Web Tension Systems

Pressductor® PillowBlock Load Cells

Tension measurement for web processes

PillowBlock

– quality tension measurement for quality tension control

Keeping the tension constant in web processes is essential for high product quality and productivity

In paper and board mills... in a wide range of converting operations... and in plants processing textiles, plastics, rubber or almost any web material you can think of, you'll find ABB PillowBlock tension measurement systems.

The performance of the PillowBlock load cells is unsurpassed for applications characterized by heavy rolls, high speeds and severe conditions – in some instances they're the only viable option.

The key reason is the operating principle. ABB PillowBlock load cells produce signals as a result of magnetic change, which frees them from the inevitable limitations and design compromises of measurement technologies relying on some form of physical movement.

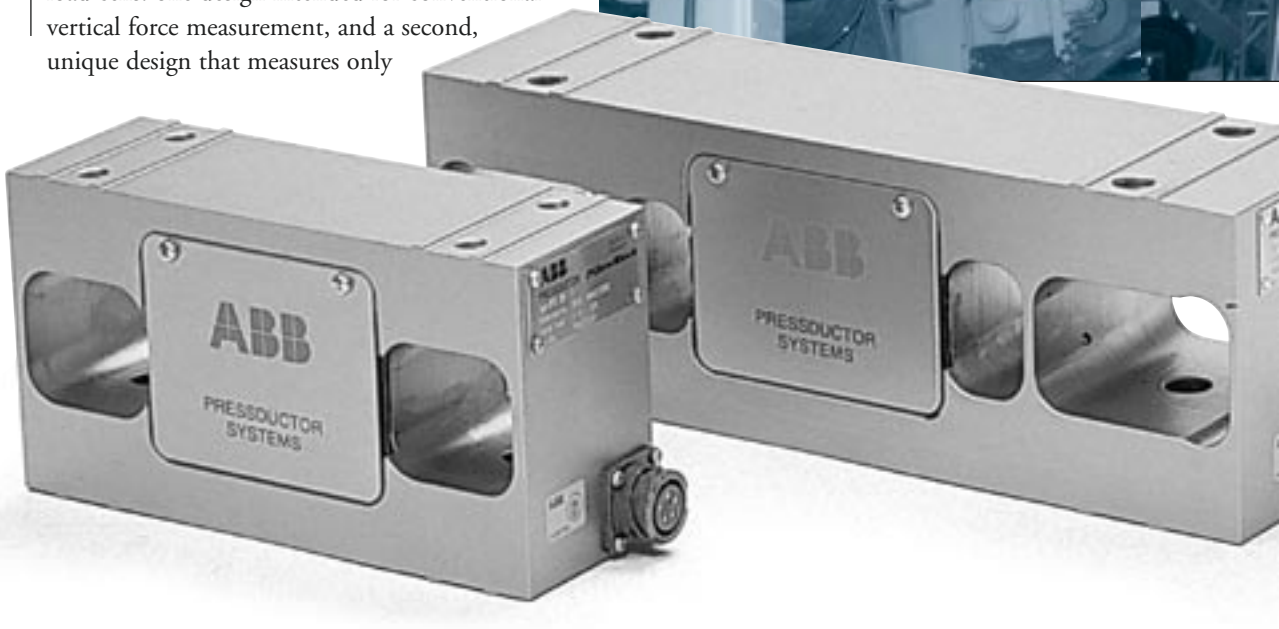
The result is a load cell that combines strong, low-impedance signal output with an exceedingly stiff and rugged construction. A reliable, high-performance load cell with exceptional resistance to vibration, overloads, extreme temperatures and otherwise harsh environments.

A complete PillowBlock measuring system consists of appropriately sized load cells and a tension electronics. A junction box is sometimes used to simplify the cabling and reduce cabling costs.

ABB offers two different types of PillowBlock load cells: one design intended for conventional vertical force measurement, and a second, unique design that measures only the horizontal force component resulting from web tension on a roll.

Several models and nominal loads are available in standard stainless steel constructions as well as in acid-resistant and mill-duty versions.

The user-friendly digital signal-processing electronics provides a high level of functionality to cover a wide range of applications.



The assurance of Pressductor® Technology

- *Consistent measurement*
- *Exceptional stiffness*
- *Durable construction*
- *Long service life*
- *Recalibration-free*

The Pressductor® difference

Like ABB's other load cells based on Pressductor® Technology, PillowBlock Load Cells rely on electromagnetic changes in the transducer, not on physical movement, to sense fluctuations in web tension. The Pressductor® Technology operating principle provides exceptional improvements in load cell performance characteristics, including reliability (notably absence of drift), durability, repeatability, and wider measurement range.

Machined from a solid block of steel, the load cells are rugged and stiff, affording high overload protection as well as an extended measurement range above the nominal capacity. And they won't contribute to machine vibration, even at high speeds.

Since the transducer action – the magnetic flux – takes place inside a steel core, environmental factors like dirt or fluids can't degrade performance and reliability.

Furthermore, low transducer impedance – less then a couple of ohms – helps eliminate susceptibility to radio-frequency and electromagnetic interference.

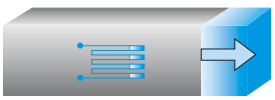
There is a PillowBlock load cell suitable for most web processing machinery used in the paper processing industries.

In the paper industry, the PillowBlock load cells are ideal in wire, felt and dryer sections as well as in coaters, calenders and winders.

In the converting industry, the PillowBlock load cells have proven their superior performance in laminator and coater machinery.

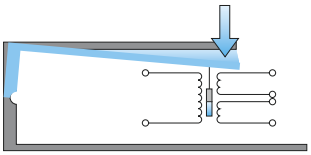
How the Measurement Signal Is Generated

Two commonly used transducer types – the strain gauge and the LVDT transducer – rely on physical movement in the transducer to produce a measurement signal (see drawings). Stretching, compression or bending motions are prerequisites for signal generation.



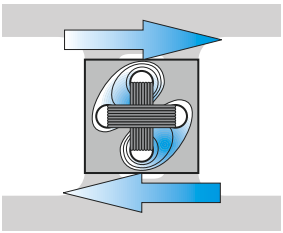
Strain gauge: *Stretching alters resistance of electrical circuits.*

ABB's exclusive Pressductor Transducer produces a signal as a result of changes in an electromagnetic field. This operating principle has its origin in a metallurgical phenomenon according to which mechanical forces alter the capacity of some steels to convey magnetic flux.



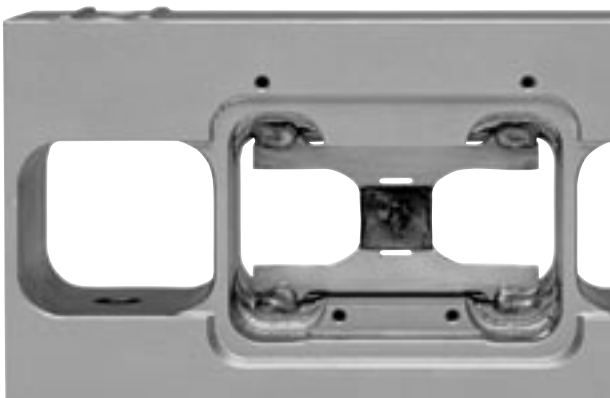
LVDT: *Movement of piston causes signal change in output coils.*

Two perpendicular windings of copper wire around a steel core combine to provide the transducers measurement signal. A magnetic field is created in one of the windings, sized so there is no magnetic coupling between them.



Pressductor® Technology: *Mechanical force alters magnetic field.*

When the transducer is subjected to a force, the magnetic field pattern changes. A portion of the field couples with the second winding and induces an AC voltage. This voltage – a comparatively strong transducer signal that is proportional to the force – is converted by the load cell system's electronics into the system output.



Extended-Range Operation

An extended range of measurement beyond the nominal load allows the PillowBlocks to be sized for normal, as opposed to maximum, tension levels. As a result, they permit greater application flexibility on the web processing machinery.

Designers appreciate...

- ✔ Remarkably high spring constant
- ✔ Wide measurement range
- ✔ High reliability

Operators value a load cell with...

- ✔ No drift
- ✔ No recalibration
- ✔ No failures
- ✔ High reliability

Measurement essentials

Keeping the tension constant in sheet or web processes is essential for high product quality and productivity. Continuously measuring the tension is an obvious prerequisite for tension control. Drives and operator instruments need quick and accurate input to regulate tension levels and monitor machine performance.

Most web processing lines put a premium on long-term reliability, in addition to accuracy and overall performance. The measurement system, after all, is the front line of machine control, exposed to all the rigors of the operating environment. The costs associated with downtime and poor product bring out the true value of its components.

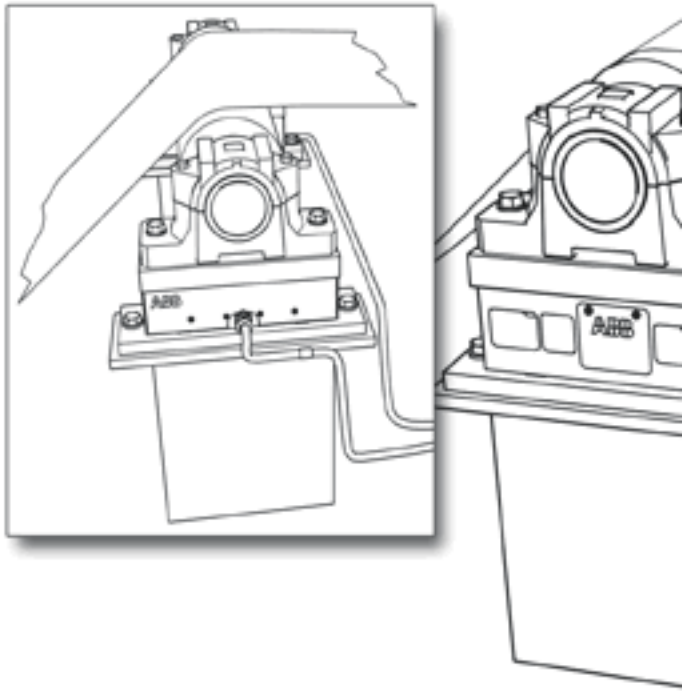
Quality measurement technology for superior tension control that will keep your processing lines productive and producing top-notch output... that's what you can expect from us. We're entirely devoted to providing process measurement systems and services, and we have 50 years of experience in the field. We're the experts in web and strip tension as well as force measurement for virtually any purpose.

Selecting and sizing load cells

Two types of ABB PillowBlock load cells are designed for either conventional vertical force measurement or to sense the horizontal force component that may arise as the processed material partially wraps around a-measurement roll.

Using the "horizontal" load cells can be quite advantageous. By design, they can be made exceptionally sturdy, rugged, and stiff. So, requirements for recalibration, other maintenance, or replacement are negligible, and they won't contribute to machine vibration. Since they don't measure the tare weight, but just the horizontal force component of the web tension, they can be sized smaller than otherwise possible, measuring tension with greater accuracy.

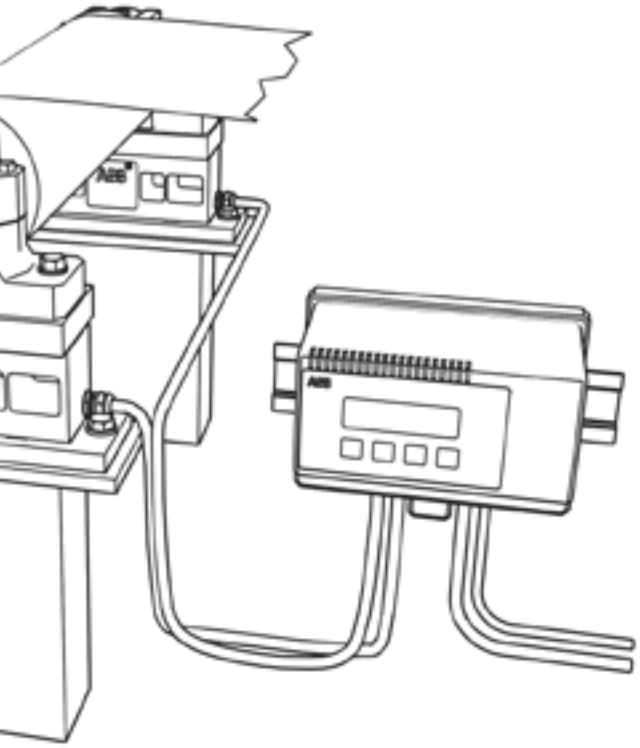
Application requirements may dictate the selection of a "vertical" load cell. But whenever an adequate horizontal force component is present (or can be developed), the horizontal cell should be considered.



The size, or nominal load, of a load cell-is contingent on the anticipated force it will measure. When a "vertical" load cell is mounted horizontally (the most common arrangement), the measurement force (F_R) is a function of the tension in the web (T), the deflection angles (α and β), and the tare weight of the roll and bearings (Tare).

The "horizontal" load cell senses the web tension's (T) horizontal component (F_R); not the vertical force (F_V).

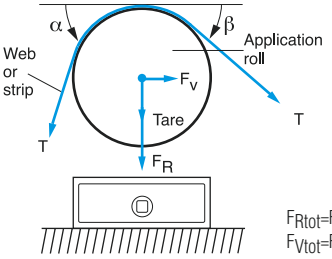
In this scenario, the measurement force (F_R) is a function of only the tension in the web (T) and the web angles (α and β). Since the tare force – the weight of the deflector roll and bearings – will not be measured, it can be very large compared to the web tension without affecting the accuracy of the tension measurement.



Specifying the load cell

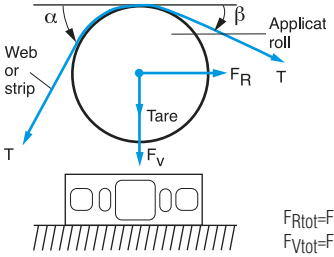
Since load cells are typically used at both ends of a roll, rating the individual cell is usually based on half of the resultant force. The ideal load cell size is usually the smallest nominal capacity rating accommodating that force level, so long as the force exceeds 10 percent of the nominal load. Before choosing a larger size, however, consider using the "extended range" feature of ABB load cells. And always verify that overload specifications will not be exceeded in either direction.

Verical measuring load cells



$F_{Rtot}=F_R+Tare=T(\sin\alpha+\sin\beta)+Tare$
$F_{Vtot}=F_V=T(\cos\beta-\cos\alpha)$

Horizontal measuring load cells



$F_{Rtot}=F_R=T(\cos\beta-\cos\alpha)$
$F_{Vtot}=F_V+Tare=T(\sin\beta+\sin\alpha)+Tare$

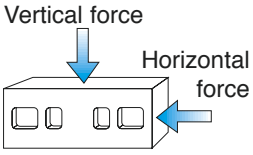
F_R= Force component of Tension in the measuring direction
F_{Rtot}= Total force in the measuring direction
F_V= Force component of Tension transverse to the measuring direction
F_{Vtot}= Total force in the transverse direction
T= Tension in web
Tare= Weight of roll and bearings
α,β= Deflection angles

Application Hint

Two "10 percent" application guidelines are useful in selecting load cell sizes:

1. The proportion of web tension that is actually sensed by the load cell should be at least 10 percent of total web tension. For operational conditions producing values below 10 percent, consult ABB.

2. During normal operation, the sensed force should not be less than 10 percent of the load cell's capacity.



Pressductor® PillowBlock Load Cells
– horizontal force measurement 10 - 100 kN

ABB's "horizontal" Pressductor® load cells are specifically designed for horizontal force measurement.

Key advantages:

- Smaller load cell sizes can be specified since the tare weight won't be a factor
- Inherently sturdier designs are virtually maintenance-free.
- No contribution to machine vibration.

In many web processes, the web tension inherently produces a horizontal force component on a roll... or, by design, it can be made to do so. Paper machines and machinery processing plastics, foils or textiles are typical examples.

Using this horizontal force component to measure web tension can be highly advantageous. The load cell can be sized to measure just the web tension, excluding the tare weight of the roll, which, on a big paper machine, for example, can be far greater than the tension in the sheet. The result is optimized measurement accuracy.

Another advantage is that ABB's unique horizontal load cell – specifically designed to measure this force component – provides stiffness levels and overload tolerances in all force directions that are significantly greater than what can be achieved with vertical load-cells.

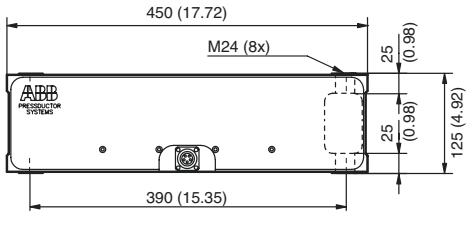
Solid stainless steel construction combines sensitivity and accuracy with exceptional ruggedness and high spring constant. The units tolerate overloads up to ten times their nominal capacity, and combined with the electronics are designed to provide stable output even when subjected to intense vibration.

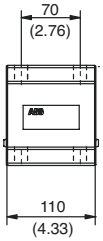
Four different models, with force measurement capacities ranging from 0.5 kN (112 lbs.) to 100 kN (22,500 lbs.), make up the family of horizontal load cells (PFTL 201 and PFTL 101). Each model is available in several nominal loads; the family can cover the highest tension levels encountered in any industry.

Two versions of the PFTL 201 are available:

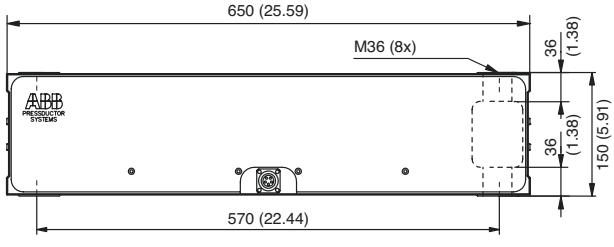
- The standard version PFTL 201C/D equipped with Cannon connector for the connection cable.
- The mill-duty version PFTL 201CE/DE with fixed connection cable in protective hose, best suited for wire and felt tension applications in paper machines.

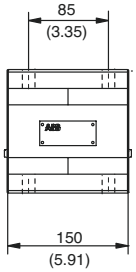
PFTL 201C





PFTL 201D





mm (inch)

Properties		PFTL 201C/CE			PFTL 201D/DE	
Nominal load						
(rated capacity)	kN	10.0	20.0	50.0	50.0	100.0
	Lbs.	2250	4500	11250	11250	22500
Extended load[1)]	kN	15.0	30.0	75.0	75.0	150.0
	Lbs.	3375	6750	16875	16875	33750
Permitted load						
Transverse direction	kN	100.0	200.0	250.0	500.0	500.0
(vertical) h=300 mm	Lbs.	22500	45000	56250	112500	112500
Overload capacity[2)]						
Measurement direction						
(horizontal)	kN	100.0	200.0	500.0	500.0	1000.0
	Lbs.	22500	45000	112500	112500	225000
Transverse direction						
(vertical) h=300 mm	kN	100.0	200.0	250.0	500.0	500.0
	Lbs.	22500	45000	56250	112500	112500
Deflection[3)]	mm	0.010	0.020	0.050	0.025	0.050
	1/1000 in.	0.4	0.8	2.0	1.0	2.0
Spring constant	kN/mm	1000	1000	1000	2000	2000
	1000 lbs/in.	5720	5720	5720	11440	11440

All Load Cells

Operating Principle		Electromagnetic Pressductor® Technology
Accuracy class[4)]	%	±0.5
Repeatability error	%	<±0.05
Operating range		30:1
Stainless steel	SIS	2387[5)]
	DIN	X4CrNiMo165
Working temp. range		-10 to +90°C 14 to 194°F
Zero point drift[6)]	%/°C	<±0.005
	%/°F	<±0.003
Sensitivity drift[6)]	%/°C	<±0.010
	%/°F	<±0.006

[1)] Values indicate the total capacity of the load cells when taking into account their permissible "extended capacity". In the extended range, above the nominal load, some decline in measurement accuracy may be experienced.

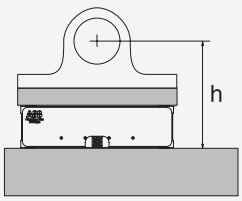
[2)] Maximum permitted loads without affecting load cell calibration.

[3)] At nominal load.

[4)] Accuracy class is defined as the maximum deviation, and is expressed as a percentage of the sensitivity at nominal load. This includes linearity deviation, hysteresis and repeatability error.

[5)] Corrosion resistance properties similar to AISI 304

[6)] Applies for +20 – 80°C
68 – 176°F



Height (h) from load cell's bottom surface to roll center line.

Pressductor® PillowBlock Load Cells
– horizontal force measurement 0.5 - 20 kN

Application Hint

✔Horizontally measuring load cells are ideal in applications with high tare loads and relatively small tensions, such as paper machines.

✔In applications where high overloads can occur in any direction, the high overload tolerance in all directions of ABB's horizontal PillowBlock load cell adds reliability.

✔If no horizontal resultant force is present, mounting the load cell on a slant will give rise to one.

ABB PillowBlock horizontal load cells are ideal in-applications characterized by low tension levels, heavy rolls and high operating speeds – a scenario often encountered in the-paper industry.

The PillowBlock comes in three versions: The standard Version, PFTL 101A/B, is often used for accurate measurement in the paper industry, for instance paper machines, calenders, coaters and winders. Load cells are designed for demanding applications with, for instance, heavy rolls, wide tension range and high speed.

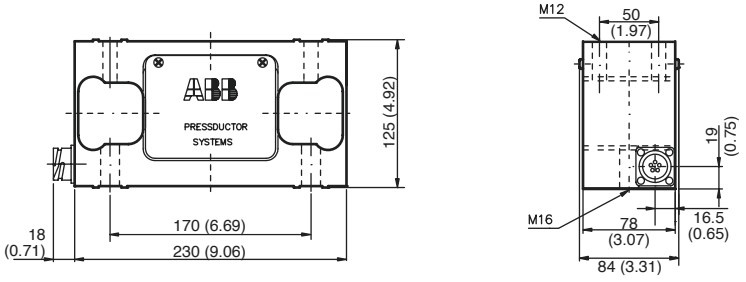
For web tension measurement in dryer sections in paper machines, the mill-duty version, PFTL 101AE/BE, is recommended. This version has a fixed connection cable and a degree of protection of IP 66[1)], which provides accurate and reliable measurement with long service life.

The acid resistant version, PFTL 101AER/BER, is designed for the wet end of the paper machines and has a degree of protection of IP 66/67[1)] (>Nema 4).

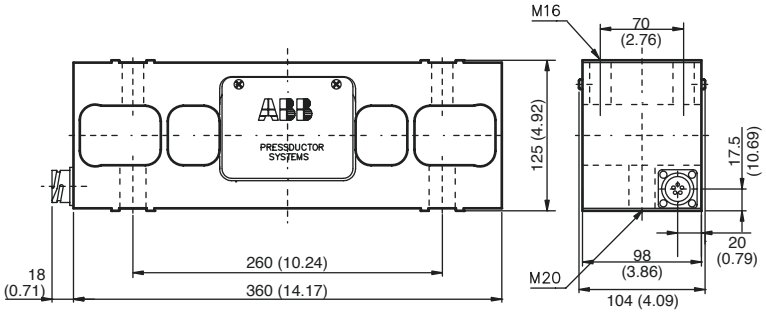
All load cells are delivered standard calibrated.

[1)] According to IEC 529, EN 60-529

PFTL 101A



PFTL 101B



mm (inch)

Properties		PFTL 101A/AE/AER			PFTL 101B/BE/BER			
Nominal load (rated capacity)	kN	0.5	1.0	2.0	2.0	5.0	10.0	20.0
	Lbs.	112	225	450	450	1125	2250	4500
Permitted load (in transverse direction)	kN	5.0	10.0	10.0	30.0	30.0	30.0	40.0
	Lbs.	1125	2250	2250	6750	6750	6750	9000
Overload capacity[1] Measurement direction (horizontal)	kN	2.5	5.0	10.0	10.0	25.0	50.0	80.0
	Lbs.	563	1125	2250	2250	5625	11250	18000
Deflection[2]	mm	0.015	0.015	0.015	0.015	0.015	0.015	0.015
	1/1000 in.	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Spring constant	kN/mm	32	65	130	130	325	650	1300
	1000 lbs/in.	183	371	743	743	1857	3715	7430

All Load Cells

Operating Principle	Electromagnetic Pressductor® Technology	
Accuracy class[3]	%	±0.5
Repeatability error	%	<±0.05
Operating range		30:1
Standard/mill-duty version		
Stainless steel	SIS	2383[4]
	DIN	17440X12CrMoS17
Degree of protection	IP 65[5] (standard version) IP 66[5] (mill-duty version)	
Acid resistant version		
Stainless steel	SIS	2348[6]
	DIN	17440X2CrNiMo17 13 2
Degree of protection	IP 66/67[5] (>NEMA 4)	
Working temp. range		-10 to +105°C 14 to 221°F
Zero point drift[7]	%/°C	<±0.003
	%/°F	<±0.002
Sensitivity drift[7]	%/°C	<±0.015
	%/°F	<±0.007

[1] Maximum permitted loads without affecting load cell calibration.

[2] At nominal load.

[3] Accuracy class is defined as the maximum deviation, and is expressed as a percentage of the sensitivity at nominal load. This includes linearity deviation, hysteresis and repeatability error.

[4] Corrosion resistance properties similar to AISI 430F

[5] According to IEC 529, EN 60-529

[6] Corrosion resistance properties similar to AISI 316L

[7] Applies for +20 – 80°C
68 – 176°F

Pressductor® PillowBlock Load Cells
– vertical force measurement 5.0 - 50.0 kN

For applications that demand vertical force measurement, the standard and mill-duty versions of ABB's "vertical" PillowBlock load cell provide the best in measurement range and durability.

These units are designed for web tension measurement in applications where it is essential or advantageous to determine the vertical force component.

Machined from a single block of stainless steel, they have exceptionally high tolerance for overloads, shock and impact, in addition to high immunity to dust and corrosion.

The standard construction is of highly resistant stainless steel with potted internal components. Mill-duty versions are available for exceptionally hostile environments. They're ideal for the wet end of a paper machine.

The family of "vertical" load cells comprises units in four operating ranges offering measurement capacities from 5 kN (1,125 lbs.) to more than 50 kN (11,250 lbs.), covering applications with tensions levels in excess of 1,000 kN (225,000 lbs.).

ABB's vertical load cells, like their counterparts for horizontal measurement, feature an extended operating load range. Up to 50 percent more measurement capacity is available in this range with fully retained performance characteristics, except some decline in measurement accuracy. As a result, in most applications, the load cells can safely be specified for the web's normal tension range, but still will accommodate substantial peak loads.

In fact, both types of ABB PillowBlock load cells feature an exceptionally wide measurement range. With the capacity to measure web and strip tension ranges of up to 30:1, they provide valuable machine versatility in processing a variety of applications.

Installation in existing equipment can be simplified by use of top and bottom adapter plates, which can be supplied by ABB.

Three versions are available:

- The standard version PFCL 201C equipped with Cannon connector for the connection cable.
- PFCL 201CD equipped with a tight cable gland and 20 m Teflon® insulated connection cable
- The mill-duty version PFCL 201CE with fixed connection cable in protective hose, best suited for wire and felt tension applications in paper machines.

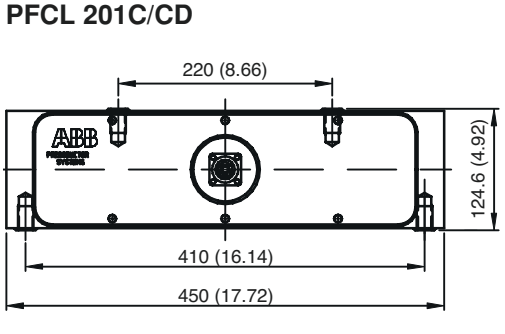
Extended-Range Operation

An extended range of measurement beyond the nominal load allows ABB's PillowBlock load cells to be sized for normal, as opposed to maximum, tension levels. As a result, they permit greater application flexibility on the web processing machinery.

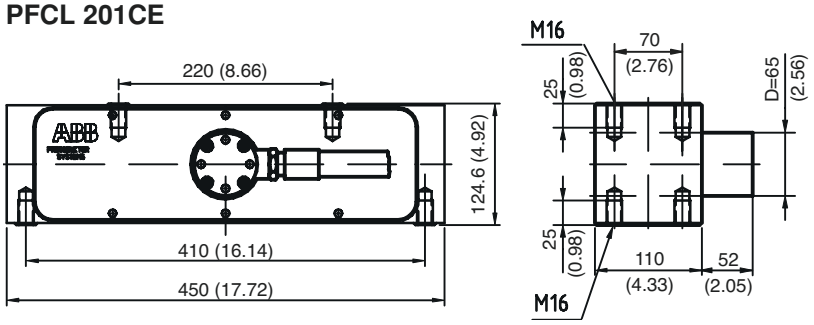
PFCL 201C/CD/CE

Properties					
Nominal load					
(rated capacity)	kN	5.0	10.0	20.0	50.0
	Lbs.	1125	2250	4500	11250
Extended load[1)]	kN	7.5	15.0	30.0	75.0
	Lbs.	1688	3375	6750	16875
Permitted load					
Transverse direction	kN	2.5	5.0	10.0	25.0
(horizontal) h=300 mm	Lbs.	563	1125	2250	5625
Overload capacity[2)]					
Measurement direction					
(vertical)	kN	50.0	100.0	200.0	500.0
	Lbs.	11250	22500	45000	112500
Transverse direction					
(horizontal) h=300 mm	kN	2.5	5.0	10.0	20.0
	Lbs.	563	1125	2250	4500
Deflection[3)]	mm	0.02	0.02	0.02	0.02
	1/1000 in.	0.8	0.8	0.8	0.8
Spring constant	kN/mm	250	500	1000	2500
	1000 lbs/in.	1430	2860	5720	14300

PFCL 201C/CD



PFCL 201CE



mm (inch)

All Load Cells

Operating Principle	Electromagnetic Pressductor® Technology	
Accuracy class[4)]	%	±0.5
Repeatability error	%	<±0.05
Operating range		30:1
Stainless steel	SIS	2387[5)]
	DIN	X4CrNiMo165
Working temp. range		-10 to +90°C 14 to 194°F
Zero point drift[6)]	%/°C	<±0.005
	%/°F	<±0.003
Sensitivity drift[6)]	%/°C	<±0.010
	%/°F	<±0.006

[1)] Values indicate the total capacity of the load cells when taking into account their permissible "extended capacity". In the extended range, above the nominal load, some decline in measurement accuracy may be experienced.

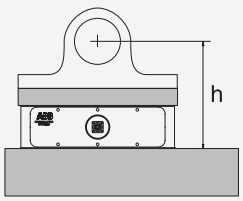
[2)] Maximum permitted loads without affecting load cell calibration.

[3)] At nominal load.

[4)] Accuracy class is defined as the maximum deviation, and is expressed as a percentage of the sensitivity at nominal load. This includes linearity deviation, hysteresis and repeatability error.

[5)] Corrosion resistance properties similar to AISI 304

[6)] Applies for +20 – 80°C
68 – 176°F



Height (h) from load cell's bottom surface to roll center line.

Tension Electronics

– bringing something new to web tension

The basic function of the tension electronics is to provide a 330 Hz excitation to the tension load cells and to process the measurement signals. It also provide outputs for control and/or indication of the measured tension.

The signal processing function of the tension electronics amplifies, rectifies, and filters the measurement signals from the load cells and provides an accurate and reliable output signal.

Covering a wide range of applications the Tension Electronics comes in three versions, with different levels of performance and functionality. All three versions have multi-language digital display and configuration keys. The configuration keys being used for setting different parameters and to check the status of the tension system. The 2 x 16 character display can present sum, difference or individual load cell signals. All three versions are available in both DIN-rail version and enclosed IP65[1)] (NEMA 4) version for mounting in more severe environments.

PFEA 111

A cost effective, compact and user friendly tension electronics providing an accurate and reliable fast analog SUM signal from two load cells for control and/or monitoring. The display can show the SUM individual A & B and difference signal. The small size and DIN-rail mount make this unit very easy to integrate into many types of electrical cabinets.

PFEA 112

This unit provides the same functionality and user friendliness as the PFEA 111 with the addition of fieldbus communication via Profibus-DP.

PFEA 113

This advanced tension electronics can supply up to four load cells and has six configurable analog outputs for control and/or monitoring of web tension. The output signals are also available on Profibus-DP.

Another useful feature is the possibility to, via the digital input or Profibus, switch the gain for two different web paths. Alternatively, the digital input could be used for remote gain scheduling or zero set. This unit also includes a self-diagnostic function and four configurable digital outputs for alarms and level detection. Status of self-diagnostic functions are also available on Profibus-DP.

By combining up to three PFEA 113 the system can handle segmented roll applications, i.e. winders, with up to 12 load cells.

The high level of functionality and user-friendliness make the PFEA 113 one of the most complete tension electronics on the market.

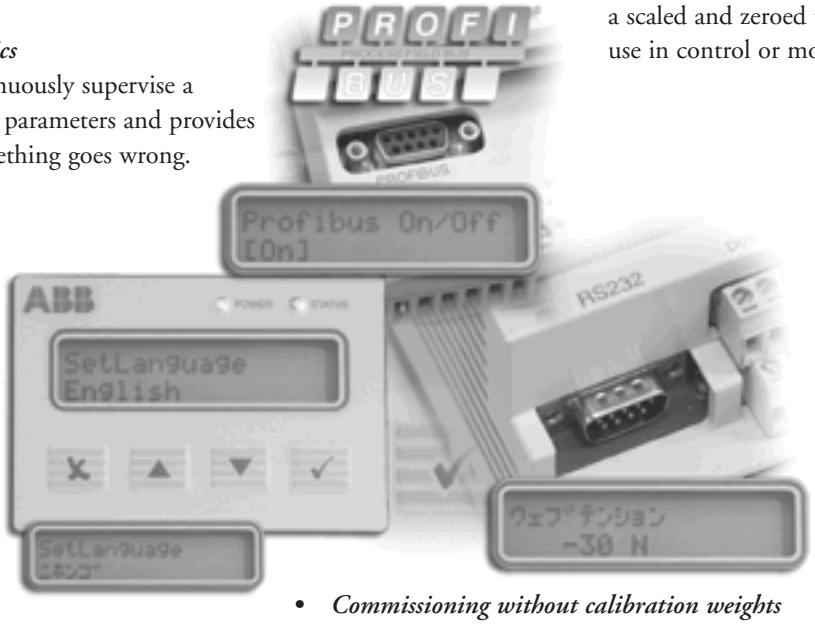
1) According to IEC 529, EN 60-529

Features and benefits

- *Interactive menu*
  The tension electronics has a unique interactive menu which guides the commissioning step by step, eliminating the potential for making mistakes and significantly reducing startup time. – An extremely helpful tool.

- *Built-in self diagnostics*
  The electronics continuously supervise a number of important parameters and provides error messages if something goes wrong.

- *Multi-language display*
  The multi-language display is a great feature that helps to eliminate mistakes, during start-up and/or operation of the tension system.



- *Load memory*
  The resetable load memory stores max. load values. A useful tool for maintenance.

- *Analog outputs*
  Individual scaling and filtering of all analog outputs.

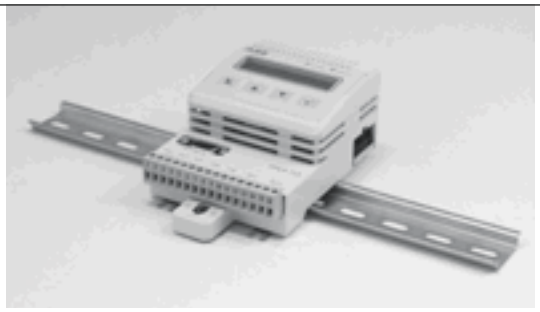
- *Commissioning without calibration weights*
  All Pressductor load cells are standard calibrated to the same sensitivity before delivery from ABB factory. This means that the fastest and most accurate way to commission a tension system is to use a calculated value instead of using calibration weights.

- *Fieldbus communication*
  Versions PFEA 112 and PFEA 113 have fieldbus communication via Profibus-DP as standard. In contradiction to many other tension systems the PFEA 112 and PFEA 113 provide a scaled and zeroed tension output ready for use in control or monitoring.

- *Filter function*
  All units come with a selectable filter function for removal of roll unbalance, machine vibrations and other disturbances.

Mounting

To provide flexibility of mounting, all three versions of the Tension Electronics are available in two mounting alternatives. For mounting on a standard DIN-rail the IP 20 and for wall mounting the IP 65 (NEMA 4).



Floor cubicle

Floor cubicle type MNS Select is available for housing of up to 24 pcs. of PFEA 111/112 or 12 pcs. of PFEA 113 when mounted on 19” plates. Exact numbers depend on the combination of different tension electronics and the number of optional units used.

Options

To meet certain special application requirements the following options are available:

Insulation amplifier PXUB 201

The insulation amplifier can be used when galvanic insulation is required for analog output signals.

The insulation amplifier can be connected to all versions and PFEA 113 - IP 65 can hold up to four PXUB 201.

Supply voltage		*+24 V (20 - 253 V AC/DC)*
Current consumption		*10 mA + external load*
Signal range	*Input*	*Output*
	0 - ±10 V	*0 - ±10 V*
	0 - ±10 V	*0 - ±20 mA*
	0 - 10 V	*4 - +20 mA*
Rated insulation voltage		*600 V (basic)*

Relay board PXKB 201

PXKB 201 is DIN-rail mounted and can be mounted in the IP 65 versions of the Tension Electronics together with the insulation amplifier.

PFEA 113-65 can hold up to four PXKB 201.

Supply voltage		*+24 V DC*
Power consumption		*18 mA*
Contact data	*AC*	*6 A at 250 V*
	DC	*6 A at 250 V*

Power supply unit

When using the DIN-rail IP 20 version of the electronics and 24 V main supply is not available, ABB offer optional power supply units.

The compact units transform main supply from 110 - 120 V/207 - 240 V AC to 24 V DC for supply of the PFEA 111, 112 and 113.

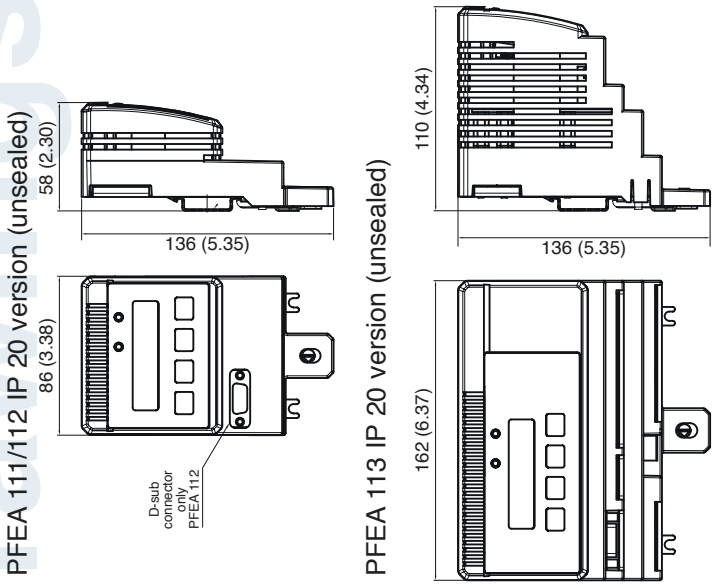
Three power supply units with different power ratings are available. The table below indicates max. number of electronics per power supply unit.

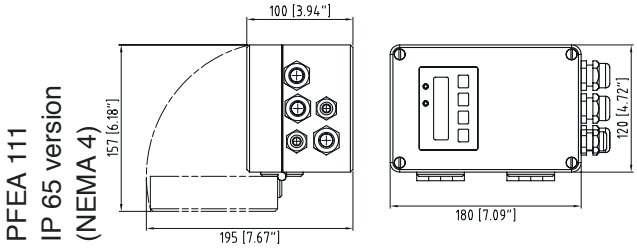
	PFEA 111	*PFEA 112*	*PFEA 113*
SD821 2.5 A	*6*	*6*	*3**
SD822 5 A	*12*	*12*	*6**
SD823 10 A	*24*	*24*	*12**

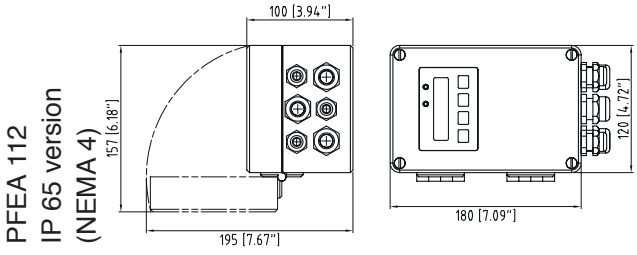
** Supply of digital outputs are not included*

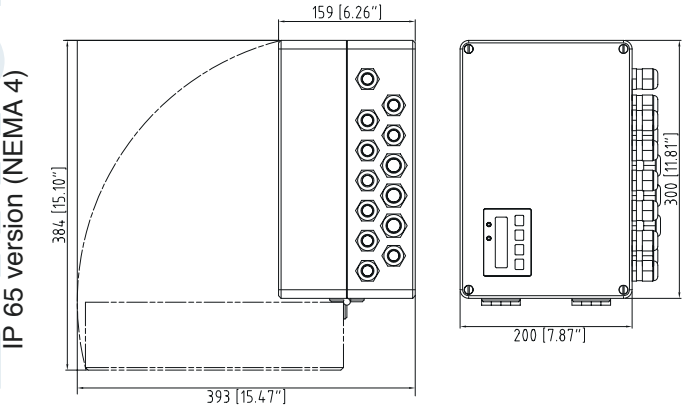
Dimension drawings

Dimension drawings mm (inch)









Data	PFEA 111	PFEA 112	PFEA 113
Power supply			
IP 20 Voltage	DC 24 V (18 - 36 V)		
Power requirement	7.5 W	7.5 W	12 W
IP 65 Main voltage	DC 24 V (18 - 36 V) 100 (-15%) - 240 (+10%) V AC		
Frequency	45 - 65 Hz		
Number of load cells	2	2	4
Load cell excitation			
Current	0.5 A rms, 330 Hz	0.5 A rms, 330 Hz	0.5 A rms, 330 Hz
Max. load	2 load cells Plus 5 Ω cable resistance	2 load cells Plus 5 Ω cable resistance	4 load cells Plus 10 Ω cable resistance
Inputs			
Digital inputs (remote zero or gain scheduling)	-	-	1
Analog inputs (connection of multiple PFEA 113 units)	-	-	2
Outputs			
Analog outputs (voltage or current)	-	-	6
-5 - +11 V (max.load 5 mA)	1	1	-
0 - 21 mA (max. load 550 Ω)	1	1	-
Selectable filter			
Step response (0 - 90%) can be set for each output	15, 30, 75, 250, 750, 1500 ms	15, 30, 75, 250, 750, 1500 ms	5, 15, 30, 75, 250, 750, 1500 ms
Scaling function of analog outputs	Yes	Yes	Yes
Digital outputs (Status OK and/or Level detectors)	-	-	4
Self diagnostics, Status OK			
LED (green/red)	Yes	Yes	Yes
Alarm on Digital output	-	-	Yes
Alarm via Profibus	-	Yes	Yes
Multi language interactive display[1)]	Yes	Yes	Yes
Selectable tension units on the display	N, kN, kg and lbs, N/m, kN/m, kg/m, pli		
Maximum load memory	Yes	Yes	Yes
Zero offset memory	Yes	Yes	Yes
Communication			
ProfiBus DP, baud rate up to 12 Mbit	-	Yes	Yes
GSD-file	-	ABB_0716.GSD	ABB_0717.GSD
Environmental tolerance			
Electrical environment			
Electrical interference environment	As per EMC Directive 89/336/EEC		
Elecrtical safety	As per Low Voltage Directive 73/23/EEC As per UL508 Industrial control equipment[2)]		
Ambient temperature	+5 - +55°C		
Degree of protection	IEC 529 Protection class IP 20 or IP 65 (NEMA 4)		

1) English, German, Italian, French, Japanese, Portugese
2) Not PFEA 112-65

Ordering guide

Product		Model designation	Ordering number
Load cells	Nominal load kN (lbs)		
	0.5 (112)	PFTL 101A-0.5	3BSE004160R1
	0.5 (112)	PFTL 101AE-0.5	3BSE004211R1
	0.5 (112)	PFTL 101AER-0.5	3BSE023010R1
	1.0 (225)	PFTL 101A-1.0	3BSE004166R1
	1.0 (225)	PFTL 101AE-1.0	3BSE004212R1
	1.0 (225)	PFTL 101AER-1.0	3BSE023011R1
	2.0 (450)	PFTL 101A-2.0	3BSE004172R1
	2.0 (450)	PFTL 101AE-2.0	3BSE004213R1
	2.0 (450)	PFTL 101AER-2.0	3BSE023012R1
	2.0 (450)	PFTL 101B-2.0	3BSE004185R1
	2.0 (450)	PFTL 101BE-2.0	3BSE004214R1
	2.0 (450)	PFTL 101BER-2.0	3BSE023158R1
	5.0 (1125)	PFTL 101B-5.0	3BSE004191R1
	5.0 (1125)	PFTL 101BE-5.0	3BSE004215R1
	5.0 (1125)	PFTL 101BER-5.0	3BSE023159R1
	10.0 (2250)	PFTL 101B-10.0	3BSE004197R1
	10.0 (2250)	PFTL 101BE-10.0	3BSE004216R1
	10.0 (2250)	PFTL 101BER-10.0	3BSE023160R1
	20.0 (4500)	PFTL 101B-20.0	3BSE004203R1
	20.0 (4500)	PFTL 101BE-20.0	3BSE004217R1
	20.0 (4500)	PFTL 101BER-20.0	3BSE023161R1

Product		Model designation	Ordering number
	Nominal load kN (lbs)		
	10.0 (2250)	PFTL 201C-10.0	3BSE007913R10
	10.0 (2250)	PFTL 201CE-10.0	3BSE007913R11
	20.0 (4500)	PFTL 201C-20.0	3BSE007913R20
	20.0 (4500)	PFTL 201CE-20.0	3BSE007913R21
	50.0 (11250)	PFTL 201C-50.0	3BSE007913R50
	50.0 (11250)	PFTL 201CE-50.0	3BSE007913R51
	50.0 (11250)	PFTL 201D-50.0	3BSE008922R50
	50.0 (11250)	PFTL 201DE-50.0	3BSE008922R51
	100.0 (22500)	PFTL 201D-100.0	3BSE008922R100
	100.0 (22500)	PFTL 201DE-100.0	3BSE008922R101
	5.0 (1125)	PFCL 201C-5.0	3BSE027070R5
	5.0 (1125)	PFCL 201CD-5.0	3BSE029774R5
	5.0 (1125)	PFCL 201CE-5.0	3BSE027062R5
	10.0 (2250)	PFCL 201C-10.0	3BSE027070R10
	10.0 (2250)	PFCL 201CD-10.0	3BSE029774R10
	10.0 (2250)	PFCL 201CE-10.0	3BSE027062R10
	20.0 (4500)	PFCL 201C-20.0	3BSE027070R20
	20.0 (4500)	PFCL 201CD-20.0	3BSE029774R20
	20.0 (4500)	PFCL 201CE-20.0	3BSE027062R20
	50.0 (11250)	PFCL 201C-50.0	3BSE027070R50
	50.0 (11250)	PFCL 201CD-50.0	3BSE029774R50
	50.0 (11250)	PFCL 201CE-50.0	3BSE027062R50

Cables	Cable with male plug connector	15 m (49 ft)	3BSE018741R15
	Cable with male plug connector	30 m (98 ft)	3BSE018741R30
	Cable with male plug connector	50 m (164 ft)	3BSE018741R50
	Cable with male angled plug connector	15 m (49 ft)	3BSE018741R115
	Cable with male angled plug connector	30 m (98 ft)	3BSE018741R130
	Cable with male angled plug connector	50 m (164 ft)	3BSE018741R150
	Male plug connector without cable		YM 321 002-D
	Male angled plug connector without cable		3BSC860249R1
Junction box		PFXC 141	3BSE029997R1
		PFTC 101X	3BSE009852R1
Tension Electronics	PFEA 111, IP 20	PFEA 111-20	3BSE028140R20
	PFEA 112, IP 20	PFEA 112-20	3BSE030369R20
	PFEA 113, IP 20	PFEA 113-20	3BSE028144R20
	PFEA 111, IP 65	PFEA 111-65	3BSE028140R65
	PFEA 112, IP 65	PFEA 112-65	3BSE030369R65
	PFEA 113, IP 65	PFEA 113-65	3BSE028144R65
	PFEA 113, IP 65, incl. 1 insulation amplifier PXUB 201 - Voltage output (connected to AO1)	PFEA 113-65.1PXV	3BSE028144R165
	PFEA 113, IP 65, incl. 2 insulation amplifier PXUB 201 - Voltage output (connected to AO1,2)	PFEA 113-65.2PXV	3BSE028144R265
	PFEA 113, IP 65, incl. 3 insulation amplifier PXUB 201 - Voltage output (connected to AO1,2,3)	PFEA 113-65.3PXV	3BSE028144R365
	PFEA 113, IP 65, incl. 4 insulation amplifier PXUB 201 - Voltage output (connected to AO1,2,3,4)	PFEA 113-65.4PXV	3BSE028144R465
	PFEA 113, IP 65, incl. 1 insulation amplifier PXUB 201 - Current output (connected to AO1)	PFEA 113-65.1PXC	3BSE028144R1165
	PFEA 113, IP 65, incl. 2 insulation amplifier PXUB 201 - Current output (connected to AO1,2)	PFEA 113-65.2PXC	3BSE028144R1265
	PFEA 113, IP 65, incl. 3 insulation amplifier PXUB 201 - Current output (connected to AO1,2,3)	PFEA 113-65.3PXC	3BSE028144R1365
	PFEA 113, IP 65, incl. 4 insulation amplifier PXUB 201 - Current output (connected to AO1,2,3,4)	PFEA 113-65.4PXC	3BSE028144R1465
Options			
Insulation amplifier PXUB 201		PXUB 201	3BSC630149R1
Relay board PXKB 201		PXKB 201	3BSC810039R1
Power supply unit SD821 (2,5 A)		SD821	3BSC610037R1
Power supply unit SD822 (5 A)		SD822	3BSC610038R1
Power supply unit SD823 (10 A)		SD823	3BSC610039R1
Floor cubicle MNS Select, ventilated IP 21 including 24 V power supplies			3BSE030582R21
Floor cubicle MNS Select, sealed IP 54 including 24 V power supplies			3BSE030582R54

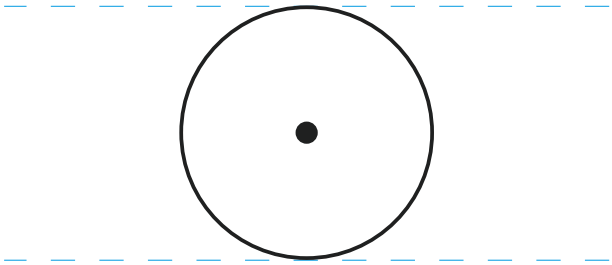
Adapter plates for load cells PFTL 201 and PFCL 201 are available on request.

Your application

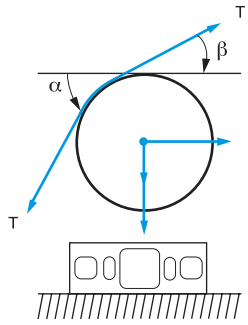
We can quickly assist you in determining the ideal specifications of one or several Mini Series PillowBlock Tensiometer Systems. Simply fill in the details of your application on copies of this page and fax them to us.

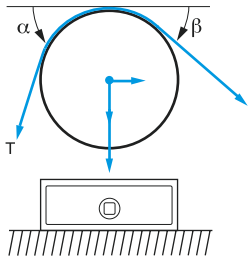
Web Path
On the template at right, sketch the web path of your application

Indicate the load cell position and close estimates of angles α, β and, if applicable γ, to the horizontal dashed lines, as appropriate.



Examples





Machine Attributes

Please indicate the pertinent machine attributes below.

Roll Specifications

Width _____ mm (in.)
Weight _____ kg (lbs.)
Shaft dia. _____ mm (in.)
Speed _____ rpm

Web Tension *Specify…*

Normal _____ kN or kN/mm (lbs. or pli)
Max. _____ kN or kN/mm (lbs. or pli)
Min. _____ kN or kN/mm (lbs. or pli)

Web Width

Min. _____ mm (in.)
Max. _____ mm (in.)

Please fill in your address information below

Name _____
Title _____
Company _____
Address _____
City _____ Country _____
Tel _____
Fax _____
E-mail _____

Please fax to:
+46 21 34 00 05

or mail to:

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ABB Automation Technologies is the global market leader in automation technology. We provide products, software and services for the automation and optimization of discrete, process and batch manufacturing operations. Key technologies include measurement and control, instrumentation, process analysis, drives and motors, power electronics, robots and low-voltage products, all geared toward one common Industrial IT architecture for real-time automation and information solutions throughout a business.

ABB Force Measurement is a business unit within ABB Automation Technologies. It provides equipment for accurate, reliable measurement and control in a broad range of applications in the metal, paper and marine industries.

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