

MODEL UPBH TRANSDUCER

The UPBH transducer is designed to accurately measure web tension in machines having live-shaft idler rolls. One is placed under the pillow block bearing on each end of the roll shaft. It has no wear points or hinges so it is more reliable and stronger than other UPB transducers. Though designed for live shafts, it can also be used with dead shaft idlers with equal accuracy.

BENEFITS/FEATURES

- Low maintenance design
- Strong parallelogram construction.
- Corrosion-resistant stainless steel and aluminum construction.
- Entire length of top plate is clear for pillow block installation only along center line.
- Can be installed in any orientation.
- 360 degree overload stop.
- Splash resistant.
- Load ratings to 5000 lbs.
- Use with live or dead shaft idler rolls.

OPTIONS

- **Extended Range output (XR).** Produces twice the output signal for a given load rating. Must be used with electronics having extended range option.
- **Environmental Connector (EC).** Prevents liquid from entering transducer through the connector. Especially useful in corrosive environments.
- **Full Bridge (FB).** Four strain gauges in only one transducer instead of two. Wheatstone Bridge configuration. Used only when a single SUPB is used.
- **Permanently Attached Cable (PT).** Permanently attached cable instead of amphenol connector.
- **Permanently Attached Cable with Connector (PTC).**
- **Right Angle Connector (RAB).** Allows electrical connector to plug in at 90° angle.

SPECIFICATIONS

ELECTRICAL:

- Excitation Voltage:** 5 Volts dc (10V with XR option)
Full Scale Output:
 250 mVdc nominal (500mVdc with XR)
Strain Gage Resistance:
 100 ohms nominal (200 ohms, XR)
Non-Repeatability: ± 1/4% full span (FS)
Non-Linearity and Hysteresis Combined: ± 1/2% FS
Temperature Range: -10°F to +200°F (-23°C to +93°C)
Temperature Coefficient:
 0.02% per deg. F typical, 0.01% per deg. C typical
Connector Pin Assignment:
 A = transducer output (WHT). B = + 5V (BLK),
 C = -5V (RED)
Mating Electrical Connector:
 Amphenol MS3106A-10SL-3S

MECHANICAL:

- Materials:** 303/304 stainless steel and aluminum
Top Plate Displacement: 0.010" (0.25 mm)
Load Ratings:
 Size 2: 100, 200, 400, 800, 1200 lbs.
 (450, 900, 1800, 600, 5350 N)
 Size 3: 1000, 2500, 5000 lbs.
 (4450, 11,125, 22,250 N)
Static Overload Capacity:
 Size 2: 2000 lbs. (8900 N)
 Size 3: 8000 lbs. (35,584 N)
Load Direction: parallel to top plate
Weight:
 Size 2: 7 lbs. (3 Kg)
 Size 3: 42 lbs. (19 Kg.)

PRODUCT CODE

You may order by description or by indicating your feature choices in place of the X's in the product code shown below.

Example: UPBH2-200-S-XR, EC

UPBH X - X - X - OPTIONS (Separated by commas)
 | | | |

SIZE	LOAD RATING	CONNECTOR POSITION	OPTIONS
2	100 ⁽¹⁾	S = Standard	D&T = Drill & Tap
3	200 ⁽¹⁾	O = Optional	EC = Environmental Connector
	400 ⁽¹⁾		FB = Full Bridge
	800 ⁽¹⁾		PT = Permanently Attached Cable
	1000 ⁽²⁾		PTC = Permanently Attached Cable with connector
	1200 ⁽¹⁾		RAB = Right Angle Connector Block
	2500 ⁽²⁾		XR = Extended Range ⁽³⁾
	5000 ⁽²⁾		Z = Special (SPR)

NOTES: 1. Size 2 only 2. Size 3 only 3. Electronics must have XRE option

BEARING RECOMMENDATION

The UPBH transducer will perform best if the proper bearings are used. First, the bearings should have self-aligning capability. This will eliminate stresses on the top plate caused by roll deflection, misalignment and uneven mounting surfaces. Second, one of the bearings should be able to "float" (move axially a small amount) to compensate for roll/shaft expansion caused by heat. The other bearing should not float.

SELECTION OF LOAD RATING

The Model UPBH Transducer is available in several standard load ratings, ranging from 100 lbs. (450 N) to 5000 lbs. (22250 N). The correct rating for any particular application depends on web tension, transducer roll weight, wrap angle and the direction of the tension force. Select the appropriate wrap configuration from the sketches below and apply the formula below the sketch.

- The Model UPBH transducer is sensitive to forces **parallel** to its top plate.
- Angle "D" should be as small as possible. Output will rapidly drop as D gets larger. Do not exceed 45E.
- If A = 0, idler weight will not produce any output signal.

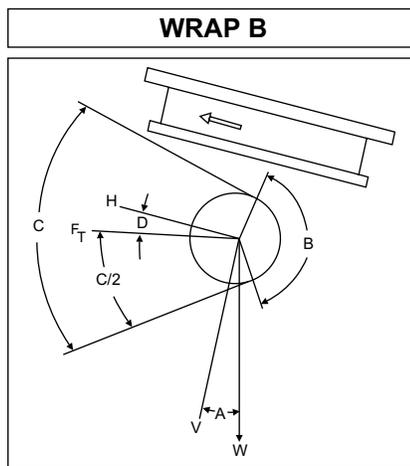
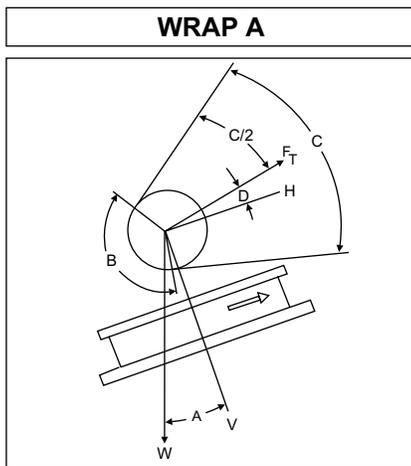
Use the chart at bottom of page to select the correct load rating. In some cases, the load rating may be LESS than the computed Net Force. This is acceptable because the Net Force formula contains an oversizing factor of 2. Sometimes the weight of a transducer roll uses up most of the operating range of the transducers. When this happens,

it may not be possible to adjust the tension indicating meter to read zero when tension is zero because the adjustment range of the electronic circuit has been exceeded. If the effective roll weight, represented by the "WSIN(A)" term in the formulae below, is more than 95% of the load rating chosen, the tension meter will probably not be adjustable to zero. If this is the case, one or more of the following changes must be made to reduce WSIN(A).

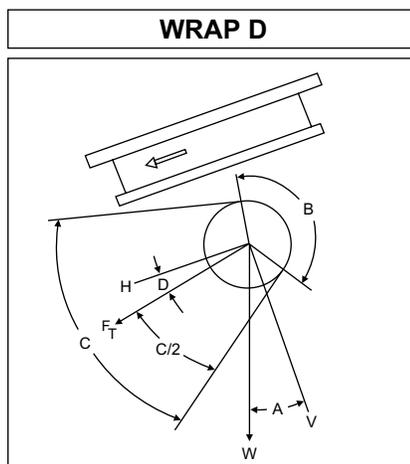
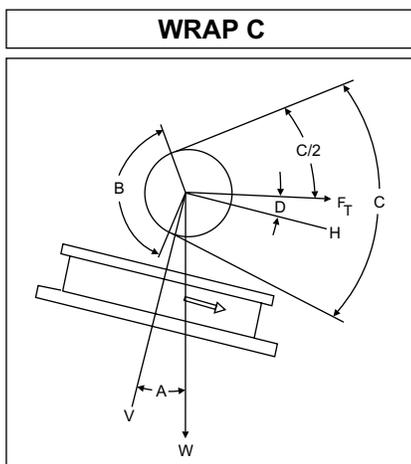
- Reduce the transducer roll weight.
- Decrease angle (A).
- Use the next higher load rating. (This is the least desirable choice because it reduces the transducer output signal).

Recommended Roll Weight Maximums:

100 lbs load rating: 400 lbs max roll weight
 200 to 400 lbs load rating: 100 lbs max roll weight
 800 to 1200 lbs load rating: 2500 lbs max roll weight



$$\text{Net Force} = \frac{4T \sin\left(\frac{B}{2}\right) \cos(D) - W \sin(A)}{2}$$



$$\text{Net Force} = \frac{4T \sin\left(\frac{B}{2}\right) \cos(D) + W \sin(A)}{2}$$

FT = force due to tension

W = idler Roll weight

B = wrap angle = 180° - C

A = angle between line "v" and vertical

D = angle between top plate and direction of force

Line "H" is parallel to top plate

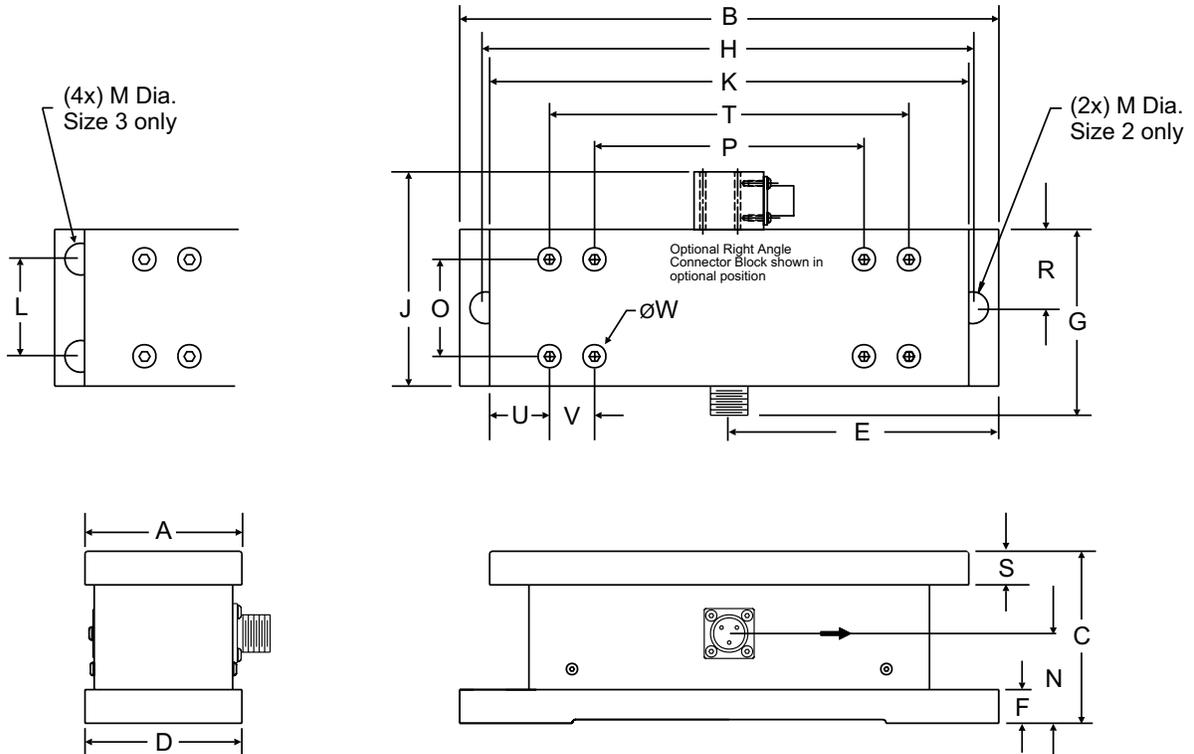
Line "V" is perpendicular to top plate

Angle (Degrees)	SINE	COSINE
0	.000	1.000
5	.087	.996
10	.174	.985
15	.259	.966
20	.342	.940
25	.423	.906
30	.500	.866
35	.574	.819
40	.643	.766
45	.707	.707
50	.766	.643
55	.819	.574
60	.866	.500
65	.906	.423
70	.940	.342
75	.966	.259
80	.985	.174
85	.996	.087
90	1.000	.000

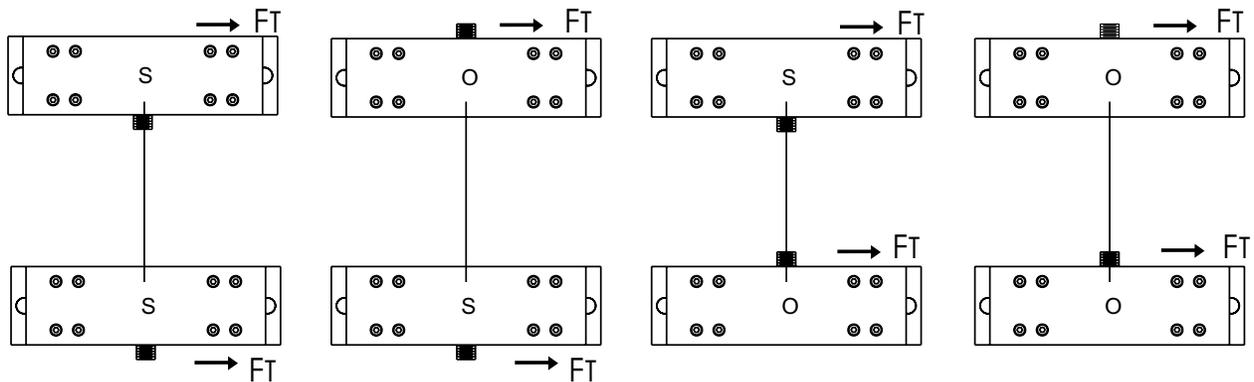
Size	Net Force (lb.)	Load Rating
2	up to 120	100 lbs (450 N)
	121 - 240	200 lbs (900 N)
	241 - 480	400 lbs (1800 N)
	481 - 960	800 lbs (3500 N)
	721 - 1440	1200 lbs (5350 N)
3	up to - 1200	1000 lbs (4450 N)
	1201 - 3000	2500 lbs (11125 N)
	3001 - 6000	5000 lbs (22250 N)

DIMENSIONS

SIZE		A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	R	S	T	U	V	W
2	in	2.62	9.00	2.88	2.62	4.50	0.56	3.12	8.00	3.59	8.00	---	0.53	1.50	1.62	4.50	1.31	0.56	6.00	1.00	0.75	0.38
	mm	67	229	73	67	114	14	79	203	91	203	---	13	38	41	114	33	14	152	25	19	10
3	in	4.50	13.50	4.61	4.12	6.75	0.94	4.92	12.25	5.51	11.00	2.75	0.53	2.15	2.60	7.37	---	0.94	9.60	0.70	1.13	0.56
	mm	114	343	117	105	171	24	125	311	140	279	70	14	55	66	187	---	24	244	18	29	14



Examples of Connector Configurations:



"S" DENOTES **STANDARD** CONNECTOR POSITION
 "O" DENOTES **OPTIONAL** CONNECTOR POSITION

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