DATA SHEET

THE TENSION CONTROL SPECIALISTS

MODEL **LT** LOW TENSION TRANSDUCER/LOAD CELL

The LT Low Tension Transducer is often used in filament, fiber, ribbon and wire processing applications that require tension control at very low levels.

Coupled with an amplifier or indicator, it functions as an electro-mechanical sensor device that converts filament or ribbon tension into a DC voltage proportional to tension. The voltage output can be displayed as actual tension on an analog or digital meter in pounds, ounces, grams, kilograms or newtons.

LT transducer output can also be fed into a DFE automatic tension controller to manage tension in a closed-loop by regulating a torque device such as a brake, clutch or motor drive system.

The LT transducer is available in either a stackable housing configuration or a threaded housing (M36 x 4) with two locking jam nuts. The threaded housing installs easily into a hole on your machine frame. The lock-nut system allows force direction to be quickly adjusted by simply loosening the jam nuts and rotating the transducer housing into position.

Standard LT transducer wheels are lightweight, hard coat anodized aluminum. They are durable, low inertia and fitted with instrument grade ball type bearings. The LT transducer may also be purchased without a wheel for customers who prefer their own design, or run a variety of different materials that require application-specific wheel profiles.

FEATURES & BENEFITS

- High-performance semiconductor strain gages deliver superior precision and longevity
- Two mounting styles: threaded bolt or stackable
- Special wheels are available
- Loading ratings from 50g to 2000g (2 oz to 4.4 lbs)
- Highly accurate and reliable semiconductor strain gage technology
- Six load ratings, from 50 grams to 2000 grams
- Aluminum construction
- Choice of filament wheel, ribbon wheel, or stationary pin
- Two mounting styles – stackable or threaded
- Use with any DFE tension indicator or controller
- Helps reduce waste and improve quality and productivity
- Compact size allows transducer to fit into small spaces
- Ultra-low break-away torque (1.5 g-cm or 0.02 oz-inches) means no sliding or scratching of filament on wheel
- Stackable – several transducers fit into a small space
- High output provides resistance to electrical noise
- Two mounting styles to fit any application
- Measures very low tension accurately
- Strong construction
- Low cost
- 5 year tension-free warranty

OPTIONS

Special (Z) - Engineered to a non-std specification.

ACCESSORIES

Cables - Transducer cables are available in lengths of 15, 20, 25 or 30 feet. Special lengths can also be ordered. Your DFE Applications Engineer will help you select the proper cable for your application.

PRODUCT CODE

You may order from description or by specifying the code below by matching each labeled digit with one of the choices given.

Example: LTS-50-F

LT X - X - X - OPTIONS

HOUSING	LOAD RATING	WHEEL	OPTIONS
S = Stackable T = Threaded	50 grams 100 grams 200 grams 500 grams 1000 grams 2000 grams	F = Filament R = Ribbon P = Pin N = No wheel Z = Custom	Z = Special

SPECIFICATIONS

Excitation Voltage: Up to 10 VDC

Output: 500 mVDC nominal

Strain Gauges: Semiconductor, 800 ohms nominal resistance

Non-Repeatability: ±1/2% full span (FS)

Non-Linearity and Hysteresis Combined: ±1/2% (FS)

Maximum Overload Capacity: 20 lbs (89 N)

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

Deflection: 0.02" typical (0.50 mm typical)

Temperature Coefficient: 0.02% per degree F typical (0.01% per degree C typical)

Load Ratings: 50, 100, 200, 500, 1000, 2000 grams (0.11, 0.22, 0.44, 1.10, 2.20, 4.40 lbs)

Electrical Connector: Bendix PT02E-10-6P

Mating Electrical Connector: Bendix PT06E-10-6S

Connector Pin Assignments:
Pin A = negative output (WHT)
Pin B = 10V+ (BLK)
Pin C = 10V- (RED)
Pin D = positive output (GRN)
Pin E = 10V- (BLU)
Pin F = 10V+ (BRN)

Break Away Torque: 0.02 oz-in (1.5 gram-cm) typical

Standard Connector Position: Rear Only

Basic Dynamic Load Rating of Bearings: 299 lbs (1340 N)

Materials: Stainless Steel & Aluminum

SELECTION OF LOAD RATING

The correct transducer load rating for your application is determined by maximum web tension, wrap angle, and wheel weight. Choose the appropriate wrap configuration from the diagrams below. Then compute the Net Force using the formula below the diagram.

In some cases the load rating may be less than the computed Net Force. This may be 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 non-standard wheels or other hardware used in place of the wheel:

Sometimes a wheel 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 wheel is too heavy, compare the load rating with the effective weight of the wheel as follows:

The effective wheel 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. Reduce the transducer wheel weight.
2. Increase angle (A).
3. Use the next higher load rating (this is the least desirable choice because it reduces transducer signal output).

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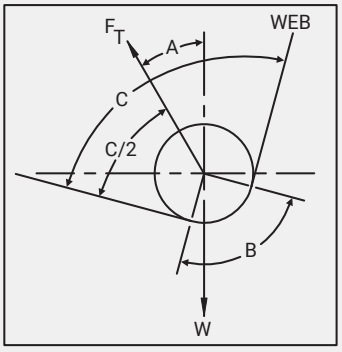
WRAP 1

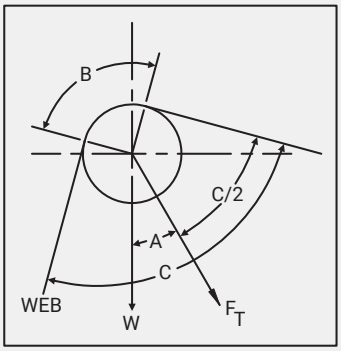
Tension Force (F_T) **Above** Horizontal



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

WRAP 2

Tension Force (F_T) **Below** Horizontal



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

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

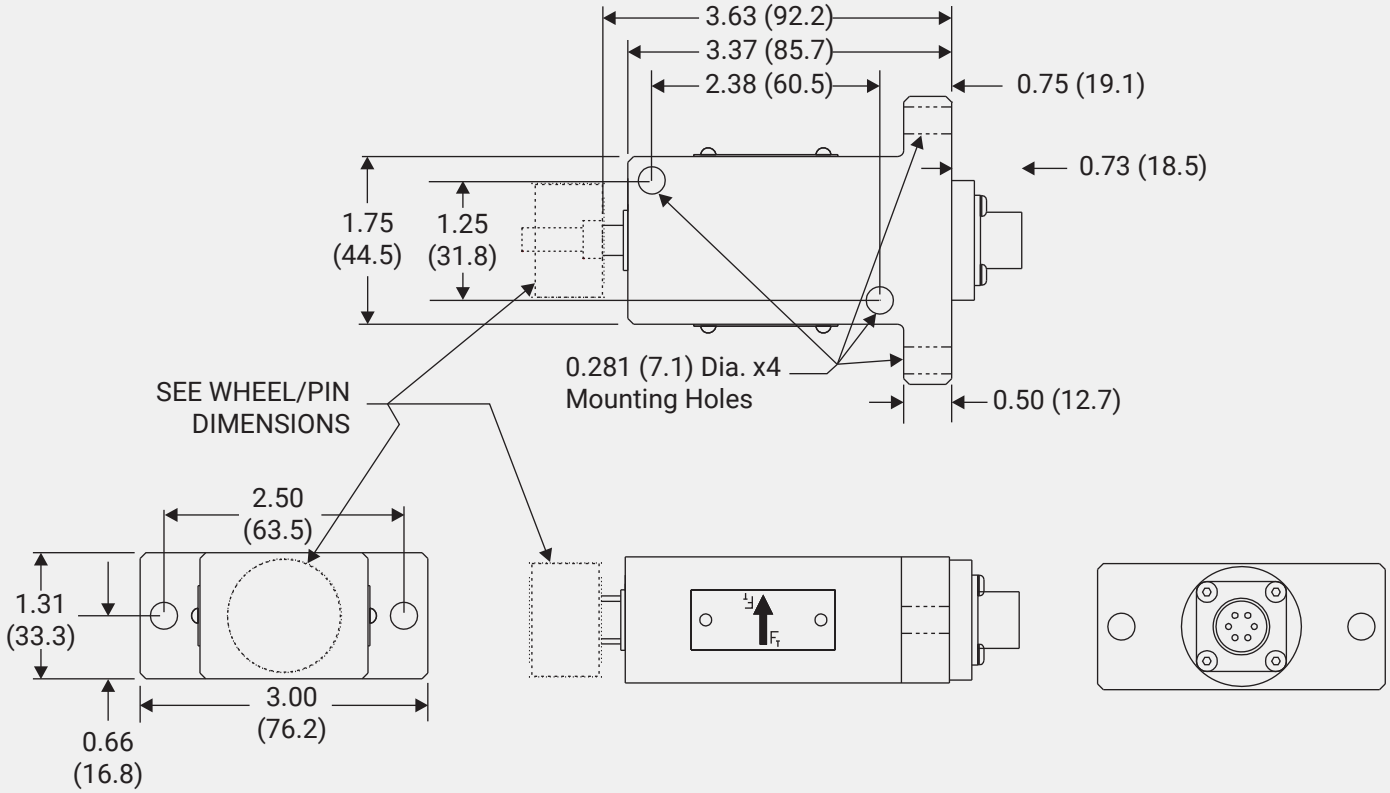
W = Wheel Weight
T = Maximum Web Tension
B = Wrap Angle = 180° - C°
A = Angle Between Tension Force (F_T) and Vertical

NOTE: Weight of filament wheel is 14 grams including bearings and fasteners.
Weight of ribbon wheel is 18 grams including bearings and fasteners.

DIMENSIONS

inches (mm)

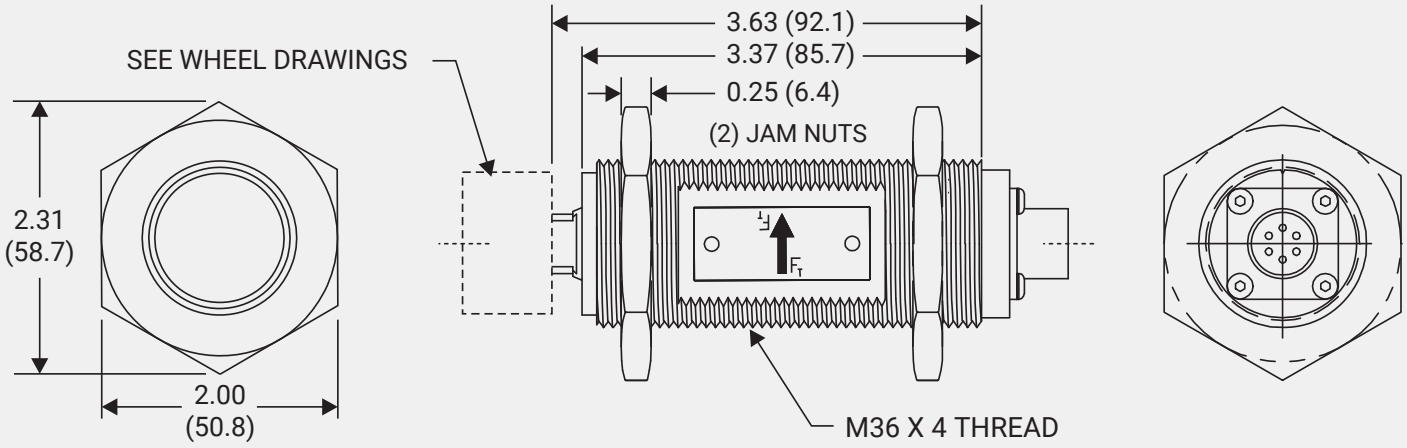
STACKABLE HOUSING



DIMENSIONS

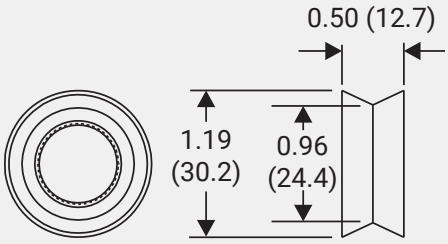
inches (mm)

THREADED HOUSING

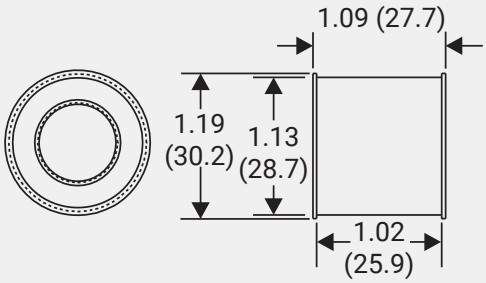


WHEEL & PIN DIMENSIONS

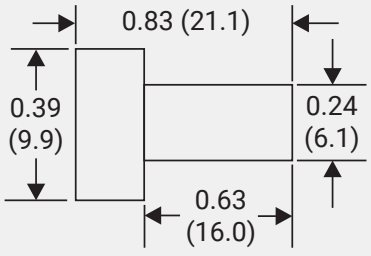
FILAMENT WHEEL



RIBBON WHEEL



PIN



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