



**Fives Landis Corp.**  
 16778 Halfway Blvd.  
 Hagerstown, MD 21740  
 UNITED STATES  
 Tel: +1 301 797 3400

**Fives Landis Ltd.**  
 Eastburn Works, Skipton Road  
 Cross Hills Keighley  
 West Yorkshire BD20 7SD  
 UNITED KINGDOM  
 Tel: +44 (0) 1535 633 211

**Cranfield Precision**  
**Division of Fives Landis Ltd**  
 Woburn House, 3 Adams Close  
 Kempston, Bedford MK42 7JE  
 UNITED KINGDOM  
 Tel: +44 (0) 1234 312 820

**Fives Landis GmbH**  
 Dreifelderstrasse 42  
 70599 Stuttgart  
 GERMANY  
 Tel: +49 (0) 711 45 11 45

**Fives Giustina S.r.l.**  
 Corso Lombardia 79  
 San Mauro Torinese, Torino, 10099  
 ITALY  
 Tel: +39 011 222 8621

**Daisho Seiki Corporation**  
 2-1, Kunimidai 6-Chome, Ishinomiya  
 Hyogo 669-1135  
 JAPAN  
 Phone: +81 797 62 5500

**Fives Grinding Mexico**  
 Circuito Aguascalientes Norte # 151-4  
 Parque Industrial Valle de Aguascalientes  
 San Francisco de los Romo  
 Aguascalientes C.P. 20358  
 MEXICO  
 Tel.: +52 449 688 5118

**Shanghai Fives Automation &  
 Processing Equipment Co., Ltd**  
**Guangzhou Branch office**  
 Plant No. 12, American Industry Park  
 No. 48, Hongmian Ave.  
 Huda District, Guangzhou, 510800  
 CHINA  
 Phone: +86 (0) 20 3770 7471



[www.fivesgroup.com](http://www.fivesgroup.com)

[grinding-ultraprecision@fivesgroup.com](mailto:grinding-ultraprecision@fivesgroup.com)

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# Ultimate grinding solutions

Orbital, cylindrical, centerless, internal,  
 surface & ultra-precision technologies

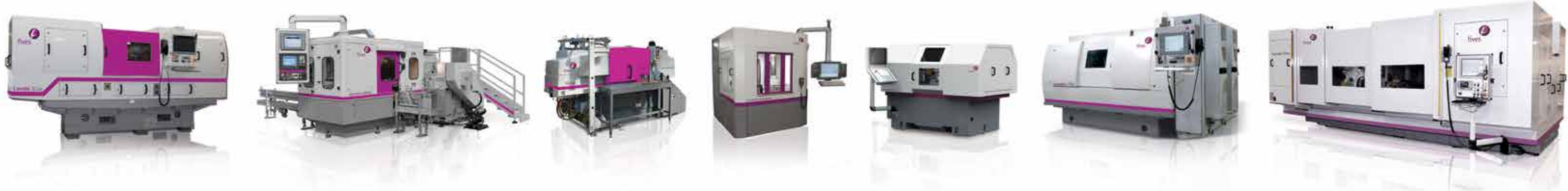
Renowned legacy names:  
 Bryant, Cincinnati, Cranfield Precision, Daisho, Gardner, Giustina and Landis



HIGH PRECISION  
 MACHINES

GRINDING | ULTRA PRECISION

Fives designs and supplies ultimate grinding solutions for precision component manufacturers in a broad range of industries



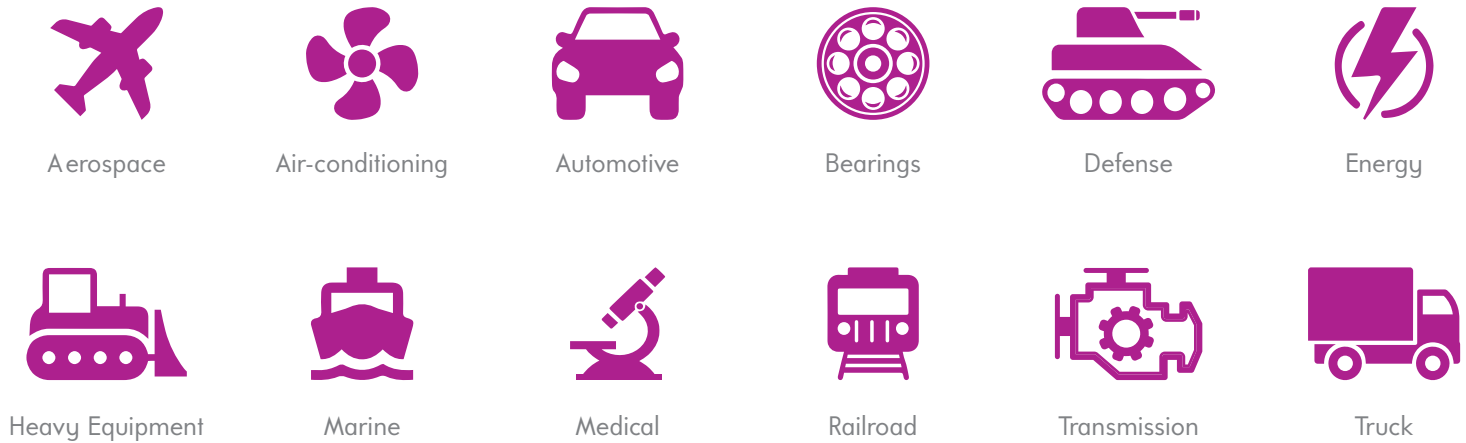
Aerospace — Automotive — Bearings — Commercial — Heavy Industry — Railroad and more

Fives and its dedicated Grinding | Ultra Precision teams - over 700 people globally - offer a complete range of grinding and specialist high-precision machines, plus a comprehensive range of systems, grinding accessories and service/support programs.

Fives is a leader in centerless and disc grinding processes, orbital crankshaft and camshaft profile grinding as well as lean and flexible peel and cylindrical (OD/ID) grinders for a wide range of components in various industries. Furthermore, Fives provides bespoke solutions for unique, ultra-precise machining requirements.

With a strong legacy based on 7 major names - Bryant, Cincinnati, Cranfield Precision, Daisho, Gardner, Giustina, Landis and more than 200 years of expertise developing pioneering solutions in close partnership with customers, Fives is recognized as the leading provider of grinding and ultra precision solutions - a partner that helps customers maximize operational performance.

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.



## ID/OD grinding

Fives' range of Bryant grinding solutions in the ID/OD sector includes single purpose ID and multi-surface grinders as well as highly flexible ID/OD twin turret grinding systems to manufacture high precision components for a variety of industry sectors such as; fuel systems, valve train, bearing, gears and many others.

## Bryant TTG Twin-turret, multi-spindle grinding

The Bryant TTG 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



Bryant TTG



Grinding / polishing / hard turning and metrology



Bore, seat & face configuration



Between centers



Model	Bryant TTG
<b>Grinding capacity</b>	
Max. grinding diameter (OD)	350 mm
Max. external grinding length	150 mm
Max. internal grinding length	100 mm
<b>Grinding spindle turret</b>	
Swivel range	+/- 135 deg
Turret bearing	Hydrostatic
Max. number of spindles	3
Wheel type	Conventional / CBN / Diamond
Max. wheel Ø	250 mm
Wheel surface speed	120 m/s
Max. ID spindle speed	60,000 rpm
<b>Work spindle turret</b>	
Swivel range	+/- 135 deg
Turret bearing	Hydrostatic
Workhead speed	1 - 1,000 rpm (2,000 option)
Linear axes travel (infeed)	200 mm
Linear axes bearing	Hydrostatic
<b>Dimensions</b>	
Machine dimensions (W x L)	1,800 x 1,950 mm
Machine weight	3,000 kg

Grinding spindle configuration, speeds, bearing type and powers can be changed to suit specific customer requirements. In-process gauging available.

## 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 fuel management, valve train, bearing and other custom 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

## Bryant RU2

Multi-surface grinder for process operations

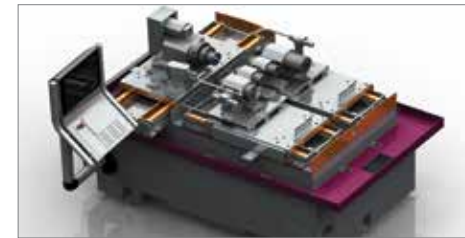
The Bryant RU2 has multi-slide possibilities in both the X and Z axis, multiple work heads, wheel heads, and dressing systems

As a modular multi-surface grinder, the Bryant RU2 is capable of processing the most complex workpieces for fuel systems, valve and drive trains, bearings, aerospace and medical applications. This grinder is an ideal platform for most common (and uncommon) process operations such as bore, seat, and face.

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



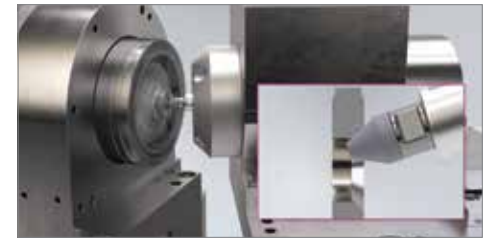
Bryant RU2



Multi-spindle and dual slide (Z) arrangement



Typical applications



Dual slides in Z for fuel management components

Model	Bryant RU1
<b>Grinding capacity</b>	
Max. swing diameter	127 mm
Max. workpiece length	63 mm
Max. internal grinding diameter	38 mm
Max. internal grinding depth	31 mm
<b>Spindles &amp; workhead</b>	
Max. number spindles	1
Max. ID spindle speed	120,000 rpm
Max. workhead speed	3,000 rpm
<b>Axes &amp; control</b>	
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
<b>Dimensions</b>	
Dimensions (W x L)	1,220 x 760 mm
Machine weight	3,940 kg

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

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

<sup>(2)</sup> Dual slide arrangement

# Bryant UL2

Designed for high speed & high precision internal 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, gears, constant velocity joint components as well as drive and transmission 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



CV joint components



Gears



Hydraulic lash adjustor

Model	Bryant UL2
<b>Grinding capacity</b>	
Max. workpiece diameter	177 mm
Max. internal grinding diameter	100 (140) mm
Max. internal grinding depth	75 mm
<b>Spindles &amp; workhead</b>	
ID spindle speed	up to 120,000 rpm
Max. workhead speed	4,000 rpm
<b>Axes</b>	
Axis travel X	50 mm
Axis speed X	13 m/min
Axis travel Z	254 mm
Axis speed Z	46 m/min
<b>Dimensions</b>	
Dimensions (W x L)	2,555 x 1,825 mm
Machine weight	4,750 kg

## Centerless grinding

Cincinnati centerless grinders, 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. The Cincinnati product range includes grinders able to grind from 2 mm to 152 mm diameters. Part length can range up to more than 10 m in length for through-feed application or 660 mm for in-feed application.

# Cincinnati centerless product range

Superior machine accuracy, reliability & ease of use

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-center machines to accommodate a variety of different applications and requested material handling systems.

- Cincinnati centerless ranges from the simple PLC machine all the way up to a 10-axes CNC turn-key solution

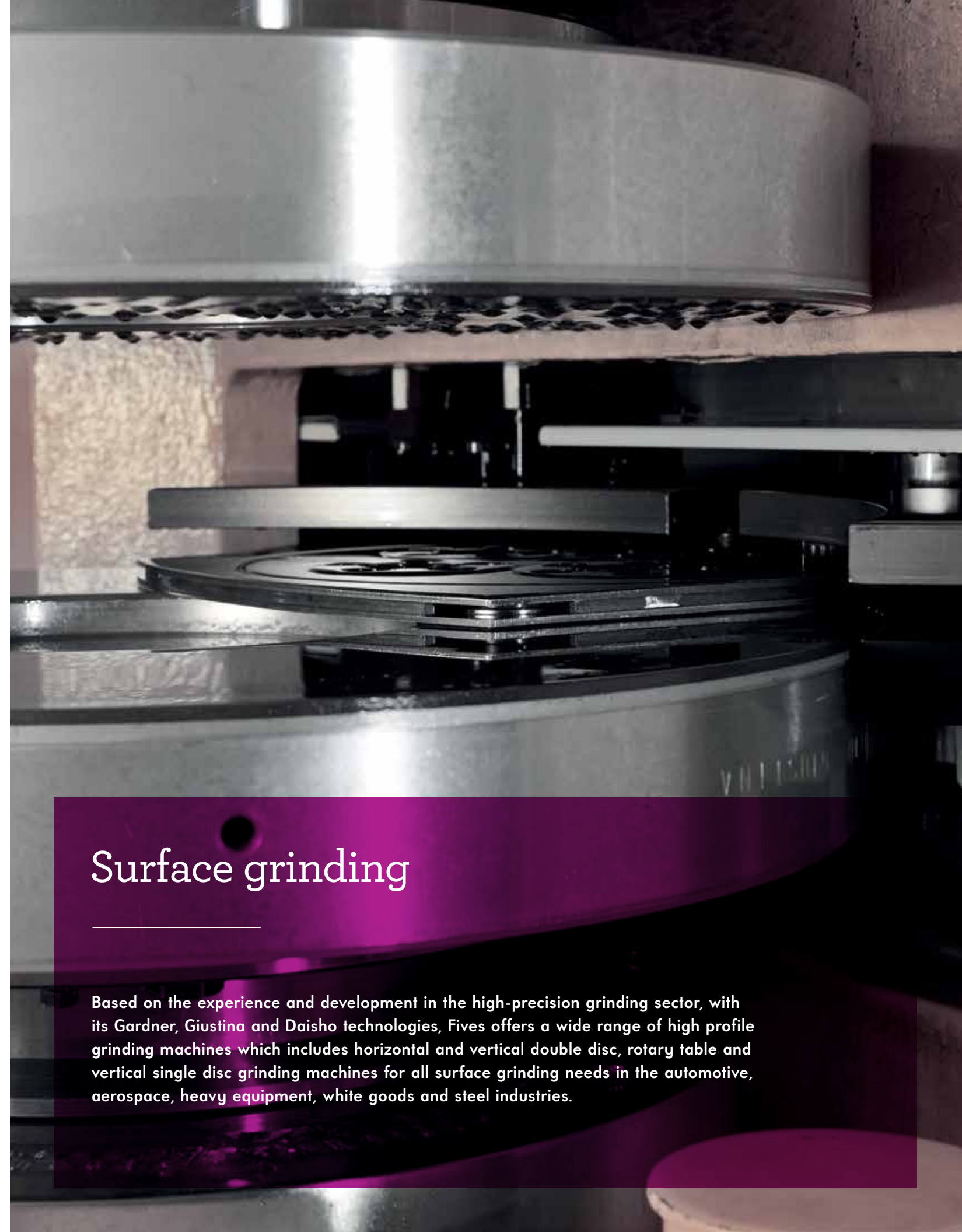


Cincinnati R125



Cincinnati Viking

Model	Cincinnati Viking	Cincinnati RK	Cincinnati R125	
	250	350-20	500	660
Type	Twin grip	Twin grip	Twin grip fixed center	Twin grip fixed center
<b>Working capacity</b>				
Min. / Max. outer diameter	1.2 - 60 (100) mm	12.7 - 152 mm	2 - 250 mm	2 - 300 mm
<b>Grinding wheel</b>				
Sizes / width	250 mm	508 mm	508 mm	650 mm
Max. / Min. OD	450 / 300 mm	610 / 431 mm	610 / 410 mm	610 / 410 mm
Motor power	15 (30) kW	37 (55) kW	110 kW	110 kW
Peripheral speed	45 (137) m/s	45 m/s	45 (60) m/s	45 (60) m/s
<b>Regulating wheel</b>				
Sizes / width	250 mm	508 mm	508 mm	650 mm
Max. / Min. OD	355 / 255 mm	355 / 279 mm	355 / 250 mm	355 / 250 mm
Motor power	3.3 kW	3.3 kW	3.3 kW	3.3 kW
Operating speed	10 - 70 rpm	10 - 70 rpm	10 - 70 rpm	10 - 70 rpm
Dressing speed	600 rpm	300 rpm	300 rpm	300 rpm
<b>Infeeds</b>				
Max. plunge infeed	1,500 mm/min	1500 mm/min	1,500 mm/min	1,500 mm/min
Min. plunge infeed	0.1 mm/min	0.1 mm/min	0.1 mm/min	0.1 mm/min
<b>Dimensions</b>				
Dimensions (W x D x H)	3,100 x 2,700 x 2,300 mm	3,300 x 2,800 x 2,700 mm	3,400 x 1,800 x 1,900 mm	3,400 x 2,000 x 1,900 mm
Machine weight	9,072 kg	11,794 kg	18,000 kg	20,000 kg



## Surface grinding

Based on the experience and development in the high-precision grinding sector, with its Gardner, Giustina and Daisho technologies, Fives offers a wide range of high profile grinding machines which includes horizontal and vertical double disc, rotary table and vertical single disc grinding machines for all surface grinding needs in the automotive, aerospace, heavy equipment, white goods and steel industries.

## Vertical double disc product range

### Superior machine rigidity with high flexibility

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.

Our double disc grinding technology is second to none, and machines range in size from 305 mm wheel diameter up to 1,067 mm wheel diameter with spindle power as high as 100 kW.

- 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 tilting mechanism of wheel tilting



Rotary Vertical Disc (RVD)



Rotors



## Horizontal double disc product range

### Compact design with high throughput

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 305 mm wheel diameter up to 1,067 mm wheel diameter with spindle power as high as 75 kW.



R242



Conrods



Combination of HDD components

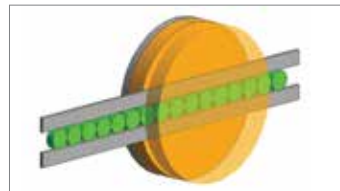


Gears

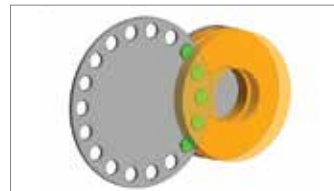


Valve plates

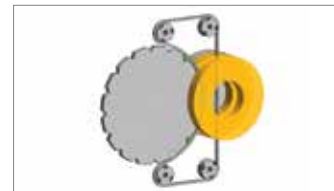
## Fixtures



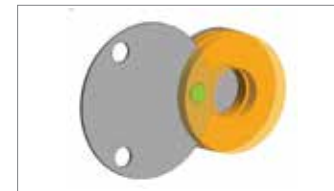
Linear through-feed



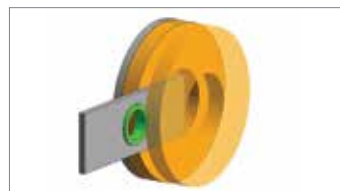
Rotary through-feed



Rotary carrier wire clamp



Index carrier

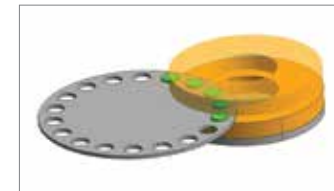


Reciprocating feeder carriage

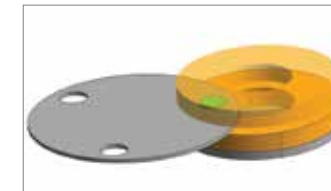


Swing arm

## Fixtures



Rotary through-feed



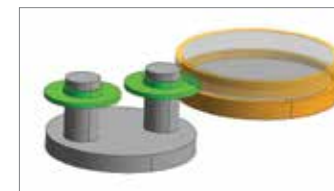
Index carrier



Oscillating infeed carrier



Workpiece rotating index



Index table work drive

Vertical models	RVD					
	20		23		30	
Machine weight	5,550 kg		5,550 kg	12,000 kg	15,000 kg	
OD grinding wheel	305 mm	355 mm	455 mm	510 mm	585 mm	760 mm
Max. power grinding wheel	5.5 - 7.5 kW	7.5 - 11 kW	11 - 15 kW	11 - 15 kW	22 - 30 kW	30 kW
Positioning precision	1 μm	1 μm	1 μm	1 μm	1 μm	1 μm
Max. workpiece - OD	5 - 50 mm	5 - 60 mm	15 - 75 mm	15 - 75 mm	20 - 100 mm	25 - 180 mm
Max. workpiece - width	0.5 - 15 mm	0.5 - 15 mm	0.7 - 25 mm	0.7 - 25 mm	1 - 50 mm	1 - 75 mm

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

Horizontal models	R214	R220		R242		
Machine weight	4,500 kg	6,000 kg	6,000 kg	14,000 kg	14,000 kg	14,500 kg
OD grinding wheel	305 mm	508 mm	610 mm	760 mm	915 mm	1,067 mm
Max. power grinding wheel	7.5 kW	22 kW	22 kW	75 kW	75 kW	75 kW
Positioning precision	1 μm	1 μm	1 μm	1 μm	1 μm	1 μm
Max. workpiece - OD	50 mm	90 mm	90 mm	370 mm	800 mm	900 mm
Max. workpiece - width	1 - 30 mm	1 - 40 mm	1 - 50 mm	1 - 110 mm	1 - 110 mm	1 - 110 mm

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

## Vertical single disc product range

Superior machine rigidity with exceptional parallelism & flatness

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

The RP is a vertical single disc grinder with magnetic rotary table and specially developed for the processing of big workpieces like large bearings, plates and pump covers. The machine's multiple workpiece clamping feature helps to reduce cycle time and enhance productivity.

- Monoblock wheelhead for highest rigidity & fast stock removal
- Rough and finish grind in one clamping
- Segmented grinding wheel
- In-process measuring system
- Robot or gantry loading systems
- Magnetic rotary table in several sizes



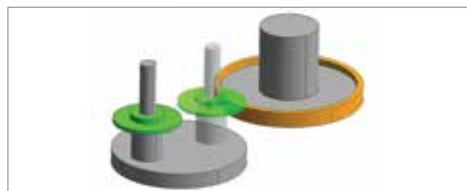
RP 1000/2000

The RVD-IT is a vertical single disc grinder with an ID/OD clamping system and specially developed for the processing of sun gears. The machine can be equipped with a multi workpiece clamping feature to reduce the cycle time and enhance productivity.

- Monoblock machine basement in cast iron
- Low footprint
- CBN grinding wheel
- Automatic robot loading / unloading system
- In-process measuring system
- Customized clamping system



RVD-IT



Index table work drive

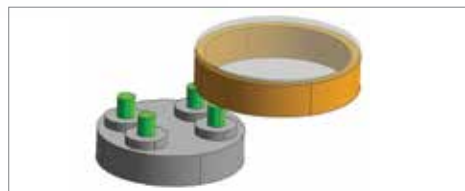
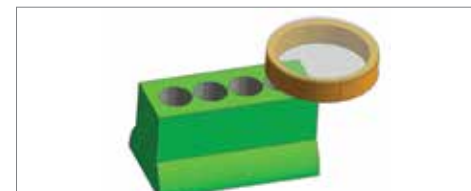


Table travers



Model	RP 1000	RP 2000	RP 3000	RVD-IT			
				12"	14"	18"	20"- 23"
<b>Machining capacity</b>							
Max. workpiece diameter	1,200 mm	2,100 mm	3,200 mm	Joint face	225 mm	250 mm	Upon requirements
Max. workpiece thickness	400 mm	400 mm	500 mm	fixture only	125 mm	125 mm	
<b>Wheelhead</b>							
Wheel diameter	660 mm	660 mm	915 mm	305 mm	355 mm	455 mm	510mm-585mm
Max. power	75 kW	75 kW	95 kW	7.5 kW	7.5 kW	11 kW	22 kW
<b>Linear axes</b>							
Positioning resolution	1 µm	1 µm	1 µm	1 µm	1 µm	1 µm	1 µm
<b>Coolant</b>							
Delivery	350 l/min	350 l/min	500 l/min	200 l/min 2.5	250 l/min 2.5 bar	250 l/min 2.5 bar	250 l/min 2.5 bar
<b>Dimensions</b>							
Machine weight	16,000 kg	24,000 kg	51,000 kg	5,500 kg	5,500 kg	5,500 kg	12,000 kg

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

## Vertical single disc product range

Large part capacity up to 2 meters

The Rotary Vertical (RV) series grinders, with vertical or universal spindles, are designed for the finishing of inner, outer diameters and faces, especially of large gears, bearings, turbines along with components for the naval, power generation, wind energy and mining industries.

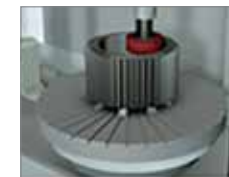
- Rotary tables (standard or hydrostatic) ranging in diameter from 800 mm up to 2,000 mm
- Variety of wheel diameters from 300 mm up to 500 mm
- Equipped with an automatic tool changer, automatic probe, wheel balancing, and a table mounted rotary dressing attachment, all powered by a Siemens 840D



Rotary Vertical (RV)



External profile grinding



Internal grinding



Part hard turning



Surface grinding



Part probing



External cylindrical grinding

Model	RV / RVU 80	RV / RVU 120	RV / RVU 160	RV / RVU 200
<b>Working capacity</b>				
OD x height *standard wheel	850 x 500 mm	1,300 x 500 mm	1,700 x 500 mm	2,100 x 500 mm
Min. ID x depth *standard wheel	500 x 500 mm	500 x 500 mm	600 x 500 mm	700 x 500 mm
Min. ID x depth *w/extension	200 x 250 mm	200 x 250 mm	200 x 300 mm	300 x 300 mm
<b>Wheel dimensions</b>				
Standard wheel OD x W	300 x 75 mm	300 x 75 mm	400 x 100 mm	500 x 100 mm
Wheel diameter w/extension	140 mm	140 mm	140 mm	200 mm
<b>Universal spindle</b>				
Power	15 kW	15 kW	25 kW	40 kW
Speed min. / max	2,000-6,000 rpm	2,000-6,000 rpm	1,400-6,000 rpm	1,150-4,000 rpm
Angle swiveling *RV/U	+/-110 deg	+/-110 deg	+/-110 deg	+/-110 deg
<b>Standard rotary table</b>				
Diameter	800 mm	1,200 mm	1,600 mm	2,000 mm
Speed min. / max	10-220 rpm	5-150 rpm	5-100 rpm	1-50 rpm
<b>Hydrostatic rotary table</b>				
Diameter	800 mm	1,200 mm	1,600 mm	2,000 mm
Speed min. / max	5-320 rpm	5-240 rpm	5-160 rpm	1-80 rpm
Load capacity w/o magnetic chuck	2,000 kg	3,500 kg	5,000 kg	1,300 kg
<b>Vertical-transversal Axis</b>				
Speed	15 m/min	15 m/min	15 m/min	15 m/min
Increment min. setting	0.001 mm	0.001 mm	0.001 mm	0.001 mm

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



# External cylindrical grinding

Fives offers accurate, reliable, flexible, productive solutions for a variety of cylindrical-type parts grinding applications. The inherent design of the Landis' grinding machines is proven daily, serving businesses successfully competing in today's global market.

## Landis LT1Se & LT1Se-DH High volume grinding for small to mid-size cylindrical components

Designed as compact cam-segment grinders, the Landis LT1Se models can grind cylindrical and non-cylindrical shapes on small to mid-sized components.

- Dual headstock (Landis LT1Se-DH)
- Chucker or between-centers options
- Virtually zero parasitic time for high production requirements
- Integrated loader mechanism to load/unload while machining (Landis LT1Se-DH)
- Linear motors on all slide ways
- In process gauging



Landis LT1Se



Landis LT1Se-DH



Tripod



Cam segment

Model	Landis LT1Se	Landis LT1Se-DH
<b>Grinding capacity</b>		
Max. component swing	200 mm	75 mm
Max. grinding length	250 mm	150 mm
Max. workpiece weight	100 kg	30 kg
<b>CBN Grinding wheel</b>		
Max. number of spindles		2
Wheel type		CBN
Max. wheel Ø	200 mm	120 mm
Max. wheel width	50 mm	80 mm
Wheel surface speed	120 m/s	120 m/s
Spindle power	20 kW	26 kW
<b>Workhead &amp; footstock</b>		
Quantity	1	2
Workhead speed range		0 - 600 rpm
Workhead drive power		5.5 kW
Max. workhead motor torque		260 Nm
Footstock stroke		150 mm
Type		Live spindle
<b>Axes &amp; Control</b>		
Guideways / bearings (X)	Precision linear ways	Hydrostatic
Guideways / bearings (Z)	Precision linear ways	Precision linear ways
Drive	Linear motor	Linear motor
Grinding spindle	Ball bearings	Hydrostatic
<b>Dimensions</b>		
Machine bed	Composite	Cast iron
Dimensions	2,600 x 2,150 mm	2,205 x 2,705 mm
Machine weight	12,500 kg	12,000 kg

## Landis 3LVe

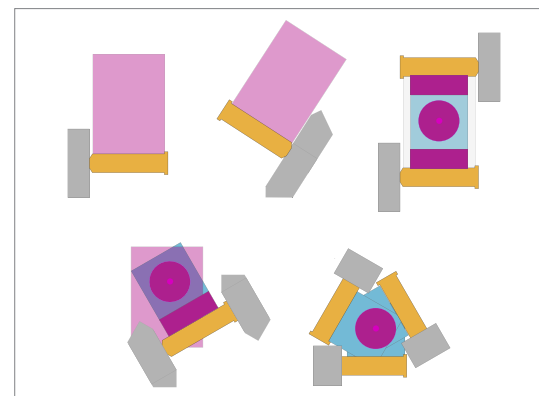
### Cam, OD plunge and peel grinding

The Landis 3LVe grinding machine builds on the incredible success of the original Landis 3LVe with over 500 machines installed worldwide. The Landis 3LVe is an evolution of the original machine, utilizing state of the art technology to improve efficiency and reliability. The technology is incorporated into an optimized design, providing unrivaled quality and cycle time standards at lower cost. Various machine configurations can be built on a modular platform to configure the Landis 3LVe for plunge, angle approach, peel or even cam lobe grinding.

- Range of workdrive options available for high torque cam profile grinding (up to 260 Nm), or high speed peel grinding (up to 7,500 rpm)
- High power wheel spindles enable high stock removal, wide plunge grinding or simultaneous lobe grinding without compromise to cycle time or quality
- When peel grinding, the high speed grinding wheel (200 m/s) contours and finishes the workpiece
- Reduced cost per piece compared with conventional hard turning, grinding and polishing methods



Landis 3LVe



Wheelhead options



Model	Landis 3LVe
<b>Working capacity</b>	
Center height	220 mm
Center distance (min/max)	300 / 500 / 700 mm
<b>CBN grinding wheel</b>	
Wheel diameter	350 / 500 / 600 mm
Max. wheel width	5 / 50 / 150 / 250 mm
Max. surface speed	125 or 200 m/s
<b>Wheel spindle &amp; workhead</b>	
G.W. spindle motor	19 / 22 / 25 / 50 kW
Max. G.W. speed	2,500 / 7,500 / 12,000 rpm
Workhead spindle motor power	5.5 / 9.5 kW
Workhead spindle motor torque	12 / 125 / 260 Nm
Max. workhead speed	600 / 2,250 / 7,500 rpm
<b>Axes</b>	
Linear guide ways	Precision linear guideways
Grinding spindle	Super precision ceramic bearing
Drive	Linear motor / high precision ball screw
<b>Dimensions</b>	
Dimensions	4,030 x 3,050 x 2,338 mm
Machine weight	10,000 kg

## Landis Flex

### Traverse/plunge/contour grinding

The Landis Flex is designed for grinding shaft-type parts. Sustainable productivity, precision and flexibility in a package with a small carbon footprint.

- Linear motors on all feed and traverse mechanisms
- Hydrostatic wheel spindles
- Meets micron level dimensional & geometric part tolerances
- CBN, diamond or conventional wheels
- Reduced power consumption
- Polishing head & protomar gauge



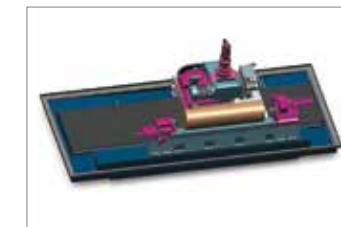
Landis Flex



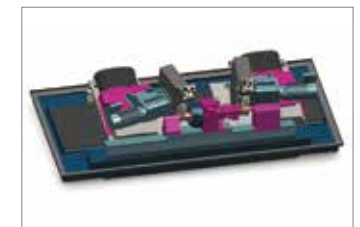
30 degree plunge machine



Dedicated straight machine

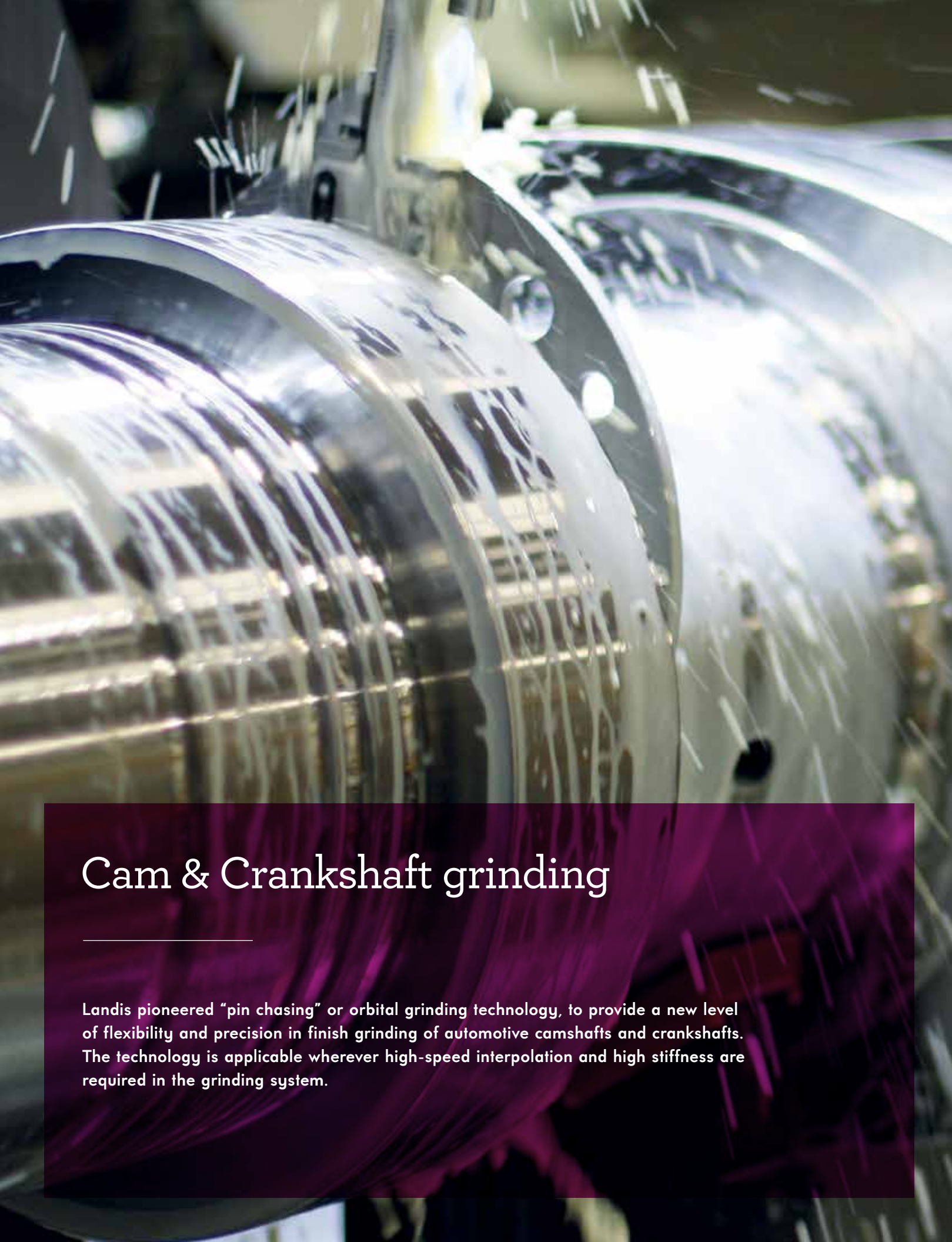


Swivel machine



Twin wheel head machine

Model	Landis Flex		
Grinding capacity	Straight	30° angle head	Swivel head
Max. component swing	400 (750) mm	400 (750) mm	400 (750) mm
Max. grinding length	1,500 / 2,500 mm		
Max. workpiece weight	1,350 kg	1,350 kg	1,350 kg
<b>Wheelhead</b>			
Max. number of wheels	1	1	3
Wheel type	Conventional or CBN		
Max. wheel Ø	760 mm	760 mm	600 mm
Max. wheel width	100 (75) mm	100 (75) mm	100 (75) mm
Wheel surface speed	45 (80) m/s	45 (80) m/s	45 (80) m/s
Spindle power	50 kW	50 kW	50 kW
<b>Workhead &amp; Footstock</b>			
Workhead speed	300 rpm		
Footstock stroke	70 mm		
<b>Axes</b>			
Guideways / bearings (linear axes)	Anti-friction bearing		
Grinding spindle	Hydrostatic		
Drive	Linear motors		
<b>Dimensions</b>			
Machine weight	15,000 to 19,500 kg (dependent on length)		



## Cam & Crankshaft grinding

Landis pioneered “pin chasing” or orbital grinding technology, to provide a new level of flexibility and precision in finish grinding of automotive camshafts and crankshafts. The technology is applicable wherever high-speed interpolation and high stiffness are required in the grinding system.

## Landis LT1e Adaptable component grinding

The compact machine design is ideal for high volume production of camshafts and multi diameter shaft-type components. The Landis LT1e series is also suitable for grinding of concentric diameters, eccentrics, profiles, tapers, chamfers and faces.

- Available for different length capacities
- Optional swivelling wheelhead with an infinitely variable hydrostatic
- Hydrostatic linear axes and wheel spindles



Landis LT1e



Camshaft



Tripod



Transmission shaft

Model	Landis LT1e 500	Landis LT1e 1200
<b>Grinding capacity</b>		
Max. component swing		150 mm
Max. grinding length	500 mm	1,200 mm
Center height		220 mm
Max. workpiece weight		250 kg
<b>Wheelhead</b>		
Wheel type		CBN
Max. wheel Ø		350 mm
Max. wheel width		65 mm
Wheel surface speed		200 m/s
Spindle power		40 kW
Swivel wheelhead (B-axis)	n/a	Optional
B-axis swivel range	n/a	230 deg
<b>Workhead &amp; footstock</b>		
Type		Live spindle
Workhead speed range		0 - 600 rpm
Workhead drive power		5.5 kW
Max. workhead motor torque		230 Nm
Type		Hydraulic operated
Footstock stroke		50 / 80 / 160 mm
<b>Axes</b>		
Linear guide ways		Hydrostatic
Grinding spindle		Hydrostatic
Drive		Linear motor
<b>Dimensions</b>		
Dimensions	4,330 x 5,650 x 2,385 mm	5,530 x 5,650 x 2,465 mm
Machine weight	9,800 kg	12,000 kg

# Landis LT2e

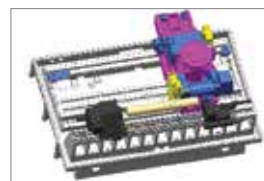
The benchmark for processing concentric and non-concentric workpieces

The built-in flexibility of the Landis LT2e allows the processing of a diverse range of parts within the operating envelope. It offers a customizable solution that is tailored to the exact needs of the customer and the workpiece.

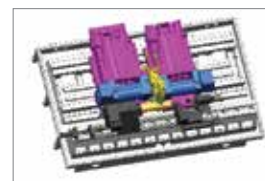
- Compact footprint
- Angle-mounted wheelhead option
- Optional swivel wheelheads for up to four spindles
- Simultaneous grinding with wheels spaced as close as 20mm
- ID attachment available for simultaneous ID/OD grinding



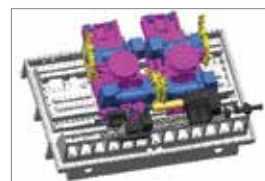
Landis LT2e



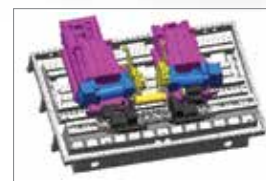
Single swivel



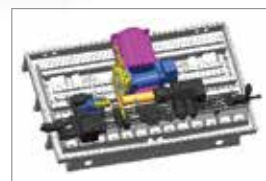
Twin standard



4 spindle



Twin opposed 5°



Flange & bore

Model	Landis LT2e Single Swivel	Landis LT2e Twin Standard	Landis LT2e 4 Spindle (3 spindle option)	Landis LT2e Twin Opposed 5°	Landis LT2e Flange & Bore
<b>Grinding capacity</b>					
Max. component swing	210 mm	210 mm	210 mm	210 mm (*170 mm)	210 mm
Max. grinding length	1,500 mm	750 mm	750 mm	550 mm	750 mm
Max. workpiece weight	250 kg	250 kg	250 kg	250 kg	250 kg
<b>Wheelhead</b>					
Wheel type	CBN	CBN	CBN	CBN	CBN
Max. wheel Ø	520 mm	520 mm	520 mm	520 mm	520 mm
Max. wheel width	30 mm / 40 mm / 60 mm options			20 mm	120 mm 60 mm bore
Max. wheel surface speed	180 m/sec	180 m/sec	180 m/sec	180 m/sec	180 m/sec
Max. spindle power	70 kW	70 kW	70 kW	70 kW	70 kW
B-axis swivel range	230° infinitely	N/A	230° infinitely	Optional	Optional
<b>Workhead &amp; footstock</b>					
Type	Headstock drive between centers			Dual footstock	Headstock drive centerless
Workhead drive power	13 kW	13 kW	13 kW	3.7 kW	13 kW
Max. motor torque	250 Nm	250 Nm	250 Nm	210 Nm	250 Nm
Footstock stroke	160 mm	160 mm	160 mm	160 mm	160 mm
<b>Axes</b>					
Linear guide ways	Hydrostatics	Hydrostatics	Hydrostatics	Hydrostatics	Hydrost./Linear elem.
Grinding spindle	Hydrostatics	Hydrostatics	Hydrostatics	Hydrostatics	Hydrost./Rolling elem.
Drive	Linear Motors	Linear Motors	Linear Motors	Linear Motors	Linear Motors / Ballscrew
<b>Dimensions</b>					
Dimensions	4,965 x 5,429 x 2,300 mm				
Machine weight	21,500 kg	17,500 kg	24,000 kg	17,500 kg	17,500 kg

# Landis LT2He

Crankshaft and camshaft grinding machine

The Landis LT2He models offer an extended component capacity. The machines are designed to grind crankpins and journals on large crankshafts, or lobes and journals on large camshafts, using single or twin wheelheads.

- Capacity up to 3,000 mm part length
- Linear motor technology
- Hydrostatic wheel head feed & cross slides
- Hydrostatic wheel spindles
- Variable speed work drive
- Automatic in-process gauging
- Flexible table tooling with rack & pinion adjustment
- Patented grinding processes



Landis LT2He



Finish grinding intake, exhaust cam lobes and injectors



Large crankshaft

Model	Landis LT2He Single Wheelhead *2 Spindle Swivel Optional	Landis LT2He Twin Wheelhead
<b>Grinding capacity</b>		
Max. component swing	550 mm	550 mm
Max. grinding length	3,000 mm	1,400 mm
Max. workpiece weight	500 kg	500 kg
<b>Wheelhead</b>		
Wheel type	CBN	
Max. wheel Ø	120/400/675 mm options	675 mm
Max. wheel width	80 mm	80 mm
Max. wheel surface speed	150 m/sec	150 m/sec
Max. spindle power	25/65/95 kW options	95 kW
B-axis swivel range	*Optional 230° infinitely	N/A
<b>Workhead &amp; footstock</b>		
Max workhead speed	600 rpm	300 rpm
Workhead drive power	13 kW	20 kW
Max. workhead motor torque	160 Nm	280 Nm
Footstock stroke	160 mm	160 mm
<b>Axes</b>		
Linear guide ways	Hydrostatics	Hydrostatics
Grinding spindle	Hydrostatics	
Drive	Linear motors	
<b>Dimensions</b>		
Dimensions	7,552 x 5,464 x 2,800 mm	
Machine weight	26,000 kg	29,000 kg

# Landis LT2HHe

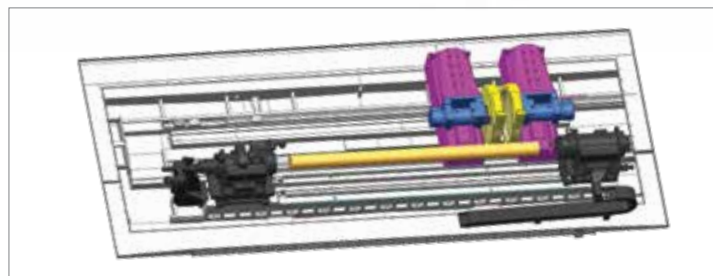
## Shaft grinder for heavy industrial applications

Specifically designed for grinding crankpins and journals on crankshafts up to 4.5m in length, the Landis LT2HHe is the world's largest-capacity fully automatic, twin wheelhead CBN grinding machine. Designed around proven Landis technology utilizing linear motors and fully hydrostatic linear and rotary axes, the Landis LT2HHe brings the latest developments in high volume grinding processes to the heavy industrial sector.

- Capacity up to 4,500 mm part length
- Linear motor technology
- Hydrostatic wheel head feed & cross slides
- Hydrostatic wheel spindles
- Hydrostatic workheads
- Variable speed work drive
- Automatic in-process gauging and centerline correction
- Flexible table tooling with rack & pinion adjustment
- Fully automatic taper control & adjustment



Landis LT2HHe



Landis LT2HHe configuration

Model	Landis LT2HHe Twin Wheelhead
<b>Grinding capacity</b>	
Max. component swing	600 mm
Max. grinding length	4,500 mm
Max. workpiece weight	4,500 kg
<b>Wheelhead</b>	
Wheel type	CBN
Max. wheel Ø	1,000 mm
Max. wheel width	150 mm
Max. wheel surface speed	120 m/sec
Max. spindle power	124 kW
B-axis swivel range	± 3° for tapers
<b>Workhead &amp; footstock</b>	
Max. workhead speed	50 rpm
Workhead drive power	65 kW
Max. workhead motor torque	1,250 Nm
Footstock stroke	150 mm
<b>Axes</b>	
Linear guide ways	Hydrostatics / Linear rail
Grinding spindle	Hydrostatics
Drive	Linear motors
<b>Dimensions</b>	
Dimensions	10,000 x 4,400 mm
Machine weight	70,000 kg



Large crankshaft grinding

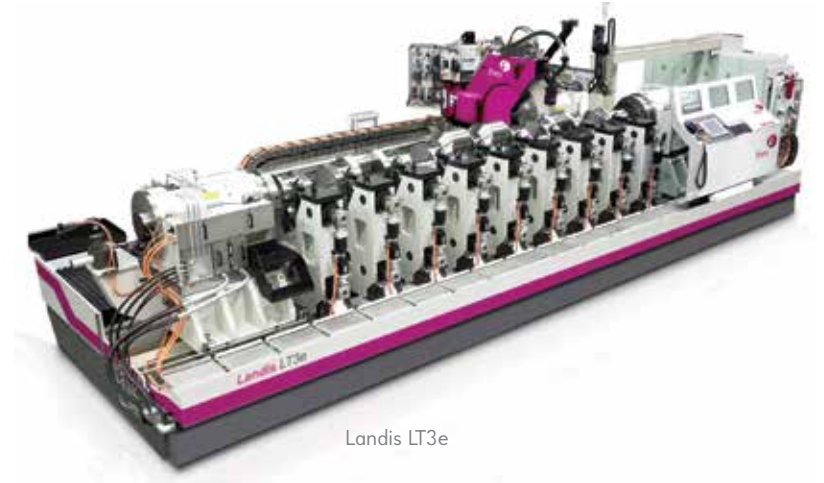


# Landis LT3e

## Specifically designed for grinding of large shafts

The Landis LT3e machine design provides the capability of grinding workpieces up to 8.5m in length, taking advantage of state-of-the-art technological developments and providing outstanding features.

- CNC Hydrostatic wheelhead and workhead bearings
- Up to 40 servo axes supported
- Servo workrests
- Electronically synchronized crankheads
- In-process gauging



Landis LT3e



Grinding of pins on 6,500 mm crankshaft

Model	Landis LT3e 4500	Landis LT3e 6500	Landis LT3e 8500
<b>Grinding capacity</b>			
Max. component swing	850 mm	850 mm	850 mm
Max. pin diameter	350 mm	350 mm	350 mm
Max. journal diameter	350 mm	350 mm	350 mm
Max. throw	250 mm	250 mm	250 mm
Max. part length	4,500 mm	6,500 mm	8,500 mm
Max. grinding length	4,500 mm	6,500 mm	8,500 mm
Max. workpiece weight	4,500 kg	6,500 kg	8,500 kg
<b>Wheelhead</b>			
Wheel type	Aluminium oxide	Aluminium oxide	Aluminium oxide
Wheelhead	Single wheel head	Single wheel head	Single wheel head
Max. wheel Ø	1,400 mm	1,600 mm	1,600 mm
Max. wheel width	250 mm	250 mm	250 mm
Wheel surface speed	35 m/sec	35 m/sec	35 m/sec
Spindle power	60 kW	60 kW	60 kW
Bearings	Hydrostatics	Hydrostatics	Hydrostatics
<b>Workhead &amp; footstock</b>			
Workhead speed range	0-12 rpm	0-12 rpm	0-12 rpm
Max. workhead motor torque	8,000 Nm	8,000 Nm	8,000 Nm
Workhead bearings	Hydrostatics	Hydrostatics	Hydrostatics
Footstock stroke	150 mm	150 mm	150 mm
<b>Axes</b>			
Linear guide ways	Hydrostatics / Linear rails	Hydrostatics / Linear rails	Hydrostatics / Linear rails
Grinding spindle	Hydrostatics	Hydrostatics	Hydrostatics
Drive	Linear motors	Linear motors	Linear motors
<b>Dimensions</b>			
Dimensions	10,225 x 5,500 mm	12,400 x 5,500 mm	14,575 x 5,500 mm
Machine weight	80,000 kg	90,000 kg	100,000 kg

# 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.

## Industry 4.0 The future of manufacturing

Industry 4.0 is the next Industrial Revolution, which is a transition powered by data and automation technology that could transform every step of the manufacturing process from the supply chain and enterprise to the shopfloor and end users.

### Instrumentation

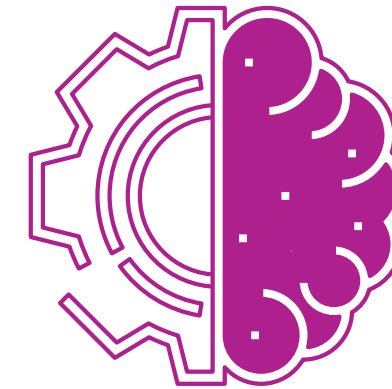
- Choice of sensor technologies
- Development of sensor/gateway interface

### 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



### Experience advanced monitoring

- Optimize your teams working time by benefiting from relevant information
- Benefit from alerts issued at the right time, to the most appropriate people
- Measure your performance in real time
- Identify the potential gains on all your installations



### Improve and accelerate quality control

- Master the parameters of your processes by integrating quality prediction models into your toolbox
- Adjust the many parameters that influence the quality of the finished product
- Control repeatability
- Detect abnormal events and slow changes



### From retrospection to prediction

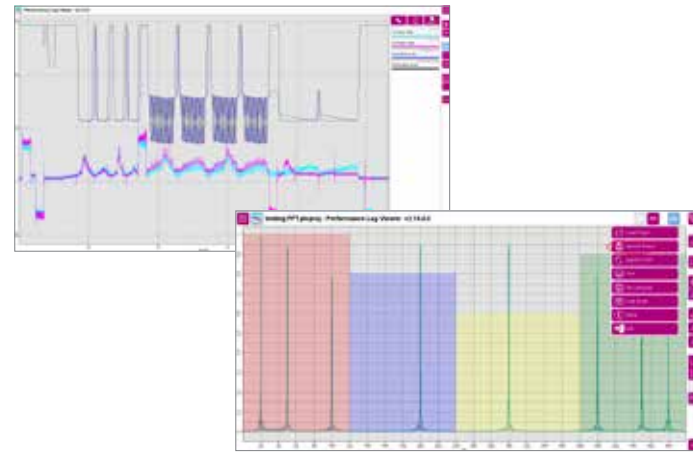
- Predictive models built on the most advanced techniques in data mining and analysis
- Maximize the use of your tools without risking breakage
- Utilize AI to detect weak signals that are undetectable to humans
- Enhance your data history with AI

# 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.

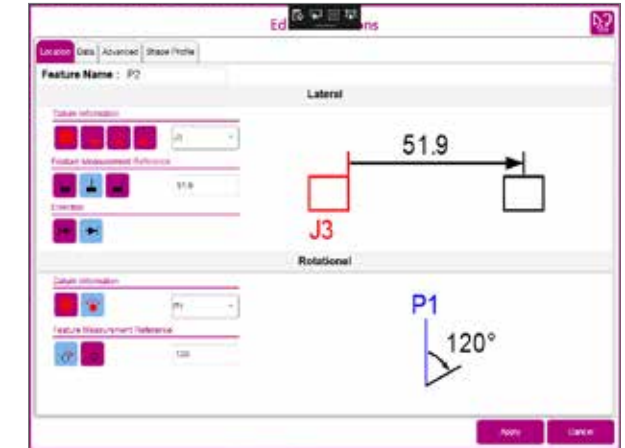
- It can be installed on grinding machines as well as desktops/laptops
- FFT analysis (SIEMENS compatible)
- Viewer for log files created by CNC6400, including force, position and velocity data from all axes
- Key for analysis of process



## 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.

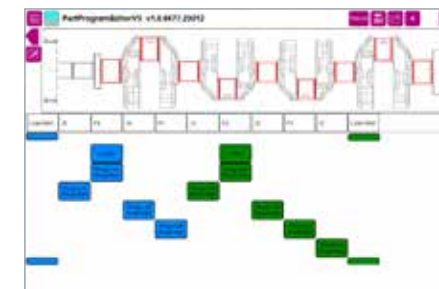
- Produces a visual representation of the part and its features
- Add, remove or change the position of processes easily
- Provides a common programming platform between CNC6400, Siemens and FANUC



## 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.

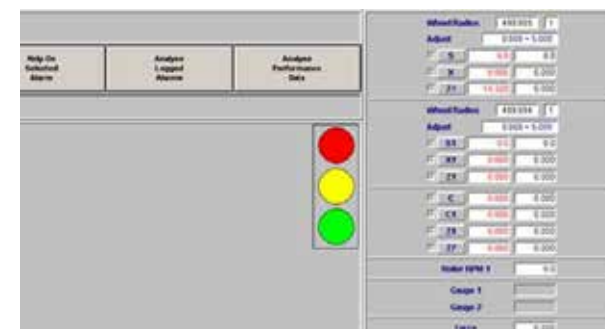
- 3D visualisation driven directly from control
- Allows software development prior to machine build
- Crash detection (in use on multiple applications)



## Machine Health

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

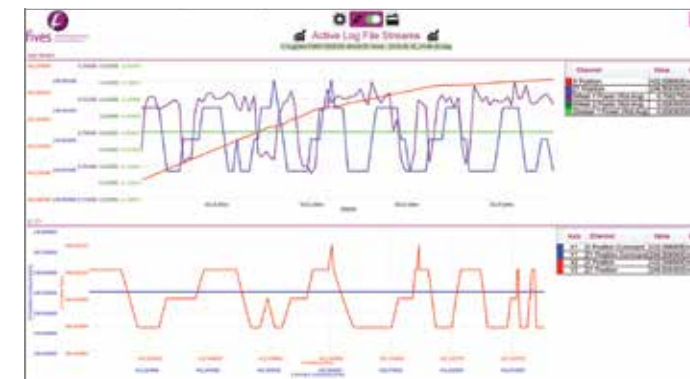
- Uses log data to determine machine axis condition
- Automatic FFT analysis of axis data
- Provides simple, visual information of machine condition to the operator



## 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.

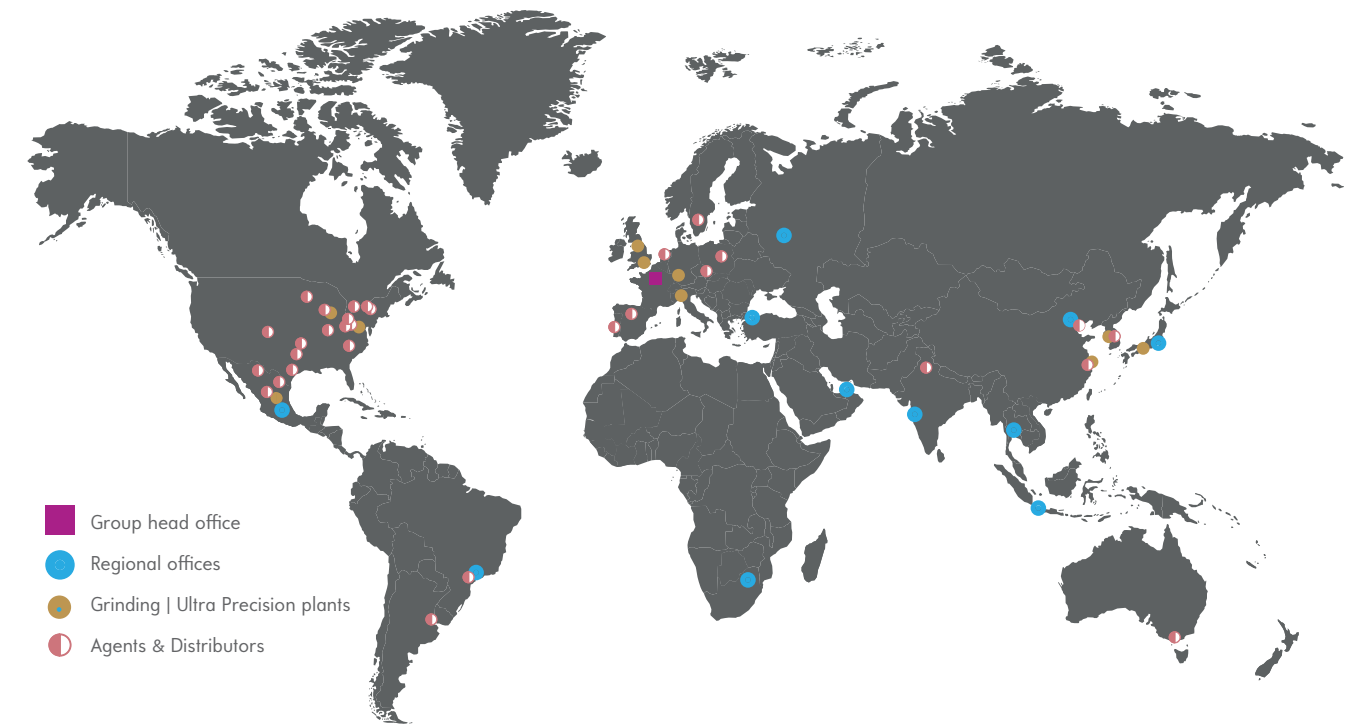
- Market specific solutions
- Engineered in-house
- Easy implementation into your current production processes
- Eliminate all possible project management headaches
- Gaging



## 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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