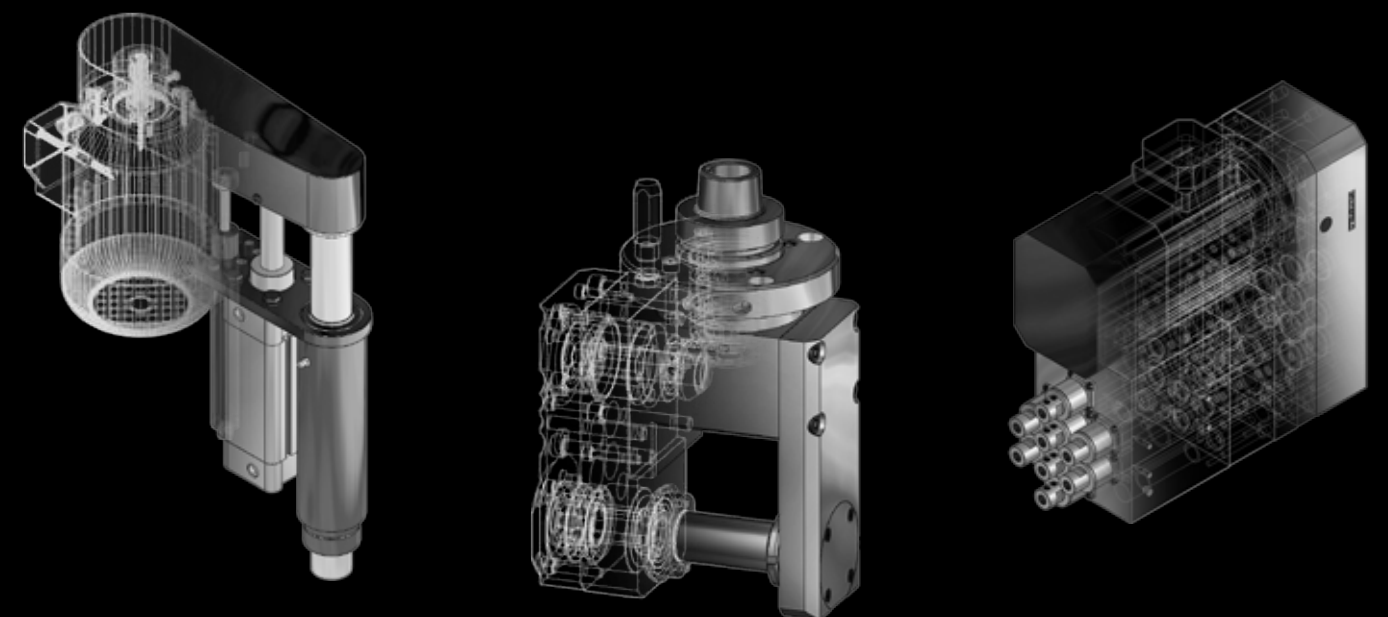


# GROTEFELD

The driving force.



Programme summary

**GROTEFELD units**

for the woodworking, plastics processing and aluminium processing industries and for the trades

**GROTEFELD**

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**GROTEFELD**

**GROTEFELD**

Dear Reader,

as you know, even the best technology is subject to a constant process of further development and change, but we will keep you up-to-date with the latest state of the art. This catalogue provides an insight into our product range.

This catalogue is intended as a source of ideas, not as a list of article numbers. It is designed to arouse your interest in the wealth of varieties in which our products are available and to give you some idea of just what can be achieved today. Let us advise you. One thing you can be sure of is that we will also find a technically and economically optimum solution for you, too.

For more than 50 years we have carried the GROTEFELD philosophy in our hearts. We live, think and breathe GROTEFELD. And we are proud of the results.

We produce almost everything ourselves with our ultra-modern machinery, for the quality of the end-product is decisive. And that encompasses everything from engineering design (3D-CAD systems) through manufacture (CNC machines) to assembly. Our vertical integration is now over 90%. Only DIN parts, such as screws and bolts, ball bearings and electric motors, are still purchased as merchandise from selected premium suppliers.

Our quality control department is equipped with the very latest measuring instruments and test benches which we have developed ourselves in order to guarantee the outstanding quality of our products.

In addition, we offer a service ensuring that your production process runs smoothly and safeguards your investments.

**Our experience forms the basis for your success in the long term. Make use of our capacities!**

Best regards,

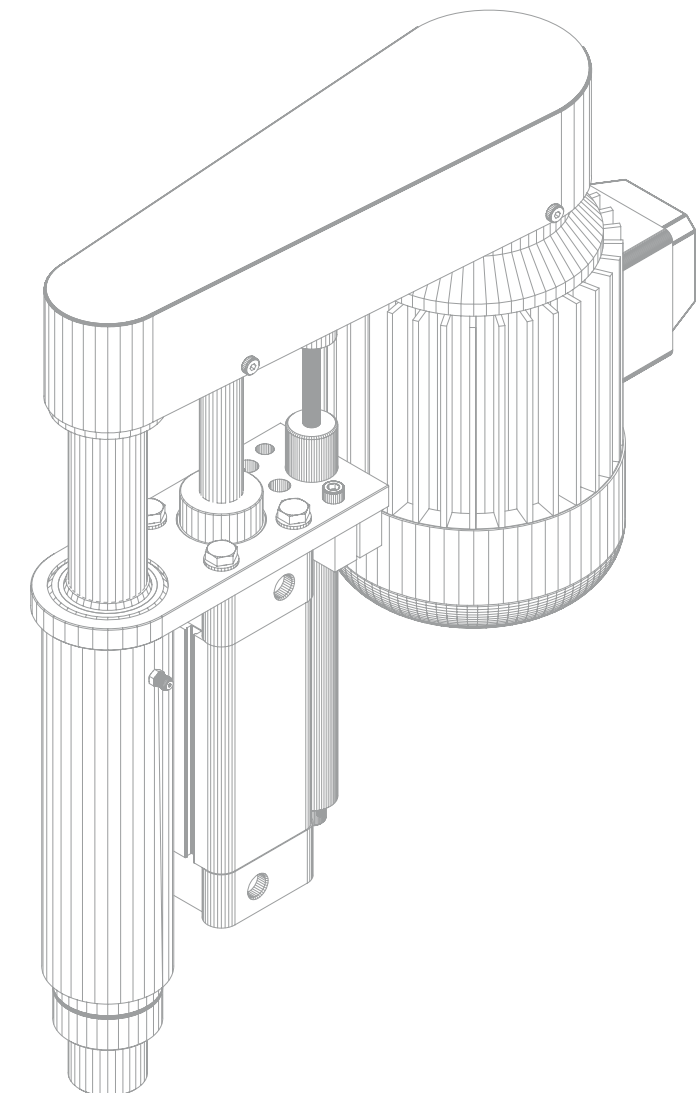
A handwritten signature in black ink, appearing to read "Carsten Clauder".

Carsten Clauder

## Why GROTEFELD

Direct contact with leading machine manufacturers and end-users throughout the world has made us a recognized specialist and partner for trade and industry. Cutting is our job – for wood, plastics and aluminium. For several decades, we have designed, developed and built machining units for machines and CNC machining centres to the highest standards.

**GROTEFELD units stand for top quality, precision and durability. They offer good value for money, making their use most appropriate. GROTEFELD can supply the right unit – functional, fully matured and without compromises – for every machining job.**



Sawing, drilling, milling and tracing ...

... we can offer you competence, know-how, quality and service – all from a single source.

**GROTEFELD**

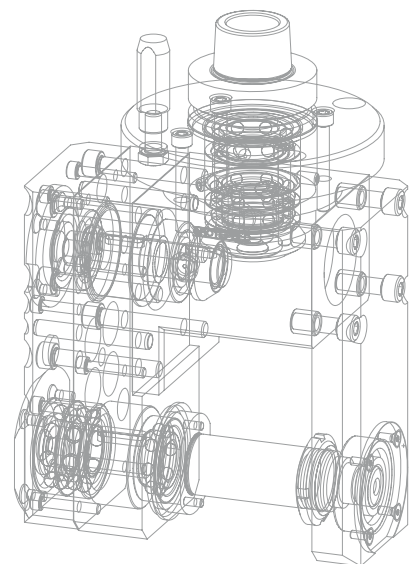
**GROTEFELD**

## COMPETENCE

Competence is the ability to distinguish between right and wrong, and to act professionally, logically and responsibly. Every employee at GROTEFELD has this competence.

In all corporate processes, a highly specialized team of advisers, technicians, engineers and production workers ensures that the customers' requirements are optimally met.

**GROTEFELD units are like Swiss clockwork: highly precise gear wheels with maximum durability.**



## KNOW-HOW

All the various machining processes must be known precisely so that the different machining tasks, such as sawing, drilling, milling and tracing, can be optimally handled.

This knowledge of different branches and production processes, together with the ability to develop new approaches in collaboration with leading machine manufacturers and end-users, is essential in order to produce high-quality cutting units.

That is why using new manufacturing and engineering methods is just as much a part of GROTEFELD as the regular further training provided for our employees.

**GROTEFELD units are intelligently designed and technically sophisticated.**

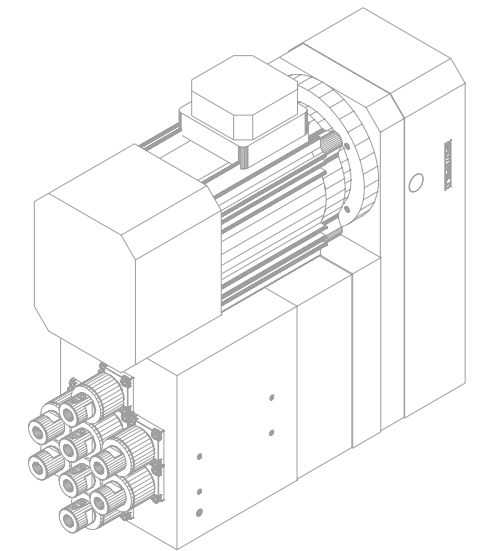
## QUALITY

A product's quality depends on its properties and capabilities. GROTEFELD consequently attaches top priority to ensuring the highest possible quality.

These quality standards are assured through conscientious engineering design and the use of proven technology, state-of-the-art manufacturing methods and permanent quality controls in all manufacturing processes.

The precise functioning demanded by the market is permanently incorporated into all company processes. Quality requirements are documented and assured by our in-house inspection and test laboratory.

**GROTEFELD units are high-quality products „Made in Germany“.**



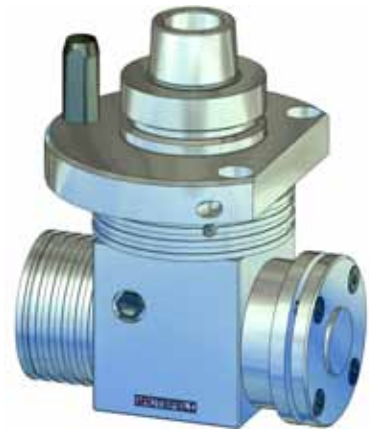
## SERVICE

Ensuring the satisfaction of its customers is GROTEFELD's prime objective. Maintenance and the supply of spare parts – even after decades – for all units which we produce are therefore a matter of course.

Service begins at the moment of making contact with the customer and continues without interruption. This is guaranteed by all our employees. A service that creates confidence.

**GROTEFELD: Service from the very first moment.**





### W01 angular sawing heads

The angular sawing head series W01 have one continuous processing spindle. The receptacle is a sawing- or nut milling receptacle. The turning direction of the receptacle is opposite to the drive turning direction. The drive speed is transmitted in a ratio of 1:1,55 to the tool receptacles.

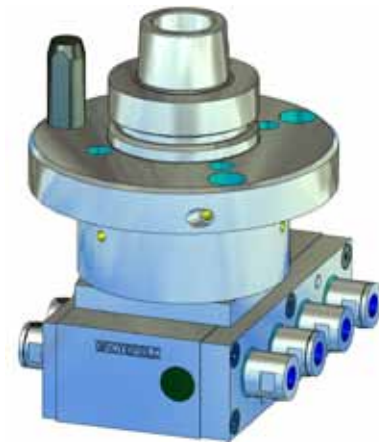
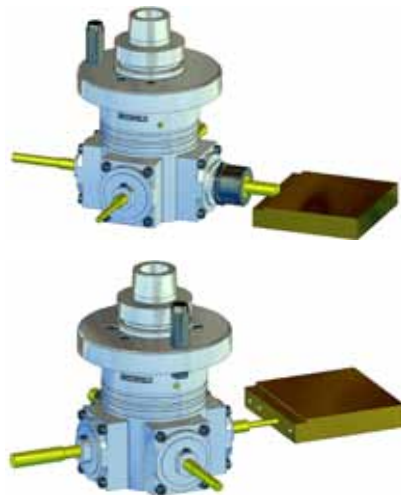
The maximum spindle speed is 10,000 rpm in interval operation. The maximum spindle speed is operation.



### G03 angular heads

The angular heads of the series G03 are equipped with up to 4 processing spindles. The spindle turning direction of all tool receptacles is always equal to the drive turning direction.

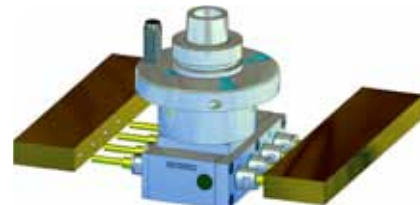
The drive speed is transmitted in a ratio of 1:1,55 to the tool receptacles. The maximum spindle speed in interval operation is 18,000 rpm.



### W04 angular heads

The angular drilling head series W04 can be equipped on two opposite sides with up to 5 horizontal drilling spindles. The minimum spindle distance is 20,0mm. The spindle turning direction is according to the number and position of the spindles R.H./L.H.

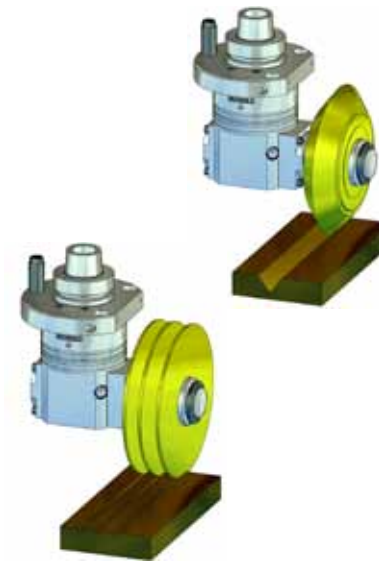
The drive speed is transmitted in a ratio of 1:1. A maximum spindle speed of 6.000 rpm is possible in permanent operation.



### G06-1.1 angular heads

The angular heads of the series G06-1.1 have a continuous machining spindle. The drive speed is transmitted in a ratio 1:1,55 to the tool receptacles.

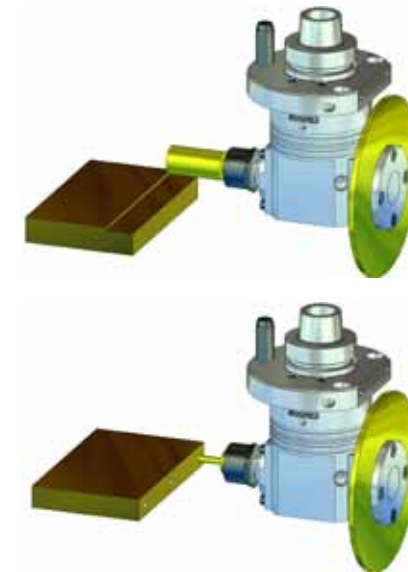
The maximum spindle speed in interval operation is 20,000 rpm.



### G06-1.2 angular heads

The angular heads of the series G06-1.2 have a continuous machining spindle with two tool receptacles. One of the receptacles is turning equal to the drive turning direction, the other is turning opposite to the drive turning direction. Different from the G10 housing type, no further spindles can be put in the G06 casing type.

The drive speed is transmitted in a ratio 1:1,55 to the tool receptacles. The maximum spindle speed in interval operation is 20,000 rpm.

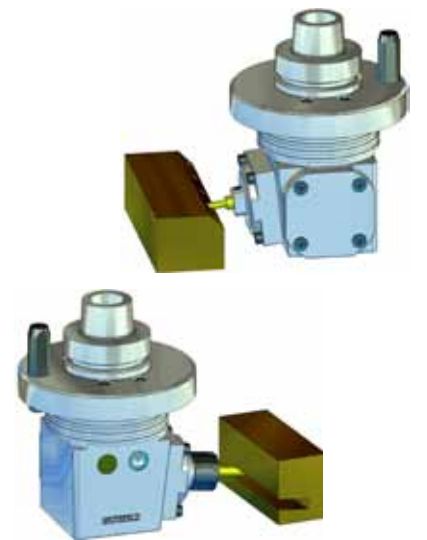


### G07 angular heads

The angular heads of the series G07 offer you the possibility to choose an angular head with a fixed spindle position between 10° bended up and up to 10° bended down.

In the two-spindle-execution the 180° opposite tool receptacle may have another angle than the other tool receptacle. The determined angle cannot be modified afterwards. The spindle turning direction is opposite to the drive turning direction.

The drive speed is transferred to the tool receptacles in a relation of 1:1. The maximum spindle speed is 18,000 rpm in interval operation.

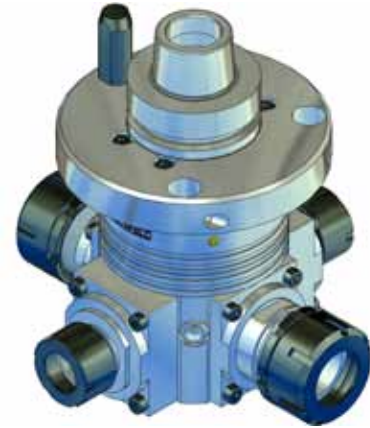
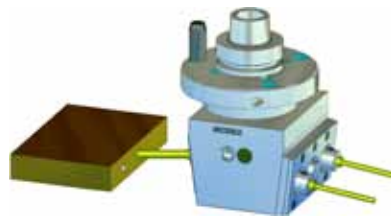




### W09 angular heads

The angular heads of the series W09 offer you the possibility to choose an angular head with a fixed spindle position between 10° bended up and up to 10° bended down. The determined angle cannot be modified afterwards.

The spindle turning direction is right / left. The drive speed is transferred to the tool receptacles in a relation of 1:1. The maximum spindle speed is 6,000 rpm in permanent operation.



### G10 angular heads

The angular heads of the series G10 are equipped with a continuous processing spindle with two possibly different tool receptacles. The spindle turning direction of these tool receptacles is always equal to the drive turning direction.

The drive speed is transferred in a relation of 1:1,55 to the tool receptacles. A maximum spindle speed up to 18.000 rpm while interval operation is possible.



### G10-4.5 angular heads

The angular heads of the series G10-4.5 are equipped with a continuous processing spindle with two possibly different tool receptacles. The other existing processing spindles are arranged in an angle of 90° to the continuous processing spindle.

The spindle turning direction of these tool receptacles is equal to the drive turning direction, that of the lower spindle opposite to the drive turning direction. The drive speed is transferred in a relation of 1:1,55 to the tool receptacles.

A maximum spindle speed up to 18.000 rpm is possible in interval operation.

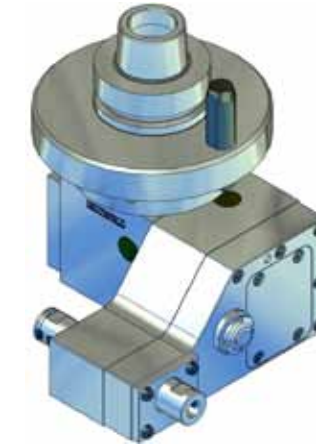
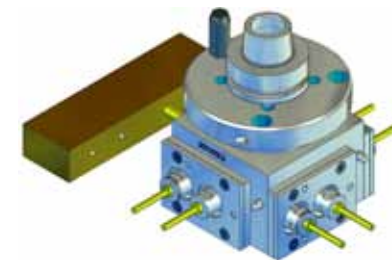


### W11 angular heads

The angular heads of the series W11 can be equipped with up to two tool receptacles 4 sides. The spindle distance can be minimum 21,5 up to maximum 32,0 mm.

The spindle turning direction is according to the number and position of the spindles R.H./L.H. The drive speed is transferred to the tool receptacles in a relation of 1:1,55.

A maximum spindle speed of 6.000 rpm is possible in permanent operation.

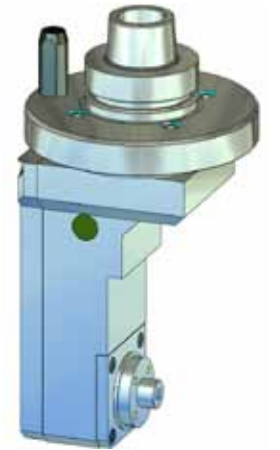
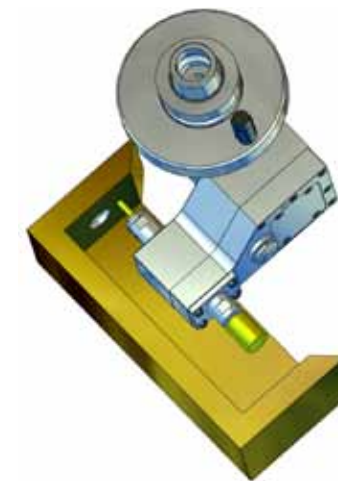


### W12 angular heads

The angular heads of the series W12 can be equipped with a continuous processing spindle with two tool receptacles.

One of the receptacles is turning equal to the drive turning direction, the other is turning opposite to the drive turning direction.

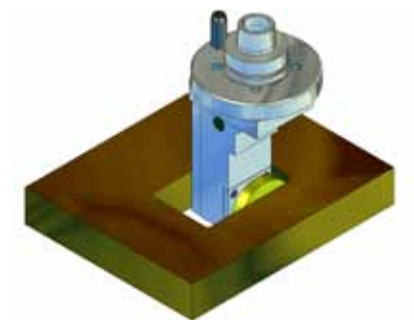
A maximum spindle speed of 9.000 rpm is possible in permanent operation.



### G15 angular heads

The angular heads of the G15 series are used as edge notching aggregates. The drive speed is transmitted in the ratio 1:1,55 on the tool receptacles.

A maximum spindle speed up to 12.000 rpm is possible in interval operation.





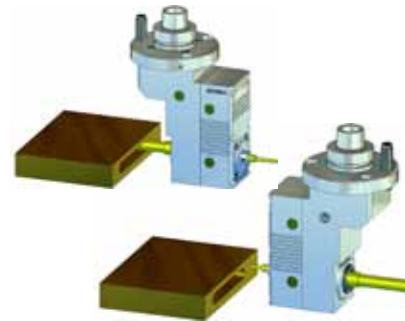


### G16 angular heads

The angular heads of the series G16 are especially designed for the processing of lock casemillings. The housing is cranked so that a small partial circle is achieved with a long mounted tool.

They are equipped with a continuous processing spindle with max. two opposite tool receptacles. Therefore the spindle turning direction of one of the two tool receptacles is equal to the drive turning direction, the other is turning opposite to it.

The drive speed is transferred to the tool receptacles in a relation of 1:2,248. The maximum spindle speed in interval operation is 15.000 rpm.

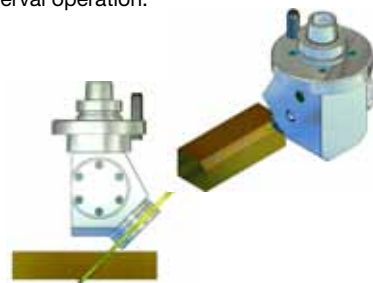


### W17 angular heads

The angular heads of the series W17 are equipped with one processing spindle which can be arranged in a determined angle in the area from 0° (horizontally) up to 90° max. (vertically).

The determined angle cannot be modified afterwards. The spindle turning direction is opposite to the drive turning direction. The drive speed is transferred to the tool receptacle in a relation of 1:1.

With regard to the type W17-1.2-SB the spindle can be arranged with a sawing and a drilling receptacle according to the above mentioned indications. A maximum spindle speed of 18.000 rpm is possible in interval operation.



### W19 angular heads

The angular heads of the series W19 were developed as processing heads for work piece edges and today they are a particular small sized and light type series. They are equipped with a continuous processing spindle with two possibly different tool receptacles 180° opposite towards each other. Therefore the spindle turning direction of one of the two tool receptacles is equal to the drive turning direction, the spindle turning direction of the other tool receptacle is opposite to it.

The drive speed is transferred in a relation of 1:1 to the tool receptacles. A maximum spindle speed of 12.000 rpm is possible in permanent operation.

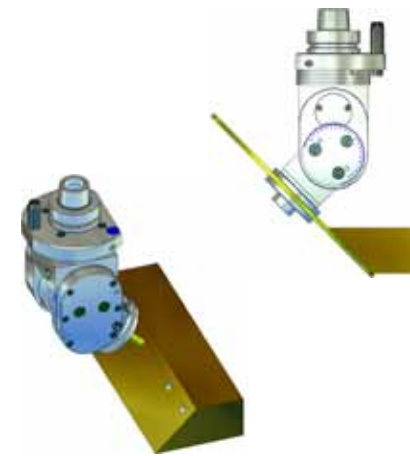


### G25 angular heads

The angular milling heads G25 have a machining spindle continuously adjustable by scale. The adjustment range is 0° (vertical) up to 100° to both sides.

The spindle turning direction is opposite to drive turning direction. The drive speed is transmitted in a ratio of 1:2,06 to the Collet receptacle and 1:1,48 to the Sawing receptacle.

The maximum spindle speed is 18,000 rpm in interval operation.

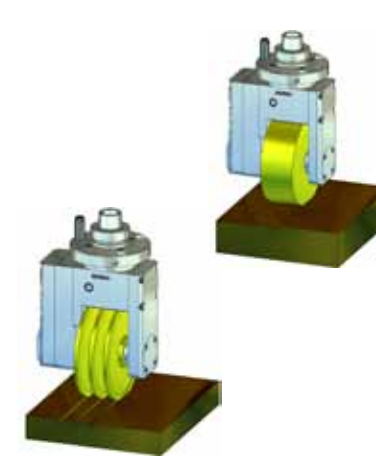


### G30 angular heads

The angular heads of the series G030 are especially designed for milling of horizontal surfaces. The casing is equipped with one processing spindle for receptacle of tools with an aluminium base.

The spindle turning direction of the tool receptacles is opposite to the drive turning direction. The drive speed is transferred to the tool receptacle in a relation of 1:1,29.

The maximum spindle speed is 12.000 rpm in interval operation.



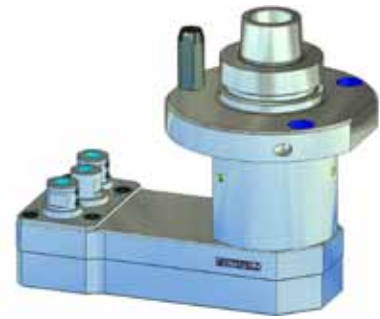
### W56 angular milling heads

The angular milling heads W56 are equipped with one processing spindle, which can be arranged in a determined angle from 15° up to a maximum of 31° downwards.

The determined angle cannot be changed later. The spindle turning direction is opposite to the drive turning direction. The drive speed is transferred in a ratio of 1:2,06 to the tool receptacle.

The maximum spindle speed is 16,000 rpm in interval operation.

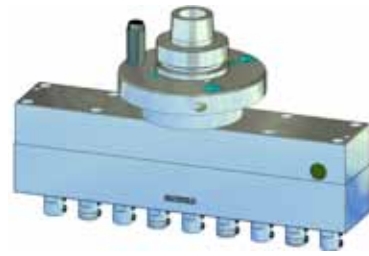
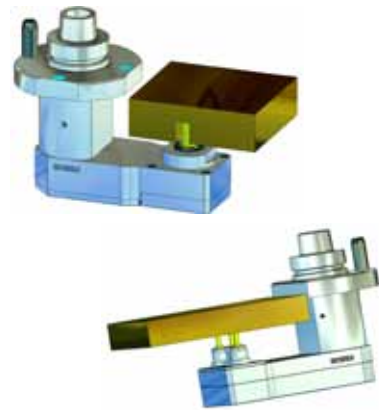




### G200W angular heads

The underfloor drilling milling aggregate G200 is due to its design conceived for drilling or milling the bottom side of workpieces. The spindle turning direction of the tool receptacle is opposite to the drive turning direction.

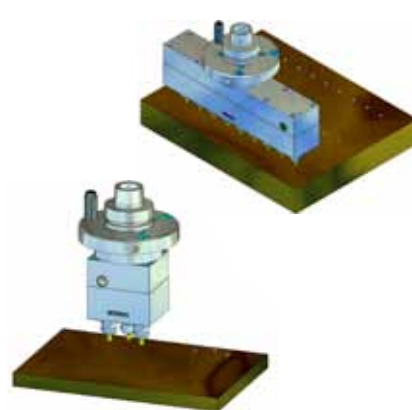
The drive speed is transferred in a ratio of 1:1 to the tool receptacle. The maximum spindle speed is 12,000 rpm in interval operation. The dimensions are variable and can be created on almost any size you want. The dimensions are variable and can be created on almost any size you want.



### UNI1-SV drilling unit

The drilling gears of the series UNI1-SV can be produced with spindle distances  $A \geq 20$  mm. During the construction was attempted to keep the speed gap between the spindles as low as possible. If possible the drive speed is transmitted in a ratio of 1:1. At different spindle distances within a drilling gear it is often necessary to vary the speeds of the individual spindles because of different gears.

The maximum spindle speed is 10,000 rpm in permanent operation.



### DPL drilling unit

The multi-spindle drilling gear DPL are available with customized drill patterns. The minimal distance between spindles is 16mm. The spindle speeds are 4,500 rpm in permanent operation and 6,000 rpm in interval operation.

The spindle speeds are 4,500 rpm in permanent operation and 6,000 rpm in interval operation.



### STB multi-spindle drilling gears

The multi-spindle drilling gear STB series are suitable for the processing of materials with steel insert. The shank of the center spindle is 5 mm longer than the outer spindles. The speed of max. 4500 rpm is transferred in a ratio of 1:1 to the central spindle.

The speeds of the outer spindles depend on the distance. The speeds of the outer spindles depend on the distance.



### DN-VCM vertical chisel mortiser

The vertical chisel mortiser DN-VCM can be used to make square holes. They have a tool spindle with a rotating tool holder and a fixed inclusion for square tools. The spindle direction is equal to the drive turning direction.

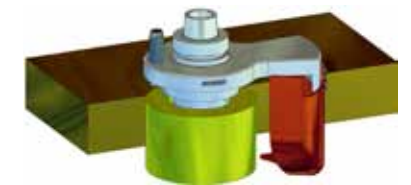
The drive speed is transferred in a ratio of 1:1 to the tool receptacle. The maximum spindle speed is 5,000 rpm in permanent operation.



### DN-X-SPL chip guiding systems

The chip guiding systems of the series DN-X-SPL have a tool receptacle according to your specifications. The direct receptacle DN-X-SPL is used for direct reception of tools for the processing of solid wood or wood-like composite materials.

The standing adapter casing (due to torque support) is used for mounting chip deflectors, according to the used profiling tool. The maximum spindle speed is 18,000 rpm in permanent operation.





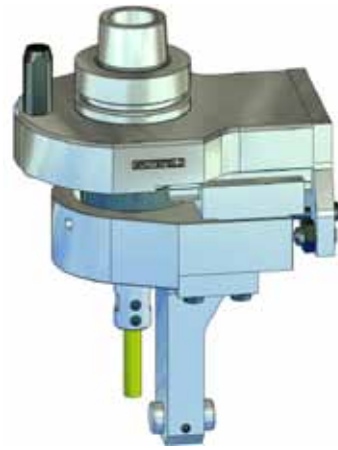


### FN2 tracing spindles

The tracing spindles FN2 are equipped with a collet receptacle for shaft milling cutters. The spindle turning direction is opposite to the drive turning direction. The drive speed is transferred to the tool receptacle in a ratio of 1:3. The maximum spindle speed is 10,000 rpm in interval operation.

The tracing stroke is 1,0 mm in X(Y)- and in Z-direction. The 2D-Horizontal-tracing spindle is used for light rounding, chamfering and equalizing of the upper and the lower panel edges (for example at soft- or postforming).

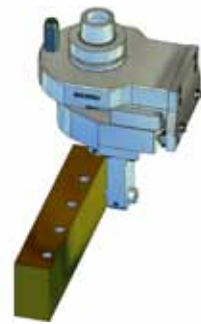
The spindle traces by copying the surface of the panel and so it ensures that the processing is made equal to these traced surfaces.



### FN6 tracing spindles

The tracing spindles series FN6 have a shank receptacle and are used for drilling in a constant distance to the traced surface of the workpiece. So you get on uneven surfaces a constant distance relative to the surface with a tolerance of  $\pm 0.05$  mm.

The tracing spindle must be provided with a tracing piece. The material of the tracing piece should be chosen depending of the surface constitution. Available is a piece of steel or polyamid.



### FN7 tracing spindles

The tracing spindle series FN7 work with a spring suspended stroke of 10 mm. The distance of the tool receptacle to the tracing arm or bell is constant. The sensing device is guided over the workpiece surface and adapts the suspension stroke through the different workpiece tolerances. In that way for example Lammello-connections, grooves or feathers are always done in a constant distance to the surface from the working piece.

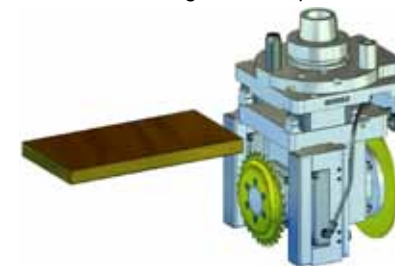
For different materials, it is necessary to adapt the tracing force. At the FN7 this can easily be changed by the user with an adjustment screw. Depending on the surface of the workpiece either sliding rings of polyamide or hard chrome plated steel can be used, on request with blow-off nozzles. The height between the tracing bell to the tool can be adjusted continuously by scale. The maximum speed is 18,000 rpm.



### FN9-1.3-S tracing spindles

The edge cutter and router FN9-1.3-S offers the opportunity to cut and round even glued and protruding edge bands one-sided traced to the work piece. The FN9-1.3-S is a multi-function aggregate, which is equipped with a cutter-saw and a profile router. The beside placed elongated runners enables the enclosure to the work piece and the vertical working direction. With two integrated pneumatic cylinders the runners are able to be adjusted automatically to the cutters and routers working relation. By fine adjustable end stops the runners can be easily adapted to different tool sets. To realize the compensatory movement of the tracing unit the drive and the working unit are decoupled and connected by movable linear slides free of play. A high dynamic compensation coupling allows spindle speeds up to 13,500 rpm.

This causes a very high surface quality. The tracing force of about 100N is set by the Controlflex coupling and cannot be modified. The unit can be used to cap and round corners of solid wood materials, MDF, particleboards, coating materials, plastics.



### FN10 2D-tracing spindles

The 2D-Tracing spindle FN10 is used for rounding, chamfering or milling of workpiece edges. It sampled at the same time from the top and front face of the workpiece and works with a spring suspended stroke, each 10 mm in horizontal and vertical direction. Unevenness in the material can be equalized thereby. The sensing device is made with adjustable sliders on the workpiece surface and conforms to the tolerances due to a spring suspended stroke.

As a result the processing is always in the same distance to the surface of the workpiece. For different materials, it is necessary to adjust the tracing force. At the FN 10 this can easily be changed steplessly with adjustment screws by the user. Depending on surface characteristics of the workpiece either sliding pieces of polyamide or hard chrome plated steel can be used. The maximum speed is 17,000 rpm.



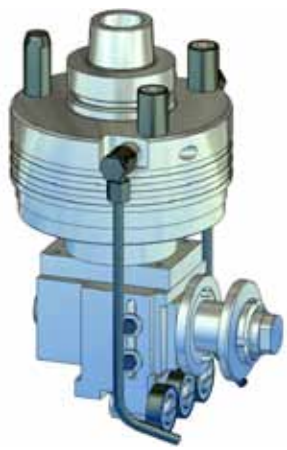
### FN12 tracing spindles

The Tracing spindle series FN12 are used for rounding or chamfering edges of workpieces. They are scanning the lower side of the workpiece and work with a spring suspended stroke of 10 mm in vertical direction. Unevenness in the material can be equalized thereby. The sensing device is made with adjustable sliders on the workpiece surface and conforms to the tolerances due to a spring suspended stroke.

As a result the processing is always in the same distance to the surface of the workpiece. For different materials, it is necessary to adjust the tracing force. This can easily be changed steplessly with an adjustment screw by the user. Depending on surface characteristics of the workpiece either sliding pieces of polyamide or hard chrome plated steel can be used. The maximum speed is 18,000 rpm.







### FN19 tracing spindles

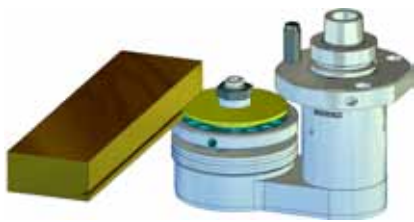
The tracing spindle series FN19 work with a spring suspended stroke of 5mm. The distance of the tool receptacle to the tracing rollers is constant. The sensing device is guided over the workpiece surface and adapts the suspension stroke through the different workpiece tolerances. In that way for example Lammello-connections, grooves or feathers are always done in a constant distance to the surface from the working piece. For different materials, it is necessary to adapt the tracing force. This is set before the delivery to the requested force. Depending on the surface of the workpiece either tracing rollers of rubber or steel can be used. On request the tracing device can be supplied with blow-off nozzles. The height between the tracing rollers to the tool can be adjusted continuously. The maximum speed is 9.708 rpm.



### FU7 tracing spindles

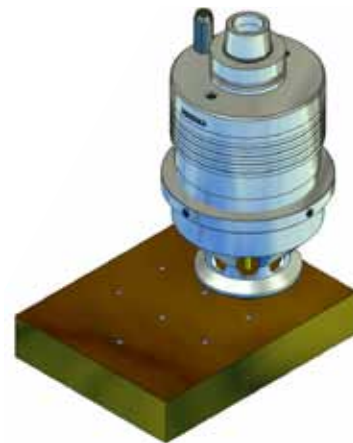
The Tracing spindle series FU7 are used for scanning the lower side of the workpiece and makes a milling cut parallel to it. They have a spindle with a tool receptacle for saw blades or disc cutters. There are also other possible tool receptacles. The drive speed is transferred 1:1 by a belt drive to the tool receptacle.

The maximum spindle speed is 12,000 rpm in interval operation. The tracing bell has an outer diameter of 120 mm and allows a maximum tool diameter of 100 mm. The tracing stroke is 5 mm.



### G50 direct drive spindles

The direct drive spindles of the G50 series are for holding down the workpiece during the working process. The Aggregate has a stroke of 25mm. Tool receptacle and pressure ring can be made to customer specification. The maximum speed is 18,000rpm.



### B030 drilling units

The drilling units of the series B030 are the smallest units with pneumatic feed.

These units are suitable for working with wood and plastic. The B030T units are specially designed to reach a small drilling center distance.

With this unit the smallest drilling distance of 32mm can be achieved in a quantity of 4. The units are available with 50 and 80 mm stroke. The drive capacity is 0.45 kW.



### B050 drilling units

The B050 series is the middle power class of drilling units with pneumatic feed. These units are suitable for working with wood and plastic, light metal and steel. They can be used with different tool receptacles and for multi spindle drilling gears.

The drilling units of the B050 series are available with 80 to 125mm stroke. All cylinders are equipped with magnetic pistons, so that cylinder switches can be used for controlled processings. Depending on the type the following capacities are available: 0.45 kW, 0.75 kW and 1.1 kW.

The use of reducing gears allows a reduction of rotation speed while keeping the power of the engine and increases the spindle torque. The offered control elements provides you the opportunity to control the unit manual or fully automatic. By suitable combining end position response and feed reversal as well as fast traverse can be realized. For this you can get limit switches, holders for proximity switches and pneumatic valves.



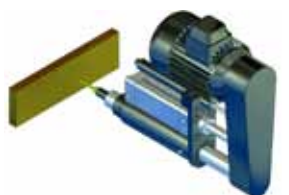
### B051A-St drilling units

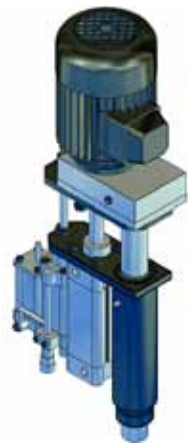
The B051A-St series is the middle power class of drilling units with pneumatic feed. These units are suitable for working with wood and plastic, light metal and steel.

They can be used with different tool receptacles and for multi spindle drilling gears. The drilling units of the B051A-St series are available with 80mm stroke. All cylinders are equipped with magnetic pistons, so that cylinder switches can be used for controlled processings.

The drive capacity is 1.1 kW. Due to the use of belt drive a speed transfer to raise or reduce the rotation speed is possible. The offered control elements provides you the opportunity to control the unit manual or fully automatic.

By suitable combining end position response and feed reversal as well as fast traverse can be realized. For this you can get limit switches, holders for proximity switches and pneumatic valves. In addition, these units have a hydraulic damping.

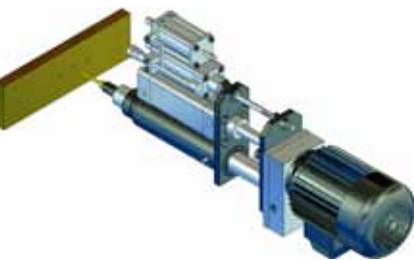




### B050T-St drilling units

The B050T-St series is the middle power class of drilling units with pneumatic feed. These units are suitable for working with wood and plastic, light metal and steel. They can be used with different tool receptacles and for multi spindle drilling gears.

The drilling units of the B050T-St series are available with 80 to 125mm stroke. All cylinders are equipped with magnetic pistons, so that cylinder switches can be used for controlled processings. Depending on the type the following capacities are available: 0.75 kW and 1.1 kW. A reducing gear is feature of this unit. The offered control elements provides you the opportunity to control the unit manual or fully automatic.



By suitable combining end position response and feed reversal as well as fast traverse can be realized.

For this you can get limit switches, holders for proximity switches and pneumatic valves. In addition, these units have a hydraulic damping.



### Reduction gear 050

The Reduction gear can be used in conjunction with the direct drive drilling unit B050D and B050D-St. The gears are accessories.

The installation can be done in the factory and also afterwards at the customer.

The use of the gear allows the reduction of speeds while maintaining the drive capacity of the motor and increases the torque of the drilling spindle.



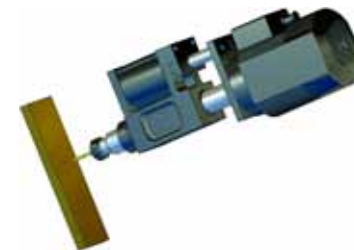
### B100 drilling units

The B100 Series is the upper power class of the drilling units with pneumatic feed.

These units are suitable for working with wood and plastic, light metal and steel. For the processing of light metal and steel they are supplied with a hydraulic damping.

The necessary holes are available in standard units, so that an addition of the units can also be done later. They can be used with different tool receptacles and for multi spindle drilling gears. The drilling units of the B100 series are available with 75, 100, 150 and 200 mm stroke.

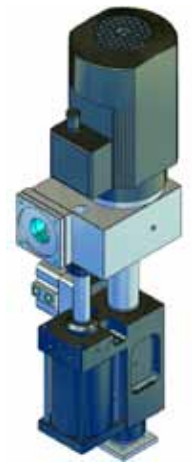
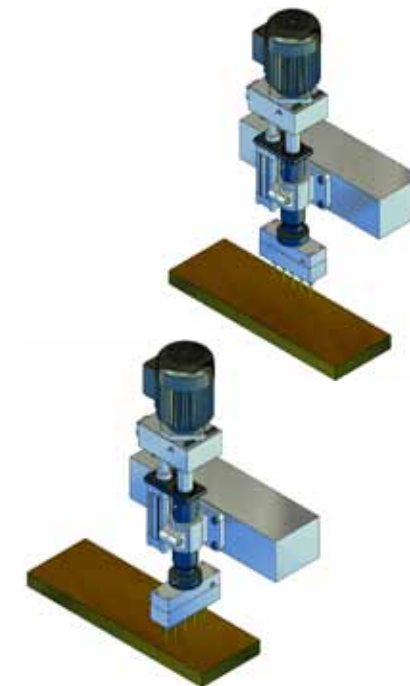
To allow the use under various spatial conditions, the units can be equipped with different types of drives. If special speeds are required, the units can be added by a reducing gear RZG100. This can achieve the required speed by a predefined ratio.



### DVM050 drilling units

The swivel unit series DVM050 are similar in construction and structural dimensions to the GROTEFELD drilling units B050.

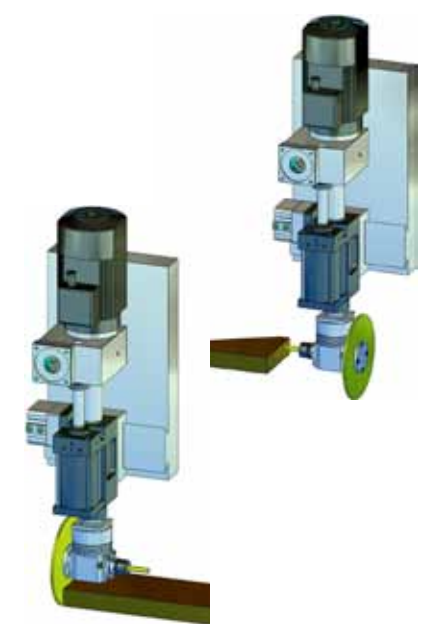
They have a stroke of 77 mm and a spindle speed of 2780 rpm. The Swivel range is from 0°- 90°. That means turning from the X- to the Y-axis and reverse and all intermediate positions is possible. The desired angle is set by adjustable stop screws.



### DVM100 swivel units

The swivel unit series DVM100 are similar in construction and structural dimensions to the GROTEFELD drilling units B100. They have a stroke of 75mm or 100mm and a spindle speed of 2,800 rpm.

The swiveling-process is done by a servo motor. All angles between 0° and 360° can be selected by the controller. Servo motor and controller are not part of our unit.







**B045D**  
drilling units

The drilling spindles B045D are units without an own pneumatic feed. To reach the required stroke, the units can be mounted for example on slide units or machine axes.

The drilling spindle B045D relates to the series 100 and can be equipped with all tool holders of that series.

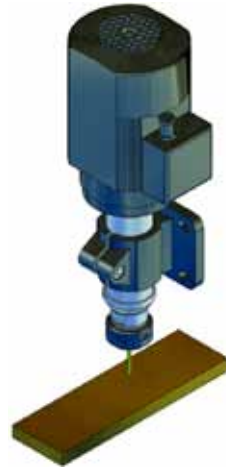


**B060D**  
drilling units

The drilling spindles B060D are units without an own pneumatic feed.

To reach the required stroke, the units can be mounted for example on slide units or machine axes. The Drilling spindle B060D is equipped with a receptacle for collets with the size 25.

Other tool receptacles can be used, too.

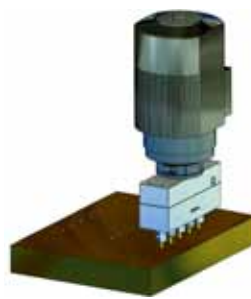


**D045-AN**  
drive units

The drive unit D045-AN is designed for the propulsion of multi-spindle drilling gears up to a maximum speed of 4,500rpm.

The gears must be supplied with a clamping ring of the series B100. The necessary drive piece is part of the drive unit. At higher drive speeds (6,000 rpm max.) it is necessary to use unit D045-D16 force and interlocking D16-receptacle.

The angular heads have to be equipped with the adapter W-D16.

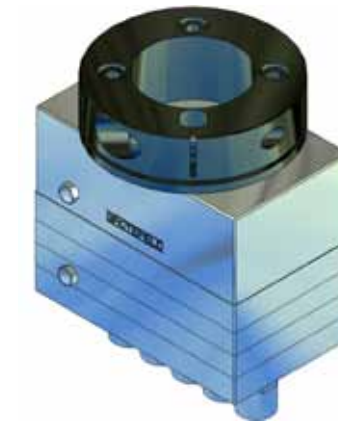
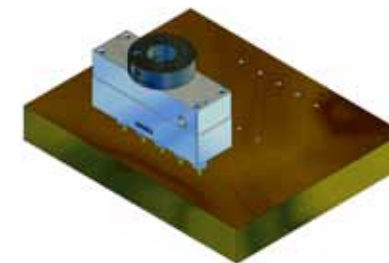


**UNI1-SV**  
drilling gears

The drilling gears of the series UNI1-SV with clamping ring for drilling units can be produced with spindle distances  $A \geq 20$  mm.

During the construction was attempted to keep the speed gap between the spindles as low as possible. If possible the drive speed is transmitted in a ratio of 1:1. At different spindle distances within a drilling gear it is often necessary to vary the speeds of the individual spindles because of different gears.

The maximum spindle speed is 10,000 rpm in permanent operation.

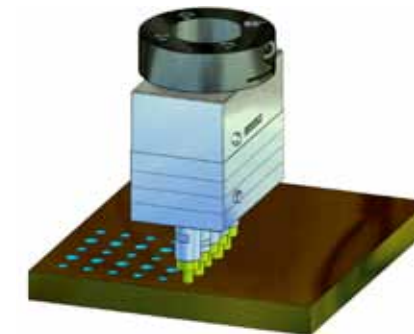


**DPL**  
multi-spindle drilling gears

The multi-spindle drilling gears DPL with clamping ring for drilling units are available with customized drill patterns. The minimal distance between spindles is 16mm.

During the construction was attempted to keep the speed gap between the spindles as low as possible. If possible the drive speed is transmitted in a ratio of 1:1. At different spindle distances within a drilling gear it is often necessary to vary the speeds of the individual spindles because of different gears.

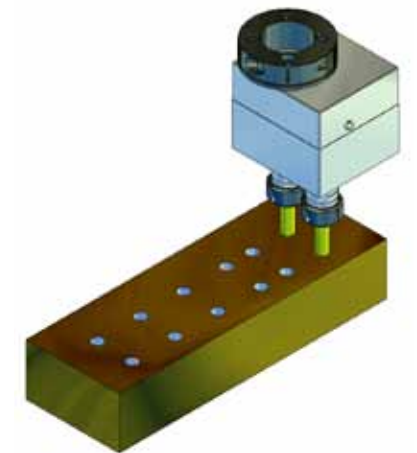
The spindle speeds are 4,500 rpm in permanent operation and 6,000 rpm in interval operation.



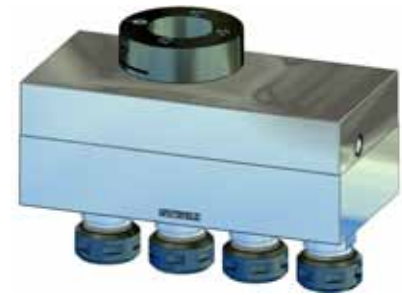
**VS12**  
multi-spindle drilling gears

The multispindle drilling gears of the series VS12 are available with spindles distances  $A \geq 38$  mm. They are equipped with collet receptacles Type „N „ (12mm max.).

The turning direction of the spindles is „RIGHT“. The maximum spindle speed is limited to 4,500 rpm.

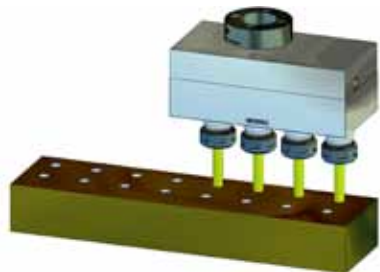






### VS16 multi-spindle drilling gears

The multispindle drilling gears of the series VS16 are available with spindles distances  $A \geq 44$  mm. They are equipped with collet receptacles Type „O“ (16mm max.). The turning direction of the spindles is „RIGHT“. The maximum spindle speed is limited to 4,500 rpm.

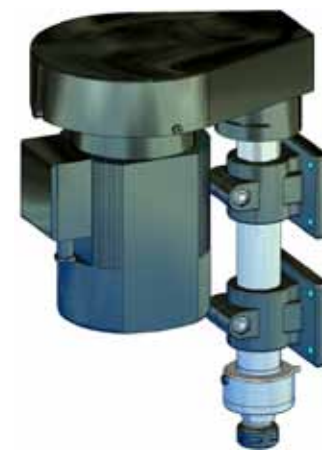
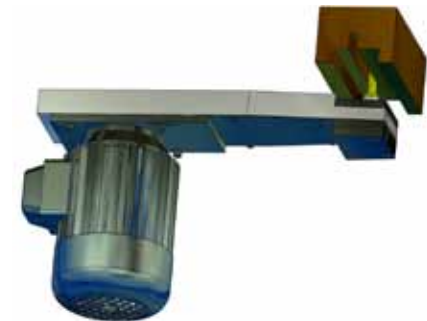
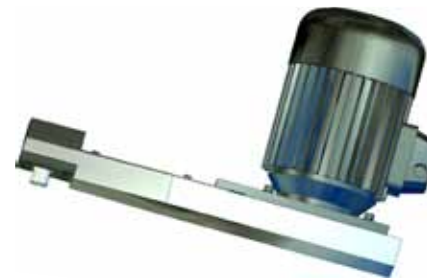
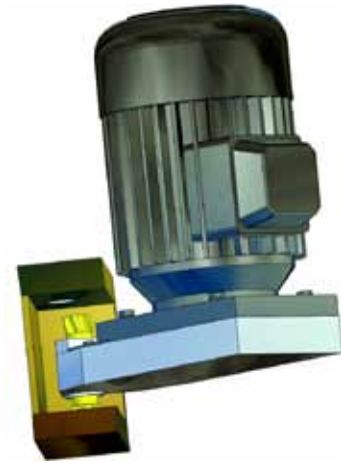


### B200W angular drilling spindles

The angular drilling spindles series B200W are units without own feed. These units are suitable for working with wood, plastic, light metal and steel in confined and tight spaces within and below work pieces.

To reach the required processing stroke, for example, the units can be mounted on cross slides or machine axes. The units can be individually adapted to specific customer requirements. Due to the belt drive transmission ratios up to a maximum spindle speed of 13,000rpm possible.

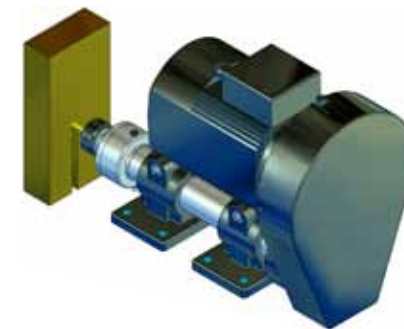
For mounting the unit the cover and the sides of the case are available. In addition, the units can be equipped with a foot bracket motor.



### F045 milling spindles

The milling spindles F045 are units without own feed. To reach the required processing stroke, for example, the units can be mounted on cross slides or machine axes.

The spindles are equipped with a tool receptacle for collets size 16 (maximum shaft diameter 16mm). Alternative tool receptacles also can be used. For the use in different space conditions, the spindles of the F045 series can be equipped with different types of drives.



### S060 sawing spindels

The sawing spindles of the series S060 are units without own feed. To reach the required processing stroke, for example, the units can be mounted on cross slides or machine axes. The mounting takes place over an integrated clamping element.

These units are suitable for working with wood, plastic, aluminum and steel. The tool receptacle is an integrated part of the saw units. This Saw receptacle is suitable for blades with a hole of 30 mm and a thickness of minimum 1.0 to a maximum of 5.0mm. Saw blades up to a maximum diameter of 400 mm can be used. The following drive capacities are available: 1.7 kW, 2.2 kW and 3.0 kW.

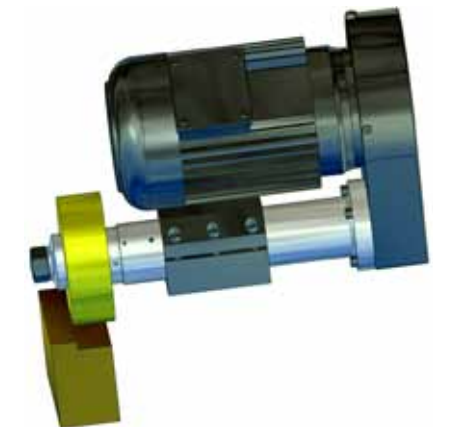


### F070 milling spindles

The milling spindles of the series F070 are units without own feed. To reach the required processing stroke, for example, the units can be mounted on cross slides or machine axes.

The mounting takes place over an integrated clamping element. These units are suitable for working with wood, plastic, aluminum and steel.

The F070 milling spindles are available with a tool receptacle for collets size 25, max.  $\varnothing 25$ mm (Version P) or are equipped with a milling cutter  $\varnothing 30$  mm (Versions F).





**F100**  
milling units

The milling spindles of the series F100 are units with pneumatic feed. These units are suitable for working with wood and plastic, light metal and steel. For the processing of light metal and steel they are supplied with a hydraulic damping.

The necessary holes are available in standard units, so that an addition of the units can also be done later. To allow the use under various spatial conditions, the units can be equipped with different types of drives.

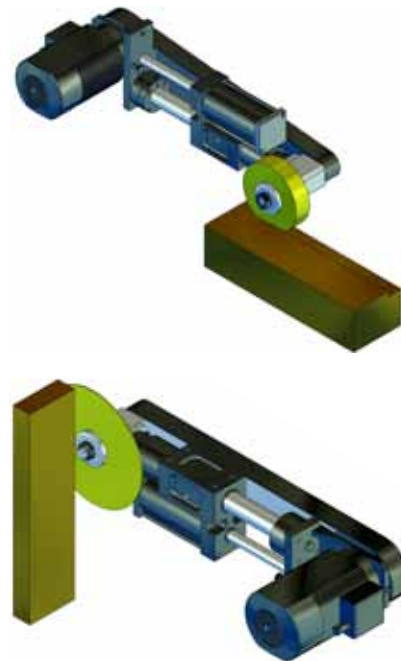


**S100W-S**  
**F100W-F**  
sawing- and milling units

The angular sawing- and milling units of the series S100W and F100W are equipped with a pneumatic feed. These units are suitable for working with wood, plastic and light metal.

For the processing of light metal they are supplied with a hydraulic damping. The necessary holes are available in standard units, so that an addition of the units can also be done later. The units of series S100W and F100W are available as left and right versions, the shown version is left.

For mounting the unit threaded holes are available.



**DBE1**  
drilling spindle units

The drilling spindle unit series DBE1 are designed for the use in CNC machines and have been proved for many years in practical use. The units are driven by wheels; all the spindles are turning right. Therefore, these units are also suitable for processing metal materials.

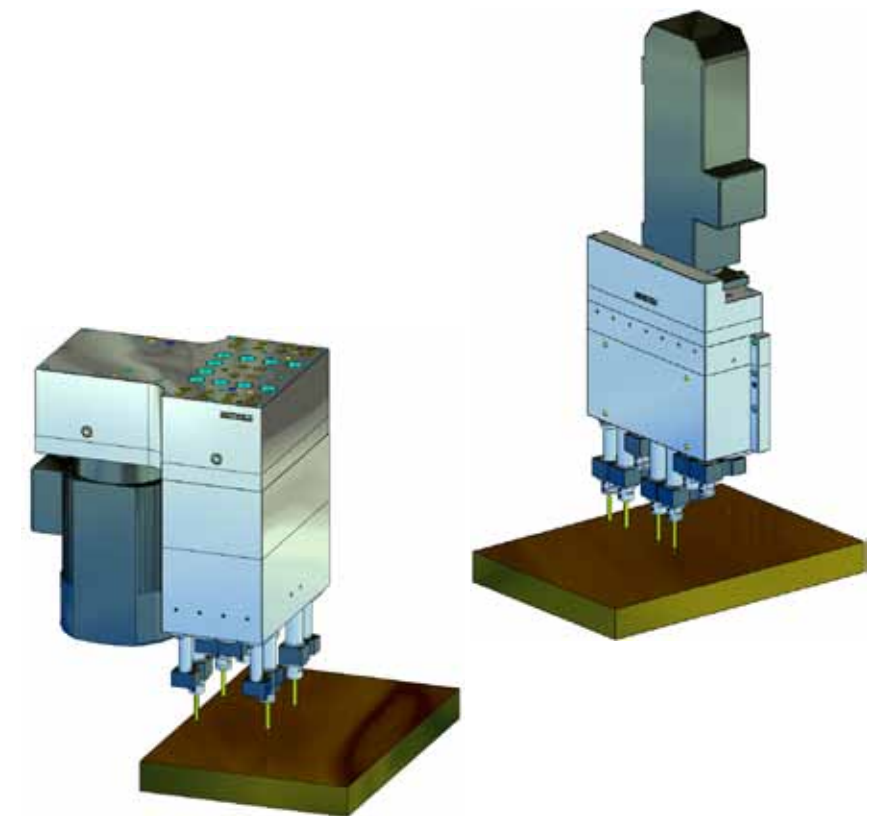
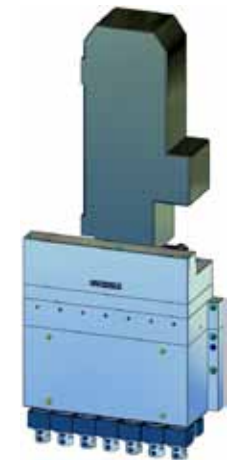
Each single spindles can be submitted 50mm, units with longer stroke are available on request. The drilling feed itself must be provided by the feed of the machine. Depending on customer request the drilling spindle units are formed different, the minimal spindle distance is 25mm.



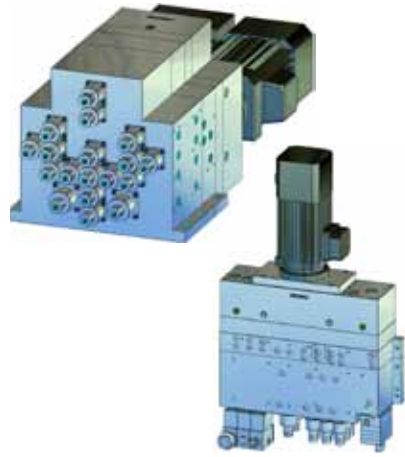
**DBE3**  
drilling spindle units

The drilling spindle unit series DBE3 are designed for the use in CNC machines and have been proved for many years in practical use. The units are driven by wheels.

Each single spindle can be submitted 50mm; units with longer stroke are available on request. The drilling feed itself must be provided by the feed of the machine. Depending on customer request the drilling spindle units are formed different, the minimal spindle distance is 32mm.







### DBE22 drilling spindle units

The drilling spindle unit series DBE22 are designed for the use in CNC machines and offer the possibility to arrange more than 2 rows in a distance  $\geq 32$ mm. Almost all drill patterns can be realized to customer specification.

The vertical drilling spindles can be combined with horizontal and vertical drilling gears with drilling distances  $\geq 16$ mm. Each single spindle can be submitted 50mm; units with longer stroke are available on request. The drilling feed itself must be provided by the feed of the machine.



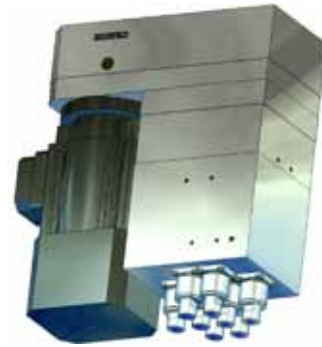
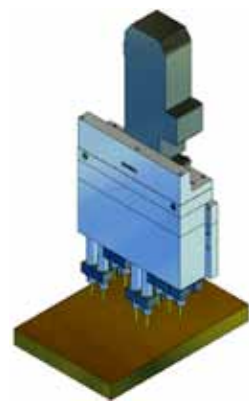
Depending on customer request the drilling spindle units are formed different, the minimal spindle distance is 32mm. The units are driven by wheels, the maximum speed is 8600 rpm.



### TBE3 drilling spindle units

The drilling spindle unit series TBE3 are designed for the use in CNC machines and have been proved for many years in practical use. The units are driven by toothed belts. Each single spindle can be submitted 50mm; units with longer stroke are available on request.

The drilling feed itself must be provided by the feed of the machine. Depending on customer request the drilling spindle units are formed different, the minimal spindle distance is 32mm.

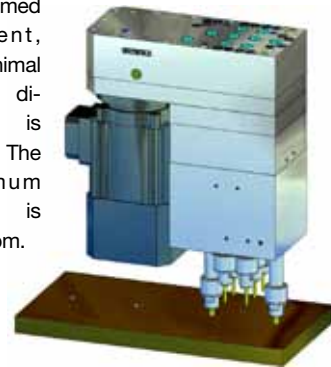


### TBE20 drilling spindle units

The drilling spindle unit series TBE20 are designed for the use in CNC machines and offer the possibility to arrange more than 2 rows in a distance  $\geq 32$ mm. Almost all drill patterns can be realized to customer specification.

The units are driven by toothed belts, all the spindles are turning right. The vertical drilling spindles can be combined with horizontal and vertical drilling gears with drilling distances  $\geq 16$ mm. Each single spindle can be submitted 50mm; units with longer stroke are available on request.

The drilling feed itself must be provided by the feed of the machine. Depending on customer request the drilling spindle units are formed different, the minimal spindle distance is 32mm. The maximum speed is 8600 rpm.



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