

INSTRUCTION MANUAL

WEBHANDLER™ 3

Digital Tension Controller



DOC 801-1667

5 YEAR WARRANTY



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READ THIS!

Your WebHandler™ Model 3 Digital Controller has been properly configured at our factory. To install it and start it up, it should only be necessary to use these sections of this manual:

Section 2 - Installation

Section 3 - Calibration and Set-Up

The other sections are for reference and for instruction if you wish to change the configuration at some later time.

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1.1 GENERAL DESCRIPTION

The WebHandler™ Model 3 digital tension controller automatically maintains tension of any continuous material at the value selected by the machine operator. Basic functions are divided into three parts:

The first part is the tension amplifier, which supports all Dover Flexo Electronics tension transducers. (The transducers measure the actual tension in the web). It includes a regulated power supply to excite the transducers, an amplifier to boost the transducer output signal, and a calibration circuit to adjust the tension readout to display actual tension.

The second part is the tension regulator. It compares the output signal from the transducers with the Auto set-point value. If there is a difference, the regulator will either increase or decrease its output signal to equalize them. The tension amplifier is located on the front board. The tension regulator function is performed in software which is executed by the processor on the Control Board. See Figure 3 for board locations, and Appendix A for board views.

The third part is the output circuit. It accepts the output from the tension regulator and actuates a brake, clutch, or variable speed DC or AC drive which actually creates the tension in the web.

There is a location on the Control Board for a plug-in card containing an isolation module for the isolated output option.

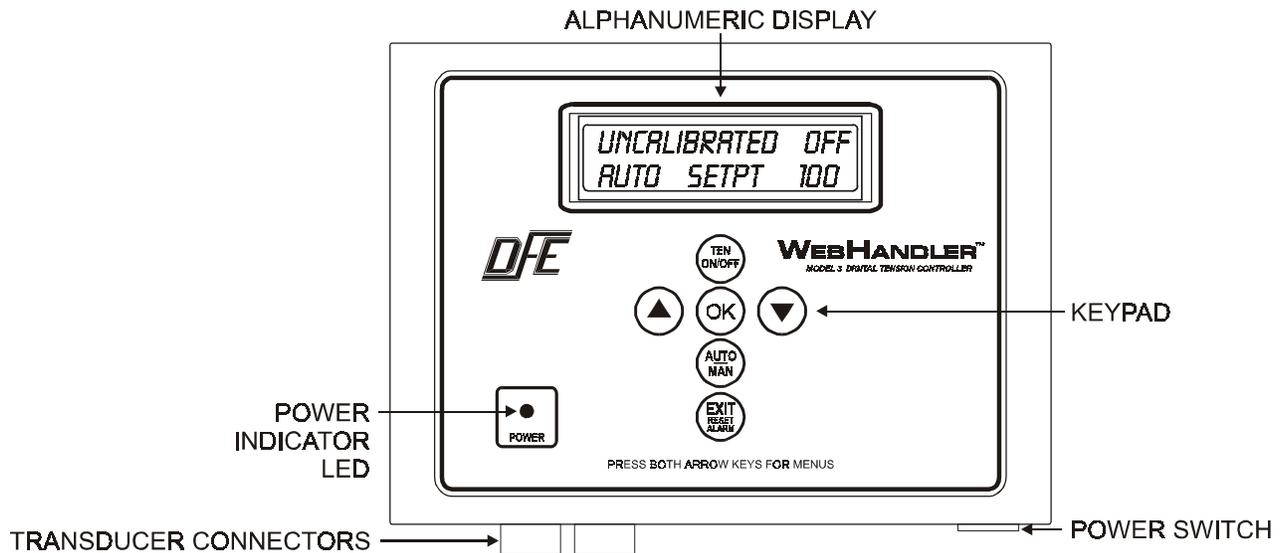


Figure 1 - FRONT PANEL and OPERATOR DEVICES

TENSION ZONES

Tension zones are created by driven or braked nip rolls, drag bars, braked or driven unwind or rewind shafts, or anything else that can increase or decrease web tension. One of these elements is at each end of every tension zone.

Many machines that process a continuous web have more than one tension zone. The WebHandler3™ controller can be used in all tension zones, when properly configured for the zone it will be used in. See Figure 2 for examples of tension zones.

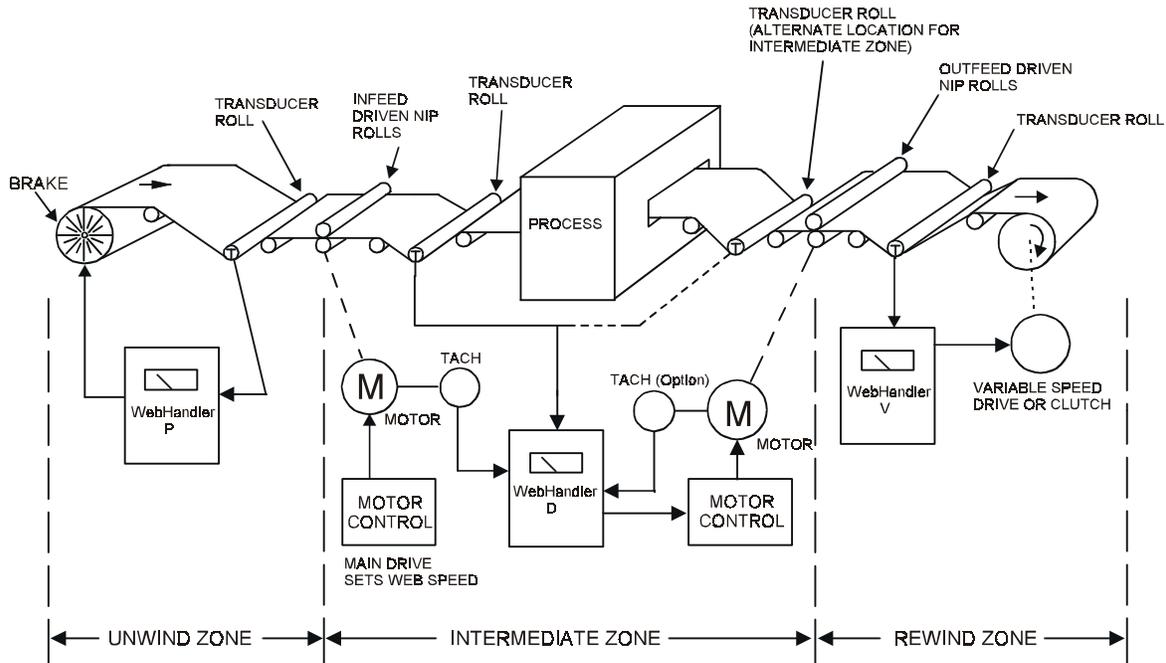


Figure 2 - EXAMPLES OF TENSION ZONES

1.2 OUTPUTS, VERSIONS OF CONTROLLER

The WebHandler™ Model 3 controller is available with one of four outputs:

- A. Pneumatic output.** (Version P). This is used to actuate any air operated brake or clutch. The standard version includes a servo valve, air filter and pressure regulator installed in an separate enclosure. The output range is 0.5 to 75 psi.(0.03 bar to 5.17 bar). Also see D. below.
- B. High Voltage output.** (Version V). This output uses Silicon Controlled Rectifiers (SCR's) to produce a standard variable voltage of up to 90Vdc to operate any electric brake or clutch, including eddy current clutches. 45 volt, and 24 volt outputs (24V not available with 230Vac input) are optional.
- C. 0-10Volt DC compensated output module.** (Version D). This output is used to control DC drives or other variable speed drive systems. This output can be isolated from earth ground to make it more compatible with all drives. See Options, Section 1.6, for more details.
- D. Driver Card.** (Version C). This version provides power and signal outputs for non-standard pneumatic servo valves.

1.3 WebHandler3™ EXPLODED VIEW

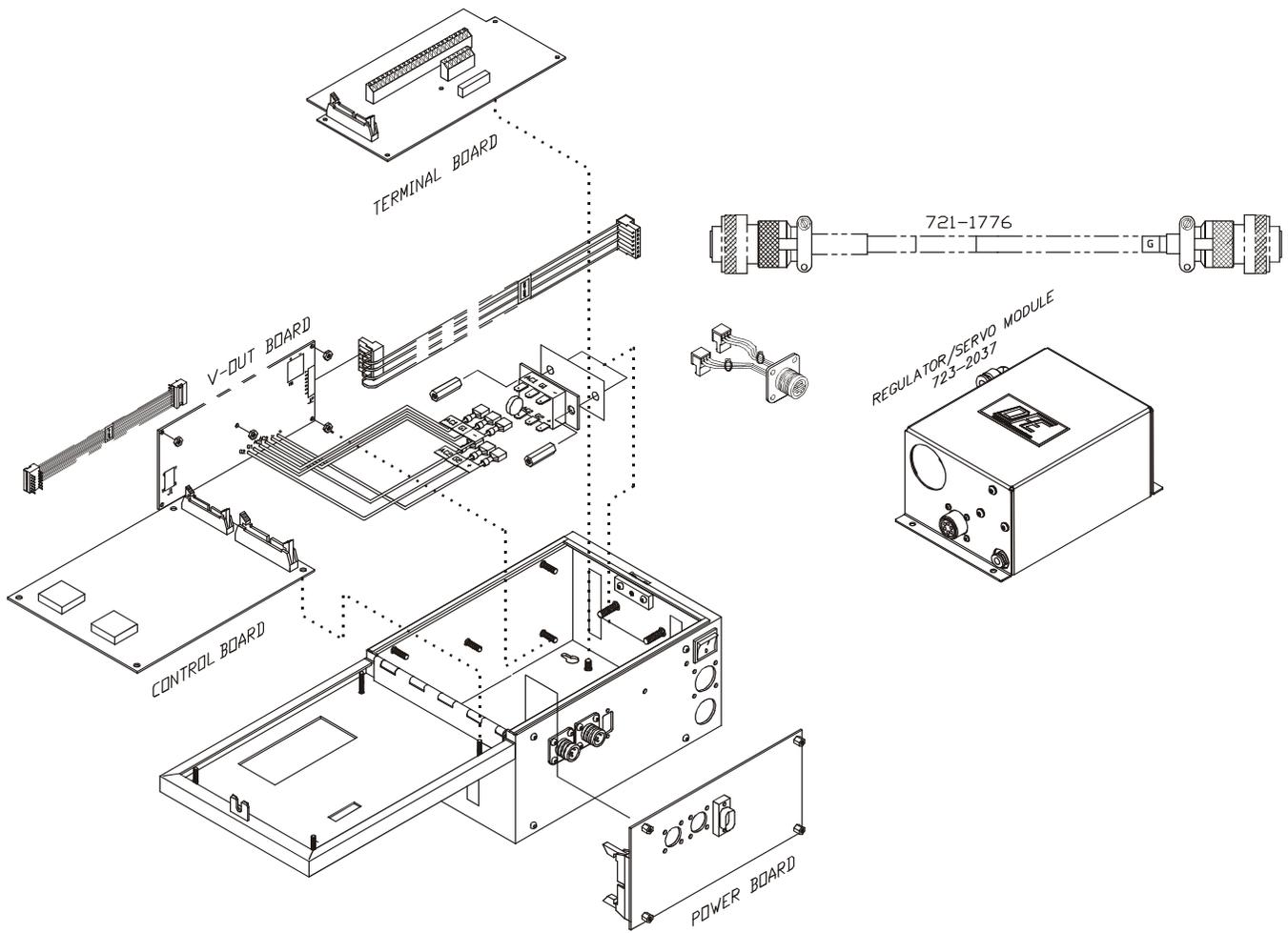


Figure 3 - WebHandler™ Model 3 EXPLODED VIEW

1.4 SPECIFICATIONS (separated into Versions V, D, C or P where applicable)

Power Input:

Versions P, D, C:	115/230 Volts 60/50Hz single phase @ 1 Amp
Version V:	115/230 Volts 60/50Hz single phase @ 6 Amps

Output:

Version P:	0.5 to 75 psi (0.03 to 5.17 bar)
Version V:	0 to 90, 45, or 24 Vdc, all @ 5 Amp with 115 Vac In OR 0 to 90 Vdc, 45 Vdc all @ 5 Amp with 230 Vac In
Version D:	0 to ±10 Vdc, Compensated (Optional Isolated signal available)
Version C:	+15Vdc @ 250mADC or 24VAC @ 200mA to power a servo valve

Enclosure:

Steel, powder resin painted, NEMA 1

Weight:

9 lbs. (4.1 kg)

Transducer Signal Accepted

500 mVdc per pair at rated load (1000 mV with XR option)

Mating Transducer Cable Connectors

Amphenol MS3106A-10SL-3S

Zero (Tare) Range:

95% of transducer rating, minimum

Calibration Range:

25:1 max.

Temperature Range:

32° F to 104° F (0° C to 40° C)

System Accuracy:

Within 1 to 3% typical

Output Range, Automatic mode:

0 to 100% of rated output (See output)

Manual Mode Output Range:

0 to 100% of rated output

Standard Tension Meter Ranges:

0 - 1, 5, 10, 25, 50, 75, 100, 150, 200, 250, 300, 500, 1000, 1500, 2000, 2500, 3000

Taper Tension Range (option):

0 to 100%

Taper Tension by Rider Roll / Diameter Sensor. ..

0 to 10 Vdc input

Pneumatic Enclosure (Version P, only)

Input: 125 psi Max.,
Output: 0.5 to 75 psi (0.03 to 5.17 bar)
Servo Valve Drive Signal: 4 to 20mA
Air Connection In. 3/8" NPT
Air Connection Out. 1/4" NPT
Weight: 2.84 lbs. (1.28 kg.)

1.5 STANDARD FEATURES

SOME OF THESE FUNCTIONS REQUIRE CONFIGURING OR EXTERNAL WIRING. REFER TO SECTION 2.5 FOR WIRING AND SECTION 3 FOR CONFIGURATION.

- **ANTI-TAMPER SWITCH (Keypad Lockout).** Disables access to certain menu functions.
- **AUTOMATIC CONTROL MODE.** The controller output is determined by the difference between web tension and the AUTO set point value. The internal regulator automatically varies the output as required to maintain set tension.
- **CONTROLLER CONFIGURATION.** Transducer feedback only, Line Speed Follower with tension trim, and Line speed follower with diameter compensation and tension trim (all with transducer feedback).
- **EMERGENCY STOP.** Controller immediately goes to full output, or minimum output, upon closure of an external contact. Normally full output is used on braked unwinds to stop the roll of material quickly, and minimum output is used for other applications.
- **REMOTE TENSION READOUT.** 0 to 10Vdc and 0 to 1mA external meter or monitoring output. Proportional to tension.
- **MANUAL CONTROL MODE.** The controller output is determined only by the setting of the MANUAL set point value. No output change occurs unless the setting is changed. Used during machine set-up or during trouble-shooting.
- **METER DAMPING.** Minimizes flicker of the digital tension display.
- **POWER VOLTAGE SELECTION.** The WebHandler™ Model 3 controller is designed to operate on two ranges of AC power; 115 Volts 60/50 Hz, and 230 Volts 60/50 Hz. A slide switch on the Power Board selects between the two.
- **RS232.** Serial Communications Interface. Supplied with PCWebLink windows based software to configure, operate, or monitor WebHandler™ Model 3 from a PC or laptop. The serial interface can also be used to accept commands from a host computer.
- **SERVO VALVE ASSEMBLY.** Standard for Version P. Allows servo valve to be installed close to the brake/clutch while the controller is located elsewhere. Includes servo valve, regulator, and air filter in a separate enclosure.
- **SOFT START.** Used on braked unwinds. Actuated either automatically upon a loss of tension below the preset trip point or by machine speed dropping below speed trip point (after an adjustable delay), or immediately upon an external contact closure. Controller output is reduced to a preset (user adjustable) low level to prevent brake lock-up when the machine starts. When tension rises above the soft start trip point, the controller goes back to automatic control mode. Unit remains in Soft Start while contact remains closed. Does not operate in the MANUAL control mode.
- **TENSION AND STATUS DISPLAY.** A 2 line, 16 character per line LCD display shows web tension and the status of particular functions including Tension Limit Switch. Display is calibrated to read out total tension in pounds, newtons, kilograms, or many other desired units.
- **TENSION LIMIT SWITCH (TLS).** A relay is activated to alert operators to a preset low or high tension condition. Function will show up on display. Can be configured to stop the machine or sound an alarm.
- **REMOTE AUTO/MANUAL SELECT SWITCH.** A remote maintained switch may be connected. Function is selected in the Setup Menu or Misc Features page of PCWebLink.
- **REMOTE AUTO SETPOT INPUT.** An external remote potentiometer may be connected to one of several alternate inputs. Function is selected in the Setup Menu or Misc Features page of PCWebLink.
- **REMOTE MANUAL SETPOT INPUT.** An external remote potentiometer may be connected to one of several alternate inputs. Function is selected in the Setup Menu or Misc Features page of PCWebLink.

1.6 OPTIONS (Shown with option code in parentheses)

SOME OF THESE OPTIONAL FUNCTIONS REQUIRE CONFIGURING OR EXTERNAL WIRING. REFER TO SECTION 2.5 FOR WIRING AND SECTION 3 FOR CONFIGURATION.

- **230 VOLT POWER (230).** 230 volt 50/60 Hz power input.
- **24V or 45V OUTPUT (24,45).** Version V only. 24V available only with 115Vac power input.
- **ATTACHED POWER CORD (APC).** A heavy duty 3 conductor power cord wired to the unit .
- **EXTENDED RANGE (XRE).** The transducers excitation is 10 volts instead of the standard 5 volts. Used when tension range is a low percentage of transducer load rating, i.e. measuring light tension on a wide (heavy) roller. The transducers must also have the XR option.
- **ISOLATED 10V OUTPUT (I10) OR ISOLATED 4-20mA OUTPUT (I420).** Isolates the output signal from ground or circuit common. Recommended for all Version D units. Recommended for all units connecting to drives or PLC's.
- **NONSTANDARD METER SCALE (NMS).** Any nonstandard meter range. See Specifications, page 4, for standard ranges.
- **REVERSE OUTPUT (RO).** Increases output when tension exceeds set point, and decreases when tension drops below set point. Used in intermediate applications where transducers are located after the nip rolls being controlled by the transducers or for driven unwinds.
- **REMOTE TENSION AMPLIFIER (RTA).** The internal tension amplifier is bypassed and the tension signal is provided by an external remote device such as the FireGuard™. This allows use of special indicator functions, such as intrinsic safety, which are not available in the WebHandler™ Model 3 controller.
- **REMOTE TENSION SWITCH (RTS).** Tension On/Off switch installed in remote enclosure, with servo valve. (Version P only).
- **RS485 (RS48).** Serial Communications using the RS485 protocol.
- **SPEED FOLLOW.** This is a function normally used on Version D controlling tension in an intermediate zone or surface driven rewinds and unwinds. The Control board contains a regulator circuit, separate from the tension regulator, that can accept a 0 to 10V line speed signal or one from a DC tach (**SFD**), or a pulse tach (**SFP**). The line speed signal causes the output of the controller to follow (go up and down with) line speed. The output of the tension regulator then trims the follower output as needed to maintain set tension.
- **TAPER TENSION.** For rewind applications only. Causes tension to decrease as roll diameter increases as calculated electronically using inputs from: two DC tachs (**TTD**), two pulse tachs. (**TTP**), or as sensed by a follower roll or ultrasonic sensor (**TTF**). Helps produce a better quality roll by eliminating telescoping, crushed cores, too tight or too loose rolls. Taper is adjustable from 0 to 100%.

1.7 ACCESSORIES

- **Analog Tension Meter (#722-1385).** 3.5", 0 to 1mA dc. Must be installed remotely.
- **Analog Tension Meter in Enclosure (#722-1453).** Same as above but in enclosure.
- **Ultrasonic roll diameter sensor (#149-0002).** Compact user-adjustable sensor with a 0 to 10V output proportional to target distance.

DFE also offers a wide variety of interconnect cables. Please consult your applications engineer for more information.

SECTION 2

INSTALLATION

2.1 DIMENSIONS, inches (mm)

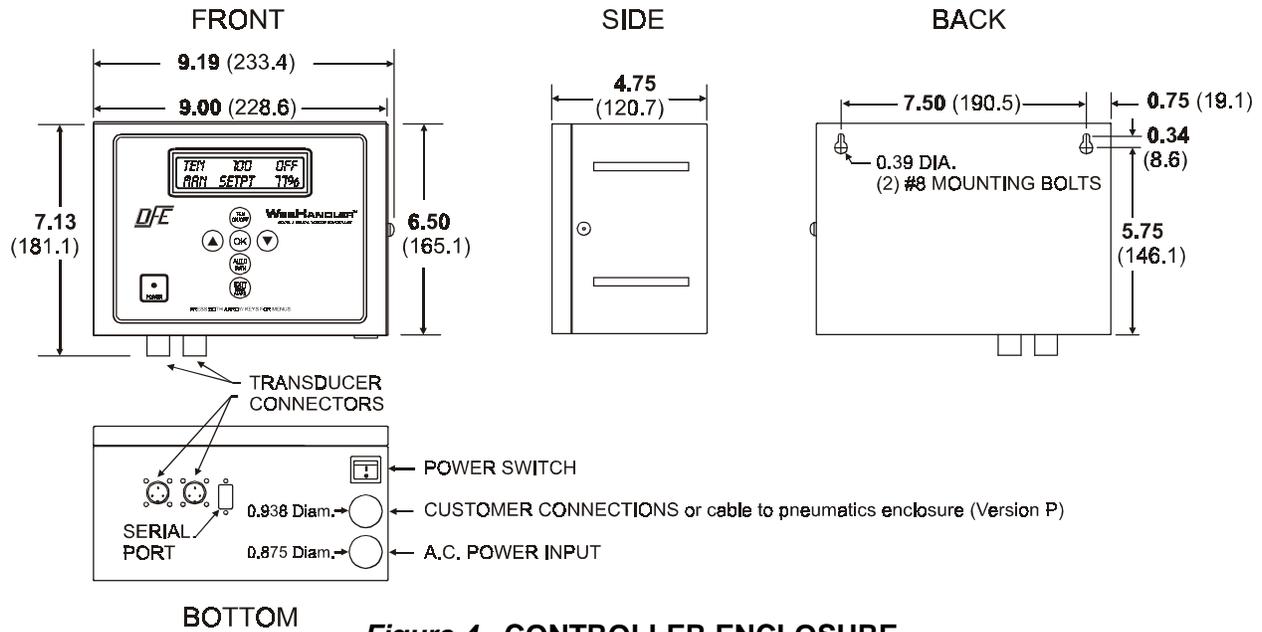


Figure 4 - CONTROLLER ENCLOSURE

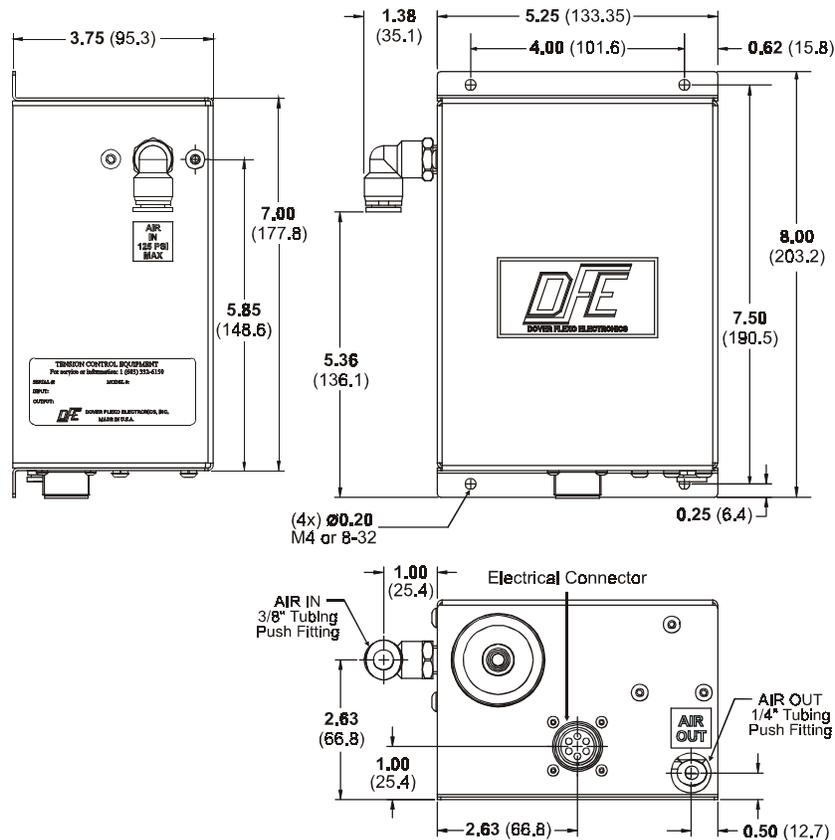


Figure 5 - PNEUMATICS ENCLOSURE FOR VERSION P

2.2 SELECTING A LOCATION AND INSTALLING THE CONTROLLER

A. Location for Controller:

1. **Versions P, V, C and D:** Select a location on the machine frame or a wall that will be convenient for the machine operator to operate the controller and to see the tension meter easily. Be sure the location is free of vibration, and is dry and clean. Take care to choose a place that the controller won't be struck and damaged by anything or anyone.
2. **Version P only:** The remote pneumatic enclosure is designed for mounting close to your brake or clutch. They will therefore require shop air to be brought to its input, and the output is brought to the clutch or brake. In addition, a connection cable must be run between the pneumatic unit and the controller. Choose a location which is free from vibration.

B. Installation of Controller:

1. **Versions P, V, C and D:** The enclosure is fastened to the mounting surface you have chosen by two socket head cap screws. Install the screws on the mounting surface to match the screw hole dimensions on the back surface of the WebHandler™ Model 3 enclosure. See Section 2.1, Dimensions. Leave them loose about 6 turns. Position the keyholes in the back panel of the enclosure over the screws and slide it down until it locks in place. The cover must be open to tighten the mounting screws.
2. **Version P only:** The pneumatic enclosure should be attached to your machine in the area of your clutch or brake. Drill four holes in a pattern 4" W x 7.5" H. Use four screws to attach the pneumatic enclosure to your machine.

2.3 POWER VOLTAGE SELECTION

The WebHandler™ Model 3 controller is designed to operate on either 115v-60Hz or 230v-50/60Hz power. Confirm that the correct voltage for your application has been selected. The AC voltage select switch is located on the power board (in the bottom of the unit) next to the fuses. See Figure 3 for location of the board.

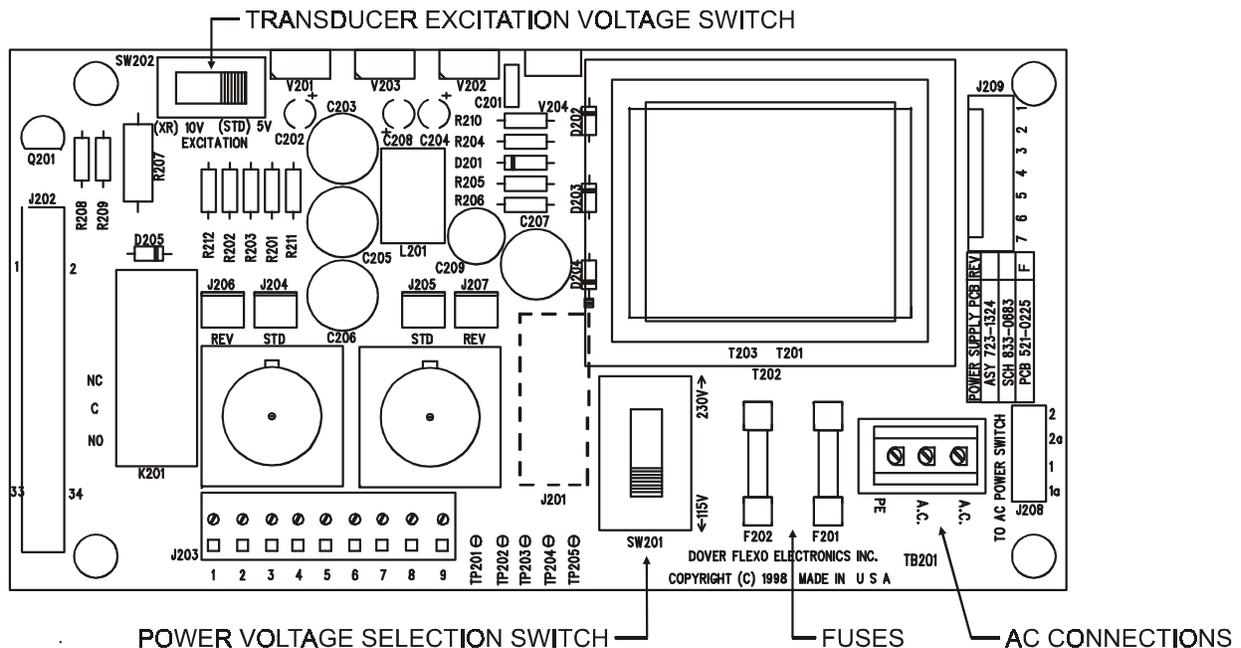


Figure 6 - POWER BOARD

Slide switch SW201 to select 115 volts or 230 volts. Also verify that the correct fuses are used for the voltage you have selected. 115V uses (2) 0.25 Amp (#108-0046). 230V uses (2) 0.125 Amp (108-0045)

See Figure 7, below. **CAUTION! The wrong selection will damage the controller!**

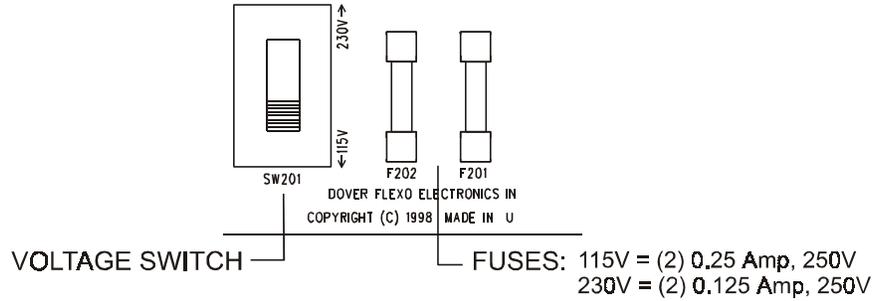


Figure 7 - POWER VOLTAGE SELECTION SWITCH

2.4 TRANSDUCER EXCITATION VOLTAGE SELECTION

The transducer excitation voltage switch is located at the upper left corner of the power board. Confirm that the correct transducer excitation has been selected. 5 Volts is standard, 10 Volts provides a wider operating range. The transducer excitation select switch is located on the Power Board. Note: If using external tension input (RTA option), this selection is not necessary.

CAUTION - The transducers MUST have the XR option if you select 10 Volts! Otherwise damage to your transducers will result!

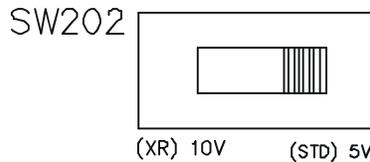


Figure 8 - TRANSDUCER EXCITATION VOLTAGE SWITCH

2.5 CUSTOMER ELECTRICAL CONNECTIONS

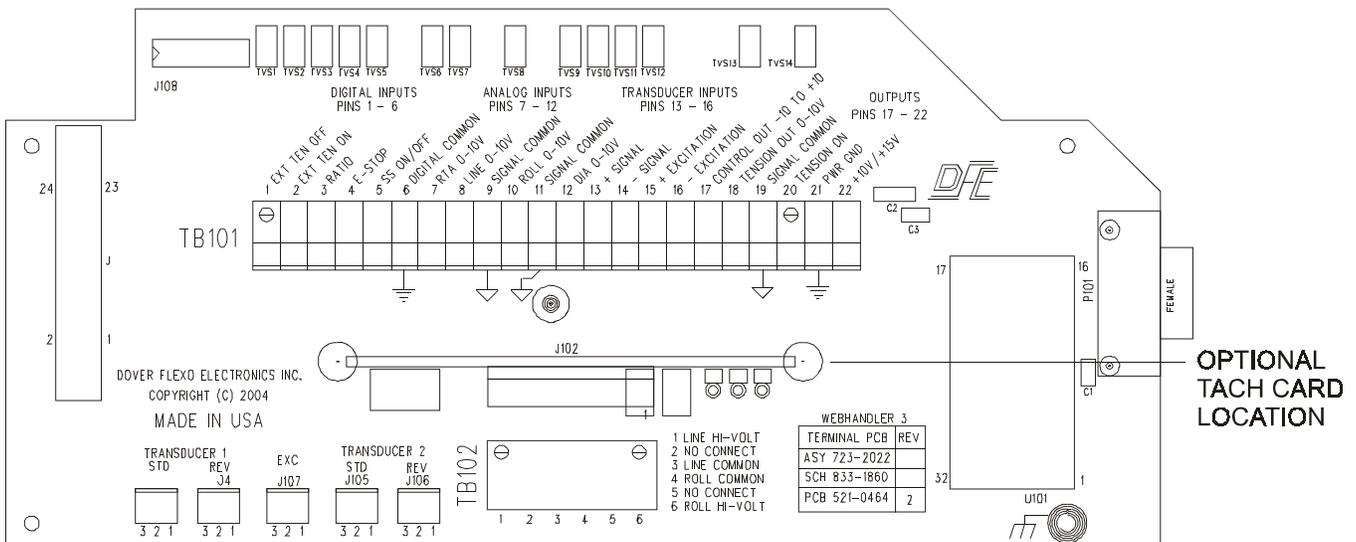


Figure 9 - TERMINAL BOARD

2.5.1 ELECTRICAL CONNECTIONS FOR POWER BOARD, STANDARD AND OPTIONS

See Figures 3 and 6 for locations of Power Board terminal strips.

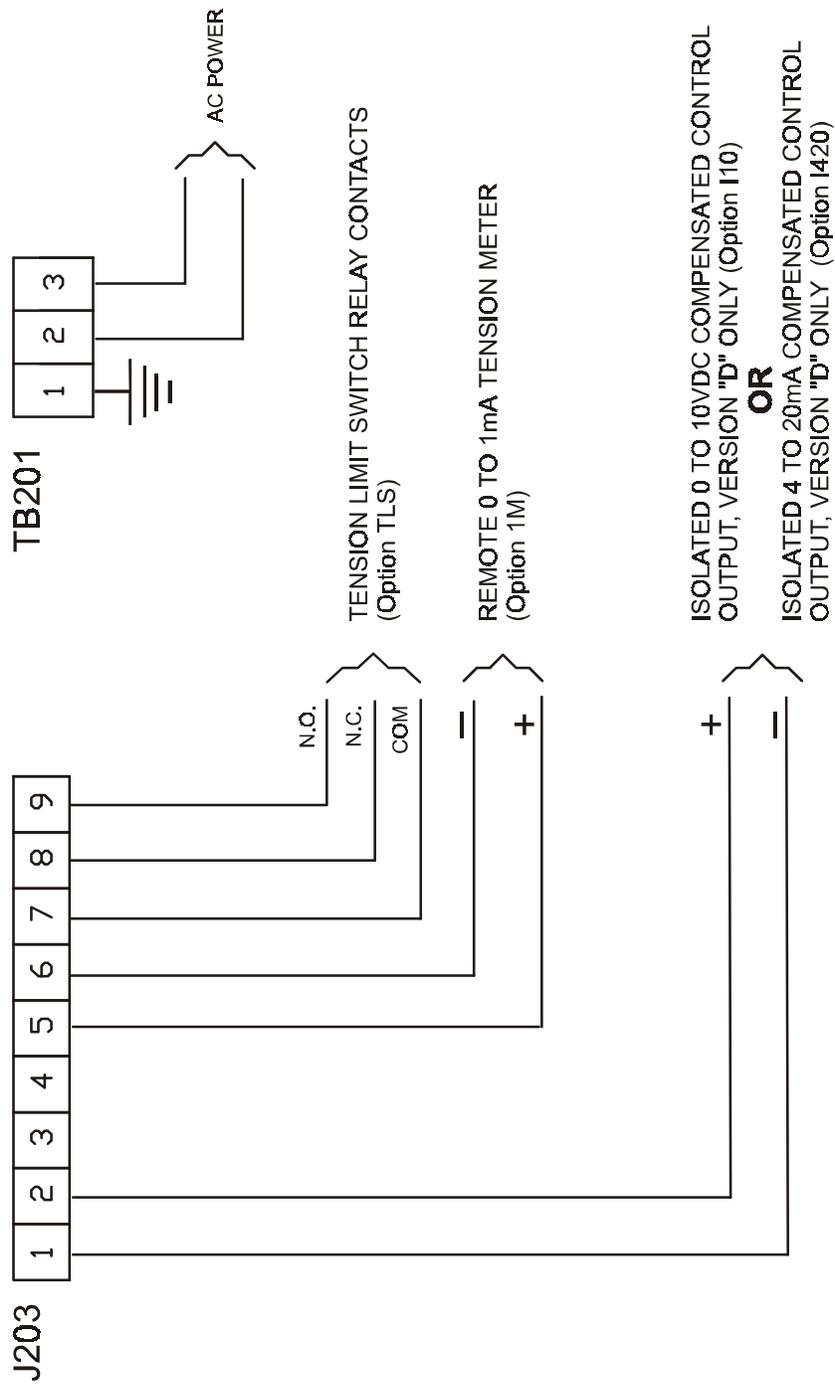


Figure 10 - ELECTRICAL CONNECTIONS FOR POWER BOARD. STANDARD AND OPTIONS

2.5.2 ELECTRICAL CONNECTIONS FOR STANDARD FEATURES

Depending on the feature you will be using, you may not need to make all of the connections shown. These connections are made on the Terminal Board. See Figure 3 for location of Terminal Board.

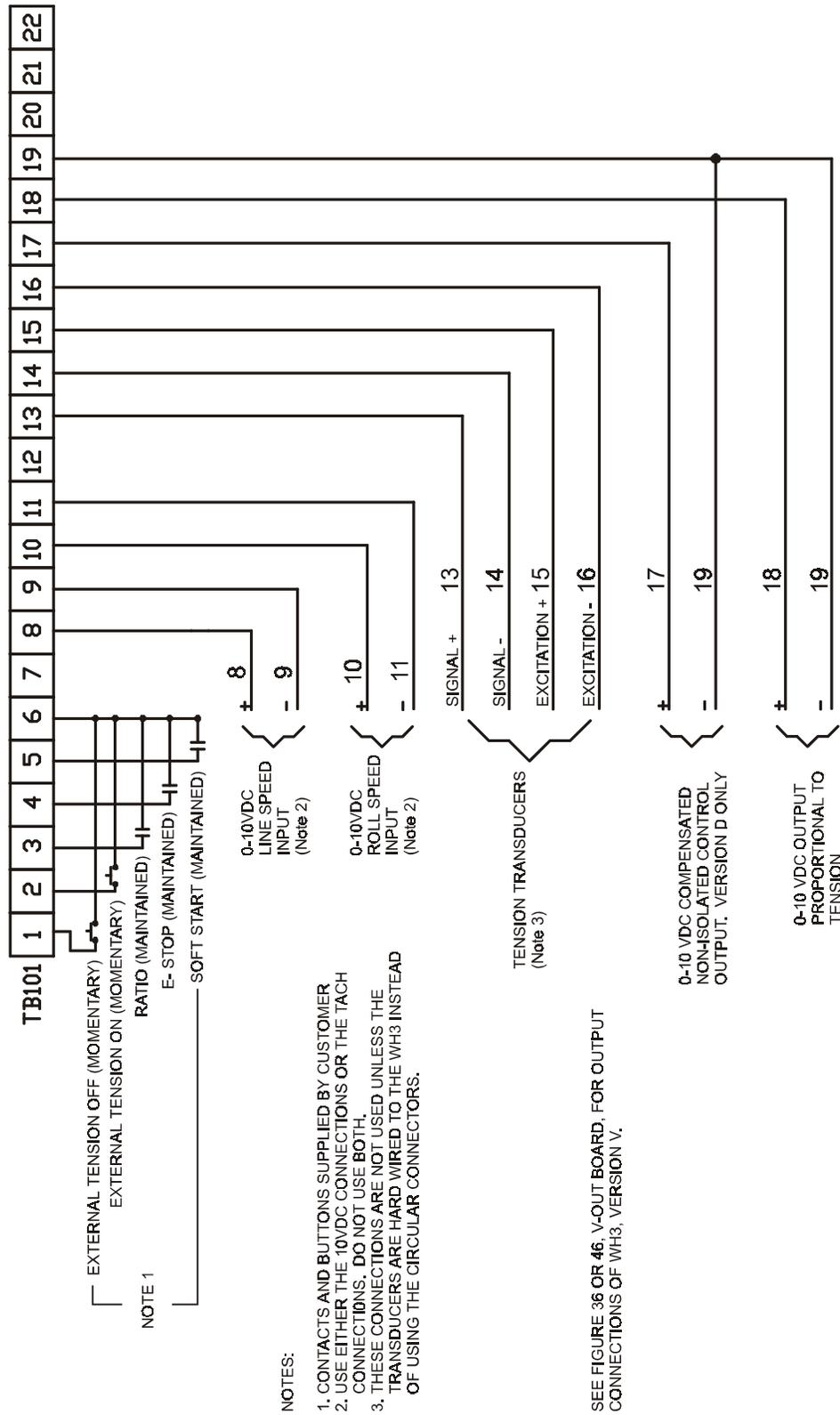


Figure 11 - ELECTRICAL CONNECTIONS FOR STANDARD FEATURES

2.5.3 ELECTRICAL CONNECTIONS FOR OPTIONS AND ACCESSORIES

These connections are made on the Terminal Board. See Figure 3 for location of Terminal Board.

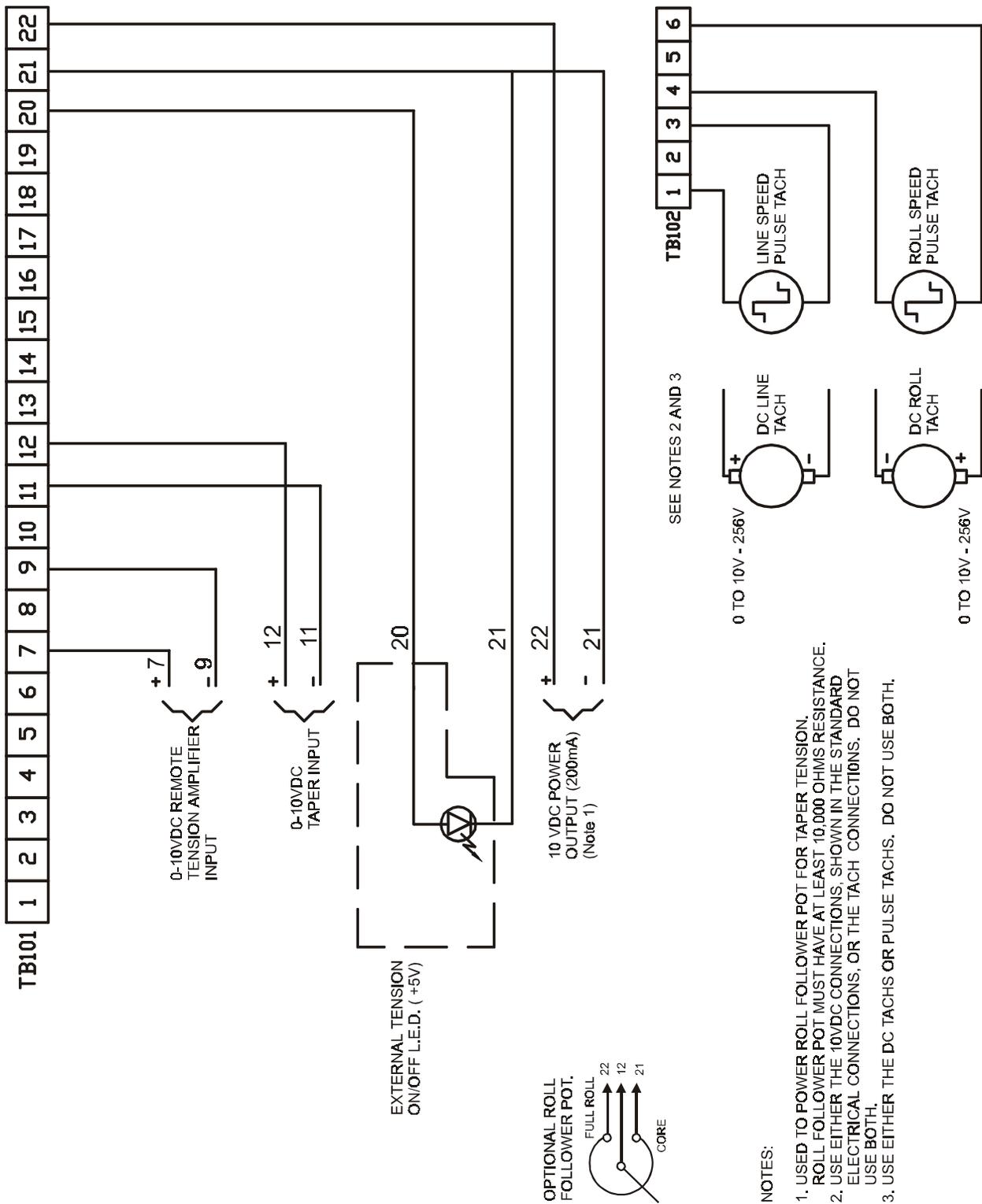


Figure 12 - ELECTRICAL CONNECTIONS FOR OPTIONS AND ACCESSORIES

3.1 INITIAL POWER-UP AND OVERVIEW OF USER INTERFACE

Turn unit ON by moving switch at bottom of unit to the ON position. The green Power LED will come on and after a few seconds the default display shown below will appear.



Figure 13 - DEFAULT DISPLAY

The WebHandler™ Model 3 Control Panel consists of a simple six-key membrane keypad to allow the user to operate the unit, to enter data, and to make selections between functions, and a 2-line display to provide operating data and status information to the user.

A. THE ALPHANUMERIC DISPLAY

The Alphanumeric Display has 2 lines, with 16 characters in each line. In operating mode the top line of the display shows the measured tension, and if Output is enabled, ON will appear to the right. If output is not enabled (Tension is Off), OFF will appear to the right instead.

The controller set-point is shown on the second line of the display by default. If the controller is in Manual mode, MAN SETPT will be shown to the left, and on the right the Manual set-point is displayed in percent. If the controller is in Auto mode, AUTO SETPT is shown to the left, and the Auto set-point is displayed on the right.

If the controller has an alarm condition or if it is in a special mode, the bottom display line will flash TLS Hi active or TLS Lo active, or ESTOP active, Ratio active or Soft Start active. Also if the Taper feature is active, a “T” will appear to the right of the Auto set-point value (wherever displayed).

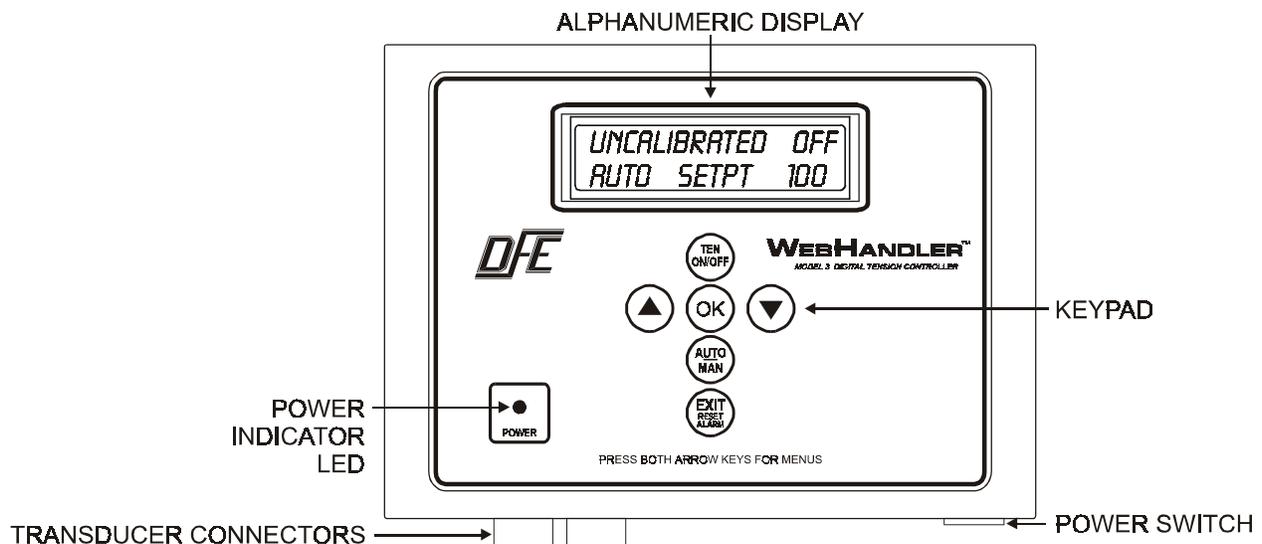


Figure 14 - WEBHANDLER3 CONTROL PANEL

B. THE KEYPAD

The **TEN ON/OFF** key is used to turn output **ON** and **OFF**. When Tension is **OFF**, no output is produced regardless of other operating modes you are in. When Tension is **ON**, the controller produces output depending on whether it is in **MANUAL** or **AUTO** mode.

The **AUTO/MAN** key is used to select between the two main operating modes. When the controller is in **MANUAL** mode, output is determined by the **MANUAL** set-point. When the controller is in **AUTO** mode, output is determined by the **AUTO** set-point, the measured tension, and the tuning settings.

The **▲** key is pressed simultaneously with the **▼** key to enter menu mode. It is used to navigate through function groups, functions or function choices, or to increase the value of a setting.

The **OK** key is pressed to select a menu group or a function; and to make or remove a choice within a function. Press **OK** to save and use the displayed setting value or function. This will blank the second line of the display showing you are now back at the function menu.

The **EXIT/RESET ALARM** key is pressed to initiate an exit from a function without saving any changes, and to navigate back to the Default display. It is also used to reset the diameter calculator (when used) to full roll or to core, and to reset a **TLS** alarm (when used).

C. MENUS

The display has a default screen, which is the screen the unit shows during normal operation. Pressing the **▲** and **▼** keys simultaneously puts you into Menu Mode. There are four Menu Groups available: Operator, Calibration, Setup and Diagnostic Menus. By pressing the **▲** or **▼** keys, you can pick the one you want, then press the **OK** key. This will put you into that Menu Group, where you can choose the particular function you want pressing the **▲** or **▼** keys, then **OK**. Once you are in a function, you can use the **▲** or **▼** keys to adjust a value or make a selection. When complete, you can press the **OK** key to save a value, or the **EXIT** key to exit the function without saving the change. When enabled, an anti-tamper function prevents unauthorized access to certain menu items. See section 4.1.C.5 for details

A menu tree showing all of the functions is shown in Appendix D, while a detailed description of all the functions is shown in Appendix E.

3.2 TENSION CALIBRATION

A. USING STANDARD TRANSDUCER CONNECTION (see Figure 15)

1. Press both **▲** and **▼** keys together to enter function group menus. Select the Set-up menu and press **OK**. Navigate to “Tension Source”, press **OK**, select “Transducer”, and press **OK**. An asterisk will appear at the right edge of the second line, then line 2 will blank out.
2. Press **EXIT** to get to menu mode. Select Calibration menu and press **OK**. Navigate to “TensionRange” and choose your full scale range from the list. If your desired tension range is not shown, choose “NonStandard” and press **OK**. Use the **▲** and **▼** keys to select your desired tension range, then press **OK**.
3. Navigate to “Set CalibrationWt.” Set to the value of your weight. Press **OK**.
4. Navigate to Calibrate Xducer, and press **OK**. Follow the instructions shown. When complete, you will return to the Calibrate Xducer screen in the Calibration Menus. Press the **EXIT** key twice to return to the Default Display.

Note: If the error message “Unable to Calibrate” appears, this means that the signals the controller sees for your zero point, and for your calibration point, are too close to each other for accurate tension reading. This could be because your transducers are not connected properly, because your transducers are not oriented correctly, or because your calibration weight is not high enough. Recheck these things and repeat the procedure.

5. Tension Calibration Completed.

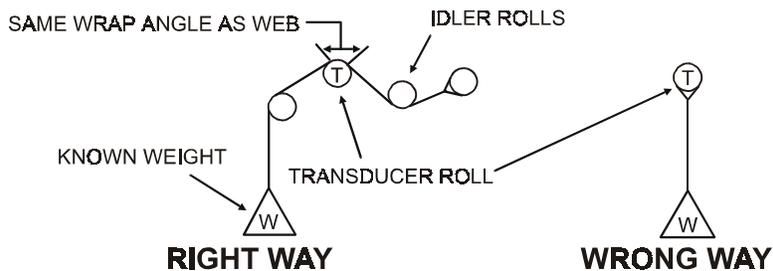


Figure 15 - WEB PATH FOR CALIBRATION

B. USING A REMOTE TENSION AMPLIFIER (RTA) SUCH AS THE DFE FIREGUARD INDICATOR.

1. Press both ▲ and ▼ keys simultaneously to enter function group menus. Select the Set-up Menu and press **OK**. Navigate to Tension Source. Press **OK** and choose “External”. An asterisk will appear at the right edge of the second line, then line 2 will blank out.
2. Press **EXIT** to get to menu mode. Select the Calibration menu and press **OK**. Navigate to RTA Ten Range and choose your full scale tension range from the list. If your desired tension range is not shown, choose “NonStandard” and press **OK**. Use the ▲ and ▼ keys to select your desired tension range then press **OK**.

Full scale Tension Ranges for the Transducer input and for the External inputs are independent from each other. The Tension Range which applies to your chosen setpoint source must be set (and if Transducers are used, they must be calibrated), otherwise the controller will display the “Uncalibrated” message.

3.3 LINE SPEED CALIBRATION AND SETUP

Line Speed Calibration is required when you want to use the WebHandler in any of the following modes: Line Speed Follower; Diameter Compensated Line Speed Follower; Taper by Diameter Calculation; or Soft Start by Line Speed. There are three kinds of Line speed signals which can be used: a 0-10Vdc signal which may come from a drive or interface card; a high voltage DC tachometer signal; or a Pulse tachometer or encoder signal. Refer to step A, B, or C as appropriate for the type of Line Speed signal you have, then jump to step D.

A. CALIBRATION FOR 0-10V LINE SPEED SIGNAL

1. Verify that your 0 to 10V Line Speed signal actually produces 0V at zero speed, and 10V at full speed. Verify that your Line speed signal is connected to Terminal Board at TB101 pins 8 (Signal +) and 9 (Signal Return).
2. If either Diameter Compensated Line Speed follower or Taper by Diameter Calculator modes are to be used with a 0-10V roll speed signal, verify that your 0-10V Roll Speed signal actually produces 0V at zero speed, and 10V at full speed. Also verify that your 0-10V Roll speed signal is connected at TB101 pins 10 (Signal +) and 11 (Signal Return).
3. Go to step D for setup.

B. DC TACHOMETER OPTION CARD CALIBRATION AND SETUP

The DC Tachometer card is only used when your machine has DC tachometers to measure speed.

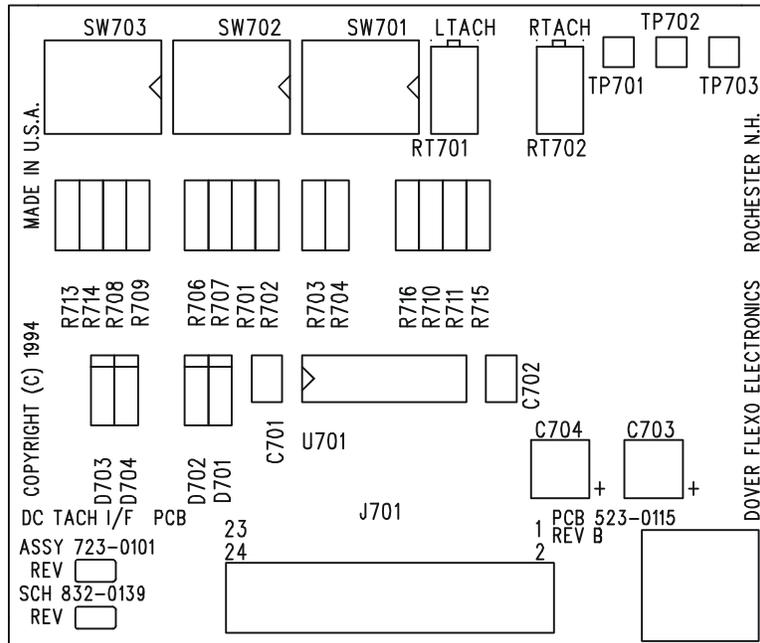


Figure 16 - DC TACHOMETER OPTION CARD

Verify that a DC tachometer card is installed in the option card slot J102 on the Terminal Board, located in the back of the WebHandler3. See Figures 3 and 9.

Verify that your DC Line Speed tachometer is connected to terminal board TB102 pins 1 (Signal+) and 3 (Signal -). If diameter Compensated Line Speed Follower or Taper Diameter Calculation is to be used, you may verify that your DC Roll Tachometer is connected to TB102 pins 6 (signal+) and 4 (signal -). See Figure 17 below.

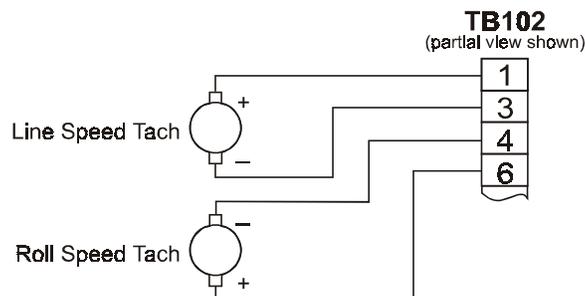


Figure 17 - DC TACHOMETER ELECTRICAL CONNECTIONS

There are two +10 Vdc outputs on the card, named LTACH and RTACH. Both are needed for the Taper by Diameter Calculation (TTO) option and the Line Speed Follower with diameter compensation (SFD) option, but only LTACH is needed for the speed-actuated Soft Start function and the Line Speed Follow function. LTACH refers to the line (machine) speed tachometer. RTACH refers to the rewind roll speed tachometer.

The following procedure sets the outputs of the card to +10 volts at maximum machine speed.

Refer to Figures 16 and 18 for card layout and locations for adjustments.

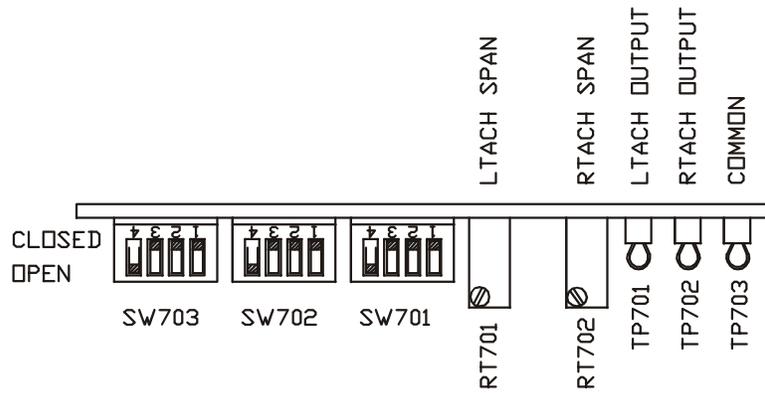


Figure 18 - DC TACHOMETER CARD SWITCH SETTINGS AND ADJUSTMENTS

1. Initial Switch Settings

WARNING! To prevent possible damage to the circuit card, set the SW702 and SW703 switches as shown **BEFORE** installing the card and **BEFORE** running the machine!

INITIAL SW702 and SW703 SWITCH SETTINGS
1 - Open
2 - Open
3 - Open
4 - Closed

- Run the machine at the maximum expected operating speed. Measure the line tachometer voltage and note its polarity. This is called the LTACH voltage. (NOTE: If desired, run the machine at 50% of maximum speed. In this case the LTACH output voltage will be set at 5.0 volts instead of 10 volts (50%).)
- Set the SW701 switches to accommodate the tach polarity measured at TB102 terminals 3 and 1. Use the following charts to set the switches based on which terminal is positive polarity.

SW701 SWITCHES (NA = Not Applicable)				
TB102 terminals	1	2	3	4
Ltach ----- if pos 1 is +	NA	NA	Open	Closed
if pos 3 is +	NA	NA	Closed	Open

- Set SW702 to accommodate the voltage measured in step 3 above using the chart below. If the machine was run at half speed, multiply the voltages by 2 and use those values for the following switch-setting chart.

SW702 SWITCH SETTINGS				
VOLTS DC	1	2	3	4
3 - 4	Closed	Open	Open	Open
4 - 16	Open	Closed	Open	Open
16 - 64	Open	Open	Closed	Open
64 - 250	Open	Open	Open	Closed

- Set the LTACH span pot. Run the machine at maximum speed. Measure the LTACH output voltage at test points TP701 (+) and TP703. Adjust the LTACH Span pot. (RT701) for 10.0 volts.

C. PULSE TACHOMETER OPTION CARD CONNECTION AND CALIBRATION

The Pulse Tach card is only used when your machine has pulse tachometers or encoders to measure speed.

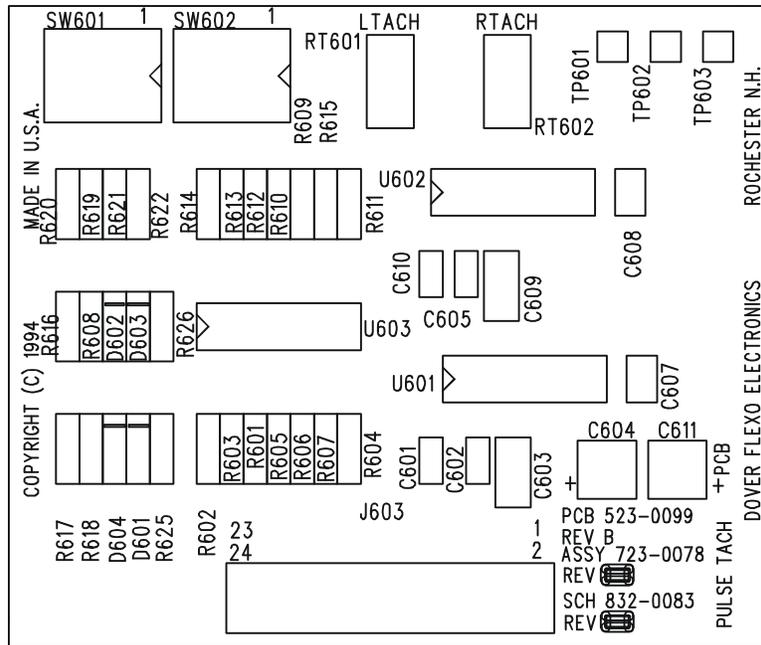


Figure 19 - PULSE TACHOMETER CARD

Verify that a pulse tachometer card is installed in the option card slot J102 on the Terminal Board located in the base of the WebHandler.

Verify that your DC Line Speed tachometer is connected to Terminal Board TB102 pins 1 (Signal+) and 3 (Signal -). If diameter Compensated Line Speed Follower or Taper Diameter Calculation is to be used, you may verify that your DC Roll Tachometer is connected to TB102 pins 6 (signal+) and 4 (signal-). See Figure 12.

There are two +10 Vdc outputs on the card, named LTACH and RTACH. Both are needed for the Taper option, but only LTACH is needed for the speed-actuated Soft Start function or Line Speed Follower function. LTACH refers to the line (machine) speed pulse tach. RTACH refers to the rewind roll speed pulse tach.

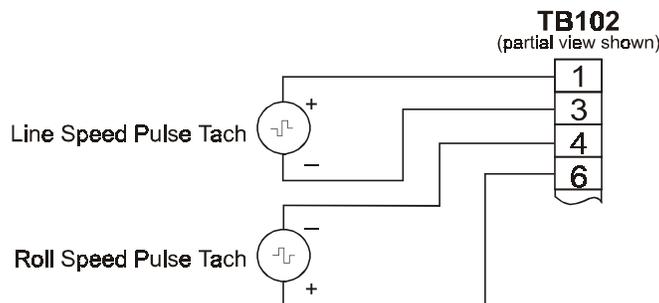


Figure 20 - PULSE TACHOMETER CARD ELECTRICAL CONNECTIONS

The following procedure sets the outputs of the card to +10 volts at maximum machine speed.

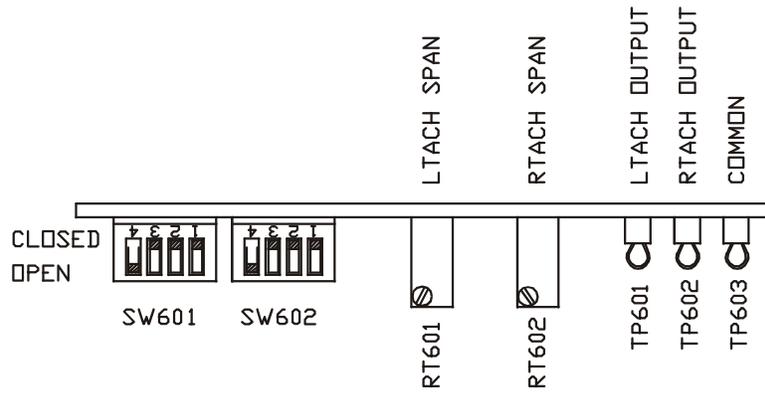


Figure 21 - PULSE TACHOMETER CARD SWITCHES AND ADJUSTMENTS

1. Initial Switch Settings

WARNING!! To prevent possible damage to the circuit card, set the SW601 switches as shown below **BEFORE** installing the card and **BEFORE** running the machine!

INITIAL SW601 SETTINGS	
1	Closed
2	Open
3	Open
4	Closed

2. Determine the maximum pulse amplitude of pulses from the LTACH pulse tach. The data sheet that came with it should give this data or allow you to calculate it. The amplitude can also be measured using an oscilloscope. Set the SW601 switches according to the maximum amplitude using the chart below.

SW601 SWITCHES		
	LTACH	
Pulse Amplitude (volts)	3	4
.25 - 2.0	Closed	Open
1.0 - 50.0	Open	Closed

3. Determine the frequency of the LTACH pulse tach at maximum machine speed. Calculation is usually the best method. Look on the pulse tach data sheet for the number of pulses per revolution and multiply by the revolutions per second, considering any gear ratios that may be used.
4. Set the SW602 switches according to the frequencies in the previous steps.

SW602 SWITCHES		
	LTACH	
Frequency	3	4
180 Hz - 1.7 KHz	Closed	Closed
1.1 KHz - 40 KHz	Closed	Open

Note: Opening switch 2 disables the RTACH output. Opening switch 3 disables the LTACH output.

5. Set the LTACH span pot. Run the machine at maximum speed. (As an alternate method, run the machine at 50% of maximum speed. Set the output voltages at 50% of the values specified below)
6. Measure the LTACH output voltage at test points TP601 (+) and TP603(-). Adjust the LTACH Span pot. (RT601) for 10.0 volts.

D. MAXIMUM LINE-SPEED CALIBRATION

On the front of the controller, navigate to **Setup Menus** then **Max Line Speed**, and enter your maximum line speed (the speed which you just calibrated to produce the 10V output). Enter it in that function. Navigate to the very next function, **Threshold Speed**, and enter a value equal to 10% of your previously entered maximum.

This completes Line Speed Calibration. If you need to set up a Roll Tachometer for the TTD or SFD options, proceed to section 3.4. Otherwise, your Line tachometer calibration procedure is complete.

3.4 ROLL DIAMETER CALIBRATION AND SET-UP

If you intend to use an option or mode which requires the controller to know roll diameter information, there are three ways to get that information into the controller.

Direct Input is used when you have an external device supplying a 0-10V roll diameter signal to the controller, where 0V = core or minimum diameter, and 10V = full or maximum roll diameter. Examples of these devices are Ultrasonic sensors, and certain Motor Drives which perform diameter calculation, resulting in a 0-10V output signal.

Diameter Calculation is used when you have two signals, one representing line speed and one representing roll speed. The two signals are used by the controller to calculate roll diameter. If the signals come from DC tachometers, a DC tachometer card needs to be used. If the signals are pulsed, coming from inductive proximity sensors or encoders, a Pulse tachometer card needs to be used. If the two signals are 0-10V level (such as from certain motor drives) then no tachometer card needs to be used

Calibrated Rider input is used when a rider arm connected to a potentiometer is used to provide roll diameter information. This differs from the direct input in that the input range is not a full 10V and so it requires some calibration.

You must calibrate your controller for the method you intend to use.

A. DIRECT

1. Install the device in accordance with the instructions supplied with it. Make sure that the ultrasonic beam is aimed perpendicular to the rewind roll, not at an angle.
2. Verify that the unit has been connected as described in Section 2.5.
3. Follow the directions supplied with the unit to calibrate it, so that it will produce 10V with the maximum roll size on the machine, and 0V with a core on the machine. Proceed to section 3.4.D.

B. DIAMETER CALCULATION

If you intend to use Line Speed Follower with Diameter Compensation mode, or if you intend to use Taper by Diameter Calculation, you will have two DC or two pulse tachometers. You should have already calibrated your unit for line speed and checked the wiring for your roll tach. In this section, you will calibrate your second, roll speed tachometer.

1. **DC Tachometer card calibration** (See Figures 16, 18 for locations of switches and adjustments)

Place a core on the spindle, and run it at the maximum expected operating speed. Use a hand tach to verify that it is running at the maximum line speed. With your voltmeter's red lead at TB102 terminal 6 and the black lead at terminal 4, measure the roll tachometer voltage, and note its polarity. (Note: If desired, you can run the machine at 50% of maximum and multiply it by 2). This is called your maximum RTACH voltage, which will be used later. Stop your machine.

Set the SW701 switches to accommodate the tachometer polarity according to the following chart:

SW701 SWITCHES				
TB102 terminals	1	2	3	4
Rtach ---- if pos 6 is +	Open	Closed	Na	Na
if pos 4 is +	Closed	Open	Na	Na

Set the SW703 (RTACH) switches to accommodate the maximum RTACH voltage measured above, using the chart below. Remember to use the computed voltage if your machine was run at some speed other than maximum.

SW703 SWITCH SETTINGS				
VOLTS DC	1	2	3	4
3 - 4	Closed	Open	Open	Open
4 - 16	Open	Closed	Open	Open
16 - 64	Open	Open	Closed	Open
64 - 250	Open	Open	Open	Closed

Now you will set your RTACH Span potentiometer. Connect your red and black voltmeter leads to tach card test points TP702 (+) and TP703(-) With the machine running at maximum speed, adjust the RTACH Span potentiometer for exactly 10V at core diameter. If you already have some material on your core, measure the roll diameter and adjust the RTACH Span pot to produce a test point voltage of

10 x (core diameter/actual diameter).

Note: If you ran your machine at half speed, set the test point voltage to half of what it would otherwise be.

Proceed to section 3.4.D.

2. Pulse Tachometer Card calibration (see Figures 19, 21 for locations of switches and adjustments)

Determine the maximum pulse amplitude of pulses coming from the RTACH pulse tach. Refer to the data sheet that came with it. The amplitude can also be measured using an oscilloscope. Set the SW601 switches according to the maximum amplitude using the following chart:

SW601 SWITCHES		
Pulse Amplitude (volts)	1	2
0.25 - 2.0	Open	Closed
1.0 - 50.0	Closed	Open

Determine the frequency of the RTACH pulse tach at maximum machine speed and at core diameter. Calculation is the best method, but it is also useful to verify it by measurement. Be sure to take all gear ratios into account. Set SW602 according to the maximum frequency:

SW602 SWITCHES		
	RTACH	
Frequency	1	2
180 Hz - 1.7 KHz	Closed	Closed
1.1 KHz - 40 KHz	Open	Closed

Now you will set your RTACH Span potentiometer. Connect your red and black voltmeter leads to tach card test points TP602 (+) and TP603(-) With the machine running at maximum speed, adjust the RTACH Span potentiometer for exactly 10V at core diameter. If you already have some material on your core, measure the roll diameter and adjust the RTACH Span pot to produce a test point voltage of

10 x (core diameter/actual diameter).

Note: If you ran your machine at half speed, set the test point voltage to half of what it would otherwise be.

Proceed to section 3.4.D to test the Diameter Calculator.

C. CALIBRATED RIDER

1. Connect your rider assembly according to Figure 12 in Section 2.5. Verify that it moves freely over the entire range of roll diameters.
2. Connect a DVM between TB101 pins 12 (+) and 21 (-) and verify that there is at least 4V of change between core diameter and full roll diameter.
3. Enter the Set-up menu. Navigate to the **Calibrate Rider** function. Press **OK** to start the procedure. Follow the prompts on the screen. You will end up back at the **Calibrate Rider** function in the menu. Press **EXIT** twice to return to the default display. Proceed to section 3.4.D.

D. CONFIGURE CONTROLLER FOR TYPE OF DIAMETER MEASUREMENT

1. Now you must configure your controller for the type of diameter input you are using:
2. Navigate to the Setup Menus Group.
3. Navigate to the **Set Core Dia** function. Enter the minimum roll size you will be using.
4. Navigate to the **Set Fullroll Dia** function and enter the maximum roll diameter you will be using.
5. Navigate to the **Dia Input Type** function and choose the method of diameter entry you have chosen (Direct, Diameter Calc, or Calibrated Rider).

E. TEST YOUR DIAMETER MEASUREMENT DEVICE

1. Navigate to the Operator Menus Group.
2. Navigate to the **Display Select** function and choose “Roll Diameter”.
3. Run your machine and observe the diameter value shown on the bottom line of the display. The diameter shown should agree with the actual measured diameter within at least 10%, preferably within 5%. If this is not the case, you will need to go back and check the calibration of your sensors. Otherwise, calibration is complete.

4.1 BASIC SETUP OF CONTROLLER including STANDARD FEATURES

Your WebHandler™ Model 3 digital controller has been properly configured at the factory. It should not be necessary to make any changes except tension calibration and operation tuning. Use this section to verify the configuration, or to reconfigure the controller if your application requirements change.

A. CONFIGURATION

In this section you will configure the WebHandler for use in your application. To do this, you go through the menus and change certain items to fit your application.

1. Choose the tension zone in which you will be using your controller by navigating to Setup Menus->Set Tension Zone, and choosing **Unwind**, **Intermediate**, or **Rewind**.
2. Choose the operating mode of your controller by navigating to Setup Menus->Control Feedback and selecting **Std Closed Loop** (for braked unwinds, eddy current rewinds, or driven unwinds or rewinds when no tachometer feedback signals are available), **SpeedFollowTTrm** (for Intermediate machine sections), or **SFDiaCompTenTrm** (for unwind or rewind sections using motor drives and you have line speed and roll diameter feedback).

This completes the Basic Setup procedure.

B. SETUP OF BASIC STANDARD FEATURES

In this section you can choose to activate standard features for use in your application.

1. Normally, your controller will power up with Tension turned Off. If you want to change this so that it powers up with Tension turned On (output enabled), navigate to Setup Menus->PowerOnTens Mode, and select On.
2. Your controller will also power up in Auto mode. If you want to change this so that it powers up in Manual mode, navigate to Setup Menus->PowerOnControlMd and select Manual.

C. SETUP OF ADVANCED STANDARD FEATURES

1. **Emergency Stop** (see Figure 45 in Appendix A, Control Card, for location of jumper. Also see Figure 11 for wiring). The ESTOP feature is useful to stop large rolls of material when an external switch or contact is closed. It requires the external switch or contact to be connected to TB101 pins 4 and 6 as shown in Fig.11 in Section 2.5.2. You will also need to configure your ESTOP output for either zero or full output by applying jumper JP1 on pins 1 and 2 as shown. These pins are located in the lower right corner of the control PCB. For full output, set the jumper on pins 2 and 3.

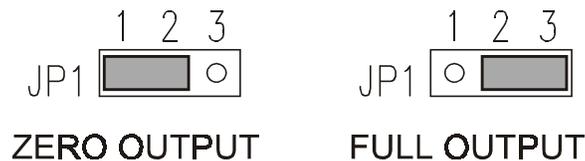


Figure 22 - E-STOP JUMPER SETTINGS

When ESTOP is activated, the controller will now produce either zero or full output, as you have configured above. Also, the second display line will flash “ESTOP ACTIVE”. When the contact closure is removed, the controller will remain in Tension On mode, with output enabled. When you exit ESTOP mode, the second line will revert to its normal display.

If you wish to have the ESTOP condition disable output (turn Tension Off), navigate to Setup Menus->Tens Off By EStop, and select **ON**.

2. RS232 and RS485 Serial Interfaces

The WebHandler has a serial data port which can be used for two purposes. The first, is to provide connectivity to a Windows PC or notebook computer running PCWebLink software, which is supplied with each unit on a diskette. This software, when connected to the WebHandler using a serial cable, allows easy setup and operation. Functions are grouped into convenient screens for easy viewing, and to allow simultaneous viewing of multiple operating parameters in the Run Screen.

The second, is to provide remote access from a host computer. Some machines have a master computer or PLC, and it may be convenient to have the host issue commands (such as Tension On/Off) and obtain operating parameters (such as current Tension), and display these conditions on a user interface that is already available in a central location.. To do this the host computer must be programmed to use the commands contained in the Appendix F.

The WebHandler must be configured for the same type of interface as the computer to which it is to be connected. The standard interface for WebHandlers is RS-232, which will allow direct connection to laptop computers. For industrial shop floor applications with longer cable runs, higher noise immunity requirements, and potential multidrop usage, you may want to order the RS-485 interface option. Many devices used in industrial applications already use an RS-485 interface. You will also need to determine whether your existing system uses a 4-wire or a 2-wire interface, so you can configure your WebHandler accordingly. The 4-wire interface is probably more common, but the 2-wire interface requires fewer wires to implement.

Note: PCWebLink software has no multidrop capability, although it can be used to configure a controller for multidrop operation

Note: The software interface (PCWebLink vs. Host Interface) and the hardware interface (RS232 vs. RS485) are independent - it is possible to use either software interface with either type of serial port.

a. HARDWARE SETUP

- (1) **RS232** To use RS232 you will need to make or buy a null modem cable which has a 9-pin female D subminiature connector on each end to connect to the male connectors on the bottom of your WebHandler and your computer. For RS232 connections, use only pins 2, 3, and 5. Refer to the following connection diagram. **NOTE:** TO change to a standard connection, move the jumpers on the Control Board from JP3 and JP4 positions 1 and 2, to positions 2 and 3. See Fig. 24.

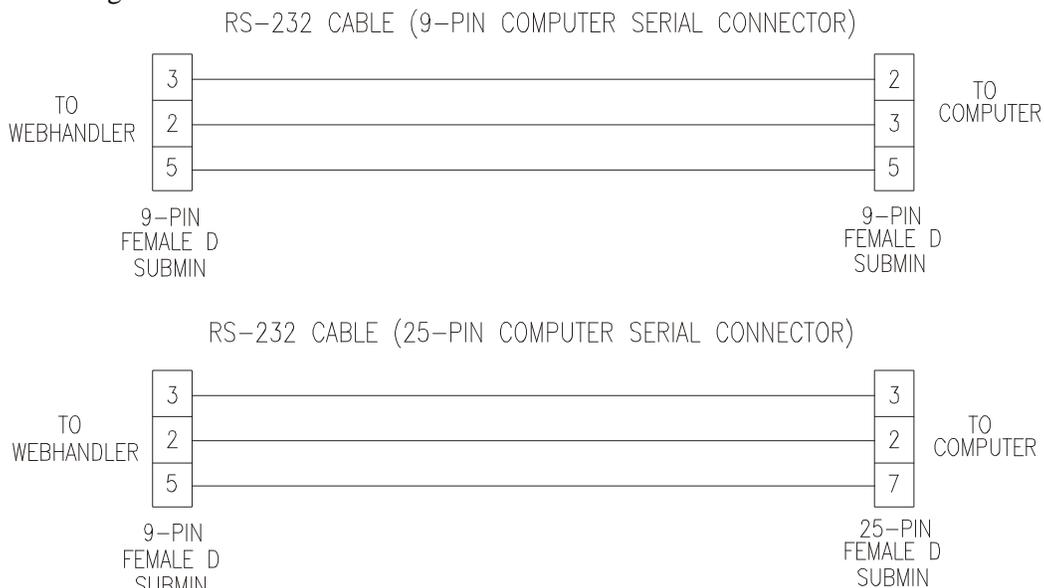


Figure 23 - RS232 CABLE CONNECTIONS

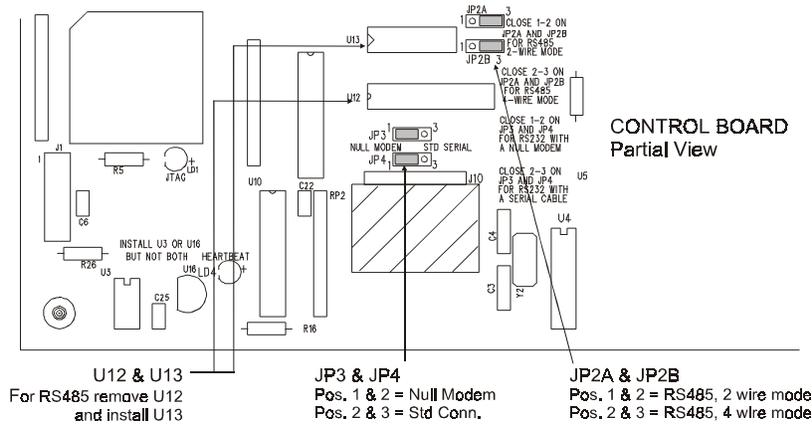


Figure 24 - RS232 / RS485 JUMPERS AND ADJUSTMENTS

(2) **RS485** Since the TensionManager has RS232 as a standard interface, if RS485 communication is desired, your WebHandler will need the RS485 option, or you can install the driver IC as follows:

- (a) Turn all power off and disconnect any cables
- (b) On the Control board, remove U12 (MAX233) and store for later re-use.
- (c) Install MAX491 (DFE P/N 104-0042) in socket U13.

You will then need to connect your WebHandler to your existing computer. Again, you will need to wire appropriately for either 2-wire or 4-wire, as shown in the following figure:

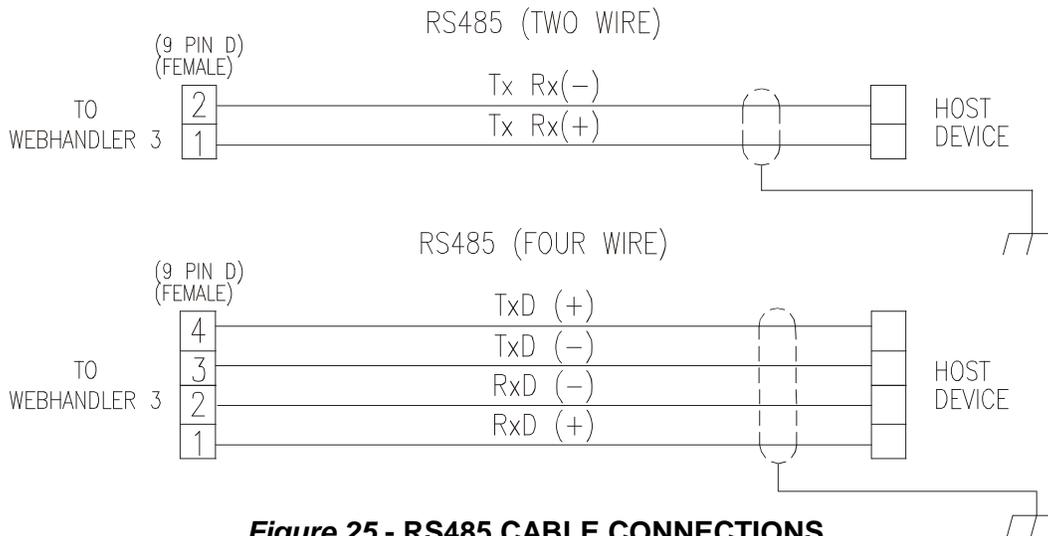


Figure 25 - RS485 CABLE CONNECTIONS

For two-wire RS485 connections, use only pins 1, 4, and 5.

For four-wire RS485 connections, use pins 1, 2, 3, 4, and 5.

Regardless of the type of interface you are using, do not make connections to pins other than those required for your interface.

Then, on the Control board in the WebHandler, Check jumpers JP2A and JP2B. If 4-wire is used, do NOT install the jumpers. If 2-wire is to be used, install shorting jumpers on both pair of pins.

Reference Control board in Figure 45 in Appendix A for location of IC's and jumpers.

b. SOFTWARE SETUP

In order to use either type of WebHandler serial options, it is necessary for the communication parameters on your laptop or host computer be set as follows: (1) Set your baud rate to 9600 baud, and (2) Set your communications format to 8 data bits, No parity, and 1 stop bit.

Using PCWebLink

(1) Loading and installing PCWebLink on your computer

- (a) Insert the supplied diskette in your computer. From the Windows Taskbar, select Start -> Run ->, and Browse to A:\WH3LinkInstall_.exe". Double-click on it and press OK. (You can also use Windows Explorer, go to your folder and double-click on "WH3LinkInstall_.exe"). The installer will give you a box to select where you want the files, defaulting to "C:\DFE". If you like that, press "UNZIP" and it will automatically create that directory and extract the files. If you want the files to be somewhere else, you can choose where. After it is done unzipping it will say so. Then press "CLOSE".
- (b) Go to Start -> Run -> , browse to your chosen folder and highlight "WH3Link_.exe". Right-click, choose "Create Shortcut" and the shortcut will appear in DFE. Drag the shortcut onto your desktop. Close out the Browse box.

(2) Running PCWebLink

- (a) Go to your desktop and double-click "Shortcut to WH3Link...".
- (b) A screen will come up asking you to select the COM port you are using for connection. If you select a COM port in use by another application, the message "Port error.." will come up, and your computer may hang up. You can click OK but you may get a fatal error message. Exit completely, go back to step 1 and enter the correct COM port.
- (c) Once you have successfully selected an available COM port, the PCWebLink screen will come up, with a white box with the DFE logo in it. Go to the menu bar, select File -> New. A Status box will appear.
- (d) 1 - At this time your computer attempts to communicate with the WebHandler. If you are connected correctly, the message 'Loading Data, Please Wait' will come up for a moment, and the Run screen will appear containing the values provided by the WebHandler.

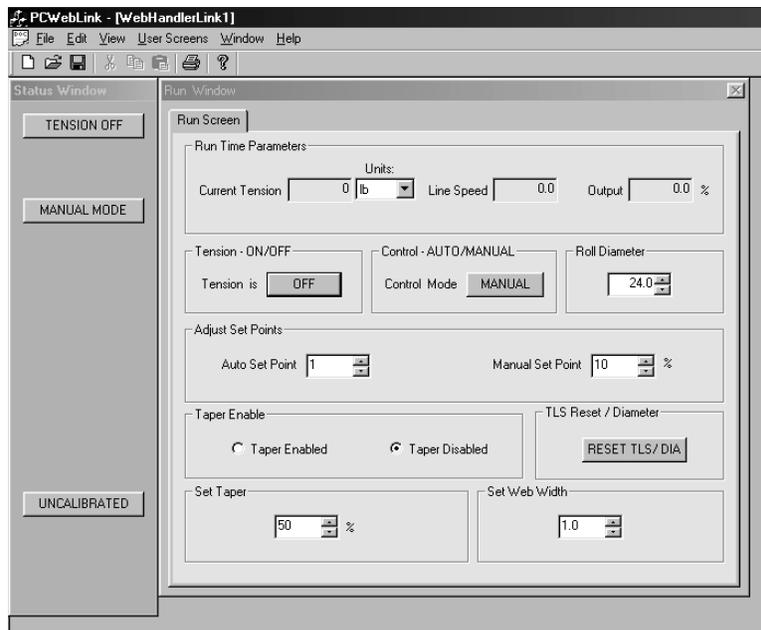


Figure 26 - PCWebLink RUN SCREEN

2 - If you are not connected correctly, after from 5 to 45 seconds, the program realizes that you don't have a WebHandler connected and gives you the error message, "COMMUNICATION ERROR: Please Check Cable Connection OR Heartbeat LED and restart WH3 and PCWebLink.

Press "OK". You should then attempt to resolve the problem. However you can still view the screens but you will not be communicating with the WebHandler, so the values will not be correct.

(3) Using PCWebLink to operate the WebHandler controller

The Run screen is the standard status screen for operation. You can use it for operating the controller and viewing tension, line speed (if calibrated), current controller output, and roll diameter (if calibrated). You can also change Tension Mode (On or Off), Controller mode (Manual or Auto), and Taper (on or Off). You can select Tension Display units and enter Auto and Manual Setpoints, Taper Percent, and Web Width. Note that if you enter an erroneous value, the WebHandler will reject it. **NOTE: Always Store your changes before exiting program.**

(4) Using PCWebLink to configure the controller

Other screens are available to assist in controller setup. To access these screens, go to the User Screens menu on the tool bar. The following screens group similar parameters for easy setup:

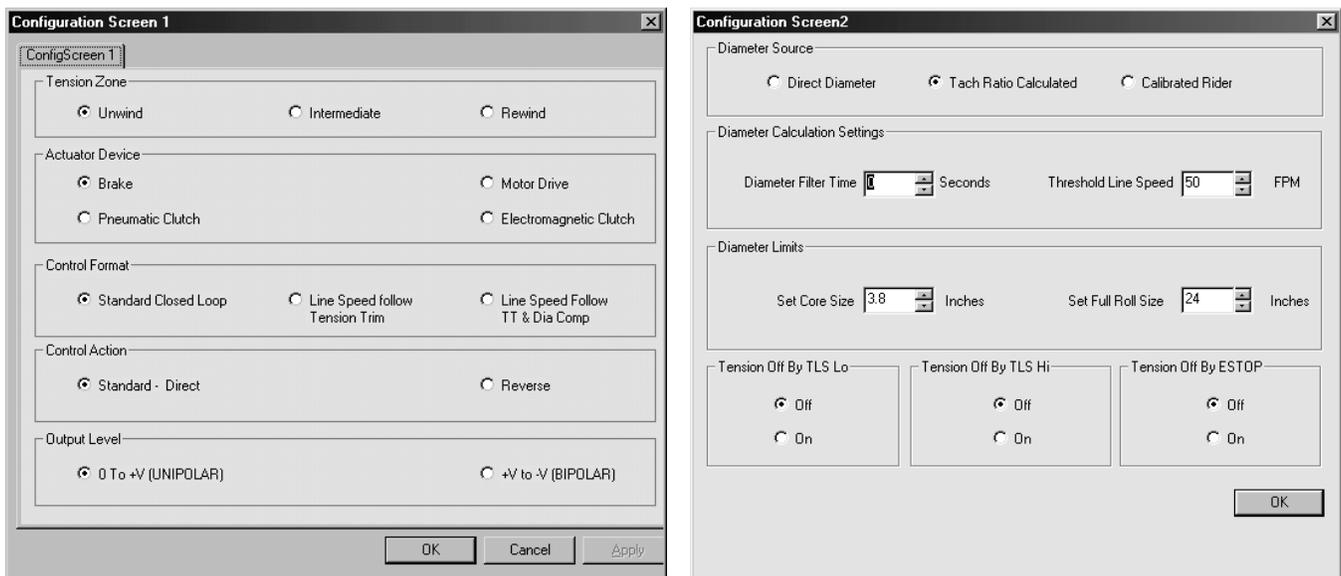


Figure 27 - CONFIG1 and CONFIG 2 SCREENS

Configuration 1: Tension Zone, Actuator Device, Control Format, Control Action, Output Level

Configuration 2: Diameter Source, Diameter calculation settings, Diameter Limits, Tension Off by TLS Lo, Hi, and EStop.

TLS: TLS Lo and Hi Modes, TLS Delay, TLS Lo and Hi Setpoints,

Soft Start: Soft Start by Speed, Tension, and Switch, Soft Start Delay, Soft Start by Tension and Line Speed Trip Points.

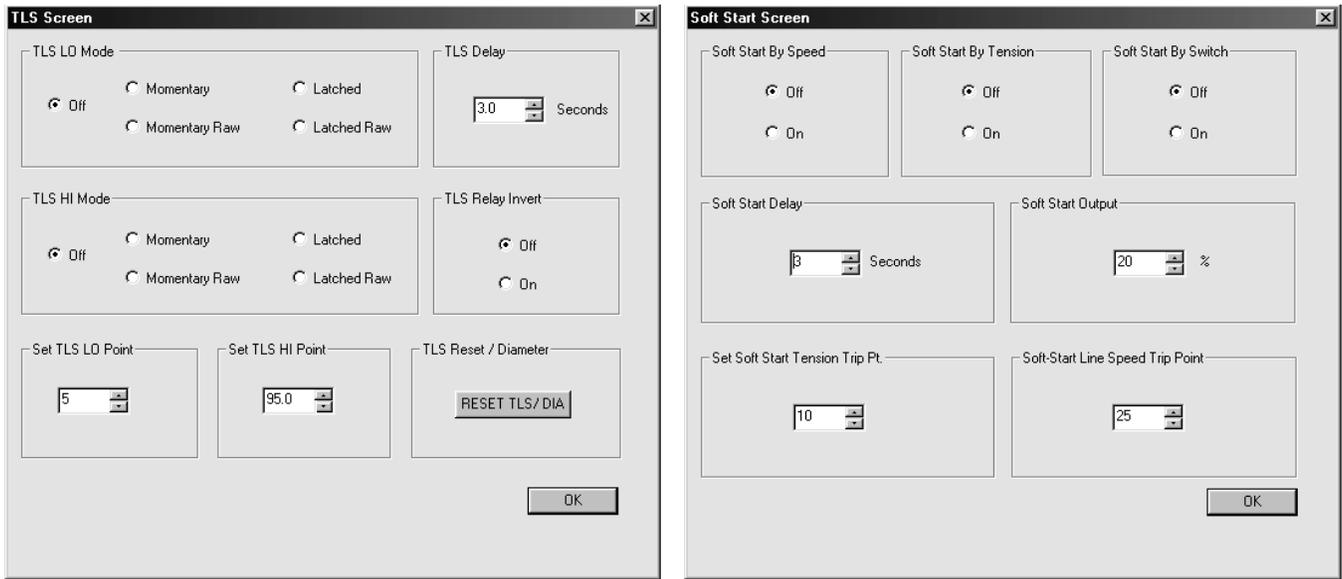


Figure 28 - TLS and SOFT START SCREENS

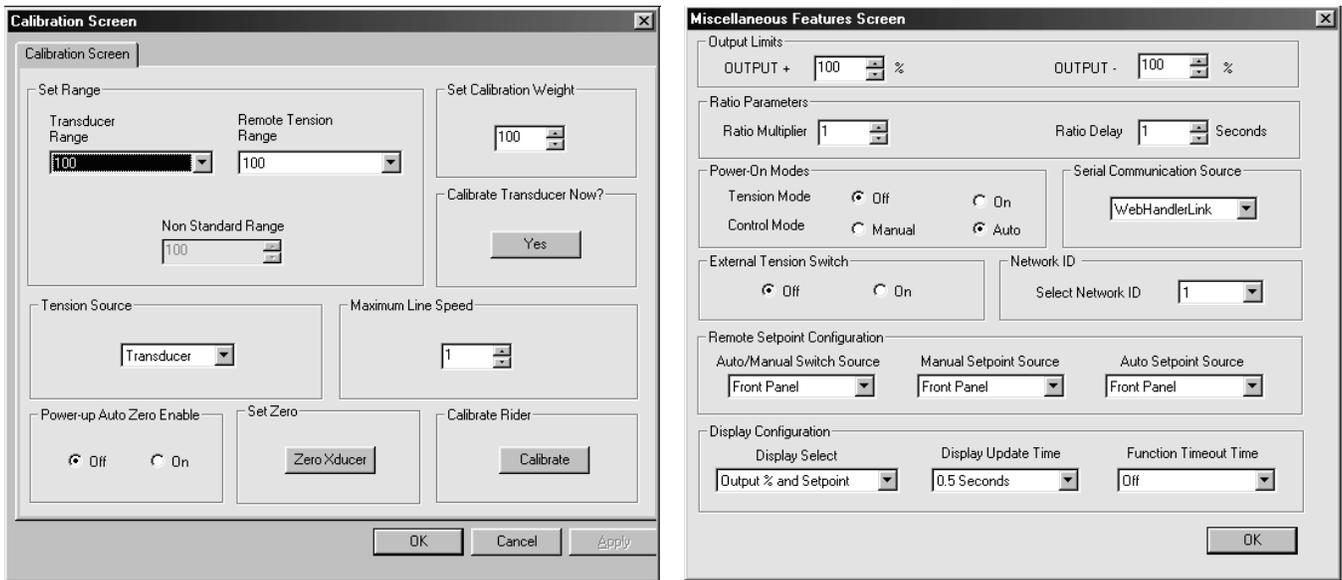


Figure 29 - CALIBRATION and MISCELLANEOUS FEATURES SCREENS

Calibration: Transducer and Remote Tension Ranges, Calibration Weight, Tension Source, Maximum Line Speed, Powerup Auto Zero enable, Rezero, Rider calibration

Misc. Features: Positive and negative Output limits, Ratio multiplier and delay, Power-on control and tension modes, Serial Communication Source (see below), Enable external tension switch, Serial Network ID, Remote auto/manual switch, and manual and auto setpoint sources.

Diagnostic (to be used only with assistance of DFE technical service personnel): Reading raw A to D converter values, selecting and writing to the D to A converters, reading port pin values, Gain, Stability, and Response upper limits, reinitialization of all controller settings to default.

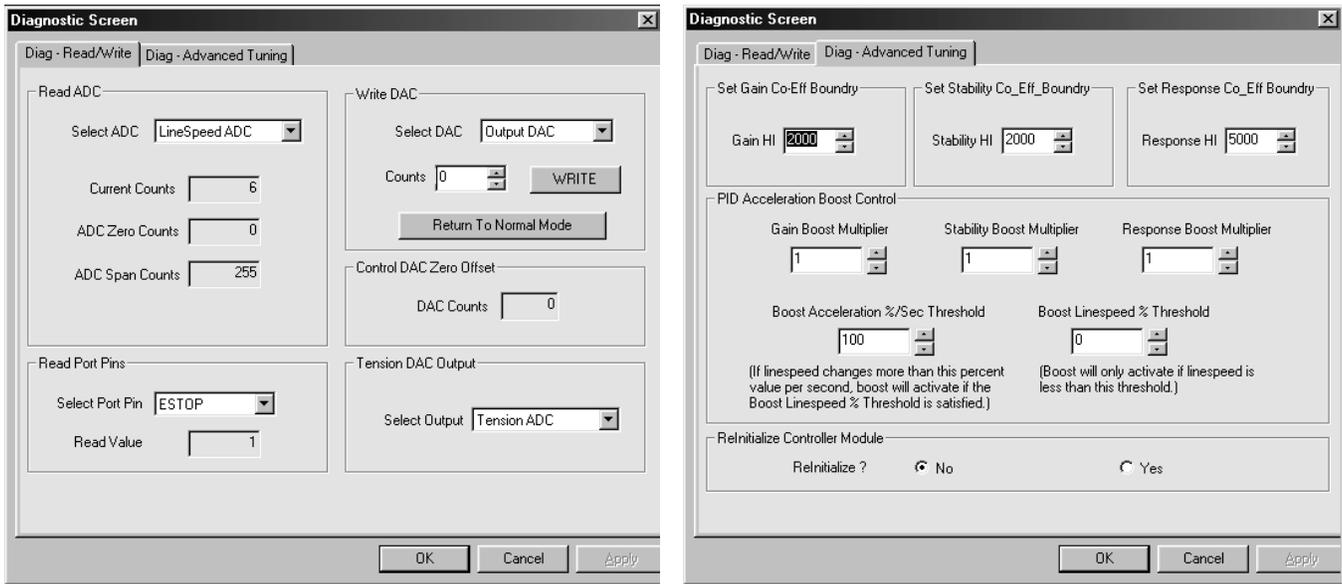


Figure 30 - DIAGNOSTIC SCREENS

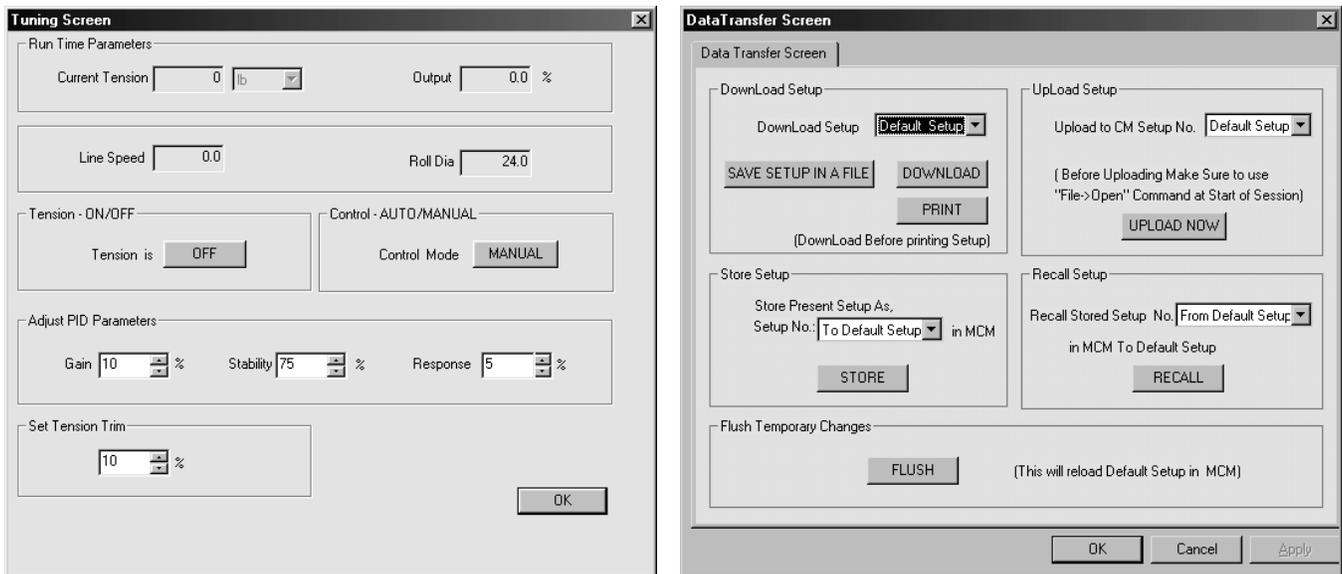


Figure 31 - TUNING and DATA TRANSFER SCREENS

Tuning: (see below)

Data Transfer: ALWAYS use this screen to save your setup changes before exiting the program. Changes not STORED to DEFAULT SETUP will not affect the unit after a power OFF/ON cycle. Be aware the unit always powers up in the DEFAULT SETUP configuration.(see also (5) below)

To store a setup in your WebHandler:

Select DEFAULT SETUP in the **Store Setup As** pulldown box. Click the **STORE** button. You will be advised when Storing is complete. The unit will power up in your stored configuration now. To store additional setups for different processes requiring a different setup or tuning, Simply Select a numbered Setup in the pulldown box, then Click the Store button for each setup. It will be helpful to document which setup works for each process.

To Recall a setup in your WebHandler:

WARNING: Do not recall while web is running in your machine, Tension control will be lost. Select the desired setup number in the **Recall Stored Setup No.** pulldown box, Click the RECALL button. You will be advised when recall is complete.

To take a setup stored in the WebHandler and make it the Default (or other) Setup in the WebHandler:

This is a two-step process. First, in the Recall Setup box, choose the setup number within the WebHandler you want and press the RECALL button. This loads that setup into the PCWebLink Setup in PCWebLink. Then in the Store Setup box, choose the destination setup number (or the Default), and press the STORE button.

The various User Screens are also shown in Appendix G. Enter the same values and parameters as if you were using the controller's user interface.

(5) Using PCWebLink to Transfer setups between a PC and the WebHandler

The Data Transfer screen controls the transfer of controller setups. It provides a powerful capability to manipulate stored setups between the controller and the PC or notebook, or between memory areas within the WebHandler. You can extract a setup from a controller and print it, or store it as a disk file on your computer. You may want to load a stored file into your controller. This provides the ability to store known good setups outside the controller for archival purposes or perhaps for DFE technical service to evaluate a setup if a controller is not operating correctly. It also provides a means to quickly configure multiple controllers for similar applications, and for other uses.

To download a setup from a WebHandler to your computer:

As noted elsewhere, your controller's current setup is stored as the Default setup, while other setups may be stored as Setup #1, #2, etc. Choose the setup within the WebHandler you want to transfer to your computer using the DownLoad Setup menu box. Then press the Download button. An hourglass may appear momentarily while the data is transferred. When complete, the setup is now the "PCWebLink Setup" on your PC or notebook computer.

Once a "PCWebLink Setup" has been loaded into PCWebLink, it can be viewed by going to the various User Screens, printed, stored or transferred.

To print the PCWebLink Setup:

Press the PRINT button located inside the Download Setup box.

To store the PCWebLink Setup in a disk file:

Press the SAVE SETUP IN A FILE button. Windows will open a dialog box for you to enter the name of the file, and then store the file.

To store the PCWebLink Setup in the WebHandler:

In the Upload Setup box, choose the memory location in the WebHandler where you want to store the setup, then press the UPLOAD NOW button. After a few moments, the hourglass will go away and the setup will be stored.

To retrieve a disk file on your computer into the PCWebLink Setup on your computer:

When starting PCWebLink, In the File menu on the toolbar, choose Open and locate the file you want, and press OK. This will make that setup the PCWebLink Setup.

Using PCWebLink to tune the controller:

The Tuning Screen contains the adjustments required for tuning the controller : Gain, Stability and Response, and Tension Trim (when used). It also displays current Tension, Output, Line

Speed and Roll Diameter and allows the user to turn Tension On or Off, and select Manual or Auto Control Mode to facilitate the process. Standard tuning instructions still apply (see Section 4.4). Remember to STORE your settings when finished.

(6) Using the Host Interface:

The WebHandler™ 3 has the capability of serial communication with external computers or PLCs using its Host Interface. Setpoints, tension modes and other parameters may be sent to the WebHandler, and tension readings and other status information may be read from it.

The WebHandler, of course, has a local front-panel interface. There is a provision to select whether the WebHandler will accept input from that interface, or from the Host interface. To activate the Host interface, go to the Setup Menus group and select the function **SerialCommSource**, then select “host”, then OK. At that time, the Host interface will activate but the local interface will remain functional. Control input will continue to be accepted from the local interface along with the Host. Keep in mind that it is possible for a Host and a User to be selecting conflicting controls. The unit will follow the last entry.

All commands include a unit address for those applications which have multiple units on a single RS485 serial communications link. Appendix F contains a listing of these commands. In the command descriptions, “#” indicates the WebHandler's one-byte ASCII address from 1 through 9 or A through Z. This provides 35 possible addresses for multiple unit installations. The factory default (“1”) is usually satisfactory unless multiple units are to be connected to the same loop using an RS485 interface. If this is the case, each controller must be assigned a unique address as follows.

Go to the Setup Menus group and select the function **Network Unit ID**. Change the address of each controller to an address different from any of the other controllers. The choices of addresses are as described above.

Whenever the controller receives a command which requires a specific response to that command, it responds with a prefix specific to that command, its address, and then the requested information. In this way the host has confirmation that the WebHandler processed the command correctly and that the data is valid. If the WebHandler receives a command which only requires the WebHandler to process the command, the WebHandler still acknowledges receipt of that command with the ACK (acknowledge) response, “%#A”. If the WebHandler receives a command but does not recognize it, or for any reason cannot process the command, the WebHandler will acknowledge the receipt of these undefined or inappropriate commands or command arguments with the NAK (negative acknowledge) response, “%#?”.

The host computer may transmit commands to other devices on the same network as the WebHandler. If the command prefix is not a “\$” character, the WebHandler will ignore it completely, and no NAK response will be generated. In similar fashion, a WebHandler with a given address will ignore a command sent to a WebHandler with a different address.

In multiple unit installations it may be desirable to broadcast the same command to all WebHandlers. An example of this would be turn all WebHandlers’ tension “On” at the same time, or to simultaneously update all of them with a new set-point. For this purpose, the address “0” is reserved as a “broadcast” address. However, to eliminate garbled data from multiple controllers responding with the ACK response, WebHandlers do not respond when a broadcast command is issued (this is the only circumstance that WebHandler does not respond to a command when it is processed correctly). Be aware that other manufacturers products may respond in different ways, making this usage have unpredictable results.

The user must constrain command arguments, including numeric ranges, to be valid entries, otherwise unpredictable results may occur.

Note: All host commands and all WebHandler responses below must be followed by the ASCII code for <CR> (0Dh).

3. **Soft Start**

Soft start is normally used only in braked UNWIND zone applications. Turn off soft start when the controller is being used to control rewind or intermediate tension because it serves no purpose and it may not be possible to leave soft start. Soft start can be actuated in one of three ways; 1. by sensing a loss of tension, 2. by closure of an external contact, or 3. low machine line speed (see Options). It is possible to actuate Soft Start using one or more sources at a time.

a. ACTUATION BY LOW TENSION. This is the standard configuration.

- (1) No external electrical connections are needed for actuation. Navigate to **Tension SoftStart** and choose “On”.
- (2) Navigate to **SS Output Level** and adjust to the output you want while in Soft Start. The range is 0 to 100% of maximum output. It is best to set it low, but high enough to produce enough tension to exceed the trip point tension or the controller may not be able to get out of Soft Start. Factory preset is 20% of full output.
- (3) Navigate to **Soft Start Delay** and enter a short time delay before Soft Start actuates. This eliminates nuisance actuation if tension drops for only a short time. The range is 1 to 60 seconds. There is no delay when leaving the Soft Start mode.
- (4) Navigate to **SS Tension Trip Pt.** and enter the tension which will actuate Soft Start. The range is 0 to 100% of the tension meter scale*. Avoid setting the trip point close to your operating tension. Set it much lower, instead. Be sure the **SS Output Level** value is set high enough to produce enough tension to exceed the trip point tension.

* Factory preset is 10% of the tension meter scale.

b. ACTUATION BY EXTERNAL CONTACT CLOSURE.

- (1) Connect the external switch or relay contact as shown. The controller will remain in the Soft Start mode as long as the contact is closed. TB101 is on the Terminal Board. See Figure 11.

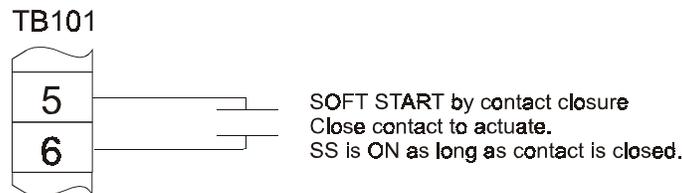


Figure 32 - SOFT START BY EXTERNAL CONTACT CONNECTIONS

- (2) Navigate to **SwitchSoftStart** and select “On”
- (3) Navigate to **SS Output Level** and enter or adjust the output you want while in Soft Start. The range is about 0 to 100% of maximum output. Factory preset is 20% of maximum output. Avoid setting the output higher than the operating tension. It is best to set it low, but high enough to produce enough tension to create a smooth takeoff. Soft Start actuates immediately upon contact closure. There is no time delay. There are no other adjustments.

c. ACTUATION BY LINE SPEED

- (1) Verify that line speed is configured and calibrated as described in Section 3.3
- (2) Navigate to **Speed SoftStart** and select “ON”.
- (3) Navigate to **SS Speed Trip Pt.** and choose a level which is about 10% of your maximum. Soft start will activate when line speed drops below this threshold. When your controller is in Soft Start mode, the second line of the display will flash between the normal screen and one that says “SS”. When you leave Soft Start mode the second line will remain steady.

- (4) Navigate to **SS Output Level** and adjust to the output you want while in Soft Start. The range is 0 to 100% of maximum output. It is best to set it low, but high enough to produce enough tension to exceed the trip point tension or the controller may not be able to get out of Soft Start. Factory preset is 20% of full output.

4. **Sample and Hold/Ratio**

The Sample & Hold/Ratio feature provides a way of producing a fixed output proportional to controller output at the time this mode is triggered. This is useful for basic unwind splicing operations, to quickly adjust output from the level produced at core, to a level appropriate for a full roll. It requires an external switch or dry contact to be connected to TB101 pins 3 and 6 as shown in Figure 32 below. You will then need to navigate to Setup Menus->**Ratio Multiplier** and choose a Ratio Multiplier value. A typical starting point for this value can be calculated as follows: Suppose you are splicing from a 3" core, to a 24" full roll. The output will therefore need to increase approximately 8x after the splice, so you should set your Ratio Multiplier to 8x. TB101 is on the Terminal Board. See Figure 9 (or Fig. 47 in Appendix A).

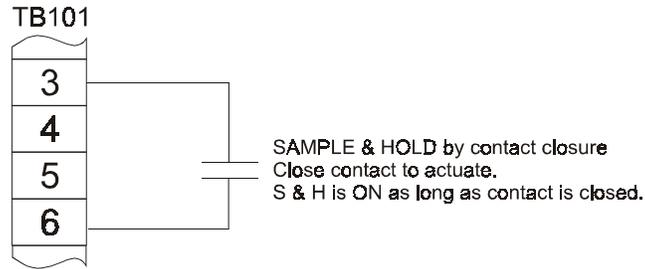


Figure 33 - SAMPLE AND HOLD CONTACT CONNECTIONS

Usually you will want to put the controller in Ratio the moment before the splice, until the web has settled down from the disturbance of splicing. The ratioed output begins when the switch is first closed, and ends when it is opened plus however long is specified as the Ratio Delay. You may want to set a delay to keep your controller in Ratio mode longer than the switch is closed to allow the web to stabilize before going back to Auto mode. To do this, navigate to Setup Menus->**Set Ratio Delay** and set your delay time, based upon your particular application.

When your controller is in Ratio mode, the second line of the display will flash between the normal screen and one that says "Ratio". When you leave Ratio mode, the second line will return to normal.

5. **Anti-Tamper/Security Lockout**

If you wish to prevent unauthorized changes to controller configuration and setup parameters, a security keypad lockout is available. It provides the ability to disable menus through the use of a lockout jumper. See Figure 34. To use the Security Lockout, move the jumper on JP5 to positions 2 and 3. When lockout is in effect, operators will not be able to store setups, or to access any menu aside from OPERATOR MENU. Menu access can be restored by moving the jumper back to positions 1 and 2.

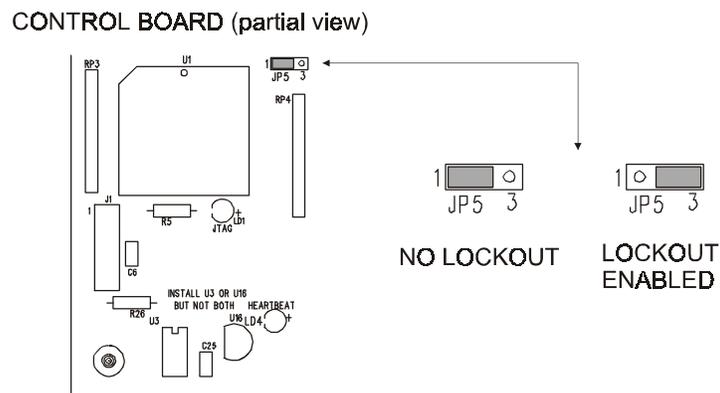


Figure 34 - SECURITY LOCKOUT JUMPER SETTING

6. Setup for Tension Limit Switch

The TLS feature is typically used to provide an alarm when web tension exceeds or drops below user determined levels. It can also be configured to provide an alarm when tension is within a specified operating range. When a TLS condition occurs, the controller provides a visual alarm indication on the display and activates a set of relay contacts which the user can use within his machine. The TLS condition can also be used to disable controller output (turn Tension Off). There are four TLS modes available to TLS Lo and TLS Hi independently: Momentary; Latched; Momentary Raw; and Latched Raw. These are described below.

In **Momentary mode**, a TLS alarm is triggered when the tension is below (for TLS Lo) or above (for TLS Hi) the corresponding setpoint. If the tension goes back within the normal range, the TLS alarm is cleared. In this mode, TLS is not armed until the tension has entered the non-alarm range. This is useful when your process might not produce reliable tension readings until the process is up and running, and you want the momentary alarm condition to disable the machine, such as for a web break.

In **Momentary Raw mode**, a TLS alarm is triggered when the tension is below (for TLS Lo) or above (for TLS Hi) the corresponding setpoint. If the tension goes back within the normal range, the TLS alarm is cleared. The difference between this mode and standard Momentary mode, is that the alarm is triggered even if the tension has never been brought into the non-alarm range. This mode can be useful if your process stays under tension even when the controller is not powered up or enabled, but you want indication that the tension is not within desired limits.

In **Latched mode**, a TLS alarm is triggered when the tension is below (for TLS Lo) or above (for TLS Hi) the corresponding setpoint. If the tension goes back within the normal range, the TLS alarm is not cleared, and remains active until the operator clears it by pressing the EXIT key on the front panel. Note that in this mode, TLS is not armed until the tension has been entered the non-alarm range. This is useful when your process might not produce reliable tension readings until the process is up and running, and you want a maintained alarm condition to disable the machine and provide positive indication of what caused the shut down.

In **Latched Raw mode**, a TLS alarm is triggered when the tension is below (for TLS Lo) or above (for TLS Hi) the corresponding setpoint. If the tension goes back within the normal range, the TLS alarm is not cleared, and remains active until the operator clears it by pressing the EXIT key on the front panel. The difference between this mode and standard Momentary mode, is that the alarm is triggered even if the tension has never been brought into the non-alarm range.

In any mode, a user determined delay is available to eliminate false triggering. Once configured, TLS can be turned Off while maintaining the trip points so that it can be used only when needed.

If relay output is desired, make the connection as follows:

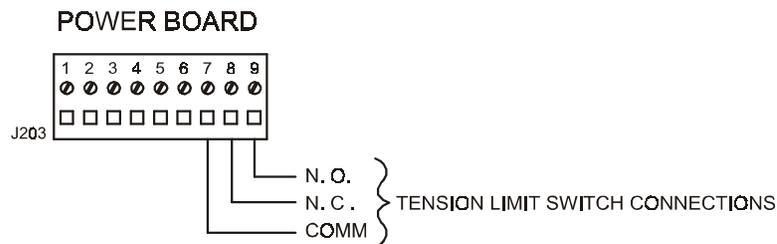


Figure 35 - TENSION LIMIT SWITCH OUTPUT CONNECTIONS

You must then configure operation of the TLS functions according to your application. TLS Lo and Hi are configured independently from each other. In the Setup Menus, navigate to Set TLS Lo Mode (and/or Set TLS Hi Mode). Choose Momentary, Momentary Raw, Latched, or Latched Raw operation, as described above.

Then the TLS Lo and Hi set-points can be entered in the functions SetTLS Lo Setpt and SetTLS Hi Setpt, respectively. The set-points are entered in the same units of measure as your measured Tension.

A delay can be entered in the function **Set TLS Delay**. Typically a delay of no more than 3 seconds is adequate to prevent false triggering. If you wish to have either TLS Hi or TLS Lo turn tension Off, navigate to Setup Menus->Tens Off ByLo, TensOffByHi and choose **ON**. This completes setup of the TLS function.

When you run your machine, and the TLS condition is met, the second line of the display will flash **TLShi** or **TLsLo** when the appropriate condition occurs. At the same time, the relay will activate and make or break any connection you have made. If you have configured your controller to turn Tension Off when TLS occurs, Tension will also turn off.

If you have chosen **Latched** operation of TLS, the alarm will persist until you press the “EXIT/Reset Alarm” key. Note that if a TLS alarm is active and you turn that mode off, you must press the Exit/Alarm reset to turn the alarm off. It will not automatically reset.

In the setup menu, an item called TLS Relay Invert controls the TLS relay polarity during a TLS alarm. If TLS Relay Invert is set to “Off” (default), the normally open contact is closed and the normally closed contact is opened during a TLS alarm. If it is set to “On”, the opposite is true. This allows the TLS relay to be used as a “Tension OK” relay, closing when tension is in the desired range. One way to do this, is to set both TLS Lo and TLS Hi modes to Raw (Momentary or Latched, as desired) and set TLS Relay Invert to “On”. Once TLS Lo and TLS Hi setpoints are entered, the relay will close whenever tension is between the Lo and Hi setpoints. This provides a simple, reliable indication that tension is within range without external logic, and can be used to sequence another part of the machine.

7. FuncTimeoutTime

As you set your controller up, you need to navigate into and out of menus. Sometimes it is convenient to have a display return to the default screen automatically. If you wish to use this feature, navigate to Setup Menus->**FuncTimeoutTime**, and choose an appropriate delay time.

Now, even if you leave your controller in a function menu, it will automatically return to the default screen for operation.

8. Setup for remote Manual and Auto set-point potentiometers and switch

It is possible to reassign the function of certain unused analog inputs if you want to use external Manual and/or Auto setpoint inputs. The inputs which can be reassigned (if unused) are the Line Speed, Roll Speed, Remote Tension Amplifier, or Diameter inputs.

It is also possible to reassign the function of certain unused digital inputs if you want to use an external Auto/Manual switch input. The inputs which can be reassigned (if unused) are the Ratio and Soft Start inputs.

NOTE: It is not necessary to use both Auto and Manual pots remote - you may use either or both as desired.

CAUTION: It is strongly recommended you use 2 separate pots for Auto and Manual remote setpoint inputs. But, it is possible to use a common pot for both if your operation requires this setup.

Connect the external switch or potentiometer as shown in Fig. 34. TB101 is on the Terminal Board. For external setpoint potentiometers connect either side of the potentiometers to TB101 pin 22 (+10V) and TB101 pin 9 or pin 11 (Gnd), and connect the wiper to one of the unused analog inputs (TB101 pin 7, 8, 10, or 12). The Pot value should be 10K ohms.

For an external Manual/Auto switch input connect one side to TB101-21 (Gnd) and the other to one of the unused digital inputs (TB101 pin 3 or TB101 pin 5). This should be a maintained type switch.

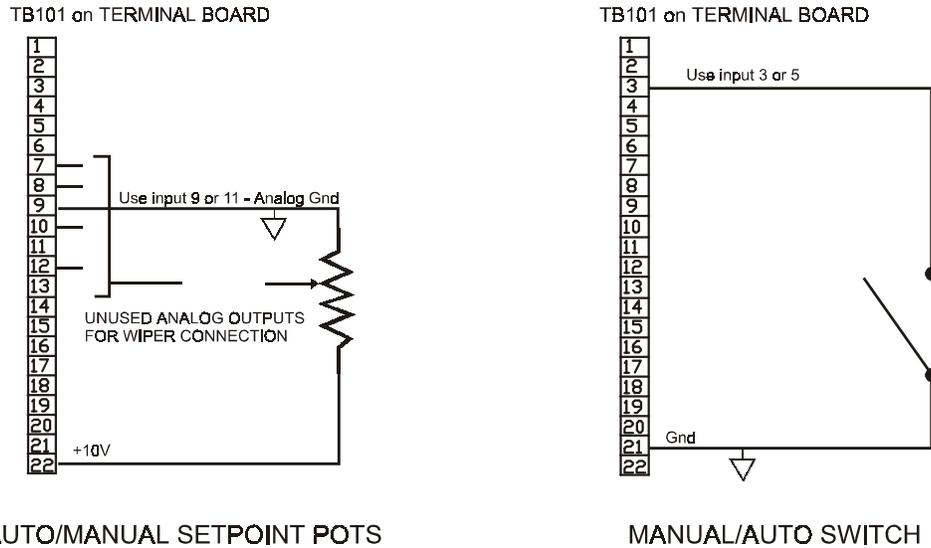


Figure 36 - CONNECTIONS FOR REMOTE AUTO/MANUAL SET-POINT POTENTIOMETERS AND MANUAL/AUTO SWITCH

For a Manual potentiometer input, navigate to **ManSetptSrc** and select either **Line Spd Input** (pin 8), **Roll Spd Input** (pin 10), **RTA input** (pin 7), or **Diameter input** (pin 12).

For an Auto potentiometer input, navigate to **AutSetptSrc** and select either **Line Spd Input** (pin 8), **Roll Spd Input** (pin 10), **RTA input** (pin 7), or **Diameter input** (pin 12).

For a Man/Auto switch input, navigate to **Aut/ManSWSrc** and select either **Ratio Input** (pin 3) or **SoftStart Input** (pin 5).

4.2 SETUP OF OPTIONAL FEATURES

A. REMOTE TENSION AMPLIFIER (RTA Option) See Figure 9, Terminal Board, for location of TB101.

This feature allows a 0-10V tension signal from an external tension amplifier, to be brought into the WebHandler for tension control. Calibration of this option is covered in Section 3.2.

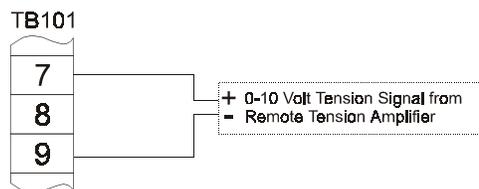


Figure 37 - REMOTE TENSION AMP CONNECTIONS

B. REVERSE OUTPUT (Option - RO)

In its standard output configuration, the WebHandler’s output increases when the measured tension drops below the set-point. In some circumstances, such as for a driven unwind or in an intermediate tension zone with transducers mounted after the driven roll, it is necessary to use Reverse Output so that the controller’s output decreases when measured tension drops below set-point.

To configure the WebHandler for Reverse Output, navigate to Setup Menu->Control Output and select “Reverse”.

C. TAPER TENSION (TTF Option)

Taper tension is a feature which automatically reduces the tension set-point, and hence the tension, in a roll as the diameter increases. Taper tension is usually needed when winding rolls with large build-up ratios, or when winding slippery materials, so that the roll does not crush the core yet the material does not telescope. When taper is enabled, the set-point will be equal to the displayed value at core, but will be reduced linearly as the roll diameter builds until it is equal to the Taper Value times the displayed set-point at full roll.

In order to use the Taper feature, you must have a calibrated source of roll diameter information (see Section 3.4). Then, in the Operator Menus, navigate to **Set Taper Enable** and select On. This enables the Taper Feature.

You can adjust the amount of taper provided at full roll by navigating to Operator Menus->Set Taper Value and choosing an appropriate value (typically between 10 and 50 per cent).

D. NONSTANDARD METER SCALE (Option - NMS)

The WebHandler3 has a number of preprogrammed full-scale tension ranges to choose from. However if your application requires a range not included as standard, it is possible to enter a different full-scale range as follows: Navigate to Calibration Menu->Tension Range. Select “Non Standard”, and press OK. A screen will come up with a number that you can increase or decrease using the ▲ or ▼ buttons. When the value you want is displayed, press the OK key, which will return you to the menu system. Your unit will require tension calibration after this setting is changed.

E. LINE SPEED FOLLOWER MODES

See Section 3.3 for making line speed signal connections and for calibrating your tachometer card, if used.

4.3 SPECIAL SETUP NOTES (BY VERSION)

A. 10 VOLT OUTPUT (Versions V, C & P only)

Two variations of control output are possible depending on the setting of the “Output Range” function. Navigate to “Output Range” in the Setup Menu, and choose your range. 0 to +V, or -V to +V. For V, C and P versions, always use 0 to +V.

B. HIGH VOLTAGE OUTPUT (Version V only)

To connect this option, see Figure 38, below for user connections. Your unit was set to the output ordered at the factory. Use this procedure to change it if your requirements change.

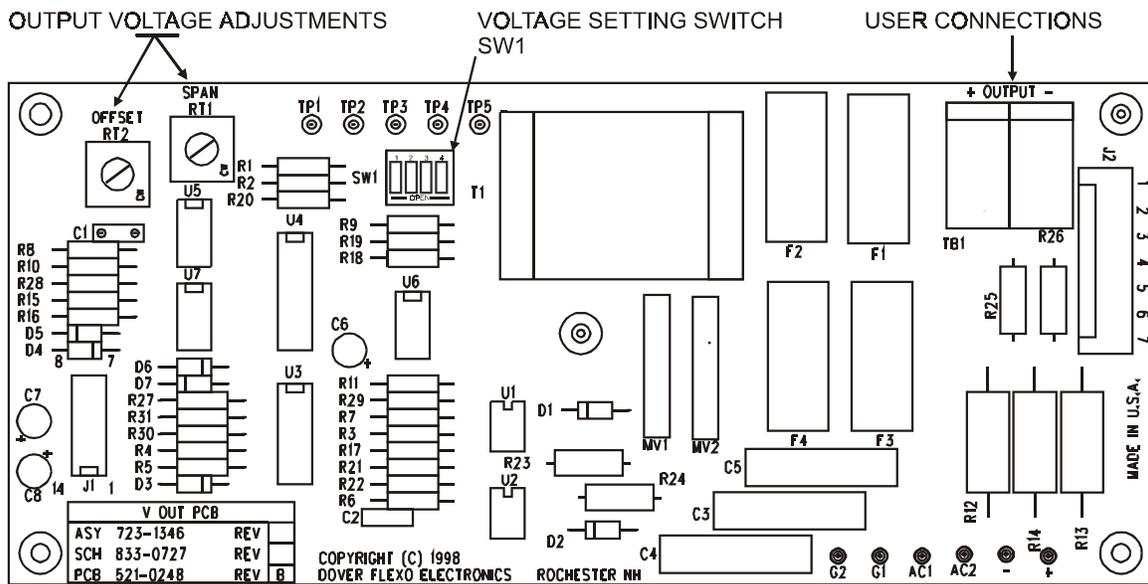


Figure 38 - V-OUT BOARD

- To change input and output voltages, set the SW1 switch on the V-Out Board as follows:

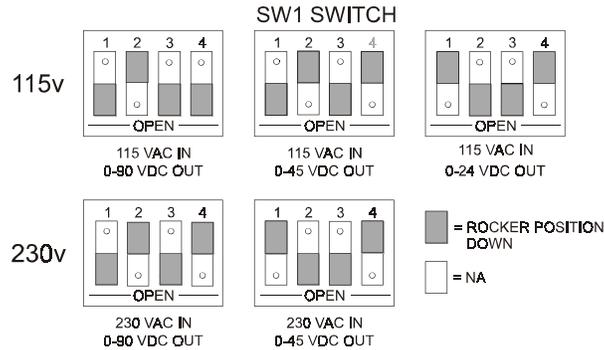


Figure 39 - HIGH VOLTAGE OUTPUT SWITCH SETTINGS

The SPAN and OFFSET pots (RT1 and RT2 on V-Out board) are set at the factory and should not require any adjustment. If their settings have been changed, reset them as follows.

- Turn power on. Turn Tension on. Switch to MANUAL control mode. Adjust manual set-point to 0%. Connect a voltmeter to the controller output terminals along with your brake or clutch.
- Turn both SPAN and OFFSET pots to midpoint.
- Observe the voltmeter. If it reads above zero skip to step 5. If it reads zero, turn the OFFSET pot (RT2) slowly clockwise until a voltage reading is obtained.
- Turn the OFFSET pot (RT2) slowly counter-clockwise until the output drops to zero on the voltmeter.
- Adjust manual set-point to 100%. If the voltage reads lower than the rated output chosen, turn the SPAN pot (RT1) slowly clockwise until the desired voltage is obtained.
- If the output voltage is higher than the chosen range, slowly turn the SPAN pot (RT2) count-clockwise until the desired output is obtained.
- Set the Manual set-point to 0%.
- Repeat steps 4 through 8 if needed to fine tune the output level.

C. ISOLATED 10V OR 4-20mA OUTPUT (Options - I10 or I420, D Version)

The isolated output card is mounted on the Control Board. See Appendix A for board view. Make isolated output connections as shown in Figures 10, 40. Your normal non-isolated 0 to 10Vdc output is still available for monitoring purposes.

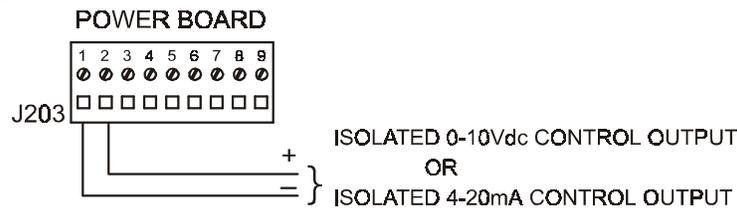


Figure 40 - ISOLATED 10V OUTPUT CONNECTIONS

D. NON-STANDARD SERVO VALVE DRIVER (Version C) See Figure 3 for location of this card.

The use of WebHandler3 Version C allows customers to purchase a servo valve of their own choosing. Version C includes a driver circuit card that provides a regulated +15Vdc @250mA or 24Vac to power a servo valve, plus optional signal outputs of 0 to +10Vdc @ 2mA, or 4 to 20mA to control the servo valve output. This driver card is mounted to the top inside of the unit.

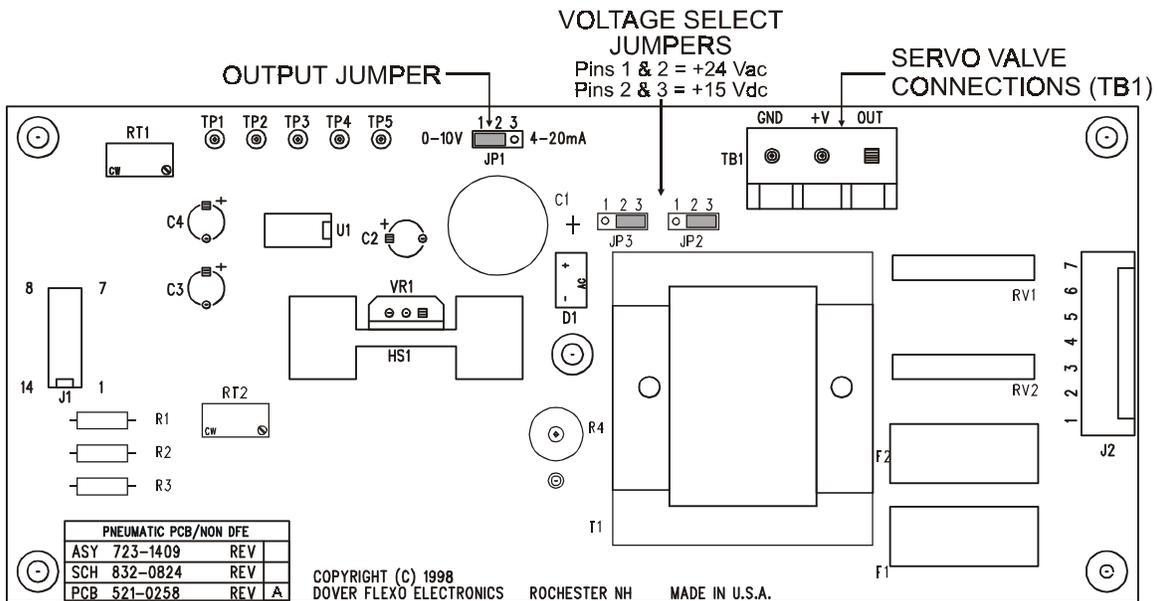


Figure 41 - NON-STANDARD SERVO VALVE DRIVER CARD (top view)

1. Make sure the shop air provided to the servo valve is clean and dry and that the input air pressure is regulated such that the output pressure is no more than 75 psi. For more reliable operation, install an in-line air filter to keep out dirt, oil and moisture. Attach air tubing to the input port of the valve, making sure there are no air leaks. Attach output tubing to brake or clutch making sure tubing does not contact any moving parts on the machine.
2. Select desired output, 0 to 10V or 4 to 20mA by positioning the jumper on JP1 of the driver card. The jumper should cover pins 1 and 2 for 0 to 10V output, or pins 2 and 3 for 4 to 20mA output.

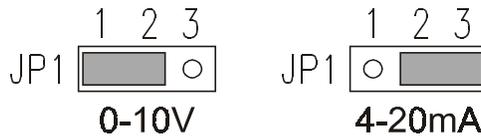


Figure 42 - NON-STANDARD SERVO VALVE DRIVER OUTPUT JUMPERS

3. If +24Vac is required for servo, position jumpers on pins 1 and 2 on JP2 and JP3. Default is +15Vdc.

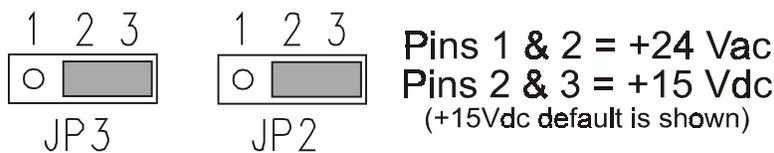


Figure 43 - NON-STANDARD SERVO VALVE DRIVER POWER VOLTAGE SELECT JUMPERS

4. Make electrical connections between your servo valve and the Driver card as shown in Figures 41, 44.

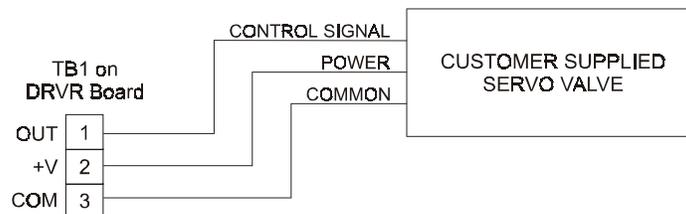


Figure 44 - CONNECTIONS FOR NON-STANDARD SERVO VALVE

5. For 0 to 10V ONLY

Adjust RT1 (SPAN) on the Control board fully clockwise. Refer to pneumatic valve manufacturers instructions for calibration.

6. For 4 to 20mA

Refer to pneumatic valve manufacturers instructions for calibration.

7. Check servo valve for proper operation. Connect a pressure gauge to the valve output. Set the external air pressure regulator to 80psi (5.5 bar). Select MANUAL mode of operation. Set the MANUAL set- point to full clockwise. If the output is not 75 psi, adjust pot RT1 on the Driver board. Set the pot to give 75 psi. It is normal for the sound of the exhaust port to change as the output varies.

E. RTS (REMOTE TENSION SWITCH) OPTION (Version P Option)

Navigate to Ext Tens OnOff and choose On to allow external tension On/Off switch to work.

4.4 TUNING ADJUSTMENTS

A. DESCRIPTION OF ADJUSTMENTS

The procedures in this section apply to all versions of WebHandler Model™ 3 controllers, used in all tension zones. Unlike most of the adjustments for standard features and options, tuning adjustments can not be preset at the factory.

There are three tuning adjustments; GAIN, STABILITY, and RESPONSE. These adjustments are contained in the Calibration Menus and are entitled Adjust Gain, Adjust Stability, and Adjust Response, respectively.

1. The GAIN setting determines the sensitivity of the controller. A low setting will produce a small output change upon a tension error and a high setting will produce a large output change. If set too high, the controller may be unstable. A typical setting would be 5 - 15%.
2. The STABILITY setting provides variable amounts of integration. If set too Low, the controller may be unstable. If set too high, the controller may ignore some tension variations instead of correcting for them, and the controller may appear to be very slow to react. This is typically set at 50-75%.
3. The RESPONSE setting adjusts the controller's reaction amount when a tension variation occurs. If set too high, the controller may be unstable. A typical setting would be 0-10%.

B. TUNING PROCEDURE

1. Turn the controller on and navigate to the Calibration Menu. Make sure the initial settings are as shown below. Most systems will run steadily with these initial settings.

Adjust Gain to 10%

Adjust Stability to 75%

Adjust Response to 5%

2. Switch the controller to AUTO mode. Web-up the machine with a typical web material. Use the Up and Down arrow keys to set the tension at a normal value for the material. Run the machine at normal operating speed.
3. Vary the Stability setting slowly up and down while watching the tension display. Wait after each adjustment for tension to stabilize. Choose the setting where tension fluctuations are the least, then press OK to set the parameter.

Note: If the controller is controlling rewind or unwind tension, try to make these adjustments at or near mid diameter. Adjust your controller while running at normal speed. Be sure to run a complete roll to verify stability at all roll sizes.

4. Accelerate and decelerate the machine while watching the tension display. If tension oscillates, readjust (increase) Stability or (reduce) Gain. If Tension lags excessively (reduce) Stability or (increase) Gain. Try changing the Stability first, If Stability will not hold steady tension, use Gain
5. Then vary the Gain and/or Response setting to minimize the time needed for tension to return to the set value. Very low response values are normal on most equipment.
6. With Taper off, run a full roll of material starting at the core (rewind) or full roll (unwind). Record the starting tension. At the end of the roll, record the ending tension. Verify that the tension is the same.

5.1 BASIC OPERATION

When your controller is properly set up and the control loop has been tuned, it should maintain constant tension while the machine is running, while speeds, roll diameters, or other conditions change. However during startup of a new roll you may want to change modes, set-point or other settings. Usually the only thing the operator will need to do, is turn Tension On or Off, go between Auto and Manual modes, and change Auto or Manual set-points.

With tension off, to turn Tension On and enable output, press the TEN ON/OFF key. The indicator in the display will change to ON, and output will be enabled. In Auto mode, The output will start off at Zero when Tension is switched ON and ramp to the required output to maintain the desired Tension. In Manual Mode, Output will immediately jump to the Manual Set-point commanded level.

Note: Your controller will not go into Auto mode if the tension has not been calibrated.”

To turn Tension Off and disable output, press the TEN ON/OFF key again. The indicator in the display will change to OFF, and output will be disabled, regardless of whether the unit is in Auto or Manual mode.

To change the controller to Auto mode, press the AUTO/MAN key. The display top line will change to AUTO SETPT, and output will be generated based upon the measured tension and the Auto set-point. To change the Auto set-point, press and hold the ▲ key (to increase), or the ▼ key (to decrease it). If you continue to Hold the key the increments will step to larger / faster rate of change. This allows you to make small precise adjustments while enabling large changes in a reasonable amount of time. NOTE: Rapid or Large changes of Auto Set-point while running web is not advised. Make moderate changes and allow the web tension to stabilize before making further changes.

To change the controller to Manual mode, press the AUTO/MAN key. The display bottom line will change to MAN SETPT, and the output will be generated according to the manual set-point. This Mode has no PID function, think of this as a speed Pot control for your output. To change this setting press and hold the ▲ key (to increase it), or the ▼ key (to decrease it). The rate of change will step up just like Auto Mode.

Sometimes you may see any of several alarm indications on your display, depending on which features are activated and your conditions. They will always flash on the lower line of the display, leaving the tension reading showing on the top line. Possible Alarms resulting from configuration settings and operating conditions are: E-Stop, Soft Start, TLS LO, TLS HI, and Ratio (excitation and control-out faults also). E-Stop and Soft Start will change the controllers output, Ratio will usually change it, TLS LO and TLS HI will only change output if you have configured them to turn tension OFF. If a more important alarm triggers while an alarm is present the higher alarm condition will be displayed. Once the higher condition is removed, the lower alarm will again be displayed if the condition is still present.

Two other alarm conditions can arise which indicate wiring or controller errors. These are “Excitation Fault”, and “Output Fault”. “Excitation Fault” is displayed when the transducer excitation voltage is not within specified limits. This can be caused by an error in wiring the transducer, such as a shorted connection, or by a bad cable. Try disconnecting the transducer wiring at the controller. If the alarm condition disappears, the problem is in the external wiring. If it does not, then the problem is within the controller, which should be returned to DFE for service.

“Output Fault” is displayed when the controller determines that the actual output voltage is not equal to the output voltage it is attempting to generate. Again, if this is caused by a wiring error, disconnecting the output wiring at Tb101-17 and -19 (for non-isolated D versions) will eliminate the error condition. Otherwise the problem is likely within the controller, which should be returned to DFE for service.

5.2 OPERATION OF ADDITIONAL FUNCTIONS

The unit is factory configured for your application. If additional changes become necessary, your unit may be programmed by adjusting settings contained in various functions. Functions are arranged into four menu groups: Operator, Calibration, Set-up, and Diagnostic. These are shown in the menu group chart in Appendix D.

To access the main menu, first press and hold the ▲ and ▼ keys simultaneously. One of the menu groups will appear in the display. Use the ▲ or ▼ keys until OPERATOR MENUS is displayed. Then press the OK key. Use the ▲ or ▼ keys to select the desired function (as described below) then press the OK key again. This puts you into the desired function. Once you are in a function, you can press the ▲ or ▼ keys to change a value or to view the available selections. To activate a selection, press the OK key. An asterisk will appear, indicating the selection has been made. The lower line will then blank and you will EXIT the function. Your changes will be stored. You can then use the ▲ or ▼ keys to locate another function, or press the EXIT key once to return to the group Menu screen, or twice to return to the Default screen.

A. CHANGING YOUR DEFAULT DISPLAY

The default display normally shows measured tension on the first line and the current set-point (either Auto or Manual) on the second line. If desired, the displayed value on the second line can be changed by going into the function **Disp Select** and selecting **Output, Line Speed, Roll Diameter, Output % & Line Speed, Line Speed & Setpoint, Roll Diameter & Setpoint, Output% & Line speed, Output% & Roll Diameter, Line Speed & Roll Diameter, or Manual Setpoint & Auto Setpoint**, instead of **Setpoint**.

B. DISPLAY CONTRAST ADJUSTMENT

Your controller's display contrast is factory-set. However unusual lighting conditions may require minor contrast adjustment. To do this, open the cover and on the Control Board, located on the door, locate RT3. Using a small screwdriver, turn it in either direction to obtain optimum contrast. Note that this only adjusts contrast, not brightness, which is fixed. See Appendix A for location of RT3 on the board.

C. SETTING MANUAL SET-POINT WHILE RUNNING IN AUTO MODE

In the Operator Menu, Select the **Set Manual SetPt** function. You can then use the ▲ or ▼ keys to set the desired Manual mode output level in %. The Range is 0 to 100%. Once you have the desired value set, Press OK. The display will pause then show an asterisk briefly, then blank out the second line.

D. SETTING AUTO SET-POINT WHILE RUNNING IN MANUAL MODE

In the Operator Menu, Select the **Set Auto SetPt** function. You can then use the ▲ or ▼ keys to set the desired Auto mode tension level. Once you have the desired value set, Press OK. The display will pause then show an asterisk briefly, then blank out the second line.

E. USING TAPER

If your controller is used in a rewind application, it may be factory-configured for the Taper function. Taper allows the Auto set-point to automatically decrease as the diameter increases. Since you may not always want to use this feature, it can be controlled by going into the **Taper Enable** function and turning it Off or On. You can also vary the amount of effect the Taper feature has when it is enabled by going into the **Set Taper** function and varying the setting (between 10% and 50% in most cases. Range is 0 to 100%). When the taper function is enabled, a "T" will appear in the display after the Auto Setpoint value.

F. SETTING ROLL DIAMETER

Some controllers include a diameter calculator which affects controller output. The setup for this type of control has Core and Full Roll values set. When a different diameter roll of material than normal is installed, better control will result if the new roll diameter is entered in the function **Set Roll Dia** before starting the roll run. This is not necessary if the roll diameter information comes from a roll follower or ultrasonic sensor.

G. CHANGING UNITS OF TENSION MEASUREMENT

Your controller comes factory configured with requested units for your tension measurement application. You may later find that other units are more appropriate, e. g. metric units, or units which take into account web width. For example; you can read tension in PLI. To change your measurement units, go to the **Tension Units** function and select the unit you desire. If you want to use a web-width based unit, you will also need to go to the **SetWebWidth** function to enter your web width. You can change the unit of measure without affecting calibration.

H. STORING AND RECALLING CHANGES

Changes made (from the front panel) to controller settings during an operating session are automatically saved in the controller's permanent memory so that if power is turned off, the controller will be able to operate properly when it is turned on again. However you can also save additional setups if, for example, you are processing different materials with different set-points, different tuning settings, and so forth. The WebHandler™ allows you to store up to seven setups for later recall. To do this, Enter the Operator Menu by pressing both the ▲ or ▼ keys, then press the ▲ or ▼ key until Operator Menu is displayed, Press OK to enter the menu group, then press the ▲ or ▼ key until **Store Setup** is displayed. Press the OK key again. The screen will show **To Default** unless you have Stored a setup since switching power on. You should use the ▲ or ▼ keys to choose the setup number you want to use. When you have chosen one, press OK again. The display will pause then show an asterisk briefly, then blank out the second line. Press Exit once to return to menu, twice to return to default display. It is helpful to record which setup you use on a given product for reference later. (See also Section 4.1.C.2.b for PCWebLink Software operation)

To recall one of the seven previously-stored setups, navigate to the "**Recall Setup**" screen and press OK. The screen will show **From Default** unless you have already recalled a setup since switching power on. You should use the ▲ or ▼ keys to choose the setup number you want to recall. When you have chosen one, press OK again. The display will pause, then show an asterisk in the rightmost space, then the second line will blank out. Press Exit to return to the menu. (See also Section 4.1.C.2.b for PCWebLink Software operation)

Warning: Do not use the "Recall Setup" function while your machine is running. **Tension will be lost.**

I. CHANGING THE DISPLAY UPDATE TIME

It is possible to slow down the rate at which the controller updates the display, this will make the display change less often. This has no effect on the output controlling tension. Simply navigate to the **DispUpdateTime** function and press **OK**, then use the ▲ or ▼ keys to select the update period you desire. The display will pause then show an asterisk briefly, then blank out the second line. Press Exit once to return to menu, twice to return to default display.

J. CHANGING THE FUNCTION TIMEOUT TIME

Normally when you enter a function, the controller will remain in that function until you leave it by selecting something else and pressing **OK** or **EXIT**. If you want the controller to exit automatically, navigate to "Func Timeout Time" and select the time the controller will remain in a function before it returns to the default display. NOTE: When the controller returns to the default display, any changes in progress will be lost.

K. RESETTING THE TLS (tension limit switch) ALARMS

At any time while either TLS alarm is active you may press EXIT/Reset Alarms to reset the TLS Function. This will momentarily silence the Relay output and will release the Latch if Latching mode is selected. If your tension remains in violation of the parameters you have set in **TLS Lo SetPt** or **TLS Hi SetPt** functions, the Display and Relay will not reactivate until the violation clears and re-occurs.

L. SOFT START

This is normally an Unwind function. When starting a new roll of material with no tension in the web, it is undesirable for the controller to lock the unwind brake with full output at startup time. The Soft Start function will remove the controller from full Auto output and hold the output at a preset value. This allows the machine to start up with a nominal tension while coming up to speed. Once the system passes the trigger point, the unit will resume full Auto control with a bumpless transition from Soft Start output level. Soft

Start can be Triggered by Low Tension, Low line speed or an External Contact Closure, or any combination of these. All Soft Start functions are set from within the Setup Menu. The set-points for Tension and Speed to trigger soft start are adjustable, as is the Output level. The delay prior to entering soft start is also adjustable. There is no delay for Soft Start by External contact. Exiting Soft Start upon meeting the set point is always immediate.

M. RE-ZEROING THE TENSION DISPLAY

At any time while no web is on the tension roll, Enter the Menus, Select the Calibration Menu, select the Set Zero Tension function. Press OK to start the process to re-zero the tension reading. Follow the on screen prompts. Your Calibration will still be Valid. This function is used to compensate for minor transducer variations from thermal change or buildup of material on the tension roller. **NOTE: Do NOT use this function while running web!** Your running tension value will become the new zero tension reading and the controller will change output to compensate. The likely result is a broken web.

N. ACTIVATING THE AUTOZERO FUNCTION

If desired , the controller can automatically rezero whenever it is powered up. Select the **Auto Zero Enable** function. Use the ▲ or ▼ keys to select On, then Press OK. The display will pause then show an asterisk briefly, then blank out the second line. **NOTE:** This function cannot compensate for any residual tension in the web on the tension roll. This can cause inaccurate readout of tension.

SECTION 6

CARE AND MAINTENANCE

It is not necessary to perform any type of maintenance on the controller. However, you may find it worthwhile to observe whether there is a buildup of dust, debris, or moisture on or near the unit after a period of time. If so, you may consider moving the unit or putting the unit in an enclosure more suited to your particular environment.

Washing the exterior of the unit may be done using warm water and a mild detergent on a cloth. Disconnect ac power prior to washing, do not spray or pressure wash unit. Ensure unit is dry prior to reconnecting power.

Validation of tension reading is recommended during your periodic maintenance cycle.

1. Most problems are caused by incorrect installation or misapplication of the equipment. So it is very important to be sure these factors are correct before making any changes to potentiometer, parameters, and switch settings.

If you would like assistance evaluating your installation, please call Technical service at (603) 332-6150 (Fax: (603) 332-3758, E-mail: techsupport@dfc.com). We offer experienced technicians whose responsibility it is to make sure you are satisfied with your DFE equipment. They will be pleased to help.

2. The most common source of improper operation of tension equipment is incorrect installation of the tension transducers or using transducers of the wrong load rating. Refer to your transducer instruction manual and check the sizing and installation procedures to verify the installation. NOTE: Avoiding pre-loading the transducers is very important.
3. Verify the electrical connections to the WebHandler3™ controller. Refer to Section 2.5 .
4. Proper calibration of the tension meter is very important to the operation of the controller. Be sure the calibration is correct. Refer to Section 3. Improper calibration may cause unstable operation.
5. If your controller has a pneumatic output (WebHandler™ Versions P, C), check the following factors:
 - A. The output pressure should not fall below 5 psi at core diameter. If it does, the controller may be unstable. This is caused by the compressibility of air which creates a time delay when the controller calls for a change of output pressure. At low pressures, the delay becomes long.
 - B. The air connection between the controller and the brake or clutch should be 1/4 inch O.D. tubing, no more than 25ft. long. Larger or longer tubing creates excessive volume which causes a time delay when output pressure changes. This can cause instability. If greater distance is unavoidable, the pneumatic enclosure should be moved closer to the brake or clutch. Use of a volume booster is an alternative. Call Technical Service at (603) 332-6150 for details.
6. If the above steps are not successful, perform the basic set-up sequence in Appendix C. If you get unexpected results in any step, call Technical Service at (603) 332-6150 for assistance.

SECTION 8

REPLACEMENT PARTS LIST

8.1 STANDARD CIRCUIT BOARDS

Power Board	723-1324
Control Board	723-2020
Terminal Board	723-2022

8.2 OPTIONAL CIRCUIT CARDS

DC Tach Option Card	723-0101
Pneumatic Enclosure Assembly	723-2037 (Version P)
Isolated Output Card	723-1439 (Version D)
Non-Standard Servo Valve Driver Card	723-1409 (Version C)
V-Out Board	723-1346 (Version V)
Pulse Tach /Encoder Option Card	723-0078

8.3 OUTPUT MODULES

SCR bridge	103-0013 (High voltage output module for version V)
Servo valve	119-0003 (For version P only)

8.4 FUSES (Slo Blo type)

Power in: 0.25A/250V	108-0046 (All versions of controller, 115 Vac)
5A/250V	108-0003 (For version V only, on V-Out Board)
0.125A/250V	108-0045 (230 Vac)
Power out: 5A/250V	108-0003 (For version V only, on V-Out Board)

8.5 CABLES

14 Conductor, Ribbon	131-0000 (Output Module board to Control Board)
24 Conductor, Ribbon	723-1362 (Terminal board to Control Board)
34 Conductor, Ribbon	723-1313 (Control Board to Power Board)
6 Conductor	721-1910 (Internal cable: Control Board to RPE port)
6 Conductor	721-1776/77 (WebHandler™ to Pneumatic module) Ver.P

8.6 RELAYS

TLS Tension Limit Relay	105-0028
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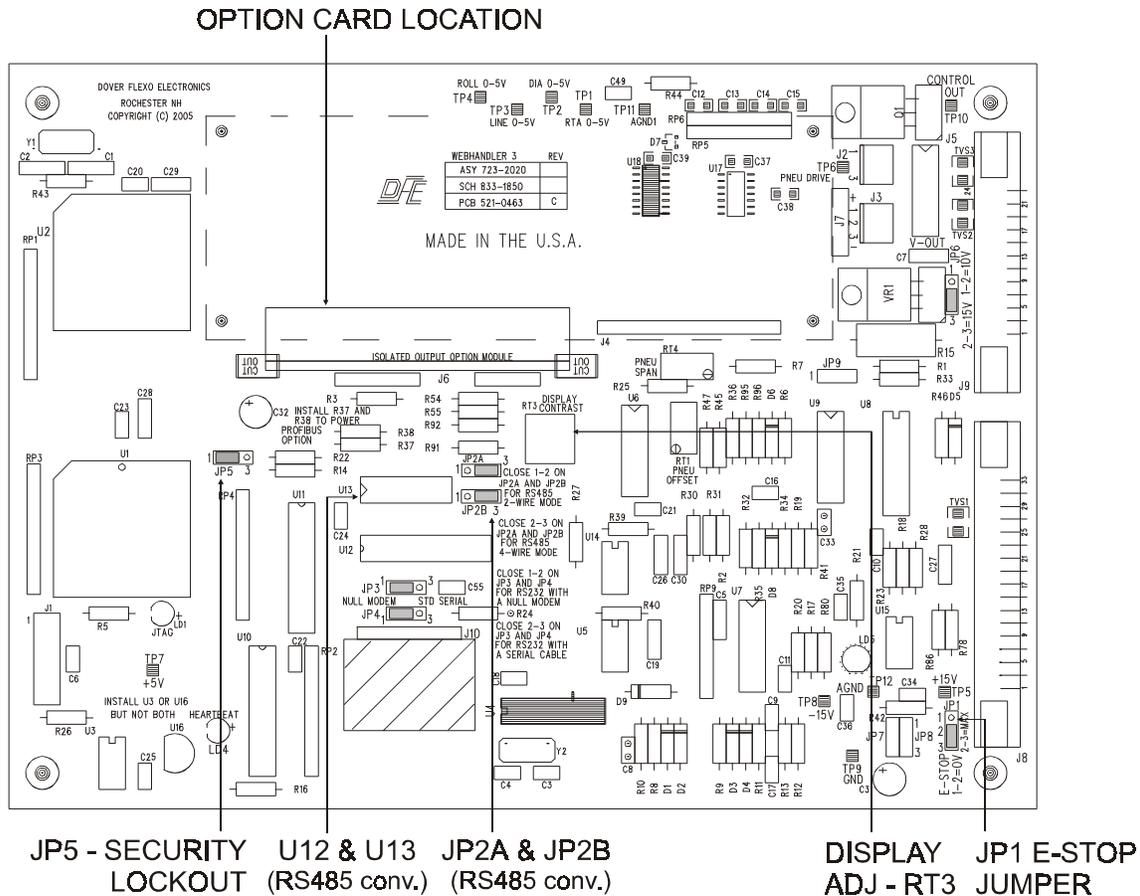


Figure 45 - CONTROL BOARD

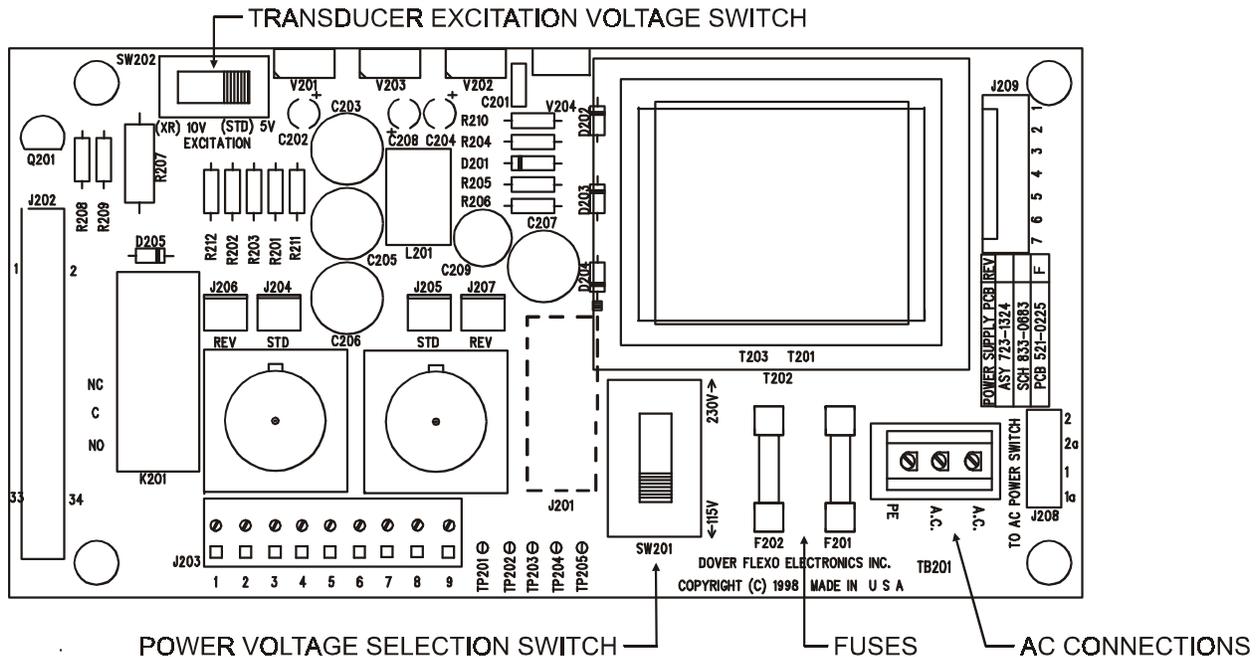


Figure 46 - POWER BOARD (top view)

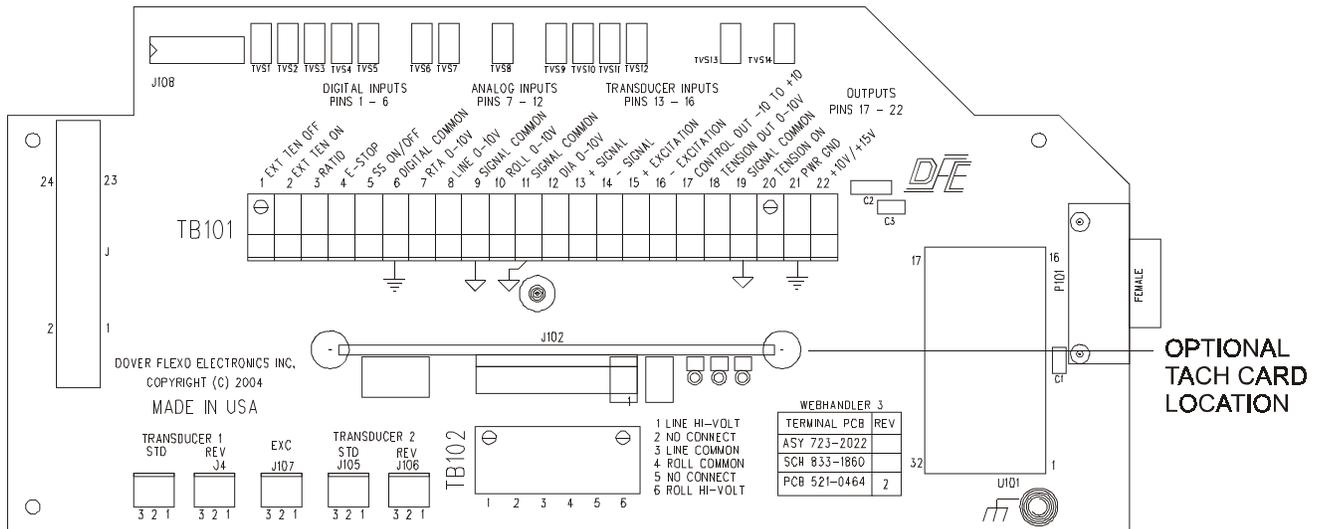


Figure 47 - TERMINAL BOARD

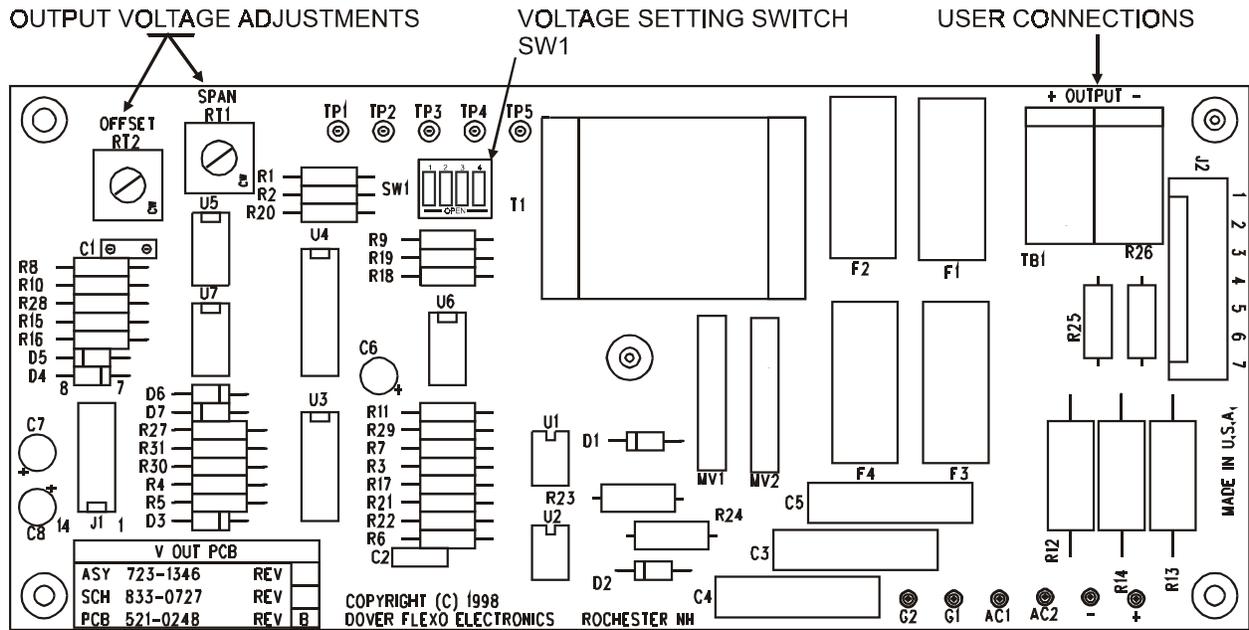


Figure 48 - V-OUT BOARD (top view)

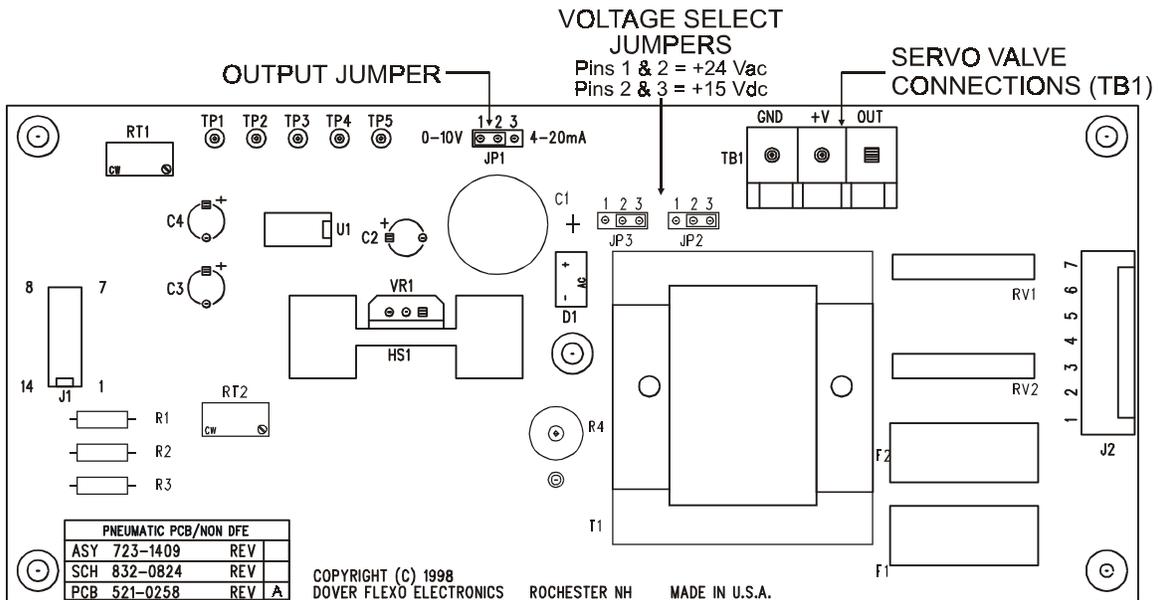


Figure 49 - NON-STANDARD SERVO VALVE DRIVER CARD

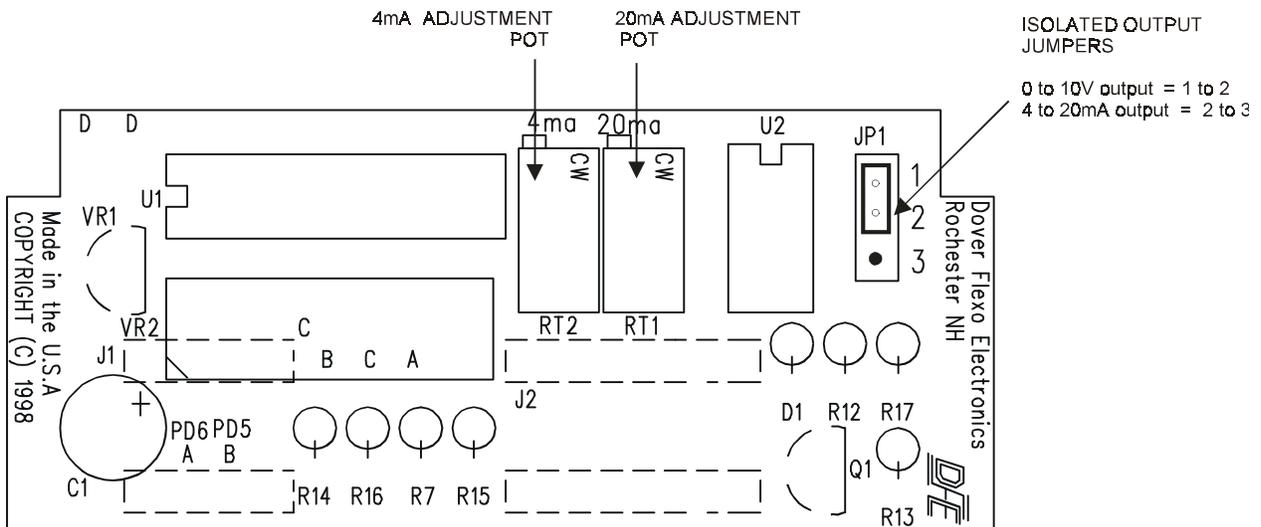


Figure 50 - ISOLATED OUTPUT CARD

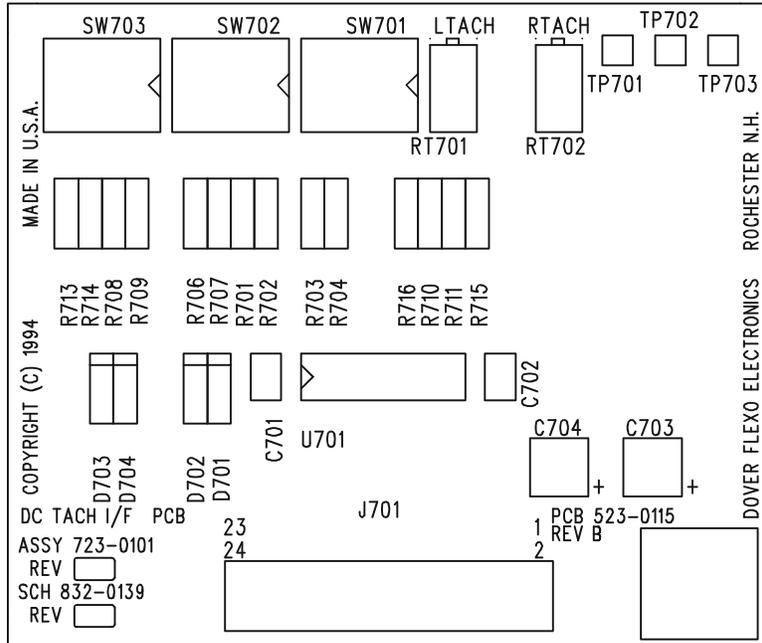


Figure 51 - DC TACH OPTION CARD

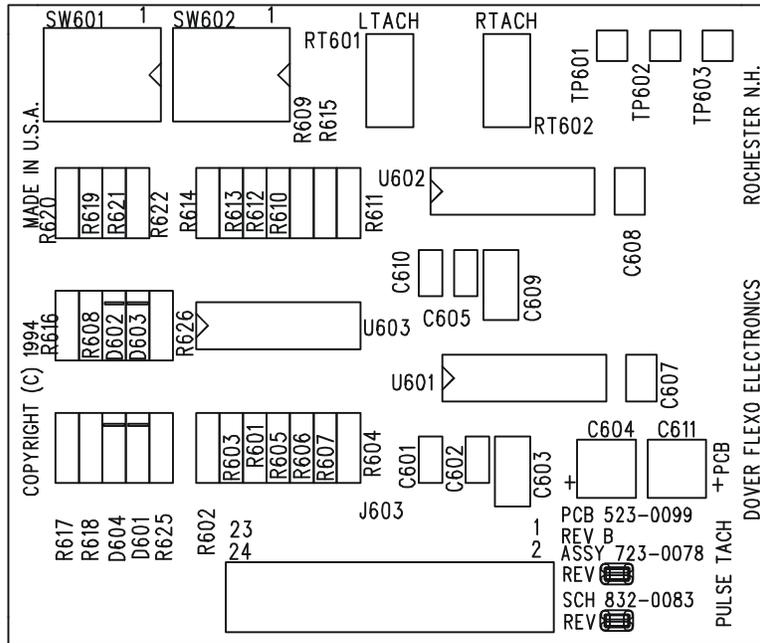


Figure 52 - PULSE TACH OPTION CARD

Appendix B

DIP Switch Settings & Jumpers

DC TACH CARD

INITIAL **SW702** and **SW703** SWITCH SETTINGS

1	2	3	4
O	O	O	C

SW701 SWITCHES

Ltach ----- if pos 1 is +
 if pos 3 is +
 Rtach ----- if pos 6 is +
 if pos 4 is +

1	2	3	4
Na	Na	O	C
Na	Na	C	O
O	C	Na	Na
C	O	Na	Na

(NA = Not Applicable)

SW702 and SW703 SWITCHES

Volts DC
 3 - 4
 4 - 16
 16 - 64
 64 - 250

1	2	3	4
C	O	O	O
O	C	O	O
O	O	C	O
O	O	O	C

PULSE TACH CARD

INITIAL **SW601** SETTINGS

1	2	3	4
C	O	O	C

SW601 SWITCHES

Pulse Amplitude (volts)
 0.25 - 2.0
 1.0 - 50.0

RTACH		LTACH	
1	2	3	4
O	C	C	O
C	O	O	C

SW602 SWITCHES

Frequency
 180 Hz - 1.7 KHz
 1.1 KHz - 40 KHz

RTACH		LTACH	
1	2	3	4
C	C	C	C
O	C	C	O

V-OUT BOARD

SW401

POWER IN	OUTPUT
115Vac	0-90
	0-45
	0-24
230Vac	0-180
	0-90
	0-45
	0-24**

RTACH		LTACH	
1	2	3	4
O	C	O	O
O	C	O	C
C	O	O	C
O	C	O	O
O	C	O	C
C	O	O	C
O	C	O	O

** This is a factory-installed option, only!

CONTROL BOARD JUMPERS

JP1

E-Stop Open = Max. Output on E-Stop Closed = Zero Output on E-Stop

JP2A & JP2B

RS485 Option Closed = RS485 - 2 wire mode Open = All Other Conditions/Set-ups

NON-STANDARD SERVO VALVE DRIVER CARD

JP1 Pins 1 2 = 0 - 10V Pins 2 and 3 = 4 - 20mA

ISOLATED OUTPUT CARD

JP1 Pins 1 2 = 0 - 10V Pins 2 and 3 = 4 - 20mA

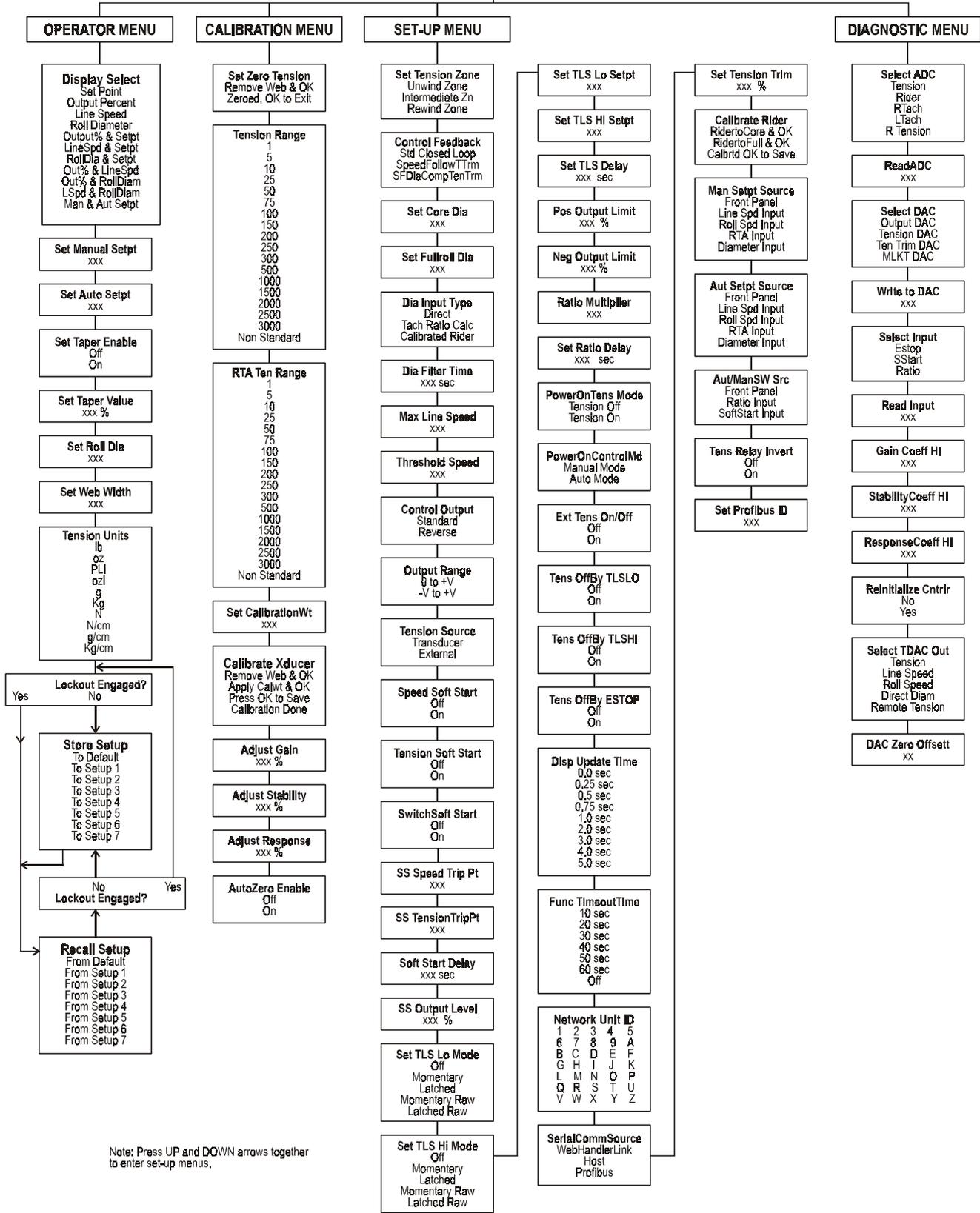
This section of the instruction manual is provided for those cases in which many settings may have been changed and it is reasonable to assume that nothing is set correctly. In order to get the controller operating properly perform the set-up in the sequence given below. This is the sequence used here at Dover Flexo Electronics. For the sake of clarity, the actual set up steps are not repeated here because they are located elsewhere in this book. Their locations are stated after the setup step descriptions.

WARNING: This procedure will also clear any factory settings done by DFE to configure your controller. This procedure has no provision to undo the results. There is no warning or verification in the controller. We recommend that you call Technical Support at DFE prior to using this procedure. Call 603-332-6150

1. Verify the power voltage selection switch and fuse values on the Power Board. (Section 2.3)
2. Turn on the AC power to the controller and check the power supplies. Refer to Figures 6 or 44, the Power Board. Verify the following voltages using the test points listed.

+15 Volt	TP201 (+) and TP204
-15 Volt	TP205 (+) and TP204
5 Volt/10 Volt	TP203 (+) and TP204 (transducer supply, 10V if using XRE)
5 Volt	TP202 (+) and TP204
3. Switch the Power off.
4. While depressing the Exit, ▲ and ▼ arrow keys, switch the power On. The controller will read: Controller being initialized....
5. Release the keys and wait. The normal start-up display will appear in a minute.
6. Calibrate the tension meter. (Sections 3.2)
7. Set up the output circuit.
(Section 4.3.B High Voltage output, Version V)
(Section 4.3.D Pneumatic output using non-standard servo valve, Version C)
8. Check operation of Emergency Stop, if used. (Section 4.1.C.1)
9. Set up Soft Start, if used. If Soft Start is speed-actuated, perform step 11 first. (Section 4.1.C.3)
10. Set up line speed option card, if installed (Section 3.3). Only Steps 1-3 are required by the soft start function.
11. Set up the TAPER card, if used. (Section 4.2.C) if using Roll Follower or range finding device for diameter input.
12. Set-up roll diameter calculation if used. See Section 3.4.
13. Tune for running stability. (Section 4.4)

UNCALIBRATED OFF
AUTO SETPT 100
DEFAULT SCREEN - Press UP and DOWN arrows together to enter Menus



Note: Press UP and DOWN arrows together to enter set-up menus.

OPERATOR MENUS

Display Select

Allows the user to select what value appears on the second line of the Default Display.

List of choices:

- Set point
- Output Percent
- Line Speed
- Roll Diameter
- Output% & Setpoint
- LineSpd & Setpoint
- RollDia & Setpoint
- Output% & Lspd
- Output% & Rdiam
- LineSpd & Rdiam
- MSetpt & ASetpt

Default choice or value: Setpoint

Set Auto Setpoint

Allows the user to specify the desired tension. The controller will then produce an output which causes this tension to remain constant.

Range of values: 0 - rrrr (where rrrr is the current "Range" value).

Default choice or value: 1.0

Set Taper Value

Allows the user to set the "taper percent" coefficient when the controller is configured for Taper.

The Taper function causes a set-point multiplier to change from unity at core, to a multiplier value of 100% minus the taper setting at full roll.

For example: With a 3" core, 12" full roll, a set-point of 50 lbs., and a taper setting of 20%, the auto set-point would be 50 lbs. at core, decreasing to $(100\% - 20\%) \times 50 \text{ lbs.} = 40 \text{ lbs.}$ at full roll).

Using Taper requires that the controller be configured and calibrated for a roll diameter source, in order to work properly.

Range of values: 0-100%

Default choice or value: 50%

Set web width

This function allows the user to enter the width of the web material being processed so that the display can read in tension force per web width. If one of these display units has been selected, then it is mandatory to enter a value in this function. Otherwise, entering a value has no effect until a force per web width unit has been chosen.

Range of values: 0.1-1-10-100-1000

Default choice or value: 1.0

Store Setup

This allows the user to store all of the existing controller parameters for later recall. There are seven memory locations, plus the "default" setup, which is the one used for normal operation.

List of choices:

To Default	To Setup 1
To Setup 2	To Setup 3
To Setup 4	To Setup 5
To Setup 6	To Setup 7

Default choice or value: To Default

Set Manual Setpt

Allows the user to specify how much output the controller will produce when it is in Manual mode.

Range of values: 0-100%

Default choice or value: 0 %

Set Taper Enable

This function allows the user to select whether the taper function is to be used in a given situation (Even though a controller may be set up for taper, a particular job may not require it, so this function allows the user to turn it off while allowing its use at a later time).

List of choices: Off, On

Default choice or value: Off

Set Roll Dia

Allows the user to enter the current roll diameter. This is helpful when the controller is being used in Line Speed Follower with Diameter Compensation mode, with Diameter Calculation method of providing roll diameter information to the controller, and the winding (or unwinding) roll has been changed to something other than the Full Roll (or Core) setting.

Range of values: Core Dia to Full Roll Dia,
Max = 24.0, Core = 3.8

Default choice or value: 3.8

Tension units

Allows the user to choose the units of calibration and display of tension and other parameters.

List of choices: lb, oz, PLI, ozi, g, Kg, N, N/cm
g/cm, kg/cm

Default choice or value: lb

Recall Setup

This allows the user to recall a complete operating setup from one of seven controller memory locations for use. When the setup is recalled, it goes into the "default" setup, and overwrites the one already in use.

List of choices:

From Default	From Setup 1
From Setup 2	From Setup 3
From Setup 4	From Setup 5
From Setup 6	From Setup 7

Default choice or value: From Default

CALIBRATION MENUS

Set Zero Tension

This function allows the user to establish a new zero point for tension measurement. This may become necessary if the transducers were not allowed to warm up long enough before the initial calibration. The user should remove any web from the roll before using this function, otherwise tension calibration will not be accurate. When the function is entered, the display prompts the user to do this by saying "Remove Web & OK". The final step, "Zeroed, OK to Exit", actually stores the new zero value. The zero sequence can be aborted, and the previous value will be restored, if the Exit key is pressed any time prior to the last step "Zeroed, OK to Exit". If the OK key is pressed at that time, the value is stored and the function is exited.

RTA Ten Range

This function allows the user to set or change the maximum expected full scale tension value for the application. Setting a tension range is required for initial calibration of the controller. Also, any time this function is entered and the existing value is changed, recalibration of tension will be required. The range value is specified in a force unit (e. g. pounds, Newtons, grams, ounces; but not PLI, N/cm, etc.). A number of commonly used full scale tension ranges are provided. If a different one is required, you may choose "Non Standard" and use the Up or Down arrow keys to select a special value.

List of choices: 1, 5, 10, 25, 50, 75, 100, 150, 200
250, 300, 500, 1000, 1500, 2000
2500, 3000, Non Standard
Default choice or value: 100

Calibrate Xducer

This function is used to adjust the offset and gain of the measuring system used for the particular transducer used and the web geometry of your system. Once the user enters the function, the controller prompts the user with instructions for calibration. The first (zeroing) message, "Remove Web & OK", directs the user to remove all web from the transducer roller, then press the OK key. The second (calibration) message, "Apply Calwt & OK", directs the user to apply the calibration weight, then press the OK key. The final step, "Press OK to Save" actually stores the calibration values. The calibration sequence can be aborted, and the previous values will be restored, if the Exit key is pressed any time prior to the last step "Press OK to Save". If the OK key is pressed at that time, the values are stored and the message "Calibration Done" comes up on the display. Then the function is exited.

Adjust Stability

Allows the user to specify the Integral Time coefficient for tuning the controller.

List of choices: N/A
Range of values: 1-100%
Default choice or value: 60%

Auto Zero Enable

Enabling this feature allows the controller to perform an automatic re-zeroing after its power is first turned on. If this function is enabled, care must be taken so that nothing is in contact with the transducer roller when the unit powers up, otherwise erroneous tension readings will result.

List of choices: Off, On Default choice or value: Off

Tension Range

This function allows the user to set or change the maximum expected full scale tension value for the application. Setting a tension range is required for initial calibration of the controller. Also, any time this function is entered and the existing value is changed, recalibration of tension will be required. The range value is specified in a force unit (e. g. pounds, Newtons, grams, ounces; but not PLI, N/cm, etc.). A number of commonly used full scale tension ranges are provided. If a different one is required, you may choose "Non Standard" and use the Up or Down arrow keys to select a special value.

List of choices: 1, 5, 10, 25, 50, 75, 100, 150, 200
250, 300, 500, 1000, 1500, 2000
2500, 3000, Non Standard
Default choice or value: 100

Set CalibrationWt

This function allows the user to enter the weight with which the tension transducers will be calibrated. This weight is generally 60% to 90% of the amount set as the range value. The unit of measure is the same as the force units selected in the Tension Units function.

Range of values: 1 - rrrr (where rrrr is the current "Range" value).
Default choice or value: 100

Adjust Gain

Allows the user to specify the Proportional Gain coefficient for tuning the controller.

List of choices: N/A
Range of values: 1-100%
Default choice or value: 15%

Adjust Response

Allows the user to specify the Derivative Rate coefficient for tuning the controller. Setting this value to 0 puts the controller into PI mode.

List of choices: N/A
Range of values: 0-100%
Default choice or value: 5.0%

SETUP MENUS

Set Tension Zone

A choice from this menu must be made to tell the controller what tension zone it will be used in. This enables certain features usable only in the appropriate zone.

List of choices: Unwind Zone
Intermediate Zn
Rewind Zone

Default choice or value: Unwind Zone

Set Core Dia

This function allows the user to set a lower limit for roll diameter. This is especially useful when using the diameter calculator, but it is also used when a direct or calibrated rider is used. It also represents the roll diameter that the controller uses when the EXIT/RESET key is pressed and the controller is set up for a rewind tension zone.

Range of values: 1-999

Default choice or value: 3.8

Dia Input Type

This function allows the user to specify whether the system's diameter information is to be supplied by a direct diameter measuring device (such as an ultrasonic sensor); computed as a ratio of the roll and line speed tachometer signals; input from a rider roll which would require calibration.

Diameter information is required when the controller is operated in SFDiaCompTenTrm mode, or when the Taper feature is used.

List of choices: Direct
TachRatioCalc
Calibrated Rider

Default choice or value: TachRatioCalc

Max Line Speed

This function allows the user to specify the maximum line speed of your system. Line speed signals are required for SpeedFollowTTrm or SFDiaCompTenTrm modes, and can be used if the user simply wants to be able to show line speed on the controller's display,

Range of values: 1-999

Default choice or value: 1

Control Output

The setting of this function determines whether controller output rises as tension decreases (Standard) or decreases as tension decreases (Reverse). Standard is used most of the time; Reverse should be used for driven Unwinds and in Intermediate applications when transducers are located after the controlled nip rolls.

List of choices: Standard, Reverse

Default choice or value: Standard

Tension Source

This function allows the user to select the source of the tension signal used for this application.

Tension input from a Transducer requires calibration using the Tension Range, SetCalibrationWt, and Calibrate Transducer functions. Tension input from an External source assumes an external 0-10V signal, and requires only that the Tension Range be set.

List of choices: Transducer, External

Default choice or value: Transducer

Control Feedback

This function is used to select the controller's operating mode and hence the feedback signals used to produce output. "Std Closed Loop" uses only the measured tension for feedback. "SpeedFollowTTrm" uses tension plus a line speed signal to produce output. "SFDiaCompTenTrm" uses tension, line speed, plus roll diameter to produce output.

List of choices: Std Closed Loop
SpeedFollowTTrm
SFDiaCompTenTrm

Default choice or value: Std Closed Loop

Set Fullroll Dia

This function allows the user to set an upper limit for roll diameter. This is especially useful when using the diameter calculator, but it is also used when a direct or calibrated rider is used. It also represents the roll diameter that the controller uses when the EXIT/RESET key is pressed and the controller is set up for an unwind tension zone.

Range of values: 1-999

Default choice or value: 24

Dia Update Time

This function is only to be used in special circumstances. With the default value of 0.0, the roll diameter used for Taper and for Diameter Compensated Line Speed Follower modes adjusts instantaneously when the corresponding inputs change. In very unique circumstances it is desirable to allow the tension in the controlled zone to stabilize before changing the roll diameter, because doing otherwise would introduce an unwanted transient into the system. Consult DFE Technical Service before changing the setting of this function.

List of choices: 0.0, 0.5, 1.0, 1.5, 2.0, 2.5, 3.0,
3.5, 4.0, 4.5, 5.0,

Default choice or value: 0.0

Threshold Speed

When line speed is used, this function allows the user to set the minimum line speed the controller to use for diameter calculation. Beneath this speed, roll diameter will be frozen at the previous value.

Range of values: 1 to xxx (where xxx is the value entered as Max Line Speed)

Default choice or value: 50

Set Output Range

This function restricts controller output to be always positive, or to have a full negative-to-positive voltage excursion. This function should be set to "0 to +V" unless the controller is a D version and is used for a driven unwind.

List of choices: 0 to +V
-V to +V

Default choice or value: 0 to +V

SpeedSoftStart

Enabling this feature causes controller output to be at the level set in the SS Output Level function, when line speed drops below the value set in the SS Speed Trip Pt function, for the time period specified in the Soft Start Delay function.

List of choices: Off
On

Default choice or value: Off

SETUP MENUS continued. . .

TensnSoftStart

Enabling this feature causes controller output to be at the level set in the SS Output Level function, when the tension drops below the level set in the SS Tension Trip Pt function, for the time period specified in the Soft Start Delay function.

List of choices: Off
On

Default choice or value: Off

SS Speed Trip Pt

This is the line speed level below which the Soft Start feature is activated, when the Speed Soft Start function is enabled.

Range of values: 0 - 9999 (for line speed)

Default choice or value: 25

Soft Start Delay

When Soft Start by either Speed or Tension is enabled, this is the amount of time for which the condition selected must be present before the mode is actually entered. At that time the controller produces the output level specified in the SS Output Level function. There is no delay associated with leaving soft start mode, only entering it. (No delay is associated with the SwitchSoftStart feature).

Range of values: 1 to 60 seconds

Default choice or value: 3 seconds

Set TLS Lo Mode

Enables the TLS Lo alarm, which allows the user to set a trip point which, should tension fall below this level, an alarm condition occurs. The user can choose Momentary mode, where the alarm condition resets itself if the measured tension returns to the normal range, or Latched mode, where the alarm condition remains until it is reset by the operator using OK key. The Raw modes enable the alarm even if the measured tension was never in-range first. The alarm condition produces a message on the display as well as activating the TLS relay.

List of choices: Off
Momentary
Latched
Raw Momentary
Raw Latched

Default choice or value: Off

Set TLS Lo Setpt

This is the TLS Lo tension trip point below which an alarm condition occurs. The trip point may be set anywhere from zero tension up to the maximum "range" setting and is in the unit of measure chosen in the Tension Units function (or its corresponding Force unit).

Range of values: 0 - rrrr (where rrrr is the "Range" value).

Default choice or value: 5

Set TLS Delay

This function allows the user to set a delay for TLS activation. This tends to prevent false alarms when the tension varies around the trip point.

Range of values: 0 - 10 sec.

Default choice or value: 3.0 sec.

SwitchSoftStart

Enabling this function causes controller output to be at the level set in the SS Output Level function, when the Soft Start contacts are closed.

List of choices: Off
On

Default choice or value: Off

SS Tension Trip Pt

This is the tension level below which the Soft Start feature is activated, when the TensionSoftStart function is enabled.

Range of values: 0 - rrrr (where rrrr is the "Range" value).

Default choice or value: 10

SS Output Level

When Soft Start is enabled, this is the percentage of output the controller produces when soft start is activated.

Range of values: 0-100%

Default choice or value: 20%

Set TLS Hi Mode

Enables the TLS Hi alarm, which allows the user to set a trip point which, should tension exceed this level, an alarm condition occurs. The user can choose Momentary mode, where the alarm condition resets itself if the measured tension returns to the normal range, or Latched mode, where the alarm condition remains until it is reset by the operator using the OK key. The Raw modes enable the alarm even if the measured tension was never in-range. The alarm condition produces a message on the display as well as activating the TLS relay.

List of choices: Off
Momentary
Latched
Raw Momentary
Raw Latched

Default choice or value: Off

Set TLS Hi Setpt

This is the TLS Hi tension trip point above which an alarm condition occurs. The trip point may be set anywhere from zero tension up to the maximum "range" setting and is in the unit of measure chosen in the Tension Units function (or its corresponding Force unit).

Range of values: 0 - rrrr (where rrrr is the "Range" value).

Default choice or value: 9.5

TLS Relay Invert

This function Inverts the function of the TLS Relay. Normally the relay is not energized when TLS is Inactive and is energized when TLS is Active. Setting this function to On inverts this, so that the relay is energized when TLS is Inactive and is not energized when TLS is Active.

List of Choices: Off
On

Default choice or value: Off

SETUP MENUS continued. .

Pos Output Limit

Some applications work best when the maximum output is limited to some value less than the maximum possible value. This function allows the user to set that value, as a percent of maximum.

Range of values: 0-100%
Default choice or value: 100%

Ratio Multiplier

This function allows the user to set the ratio multiplier which is used when the ratio function is invoked. The ratio function allows the instantaneous output to be multiplied and set to that value when the Ratio contact is closed. If the product is greater than the maximum possible, the product is set to maximum.

List of choices: N/A
Range of values: 0.1X to 10.0X
Default choice or value: 2.0X

PowerOnTens Mode

This function allows the user to choose whether the controller will come up with tension On or Off when power is first applied to it.

List of choices: Off
On
Default choice or value: Off

ExtTens On/Off

When activated this function will allow an external input to turn tension mode On or Off. Off prevents the external input from having an effect, while On will allow the external input to have its effect. This function must be set to On when the optional tension On/Off switch is used with P version controllers.

List of choices: Off
On
Default choice or value: Off

TensOffByTLSHI

When activated, a TLS Hi condition will cause tension to be turned Off.

List of choices: Off
On
Default choice or value: Off

Disp Update Time

This function allows the user to set the interval at which the display is updated.

List of choices (sec): 0.5, 1.0, 2.0, 3.0, 4.0, 5.0
6.0, 7.0, 8.0, 9.0, 10.0
Default choice or value: 0.5

SerialCommSource

The controller is capable of communicating with a notebook computer (running WebHandlerLink software) or a host computer. These devices have different command sets. This function allows the user to select which software interface is to be used.

List of choices: WebHandlerLink
Host
Default choice or value: WebHandlerLink

Neg Output Limit

Some applications work best when the minimum output is limited to some value less than the minimum possible value. This function allows the user to set that value, as a percent of the negative maximum (-100%). This function can only be used when Output Range is set to -V to +V..

Range of values: -100-0%
Default choice or value: -100%

Set Ratio Delay

This function sets the amount of time which must elapse between the time the Ratio contact is opened, and the time normal control output is restored. Note that this delay is not associated with entering the Ratio feature, only leaving it.

List of choices: N/A
Range of values: 0.1 sec to 10.0 sec
Default choice or value: 1.0 seconds

PowerOnControlMd

This function allows the user to choose whether the controller will come up in Manual or Automatic control mode when power is first applied to it.

List of choices: Manual Mode
Auto Mode
Default choice or value: Auto Mode

TensOffByTLSLO

When activated, a TLS Lo condition will cause tension to be turned Off.

List of choices: Off
On
Default choice or value: Off

TensOffByESTOP

When activated, an Emergency Stop condition will cause tension to be turned Off.

List of choices: Off
On
Default choice or value: Off

Func TimeoutTime

Allows the user to choose the amount of time which must elapse before the controller reverts from Function mode back to the default screen. This may be helpful if the user tends to leave the controller in a function.

List of choices: 10 sec., 20, 30, 40, 50, 60, Off
Default choice or value: Off

Set Tension Trim

When Control modes SpeedFollowTTrm or SFDiaCompTenTrm are used, the overall output provided by Line Speed and Roll diameter needs some amount of Tension Trim output provided by the PID controller because of tension changes. This function allows the user to adjust the amount of that PID output.

Range of values: 0-100%
Default choice or value: 10%

SETUP MENUS continued.

Network Unit ID

If the RS485 serial option is used, it is possible to have more than one device connected on the same network. If this is done each device needs to have a unique address for communication. This function allows the user to set a unique address in each controller. The default address (0) is an address to which all controllers respond.

List of choices: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9,
 A, B, C, D, E, F, G, H,
 I, J, K, L, M, N, O, P, Q,
 R, S, T, U, V, W, X, Y, Xf

Default choice or value: 0

Calibrate Rider

If Calibrated Rider is selected as a diameter measurement device in the DialInputType function, this function is required to calibrate that rider.

When the function is first entered, the message "RiderToCore & OK" comes up. At this time you should adjust your rider arm to the core position, then press OK. The next message, "RiderToFull & OK" directs the user to adjust the rider arm to the full roll position, then press the OK key. The final message "Calibrtd OKToSave", directs the user to store the calibration values. The calibration sequence can be aborted, and the previous values will be restored, if the Exit key is pressed any time prior to the last step. If the OK key is pressed at that time, the value is stored and the function is exited.

Aut Setpoint Source

This function allows the user to choose which unused analog input is to be used for Auto setpoint entry. A potentiometer or

or 0-10V signal is then applied to that pin.

List of choices: Front Panel
 Line Spd Input
 Roll Spd Input
 RTA Input
 Diameter Input

Default choice or value: Front Panel

Set Profibus ID

This function allows the user to specify the network Profibus address to match the setting in their own system. The default setting of 126 is a generally-accepted "broadcast" address.

List of Choices 0-127
Default choice or value 126

Man Setpoint Source

This function allows the user to choose which unused analog input is to be used for Manual setpoint entry. A potentiometer

or 0-10V signal is then applied to that pin.

List of choices: Front Panel
 Line Spd Input
 Roll Spd Input
 RTA Input
 Diameter Input

Default choice or value: Front Panel

Aut/Man SW Src

This function allows the user to choose which unused digital input to be used for an Auto / Manual mode switch. The signal

from the switch is then applied to that pin.

List of choices: Front Panel
 Ratio Input
 Softstart nput

Default choice or value: Front Panel

DIAGNOSTIC MENUS

These Diagnostic functions are intended as a troubleshooting aid when working closely with DFE Technical Support personnel. Do not attempt to modify these settings without consulting DFE Technical Support first, or settings may be lost, or unpredictable results may occur!!

Select ADC

This function allows the user to select which raw analog-to-digital converter output to view to verify it is operating correctly. Once selected, the Read ADC function must be used to view the output.

List of choices: Tension Rider
 Rtach Ltach
 R Tension

Default choice or value: Tension

Read ADC

This function allows the user to view the output of the analog-to-digital converter output which was selected in the Select ADC function.

Range of values: 0 to 65535 (Tension ADC)
 0 to 255 (all others)

Select DAC

This function allows the user to select which digital-to-analog converter to test by entering a value in the Write to DAC function.

List of choices: Output DAC
 Tension DAC
 TenTrm DAC
 MLTK DAC

Default choice or value: Output DAC

DIAGNOSTIC MENUS continued. .

Write to DAC

This function allows the user to enter a value for the DAC selected in the Select DAC function. To enter it, the up and down arrow keys must be used to adjust the value shown in the display, then the OK key must be used to actually send the value to the DAC.

Range of values: 0 to 1024 Default choice or value:
0

Read Input

This function allows the user to read the logic level of the input pin selected in the Select Input function.

Range of values: 0 or 1

Stability Coeff HI

This function allows the user to select the upper level of the Stability coefficient use for the Adjust Gain function.

Range of values: 1 to 9999

Default choice or value: 5000.0

Response Coeff HI

This function allows the user to select the upper level of the Response coefficient use for the Adjust Gain function.

Range of values: 1 to 9999

Default choice or value: 500.0

Select TDAC Out

This function allows the user to cause the Tension output to temporarily output other values for troubleshooting purposes. Do not use this function unless instructed to do so by DFE Technical Support!

List of choices: Tension
 Line Speed
 Roll Speed
 Direct Diam
 Remote Tension

Default choice or value: Tension

Boost Accel %Set

Sets the line speed acceleration required for the PID boost feature to become activated. This should be set at a level (in % change per second) at least equal to the acceleration which occurs when the machine is started. Setting the value to 100% disables this feature. (Note: In order to activate the Boost feature, machine acceleration must exceed the level set in this menu, AND line speed must be lower than the level set in the **Boost Line %Set** menu).

Range of Values 1-100%

Default choice or value 100%

Boost Kp Mult

Sets the multiplier applied to the proportional gain coefficient to improve response during periods of acceleration.

Range of Values 0.1-10

Default choice or value 1

Boost Kd Mult

Sets the multiplier applied to the derivative gain coefficient to improve response during periods of acceleration.

Select Input

This function allows the user to select an input signal pin to be read, using the Read Input function.

List of choices: Estop
 Sstart
 Ratio

Default choice or value: Estop

Gain Coeff HI

This function allows the user to select the upper level of the Gain coefficient use for the Adjust Gain function.

Range of values: 1 to 9999

Default choice or value: 2000.0

Reinitialize Cntrl

This function allows the user to completely restore a controller's memory to a reset condition, erasing all calibration, operation and configuration settings. Do not use this function unless instructed to do so by DFE Technical Support!

List of choices: No Yes

Default choice or value: No

Before using this Function note and record the DAC Zero Offset of your unit below. You will need to re-enter the Offset for output accuracy after Reinitializing your unit.

DAC Zero Offset

This function allows the user to adjust the offset of the Tension output DAC. This value is preset at the factory during final unit Test and Setup for your order. Do not use this function unless instructed to do so by DFE Technical Support!

Range of values: +/- 25 (DAC counts)

Default choice or value: 0 (Value is Preset at the factory)

Boost Line % Set

Sets the threshold line speed beneath which you want the boost feature to operate. Setting the value to 0% disables this feature. (Note: In order to activate the Boost feature, line speed must be lower than the level set in this menu, AND machine acceleration must exceed the value set in the **Boost Accel %Set** menu).

Range of Values 0-100%

Default choice or value 0%

Boost Ki Mult

Sets the multiplier applied to the integral gain coefficient to improve response during periods of acceleration.

Range of Values 0.1-10

Default choice or value 1

Range of Values 0.1-10

Default choice or value 1

DIAGNOSTIC MENUS continued. .

Zero Select ADC

Electronically calibrates the “zero” of the ADC you already selected in the **Select ADC** menu.

(Note: Before using this menu, go to the **Read ADC** menu and cause some change to the input to verify that you selected the ADC properly and that you are wired to the correct terminal). To use this menu, verify that the desired level is being applied, use the arrow keys to change the displayed value to “Yes”, then press the “OK” key.

List of Choices	No	Yes
Default choice or value	No	

Span Select ADC

Electronically calibrates the “span” of the ADC you already selected in the **Select ADC** menu. This menu should be used only after you have already set your Zero value using the **Zero Select ADC** menu. (Note: Before using this menu, go to the **Read ADC** menu and cause some change to the input to verify that you selected the ADC properly and that you are wired to the correct terminal. If you are not able to produce a full input level, you should go to the **Span % of Max** menu first and set the percent of full level you will be using for calibration). To use this menu, verify that the desired level is being applied, use the arrow keys to change the displayed value to “Yes”, then press the “OK” key.

List of Choices	No	Yes
Default choice or value	No	

Span % of Max

Sets the percentage of full scale input signal you will be applying to the controller when using the **Span Select ADC** menu.

Range of Values	0-100%
Default choice or value	100%

Appendix F: Host Interface Commands & Responses

1. HOST/WEBHANDLER COMMANDS AND RESPONSES

\$#a(+4)	Set Auto setpoint Host sets automatic set-point to be equal to the value contained in the following four bytes, where the data format is: “X.XX” when the full scale Range setting is between 1.00 and 9.99 “XX.X” when the full scale Range setting is between 10.0 and 99.9 “XXX.” when the full scale Range setting is between 100. and 999. and “XXXX” when the full scale Range setting is between 1000 and 9999. <u>WebHandler response:</u> %#A Command receipt acknowledged; command processed correctly
\$#A	Go to Auto Mode Host instructs WebHandler to go to Automatic control mode. <u>WebHandler response:</u> %#A Command receipt acknowledged; command processed correctly
\$#C	Inquire controller mode (Manual / Auto) <u>WebHandler response:</u> %#C(+1) Controller mode is contained in the next byte, where “0” (48d) = Manual mode, and “1” (49d) = Auto mode
\$#d	Inquire roll diameter Host inquires what the present roll diameter is. <u>WebHandler response:</u> %#d(+5) Roll diameter value is contained in the following five bytes, where the data format is “XXX.X” (e. g. _25.4 represents 25.4 inches, centimeters, or other units of distance measurement).
\$#F	Turn Tension Off Host instructs WebHandler to deactivate WebHandler output. <u>WebHandler response:</u> %#A Command receipt acknowledged; command processed correctly
\$#G(+3)	Set Gain coefficient Hosts sets gain (proportional of the PID) to be equal to the value contained in the following three bytes, where the data format is “XXX” (e. g. 020 represents a gain value of 20). <u>WebHandler response:</u> %#A Command receipt acknowledged; command processed correctly
\$#I	Status inquiry Host inquires what the present controller status is. <u>WebHandler response:</u> %#I(+1) Controller status is contained in the following byte, where the value of each bit within the byte is as follows: XXXXXXXXn: n = 0: Tension is Off, n = 1: Tension is On XXXXXXXXnX: n = 0: Auto mode, n = 1: Manual mode XXXXXXXXnXX: n = 0: TLS Lo is inactive, n = 1: TLS Lo is active XXXXnXXXX: n = 0: TLS Hi is inactive, n = 1: TLS Hi is active XXXnXXXX: n = 0: Ratio is inactive, n = 1: Ratio is active XXnXXXX: n = 0: Softstart is inactive, n = 1: Softstart is active XnXXXX: n = 0: ESTOP is inactive, n = 1: ESTOP is active nXXXX: Reserved

HOST/WEBHANDLER COMMANDS AND RESPONSES continued...

- ##K(+1) Store default setup**
Store the default setup in WebHandler memory locations 1 through 9, as selected according to the last byte (e. g. \$1K6 will store the default setup in memory location 6).
WebHandler response:
%#A (Command receipt acknowledged; command processed correctly)
Note: Due to the time required for the storage operation to take place, it make take up to two seconds for the WebHandler to deliver the ACK response. Also, if the WebHandler returns the NAK response %#?, this is because the memory location number is out of range).
- ##m(+3) Set Manual setpoint**
Host sets manual setpoint to be equal to the value contained in the following three bytes, where the data format is “XXX” (e. g. 067 represents 67 percent output).
WebHandler response:
%#A Command receipt acknowledged; command processed correctly
- ##M Go to Manual mode**
Host instructs WebHandler to go to Manual control mode.
WebHandler response:
%#A Command receipt acknowledged; command processed correctly
- ##N Turn Tension On**
Host instructs WebHandler to activate WebHandler output.
WebHandler response:
%#A Command receipt acknowledged; command processed correctly
- ##O Inquire tension mode (Tension On / Off)**
WebHandler response:
%#O(+1) Tension mode is contained in the next byte, where FFh = Tension On, and 00h = Tension Off
- ##P(+1) Retrieve stored setup**
Activate one of the stored setups (1 through 9) and make it the default (e. g. \$1P4 will take the setup in memory location 4 and make it the default).
Note: due to the time required for the storage operation to take place, it make take up to two seconds for the WebHandler to deliver the ACK response. Also, if the WebHandler returns a %#?, this is either because the stored setup is not valid, or because the setup storage number is out of range.
- ##r(+3) Set Tension Trim**
Host sets tension trim setting to be equal to the value contained in the following three bytes, where the data format is “XXX” (e.g. 009 represent 9% tension trim).
WebHandler response:
%#A Command receipt acknowledged; command processed correctly
- ##R(+3) Set Response**
Hosts sets response (derivative of the PID) to be equal to the value contained in the following three bytes, where the data format is “XXX” (e. g. 001 represents a response value of 1).
WebHandler response:
%#A Command receipt acknowledged; command processed correctly
- ##s Inquire line speed**
Host inquires what the present line speed is.
WebHandler response:
%#s(+5) Line speed value is contained in the following five bytes, where the data format is “XXX.X” (e. g. “125.7” represents 125.7 fpm, mpm, or other units of speed measurement).
- ##S(+3) Set Stability**
Hosts sets stability (integral of the PID) to be equal to the value contained in the following three bytes, where the data format is “XXX” (e. g. 100 represents a stability value of 100).
WebHandler response:
%#A Command receipt acknowledged; command processed correctly

HOST/WEBHANDLER COMMANDS AND RESPONSES continued...

- ##t** **Inquire tension value**
Host inquires what the present tension value is.
WebHandler response:
##t(+4) Tension value is contained in the following four bytes, where the data format is:
 "X.XX" when the full scale Range setting is between 1.00 and 9.99
 "XX.X" when the full scale Range setting is between 10.0 and 99.9
 "XXX." when the full scale Range setting is between 100. and 999. and
 "XXXX" when the full scale Range setting is between 1000 and 9999.
- ##T** **Read Tension Trim**
Host inquires current tension trim setting from controller.
WebHandler response:
##T(+3) Set-point value is contained in the following 3 bytes. IE: "%1X010" is a setting of 10.
- ##V** **Inquire Manual set-point**
Host inquires what present Manual set-point is.
WebHandler response:
##V(+3) Manual set-point value is contained in the following three bytes (e. g ##V_ _9 represents a manual set-point value of 9%).
- ##W** **Read Auto Setpoint**
Host inquires the current Auto Set-point from the controller
WebHandler response:
##W(+6) Set-point value is contained in the following 6 bytes, right justified, with leading zeroes suppressed. IE: "%1W 50.0" is a setting of 50.0
- ##X** **Read Gain**
Host inquires the current PID Gain setting from the controller.
WebHandler response:
##X(+3) Set-point value is contained in the following 3 bytes IE: "%1W 010" is a setting of 50.
- ##Y** **Read Stability**
Host inquires the current Stability from the controller
WebHandler response:
##Y(+3) Set-point value is contained in the following 3 bytes. IE: "%1Y 50.0" is a setting of 50.
- ##Z** **Read Response**
Host inquires the current PID Response setting for the controller.
WebHandler response:
##Z(+3) Set-point value is contained in the following 3 bytes. IE: "%1W 005" is a setting of 5.
- WebHandler negative acknowledge (NAK) response:**
##? Command interpreted and acknowledged, but not processed. Typically this is because the argument is out of range, or because the formatting is not correct.

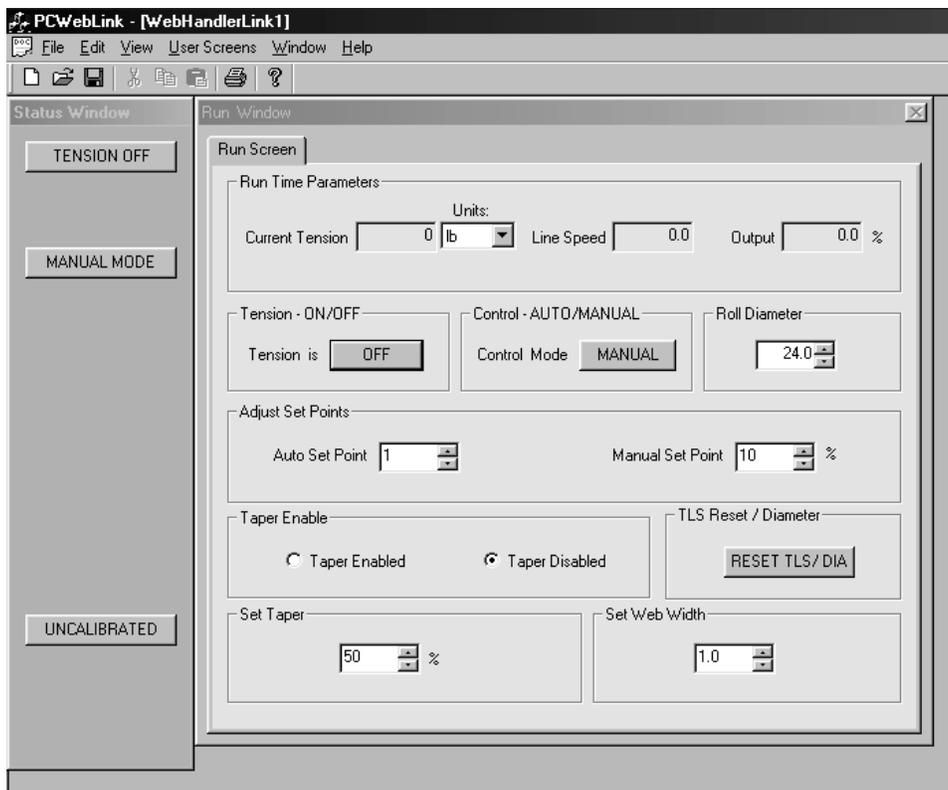


Figure 53 - PCWebLink RUN SCREEN

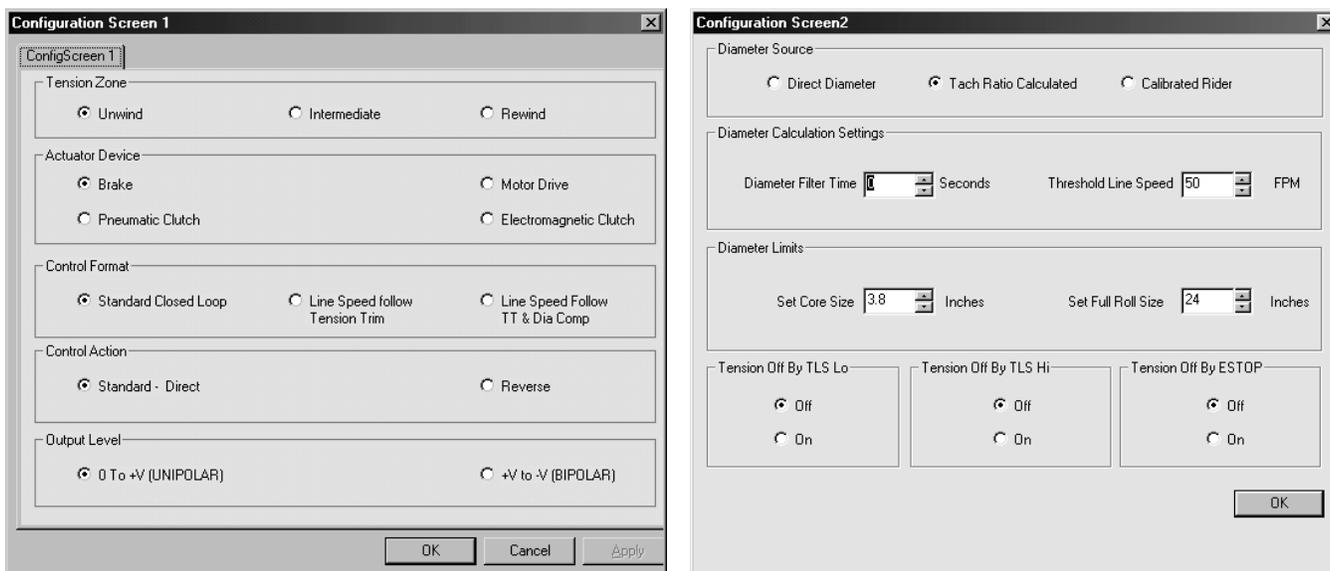


Figure 54 - PCWebLink CONFIG 1 AND CONFIG2 SCREENS

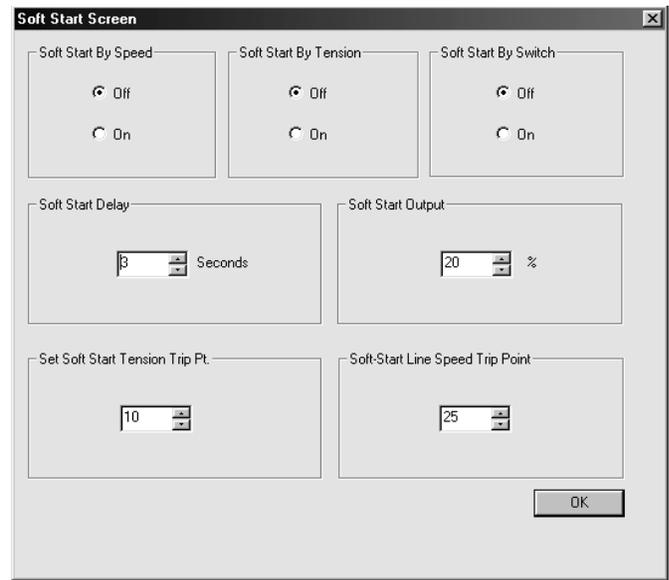
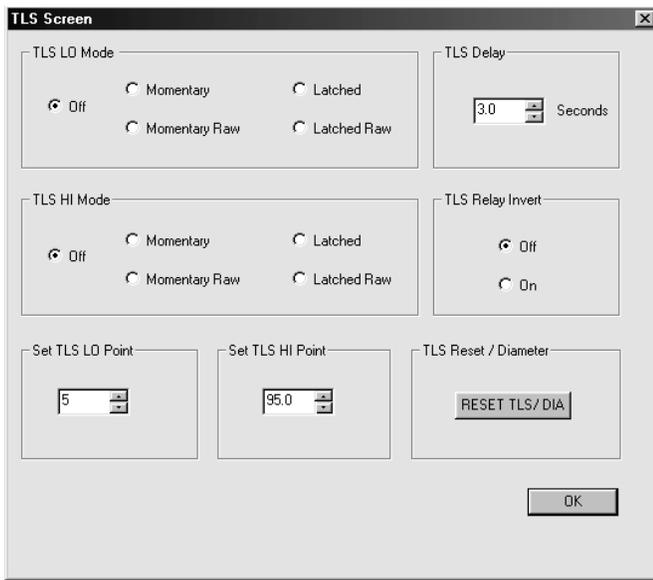


Figure 55 - PCWebLink TLS AND SOFT START SCREENS

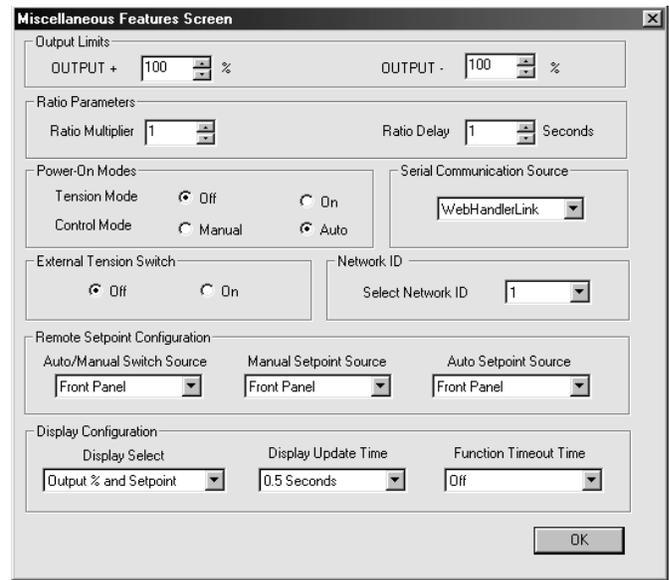
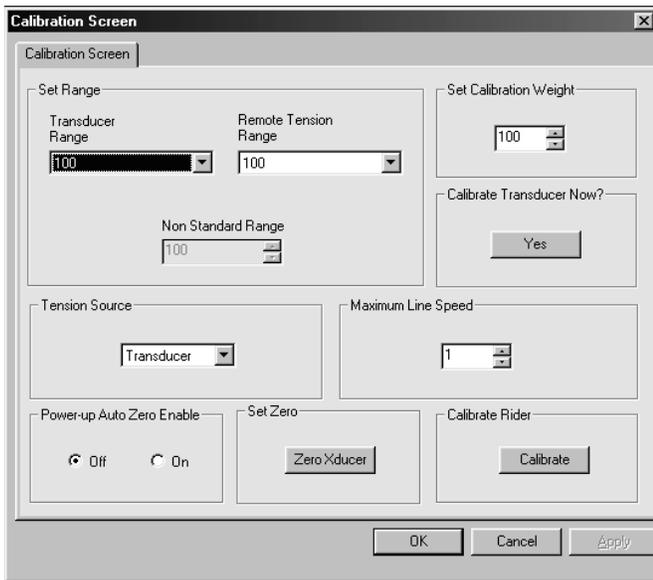


Figure 56 - PCWebLink CALIBRATION AND MISCELLANEOUS SCREENS

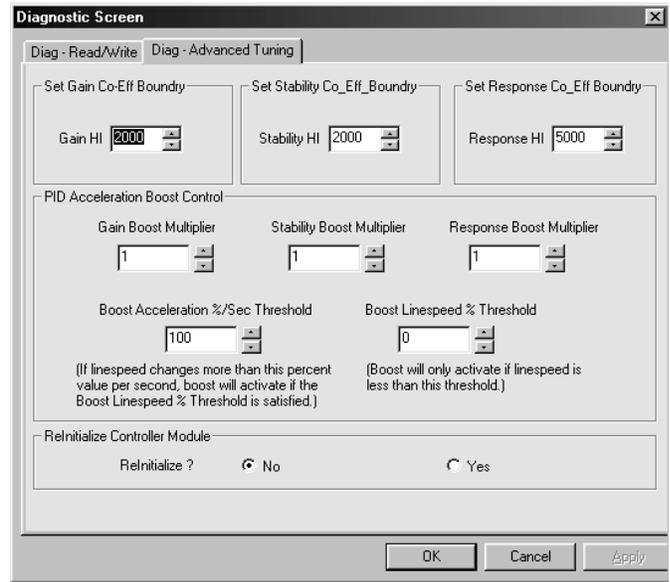
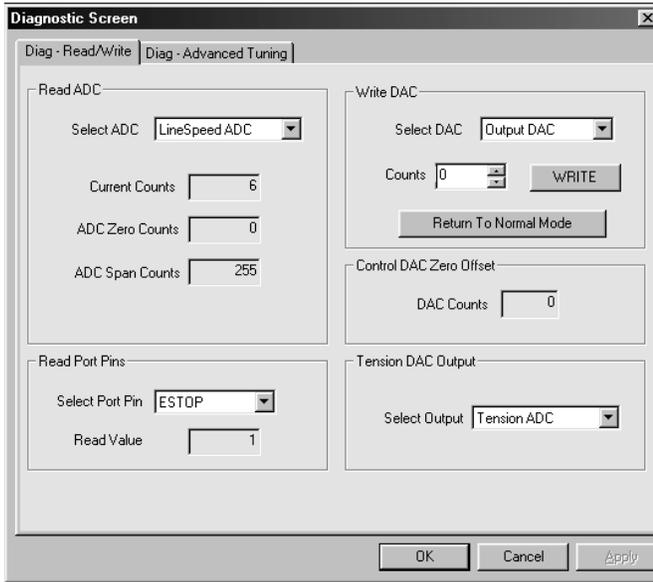


Figure 57 - PCWebLink DIAGNOSTIC SCREENS

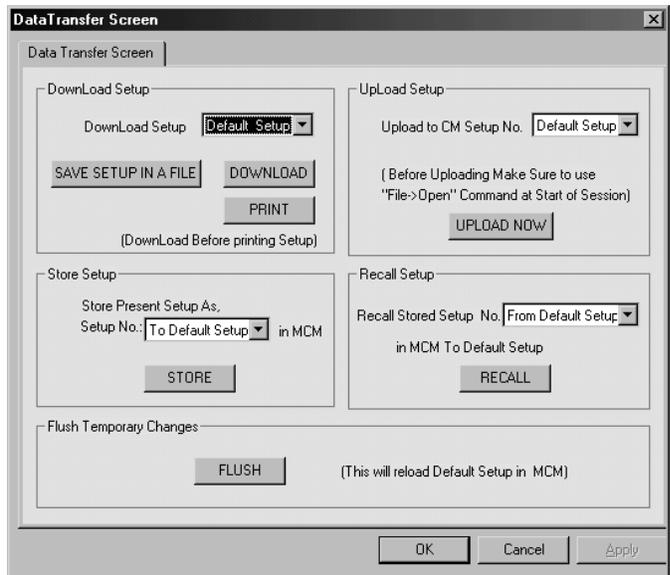
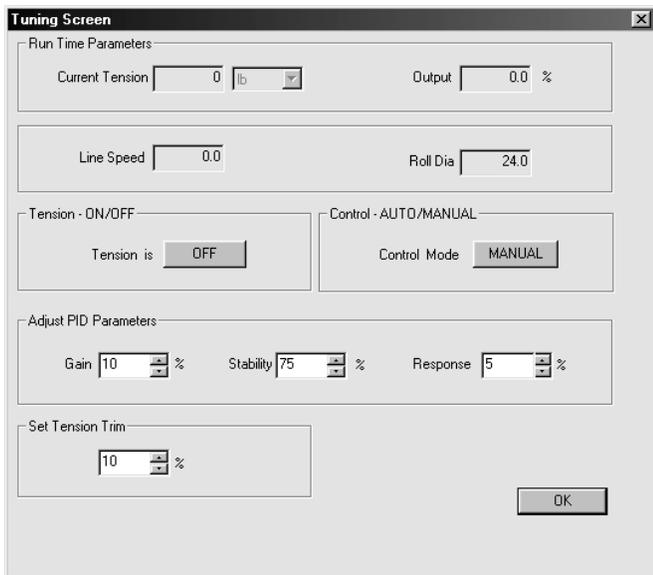


Figure 58 - PCWebLink TUNING AND DATA TRANSFER SCREENS

Appendix H: Transducer Electrical Connections

MODELS C, RS, AND UPB TRANSDUCERS

THE TENSION (T) AND COMPRESSION STRAIN GAGES ARE CONNECTED IN A BRIDGE CONFIGURATION. AS THE BEAMS BEND SLIGHTLY UNDER WEB TENSION, THE GAGE RESISTANCES CHANGE PRODUCING AN OUTPUT SIGNAL WHICH IS DIRECTLY PROPORTIONAL TO THE WEB TENSION.

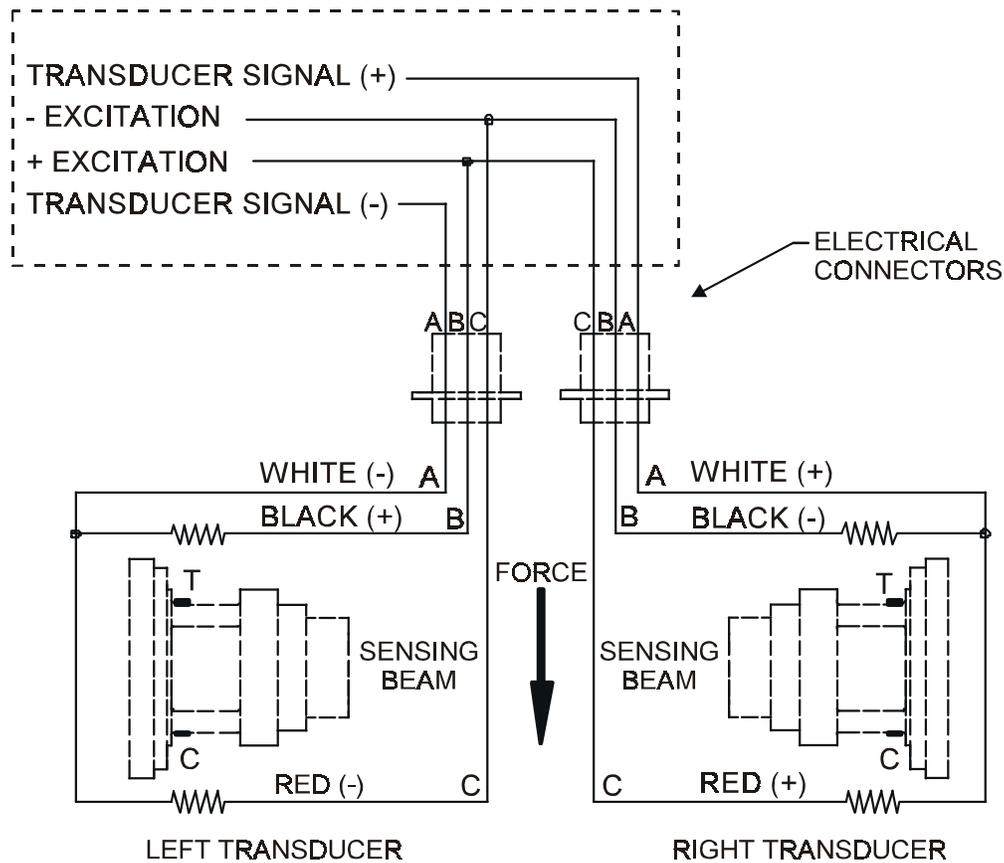


Figure 59 - MODELS C, RS, & UPB TRANSDUCER WIRING

RIBBON FILAMENT (RFA) & VNW TRANSDUCERS

THE TENSION (T) AND COMPRESSION (C) STRAIN GAGES ARE CONNECTED IN A BRIDGE CONFIGURATION. AS THE BEAMS BEND SLIGHTLY UNDER WEB TENSION, THE GAGE RESISTANCES CHANGE PRODUCING AN OUTPUT SIGNAL WHICH IS DIRECTLY PROPORTIONAL TO THE WEB TENSION.

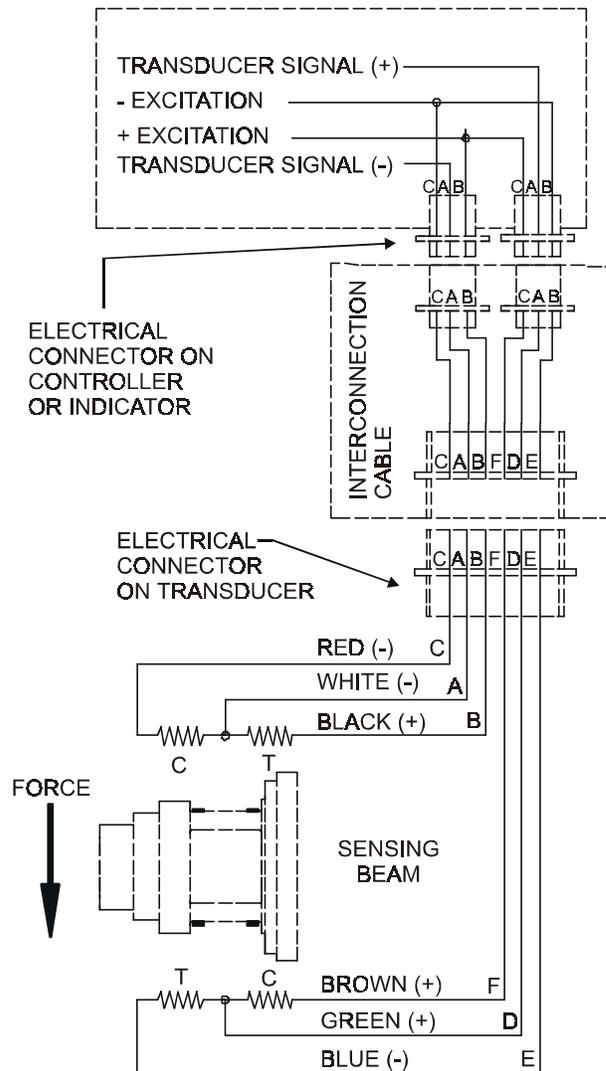


Figure 60 - MODEL RFA & VNW TRANSDUCER WIRING

TENSION ROLL (TR) AND NARROW WEB (NWI) TRANSDUCERS

The tension (T) and compression (C) strain gages are connected in a bridge configuration. As the beams bend slightly under web tension, the gage resistances change producing an output signal which is directly proportional to the web tension.

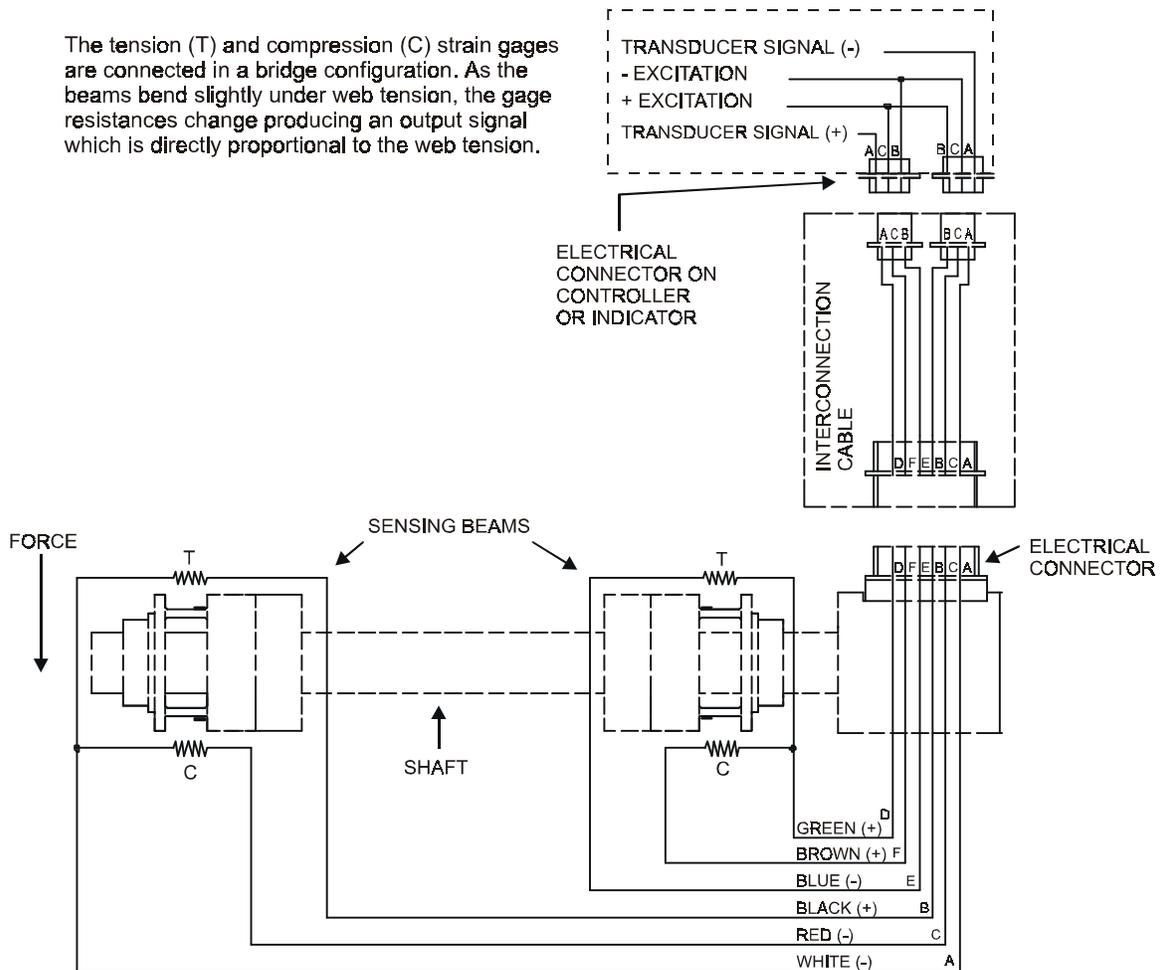
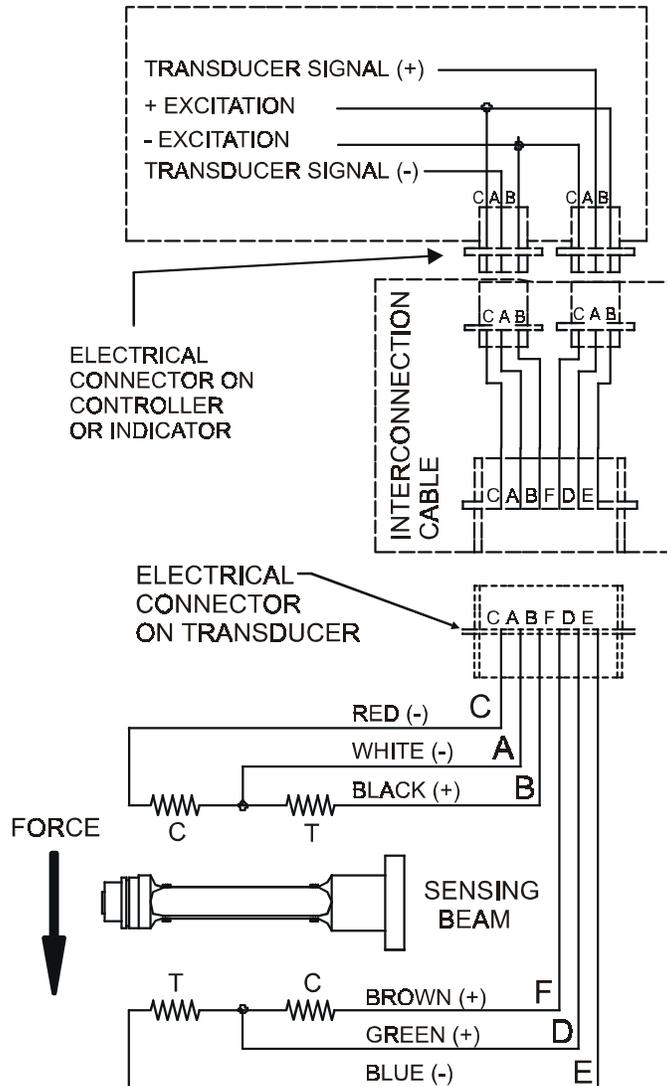


Figure 61 - MODELS TR & NWI TRANSDUCER WIRING

LOW TENSION (LT) TRANSDUCERS



Note: XR Option must be used with LT Transducers

Figure 62 - MODEL LT TRANSDUCER WIRING

Appendix I: Typical Tension for Various Materials

TYPICAL TENSIONS FOR WEB MATERIALS

ACETATE		0.5 lb. per mil per inch of width	
FOIL	Aluminum	0.5 lb. per mil per inch of width	
	Copper	0.5 lb. "	
CELLOPHANE		0.75 lb. per mil per inch of width	
NYLON		0.25 lb. per mil per inch of width	
PAPER	15 lb *	0.4 lb. per inch of width	
	20 lb	0.5 lb. "	
	30 lb	0.75 lb. "	
	40 lb	1.25 lb. "	
	60 lb	2.0 lb. "	
	80 lb	3.0 lb. "	
	100 lb	4.0 lb. "	
* based on 3000 sq. ft. ream			
PAPERBOARD	8pt	3.0 lb. per inch of width	
	12pt	4.0 lb. "	
	15pt	4.5 lb. "	
	20pt	5.5 lb. "	
	25pt	6.5 lb. "	
	30pt	8.0 lb. "	
POLYETHYLENE		0.12 lb. per mil per inch of width	
POLYESTER (Mylar)		0.75 lb. per mil per inch of width	
POLYPROPYLENE		0.25 lb. per mil per inch of width	
POLYSTYRENE		1.0 lb. per mil per inch of width	
RUBBER	<u>GAUGE</u>	<u>AT 25% STRETCH</u>	<u>AT 50% STRETCH</u>
	10 mil	1.75	3.68
	12 mil	1.10	2.03
	16.5 mil	4.09	8.17
	26 mil	2.47	4.97
SARAN		0.15 lb per mil per inch of width	
STEEL	<u>GAUGE - INS</u>	<u>UNWIND-PSI</u>	<u>REWIND-PSI</u>
	.001 -.005	1000	4000
	.006 -.025	850	3500
	.026 -.040	750	3000
	.041 -.055	650	2600
	.058 -.070	550	2200
	.071 -.090	450	1800
	.091 -.120	450	1400
	.121 -.140	400	1200
	.141 -.165	400	1000
	.166 -.200	400	900
	.201 -.275	400	800
	.276 -.380	300	700
VINYL		0.05 lb. per mil per inch of width	

*** For laminated webs, sum the tension for the individual webs and add 0.1 lb per inch of width.

TERMS AND CONDITIONS OF SALE AND SHIPMENT

1. THE COMPANY

Dover Flexo Electronics, Inc. is hereinafter referred to as the Company.

2. CONFLICTING OR MODIFYING TERMS

No modification of, additions to or conflicting provisions to these terms and conditions of sale and shipment, whether oral or written, incorporated into Buyer's order or other communications are binding upon the Company unless specifically agreed to by the Company in writing and signed by an officer of the Company. Failure of the Company to object to such additions, conflicts or modifications shall not be construed as a waiver of these terms and conditions nor an acceptance of any such provisions.

3. GOVERNING LAW

This contract shall be governed by and construed according to the laws of the state of New Hampshire, U.S.A. The parties agree that any and all legal proceedings pursuant to this contract shall take place under the jurisdiction of the courts of the State of New Hampshire in the judicial district of Strafford County.

4. PENALTY CLAUSES

Penalty clauses of any kind contained in orders, agreements or any other type of communication are not binding on the Company unless agreed to by an officer of the Company in writing.

5. WARRANTY

Dover Flexo Electronics, Inc. warrants, to the original Buyer, its' products to be free of defects in material and workmanship for five years from date of original shipment. Repairs on products are warranted for 90 days from date of shipment. During the warranty period the Company will repair or replace defective products free of charge if such products are returned with all shipping charges prepaid and if, upon examination, the product is shown to be defective. This warranty shall not apply to products damaged by abuse, neglect, accident, modification, alteration or mis-use. Normal wear is not warranted. All repairs and replacements under the provisions of this warranty shall be made at Dover Flexo Electronics or at an authorized repair facility. The Company shall not be liable for expenses incurred to repair or replace defective products at any other location or by unauthorized persons or agents. This warranty contains all of the obligations and warranties of the Company. There are no other warranties, either expressed or implied. No warranty is given regarding merchantability or suitability for any particular purpose. The Company shall not be liable in either equity or law for consequential damages, losses or expenses incurred by use of or inability to use its' products or for claims arising from same. No warranty is given for products of other manufacturers even though the Company may provide these products with its' own or by themselves. The provisions of this warranty can not be changed in any way by any agent or employee of the Company. Notice of defects must be received within the warranty period or the warranty is void. The warranty is void if the serial number tag is missing or not readable.

6. PAYMENTS

Standard terms of credit are net 30 days from date of shipment, providing satisfactory credit is established with the Company. Amounts past due are subject to a service charge of 1.5% per month or portion thereof or 18% per annum. The Company reserves the right to submit any unpaid late invoices to a third party for collection and Buyer shall pay all reasonable costs of such collection in addition to the invoice amount. All quoted prices and payments shall be in U.S. Dollars.

If the Company judges that the financial condition or payment practices of the Buyer does not justify shipment under the standard terms or the terms originally specified, the Company may require full or partial payment in advance or upon delivery. The Company reserves the right to make collection on any terms approved in writing by the Company's Finance Department. Each shipment shall be considered a separate and independent transaction and payment therefore shall be made accordingly. If the work covered by the purchase order is delayed by the Buyer, upon demand by Company

payments shall be made on the purchase price based upon percentage of completion.

7. TAXES

Any tax, duty, custom, fee or any other charge of any nature whatsoever imposed by any governmental authority on or measured by any transaction between the Company and the Buyer shall be paid by the Buyer in addition to the prices quoted or invoiced.

8. RETURNS

Written authorization must be obtained from the Company's factory before returning any material for which the original Buyer expects credit, exchange, or repairs under the Warranty. Returned material (except exchanges or repairs under the Warranty) shall be subject to a minimum re-stocking charge of 15%. Non-standard material or other material provided specially to the Buyer's specification shall not be returnable for any reason. All material returned, for whatever reason, shall be sent with all freight charges prepaid by the Buyer.

9. SHIPPING METHOD AND CHARGES

All prices quoted are EXW the Company's factory. The Company shall select the freight carrier, method and routing. Shipping charges are prepaid and added to the invoice of Buyers with approved credit, however the Company reserves the right to ship freight-collect if it prefers. Shipping charges will include a charge for packaging. Company will pay standard ground freight charges for items being returned to Buyer which are repaired or replaced under the Warranty.

10. CANCELLATION, CHANGES, RESCHEDULING

Buyer shall reimburse Company for costs incurred for any item on order with the Company which is cancelled by the Buyer. Costs shall be determined by common and accepted accounting practices.

A one-time hold on any item ordered from the Company shall be allowed for a maximum of 30 days. After 30 days, or upon notice of a second hold, Company shall have the right to cancel the order and issue the appropriate cancellation charges which shall be paid by Buyer. Items held for the Buyer shall be at the risk and expense of the Buyer unless otherwise agreed upon in writing. Company reserves the right to dispose of cancelled material as it sees fit without any obligation to Buyer.

If Buyer makes, or causes to make, any change to an order the Company reserves the right to change the price accordingly.

11. PRICES

Prices published in price lists, catalogs or elsewhere are subject to change without notice and without obligation. Written quoted prices are valid for thirty days only.

12. EXPORT SHIPMENTS

Payment for shipments to countries other than the U.S.A. and Canada or to authorized distributors shall be secured by cash in advance or an irrevocable credit instrument approved by an officer of the Company. An additional charge will apply to any letter of credit. There will also be an extra charge for packaging and documentation.

13. CONDITION OF EQUIPMENT

Buyer shall keep products in good repair and shall be responsible for same until the full purchase price has been paid.

14. OWNERSHIP

Products sold are to remain the property of the Company until full payment of the purchase price is made.

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