



UNDER PILLOW BLOCK WASHDOWN-DUTY LOAD CELL

ULTRA LINE ✱

Provides the ultimate solution for measuring and monitoring precise tension on web process or wire machinery in demanding industrial environments

Performance Benefits

The Ultra Line UPB (Under-Pillow-Block) Washdown-Duty LC (load cell) is part of the Cleveland-Kidder® Ultra Line family. It sets the standard for under-pillow-block tension transducers for the web process industry.

The Ultra Line UPB Washdown-Duty LC has a completely sealed corrosion-resisting design, making it ideal for use in demanding industrial environments, including the production of paper, steel, textiles, roofing shingles, linoleum, rubber, foil, and food products.

The Ultra Line UPB Washdown-Duty LC can be mounted at any angle. Its web force direction is not restricted to being either parallel or perpendicular to the UPB top surface (common with other load cell designs). Its compact low profile design makes it perfect for use in both retrofit and OEM applications.

The Ultra Line UPB Washdown-Duty LC is made from a solid block that results in a completely sealed

design with a very low profile. It is typically applied in pairs, one under each of the supporting guide roll's pillow block bearings. Mounting the pillow block bearing to the Ultra Line UPB Washdown-Duty LC is simple and convenient:

Rather than having to drill into the top of the load cell, the Ultra Line UPB Washdown-Duty LC uses a convenient mounting plate, making installation and replacement easier. Held in place by four corner bolts, the mounting plate is easily removed, drilled and tapped to match the pillow block mounting dimensions. The plate is then remounted and the pillow block bearing is bolted into place.

To assure maximum corrosion and chemical resistance, the Ultra Line UPB Washdown-Duty LC is made from either Stainless Steel or Aluminum Alloy depending on the size rating. Displacement from loads is negligible (typically 0.002 in.) and the output is temperature compensated.

- Provides up to a 40:1 tension range and noise immunity.
- For use with pillow block bearings and rotating shaft installations.
- Washdown-duty, withstanding impinging liquids and wet environments.
- Designed to comply with NEMA 4x, IP65/67 standards.
- Completely sealed. Corrosion-resisting and chemical-resisting (Stainless Steel 410 or Anodized Aluminum Alloy 6061).
- Competitively priced against common non-sealed, non-corrosive and chemical resistive designs.
- Compact low-profile design fits easily into tight places.
- With an end connector design (instead of on the side), no need for a left hand and right hand configuration.
- Available in a variety of load capacities (25 to 30,000 lb.) and sizes (6.5 to 17 in. long), suiting a wide range of applications.
- Provides 500% overload protection.
- Easily mounted at any angle.
- Convenient mounting plate for easy installation of pillow block bearing.
- Solid block one-piece design.

Benefits: Advantages Over Conventional Transducers	Features: Why It Can Be Done	Technical Specifics: How CMC Does It
Operates over a wider tension range. Provides up to 40:1 tension range. Competitive products typically provide tension ranges of only 8:1 or 16:1, at the very best.	Provides a higher output signal which results in better signal resolution.	Full Wheatstone Bridge semiconductor strain gage transducer design provides a higher and more stable signal. "Twin beam" design provides high mechanical gain with negligible displacement.
Ability to measure lower (light) tensions.	Substantial and stable output signal even at low tensions.	New amplifier technology eliminates drift, which distorts low-tension measurements.
Does not react to electrical noise from AC motors, servo, relay coils, or other electrical disturbances.	Rejects electrical noise resulting in clean and accurate output signal devoid of distortion.	Four-wire differential ended technology provides common mode rejection of electrical disturbances.
Better at maintaining proper tension measurement regardless of ambient temperature changes.	Minimum deviation of signal output due to temperature changes.	Precise temperature compensation network cancels out temperature influences.

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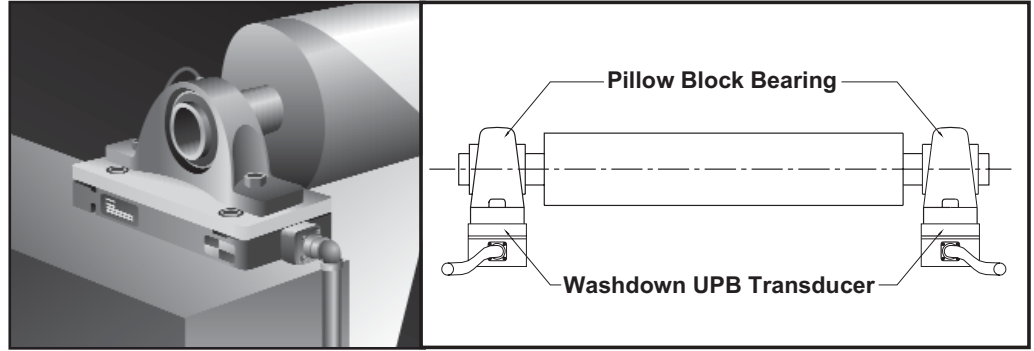


Figure 1 –Mounting Configuration

SPECIFICATIONS

Transducer Weight	UPB1	UPB2	UPB3
	1.5 lbs. 0.68 kg.	12 lbs. 5.4 kg.	57.1 lbs. 25.9 kg.
Mounting Plate with screws	UPB1	UPB2	UPB3
	2.2 lbs. 1 kg.	10 lbs. 5 kg.	44.9 lbs. 20.4 kg.
Material	Strain Sensing beam - UPB1: 6061 Aluminum UPB2, UPB3: 410 Stainless steel Mounting Plate - 304 Stainless steel		
Finish Material	UPB1 only: Anodized Aluminum		
Mounting Surface Flatness	0.002 inches from one side of transducer to the other.		
Bridge Resistance	Steel Transducer: 135-147 Ohms @ 20° C Aluminum Transducer: 122-134 Ohms @ 20° C		
Gage Type	Semi-conductor strain gage, gage factor equals 95 (nominal)		
Connector Type	M12 Quick-disconnect, 4 conductor, DC keyed		

Excitation Voltage	5.6 VDC or VAC (RMS) maximum (Excess voltage can cause permanent damage)
Nominal Output Signal at Rated MWF	+/- 120 mV per Transducer (with 5.0 VDC or VAC rms excitation voltage)
Output Impedance	Steel Transducer: Approximately 64 Ohms per Bridge leg Aluminum Transducer: Approximately 60 Ohms per Bridge leg
Ultimate Overload	500% MWF (typ) for units rated 10,000 M.W.F or less 250% MWF (typ) for units rated at 20,000 M.W.F
Maximum Voltage, Gage to Beam or Base (Ground)	50 Volts peak
Operating Temperature Range	0° F to +200° F

RATINGS

SIZE	RATING (LB)	* ULTIMATE OVERLOAD (%)
UPB1	25 to 1000	500
UPB2	1000 to 10000	500
	20000	250
UPB3	10000 to 30000	500

*Ultimate overload: Maximum force applied on the transducer without risking permanent deformation. For the Washdown duty UPB the output is linear up to the point of the ultimate overload.

SIZING CALCULATION:

T = Max Tension
 A = Wrap Angle (Degrees)
 W = Roller Weight
 B = Angle of Tension Force (Degrees)
 K = Overload for Transients (Nominally 1.4 for most applications)
 MWF = Maximum Working Force (This is used to select the proper force rating of the transducer)

$$MWF^* = \frac{[2KT \sin \frac{A}{2}] [H \sin B + L \cos B] \pm W[L \cos C - H \sin C]**}{2L}$$

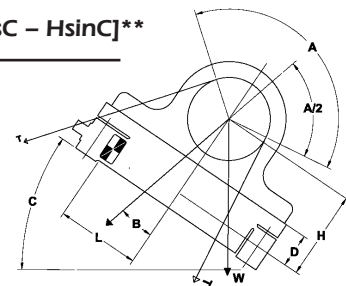
C = Mounting Angle
 H = Bearing Height + D

*The MWF calculation defines the force on each individual load cell.

**If Angle B is below horizontal use + in calculation. If Angle B is above horizontal use - in calculation

Note: Consult CMC for assistance in sizing the load cell to your specific application.

SIZE	L (in.)	D (in.)
UPB1	2.5	0.98
UPB2	4.5	1.25
UPB3	6.5	2.10



INDUSTRIAL PRODUCTS

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 Fax: 216-642-2100

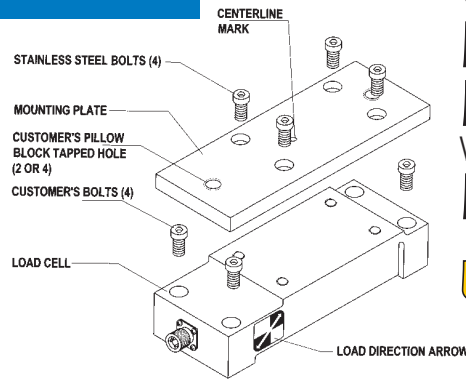
www.clevelandkidder.com

CMC Cleveland
 Motion Controls
 An IMC Company

Procedure for Mounting the UPB Load Cell to the Machine Frame (see picture to right)

Remove the pillow block mounting plate (it is held in place by four stainless steel corner bolts) in order to gain access to the four load cell mounting holes. Drill and tap the machine frame to match the load cell mounting holes.

Note: The UPB must be oriented so that the resultant tension force direction (bisector of the wrap angle) is in the same quadrant as the load direction arrow on the side of the UPB.



Bolt the load cell in place. The UPB load cell is designed so that either imperial or metric mounting bolts can be used when mounting the load cell to the machine frame. Refer to E in the Dimensions Table for the proper bolt size. Before remounting the pillow block mounting plate refer to the procedure below.

Procedure for Mounting the Pillow Block Bearing to the UPB Load Cell (see picture above)

Mounting the pillow block bearing to the UPB is simple and convenient. The UPB is offered with a pillow block mounting plate. The mounting plate is held in place by four stainless steel corner bolts. Remove the mounting plate, then drill and tap it to match the pillow block mounting dimensions. A centerline mark is provided on the mounting plate. The plate is to be drilled and tapped by utilizing this centerline mark to insure that the pillow block bearing is centered on the plate. Remount the plate and bolt the pillow block bearing to it. The mounting plate is 304 Stainless Steel, which is amenable to drilling but offers corrosive and chemical resistance. Refer to J in the Dimensions Table for the maximum bolt diameter recommended for bolting the pillow block bearing to the mounting plate.

HOW TO ORDER

EXAMPLE: If you need to purchase a Transducer, corresponding to the following description:	Use The Following Catalog Numbers:
<ul style="list-style-type: none"> • Size 1 Under Pillow Block Transducer • With Blank mounting plate. • Maximum Working Force (MWF) of 100 lbs. 	Ultra Series Transducer = M846-13523-100 (Refer to Table A)

TABLE A - DETERMINING A CATALOG NUMBER FOR THE ULTRA SERIES UPB LOAD CELL

English Size	Base Part Number	Order Code Suffix, M.W.F					
		-000	-100	-200	-300	-400	-500
UPB1	M846-13523	25 lb.	50 lb.	100 lb.	250 lb.	500 lb.	1000 lb.
UPB2	M846-13510	1000 lb.	2500 lb.	5000 lb.	10000 lb.	20000 lb.	
UPB3	M846-13903	10000 lb.	20000 lb.	30000lb.			
Metric Size	Base Part Number	Order Code Suffix, Metric M.W.F					
		-000	-100	-200	-300	-400	-500
UPB1	M846-13523	110 N	225 N	450 N	1100 N	2250 N	4500 N
UPB2	M846-13510	4500 N	11000 N	22000 N	45000 N	90000 N	
UPB3	M846-13903	45000 N	90000 N	135000 N			

TABLE B - DETERMINING A CABLE CATALOG NUMBER FOR THE ULTRA SERIES UPB LOAD CELL

The load cell end of the cordset is provided with a straight or right angle M12 Quick-Connect Sealed 4-pin keyed Connector as specified. The controller/amplifier end of the cordset is provided with flying leads (4 signal and 1 shield drain). The controller/amplifier end of the cable can be cut to length by the customer if the standard lengths provided are not the exact lengths required.

Cable Length	Part Number - Straight Connector	Part Number - Right Angle Connector
26 Feet (8 meters)	X44-33975-026	X44-33976-026
52 Feet (16 meters)	X44-33975-052	X44-33976-052
78 Feet (24 meters)	X44-33975-078	X44-33976-078
105 Feet (32 meters)	X44-33975-105	X44-33976-105
157 Feet (40 meters)	X44-33975-157	X44-33976-157

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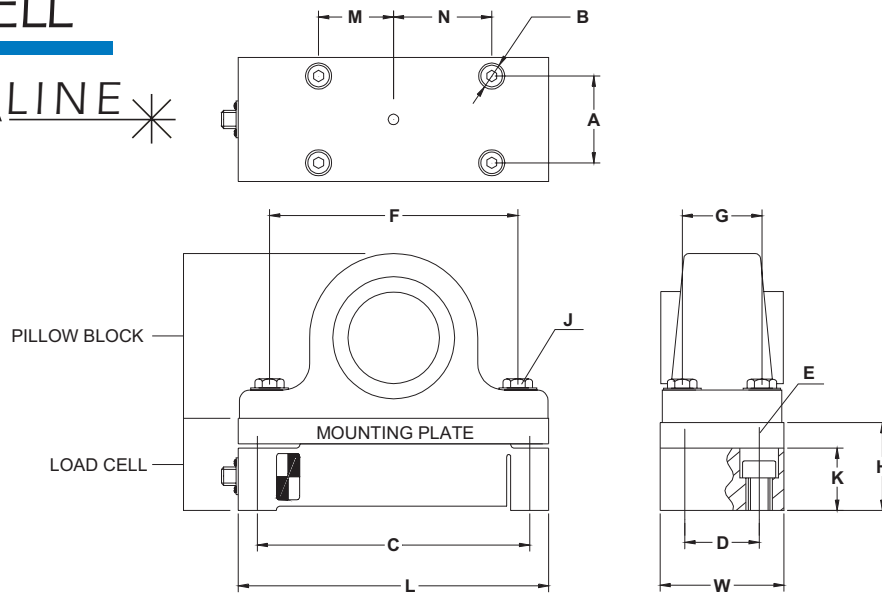


Figure 3 – Mounting Dimensions

Mounting dimensions in Inches:

Designator:	UPB1	UPB2	UPB3
A	1.5	3	4.5
B	0.55	0.80	1.63
C	5.8	10.0	15.0
D	1.5	3.0	4.5
E	5/16 (4)	1/2 (4)	1 (4)
F	5.8 (Max.)	10.0 (Max.)	15.6 (Max.)
G	1.6	3.0	5.0
H	1.95	2.5	4.2
I	-	-	-
J	1/2 (Max.) (2)	3/4 (Max.) (4)	1 1/8 (Max.) (4)
K	1.40	1.71	2.8
L	6.5	11.0	17.0
M	1.3	3.3	4.8
N	2.2	3.95	5.2
O	-	-	-
P	-	-	-
Q	-	-	-
R	-	-	-
S	-	-	-
T	-	-	-
U	-	-	-
V	-	-	-
W	2.2	4.0	6.5
X	-	-	-
Y	-	-	-
Z	-	-	-

Mounting dimensions in Millimeters:

Designator:	UPB1	UPB2	UPB3
A	38	76	114
B	14	20	41.5
C	147.5	254	381
D	38	76	114
E	M8 (4)	M12 (4)	M24 (4)
F	147 (Max.)	254 (Max.)	396 (Max.)
G	40.5	76	127
H	49.5	63.5	106.5
I	-	-	-
J	M12 (Max.) (2)	M20 (Max.) (4)	M30 (Max.) (4)
K	35.5	43.5	71
L	165	279.5	432
M	33	84	122
N	56	100	132
O	-	-	-
P	-	-	-
Q	-	-	-
R	-	-	-
S	-	-	-
T	-	-	-
U	-	-	-
V	-	-	-
W	56	101.5	165
X	-	-	-
Y	-	-	-
Z	-	-	-

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