Double Disc Grinding Machine TwinStar

Double disc grinding – the new generation: Economical – flexible – easy to use
Based on their 60 years experience with precision surface machining, Thielenhaus has developed a new generation of double disc grinding machines for the 3rd millennium – the TwinStar.

With this new and universal machine concept Thielenhaus has thrown in its experience gained during the production of many double disc grinding machines. The new machine employs state of the art design techniques and materials like e.g. machine beds made of polymer concrete and innovative solutions for details like maintenance-free bearings and slides.

Based on two platforms with 600mm and 900mm grinding disc diameter, Thielenhaus offers horizontal and vertical machines for microfinishing a wide range of work pieces. Transportation of work pieces can be done either according to the plunge-cut method or the through-feed method or a combination of both.

This new concept offers the customer a multitude of flexible applications.

Competence through experience:

TwinStar gives double disc grinding even more flexibility
Advantages of the new generation:

- flexible adaptation to all production and automation requirements
- wide range of work pieces
- individual solutions
- high productivity due to short cycle times and change-over times as well as a reduction of tool change times by up to 70%
- high process reliability and maintainability
- almost no need for maintenance
- use of state of the art design techniques and materials
- wide machining range from roughing to fine finishing
- ergonomic and easy accessible, completely encased working area
- flexible range of application from manual stand-alone solutions to integration into highly automated production lines
- easy adaptation to already existing production systems by small machine footprint
- easy inter-linking with automatic workpiece feeding devices to form entire finishing lines
- fast integration in automatic logistic systems
The directly driven grinding spindles form a functional unit together with the NC feeding system. Well dimensioned, water-cooled, optionally adjustable, and rpm-optimised main drives ensure high performances. The bearings of the spindles are hermetically sealed and absolutely maintenance-free. The spindle slide rest is guided along pre-loaded linear anti-friction slideways. A high feed rigidity is achieved by the additionally well proportioned pre-loaded ball screws. Tilting of the spindle is effected by a simple adjustment unit, which also insures the highest quality.

**Innovative design**

**Machine base**

The inclined-bed machine base with an optimised structure according to FEM (finite element method) consists of polymer concrete ensuring high rigidity, thermostability, and absorption. The machine bed is the base for all major assemblies and features standardised interfaces for various work piece loading systems. Cooling lubricant drains and suction ports are situated in the base making use of the process-bound flow of the cooling lubricant, and producing an additional maximum negative pressure in the encased work area. This innovative technology insures the optimum in quality.

**Headstock**

The directly driven grinding spindles form a functional unit together with the NC feeding system. Well dimensioned, water-cooled, optionally adjustable, and rpm-optimised main drives ensure high performances.
Grinding discs and grinding disc change

High-quality grinding discs from renowned manufacturers are being used. Tool life depends on material, pre-machining of work pieces, removal thickness, and required surface quality. Both ceramic and resinoid bonds as well as abrasives made of CBN and diamonds are used, depending on the application.

Work piece reception is a steep taper with bayonet fixing. A simple loosening of screws and easy accessibility of the work area allow for a grinding disc change within a very short time. With horizontally arranged spindles the change takes place from the top, with vertical machines from the side via a tool change support. A pivoted tool change gantry can be used optionally.

Dresser

The dresser, optimised by finite elements, features high rigidity and precision. For a tool or diamond change the NC-driven dresser can be swivelled out of the work area. The dressing tools are pre-adjusted by a gauge. The cooling lubricants allow for a further optimising of the dressing cycle and reduce diamond abrasion at the same time. Automatic machining guarantees high process reliability as both dressing dimension and tool abrasion are being compensated for. Dressing intervals can be programmed according to cycle time or number of work pieces. Optionally, the whole process can be optimised by the use of impact sound reception.
Loading units and grinding methods

The interface on the universal machine bed allows the application of various loading systems for the different grinding methods being used, depending on the work piece:

- NC-controlled transport disc for continuous or discontinuous part transportation according to the plunge-cut, through-feed, or plunge-cut through-feed method.
- Slide or rocker arm for floating or clamped reception of work pieces according to the plunge-cut or plunge-cut through-feed method.
- Linear part transportation with a continuous drive of work pieces through the fixed grinding gap of the tilted grinding tools for machining according to the through-feed method.

Application examples

With the plunge-cut through-feed method the tools are being driven continuously from a rear starting position until the work piece reaches the final dimension. Thus high-quantity removal of material together with highest precision is rendered possible – e.g. for finishing con rods. After unloading of the work piece the grinding discs return to the rear position. With open work piece reception and tangential part feed the guide way of the work pieces within the grinding station is being safeguarded by coolant bracing at the disc circumference.

With the through-feed method the work pieces run through the grinding gap of the tilted grinding tools with a continuous drive. These tools are set in such a way as to achieve a certain removal per cycle.

One special feature of the double disc grinding machine is its use with grinding brake discs and similar work pieces. With this application we use a machine bed with integrated headstock and driven tailstock for holding the brake disks. The brake discs can be machined by a dry or wet grinding process using abrasive segments.
Control and electric

A Siemens CNC control, type 840 D, with digital drive and safety-integrated-function is used for machine control eliminating the need of mechanical limit switches at the axles, which are prone to malfunction. The use of a path measuring system with absolute value indication renders a time consuming reference point run after switching on the machine or after power failure unnecessary. A TFT-colour display with expanded keyboard is used as operator interface. Visualisation allows for a very high flexibility in order to realise individual machining concepts. During the process all important data such as removal rate and power consumption of the drives can be displayed. The machining programme is being determined by optimising the abrasive process during a trial run. The determined parameters can be stored for each work piece with a memory capacity of up to 100 finishing types. Thus they can be reproduced on demand. All data can be transferred to a PC for further processing. The graphic display system, with tolerance check and fault detection system in German or English, supervises all important machine functions. It prevents unintentional operating errors and informs the operator about servicing intervals.

Optional equipment

Adjustable drives
In order to manually adjust spindle speeds – e.g. for different chipping volumes on l.h. and r.h. side – adjustable spindle drives can be used.

Impact sound reception
Impact sound reception can be integrated into the spindles for first cut recognition. These receptions reduce grinding disc wear and minimise diamond abrasion by exact and controlled dressing of both grinding discs, i.e. a controlled feed between tool and work piece.

Dimensional control
A post process gauge can be installed at the work piece outlet to check the thickness of each work piece. Should corrections become necessary, the respective dimension will be transferred automatically to the control unit where it will be compensated for. A master work piece is used for the gauging of the dimensional control.

Cooling lubricant supply
A central cooling lubricant unit can be connected to the double disc grinding machines. Optionally, the machines can also use an integral cooling lubricant system with filters. A flow meter, situated at the cooling lubricant intake, prevents machining process without cooling lubricant flow.
Thielenhaus, founded in 1909, is a specialist in the manufacturing of economical specialised precision grinding machines. With facilities in Germany, the United States and China, and a worldwide agency and service network Thielenhaus meets the demands of its customers in more than 40 countries. The technical service department offers a wide range of services world wide, e.g. technological counselling on experimental and commission machining, training, 24-hour-hotline, inspection, overhauling and repair, online-direct-service.

### Technical data TwinStar

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<tr>
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<th>V3</th>
<th>V5</th>
<th>V600</th>
<th>H600</th>
<th>H900</th>
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<tr>
<td>Grinding disc diameter</td>
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<td>Peripheral speed</td>
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Zertifiziert nach:
- QS 9000 TE
- VDA 6.4
- ISO 9001