

## H. CHECKING THE CONTROL UNIT

### 1. VOLTAGES WITH UNIT PLUGGED IN.

To check the control unit, plug the line cord into 120 volt AC power. With no connections to the terminals turn the on-off switch to the "on" position, the meter light will illuminate. The meter needle will remain on the left hand "S". Terminals 1 and 2 should show 30 volts AC (approximately) when the brake lever is depressed.

Terminals 1 and 5 should show 30 volts AC with brake release lever depressed and CW lever depressed.

Terminals 1 and 6 should show 30 volts AC with brake release lever depressed and CCW lever depressed.

Terminals 3 - 7 should show approximately 13 VDC.

### 2. RESISTANCES WITH UNIT NOT PLUGGED IN

Disconnect the AC power source and remove the eight wire control cable. Be sure to tag each wire with the corresponding terminal number.

The control box can be checked without removing the cover by using a volt-ohmmeter to check values across terminals. Resistance across terminals No. 1-2 should read .4 Ohms. Read same value across terminals No. 1-5 with clockwise switch lever (right-hand) depressed and across terminals No. 1-6 with counter clockwise switch lever (left-hand) depressed. Resistance across input line cord with on-off switch in the "on" position and the brake lever depressed should read 3.8 Ohms.

## I. CHECKING THE ROTATOR FROM THE GROUND

You may possibly avoid bringing the rotator down by making electrical checks from the control box position. This is done by disconnecting the 8 wires from the screw terminals and tagging them carefully No. 1 through No. 8 to correspond with the terminal numbers from which they were removed. From the schematic diagram it is apparent that the resistance of the lead wires will be added to the resistance of the motor windings and potentiometer strip in making the resistance checks as shown in Table 1. All readings taken at **OTHER** than end of rotation.

To Check	Read Resistance	Between Terminals
Brake Solenoid	.75 ohms + leads	1-2
1/2 Motor Winding	2.5 ohms + leads	1-8
1/2 Motor Winding	2.5 ohms + leads	1-4
1/2 Motor + Switch	2.5 ohms + leads	1-5
1/2 Motor + Switch	2.5 ohms + leads	1-6
Entire Motor	5 ohms + leads	8-4
Right Limit Switch	0 ohms + leads	8-5
Left Limit Switch	0 ohms + leads	4-6
Entire Pot	500 ohms	3-7
Pot Arm to + End	0 to 500 ohms	3-1
Pot Arm to — End	0 to 500 ohms	1-7

Table 1

## IV. DISASSEMBLY OF THE ROTATOR

In order to service the rotator, the unit must be disassembled. We recommend the following procedure:

1. Set the rotator on a flat surface.
2. Remove the six 5/16-18 bolts and hex nuts and carefully raise the top casting to expose the potentiometer and drive mechanism.
3. Carefully remove the upper ball retaining ring. Keep it circular, and lay it on clean paper.

4. See that the potentiometer strip is clean and not burned at either end and that the arm is clean at the point of contact. Use only fine rouge cloth to polish the contact arm.
5. If the drive ring happens to be near the end of rotation, hold the unit horizontal, operate the top spur gear to rotate the mechanical stop on the drive ring away from the area of the limit switch. See that the mechanical stop lever (which is positioned between the two limit switches) will open each electrical contact before it hits the corresponding mechanical stop. Also see that the stop lever has not been deformed and that the electrical contacts are clean and uncorroded. Rotate the top spur gear several revolutions to determine that the motor and its bearings are operating freely. Look for broken teeth in any of the gears.
6. Lift the motor and brake mechanism out of the brake housing. Carefully remove the lower ball bearing retainer and place it on a clean piece of white paper.
7. Remove the ring gear from the motor base. This is accomplished by first pulling up on the side opposite the gear train. Then raise the entire ring slightly upward with the side away from the gear train so that it will slide out from under the gears. Examine closely for evidence of broken or worn teeth.
8. Examine the inside of the screw terminal strip to see that there is proper clearance between the solder lugs and frame and that there are no breaks in the insulation. Pay particular attention to the insulation at the point where the wires are held in the metal clip.
9. Examine the teeth in the brake casting.
10. To separate the motor, pot, and gear assembly from the brake assembly, unsolder the solenoid leads from the terminals 1 and 2. Remove the screws holding the terminal board to the casting. Then remove the four large screws in the base. Be careful to clear the wires and the terminal strip through the opening.
11. Carefully remove the ball bearing retaining ring from the lower portion of the brake housing.
12. To remove the potentiometer, remove the hex nuts and unsolder the leads. The mounting studs are integral to the motor and bell. In replacing the pot be sure the connections are on the side which overhangs the motor.
13. To replace the motor, first remove the pot per Paragraph 12, then unsolder the black motor lead from the screw terminal 1, the red lead from the inside left limit switch lug, and the blue lead from inside the right limit switch lug. The fastenings holding the motor on the studs may then be removed and the motor pulled up and out. In replacing a motor, be sure to see that the round hole in the motor is next to the limit switch. Use a double lock nut on this stud near the limit switch, to provide clearance for the leads. Use special internal-external lockwasher over the stud that works in the slotted hole in the motor. Be sure that the pinion is snug against the spur gear before tightening this fastening over the slot.
14. When it is necessary to closely inspect or replace gears, it is possible to remove the motor, limit switch, pot, and terminal strip without unsoldering more than the solenoid leads from terminals 1 and 2. Remove the motor fastenings from the mounting studs. Work the motor up and out, exercising care in pulling the leads and terminal strip through the window in the gear housing. Remove the plate to expose the gears. Carefully note the positions for proper replacement.

## V. RE-ASSEMBLY OF THE ROTATOR

It is assumed in the following instructions that the brake mechanism is assembled and operative. The motor and gear train along with the potentiometer and the limit switches are likewise



assembled and wired and operative.

It is not likely that the brake wedge will be exactly positioned in relation to the teeth in the brake housing to permit proper assembly unless the brake mechanism is retracted. For this reason it is necessary to operate the brake mechanism electrically during step 8 of the assembly of the rotator unit.

1. See that a small amount of low temperature, high quality, light weight grease is conservatively distributed around the ball bearings, ring gear, and spur gears. Only an even film of grease is desirable (approximately one thimbleful of grease should be used to lubricate a completely dry rotator). Excessive grease will only run out in high temperatures or cause power loss in low temperatures.
  2. Rotate the upper spur gear until the inwardly protruding mechanical stop on the ring gear engages the channel shaped stop lever and pushes it for enough to the right to just open the right hand limit switch contact (it is assumed that the rotator is viewed from the side of the limit switch). This situation represents the extreme counterclockwise end of rotation. The potentiometer arm must then be rotated to its extreme counterclockwise position against the top stop.
  3. Secure the upper bell housing upside down by the mast support in a vise with the open end of the "V" toward the bench. The boss which drives the potentiometer arm which is located in the bottom part of the bell housing will then be to the left of center.
  4. Clean the inner portion of the housing and apply a small amount of grease to the ball race. Then carefully insert one ball bearing assembly with the flanged rim up and against the outer edge of the casting.
  5. Grasp the operating mechanism by the flat base, steady the ring gear, invert the mechanism and lower it into the housing. In doing this, note that the serrated portion of the potentiometer arm must engage the driving boss in the housing and that the three driving bosses on the ring gear must engage into the mating recesses in the top housing. This situation will result automatically if the previous instructions have been followed.
  6. Clean the exposed bearing race and apply a film of grease. Then apply the top bearing assembly to the race with the rim downward.
  7. Clean the brake housing and bearing race and apply a light film of grease. Place the ball bearing assembly in the lower portion of the brake housing with the retainer flange in the up position. Lower the brake housing into place so that the assembly holes will approximately line up with the threaded holes in the bell housing. **DO NOT MECHANICALLY FORCE AN EXACT ALIGNMENT OF THESE HOLES WITHOUT ELECTRICALLY RETRACTING THE BRAKE MECHANISM.**
  8. Connect the control unit terminals No. 1 and No. 2 only to the corresponding terminals on the rotator while it remains clamped in the vise. Momentarily operate the "Brake Release". This will permit the brake housing to freely rotate for exact alignment of the holes. With the brake retracted, use the six 5/16-18 x 1.62" bolts, lock washers, and hex nuts to secure the upper mast support (bell) to the lower brake housing. Tighten finger tight. With the brake re-engaged, tighten all six bolts in an alternate pattern to approximately 175 inch pounds of torque. Recheck the brake to make sure that it operates freely.
- It is suggested that all 8 wires be connected from the control box while the rotor is still on the bench and that its complete operation be checked.

## VI. HOW TO GET FACTORY SERVICE

If service is required, the unit must be packed securely and sent prepaid to:

CORNELL - DUBILIER ELECTRONICS  
Rotor Service Department  
118 East Jones Street  
Fuquay-Varina, N. C. 27526

For units that are in warranty, no charge will be made for any repair work required. Include a copy of your sales receipt. For out - of - warranty units, the following flat rate charges apply:

Control Unit Only	\$35.00
Rotator Only	\$60.00
Complete Unit - Rotator and Control	\$75.00

The above flat rate charge includes rebuilding the unit, replacing all defective and/or worn parts, and return freight charges. CDE reserves the right to change prices at its option. When returning items for repair, a check or money order for the repair charges must be included. Be sure to include your name, address, zip code and telephone number. Also give a brief description of the problem.

LIMITED WARRANTY	
CORNELL-DUBILIER ELECTRIC CORPORATION (CDE) warrants that your new ROTOR has been manufactured free of defects in design, material and workmanship. If this product fails to give satisfactory service due to defects covered by warranty, including any warranty implied by law such as WARRANTIES OF MERCHANTABILITY OR FITNESS, for a period of ONE YEAR FROM THE DATE OF PURCHASE, CDE will, at its option, replace or repair the unit, or any defective part free of charge.	
To obtain warranty service, return the ROTOR to your dealer, or pack it securely, and send it with proof of purchase date and a letter explaining the problem, shipping cost prepaid, to: CORNELL-DUBILIER ELECTRIC CORPORATION, WARRANTY REPAIR DEPARTMENT, 118 E. JONES ST., FUQUAY-VARINA, N.C. 27526.	
IMPORTANT	
Warranty service covers repair or replacement of the ROTOR only. CDE is not responsible for costs of removal or reinstallation, or shipping to the place of repair. The warranty period is not extended due to repair or replacement.	
CDE reserves the right to make reasonable charges for service if there is evidence of damage due to alteration, misuse or installation not according to the enclosed instructions.	
CDE IS NOT RESPONSIBLE FOR DAMAGE TO OTHER EQUIPMENT OR PROPERTY OR FOR ANY OTHER CONSEQUENTIAL OR INCIDENTAL DAMAGES OF ANY KIND, WHETHER BASED ON CONTRACT, NEGLIGENCE OR STRICT LIABILITY. MAXIMUM LIABILITY SHALL NOT, IN ANY CASE, EXCEED THE PURCHASE PRICE OF THE UNIT.	
(Some states do not allow limitations on how long an implied warranty lasts, or the exclusion or limitation of incidental or consequential damages, so the above limitations and exclusion may not apply to you.)	
(This warranty gives you specific legal rights. You may also have other rights which may vary from state to state.)	

IF YOUR UNIT IS DAMAGED, CONTACT YOUR DEALER OR THE SHIPPER. IF ANY OF THE ITEMS ARE MISSING, RETURN THE COMPLETE UNIT TO YOUR DEALER OR WRITE THE FACTORY FOR ASSISTANCE. A COPY OF YOUR SALES RECEIPT MUST ACCOMPANY ANY RETURN.