Universal Cylindrical Grinder: Extreme Speed, Accuracy & Cost-effectiveness

United Grinding Technologies (UGT) announces the new Studer S41 CNC universal cylindrical grinder, featuring outstanding technology and cost-effectiveness. The machine grinds with superior precision and at extreme metal removal rates. In addition, the longitudinal and cross slide, as well as the swivel axis for the wheel head, feature electric direct drives, which move to the working position very swiftly and precisely.

Higher precision, better surface quality, higher metal removal rates – these are the constantly increasing requirements made by the market. In addressing these requirements, UGT has again set the standard with its new S41 CNC universal cylindrical grinder. The developers based the new grinder on a predecessor machine proven worldwide over many years, while adding a number of outstanding design features. It works more quickly and precisely, offers a broader range of applications, with production options that are highly attractive with regard to cost-effectiveness. By saving on auxiliary times, the S41considerably shortens the cycle times of the grinding process.

Extremely rigid machine bed and maintenance-free guide system
The Granitan® S103 machine bed provides a very solid, rigid and thermally stable S41. The formula of this mineral casting is designed for optimal grinding operation conditions. Thus, the machine bed literally provides the integrated guide system with a stable basis for absorbing the high forces that occur during grinding with high metal removal rates.

Thanks to its remarkable thermal behavior, the machine bed largely equalizes brief variations in temperature – so that the machine operates with consistently high precision even with changing ambient temperatures. Its high rigidity and excellent damping provide the basic prerequisites for outstanding surface quality of ground parts and long grinding wheel lifetimes. The guide ways of both the longitudinal slide and the cross slide are molded directly into the machine bed. To ensure that the high forces that occur during grinding with high metal removal rates are

optimally absorbed into the machine bed, the guide ways have a larger spacing.

The new StuderGuide® guide way system ensures high precision of the longitudinal and cross slides when both stationary and during movement. The StuderGuide® system uses the advantages of hydrostatic and hydrodynamic guide systems and avoids the slip-stick effect or floating of the slide. Also contributing to the machine's high precision is the fact that the solid gray cast iron longitudinal and cross slides rest completely on the guide ways over the entire travel. With this maintenance-free guide system, UGT guarantees a straightness of 0.0001” over a measured length of 37.4”.

Electric direct drives increase speed and precision
The longitudinal slide (Z-axis) has a ground work table which carries the work head and tailstock as well as additional accessories and devices. A ground T-slot over the entire length of the guide way enables optimal positioning of dressing tools. The cross slide (X-axis) supports the wheel head. Longitudinal and cross slides are moved by linear direct drives and, with up to 66 ft per minute, achieve four times higher travel speeds and axis system resolutions of ten nanometers. This enables high-precision and highly efficient grinding, as well as making a huge contribution to reducing auxiliary times.

The swivel movement of the turret wheel head (B-axis) is also by a direct drive. It swivels the turret wheel head around three times faster and positions the new grinding wheels in a much shorter time with a positioning resolution of 0.00005 deg. The positioning is therefore twice as precise as with the predecessor machine. The elimination of the Hirth gear, which fixed the wheel head in position on the predecessor machine, also contributes to faster positioning. When swiveling in a new grinding wheel it is no longer necessary to lift the turret wheel head out of the Hirth gear and then to engage it again by lowering it. The time required for fine adjustment after engaging in the Hirth gear is also saved. This new concept makes a considerable contribution to saving on auxiliary times — particularly when the work piece grinding process requires frequent swiveling-in of different wheels.

Machine variants expand market potential for users
In addition to the considerable increases in working speed and precision, the S41 also has a number of advantageous characteristics which enable the user to cover an extended work piece range, and thus a broader market range.

For instance, the height of centers on the standard version has been increased to 8.9”. The machine is also optionally available with a height of centers of 10.8”; this is not achieved by means of distance plates, but by making the work heads higher. The maximum distance between centers is 39.4” on the standard machine, but a machine variant with a distance between centers of 63” is also available. Thanks to the greater heights of centers and distances between centers, work pieces with weights of up to 551 lb. can now also be machined. The machine is equipped with a hydraulically clamped tailstock for the heavier work pieces.

Up to four external grinding wheels or three internal grinding spindles enable over 30 grinding head combination. The grinding wheels are no longer driven by belt

drives, but by motor spindles. The machine can also be equipped with motor spindles for high speed grinding (HSG). Internal grinding spindles with speeds from 6000 to 120,000 rpm can be used. Automatic balancing systems and frequency converters for each external grinding spindle allow the grinding process to be specifically matched to the respective conditions of use. Wheel head variants are also available with a vertical spindle for grinding keyways or with a traverse grinding axis for traverse grinding of internal tapers.

Simple operation and integration into complete manufacturing processes>
Fatigue-free working and straightforward machine operation are important components for consistently high quality. For this reason, optimized ergonomics were one of the developers' priorities. For instance, hoses and cables have largely disappeared from the work area of the machine. Grinding wheel change is performed with a single Allen wrench, and a special small crane is integrated into the machine, so that heavier grinding wheels do not have to be lifted manually.

The Fanuc 31i-A machine control with integrated PC operates with the StuderGRIND software specially developed for the grinding processes, and the StuderWIN operator interface. A 15” touch screen and ergonomically arranged controls are available to the grinder for communication with the control system and for programming. An additional manual control unit facilitates setup of the grinding processes. The convenient electronic cut-in detection facilitates operation and contributes to increasing precision and reducing auxiliary times. The software also contains tools for programming form and contour grinding processes, and enables offline programming of grinding processes as well as the determination of important basic cycle data to give the user a good basis to quote grinding tasks to his customers. A free-standing operating panel with adjustable height is also available.

UGT considers itself a partner for the customer in the design of technically and economically optimized grinding processes. The efficient grinding of work pieces requires process-optimized complete solutions. This includes an integrated quality control system based on continuous measurement, re-measurement, recording and correction. In addition, grinding of work pieces with modular peripheral equipment such as loading/unloading systems can be seamlessly integrated into the complete production process. The automation systems of the peripheral equipment communicate with the S41 by means of standard interfaces, so that even complex handling tasks can be carried out.

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