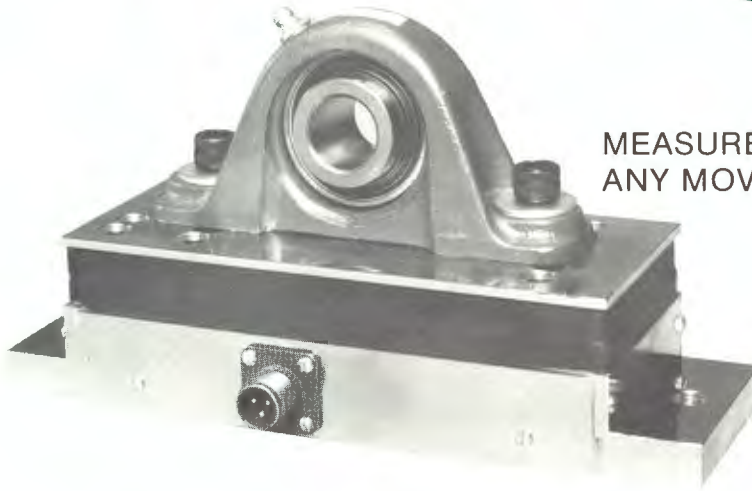


# DFE DATA SHEET

## 8401UPB



MEASURES TENSION IN  
ANY MOVING WEB

## MODEL UPB TENSION TRANSDUCERS

### DESCRIPTION

The Model UPB (Under Pillow Block) transducers are heavy duty devices for installation on machines using idler rolls with rotating shafts. A standard pillow block bearing is bolted to the top plate and the idler roll shaft inserted in the bearings. Non-rotating shafts may also be used if desired. A removable adapter plate is bolted to the top of the transducer and must be drilled and tapped to fit the pillow block bearing. Drilling may be done by DFE or the user. The adapter plate eliminates the necessity of building each transducer to order and drastically reduces delivery time and spare stock requirements.

Two semiconductor strain gages are installed on a cantilever beam inside the transducer. The beam bends a small amount as web tension is applied, and produces an electrical signal which is directly proportional to tension. The signal is large so noise immunity is very good. Beam movement is negligible and does not affect the web. Built-in stops limit beam deflection and allow high overloads without damage.

The UPB is used in pairs, one on each edge of the web, so lateral web position does not affect tension measurement accuracy. The transducer can be mounted in any orientation, even upside down if overhead installation is desired. It is used on any continuous process machine such as printing

presses, sheeters, coaters, laminators, slitters, winders and any other machine running a web of any width. The UPB transducer is used with any DFE tension controller or indicator to control or display rewind, unwind or intermediate tension.

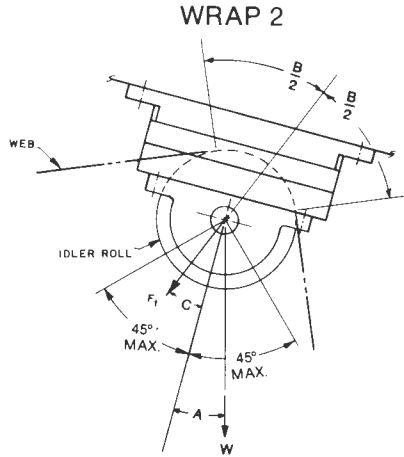
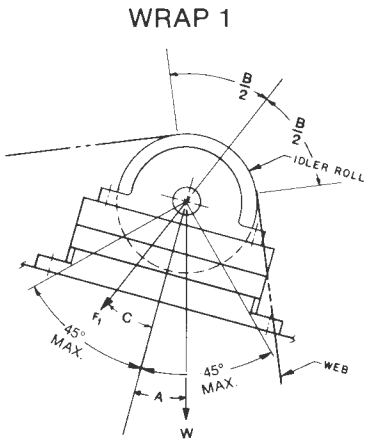
### SPECIFICATIONS

- Load ratings Size 5—100, 250, 500, 1000 pounds  
Size 10—1000, 2500, 5000 pounds
- Excitation ..... 5 volts, D.C.
- Output ..... 250 millivolts, nominal
- Gage resistance ..... 100 ohms, nominal
- Deflection ..... .005" to .010" typical
- Linearity and hysteresis combined .....  $\pm 0.5\%$
- Repeatability .....  $\pm 0.2\%$
- Temperature Range .....  $-10^{\circ}$  to  $+150^{\circ}$  F
- Temperature Coefficient .. 0.02% per  $^{\circ}$  F typical
- Connector is Amphenol MS3102A-10SL-3P
- Connector Pin Designations
  - Pin A ..... Output Signal
  - Pin B ..... Tension Gage
  - Pin C ..... Compression Gage
- Dust and Splash guarded
- Finish ..... Nickel plated
- Ultimate strength (all load ratings)
  - Size 5 ..... 3,000 lbs. minimum
  - Size 10 ..... 15,000 lbs. minimum

## DOVER FLEXO ELECTRONICS, INC.

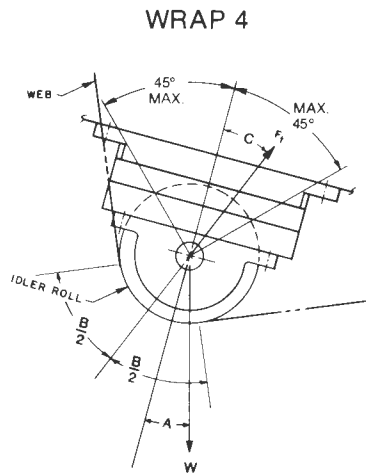
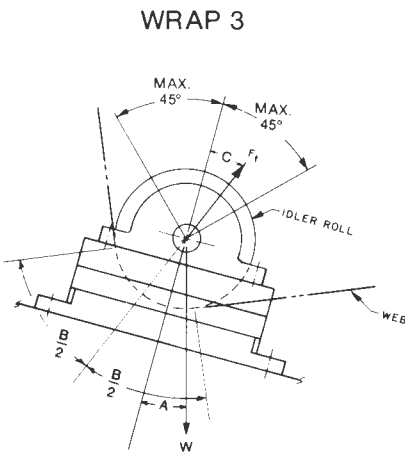
93 Pickering Road, Rochester, N.H. 03867 (603) 332-6150 Telex 944351

# SELECTION OF LOAD RATING



- T = TOTAL MAXIMUM TENSION
- W = WEIGHT OF IDLER ROLL
- B = WRAP ANGLE
- F<sub>T</sub> = RESULTANT FORCE DUE TO TENSION
- C = ANGLE BETWEEN DIRECTION OF RESULTANT FORCE AND DIRECTION PERPENDICULAR TO TRANSDUCER TOP PLATE
- A = ANGLE BETWEEN VERTICAL DIRECTION AND DIRECTION PERPENDICULAR TO TRANSDUCER TOP PLATE
- L = LOAD RATING

A.  $L = 2T \sin\left(\frac{B}{2}\right) \cos(C) + \frac{W}{2} \cos(A)$



Angle (Degrees)	SINE	COSINE
0	0.00	1.00
5	0.087	0.996
10	0.174	0.985
15	0.259	0.966
20	0.342	0.940
25	0.423	0.906
30	0.500	0.866
35	0.574	0.819
40	0.643	0.767
45	0.707	0.707
50	0.767	0.643
55	0.819	0.574
60	0.866	0.500
65	0.906	0.423
70	0.940	0.342
75	0.966	0.259
80	0.985	0.174
85	0.996	0.087
90	1.000	0.000

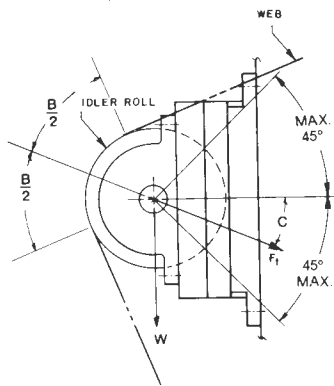
Notes: 1. Angle "C" must not exceed 45°.

B.  $L = 2T \sin\left(\frac{B}{2}\right) \cos(C) - \frac{W}{2} \cos(A)$

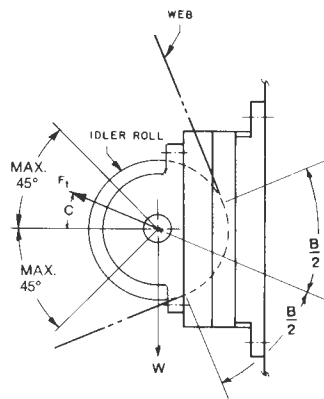
- 2. Wraps 2, 3 and 6 will produce an output signal which is opposite in polarity from normal. The transducer signal leads must be reversed at the controller or indicator terminal strip so the tension meter will read up-scale. **DO NOT REVERSE THE METER CONNECTIONS.**

- 3. If the  $\frac{W}{2} \cos(A)$  term in equations A or B exceeds 50% of the transducer load rating, use the next larger size transducer.

WRAP 5



WRAP 6



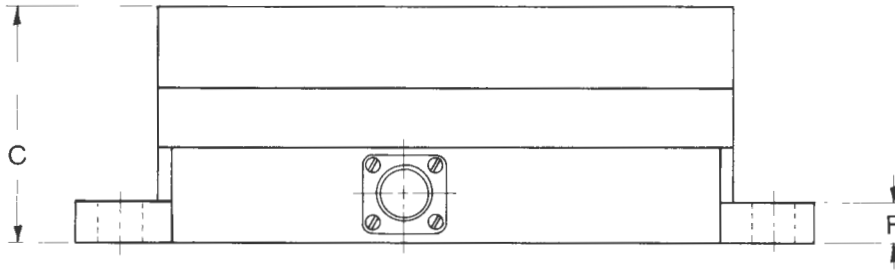
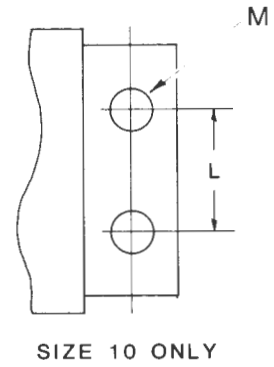
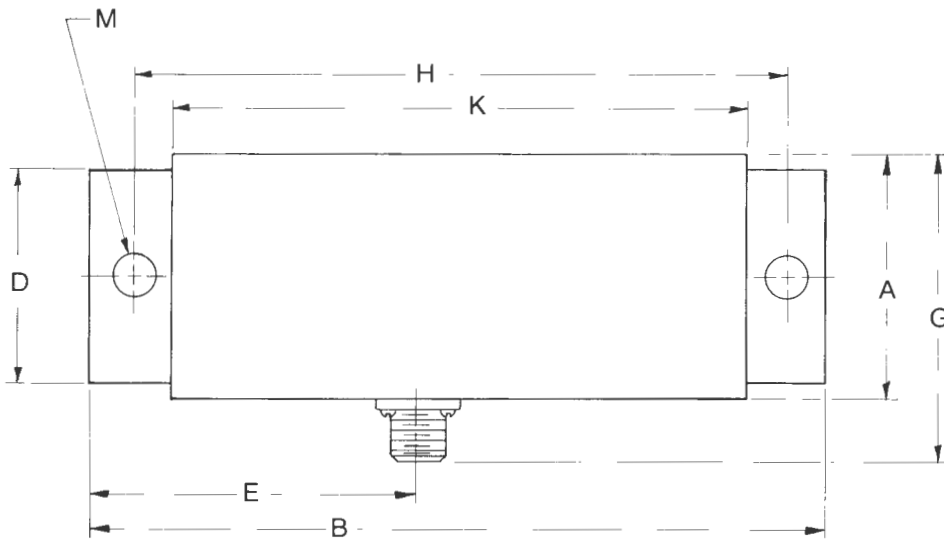
C.  $L = 2T \sin\left(\frac{B}{2}\right) \cos(C)$

## STANDARD LOAD RATINGS

- Size 5 ..... 100, 250, 500, 1000 lbs.
- Size 10 ..... 1000, 2500, 5000 lbs.

# DIMENSIONS

(Expressed in inches)



SIZE	A	B	C	D	E	F	G	H	K	L	M
5	3	9	2.87	2.62	4	0.5	3.75	8	7	—	.531 (2)
10	4.5	13.5	4.75	4.12	6.25	0.75	5.25	12.25	11	2.75	.531 (4)

**DOVER FLEKO ELECTRONICS MANUFACTURES:** Tension Transducers, Tension Indicators, Rewind Tension Controllers, Unwind Tension Controllers for electric brakes and clutches, D.C. Motor Tension Controllers, Pneumatic Tension Controllers, and D.C. Motor Drives.

## IF YOU WANT TO CONTROL TENSION YOU HAVE TO MEASURE IT FIRST!

Dover Flexo Electronics measures web tension with patented strain gauge transducers. The transducer output is displayed on a large meter, calibrated in pounds. The machine operator adjusts web tension by turning the tension-set knob until the meter indicates the desired tension and the controller maintains that tension automatically, regardless of speed or diameter changes.

## TO COMPETE IN TODAY'S MARKET PRODUCTIVITY MUST BE INCREASED, WASTE REDUCED AND QUALITY MAINTAINED

DFE's precision automatic tension control and indication systems improve registration and allow faster web speeds. Re-wound rolls have better profiles and go through subsequent operations with less trouble. Automatic control produces smoother tension and eliminates the human factor from the quality control equation. Because web tension is displayed on a large meter, it is easy to consistently run the correct tension roll after roll, job after job.

## DFE OFFERS UNWIND, REWIND CONTROLS WITH A DIFFERENCE

And that difference is our commitment to our customers. Because we began as a service company, we have a unique knowledge not only of the product, but of the market's requirements for accuracy and dependability. DFE continues to develop and manufacture web tension controls to meet the demands of our customers. Several new models are currently under development in response to demand. But, unlike other companies with a large and varied range of products, DFE specializes in a single group of products, and we feel that it shows. We pride ourselves on producing the most reliable web tension controls available. But more than that, we make equipment that is easy to troubleshoot, economical to operate and flexible. Of course, DFE engineers are always available to consult on specific problems or installations. The DFE difference translates into increased productivity for your company. Call us and experience the difference.