise soft and hard machining, we can meet a wide range of requirements. Adapting to the quantity is a flexible process and can be carried out with either one or two spindles. This enables efficient turnkey machining that covers all aspects of gear cutting for drive components, which not only saves time but also ensures high quality products.

ADVANTAGES

- Versatile range of technologies for precise soft and hard machining
- One or two spindles depending on quantity requirements
- Efficient turnkey machining for the gearing of drive components



DEBURRING



IMPACT MILLING



CHAMFERING



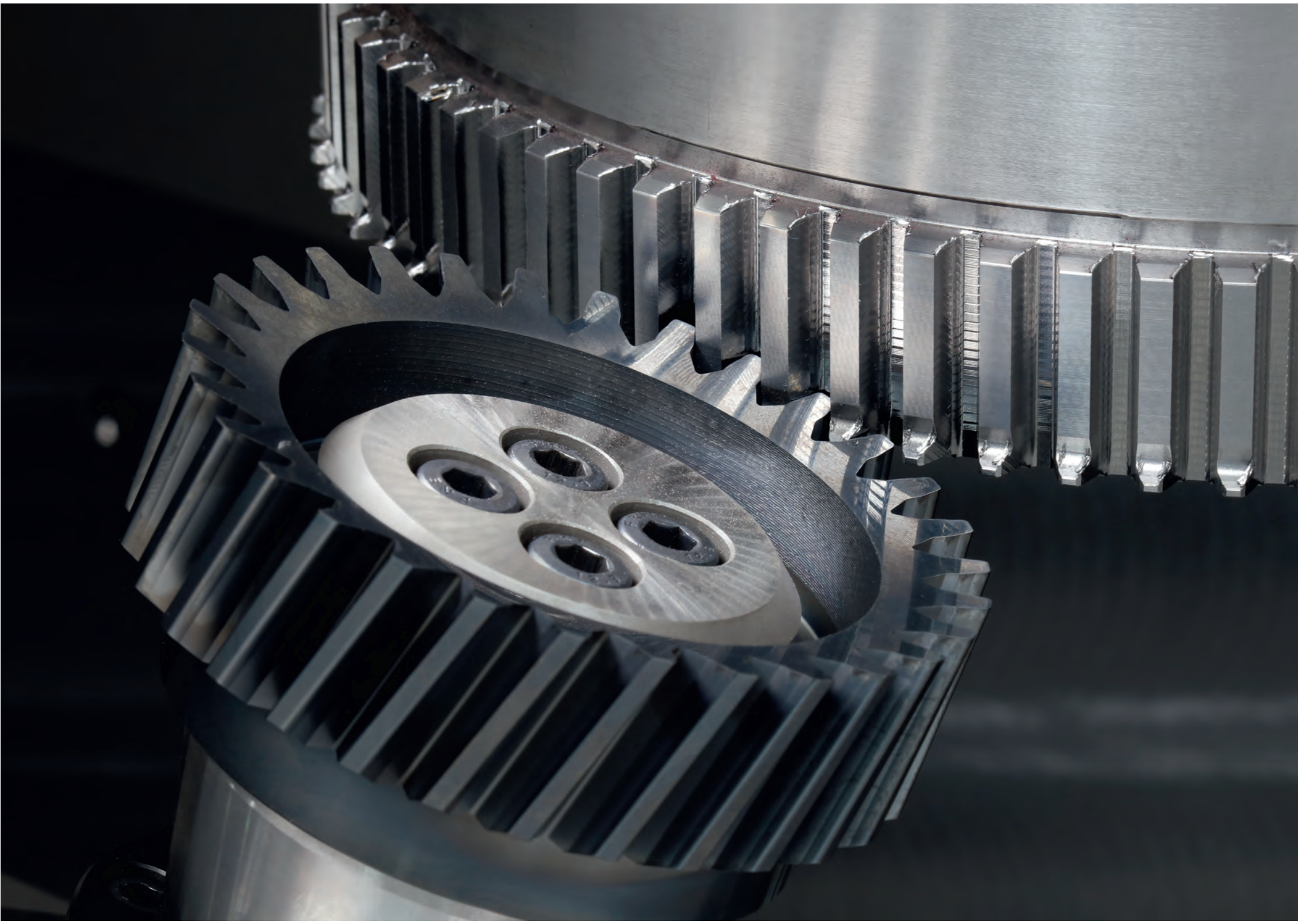
BACKTAPERING



SKIVING



INTERNAL HONING





Maximum Precision for Internally Toothened Ring Gears

The requirements for ring gears of planetary gearboxes used in hybrid or electric vehicles have increased significantly in recent times. Due to the higher speeds and higher load ratios of the gearing in alternative drives, ring gears are hardened. The resulting heat deformations on the gearing can be precisely and efficiently compensated with the PRÄWEMA internal gear honing technology.



Internal gear honing

This technology creates a much finer surface and a defined flank geometry of the internal teeth. The noise behavior of the ring gear remains low despite high speeds.

System Solution for the Machining of Running Gears

Running gear

The PRÄWEMA SynchroFormV is also the ideal machining solution for drive components with running gears. The machine reliably performs turning, gear cutting, and deburring operations in soft machining. Already hardened components are geared using the hard skiving process. For the final machining of external gears, PRÄWEMA offers gear honing with the SynchroFine machine type.



Skiving

PRÄWEMA's gear skiving technology enables maximum cost-effectiveness thanks to the high cutting volume that can be achieved.



Deburring

The removal of the massive main burr can usually be integrated into the machining process without affecting the cycle time. Moreover, VarioChamfer is now also a process for the targeted introduction of chamfers.

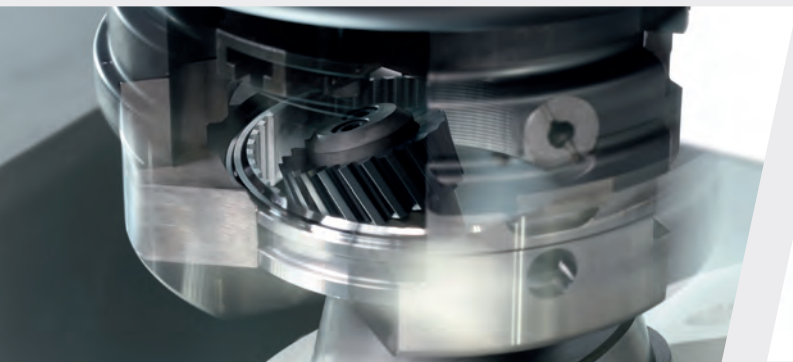


Honing of internal gears

PRÄWEMA gear honing is a highly accurate and economical process for the hard-fine machining of internal gears up to a pitch circle diameter of 250 mm.

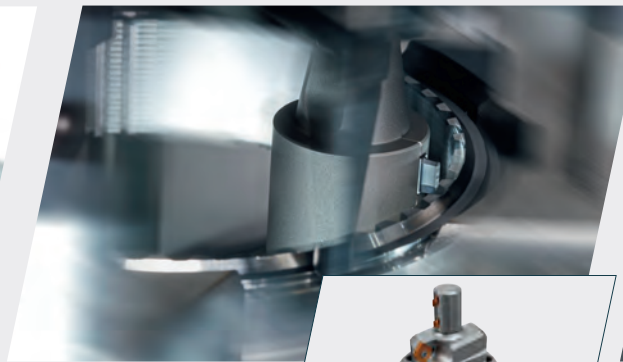


Complete Machining of Sliding Sleeves



Skiving

Thanks to the latest developments in manufacturing technology, this efficient and flexible technology is one of the most economical methods for the gearing of workpieces.



Backtaper/locking groove milling

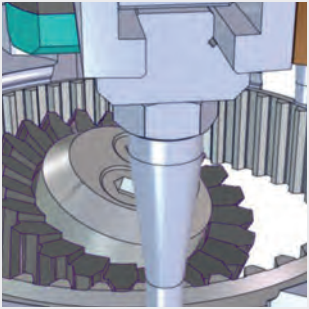
PRÄWEMA uses the hypocycloid milling process for the economical machining of backtaper and locking grooves in a metal-cutting process on internal and external gears.



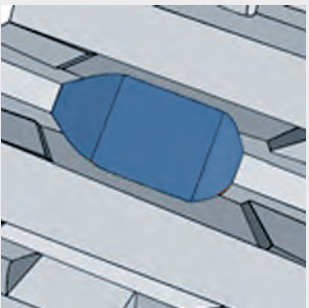
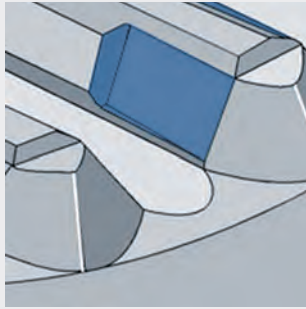
Pointing/sharpening

A wide variety of pointing shapes can be realized. These include crowned, round and straight pointing.

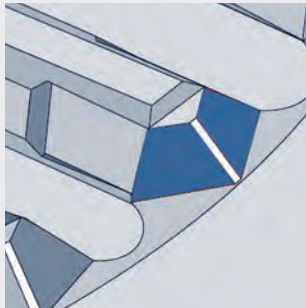
Skiving



Backtapering



Locking groove milling



Pointing

Sliding sleeves

Sliding sleeves enable gear changes in manual transmissions and transmit the torque from the transmission shaft to the gear wheel via the synchronizer and clutch body. With the SynchroFormV, sliding sleeves can be fully machined with high precision and at a low cost per unit.

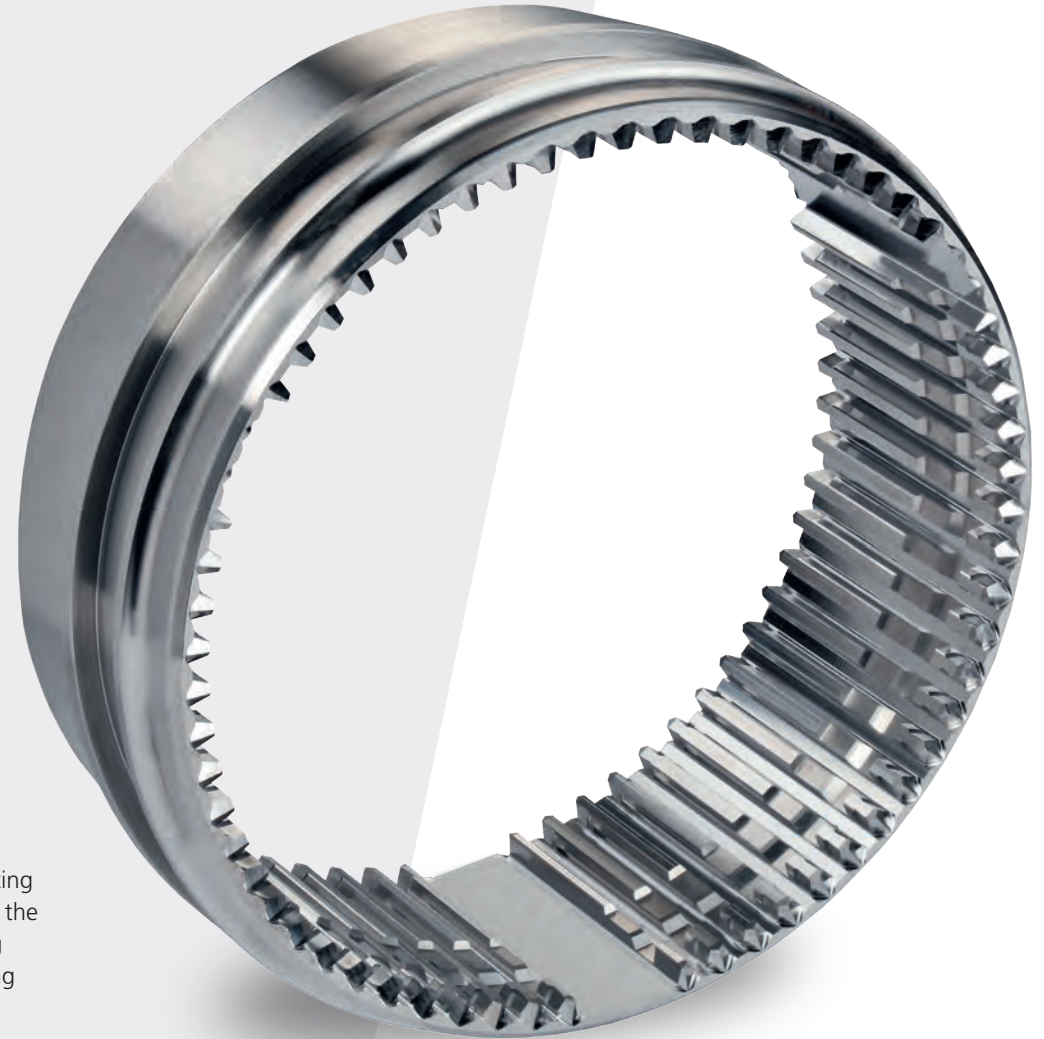


Special Gearing Impact Milling etc.



Impact milling

Impact milling is an advanced machining technology. It involves striking a rotating tool on the workpiece at high speed and thus removing or shaping material in the process. This technique enables precise and efficient machining. Impact milling is widely used in the production of precision parts and enables complex shaping and a surface finish of the highest quality.



Technical Data

	SynchroFormV		SynchroFormV
WORKPIECE		TOOL SPINDLE	
Max. workpiece diameter (mm)	300	Max. speed (rpm)	6000 – 10000
Max. workpiece length (mm)	290 for CL* – 100 for SL*	Rated power (kW)	6 – 42
Additional workpiece dimensions subject to technical clarification		Rated torque	10 – 140
		Mount/interface	Capto
COMPOUND SLIDES		DIMENSIONS / WEIGHT	
X-axis travel (mm)	1500 – 3300	Width (mm)	2800 – 3450
Y-axis travel (mm) (WKZ option)	284 – 364	Depth (mm)	2760
Z-axis travel (mm)	330	Height (mm)	2550
		Total net weight (kg)	7000 – 10000
WORKPIECE SPINDLE		AUTOMATION	Manual loading Circular loader with oval band (standard) Loading shuttle Robot loading
Drive power 100% duty cycle (kW)	35 – 63		
Torque 100% duty cycle (Nm)	75 – 430		
Max. speed (rpm)	6000 – 10000		

Key:
CL* = center loading
SL* = side loading

PRÄWEMA TOOLS

Gear cutting tools with maximum performance

The team of experts at PRÄWEMA Antriebstechnik GmbH has specialized exclusively in the development and production of gear cutting tools for honing and skiving machines as well as special machines for the DVS TECHNOLOGY GROUP.

Customer-specific tools, such as deburring or skiving tools, are also developed and manufactured.



Phone: +49 5651 8008-0

E-mail: tools@praewema.de

Website: dvs-technology.com/praewema-antriebstechnik



The tool is the interface between the machine and the workpiece. It is critical to ensure process reliability. High-quality tools deliver consistent quality and reduce production fluctuations. This applies to both new and remanufactured tools in original equipment quality.

Tool quality is especially important for gear skiving tools, which must achieve the highest gear quality through the rolling process.

PRÄWEMA TOOLS maps the entire technology process from analysis, design, manufacturing, coating, and application in-house and thus guarantees a customer-oriented tool solution, no matter what the challenge may be.



REUSABLE TOOLS



SINGLE-USE TOOLS



GEAR DRESSER,
SPECIAL TOOLS



SHAFT TOOLS



TURNING TOOLS



INDEXABLE INSERTS



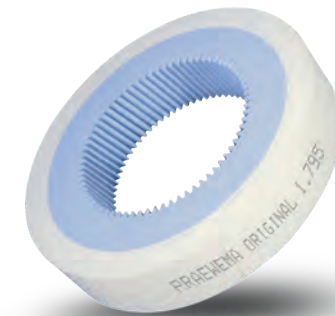
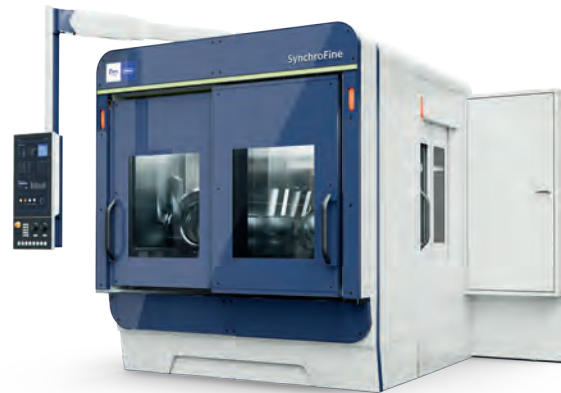
GEAR DRESSER,
SPECIAL TOOLS



REUSABLE OR SINGLE-USE
TOOLS WITH HOLLOW &
STEPPED GRINDING

Präwema Honing®

DVS as system provider



VarioSpeedDresser®

Honing machine

Honing rings

DVS as system provider: Technology + Machine + Tools

Präwema HRI Smart Connect®

Your access to safety and efficiency in digital manufacturing

From 2025, we will be introducing HRI Smart Connect®, an innovative model based on continuous updates and proactive support. The aim is to make your production process more efficient and safer.

YOUR ADVANTAGES WITH HRI SMART CONNECT®

- Always up-to-date software
- Automatic updates for the highest security standards
- Extended support options
- Prioritized access to experts for fast problem resolution
- Proactive maintenance services for maximum availability
- Predictable costs
- Transparent and predictable fee structure.



CHALLENGES AND OPPORTUNITIES

The changeover to HRI Smart Connect® is based on growing requirements for data protection and IT security, which can be seen in the following areas:

- **Cybersecurity threats:** Currently secure software can become vulnerable to new vulnerabilities, whereby increasing threats place greater demands on machine and software manufacturers.
- **Compliance and regulations, EU directives:** From 2027, manufacturers and operators will be obliged by the NIS2 Directive and the Cyber Resilience Act (CRA) will require manufacturers

and operators to manage vulnerabilities and provide and apply security updates.

- **Adaptations to new requirements:** Changing requirements for data and interfaces require regular updates.

YOUR SOLUTION

- **Secure access for your company -** Access via browser / mobile devices, full control (users/rights)
- **Digital access to documentation -** All relevant documents available at any time
- **Provision of software updates -** especially with regard to NIS2/CRA conformity
- **Vulnerability Management -** Compliance NIS2/CRA requirements regarding vulnerability management and patching
- **Optimized processes for remote -** e.g. Machine health checks and other services

DVS SERVICE

Turning, grinding, gear cutting –
and learning, networking, and improving

DVS TECHNOLOGY GROUP machines produce high-quality components. We also strive to exploit the potential of digitalization and making it even easier for you to produce workpieces and operate machines. The future is digital, networked, smart – and it just feels right.

What's great about it: As a user, you can also gradually tap into the digital potential of your production and benefit from the advantages that are particularly beneficial for your production – from the use of the customer portal to almost self-sufficient production.

DVS Connect

The digital customer portal DVS Connect serves as a platform and starting point for accessing information and applications from the DVS TECHNOLOGY GROUP and is therefore at the center of networking and integration.

DVS Edge

As the basis for all applications, smart machines need a brain that allows them to speak. That is exactly what DVS Edge does, and it networks data, machines, and people into a self-learning system that operates in different modes: online and offline, continuously, or selectively.

DVS Digital Experience

The DVS Digital Experience consists of the applications and functions that you can use based on the knowledge and experience of the DVS TECHNOLOGY GROUP. Your benefits: ergonomics, efficiency, and consistent quality.



Phone: +49 6074 30406-53

E-mail: digital@dvs-technology.com

Website: dvs-technology.com/dvs-service



Contact us:



**PRÄWEMA
Antriebstechnik GmbH**

Hessenring 4
D-37269 Eschwege

Fon +49 (0) 56 51 8008-0
Fax +49 (0) 56 51 12546
vertrieb@praewema.de
dvs-technology.com/praewema-antriebstechnik

Members of the DVS TECHNOLOGY GROUP

DVS MACHINE



BUDERUS Schleiftechnik GmbH | dvs-technology.com/buderus-schleiftechnik
I.D. grinding – O.D. grinding – Bore honing – Hard turning



PITTLER T&S GmbH | dvs-technology.com/pittler
Vertical turning center and Pick systems – Gear cutting for complete machining



PRÄWEMA Antriebstechnik GmbH | dvs-technology.com/praewema-antriebstechnik
Gear honing – Gear grinding – Hobbing/Fly-cutting – Chamfering



rbc robotics GmbH | dvs-technology.com/rbc-robotics
Camera-guided robot automation systems

DVS INTERNATIONAL SALES & SERVICE



DVS Technology America, Inc. | dvs-technology.com
DVS Sales & Service in USA, Canada & Mexico



DVS Technology (Taicang) Co., Ltd. | dvs-technology.com
DVS Sales & Service in China

DVS SERVICES & TOOLS



DVS TOOLING GmbH | dvs-technology.com/dvs-tooling
Tool solutions and technology support for PRÄWEMA gear honing



NAXOS-DISKUS Schleifmittelwerke GmbH | dvs-technology.com/naxos-diskus
Conventional grinding tools – CBN and diamond tools



Werkzeugmaschinenbau Ziegenhain GmbH | dvs-technology.com/wmz
Motorspindles & Components



DVS Service GmbH | dvs-technology.com/dvs-service
Maintenance – Complete overhauls – Repairs



DISKUS WERKE Schleiftechnik GmbH | diskus-werke.dvs-gruppe.com
Face grinding – Double face grinding – Special machining

DVS PRODUCTION



DVS Precision Components (Taicang) Co. Ltd.
Precision powertrain components in series production for passenger cars and trucks on DVS machines