

**MANNESMANN  
DEMAG**

**AIR TALDE**

Partner for the professionals

# Deburring spindles for robots



## Combined know-how

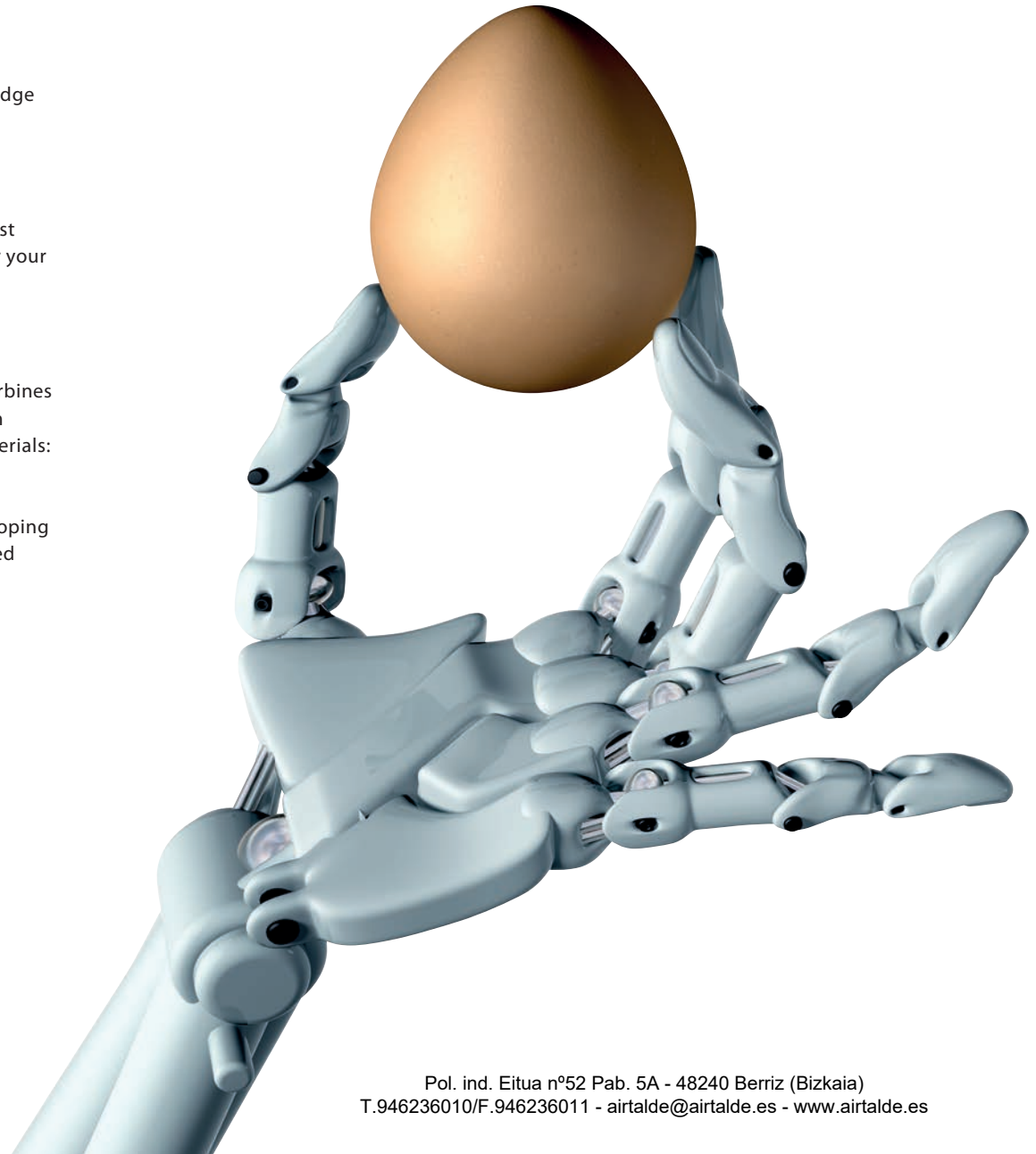
MANNESMANN DEMAG have from a proud tradition of manufacturing sophisticated compressed air products in Germany. Our air spindles and air motors contain the knowledge and experience of more than 100 years of development and production. Our success is based on decades of research and development with deburring spindles and brushing machines for robot applications.

When installing MANNESMANN DEMAG air spindles and motors you can be sure: the latest technology, maximum reliability and reputable top quality bring decisive advantages for your automation process.

## Integrators and end users know the benefits of our solutions

As a reliable manufacturer of both power units and deflection units we know the best turbines and motors for your deburring needs, if not we have the knowledge and ability to design them specifically for you. We have experience with and solutions for a wide range of materials: plastics, fibre composites or metals.

Constant innovations are a pillar of our success. Our designers are constantly busy developing new products and improving existing products in order to open up new and sophisticated possibilities to the growing needs of our customers.



# The many advantages of air power units



## The choice of drive – turbine versus vane motors

As a manufacturer of turbine power units and vane motors we can provide you with machine neutral and application related advice. Oil-free turbine drives offer advantages where high speeds and relatively low power are required for the deburring task. With increasing power of the turbine drive, its air consumption also increases. With a comparable performance of a vane drive, the air consumption of the turbine drive is almost twice as high. There are also other application characteristics that must be considered when choosing a turbine engine. Do you want to avoid unclean deburring contours, chatter marks or drops in speed during machining? We can provide you with in depth and neutral advice - with the aim of helping you find and use the best machines for your application.

## The plus points

- + Easy installation
- + Stall resistant in case of overload
- + Long service life
- + Light and small design
- + Low follow up costs in maintenance and service



Turbine: EST 1000 ZG



Motor: EBM 38-5200 B



VSpin



ESR



EBM



SSU

## The right deflection unit

In addition to the power unit, the design of the radial and the axial deflection unit is key to a successful deburring application. Many parameters and specific details determine whether the required accuracy and quality can be maintained in the long term during automated deburring. Reworking can result in high costs. Trust in our know-how and our quality right from the start: one thing fits exactly to the other.

## Industry 4.0 – with our spindles you are machining the future

The sensors and evaluation electronics of our spindles, drilling and brushing motors for robot applications provide you with all the important data to master your deburring task:

- + Motors with speed monitoring
- + Axial and radial path monitoring of the deflection
- + Storage of your process data such as speed, deflection distance and angle
- + Operating time monitoring
- + Visual and acoustic feedback signals in the teach-in procedure

## Great experience and development power in deburring projects

### Exactly your case: application testing with our own robot

We can advise you without obligation using our many years of experience. With the ability to simulate processes and test new approaches using our own robots we can offer you the best solution with our tools. Benefit from our know-how!

- + We will find the most economical solution for your application.
- + Your advantage: our experience in numerous successfully completed deburring projects.
- + Our cooperation with system integrators makes one-stop solutions possible.
- + You receive detailed documentation of the test process as a basis for your robot programming. The dossier includes videos of the deburring process as well as additional technical details.

We are happy to advise you: there may be several different solutions available to you, we will be able to advise on which makes the most sense for your application. Not every application requires a robot spindle, there may be a simpler solution. As a manufacturer of air motors we can offer suitable alternative models for all speed ranges and performance classes. Take advantage of our years of experience with power units, materials and suitable accessories: talk to us!



## Our world innovation: highly precise and easy to operate

The new √Spin series deburring spindles provide end customers and integrators with detailed process information that enables evaluations of the status of the spindle and cutter, the component and burr, and the deburring process. This data can be processed in the robot control. Furthermore, the teaching of the spindles is greatly simplified.

## Wide range of features

- + Simplified installation  
The correct setting of the air pressure, hose length and hose cross sections can be checked immediately by means of the speed monitoring system.
- + Live feedback  
Evaluate and save measured values such as speed, deflection, deflection direction, service intervals and running time in real time.
- + Quality assurance  
Seamless verification for system integrators. Increased safety and precision in the system setup as well as later in the running process.
- + Crash protection  
No more crashes due to faulty travel paths or contour deviations.
- + Full process control  
Monitoring and storage of all relevant data of the deburring process: The component with contour, the burr formation, the spindle speed, the deflection and direction in degrees and many other process data.
- + Maintenance / servicing  
The ability to measure values allows early detection of tool wear. This simplifies the planning of maintenance intervals and helps to avoid breakdowns.
- + Position monitoring  
Component position and component location can be determined to within 0.2 mm using the deflection data.
- + Fast access  
Whether on mobile devices or a PC: evaluations and settings are possible on many devices.
- + Simplified teaching  
Thanks to audio visual feedback teaching takes place in a fraction of the time previously required.



√Spin 350

# Deburring is now smart



## √Port – the interface to the robot

The √Port has digital and analogue interfaces for smooth integration of the deburring spindle into the robot controller. When this data is integrated the robot can react to events such as cutter failure, a changed component contour or excessive burr with an emergency stop or a tool change. By transmitting all process data from the spindle during the deburring process the full potential of the √Spin is exploited.

## √App and √Control – The software for the spindle

The free Android app significantly shortens installation and teaching times. The spindle provides a wide range of data saving, evaluation and warning functions for monitoring the deburring task:

- + Simple teaching
- + Saving of data and curve recordings
- + Defining the logging interval
- + Defining extreme and threshold values for warning messages
- + Recording of idle speed, minimum speed
- + Maximum deflection
- + Crash warnings with speed, deflection, date and time
- + Service and repair data
- + Spindle running time

When using the √Port all settings can be accessed in the comprehensive √Control PC software. √Control also enables extensive data analysis of the deburring process. For example, this data can be imported into Excel.

All highlights as well as product videos at [vspin.mannesmann-demag.com/en/](http://vspin.mannesmann-demag.com/en/)



√Port



√App and √Control



√Spin 1000



√Spin 350

### Deburring | Milling

#### √Spin 1000

+ Non lubricated turbine motor for highest speeds, offering excellent surface results with low air consumption

#### √Spin 350

+ High torque vane motor with paired bearings – for fine to medium burr removal

√Port – the interface to the robot → see p.39



## Application

### VSpin 1000

The VSpin 1000 is used for the finest deburring tasks. Collaborative as well as small robots can take over deburring tasks with this spindles in addition to handling the components.

Deburring tasks can be carried out parallel to the main machine time, especially in CNC machining. As the CNC machines are loaded and unloaded by robots the defined grip position of the component is used to subsequently process secondary burrs. The high speed of the spindles, the floating spindle bearings and the sensitive deflection allow high machining speeds with this type.

### VSpin 350

The powerful spindle can be used for fine burrs as well as for medium burrs. This tool is also ideal for machining undefined contours of castings.

During CNC machining of castings undefined secondary burrs can occur from the machined surface. The spindle shows its full strengths through radial and axial flexibility. Depending on the material type the high torque motor can normally be used without problems for burrs up to 3 mm. For more pronounced burrs, pre-deburring with a rigid spindle can be useful. Alternatively, even more powerful units are available in the VSpin 200 to VSpin 170 series.

## Technical data

Type		VSpin 1000	VSpin 350
Order no.		60061-86-5	60061-87-5
Compressed air		non lubricated	lubricated
Free speed	min <sup>-1</sup>	100 000	35 000
Power	Watt	80	300
Radial deflection		± 4°	± 4°
Collet chuck	mm	3	6
Contact pressure Infinitely variable	N	3 – 12	6 – 55
Weight	kg	1.7	1.9

Power and speed at 6.3 bar operating pressure.



√Spin 200



√Spin 170

### Deburring | Milling

- + High torque vane motors with paired bearings – for medium to coarse burr removal
- + Stainless steel housing
- + Sealed with splash protection caps and bellows
- + Slim design for good workpiece accessibility
- + High concentricity (< 0.02 mm)

#### √Spin 200

- + For medium to coarse burr removal

#### √Spin 170

- + For the toughest deburring tasks

√Port – the interface to the robot → see p.39



## Application

### √Spin 200 und √Spin 170

These models are used for medium to coarse burr removal. Our powerful vane driven power units can even cope with irregular burrs. Even closed casting windows or casting lugs can be deburred with these series. Depending on the cutter types and cutter diameters to be used a large machining field can be covered with these three types. In the case of extreme burr formation, which requires pre-deburring, powerful drives with up to 1.2 kW are available with the rigid spindle series. (see p.20)

## Technical data

Type		<b>VSpin 200</b>	<b>VSpin 170</b>
Order no.		60067-62-5	60067-63-5
Compressed air		lubricated	lubricated
Free speed	min <sup>-1</sup>	22 000	15 000
Power	Watt	400	800
Radial deflection		± 4°	± 4°
Direction of rotation		clockwise	clockwise
Collet chuck	mm	6	8
Contact pressure Infinitely variable	N	10 – 60	25 – 110
Weight	kg	5.0	5.1

Power and speed at 6.3 bar operating pressure.



ESR 1000



ESR 551



ESR 350



ESR 353 with extended collet spindle

### Deburring | Milling

#### ESR 1000

- + Ideal for deburring plastics and materials requiring the cleanest air quality

#### ESR 551

- + High concentricity (< 0.02 mm) for long continuous running times

#### ESR 350 / ESR 353

- + Stainless steel housing, sealed with splash protection caps and bellows.
- + High concentricity (< 0.02 mm).
- + Easy horizontal or vertical flange mounting on tool stands due to cuboid housing.
- + Available with guided exhaust air
- + Available with extended collet spindle



ESR 350 with guided exhaust air

## Application

### ESR 1000 and ESR 551

The spindles are used for the finest deburring tasks. Collaborative as well as small robots can take over deburring tasks with these spindles in addition to handling the components. Deburring tasks can be carried out parallel to the main machine time, especially in CNC machining. As the CNC machines are loaded and unloaded by robots the defined grip position of the component is used to subsequently process secondary burrs. Due to the small size of the ESR 551 spindle even hard-to-reach places can be deburred. With good accessibility the ESR 1000 offers additional advantages in machining due to the non lubricated turbine motor and floating spindle bearing.

### ESR 353 und ESR 350

With its extended collet spindle of 82 mm and the high concentricity, the spindle ESR 353 is especially suitable for hard-to-reach places. With a special cap on the air outlet, the exhaust air of the spindle can be collected and discharged with these two variants. This ensures that no oily exhaust air gets into the working environment.

Due to the radial and also axial flexibility, the spindle shows its full strengths. Depending on the material, the high-torque motor can easily withstand burrs up to 3 mm. In the case of extreme burr formation, which requires pre-deburring, powerful drives with up to 1.2 kW are available with the series of rigid spindles. (see p.20)

## Technical data

Type		ESR 1000	ESR 551	ESR 353	ESR 350
Order no.		60007-42-5	60007-39-5	60059-78-5	60008-59-5
Compressed air		non lubricated	lubricated	lubricated	lubricated
Free speed	min <sup>-1</sup>	100 000	55 000	35 000	35 000
Power	Watt	80	60	300	300
Radial deflection		± 4°	± 4°	± 4°	± 4°
Direction of rotation		clockwise	clockwise	clockwise	clockwise
Collet chuck	mm	3	3	6	6
Contact pressure Infinitely variable	N	3 – 12	3 – 12	8 – 55	8 – 55
Weight	kg	0.90	0.75	1.95	1.85

Power and speed at 6.3 bar operating pressure.



ESR 280



ESR 200



ESR 200 WS



ESR 170

### Deburring | Milling

- + Wide speed and power ranges for the most diverse deburring tasks
- + Stainless steel housing
- + Sealed with splash protection caps and bellows
- + Small sizes for good workpiece accessibility
- + High concentricity (< 0.02 mm)

#### ESR 280, ESR 200

- + For medium to coarse burr removal
- + ESR 200 also available with guided exhaust air

#### ESR 170

- + For the toughest deburring tasks

#### ESR 200 WS, ESR 170 WS

- + Available with quick change chuck



## Application

The ESR 280, ESR 200 and ESR 170 are used for medium to rough burr removal. Our powerful vane driven power units can even cope with irregular burrs. Even closed casting windows or casting lugs can be deburred with these series. Depending on the cutter types and cutter diameters to be used a large machining field can be covered with these three types. In principle, rigid spindles up to 1.2 kW are also available for pre-deburring if initial machining is required with extreme burr formation. (see p.20)

## Technical data

Type		ESR 280	ESR 200	ESR 170
Order no.		60019-99-5	60057-66-5	60032-40-5
Compressed air		lubricated	lubricated	lubricated
Free speed	min <sup>-1</sup>	28 000	22 000	15 000
Power	Watt	380	400	800
Radial deflection		± 4°	± 4°	± 4°
Direction of rotation		clockwise	clockwise	clockwise
Collet chuck	mm	6	6	8
Weight	kg	2.0	4.5	5.2

Power and speed at 6.3 bar operating pressure.

## Fundamental tools

With our standard spindles without deflection, you can solve basic deburring tasks or use them to support the deflectable robot spindles. Rigid spindles are suitable for pre-deburring or for removing very irregular, even large burrs. In a second step, the contour is reworked with a suitable robot spindle.

## Powerful alternatives

- + Maximum reliability
- + High power output due to powerful motors
- + Long service life
- + Small dimensions for limited space
- + Customized spindles on request
- + Inexpensive repair

Turbine spindles are operated oil-free, but have up to 100 % higher air consumption than vane motors. The provision of the required amount of air is often a bottleneck in robot cells, especially in tool change systems or in general with long hose lines.

In order to be able to cover high power ranges from 400 watts, we therefore recommend vane drives that respond without delay, in which the oiled exhaust air can be discharged and, if necessary, guided via an exhaust air deoiler. This alternative is available for many drives.





EST 1000 ZG



ES 804 ER



ES 550 ZG

### Deburring | Milling

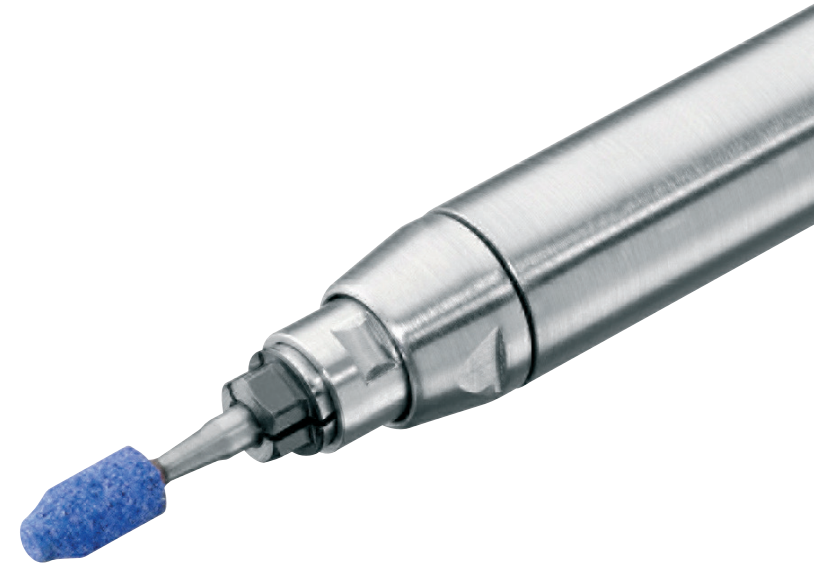
#### EST 1000 ZG

- + High speeds for excellent machining quality
- + High concentricity for long continuous running times
- + Low maintenance turbine motor
- + Stainless steel housing
- + Stainless steel collet spindles

#### ES 804 ER and ES 550 ZG

- + Powerful vane motors
- + ES 804 ER with paired bearings
- + Small dimensions
- + Stainless steel housing
- + Stainless steel collet spindles

All other models with vane motor and paired bearings (except ES 550 ZG).



## Application

The rigid spindles are clamped to the housing and are used in a wide variety of applications. In addition to classic deburring and grinding tasks, the spindles are also used for engraving or marking components or for drilling. For drilling applications, however, the cutter and material as well as the feed rate must be matched to prevent overloading the machine or the bearings. The small diameters of the spindles allow for very narrow centre distances. On the EST 1000 ZG type, the non lubricated exhaust air is blown off to the front. The ES 804 ER and ES 550 ZG discharge the silenced exhaust air to the rear adjacent to the air supply connection.

## Technical data

Type		EST 1000 ZG	ES 804 ER	ES 550 ZG
Order no.		60069-27-7	60051-24-7	29924-59-7
Compressed air		non lubricated	lubricated	lubricated
Free speed	min <sup>-1</sup>	100 000	80 000	55 000
Power	Watt	80	110	60
Direction of rotation		clockwise	clockwise	clockwise
Collet chuck	mm	3	3	3
Weight	kg	0.30	0.11	0.08

Power and speed at 6.3 bar operating pressure.



ES 350 ER



ES 280 ER



ES 200 ER



ES 170 ER

### Deburring | Milling

ES 350 ER, ES 280 ER, ES 200 ER, ES 170 ER

- + For installation in transfer lines, machine tools and robot stations
- + Stainless steel housing and collet spindles
- + High concentricity
- + Paired bearings for longer service life and better running characteristics
- + Rotating splash protection cap to prevent the ingress of dust, water or chips



## Application

Deburring, grinding, polishing or milling: these spindles are true classics. Robust, versatile and with a power that is second to none. The spindles can be supplied in a version with guided exhaust air. This exhaust air variant allows the speed of the machines to be throttled with little loss of power. Alternatively, the exhaust air can be discharged or routed via an exhaust air deoiler for filtering. In the field of robot spindles, the rigid types are used for pre-deburring with very irregular burr contours. The spindles are mounted directly on the housing and can also be used, for example, for opening casting windows, deburring sprues or milling grooves.

## Technical data

Type		ES 350 ER	ES 280 ER	ES 200 ER	ES 170 ER
Order no.		60012-15-7	29924-52-7	60008-32-7	29924-44-7
Compressed air		lubricated	lubricated	lubricated	lubricated
Free speed	min <sup>-1</sup>	35 000	28 000	22 000	15 000
Power	Watt	290	380	400	800
Direction of rotation		clockwise	clockwise	clockwise	clockwise
Exhaust air		rear	rear	rear	rear
Collet chuck fitted	mm	6	6	6	8
Weight	kg	0.46	0.75	1.10	1.65

Power and speed at 6.3 bar operating pressure.

## The brushing champions

Brush motors are ideal for rounding sharp edges or, when choosing the right brush also for levelling and deburring mold parting seams. Since the bristles are generally subject to greater wear than the cutting edges of milling cutters, we recommend using our quick change system for the automated changing of brushes. The changing process is simple, mechanically safe and reliable. Different brushes can be used with a single drive.

## Everything under control

Brush wear on standard brush motors without deflection can be very easily determined using our motors with speed sensors. These allow conclusions to be drawn about brush wear when the speed changes during operation. When idling, i. e. without brush intervention, the speed sensor provides information about the operating status of the motor. This also makes it possible to check the maintenance intervals of the engine.

## Full choice

Robotic brushing applications are easy to program. If the bristles are sufficiently flexible, work-piece and position tolerances can be easily compensated. The application and the brushes to be used determine whether a spindle with deflection (robot spindle) or a standard brush motor without deflection is used. You can't find the right speed or the desired output variant? Do you have special contours or housing shapes that require adaptation? As a manufacturer we can basically offer you brush motors across the entire performance spectrum of our air motor series.





EBM 19000 S-ST



EBM 5200 S



EBM 2900 S



EBM 2400 S



EBM 1200 S

## Drilling | Brushing

For installation in transfer lines, machine tools and robot stations

- + Stainless steel housing
- + Collet for precise work
- + Without valve for central remote control
- + Small housing diameter allows narrowest axis distances
- + Exhaust air for all types via G 1/4"
- + Protective cap against the ingress of chips and dust

- Guided exhaust air, clockwise rotation
- Speed sensor for monitoring the working speed, also available for counterclockwise rotation
- Guided exhaust air, counterclockwise



## Application

These built-in motors cover a wide range of applications with their 380 watts. The supplied 6 mm collet is suitable for standard brush shafts with a brush diameter up to approx. 100 mm. The design of the collet ensures high concentricity with high clamping force. This series can be excellently throttled by up to 60 % via the exhaust air, i. e. a wide range of speeds can be covered with reduced air consumption and wear. The non-lubricated motors used already offer oil-free operation at 6 bar and a service life of approx. 800 to 1000 hours at full speed. If the air quality is maintained and the supply air lubricated, a 6-fold increase in service life is easily possible. In this case, the lubricated exhaust air can be fed through an exhaust air de-oiler for filtering.

A flexible brush set can often compensate for component tolerances in robot applications. Our brush motors with speed sensor can detect these component tolerances. A standard brush motor **without axial or radial compensation** can therefore often be used instead of a robot spindle.

## Technical data

<b>Type guided exhaust air</b>		● EBM 19000 S	● EBM 5200 S	● EBM 2900 S	● EBM 2400 S	● EBM 1200 S
Order no.		29945-61-7	60003-64-7	29948-33-7	60003-63-7	60015-38-7
<b>Type speed sensor</b>		● ESM 19000 S-ST	● EBM 5200 S-ST	● EBM 2900 S-ST	● EBM 2400 S-ST	● EBM 1200 S-ST
Order no.		60054-91-7	60058-01-7	60058-02-7	60058-03-7	60058-04-7
<b>Type counterclockwise rotation</b>		● EBM 19000 SL	● EBM 5200 SL	● EBM 2900 SL	● EBM 2400 SL	● EBM 1200 SL
Order no.		29946-52-7	60026-90-7	29948-32-7	60003-86-7	60054-74-7
Compressed air		lubricated	lubricated	lubricated	lubricated	lubricated
Free speed	min <sup>-1</sup>	19 000	5 200	2 900	2 400	1 200
Power	Watt	380	380	380	380	380
Collet chuck	mm	6	6	6	6	6
Gear ratio for speed sensor		1 : 1	1 : 3.58	1 : 6.44	1 : 8	1 : 16.25
Weight	kg	1.10	1.10	1.10	1.10	1.40

Power and speed at 6.3 bar operating pressure.



EBM 38-5200 B



EBM 38-2900 B



EBM 38-1200 B



EBM 12-5000 B

## Drilling | Brushing

For installation in transfer lines, machine tools and robot stations

- + Stainless steel housing
- + Without valve for central remote control
- + Small housing diameter allows narrowest centre distances
- + High true running accuracy of the drill chuck (< 0.1mm)



## Application

The drill motors are classically used for drilling applications. In principle, however, these types can also be used for brush applications. The advantage is that brushes with different diameters can be clamped easily. The speed can be throttled by up to 60 % via the exhaust air, i. e. a wide range of speeds can be covered with reduced air consumption and wear. The non lubricated motors of the EBM 38 series already offer a service life of approx. 800–1000 hours in non-lubricated operation at 6 bar and full speed. If the air quality is maintained and the supply air is lubricated, a 6-fold increase in service life is easily possible. In this case, the lubricated exhaust air can be filtered through an exhaust air de-oiler.

A flexible brush set can often compensate for component tolerances in robot applications. Our brush motors with speed sensor can detect these component tolerances. A standard brush motor **without axial or radial compensation** can therefore often be used instead of a robot spindle.

## Technical data

Type Standard		EBM 38-5200 B	EBM 38-2900 B	EBM 38-2400 B	EBM 38-1200 B	EBM 12-5000 B	EBM 12-3500 B
Order no.		60053-66-7	60019-47-7	60058-05-7	60019-71-7	60058-76-7	60058-60-7
Compressed air		lubricated	lubricated	lubricated	lubricated	lubricated	lubricated
Free speed	min <sup>-1</sup>	5 200	2 900	2 400	1 200	7 000	3 500
Power	Watt	380	380	380	380	160	160
Drill chuck clamping range	mm	1–10	1–10	1–10	1–10	1–6	1–6
Direction of rotation		clockwise	clockwise	clockwise	clockwise	clockwise	clockwise
Din taper or thread drill chuck		3/8 " × 24 UNF	3/8 " × 24 UNF	3/8 " × 24 UNF	3/8 " × 24 UNF	B10	B10
Weight	kg	1.20	1.20	1.20	1.50	0.60	0.60

Power and speed at 6.3 bar operating pressure.



EBMU 40-4800 B



EBMU 40-3000 B



EBMU 23-4000 B



EBM 23-2000 B

## Drilling | Brushing

For installation in transfer lines, machine tools and robot stations

- + Stainless steel housing
- + Without valve for central remote control
- + Small housing diameter allows narrowest centre distances
- + High true running accuracy of the drill chuck (< 0.1mm)



## Application

Despite the name “drilling motors”, the EBMU 23 and EBMU 40 series are mainly used in brushing applications. The reversal of the direction of rotation allows variable use and mounting in the construction. For brush diameters of more than 80 mm the EBMU 40 is recommended. The reversal of the direction of rotation should always be discussed with the brush manufacturer. In deburring processes the bristles knock off the burr. Reversing the direction of rotation can lead to premature wear of the bristles. In simple cleaning processes with soft bristles the cleaning result can be significantly improved by reversing the rotation.

The speed can be throttled by up to 60 % via the exhaust air, i. e. a wide range of speeds can be covered with reduced air consumption and wear. The non-lubricated motors of the EBMU 23 series already offer a service life of approx. 800–1 000 hours even in non-lubricated operation at 6 bar and full speed. If the air quality is maintained and the supply air is lubricated, a 6-fold increase in service life is easily possible. In this case, the lubricated exhaust air can be filtered through an exhaust air de-oiler.

## Technical data

Type		<b>EBMU 40-4800 B</b>	<b>EBMU 40-3400 B</b>	<b>EBMU 40-3000 B</b>	<b>EBMU 23-4000 B</b>	<b>EBMU 23-2000 B</b>	<b>EBMU 23-1000 B</b>
Order no.		60008-19-7	60008-17-7	60008-15-7	60009-28-7	60009-31-7	60009-34-7
Compressed air		lubricated	lubricated	lubricated	lubricated	lubricated	lubricated
Free speed	min <sup>-1</sup>	4 800	3 400	3 000	4 000	2 000	1 000
Power	Watt	500	500	500	230	230	230
Drill chuck clamping range	mm	1–10	1–10	1–10	1–10	1–10	1–10
Thread drill chuck mounting	UNF	1/2" × 20	1/2" × 20	1/2" × 20	3/8" × 24	3/8" × 24	3/8" × 24
Direction of rotation		reversible	reversible	reversible	reversible	reversible	reversible
Weight	kg	2.30	2.30	2.60	1.30	1.30	1.60

Power and speed at 6.3 bar operating pressure.



EBM 120-18600 WS



EBM 120-1200 WS with chuck



EBMU 82-13600 WS



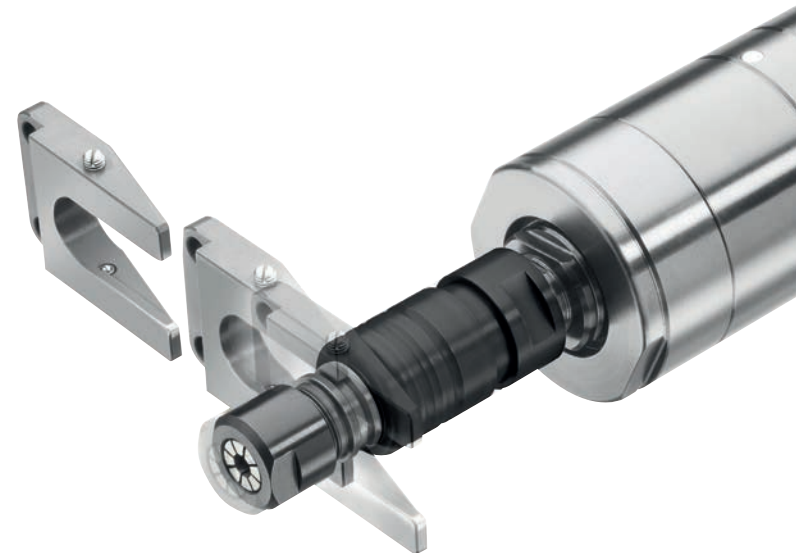
EBMU 82-4000 WS

## Brushes

The brush unit consists of a quick change chuck and holders that allow quick and easy changing of the tools. The tools to be changed can be prepared outside the working process in a secondary process and changed in a very short time. The tool change can be carried out manually or by means of a robot.

- + Automatic brush change for robot system
- + Ideal for brushing
- + Required accessories:
  - holder with collet or M14 × 2 threaded holder
- + Optional accessories:
  - fork, rotary collet chuck

You will find the matching accessories on → [p. 39](#)



## Application

The changing system was specially developed for robot applications – regardless of whether the robot guides the tool or the workpiece. With the appropriate accessories both applications are covered. The rotary holders are used for safe storage of the brush holders that have been changed in and out, provided that the changing process is carried out with the fork on the robot arm. When the machine is mounted on the robot arm the replaced brush holders can be safely and reliably deposited with the fork in any position.

All series can be supplied with an optional speed sensor.



## Technical data

Type		EBM 120-18600 WS	EBM 120-5400 WS	EBM 120-1200 WS	EBMU 82-13600 WS	EBMU 82-4000 WS	EBMU 82-850 WS
Order no.		60038-70-5	60038-71-5	60038-72-5	60038-65-5	60038-73-5	60038-74-5
Compressed air		lubricated	lubricated	lubricated	lubricated	lubricated	lubricated
Free speed	min <sup>-1</sup>	18 600	5 400	1 200	13 600	4 000	850
Power	Watt	1 200	1 200	1 200	820	820	820
Direction of rotation		clockwise	clockwise	clockwise	reversible	reversible	reversible
Weight	kg	3.40	3.40	3.40	3.40	3.40	3.40

Power and speed at 6.3 bar operating pressure.



EBM 55-5600 WS



EBM 55-3600 WS



EBMU 40-19000 WS



EBMU 40-3000 WS

## Brushing

The brush unit consists of the quick change chuck and holders that enable the tools to be changed quickly and easily.

The tools to be changed can be prepared outside the working process in a secondary process and changed in a very short time. The tool change can be carried out manually or by means of a robot.

- + Automatic brush change for robot system
- + Ideal for brushing
- + Required accessories:
  - holder with collet or M14 x 2 threaded holder
- + Optional accessories:
  - fork, rotary collet chuck

## EBMU 40

- + Reversible

You will find the matching accessories on → p. 39



Rotary chuck WS

## Application

The changing system was specially developed for robot applications – regardless of whether the robot guides the tool or the workpiece. With the appropriate accessories both applications are covered. The rotary holders are used for safe storage of the brush holders that have been changed in and out, provided that the changing process is carried out with the fork on the robot arm. When the machine is mounted on the robot arm the replaced brush holders can be safely and reliably deposited with the fork in any position.

All series can be supplied with an optional speed sensor.



Fork

## Technical data

Type		EBM 55-5600 WS	EBM 55-3600 WS	EBMU 40-19000 WS	EBMU 40-4800 WS	EBMU 40-3000 WS
Order no.		60038-27-7	60038-69-7	60050-76-7	60038-29-7	60038-28-7
Compressed air		lubricated	lubricated	lubricated	lubricated	lubricated
Free speed	min <sup>-1</sup>	5 600	3 600	19 000	4 800	3 000
Power	Watt	620	620	500	500	500
Direction of rotation		clockwise	clockwise	reversible	reversible	reversible
Weight	kg	2.30	2.30	2.30	2.30	2.30

Power and speed at 6.3 bar operating pressure.



EBM 38-19000 WS



EBM 38-5200 WS



EBM 38-2400 WS



EBM 38-1200 WS

## Brushing

The brush unit consists of the quick change chuck and holders that enable the tools to be changed quickly and easily.

The tools to be changed can be prepared outside the working process in a secondary process and changed in a very short time. The tool change can be carried out manually or by means of a robot.

- + Automatic brush change for robot system
- + Ideal for brushing
- + Required accessories:
  - holder with collet or M14 × 2 threaded holder
- + Optional accessories:
  - fork, rotary collet chuck

You will find the matching accessories on → p. 39



Collet retainer

## Application

The changing system was specially developed for robot applications – regardless of whether the robot guides the tool or the workpiece. With the appropriate accessories both applications are covered. The rotary holders are used for safe storage of the brush holders that have been changed in and out, provided that the changing process is carried out with the fork on the robot arm. When the machine is mounted on the robot arm the replaced brush holders can be safely and reliably deposited with the fork in any position.

All series can be supplied with an optional speed sensor.



## Technical data

Type		EBM 38-19000 WS	EBM 38-5200 WS	EBM 38-2400 WS	EBM 38-1200 WS
Order no.		60051-92-7	60038-62-7	60038-63-7	60061-78-7
Compressed air		lubricated	lubricated	lubricated	lubricated
Free speed	min <sup>-1</sup>	19 000	5 200	2 400	1 200
Power	Watt	380	380	380	380
Direction of rotation		clockwise	clockwise	clockwise	clockwise
Weight	kg	1.20	1.20	1.20	1.50

Power and speed at 6.3 bar operating pressure.



EBMU 23-14000 WS



EBMU 23-4000 WS



EBMU 23-2000 WS



EBMU 23-1000 WS

## Brushing

The brush unit consists of the quick change chuck and holders that enable the tools to be changed quickly and easily.

The tools to be changed can be prepared outside the working process in a secondary process and changed in a very short time. The tool change can be carried out manually or by means of a robot.

- + Automatic brush change for robot system
- + Ideal for brushing
- + Required accessories:
  - holder with collet or M14×2 threaded holder
- + Optional accessories:
  - fork, rotary collet chuck

You will find the matching accessories on → p. 39



Holder with M14×2 thread

## Application

The changing system was specially developed for robot applications – regardless of whether the robot guides the tool or the workpiece. With the appropriate accessories both applications are covered. The rotary holders are used for safe storage of the brush holders that have been changed in and out, provided that the changing process is carried out with the fork on the robot arm. When the machine is mounted on the robot arm the replaced brush holders can be safely and reliably deposited with the fork in any position.

All series can be supplied with an optional speed sensor.



## Technical data

Type		EBMU 23-14000 WS	EBMU 23-4000 WS	EBMU 23-2000 WS	EBMU 23-1000 WS
Order no.		60037-48-7	60038-54-7	60038-57-7	60050-75-7
Compressed air		lubricated	lubricated	lubricated	lubricated
Free speed	min <sup>-1</sup>	14 000	4 000	2 000	1 000
Power	Watt	230	230	230	230
Direction of rotation		reversible	reversible	reversible	reversible
Gewicht	kg	1.20	1.20	1.20	1.50

Power and speed at 6.3 bar operating pressure.



## Accessories

### Brushing motors with quick change chuck



Fork, collet retainer, M 14 × 2 holder, rotary chuck WS

#### Technical data

<b>Fork for automatic tool change</b>	60036-02-5
<b>Collet retainer</b>	6 mm 60050-24-5
	8 mm 60063-53-5
	10 mm 60063-54-5
<b>Holder with M 14 × 2 thread</b>	60050-38-3
<b>Rotary chuck WS</b>	60059-05-5

The tools to be changed can be prepared in a secondary process and changed in a very short time.

## VPort – Interface to the robot



VPort

#### Technical data

<b>VPort</b>	60066-08-5
Dimensions (W × H × D)	88 × 90 × 58 mm
Operating voltage	
Nominal value / range	24.0V DC / 18.0 – 28.0V DC
Current nominal value / max. value	0.1 / 0.5 A
Voltage at the digital inputs	
Rated value / max. value	24.0V DC / 32.0V DC
Voltage at the digital outputs	
Nominal value / max. value	24.0V DC / 24.0V DC
Voltage at the analogue outputs	
Outputs @ max	24.0V, 0 – 20 mA

## Robot spindles with radial deflection

For brushing  
**AIRALDE**



ESR 50



ESR 50 WS with quick change chuck

### Brushing

Radial deflection brushing motors offer 360° compensation and can optionally be combined with quick-change chucks.

You will find the matching accessories on → [p. 39](#)



## Application

Brush motors with radial deflection are a sensible alternative to the standard brush motor when there are large dimensional variations on the component and high brush stiffness, such as with knotted wire brushes. Brushes up to a diameter of 100 mm can then be quickly and easily integrated into the deburring process. The additional equipment with an interchangeable chuck offers maximum flexibility. Worn brushes can be automatically replaced with the interchangeable chuck. With a similar working speed, different brushes can be used with only one machine thanks to the changing system.

## Technical data

Type		ESR 50	ESR 30	ESR 20	ESR 10
Order no.		29940-05-5	60051-09-5	60071-21-5	60050-93-7
<b>Type with quick-change chuck</b>		<b>ESR 50 WS</b>	<b>ESR 30 WS</b>	<b>ESR 20 WS</b>	—
Order no.		60051-67-5	60051-71-5	60051-66-5	
Compressed air		lubricated	lubricated	lubricated	lubricated
Free speed	min <sup>-1</sup>	5 000	3 000	2 000	1 000
Power	Watt	380	380	380	380
Radial deflection		± 4°	± 4°	± 4°	± 4°
Collet chuck	mm	6	6	6	6
Contact pressure infinitely variable	N	10 – 60	10 – 60	10 – 60	10 – 60
Weight	kg	4.70	4.70	4.70	5.00

Power and speed at 6.3 bar operating pressure.

## Robot spindles with axial deflection

For brushing  
**AIRALDE**



ESR 84-2700 AX25



ESR 84-2700 AX25 WS with interchangeable chuck



ESR 30 AX25 ST with sensor

### Brushing

- + Optimal for use with cup brushes or brushes with increased contact pressure
- + Powerful vane motors
- + High torque due to gearbox
- + High brush contact load possible
- + Large axial deflection

Robot spindles with axial deflection and monitoring of position and end position are available on request.

You will find the appropriate accessories on → [p.39](#)



Rotable quick change chuck

## Application

In an axial brushing application it is often necessary to change the brush at regular intervals.

The quick change chuck of the WS types enables the brushes to be changed quickly and easily. The tools to be changed can be prepared outside the working process in a secondary process and changed in a very short time. The tool change is ideally be carried out by a robot.

Rotating holders are used for safe storage of the brush holders that are being changed in and out, provided that the changing process is carried out with the fork on the robot arm. When the machine is mounted on the robot arm the exchanged brush holders can be safely and reliably deposited in the forks in any position.



Collet chuck mounting

## Technical data

Type		ESR 84-6000 AX25	ESR 84-4700 AX25	ESR 84-2700 AX25	ESR 50 AX25	ESR 30 AX25
Order no.		60058-64-5	60071-07-5	60057-45-5	60001-34-5	60001-35-5
<b>Type with quick change chuck</b>		<b>ESR 84-6000 AX25 WS</b>	<b>ESR 84-4700 AX25 WS</b>	<b>ESR 84-2700 AX25 WS</b>	—	—
Order no.		60051-29-5	60051-30-5	60051-31-5		
Compressed air		lubricated	lubricated	lubricated	lubricated	lubricated
Free speed	min <sup>-1</sup>	6 000	4 700	2 700	5 000	3 000
Power	Watt	840	840	840	380	380
Axial deflection	mm	25	25	25	25	25
ER collet chuck	mm	6	6	6	6	6
Contact pressure infinitely variable	N	25 – 1 000	25 – 1 000	25 – 1 000	25 – 1 000	25 – 1 000
Weight	kg	6.80	6.80	6.80	6.50	6.50

Power and speed at 6.3 bar operating pressure.

# Robot spindles and countersinks for countersinking

With and without deflection

**AIR**TALDE



## RWBS 38-520 ER

- + Small angle head, head height 30 mm, for difficult to reach deburring points

## RBS 38-520 AX25

- + Helical coupling to compensate for the radial offset of the hole
- + Large axial deflection

## EBS 520 ER

- + Large adjustable speed range via exhaust air

## EBS 504 ZG

- + With push start by pressing the tool against the hole

## EWBS 903 ST

- + Very small angle head, head height 20 mm
- + With sensor for monitoring speed and resulting load



## Application

Depending on the countersinking / deburring task, different types are available. If, for example, dimensional deviations are to be expected due to the casting the use of axial or radial compensation is recommended.

For components with high repeat accuracy of the bore, a type without deflection such as EBS 520 ER or EBS 504 ZG can also be used.

In order to achieve an optimal speed depending on the counterbore size, the speed of the machines can be throttled via the supply and exhaust air. Due to the high gear reduction, there is still sufficient power for the chamfering process even with a low working pressure.

## Technical data

Type		RWBS 38-520 60051-11-5	RBS 38-520 AX25 60001-33-5	EBS 520 ER 60001-36-7	EWBS 903 ST 60066-42-5	EBS 504 ZG 29937-30-7
Compressed air		lubricated	lubricated	lubricated	lubricated	lubricated
Free speed	min <sup>-1</sup>	520	520	520	900	500
Power	Watt	380	380	380	35	160
Start-up		external	external	external	external	pressure start
Radial deflection		± 4°	—	—	—	—
Axial deflection	mm	—	25	—	—	—
ER collet chuck	mm	—	6	8	—	—
ZG collet	mm	—	—	—	—	8
Contact pressure infinitely variable	N	10 – 70	25 – 1 000	—	—	—
Countersinking range	mm	5 – 25	5 – 25	5 – 30	2 – 10	5 – 30
Weight	kg	5.80	6.70	1.40	0.50	0.80

Power and speed at 6.3 bar operating pressure.



RF 110



FRV 100

### Deburring

For deburring cast and machine parts.  
For use with files with round shank  $\varnothing$  6,0 mm

+ Extremely low vibration values:  $2.0 \text{ m/s}^2$ , resulting in high precision and smooth running.

#### RF 110

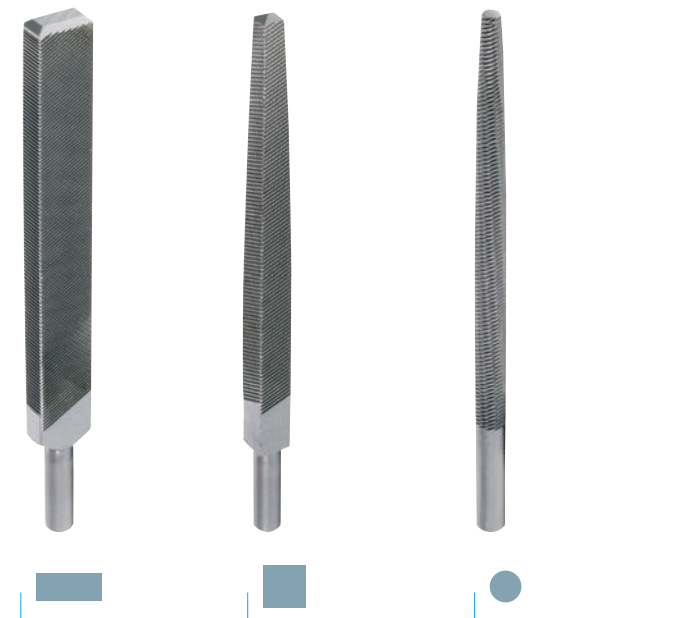
+ With radial deflection

#### FRV 100

+ Rigid design

## Application

The advantage of a filing machine lies in its easy handling and programming. Files are also used for work that basically requires oscillating machining. The tool used is not necessarily a file. For example in sand core deburring in core making a simple piece of round steel can be used to clean contours. Applications where a cutting blade oscillates instead of a file are also quite common.



## Technical data

Type		RF 110	FRV 100
Order no.		60057-29-5	60026-94-6
Compressed air		lubricated	lubricated
Stroke rate	min <sup>-1</sup>	9 000	9 000
Frequency	Hz	150	150
Tool holder Ø	mm	6	6
Radial deflection		± 4°	—
Contact pressure infinitely variable	N	18 – 75	—
Weight	kg	4.60	0.85

Power and speed at 6.3 bar operating pressure.

## SSU 60 deflection unit

The versatile ones  
**AIR TALDE**



EWS 121



EWS 121 with deflection unit



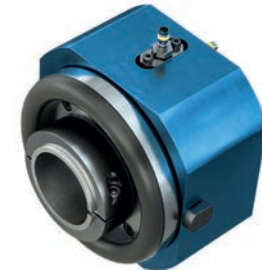
FRV 100 with deflection unit

### Boost your potential

With the SSU 60 deflection unit you can combine a variety of air motors, angle drill deburrers, files or grinding spindles. The deflection unit can be radially deflected upwards and downwards in one axis. The angle to the centre axis is  $\pm 5^\circ$ .

Due to the modular design and the separation of the drives from the deflection unit, drives can be exchanged cost effectively when the process changes or when tools wear out.

The deflection is monitored by means of analogue sensors for path and angle monitoring.



## Application

With its rocker function and a clamping diameter of 60 mm the SSU 60 offers a wide range of possible applications. The inductive analogue M12 sensor enables precise position detection of the drive. In brushing applications this allows bristle wear to be detected. In deburring applications excessively large or even irregular burrs can be detected and a stop initiated. The contact pressure of the SSU 60 varies depending on the projection length and centre of gravity of the drive and is, for example, approx. 80 N for a projection length of 150 mm at 6 bar pressure.

## Technical data

<b>Type</b>	<b>SSU 60</b>
Order no.	60058-00-5
Analogue sensor for monitoring the deflection	yes
Clamping diameter	60 mm
Deflection radial 1-axis	5°
Weight	6.40 kg



# **AIR**TALDE **MANNESMANN** **DEMAG**

Air tools | Air motors

