

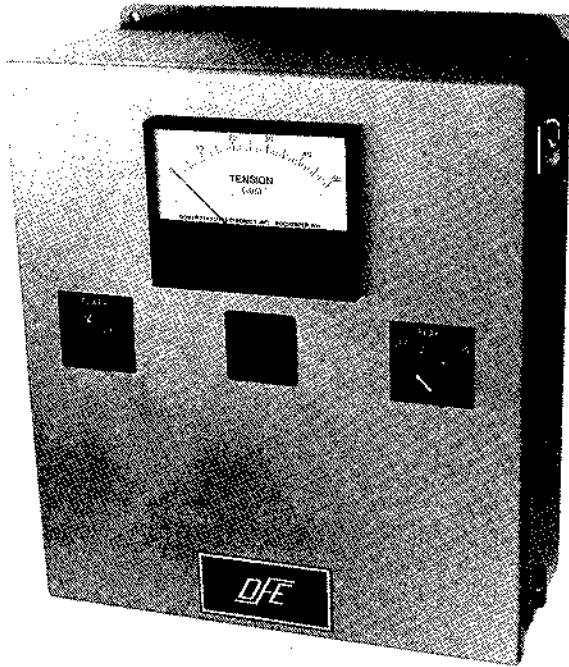
# **INSTRUCTION MANUAL**

## **MODEL UTC-2A UNWIND TENSION CONTROLLER**

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# DFE DATA SHEET

## 8308UTC2A



## UNWIND TENSION CONTROLLER

### DESCRIPTION

The UTC-2A tension controller is used for accurate, automatic tension control of webs at unwind and intermediate positions in printing presses and other process lines. It automatically compensates for changes in machine speed, roll diameter, and brake friction to maintain constant tension. It can be used with any electric clutch or brake having a 90 volt D.C. coil with at least 58 ohms resistance.

Web tension is measured by a pair of Dover Flexo Transducers installed on an idler roll. The controller compares the transducer tension signal with desired tension (set by the machine operator) and adjusts brake voltage to make web tension equal to desired tension.

The machine operator can increase or decrease tension by watching the tension meter and turning a knob until tension is at the desired level.

### ADVANTAGES

- Improved product quality. Reduced sheet length and registration problems.
- No cumbersome dance roll required.
- Less waste.
- Greater productivity.
- Simple to install and calibrate.
- Repeatable performance. Tension is maintained automatically roll after roll.
- Actual tension is displayed on a large, easily read meter.
- Easy to change tension. Just turn the knob and watch the meter.
- Used with standard electric brakes and clutches.
- Automatically compensates for changes in friction and inertia.
- Low tension detector built in (optional).
- Used with easily installed, maintenance free transducers.

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## FEATURES

- Adjustable maximum tension limit
- Low tension detector built in (optional)
- Terminal strip for all electrical connections
- Plug-in circuit cards for easy maintenance and minimum down time
- 5 volt transducer excitation for minimum strain gage heating and excellent linearity
- Tension signal output for recorder
- Actual tension is displayed on a large meter
- Adjustable stability circuitry allows wide range of application
- Conservatively designed for long life
- Electronic circuitry isolated from environmental electrical noise
- Industrial duty steel enclosure
- Built-in circuit to buck residual magnetism of brake
- Soft start circuit

## OPTIONS

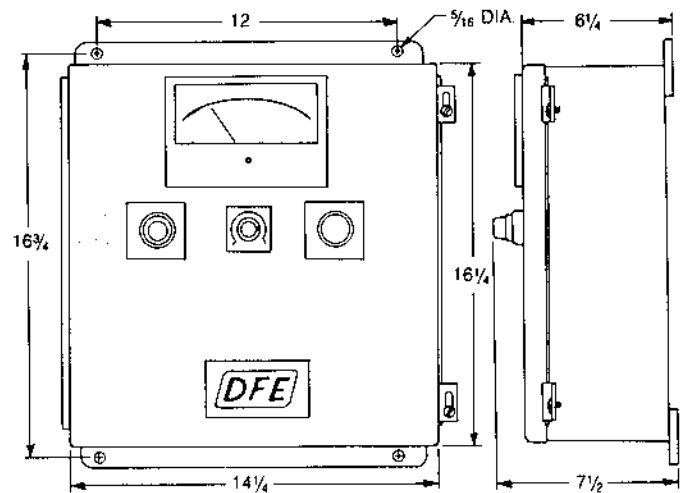
- A. Low tension detector plug-in card. SPDT relay contacts for customer use rated .1A, 125 VAC
- B. Connectors for all external electrical connections except AC power
- C. Connector and 10' cord for AC power
- D. Adjustable anti-coast circuit
- E. Remote tension meter and set point pot
- F. Non-standard tension meter scale
- G. Remote tension off-on control, 2 locations
- H. Special configurations
- I. Manual brake control

## SPECIFICATIONS

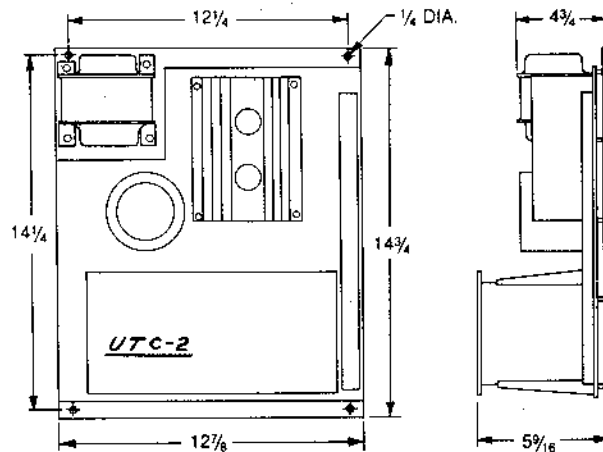
- Power: Input ..... 117v, 60Hz @ 1.6A  
Output ..... 85v DC @ 1.5A
- Transducer Excitation ..... 5v DC regulated
- Tension signal ..... 600mv max
- Zero Range (Tare) ..... 50% of transducer rating, minimum
- Calibration range ..... 25:1, minimum
- Temperature range ..... 0-40° C
- Tension meter ..... 5% x 4½ taut band 2%
- Standard meter scales ..... 0-1, 0-5, 0-10, 0-25, 0-50, 0-100, 0-250, 0-500, 0-1000 lbs.
- Tension limit range ..... reduces maximum brake torque by 60% of rating
- System Accuracy ..... 1%-3% typical

## DIMENSIONS

UTC-2A ENCLOSURE



PANEL



**DOVER FLEXP ELECTRONICS MANUFACTURES:** Tension Transducers, Tension Indicators, Rewind Tension Controllers, Unwind Tension Controllers for electric brakes and clutches, D.C. Motor Tension Controllers, Pneumatic Tension Controllers, and D.C. Motor Drives.

MODEL UTC-2A TENSION CONTROLLER

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## UTC-2A CONTROLLER INSTALLATION

### ELECTRICAL RATINGS :

INPUT--- 117 volts, 60 hz. @ 1.4 amp

OUTPUT--- 85 volts D.C. @ 1.5 amp

### LOCATION OF CONTROLLER

Mount the controller in a dry place, away from any source of heat. It should not be more than 7 feet from the floor. The mounting surface should be free of excessive vibration.

### WIRING

All external connections are made at the terminal strip on the right side of the panel. Refer to the external connection diagram provided.

1. Use shielded cable for tension meter, tension set-point potentiometer, and transducer wiring.  
Ground the shield at the controller end only!
2. Connect the subplate to earth-ground as indicated on the external connection diagram.
3. Double check accuracy of all connections before applying power to the controller.



# Transducer Installation Instructions for Types S, FL, PB

(FOR NON-ROTATING SHAFTS ONLY)

## CONTENTS

### DESCRIPTION

SECTION A – ORIENTING THE TRANSDUCER CORRECTLY

SECTION B – INSTALLING THE TRANSDUCERS

SECTION C – HINTS FOR A TROUBLE-FREE INSTALLATION

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## DESCRIPTION

The tension transducer is a device that converts web tension into an electrical signal. The size of the signal changes proportionally with changes in tension, so by measuring the signal, tension is also measured. Parts of a typical transducer are identified in Figure 1.

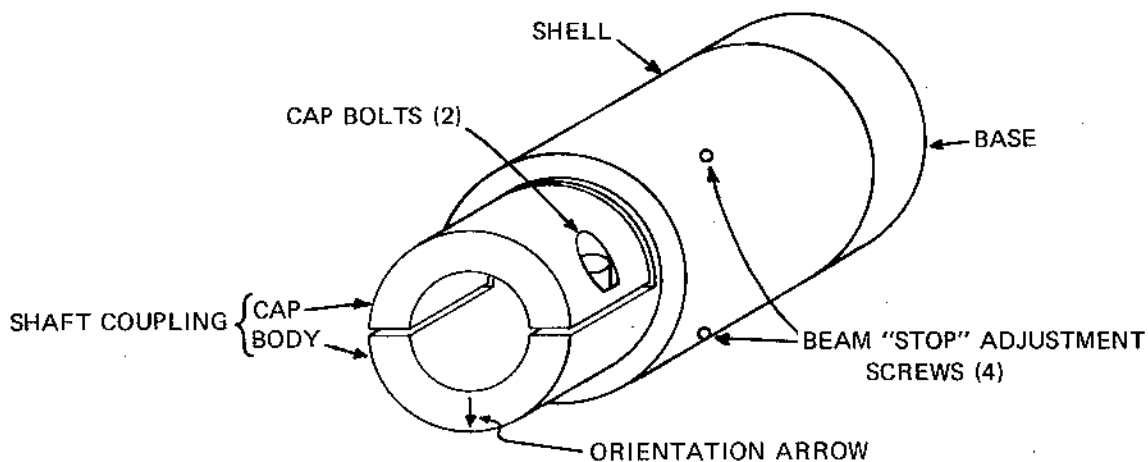


Figure 1

- The BEAM STOP adjusting screws are set and sealed at the factory. Turning them will cause improper operation. **DO NOT TOUCH!**
- The orientation arrow must point in the proper direction. See Section A of instructions. Notice that when properly installed, web tension will force the idler roll shaft against the shaft coupling body (not the cap) right at the end of the arrow.

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REFER TO THE APPLICATION DATA SHEET FOR ALL SPECIFICATIONS.

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## SECTION A

### ORIENTING THE TRANSDUCER CORRECTLY

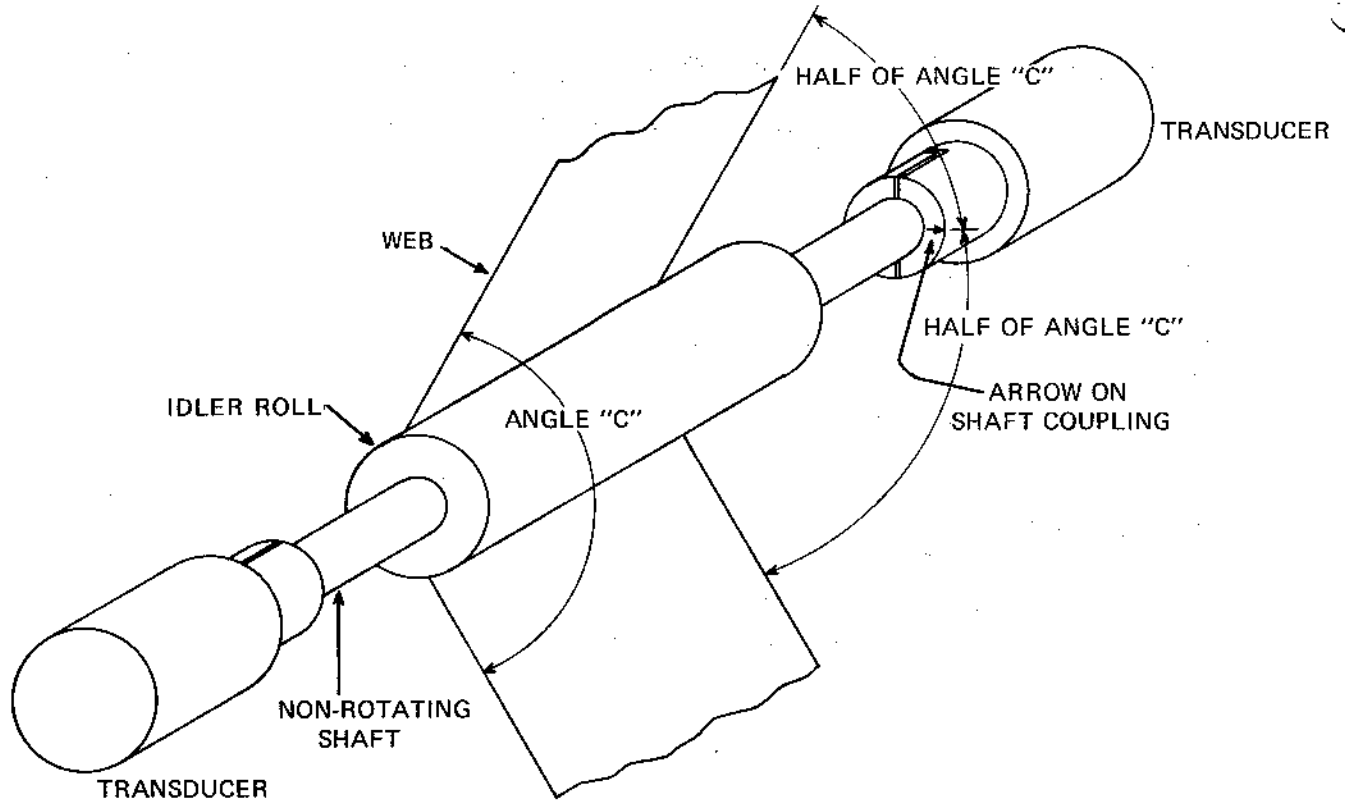


Figure 2

The arrow on the transducer shaft coupling must point in the direction shown above, relative to the web, for maximum transducer output and correct output polarity. If it points in the wrong direction, the output signal will be reduced until, at 90 degrees from the correct direction, there will be no output. If the arrow points opposite to the correct direction, the output signal will have the wrong polarity. The arrow must bisect the angle formed by the web as it goes around the idler roll. Be sure the arrows on both transducers are pointing in the same direction.

Read Section B, "INSTALLING THE TRANSDUCERS", for correct procedure.

## SECTION B

### INSTALLING THE TRANSDUCERS

The previous section explained the importance of aligning the arrow on the shaft coupling in the correct direction.

To point the arrow in the right direction, THE WHOLE TRANSDUCER MUST BE TURNED. Do not attempt to turn only the shaft coupling.

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NEVER USE A WRENCH OR OTHER TOOL TO TURN TRANSDUCERS. USE YOUR HANDS ONLY.

---

Use the following procedure.

Step 1. Remove the shaft cap from both transducers.

Step 2. Mount the transducers in the machine. Be sure the arrows on both transducers point down so the idler roll shaft can be conveniently laid in the transducers later without being held.

If the transducer is: Type "S" — Leave the transducer mounting bolt slightly loose.

Type "PB" — Loosen the two transducer clamp bolts and tighten the pillowblock mounting bolts.

Type "FL" — Install only one mounting bolt on each transducer.

Step 3. Lay the idler roll shaft in the transducers. Be sure there is 1/16" to 1/4" clearance between the end of the shaft and the inside of the transducer. Install the shaft caps. **DO NOT TIGHTEN THE CAP BOLTS YET!** See Figure 3.

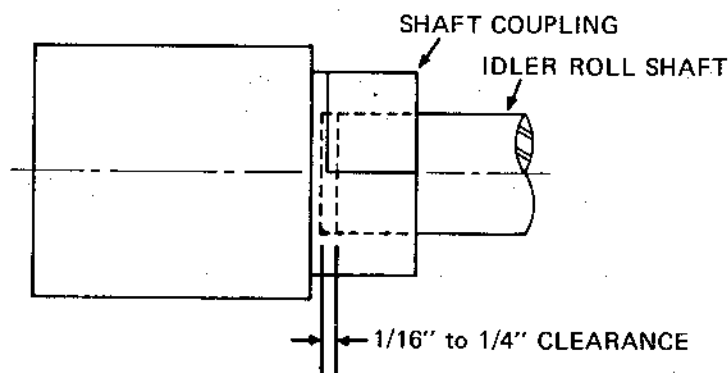


Figure 3

If a split bushing is used to adjust shaft diameter, be sure the gap lines up with the gap of the shaft clamp. Otherwise, the shaft will not be held tightly. See Figure 4.

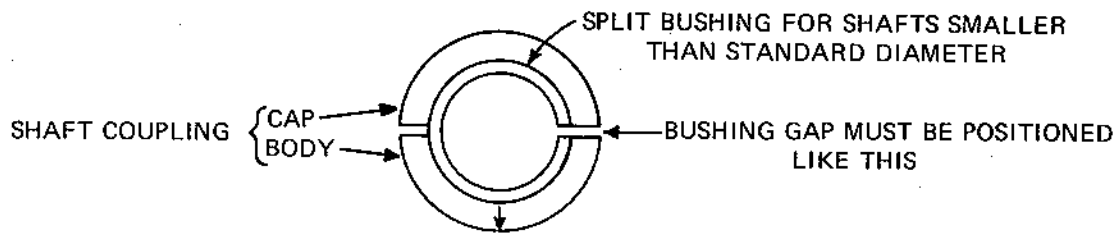


Figure 4

Step 4. Rotate each transducer so the arrow on the shaft clamp points in the correct direction. (See Section A) Be sure the gap in the split bushing (if used) is still in the right place.

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**TURN THE WHOLE TRANSDUCER. USE YOUR HANDS ONLY. DO NOT USE A WRENCH.**

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- Type "S" – Grip the transducer with your hand and turn.  
Type "PB" – Turn the transducer in the pillowblock with your hand. It may be necessary to insert a tool in the pillowblock split and pry the sides apart to release pressure on the transducer.  
Type "FL" – Remove the mounting bolt and turn the transducer with your hand. Install all four mounting bolts.

Step 5. Tighten all mounting bolts.  
Type "PB" – Tighten the two transducer clamp bolts.

Step 6. Tighten the shaft clamp cap bolts.  
This step MUST BE DONE LAST to prevent causing any strain on the transducers when tightening the mounting bolts.

## SECTION C

### HINTS FOR A TROUBLE-FREE INSTALLATION

1. Mount the transducers on rigid, strong surfaces. Avoid using narrow angle iron or thin metal brackets. Bending and twisting of these members will cause the transducers to output false signals and may prevent the tension meter from returning to zero. Be sure the entire mounting surface of the transducer bears against a rigid surface.
2. Be sure all mounting bolts and cap bolts are tight. Loose bolts can cause false signals and poor performance.
3. If the idler shaft diameter is smaller than the transducer bore, use a solid bushing, with a cut in one side, to enlarge the diameter. Do not wrap shimstock, or other material, around the shaft. Bushings are available from Dover Flexo Electronics.
4. Be sure the idler roll shaft is stiff. The roll bearings should be as close to the transducers as possible. Shaft deflection should be minimized because excessive deflection may reduce transducer life and cause the tension meter needle to flutter.
5. DYNAMICALLY BALANCE the idler roll to within 1 ounce-inch at 1400 FPM surface speed. An unbalanced roll can damage the transducers or reduce their life.
6. Be sure the arrows on both transducers point in the same direction. If they don't the tension meter will read differently, even when the same force is applied to each transducer.
7. DO NOT DIS-ASSEMBLE THE TRANSDUCERS. This voids the warranty, and may cause un-necessary damage. If you suspect the transducer is faulty, call Dover Flexo Electronics.



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## DESCRIPTION OF OPERATION

### SYSTEM OPERATION

The Model UTC-2A unwind tension controller is part of a closed loop (negative feedback) control system. Also included in the system are the tension transducers, unwind brake or clutch, and the tension set point potentiometer.

Briefly, the system functions in this way: The press operator sets the tension pot to the desired tension. The transducers measure actual tension. The controller compares actual tension with desired tension and adjusts torque output of the unwind brake to make actual tension the same as desired tension. The controller automatically varies brake torque to compensate for speed changes, roll diameter changes and other factors to maintain desired tension. Web tension is displayed on a large meter so the operator can see it easily at a glance.

### TRANSDUCER OPERATION

The tension transducers convert web tension into an electrical signal which is linearly proportional to tension. Two transducers are used, one on each end of an idler roll. The two signals are added together so the sum represents average web tension.

Each transducer contains two strain gages connected in series. They are wired so the four gages form a bridge which is excited by 5 volts DC. As web tension applies force to the transducers, the resistance of the strain gages changes and a small output voltage signal is produced.

### CIRCUIT CARD FUNCTION

- A. The Tension Amplifier card accepts the transducer signal, amplifies it, and sends it to the signal amplifier and tension meter. The 5 volt DC power supply for the transducers is also on this card.
- B. The Signal Amplifier card accepts the tension signal and compares it to the signal from the tension set

point pot. The resulting error signal will be high if tension is too low, and low if tension is too high. This signal controls the output power transistors which adjust the voltage to the unwind brake.

The card also contains the stability and gain circuits and a Tension Limit circuit which limits the maximum brake voltage to about 24 volts (min.).

This card also contains the soft start-up circuitry that automatically adjusts the output voltage to a low value when the web is slack.

- C. The Shut Off Switch card monitors tension continuously. If it falls to a very low level and stays there for about  $1\frac{1}{2}$  seconds, a relay on the card operates. The relay contacts can be wired to stop the press, actuate an alarm, or perform some other function.
- D. The 15 Volt Power Supply card provides power for the electronic circuitry.
- E. The 85 Volt Power Supply card provides power to operate the unwind brake.

## START-UP PROCEDURE

### DESCRIPTION OF ALL ADJUSTMENTS

#### TENSION AMPLIFIER CARD:

CALIBRATE - USED TO CALIBRATE THE TENSION METER TO A KNOWN TENSION APPLIED AT THE TENSION SENSING ROLL.

ZERO - USED TO ADJUST THE TENSION METER TO ZERO.

#### SIGNAL AMPLIFIER CARD:

SOFT START SET PT. - SETS THE TRIP LEVEL THAT DETERMINES WHETHER THE UNIT SHOULD BE IN THE AUTOMATIC MODE OR THE SOFT START MODE. THE TENSION SIGNAL IS CONTINUALLY BEING MONITORED BY THE SOFT START CIRCUITRY. IF THE TENSION (ON THE WEB) GOES BELOW THE SOFT START SET POINT SETTING, THE UNIT WILL GO INTO THE SOFT START MODE AFTER A 3 SECOND TIME DELAY. IF THE TENSION (ON THE WEB) IS ABOVE THE SOFT START SET POINT SETTING, THEN THE UNIT WILL IMMEDIATELY GO INTO THE AUTOMATIC MODE.

THE RANGE OF ADJUSTMENT FOR THIS POT IS:

FULLY CW - SOFT START MODE NOT ACTIVATED AT ALL.

FULLY CCW - TRIP POINT WILL BE AT ABOUT 1 MAJOR DIVISION OF THE TENSION METER OR ABOUT 10% OF FULL SCALE. THE SOFT START SET POINT IS FACTORY ADJUSTED FOR 2 MINOR DIVISIONS OF THE TENSION METER OR 4% OF FULL SCALE.

SOFT START OUTPUT - USED TO ADJUST THE VOLTAGE OUTPUT TO THE BRAKE WHEN THE UNIT IS IN THE SOFT START MODE.

OUTPUT LIMIT - USED TO LIMIT THE MAXIMUM VOLTAGE OUTPUT TO THE BRAKE.

GAIN - USED TO ADJUST THE CONTROLLER OVERALL CIRCUIT GAIN IN THE PROCESSING (OR REGULATOR) SECTION.

STABILITY - USED TO TUNE THE UNIT FOR OVERALL STABILITY AND STABLE OPERATION. ALSO, DETERMINES THE AMOUNT OF INTEGRATION OCCURING IN THE PROCESSING (OR REGULATOR) SECTION.

RESPONSE -- ADJUSTMENT USED TO ALLOW THE UNIT TO RESPOND TO FAST CHANGES THAT MIGHT OCCUR DURING THE UNWINDING PROCESS. WHEN FAST OR LARGE TENSION CHANGES OCCUR ON THE WEB THE RESPONSE POT DETERMINES HOW MUCH THE OUTPUT OF THE UNIT SHOULD CHANGE TO CORRECT FOR THESE TENSION CHANGES.

## START-UP PROCEDURE

### CALIBRATION

1. CHECK THE TRANSDUCERS TO BE SURE THEY ARE PROPERLY MOUNTED AND ORIENTED. (REFER TO THE TRANSDUCER INSTALLATION INSTRUCTIONS.)
2. BEFORE APPLYING POWER TO THE TENSION CONTROLLER, CHECK THE TENSION METER NEEDLE. IF IT IS NOT ON ZERO, ADJUST THE SMALL SCREW BELOW THE METER SCALE UNTIL THE NEEDLE RESTS ON ZERO.
3. TURN ON POWER TO THE CONTROLLER AND LET IT WARM UP FOR 5 MINUTES.
4. TURN THE ZERO POT. ON THE TENSION AMPLIFIER CARD UNTIL THE METER READS ZERO. (TURNING THE POT. CLOCK-WISE WILL INCREASE THE METER READING.)
5. THREAD A LENGTH OF ROPE OVER THE CENTER OF THE TENSION SENSING ROLL FOLLOWING THE EXACT SAME PATH AS THE WEB WILL TAKE. DO NOT PASS THE ROPE OVER DEAD BARS, DRIVEN ROLLS, BRACES OR ANY OTHER NON-FREE WHEELING MEMBER. THE SLIDING FRICTION INTRODUCED BY THESE MEMBERS WILL CAUSE IN-ACCURATE CALIBRATION. FASTEN ONE END OF THE ROPE SECURELY.
6. ATTACH A WEIGHT OF KNOWN VALUE TO THE OTHER END OF THE ROPE. (ITS WEIGHT SHOULD BE ABOUT HALF THE MAXIMUM SCALE READING OF THE TENSION METER). OR USE A SPRING SCALE TO APPLY THE REQUIRED FORCE.
7. TURN THE CALIBRATE POT. ON THE TENSION AMPLIFIER CARD UNTIL THE METER READING IS THE SAME AS THE WEIGHT.
8. IF THE TENSION METER READS BACKWARDS, REVERSE THE TWO WHITE WIRES IN THE TRANSDUCER CABLES.
9. REMOVE THE LOAD FROM THE SENSING ROLL AND OBSERVE THE TENSION METER. IF IT DOES NOT RETURN TO ZERO, REPEAT STEPS 4, 7 and 9.

### TUNING THE CONTROLLER FOR STABLE OPERATION

1. INSTALL A FULL ROLL IN THE UNWIND AND WEB UP THE PRESS.
2. LOCATE THE SIGNAL AMPLIFIER CARD.
  - A. GAIN - THE GAIN POT IS A 1 TURN (320°) POT. SET THE GAIN POT 100% (FULLY) CW.
  - B. STABILITY - THE STABILITY POT IS A 1 TURN (320°) POT. SET THE STABILITY POT 60% CW.

C. RESPONSE - THE RESPONSE POT IS A 1 TURN (320°) POT. SET THE RESPONSE POT 25% CW.

3. RUN THE PRESS AT 150 FPM AND OBSERVE THE TENSION METER. IF TENSION FLUCTUATES MORE THAN 2 OR 3 DIVISIONS, ADJUST THE STABILITY AND RESPONSE POTS TO MINIMIZE FLUCTUATION.

TURN THE POTS VERY SLOWLY

NOTE: STABILITY IS USUALLY SET HIGH AND RESPONSE IS USUALLY LOW. IF RESPONSE IS TOO HIGH IT WILL CAUSE INSTABILITY.

4. IF ADJUSTING THE STABILITY AND RESPONSE POTS DOESN'T STABILIZE THE CONTROLLER, TURN THE GAIN POT. CCW SLOWLY UNTIL STABILITY IS ACHIEVED.
5. RUN THE PRESS AT MAXIMUM SPEED AND OBSERVE THE TENSION METER. IF NECESSARY, TENSION VARIATIONS CAN BE MINIMIZED BY SLOWLY ADJUSTING THE STABILITY AND RESPONSE POTS.

ADJUSTING THE OUTPUT LIMIT CIRCUIT

THE LIMIT CIRCUIT PREVENTS WEB BREAKAGE OR STRETCHING DURING SPLICING OR WHILE THE MACHINE IS STARTING. THIS IS ACCOMPLISHED BY LIMITING THE MAXIMUM TORQUE TO THE BRAKE TO THAT REQUIRED BY THE FULL ROLL.

1. INSTALL A FULL ROLL IN THE UNWIND.
2. THE OUTPUT LIMIT POT HAS ALREADY BEEN FACTORY ADJUSTED SO THAT THE MAXIMUM VOLTAGE OUTPUT TO THE CLUTCH IS 85 VDC.
3. RUN THE MACHINE AT 200 FPM AND ADJUST UNWIND TENSION TO THE DESIRED VALUE.
4. TURN THE OUTPUT LIMIT CCW SLOWLY UNTIL TENSION JUST BEGINS TO DECREASE. LEAVE AT THIS SETTING.

TUNING THE CONTROLLER FOR SOFT START OPERATION

1. SOFT START CIRCUITRY HAS BEEN DESIGNED TO ELIMINATE "LOCKED UP" AND/OR HIGH TENSION START UPS WHEN THE CONTROLLER IS USED AS AN UNWIND.

NOTE: IF THIS CONTROLLER IS USED AS A REWIND THE SOFT START OPERATION IS NOT DESIRABLE. TO ELIMINATE THE SOFT START OPERATION WHEN THE CONTROLLER IS USED AS A REWIND, TURN THE SOFT START SET POINT POT FULL CW. THIS POT IS A 22 TURN POT AND A NUMBER OF TURNS CW MAY BE NECESSARY TO ACHIEVE THE FULLY CW MODE.

2. REFER TO THE "DESCRIPTION OF ALL ADJUSTMENTS" SECTION AND NOTE THE FUNCTION OF THE SOFT START OUTPUT AND SOFT START SET POINT POT.

NOTE: ADJUSTMENTS FOR THESE POTS SHOULD NOT BE NECESSARY. THEY HAVE BEEN FACTORY ADJUSTED FOR NORMAL OPERATION AND SHOULD NOT BE ADJUSTED UNLESS NECESSARY.

3. IF ADJUSTMENT OF THE SOFT START OUTPUT POT OR THE SOFT START SET POINT POT IS NECESSARY, MAKE SURE THE WEB IS SLACK AND THE TENSION METER IS AT ZERO.

#### ANTI-COAST ADJUSTMENT (OPTIONAL)

THIS CIRCUIT PREVENTS THE WEB FROM GOING SLACK IF THE MACHINE STOPS VERY QUICKLY.

1. RUN THE MACHINE AT MAXIMUM SPEED AND PRESS THE STOP BUTTON. TURN THE ANTI-COAST POT. CW UNTIL THE WEB IS NO LONGER SLACK.



## TROUBLE-SHOOTING PROCEDURE, UTC-2A

The procedure detailed here is intended to help the electrician to determine which plug-in circuit card is faulty so it may be replaced with a new one. No instruction is given for repair of the cards themselves.

EQUIPMENT REQUIRED: (1) AC-DC multi-meter having 0-1 volt and 0-100 volt scales  
(1) small screwdriver or TV tuning tool to adjust potentiometers

TEST CONDITIONS: The machine must be stopped.  
The web must lay slack or be removed from over the transducer roll.

### ALL TESTS SHOULD BE DONE BY A QUALIFIED ELECTRICIAN

POINTS TO REMEMBER: \* All voltages given are approximate. Actual values may vary 20%.  
\* The tests are written to describe proper operation of each card. Results which are much different from those given indicate that a problem exists.  
\* Do not change the setting of any pot. until told to do so.

REFER TO FIGURE 1

Each step in the following procedure should be performed in the order given!

1. Turn off power to the UTC-2A controller panel.
2. Remove the red cover from over the circuit cards.
3. Take a few moments to locate and identify each circuit card. Notice, each card has several test jacks of different colors on the front edge. The significance of the colors is explained below:

Blue ----- inputs  
Red ----- outputs  
Green ----- circuit common (ground)  
Brown ----- +15 volts DC  
Yellow ----- -15 volts DC

- Black - - - - - factory test point, or as indicated in test procedure.
- White - - - - - positive side of 5 volt DC transducer power supply.
- Black/white - - - - - negative side of 5 volt DC transducer power supply.

The test jacks will accept the standard .080" diameter test probes on most multimeters.

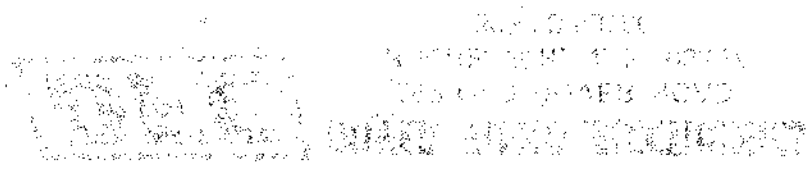
4. Perform this test only if tension has gone very high and can not be turned down with the tension pot.
  - a. Turn on power to the UTC-2A controller.
  - b. Turn the tension pot. fully CCW.
  - c. Locate the ZERO pot. on the Tension Amplifier card and turn it CW until the tension meter reads about half scale.
  - d. Measure the controller output voltage at terminals 1(+) and 2(-) on the long vertical terminal strip. It should be close to zero. If it is more than 5 volts, turn off all power to the controller and replace the power transistor, which is located on the big black heat sink.
  - e. Turn the ZERO pot. CCW until the tension meter reads zero. Be sure the web is slack over the transducer roll when adjusting the ZERO pot.
5. Turn on the power to the controller.

85 VOLT POWER SUPPLY CARD

6. Measure voltage between the Blue jacks. It should be 70 volts AC. Measure voltage between the Green and Red(+) jacks. It should be at least 85 volts DC.

15 VOLT POWER SUPPLY CARD

7. The voltage between the Green and Brown(+) jacks should be 15 volts DC.
8. The voltage between the Yellow and Green(+) jacks should be 15 volts DC.



### TENSION AMPLIFIER CARD

8. Measure voltage between the Black/white and White(+) jacks. It should be 5 volts DC.
9. Turn the ZERO pot. until the tension meter reads full scale.
10. The voltage between the Green and Red(+) jacks should be 0.1 volts DC.
11. Turn the ZERO pot. until the tension meter reads zero.

### SIGNAL AMPLIFIER CARD

12. Turn the BRAKE switch "on". Turn the tension pot. fully CCW. The voltage between the Green(+) and Red jacks should be 2.5 volts DC.
13. Turn the BRAKE switch "off". Voltage between the Red and Green(+) jacks should be 1.9 volts DC.
14. Turn the BRAKE switch "on". Turn the tension pot. fully CW. Voltage between the Green and Red(+) jacks should be 0.5 volts DC.
15. Turn the ZERO pot. until the tension meter reads  $\frac{1}{2}$  of full scale. Voltage between the Green and Red(+) jacks should be about 4.5 VDC.
16. Turn the LIMIT pot. fully CCW. Voltage between the Green and Red(+) jacks should be about .5 volts DC.
17. Turn the LIMIT pot. fully CW.
18. Turn the ZERO pot. until the tension meter reads zero.

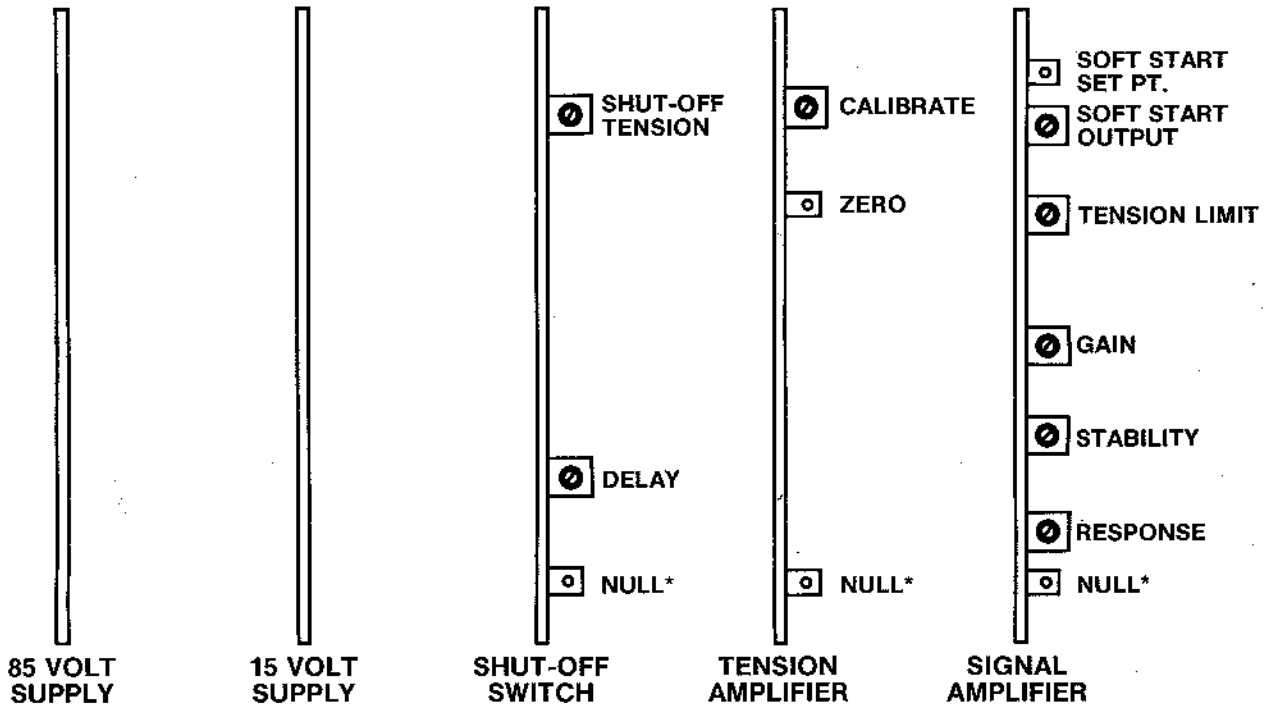
### SHUT-OFF SWITCH CARD (optional equipment)

19. Adjust the ZERO pot. on the Tension Amplifier card until the tension meter reads about half full scale.
20. Measure voltage between the Green and Red(+) jacks. It should be 0.6 volts DC. The relay on the card should be energized.
21. Adjust the ZERO pot. on the Tension Amplifier card until the tension meter reads zero. The relay should de-energize and the voltage between the Red and Green(+) jacks should drop to 0.5 volts DC. NOTE: The voltages in steps 19 and 20 are of opposite polarity.

THIS COMPLETES THE TROUBLESHOOTING PROCEDURE. REFER TO THE START UP PROCEDURE SECTION FOR CALIBRATION AND TUNING.

FIG. 1

**CALIBRATION AND TUNING ADJUSTMENTS, UTC-2A**



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\*SET AT FACTORY, DO NOT ADJUST

## PREVENTIVE MAINTENANCE

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

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

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

Use a dry, soft brush to remove dust.

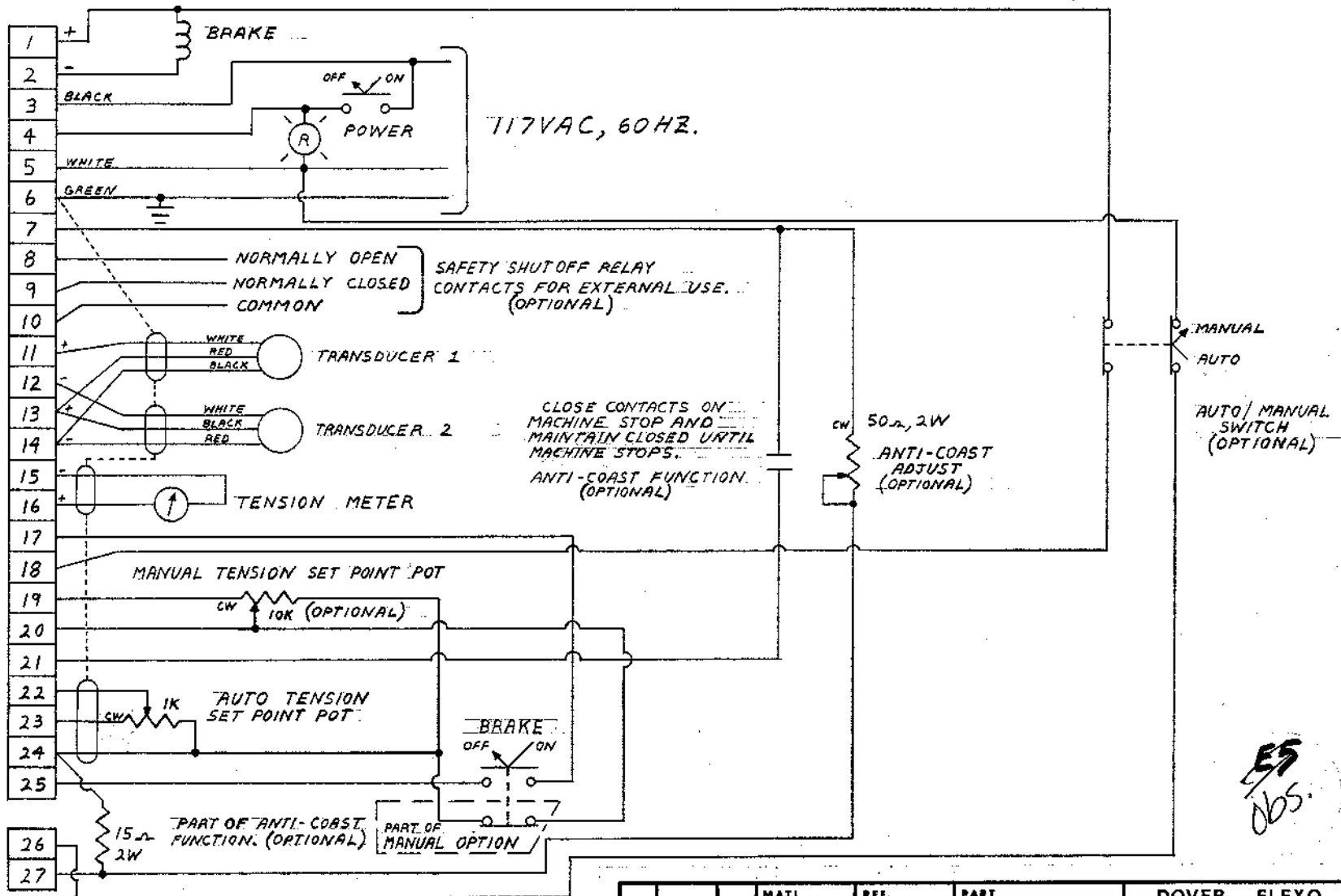
If a solvent is necessary, use denatured alcohol.

DOVER FLEXO  
ELECTRONICS

UNWIND TENSION CONTROLLER

MODEL UTC-2A  
DIAGRAM  
REF.

DES	PART NO.	DESCRIPTION	QTY	MFR
1	85V3	85 Volt Power Supply Card	1	
2	UPS2	15 Volt Power Supply Card	1	
3	RTA3	Tension Amplifier Card	1	
4	USA4	Signal Amplifier Card	1	
5	SOS2	Shut-Off Switch Card (optional)	1	
6				
7	IR423	Power Transistor	2	
8	R82B	Transformer	1	
9	36D	Capacitor, 1600 mf	1	
10	3AG	Fuse, 4 amp 250 volt	1	
11				
12				
13		ELECTRICAL DIAGRAMS		
14	E335B	External connections UTC-2A		
15	E125A	Tension amplifier RTA3		
16	E334B	Signal amplifier USA4		
17	E339B	85 Volt power supply		
18	E70A	15 Volt power supply UPS2		
19		Shut-off switch SOS2		
20	E336B	Power Amplifier, Interconnection		
21				
22				
23				
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36				

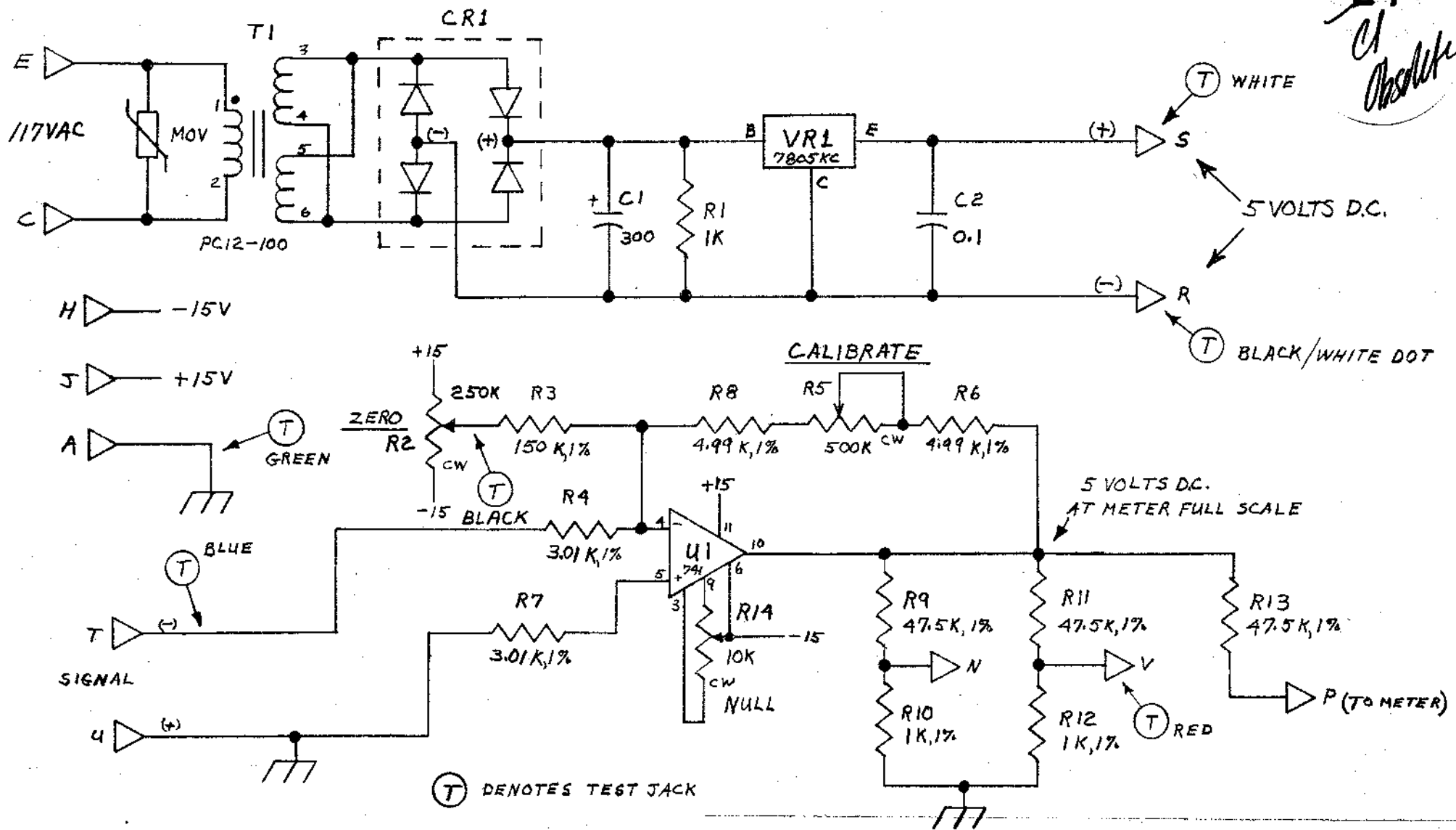


**NOTE:**

- A.) USE SHIELDED CABLE WHERE INDICATED. GROUND SHIELD ON CONTROLLER END ONLY.
- B.) IF TENSION METER READS BACKWARDS, INTERCHANGE WIRES ON TERM. 11, 12.
- C.) TERMINALS 6, 15, 24 ARE GROUNDED TO SUBPLATE.

			MATL.	REF.	PART EXTERNAL CONNECTIONS		DOVER FLEXO ELECTRONICS INC.		
			MACHINED LIMITS OTHERWISE	DIMENSION UNLESS SPECIFIED	MODEL UTC-2A		ROCHESTER, N.H. 03867		
			.X	± .04	USE UNWIND		DR. BY	DATE	SCALE
J.W.			.XX	± .02	TENSION CONTROLLER		J.W.	4/30/81	
BY DATE REV.			.XXX	± .005			DRAWING NO. E335B		

*E4*  
*Cl*  
*Obsolite*



(T) DENOTES TEST JACK

U DENOTES CONNECTOR PIN ON PC CARD

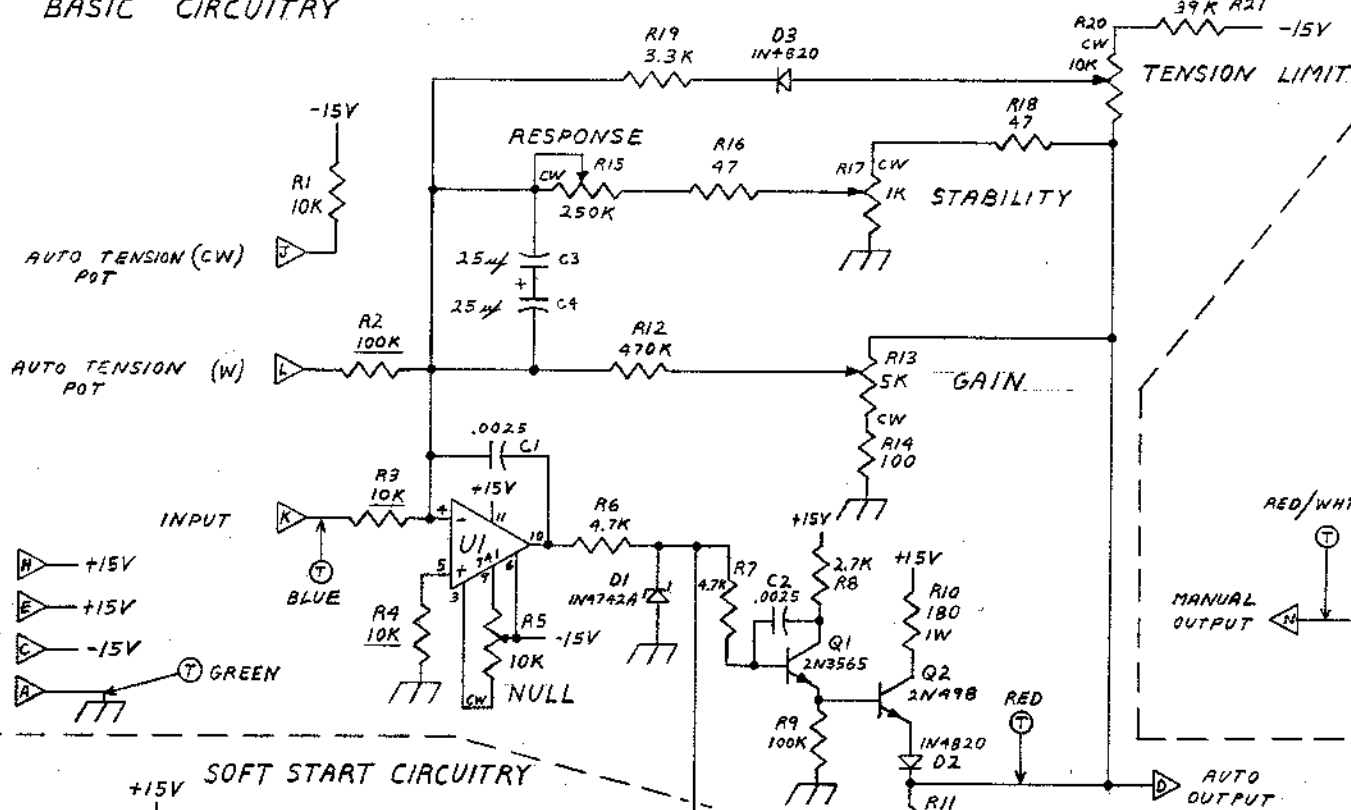
A 4-1-81 J.W.  
REVISED; 11-27-78

PART NAME	TENSION AMPLIFIER
MODEL	RTA3
UNIT	ALL
KEYPIN "M"	

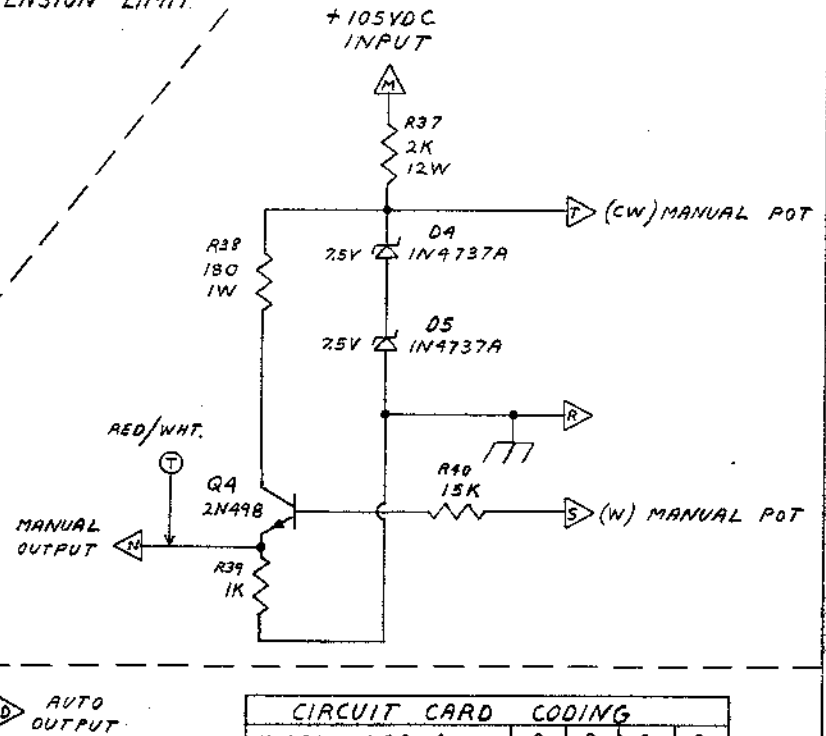
<b>DOVER FLEXO ELECTRONICS</b>		
SOMERSWORTH, N.H. 03878		
DR. BY KE	DATE 5-17-78	SCALE
DRAWING NO.		E125A



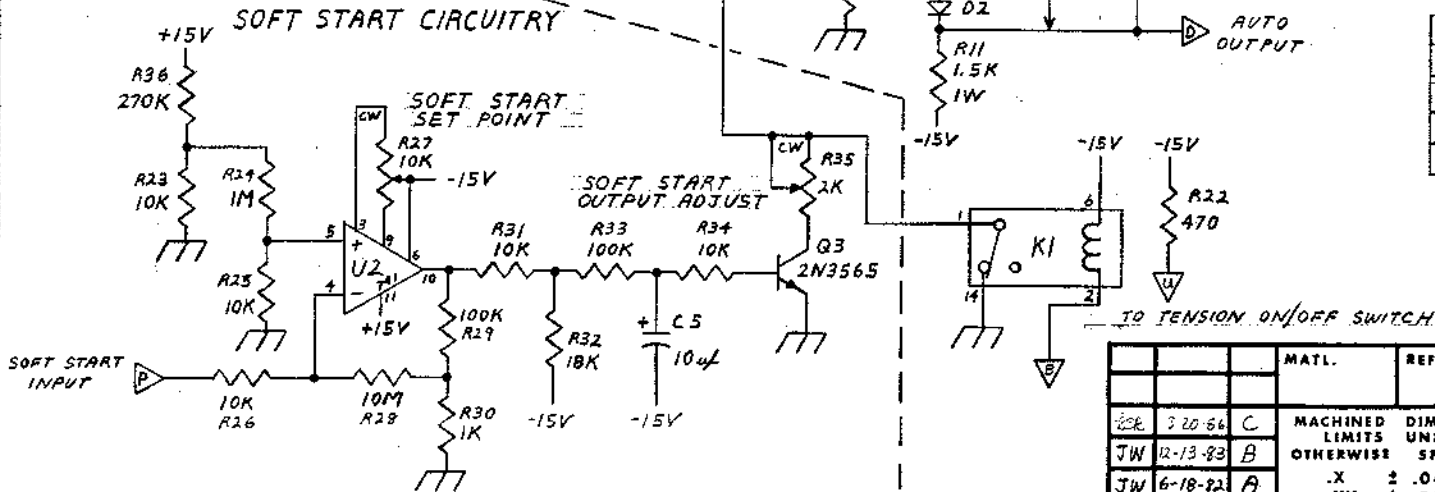
**BASIC CIRCUITRY**



**MANUAL CIRCUITRY**



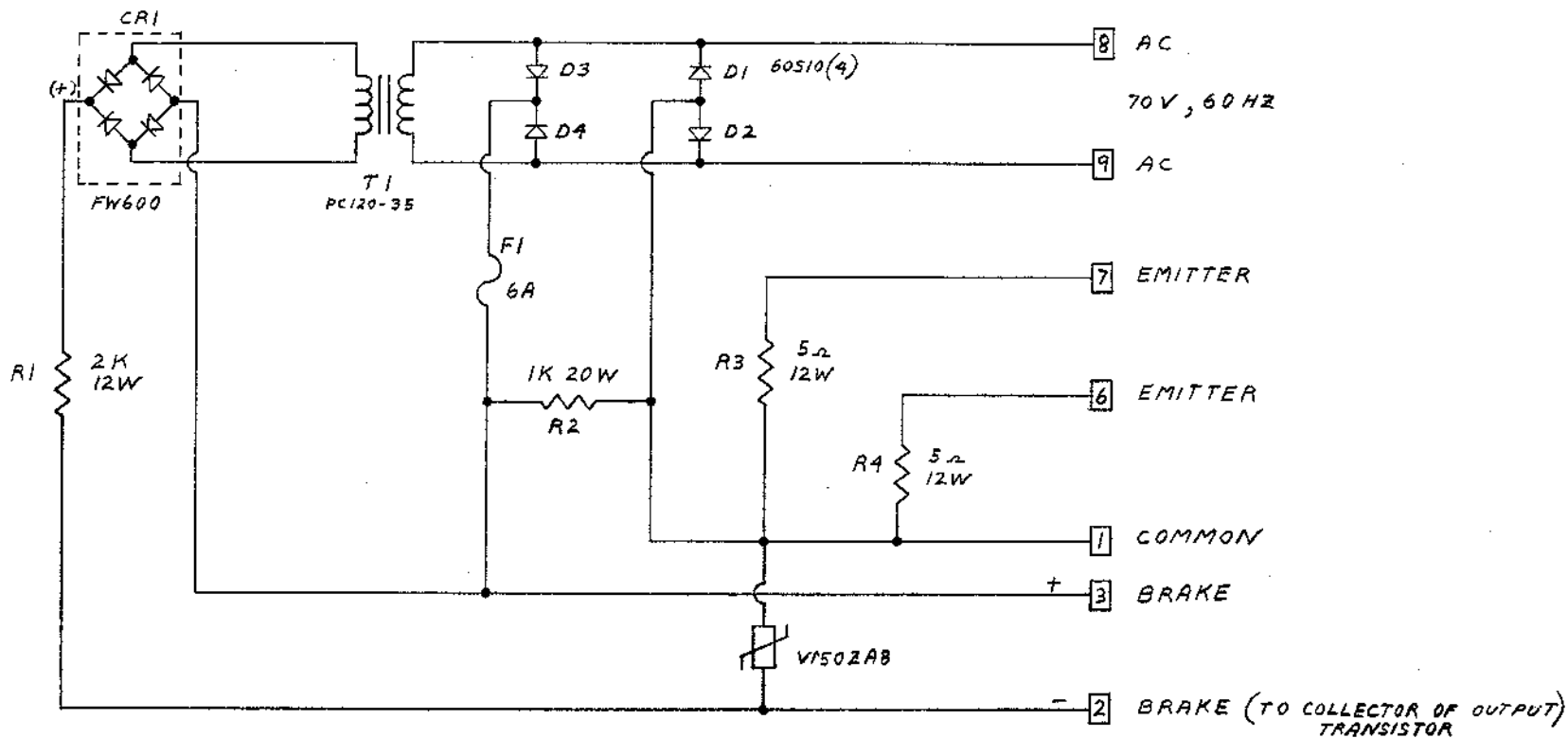
**SOFT START CIRCUITRY**



CIRCUIT CARD CODING				
MODEL: USA-4	A	B	C	D
BASIC CIRCUITRY	✓	✓	✓	✓
SOFT START CIRCUITRY		✓		✓
MANUAL CIRCUITRY			✓	✓

BY	DATE	REV.	MATL.	REF.	PART UNWIND SIGNAL AMPLIFIER SCHEMATIC	DOVER FLEVO ELECTRONICS INC. ROCHESTER, N.H. 03867
JW	3-20-64	C			MODEL USA-4	DR. BY J.W. DATE 4/29/81 SCALE
JW	12-13-83	B	MACHINED DIMENSION LIMITS UNLESS OTHERWISE SPECIFIED		USE ELECTRIC UNWIND	DRAWING NO. E334B
JW	6-18-82	A	.X ± .04			
			.XX ± .02			
			.XXX ± .005			

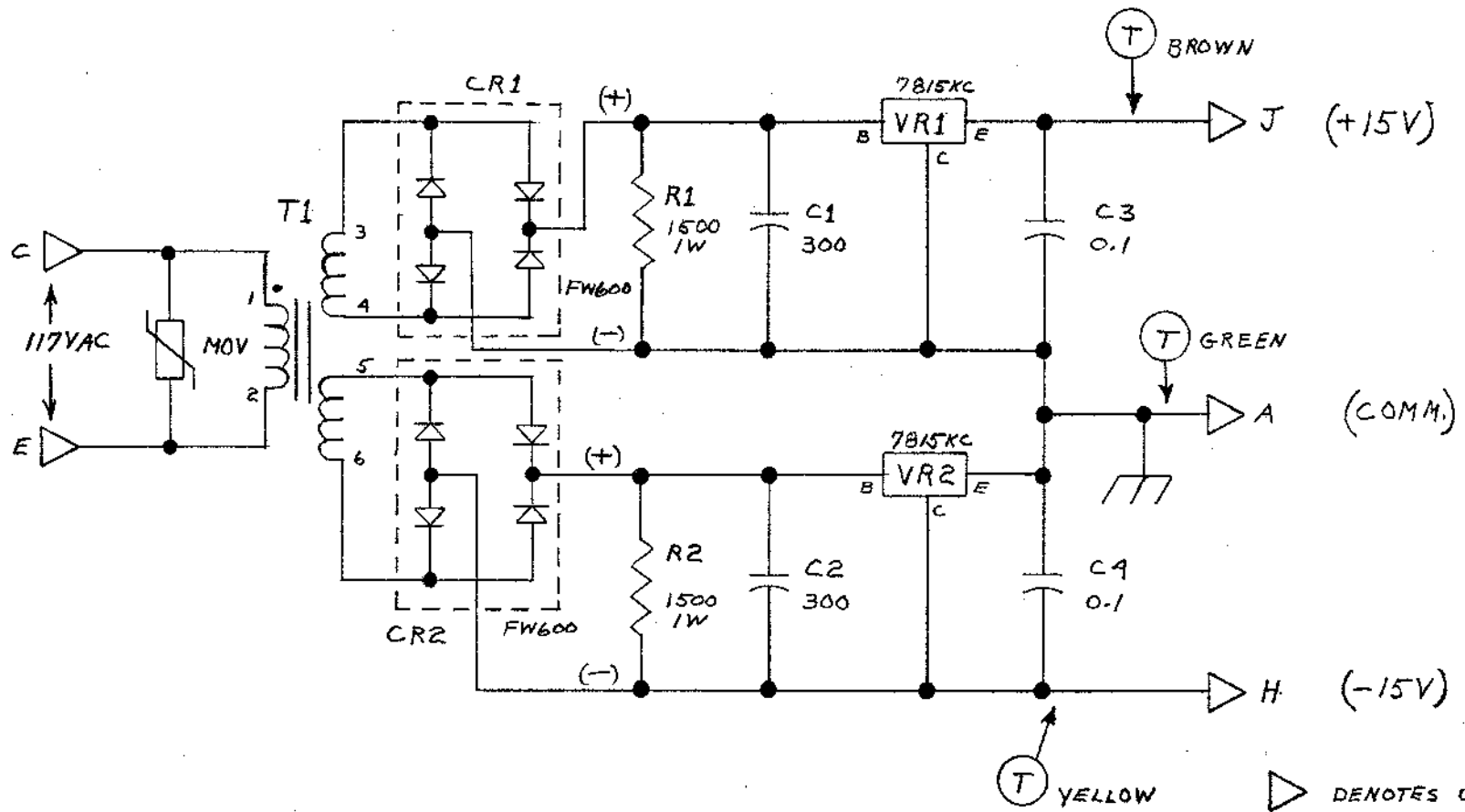
*ES Obs.*



ES  
Obs.

□ DENOTES CARD TERMINAL

			MATL.	REF.	PART 85 VOLT POWER SUPPLY W/NEG. BIAS MODEL 85V3 USE UNWIND	DOVER FLEXT ELECTRONICS INC. ROCHESTER, N.H. 03867		
			MACHINED LIMITS OTHERWISE SPECIFIED	DIMENSION UNLESS SPECIFIED		DR. BY J.W.	DATE 5/4/81	SCALE —
BY	DATE	REV.	.X ± .04	.XX ± .02				
			.XXX ± .005					

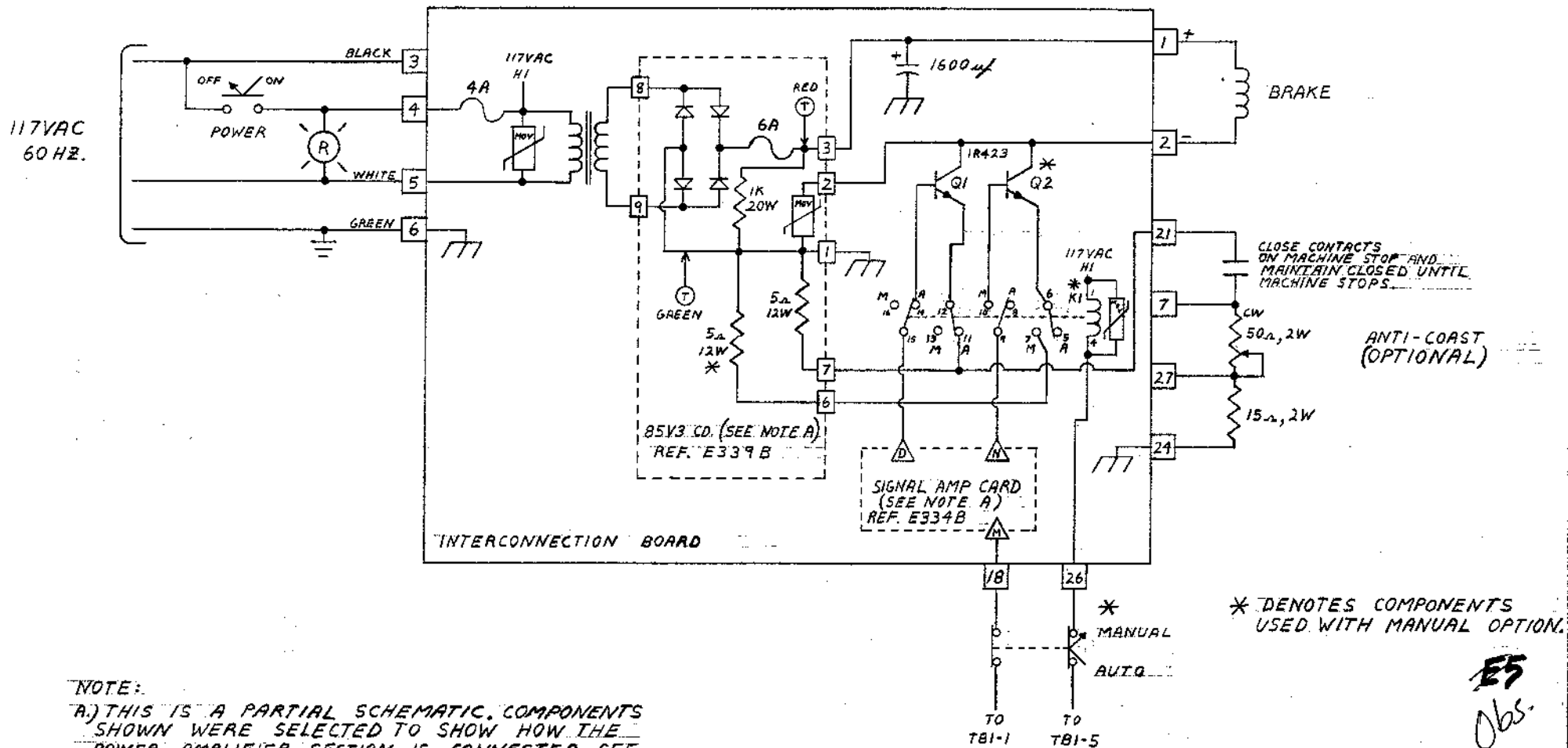


*EM  
C1  
obsolete*

▷ DENOTES CONNECTOR PIN ON PC. CARD

⊙ DENOTES TEST JACK

PART NAME 15 VOLT POWER SUPPLY	<b>DOVER FLEXO ELECTRONICS</b>	
MODEL UP52	SOMERSWORTH, N.H. 03878	
UNIT	DR. BY KE	DATE 3-20-77 SCALE ~
KEY PIN "L"	DRAWING NO.	E 70A



NOTE:

- A) THIS IS A PARTIAL SCHEMATIC, COMPONENTS SHOWN WERE SELECTED TO SHOW HOW THE POWER AMPLIFIER SECTION IS CONNECTED. SEE DIAGRAM REFERENCED FOR COMPLETE SCHEMATIC.
- B. K1 CONNECTIONS ARE HARD WIRED WHEN THE MANUAL OPTION IS NOT USED.

			MATL.	REF.	PART	DOVER FLEVO		
					POWER AMPLIFIER, INTERCONNECTION	ELECTRONICS INC.		
					MODEL UTC-2A	ROCHESTER, N. H. 03867		
					USE UNWIND	DR. BY	DATE	SCALE
JW	9/29/61	A	.X	± .04	TENSION CONTROLLER	J. W.	9/30/61	—
BY	DATE	REV.	.XX	± .02	DRAWING NO. E336B			
			.XXX	± .005				