



# DOVER FLEXO ELECTRONICS

## APPLICATION ENGINEERING DATA

### MODEL TI-2A TENSION INDICATOR

**GENERAL DESCRIPTION** The TI-2A Tension Indicator is used anywhere the tension in a web, tape, ribbon, cord or wire should be accurately known. Tension is sensed by a pair of DFE Tension Transducers mounted on an idler roll. The web traveling over the roll produces an electrical output signal which is *directly proportional* to web tension. The signal is amplified by the indicator circuitry and displayed on the tension meter which is calibrated to read *actual* total web tension, in pounds.

Once web tension is known, the operator can make machine adjustments to produce the correct tension level or pattern. The result is improved productivity and quality and less waste.

Auxiliary tension signal outputs are included for interfacing with recorders or drive systems for control of tension.

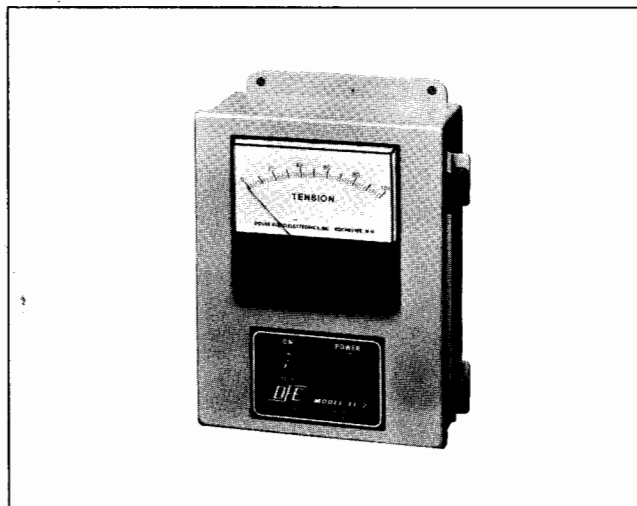
High and low tension detectors and a web break detector are available to provide alarms or control or to shut the machine down if tension is incorrect.

**APPLICATION** The tension indicator is used on any continuous process machine such as printing presses, embossers, coaters, laminators, slitters, rewinders, or label presses. Typical materials processed on these machines are paper, foil, polyethylene, polyester and other films, textiles, linoleum, rubber, wire, filaments, cords and tapes and ribbons.

#### **ADVANTAGES**

- Actual tension displayed on large meter.
- Easy to set correct tension.
- Machine problems affecting tension are easily discovered.
- Reduces waste.
- Improves productivity.
- Signal outputs can be used to control tension.
- Correct tension can be repeated from run to run and day to day because it is displayed on the meter.
- Improves control of quality.
- Reduces breakage.

#### **DATA SHEET 8209TI2A**



#### **FEATURES**

- Low cost
- Simple to use
- Tamper-resistant adjustments
- Available without enclosure
- Broad calibration and tare ranges
- MS type cable connectors for quick and easy installation
- Red light indicates power is on. Visible from long distance
- Large taut-band tension meter
- Printed circuit construction
- Meter movement shorted when switch is off. Protects against damage during transportation.
- Surge and overload protected
- Integral power supply for transducers
- Industrial quality
- Auxiliary tension signal outputs
- Many options available

## SPECIFICATIONS

Power ..... 117V, 60Hz @ ¼ Amp  
 Transducer Supply ..... 5V DC regulated  
 Meter ..... 5% x 4½ taut band, 2%  
 Standard Meter Scales ..... 0-25, 50,  
 100, 250, 500, 1,000 lbs.  
 Zero Range (Tare) ..... 50% of  
 transducer rating  
 Calibration Range ..... 25:1  
 Temperature Range ..... 0-40° C  
 Tension Signal ..... 500mV DC max.  
 Enclosure ..... Steel, 14 Ga. NEMA 13  
 Recorder Output ..... 0-100mV DC  
 10 Volt Output ..... (Nominal)  
 Adjustable 0-3.5 to 13V DC approx.  
 3-Pin connectors for transducer cables  
 ⅞ inch hole for power and auxiliary  
 connections to internal terminal strip

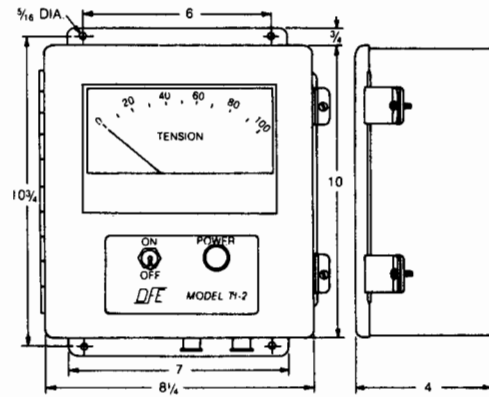
## OPTIONS\*

- Web break detector
- Six-Pack construction. Up to 5 plug-in tension indicator cards with integral adjustments and one power supply card mounted on an 8½ x 16½ inter-connection card with terminal strip connections
- Calibrate and zero adjustments externally mounted
- Non-standard meter scales
- Provisions for permanent wiring instead of MS connectors for transducer cables
- Special configurations
- Digital tension meter
- Dual range meter scale with dual calibration
- TLR indication (read total, left side or right side tension)
- Tension limit outputs (relay contact closures). High and/or Low 2 Amp, 120 V AC rating
- Attached power cord; 6 foot long heavy duty type SJ, 3 wire
- 16 BIT BCD digital tension signal output
- 0-20 milliamp output
- Dual zero and calibration adjustments with switch

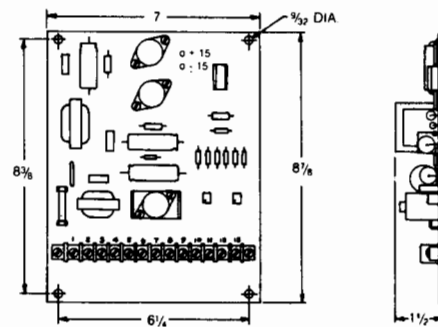
\*Some options require optional enclosure

## DIMENSIONS

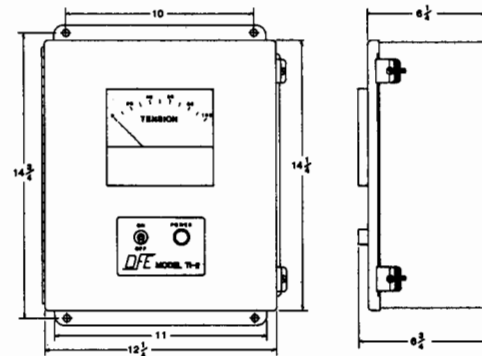
TI-2A STANDARD ENCLOSURE\*



INDICATOR PANEL



TI-2A WITH OPTIONAL ENCLOSURE



**OTHER PRODUCTS BY DOVER FLEXO ELECTRONICS:** Tension Transducers, Rewind Tension Controllers, Unwind Controllers for electric brakes and clutches, combination Pneumatic-Electric Tension Controllers, Pneumatic Tension Controllers for brakes and clutches.



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# MODEL TI-2 TENSION INDICATOR

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## INSTALLATION AND OPERATION

### Tension Indicator, Model TI-2

#### INSTALLATION

1. Install the tension transducers. Refer to the transducer installation instructions included.
2. Mount the Indicator cabinet in a convenient location away from heat and vibration.
3. Connect a transducer cable to each transducer. Use the longer cable on the one farthest away from the Indicator.
4. Connect the other end of the cables to the receptacles on the bottom of the Indicator cabinet.
5. Plug the power cord into the cabinet, and plug the other end into a 117 volt 60 Hz. receptacle.

#### OPERATION

Operation of the Indicator is fully automatic. Flip the toggle switch (on the front of the cabinet) "up" to apply power. The red pilot light will glow as long as power is on. If the switch is on but the light doesn't glow, check the 117 volt source and the  $\frac{1}{2}$  amp fuse on the Indicator panel.

## CALIBRATION

### Tension Indicator, Model TI-2

#### TARE (ZERO) ADJUSTMENT

1. Turn off power to the Indicator. Observe the tension meter. If the needle is not on zero, adjust the screw on the meter face until the needle rests on zero.
2. Turn on power and allow the Indicator to warm up for five minutes.
3. Open the door of the Indicator and, using a small screw-driver, turn the ZERO potentiometer until the meter reads zero. The needle moves upscale when the pot. is turned clockwise (CW).

#### CALIBRATION ADJUSTMENT

4. Thread a length of rope over the center of the tension sensing roll following the exact same path the web will take. Do not pass the rope over dead-bars, driven rolls, braces or any other non-free wheeling member. The sliding friction introduced by these members will cause inaccurate calibration. Fasten one end of the rope securely.
5. Attach a weight of known value to the other end of the rope. Its weight should be about half the maximum scale reading of the tension meter. A spring scale can also be used to apply the required force.
6. Turn the CALIBRATE potentiometer until the tension meter reads the same as the weight.
7. Remove the load from the sensing roll and observe the tension meter. If it doesn't read zero, repeat step 3.
8. Apply the load to the sensing roll again and repeat step 6.
9. Repeat steps 6,7,8 until the tension meter reads the same as the applied weight and returns to zero when the weight is removed.

THIS COMPLETES THE CALIBRATION PROCEDURE

## AUXILIARY OUTPUTS

### Tension Indicator, Model TI-2-A

1. 100 millivolt output. Terminals 11 (+) and 12 (-).  
This output is usually fed to a tension recorder for permanent record of tension patterns and levels. Output is 100 mv when tension meter reads full scale, and varies directly with meter. Minimum input resistance of recorder should be 10,000 ohms.
2. Voltage output, adjustable. Nominal adjustment range is 4 volts to 13 volts, measured when tension meter reads full scale. This output varies directly with tension, and can be used for display or control purposes. Minimum load resistance should be 10,000 ohms.  
Terminals 13 (+) and 12 (-). Adjust V OUT potentiometer to vary voltage.

## PREVENTIVE MAINTENANCE

Preventive maintenance for electronic equipment consists of keeping it clean. Layers of dust cause overheating of electronic components. If the dust is conductive it can cause short circuits and produce all kinds of strange behavior.

Check the equipment at least once a month. It doesn't take long and could prevent costly down-time.

DO NOT USE COMPRESSED AIR FOR CLEANING. DAMAGE COULD RESULT.

Use a dry, soft brush to remove dust.

If a solvent is necessary, use denatured alcohol.

