HDT-B| Servohydraulic dynamic testing machine | Floor-standing

Floor-standing servohydraulic dynamic testing machine is ideal for for testing components and materials such as plastics, elastomers, aluminum, composites, steel, super alloys and more.

» High cycle fatigue
» Low cycle fatigue
» Advanced low cycle fatigue
» Fatigue crack growth
» Fracture toughness
» Crack propagation
» K_{Ic}, J_{Ic}
» Environmental testing
» Thermal mechanical fatigue

- The high-low cycle fatigue test can output sine wave, triangular wave, trapezoidal wave and other waveforms.
- With different fixtures, it can address the loading mode such as tension, compression, tension- compression.
- With additional devices, tests under high / low temperature, salt spray and corrosion are also supported.
- The closed-loop servo control system is composed of controller, servo valve, force transducer, displacement transducer and computer to realize PID control, and automatically measure test parameters such as force, displacement and deformation. The test process is all controlled by computer, which is an ideal cost-effective test system for scientific research institutes, metallurgical construction, national defense, colleges and universities, machinery manufacturing, transportation and other industries.

Load frame

- The machine is designed with closed-type structure, with high stiffness, backlash free, and excellent stability.
- The column surface is treated with high frequency hardening. Extra-high hardness ensures smooth guide, not easy to be scratched. The surface is chrome plated with super anti-rust ability.
- Crosshead lifting and lowering, and locking are hydraulically driven by the handle, flexible and convenient; the crosshead has a self-locking function to prevent sliding even shutdown.
- The alignment fixture is equipped to enhance system precision and test accuracy.
- Integrated actuator beam features more compact, less joints, and better rigidity.

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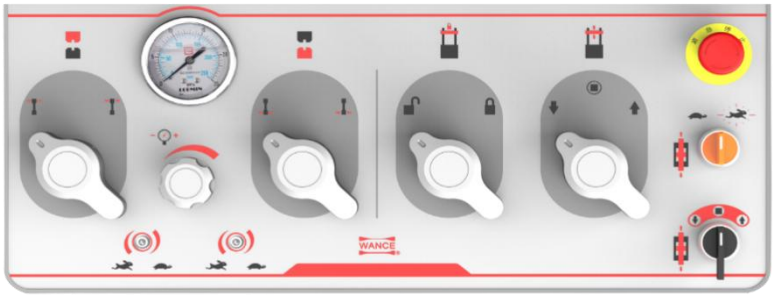
- Servo actuator adopts clearance seal, no high pressure seal ring, and seals hydraulic oil by minimal and ultra-high precision clearance. Piston runs smoothly with very low damping coefficient, no crawling phenomenon, smooth curve, and a very high response frequency.
- Intuitive centralized controls provides with easy-to-turn handles and clear, universally understood labeling.

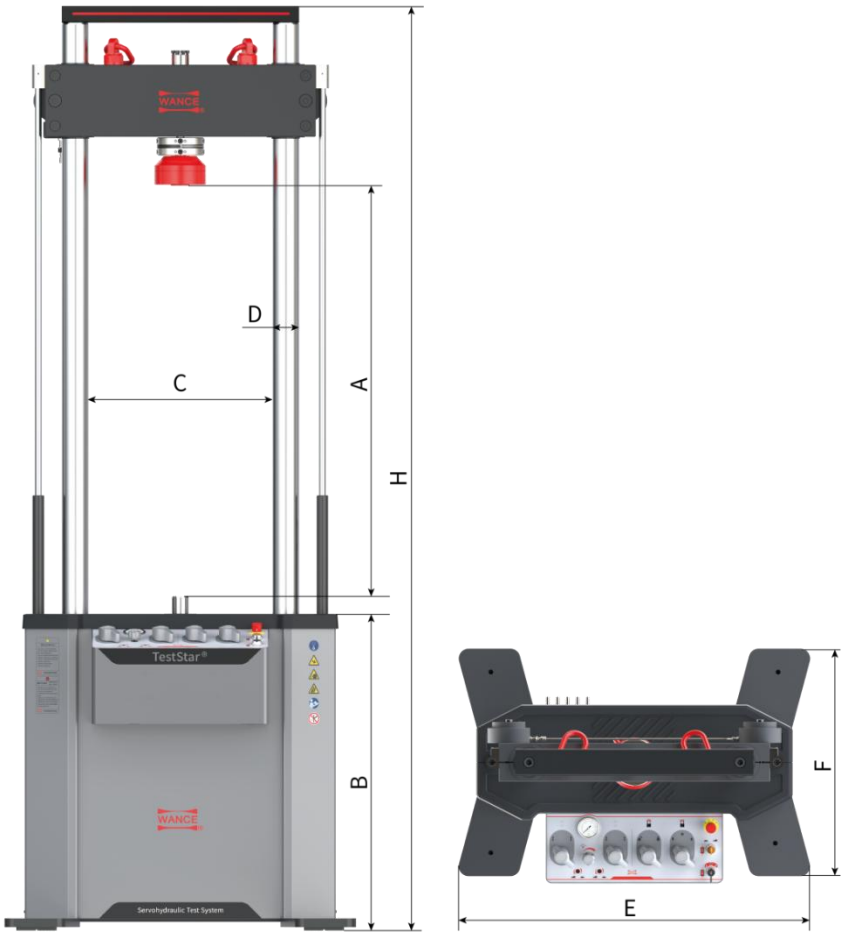


Parameters

Model	HDT254B	HDT504B	HDT105B	HDT255B	HDT505B
Force capacity (kN) (rated dynamic force)	25	50	100	250	500
Force measurement range (kN) (2%~100%FS)	0.5~25	1~50	2~100	5~250	10~500
Static force accuracy	±0.5%				
Dynamic force accuracy	±2%				
Actuator stroke (mm)	150				
Displacement range (mm)	0~150(±75)				
Displacement resolution (mm)	0.001				
Displacement accuracy	⩽3mm, 0.015mm >3mm ±0.5% of reading				
Test frequency (Hz, Sine wave)	0.01~60				
Minimum vertical space A (mm)	140~1285			230~1620	420~2080
Minimum vertical space with extended columns A(mm)	435~1760			700~2120	/
Base height B (mm)	950				970
Column spacing C (mm)	550			650	760
Column diameter D (mm)	80				100
Machine width E (mm)	1050			1155	1355
Machine depth F (mm)	680			740	895
Machine height H (mm)	2760			3215	3875
Height of machine with extended columns H (mm)	3250			3715	/
Frame stiffness (N/m)	5×108			5.4×108	7.8×108
Machine weight (kg)	760		800	1140	2080
Machine weight with extended columns (kg)	800		840	1200	/
Alignment	5%				

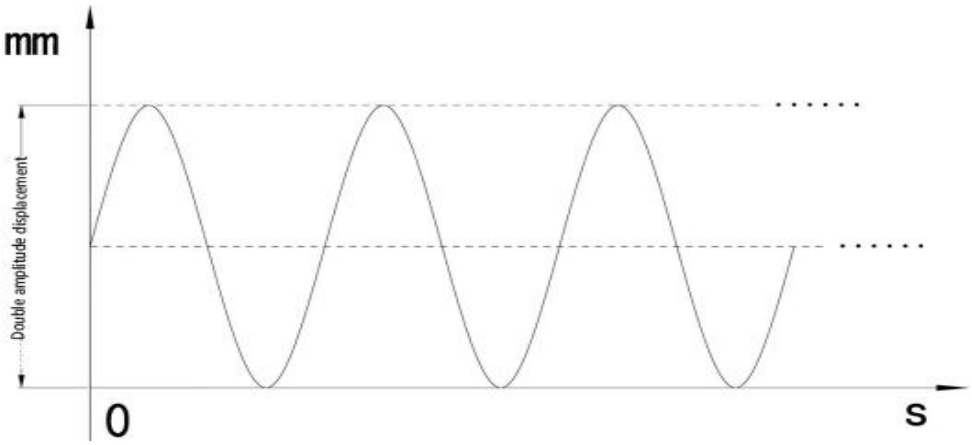
Note:

If the environmental chamber is equipped, the machine with extended columns will be selected.



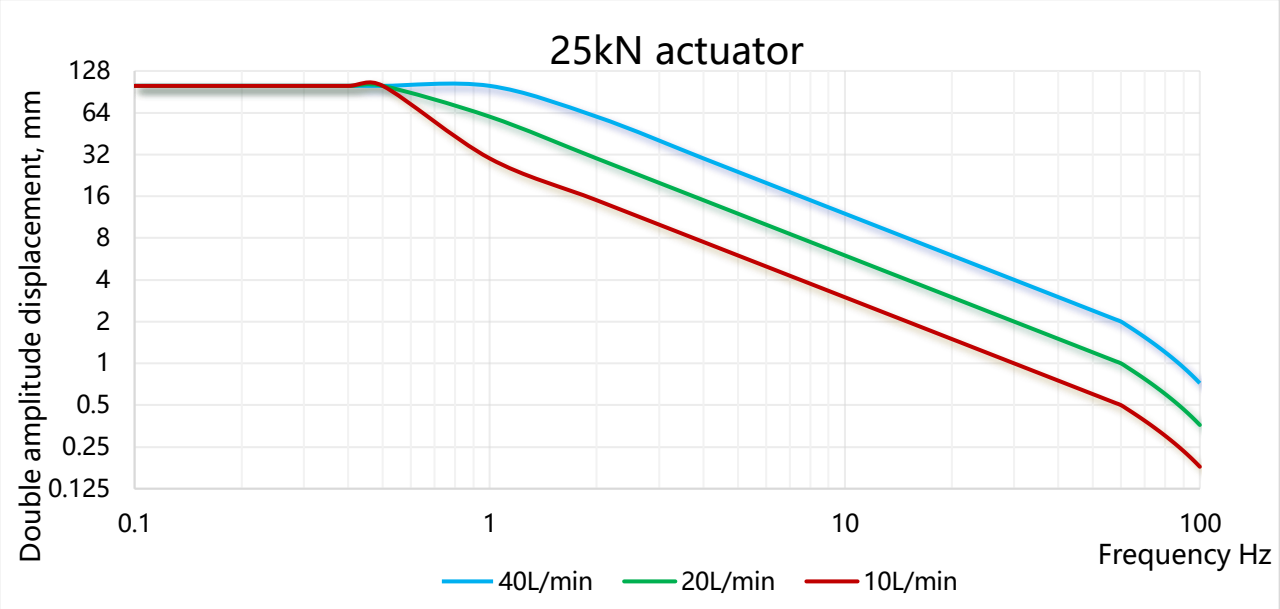
Dimension diagram

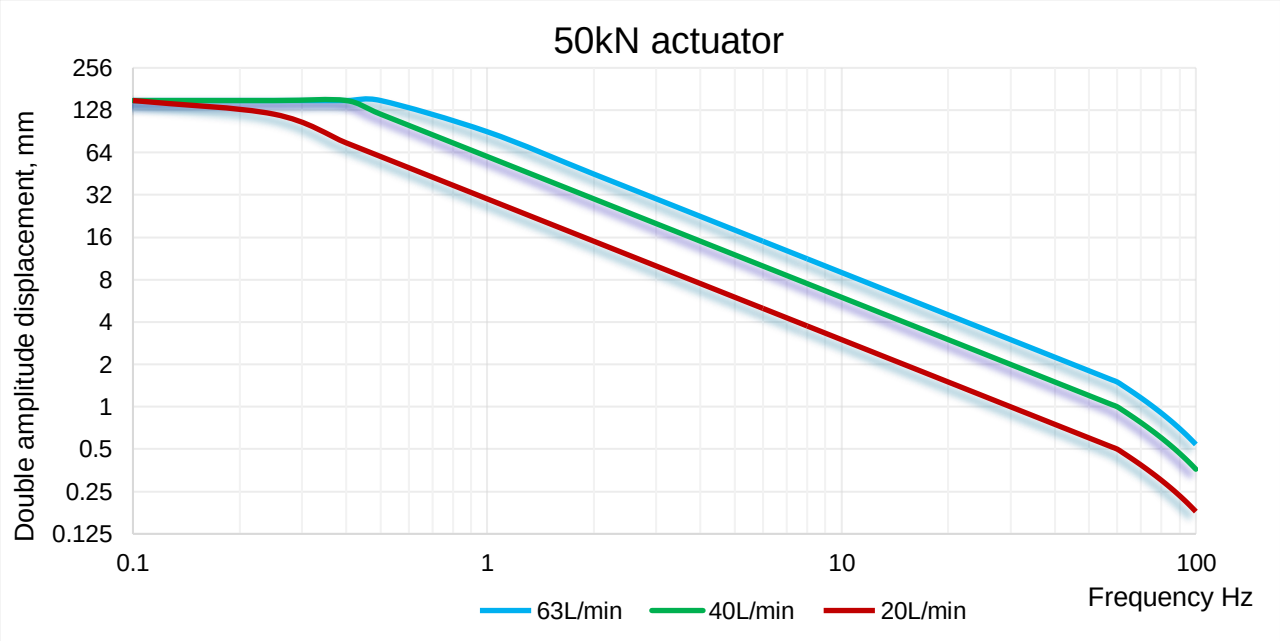
Amplitude frequency performance curves

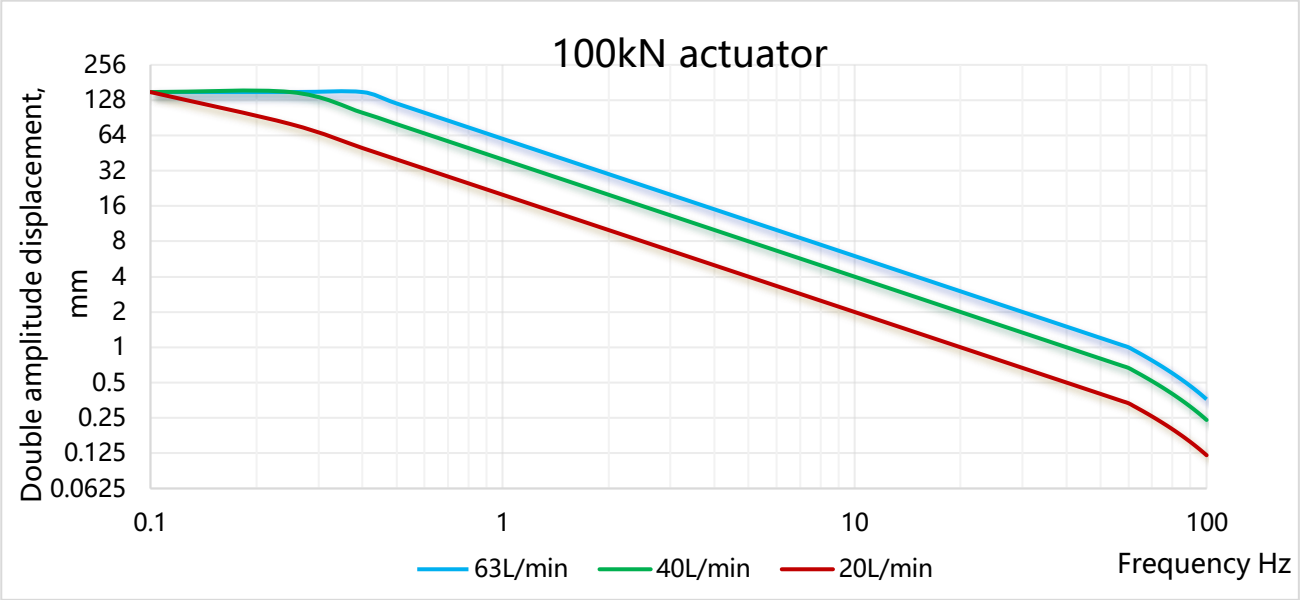


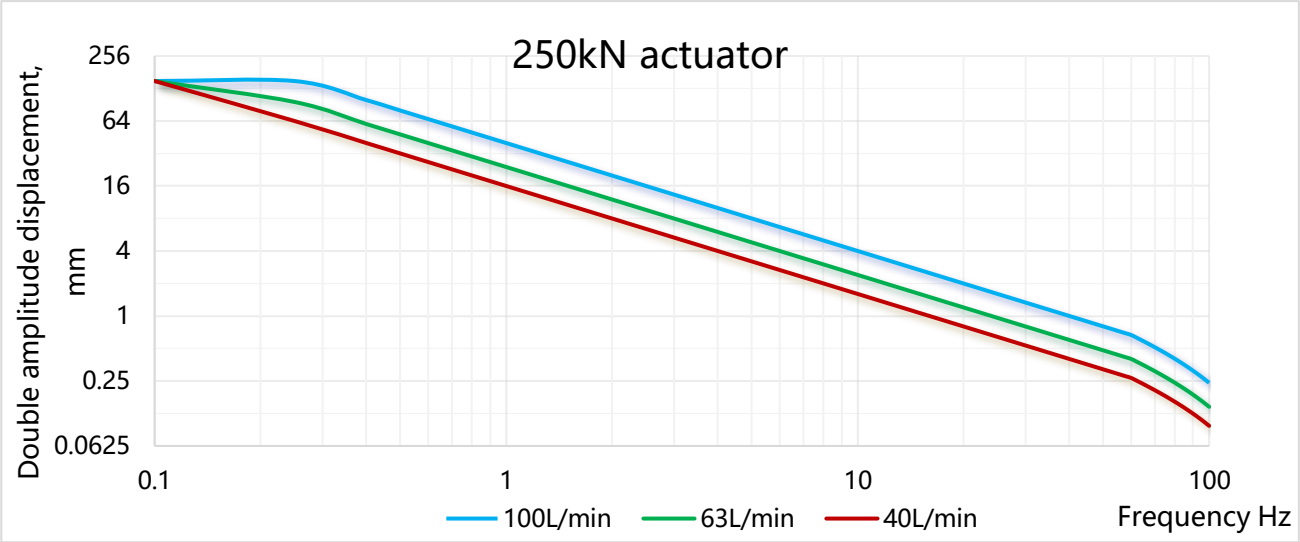
Double amplitude displacement diagram

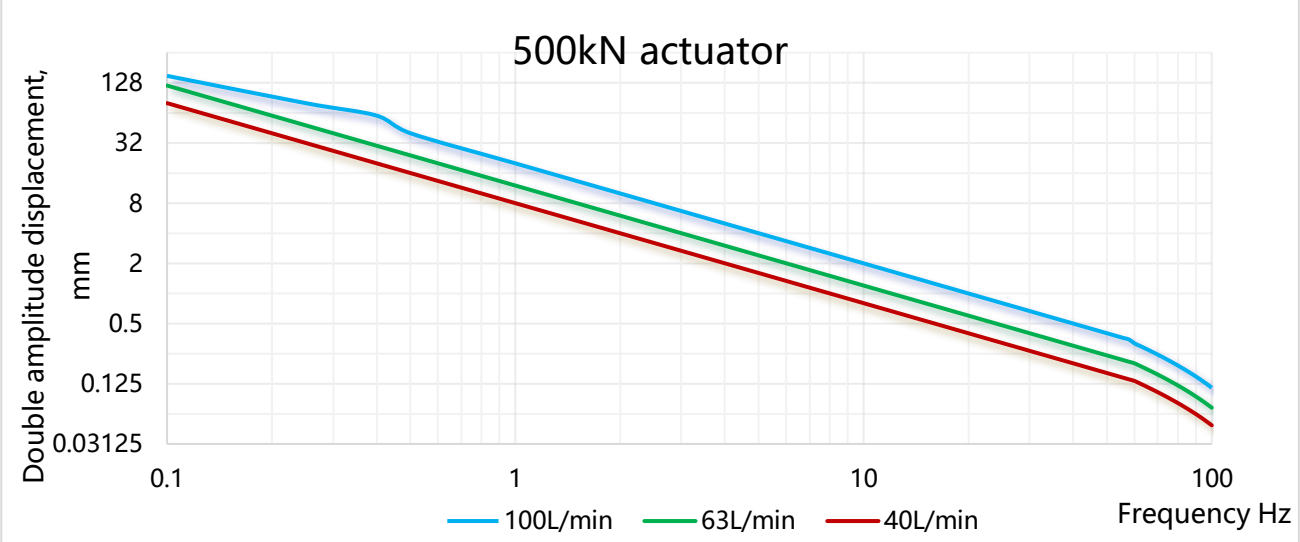
Double amplitude displacement: refers to the total displacement of the actuator during the test, i.e. the absolute value of the upper peak value reducing the lower peak value






100kN actuator
Double amplitude displacement, mm
256
128
64
32
16
8
4
2
1
0.5
0.25
0.125
0.0625
0.1
1
10
100
Frequency Hz
63L/min
40L/min
20L/min


250kN actuator
Double amplitude displacement, mm
256
64
16
4
1
0.25
0.0625
0.1
1
10
100
Frequency Hz
100L/min
63L/min
40L/min


500kN actuator
Double amplitude displacement, mm
128
32
8
2
0.5
0.125
0.03125
0.1
1
10
100
Frequency Hz
100L/min
63L/min
40L/min

Standard accessories

Model	HDT254B	HDT504B	HDT105B	HDT255B	HDT505B
Force	25kN	50kN	100kN	250kN	500kN
Frame	Two columns structure, the actuator mounted under the worktable of machine				
Actuator	Max. force: ±25kN	Max. force: ±50kN	Max. force: ±100kN	Max. force: ±250kN	Max. force: ±500kN
	Brand: WANCE Rated pressure:21Mpa Structure: Double outlet rod double action symmetrical structure Actuator stroke: 150mm Seal type: Clearance seal				
Servo valve	Brand: Moog Model:G761 Flow rate: 19L/min Max. Working pressure:31.5Mpa Qty.:1 piece			Brand: Moog Model:G761 Flow rate:63L/min Max. Working pressure:31.5Mpa Qty.:1 piece or 2 pcs	
Displacement transducer	Brand: MTS Model: R Series Measurement range:150mm Resolution:1um				
Spoke-type load cell	±25kN	±50kN	±100kN	±250kN	±500kN
	Brand: Interface or Tovey Structure: Fatigue level spoke-type load cell Repeatability: ±0.02%FS Sensitive: 2mV/V Overload protection: 300%FS				
Intuitive Centralized Controls	Brand: WANCE Control crosshead lifting and lowering Control hydraulic grips Control emergency stop and the movement of actuator				
Controller	Brand: German DOLI Model: EDC i50				
Tools	Allen wrench: 1.5-10mm, 1 set Allen wrench: 14mm, 1 set Allen wrench: 17mm, 1 set Allen wrench: 19mm, 1 set Phillips screwdriver and flat-head screwdriver: one for each Adjustable wrench: 10 inch, 1 set Needle nose pliers: 1 set Round head hook wrench: 45-50 2 pcs				
	Round head hook wrench: 45-50 2 pcs	Round head hook wrench: 68-75 2 pcs		Round head hook wrench: 80-90 2 pcs	Round head hook wrench: 110-115 2 pcs
Flushing kit	Replace servo valve G761 when cleaning hydraulic power unit				
Documents	Quality certificate, warranty card and manuals				

Optional accessories

Alignment fixture	Brand: WANCE Adjust the alignment of the grips in eight directions
Computer	Brand: Lenovo, CPU: i7, RAM: 16G, HDD: 1T, display: 23.8”

Optional hydraulic grip

25kN	Vee jaws: Φ5~Φ10mm, Φ10~Φ15mm Flat jaws: 0~8mm, width x height: 30x38mm Outside diameter: Φ126mm Height (without piston): 163mm Unit weight: 9kg
50kN/100kN	Vee jaws: Φ5~Φ10mm, Φ10~Φ15mm, Φ15~Φ20mm Flat jaws: 0~8mm, 8~15mm, width x height: 50x65mm Outside diameter: Φ210mm Height (without piston): 175mm Unit weight: 39kg
250kN	Vee jaws: Φ10~Φ20mm, Φ20~Φ30mm Flat jaws: 0~10mm, width x height: 50x90mm Outside diameter: Φ270mm Height (without piston): 232mm Unit weight: 85kg
500kN	Vee jaws: Φ10~Φ20mm, Φ20~Φ30mm, Φ30~Φ40mm Flat jaws: 0~10mm, width x height: 80×90mm Outside diameter: Φ340mm Height (without piston): 287mm Unit weight: 160kg

Hydraulic power unit (20 L/min, 40 L/min, 63L/min, 100L/min)

- Noise reduction design: motor and pump are completely immersed in hydraulic oil, so the noise was absorbed by oil. Special shock absorbing rubber is attached when the motor is mounted, to prevent vibration from transmitting to each other and reduce noise; fully enclosed structure once again reduces noise;
- Energy saving design: the variable displacement piston pump can automatically adjust the flow output according to the actual demand of the servo actuator, energy-saving and noise reduction;
- Touch screen control;
- Able to be controlled by software;
- Easy to open and maintain;

- Good cooling effect, can run for a long time and ensure that the oil temperature is controlled within 55℃;

•Wind cooling to grantee long time tests with temperature below 55℃;

•Safety protection: over-temperature, insufficient hydraulic oil, overpower, and test over, the motor will automatically turn off and alarm。

Parameters

Model	HPU201	HPU401	HPU631	HPU102
Rated flow rate(L/min)	20	40	63	100
Rated pressure (MPa)	21	21	21	21
Rated power(kW)	11	18.5	30	45
Tank volume(L)	200	200	400	400
Filter fineness(μm)	3	3	3	3
Noise(dB)	58	62	65	67
Net weight (kg)	340	350	480	500
Length (mm)	1370	1370	1670	1670
Width (mm)	780	780	780	780
Height (mm)	1155	1155	1305	1305

Accessories of HPU

Model	HPU201	HPU401	HPU631	HPU102	QTY.
Tank	Brand: WANCE Tank material: aluminum Tank volume:200L	Brand: WANCE Tank material: aluminum Tank volume:200L	Brand: WANCE Tank material: aluminum Tank volume:400L	Brand: WANCE Tank material: aluminum Tank volume:400L	1
Oil immersed motor	Brand: Italian HYLINCO Power:11kW	Brand: Italian HYLINCO Power:18.5kW	Brand: Italian HYLINCO Power: 30kW	Brand: Italian HYLINCO Power: 45kW	1
Oil Pump	Brand: REXROTH	Brand: REXROTH	Brand: REXROTH	Brand: REXROTH	1

	Flow rate:20L/min	Flow rate:40L/min	Flow rate:63L/min	Flow rate:100L/min	
Valve manifolds	Brand: WANC Function: Integrated hydraulic components, filter, pressure control, pressure monitoring.				1
High pressure filter	Brand: LEEMIN Filter fineness:3μm				1
Cooler	Brand: BAODE Structure: plate cooler				1
Spare high pressure filter	Brand: LEEMIN The same as the original				2
Chiller *	Brand: HAILINGKE Model: HL-03A 3-phase 380V, 50/60Hz Power:2.85kW LxWxH: 800×600×1190mm 90kg	Brand: HAILINGKE Model: HL-05A 3-phase 380V, 50/60Hz Power:4.86kW LxWxH 1150×600×1190mm 170kg	Brand: HAILINGKE Model: HL-08AD 3-phase 380V, 50/60Hz Power:7.65kW LxWxH 1330×705×1330mm 270kg	Brand: HAILINGKE Model: HL-12AD 3-phase 380V, 50/60Hz Power:11.4kW LxWxH 1550×750×1450mm 370kg	1
Sub-HPU	Especially for multiple machines. Each machine need one sub-HPU				1

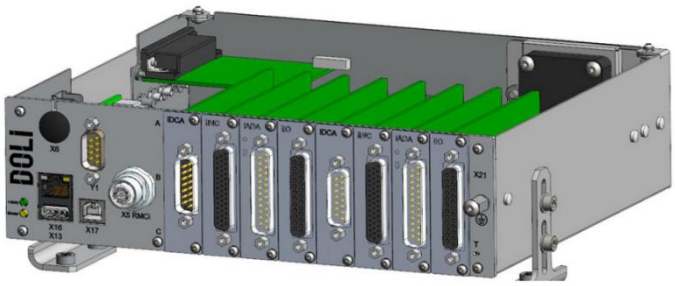
Remark: chiller, or no cooling system, select one option only.

Controller

Model: EDC i50

Brand: Germany DOLI

Function:



- It has PIDF control, which can realize closed-loop control of force, displacement, deformation and other parameters, and the three control modes can be smoothly switched without disturbance. Automatic setting of initial PID parameters: dynamic response adaptive control system. The PID parameters can be automatically updated continuously, and the change of sample stiffness can be automatically compensated to ensure that the system runs in the best control state.
- Various test waveforms can be created: sine wave, triangular wave, square wave, oblique wave, sawtooth wave, random wave and various combination waves.
- Various test data can be collected: peak value, valley value, time, maximum value, minimum value, average value, and cycle data, fatigue data, etc. Data sampling and feedback frequency is not less than 10 kHz. The fully digital controller uses a VortexDX86 800 MHz processor for the control and data acquisition systems respectively. The control speed is 10 kHz, where 10 kHz is the control closed loop (position, load, strain) and 10 kHz is the stiffness control closed loop.
- With multiple parameter control: proportional, integral, differential (PID), delay (Lag), Feed forward (Feed) serial and parallel control.
- The signal resolution is up to ± 250,000 steps, and manual conversion is eliminated in the range of full scale use.
- It can be used independently: the test data is directly displayed on the EDC, the control instruction is input by the compound function key, and the basic data analysis and processing program installed in the EDC can output the tabular control and measurement data after connecting the printer, and there are a variety of embedded application software for users to choose.

Technical parameters

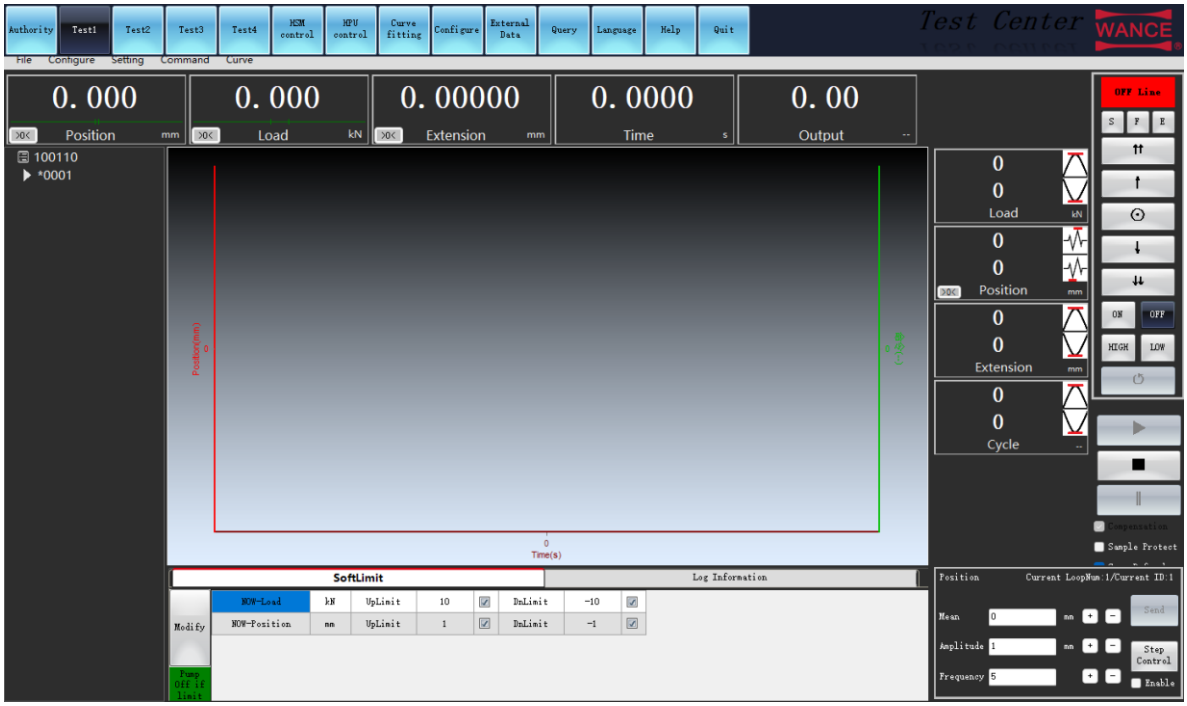
- Main processor: VortexDX86 800 MHz;
- Control frequency: 10kHz;
- PC communication interface: USB 2.0 Full speed or Ethernet 10/100Mbit;
- Encoder input channel: square wave max 32MHz, app.300kHz;
- SSI signal input: 300kHz;
- Digital input/output: 24V; Eight pcs;
- Serial sensor interface: COM1(built-in);

- Synchronous data acquisition and motion control: satisfactory;
- iSI bus expansion slot: 3;
- Load and strain resolution: ± 250,000 steps;
- Digital position, load and strain control, smooth transition between control modes without impact;
- The synchronous sampling and display data is 10kHz, enabling dynamic testing of trapezoidal, triangular and sinusoidal waves;
- Power amplifier with servo valve inside: 300mA.

Test software

- TestCenterV1.0 is a multi-functional test software independently developed by WANCE. The software integrates various test standards and customer needs of various industries, and the test control and results are professionally reviewed by industry experts; the results are consistent with those of several internationally renowned fatigue testing machines.
- According to the test standard, built-in independent high-low cycle test plan, crack test plan, elastomer test plan, easy to operate.
- For environmental simulation working condition test, users can customize the test waveform, customize the test process, and coordinate the fatigue test with external equipment (such as high temperature furnace).
- For non-standard equipment, test plans and test reports can be customized according to user needs. Such as seismic support, shock absorber, multi-channel coordinated loading test.
- Software supports custom report templates, allowing multiple groups of test results to be exported and calculated (such as R resistance and fatigue life statistics reports).
- Multi-function curve function (stress/strain hysteresis curve, peak and valley value curve, cumulative curve) to meet customer needs.
- Support for experimenter permission Settings.
- Supports multi-channel coordination control.
- Support PLC communication, remote control of oil source, cooling device, etc.
- A variety of test control, can achieve dynamic, static, sweep frequency, superposition, displacement control force target and other operations.
- Multi-stage control of user-defined running parameters.
- Set the test conditions, and set the logical relationship of the test process in advance, such as the test end conditions, oil source stop conditions, etc.
- Single-window multi-curve interface, multi-window curve interface, convenient to observe the test status in the test.
- Curve coordinates can be freely defined, and real-time curves, peak-valley value curves, and crack growth rate curves of various data can be realized.
- Software supports data analysis such as fitting calculations/curves.

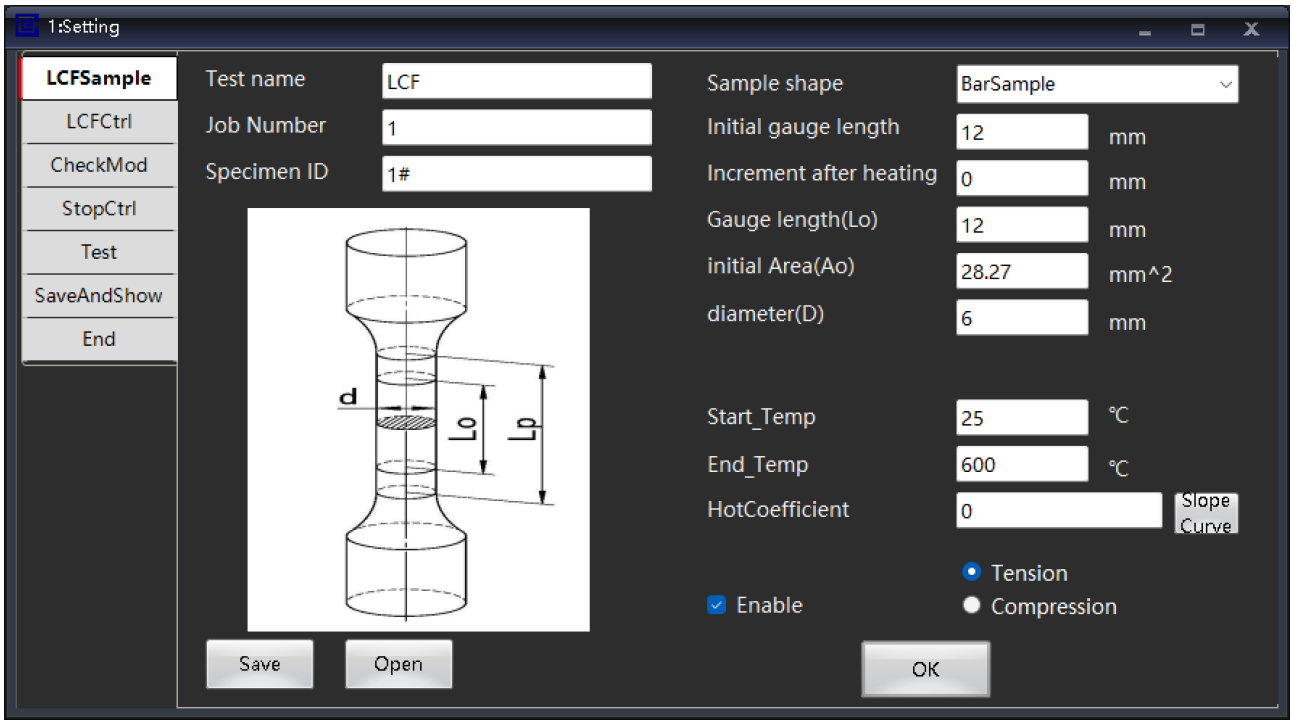
- Logs record every operation and error, helping you query error causes.
- Lifetime upgrade service.



The following software functions need supporting test accessories, such as extension meter, COD gauge, fixture, high temperature furnace, environmental box, etc.

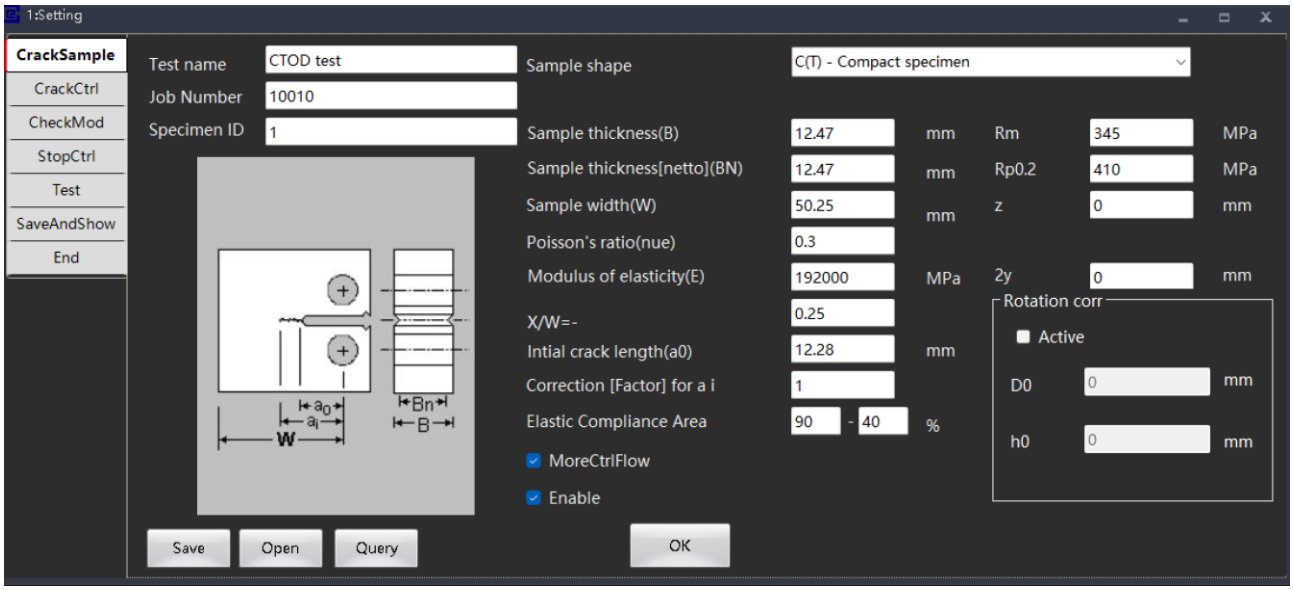
1) High-low cycle test module

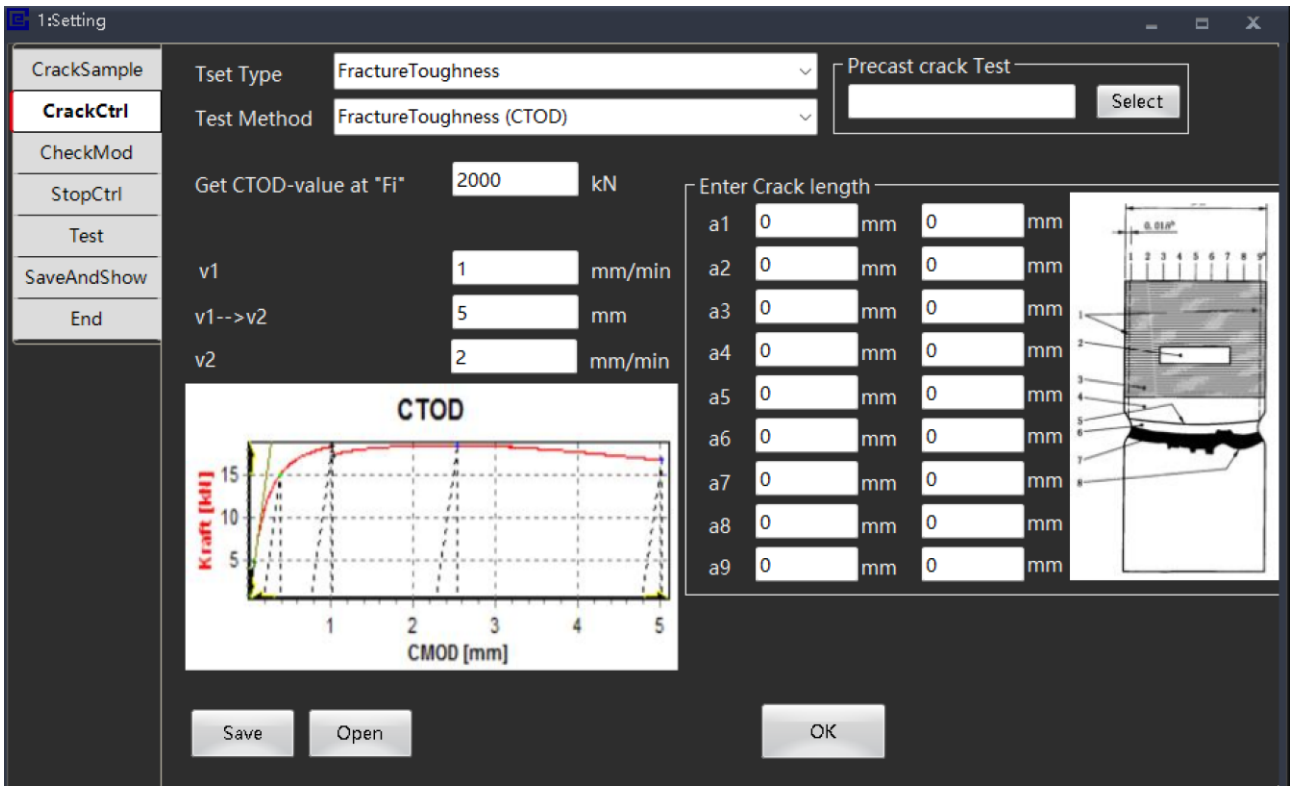
Meet the relevant standards of high-low cycle test (ISO 1099, ISO 12106, GBT 3075, GBT 5248, GBT 26077, ASTM E466, ASTM E606, etc.);



2) Fracture test module

- Meet KIC test, CTOD test, JIC test, da/dN crack growth rate test related standards (ASTM E399, ASTM 1820, ISO12135, GB/T21143, etc.);
- Suitable for CT, SEB, MT and other sample shapes;
- Data result statistics module can generate R resistance curve;
- CTOD and JICC tests support multi-sample and single-sample methods.
- Crack growth test supports K-increasing, K-decreasing, and constant K.





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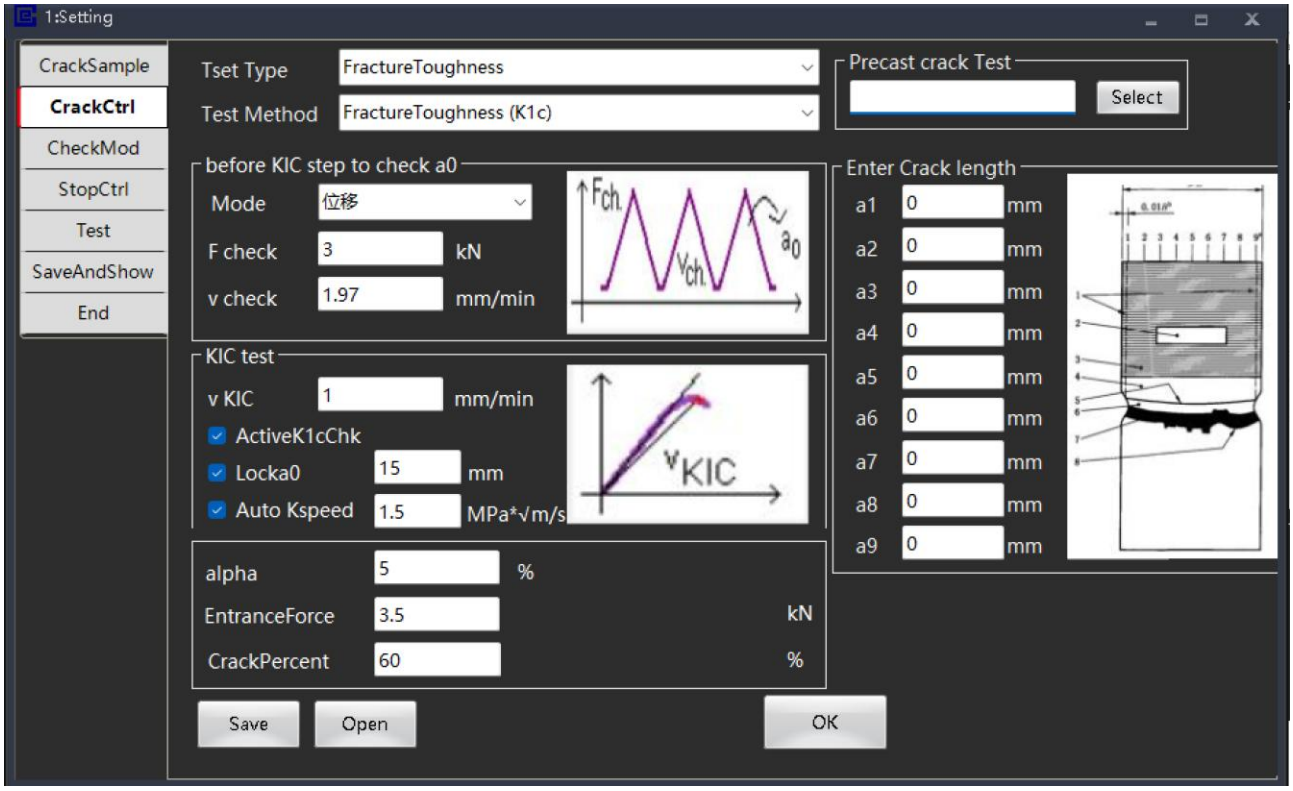
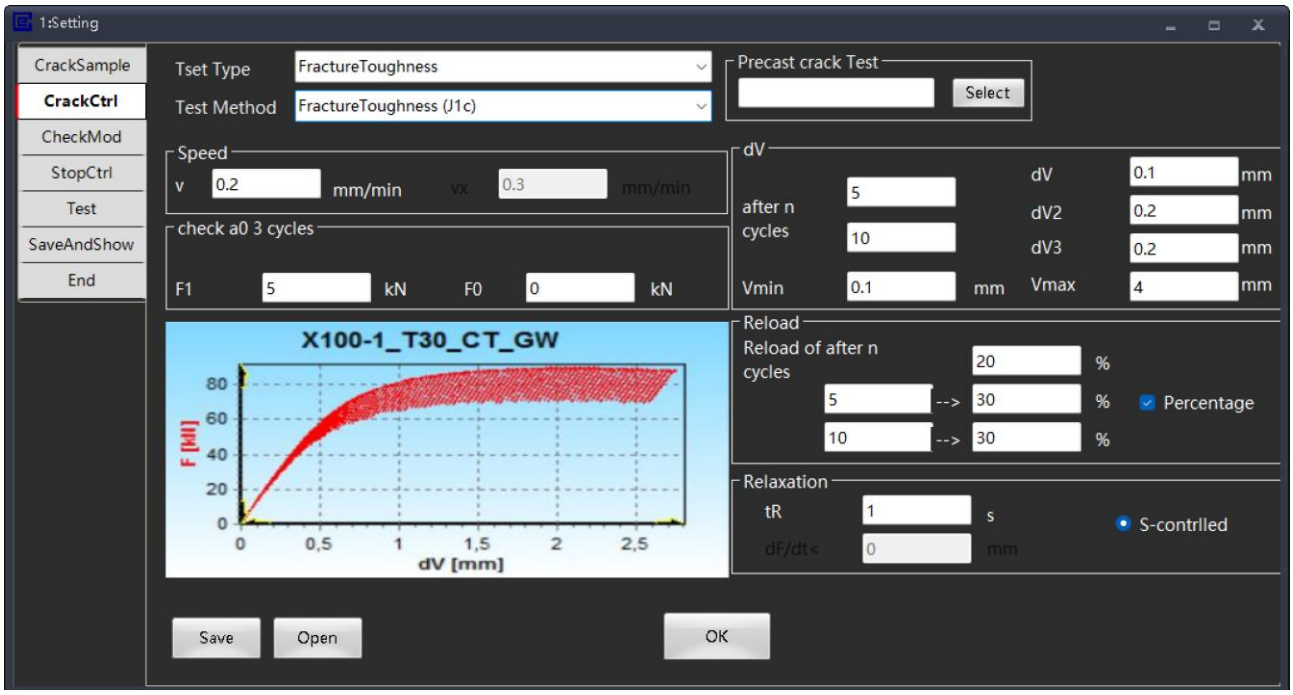
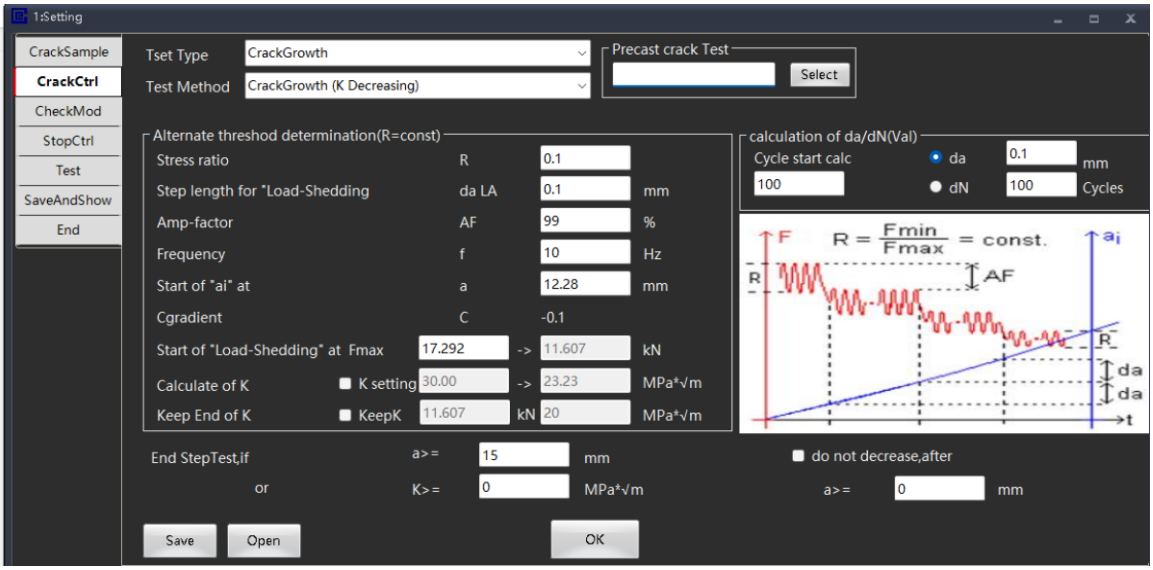




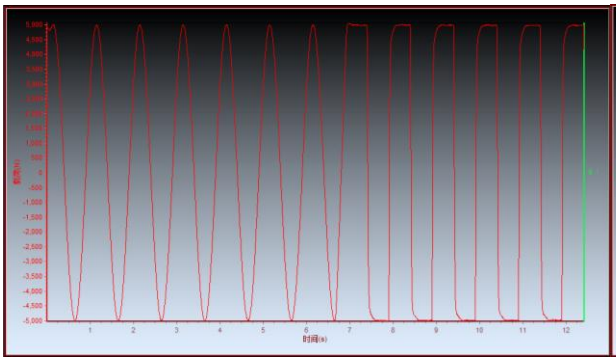


3) Elastomer test module

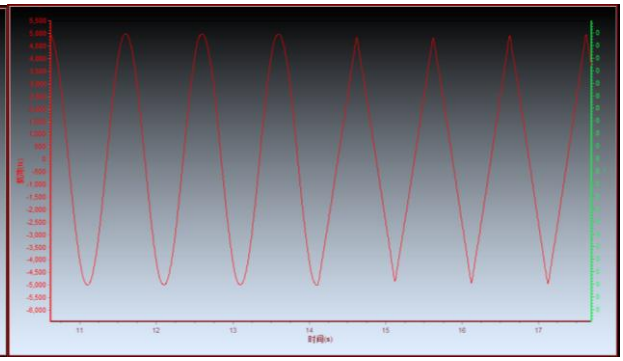
- Independent test program to improve customer operability;
- meet elastomer damping test standards;
- Variable amplitude, frequency conversion and other test actions can occur in the test;
- Full report on built-in elastomer.

4) Waveform combination action test

- Can be freely combined, there is no quantity limit;
- Free start test protection conditions to protect different waveforms;
- Can save the combination waveform setting scheme, easy to recall.



Sine wave + square wave



Sine wave + triangle wave

5) Custom waveform

Can input irregular waveform to realize simulation test, spectrum and other tests.