ABB MEASUREMENT & ANALYTICS

# Web tension systems

## Pressductor Radial load cells

# Measurement made easy

## Web tension systems

Quality tension measurement
for quality tension control

- Accurate
- Rugged
- Reliable

# **Pressductor Radial load cells**
# Introduction

ABB's Pressductor® Radial load cells (PRT load cells) are sensitive and accurate yet rugged, reliable and compact. They can withstand high overloads and vibrations, and operate over a wide range of tensions: ideal for any web converting application such as coating, laminating, printing, slitting, winding/unwinding and many others.

The well-proven Pressductor load cells combined with the tension electronics, offer an easy-to-use/ user-friendly web tension measurement system with superior long term performance leading to higher productivity and product quality and higher profit for the web producer.

**Increased process uptime**
In a web process running continuously, every minute of production time is precious. Even so, no production line runs without downtime.

With Pressductor Radial load cells the risk of web breaks can be reduced to a minimum, thus leaving as much time as possible for real production.

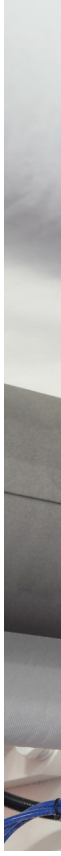
Thanks to a strong and stable signal deriving from the PRT load cells, the upcoming web breaks are kept to an absolute minimum level.

**Tighter product tolerances**
The ability to produce web to tighter tolerances minimizes the costs associated with non-conforming web. It also increases the web producer's accessible market to include products with tighter tolerance requirements.

—

A Pressductor transducer produces its measurement signal without requiring any physical movement in the transducer measurement element. And it generates a strong signal at comparatively low stress levels. So there is no possibility of fatigue leading to drift and deteriorating measurement performance.

# **Pressductor Radial load cells**
## 50 years of experience



—
01 Pressductor technology – mechanical force alters magnetic field.
—
02, 03, 04 Typical PRT load cell installations.

**Minimize maintenance**
Share the experience, of virtually maintenance-free load cells, with thousands of other Pressductor load cell users. A robust load cell design with no fragile or ageing components makes this possible. Thanks to its robust and compact design, the PRT load cells work consistently for many years without any need for maintenance.

**Fast access to support and service**
ABB provides customers with superior distinctive after sales service that really differentiates from the competition. You obtain advanced solutions to problems, service and professional consultation through our After Sales Service program. Expert engineers with extensive experience of all types of Force Measurement products are available to assist you through our world-wide network.

**There is a shaft-mounted PRT tension measurement load cell suitable for most web processing machinery used in the converting, printing, plastic film, textiles, and other industries.**
In the converting industry, the PRT load cells are ideal on machinery for coating, laminating, embossing, and many other processes.

PRT load cells are used on a wide range of printing presses – in both converting and commercial printing as well as newspaper and magazine production.

In the plastics industry, PRT load cells are used to optimize the production and processing of blown and cast film.

And in the textiles industries, machinery applications include nonwovens production as well as finishing operations like bleaching, desizing, dyeing, and printing.

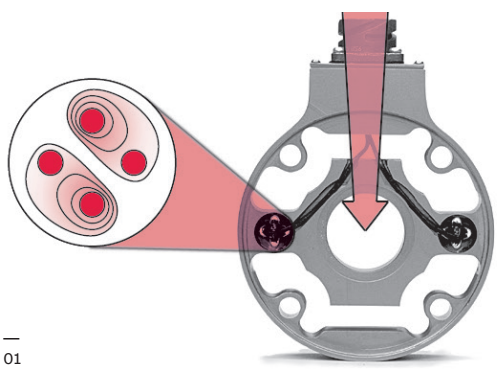
In all web processing areas, PRT load cells are used on the full range of winding machinery, from unwinders to slitter-rewinders.

**The Pressductor difference**
Like ABB's other load cells based on Pressductor Technology, PRT 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 load. And they do not 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. These stainless steel load cells don't require any physical seals.

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



—
01

02

03

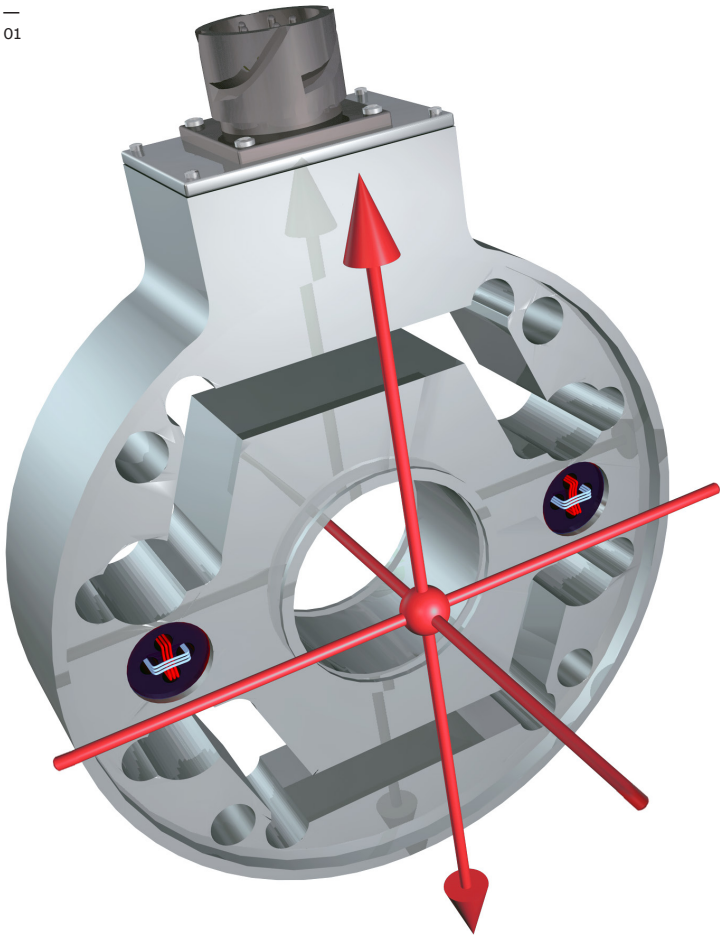


04

# Pressductor Radial load cells
## Simple to size and easy to apply

**Designers appreciate:**
- Remarkably high spring constant
- Very narrow profile
- High reliability

**Operators value a load cell with:**
- No drift
- No need for recalibration
- No failures
- High reliability



— 01 Measurement directions.

**Selecting and sizing load cells**
Calculating the forces exerted on load cells in a specific application allows you to determine the ideal load cell size specification. Force calculations and load cell sizing are typically conducted in collaboration with ABB; this page provides an overview of the considerations that play a role in this stage of the specification process.

The orientation of PRT load cells on the end of the roll shaft can be adjusted to perform measurements in the most advantageous direction for each application.

In sizing PRT load cells, both the web tension and the weight of the roll and bearings (tare weight) should be considered. If the load cell is oriented vertically or diagonally with respect to the force of gravity, the tare force will contribute to the total force level sensed by the PRT load cell system. If the load cell is oriented horizontally, the tare force will be perpendicular to the measurement axis, and so will not be sensed.

**Calculating the forces**
The PRT load cell measures bi-directionally along its measurement axis (see illustration). Once the load cell is oriented and the measurement axis determined, the force components exerted on the load cells of a roll are easily calculated as functions of the web tension, tare force, and deflection angles. Since most systems involve two load cells, the calculated forces are divided by 2 to obtain the forces exerted on each individual load cell. The illustrations on this spread show three scenarios, involving horizontal, vertical and diagonal measurement axes.

When horizontal, the measurement force ($F_{Rtot}$) is a function of just the tension in the web (T) and the deflection angles (α and β). Since the weight of the roll and bearings (Tare) is not sensed, the load cells can be sized to measure low tension levels even on a comparatively heavy roll. However, the perpendicular force ($F_{Vtot}$) – which does include Tare – should not exceed the overload rating.

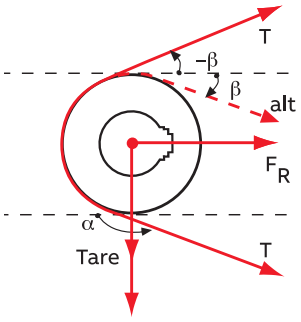
When the measurement force ($F_{Rtot}$) is vertical, it includes the weight of the roll and bearings (Tare), and the load cell must be sized accordingly. In effect, the weight of the roll and bearings are using up some of the measurement range of the load cell.

A diagonal load force orientation requires a more complex calculation. Here, the forces sensed in both the measurement direction and the perpendicular direction include a portion of the tare as well as the web tension, and the angle formed by the measurement axis and the horizontal axis (γ) enters into the calculation.

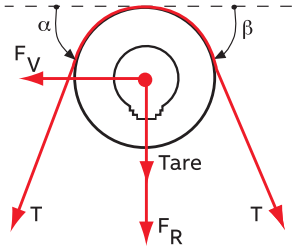
**Application hint**
Two 10 % application guidelines are useful in selecting load cell sizes:

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

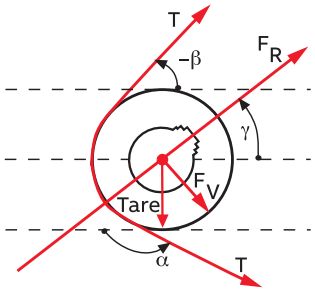
2. During normal operation, the sensed force should not be less than 10 % of the load cell's capacity.




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




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



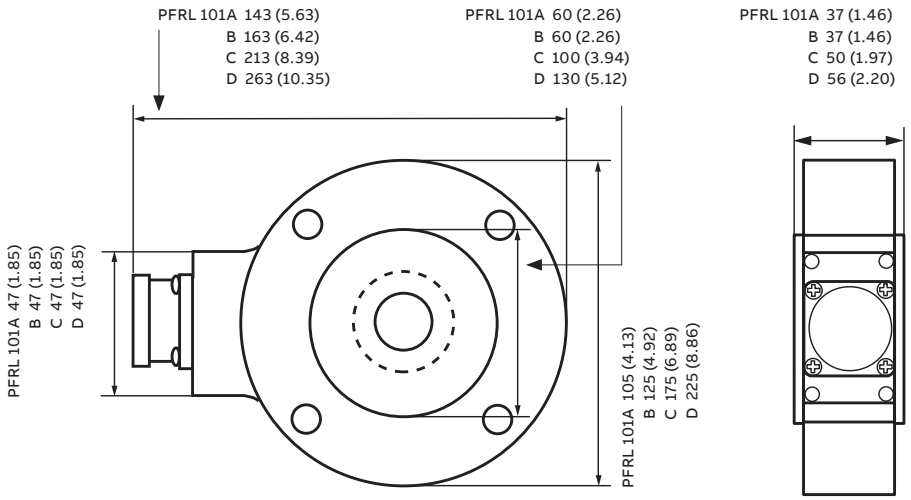

**Diagonal measuring load cells**
$F_{Rtot} = T(\cos(\beta + \gamma) - \cos(\alpha - \gamma)) - Tare \times \sin\gamma$
$F_{Vtot} = T(\sin(\alpha - \gamma) + \sin(\beta + \gamma)) + Tare \times \cos\gamma$

| | | |
|---|---|---|
| $F_R$ | = | 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 |
| γ | = | Angle for load cell mounting |

# **Pressductor Radial load cells**
## Designed to measure web tension

Four standard sizes measure web tension from 0.1 to 100 kN. With its extended-capacity feature, the PRT load cell is capable of measuring tension reliably over a 30:1 range. Superior overload characteristics in all force directions (up to 500 %) eliminate overload failures for all practical purposes.

Exceptionally high spring constant virtually eliminates load cell contributions to machine vibration, even at very high machinery speeds. The performance of the load cells is unaffected by environmental factors like dust, corrosion and radio or electromagnetic interference.




PRT dimensions in mm (in)

—

Designed to measure web tension on most types of web processing machinery used in the converting, plastic film, printing, textiles, and other industries.

| **Technical data** | | **PFRL 101A** | **PFRL 101B** | | | **PFRL 101C** | **PRFL 101D** |
|---|---|---|---|---|---|---|---|
| Nominal load (rated capacity) | kN | 0.5 | 1.0 | 0.5 | 1.0 | 2.0 | 5.0 |
| | lb | 112 | 225 | 112 | 225 | 450 | 1125 |
| Extended load [1] | kN | 0.75 | 1.5 | 0.75 | 1.5 | 3.0 | 7.5 |
| | lb | 169 | 337 | 169 | 337 | 675 | 1687 |
| Overload capacity [2] | kN | 2.5 | 5.0 | 2.5 | 5.0 | 10.0 | 25.0 |
| Measurement direction | lb | 562 | 1125 | 562 | 1125 | 2250 | 5625 |
| Transverse to measurement | kN | 2.5 | 3.0 | 1.25 | 2.5 | 5.0 | 10.0 |
| direction | lb | 562 | 674 | 281 | 562 | 1125 | 2250 |
| Axial | kN | 2.5 | 5.0 | 2.5 | 5.0 | 10.0 | 25.0 |
| | lb | 562 | 1125 | 562 | 1125 | 2250 | 5625 |
| Spring constant | kN | 50 | 100 | 50 | 100 | 200 | 500 |
| | 1000 lb/in | 286 | 572 | 286 | 572 | 1143 | 2858 |
| Deflection [3] | mm | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |
| | 1/1000 in | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 |

| **All load cells** | | |
|---|---|---|
| Operating principle | | Electromagnetic Pressductor technology |
| Accuracy class [4] | % | ±0.5 |
| Repeatability error | % | <±0.1 |
| Operating range | | 30:1 |
| Stainless steel | SIS | 2387 [5] |
| | DIN | X4CrNiMo165 |
| Working temperature range | | –10 to 80 °C<br>14 to 176 °F |
| Zero point drift [6] | %/°C | <±0.015 |
| | %/°F | <±0.008 |
| Sensitivity drift [6] | %/°C | <±0.015 |
| | %/°F | <±0.008 |

Extended-Range Operation Beyond their nominal capacity, PRT load cells have an extended range of measurement – so they can be sized for normal, as opposed to maximum, tension levels. As a result, they can process a wider variety of materials.

[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 small 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 to 80 °C (68 to 176 °F).

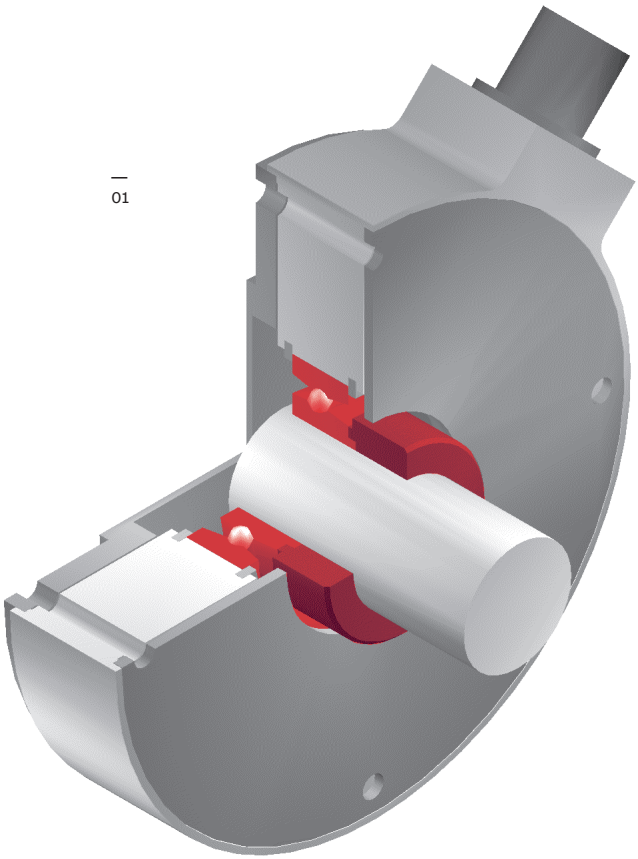
# **Pressductor Radial load cells**
## Shaft sizes and bearing recommendations

—
01 The bearing is press fit to the roll shaft, and the assembly is slip fit to the load cell and secured with snap rings.
—
02 Integration of load cell and shaft.

PRT load cells work well with both rotating (live) and non-rotating (dead) shafts. For live shaft applications, many different bearing types and sizes can be used. The load cell and the shaft can be integrated by first press-fitting the selected bearing onto the shaft and then sliding the assembly into the center hole of the PRT load cell. Or, alternatively, the roll shaft may be machined to create a shoulder that one side of the bearing rests against, while the other side is restricted by a snap ring.

In live shaft assemblies, the roll is held securely in place by snap rings installed in grooves on each side of the bearing in the center hole of the load cell. Thermal expansion of the roll is accommodated by installing snap rings on both sides of the bearing in just one load cell.

—
01



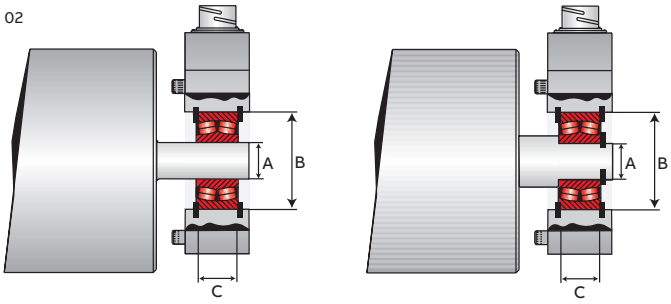
The table presents a sampling of bearing specifications for PRT load cells for various shaft diameters and bearing types. Other bearing types and sizes can be accommodated, including both conventional SKF bearings and many self-locking Torrington-type bearings.

The table includes typical examples of bearings for a variety of shaft diameters, based on specific load cell capacities, center hole diameters, and bearing widths (distance between snap rings). Of course, bearing load and rotational speed are also important specification criteria that must be considered when selecting an appropriate bearing. Only the bearings for the largest shaft diameters that fit standard PRT load cells are shown; many other options are available. ABB applications engineers can provide assistance with bearing selection.

**Application hint**
Thermal expansion  of the roll is accommodated by installing snap rings on both sides of the bearing in just one load cell.

| **Load cell** | | | | **PRFL 101A** | | | | **PRFL 101B** | | | | **PRFL 101C** | | **PRFL 101D** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nominal load | kN | 0.5 | 0.5 | 0.5 | 0.5 | 1.0 | 1.0 | 1.0 | 0.5 | 1.0 | 2.0 | 5.0 | 5.0 |
| | lb | 112 | 112 | 112 | 112 | 225 | 225 | 225 | 112 | 225 | 450 | 1125 | 1125 |
| Load cell | mm | 32 | 35 [1] | 35 [1] | 40 | 40 | 47 | 52 | 80 | 80 | 80 | 110 | 125 |
| hole diameter | in | 1.26 | 1.38 | 1.38 | 1.57 | 1.57 | 1.85 | 2.05 | 3.15 | 3.15 | 3.15 | 4.33 | 4.92 |
| Distance between | mm | 14 | 11 | 14 | 16 | 16 | 18 | 18 | 23 | 23 | 23 | 28 | 28 |
| snap rings | in | 0.55 | 0.43 | 0.55 | 0.63 | 0.63 | 0.71 | 0.71 | 0.91 | 0.91 | 0.91 | 1.10 | 1.10 |
| Self-alinged ball bearing | | | | | | | | | | | | | |
| SKF# | | 2201E | 1202E | 2202E | 2203E | 2203E | 2204E | 2205E | 2208E | 2208E | 2208E | 2212E | 2212E |
| Shaft diameter | mm | 12 | 15 | 15 | 17 | 17 | 20 | 25 | 40 | 40 | 40 | 60 | 70 |
| | in | 0.47 | 0.59 | 0.59 | 0.67 | 0.67 | 0.79 | 0.98 | 1.57 | 1.57 | 1.57 | 2.36 | 2.76 |
| Spherical roller bearig | | | | | | | | | | | | | |
| SKF# | | | | | | | | 22205E | 22208E | 22208E | 22208E | 22212E | 22214E |
| Shaft diameter | mm | | | | | | | 25 | 40 | 40 | 40 | 60 | 70 |
| | in | | | | | | | 0.98 | 1.57 | 1.57 | 1.57 | 2.36 | 2.76 |

—
02




Note:
Bearing specifications in table are samples.
PRT load cells can accommodate bearings for many other shaft diameters besides those shown.

[1] Please specify required snap ring distance when ordering.

A = Shaft diameter
B = Load cell hole diameter
C = Distance between snap rings

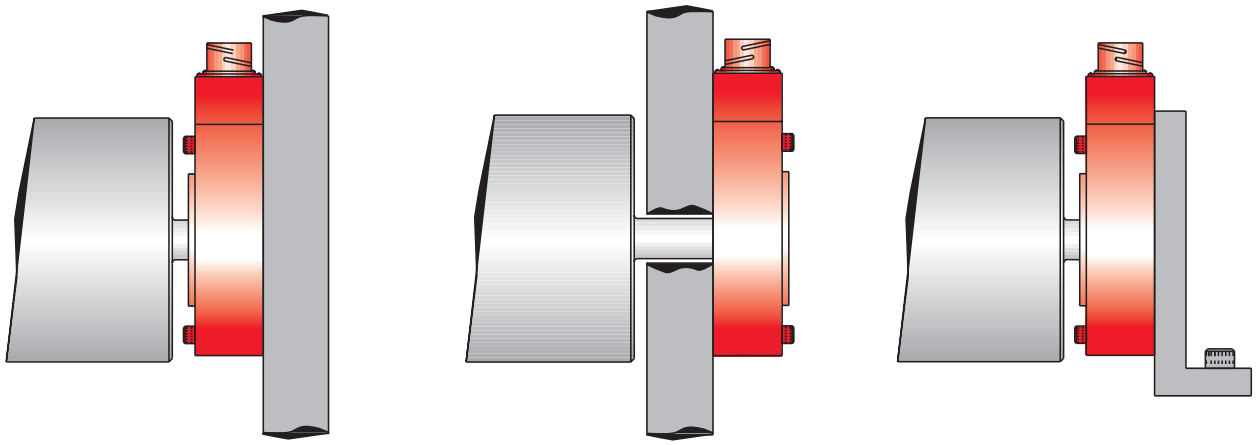
# **Pressductor Radial load cells**
## Mounting options

—
01 Three ways to mount.
—
02 Easy wall mounting.
—
03 For dead shaft rolls ABB provides a dead shaft kit with an adapter that clamps onto the non-rotating roll shaft.
—
04 Grease nipple.

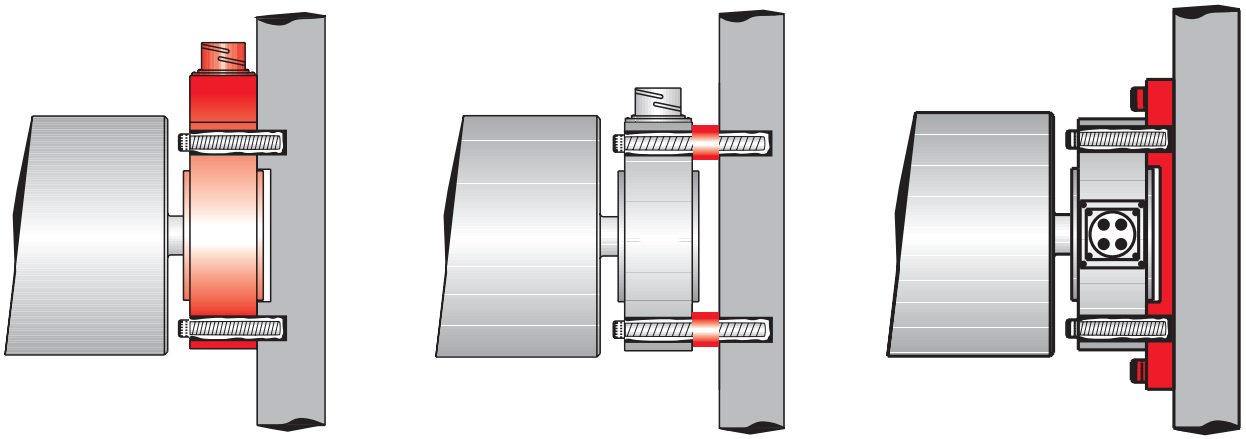
**Three ways to mount**
PRT load cells mount with equal ease on the inner and outer side of machine walls. In locations where pedestal mounting is required, a specially designed angle bracket extends the usefulness of the radial load cell.

**Easy wall mounting**
Aligning load cells on opposing machine walls is made easy by fitting the shallow surface protrusion on the load cells' back cover into predrilled cavities in the machine walls. Alternatively, the load cells can be separated from the machine wall with spacers, or bolted to an adapter plate.

—
01



—
02

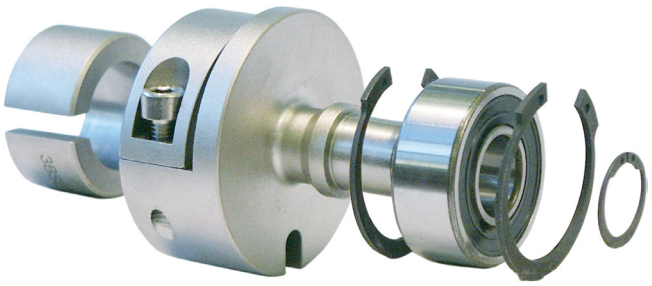


**Dead shaft adapter kit**
For applications with non-rotating shaft ends ABB provides an optional dead shaft adapter kit for PFRL 101A and PFRL 101B. The kit consists of a self-aligning bearing to manage misalignments, adapter for different shaft diameters and an anti-rotation pin.

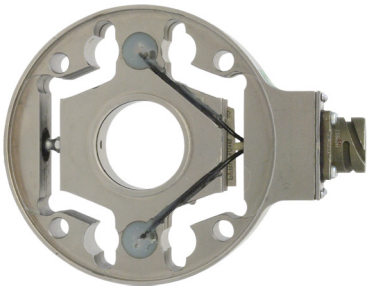
Dead shaft adapter kit is available for following shaft diameters: ¾ in, 1 in, 1⅛ in, 1¼ in, 1½ in, 20 mm, 25 mm and 30 mm.

**Grease nipple**
ABB recommends to use sealed bearings that will meet most demands in web handling machinery without the need for regular greasing operations. However, if greasable bearings must be used, ABB offers, as an option, grease nipples.
This option is available for PFRL 101B, PFRL 101C and PFRL 101D.

— 03



— 04



# Tension Electronics
## PFEA – the compact solution

Covering a wide range of applications the Tension Electronics comes in three versions, with different levels of performance and functionality.

01 PFEA tension electronics.
02 IP20 version for control room cubicle.
03 Interactive display.
04 IP65 version for mounting on machine.

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 × 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] 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.

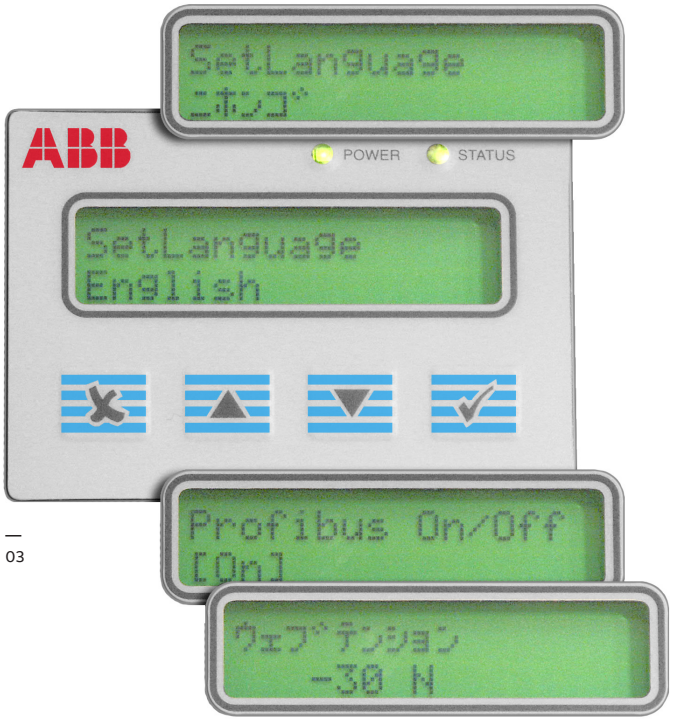
Another useful feature is the possibility to, via the digital input or Profibus, switch the gain for two different web paths. Alternatively, the digital input could be used for remote gain scheduling or zero set. This unit also includes a self-diagnostic function and four configurable digital outputs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

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


01

—
02


SetLanguage
ポジ
ABB
POWER
STATUS
SetLanguage
English
Profibus On/Off
[On]
ウェブテンション
-30 N

—
03


PFEA113
ABB
WebTension
33 N

—
04

# 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 – a very 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. 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.

**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.

**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 IP20 and for wall mounting the IP65.

**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 inch plates. Exact numbers depend on the combination of different tension electronics and the number of optional units used.

# Options and dimensions

**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 – IP65 can hold up to four PXUB 201.

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

**Relay board PXKB 201**
PXKB 201 is DIN-rail mounted and can be mounted in the IP65 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 IP20 version of the electronics and 24 V main supply is not available, ABB offers optional power supply units.

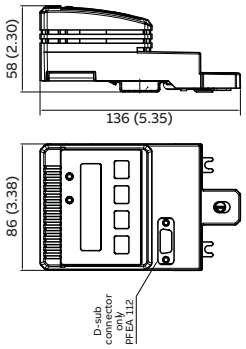
The compact units transform main supply from 110 to 120 V/207 to 240 V AC to 24 V DC for supply of the PFEA 111, 112 and 113.

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

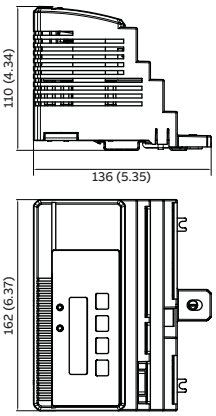
| | PFEA 111 | PFEA 112 | PFEA 113 |
|---|---|---|---|
| SD831 3 A | 6 | 6 | 3* |
| SD832 5 A | 12 | 12 | 6* |
| SD832 10 A | 24 | 24 | 12* |

* Supply of digital outputs are not included

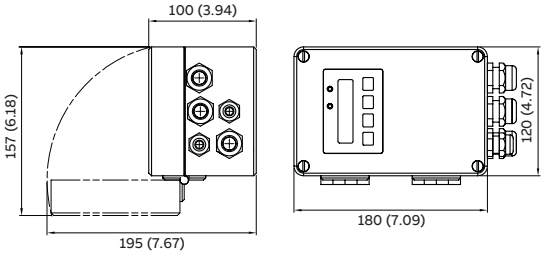
**PFEA 111/112 IP20 version (unsealed)**



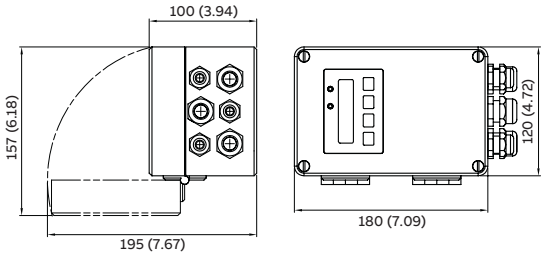

**PFEA 113 IP20 version (unsealed)**



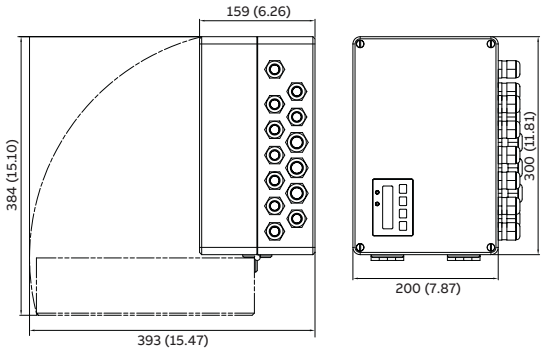

**PFEA 111 IP65 version**




**PFEA 112 IP65 version**




**PFEA 113 IP65 version**




Dimensions in mm (in)

# Technical data

| Data | PFEA 111 | PFEA 112 | PFEA 113 |
|---|---|---|---|
| **Power supply** | | | |
| IP20 voltage | | | 24 V DC (18 to 36 V) |
| Power requirement | 7.5 W | 7.5 W | 12 W |
| IP65 main voltage | | | 24 V DC (18 to 36 V), 100 (–15 %) to 240 (+10 %) V AC |
| Frequency | | | 45 to 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 to 11 V (max.load 5 mA) | 1 | 1 | — |
| 0 to 21 mA (max. load 550 Ω) | 1 | 1 | — |
| Selectable filter | | | |
| Step response (0 to 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 2014/30/EU |
| Electrical safety | | | As per Low Voltage Directive 2014/35/EU<br>As per UL508 Industrial control equipment [2] |
| Ambient temperature | | | 5 to 55 °C |
| Degree of protection | | | IEC 529 Protection class IP20 or IP65 |

[1] English, German, Italian, French, Japanese, Portuguese
[2] Not PFEA 112-65

| Product | | | | Model designation | Ordering number |
|---|---|---|---|---|---|
| Load cells | Nominal load kN (lb) | Bearing seat diameter mm (in) | Distance between snap rings mm (in) | | |
| | 0.5 (112) | 32 (1.26) | 14 (0.55) | PFRL 101A-0.5 | 3BSE002950R1 |
| | 0.5 (112) | 35 (1.38) | 11 (0.43) | PFRL 101A-0.5 | 3BSE002950R4 |
| | 0.5 (112) | 35 (1.38) | 14 (0.55) | PFRL 101A-0.5 | 3BSE002950R2 |
| | 0.5 (112) | 40 (1.57) | 16 (0.63) | PFRL 101A-0.5 | 3BSE002950R3 |
| | 1.0 (225) | 40 (1.57) | 16 (0.63) | PFRL 101B-1.0 | 3BSE002958R1 |
| | 1.0 (225) | 47 1.85) | 18 (0.71) | PFRL 101B-1.0 | 3BSE002958R4 |
| | 1.0 (225)* | 52 (2.05) | 18 (0.71) | PFRL 101B-1.0 | 3BSE002958R5 |
| | 0.5 (112)* | 80 (3.15) | 23 (0.91) | PFRL 101C-0.5 | 3BSE002963R502 |
| | 1.0 (225)* | 80 (3.15) | 23 (0.91) | PFRL 101C-1.0 | 3BSE002963R1002 |
| | 2.0 (450)* | 80 (3.15) | 23 (0.91) | PFRL 101C-2.0 | 3BSE002963R2 |
| | 5.0 (1,125)* | 110 (4.33) | 28 (1.10) | PFRL 101D-5.0 | 3BSE002968R2 |
| | 5.0 (1,125)* | 125 (4.92) | 31 (1.22) | PFRL 101D-5.0 | 3BSE002968R3 |
| The table shows the ordering numbers for load cells with a hole in one of the two lids ...R1, ...R502, ...R1002.<br>Ordering numbers for load cells with a hole in both lids end with ...R**1**1, ...R5**1**2, ...R10**1**2 (second from last digit is 1). | | | | | |
| **Grease nipple**<br>*Available for the above marked load cells | | Load cell modification for grease nipple (one per order) | | | 3BSE027068R1 |
| | | Grease nipple kit mounted. One kit per load cell | | | 3BSE026315R1 |
| **Dead shaft adapter load cell**<br>Includes hole for anti-rotation pin | | Load cell PFRL 101A-0.5 kN for dead shaft application | | | 3BSE002950R6 |
| | | Load cell PFRL 101B-1.0 kN for dead shaft application | | | 3BSE002958R6 |
| | | Load cell PFRL 101C-2.0 kN for dead shaft application | | | 3BSE002963R6 |
| **Dead shaft adapter kit for shaft diameter** | | ¾ in | | | 3BSE025538R5 |
| | | 1 in | | | 3BSE025538R4 |
| | | 1⅛ in | | | 3BSE025538R3 |
| | | 1¼ in | | | 3BSE025538R2 |
| | | 1½ in | | | 3BSE025538R1 |
| | | 20 mm | | | 3BSE025538R20 |
| | | 25 mm | | | 3BSE025538R25 |
| | | 30 mm | | | 3BSE025538R30 |
| **Connection cables (PVC free)** | | Cable with female connector, 8 m | | | 3BSE003697R108 |
| | | Cable with female connector, 20 m | | | 3BSE003697R120 |
| | | Cable with female connector, 30 m | | | 3BSE003697R130 |
| | | Cable with female connector, 50 m | | | 3BSE003697R150 |
| | | Cable with angular female connector, 8 m | | | 3BSE003697R208 |
| | | Cable with angular female connector, 20 m | | | 3BSE003697R220 |
| | | Cable with angular female connector, 50 m | | | 3BSE003697R250 |
| **Mounting brackets** | | PFRL 101A/B | | | 3BSE003694R1 |
| | | PFRL 101C | | | 3BSE003695R1 |
| | | PFRL 101D | | | 3BSE003696R1 |
| **Junction box** | | | | PFXC 141 | 3BSE029997R1 |
| **Tension electronics** | PFEA 111, IP20 | | | PFEA 111-20 | 3BSE050090R20 |
| | PFEA 112, IP20 | | | PFEA 112-20 | 3BSE050091R20 |
| | PFEA 113, IP20 | | | PFEA 113-20 | 3BSE050092R20 |
| | PFEA 111, IP65 | | | PFEA 111-65 | 3BSE050090R65 |
| | PFEA 112, IP65 | | | PFEA 112-65 | 3BSE050091R65 |
| | PFEA 113, IP65 | | | PFEA 113-65 | 3BSE050092R65 |
| | PFEA 113, IP65, incl. 1 insulation amplifier PXUB 201 – voltage output (connected to AO1) | | | PFEA 113-65.1PXV | 3BSE050092R165 |
| | PFEA 113, IP65, incl. 2 insulation amplifier PXUB 201 – voltage output (connected to AO1,2) | | | PFEA 113-65.2PXV | 3BSE050092R265 |
| | PFEA 113, IP65, incl. 3 insulation amplifier PXUB 201 – voltage output (connected to AO1,2,3) | | | PFEA 113-65.3PXV | 3BSE050092R365 |
| | PFEA 113, IP65, incl. 4 insulation amplifier PXUB 201 – voltage output (connected to AO1,2,3,4) | | | PFEA 113-65.4PXV | 3BSE050092R465 |
| | PFEA 113, IP65, incl. 1 insulation amplifier PXUB 201 – current output (connected to AO1) | | | PFEA 113-65.1PXC | 3BSE050092R1165 |
| | PFEA 113, IP65, incl. 2 insulation amplifier PXUB 201 – current output (connected to AO1,2) | | | PFEA 113-65.2PXC | 3BSE050092R1265 |
| | PFEA 113, IP65, incl. 3 insulation amplifier PXUB 201 – current output (connected to AO1,2,3) | | | PFEA 113-65.3PXC | 3BSE050092R1365 |
| | PFEA 113, IP65, incl. 4 insulation amplifier PXUB 201 – current output (connected to AO1,2,3,4) | | | PFEA 113-65.4PXC | 3BSE050092R1465 |
| **Options** | | | | | |
| Insulation amplifier | | | | PXUB 201 | 3BSC630149R1 |
| Relay board | | | | PXKB 201 | 3BSC810039R1 |
| Power supply device (3 A) | | | | SD831 | 3BSC610064R1 |
| Power supply device (5 A) | | | | SD832 | 3BSC610065R1 |
| Power supply device (10 A) | | | | SD833 | 3BSC610066R1 |
| Floor cabinet MNS select, sealed IP54 | | | | | 3BSE030582R54 |
| Floor cabinet MNS select, ventilated IP21 | | | | | 3BSE030582R21 |

**ABB AB**
**Measurement & Analytics**
Force Measurement
S-721 59 Västerås, Sweden

**abb.com/webtension**



3BSE030912R0401-EN Rev. D 11.2022