WANCE®
Do Our Best for Your Test

Drop Weight Impact Testing Machine| DIT302E | 300J

Functions

The DIT302E drop weight impact testing machine is mainly suitable for prefabrication damage testing of composite sheets, meeting various specifications in the aerospace and automotive industries. The impact force transducer and test system are adopted, and the high-speed data acquisition card is used to measure the load and deformation transient value of the impacted sample during the fracture process through the oscillographic impact sensor, that is, the impact absorption work, the force-displacement-energy curve of the impact process and the characteristic points on the curve: The slope discontinuity force F1, the maximum contact force Fm, the maximum energy Wm, the total impact energy Wt and the corresponding displacement realize the data analysis of the impact process of the sample, reflecting the resistance of the material to the dynamic impact load, the force and deformation characteristics of the sample under the impact load, and the dynamic fracture toughness analysis of the material under high strain rate..

Standards

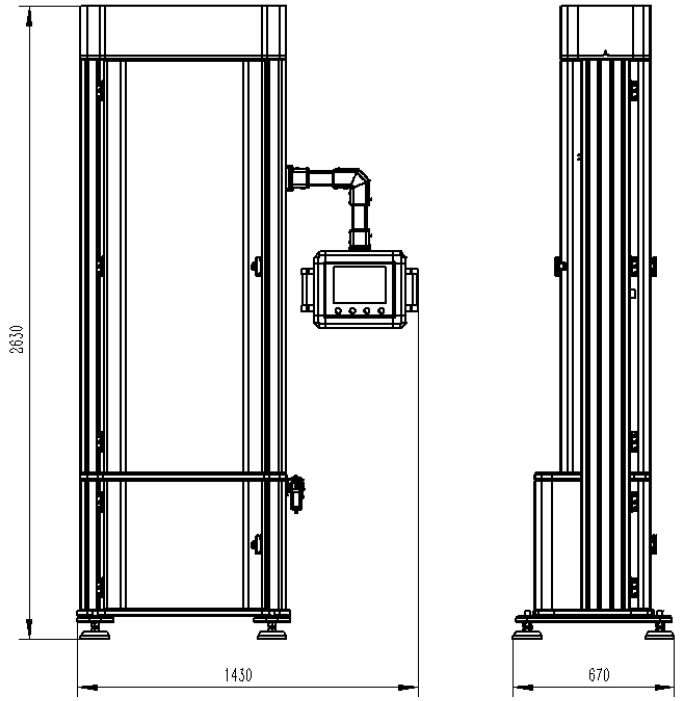
ASTM D 7136/D 7136M, GB/T21239, GB/T 2611

Specifications

Model	DIT302E
Energy	6~300 J
Impact speed	1.47~4.65 m/min
Hammer lifting	1m/min~3m/min, adjustable
Impact height	110-1100 mm
Hammer positioning accuracy	1.0 mm
Mass	5.5~29.5 kg
Hammer sphere diameter (half-sphere)	16mm
Force transducer	100kN
Force transducer static linearity error	±1%FS (10%～50%FS) ±2% of reading (50%～100%FS)
A/D sampling resolution	16bits
Maximum sampling frequency	2MHz
Frequency response	500kHz
Dynamic error	<2%
Machine dimension (length x width x height)	1430×670×2630 mm
Power	AC220V±10% 50Hz 400W
Weight	550 kg

Specifications

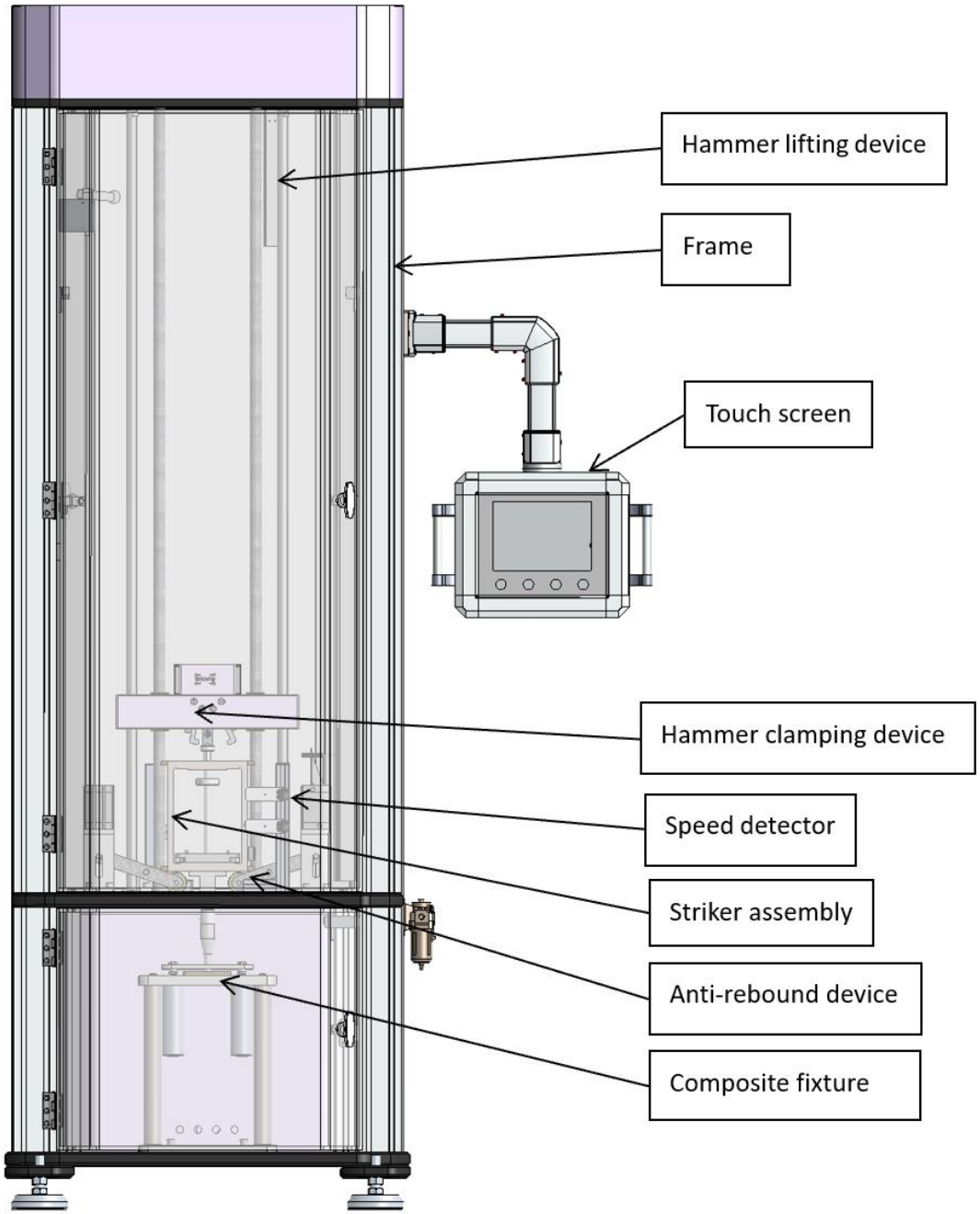
Model	Dimension	Maximum impact height
DIT302E	1430×670×2630	1100



Standard accessories

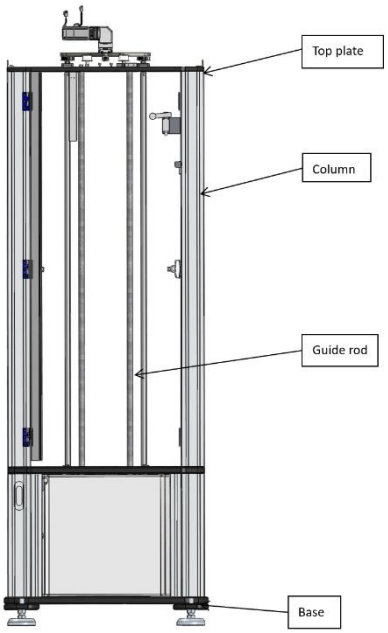
No.	Name	Description	QTY
1	DIT302E machine		1 set
1.1	Frame		1 set
1.2	Servo motor and controller	400W	1 set
1.3	Mass	5.5kg~29.5kg, striker D16	1 set
1.4	Hammer lifting device		1 set
1.5	Hammer clamping device		1 set
2	Specimen fixture	ASTM D7136	1 set
3	Control electronics	SIEMENS PLC	1 set
4	Instrumentation system		1 set
4.1	Force transducer	25kN, 100kN	1 set
4.2	Data acquisition system	16bit/2MHz	1 set
4.3	Signal conditioner		1 set
4.4	Speed detector		1 set
4.5	Test software		1 set
5	Computer		1 set
6	Air compressor	YH-04	1 set
7	Tools		1 set

Machine structure



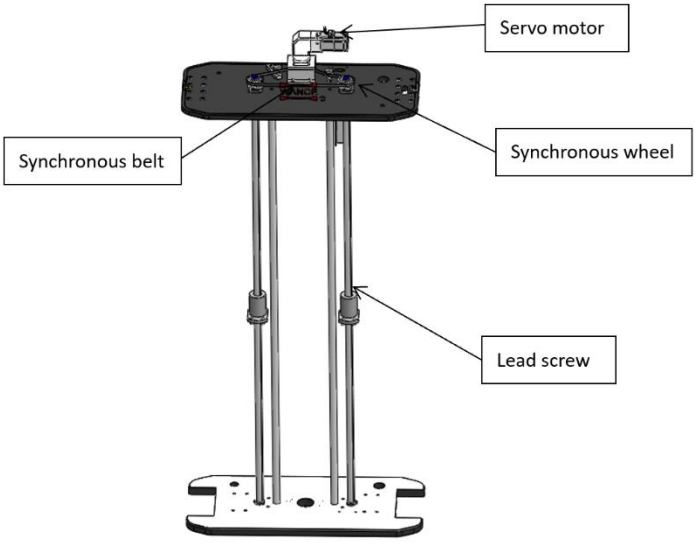
Machine frame

The main frame is mainly composed of base, top plate, guide rod and aluminum alloy column. The base is a frame structure composed of two 45 steel plates and aluminum alloy columns. The column is aluminum profile, four-point support, to ensure the stability of the main frame; The aluminum alloy column is connected with the bottom plate and the top plate by screws. Although the whole frame height is higher, but the center of gravity is lower, and the stability is better. The guide rail is a precision smooth rod with chromium plated and hardened surface, good straightness and high precision. The upper and lower ends of the smooth column are connected by thread, and the two ends are tightened to ensure the stiffness of the main frame and guide rail, and to avoid the possibility of loosening the connecting parts of the main host due to vibration.



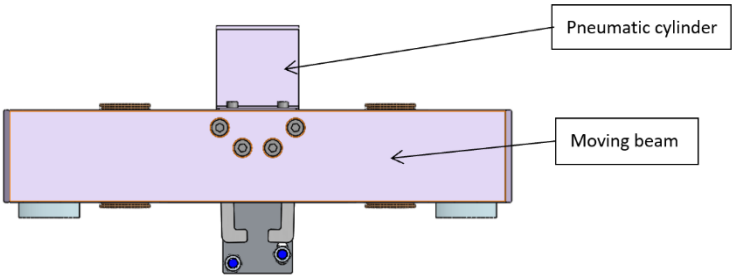
Hammer lifting device

The hammer lifting device is mainly composed of servo motor, lead screw, synchronous wheel, synchronous belt and other parts. The motor has the advantages of high efficiency, low noise, stable performance and high positioning accuracy, and the motor with brake function will lock itself when the power is off, and the hammer will not fall accidentally.



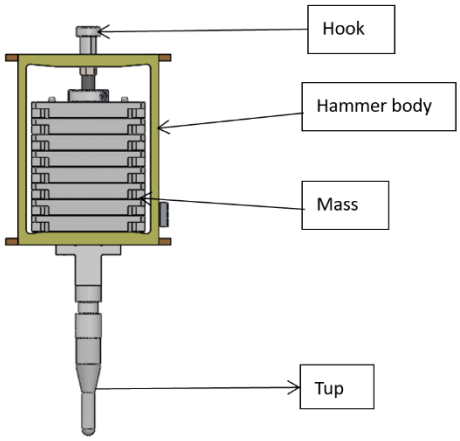
Hammer clamping device

The hammer clamping device is equipped with a self-locking device, which self-locks immediately after lifting the hammer, and will not open and cause accidents under the action of pituitary gravity. It is equipped with a proximity switch to detect the position of the hook at any time. If the hammer body is not caught, the moving beam will not be lifted. Cylinder actuating, easy to install, easy to use, long service life, safe and reliable.



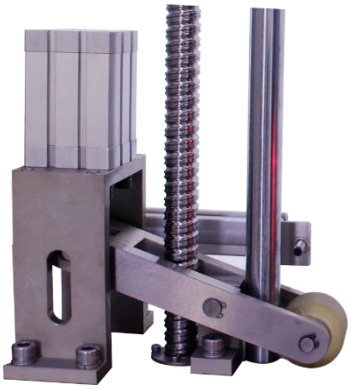
Hammer assembly

Striker body is 5.5kg, by adding mass, the assembly mass can reach 29.5kg. Tup is made of alloy steel with high wear-resistance and impact-resistance. Tup is sphere shape D16±0.1mm, complying with ASTM D7136.



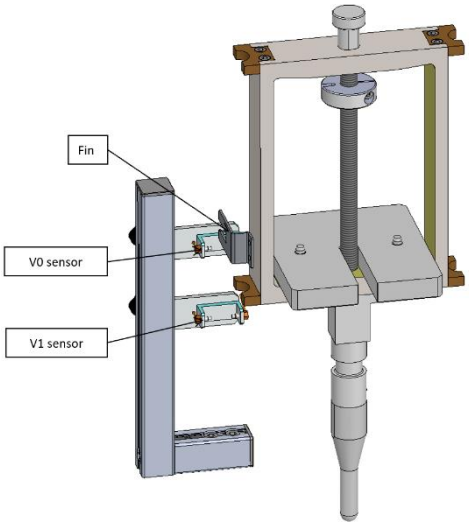
Anti-rebound device

The function of the anti-rebound device is to raise the head of the hammer after impacting the sample and before impacting the sample again to prevent the secondary impact from affecting the result. The device is mainly composed of a base, a cylinder and a buffer rubber wheel, as shown in Figure 8. When the impact test is completed, the cylinder remains in the retracted state. When the hammer component is bounced up, the sensor can detect a signal. At this time, the control system triggers the solenoid valve to make the cylinder extend and the buffer rubber wheel rise against the hammer to prevent secondary impact. The anti-secondary impact device detects the rebound of the hammer body through the detection switch, and the driving cylinder is extended to prevent the sample from being subjected to secondary impact.



Specimen fixture

Designed according to ASTM D 7136, opening size is 125x75mm. Specimen size is 150x100mm. Place specimen onto support, pneumatic cylinder to tighten specimen. This fixture has interlock with safety door, only tighten when door is close.



Speed detector

There are two pairs of velocity sensors on the speed measuring device. One group measures the initial velocity of the hammer when it hits the specimen surface, while the other group measures the final velocity of the hammer when it penetrates the specimen. The opposite shooting head of the initial velocity sensor is installed at a position of 2-3mm above the velocity measurement piece of the hammer body. The distance between the fixed block of the final velocity sensor and the fixed block of the initial velocity sensor should be equal to the thickness of the sample.

Safety door

The whole testing machine is surrounded by a fully closed protective cover, which can effectively prevent the splashes of broken samples and prevent the test personnel from entering the inside of the testing machine during the test. The protective cover is provided with a threshold switch, when the protective door is opened, the test opportunity will lock itself, and the main operation is invalid, so as to prevent misoperation and ensure the safety of the test personnel.

Control electronics

The testing machine is equipped with a set of automatic control system, which makes the clamping, positioning, lifting and impact become a fully automated process, greatly reducing the labor intensity of the operator, improving the work efficiency and operation safety. Siemens programmable controller is used to design the automatic control system of the testing machine, equipped with a touch screen as a terminal operator, and a servo motor is used to control the height. Due to the high reliability and stability of PLC and strong anti-interference ability, the reliability and stability of the entire control system is also high, and there will be no misoperation, which greatly improves the safety of the test personnel. At the same time, the control system also has the alarm function for the following faults: the hammer head is not self-locking fault, the protection device fault, the hammer head lifting is not in place fault. The system has the functions of beam travel limit, emergency stop switch, motor overcurrent, overheating, leakage and power failure protection.

Instrumented system

Force transducer in striker transfers the force signal to high speed data conditioner for amplification. Then the signal is A/D converted by high speed sampling card, and transferred to computer for storage and analysis.

- Force transducer: Bridge strain gauge type force transducer with various energy is available, ranging 0.1J to 100,000J in energy and 1,000N~1,000,000N in force. It provides high frequency, high linearity and durability.
- High speed data sampling card made from American NI: 16bits A/D resolution and 1.25MHz high speed data sampling permit reproduction of instantaneous force changing with good fidelity. Industrial standard PCI interface is easy to communicate with computer.
- High speed signal conditioner: Enlarge the strain signal to match the analog signal input range required by high speed data sampling card, improving measurement resolution and sensibility. 500kHz band width ensures high frequency signal without attenuation.

Instrument data analysis system - Software

- Automatic curve fitting of force vs. displacements
- Automatically determine Fgy, Fm, Fiu, Fa, and other characteristic parameter, further determine after calculation Sgy, Sm, Siu, Sa, St, Wm, Wiu, Wa, Wt and others.
- Fully automatic data processing permits to get test results and report after each test immediately.
- Curve and raw data can be exported