

JUCAM

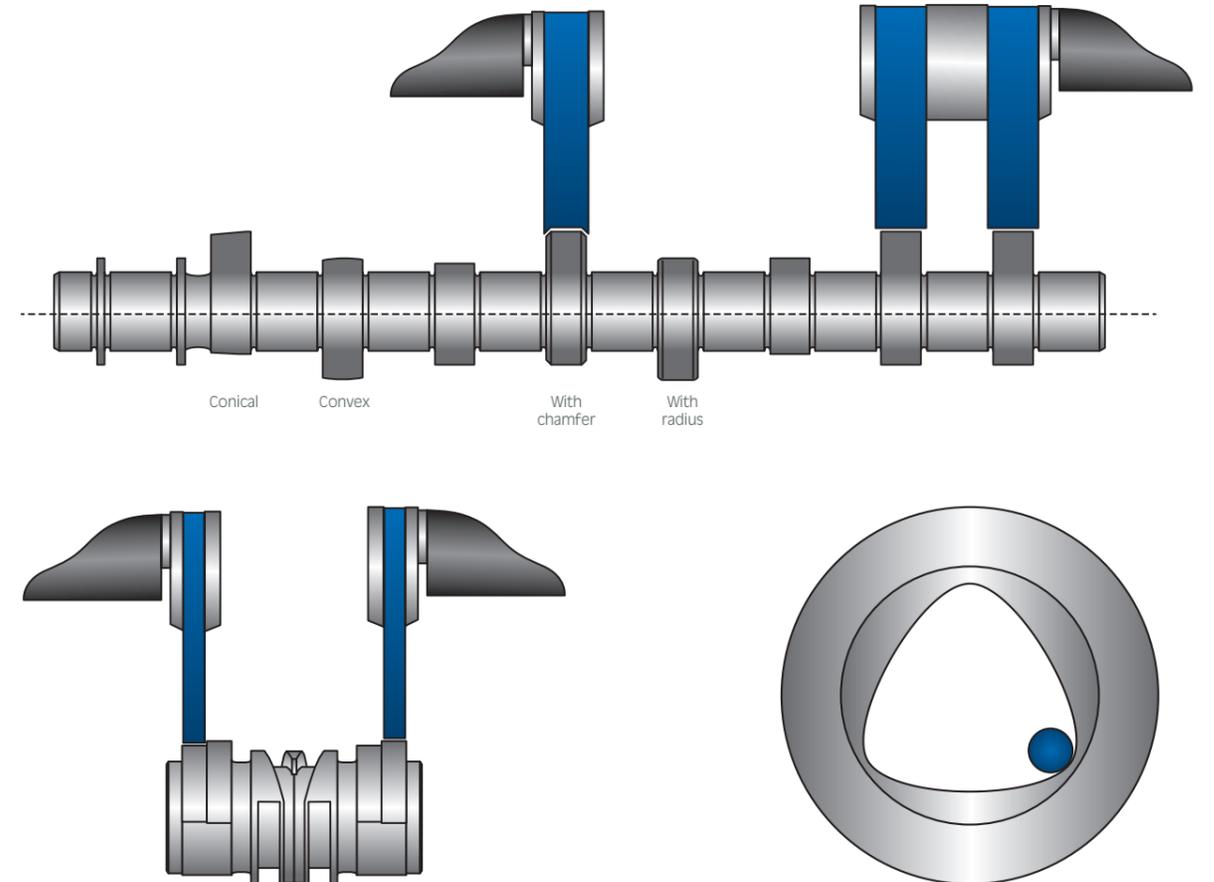
CAM GRINDING



PURELY A MATTER OF FORM



The OD/ID grinding machines of the JUCAM series impress with precise grinding results in a single clamping set-up. Thanks to the control system with learning function – with which virtually all disturbing variables are compensated – camshafts, cam pieces and individual cams are given a perfect finish. The many decades of experience in grinding cams, the many special solutions and the resulting expertise in finding solutions convince engine and pump manufacturers the world over.



OD/ID GRINDING

Grinding machines for grinding camshafts, cam pieces and individual cams combine non-cylindrical grinding for the cams and cylindrical grinding for the bearings. With non-cylindrical OD/ID grinding, the grinding wheel follows the cam contour through interpolation of the workpiece spindle (C-axis) with the grinding spindle (X-axis). CBN or diamond are used as an abrasive – for high cutting performance with a constant level of quality and a long tool life.

The cam geometry is specified in a lift table. In the process, each angle is assigned a lift value to define the cam contour and import it to the program. The software then interpolates the values automatically. The cam contour is frequently concave in the infeed and discharge area. Here the concave radius determines the maximum grinding wheel diameter that can be used.

ECONOMICAL GRINDING WITH LEADING TECHNOLOGY



HIGHLIGHTS

- **Broad range of grinding solutions** for camshafts, cam pieces and individual cams
- **Non-cylindrical OD/ID grinding**
- **High utility value** through adjustment to respective grinding assignment
- **High long-term precision** due to hydrostatic round guides
- **Maximum repeat accuracy** thanks to CBN or diamond abrasives
- **Minimized undulations** due to grinding wheel balancing on two levels

CAM PIECES

When grinding cam pieces, it is essential that the exact angular reference to the inner toothing is ensured. For this reason, the JUCAM clamps the cam pieces with an inner clamping mandrel. The longitudinal and radial positioning and the C-axis with direct drive result in a smooth, transition-free shifting surface.



WORKPIECE SPECTRUM

The grinding machines of the JUCAM series grind camshafts, cam pieces and individual cams in all series production sizes. In addition to the cams, the bearings and the flat shoulders can also be ground in a single clamping set-up. The many decades of experience in grinding with CBN guarantees maximum accuracy with extremely short cycle times.

The grinding range covers all cam shapes – with or without a chamfer or radius:

- cylindrical/conical
- concave/convex
- polygonal/elliptical
- with tangent

Concave



Polygonal



Elliptical



With tangent



Internal toothed wheel



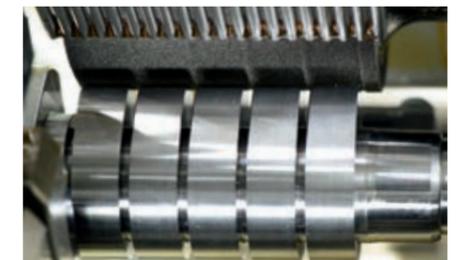
DOUBLE WORKHEAD

The workhead with two opposing clamping devices minimizes the downtime when grinding individual cams and cam pieces: While grinding is being carried out on one side, unloading and loading, clamping and positioning are carried out on the other. The only downtime: Swiveling by 180 degrees in less than 3 seconds.



GRINDING WHEEL SETS

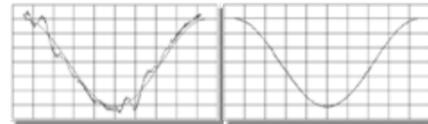
The use of grinding wheel sets is ideal for grinding cams with the same orientation. Several cam contours are ground simultaneously in one operation, which considerably reduces the cycle time. Carbon base bodies are also available for saving weight.



EQUIPMENT AND OPTIONS

LEARNING FUNCTION

The JUCAM's control system provides automatic compensation of runout and disturbing variables such as temperature influences, grinding allowance fluctuations or material changes. Even minimal deviations between the target and actual position of the grinding wheel are automatically corrected.



STEADIES

The self-centering three-point steadies ensure centric support even in the event of different workpiece diameters. Tracking hydraulic jaws guarantee a balanced ratio of forces at all three support points, and with it a grinding process with repeat accuracy.

LONGITUDINAL AND RADIAL POSITIONING

In order to generate a precise width and angular position, the position must be precisely determined when clamping the camshaft. For this, a touch probe measures the longitudinal position. The radial positioning is carried out either via the touch probe or mechanically with the workpiece geometry during clamping. The measured values are automatically integrated in the grinding process by the control system.



IN-PROCESS MEASURING SYSTEM

A digital measuring head carries out an in-process measurement of the bearing diameter. The control system logs the measured values, calculates the correction data and compensates process influences due to temperature fluctuations or grinding wheel wear in this way. The measuring probes can be adjusted quickly to the respective diameter manually.

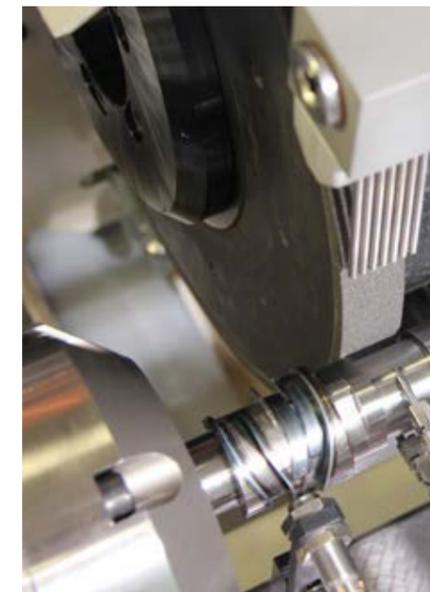
C AXIS WITH DIRECT DRIVE

Torque motors are used for direct drive of the C axis. This ensures impressive quiet running, high torque rigidity and superb dynamics in the C axis.



CONTROL SYSTEM

The Erwin Junker Operator Panel was specifically developed to control grinding machines. All machine components are controlled using the operator panel – irrespective of the series and the used control system. The identical structure, intuitive menu guidance and visualization of the workpiece geometry make for extreme user convenience and flexibility in operation. Programming takes place directly using the operator panel or an external programming tool.

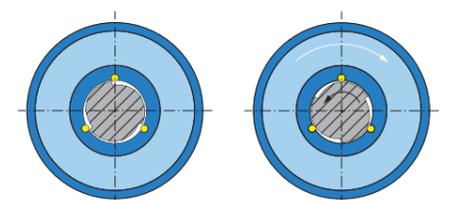


AXIS DRIVE AND GUIDANCE

With platforms 1 to 8, the wheelheads traverse along the Z axis. The mechanical direct drive uses the rack and pinion to perform absolutely play-free positioning independent of both load and temperature – thanks to two drive motors per slide. With platforms 1000 to 5000, the grinding table traverses on a flat prism guide with pre-tensioned ball screw. The X axis with hydrostatic round guide carries out stick-slip-free positioning with minimal wear and maintenance requirement – due to the absence of any metal contact between the guide column and housing. Drive takes place by means of an ultra-precise hydrostatic feed spindle which is suitable for extremely high forces and has no acceleration limit. The B axis of the wheelheads is driven by a play-free gear or torque motor. Every angular position is programmable; the path measuring system has a sensational resolution of 0.00001 degrees. The directly driven grinding spindles – internally produced – ensure extremely low-noise running, with structure-borne sound sensor and dynamic balancing system on one or two levels.

CLAMPING FIXTURE

The patented 3-point mounting interface allows grinding wheels, centers and work holding on grinding spindles, workheads and tailstocks with highest precision in record time. Adjustment of the tailstock and, where applicable, the workhead can optionally take place using a chain wheel, a hydraulic cylinder or a CNC axis with rack and pinion drive. An airlift function simplifies position adjustment. Depending on the workpiece, in addition a wide range of clamping systems are also available.



MACHINE BED

The machine bed made of cast mineral provides impressive damping behavior and torsional rigidity. The temperature stability allows fluctuations in the ambient temperature to be compensated with a minimum of effort. This ensures a high level of dimensional stability throughout the whole day.

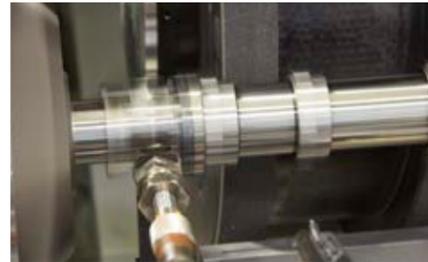


LOADING SYSTEMS

JUNKER offers both internal and external loading systems for all series, depending on the customer and workpiece requirement. The loading systems can be combined with different infeed and discharge systems such as conveyor belts and systems customized in line with customer requirements.

MEASUREMENT SYSTEMS

The measurement systems are also individually adjusted to the various workpieces and customer specifications. The measurement processes entail evaluating the recorded measured values and utilizing them for measurement correction in line with the prepared measurement strategy. A grinding wheel measuring system to determine the diameter, axial position and width of the grinding wheel completes the wide range of systems on offer.



DRESSING UNIT

Grinding wheel dressing is CNC controlled. A driven diamond dressing wheel or a workpiece-dependent diamond profile roller can be used. Dressing takes place manually or using an automatic dressing program with grinding wheel compensation.

ABRASIVE

Depending on the application, the abrasive CBN or diamond is used. The basic bodies of the grinding wheels comprise steel or carbon. In conjunction with CBN, it can make sense to use a carbon base body: It is light, has vibration-damping properties and remains dimensionally stable even at high speeds.



FIRE PROTECTION AND LTA AIR FILTER

In case of an explosion, the machine interior is automatically hermetically sealed, suffocating a fire before it has a chance to spread. If required, extinguishers (CO₂ or water mist systems) and exhaust air purification systems can be additionally installed. A competent partner for fire protection and filtration solutions is LTA Lufttechnik GmbH, which also belongs to the JUNKER Group and which researches, develops and produces filtration systems for industrial air purification.

FIELDS OF COMPETENCE

TECHNOLOGY CENTERS

The JUNKER Technology Centers in Nordrach, Germany and in Holice in the Czech Republic offer a wide selection of grinding machines for demonstrations and customer-specific grinding tests. These facilities give potential buyers and customers the chance to be impressed by the technical and economic performance of JUNKER and ZEMA grinding machines and test them on their own workpieces.

SERVICE

The company group's growing sales and servicing network ensures satisfied customers the world over. JUNKER Premium Service acts swiftly and with outstanding expertise wherever its customers are around the globe. Available round the clock, this service provides the assurance of planning reliability for customers: The highly qualified team will find the right solution no matter what the problem.

ENERGY EFFICIENCY

A key indicator for the efficiency of a machine tool is the amount of energy required for a good part. This value is continuously falling in grinding machines from JUNKER, as ever more grinding steps are possible in a single machine, downtimes are reducing and precision continues to increase.

Within the framework of energy management, potential for savings is continuously recognized and utilized. Examples include frequency-regulated components, recovered braking energy or the optimized sealing air requirement of self-developed grinding spindles.

PRODUCTION LINES

JUNKER can offer comprehensive references for the design and implementation of production lines tailored perfectly to customer requirements. As general contractor, JUNKER attaches enormous importance to standardized interfaces, for instance for workpiece transport, coolant systems or measurement devices. This enhances efficiency and ensures the long-term interaction of all plant components.

NON-STANDARD SOLUTIONS

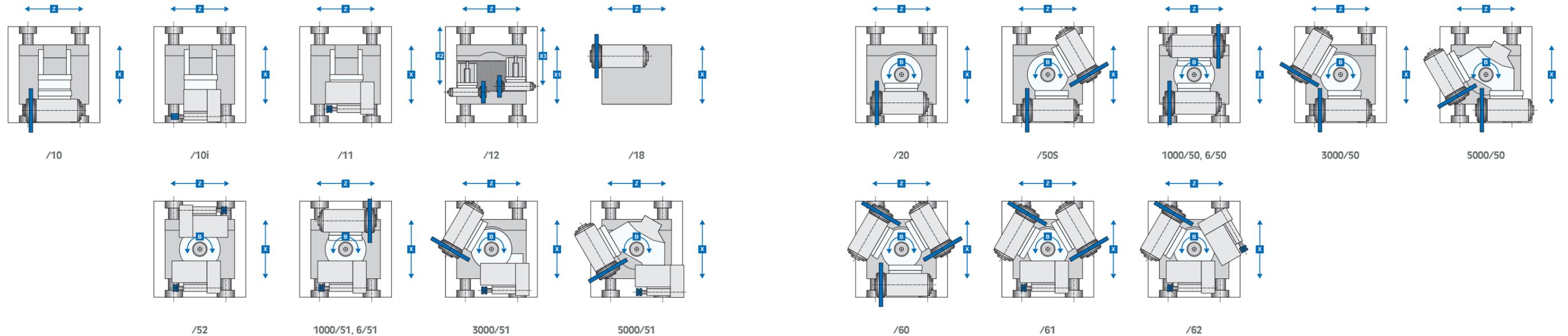
A new grinding technology challenge for JUNKER? "Tell us what your grinding assignment is and we will supply the perfect machine." The engineers and technicians of the JUNKER team are able to draw on an enormous fund of technological expertise to put together customized solutions to address every conceivable application. Top priority: Increasing the quality of workpieces, reducing cycle times.

TECHNICAL DATA



PLATFORM	1S	1000	3000	5000	6XS	6S	6L	6XL
Available wheelhead versions	/10 /10i /11 /20 /50 /51	/10 /10i /11 /20 /50 /51	/10 /10i /11 /20 /50 /51 /60 /61	/10 /10i /11 /20 /50 /51 /60 /61	/10 /10i /11 /12 /20 /50 /51 /60 /61	/10 /10i /11 /12 /20 /50 /51 /60 /61	/10 /10i /11 /12 /20 /50 /51 /60 /61	/10 /10i /11 /12 /20 /50 /51 /60 /61
Number of wheelheads	1	1	1	1	1	1 2	1 2	1 2
Grinding length	150 mm	150 mm	400 mm	700 mm	500 mm	1.000 mm 750 mm	1.800 mm 1.500 mm	2.800 mm 2.500 mm
Clamping length	150 mm	150 mm	400 mm	700 mm	600 mm	1.200 mm	2.000 mm	3.000 mm
Center height	100 mm	100 mm	150 mm	170 mm	170 mm	170 mm	170 mm	170 mm
Workpiece weight	5 kg	5 kg	15 kg	130 kg	130 kg	150 kg	200 kg	300 kg
Grinding wheel diameter (max.)	350 mm	350 mm	350 mm	500 mm	500/700 mm	500/700 mm	500/700 mm	500/700 mm
Peripheral diameter	80 mm	80 mm	150 mm	280 mm	280/320 mm	280/320 mm	280/320 mm	280/320 mm
W x D x H (without peripherals)	1.800 x 2.500 x 2.100	1.500 x 2.500 x 2.100	3.400 x 2.800 x 2.200	4.900 x 3.400 x 2.350	3.260 x 3.750 x 2.450	4.100 x 3.750 x 2.450	4.900 x 3.750 x 2.450	6.400 x 3.750 x 2.450
Weight	10.000 kg	9.000 kg	12.000 kg	17.000 kg	20.000 kg	25.000 kg 28.000 kg	28.000 kg 31.000 kg	31.000 kg 34.000 kg

WHEELHEAD VERSIONS



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