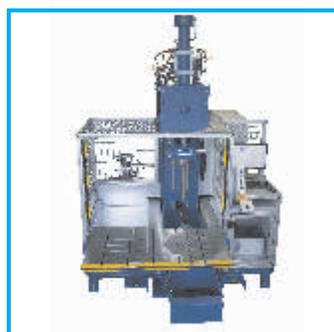
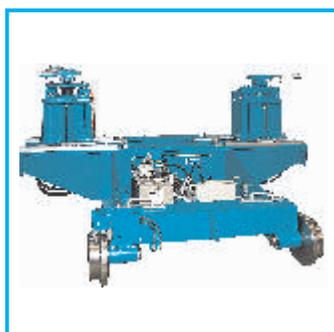
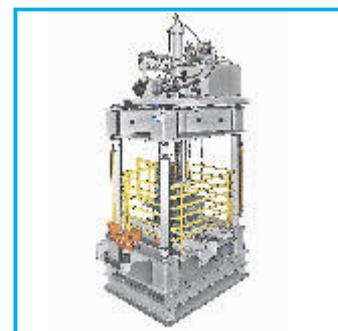
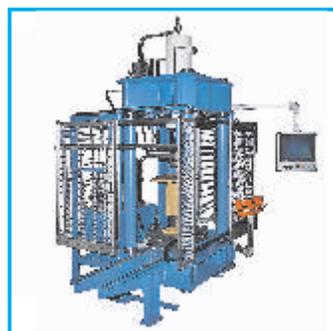
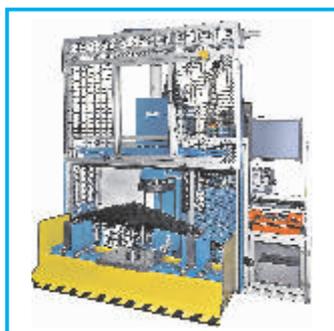
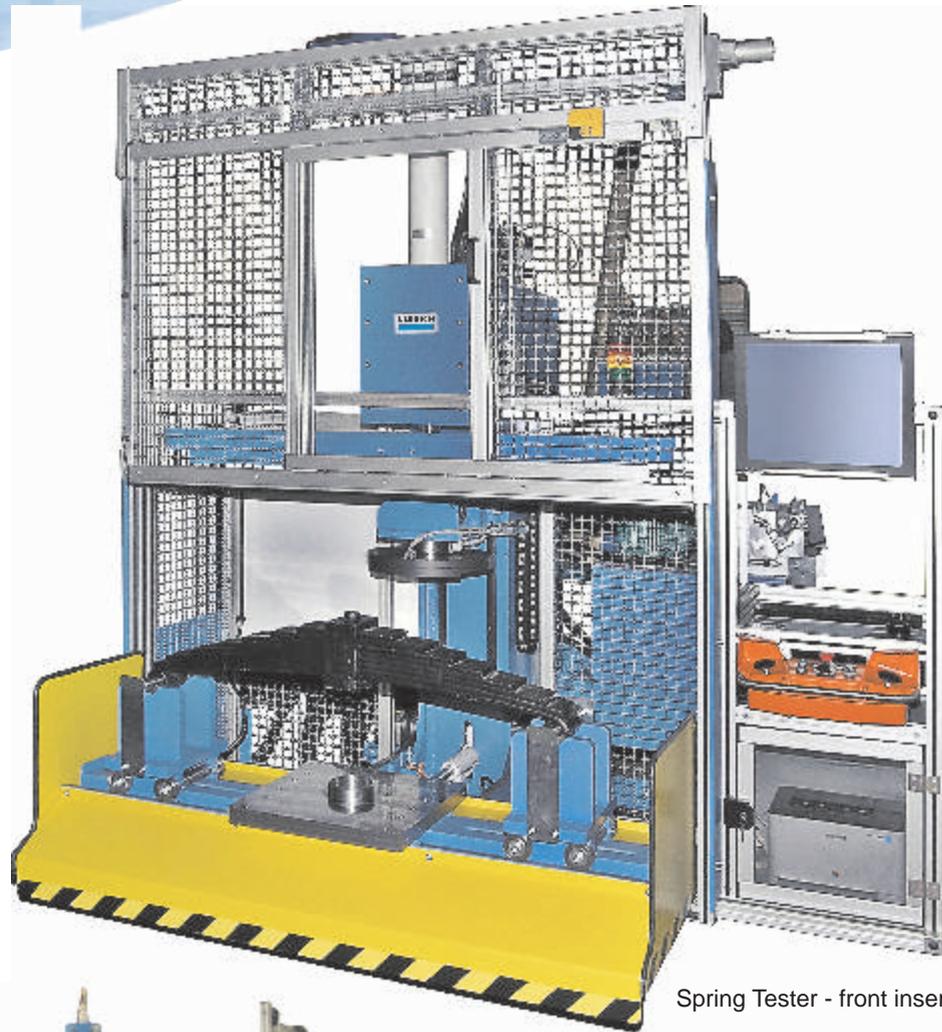
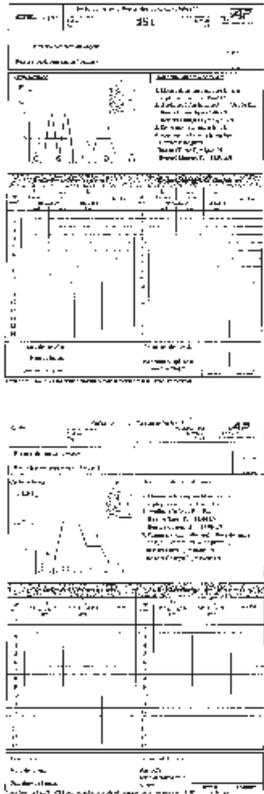


Railway Depot Equipment

A brief overview about our Test and
Joining Machines

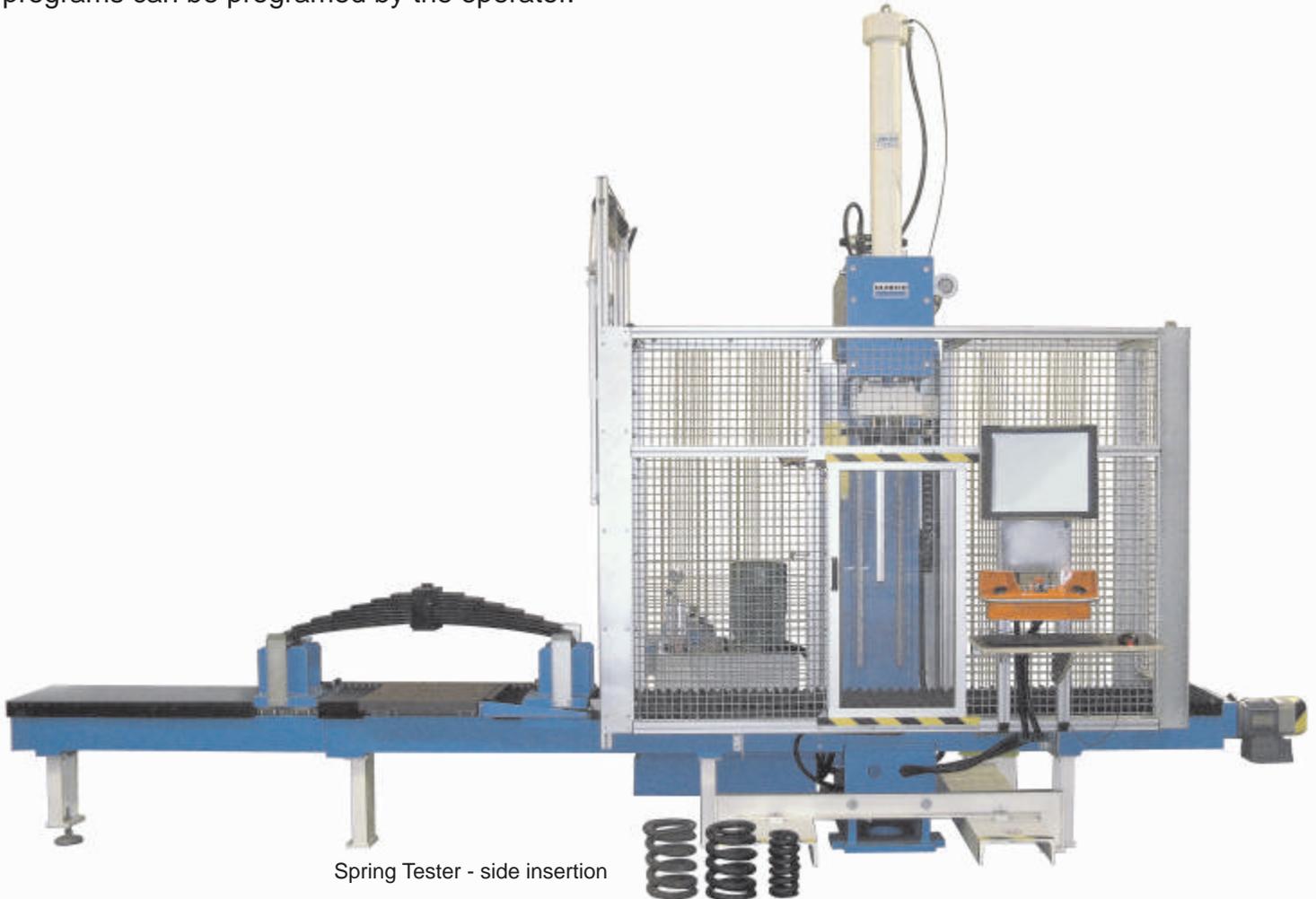


Universal Spring Tester



Process-Integrated determination of data characteristics and Quality control of Leaf and Coil springs

Ulbrich spring test machines are developed specifically for the railroad-industry. They are in use at workshops as well as spring manufacturers. Beside the classic coil springs, leaf springs, parabolic-feathers and rubber springs can be tested on the same machine. According to implementation, the axial stiff-ness as well as the transversal (horizontal) stiff-ness and its direction can be measured. Individual test-programs can be programmed by the operator.

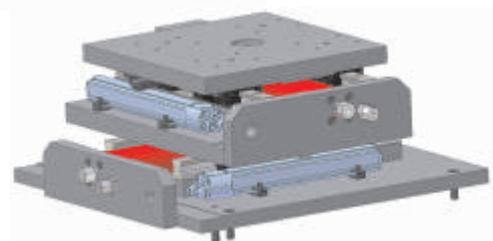
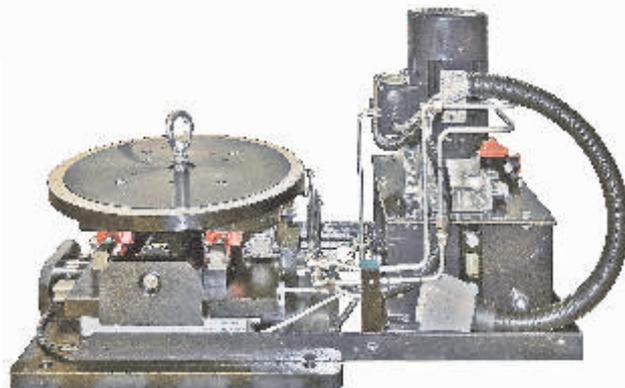


Lateral Spring Table

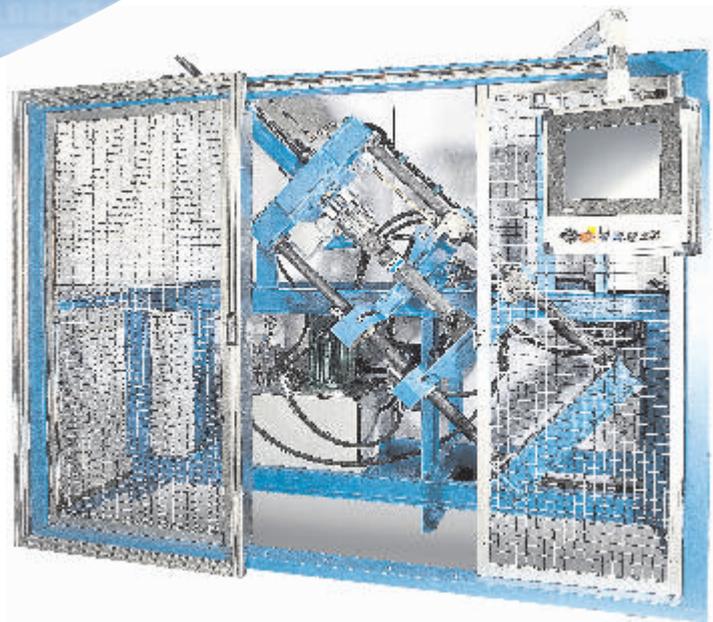
In addition to the analysis of the spring characteristics curve it is necessary to measure the angle of deflection, lateral displacement and the lateral forces of coil springs.

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.



Universal Shock Absorber Test Machines



Model: 300/25 (mm/sec/kN)

Shock absorbers need to be regularly tested in order to ensure that the energy absorption properties are in-line with the specification.

Such tests will be carried out in accordance to the manufacturers quality control procedures or railway regulations.

The main test criterion revolve around the measurement of impacts in relation to a selected speed linked to a number of specific strokes with specific stroke lengths (normally displayed with a sinusoidal curve).

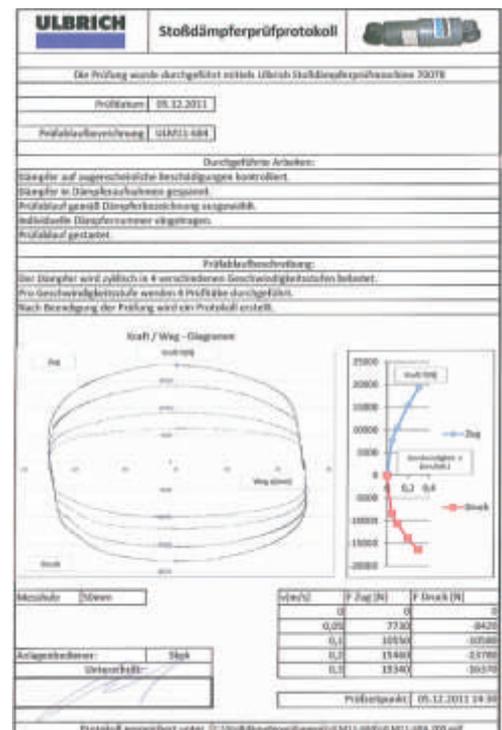
The resulting forces are measured and recorded using the integrated load-cells.

Basic characteristics of the control and test software

- Display shows the required / achieved data for the distance and speed
- Speed profile over the stroke from the stroke starting position and the No. of strokes-fully programmable
- Envelope for press curve graphically available on the screen panel
- I.O. / N.I.O. result on the screen panel
- Saving of Operator details and contract No.
- Memory for XX programmes
- Programme call up in accordance to contract No. or type of shock absorber
- All relevant process data shown on a operator friendly display screen
- Test result , operator, date, time , test parameter , contract No. and or type will saved and archived on the computers hard drive
- Test curve in the form of stroke / force diagram also available on the screen
- Printing / coding of results in the form of a sticker – optional
- Statistical analysis option available
- Memo field available for extra remarks

Main features as follows

- Max. press and extension force up to 45 kN
- Max. stroke 360 mm (i.e. +/- 180 mm)
- Max. total length of the shock absorber = 1100 mm
- Max. speed of the sinus curve profile up to 550 mm/sec.
- Test position from 0° vertical to 120°, fully adjustable
- Hydraulic system controlled by servo-valves incorporating a synchronous cylinder and a 7,5 kW up to 45 kW drive unit
- Option: Minimum speed xx mm/sec



Joystick for test object positioning

Working area fully enclosed with protective cage

High resolution / fully integrated distance measurement and control

Two press plate heights enable measurement of shock absorbers with varying lengths

Test parameter settings, analysis, display of results and saving of data via "touchscreen" PC

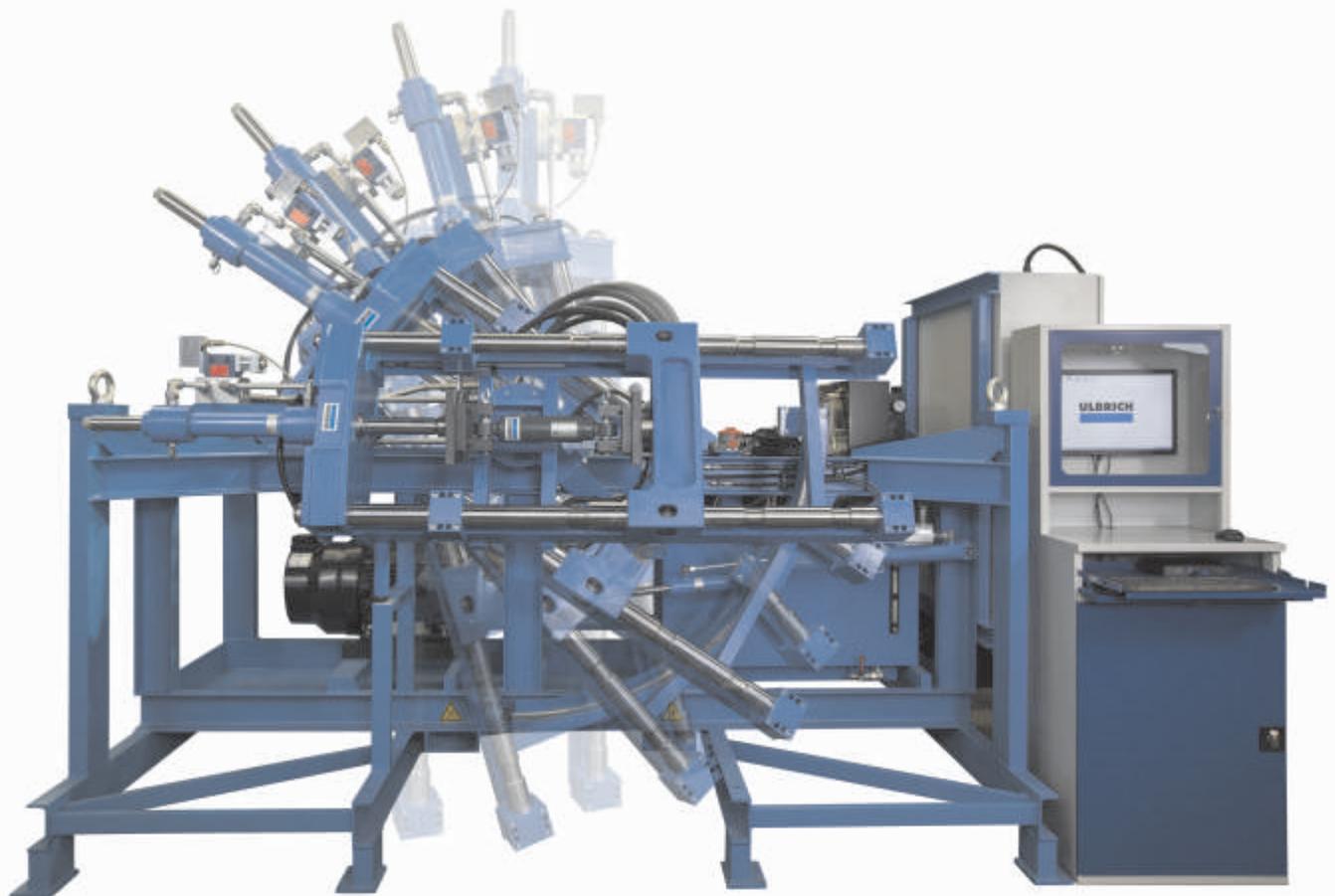
All test positions programmable with help from the angle transmitter

Data transfer via USB flash drive and / or LAN

Robust high precision loadcell



Model: 550/45 (mm/sec/kN)



Model: 500/25 (mm/sec/kN)

Air Spring Test Machine

Technical description:

ULBRICH position- and force monitored, additionally position- and force controlled. Test machine for measuring the spring characteristics and sealing properties of air springs to the specifications and drawings.

Operation:

The test cycle is carried out in accordance to specified performance criterion, the actual test run itself is freely programmable thus enabling the test centre to control any number of different spring types.

The press force, compression depth, holding time, air cushion internal pressure, pre-test run compression set, the test protocol form and automatic archiving methodology can all be individually defined for an open ended number of test programs.

The open protection housing enables visual control of the spring and eases the placement and removal of the test object. The internal pressure of the spring is maintained by airlines which allow for the spring movement. Air pressure is displayed and can be adjusted according to the test criterion.

Safety standards are set up in accordance to customer needs and we carry out a workplace risk analysis taking into account the actual operational environment where the machine will be installed.

Additional Features:

- Production data entry and saving of the test cycle results in a user friendly format. This can be numeric and also graphically presented, saved and printed
- Barcode prints and other forms of labelling per printer are also possible but not in the standard delivery package
- Access to the control system and software only possible with code entry Entering of new test run programmes can be executed via an external PC
- Exit air pressure can be pre-selected
- LAN / WAN connectivity
- On-line diagnostic service available



Universal Buffer Test Machine

Process integrated analysis of energy absorption and Quality Control for rail buffers and rolling stock coupling systems

Railway buffers need to be regularly tested to ensure that the energy absorption characteristics are within the specified ranges. Test cycles are based on the OEM specifications, the National Railway Regulations and /or in accordance to the European Norm EN 15551- Annex D “(normative) Testing of

static characteristics of buffers”. The test run in accordance to this Norm requires the plotting of a force – distance curve during the entire press cycle. The test is carried out using a complete buffer system, i.e. the spring and shock absorber elements to be tested are fitted into a housing that correlates to the Norm.

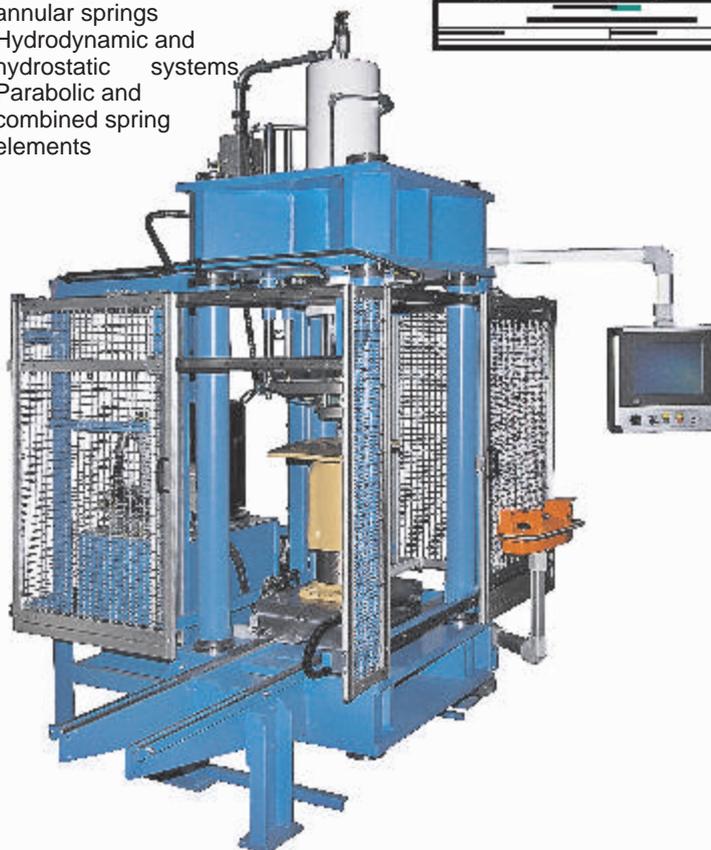
The following types of springs can be fitted into the Buffer housing:

- Rubber and or other elastomeric springs systems
- Frictional dampers or annular springs
- Hydrodynamic and hydrostatic systems
- Parabolic and combined spring elements

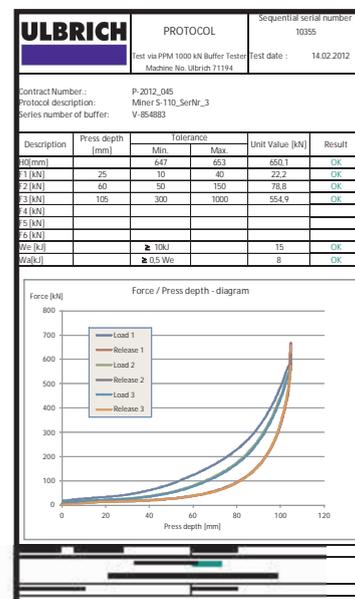
Main software control features

- Display of stroke / force curve
- Calculation of force applied and energy absorption
- Customer can create and modify own Test Protocol layout
- I.O. / N.I.O. Anzeige
- Result of press, ie N.I.O. or I.O. displayed on control screen
- Entry and saving of operator information and contract number
- Programme memory capable of multiple spring types
- Programme call up via contract No. or the type of buffer
- All relevant process data presented on an open (editable) user friendly screen layout test result, operator, date, time, test info and contract No.
- displayed & recorded following every test run. All system relevant data (numerical and graphical) is registered and automatically archived on the P.C's hard drive
- Statistical analysis optional
- Memo fields can be integrated upon request

| | | |
|--------------------------------|---------------|---------|
| Maximum pressforce | 1000 kN | 1500 kN |
| Minimum pressforce | 100 kN | 150 kN |
| Cylinder stroke | 550 mm | |
| Width of opening Z | 900 mm | |
| Width of opening front Y | 600 mm | |
| Width of opening side X | 500 mm | |
| Test object carrier height | 700 mm | |
| Test object carrier Dims. | 400x600 mm | |
| Test speed | 7-14 mm/s | |
| Motor performance | 15 kW | |
| Load cell | 100 - 1500 kN | |
| Test object carrier on rollers | | |
| Buffer loading option | left or right | |



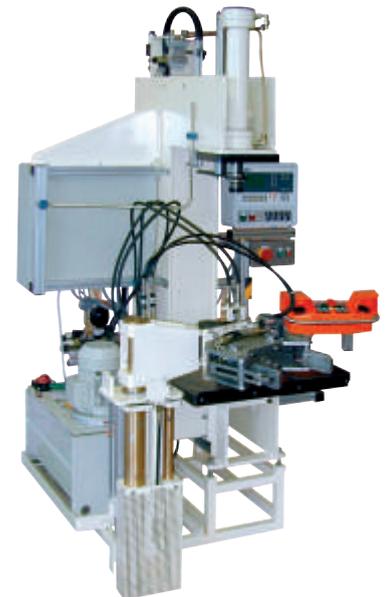
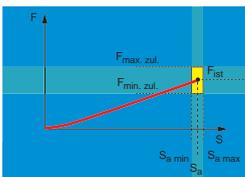
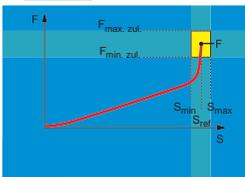
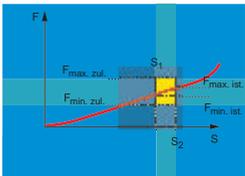
- Fully integrated high resolution distance measurement and control
- External loading area externally allows for easier handling via crane or forklift truck.
- (Customer can specify left-side or right-side)
- Protective housing door on slides with safety switch Test object carrier mounted on rollers for ease of placement / removal
- Superior high-pressure hydraulic cylinder with extremely robust piston and guides
- Communication via PC, in order to set test parameters, to display, analyse and save results
- Two-hand operation console. Position adjustable via flexible jointed arm
- Buffer carrier mounted to transport table. Insertion and removal driven by linear drive unit.
- Robust high precision load cell
- USB port
- Joystick
- PC on flexible jointed arm



Monitored Joining and Test Machines from 50 kN to 1000 kN

Position, force controlled and monitored.

In order to comply with current quality assurance standards, all production steps should be guided and controlled within defined tolerance levels and these values must be effectively documented. The ULBRICH Q-Control press system caters for the guidance and control of the press run with analysis of the force/distance curve and pre-set values.



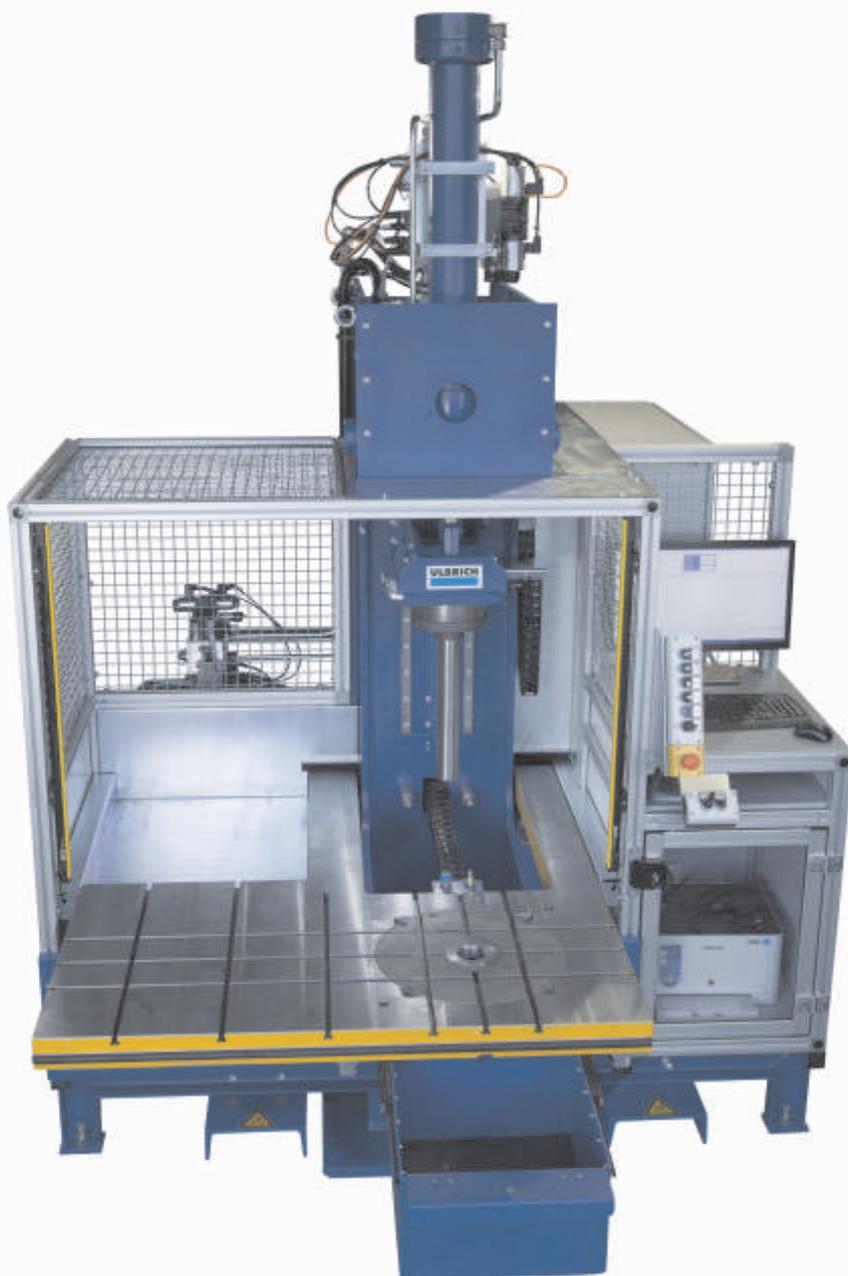
Joining Machine RLP-200 for assembly and disassembly particularly for all kind of wheelset mounts

Brief description:

Position and force controlled
Position and force monitored
Operation programable and visualized

| | |
|-----------------|---------------|
| Max. pressforce | 200 kN |
| Min. pressforce | 5 kN |
| Opening width | 700 mm |
| Reach | 345 mm |
| Stroke | 700 mm |
| Table dim | 1130 x 620 mm |

Table extendable and
barriere free loadable
turnable closing plate
collecting tray
pneumatic ejection cylinder
Enclosure with light grid protection
and body protection strip
Energy optimised hydraulic drive



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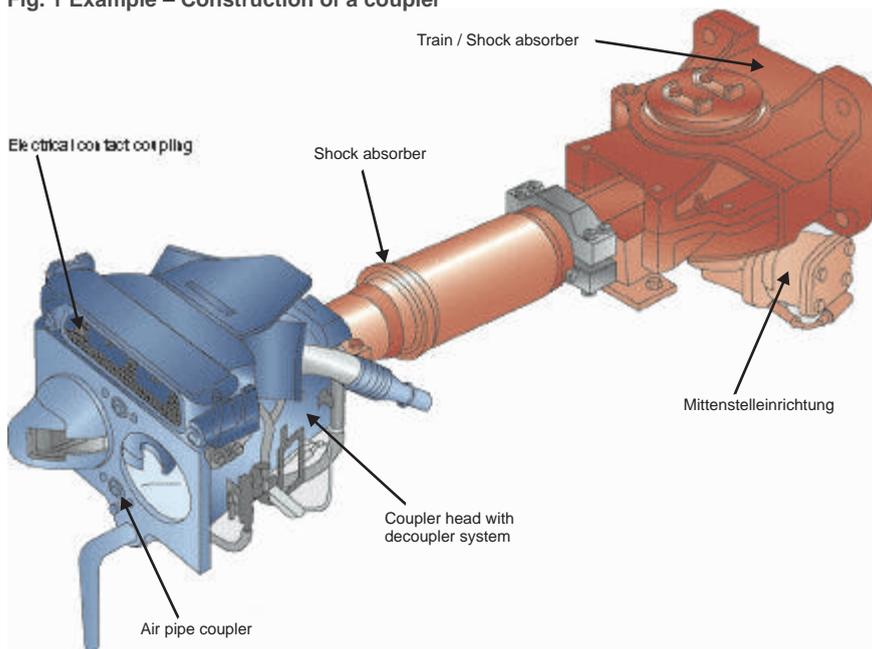
Coupler test machine for automatic centre buffer coupler

Automatic rail couplers must be serviced and tested during a review.

The following functions can be examined with the ULBRICH Coupler test machine:

1. Check the coupler lock - pneumatic and electronic interfaces - with the use of the signal transmitter
2. Tests the coupler pneumatics for leaks/seal
3. Checks the coupler signal pass through electronics
4. Functional load test of the coupler up to a max. of 50 kN
5. Checks the coupler and uncoupler function

Fig. 1 Example – Construction of a coupler



A coupler element to be tested always consists of a unit in the scope shown in Fig. 1. The flange with which the coupler is screwed to the machine can be seen in the upper right of the picture.

The counterpart that will be coupled, remains permanently on the test machine and will only be replaced if another type of coupler needs to be tested.

Since different types of coupler systems usually also have different functions, where their plug connections and pneumatic connections are different, the test machine has corresponding adaptation possibilities.

Technical design:

A plate serves to receive the machine coupler on one side of the machine. The connections of the machine coupler are designed in such a way that they can be loosened by means of plug connectors in a simple manner and by way of fewer manual actions. Only the coupler head is mounted without the shock absorber system. (It can also be designed so that the machine coupler is mounted on the movable plate and the coupler to be tested is on the fixed plate).

The plate is movable and connected to the main frame.

The moveable part of the machine to which the coupler is mounted has a minimum clearance of 1500 mm from the fixed part and can be moved away up to 2500 mm.

The control unit is housed in a control cabinet - which is in the form of a desk and stands next to the machine. A touch panel PC is installed in the console itself on which the test process sequence can be followed. In addition, a printer can be installed where a test report can be printed after the checking of the coupler has completed.

The force is measured by means of the measured hydraulic pressure.

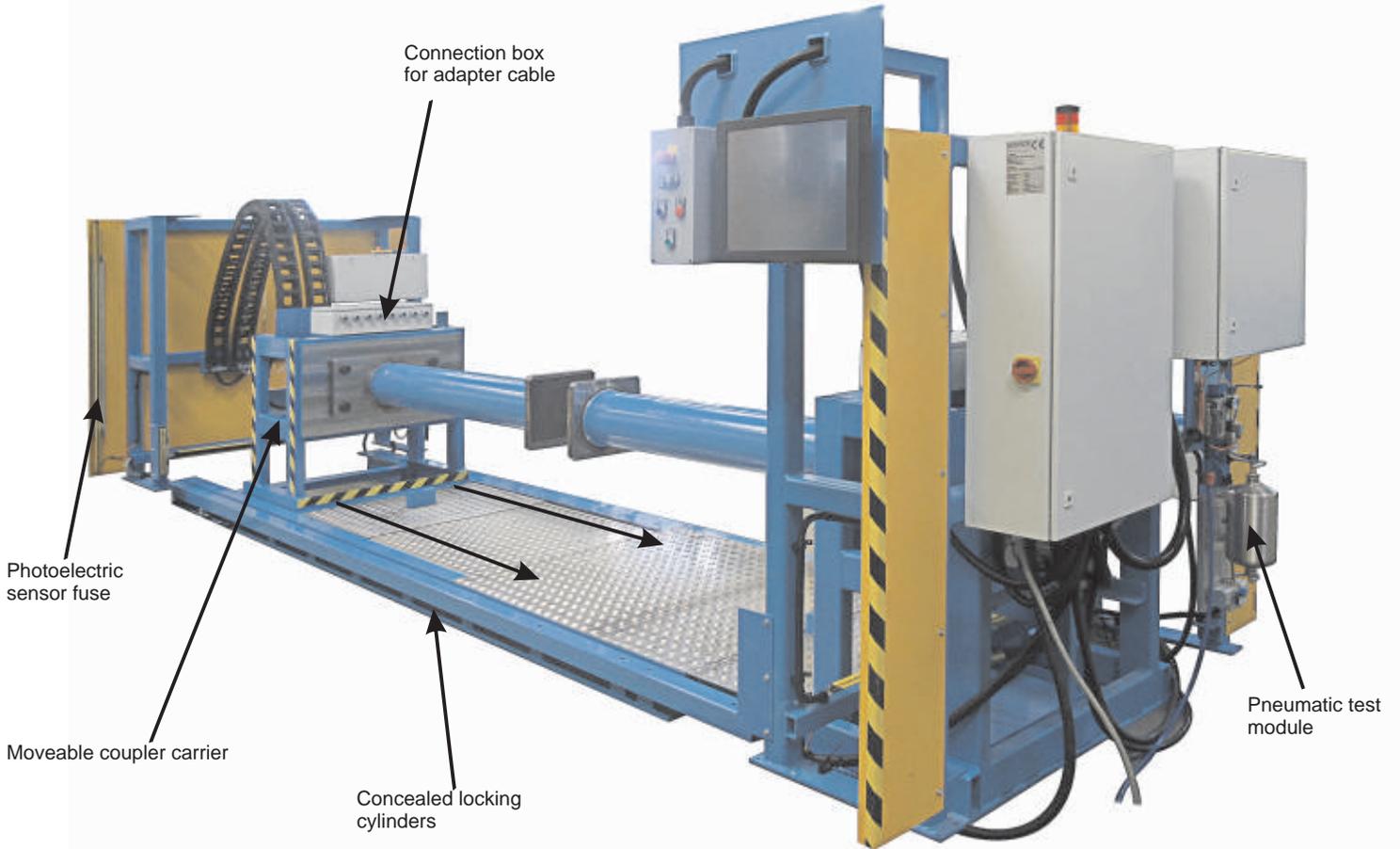
A distance measurement is not provided by default.

The pneumatic pressure measurement or pressure drop measurement is carried out by means of pneumatic pressure sensors with an accuracy of 0.01 bar.

The maximum operating pressure is 7 bar.

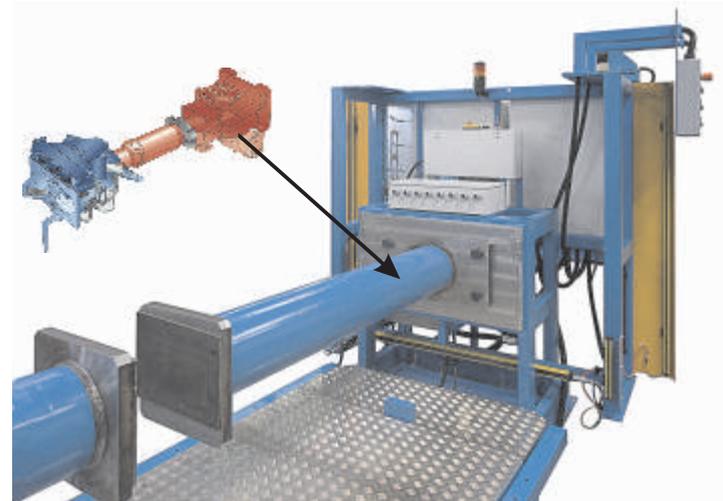
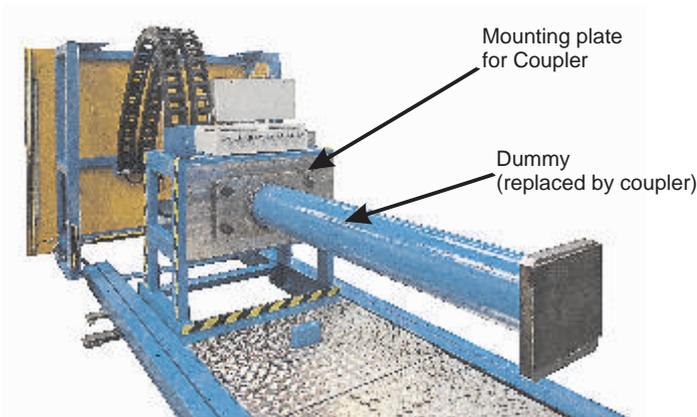
The decoupling is carried out pneumatically by controlling the decoupler line.

The maximum force for connection / coupling is 50 kN.



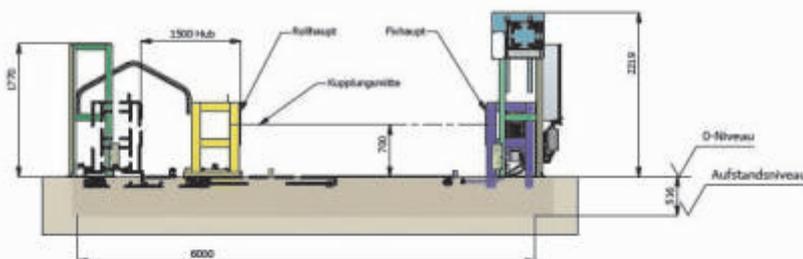
Moveable roll head

Standing coupler carrier



Technical Data / Dimensions

| | | |
|-----------------|--------------------------|------------------------------------|
| Length: 6000 mm | Opening width: 4500 mm | max. closing speed: 300 mm/sec |
| Width: 2200 mm | Stroke: 1500 mm | Breaking zone selectable |
| Height: 2400 mm | Installed capacity: 4 kW | Installed pneum. pressure increase |



Brake testing machine for testing of calliper and chockblock units

Usually, either calliper or block brake units are used for braking train carriages (rolling stock). They are a compact, mechanically independent and a combination of the conventional sub-assemblies: brake cylinders, slack adjusters and brake pad holders. In some instances they are equipped with add-on modules such as spring mechanisms.

Clamp and calliper brakes are available in various construction designs. Essentially all perform the same function and usually have the same connecting dimensions. Apart from additional functions, there is a difference in the design of the brake mount and the position of the mounting thread bores.

The following tests are possible automatically:

- Checking of the adjuster
- Checking of the spring-loaded brake
- Checking of the emergency release device of the spring-loaded brake
- Checking of the service brake
- Sealing test of the service brake
- High pressure sealing test
- Spring-loaded brake sealing test

Each test program contains all the necessary electrical and pneumatic settings. No manual intervention is required during the testing sequence. The programs can be edited and created independently. The content and sequence of the program steps as well as times, pressures and forces can be adapted to job. The expected values are output and stored as IO or NIO in the tabular test report.

The test programs for block and calliper brake units are largely identical - but can be parameterised and retrieved specifically for the type of testing.

In addition to the measured data and test results, the following information is stored:

- Type designation of the BU (brake unit)
- Serial number of the BU
- Type designation of the spring mechanism
- Serial number of the spring mechanism
- Date and time of testing
- Personnel number and/or name of the operator
- Order number of the test



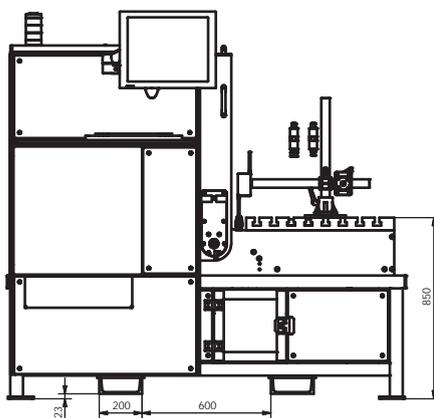
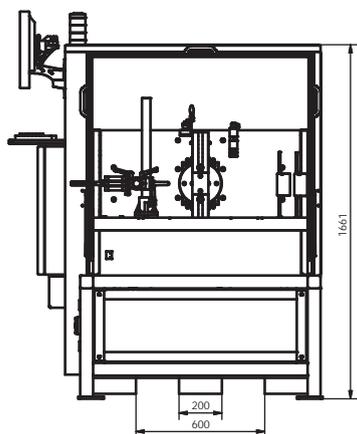
Programming window:

Here, the parameters of the respective tests are defined. Program management allows you to save and edit the programs.

When a program has been selected, technical data and image must be checked against the test item.

After pressing OK, the predefined program loads and the test sequence can be started.

Images and data stored in the program allow a visual check of the built-up CBU (chockblock unit) and a comparison between the set-up and the actual set-up.

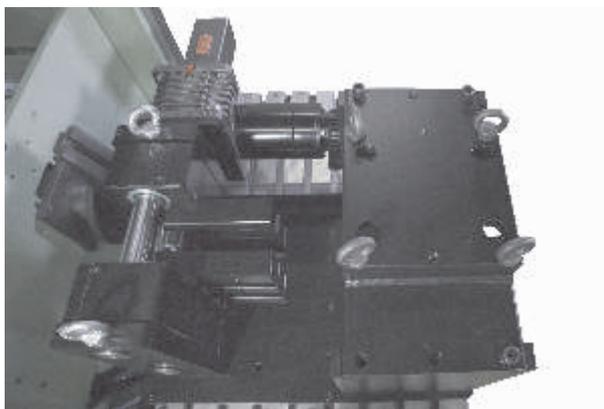


| | |
|---------------------|---------|
| Length: | 1830 mm |
| Width: | 1120 mm |
| Height: | 2000 mm |
| Weight: | 1700 kg |
| Installation Power: | 1 kW |

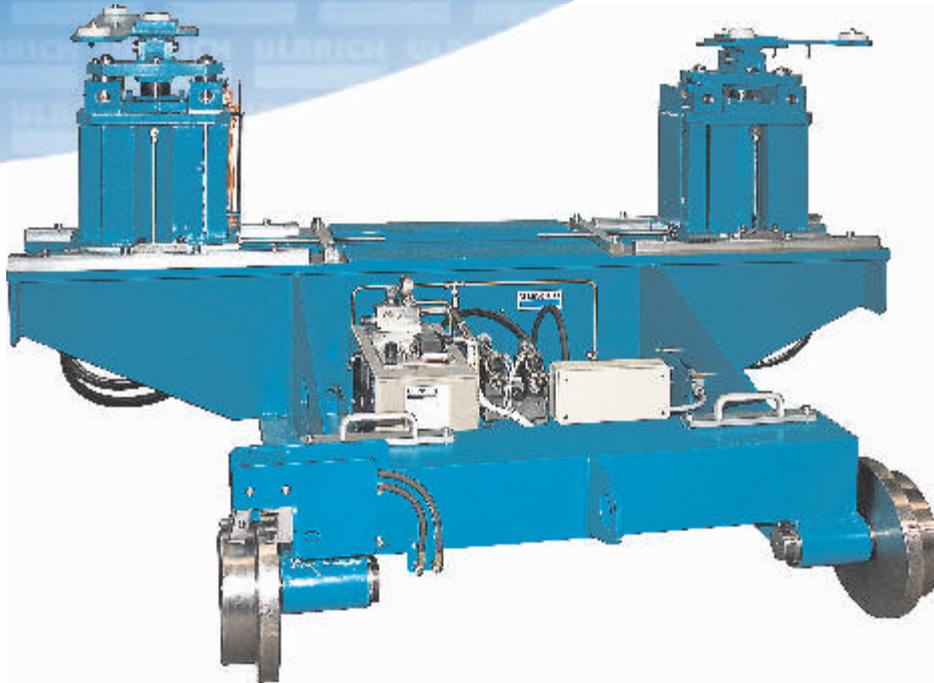
Brake testing machine with fixtures for calliper brakes



Brake testing machine with a fixture for a chockblock unit



Locomotive and carriage positioning, lifting and weighing system



Technical Description

The lifting equipment consists of two mobile jacks. Integrated within the superstructure is a hydraulic power pack which drives the two hydraulic cylinders. The cylinders are situated in the highly robust and laterally adjustable lifting blocks. The lifting blocks and the jack contact surfaces (lifting points) can be repositioned along the cross-beam via a spindle. This allows the flexibility to lift and control a number of different types of Locomotive and carriage.

Once the carriage has been lifted, the lifting blocks can be locked out using safety bolts which ensure that the height selected is safely maintained. The position of the safety bolts themselves can also be controlled by sensors.

An optional function to weigh and calculate the centre of gravity is available upon request. Here, the lifting blocks have been fitted out with "load cells", which can transfer the load input into a unit of weight. With the accompanying software these values can be evaluated in order to determine the centre of gravity.

Technical Data:

Stroke force pro contact surface 125 kN (force can be increased upon request)
Stroke 500 mm (increased stroke upon request)
Contact surface height at rest 1372 mm
Contact surface height fully extended 1872 mm
Contact surface laterally adjustable from 1500 - 2200 mm
Power requirement 1,5 kW
Optional:
Weight analysis via x4 load cells (150 kN per cell)
Weight measuring accuracy < 1,5 %

Operational Overview

During the production or servicing of locomotives and carriages it is often necessary to carry out assembly, service and repair work underneath. Therefore, it is highly recommendable to be in the position to raise and lower the locomotive and carriages simultaneously, to specific heights to allow the optimal working clearance. Due to the fact that the various construction, assembly and service stations are often situated in different locations throughout the plant; the need for the lifting system to be mobile is paramount. Upon completion of the lifting process, the operator can now utilise the optional load measurement and centre of gravity analysis module.



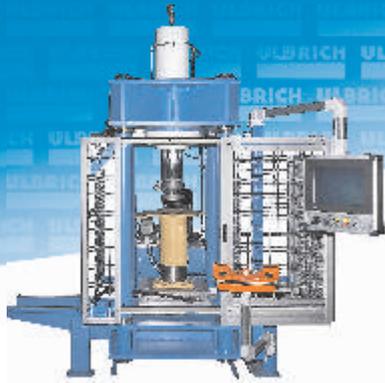
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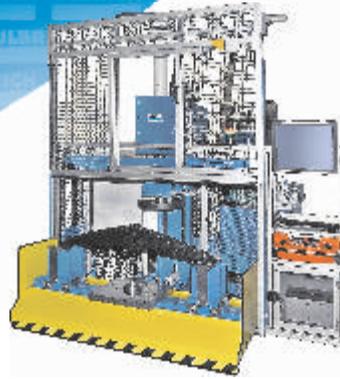
Stromabnehmer

O

W



Puffer Testing Machine



Spring Testing Machine



Shock Absorber Testing Machine

Machines for testing assembling & joining

ULBRICH

Competence in joining and testing machines, as well as in hydraulic solutions

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Hydraulic Components

Hydraulic Systems

Our goal is to provide customers with Test and Production equipment that enable our customers to sink their production costs and increase efficiency, quality and ultimately provide our customers with a significant competitive advantage.

In addition to our standard machinery we also work together with our customers to provide bespoke special hydraulic machines and system solutions based on their unique specifications.

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Press fit and analysis units

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Spring and Shock Absorber Testing Machine



Chockblock Testing Machine



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