ELECTRO-TECHNIC PRODUCTS INC.
4642 N. RAVENSWOOD, CHICAGO, ILLINOIS 60640-4510
TELEPHONE: 1-773-561-2349
FAX: 1-773-561-3130

OPERATING MANUAL
Model BD-80C
High Frequency Corona Surface Treater

Leak Testers, Corona Treaters, Science Education Products

SECTION 1 - GENERAL INFORMATION

1.1 Description

1.1.1 The Model BD-80 High Frequency Corona Surface Treater is designed to treat the surfaces of polymeric materials in situations where other methods are impractical or impossible. The high frequency employed permits useful corona to be generated using only a single electrode.

1.1.2 This makes possible the corona treatment of large or irregularly-shaped-surfaces where flame treatment may have been required before. Corona treatment does not cause warping problems frequently encountered with flame treatment.

1.1.3 The single electrode configuration of the Model BD-80 means that strikethrough, or dielectric breakdown of a thin film is less likely to occur than with conventional corona treaters requiring a ground electrode. However, the corona produced by the Model BD-80 is comparable to that of a conventional two-electrode corona treater of the same power.

1.1.4 The uniqueness of the Model BD-80 lies in its ability to treat the surfaces of large, thick, or irregularly shaped objects made from polymers. It can be used to treat the following thermoplastics:

- high and low-density polyethylenes
- polypropylene
- polystyrene
- polycarbonate
- polyphenylene sulfide
- perfluoroethylene copolymers or FEP
- polyamide (Kapton®, a DuPont trademark)
- polyesters
- polyvinyl chloride
- acrylics
- and similar plastics

in the form of continuous or porous films, sheets, foams, tubing, fibers, or finished articles having large dimensions and/or small crevices up to 2 in. in depth.

1.1.5 Excellent results have also been obtained on surface treating of elastomers and thermosets. The above list is not meant to be exhaustive; other materials and geometries are possible. Consult the factory concerning particular applications.

1.1.6 The Model BD-80C is available in different configurations, depending upon output power, low or high, and frequency, 2 MHz or 4 MHz. For more precise control of the power at low outputs for certain applications, a regulated output model is available. Models with remote resonators are also available, with the suffix "R" next to the base SKU. The table below lists these options. These models must be ordered configured as indicated. It is not practical to reconfigure models to different power or frequency outputs once configured.

1.1.7 All of these model variations will simply be referred to as the Model BD-80 in this instruction manual, unless a specific reference is made to the model variation.

Model SKU	Description
18011	Low Power (30 mA), 2 MHz
18011-21	High Power (58 mA), 2 MHz
18011-31	Low Power (30 mA), 4 MHz
18011-41	High Power (58 mA), 40 MHz
18051	Low Power (30 mA), 2 MHz, Regulated

1.2 Packing List

1.2.1 Carefully remove the instrument and accessories from the packing material. Check all parts against the Packing List. Notify Electro-Technic Products, Inc, immediately of any shortages.

1.2.2 Packing List for Model BD-80C:

Quantity	SKU	Description
1	180xx-xxx	Corona Treater
1	Xxxxx	Electrode
2	059-0066-4	Catalytic Reactor Tray Assembly
1	070-0045-3	Shipping Crate
1	085-0034-3	Instruction Manual

1.3 Specifications

Voltage Output	50,000 to 250,000 V
Frequency Output	2 MHz, or 4 MHz
Coil Input Current	30 ma, or 58 Ma
Operating Duration	Continuous
Input Power	115 V, 60 Hz, single phase 230 V operation upon request
Power Consumption	350 watts
Dimensions, Overall (with Catalytic Reactor)	18 x 15 x 26½ in. high (without electrode)
Mounting Bracket Holes	18 in. centers - horizontal; 12 in. centers - vertical Hole Diameter: 3/8 in.
Net Weight	125 lbs (57 kg)
Shipping Weight	208 lbs (94 kg)
Shipping Dimensions	24 x 46 x 36 in. (61 x 117 x 92 cm) crated on skid

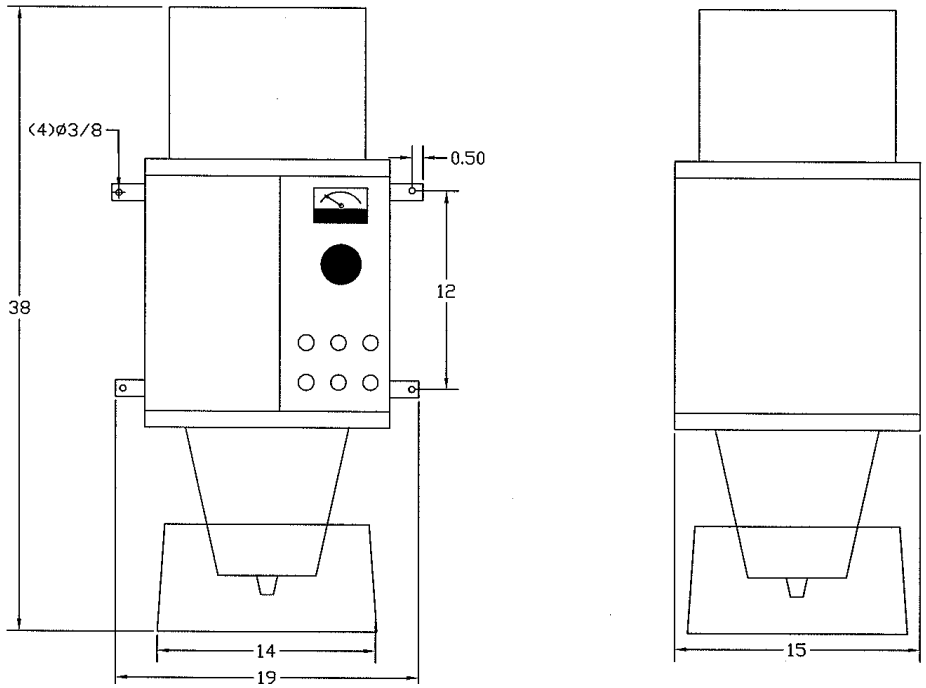


Figure 1.1 Dimensional Drawing Model BD-80C w/Catalytic Reactor

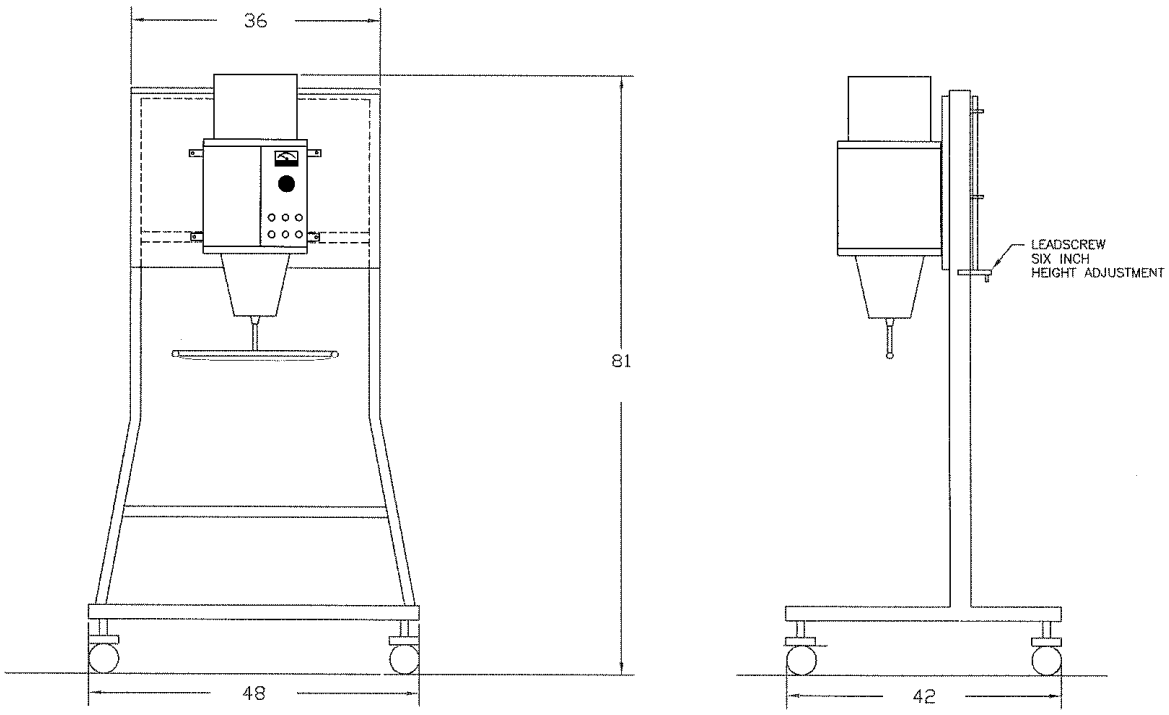


Figure 1.2 Dimensional Drawing Model BD-80C w/Stand

1.4 Accessory Equipment

Figure 4.1 Model BD-80C with Stand and Conveyor

1.4.1 The Model BD-80C is available separately, for self-mounting. Also available are a support stand and conveyor system. The conveyor is a special design for corona treating. It has a plastic mid-section, and uses non-conductive belting, without the use of metal pins.

1.4.2 Standard Round Electrode Accessories List for Model BD-80:

Product Number	Description
12801	Electrode, Round, ½ in. Diameter
128051	Electrode, Round, ¾ in. Diameter
12811	Electrode, Round, 1 in. Diameter
128151	Electrode, Round, 1½ in. Diameter
128221	Electrode, Round, 2 in. Diameter
12831	Electrode, Round, 3 in. Diameter
12841	Electrode, Round, 4 in. Diameter
12851	Electrode, Round, 5 in. Diameter
12861	Electrode, Round, 6 in. Diameter
12881	Electrode, Round, 8 in. Diameter
13101	Electrode, Round, 10 in. Diameter
13121	Electrode, Round, 12 in. Diameter

1.4.3 Field-Effect Electrode Accessories List for Model BD-80

Product Number	Description
13181	Electrode, Cup Treating
13281	Electrode, Concentric Ring
13811	Electrode, 3 in., 1 Wire
13831	Electrode, 4½ in., 3 Wire
13841	Electrode, 6¼ in., SS, 1 Wire
13851	Electrode, 6 to 9 in.
13861	Electrode, 9 to 12 in.

1.4.4 The above list of accessory Electrodes describes the standard product line. Custom electrodes can be designed to fit a particular application. Consult the factory for specific details.

1.4.5 A Model PM-80 Power Module is also available as an accessory with any of the above electrodes. It is used in conjunction with a second electrode to make possible the treating of both sides of an object at the same time.

1.4.6 A Wire Treating Electrode has been designed specifically for treating the plastic insulation of wires prior to printing or striping. It is intended to handle a continuous length of wire.

1.4.7 Special inks are available to determine the surface tension of the object after treating. Consult the factory for availability.

1.5 Warranty Repair/Replacement Information

1.5.1 For a period of one year from the date of purchase, if the unit fails due to defective parts, or poor workmanship, Electro-Technic Products, Inc. will at no charge, repair the unit, and ship it back to the customer, or dealer, at our expense.

1.5.2 Parts not covered under warranty include the vibrating contacts, both upper and lower, that wear with usage. Damage due to misuse, or as a result of being dropped, are not covered under this warranty.

1.5.3 If the Model BD-80C requires repair, send it freight prepaid to the factory, The instrument has a serial number which can be used to verify the date of manufacture.

1.5.4 Electro-Technic Products, Inc. reserves the right to repair or replace any instrument sent in for warranty repair.

1.5.5 If found to be out of warranty, or damaged due to improper use, will be repaired for a minimal labor and parts charge, unless directed by the customer to do otherwise. If it is determined that repair costs will exceed the cost of a new Model BD-80C, the customer will be so advised.

1.5.6 Parts for discontinued models will be made available wherever possible for a minimum period of five years from the date of discontinuance. Retrofit kit will be made available wherever possible in the event an original component is no longer available.

SECTION 2 - INSTALLATION

2.1.1 It is recommended that the Model BD-80C be mounted vertically, with the electrode attached to the bottom of the unit, as this generally simplifies the handling of the material to be treated. Mounting tabs are attached to the chassis for mounting. See Figures 1.1 or 1.2 for dimensions.

2.1.2 Horizontal or inverted vertical mounting is possible. Be sure not to block ventilation holes. A right angle duct, SKU 18501-91 must be used to properly direct air flow from the Model BD-80C to the Catalytic Reactor. Consult the factory for information for these installations.

2.13 Locate the Model BD-80C within 6 ft. of a 115 V power source. Provide a separate power circuit to prevent the possibility of electrical interference with other equipment connected to the same circuit.

2.1.4 With the High Voltage and Motor Switches in their OFF positions, insert the power line cord into its matching three wire power line receptacle. This provides power properly polarized and grounded. Operation in any other way will result in a potential shock hazard and may affect the performance of the instrument. Never use a two-prong plug adapter.

2.1.5 With vertical mounting, the piece to be treated is passed beneath the electrode at a speed and distance from the electrode which is determined by the amount of treatment required. See Section 3 - Operation for information to determine the proper electrode to piece distance and treatment time.

2.1.6 The electrode is installed into the receptacle at the base of the unit. Push firmly into the receptacle. Make certain that there are no exposed conducting surfaces within 3 in. of the electrode.

CAUTION

Prior to applying power, remove the left panel and observe that the electrode wheel assembly is turning freely. Jarring during shipment could cause this assembly to shift slightly. Readjust position if required.

SECTION 3 - OPERATION

3.1 Operating Considerations

3.1.1 The surface of polymers is modified by corona treatment at a characteristic rate which varies from material to material. Furthermore, the degree of treatment or extent of surface modification required, will depend on the particular application.

3.1.2 The guidelines below are given to help determine the optimal conditions for a particular application, as the surface effect produced by corona treatment depends upon the following:

- treatment time, see Section 3.1.3
- power level, see Section 3.1.4
- distance between electrode / surface to be treated, see Section 3.1.5
- electrode size and shape, see Section 3.1.6
- area being treated, see Section 3.1.7
- material being treated, see Section 3.1.8
- decay of surface energy with time, see Section 3.1.9
- use of ground plane, see Section 3.1.10

3.1.3 **Treatment Time.** The most important variable in nearly all applications is treatment time. Treatment effect, measured by an increase in surface energy, is approximately an exponential function of time as indicated in Figure 3.1. As shown, most of the treatment effect occurs quickly. The characteristic time, t*, is determined by electrode size, power, etc. of the Model BD-80C.

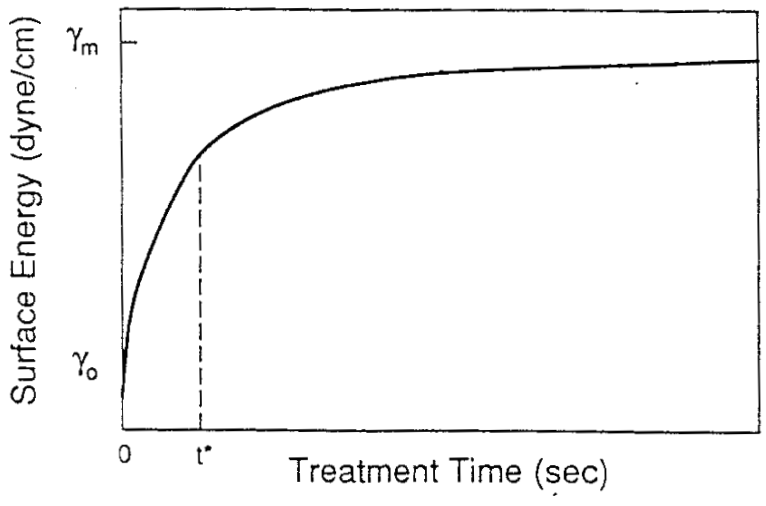


Figure 3.1 Surface Energy vs. Treatment Time

3.1.4 **Power** is adjusted by the autotransformer of the Model BD-80 from the large front-panel knob, and is indicated (in arbitrary units) by the meter on the control panel. The product of power and time is effectively constant for any application. In other words, reducing the power in half will double the time required to obtain the same treatment, when all other parameters are held constant.

3.1.5 **Distance between electrode and surface** to be treated can be varied. Normally the most efficient treatment is obtained at distances between 1/8 in. (3 mm) and ¼ in. (6 mm). Treatment can still be obtained at distances as great as 2 in. (50 mm), though treatment times become longer.

3.1.5.1 For example, the treatment done in 0.25 seconds at ½ in. (12 mm) may take 15 seconds to do the same treatment at a distance of 1½ in. (38 mm). A qualitative feel for the distance over which the corona is effective can be obtained by visual inspection of the purple corona. This is best done in a darkened room.

3.1.5.2 A metallic conductor within about 2 in. (50 mm) of the electrode (a floating ground plate) will pull the corona in the direction of the plate. This may permit more efficient treatment at larger distances from the electrode, but the treated area is somewhat smaller. The conductor may be quite thin (e.g., copper clad printed circuit board material, standard aluminum foil), but it must be covered with a dielectric to prevent arcing from the electrode.

3.1.6 **Electrode Size and Shape.** A variety of electrode shapes and sizes are available to optimize the performance of the Model BD-80 in most applications.

3.1.6.1 Maximum useful power setting increases with the size of the electrode. Small electrodes project the corona farther than large electrodes. The geometry of the electrode is an important factor in selecting an electrode for the application. The larger the electrode, the larger the effective area to be treated.

3.1.6.2 Circular electrodes are available in diameters from ½ to 12 in. These are used primarily to treat flat surfaces. The diameter of the electrode may be about 1 in. less than the maximum width of the surface to be treated. See Section 4.3.1 for a list of available electrodes.

3.1.6.3 Field-Effect Electrodes, either fixed or adjustable width, are also available. They are used to treat thick or irregular-shaped surfaces. These patented electrodes can project the corona up to 2 in. See Section 4.3.2 for a list of available electrodes.

3.1.6.4 A Wire Treating Electrode is available to treat the surface of insulated wire, dielectric filaments, and other similar objects.

3.1.6.5 A Power Module is available to treat both sides of a surface simultaneously. One electrode is inserted into the Model BD-80, and a separate electrode is inserted into the Power Module. The coil of the Power Module picks up the power inductively from the field generated by the Model BD-80, and directs the corona from its electrode.

3.1.6.6 Electro-Technic is available to assist customers by developing new electrodes or adapting existing electrodes for particular applications.

3.1.7 **Treated Area** is determined by several factors, including the electrode size and shape, power and time. A larger electrode will treat a larger area, but the effect at any one point will take longer to occur.

3.1.7.1 The function: [(time x power)/area] is an effective constant. So doubling the treated area (by using an electrode which is twice the size) will require twice the time to achieve the same treatment level if the power setting is unchanged.

3.1.8 **Material Treated**. See Figure 3.1. The untreated surface energy (x_o) and the maximum surface energy obtained by corona treatment (x_m) depend on the material. The amount by which the surface energy is to be increased must be established for each application.

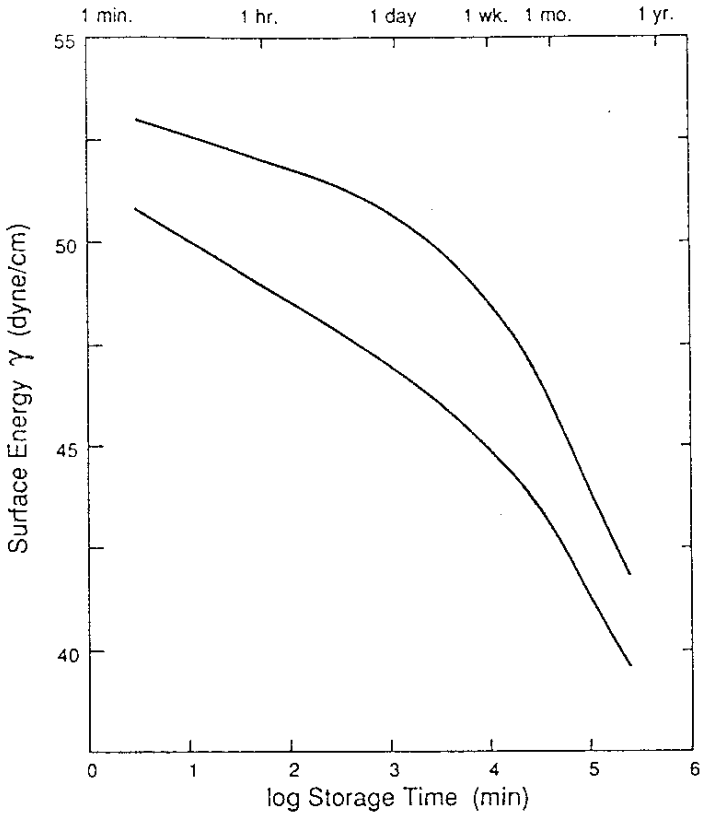


Figure 3.2 Surface Energy vs. Treatment Time

3.1.10 **Use of Ground Plane**. See Figure 3.3. It shows the surface energy vs. time in seconds with a single electrode (no ground plane), and with a metal plate underneath the surface to be treated. The ground plane helps to direct more of the corona to the surface, but does cause a slight reduction in the treated area.

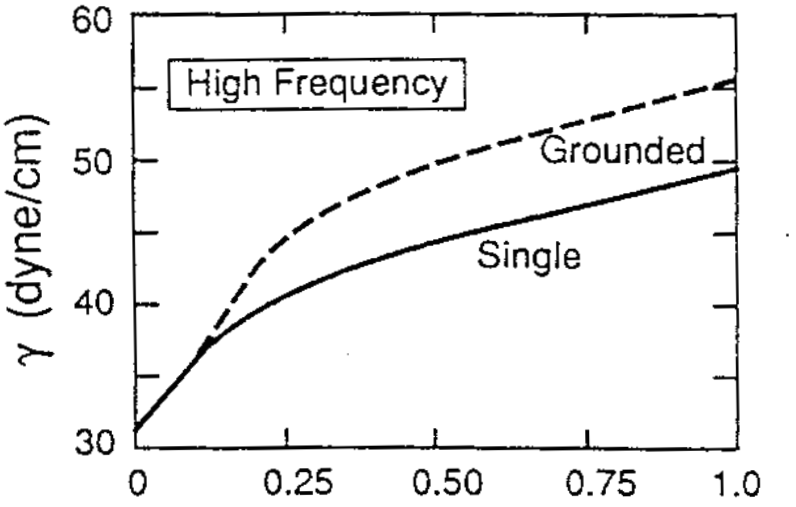


Figure 3.3 Surface Energy vs. Treatment Time

3.2 Operating Controls

Figure 3.2
Front Panel Controls

3.2.1 An Output Meter is located above the Power Control Knob. It indicates the relative power available to the treating electrode.

3.2.2 Motor ON/OFF Switch. Located on the lower right side of the front panel. Placing in the ON position energizes a motor which turns the internal Electrode Wheel Assembly.

3.2.2.1 A Pilot Lamp marked "Motor" indicates when power is applied to the motor.

3.2.3 High Voltage ON/OFF Switch. Located on the center, right of the front panel. Placing in the ON position when the Motor Switch is also on the ON Position energizes the circuitry to deliver the high frequency, high voltage to the electrode.

3.2.3.1 A Pilot Lamp marked "High Voltage" indicates when power is applied to the high voltage circuitry.

3.2.4 Power Control Knob. Located on the upper right side of the front panel. Clockwise rotation increases voltage. Graduations around knob permit reestablishing the same setting.

3.2.5 The front panel also contains a Fuse for the High Voltage circuitry and a Circuit Breaker for the Motor circuitry.

3.3 Calibration

3.3.1 The Model BD-80 is factory calibrated. Under normal use it requires no user calibration. If an internal electrode should require replacement, or if the output becomes inconsistent, particularly at low power settings, the internal electrode gap may require resetting. Refer to Section 4 - Maintenance for details.

3.4 Operation

3.4.1 Once the Model BD-80 has been installed and the proper electrode inserted into the electrode socket, and power connected to the unit, turn the Motor Switch to the ON position. If a Catalytic Reactor is attached to the unit, either factory installed, or properly installed by the end user, power is applied to its fan when the Motor Switch is turned ON.

3.4.2 When the Pilot Lamp indicates power being applied to the motor, turn the High Voltage Switch to the ON position and adjust the Power Control Knob to its proper position.

3.4.3 Do not increase power beyond the setting at which irregular discharges ("flames") come off the electrode.

CAUTION

If the High Voltage is at or near its maximum setting, make certain that there are no conductors within 3 in. nearby which will draw an arc from the Model BD-80C electrode. A lower setting will permit the location of conductors proportionately closer to the electrode.

If arcing is observed, turn off the High Voltage Switch immediately. Continued operation will permanently damage the circuitry. Furthermore, arcing extinguishes the corona, preventing surface treatment from being achieved.

3.4.4 As with any surface treatment procedure, it is important that the surface to be treated be clean and dry. The surface treatment is not permanent; it decays with time to some limiting value (generally different from the untreated state) at a rate which depends on the particular material and storage conditions.

3.4.5 Corona treated surfaces are not mechanically durable, so the treated surface should be disturbed as little as possible after treatment.

3.5 Hazards

3.5.1 The Model BD-80c is designed to give reliable and safe performance. However, any corona generator produces high voltages and chemically reactive species, so suitable precautions should be taken.

3.5.2 High Voltages. High voltages are present at the electrode and within various parts of the Model BD-80C cabinet. Take standard precautions when working near the electrode. Never operate the Model BD-80C without all cabinet sides secured in place. Only trained personnel should attempt to service the unit.

3.5.3 Ozone. Ozone and other reactive species are present in the corona. Each Model BD-80C is equipped with a Catalytic Reactor to remove the small amount of ozone generated during the operation of the Model BD-80C. is available for ozone Users should check with plant safety officers and/or OSHA personnel for protective measures.

3.5.3.1 Ozone has deleterious effects on certain materials, especially natural rubber and similar elastomers. Only ozone-resistant materials should be used around the Model BD-80 installation.

3.5.3.2 Other reactive compounds may be formed by the corona, depending on the type of impurities present in a particular workplace. As an example, some chlorine-containing airborne contaminants are activated by the corona and cause accelerated corrosion of ferrous and cupric components of the Model BD-80, and other equipment in the area. Users should be aware of such possible problems.

3.5.4 Only factory approved electrodes should be used. No other electrodes should be used with this device. Never operate without an electrode.

3.5.5 Never touch or come in contact with the high voltage output of this device, nor with any device it is energizing.

3.5.6 Since its output is either 2 or 4 MHz, it radiates its energy for a short distance. It may interfere with sensitive electronic devices nearby. If a user is wearing a pace maker or similar device, their physician should be contacted prior to using this device. The same should be said for women who are pregnant.

SECTION 4 - MAINTENANCE

4.1 General

4.1.1 The Model BD-80 is designed for tens of thousands of hours of operation under normal conditions. To insure maximum performance, it is recommended that the unit be inspected at regular intervals.

4.1.2 Inspection after every 500 to 1000 hours of use is proposed as a guideline; optimum inspection frequency will depend on many factors associated with the use and environment of the Model BD-80.

4.1.3 Follow these procedures during periodic inspection:

4.1.3.1 Remove the line cord from its power source.

4.1.3.2 Remove the blank portion (the side without switches and controls, etc.) of the cabinet panel which comprises one side and part of the front of the unit.

CAUTION

High voltages may be present within the cabinet of the Model BD-80 even after the power source is disconnected due to capacitor charging. Before touching any parts within the cabinet, discharge all of the supply capacitors located on the back panel of the cabinet. Discharging can be done by carefully shorting the two terminals of any one capacitor with a conductor, such as by the blade of a screwdriver with an insulated handle.

4.1.3.3 Inspect for buildup of dirt, dust, lint, etc. If such is found, remove by carefully dusting or by physical manipulation. Do not use liquids or solvents without first consulting the factory.

4.1.3.4 Inspect the internal electrode system for satisfactory appearance. The moving electrodes on the Electrode Wheel Assembly should be of uniform size, not bent or broken, and have proper clearances from the stationary electrodes. Refer to Section 4.2 Electrode Adjustment. Bent, broken, or excessively corroded electrodes should be replaced. Some corrosion of the moving and stationary electrodes can be expected with normal spark gap operation.

4.1.3.5 Inspect the rest of the cabinet interior for evidence of corrosion on parts other than the electrode.

CAUTION

If it is desired to operate the unit without the cabinet panel in place in order to observe operation of the spark gap, etc., be advised that high speed rotating equipment is activated. Wear adequate eye protection and keep tools or parts of the body well away from the spinning Electrode Wheel Assembly. While no mechanical failure of the this part has been reported, it is strongly recommended that a mirror be used to view indirectly the interior of the cabinet under these circumstances.

4.1.3.6 Replace the cabinet panel and reconnect the power cord.

4.2 Internal Electrode Adjustment

4.2.1 The gaps between the two stationary spark gap contacts (stationary electrodes) and the spokes on the Electrode Wheel Assembly should be between 1/32 in. and 1/16 in. These gaps should be large enough to insure that the moving electrodes do not contact the stationary electrodes during startup or running.

4.2.2 Treating performance at low power is adversely affected if the gaps are set too large.

4.2.3 Following these procedures when making electrode adjustments:

4.2.3.1 Remove the power line cord from its power source. Remove the left (blank) cabinet panel. See Sections 4.1.3.1 and 4.1.3.2, and the Caution regarding the discharging of capacitors within the cabinet.

4.2.3.2 Inspect the Electrode Wheel Assembly for defective moving electrodes. Vertical run-out, or “wobble”, should be less than 1/32 in. If the wheel assembly is defective, individual moving electrodes, or the entire Electrode Wheel Assembly itself, should be replaced. See Section 5.3 Internal Electrode Replacement.

4.2.3.3 The vertical Stationary Electrode, labeled "B" in Figure 4.1 below, is threaded into a plastic stud, which has been glued onto the plastic bracket "L". Check that the motor, "L" bracket and aluminum angle bracket are all fastened tightly. Turn the electrode and locknut with caution so as not to shear the plastic stud.

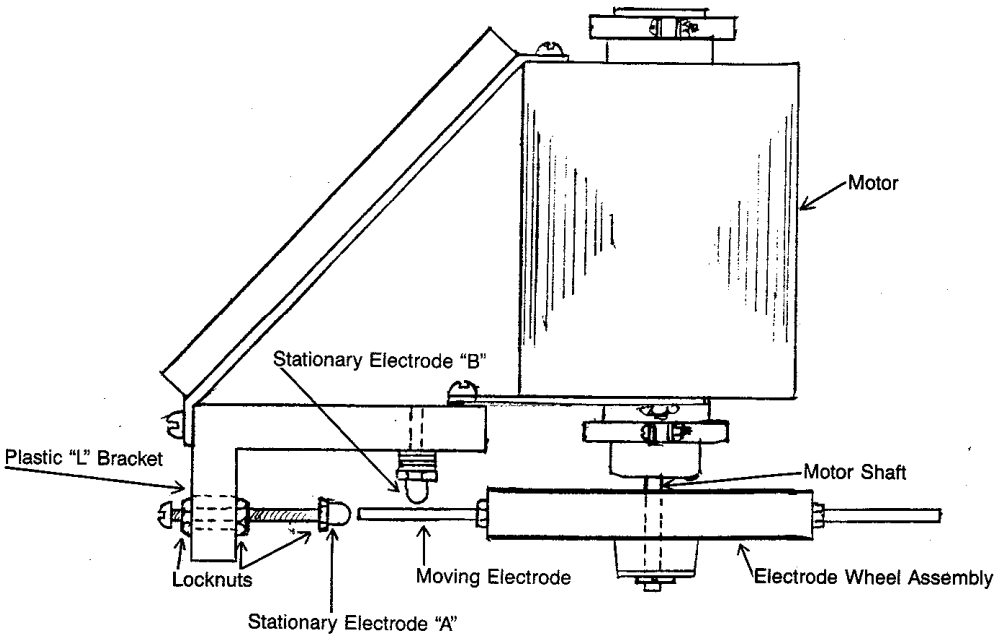
4.2.3.4 Adjust the vertical gap between electrode "B" and the spokes of the Electrode Wheel Assembly to between 1/32 in. and 1/16 in. Then tighten the electrode locknut. Turn the Electrode Wheel Assembly by hand to check for the proper gap, and then test run the motor to assure that no contact is made during operation. Read the Caution in Section 5.1.3.5 before test running the motor.

4.2.3.5 The horizontal Stationary Electrode labeled "A" in Figure 4.1 below, should be aligned with the spokes of the Electrode Wheel Assembly, and the horizontal gap between electrode "A" and the ends of the spoke electrodes should be between 1/32 and 1/16 in.

4.2.3.6 The stationary and moving electrodes must not touch one another. Vertical alignment of the Stationary Electrode "A" is accomplished with the two locking nuts which secure the mounting screw in the slot of the plastic bracket labeled "L" in Figure 4.1 below. Loosen the locknut at the "L" bracket. Adjust the electrode so it is in alignment with the Moving Electrode. Then adjust the gap between electrodes by turning the electrode on the stud; make certain the copper conducting strap is secured against the electrode by the third locknut. As in Section 4.2.3.4, final check by hand turning and the test running the motor.

4.2.3.7 Make a final check to make certain the clearances are correct, and that the locknuts are tight. Replace the cabinet panel and reconnect power.

4.1 Internal Electrode Replacement



4.3.1 Excessively corroded internal electrodes, or those which have been damaged mechanically must be replaced.

4.3.2 Follow these procedures when replacing electrodes:

4.3.2.1 Remove the power line cord from its power source. Remove the left (blank) cabinet panel. See Sections 4.1.3.1 and 4.1.3.2, and the Caution regarding the discharging of capacitors within the cabinet.

4.3.2.2 The horizontal Stationary Electrode, labeled "A" in Figure 4.1 above, is threaded onto mounting screw. Loosen the locknut securing the electrode tip and conducting strap, and unscrew the electrode tip to remove it. Replace with a new electrode tip, setting the gap between 1/32 in. and 1/16 in., as described in Sections 4.2.3.5 and 4.2.3.6.

4.3.2.3 The vertical Stationary Electrode, labeled "B" in Figure 4.1 above, is removed by unscrewing from the plastic stud. First remove the other end of the conducting strap from the capacitor on the back of the cabinet; this prevents the twisted strap from distorting the stud. Install the new electrode tip, set the gap between 1/32 and 1/16 in., tighten the locknut, and attach the conductor to the capacitor.

4.3.2.4 Moving electrodes are threaded into the wheel of the Electrode Wheel Assembly. Removal can be done with a suitable end wrench or hollow shaft nut runner when the Electrode Wheel Assembly remains in the cabinet. Alternatively, the entire motor and electrode assembly can be removed, and then the electrodes removed. See Section 5.4 Motor/Electrode Assembly Removal.

4.3.2.5 Screw in replacement Moving Electrodes and tighten firmly.

4.3.2.6 Reinstall the Motor/Electrode Wheel Assembly into the unit if it had been removed. Reinstall the cabinet panel and reconnect power to the Model BD-80C.

4.4 Motor/Electrode Wheel Assembly Removal

4.4.1 It may become necessary to remove the Motor/Electrode Wheel Assembly to replace the Moving Electrodes, or to make other repairs to the assembly, or other parts which would be inaccessible without removing this assembly.

4.4.2 Follow these procedures to remove the Motor/Electrode Wheel Assembly:

4.4.2.1 Remove the power line cord from its power source. Remove the left (blank) cabinet panel. See Sections 4.1.3.1 and 4.1.3.2, and the Caution regarding the discharging of capacitors within the cabinet.

4.4.2.2 Remove the two copper conductor straps from the capacitors. Make certain to label them, so that they can be reconnected properly later to the correct terminals.

4.4.2.3 Disconnect the four (4) wires which enter the motor housing by unscrewing the wire nuts. Again, make certain to label the wires for correct reassembly later.

4.4.2.4 Remove the clamps from the top and bottom flexible motor mounts. The Motor/Electrode assembly can then be removed from the cabinet.

4.4.2.5 Remove the retaining ring and washer on the bottom of the motor shaft, and remove the Electrode Wheel Assembly.

4.4.2.6 When reassembling the Electrode Wheel Assembly, make certain the hub is pointing away from the motor.

4.4.2.7 Reassemble by reversing the disassembly steps. Make certain that the motor wires and copper conducting straps are reconnected properly. Reattach the front panel to the cabinet.

SECTION 5 - PARTS LIST

5.1 The major parts and subassemblies are listed for the Model BD-80C. Common hardware is not listed. A Parts Price List is available upon request.

Product No.	Description
010-0018-3	Transformer, Variable Control
010-0019-3	Transformer, High Voltage, 30 mA, 16 kV
010-0075-4	Transformer, 55 mA, 8 kV (2 Required)
010-5000-3	Motor, Synchronous, 1/3 hp
020-2000-3	Resistor, 2500 ohm, Porcelain Mount
021-0035-3	Capacitor, Motor Start
021-0045-3	Capacitor, 500 pF, 10 kVDC
025-1000-3	PC Board Assembly, Meter, 0-100 mA
027-0016-3	Meter, 0-100 mA
027-0030-3	Relay, Motor
028-0002-1	Pilot Light
029-0002-1	Fuse Holder
029-0006-3	Switch, Motor, Toggle, DPST
029-0011-3	Switch, Toggle, SPST, BD-80
029-0025-3	Fuse, 5 A, 3 AG
029-0056-3	Circuit Breaker, 15 A
030-0023-3	Connector Strap, Capacitor

036-0003-3	Resonator Cover Assembly, Fiber Glass
043-0101-3	Cover, Plastic, for Catalytic Reactor
045-0003-1	Treating Electrode Socket
049-0005-3	Knob, Variable Transformer
050-0047-3	Moving Spark Gap Electrode
050-0062-3	Stationary Spark Gap Contact
059-0017-3	Capacitor/Resistor Assembly
060-0016-3	Line Cord, 3 Wire, 115 V, Type SJ
080-1508-3	Resonator Assembly, High Voltage
080-1512-3	Primary Coil, Resonator
083-1217-3	Electrode Wheel Assembly
083-1218-3	Stationary Electrode and L-Bracket Holder

SECTION 6 – CIRCUIT DIAGRAMS

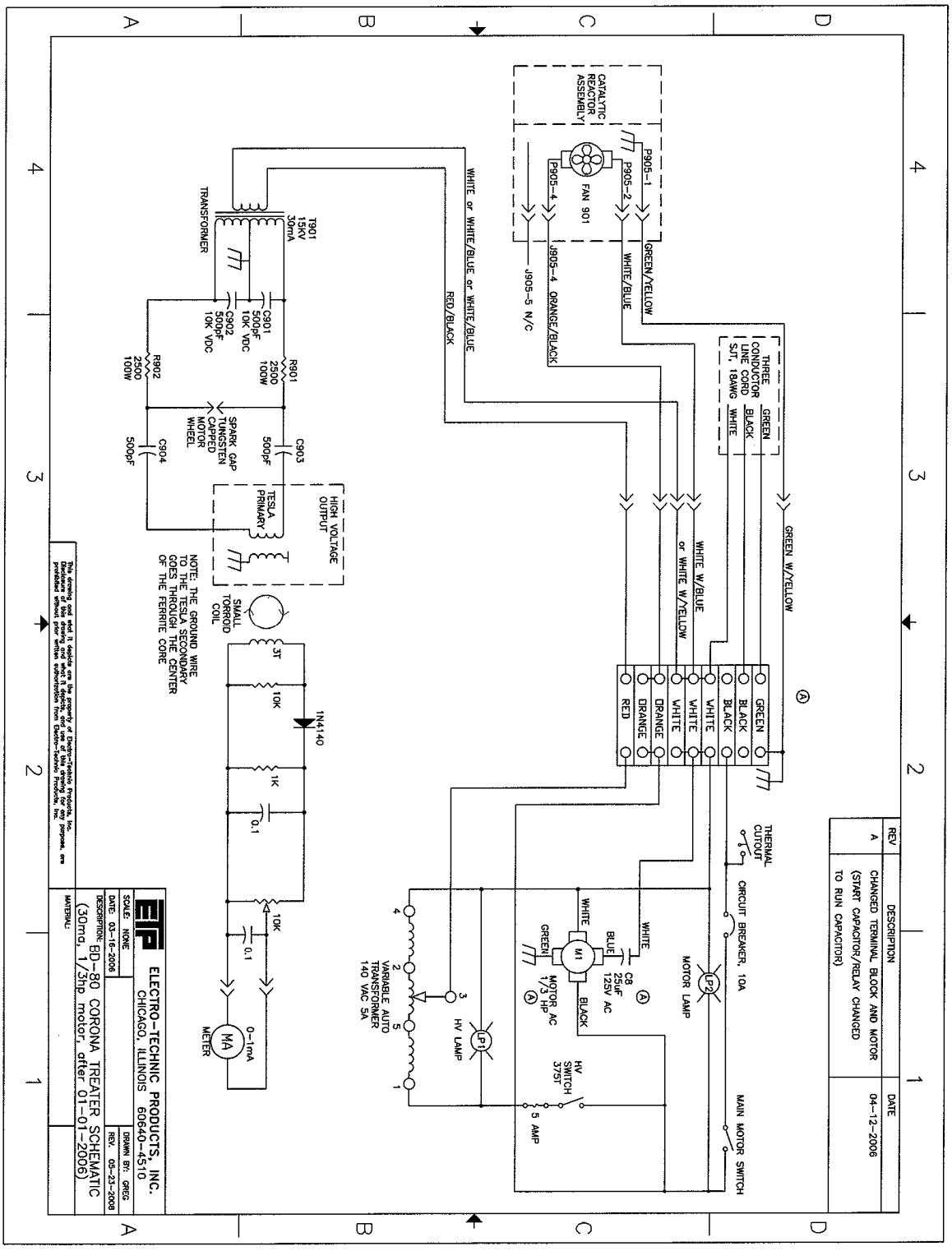


Figure 6.1 Component Schematic Drawing, 30 mA

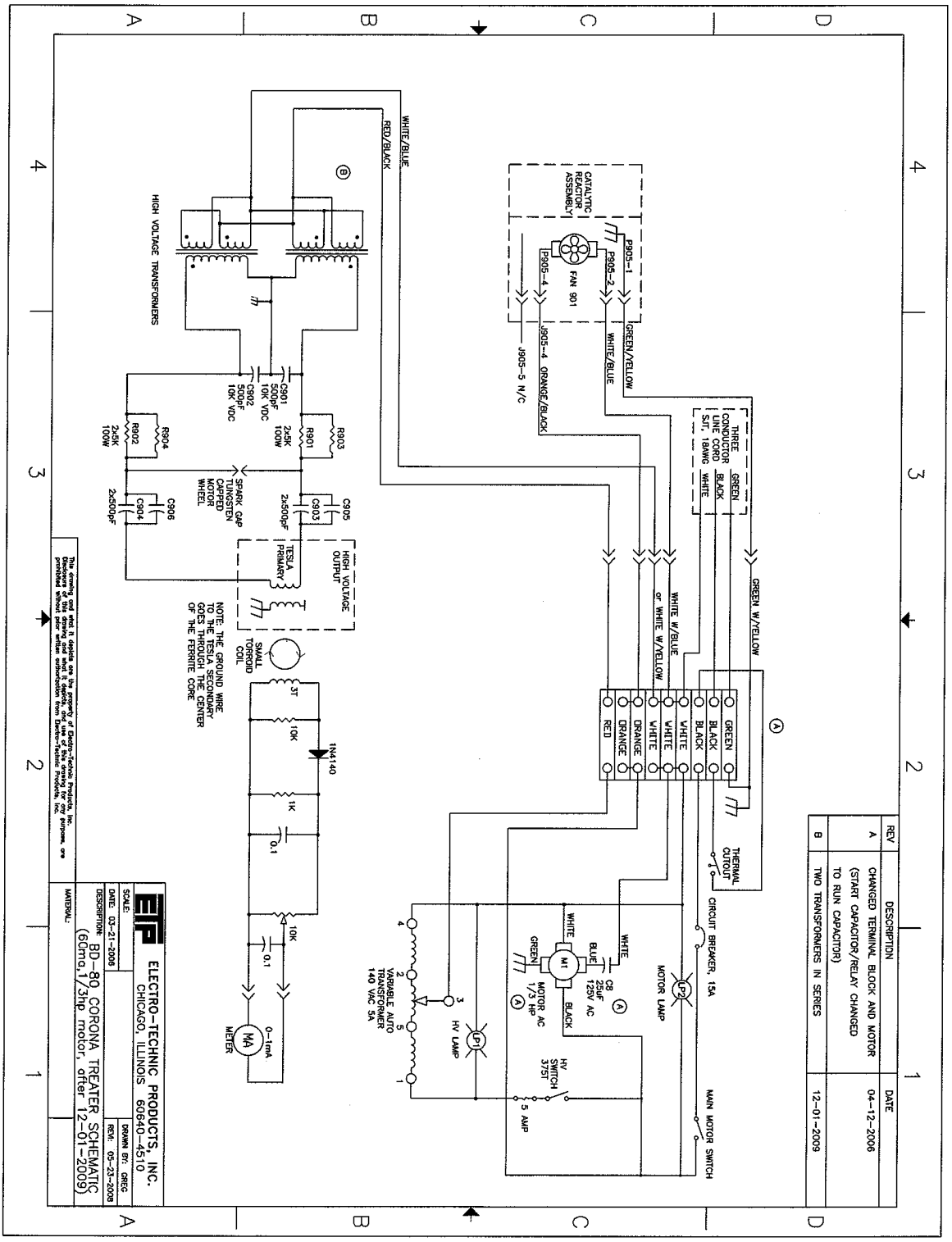


Figure 6.2 Component Schematic Drawing, 58 mA