

TENSION CONTROL

MODEL 4810V-TC820 CONSTANT TENSION DEVICE WITH VERTICAL LINEAR SLIDE ASSEMBLY

Design

Designed to apply constant adjustable tension to single or multiple, round, square or rectangular wire, as well as ferrous and nonferrous foil. It also provides a direct readout of the amount of tension. Manual forming and pounding of the coil into shape is completely eliminated. Model 4810V-TC820 can be used with many heavy duty coil winding machines.

The Way it Works

THE TENSION SYSTEM is comprised of a Tension Device, Tension Sensor, Tension Controller, Converter, and Pneumatic Actuator (Figure 1 and Illustration 1). At the start of an operation, a set-point tension is entered into the Tension Controller. Once winding begins, the material is pulled through two tension plates

(located within the Tension Device), thus creating Force (F) on the Tension Sensor. The Tension Sensor measures the amount of Force (F) and transmits an input signal to the Tension Controller. The Tension Controller compares the tension of Force (F) against the set-point and reduces the signal deviation to zero by increasing or decreasing the output signal to the Converter.



As a result, the Converter translates the signal and sends it to the Pneumatic Actuator which, in turn, regulates the consistency of tension plate pressure. Throughout this Close-Loop System, constant tension is maintained in real-time.

The mechanical components of the Tension System are mounted on low friction, corrosion resistant, Linear Slide Assemblies. The Tension Housing Linear Slides permit the Tension Housing to move toward the Tension Sensor, creating Force (F). The Traverse Linear Slides permit the entire Tension Device assembly free linear movement. The operator can manually traverse the Tension Device assembly to a standard maximum travel distance of 27" (up to 96" optional). The assembly is designed to handle up to No. 1 & 0 wire. Consult factory for other available Linear Slide Assembly sizes.

Tension	Up to 500 Lbs. Max
Material Capacity	AWG Size 20-00 Round, Shaped Wire and Foil



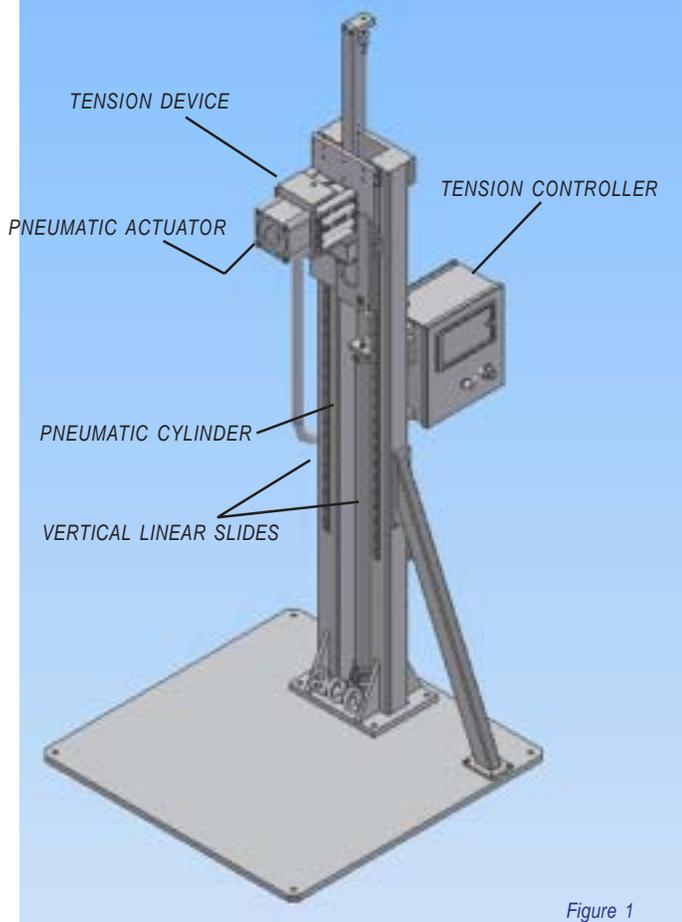
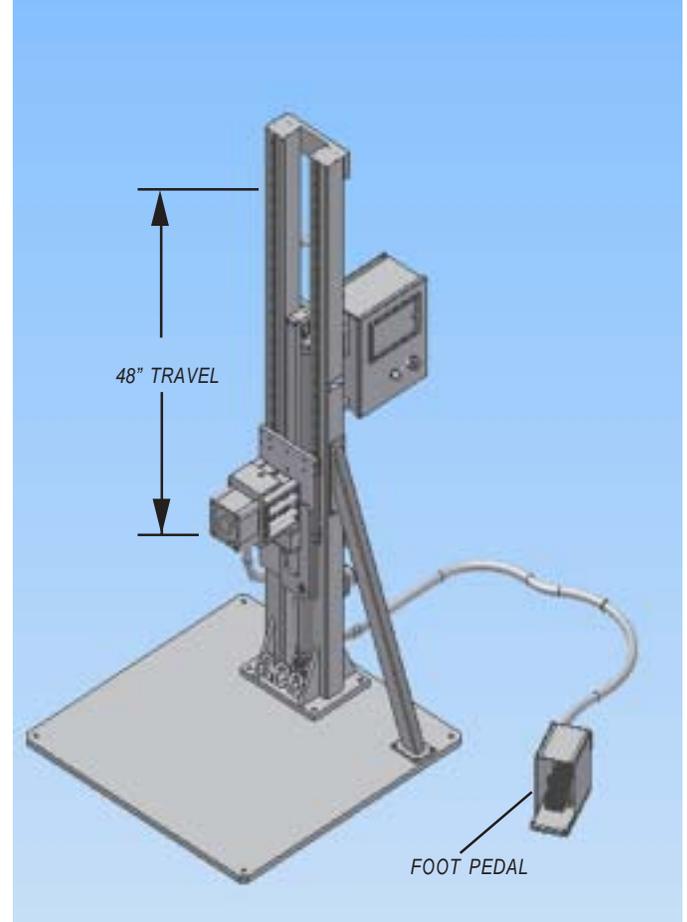


Figure 1



Component Features

TENSION DEVICE

TENSION HOUSING, TENSION PLATES, PNEUMATIC ACTUATOR, AND WIRE GUIDE ROLLERS

The Tension Housing contains the mechanical elements of the Tension Device. A Pneumatic Actuator provides the necessary downward pressure on the Tension Plates during winding. At completion of the winding operation, tension on the plates is relieved, making it possible to easily pull the material through the plates by hand. An opening, located in the rear of the Housing, permits easy replacement of the Tension Plates.

Two steel wire guide rollers, fastened to the front and two in the back of the Tension Housing, guide the wire(s) into and out of the Tension Device. The standard spacing between the rollers is infinitely adjustable from 0 to 4 inches. Additional rollers can be installed by the customer.

The Tension Device is supplied with a pressure regulator, filter, gauge, on-off air valve and connecting air hoses with fittings. Longer life may be gained from worn Tension Plates by turning them 90°. This is easily accomplished by removing the two rear Wire Guide Rollers.

TENSION SENSOR

Precise, accurate measurement of wire tension. A tension sensor (load cell) uses an LVDT type sensor to convert tension on the wire into a proportional electrical signal. The LVDT system provides precise, accurate tension measurement while the mechanical design allows for extremely high overloads without structural damage or variance in calibration. No calibration or maintenance required.

FUNCTION

As wire tension increases, the resultant Force (F) also increases. This causes the load plate to rotate minutely around the Pivot Point O. This O point is a Torsion Bar which resists the Force (F). Due to leverage advantage, actual sensing roll movement is quite small. Movement of the core in the LVDT is proportionately larger. As the core moves within the LVDT coil, the output of the coil varies directly with the core movement, which varies directly with the Force F. The output is thus proportional to (F). The mechanical structure of the torsion bar and the mechanical limit stops on the load plate allows the sensor to survive 100-to-1 overloads without structural failure or variance in calibration. The LVDT housing also contains a high-frequency oscillator circuit which guarantees excellent linearity. And a thermal compensating circuit which ensures zero thermal drift when used within the stated temperature range.



TENSION CONTROL

Performance Features of the TC-820

- ▶ Simple to setup, calibrate and operate.
- ▶ Easy to read digital 16 LED control output tension display.
- ▶ Tension correction at the push of a button.
- ▶ Set tension directly from external sources.
- ▶ Start level stored in memory for easy start-ups.
- ▶ Stop level mode for quick stops reduces over-travel and tangling.
- ▶ Start level mode to reduce stress on wire.
- ▶ Interfaced with pneumatic actuator.
- ▶ Password protected to prevent tampering.
- ▶ The distance between the tension plates is automatically adjustable for various wire and foil thickness.
- ▶ Provides tension correction for thickness variations and change in reel diameter.
- ▶ Reduces stress on wire during starting and stopping.
- ▶ Taper tension control.
- ▶ Settings are stored in memory.

CONVERTER

Converts an electric current input signal into a proportional pneumatic output. It is designed to input a DC signal in the range of 4-20 mA and to convert this signal into a proportional pneumatic pressure. It exhibits excellent linearity and response.

TENSION CONTROLLER TC-820

Illustration 3 illustrates wire drawn through the tension device. The load cell sensor converts Force (F) into an electrical signal. The TC820 Tension Controller receives the input signal. This controller amplifies the signal, which is used by the Electro-Pneumatic Converter Interface Element. Output air pressure from the converter is used to actuate the pneumatic actuator on the tension device and clamp down on the wire.



VERTICAL LIFT MECHANISM

The Vertical Lift mechanisms foot pedal is a three position pedal that latches in all three positions. If the pedal is left in the up position and the foot is removed from the pedal, the Vertical Lift mechanisms will continue to rise until it reaches the top limit position. If the pedal is left in the down position and the foot is removed from the pedal, the Vertical Lift mechanisms will continue to lower until it reaches the lower limit position. When the pedal is left in the neutral (center) position and the foot is removed from the pedal, the Vertical Lift mechanisms will remain in position.

The pneumatic air lines providing air pressure to the Vertical Lift mechanisms pneumatic cylinder are connected to two flow controls at each port. These meter the exhaust of the ports. One is a standard flow control allowing maintenance personnel and operators to change the speed of the Vertical Lift mechanism's travel. The second flow control is preset at ACE Equipment and requires a special tool to adjust. They are set to limit the speed of the Vertical Lift mechanism's travel.

The Vertical Lift mechanism's foot pedal is pneumatically operated and does NOT have any electrical interface. The Vertical Lift mechanism will operate as long as the air is provided to its regulator - EVEN WHEN POWER IS DISCONNECTED FROM THE UNIT!

The 4810V pneumatic components are designed to operate in a range of 4-6 Bar (58-87 psi).



Wire Guiding System Designed to Assist the Operator

ACE Model 4810V-TC820 is designed to layer wind single or multiple strands of round, square, or rectangular wire with constant tension.

This accurate wire guiding system assists the operator in consistently producing quality layer wound coils with constant tension, meaning less wire per coil, and at higher speeds. By design, it's simple, easy to understand and fun to use.

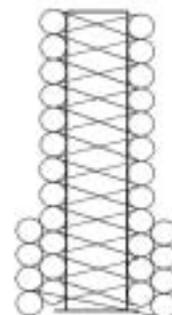
The slightest linear movement of the wire, as it passes through the tension housing, results in an equal linear movement of the tension housing. Linear movement of the tension housing assists the operator in positioning the wire on the coil of your rotating winding fixture for layer winding with no crossovers. Operator's hands are merely guiding the wire.

The low coefficient of friction between the tension housing and linear slides permits the almost freely floating tension housing to precisely track the smallest linear motion of the wire for layer winding a coil.



The Model 4810V-TC82 provides proper tension when winding specialized rotors resulting in a tight coil for a perfect fit. There is no damage to the wire or equipment and minimal operator manipulation is required.

Coils wound with little or no tension develop gaps and crossovers resulting in a coil that is too large. Coils wound with the proper tension fit better and use less wire.



Specifications

DIMENSIONS	48"W x 58"D x 91"H
NET WEIGHT	1,300 Lbs
GROSS WEIGHT	1,400 Lbs
POWER	120/1/60
AIR PRESSURE	100 P.S.I.

Complete Winding Systems

The Model 4810V-TC820 can be configured with other ACE winding components to create a complete coil winding and tension system.....



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