



LIDKÖPING High Volume™

SGP 320 External Grinder / SSB 320 Internal Grinder

Fast, precise and profitable



About us

KMT Precision Grinding develops, markets, manufactures, and installs high precision grinding machines with surrounding equipment within the area of high precision grinding. We market our products under the trademarks UVA and LIDKÖPING. KMT business areas include grinding machines, internal,- external,- simultaneous,- centerless and hard turning processes with complete aftermarket solutions that include service, productivity-enhancing upgrades, and rebuilds.

KMT was founded in 1875 and has delivered over 10 000 machines, and is represented in every part of the industrialized world. KMT has production units in Gurgaon India, Lidköping and Bromma in Sweden. KMT also has fully owned subsidiaries in Germany, USA and China with Sales and After-market services.

With over a 100 year old tradition of engineering excellence, KMT is today a high-technology company in the vanguard of grinding research and development. Extensive knowledge and grinding experience gives KMT a powerful technological advantage and our products are recognized for their consistently high performance and quality. Customers include most of the world's leading producers in the fuel injection, bearing, automotive and hydraulic industries.



A close-up, high-angle photograph of a grinding wheel, showing its metallic surface and the circular structure of the wheel. The lighting creates bright highlights and deep shadows, emphasizing the texture and curvature of the wheel.

The High Volume™ Grinders

A new series of internal and external grinders for high volume manufacturing of bearings and similar parts. The machine concept is based on the earlier generations of Lidköping machines delivered in thousands all over the world. While this concept originally was made for the small range bearing sizes, the all new High Volume™ machines take this well proven concept also into the medium and large segment of bearings and other work pieces.

The High Volume™ SGP 320 External Grinder

The direct driven grinding wheel spindle carries a Ø 610 mm grinding wheel, up to 120 mm wide, with or without automatic balancing built-in to the grinding wheel flange. With the grinding wheel dresser fixed onto the machine base, during the grinding cycle, the grinding wheel spindle is moving between three positions; grinding, loading and dressing.

The High Volume™ SSB 320 Internal Grinder

Various speed range high frequency grinding wheel spindles are used and automatic balancing can be built-in to the grinding wheel quill. The cross and length slides are stack mounted while the dressing unit is fixed onto the machine base. All positioning for grinding and dressing is made by the stacked slides.

Fit for Purpose

In order to have an optimal machine investment, the machines are designed with “fit for purpose” as a leading star. No equipment without a clear and specific use is integrated. The machines may, by the customer, be configured and optimized for its exact desired operation. While using the very same slide modules, the machine is divided into three totally optimized machine working ranges. Should later another machine range be needed, it would only require a light reconfiguration of the machine to have a different working range.

Modular Design

To the highest degree possible, the very same machine modules are used for both the High Volume™ SSB 320 Internal and SGP 320 External Grinders. This in order to keep the number of needed spare part inventory to a minimum. It will also be a benefit for the machine maintenance since the machine’s common building structure will make the machines easier to understand and thus require less training. But maybe the most important: the machine’s modern concept and reduced number of components result in a high machine uptime.

The everlasting hydrostatic slides are of Lidköping design and driven by either a servomotor & ball screw or an optional high performance linear motor. The machines are approved for cutting speeds up to 60 m/s.

There are two types of dressing units available; a fast full profile diamond roller dresser for the highest productivity needs and an NC-dresser for more flexibility. The NC-dresser comes with three different dressing tools; single point diamond, cup wheel diamond or diamond disc. The diamond disc dressing spindle could also be fitted with a full profile diamond roller thus uniting the two worlds of productivity and flexibility.

With the precision optimized for standard bearing manufacturing, the machine’s fast dressing, loading and unloading enables very low cycle times.

For workpieces with large stock allowance an intermediate dressing is often required with an extended cycle time as a result. As a new feature, it is possible to get the SGP 320 fitted with an additional NC-dresser. The second dresser, mounted on the length slide, is used for dressing of the grinding wheel simultaneously as the rough grinding is on-going. The intermediate dressing is thus hidden into the regular grinding cycle. The cycle time is recovered!

Sustainability

The machines only require 4 bars air inlet. By using the Lidköping Energy & Cost saving technology, the compressed air consumption is reduced by more than 50%. (Compared to the earlier generation machines.)

Both dressing and loading systems are built with electrically or pneumatically driven parts. Hydraulics are only used for the hydrostatic slides. Thus the hydraulic unit is very small and in order to reduce energy consumption, its motor is controlled by the control system and only operates when needed.

Loading & Unloading

The workpieces are fed in and out of the machine through adjustable in- and outlet chutes. The newly designed loaders, one for each of the three machine ranges, are of 1- or 2-arm loading concept and very fast. Loading/unloading times from 1 second for the smallest ring up to 6 seconds for the largest is achieved. These loaders are used for magnetic shoe chucking applications.

The machines can also be configured with a centric chuck for grinding of cogwheels and hub unit rings with flanges. In these cases a V-loader is used. The parts are fed in and out of the machines on chutes or through a gantry loader.

Since the work head is fixed, the work piece loading/unloading can be made simultaneously as the dressing operation.

High Volume Production

Both the low cycle times and the high uptime are important factors in ensuring a very high output capacity. The high output makes the machine a perfect match for large batch size manufacturing. Nevertheless, the change-over time from one workpiece to another is less than 30 minutes.



Plug-and-Play

The machines are designed with small footprint in mind. The electrical cabinet and the control system panel are tightly integrated into the machine cover. The hydraulic unit is also attached to the machine, but only during the transport. During the installation the unit is released and placed on the floor to avoid eventual vibrations being transferred into the machine while grinding. Obviously a small footprint is good for floor space reasons.

Another benefit of the small footprint is that it makes the machines easily transported in standard containers. Several machines can be transported in one single container.

Once the machine is delivered, the installation is plug-and-play, no on-site assembly is required. Thus, the installation time can be kept to a minimum.



Slides System

The close to zero-friction avoids all slip-stick effects and since there is no metal-to-metal contact, the slide has everlasting life.

The length slides, and the SSB 320 cross-slide, are hydrostatic for a trouble free and accurate positioning.

The slide's hydrostatic pockets are cross-balanced thus self-adjusting for lateral forces.

The SGP 320 dovetail type cross slide can be manually operated from the front of the machine, without opening the door.

Work Head

The work head is either fixed or fitted with a swivel function. The swiveling is used for setting the work head in an angle from 0,5 to 32 degrees. When dressing with a full profile diamond roller, it is also used for manual work-piece taper correction.

The direct driven work head spindle is supported by high precision angular contact ball bearings. The axial run-out is less than 1 μm . By using a direct driven spindle, any unwanted vibrations from belts are avoided. Neither are there any belt maintenance and adjustment needed. The special spindle is manufactured by GMN to our specific KMT specification.



Siemens 840 D, Solution Line.

Control System

The control system design is also designed with “fit for purpose” thinking. It is simplified however holding a high degree of module supervising in the background. The operator will see only what is needed for operating the machine. We also have a long experience in making a Human-Machine-Interface for the customer's specific grinding process with automatic storing of all grinding parameters.

After entering actual part geometry and desired removal rate Q' , the HMI automatically calculates the complete grinding cycle (positions, feed rates etc.). The geometrical compensations are also made easy. After grinding a part and manually measuring it, the operator simply enters the gage's read outs. The machine then calculates necessary compensations which are performed during the subsequent dressing.

Customization

As usual KMT offer the machines tooled, programmed and fully capability tested using the customer's own workpieces. Another option is to get the machines also tooled, programmed and fully capability tested however using a KMT pre-defined workpiece for the testing.

A third option for the experienced customer is to handle the tooling and also the grinding process by themselves. Therefore we offer the machines in un-tooled condition i.e. a thoroughly function tested machine with a machine program for only the basic machine movements.

The machines are built with the KMT choice of optimized modules and components. Should it be required we could also offer the machines built to the customer's own technical specification.

Basic Machine

The following is included in the High Volume™ Grinder basic machine:



- Base, made of cast iron.
- Hydrostatic length slide, driven by servomotor and ball screw.
- Hydrostatic cross-slide, driven by servomotor and ball screw. (SSB 320)
- Dovetail type cross-slide, manually operated. (SGP 320)
- Work head spindle, direct driven.
- Grinding wheel spindle, direct driven.
- Loading unit with adjustable in- and outlet chutes
- Control system, Siemens 840D sl.
- Machine cover and doors.
- Control system cabinet, integrated into the machine's front side.
- Compressor cooled complete electrical cabinet, integrated into the back of the machine.
- Machine light.
- Hydraulic and pneumatic panels with cabling & piping.
- Coolant in- and outlet.
- Oil mist exhaust chimney.
- Full function testing.

Machine configuration procedure

Step 1 Basic Machine

Machine Range

Diameter working range:

- Shoe chuck with 2-armloader, Ø 50 - 160
- Shoe chuck with 2-armloader, Ø 120 - 240
- Shoe chuck with 2-armloader, Ø 190 - 320
- Centric chuck with V-loader

Dressing unit

- Plunge dresser for full profile diamond roller
- NC-dresser for single point diamond
- NC-dresser for cup wheel diamond
- NC-dresser for high speed diamond disc
- NC-dresser for full profile diamond roller or disc
- Twin dressers (Plunge and NC)

Grinding Spindle (SSB 320)

- High frequency spindles for several different speed ranges are available.

Grinding Process

- Machine program for plunge dressing
- Machine program(s) for NC-dressing, various bearing types

Workhead Swiveling

- Workhead in 0 degrees, fixed
- Workhead in 0 degrees, with mechanical taper adjustment
- Workhead with mechanical swiveling 0 - 30 degrees

BASIC MACHINE

Step 2 Additional

Machine Options

- Gauging
- Software
- Linear motor
- Grinding wheel spindle equipment

Auxiliary Equipment

- Hydraulics
- Cooling water
- Oil mist filtration
- Grinding coolant

Tooling

- Setting tools
- Range dependent tooling
- Type dependent tooling

Engineering

- Voltage
- Run-off (FAT)
- Machine reception (SAT)
- Documentation & Language
- Machine colors
- Installation
- Training

Shipping

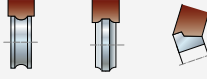
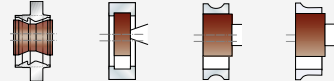
- Shipping destination

Spare Parts

- Sparepart packages and kits
- Service contract

COMPLETE SCOPE OF SUPPLY

Technical Data

MACHINE	TYPE	WORK HOLDING	PRINCIPLE	WORK PIECE DIMENSION	
				OD	WIDTH
SGP320	External	Shoe centerless or centric		ø 50-160 ø 120-240 ø 190-320	Max 120
				ø 50-160 ø 120-240 ø 190-320	
SSB320	Internal	Shoe centerless or centric		ø 50-160 ø 120-240 ø 190-320	Max 120
				ø 50-160 ø 120-240 ø 190-320	

GENERAL

	SGP 320	SSB 320
Workhead spindle speed	0-1100 rpm	0-1100 rpm
Work height (from floor to work piece centre)	1100 mm	1100 mm
Machine height	2198 mm	2280 mm
Machine weight including electrical cabinet	6500 kg	7500 kg
Footprint	2728 mm x 2190 mm	2920 mm x 2190 mm
Safety standards	Machines 2006/42/ECC EMC 2004/108/EEC Low voltage 2006/95/EEC	Machines 2006/42/ECC EMC 2004/108/EEC Low voltage 2006/95/EEC
Material in base	Cast iron, GJL-250	Cast iron, GJL-250
Noise level	75 db (A)	75 db (A)

LENGTH SLIDE

Slide type	LIDKÖPING System 200 hydrostatic linear slide	LIDKÖPING System 200 hydrostatic linear slide
Type of feeding	Ballscrew or Linear Motor	Ballscrew or Linear Motor
Type of position feedback	Linear encoder	Linear encoder
Position feedback resolution	0,0001 µm	0,0001 µm
Repeatability accuracy	0,05 µm	0,05 µm

CROSS SLIDE

Slide type	Dovetail	LIDKÖPING System 300 hydrostatic linear slide
Type of feeding	Manual	Ballscrew or Linear Motor
Type of position feedback	-	Linear encoder
Position feedback resolution	-	0,0001 µm
Repeatability accuracy	-	0,05 µm

WORKHEAD SPINDLE	SGP 320	SSB 320
Type/Make	Lidköping / GMN	Lidköping / GMN
Speed	1-1100 rpm	1-1100 rpm
Max torque	100 Nm	100 Nm
Drive motor type	High frequency spindle	High frequency spindle
Rpm supervision type	Built in Encoder	Built in Encoder
Axial run-out	Less than 1 µm	Less than 1 µm
Axial movement driving plate	8 mm	8 mm
Swivel angle	+30° - -0,5°	+0,5° - -30°

GRINDING SPINDLE	Lidköping / GMN	Lidköping / GMN
Type/Make	Lidköping / GMN	Lidköping / GMN
Speed	1500-2420 rpm	Range dependent
Power	30 kW S1	Range dependent
Drive motor type	High frequency spindle	High frequency spindle
Balancing unit type	Automatic - mechanical	Automatic - mechanical

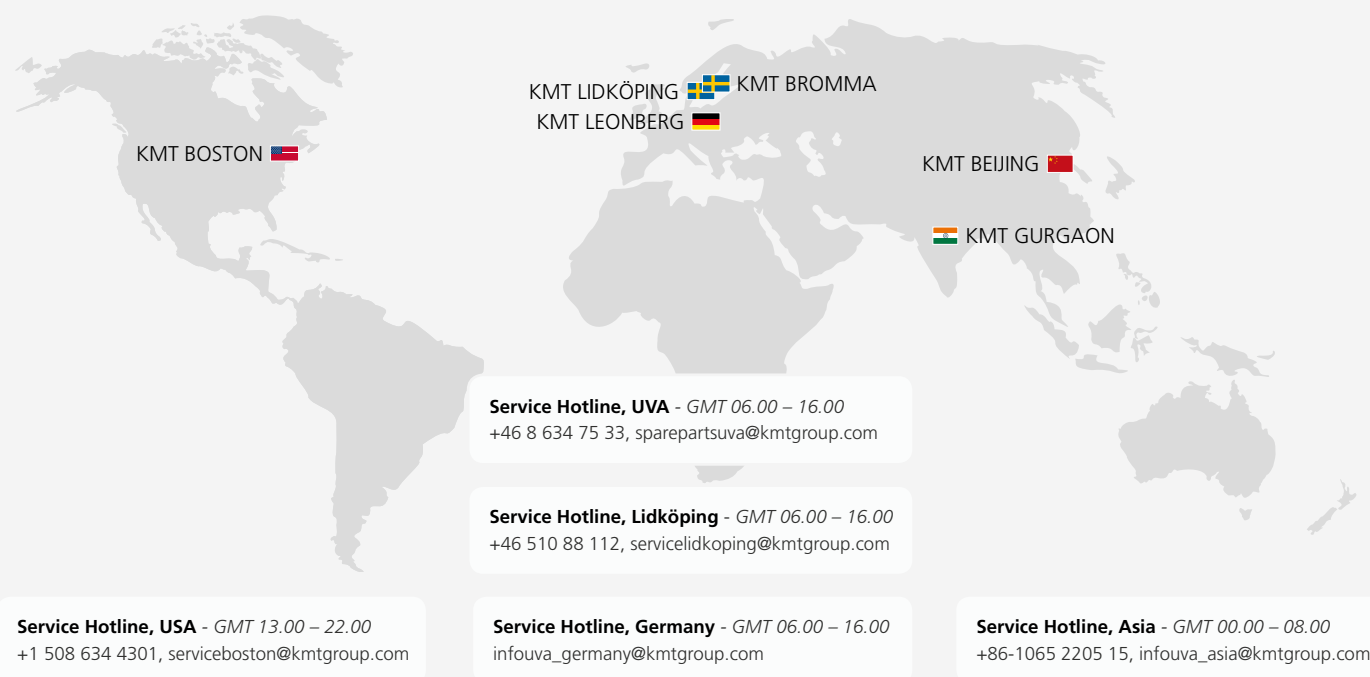
GRINDING WHEEL	Ø 610 mm	Ø 180 mm
Grinding wheel Max diameter	Ø 610 mm	Ø 180 mm
Worn out diameter	70% of new wheel	70% of new wheel
Max width	120 mm	120 mm
Max surface speed	60 m/s	60 m/s

CHUCKING AND LOADING	Shoe centerless / centric	Shoe centerless / centric
Chuck type	Shoe centerless / centric	Shoe centerless / centric
Loading type	2-arm loading system S ø 60-150 mm M ø 120-240 mm L ø 190-320 mm V-loader, max ø 320 mm	2-arm loading system S ø 60-150 mm M ø 120-240 mm L ø 190-320 mm V-loader, max ø 320 mm
Clamping type	Magnetic / Mechanical centric clamp	Magnetic / Mechanical centric clamp

GAUGING	In-process	In-process
Type (in/post-process)	In-process	In-process
Type of retraction	Pneumatic	Pneumatic

Please note that all data stated are correct at time of printing but are subject to change.

KMT Precision Grinding



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