专业工程试验与测试解决方案提供商

国机集团 SINOMACH

SINOTEST 中机试验

动态疲劳试验机

自强系列（self-strengthening）

中国高端试验装备技术引领者

中机试验装备股份有限公司　Sinotest Equipment Co.,ltd.

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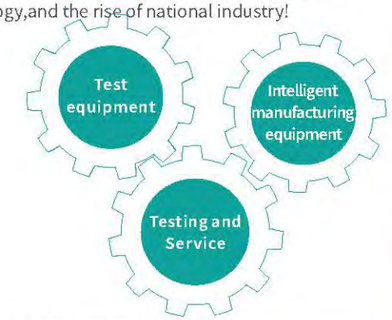
中机试验官方微信平台

COMPANY PROFILE /公司介绍

SINOTEST EQUIPMENT CO.,LTD. (short name:SINOTEST) was founded in 1959. (formerly known as Changchun Testing Machine Research Institute of the Ministry of Machinery Industry, formerly known as Changchun Machinery Science Research Institute Co., Ltd.) is a subsidiary of SINOMACH Group, a Fortune 500 large state-owned enterprise. It is a supporting unit of the National Testing Machine Quality Supervision and Inspection Center and the National Testing Machine Standardization Committee. The Secretariat of the National Testing Machine Industry Society and Association is located in SINOTEST and is known as the "cradle of Chinese testing machine technology". It is a high-tech enterprise with perfect innovation ability in China's test equipment industry.

SINOTEST is a national level scientific and technological innovation enterprise mainly engaged in the research and development and manufacturing of "testing equipment", and was successfully selected as the "National Enterprise Technology Center" in 2021; Selected in the list of "Science and Technology Reform Demonstration Enterprises" by the State owned Assets Supervision and Administration Commission of the State Council in 2022; In 2023, it was selected for the list of "Creating world-class specialized and innovative demonstration enterprises" by the State owned Assets Supervision and Administration Commission of the State Council. The company has jointly revised nearly 160 national and industry standards for testing machines. During the 13th Five Year Plan period, SINOTEST presided over and participated in a total of 61 national and industry standards. Currently, there are 234 patents, including 54 invention patents, 79 software copyrights, and 101 utility models. And SINOTEST has undertaken four national major scientific instrument projects and obtained national acceptance. SINOTEST continues to innovate and has acquired multiple international cutting-edge core technologies in the testing equipment industry, solving multiple national technological bottlenecks Among them, a number of key technologies such as hydrostatic support technology and measurement sensing technology have already taken an international leading position.

SINOTEST is a provider of engineering testing equipment and material testing solutions in China, with the strongest product innovation capabilities and a dedicated aircraft product research and development manufacturing system in the industry. Our product and service covers the component development , standardized product manufacturing, customized product designing, turn-key laboratory construction. Currently, SINOTEST has formed a center and two manufacturing base layouts, with manufacturing bases in Changchun and Wuxi, R&D center in Beijing. SINOTEST has always focused on the high-end equipment manufacturing field,making unremitting efforts to promote the development of China's testing equipment technology,and the rise of national industry!



Core value

Integrity, innovation, passion, and win-win cooperation

With 60 years of material testing experience, SINOTEST provides professional material testing solutions for users with rich technology accumulation and strong innovation ability

Enterprise qualification

High tech enterprises
Innovative technology enterprises
IS09001 Quality Management System
Rheinland Certification in Germany
EU CE certification
Safety Production Standardization Certification
Intellectual Property Management System Certification
Military Industry Confidentiality Qualification Certification

Industry qualifications

National Testing Machine Quality Inspection and Testing Center
National Standardization Technical Committee for Testing Machines
National Standardization Group for School Direct Machinery
Secretariat of the National Testing Machine Industry Association
Secretariat of the National Testing Machinery Industry Association
Editing and publishing industry scientific journal "Engineering and Testing"

Research and development testing institutions

Academician Workstation, Postdoctoral Research Workstation
Engineering Research Center for Mechanical Industry Material Testing Instruments
Mechanical Industry Calibration Equipment Engineering Research Center
Jilin Province Material Testing Machine Technology Innovation Center
Jilin Provincial School Direct Equipment Engineering Center
Jilin Province Testing Technology Public Service Center

Academic degree granting and training

Master's Degree in Mechanical Engineering and Design
Jilin University Graduate Training Base

From standardized testing equipment to customized solutions to meet users' specific needs
Experimental system and series testing solutions,
Build and establish a top tier domestic and internationally influential high-end brand

MATERIAL
MECHANICS TEST EQUIPMENT
材料力学试验装备

As the most powerful leading brand of testing technology recognized in China, SINOTEST aims to provide users with perfect test solutions with excellent product quality, professional technical support and perfect after-sales service.

材料力学试验装备 Material mechanics test equipment

The technical capability of SINOTEST covers the whole system of material mechanics test, and can provide you with comprehensive test solutions, which can meet the test requirements of almost all industries, especially in micro mechanics at the scientific research level, large material structure, mechanical property test under high temperature and complex environment, and personalized special demand test equipment.

Flexible modular test procedure Standard modular test accessories Intelligent automatic test software Accurate data measurement and analysis system

动态疲劳试验机用途广泛 The dynamic fatigue testing machine has a wide range of applications

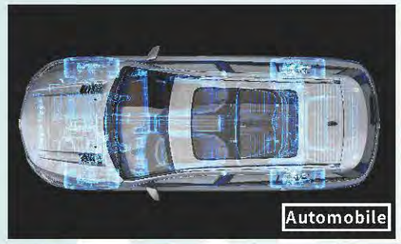
Meet the requirements of fatigue life performance test of all materials and components from thin film to high-strength aviation materials, from microelectronics to auto parts:

Metals (all metals such as steel, aluminum, alloy, etc.)

Non metallic (rubber, plastics, seals, elastomers, composites)

Parts (shock absorber, chain, connecting rod, anchor chain, medical equipment)

PARTNER
合作伙伴



car

- National Automotive Quality Supervision and Inspection Center (Xiangfan)
- Hangzhou Donghua Chain Group Co., Ltd.
- Huachen Automotive Research Institute
- Jiangling Motors Corporation, Ltd.
- Renold(Hangzhou)Co.,Ltd.
- Chery Automobile Co., Ltd.
- SHANGHAI DIESEL ENGINE COMPANY LIMITED
- Shanghai Komman Vehicle Parts System Co., Ltd.
- Xugong Group Construction Machinery Co., Ltd.
- YUBEIKOYO STEERING SYSTEM CO., LTD.
- Zhengzhou Yutong Bus Co., Ltd.
  China First Automobile Group Technology Center Huachen
- Automobile Research Institute
- China Automotive Engineering Research Institute Co., Ltd
  Chongqing Skyman Autobody Manufacture Co., Ltd.

colleges and universities

- Beijing Institute of Technology
- Chongqing University
- Chengdu University of Technology
- Dalian University of Technology
- Northeastern University
- Fujian University of Engineering
- Fuzhou University
- Fudan University
- National University of Defense Technology
- Harbin Institute of Technology
- Hefei Polytechnic University
- Henan Polytechnic University
- Hubei University of Technology
- Hunan University
- East China University of Science and Technology
- Huazhong University of Science and Technology
- Huanggang Normal University
- Jilin University
- Jishou University
- Jianghan University
- Jiangsu University
- Jiangsu University of Science and Technology
- Jiangsu University of Technology
- Nanjing Institute of Technology
- Nanjing University of Aeronautics and Astronautics
- Nanjing University of Science and Technology
- Ningbo University
- Ningbo University of Technology
- Panzhihua University
- Sanjiang University
- Xiamen University of Technology
- Shanghai University of Engineering and Technology
- Shanghai Jiaotong University
- Shanghai University of Technology
- Suzhou University
- Taiyuan University of Science and Technology
- Taiyuan University of Technology
- Tianjin University
- Tongji University
- WuHan University
- Wuhan University of Engineering
- Wuhan University of Science and Technology
- Southwest Jiaotong University
- Xiangtan University
- Yantai University
- Zhejiang University
- Zhejiang Agriculture and Forestry University
- Zhengzhou University
- China University of Mining and Technology
- Civil Aviation University Of China
- Central South University

Research institutes

- Hefei General Machinery Research Institute
- Henan Province Transportation Science and Technology Research Institute Co., Ltd.
- Nuclear Power Institute
- Shanghai Bearing Technology Research Institute Co., Ltd.
- AVIC Shenyang Aircraft Design Institute
- Southwest Institute of Technical Physics
- Zhengzhou Research Institute of Machinery
- CRRC Electric Locomotive Research Institute
- CRRC Qilin Locomotive & Rolling Stock Research Institute Co., Ltd.
- CSIC 719 Institute
- CSIC 725th Research Institute
- Zhonggang Group Zhengzhou Metal Products Research Institute Co., Ltd.
- China Electric Power Research Institute
- China Institute of Powder Metallurgy
- Chinese Aerospace Power Machinery Research Institute
- Jianghan Machinery Research Institute Limited Company of CNPC
- Institute of Metal Research, Chinese Academy of Sciences
- Chongqing Materials Research Institute Co., Ltd.

EADS

- Fujian Longxi Bearing (Group) Co., Ltd
- Aerospace Precision Industry Group
- Taiyuan Aviation Instrument Co., Ltd
- Tianjin Aerospace Ruilai Technology Co., Ltd
- Wuxi Turbine Blade Co., Ltd
- China Aviation Industry Standard Parts Manufacturing Co., Ltd

Rail Transit

- CRRC Meishan Fastener Technology Co., Ltd
- Zhongyuan Lida Railway Track
- Technology Development Co., Ltd.
- Zhuzhou Gofront Equipment Co., Ltd.
- Zhuzhou Times New Material Technology Co., Ltd.

Heavy materials

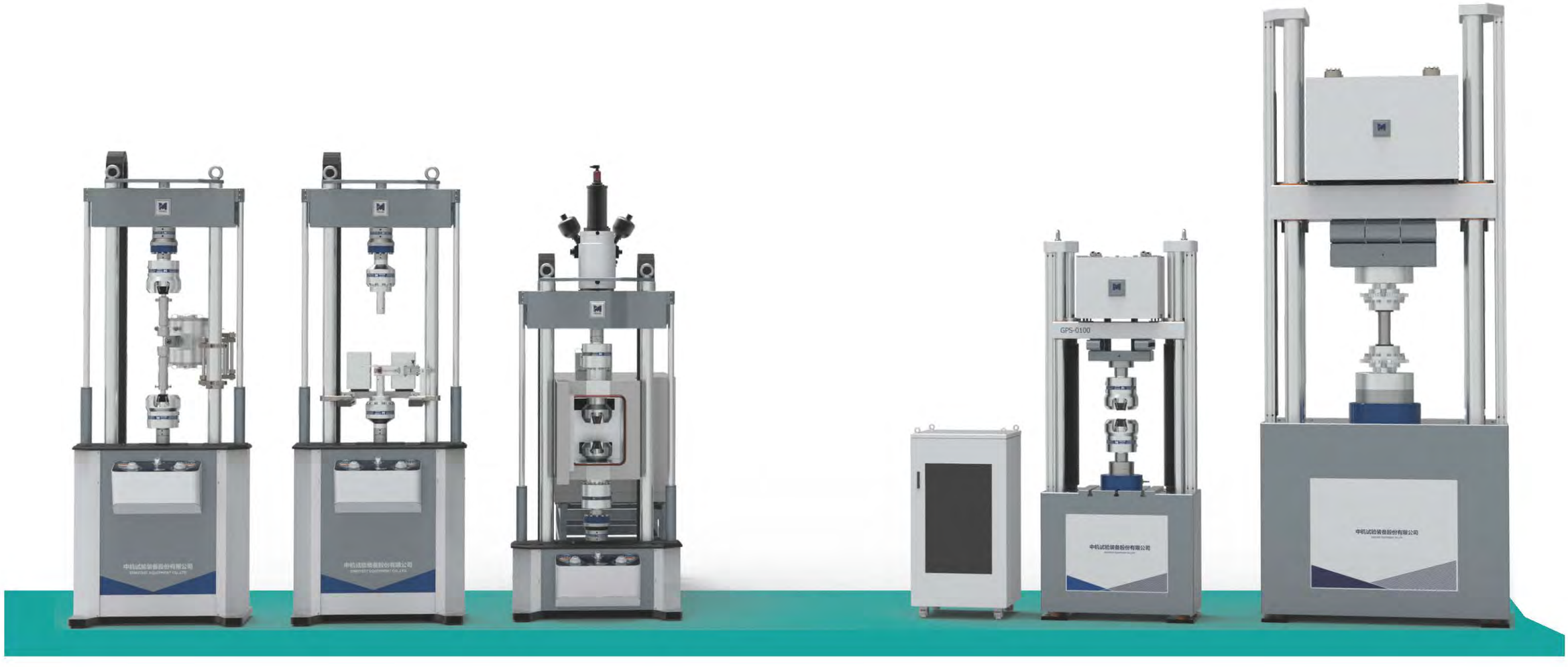
- HANGZHOU SHANSHUI INDUSTRIAL CO., LTD.
- Hubei Century Zhengde Electromechanical Equipment Co., Ltd.
- Jilin Dahua Machinery Manufacturing Co., Ltd.
- CNPCJinlin
- Dongfang Electric Steam Turbine Co., Ltd.
- Shanghai Electric Power Generation Equipment Co., Ltd.
- Sany Heavy Industry Co., Ltd.
- Qingdao Ruida Kemu Co., Ltd
- Shanghai Electric Power Generation Equipment Co., Ltd.
- Sieyuan Electric Co., Ltd.
- Zhengzhou Mingtai Traffic New Material Co., Ltd.
- China Baowu Steel Group Corporation Limited
- China Baowu Steel Group Corporation Limited
- Erzhong (Deyang) Heavy Equipment Co., Ltd. Detection Center
- Chongqing Wangjiang Industry Co., Ltd.

*The above order is sorted by the first letter

Dynamic fatigue testing machine

typical product set

Collection of typical products of dynamic fatigue machine



Electro-hydraulic servo

fatigue testing machine

Electro hydraulic servo dynamic and static fatigue testing machine

The electro-hydraulic servo fatigue testing machine system is a high-precision mechanical testing system independently developed and manufactured by SINOTEST (formerly Changchun Institute of Mechanical Science Co., Ltd.) with the special fund of the national institute. The system uses a hydraulic station as the power source, a servo actuator as the actuator, and an automatic control system composed of servo valves, sensors, computers, and controllers. It adopts the principle of electro-hydraulic servo closed-loop control to convert electrical energy into hydraulic energy and then convert it into mechanical energy to be applied to the designated position of the tested sample. It has the characteristics of fast response speed, high control accuracy, wide frequency band, and multiple types of test waveforms

The V4.0 version of the electro-hydraulic fatigue testing machine is equipped with a fully digital controller, high-frequency valve, hydrostatic support linear actuator, and alignment ring assembly, mainly used to test the dynamic and static mechanical properties of various metal materials, non-metal materials, and components. It can achieve dynamic high cycle fatigue, low cycle fatigue, program-controlled fatigue, fracture mechanics, as well as static constant deformation rate, constant load rate, and various conventional mechanical performance tests. It is widely used in aerospace, vessel, rail vehicles, civil engineering, nuclear energy research and other fields, especially in the exploration and verification of new materials in materials science research.

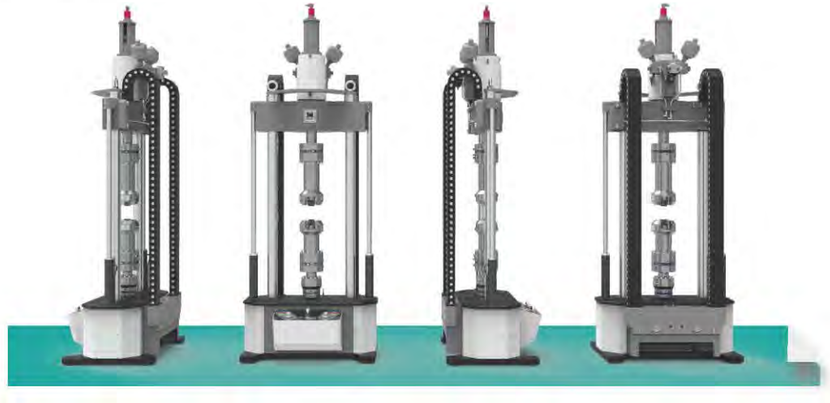
DY-A Self Strengthening Series Floor standing Electro hydraulic Servo Dynamic and Static Fatigue Testing Machine

Typical product

specification parameters

Typical product specifications and parameters

No.	Parameter	DY-0010	DY-0025	DY-0050	DY-0100	DY-0200	DY-0300
1	Max. static test force	± 10kN	± 25kN	± 50kN	± 100kN	± 200kN	± 300kN
2	Max. dynamic test force	± 10kN	± 25kN	± 50kN	± 100kN	± 200kN	± 300kN
3	Suggested dynamic test force	⩽± 8kN	⩽± 20kN	⩽± 40kN	⩽± 80kN	⩽± 160kN	⩽± 240kN
4	Test force measurement range	2-100%FS					
5	Static Load measurement accuracy	⩽ ± 0.5% reading					
6	Dynamic load measurement accuracy	⩽ ± 1.0% reading					
7	Dynamic accuracy calibration frequency	30Hz					
8	Actuator displacement stroke	± 50mm/ ± 75mm					
9	Displacement measurement accuracy	⩽ ± 0.5% of indication or 0.05 mm, whichever is larger					
10	Deformation measurement accuracy	⩽ ± 0.5% of indication or 0.005 mm, whichever is larger					
11	Load coaxiality	better than 5%					
12	Test frequency range	0.001-120Hz				0.001-100Hz	
13	Effective use spacing of columns	500		550		600	
14	Vertical test space	0-600		0-650		0-750	
15	Host size Length × Width × Height	1000 × 680 × 2500		1050 × 680 × 2580		1150 × 880 × 2750	
16	Weight (kg)	About 935		About1065		About1855	



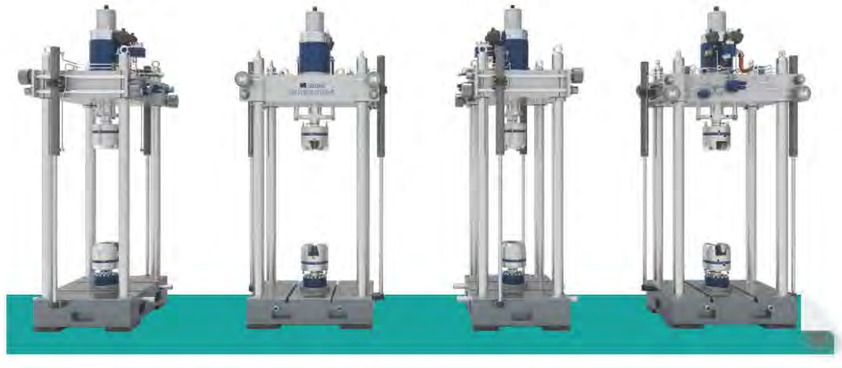
DY-B Self-Reliance Series Inverted Electro-Hydraulic Servo Dynamic and Static Fatigue Testing Machine

Customized product

specifications and parameters

Customized product reference specifications and parameters

No.	Parameter	DY-D0200	DY-D0300	DY-D0500	DY-D1000	DY-D2000	DY-D3000
1	Max. static test force	± 200kN	± 300kN	± 500kN	± 1000kN	± 2000kN	± 3000kN
2	Max. dynamic test force	± 200kN	± 300kN	± 500kN	± 1000kN	± 2000kN	± 3000kN
3	Suggested dynamic test force	≤± 160kN	≤± 240kN	≤± 400kN	≤± 800kN	≤± 1600kN	≤± 2400kN
4	Test force measurement range	4-100%FS					
5	Static load measurement accuracy	≤ ± 0.50% of reading				≤ ± 1.0% of reading	
6	Dynamic load measurement accuracy	≤ ± 1.0% of reading		≤ ± 1.5% of reading		≤ ± 2.0% of reading	
7	Dynamic accuracy calibration frequency	20Hz					
8	Actuator displacement stroke	± 50mm/±75mm/±100mm/±125mm/±150mm/±200mm					
9	Displacement Measurement accuracy	± 0.5% of indication or 0.05 mm, whichever is larger					
10	Deformation measurement accuracy	± 0.5% or 0.005 mm, whichever is larger.					
11	Load coaxiality	better than 8%					
12	Test frequency range	0.001-30 Hz (standard actuator) / 100 Hz (hydrostatic actuator)					
13	Effective use spacing between columns (mm)	500 × 600		600 × 800	800 × 800	1000 × 1000	
		Customized according to actual needs					
14	vertical test space	50-700		50-800	100-1200	200-1500	
		Customized according to actual needs					
15	Host size and shape Length × Width × Height	800 × 1000 × 3200		900 × 1300 × 3350	1400 × 1800 × 4350	1800 × 2100 × 5300	
		Customized according to actual needs					
16	Weight (kg)	about4500		about9000	about14000	about21000	about28000



DY-D Self-strengthening Series Customized Electric Hydraulic Servo Dynamic and Static Fatigue Testing Machine

Product features and highlights

specification parameters

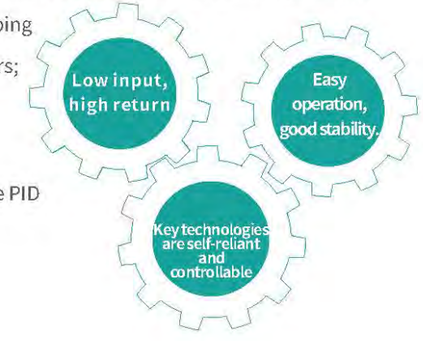
Product highlights

Features

- The test frequency range is wide, from 0.001 Hz to 120 Hz;
- Strong effective load capacity, 200N to 3000kN;
- The closed-loop control method is complete, with force/stress, displacement, deformation and strain smoothly switched;
- The function is extensible, able to customize loading and special environment simulation testing;
- It is simple to operate and has complete detection protection, effectively preventing accidental operation.

Features

- The localization rate of core components exceeds 90%, and all key technologies are independently controllable
- High-strength frame, closed-frame stiffness exceeds 500 × 10° N/m, safe overload capacity of 150%;
- High response actuator, hydrostatic support actuator with a maximum linear velocity of 4m/s, maintenance free for life
- High precision force sensor, spoke type tension compression bidirectional force sensor with an accuracy level of 0.05NS and a safe overload capacity of 300%;
- High-resolution displacement sensor, magnetostrictive displacement sensor resolution 0.001 mm;
- Built in acceleration sensor to compensate for inertial force errors of moving parts;
- full state detection module, strong logic operation guidance and effective reduction of erroneous operations;
- Intelligent online pressure regulation, which can recommend clamping pressure values based on sample characteristics and test parameters;
- Self developed single-channel controller, supporting amplitude compensation and phase compensation;
- An autonomous copyright test software platform, supporting online PID adjustment and sample zero-load protection.



Electromagnetic resonance

high-frequency fatigue testingmachine

Electromagnetic resonance high-frequency fatigue testing machine

The electromagnetic resonance fatigue testing machine system is an electromagnetic excitation resonance type fatigue testing machine testing system. The system uses electric energy to drive servo motors to achieve static loading, and uses elastic structures such as electromagnets and bow rings to form a resonance mechanism. The automatic control system is composed of sensors, computer, and controller. Combined with high-frequency phase detection theory, it can achieve high load and low power consumption loading tests at high frequencies, greatly reducing test time and testing costs.

The currently implemented electromagnetic resonance high-frequency fatigue testing machine, version 3.0, features a fully digital controller and an efficient electric control system, primarily used for dynamic fatigue mechanical property tests of various metal materials, non-metallic materials, and components. It can realize dynamic high-cycle fatigue tests such as tensile, compression, bending, shear, etc., as well as partial fracture mechanics tests. When matched with static modules, it can also achieve conventional static tests at constant load rates. For exploring new materials, processes, technologies, and structures in material science research, this is an ideal equipment to improve test technology and develop test methods. Widely applied in departments such as machinery, metallurgy, petroleum, building materials, construction engineering, aerospace, shipbuilding, transportation, and other industrial sectors, as well as related laboratories in universities, colleges, and scientific research institutes.

Typical product

specification parameters

Specification parameters

No.	Parameter	DC-0025	DC-0050	DC-0100	DC-0250	DC-0500	DC-1000
1	Maximum static test force	±25kN	±50kN	±100kN	±250kN	±500kN	±1000kN
2	Maximum dynamic test force	±12.5kN	±25kN	±50kN	±125kN	±250kN	±500kN
3	Suggested dynamic test force	⩽±10kN	≤±20kN	≤±40kN	≤±100kN	≤±200kN	≤±400kN
4	Test force measurement range	4-100%FS					
5	Static load measurement accuracy	⩽±0.5% of reading					
6	Dynamic load measurement accuracy	⩽±1.0% of reading					
7	Accuracy of deformation measurement	⩽±0.5% of indication or 0.05 mm, whichever is larger					
8	Alignment	better than 5%					
9	Test Frequency Range	60-400Hz				60-300Hz	60-220Hz
10	Effective distance between columns	440	480	620		750	1000
11	Vertical test space	⩾560	⩾770	⩾900		⩾1100	⩾1300
12	Host size Length × Width × Height	840×730×1950	900×720×2250	1000×790×2570		1450×950×3250	1600×1250×3690
13	Weight (kg)	About 2113	About 2650	About 3500		About 8500	About 13500

Product features

and highlights

Product highlights

Features

- Ultra-high frequency range, 60 Hz ~ 400 Hz;
- Super strong load capacity, 500N ~ 1000kN;
- Ultra-low energy consumption, 1.5W ~ 5kW / 220V;
- Super clean energy, green and environmental protection;
- Super simple operation, plug and run;
- Super strong function expansion, supporting customized loading and special environment simulation testing.

Features

- The core components have an autonomousization rate of more than 95%, and all key technologies are fully controllable;
- High rigidity frame, four-column guide, rigid and flexible multi-stage bn transmission method;
- High-frequency exciter, up mounted weight, noise reduction with extreme low-noise;
- High-precision force sensors, spoke type tension-compression dual-directional force sensor accuracy grade of 0.05NS, safe overload capacity is 150%;
- Built-in acceleration sensor, compensates for inertial force errors of moving parts;
- Full self-developed single-channel controller, supporting amplitude compensation;
- Autonomous copyright test software platform, expandable static loading function.

Dynamic fatigue test–ing

machines Standardsand test methods

Applicable standards and test methods for dynamic fatigue machines

Type	Standard number	Standard Name
Metallic materials test standards	GB/T3075-2021	Method of axial force control for fatigue test on metal materials
	GB/T15248-2008	Method for axial equal amplitude low cycle fatigue test of metallic materials
	GB/T26076-2010	Method for axial force control fatigue test of metal thin plate (strip)
	GB/T26077-2021	Axial strain control method for fatigue test of metal materials
	GB/T4161-2007	Axial strain control method for fatigue test of metal materials
	GB/T6398-2017	Fatigue crack propagation method of metal materials fatigue test
	GB/T21143-2014	Unified test method for quasi-static fracture toughness of metallic materials
	GJB 6213-2008	Method for thermal-mechanical fatigue test of metal materials
	ISO 1099	Method of axial force control for fatigue test on metal materials
	ISO 12106	Axial strain control method for fatigue test of metal materials
	ISO 12108	Fatigue crack propagation method of metal materials fatigue test
	ISO 12737	Method for testing plane strain fracture toughness of metallic materials, KIC
	ISO 12135	Unified test method for quasi-static fracture toughness of metallic materials
	ASTM E466	Method for axial fatigue test of metal materials under constant amplitude load control
	ASTM E606	Strain controlled fatigue test method
	ASTM E647	Standard for measuring fatigue crack propagation rate
	ASTM E399	Standard test method for plane strain fracture toughness of metallic materials, KIC.
	ASTM E1820	Standard test method for measuring fracture toughness
Composite material test standards	GBT 1688-2008	Standard test methods for fracture toughness measurement
	GB/T 16779-2008	Test method for tensile-tensile fatigue properties of fiber reinforced plastic laminates
	GB/T35465.3-2017	Test methods for fatigue properties of polymer matrix composites - Part 3: Tension-tension fatigue.
	GB/T35465.4-2020	Test methods for fatigue properties of polymer matrix composites - Part 4: Tension-compression and compression-compression fatigue.
	GB/T35465.5-2020	Test methods for fatigue properties of polymer matrix composites - Part 5: Bending fatigue.
	GB/T35465.6-2020	Testing methods for fatigue properties of polymer matrix composites - Part 6: Adhesive tensile shear fatigue.
	GJB 2637-1996	Fatigue test method of carbon fiber reinforced resin composite laminates
	HB7624-1998	Method for bending fatigue test of carbon fiber reinforced composite laminates
	ASTM D7774	Standard test method for plastic resistance to fatigue
	ASTM D7791	Standard test method for single-axis fatigue properties of plastics
	ASTM D4482	Rubber properties test method periodic extension fatigue

Case
应用案例

Basic fatigue testing

Basic fatigue testing

The basic fatigue test can be performed on simple ramp, hold, sine wave, triangular wave and square wave tests. The control methods are usually displacement control and force control, which are mainly used for testing the fatigue life of materials and components.

Basic fatigue test setting interface

Basic fatigue test operation interface

- The basic fatigue test is usually matched with a constant temperature hydraulic wedge fixture or a special fixture for components.
- The initial clamping force of a hydraulic wedge grip is completely driven by the pressure provided by the hydraulic pump unit to push the piston rod, which in turn pushes the clamping block downward. Under the restriction of the wedge-shaped jaws on the grip body, the distance between the two clamping blocks becomes smaller and smaller until it finally tightens the sample. After both clamping blocks are tightened around the specimen, when the system applies tensile load, the clamping block continues to slide within the wedge surface of the grip, further tightening the specimen. Throughout the entire test process, the specimen will be held tighter as it stretches more, so this fixture does not experience slipping phenomenon regardless of how large the testing force may be; the clamping force remains stable throughout. This fixture has advantages such as reliable clamping and no slippage, making it suitable for various metal and composite materials' tensile/compression tests at room temperature. The clamping block adopts an insert structure with springs installed on its surface to ensure that the piston and clamping block remain tightly attached. Hydraulic oil enters chamber A, causing the piston rod to extend, resulting in relative movement between the clamping block and the grip body. As the two clamping blocks move downwards towards each other, they achieve specimen clamping. When releasing the clamping block, hydraulic oil enters chamber B, causing the piston rod to retract while the clamping block follows the upward motion of the piston due to the pull spring's force, allowing the two clamping blocks to separate from one another. During operation, the clamping block fixing method uses a spring hook design, facilitating easy replacement of the clamping block and removal of dust or debris. Typically, hydraulic fixture connect with loading systems via threaded connections, but can also use flange adapters for quick disassembly and assembly of independent modules.

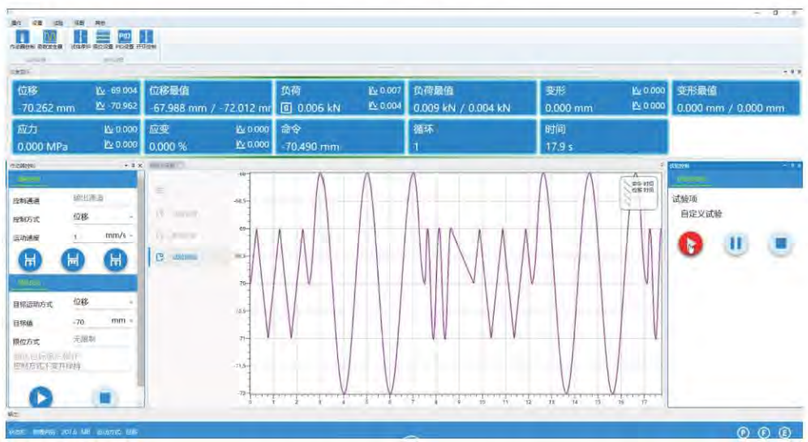
Hydraulic wedge grips at room temperature

Typical product–
Custom experiment

Custom experiment

- Customized tests are based on basic tests, combining simple ramps, holds, sine waves, triangular waves and square waves to achieve customized waveforms.
- When switching between different waveforms, they will move through a ramp form to the average position of the next waveform before loading, ensuring stability during waveform switching. When setting the waveform, it is important to note that you should not exceed the machine's maximum capacity, otherwise there may be cases where amplitude cannot reach expected levels.

Customized test settings interface



Customize test running interface

Typical product–

High cycle fatigue test

High cycle fatigue test

- High-cycle fatigue tests generally refer to cycles greater than 10^4~10^5, and are usually conducted under stress control. It can also be directly converted to force control (load control). In high-cycle fatigue testing, except for special conditions, multiple specimens should be tested in groups as a set of tests.
- Before high-frequency fatigue tests, sample group information can be input through software. Detailed sample size information for each specimen can also be separately entered.

High-frequency fatigue test setting interface

High-frequency fatigue test operation interface

- In tests of non-metallic materials, it is usually required to maintain a constant temperature and humidity environment. At this time, equipment will match high-temperature and low-temperature hydraulic wedge fixtures as well as a constant temperature and humidity environment. The high-temperature and low-temperature hydraulic wedge fixture is based on an ordinary hydraulic wedge fixture with a connecting rod that runs through the ring-shaped filling box to achieve the structure where the body of the clamping mechanism is outside the environmental chamber while the head body is inside the environmental chamber.

High and low temperature hydraulic wedge grip

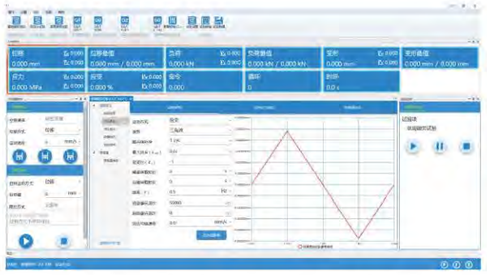
Constant temperature and humidity environment chamber

Typical product–

Low cycle fatigue test

Low cycle fatigue test

- Low-cycle fatigue tests generally refer to cycles less than 10^4, and are usually conducted using strain control. Compared with high-cycle fatigue testing, users need more complex data during low-cycle fatigue testing, in addition to peak-to-valley values of sensors, they also need real-time calculations for elastic modulus of the rising segment, elastic modulus of the falling segment, as well as hysteresis loop area.
- Before low-cycle fatigue tests, sample group information can be input through software. Detailed sample size information for each specimen can also be separately entered.

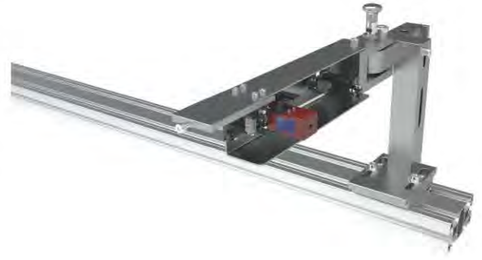


Low-cycle fatigue test setting interface

Low-cycle fatigue test operation interface

- Low-cycle fatigue tests are usually conducted at room temperature, but special materials may require high-temperature environments, such as metal superalloys. High-temperature environments can match hydraulic top rod fixtures and high-temperature extensometers to realize high-temperature low-cycle strain testing.

- The Low cycle fatigue testing is usually conducted at room temperature, and special materials require high-temperature environments, such as metal high-temperature alloys. High temperature environments can be matched with hydraulic top rod grips and high-temperature extensometers to achieve high-temperature low cycle strain testing.



- The high temperature environment can be matched with silicon carbide rod heating furnace or resistance wire heating furnace.
- The furnace shell of the silicon carbide high-temperature furnace is made of stainless steel and has an extensometer installation opening on the front of the atmospheric furnace. The silicon carbon rod adopts SIC TECH W-type silicon carbon rod heating element, which has the characteristics of compactness and high heating capacity. The temperature controller adopts a fuzzy logic PID adjustment control method to control the conduction amplitude of the thyristor conduction angle. The temperature control meter controls the conduction amplitude of the thyristor through phase shifting triggering, thereby adjusting the output power and ultimately controlling the voltage at both ends of the heating element to achieve the purpose of adjusting the ambient temperature of the sample. Control each heating element separately through an intelligent digital temperature control instrument. The temperature collection adopts a thermocouple inserted on the furnace wall and connected to the temperature control instrument through compensation wires.

- The alkaline silicon high-temperature furnace is mainly used for high-temperature and low cycle strain test experiments, usually matched with high-temperature hydraulic top rod grips.

No-load heating capacity	300～1300°C	Long term working temperature	300～1200°C
Temperature fluctuation	±3°C	temperature gradient	≤6°C
Heating method	Silicon carbon rod heating	Maximum heating rate	≥20°C/min
Thermocouple	3 PCS (S couple)	Maximum power of heating furnace	380V，2kW
Furnace size	About 50×62×180mm	Uniform temperature zone length	75mm(No-load)
Outer height	About 220mm	Suitable for extensometer opening	12mmgauge length

- The resistance wire high-temperature furnace is a split type, making it easy to load and unload samples. The furnace shell is made of stainless steel material, which has excellent high temperature resistance. The insulation material is ultra-fine ceramic cotton, which has good insulation effect; To ensure uniform temperature in the effective working area of the furnace, a three-stage electric heating wire is used for heating. The test temperature and parameter settings can be operated on the temperature controller.

- The resistance wire high-temperature furnace is mainly used for stress testing in high-temperature environments, usually matched with manual high-temperature grips.

No-load heating capacity	300～1300°C	Long term working temperature	300～1000°C
Temperature fluctuation	±2°C	temperature gradient	≤3°C
Heating method	Resistance wire heating	Furnace wire diameter	Φ1.2mm/Φ1.5mm
Thermocouple	3 PCS (S couple)	Maximum power of heating furnace	380V，4kW
Furnace size	About Φ90×280mm	Uniform temperature zone length	50mm(No-load)
overall dimension	About Φ280×280mm	Suitable for extensometer opening	25mmgauge length

Typical product–

Fracture mechanics test

Fracture mechanic testing

- The fracture mechanics testing is currently the most complex testing standard, both in terms of the testing process and later data processing and calculation. Fracture mechanics can generally be divided into fatigue fracture testing and quasi-static fracture testing.
- The fatigue crack propagation test adopts the national standard GB/T6398, mainly including prefabricated cracks, crack propagation rate and threshold value;
- The plane strain fracture toughness test adopts the national standard GB/T4161, mainly including KIC;
- The quasi-static fracture mechanics test (also known as quasi-static fracture toughness) adopts the national standard GB/T21143, mainly including JIC CTOD.
- Precrack are the prerequisite and foundation for all tests, and other tests can only be conducted after the completion of precrack.

Fracture mechanics specimen setting interface

Precrack operation interface

Crack propagation rate setting interface

Fracture toughness parameter setting interface

Calculation interface for KIC results of planar fracture toughness

Calculation interface for CTOD results of quasi-static fracture toughness

Popular fixtures

specification parameters

Industry popular grips

- Special grips

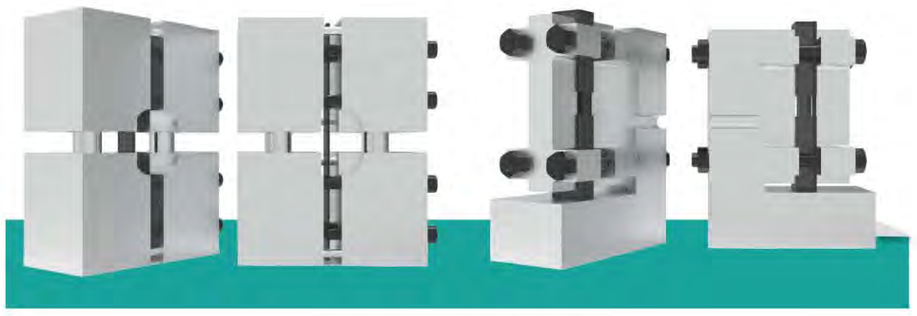
The special grips are mainly used for testing specific working conditions, such as compression, bending, and other special working conditions. Common ones include three/four point bending grips, disc compression platen, shear grips, fracture mechanics grips, etc.

No.	Name	Applicable test	Connection method
1	Three point/four point bending fixture	Multi point bending fatigue test SEB fracture mechanics test	The hydraulic chuck holds directly
2	Disc type compression fixture	Compression fatigue test	
3	Compact stretching fixture	Ct specimen fracture mechanics test	

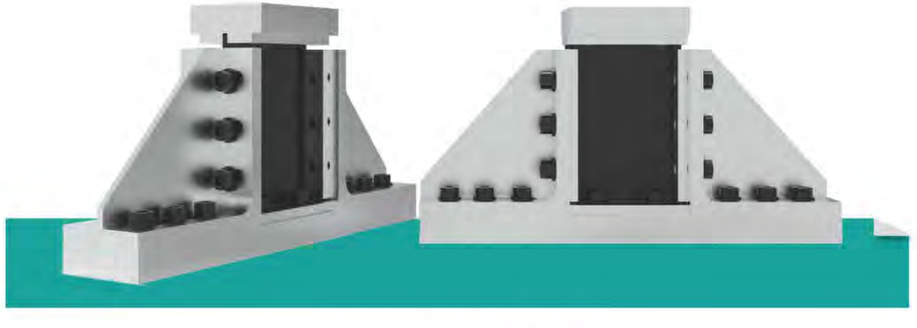
The composite material fixtures used in non-metallic material test are all special fixtures.

No.	Name	Applicable test	Connection method
1	Three point/four point bending fixture	Multi-point bending fatigue test	The hydraulic chuck holds directly
2	Tightening Shear Fixture	Single shear/dual shear test	
3	V-notch beam shear fixture	V-beam shear test	
4	V-shaped track groove cutting fixture	Shear test of V-shaped groove track	
5	Open-hole compression fixture	Open-hole compression fixture (ASTM D6484)	
6	Combination compression fixture	Compressive strength test(ASTMD6641)	Compressive Fixture Load
7	Post-Punch Compression Fixture	Compression test after impact(ASTM D7137)	

Tightening shear, V-shaped shear, and hole compression grip



Combination compression grip



Compression fixture after punching

The high temperature environment, commonly used temperature range of 300-1000 °C/1200 °C;
Suitable for testing materials (plates, rods) under high temperature conditions.

Feature

- The shape of the furnace body is optional, circular or square;
- Three stage temperature control, remote control, online monitoring;
- Circular furnace swing arm bracket, square furnace slide rail mobile;
- Mechanical and hydraulic clamping methods are optional

The High and low temperature environment, commonly used temperature range -70-350 °C/540 °C, suitable for testing materials (plates, rods) and parts under high and low temperature conditions;

Feature

- Mobile chamber structure, easy to place;
- Constant temperature and humidity remote control, online monitoring;
- Mechanical and hydraulic clamping methods are optional;
- Large testing space, suitable for materials and small components performing low&high temperature test;
- Temperature testing conditions;

Mechanical fixtures are suitable for zero and component expansion fixtures, which are connected to the mother fixture through a double nut locking method when the sample mother fixture is not frequently replaced. When replacing the sample, the sub fixture can be replaced;

Feature

- Mechanical locking is reliable and convenient;
- Maximize the utilization of vertical space to meet the testing requirements of
- large-sized specimens;
- Using threaded connections, the tooling can be reused and has a long service
- life;

Hydraulic fixtures are particularly suitable for material (plate, rod) testing, which means that under frequent sample replacement conditions, the sample can be replaced by manually controlling the hydraulic fixture to lock and release it;

Feature

- Replacing samples is fast and convenient, improving work efficiency;
- Manual pumps have small footprint, simple operation, and low maintenance costs;
- Adjustable clamping force, controlled by hydraulic pressure to avoid excessive clamping;

High temperature environment, commonly used temperature range of 300-1100 °C, suitable for testing materials (plates, rods) under high temperature conditions;

Feature

- The shape of the furnace body is optional, square, circular, with 2 or 3 heating stages;
- The fixed method is optional, fixed on the host or mobile frame;
- Mechanical and hydraulic clamping methods are optional;

High and low temperature environment, commonly used temperature range -70-350 °C, suitable for testing materials (plates, rods) and parts under high and low temperature conditions;

Feature

- Mobile box structure, easy to place;
- Large experimental space, suitable for high and low temperature testing conditions of parts (bolts, gears, etc.);

- Industrial fixture

Gear bending fixture (single and double teeth), fine steel wire tensile fixture, steel strand tensile fixture, valve high-temperature tensile fixture

Gear fixture

Valve fixture

Fine steel wire fixture

Chain fixture

Steel strand fixture

Bolt fixture