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fives
Industry can do it


fives

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Ultimate turning & grinding solutions for bearing industry

Cylindrical, centerless, internal, surface grinding
& vertical turning technologies
Bryant, Cincinnati, Daisho, Gardner, Giddings & Lewis, Giustina & Landis



HIGH PRECISION
MACHINES



Aerospace



Air-conditioning



Automotive



Bearings



Defense



Energy



Heavy Equipment



Marine



Railroad



Transmission



Truck

ULTIMATE GRINDING, TURNING & MILLING SOLUTIONS FOR PRECISION BEARING MANUFACTURERS

HIGH PRECISION MACHINES FOR ADVANCED MANUFACTURING

Through its High Precision Machines Division, Fives has positioned itself as the solution provider in the fields of grinding, turning and milling, cutting tools and abrasive wheels, and additive manufacturing.

Its activities as a designer, equipment manufacturer and integrator are supplemented by an extended range of services, to support customers throughout the life cycle of their installations, from commissioning to refurbishment.

As a real player in Industry 4.0, Fives provides a service offer based on data processing and AI, combining the use of production data and control of industrial processes, thus enabling field teams to improve the availability, responsiveness and flexibility of the machine.

Fives has an extensive knowledge base for optimizing and providing overall grinding, turning & milling processes through their diverse product ranges to satisfy manufacturing needs in the bearing industry.

From system design to installation and throughout the product's lifecycle, Fives proposes the best solution to the customer and executes projects as a true partner. It is a value-added resource, with a global presence, an unrivalled expertise, and decades of experience of understanding and adapting to customers' needs.

1

LARGE BEARINGS

ID/OD, raceway, surface grinding and turning & milling

2

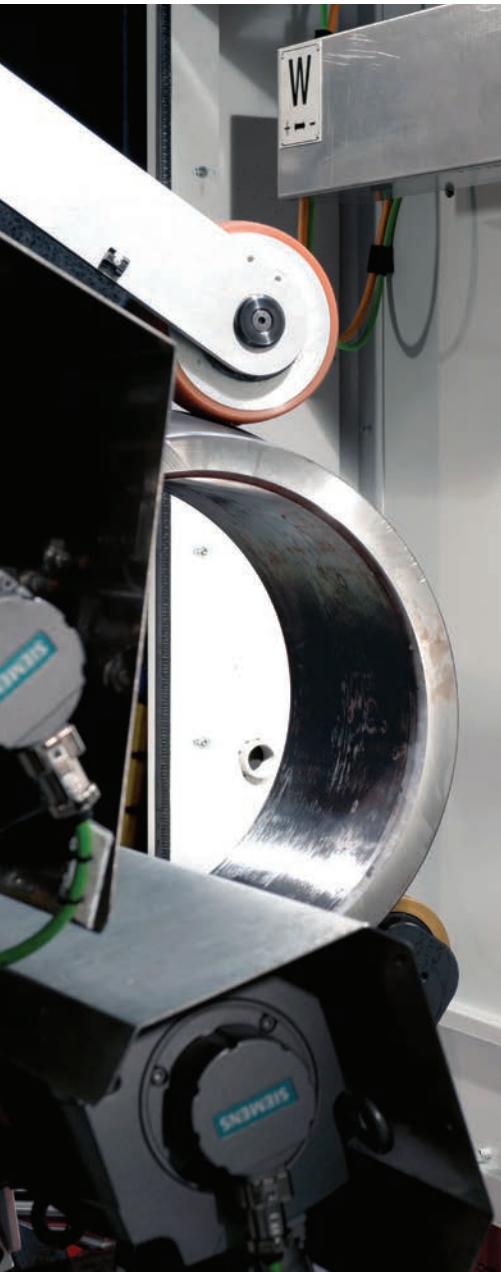
HIGH VOLUME PRODUCTION

Surface, ID, OD, and raceway grinding

3

FLEXIBLE LINES

Surface, ID, OD, and raceway grinding





LARGE BEARINGS

With an extensive knowledge base for optimizing and providing overall grinding processes, Fives product range satisfies all areas of manufacturing needs for large bearings; including ID/OD, raceway, face grinding and turning & milling.

XL-VERTICAL SINGLE DISC GRINDING RANGE

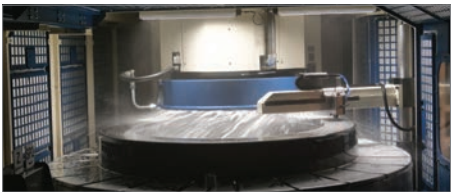
Gardner, Giustina or Daisho machines will be proposed according to standards in specific geographical areas

VERTICAL
SURFACE
GRINDING

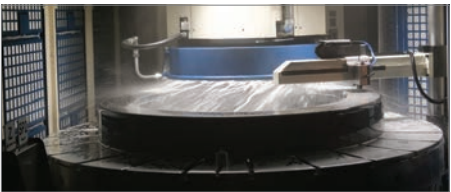
Vertical single disc grinding machines are designed preparing only one grinding spindle vertically. When high accuracy (flatness, rectangularity and squareness) is required, this range of machines is effective.

The XL-VSD 1000-4000 models are vertical single disc grinders with a magnetic rotary table and specially developed for the processing of big workpieces like large bearings, plates, hydraulics motor flanges, transmission crown gears and pump covers. The machine's multiple workpiece clamping feature helps to reduce cycle time and enhance productivity.

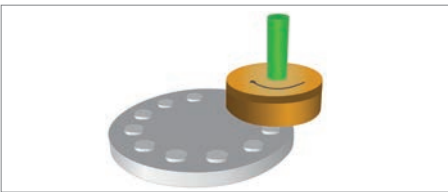
- Variation of table magnetism during process
- Table rotation on anti-friction oil-bath paths (turcite) or hydrostatic bearings
- Segmented grinding wheel
- In-process measuring system
- Robot or gantry loading systems
- Magnetic rotary table in several sizes



Grinding zone



In-process gauge



Rotary table

Model		XL-VSD1000	XL-VSD1600	XL-VSD2000	XL-VSD2500	XL-VSD4000
Machining capacity						
Max. workpiece diameter	mm	1,000	1,600	2,000	2,500	4,000
Max. workpiece thickness	mm	500	710	710	710	710
Wheelhead						
Wheel Ø	mm	762	762	915	1,220	1,220
Max. power	kW	59	59	59	86	109
Machine						
Width	mm	1,700	2,000	2,400	2,900	4,900
Depth	mm	5,000	5,900	6,300	7,500	9,000
Height	mm	4,500	4,900	4,900	6,200	6,300
Weight	kg	25,700	26,500	40,000	76,500	110,000

GIDDINGS & LEWIS VTC

Multi-functional large capacity machining

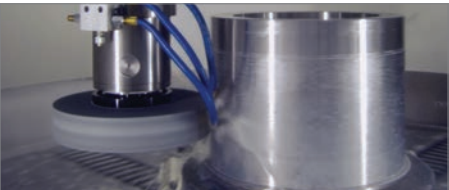
TURNING & MILLING

Whether it's standard turning, hard turning, grinding, live spindle machining, four-axis operations or cutting on multiple sides of the part, there is a Giddings & Lewis vertical turning center configuration to meet the demand.

- Ability to configure the machine to the application with VTC modular design
- VTC Series uses cost effective modular tooling system
- High capacity table bearings support heavy loads
- Rigidity of hydrostatic ram handles heavy cuts with greater accuracy
- Optimize cutting with full X-axis travel left and right of center
- Large part capacity and productive machining capabilities
- High performance control with open architecture



Giddings & Lewis VTC 1600



VTC Grinding



Large part capacity



Capto tooling

Model	Giddings & Lewis VTC 1250	Giddings & Lewis VTC 2500	Giddings & Lewis VTC 3500
Capacities			
Table size	1,250mm	2,500 mm	3,500 mm
Max. swing & facing capacity	1,300 mm	2,700 mm	3,700 mm
Min./max. standard height table top to ram bottom	1,035 mm	1,000 / 1,500 mm	
Power requirements	480 V, 3 ph, 60 hz (50 hz)		
Ram head			
Size	250 mm x 250 mm		
Z-Axis vertical travel	750 mm / 1,250 mm	1,250 mm / 1,750m	
Accuracies (ISO 230-2-97)			
Bidirectional accuracy A	0.015 mm		
Bidirectional repeatability R	0.010 mm		
Reversal	0.006 mm		
Dimensions			
Dimensions (W x D x H)	4.4 x 4.2 x 5 m	7 x 5.5 x 5.7 m	12 x 5.7 x 6.45 m
Machine weight	25,000 kg	57,000 kg	84,000 kg

HIGH VOLUME

High volume precision grinding machines available for surface, ID, OD, and raceway grinding for multiple different applications that can be customized to fit your production needs.

VERTICAL DOUBLE DISC GRINDING RANGE

Gardner, Giustina or Daisho machines will be proposed according to standards in specific geographical areas

VERTICAL
SURFACE
GRINDING

A vertical double disc grinder for flat and parallel surface grinding of inner/outer bearing rings. It is available in 6 versions depending on the parts dimensions and productivity.

FEATURES

- High resistance cast iron machine bed
- CBN or conventional grinding wheels
- Servo-controlled wheelhead and dresser positioning
- Closed loop of forces to guarantee thermal stability and mechanical stiffness
- Wheel balancing system
- Robust single cast dressing arms for an optimal grinding performance
- Wheels are dressed simultaneously, to ensure an optimal dressing time

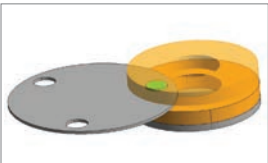
OPTIONS

- Optical scales on vertical infeed movements for better positioning accuracy
- Acoustic emission to detect when the dresser diamond touches the grinding wheel
- Lower wheel positioning device to ensure optimal grinding position

FIXTURES



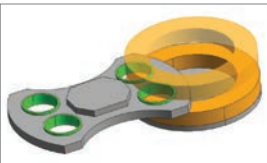
Rotary through-feed



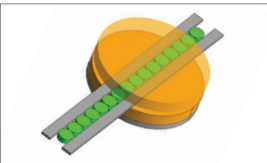
Index carrier



Oscillating infeed carrier



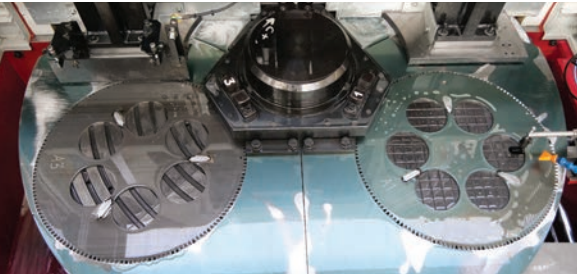
Workpiece rotating index



Through-feed



VDD585



Vertical models			Giustina VDD305	Giustina VDD355	Giustina VDD455	Giustina VDD510	Giustina VDD585	Giustina VDD760
Wheelhead								
Wheel Ø	mm		305	355	455	510	585	760
Max. power grinding wheel	kW		7.5	11	15	15	37	45
Grinder workpiece capacity								
Max. OD	Infeed	mm	80	120	180	180	300	400
	Through-feed	mm	25	40	50	60	120	240
Max. thickness		mm	20	25	40	40	65	100
Min. thickness	Infeed	mm	2	2.5	2.5	2.5	2.5	2.5
	Through-feed	mm	0.8	0.8	0.8	1	1	1
Machine								
Width	mm		1,550	1,550	1,550	1,550	1,900	2,700
Depth	mm		1,625	1,625	1,625	1,625	2,700	2,700
Height	mm		2,200	2,200	2,200	2,200	2,800	3,200
Weight	kg		5,500	5,500	5,500	5,500	12,000	15,000

HORIZONTAL DOUBLE DISC GRINDING RANGE

Gardner, Giustina or Daisho machines will be proposed according to standards in specific geographical areas

HORIZONTAL
SURFACE
GRINDING

Horizontal double disc grinding is designed by preparing two grinding spindles facing each other horizontally. Enough rigidity and simple structure are adopted for precise and heavy duty grinding processes.

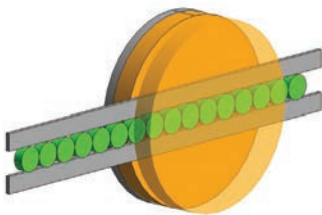
Fives offers a large range of CNC machines built for high production and quality standards, to process flat and parallel surfaces in various working modes.

Fives' horizontal double disc grinding technology is second to none, and machines range in size from 610 mm wheel diameter up to 1,067 mm wheel diameter with spindle power as high as 75 kW.

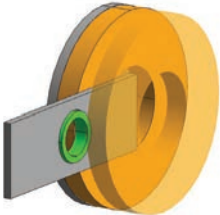
- Wheelheads fixed on machine bed for a maximal rigidity
- In-process gauging for fully auto solution
- Zero changeover for fully auto solution
- Automatic loading / unloading by gantry or robot



HDD1067



Linear through-feed



Reciprocating feeder carriage



Sample parts

Horizontal models			Giustina HDD355	Giustina HDD380	Giustina HDD610	Giustina HDD760	Giustina HDD800	Giustina HDD915	Giustina HDD1067
Wheelhead									
Wheel Ø	mm		355	380	610	760	800	915	1,067
Max. power grinding wheel	kW		7.5	11	22	75	75	75	75
Grinder workpiece capacity									
Max. OD	Infeed	mm	50	70	300	450	700	800	1,000
	Through-feed	mm	35	50	NA	200	NA	320	NA
Max. thickness	Infeed (Std)	mm	50	75	90	200	200	200	200
	Infeed (special bed)	mm	NA	NA	NA	Δ between min. & max.: 230	Δ between min. & max.: 230	Δ between min. & max.: 230	Δ between min. & max.: 230
	Through-feed	mm	25	25	NA	85	NA	130	NA
Min. thickness	Infeed	mm	15	15	2	12	12	15	20
	Through-feed	mm	1.5	1.5	NA	2	NA	2.5	NA
Machine									
Width	mm		2,280	2,280	3,700	4,800	4,800	4,800	4,800
Depth	mm		1,540	1,540	3,100	4,700	4,200	6,000	6,500
Height	mm		1,940	1,940	2,200	2,500	2,600	2,900	2,900
Weight	kg		4,500	4,500	7,000	14,500	15,000	17,000	17,500

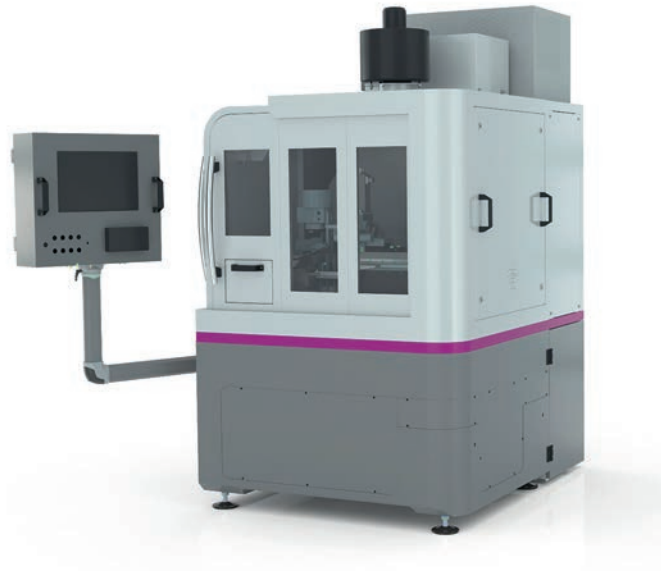
BRYANT RU1

Ideal for small precision part processing

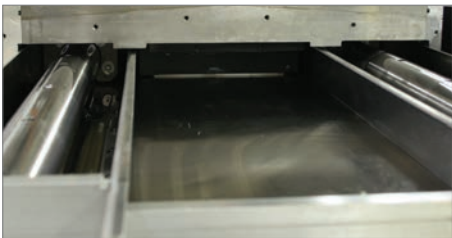
The very compact Bryant RU1 with its stacked slide arrangement offers high precision grinding on a very small footprint.

The Bryant RU1 is a single spindle machine that offers large machine capability on a small footprint and is ideal for standard or custom bearing ring applications.

- Hydra-Truc™ round bar hydrostatic way system
- Fanuc i series control
- High acceleration linear motors
- Thermally stable base and adaptive thermal compensation



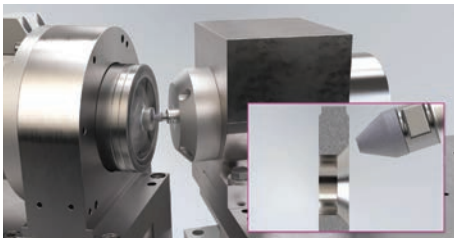
Bryant RU1



Round bar hydrostatic



Typical application



30° angle workhead, ID setup

Model	Bryant RU1
Grinding capacity	
Max. swing diameter	127 mm
Max. workpiece length	63 mm
Max. internal grinding diameter	38 mm
Max. internal grinding depth	31 mm
Spindles & workhead	
Max. number of spindles	1
Max. ID spindle speed	120,000 rpm
Max. workhead speed	3,000 rpm
Axes & control	
Axis travel X	101 mm
Axis travel Z	101 mm
Axis speed (X & Z)	24,000 mm/min
Axis arrangement	Stacked
Control	Fanuc i series
Dimensions	
Dimensions (W x D x H)	1,220 x 760 x 1,660 mm
Machine weight	3,940 kg

BRYANT RU2

Multi-surface grinder for process operations

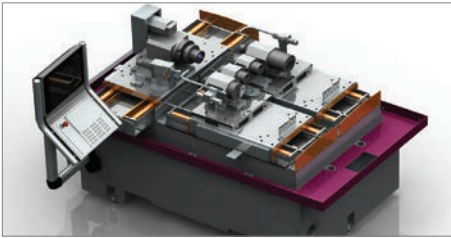
The Bryant RU2 has multi-slide possibilities in both the X and Z axis, multiple work heads, wheel heads, and dressing systems.

As a modular multi-surface grinder, the Bryant RU2 is capable of processing the most complex workpieces for bearing applications. This grinder is an ideal platform for most common (and uncommon) process operations such as raceway, bore, shoulder, taper, cylindrical and face.

- Hydra-Truc™ round bar hydrostatic way system
- Fanuc i Series control
- High acceleration linear motors
- Thermally stable base and adaptive thermal compensation



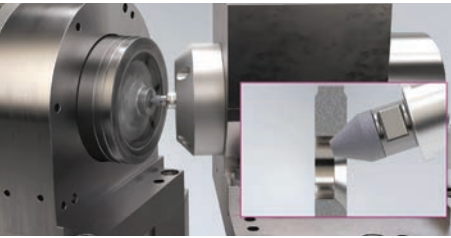
Bryant RU2



Multi-spindle and dual slide (Z) arrangement



Typical applications



Dual slides in Z for fuel management components

Model	Bryant RU2
Grinding capacity	
Max. swing diameter	250 mm ⁽¹⁾
Max. workpiece length	177 mm
Max. internal grinding diameter	228 mm
Max. internal grinding depth	88 mm
Spindles & workhead	
Max. number of spindles	4
Max. ID spindle speed	120,000 rpm
Max. workhead speed	3,000 rpm
Axes & control	
Axis travel X	508 mm
Axis travel Z	2 x 254 mm ⁽²⁾
Axis speed (X & Z)	24,000 mm/min
Axis arrangement	Independent
Control	Fanuc i series
Dimensions	
Dimensions (W x D x H)	2,440 x 1,520 x 2,110 mm
Machine weight	6,300 kg

⁽¹⁾ The biggest possible part diameter can vary, depending on application and part geometry

⁽²⁾ Dual slide arrangement

CINCINNATI CENTERLESS GRINDING RANGE

Superior machine accuracy, reliability & ease of use

CENTERLESS
GRINDING

Fives centerless grinders, with its Cincinnati and Giustina technologies, are field proven, backed by a long history of engineering experience in designing and manufacturing production grinders and special grinding machines for a multitude of industries worldwide.

Fives has been a pioneer in the field of centerless grinding. Whether using aluminum oxide, harder synthetics or super abrasives such as CBN and diamond wheels, Cincinnati centerless grinders are ready to optimize grinding on conventional ferrous metals or exotic ceramic components.

Fives offers both conventional slide design as well as fixed-blade machines to accommodate a variety of different applications and requested material handling systems.

- Best in class 3,000,000+ lb/in. of static stiffness machine base
- Conventional (45 m/s) or superabrasive (80 m/s) capability
- Siemens, Fanuc and Allen-Bradley controls offering
- Variable frequency drive grinding wheel

Model	Cincinnati Viking	Cincinnati RK
	250	350-20
Type	Twin grip	Twin grip
Working capacity		
Min. / Max. outer diameter	1.2 - 80 mm	12.7 - 152 mm
Grinding wheel		
Sizes / width	250 mm	508 mm
Max. / Min. OD	450 / 300 mm	610 / 431 mm
Motor power	15 / 30 kW*	37 / 55 kW*
Peripheral speed	45 (60) m/sec	45 (60) m/sec
Regulating wheel		
Sizes / width	250 mm	508 mm
Max. / Min. OD	355 / 255 mm	355 / 279 mm
Motor power	3.3 kW	3.3 kW
Operating speed	10 - 600 rpm	10 - 300 rpm
Infeeds		
Max. plunge infeed	1,500 mm/min	1,500 mm/min
Min. plunge infeed	0.1 mm/min	0.1 mm/min
Dimensions		
Dimensions (W x D x H)	3,100 x 2,700 x 2,300 mm	3,300 x 2,800 x 2,700 mm
Machine weight	9,072 kg	11,794 kg

*upgraded grinding wheel motor availalbe upon request

BRYANT UL2

Designed for high speed & high precision internal grinding

ID
GRINDING

Bryant ULTRALINE is engineered for high volume productivity and exceptional accuracy. Ultimate rigidity and thermal stability are two of the key characteristics of these grinding machines.

Typical applications include bores, faces and contours of precision bearing components.

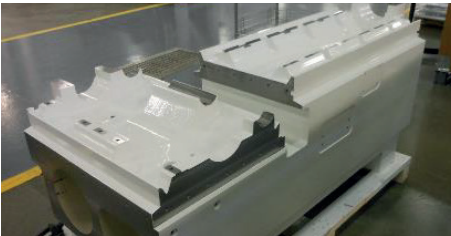
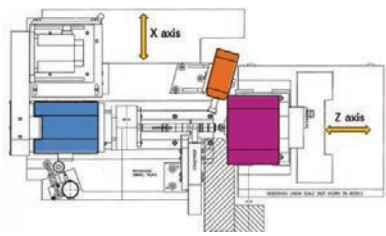
- Round bar hydrostatic slides
- “Flow-Thru” concept for ultimate thermal stability
- Pre-programmed custom grinding cycles
- Automation for high-volume production
- Various gauging options



Bryant UL2

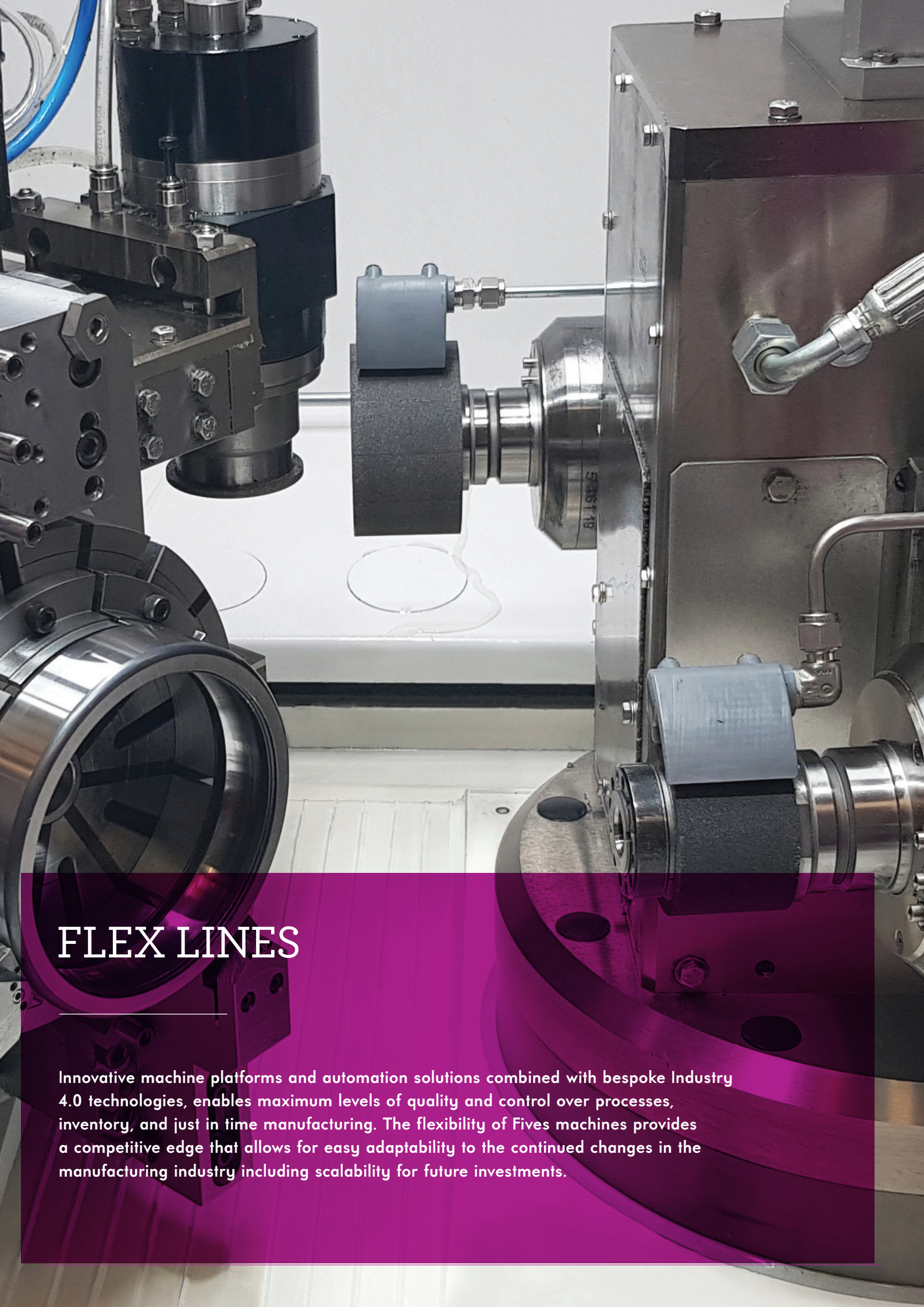


Independent X and Z slides



Machine bed

Model	Bryant UL2
Workpiece material	
Max. workpiece diameter	177 mm
Max. internal grinding diameter	100 (140) mm
Max. internal grinding depth	75 mm
Spindles & workhead	
ID spindle speed	up to 120,000 rpm
Max. workhead speed	4,000 rpm
Axes & control	
Axis travel X	50 mm
Axis speed X	13,000 m/min
Axis travel Z	254 mm
Axis speed Z	46,000 m/min
Control	Fanuc i series
Dimensions	
Dimensions (W x D x H)	2,555 x 1,825 x 2,546 mm
Machine weight	4,750 kg



FLEX LINES

Innovative machine platforms and automation solutions combined with bespoke Industry 4.0 technologies, enables maximum levels of quality and control over processes, inventory, and just in time manufacturing. The flexibility of Fives machines provides a competitive edge that allows for easy adaptability to the continued changes in the manufacturing industry including scalability for future investments.

HORIZONTAL DOUBLE DISC GRINDING RANGE

Gardner, Giustina or Daisho machines will be proposed according to standards in specific geographical areas

Horizontal double disc grinding is designed by preparing two grinding spindles facing each other horizontally. Thanks to the Zero Changeover Fixture, this machine can achieve a high degree of flexibility.

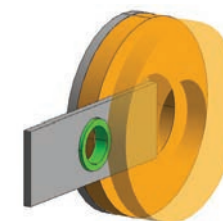
Fives offers a large range of CNC machines built for high production and quality standards, to process flat and parallel surfaces in various working modes.

The Zero Changeover Fixture allows a machine setup during the loading/unloading process without any lost production time. The possibility to customize it along with in-process gauging capability make this machine suitable for any production needs.

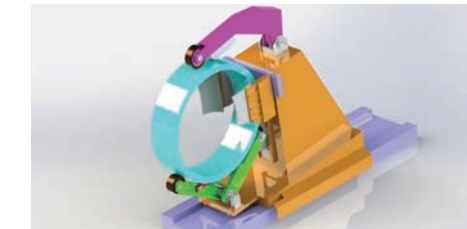
- Wheelheads fixed on machine bed for a maximal rigidity
- In-process gauging for fully auto solution
- Zero changeover for fully auto solution
- Automatic loading / unloading by gantry or robot



HDD760



Reciprocating feeder carriage



Zero changeover fixture



Sample parts

Horizontal models			HDD800	HDD915	HDD1067
Wheelhead					
Wheel Ø		mm	800	915	1,067
Max. power grinding wheel		kW	75	75	75
Grinder workpiece capacity					
Max. OD	Infeed	mm	700	800	1,000
Max. thickness	Infeed (Std)	mm	200	200	200
	Infeed (special bed)	mm	Δ between min. & max.: 230	Δ between min. & max.: 230	Δ between min. & max.: 230
Min. thickness	Infeed	mm	12	15	20
Machine					
Width		mm	4,800	4,800	4,800
Depth		mm	4,200	6,000	6,500
Height		mm	2,600	2,600	2,900
Weight		kg	15,000	17,000	17,500

LANDIS TTG 1000

Twin-turret, multi-spindle grinding

The Landis TTG 1000 twin-turret, multi-spindle solution is ideal for grinding internal and external forms and diameters to sub-micron tolerances in a single clamping.

- High flexibility in workpiece grinding operations
- Various spindle configurations available
- Hard turning and polishing capabilities
- Reduced work piece changeover time
- Constant wheel surface speed
- Superior surface finishes
- Easy automation integration
- High performance control with open architecture



Landis TTG 1000

ID/OD
GRINDING

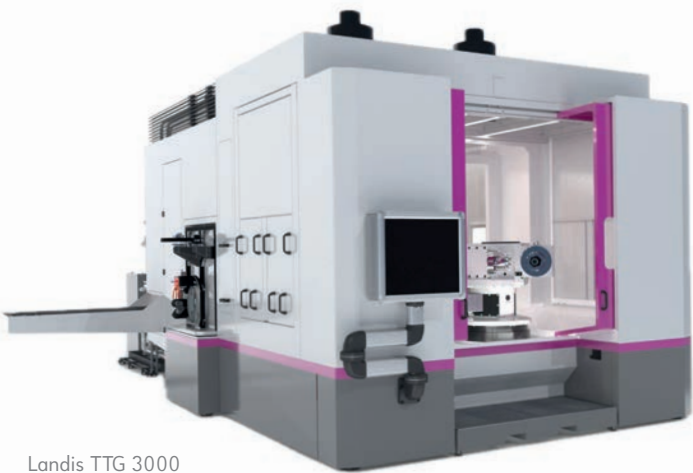
LANDIS TTG 3000

Twin-turret multi-spindle grinding

The Landis TTG 3000 machine is a three-part solution to issues faced in the modern manufacturing process—flexible processing, flexible machine, flexible layouts.

This machine allows for a highly flexible process in which multiple operations may be combined into one machining platform while maintaining or improving the accuracy and precision of a traditional single spindle machine.

The Landis TTG 3000 is a twin-turret, multi-spindle solution to grind ODs, IDs, faces, tapers, concentric and eccentric diameters to sub-micron tolerances in a single clamping.

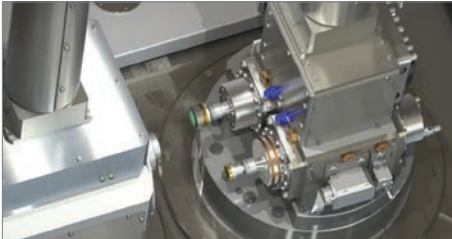


Landis TTG 3000

ID/OD
GRINDING

- High flexibility in workpiece grinding operations
 - Various spindle configurations available
 - Hard turning and polishing capabilities
 - Reduced work piece changeover time
- Constant wheel surface speed
 - Superior surface finishes
 - Easy automation integration
 - High performance control with open architecture

Model	Landis TTG 1000
Grinding capacity	
Max. grinding diameter (OD)	200 mm (7.9")
Max. external grinding length	80 mm (3.1")
Max. internal grinding length	80 mm (3.1")
Grinding spindle turret	
Swivel range	+/- 135°
Turret bearing	Hydrostatic
Turret motor torque	120 Nm
Max. number of spindles	3
Wheel type	Conventional / CBN / Diamond
Max. wheel Ø	200 mm (7.9")
Wheel surface speed	120 m/sec (394 ft/sec)
Max. ID spindle speed	110,000 rpm
Workhead turret	
Swivel range	+/- 135°
Turret bearing	Hydrostatic
Turret motor torque	120 Nm
Workhead speed	1 - 1,250 rpm (high speed option available)
Linear axis travel (infeed)	200 mm (7.9")200 mm (7.9")
Linear axis bearing	Hydrostatic
Linear axis drive	Linear Motor
Dimensions	
Machine dimensions (W X D x H)	1,800 x 1,950 x 2,400 mm (6' x 6.4' x 8')
Machine weight	3,000 kg (6,614 lb)



Grinding / polishing / hard turning & metrology



Bore, seat & face configuration

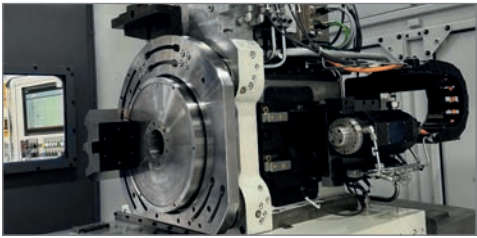


Sample parts

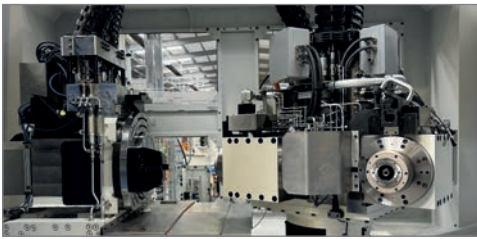
Model	Landis TTG 3000
Grinding capacity	
Max. grinding diameter (OD)	350 mm (13.8")
Max. external grinding length	100 mm (3.9")
Max. internal grinding length	100 mm (3.9")
Grinding spindle turret	
Swivel range	+/- 150°
Turret bearing	Hydrostatic
Turret motor torque	1050 Nm
Max. number of spindles	3
Wheel type	Conventional / CBN / Diamond
Max. wheel Ø	350 mm (9.8")
Wheel surface speed	120 m/sec (394 ft/sec)
Max. ID spindle speed	110,000 rpm
Workhead turret	
Swivel range	+/- 135°
Turret bearing	Hydrostatic
Turret motor torque	1050 Nm
Workhead speed	1 - 1,250 rpm (high speed option available)
Linear axis travel (infeed)	350 mm (13.8")
Linear axis bearing	Hydrostatic
Linear axis drive	Linear Motor
Dimensions	
Machine dimensions (W X D x H)	3,000 x 2,800 x 3,000 mm (9.8' x 9.2' x 9.8')
Machine weight	10,000 kg (22,026 lb)



Integral automation package



Headstock & face plate for tooling quick change



Bed, turrets, headstock and spindles

VERTICAL DOUBLE DISC GRINDING RANGE

Gardner, Giustina or Daisho machines will be proposed according to standards in specific geographical areas

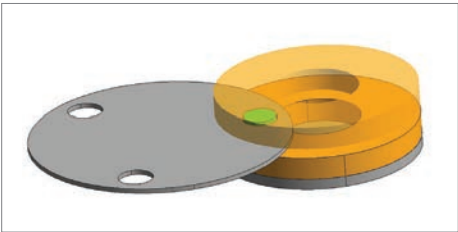
VERTICAL
SURFACE
GRINDING

Vertical double disc grinding is designed by preparing two grinding spindles facing each other vertically. When high precision grinding is required, Fives provides a large range of CNC machines built for high production and quality standards.

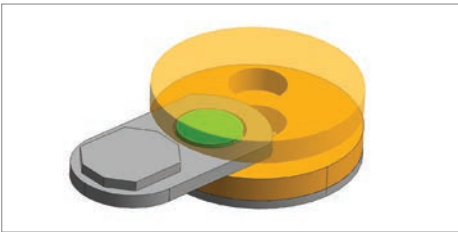
Fives’ vertical double disc grinding technology is second to none, and machines range in size from 305 mm wheel diameter up to 760 mm wheel diameter with spindle power as high as 45 kW.

Our solution is based on a special fixture design and integrated gauging process that allows changeover without any lost production time, which provides unrivaled flexibility.

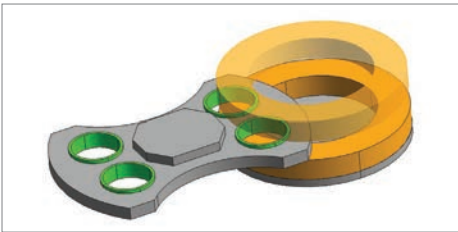
- High rigidity 3 block cast iron box type framing structure
- Main spindle and wheel mounting flange is forged as one piece
- Fine wheel in-feeding mechanism and control system
- Simple and adjustable titling mechanism of wheel titling



Index carrier



Oscillating infeed carrier



Workpiece rotating index

Vertical models			VDD305	VDD355	VDD455	VDD510	VDD585	VDD760
Wheelhead								
Wheel Ø	mm		305	355	455	510	585	760
Max. power grinding wheel	kW		7.5	11	15	15	37	45
Grinder workpiece capacity								
Max. OD	Infeed	mm	80	120	180	180	300	400
Max. thickness		mm	20	25	40	40	65	100
Min. thickness	Infeed	mm	2	2.5	2.5	2.5	2.5	2.5
Dimensions								
Width	mm		1,550	1,550	1,550	1,550	1,900	2,700
Depth	mm		1,625	1,625	1,625	1,625	2,700	2,700
Height	mm		2,200	2,200	2,200	2,200	2,800	3,200
Weight	kg		5,500	5,500	5,500	5,500	12,000	15,000

INDUSTRY 4.0

Within the Fives Group, the focus is on a global vision of industry that is meant to be a continuous source of inspiration for innovation. We combined the expertise of Fives specialists with the latest technologies in intelligent and self-learning systems to offer state-of-the-art technology.

Instrumentation

- Choice of sensor technologies
- Development of sensor/gateway interface

Maintenance methods

- Functional decomposition of machines

Maintenance expertise

- Machine knowledge

Software development

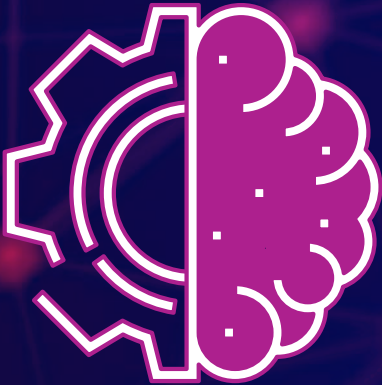
- Data acquisition
- Signal processing

Web development

- Dashboard
- Alert systems

Data science

- Optimization of instrumentation plans
- Predictive models development

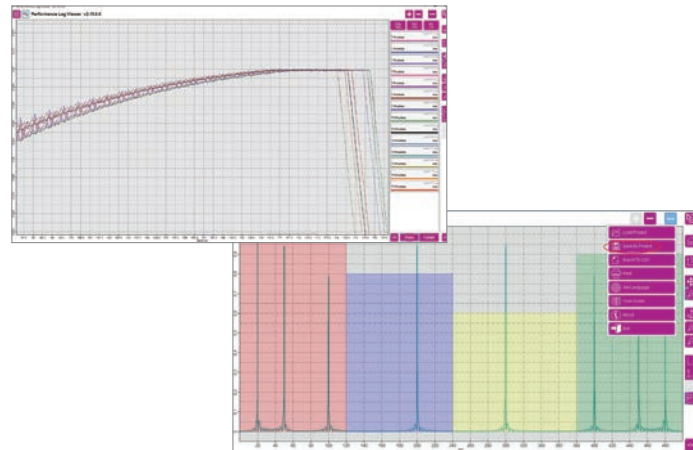


Industry 4.0 Solutions

Performance Log Viewer

Touch friendly application with a range of tools for viewing and analyzing log data on both machines and desktops. It is compatible with multiple file formats, including Siemens, XML, CSV and a new streaming log which allows large data sets to be written.

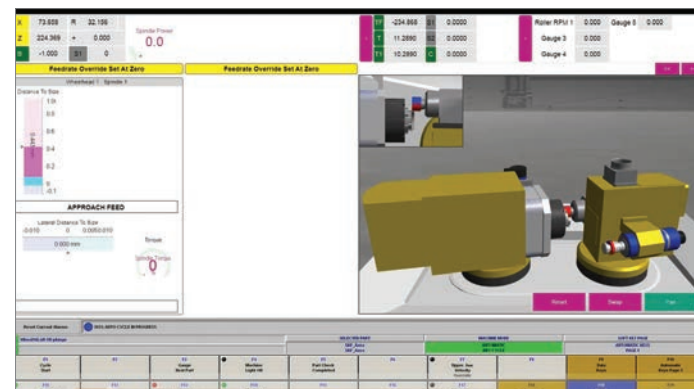
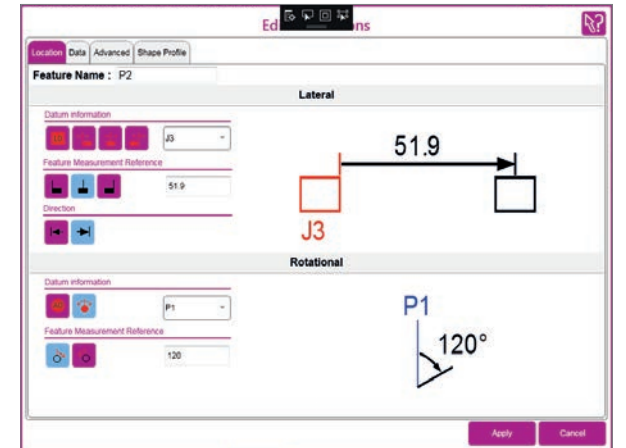
- It can be installed on grinding machines as well as desktops/laptops
- FFT analysis (SIEMENS compatible)
- Viewer for log files created by CNC6400, including force, position and velocity data from all axes
- Key for analysis of process



Part Program Editor

The part program editor is a tool created to provide an intuitive programming environment which is accessible to all. It is developed to facilitate programming operations from the information on the process sheet (drawing) to grinding the part.

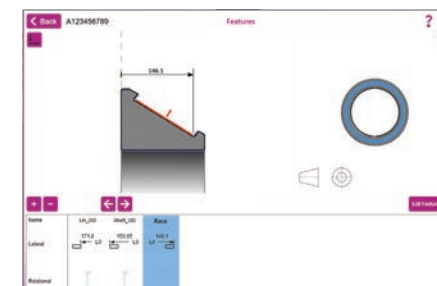
- Produces a visual representation of the part and its features
- Add, remove or change the position of processes easily
- Provides a common programming platform between CNC6400, Siemens and FANUC



Digital Twin

The digital twin has a sub-micron accurate, live, 3D view of the machine in the HMI. Views can be manipulated to show different angles throughout grinding cycles. The application can be used to test machining cycles virtually to preemptively detect crashes and optimize machine positioning.

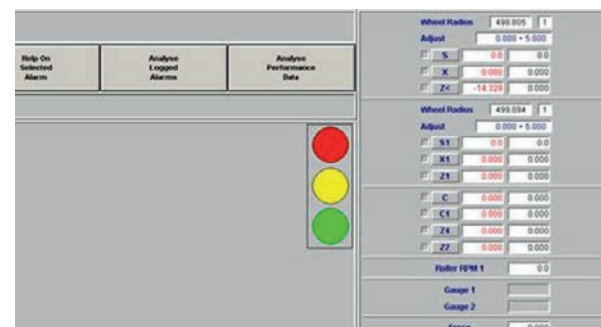
- 3D visualisation driven directly from control
- Allows software development prior to machine build
- Crash detection (in use on multiple applications)



Machine Health

Localized intelligent machine monitoring can pick up machine anomalies before they can manifest as quality issues or as machine down time.

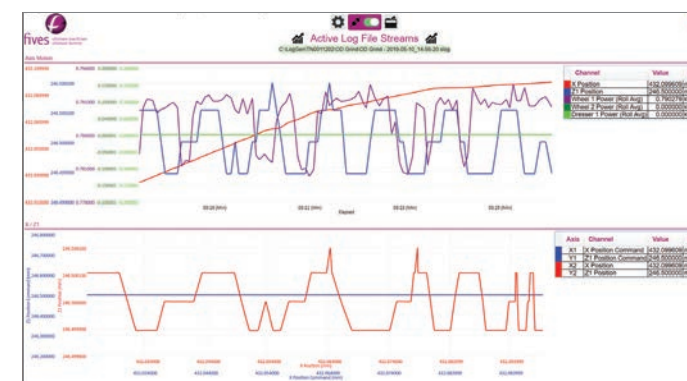
- Uses log data to determine machine axis condition
- Automatic FFT analysis of axis data
- Provides simple, visual information of machine condition to the operator



Log Generator

Log generator is a program which runs inside a Windows environment, connects to a CNC over a network and generates log files for examination by the Performance Log Viewer. The log generator also provides live values displayed on screen in numeric and chart form. Signals, visuals and log triggers are configured through the app and saved within project files. Different projects may be loaded to monitor different machines at will.

- Supports concurrent log file streaming for multi-path, asynchronous operations
- Live graphics for real-time monitoring
- Applicable to all the latest generations of Fanuc controllers (0i and 3xi series)



GRINDERCARE

Complete Life cycle solutions for grinding machines around the globe:

- Extend product life
- Maintain peak efficiency
- Reduce the cost of machine ownership
- Maximize performance through a full range of services



Operation

From commissioning to maintenance, the GrinderCare team will keep your machine running for longer.

- Machine commissioning
- Warranty periods
- Spare parts
- Preventive maintenance



Optimization

Our technical support enables customers to adjust for changing requirements and continually make improvements to maximize machine capabilities.

- Customizable training
- Machine evaluations
- Technical support & consultations



Evolution

GrinderCare enables us to provide ongoing research and adjustments to the machine with the opportunity to bring new technologies into place to further enhance the machine capabilities and performance.

- Retools & refurbishment
- Remanufacturing
- Machine relocations
- Up-to-date technologies



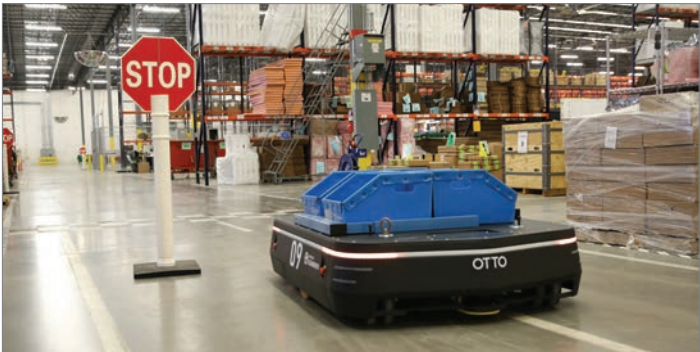
GrinderCare supports the full and maximum product life of the following brands:

- | | | | |
|--------------|-----------------------|--------------|-------------------|
| — Besly | — Cranfield Precision | — Giustina | — Norton |
| — Bryant | — Daisho | — Gold Crown | — Pratt & Whitney |
| — Cincinnati | — Gardner | — Landis | — Warner Swasey |

AUTOMATION & TURNKEY SOLUTIONS

Years of experience providing automation & turnkey solutions that are specifically tailored to the needs of the customer and today's production requirements.

- Market specific solutions
- Engineered in-house
- Easy implementation into your current production processes
- Eliminate all possible project management headaches
- Gaging



AUTOMATION - MAXIMUM FLEXIBILITY

- Loading/unloading: manual, conveyors, pushing devices, robots, portals
- Machine integration in new and existing production lines
- Automatic parts detection and adaptation to mixed part types

PROVIDING PARTS AND SERVICES ALL AROUND THE WORLD



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