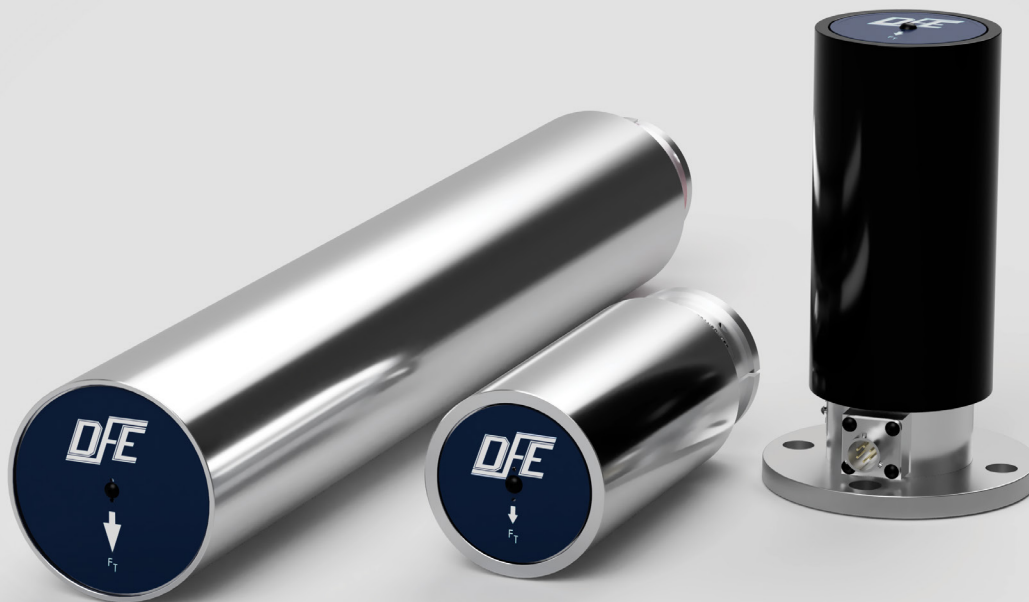




### MODEL **NW** SERIES NARROW WEB TENSION TRANSDUCER



Constructed of stainless steel and aluminum for excellent corrosion resistance, the Narrow Web Transducer can be used as the sensing mechanism in a web tension control or display system for continuous label, tag or tape processes.

The NW transducer mounts cantilevered on a single-sided machine frame. Precision-balanced load cells fixed internally at each end of the idler roll deliver a highly accurate tension measurement. The dead shaft core and distributed load cell deflection of the NW transducer design delivers exceptional web tracking performance.

By summing the dual load cell outputs together, tension can be measured accurately regardless of the web position on the roll face.

Alternatively, in combination with a TriView™ LRT tension display indicator, the NW transducer can report independent web edge tension characteristics, if needed.

The Narrow Web transducer is available in three roll diameters: 2.25" (57 mm), 3" (76 mm) and 3.5" (89 mm) and in standard lengths up to 20". Custom lengths up to 26" are also available (load ratings should be pre-qualified with a DFE sales engineer prior to ordering).

An optional LED display indicator mounted in the end of the roll is available on 3.5" diameter Narrow Web transducers with a roll face at least 8 inches long. The (IND) option also includes a tension amplifier capable of supplying a 0-10 VDC output to a drive or PLC.

## FEATURES & BENEFITS

- 5 year tension-free warranty
- Measures accurate tension regardless of web tracking
- Each side of a web can be measured independently (requires an LRT tension indicator)
- Promotes improved product quality and less waste
- Does not affect the web – no steering effect, web breakage or length change
- Idler roll is included, nothing else to buy
- Highly accurate and reliable semiconductor strain gage technology
- Easy to install
- Optional digital LED display indicator in the end of the roll (3.5" diameter only)
- Optional hard coat anodize roll finish
- Optional stainless steel roll shell
- Custom roll coatings and finishes available

## OPTIONS

**Extended Range (XR)** - Increased sensitivity when used with legacy amplifiers and indicators such as the TI14, TI15, TI17, TI18, TI23 & TI24.

**Hard Coat (HC/HCN)** - Hard coat anodized roll finish.

**Indicator Option (IND)** - Tension display in end of roll. Requires 24 VDC power for included TI26 amplifier module. Includes a standard 5 ft long transducer cable. This option is only available on the NW2 (3.5" diameter) without the Extended Range (XR) option.

**Metric Mount Stud (MMS)** - Metric mounting screw for S type transducer.

**Mounting Spacer (MS)** - Spacer to duplicate 2.50" mounting dimension of previous model NWI transducer (size 2 only).

**Non-Lubricated Bearings (NLB)** - No lubrication for bearings. For lowest drag torque. Voids warranty.

**Oiled Bearings (OB)** - Uses oil instead of grease for lubrication. For low drag torque. Voids warranty.

**Steel Roll (SR)** - Roll is made of steel.

**Stainless Steel Roll (SSR)** - Roll is made of stainless steel.

## ORDERING INFORMATION

You may order by description or by specifying the code below by matching each labeled digit with your choice.

**Example: NW1S-10-25-6-HC,XR**

NW X                      X                      -                      X                      -                      X                      -                      X                      -                      OPTIONS (Separated by Commas)

SIZE	MOUNTING STYLE	ROLL WIDTH	LOAD RATING	CONNECTOR POSITION	OPTIONS
0	S = Screw / Bolt	6 (152) <sup>3</sup>	12 lbs (53 N) <sup>11</sup>	3 (3:00)	25CW = 25% Calibration Weight Ratio <sup>6</sup>
1	FL = Flange	7 (178) <sup>8</sup>	25 lbs (111 N)	6 (6:00) Std.	DRC = Din Rail Clip
2		8 (203)	50 lbs (222 N)	9 (9:00)	HC = Black Hard Coat Anodized
		10 (254)	100 lbs (445 N)	12 (12:00)	HCN = Natural Hard Coat Anodized
		12 (305)	150 lbs (670 N) <sup>9</sup>	Rear <sup>5</sup>	IND = Built-In Tension Display Indicator
		14 (356)	200 lbs (900 N) <sup>10</sup>		MMS = Metric Mounting Stud
		16 (406)	400 lbs (1800 N) <sup>10</sup>		MS = Mounting Spacer
		18 (457) <sup>4</sup>			NLB = Non-Lubricated Bearings
		20 (508) <sup>4</sup>			OB = Oiled Bearings
		Specify <sup>1</sup>			SR = Steel Roll
					SSR = Stainless Steel Roll
					XR = Extended Range
					Z = Special (SPR)

**NOTES:** 1. Extra cost for non-standard widths. 2. XR option requires electronics to have XRE option. **NOTE:** The XR option is not available with the IND option. 3. Sizes 0, 1 only. 4. Size 2 only. 5. Flange mounting style only. 6. Only used on the IND option, amplifier cal ratio set to 25%. 7. Cannot be used with rear connector. 8. IND option not available on 7" roll. 9. For Size 0 or 1 with 8" or less roll width. 10. For Size 2 with 8" or less roll width. 11. 12 lb load rating only available on Size 0 and Size 1.

## SPECIFICATIONS

### ELECTRICAL

**Excitation:** 5 VDC, (10 VDC with XR option)

**Output:** 500 mVDC, nominal (1 VDC with XR option)

**Gage Resistance:** Half bridge at each end of idler roll.  
100 Ohms ( $\pm 20$  ohms), nominal, each gage.

**Non-Repeatability:**  $\pm 1/4\%$  FS, typical

**Combined Non-Linearity and Hysteresis:**  $\pm 1/2\%$  FS

**Temperature Range:**  $-10^{\circ}\text{F}$  to  $200^{\circ}\text{F}$  ( $-23^{\circ}\text{C}$  to  $93^{\circ}\text{C}$ ),

**IND Option:**  $40^{\circ}\text{F}$  to  $104^{\circ}\text{F}$  ( $4^{\circ}\text{C}$  to  $40^{\circ}\text{C}$ )

**Temperature Coefficient:** 0.02% per  $^{\circ}\text{F}$ , typical  
(0.036% per  $^{\circ}\text{C}$ )

**Mating Electrical Connector:** ITT Cannon KPT06F10-6S

**Electrical Connector Position:** Connector position is shown by looking at end of roll. Standard is 6 o'clock, same as load direction. Others are 12:00 and Rear (Rear connector position is for flange mounting style only).

**CE-marked:** When used as an accessory with an approved device such as the TA1, TA500 or 1100TV.

### MECHANICAL

**Deflection of Sensor Beam:** 0.016 inch max (0.41mm)

**Load Ratings:** 12, 25, 50, 100, 150, 200, 400 lbs  
(53, 111, 222, 445, 670, 900, 1800 N)

**Overload Rating:** Size 0 and 1 = 500 lbs (2225 N),  
Size 2 = 1000 lbs (4449 N) minimum, in load direction, without damage.

**Standard Roll Widths:** 6, 7, 8, 10, 12, 14, 16, 18, 20 inches  
(152, 178, 203, 254, 305, 356, 406, 457, 508 mm).

6" long roll available only on Size 0 and 1.

18", and 20" long rolls available only on Size 2.

**Orientation:** The transducer may be installed in any position (IND option may be rotated to compensate).

**Roll:** Material = 6061 Aluminum, Balance = quality grade G2.5 per ISO 1940/1-1986/E & ANSI S2.19-1989, Finish =  $16\mu$  inch or better.

**Shaft and Shaft Housing:** Stainless steel shaft and aluminum housing.

## SELECTION OF LOAD RATING

The Model NW Transducer is available with four standard load ratings. The correct transducer load rating for your application is determined by maximum web tension, wrap angle, and roll weight. Choose the appropriate wrap configuration from the diagrams below. Then compute the Net Force using the formula below the diagram. (The direction of the tension force determines which diagram and formula to use). 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, which means that the actual force exerted on the transducer will not exceed its rating.

**The following applies only to steel, and stainless steel rolls and rolls in excess of 20 inches (508 mm) in width:**

Sometimes a roll is so heavy that its weight uses up

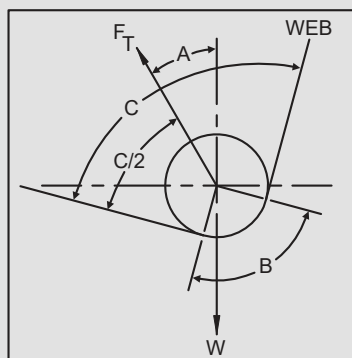
most of the operating range of the transducer. When this happens it may not be possible to adjust the tension indicating meter to read zero when tension is zero because the adjustment range of the electronic circuit has been exceeded. To find out if the roll is too heavy, compare the load rating with the effective weight of the roll as follows: The effective roll weight is the "W COS(A)" term in the formula. If W COS (A) 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 W COS(A) to less than 95% of the load rating:

1. Increase angle (A).
2. Use the next higher load rating (this is the least desirable choice because it reduces transducer signal output).

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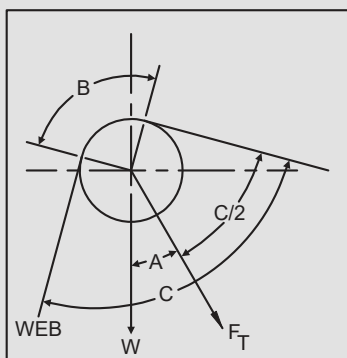
## SELECTION OF LOAD RATING (CONTINUED)

WRAP 1

Tension Force ( $F_T$ ) **Above** Horizontal

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

WRAP 2

Tension Force ( $F_T$ ) **Below** Horizontal

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

**W** = Idler Roll Weight (See Note 1) **T** = Maximum Web Tension**B** = Wrap Angle =  $180^\circ - C^\circ$  **A** = Angle Between Tension Force ( $F_T$ ) and Vertical

TABLE 1

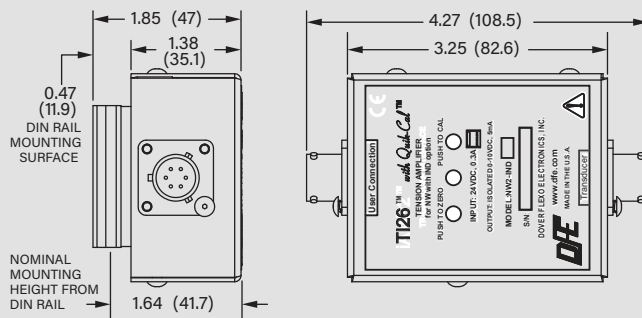
ANGLE	SINE	COSINE
0°	0.000	1.000
5°	0.087	0.996
10°	0.174	0.985
15°	0.259	0.966
20°	0.342	0.940
25°	0.423	0.906
30°	0.500	0.866
35°	0.574	0.819
40°	0.643	0.766
45°	0.707	0.707
50°	0.766	0.643
55°	0.819	0.574
60°	0.866	0.500
65°	0.906	0.423
70°	0.940	0.342
75°	0.966	0.259
80°	0.985	0.174
85°	0.996	0.087
90°	1.000	0.000

**Note 1:** Add weight of roll shell to bearing assembly weight. See chart below.

Roll Weights (Aluminum)		6"	7"	8"	10"	12"	14"	16"	18"	20"	Bearing Assembly
NW0	lbs	0.84	.....	1.15	1.45	1.76	2.06	2.37	.....	.....	0.25 0.11
	kg	0.38	.....	0.52	0.66	0.80	0.94	1.08	.....	.....	
NW1	lbs	1.63	1.93	2.23	2.83	3.43	4.03	4.64	.....	.....	1.0 0.45
	kg	0.74	0.87	1.01	1.28	1.56	1.83	2.10	.....	.....	
NW2	lbs	.....	1.3	1.6	2.2	2.6	3.1	3.5	4.0	4.4	1.7 0.77
	kg	.....	0.59	0.73	1.0	1.18	1.41	1.59	1.82	2.0	

## DIMENSIONS

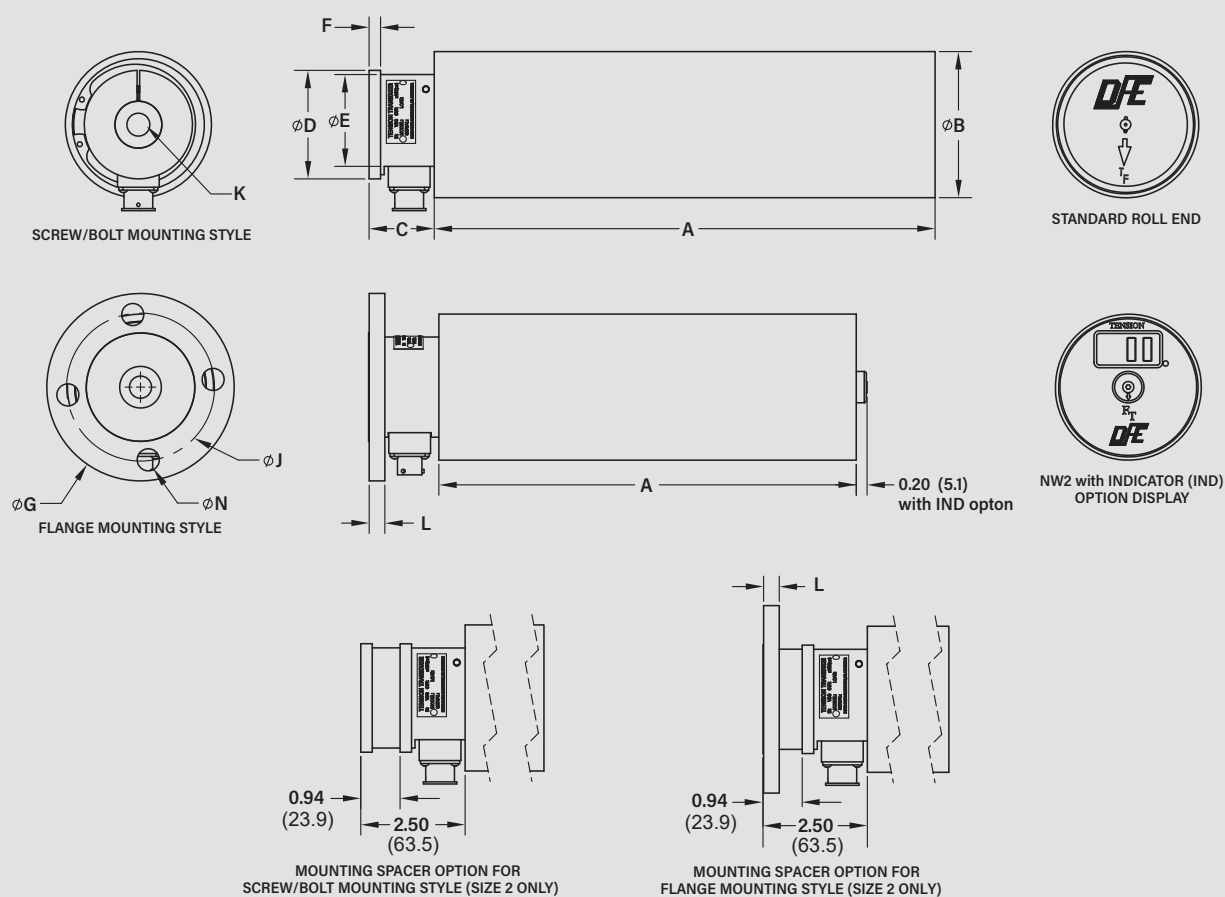
## TI26 AMPLIFIER MODULE FOR BUILT-IN INDICATOR OPTION



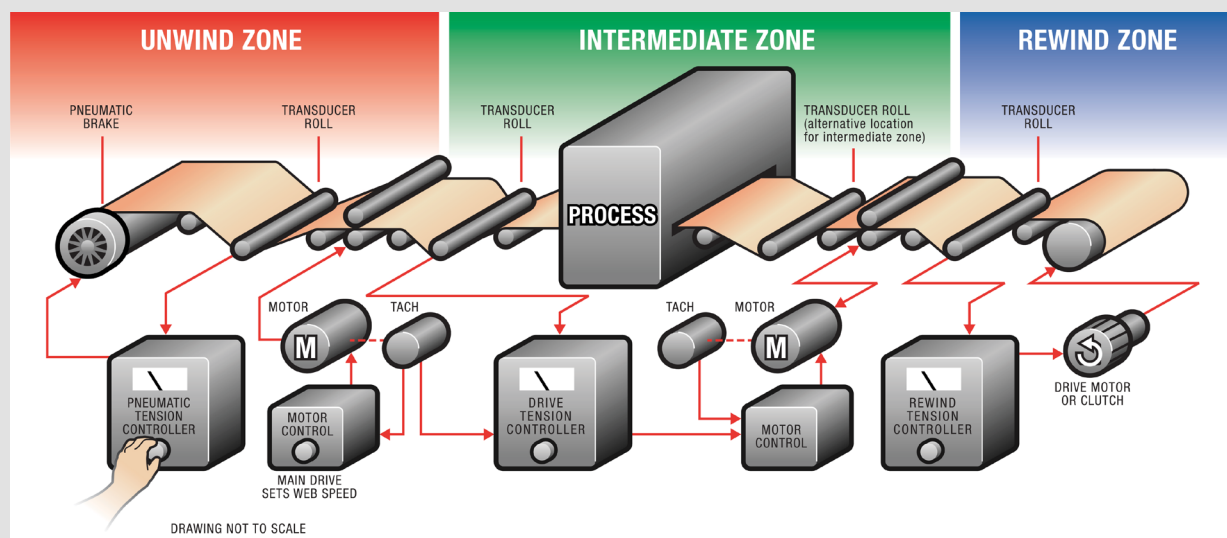
Shown with DIN Rail Clip option. Power input is 24 VDC.

# DIMENSIONS (CONTINUED)

		A	B	C	D	E	F	G	J	K	L	N
NW0	IN	6-16	2.25	1.56	1.80	1.67	0.24	3.12	2.50	1/2-13	0.38	0.34
	MM	152/406	57.2	39.6	45.7	42.4	6.1	79.2	63.5	M12	9.7	8.64
NW1	IN	6-16	3.00	1.56	2.60	2.40	0.28	4.49	3.50	1/2-13	0.38	0.53
	MM	152/406	76.2	39.6	66.0	61.0	7.1	114	88.9	M12	9.7	13.5
NW2	IN	7-20	3.50	1.56	2.60	2.40	0.28	4.49	3.50	5/8-11	0.38	0.53
	MM	178/508	88.4	39.6	66	62.0	7.1	114	88.9	M16	9.7	13.5



## TENSION ZONE DIAGRAM



## REPLACEMENT PARTS & ACCESSORIES

To complement DFE's **5 Year Warranty**, responsive Technical Support and the rest of our tension-free customer care program, you will find just what you need when it comes to spare parts and accessories. These items are listed in the instruction manuals for your Dover Flexo Electronics products. Order replacement parts quickly, simply and securely by calling or e-mailing our sales department.

- Budget-friendly repair services available
- Tension transducer interface cables
- Spare option boards and plug-in circuit cards
- Analog and digital tension meters
- Brake accessories, actuator assemblies and friction pads
- Fast turnaround
- Reasonable prices
- All major credit cards accepted

## TYPICAL RUNNING TENSIONS OF COMMON WEB MATERIALS

Material Paperboard	English		Metric		Material	English		Metric	Material	English		Metric		
	Weight (points)	Tension (lbs/lin. inch)	Weight (g/m²)	Tension (kg/cm)		Tension (lbs/in/mil)	Tension (kg/cm/mm)			Copper Wire (15,000 psi)	Tension (lbs)		Tension (kg)	
Paper (based on 3,000 sq. foot ream)	8	3.0	105	0.54	Aluminum Foils	0.5	3.52	#16 (.051 inches)	30.00	13.6				
	12	4.0	157	0.72	Cellophanes	0.75	5.27	#20 (.032 inches)	12.00	5.5				
	15	4.5	196	0.90	Acetate	0.5	3.52	#24 (.020 inches)	4.50	2.0				
	20	5.5	260	1.26	Myler (Polyester)	0.75	5.27	#28 (.013 inches)	1.75	0.79				
	25	6.5	326	1.62	Polyethylene	0.25	1.76	#30 (.010 inches)	1.25	0.57				
	30	8.0	391	1.98	Polypropylene	0.25	1.76	#34 (.006 inches)	0.50	0.23				
					Polystyrene	1.0	7.03	#36 (.005 inches)	0.25	0.11				
	15	0.40	25	0.135	Saran	0.15	1.05	#40 (.003 inches)	0.10	0.045				
	20	0.50	30	0.180	Vinyl	0.25	1.76	Run aluminum wire at ½ - 2/3 these values. 15,000 psi = 103.42 MPa 1 mil = 25.4 microns = 0.0254 mm						
	30	0.75	50	0.270	Nylon	0.25	1.76							
	40	1.25	65	0.360	Wax Paper	1.0	7.03							
	60	2.00	100	0.540	For laminated webs sum the tensions for the individual webs and add 0.1 lb/in. (0.018 kg/cm) of width.									
	80	3.00	130	0.720										