Mobile Base of Three-Dimension Motor

The movable base achieves precise positioning of the motor in the X/Y/Z directions using servo motors paired with reducers. The travel range for each axis can be customized.

The 3D base features high rigidity, ensuring industry-leading vibration performance of motors in China. It maintains vibration velocity values below 1.5 mm/s for 16MW motors and 1.8 mm/s for 30MW motors across the full-speed range.

The base supports integrated lifting, enabling rapid position switching.

Gearbox position switching efficiency has improved by 75%, reducing the transition time from two days (traditional base) to just half a day or less.

More than 20 sets (40+ units) of motor movable bases have been successfully delivered.

Year of 2018
3.7MW motor 3D movable base

Year of 2018-2019
8MW motor 3D movable base

Year of 2023
10MW motor 3D movable base

Year of 2021-2023
16MW motor 3D movable base

Year of 2023
24MW motor 3D movable base

Year of 2024
28MW motor 3D movable base

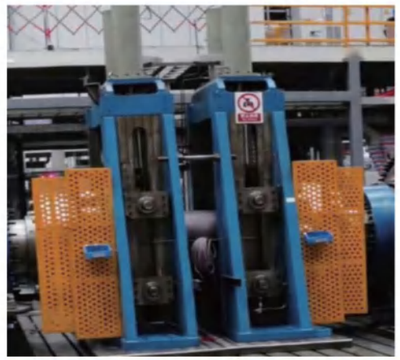
Rigid shaft/low speed shaft connector

Mainly used for the quick connection of two gearboxes under the test in the wind power speed increaser test bench and the transmission of test speed and test torque.

To meet the gearbox test requirements of different heights, the bearing housing of the low-speed shaft transmission system can be adjusted vertically within the rigid shaft support.

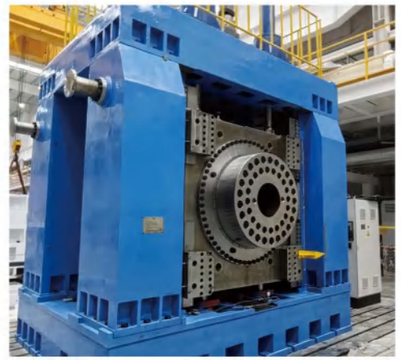
After adjusting the bearing housing to the specified position, it is locked as an integrated unit with the rigid shaft support using dual-side locking hydraulic cylinders (disc spring locking, hydraulic release), simulating the actual gearbox installation conditions.

First Generation	Second Generation	Third Generation
Product Features: ①. Utilizes a hydraulic cylinder for overall lifting, allowing a large left-right adjustment range; ②. Equipped with 8 side locking devices with disc spring locking; ③. Each flange side has 8 locking hydraulic cylinders with disc spring locking; ④. Maximum single-side suspended gearbox weight of 50T.	**Product Features:** ①. Added ball screw lifting mechanism, significantly increasing load capacity; ②. Equipped with 20 side locking devices with disc spring locking; ③. Closed-loop control with grating ruler, ensuring high synchronization; ④. Maximum single-side suspended gearbox weight of 80T.	**Product Features:** ①. Optimized guide rail structure for strong vibration resistance; ②. Closed-loop control with grating ruler, ensuring high synchronization, with added gantry functionality; ③. Composite rolling-sliding guide for improved guiding performance; ④. High load capacity and strong rigidity, with a maximum single-side suspended gearbox weight of 140T.



Year of 2016 8MW gearbox test bench
Rigid shaft/low-speed shaft connector

Year of 2018 16MW gearbox test bench
Rigid shaft/low-speed shaft connector



Year of 2022 16MW-28MW gearbox test bench
Rigid shaft/low-speed shaft connector

Digital Multi-Function Comprehensive Performance Test Bench

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Gear Milling Supporting

Process Support & Auxiliary Equipment

Rough Milling

With larger cutting depths and suitable metal removal rates, it is suitable for the rough machining needs of gears.

Semi-Finish Milling

Using a semi-finish milling cutter on a machine tool configuration for finish milling can meet pre-grinding high-efficiency processing, optimizing machining efficiency and overall cost.

Finish Milling

Using a finish milling cutter on a machine tool configuration for finish milling can achieve GB8-level precision.

Process Combination

Rough Milling—Finish Milling

The entire machining process of the workpiece can be completed with tool changes on the same equipment, or direct shaping can be performed using a finish milling cutter.

Milling—Grinding

For high-precision and high-hardness workpieces, a semi-finish milling cutter head is used to machine the gear teeth, leaving a small normal allowance for final gear grinding and profiling.

Typical User On-site Images






SKXC CNC High-Speed Gear Milling Machine

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Machine Characteristics Introduction

Machine-bed

The Machine-bed features a rectangular guideway structure, offering good rigidity and vibration damping properties.

Column

A double-layer webbed structure. The bottom is equipped with a locking device to ensure cutting rigidity. An optional rear column mechanism is available for machining gearshaft-type components.

CNC System

Secondary development of the human-machine interface, making the operation of the machine tool more convenient and user-friendly.

Spindle Box Automatic Rotation Mechanism

Satisfying the requirements for helical gear processing.

Spindle Box

Dual-side drive system for transmitting high cutting power, with an active hydraulic backlash elimination structure to reduce milling cutter noise and improve gear surface finish.

Single/Dual Worm-gear Rotary Table

Utilizes heavy-duty, high-precision rotary tables. The locking mechanism enhances the cutting rigidity in the circumferential direction, suppressing both radial and circumferential vibrations of the rotary table.

Semi-Protective and Full-Protective

Optional semi-protective or full-protective structures are available.

Milling Gear Advantages

Application Range

Efficient and high-precision machining of internal/external spur/helical gears, soft and hardened gear teeth surfaces.

Efficiency

Supports high-power cutting for materials with hardness up to HB350.

Low Cost

Dry cutting with air cooling; interchangeable inserts with continuously improving service life.

Reliability

Incorporates multiple advanced detection methods and cross-sensing technologies.

User-Customized Machining Trajectory Planning

Capable of processing specified tooth profiles, such as crown, K-shape, inclined, other predefined curves, and symmetric/asymmetric tooth profile modifications.

Materials: 42CrMo Hardness: HB280-HB320 Mode:16mm Number of teeth: 177
Tooth width: 135mm Helix angle: 0°

Cutting Examples	Processing method	Gear milling processing	
		First cut	Second cut
	Cutting depth	33mm	36mm
	Feed rate	350mm/min	380mm/min
	Processing time	3.2h	3.0h
		6.2h	
	Cooling method	Air-cooling	

Technical Data Sheet

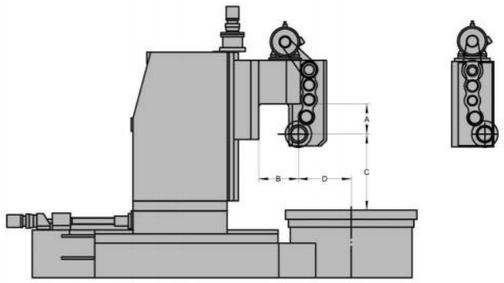
Technical specifications	SKXC-2000/16		SKXC-3000/20		SKXC-3000/25 SKXC-3000K/25		SKXC-4000/30 SKXC-4000K/30		SKXC-5000/35 SKXC-5000K/35		SKXC-6000/35		SKXC-8000/40		SKXC-10000/45		SKXC-12500/50	
Maximum processing module (mm)	20	26	26		26		26		32	36	32	36	36	40	36	40	36	40
Tool diameter (mm)	ø360-ø400	ø380-ø420	ø380-ø420		ø380-ø420		ø380-ø420		ø400-ø480		ø400-ø480		ø420-ø500		ø420-ø500		ø420-ø500	
Tool holder diameter (mm)	ø70	ø90	ø80	ø90	ø80	ø90	ø80	ø90	ø100		ø100		ø100		ø100		ø100	
Maximum helix angle (°)	±22.5		±22.5		±22.5		±22.5		±22.5		±22.5		±22.5		±22.5		±22.5	
Minimum processed outer tooth root diameter (mm)	—	ø550	—	ø1100	—	ø1400	—	ø1900	—	ø2500	—	ø3000	—	ø4000	—	ø6000	—	ø8000
Maximum processed outer tooth outer diameter (mm)	—	ø2000	—	ø2500	—	ø3000	—	ø4000	—	ø5000	—	ø6000	—	ø8000	—	ø10000	—	ø12500
Minimum processed inner tooth inner diameter (mm)	ø550	—	ø1100	—	ø1400	—	ø1900	—	ø2500	—	ø3000	—	ø4000	—	ø6000	—	ø8000	—
Maximum processed inner tooth outer diameter (mm)	ø2000	—	ø2500	—	ø3000	—	ø4000	—	ø5000	—	ø6000	—	ø8000	—	ø10000	—	ø12500	—
Tool center depth (mm) A	600	—	600	—	600	—	600/800	—	600/800	—	600	—	600	—	600	—	600	—
Distance from tool center to rear wall (mm) B	610	—	610	—	610	—	610	—	650	—	650	—	650	—	650	—	650	—
Worktable repeat positioning accuracy (")	≤±3		≤±3		≤±3		≤±3		≤±4		≤±4		≤±5		≤±5		≤±6	
X/Z axis repeat positioning accuracy (mm)	≤±0.01		≤±0.01		≤±0.01		≤±0.015		≤±0.015		≤±0.015		≤±0.015		≤±0.015		≤±0.025	
Spindle speed (rpm)	70-140		70-140		70-140		70-140		70-140		70-140		70-140		70-140		70-140	
Spindle radial runout (mm)	0.01		0.01		0.01		0.01		0.01		0.01		0.01		0.01		0.01	
Rotary worktable diameter (mm)	ø1600		ø2000		ø2500		ø3000		ø3500		ø3500		ø4000		ø4500		ø5000	
Maximum allowable worktable load (Kg)	12000		20000		25000		30000		50000		50000		100000		150000		200000	
Main motor power/Total power (kW)	30/60	37/70	37/70		37/70		37/70		45/80		45/80		50/90		50/90		50/100	
Machine weight(Kg)	45000		55000		60000		70000		85000		95000		125000		145000		180000	
Machine dimensions (Length x Width x Height，m)	6×3.5×5		8×4×5		8.5×4.5×5		9×5×5		11×6.5×6		12×7.5×6		15×9×6		17×12×6		22×18×6	

Note: The tool center depth (mm) A and the distance from the tool center to the rear wall (mm) B can be customized according to requirements.

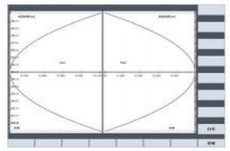
The technical parameters above are for communication/exchange purposes only, and The final machine specifications shall be subject to the technical agreement.

The workpiece processing diameter is related to parameters such as tool disc diameter, workpiece modulus, helix angle, etc.

SKXC-2000/16 can be optionally equipped with a rear column.



Extended Functionality



The software features comprehensive functionalities, a user-friendly interface, and intuitive human-machine interaction, integrating multiple tooth trace modification functions.

The machine is equipped with real-time axis safety monitoring, ensuring operational security in real time.

A dedicated internal gear milling spindle box can be configured to expand machining capabilities.

The machine includes an emergency stop and retraction function, effectively protecting the tool and equipment.

An optional rear column can be configured, available in both center support and clamping block structures.

The machine is equipped with embedded hobbing-milling composite software, allowing seamless switching between hobbing and milling operations.

Application Scenarios

Wind Power

Construction Machinery

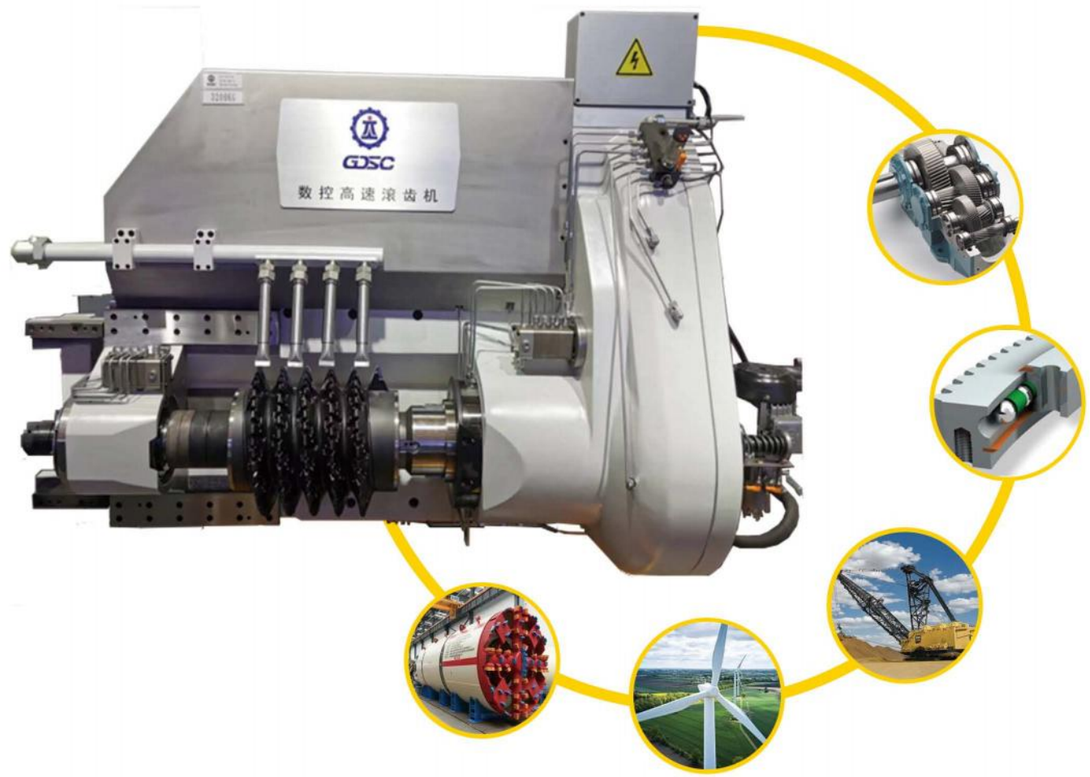
Petroleum Industry

Mining Machinery

Aerospace

Shipbuilding

SKGC CNC High-Speed Precision Hobbing Machine



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Machine Introductions

The SKGC series CNC high-speed hobbing machine is designed for machining various high-precision external cylindrical gears, achieving a processing accuracy of GB 8-9 grade. Optional configurations include an internal gear milling spindle box and a rear column. This equipment is widely applicable to the machining of internal and external gears in industries such as construction machinery, forging, wind power, and port machinery.

The standard configuration of the SKGC series CNC high-speed hobbing machine supports maximum machining diameters of Φ1250, Φ2000, Φ3000, Φ4000, and Φ5000, with a maximum module of up to 40mm. It is suitable for machining various internal/external, spur/helical gears.

Machine Characteristics

1. The machine' s hob spindle motor transmits power to the hob spindle through a high-precision gear pair, with a backlash elimination mechanism at the spindle' s end gear.

2. The hob spindle support adopts a hydrostatic bearing structure, enhancing transmission rigidity and torsional vibration resistance.

3. The tool holder spindle features a high-precision HSK interface with a built-in automatic clamping system, providing superior accuracy, rigidity, and balance. This prevents insufficient system stiffness from accelerating tool wear, there by extending tool life.

4. The linear feed axes adopt a combination of steel-inlaid guideways and linear rolling bearings with preloaded negative clearance guidance, improving positioning and repeatability accuracy while significantly reducing hobbing chatter under alternating cutting forces.

5. The machine bed and column are optimized using advanced design methodologies, ensuring high dynamic and static rigidity.

6. Equipped with a dual-worm gear and dual-worm backlash elimination rotary table, achieving a DIN 2-grade worm gear accuracy. The fully hydrostatic guideway provides high load-bearing capacity, excellent dynamic response, and high motion resolution.

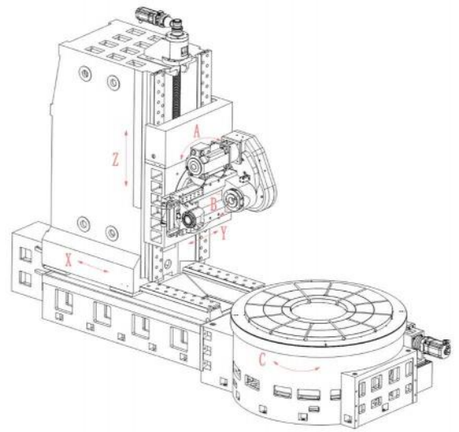
Technical Data Sheet

Serial Number	Technical Specifications	Parameter Specifications					
		SKGC-1250/10	SKGC-2000/16	SKGC-3000/20	SKGC-3000/25	SKGC-4000/30	SKGC-5000/35
1	Minimum Workpiece Diameter (mm)	100	300	750	1100	1600	2200
2	Maximum Workpiece Diameter (mm)	1250	2000	2500	3000	4000	5000
3	Maximum Workpiece Module (mm)	20	26	30	30	36	40
4	Z-Axis Travel Distance (mm)	1000	1400	1400	1600	1600	1600
5	Maximum Swivel Angle of Tool Holder (degrees)	±45	±45	±45	±45	±45	±45
6	Maximum Installed Hob Diameter and Length (mm)	Φ350×400	Φ450×500	Φ450×500	Φ450×500	Φ450×600	Φ500×700
7	Spindle Taper Bore	HSK-B125	HSK-B160	HSK-B160	HSK-B160	HSK-B160	HSK-B160
8	Maximum Hob Axial Travel (mm)	450	450	450	450	450	450
9	Distance Range Between Hob Center and Worktable Center (mm)	125-975	355-1355	550-1650	700-1900	900-2200	1250-2800
10	Distance Between Hob Center and Worktable Surface (mm)	430-1430	550-1950	600-2000	600-2200	600-2200	700-2300
11	Maximum Spindle Speed (r/min)	250	200	200	200	200	200
12	Maximum Worktable Speed (r/min)	12	6	5	5	4	4
13	Worktable Load Capacity (Kg)	8000	12000	20000	25000	30000	50000
14	Minimum Programmable quantity for X, Y, Z Axes (mm)	0.001	0.001	0.001	0.001	0.001	0.001
15	Main Motor Power (kW)	43	53	53	53	53	70
16	Worktable Diameter (mm)	1000	1600	2000	2500	3000	3500
17	Total Power Consumption (kW/50Hz)	80	90	90	95	100	120
18	Net Machine Weight (Kg)	35000	45000	50000	55000	65000	80000

*The minimum workpiece diameter depends on the cutter diameter, the presence of a transition plate, and the thickness of the transition plate.

Note: 1. The technical parameters above are for exchange purposes only; The final machine specifications shall be subject to the technical agreement;
2. The machine can be equipped with a dedicated internal gear milling spindle box to expand machining capabilities;
3. The SKGC-1250/10 and SKGC-2000/16 models can be configured with a rear column (optional tailstock and clamping block structure).

Machine Coordinate System



CNC Control Axes

X-Axis: Hob Radial Movement

Y-Axis: Hob Tangential Movement

Z-Axis: Hob Axial Movement

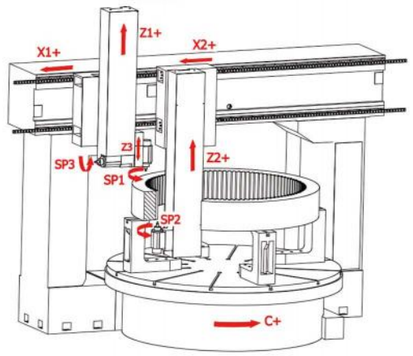
A-Axis: Tool Holder Swivel

B-Axis: Tool Rotation

C-Axis: Worktable Rotation

Machine Structure And Characteristics

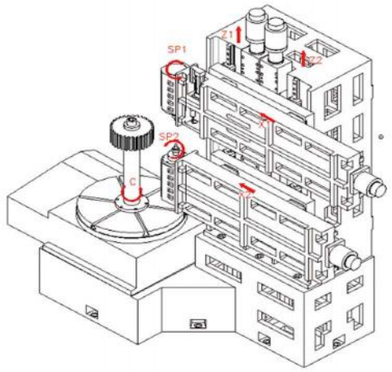
Machine Tool Coordinate System



◎Coordinate Axis

X1、X2	Radial Feed System
Z1、Z2	Axial Feed System
Z3	In-process Probe System
C	Rotary Table Indexing System
SP1/SP2	Gear Profile Chamfering Spindle System
SP3	Gear Lead Chamfering Spindle System

Gantry-Type CNC Composite Chamfering Machine: Large-Specification Internal/External Cylindrical Gears

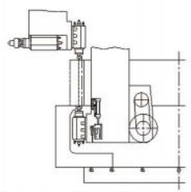


◎Coordinate Axis

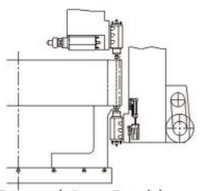
X1/X2	Radial Feed System
Z1/Z2	Axial Feed System
Z3	In-process Probe System
C	Rotary Table Indexing System
SP1/SP2	Gear Profile Chamfering Spindle System

Single-Column CNC Composite Chamfering Machine: Small-Specification Internal/External Cylindrical Gears

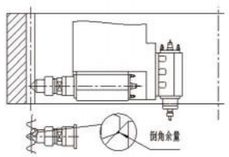
Composite Chamfering Process



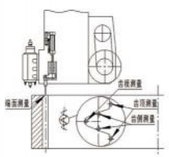
Internal Gear Double-Sided (Bilateral) Profile



External Gear Double-Sided(Bilateral) Profile



Gear Lead



Automatic Centering

Typical Workpiece





SKDL CNC Gear Composite Chamfering Machine

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Machine Characteristics Introductions

Introduction to Machine Tool

The SKDL series polar coordinate CNC gear composite chamfering machine is based on the CNC envelope principle. It utilizes carbide milling cutters to simultaneously chamfer both end faces of internal/external spur and helical gears, as well as both sides of the tooth flank and tooth slot. The machine features adjustable chamfer size and shape, consistent chamfer dimensions, automatic tooth slot centering, a high degree of automation, and high efficiency. It is suitable for CNC chamfering of gear profiles and tooth trace with diameters ranging from Φ150 to 4000mm.

Chamfering Types

The machine adopts an AC variable-frequency electric spindle direct-drive technology. It utilizes a variable-diameter ER collet to clamp carbide chamfering milling cutters for chamfering operations. The chamfering form is determined by the tool type, allowing for various chamfering options such as 30°, 45°, and R-radius chamfers. The chamfer size can be freely set by the machine, with the depth of cut controlled by the Z1/Z2 (or X1/X2) axes to adjust the chamfer dimensions. For workpieces with a hardness of HB250-350, a single pass can achieve a 3.5×45° chamfer with a surface roughness of Ra6.3.

Auxiliary Functions

The rotary table is equipped with an additional mechanical sealing device to prevent iron chips from entering.

The electric spindle adopts a closed-loop circulating water cooling system.

The cutting tool utilizes air-cooled dry cutting and supports fast positioning and clamping solutions for various types of gears.

Machine Protection

The machine is equipped with a semi/full protective enclosure, effectively preventing iron chip splashing.

Electrical Description

The machine is equipped with the Siemens SINUMERIK 828D CNC system, featuring a 10.4" color LCD display. The front panel supports a USB interface and an Ethernet interface, enabling convenient human-machine interaction and program data input. The system utilizes a high-speed bus communication method and is equipped with a Chinese-language display and a handheld operation unit, ensuring high reliability.

The CNC system of the machine can be connected to a PC for online debugging and program transmission. Additionally, it is equipped with a trigger-type probe, which utilizes the system's digital measurement interface to perform tooth surface centering measurements. Through built-in software algorithms, the system determines the relative position between the tool and the tooth slot, enabling automated tooth slot alignment. This significantly enhances alignment efficiency and accuracy.

Technical Data Sheet

Gantry-Type Structure: Primarily for Internal Gear Rings

Serial Number	Parameter Items	Unit	Technical Parameters		
			SKDL-1600	SKDL-2300	SKDL-4000
1	Gear Type		Internal/External Cylindrical Gears (Double-Sided)		
2	Workpiece Module	mm	6-40		
3	Root Fillet Radius	mm	≥R2.5		
4	Maximum Internal Gear Ring Outer Diameter	mm	Φ1600	Φ2300	Φ4000
5	Internal Gear Ring Inner Diameter	mm	Φ700-1400	Φ1000-2000	Φ1200-3600
6	External Gear Ring Outer Diameter	mm	Φ150-1400	Φ400-2000	Φ600-3600
7	Workpiece Helix Angle	°	≤30		
8	Tooth Width	mm	100-400	100-500	100-800
9	Chamfer Size	mm	3.5X45°(Chamfer Angle Adjustable by Tool)		5X45°
10	Worktable Diameter	mm	Φ1200	Φ2000	Φ3500
11	Worktable Load Capacity	Kg	3200	10000	30000
12	Overall Dimensions	m	3.5X2.5X3.0	4.5X3.5X4.0	6.0X4.0X5.0

Single-Column Structure: Primarily for External Gears

Serial Number	Parameter Items	Unit	Technical Parameters	
			SKDL-800	SKDL-1600
1	Gear Type		Internal/External Cylindrical Gears (External Gear Double-Sided, Internal Gear Single-Sided)	
2	Workpiece Module	mm	6-26 (Root Fillet Radius ≥ R2.5)	
3	Workpiece Diameter	mm	Φ100-800	Φ800-1600
4	Helix Angle	°	≤30	
5	Tooth Width	mm	30-800	100-800
6	Chamfer Size	mm	3.5X45°(Chamfer Angle Adjustable by Tool)	
7	Worktable Diameter	mm	Φ630	Φ1200
8	Worktable Load Capacity	Kg	2000	3200
9	Overall Dimensions	m	2.8X2.0X2.5	4.5X4.0X2.5

Project Application

Wind Power Sector

- Wind Power Yaw Slewing Bearing Test Bench
- Wind Turbine Pitch Slewing Bearing Test Bench
- Wind Turbine Main Shaft Bearing Test Bench
- Wind Power Gearbox Test Bench
- Wind Turbine Yaw Gearbox Test Bench
- Wind Turbine Pitch Gearbox Test Bench
- More.....

Tunnel Boring Machine (TBM) Sector

- Tunnel Boring Machine (TBM) Main Shaft Bearing Test Bench
- More.....

Construction Machinery/ Automotive Sector

- Construction Machinery Slewing Bearing Test Bench
- Transmission Test Bench
- Drive Axle Test Bench
- Wheel Hub Reducer Test Bench
- Hydraulic Torque Converter Test Bench
- More.....

General Mechanical Transmission Sector

- Standard/Non-standard Gearbox Test Bench
- More.....

Key Technology

Energy Feedback Technology

The gearbox torque testing bench can utilize an energy feedback system for loading. The drive unit is responsible for driving the tested gearbox, while the loading unit applies the required torque. During operation, the loading unit feeds energy back into the system, reducing overall energy consumption.

Arbitrary Load Curve Loading

The system enables dynamic loading with arbitrary load curves. The loading curve can be in various forms, including sine waves, ramp waves, square waves, or a combination of these. Users can freely set the loading type, cycle duration, and number of loading repetitions, ensuring long-term operation without distortion of the loading curve.

Automated Control and Testing

Users only need to configure the loading curve on the test bench's operating system and click "Start" to automatically complete the test process. The automated control program enhances operational convenience and reliability, freeing engineers from complex testing procedures.

Non-standard Structural Design

For different test objects and requirements, non-standard mechanical structure designs are carried out. While ensuring the reliability of the test functions, the design also takes into account the convenience and safety of installation and usage of the test bench.

Data Acquisition and Recording

Data acquisition and storage during the testing process are accomplished through acquisition boards. The data is displayed in various forms such as charts, numerical values, etc., making it easier for operators to run the system and analyze performance.

Fault Diagnosis Technology

Through reliable signals and advanced sensing technology, multi-dimensional condition monitoring of the tested object is conducted. By extracting and analyzing signals, potential faults of the object are identified, enabling early detection and prevention.

Experimental Platform of Gear Box

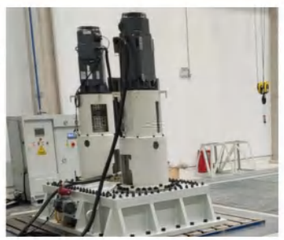
The test bench is used for factory testing, type testing, and product research testing of various specifications of gearboxes. It integrates advanced industrial technologies such as machinery, electricity, hydraulics, measurement, and control.

The test bench adopts advanced vector or DTC control technology, with the load-free loading unit directly controlling the drive motor and auxiliary motor to achieve precise system control. Motor parameters can be optimized and adjusted to ensure the motor operates in the best state.

Energy recovery technology is used for testing. From an energy perspective, the external power supply only needs to provide the portion of power that is converted into heat due to mechanical friction and electronic component losses during the test cycle, allowing the system to run efficiently.

Loading power range: Kilowatt(KW)-level to Megawatt(MW)-level.

Wind power gearbox test bench



Wind Turbine Pitch Slewing Bearing Test Bench

Transmission test bench

Transmission/torque converter /drive axle/wheel reduction assembly test bench

Experimental Platform of Slewing Bearing

Independently developed and designed, applied to non-standard test rigs for large-scale slewing bearings/bearing industries.

It integrates multidisciplinary technologies including mechanical structure analysis, hydraulic system design, control system design, testing system analysis, and construction engineering.

Test purpose: To simulate the performance and lifespan of slewing bearings/bearings under axial force, radial force, and overturning load conditions.

Test functions: Static load testing, dynamic load testing, bearing life testing, root stress testing, etc.

Shield Machine Main Bearing Test Bench
Maximum Workpiece Size: Φ4800mm

Wind Power Slewing Bearing Performance Test Bench
Maximum Workpiece Size: Φ6500mm

Construction Machinery Slewing Bearing Test Bench
Maximum Workpiece Size: Φ1600mm

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