



HKW - Model 2000 Multi-function friction and wear testing machine



国家高新技术企业

Product Proposal

**Jinan HengXu Testing Machine Technology Co.,
Ltd**

TECHNICAL INFORMATION, DO NOT COMMUNICATE



One.Product introduction

HKW-2000 multi-functional friction and wear testing machine is a new friction and wear testing machine product. It is a reciprocating, rotary and ring-block sliding friction and wear testing machine widely used. It is mainly used to study the friction performance of materials or surface coatings. The equipment has the advantages of stable and reliable reciprocating stroke adjustment, wide adjustment range, high friction measurement accuracy, various integrated rotary (pin plate, end face, ring block, etc. friction) test forms, etc.

The main friction pair of the machine adopts standard pin plate friction, ball friction and end face friction can be selected, and the selection of ball plate reciprocating, pin plate reciprocating, end face rotation, ring block sliding friction and other friction pairs can be expanded from the function. The testing machine host adopts computer detection and control. The special friction and wear testing machine measurement and control system developed by Hengxu based on imported NI high-speed industrial control can collect real-time test data at high speed and draw various parameter curves in real time. The point acquisition frequency is up to 50kps, and the safety protection is perfect (millisecond protection), so as to realize dynamic and effective detection of the process and improve the measurement accuracy of friction, test force and other parameters. The software is provided with parameter over-preset shutdown or alarm protection. Sophisticated instrument design, convenient installation and commissioning, clear and humanized software interface, and convenient operation.

1. The reciprocating friction mode of the tester is the upper pin/pin roll and the lower friction plate. The sliding friction pair is formed through the reciprocating motion of the plate. The size of the pin roll or pin roll can be



changed by changing the collet; The rotating friction form is fixed by the upper pin sample or end face sample. The load is applied to the upper sample and the lower sample rotates to form a sliding friction pair; The friction form of the ring block is that the upper sample block is fixed, and the test ring rotates to form a ring block friction pair;

2. The tester can monitor the friction, test force, comprehensive wear and temperature in the friction process in real time, calculate the friction coefficient, and analyze and judge the friction state by judging the change of parameters: running-in (initial fluctuation) - stable (smooth or slightly fluctuated) - initial failure (friction and friction coefficient fluctuation are obvious and violent) - complete failure (friction and friction coefficient suddenly increase or fluctuate, and temperature may also increase suddenly).

3. The tester has high temperature heating function, and the system is equipped with high temperature alarm system, which is used for system stability monitoring and detection (optional) during long-time operation.

4. The tester is composed of main frame to bear transmission parts, stressed parts and sensing and measuring parts. Meanwhile, it is equipped with special multi-functional friction and wear measurement and control system. The control system mainly consists of electrical parts, driving system and actuating parts. The experimental test system installed on the industrial control computer controls the coordinated action of each part. During the experiment, the data processing software system collects, analyzes and stores the test data in real time.

5. Equipment accessories include clamps, special tools and tools required for conducting tests, and some vulnerable accessories include pressure heads, pressure blocks, screws, etc.



The equipment is continuously innovated and upgraded,
and the pictures are for reference only

Two. Main technical specifications:

No	Project	Parameter	
1	Maximum test force	200N/500N/1000N, error $\pm 1\%$	
2	Loading mode	Automatic loading (closed loop control)	
3	Force sensor	20/50/100kg	
4	Reciprocating friction	Reciprocating frequency	0~20Hz
		Linear velocity	0.1m/min~10m / min, based on stroke calculation, stepless adjustable, error $\pm 5\%$
		Form of friction	Surface-to-surface friction of pin on disc, simulation wear test of pipe cylinder surface, optional additional configuration (column and plate rolling friction, ball and inventory line friction)
		Reciprocating stroke	0.2mm~20mm
		Measurement of	Dynamic friction measurement of acceleration



		friction force	
		Force measurement accuracy	$\pm 1\%$
		Sample size	Pin sample: $\phi 4-10\text{mm}$ (standard 4mm,4.8mm,5mm optional), ball sample $\phi 6.35$, disk sample $\phi < 80\text{mm}$, disc thickness $\leq 10\text{mm}$ (standard configuration $\phi 75\text{mm}$, thickness 4mm)
*Note: this module is the standard basic module			
5	Rotational friction	Max rotating speed	2000rpm
		Rotation accuracy	$\pm 1\text{rpm}$
		Diameter of rotation	80mm
		Form of friction	Pin disc friction,(optional ball disc friction and end face friction)
		Friction medium	Dry and wet pin on disc friction, end face friction, adjustable oil drop lubrication 40ml/min(optional)
		Force sensor	200N
		Force measurement accuracy	$\pm 1\%$
		Sample size	Pin sample: $\phi 4-10\text{mm}$ (standard 4mm,4.8mm,5mm optional), ball sample $\phi 6.35$, disk sample $\phi < 80\text{mm}$, disc thickness $\leq 10\text{mm}$ (standard configuration $\phi 75\text{mm}$, thickness 4mm)
*Note: This module is an optional module, which can be added with a normal-temperature standard rotating module or an ultrahigh temperature rotating module			
6	Ring on block friction	Max ring speed	2000rpm
		Rotation accuracy	$\pm 1\%$
		Diameter of friction	20-50mm(standard 40mm)



	ring	
	Form of friction	adjustable oil drop lubrication 40ml/min
	Force sensor	10kg
	Force measurement accuracy	$\pm 1\%$
*Note: This module is an optional additional module as a whole		
7	Temperature measurement mode	PT100/thermocouple
8	Online grinding measurement	Photoelectric measurement (optional extra module)
9	Resolution of wear measurement	0.001mm
10	Lifting height	0~100mm
11	Precision of guide rail	ΔC not more than 5 μm , ΔD not more than 8 μm)
12	Time display mode and control	10S-9999H (frequency and reciprocating frequency mode)
13	Data processing	A set of standard Advantech special computer processing system
14	Optional extended functions	Independent functions such as high-temperature rotation module, electrochemical corrosion friction module, conventional high and low temperature environmental testing module (HCW), salt spray corrosion testing module (HCW), vacuum environmental testing module (HCW), ultra-low temperature module (HCW), current carrying friction module, and abrasion measurement module (all functions are optional)
15	Main drive motor power	750W/1000W/1500W
16	Module drive motor power	500W/750W/1000W
17	software function	The equipment configuration software can realize the integrated display of load, friction force, friction temperature, reciprocating frequency, friction



		coefficient, wear amount and wear volume; Draw parameter curves in real time and save real-time data; Compare and analyze the data at the stage and generate the test report.
18	Size	Mainframe: 450*800*1050 (mm) Control cabinet:580*620*1600 (mm)
19	Weight	400kg

Note: friction wear equipment has strong specificity, and the above parameters are only for reference.

Three. Main configuration:

NO	Name	Brand	Quantity	
1	Main frame	HENGXU/M002	1 unit	
2	Combination constant loading system	HENGXU/M002	1 set	
3	Main motor	Taiwan/Dongyuan	1 unit	
4	servo controller	Taiwan/Dongyuan	1 set	
5	Temperature measurement system	Xiamen/Yudian	1 set	
6	Specialized measurement and control system	HENGXU/SMCS1.6	1 set	
7	Reciprocating sliding module	HENGXU/HR2	1 set	
8	Rotating friction module	HENGXU/MV2	1 set	Optional configuration
9	Ring block rotation module	HENGXU/MH2	1 set	Optional configuration
10	Industrial control system	Hengxu/Customized	1 unit	
11	Collection board	Hengxu/Customized	1 set	
12	Force sensor	Guangzhou/Electrical Testing	1 set	
13	Sample loading and unloading tools	——	1 set	Accompanying gift
14	Standard toolkit	——	1 set	Accompanying gift



15	Color printer	HP/Color Spray	1 unit	Accompanying gift
18	Product User Manual	_____	1 copy	Attached
19	Product Qualification Certificate	_____	1 copy	Attached
20	Product packing list	_____	1 copy	Attached

Note: Due to continuous innovation and improvement of the product, the product accessories/brands will be upgraded synchronously.

Four.Detail advantage analysis

1. **Loading mode:** this type of testing machine adopts automatic loading, with strong controllability and low failure rate. After years of continuous improvement, the performance is stable and reliable. The double floating bearing technology, gapless guide technology and buffer balance technology are all guarantee for accurate and stable test force, reduce system error and ensure the accuracy of real-time tracking measurement of test force and friction force;

2. **Main structure:** during the test, the impact of vibration of the motor and accessory parts on the abrasion marks shall be minimized. The main shaft shall be driven by the Taiwan Dongyuan Servo Motor, and the relevant bearings shall also be P4 precision bearings;

3. **Electrical part:** independent analysis module is adopted for the equipment to ensure the impact on the performance of the control part when the equipment vibrates at high speed or the film layer breaks violently;

4. **Control software:** the software can realize real-time acquisition, self-developed professional system based on friction condition matching (superior to the utility system transformed by static mechanical testing machine), and at the same time, according to different Establish professional test scheme according to the standard, with data table saving and exporting function.



5. Service team: We are not only an equipment manufacturer, but also a national high-tech enterprise. We have cooperated with more than 200 universities and research institutes in research and development of friction and wear testing machines for many years, and have independent technical service departments, which can analyze and solve specific problems in real time. Meanwhile, we have independently invested in Hengxu Testing Machine - Research and Exhibition Center in the National New Material Industrial Park. We always adhere to the principle of "providing high-quality and high-end testing equipment for the society", and adhere to "innovation and focus", laying a solid foundation for the sustainable and stable development of the company. There are no hidden dangers such as temporary leasing of plants, purchase of old drawings and assembly, unlicensed production, quality and service failure, etc.

*Hengxu - Products have been innovated for more than ten years, several technologies have been patented, and the product parameters have been imitated, but have never been exceeded. Hengxu - Products are manufactured by heart, and the "core" is different!

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