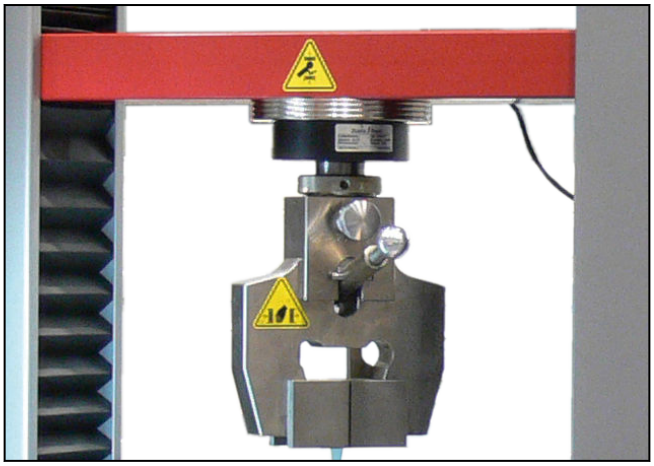
Zwick / Roell

Product Information

Xforce P load cell

CTA: 42892 42390

Xforce P



Xforce P

Patented Xforce load cells - exclusively from ZwickRoell

Xforce load cells are only available from ZwickRoell. These high-accuracy load cells are used for all load-frame ranges, including for ProLine - no compromises here.

Area of application

Xforce load cells are ideal for tensile, compression and flexure tests and for cyclic tests with zero crossing.

Parasitic influences

All Xforce load cells are highly insensitive to parasitic influences such as transverse forces, bending moments, torque and temperature variations.

Load cell design and construction

- All Xforce load cells are based on a rotation-symmetrical or axis-symmetrical design principle, making them highly resistant to transverse forces.
- The low overall height reduces measurement errors.
- The design delivers high operating forces, very small measurement travel and high stiffness levels.
- A high-quality shielded measurement cable with sensor plug forms the connection to the measurement amplifier for the measuring equipment.

Self-identifying sensor plugs

These intelligent load cells have a unique electronic identification system stored on an internal EEPROM.

- The testXpert III testing software automatically identifies the sensor type and properties.
- Force and travel limits are automatically imported.
- Sensor overloads plus date are stored in the EEPROM.

Fast load cell change

If several load cells are to be used, or in the event of frequent load cell changes, we recommend the 'Connection via Mounting Stud' option.

- Saves time and increases flexibility.
- Avoids unnecessary strain on the load cell cable during screwing in and unscrewing.
- The plug-in system delivers better alignment to the test axis than the usual threaded mounting.
- Reference positions for different test arrangements are automatically re-attained (with a threaded mounting, reference positions change according to the number of turns screwed in).

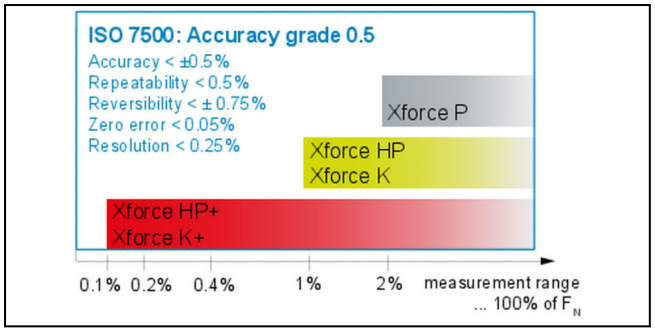
PI 675 223

Zwick / Roell

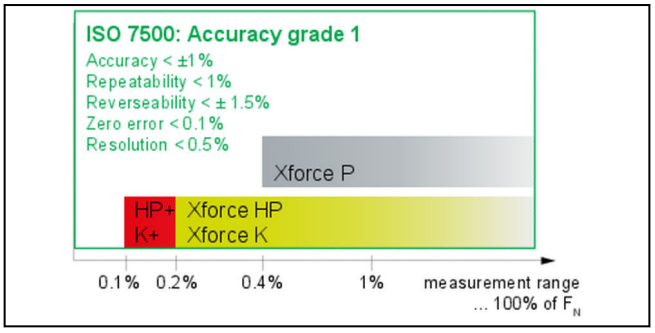
Product Information

Xforce P load cell

CTA: 53175 53176



Satisfies all 5 criteria for ISO 7500-1, Accuracy Class 0.5



Satisfies all 5 criteria for ISO 7500-1, Accuracy Class 1

Simple mechanical plug-in system, including for two test areas

- Each load cell is equipped with a precision-fit mounting stud, allowing fast, play-free fitting of specimen grips and test fixtures, with optimum alignment to the test axis.
- Reference positions (e.g. test-fixture separation) are set up just once by the operator and are stored in the test environment of the testXpert III testing software. This reference position is automatically and exactly re-attained after each fixture change. It doesn't get more convenient than that!
- With Xforce K load cells a second mounting-stud can optionally be used, allowing use in two test areas.

System calibration

Before dispatch each load cell is calibrated with the testing system plus drive and the measurement and control electronics as a complete system. This is recorded in the accompanying factory calibration certificate.

Calibration and accuracy as per ISO 7500-1

All data apply to measured values in compression and tension directions.

- All load cells are calibrated up to the relevant nominal force F_{nom} and satisfy the requirements of the following standards: EN ISO 7500 -1, EN ISO 7500 -2, ASTM E4.
- Xforce load cells satisfy the calibration requirements and all five criteria of the ISO 7500-1 accuracy classes over a very large measurement range.

Large measurement range

- The large measurement range frequently eliminates the need to purchase a second load cell, saving the costs of acquisition and annual calibration.
- Even with high pre-loads due to heavy test fixtures or specimen grips, virtually the entire load-cell measurement-range remains available. The load cell can still be used to full nominal capacity with fixture weights amounting to 45 % of nominal force.

Overload protection, force limits and operating force

- Xforce load cells are very robust and can withstand loads up to 300% of nominal capacity without mechanical failure and up to 150% without zero-point shift. This means that overload protection such as pre-loaded springs, mechanical stops or guiders to absorb transverse forces is generally unnecessary.
- The crosshead travel range can be restricted via software and hardware limit stops, protecting load cells and text fixtures.
- Force limits can be set in testXpert III to switch off the testing system automatically, protecting the load cell.

All data at ambient temperature.

Subject to change in the course of further development.

Zwick / Roell

Product Information

Xforce P load cell

Technical data

Xforce P (0.005 - 0.1 kN)

Type	Xforce P	
Measurement range	**5 - 100**	**N**
Force limits/ranges		
Operating force F_G, max.	150	% of F_{nom}
Operating range, max.	150	% of F_{nom}
Limit force F_L	150	% of F_{nom}
Force at break F_B	300	% of F_{nom}
Limit transverse force F_Q	100	% of F_{nom}
Influences/limit values		
Torque influence	±0.2	% of F_{nom}/mm
Limit torque	10.0[1)]	Nm
Limit bending moment	0.7[2)]	Nm
Ambient temperature	+10 ... +60	°C
Other values		
Nominal characteristic value C_{nom}	2	mV/V
Cable length	3.5	m

1) Unloaded. In the case of simultaneous loading with a nominal load, these values should be halved.

2) Maximum bending moments Mb for a load cell which is unloaded in the direction of measurement. In the case of simultaneous loading with a nominal load, the values should be halved.

Xforce P (0.2 - 150 kN)

Type	Xforce P	
Measurement range	**0.2 - 150**	**kN**
Force limits/ranges		
Operating force F_G, max.	150	% of F_{nom}
Operating range, max.	150	% of F_{nom}
Limit force F_L	150	% of F_{nom}
Force at break F_B	300	% of F_{nom}
Limit transverse force F_Q	100	% of F_{nom}
Influences/limit values		
Torque influence	±0.2	% of F_{nom}/mm
Limit torque	5 (14)[1)2)]	Nm
Limit bending moment	2 (3)[3)2)]	Nm
Ambient temperature	+10 ... +60	°C
Other values		
Nominal characteristic value C_{nom}	2	mV/V
Cable length	3.5	m

1) Unloaded. In the case of simultaneous loading with a nominal load, these values should be halved.

2) The values refer to the limit torques of the connection system. If these values are exceeded, recalibration is required. The values in relation to the limit torques of the measurement cell appear in parentheses.

All data at ambient temperature.

Subject to change in the course of further development.

Zwick / Roell

Product Information

Xforce P load cell

3) Maximum bending moments Mb for a load cell which is unloaded in the direction of measurement. In the case of simultaneous loading with a nominal load, the values should be halved.

Xforce P (5 - 100 N)

Load cell	**5**	**10**	**20**	**50**	**100**	**N**
Item No.	**057091**	**060253**	**060256**	**060257**	**060258**	
Item No. for ProLine	**063919[1)]**	**063920[1)]**	**063921[1)]**	**063922[1)]**	**063923[1)]**	
Nominal force F_{nom}	5	10	20	50	100	N
Nominal force F_{nom} [lbf]	1.12	2.25	4.5	11.24	22.48	lbf
Accuracy						
Accuracy Class 1 (from 0.4 % of F_{nom})	0.02[2)]	0.04[2)]	0.08	0.2	0.4	N
Accuracy Class 0.5 (from 2 % of F_{nom})	0.1	0.2	0.4	1.0	2.0	N
Dimensions						
Installation height	55	55	55	55	55	mm
Connection						
Connection thread	M28x1.5	M28x1.5	M28x1.5	M28x1.5	M28x1.5	
Mounting stud	Ø8	Ø8	Ø8	Ø8	Ø8	mm
Influences/limit values						
Limit bending moment	0.7[3)]	1.0[3)]	1.3[3)]	2.0[3)]	3.0[3)]	Nm
Limit torque	10.0[4)]	10.0[4)]	10.0[4)]	10.0[4)]	10.0[4)]	Nm

1) Only in combination with a ProLine load frame. Please observe the relevant note.

2) To calibrate and use the expanded measurement range for Xforce 5 N and 10 N, the corresponding environmental and operating requirements must exist. This is basically an installation site without jolts and vibrations. More specific details can be found in the operating manual and the installation instructions.

3) Maximum bending moments Mb for a load cell which is unloaded in the direction of measurement. In the case of simultaneous loading with a nominal load, the values should be halved.

4) Unloaded. In the case of simultaneous loading with a nominal load, these values should be halved.

Xforce P (0.2 - 1 kN)

Load cell	**0.2**	**0.5**	**0.5**	**1**	**kN**
Item No.	**011563**	**011562**	**057993**	**011560**	
Item No. for ProLine	**018542[1)]**	**018540[1)]**	**058423[1)]**	**018539[1)]**	
Nominal force F_{nom}	0.2	0.5	0.5	1	kN
Nominal force F_{nom} [lbf]	45	112	112	225	lbf
Accuracy					
Accuracy Class 1 (from 0.4 % of F_{nom})	0.8	2.0	2.0	4.0	N
Accuracy Class 0.5 (from 2 % of F_{nom})	4.0	10.0	10.0	20.0	N
Dimensions					
Installation height	55	55	61	61	mm
Connection					
Connection thread	M28x1.5	M28x1.5	M28x1.5	M28x1.5	
Mounting stud	8	Ø8	Ø20	Ø20[2)]	mm
Influences/limit values					

Zwick / Roell

Product Information

Xforce P load cell

Load cell	0.2	0.5	0.5	1	kN
Item No.	011563	011562	057993	011560	
Item No. for ProLine	018542[1)]	018540[1)]	058423[1)]	018539[1)]	
Limit bending moment	2 (3)[3)4)]	5 (7)[3)4)]	5 (7)[3)4)]	15 (17)[3)4)]	Nm
Limit torque	5 (14)[5)4)]	7 (35)[5)4)]	7 (35)[5)4)]	17 (50)[5)4)]	Nm

1) Only in combination with a ProLine load frame. Please observe the relevant note.
2) Use of Xforce load cells means that the diameter of the mounting stud for a 1-kN load cell has changed from 8 to 20 mm!
3) Maximum bending moments Mb for a load cell which is unloaded in the direction of measurement. In the case of simultaneous loading with a nominal load, the values should be halved.
4) The values refer to the limit torques of the connection system. If these values are exceeded, recalibration is required. The values in relation to the limit torques of the measurement cell appear in parentheses.
5) Unloaded. In the case of simultaneous loading with a nominal load, these values should be halved.

Xforce P (2.5 - 20 kN)

Load cell	2.5	5	10	10	20	kN
Item No.	011558	011556	017955	011554	017907	
Item No. for ProLine	018538[1)]	018537[1)]	-	018536[1)]	019242[1)]	
Nominal force F_{nom}	2.5	5	10	10	20	kN
Nominal force F_{nom} [lbf]	562	1124	2248	2248	4496	lbf
Accuracy						
Accuracy Class 1 (from 0.4 % of F_{nom})	10	20	40	40	80	N
Accuracy Class 0.5 (from 2 % of F_{nom})	50	100	200	200	400	N
Dimensions						
Installation height	61	61	54	70	66	mm
Connection						
Connection thread	M28x1.5	M28x1.5	-	M28x1.5	-	
Connection flange	-	-	Flange 1[2)]	-	Flange 1[2)]	
Mounting stud	Ø20	Ø20	Ø20	Ø20	Ø36	mm
Influences/limit values						
Limit bending moment	30 (34)[3)4)]	50 (58)[3)4)]	80 (115)[3)4)]	80 (115)[3)4)]	250 (460)[3)4)]	Nm
Limit torque	17 (80)[5)4)]	17 (130)[5)4)]	17 (200)[5)4)]	17 (200)[5)4)]	250 (1500)[5)4)]	Nm

1) Only in combination with a ProLine load frame. Please observe the relevant note.
2) Flange 1 = pitch circle 115 mm, Flange 2 = pitch circle 220 mm.
3) Maximum bending moments Mb for a load cell which is unloaded in the direction of measurement. In the case of simultaneous loading with a nominal load, the values should be halved.
4) The values refer to the limit torques of the connection system. If these values are exceeded, recalibration is required. The values in relation to the limit torques of the measurement cell appear in parentheses.
5) Unloaded. In the case of simultaneous loading with a nominal load, these values should be halved.

Xforce P (30 - 150 kN)

Load cell	30	50	100	150	kN
Item No.	017908	017909	017910	017911	
Item No. for ProLine	019246[1)]	019248[1)]	019254[1)]	-	
Nominal force F_{nom}	30	50	100	150	kN
Nominal force F_{nom} [lbf]	6744	11240	22481	33721	lbf

All data at ambient temperature.

Subject to change in the course of further development.

Zwick / Roell

Product Information

Xforce P load cell

Load cell	**30**	**50**	**100**	**150**	**kN**
Item No.	**017908**	**017909**	**017910**	**017911**	
Item No. for ProLine	**019246[1)]**	**019248[1)]**	**019254[1)]**	**-**	
Accuracy					
Accuracy Class 1 (from 0.4 % of F_{nom})	120	200	400	600	N
Accuracy Class 0.5 (from 2 % of F_{nom})	600	1000	2000	3000	N
Dimensions					
Installation height	66	66	104	104	mm
Connection					
Connection flange	Flange 1[2)]	Flange 1[2)]	Flange 2[2)]	Flange 2[2)]	
Mounting stud	Ø36	Ø36	Ø60	Ø60	mm
Influences/limit values					
Limit bending moment	250 (500)[3)4)]	250 (650)[3)4)]	3500 (4500)[3)4)]	4000 (5000)[3)4)]	Nm
Limit torque	250 (1800)[5)4)]	250 (3000)[5)4)]	6500 (10000)[5)4)]	5800 (12500)[5)4)]	Nm

1) Only in combination with a ProLine load frame. Please observe the relevant note.

2) Flange 1 = pitch circle 115 mm, Flange 2 = pitch circle 220 mm.

3) Maximum bending moments Mb for a load cell which is unloaded in the direction of measurement. In the case of simultaneous loading with a nominal load, the values should be halved.

4) The values refer to the limit torques of the connection system. If these values are exceeded, recalibration is required. The values in relation to the limit torques of the measurement cell appear in parentheses.

5) Unloaded. In the case of simultaneous loading with a nominal load, these values should be halved.