

TCS-200 Tension Control

Installation & Operating Instructions

P-2106-WE
819-0550



An **Altra Industrial Motion** Company

TCS-200

TABLE OF CONTENTS

Introduction	2
Theory of Operation	3
Technical Specifications	4
Installation	
Control	5
External Sensor	5
System Wiring	6
System Start-Up and Adjustment	9
System Troubleshooting	11
Warranty Information	Back Cover

Follow the installation instructions in this manual carefully to ensure safe, reliable operation. All stated or implied warranties are voided if this product is not installed in accordance with these instructions.

COMPONENT PARTS LIST

TCS-200 Tension Control	6910-448-126
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LIST OF ILLUSTRATIONS AND FIGURES

Figure 1 Dimensional Data, Mounting	5
Figure 2 Power and Brake Connections	6
Figure 3 Remote Sensor and Switch Connections	7
Chart 1 Roll Follower Input and Output Data	11

INTRODUCTION

The Warner Electric Tension Control system is comprised of the Electro Disc tension brake, a control module and optional external sensor input.

This manual has been designed to cover installation, start-up, adjustment and maintenance of your tension control system and covers the control system only.

Further information on brake sizing and selection can be found in catalog P-771.

Power Source

The TCS-200 Tension Control operates from a power source of 24-30 VAC, 50/60 Hz input. Primary voltage is determined by the customer's input voltage source. Specifications for the transformer are located in the technical data section of this manual. It is the responsibility of the user to supply the transformer.

Control

The TCS-200 is a current controlled power supply designed to handle up to a 12 magnet Electro Disc tension brake. This control can be operated as either a manually adjusted tension control via the front panel tension adjustment or via a remote tension adjustment. The control also has the capability of being used for simple roll follower applications.

External inputs are provided for remote "brake-on" and "brake-off" switching circuits, as well as front panel control of these functions.

Because the control provides constant current output, brake torque is not substantially affected by changes in brake operating temperatures. This provides for repeatable brake torques for given input levels.

When the TCS-200 is operated in a remote torque or roll follower adjust mode, a 1000 ohm potentiometer is required. This should be a linear type potentiometer with a rating of .5 watts, 10 percent tolerance, and .5 percent linearity.

Brakes

Any of the Electro Disc tension brakes can be used with the TCS-200 Tension Control. Brake can use from one magnet to a maximum of twelve magnets. The brake converts electrical current supplied by the control into torque, which retards material flow, maintaining the desired web tension.

THEORY OF OPERATION

The Warner Electric Tension Control System is comprised of a control transformer supplied by the customer, a control module, Electro Disc tension brake, and input sensor (optional). Depending on the type of system desired, the input sensor may vary.

The customer supplied transformer converts the incoming AC voltage to a 24 to 30 VAC level which supplies power to the TCS-200. The primary voltage of this transformer will be dependent on the AC line voltage available at the machine.

The TCS-200 rectifies the 24 to 28 VAC to provide a usable DC voltage level for powering the internal logic as well as supplying current for brake operation.

The front panel tension adjust provides for setting the brake output level when the control is operated in the local torque adjusted mode. This potentiometer provides a voltage which is fed to a comparator along with a signal obtained from the current source amplifier circuits. The sense amplifier monitors the current through the sense magnet and provides for constant current operating by increasing or decreasing the reference signal to maintain a fairly constant current through the brake for a given level of input signal.

The signal obtained from the current and tension adjust comparator is then fed to another comparator that provides a pulse-width-modulated signal. The pulse width from this circuit is dependent on the current required for the brake.

The pulse width output from this stage is then fed to the output driver circuits that provide current to the brake magnets. A short circuit detector is employed to shut down the driver should a short circuit condition occur in any of the magnets.

Logic circuits are used to provide “brake-on,” “brake-off” and run modes of operation either through the internal selector switch located on the TCS-200 front panel or via an external customer supplied switch. In the run mode, output operation is normal and is controlled by the tension adjust potentiometer. “Brake-off” mode overrides the tension adjustment and provides for resetting the short circuit indicator. The “brake-on” input provides for full output current to the brake.

A green power on indicator is provided as a visual aid to indicate when AC power is applied to the control. A red short circuit indicator is provided to indicate when the short circuit indicator has triggered and the output driver has been shut down.

When the TCS-200 is operated with a remote tension adjust potentiometer or with a roll follower input, the front panel tension adjust potentiometer becomes the span adjust. The span adjust sets the maximum input from the remote potentiometers.

Because this is a very simple tension control, no antiresidual circuits, zero adjust circuits, or other complex control circuits found in other Warner Electric tension control systems are included in the TCS-200.

TECHNICAL SPECIFICATIONS

Input Power	24 to 30VAC, $\pm 10\%$, 50/60 Hz, 1 Phase, 5 amps (150 VA)
Output	Pulse-width-modulated, full-wave rectified 0 to 270 mA continuous per magnet Up to 12 Electro Disc magnets
Ambient Temperature	-20°F to +115°F (-29 °C to +46°C)
Fusing	Internal 6 amp, fast-blow, 32V — 5 mm x 20 mm
Protection	Internal short-circuit protection on driver output stage
Sensor Inputs	Remote torque adjustment Roll follower
Auxiliary Inputs	Brake-On - Applies full 270 mA-per magnet to the brake. Will operate and provide "brake-on" in the event that both "brake-on" and "brake-off" are activated. Active low. - Minimum contact rating: 20 VDC at .01amp - Maximum off state leakage current: < 100 microamps Brake-Off - Removes output current to the brake. Puts brake at zero current level. - Active low. - Minimum contact rating: 20 VDC at .01 amp - Maximum off state leakage current: < 100 microamps
Controls (Front Panel)	Tension Adjust Provides current adjust to the brake from 0 to 100% In the remote mode, provides for maximum output level set to the brake. Brake Mode Switch Provides for brake-off, brake-run (normal operation) and brake-on modes of operation to the brake.
General	The control chassis must be considered NEMA 1 and should be kept clear of areas where foreign materials, dust, grease, or oil might affect control operation. Control chassis should be electrically grounded. Neither the sensor (if used) or brake wires are at ground potential and should be considered "floating" unless both sides of the AC input power are disconnected.

Customer Supplied Components	Transformer Primary - Determined by available AC line voltage Secondary - 24 to 30VAC, $\pm 10\%$, 50/ 60Hz, 1 Phase, 5 amps (150 VA)
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Suggested Transformers:

Manufacturer	Part No.	Primary	Secondary
Abbott	6812- 160	115VAC	24V@6amps
Quality	6-K- 119VBR	115/230VAC	24V@8 amps
Signal	24- 6	115VAC	24V@6amps
Signal	DL-24- 6	115/230VAC	24V@6amps
Triad	F-260-U	115VAC	24V@6amps

Potentiometers	Remote Torque Adjust 1000ohms, 10% tolerance, .5% linearity, .5watts, linear taper Roll Follower 1000ohms, 10% tolerance, .5% linearity, .5watts, linear taper
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INSTALLATION

This Installation and Operation Manual was arranged for the systematic installation and start-up of your tension control system. For this reason, and to achieve the best possible results, we recommend that you check off each completed step in the space provided before proceeding to the next step.

Sample: Remove two cover retaining screws and remove cover from the control chassis.

Check box after completing each step.

Control Mounting

1. Determine a suitable location for the control to be mounted. Consideration should be given as to whether the front panel adjustments will require access by the operator.
2. Remove the two cover screws, and remove the cover from the control chassis.
3. Using the dimensional data supplied in Figure 1, drill three mounting holes using a #16 drill if #8 through-bolts are used, or a #29 drill and tap holes for #8 screws.

4. Attach the TCS-200 control chassis to the mounting surface and secure with mounting hardware (not provided, customer supplied).

Note: The control chassis has been designed to accommodate two half-inch conduits for wiring when the control is mounted to the machine frame. If conduit is used, proceed to step 5, otherwise proceed to the control wiring section of this manual.

5. Attach conduit or seal tight connectors to the TCS-200 with the retaining nut on the inside of the control.

The control is now ready to be wired. Refer to the wiring section of this manual for proper system wiring.

Brake Installation

Refer to proper manual for brake installation and set-up procedures.

External Sensor Mounting (Optional)

Options for two types of external sensor inputs are available. These consist of either external torque adjust, or roll follower input which provides a signal directly proportional to the diameter of the roll to be processed.

Determine which type of external sensor will be used and proceed to that section of this manual.

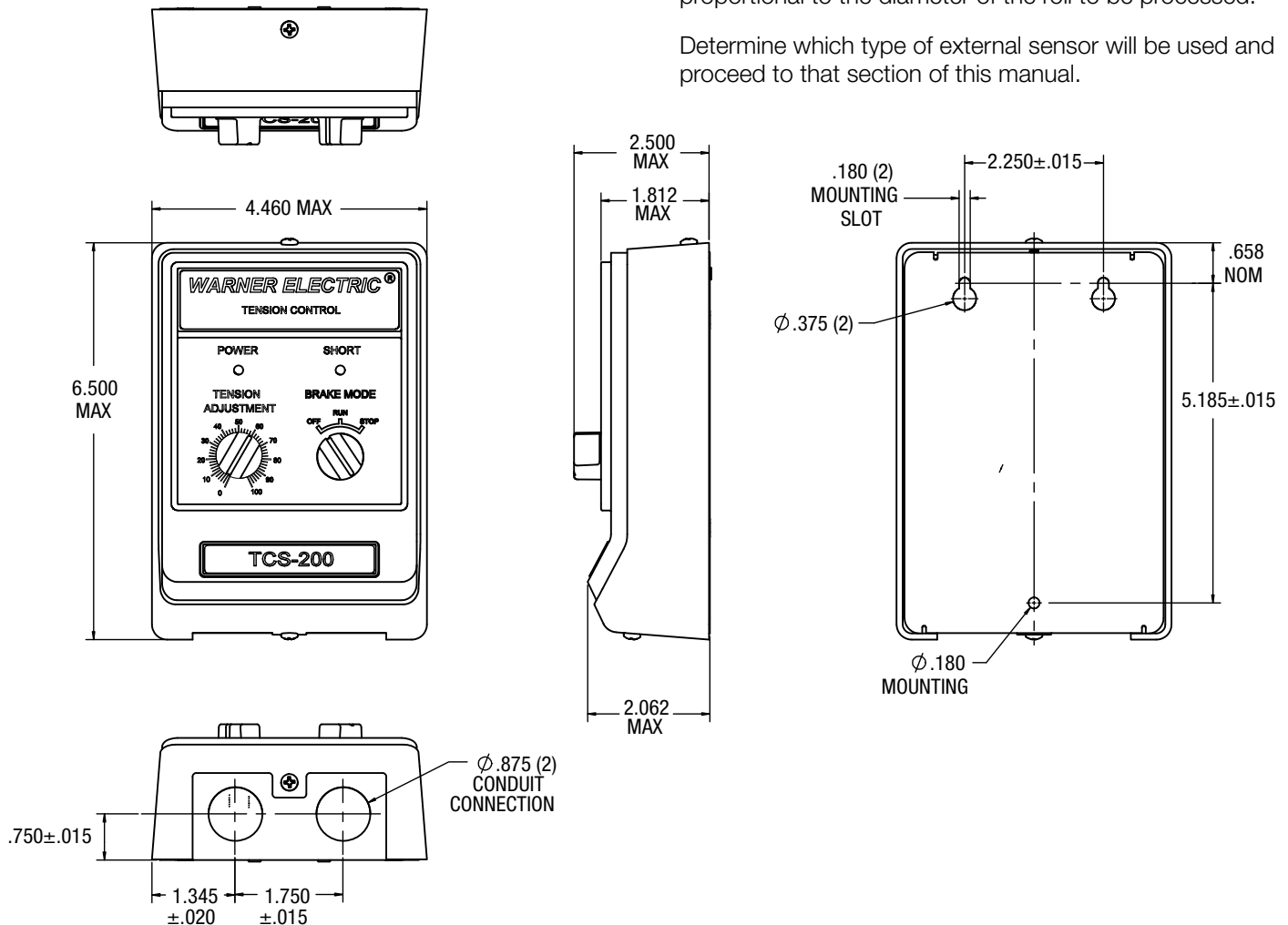


Figure 1

Remote Torque Adjust Potentiometer

- ❑ 1. Select an appropriate mounting location for the external torque adjust potentiometer.

Note: In determining the mounting location for the remote torque adjust potentiometer, take into consideration the routing of the wires necessary to connect to the control, access for the operator, and space required by the physical size of the potentiometer.

- ❑ 2. Drill a mounting hole based on the bushing diameter of the potentiometer selected.
- ❑ 3. Mount the potentiometer and secure.

This completes the mounting for an external remote torque adjust potentiometer. Refer to the wiring section of this manual for proper wiring of the control.

Roll Follower Adjust Potentiometer (Optional)

- ❑ 1. Mount the roll follower potentiometer and determine the amount of angular rotation at the potentiometer shaft.

Note: If angular rotation is not adequate, insufficient output from the control is possible. In this case, a timing belt drive between the roll follower pivot-point and the sensor potentiometer may be necessary to obtain adequate angular rotation.

- ❑ 2. Secure roll follower potentiometer.

This completes the mounting for a roll follower potentiometer. Refer to the wiring section of this manual for proper wiring of the control.

System Wiring

System Wiring Precautions

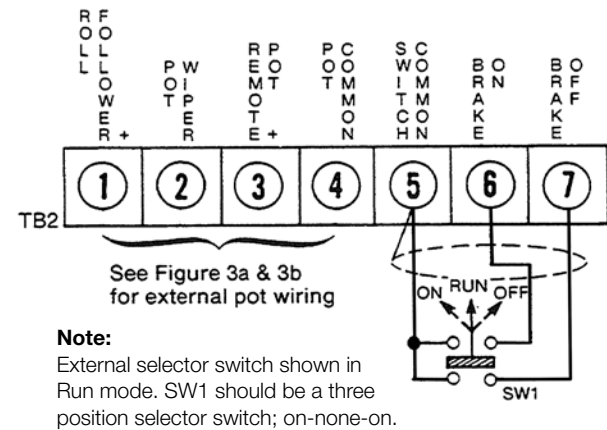
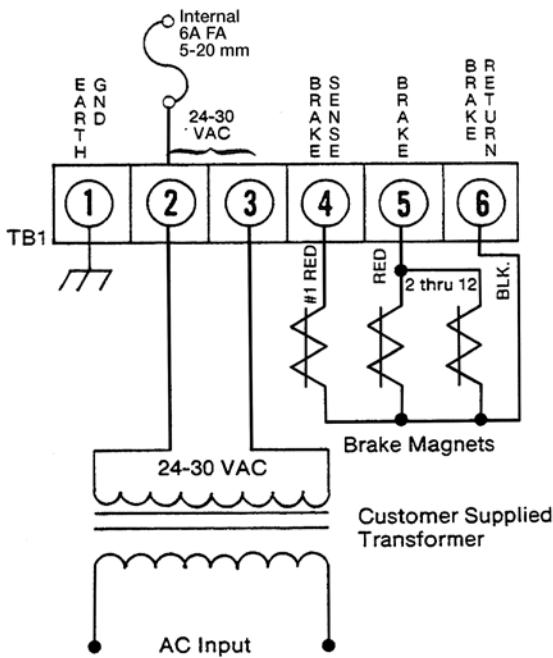
The following wiring precautions will help you properly wire and install a trouble free system.

1. Use a proper size wire gauge for all wiring.
2. Segregate AC input power from control switching and external sensor wiring (if used).
3. Do not run AC power lines with DC power, input sensor wiring, or switching wiring as noise transients can be easily transferred causing erratic control operation.
4. Use shielded cable when possible for connection of external switches and the sensor potentiometer to the TCS-200.
5. Under no circumstances should auxiliary accessories be operated from the TCS-200 control.
6. Do not attempt to incorporate external switching schemes between two or more brakes and the TCS-200 output. This will damage the control and void the warranty.

TCS-200 Wiring

Refer to Figure 2 for actual wiring connections.

- ❑ 1. Mount the appropriate control transformer in a convenient location in the control panel if not already done.



Suggested Possible Transformers

Manufacturer	Part Number	Primary	Secondary
Abbot	6812-16ø	115VAC	24V@6A.
Quality	6-K-119VBR	115/230VAC	24V@8A.
Signal	24-6	115VAC	24V@6A.
Signal	DL-24-6	115/230VAC	24V@6A.
Triad	F-260-U	115VAC	24V@6A.

Figure 2
Control Wiring - Power & Brake Wiring

Note: A suitable location should be considered so that primary AC power to the transformer and secondary AC power to the TCS-200 are segregated and not run common to other AC circuits in the control panel.

- 2. Wire one terminal of the secondary of the control transformer to terminal 2 of terminal strip TB1 of the TCS-200.
- 3. Wire from the other secondary terminal of the control transformer to terminal 3 of terminal strip TB1 of the TCS-200.
- 4. Connect an earth ground wire between terminal 1 of terminal strip TB1 of the TCS-200 and a good ground connection point in the control panel.

CAUTION Reversing the primary and secondary transformer wiring to the control and power source will damage the control if power is applied.

CAUTION Insure AC power is off and disconnect is open on the control panel before connecting the primary of the control transformer to the AC power line. Failure to do so can result in a shock hazard.

- 7. Wire the primary side of the control transformer to the appropriate AC power source.

Note: Do not apply power to the system at this point.

- 8. Connect the red wire from one (1) brake magnet to terminal 4 of terminal strip TB1 of the TCS-200. This becomes the sense magnet.
- 9. If a system with more than one magnet is used, connect the remaining red wires from magnet 2 through 12 (if used) to terminal 5 of terminal strip TB1 of the TCS-200.
- 10. Connect all black wires to terminal 6 of terminal strip TB1 of the TCS-200.

Note: The tension brake must be properly connected, otherwise the control system will not function properly.

CAUTION Insure connections are tightly secured, otherwise intermittent connections will cause the control output to go into shutdown and output current to the brake magnets will be removed.

Remote Torque Adjust Input (Optional)

Refer to Figure 3a for remote torque adjust input connections.

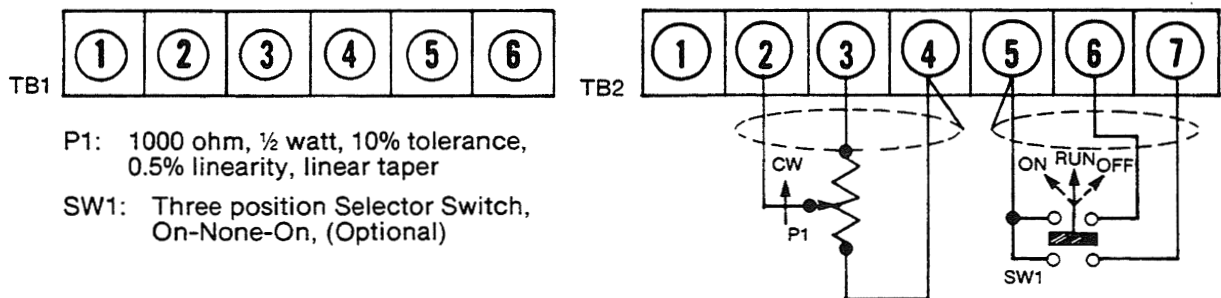
- 1. Wire a three conductor shielded cable to the remote sensor potentiometer previously installed.

Note: It is recommended that a shielded cable with wire colors of red, black, and green be used as this will simplify potentiometer and terminal connections:

- a. Black wire to low end terminal of potentiometer.
- b. Red wire to high end terminal of potentiometer.
- c. Green wire to wiper terminal of potentiometer.

CAUTION Do not connect the shield lead of the cable at the potentiometer end. Cut the shield lead off at this end.

a. Remote Torque Adjust Input



b. Roll Follower Adjust Input

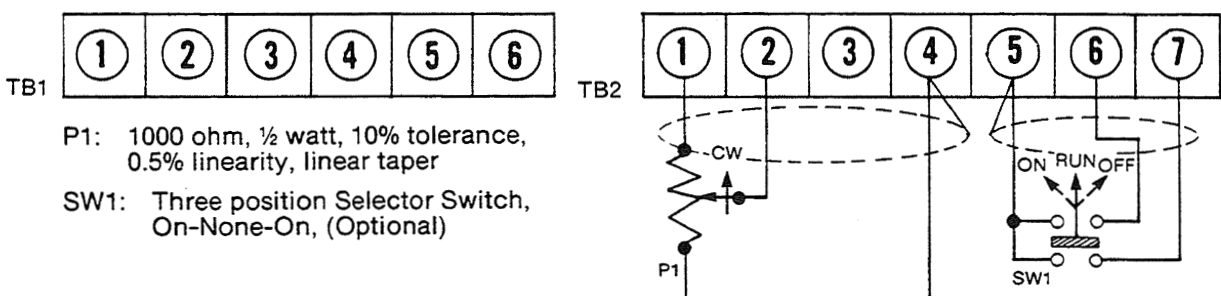


Figure 3

- 2. Route the cable from the sensor potentiometer to the control, keeping the cable segregated from high voltage AC power lines and other wiring that may cause noise transients.
- 3. Connect the black wire from the low end of the remote potentiometer to terminal 4 of terminal strip TB2 of the TCS-200. Snug terminal only.
- 4. Connect the green wire from the wiper of the remote potentiometer to terminal 2 of terminal strip TB2 of the TCS-200. Secure the terminal screw.
- 5. Connect the red wire from the high end of the remote potentiometer to terminal 3 of terminal strip TB2 of the TCS-200. Secure the terminal screw.
- 6. Connect the shield lead from the cable to terminal 4 of terminal strip TB2 of the TCS- 200. Secure the terminal screw.

Roll Follower Adjust Input (Optional)

Refer to Figure 3b for roll follower adjust input connections.

- 1. Wire a three conductor shielded cable to the roll follower potentiometer previously installed.

Note: It is recommended that a shielded cable with wire colors of red, black, and green be used as this will simplify potentiometer and terminal connections.

- a. Black wire to low end terminal of potentiometer.
- b. Red wire to high end terminal of potentiometer.
- c. Green wire to wiper terminal of potentiometer.
- 2. Route the cable from the sensor potentiometer to the control, keeping the cable segregated from high voltage AC power lines and other wiring that may cause noise transients.
- 3. Connect the black wire from the low end of the roll follower potentiometer to terminal 4 of terminal strip TB2 of the TCS-200. Do not tighten the terminal screw. Snug down only.
- 4. Connect the green wire from the wiper of the roll follower potentiometer to terminal 2 of terminal strip TB2 of the TCS-200. Tighten the screw securely.
- 5. Connect the red wire from the high end of the roll follower potentiometer to terminal 1 of terminal strip TB2 of the TCS-200. Tighten the screw securely.
- 6. Connect the shield lead from the cable to terminal 4 of terminal strip TB2 of the TCS-200. Tighten the screw securely.

Remote Mode Selector Switch (Optional)

- 1. Install selector switch at a convenient location.
- 2. Wire a three conductor shielded cable to the external mode selector switch.

Note: It is recommended that a shielded cable with wire colors of red, black, and green be used as this will simplify switch and terminal connections.

- a. Black wire to common contacts of both switch poles.
- b. Red wire to normally open contact for “on” or stop pole.
- c. Green wire to normally open contact for “off” pole.

CAUTION Do not connect the shield lead of the cable at the switch contacts. Cut the shield lead off at this end.

- 3. Route the cable from the remote mode switch to the control keeping the cable segregated from high voltage AC power lines and other control wiring that may cause noise transients.
- 4. Connect the black wire from the switch common contacts of the remote mode switch to terminal 5 of terminal block TB2 of the TCS- 200. Snug terminal only.
- 5. Connect the red wire from the normally open contact for the “on” or “stop” position of the remote mode switch to terminal 6 of terminal strip TB2 of the TCS-200. Tighten the screw.
- 6. Connect the green wire from the normally open contact for the “off” position of the remote mode switch to terminal 7 of terminal strip TB2 of the TCS-200. Tighten the screw.
- 7. Connect the shield wire from the cable to terminal 5 of terminal strip TB2 of the TCS- 200. Securely tighten the screw.

The TCS-200 Tension Control has now been wired for operation. Before applying power to the system, double check the wiring and installation for proper hook-up and connections. Once this check has been completed, proceed to the start-up and adjustment section of this manual

SYSTEM START-UP AND ADJUSTMENT

Manual Tension Adjust (Front Panel)

1. Apply power to the control system.
2. Check that the green LED marked “power” is on.
3. Using an AC voltmeter, measure the AC voltage at terminals 2 and 3 of terminal block TB1. This voltage should be between 24 VAC and 30 VAC.
4. Remove power from the control system and wait a pproximately 30 seconds before proceeding to the next step.
5. Remove the sense magnet lead from terminal 4 of terminal strip TB1 and insert a DC current meter between the lead of the sense magnet and terminal 4 of terminal strip TB1.

Note: A DC current meter with the capability of reading 0 to 500 milliamps should be used. Positive (+) to terminal 4 and negative(-) to wire.

6. Reapply power to the control system.
7. Place mode selector switch in the brake “off” position. Meter should read zero current and brake should be free-wheeling.
8. Place mode selector switch in the brake “on” or “stop” position. Meter should read 270 to 280 milliamps and brake should be locked-up tight.
9. Place mode selector switch in the “run” position and set the tension adjust potentiometer to zero or full counterclockwise position. Meter should read zero output current to the brake.
10. Rotate the tension adjust potentiometer from fully counterclockwise to full clockwise slowly noting the output current increases from zero to 270 to 280 milliamps at maximum output.
11. This concludes check-out of the control system. Remove power and allow approximately 30 seconds before proceeding to the next step.
12. Remove the meter and re-attach the sense magnet lead to terminal 4 of terminal strip TB1 and secure.
13. Re-apply power to the control system.
14. Adjust the tension potentiometer for the desired brake level required for the operation.

Note: If start-up and adjustment procedures do not produce the desired results, consult the troubleshooting section of this manual.

15. If a remote mode selector switch is used, repeat steps 7 through 13 using the remote mode selector switch.
16. Attach the cover to the control chassis using the two cover screws supplied with the control.

Remote Tension Adjust

1. Apply power to the control system.
2. Check that the green LED marked “power” is on.
3. Using an AC voltmeter, measure the AC voltage at terminals 2 and 3 of terminal strip TB1. This voltage should be between 24 VAC and 28 VAC.
4. Remove power from the control system and wait approximately 30 seconds before proceeding to the next step.
5. Remove the sense magnet lead from terminal 4 of terminal strip TB1 and insert a DC current meter in series with the lead of the sense magnet and terminal 4 of terminal strip TB1.

Note: A DC current meter with the capability of reading 0 to 500 milliamps should be used. Connect the positive (+) to terminal 4 and the negative (-) to the sense magnet wire.

6. Reapply power to the control system.
7. Place the mode selector switch in the brake off position. The meter should read zero output current and the brake should be freewheeling.
8. Place the mode selector switch in the brake on or “stop” position. The meter should read maximum output current of 270 to 280 milliamps to the brake. The brake should be locked up tight.
9. Place the mode selector switch in the “run” mode. Set the front panel tension adjust potentiometer to its maximum clockwise position. Set the remote tension adjust potentiometer to its fully counterclockwise position. The meter should read zero output to the brake.
10. Rotate the remote tension adjust potentiometer from its minimum, fully counterclockwise position, slowly to its maximum, fully clockwise position. Monitor the meter and observe that the output current goes from zero to a maximum of 270 to 280 milliamps. Leave this potentiometer at its maximum setting.
11. Rotate the front panel tension adjust potentiometer slowly from its fully clockwise, or maximum setting, to its fully counterclockwise, or minimum setting. Monitor the meter observing that the current goes from 270 to 280 milliamps to zero at the minimum setting.
12. This concludes the check-out of the control system. Remove power from the system and wait approximately 30 seconds before proceeding to the next step.
13. Remove the meter from in series with the sense magnet and terminal 4 of terminal strip TB1.

- 14. Reconnect the sense magnet lead to terminal 4 of terminal strip TB1 and re-tighten the screw.
- 15. Reapply power to the control system.
- 16. Adjust the front panel tension adjust potentiometer to the maximum output level desired for the application. Adjustment between maximum level and zero can now be made through the remote tension adjust potentiometer.

Note: If start-up and adjustment procedures do not provide the desired results consult the troubleshooting section of this manual.

- 17. If remote mode switching is used, repeat steps 4 through 15 using the remote mode selector switch.
- 18. Attach cover using the two screws supplied with the control.

Roll Follower Tension Adjust

- 1. Apply power to the control system.
- 2. Check that the green LED marked “power” is on.
- 3. Using an AC voltmeter, measure the AC voltage at terminals 2 and 3 of terminal strip TB1. This voltage should be between 24 and 28 VAC.
- 4. Remove power from the control system and wait approximately 30 seconds before proceeding to the next step.
- 5. Remove the sense magnet lead from terminal 4 of terminal strip TB1 and insert a DC current meter in series with the lead of the sense magnet and terminal 4 of terminal strip TB1.

Note: A DC current meter with the capability of reading 0 to 500 milliamps should be used. Connect the positive (+) to terminal 4 and the negative (-) to the sense magnet wire.

- 6. Reapply power to the control system.
- 7. Place the mode selector switch in the brake off position. Meter should read zero current and brake should read zero current and brake should be freewheeling.
- 8. Place the mode selector switch in the brake “on” or “stop” position. Meter should read 270 to 280 milliamps and the brake should be locked up tight.
- 9. Place the mode selector switch in the “run” position. Set the front panel tension adjust potentiometer to its maximum clockwise setting.

Note: Refer to Chart 1 for various inputs and outputs when using the roll follower system.

- 10. Place a second DC voltmeter between terminals 2 and 4 of terminal strip TB2.

Note: A DC voltmeter capable of measuring zero to 10 volts DC should be used. Connect positive (+) to terminal 2 and negative(-) to terminal 4.

- 11. With the roll follower potentiometer disconnected from the roll follower arm, position the follower arm to the true zero position. This should be the center line of the unwind spindle.
- 12. Adjust the roll follower potentiometer to obtain a zero voltage reading on the voltmeter connected between terminals 2 and 4 of terminal strip TB2.
- 13. Connect the roll follower potentiometer to the roll follower arm. After coupling the follower arm to the potentiometer, recheck the voltage between terminals 2 and 4 of terminal strip TB2 to insure the voltage is still zero VDC.
- 14. Place a full roll of material on the unwind stand.
- 15. Set the roll follower arm on the unwind roll.
- 16. Check the voltage between terminals 2 and 4 of terminal strip TB2 and refer to Chart 1. If the voltage reading is less than 2.5 VDC, refer to Chart 1 for the maximum percentage of starting torque available.

Note: If maximum starting torque available is less than the actual starting torque required, then the amount of angular travel of the roll follower potentiometer must be increased.

If the voltage reading is greater than 2.5 VDC, decrease the front panel tension adjust until a 2.5 VDC reading is obtained. This will set the system at 100 percent torque level.

- 17. Adjust the front panel tension adjust for the desired starting torque required for the application.
- 18. Start the machine and draw the web through.
- 19. Monitor the voltage at terminals 2 and 4 of terminal strip TB2 as well as the brake current. As the roll diameter decreases, the sensor voltage and the brake current will decrease keeping the tension relatively constant.
- 20. After an initial run has been completed, remove power from the system and wait approximately 30 seconds before proceeding to the next step.
- 21. Remove the meter from in series with the sense magnet lead to terminal 4 of terminal strip TB1 and tighten the screw.
- 22. Disconnect the voltmeter used from terminals 2 and 4 of terminal strip TB2.
- 23. Re-apply power to the control system.
- 24. If the remote mode selector switch is used, repeat steps 4 through 9 and step 21 using the remote mode selector switch.

Note: If start-up and adjustment procedures do not provide the desired results, consult the troubleshooting section of this manual.

- 25. Re-attach the cover using two cover screws supplied with the control.

CHART 1

Roll Follower Position (degrees)	Sensor Voltage (Term 2 to 4)	Output Current (per magnet, ±10%)	Tension Range (% of full torque)
0.00°	0.00 V	0.000 A	0 %
10.10°	0.25 V	0.028 A	0-10 %
20.30°	0.50 V	0.056 A	0-20 %
30.49°	0.75 V	0.089 A	0-30 %
40.46°	1.00 V	0.112 A	0-40 %
50.66°	1.25 V	0.140 A	0-50 %
60.86°	1.50 V	0.168 A	0-60 %
71.00°	1.75 V	0.196 A	0-70 %
81.00°	2.00 V	0.224 A	0-80 %
91.00°	2.25 V	0.252 A	0-90 %
101.00°	2.50 V	0.280 A	0-100%

TROUBLESHOOTING

General: The chart below will be helpful when isolating exact problems which may occur in the control system. The chart will also prove helpful when encountering problems with the initial start-up of the system. When the system has been running for some time, the chart will also prove helpful when checking for worn, broken or frayed wires; bent or broken control system parts; blown fuses; loose terminal connections and wire connections.

Symptom A: Green LED indicator does not come on with power on.

Probable Cause	Solution
No power is applied to the control	Check that AC power is turned on.
Transformer wiring incorrect	Re-check wiring and correct if wiring is wrong.
Internal line fuse blown	Check fuse and if blown, replace.
No AC input power to transformer	Check for AC power to transformer.

Symptom B: Red LED illuminates-short circuit.

Probable Cause	Solution
Shorted magnet coil	Check magnet coil resistance - approximately 66 ohms cold. Remove shorted magnet coil and replace.
Brake connections improperly wired	Check wiring and rewire if necessary.
Transient noise	Check for source of noise and suppress. Segregate wiring. Use shielded cable.

Symptom C: Brake is not engaging.

Probable Cause	Solution
Mode switch in brake off position	Set mode selector switch to run position.
Tension adjust set at 0	Increase tension adjust.
Remote mode switch in brake off position	Set remote mode switch to run position.
Remote sensors incorrectly wired	Check wiring and rewire if necessary.
No power to control	Refer to symptom A above.

Symptom D: Brake is not releasing.

Probable Cause	Solution
Mode switch in brake "on" or "stop" position	Set mode selector switch to run position.
Tension adjust set at maximum	Reduce level and see if brake rotates.
Remote mode switch in brake "on" or "stop" position	Set remote mode selector to run position.
Remote sensor incorrectly wired	Check wiring and rewire if necessary.
Mechanical binding	Check brake for freewheeling when control power is off. Correct if mechanical problems still exist.

Symptom E: Brake does not have adequate torque capacity.

Probable Cause	Solution
Brake is incorrectly sized	Verify brake sizing by repeating the selection procedure.
Brake is incorrectly wired	Recheck wiring and magnet connections and rewire if necessary.
Local or remote tension adjust incorrectly set	Recheck set-up procedures for the mode of operation the control is used in. Readjust if necessary.

NOTES

Warranty

Warner Electric LLC warrants that it will repair or replace (whichever it deems advisable) any product manufactured and sold by it which proves to be defective in material or workmanship within a period of one (1) year from the date of original purchase for consumer, commercial or industrial use.

This warranty extends only to the original purchaser and is not transferable or assignable without Warner Electric LLC's prior consent.

Warranty service can be obtained in the U.S.A. by returning any defective product, transportation charges prepaid, to the appropriate Warner Electric LLC factory. Additional warranty information may be obtained by writing the Customer Satisfaction Department, Warner Electric LLC, 449 Gardner Street, South Beloit, Illinois 61080, or by calling 815-389-3771.

A purchase receipt or other proof of original purchase will be required before warranty service is rendered. If found defective under the terms of this warranty, repair or replacement will be made, without charge, together with a refund for transportation costs. If found not to be defective, you will be notified and, with your consent, the item will be repaired or replaced and returned to you at your expense.

This warranty covers normal use and does not cover damage or defect which results from alteration, accident, neglect, or improper installation, operation, or maintenance.

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