

METAL CUTTING MACHINES FOR SCREWDRIVING TOOLS profile generating | milling | drilling



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POLYGONING AND SERRATING

The profile generating centers of the brand LP-Laschet are designed for processing polygons, special shapes and radial profiles.







The basis of the process is a freely programmable synchronization between the workpiece and tool spindle by means of an electronic gear. This ensures highest precision and indexing accuracy.

Thanks to extremely short machining and magazine times, cycle times are reduced. Cylindrical workpieces can usually be fed through the hollow spindle of the spindle head.

Due to the freely accessible working area without interfering contours, manual loading for special and small series is possible at any time without any modifications.

Two series are part of the product range:

- LP110
- LP130



The profile generating center of the series LP110 streamlines the machining processes in the field of polygonal generating and tooth profiling. The rotary machining process of the profile generating center combines drilling and milling technology.

The manually tiltable tool unit of the LP110 can • be swivelled from polygonal to gear machining without much set-up effort.

Drilling, turning and milling tools integrated on the tool slide allow different operations to be combined on one machine, which previously required several machines.

- manual loading for special and small series possible at any time without conversions due to freely accessible working area without interference contours
- swivelling of the manually swivelling tool unit from polygon to gear machining without great set-up effort
- combination of different operations on one machine through drilling, turning and milling tools integrated on the tool slide
- use of the following machining systems:
 - universal generating system
 - heavy-duty polygon system
 - dual spindle system







- CNC control Siemens
- generating spindle adapters: KK 3 - H 28 - horizontal D 28 - H 28 - horizontal D 20 K - V 28 - vertical
- work spindle bore: Ø 30 mm
- feedrate X and Z axes: up to 700 mm/m
- rapid travel speeds X and Z axes: 15 m/
- travel X axis, radially: 300 mm
- travel Z axis, axially: 280 mm
- generating spindle speed: up to 6 000 rpi
- rotary positioning accuracy of the spindle: 0,01°





	•	spindle torque: 35 Nm
	•	spindle torque: 7 Nm (option: 16 Nm)
	•	total power: 20 KW, 30 A
	•	standard voltage: 400 V, 50 Hz (or on request)
min	•	pneumatic power: 5–8 bar
/min	•	hydraulic power: 20 bar
,	•	dimensions of the machine including switchboard [L × W × H]: 2 800 mm × 1 450 mm × 2 000 mm
om main	•	weight: approx. 3 500 kg (depending on the equipment)



Example of use: PlusMinus screwdriver

Five-axis CNC profile generating center for processing screwdriver blades

- raw parts Ø 2-10 mm
- workpiece lengths 50–320 mm
- workpiece spindle head LP110 with chuck holder, brake disc for cycle operation and AC servo motor
- milling system manually tiltable from horizontal to vertical position
- milling spindle for machining PlusMinus tool profiles
- puncture magazine for lift loader
- NC loading system

- screw tool profiles:
 - cross recess PH 00 PH 4
 - Torx T1 to T60
 - Pozidrive Pz 0 Pz 4
 - hexagon SW 2 to SW 10
 - hexagonal ball head SW 2 to SW 10
- processing steps:
 - separation of the cut-off/sawed-off sections via lift loading magazine into blade magazine
 - pushing the sections from behind by means of NC loading system through the workpiece spindle head into clamping position
- production of the turning operations required for cross slot and Torx profiles in one clamping











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Turning the flat surface



Profile generating of Plus-Minus screwdriver blades



Milling of the protruding edges



PlusMinus screwdriver blades after machining

PROFILE GENERATING CENTERS



Example of use: Torx ball head screwdriver

Five-axis CNC profile generating center for processing screwdriver blades

- raw parts Ø 2,5-10 mm
- workpiece lengths 50–320 mm
- workpiece spindle head LP110 with chuck holder, brake disc for cycle operation and AC servo motor
- milling system manually tiltable from horizontal to vertical position
- puncture magazine for lift loader
- NC loading system

- screw tool profiles:
 - cross recess PH 00 PH 4
 - Torx T1 to T60
 - Pozidrive Pz 0 Pz 4
 - hexagon SW 2 to SW 10
 - hexagonal ball head SW 2 to SW 10
- processing steps
 - feeding of the raw part via LP step conveyor
 - turning the flat surface
 - profile generating of the Torx ballpoint screwdriver blade in one clamping











1

Feeding via LP step conveyor



3

4

Profile generating of ball end screwdriver blade

Torx ball end screwdriver blade after machining



Example of use: Cross-recess screwdriver

The profiling generating center shown here is designed for the machining of cross-recess screwdrivers.

- feeding of the blanks (round or hexagonal) via step conveyor
- blank Ø 2–4 mm
- workpiece length 80-200 mm
- profiles: cross recess, torx, pozidriv, hexagon, hexagon ball head
- machine with five CNC axes
- push-through magazine for lift loaders designed for workpiece Ø 2–12 mm













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Turning the flat surface



Profile generating





3

4

Long turning and ejection of the finished workpiece

Cross-recess screwdriver blade after machining



The profile generating center of the LP130 series is designed for medium to heavy machining of polygonal, special and radial profiles.

The rotary manufacturing process, the automation possibilities, the additional and tooling equipment for the options milling, drilling, turning etc., as well as the ease of operation and set-up make the LP130 a versatile, universal generating center.

- compact spindle head with Ø 80 mm spindle • passage
- variable tool systems
- high drive power
- large workpiece spindle passage
- optimum cutting performance
- high static and dynamic stiffness







• control Siemens CNC

•

- generating spindle adapters: KK 3 – H 28 – horizontal D 28 - H 28 - horizontal D 28 L - V 28 - vertical
- work spindle bore: Ø 80 mm
- feedrate X and Z axes: up to 700 mm/min
- rapid travel speeds X and Z axes: 15 m/min •
- travel X axis, radially: 300 mm
- travel Z axis, axially: 280 mm
- generating spindle speed: up to 5700 rpm
- rotary positioning accuracy of the main spindle: 0,01°



•	workpiece spindle torque: 42 Nm
•	tool spindle torque: 7 Nm (option 16 25 Nm)
•	total power: 25 KW, 35 A

- standard voltage: 400 V, 50 Hz (or on request)
- pneumatical power: 5–8 bar
- hydraulical power: 30 bar
- dimensions of the machine including switchboard $[L \times W \times H]$: 2800 mm × 1450 mm × 2000 mm
- weight: approx. 4000 kg (depending on the • equipment)

15 4 back to content

or

PROFILE GENERATING CENTERS

Example of use: Extension for socket wrench

In order to make the production of extensions effective, production steps are divided on the LP130 and performed in parallel.

Extensions are manufactured in three work steps:

- turning
- machining of the square
- drilling









In the first processing station, the contour of the piece is turned and the square is generated (sw 1/4"-3/8"-1/2").

The workpiece is then transported to the second machining station, the drilling station. This is also located on the machine bed for reasons of rigidity.

In the drilling station a cross hole is drilled into the square (2.5-6.6 mm Ø) under CNC control.

Parallel to drilling, the next square is machined.







- 1. Profile generating of squares (picture 1)
- 2. Turning (picture 2)
- **3.** Generating of the square (picture 3)
- **4.** CNC charging axis (picture 4)
- 5. Production of the cross hole with solid carbide tools (picture 5)



ACCESSORIES

GENERATING SYSTEMS

Depending on the application and the desired cutting performance, different generating systems are used.

All systems can be employed in profile generating centers of the LP110 and LP130 series.





Universal generating system

The manually swivelling combination tool system can be moved from the vertical to the horizontal position in no time at all. Polygonal profiles are produced in horizontal tool spindle position.

For machining external serrations, the tool unit is swivelled into the vertical position. The short set-up time impressively underlines the high flexibility of the machine (picture p. 6).

Heavy-duty polygon system

The application: Universally applicable for medium to large cutting capacities for single-part and series production of polygons and clutch lugs (picture 1).

Dual spindle system

The vertical and horizontal tool spindles are arranged stationary. Both tool systems can be used without conversion. This allows polygonal and radial profiles to be machined in one clamping.

The high static and dynamic stiffness of the machine elements allows the use of the most modern carbide cutting materials. The results are short cycle times, high precision and long tool life (picture 2).

- **1.** Heavy-duty polygon system with deburring tool (picture 1)
- 2. Dual spindle system with vertical and horizontal spindles (picture 2)



TOOLS **CLAMPING SYSTEMS**

Cutter heads

Standard cutter heads have been developed for the polygonal area, which are usually equipped with commercially available carbide indexable inserts. With a standard ratio of 2:1, all profiles are produced with parallel surfaces.

The desired profile is defined by the number of main cutting edges of a cutter head (e.g. one cutting edge machines 2 surfaces; 2 cutting edges machines 4 surfaces; 3 cutting edges machines 6 surfaces).

Additional tool cutting edges in the cutter heads enable simultaneous edge breaking, deburring and cut distribution.

For the vertical system a wide range of rolling impact tools has been developed for the production of the following profiles:

- pinion shaft profiles
- splined shafts
- pointed teeth
- tooth edge deburring
- special profiles with cones



ACCESSORIES

2



Clamping tools

The clamping devices we use meet the highest requirements even for difficult machining tasks.

Reliable clamping and high concentricity guarantee quality products with long tool life.

The pressure collet chuck was designed for collets according to DIN 6343.

We design jaw chuck and mandrel solutions according to the workpiece-specific requirements.





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- **1.** Horizontal generating tools (picture 1)
- 2. Vertical generating tools for the production of gear shaft profiles (picture 2)
- **3.** Push or pull collet closer (picture 3)
- **4.** Expanding mandrell assembly (picture 4)
- 5. 3 jaws chuck (picture 5)



OPTIONS

The machines can be equipped with various automatic workpiece feeders.

Wave-shaped workpieces are usually fed automatically by the spindle. Due to this concept the working area of the machine remains freely accessible without disturbing magazine superstructures. Tool and clamping devices can be changed quickly and easily.

The Berger Gruppe offers the following automation systems:

- vibratory conveyor with optical workpiece recognition
- lifting conveyor can be combined with punching unit
- gravity conveyor with separation and infeed and outfeed unit
- gantry loader with swivel gripper
- robots
- modular feeding systems with conveyor belts







Special accessories

- milling units
- drilling units
- turning units
- plunge-cutting units •
- deburring units
- spindle nose brakes for precision indexing •
- workpiece supports
- steady rests •
- stamping units •
- shift axis for radial cutter heads
- magnetic or hinged belt conveyors •
- tool setters

- **1.** Loading system with swivel gripper (picture 1)
- 2. Step feeder (picture 2)
- **3.** Bowl feeder (picture 3)
- **4.** Stamping unit (picture 4)
- 5. CNC-controlled cross slide with profiling tool, drilling tool, turning head and plungecutting unit (picture 5)





The Berger Gruppe offers a universal bus-based acquisition of sensor signals such as the temperature of cooling lubricants or AE signals at the spindle control on machines. The machines are networked via the Berger Machine Interface (BMI4.0).

Functions of BMI4.0

- · universal bus-based acquisition of sensor signals on a machine, such as coolant temperatures, engine load, AE signals for spindle monitoring, air pressure and quantity
- data reduction and visualization with eva-• luation software
- networking with IOT or company network
- · programming of interfaces for individual connection to existing BDE or ERP systems with OPC server

PROGRAMMING

WORKPIECE-ORIENTED PROGRAMMING

The Berger Gruppe offers a wide range of menudriven user interfaces for complex plant controls.

Examples of use (pictures)

- 1. Workpiece-oriented programmint WOP (picture 1)
- 2. Machine states "online" overview (picture 2)



	Pneumatics on	Plant off	
	Hydraulics off	Sinematic off	
3.700	all diameter =	Ва	27
12.490	Tool radius =		21
0.000	arting angle =	Sta	
105.0	End angle =		
230.0	End offset =		1
40.0	nitial offset =	I	-1
500	ch feed rate =	Approac	/
200	Feed rate 1 =		
170	Feed rate 2 =		
2	Tool PL =		
327	Tool TX =		
2500	Speed PL =		
600	Speed TX =		
0.0	wing angle =	Follo	
30.500	Trans 2 PL =		
34.000	Trans 2 TX =		
5.0	ter material =	Diame	



Advantages of BMI4.0

- prerequisite for intelligent resource management (IRP)
- prerequisite for preventive maintenance and real-time monitoring of the machine park
- acquisition of process data for process optimization and recognition of process dependencies
- optimization of downtime and setup times, thus optimal capacity planning



TYPICAL WORKPIECES

PROFILE GENERATING OF Universal generating system **SCREWDRIVER BLADES** The LP110 and LP130 profile generating centers **AND BITS**

are ideal production machines for profile generating screwdriver blades and bits.





The automatic loading of the blades (length: up to approx. 400 mm) and the bits is done by the hollow spindle of the spindle head. This considerably reduces the magazine times.

Das Teilespektrum für die Schraubwerkzeugindustrie umfasst folgende Profile:

- Phillips
- Pozidriv
- Torx

Pos.	Type of operation Machining time
1	Triple square tip
2	Screwdriver blade Phillips size 2
3	Screwdriver blade Phillips size 1
4	Screwdriver blade Pozidriv size 2
5	Screwdriver blade Torx size T 25
6	Tamper Torx blade size T 40
7	Flat screwdriver blade
8	Flat screwdriver blade with turning
9	Flat screwdriver blade with turning
10	Phillips size 1 and 2 with turning
11	Flat screwdriver blade
12	Ball end on hexagon shank
13	Square recess screwdriver blade







- Tamper Torx
- Hexagonal ball head
- Slitting Blade (Double Flat)
- Torq Set
- Tri-Wing
- Binary
- Square
- Hexagon

in s	second
	7,0
	2,0
	2,0
	3,7
	2,0
	6,0
	6,0
	7,0
	7,0
	7,0/6,5
	7,0
	4,5
	4,5

Pos.	Type of operation Machining time in s	second
14	Screwdriver blade, Tri Wing	8,0
15	Flat Bit blade	10,0
16	Flat Bit blade with turning	6,5
17	Torx-Bit size T 30 with turning	6,5
18	Tamper Torx Bit size T 40	
19	Torq Set Bit	10,0
20	Phillips Bit size 3	2,5
21	Pozidriv Bit size 1	3,5
22	Pozidrive Bit size 3	4,0
23	Phillips-Bit Gr. 0 with turning	6,0
24	Torx-Bit size T 6 with turning	8,0
25	Pozidrive Bit size 2	3,7
26	Special hexagon Bit Phillips size 2	3,0



TYPICAL WORKPIECES

Horizontal generating system

The workpieces shown below are examples

Pos.	Type of operation Machining time in s	second
1	4 front lugs	10
2	Hexagon size 15 mm a.f.	9
3	4 lugs with 5° relief cut	10
4	2 clutch lugs	11
5	9 clutch lugs	8
6	Square size 1/2" a.f.	6
7	2 drive lugs size 13 mm	18
8	Wood drill head profile dia 35 mm	20
9	Universal front side with cross holes dia 6,5 mm	25
10	Front face geometry with center slot	11
11	2 front lugs	9

of machining with the horizontal generating system. (For the principle of horizontal profile generating, see drawing 1, p. 29).

Pos.	Type of operation Machining time in s	second
12	Hollow punch, rectangle	18
13	3 drive lugs	8
14	Complete front end geometry dia 12 mm	9
15	Front slot 10 mm × 20 mm	6
16	Triangle	5
17	Square size 12 mm	20
18	Square tapered size 1/2"	8
19	Square tanks 16 mm a.f.	12
20	Square size 20 mm	10
21	Hexagon size 30 mm a.f stainless steel	9
22	Flat screwdriver blade	5
23	Ball-end hexagon 8 mm a.f.	6





Radial generating system

The workpieces shown above are examples of machining with the vertical generating system. (For the principle of vertical generating system, see drawing 2, p. 29).

Pos.	Type of operation Machining time
1	Chamfered face gear 24 teeth
2	Involute splined shaft 29 teeth
3	Face clutch 30 teeth, with relief cut
4	Tapered tooth profile 10 teeth
5	Involute splined profile 30 teeth
6	Involute splined shaft, 13 teeth
7	Involute splined shaft, 15 teeth
8	Tapered splined profile, 18 teeth
9	Phillips screwdriver blade size 2
10	Tapered splined profile, 17 teeth
11	9 clutch teeth
12	Involute splined shaft, 15 teeth
13	Splined profile, 5 teeth
14	Tapered splined profile, 11 teeth
15	Counter sink tapered, 4 teeth
16	Splined profile shaft, 11 teeth
17	Splined profile 90°, 36 teeth

in second	
	11
	19
	18
	18
	12
	17
	23
	8
	2
	6
	12
	25
	24
	15
	8
	12
	14



Principle: Horizontal profile generating





GRINDING MACHINES

BG/DA/NT

Economical grinding of simple geometries

The CNC controlled flat bevel grinding machine of the series BG/DA/NT is designed for the economical grinding of workpieces with simple geometries - in this case screwdriver blades.





- digital Windows control Siemens
- measuring control integrated in CNC control with measuring probe, digital display of grinding wheel wear, determination of remaining grinding wheel service life
- grinding table in 30° inclined bed design, roller rail guide with direct path measuring system
- workpiece-dependent programming software
- AC servo motor
- automatic interval-controlled central grease lubrication with monitoring and fault indication
- prepared for the mounting of clamping fixtures
- TeamViewer for diagnosis/remote control of CNC and PLC functions
- spindle drive 7,5 kW
- grinding length 300 mm
- 5. Transport of the machined workpieces · spindle with backlash-free preloaded preci-(picture 5) sion bearing, designed for a circumferential speed of up to 50 m/s
- mounting flange for grinding wheel Ø of 450 mm







- three axis CNC grinding machine:
 - X-axis = main feed axis grinding table driven with linear motor
- Z-axis = infeed axis grinding wheel
- Y-axis = linear pressure axis
- digital axis drive on preloaded ball screw Z axis or precision reduction gear A axis, digital axis drive linear motor for X axis

- 1. Flat bevel grinding machine of the series BG1/DA/NT (picture 1)
- 2. Processing of micro blades in cassette (picture 2)
- **3.** Reception of raw parts (picture 3)
- 4. Processing of flat screwdrivers; simultaneous grinding of four surfaces = two screwdriver blades in six seconds (picture 4)



REQUESTION FOR QUOTATION

QUESTIONNAIRE FOR TECHNICAL DATA

Company	
Contact	
E-Mail	
Phone/Fax	

Please send me an offer:

MACHINES	PAGE
PROFILE GENERATING CENTER	4-17
Raw part Ø	
Part length	
Screwdriving tool profiles	
Cross recess	
Torx	
Pozidriv	
Hexagon	
Hexagon ball head	
Others	
Feeding of the raw parts	
FLAT BEVEL GRINDING MACHINE	30-31
Workniece	
Quantity	
L ot size	
Number of models	
Magazine capacity	

