Servo Hydraulic Universal Testing Machine

SHT4000 Series

Fig1:Typical 600kN SHT4000 series with computer control running SANS' test software

SHT4000 series is servo hydraulic loading and motor driving system and a rugged four or six column construction for exceptional load frame rigidity .It has dual spaces for tension test and compression test or other tests (need corresponding grips/fixtures) respectively .An adjustable middle crosshead quickly accommodates specimens of varying lengths . In the case of additional length of columns, the maximum testing space is adjustable to meet extra length specimens. Positive specimen holding is ensured by the wedge action of hydraulic operated grips.

The machine has an operating range from 200kN to 2000kN and maintains an accuracy of ±0.5%(±1%of the displayed load from 1% to 100% of capacity

Functions and Applications

SHT4000 series' systems are guaranteed to meet ISO 15579-2000, ISO679, ISO 7438-1985, ISO6892-1998, ISO4012, ISO10065, GB/T228-2002, GB/T17671-1999, GB/T232-1999, and other international and national specifications. SHT4000 series' systems can carry out tension test, compression test, bend test and shear test by three controlling ways including force control, deformation control and displacement control; and these three controlling ways can be switched according to the preset condition, the systems can realize constant-rate loading, loading according to preset curve, testing with constant-rate displacement, testing with constant-rate deformation and so on.

With powerful testing software PowerTest, SHT4000 series' systems can acquire, dispose automatically testing data, display real-timely stress-strain curve, load-deformation curve, load-time curve and other related curves, at the same time, can save, output, print test report and data with customized format.

With knight after service of experienced experts and assistant controlling of powerful professional testing software PowerTest, the machine can be widely used in ultimate R&D department, Universities and Academies, Quality control and Inspection department, calibration centers/laboratories and concerned industries etc.

Key Features

SHT4000 series testing machine features as follow:

1. Equipped with advanced servo-hydraulic valve with excellent pollution-resistance and high accuracy;
2. Equipped with hydraulic cells and accessories with high quality to ensure non-leakage and non-pollution of hydraulic system;
3. Various self-diagnosing functions such as self-detecting of over-voltage, over-current and over-high temperature;
4. Various protecting functions including protection of over-load, position-limited, over-voltage, and self-alarming on non-pure oil and so on;

Emergency Stop

Close-up of position limiter

5. Adopting full-digital closed-loop controlling system to realize three closed-loop controlling requirement of load, deformation and displacement; and these three controlling ways can be switched smoothly and combined discretionarily;
6. Non-step loading system within capacity which is superior to loading system with step;
7. Testing space and working height complying to man-machine engineering, which offer easier and more convenient operation;
8. Special hydraulic loop to improve greatly returning rate of upper grip and save testing time;
9. Tension testing space is between upper crosshead and lower crosshead and compression testing space is between lower crosshead and testing station to accomplish various tests.

Control System

SHT4000 series is supplied with closed-loop servo control capability conducted by DCS-200/300. This closed-loop control system constantly monitors the test in progress and regulates the testing rate to Maintain preset conditions .This enables you to conduct tests automatically and ensures consistent testing control free from operator variability.

DCS200/300 controller

Accessories

Video extensometer or long travel extensometer with accuracy of ±0.1% of indicated value is available according to requirements. Extensometer can directly measure deformation of specimens by quartz-pole. It either measures separately thermal expansion strain of specimens or eliminate thermal expansion to avoid effecting deformation of specimen.

The video extensometer measures contact-free, and with high resolution, tensile and compression deformations on all types of plastic, metals, rubber, composites, panels and foils. It is also suitable for determination of reduction-in width, and the yield strength in tensile tests according to EN 10002-1.

The long travel extensometer has been designed for testing on elastic plastics, elastomers, foils, textiles, leather and similar elastic materials. It is especially used for direct extension measurement on specimen with medium and large extensions in tensile or hysteresis tests and also in temperature chambers with extended sensor arms. Safe operation is ensured, even with whipping specimen, e.g. elastomers, through a solid mechanical construction of the guiding elements and the tiltable

knive edges.
Various grips/fixtures(Fig) which are consistent with corresponding test requirements are available and comply with concerned specifications.

Optional high temperature chamber/furnace is available according to requirements. It adopts electric stove warming and can meet testing temperature requirements

from ambient temperature to 1200℃.The temperature of chamber/furnace can rise according to the preset and keep invariable ,and can be controlled subject to warming curve preset.

Fig.10:SHT4000 series(200kN/300kN

Fig.11:SHT4000 series(500kN/600kN)

Fig.12:SHT4000 series (1000kN)

Fig.13:SHT4000 series (2000kN)

Technical Specifications

Series	SHT4000			
Models	4205/4305	4505/4605	4106	4206
Accuracy Level	1			
Force range	1%-100% of capacity			
Load indicating accuracy	± 1.0% of indicating			
Load resolution	1/300000			
Speed range of loading(N/S)	0.02%FS—2%FS			
Displacement indicating accuracy	± 1%of indicating			
Displacement resolution (mm)	0.007			
Deformation indicating accuracy	+1% of indicating			
Load Capacity(kN)	200/300	500/600	1000	2000
Number of Column	4	6	6	6
Clearance between Columns(mm)	460	495	510	730
Maximum Tension Space (mm)	630	850	850	1000
Maximum Compression Space (mm)	560	700	700	800
Diameter of Round Specimens(mm)	Φ10-Φ32	Φ10-Φ40	Φ15-Φ60	Φ20-Φ80
Thickness of Flat Specimens(mm)	2-25	2-30	2-40	10-70
Diameter of Compression Platens(mm)	Φ120	Φ150	200×200(square)	Φ240
Stroke of Piston(mm)	150	250	250	250
Piston Speed(mm/min)	0-195	0-145	0-100	0-75
Crosshead Speed (mm/min)	280	270	320	300
Security protection	There are security protections of over-load, travel limits, oil pressure, over-temperature, over- voltage and others			
Over-load protection	10%			
Dimension of Load Frame(L*W*Hmm)	820×570×1955	940×650×2400	1020×670×2600	1500×900×3340
Dimension of Hydraulic Power Station(L×W×H)(mm)	1150×600×900			
Total Power(kW)	3	4		6
Weight(kg)	1500	2500	3500	8000

Specifications:

Load measurement accuracy: ±1% of indicated load from 0.4% to 100% capacity(Grade 1); ±0.5% of indicated load from 1% to 100% capacity(Grade0.5)
Load measurement resolution: 1/300000 of capacity, no steps in full loading range and keeping unchanged
Displacement Measurement Accuracy: ± 1% of indicated / ± 0.5% of indicated
Displacement Resolution (mm): 0.004/0.008
Deformation Measurement Accuracy: ± 1% of indicated / ± 0.5% of indicated
Strain measurement accuracy: ±0.5% of indicated load from 1% to 100% capacity FS
Strain Velocity Accuracy: ± 1% / ± 0.5% of set
Operating temperature range: 0℃ to 38℃
Storage temperature range: -10℃ to 45℃
Humidity range: 10% to 90% non-condensing, web bulb method
Power: standard optional voltages 220/240VAC, 50-60 Hz; power must be free of spikes and surges exceeding 10% of the nominal voltage(CMT5000 needs voltage in 380V±10%)

Special testing machine for high temperature fireproofing performance test of construction materials

This machine which is on the basis of SHT4000 series servo hydraulic testing machine was researched and designed specially for fire research laboratory of Tongji University to research materials' mechanical performance change after fire .It has 12 channels for temperature acquisition and 8 channels for signal acquisition of strain gauge to ensure to measure temperature ,strain and load etc. of different parts accurately .Through accurate loading controlling of servo hydraulic ,it can not only perform tension ,compression ,repeat test etc. routine test in high temperature of materials ,but also determine accurately heat distensibility coefficient etc. special performance indexes. It is ideal testing machine to research mechanical performance change of construction materials during fire.