



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 accurately regardless of web position
- 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 (3.50" diameter only)
- Optional hard coat anodize roll finish
- Optional steel or stainless steel roll shell
- Custom roll coatings and finishes available

OPTIONS

Black Hard Coat Anodized Roll Finish (HC) - Hard coat anodized roll finish with black dye.

Natural Hard Coat Anodized Roll Finish (HCN) - Dye-free hard coat anodized roll finish.

Indicator Option (IND) - Tension display in end of roll. This option is only available on the NW2.

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

Mounting Spacer (MS) - Spacer to duplicate 2.50" mounting dimension of previous model NW1 transducer (only fits NW2 with 3.50" diameter).

Oiled Bearings (OB) - Oil instead of grease for lowest break-away torque. Voids warranty.

Steel Roll (SR) - 1020 series carbon steel roll shell.

Stainless Steel Roll (SSR) - 304 stainless steel roll shell.

ORDERING INFORMATION

You may order by description or by specifying the code below by matching each parameter 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 ⁷	6 (152) ³	12 lbs (53 N) ¹¹	3 (3:00)	25CW = 25% Calibration Weight Ratio ⁶ DRC = Din Rail Clip HC = Black Hard Coat Anodized HCN = Natural Hard Coat Anodized IND = Built-In Tension Display Indicator MMS = Metric Mounting Stud MS = Mounting Spacer OB = Oiled Bearings SR = Steel Roll SSR = Stainless Steel Roll XR = Extended Range ² Z = Special (SPR)
1	FL = Flange	7 (178) ⁸	25 lbs (111 N)	6 (6:00) Std.	
2		8 (203)	50 lbs (222 N)	9 (9:00)	
		10 (254)	100 lbs (445 N)	12 (12:00)	
		12 (305)	150 lbs (670 N) ⁹	Rear ⁵	
		14 (356)	200 lbs (900 N) ¹⁰		
		16 (406)	400 lbs (1800 N) ¹⁰		
		18 (457) ⁴			
		20 (508) ⁴			
		Specify ¹			

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 Max (10 VDC Max w/XR Option)

Output: 100 mV/V, Nominal

Strain Gages: Semiconductor, 100 Ohms, Nominal

Non-Repeatability: $\pm 1/4\%$ Full Span

Combined Non-Linearity and Hysteresis: $\pm 1/2\%$ Full Span

Temperature Range: -10°F to 200°F (-23°C to 93°C)

IND Option: 40°F to 104°F (4°C to 40°C)

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

Mating Electrical Connector: (DFE P/N) 106-0050

Electrical Connector Position: Connector position is selected by looking at end of roll. Standard is 6:00, the same as the load direction. 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 0/1 = 500 lbs (2225 N),
Size 2 = 1000 lbs (4449 N) minimum, in load direction, without damage.

Roll Widths: 6, 7, 8, 10, 12, 14, 16, 18, 20 inches
(152, 178, 203, 254, 305, 356, 406, 457, 508 mm)
6 inch long roll available only on Size 0 and 1.
18 and 20 inch long rolls available only on Size 2.

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

Roll Spec: 6061 aluminum, 1020 series steel or 304 stainless steel; Balanced to G2.5 per ISO 1940 and ANSI S2.19-1989.

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:

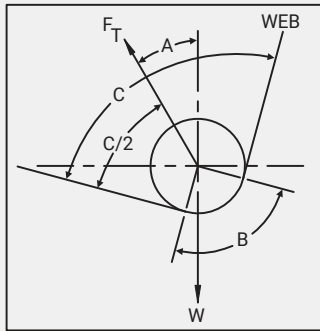
1. Increase angle (A).
2. Use the next higher load rating (this is the least desirable choice because it reduces transducer signal output).

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SELECTION OF LOAD RATING (CONTINUED)

WRAP 1

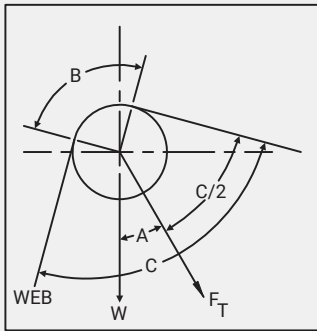
Tension Force (F_T) **Above** Horizontal



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

WRAP 2

Tension Force (F_T) **Below** Horizontal



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

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

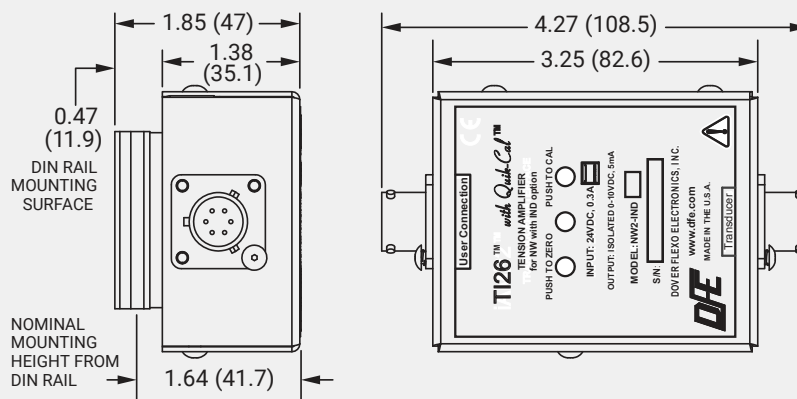
W = Idler Roll Weight, **T** = Maximum Web Tension, **B** = Wrap Angle = 180° - C°, **A** = Angle Between Tension Force (F_T) and Vertical

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 <i>0.11</i>
	kg	<i>0.38</i>	.....	<i>0.52</i>	<i>0.66</i>	<i>0.80</i>	<i>0.94</i>	<i>1.08</i>	.....	.....
NW1	lbs	1.63	1.93	2.23	2.83	3.43	4.03	4.64	.....	.....	1.0 <i>0.45</i>
	kg	<i>0.74</i>	<i>0.87</i>	<i>1.01</i>	<i>1.28</i>	<i>1.56</i>	<i>1.83</i>	<i>2.10</i>	.....	.....
NW2	lbs	.....	1.3	1.6	2.2	2.6	3.1	3.5	4.0	4.4	1.7 <i>0.77</i>
	kg	.....	<i>0.59</i>	<i>0.73</i>	<i>1.0</i>	<i>1.18</i>	<i>1.41</i>	<i>1.59</i>	<i>1.82</i>	<i>2.0</i>	

DIMENSIONS

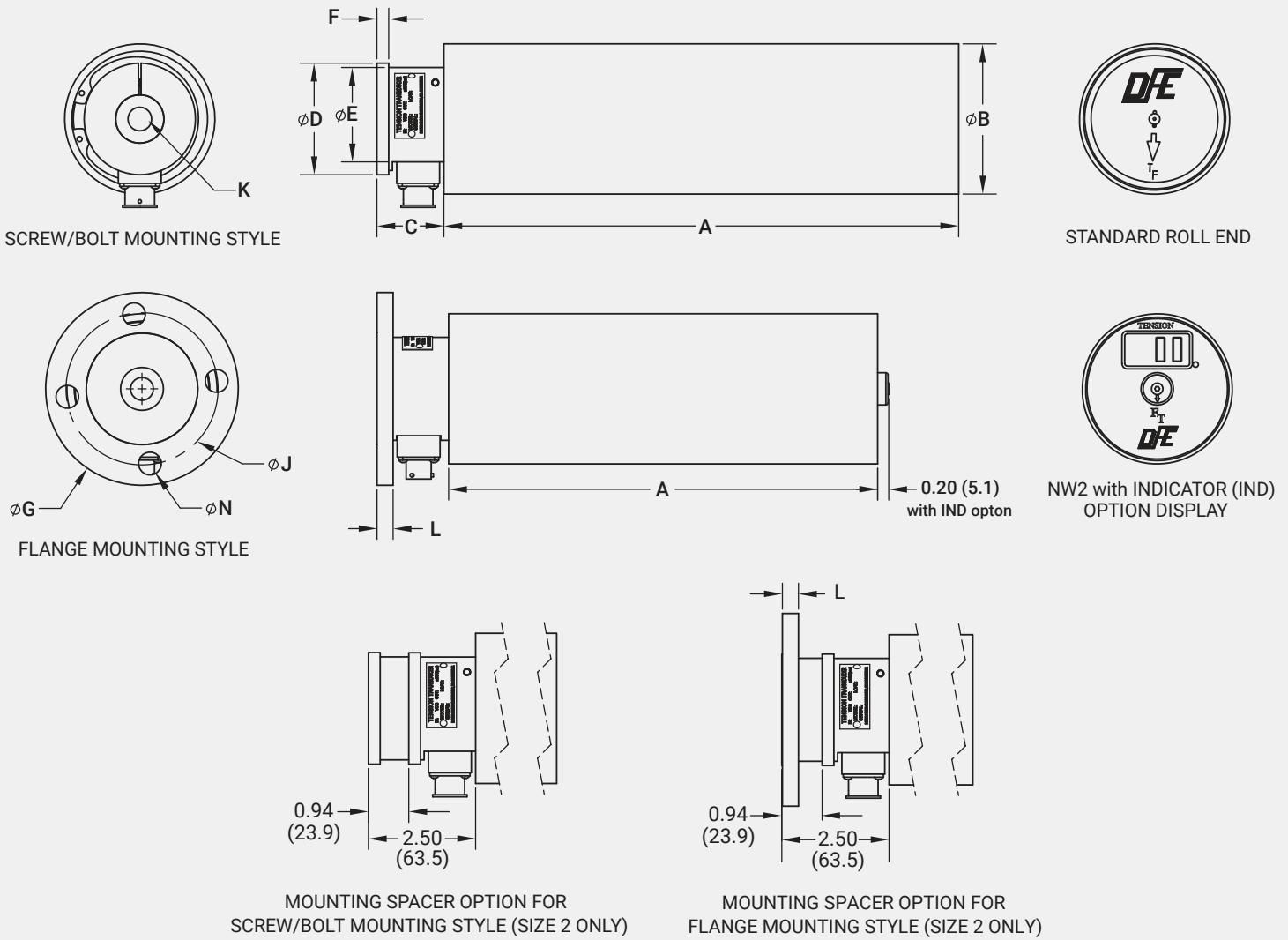
T126 AMPLIFIER MODULE FOR BUILT-IN INDICATOR OPTION



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

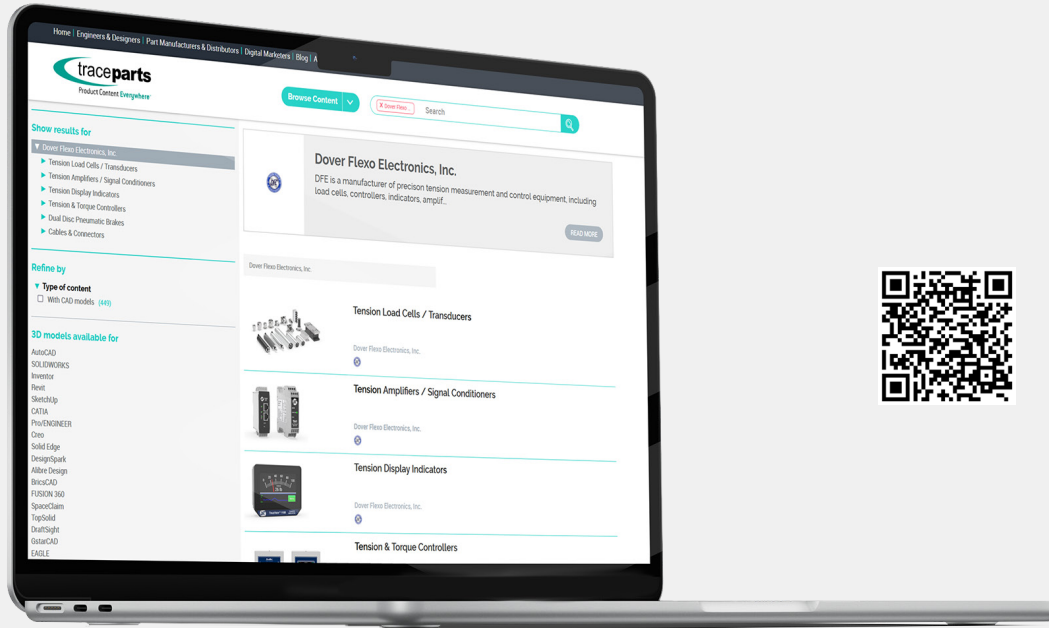
DIMENSIONS (CONTINUED)

		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



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TYPICAL RUNNING TENSIONS OF COMMON WEB MATERIALS

Material	English		Metric		Material	English		Metric	Material	English		Metric
	Weight (points)	Tension (lbs/lin. inch)	Weight (g/m ²)	Tension (kg/cm)		Tension (lbs/in/mil)	Tension (kg/cm/mm)			Copper Wire (15,000 psi)	Tension (lbs)		Tension (kg)
Paperboard	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		
Paper (based on 3,000 sq. foot ream)					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					
	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								
	80	3.00	130	0.720								

For laminated webs sum the tensions for the individual webs and add 0.1 lb/in. (0.018 kg/cm) of width.

Run aluminum wire at 1/2 - 2/3 these values. 15,000 psi = 103.42 MPa
 1 mil = 25.4 microns = 0.0254 mm

