

Product Information

Materials Testing Machines zwickiLine Z0.5 to Z5.0

CTA: 42618 42630



zwickiLine type TS, TN and TH

Application

zwickiLine is a powerful, flexible and cost-efficient testing solution for a wide range of materials and components. This materials testing machine is ideal for research and development, as well as routine quality assurance testing.

A wide range of equipment options enable use of the zwickiLine for tests on plastics, elastomers, metals, composites, paper, cardboard, textiles, foams, food products and components for the medical engineering and pharmaceutical industry.

Advantages and features



Integrated safety in accordance with the EC Machinery Directive

Maximum level of safety for user and testing system is guaranteed. All EC Machinery Directive safety requirements are guaranteed. Compliance is documented with an EC Declaration of Conformity. State-of-the-art safety technology and proven industrial components that comply with the highest level of safety and industrial standards (IEC 60947) are used.



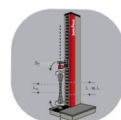
Swivelable front safety device, with electrical interlocking



Powerful drives

Extremely low minimum speeds can be set, combined with high speed-stability. The drive also delivers high crosshead-travel resolution. This is important in cases such as component tests with especially demanding travel-precision requirements, or tests on specimens with high stiffness and small displacements.

The high test-speed range can be used without restriction. In addition, test loads up to 110 % of machine nominal load are permissible to compensate for heavy test fixtures, accessories etc.



High stiffness and precise crosshead guidance

The stiff load-frame profile and generous connecting surfaces reduce the inclination angle of the crosshead under load, enabling very precise alignment and application of force to the specimen. This is advantageous for flexure tests, compression tests, precision tests on components ... and many others.

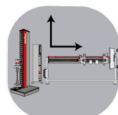
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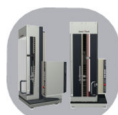
Modern, high-quality load-frame design

- Scalable testing machine with two test areas guarantees optimal capacity utilization, saving both time and money.
- The generous test area depth allows use of larger fixtures and enables bigger components to be tested, which are optimally supported by the wide base crosshead.
- The new zwickiLine profile has six continuous, freely accessible standard-profile slots for individual mounting of specimen materials, fixtures, safety devices, accessories, etc.
- High-quality design of the machine, such as electronics controls made of durable ceramic, ensures a long service life.



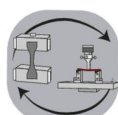
Fast, ergonomic testing

The zwickiLine can be operated in vertical or horizontal position as required, and can be swiveled 180° in horizontal mode.



Modern safety enclosure

The CE-compliant safety device with electrical interlocking and mechanical guard locking, a large working area, transparent design and excellent accessibility, protects the operator from flying specimen fragments and other hazards.



Flexible equipment options

A wide range of equipment options enable use of the zwickiLine for tests on plastics, elastomers, metals, composites, paper, cardboard, textiles, foams, food products and components for the medical engineering and pharmaceutical industry. The generous test area depth allows use of larger fixtures and enables bigger components to be tested, which are optimally supported by the wide base crosshead.



Safety for the entire testing system

The highest level of safety is achieved with the two-channel safety circuit. It includes the crosshead limit switch, the drive-Off switch, motor break function and the operation mode switch. Relevant accessories are also integrated into the safety circuit. The CE-compliant safety device with electrical interlocking and mechanical guard locking prevents interference with the machine during the test.



ZwickRoell Engineering – Made in Germany

The development and manufacture of materials testing machines, including all mechanical, electronic and software components, together with our comprehensive range of accessories, takes place at ZwickRoell's production facility in Germany, enabling us to create a product that is perfectly harmonized. Each materials testing machine is made of the highest quality standard enabling ZwickRoell to offer the best possible support.

Overview of the key advantages of testControl II machine electronics



Innovative testControl II machine electronics

All ZwickRoell materials testing machines are equipped with the powerful testControl II measurement and control electronics, offering the ideal basis for precise, reproducible test results.

The electronics are mounted vertically on the side of the load frame. This position protects the electronics from penetration of liquids and conductive particles.

The high-quality surfaces protect testControl II from external influences. The components used are highly durable.

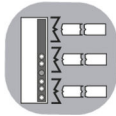


testControl II machine electronics and testXpert III testing software – a powerful combination

testXpert III testing software and testControl II machine electronics are perfectly matched, ensuring safe and efficient operation of the testing system. testXpert III provides the optimal solution for any testing requirement.

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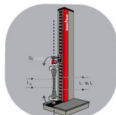
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Flexibility through modularity

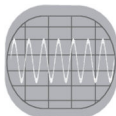
testControl II offers six flexible time-synchronized slots. These make it possible to use multiple sensors at the same time, and can be monitored and protected irrespective of use.

- For example, an extensometer and a transverse strain extensometer can be used in addition to the load cell.
- If the testing system is equipped with several load cells or additional sensors, these can all remain plugged in. All plugged-in sensors are automatically protected against overloads.



Machine compliance correction

The high-quality drive technology plus online correction of machine compliance enable very high travel-measurement and positioning accuracy.



High data transmission rate

Each travel and force peak is acquired with high resolution and recorded synchronously at 500 Hz on all measuring channels. Optionally, the measured value acquisition rate can be expanded to 2,000 Hz. The high data transmission rate enables fast measurements with the highest degree of reproducibility. This is very advantageous for quick tests, short, brittle fracture events and in tear-growth, adhesion and peel tests.



System monitoring

testControl II system monitoring provides the user/laboratory manager with detailed information on the current status and level of utilization of the testing equipment. This can further increase availability of the testing equipment and significantly simplify the planning of maintenance or replacement procurement.



Fast, adaptive drive controller

The high drive control frequency of 1,000 Hz delivers fast, precise force and strain control. Benefits include enabling components to be loaded very quickly and accurately with a predetermined force.



Maximum accuracy

The smallest force changes on the specimen are quickly and accurately recorded and displayed. The A/D converter guarantees high measured-value accuracy over a wide measurement range with sampling rates of 400 kHz and 24 bit resolution.



Innovative Interfaces

The innovative EtherCat[®] interface is incorporated as standard. The time-synchronized real-time Ethernet field bus system ensures future-proof integration of sensors and power units.



Eco mode

The testControl II machine electronics automatically switch to eco mode when not in use, saving energy.

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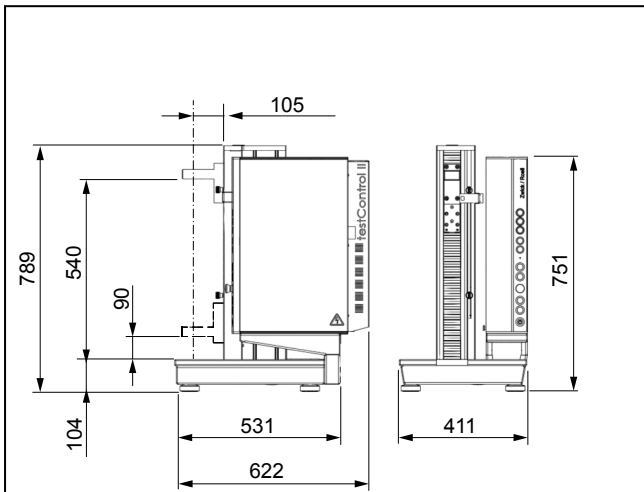


Ergonomic remote control with color display

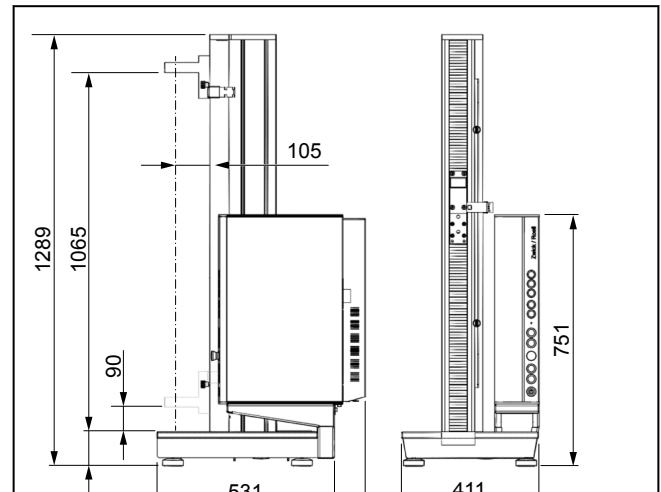
Tests can be performed entirely via the display-equipped remote control, independent of the PC. All important information is shown on the color display. Machine operation is therefore more ergonomic and effective. Maximum operator safety is guaranteed with the integrated Emergency stop. The rocker-switch with integrated dial makes positioning fast yet highly accurate.

Scale diagrams

CTA: 110410 165223

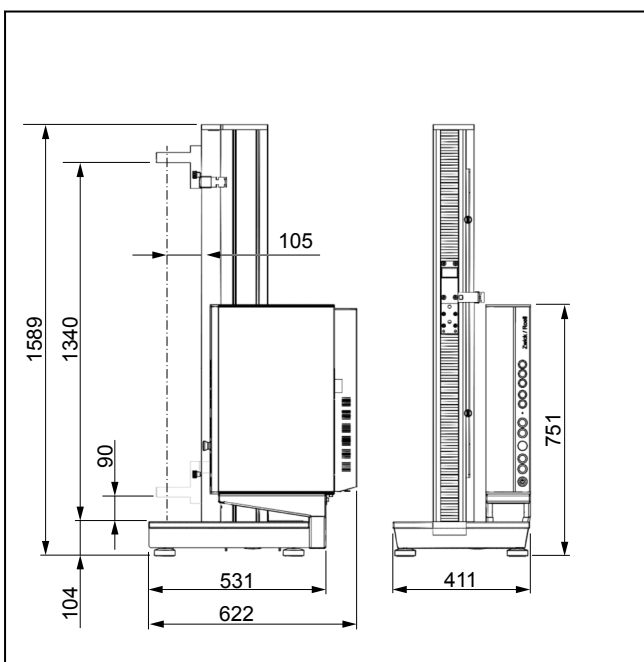


Testing system TS dimensions



Dimensions, TN testing system

CTA: 165223



Dimensions, TH testing system

All data at ambient temperature.

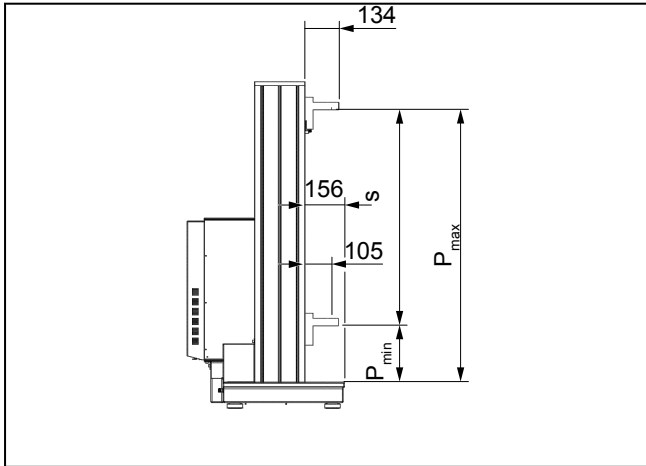
We reserve the right to make technical changes in the course of ongoing development.

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Max. travel of the moving crosshead

CTA: 205528



Basic version (example TN)

The maximum moving crosshead travel s is calculated depending on E (the sum of the installed dimensions of all the accessories) as follows:

If $E < P_{min}$:

$$s = P_{max} - P_{min}$$

If $E > P_{min}$:

$$s = P_{max} - E$$

Example:

- Z2.5 TN, moving crosshead upward
- Xforce load cell, F_{max} 2.5 kN (Item No. 011568)

- Wedge screw grips type 8206, F_{max} 2.5 kN (Item No. 313398)
- Mounting stud \varnothing 20 mm (Item No. 311588)

$$E = 62\text{mm (load cell)} + 2 \cdot 115\text{mm (specimen grip)} + 23\text{mm (mounting stud)} = 315\text{mm}$$

$P_{min}=235$ (see image); because $E > P_{min}$

$$s = P_{max} - E = 1065 - 315 = 750\text{mm}$$

P Test area height

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Technical data

General technical data for zwickiLine

Load frame		
Finish	A6-C31, RAL 7021 and RAL 3038	
Ambient temperature	+10 ... +35	°C
Relative humidity (non-condensing)	20 ... 90	%
Conformity	ISO 9000 and CE	
Drive system		
Motor	DC servo motor	
Control, set value preselection	Digital	
Controller	Adaptive	
Cycle time	1000	Hz
Positioning repeatability (without reversal of direction)	±2	µm

Description	Value	
Machine electronics		
Number of available slots for measurement and control modules:		
Synchronized module slots	2 (expandable to 5) ¹⁾	
Synchronized PCIe slots	1	
Force measurement	Class 0.5/1, depending on load cell, compliant to DIN EN ISO 7500-1, ASTM E4	
Measurement range	Up to 165% of F _{max} ²⁾	
Calculated resolution (e.g., load cell in tensile/compression direction)	24	bit
Effective resolution in tensile/compression direction:		
DCSC module	19 bits (corresponds to ±512,000 points)	
USC module	20 bits (corresponds to ±1,000,000 points)	
Measured value recording rate	400	kHz
Measurement value transmission rate to PC	500 (optional 2000)	Hz
Zero-point correction	Automatic, at start of measurement	
Measurement signal run-time correction for all channels	Yes	
Interface to PC	Ethernet	
Eco mode	Yes, automatic switch off of power section (time can be set)	
CE conformity	Yes, according to Machinery Directive 2006/42/EC	

1) A DCSC module is included in the scope of delivery (occupies one module slot). The drive requires an optional module slot.

2) For load cells with F_{max} 2.5 kN: up to 130% of F_N

Description	Value	
Power specifications		
Power supply	100 ... 240	V, 1Ph/N/PE
Tolerance range	±10	%

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Description	Value	
Power consumption (full load), approx.	500	VA
Power frequency	50/60	Hz

Z0.5

Type	Z0.5 TS	Z0.5 TN	Z0.5 TH	
Item No.	058992	058993	058996	
Test load F_{max}	0.5	0.5	0.5	kN
Test area				
Height, $P_{min} \dots P_{max}$ (each without mounting stud)				
Moving crosshead mounted with angle up	235 ... 565 ¹⁾	235 ... 1065 ¹⁾	235 ... 1365 ¹⁾	mm
Moving crosshead mounted with angle down	90 ... 420	90 ... 920	90 ... 1220	mm
Depth	105	105	105	mm
Width	No limitation	No limitation	No limitation	
Travel s of the moving crosshead, max. E = Sum of the installation dimensions of all test arrangements (load cell, specimen grips/test fixture/test tool, mounting stud)				
If $E < P_{min}$	$P_{max} - P_{min}$	$P_{max} - P_{min}$	$P_{max} - P_{min}$	
If $E > P_{min}$	$P_{max} - E$	$P_{max} - E$	$P_{max} - E$	
Load frame				
Dimensions				
Height without top crosshead	789 ²⁾	1289 ²⁾	1589 ²⁾	mm
Width	408 ³⁾	408 ³⁾	408 ³⁾	mm
Width with machine electronics	411 ³⁾	411 ³⁾	411 ³⁾	mm
Depth	480 ³⁾	480 ³⁾	480 ³⁾	mm
Depth with machine electronics	622 ³⁾	622 ³⁾	622 ³⁾	mm
Weight				
With machine electronics, approx.	68	76	81	kg
Average noise level at v_{max} measured at 1 m distance from the front of the machine	61	61	61	dB(A)
Drive system				
Crosshead speed $v_{min} \dots v_{max}$	0.0005 ... 2000 ⁴⁾ (optional 3000) ⁵⁾	0.0005 ... 2000 ⁴⁾ (optional 3000) ⁵⁾	0.0005 ... 2000 ⁴⁾ (optional 3000) ⁵⁾	mm/min
Drive travel resolution	0.0830	0.0830	0.0830	μm

1) Height of the test area without accessories

2) The dimension increases by 9 mm with the additional crosshead option (top crosshead)

3) With "large base" option: width 583 mm, width with machine electronics 585 mm, depth 565 mm, depth with machine electronics 707 mm.

4) Values apply to machines with closed safety door and closed safety guard in automatic mode and to machines without safety device and/or without safety guard. For machines with the safety door and/or safety guard open, the speed is reduced to 600 mm/min.

5) The speed can be increased to 3000 mm/min (optional).

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Z1.0

Type	Z1.0 TS	Z1.0 TN	Z1.0 TH	
Item No.	058997	058998	058999	
Test load F_{max}	1	1	1	kN
Test area				
Height, $P_{min} \dots P_{max}$ (each without mounting stud)				
Moving crosshead mounted with angle up	235 ... 565 ¹⁾	235 ... 1065 ¹⁾	235 ... 1365 ¹⁾	mm
Moving crosshead mounted with angle down	90 ... 420	90 ... 920	90 ... 1220	mm
Depth	105	105	105	mm
Width	No limitation	No limitation	No limitation	
Travel s of the moving crosshead, max.				
E = Sum of the installation dimensions of all test arrangements (load cell, specimen grips/test fixture/test tool, mounting stud)				
If $E < P_{min}$	$P_{max} - P_{min}$	$P_{max} - P_{min}$	$P_{max} - P_{min}$	
If $E > P_{min}$	$P_{max} - E$	$P_{max} - E$	$P_{max} - E$	
Load frame				
Dimensions				
Height without top crosshead	789 ²⁾	1289 ²⁾	1589 ²⁾	mm
Width	408 ³⁾	408 ³⁾	408 ³⁾	mm
Width with machine electronics	411 ³⁾	411 ³⁾	411 ³⁾	mm
Depth	480 ³⁾	480 ³⁾	480 ³⁾	mm
Depth with machine electronics	622 ³⁾	622 ³⁾	622 ³⁾	mm
Weight				
With machine electronics, approx.	68	76	81	kg
Average noise level at v_{max} measured at 1 m distance from the front of the machine	55	55	55	dB(A)
Drive system				
Crosshead speed $v_{min} \dots v_{max}$	0.0005 ... 2000 ⁴⁾	0.0005 ... 2000 ⁴⁾	0.0005 ... 2000 ⁴⁾	mm/min
Drive travel resolution	0.0554	0.0554	0.0554	μm

1) Height of the test area without accessories

2) The dimension increases by 9 mm with the additional crosshead option (top crosshead)

3) With "large base" option: width 583 mm, width with machine electronics 585 mm, depth 565 mm, depth with machine electronics 707 mm.

4) Values apply to machines with closed safety door and closed safety guard in automatic mode and to machines without safety device and/or without safety guard. For machines with the safety door and/or safety guard open, the speed is reduced to 600 mm/min.

Z2.5

Type	Z2.5 TS	Z2.5 TN	Z2.5 TH	
Item No.	059001	059003	059004	
Test load F_{max}	2.5	2.5	2.5	kN
Test area				

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Materials Testing Machines zwickiLine Z0.5 to Z5.0

Type	Z2.5 TS	Z2.5 TN	Z2.5 TH	
Item No.	059001	059003	059004	
Height, $P_{min} \dots P_{max}$ (each without mounting stud)				
Moving crosshead mounted with angle up	235 ... 565 ¹⁾	235 ... 1065 ¹⁾	235 ... 1365 ¹⁾	mm
Moving crosshead mounted with angle down	90 ... 420	90 ... 920	90 ... 1220	mm
Depth	105	105	105	mm
Width	No limitation	No limitation	No limitation	
Travel s of the moving crosshead, max.	E = Sum of the installation dimensions of all test arrangements (load cell, specimen grips/test fixture/test tool, mounting stud)			
If $E < P_{min}$	$P_{max} - P_{min}$	$P_{max} - P_{min}$	$P_{max} - P_{min}$	
If $E > P_{min}$	$P_{max} - E$	$P_{max} - E$	$P_{max} - E$	
Load frame				
Dimensions				
Height without top crosshead	789 ²⁾	1289 ²⁾	1589 ²⁾	mm
Width	408 ³⁾	408 ³⁾	408 ³⁾	mm
Width with machine electronics	411 ³⁾	411 ³⁾	411 ³⁾	mm
Depth	480 ³⁾	480 ³⁾	480 ³⁾	mm
Depth with machine electronics	622 ³⁾	622 ³⁾	622 ³⁾	mm
Weight				
With machine electronics, approx.	68	76	81	kg
Average noise level at v_{max} measured at 1 m distance from the front of the machine	55	55	55	dB(A)
Drive system				
Crosshead speed $v_{min} \dots v_{max}$	0.0005 ... 1000 ⁴⁾	0.0005 ... 1000 ⁴⁾	0.0005 ... 1000 ⁴⁾	mm/min
Drive travel resolution	0.0277	0.0277	0.0277	μm

1) Height of the test area without accessories

2) The dimension increases by 9 mm with the additional crosshead option (top crosshead)

3) With "large base" option: width 583 mm, width with machine electronics 585 mm, depth 565 mm, depth with machine electronics 707 mm.

4) Values apply to machines with closed safety door and closed safety guard in automatic mode and to machines without safety device and/or without safety guard. For machines with the safety door and/or safety guard open, the speed is reduced to 600 mm/min.

Z5.0

Type	Z5.0 TS	Z5.0 TN	Z5.0 TH	
Item No.	059005	059006	059007	
Test load F_{max}	5	5	5	kN
Test area				
Height, $P_{min} \dots P_{max}$ (each without mounting stud)				
Moving crosshead mounted with angle up	365 ... 540 ¹⁾	365 ... 1040 ¹⁾	365 ... 1340 ¹⁾	mm
Moving crosshead mounted with angle down	125 ... 300	125 ... 800	125 ... 1100	mm

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Materials Testing Machines zwickiLine Z0.5 to Z5.0

Type Item No.	Z5.0 TS 059005	Z5.0 TN 059006	Z5.0 TH 059007	
Depth	105	105	105	mm
Width	No limitation	No limitation	No limitation	
Travel s of the moving crosshead, max.	E = Sum of the installation dimensions of all test arrangements (load cell, specimen grips/test fixture/test tool, mounting stud)			
If $E < P_{min}$	$P_{max} - P_{min}$	$P_{max} - P_{min}$	$P_{max} - P_{min}$	
If $E > P_{min}$	$P_{max} - E$	$P_{max} - E$	$P_{max} - E$	
Load frame				
Dimensions				
Height without top crosshead	789 ²⁾	1289 ²⁾	1589 ²⁾	mm
Width	408 ³⁾	408 ³⁾	408 ³⁾	mm
Width with machine electronics	411 ³⁾	411 ³⁾	411 ³⁾	mm
Depth	480 ³⁾	480 ³⁾	480 ³⁾	mm
Depth with machine electronics	622 ³⁾	622 ³⁾	622 ³⁾	mm
Weight				
With machine electronics, approx.	70	78	83	kg
Average noise level at v_{max} measured at 1 m distance from the front of the machine	55	55	55	dB(A)
Drive system				
Crosshead speed $v_{min} \dots v_{max}$	0.0005 ... 600	0.0005 ... 600	0.0005 ... 600	mm/min
Drive travel resolution	0.0168	0.0168	0.0168	μm

1) Height of the test area without accessories

2) The dimension increases by 9 mm with the additional crosshead option (top crosshead)

3) With "large base" option: width 583 mm, width with machine electronics 585 mm, depth 565 mm, depth with machine electronics 707 mm.