Test Equipment

Universal Spring Tester Hydraulic

with Lateral Loading

Made in Germany as per customers specifications

CADIS Prüftechnik GmbH

www.cadis-gmbh.de

Process-Integrated determination of data characteristics and Quality control of Coil springs (Heavy or Light Duty)

Springs need to be regularly inspected and their load carrying, energy absorption and elasticity characteristics controlled and recorded.

This testing is carried out by approved rail and rolling stock maintenance organisations. The major elements of testing include the analysis of impact force on springs and the resulting correlation between compression achieved in relation to the height for coil springs, and in the case of leaf springs the relationship between the changing of length as the force is applied and then removed.

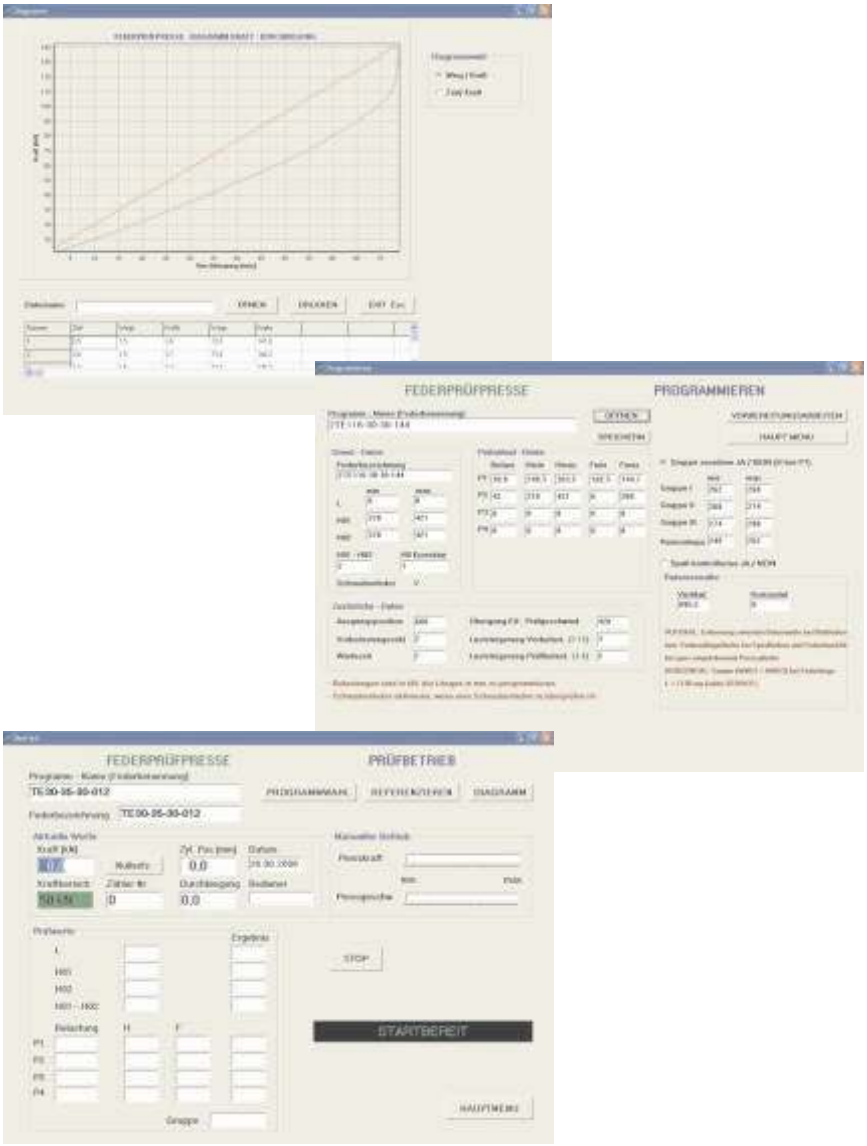
The force over distance controlled Cadis Spring Tester system enables the operator to carry out all the Statutory testing requirements. Upon tensioning and subsequent release of tension, the resulting compression and in the case of leaf springs the changing length; will be recorded by distance and force sensors. Using this saved information, the load carrying capacity, height and even the entire spring characteristic curve can be calculated. Thus allowing the rail test centre to use the data from every test cycle to compare the pre-programmed values defined by the Set tolerances with those actually achieved. The analysis of required / acceptable values with those figures actually attained is presented on the Control Screen as I.O. (In Order) or as N.I.O. (Not In Order) and is automatically saved. In addition to this function it is also possible to print this result onto a label to be then directly attached to the corresponding spring. Springs can now be paired up safely by analysing the information printed on the labels. Only those springs lying within allowable parameters can be paired up. The resulting spring characteristics curve can also be printed if this should be requested for documentation. The test run for every type of spring is pre-programmed and can be called up by the operator by entering the relevant programme number.

The name of the operator, sequential number and all other important factors are automatically saved for every test cycle.

In addition to fulfilling the criteria of the quality and safety regulations, the utilisation of the fully automatic spring feeder and integrated test run systems enables the railway test and service department to raise their efficiency and safety levels whilst also optimising productivity.

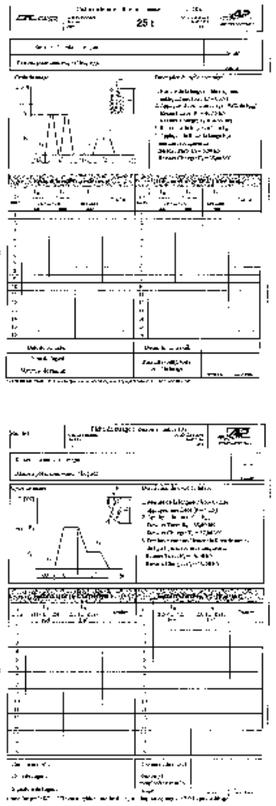
Basic characteristics of the control and test software

- Simple Windows-based control screens
- Programme memory capable of multiple
- Press cycles / multiple spring types
- Programme call up via Part No., Contract No., or other variables
- Protocol records operator name, part No., Contract No.
- All relevant process data presented on a visually accurate and easy to read screen layout
- Actual real time values are displayed throughout press cycle
- Result of press, i.e. N.I.O. or I.O. displayed on control screen
- Operational hours and No. of parts tested; displayed & recorded
- Press result, operator, date & time, programme No., plus all system relevant data in numerical and graphical format is registered after every press run and saved on the P.C´s Hard Drive
- The test results can be printed in the form of a Test Protocol or even printed as a label
- Statistical analysis optional
- Network connectivity
- Further interpretation and utilisation of results via standard software is possible upon request
- Memo fields can be integrated upon request
- Axial Spring Stiffness
- Transverse Spring Stiffness
- Bowing Deflection
- Bowing Angle
- Bowing Force
- Force - Disp - Graph Plot

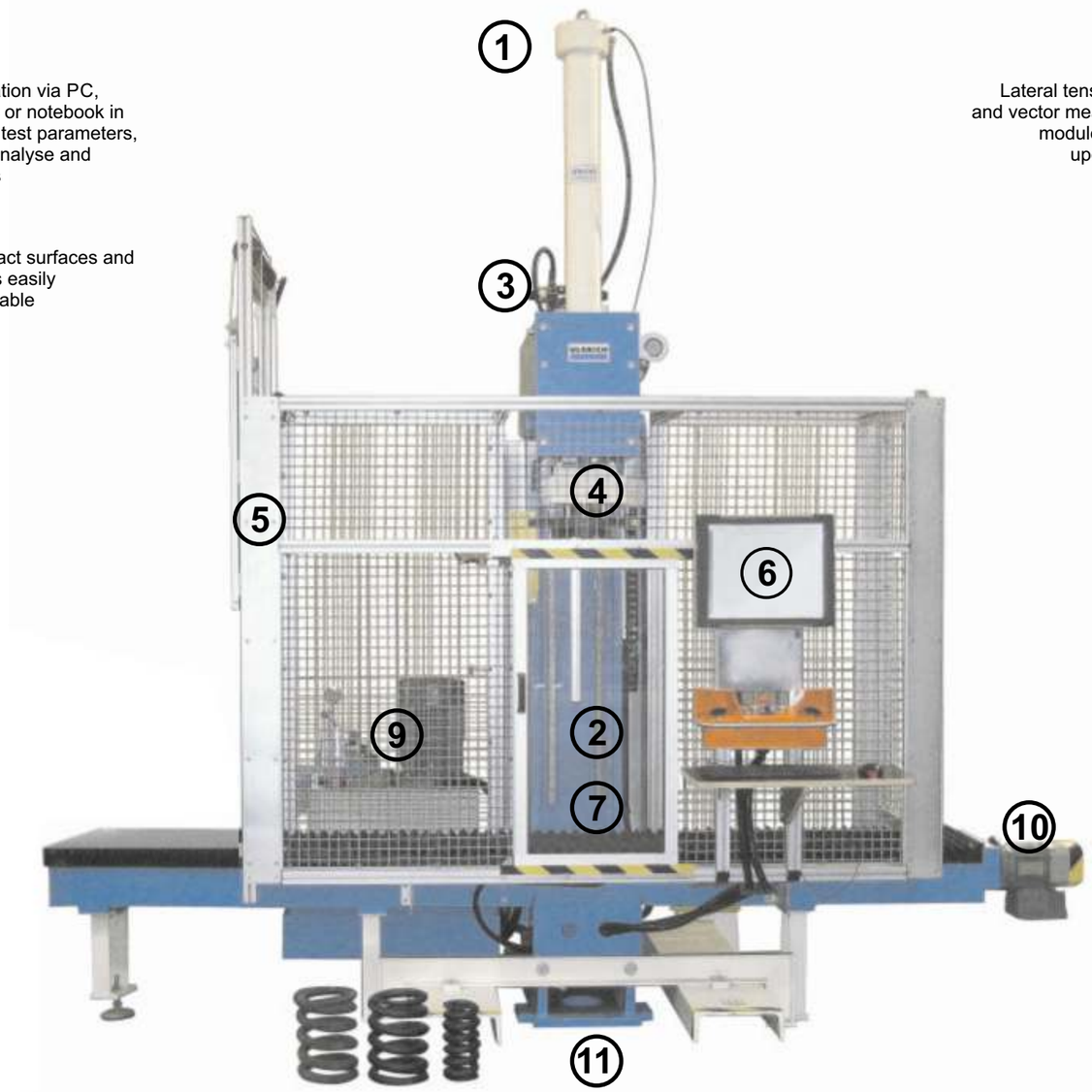


CS-250 ST Spring Tester for Leaf and Coil springs

Specially designed for Railways & Rolling Stocks



1. High resolution / fully integrated distance measurement & control hydraulic cylinder
2. Extra guide cylinder also prevents any unwanted rotational movement
3. Independent fine tuning of distance over force via high precision proportional hydraulic block, hydraulic system
4. Highly robust precision dynamometer, the option of a second dynamometer provides the option of a second measurement range Calibration function is included in the software
5. The entire working area is enclosed by a safety mesh additional protection and safety components can be integrated upon request
6. Communication via PC, industry PC or notebook in order to set test parameters, to display, analyse and save results
7. Spring contact surfaces and press plates easily interchangeable



Lateral tension, travel and vector measurement module available upon request

9. Powered by low noise two speed hydraulic pump mounted on oscillation dampening elements Control of filter contamination, oil level and operational temperature Fault display on control screen
10. Spring feed and placement via transport guides
11. Wide and adjustable pedestal, hence no special flooring or extra foundations needed Elongation of the press itself is compensated by the Spring Tester Software. Simple Windows based programming following the pre-defined requirements and test parameters set out by the relevant Governing Statutory Authority

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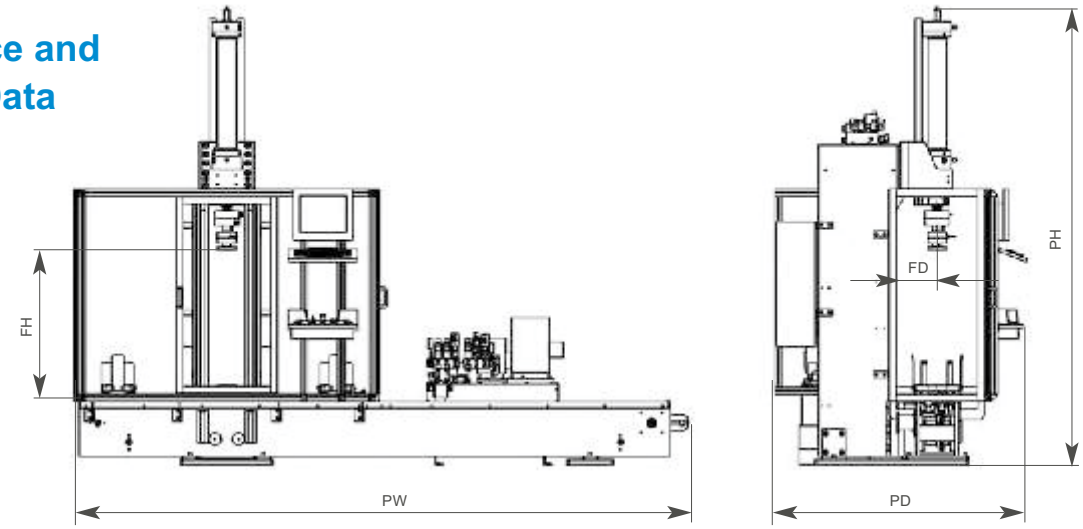
Performance and Technical Data



Force kN	Nominal force max.	250
	Control range	2.5-250
	Deviation of force control	<1%
	Testing Force Range 1 (Main)	2.5-250
	Testing Force Range 2 (Lateral)	0.5-50
	Deviation range (from 1% of nominal force)	<1%
	Display resolution accuracy	0,1
Position mm	Total stroke (Max)	700
	Measuring accuracy	0,01
	Positioning accuracy	0,1
	Display resolution accuracy	0,1
	Bowing angle (equal or better than)	±5º

Hydraulic Driven Test Machine, Noise < 70 db

Measure the angle of deflection, lateral displacement and the lateral forces of coil springs

In addition to the analysis of the spring characteristics curve it is necessary to measure the angle of deflection, lateral displacement and the lateral forces of coil springs.
This is especially important with regards to matching up opposing transverse springs (left-right) assembled in railway undercarriages. Here it is absolutely essential to match together corresponding transverse spring characteristics in order to avoid lateral distortions when the wheel set springs are in compression.
The specially designed Ulbrich X Y lateral force measurement system (loose sled-slide rails) enables the operator to measure both the lateral movement as well as the actual displacement from the centre of the spring. Both values can be combined in the analysis / test protocol.

TYPICAL TEST-RUN

A spring is inserted and the XY table then utilises position encoders to measure the lateral displacement, the direction of displacement together with the vertical displacement resulting from the (press stroke mm.) compression of the spring.
The vector resulting from the specific force / displacement is recorded.
The XY platform and compressed spring is then driven back to the central axis position of the spring by hydraulic cylinders by retracing the recorded vector data.

Actual re-position force applied in order to bring the spring to the back to the central axis position is measured by precise load cells.
We are now in a position to plot the actual correlation between compression force , lateral displacement (mm) and lateral displacement force (kN).

Resulting values are then classified in a test protocol as being I.O. or N.I.O. which is displayed on the PC screen in accordance with the customer specifications entered into the test programme. The XY work table can be easily fitted and also removed should the operator need to test parabolic springs where the XY system is not required.

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