

# HVOLT10 100KV LABORATORY ION SOURCE

SUPPLEMENTARY OPERATING INSTRUCTIONS AT END OF PACKAGE

100KV Positive COPYRIGHTED 4/89 REV 07/20 100KV Negative



THIS PRODUCT IS INTENDED FOR LAB, R&D, SCIENCE FAIR, HOBBYIST OR ANY APPLICATION INVOLVING THE TRANSFER OF ELECTRICAL CHARGE, ION MOBILITY, STATIC ELECTRICITY, ION PROPULSION, CORONA, KIRLIAN ETC.

Information Unlimited, PO Box 716, Amherst, NH 03031-0716

Your – HVOLT10 UNIT demonstrates an interesting phenomenon involving the mobility of charged particles. It is capable of producing the following effects:

INDUCING ELECTRICAL SHOCKS IN OTHER PEOPLE  
CAUSING LAMPS TO FLICKER AND IGNITE WITHOUT CONTACT  
ABILITY TO CAUSE PAPER TO STICK TO SURFACE, PLAYING CARDS, ETC..  
CAUSING MOTION OF OBJECTS/ION MOTORS  
CHARGING OF OBJECTS TO HIGH POTENTIAL WITHOUT CONTACT  
STATIC ELECTRICITY EXPERIMENTS  
KIRLIAN PHOTOGRAPHY, OZONE PRODUCTION  
STRANGE AND BIZARRE EFFECTS ON CERTAIN MATERIALS  
EFFECTS ON PAINTED AND INSULATED SURFACES - REQUIRES DARKNESS  
EFFECT ON VAPORS, STEAM, LIQUIDS, ETC..  
VISUAL DISCHARGE OF PLASMA FORCE, CORONA, ETC..  
EFFECT ON ELECTRONICS EQUIPMENT, TV, COMPUTERS \*ETC.

#### **PLEASE READ CAUTION STATEMENT**

It accomplishes much of the above without any direct connections other than the traveling of ions through air. In order to demonstrate this effect, it is necessary to produce voltages of magnitudes that may be at a hazardous shock potential but at relatively small amperage. Even though the device is operated at low input voltage it must be treated with caution. Use discretion when using it as it is possible for a person wearing insulated shoes to accumulate enough of a charge to produce a moderately painful or irritating shock when he touches a grounded object. The effect could cause injury to a person in weak physical condition (note warnings). Effects depend on many parameters including humidity, leakage amounts and types of objects, proximity etc.

The device is shown constructed in two ways. When the output is terminated into a smooth large surfaced collector it becomes a useful high potential source capable of powering particle accelerators and other related devices. It may be built as a producer of negative or positive ions demonstrating a phenomenon that is often regarded as a figure of demerit when building and designing high voltage power supplies. The device is now terminated into a sharp point where leakage of positive or negative ions can occur. This will result in corona and the formation of nitric acid via the production of the ozone produced combining with nitrogen and forming nitrous oxide that with water produces this very strong acid. The production of ions also robs the available current from the supply.

It is well known that high voltage generators usually consist of large smooth surface collectors where leakage is minimized allowing these collective terminals to accumulate high voltages with less current demand. Leakage of a high voltage point is the result of the repulsion of like charges to the extent that these charges are forced out into the air as ions. The rate of ions produced is a result of the charge density at a certain point. The magnitude of this quantity is a function of voltage and the reciprocal of the angle of projection of the surface. Note experiments in application section. This is why lightning rods are sharply pointed causing the charges to leak off into the air before a voltage can be developed to create the lightning bolt.

It is now evident that to create ions it is necessary to have a high voltage applied to an object such as a needle or other sharp device used as an emitter. Once the ions leave the emitter they possess a certain mobility allowing them to travel moderate distance contacting and charging up other objects by accumulation and collision.

## NEGATIVE ION INFORMATION

In the last two decades a medical controversy has evolved pertaining to the beneficial effects of these minute electrical particles. As with any device that appears to affect people in a

beneficial sense there are those who sensationalize and exaggerate these claims as a cure for all ailments and ills. Such people manufacture and market these devices under false pretenses and consequently give the products a diverse name. The Food and Drug Administration now steps in on these claims and the product along with any beneficial facets goes down the tubes.

The builder may wish to obtain the following articles: NEGATIVE ION AFFECT HEALTH - Oct 22, 1976; INT'L PRESS RELEASE: IONS - Oct 1960; ROTARIAN - Oct 1960; 1960 READERS DIGEST NEGATIVE IONS; POPULAR ELECTRONICS - sept 1961.

People are affected by negative ions from the property of these particles to increase the rate of activity by cilia thus enhancing (whose property is to keep the tracheas clean from foreign objects) oxygen intake and increasing the flow of mucous. This property neutralizes the effects of cigarette smoking that slows down this activity of the cilia. Hay fever and bronchial asthma victims are greatly relieved by these particles. Burns and surgery patients are relieved of pain and heal faster. Tiredness, lethargy and the general dragged out feeling are replaced by a sense of well being and renewed energy. Negative ions destroy bacteria and purify the air with a country air freshness. They cheer people up by decreasing the serotonin content of the blood. As can be seen in countless articles and technical writings, negative ions are a benefit to man and his environment.

Negative ions occur naturally from static electricity, certain winds, water falls) crashing surf, cosmic radiation, radioactivity and ultra violet radiation. Positive ions are also produced from some of the above phenomena and usually neutralize each other out as a natural statistical occurrence. However, many man-made objects and devices have a tendency to neutralize the negative ions, thus leaving an abundance of positive ions which create sluggishness and most of the opposite physiological effect of its negative counterpart.

One method of producing negative ions is obtaining a radio active source rich in Beta radiations (electronics neg) Alpha and gamma emission from this source produces positive ions that are neutralized electrically. The resulting negative ions are electrostatically directed to the output exit of the device and further dispersed by the action of a fan (this method is recently come under attack by the Bureau of Radiological Health and Welfare) for the use of tritium or other radio active salts. This approach appears to be the more hazardous of the two according to the product consumer safety people.

A more accepted method is to place a small tuft of stainless steel wool as the ION EMITTER at the output terminal of a negative HV DC power supply. The hair like property of the stainless steel wool allows ions to be produced at relatively low voltage yet reducing ozone output. Ions are produced by leakage of the particles charging air molecules in the immediate vicinity of the steel wool emitter. The unit should be operated below 15KV as over voltage can produce substantial amounts of ozone that can mask the beneficial effect of the increased ions obtained, A suitable and effective ion detector #10D1 capable of indicating relative amounts of ion flux and a high flux negative ion generator #NIG9 are described in our catalog.

## CIRCUIT DESCRIPTION

The circuit consists of high a frequency, high voltage oscillator being fed into a multistage Cockcroft Walton multiplier. This energy is converted to a potential of 25 to 100 thousand volts.

The high frequency stage consists of transistor Q1 connected as a simple oscillator where its collector drives the primary winding [PRI] of transformer [T 1]. Feedback is obtained via a second winding [FB] and fed to the base of Q1 thru current limiting resistor R3. Resistor

R1 biases Q1 into conduction and initiates oscillation.

Capacitor C2 speeds up the "turn off" time of Q1 while R2 and C3 provide a filter to prevent oscillation at the resonant frequency of T1.

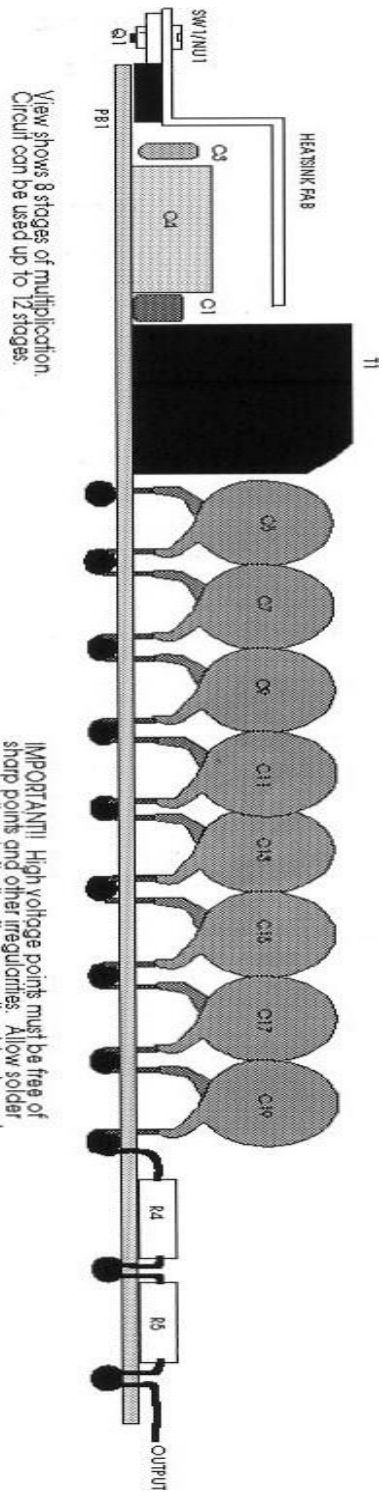
R6 is the dropping resistor for LED indicator lamp L1.

Power is controlled by switch S1. A 12VDC adapter connects to power input jack J1.

The high frequency output of T1 is fed into a voltage multiplier stage consisting of diode string D1 to Dn and capacitor string C5 to Cn. High voltage resistors R4 and R5 limits the potentially high peaks currents to a value for reducing potentially damaging transients.

Resistor R8 limits any high frequency currents from damaging the secondary of T1 .

## Assembly Board Side View Pictorial



View shows 8 stages of multiplication.  
Circuit can be used up to 12 stages.

**IMPORTANT!!** High voltage points must be free of sharp points and other irregularities. Allow solder connections to ball up in a smooth solder shopped globular sphere approximately 3/16 to 1/4" diameter.

EXTERNAL TRANSMISSION OF OUTPUT VOLTAGE WILL REQUIRE CONNECTING AT LEAST A 40 KV WIRE AT THE OUTPUT POINT AND STRAIN RELIEVING VIA A KNOT WHEN ROUTING THRU CAP1. THIS CONNECTION MUST BE MADE INTERNALLY TO AVOID POWER ROBBING/CORONA AND LEAKAGE.

## WIRE LEAD OUTPUT



USE 40 KV OR  
OUTPUT LEAD.  
CONNECT TO R5  
AND KNOT FOR  
STRAIN RELIEF  
NOTE THAT  
CONNECTION TO  
HIGH VOLTAGE  
OUTPUT MUST BE  
MADE INSIDE OF  
ENCLOSURE TO  
MINIMIZE CORONA  
AND LEAKAGE LOSS.

## TERMINAL OUTPUT



# CAUTION

PLEASE READ ALL  
INSTRUCTIONS  
BEFORE OPERATING

## HVOLT SERIES HV DC SUPPLIES

★ **DO NOT OPERATE NEAR PACE MAKER**

- ★ ALWAYS DISCHARGE OUTPUT AS SYSTEM CAN HOLD A SIGNIFICANT CHARGE
- ★ DO NOT OPERATE IN EXPLOSIVE ATMOSPHERE
- ★ REMOVE POWER PLUG BEFORE DISASSEMBLING
- ★ ALWAYS STAND ON A DRY WOODEN FLOOR WHEN USING
- ★ GREEN WIRE MUST BE EARTH GROUNDED OR CONNECTED TO AC SOCKET PLATE
- ★ DO NOT OPERATE NEAR COMPUTERS OR SENSITIVE EQUIPMENT
- ★ AVOID DIRECT EYE EXPOSURE TO DISCHARGE
- ★ DO NOT OPERATE WITHOUT MULTIPLIER PROPERLY CONNECTED

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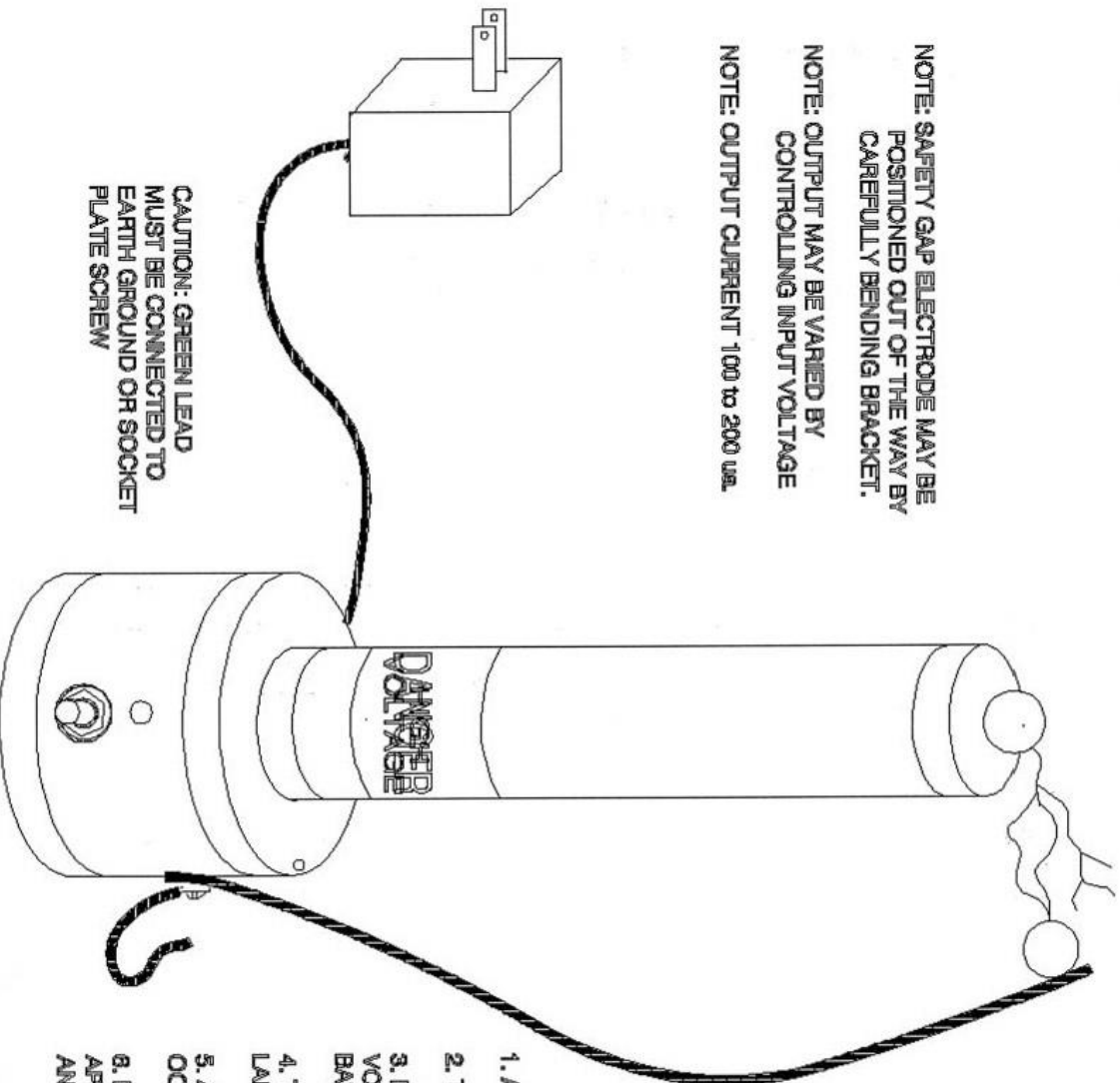
# HVOLT100 25 to 100KV DC GENERATOR INSTRUCTIONS

MODEL 100

**NOTE: SAFETY GAP ELECTRODE MAY BE POSITIONED OUT OF THE WAY BY CAREFULLY BENDING BRACKET.**

**NOTE: OUTPUT MAY BE VARIED BY CONTROLLING INPUT VOLTAGE**

**NOTE: OUTPUT CURRENT 100 to 200 uA.**



1. ADJUST GAP 1-2"
2. TURN POWER SWITCH "OFF"
3. PLUG IN WALL ADAPTER-NOTE YOU MAY USE A 12 VOLT RECHARGABLE BATTERY FOR PORTABLE OPERATION
4. TURN POWER SWITCH "ON" AND NOTE INDICATOR LAMP LIGHTING.
5. A HEAVY SPARK DISCHARGE SHOULD BE OCCURRING BETWEEN GAP BALLS.
6. NOTE THE ENCLOSED DATA SHOWING MANY APPLICATIONS AND EXPERIMENTS. WE WELCOME ANY UNIQUE OR NEW IDEAS USING THESE DEVICES.

# HVM 1 HVOLT 1 IOG - APPLICATIONS & EXPERIMENT SECTION

This approach shows how to construct a basic high potential energy source that can be used in many applications. It is intended for the laboratory, experimenter, hobbyist, science fair enthusiast classroom demonstration and use for general research in this field.

The following is a list of devices and functions possible with the unit including necessary retrofits and support equipment required. In its basic form it provides the following functions:

**VARIABLE HIGH VOLTAGE DC SOURCE** - Capable of generating a variable source of high voltage DC for lab and experimental work. Voltage capability of 100,000 is possible with suitable stages of multiplication. See description and figures on experiments.

**OZONE GENERATOR SYSTEM** - For purification, staining deodorizing production of nitric acid, etc.

**HIGH FLUX ION GENERATOR/AIR PURIFIER** - Allows a high flux of positive or beneficial negative ions. Methods of detection also shown.

**ION MOTOR PROPULSION SYSTEM** - Excellent science fair project clearly demonstrates this space-age approach to ion propulsion system. Metal rotor spins at high rotational velocity utilizing the reactionary forces of emitted ions.

**PLASMA BLASTER DRILLER** - Demonstrates the brisance of an electrical discharge by blasting micro-sized holes through most insulative materials. Holes may be used for various optical experiments as well as providing an excellent demonstration of this phenomena. LIT2 -

**LIGHTNING GENERATOR** - Demonstrates and observe man made lighting discharges.

## OTHER EXPERIMENTS & DEMONSTRATIONS:

HI POT & DI-ELECTRIC TESTING

FORCE FIELD ANTI-GRAVITY

CAPACITOR CHARGING/ENERGY STORAGE SELF

ELECTRIFICATION

PARTICLE ACCELERATOR/ATOM SMASHING

KIRLIAN PHOTOGRAPHY

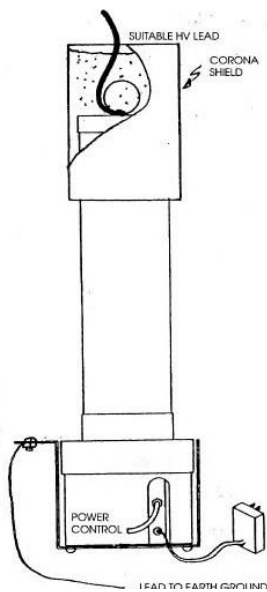
ION DETECTION

OZONE GENERATION /AIR PURIFICATION

HIGH POTENTIAL ELECTRICAL EXPERIMENTS



# 100 KV DC POWER SOURCE FOR LAB, RESEARCH AND SCIENCE PROJECT



MAKE CONNECTION TO OUTPUT TERMINAL SCREW. USE A SUITABLY RATED HIGH VOLTAGE WIRE.

FILL WITH WAX OR OTHER SUITABLE MATERIAL WITH GOOD DIELECTRIC STRENGTH

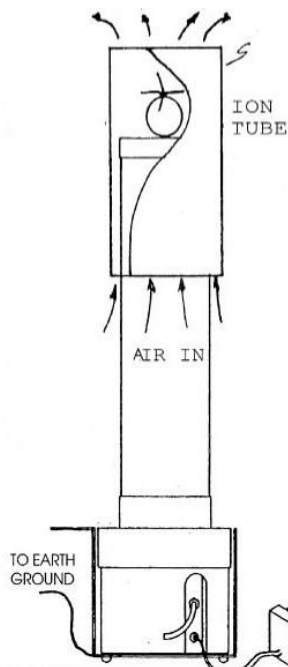
100KV DC LABORATORY SOURCE FOR R&D APPLICATIONS. OUTPUT MAY BE MADE VARIABLE BY POWERING DEVICE WITH AN ADJUSTABLE 12VDC POWER SUPPLY

1. FAB CORONA SHROUD FROM A PIECE OF SKED 40 PVC OR OTHER SIMILAR MATERIAL. SHOULD SLEEVE OVER MULTIPLIER TUBE.
2. VERIFY CONNECTION OF GROUND LEAD.
3. ALWAYS TURN POWER CONTROL TO MIN., OUTPUT BEFORE POWERING UP. SLOWLY ADJUST TO DESIRED LEVEL.
4. USE AN APPROPRIATE HIGH VOLTAGE CONTACT AND LEAD TO MAKE CONNECTION TO THE OUTPUT IF POWERING A REMOTE DEVICE.

## OZONE GENERATOR FOR LAB AND RESEARCH APPLICATIONS ERRADICATES STINKS AND SMELLS

MAY BE USED FOR DEODORIZING. USE CAUTION AS EXCESSIVE O<sub>3</sub> OUT

LEVELS MAY BE HAZARDOUS TO YOUR HEALTH. "IF IN DOUBT CHECK IT OUT".



NORMAL DIATOMIC OXYGEN (O<sub>2</sub>) IS CONVERTED TO OZONE (O<sub>3</sub>) BY THE HIGH VOLTAGE ELECTRIC FIELD BETWEEN THE ION EMITTER AND GROUNDED INNER METALLIC TAPE IN ION TUBE.

1. FAB ION TUBE AS SHOWN FROM A TIN CAN OR OTHER SUITABLE CONDUCTIVE TUBING THAT WILL FIT OVER UNIT WITH ABOUT 1/4" CLEARANCE.
2. PLACE A TUFT OR PREFERABLY STAINLESS STEEL WOOL ON THE OUTPUT TERMINAL. A PIECE OF METAL WINDOW SCREEN CAN BE USED. THIS IS THE ION EMITTER.
3. SECURE TUBE USING INGENUITY AND CONNECT TO SYSTEM GROUND.
4. APPLY POWER SLOWLY AND ADJUST CONTROL (IF YOU ARE USING AN ADJUSTABLE 12 VDC SUPPLY) JUST BEFORE POINT WHERE HV ARCING TAKES PLACE. IT MAY BE NECESSARY TO TRIM EMITTERS TO OBTAIN AN EVEN FIELD DISTRIBUTION. NOTE CLEAN AIR SMELL EMANATING FROM OPEN END OF ION TUBE. THIS IS OZONE. USE WITH GOOD VENTILATION.

HAZARDOUS TO YOUR HEALTH. "IF IN DOUBT

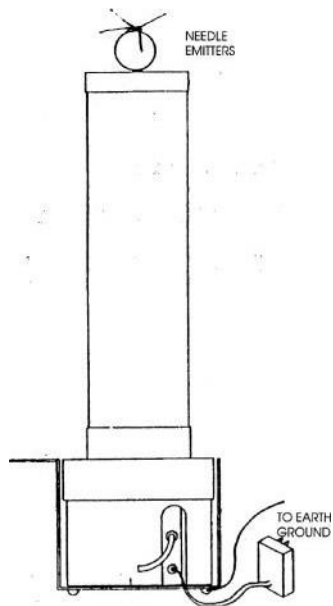
LEVELS MAY BE

# HIGH OUTPUT ION GENERATOR

## HIGH OUTPUT ION FLUX FOR LAB AND RESEARCH APPLICATIONS

A POSITIVE OR NEGATIVE ION GENERATOR FOR MANY EXPERIMENTS AND APPLICATIONS.

1. OBTAIN SEVERAL SMALL STAINLESS STEEL NEEDLES AND ATTACH TO OUTPUT TERMINAL AS SHOWN FOR ION EMITTERS.
2. SELECT REQUIRED POLARITY OF MULTIPLIER.
3. APPLY POWER SLOWLY TO OBTAIN DESIRED OUTPUT.
4. DETERMINE ION FLUX USING A NEON TUBE OR LAMP OR 10<sup>10</sup> ION DETECTOR.



# ION REACTION MOTOR

## HIGH SPEED ION REACTION MOTOR FOR SCIENCE FAIR AND EXPERIMENTATION

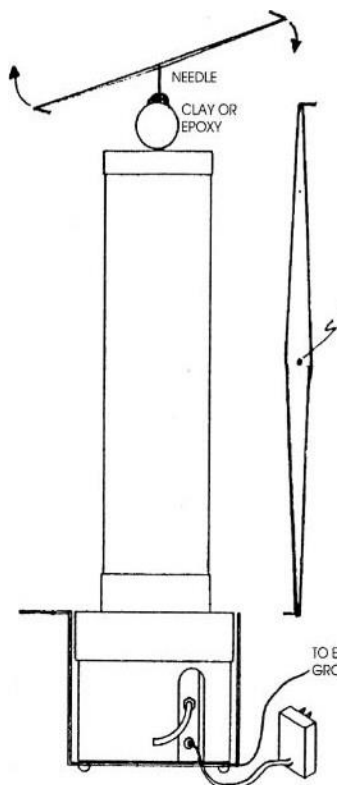
1. FAB ROTOR AS SHOWN FROM A THIN PIECE OF METAL. PIN PRICK A DIMPLE AS SHOWN TO FORM A BEARING RETAINING POINT AT EXACT CENTER.

2. SOLDER OR ATTACH NEEDLE EMITTERS AS SHOWN. USE STAINLESS STEEL PREFERABLY.

3. PLACE A WAD OF CLAY ON TOP OF OUTPUT TERMINAL. SECURE A NEEDLE'S SHAFT IN PLACE AS SHOWN.

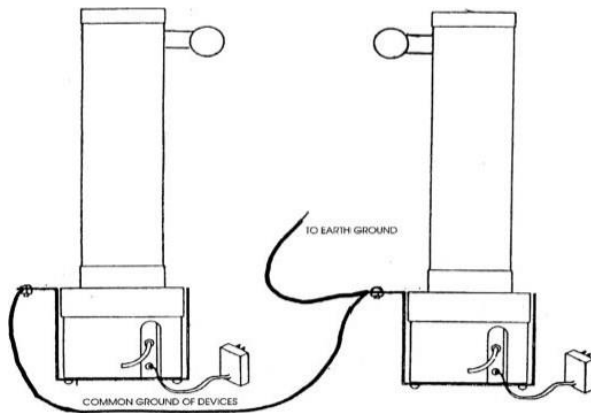
4. STATIC BALANCE ROTOR BY PLACING ON NEEDLE SHAFT. FILE OFF EXCESS MATERIAL TO OBTAIN A NEAR PERFECT BALANCE AS POSSIBLE FOR HIGH SPEED OPERATION.

5. APPLY POWER AND ADJUST FOR DESIRED ROTOR SPEED. ATTEMPT TO DISCHARGE ROTATION ROTOR WITH A GROUNDED LEAD AND NOTE MOTION FREEZING FROM LIGHT EMISSION OF SPARK DISCHARGE. PROPULSION OF ROTOR IS A RESULT OF HIGH CHARGE TO EARTH CONCENTRATION OCCURRING AT NEEDLE POINTS. IONS ARE NOW EMITTED DUE TO CHARGE REPULSION PRODUCING A REACTIVE FORCE.



CAUTION!! A WELL BALANCED ROTOR CAN ACHIEVE HI ROTATIONAL VELOCITIES BEFORE FLYING OFF OF NEEDLE SHAFT.

## LIGHTNING GENERATOR 1 DIELECTRIC TESTING

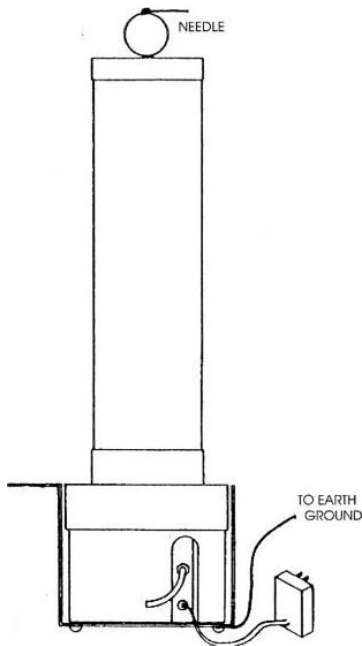


THE VOLTAGE PRODUCED BY THIS SYSTEM MAY PRODUCE X-RAYS WHEN EXPOSED TO CERTAIN CHEMICAL ELEMENTS. WHEN IN DOUBT CONSULT YOUR PROFESSOR OR A KNOW PHYSICIST.

NOTE THAT OUTPUT OF EACH UNIT MUST BE NEARLY EQUAL IN ABSOLUTE VOLTAGE VALUE. IT IS SUGGESTED TO PRESET BOTH CONTROLS TO MAXIMUM AND ADJUST VIA A COMMON VARIAC (VARIABLE TRANSFORMER)

ASSEMBLE TWO UNITS AS SHOWN WITH OPPOSITELY POLARIZED MULTIPLIER SECTIONS. THIS IS EASILY ACCOMPLISHED BY REVERSING ALL DIODES IN ONE UNIT WITH RESPECT TO THE OTHER. PLANS SHOW A POSITIVE OUTPUT. REVERSED DIODES WILL PRODUCE A NEGATIVE OUTPUT DEVICE. TOGETHER THE OUTPUT POTENTIAL WILL BE TWICE THAT OF THE SINGLE UNITS PRODUCING A DISCHARGE OF UP TO 5 TO 7". START BY PLACING BOTH UNITS ONLY SEVERAL INCHES APART AND INCREASE DISTANCE GRADUALLY. EXPERIMENT BY PLACING VARIOUS MATERIALS IN THE PATH OF THE DISCHARGE AND OBSERVE RESULTS. CAUTION AS THIS DISCHARGE CAN CAUSE A PAINFUL SHOCK. CONTINUED USE WILL REQUIRE GLASSES AS ULTRA VIOLET ENERGY MAY BE PRODUCED.

## SELF ELECTRIFICATION (ELECTRIC MAN)



1. PREPARE OUTPUT TERMINAL WITH A NEEDLE POINTING TO THE AREA YOU ARE IN.
2. OBTAIN A PLASTIC PAIL OR CONTAINER CAPABLE OF SUPPORTING YOUR WEIGHT.
3. OBTAIN A PIECE OF NEON TUBE OR FLOURESCENT TUBE.
4. TURN ON UNIT AND ADJUST TO A POINT WHERE YOU FEEL AN "ION WIND". NOTE THAT YOU SHOULD BE AT LEAST 2 TO 3' FROM OUTPUT TERMINAL.
5. CONTACT A GROUNDED OR LARGE METAL OBJECT VIA THE NEON TUBE OR STATIC STICK. NOTE A HEALTHY FLASHING OCCURRING. IF YOU FEEL BRAVE YOU CAN TOUCH THE OBJECT DIRECTLY AND RECEIVE A MILD SHOCK.
6. YOUR BODY IS ACTING AS A CAPACITOR AND IS STORING A CHARGE AS THE IONS ACCUMULATE ON YOU. THE MOUNT OF CHARGE OBVIOUSLY DEPENDS ON THE NUMBER OF ION HITTING YOU PER UNIT TIME AND THE INSULATION BETWEEN YOU AND GROUND

# ELECTROSTATIC REPULSION / ATTRACTION SCIENCE FAIR PROJECT

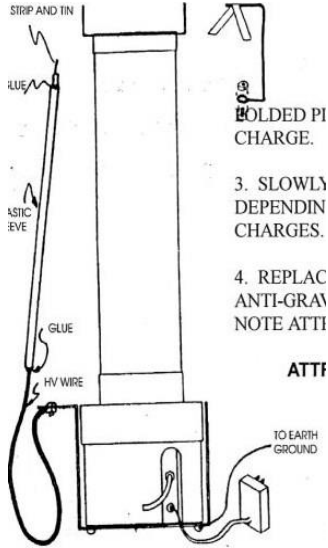
NOTE: SEE OUR CATALOG FOR

AVAILABLE READY TO USE  
ELECTROSCOPE

## ELECTROSCOPE 1 LEVITATION - ELECTRICAL CHARGE DETECTOR 1 REPULSION EXPERIMENTS

1. FORM A  
PIECE OF BUSS

WIRE AS SHOWN AND ATTACH TO OUTPUT TERMINAL SCREW OF UNIT.



2. DRAPE A PIECE OF THIN LEAD OR GOLD FOIL OVER WIRE ARM AS SHOWN. PIECES (LEAFS) SHOULD EASILY COME TOGETHER INDICATING ABSENCE OF

3. SLOWLY APPLY VOLTAGE VIA CONTROL AND NOTE "LEAFS" SEPARATING BY AN AMOUNT DEPENDING ON CHARGE VOLTAGE. EACH LEAF NOW REPELS ONE ANOTHER DUE TO LIKE

3. SLOWLY  
DEPENDIN  
CHARGES.  
4. REPLAC  
ANTI-GRAY  
NOTE ATTI

4. REPLACE METALLIC LEAFS WITH VARIOUS WIDTHS AND LENGTHS OF PAPER ETC. NOTE ANTI-GRAVITY AND LEVITATION EFFECTS. EXPERIMENT WITH THE DISCHARGE LEAD AND NOTE ATTRACTION AND REPULSION PHENOMENA.

### ATTRACTION AND REPULSION EXPERIMENTS

1. PLACE A SMALL NON-CONDUCTIVE CONTAINER, SUCH AS A PLASTIC CAP ON TOP OF THE UNIT AS SHOWN. SECURE VIA TERMINAL SCREW MAKING CONTACT TO A CIRCULAR PIECE OF ALUMINUM FOIL ARRANGED ON THE BOTTOM OF THE CONTAINER. A THIN PIECE OF ANY CONDUCTIVE MATERIAL WILL SUFFICE.

2. PREPARE DISCHARGE PROBE AS SHOWN BY SLEEVING A PIECE OF HV AUTO IGNITION WIRE THRU A RIGID PIECE OF PLASTIC TUBE ABOUT 10" LONG. STRIP AND TIN ENDS. TYE WRAP OR GLUE. LEAD TO SECURE INTO RIGID PLASTIC. CAUTION! LEAD MUST BE SECURELY ATTACHED TO MAIN FRAME AS

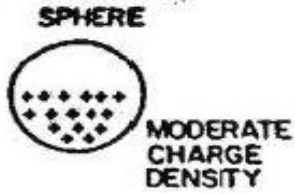
SHOWN.

3. PLACE SOME PIECES OF PAPER, STYROFOAM OR OTHER LIGHT OBJECT INSIDE OF INVERTED CAP. APPLY POWER AND NOTE SEVERAL PIECES POPPING OR SHOOTING OUT EXPERIMENT WITH VARIOUS MATERIALS. BRING DISCHARGE LEAD NEAR REMAINING OBJECTS, NOTE OTHER PIECES NOW FLYING AROUND.

4. EXPERIMENT USING SNOW FLAKES, LIQUIDS, STEAM AND OTHER SUBSTANCES AND MATERIALS.

FIG A

EXPERIMENTS



OPPOSITE CHARGED GROUND

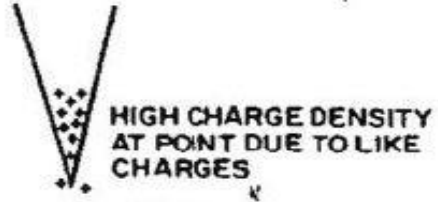


FIG B

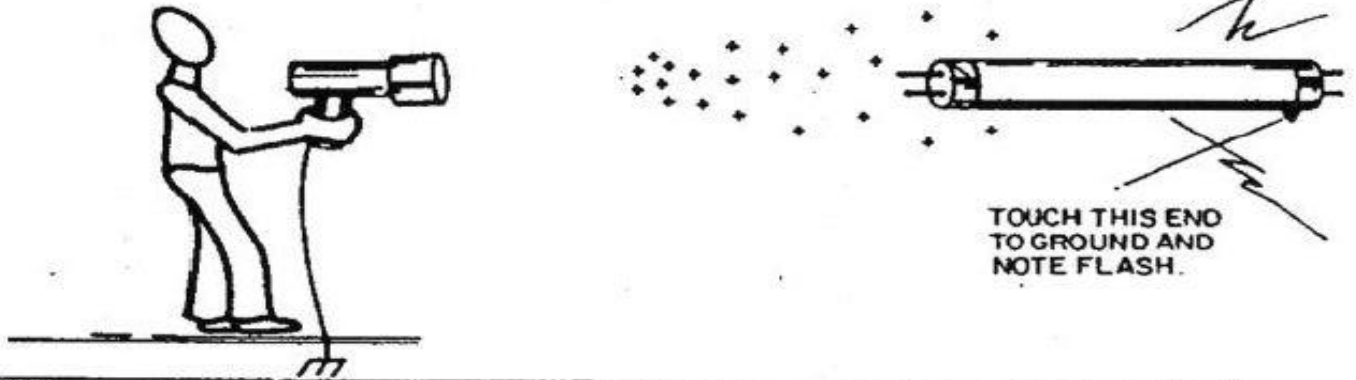


FIG C

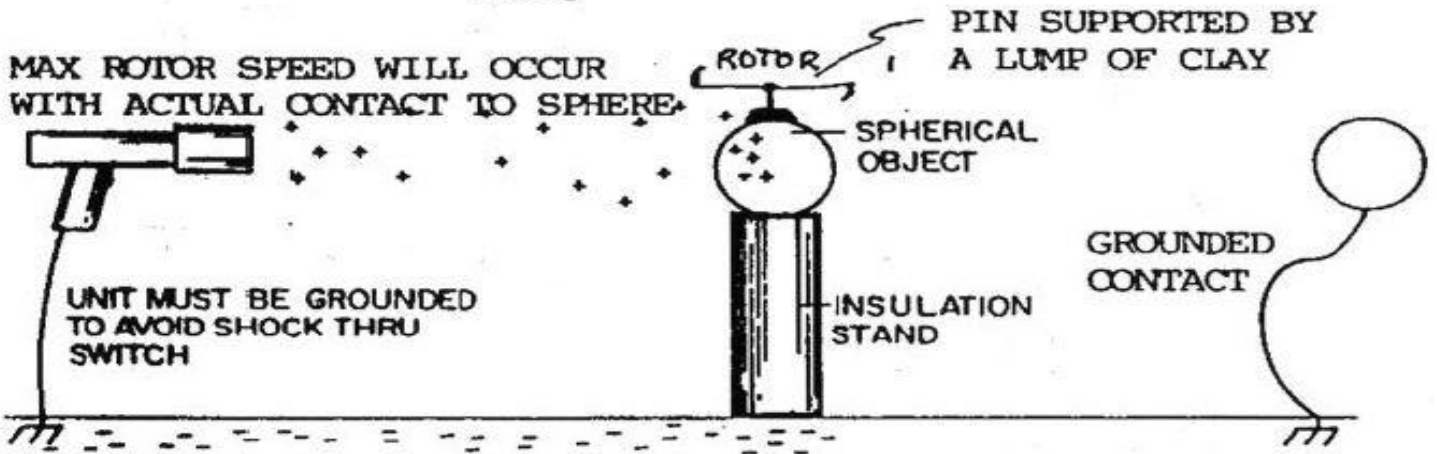
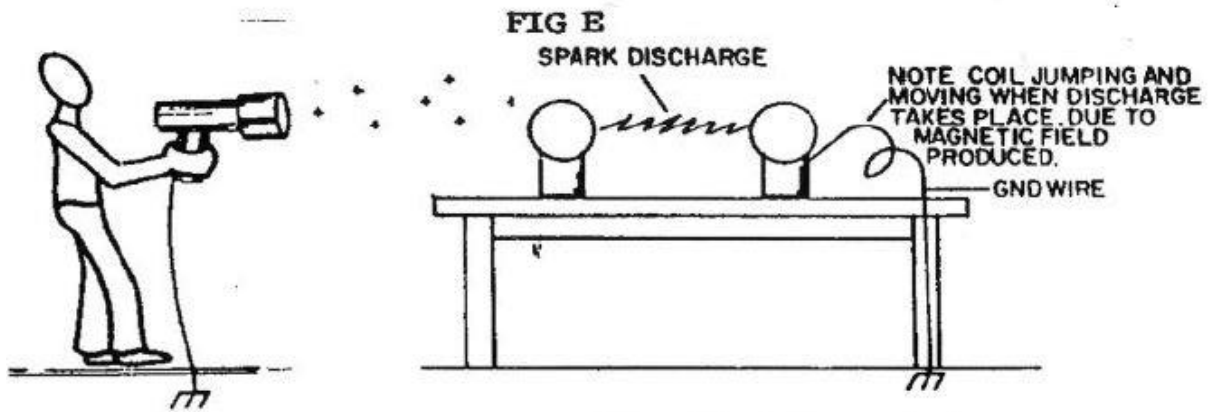
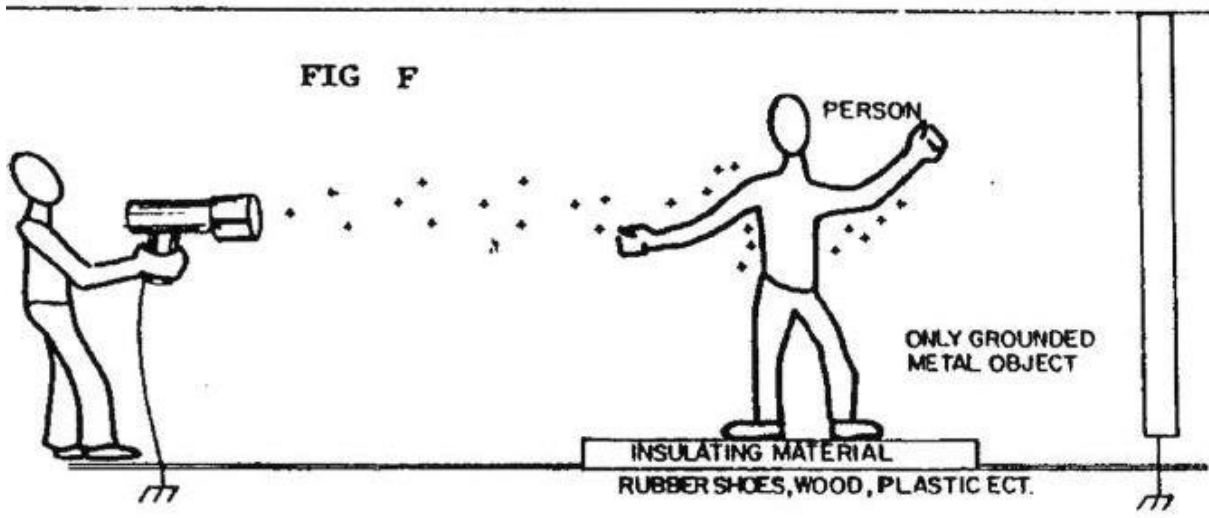


FIG D

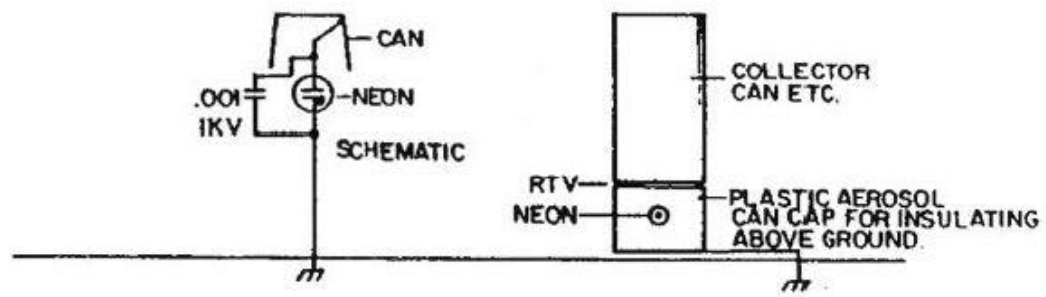




SPHERES MAY BE SUBSTITUTED WITH LARGE SMOOTH KITCHEN UTENSILS WITH A DECREASE IN PERFORMANCE.



**FIG G**  
DEMONSTRATES A SENSITIVE ION DETECTOR.



A SMALL ROUND METAL BOWL (COLLECTOR) IS ATTACHED TO A GLASS JAR, PLASTIC CAP ETC. A NEON LAMP CAPACITOR ARE CONNECTED AS SHOWN.

ION RAY GUN IS AIMED AT COLLECTOR CAUSING NEON LAMP TO FLICKER. RATE OF FLICKER DEPENDS ON NUMBER OF IONS. LAMP SHOULD INDICATE WITH ION RAY GUN 20 TO 30 FEET DISTANT. DETECTOR COLLECTOR SECTION INTERCEPTS IONS AND CHARGES CAPACITOR UP TO A VOLTAGE WHERE NEON LAMP DISCHARGES WITH AN ORANGE FLASH. CAPACITOR AGAIN CHARGES AND CYCLE REPEATS.