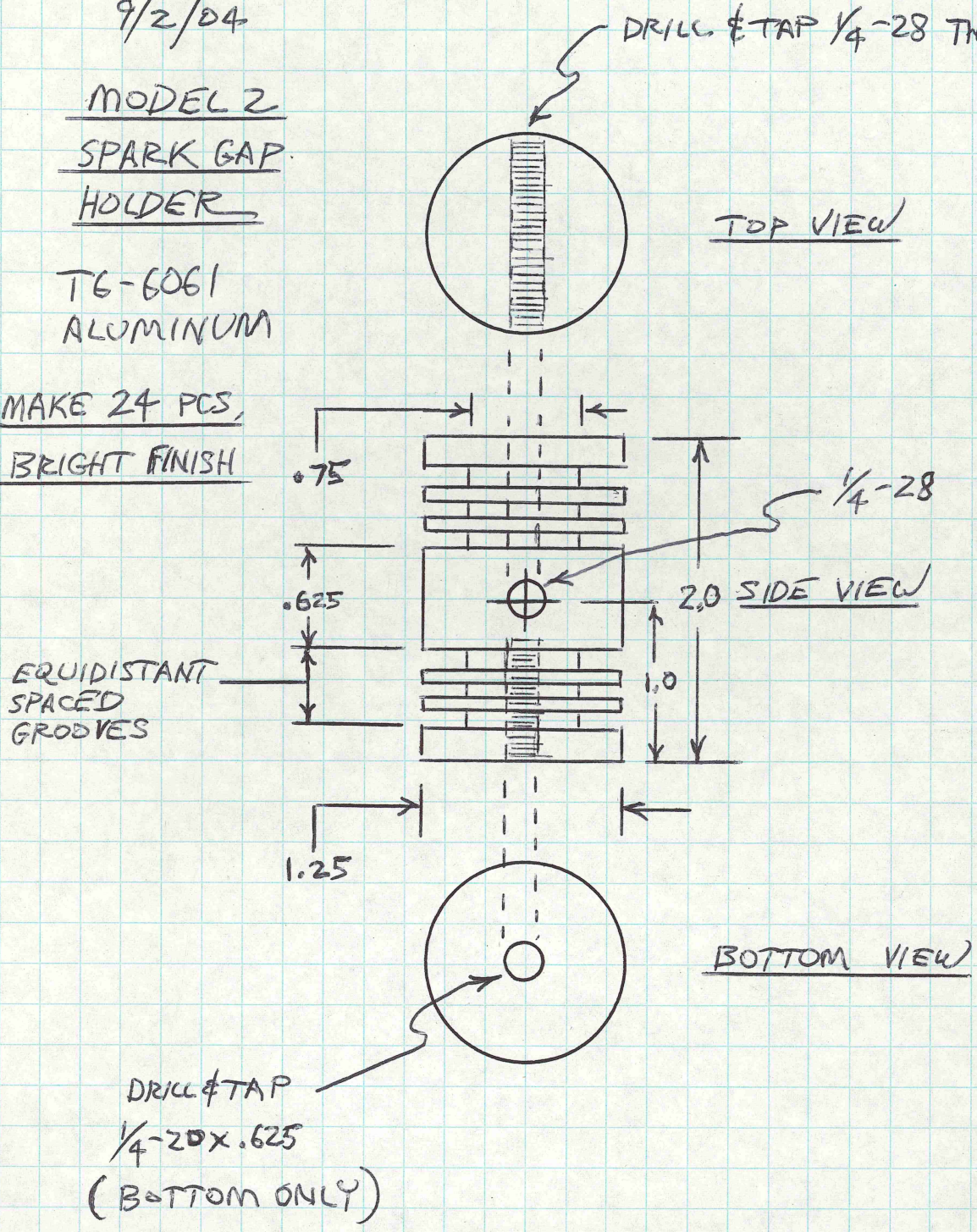
9/2/04

MODEL 2
SPARK GAP
HOLDER

TG-6061
ALUMINUM

MAKE 24 PCS,
BRIGHT FINISH



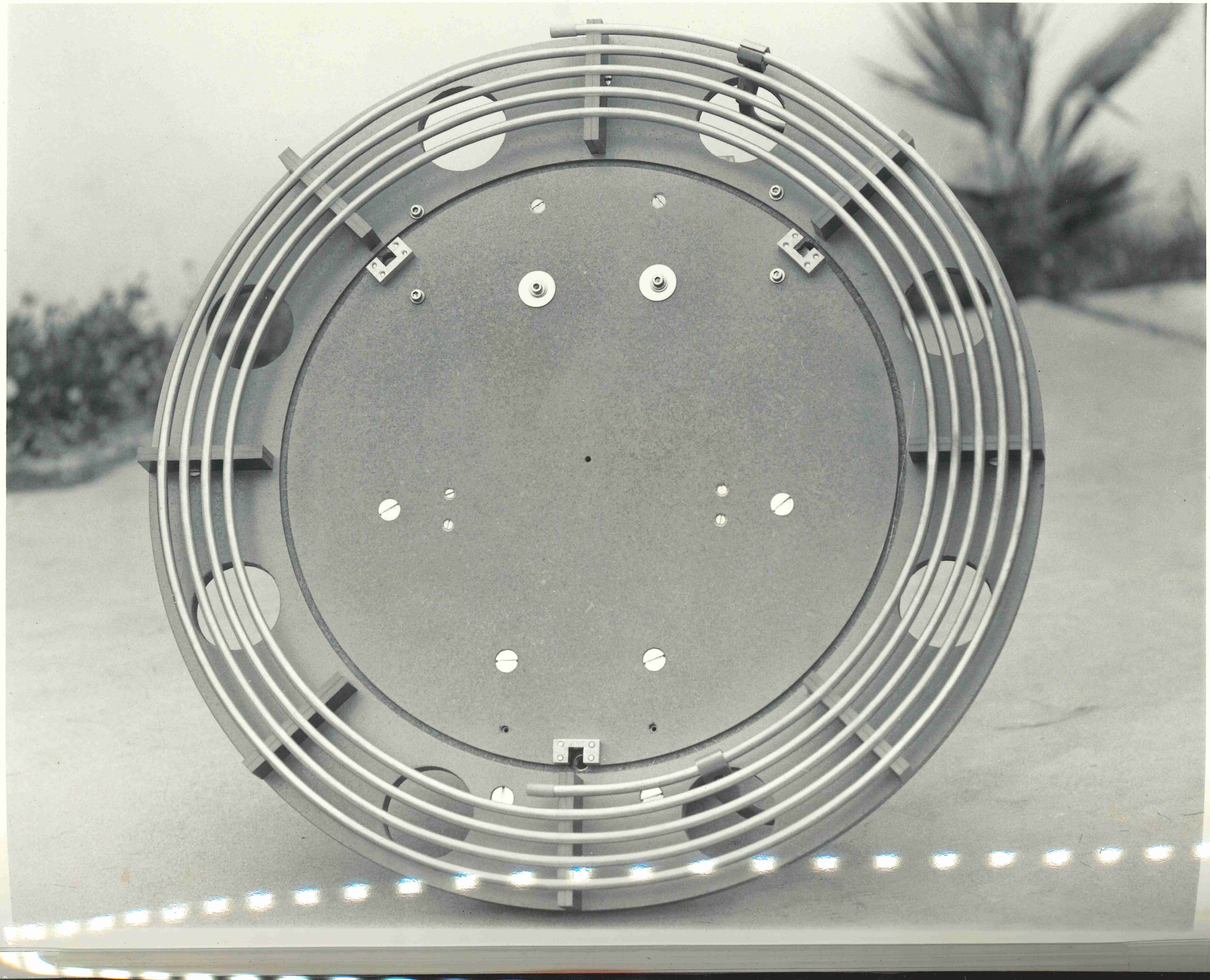
TOPS FORM 33041
MADE IN U.S.A.


PROFESSIONAL SOUND SYSTEM
ULTRA HIGH VOLTAGE DIVISION
TESLA COIL-MODEL 9
3.5 MEGAVOLT/12.5 KVA INPUT
DANGER
HIGH VOLTAGE
MAIN POWER
GROUND
READY
OPERATE
INTERLOCK/
ROTARY GAP
REMOTE
35 AMP

(1) 100%

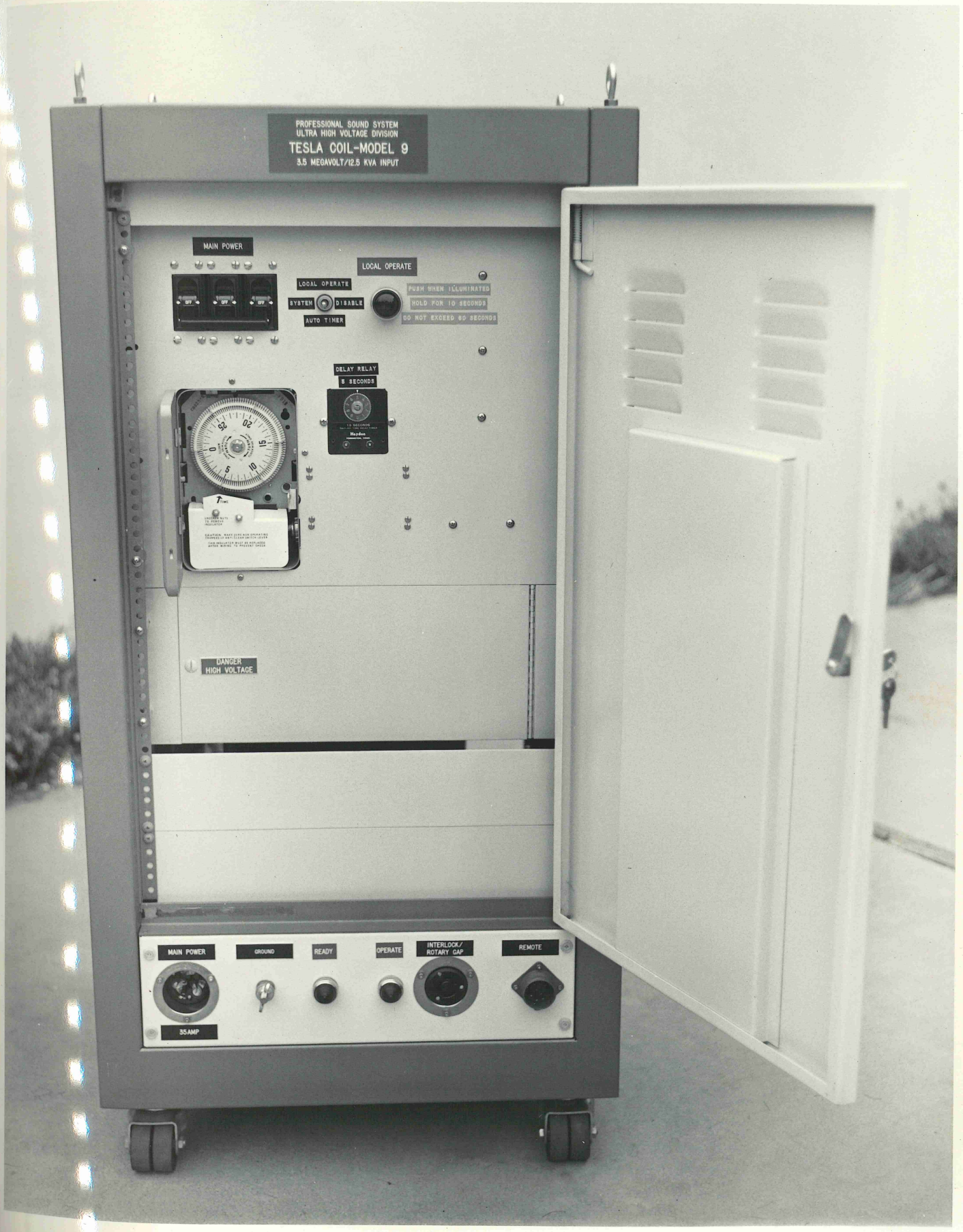
DANGER
...HIGH VOLTAGE

%70 (1)

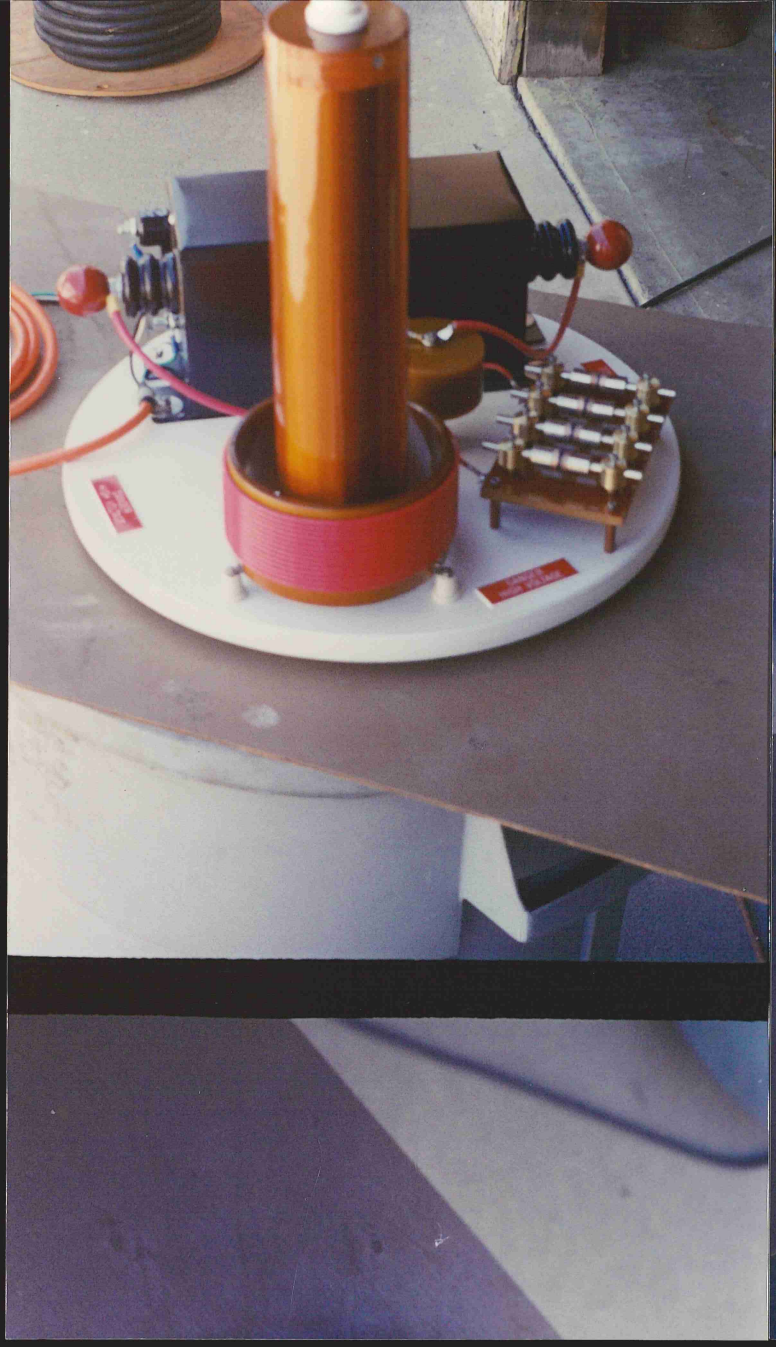


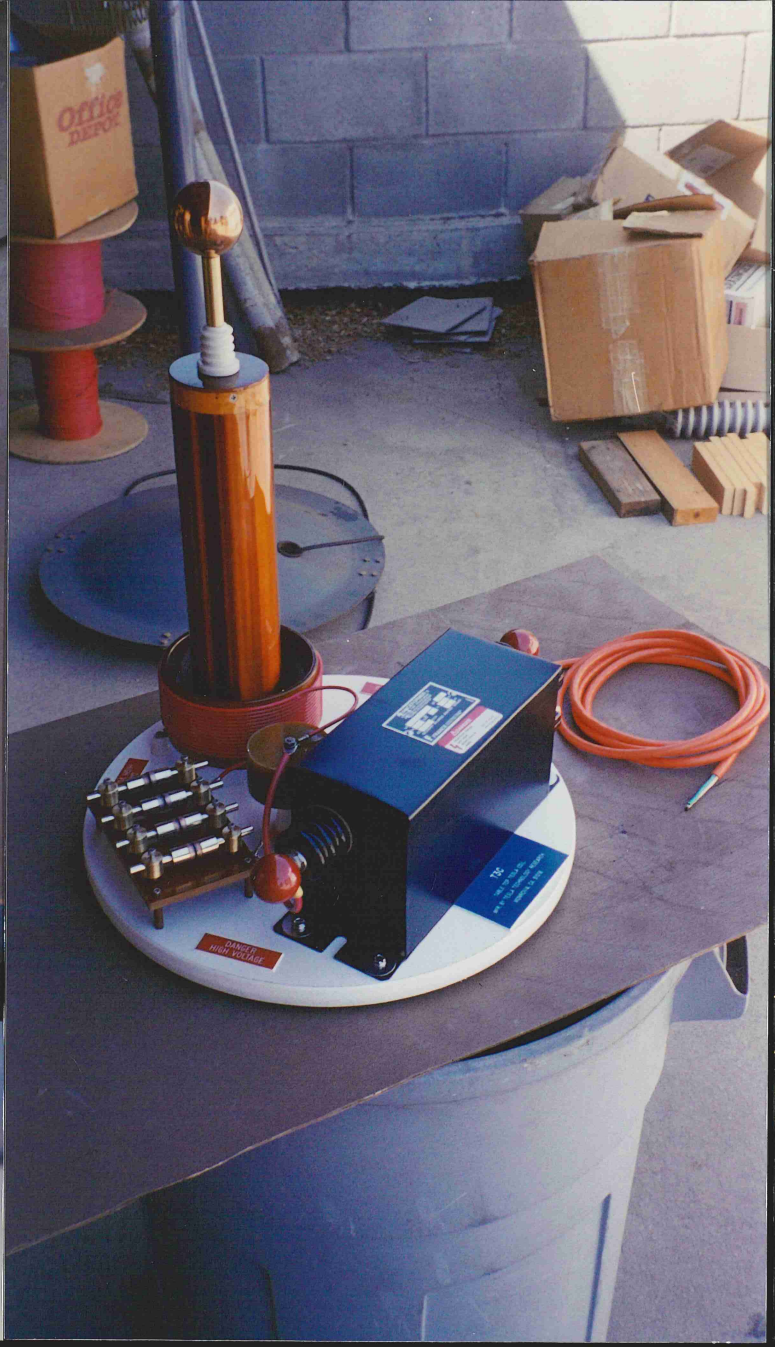
Oui!

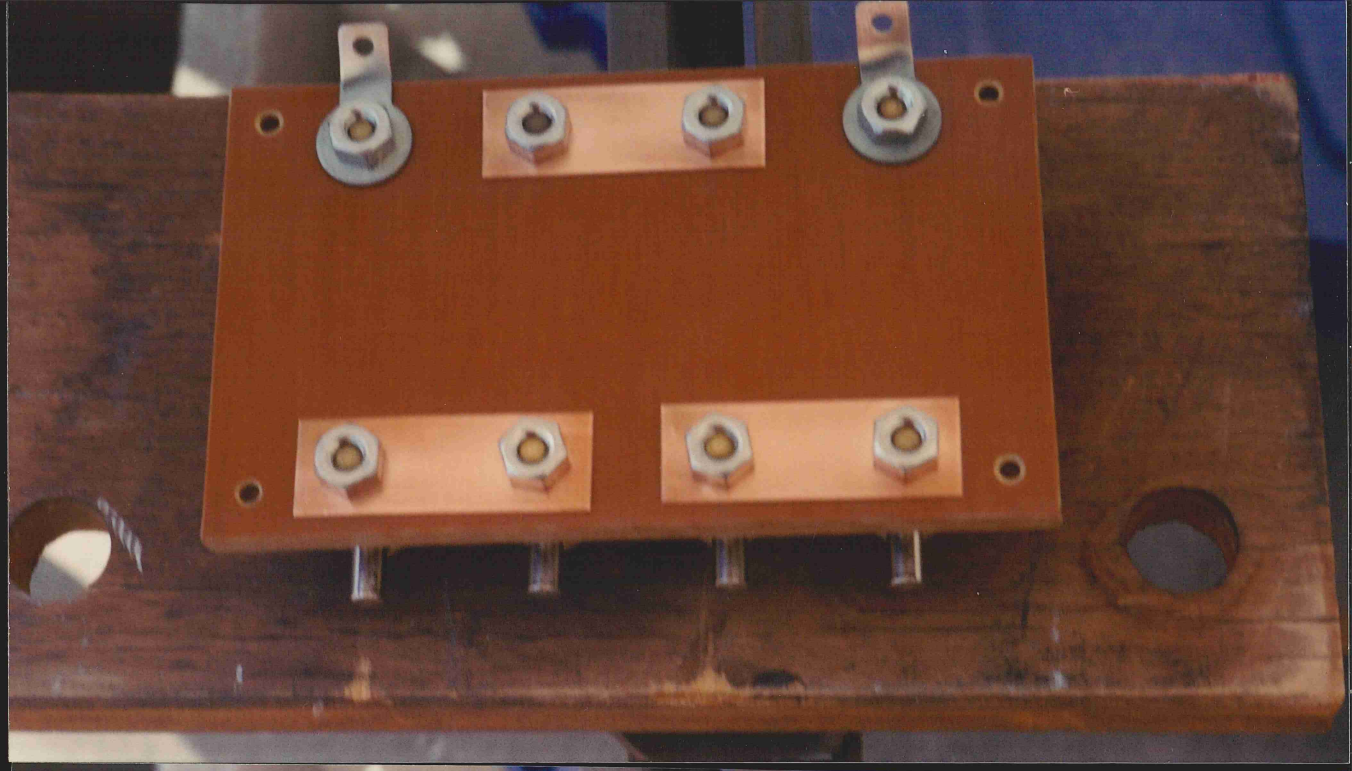

PROFESSIONAL SOUND SYSTEMS
ULTRA HIGH VOLTAGE DIVISION
TESLA COIL-MODEL 9
3.5 MEGAVOLT/12.5 KVA INPUT
MAIN POWER
LOCAL OPERATE
LOCAL OPERATE
SYSTEM
DISABLE
AUTO TIMER
DELAY RELAY
5 SECONDS
CAUTION
HIGH VOLTAGE
MAIN POWER
GROUND
READY
OPERATE
INTERLOCK/
ROTARY GAP
REMOTE
30 AMP

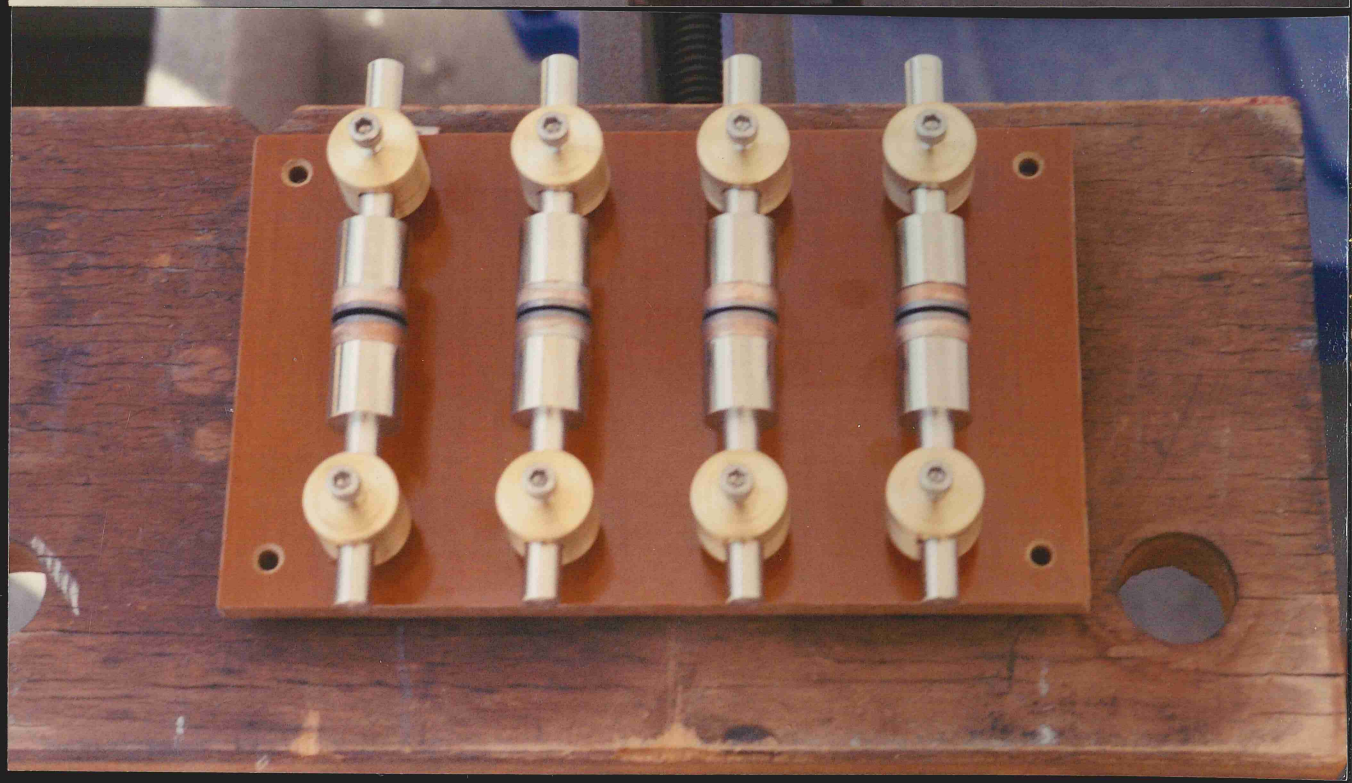

PROFESSIONAL SOUND SYSTEM
ULTRA HIGH VOLTAGE DIVISION
TESLA COIL-MODEL 9
3.5 MEGAVOLT/12.5 KVA INPUT
MAIN POWER
LOCAL OPERATE
LOCAL OPERATE
SYSTEM
DISABLE
AUTO TIMER
PUSH WHEN ILLUMINATED
HOLD FOR 10 SECONDS
DO NOT EXCEED 60 SECONDS
DELAY RELAY
5 SECONDS
DANGER
HIGH VOLTAGE
MAIN POWER
GROUND
READY
OPERATE
INTERLOCK/
ROTARY GAP
REMOTE
35AMP

① 100%


DANGER
HIGH VOLTAGE


Office
DEPOT
DANGER
HIGH VOLTAGE





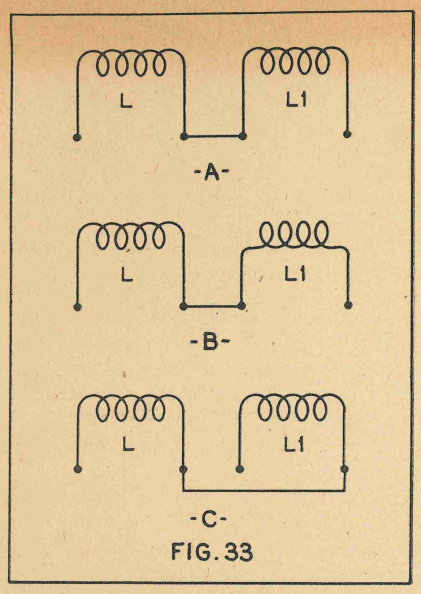


FIG. 33

Illustrating the means employed for reducing or increasing the effective inductance of two coils.

L = 242,000 centimeters (approximately)

L = 242 microhenrys since

1000 centimeters equals 1 microhenry

1000 microhenrys equals 1 millihenry

1000 millihenrys equals 1 henry.

Let us now assume a coil of small diameter, say 1 inch and the winding consists of 80 turns, with a total length of 3.33 inches. What is the inductance of this single layer solenoid? Substituting these values into the formula we have,

$L = 1.27 \times 6400 \times 5.2336$

L = 42,509 (approximate) ems

L = 42.50 microhenrys

Nagaoka's Formula

Another formula of very good accuracy is the following, of Prof. Nagaoka.

$$L = \frac{pi^2 \times d^2 \times N^2}{b} \times K \qquad (19)$$

where pi is 3.1416

d is the diameter of the coil in centimeters,

N is the total number of turns,

b is the length of the coil in centimeters,

K is the constant as follows, again equal to the diameter by the length.

Table of K constants for Nagaoka formula:

d/b	K
.01	.9958
.05	.9791
.1	.9588
.15	.9391
.2	.9201
.25	.9016
.3	.8838
.35	.8665
.4	.8490
.45	.8337
.5	.8181
.55	.8031
.6	.7885
.65	.7745
.7	.7609
.75	.7478
.8	.7351
.85	.7228
.9	.7110
.95	.6995
1.00	.6884
1.5	.5950
2.0	.5255
2.2	.5025
2.4	.4816
2.5	.4719
2.6	.4626
2.8	.4452
3.0	.4292
3.2	.4145
3.4	.4008
3.5	.3944
3.6	.3882
3.8	.3764
4.0	.3654
4.2	.3551
4.4	.3455
4.6	.3364
4.8	.3279
5.0	.3198
5.5	.3015
6.0	.2854
6.5	.2711
7.0	.2584
7.5	.2469
8.0	.2366
8.5	.2272
9.0	.2185
9.5	.2106
10.	.2033

The application of these K constants are identical to those employed in the Lorenz formula. The calculation of the constant K is in both cases the ratio between the diameter and the length and can be solved without resorting to the metric system. The solution of the formula, however, necessitates conversion into the metric system.

Let us apply this formula to the solution of the first problem, where we have a coil of 50 turns on a 3 inch outside diameter winding form and the length of the winding is 1.0 inch. Substituting into the formula we have

$$L = \frac{3.1416^2 \times 7.62^2 \times 50^2}{2.54} \times .4292$$

L = approximately the same as obtained with the Lorenz formula.

Another formula applicable to the Nagaoka table of K constants, is

$$L = \frac{.03948 \times a^2 \times n^2}{b} \times K \qquad (20)$$

Here a is the radius and b is the length of the coil winding. The constant K is again equal to the diameter (or $\frac{2a}{b}$)

Inductance Calculation of Spider-Web Coil

The pancake coil has been replaced by the spider-web coil in average radio receiver practice and the formula used for determining the inductance is

$$L = \frac{m^2 \, d}{100{,}000} \qquad (21)$$

where L = inductance in millihenrys which figure multiplied by 1000 will give the inductance in microhenrys.

m = the number of turns in the coil.

d = average diameter in centimeters.

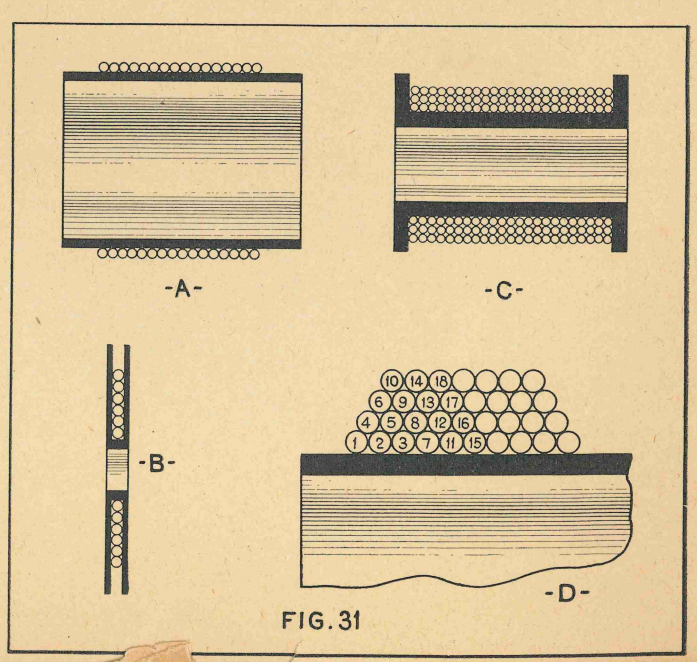


FIG. 31

Various forms of coil windings commonly used. A is the single layer or straight solenoid winding. B shows a pancake or spiral type winding. C is the common form of multiple layer winding while D is a bank wound inductance wherein the turns are staggered, as indicated by the numbers.

An example is as follows. We have a coil with 60 turns and a mean or average diameter of 3 inches. Substituting into the formula we have

$$L = \frac{3600 \times 7.62}{100{,}000} \text{ or}$$

L = .27232 millihenrys or

L = 272.32 microhenrys.

The Honeycomb Coil

The multiple layer coil has been replaced by the honeycomb coil wherever large values of inductance are required in a small space. The formula employed for determining the inductance of a honeycomb coil is as follows:

$$L = \frac{.315 \times r^2 \times N^2}{6r \text{ plus } 9e \text{ plus } 10h} \quad (22)$$

where L is the inductance in microhenrys,

N is the total number of turns,

r is the average or mean radius in centimeters,

e is the thickness of the coil, measured from the inside to the outside, in centimeters,

h is the length of the coil in centimeters.

(1 inch is equal to 2.54 centimeters. This applies equally to all formulae.)

Referring again to the flat spiral or pancake, a rough estimation can be gained by following this rule; the inductance of a flat spiral of "n" turns may be calculated approximately as

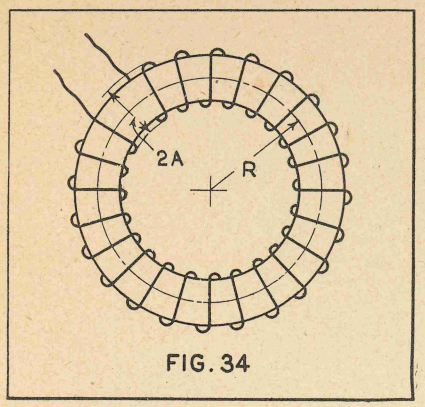


FIG. 34

An inductance of the Toroid type, often referred to as a "doughnut coil."

equal to a solenoid (single layer) of the same number of turns, with a diameter equal to the mean or average diameter of the spiral winding and a coil length equal to the width of the spiral winding, i. e., b, the usual term designating the length of the winding, being equal to R1—R2, where R1 is the radius of the outside turn from the center of the form and R2 is the radius of the inside turn from the center of the winding form.

The Toroid Winding

In Fig. 34 is shown a type of winding known as the toroid, commercially known as the "balloon" winding and under several other names. The formula applicable to the determination of an inductance of this type of winding is

$$L = .01257 \times n^2 \times (R - \text{sq. rt. of } R^2 - a^2) \quad (23)$$

where R is the distance from the axis to center of cross section of winding,

a is the radius of the turns of the winding,

n is the number of turns of the winding.

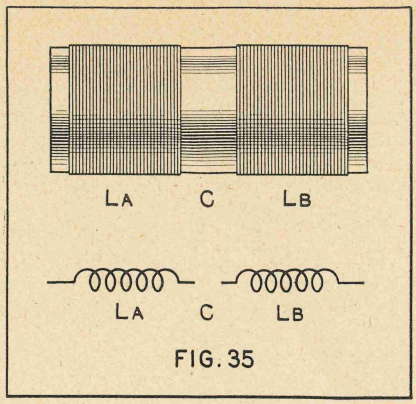


FIG. 35

Illustrating the properties of mutual inductance.

Mutual Inductance

Now, while it is understood that coils possess certain values of inductance, two coils independent of each other, when placed adjacent to each other so that the magnetic lines of force from one will cut the turns of the other, will possess what is known as "mutual inductance," that is, a certain value of inductance between the coils (see Fig. 32). The calculation of this value is very complicated, since it depends upon the characteristics of L and L1, their relation, their distance apart, etc. In average practice, however, the interested person is confronted with the problem of determining the mutual inductance between two coils of practically like diameter and placed upon the same axis, as for example in Fig. 35. The determination of the mutual inductance between such coils is of great importance when calculating the total inductance of a radio frequency choke, which consists of a series of connected windings but with a certain amount of space between the windings.

Referring to Figs. 32 and 35, let us assume that the inductances of L and L1 or La and Lb are 150 and 200 microhenrys respectively. What is the

Relation of Wavelength and the Product of Inductance and Capacity

λ Wave length meters	CL C in μf L in cm	λ Wave length meters	CL C in μf L in cm	λ Wave length meters	CL C in μf L in cm
1	0.0003	125	4.40	285	22.87
2	.0011	130	4.76	290	23.66
3	.0018	135	5.13	295	24.50
4	.0045	140	5.52		
5	.0057	145	5.92	300	25.33
6	.0101			310	27.05
7	.0138	150	6.34	320	28.83
8	.0180	155	6.76	330	30.66
9	.0228	160	7.20	340	32.55
		165	7.66	350	34.48
10	.0282	170	8.13	360	36.48
15	.0635	175	8.62	370	38.54
20	.1129	180	9.12	380	40.7
25	.1755	185	9.63	390	42.8
30	.2530	190	10.16		
35	.3446	195	10.71	400	45.0
40	.450			410	47.3
45	.570	200	11.26	420	49.7
		205	11.83	430	52.0
50	.704	210	12.41	440	54.5
55	.852	215	13.01	450	57.0
60	1.014	220	13.62	460	59.6
65	1.188	225	14.25	470	62.3
70	1.378	230	14.89	480	64.8
75	1.583	235	15.55	490	67.6
80	1.801	240	16.22		
85	2.034	245	16.90	500	70.4
90	2.280			510	73.3
95	2.541	250	17.60	520	76.0
		255	18.31	530	79.0
100	2.816	260	19.03	540	82.1
105	3.105	265	19.77	550	85.2
110	3.404	270	20.52	560	88.4
115	3.721	275	21.29		
120	4.05	280	22.07		

CALCULATING R.M.S. CURRENT in A DAMPENED LC CIRCUIT

$$I_{RMS} = \pi E C \sqrt{\frac{N}{\delta}}$$

OR

$$I_{RMS} = 0.0545\, E C_1 \sqrt{\frac{N}{\lambda \delta}}$$

where: I_{RMS} = R.M.S. CURRENT in AMPERES

E = CONDENSER VOLTAGE AT COMMENCEMENT OF EACH WAVETRAIN

δ = FREQUENCY of OSCILLATION in CY/SEC.

N = SPARK FREQUENCY/SEC.

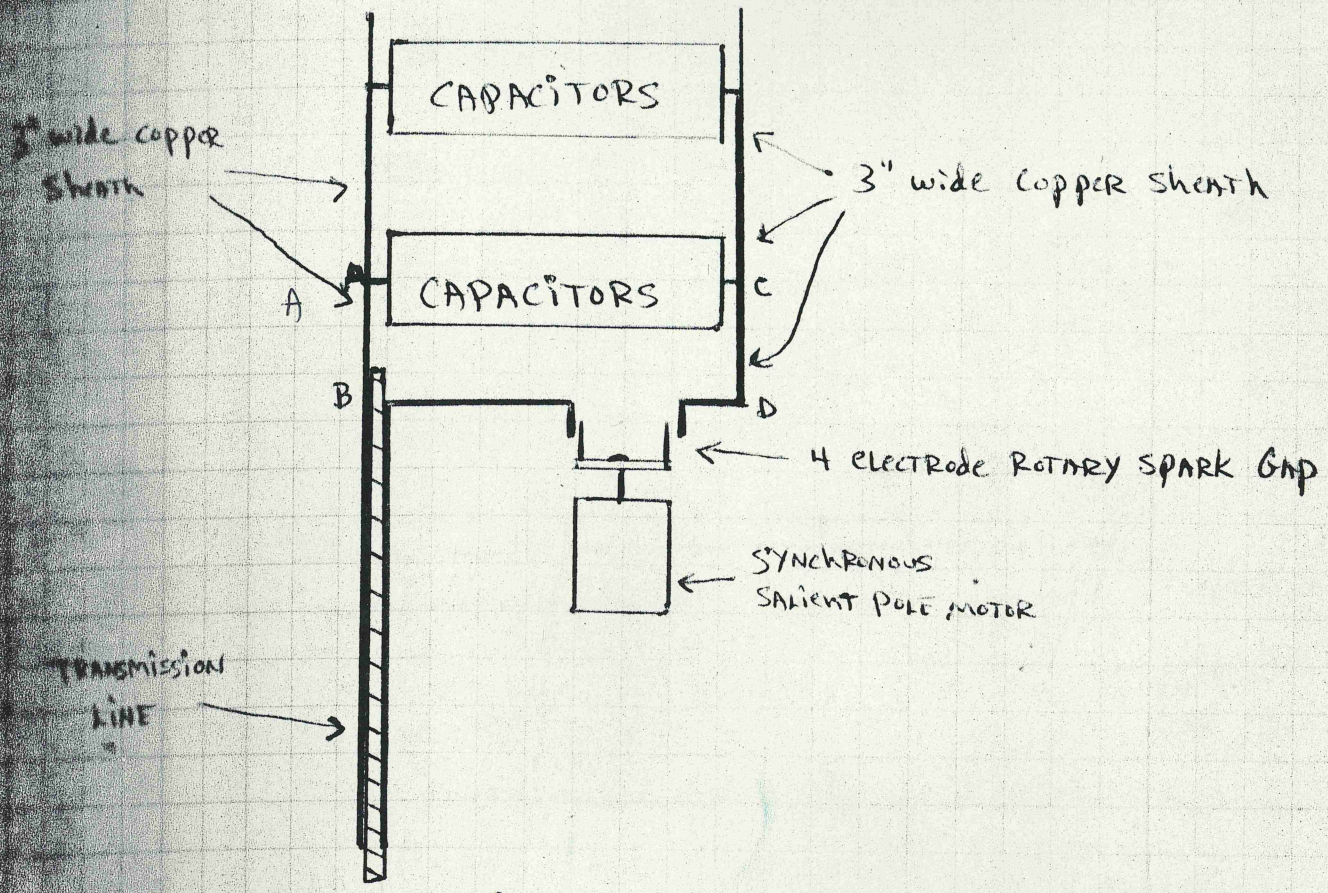
C = CAPACITANCE in FARADS

C_1 = CAPACITANCE in MFD.

λ = WAVELENGTH in METERS

δ = DECREMENT FACTOR (See p. 24a)

Low Inductance Component Layout for Tesla Oscillators



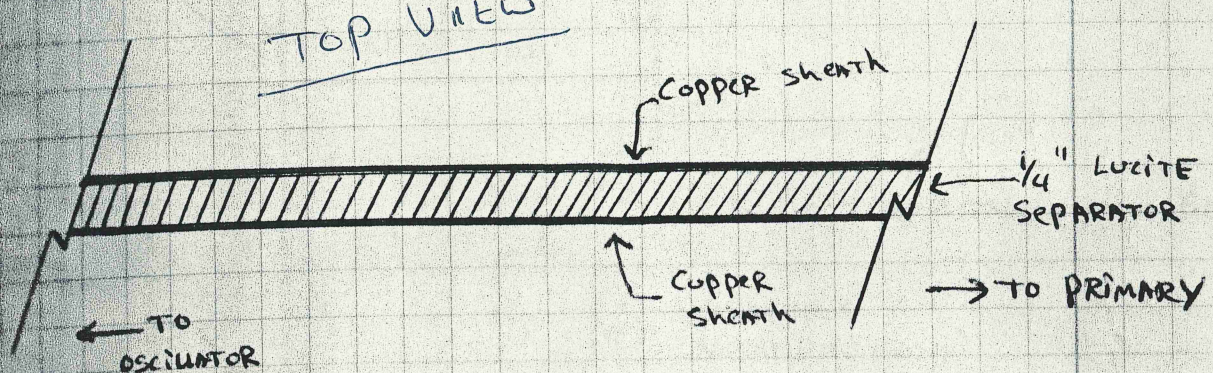
Loop ABCD should be <u>as small as physically possible</u> to keep inductance as low as possible.

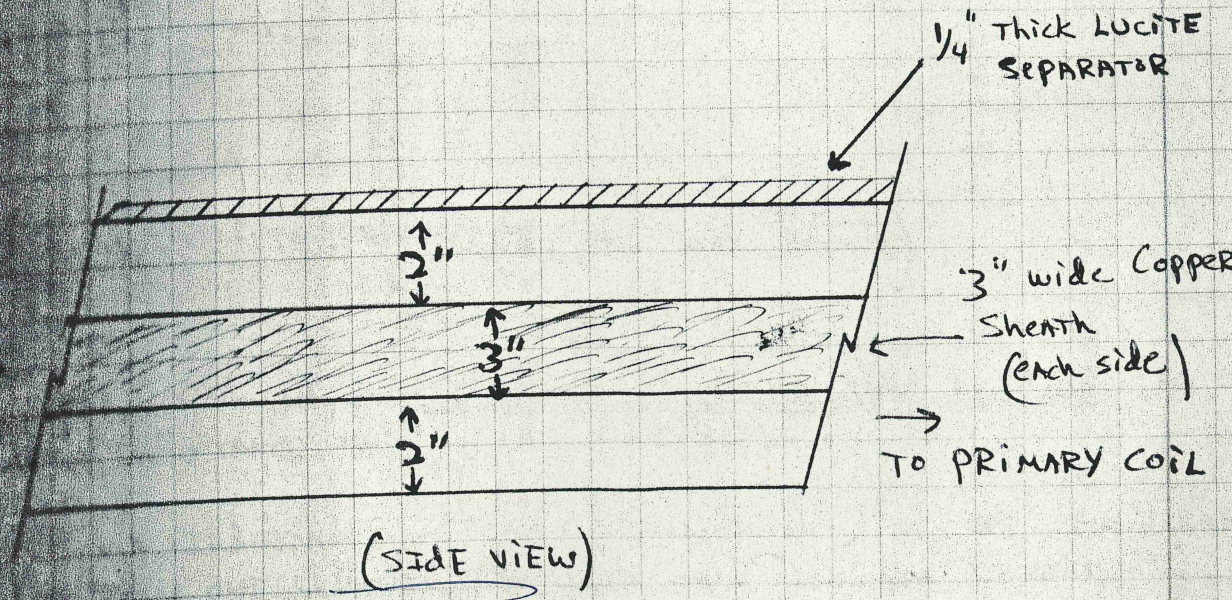
The total inductance of the transmission line is considerably less than one microhenry (actually only 200-400 nanohenries)

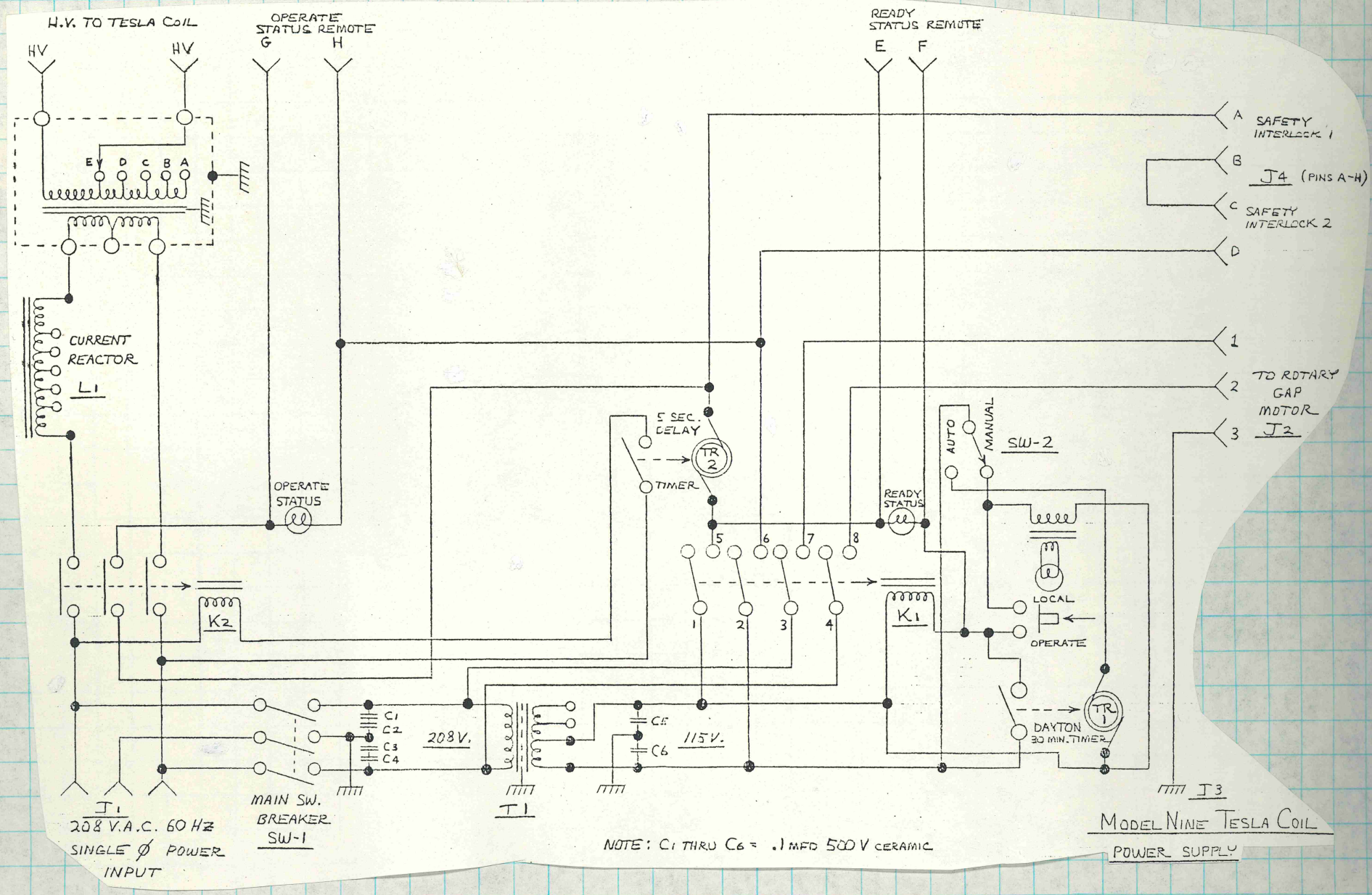
The transmission line may resonate slightly and actually increase the voltage and current delivered to the primary.

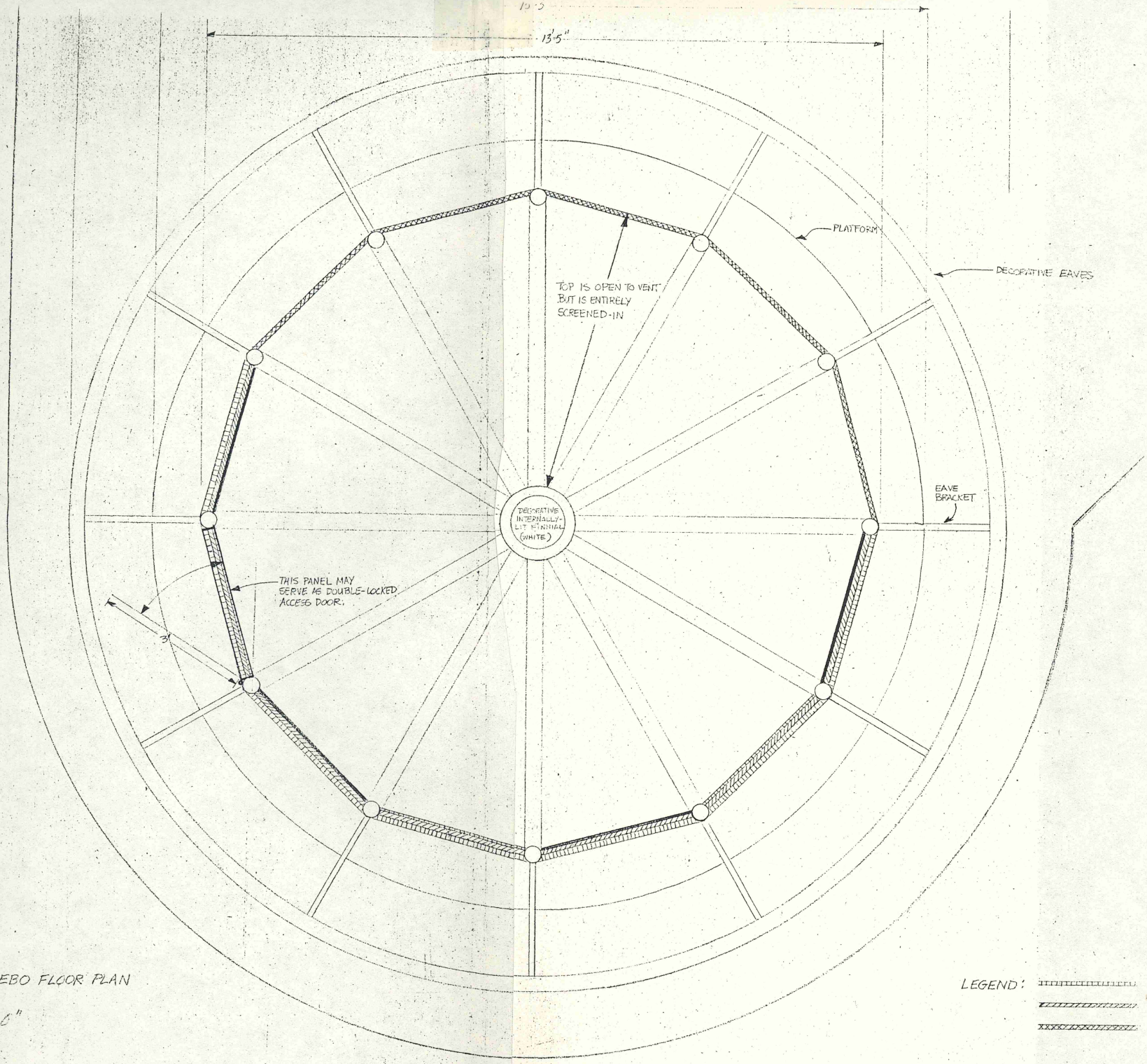
Low Inductance Transmission Line for Tesla Coils

(For 20 Kv (RMS), or less, systems)






H.V. TO TESLA COIL
HV
HV
E F D C B A
CURRENT REACTOR
L1
OPERATE STATUS REMOTE
G
H
OPERATE STATUS
READY STATUS REMOTE
E
F
A SAFETY INTERLOCK 1
B
J4 (PINS A-H)
C SAFETY INTERLOCK 2
D
1
2 TO ROTARY GAP MOTOR J2
3
5 SEC. DELAY
TR 2
TIMER
READY STATUS
AUTO
MANUAL
SW-2
5 6 7 8
1 2 3 4
K2
K1
LOCAL
OPERATE
C1
C2
C3
C4
208V.
C5
C6
115V.
DAYTON 30 MIN. TIMER
TR 1
J1
208 V.A.C. 60 Hz SINGLE Ø POWER INPUT
MAIN SW. BREAKER SW-1
T1
J3
NOTE: C1 THRU C6 = .1 MFD 500 V CERAMIC
MODEL NINE TESLA COIL
POWER SUPPLY



A GAZEBO FLOOR PLAN

= 1'-0"

LEGEND:

4-1-81 KP

PLEASE TYPE AS A SEPERATE SHEET ATTACHMENT

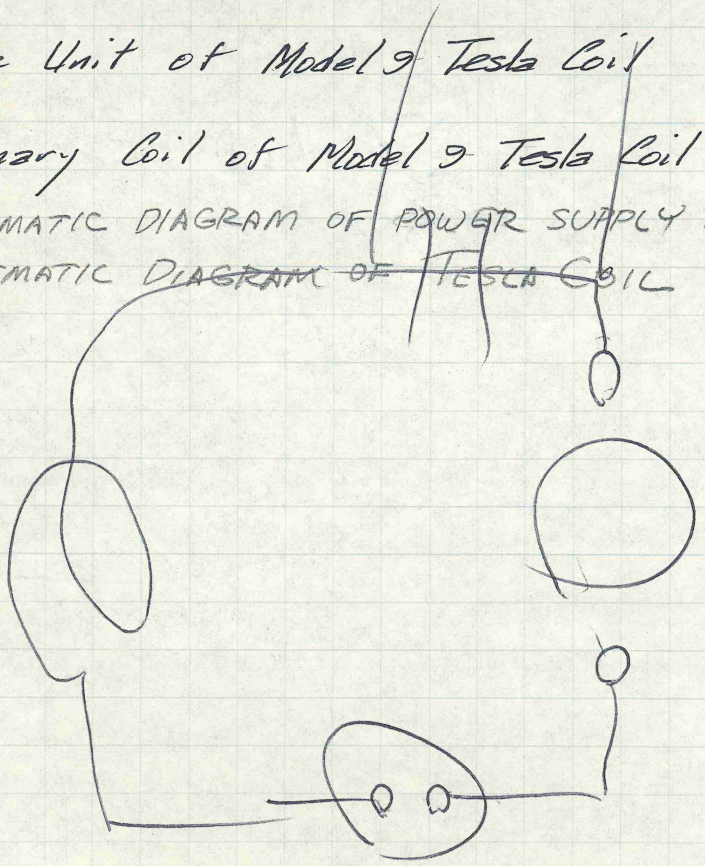
Figures

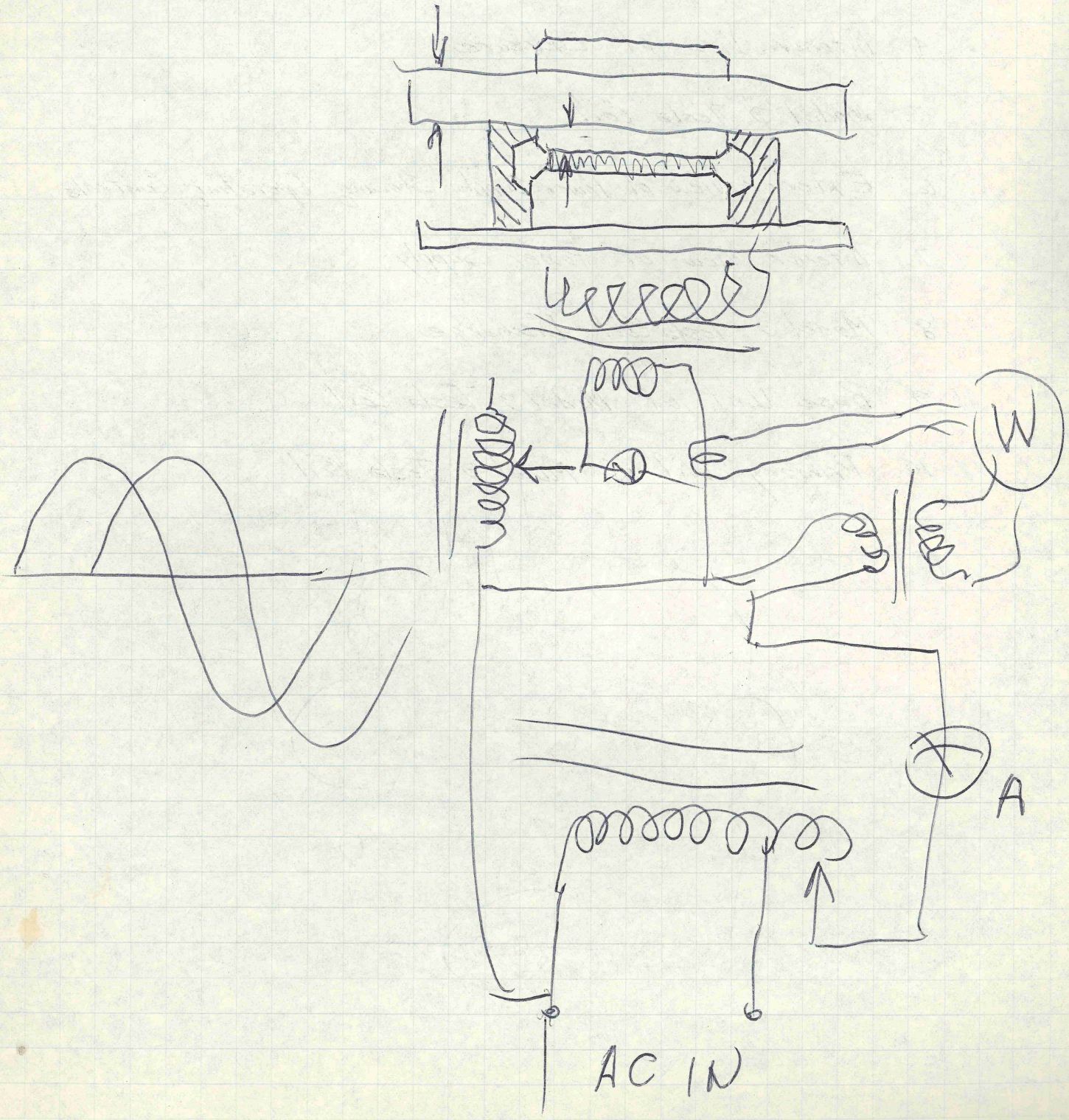
1. Plan View of Installation
2. Elevation View of Installation
3. Exterior View of Enclosure
4. Interior View of Enclosure
5. Model 9 Tesla Coil
6. Exterior View of Power Supply Showing Operating Controls
7. Interior View of Power Supply
8. Model 9 Tesla Coil Discharge

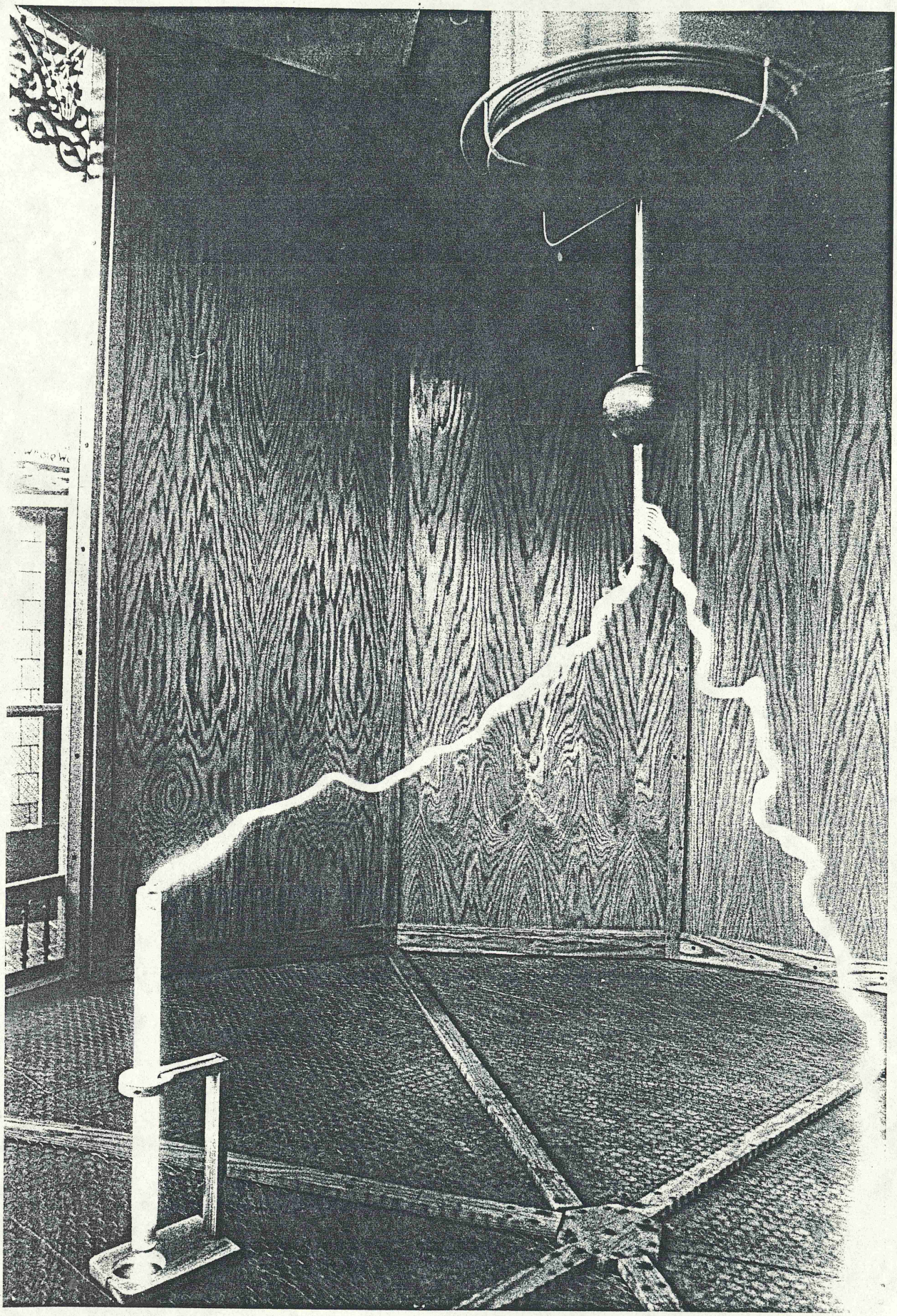
11 ~~9~~ Base Unit of Model 9 Tesla Coil

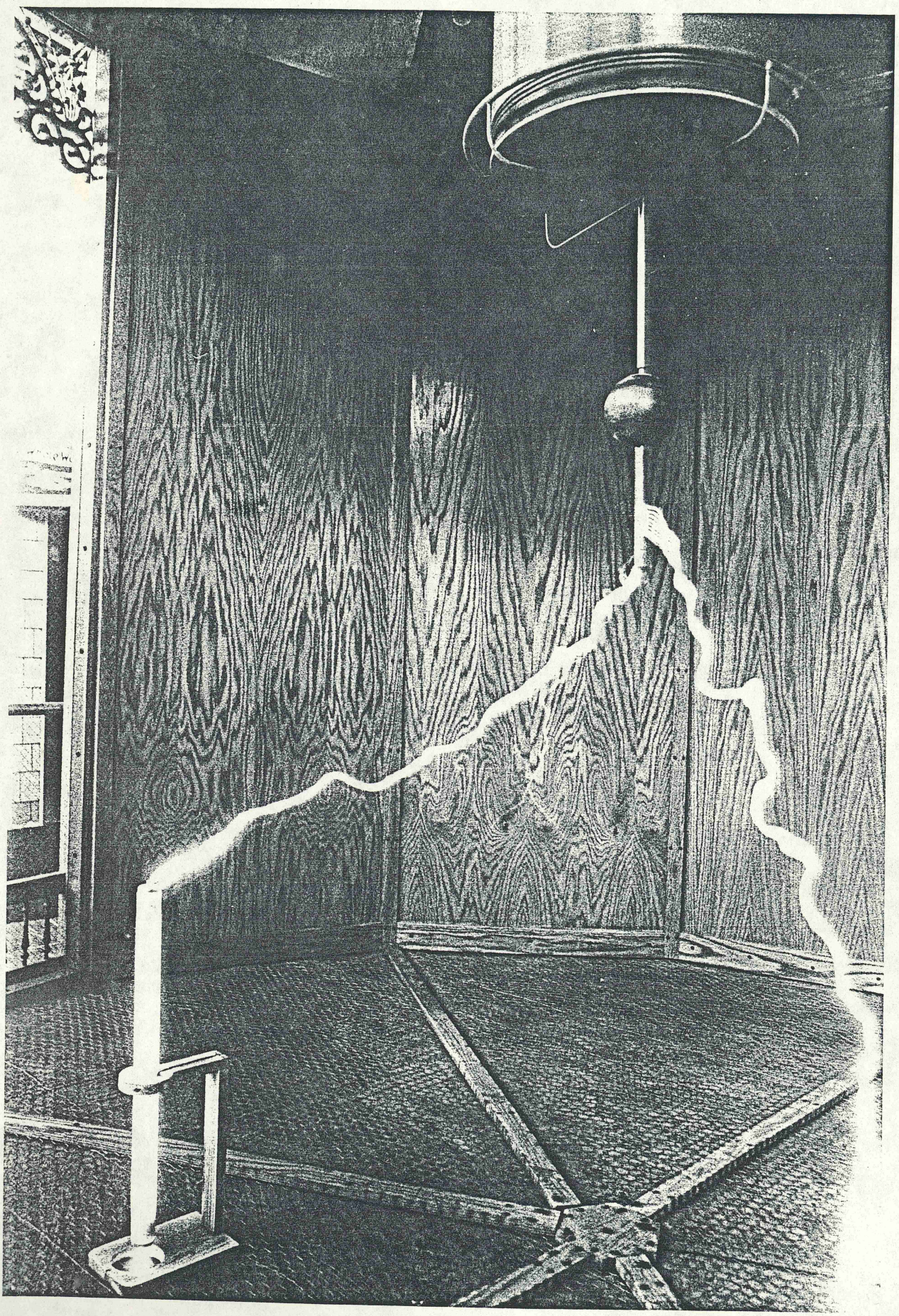
12 ~~10~~ Primary Coil of Model 9 Tesla Coil

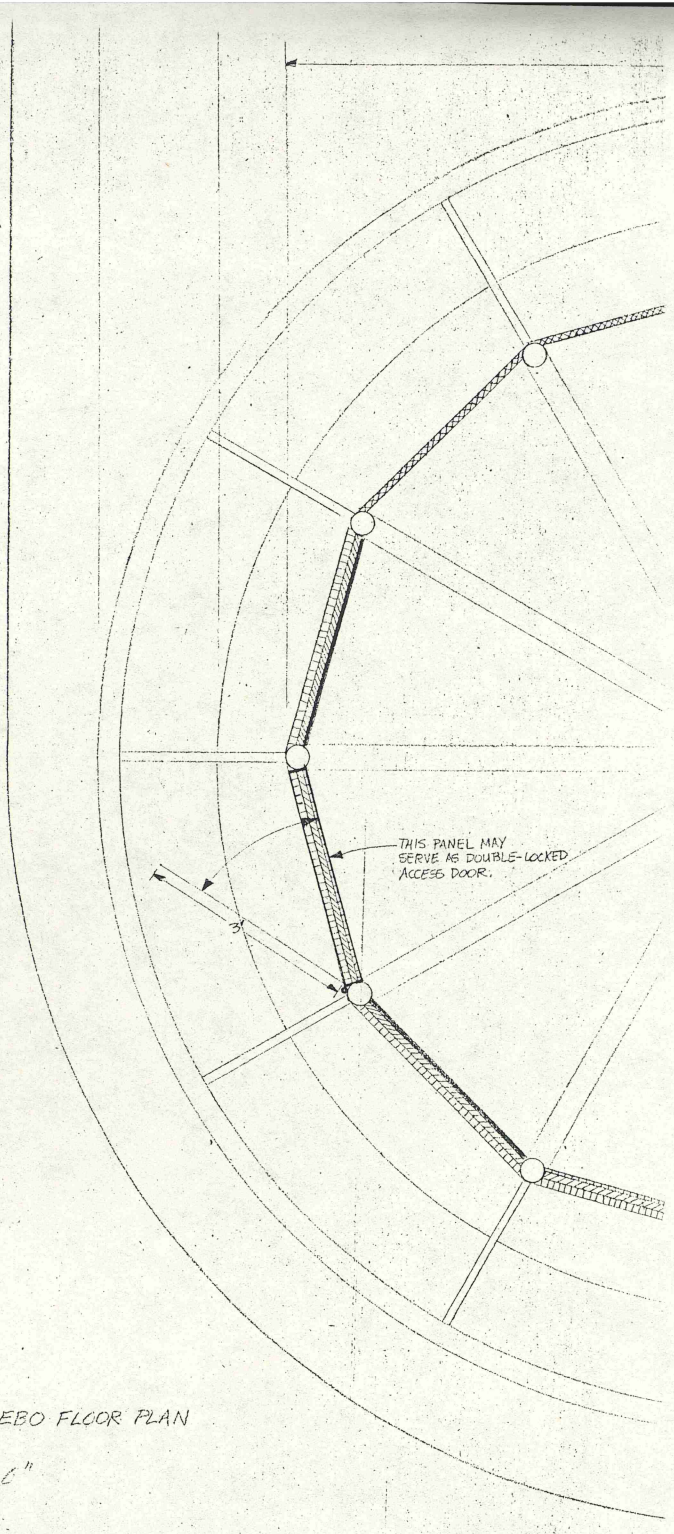
ADD
9. SCHEMATIC DIAGRAM OF POWER SUPPLY RACK
10. SCHEMATIC DIAGRAM OF TESLA COIL




W
A
AC IN



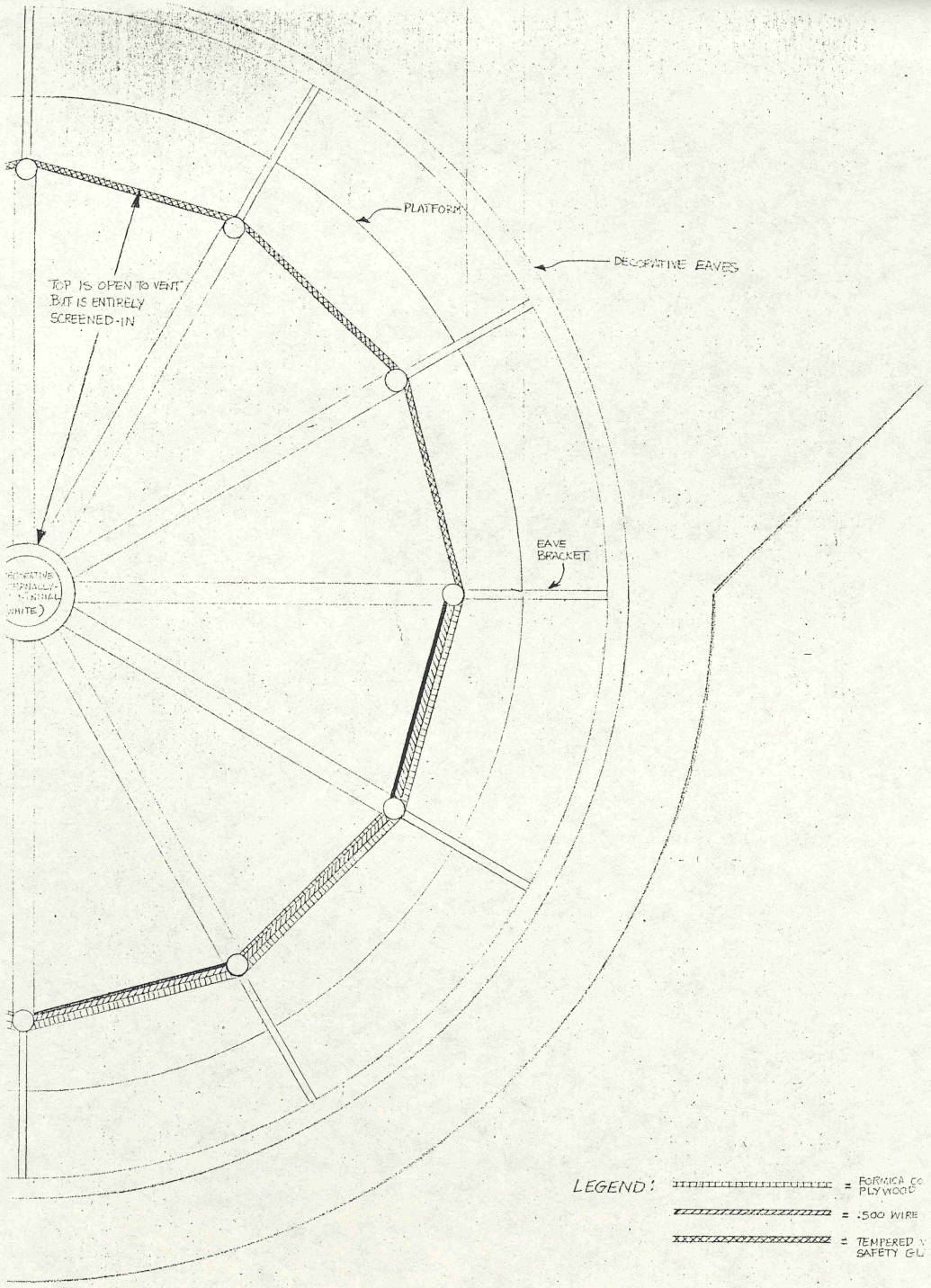


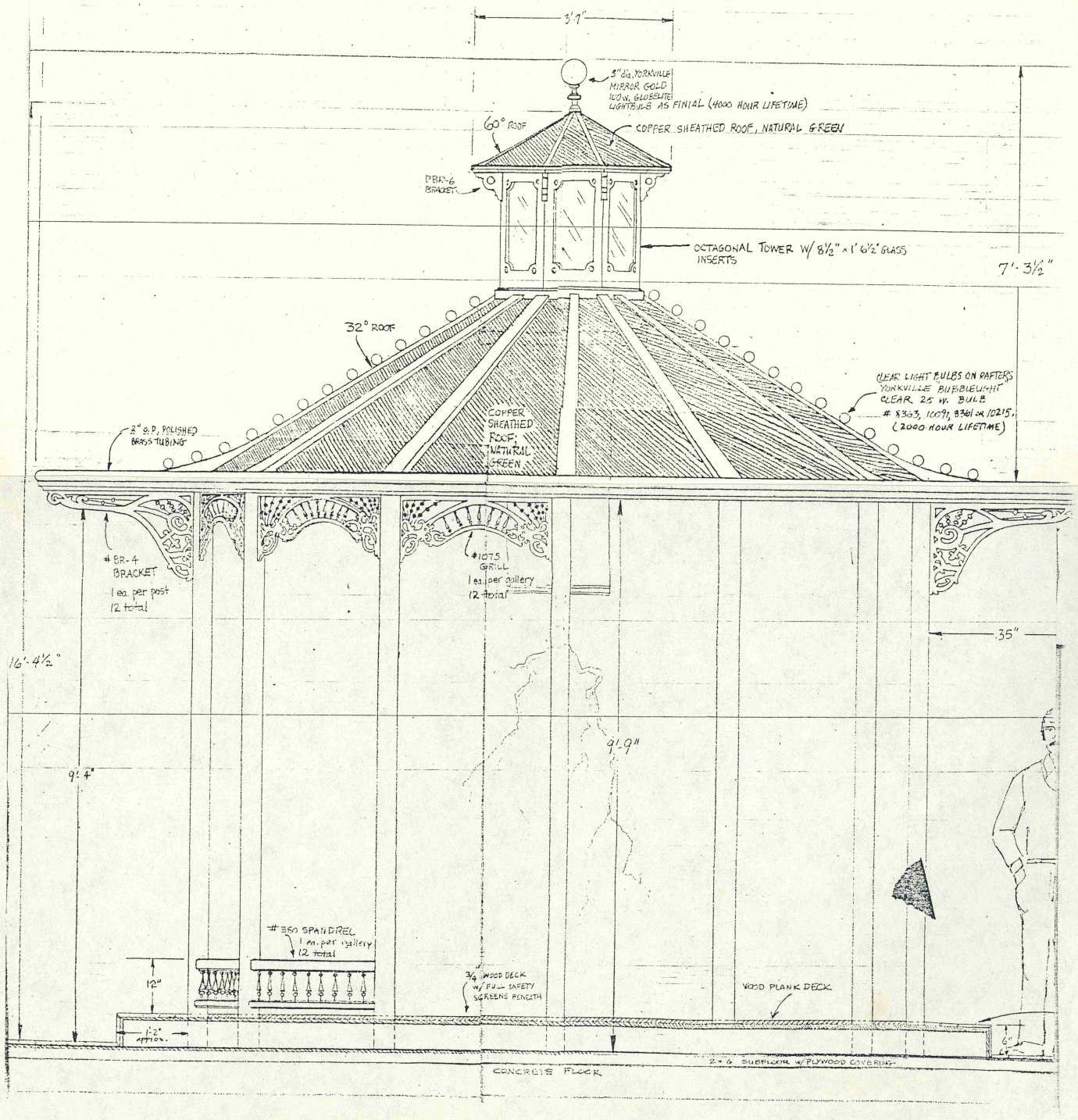


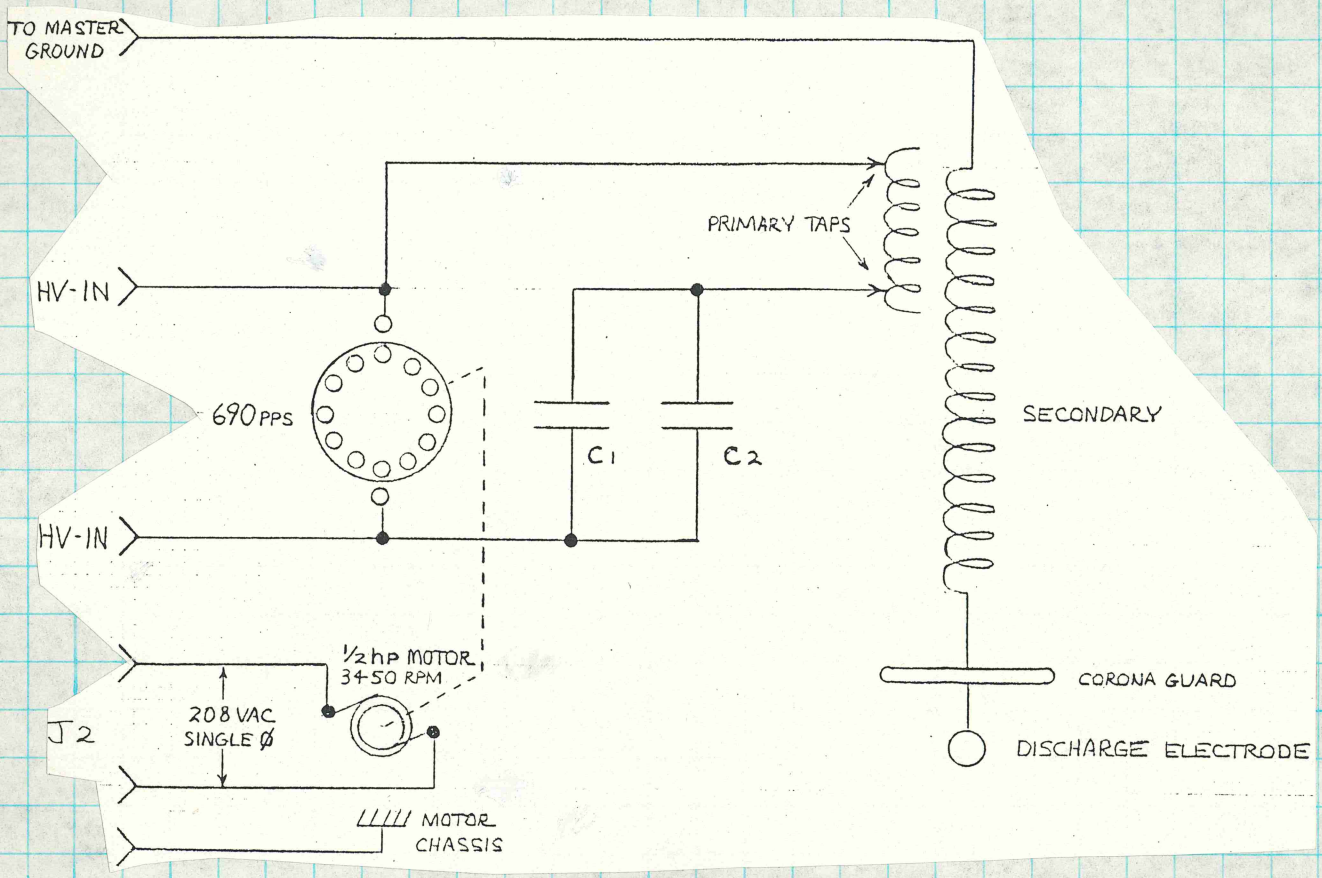
MOSI ELECTRIC PLAZA GAZEBO FLOOR PLAN

SCALE: 3/4" = 1'-0"

1/15/81 Updated and altered 4-1-81 KH

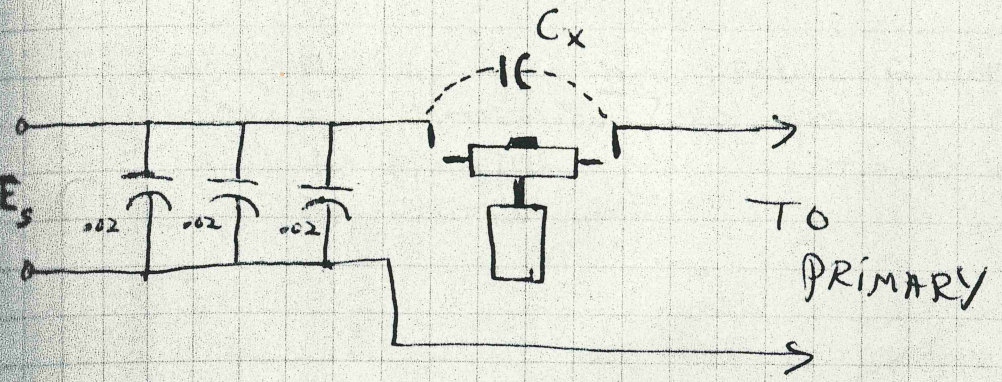

PLATFORM
DECORATIVE EAVES
TOP IS OPEN TO VENT
BUT IS ENTIRELY
SCREENED-IN
EAVE
BRACKET
LEGEND:
= FORMICA CO
PLYWOOD
= .500 WIRE
= TEMPERED
SAFETY GL


3'-7"
5" dia. YORKVILLE MIRROR GOLD 100 W. GLOBELITE LIGHTBULB AS FINIAL (4000 HOUR LIFETIME)
60° ROOF
COPPER SHEATHED ROOF, NATURAL GREEN
PBR-6 BRACKET
OCTAGONAL TOWER W/ 8½" x 1' 6½" GLASS INSERTS
7'-3½"
32° ROOF
CLEAR LIGHT BULBS ON RAFTERS YORKVILLE BUBBLELIGHT CLEAR 25 W. BULB # 8363, 10091, 8361 OR 10215, (2000 HOUR LIFETIME)
2" O.D. POLISHED BRASS TUBING
COPPER SHEATHED ROOF, NATURAL GREEN
BR-4 BRACKET 1 ea. per post 12 total
#1075 GRILL 1 ea. per gallery 12 total
35"
16'-4½"
9'-9"
9'-4"
360 SPANDREL 1 ea. per gallery 12 total
12"
1'-2" approx.
¾" WOOD DECK w/ FULL SAFETY SCREENS BENEATH
WOOD PLANK DECK
6"
CONCRETE FLOOR
2 x 6 SUBFLOOR w/ PLYWOOD COVERING



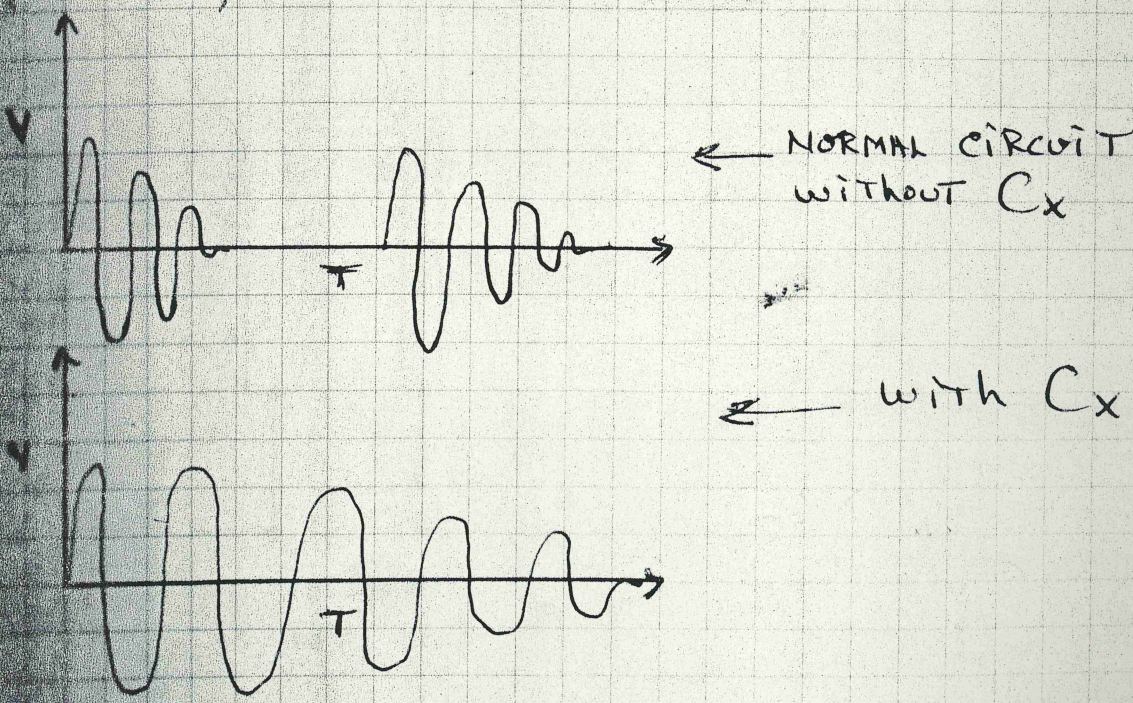
Model 9 Tesla Coil

"POULSON PRINCIPLE"
CIRCUIT FOR PROLONGING RING DURATION WITH ROTARY SPARK GAPS



C_x = .01 MFd (OR LESS) | 2700 PF, 40 KV (DC)

ATTACH ACROSS SPARK GAP. THIS WILL CAUSE MORE RAPID ELECTRODE WEAR, HOWEVER, THIS CAPACITOR WILL SUPPLY ENERGY TO FORM THE PLASMA. THIS EFFECT ACTUALLY PRODUCES A NET NEGATIVE RESISTANCE THROUGH THE SPARK GAP!



← NORMAL CIRCUIT WITHOUT C_x

← WITH C_x

THIS INCREASED RINGING WILL NOT PRODUCE POWER ARCS IN THE SPARK GAP AS THE DURATION (REST PERIOD) BETWEEN FIRINGS WILL NOT BE EFFECTED. NET EFFECT ON OUTPUT OF TESLA COIL IS INTERESTING.

CALCULATING LOGARITHMIC DECREMENT

$$\delta = \frac{R}{2\pi Lf} = \frac{2\pi R\sqrt{LC}}{2L} = \pi R\sqrt{\frac{C}{L}}$$

where: δ = LOGARITHMIC DECREMENT
R = CIRCUIT RESISTANCE IN OHMS
C = CAPACITY IN FARADS
L = INDUCTANCE IN HENRYS

example:

$$\delta = \pi R\sqrt{\frac{C}{L}} = (3.14)(5\ \text{ohms})\sqrt{\frac{6.0\times10^{-8}\ \text{F.}}{2.14\times10^{-3}\ \text{hy}}}$$

$$= 15.70\sqrt{2.73\times10^{-4}} = (15.70)(1.65\times10^{-2}) = 25.90\times10^{-2}$$

$$= .2592 = \text{decrement FACTOR}$$

TUNING FOR MAXIMUM OUTPUT

EQUATION:

$$\frac{V_s}{V_p} = \rho\sqrt{\frac{C_p}{C_s}} = \rho\sqrt{\frac{L_s}{L_p}}$$

where: V_s = Sec. output voltage (max.)

V_p = primary voltage

C_p = primary circuit capacitance

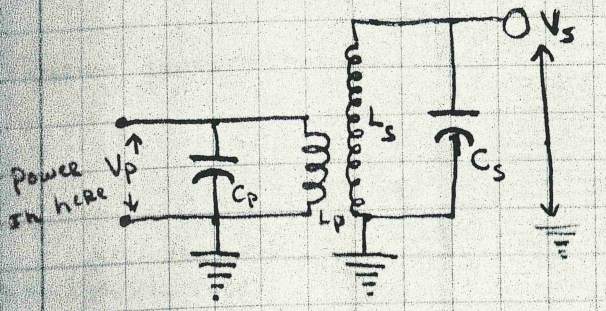
C_s = secondary circuit capacitance

L_p = primary circuit inductance

L_s = secondary circuit inductance

ρ = efficiency factor usually related to coefficient of coupling (M).

CIRCUIT DIAGRAM:



DEDUCTIONS:

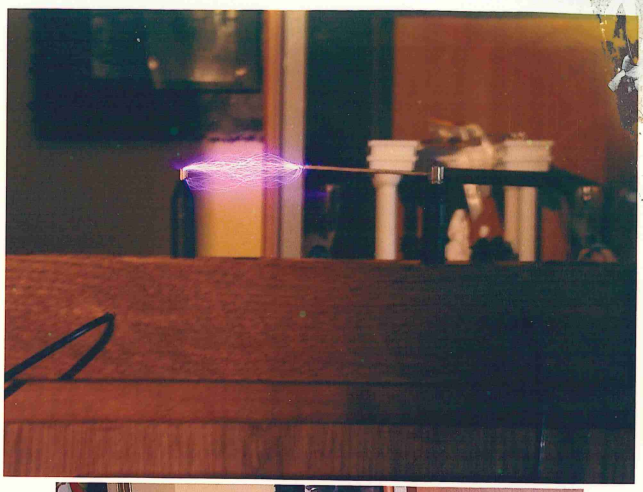
$V_{s(max)} \Longrightarrow C_p$ and L_s large

$V_{s(max)} \Longrightarrow C_s$ and L_p small

Goodlet, Perry, et al



LOW - SETTING - 1



MEDIUM - SETTING 4



HIGH - SETTING - 7

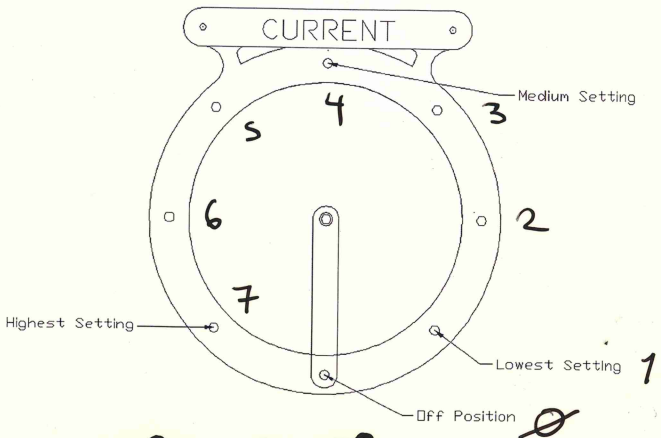








ALWAYS TURN SWITCH WITH POWER OFF TO AVOID ARCING
(ALL BUTTONS ARE ACTIVE)

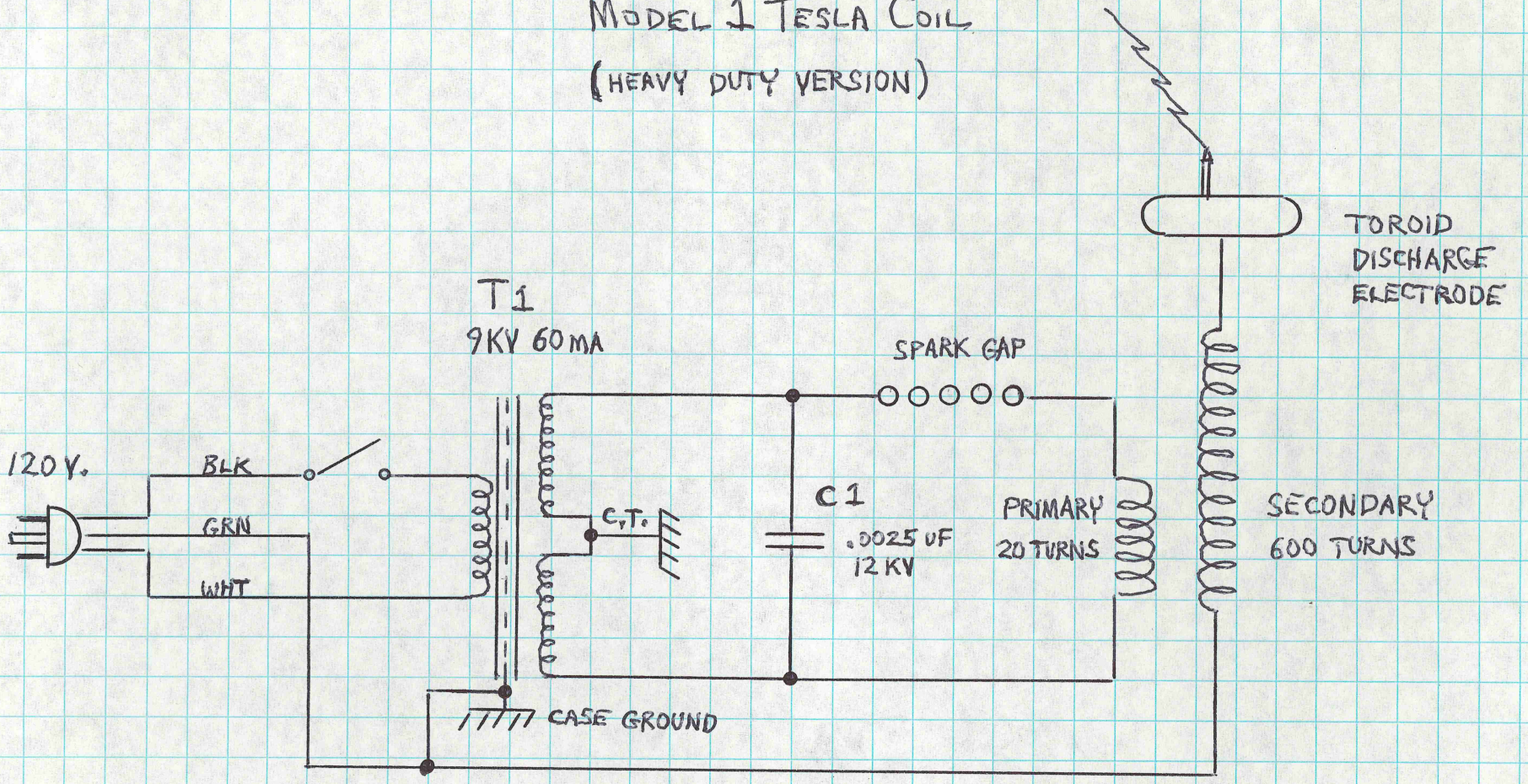


INSERT POWER CORD HERE.

TOM MANNING MODEL 1 2002
MIC SYSTEMS INC,

MODEL 1 TESLA COIL

(HEAVY DUTY VERSION)



WCW; 4-26-02

William C. Wysock
Tesla Technology Research
2527 Treelane Avenue
Monrovia, CA 91016-4951
(626) 359-1373
May 8, 2002

MIC Systems, Inc.
202 E. Cranford Avenue
Valdosta, GA 31602
Attn: Dr. Thomas J. Manning

HEAVY DUTY MODEL ONE TESLA COIL

1) SYSTEM DESCRIPTION

The Heavy Duty Model One Tesla Coil designed for extended periods of continuous operation.
Base Unit. The base unit is built on a wood disc that is 24 inches in diameter. This provides sufficient spacing for all the components.

Secondary Coil. The secondary coil is wound on a phenolic tube and features a brass screw-on bottom spacer for easy removal of the coil during transport. The secondary winding consists of 600 turns of #24 gage magnet wire. This winding is coated with a heavy layer of polyurathane insulation. The top-mounted porcelain feed-thru insulator and 2 inch brass spacer rod provides the correct dimensions for mounting the hollow-spun aluminum toroid and brass discharge corona point.

Primary Coil. The primary coil is wound on a phenolic tube and consists of 20 turns of # 12 gage wire. There is an additional phenolic insulation sleeve that fits between the primary and secondary coils. This sleeve provides additional high voltage discharge breakdown that would otherwise occur between these windings.

Capacitor. The capacitor is a high power mica transmitting type rated at 0.0025 mfd. At 12 KV. The use of this type of capacitor is key to the ability of this system to operate for extended periods of time.

Four-segment Spark Gap. The design of this gap features 2 percent thorium-doped screw-in electrodes with large brass cooling flanges. The design of this gap is also key to the ability of this system to operate for extended periods of time. This gap is maintenance-free.

Power transformer. The high voltage power supply transformer is rated at 9 KV and 60 ma. It is a current-limiting type and draws approximately 540 VA from a standard 120-volt power line. Note that the metal case, transformer core and center tap of the high voltage winding are all connected to the ground wire of the a.c. power cord.

The attached schematic diagram shows the electrical connection of these components.

2) PERFORMANCE

The Heavy Duty Model One Tesla Coil is capable of far superior performance, compared to the typical hand-held vacuum leak detector type Tesla Coil. It is easily capable of delivering very hot 6 inch-long arcs that are very robust in nature. This system may be operated for any duty cycle up to 24 hours continuous duration. However, shorter duty cycles of operation are preferred.

3) THEORY OF OPERATION

The Heavy Duty Model One Tesla Coil is of the standard spark gap-driven type. The high voltage transformer supplies an electrical charge to C1 (mica capacitor). This capacitor connected in series with the four-segment stationary spark gap and Tesla primary coil to form a "tank" oscillation circuit. The resonant frequency of this circuit is determined by the capacitance of the capacitor (in microfarads) and the inductance of the Tesla primary winding (in microhenrys) and forms the necessary circuit for converting the 60 Hz high voltage from the transformer to a certain radio frequency (RF). The primary coil is inductively coupled to the secondary coil. The voltage rise in the latter coil is based on the inductance ration between the two windings times the effective charging voltage in the tank circuit. Because this transformer operates at radio frequencies instead of 60 Hz, no iron is needed for a core material. Instead, only air is used as a core for both these windings.

4) WARNING NOTICE

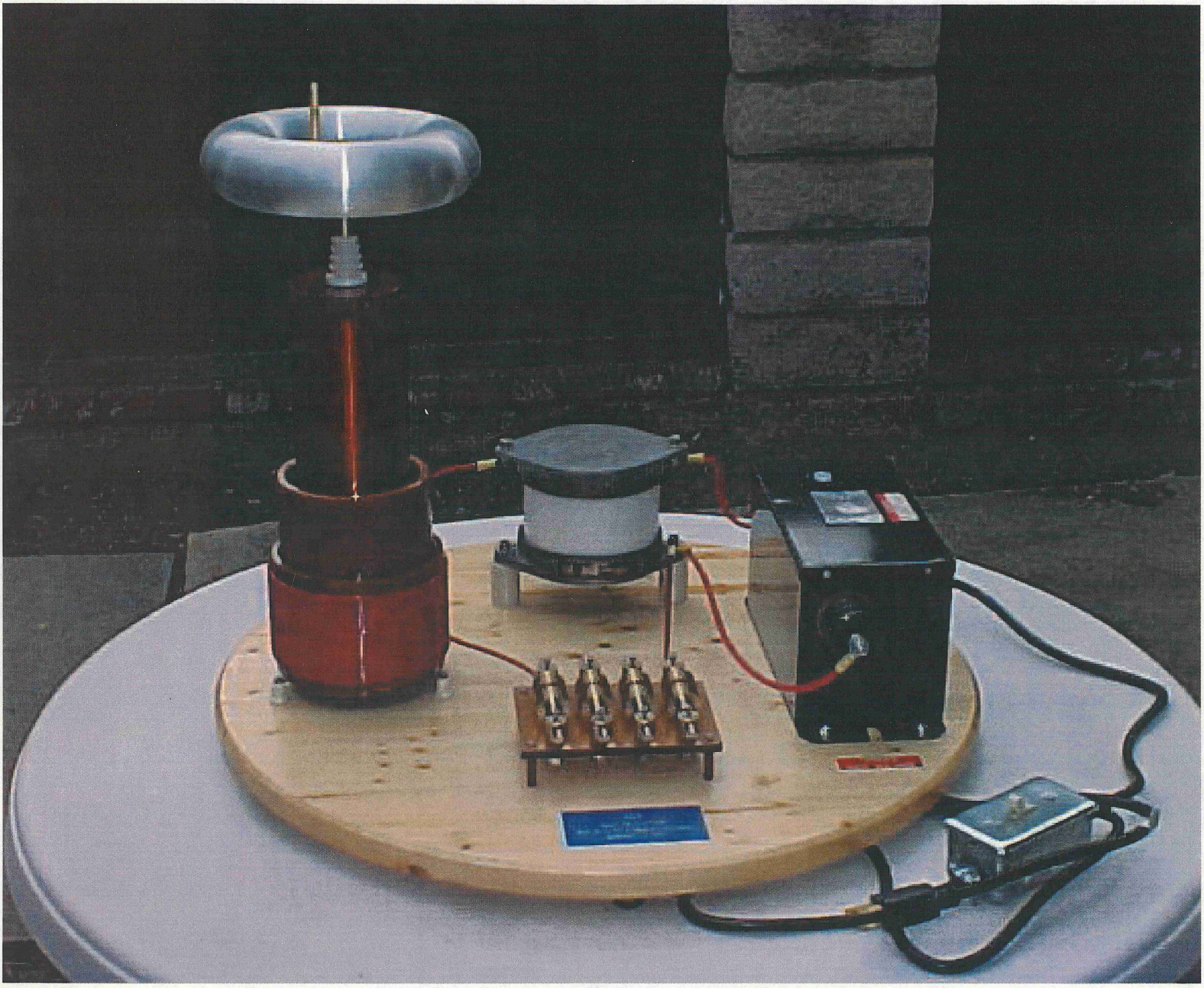
The Heavy Duty Model One Tesla Coil contains a **LETHAL ELECTRICAL SHOCK HAZARD.** Only qualified and trained personnel who have had sufficient safety training in the handling and usage of high voltage equipment must operate it.

This Tesla Coil produces radio frequency (RF) fields (RFI). For this reason, care must be taken not to operate the coil in close proximity to other sensitive electronic equipment.

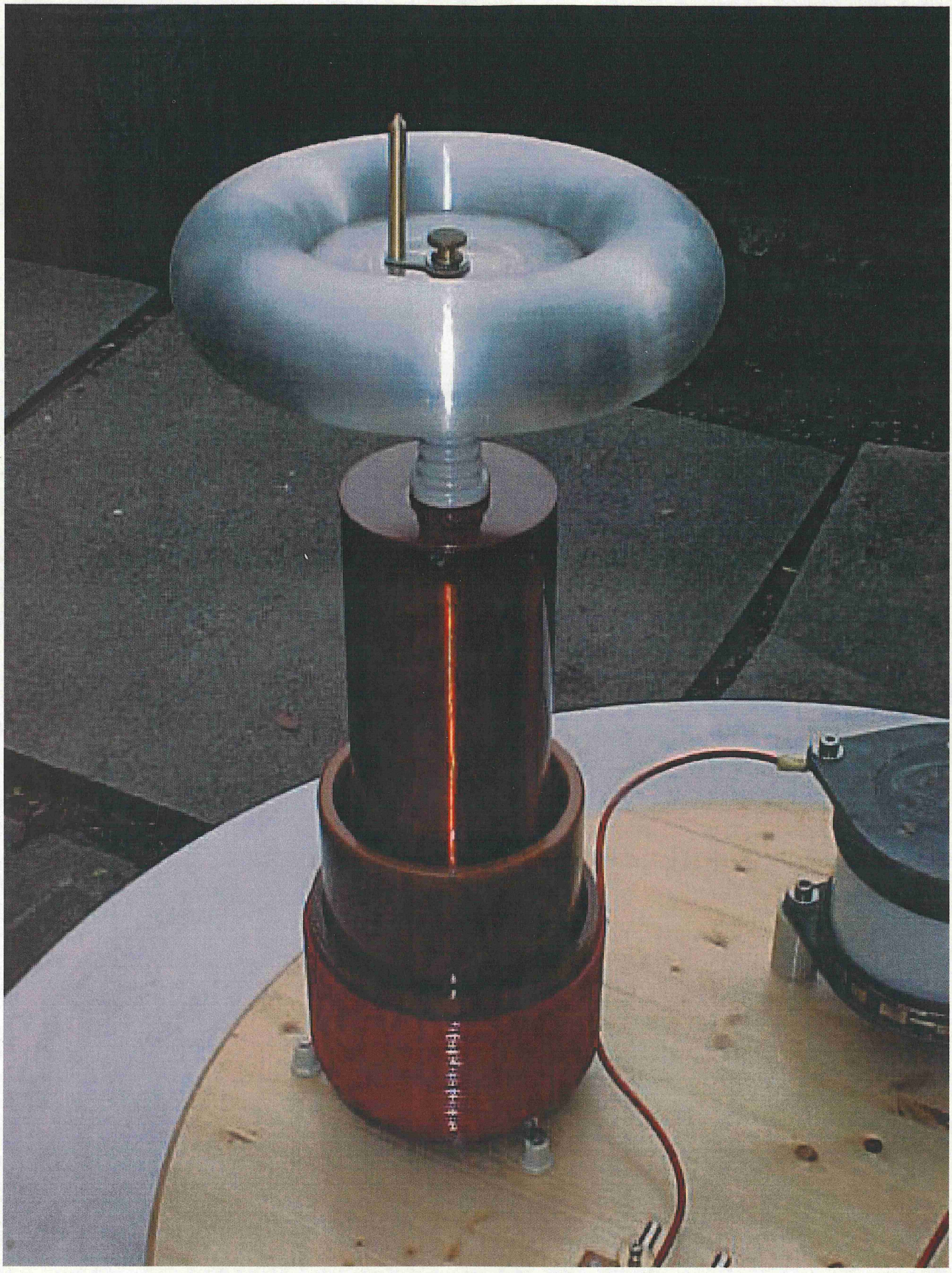
4) MAINTENANCE

The only maintenance that is required on this Tesla Coil is routine cleaning of any dust or debris on the base unit and coil surfaces. The spark gap has been factory-set for optimum performance. The tungsten-faced electrodes are designed for hundreds of hour's life expectancy. The only required maintenance on the stationary electrodes is to rotate them in their holders periodically, to promote an even edge wear pattern. Typically, this may be done only once a year, depending on the total accumulated run time of the gap. These electrodes are screw-in types and replacements are available from Tesla Technology Research.

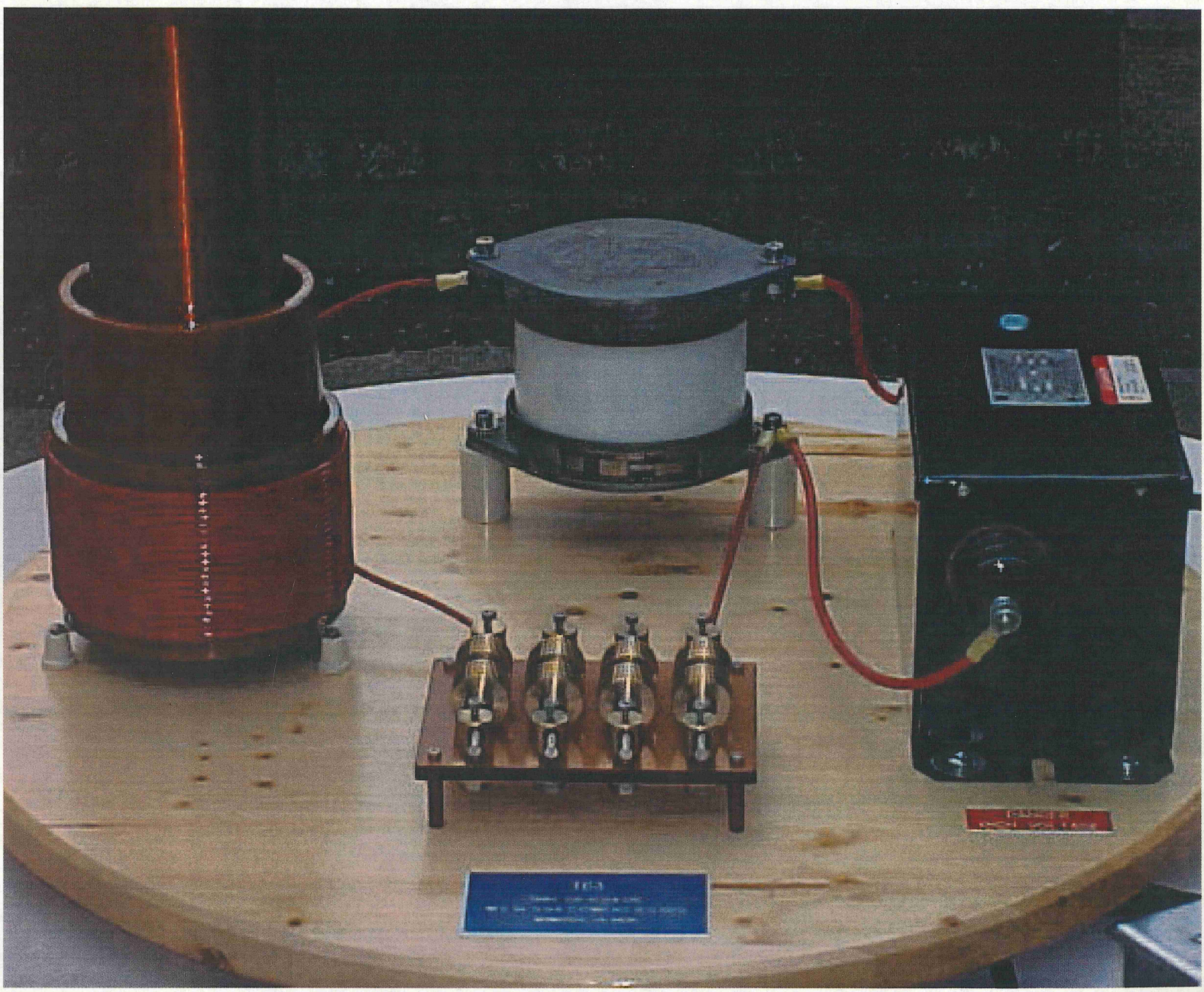
Model 1HD-5.JPG



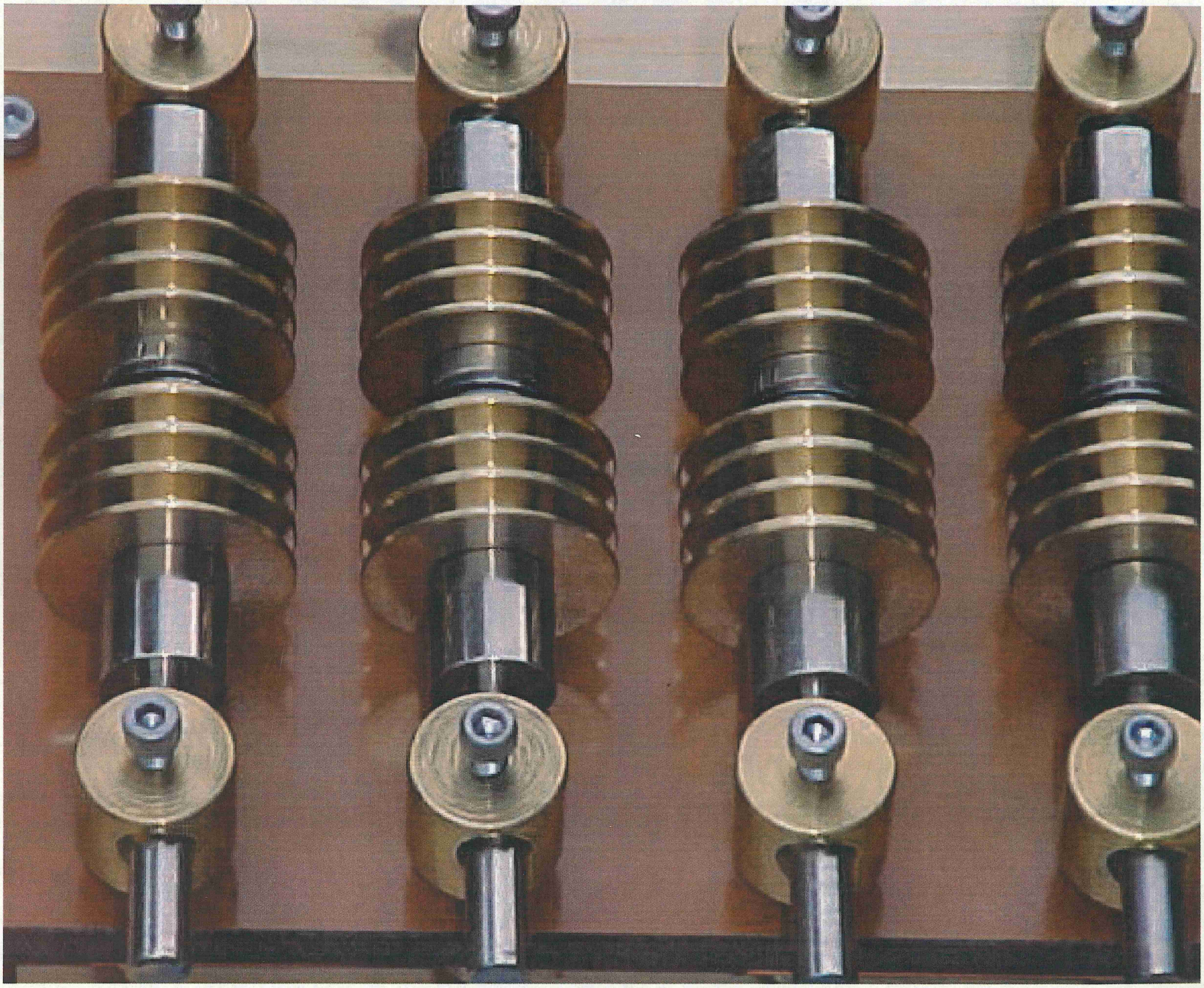
MODEL 1HD-4.JPG



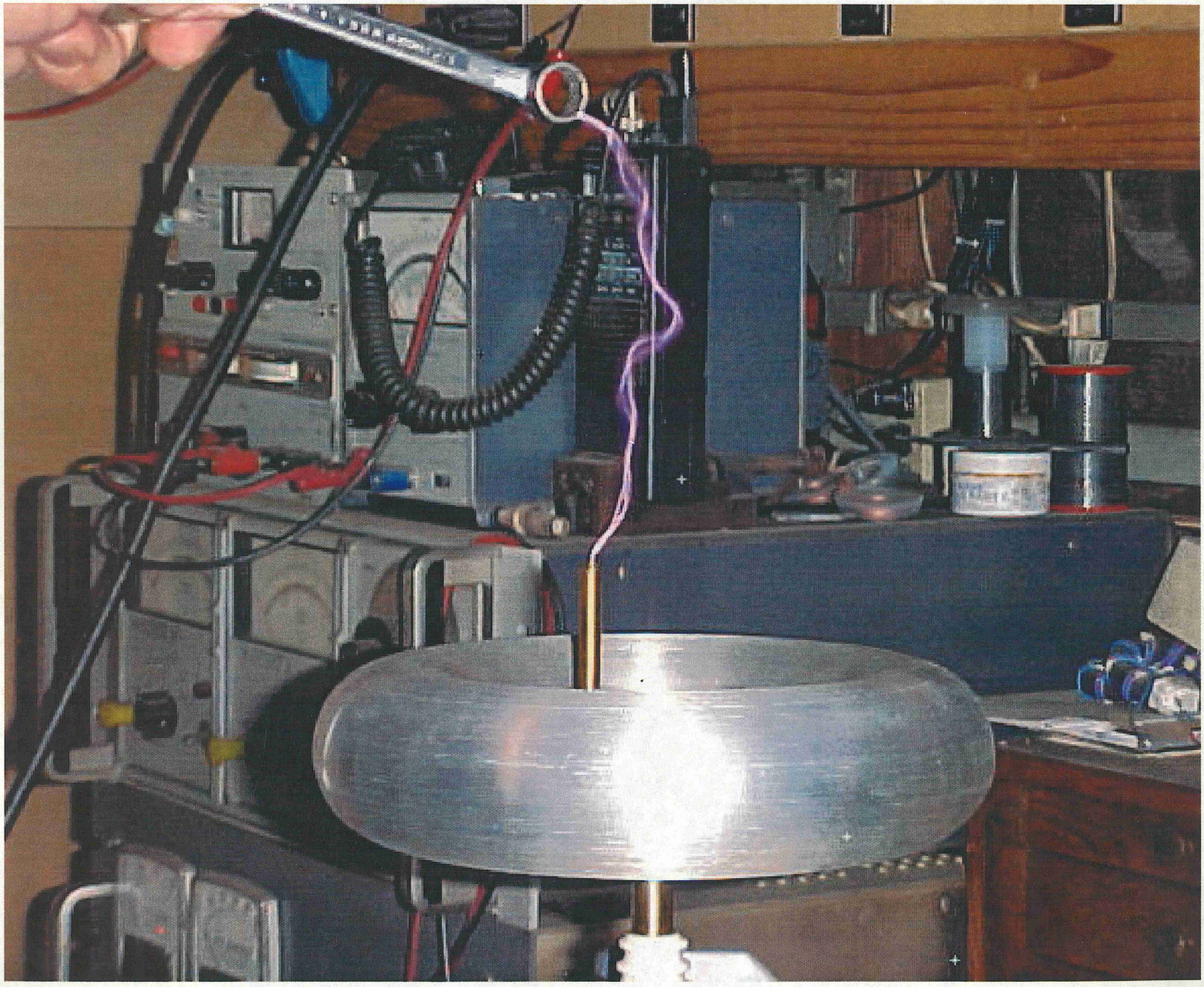
Model1HD-2.JPG



MODEL1HD-3.JPG



MODEL 1HD-6.JPG



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April 29, 2002

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HEAVY DUTY MODEL ONE TESLA COIL INSTRUCTIONS

1) ASSEMBLY AND INSTALLATION.

The Model One Tesla Coil should be placed in a clean and dry environment. The secondary coil simply screws on to the ground terminal located in the bottom-center of the Tesla primary coil. After the secondary coil has been screwed onto the ground terminal (hand-tighten only), next place the phenolic insulating sleeve so that it rests between the primary and secondary coils. The Model One Tesla Coil comes equipped with a grounded a.c. power cord. This cord may be plugged into any a.c. outlet that has a proper grounded receptacle.

If you desire to vary the output discharge from this coil you may use an autotransformer (Variac), that is rated for 10 amps. This autotransformer must also be properly grounded. It is possible to obtain smooth performance at reduced input voltages by readjusting the spacing on the four stationary spark gaps. The spacing of these gaps (as supplied), are optimized for a full input of 120 volts to the neon sign transformer. Since this coil is capable of delivering an arc of slightly greater then six inches in length, you may wish to run this coil at a reduced power setting for your application.

A supplementary ground strap is provided for additional electrical safety. It should be connected to the ground terminal located next to the a.c. input terminals on the neon sign power transformer. Connect the free end (with alligator clip provided) to a separate earth ground reference (such as a copper cold water pipe or ground rod). Attach the 6 inch aluminum toroid discharge electrode and brass corona point to the top of the secondary coil. Note that there is a small aluminum spacer-collar that fits inside the center hole of the toroid.

You may wish to replace the top-mounted brass corona pointed discharge electrode with a suitable short length of high voltage insulated wire, to facilitate connection to a remote high voltage test point or fixture. The maximum length of this wire should not exceed 24 inches.

2) WARNING NOTICE AND PRECAUTIONS.

The Model One Tesla Coil contains a **LETHAL ELECTRICAL SHOCK HAZARD.** Only qualified and trained personnel who have had sufficient safety training in the handling and usage of high voltage laboratory equipment must operate it.

The Model One Tesla Coil produces a radio frequency (RF) field that may damage other sensitive electrical and electronic equipment. This coil should not be installed or operated in close proximity to other equipment such as desktop or laptop computers and the like. The recommended minimum safe distance for such devices is not closer then 6 feet from the coil.

The insulation coating on the secondary coil may cause dust particles to accumulate on the surface of the coil, due to electrostatic attraction over a period of time. If this is observed, simply detach the secondary coil from the base and gently wipe the entire surface of the coil with a soft, clean cotton towel or cleaning rag. All components of the Model One Tesla Coil must be kept clean and dry at all times for proper operation.

3) MAINTENANCE.

The only maintenance required on the Model One Tesla Coil is routine cleaning of any dust or debris on the base unit and coil surfaces. The four-segment stationary spark gap has been factory-set for optimum performance when the power input is set at 120 volts. Each gap is about 0.050 inches. This dimension may be reduced if it is desired to operate the coil at lower input levels. Use a mechanic's feeler gauge to make adjustments. The tungsten-faced electrodes are designed for hundreds of hour's life expectancy. They are screw-in types and replacements are available from Tesla Technology Research.

4) WARRANTY.

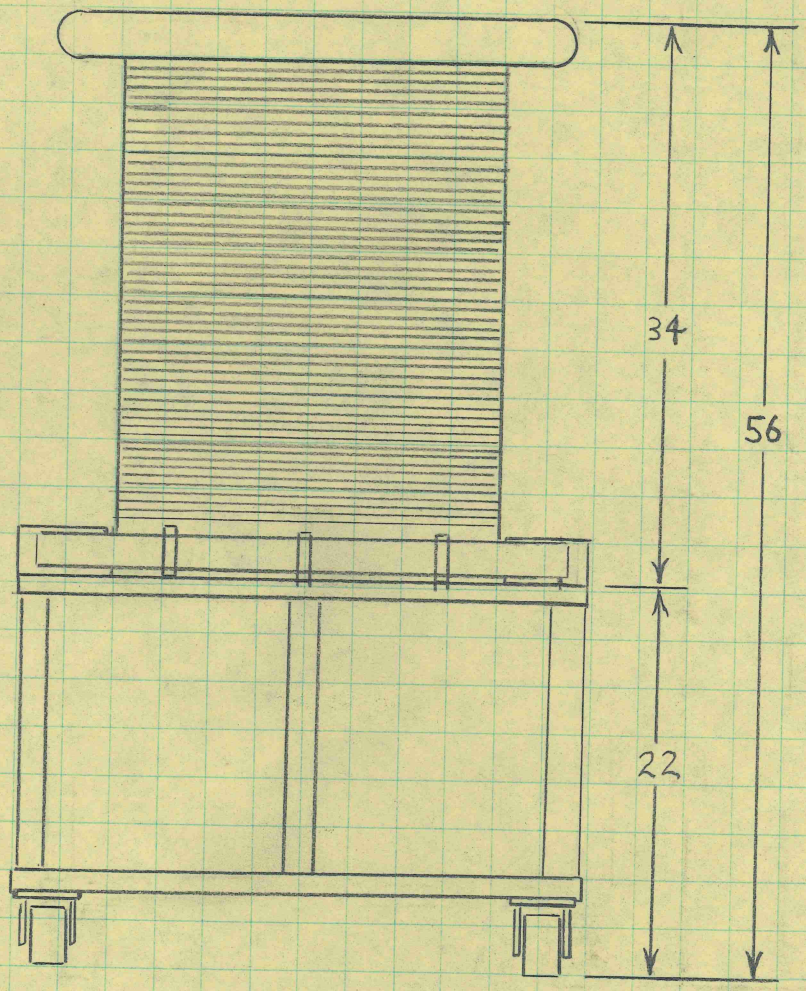
Tesla Technology Research warrants the Model One Tesla Coil to be free of defects, both in components and workmanship. Due to the requirement for extremely prolonged periods of operation, no additional warrants are expressed or implied. In the event of any component failure, Tesla Technology Research shall review the condition of any returned items and may elect to repair and or replace defective items either at no charge to the customer or on a pro-rated basis.

Best Regards,

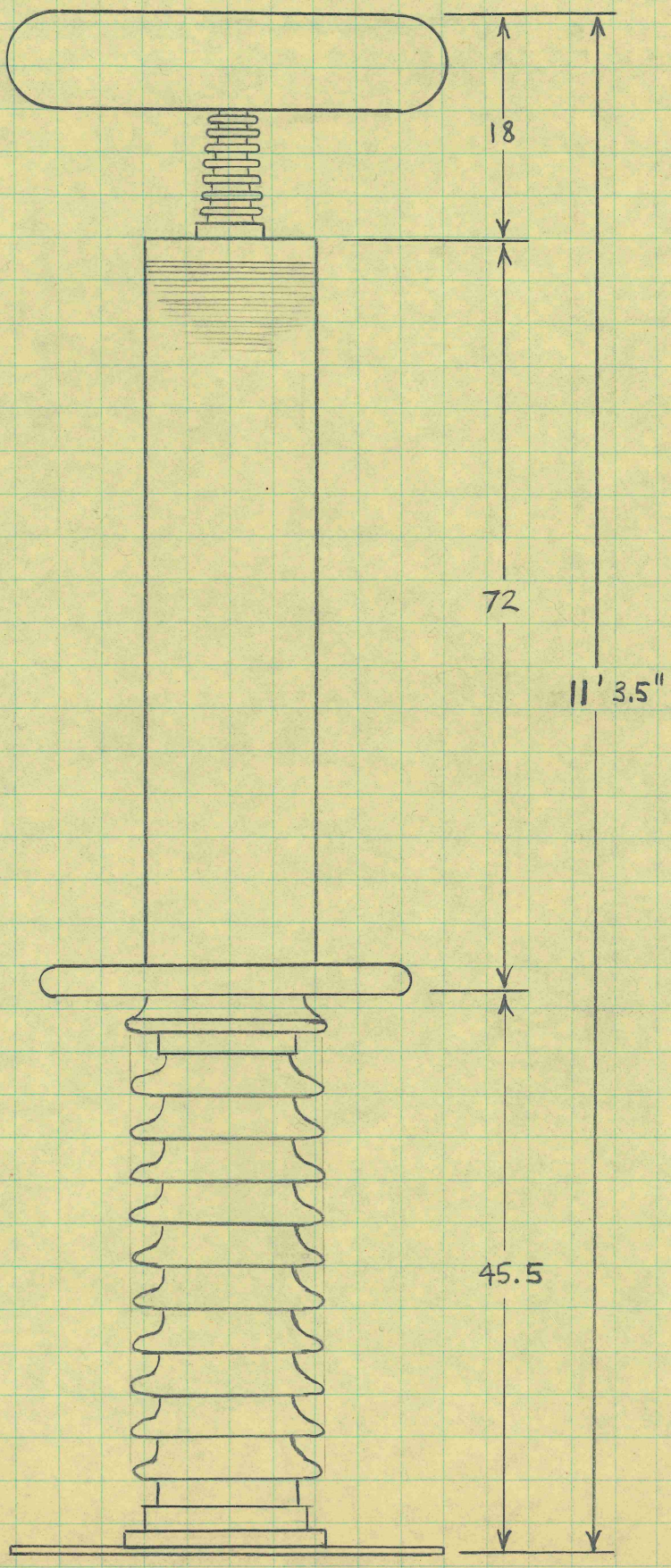
MODEL TM
BASE
8/21/03

1.50
.20
1.70

3.40
1.70
CASTOR 1.20 2.40
2.60 (1.30)
INSULATOR 2.60 (1.30)

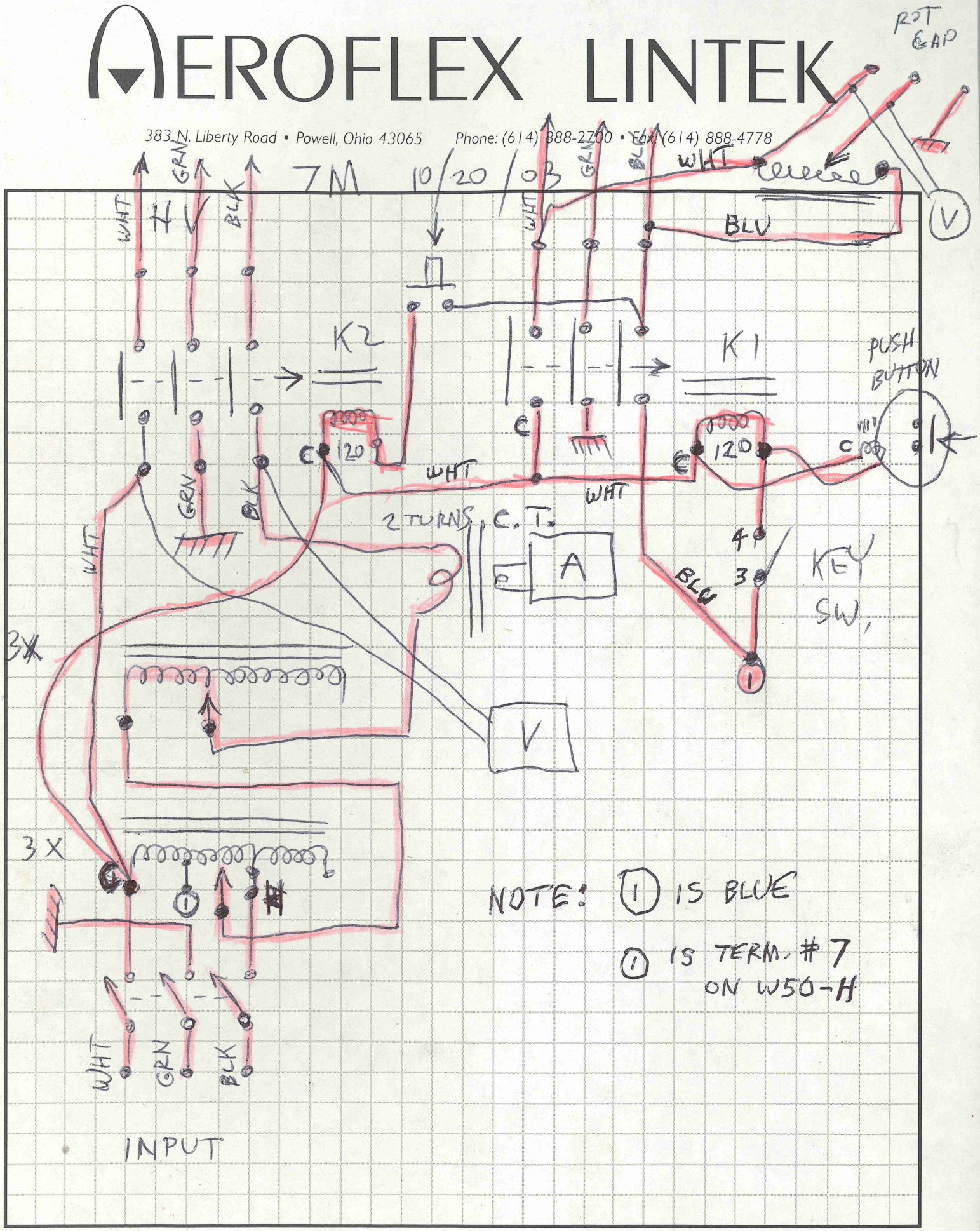


9-16-92



9-16-92

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2.130

AEROFLEX LINTEK

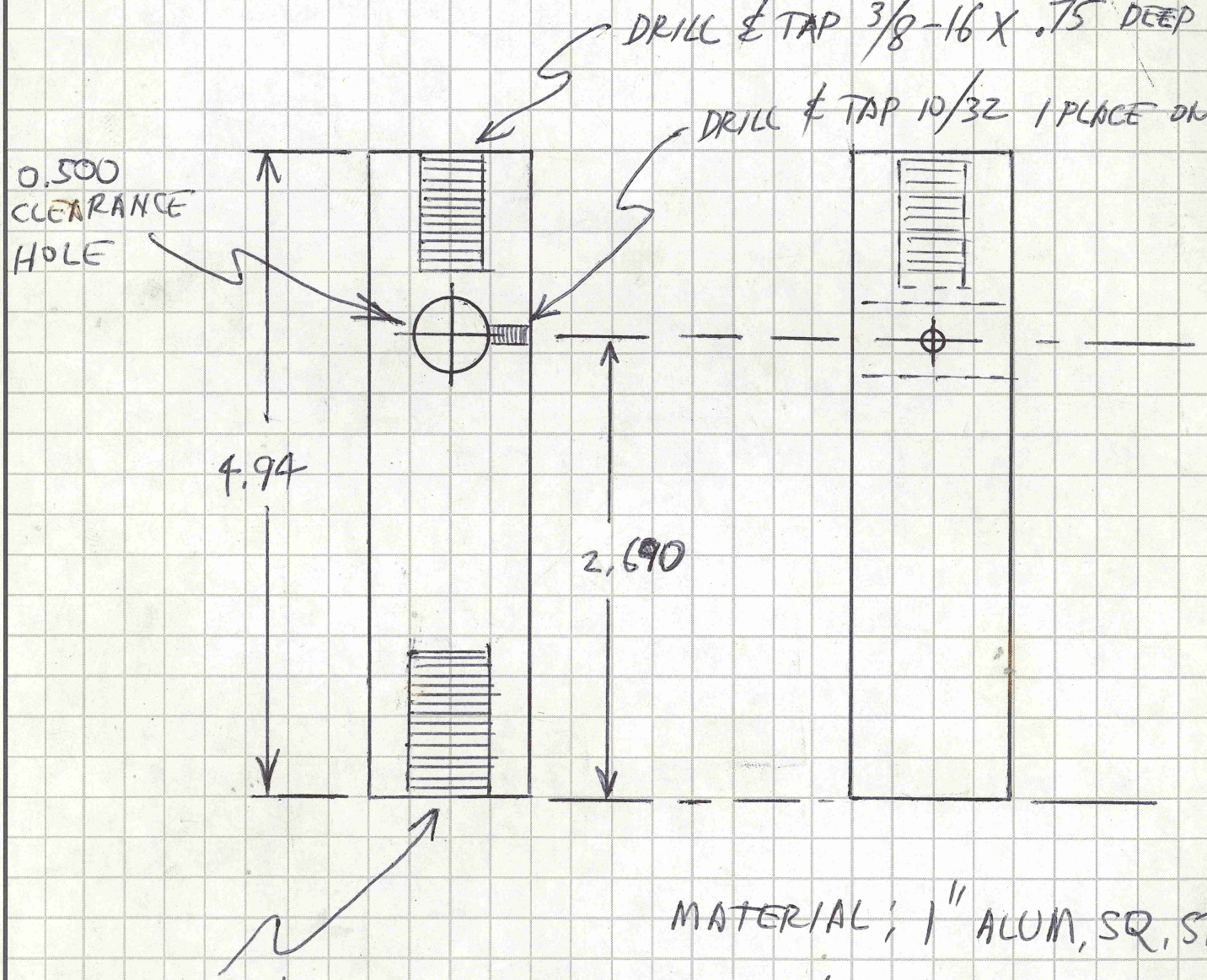
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2.127

MODEL 7M 10/6/03

ROTARY GAP STATIONARY ELECTRODES

PLATFORM TO ELECTRODE CENTER = 4.820



MATERIAL; 1" ALUM. SQ. STOCK

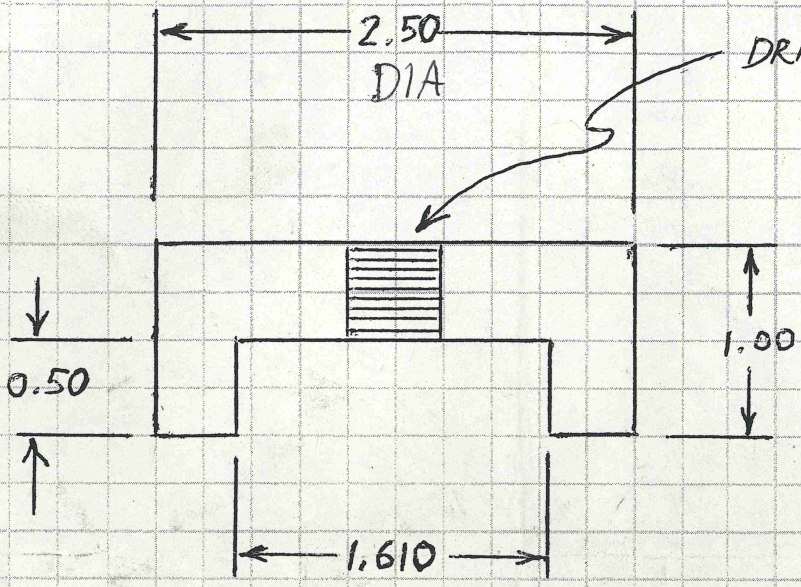
MAKE 4 EA.

BRIGHT FINISH

AEROFLEX LINTEK

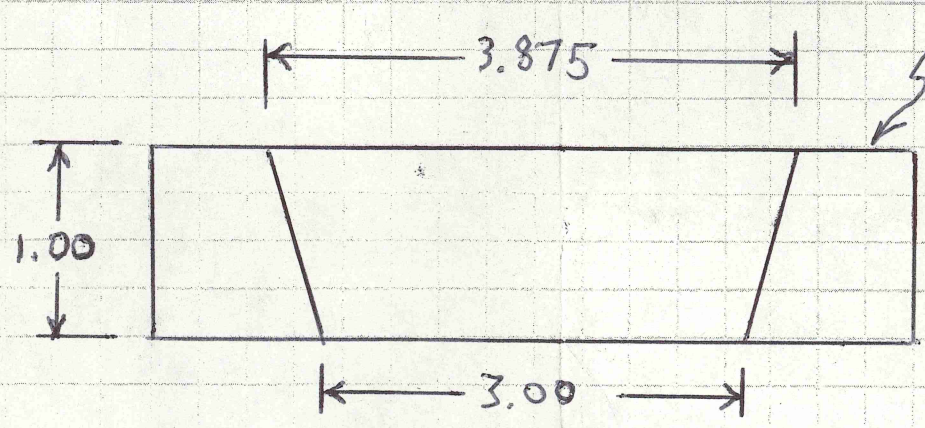
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MODEL 7M EXTRA COIL TOP TERMINAL 10/1/03



MAKE 1 EA.

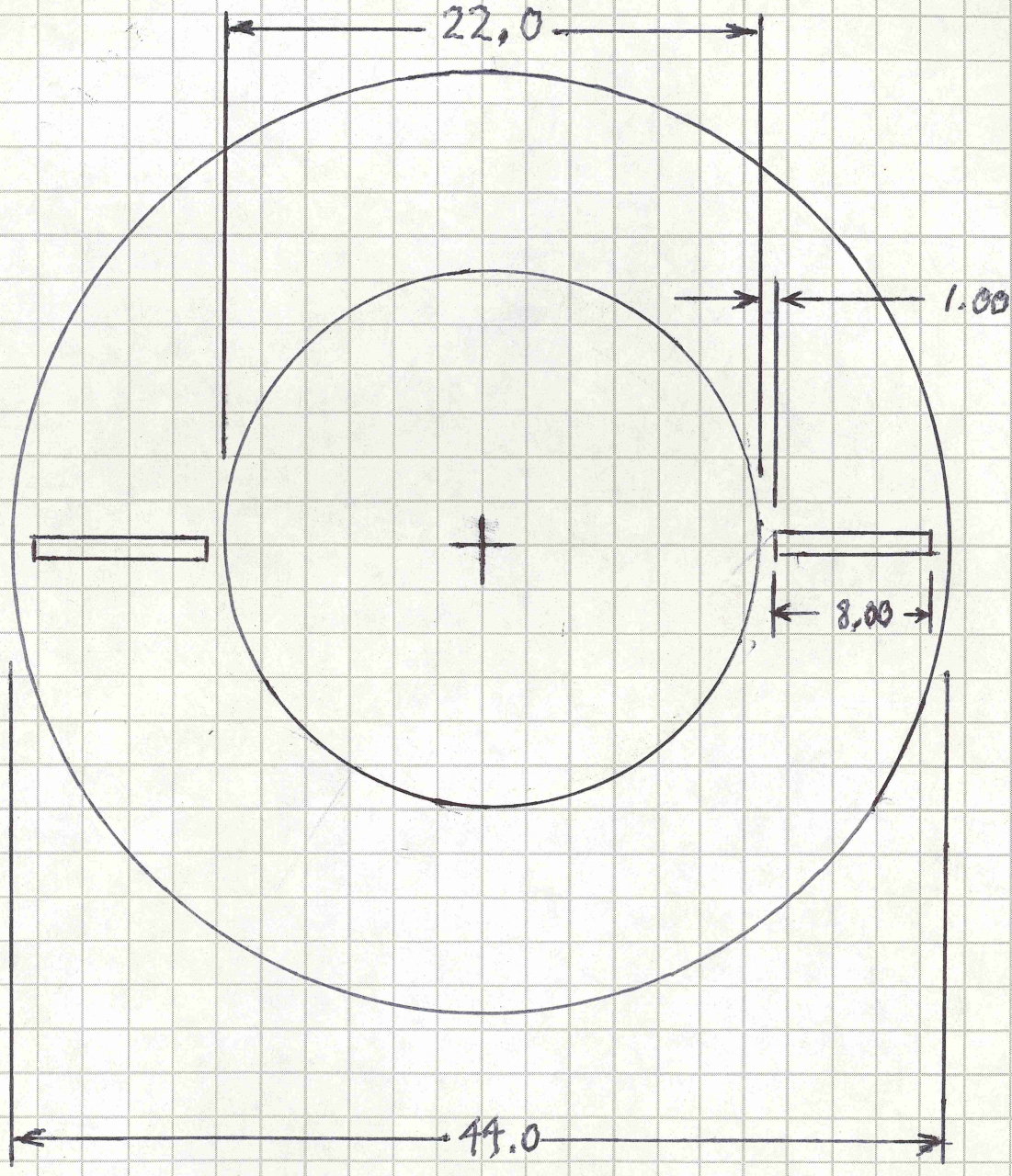
BRASS (BRIGHT FINISH)



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MODEL 7M BASE PLATE 10/7/03



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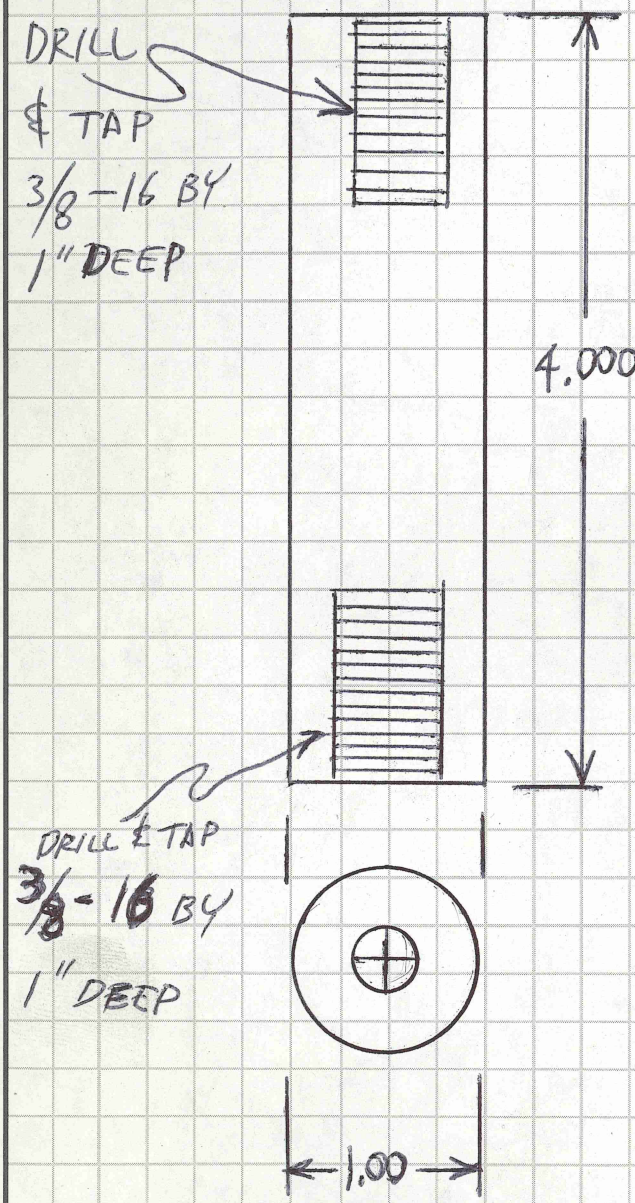
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MODEL 7M ROTARY GAP
10/6/03

MAKE 4 EA,

ALUMINUM.

BRIGHT FINISH.



MATERIAL: 6061-T6 ALUMINUM

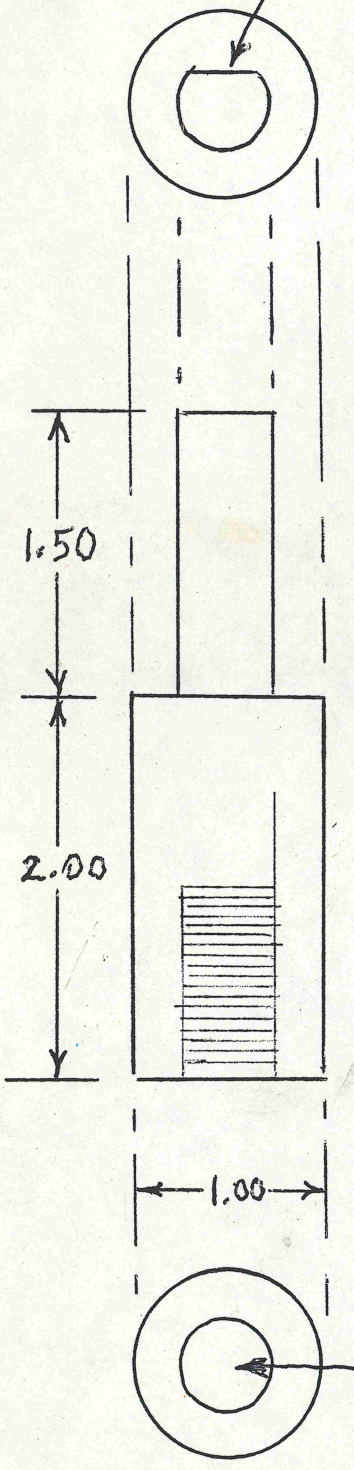
8/25/03

MODEL 7M EXTRA COIL BASE PLATE MOUNTS.

MAKE 4 EA.

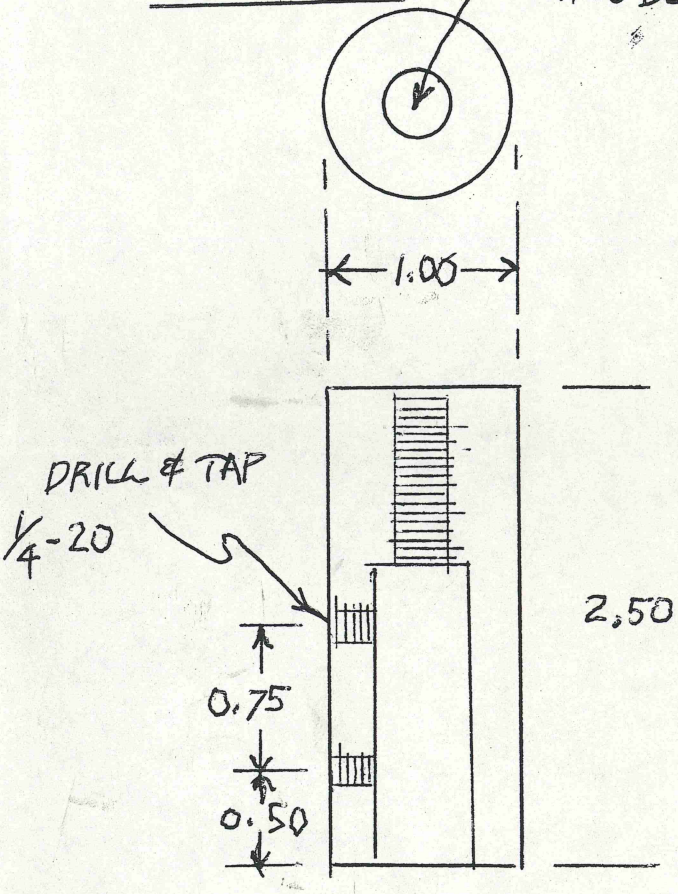
MILL FLAT

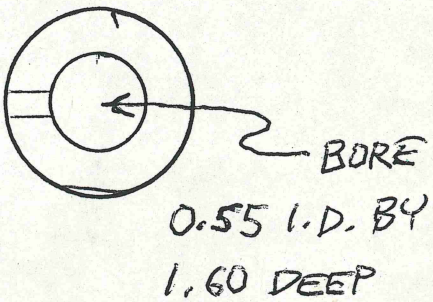
SAND ALL PIECES TO BRIGHT FINISH.



MAKE 4 EA.

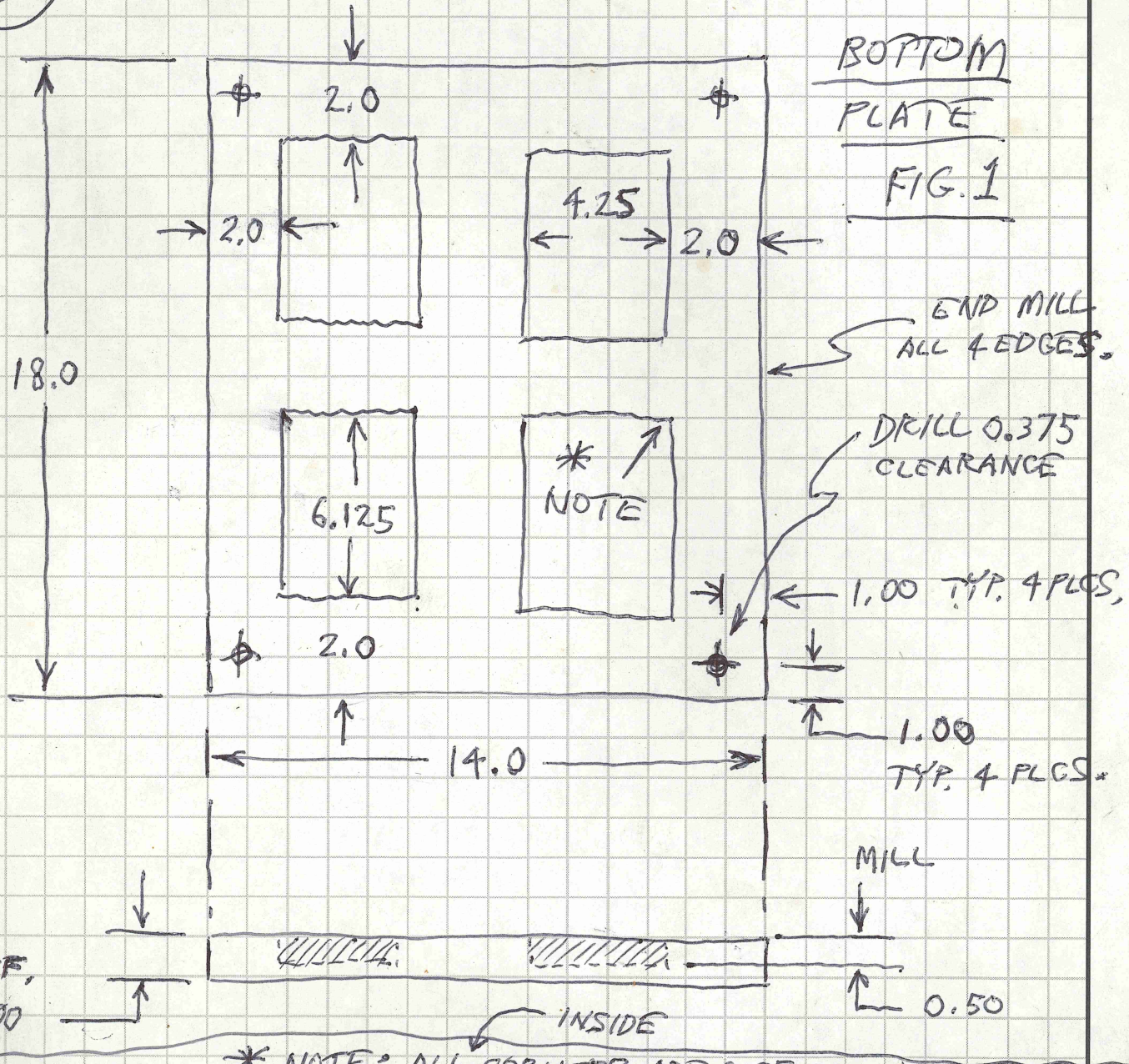
DRILL & TAP 3/8-16 BY 1.00 DEEP





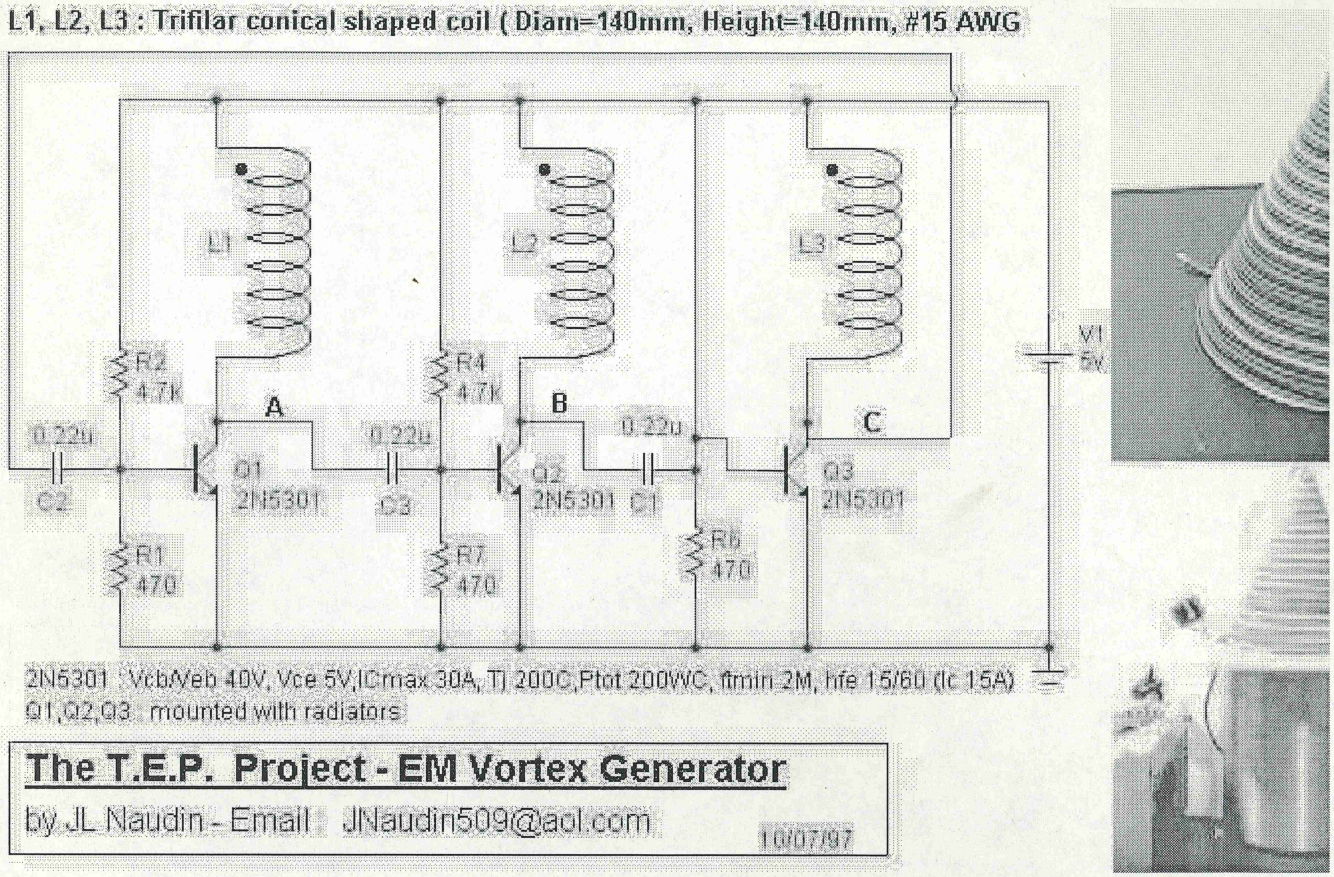
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383 N. Liberty Road • Powell, Ohio 43065 Phone: (614) 888-2700 • Fax: (614) 888-4778

(3) PLEXIGASS CAPACITOR STAND.



(4) PLEXIGLAS CAPACITOR STAND: TOP PLATE

SAME AS BOTTOM PLATE EXCEPT ALL HOLES MILLED THRU PLATE.



My purpose for winding this coil was to produce a rotating magnetic field in my alternative energy experiments; similar to the vortex J.L. Naudin was working with. After not having any luck with the pulsed trigger in the schematics above I sought to trigger the wye coil with a Tesla primary coil. My thought was that by connecting the three wires from the wye coil to the ends and middle of the primary I might get an oscillating magnetic field in the wye coil.

As seen in the photo below, I made the connections for a standard Tesla coil using a single thoriated tungsten spark gap, 15KV NST, six .324 mica caps connected in series and 3.75 turns of ¼" copper tubing for my primary circuit. I tapped the primary at both extremes of the tubing to start with.

The secondary winding was connected to the same extreme points as the primary plus the third wire was connected to the calculated middle of the primary tubing. The terminal was allowed to operate with no load and then with a copper ball.

Before assembling the coil in this manner, I tested the wye coil for its resonating frequency using a digital 20MHz oscilloscope and an audio frequency generator. The resonant peak for this coil extended from 50KHz to 100KHz, a very wide range. I checked this several times and the results were the same each time. I measured the inductance of each coil at 6.20mH, 6.23mH, and 6.25mH. The resistance of each coil was about 5.1Ohms. The diameter of the coil is 13.75" and is wound with three strands of 21-gage wire, joined at the center of the coil.

I assumed that if the resonant frequency range were correct, then it would be easy to oscillate this coil. It did seem plausible that the wye coil configuration was responsible for the wide

$$l = 2 \times pi \times R_{avg} \times N$$

Where l is the length of wire, R_{avg} is the average radius of the coil, and N is the number of turns. Thus

$$N / l = 1 / (2 \times pi \times R_{avg})$$

and

$$H = I / 2 \times pi \times R_{avg}$$

To get the total field power -

$$P_f = \mathcal{E} \times H \text{ or}$$

$$P_f = V \times I / 2 \times pi \times R_{avg} \times d \quad \text{Watts per cylinder}$$

Where $2 \times pi \times R_{avg} \times d$ is a cylinder as inferred in the diagram above.

From this, the nature of longitudinal waves in a flat spiral coil can be understood. The longitudinal wave is represented by current and circumference of the radius. It is clear that the longitudinal component of the flat spiral coil remains in the coil at all times. In actuality the full length of the flat spiral secondary fills up with charge much like a hose fills up with water. The "crest" of the water wave in the hose corresponds with the longitudinal "head" of the wave. Each time the head of the wave makes one full circle, it would appear from a radius perspective that a beat had occurred in the expansion of the wave from its center toward the outer winding.

The sum of all circumferences of the radii of the coil (same as total wire length of coil) is the stroke I mentioned in an earlier post.

$$I = \text{coulomb} / \text{sec}$$

$$\text{Stroke} = \text{meter} / \text{coulomb}$$

$$V = \text{meter} / \text{sec}$$

$$V = I \times \text{Stroke}$$

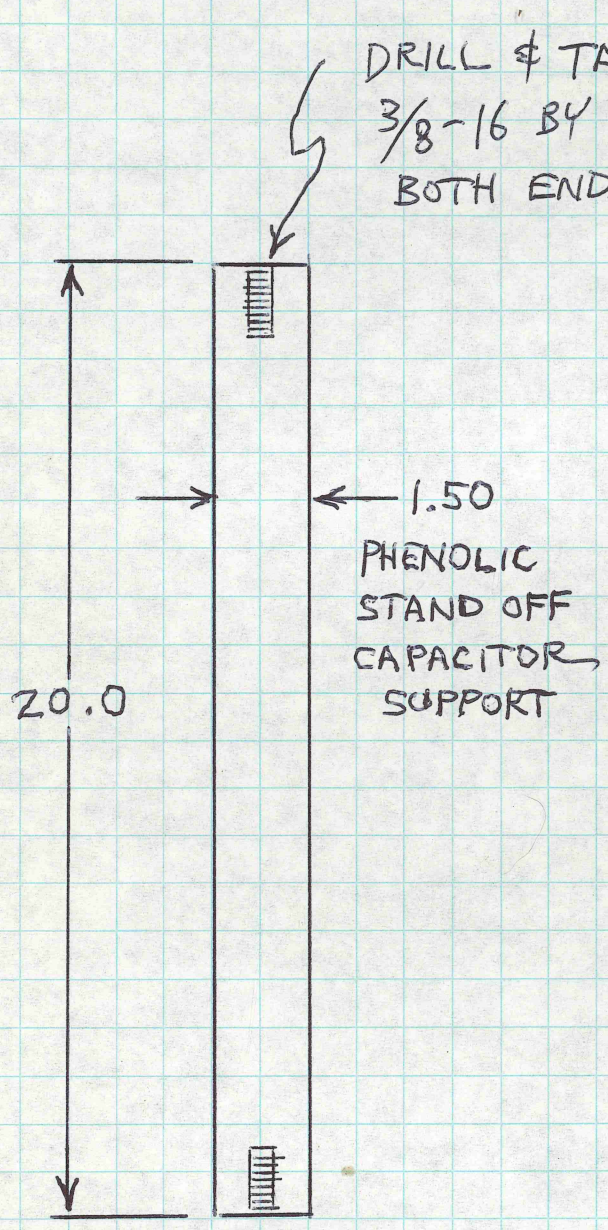
Where V is the velocity of the total charge.

As the current flows through the flat spiral coil the energy of each successive winding only adds in the direction of the propagation of the pulse. This is seen in the pulse model as the x axis and the units are in meters per second which is equal to the current times stroke. The potential in a flat spiral coil is not additive but linear. Just as the magnetic field is equal to current divided by 2 x pi x average radius, the electric field is equal to potential divided by vertical distance between two opposite charges. In a flat spiral coil oriented parallel to the surface of the earth, a negative charge builds under the coil and a positive charge builds above the coil.

8/26/03

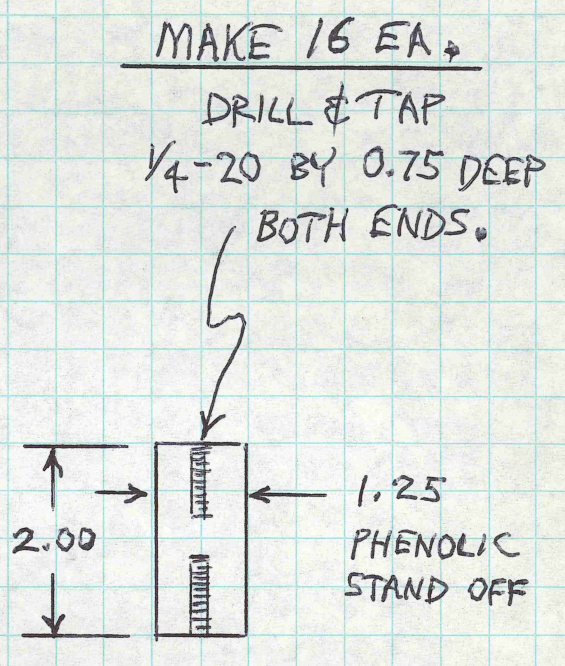
MODEL 7M

MAKE 4 EA.



MODEL 5D

MAKE 16 EA.

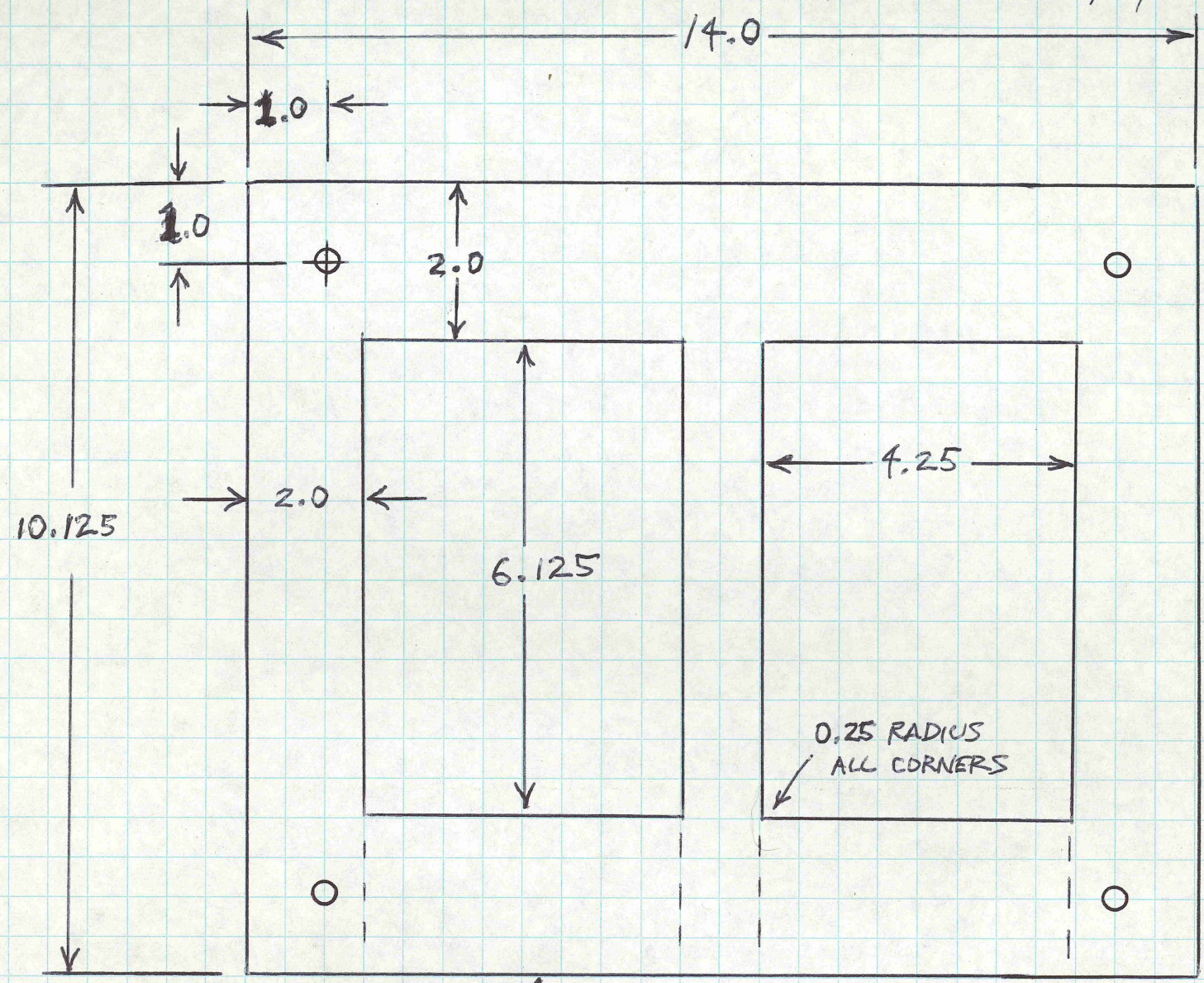


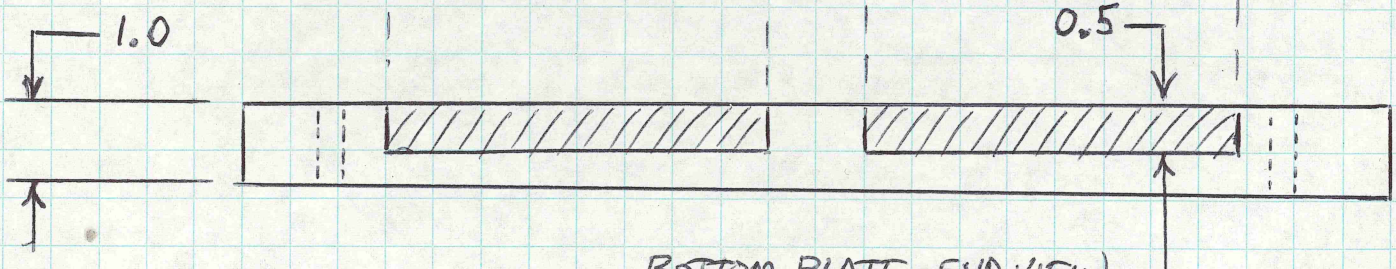
TOPS FORM 3314
LITHO IN U. S. A.

MODEL 7M

TOP PLATE - FACE VIEW

8/25/04





BOTTOM PLATE - END VIEW

TOPS FORM 33041
MADE IN U. S. A.

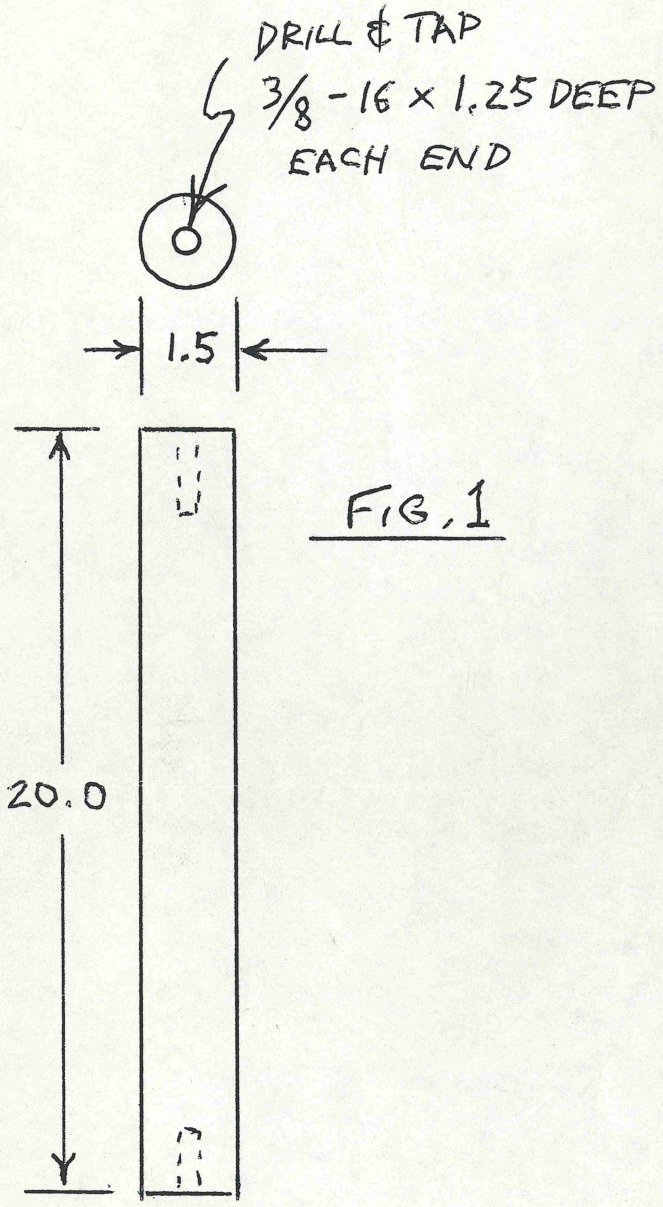


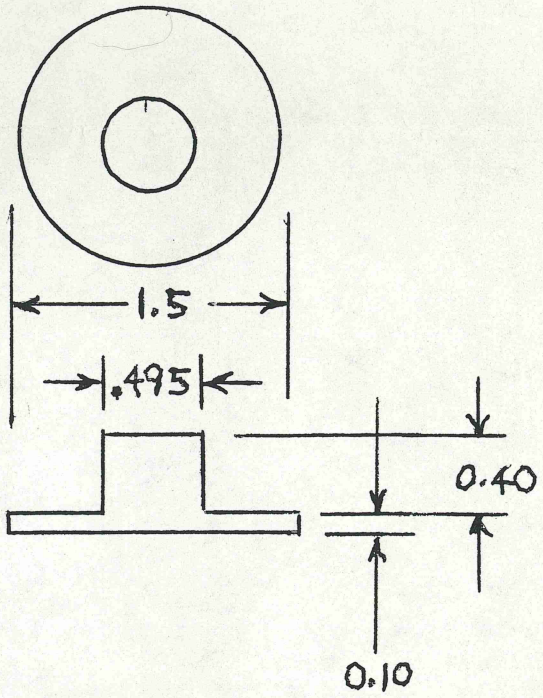
FIG. 1

PHENOLIC STANDOFF

MAKE 4 EA.

7-24-03

FIG. 2



BRASS FLANGE

MAKE 8 EA.

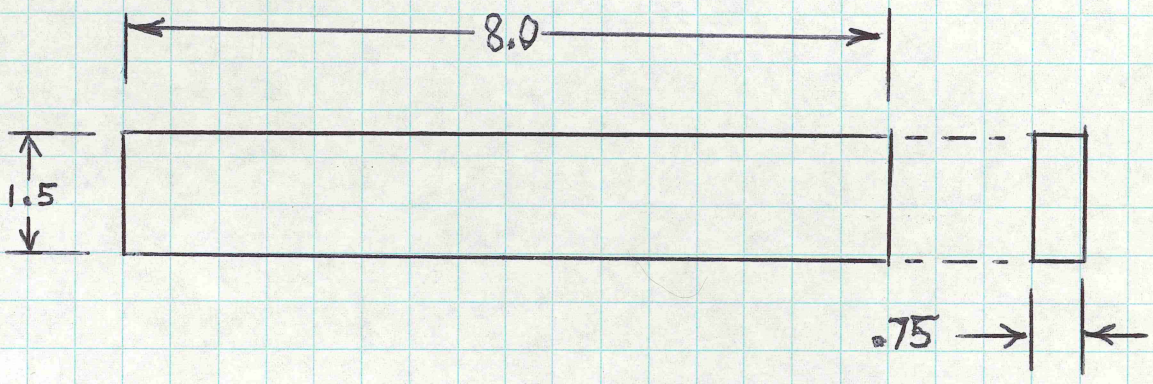
8/25/04

PHENOLIC

7M PRIMARY

EXTENSION BLOCKS

MAKE 8 EA.

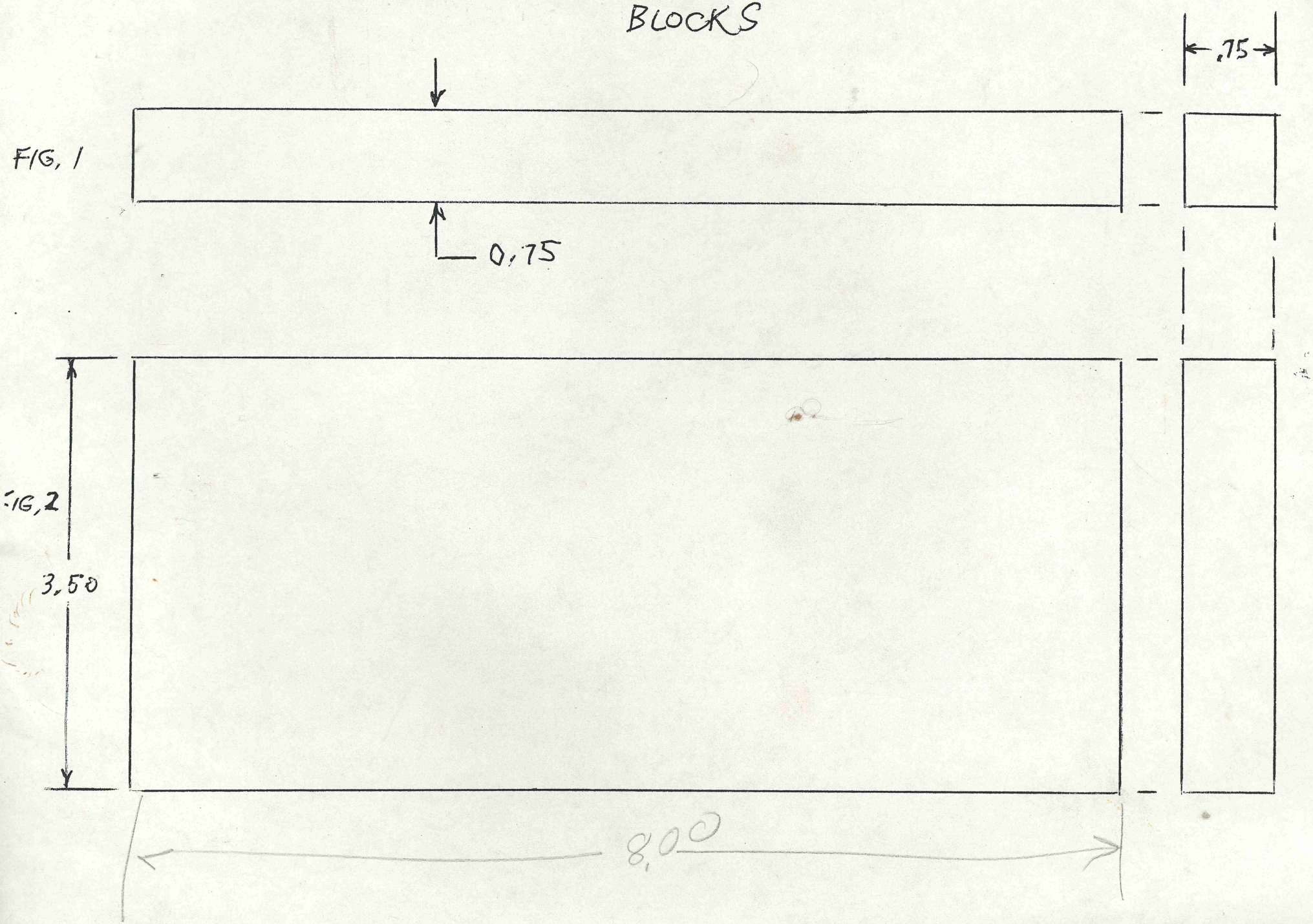


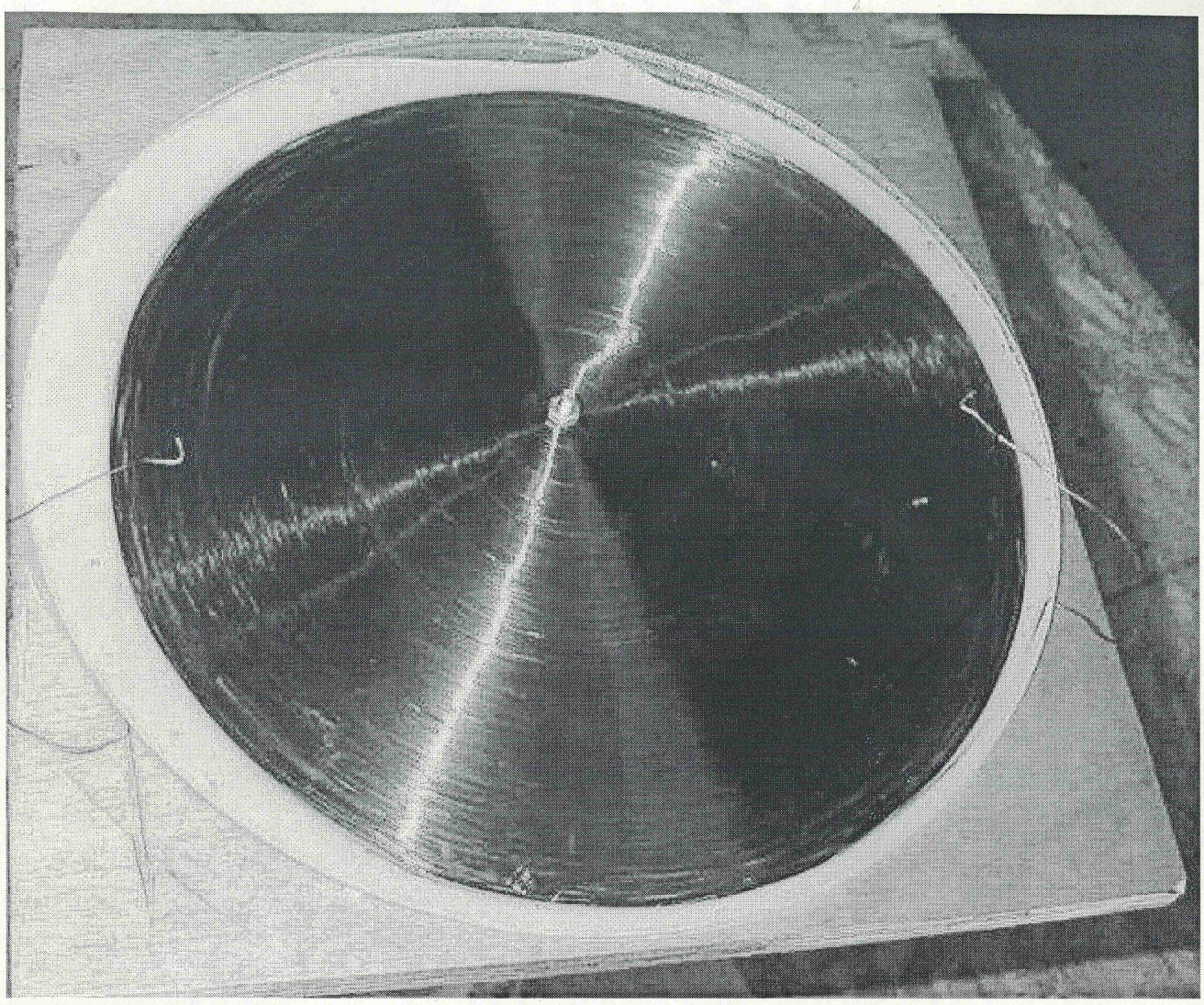
TOPS FORM 33041
MADE IN U. S. A.

MAKE 8 OF EACH

MODEL 7M PRIMARY BLOCKS

6/26/03



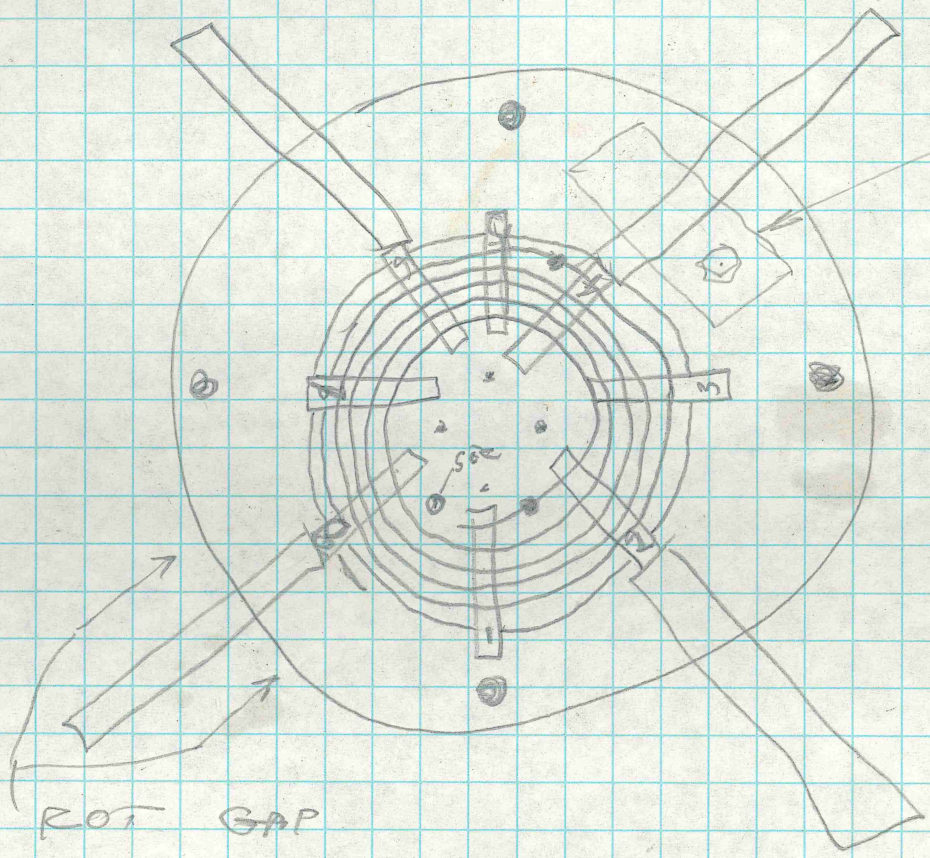


There are three wires wound in parallel on this coil. Three wires form separate ground leads at the perimeter of the coil and are joined at the center for a single terminal lead.

The inspiration for this coil came from an old J.L. Naudin web page. A picture of the coil is below:

6/11/02

UNIV. STUDIOS #2 COIL



TOPS FORM 3314
LITHO IN U. S. A.

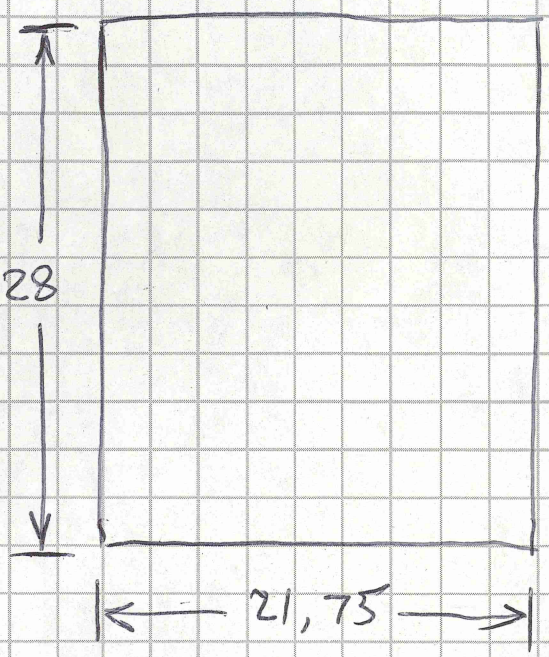
AEROFLEX LINTEK

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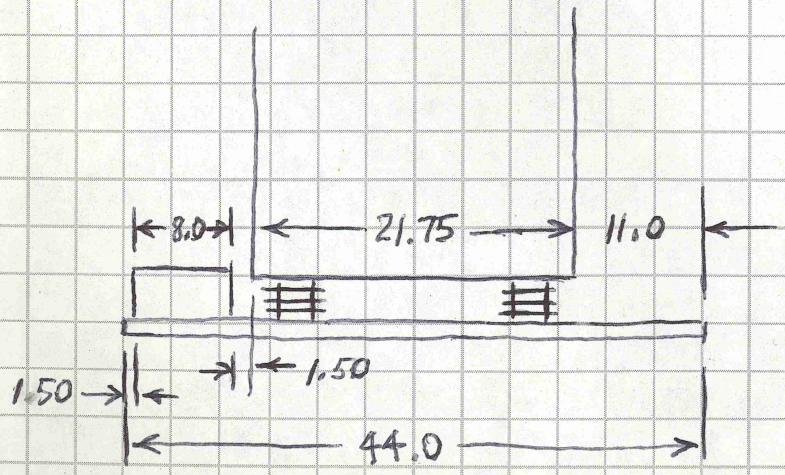
6-23-03

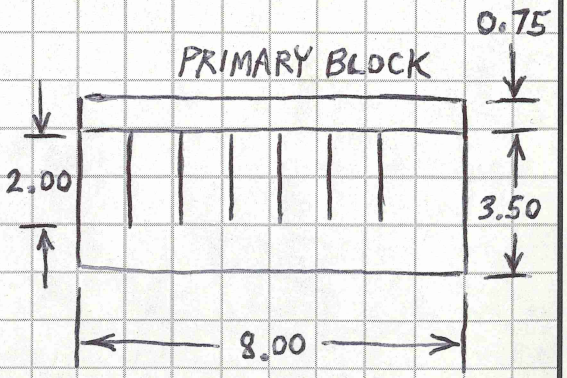
7M MASTER OSCILLATOR NOTES

SECONDARY COIL FORM:



PRIMARY COIL BASE PLATE: 44" O.D. X 0.75"





FOR MODEL
7M
MASTER
OSCILLATOR
SECONDARY COIL

$\pi d = C = 68.707$

$d = 21.75 + 0.120 = 21.87$

WHERE 0.120 = WIRE DIAMETER.

TPI = 8.333

WINDING HEIGHT = 25.00

TOTAL TURNS = 208

WIRE LENGTH = 1,191 FEET

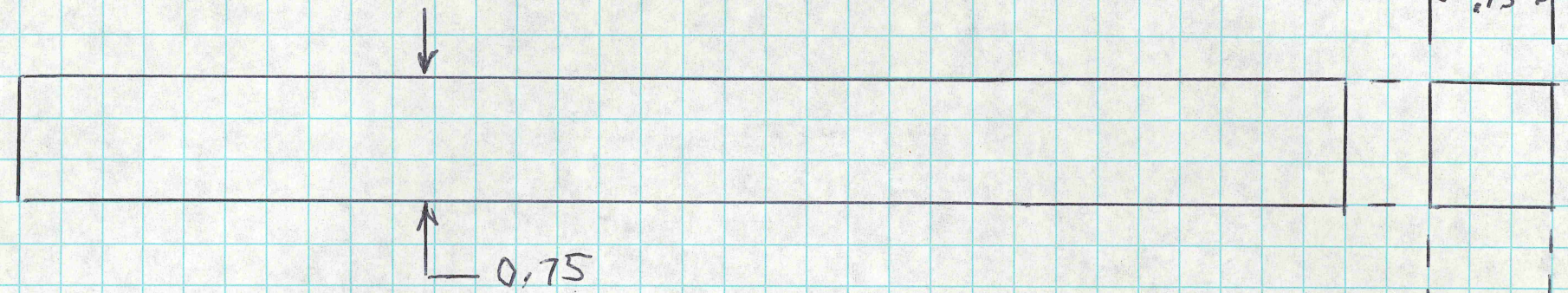
TOPS FORM 3314
LITHO IN U. S. A.

MAKE 8 OF EACH

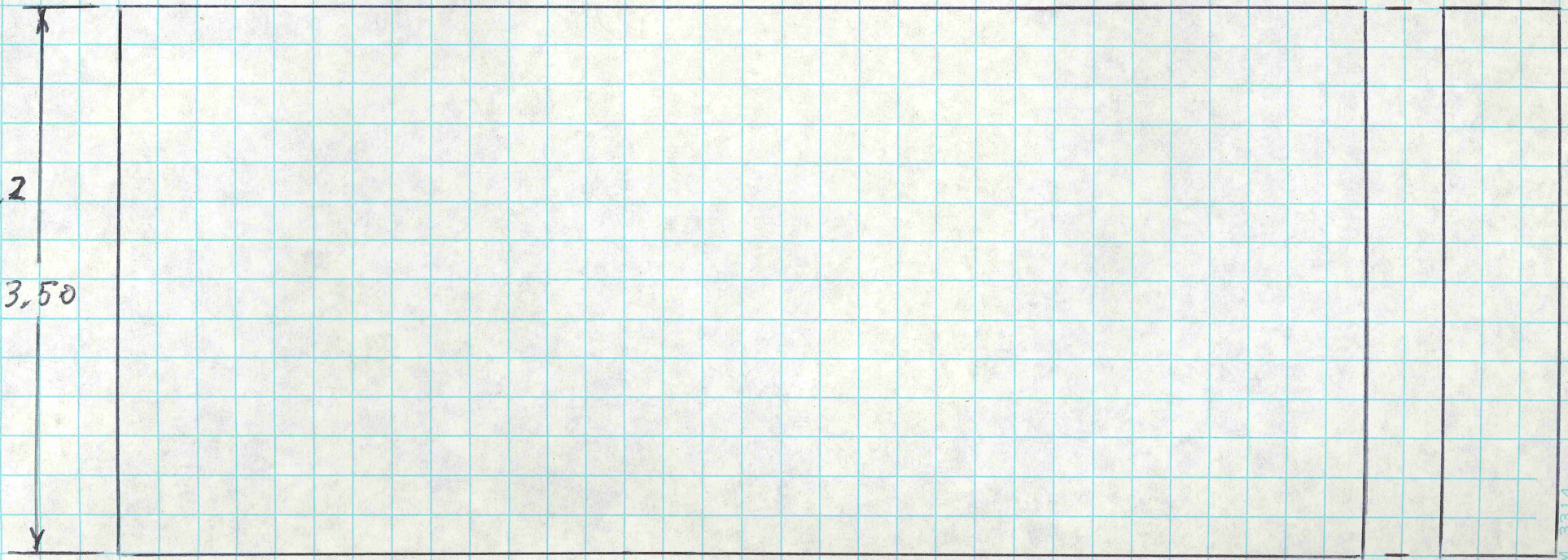
MODEL 7M PRIMARY BLOCKS

6/26/03

FIG, 1



FIG, 2

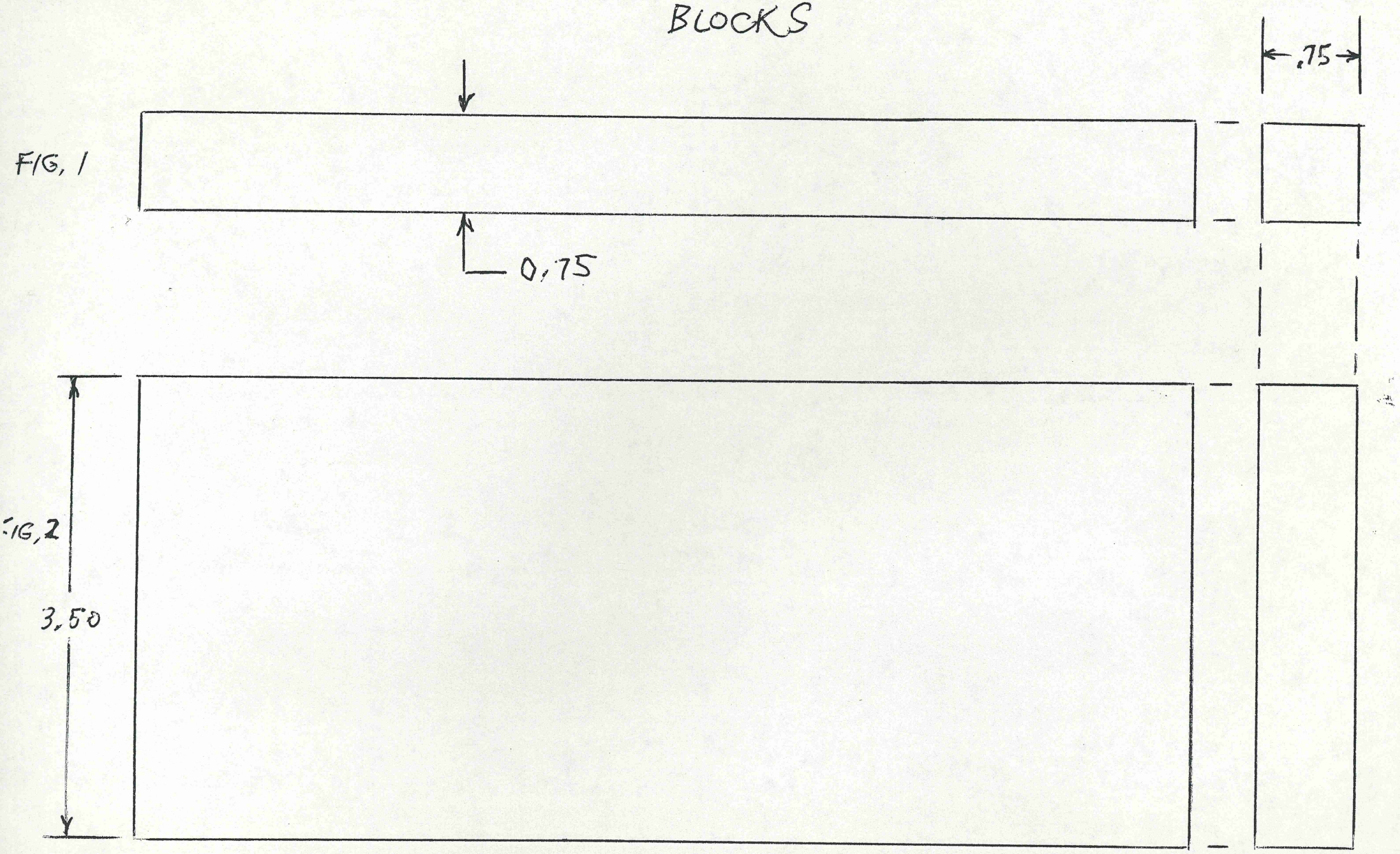


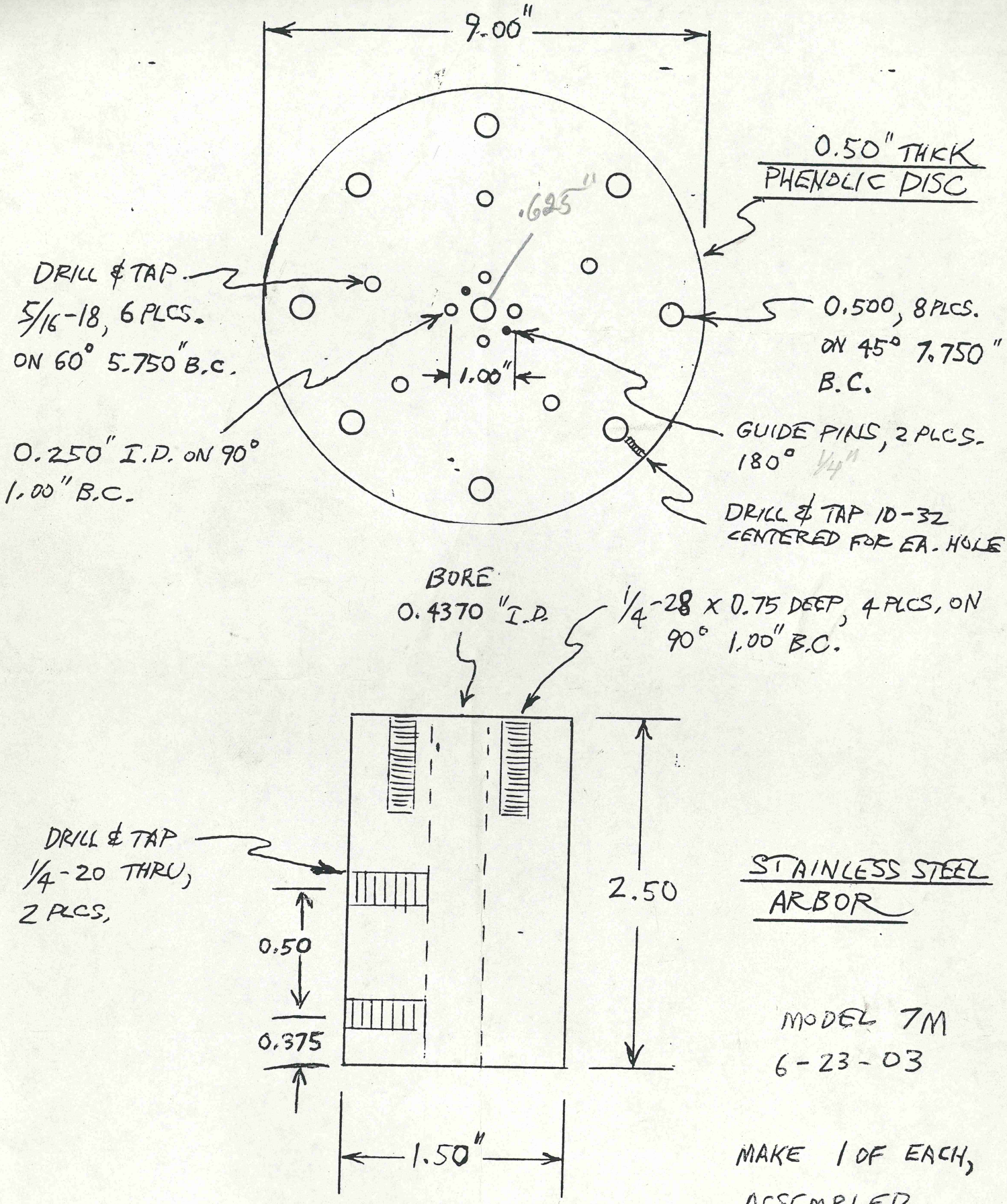
TOPS FORM 3314
LITHO IN U.S.A.

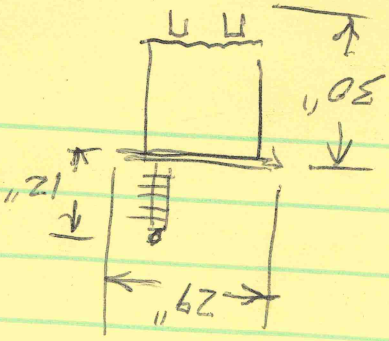
MAKE 8 OF EACH

MODEL 7M PRIMARY BLOCKS

6/26/03




9.00"
0.50" THKK PHENOLIC DISC
.625"
DRILL & TAP 5/16-18, 6 PLCS. ON 60° 5.750" B.C.
0.500, 8 PLCS. ON 45° 7.750" B.C.
1.00"
0.250" I.D. ON 90° 1.00" B.C.
GUIDE PINS, 2 PLCS. 180° 1/4"
DRILL & TAP 10-32 CENTERED FOR EA. HOLE
BORE 0.4370" I.D.
1/4-28 x 0.75 DEEP, 4 PLCS, ON 90° 1.00" B.C.
DRILL & TAP 1/4-20 THRU, 2 PLCS.
0.50
0.375
2.50
1.50"
STAINLESS STEEL ARBOR
MODEL 7M
6-23-03
MAKE 1 OF EACH, ASSEMBLED.



203 - 3315

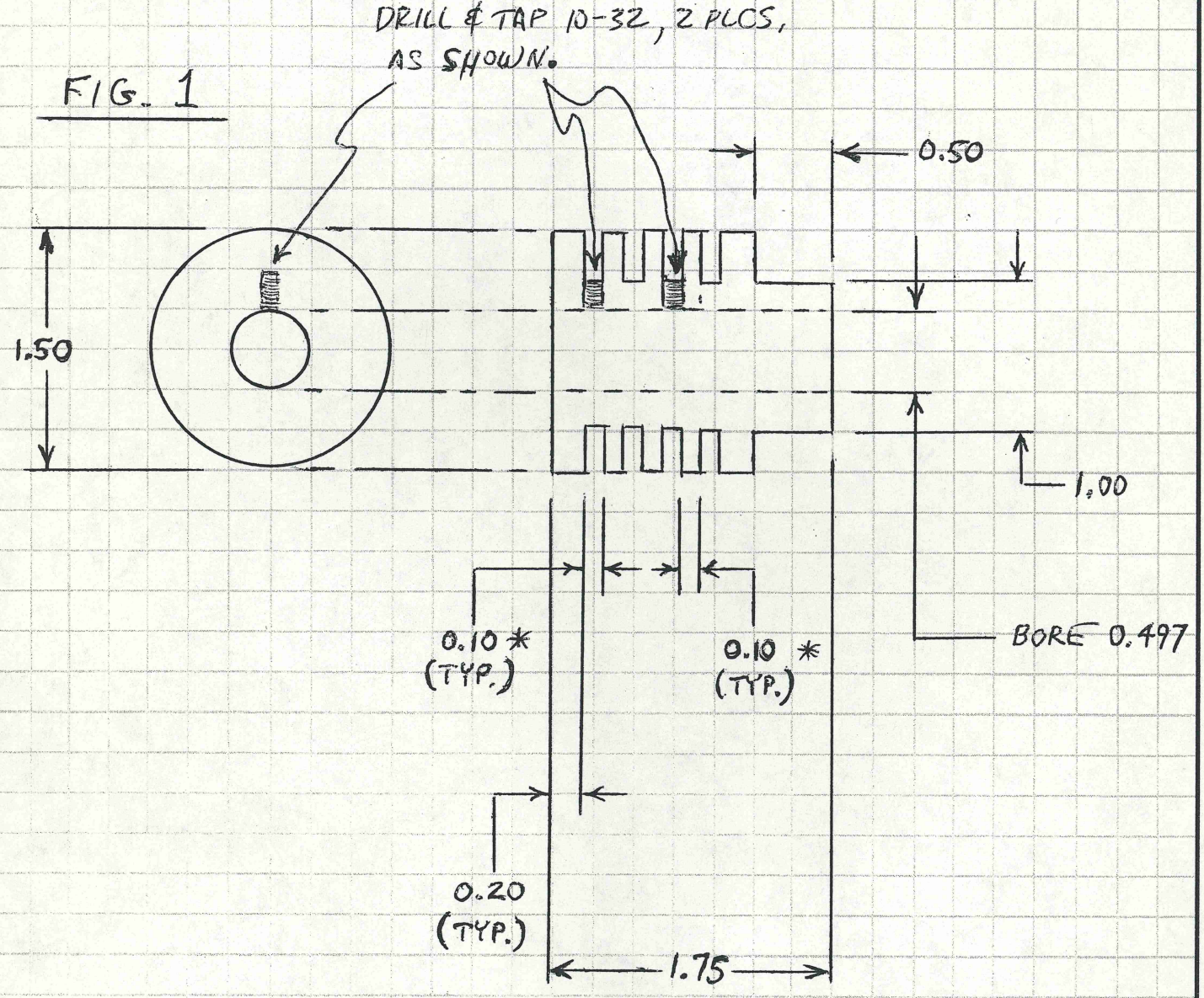
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7/6/03

MODEL 7M STATIONARY ELECTRODE BRASS COOLING FINS.

FIG. 1



* NOTE: DEPENDS ON WIDTH OF YOUR PARTING TOOL; IN ANY CASE, MAKE ALL FINS EQUAL DISTANT.

MAKE 4 EA. (BRIGHT FINISH)

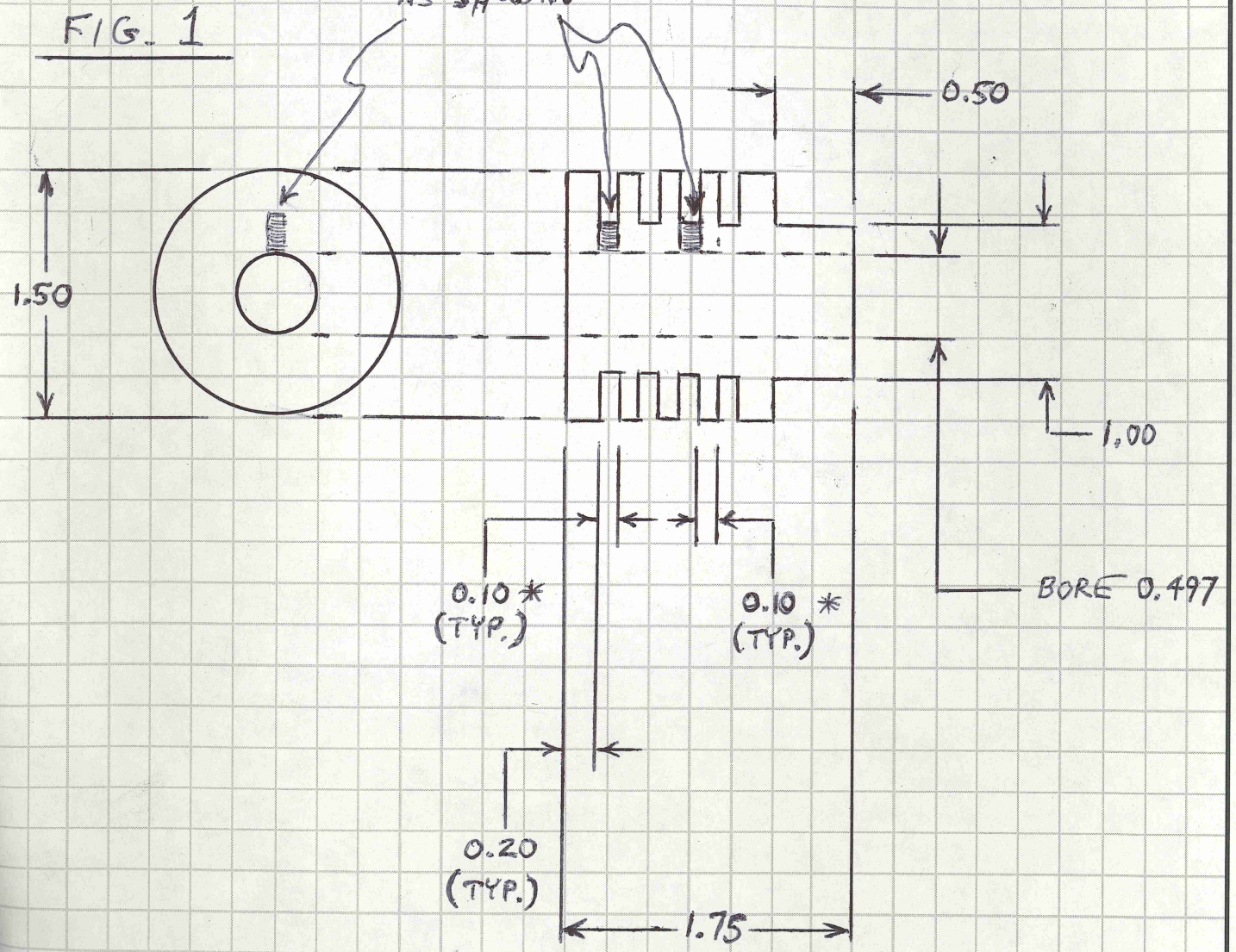
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7/6/03

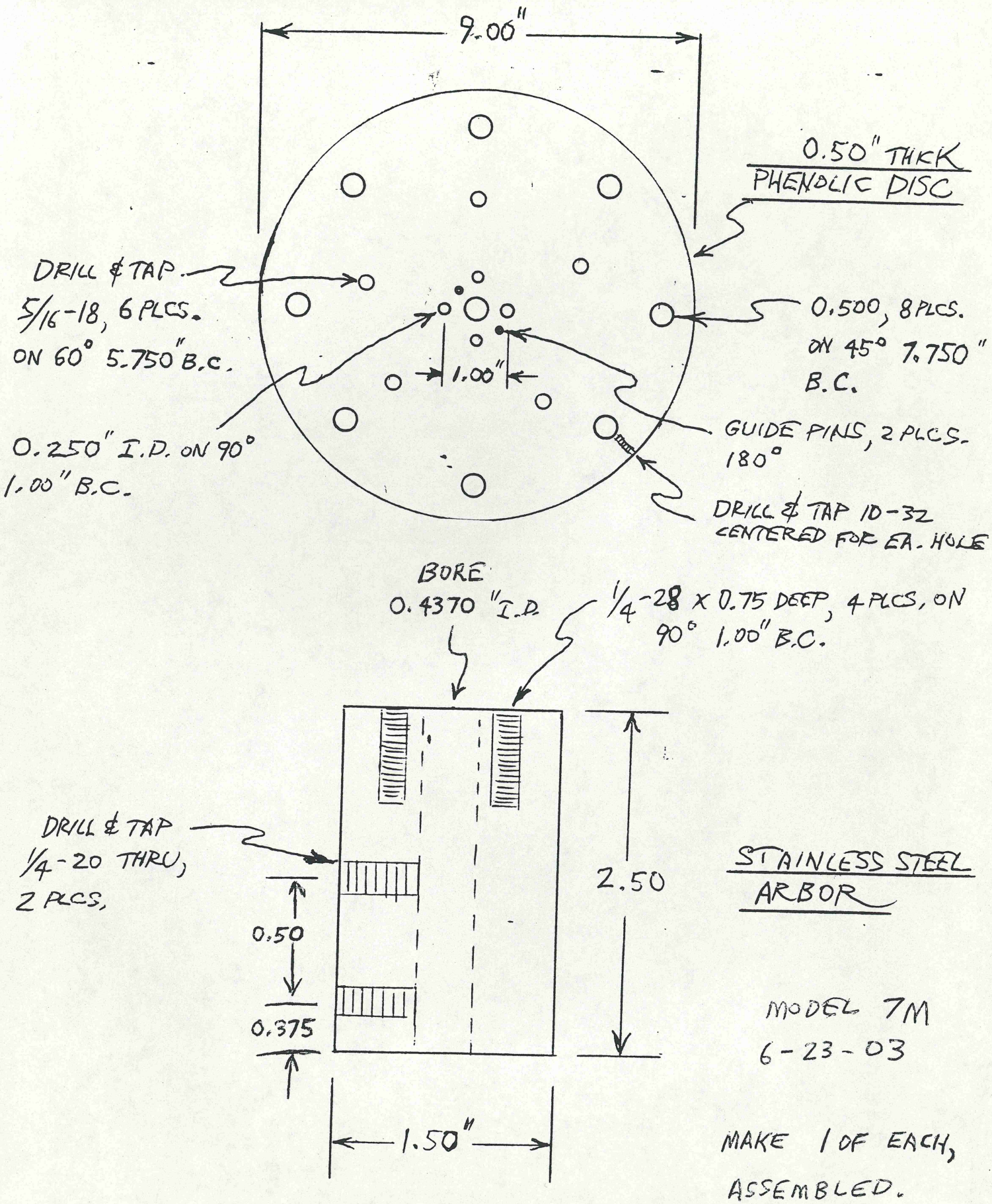
MODEL 7M STATIONARY ELECTRODE BRASS COOLING FINS.

FIG. 1



* NOTE: DEPENDS ON WIDTH OF YOUR PARTING TOOL; IN ANY CASE, MAKE ALL FINS ERUAL DISTANT.

MAKE 4 EA. (BRIGHT FINISH)



STAINLESS STEEL ARBOR

MODEL 7M
6-23-03

MAKE 1 OF EACH, ASSEMBLED.

7M NEW EXTRA COIL

7/2/05 WINGING LENGHT = 55.0"

WIRE #16 AWG = .054 O.D. =

18.5 TPI x 55" =

1,017 TURNS

TUBE O.D. = 12.50" = 39.3" PER TURN

WINDING LENGHT = 39,968 TURNS =

= 3,330'

= 14.5 Ω D.C.

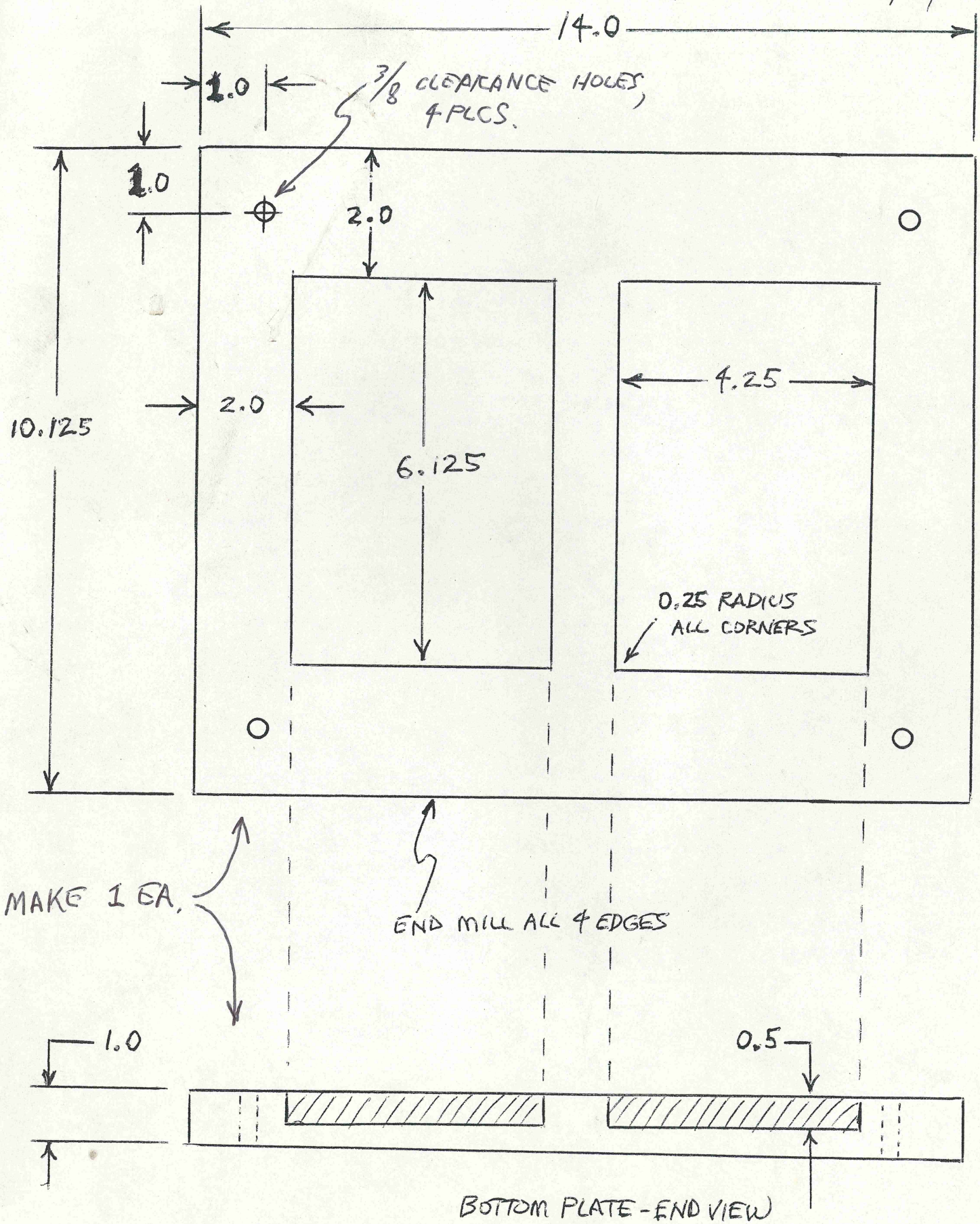
7M PRIMARY TAP POINT

5.020 TURNS

MODEL 7M

TOP PLATE - FACE VIEW

8/25/04



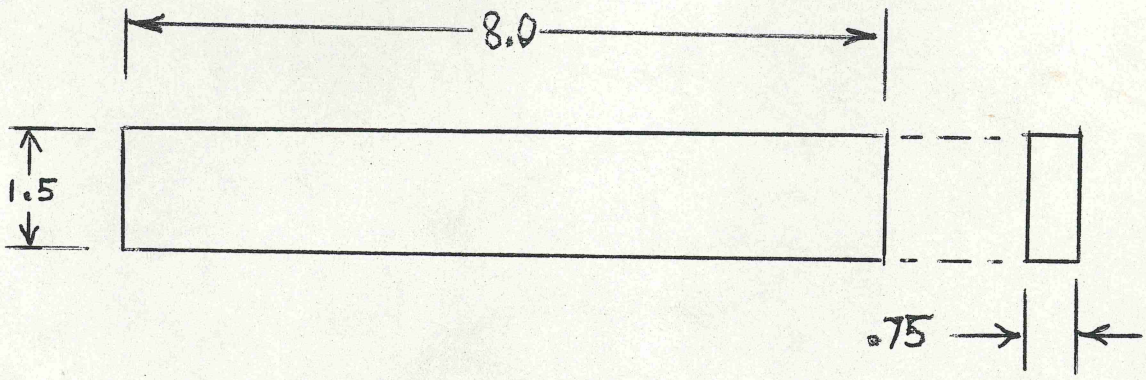
8/25/04

PHENOLIC

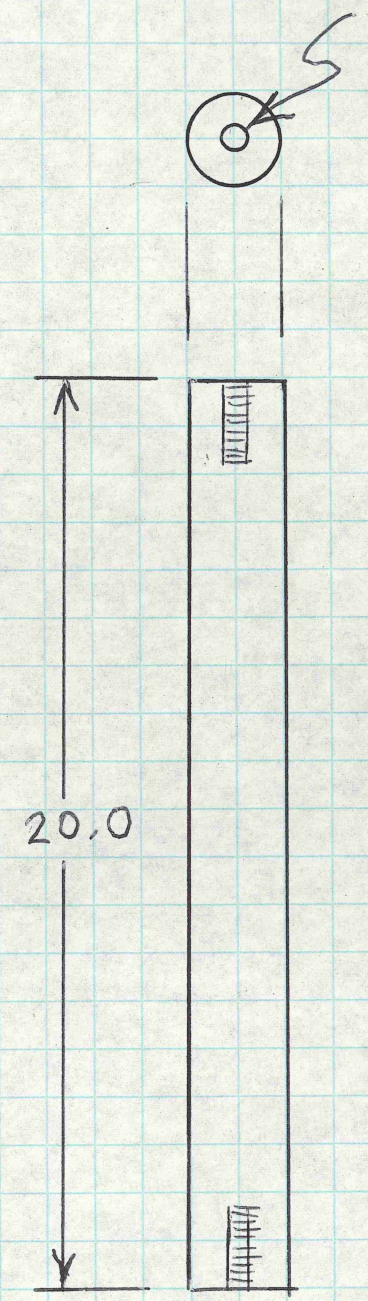
7M PRIMARY

EXTENSION BLOCKS

MAKE 8 EA.



6/30/05



PHENOLIC SPACER

MAKE 4 EA.

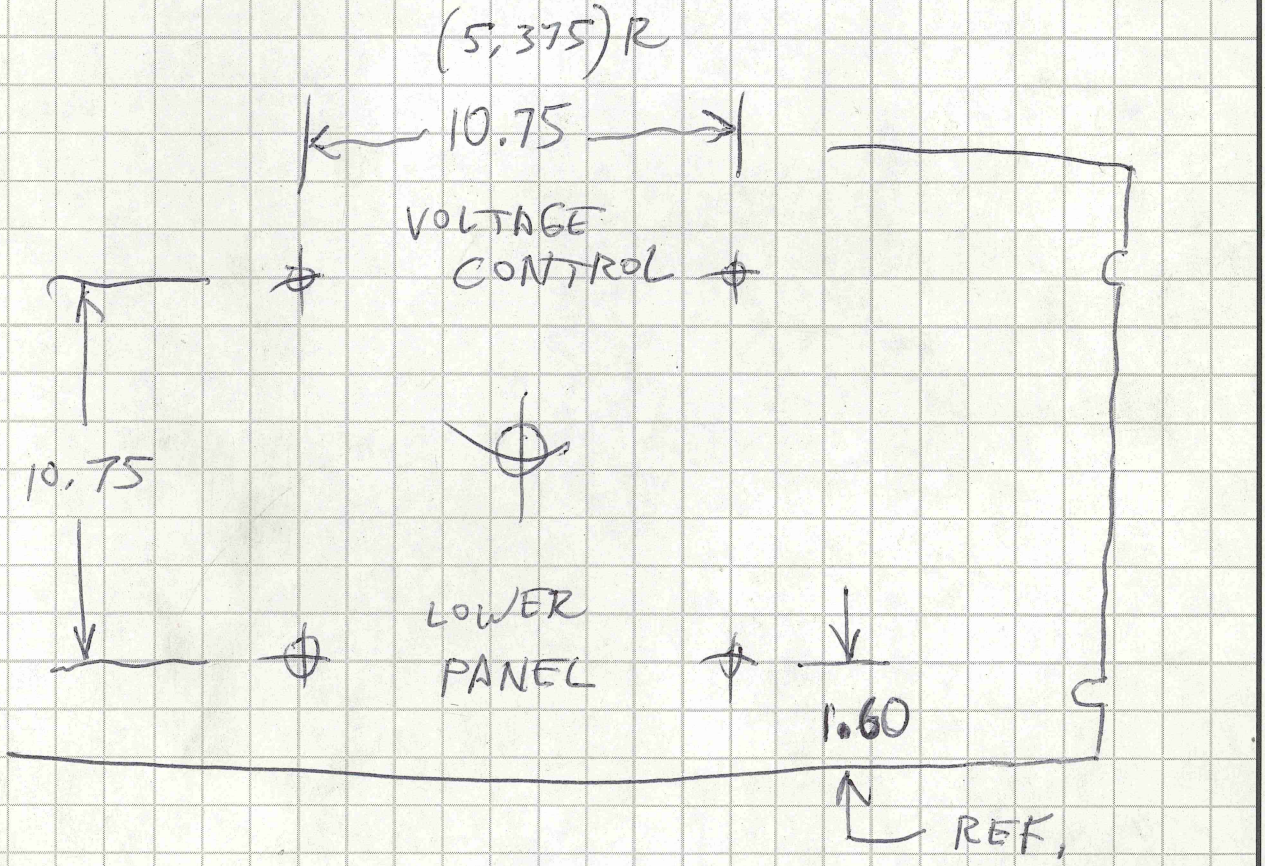
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MODEL TM CONTROLLER 10/17/03

VC VARIAC = 21.00" TALL ← NEEDS 0.125 WASHERS, 2 PLCS.

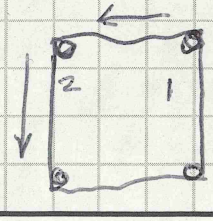
CC VARIAC = 21.125" TALL



→ KEY SW. = 1.190" O.D.

→ PUSH BUTTON = 1.190" O.D.

BREAKER COORDINATES

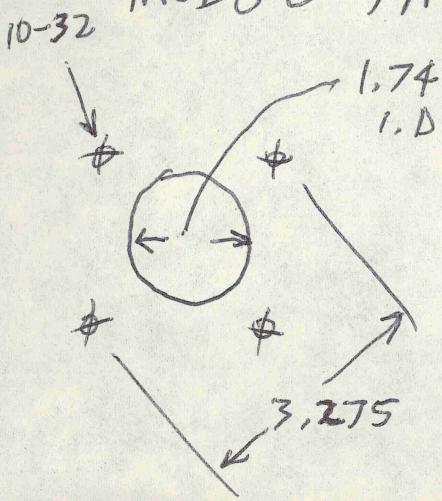


① X=0 Y=0
② X=3.902 Y=0
③ X=3.902 Y=3.800
④ X= Y=0

MOTOR HOUSING O.D. = 3.875

FOR
MODEL 7M

DAYTON
10,000 RPM
6/22/03



MOTOR SHAFT
.4360 O.D. X
1.250 LONG

7/8/05 G-11 FIBERGLASS NEW MODEL 7M ROT. GAP WHEEL

MAKE 1 EA.

FIG. 1

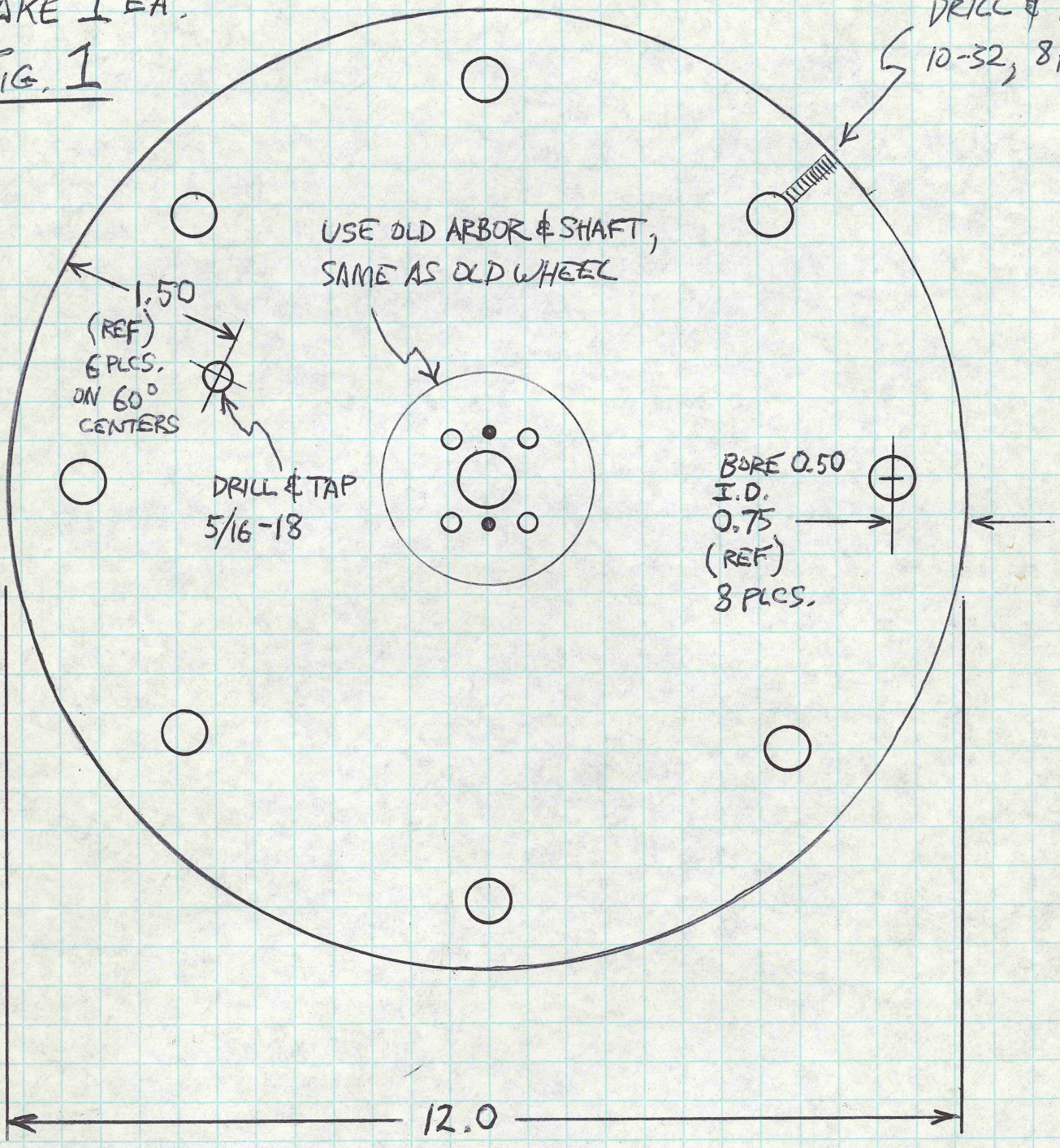
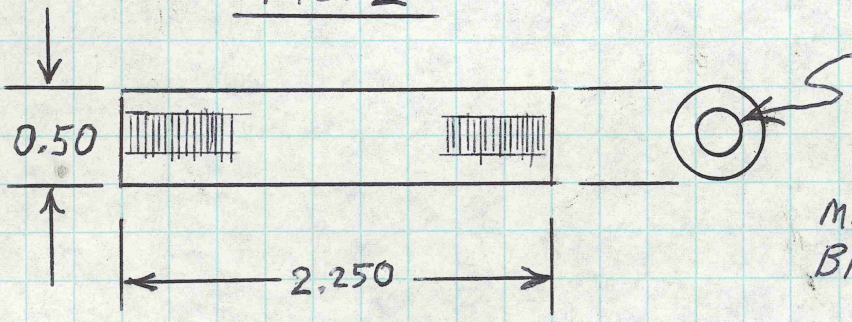


FIG. 2



MAKE 8 EA. OF FIG. 2,
BRASS BRIGHT FINISH.

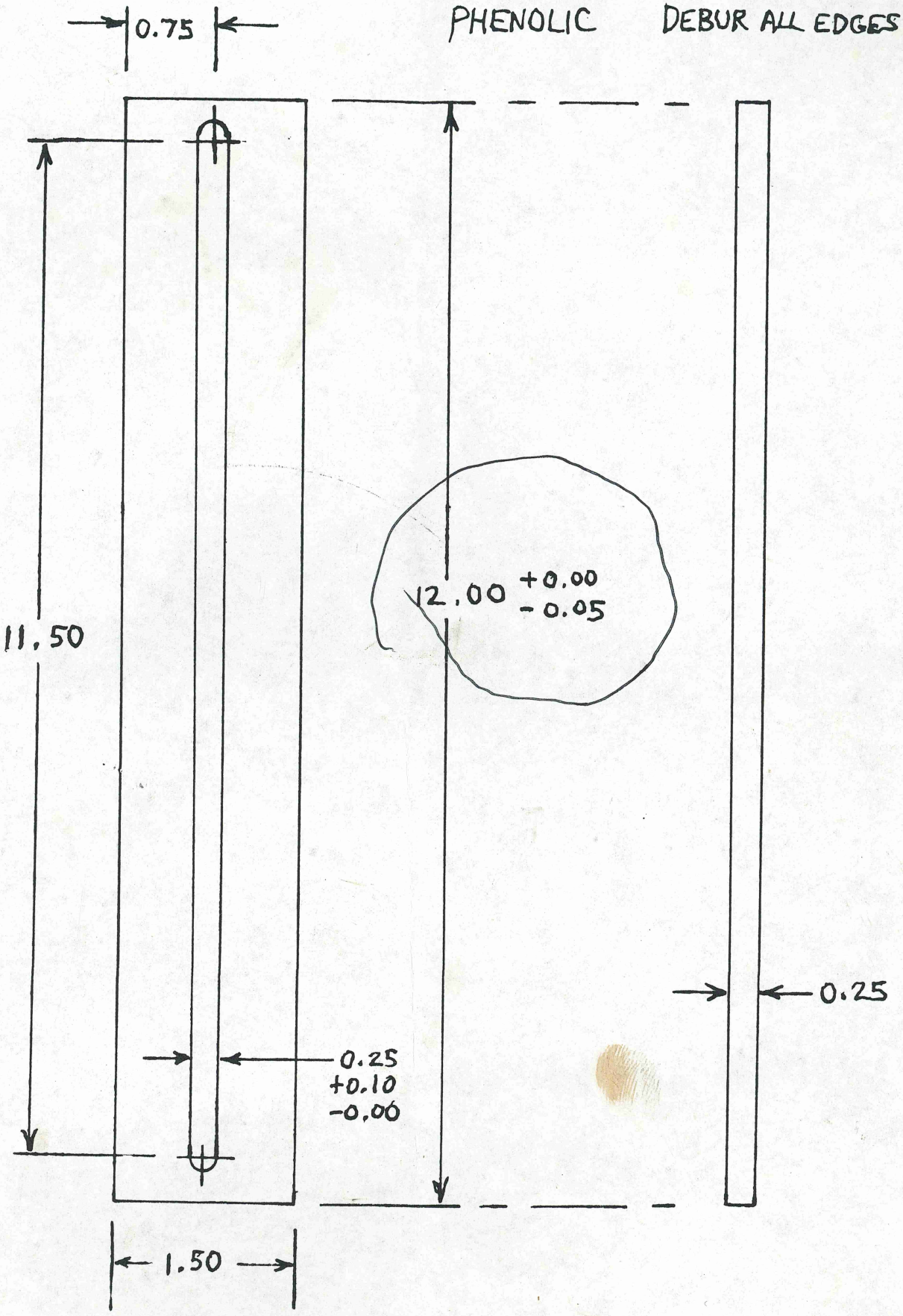
MODEL 2 SPARK GAP

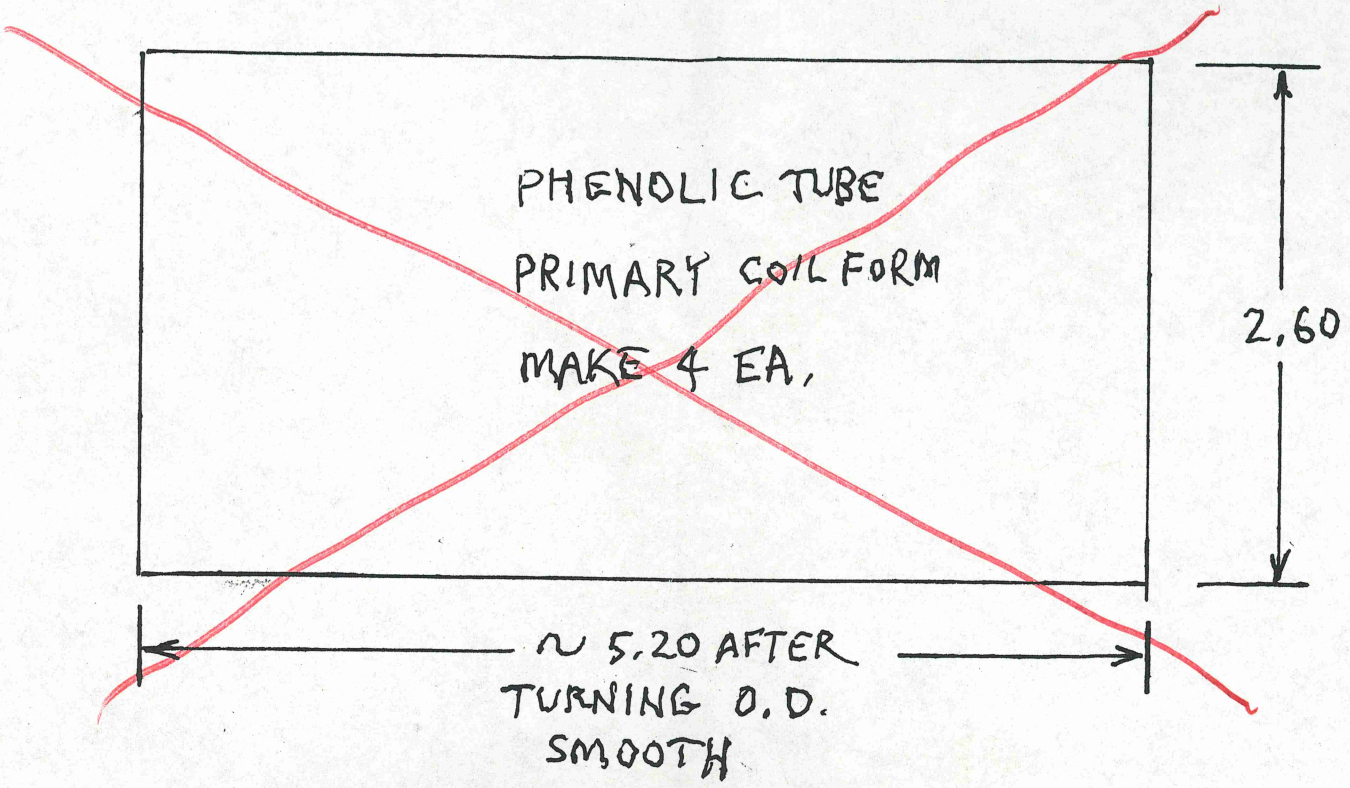
MAKE 2 EA.

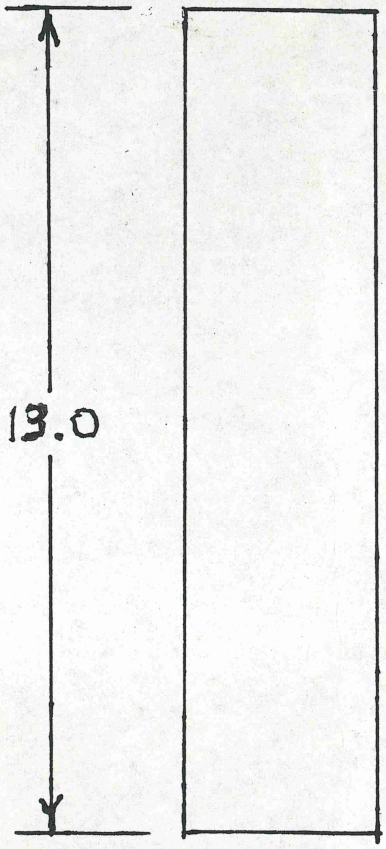
5/13/09
~~12/3/08~~

PHENOLIC

DEBUR ALL EDGES



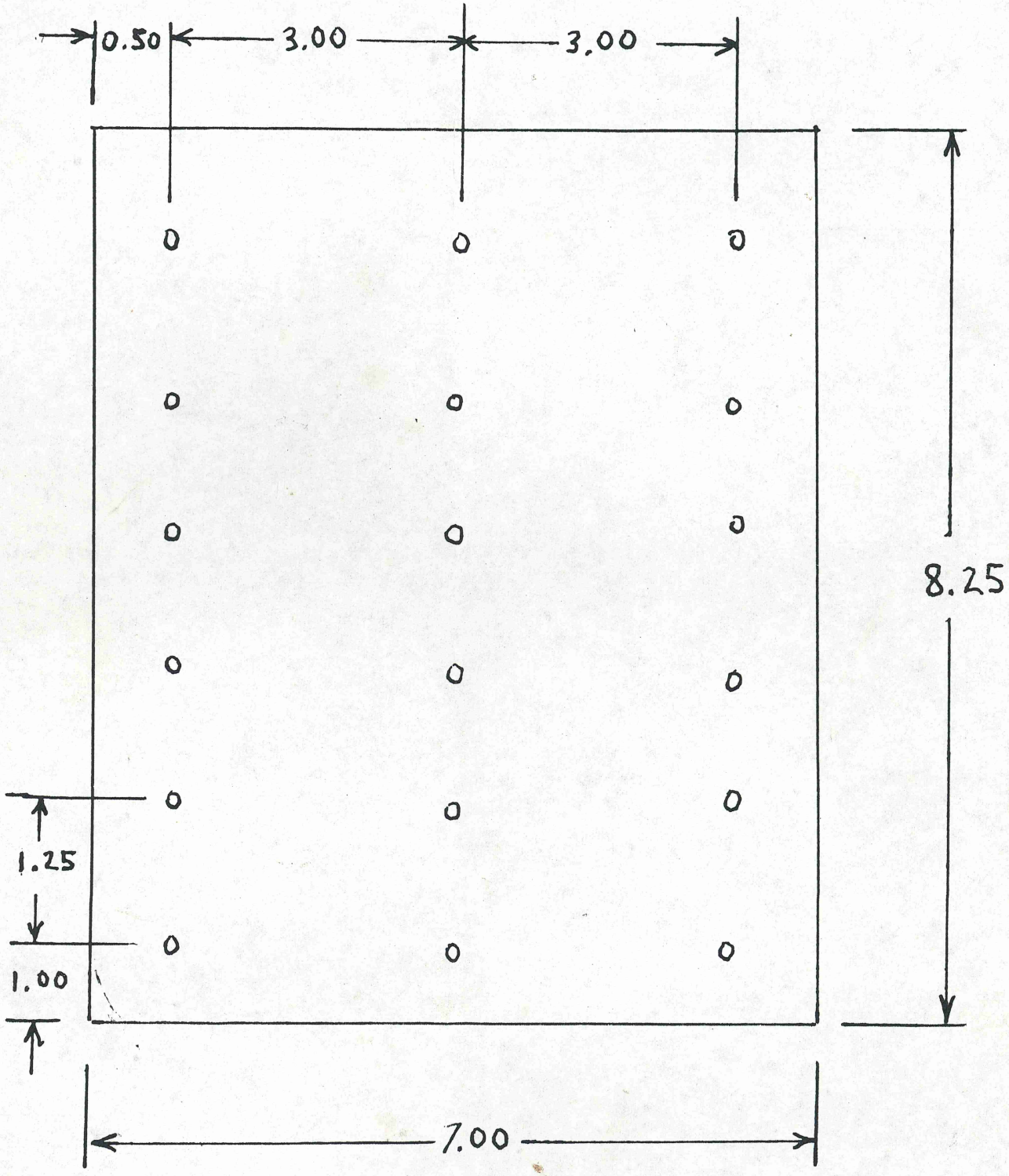




NEW SECONDARY
COIL FORM
MAKE 3 EA.

5/13/09

~~9/10/08~~



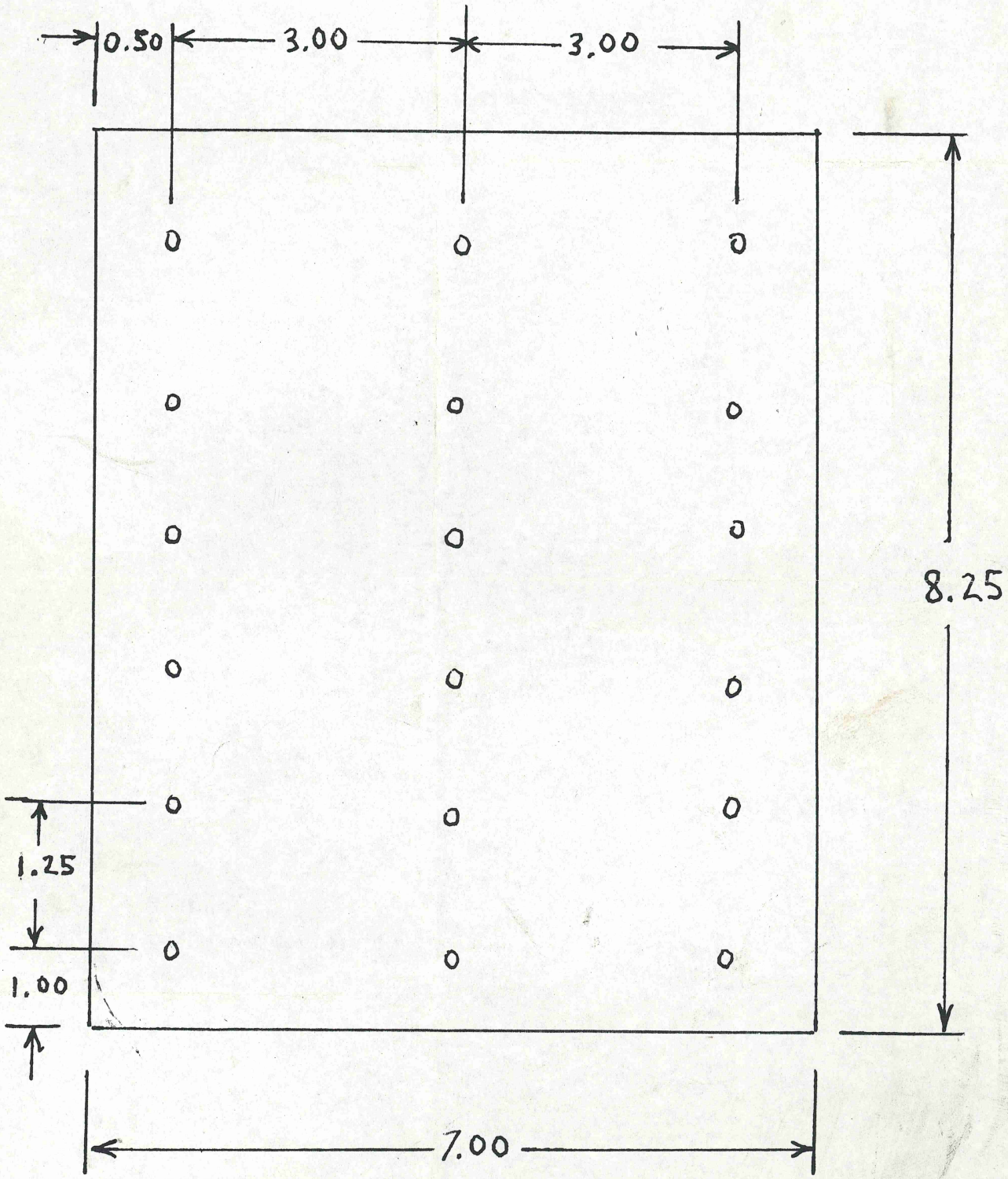
1/4" PHENOLIC SHEET

ALL HOLES ARE 8-32 CLEARANCE

MAKE 2 EA.

5/13/09

~~1/6/09~~

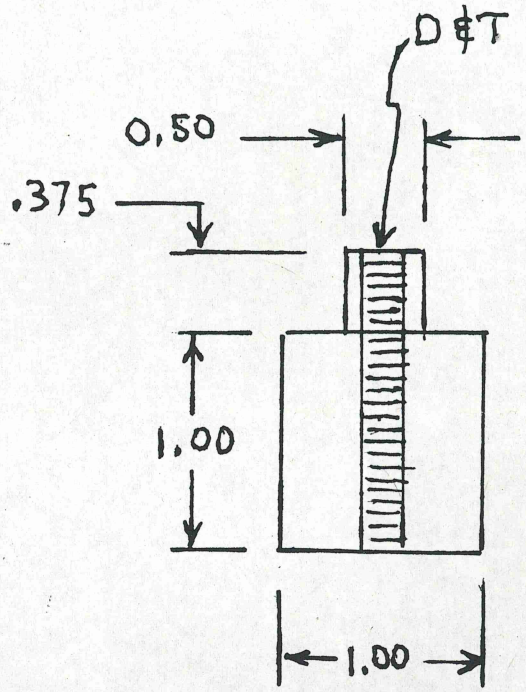


1/4" PHENOLIC SHEET

ALL HOLES ARE 8-32 CLEARANCE

MAKE 2 EA.

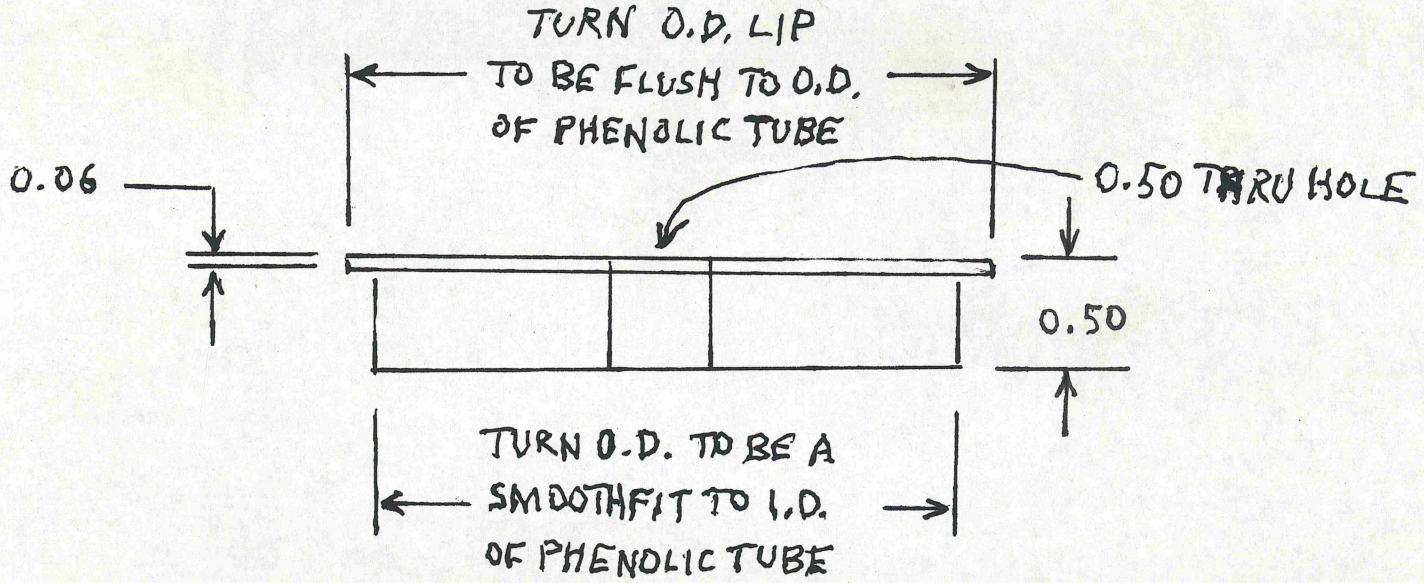
1/6/09



1" BRASS ROUND STOCK
BRIGHT FINISH

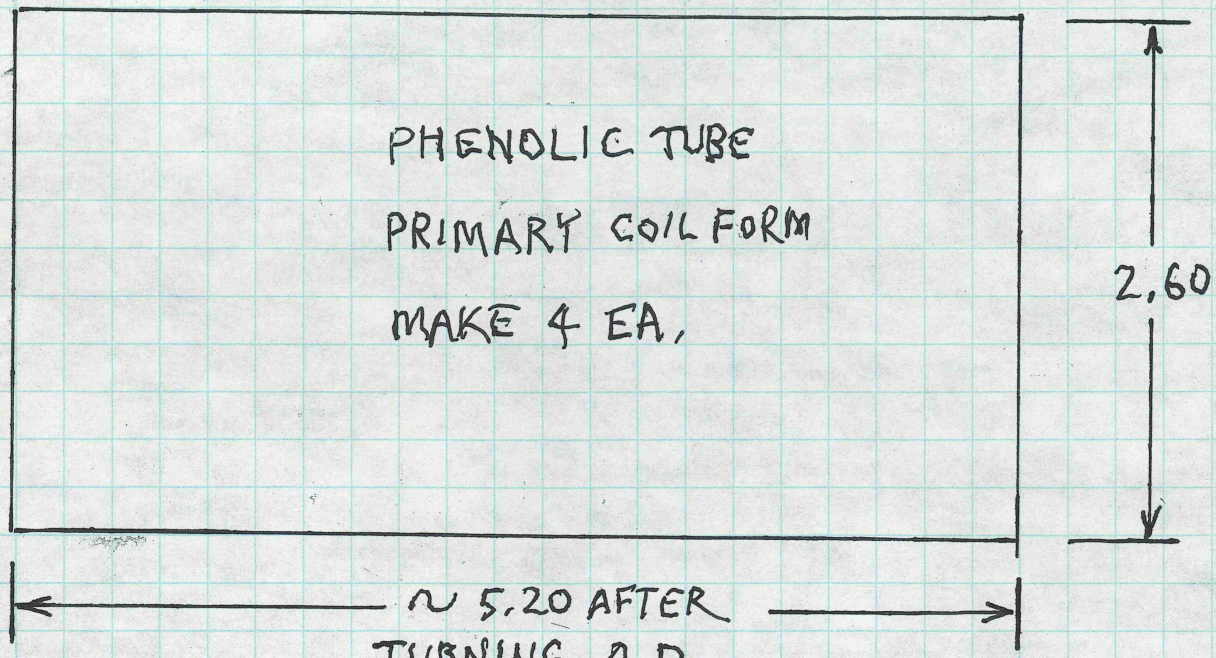
MAKE 4 EA.

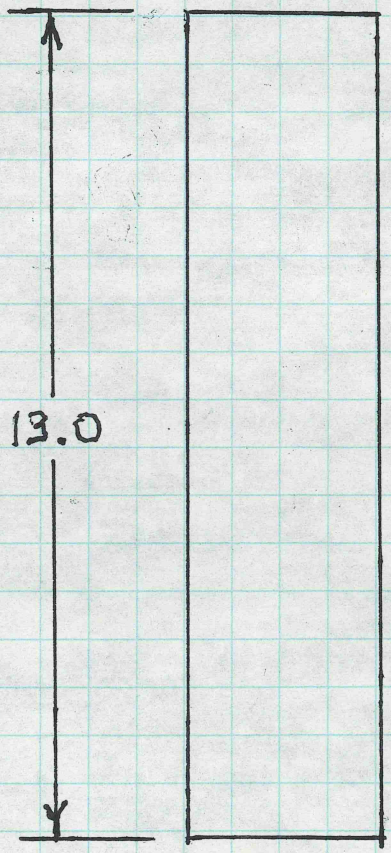
PHENOLIC END CAP
MAKE 8 EA.



PHENOLIC SECONDARY COIL
END CAP
MAKE 4 EA.

12/3/08
~~9/10/08~~





NEW SECONDARY
COIL FORM
MAKE 4 EA.

9/10/08

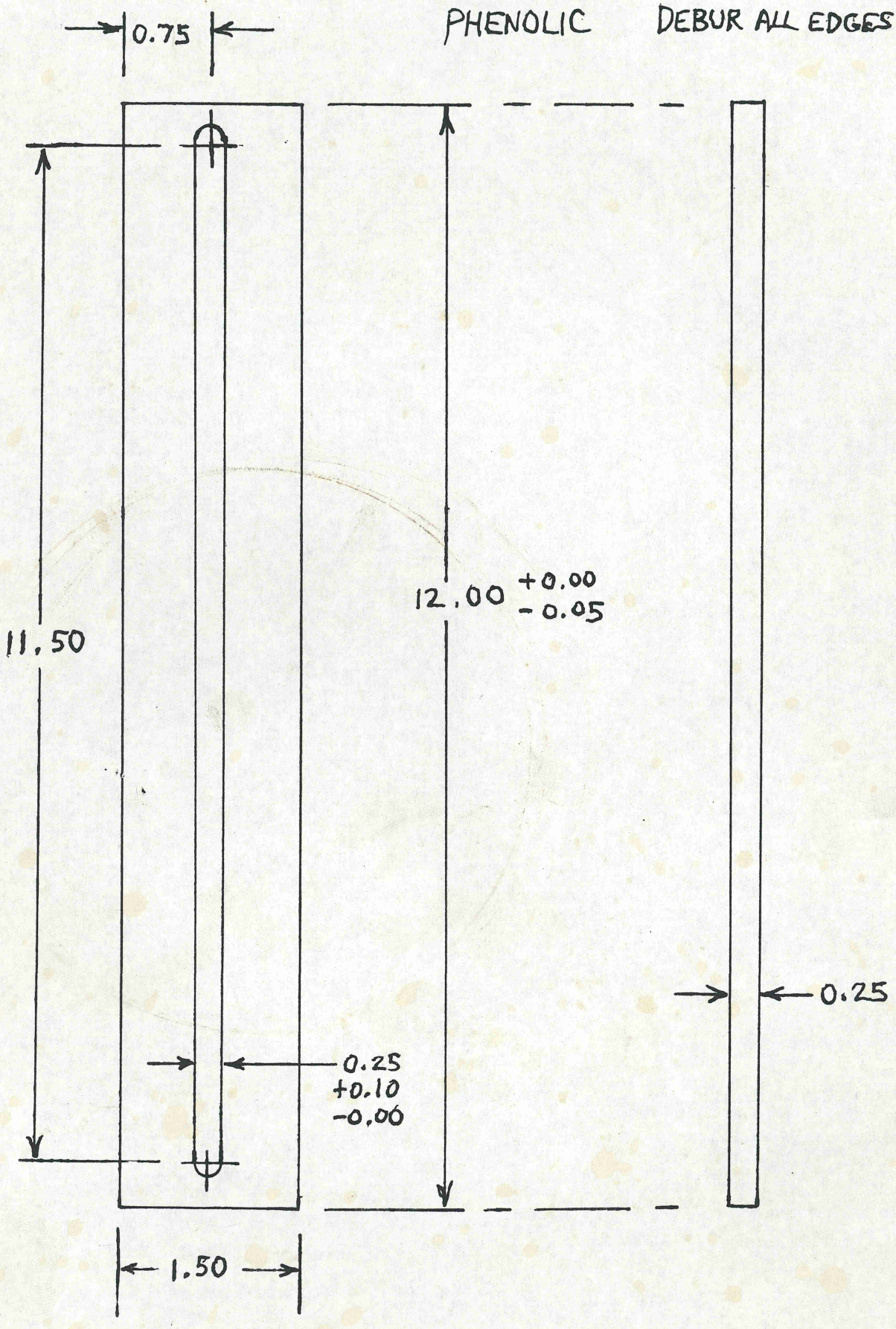
MODEL 2 SPARK GAP

MAKE 4 EA.

12/3/08

PHENOLIC

DEBUR ALL EDGES

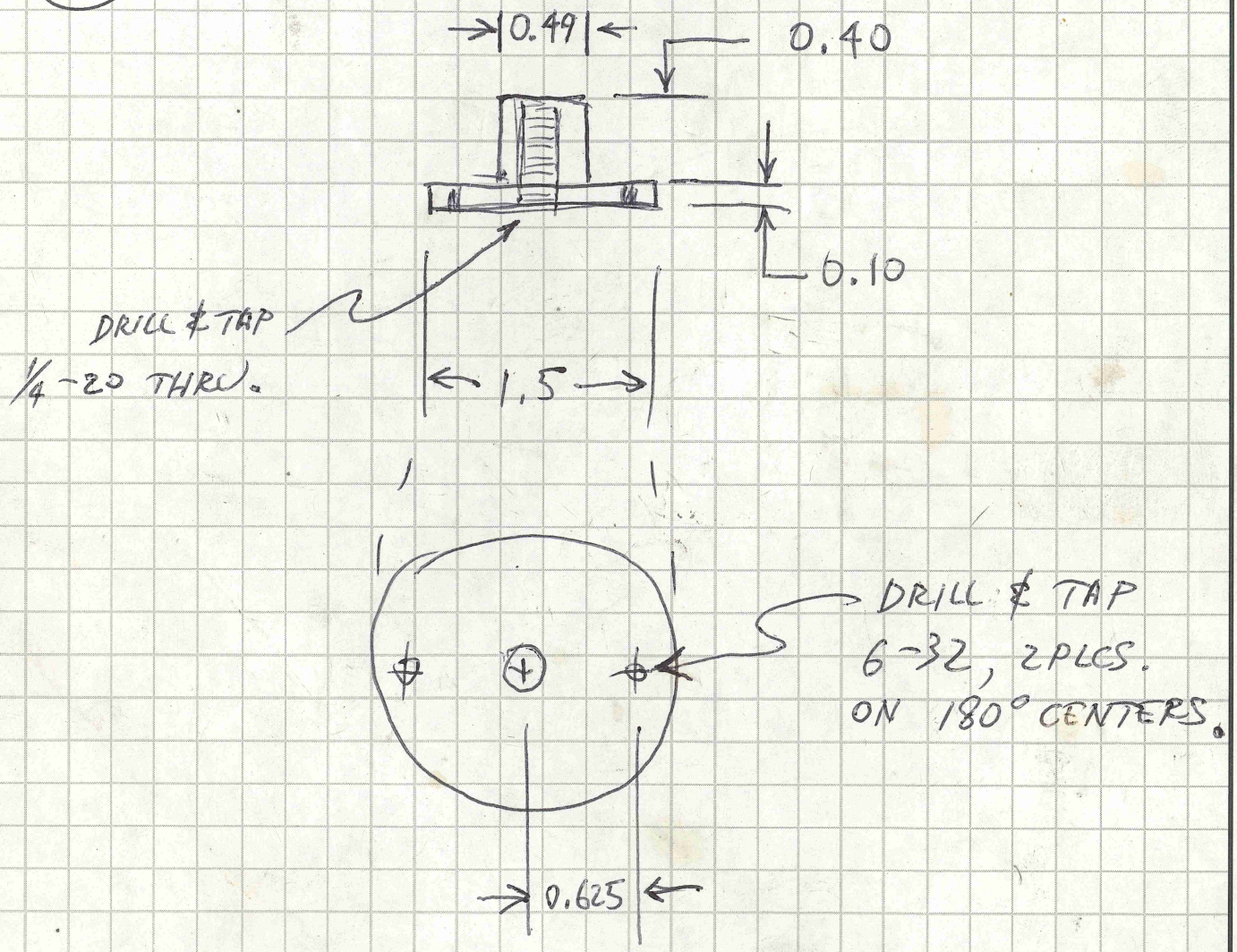


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8/18/03 JIM SHAFFER PAGE (4) OF (4)

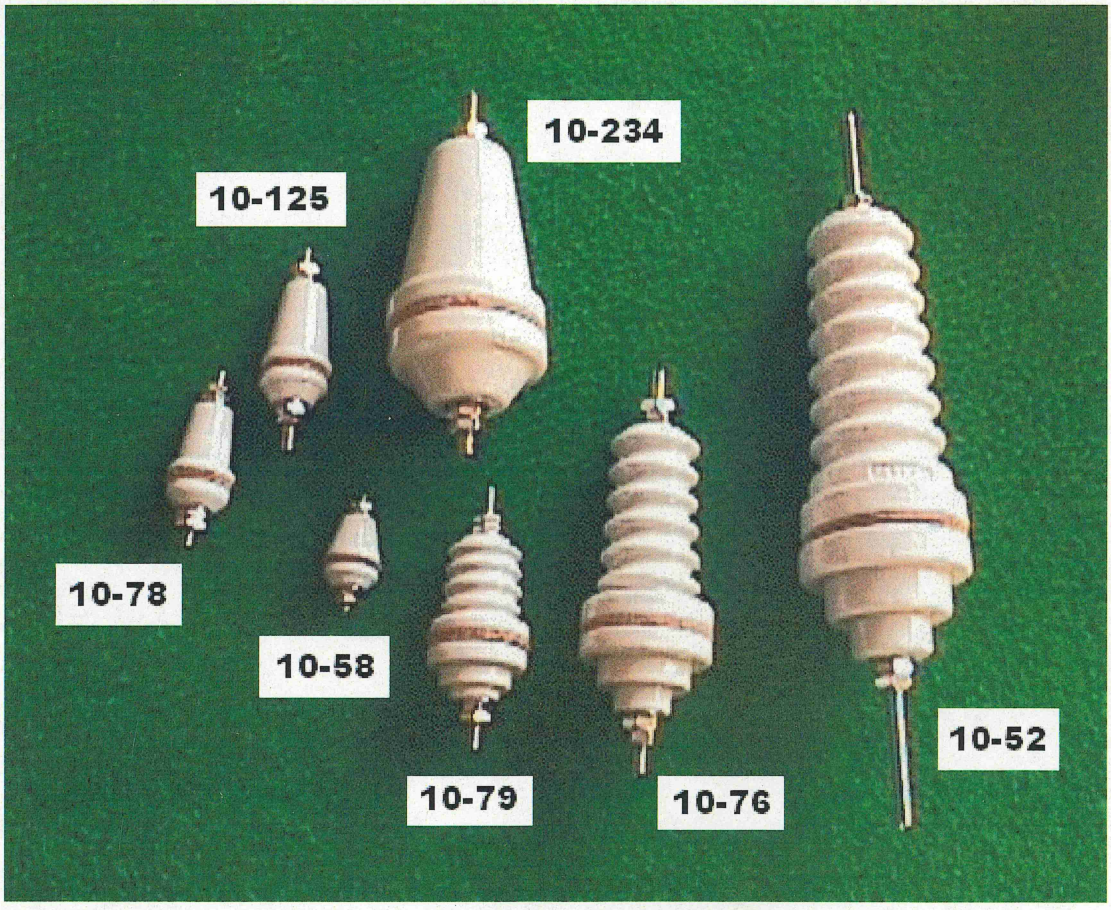
(7) MAKE 8 EA. BRASS FANGES



DABURN

Porcelain Insulators

Feed-Thru's



Description: These are quality porcelain insulators with a smooth glaze on the exteriors. They come with heavy nickel plated brass hardware plus cushioning washers. The corrugated constructions (Ill. 'B') provide twice the leak path of the straight (lll. 'A').

.75
.125
.875

.25
.0625
.3125

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passion for performance.

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#2 H.D. MODEL 1 6/24/07

SPARK GAP PLATE
(FOR 5-FIN BRASS HEAT SINKS WITH 3/4" BRASS STATONARY ELECTRODE HOLDERS)

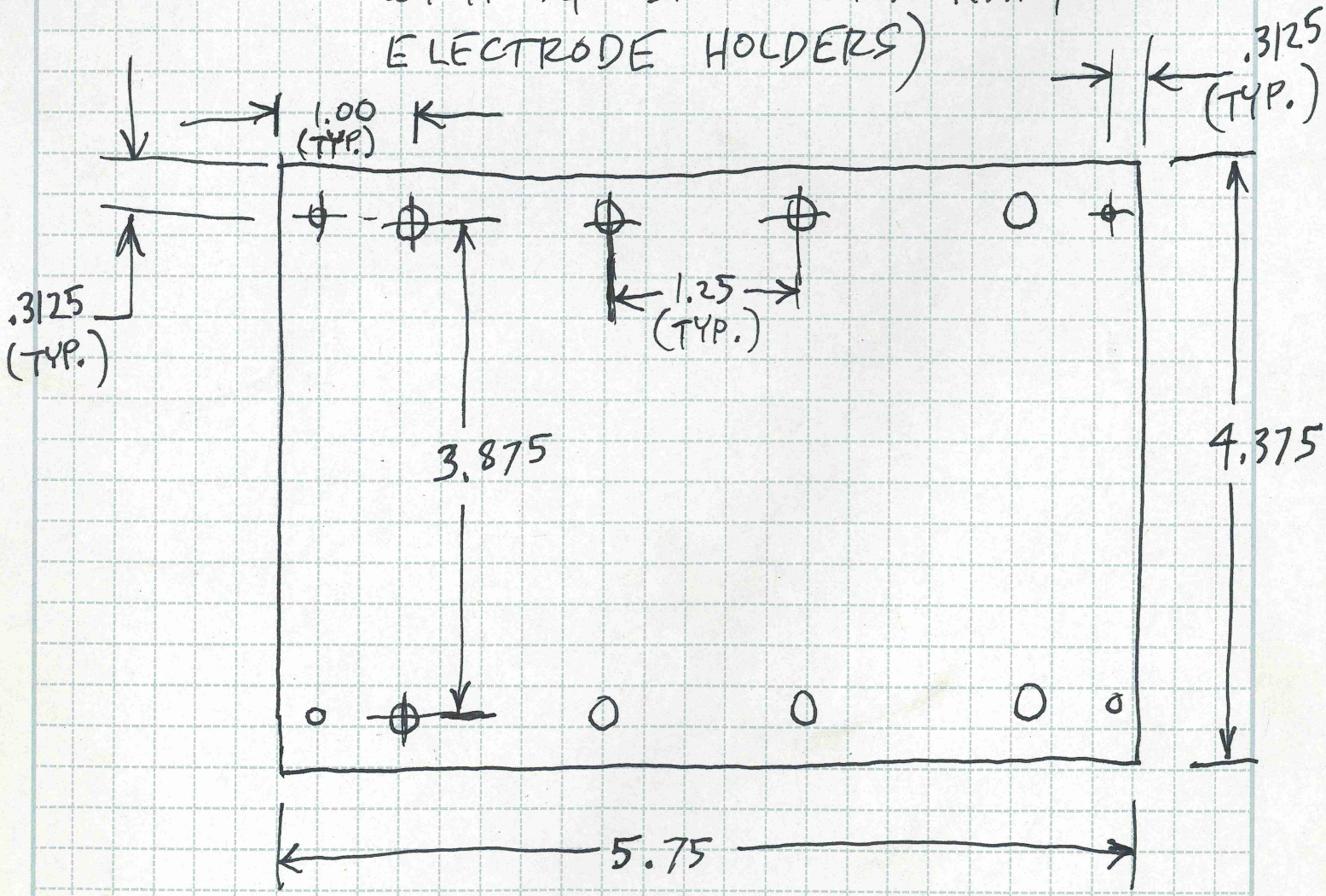
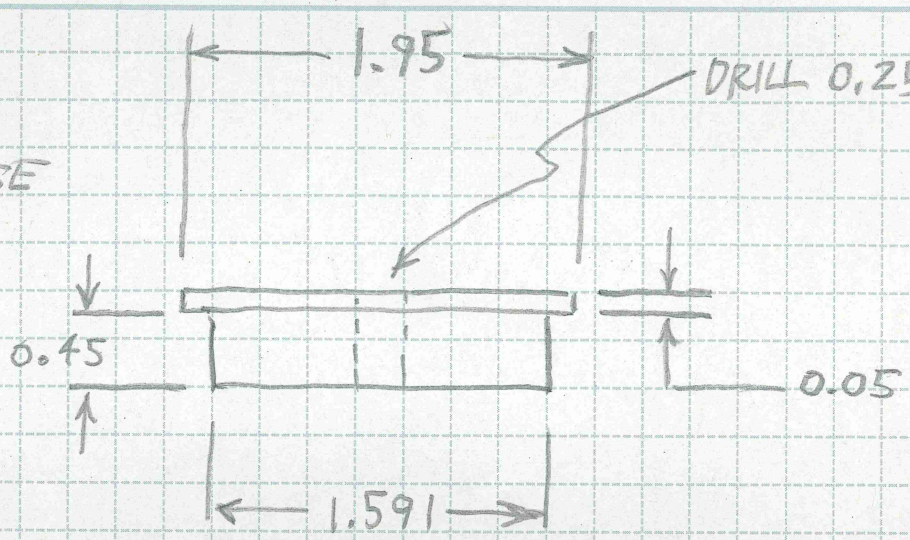


FIG. 1

8/3/06
MARY CORSE
COILS

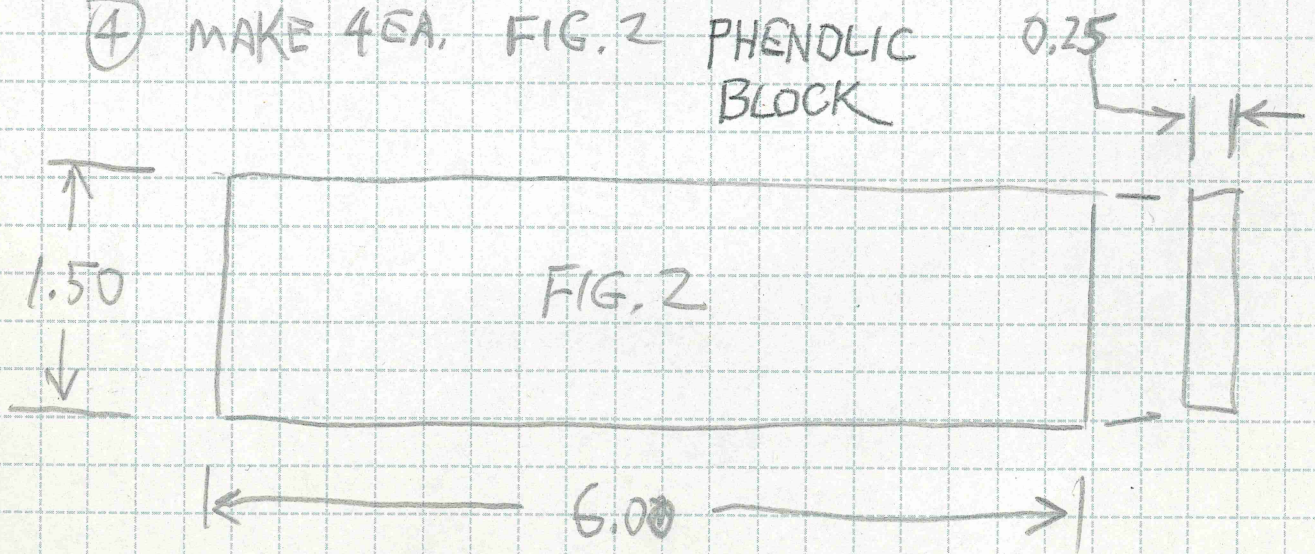


(1) MAKE 8 EA. OF FIG. 1. PHENOLIC DISC.

(2) MAKE 12 EA. ALUM. STATIONARY ELECTRODE HOLDERS PER SAMPLE SUPPLIED.

(3) MAKE 4 EA, BRASS FLANGES PER SAMPLE SUPPLIED.

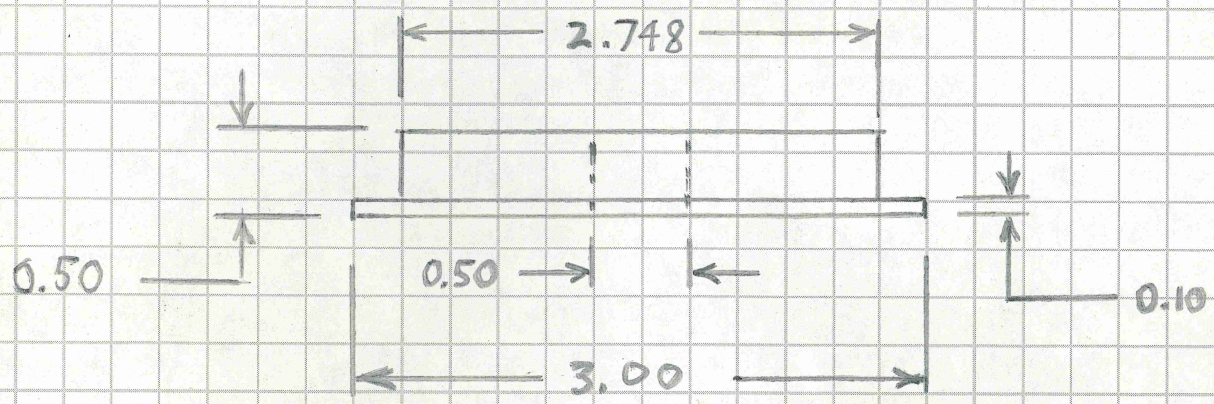
(4) MAKE 4 EA. FIG. 2 PHENOLIC BLOCK



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6/24/04 MAKE 2 EA. PHENOLIC ROUND DISCS.



7/8/05 G-11 FIBERGLASS NEW MODEL 7M ROT. GAP WHEEL

MAKE 1 EA.

FIG. 1

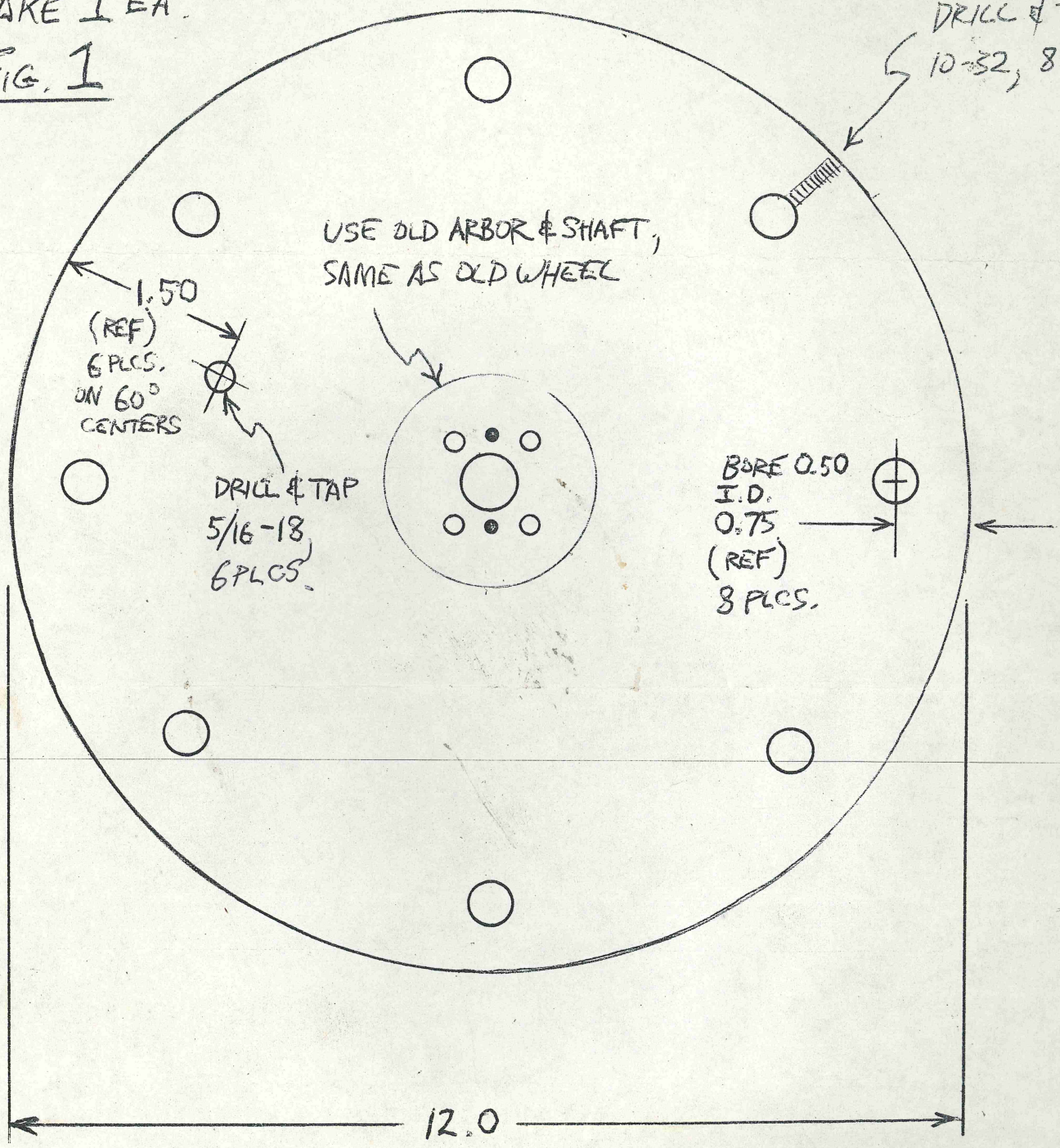
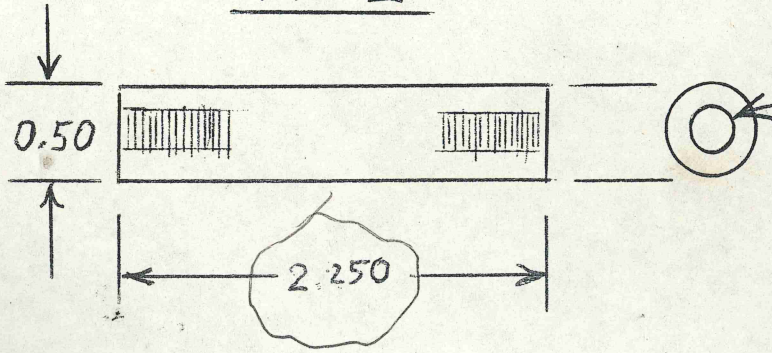


FIG. 2



DRILL & TAP 1/4-28 x 0.62 DEEP, BOTH ENDS.

MAKE 8 EA. OF FIG. 2, BRASS BRIGHT FINISH.

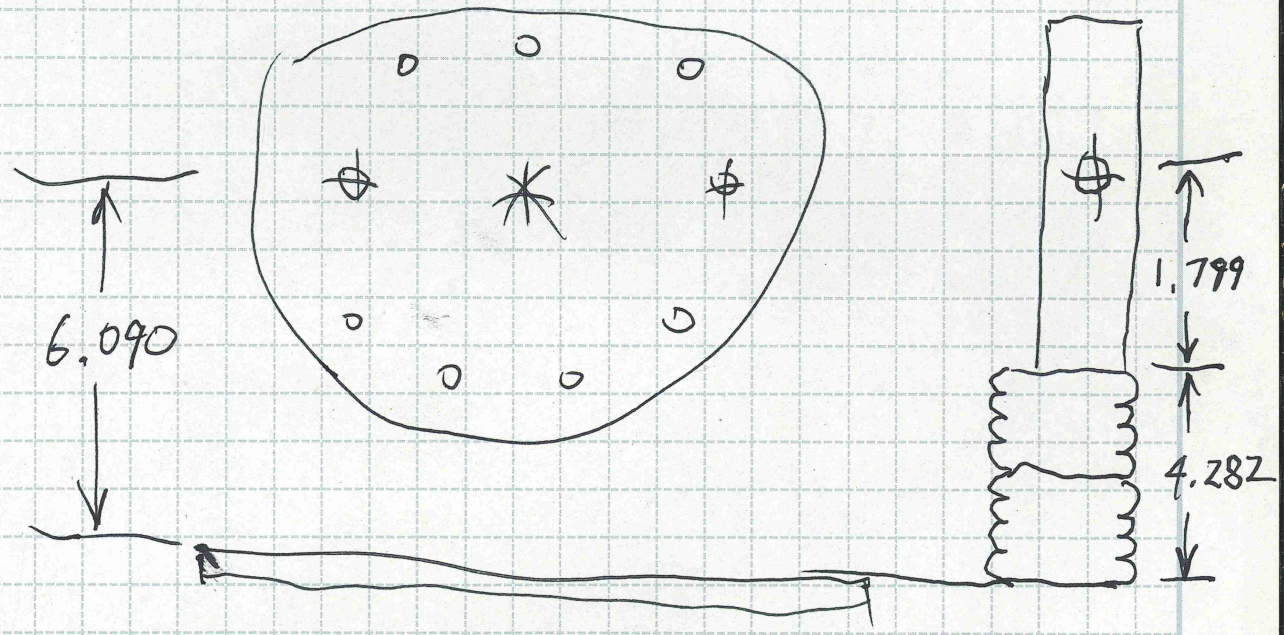
SEE 8/30/00
DATA SHEET

DAYTON # 6K347D
1 HP NEMA 56

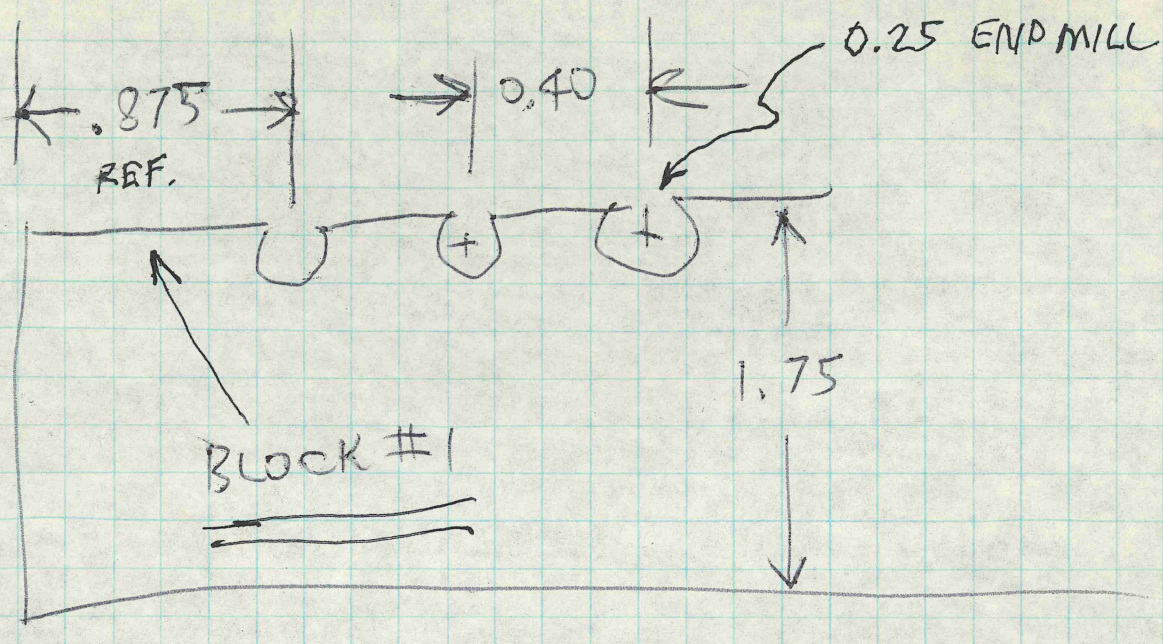
AEROFLEX
A passion for performance.

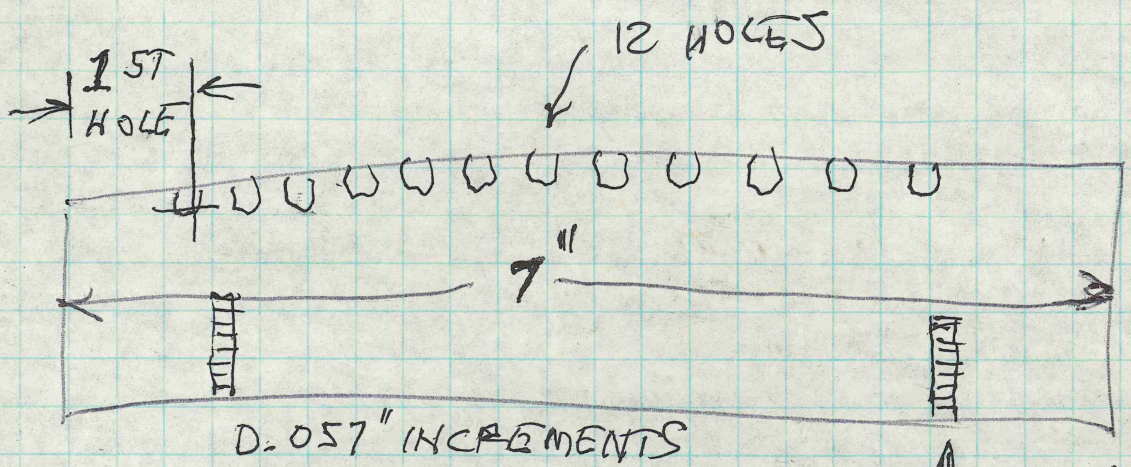
www.aeroflex.com

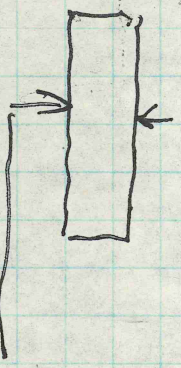
JAPAN - YUZO 5/6/06
3600 RPM 15KW RSG



4.291
4 | 4.282
4.296
4.294
4.296







BLOCK #2 1ST HOLE = 0.932

3 0.989

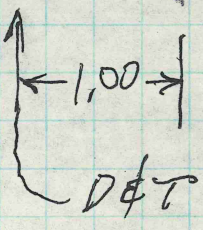
4 1.046

5 1.103

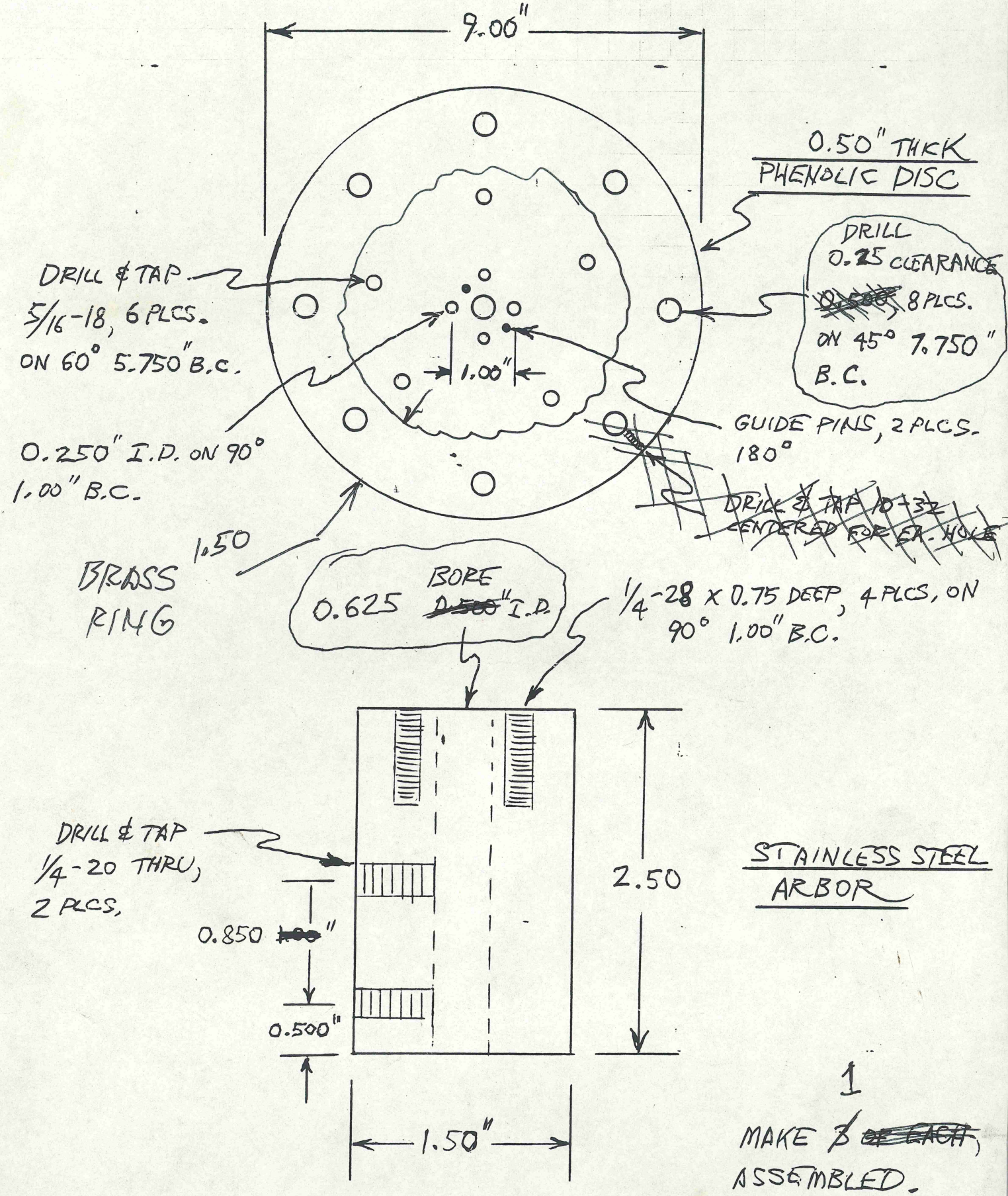
6 1.160

7 1.217

8 1.274



3375
9
3375



STAINLESS STEEL ARBOR

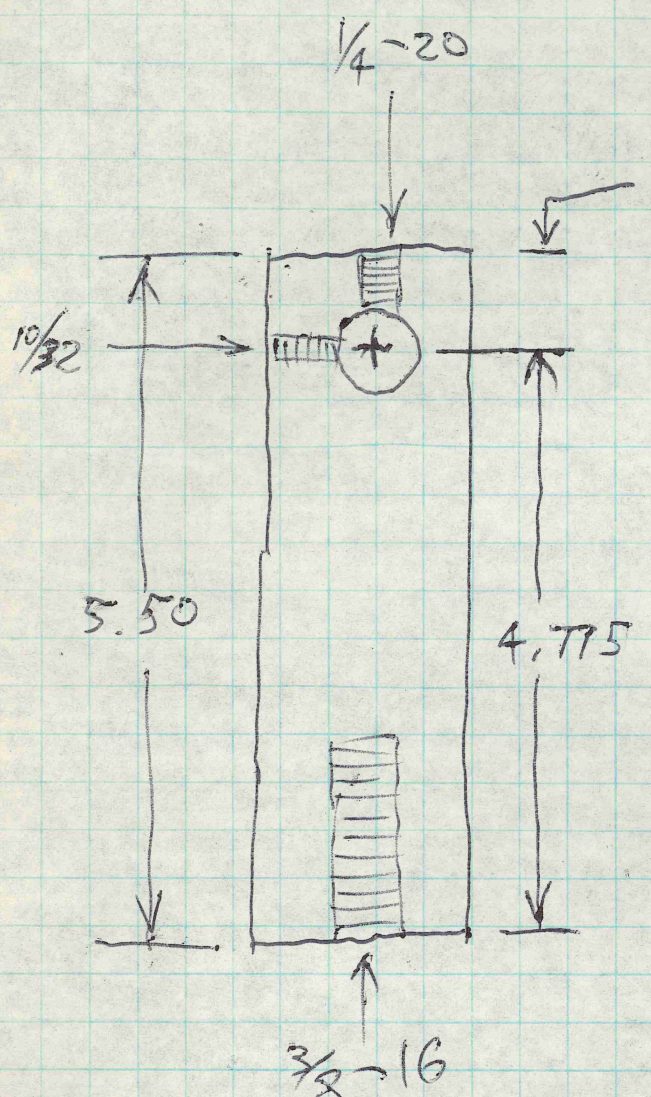
1

MAKE ~~3~~ ~~OF EACH~~,
ASSEMBLED.

~~6-23-00~~
11/17/05

12/2/05

MICHEL CRUSE
BASE UNIT
SR5G



$6\frac{7}{8}" = 6.875"$

-2.100

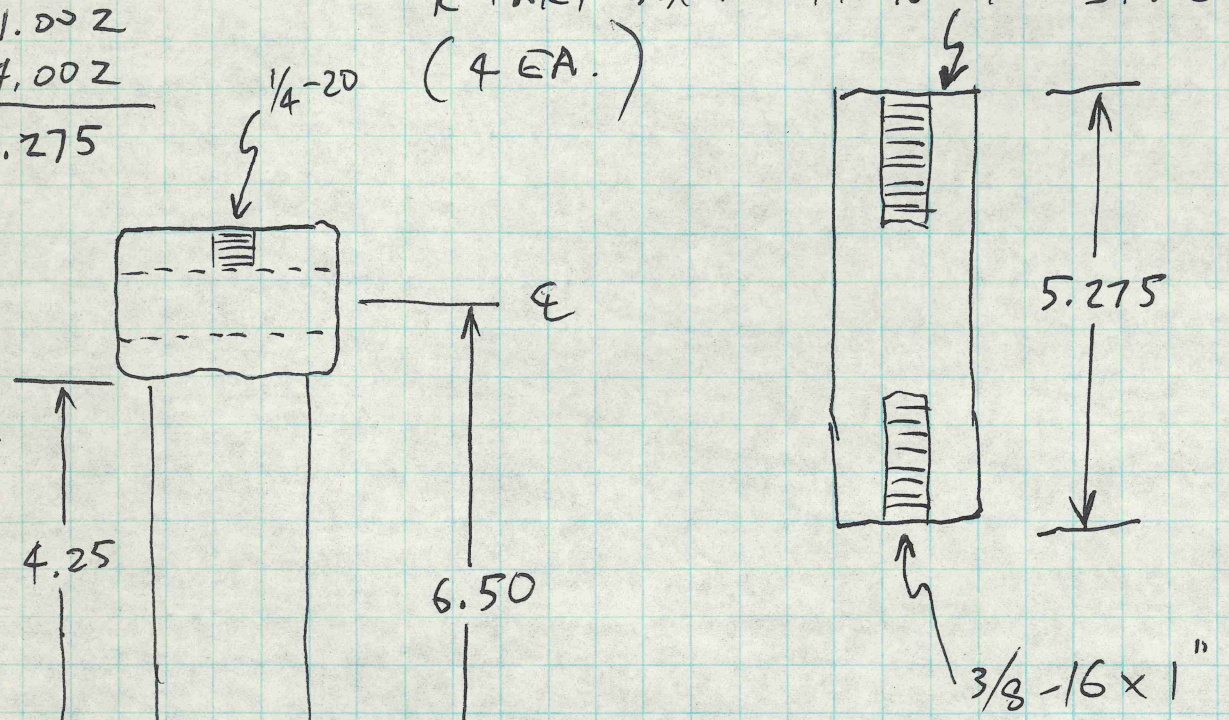
$4.775"$

GRIFFITH PARK 12/12/05

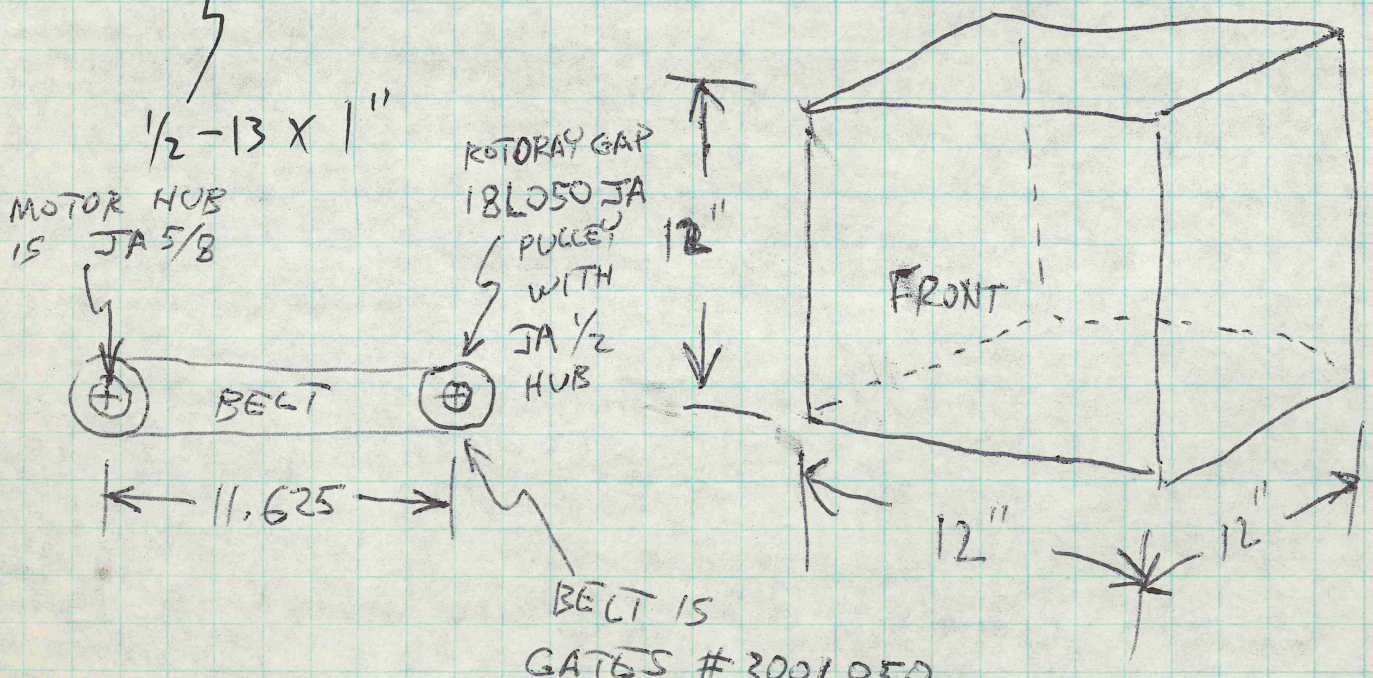
ROTARY GAP

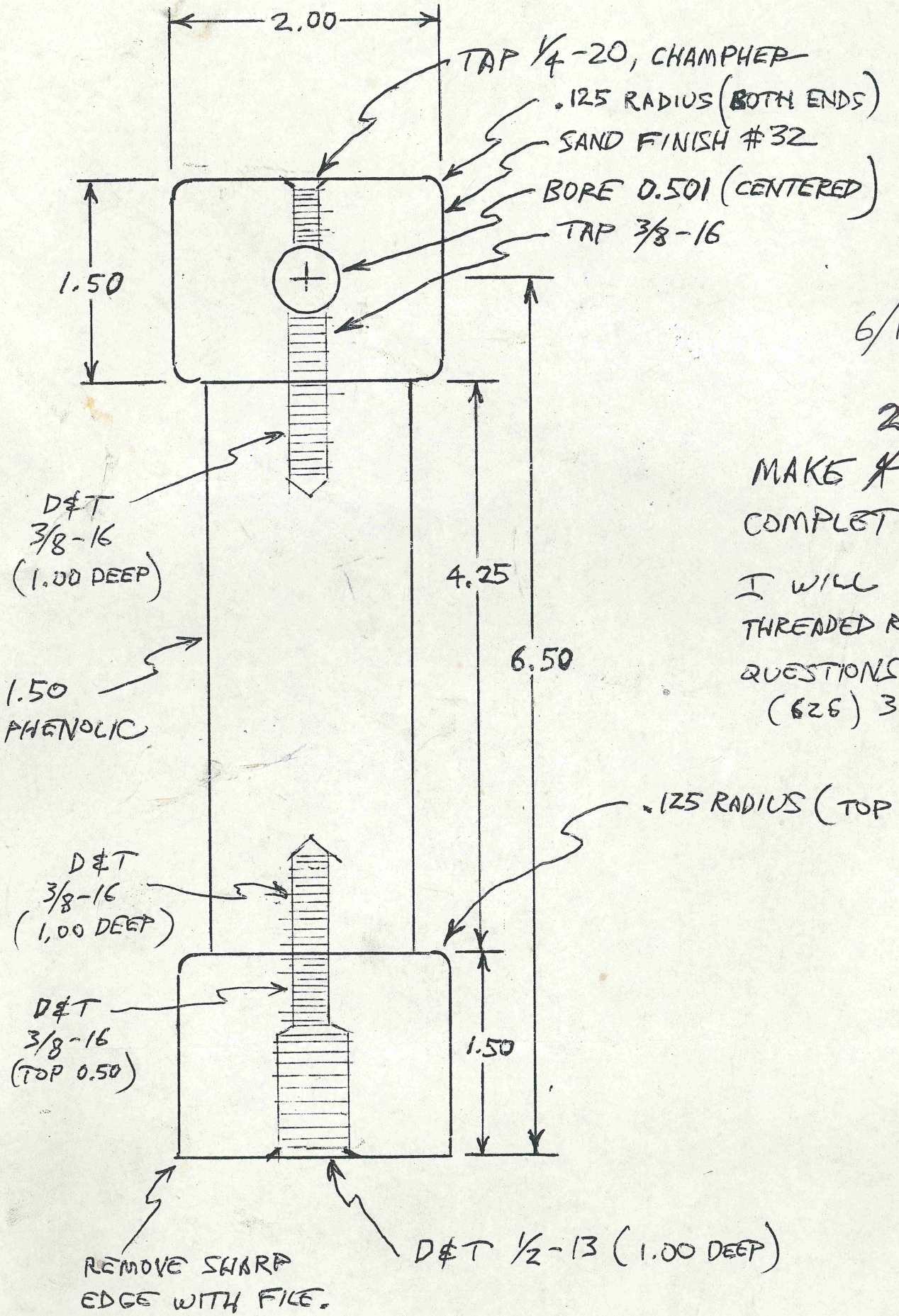
.145
.126
1.002
4.002
5.275

ROTARY AXEL PHENOLIC SPACERS (4 EA.)



PLEXIGLASS BOX: 12/14/04





6/12/02

2

MAKE ~~4~~ EA.

COMPLET ASSY'S

I WILL SUPPLY

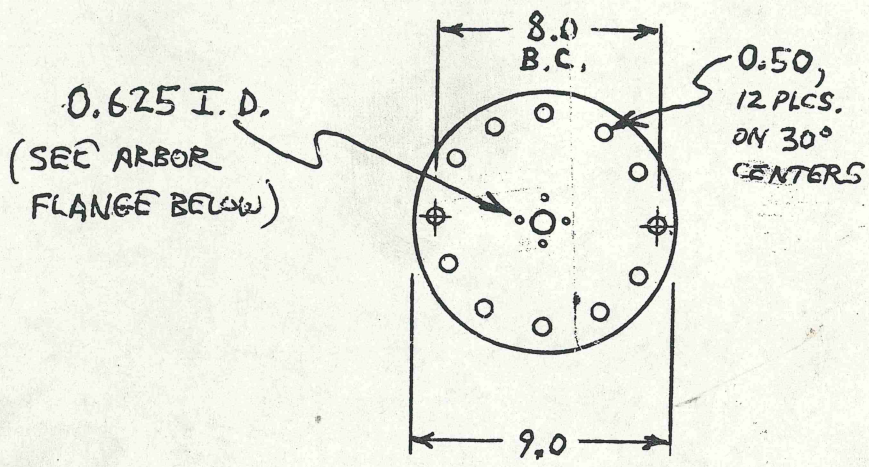
THREADED ROD STOCK.

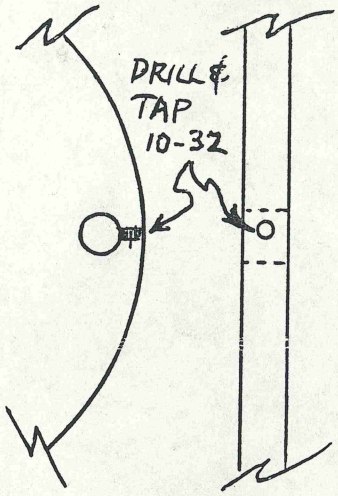
QUESTIONS

(626) 359-1373

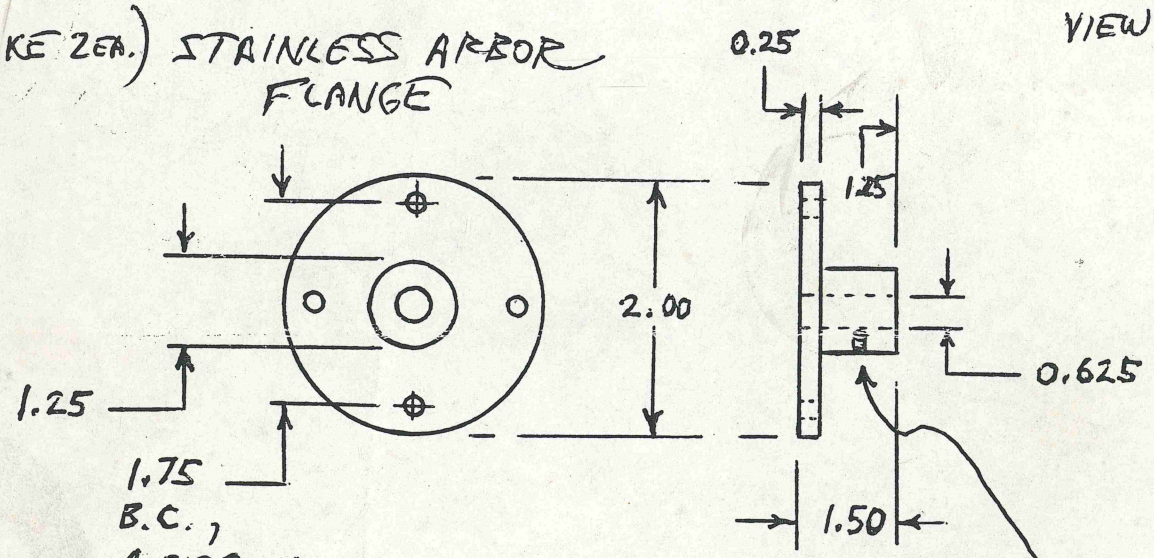
6/12/02

PHENOLIC DISC





(MAKE 2EA.) STAINLESS ARBOR FLANGE



DRILL & TAP
10-32, 0.625 IN
FROM END, 2 PLCS.
ON 90° CENTERS.

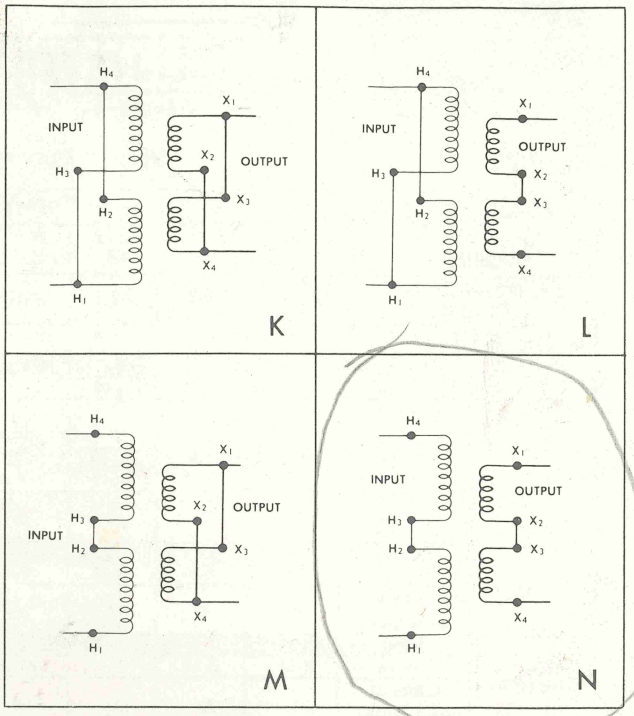
NOTE: ONE ARBOR
FLANGE IS
#11 CLEARANCE,
THE OTHER IS
TAPPED 10-32,

INPUT VOLTAGE 120 x 240: OUTPUT VOLTAGE 12 x 24: 60 HERTZ

** ALL SIZES OF ¾ KVA AND LESS ARE SUITABLE FOR 50 / 60 HERTZ

Units rated 120 x 240 v. input: 12 x 24 v. output		
Input	Output	Connection Diagram
120	12	K
120	24	L
240	12	M
240	24	N

Catalog Number	Insulating Transformer Rating	Max. Current Output 12V	24V
T-1-81047	** 50 VA	4.16	2.08
T-1-81048	** 100 VA	8.32	4.16
T-1-81049	** 150 VA	12.52	6.25
T-1-81050	** ¼ KVA	20.8	10.4
T-1-81051	** ½ KVA	41.6	20.8
T-1-81052	** ¾ KVA	62.5	31.25
T-1-11683	1 KVA	83.2	41.6
T-1-11684	1½ KVA	125.0	62.5
T-1-11685	2 KVA	166.0	83.2
T-1-11686	3 KVA	250.0	125.0
T-1-11687	5 KVA	416.0	208.0
T-2-11688	7½ KVA	625.0	312.5
T-2-11689	10 KVA	832.0	416.0



THREE PHASE CONNECTIONS

CAUTION: DO NOT USE CONNECTIONS OTHER THAN THOSE SHOWN OR PROVIDED BY FACTORY.

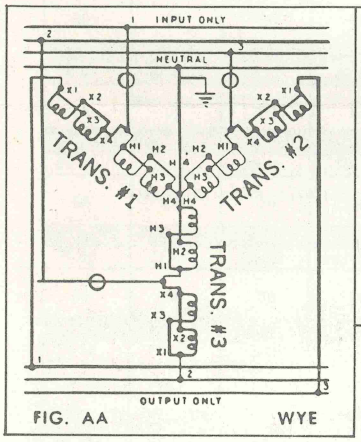


FIG. AA WYE

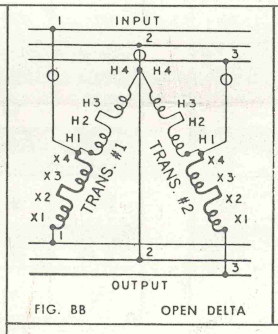


FIG. BB OPEN DELTA

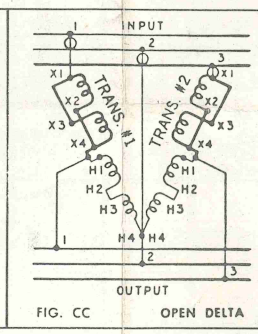


FIG. CC OPEN DELTA

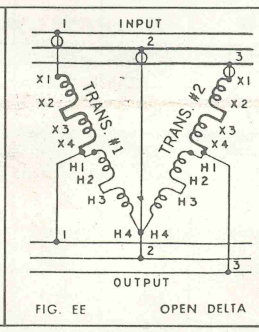


FIG. EE OPEN DELTA

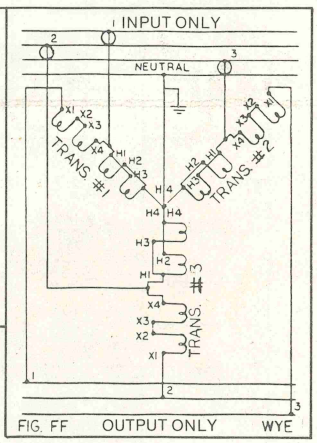
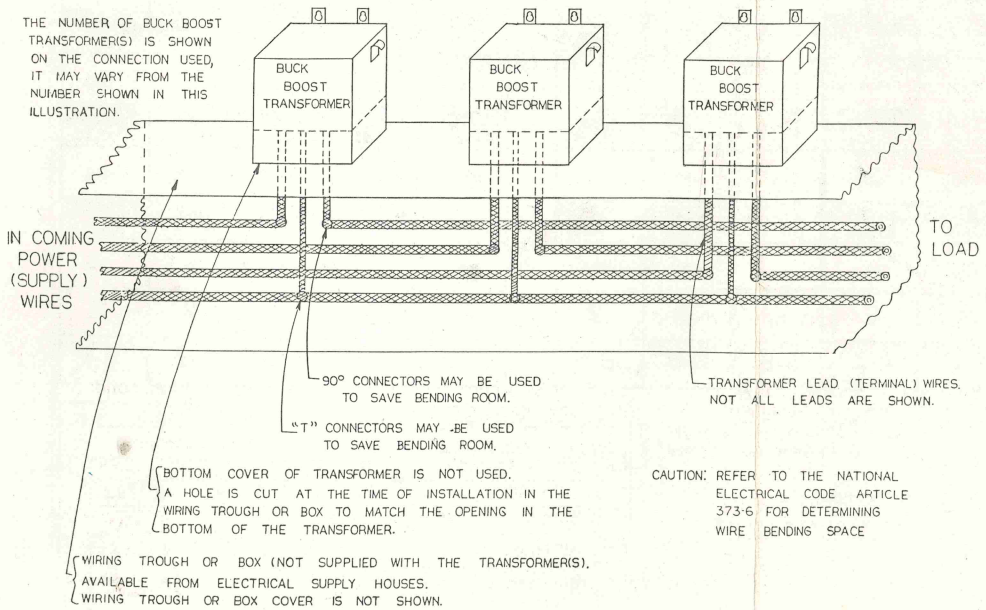


FIG. FF OUTPUT ONLY WYE

TYPICAL BUCK BOOST AUTOTRANSFORMER INSTALLATION



AUTOTRANSFORMER OVERCURRENT PROTECTION

The symbol "O" used in these three phase connection diagrams illustrates where to field install an overcurrent protective device (typically a fuse or circuit breaker).

When the input and output are reversed always install the overcurrent protection device in series with the input conductors.

For additional information refer to the National Electrical Code Article 450-4.

INPUT
COM #42 208
HOT #63 V.
OUT

USE INFORMATION BELOW FOR SINGLE PHASE AUTOTRANSFORMER CONNECTIONS

UL LISTED CSA® Certified

GROUP I

Single Phase

Single Phase		Boosting								Bucking					
Line Voltage (Available)		95	100	105	110	189	208	215	220	125	132	230	245	250	252
Load Voltage (Output)		114	120	115	120	208	230	237	242	113	120	208	222	227	240
Cat. No. ▲ (SEE FOOTNOTE)															
T-1-81047	Load KVA	.24	.25	.48	.50	.43	.48	.49	.50	.52	.54	.474	.50	.52	1.02
	Amps	2.08	2.08	4.17	4.17	2.08	2.08	2.08	2.08	4.6	4.6	2.28	2.28	2.28	4.37
	Max. Size of Fuse or Breaker	6	6	10	10	6	6	6	6	10	10	6	6	6	10
T-1-81048	Load KVA	.47	.50	.96	1.01	.87	.96	.99	1.01	1.04	1.08	.95	1.0	1.04	2.04
	Amps	4.17	4.17	8.33	8.33	4.17	4.17	4.17	4.17	9.2	9.2	4.56	4.56	4.58	8.75
	Max. Size of Fuse or Breaker	10	10	15	15	10	10	10	10	15	15	10	10	10	15
T-1-81049	Load KVA	.71	.75	1.43	1.51	1.3	1.43	1.48	1.51	1.56	1.62	1.42	1.5	1.56	3.0
	Amps	6.25	6.25	12.5	12.5	6.25	6.25	6.25	6.25	13.8	13.8	6.86	6.86	6.86	13.1
	Max. Size of Fuse or Breaker	15	15	20	20	15	15	15	15	20	20	15	15	15	15
T-1-81050	Load KVA	1.19	1.25	2.40	2.50	2.16	2.39	2.46	2.52	2.6	2.75	2.37	2.5	2.6	5.1
	Amps	10.42	10.4	20.8	20.8	10.4	10.4	10.4	10.4	22.8	22.8	11.4	11.4	11.4	21.8
	Max. Size of Fuse or Breaker	25	25	40	30	15	15	15	15	30	30	15	15	15	30
T-1-81051	Load KVA	2.37	2.5	4.80	5.0	4.33	4.79	4.93	5.04	5.2	5.4	4.74	5.0	5.2	10.2
	Amps	20.83	20.83	41.67	41.67	20.83	20.83	20.83	20.83	46.8	46.8	22.8	22.8	22.8	43.7
	Max. Size of Fuse or Breaker	35	35	60	60	30	30	30	30	60	60	30	30	30	60
T-1-81052	Load KVA	3.56	3.75	7.17	7.56	6.5	7.19	7.41	7.56	7.8	8.15	7.1	7.5	7.8	15.3
	Amps	31.25	31.25	62.5	62.5	31.25	31.25	31.25	31.25	68.5	69.5	34.4	34.4	34.4	65.5
	Max. Size of Fuse or Breaker	50	50	90	90	45	45	45	45	80	80	40	40	40	80
T-1-11683	Load KVA	4.75	5.0	9.58	10.0	8.66	9.58	9.87	10.0	10.4	10.8	9.5	10.0	10.0	20.4
	Amps	41.67	41.67	83.31	83.31	41.67	41.67	41.67	41.67	91.5	91.5	45.8	45.8	45.8	87.5
	Max. Size of Fuse or Breaker	70	70	125	125	60	60	60	60	110	110	60	60	50	110
T-1-11684	Load KVA	7.12	7.5	14.4	15.1	13.0	14.3	14.8	15.1	15.0	16.2	14.24	15.0	15.6	30.6
	Amps	62.5	62.5	125.0	125.0	62.5	62.5	62.5	62.5	138.0	138.0	68.6	68.6	68.6	132.0
	Max. Size of Fuse or Breaker	100	100	175	175	90	90	90	90	150	175	80	80	80	175
T-1-11685	Load KVA	9.5	10.0	19.2	20.2	17.3	19.9	19.7	20.1	20.8	21.6	19.0	20.0	20.3	40.8
	Amps	83.3	83.3	166.6	166.6	83.3	83.3	83.3	83.3	183.0	183.0	91.6	91.6	91.2	175.0
	Max. Size of Fuse or Breaker	125	125	250	250	125	125	125	125	225	225	110	110	110	225
T-1-11686	Load KVA	14.2	15.0	28.8	30.0	26.0	28.7	29.6	30.3	31.2	32.5	28.5	30.0	31.2	61.0
	Amps	125.0	125.0	250.0	250.0	125.0	125.0	125.0	125.0	275.0	275.0	136.8	136.8	136.8	263.0
	Max. Size of Fuse or Breaker	200	200	350	350	175	175	175	175	350	350	175	175	175	350
T-1-11687	Load KVA	23.7	25.0	47.9	50.0	43.3	47.8	49.3	50.3	52.0	54.0	47.4	50.0	52.0	102.0
	Amps	208.0	208.0	416.6	416.6	208.0	208.0	208.0	208.0	457.0	457.0	228.0	228.0	228.0	437.0
	Max. Size of Fuse or Breaker	350	350	600	600	300	300	300	300	600	600	300	300	300	600
T-2-11688*	Load KVA	35.6	37.5	71.9	75.6	65.0	71.8	74.0	75.6	78.0	81.0	71.0	76.0	78.0	153.0
	Amps	312.5	312.5	625.0	625.0	312.5	312.5	312.5	312.5	688.0	688.0	344.0	344.0	344.0	655.0
	Max. Size of Fuse or Breaker	500	500	1000	1000	450	450	450	450	800	800	400	400	400	800
T-2-11689*	Load KVA	47.5	50.0	95.8	100.0	86.6	95.8	98.7	101.0	104.0	108.0	95.0	100.0	104.0	204.0
	Amps	416.6	416.6	833.3	833.3	416.6	416.6	416.6	416.6	915.0	915.0	458.0	458.0	458.0	875.0
	Max. Size of Fuse or Breaker	700	700	1200	1200	600	600	600	600	1200	1200	600	600	600	1200
Connection Diagram		D	D	C	C	H	H	H	H	F	F	I	I	I	E

NOTE: Inputs and Outputs may be reversed; KVA capacity remains constant. All applications **above** bold face line are suitable for 50/60 Hz. All applications **below** bold face line are suitable for 60 Hz only.

IMPORTANT: REFER TO THE N.E.C. (NATIONAL ELECTRICAL CODE) ARTICLE 450-4 FOR OVERCURRENT PROTECTION OF AN AUTOTRANSFORMER.

▲ THE FIRST DIGIT OF THE CATALOG NUMBER APPEARING ON THE TRANSFORMER NAME PLATE MAY BE DIFFERENT THAN WHAT IS SHOWN ON THIS INSTRUCTION SHEET; EXAMPLE: T-1 or T-2 or T-3 AND ETC.

Larger KVA buck-boost transformers utilize multiple conductors on the secondary (X) terminals as shown below.

*

	Number of Leads per Termination							
	H1	H2	H3	H4	X1	X2	X3	X4
T-2-11688	1	1	1	1	2	2	2	2
T-2-11689	1	1	1	1	4	4	4	4

All leads with same designation (ex. X1, X1) MUST be joined together for proper operation.

USE INFORMATION BELOW FOR THREE PHASE AUTOTRANSFORMER CONNECTIONS

UL LISTED CSA® Certified

GROUP I

Three Phase

Three Phase		Boosting						
Line Voltage (Available)		189Y 109	196Y 113	201Y 116	208Y 120	189	208	220
Load Voltage (Output)		208	234	240	230	208	230	242
Cat. No. ▲ (SEE FOOTNOTE) SHOWN ON PAGE 2								
T-1-81047	Load KVA	1.50	0.84	0.87	1.66	0.75	0.83	0.87
	Amps	4.17	2.08	2.08	4.17	2.08	2.08	2.08
	Max. Size of Fuse or Breaker	10	6	6	10	6	6	6
T-1-81048	Load KVA	3.00	1.69	1.73	3.32	1.50	1.66	1.75
	Amps	8.33	4.17	4.17	8.33	4.17	4.17	4.17
	Max. Size of Fuse or Breaker	15	10	10	15	10	10	10
T-1-81049	Load KVA	4.50	2.53	2.60	4.98	2.25	2.49	2.62
	Amps	12.50	6.25	6.25	12.50	6.25	6.25	6.25
	Max. Size of Fuse or Breaker	20	15	15	20	15	15	15
T-1-81050	Load KVA	7.51	4.22	4.33	8.30	3.75	4.15	4.37
	Amps	20.83	10.42	10.42	20.83	10.42	10.42	10.42
	Max. Size of Fuse or Breaker	30	20	20	30	15	15	15
T-1-81051	Load KVA	15.01	8.44	8.66	16.60	7.51	8.30	8.73
	Amps	41.67	20.83	20.83	41.67	20.83	20.83	20.83
	Max. Size of Fuse or Breaker	60	35	35	60	30	30	30
T-1-81052	Load KVA	22.52	12.67	12.99	24.90	11.26	12.45	13.10
	Amps	62.50	31.25	31.25	62.50	31.25	31.25	31.25
	Max. Size of Fuse or Breaker	90	50	50	90	45	45	45
T-1-11683	Load KVA	30.02	16.89	17.32	33.20	15.01	16.60	17.46
	Amps	83.33	41.67	41.67	83.33	41.67	41.67	41.67
	Max. Size of Fuse or Breaker	125	70	70	125	60	60	60
T-1-11684	Load KVA	45.03	25.33	25.98	49.80	22.52	24.90	26.20
	Amps	125.00	62.50	62.50	125.00	62.50	62.50	62.50
	Max. Size of Fuse or Breaker	175	100	100	175	90	90	90
T-1-11685	Load KVA	60.04	33.77	34.64	66.40	30.02	33.20	34.93
	Amps	166.67	83.33	83.33	166.67	83.33	83.33	83.33
	Max. Size of Fuse or Breaker	250	125	125	250	125	125	125
T-1-11686	Load KVA	90.07	50.66	51.96	99.59	45.03	49.80	52.39
	Amps	250.00	125.00	125.00	250.00	125.00	125.00	125.00
	Max. Size of Fuse or Breaker	350	200	200	350	175	175	175
T-1-11687	Load KVA	150.11	84.44	86.60	165.99	75.06	82.99	87.32
	Amps	416.67	208.33	208.33	416.67	208.33	208.33	208.33
	Max. Size of Fuse or Breaker	600	350	350	600	300	300	300
T-2-11688*	Load KVA	225.17	126.66	129.90	248.98	112.58	124.49	130.99
	Amps	625.00	312.50	312.50	625.00	312.50	312.50	312.50
	Max. Size of Fuse or Breaker	1000	500	500	1000	450	450	450
T-2-11689*	Load KVA	300.22	168.87	173.21	331.98	150.11	165.99	174.65
	Amps	833.33	416.67	416.67	833.33	416.67	416.67	416.67
	Max. Size of Fuse or Breaker	1200	700	700	1200	600	600	600
Quantity Required		3	3	3	3	2	2	2
Connection Diagrams		A-A	F-F	F-F	A-A	B-B	B-B	B-B

Three Phase

Bucking				
219	230	250	255	264
208	208	227	232	240
1.58	0.83	0.90	0.92	0.95
4.39	2.30	2.29	2.29	2.29
10	6	6	6	6
3.16	1.66	1.80	1.84	1.91
8.77	4.61	4.59	4.58	4.58
15	10	10	10	10
4.74	2.49	2.71	2.76	2.86
13.16	6.91	6.88	6.87	6.88
20	15	15	15	15
7.90	4.15	4.51	4.60	4.76
21.94	11.52	11.47	11.45	11.46
30	15	15	15	15
15.80	8.30	9.02	9.20	9.53
43.87	23.04	22.94	22.90	22.92
60	30	30	30	30
23.71	12.45	13.53	13.80	14.29
65.81	34.56	34.42	34.35	34.38
80	40	40	40	40
31.61	16.60	18.04	18.40	19.05
87.74	46.07	45.89	45.80	45.83
110	60	60	60	60
47.41	24.90	27.06	27.60	28.58
131.61	69.11	68.83	68.70	68.75
175	80	80	80	80
63.22	33.20	36.08	36.81	38.11
175.48	92.15	91.78	91.59	91.67
225	110	110	110	110
94.83	49.80	54.13	55.21	57.16
263.22	138.22	137.67	137.39	137.50
350	175	175	175	175
158.05	82.99	90.21	92.02	95.26
438.70	230.37	229.44	228.99	229.17
600	300	300	300	300
237.07	124.49	135.32	138.02	142.89
658.05	345.55	344.16	343.48	343.75
800	400	400	400	400
316.10	165.99	180.42	184.03	190.53
877.40	460.74	458.88	457.97	458.33
1200	600	600	600	600
2	2	2	2	2
C-C	E-E	E-E	E-E	E-E

NOTE: (1) Inputs and Outputs may be reversed; KVA capacity remains constant. All Applications **above** bold face line are suitable for 50/60 Hz. All applications **below** bold face line are suitable for 60 Hz only.

(2) Connection Diagrams A-A and F-F cannot be reverse connected.

IMPORTANT: REFER TO THE N.E.C. (NATIONAL ELECTRICAL CODE) ARTICLE 450-4 FOR OVERCURRENT PROTECTION OF AN AUTOTRANSFORMER.

Larger KVA buck-boost transformers utilize multiple conductors on the secondary (X) terminals as shown below.

*

	Number of Leads per Termination							
	H1	H2	H3	H4	X1	X2	X3	X4
T-2-11688	1	1	1	1	2	2	2	2
T-2-11689	1	1	1	1	4	4	4	4

All leads with same designation (ex. X1, X1) MUST be joined together for proper operation.

†Trademarks of Acme Electric Corporation.

Acme Electric †
Acme Transformer Division

MAIN OFFICE and PLANT: LUMBERTON, N.C. 28358
Phones: 919-738-1121 1-800-334-5214 TELEX: 57-9358
FAX: 919-739-0024
WESTERN SALES OFFICE and REGIONAL WAREHOUSE
SALT LAKE CITY, UTAH 84116
Phone: 801-539-0227 TELEX: 38-9467

A-22498-H

BUCK AND BOOST TRANSFORMER

INSTALLATION INSTRUCTIONS

Steps for Selecting the Proper Buck-Boost Transformer

First, **you should have this information** before selecting a buck-boost transformer.

Line Voltage — The voltage that you want to buck (decrease) or boost (increase). This can be found by measuring the supply line voltage with a voltmeter.

Load Voltage — The voltage at which your equipment is designed to operate. This is listed on the nameplate of the load equipment.

Load KVA or Load Amps — You do not need to know both—one or the other is sufficient for selection purposes. This information usually can be found on the nameplate of the equipment that you want to operate.

Frequency — The supply line frequency must be the same as the frequency of the equipment to be operated — either 50 or 60 cycles.

Phase — The supply line should be the same as the equipment to be operated—either single or three phase.

4 Step Selection

1 A series of LINE VOLTAGE and LOAD VOLTAGE combinations are listed across the top of each selection chart. Select a LINE VOLTAGE and LOAD VOLTAGE combination from ANY of the charts that comes closest to matching the LINE VOLTAGE and LOAD VOLTAGE of your application.

2 Read down the column you have selected until you reach either theLOAD KVA or LOAD AMPS of the equipment you want to operate. You probably will not find the exact value of LOAD KVA or LOAD AMPS so go to the next higher rating.

3 From this point, read across the column to the far left-hand side and you have found the catalog number of the exact buck-boost transformer you need.

4 CONNECT the transformer according to the connection diagram specified at the bottom of the column where you selected your LINE VOLTAGE and LOAD VOLTAGE combination.

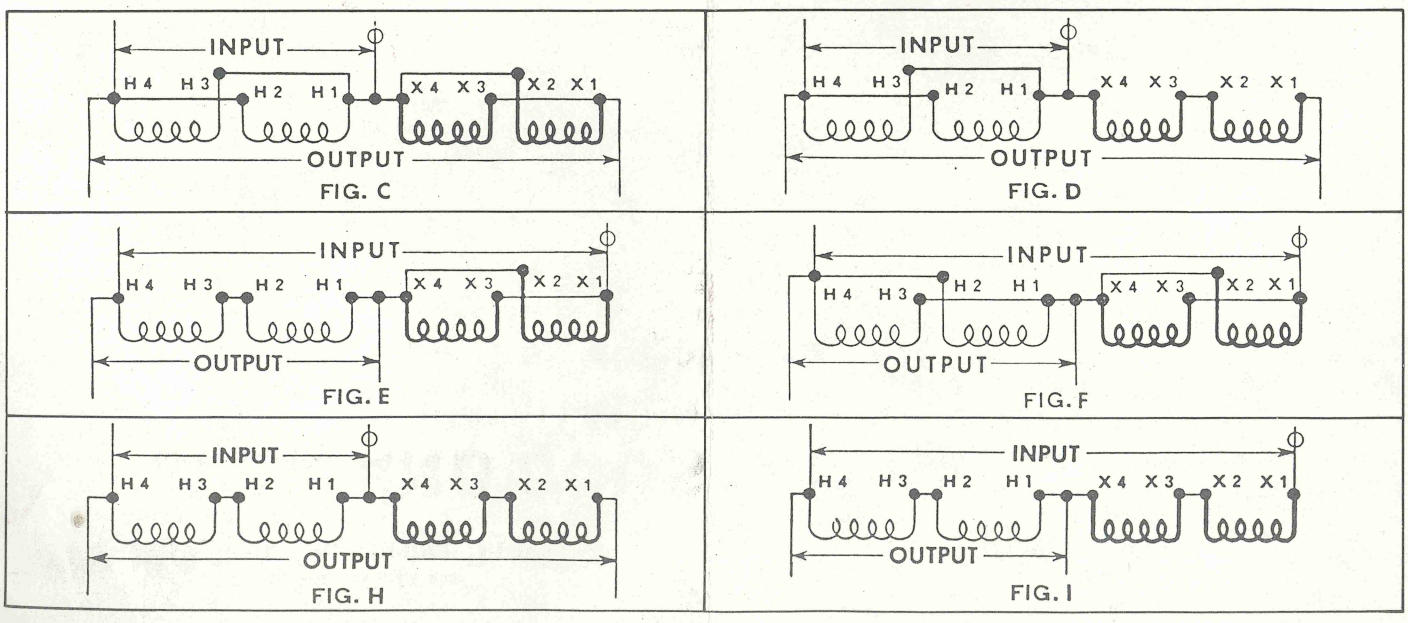
Connection Diagrams

Single Phase

AUTOTRANSFORMER OVERCURRENT PROTECTION

1. The symbol "O" used in these single phase connection diagrams illustrates where to field install an overcurrent protective device (typically a fuse or circuit breaker) when one input conductor is grounded and the other input conductor is ungrounded.
2. When both input conductors are ungrounded an overcurrent protection device is required to be installed in series with each input conductor.
3. When the input and output are reversed always install the overcurrent protection device in series with the input conductor(s), as noted in items No. 1 and No. 2 shown above.
4. For additional information refer to the National Electrical Code, Article 450-4.

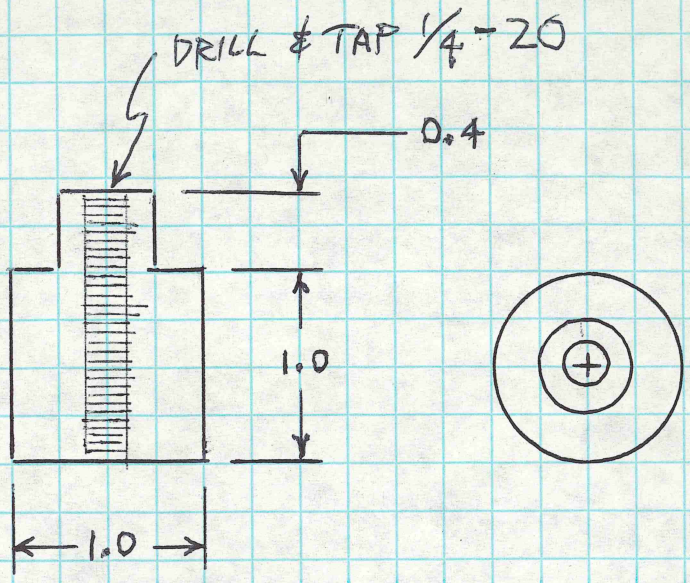
Only 1 transformer is required in figure shown below.



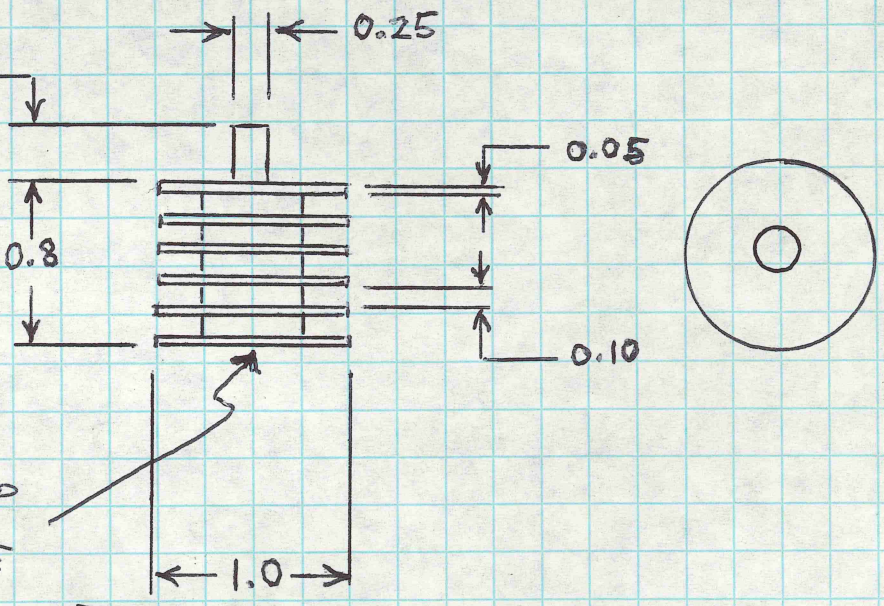
CAUTION: DO NOT USE CONNECTIONS OTHER THAN THOSE SHOWN OR PROVIDED BY FACTORY.

10/21/02

STAND OFF
MAKE 4 EA.
BRASS



HEAT SINK
MAKE 8 EA.
BRASS

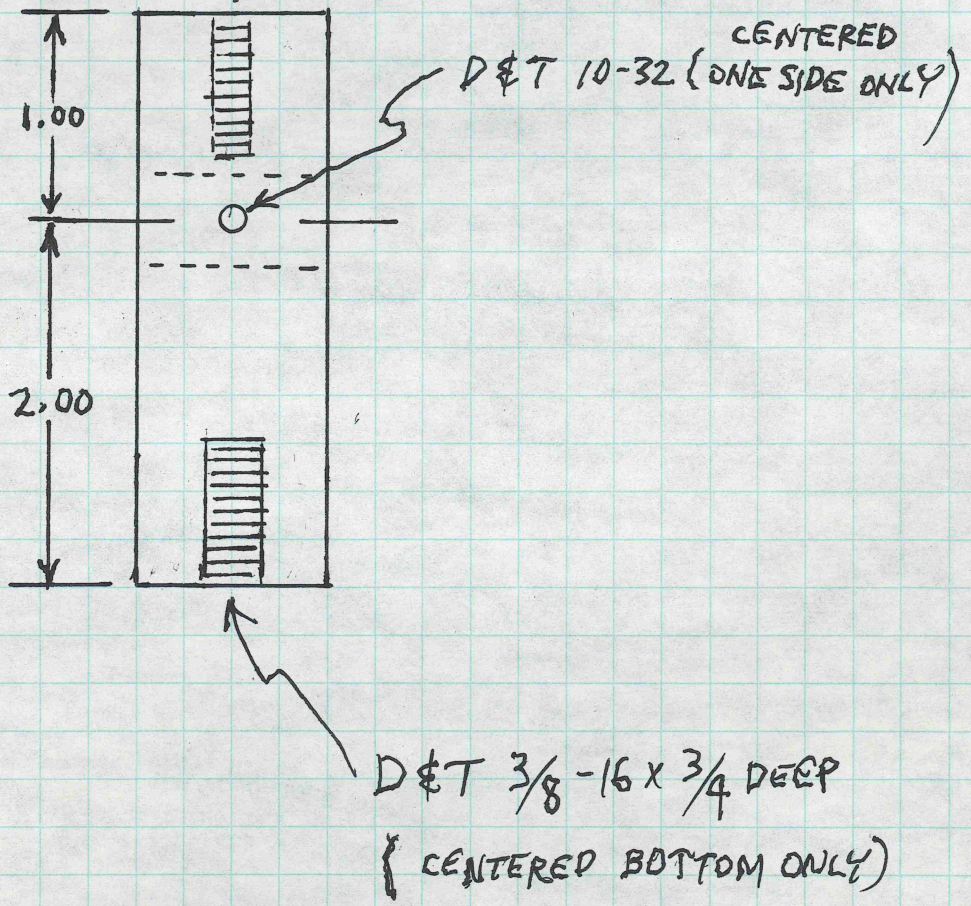


DRILL & TAP
BLIND HOLE
1/4-28 X 0.5 DEEP

1" SQ. BRASS ROD ELECTRODE HOLDERS (BRIGHT FINISH) 8/20/08

MAKE 8 EA.

CHAMFER ALL HOLES



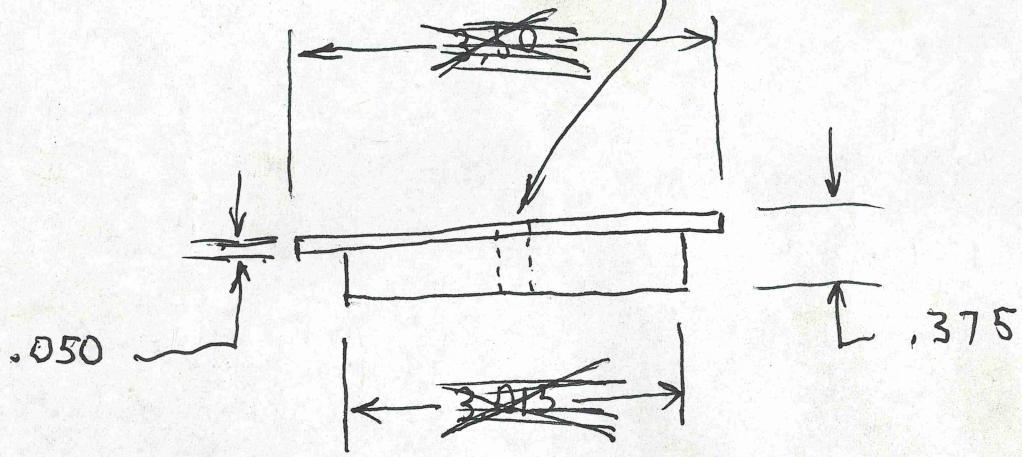
2/13/08 ~~1/16/08~~

SECONDARY TUBE
PHENOLIC END CAPS

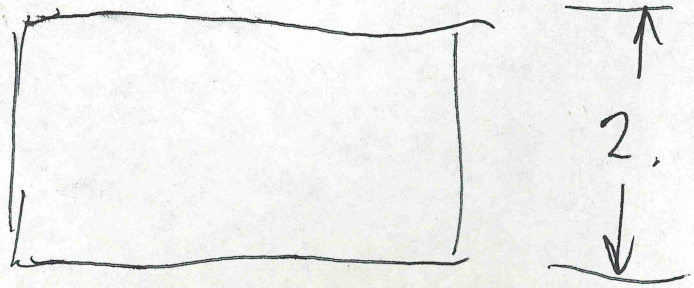
MAKE ~~4 EA~~
2 EA

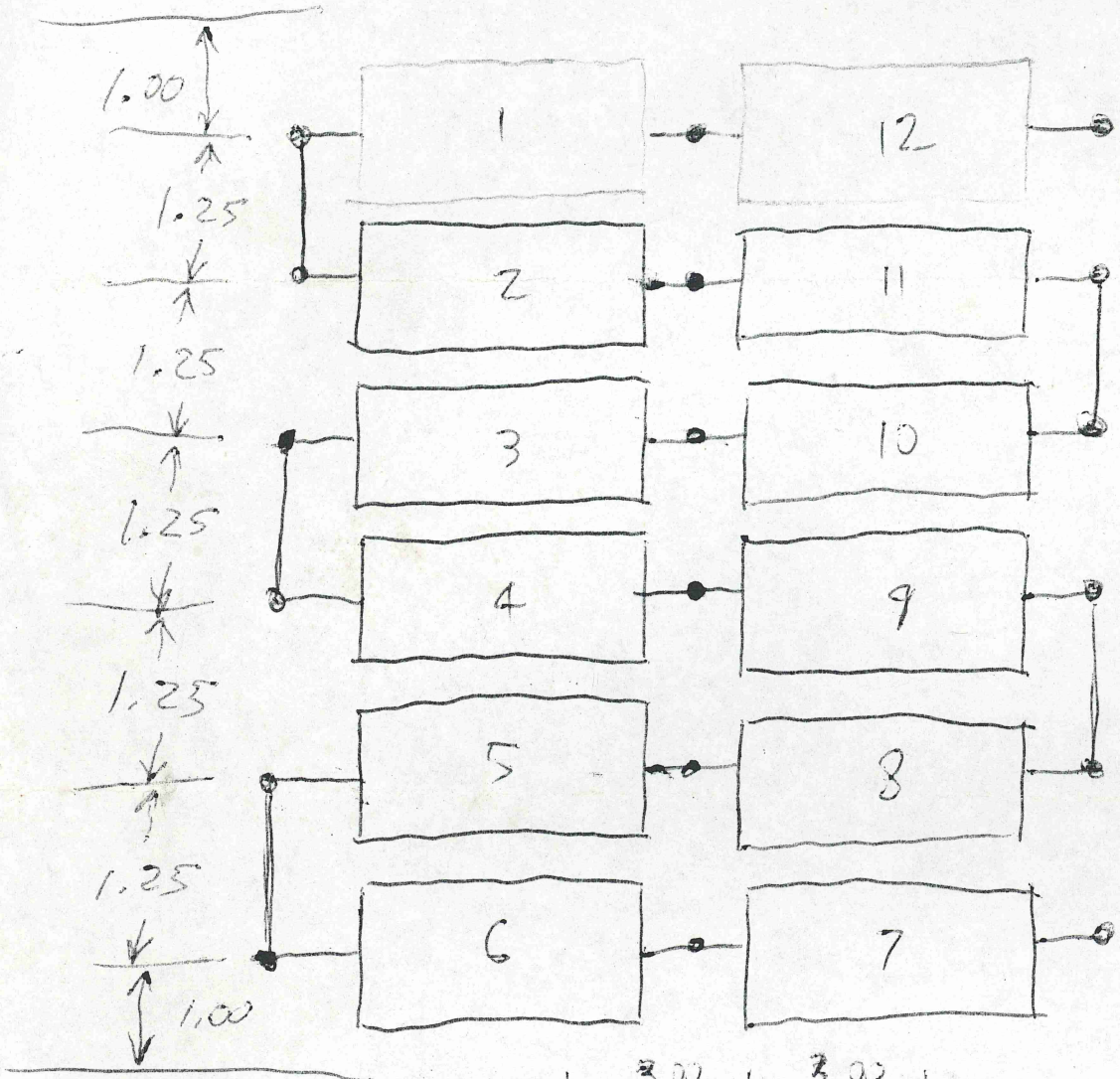
3.05

DRILL 0.25



~~TRUE ENDS OF PIPE~~





11/20/06

MMC

.012 MFD

18 SPACERS

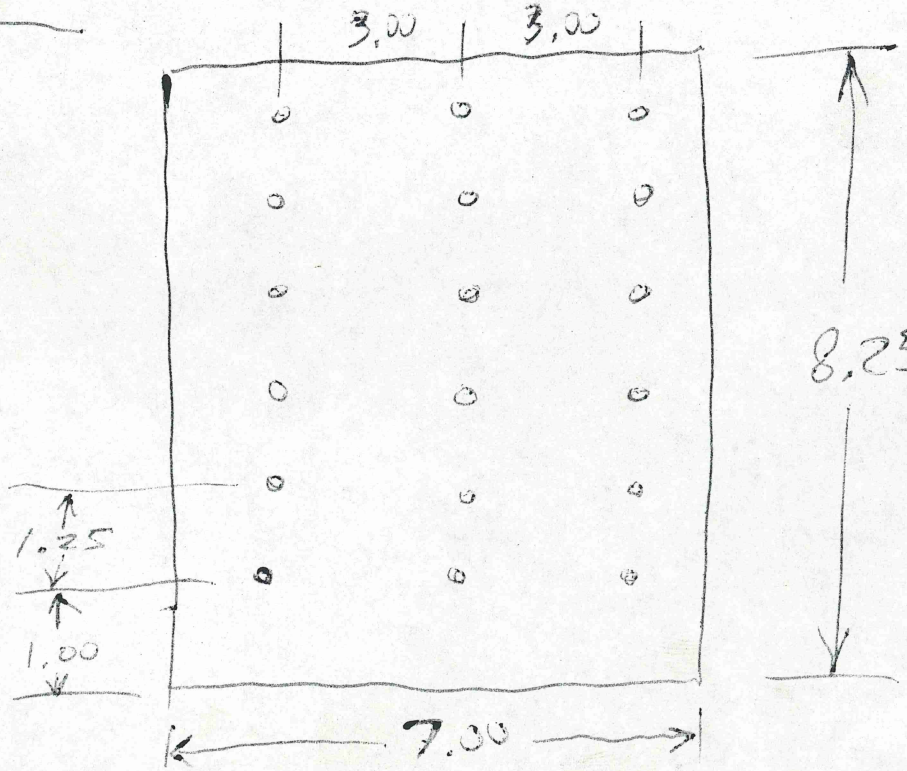
MODEL 2

COIL

(707)

239-0005

MARTIN



SEC. Ω =

32.0

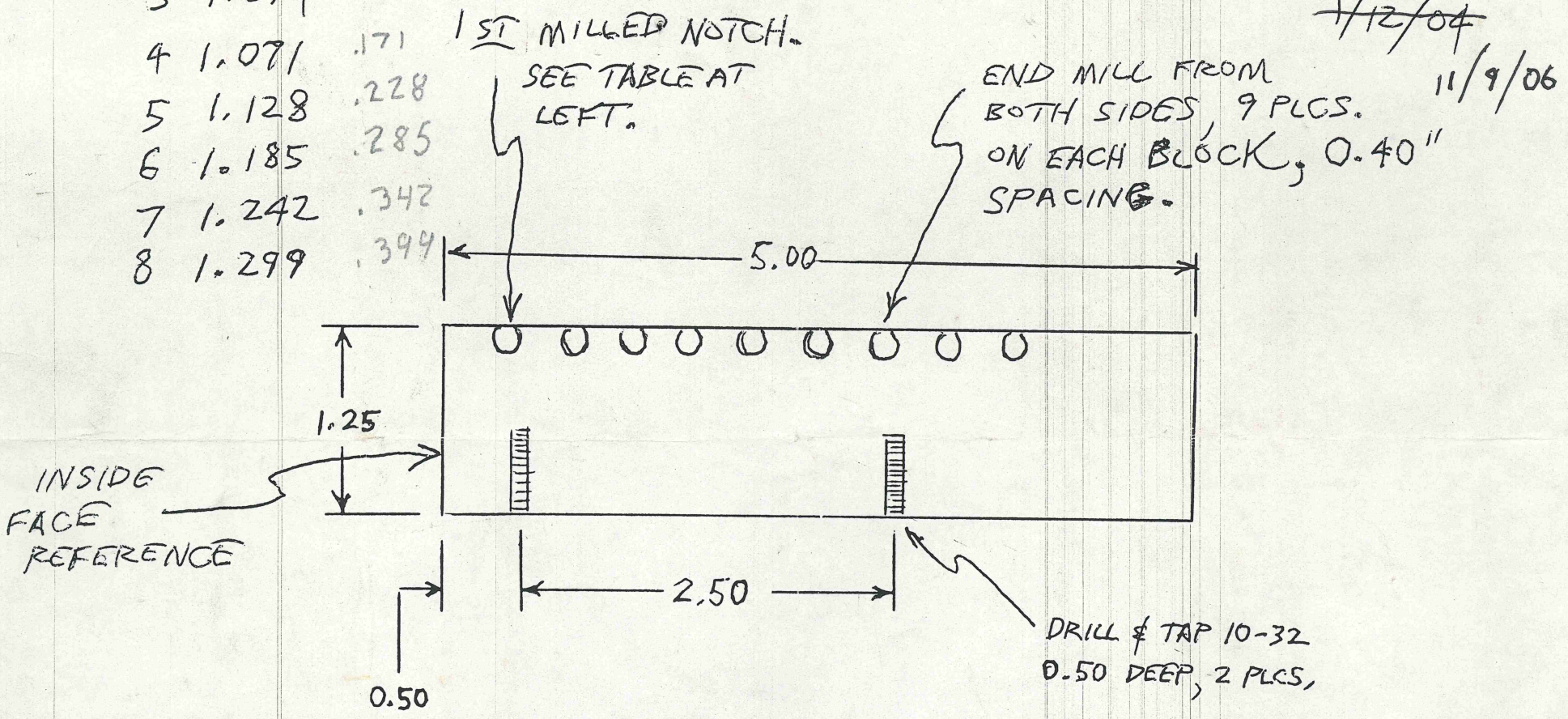
FROM INSIDE FACE TO 1ST NOTCH

BLOCK 1	0.900	
2	0.957	.057
3	1.014	.114
4	1.071	.171
5	1.128	.228
6	1.185	.285
7	1.242	.342
8	1.299	.399

~~2/9/01~~

~~1/12/04~~

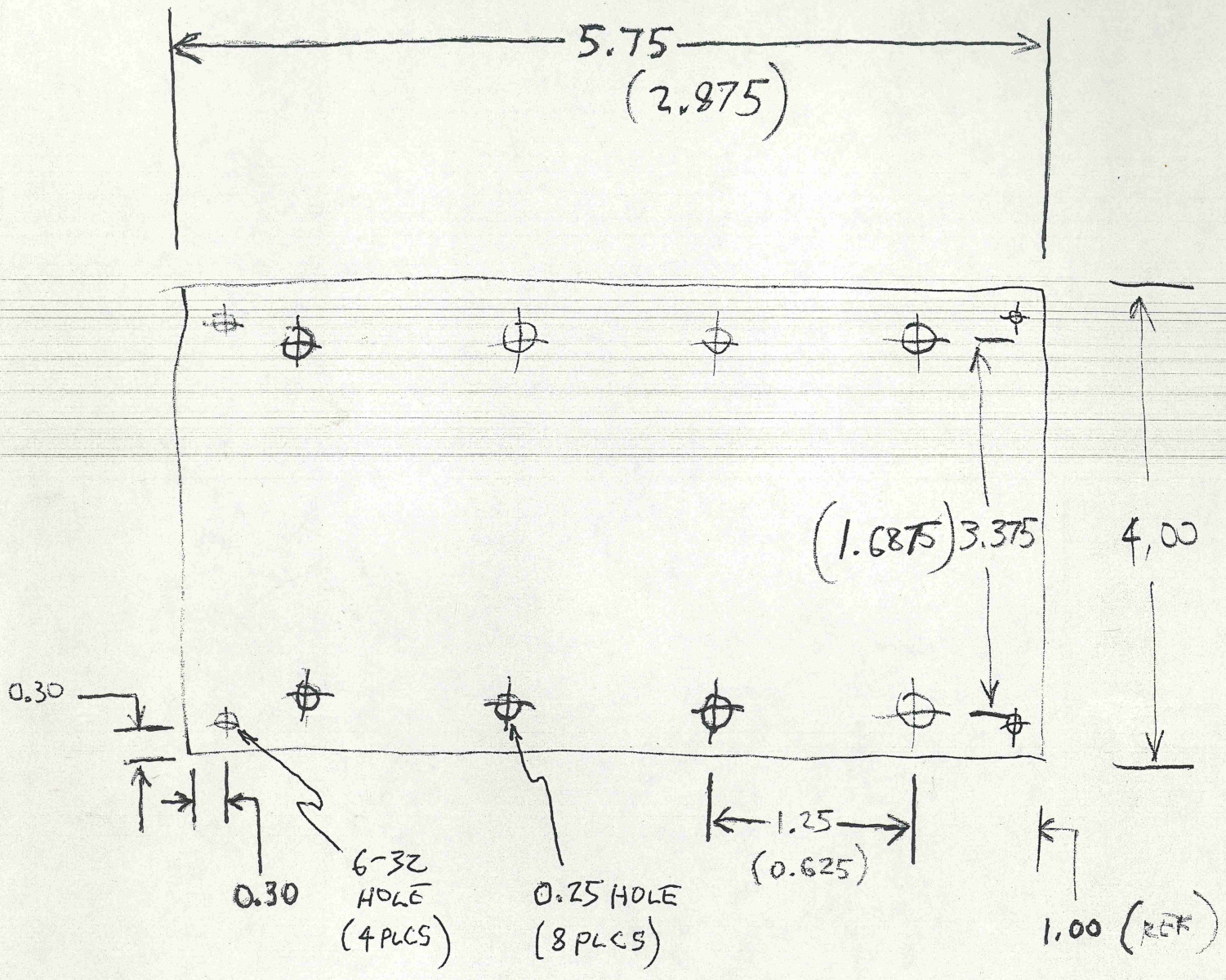
11/9/06



MODEL 2 COIL PRIMARY 3/8" THICK PHENOLIC BLOCKS,

MAKE 2 SETS OF 8 EACH

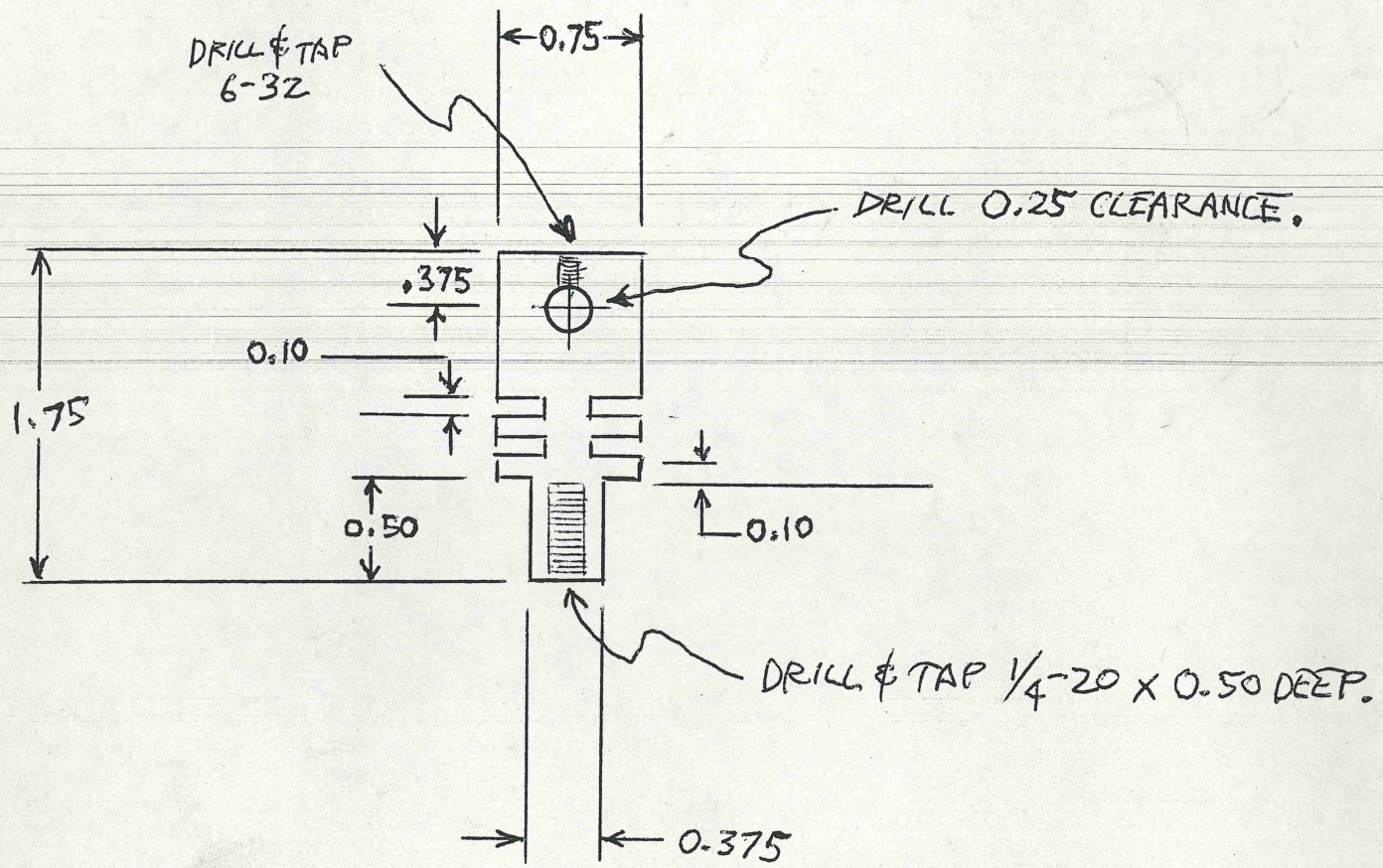
THOMAS MANNING H.D. MODEL 1 COIL 4/16/02



1/4" THICK PHENOLIC PLATE

1/12/04

MAKE 8 PCS., BRASS (BRIGHT FINISH).



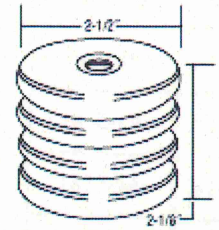
STORM COPPER COMPONENTS, CO.

Glastic Stand-off Insulators and Spacers

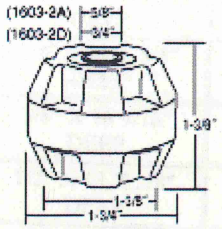
For grounding bar insulation, busbar standoffs and bus connectors

Storm Copper Components Co is a stocking distributor of stand-off insulators for the Glastic Corporation. These insulators find applications as standoffs for grounding bars, busbar insulators, ground kits, bus connectors, panelboards, switchboards and buss bar applications.

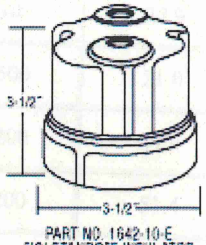
For Pricing and Availability - 800-394-4804



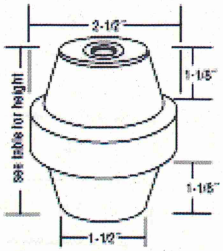
SERIES 1461
APPARATUS
STANDOFF INSULATORS



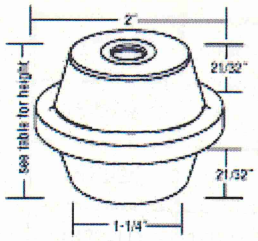
1603-2A STD
1603-2D WIDE
600 VOLT HIGH STRENGTH
STANDOFF INSULATOR



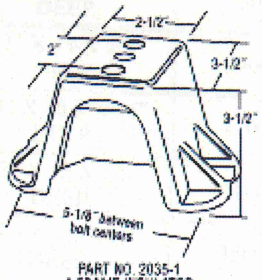
PART NO. 1642-10-E
5KV STANDOFF INSULATOR
Meets the requirements specified for a 5 BKV-20 Indoor Insulator per NEMA SG-6-1995



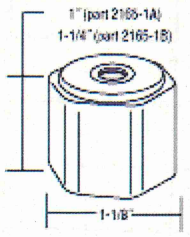
SERIES 1872
CENTER-POST INSULATORS



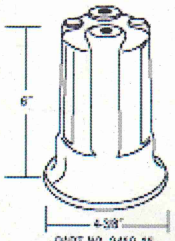
SERIES 2015
CENTER-POST INSULATORS



PART NO. 2035-1
A FRAME INSULATOR



SERIES 2165
PANEL AND
SWITCHBOARD INSULATORS



PART NO. 2450-15
15KV STANDOFF INSULATOR
Meets the requirements specified for a 15.2KVA-20 Indoor Insulator per NEMA SG-6-1995

Dimensions

Part Number	Height	Thread Size	Suggested Indoor Voltage Rating	Short Time Electrical Strength kV	Weight/Pound
2165-1A	1"	1/4" X 20 X 5/16" DEEP	600	18.6	.06
2165-1B	1-1/4"	1/4" X 20 X 5/16" DEEP	600	----	.06
1603-2A	1-3/8"	3/8" X 16 X 3/8" DEEP	600	10.0	.19
1603-2D	1-3/8"	3/8" X 16 X 3/8" DEEP	600	10.0	.19
2015-1A	1-1/2"	1/4" X 20 X 1/2" DEEP	1500	33.4	.20
2015-2A	1-1/2"	5/16" X 18 7/16"	1500	33.4	.19

		DEEP			
2015-3A	1-1/2"	3/8" X 16 X 3/8" DEEP	1500	33.4	.20
2015-2B	1-3/4"	5/16" X 18 7/16" DEEP	2000	---	.25
2015-3B	1-3/4"	3/8" X 16 X 3/8" DEEP	2000	---	.25
2015-2C	2"	5/16" X 18 X 7/16" DEEP	2300	43.1	.30
2015-3C	2"	3/8" X 16 X 9/16" DEEP	2300	43.1	.31
2015-4C	2"	1/2" X 13 X 5/8" DEEP	2300	43.1	.30
2015-3D	2-1/4"	3/8" X 16 X 9/16" DEEP	2700	---	.36
2015-4D	2-1/4"	1/2" X 13 X 5/8" DEEP	2700	---	.36
1461-1A	2-1/8"	3/8" X 16 X 9/16" DEEP	2500	49.3	.61
1461-1B	2-1/8"	1/2" X 13 X 5/8" DEEP	2500	27.9	.61
1461-1C	2-1/8'	5/8" X 11 X 5/8" DEEP	2500	21.0	.61
1872-1A	2-1/2"	3/8" X 16 9/16" DEEP	3200	51.4	.44
1872-2A	2-1/2"	1/2" X 13 X 5/8" DEEP	3200	51.4	.45
1872-3F	2-5/8"	5/8" X 11 X 11/16" DEEP	3400	---	.60
1872-1B	2-3/4"	3/8" X 16 X 9/16" DEEP	3600	---	.53
1872-2B	2-3/4"	1/2" X 13 X 5/8" DEEP	3600	---	.51
1872-1C	3"	3/8" X 16 X 9/16" DEEP	4100	---	.59
1872-2C	3"	1/2" X 13 X 5/8" DEEP	4100	---	.60
1872-1D	3-1/4"	3/8 X 16 X 9/16" DEEP	4500	---	.67
1872-2D	3-1/4"	1/2" X 13 X 5/8" DEEP	4500	---	.67
1872-1E	3-1/2"	3/8" X 16 X 9/16" DEEP	5000	55.2	.76
1872-2E	3-1/2"	1/2 X 13 X 5/8" DEEP	5000	55.2	.58
1872-3E	3-1/2"	5/8" X 11 X 11/16" DEEP	5000	55.2	.74
2035-1	3-1/2"	2" BOLT CIRCLE	5000	---	1.20
1642-10E	3-1/2"	3/8" X 16 X 9/16" DEEP - 2" BOLT CIRCLE	5000	---	1.78
2450-15	6"	3/8" X 16 X 9/16" DEEP - 2" BOLT CIRCLE	15,000	---	3.49

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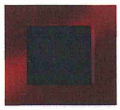
Glastic Standoff Insulator email info

Physical and Electrical Properties

VALUES	STYLES								
	2165	1603-2A	1603-2D	2015	1461	1872	2035-1	1642-10-E	2450-15
Tensile Strength (lbs.)	1,000	2,000	2,500	2,000	3,000	2,500	2,500	3,000	5,000
Cantilever Strength (inch lbs.)	400	1,500	1,800	1,650	3,500	3,000	3,600	6,000	10,000
Compression Strength (lbs.)	8,000	20,000	20,000	20,000	60,000	25,000	25,000	20,000	20,000
Torgue Strength (ft. lbs.)	12	25	30	50	50	50	---	200	285
Arc Resistance (sec.)	180	180	180	180	180	180	180	180	180
UL Subject 94 Flame Resistance	94 V-0	94 V-0	94 V-0	94 V-0	94 V-0	94 V-0	94 V-0	94 V-0	94 V-0
Height Tolerance (in.)	+/- .015	+/- .015	+/- .015	+/- .015	+/- .015	+/- .015	+/- .015	+/- .015	+/- .015
Creep Distance (in.)	Insulator Height	1-5/8	1-5/8	1/4 Plus Insulator Height	3-1/4	5/16 Plus Insulator Height	3-1/2	3-11/16	7
Dry Hi-Pot (volts) NEMA Specs.	---	---	---	---	---	---	---	19,000	36,000
Dew Hi-Pot (volts) NEMA Specs.	---	---	---	---	---	---	---	15,000	26,000
Impulse (volts, 1.5 x 40 wave)	---	---	---	---	---	---	---	60,000	95,000
Track Resistance (minutes)	600	600	600	600	600	600	600	600	600

For Pricing and Availability - 800-394-4804

Glastic Standoff Insulator email info



Contact:
Sheila Amburn-Stone
240 Industrial Drive
Decatur, TN 37322
1-800-394-4804
423-334-3389 Fax
Email Glactic Standoff Insulators@stormcopper.com

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Ampacity Tables

Battery Connectors

Busbar

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Ground Bars

Grounding Kits

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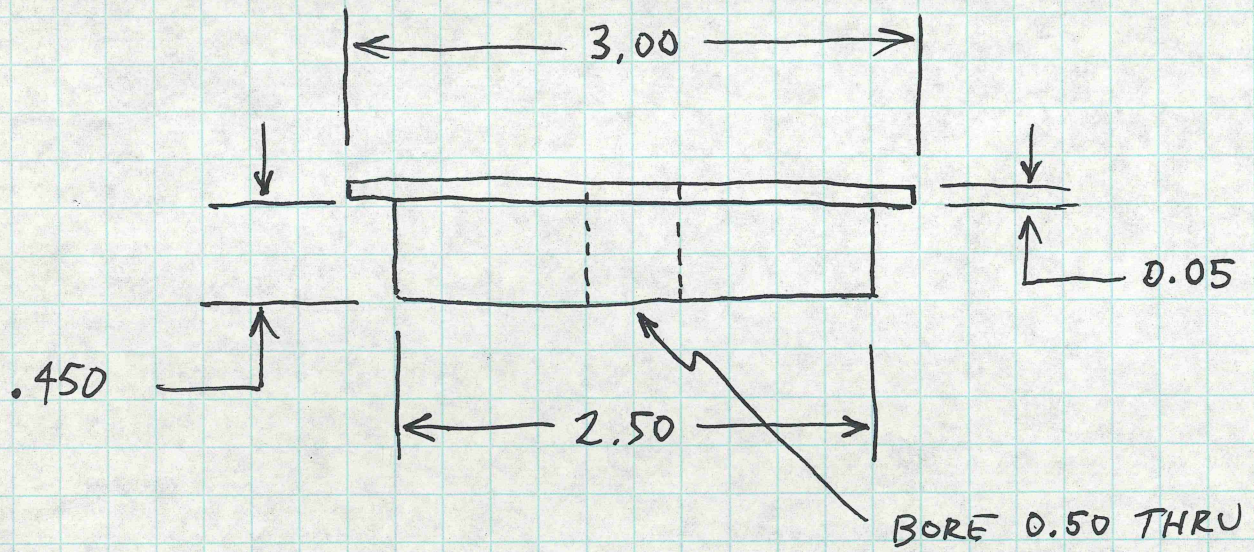
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Glastic Standoff Insulators

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MAKE 2 EA. PHENOLIC

NEW MODEL 1 H.D. COIL

5/1/07

MODEL 2D 5/16/07

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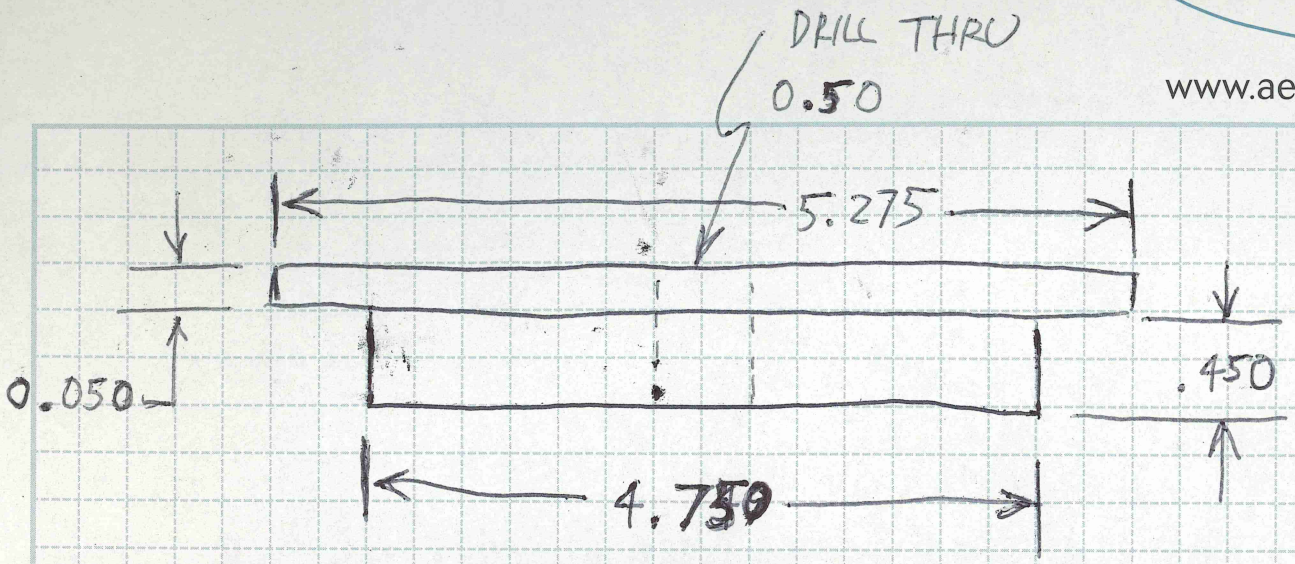


FIG. 1 MAKE 4 EA.
PHENOLIC DISCS

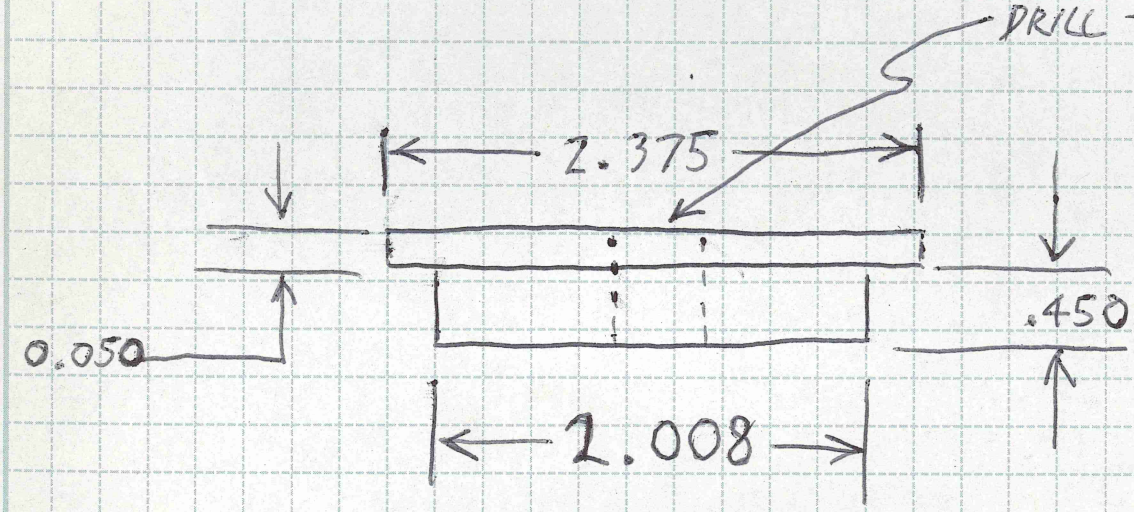
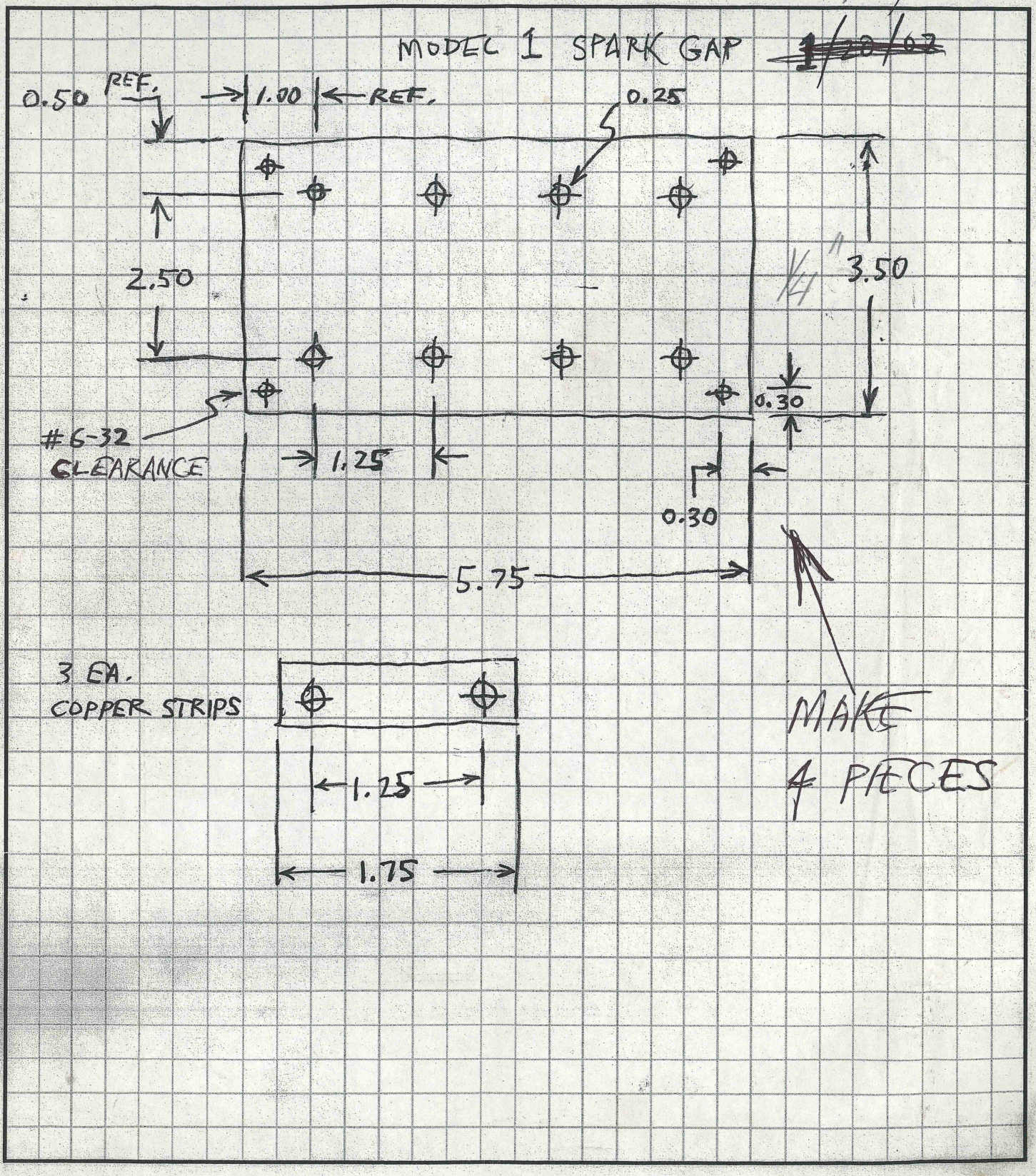


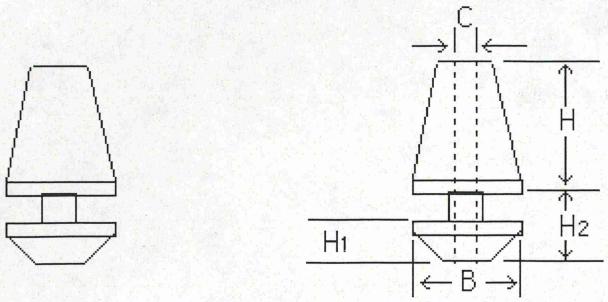
FIG. 2 MAKE 10 EA.
MARY CORSE SECONDARY
COILS

AEROFLEX LINTEK

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3/16/05





Ill. A

DABURN Cat. No.	Ill	HT. H	B	H1	H2	C	Mounting Hole	Hardware	Std. Pkg
10-58	A	5/8"	11/16"	1/4"	9/16"	5/32"	5/16"	6-32	50
10-78	A	1"	13/16"	5/16"	11/16"	7/32"	7/16"	10-32	25
10-125	A	1 1/4"	7/8"	3/8"	7/8"	7/32"	7/16"	10-32	25
10-234	A	2 3/4"	2 1/32"	1"	2 5/16"	9/32"	1 1/4"	1/4-20	10
10-79	B	1 3/8"	1 1/4"	11/16"	1 3/8"	7/32"	9/16"	10-32	25
10-76	B	2 3/4"	1 5/8"	1"	2 1/4"	9/32"	3/4"	1/4-20	10
10-52	B	4 1/2"	2 1/8"	1 1/2"	2"	9/32"	1"	1/4-20	5

$180.00
$134.28

VISA

6/12/08
MIKE EXT. 11

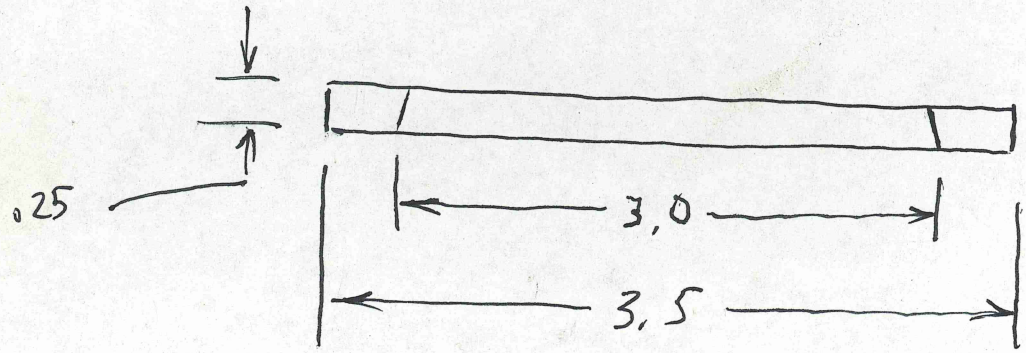
To additional porcelain insulators.
To 10-205 series of additional feed-through insulators.
Back to DABURN'S Home Page.

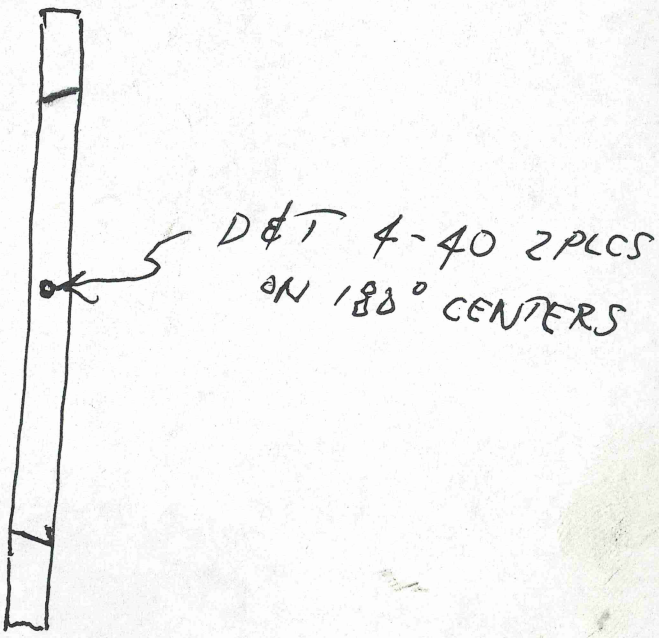
Daburn electronics & cable
224 Pegasus Ave.
Northvale, NJ 07647
Tel: 201-768-5400
Fax: 201-768-9642
E-Mail: daburn@daburn.com
URL: http://www.daburn.com/

1/16/08

MAKE 1 EA.

BRASS CORONA RING
FOR 3" CU SPHERE



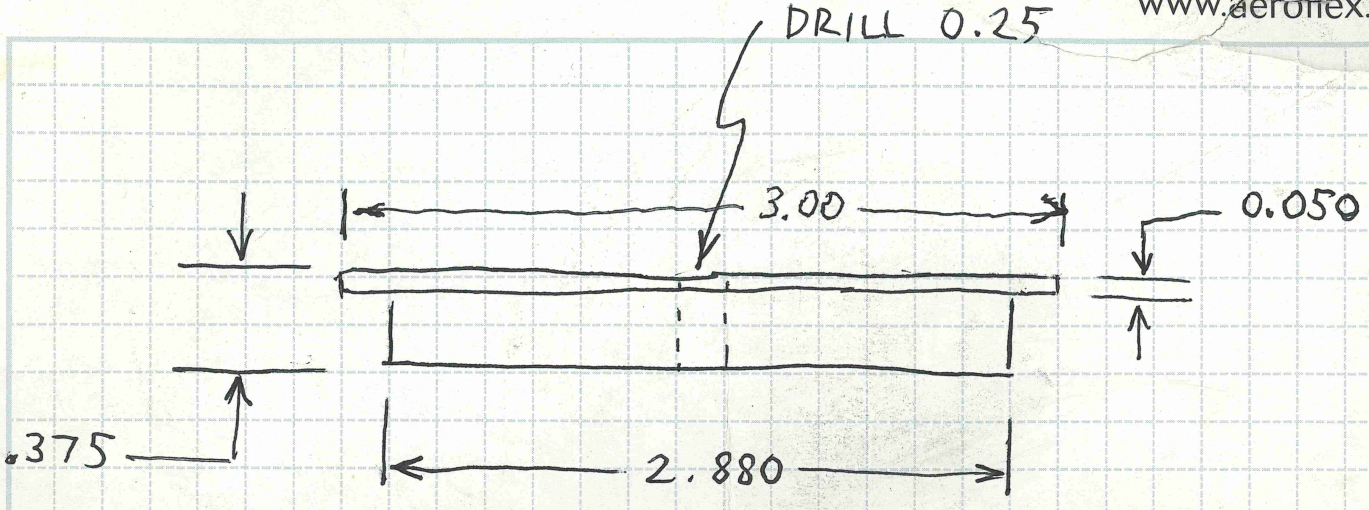


PHENOLIC DISCS

MAKE 2 EA.

AEROFLEX
A passion for performance.

www.aeroflex.com



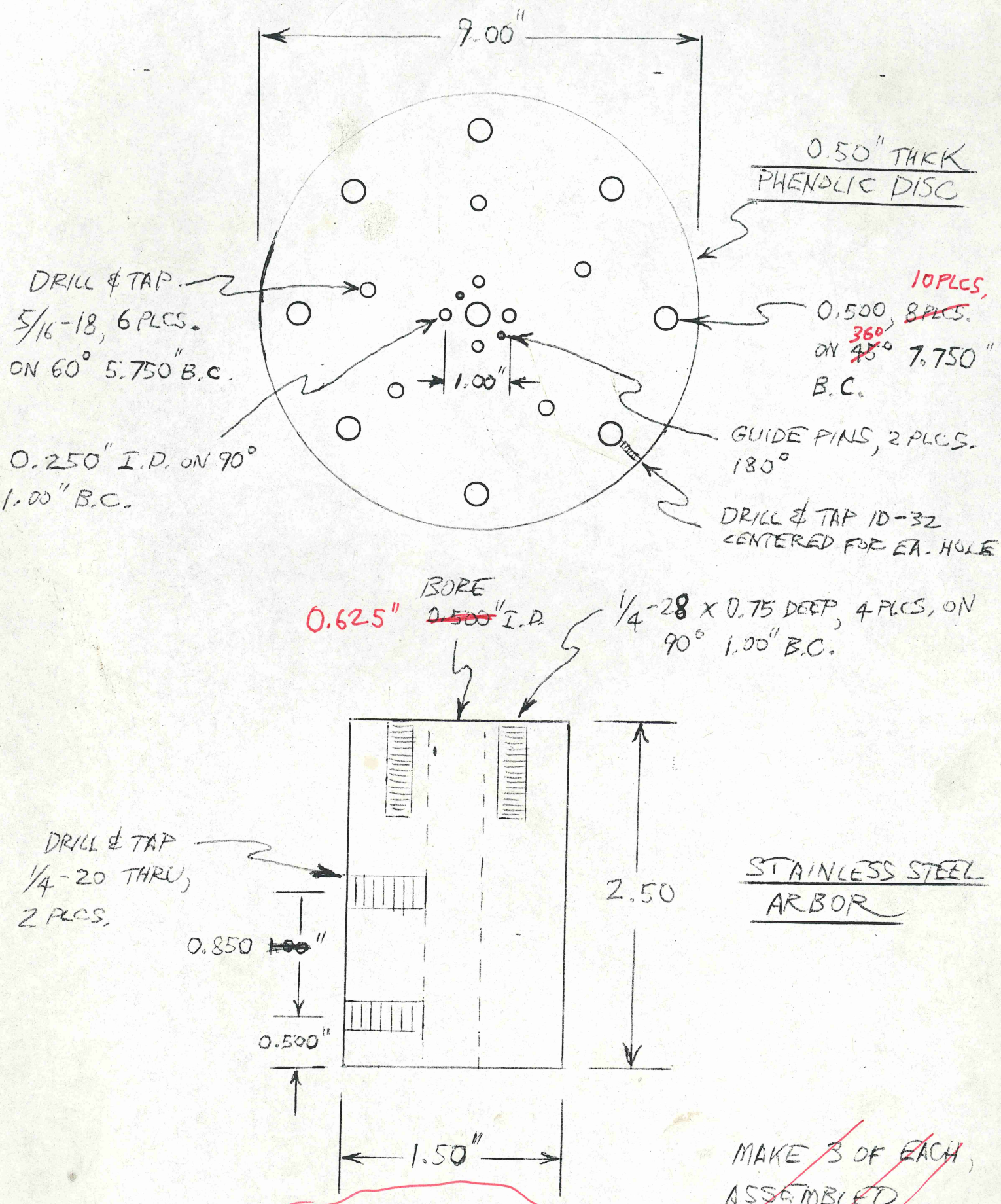
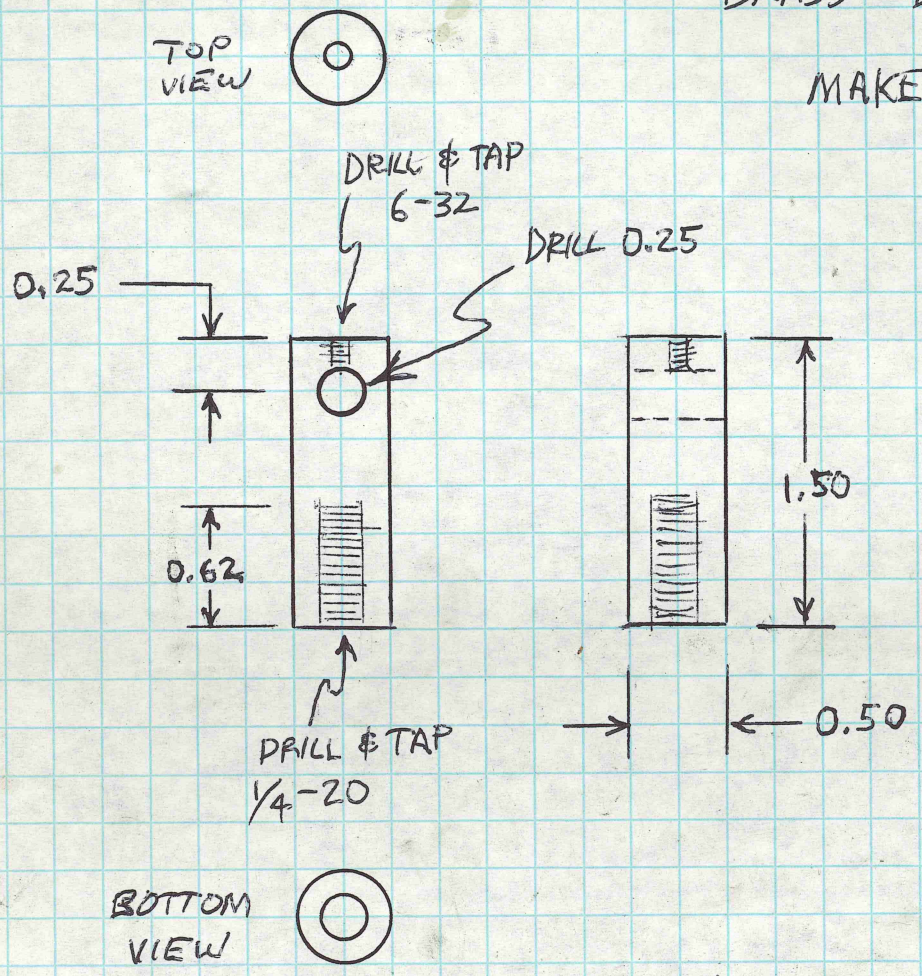

9.00"
0.50" THKK
PHENOLIC DISC
DRILL & TAP
5/16-18, 6 PLCS.
ON 60° 5.750" B.C.
10 PLCS,
0.500, ~~8 PLCS.~~
ON ~~45°~~ 360° 7.750"
B.C.
1.00"
0.250" I.D. ON 90°
1.00" B.C.
GUIDE PINS, 2 PLCS.
180°
DRILL & TAP 10-32
CENTERED FOR EA. HOLE
BORE
0.625" ~~0.500~~" I.D.
1/4-28 x 0.75 DEEP, 4 PLCS, ON
90° 1.00" B.C.
DRILL & TAP
1/4-20 THRU,
2 PLCS.
0.850 ~~1.00~~"
0.500"
2.50
1.50"
STAINLESS STEEL
ARBOR
MAKE 3 OF EACH,
ASSEMBLED.
6-23-00

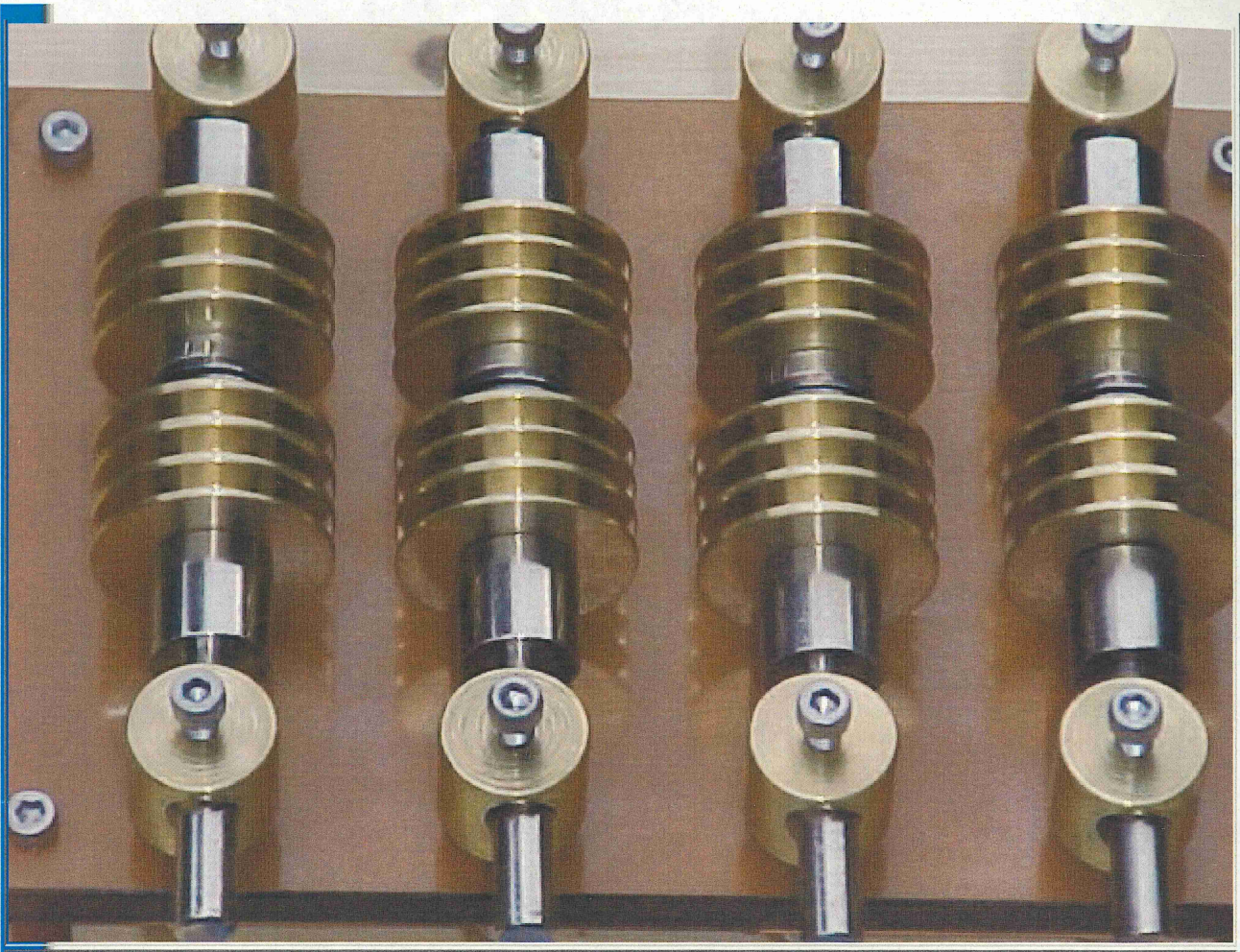
FIGURE 5

3/17/05

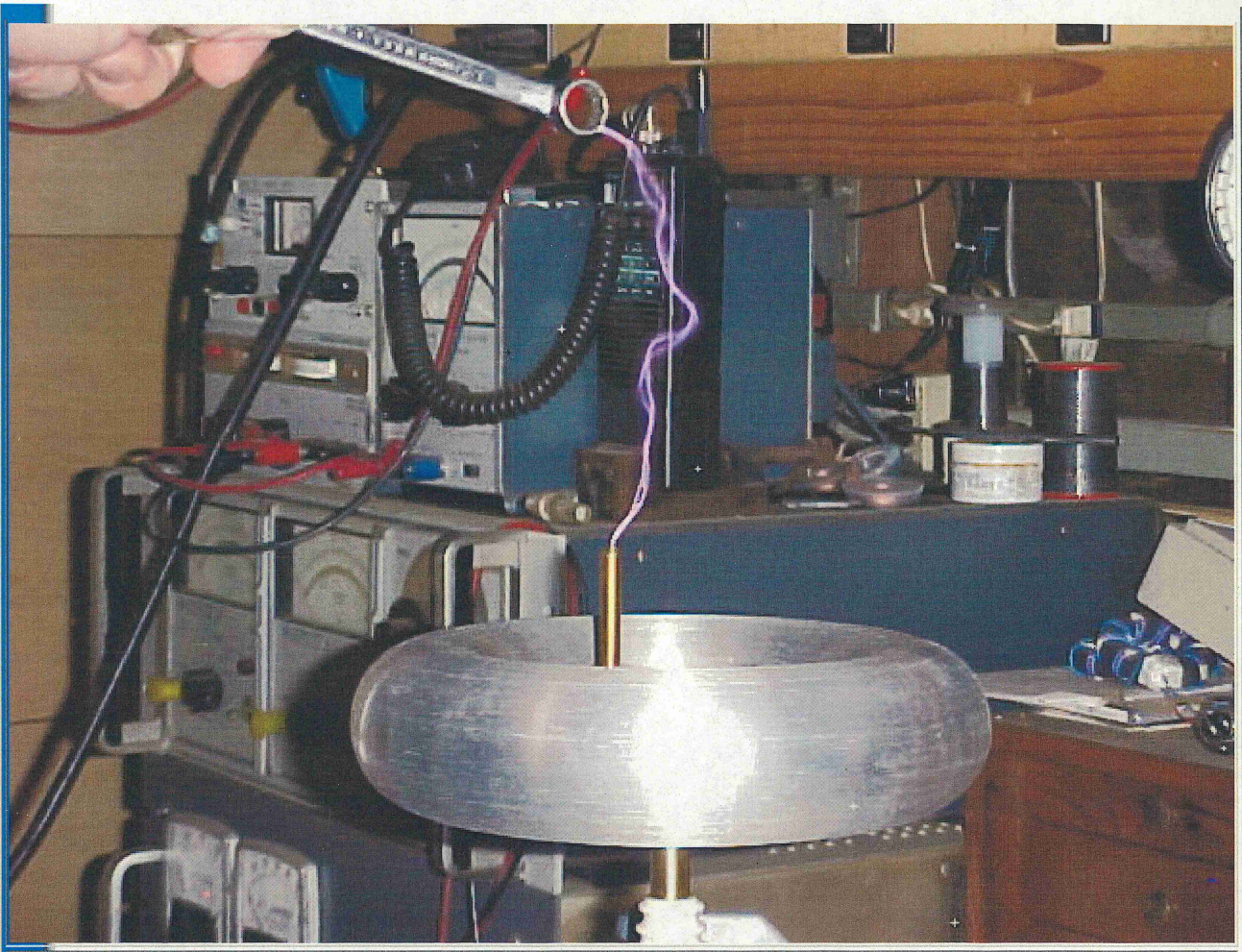
BRASS - BRIGHT FINISH

MAKE 16 PCS.



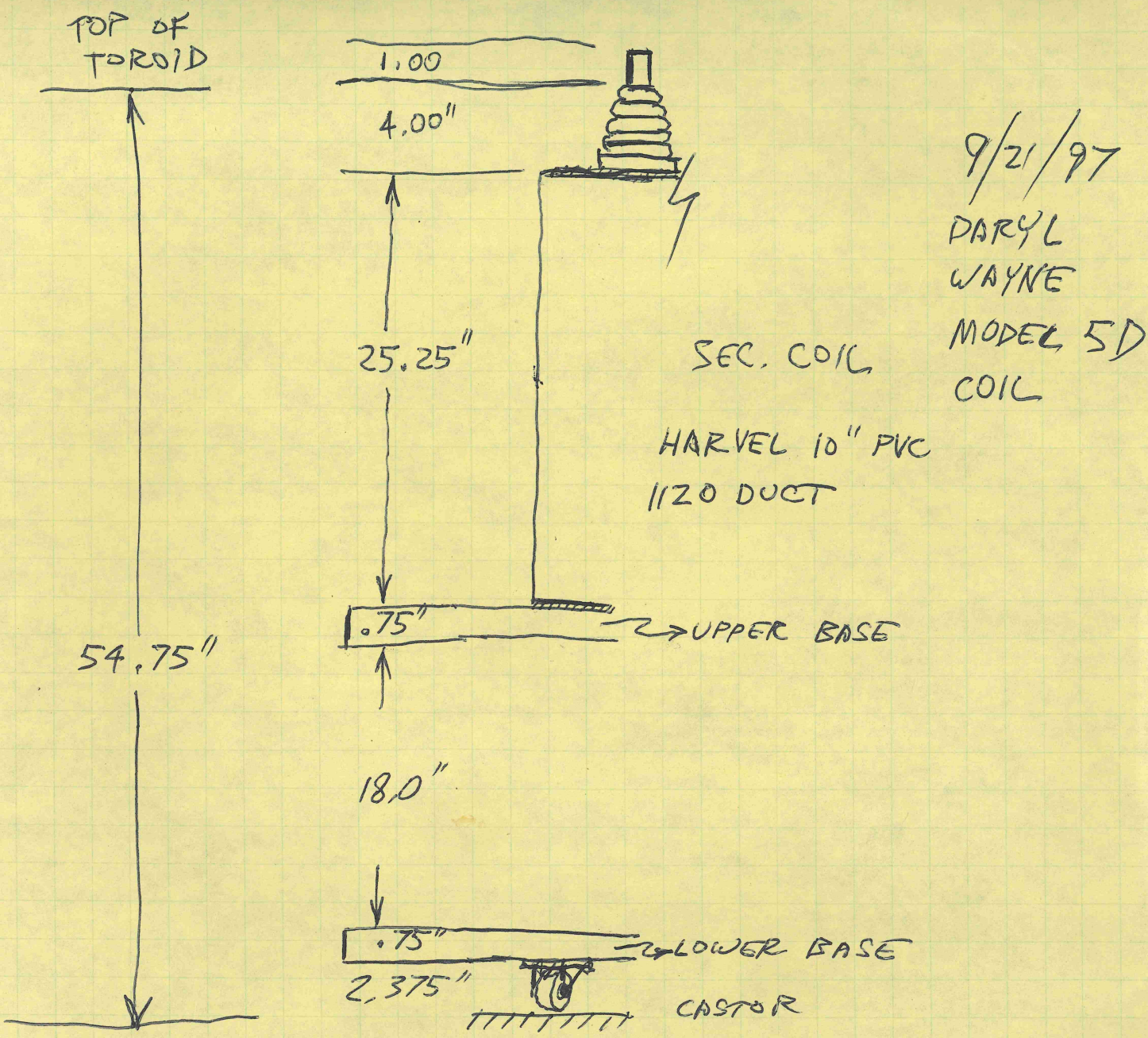


Heavy-Duty Model One Tesla Coil 4-segment tungsten spark gap with brass cooling fins.



A 6 inch arc being drawn to a hand-held metal wrench from the new Heavy-Duty Model One Tesla Coil.

© Copyright Tesla Technology Research 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006



9/21/97
DARYL
WAYNE
MODEL 5D
COIL

SEC. COIL

HARVEL 10" PVC
1120 DUCT

Hipotronics®
BREWSTER, NY

Part No.: MSAF-1535-A310
Capacitance: 20 nF
Voltage: 20 kV
Frequency: PULSE

CAUTION
ALWAYS KEEP CAPACITOR SHORTED
WHEN NOT IN USE

Hipotronics®
BREWSTER, NY

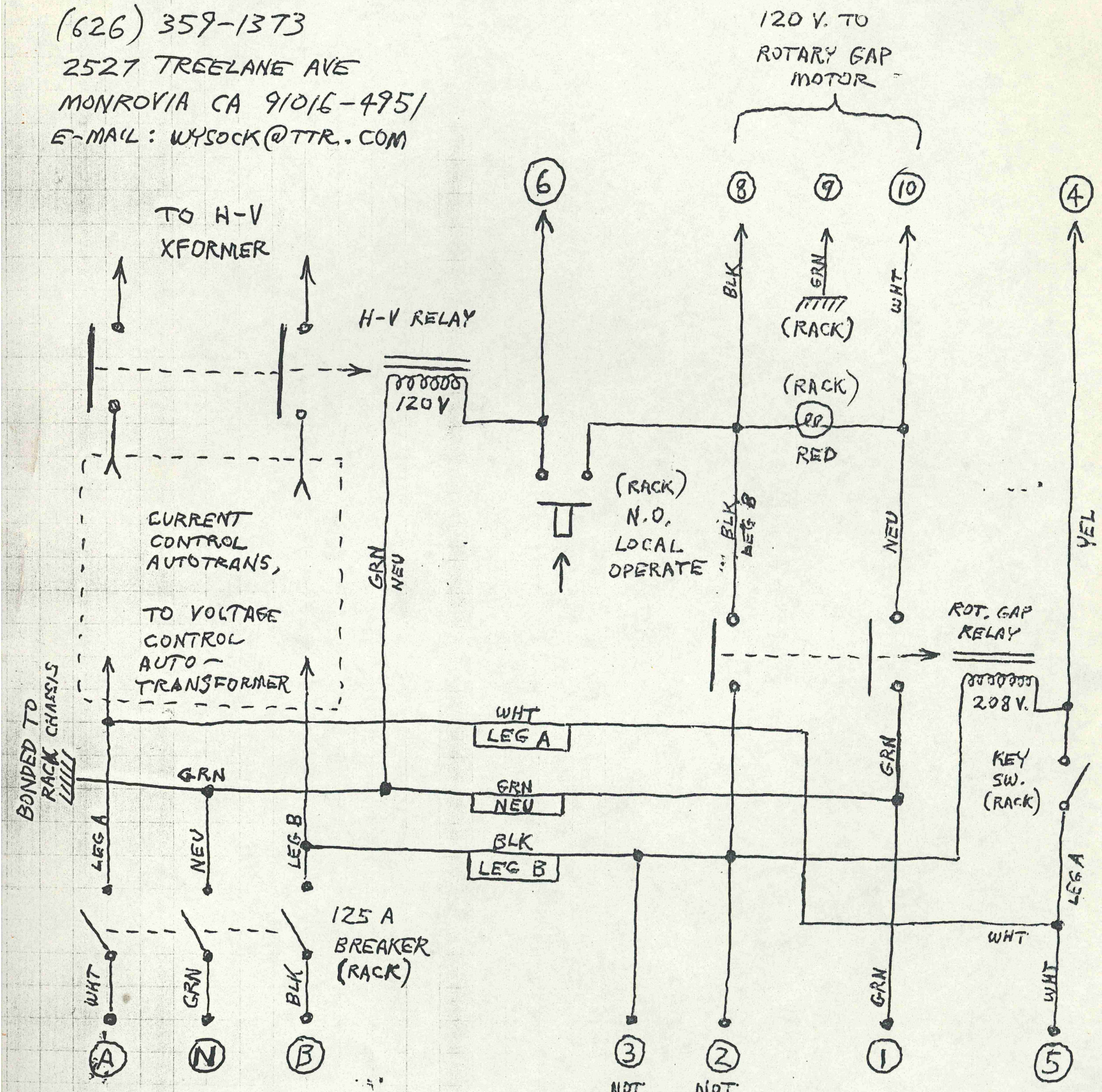
Part No.: MSAF-1535-A310
Capacitance: 20 nF
Voltage: 20 kV
Frequency: PULSE

CAUTION
ALWAYS KEEP CAPACITOR SHORTED
WHEN NOT IN USE

LUXOR HOTEL
MODEL 9 TESLA COIL
IMAGINE THEATER

9-4-97

BILL WYSOCK
TESLA TECHNOLOGY RESEARCH
(626) 359-1373
2527 TREELANE AVE
MONROVIA CA 91016-4951
E-MAIL: WYSOCK@TTR.COM



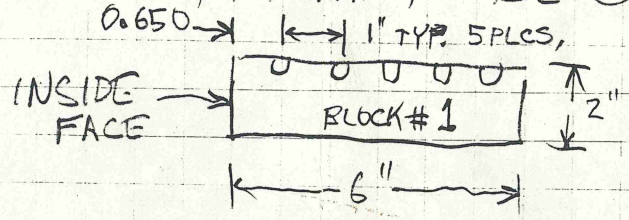
BEEZLEY COIL NOTES
8-18-89

PRIMARY

I.L ≅ 13.00"

O.D. ≅ 21.50"

PRIMARY BLOCKS



NOTE:
RESONANCE TAP @ 4 1/8 TURNS

PRIMARY IS 3/8" CU TUBING: COUNTER-CLOCK WISE WOUND 5 TURNS

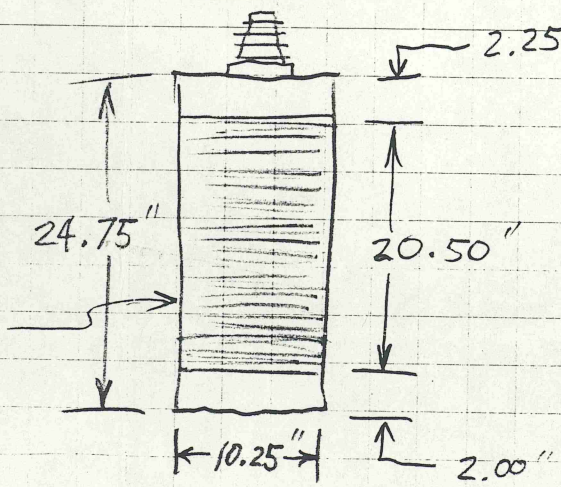
MAIN SECONDARY

ROT GAP

3600 RPM SYNCRONOUS

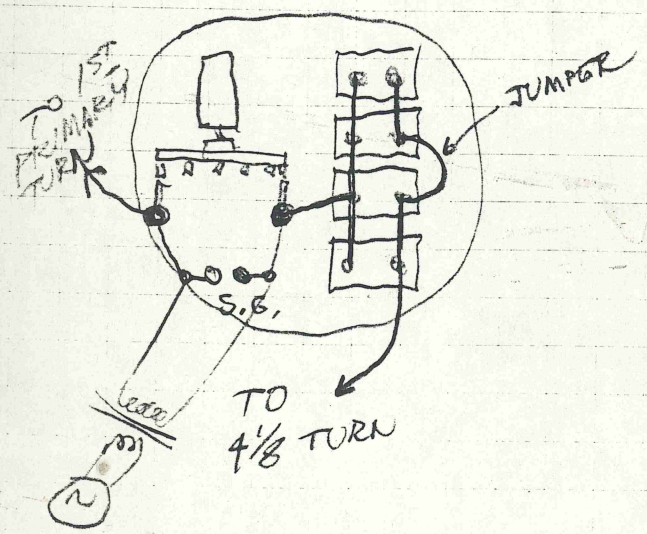
GAP DIA. = 6.50" B.C.

10 STUDS

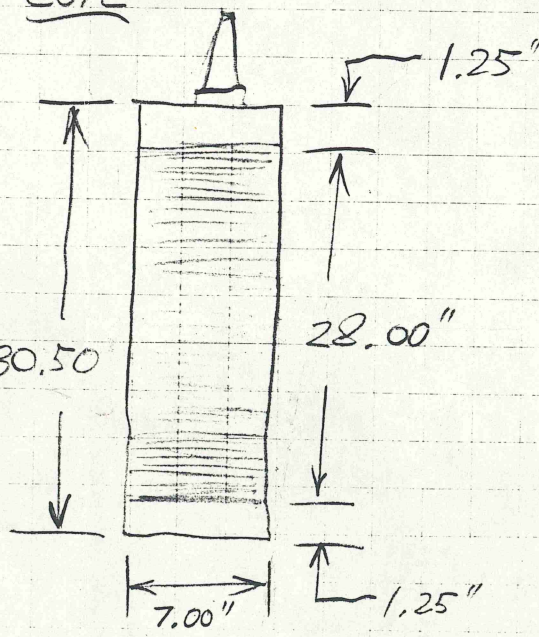


MEASURED INDUCTANCE 12.0 MH

LAYOUT



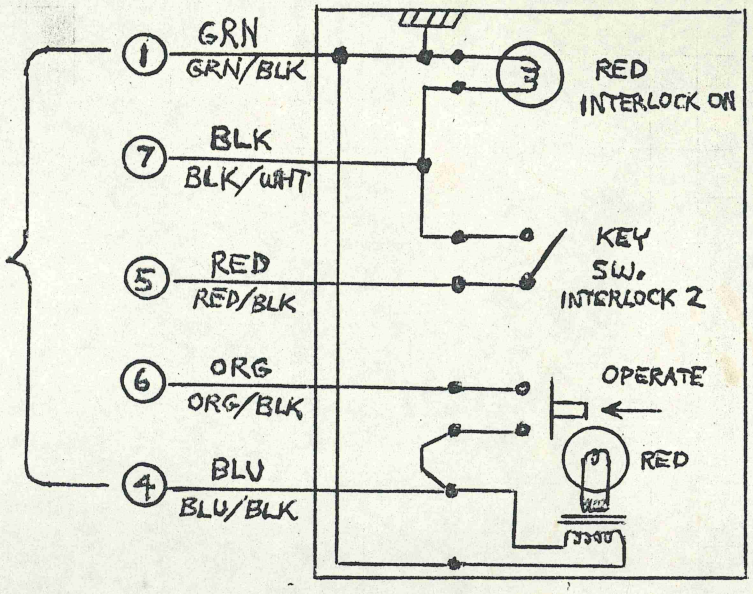
EXTRA COIL



MEASURED INDUCTANCE 8.4 MH

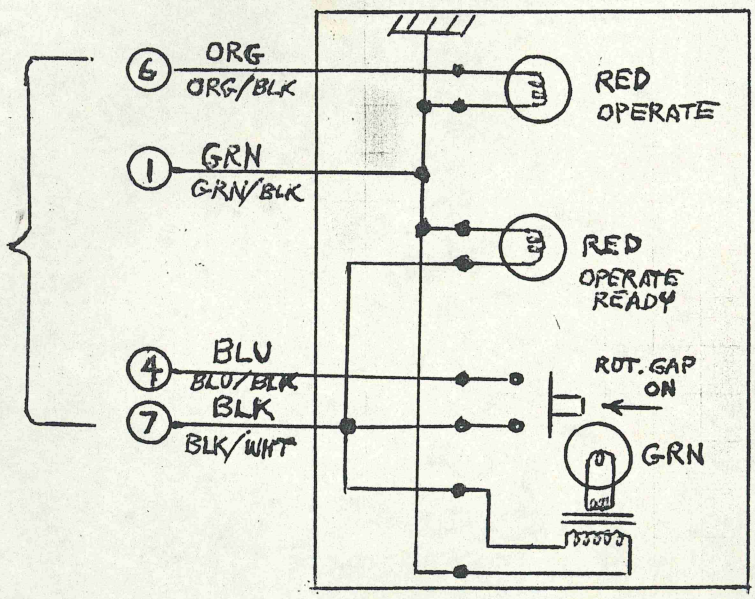
LUXOR HOTEL MODEL 9 TESLA COIL
REMOTE BOX SCHEMATICS 8/24/97

75' RUN
BELDEN M 8622 GL
12 COND. 16 AWG



STAGE RIGHT
MAIN OPERATOR'S REMOTE BOX

75' RUN
BELDEN M 8622 GL
12 COND. 16 AWG

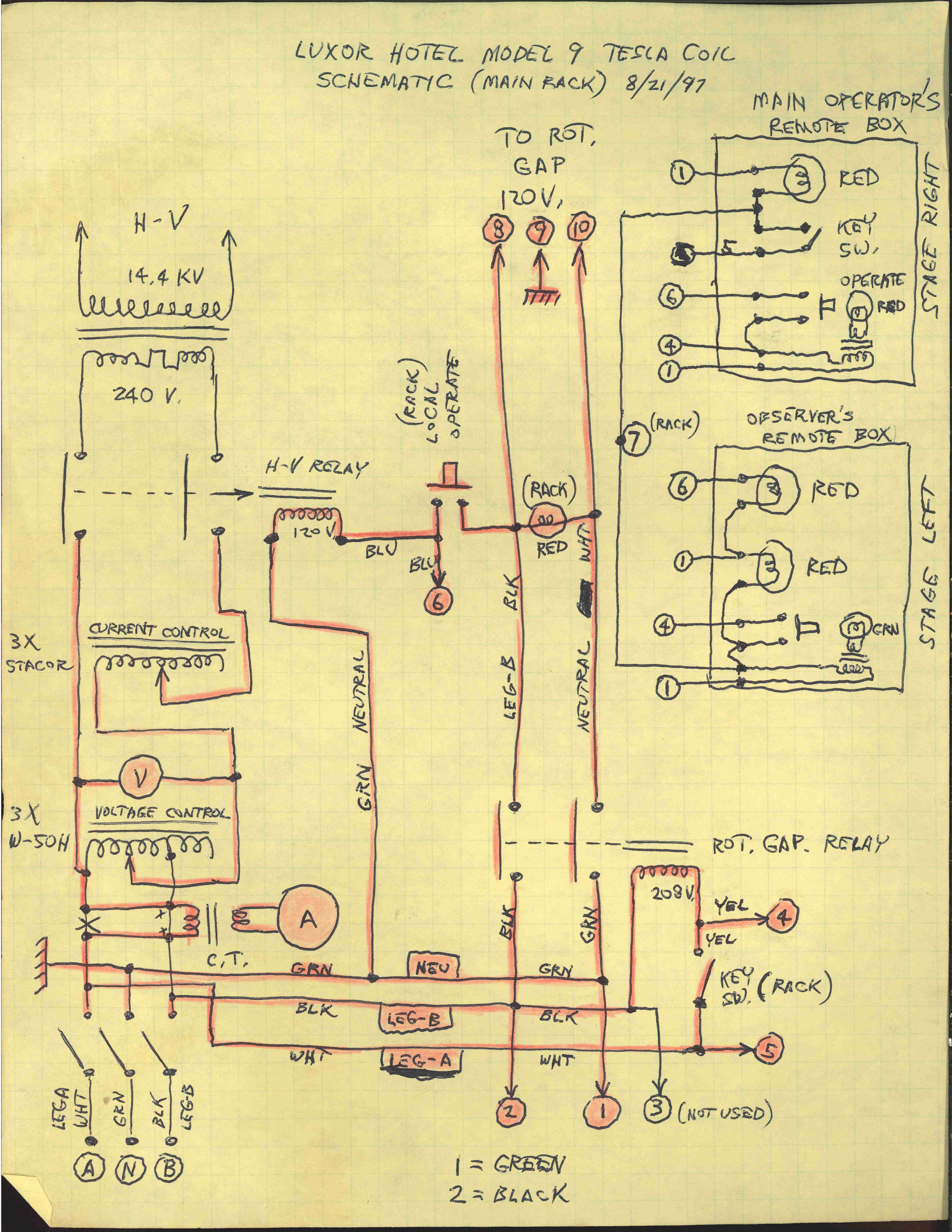


STAGE LEFT
OBSERVER'S REMOTE BOX

NOT USED: ~~GRN/BLK~~
~~RED/BLK~~
~~ORG/BLK~~
~~BLU/BLK~~
WHT/BLK
~~BLK/WHT~~
WHT

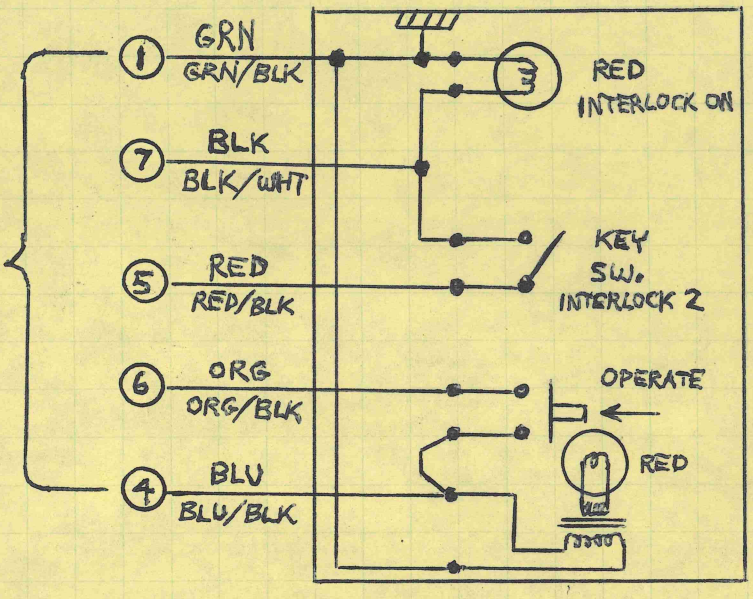
NOTE: REMOTE BOXES ARE
SQUARE-D
CLASS 9001 TYPE KY-3.
SERIES A.

LUXOR HOTEL MODEL 9 TESLA COIL SCHEMATIC (MAIN RACK) 8/21/97



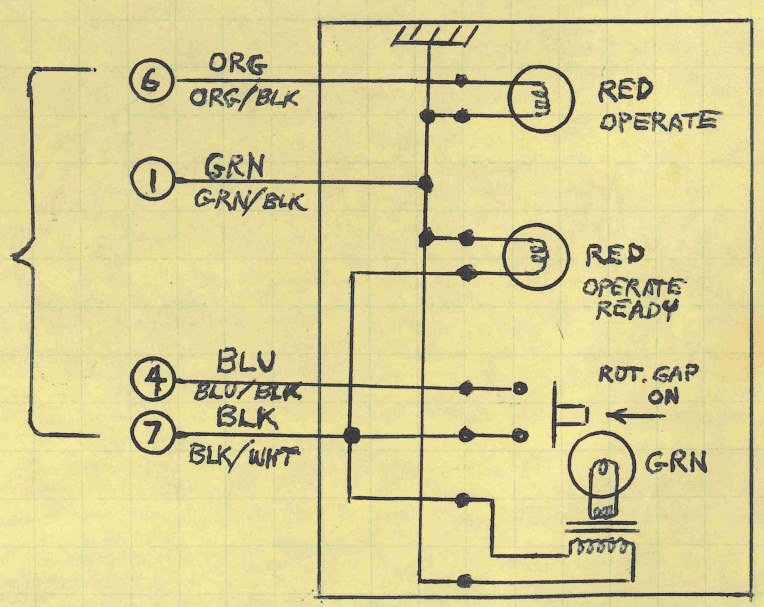
LUXOR HOTEL MODEL 9 TESLA COIL
REMOTE BOX SCHEMATICS 8/24/97

75' RUN
BELDEN M 8622 GL
12 COND. 16 AWG



STAGE RIGHT
MAIN OPERATOR'S REMOTE BOX

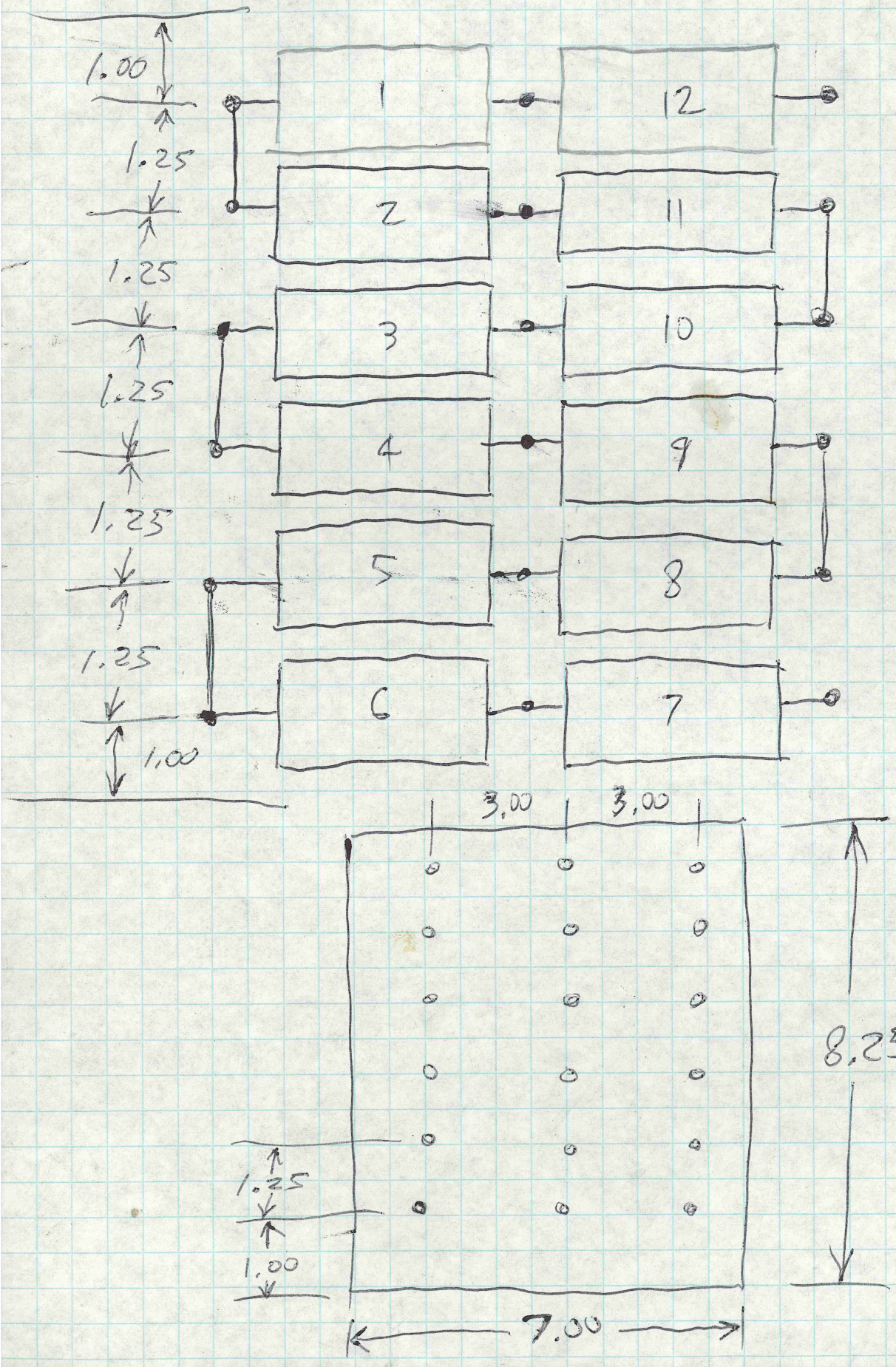
75' RUN
BELDEN M 8622 GL
12 COND. 16 AWG



STAGE LEFT
OBSERVER'S REMOTE BOX

NOT USED: ~~GRN/BLK~~
~~RED/BLK~~
~~ORG/BLK~~
~~BLU/BLK~~
WHT/BLK
~~BLK/WHT~~
WHT

NOTE: REMOTE BOXES ARE
SQUARE-D
CLASS 9001 TYPE KY-3
SERIES A.



11/20/06

MMC

.012 MFD

18 SPACERS

MODEL 2

COIL

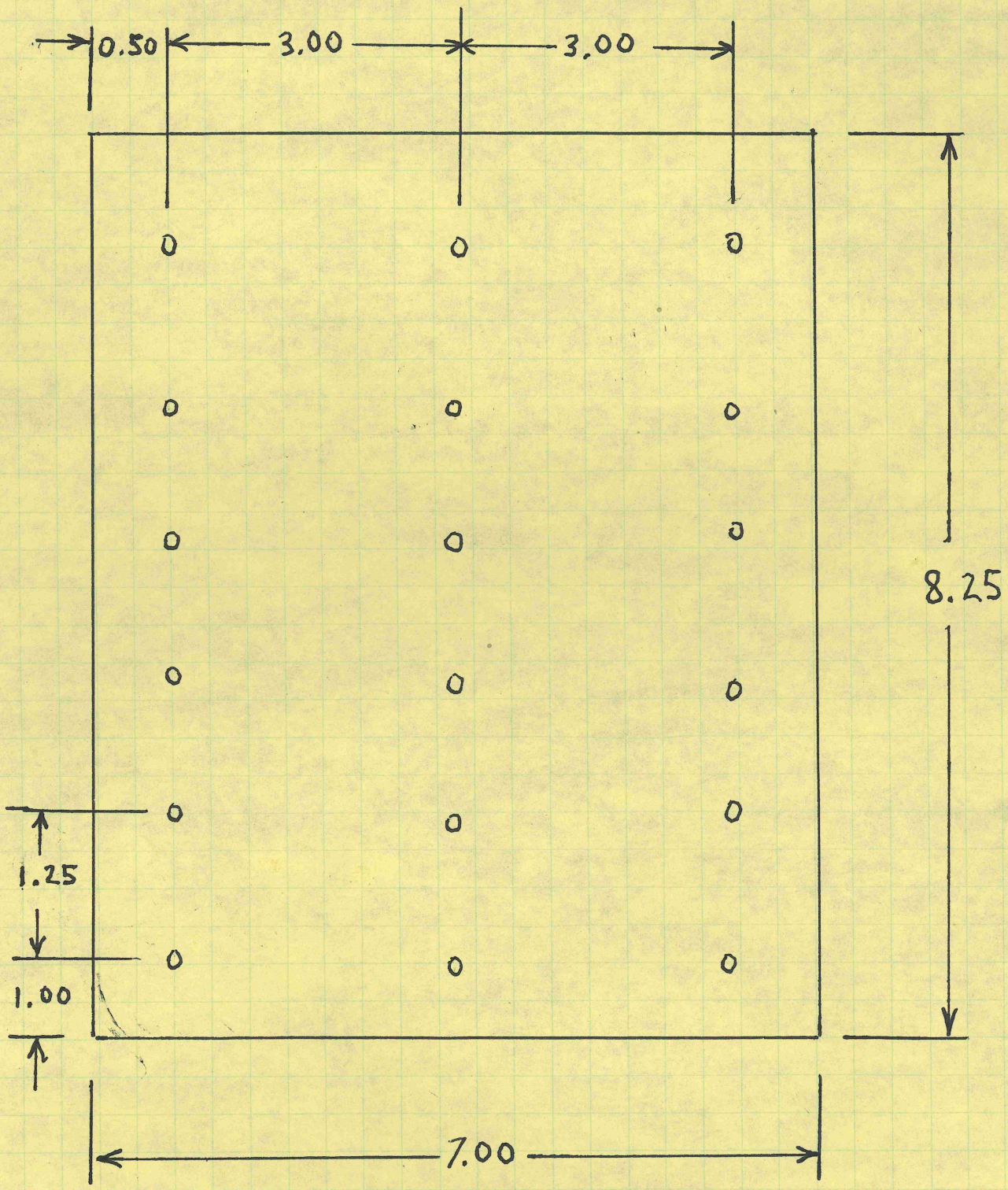
(707)

239-0005

MARTIN

SEC. Ω =

32.0



1/4" PHENOLIC SHEET

ALL HOLES ARE 8-32 CLEARANCE

MAKE 2 EA.

1/6/09

3/31/09

DAVID & TIM'S MODEL 1 COIL

SEC. 11.7 Ω

SEC. AWG = 24

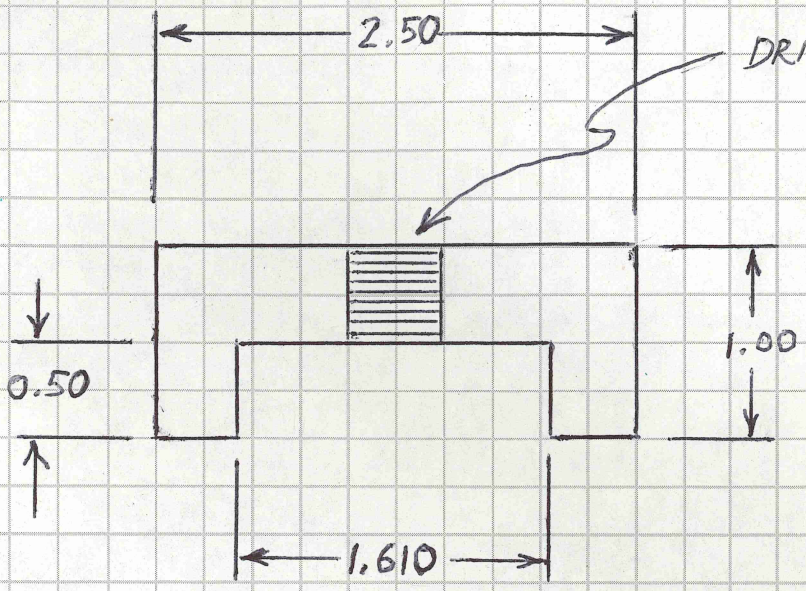
5/29/09

MODEL 2 SEC. RES. =
19.5 Ω

AEROFLEX LINTEK

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MODEL 7M EXTRA COIL TOP TERMINAL 10/1/03



MAKE 1 EA.

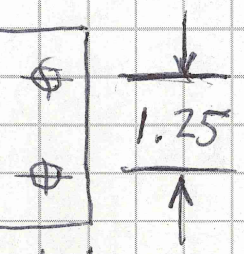
BRASS (BRIGHT FINISH)

AEROFLEX LINTEK

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MODEL 7M 10/8/03

CAP 2" COPPER STRAPS



2.3125)

.625

.125

.5625)

2 EA,

MODEL 7M — McMASTER/CARR 10/10/03

1 BOX # 92865A350 / 9.65

1 BOX # 90275A622 / 11.59

1 BOX # 90275A716 / 10.99

1 BOX # 98019A509 / 9.23

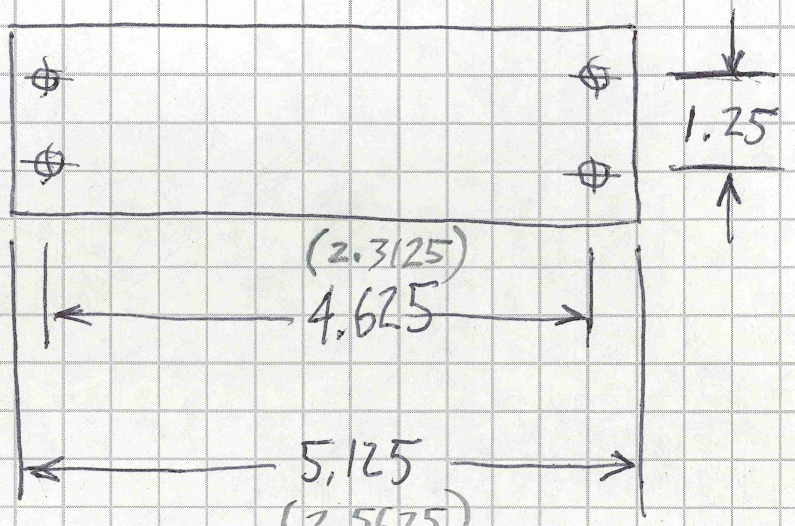
1 BOX # 90108A033 / 9.07

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MODEL 7M 10/8/03

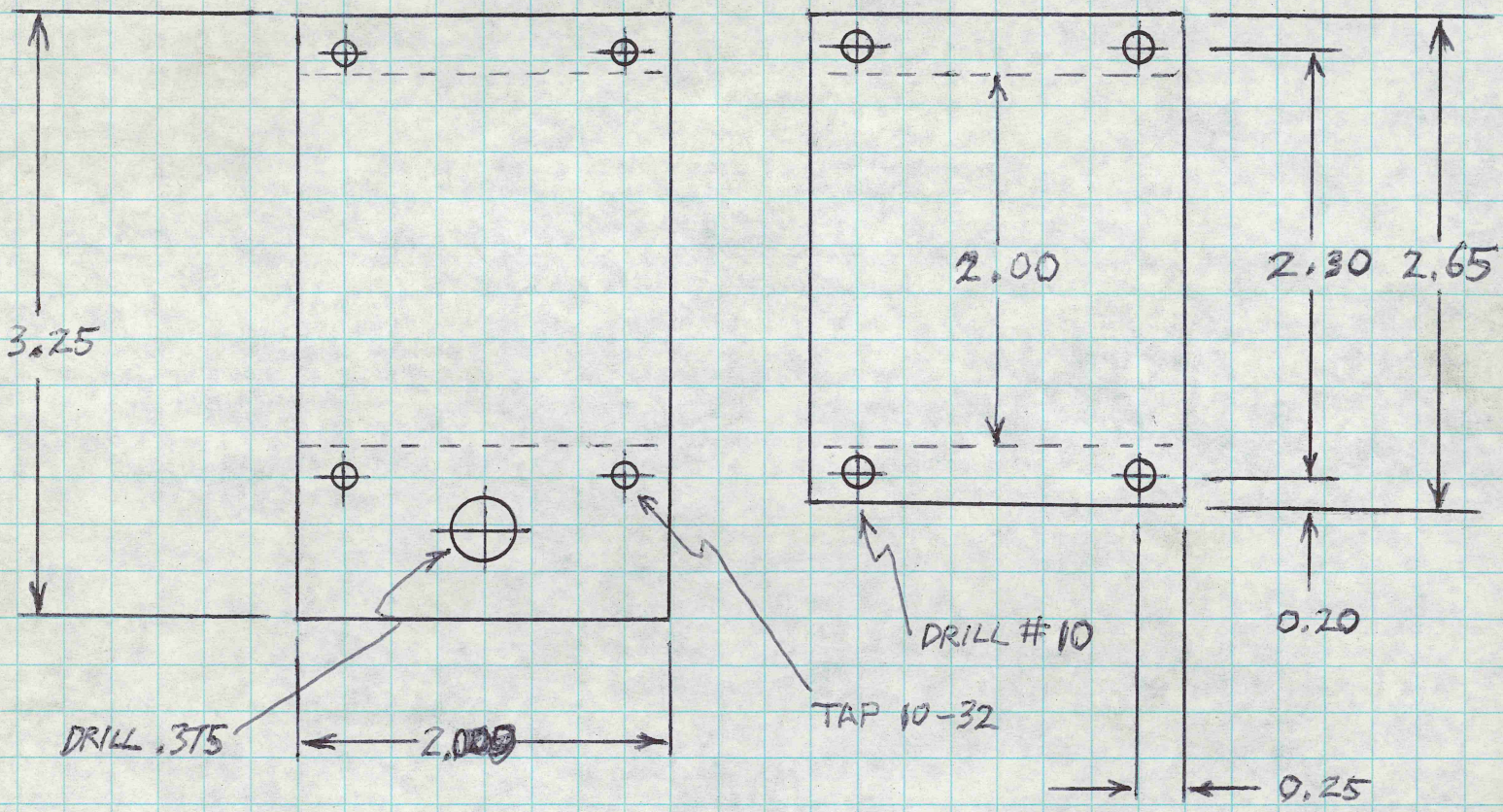
CAP 2" COPPER STRAPS



MAKE 2 EA,

MODEL 7M PRIMARY TAP PLATES 10/12/03

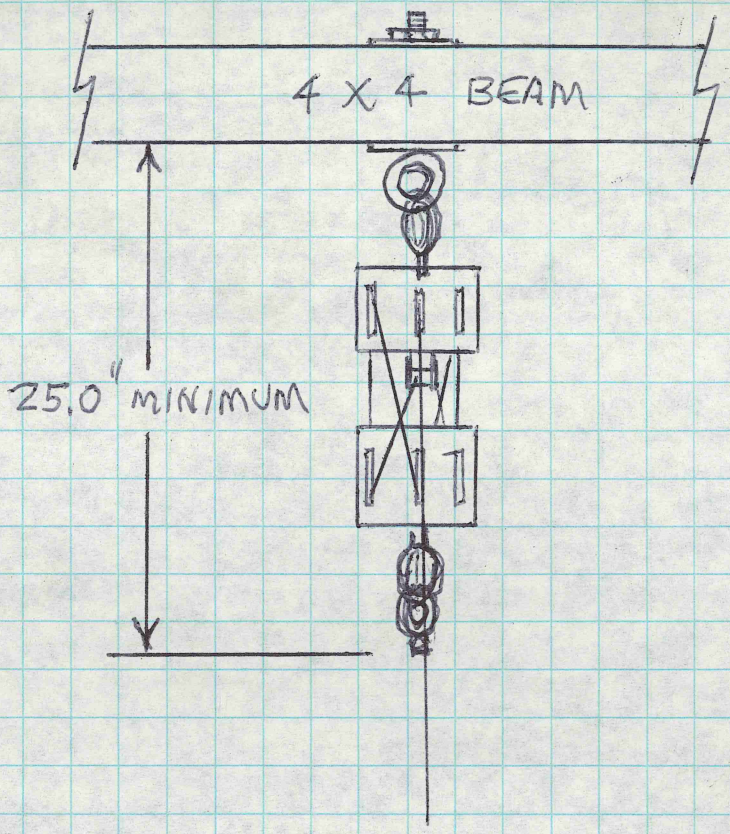
.125 THICK COPPER



TOPS FORM 3314
LITHO IN U. S. A.

MODEL 7M GANTRY BRIDGE

10/10/03



PROCESS

1. ATTACH 5' TOROID ON TOP OF EXTRA COIL WITH ½-13 MACHINE EYE.
2. RAISE ASSEMBLY ON TOP OF PEDESTAL INSULATOR.

EXTA COIL = 133.25
BLOCK & TACKEL
MIN. CLEARANCE = 25.00

TOTAL = 158.25"
= 13.2'

BRIDGE CLEARANCE
MAX. = 180"
= 15'

TOPS FORM 3314
LITHO IN U. S. A.

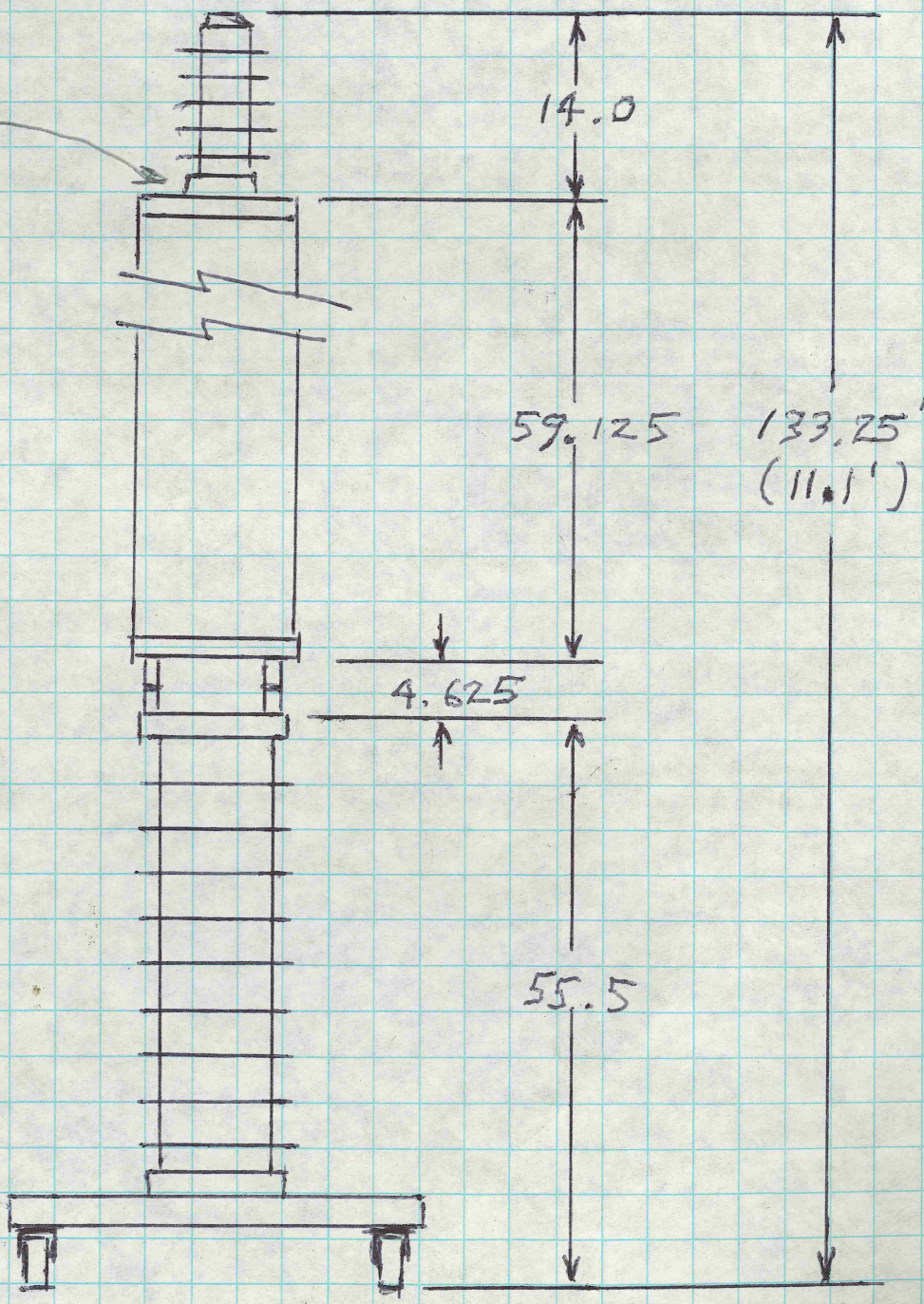
MODEL 7M 10/10/03

EXTRA COIL

OVERALL HEIGHT

EXTRA COIL = 1.445 R

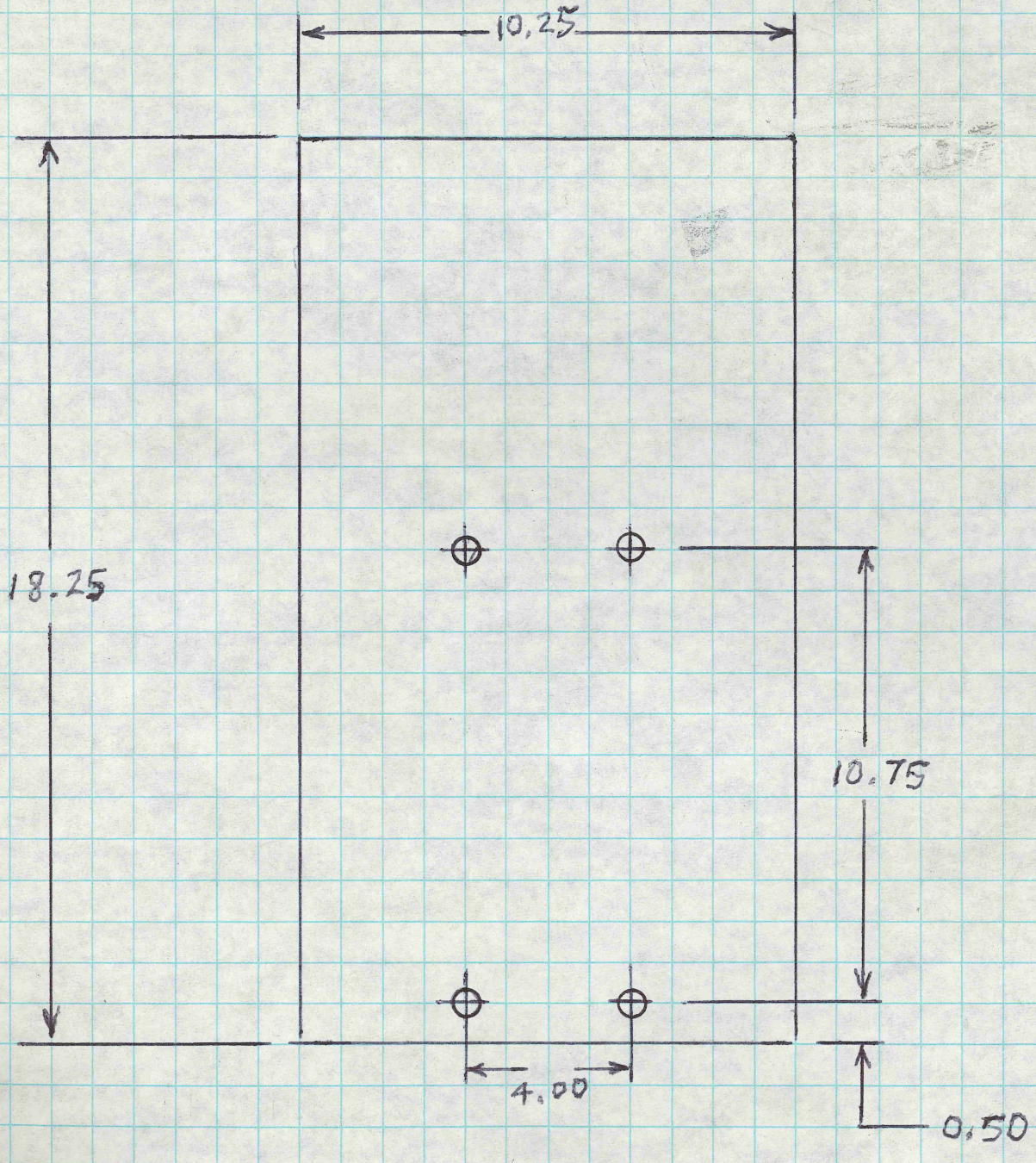
SECONDARY = 1.0625 R



TOPS FORM 3314
LITHO IN U. S. A.

10/11/03

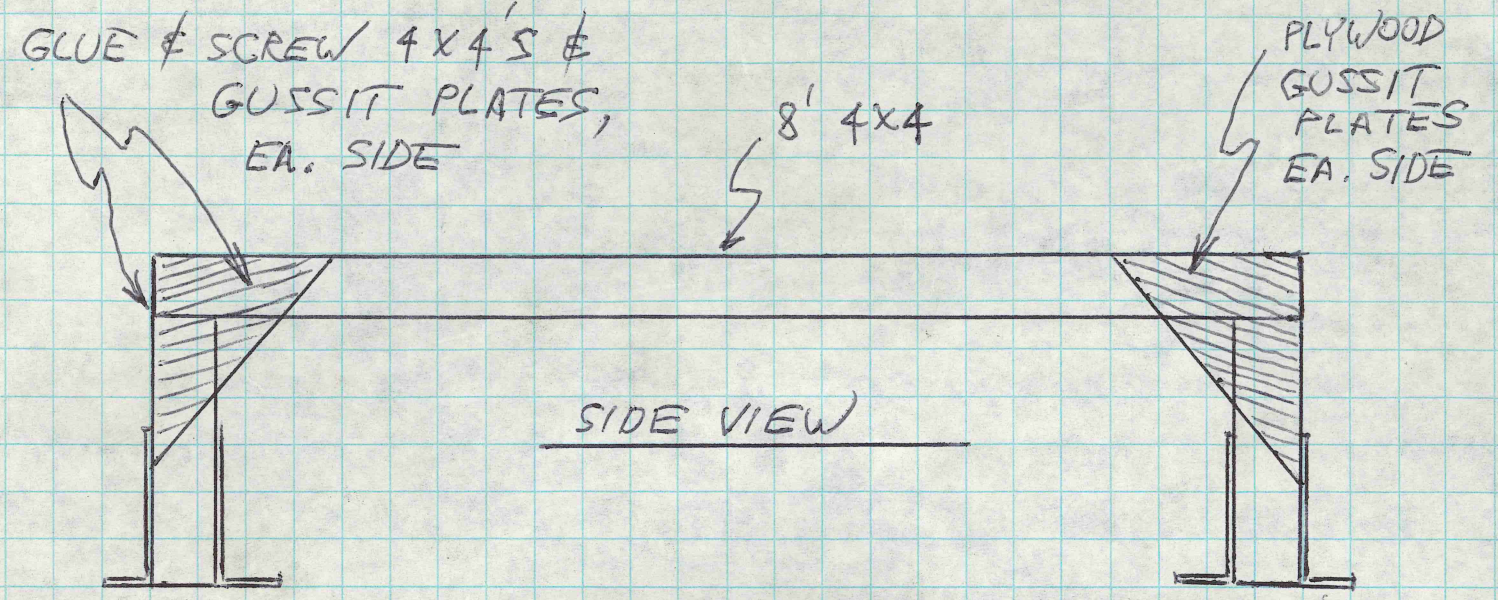
MODEL 7M ROTARY GAP
BASE PLATE



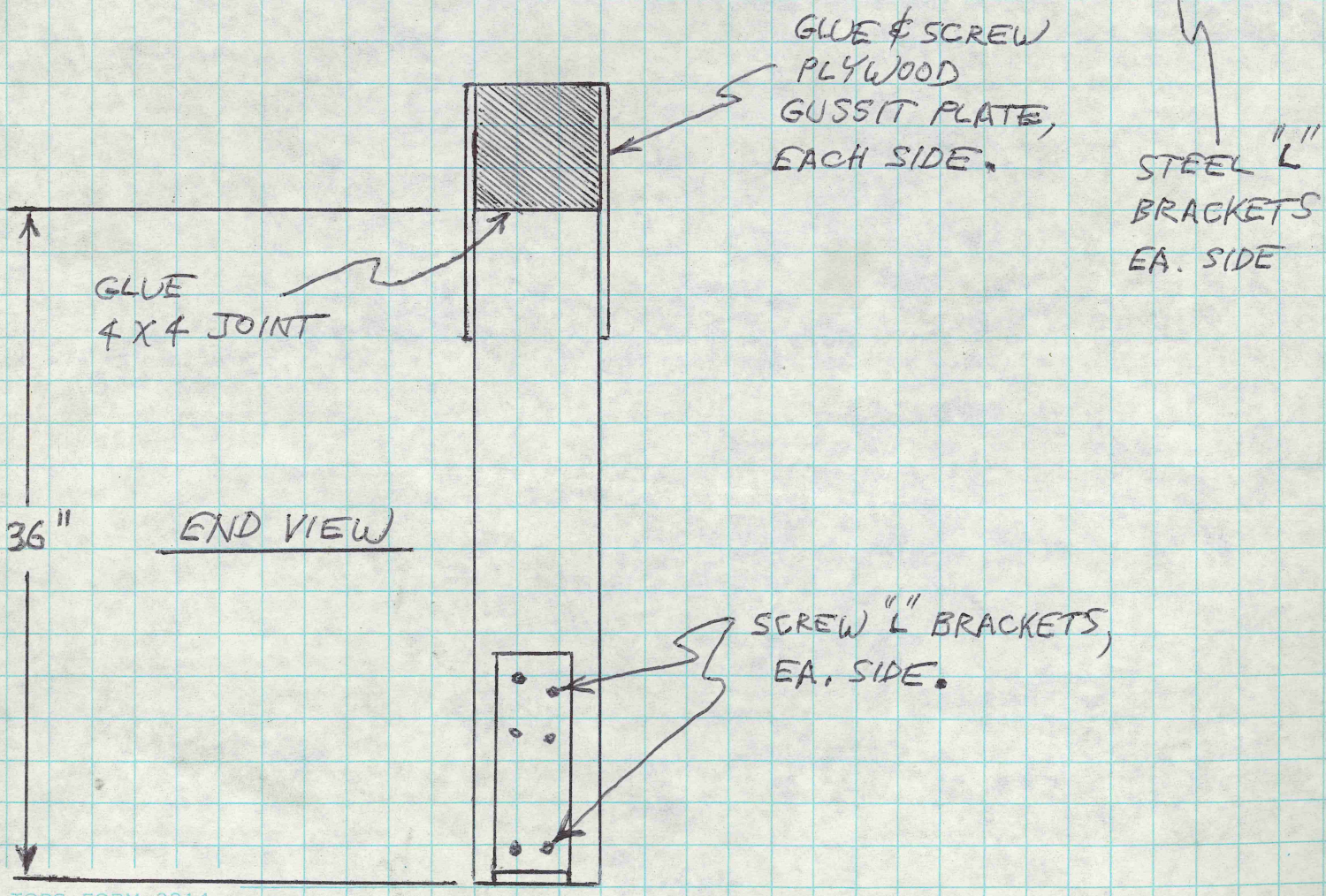
TOPS FORM 3314
LITHO IN U.S.A.

MODEL 7M GANTRY BRIDGE

10/10/03



SIDE VIEW



END VIEW

TOPS FORM 3314
LITHO IN U.S.A.

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9-29-03

MODEL 7 M EXTRA COIL

12.5" O.D. x 56" WINDING LENGTH

WIRE O.D. = 0.087

1 TURN CIRCUMFERENCE = 39.54"

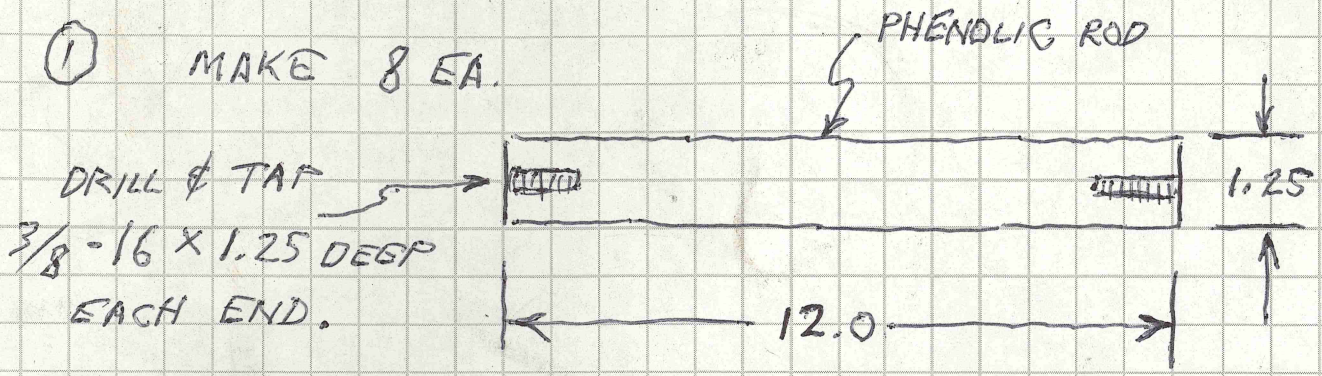
56" LENGTH WITH 0.087 = 643 TURNS
= 2118 FEET

AEROFLEX LINTEK

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8/18/03 FOR JIM SHAFFER

(1) MAKE 8 EA.

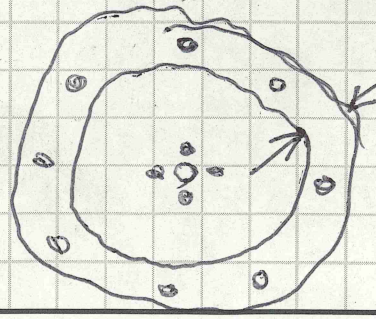


(2) MAKE 1 EA. ROTARY GAP WHEEL (AS PER SAMPLE SUPPLIED) EXCEPT WITH THE FOLLOWING CHANGES.

(A) ELECTRODE HOLES ARE 0.25 I.D. CLEARANCE HOLES (NO SET SCREWS ON OUTSIDE OF WHEEL). SAME BOLT CIRCLE DIMENSIONS HOWEVER.

(B) TURN BRASS PLATE FOR RING THAT IS 1.5" WIDE

(C) MAKE STAINLESS STEEL ARBOR SHAFT I.D. =



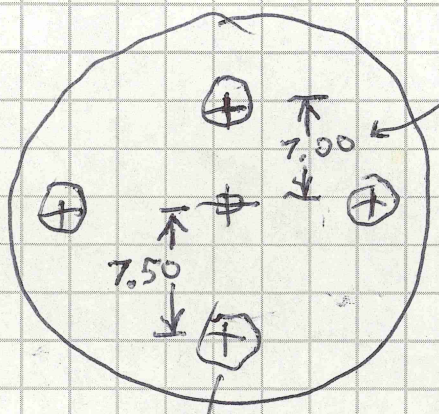
AEROFLEX LINTEK

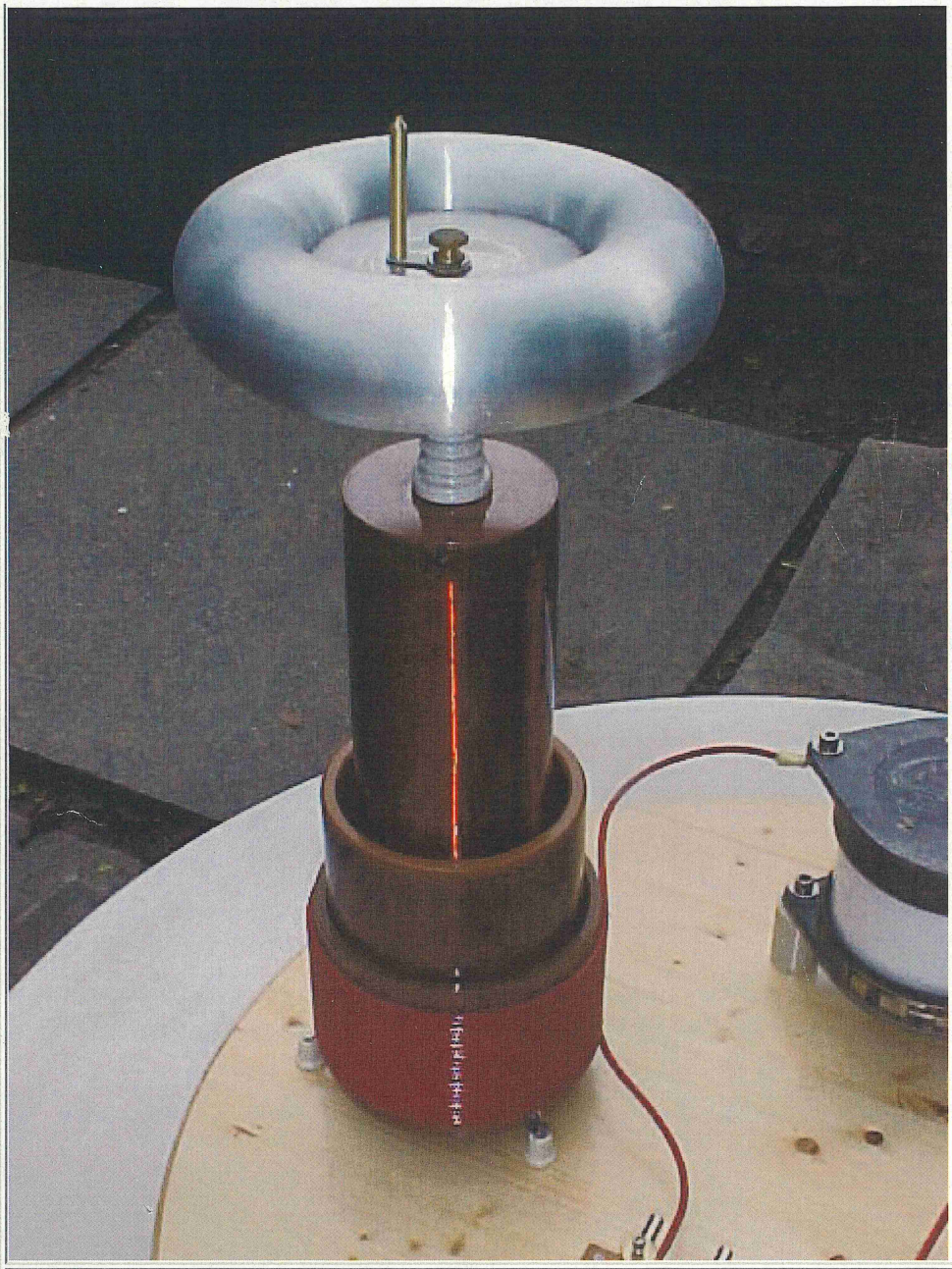
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10/3/03

MODEL 7M

MASTER OSCILLATOR SECONDARY COIL
BASE PLATE





Heavy-Duty Model One Tesla Coil showing the primary and screw-in secondary coil with phenolic insulation sleeve and a six inch aluminum toroid. Also shown is an optional brass corona point discharge electrode.

Description
The Ranvar B277-1 is a fast drying electrical insulating varnish for use up to180°C.

Uses
- Impregnation of stators, coils and transformers

Cured Properties
The Ranvar B277-1 can be baked at 110°C to accelerate the dry time. It has excellent moisture resistance

Recommended Cure
1 – 2 hours at 25°C (77 °F)
-OR-
30 minutes at 110°C (230°F)

Features and Benefits
- Low viscosity
- Can be thinned with low cost solvents
- Offers thermal ratings from 130° C to 180° C
- Fast drying

Application Methods
- Dip and Bake

Storage/Shelf Life
This resin should be stored at a 25°C (77°F) in a dry controlled environment out of direct sunlight. This material should be suitable for use stored under these conditions in the original sealed containers for twelve (12) months from the date of shipment.

Properties of Material Supplied

Test	*Value*	*Units*
Viscosity @ 25°C (77°F) (ASTM D2196)	45 – 100	Cp
Percent non-volatile matter (ASTM D115)	34 – 36	%
Flash Point (ASTM D93)	27 (81)	°C (°F)

E. ELANTAS

TYPICAL PROPERTIES

Test	Value	Units
Typical Dry Time @ 25°C (77°F)	20	Minutes
Recommended Thinner	Xylol	

Electrical Properties – Dried 24 hours at 25°C (77°F)

Test	Value	Units
Dielectric Strength – AS MADE (ASTM D149)	4100	Volts/mil
Dielectric Strength after 24 hours in water (ASTM D149)	3000	Volts/mil
Film thickness	2	mils

UL Recognized Insulation Systems (E52215)

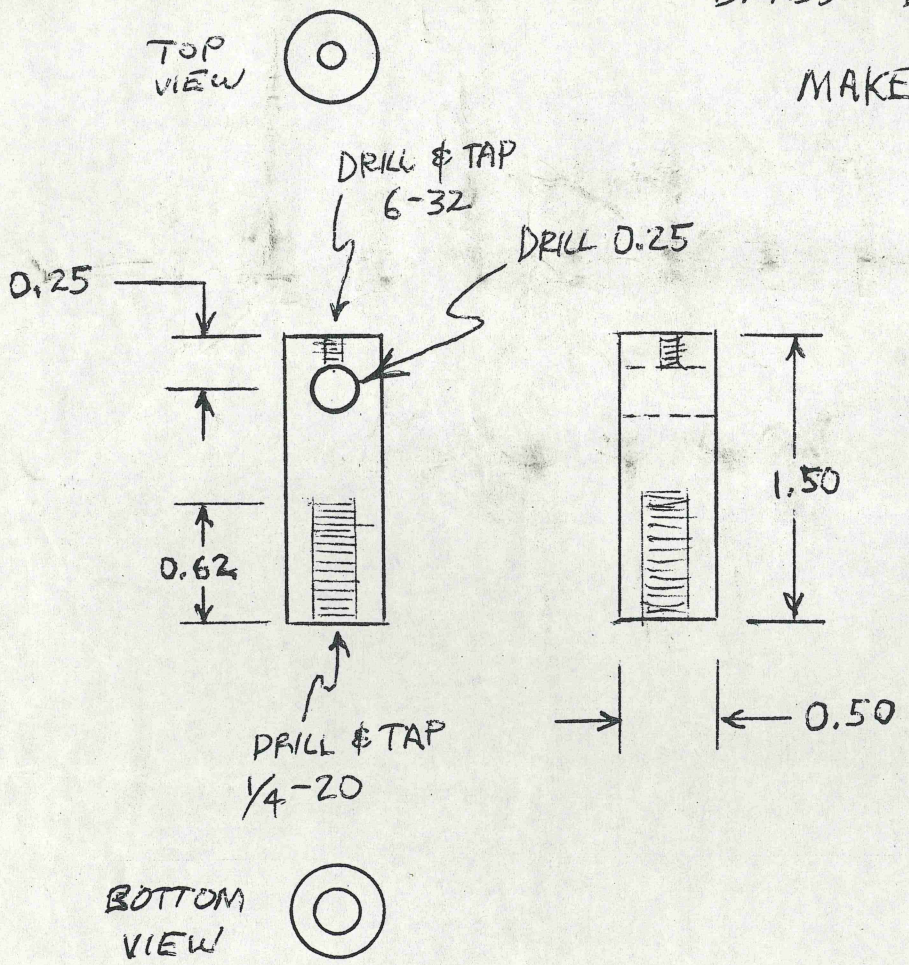
Class	Systems
Class 130	MEGA I
Class 155	82
Class 180	MEGA III

A member of E. ELANTAS

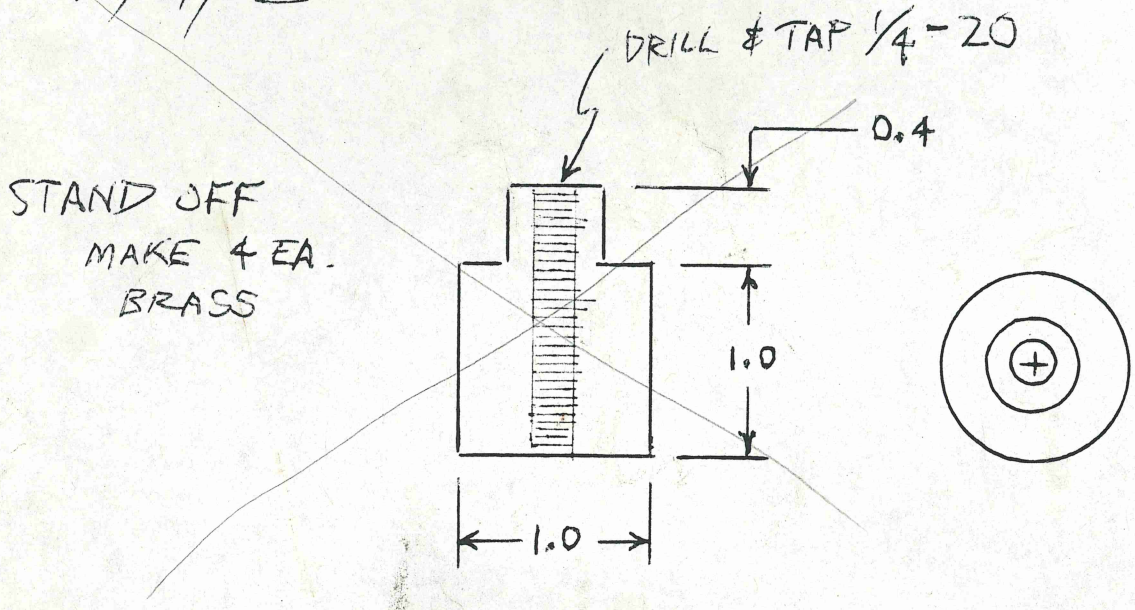
3/17/05

BRASS - BRIGHT FINISH

MAKE 16 PCS.



10/21/02



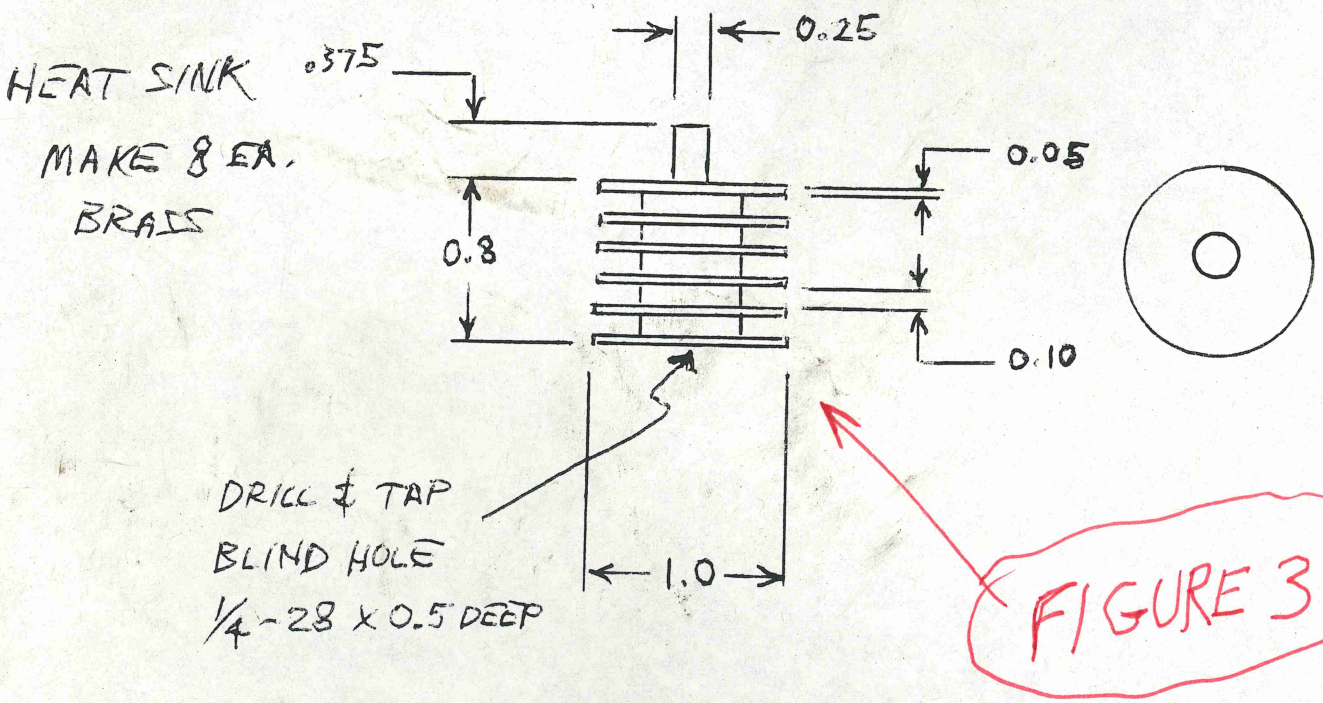


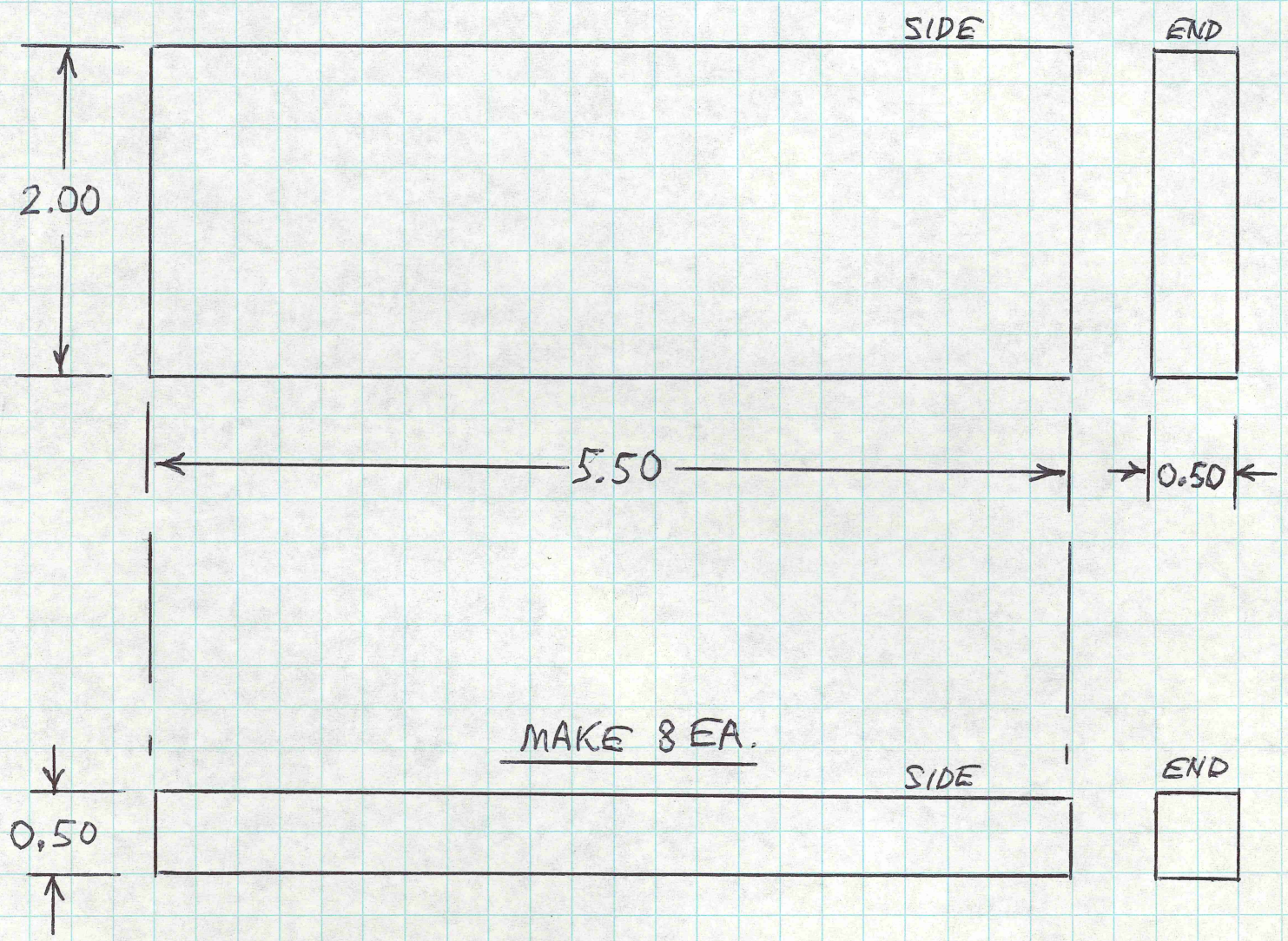
FIGURE 3

9-2-03

MINI GPO-2 COIL

PRIMARY PHENOLIC BLOCK

MAKE 8 EA.



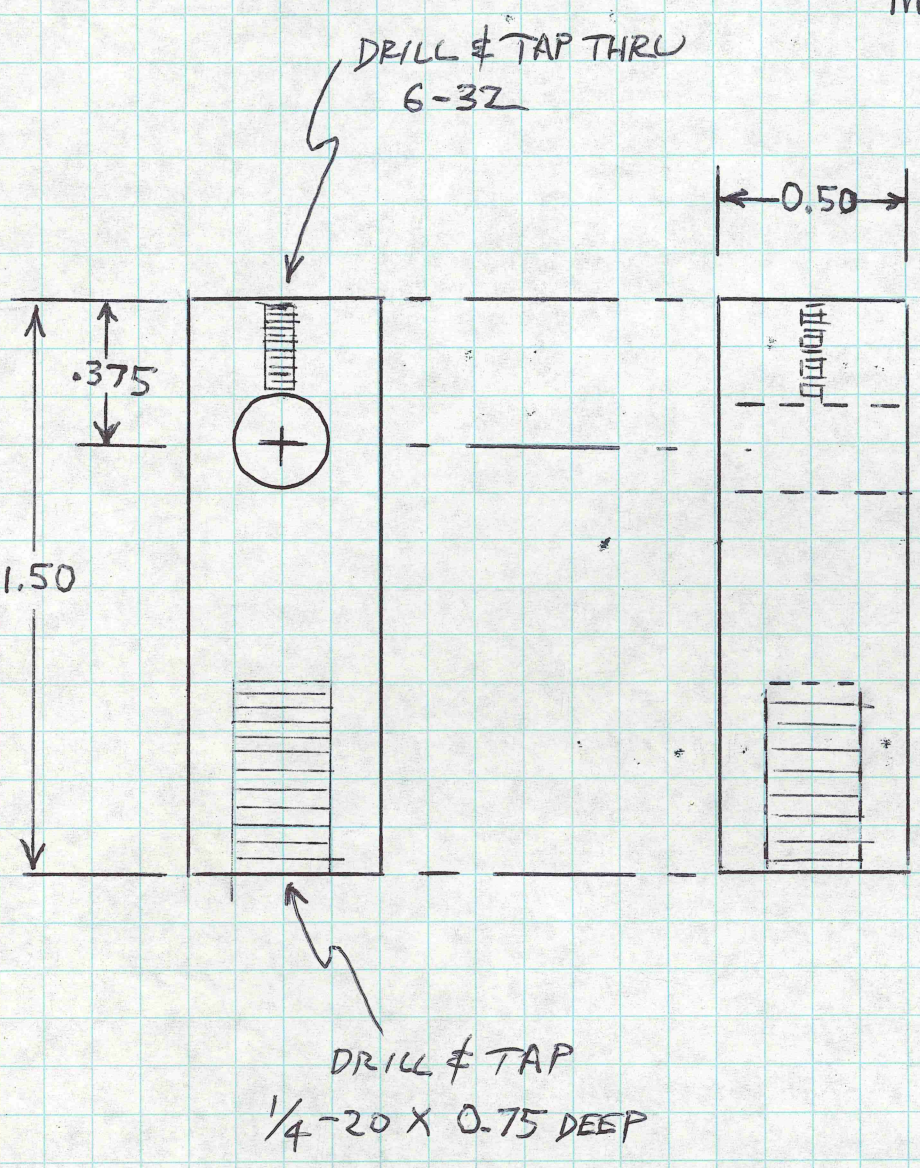
MAKE 8 EA.

TOPS FORM 3314

9-2-03

MINI GPO-2 COIL

STATIONARY SPARK GAP POST



MAKE 20 PCS,

BRASS

BRIGHT FINISH

TOPS FORM 3314

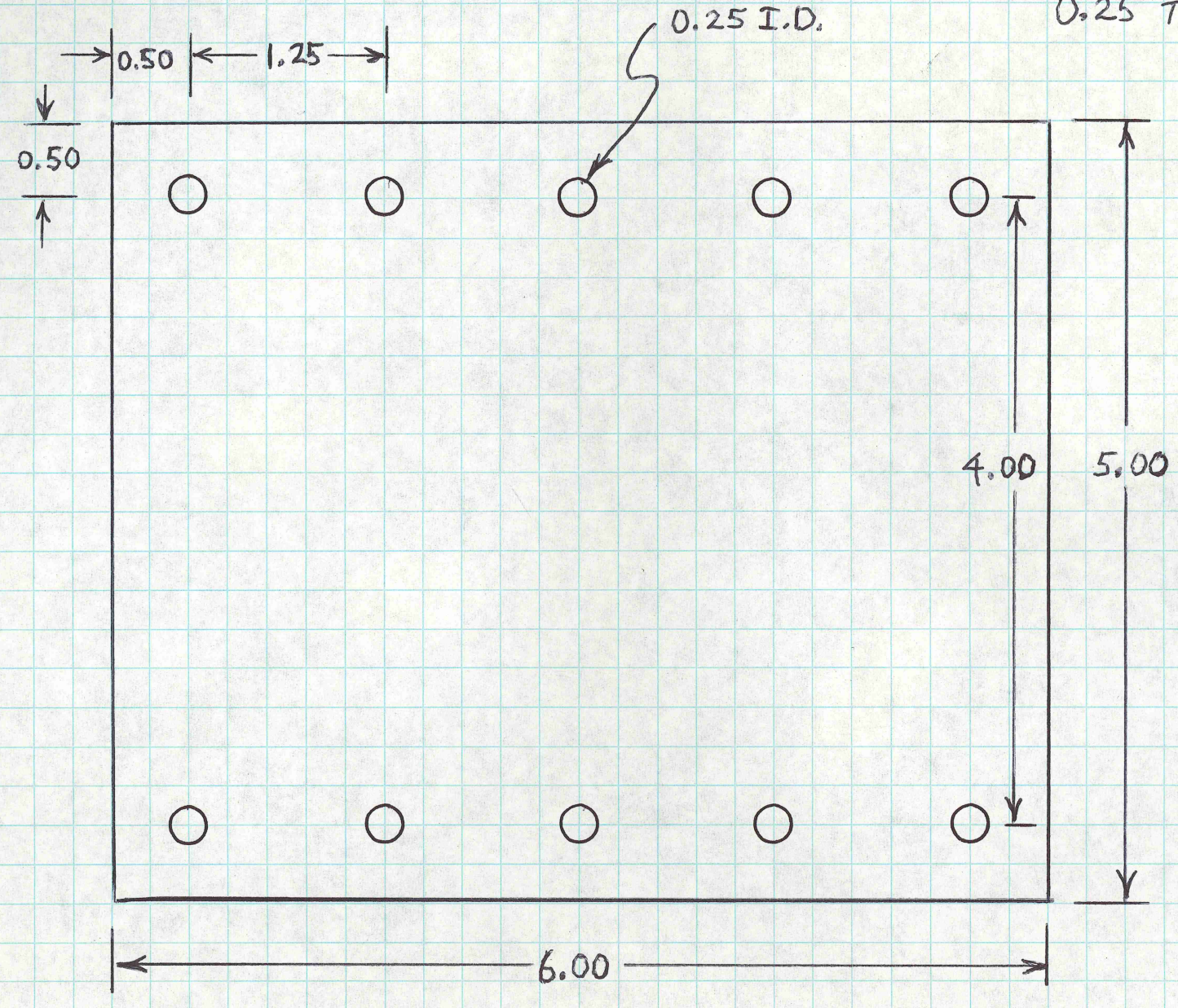
9-3-03

MINI GPO-2 COIL

0.25" THICK PHENOLIC

MAKE 1 EA.

SPARK GAP PLATE



TOPS FORM 3314
LITHO IN U.S.A.

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MINI GPO-2 COIL 10/2/03

ATTEMPT #2 ON SECONDARY COIL

(BLUE AWG #20 WIRE) O.D. = 0.068

16" WINDING LENGTH = 235 TURNS

1 TURN = 28.49"

= 6698"

= 558 FEET

FORMVAR #24 AWG = 0.023 O.D.

16" WINDING LENGTH = 695 TURNS

1 TURN = 28.35"

= 19,703"

= 1,642 FEET

FORMVAR #21 AWG = 0.031 O.D

16" WINDING LENGHT = 516 TURNS

1 TURN = 28.37"

= 1480"

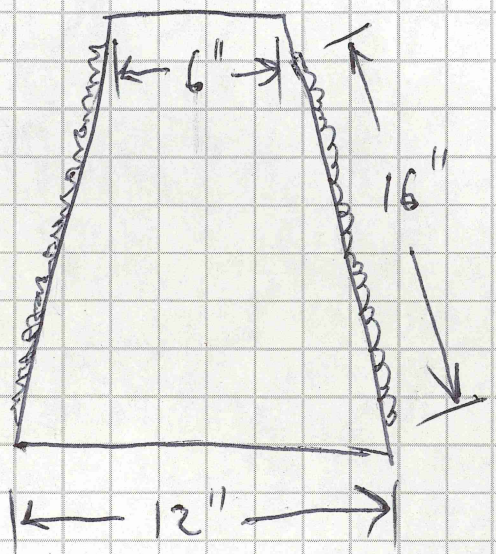
= 1,234 FEET

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MINI GPO-2 COIL 10/1/03

MEAN DIAMETER = ~ 9.00"



1 TURN = ~ 28.27"

WIRE O.D. = 0.105"

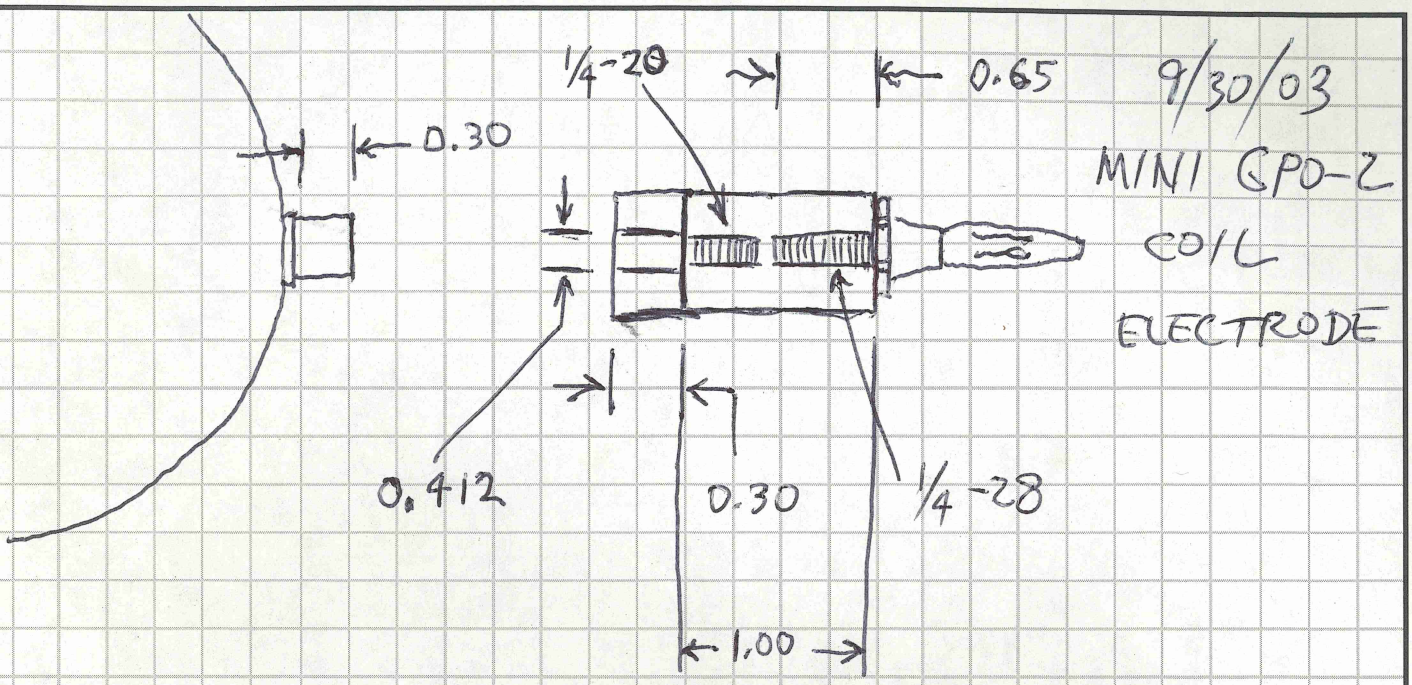
16" WINDING LENGTH = 152.38 TURNS
= 4,308"
= 358.98'

NO GOOD

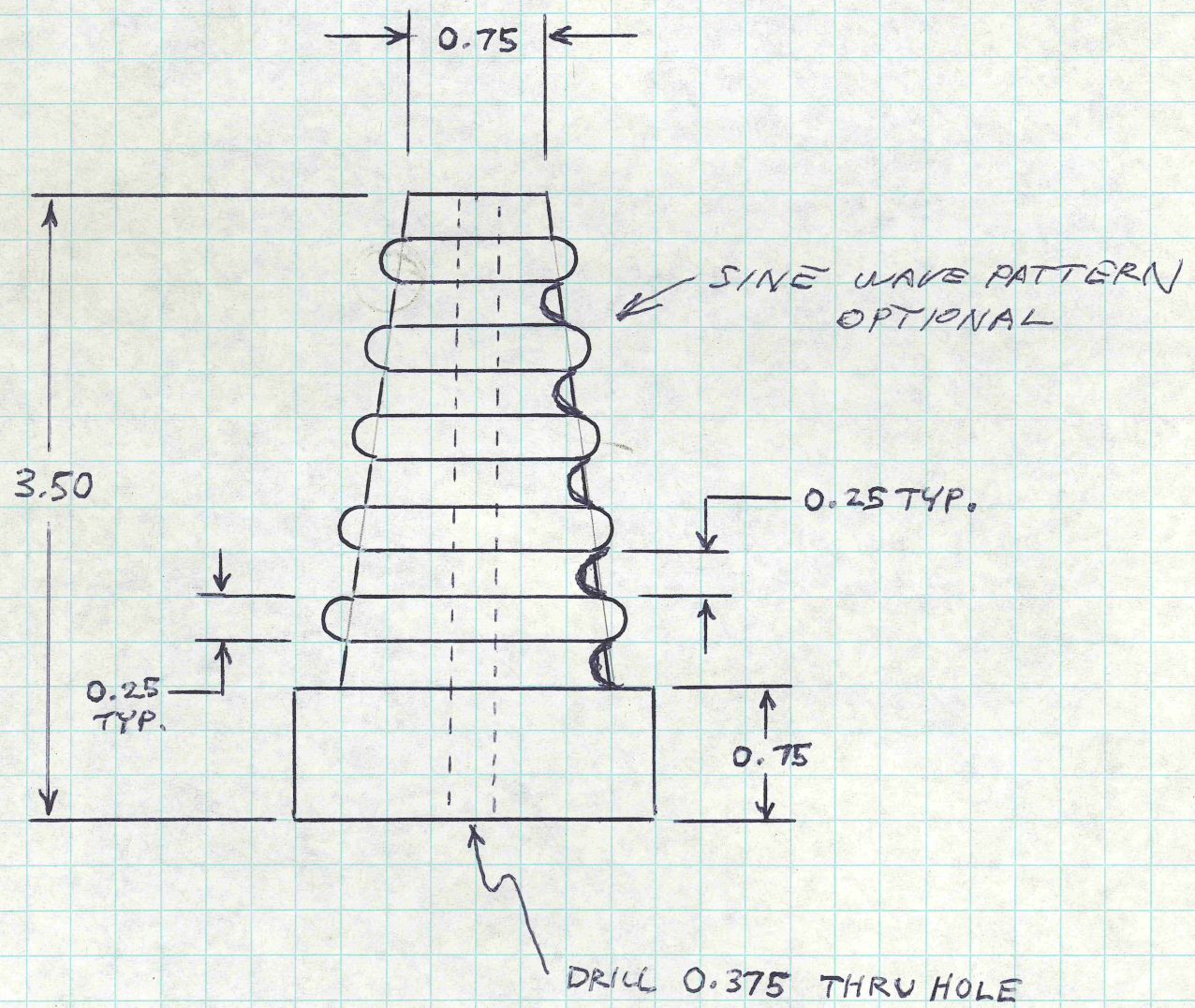
10/2/03 ≅ 6" MAXIMUM SPARK @ 1 TURN PRIMARY!
CAN'T USE!

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MAKE 1 EA. DELRIN



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10/15/03

MINI MODEL GPO-2

SPARK GAP SPACING

.011
.012
.013

.036 x 4 = 0.144

0.144 ÷ 5 = 0.028 > 0.029 ↓

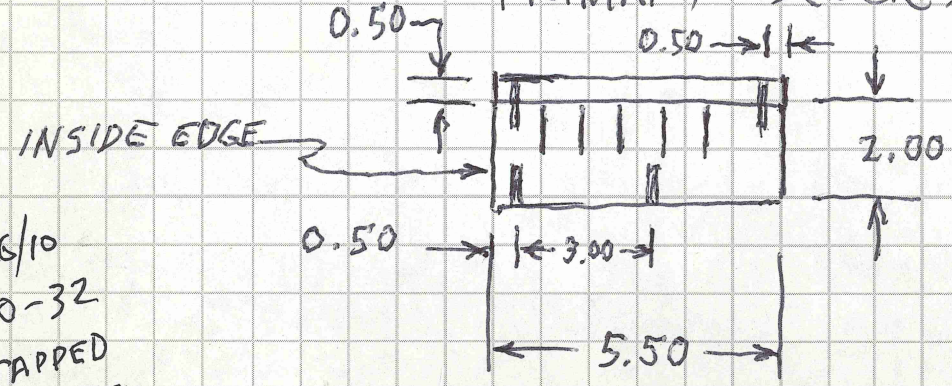
TOPS FORM 3314
LITHO IN U. S. A.

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MINI GPO-2 COIL 9/29/03

PRIMARY BLOCKS

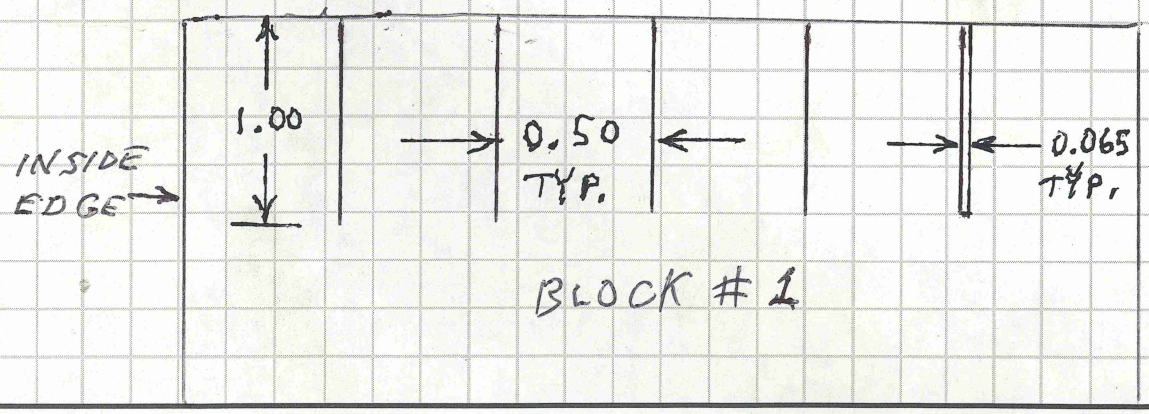


4/26/10
10-32
TAPPED
HOLES

BLOCK #	1ST SLOT
1	0.80
2	0.90
3	1.00
4	1.10
5	1.20
6	1.30
7	1.40
8	1.50

4/26/10
SLOT WIDTH 0.063
SLOT DEPTH 1.00

4/26/10
8 SLOTS TOTAL
EA. BLOCK
EXCEPT BLOCK #8
WHICH HAS 7 SLOTS



BLOCK # 1

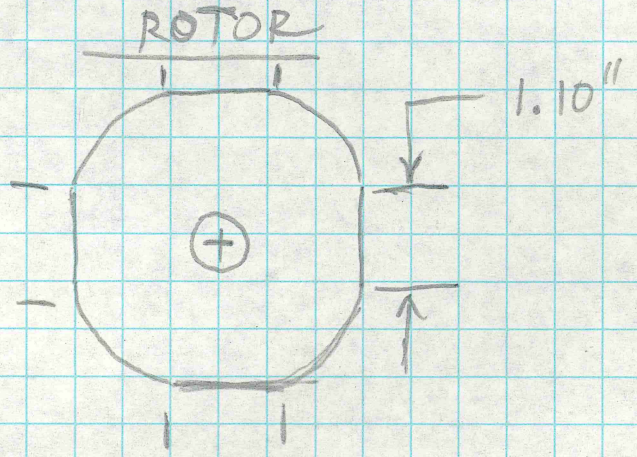
5/25/02

UNIVERSAL STUDIOS EARTHQUAKE #2

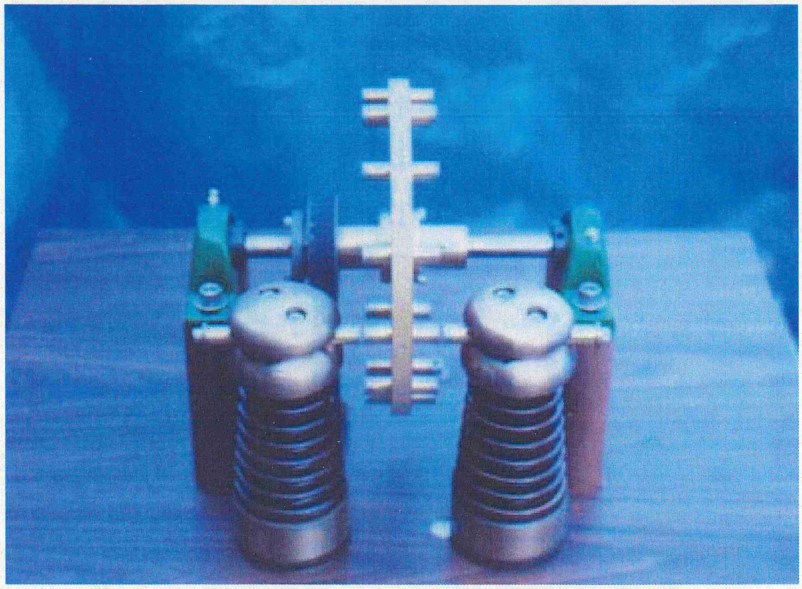
COIL REPAIR PROJECT

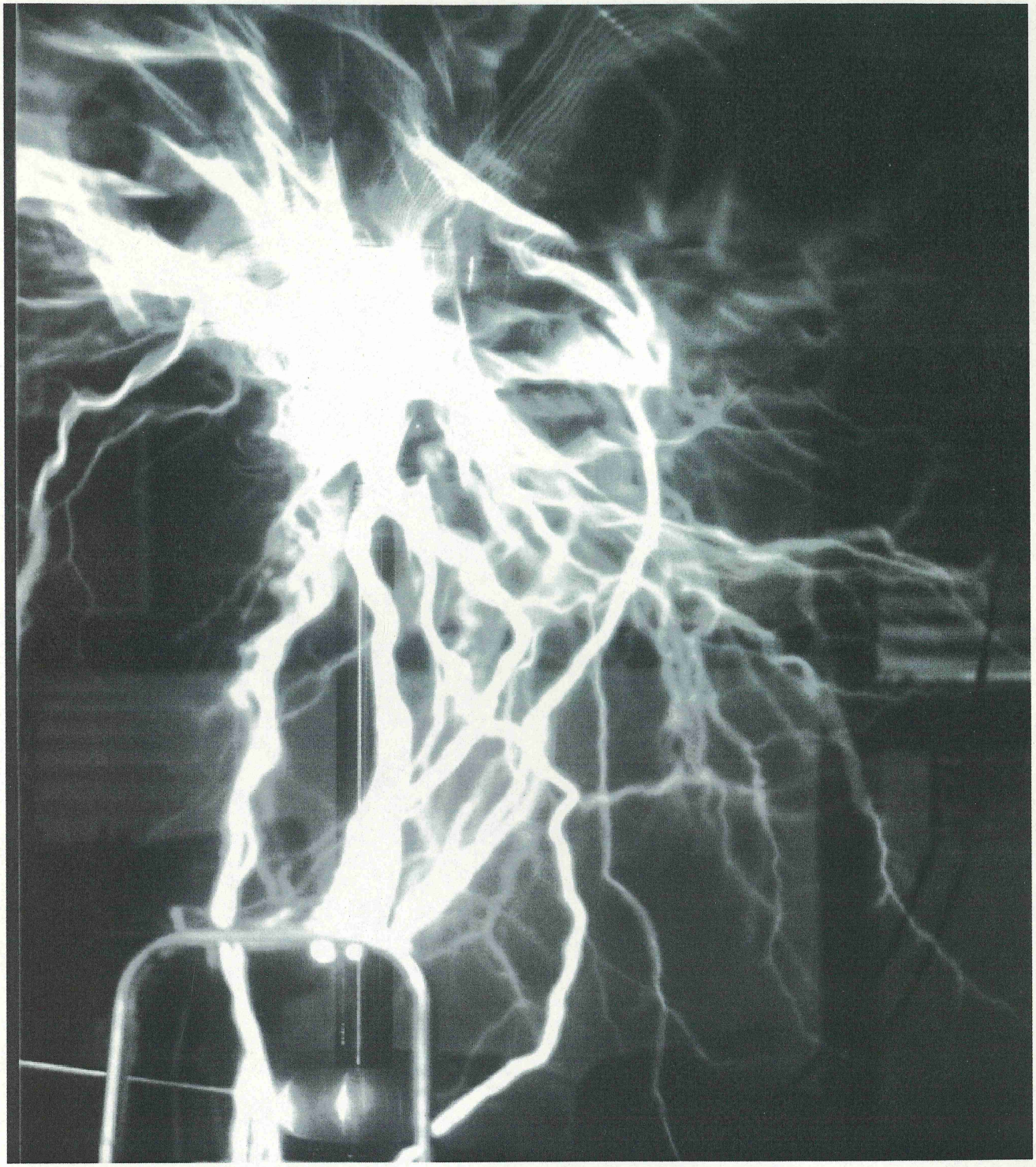
LEESON MOTOR # 100010.60
MODEL # A4C17DJ2E

1725 RPM 1/3 HP. 5/8 SHAFT CRADLE MOUNT
BALL BEARING



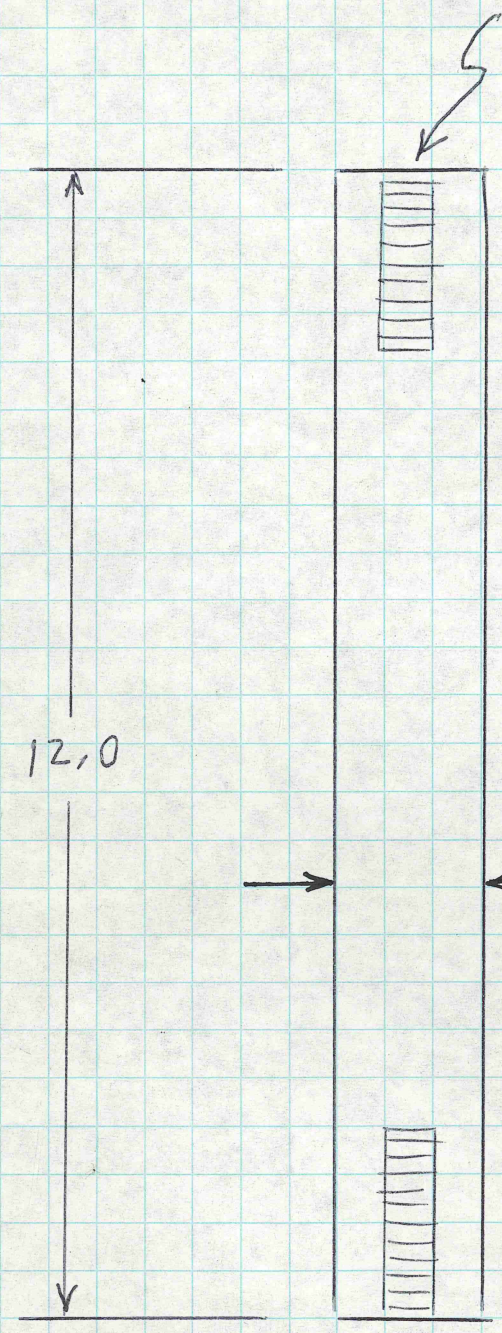
TOPS FORM 3314
LITHO IN U. S. A.







MODEL 2 COIL 12/3/08 ~~1/12/04~~



MAKE 8 EA. PHENOLIC SPACERS.

TOPS FORM 3314
LITHO IN U. S. A.

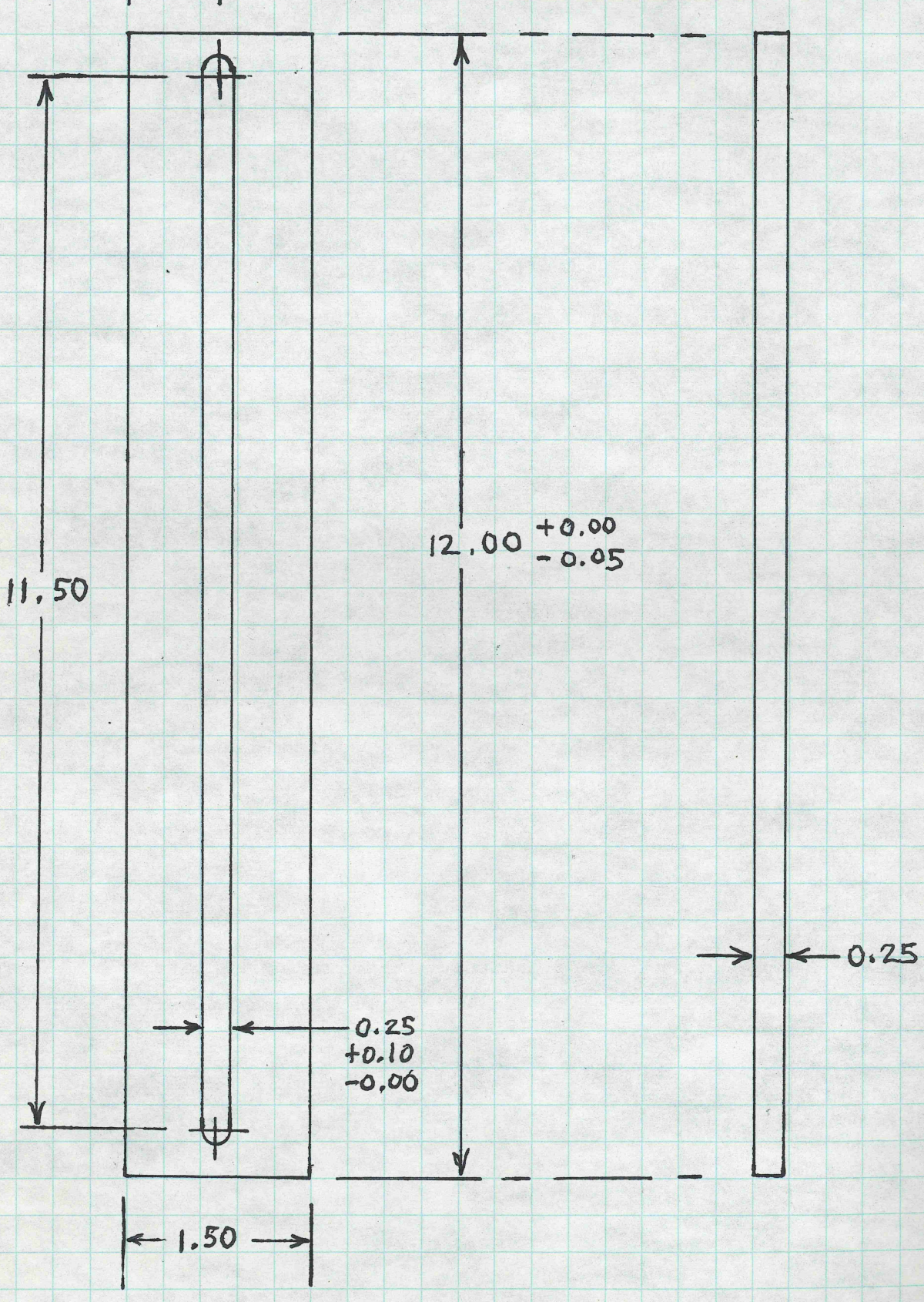
MODEL 2 SPARK GAP

MAKE 4 EA.

12/3/08

PHENOLIC

DEBUR ALL EDGES



7/6/07

T, K. LEONG MODEL 2 COIL

SEC. WIRE = #24 AWG (.023") O.D

SEC. COIL FORM = 5.125" O.D. BY 25.75" O.A.

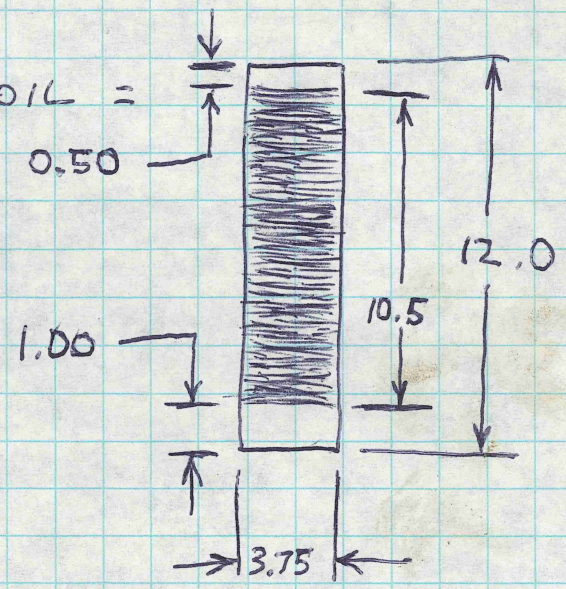
WINDING LENGTH = 24" LONG

MONOFILIMENT SPACER = 25 LB. TEST (.020")

7/27/07 MEASURED D.C. RESISTANCE = 20 Ω

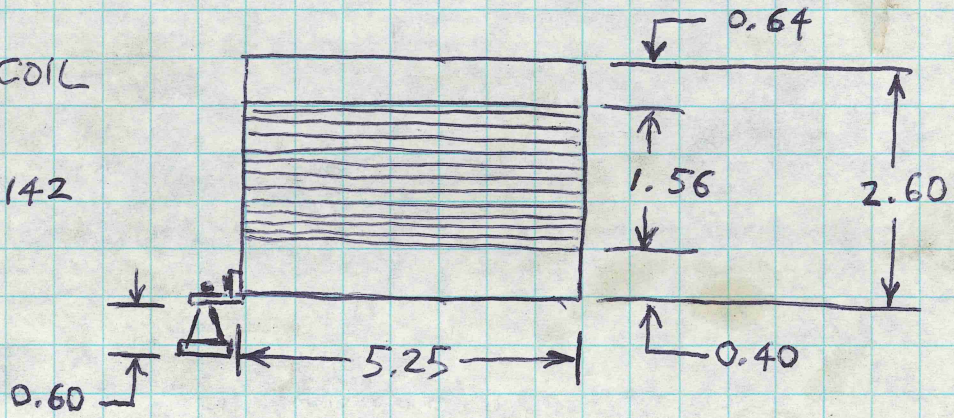
MODEL 1 COIL NOTES 2/20/01

SEC. COIL =

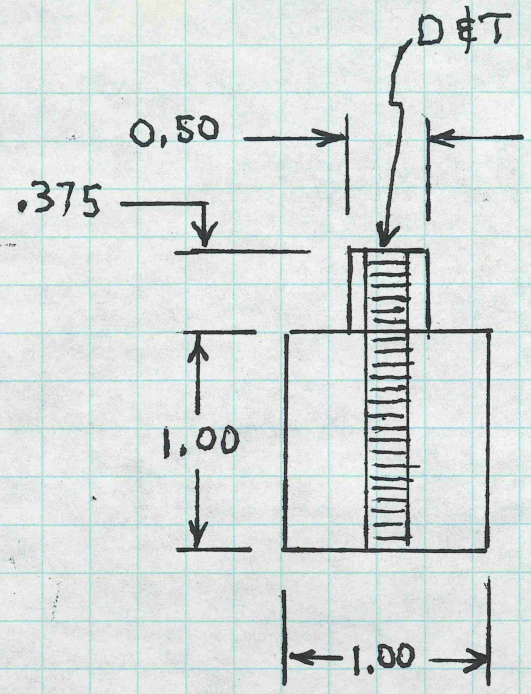


PRI. COIL

WIRE O.D. = 0.142



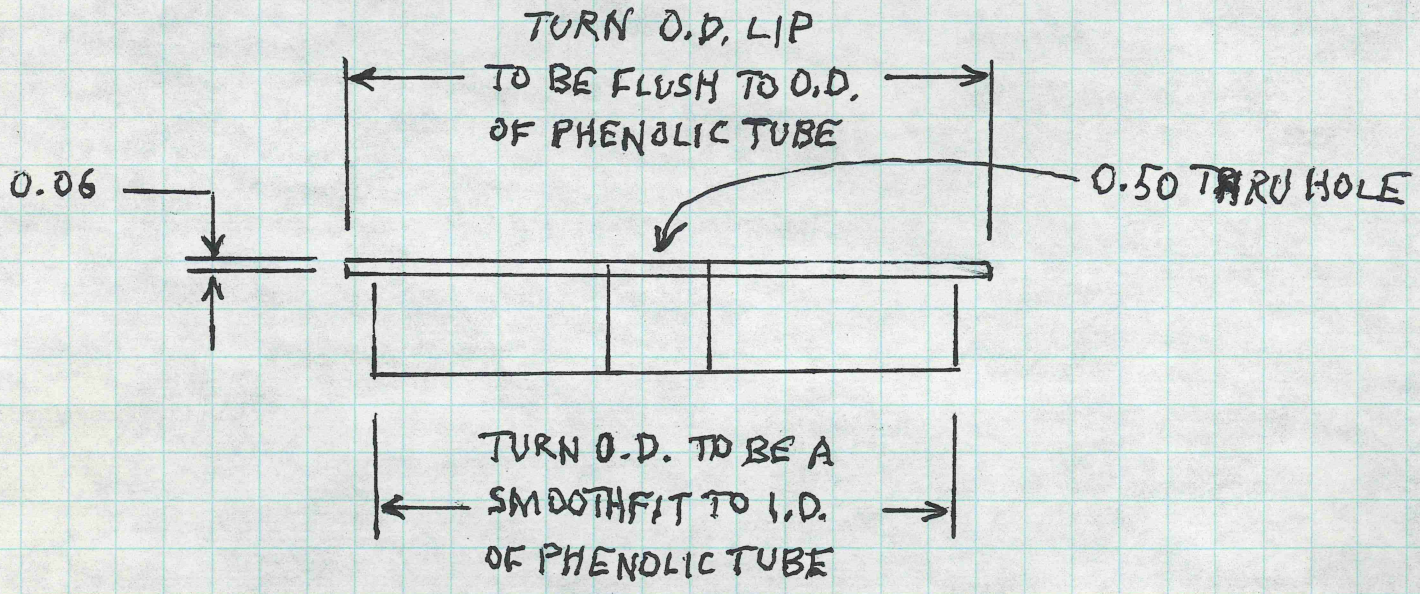
TOPS FORM 3314
LITHO IN U. S. A.



1" BRASS ROUND STOCK
BRIGHT FINISH

MAKE 4 EA.

PHENOLIC END CAP
MAKE 8 EA.

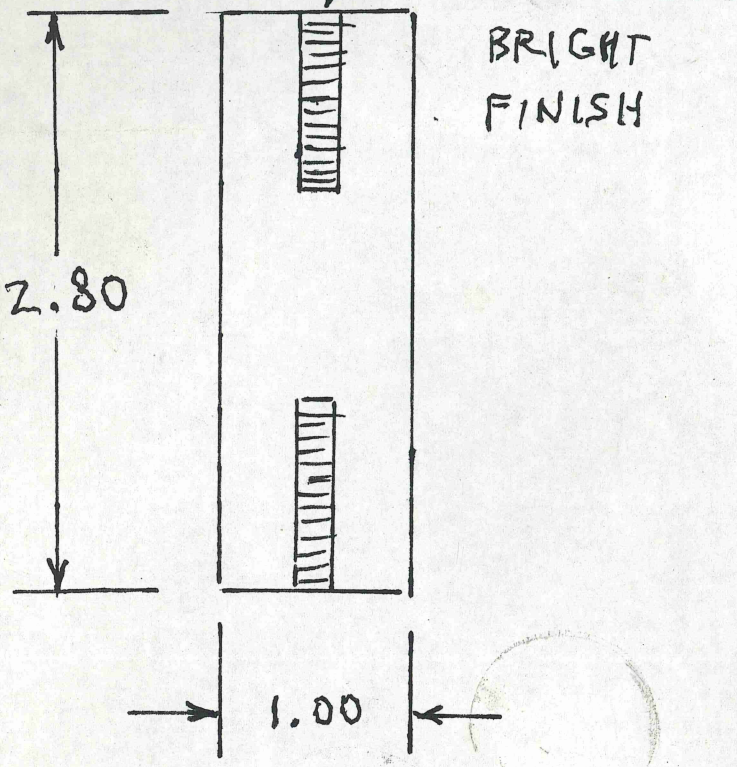


9/10/08

9/8/08

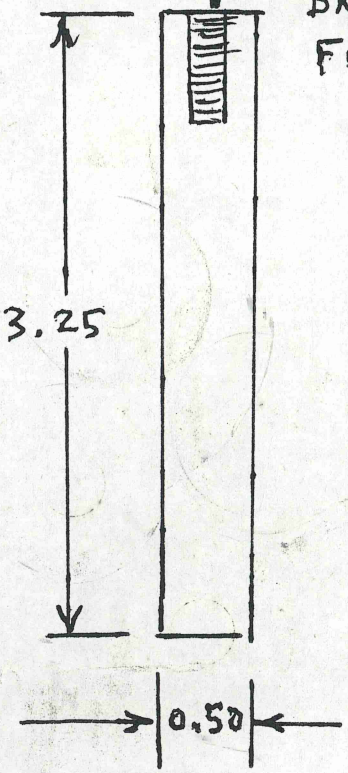
T6-6061 ROUND STOCK
D&T 5/16-18 x 1.00

EA. END
MAKE 4 EA.
BRIGHT
FINISH



ROUND BRASS STOCK
D&T 1/4-28 x 0.5

ONE END ONLY
MAKE 4 EA.
BRIGHT
FINISH

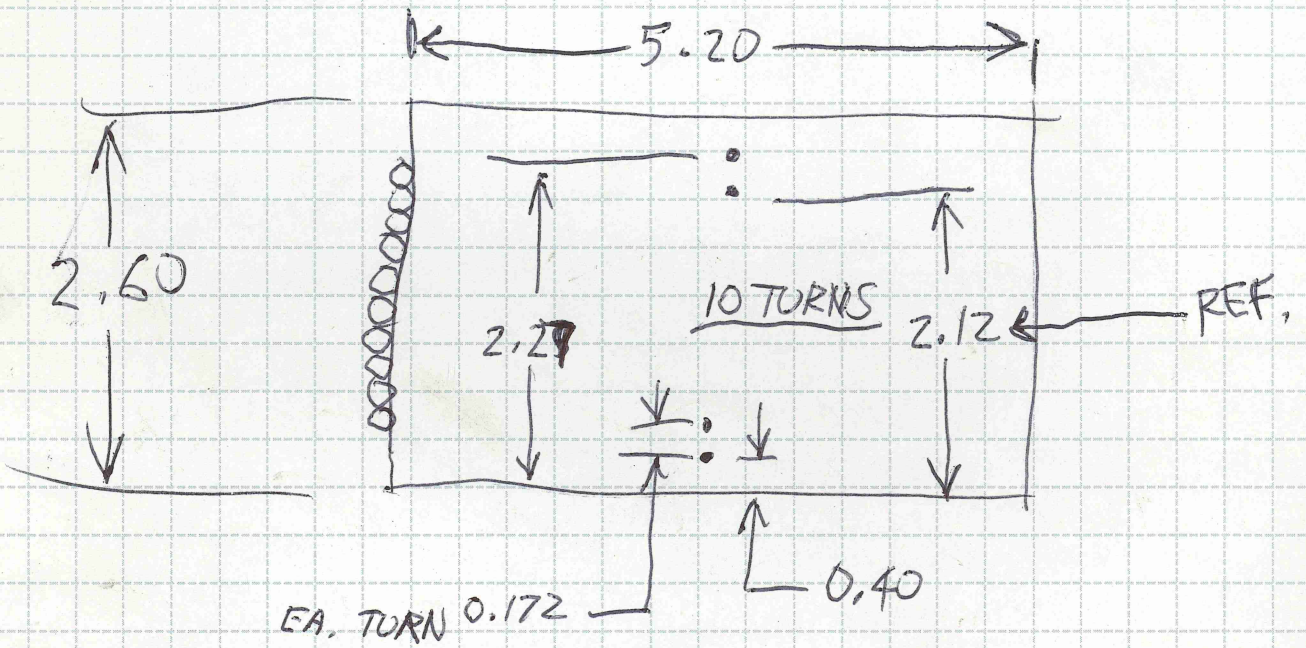


MODEL 1

9/16/08

PRIMARY

NEW MODEL 1 COILS

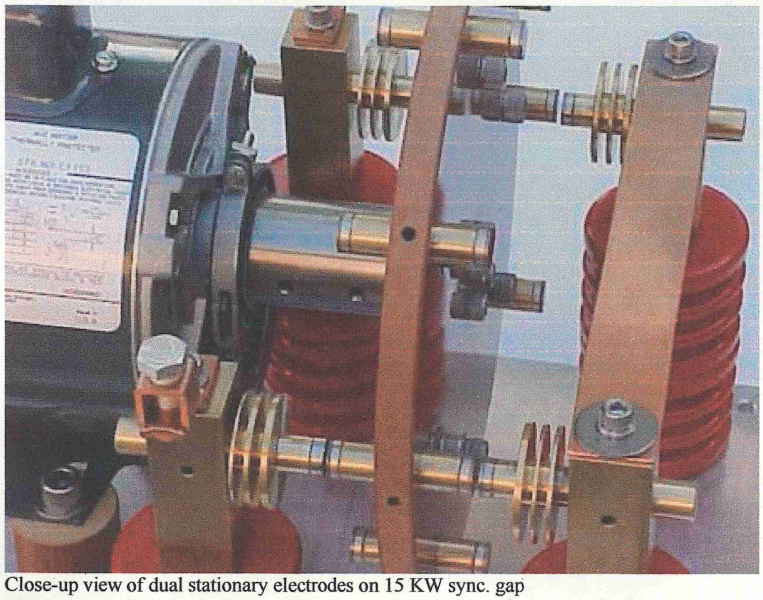


~~0.40~~

+ 0.172

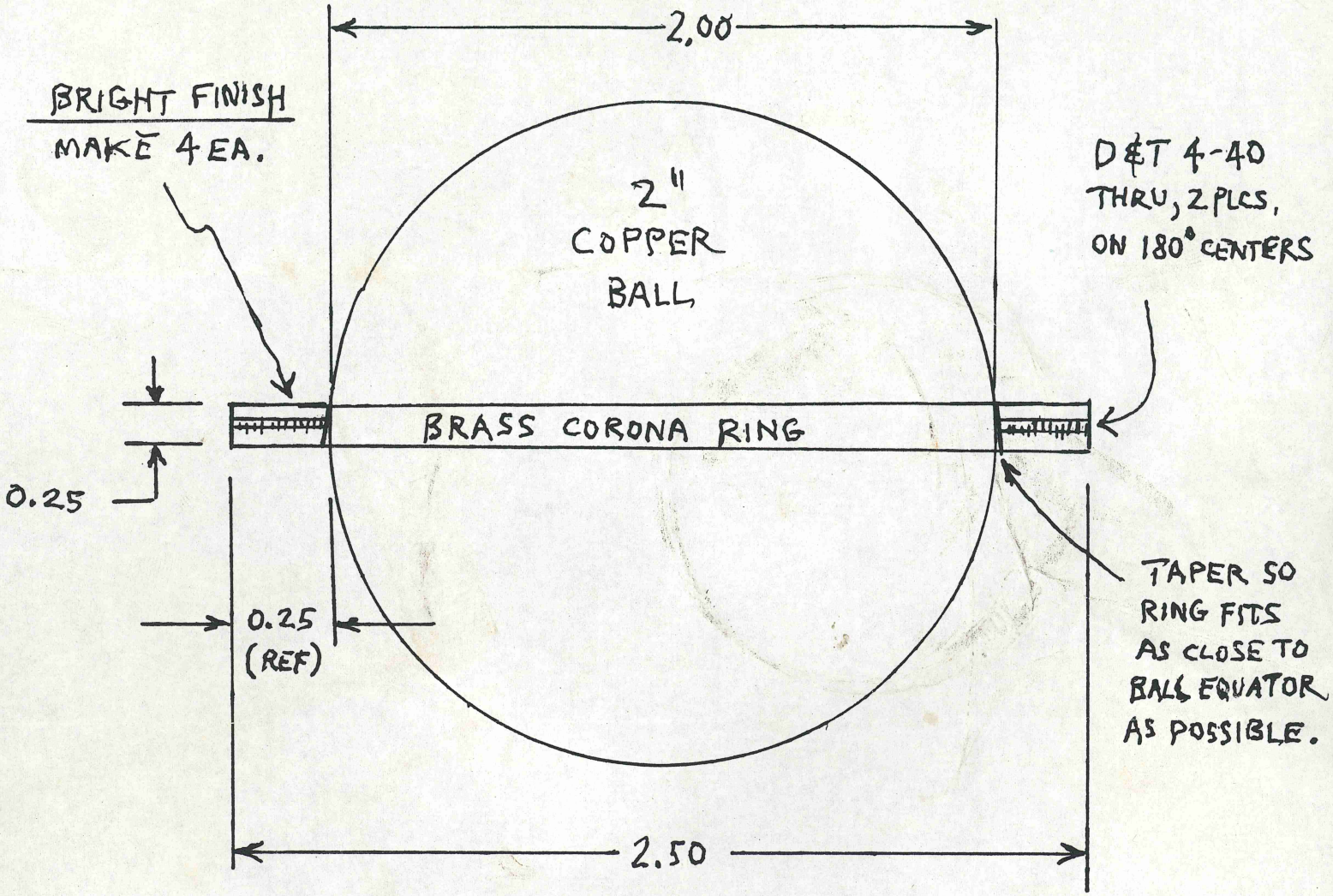
0.572

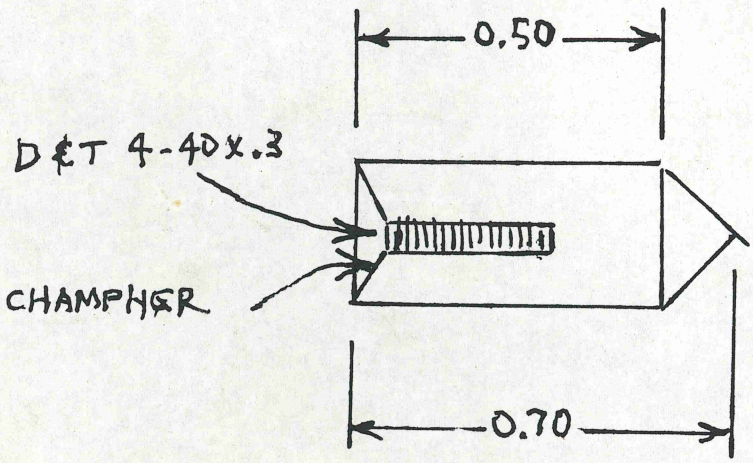
15 KW 3,600 RPM salient-pole synchronous rotary spark gap. 480 breaks per second (BPS)



Close-up view of dual stationary electrodes on 15 KW sync. gap







0.25 O.D.
BRASS ELECTRODE
BRIGHT FINISH

MAKE 8 EA.

9/10/08

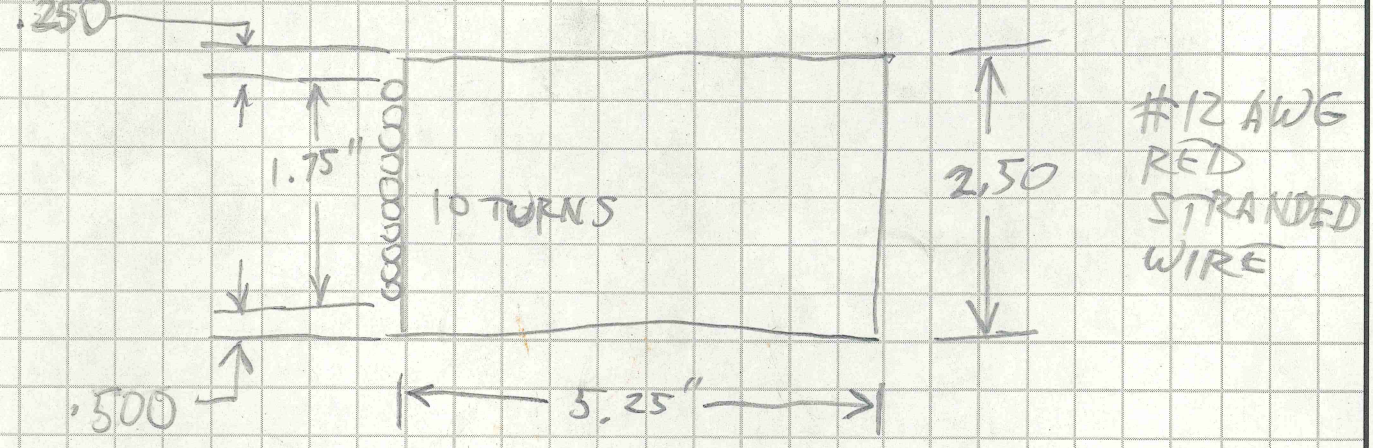
AEROFLEX LINTEK

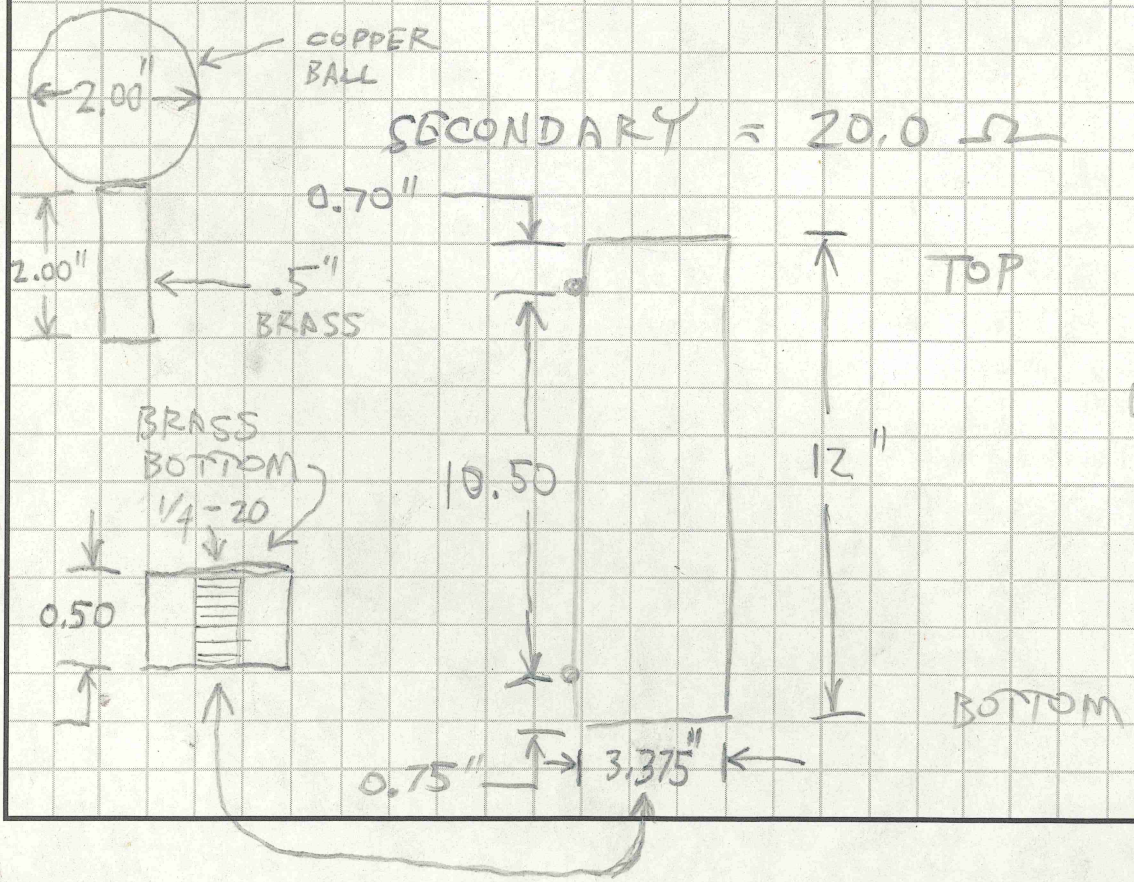
383 N. Liberty Road • Powell, Ohio 43065 Phone: (614) 888-2700 • Fax: (614) 888-4778

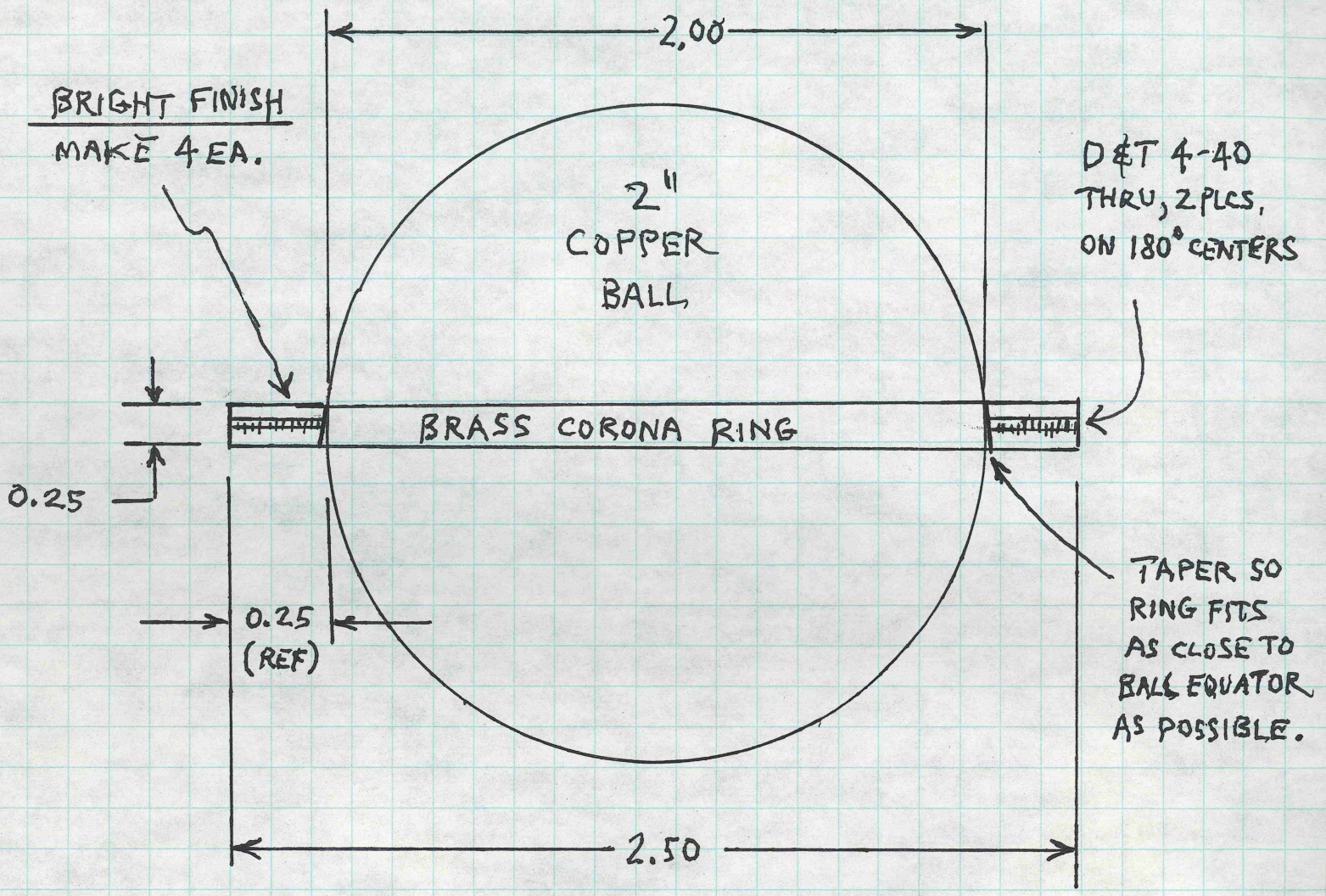
1/12/02 MODEL 1 COIL NOTES

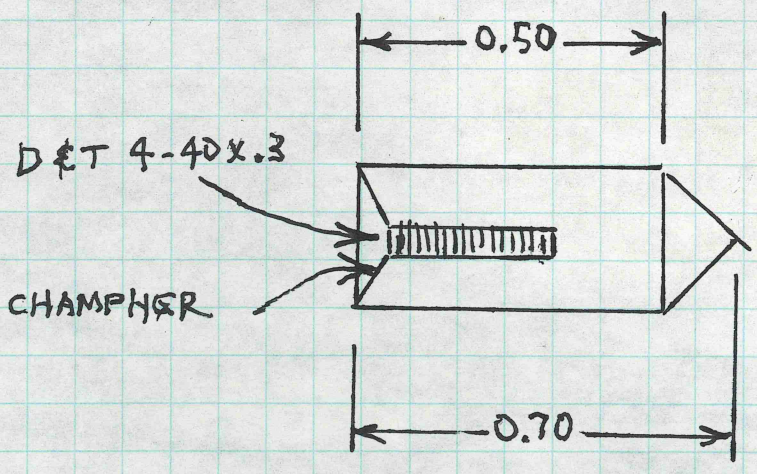
PRIMARY: 5.25" O.D. X 2.50" HIGH

#12 AWG X 10 TURNS = 1.75"



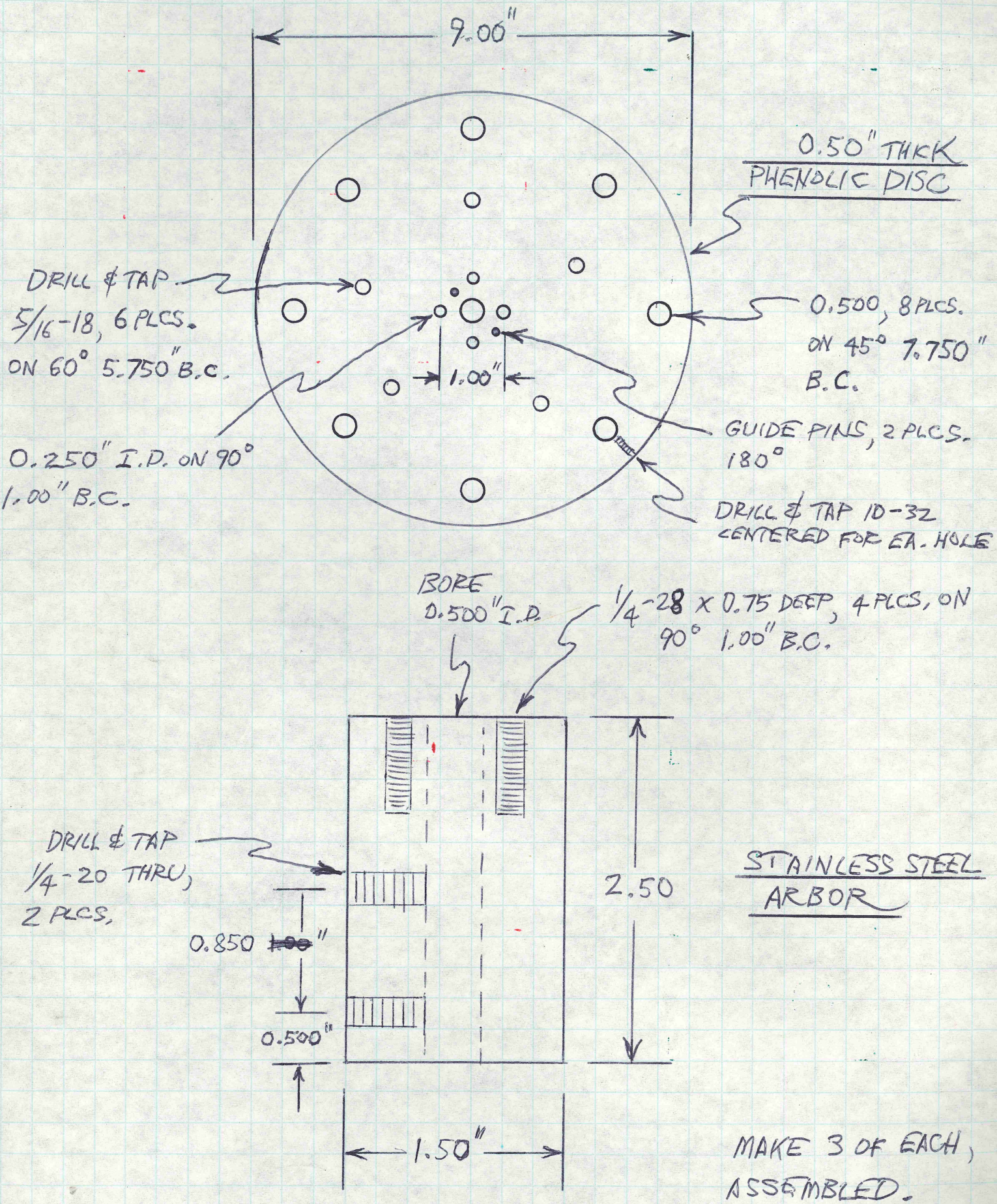






0.25 O.D.
BRASS ELECTRODE
BRIGHT FINISH
MAKE 8 EA.

9/10/08

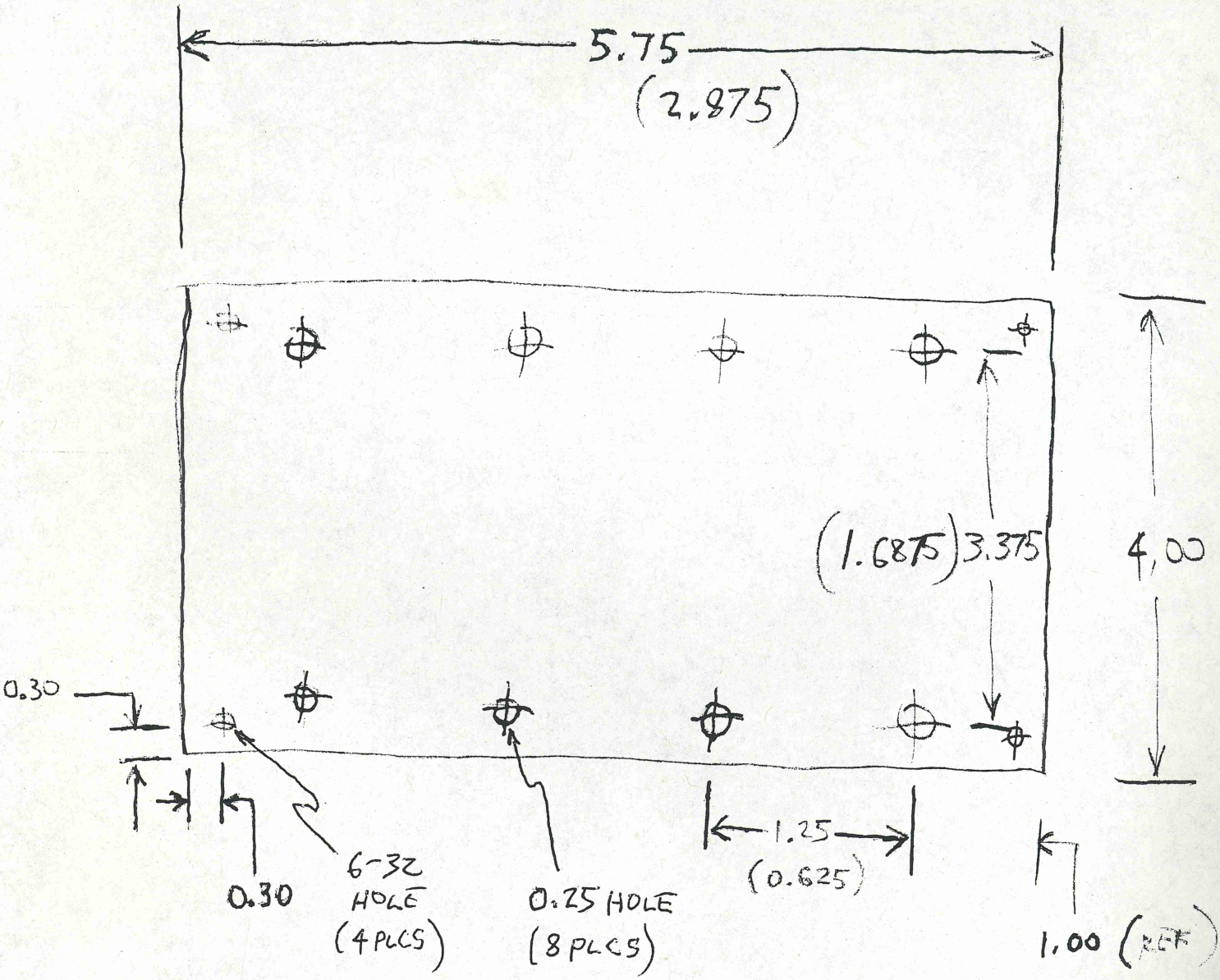


STAINLESS STEEL ARBOR

MAKE 3 OF EACH, ASSEMBLED.

6-23-00

THOMAS MANNING H.D. MODEL 1 CPU 4/16/02



1/4" THICK PHENOLIC PLATE

FIGURE 1

~~1/12/04~~

~~MAKE 8 PCS.~~, BRASS (BRIGHT FINISH).

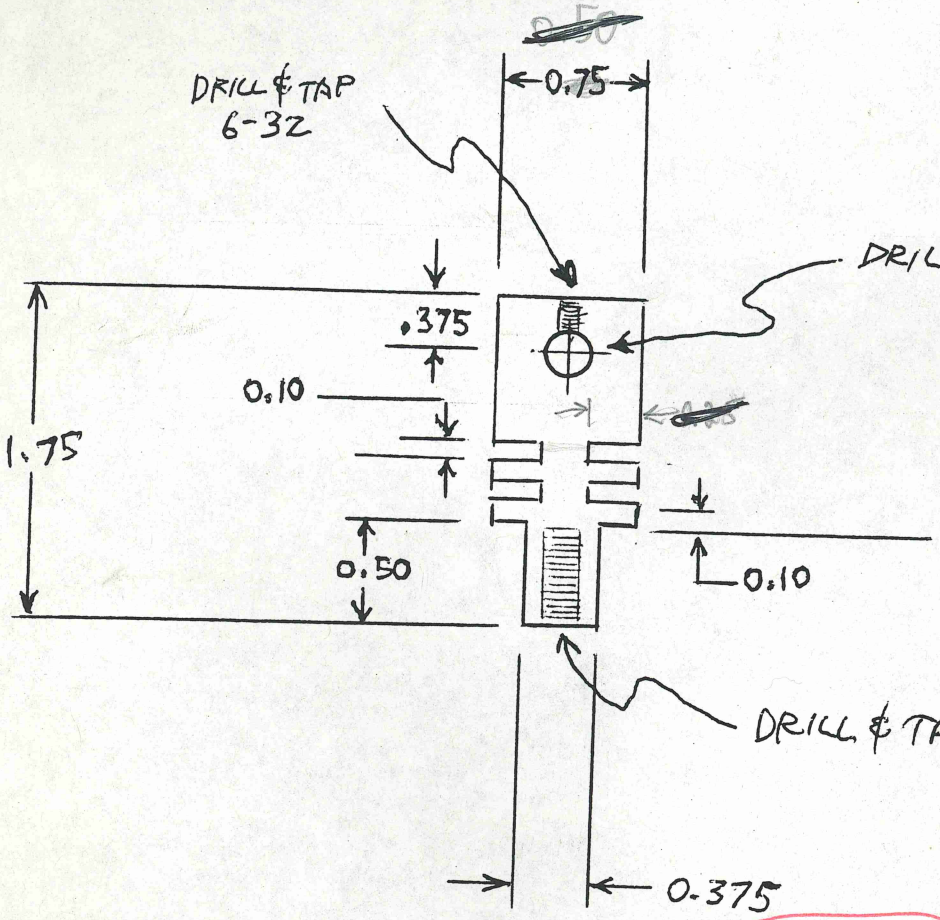


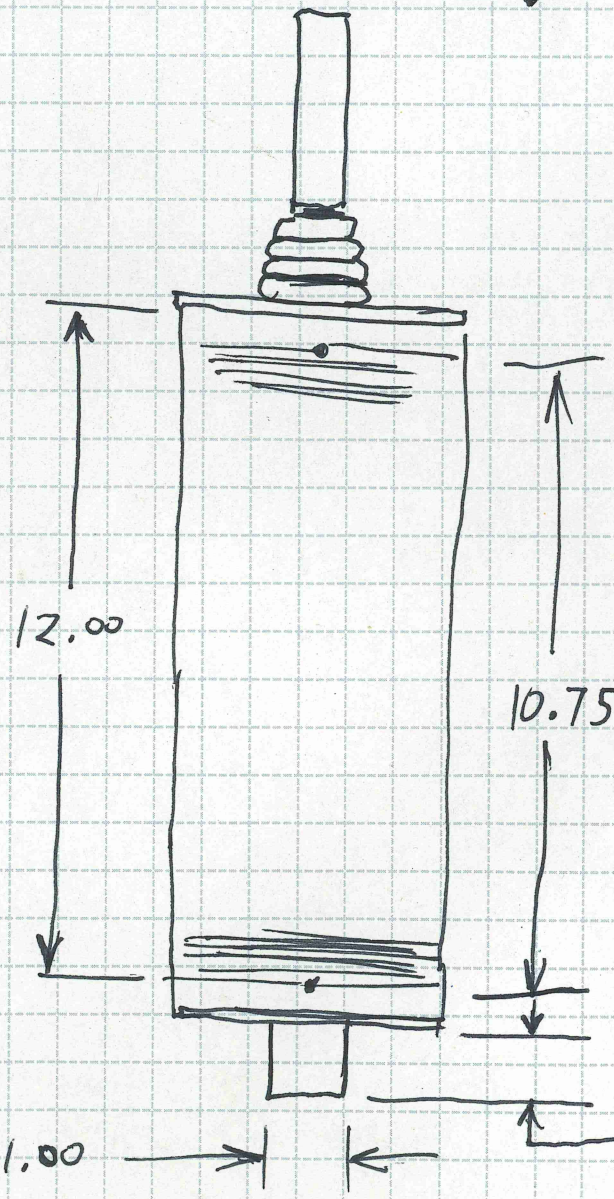
FIGURE 4

#2 H.D. MODEL 1 6/28/07

SECONDARY COIL SPECS.

SEC. Ω = 25.0

SEC. WIRE O.D. = 0.018

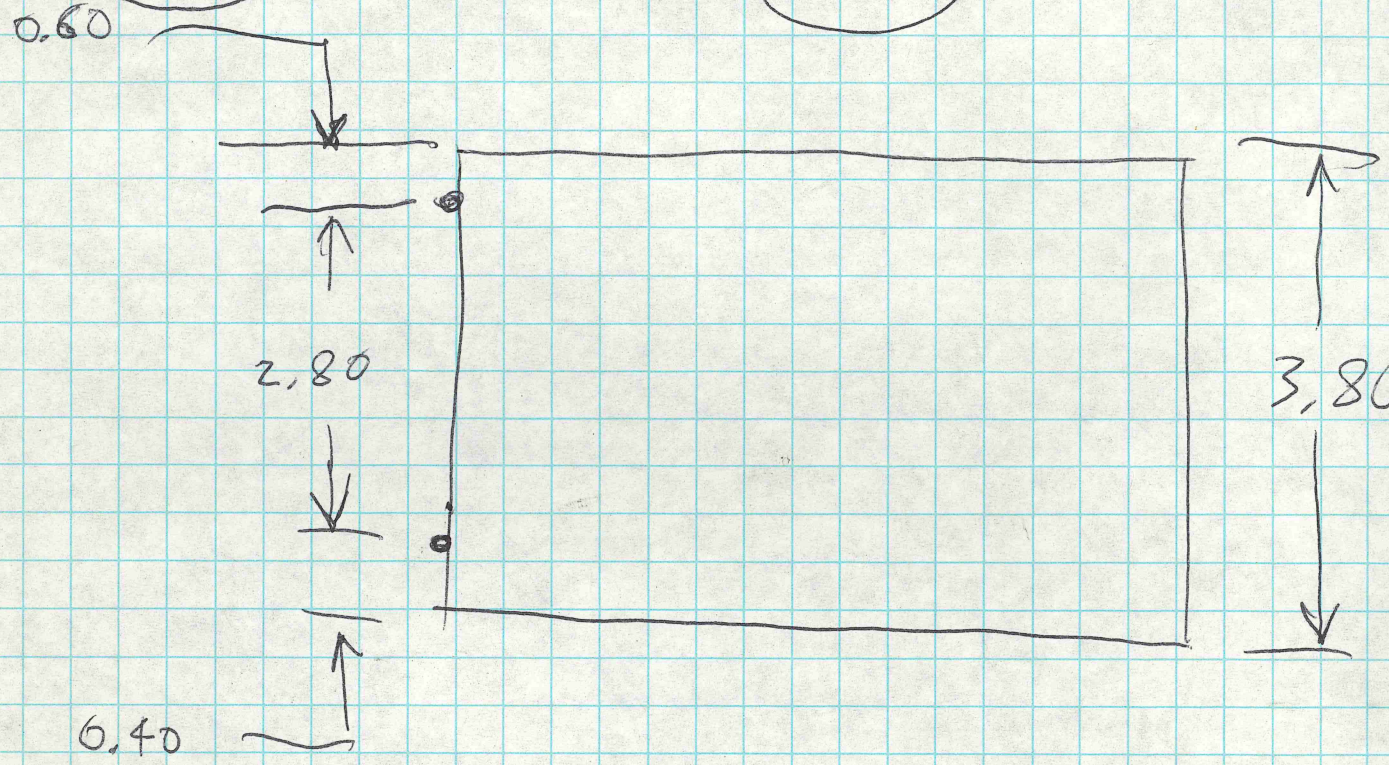


CAP = 0.0025 MFD
w/ 7.5" TOROID

4/25/02

H.D. #1016

#12 AWG WIRE @ .140" X 20 TURNS = 2.8"



TOPS FORM 3314
LITHO IN U. S. A.

10/16/08 #12AWG = 0.130 O.D.

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A passion for performance.

www.aeroflex.com

#2 H.D. MODEL 1 COIL 6/23/07
VERSION

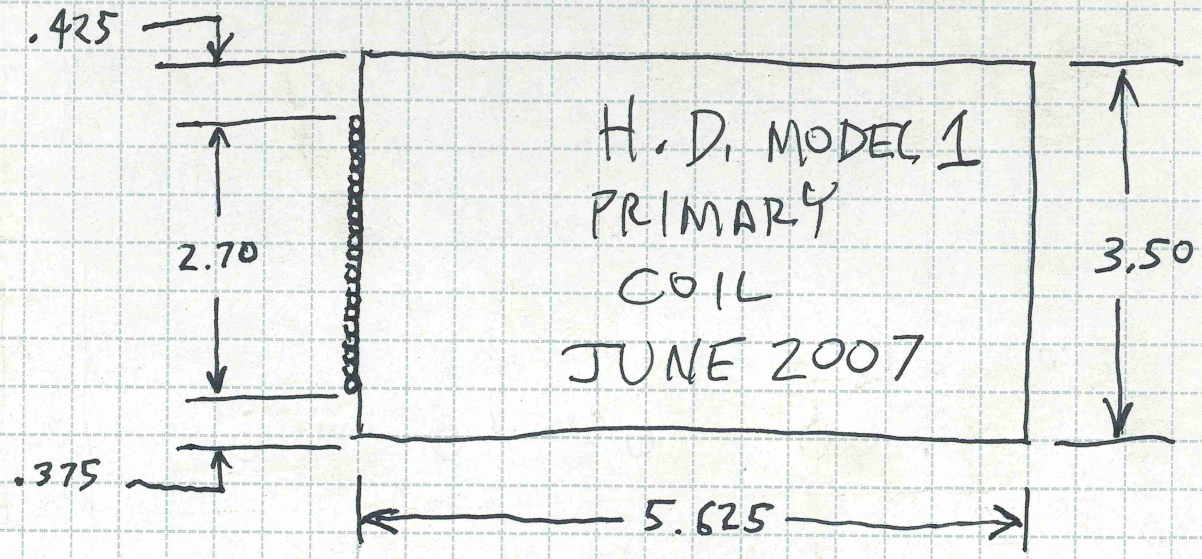
PRI. COIL FORM DIA. = 5.625

#12 AWG PRI. WIRE = 0.135 O.D.

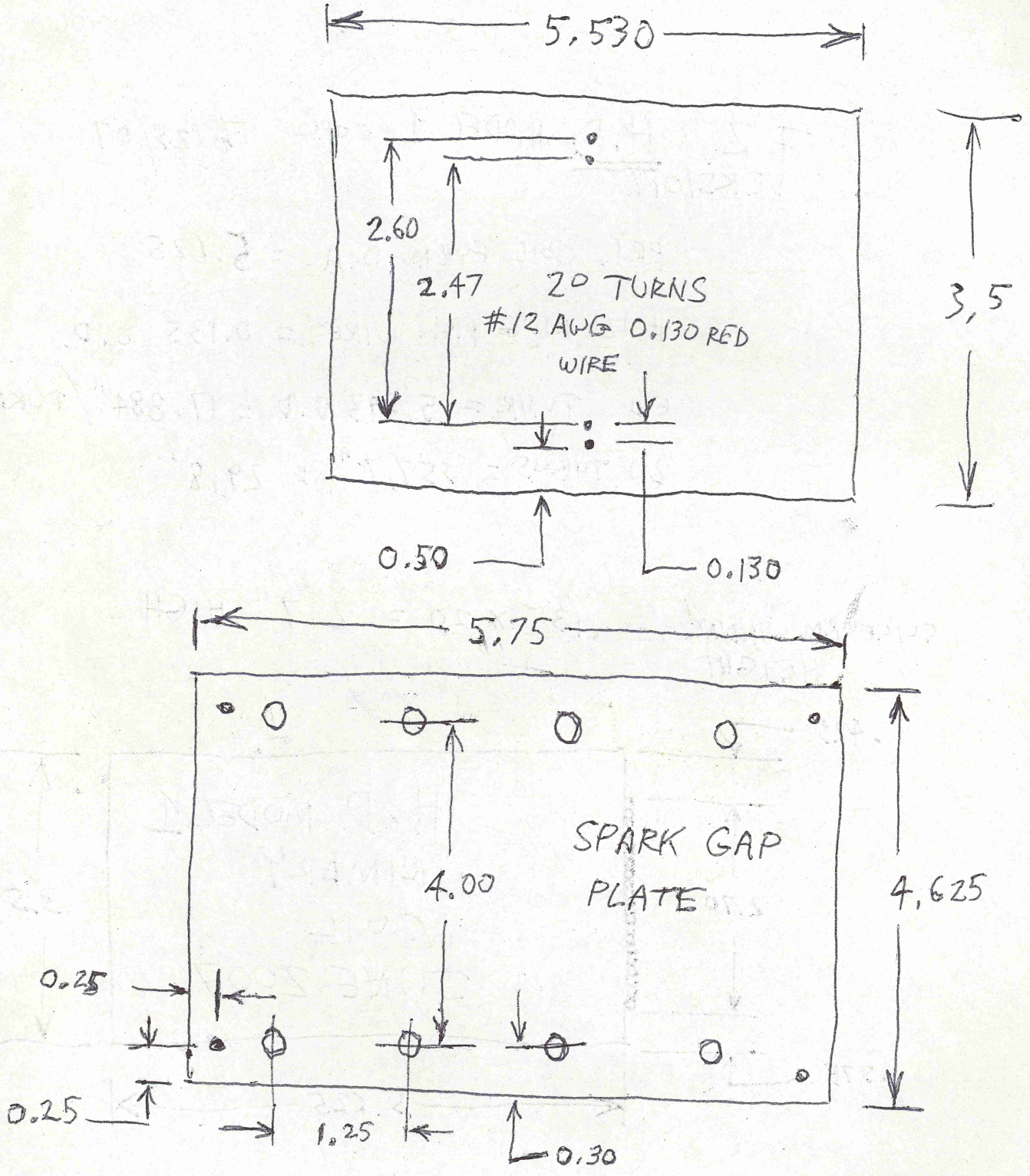
EA. TURN = 5.693 O.D. = 17.884"/TURN

20 TURNS = 357.7" = 29.8'

COILFORM WINDING HEIGHT = .135 × 20 = 2.7" HIGH



H.D. MODEL 1 10/16/08

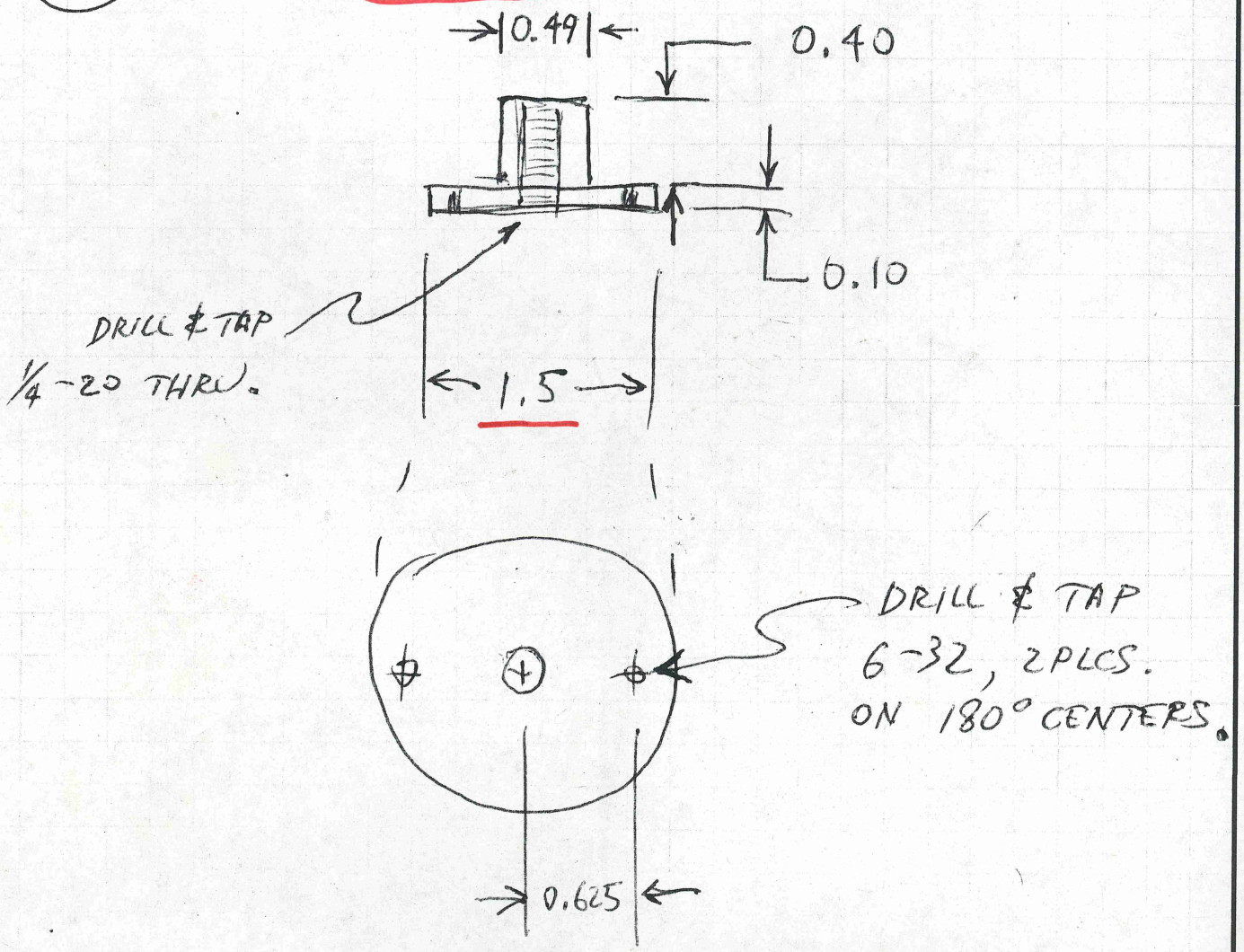


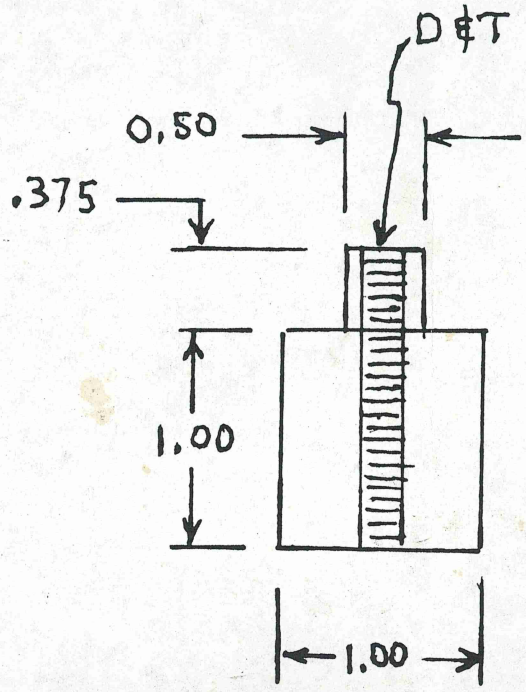
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~~8/18/03~~ JIM SHAFFER ~~PAGE 4 OF 4~~

(7) MAKE ~~8~~ EA. 5/13/09 BRASS FLANGES

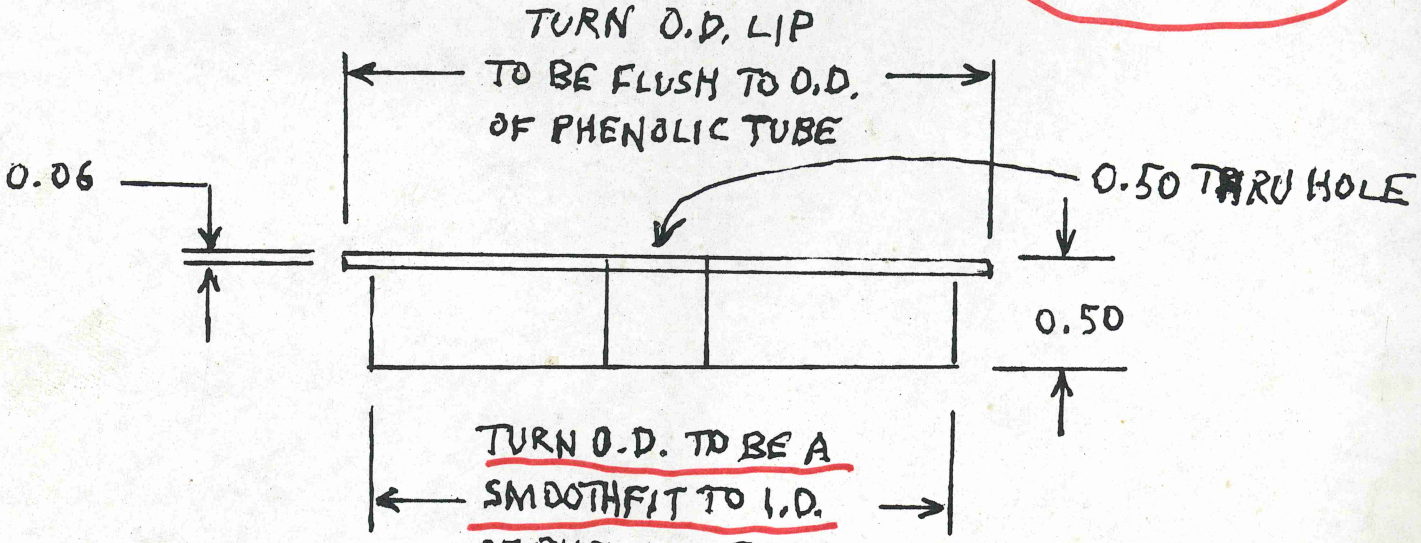




1" BRASS ROUND STOCK
BRIGHT FINISH

MAKE 4 EA.

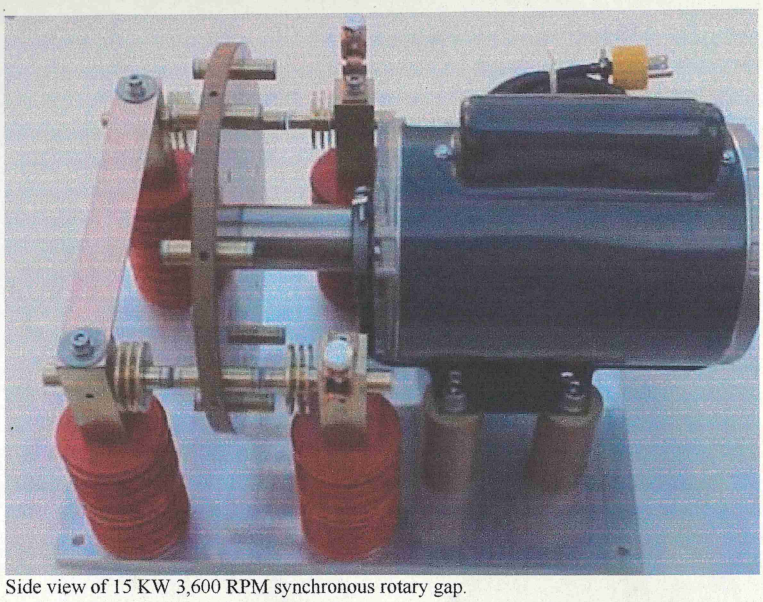
PHENOLIC END CAP
MAKE 8 EA.



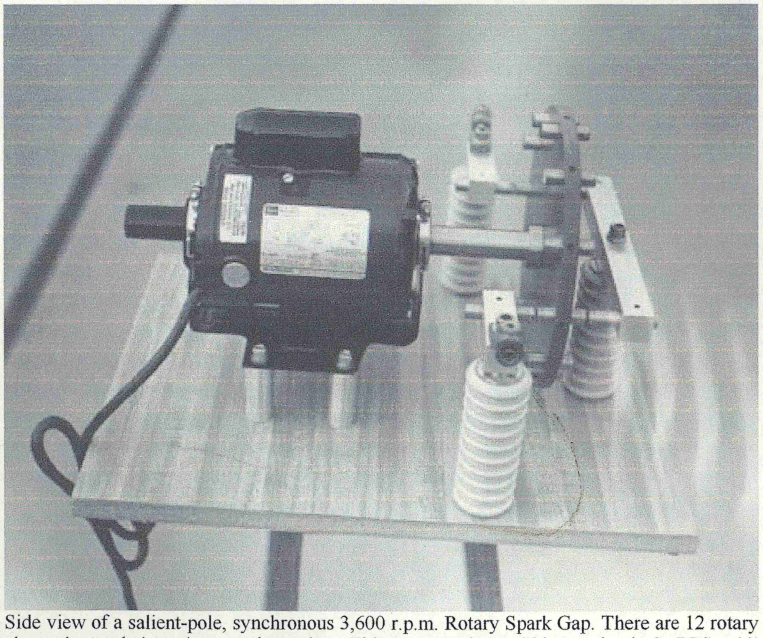
PHENOLIC SECONDARY COIL
END CAP
MAKE 6 EA.

5/13/09
~~12/3/08~~
~~9/10/08~~

Front view of 15 KW 3,600 RPM synchronous rotary gap.

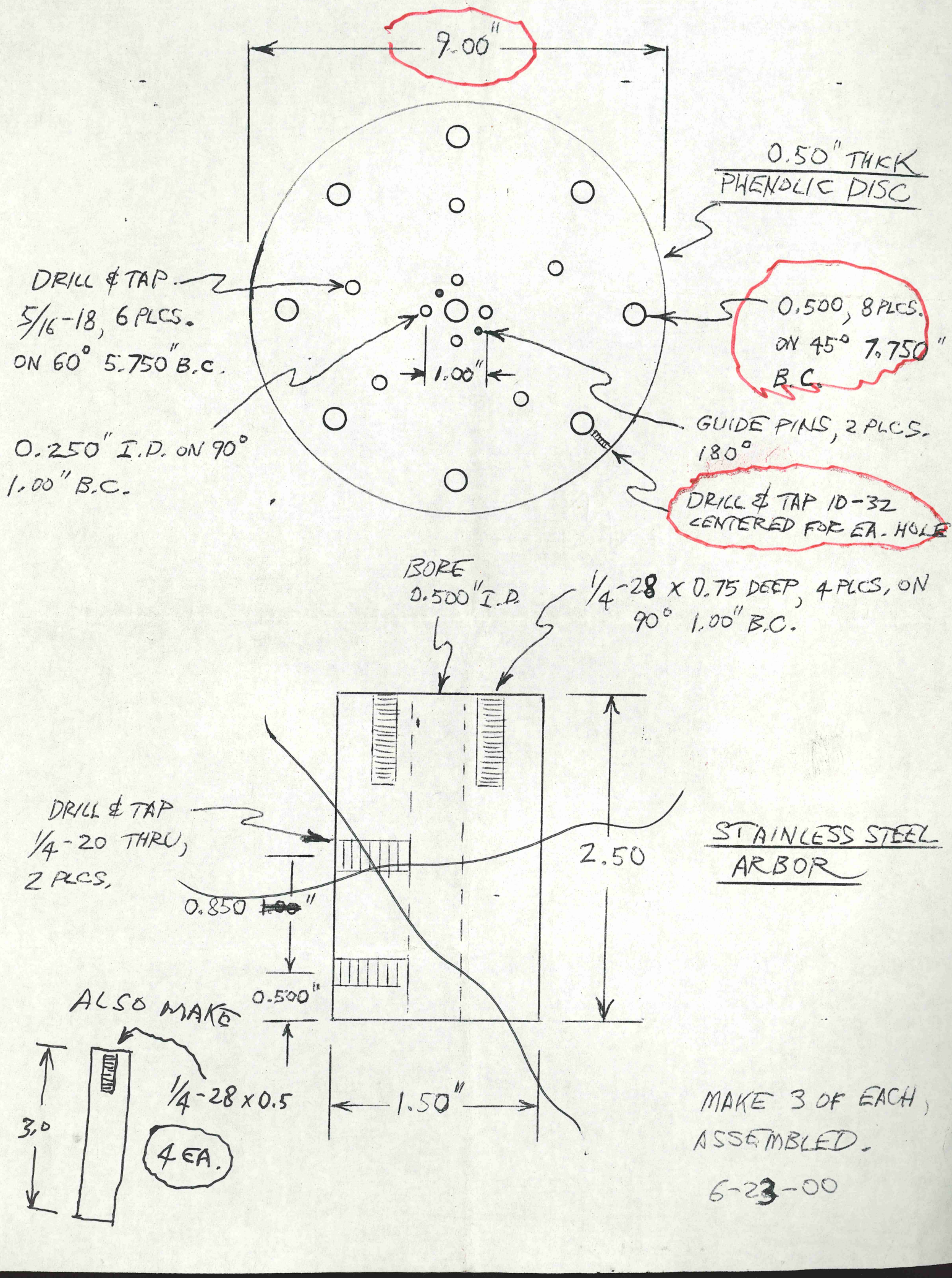


Side view of 15 KW 3,600 RPM synchronous rotary gap.



Side view of a salient-pole, synchronous 3,600 r.p.m. Rotary Spark Gap. There are 12 rotary electrodes and 4 stationary electrodes. This gap produces 720 (mechanical) BPS. All electrode faces are 2 percent thorium alloy, 0.500" diameter tungsten screw-in (replaceable) units.




9.00"
0.50" THKK
PHENOLIC DISC
DRILL & TAP
5/16-18, 6 PLCS.
ON 60° 5.750" B.C.
0.500, 8 PLCS.
ON 45° 7.750"
B.C.
1.00"
0.250" I.D. ON 90°
1.00" B.C.
GUIDE PINS, 2 PLCS.
180°
DRILL & TAP 10-32
CENTERED FOR EA. HOLE
BORE
0.500" I.D.
1/4-28 x 0.75 DEEP, 4 PLCS, ON
90° 1.00" B.C.
DRILL & TAP
1/4-20 THRU,
2 PLCS.
2.50
STAINLESS STEEL
ARBOR
0.850"
0.500"
ALSO MAKE
1/4-28 x 0.5
3.0
4 EA.
1.50"
MAKE 3 OF EACH,
ASSEMBLED.
6-23-00

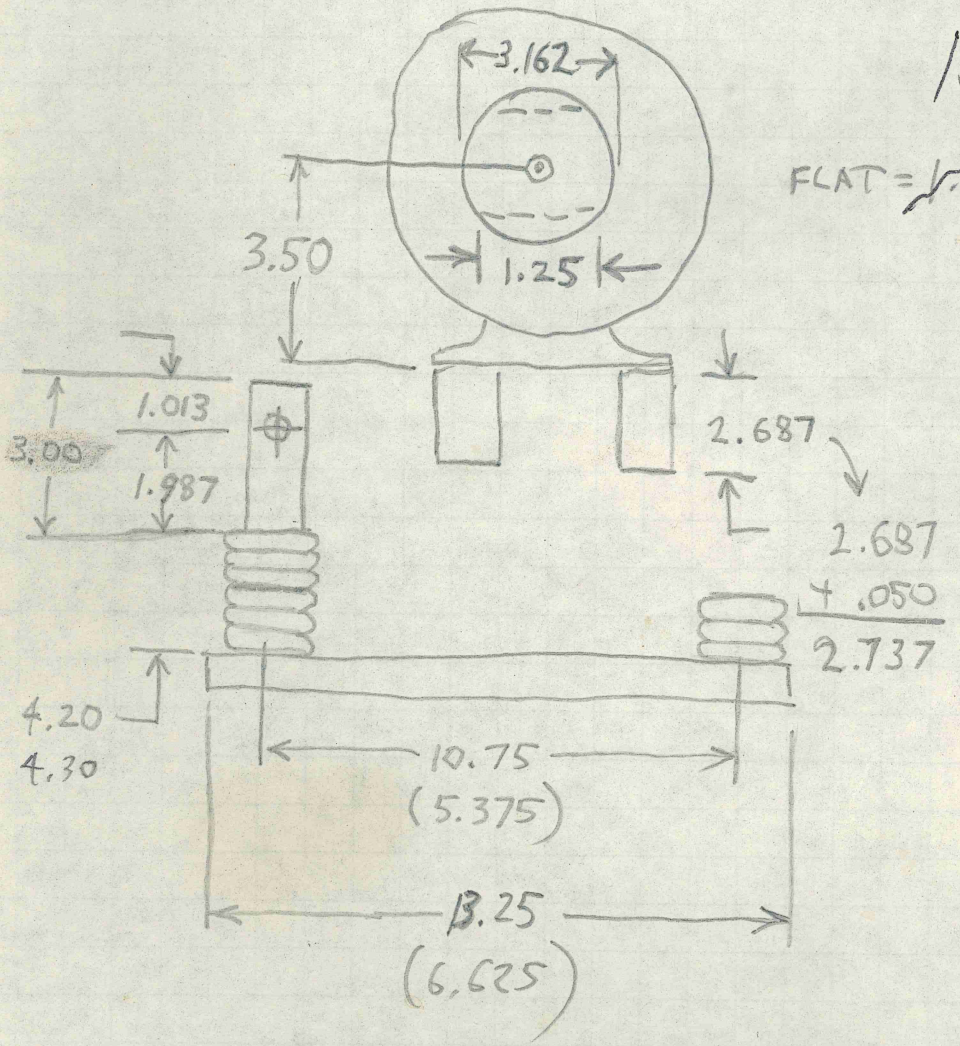
9-25-00

MARCO DELENCOLAI

(HUT) UNIV. OF HELSINKI - FINLAND

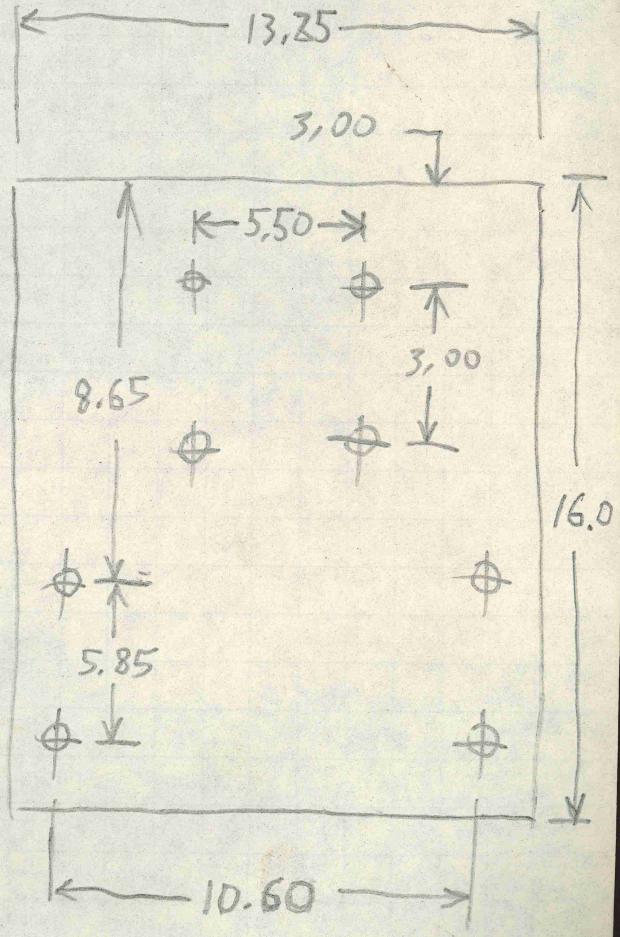
3,000 RPM SYNC, ROT. GAP 50HZ 15KVA

MOTOR: LEESON NEMA-56 RIDGID MOUNT 0.625" SHAFT
MODEL # C6C28DB26C 1 H.P.



1.10"

FLAT = ~~1.25"~~ = KNEE



1.495

6.187

.895

5/9/94

MODEL 13M SPARK GAP DWELL TIME

ASSUME ROTARY ELECTRODES = 24" B.C. = 75.398224" CIRCUM.

AT 60 RPS • C = $\frac{4,523.893422 \text{ IN.}}{\text{SEC.}}$

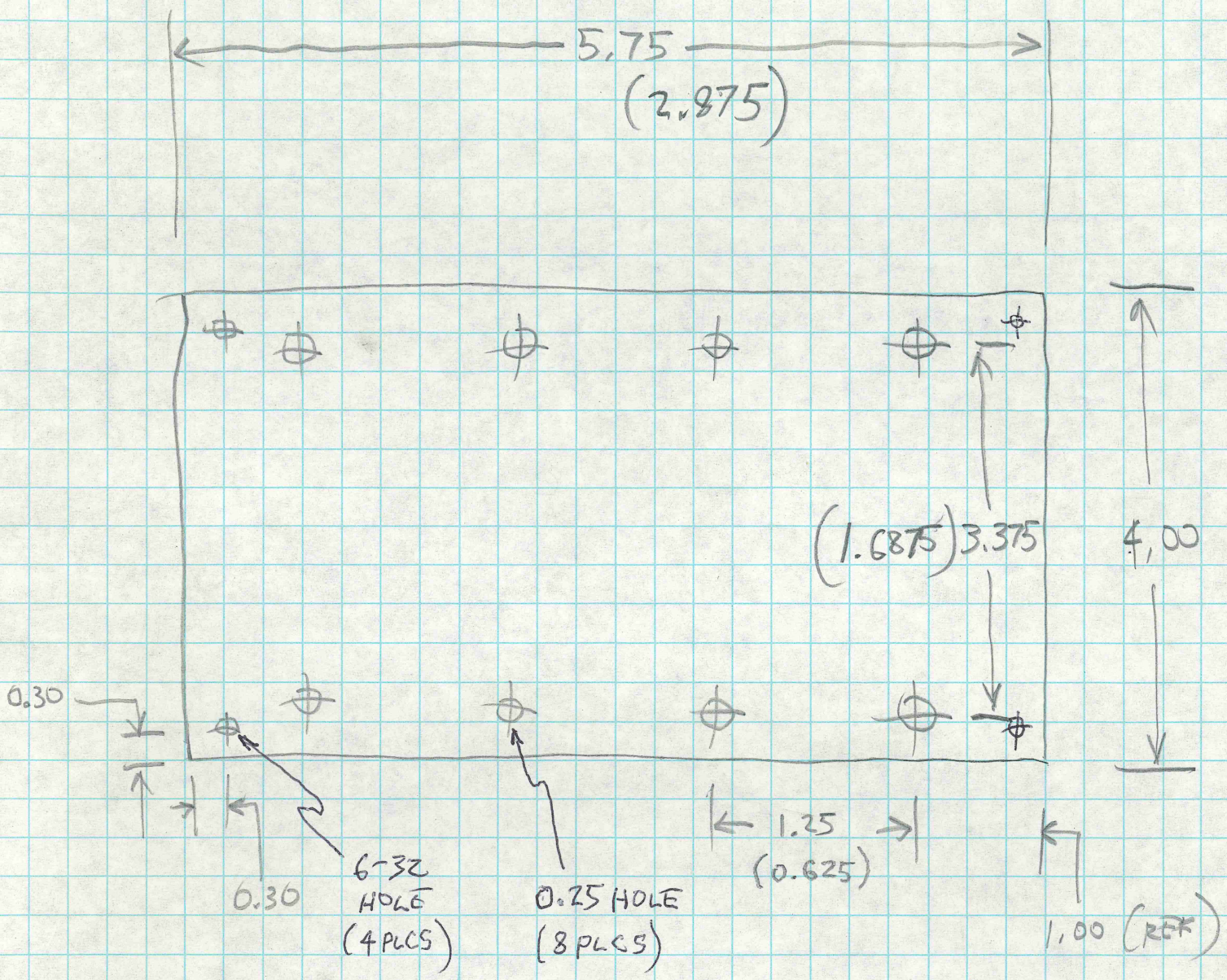
LINEAR VELOCITY = $\frac{.004524 \text{ IN.}}{\mu\text{SEC.}}$

WHICH = $\frac{.067858 \text{ IN.}}{15\ \mu\text{SEC.}}$

= $\frac{0.5424 \text{ IN.}}{100\ \mu\text{SEC.}}$

= $\frac{0.2262 \text{ IN.}}{50\ \mu\text{SEC.}}$

THOMAS MANNING H.D. MODEL 1 COIL 4/16/02

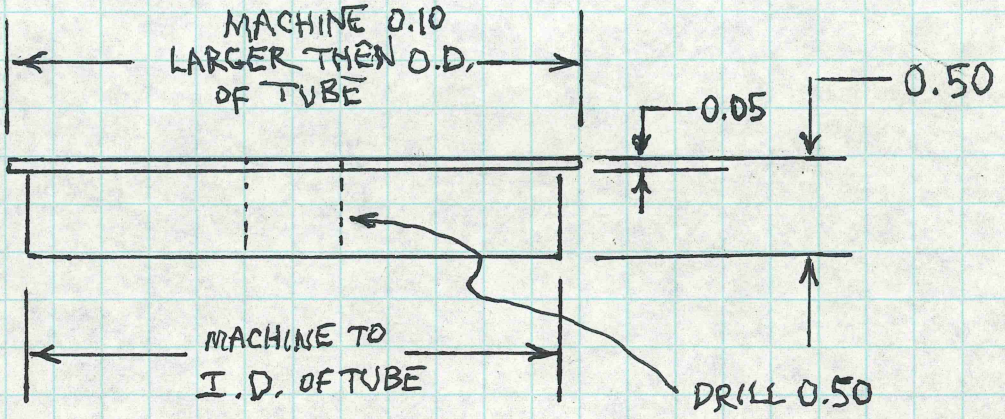


14 CM X 8.5 CM SALGADOSA

TOPS FORM 3314
LITHO IN U. S. A.

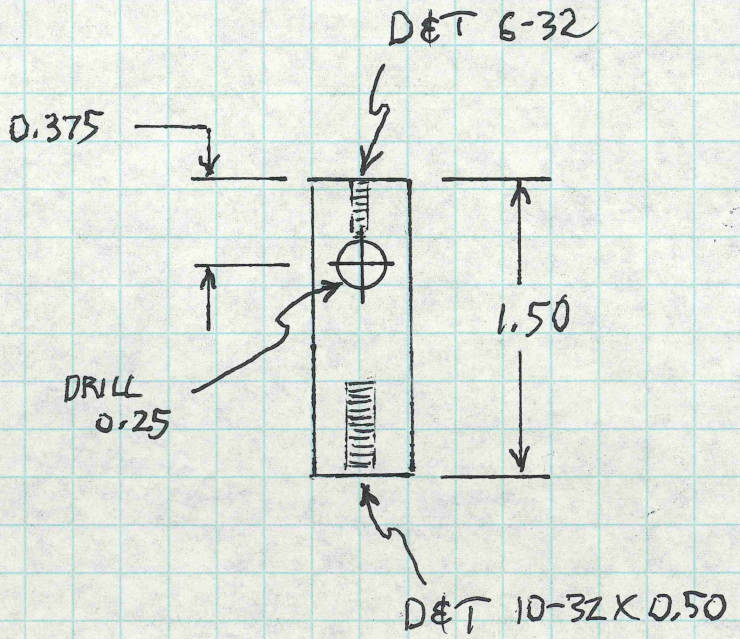
10/4/05

MAKE 4 EA.
PHENOLIC



MAKE 16 EA.

BRIGHT FINISH
ROUND BRASS
ELECTRODE
HOLDER

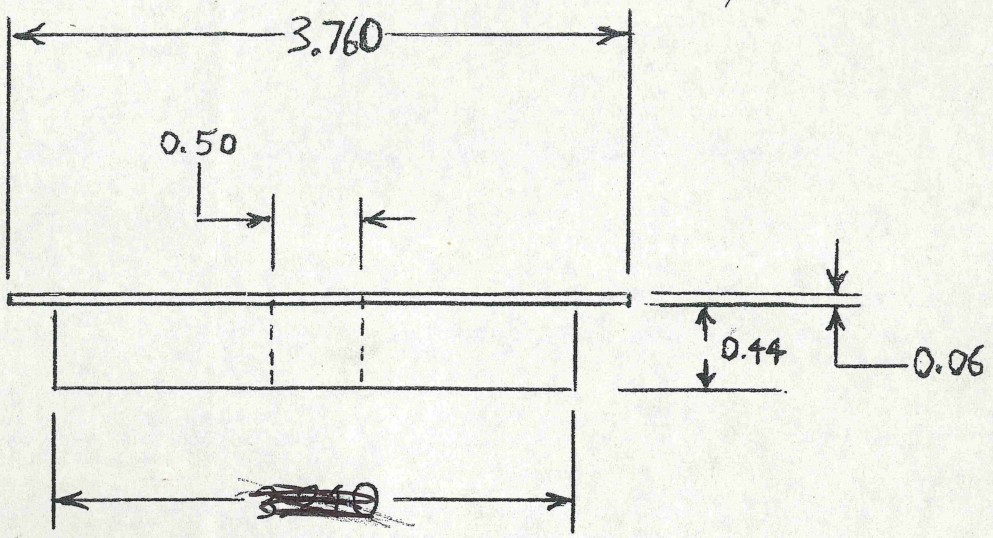


3/16/05

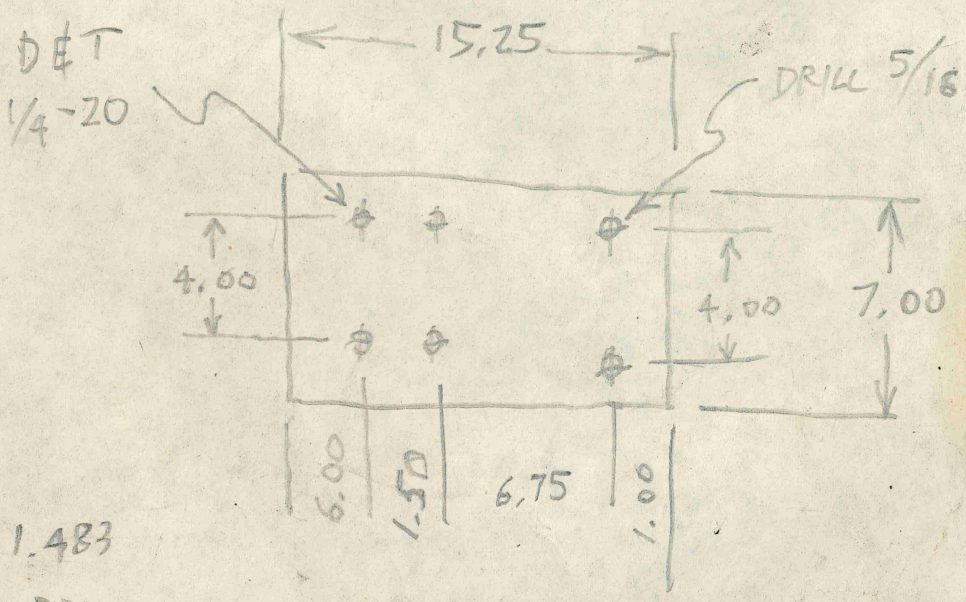
MODEL 1 SECONDARY
PHENOLIC CAPS

~~02~~

MAKE 8 PCS.



~~3.240~~
3.250



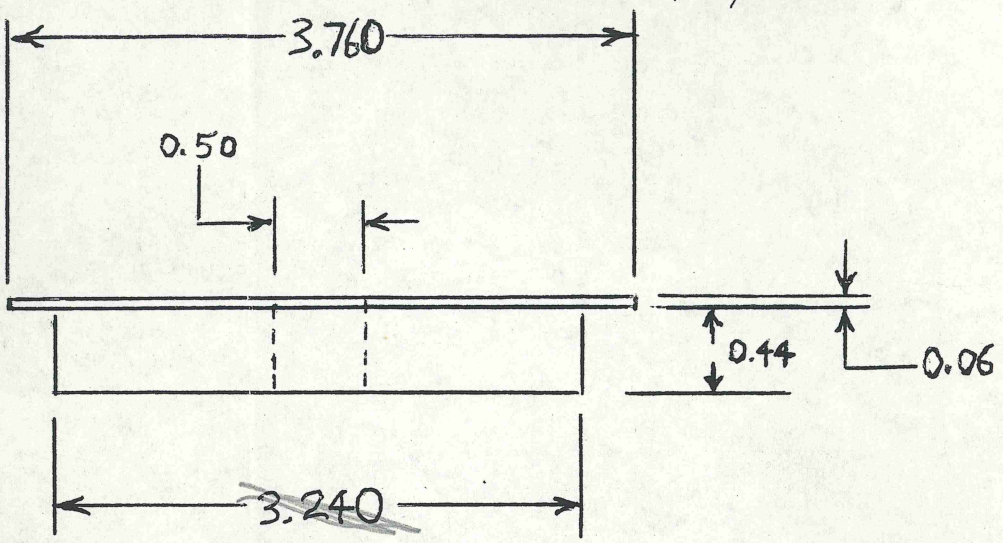
1.483

.303

MODEL 1 SECONDARY
PHENOLIC CAPS

2/11/02

MAKE 6 PCS.

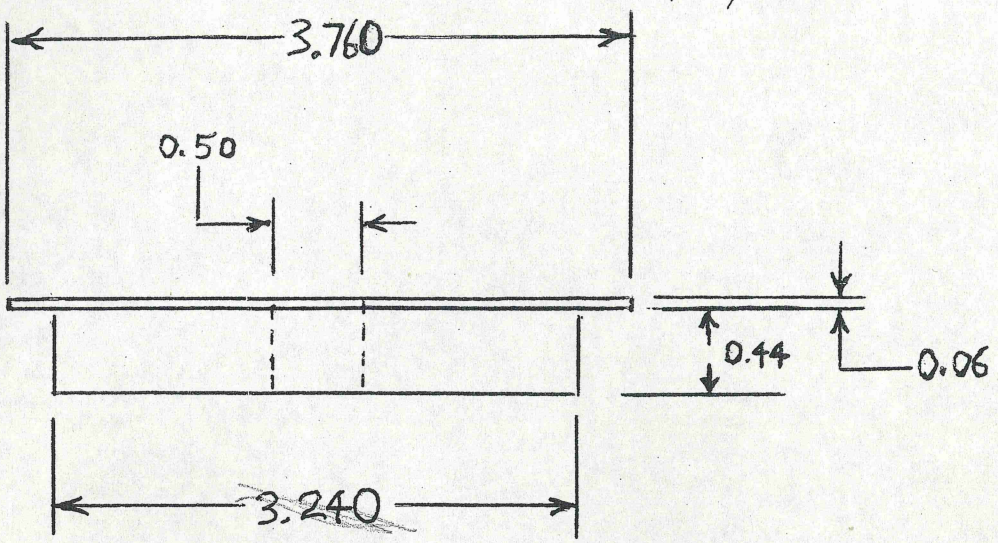


3.250

MODEL 1 SECONDARY
PHENOLIC CAPS

2/11/02

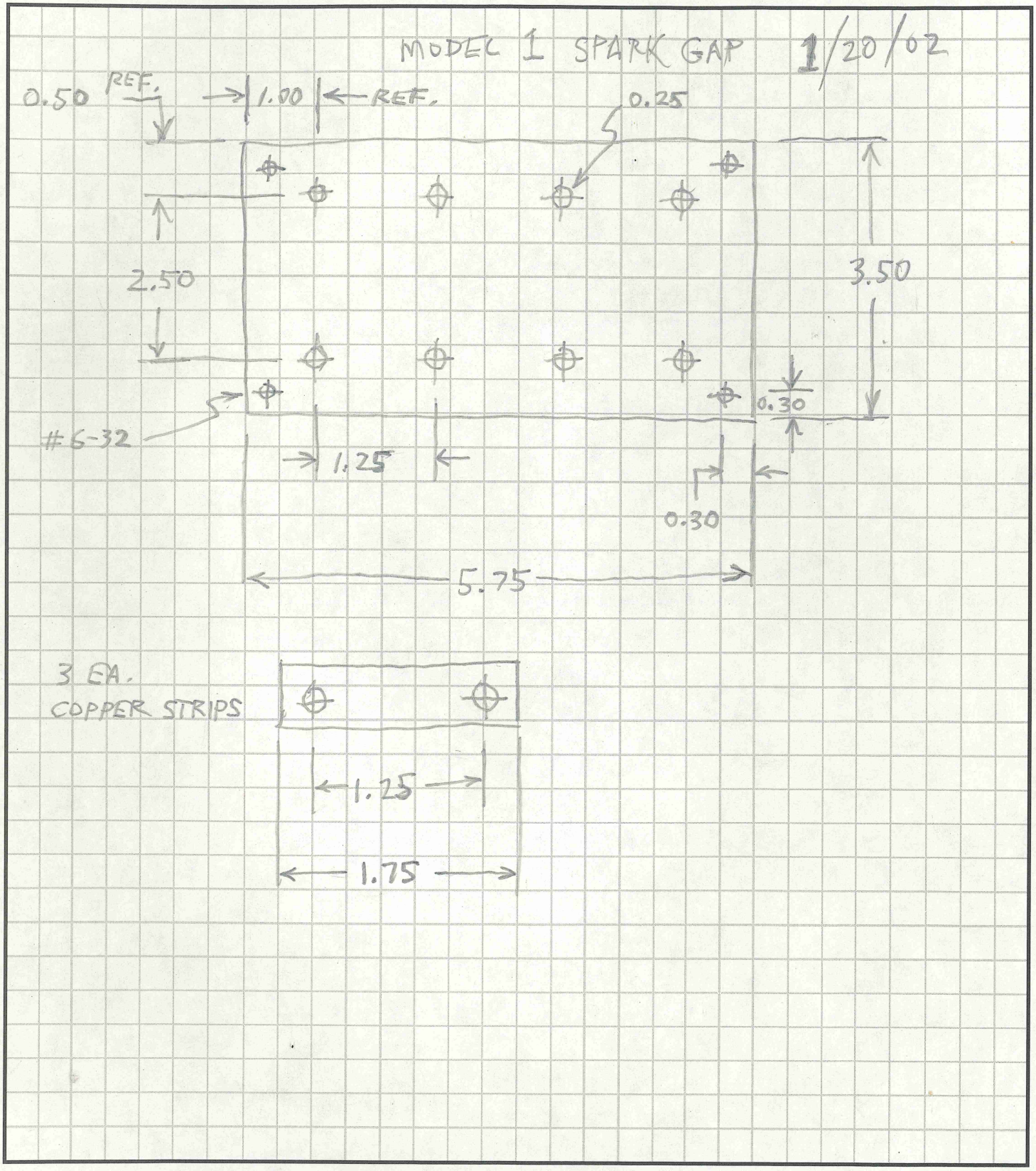
MAKE 6 PCS.



3.250

AEROFLEX LINTEK

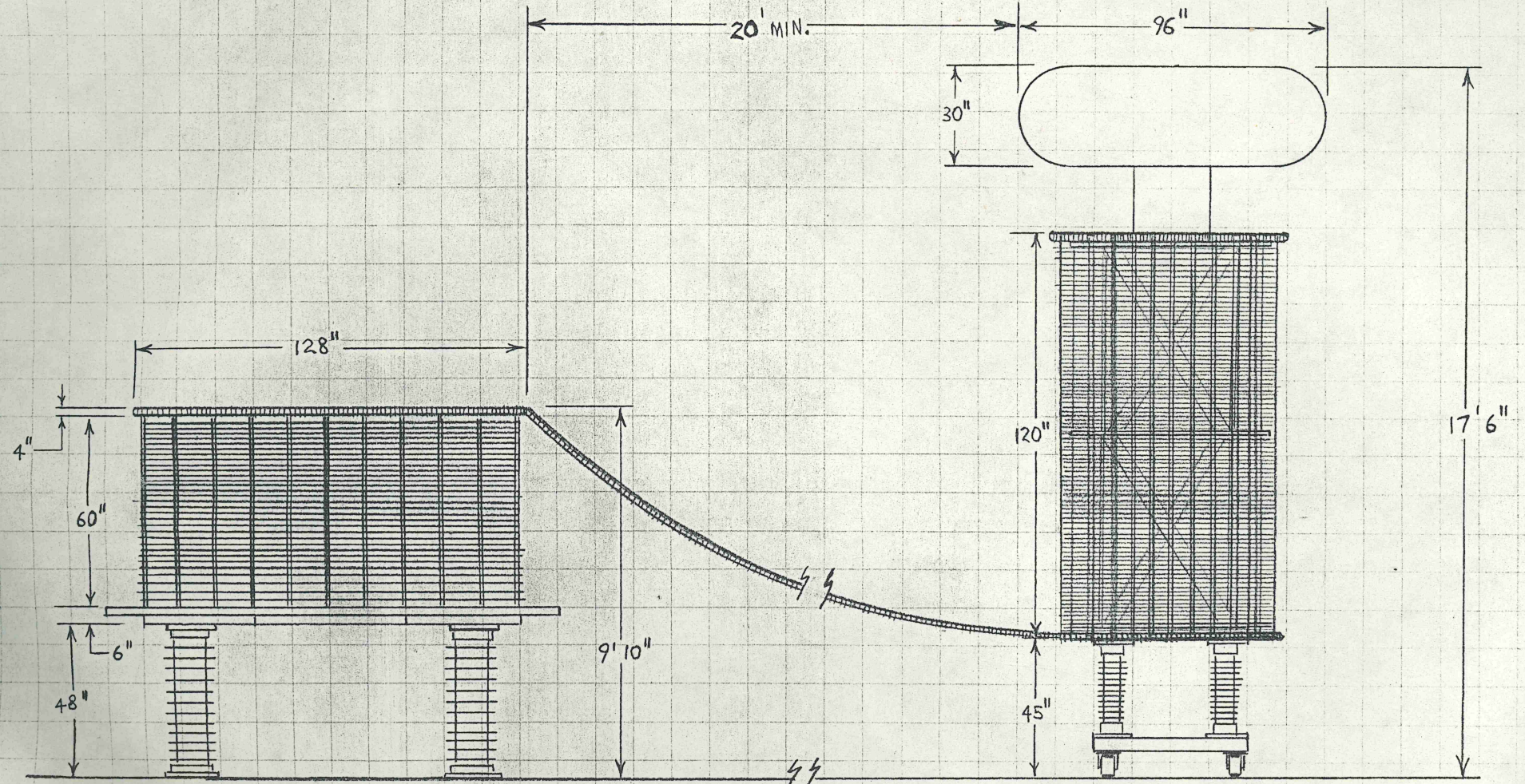
383 N. Liberty Road • Powell, Ohio 43065 Phone: (614) 888-2700 • Fax: (614) 888-4778



TESLA TECHNOLOGY RESEARCH

MODEL 13M MAGNIFIER
TESLA COIL SYSTEM
10 MEGAVOLT

4-13-94



PRIMARY/SECONDARY

APPROX. 1,500 LBS.

MIN. 360° CLEARANCE FROM CENTER: 12'

0 4 8

SCALE, FEET

EXTRA COIL ASSY

APPROX. 1,200 LBS.

MIN. 360° CLEARANCE FROM CENTER: 40'

(1) THE REASON IS YOU

(2) DAVID GRAY

MODEL 1 T.C.

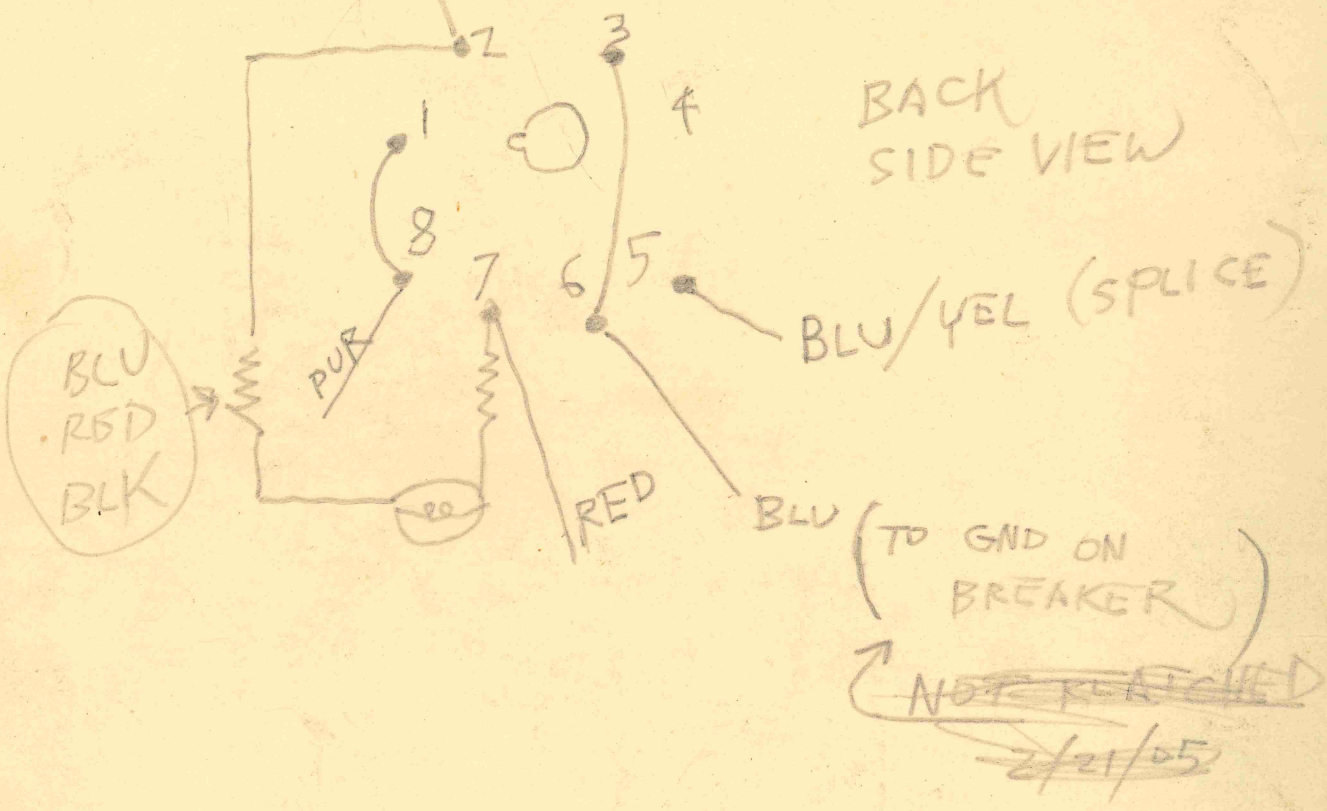
SYSTEM 2

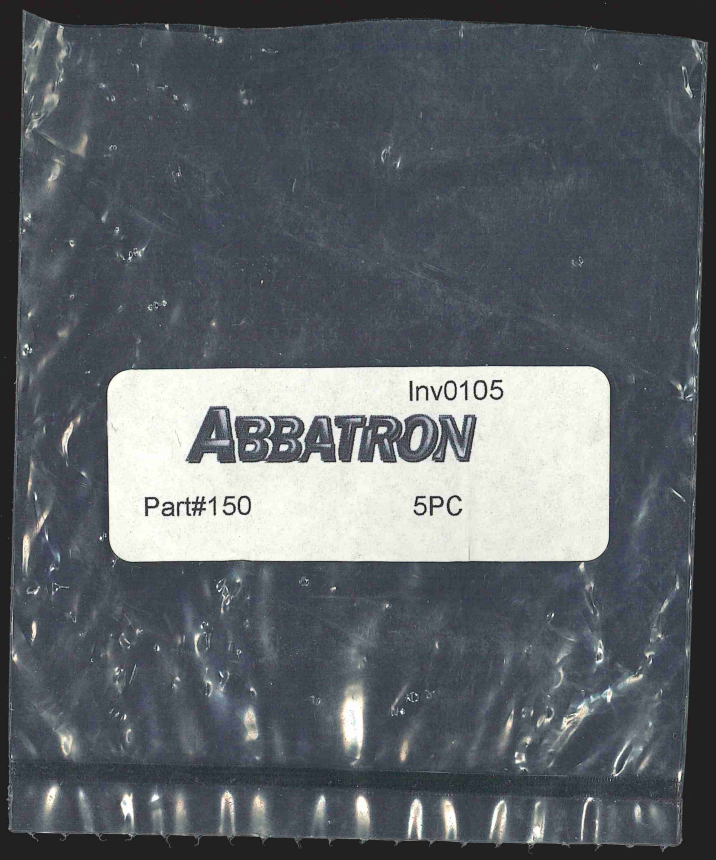
K5

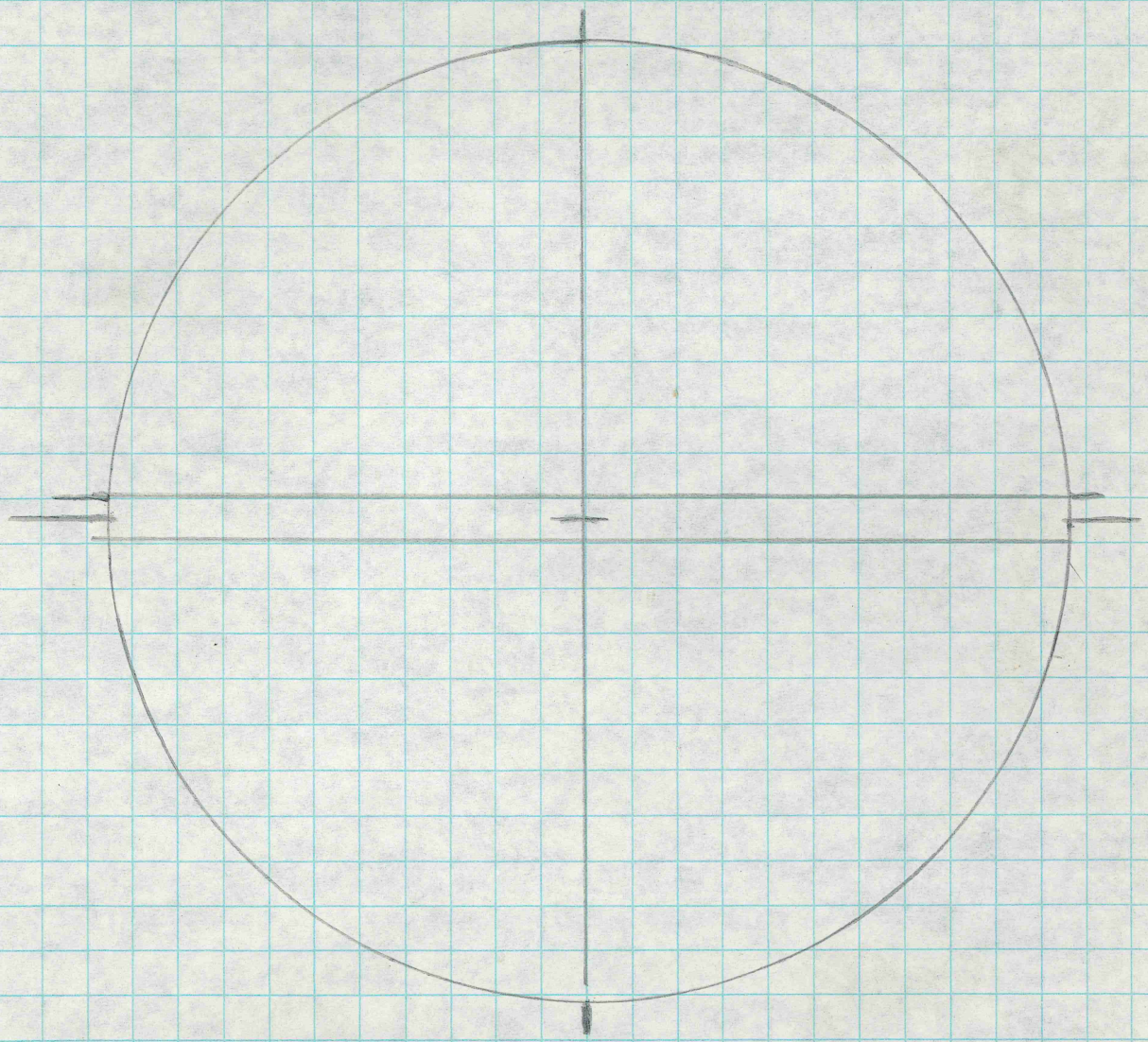
HV ON

UNIVERSAL
EARTH QUAKE

2/21/05
REPAIR

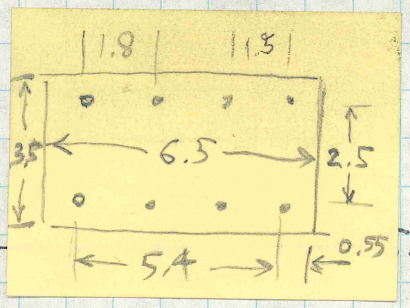


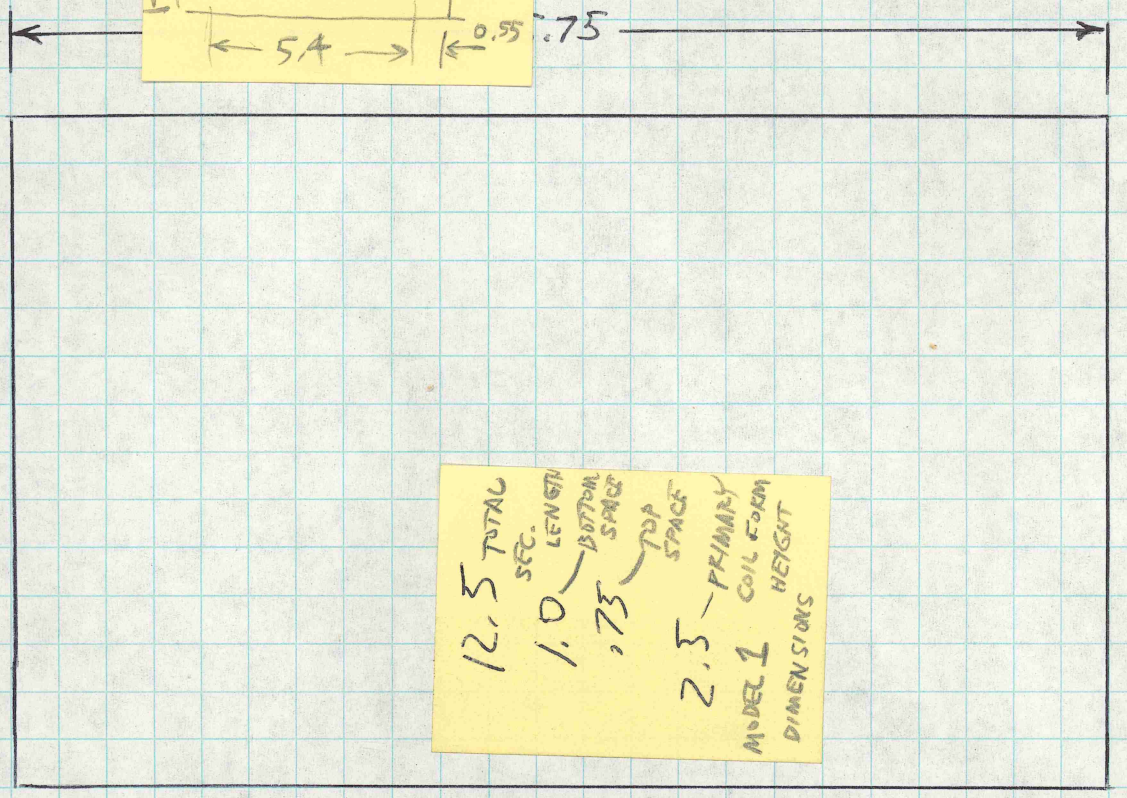

Inv0105
ABBATRON
Part#150
5PC



TOPS FORM 3314
LITHO IN U. S. A.

2/9/01





1/4" THICK MODEL 1 PHENOLIC SPARK GAP PLATE

TOPS FORM 3314

MODEL 1 COIL

BEIJING, CHINA
7/30/04

SEC. COIL D.C. RESISTANCE = 40.0 Ω

COIL FORM: 12.75" LONG O.A.

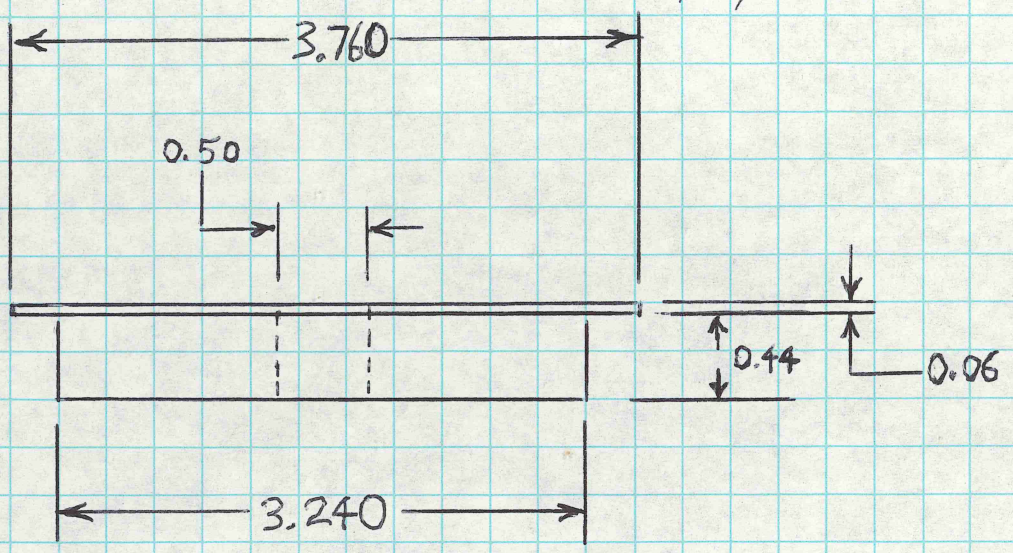
WINDING LENGTH: 11.5" O.A.

COIL DIA. = 3.00"

WIRE = 0.015" O.D.

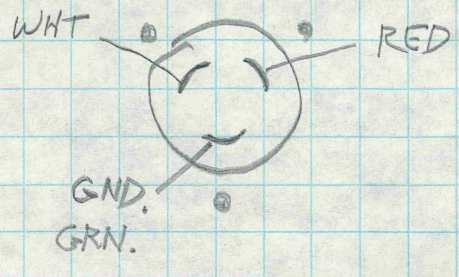
MODEL 1 SECONDARY
PHENOLIC CAPS

2/11/02



TOPS FORM 3314
LITHO IN U. S. A.

OUTSIDE PANEL VIEW
INPUT CONNECTOR



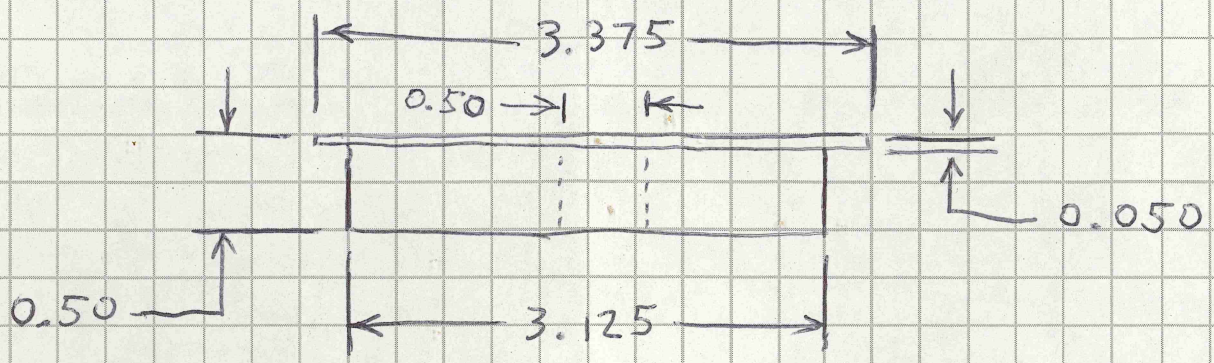
10/17/01

NEW MODEL 5M CONTROLLER

TOPS FORM 3314
LITHO IN U. S. A.

AEROFLEX LINTEK

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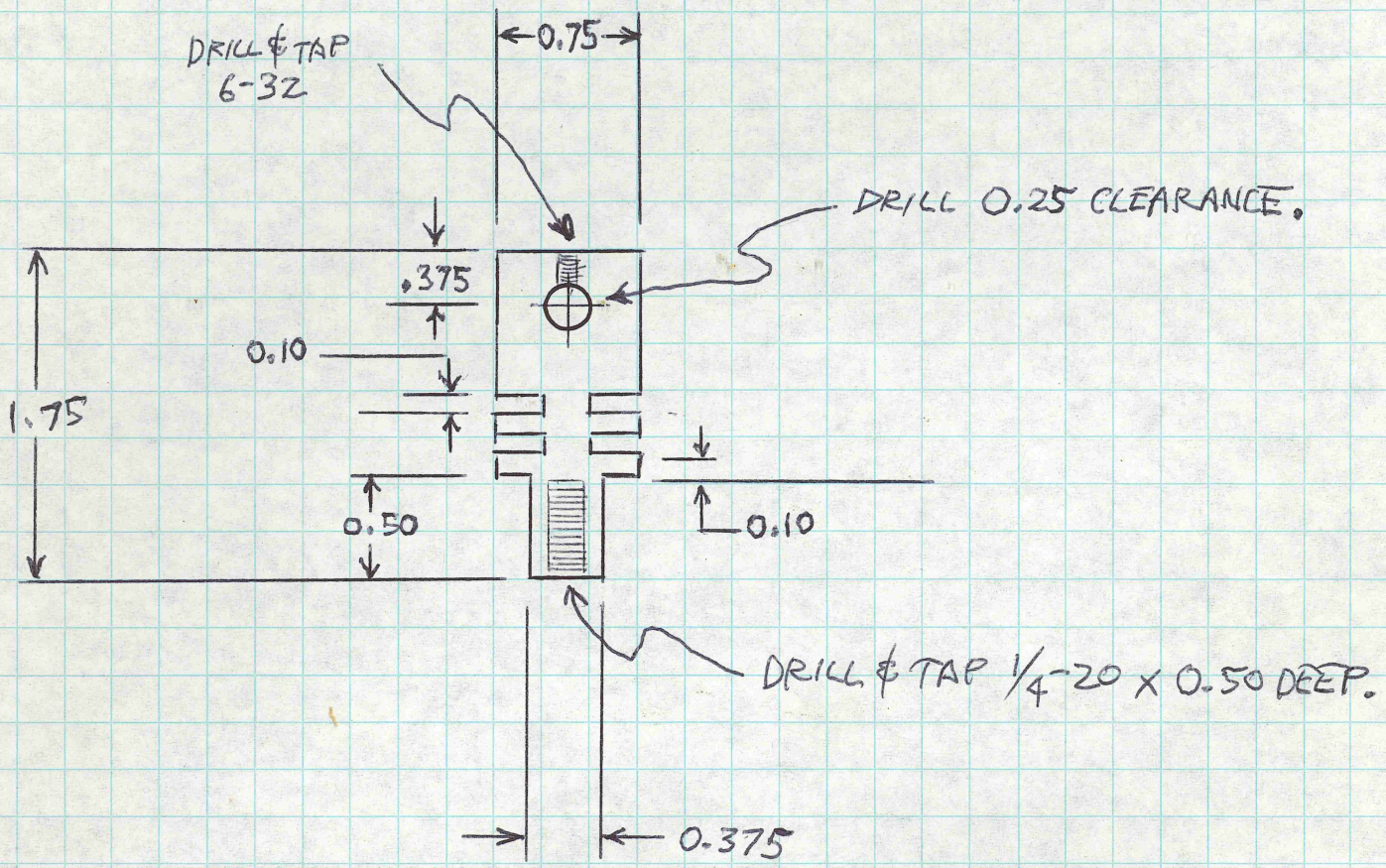


MAKE 4 EA,

SPHERE = 2.050
2.020
2.036
2.011
2.025

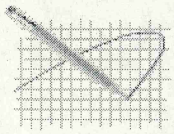
1/12/04

MAKE 8 PCS., BRASS (BRIGHT FINISH).



TOPS FORM 3314
LITHO IN U. S. A.

SALGADOSA 1/15/04
MODEL 1 H.D.



William C Wysock
01/15/2004 04:53 AM

To: salgadosa@inta.es
cc:
cc: William C Wysock <William.C.Wysock@aero.org>, wysock@ttr.com
Subject: Re: malfunctions

Tesla Technology Research

2527 Treelane Ave.

Monrovia, CA 91016-4951

USA

January 15, 2004

SOLD TO:

Antonio Salgado Serrano, PhD

Centro de Astrobiología, CAB
(CSIC-INTA)
carretera de Ajalvir, km. 4
28850 Torrejón de Ardoz
Madrid, Spain

1 EA. Replacement Spark Gap Plate Assembly for Heavy-Duty Model One Tesla Coil.
$50.00 USD

1 EA. Shipping and handling charge
$45.00 USD

This invoice total:
$95.00 USD

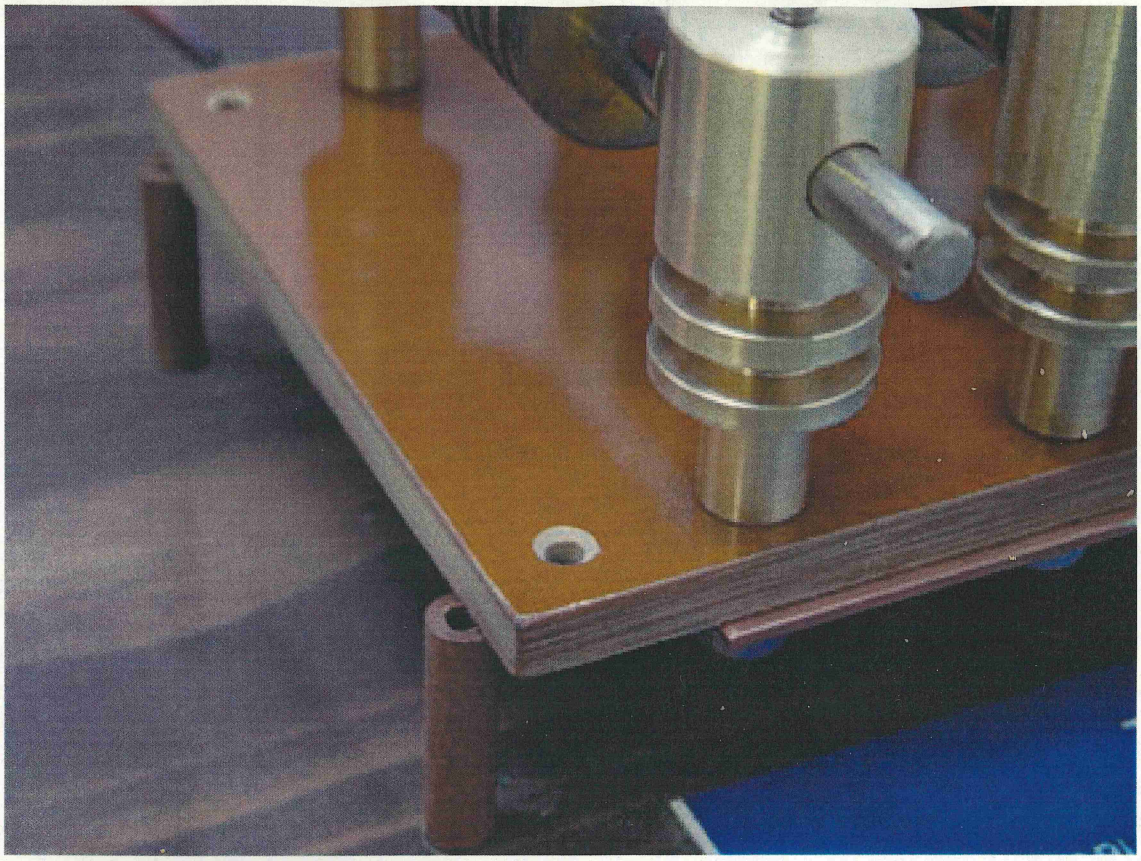
Bill Wysock
salgadosa@inta.es



salgadosa@inta.es
01/13/2004 07:09 AM

To: William C Wysock <William.C.Wysock@aero.org>
cc: wysock@ttr.com
Subject: Re: malfunctions

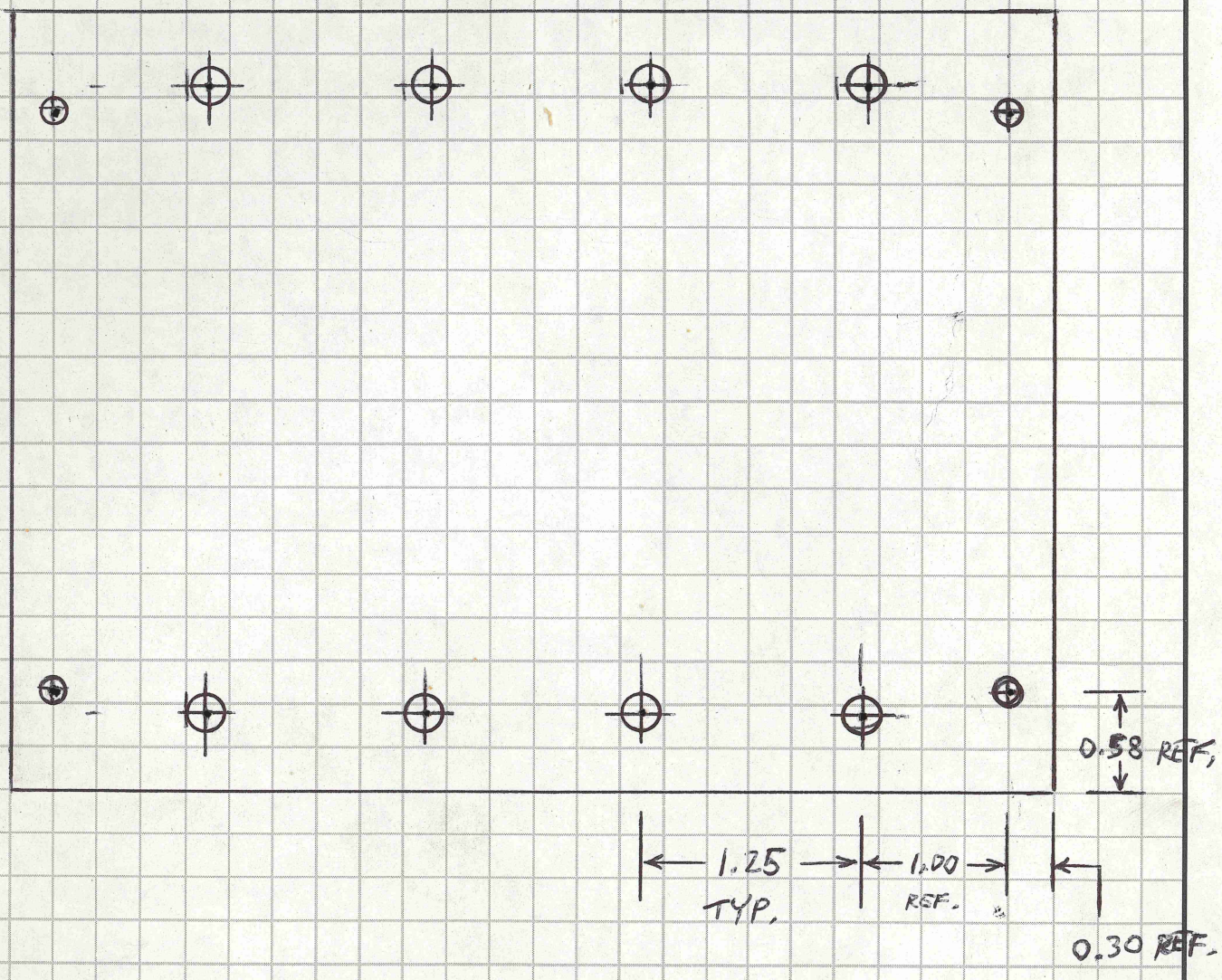
Dear Bill,



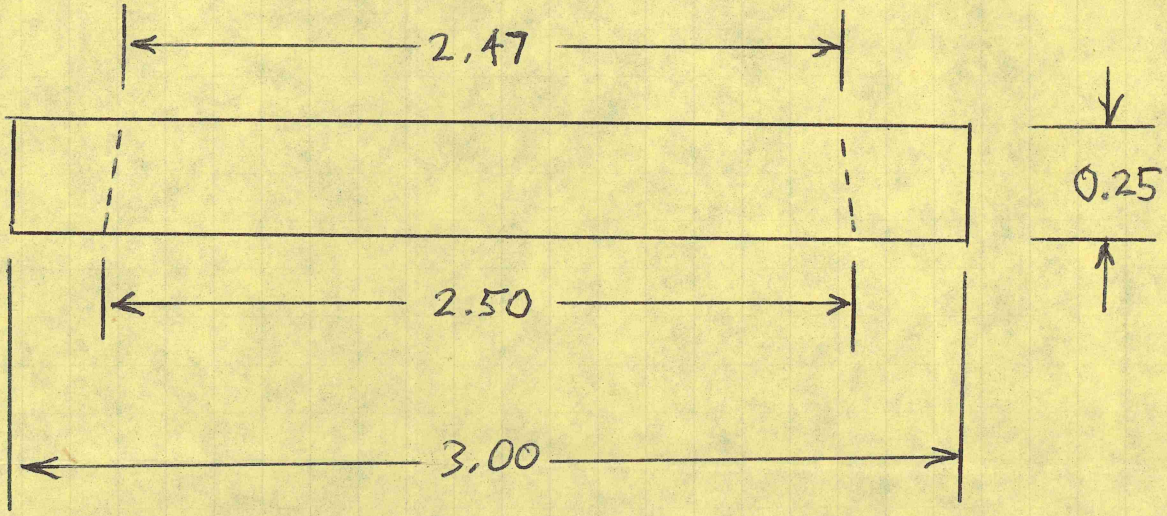
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H-D MODEL 1 T.C, SALGADOSA 2/2/04



MAKE 1 BRASS RING



PURE AIR

800

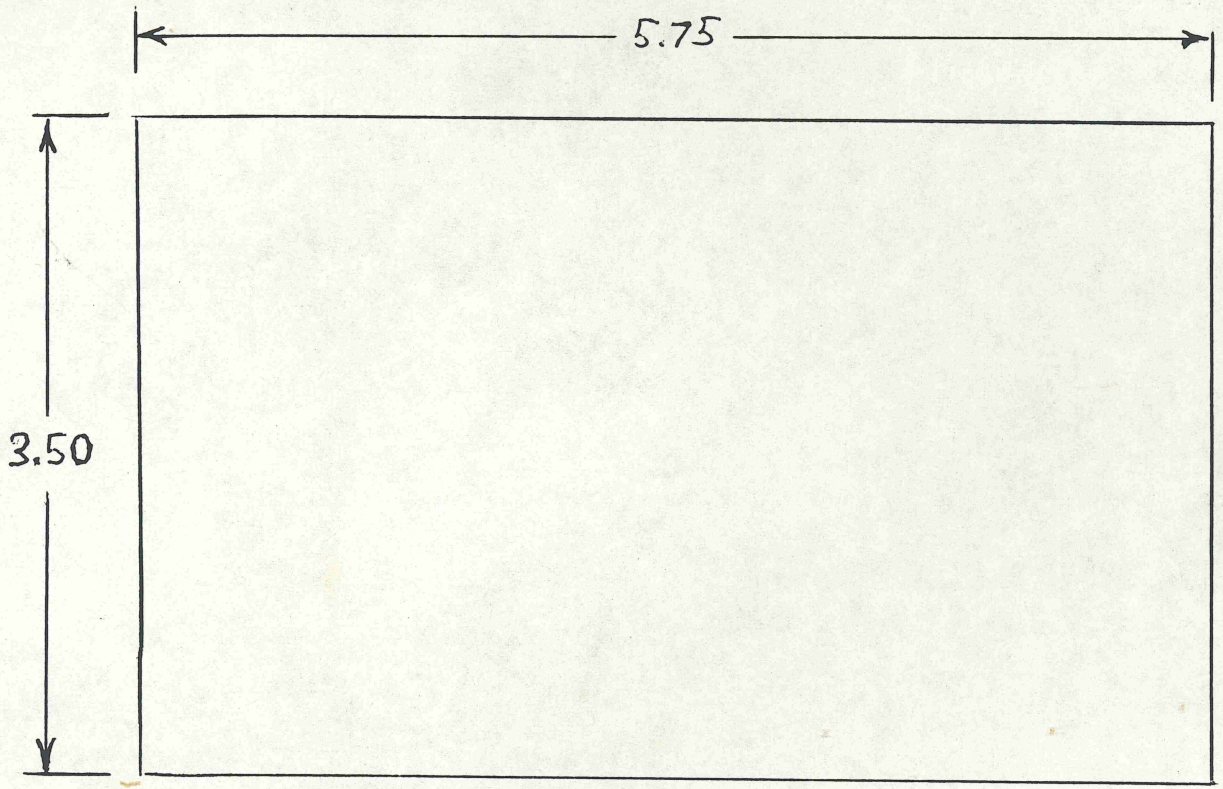
25C 0670

LIVINGAIR-CLASSIC

10,75

1,25

2/9/01



MODEL 1 SPARK GAP 1/4" THICK PHENOLIC BLOCKS

MODEL NINE TESLA COIL SYSTEM

OWNER'S MANUAL

PROFESSIONAL SOUND SYSTEMS

Ultra High Voltage Division

MODEL NINE TESLA COIL SYSTEM

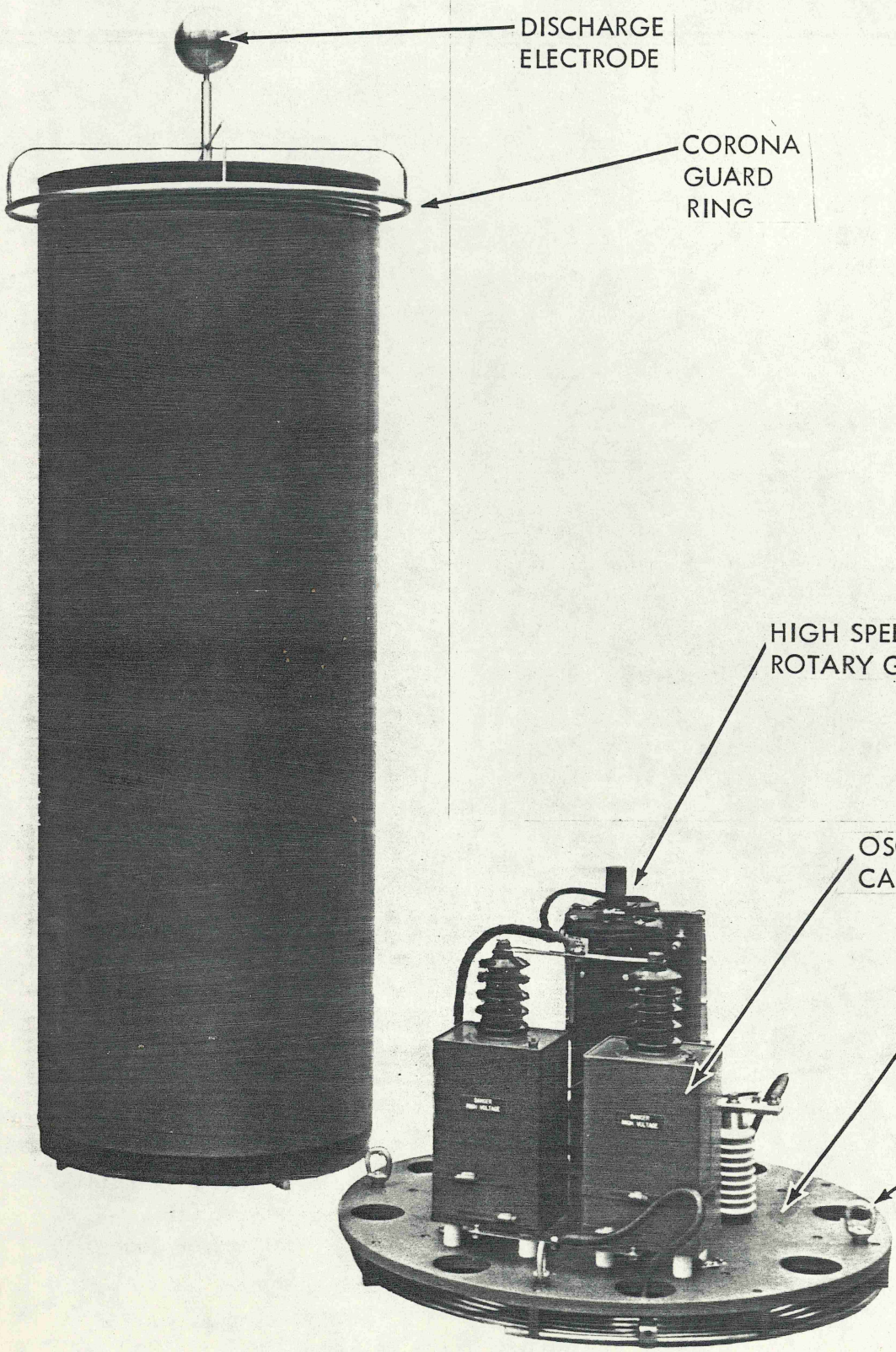
CONTENTS

Page

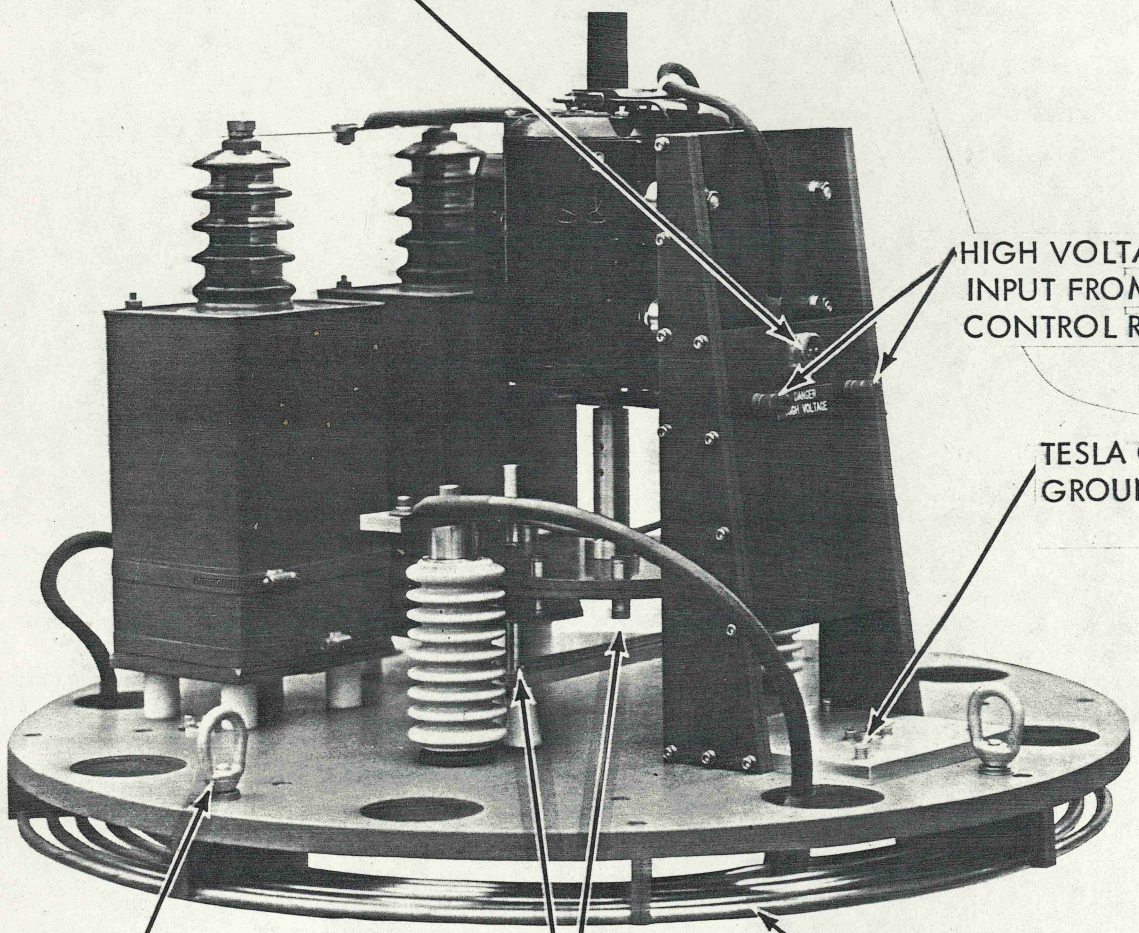
1. MODEL NINE TESLA COIL PICTORIAL DESCRIPTION
2. MODEL NINE TESLA COIL BASE UNIT PICTORIAL DESCRIPTION
3. MODEL NINE TESLA COIL CONTROL RACK PICTORIAL DESCRIPTION
4. MODEL NINE TESLA COIL CONTROL RACK OPERATING CONTROLS
5. MODEL NINE TESLA PRIMARY COIL PICTORIAL DESCRIPTION
6. INSTALLATION PROCEDURE
7. OPERATING INSTRUCTIONS
8. POWER REQUIRMENTS / ROUTINE MAINTENANCE
9. WARRANTY/SYSTEM SCHEMATICS AND MISCELLANEOUS WARRANTYS

WARNING: READ ALL INSTRUCTIONS CAREFULLY BEFORE ATTEMPTING OPERATION OF THE MODEL NINE TESLA COIL SYSTEM.

1. MODEL NINE TESLA COIL PICTORIAL DESCRIPTION



2. MODEL NINE TESLA COIL BASE UNIT PICTORIAL DESCRIPTION



AEROFLEX LINTEK

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SSC - SINGAPORE MODEL 5D 9-20-03

Hipotronics®

BREWSTER, NY

Part No.: MSAF-1535-A310
Capacitance: 20 nF
Voltage: 20 kV
Frequency: PULSE

CAUTION
ALWAYS KEEP CAPACITOR SHORTED
WHEN NOT IN USE

Hipotronics®

BREWSTER, NY

Part No.: MSAF-1535-A310
Capacitance: 20 nF
Voltage: 20 kV
Frequency: PULSE

CAUTION
ALWAYS KEEP CAPACITOR SHORTED
WHEN NOT IN USE

Hipotronics®

BREWSTER, NY

Part No.: MSAF-1535-A310
Capacitance: .02 uF
Voltage: 20 kV
Frequency: 60 Hz

CAUTION
ALWAYS KEEP CAPACITOR SHORTED
WHEN NOT IN USE

Hipotronics®

BREWSTER, NY

Part No.: MSAF-1535-A310
Capacitance: .02 uF
Voltage: 20 kV
Frequency: 60 Hz

CAUTION
ALWAYS KEEP CAPACITOR SHORTED
WHEN NOT IN USE

0.100 INCREMENTS

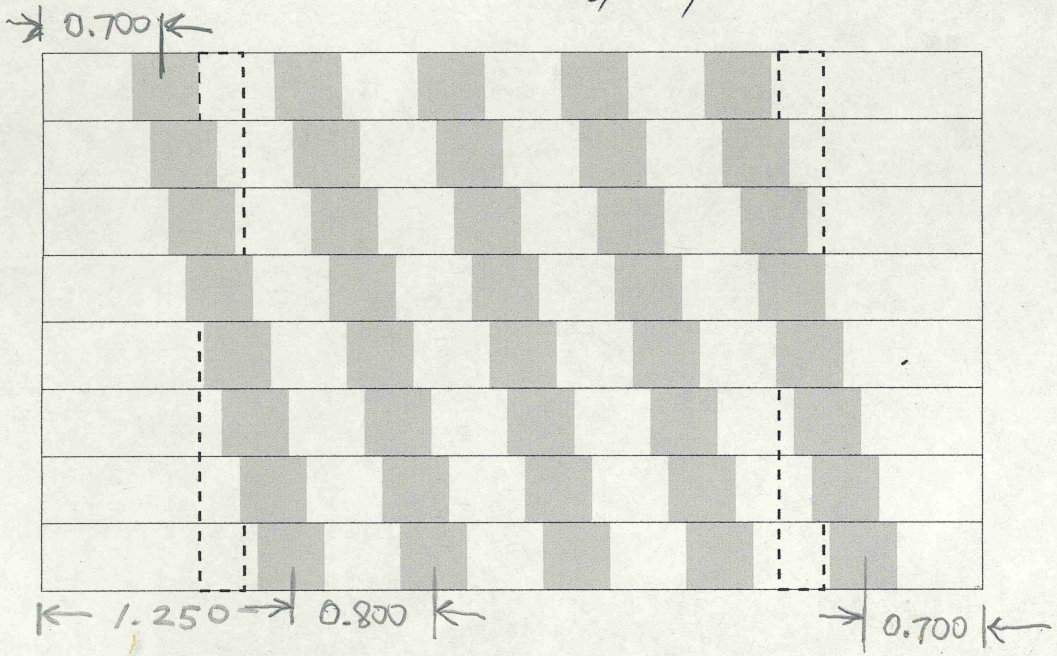
8/18/00

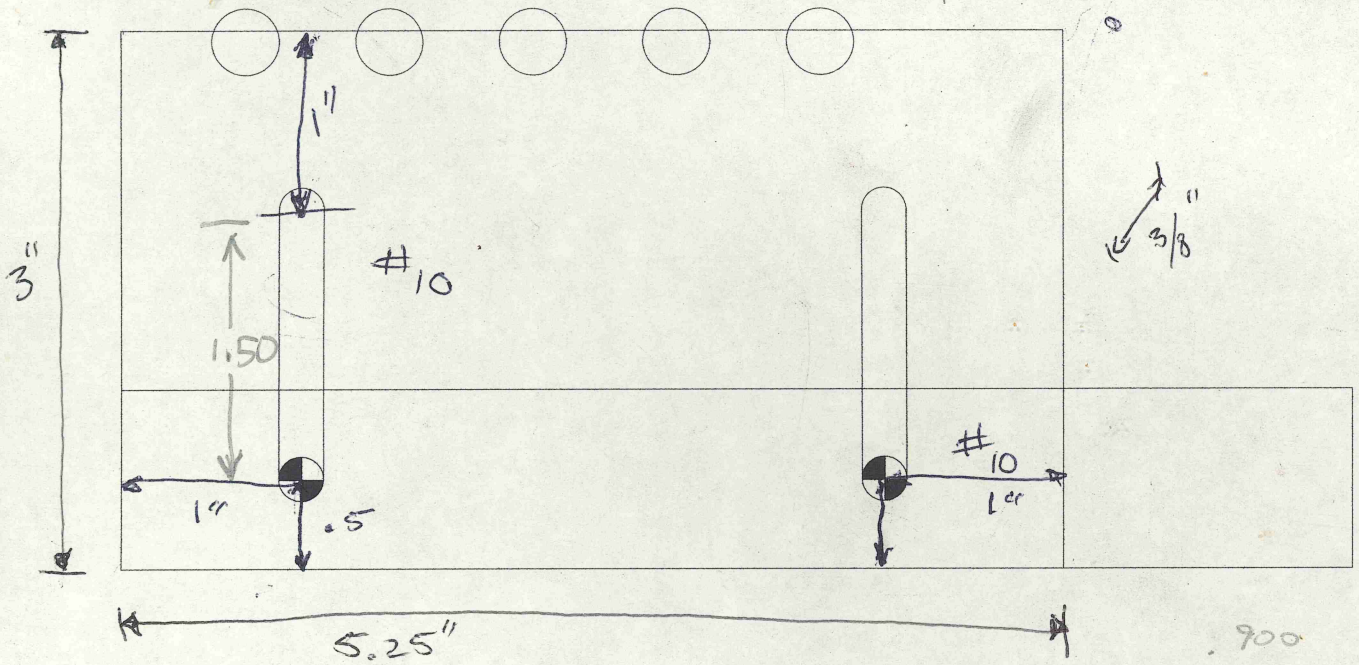
Coils Due

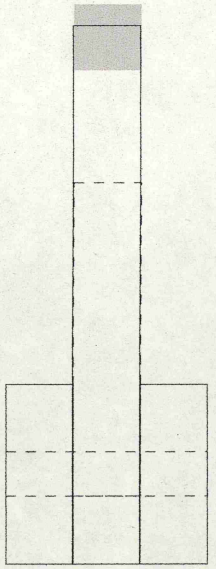
2 Coils Due Oct 1st
1 Coil Due Oct 15th
*1 Coil Due Nov. 5th

1 Coil for Jeff (Dec.)

1" Taller







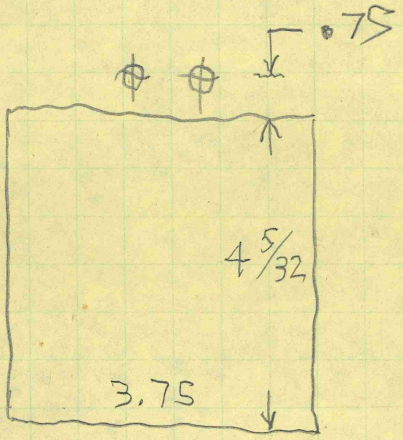
.900
.500
2 | .400 = .200
.500
.700

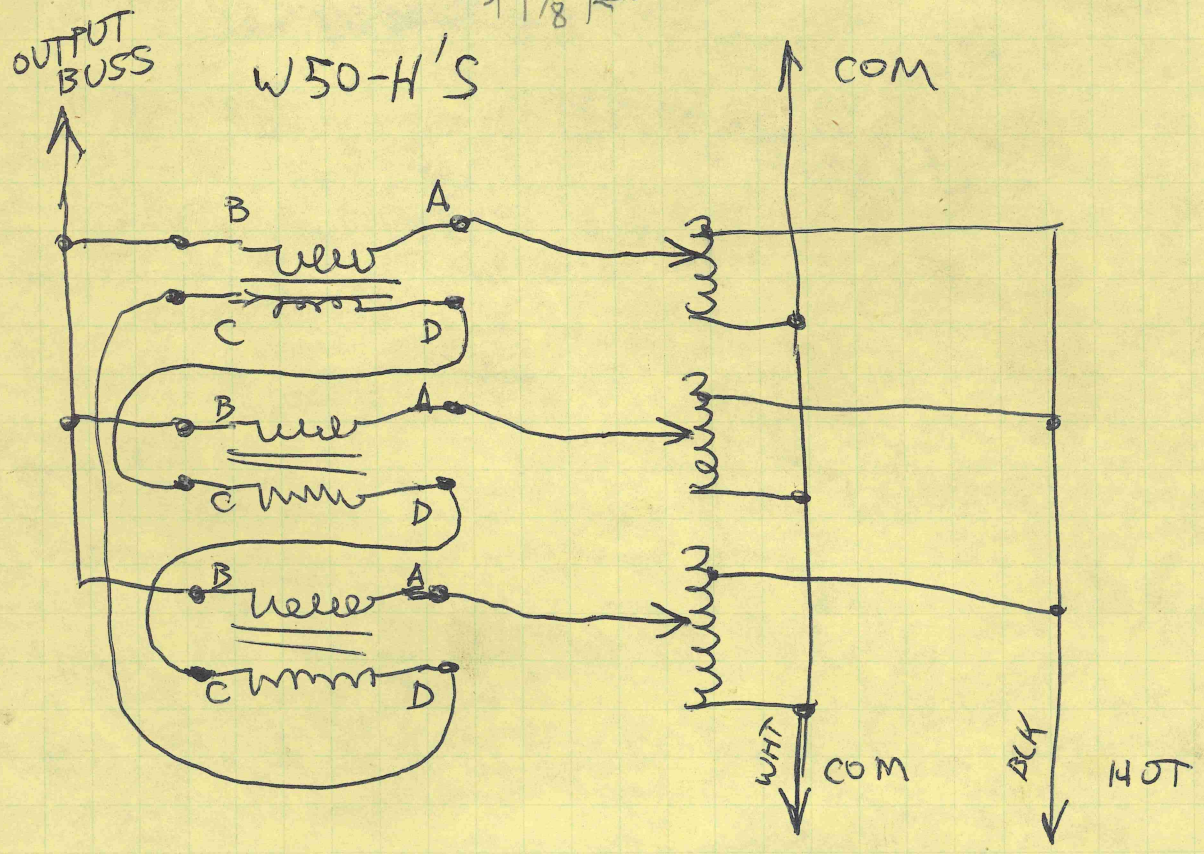
BRAKER

3-STACK
GR-W50-H

MODEL 9
LUXOR
HOTEL

8/19/97





4

TESLA TECHNOLOGY RESEARCH
2527 TREELANE AVE
MONROVIA CA 91016

(CALLER) BILL

YOUR PURCHASE ORDER NUMBER
BILL092503
Today's Date: 9/25/03

MCMASTER-CARR
9630 NORWALK BLVD
SANTA FE SPRINGS CA 90670-2932
IF THERE ARE ANY QUESTIONS ABOUT THIS SHIPMENT CONTACT OUR SALES DEPARTMENT
(562)692-5911

PAGE 1 OF 1
MCM NUMBER
7237796-01

Warehouse Location	McMaster Carr Part Number	Fill Quantity	Item Description	Your Line	Your Order	This Shipment
3-215-01 **08-17**	6208 **K46**	1 EA	HELICAL BEAM COUPLING 5/8" X 5/8" BORE,1-1/2" OD X 2-3/8" LENGTH	3	1 EA	1
3-219-12 **48-36**	6361 **K21**	2 EA	CAST IRON-MOUNT STEEL BALL BEARING BASE MOUNT ECCENTRIC LOCK FOR 5/8" SHAFT DIA 2	2	2 EA	2
3-226-01 **09-92**	6253 **K56**	1 EA	HARDENED PRECISION 440C STAINLESS STEEL SHAFT 5/8" OD,12" LENGTH 1	1	1 EA	1

McMASTER-CARR PACKING LIST

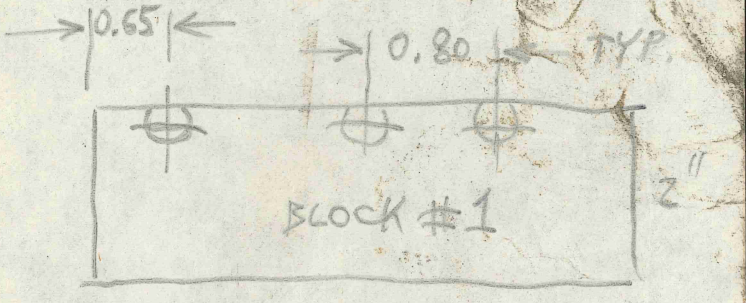
822

SINGAPORE 9-14-03

MODEL 5V

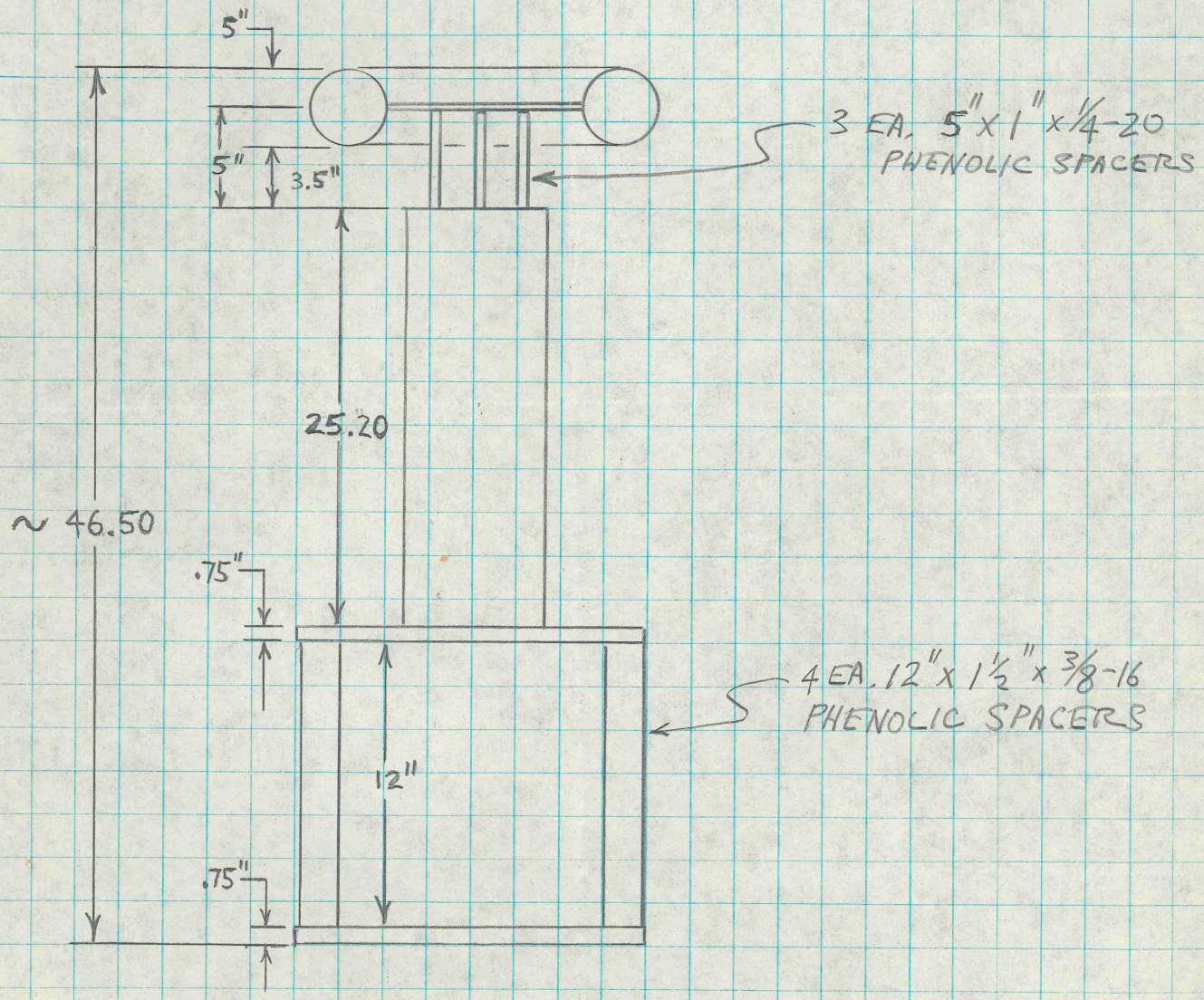
PRIMARY BLOCKS

0.100" INCREMENTS



INSIDE EDGE 6"

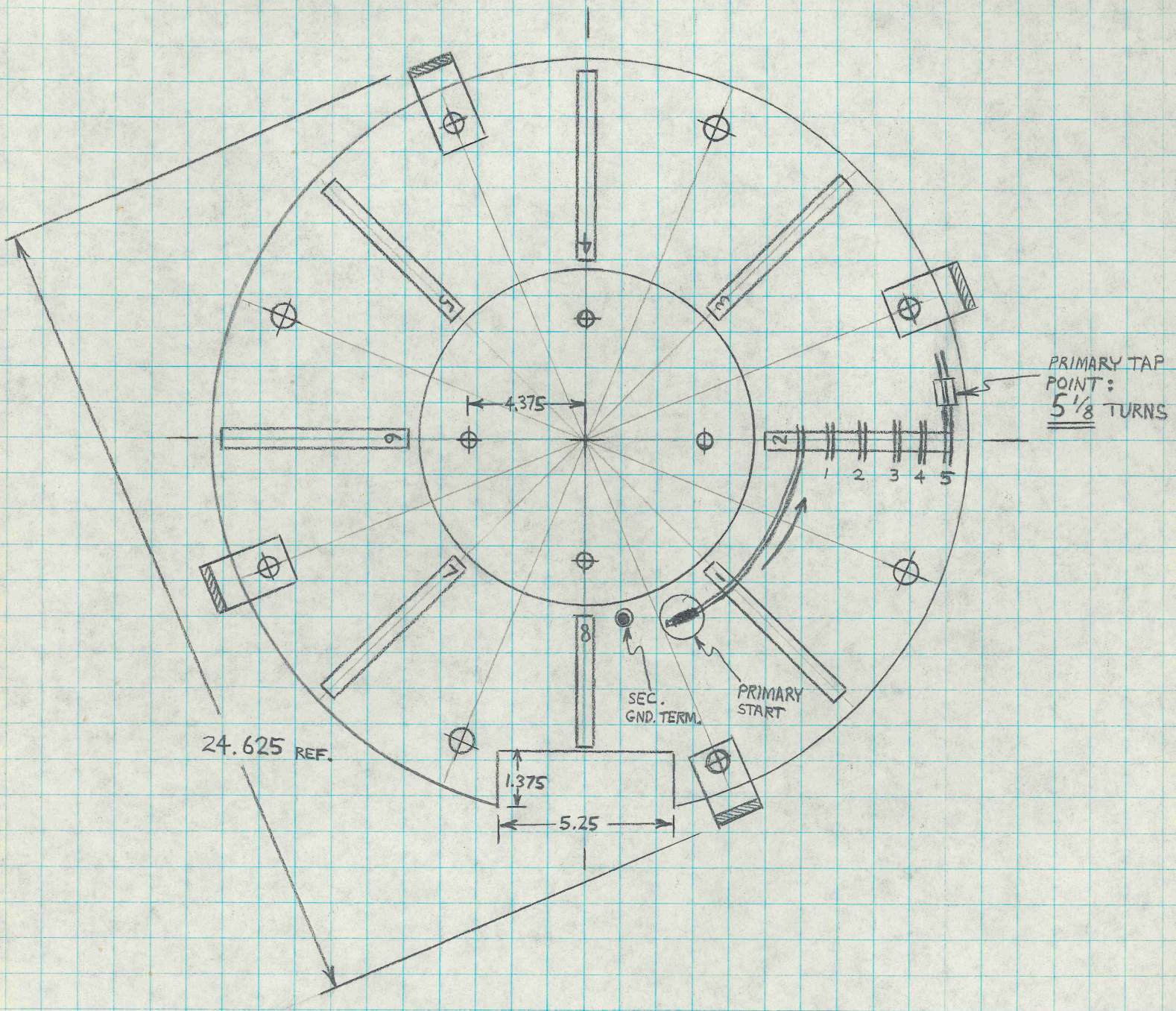
TURN #	X AXIS READOUT		
1	= 0.000	6	= 4.00
2	= 0.800		
3	= 1.600		
4	= 2.400		
5	= 3.200		


5"
5"
3.5"
3 EA. 5" x 1" x 1/4-20
PHENOLIC SPACERS
25.20
~ 46.50
.75"
4 EA. 12" x 1 1/2" x 3/8-16
PHENOLIC SPACERS
12"
.75"

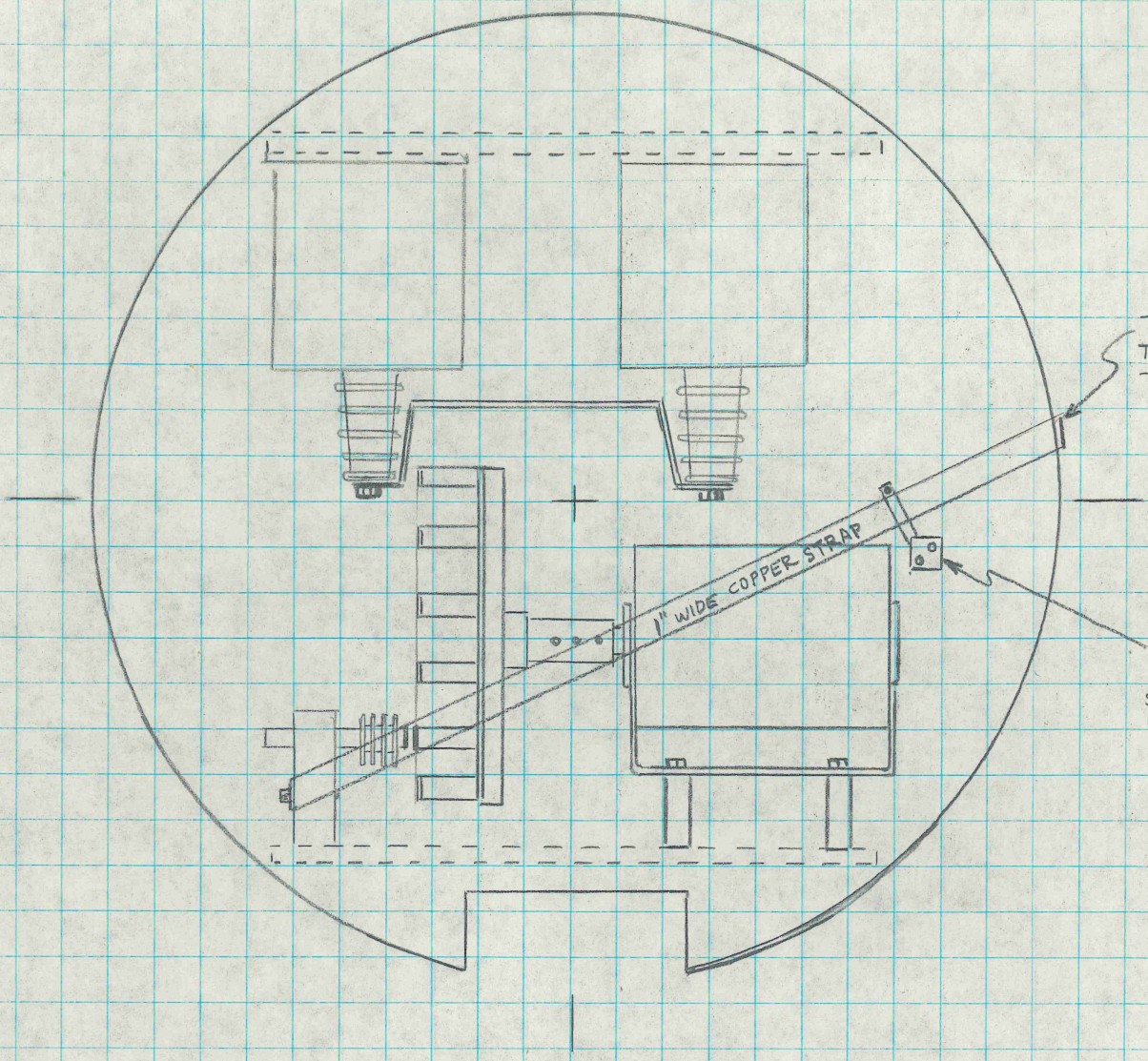
01-25-90

PRIMARY BLOCKS

BLOCK # 1	0.650
2	0.775
3	0.900
4	1.025
5	1.150
6	1.275
7	1.400
8	1.525

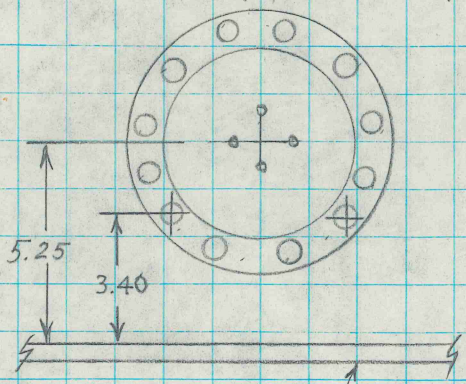

4.375
PRIMARY TAP POINT: 5 1/8 TURNS
1 2 3 4 5
SEC. GND. TERM.
PRIMARY START
24.625 REF.
1.375
5.25

01-25-90


TO PRIMARY
TAP @ 5 1/8
TURNS
1" WIDE COPPER STRAP
1" X 1" X 1"
PORCELAIN
SUPPORT
INSULATOR

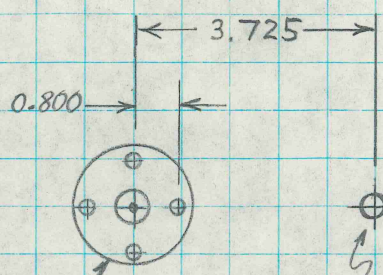
01-25-90

ROTARY GAP ELEVATION



3/8" G-10 EPOXY-FIBERGLAS BOARD

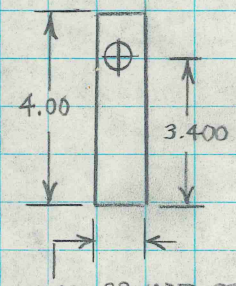
ROTARY GAP RADII



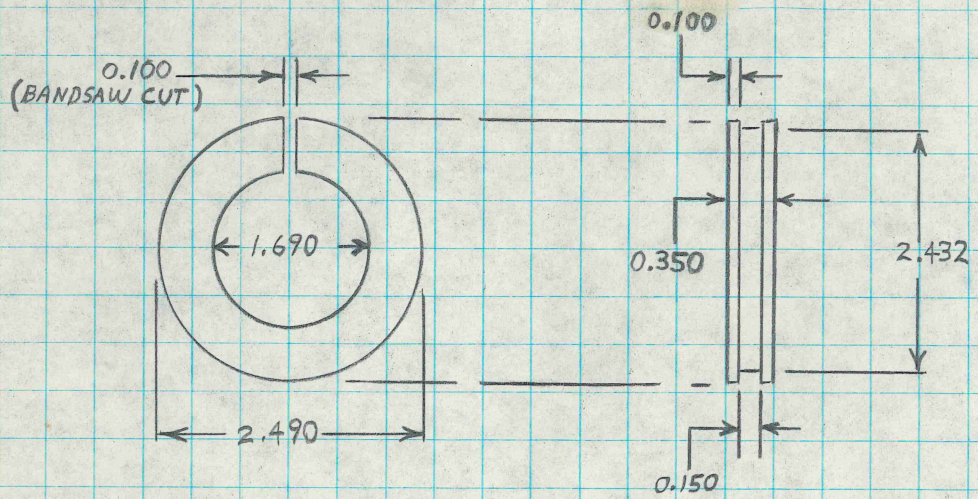
ROTARY GAP MOTOR ARBOR

ROTARY ELECTRODE TYP. 12 PLCS. ON 30° CENTERS (7.450 B.C.)

STATIONARY ELECTRODE HOLDER



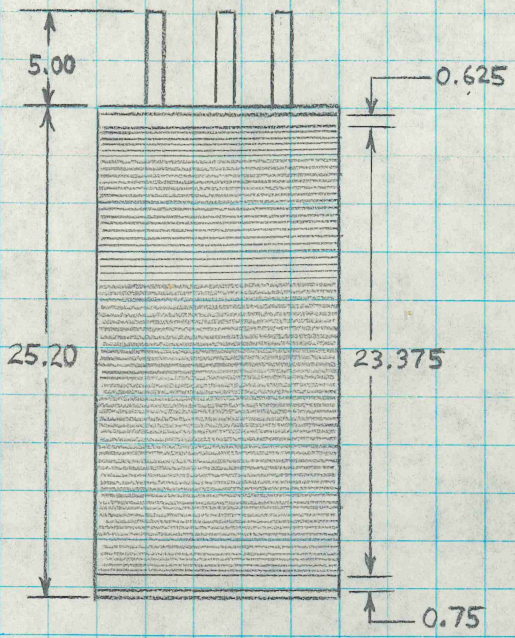
T-6 1.00 SQUARE STOCK



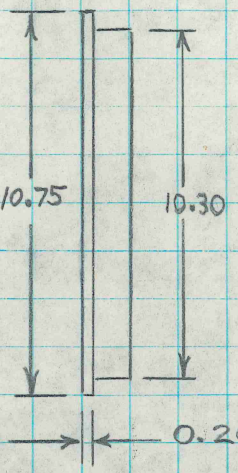
T-6 ROTARY GAP MOTOR SOLID MOUNT SPACER

02-09-90

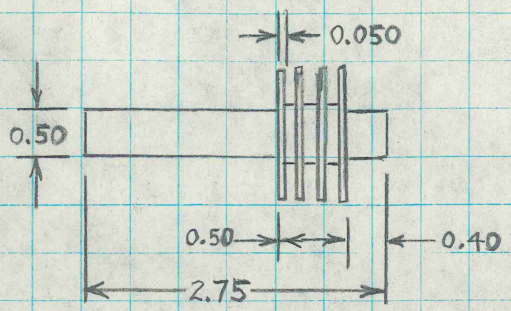
SECONDARY COIL



SECONDARY COIL END PLATES

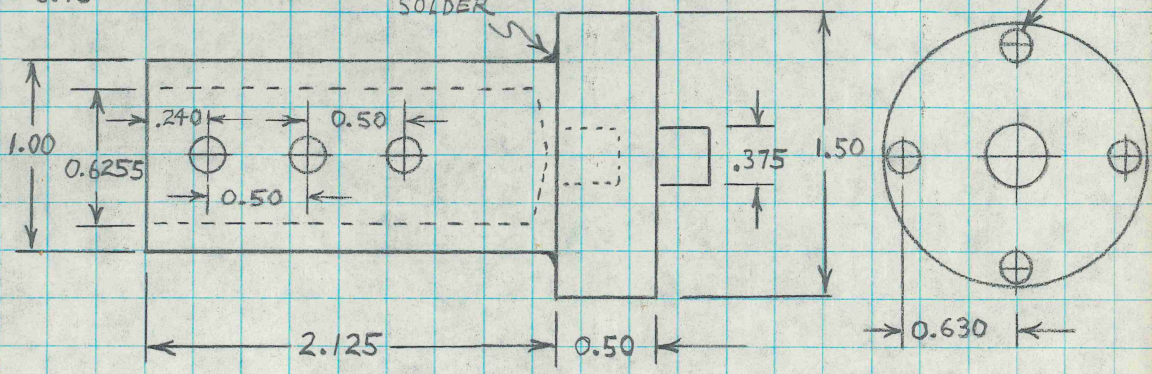


FOR END PLATES { USE #29 PILOT DRILL. USE #17 CLEARANCE DRILL. USE 1¼ PHILLIPS SHEET METAL SCREWS, 8 PLCS. EA. END.



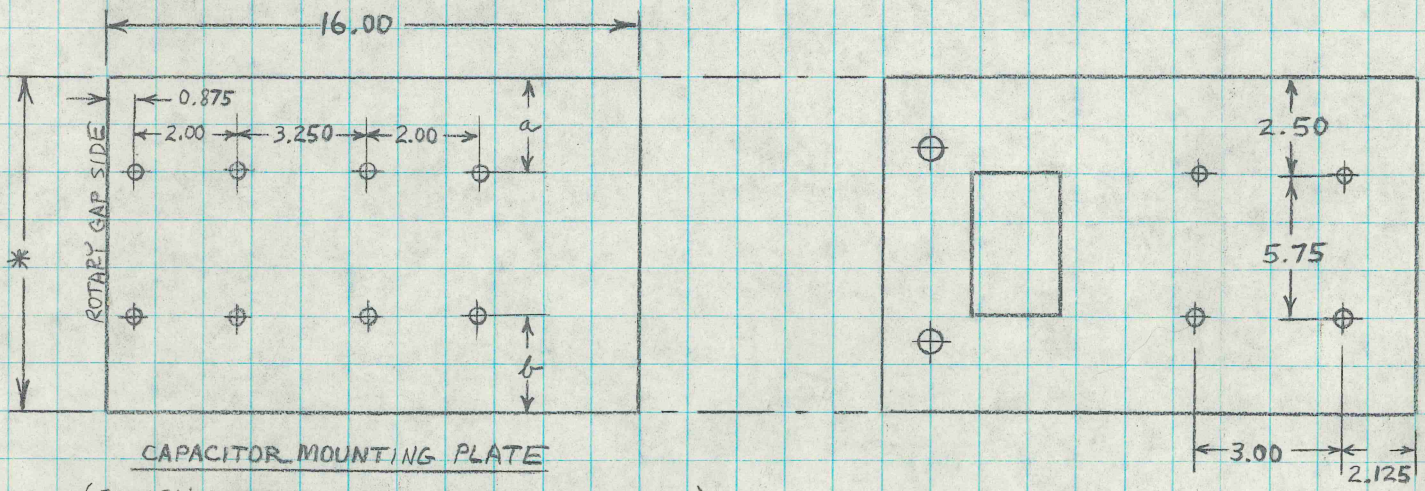
STATIONARY ELECTRODE

ROTARY GAP ARBOR



SIDE

FACE



CAPACITOR MOUNTING PLATE

(ROTARY GAP PLATE SAME OVERALL DIMENSIONS.)

* UNIVERSAL – HOLLYWOOD = 11.00"

UNIVERSAL – FLORIDA = 12.00"

MAKE DIMENSIONS a & b EQUAL.

01-25-90

MACHINE DEVIDING HEAD:

40 TURNS = 360°

1 TURN = 9°

2 TURNS = 18°

$\begin{array}{r} 18^\circ \\ 6^\circ \\ \hline 24^\circ \end{array}$ = 15 HOLE LOCATIONS AROUND A 360° CIRCLE USED ON NEW MEXICO STATE UNIVERSITY ROTARY GAP.

USE 15 HOLE INDEX .6

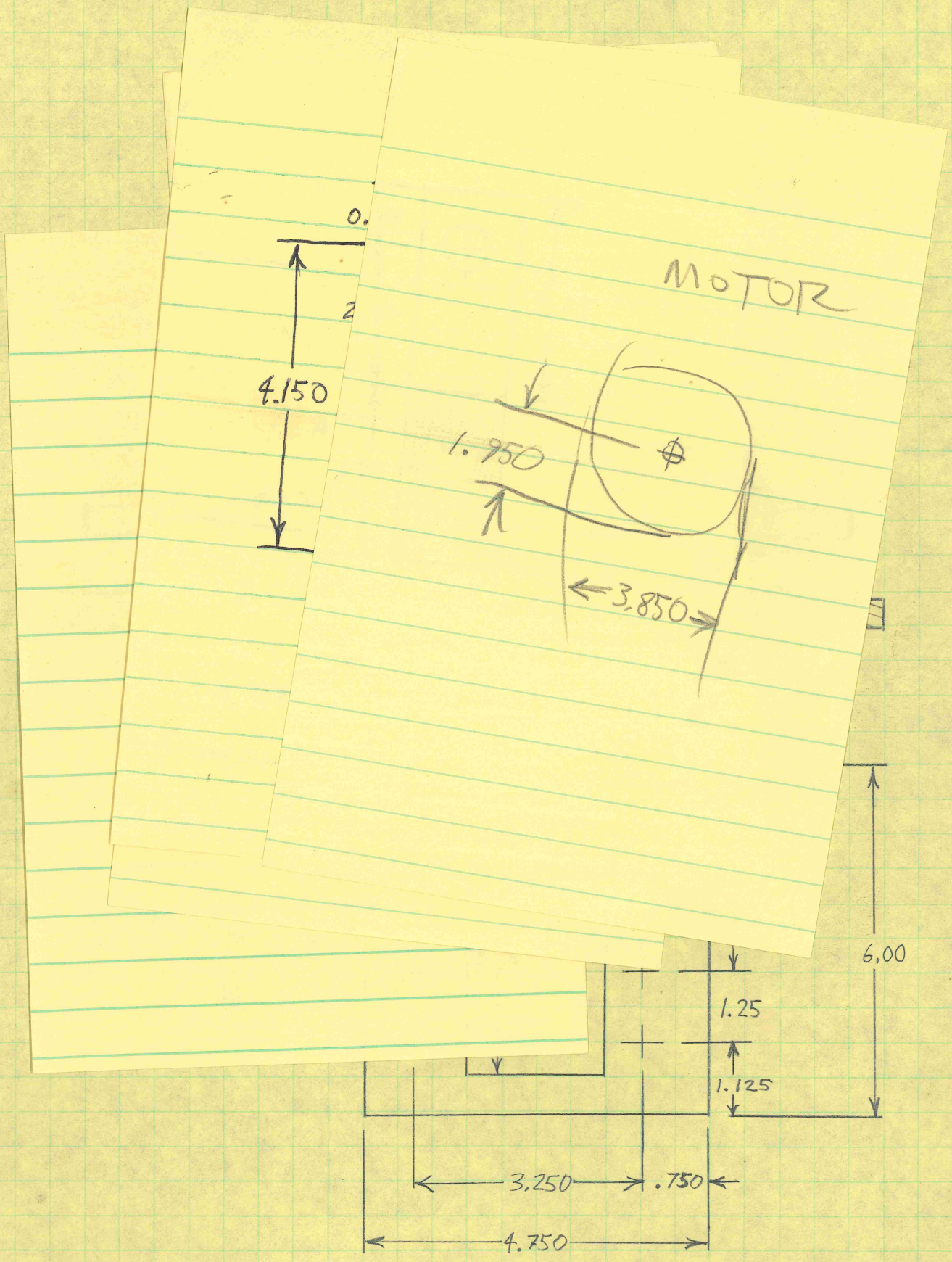
GAROLITE RODS

2 EA. GRADE C

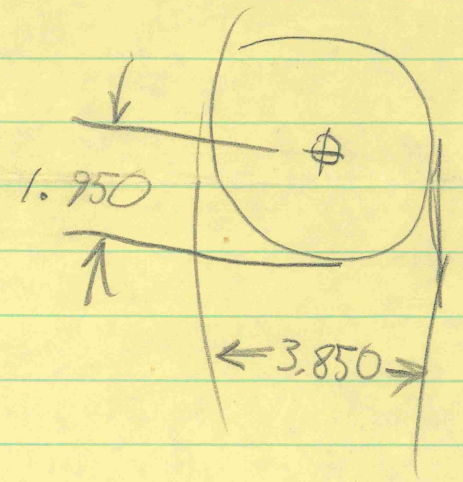
8526K47 $57.28

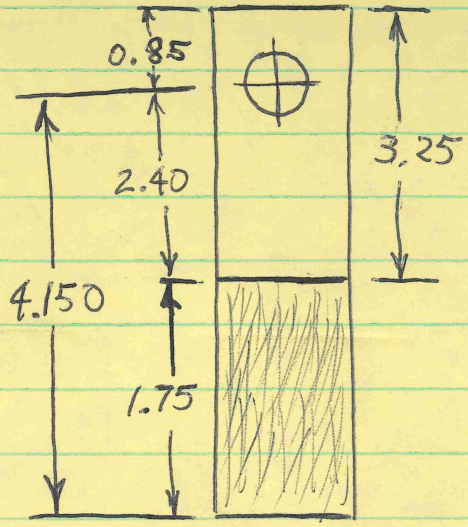
6/52

(213) 692-5911


MOTOR
4.150
1.950
3.850
6.00
1.25
1.125
3.250
.750
4.750

MOTOR




0.85
2.40
4.150
1.75
3.25

XFORMER

PWR PLATE

1 EA. 3" X 3" X 1/8"

4 EA. 10-32 X 2 1/4" SPACERS

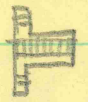
ROT. GAP

2 EA. STATIONARY ELECTODES

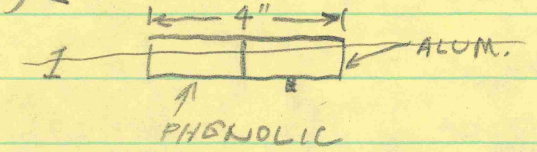
8 EA. ROT. GAP, ROTARY ELECTRODES

NEEDED FOR
5C COIL

1.) ~~SEC. COIL BRASS FEED THRU~~



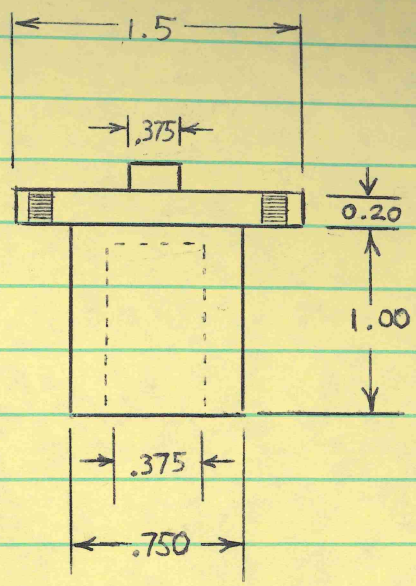
2.) ~~2~~ PHENOLIC 1" O.D. X 4" 1/4-20 TAPPED

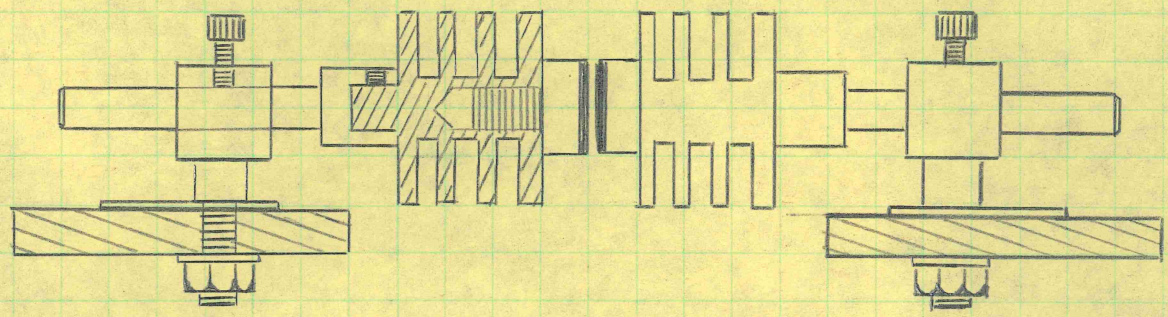


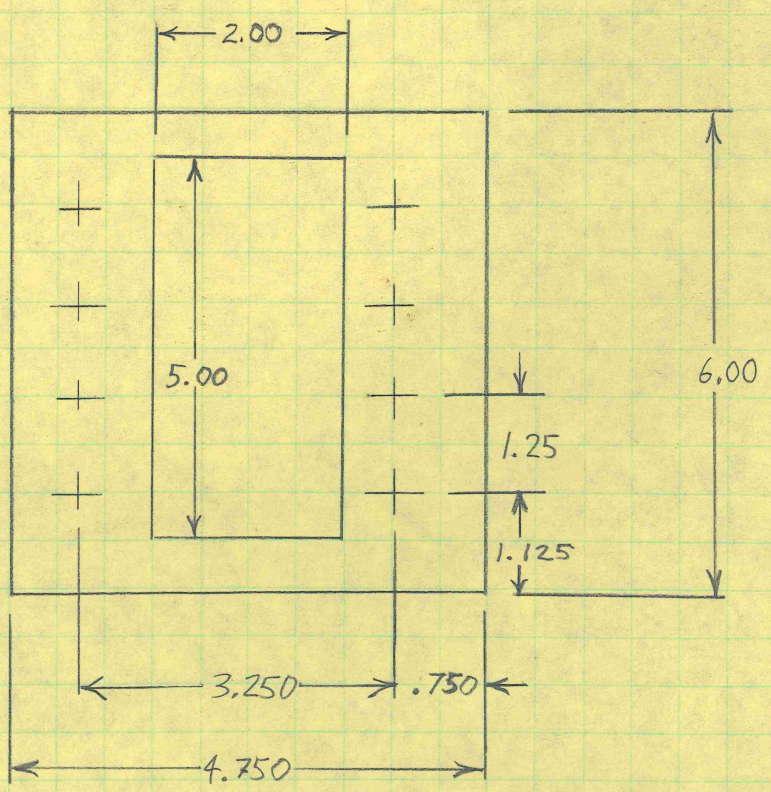
3.) ~~4 1½" O.D. X 10" PHENOLIC STANDOFFS~~

4.) 8 PRIMARY PHENOLIC BLOCKS

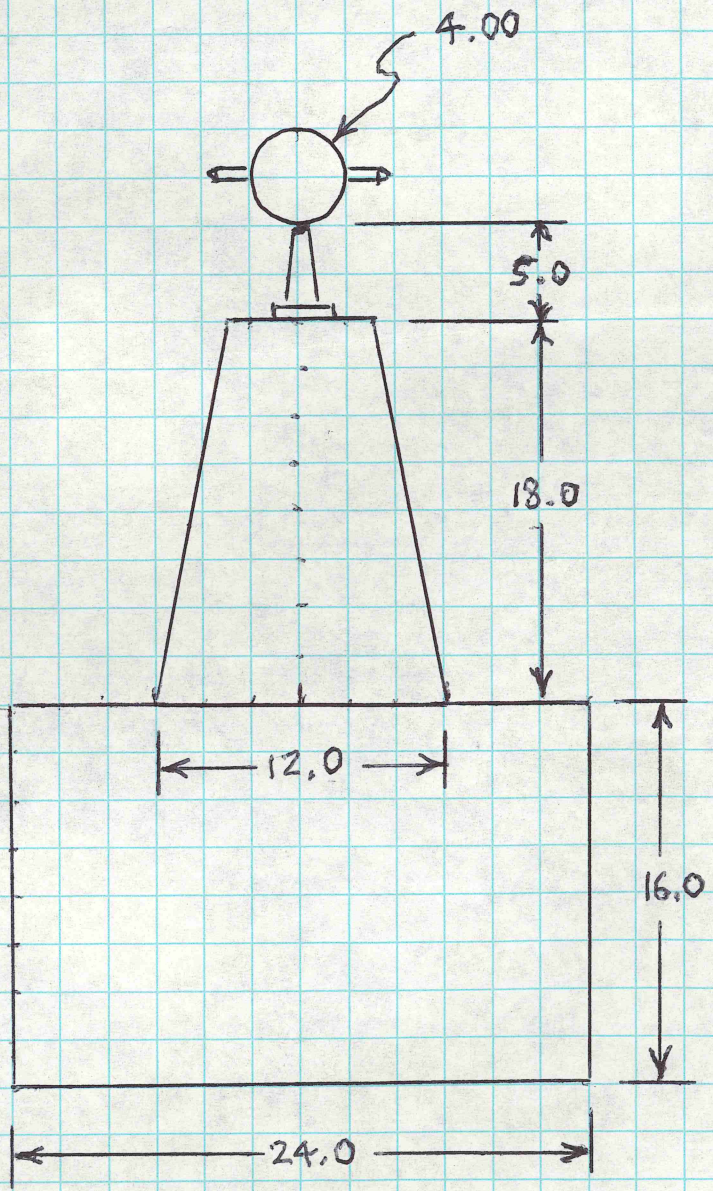
5.) ROTARY GAP WHEEL & ARBOR
2 EA. STATIONARY ELECTRODE HOLDERS
1 EA. MOTOR MOUNT


1.5
.375
0.20
1.00
.375
.750




2.00
5.00
6.00
1.25
1.125
3.250
.750
4.750

"MINI" GPO-2 7-24-03



TOPS FORM 3314
LITHO IN U. S. A.

27" LONG WINDING

D = 8.625" C = 27.096"

$\frac{1}{2}$ L = 13.5

WIRE = 0.018

MONOFIL = 0.018

@ 0.018" = 55.56 TPI

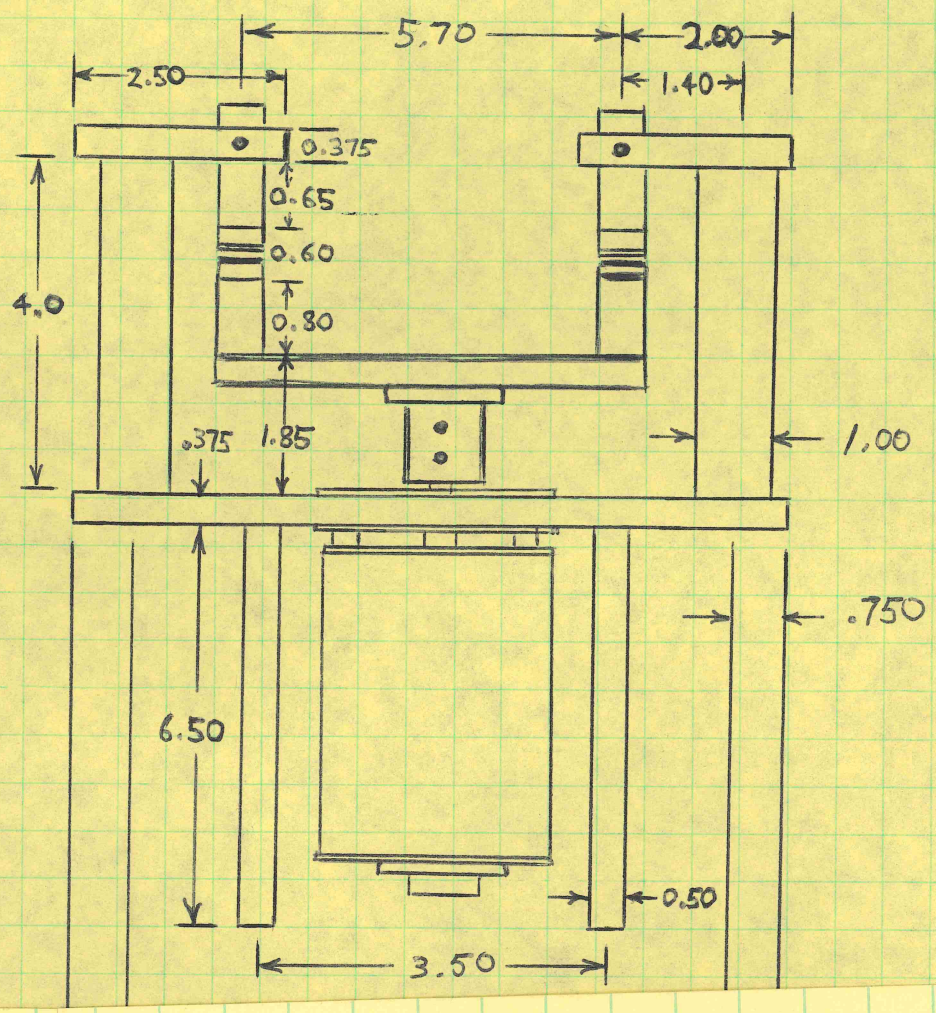
= 750 TURNS/WIRE

& 750 TURNS/MONOFIL

= 1693.64'

I.D. = 5.492

O.D. = 6.005



DANA-MAXWELL
(818) 359-1191

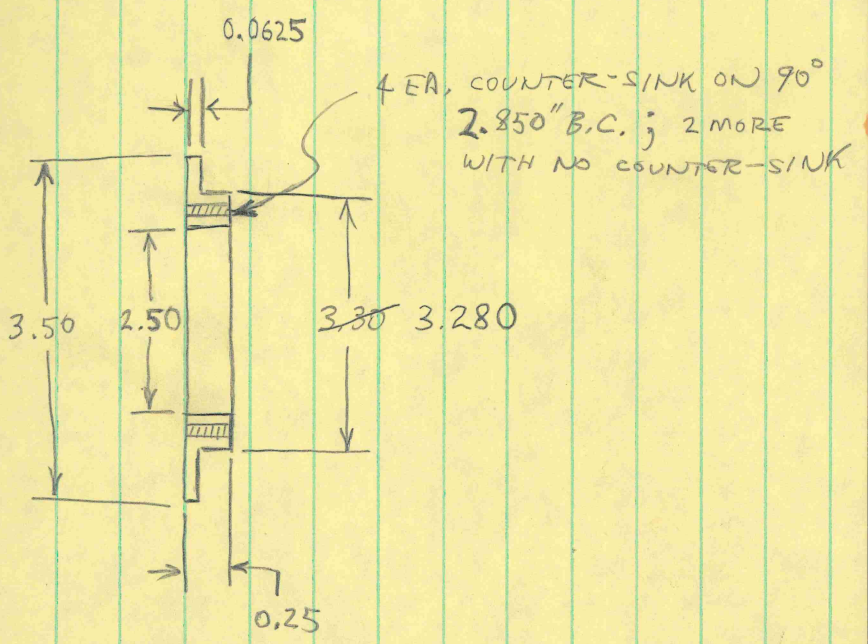
345D ½HP
G.E.
MOTOR 5KC19FGJ18AU

RELAY 91252-650EK
MALLORY 243-292 MFD
CAP 125 VAC

REMOVE ALL BUT THE 1ST
1½ LAYERS OF WINDING
PARALLEL .1MFD CAP ON
CONTACTS

ARMATURE
REMOVE .125 OU ED SIDE
1.97 TO 1.98 O.D.

3.50



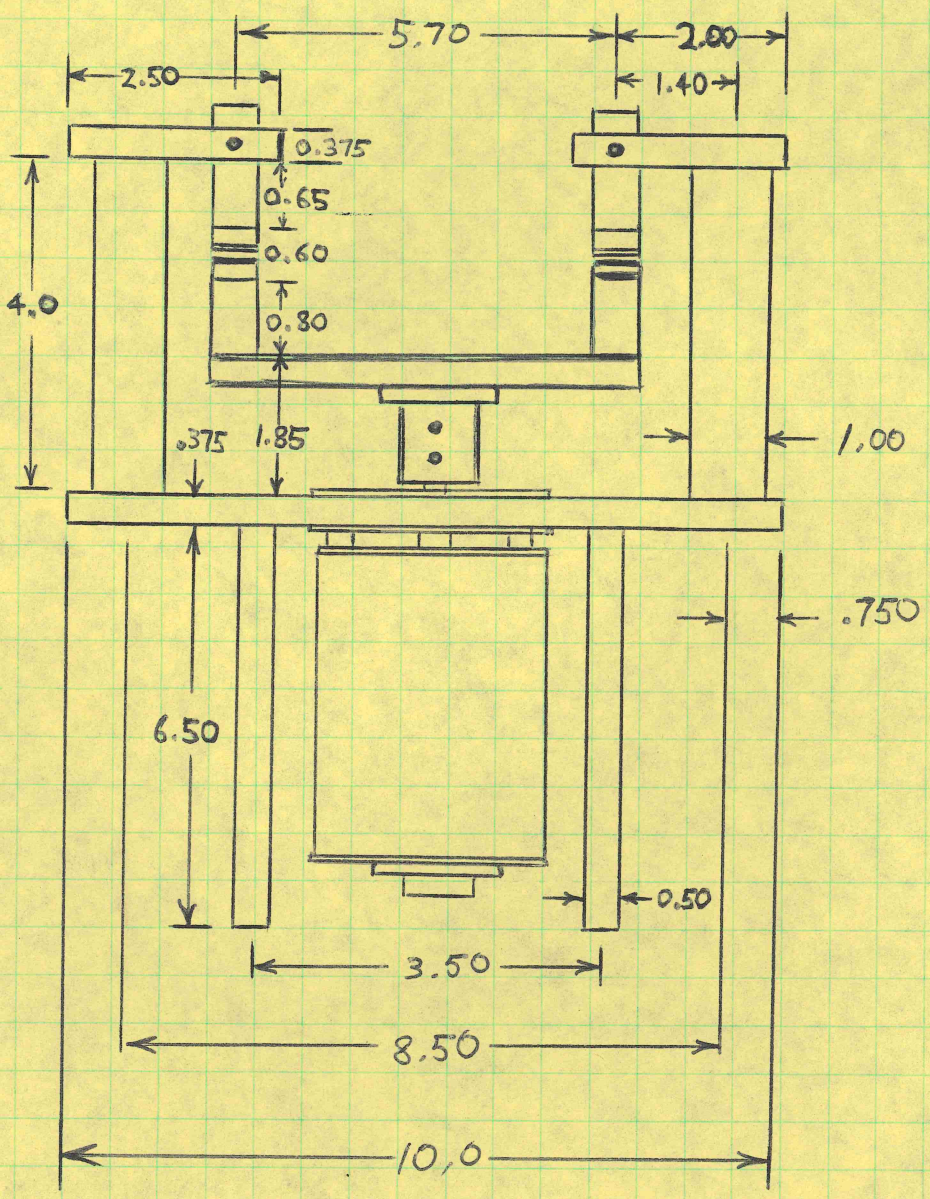
DANA - MAXWELL
(818) 359-1191

345D ½HP
G.E.
MOTOR 5KC19FGN18AU

RELAY 9125Z-65DEK
MALLORY 243-292 MFD
CAP 125 VAC

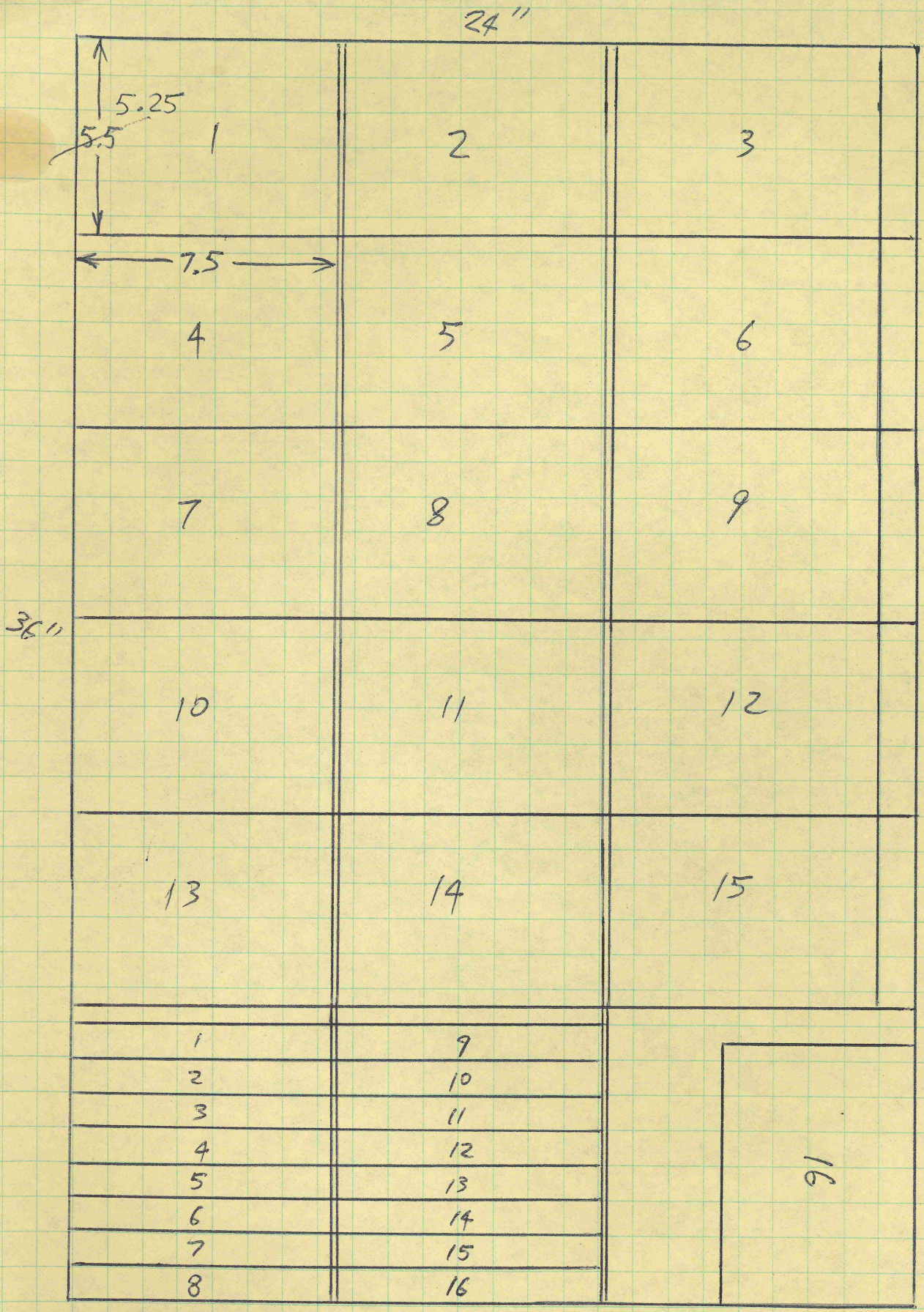
REMOVE ALL BUT THE 1ST
½ LAYERS OF WINDING
PARALLEL .1MFD CAP ON
CONTACTS

ARMATURE
REMOVE .125 ON EA. SIDE
1.97 TO 1.98 O.D.


5.70
2.00
2.50
1.40
0.375
0.65
0.60
0.80
4.0
.375
1.85
1.00
.750
6.50
0.50
3.50
8.50
10.0

8-11-92

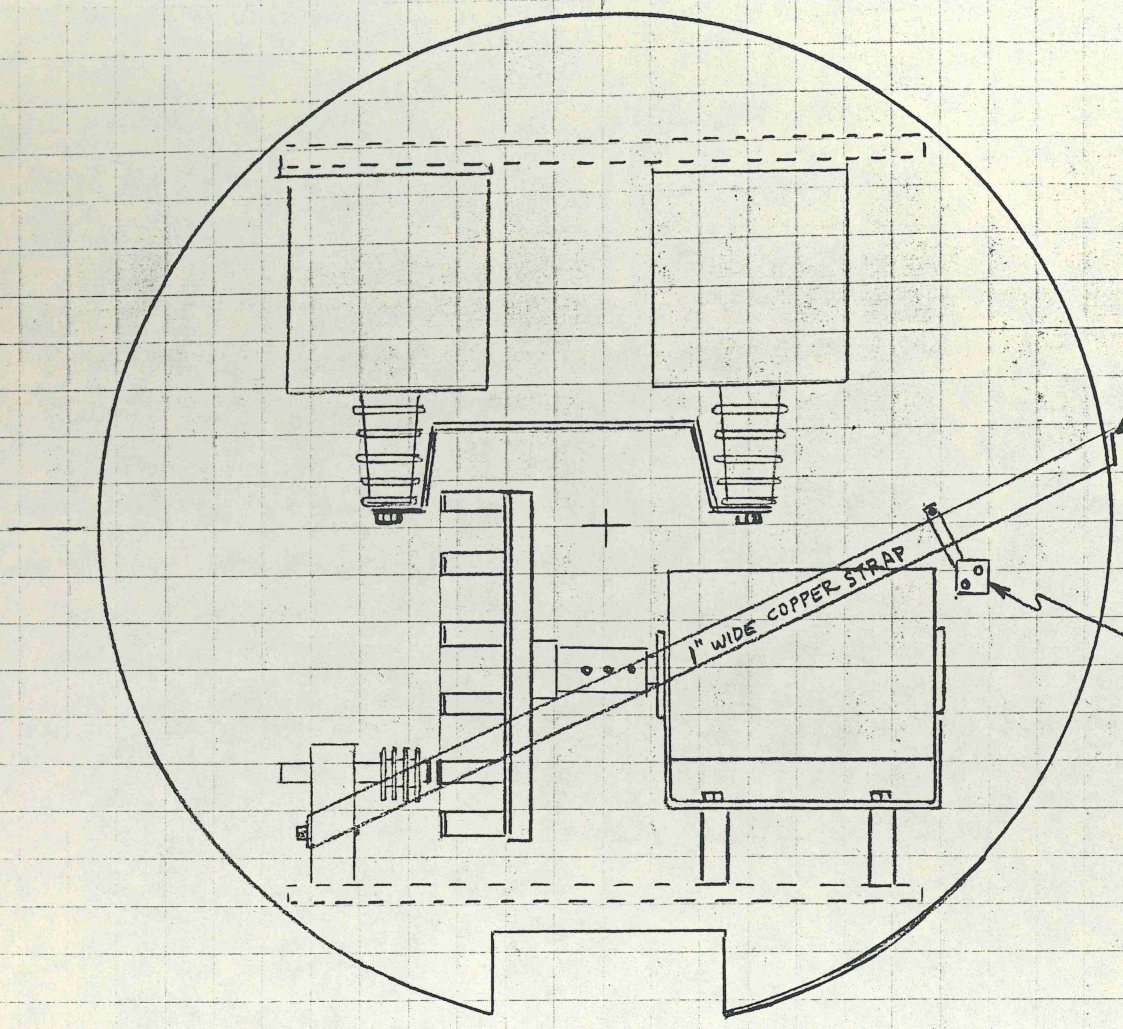
NEW MODEL 12 PRIMARY COIL PHENOLIC BLOCKS 3/4" THICK LE GRADE STOCK.



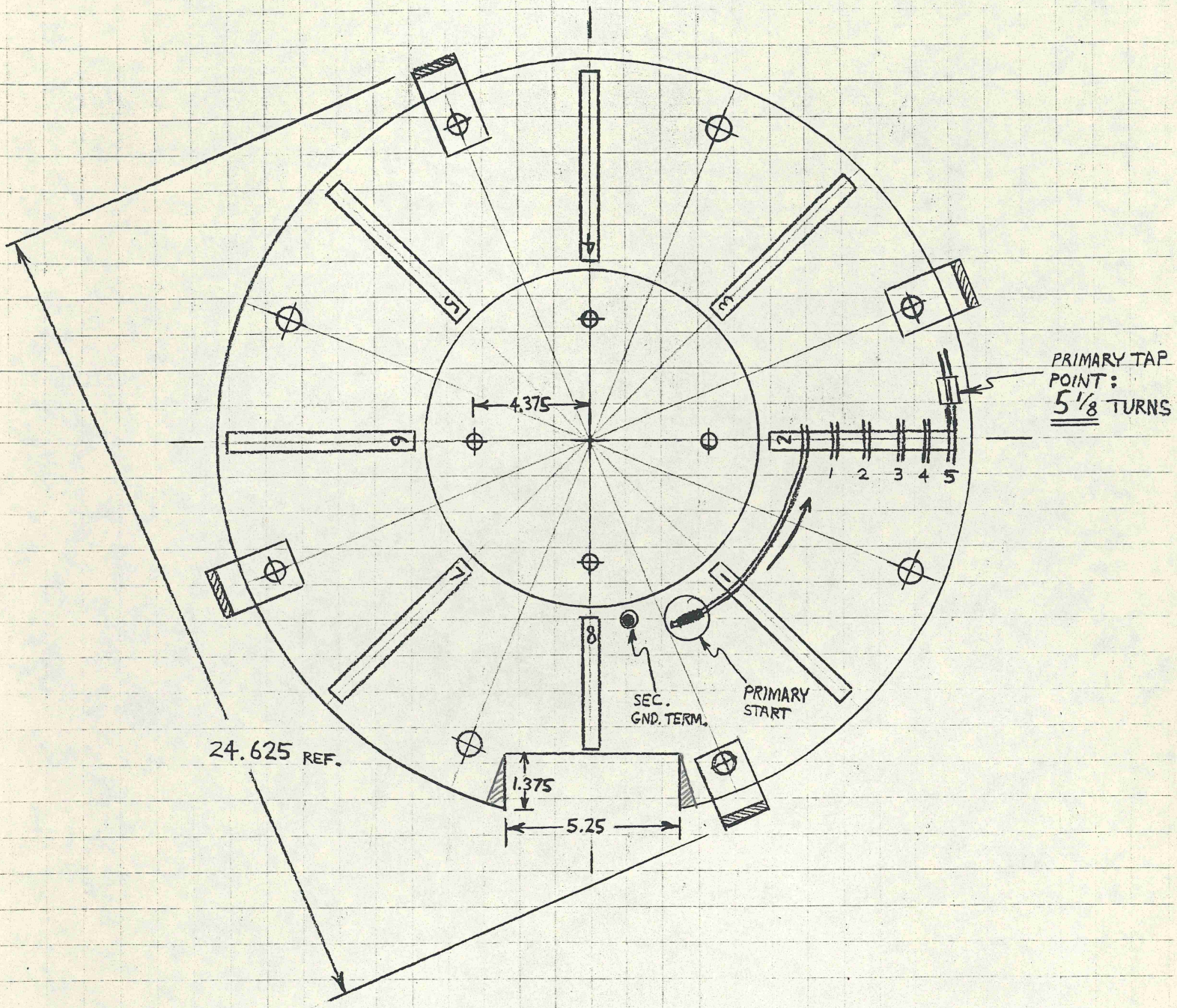
1	9
2	10
3	11
4	12
5	13
6	14
7	15
8	16

$160.51 1 EA. 8525K271

ORDERED 8-13-92 LE GRADE

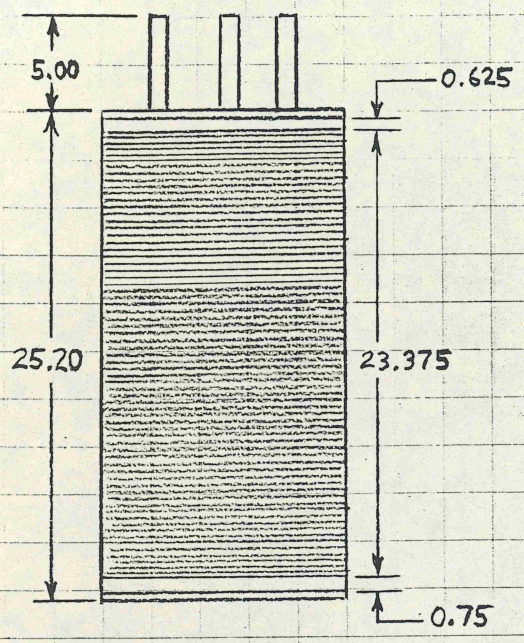

TO PRIMARY TAP @ 5 1/8 TURNS
1" WIDE COPPER STRAP
1" X 1" X 1" PORCELAIN SUPPORT INSULATOR

01-25-90

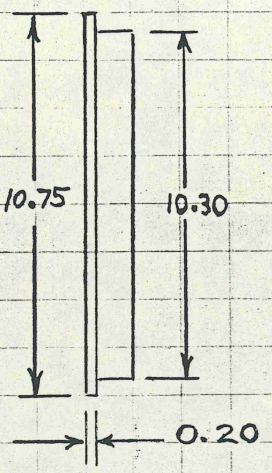

PRIMARY TAP POINT: 5 1/8 TURNS
4.375
24.625 REF.
1.375
5.25
SEC. GND. TERM.
PRIMARY START
1 2 3 4 5
2
3
5
6
7
8

01-25-90

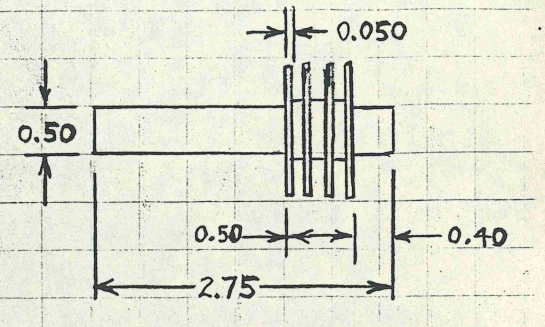
SECONDARY COIL



SECONDARY COIL END PLATES

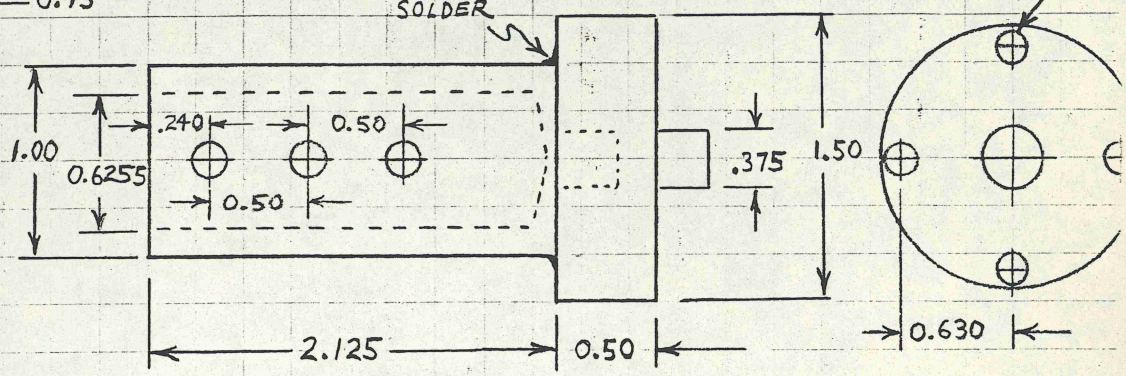


FOR END PLATES { USE #29 PILOT DRILL. USE #17 CLEARANCE DRILL. USE 1¼ PHILLIPS SHEET METAL SCREWS, 8 PLCS. EA. END.



STATIONARY ELECTRODE

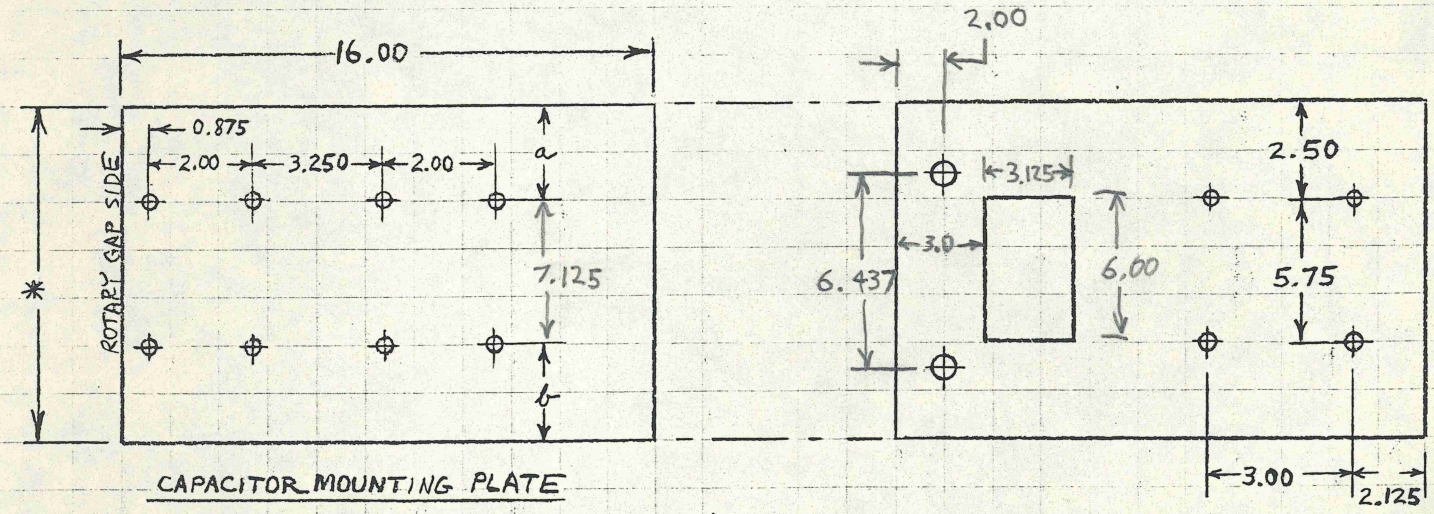
ROTARY GAP ARBOR



SIDE FACE

CAPACITOR MOUNTING PLATE

(ROTARY GAP PLATE SAME OVERALL DIMENSIONS.)

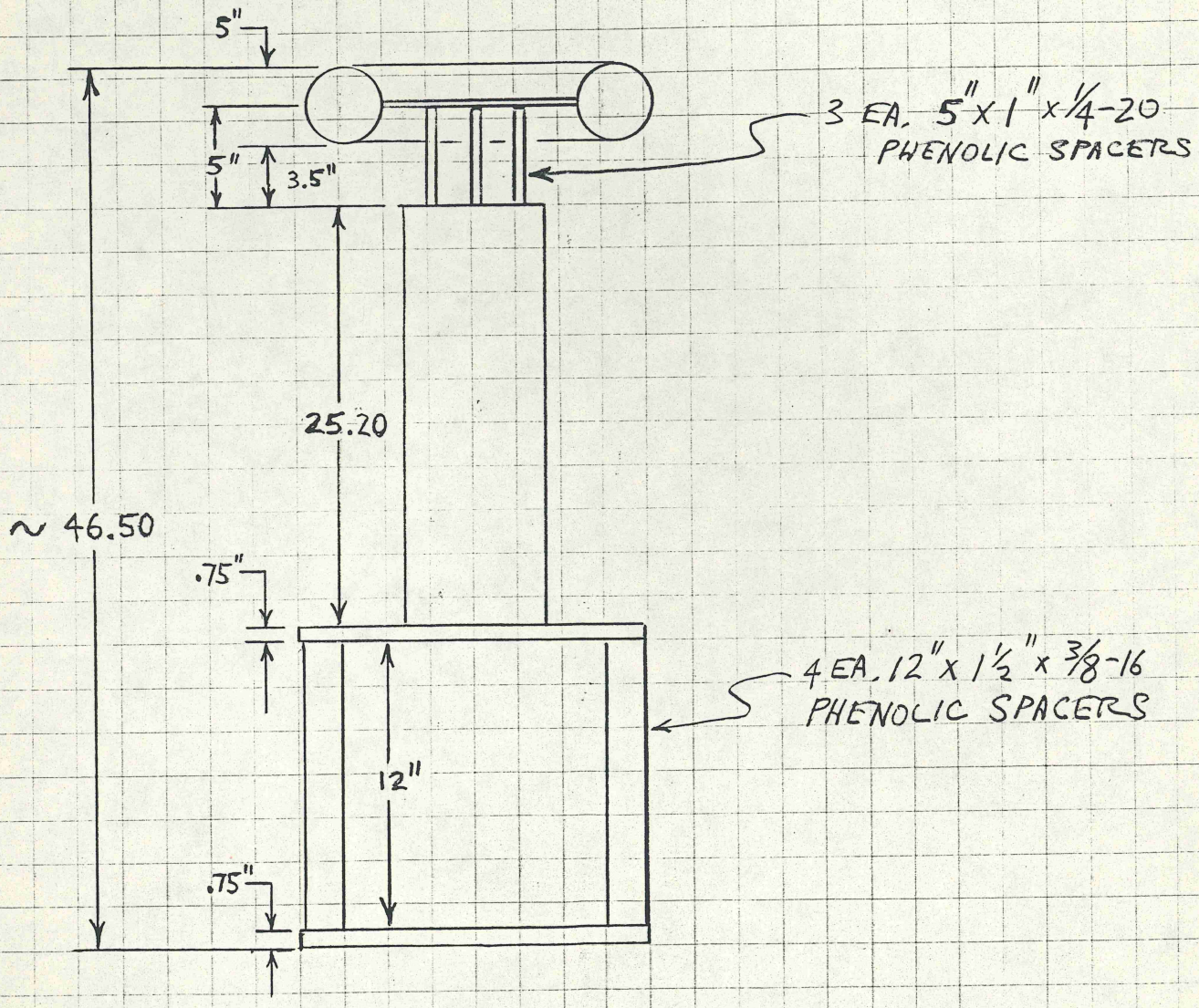


* UNIVERSAL – HOLLYWOOD = 11.00"

UNIVERSAL – FLORIDA = 12.00"

MAKE DIMENSIONS a & b EQUAL.

01-25-90


5"
5"
3.5"
3 EA. 5" x 1" x 1/4-20
PHENOLIC SPACERS
25.20
~ 46.50
.75"
4 EA. 12" x 1 1/2" x 3/8-16
PHENOLIC SPACERS
12"
.75"

01-25-90

Lateral Waves and the Pioneering Research of the Late Kenneth A. Norton (1907-1982)

James R. Wait
2210 Waverly
Tucson, AZ 95719-3848

In recent years, there has been a strong inclination to introduce *lateral waves* into the lexicon of radiowave engineering. The monumental treatise by King, Owens, and Wu [1] is an expression of this trend. But it may not be realized that the early pioneering research by Norton [2, 3] contained the vital essence of lateral waves in the context of radio. In this brief essay, I would like to dwell on this issue. My motivation is partly personal, because I was greatly encouraged by Norton in my embryonic attempts to extend his analyses to other geometries and configurations. Here, I will deal with a restricted aspect of the general subject, which is relevant to the prediction of low-angle radiation and propagation, at VHF, over an idealized, imperfectly conducting plane earth. My time factor is $\exp(j\omega t)$.

Let me summarize the relevant facts here. For a vertical electric dipole, located at height h_1 over a flat earth with a surface impedance of 377Δ ohms, the vertical electric field, E_v, at height h_2, at a horizontal range r, is well approximated by

$$E_v \cong 2E_0 W, \tag{1}$$

where E_0 is the free-space field, and

$$\begin{aligned} W &= -(1/2p)(1+q_1)(1+q_2) \\ &= -(1/2p)\left[1+(q_1+q_2)+q_1q_2\right] \end{aligned} \tag{2}$$

is the "Sommerfeld Attenuation Function." The other quantities are defined as follows: $p = -jkr\Delta^2/2$ is the "numerical distance" ($k = 2\pi$ / wavelength), and $q_1 = jk\Delta h_1$ and $q_2 = jk\Delta h_2$ are dimensionless height parameters. The approximations, in the asymptotic sense, are equivalent to those made by Gilbert et al [4]. Here, I say that $|p| >> 1$, and $|q_1| << |p|$. An explicit derivation of Equation (2) is given by Norton [3].

The factors $(1+q_1)$ and $(1+q_2)$ are height-gain functions, applicable to the source and observer heights, respectively. The $-1/(2p)$ term is the far-zone- (large-distance-) attenuation function, for vanishing terminal heights h_1 and h_2. For a spherical-earth model (i.e., not the naive flat-earth case!), the $-1/(2p)$ is replaced by a more-complicated form (e.g., see Hill and Wait [5]), but I will not dwell further on this point here, except to say the height-gain functions are also applicable in a limited sense.

By employing explicit notation, I can write Equation (2) as follows:

$$W = -(2jkh_1h_2/r)\left[1 - j(h_1+h_2)/(\Delta h_1h_2) - 1/\left(k^2\Delta^2 h_1h_2\right)\right]. \tag{3}$$

When the normalized surface impedance Δ is approximated by $1/n$, where n is the complex refractive index (such as for sea water), Equation (3) is the same as the result given by Gilbert et a1. [4] in their Equation (30), for vertical polarization. A more-refined result is obtained by using the result for Δ corresponding to a vertically polarized plane wave at grazing incidence [in this case, we would simply set $\Delta = n^{-1}\left(1-n^{-2}\right)^{1/2}$]. Two particularly relevant papers are by Barrick [6, 7], who has contributed so much to our understanding of HF transmission and scattering for ocean-like surfaces.

A related question, stimulated by Norton [2], is, "Does the Zenneck surface wave get excited?" In two papers (Hill and Wait [8, 9]), we showed how the Zenneck wave could be excited over the surface of the earth if a large enough aperture was constructed. Certainly, the Zenneck wave alone would not dominate the far field for a realistic source. But other interesting things happen, when the effective surface impedance has an (inductive) phase angle exceeding 45°. The resulting enhancements of the ground-wave field, such as occur over ice-covered oceans, were pointed out many years ago (e.g., see Wait [10, 11], and Hill and Wait [5]). The height-gain functions do not have the simple form described above. In fact, the fields decay more rapidly with height, and the distance dependence is more like $1/r^{1/2}$ than $1/r^2$ in the so-called lateral-wave case. Indeed, we now have a "trapped surface wave," as opposed to the Norton surface wave.

References

1. R. W. P. King, M. Owens, and T. T. Wu, *Lateral Waves*, Springer-Verlag, 1992.

2. K. A. Norton, "The propagation of radio waves over the surface of the earth and the upper atmosphere," *Proceedings of the Institute of Radio Engineers*, **25**, 1937, pp. 1203-1236.

3. K. A. Norton, "The calculation of ground-wave field intensity over a finitely conducting spherical earth," *Proceedings of the Institute of Radio Engineers*, **29**, 1941, pp. 623-639.

4. G. Gilbert, E. Raiten, and M. Visser, "Lateral wave contribution to the low-altitude radar propagation factor," *Radio Science*, **29**, 1994, pp. 483-494.

5. D. A. Hill and J. R. Wait, "Ground wave attenuation function for a spherical earth with arbitrary surface impedance," *Radio Science*, **15**, 1980, pp. 637-643.

6. D. E. Barrick, "Theory of HF/VHF propagation across the rough sea, Part 1," *Radio Science*, **6**, 1971, pp. 517-526.

7. D. E. Barrick, "Theory of HF/VHF propagation across the rough sea, Part 2," *Radio Science*, **6**, 1971, pp. 527-533.

8. D. A. Hill and J. R. Wait, "Excitation of the Zenneck surface by a vertical aperture," *Radio Science*, **13**, 1978, pp. 967-977.

9. J. R. Wait and D. A. Hill, "Excitation of the HF surface wave by vertical and horizontal apertures," *Radio Science*, **14**, 1979, pp. 767-780.

10. J. R. Wait, "Electromagnetic surface waves," in *Advances in Radio Research*, **1**, New York, Academic Press, 1964, pp. 157-219.

11. J. R. Wait, *Electromagnetic Wave Theory*, New York, Harper & Row, 1985, Chapters 6 and 7.

Editor's Comments *Continued from page 5*

described in the article, physical optics is used for computing surface reflections. Physical optics is combined with the physical theory of diffraction to model diffraction. A combination of physical optics and geometrical optics are used to compute the results for double reflections, double diffractions, or combinations of a reflection and a diffraction. In all cases, the computations are essentially reduced to geometrical considerations in combining results for a relatively small number of categories of patches. The article is especially easy to read because it uses a minimum of mathematics to describe how the technique works, and to explain the several quite interesting examples presented. There are also welcome details regarding computational speed, problem complexity, and accuracy.

1995 is the centennial of Marconi's wireless transmission. I have been hoping that we would have some related articles to publish this year. Duncan Baker and Brian Austin have provided just such an article. This is their fascinating and carefully researched description of an attempt to procure wireless-telegraphy equipment for use in what became known as the Boer War, three years after Marconi's first demonstration. They have succeeded in using quotations from the original documents to tell much of the story in a very effective manner. The amount of research which went into this article was tremendous, and I'm sure you will appreciate it as much as I did.

There is an appeal for help in the Boer War article. It is particularly aimed at those in the Netherlands, although I'm sure relevant input would be welcomed from any knowledgeable source. As the authors point out, the central character in the South African story, van Trotsenburg, was originally from the Netherlands, and he returned to there after the end of the war. He was relatively young at the time, and could be expected to have had a substantial, subsequent career. Does anyone have any information on this? If so, please contact the authors or send it to the *Magazine*, and, hopefully, we'll be able to publish a follow-up.

Do you use iterative solvers to solve sets of linear equations, such as occur in MoM calculations? Then read the EM Programmer's Notebook in this issue. It has an excellent comparative study of linear-system solvers, by Forsman, Gropp, Kettunen, Levine, and Salonen. Furthermore, John Volakis has provided a very nice summary of both the methods and algorithms for the most-commonly-used techniques, by way of introduction. The Antenna Designer's Notebook has a useful treatment of the effect of tolerances on sidelobes in arrays using corporate feeds. There are lots of other interesting and useful items in this issue, including a proposal for a new way of classifying rotationally symmetric antennas, and a description of a symposium marking the Marconi centennial.

Help, please! As I announced in last issue's column, the *Magazine* needs a new Advertising Manager. If you are interested, or if you know somebody who might be, please call, fax, or e-mail me as soon as possible. Until we find a replacement, Jeff Young and I will be "juggling" that job between us. If you want to place an ad, contact me directly, for the time being.

Pseudo trash. No, that isn't a potential new title for this column: it's the term which might be applied to a phenomenon I observed on one of the disks I recently received. This was a Macintosh floppy disk, sent with a copy of one of the contributions for this issue. I don't claim to be a Mac expert, but what I think happened was something like this. The person who made this disk had dragged some files into the trashcan on their Mac desktop. I suspect that these were files which had originally been on the floppy: they were cleaning off the floppy, to use it to send the file with their contribution to me. However, unless you select "Empty Trash" under "Special" on the desktop menu bar, those files remain easily recoverable. That was not done. The file with the contribution was then dragged onto the floppy, and the floppy was sent to me. When I inserted this disk into another Mac, I noticed that there was a huge discrepancy between the number of files shown on the floppy, and the number of files checked by some virus-scanning software, which scanned the disk when it was inserted. The difference, of course, was due to the dozen or so files from the "unemptied" trash on the floppy–which now appeared in the trashcan of the Mac I was using. Of course, I had access to those files by simply opening the trashcan (no, there wasn't anything the least bit interesting in those files–not that I looked!). However, there is a moral here: if you don't want to send copies of your "trash" along with what you send out, make sure you empty it! Actually, to be sure, you should reformat–"initialize," in Mac parlance–the floppy. Well, at least in theory, to be *really* sure, you need to do more than that (I'm thinking of a tape one of our former Presidents thought he had erased)–but if you're worried to that extent, you shouldn't be sending out used floppies!

Someone actually reads this column! Actually, several of our Canadian readers were kind enough to point out that, in my haste to express thanks to our readers and Staff, I moved Canada's October Thanksgiving celebration into November. Rest assured, this didn't alter the sincerity of the wishes.

Given the timing of this issue and the last one, I didn't have the opportunity to note another event in a timely fashion. Small companies are not too rare, in our field, in North America. However, they are definitely much rarer in other parts of the world. Successful small companies–let alone those which are both successful and relatively small for as long as 30 years–are rare wherever they can be found. One such company is Antenna Giken Company Limited, of Omiya, Japan, founded by Gentei Sato (Sato Gentei), whose articles have appeared several times in the *Magazine*. Antenna Giken celebrated 30 years of operation December 1, 1995. I had the privilege of visiting this company several years ago, and I have had the pleasure of knowing several people associated with it. Like most successful small companies I've known, it is also unusual in the degree to which those involved are treated like, and feel a part of, an extended family. Congratulations, and may you enjoy at least another 30 years of success!

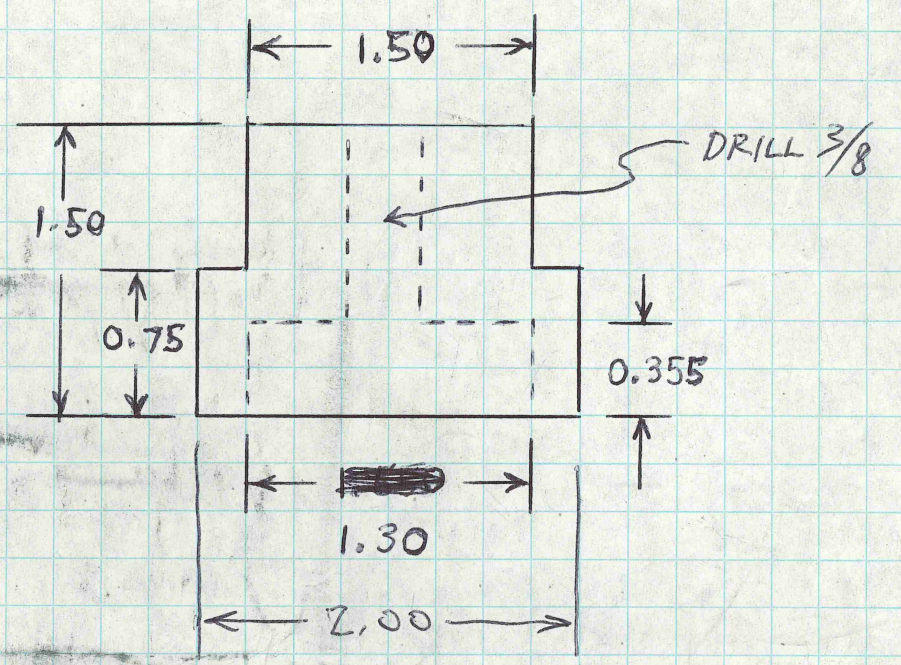
Assuming you get this in January, I do want to repeat my very best wishes to you, your family, and your colleagues for a most happy and prosperous New Year. May it bring you health, fascinating and fulfilling work, and peace.

Roll

ALUMINUM

MAKE 2EA,

COIL WINDER
BEARING SUPPORT

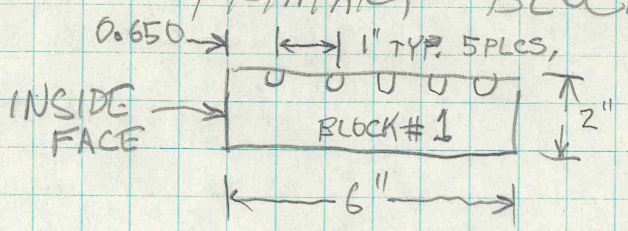


TOPS FORM 3314

BEEZLEY COIL NOTES
8-18-89

PRIMARY
I.D. ≈ 13.00"
O.D. ≈ 21.50"

PRIMARY BLOCKS

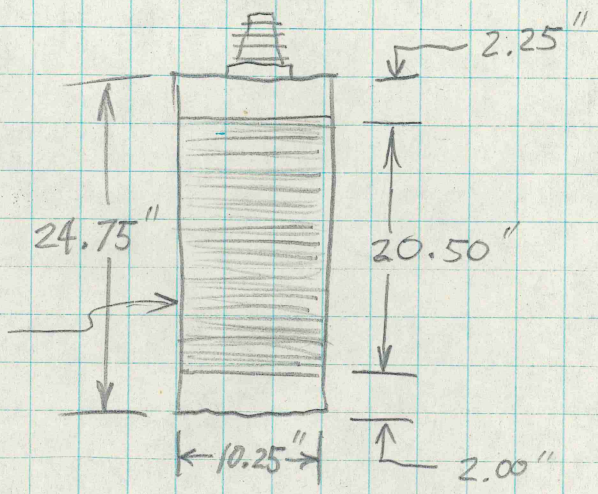


NOTE:
RESONANCE TAP @ 4 1/8 TURNS

PRIMARY IS 3/8" CU TUBING: COUNTER-CLOCK WISE WOUND 5 TURNS

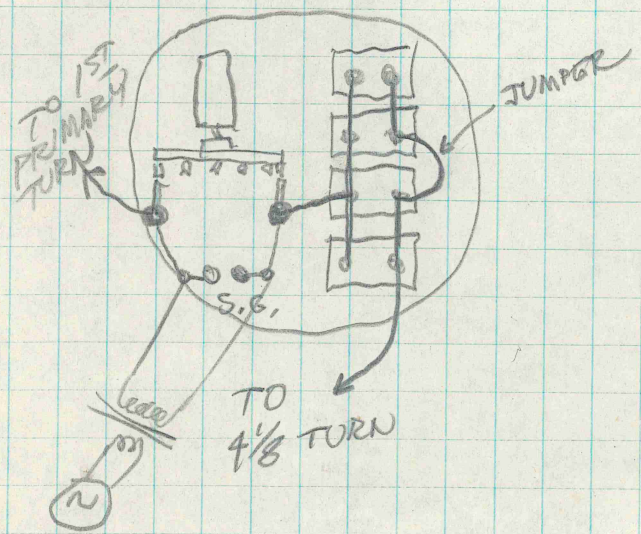
ROT GAP
3600 RPM SYNCRONOUS
GAP DIA. = 6.50" B.C.
10 STUDS

MAIN SECONDARY

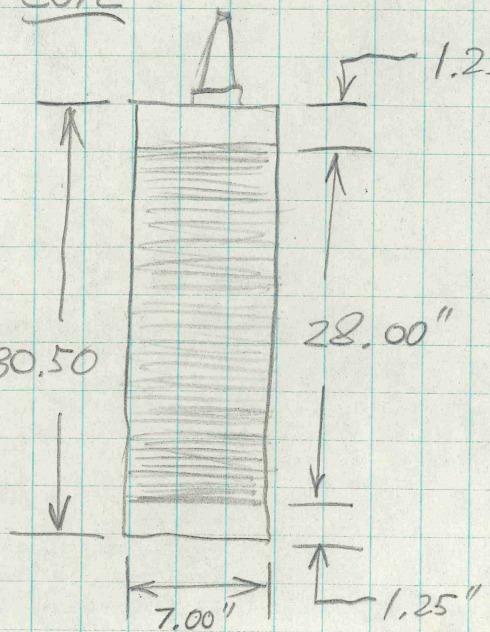


MEASURED INDUCTANCE
12.0 MH

LAYOUT



EXTRA COIL



MEASURED INDUCTANCE
8.4 MH

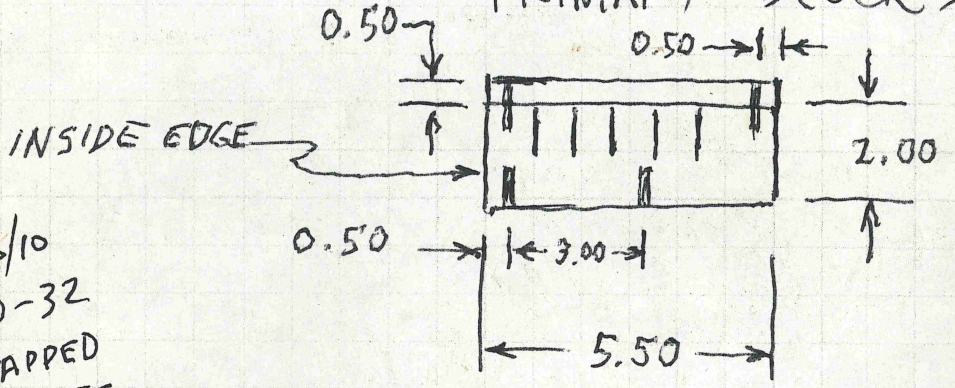
AEROFLEX LINTEK

383 N. Liberty Road • Powell, Ohio 43065 Phone: (614) 888-2700 • Fax: (614) 888-4778

MINI GPO-2 COIL

9/29/03

PRIMARY BLOCKS

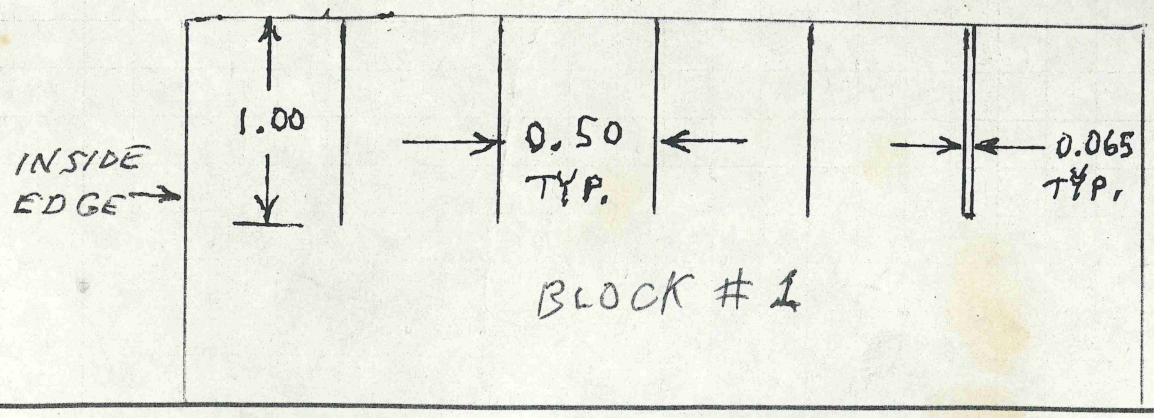


4/26/10
10-32
TAPPED
HOLES

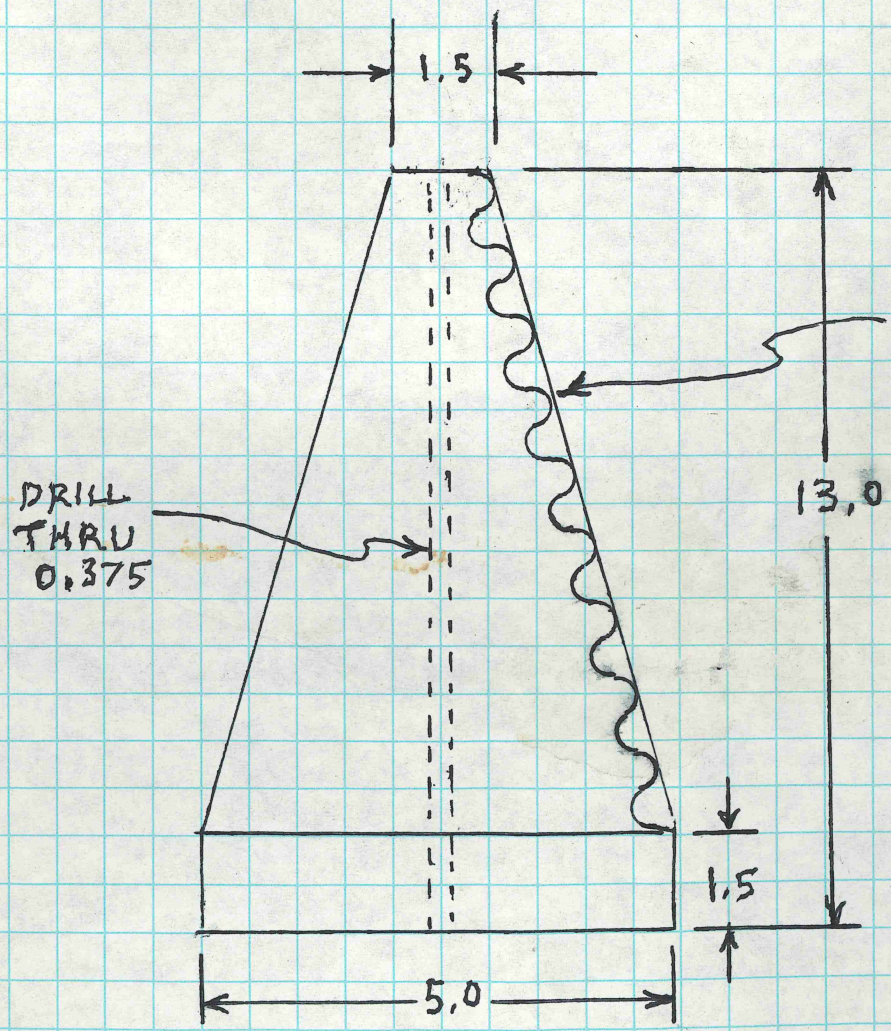
BLOCK #	1ST SLOT
1	0.80
2	0.90
3	1.00
4	1.10
5	1.20
6	1.30
7	1.40
8	1.50

4/26/10
SLOT WIDTH 0.063
SLOT DEPTH 1.00

4/26/10
8 SLOTS TOTAL
EA. BLOCK
EXECPT BLOCK #8
WHICH HAS 7 SLOTS



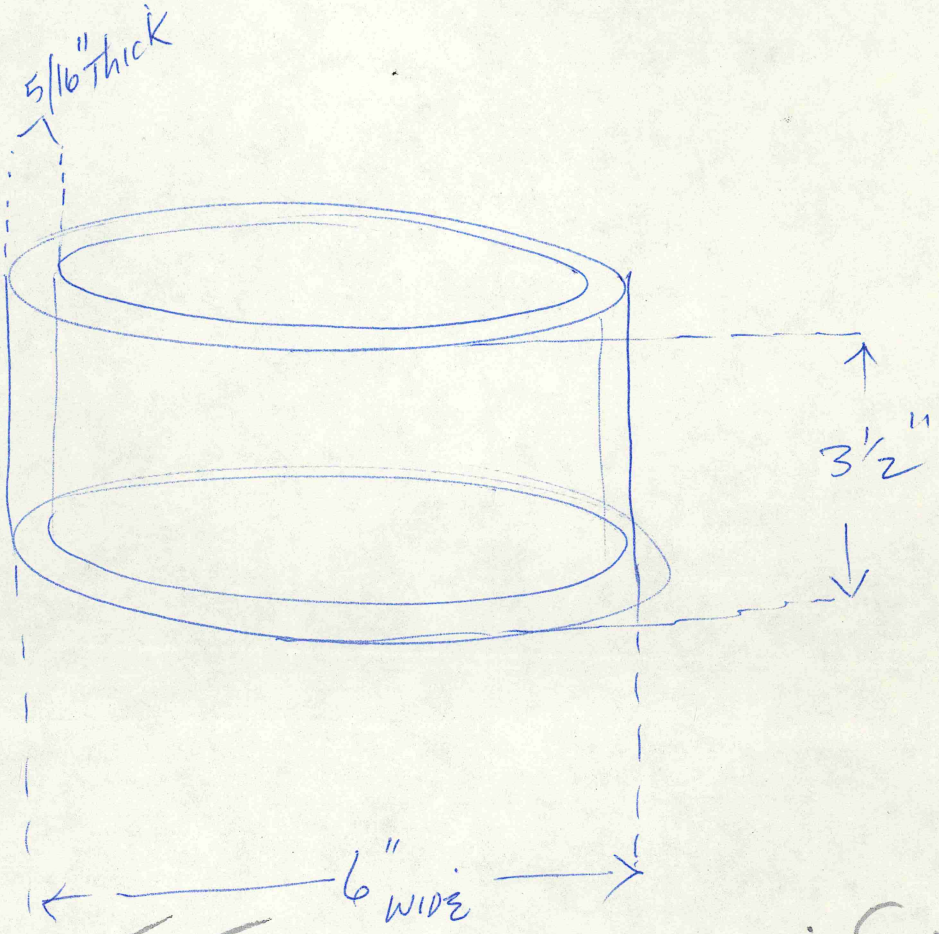
BLOCK # 1



1 EA.
BLACK DELRIN

5/19/10

TOPS FORM 3314
LITHO IN U. S. A.



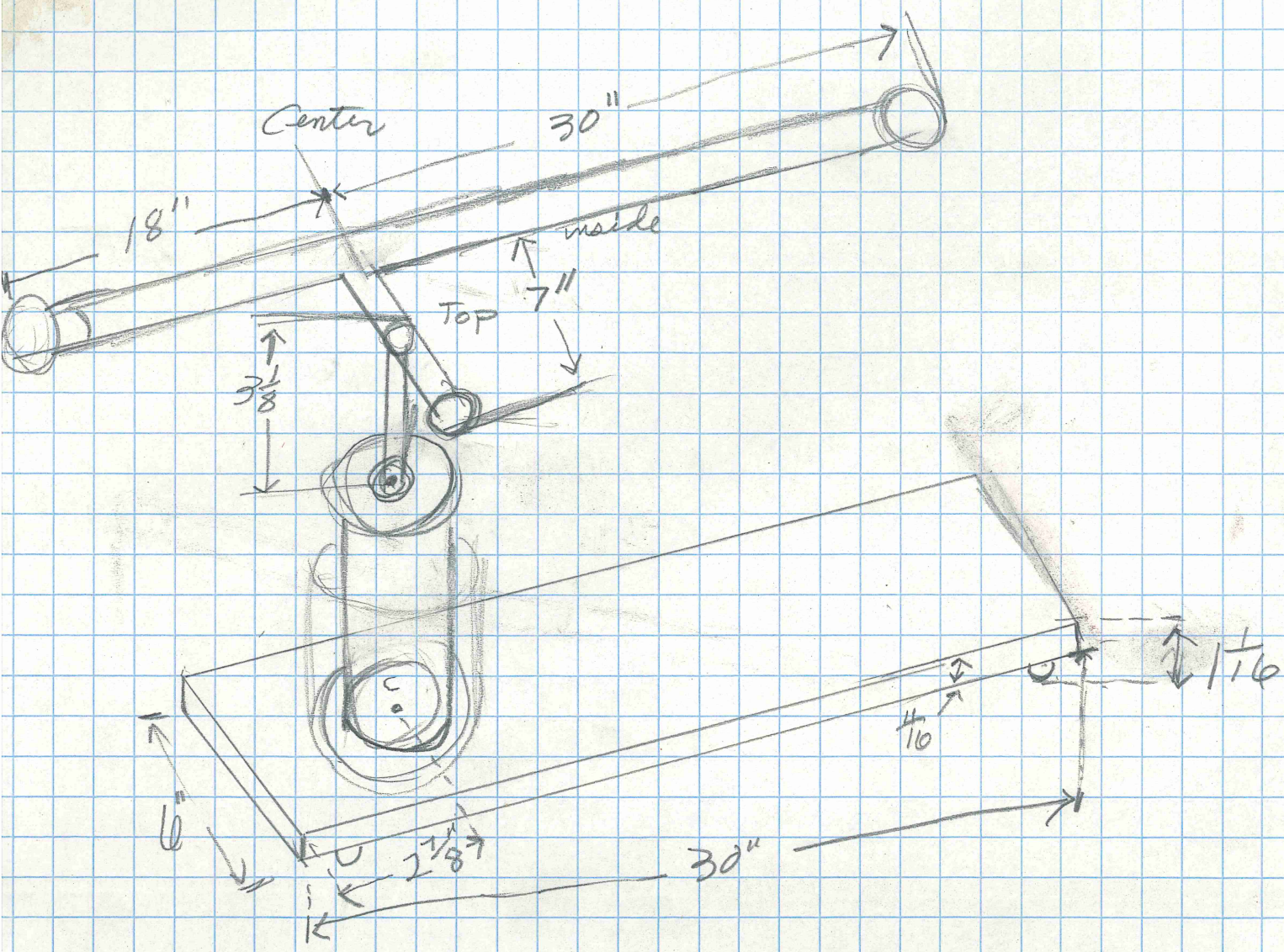
Bill

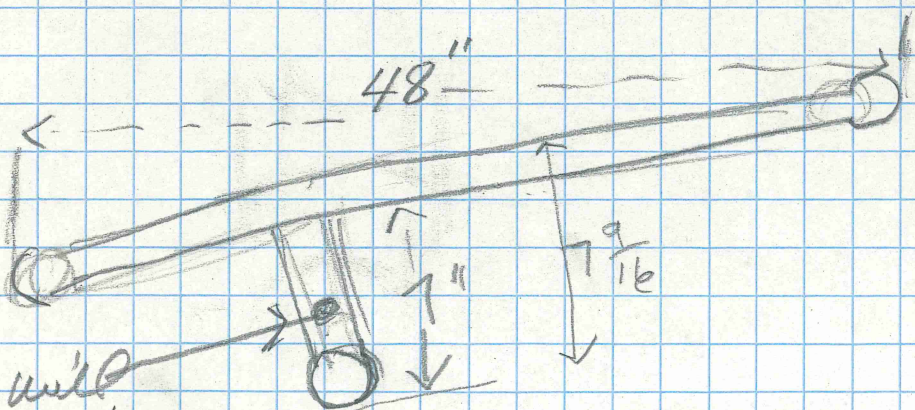
This one is just right for the #5 coil Torris Size.

Best - D.

Hi Bill,

I hope this makes sense.



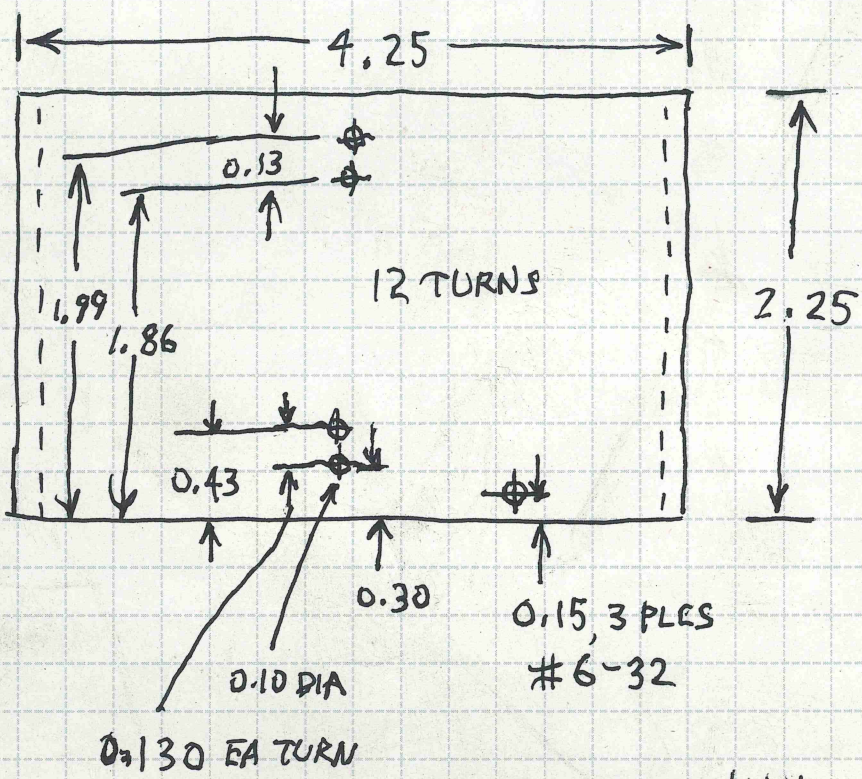


I will drill a hole to coil

Thanks
Mary

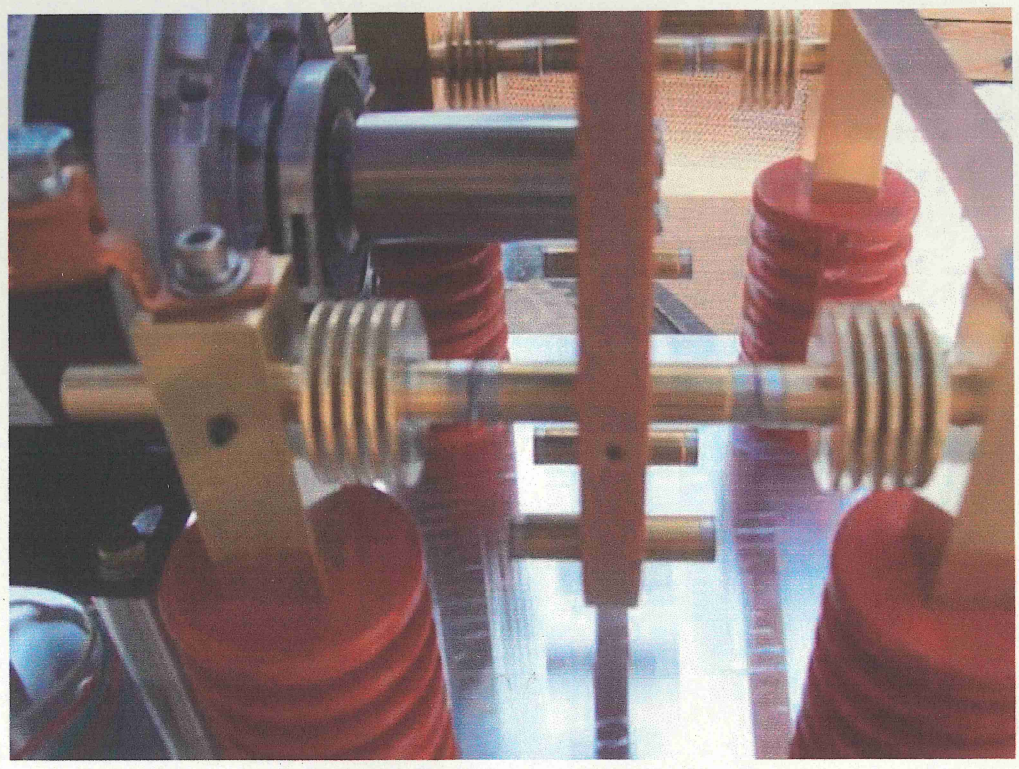
7/24/11

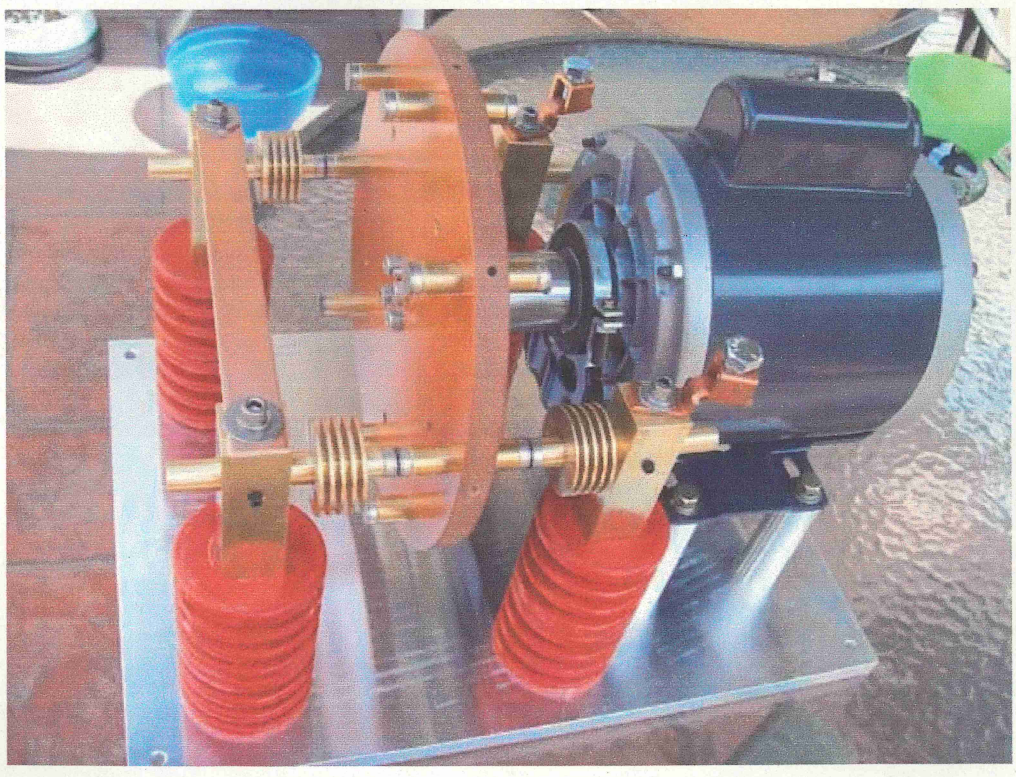
MARY CORSE
PRIMARY



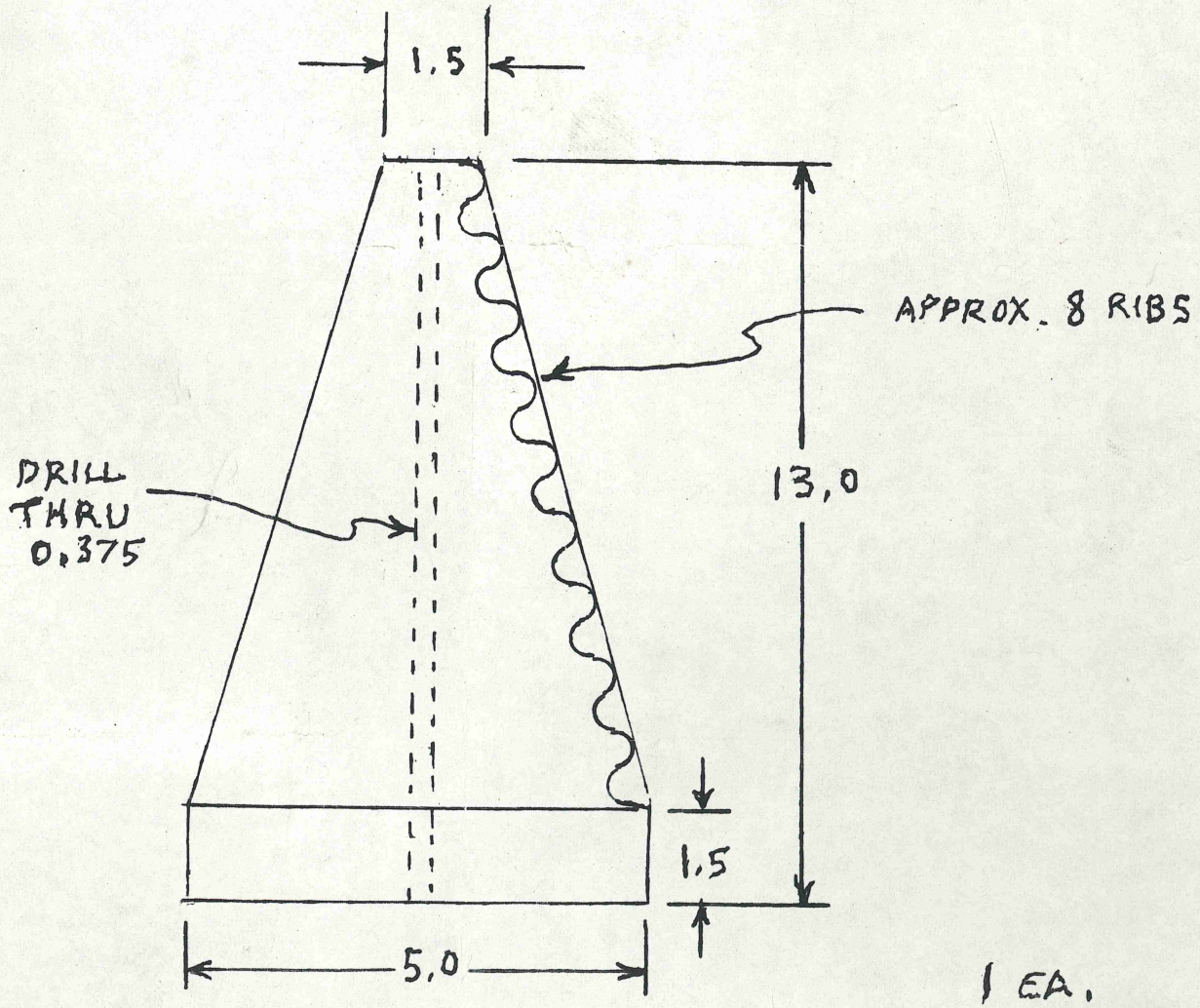


12 TURNS = 1.99"







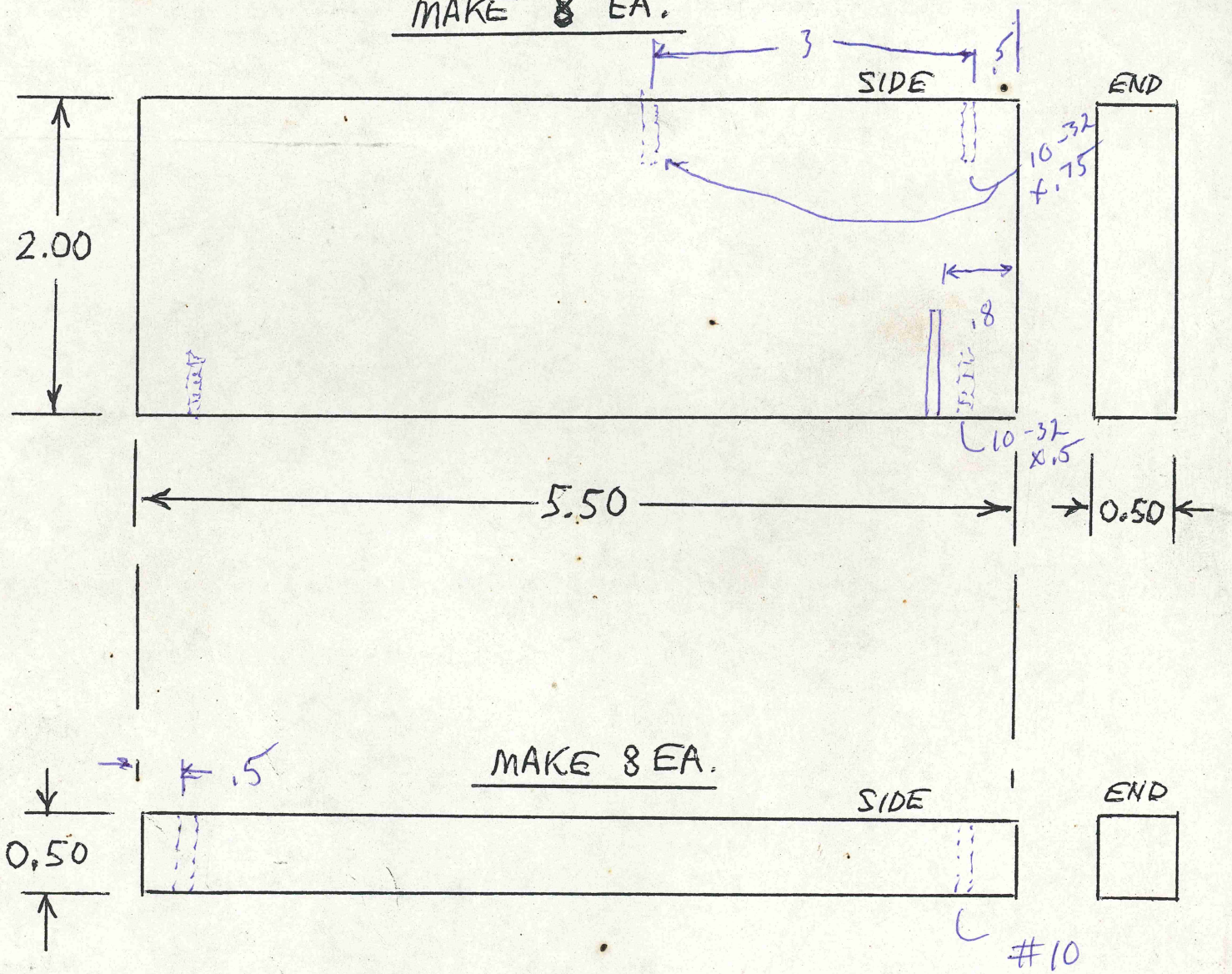


1 EA.
BLACK DELRIN
5/19/10

9-2-03

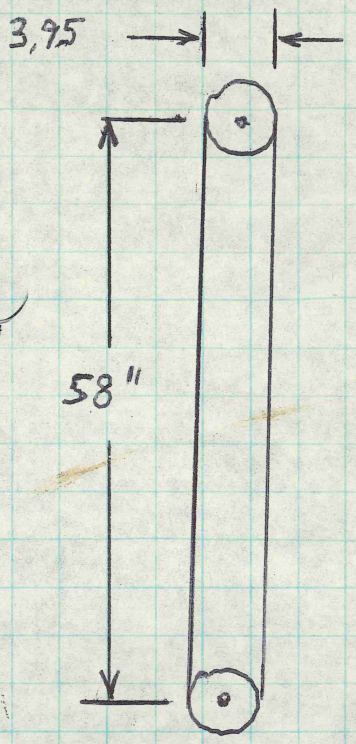
MINI GPO-2 COIL

PRIMARY PHENOLIC BLOCK

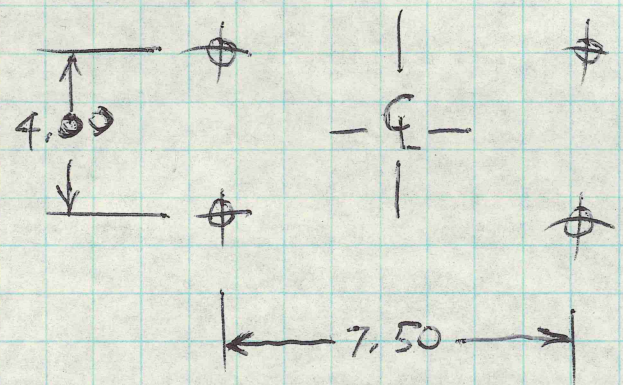


SCI 4/30/05

IMV VGD NOTES



LOWER TEFLON PULLY MOUNTS



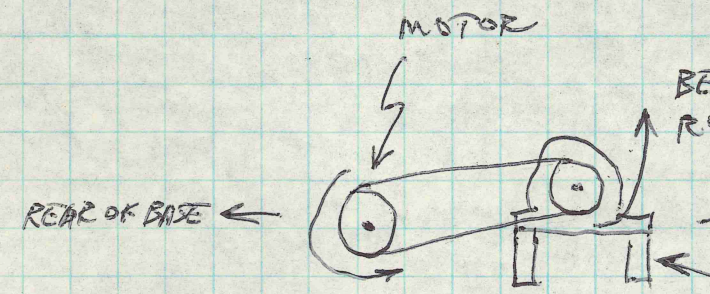
$\pi D = 12.40$

$2 \times 58 = 116.00$

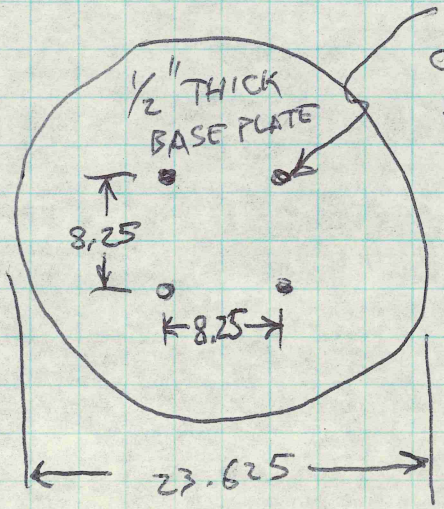
128.40

$(-24)\ 24.00$

BELT LENGTH 104.40



2.00 PHENOLIC SPACERS
1.25 O.D. DRILL & TAP 3/8-16 x 1.00 EA. END

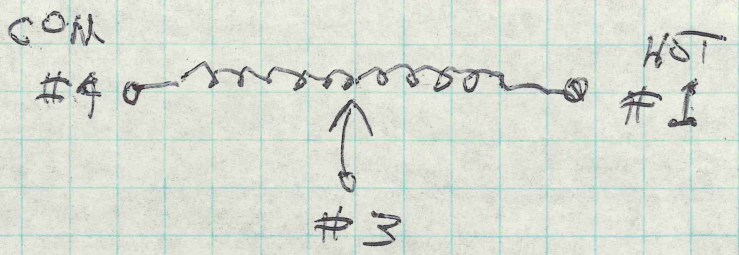


SCI VDG NOTES

ADJUST - A - VOLT

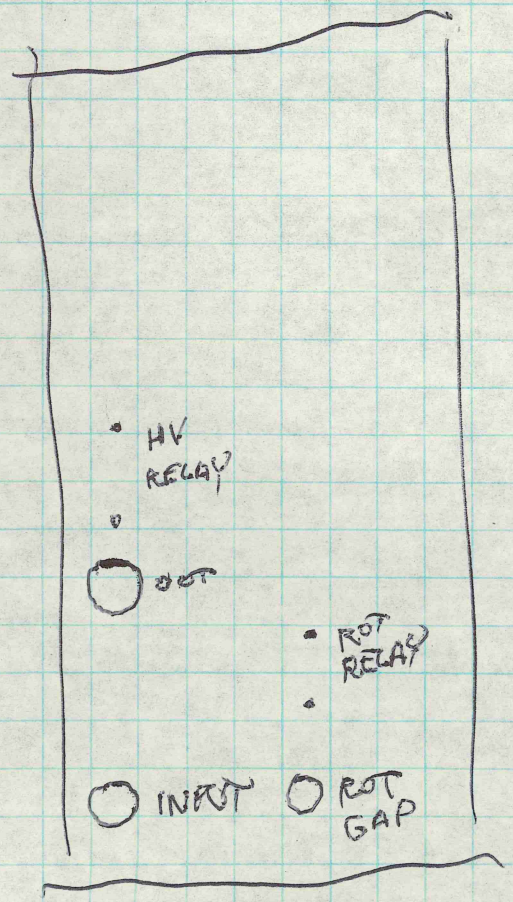
500 BU

7.5 A

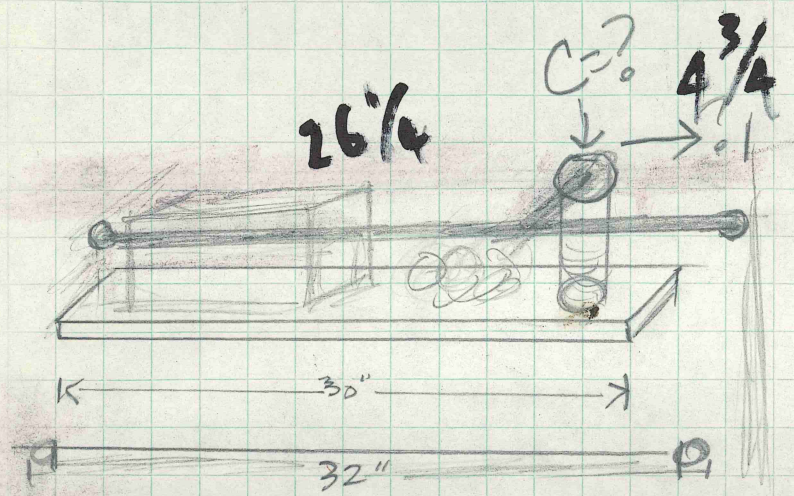


HEINEMANN CAT. # AM12MG3-10-7

125 VAC 10 AMP CURVE 5

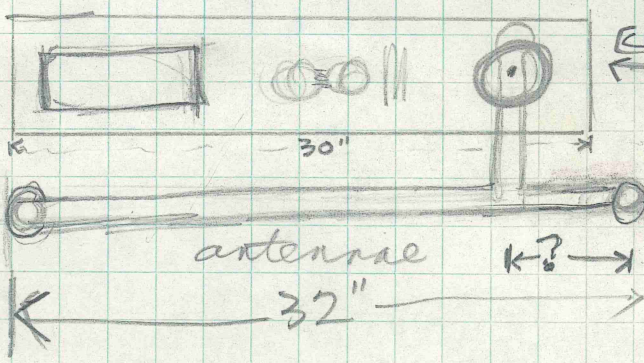


these 36" antennas are too long anyway – 32" is all I need



I 3 9/16"

need (4)



COMPLETE
6/19/07

P.S.

Check is in

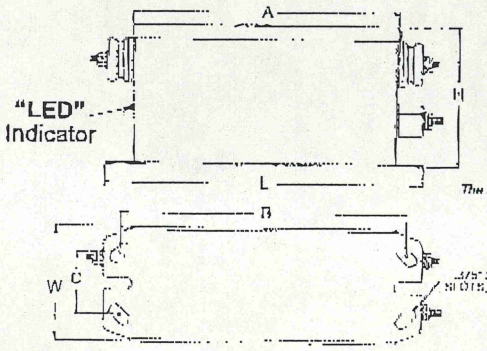
MAILBOX

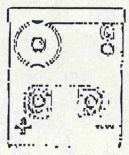
NORMAL POWER FACTOR

Catalog Number	VAC	Hz	Secondary		Primary	Input	Wt.	Case Dimensions					
			Volts	mA	VA	Amps	Lbs.	L	W	H	A	B	C
15030 P5G-2	120	60	15000	30	475	3.95	21	11.25	4.656	5.205	9.203	10.125	3.0
12030 P5G-2	120	60	12000	30	380	3.15	18	11.25	4.656	5.205	9.203	10.125	3.0
10530 P5G-2	120	60	10500	30	320	2.65	18	11.25	4.656	5.205	9.203	10.125	3.0
9030 P5G-2	120	60	9000	30	300	2.50	13	10.00	3.700	4.890	8.375	9.000	2.0
7530 P5G-2	120	60	7500	30	250	2.10	12	10.00	3.700	4.890	8.375	9.000	2.0
6030 P5G-2	120	60	6000	30	200	1.15	12	10.00	3.700	4.890	8.375	9.000	2.0
5030 P5G-2	120	60	5000	30	170	1.40	12	10.00	3.700	4.890	8.375	9.000	2.0
4030 P5G-2	120	60	4000	30	140	1.65	11	10.00	3.700	4.890	8.375	9.000	2.0
15060 P5G-2	120	60	15000	60	900	7.50	39	13.00	5.375	6.200	10.875	11.875	3.0
12060 P5G-2	120	60	12000	60	720	6.00	37	13.00	5.375	6.200	10.875	11.875	3.0
9060 P5G-2	120	60	9000	60	595	4.95	24	11.25	4.656	5.205	9.203	10.125	3.0
7560 P5G-2	120	60	7500	60	475	3.95	21	11.25	4.656	5.205	9.203	10.125	3.0
6060 P5G-2	120	60	6000	60	380	3.15	19	11.25	4.656	5.205	9.203	10.125	3.0
5060 P5G-2	120	60	5000	60	320	2.65	18	11.25	4.656	5.205	9.203	10.125	3.0
4060 P5G-2	120	60	4000	60	265	2.20	13	10.00	3.700	4.890	8.375	9.000	2.0
15030 P5G-2	277	60	15000	30	500	1.80	21	11.25	4.656	5.205	9.203	10.125	3.0
12030 P5G-2	277	60	12000	30	400	1.45	19	11.25	4.656	5.205	9.203	10.125	3.0
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6030 P5G-2	277	60	6000	30	210	.75	12	10.00	3.700	4.890	8.375	9.000	2.0
5030 P5G-2	277	60	5000	30	165	.60	12	10.00	3.700	4.890	8.375	9.000	2.0
4030 P5G-2	277	60	4000	30	140	.50	11	10.00	3.700	4.890	8.375	9.000	2.0
15060 P5G-2	277	60	15000	60	940	3.40	39	13.00	5.375	6.200	10.875	11.875	3.0
12060 P5G-2	277	60	12000	60	750	2.70	37	13.00	5.375	6.200	10.875	11.875	3.0
9060 P5G-2	277	60	9000	60	595	2.15	24	11.25	4.656	5.205	9.203	10.125	3.0
7560 P5G-2	277	60	7500	60	500	1.80	21	11.25	4.656	5.205	9.203	10.125	3.0
6060 P5G-2	277	60	6000	60	400	1.45	20	11.25	4.656	5.205	9.203	10.125	3.0
5060 P5G-2	277	60	5000	60	330	1.20	19	11.25	4.656	5.205	9.203	10.125	3.0
4060 P5G-2	277	60	4000	60	240	0.87	13	10.00	3.700	4.890	8.375	9.000	2.0

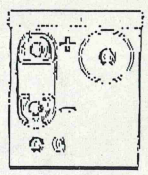
HIGH POWER FACTOR

Catalog Number	VAC	Hz	Secondary		Primary	Input	Wt.	Case Dimensions					
			Volts	mA	VA	Amps	Lbs.	L	W	H	A	B	C
15030 P5CG-2	120	60	15000	30	240	2.00	26	11.25	4.656	6.062	9.203	10.125	3.0
12030 P5CG-2	120	60	12000	30	190	1.60	25	11.25	4.656	6.062	9.203	10.125	3.0
10530 P5CG-2	120	60	10500	30	170	1.40	21	11.25	4.150	5.580	9.203	10.125	3.0
9030 P5CG-2	120	60	9000	30	145	1.20	19	11.25	4.150	5.580	9.203	10.125	3.0
7530 P5CG-2	120	60	7500	30	120	1.00	19	11.25	4.150	5.580	9.203	10.125	3.0
15060 P5CG-2	120	60	15000	60	495	4.15	39	13.00	5.375	6.200	10.875	11.875	3.0
12060 P5CG-2	120	60	12000	60	400	3.35	37	13.00	5.375	6.200	10.875	11.875	3.0
9060 P5CG-2	120	60	9000	60	300	2.50	26	11.25	4.656	6.062	9.203	10.125	3.0
7560 P5CG-2	120	60	7500	60	240	2.00	26	11.25	4.656	6.062	9.203	10.125	3.0
6060 P5CG-2	120	60	6000	60	190	1.60	26	11.25	4.656	6.062	9.203	10.125	3.0
5060 P5CG-2	120	60	5000	60	170	1.40	21	11.25	4.150	5.580	9.203	10.125	3.0
4060 P5CG-2	120	60	4000	60	145	1.20	21	11.25	4.150	5.580	9.203	10.125	3.0





The 9030 P5G-2U & 7530 P5G-2 has horizontal mounting of primary bushing as shown in diagram above



This end view of primary bushing is applicable to all units except the 9030 P5G-2 & 7530 P5G-2

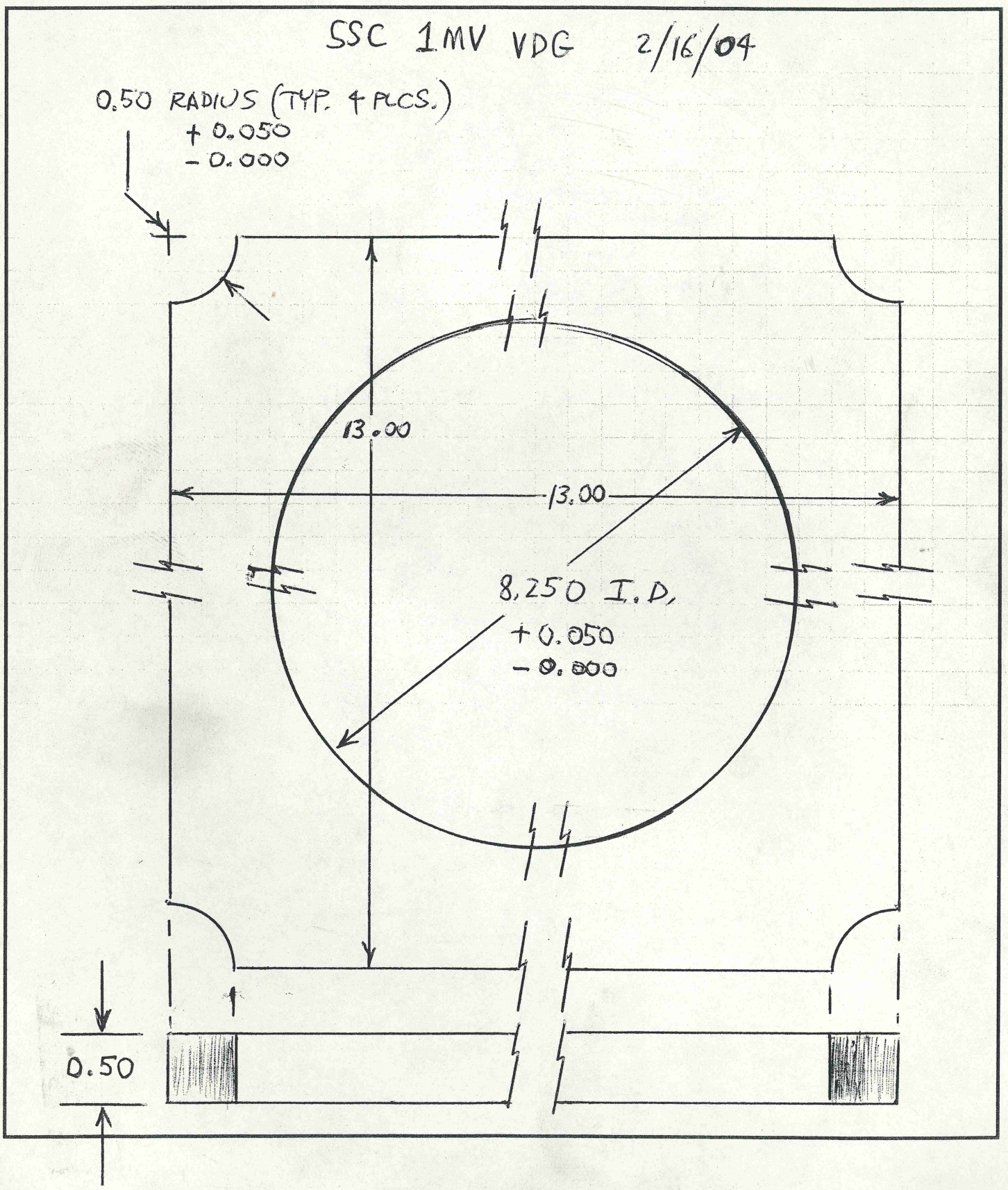
* UL does not have listing requirements for transformers that are remotely dimmed or flashed.

* High Power Factor Models may not be flashed.

10/24/03

AEROFLEX LINTEK

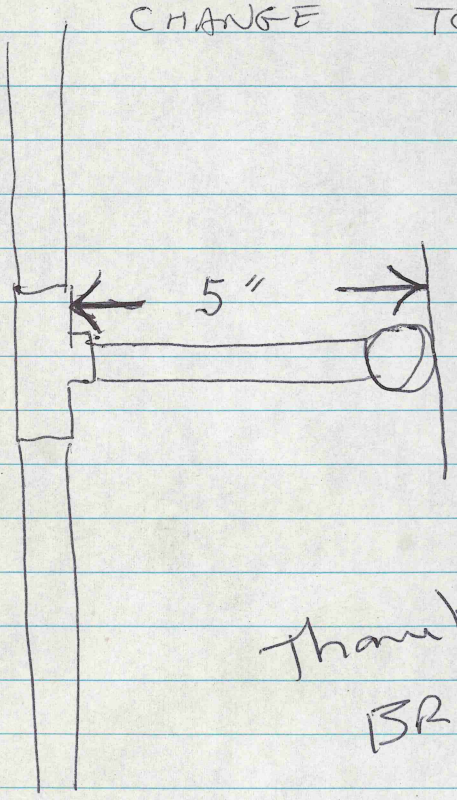
383 N. Liberty Road • Powell, Ohio 43065 Phone: (614) 888-2700 • Fax: (614) 888-4778



BILL –

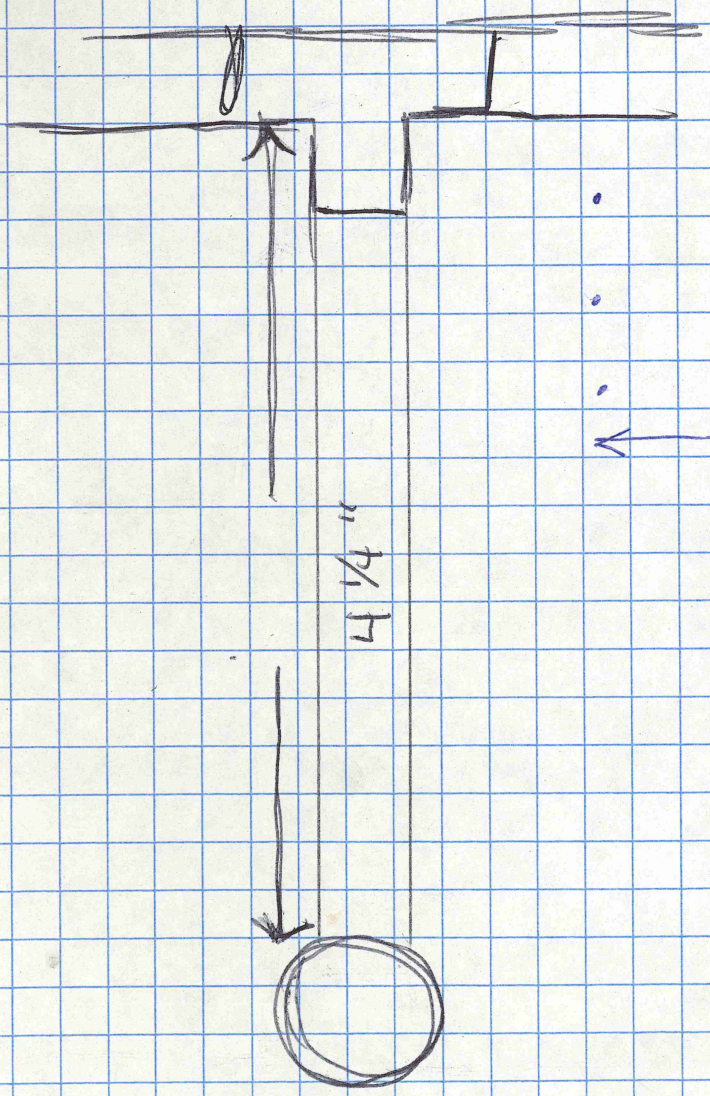
WE MADE A MISTAKE ON MEASURING THE SHORT ARM OF ELECTRODE – WILL PAY YOU FOR RECONSTRUCTION ——

CHANGE TO –



Thanks
BRAD

TO BILL WAYSOCK
2527 TREELANE AVE
MONROVIA CA 91016



- BARS STRAIGHT
- NO HOLES
- CORRECT LENGTH ON SHORT ARM ←

THANKS BILL /
BRAD

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A passion for performance.

www.aeroflex.com

MARY COURSE
23 MAY 2008

5 EA. NEW MICA CAPACITORS
INCLUDING S&H $ 1,248.85

10 EA. FANS & CORDS $ 159.93

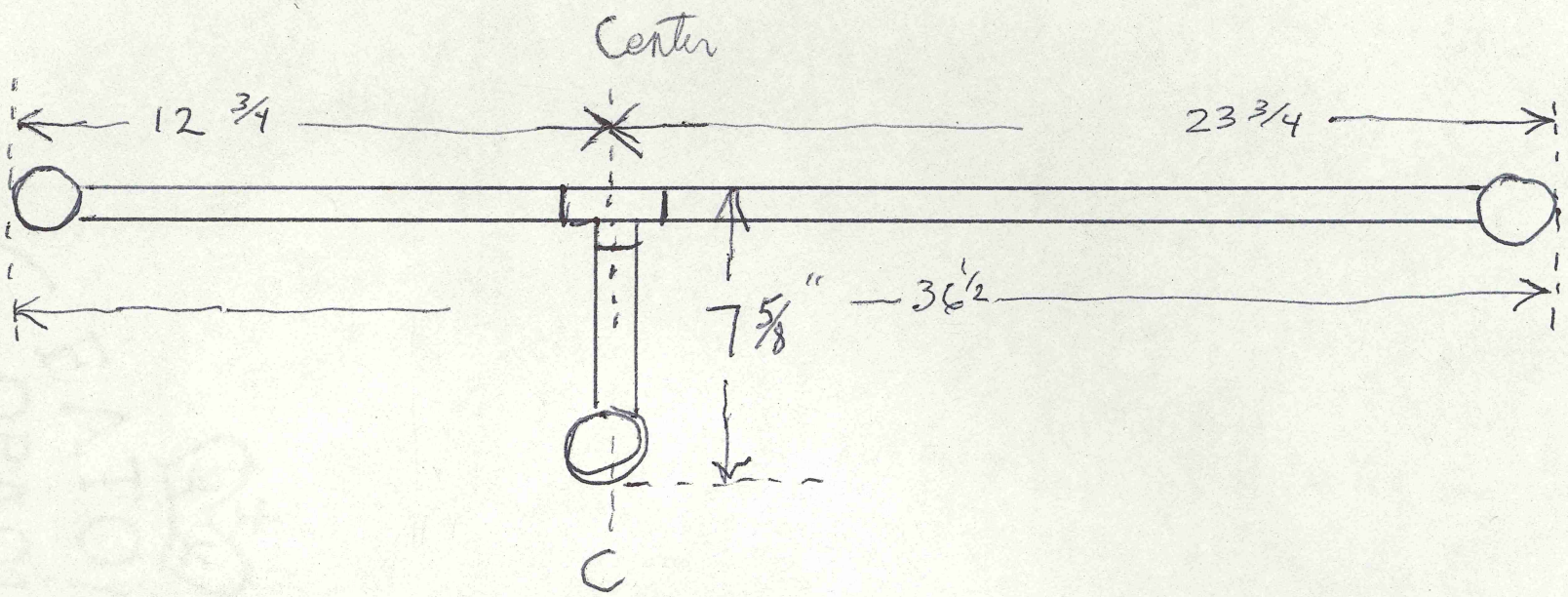
SUB TOTAL $ 1,408.70

4 EA. NEW COPPER
DISCHARGE ELECTRODES $100.00

INVOICE FOR 5/23/08 TOTAL $ 1,508.78 P.I.F.

6/1/08 8 EA. CU TEES $ 5,84 + TAX = $6.32 TOTAL
4 EA. 48" x 1/2" CU PIPE $ 38.20 + TAX = $41.35 TOTAL

Bell —

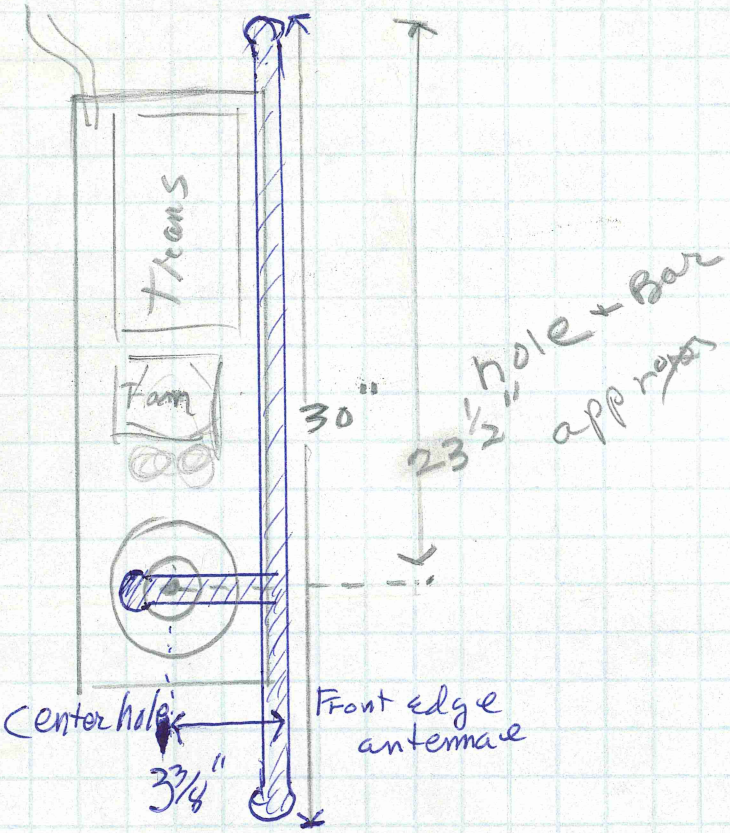


Thanks-

Mary

Hi Bill,

I wonder if you can Sodder 2 antennas (or Bolt) something like this?



I need 2 —

Thanks —

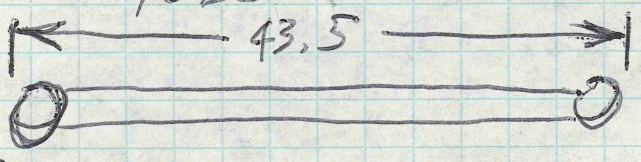
Marny

310 455 1810

A.C. SWITCH
HUBBLG #275

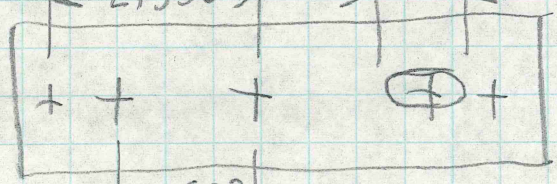
10/16/05 DELIVERED
SEC. COIL = Ω = 9.0
26 AWG

TUBE LENGTH
43.5



±0.100

SPARK GAP
2.550



1.620
5.90

EA. GAP = 0.026 X 2

MARY CORSE
COILS 9/2/05

CAP = .002 @ 6KV

PRI = STD. MODEL 1
10 TURNS

SEC = 3" O.D. X 6" LONG
WINDING LENGTH = 5"
28 AWG
TOP TERMINAL = 2.25" X 1/2"
ALUM.

2-3 WKS DELIVERY
FROM 9/2/05

10/14/05
FRANCE FORMER
CAT. # 641642
120V 180 VA
3,000 V 60 MA.

43.5
- 2.0
41.5

Mary Corse
655 Old Topanga Cyn Rd.
Topanga Ca 90290
310 455 1810

03/24/2010

QUOTATION

★ CMW is ISO 9001:2000 Certified

CMW

THE FORERUNNER IN SPECIALTY METALS

CMW Inc.
Post Office Box 2266
Indianapolis, IN 46206 USA

70 South Gray Street
Indianapolis, IN 46201 USA

MAIN PH: 317 634 8884
MAIN FX: 317 638 2706
www.cmwinc.com

Please reference when ordering▶ **QUOTE/ITEM #** 153321/001

ATTENTION: BILL
TESLA TECHNOLOGY RESEARCH
2527 TREELANE AVENUE
MONROVIA, CA 91016

INQUIRY #:
PHONE #: 626-359-1373
FAX #: 310-336-0623
CUSTOMER #: 00821401
YOUR PART/REV #:

WE SUBMIT THE FOLLOWING QUOTATION FOR YOUR CONSIDERATION

CMW PART#: 33-185-1001 / TUNGSTEN ON STEEL SCREW ASSEMBLY.

QUANTITY	UM	PRICE
150	PC	$1,906.59/C
300	PC	$1,535.65/C

FOB: INDPLS. IN. TERMS: 1% 10 NET 30 OR VISA, MASTERCRD, AMEX ACCEPTED

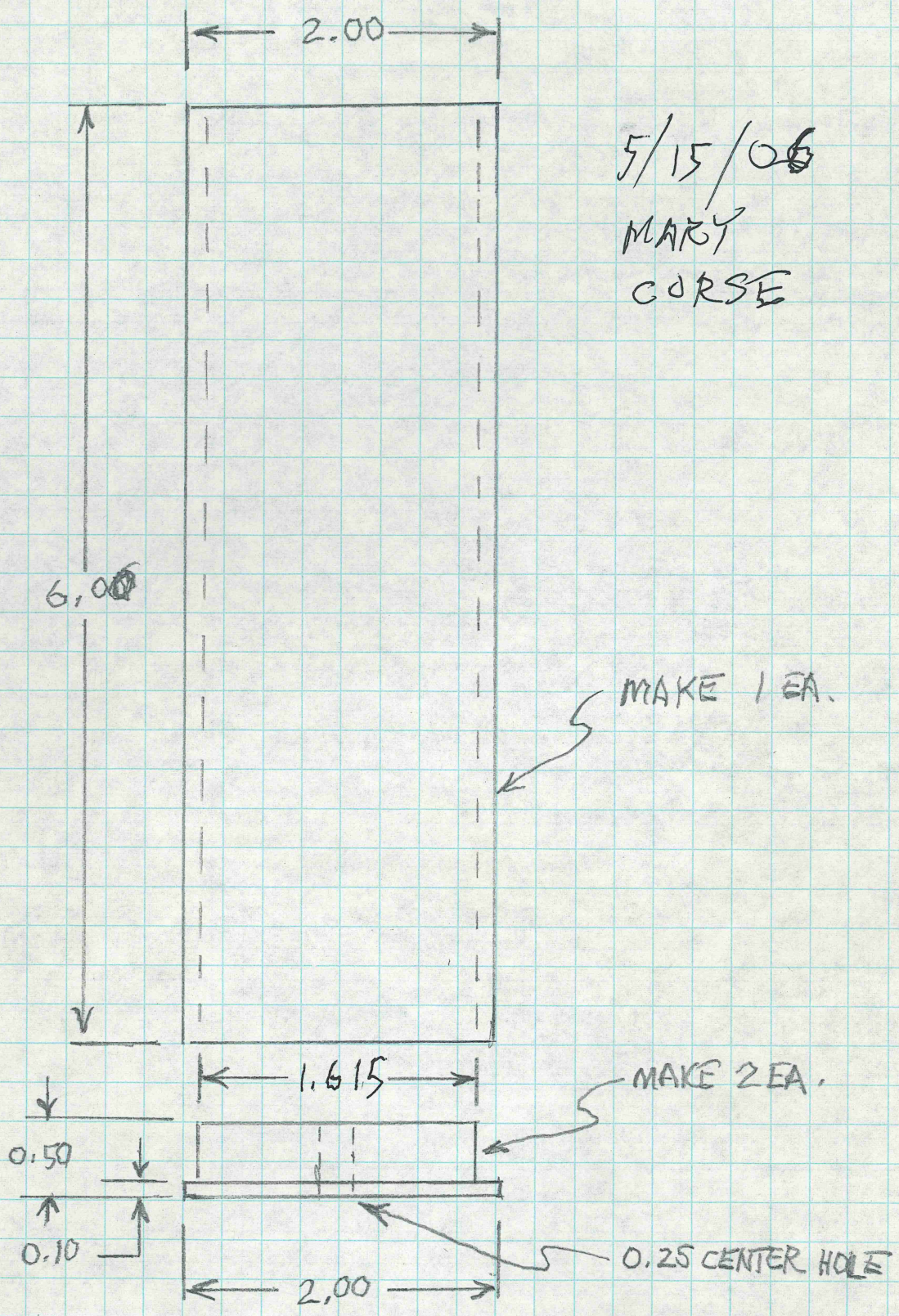
LEAD TIME: 4 TO 6 WEEKS, PLUS ANY NEW TOOLING IF NEEDED

(866) 634-8884
STEVE JONES EXT. 127

IF CERTIFICATION REQ'D :STD Cert of Compliance - No Charge
:Cert of Compliance with Instructions - $25
:Special Requirements - Call for pricing

Quantity shipped will be +/- 10% of quantity ordered. When order requires an exact quantity to be shipped, a 10% charge will be added.
NOTE: Pricing is valid for a period of 30 DAYS from the day of quotation

Thank you for the opportunity Pat



5/15/06
MARY
CORSE

TOPS FORM 99522
MADE IN U.S.A.

AEROFLEX LINTEK

383 N. Liberty Road • Powell, Ohio 43065 Phone: (614) 888-2700 • Fax: (614) 888-4778

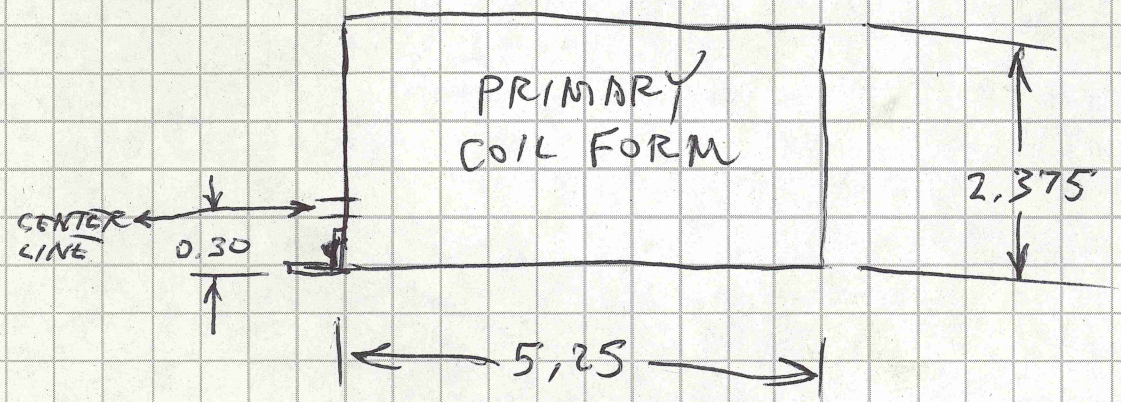
MARY CORSE

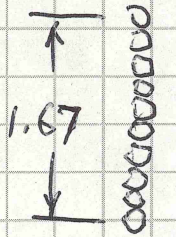
MODEL 1 T.C.

11/6/03

PRIMARY WIRE O.D. = 0.167"

(0.0835R)





10 TURNS

PACKING LIST

SOLD TO ACCOUNT **839410479** TESLA TECHNOLOGY RESEARCH 2527 TREELANE AVE MONROVIA CA 91016-4951	PURCHASE ORDER NUMBER BILL 4-6-2010	DELIVERY DATE AND TIME 04/07/2010 06:57	EMPLOYEE BNMEF	PAGE 1 OF 1
	DEPARTMENT NUMBER	DBT/CRD CODE Z001	SALES ORDER NUMBER **1101848297**	DELIVERY **6128088676**
CALLER BILL WYSOCK	REQUISITIONER	BRANCH ADDRESS 12780 SCHABARUM AVE. IRWINDALE CA 91706-6801 626-337-7668		
TELEPHONE NUMBER 6263591373	PROJECT/JOB NUMBER			
SHIP TO **TESLA TECHNOLOGY RESEARCH** **2527 TREELANE AVE** **MONROVIA CA 91016**	PO RELEASE NUMBER	CHECK NUMBER	CHECK AMOUNT	CASH REC'D/PAID / TRANS TYPE WC
	SPECIAL INSTRUCTIONS	INVOICE WILL FOLLOW SALES TERMS AND CONDITIONS ON REVERSE SIDE **THANK YOU FOR YOUR ORDER**		
ATTENTION	CARRIER NAME NONE	# OF BOXES	FREIGHT TERMS PPA	DATE SHIPPED/PICKED UP

ITEM DESCRIPTION	ITEM NUMBER	SHIP QTY	BACKORDER MESSAGE	TAX	UNIT PRICE	TOTAL
Motor,1/2 HP,General	**6K764**	1		E	**178.50**	**178.50**
Motor,1/2 HP,General	**6XH89**	1		E	**166.75**	**166.75**

Upon the return for credit and or replacement of the above listed Grainger product(s), customer warrants and represents that no property damage or personal injury has resulted from use of returned product(s) and customer further agrees that it will not assert any claim against W.W. Grainger, Inc., its subsidiaries and divisions or its suppliers in any suit involving the above listed product(s).

GRAINGER
FOR THE ONES WHO GET IT DONE

I certify that if I am purchasing the material(s) as "materials of trade" as defined in the Hazardous Materials Regulations Title 49 of the Code of Federal Regulations. I intend to use the materia(s) in direct support of my principal business (which is not transportation), and I do not intend to resell the material, or transport them in a vehicle other than my own.

FREIGHT	0.00
TAX	0.00
TOTAL	345.25

These items are sold for domestic consumption in the United States. If exported, purchaser assumes full responsibility for compliance with US export controls.

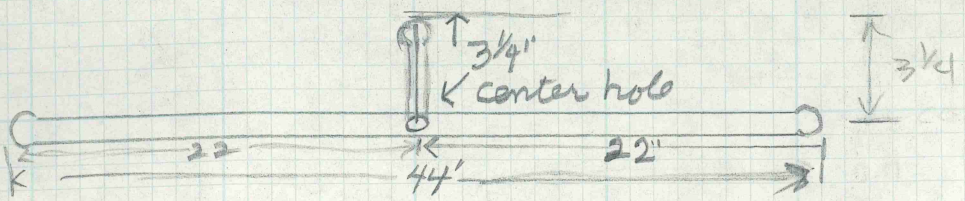
SAP DELIVERY
6128088676



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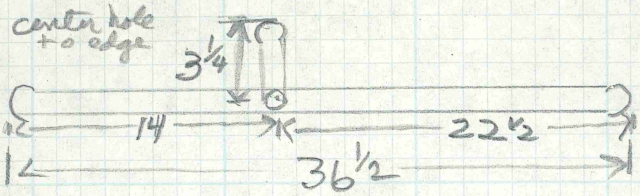
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need 2



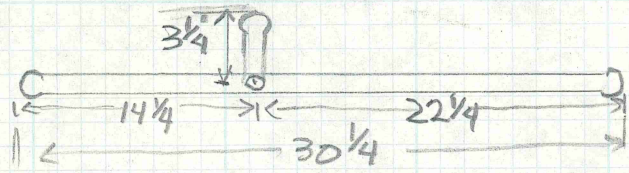
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need 2



#3

need 2



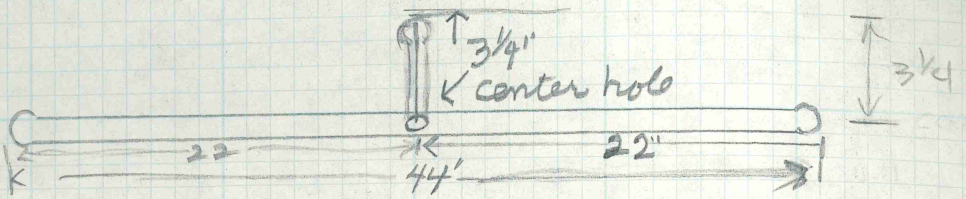
FRANCE # 641642 S/N 10/86

Thanks Bill —

See you Sun —

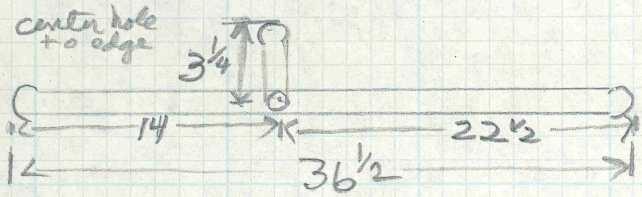
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need 2



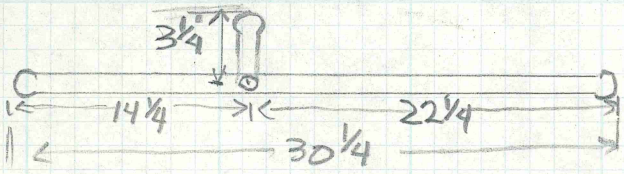
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need 2



#3

need 2

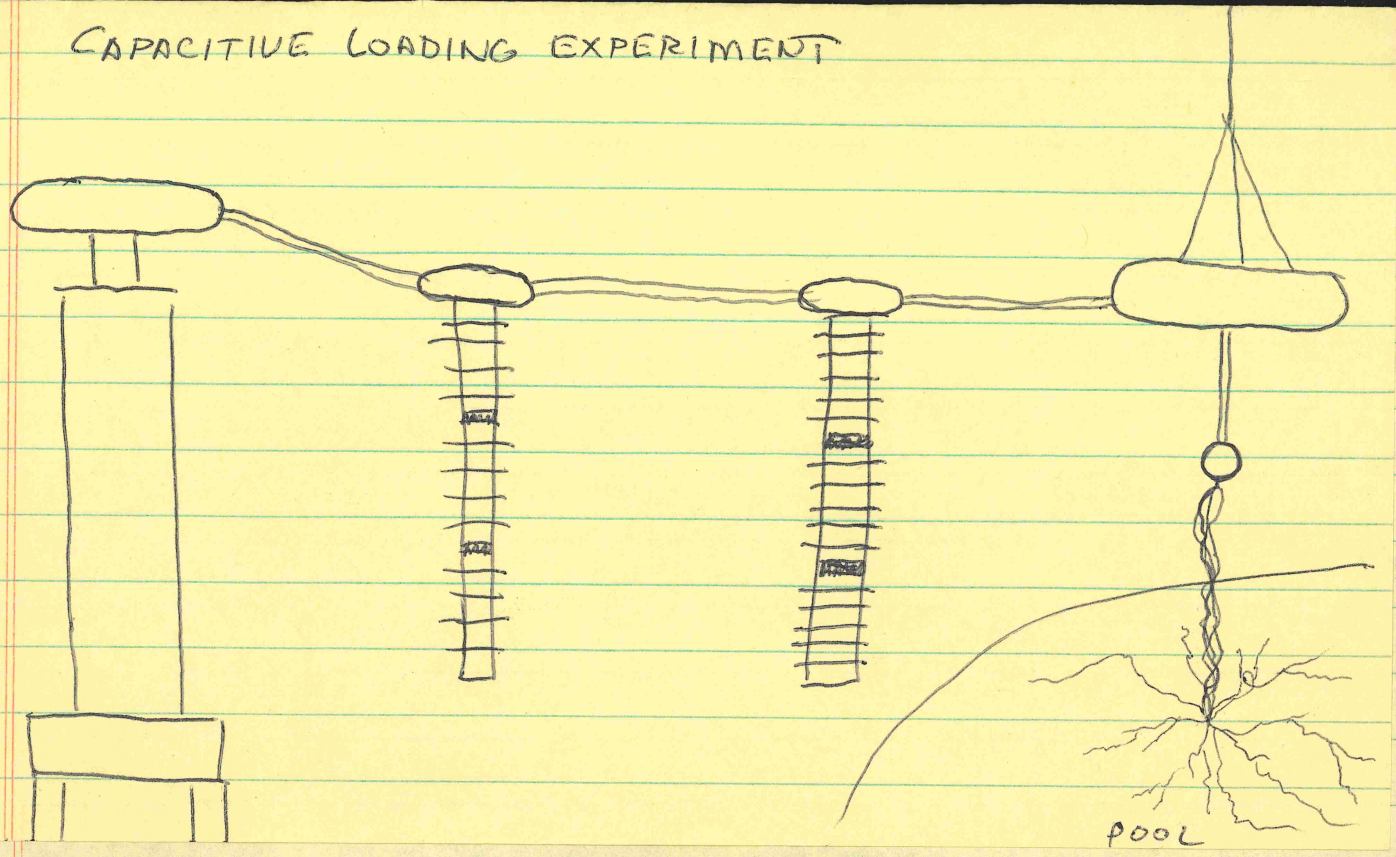


FRANCE # 641642 S/N 10/86

Thanks Bill

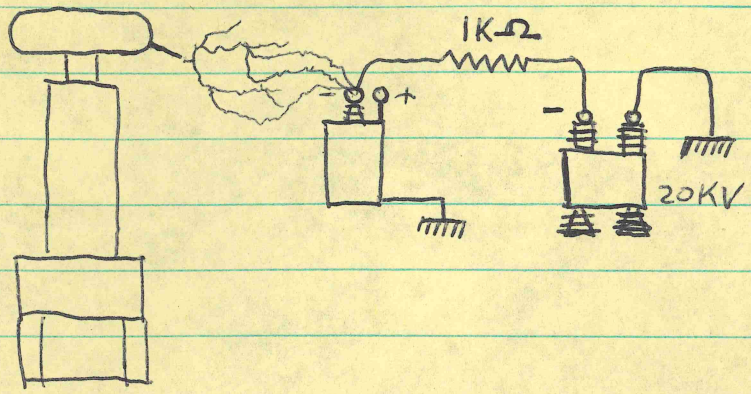
See you Sun

2. CAPACITIVE LOADING EXPERIMENT



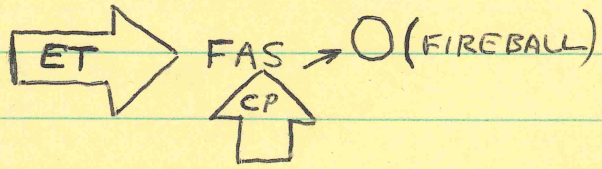
- IDEAS - 4-15-80

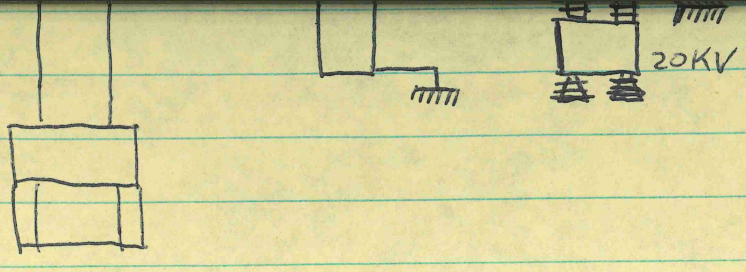
1. BALL LIGHTNING TRY # 1



NOTE: 1. FIRST, CHARGE C_x TO 20KVDC AS SHOWN
2. REMOVE CHARGING LINE FROM C_x
3. DISCHARGE # 10 COIL TO BALL GAP (-)

THEORY: C_x CARRIES A DENSE ELECTRIC CHARGE; OVER-VOLTAGED BY T COIL DISCHARGE, BALL GAP IS BROKEN DOWN BY AVELANCHE CONDITION. RESULTANT DISCHARGE ACROSS CAPACITOR BALL GAP IS CHARACTERIZED BY INITIAL IONIZATION (STEPPED LEADERS) AND IS ALMOST INSTANTANEOUSLY FOLLOWED BY HIGH CURRENT (FROM STORED CAPACITOR ENERGY.) THIS ENERGY TRANSFER (ET) THRU FREE AMBIENT SPACE, (FAS) IS COMPLEXED BY COLLIDING PULSES (CP) FROM THE TESLA COIL.

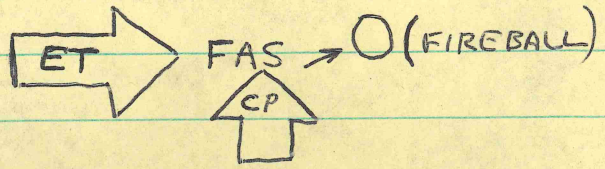




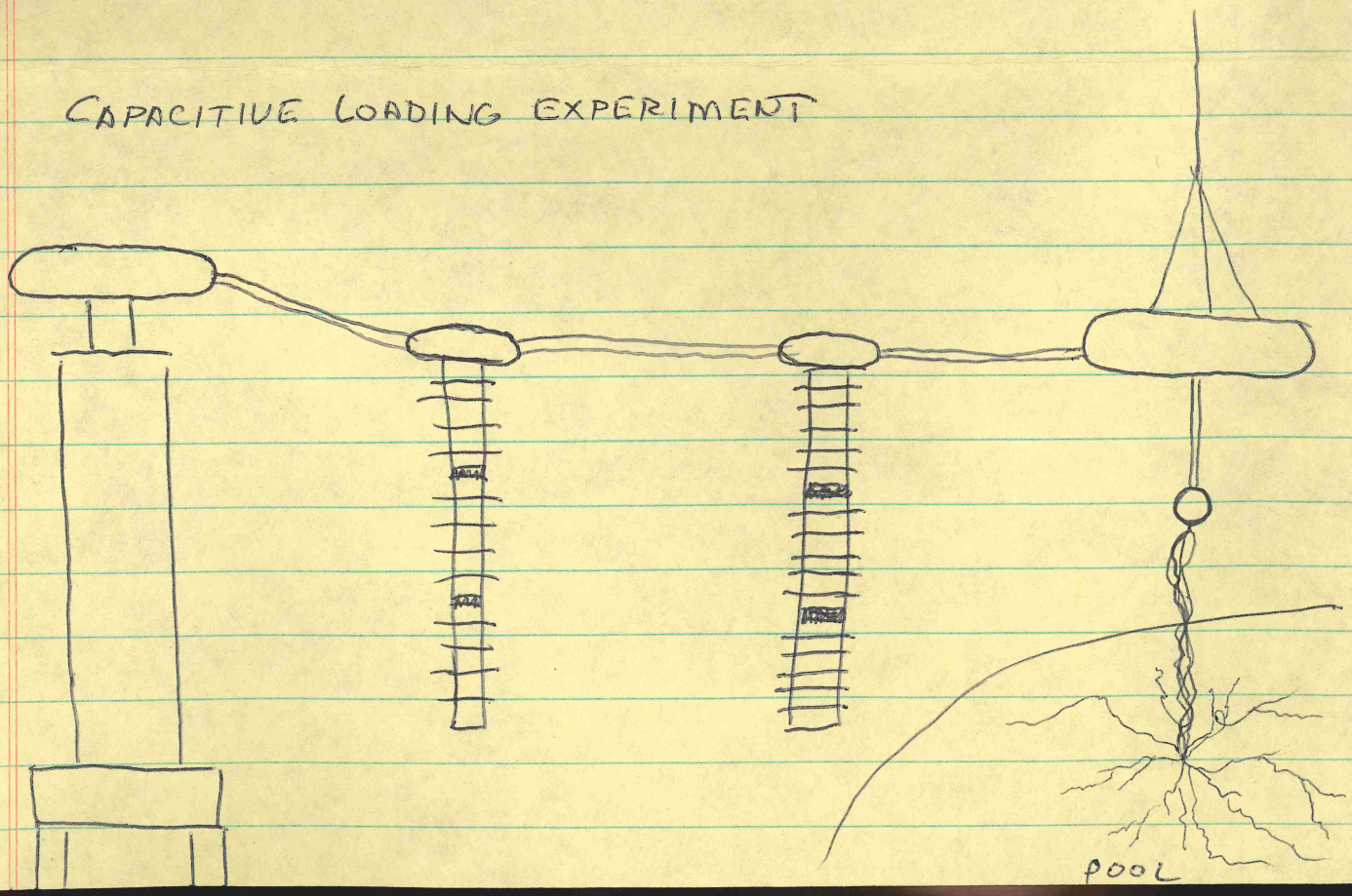
2. REMOVE CHARGING LINE FROM C_x

3. DISCHARGE # 10 COIL TO BALL GAP (-)

THEORY: C_x CARRIES A DENSE ELECTRIC CHARGE; OVER-VOLTAGED BY T COIL DISCHARGE, BALL GAP IS BROKEN DOWN BY AVELANCHE CONDITION. RESULTANT DISCHARGE ACROSS CAPACITOR BALL GAP IS CHARACTERIZED BY INITIAL IONIZATION (STEPPED LEADERS) AND IS ALMOST INSTANTANEOUSLY FOLLOWED BY HIGH CURRENT (FROM STORED CAPACITOR ENERGY.) THIS ENERGY TRANSFER (ET) THRU FREE AMBIENT SPACE, (FAS) IS COMPLEXED BY COLLIDING PULSES (CP) FROM THE TESLA COIL.

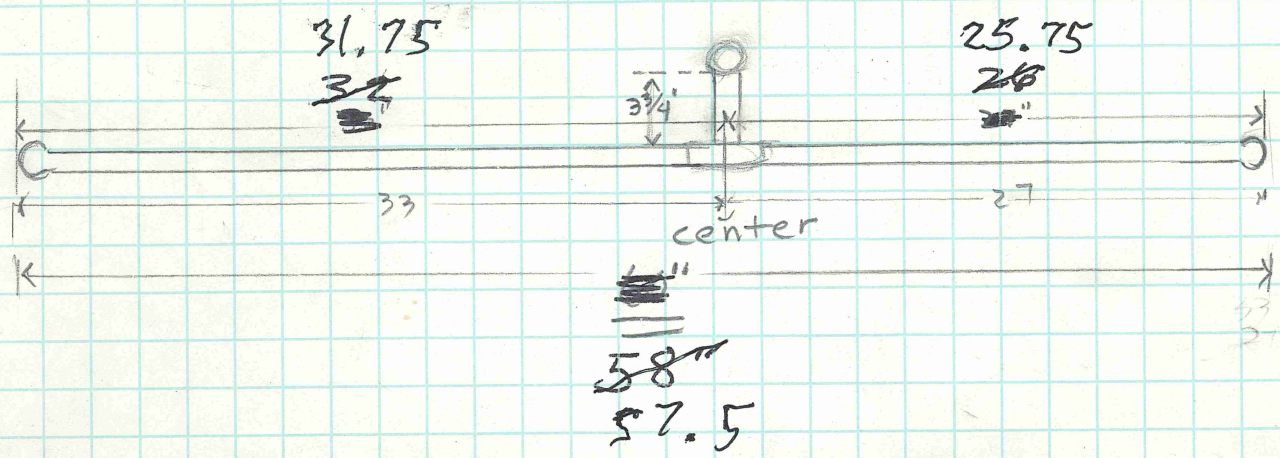


2. CAPACITIVE LOADING EXPERIMENT

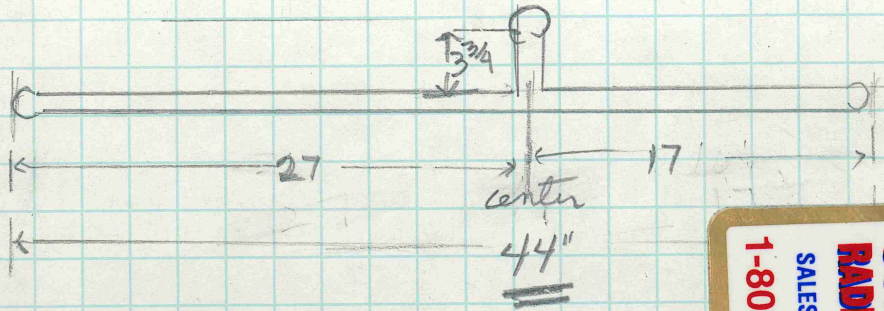


P.S. Please spread out the coil & transformer as far as possible - a longer base would be good - & remember the metal fan. Thanks,

need (4) ↘



need (4) →



First →

MADE WITH PRIDE IN THE USA
COMMERCIAL RADIO COMPANY
SALES • SERVICE • PARTS
1-802-226-7582

Hi Bill -

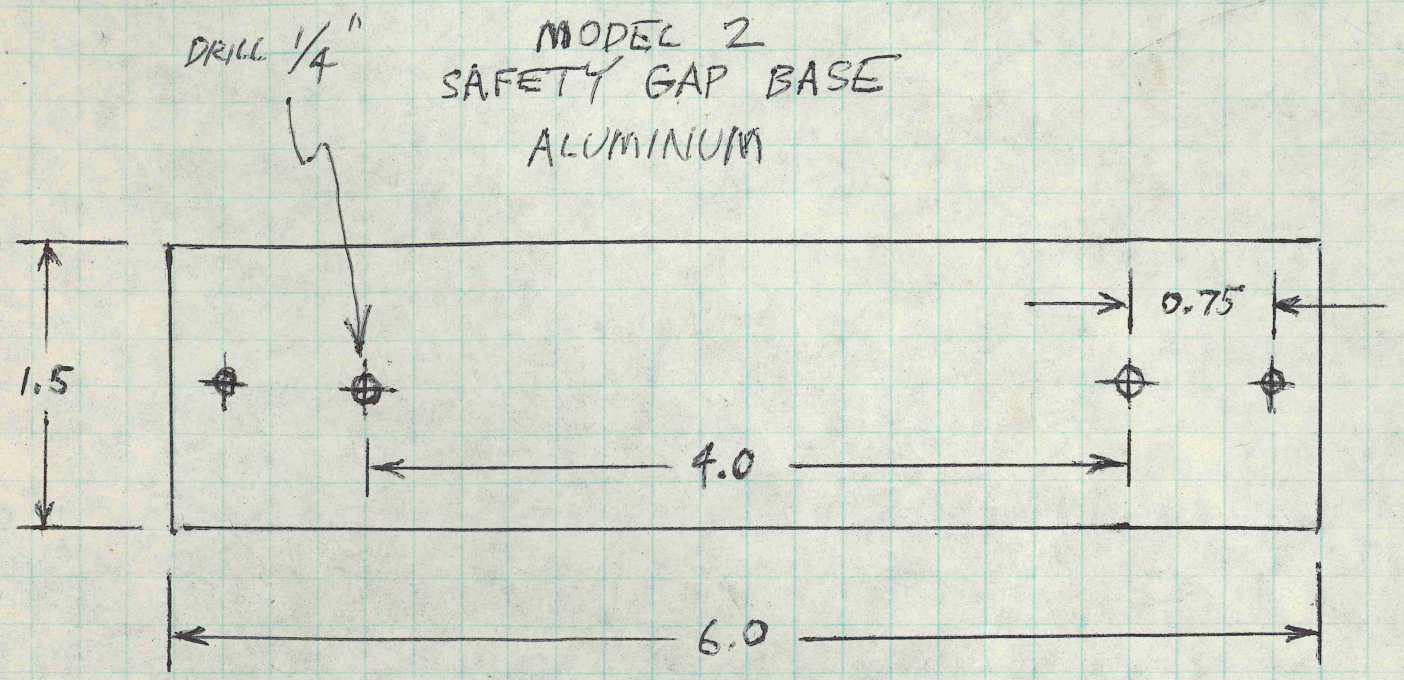
I don't need the 58" ones until the 4 new coils are built

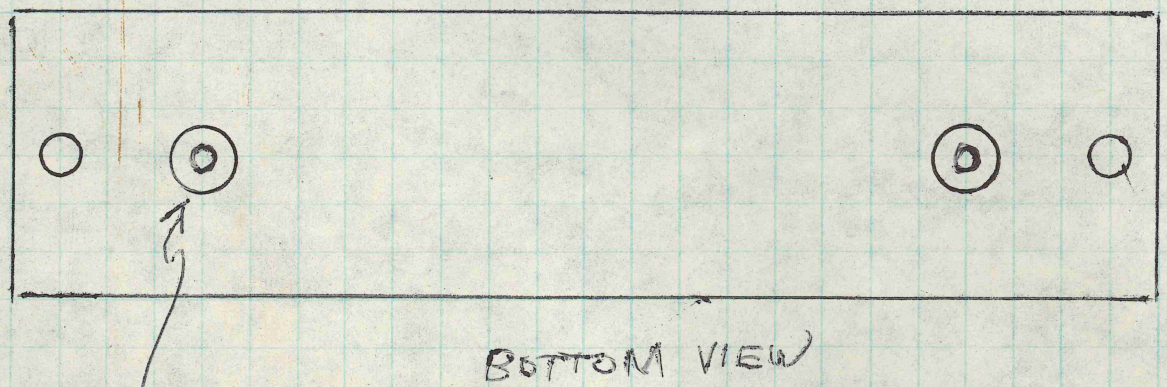
but

I need the 44" ones as soon as possible, before you make the coils - Thanks - the piece is waiting for the antennas - Mary

9/18/04

MODEL 2
SAFETY GAP BASE
ALUMINUM

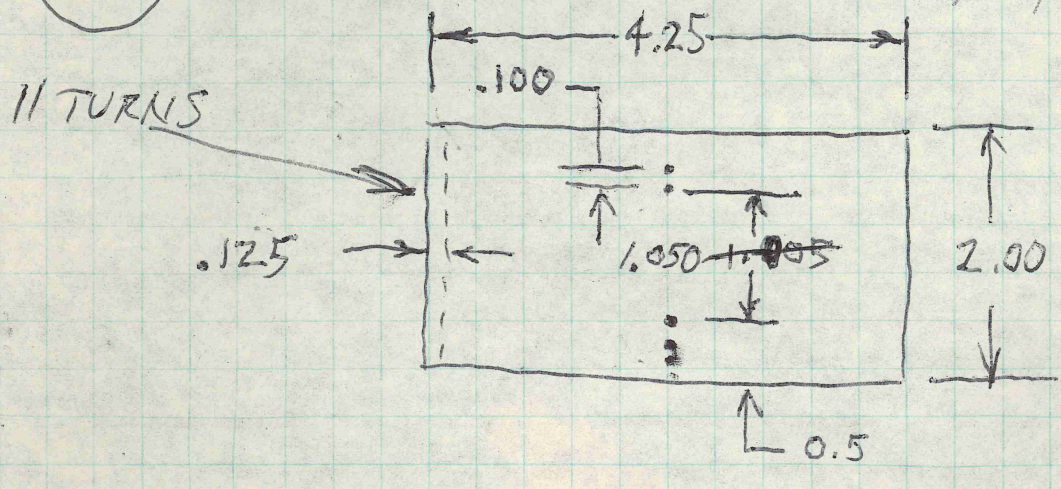




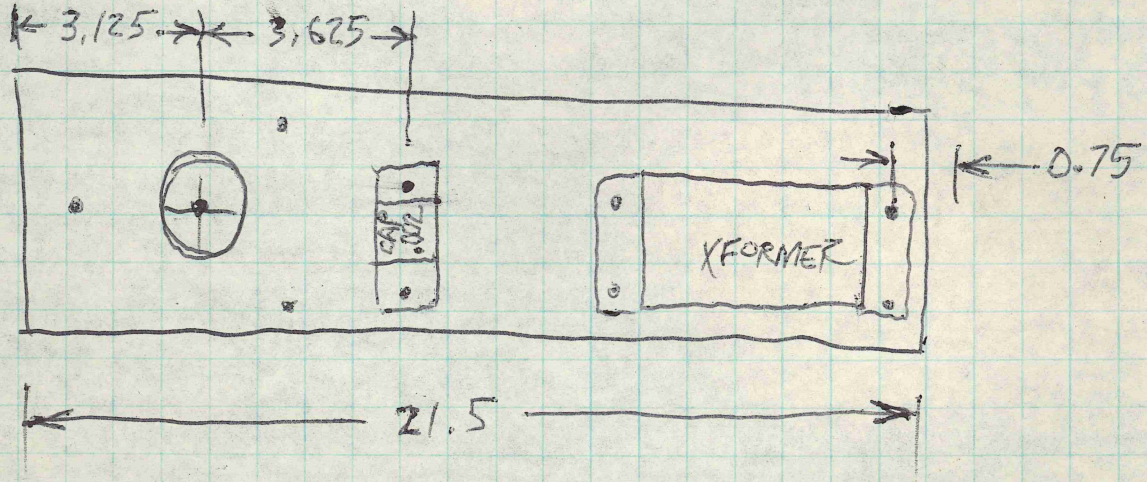
BOTTOM VIEW

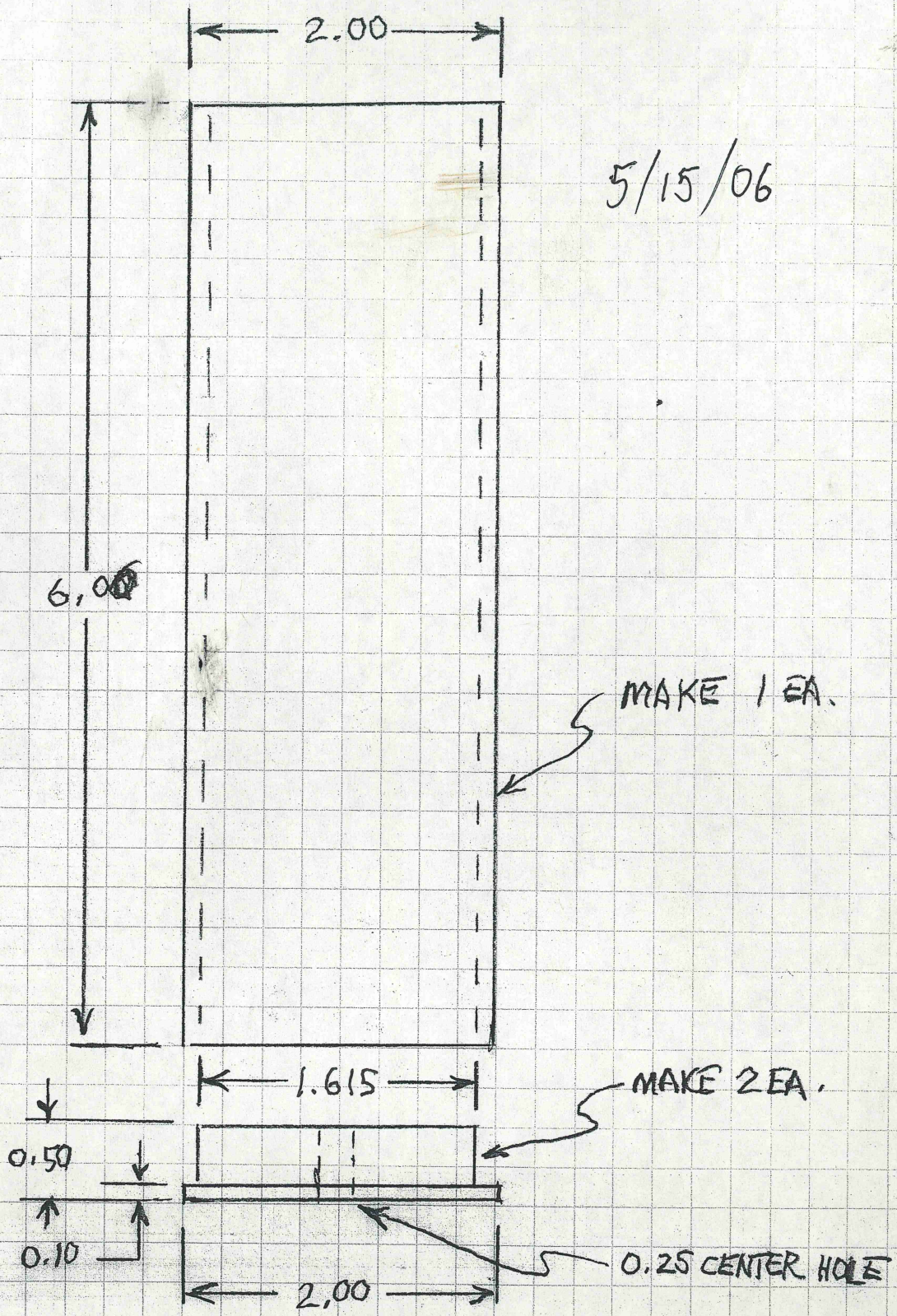
COUNTERSINK
FOR 1/4 F.H.
SCREW
2 PLCS.

#1 of 2 MARY CORSE MINI COILS 1/29/06



#16 AWG RED PRI. WIRE = 0.105 O.D.



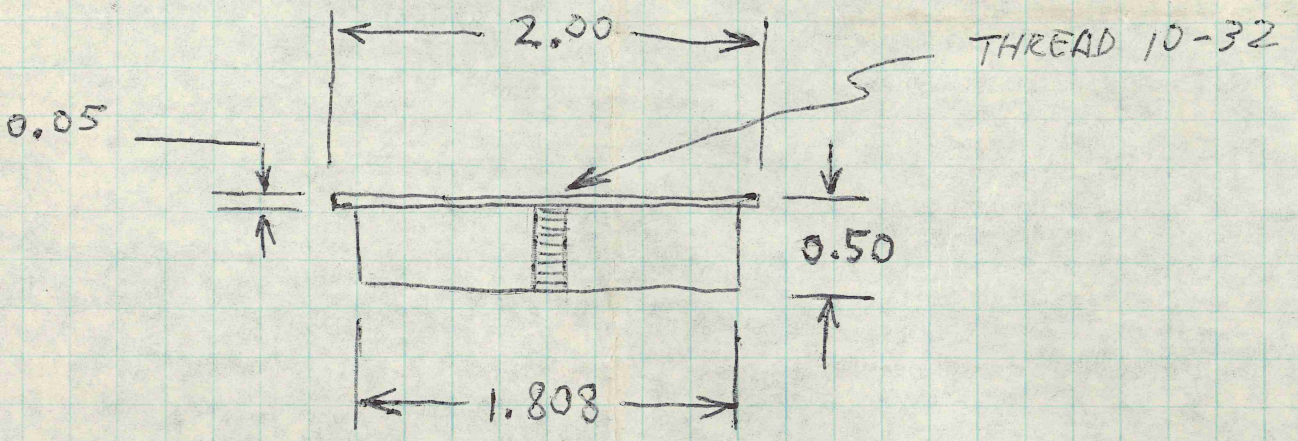


5/15/06

TOPS FORM 99522
MADE IN U. S. A.

MARY COURSE COIL 1/15/06

MAKE 4 EA.

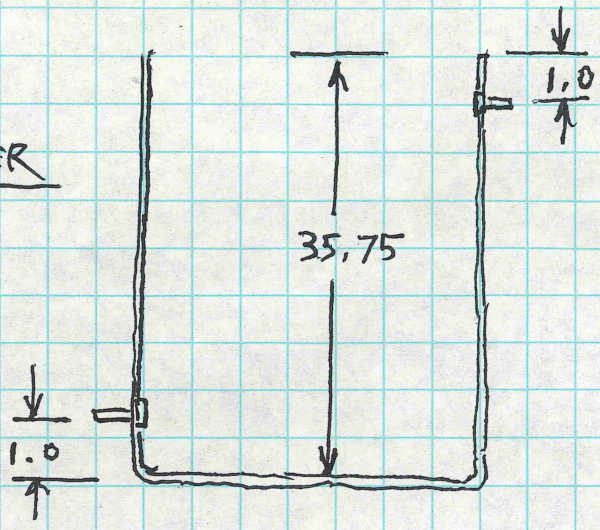


LARGE CYLINDER:

#14AWG WIRE → 314 TURNS @ 0.064" DIA. = 20.1" WINDING LENGTH

POLYESTER CORD → 313 TURNS @ 0.060" DIA. = 18.8" WINDING LENGTH

LARGE CYLINDER



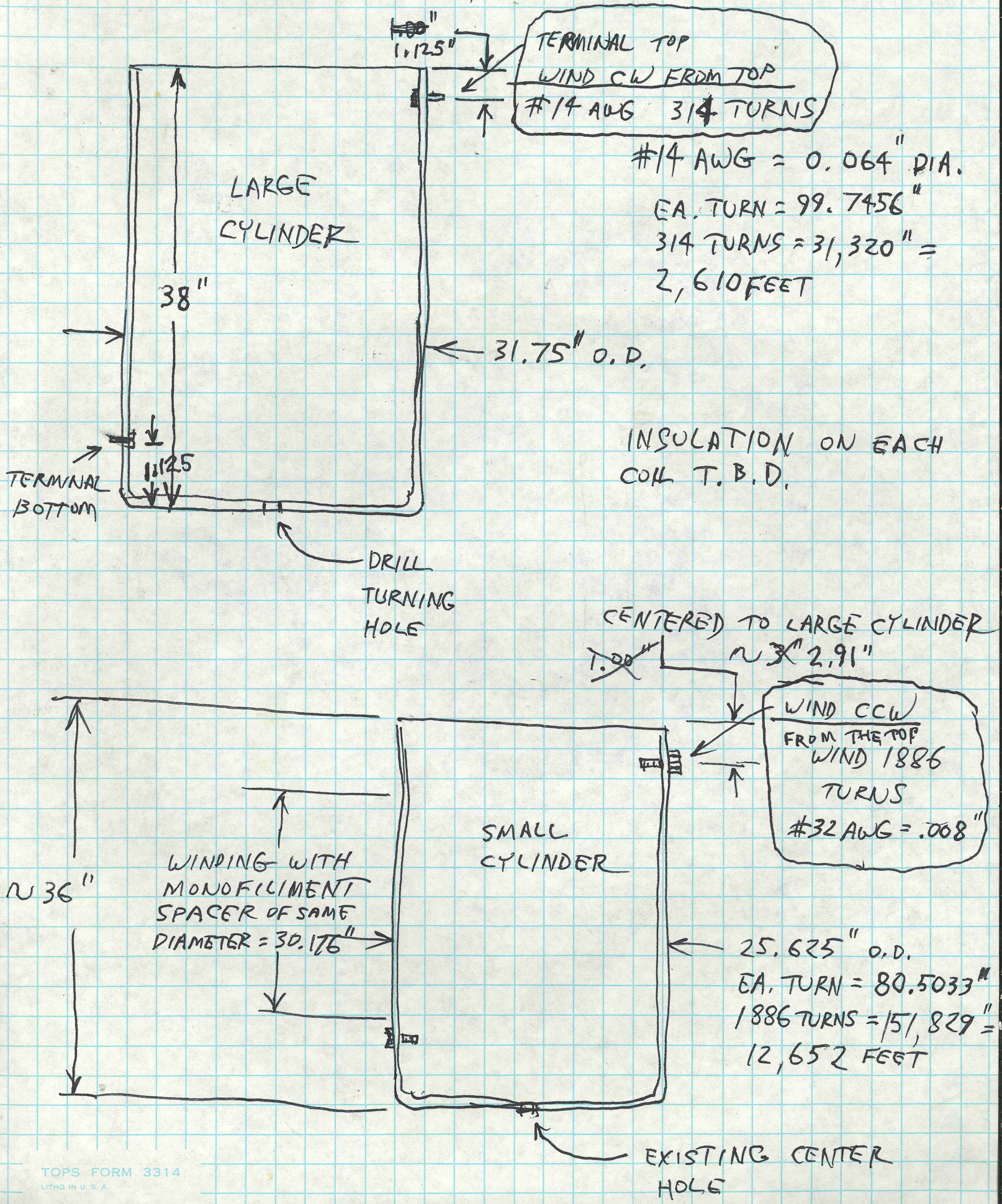
20.1
18.8
38.9" TOTAL

AVALIBLE WINDING LENGTH = 33.75"

313 TURNS OF SPACE = 0.044

TOPS FORM 3314
LITHO IN U. S. A.

6/13/09 PETER GRANDIS

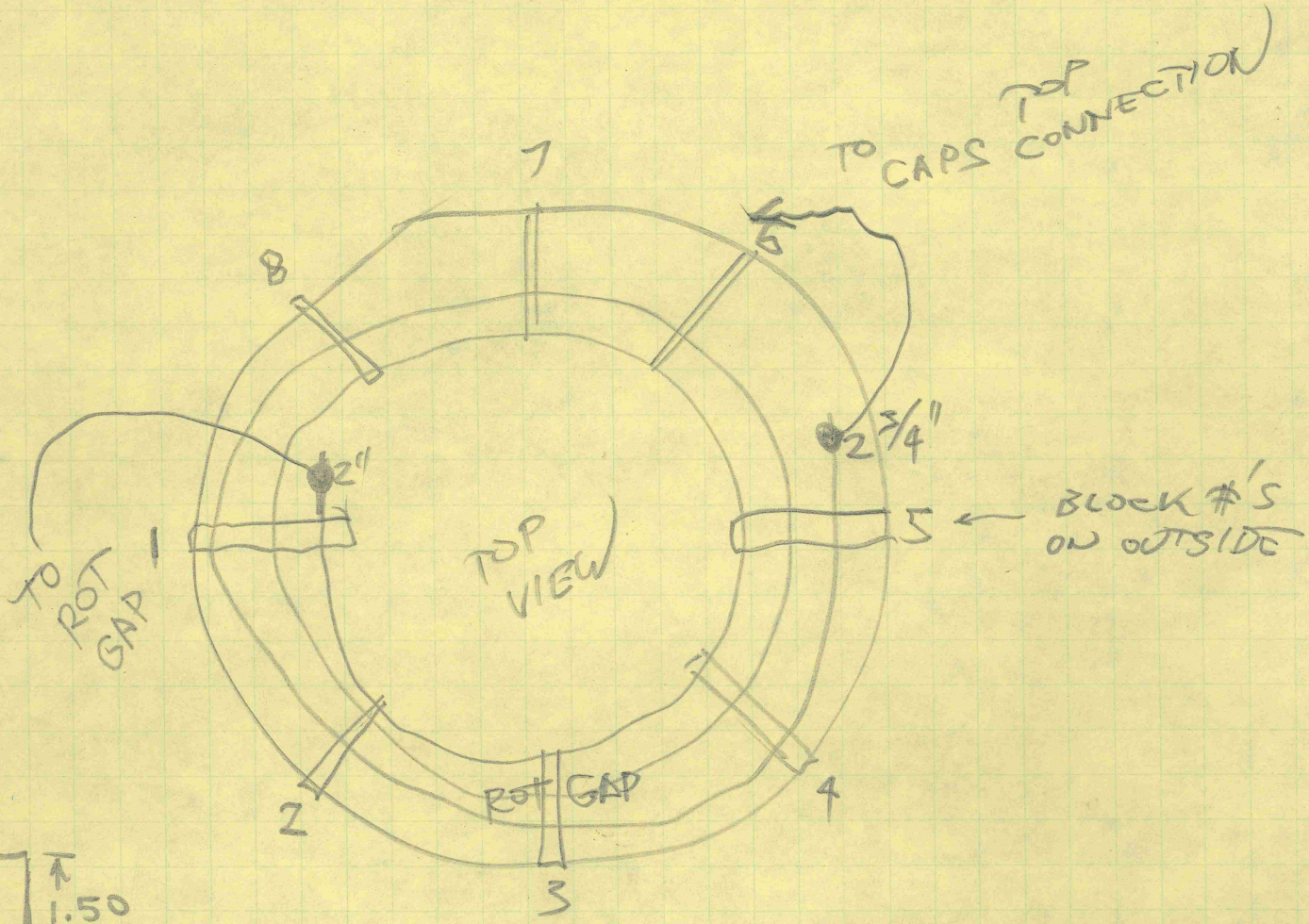


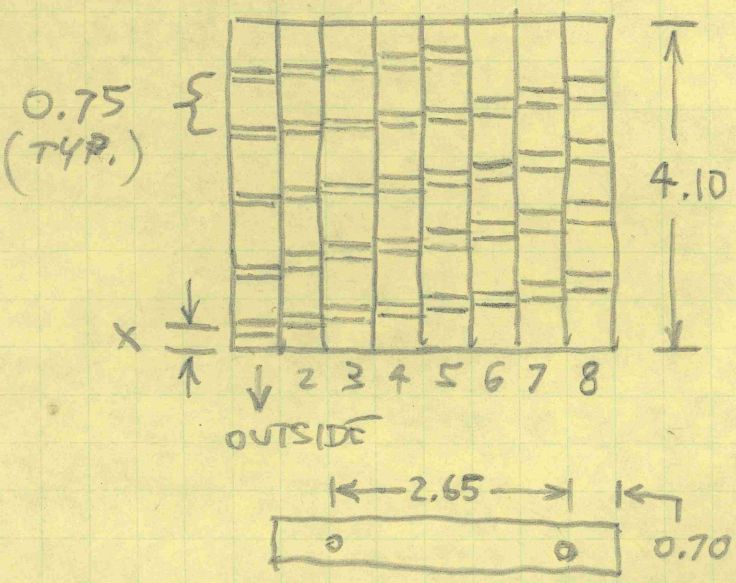
TOPS FORM 3314
LITHO IN U.S.A.

SEPT. 1997

MODEL 9 TESLA COIL

PRIMARY BASE PLATE



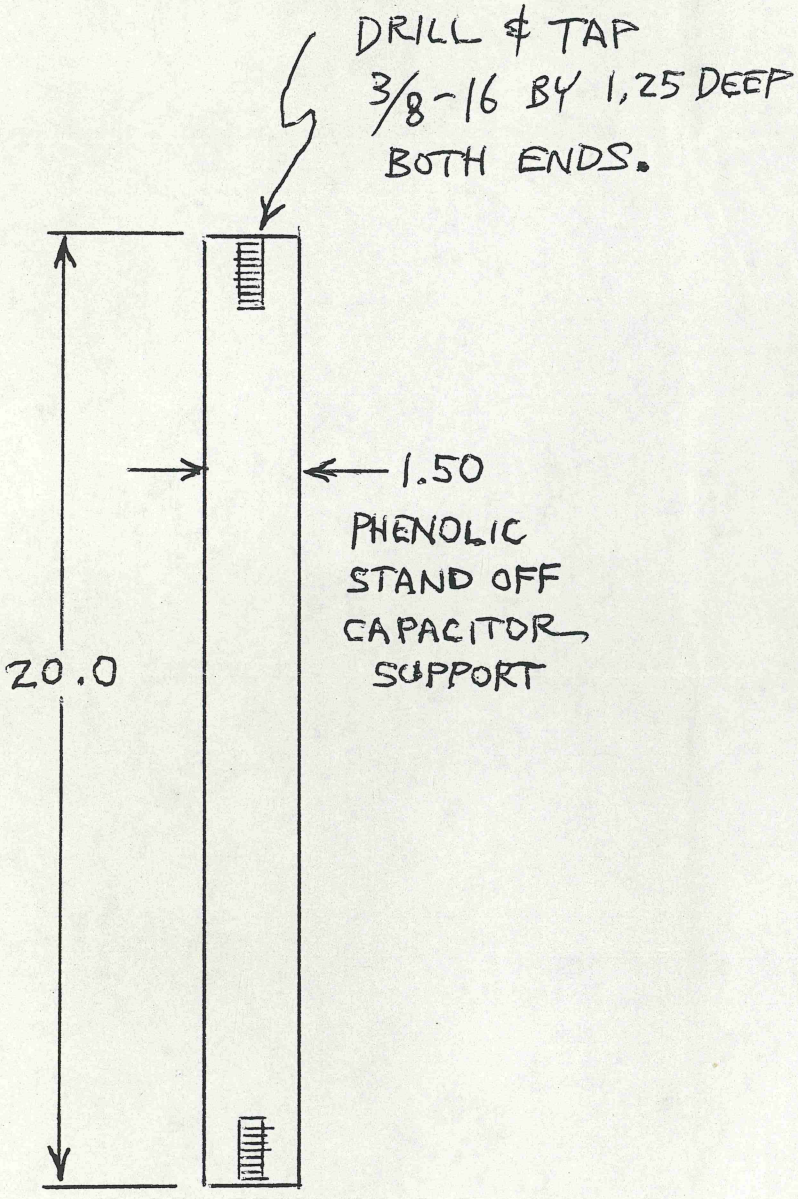


	X =
#1	0.33
2	0.43
3	0.53
4	0.63
5	0.73
6	0.83
7	0.87
8	0.99

8/26/03

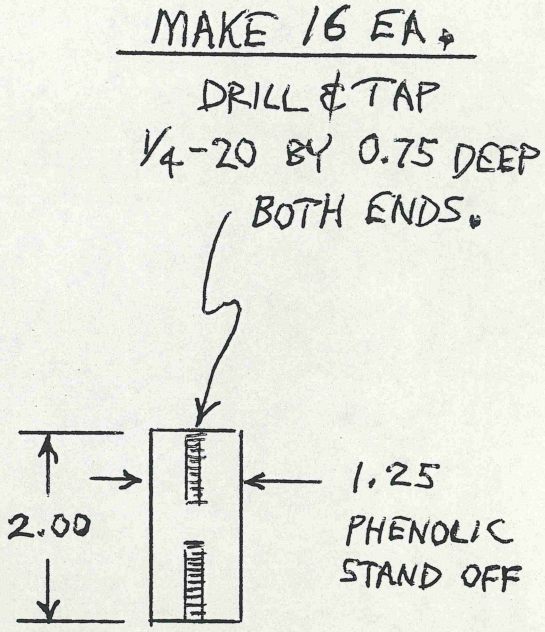
MODEL 7M

MAKE 4 EA.



MODEL 5D

MAKE 16 EA.



(562) 692-5911

18.7" 1 EA. 6484K146 BELT

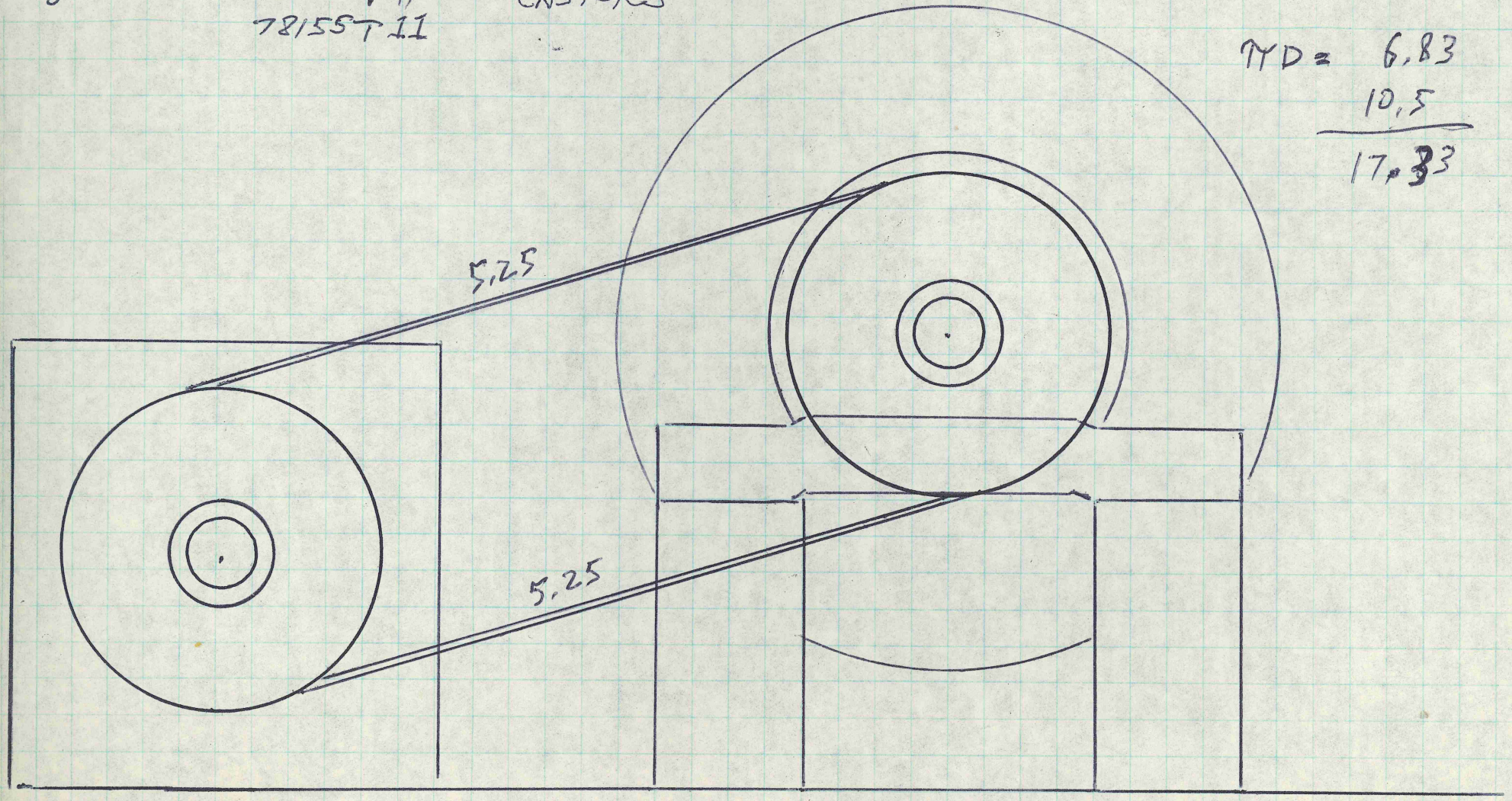
21" 1 EA. 6484K147 BELT

20' 7940A24 CABLE

10' 51845K21 SILICONE TUBING

8 EA. ~~78155T11~~ CASTORS
78155T11

TYD = 6.83
10.5
17.33



MATERIAL: 6061-T6 ALUMINUM

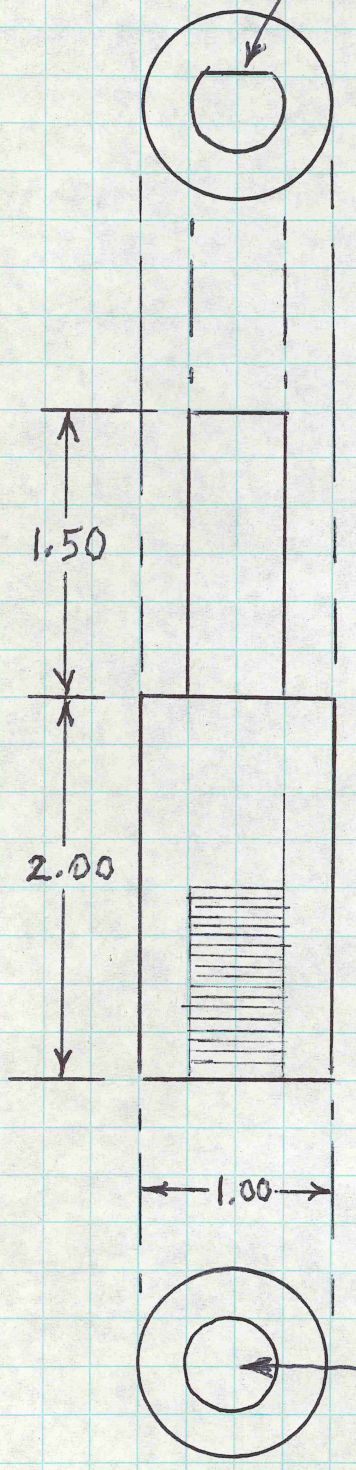
8/25/03

MODEL 7M EXTRA COIL BASE PLATE MOUNTS.

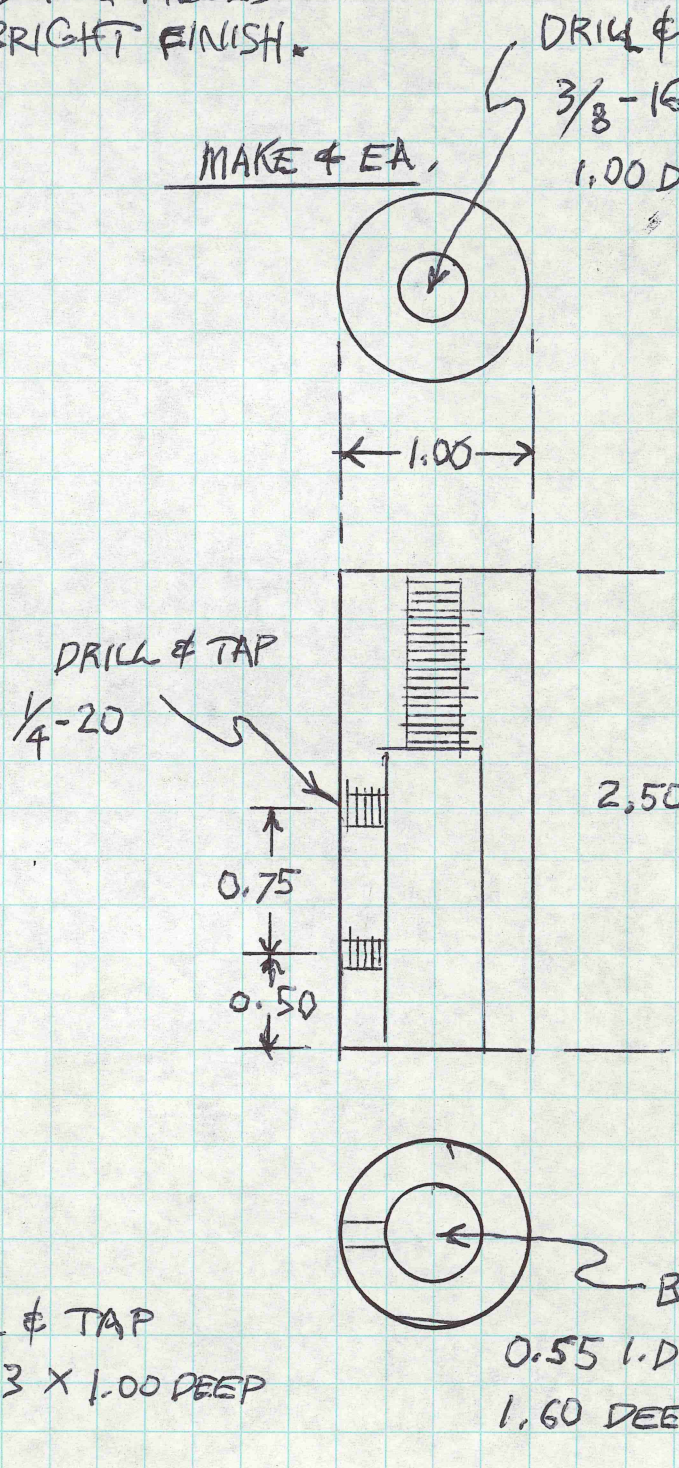
MAKE 4 EA.

MILL FLAT

SAND ALL PIECES TO BRIGHT FINISH.



MAKE 4 EA.



TOPS FORM 3314
LITHO IN U.S.A.

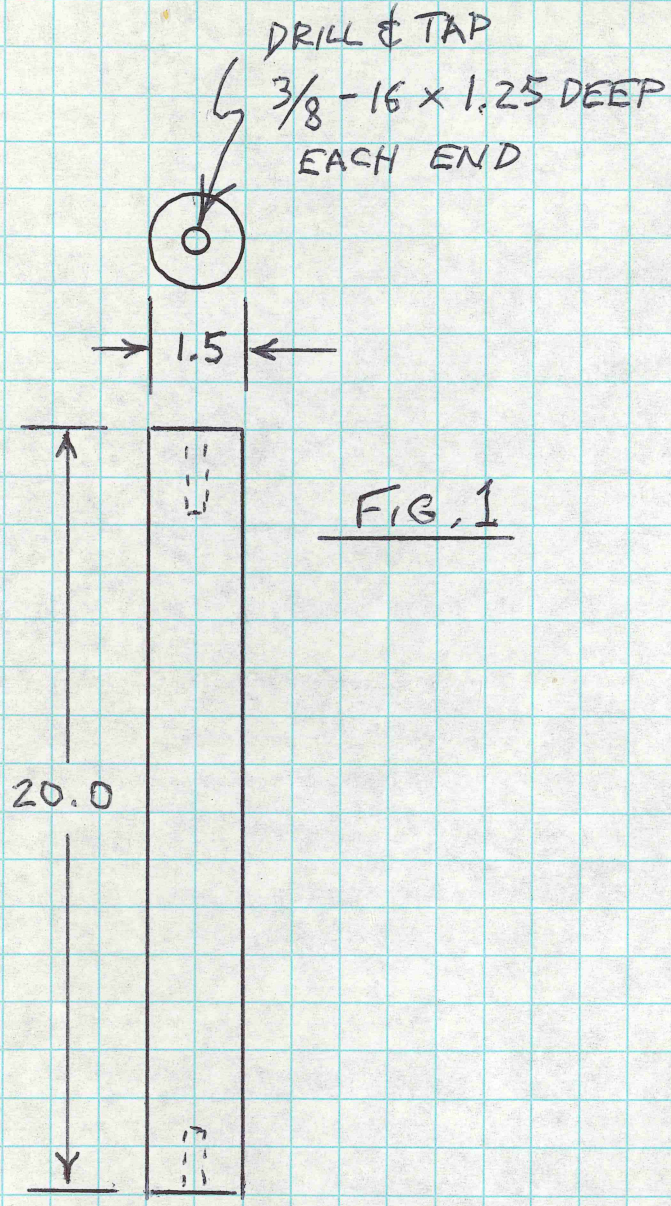


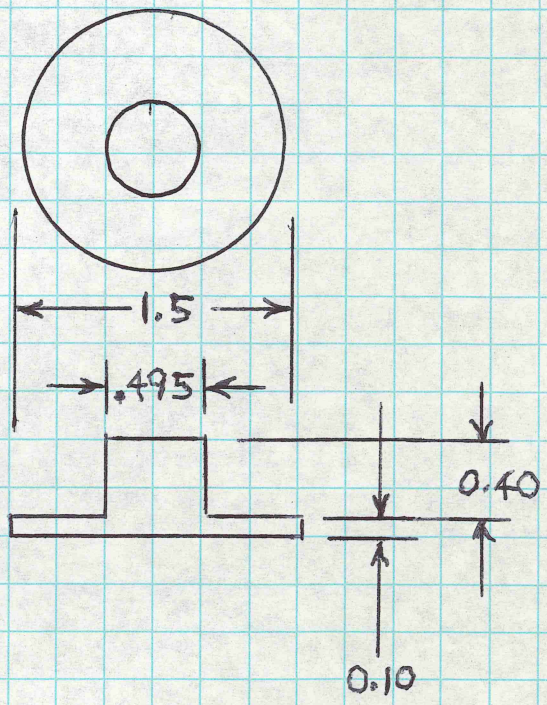
FIG. 1

PHENOLIC STANDOFF

MAKE 4 EA.

7-24-03

FIG. 2



BRASS FLANGE

MAKE 8 EA.

TOPS FORM 3314
LITHO IN U. S. A.

Bud Industries, Inc.
4605 East 355th St. Willoughby, OH 44094-0998

PACKING LIST COPY

ORDER / PICKING TICKET

PAGE NO. 1

SHIP TO
40304
TESLA TECH RESEARCH
2527 TREELANE AVENUE
MONROVIA CA 91016

BILL TO
903236
NEWARK ELECTRONICS
ATTN:INVENTORY A/P
PO BOX 94158
PALATINE IL 60094-4158

ORDER NUMBER	87830
ORDER DATE	1/10/03

NO CREDIT ALLOWED ON GOODS RETURNED WITHOUT OUR PERMISSION. CLAIMS NOT ALLOWED UNLESS MADE WITHIN FIVE DAYS AFTER DELIVERY. MAKE NO DEDUCTIONS UNLESS ACCOMPANIED BY OUR CREDIT MEMORANDA.
WE HEREBY CERTIFY THAT THESE GOODS WERE PRODUCED IN COMPLIANCE WITH ALL APPLICABLE REQUIREMENTS OF SECTION 6, 7, AND 12 OF THE FAIR LABOR STANDARDS ACT OF 1938, AS AMENDED, AND OF REGULATIONS AND ORDERS OF THE UNITED STATES DEPARTMENT OF LABOR ISSUED UNDER SECTION 14, THEREOF.

TERMS	SALESMAN		DATE ORDERED	DATE REQUESTED	DATE SHIPPED	REFERENCE NUMBER	SHIP VIA	ORDER NUMBER
1%/15/N30	Industrial R	PREPAID/ADD	12/17/02	12/17/02		833589	BEST WAY	87830

LN #	ITEM NUMBER	ITEM DESCRIPTION (COMMENTS)	ALLOW B/O	U/M	QUANTITY ORDERED	QUANTITY SHIPPED	Whs 9:30:06
1	60-2309-RB	UPRIGHT CABINET RACK	YES	EA	2.0000	2	1 Loc: SHOP
		**********SHIPPING INSTRUCTIONS**********					
		COLLECT SHIPMENTS INTO NEWARK THAT TOTAL WEIGHT 400# OR LESS					
		SHIP: UPS FRT COLLECT # 6A409X - This is Newark's inbound					
		Frt collect # for all shipments into the following					
		Facilities: CHICAGO IL, GAFFNEY SC, DALLAS TX					
		LESS THAN 15,000# (LTL CONTINENTAL U.S.) USE.....OVERNITE					
		GREATER THAN 15,000# (CONTINENTAL U.S.) TRUCKLOAD CALL FOR					
		ROUTING INSTRUCTIONS - Walt Stiffler (864)487-1958 or					
		Janet Upchurch (864)487-1959					
		**********					
		Quantity Ordered			2.0000		
		FAX/LH					
		176# EA					

DATE SHIPPED	CARRIER	B/L #	NO. OF PCS.	A.W.	B.W.	TOTAL FRT. COST $	CLERICAL	PULLER	PACKER	STAGE
1-10-03	SCD Service Trans		2	352						

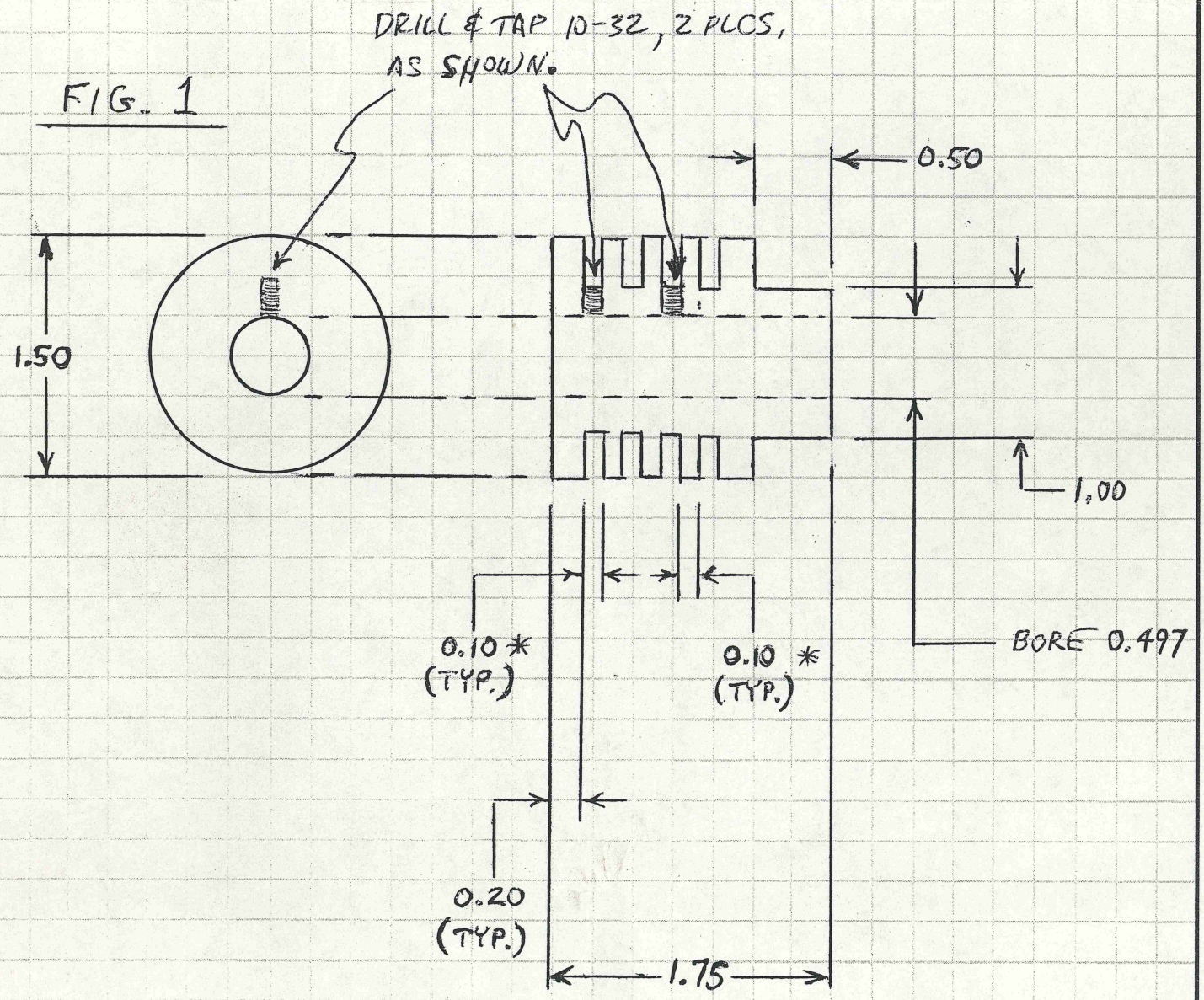
AEROFLEX LINTEK

383 N. Liberty Road • Powell, Ohio 43065 Phone: (614) 888-2700 • Fax: (614) 888-4778

7/6/03

MODEL 7M STATIONARY ELECTRODE BRASS COOLING FINS.

FIG. 1



* NOTE: DEPENDS ON WIDTH OF YOUR PARTING TOOL; IN ANY CASE, MAKE ALL FINS EQUAL DISTANT.

MAKE 4 EA. (BRIGHT FINISH)

M&K METAL CO.

14108 SOUTH WESTERN AVENUE
GARDENA, CALIFORNIA 90249
Tel: (310) 327-9011 / Fax: (310) 715-1261

ALUMINUM, STEEL,
STAINLESS, COPPER
BRASS & GALVANIZED

335627

SOLD TO: CASH SALES

DATE 10/23/2002
CUSTOMER NO. 1-
P.O. #
SALESPERSON RICK
ORDERED BY

SHIP TO: SAME

QUANTITY	DESCRIPTION	UNIT PRICE	EXTENSION
1	360 BRASS ROUND 1" 1 W/CUT 36	31.256	31.26

Must Cut

PARTIAL LENGTHS MAY INCLUDE CUTTING CHARGE.

PLEASE PAY FROM INVOICE-NO STATEMENT WILL BE MAILED

31.26

CLAIMS–For Damages or Shortages must be made in Writing within 5 days after receipt of Goods. Our liability is limited to Replacing the Material or Refunding the Value.

TERMS: Our terms are Net 30 days from date of invoice. **Contact price is subject to a late charge payable on demand at the rate of 9.99% per annum of the unpaid balance.** Restock charge of 15% will be issued for returns up to 10 days subject to inspection and approval by vendor. Absolutely NO RETURNS on cut materials.

SALES TAX	2.58
TOTAL AMOUNT $	33.84

CASH SALE

ROSEN'S ELECTRICAL EQUIPMENT CO.

SALES ORDER

8226 E. WHITTIER BLVD., PICO RIVERA, CA 90660-2584

(562) 695-9000 • FAX (562) 699-5196

(800) 877-9870

BY: AR

SOLD TO:

TESLA TECHNOLOGY RESEARCH

SHIP TO:

SAME

MARK:

DATE ORDERED 6/27/03

DATE SHIPPED

☐ DEBIT ☐ MEMO ☐ PARTIAL
☐ CREDIT ☐ RENTAL ☐ COMPLETE

TERMS
☐ 1% 10 ☐ NET 30
☐ 1% 10TH PROX. ☐ R.O.I.
☐ C.O.D.

PURCHASE ORDER NO.	BUYER	TELEPHONE	DELIVERY PROMISE	☐ RESALE ☐ TAXABLE ☐ OUT OF STATE

☐ WILL CALL NOTIFY ☐ OTHER
☐ WILL CALL ☐ UPS _____ ☐ PREPAY ☐ PREPAY AND ADD ☐ COLLECT

SHIP VIA	CREDIT	EXT.	CH.	INV. #	SALES ORDER #
	AR				371635

ORDERED	SHIPPED	BACK ORDER	CLASS NO.	DESCRIPTION	LIST PRICE	UNIT PRICE	AMOUNT	UNIT COST	TOTAL COST
1500	1500		20X5	10 STA 14S RED NON PRINTED		.26	390.00		

TERMS & CONDITIONS: Seller retains a security interest in the goods sold hereunder until paid in full. Upon default by Buyer in any obligation hereunder: (a) at option of Seller, entire balance shall become immediately due and payable, (b) Seller shall have all rights and remedies under California Uniform Commercial Code, (c) Buyer shall pay reasonable attorney's fees incurred by Seller in enforcing any of its rights and remedies hereunder, whether or not suit is commenced, and (d) all obligations of Buyer hereunder shall bear interest at ten percent per annum from date due. Buyer acknowledges receipt of the goods sold hereunder. A charge of 1½% per month (18% annual rate) will be made on past due accounts.

APPROX. SALE

P.O. #:

B/O P.O. #

SIGNED:

Form # Recco-004

CONTRACTORS INVOICE

WORK PERFORMED AT:

TO: BILL W/SOCK/TTR

SHOP FACILITY

DATE	YOUR WORK ORDER NO.	OUR BID NO.
MAY-21-03	2282-F	

DESCRIPTION OF WORK PERFORMED

- SQUARE OFF ENDS OF 13" COIL FORM AT 60" (APPROX.)
- (2) 12" COIL FORMS AT 28" EACH. = 45.22

- (2) 13" END CAPS (¾" MULTI-PLY BIRCH - TYPICAL)
- (4) 12" END CAPS
- (3) 13" X ½" PLEXIGLASS BAFFLES
- (4) 12" X ½ PLEXIGLASS BAFFLES = 438.15

- MATERIALS FOR ABOVE PARTS = 233.34

SUB-TOTAL = 717.09
LESS-DEPOSIT = 300.00
TOTAL = 417.09

All Material is guaranteed to be as specified, and the above work was performed in accordance with the drawings and specifications provided for the above work, and was completed in a substantial workmanlike manner for the agreed sum of _____ Dollars ($ 417.09).

This is a ☐ Partial ☒ Full invoice due and payable by: _____ Month _____ Day _____ Year

in accordance with our ☐ Agreement ☐ Proposal No. _____ Dated _____ Month _____ Day _____ Year

adams TC8122 MADE IN USA

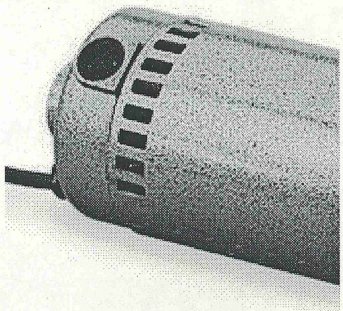
CONTRACTORS INVOICE

Item Details

Product Category: Motors & Power Transmission > Definite Purpose > Universal AC-D

Description

Universal AC/DC Open Motor, HP 1, RPM 10,000, Voltage 115 V, Service Factor 1.00, Frequency 60 Hz, Mounting Holes, Bearings Ball, Thermal Protection None, Shaft Dimensions 7/16 x 1 1/4 Inch, Full Load Amps 12.1, Rotation CCW, Face with Four Tapped Size 10-32 Holes, 3 1/4 Inch OC 90 Degrees Apart



Grainger Item:	2M191	Ship Qty :	1
Price (ea) :	$205.75	Sell Qty(Will-Call) :	1
Manufacturer:	DAYTON	Usually Ships :	Today
Mfg. Model#:	2M191	Catalog 394 Page:	102

Select Qty.

Add to Personal List ADD TO ORDER

Price shown may not reflect your price. *Log-in* above, or click here to register.

NOTES & RESTRICTIONS

Repair Parts Info available for this product.

Modification & Service available contact your local branch.
See Catalog 394 Page for application and/or safety information.

OPTIONAL ACCESSORIES

Description

Motor Brush, Replacement For 2M191 Motor, Carbon, Copper Coil Springs Replacements for 3 7/8 Inches Diameter, Package 2

Price (pk):	$8.31	Usually Ships :	Today
Grainger Item#:	1R473		

Select Qty.

Add to Personal List ADD TO ORDER

TECHNICAL SPECIFI

Body Diameter (In	3 7/8
Full Load Amp	12.1
HP:	1
Length Less Shaft (I	9 1/32
Nameplate RPI	10,000
Shaft Diameter (In	7/16 x 1 1/4
Bearings:	Ball
Enclosure:	Open
Footnotes:	-
Insulation Clas	A
Motor Type:	Universal AC/D
NEMA/IEC Fran	Non-Standarc
Rotation:	CCW
Volts:	115
Thermal Protecti	

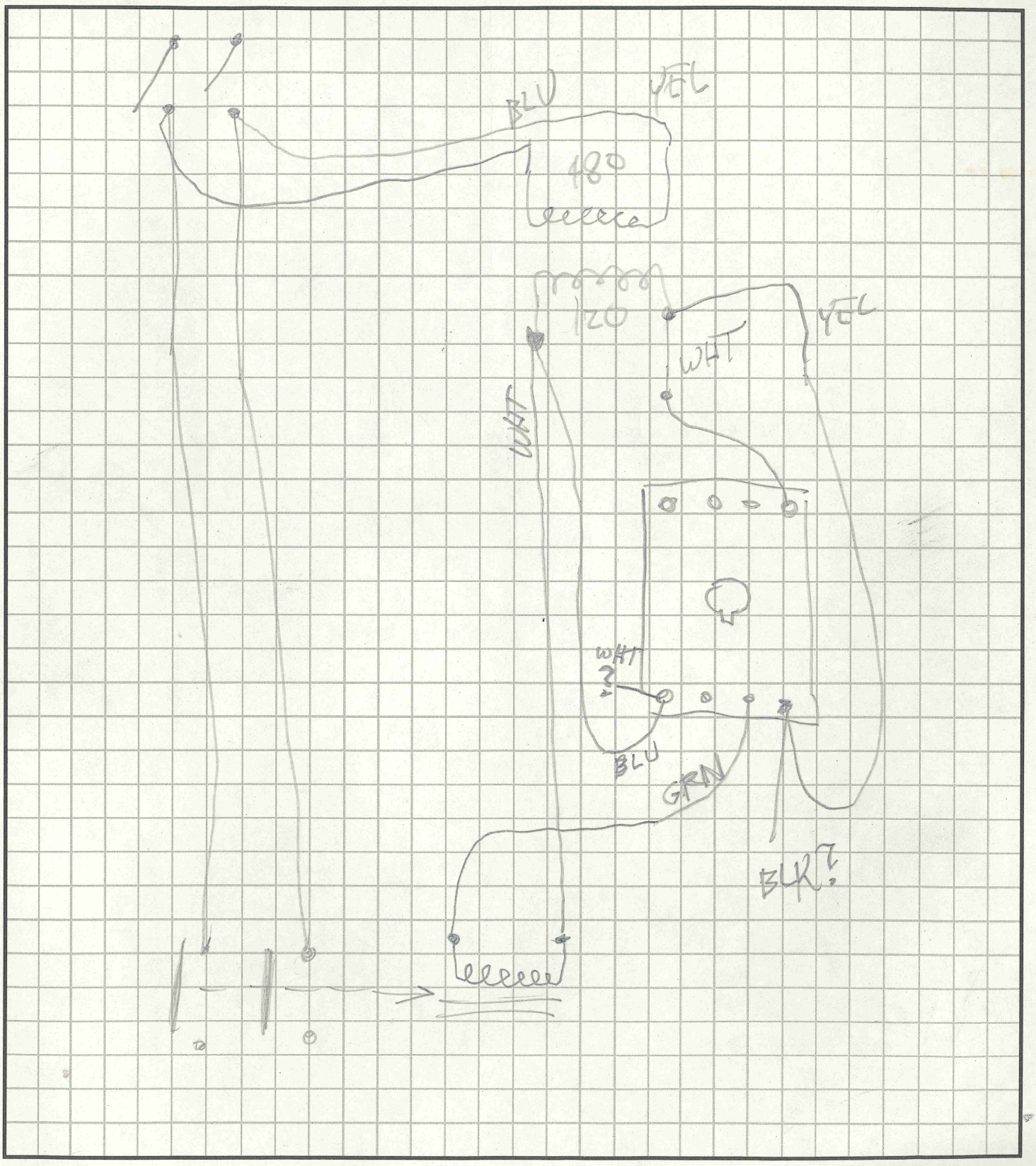
Thermal Protect	None
Hz:	60
Mounting:	Face with Four Tapped Size 3 1/4 Inch OC 90 Degr
Service Factor	1.00
Average Brush Life (	300
Ambient (ºC):	40

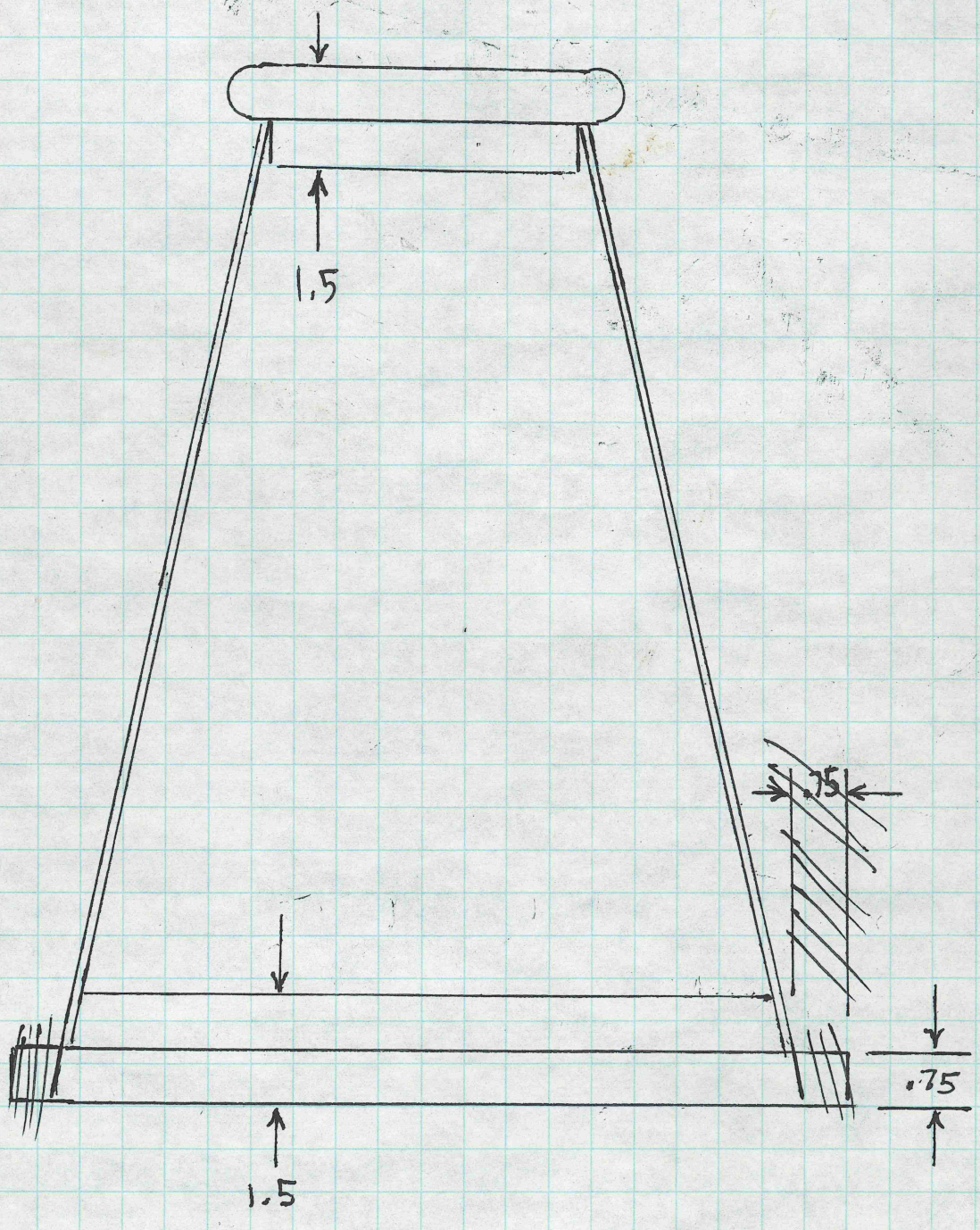
10-32

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AEROFLEX LINTEK

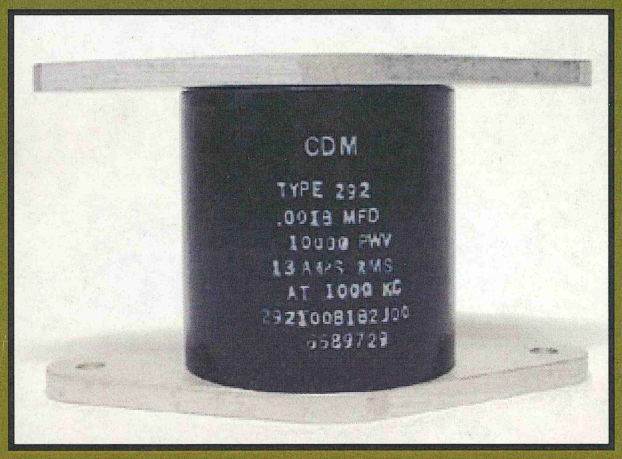
383 N. Liberty Road • Powell, Ohio 43065 Phone: (614) 888-2700 • Fax: (614) 888-4778




1.5
.75
.75
1.5

Commercial Radio Company

Type 292 Mica Capacitors





Catalog Number	Capacitance	Voltage	Current at 1 MHz
292100B101J02	100 PF	10000	3.0 Amperes
292100B111J02	110 PF	10000	3.0 Amps
292100B121J02	120 PF	10000	3.3 Amps
292100B131J02	130 PF	10000	3.6 Amps
292100B151J02	150 PF	10000	3.6 Amps
292100B161J02	160 PF	10000	3.9 Amps
292100B181J02	180 PF	10000	4.3 Amps
292100B201J02	200 PF	10000	4.3 Amps
292100B221J02	220 PF	10000	4.7 Amps
292100B241J02	240 PF	10000	5.1 Amps
292100B251J02	250 PF	10000	5.1 Amps
292100B271J02	270 PF	10000	5.1 Amps
292100B301J02	300 PF	10000	5.6 Amps
292100B331J02	330 PF	10000	5.6 Amps
292100B361J02	360 PF	10000	6.2 Amps
292100B391J02	390 PF	10000	6.2 Amps
292100B401J02	400 PF	10000	6.2 Amps
292100B431J02	430 PF	10000	6.2 Amps

292100B471J02	470 PF	10000	6.8 Amps
292100B501J02	500 PF	10000	6.8 Amps
292100B511J02	510 PF	10000	6.8 Amps
292100B561J02	560 PF	10000	7.5 Amps
292100B621J02	620 PF	10000	8.2 Amps
292100B681J02	680 PF	10000	8.2 Amps
292100B751J02	750 PF	10000	8.2 Amps
292100B821J02	820 PF	10000	9.1 Amps
292100B911J02	910 PF	10000	9.1 Amps
292100B102J02	1000 PF	10000	10.0 Amps
292100B112J02	1100 PF	10000	10.0 Amps
292100B122J02	1200 PF	10000	11.0 Amps
292100B132J02	1300 PF	10000	11.0 Amps
292100B152J02	1500 PF	10000	12.0 Amps
292100B162J02	1600 PF	10000	12.0 Amps
292100B182J02	1800 PF	10000	13.0 Amps
292100B202J02	2000 PF	10000	13.0 Amps
29280B222J02	2200 PF	8000	13.0 Amps
29280B242J02	2400 PF	8000	15.0 Amps
29280B252J02	2500 PF	8000	15.0 Amps
29280B272J02	2700 PF	8000	15.0 Amps
29280B302J02	3000 PF	8000	16.0 Amps
29280B332J02	3300 PF	8000	16.0 Amps
29280B362J02	3600 PF	8000	18.0 Amps
29280B392J02	3900 PF	8000	18.0 Amps
29280B402J02	4000 PF	8000	18.0 Amps
29280B432J02	4300 PF	8000	18.0 Amps
29260B472J02	4700 PF	6000	20.0 Amps
29260B502J02	5000 PF	6000	20.0 Amps
29260B512J02	5100 PF	6000	20.0 Amps
29250B562J02	5600 PF	5000	20.0 Amps
29250B602J02	6000 PF	5000	22.0 Amps
29250B622J02	6200 PF	5000	22.0 Amps

29250B682J02	6800 PF	5000	22.0 Amps
29250B752J02	7500 PF	5000	22.0 Amps
29250B822J02	8200 PF	5000	24.0 Amps
29250B912J02	9100 PF	5000	24.0 Amps
29250B103J02	10000 PF	5000	24.0 Amps
29250B113J02	11000 PF	5000	27.0 Amps
29240B123J02	12000 PF	4000	27.0 Amps
29240B133J02	13000 PF	4000	27.0 Amps
29240B153J02	15000 PF	4000	27.0 Amps
29240B163J02	16000 PF	4000	27.0 Amps
29230B183J02	18000 PF	3000	30.0 Amps
29230B203J02	20000 PF	3000	30.0 Amps
29230B223J02	22000 PF	3000	30.0 Amps
29230B243J02	24000 PF	3000	33.0 Amps
29230B273J02	27000 PF	3000	33.0 Amps
29220B303J02	30000 PF	2000	33.0 Amps
29220B333J02	33000 PF	2000	33.0 Amps
29220B363J02	36000 PF	2000	33.0 Amps
29220B393J02	39000 PF	2000	36.0 Amps
29220B433J02	43000 PF	2000	36.0 Amps
29220B473J02	47000 PF	2000	36.0 Amps
29220B513J02	51000 PF	2000	36.0 Amps
29220B563J02	56000 PF	2000	36.0 Amps
29220B623J02	62000 PF	2000	39.0 Amps
29220B683J02	68000 PF	2000	39.0 Amps
29215B753J02	75000 PF	1500	39.0 Amps
29215B823J02	82000 PF	1500	39.0 Amps
29215B913J02	91000 PF	1500	39.0 Amps
29215B104J02	100000 PF	1500	39.0 Amps

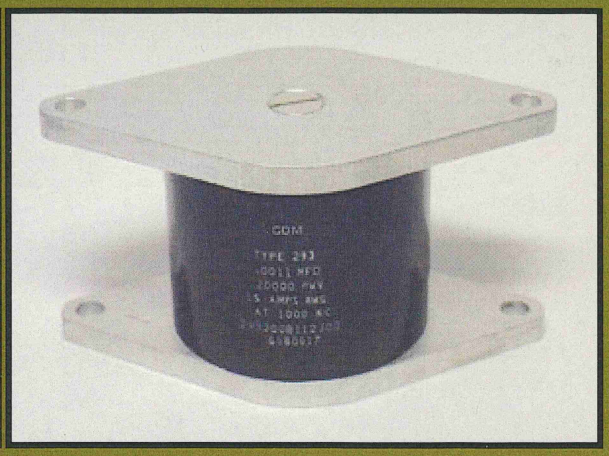
type 291 | type 292 | type 293 | type 294

Contact Us

Commercial Radio Company

Type 293 Mica Capacitors





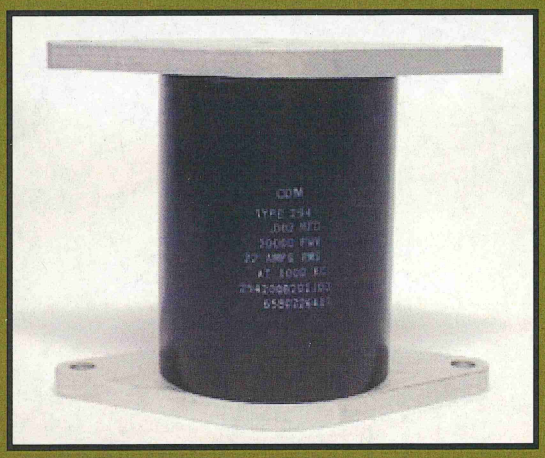
Catalog Number	Capacitance	Voltage	Current at 1 MHz
293200B500J02	50 PF	20000	2.4 Amperes
293200B101J02	100 PF	20000	3.6 Amps
293200B111J02	110 PF	20000	3.9 Amps
293200B121J02	120 PF	20000	4.3 Amps
293200B131J02	130 PF	20000	4.3 Amps
293200B151J02	150 PF	20000	4.7 Amps
293200B161J02	160 PF	20000	5.1 Amps
293200B181J02	180 PF	20000	5.1 Amps
293200B201J02	200 PF	20000	5.6 Amps
293200B221J02	220 PF	20000	6.2 Amps
293200B241J02	240 PF	20000	6.2 Amps
293200B251J02	250 PF	20000	6.2 Amps
293200B271J02	270 PF	20000	6.8 Amps
293200B301J02	300 PF	20000	6.8 Amps
293200B331J02	330 PF	20000	7.5 Amps
293200B361J02	360 PF	20000	7.5 Amps
293200B391J02	390 PF	20000	8.2 Amps

293200B431J02	430 PF	20000	8.2 Amps
293200B471J02	470 PF	20000	9.1 Amps
293200B501J02	500 PF	20000	9.1 Amps
293200B511J02	510 PF	20000	9.1 Amps
293200B561J02	560 PF	20000	10.0 Amps
293200B621J02	620 PF	20000	11.0 Amps
293200B681J02	680 PF	20000	11.0 Amps
293200B751J02	750 PF	20000	12.0 Amps
293200B801J02	800 PF	20000	12.0 Amps
293200B821J02	820 PF	20000	12.0 Amps
293200B911J02	910 PF	20000	13.0 Amps
293200B102J02	1000 PF	20000	13.0 Amps
293200B112J02	1100 PF	20000	15.0 Amps
293150B122J02	1200 PF	15000	15.0 Amps
293150B132J02	1300 PF	15000	15.0 Amps
293150B152J02	1500 PF	15000	16.0 Amps
293200B152J02	1500 PF	20000	16.0 Amps
293150B162J02	1600 PF	15000	18.0 Amps
293150B182J02	1800 PF	15000	18.0 Amps
293150B202J02	2000 PF	15000	20.0 Amps
293120B222J02	2200 PF	12000	20.0 Amps
293120B242J02	2400 PF	12000	22.0 Amps
293120B252J02	2500 PF	12000	22.0 Amps
293120B272J02	2700 PF	12000	22.0 Amps
293120B302J02	3000 PF	12000	24.0 Amps
293120B332J02	3300 PF	12000	24.0 Amps
293120B362J02	3600 PF	12000	24.0 Amps
293120B392J02	3900 PF	12000	27.0 Amps
293120B402J02	4000 PF	12000	27.0 Amps
293120B432J02	4300 PF	12000	27.0 Amps
293100B472J02	4700 PF	10000	27.0 Amps
293100B502J02	5000 PF	10000	30.0 Amps
293100B512J02	5100 PF	10000	30.0 Amps

293100B562J02	5600 PF	10000	33.0 Amps
293100B602J02	6000 PF	10000	33.0 Amps
293100B622J02	6200 PF	10000	33.0 Amps
293100B682J02	6800 PF	10000	33.0 Amps
293100B752J02	7500 PF	10000	36.0 Amps
293100B802J02	8000 PF	10000	36.0 Amps
293100B822J02	8200 PF	10000	36.0 Amps
29380B912J02	9100 PF	8000	39.0 Amps
29380B103J02	10000 PF	8000	39.0 Amps
29380B113J02	11000 PF	8000	39.0 Amps
29350B123J02	12000 PF	5000	43.0 Amps
29350B133J02	13000 PF	5000	43.0 Amps
29350B153J02	15000 PF	5000	43.0 Amps
29350B163J02	16000 PF	5000	47.0 Amps
29350B183J02	18000 PF	5000	47.0 Amps
29350B203J02	20000 PF	5000	47.0 Amps
29350B223J02	22000 PF	5000	47.0 Amps
29350B243J02	24000 PF	5000	51.0 Amps
29330B273J02	27000 PF	3000	51.0 Amps
29330B303J02	30000 PF	3000	51.0 Amps
29330B333J02	33000 PF	3000	51.0 Amps
29330B363J02	36000 PF	3000	51.0 Amps
29330B393J02	39000 PF	3000	51.0 Amps
29330B433J02	43000 PF	3000	51.0 Amps
29330B473J02	47000 PF	3000	51.0 Amps
29330B513J02	51000 PF	3000	51.0 Amps
29330B563J02	56000 PF	3000	51.0 Amps
29330B623J02	62000 PF	3000	51.0 Amps
29330B683J02	68000 PF	3000	51.0 Amps
29320B753J02	75000 PF	2000	51.0 Amps
29320B823J02	82000 PF	2000	51.0 Amps
29320B913J02	91000 PF	2000	51.0 Amps
29320B104J02	100000 PF	2000	51.0 Amps

Commercial Radio Company

Type 294 Mica Capacitors





Catalog Number	Capacitance	Voltage	Current at 1 MHz
294300B500J02	50 PF	30000	5.1 Amperes
294300B101J02	100 PF	30000	5.1 Amps
294300B111J02	110 PF	30000	5.1 Amps
294300B121J02	120 PF	30000	5.6 Amps
294300B131J02	130 PF	30000	6.2 Amps
294300B151J02	150 PF	30000	6.2 Amps
294300B161J02	160 PF	30000	6.8 Amps
294300B181J02	180 PF	30000	6.8 Amps
294300B201J02	200 PF	30000	7.5 Amps
294300B221J02	220 PF	30000	7.5 Amps
294300B241J02	240 PF	30000	8.2 Amps
294300B251J02	250 PF	30000	8.2 Amps
294300B271J02	270 PF	30000	9.1 Amps
294300B301J02	300 PF	30000	9.1 Amps
294300B331J02	330 PF	30000	9.1 Amps
294300B361J02	360 PF	30000	10.0 Amps
294300B391J02	390 PF	30000	11.0 Amps
294300B431J02	430 PF	30000	11.0 Amps

294300B471J02	470 PF	30000	11.0 Amps
294300B501J02	500 PF	30000	12.0 Amps
294300B511J02	510 PF	30000	12.0 Amps
294300B561J02	560 PF	30000	13.0 Amps
294300B621J02	620 PF	30000	13.0 Amps
294300B681J02	680 PF	30000	13.0 Amps
294300B751J02	750 PF	30000	15.0 Amps
294300B801J02	800 PF	30000	15.0 Amps
294300B821J02	820 PF	30000	15.0 Amps
294300B911J02	910 PF	30000	15.0 Amps
294300B102J02	1000 PF	30000	16.0 Amps
294250B112J02	1100 PF	25000	18.0 Amps
294250B122J02	1200 PF	25000	18.0 Amps
294250B132J02	1300 PF	25000	18.0 Amps
294250B152J02	1500 PF	25000	20.0 Amps
294250B162J02	1600 PF	25000	20.0 Amps
294250B182J02	1800 PF	25000	22.0 Amps
294200B202J02	2000 PF	20000	22.0 Amps
294200B222J02	2200 PF	20000	24.0 Amps
294200B242J02	2400 PF	20000	24.0 Amps
294200B252J02	2500 PF	20000	24.0 Amps
294200B272J02	2700 PF	20000	24.0 Amps
294200B302J02	3000 PF	20000	27.0 Amps
294200B332J02	3300 PF	20000	27.0 Amps
294200B362J02	3600 PF	20000	27.0 Amps
294200B392J02	3900 PF	20000	30.0 Amps
294200B402J02	4000 PF	20000	30.0 Amps
294150B432J02	4300 PF	15000	30.0 Amps
294150B472J02	4700 PF	15000	30.0 Amps
294150B502J02	5000 PF	15000	33.0 Amps
294200B502J02	5000 PF	20000	33.0 Amps
294150B512J02	5100 PF	15000	33.0 Amps
294150B562J02	5600 PF	15000	36.0 Amps

294150B602J02	6000 PF	15000	36.0 Amps
294150B622J02	6200 PF	15000	36.0 Amps
294150B682J02	6800 PF	15000	36.0 Amps
294150B752J02	7500 PF	15000	36.0 Amps
294120B802J02	8000 PF	12000	39.0 Amps
294120B822J02	8200 PF	12000	39.0 Amps
294120B912J02	9100 PF	12000	39.0 Amps
294100B103J02	10000 PF	10000	43.0 Amps
294100B113J02	11000 PF	10000	43.0 Amps
29480B123J02	12000 PF	8000	43.0 Amps
29480B133J02	13000 PF	8000	47.0 Amps
29480B153J02	15000 PF	8000	47.0 Amps
29480B163J02	16000 PF	8000	47.0 Amps
29460B183J02	18000 PF	6000	51.0 Amps
29460B203J02	20000 PF	6000	51.0 Amps
29460B223J02	22000 PF	6000	51.0 Amps
29460B243J02	24000 PF	6000	56.0 Amps
29460B273J02	27000 PF	6000	56.0 Amps
29460B303J02	30000 PF	6000	56.0 Amps
29450B333J02	33000 PF	5000	56.0 Amps
29450B363J02	36000 PF	5000	56.0 Amps
29450B393J02	39000 PF	5000	56.0 Amps
29450B403J02	40000 PF	5000	56.0 Amps
29450B433J02	43000 PF	5000	56.0 Amps
29450B473J02	47000 PF	5000	56.0 Amps
29450B513J02	51000 PF	5000	56.0 Amps
29450B563J02	56000 PF	5000	56.0 Amps
29450B623J02	62000 PF	5000	56.0 Amps
29440B683J02	68000 PF	4000	56.0 Amps
29440B753J02	75000 PF	4000	62.0 Amps
29430B823J02	82000 PF	3000	62.0 Amps
29430B913J02	91000 PF	3000	62.0 Amps
29430B104J02	100000 PF	3000	62.0 Amps

Commercial Radio Company

Type F2 Mica Capacitors





Catalog Number	Capacitance	Voltage	Current at 1 MHz
F250B470JM	47 PF	5000	.62 Amperes
F250B510JM	51 PF	5000	.68 Amps
F250B560JM	56 PF	5000	.75 Amps
F250B620JM	62 PF	5000	.82 Amps
F250B680JM	68 PF	5000	.91 Amps
F250B750JM	75 PF	5000	1.0 Amps
F250B820JM	82 PF	5000	1.1 Amps
F250B910JM	91 PF	5000	1.2 Amps
F250B101JM	100 PF	5000	1.2 Amps
F250B111JM	110 PF	5000	1.3 Amps
F250B121JM	120 PF	5000	1.5 Amps
F250B131JM	130 PF	5000	1.6 Amps
F250B151JM	150 PF	5000	1.8 Amps
F250B161JM	160 PF	5000	1.8 Amps
F250B181JM	180 PF	5000	2.0 Amps
F250B201JM	200 PF	5000	2.0 Amps
F250B221JM	220 PF	5000	2.2 Amps
F250B241JM	240 PF	5000	2.4 Amps

F250B251JM	250 PF	5000	2.4 Amps
F250B271JM	270 PF	5000	2.4 Amps
F250B301JM	300 PF	5000	2.7 Amps
F250B331JM	330 PF	5000	2.7 Amps
F250B361JM	360 PF	5000	2.7 Amps
F250B391JM	390 PF	5000	2.7 Amps
F250B401JM	400 PF	5000	2.7 Amps
F250B431JM	430 PF	5000	3.0 Amps
F250B471JM	470 PF	5000	3.3 Amps
F250B501JM	500 PF	5000	3.3 Amps
F250B511JM	510 PF	5000	3.3 Amps
F250B561JM	560 PF	5000	3.6 Amps
F250B601JM	600 PF	5000	3.6 Amps
F250B621JM	620 PF	5000	3.6 Amps
F250B681JM	680 PF	5000	3.6 Amps
F250B751JM	750 PF	5000	3.9 Amps
F250B821JM	820 PF	5000	3.9 Amps
F250B911JM	910 PF	5000	4.3 Amps
F250B102JM	1000 PF	5000	4.3 Amps
F250B112JM	1100 PF	5000	4.7 Amps
F250B122JM	1200 PF	5000	4.7 Amps
F250B132JM	1300 PF	5000	5.1 Amps
F250B152JM	1500 PF	5000	5.1 Amps
F250B162JM	1600 PF	5000	5.6 Amps
F250B182JM	1800 PF	5000	5.6 Amps
F2100B202JM	2000 PF	10000	6.2 Amps
F250B202JM	2000 PF	5000	6.2 Amps
F260B202JM	2000 PF	6000	6.2 Amps
F250B222JM	2200 PF	5000	6.2 Amps
F250B242JM	2400 PF	5000	6.2 Amps
F250B252JM	2500 PF	5000	6.4 Amps
F230B272JM	2700 PF	3000	6.8 Amps
F230B302JM	3000 PF	3000	6.8 Amps

F250B302JM	3000 PF	5000	6.8 Amps
F230B332JM	3300 PF	3000	6.8 Amps
F230B362JM	3600 PF	3000	7.5 Amps
F230B392JM	3900 PF	3000	7.5 Amps
F230B402JM	4000 PF	3000	7.5 Amps
F230B432JM	4300 PF	3000	7.5 Amps
F230B472JM	4700 PF	3000	8.2 Amps
F230B502JM	5000 PF	3000	8.2 Amps
F250B502JM	5000 PF	5000	8.2 Amps
F260B502JM	5000 PF	6000	8.2 Amps
F230B512JM	5100 PF	3000	8.2 Amps
F230B562JM	5600 PF	3000	9.1 Amps
F230B602JM	6000 PF	3000	9.1 Amps
F230B622JM	6200 PF	3000	9.1 Amps
F230B682JM	6800 PF	3000	9.1 Amps
F230B752JM	7500 PF	3000	9.1 Amps
F220B822JM	8200 PF	2000	10.0 Amps
F220B912JM	9100 PF	2000	10.0 Amps
F220B103JM	10000 PF	2000	11.0 Amps
F220B113JM	11000 PF	2000	11.0 Amps
F220B123JM	12000 PF	2000	11.0 Amps
F220B133JM	13000 PF	2000	12.0 Amps
F220B153JM	15000 PF	2000	12.0 Amps
F220B163JM	16000 PF	2000	12.0 Amps
F220B183JM	18000 PF	2000	13.0 Amps
F220B203JM	20000 PF	2000	13.0 Amps
F220B223JM	22000 PF	2000	13.0 Amps
F215B243JM	24000 PF	1500	15.0 Amps
F215B273JM	27000 PF	1500	15.0 Amps
F215B303JM	30000 PF	1500	15.0 Amps
F215B333JM	33000 PF	1500	15.0 Amps
F215B363JM	36000 PF	1500	16.0 Amps
F215B393JM	39000 PF	1500	16.0 Amps

F215B433JM	43000 PF	1500	16.0 Amps
F215B473JM	47000 PF	1500	16.0 Amps
F215B503JM	50000 PF	1500	16.0 Amps
F215B513JM	51000 PF	1500	16.0 Amps
F210B563JM	56000 PF	1000	16.0 Amps
F210B623JM	62000 PF	1000	18.0 Amps
F210B683JM	68000 PF	1000	18.0 Amps
F210B753JM	75000 PF	1000	18.0 Amp
F205B823JM	82000 PF	500	18.0 Amps
F205B913JM	91000 PF	500	18.0 Amps
F205B104JM	100000 PF	500	18.0 Amps
F210B104JM	100000 PF	1000	18.0 Amps
F205B204JM	200000 PF	500	18.0 Amps
F205B254JM	250000 PF	500	18.0 Amps

Contact Us

Subject: Richard Mathias at the Griffith this Saturday Oct 8 and Screenings of Three Universal Frankenstein Films at the Egyptian Theater

Hollywood

> Hi Bill,

Long time no see. I was contacted today by Richard Mathias who will be visiting Griffith Observatory this Saturday (Oct 8). I happened to mention to him that during the evening there will be a screening of all three Universal Frankenstein movies (Frankenstein, Bride of Frankenstein, and Son of Frankenstein) on the big screen at the Egyptian Theater in downtown Hollywood. He might join me and I would be happy to treat you both to the films, if you're interested and can meet us down there. It would be an opportunity to hear your relate your memories of Ken Strickfaden and other Tesla electrical stuff.

Let me know if you're interested.

Best,

Matt

Tesla Technology Research

------- End of forwarded message -------

Tesla Technology Research

It would be my pleasure to treat you both to dinner before the films. Right next to the Egyptian Theater is the historic Pig and Whistle (bar and grill) where Hollywood celebrities would hang out following film premieres. And just a short walk away is Miceli's Italian restaurant, a famous haunt of Frank Sinatra. If we can get to the restaurant of our choice by 5:00pm, we could enjoy dinner with plenty of time to talk before the screenings. Naturally, I would quite understand if either of you can't stay for all three films which will probably end sometime after midnight. But (of course) I will be sticking it through to the end.! Although I saw Bride of Frankenstein recently at the Turner Classic Movie Festival two years ago (screening hosted by Boris Karloff's daughter Sarah with friend and director Peter Bogdanovich - an absolutely brilliant film historian among his other talents.), I haven't seen the other two films on a big screen in years.

The Egyptian is located on the south side of Hollywood Blvd., between Highland Ave and Cahuenga Blvd., near the corner of Hollywood Blvd. and Las Palmas Ave. I've attached a preliminary location map, but will provide a better one soon with preferred parking area indicated.

Please let me know your preferences for Saturday night.

Best regards,

Matt

-----Original Message-----

From: wysock@teslatechnologyresearch.com
[mailto:wysock@teslatechnologyresearch.com]

Sent: Tuesday, October 04, 2011 7:15 PM

To: Matt Ventimiglia

Subject: Re: Richard Mathias at the Griffith this Saturday Oct 8 and Screenings of Three Universal Frankenstein Films at the Egyptian Th

Matt,

Thank you for the invite. I vagluy remember where that theater is in Hollywood. I'll have to

Google it. What time to be there and where to park? Are you meeting Richard Mathias at the

Observatory before or what? Tell me what you want me to do. We have SO MUCH to

talk about. I will do my best to be there at the appointed time and place.

Best regards.

Bill.

Date sent: Sun, 2 Oct 2011 12:12:38 -0700 (GMT-07:00)

From: Matt Ventimiglia <nicknova@jps.net>

Send reply to: Matt Ventimiglia <nicknova@jps.net>

To: wysock@teslatechnologyresearch.com

treat, I am open to your final selection. If we could all meet at the Observatory around 4 or 5 p.m., this would accommodate my schedule. Just let me know your preference.

I will be staying at the Embassy Suites (LAX 310-215-1000) Friday evening. If you need to reach me, please call me on my cell phone (501) 915-2336. I will be selecting a hotel in the Hollywood or Glendale area for Saturday evening so that I don't have to drive far after the show.

This will be a very special time!

Best regards,

Richard

-------Original Message-------

From: Matt Ventimiglia

Date: 10/05/11 00:05:11

To: wysock@teslatechnologyresearch.com

Cc: 'Mid-America Science Museum'

Subject: RE: Richard Mathias at the Griffith this Saturday Oct 8 and Screenings of Three Universal Frankenstein Films at the Egyptian Th

Hi Bill and Richard,

Glad to hear from you - Bill.! Richard will be visiting the Griffith Observatory on Saturday and would be leaving there at 4:00pm. I'm not sure what his plans are after that, but he does seem very interested in seeing the films at the Egyptian Theater which begin at 7:30pm. I've copied this email to him so that he can chime in on our plans for the evening. I wasn't originally planning to stop at the observatory myself, but I could be persuaded to meet you both there around 3:00pm, at which point I would provide printed maps and parking instructions for the Egyptian. Unfortunately the theater no longer validates for parking at Hollywood and Highland underground structure (Kodak Center) a few blocks away from the theater. I'll find out what they now recommend in the way of cheap flat-rate parking nearby.

keep track of that...)

Another option is to park at the Hollywood/Highland Complex structure (entrance on the west side of Highland Ave, north of Hollywood Blvd. just south of the entrance to the Hollywood Renaissance Hotel...the complex is two blocks west of the Egyptian Theater and its just a short walk more to Miceli's). Parking could be validated at the H&H Complex visitor's information center (wherever that is...but I'm sure it will be obvious, although I've never actually done it...) With validation you can stay there for two hours at a total cost of $2, but after that it goes up $1 every 15 minutes to the day-maximum of $10, which means for the length of our stay it will still likely come to $10. One advantage of this location is proximity to a Metro Rail Redline station and probably better security.

Maps are included for your review.

Let me know if you still want to meet at the Observatory at around 4:30pm or would rather just meet at Miceli's no later than 6:00pm. (The problem with meeting at the observatory in late afternoon might be traffic on roads leading past the Greek Theater...)

Best,

Matt

From: Mid-America Science Museum [mailto:masm@suddenlink.net]

Sent: Wednesday, October 05, 2011 2:05 AM

To: nicknova@jps.net

Subject: RE: Richard Mathias at the Griffith this Saturday Oct 8 and Screenings of Three Universal Frankenstein Films at the Egyptian Theater

Hi Matt and Bill,

I am very pleased that we all three can spend some time together on Saturday evening for dinner and the show.

I appreciate your gracious invitation for dinner. Miceli's Italian restaurant sounds particularly inviting, but either place would be a special

(Fwd) Richard Mathias at the Griffith this Saturday Oct 8 and

wysock to: william.c.wysock 10/05/2011 06:16 PM

4 attachments

- - EgyptianMapWide.jpg FinalMiceliEgyptianMap.jpg

------- Forwarded message follows -------
From: "Matt Ventimiglia" <nicknova@jps.net>
To: "'Mid-America Science Museum'" <masm@suddenlink.net>
Copies to: <wysock@teslatechnologyresearch.com>
Subject: Richard Mathias at the Griffith this Saturday Oct 8 and Screenings of Three Universal Frankenstein Films at the Egyptian Theater
Date sent: Wed, 5 Oct 2011 16:44:50 -0700

Hi Richard and Bill,

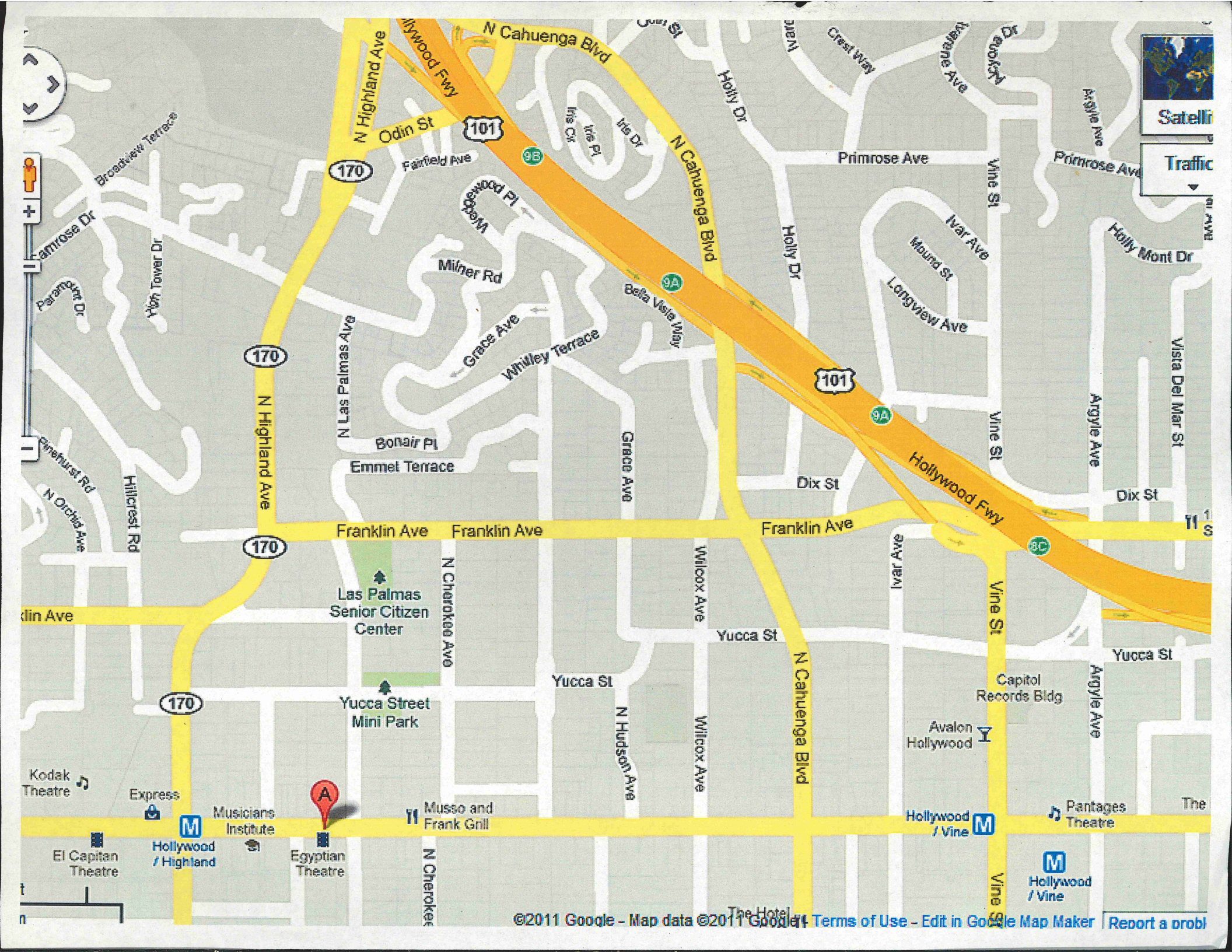
I would suggest that we meet at the observatory at 4:30pm. If we leave no later than 5:30pm, we should get to a parking area near Miceli's and the Egyptian Theater in plenty of time.

Just after we get seated and order dinner, I'll quickly slip over to the theater and get the tickets in advance. That way we won't have to wait in the ticket line which sometimes gets long about 1/2 hour before show time. I don't expect a huge crowd, but you never know...there might be a lot of Frankenstein fans in this town...!

Bill - If you don't think you'll have time to stop at the observatory first, we could just meet at Miceli's restaurant on Las Palmas Ave. just south of Hollywood Blvd. no later than 6:00pm.

The best option for parking near the Egyptian Theater and Miceli's restaurant appears to be a lot used by the Blessed Sacrament Church and School on Selma Ave. I'm told it has a $5 flat rate. Take the 101 FWY. Exit on Highland Ave. to go south. Pass Hollywood Blvd. Make a left turn on Selma Ave. (a block before Sunset Blvd.) Go straight past both Las Palmas and Cherokee St. Make a right into the parking lot of Blessed Sacrament Church and School.

There may be other $5 flat-rate lots on Selma east of Las Palmas Ave. If you can find street parking on Selma, it would be free. Otherwise you can look for a lot off of Las Palmas Ave. (where Miceli's is located) north or south of Hollywood Blvd., but be prepared to pay up to $10 for the length of our stay in some of them. The lot just south of Miceli's restaurant validates for the time we would be eating (although I don't know how they


N Cahuenga Blvd
Hollywood Fwy
N Highland Ave
Odin St
101
170
9B
9A
9C
Fairfield Ave
Primrose Ave
Holly Dr
Vine St
Ivar Ave
Argyle Ave
Holly Mont Dr
Vista Del Mar St
Milner Rd
Bella Vista Way
Longview Ave
Mound St
Grace Ave
Whitley Terrace
N Las Palmas Ave
Bonair Pl
Emmet Terrace
Dix St
Franklin Ave
Las Palmas Senior Citizen Center
N Cherokee Ave
Wilcox Ave
Yucca St
Yucca Street Mini Park
N Hudson Ave
Capitol Records Bldg
Avalon Hollywood
Hollywood / Vine
Pantages Theatre
Kodak Theatre
Express
Musicians Institute
Musso and Frank Grill
El Capitan Theatre
Hollywood / Highland
Egyptian Theatre
Hillcrest Rd
N Orchid Ave
Glenehurst Rd
Paramount Dr
High Tower Dr
Broadview Terrace
Satelli
Traffic
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Commercial Radio Company

Mica Capacitors

Type 291	Type 292	Type 293	Type 294
Special Type	Type F1	Type F2	Type F3
Type AT	Type AK	Type HT and HK	Type 1996-1991
Type 271	Type 272		

Contact Us

Commercial Radio Company

Type F3 Mica Capacitors





Catalog Number	Capacitance	Voltage	Current at 1 MHz
F380B201JM	200 PF	8000	5.0 Amperes
F380B251JM	250 PF	8000	5.0 Amps
F380B501JM	500 PF	8000	6.0 Amps
F380B102JM	1000 PF	8000	8.5 Amps
F380B202JM	2000 PF	8000	11.5 Amps
F380B302JM	3000 PF	8000	13.5 Amps
F380B402JM	4000 PF	8000	15.5 Amps
F380B452JM	4500 PF	8000	16.0 Amps
F380B502JM	5000 PF	8000	16.0 Amps
F380B602JM	6000 PF	8000	17.0 Amps
F380B802JM	8000 PF	8000	19.0 Amps
F380B103JM	10000 PF	8000	20.0 Amps
F350B203JM	20000 PF	5000	23.0 Amps
F340B253JM	25000 PF	4000	24.0 Amps
F340B303JM	30000 PF	4000	24.0 Amps
F340B403JM	40000 PF	4000	24.0 Amps

29140B622J02	6200 PF	4000	18.0 Amps
29140B682J02	6800 PF	4000	18.0 Amps
29140B752J02	7500 PF	4000	18.0 Amps
29140B822J02	8200 PF	4000	20.0 Amps
29140B912J02	9100 PF	4000	20.0 Amps
29140B103J02	10000 PF	4000	20.0 Amps
29140B113J02	11000 PF	4000	20.0 Amps
29130B123J02	12000 PF	3000	20.0 Amps
29130B133J02	13000 PF	3000	20.0 Amps
29130B153J02	15000 PF	3000	20.0 Amps
29130B163J02	16000 PF	3000	20.0 Amps
29120B183J02	18000 PF	2000	20.0 Amps
29120B203J02	20000 PF	2000	22.0 Amps
29120B223J02	22000 PF	2000	22.0 Amps
29120B243J02	24000 PF	2000	22.0 Amps
29120B273J02	27000 PF	2000	22.0 Amps
29115B303J02	30000 PF	1500	22.0 Amps
29115B333J02	33000 PF	1500	22.0 Amps
29115B363J02	36000 PF	1500	22.0 Amps
29115B393J02	39000 PF	1500	22.0 Amps
29115B433J02	43000 PF	1500	22.0 Amps
29115B473J02	47000 PF	1500	22.0 Amps
29115B513J02	51000 PF	1500	22.0 Amps
29115B563J02	56000 PF	1500	22.0 Amps
29115B623J02	62000 PF	1500	22.0 Amps
29115B683J02	68000 PF	1500	22.0 Amps
29110B753J02	75000 PF	1000	22.0 Amps
29110B823J02	82000 PF	1000	22.0 Amps
29110B913J02	91000 PF	1000	22.0 Amps
29110B104J02	100000 PF	1000	22.0 Amps

type 291 | type 292 | type 293 | type 294

Contact Us

29160B471J02	470 PF	6000	5.1 Amps
29160B501J02	500 PF	6000	5.1 Amps
29160B511J02	510 PF	6000	5.1 Amps
29160B521J02	520 PF	6000	5.1 Amps
29160B561J02	560 PF	6000	5.6 Amps
29160B621J02	620 PF	6000	6.2 Amps
29160B681J02	680 PF	6000	6.2 Amps
29160B751J02	750 PF	6000	6.8 Amps
29160B821J02	820 PF	6000	6.8 Amps
29160B911J02	910 PF	6000	7.5 Amps
29160B102J02	1000 PF	6000	7.5 Amps
29160B112J02	1100 PF	6000	8.2 Amps
29160B122J02	1200 PF	6000	8.2 Amps
29160B132J02	1300 PF	6000	9.1 Amps
29160B152J02	1500 PF	6000	9.1 Amps
29160B162J02	1600 PF	6000	10.0 Amps
29160B182J02	1800 PF	6000	11.0 Amps
29160B202J02	2000 PF	6000	11.0 Amps
29160B222J02	2200 PF	6000	12.0 Amps
29160B242J02	2400 PF	6000	13.0 Amps
29160B252J02	2500 PF	6000	13.0 Amps
29160B272J02	2700 PF	6000	13.0 Amps
29160B302J02	3000 PF	6000	13.0 Amps
29160B332J02	3300 PF	6000	15.0 Amps
29160B362J02	3600 PF	6000	15.0 Amps
29160B392J02	3900 PF	6000	15.0 Amps
29160B402J02	4000 PF	6000	15.0 Amps
29160B432J02	4300 PF	6000	15.0 Amps
29160B472J02	4700 PF	6000	16.0 Amps
29160B502J02	5000 PF	6000	16.0 Amps
29140B512J02	5100 PF	4000	16.0 Amps
29140B562J02	5600 PF	4000	18.0 Amps
29140B602J02	6000 PF	4000	18.0 Amps

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Type 291 Mica Capacitors





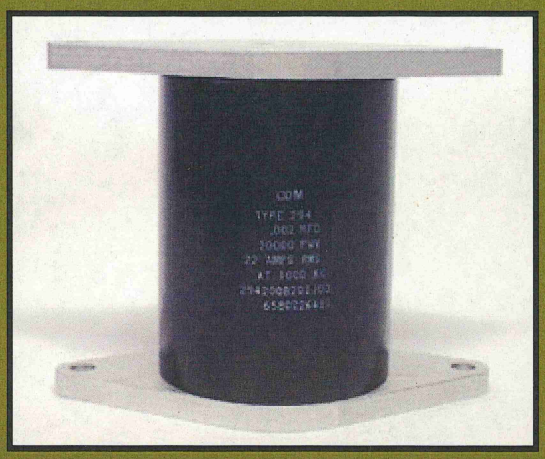
Catalog Number	Capacitance	Voltage	Current at 1 MHz
29160B101J02	100 PF	6000	2.0 Amperes
29160B111J02	110 PF	6000	2.2 Amps
29160B121J02	120 PF	6000	2.2 Amps
29160B131J02	130 PF	6000	2.4 Amps
29160B151J02	150 PF	6000	2.4 Amps
29160B161J02	160 PF	6000	2.7 Amps
29160B181J02	180 PF	6000	3.0 Amps
29160B201J02	200 PF	6000	3.0 Amps
29160B221J02	220 PF	6000	3.3 Amps
29160B241J02	240 PF	6000	3.6 Amps
29160B251J02	250 PF	6000	3.6 Amps
29160B271J02	270 PF	6000	3.6 Amps
29160B301J02	300 PF	6000	3.9 Amps
29160B331J02	330 PF	6000	4.3 Amps
29160B361J02	360 PF	6000	4.3 Amps
29160B391J02	390 PF	6000	4.7 Amps
29160B401J02	400 PF	6000	4.7 Amps
29160B431J02	430 PF	6000	4.7 Amps



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Special Mica Capacitors (Custom built to order)





Capacitance	Voltage	Current at 1 MHz
.00025 MFD	60 KV	12.0 Amperes
.0005 MFD	60 KV	16 Amps
.00075 MFD	50 KV	20 Amps
.001 MFD	40 KV	22 Amps
.0015 MFD	40 KV	27 Amps
.002 MFD	40 KV	30 Amps
.0025 MFD	30 KV	33 Amps
.003 MFD	30 KV	36 Amps
.005 MFD	20 KV	43 Amps
.01 MFD	12 KV	51 Amps
.015 MFD	12 KV	56 Amps
.02 MFD	10 KV	56 Amps
.025 MFD	10 KV	56 Amps
.05 MFD	6 KV	65 Amps

type 291 | type 292 | type 293 | type 294

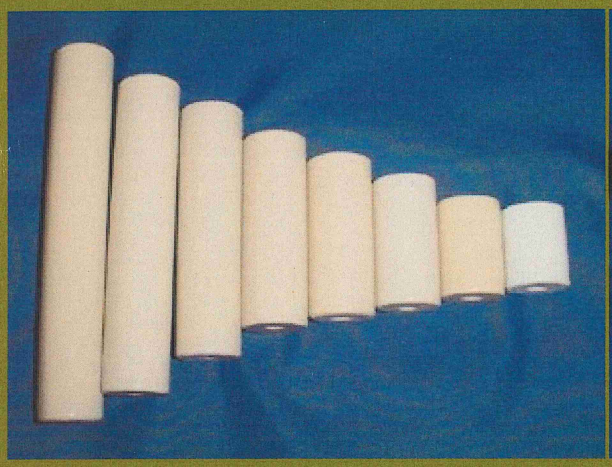
Contact Us

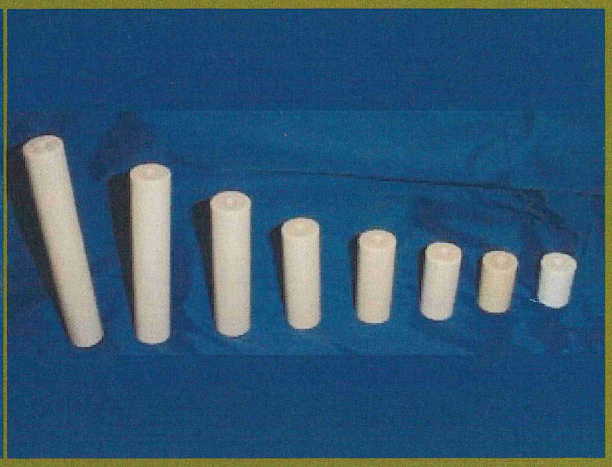
F340B503JM	50000 PF	4000	25.0 Amps
F320B104JM	100000 PF	2000	25.0 Amps
F306B204JM	200000 PF	600	25.0 Amps
F306B254JM	250000 PF	600	25.0 Amps
F306B304JM	300000 PF	600	25.0 Amps
F306B404JM	400000 PF	600	25.0 Amps
F306B504JM	500000 PF	600	25.0 Amps
F306B604JM	600000 PF	600	25.0 Amps
F306B754JM	750000 PF	600	25.0 Amps
F306B105JM	1000000 PF	600	25.0 Amps

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Isolantite Round Standoff Insulators



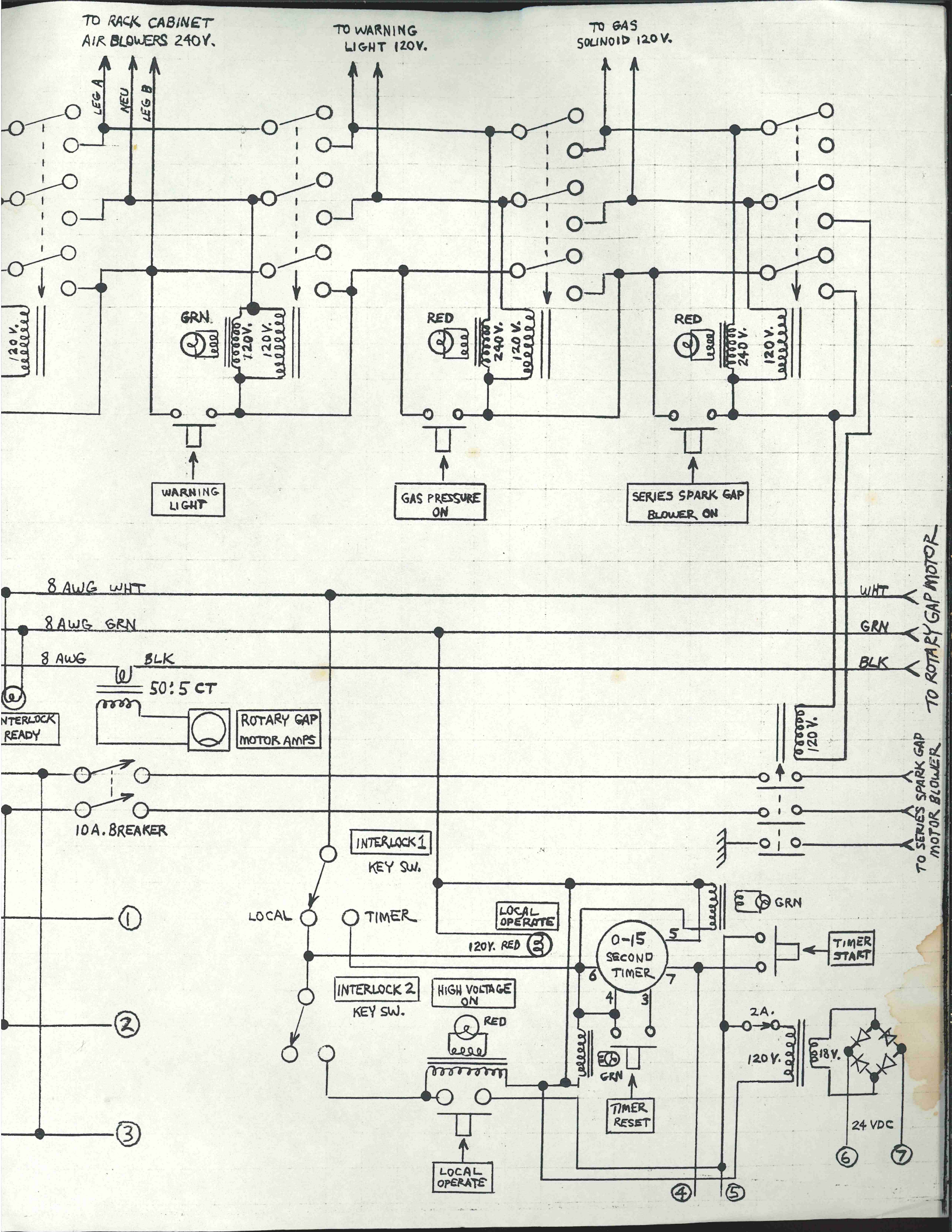


TYPE 397

Part Number	L" X D"	TAP
NL523W02-	1/2"X1/2"	8-32 TAP
NL523W02-005	5/8"X1/2"	8-32 TAP
NL523W02-006	3/4"X1/2"	8-32 TAP
NL523W02-008	1"X1/2"	8-32 TAP
NL523W02-010	1-1/4"X1/2"	8-32 TAP
NL523W02-012	1-1/2"X1/2"	8-32 TAP
NL523W02-016	2"X1/2"	8-32 TAP
NL523W02-020	2-1/2"X1/2"	8-32 TAP
NL523W02-024	3"X1/2"	8-32 TAP

TYPE 337

Part Number	L" X D"	TAP
NL523W03-	3/4"X3/4"	10-32 TAP
NL523W03-008	1"X3/4"	10-32 TAP
NL523W03-010	1-1/4"X3/4"	10-32 TAP
NL523W03-012	1-1/2"X3/4"	10-32 TAP


TO RACK CABINET AIR BLOWERS 240V.
LEG A
NEU
LEG B
TO WARNING LIGHT 120V.
TO GAS SOLINOID 120 V.
120 V.
GRN.
120V.
120 V.
RED
240V.
120 V.
RED
240V.
120 V.
WARNING LIGHT
GAS PRESSURE ON
SERIES SPARK GAP BLOWER ON
8 AWG WHT
8 AWG GRN
8 AWG BLK
50:5 CT
NTERLOCK READY
ROTARY GAP MOTOR AMPS
WHT
GRN
BLK
TO ROTARY GAP MOTOR
120 V.
TO SERIES SPARK GAP MOTOR BLOWER
10A. BREAKER
INTERLOCK 1
KEY SW.
LOCAL
TIMER
LOCAL OPERATE
120V. RED
GRN
0-15 SECOND TIMER
TIMER START
INTERLOCK 2
KEY SW.
HIGH VOLTAGE ON
RED
2A.
120 V.
18 V.
GRN
TIMER RESET
24 VDC
LOCAL OPERATE
1
2
3
4
5
6
7

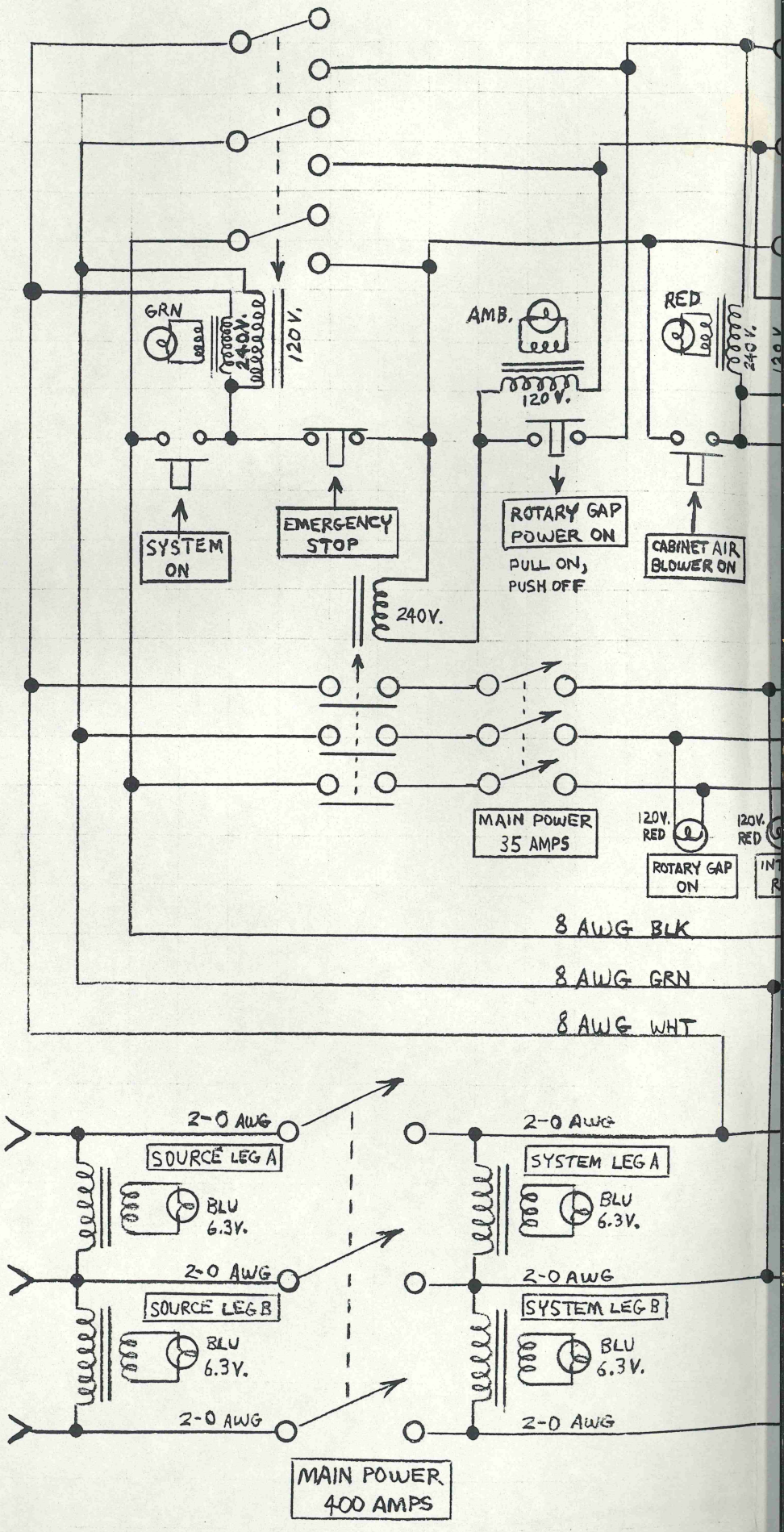

GRN
240V.
120V.
AMB.
120V.
RED
240V.
SYSTEM ON
EMERGENCY STOP
240V.
ROTARY GAP POWER ON
PULL ON, PUSH OFF
CABINET AIR BLOWER ON
MAIN POWER 35 AMPS
120V. RED
120V. RED
ROTARY GAP ON
8 AWG BLK
8 AWG GRN
8 AWG WHT
2-0 AWG
SOURCE LEG A
BLU 6.3V.
2-0 AWG
SOURCE LEG B
BLU 6.3V.
2-0 AWG
2-0 AWG
SYSTEM LEG A
BLU 6.3V.
2-0 AWG
SYSTEM LEG B
BLU 6.3V.
2-0 AWG
MAIN POWER 400 AMPS

TABLE 1 CLASS II

TABLE 2 SERVICE FACTOR 1.6 − .2 = 1.4

DESIGN HP 1.4 x 10 = 14 HP ← STEP 1b

H = ½" PITCH WIDTH FACTOR = 1.0

WIDTH = 1"

PULLEY DIA 26H

MOTOR 1.375 4.138 PITCH DIA

700 H

140 TEETH 28.01 SPACING

PULLEY TB 26 H 100

2.250 GAP SHAFT LENGTH

3.00 MOTOR

KEYWAY .310

PD = 4.138

5 x 140 T = 70" TOT

4.138 π = 13.0

(2 x 20) + 13 = 70

26 TEETH ½" PITCH

PULLEY TB 26 H 100 DOUBLE FLANGE

(180)

BELT 700H

(140 TEETH

½" PITCH)

NEED TO GET P/N

FOR TAPER SHAFT

ADAPTER 1 7/8 BORE

.35 – 1
+.09
.44 – 2
+.09
.53 – 3
.09
.62 – 4
.09
.71 – 5

.71
.09
.80 – 6 =
.09
.89 – 7
.09
.98 – 8

10
111 138
75 75
36 63

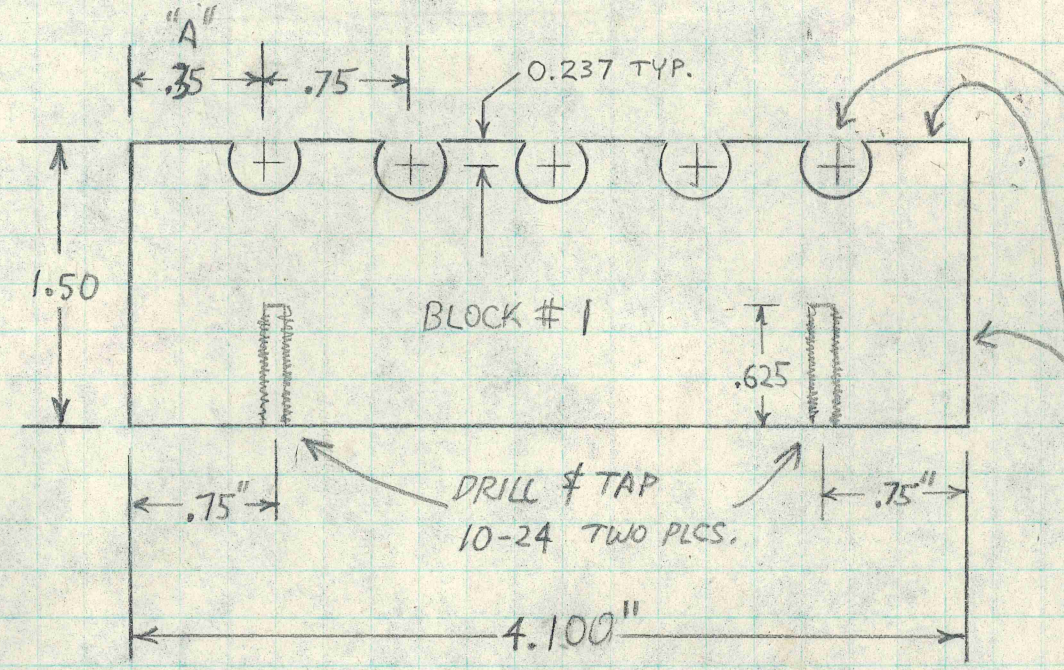
1 - 75
2 - 84
3 - 93
4 - 102
5 - 111
6 120
7 129
8 138

PRIMARY COIL PHENOLIC SPACER-BLOCKS

THIS IS BLOCK (1) OF (8)

BLOCK (2) OF (8) ADD .09 TO "A" = .84

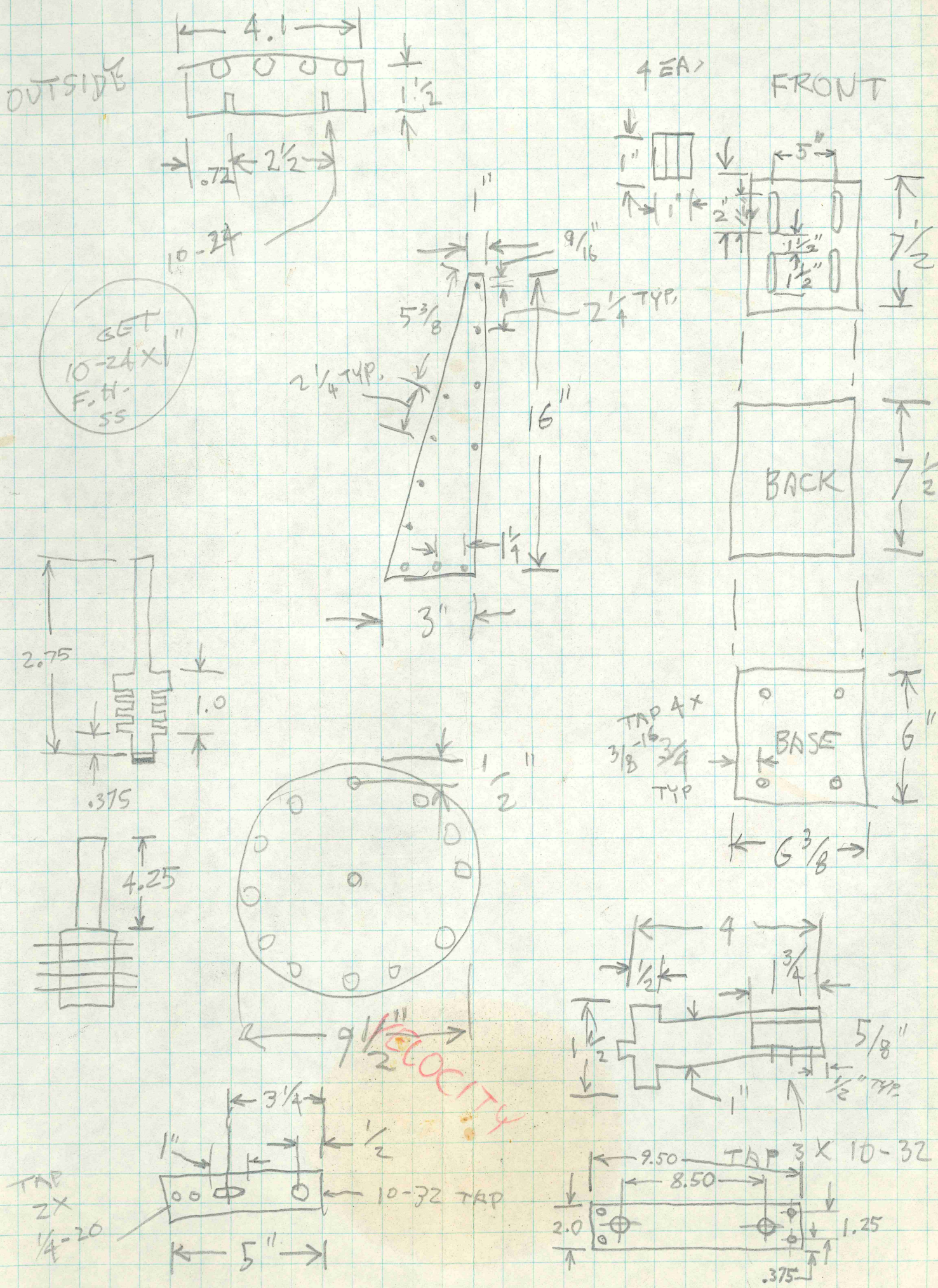
BLOCK (3) OF (8) ADD .18 TO "A" = .93



NOTE: 5TH BLOCK IS THE LAST ONE WITH THE 5TH HOLE SLOT ON RIGHT HAND SIDE

MILL WITH .375 END MILL SUCH THAT 3/8" CU TUBING WILL NEATLY PRESS-FIT IN SLOTS

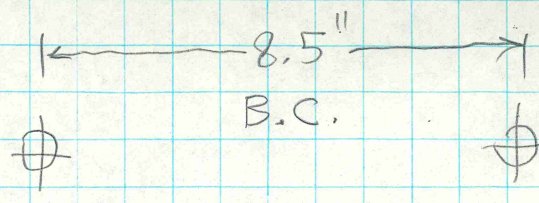
END MILL TO SMOOTH FINISH ON ALL FOUR SIDES


OUTSIDE
4.1
1 1/2
.72
2 1/2
10-24
GET 10-24 X 1" F.H. SS
4 EA.
FRONT
1"
1"
2"
5"
1 1/2"
1 1/2"
7 1/2
9/16"
5 3/8
2 1/4 TYP.
2 1/4 TYP.
16"
1 1/4
3"
BACK
7 1/2
2.75
1.0
.375
TAP 4X
3/8-16
3/4
TYP
BASE
6"
6 3/8
1 1/2"
4.25
9 1/2"
SLOTTY
4
1/2
3/4
1 1/2
5/8"
1/2" TYP.
1"
3 1/4
1"
1/2
TAP 2X 1/4-20
10-32 TAP
5"
9.50
TAP 3 X 10-32
8.50
2.0
1.25
.375

ROTARY GAP DWELL TIME FOR KEN CORUM

8-3-88

(216)
272-5722
(HOME PHONE #)



$\pi D = 26.703538'' \times 1800\ RPM =$

$\frac{48066.368''}{MINUATE} = \frac{801.10613''}{SECOND}$ VEL.

12 STUDS @ 0.50" O.D. EA. = 6" SURFACE AREA / REV.

1800 RPM = 30 REV. PER SEC.

30 RPS x 6" S.A. = $\frac{180''\ S.A.}{SECOND}$

12 STUDS @ 0.100" O.D. EA. = 1.2" SURFACE AREA / REV.

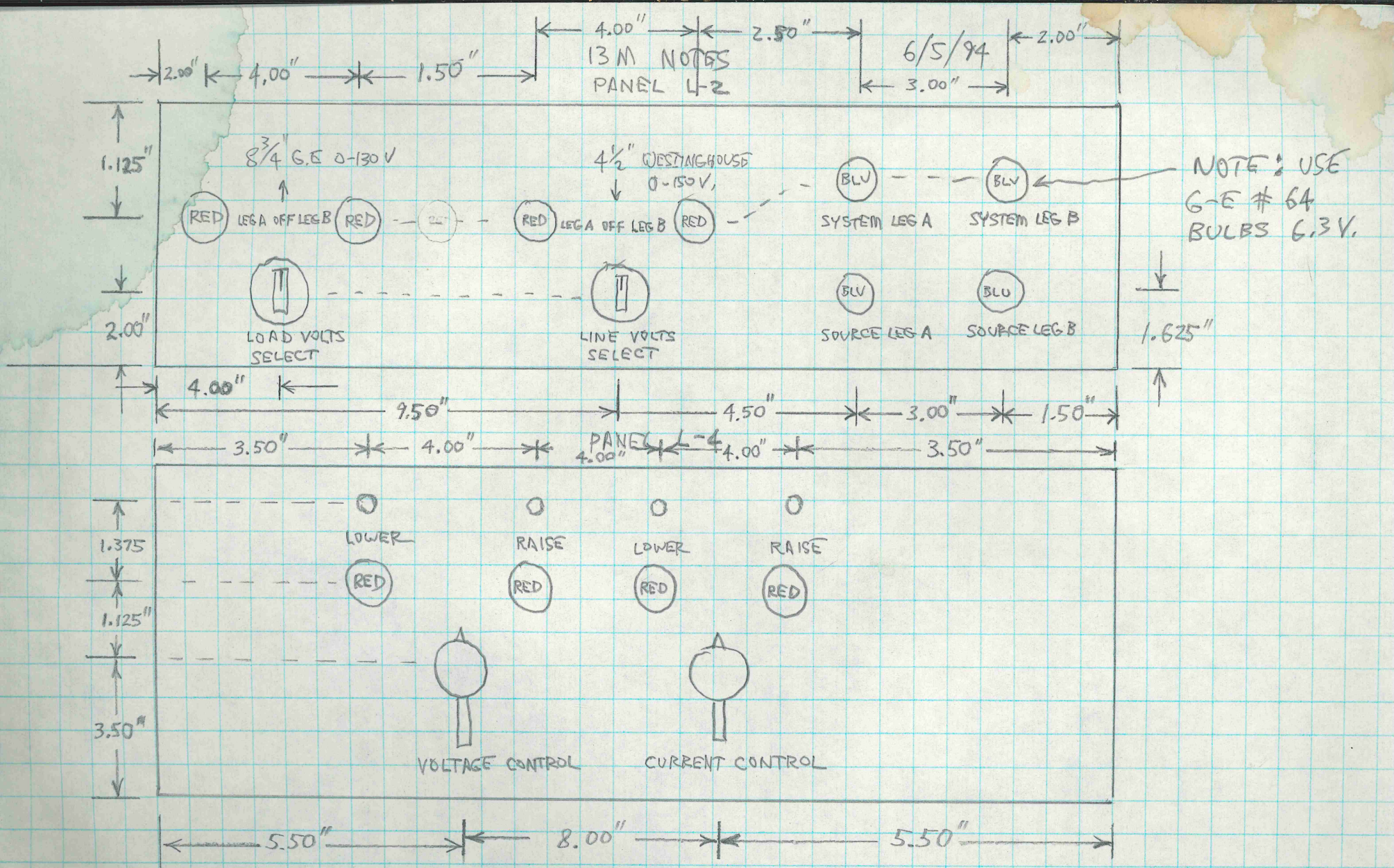
30 RPS x 1.2" S.A. = $\frac{36''\ S.A.}{SECOND}$

100 μS = 0.00000100

IF 4.4505896 = 100 μS
THEN 22.252948 = 20 μS

$\frac{801.10613}{180} = 4.4505896\ \Delta_V$

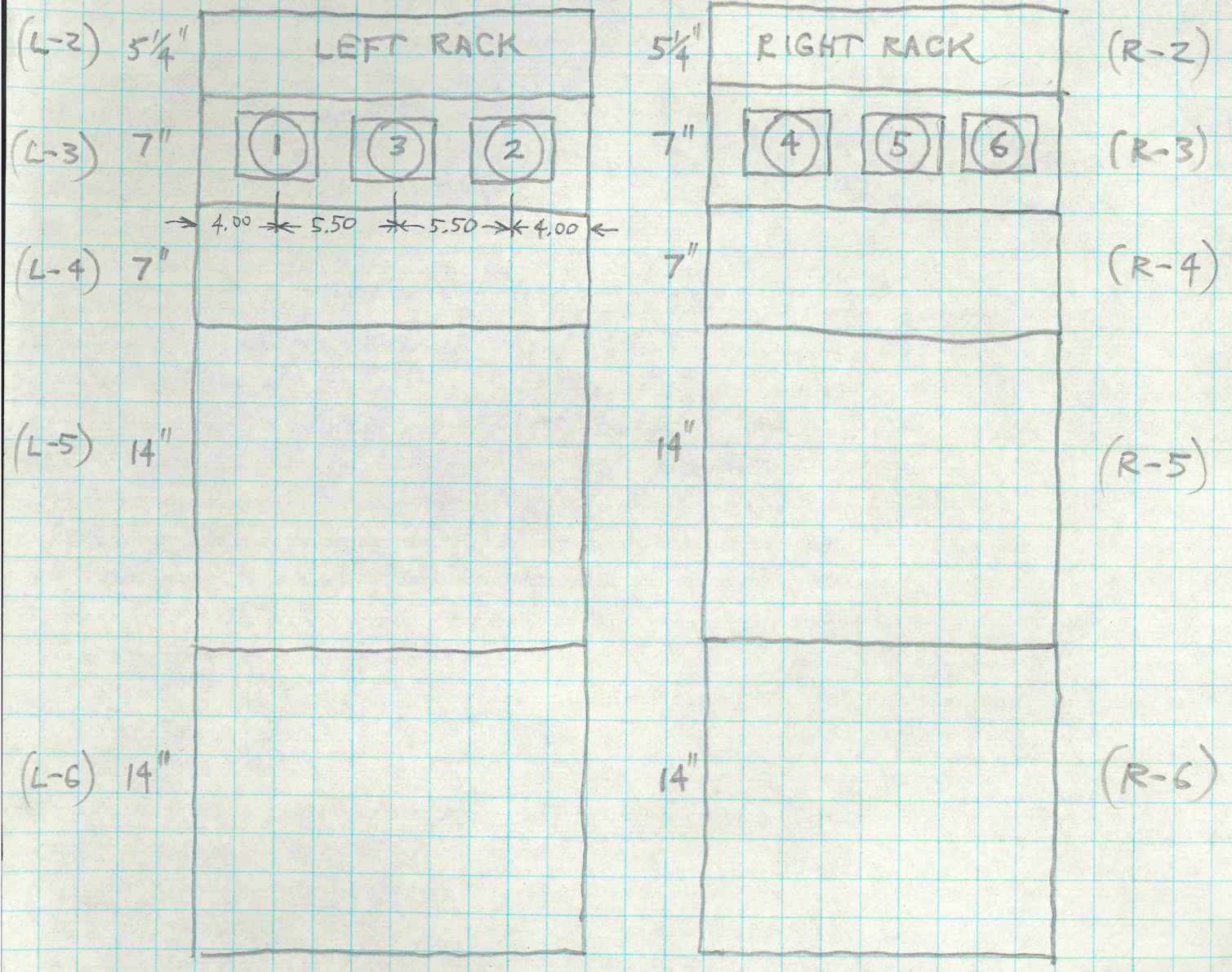
$\frac{801.10613}{36} = 22.252948\ \Delta_V$


13M NOTES
PANEL L-2
6/5/94
2.00"
4.00"
1.50"
2.50"
3.00"
1.125"
2.00"
8 3/4" G.E 0-130 V
4 1/2" WESTINGHOUSE 0-150 V,
RED
LEG A OFF LEG B
SYSTEM LEG A
SYSTEM LEG B
BLU
NOTE: USE G-E # 64 BULBS 6.3 V.
LOAD VOLTS SELECT
LINE VOLTS SELECT
SOURCE LEG A
SOURCE LEG B
1.625"
4.00"
9.50"
4.50"
3.00"
1.50"
3.50"
PANEL L-4
1.375
1.125"
3.50"
LOWER
RAISE
VOLTAGE CONTROL
CURRENT CONTROL
5.50"
8.00"

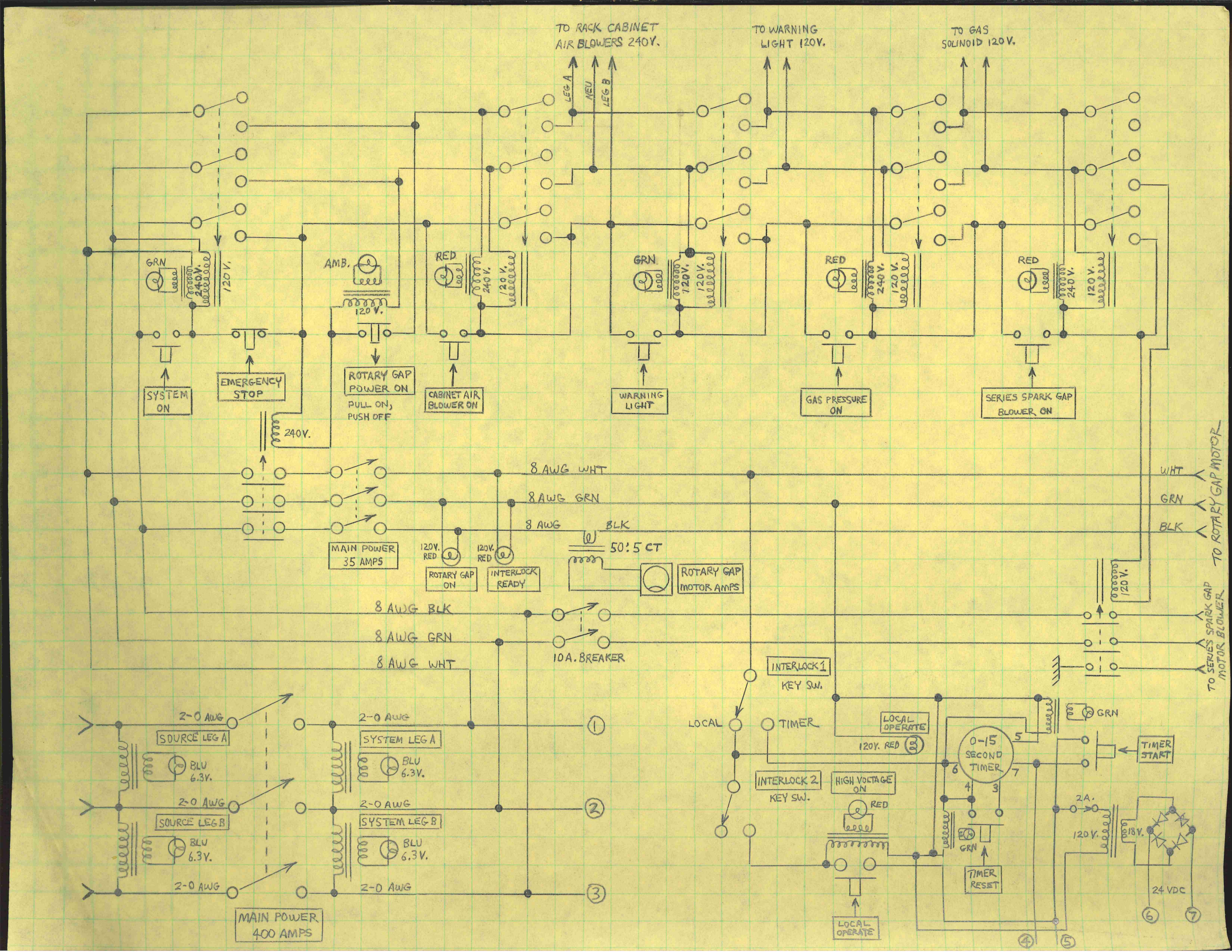
13M NOTES 6/5/94

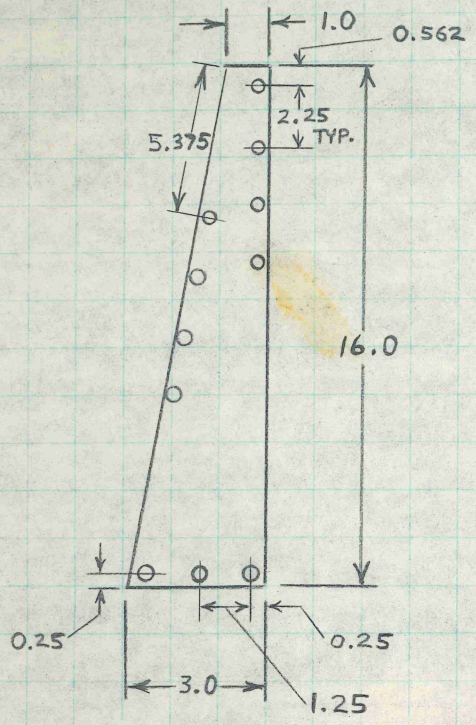
METER ASSIGNMENT

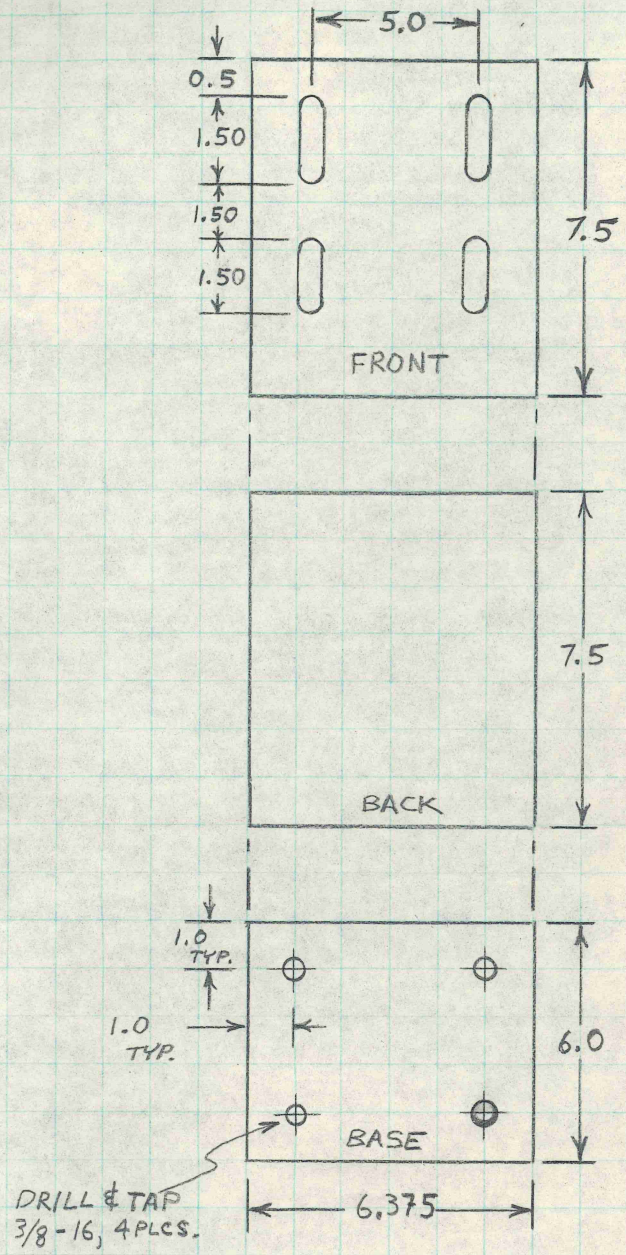
1. WESTINGHOUSE 0-400 V. (GRAY) = SYSTEM VOLTS
2. WESTINGHOUSE 0-400 A (GRAY) = SYSTEM AMPS
3. WESTINGHOUSE 0-150 V. (LT. BLUE) = LINE VOLTS SELECT
4. WESTINGHOUSE 58-62 CYCLES (BLK) = LINE FREQUENCY
5. G-E 0-300 V. (BLK) = LINE VOLTS
6. WESTINGHOUSE 0-50 A (BLK) = ROTARY GAP MOTOR AMPS



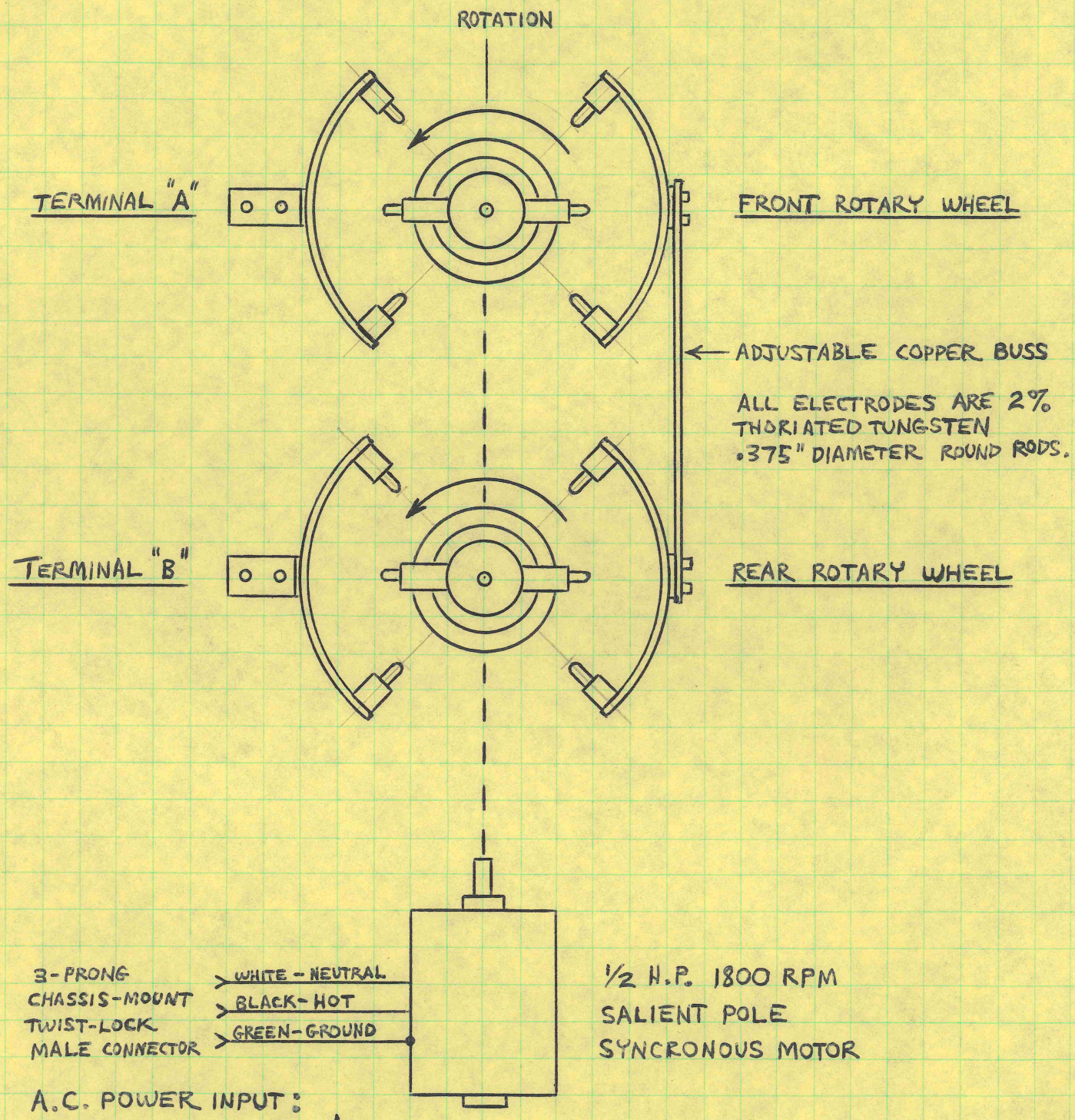
METER DIA. = 3.980" R = 1.990"


TO RACK CABINET AIR BLOWERS 240V.
TO WARNING LIGHT 120V.
TO GAS SOLINOID 120V.
LEG A
NEU
LEG B
GRN
240V.
120V.
AMB.
120V.
RED
GRN
RED
RED
SYSTEM ON
EMERGENCY STOP
240V.
ROTARY GAP POWER ON
PULL ON, PUSH OFF
CABINET AIR BLOWER ON
WARNING LIGHT
GAS PRESSURE ON
SERIES SPARK GAP BLOWER ON
8 AWG WHT
8 AWG GRN
8 AWG BLK
WHT
GRN
BLK
TO ROTARY GAP MOTOR
MAIN POWER 35 AMPS
120V. RED
ROTARY GAP ON
120V. RED
INTERLOCK READY
BLK
50:5 CT
ROTARY GAP MOTOR AMPS
120V.
8 AWG BLK
8 AWG GRN
8 AWG WHT
10A. BREAKER
TO SERIES SPARK GAP MOTOR BLOWER
INTERLOCK 1
KEY SW.
LOCAL
TIMER
LOCAL OPERATE
120V. RED
GRN
TIMER START
0-15 SECOND TIMER
INTERLOCK 2
KEY SW.
HIGH VOLTAGE ON
RED
GRN
TIMER RESET
2A.
120V.
18V.
24 VDC
LOCAL OPERATE
2-0 AWG
SOURCE LEG A
BLU 6.3V.
2-0 AWG
SOURCE LEG B
BLU 6.3V.
2-0 AWG
SYSTEM LEG A
BLU 6.3V.
2-0 AWG
SYSTEM LEG B
BLU 6.3V.
2-0 AWG
MAIN POWER 400 AMPS
1
2
3
4
5
6
7


1.0
0.562
2.25
TYP.
5.375
16.0
0.25
0.25
3.0
1.25

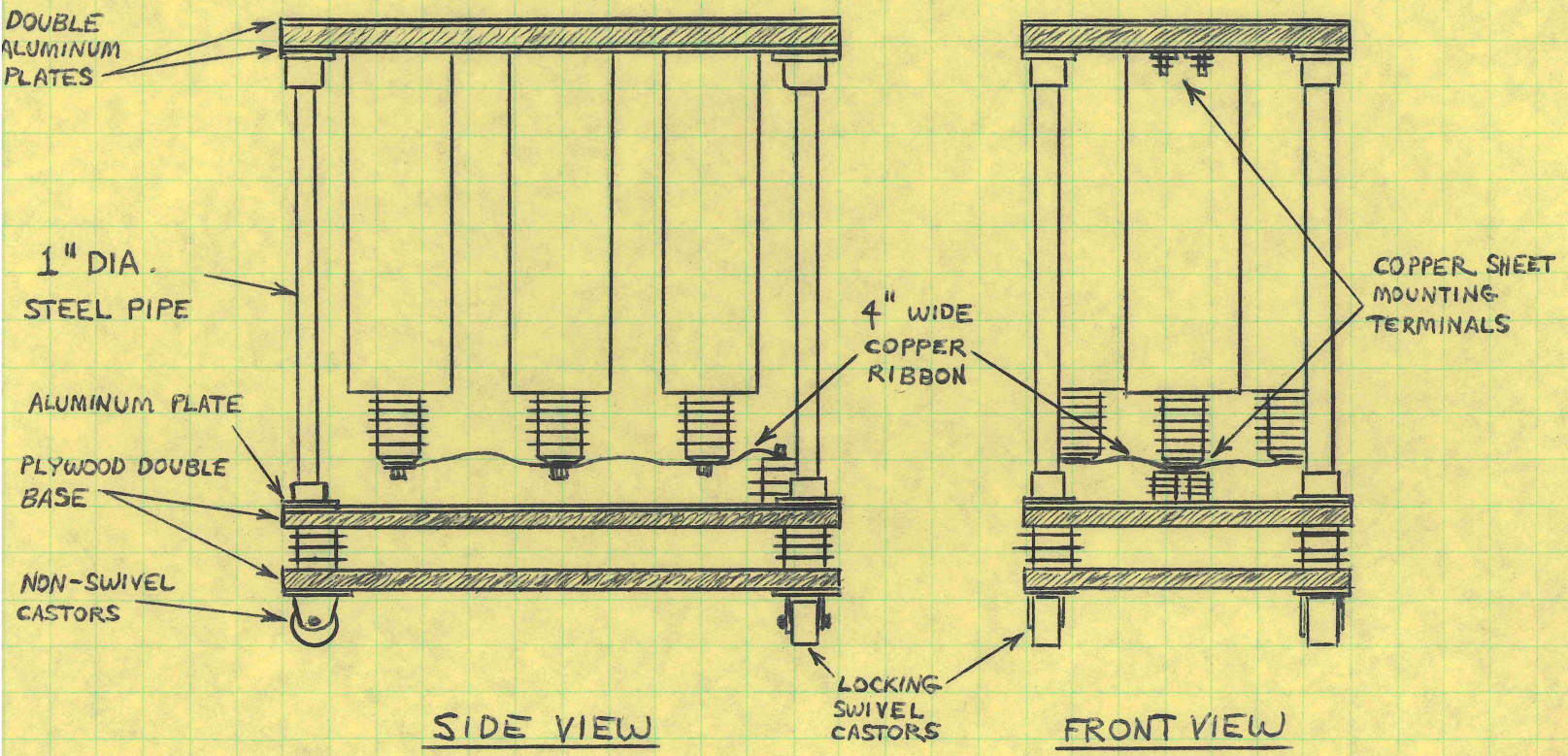

5.0
0.5
1.50
1.50
1.50
7.5
FRONT
7.5
BACK
1.0
TYP.
1.0
TYP.
6.0
BASE
DRILL & TAP
3/8-16, 4PLCS.
6.375

MODEL 12 TESLA COIL SYNCRONOUS ROTARY SPARK GAP

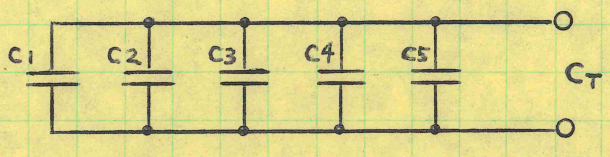


A.C. POWER INPUT:
120 VOLTS, 60 Hz ONLY!
7.5 AMPS

MODEL 12 TESLA COIL CAPACITOR BANK



SCHEMATIC

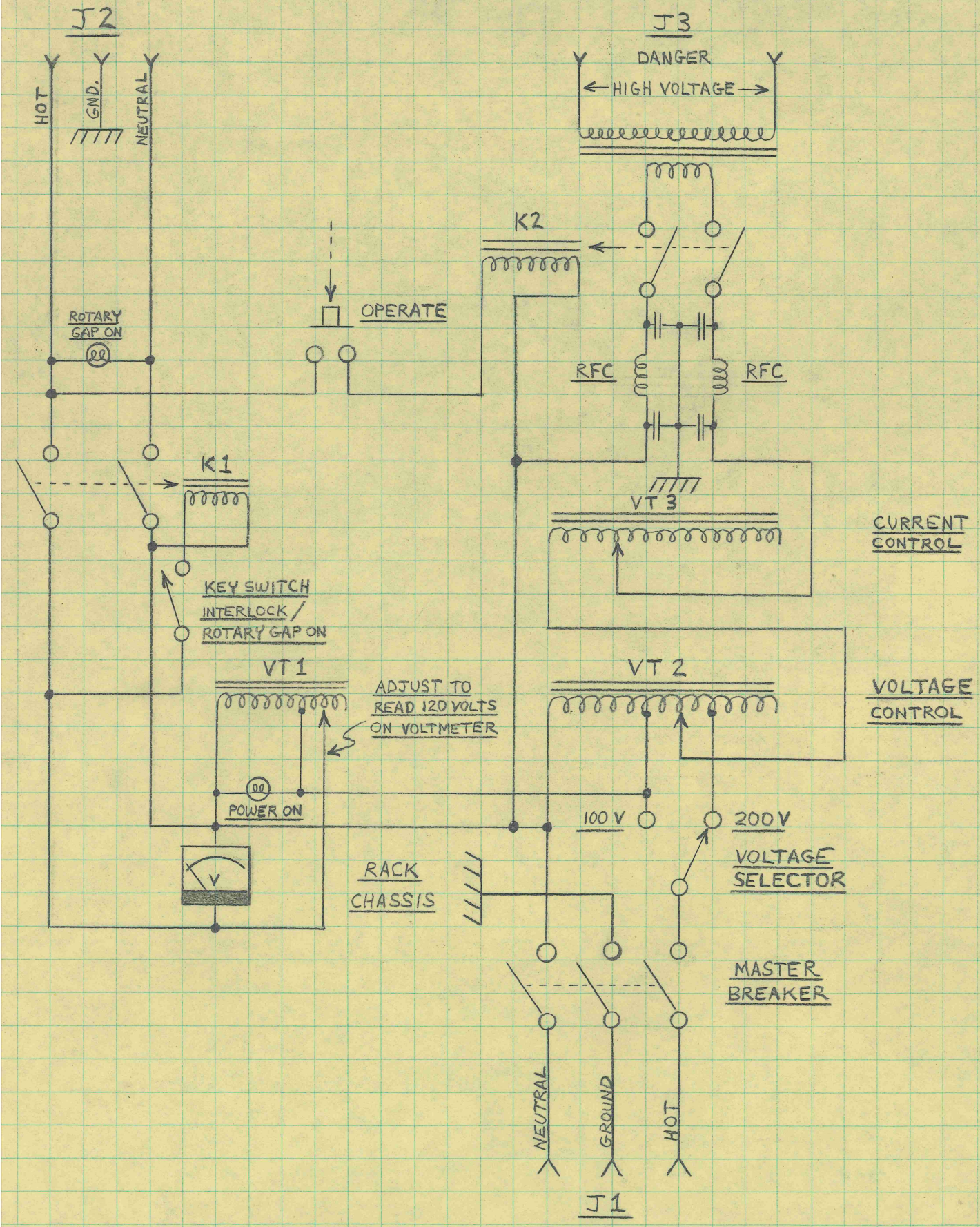


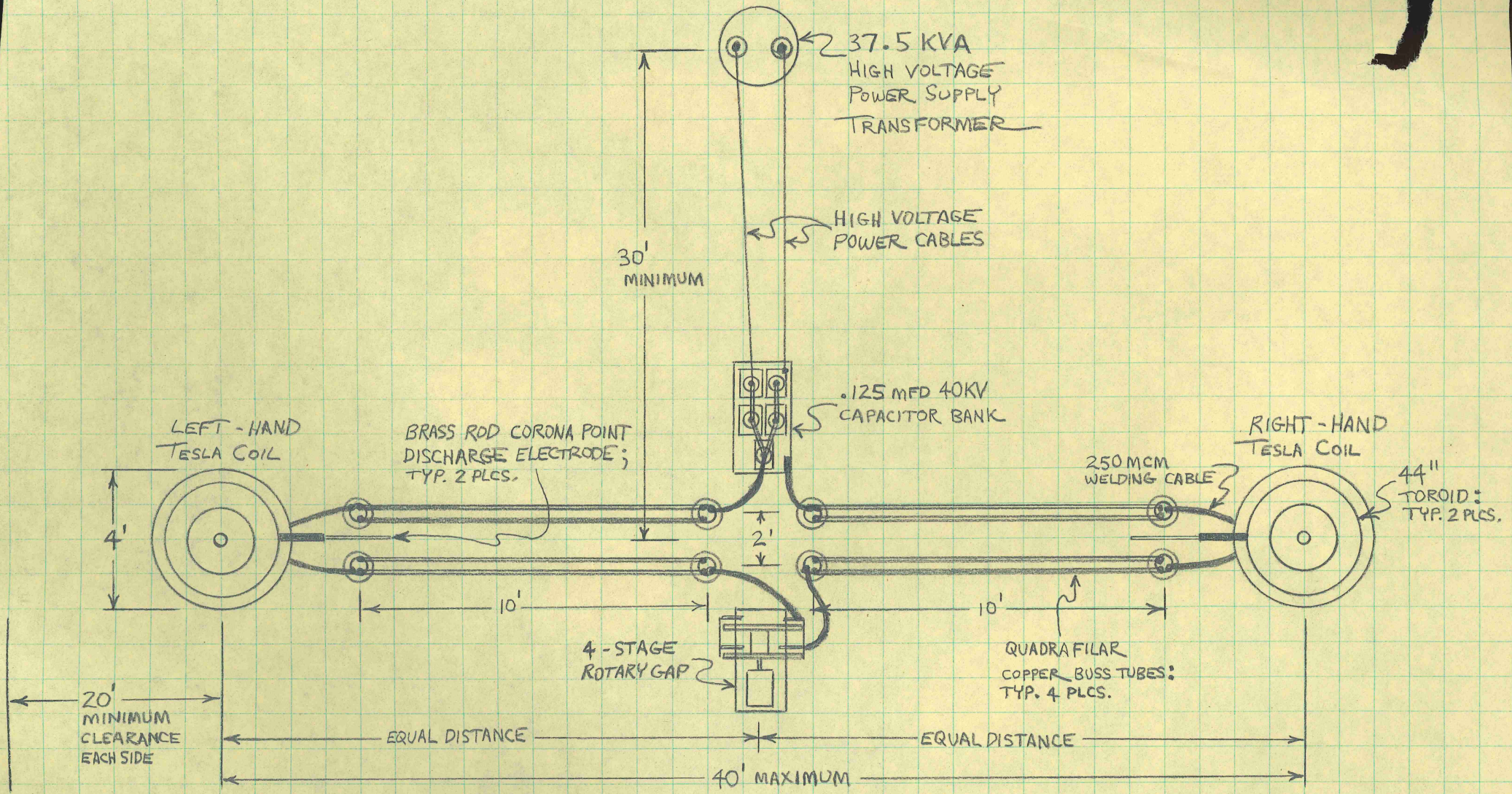
C_1 THRU C_5 = 0.025 MFD., 40 KV PEAK

C_T = 0.125 MFD.

MODEL 5D TESLA COIL POWER SUPPLY CONSOLE

100 OR 200 VOLT INPUT, 60 Hz ONLY





MODEL 12 TESLA COIL SYSTEM

FLOOR PLAN VIEW

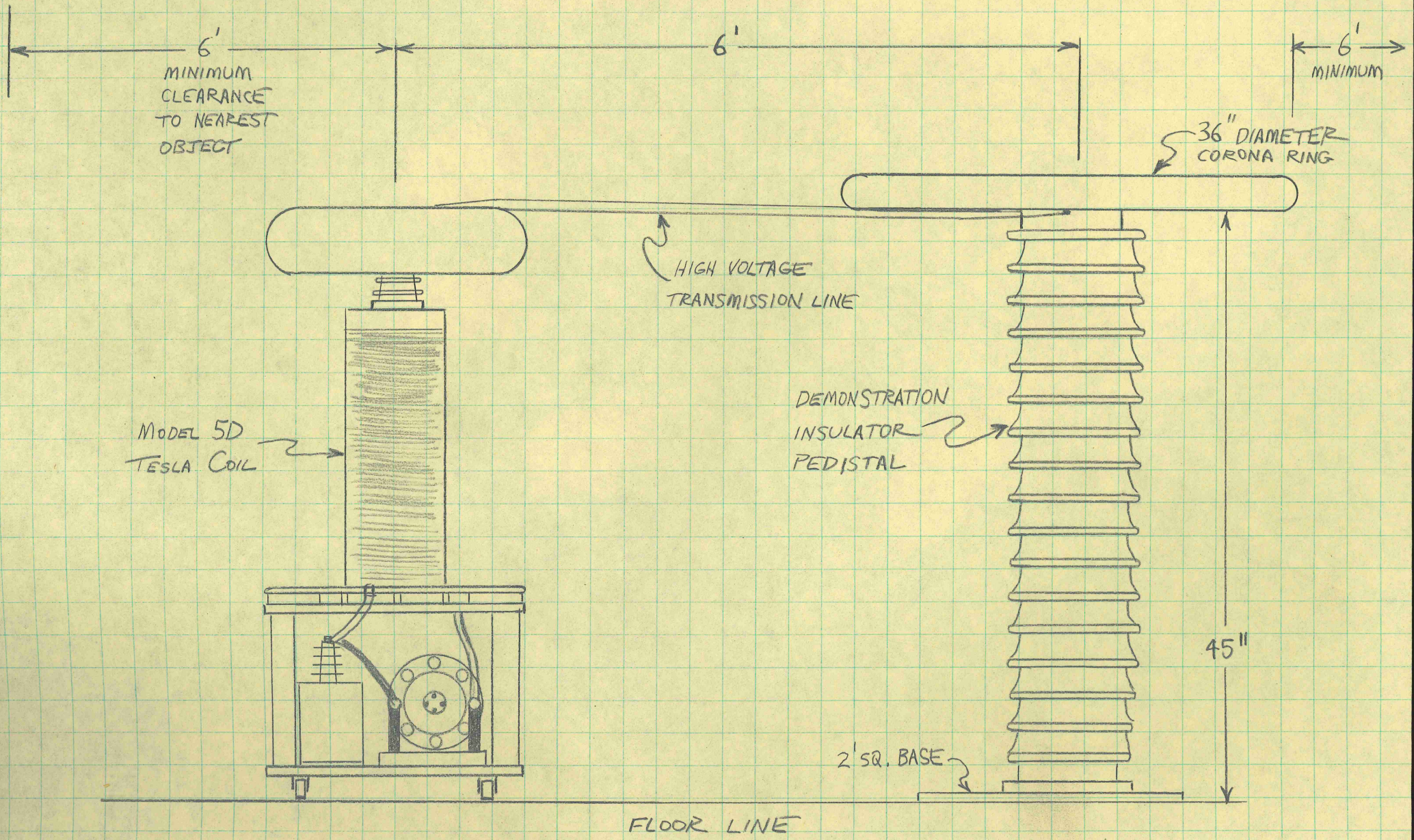
NOT TO SCALE : ALL DEMINSIONS SHOWN IN FEET AND INCHES.

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7-18-92

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MONROVIA, CA 91016 USA
DEC. 1, 1992

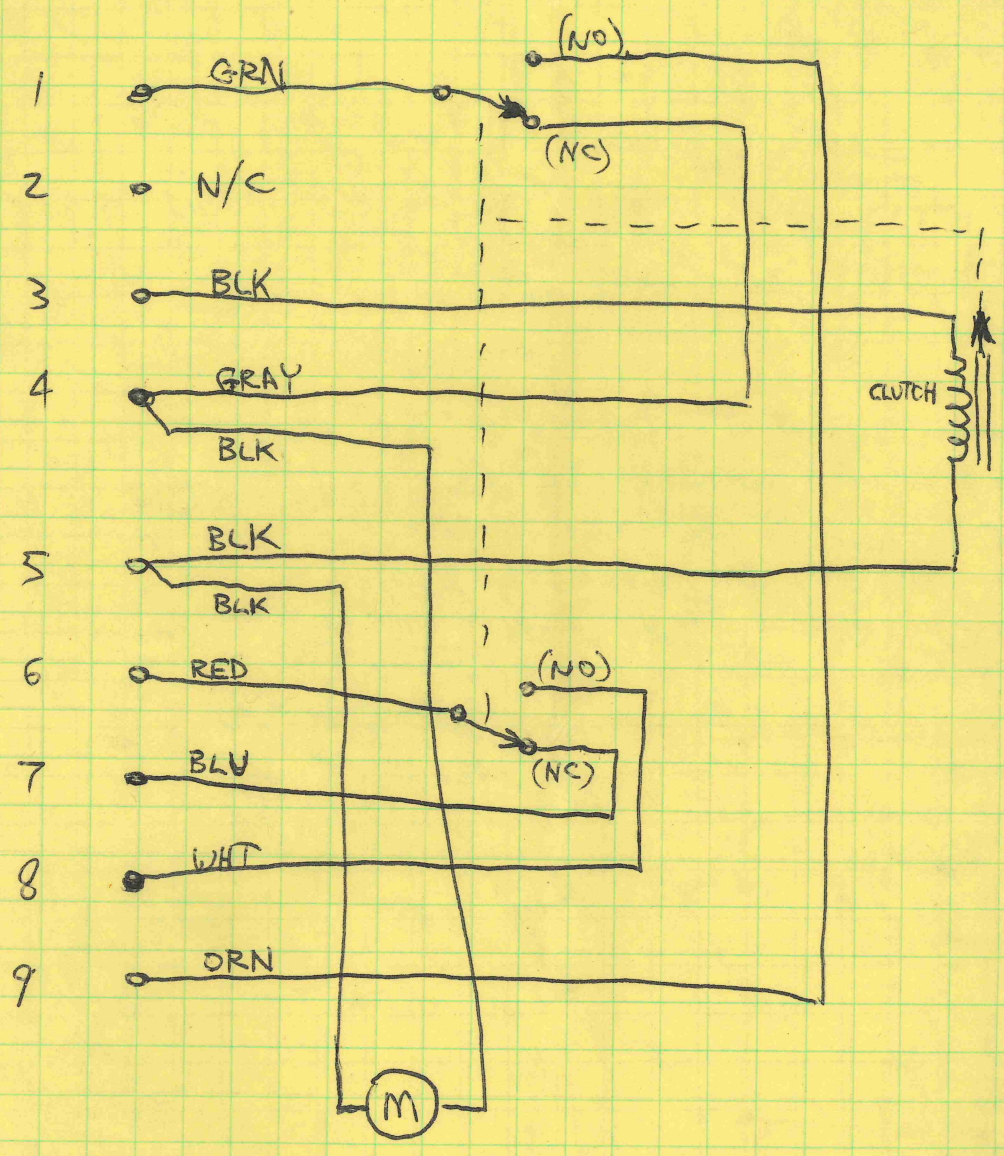
MODEL 5D DEMONSTRATION
TESLA COIL SYSTEM

SIDE VIEW
NOT TO SCALE



MODEL 12 TESLA COIL
60 MINUTE OPERATE TIMER

6-2-93

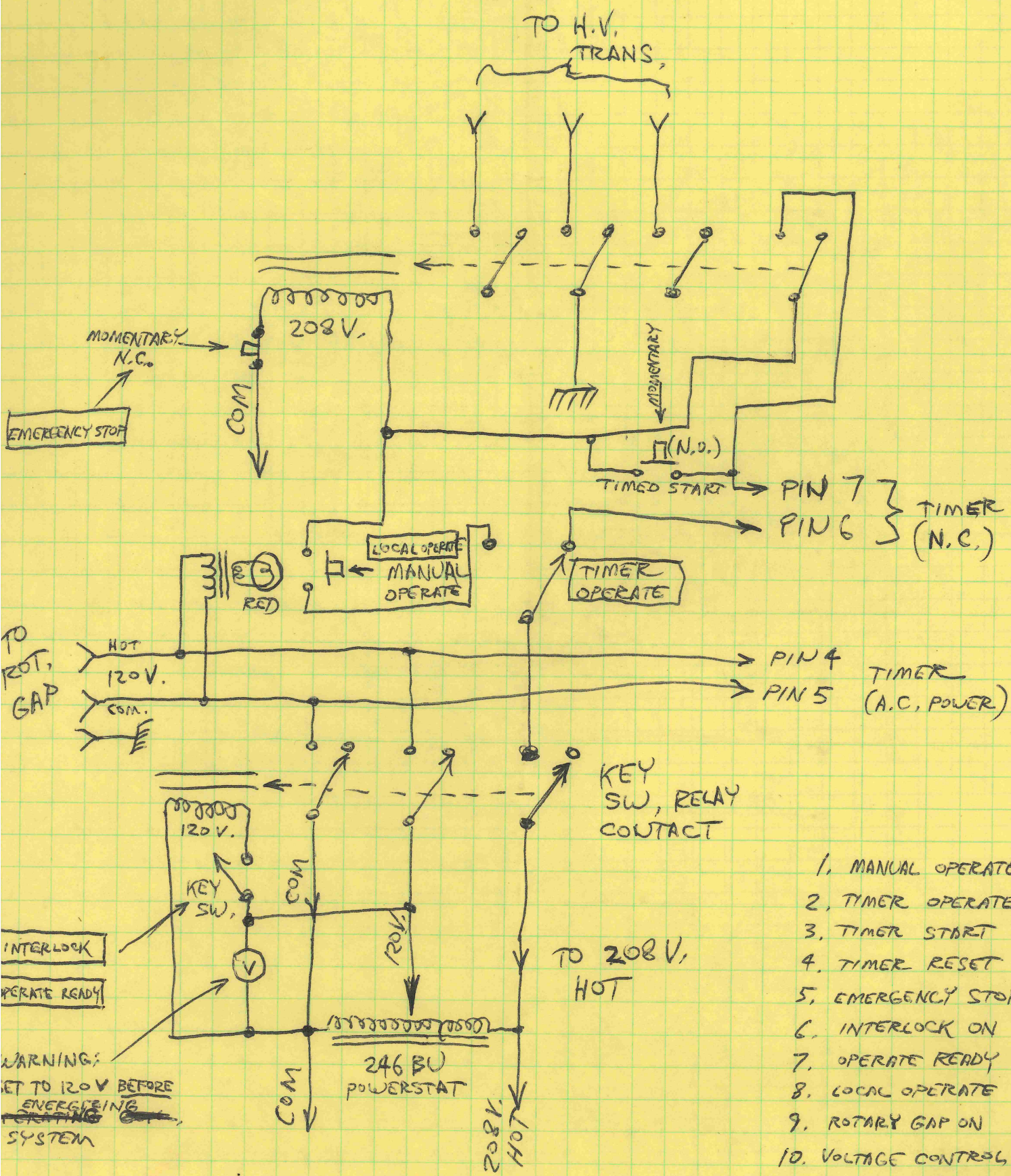


CRAMER DIV.
GIANNINI CONTROLS CORP., OLD SAYBROOK, CONN.
SERIAL Y2872A
DATE 10/63
422E-6014
422EW100-H0208A
115 V 60 Hz MOTOR
115 V 60 Hz CLUTCH
W.D. 1126

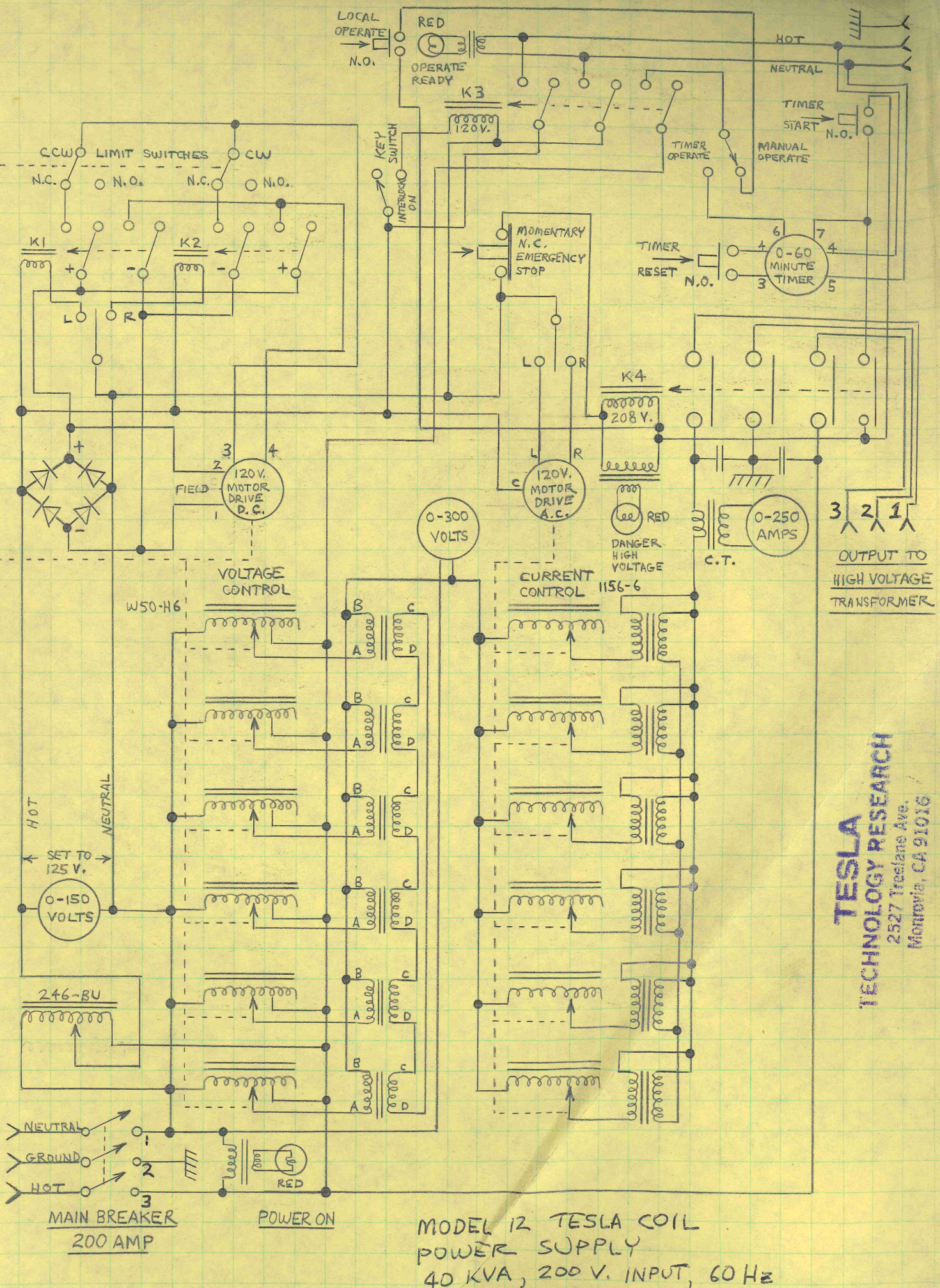
LOGIC: USE PIN 6 & 7 FOR SYSTEM TIMED OPERATE

RESET: USE PIN 3 & 4 (MOMENTARY N.O.)

AC: USE PIN 4 & 5



1. MANUAL OPERATE
2. TIMER OPERATE
3. TIMER START
4. TIMER RESET
5. EMERGENCY STOP
6. INTERLOCK ON
7. OPERATE READY
8. LOCAL OPERATE
9. ROTARY GAP ON
10. VOLTAGE CONTROL
11. SYSTEM CONTROL (2EA)
12. RAISE (2 EA.)
13. LOWER (2EA.)
14. CURRENT CONTROL
15. WARNING: SET TO 120 VOLTS BEFORE ENERGIZING



MODEL 12 TESLA COIL
POWER SUPPLY
40 KVA, 200 V. INPUT, 60 Hz

TESLA
TECHNOLOGY RESEARCH
2527 Trevlane Ave.
Monrovia, CA 91016

TO: HIROSHI YAMABE

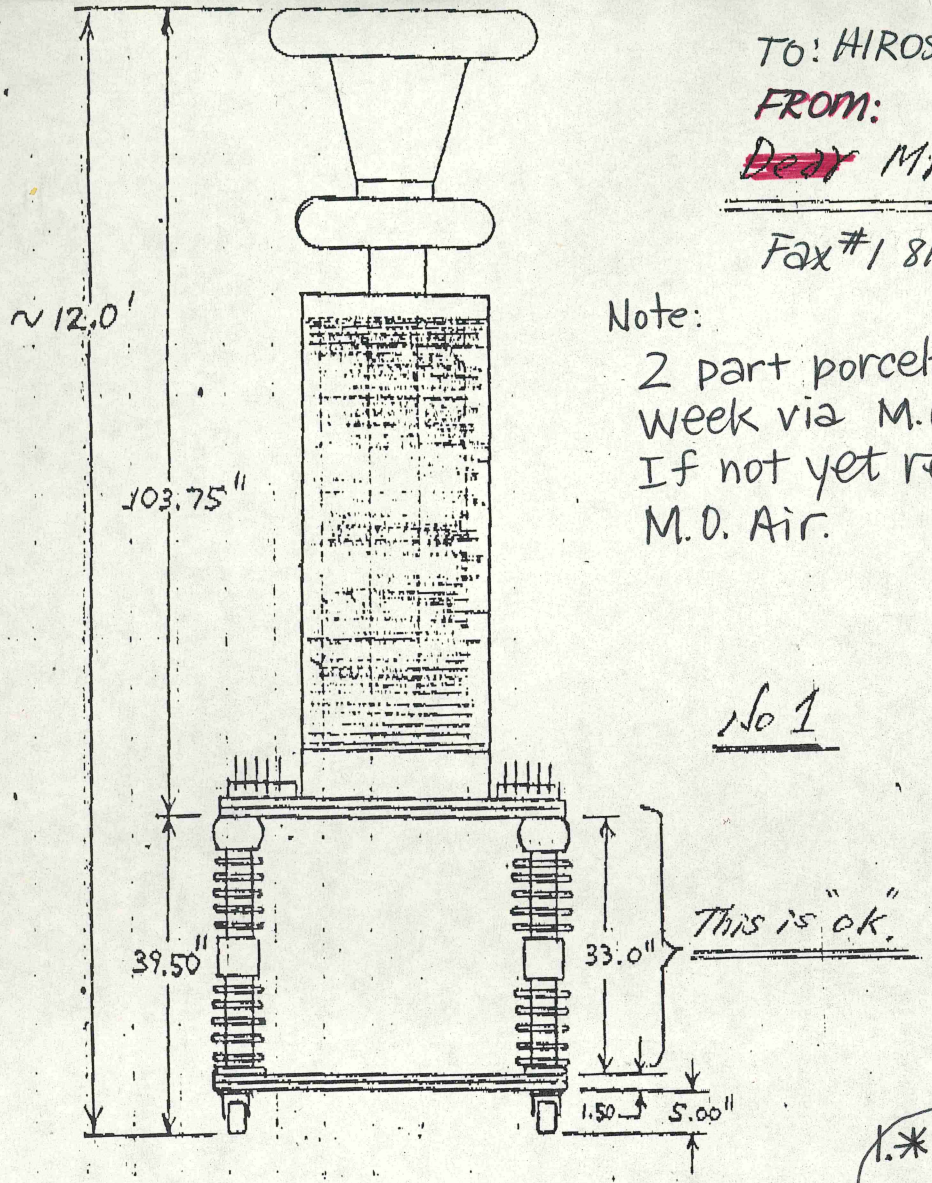
FROM:

~~Dear~~ Mr. William C. Wysock.

Fax#1 818 307-4215

Note:

2 part porcelain sent last week via M.O. AIR (SHIPPER) If not yet received, call M.O. Air.



No 1

This is "ok."

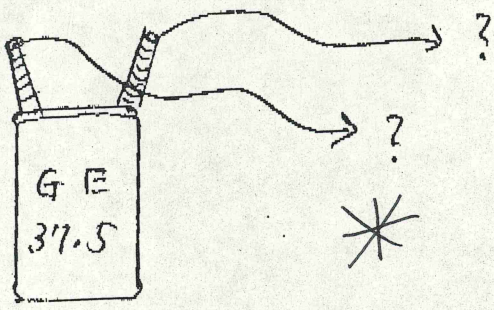


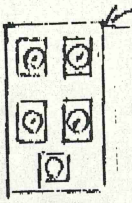
BUT this is No send.

Please one piece send me. *

1.* NO MORE 1 PART PORCELAIN - DON'T HAVE

No2. give me answer.





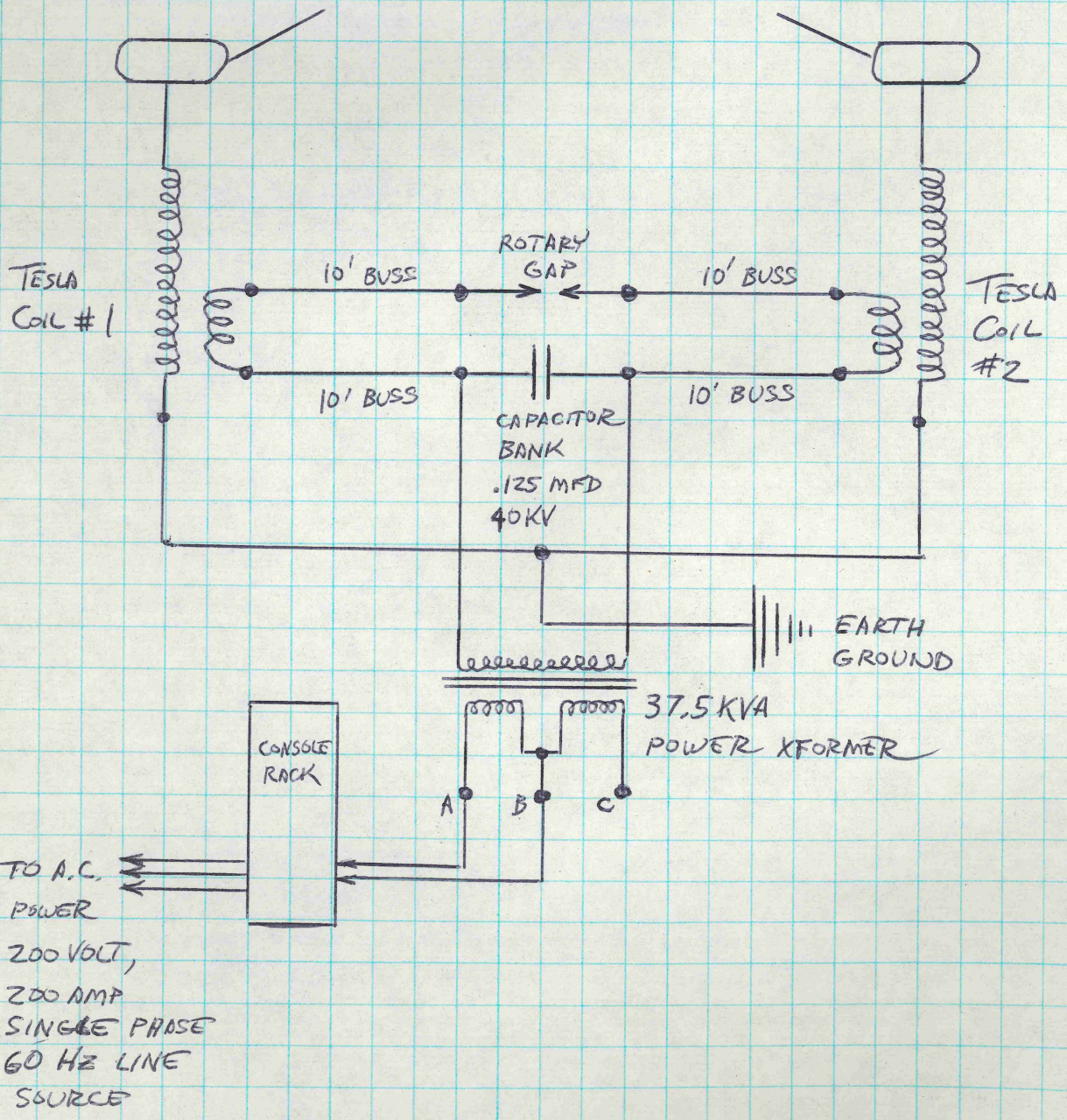
2.* instructions on video tape- see tape. to see "how to tie"..

Please tell me "How to tie"

High voltage Transformer to Capacitor Bank

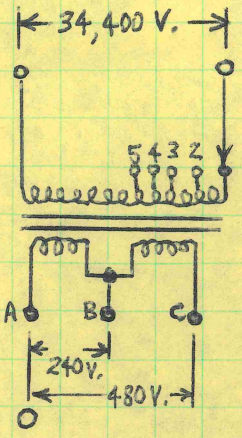
*Please send me FAX!. FAX No 082-223-8[illegible]

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Monrovia, CA 91016

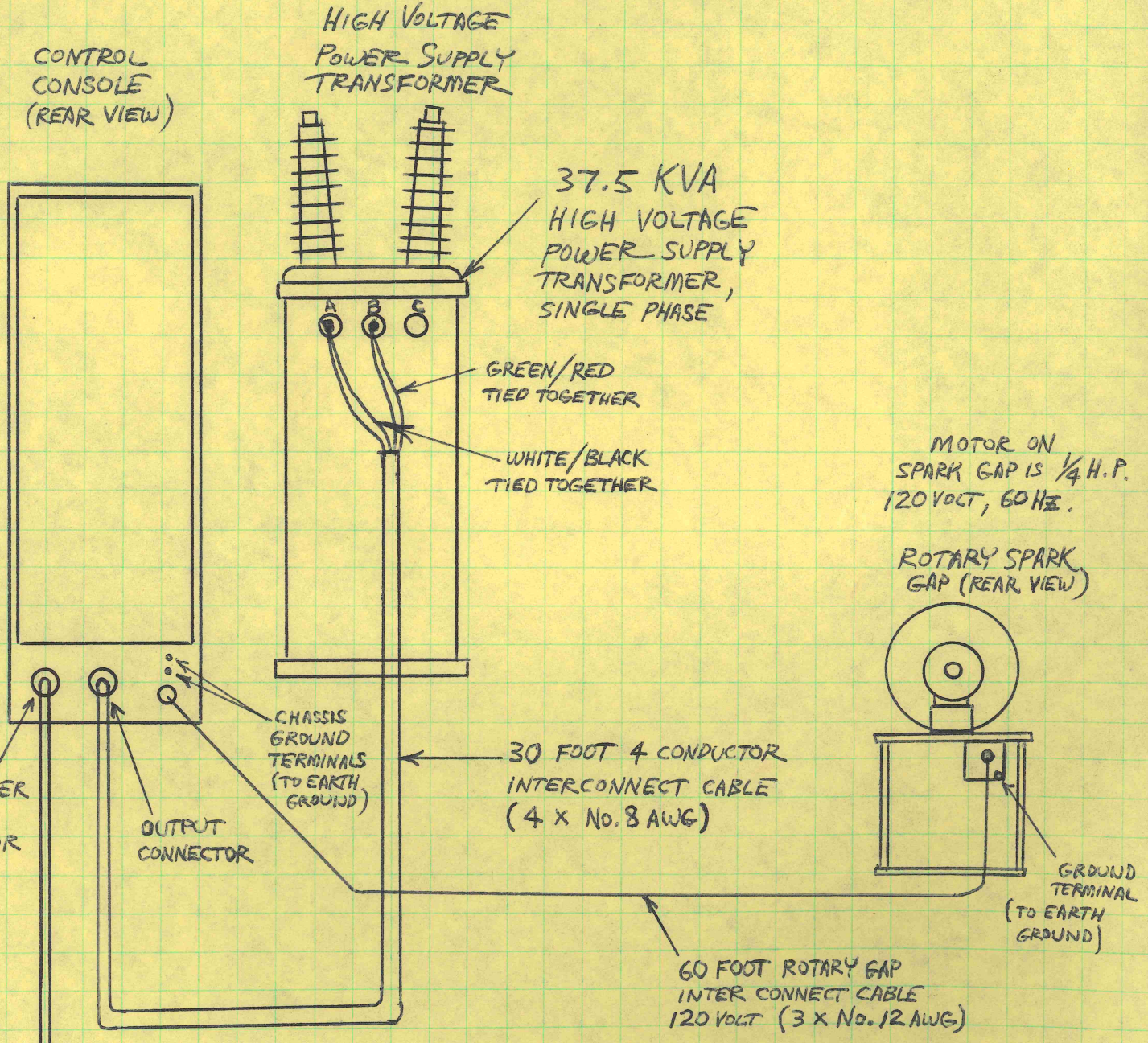


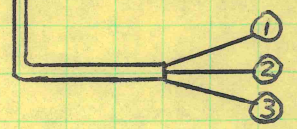
TESLA
TECHNOLOGY RESEARCH
2527 Treelane Ave.
Monrovia, CA 91016

MODEL 12 TESLA COIL MAJOR ELECTRICAL POWER COMPONENTS



FOR SCHEMATIC OF CONTROL CONSOLE, SEE SEPERATE SHEET ATTACHED.

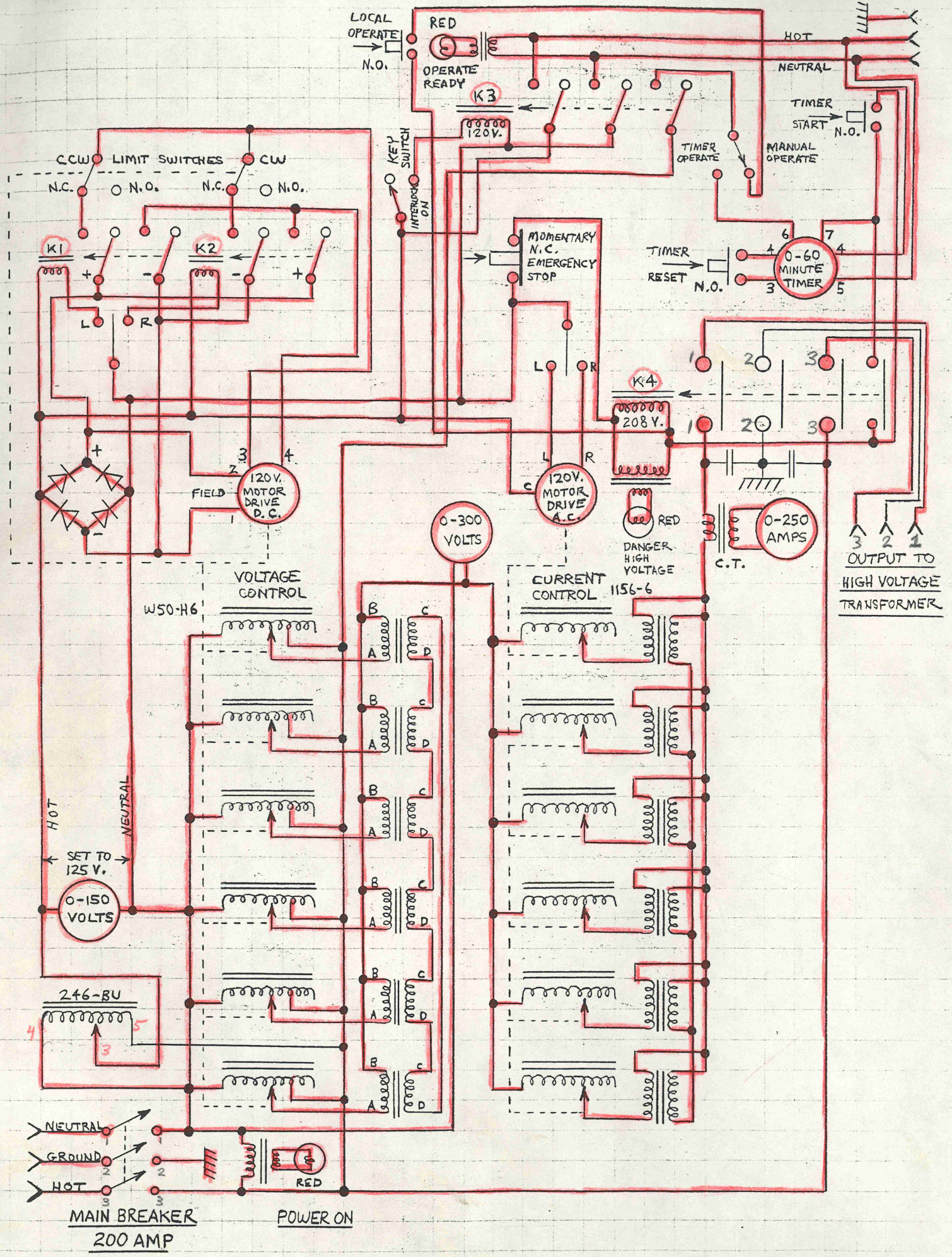


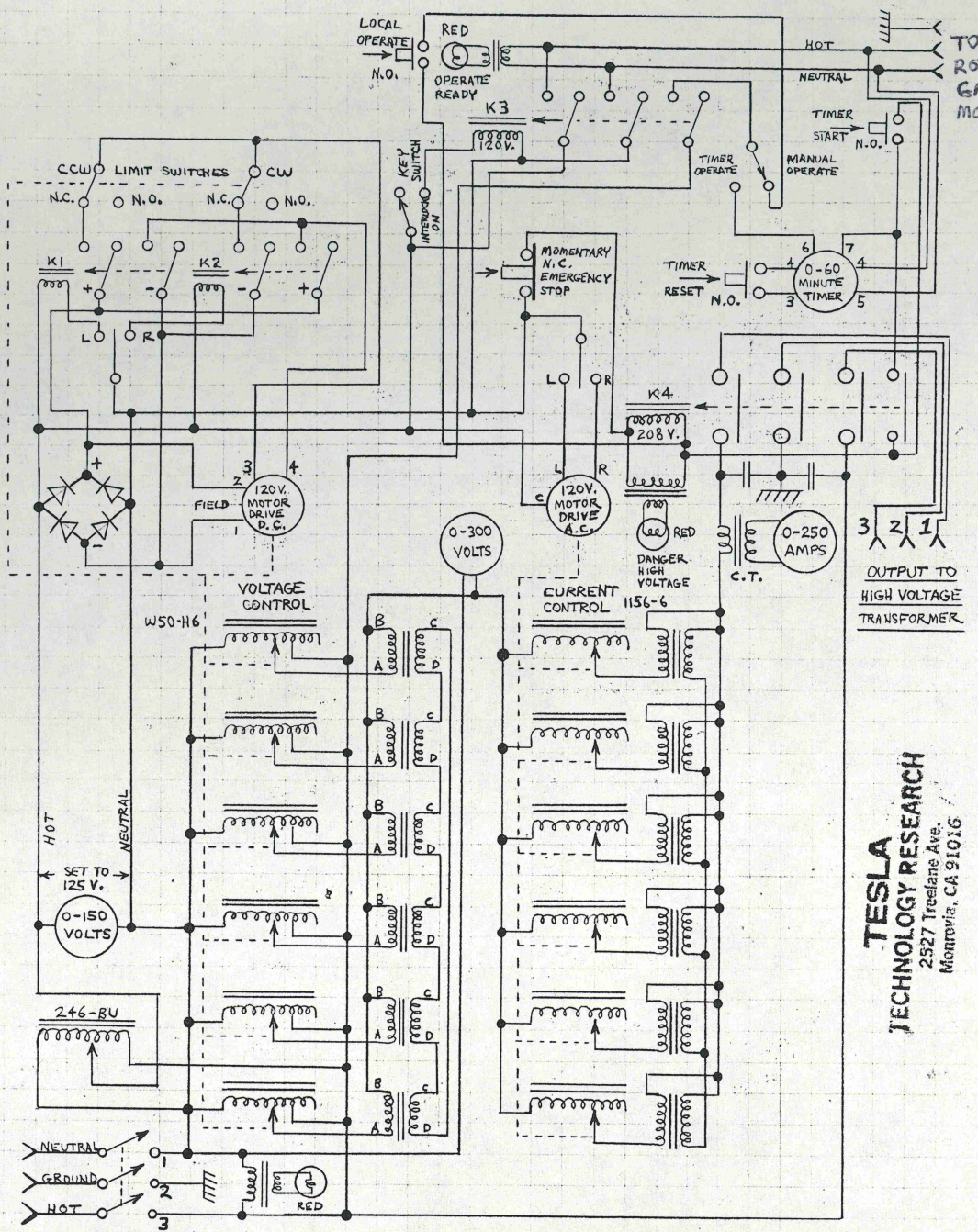


A.C. POWER INPUT CABLE
10 FOOT (3 x No. 4 AWG)

1 = WHITE WIRE = NEUTRAL
2 = GREEN WIRE = GROUND
3 = BLACK WIRE = HOT

NOTE: THIS PIG TAIL TO BE WIRED TO POWER SOURCE BY CUSTOMER.


LOCAL OPERATE
N.O.
RED
OPERATE READY
K3
120V.
HOT
NEUTRAL
TIMER START
N.O.
TIMER OPERATE
MANUAL OPERATE
KEY SWITCH
INTERLOCK ON
CCW LIMIT SWITCHES CW
N.C.
N.O.
N.C.
N.O.
K1
K2
L
R
MOMENTARY N.C. EMERGENCY STOP
TIMER RESET
N.O.
0-60 MINUTE TIMER
K4
208 V.
120V. MOTOR DRIVE A.C.
120V. MOTOR DRIVE D.C.
FIELD
0-300 VOLTS
RED
DANGER HIGH VOLTAGE
C.T.
0-250 AMPS
OUTPUT TO HIGH VOLTAGE TRANSFORMER
VOLTAGE CONTROL
W50-H6
CURRENT CONTROL 1156-6
HOT
NEUTRAL
SET TO 125 V.
0-150 VOLTS
246-BU
NEUTRAL
GROUND
HOT
MAIN BREAKER 200 AMP
RED
POWER ON

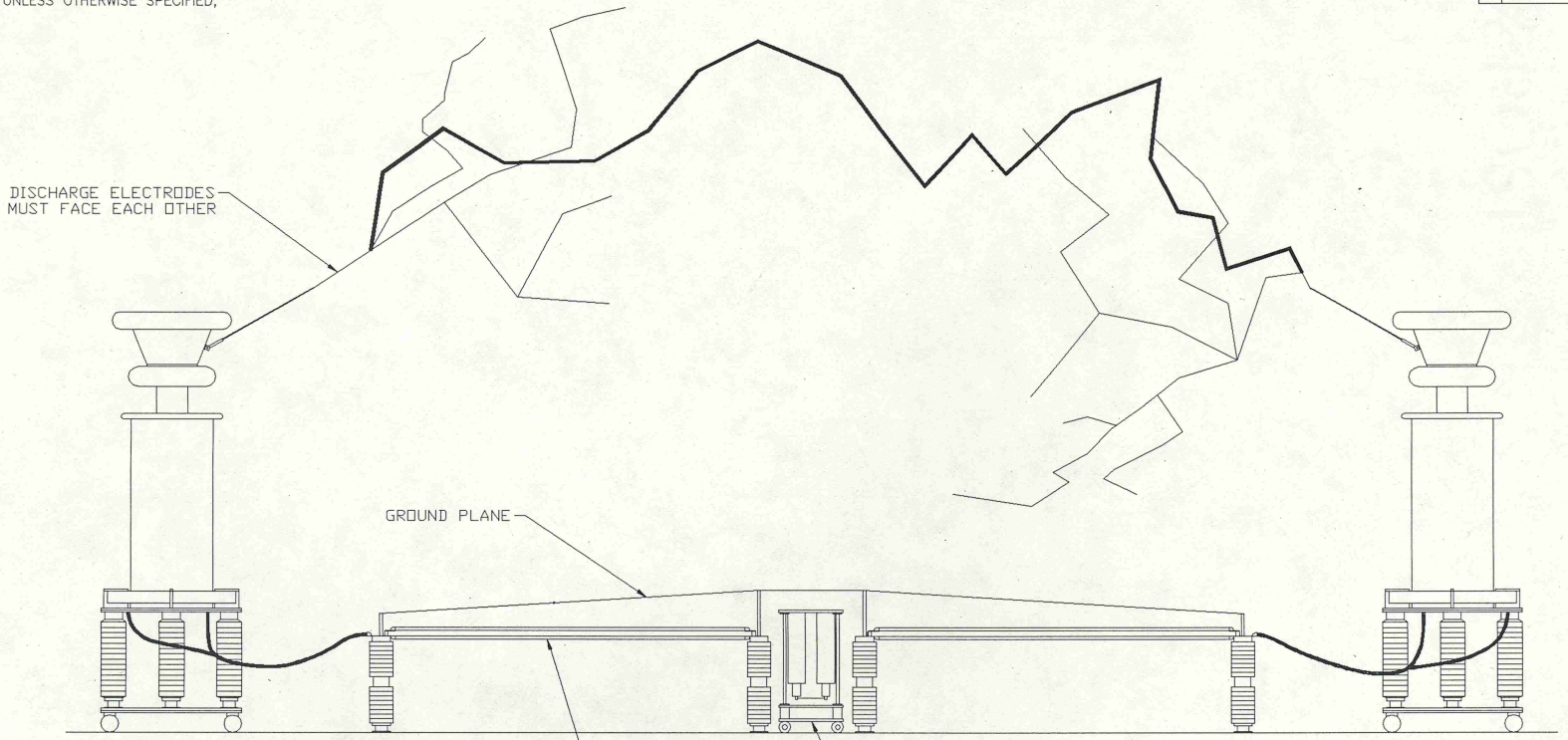


TESLA
TECHNOLOGY RESEARCH
2527 Treelane Ave.
Monrovia, CA 91016

MODEL 12 TESLA COIL
POWER SUPPLY
40 KVA, 200 V. INPUT, 60 Hz

REVISIONS				
LTR	DESCRIPTION	PREPARED	CHECKED	APVD

NOTES: UNLESS OTHERWISE SPECIFIED,



SIDE VIEW, INLINE CONFIGURATION

QTY REQD	PART NO.	DESCRIPTION	MATERIAL	ITEM NO.
		LIST OF MATERIALS		

UNLESS OTHERWISE SPECIFIED
INTERPRET DIMENSIONS & TOLERANCES PER ANSI Y14.5
INTERPRET ABBREVIATIONS PER ANSI Y1.1
.X±.1 .XX±.03 .XXX±.010
ANGULAR TOLERANCE ±0° 30'
MACHINED SURFACES 250 / MAX
DIMENSIONS ARE IN INCHES
DO NOT SCALE DOCUMENT

NEXT ASSY | PRODUCT
APPLICATION

APPROVALS		DATE
PREPARED	P. MILLER	6/93
CHECKED		
ENGR	BILL WYSOCK	
APPROVED		

THIS DOCUMENT CONTAINS PROPRIETARY INFORMATION, AND SUCH INFORMATION MAY NOT BE DISCLOSED TO OTHERS FOR ANY PURPOSE NOR USED FOR MANUFACTURING PURPOSES WITHOUT WRITTEN PERMISSION FROM TESLA TECHNOLOGY RESEARCH

TTR TESLA TECHNOLOGY RESEARCH

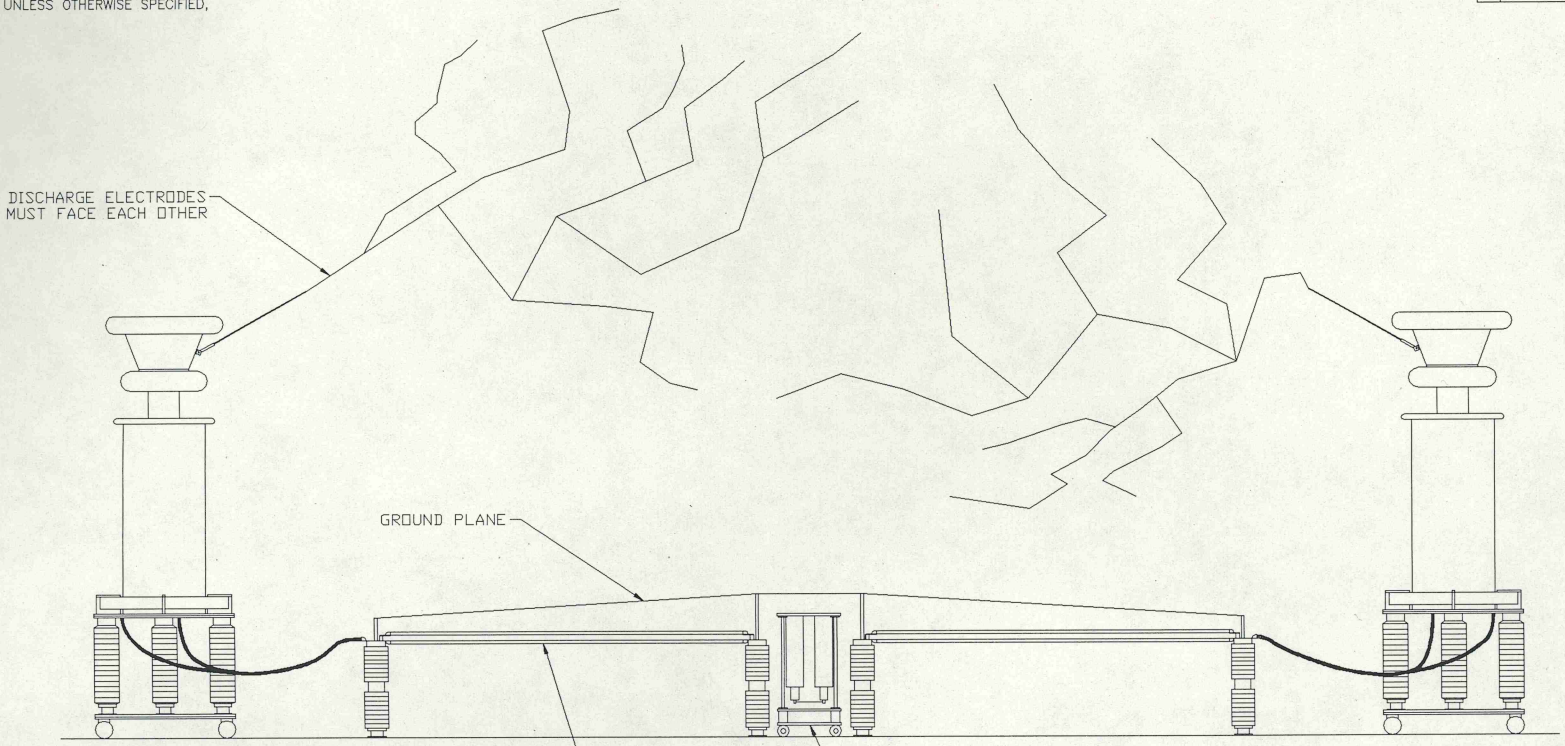
TITLE: SIDE VIEW INLINE CONFIGURATION

SIZE D | DOCUMENT NO. MODEL12

SCALE NONE | WT LB ~ | SHEET 1 OF 1

NOTES: UNLESS OTHERWISE SPECIFIED,

REVISIONS				
LTR	DESCRIPTION	PREPARED	CHECKED	APVD



SIDE VIEW, INLINE CONFIGURATION

QTY REQD	PART NO.	DESCRIPTION	MATERIAL	ITEM NO.
LIST OF MATERIALS				

UNLESS OTHERWISE SPECIFIED
INTERPRET DIMENSIONS & TOLERANCES PER ANSI Y14.5
INTERPRET ABBREVIATIONS PER ANSI Y1.1
X±.1 XX±.03 XXX±.010
ANGULAR TOLERANCE ±0° 30'
MACHINED SURFACES 250 √ MAX
DIMENSIONS ARE IN INCHES
DO NOT SCALE DOCUMENT

APPROVALS		DATE
PREPARED	P. MILLER	6/93
CHECKED		
ENGR	BILL WYSOCK	
APPROVED		

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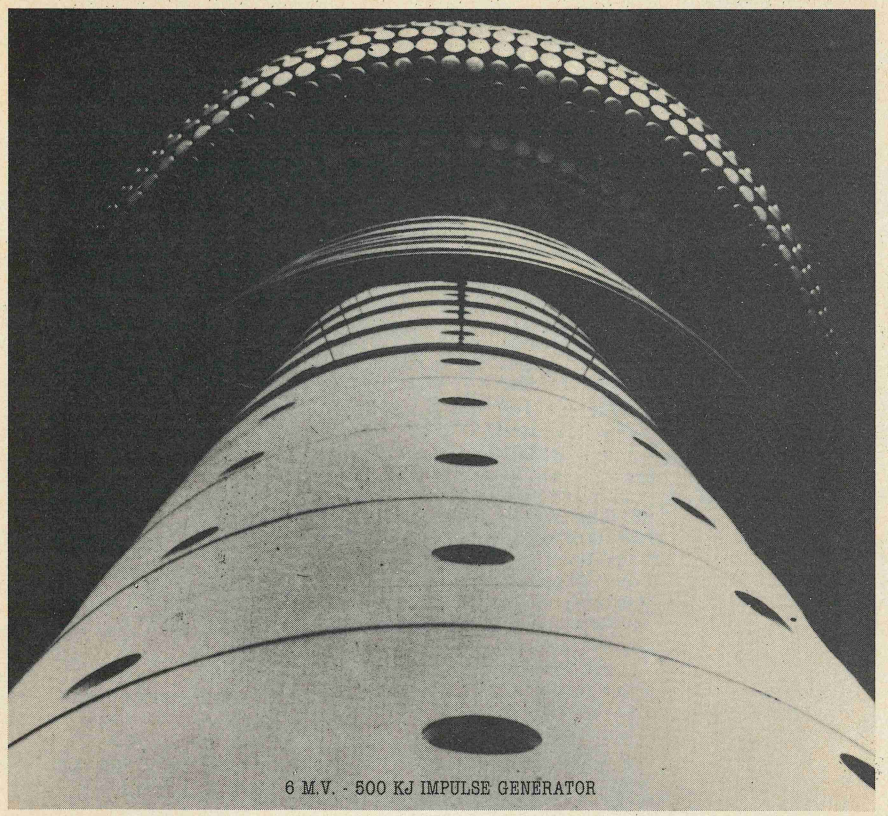
NEXT ASSY | PRODUCT
APPLICATION

TESLA TECHNOLOGY RESEARCH

TITLE: SIDE VIEW INLINE CONFIGURATION

SIZE D | DOCUMENT NO. MODEL12 | SCALE NONE | WT LB ~ | SHEET 1 OF 1

PASSONI & VILLA
Over 60 years of experience in H.V. Technology



6 M.V. - 500 KJ IMPULSE GENERATOR

PASSONI & VILLA

IMPULSE GENERATORS • D.C. STATIC GENERATORS
TEST TRANSFORMERS • RESONANT TEST SYSTEMS
STANDARD CAPACITORS • DIVIDERS, SHUNTS AND MEASURING EQUIPMENT
BUSHINGS UP TO 1200 kV • CAPACITIVE VOLTAGE TRANSFORMERS
POWER FACTOR CAPACITORS • GRADING CAPACITORS
CAPACITORS FOR SPECIAL APPLICATIONS

PASSONI & VILLA
EXPERTS IN HIGH VOLTAGE

20124 Milano - Italy - Via Oldofredi 43 - Telex 330420 PASVIL I

CIRCLE 44 ON READER SERVICE CARD

Export sales (percent of total turnover, 1984): 65%
President/Managing Director: Ing G Iaciarino
Sales Director: A Barozzi
Export Director: Ing G D'Orsi
Operation areas: North America, Central and South America, Middle East and North Africa, Far East, Africa (other), Europe

Metallurgica Viganò SpA
Via al Gigante 38
22044, Inverigo (CO)
TEL 39-31-607311
TLX 380438 METAVI I

Established: 1950
Turnover (1984): $5,300,000
Export sales (percent of total turnover, 1984): 34%
No. of employees: 125
President/Managing Director: Gr Uff E Vigano
Sales Director: P.I. V Pozzi
Export Director: P.I. V Pozzi
Operation areas: Middle East and North Africa, Europe

Micoperi SpA
Piazzale Accursio 18
20156, Milan
TEL 39-2-3262
TLX 332193 MIC I

Established: 1946
Turnover (1984): $55,000,000
Export sales (percent of total turnover, 1984): 90%
No. of employees: 800
President/Managing Director: Dr G Makaus
Sales Director: Rag U Boeri
Export Director: Dr N Arniani
Operation areas: North America, Central and South America, Middle East and North Africa, Far East, Africa (other), Europe

(See our ad on page I-135)

Misan Chimica SpA
Località Ponte Riccio
80019, Qualiano (NA)
TEL 39-81-8181611
TLX 720343 MERIS I

Established: 1975
Turnover (1984): $3,880,000
Export sales (percent of total turnover, 1984): 10%
No. of employees: 32
President/Managing Director: Dr A E Labi
Sales Director: Dr M Valducci
Export Director: A Mirabile
Operation areas: North America, Central and South America, Middle East and North Africa, Far East, Africa (other), Europe

(See our ad on page I-49)

Misan Service Srl
Piazzetta Duca D'Aosta 265
80132, Naples
TEL 39-81-8181611
TLX 730343 I

Established: 1964
Turnover (1984): $1,203,000
Export sales (percent of total turnover, 1984): 10%
No. of employees: 20
President/Managing Director: Ing A E Labi
Sales Director: C M G Schettino
Export Director: Ing G Snichelotto
Operation areas: North America, Central and South America, Middle East and North Africa, Far East, Africa (other), Europe

(See our ad on page I-47)

Morrel Srl
Via Milano, 258
20021, Baranzate di Bollate
TEL 39-2-3560433/3560452
TLX 330856 VICOIN I FOR MORREL

Established: 1953
Operation areas: Central and South America, Middle East and North Africa, Far East, Africa (other), Europe

(See our ad on page I-133)

Muratori Srl
Via Lattanzio 51
00136, Rome
TEL 39-6-351014/386148
TLX 612659 MURELE I

Established: 1927
Turnover (1984): $1,200,000
Export sales (percent of total turnover, 1984): 10%
No. of employees: 70
President/Managing Director: Ing C Lanzi
Sales Director: Ing A Muratori Jr
Export Director: Ing C Lanzi
Operation areas: North America, Central and South America, Middle East and North Africa, Far East, Africa (other), Europe

(See our ad on page I-113)

Nuova Fulgor Cavi SpA
Via del Crocefisso 18
04100, Latina
TEL 39-773-2461
TLX 680886-7 NUFULG I

Established: 1969
Turnover (1984): $30,000,000
Export sales (percent of total turnover, 1984): 10%
No. of employees: 1200
President/Managing Director: G Di Giovanni
Sales Director: F M Cornaro
Export Director: V Rinaldi
Operation areas: North America, Central and South America, Middle East and North Africa, Far East, Africa (other), Europe

Nuova Industrie Elettriche di Legnano
Via Boccaccio 19
20025, Legnano (MI)
TEL 39-331-545294
TLX 330671 INELEG I

Established: 1931
Turnover (1984): $10,000,000
Export sales (percent of total turnover, 1984): 33%
No. of employees: 400
President/Managing Director: Ing G Cavina
Sales Director: Ing G Redaelli
Export Director: Ing T Solbiati
Operation areas: North America, Central and South America, Middle East and North Africa, Far East, Africa (other), Europe

Nuova Magrini Galileo SpA
Via Luigi Magrini 7
24100, Bergamo
TEL 39-35-23544
TLX 301535 MAGGAL I

Established: 1984
Turnover (1984): $544,100,000
Export sales (percent of total turnover, 1984): 40%
No. of employees: 1452
President/Managing Director: Dr L Folio
Export Director: Ing G Becci
Operation areas: North America, Central and South America, Middle East and North Africa, Far East, Africa (other), Europe

(See our ad on page I-87)

Nuovo Pignone SpA
Via F Matteucci 2
50127, Florence
TEL 39-55 43921
TLX 571320 PIGNON I

Established: 1954
Turnover (1984): $444,000,000
Export sales (percent of total turnover, 1984): 86%
No. of employees: 6192
President/Managing Director: Dr F Ciatti
Sales Director: Dr A M Bernardini
Export Director: Rag M Benelli
Operation areas: North America, Central and South America, Middle East and North Africa, Far East, Africa (other), Europe

(See our ad on page I-15, I-24)

Nuovo Pignone SpA
Automation Sistems Div
Via Tiburtina Km 12,7
00131, Rome
TEL 39-6-4123456
TLX 610250 PIGNOR I

Established: 1973
Turnover (1984): $8,600,000
Export sales (percent of total turnover, 1984): 65%
No. of employees: 190
President/Managing Director: Ing A M Bernardini
Sales Director: Ing P Vitiello
Export Director: G Fillarini
Operation areas: Middle East and North Africa, Africa (other), Europe

(See our ad on page I-15, I-24)

Nuovo Pignone SpA
Inso-Sistemi per le Infrastrutture Sociali
Via F Matteucci 2
50100, Florence
TEL 39-55-43921
TLX 571320 PIGNON I

Established: 1976
Turnover (1984): $30,860,000
No. of employees: 420
President/Managing Director: Ing A M Bernardini
Sales Director: Ing G Cocilovo
Export Director: Ing A Castelli
Operation areas: Middle East and North Africa, Africa (other), Europe

(See our ad on page I-15, I-24)

Nuovo Pignone SpA
Turbotecnica
Via F Matteucci 2
50100, Florence
TEL 39-55-43921
TLX 571320 PIGNON I

Established: 1974
Turnover (1984): $13,150,000
Export sales (percent of total turnover, 1984): 57%
No. of employees: 55
President/Managing Director: Ing L Sangiovanni
Sales Director: Ing G Gheri
Export Director: Ing F Pacini
Operation areas: North America, Middle East and North Africa, Far East, Europe

(See our ad on page I-15, I-24)

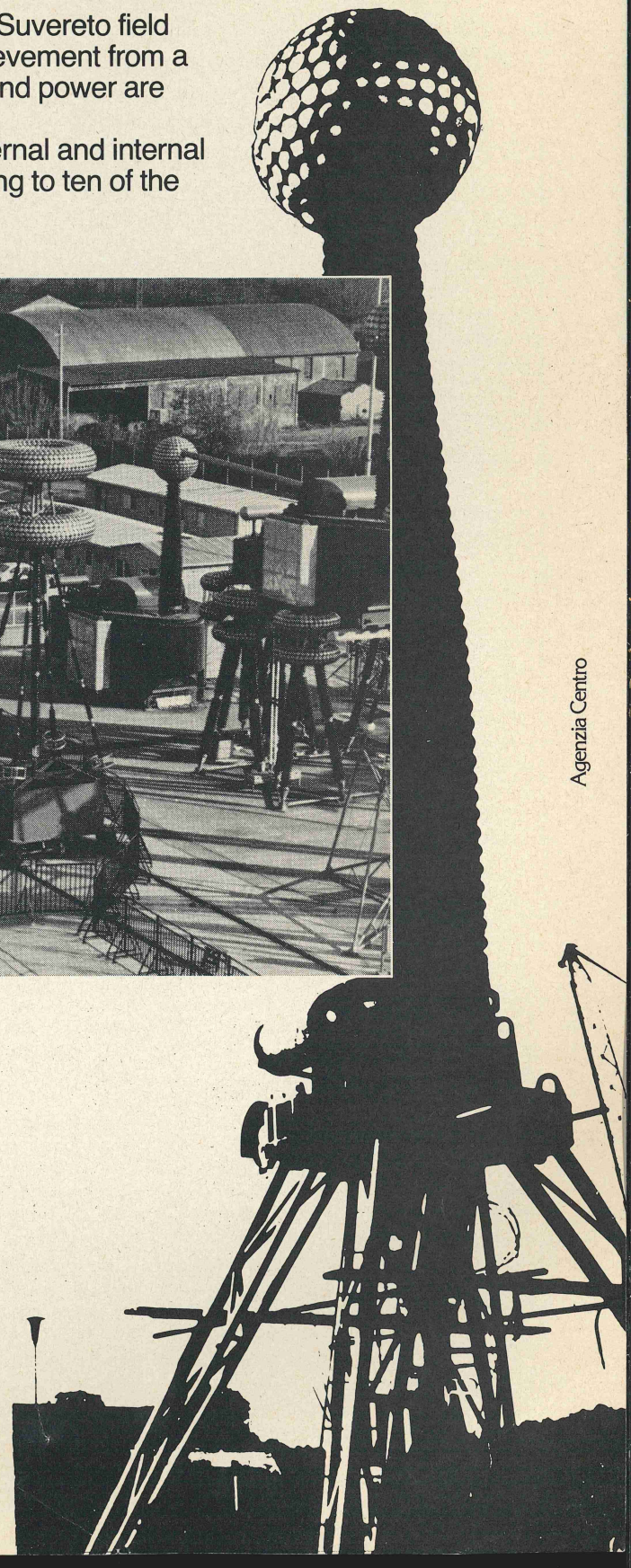
Nuovo Pignone SpA
Valves & Instruments Div
Strada Provinciale per Modugno 10
70123, Bari
TEL 39-80-461111
TLX 310246 ENI FOR NP BARI

Established: 1961
Turnover (1984): $20,000,000
Export sales (percent of total turnover, 1984): 65%
No. of employees: 870
President/Managing Director: Ing A M Bernardini
Sales Director: Ing Mascolo

Pirelli matches future needs of power transmission with a 1100 kV cable.

The 2000 sq.mm oil filled cable at 1100 kV installed in Suvereto field testing plant of ENEL can be considered as a top achievement from a technical point of view as far as transmission voltage and power are concerned.
Its proved power transmission capability with both external and internal cooling is about 10,000 MVA, i.e. a power corresponding to ten of the most diffused nuclear plant power units.





Agenzia Centro

PIRELLI

Società Cavi Pirelli spa

Power Cable Sector
Viale Sarca, 202-20126 Milano (Italy)
Phone (2) 64421
Telex 310135 PIREMI I

CIRCLE 31 ON READER SERVICE CARD

slurry systems.

■ *Italimpianti* has built powerplants and electric systems for industry for 20 years, offering services from feasibility studies to startup and operation. Its Cordova (Argentina) project was the first overseas nuclear powerplant engineered by an Italian company.

Italimpianti—a diverse engineering firm

Here's an engineering firm whose activities carry it into many fields—iron and steel, nonferrous metals, chemistry, ecology, energy. It designs and engineers industrial steam powerplants, electric transmission and distribution systems, remote control systems for distribution networks, and power-factor correcting systems. Italimpianti SpA performs energy audits for industry, energy-conservation studies, and verification calculations.

The company's experience in the energy sector is the natural development of a long-standing tradition (20 years) of building powerplants and industrial electric systems. It possesses the know-how to set up modern plants by facing the ever increasing and ever more complex problems these plants present—and solving them.

Italimpianti's accomplishments are characterized by a complete design autonomy and by calculation methods which enable it to supply complete powerplants and electric distribution networks capable of meeting the most extreme requirements.

Snamprogetti promotes advanced technology

Snamprogetti SpA is the engineering and main contracting company of the ENI group (Italy's hydrocarbon authority), providing a full range of engineering services for projects like refineries, petrochemical/chemical plants, land and submarine pipelines, offshore installations, textile mills, desalination plants.

Established in 1956, Snamprogetti has developed its own services in the fields of advanced technology and has assumed a leading position in the market, as indicated by the ever growing activities of its 4000 engineers in 70 countries, covering a variety of high-level projects in various technological sectors. Its international position is supported by associates in eight countries (including the US), with local offices in 17 countries.

CIVIL WORKS

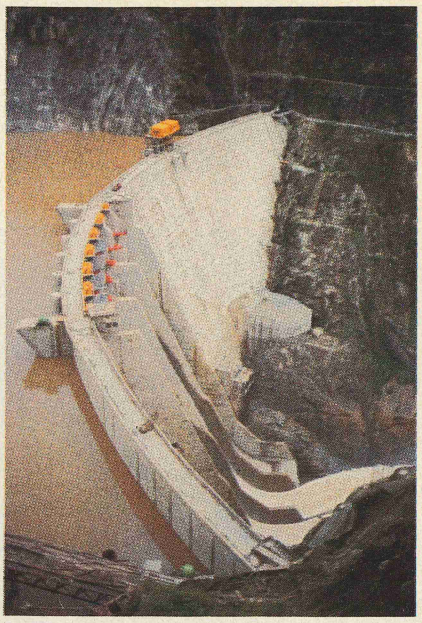
As the chart shows, Italian contracts in civil works projects worldwide have amounted to billions of dollars since 1970. The first big foreign project built by Italian contractors was the Kariba concrete-arc dam, on the Zimbabwe/Zambia border, in 1960. The success of this early project opened the door to many other opportunities for Italian contractors. Here's a sampling of more recent civil works:

■ *Tarbela dam* Located in Pakistan, this dam collects water for irrigation and for a hydro plant. Work started in 1968 and was completed in 1977; since then, however, improvements have been made and an extension to the powerplant has recently been approved. The dam has a useful capacity of 388-billion ft^3 and 10 hydro units totaling 1750 MW. Italian companies: Impregilo SpA (lead contractor), Impresa Generale Costruzioni MBM Meregaglia SpA, Angelo Farsura SpA, Astaldi Estero SpA.

■ *Akosombo dam* Located in Ghana, this dam was completed in 1966 by a joint venture between Impregilo and Recchi. The site is famous because the dam forms the largest artificial lake in the world (3281 square miles)

■ *Salto Grande dam* On the Rio Uruguay river dividing Argentina and Uruguay, this project was completed in 1979 by a consortium consisting of Impregilo (main contractor) and companies from the two countries.

■ *High Island reservoir* Completed in 1979, this Hong Kong project was built to provide a source of water for the growing population of the crown colony. Vianini SpA was the contractor. The reservoir will also be able to supply water to powerplants being planned for Hong Kong.



Concrete dam serves the Paute hydroelectric project in Ecuador

■ *Yacireta dam* Located on the Parana river dividing Argentina and Paraguay, this enormous dam will have a length of 37.8 miles and a maximum height of 137 ft when completed in 1993 (work started in 1983). Total cost of the project is expected to be about $1.55 billion. Impregilo is the sponsor and main contractor for Yacireta.

Leading Italian civil works contractors specializing in nuclear, fossil-fuel, and hydro plants are: Astaldi Estero SpA, Cogefar SpA, Delieto, Dipenta, Farsura, Furlanis Costruzioni Generali SpA, Gambogi Costruzioni SpA, Girola, Grandi Laori SpA, Guffanti, Icori, Impresit-Girola-Ladigiani-Impregilo SpA, Italstrade, Lodigiani SpA, Condotte Acqua SpA, Pizzarotti, Recchi, Torno SpA, Federici, and Vianini. Others with long experience in pilework and foundations are Edilsonda, Fondedile, Icos, Rodio, Trevi SpA, and Icelspali.

A complete and detailed list of Italian companies with civil works capabilities abroad can be obtained by contacting Associazione Nationale Costruttori Edili (ANCE, Italy's national association of contractors; see "Associations" section).

Electrical Engineering

Registered U. S. Patent Office

November 1934
Volume 53
No. 11

The Official Monthly Journal and Transactions of the A.I.E.E.

This Month—

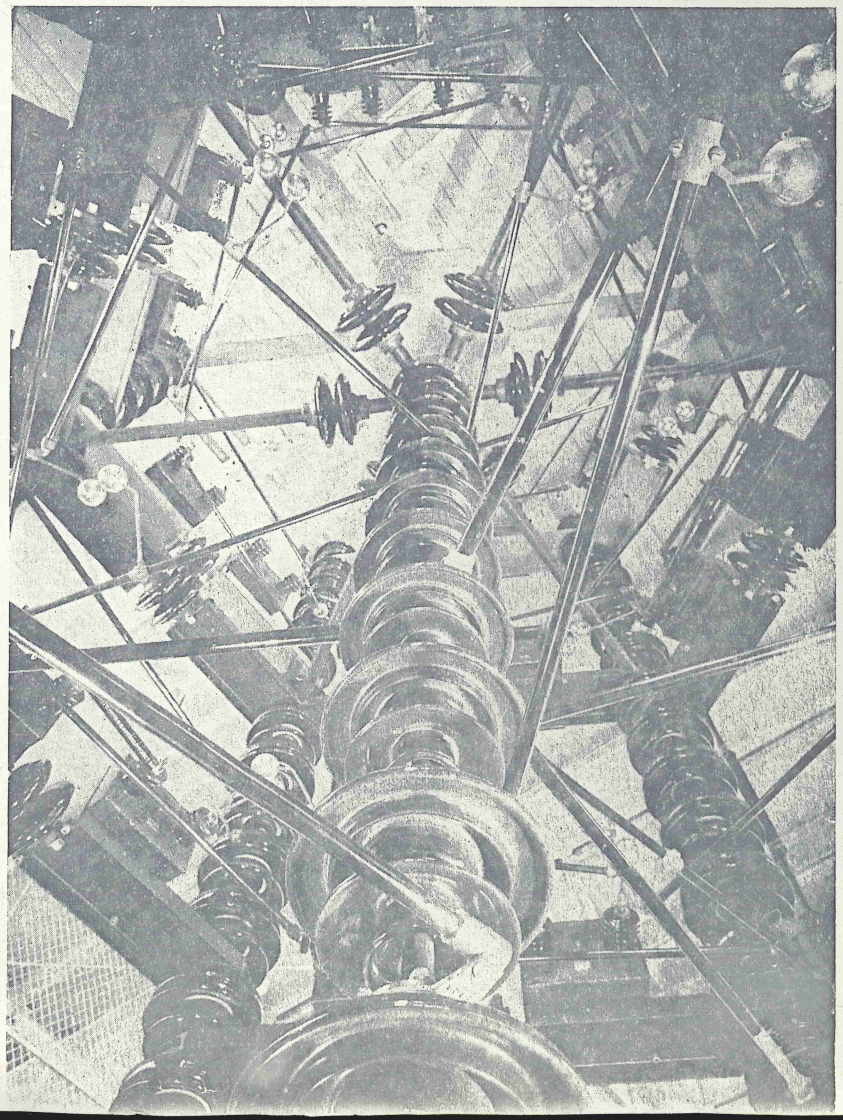
Front Cover

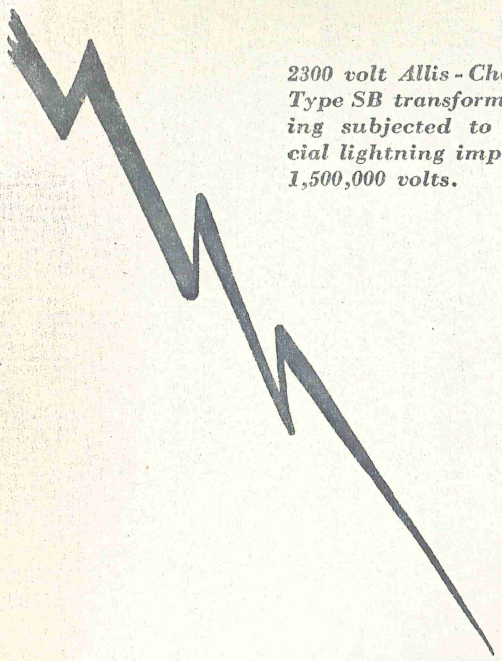
Looking up through the interior of the new 3,000-kv impulse generator with helical mounting at the Ohio Brass Company's high voltage testing laboratory, Barberton, Ohio. (See description in ELEC. ENGG., v. 53, 1934, p. 1255–9.)

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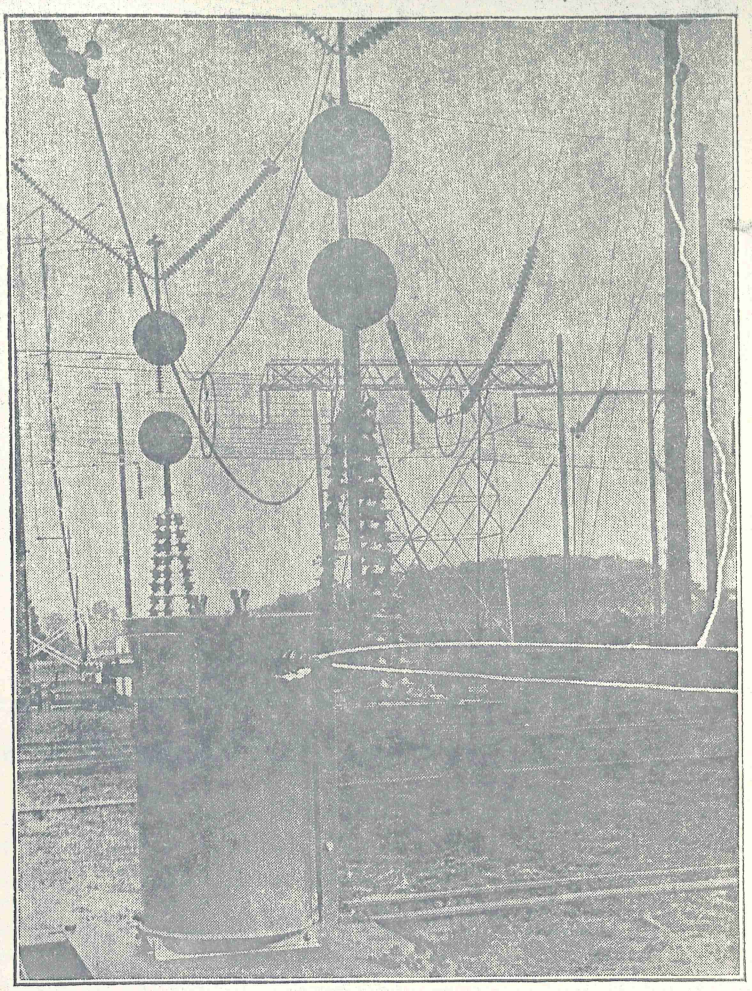
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2300 volt Allis-Chalmers Type SB transformer being subjected to artificial lightning impulse of 1,500,000 volts.



Three years service

Repeated Tests by Artificial Lightning

and

Not one has failed—

Between 4000 and 5000 Type SB transformers have been shipped to various points in the United States during the past three years.

Not one of these transformers has failed from any cause.

This operating record is due to features of construction which are built into Allis-Chalmers type SB transformers.

1. Cable paper insulation treated by a special process developed by Allis-Chalmers research chemists.

2. Detachable stud bushings having a definitely co-ordinated flashover value with respect to the coil insulation.

3. McCoy low temperature impregnation (anti-ionization) process.

SB transformers also include the following additional features:

1. Non-Siphoning bushing construction.
2. Copper alloy steel tanks, D. C. arc welded.
3. Pressed steel covers.
4. Skid cradle suspension construction in connection with hot dipped galvanized hangers.
5. Low core and copper losses.
6. Core and coil structure supported against side shifting by T rails and improved mechanical lock.
7. Transformers can be shipped completely filled with oil ready for service.

These transformers cost very little more than transformers not possessing these important advantages.

Write our nearest district office for details.

ALLIS-CHALMERS

Allis-Chalmers Manufacturing Company, Milwaukee

Electrical Engineering

Registered U. S. Patent Office

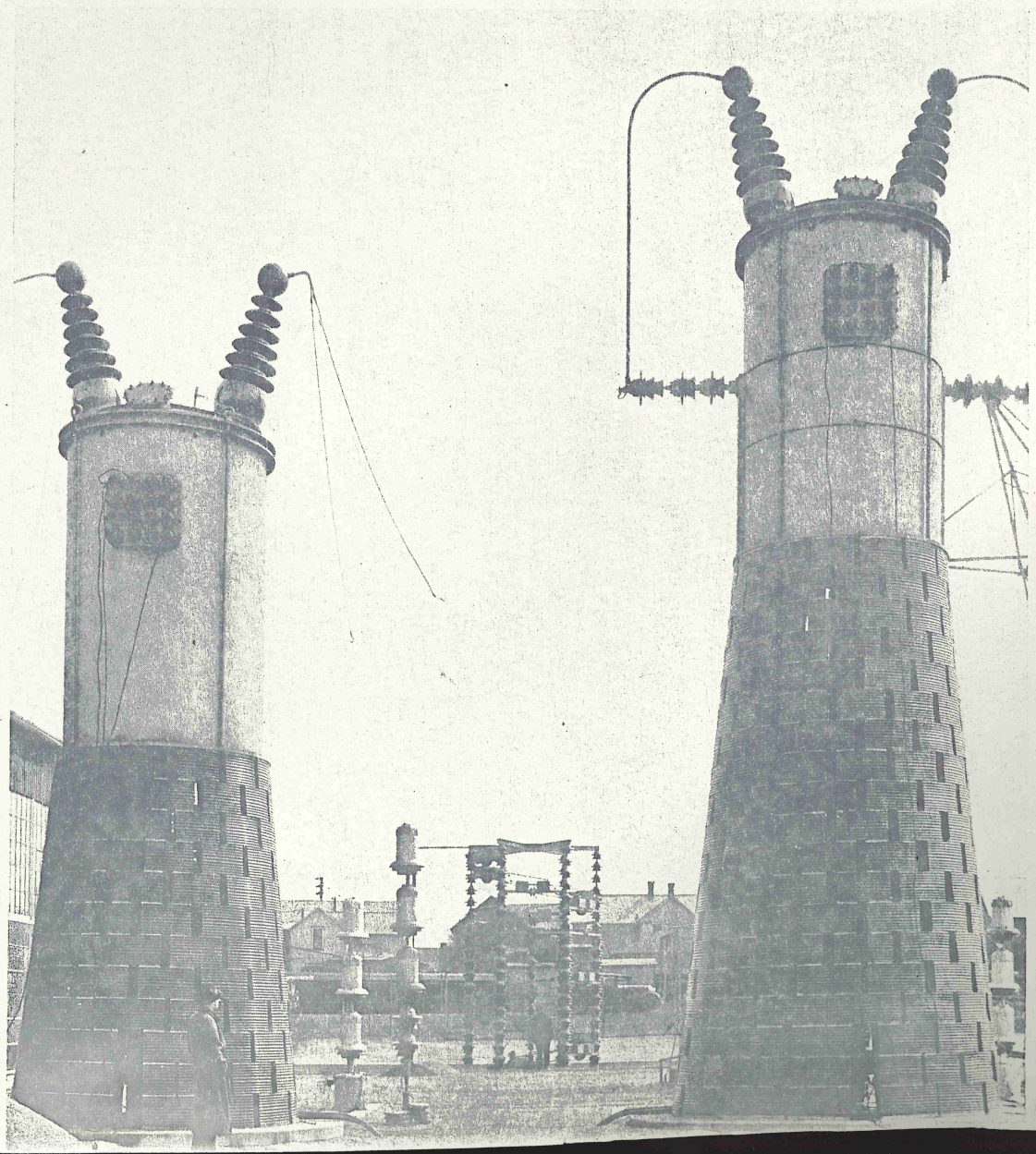
September 1936
Volume 55
No. 9

The Official Monthly Journal and Transactions of the AIEE

This Month—

Front Cover

Two 500-kva 750-kv 60-cycle transformers for making high voltage tests at normal frequency at the laboratory of the Ohio Brass Company, Mansfield. A similar transformer is housed in an adjacent building, and the 3 units may be connected in cascade to provide 60-cycle testing voltages of 2,250 kv, outdoors. Each transformer is mounted on a porcelain tile base.



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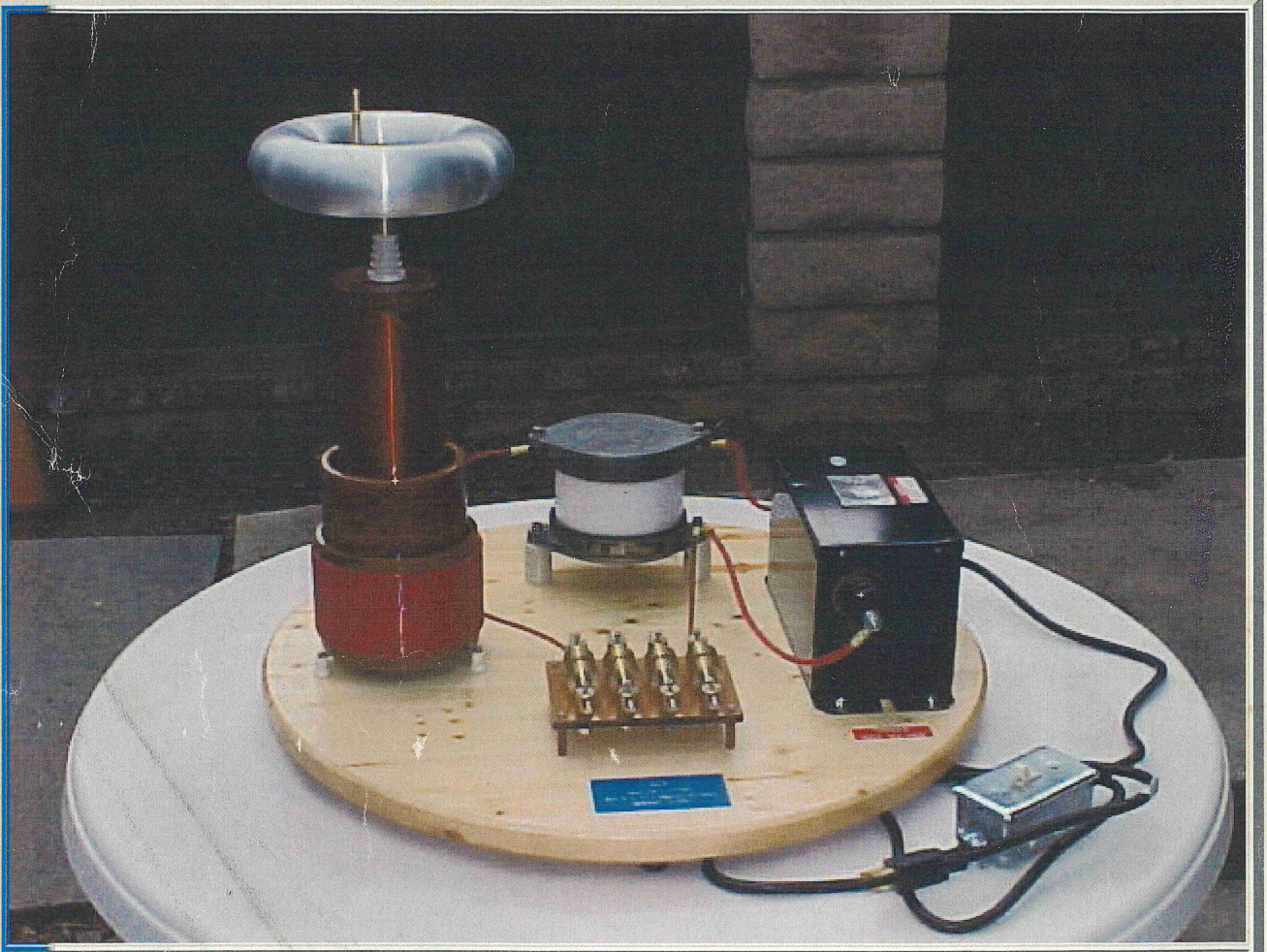
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TESLA TECHNOLOGY RESEARCH

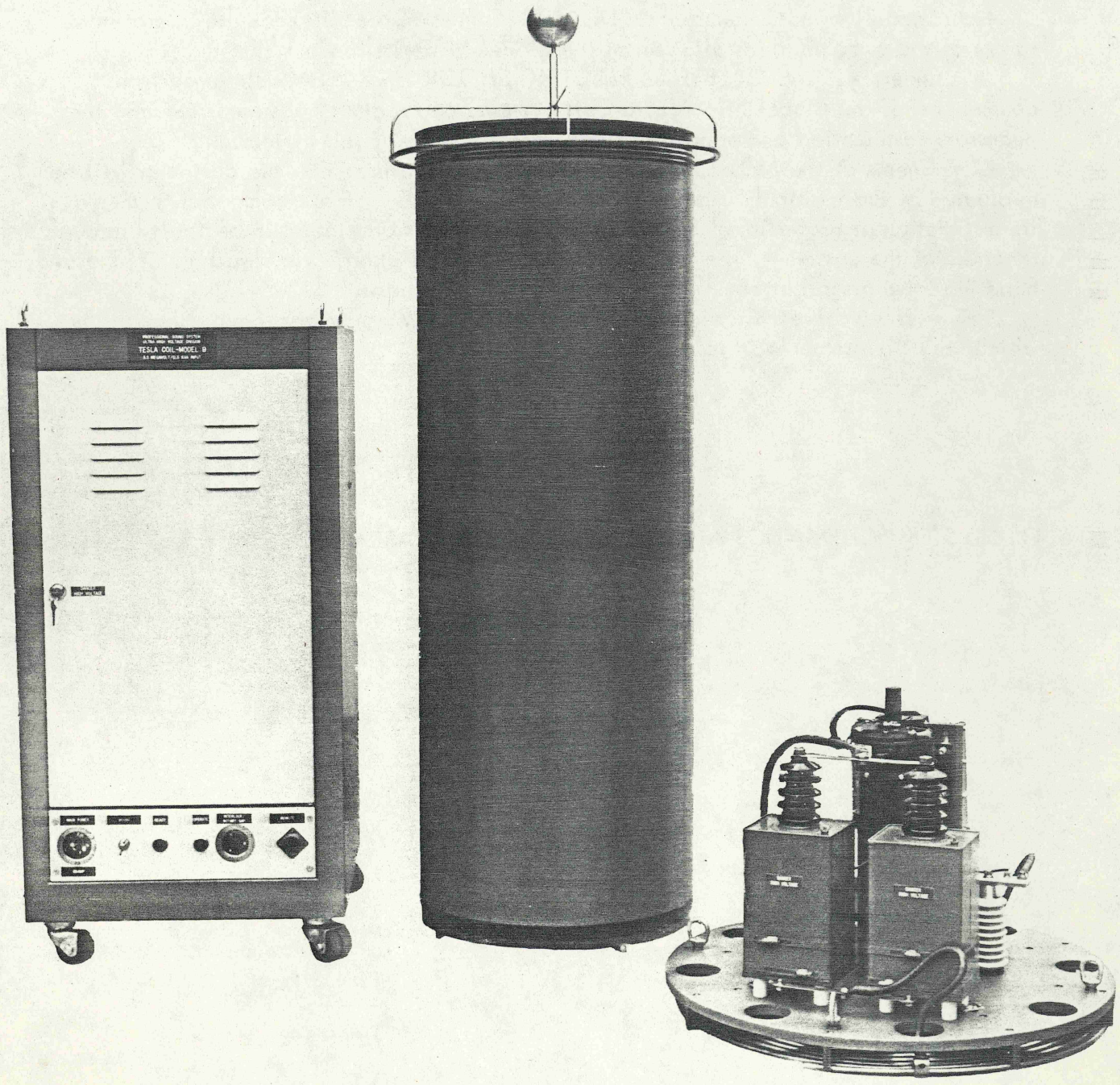


Introducing the new Heavy-Duty Model One Tesla Coil. This coil is designed for continuous duty cycle operation. It produces a very hot arc over six inches long. The discharge may be safely taken to a piece of metal held in the hand.

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2527 TREELANE AVE., MONROVIA, CA 91016 - (213) 359-1373

MODEL NINE TESLA COIL



10. WARRANTY

READ CAREFULLY - THIS IS A LIMITED WARRANTY

Professional Sound Systems UHV-Division warrants the complete Model Nine Tesla Coil System to be free of defects in workmanship and materials and hereby certifies that this equipment functions as in accordance with its design parameters at the time of shipping. This warranty does not cover the customer's use of this equipment, as Professional Sound Systems UHV-Division has no control over the Model Nine Tesla Coil System after shipment to the customer.

Professional Sound Systems UHV-Division assumes no liability for the operational safety of the customer's installation of the Model Nine Tesla Coil System.

It is understood that a LETHAL ELECTRIC SHOCK HAZARD exists in certain components of the Model Nine Tesla Coil System, and that the customer assumes the necessary installation and operation safety requirements of this system.

Components of the Model Nine Tesla Coil System returned by the customer will be evaluated by Professional Sound Systems UHV-Division. If these components are, in the estimation of Professional Sound Systems UHV-Division, found to be faulty through no cause of the customer, they will be replaced free of charge, excluding shipping and handling for a period of one year from the date of purchase.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

11. SYSTEM SCHEMATICS AND MISCELLANEOUS WARRANTYS (inserted)

7. OPERATING INSTRUCTIONS

First, double-check that all previous instructions have been carefully followed before proceeding further.

WARNING: A lethal electrical shock hazard exists in the circuitry inside the rack cabinet and on the Tesla Coil base unit and Tesla primary coil winding. Make sure all power is off before attempting any adjustments. Avoid Murphy's Law which states that if anything can possibly go wrong, IT WILL!

All observers should stay at a minimum distance of twelve feet away from the Tesla Coil during periods of operation.

> ANY PERSONS possessing any form of electro-cardiac devices (pacemakers) should leave the area BEFORE operating the coil.
> THESE PRECAUTIONS ARE ABSOLUTELY NECESSARY FOR YOUR PROTECTION.

Apply power by actuating the main power switch breaker to the "on"position, (see page 4). Now locate the three position toggle switch immediately to the right of the main breaker switch, move the switch to the upper position marked LOCAL OPERATE. When this is done, the LOCAL OPERATE push button to the right should be illuminated red.

READ the printed instructions adjacent to the push button and proceed. Immediately upon pushing this button, you should observe the READY status light located on the bottom panel as being illuminated red. Also at this time, the relay K1 will be activated starting the rotary gap and the delay relay TR2. Continuing to hold the push button, after approximately 5 seconds, a second status light on the bottom panel marked OPERATE should be illuminated red. Also, relay K2 will be engaged, and the Tesla Coil energized. A loud report and torrent of long corona stramers should be seen emitting from the discharge electrode.

If no sparks are indicated, switch the main breaker to the "off" position and carefully inspect all visible connections for proper electrical and mechanical contact. If again no sparks appear after repeating the above instructions, DO NOT PROCEED FURTHER. Turn off all power to the power supply rack and consult with Professional Sound Systems for further instructions.

If coil is operating correctly, long corona streamers should continuously issue forth in random directions from the discharge electrode.

Duration of operation SHOULD NOT EXCEED 60 SECONDS MAXIMUM for a continuous period, with no more than 2 operations per 1/2 hour in the local operate mode, and no more than 5 operations in the auto timer mode, to allow for system cooling. This instruction is designed to protect the Tesla Coil System from becoming excessively heated. Additionally, it will insure longest component life expectancy. Failure to observe these operating instructions may shorten the life expectancy of the Tesla Coil System significantly.

For automatic operation, simply move the toggle switch, (SW-2) to the AUTO TIMER position. This will activate the time sequence relay, (TR-1). This unit is pre-set to automaticlly cycle the Model Nine Tesla Coil through one complete operating sequence every five minutes.

8. POWER REQUIREMENTS

The basic electrical parameters of the Model Nine Tesla Coil System are as follows:

Power input: 208 V.A.C., 60 HZ single phase, 50-70 amp nominal
Output: 1,500,000 to 3,500,000 maximum

9. ROUTINE MAINTENANCE

Simple periodic maintenance of the Model Nine Tesla Coil System will insure continued maximum performance. Basically, only three areas are of concern; the high speed rotary spark gap, insulation on the Tesla secondary coil, and the upper surfaces of the primary coil. The latter should be regularly cleaned of dust particle build-up. This will aid in preventing unwanted small corona point discharges from propagating in this crucial air dielectric area.

The procedure for periodic cleaning is by wiping down all surfaces with a soft cotton towel. Make sure no lint particles remain on the coil. This operation should be performed once after every 5 hour elapsed running time period.

On the high speed rotary gap, inspection of the various tungsten sparking surfaces and phenolic disk are absolutely essential in order to insure peak performance of the coil, (see page 2). If an air compressor air blast is available, blow all surfaces clean of residue and particles. This procedure should be CAREFULLY followed after every 1 hour elapsed running time period. Failure to meet this requirement may considerably shorten the gap assembly life expectancy. This gap assembly has been designed for heavy duty service and should give excellent results for many years. Observe the instructions for maintenance on the rotary gap motor, (see motor sheet). Replacement parts, if needed, are available from Professional Sound Systems UHV-Division.

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READ the printed instructions adjacent to the push button and proceed. Immediately upon pushing this button, you should observe the READY status light located on the bottom panel as being illuminated red. Also at this time, the relay K1 will be activated starting the rotary gap and the delay relay TR2. Continuing to hold the push button, after approximately 5 seconds, a second status light on the bottom panel marked OPERATE should be illuminated red. Also, relay K2 will be engaged, and the Tesla Coil energized. A loud report and torrent of long corona stramers should be seen emitting from the discharge electrode.

If no sparks are indicated, switch the main breaker to the "off" position and carefully inspect all visible connections for proper electrical and mechanical contact. If again no sparks appear after repeating the above instructions, DO NOT PROCEED FURTHER. Turn off all power to the power supply rack and consult with Professional Sound Systems for further instructions.

If coil is operating correctly, long corona streamers should continuously issue forth in random directions from the discharge electrode.

Duration of operation SHOULD NOT EXCEED 60 SECONDS MAXIMUM for a continuous period, with no more than 2 operations per 1/2 hour in the local operate mode, and no more than 5 operations in the auto timer mode, to allow for system cooling. This instruction is designed to protect the Tesla Coil System from becoming excessively heated. Additionally, it will insure longest component life expectancy. Failure to observe these operating instructions may shorten the life expectancy of the Tesla Coil System significantly.

For automatic operation, simply move the toggle switch, (SW-2) to the AUTO TIMER position. This will activate the time sequence relay, (TR-1). This unit is pre-set to automaticlly cycle the Model Nine Tesla Coil through one complete operating sequence every five minutes.

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The basic electrical parameters of the Model Nine Tesla Coil System are as follows:

Power input: 208 V.A.C., 60 HZ single phase, 50-70 amp nominal
Output: 1,500,000 to 3,500,000 maximum

9. ROUTINE MAINTENANCE

Simple periodic maintenance of the Model Nine Tesla Coil System will insure continued maximum performance. Basically, only three areas are of concern; the high speed rotary spark gap, insulation on the Tesla secondary coil, and the upper surfaces of the primary coil. The latter should be regularly cleaned of dust particle build-up. This will aid in preventing unwanted small corona point discharges from propagating in this crucial air dielectric area.

The procedure for periodic cleaning is by wiping down all surfaces with a soft cotton towel. Make sure no lint particles remain on the coil. This operation should be performed once after every 5 hour elapsed running time period.

On the high speed rotary gap, inspection of the various tungsten sparking surfaces and phenolic disk are absolutely essential in order to insure peak performance of the coil, (see page 2). If an air compressor air blast is available, blow all surfaces clean of residue and particles. This procedure should be CAREFULLY followed after every 1 hour elapsed running time period. Failure to meet this requirement may considerably shorten the gap assembly life expectancy. This gap assembly has been designed for heavy duty service and should give excellent results for many years. Observe the instructions for maintenance on the rotary gap motor, (see motor sheet). Replacement parts, if needed, are available from Professional Sound Systems UHV-Division.

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READ the printed instructions adjacent to the push button and proceed. Immediately upon pushing this button, you should observe the READY status light located on the bottom panel as being illuminated red. Also at this time, the relay K1 will be activated starting the rotary gap and the delay relay TR2. Continuing to hold the push button, after approximately 5 seconds, a second status light on the bottom panel marked OPERATE should be illuminated red. Also, relay K2 will be engaged, and the Tesla Coil energized. A loud report and torrent of long corona stramers should be seen emitting from the discharge electrode.

If no sparks are indicated, switch the main breaker to the "off" position and carefully inspect all visible connections for proper electrical and mechanical contact. If again no sparks appear after repeating the above instructions, DO NOT PROCEED FURTHER. Turn off all power to the power supply rack and consult with Professional Sound Systems for further instructions.

If coil is operating correctly, long corona streamers should continuously issue forth in random directions from the discharge electrode.

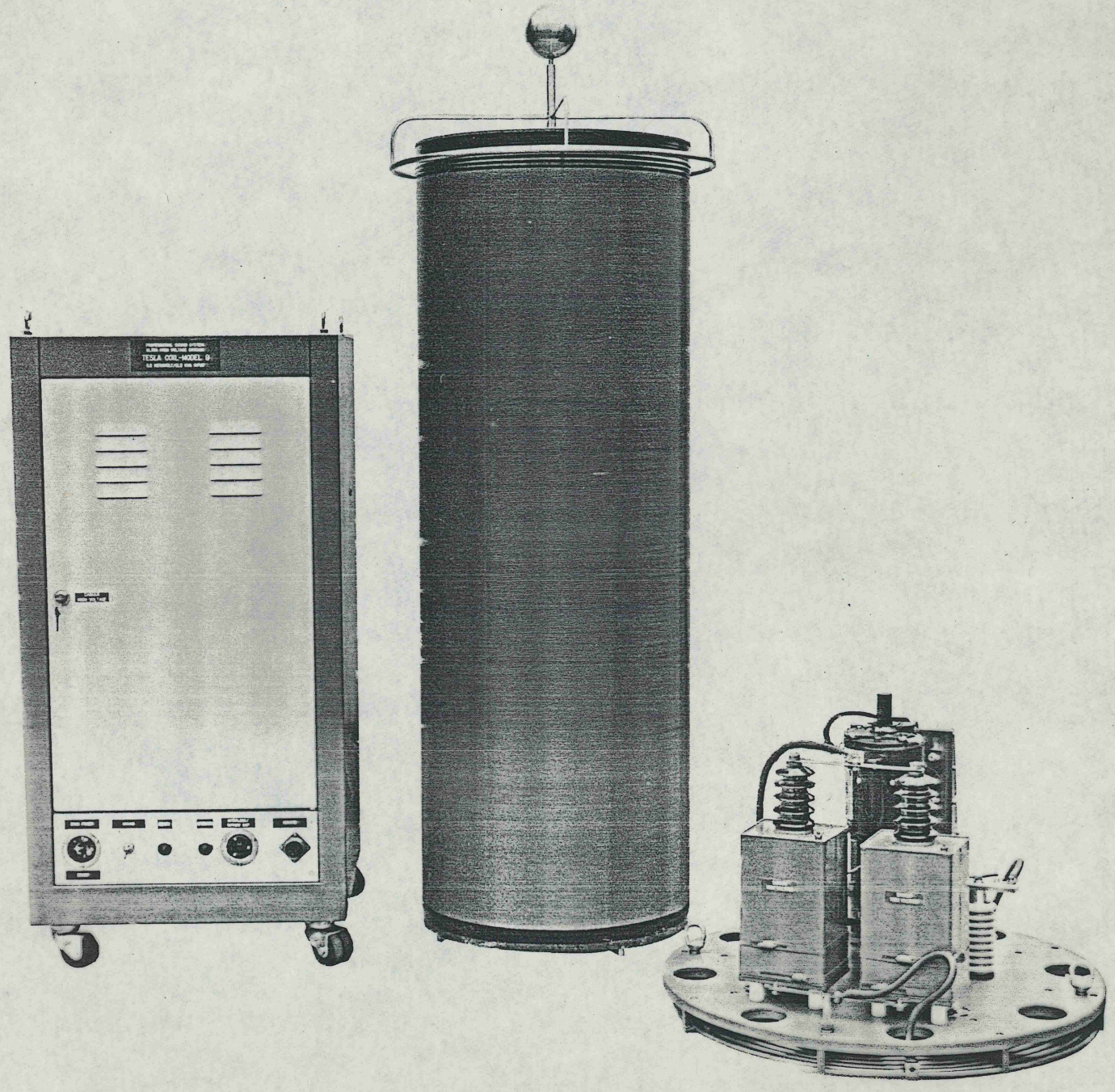
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For automatic operation, simply move the toggle switch, (SW-2) to the AUTO TIMER position. This will activate the time sequence relay, (TR-1). This unit is pre-set to automaticlly cycle the Model Nine Tesla Coil through one complete operating sequence every five minutes.

PROFESSIONAL SOUND SYSTEMS — UHV DIVISION

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MODEL 9 TESLA COIL



MODEL NINE TESLA COIL SYSTEM

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8. POWER REQUIRMENTS / ROUTINE MAINTENANCE
9. WARRANTY /SYSTEM SCHEMATICS AND MISCELLANEOUS WARRANTYS

WARNING: READ ALL INSTRUCTIONS CAREFULLY BEFORE ATTEMPTING OPERATION OF THE MODEL NINE TESLA COIL SYSTEM.

6. INSTALLATION PROCEDURE

The Model Nine Tesla Coil System is designed for easy installation. First, determine that the perspective installation site is physically correct in size to insure safe operation. This may be accomplished by allowing a minimum eight foot radius clearance on all sides from the base of the Tesla Coil. A minimum six foot vertical clearance is required, measured from the Tesla Coil discharge electrode.

It may be desirable to arrange one or more grounded electrodes near the vicinity of the discharge electrode, thus allowing the high voltage discharge to arc to these grounded points. The spacing of each of the grounded points to the discharge electrode determines the amount of high voltage potential built up. An arc jumping a straight line measured distance of 72" represents slightly more than 1,500 KV output potential.

It may also be desirable to arrange some form of booth or alcove in which the Tesla Coil is to be positioned. In this manner, the discharges will be seen more dramatically, especially if the area surrounding the coil and its background are darkened from ambiate light in the room. Additionally, this configuration has the advantage of keeping spectators at a safe distance, and may be used to support a grounded metal screen, forming an effective R.F.I. Faraday cage.

The power supply rack may be located in any well ventilated area up to a maximum distance from the Tesla Coil determined by the interconnecting cable length. A suitable 70 amp service outlet should be located so that the power input cable may be directly plugged in. If an extension cable is unavoidably necessary, it must be of the 3 conductor #8 AWG size stranded conductor type and should be rated for at least 50 amp, 250 volt continuous duty.

Once both units are properly positioned, next connect a length of #8 AWG copper braided wire (or equivalent) to a very good earth ground, such as a cold water pipe, if the plumbing runs directly into soil beneath the foundation. If no substantial ground is available, a grounding rod must be driven vertically down through the foundation into the soil. Such a rod should be of the type available from most hardware stores for the purpose of securing a good electrical ground reference. The other end of this cable must be connected to both the rack chassis and the ground terminal of the high voltage resonator (see page 1) on the Tesla Coil base. The maximum length of this cable between all points should not exceed 75 feet. Connection at the rack chassis may be accomplished by fastening a suitable 3/8" I.D. eyelet solderless crimp terminal to the threaded mounting screw in the front of the cabinet, (see page 3).

WARNING: UNDER NO CIRCUMSTANCES SHOULD POWER BE APPLIED TO THE SYSTEM UNTIL ALL GROUNDING OPERATIONS HAVE BEEN SATISFACTORILY COMPLETED.

Next, connect the interconnecting cables from the power supply to the Tesla Coil; see illustrations on pages 2, 3, and 4.

Now make sure that the main power switch breaker is off and connect the power cable first to the rack and then to the A.C. outlet.

This completes all installation instructions. Proceed to the next section entitled OPERATION INSTRUCTIONS.

7. OPERATING INSTRUCTIONS

First, double-check that all previous instructions have been carefully followed before proceeding further.

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If coil is operating correctly, long corona streamers should continuously issue forth in random directions from the discharge electrode.

Duration of operation SHOULD NOT EXCEED 60 SECONDS MAXIMUM for a continuous period, with no more than 2 operations per 1/2 hour in the local operate mode, and no more than 5 operations in the auto timer mode, to allow for system cooling. This instruction is designed to protect the Tesla Coil System from becoming excessively heated. Additionally, it will insure longest component life expectancy. Failure to observe these operating instructions may shorten the life expectancy of the Tesla Coil System significantly.

For automatic operation, simply move the toggle switch, (SW-2) to the AUTO TIMER position. This will activate the time sequence relay, (TR-1). This unit is pre-set to automaticlly cycle the Model Nine Tesla Coil through one complete operating sequence every five minutes.

8. POWER REQUIREMENTS

The basic electrical parameters of the Model Nine Tesla Coil System are as follows:

Power input: 208 V.A.C., 60 HZ single phase, 50-70 amp nominal
Output: 1,500,000 to 3,500,000 maximum

9. ROUTINE MAINTENANCE

Simple periodic maintenance of the Model Nine Tesla Coil System will insure continued maximum performance. Basically, only three areas are of concern; the high speed rotary spark gap, insulation on the Tesla secondary coil, and the upper surfaces of the primary coil. The latter should be regularly cleaned of dust particle build-up. This will aid in preventing unwanted small corona point discharges from propagating in this crucial air dielectric area.

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10. WARRANTY

READ CAREFULLY - THIS IS A LIMITED WARRANTY

Professional Sound Systems UHV-Division warrants the complete Model Nine Tesla Coil System to be free of defects in workmanship and materials and hereby certifies that this equipment functions as in accordance with its design parameters at the time of shipping. This warranty does not cover the customer's use of this equipment, as Professional Sound Systems UHV-Division has no control over the Model Nine Tesla Coil System after shipment to the customer.

Professional Sound Systems UHV-Division assumes no liability for the operational safety of the customer's installation of the Model Nine Tesla Coil System.

It is understood that a LETHAL ELECTRIC SHOCK HAZARD exists in certain components of the Model Nine Tesla Coil System, and that the customer assumes the necessary installation and operation safety requirements of this system.

Components of the Model Nine Tesla Coil System returned by the customer will be evaluated by Professional Sound Systems UHV-Division. If these components are, in the estimation of Professional Sound Systems UHV-Division, found to be faulty through no cause of the customer, they will be replaced free of charge, excluding shipping and handling for a period of one year from the date of purchase.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

11. SYSTEM SCHEMATICS AND MISCELLANEOUS WARRANTYS

WALT DISNEY IMAGINEERING

TESLA COIL SYSTEM 5D

MAINTENANCE MANUAL

MANUFACTURED BY: TESLA TECHNOLOGY RESEARCH
2527 Treelane Ave., Monrovia, Ca. 91016
(818) 359-1373

WARNING:

THE ELECTRICAL CURRENT IN THE MACHINERY OF THIS INSTALLATION CARRIES A LETHAL ELECTRIC SHOCK HAZARD; DO NOT ATTEMPT ANY ADJUSTMENT OR MAINTENANCE TO THIS SYSTEM UNTIL ALL POWER IS COMPLETELY SHUT OFF AND LOCKED OUT. ALL WORK MUST BE PERFORMED ONLY BY QUALIFIED TECHNICAL PERSONNEL. READ THIS MANUAL COMPLETELY BEFORE ATTEMPTING ANY ADJUSTMENT TO THIS EQUIPMENT. SPARE PARTS AND ADDITIONAL TECHNICAL ASSISTANCE IS AVAILABLE THROUGH THE ABOVE ADDRESS.

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1. MODEL 5D TECHNICAL DESCRIPTION AND SPECIFICATIONS.

Model 5D consists of a rack cabinet-enclosed power supply section and an enclosed Tesla Coil assembly, configured on a 24 inch diameter base. The power supply major operating components are; voltage control autotransformer, current control autotransformer, high voltage step-up power transformer, power and control relays. The Tesla Coil major operating components are; motor-driven rotary spark gap assembly, oscillation capacitors, Tesla primary and secondary coils, and a 20 inch diameter toroid discharge electrode. The voltage and current controls are adjustable for obtaining the desired result. The settings can be noted on the control dial plates. Refer to pictorial illustration on page 7.

The power requirement for System One is 208 V.A.C., single phase with a neutral leg (grounded,) and a current rating of 30 amps. The prototype model 5D coil utilizes manual controls for rotary gap and local operate functions. In the production version, to be perminently installed, four 24 V.D.C. feeds are required to operate the system relay logic; K3 relay emergency enable, K4 relay-rotary gap motor power on, K5 relay-high voltage on, and K6 relay-feedback signal indication of system main breaker switch energized. Relays K4 and K5 are sequentially latched in order to energize the system. K3 relay, the emergency stop relay, has override priority, and remains in a continuous ON state during normal conditions. This system requires a nominal current of 20 amps for full rated output. The Tesla Coil is designed to give a solid 24 inch long corona discharge as installed, yielding a potential output of approximately 250,000 volts at a resonate frequency of about 375 KHz.

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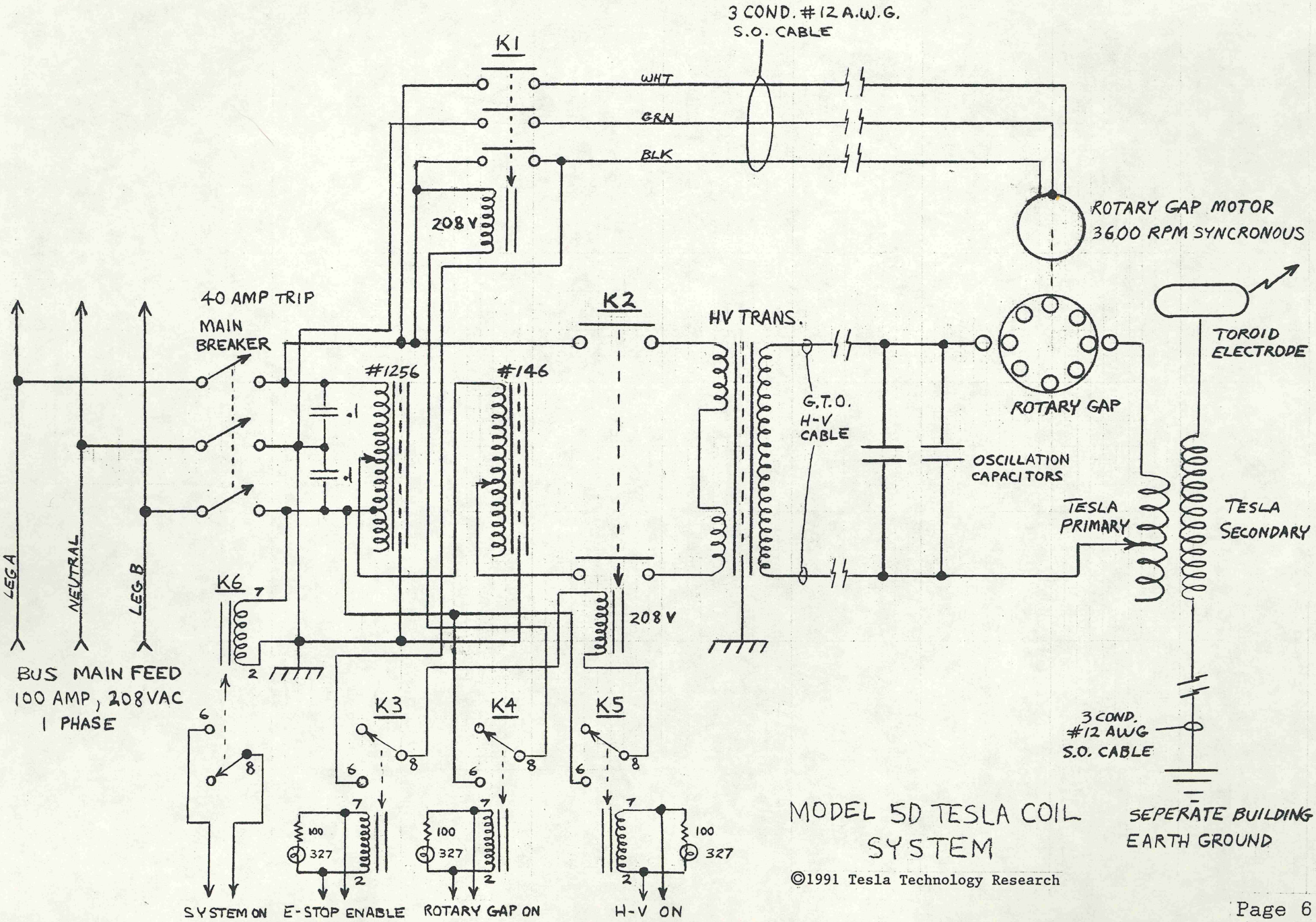
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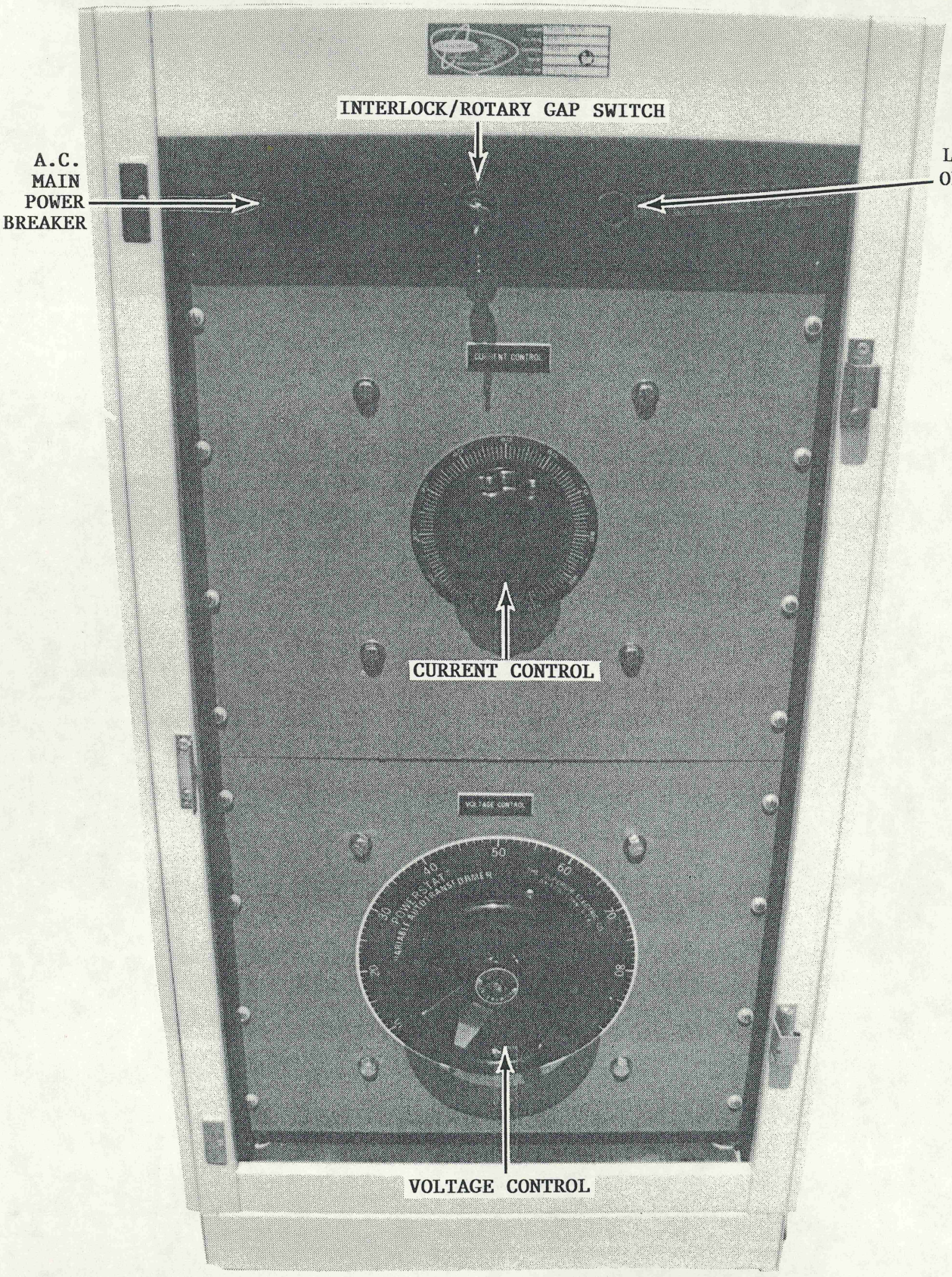
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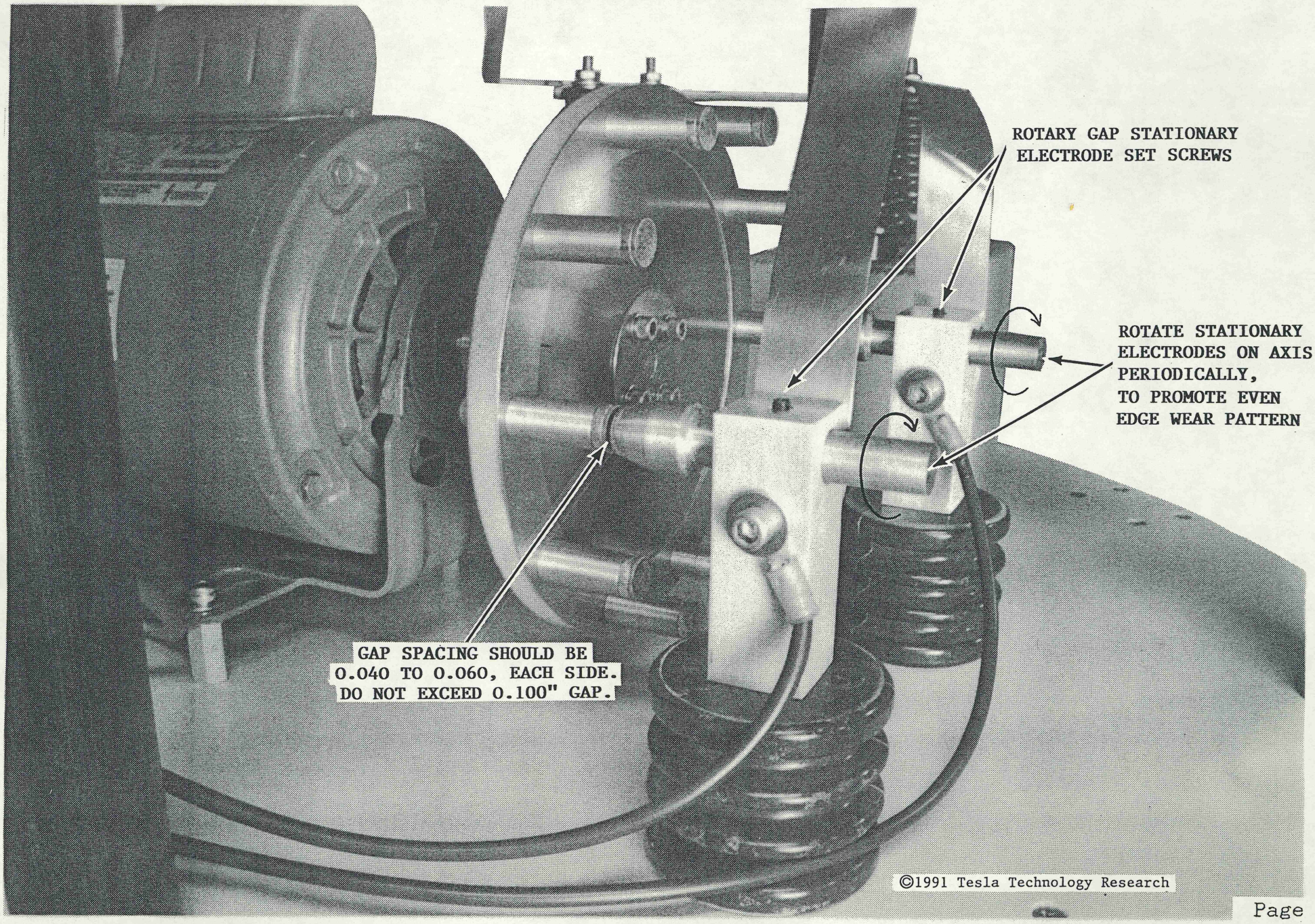
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MODEL 5D TESLA COIL POWER SUPPLY



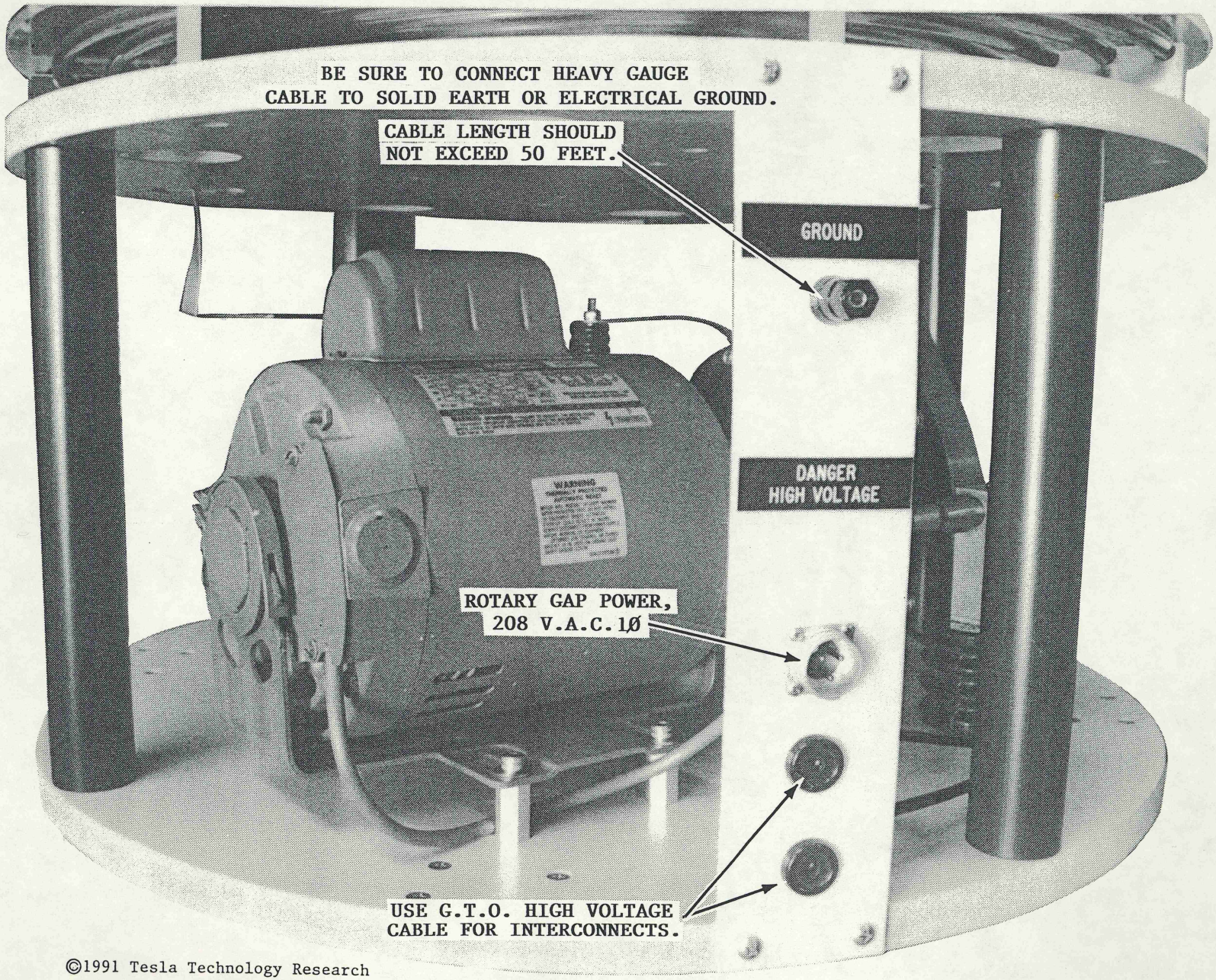
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MODEL 5D TESLA COIL • BASE UNIT • ROTARY GAP



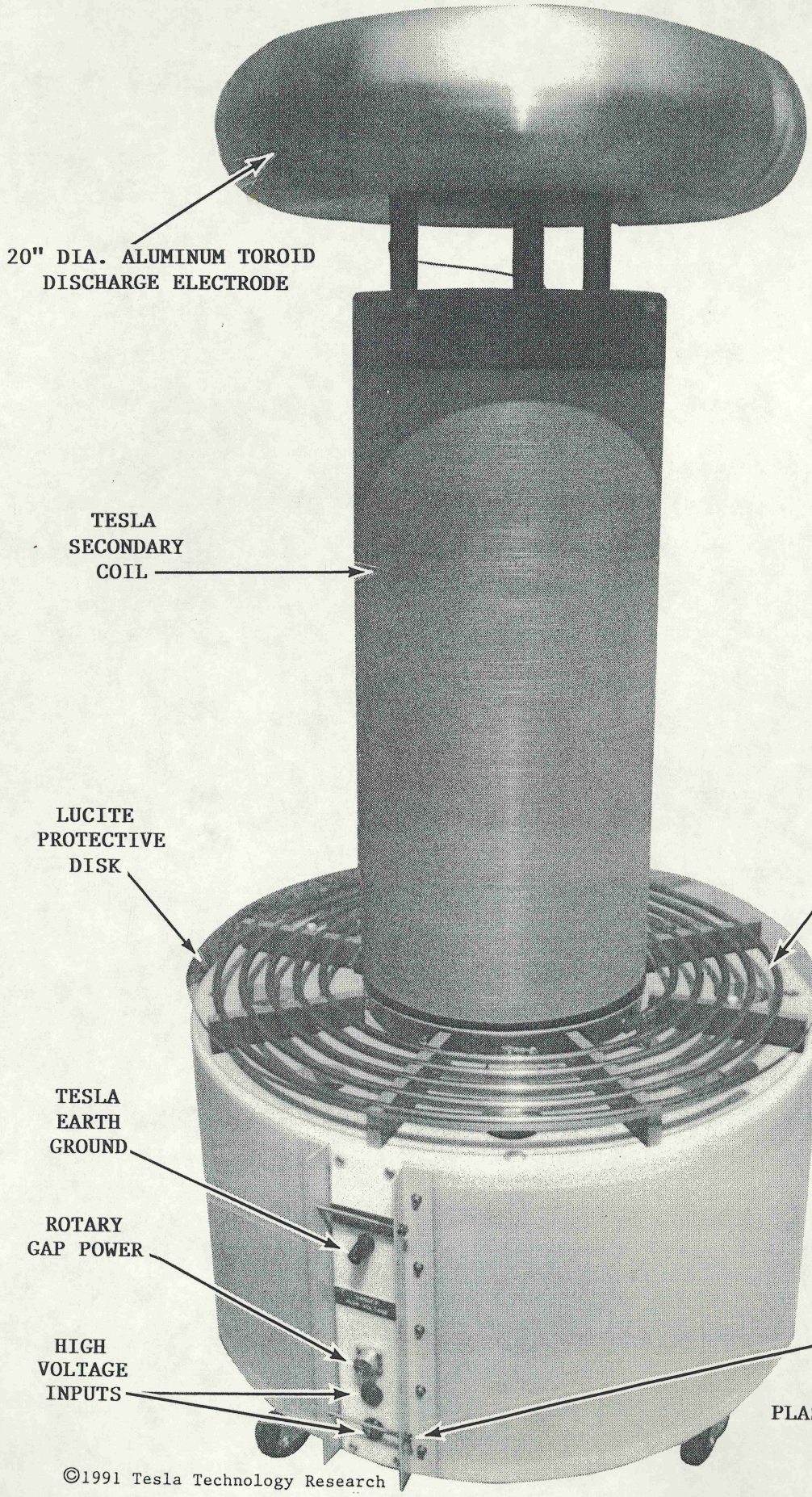
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MODEL 5D TESLA COIL



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TESLA COIL SYSTEM 5D

MAINTENANCE MANUAL

MANUFACTURED BY: TESLA TECHNOLOGY RESEARCH
2527 Treelane Ave., Monrovia, Ca. 91016
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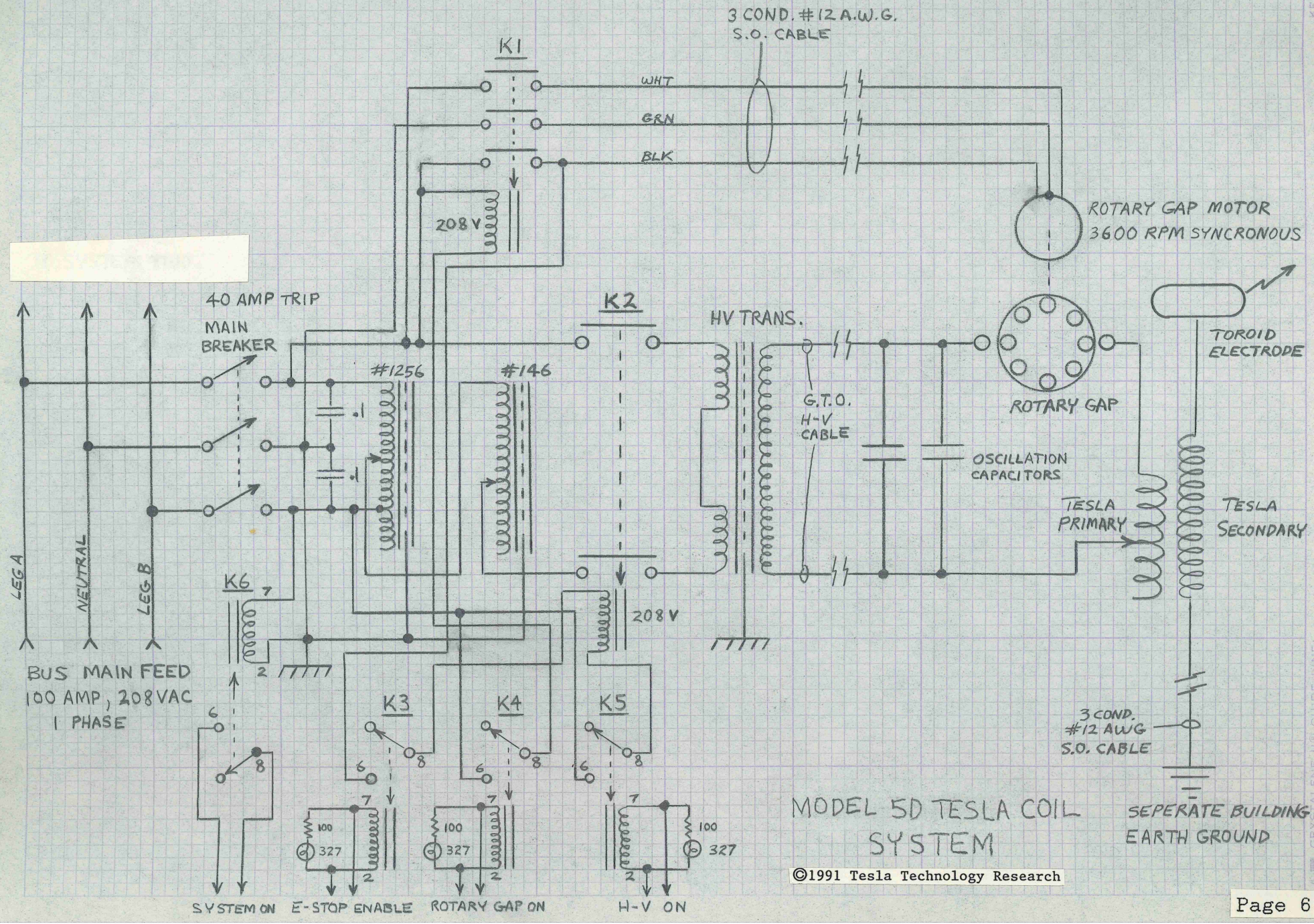
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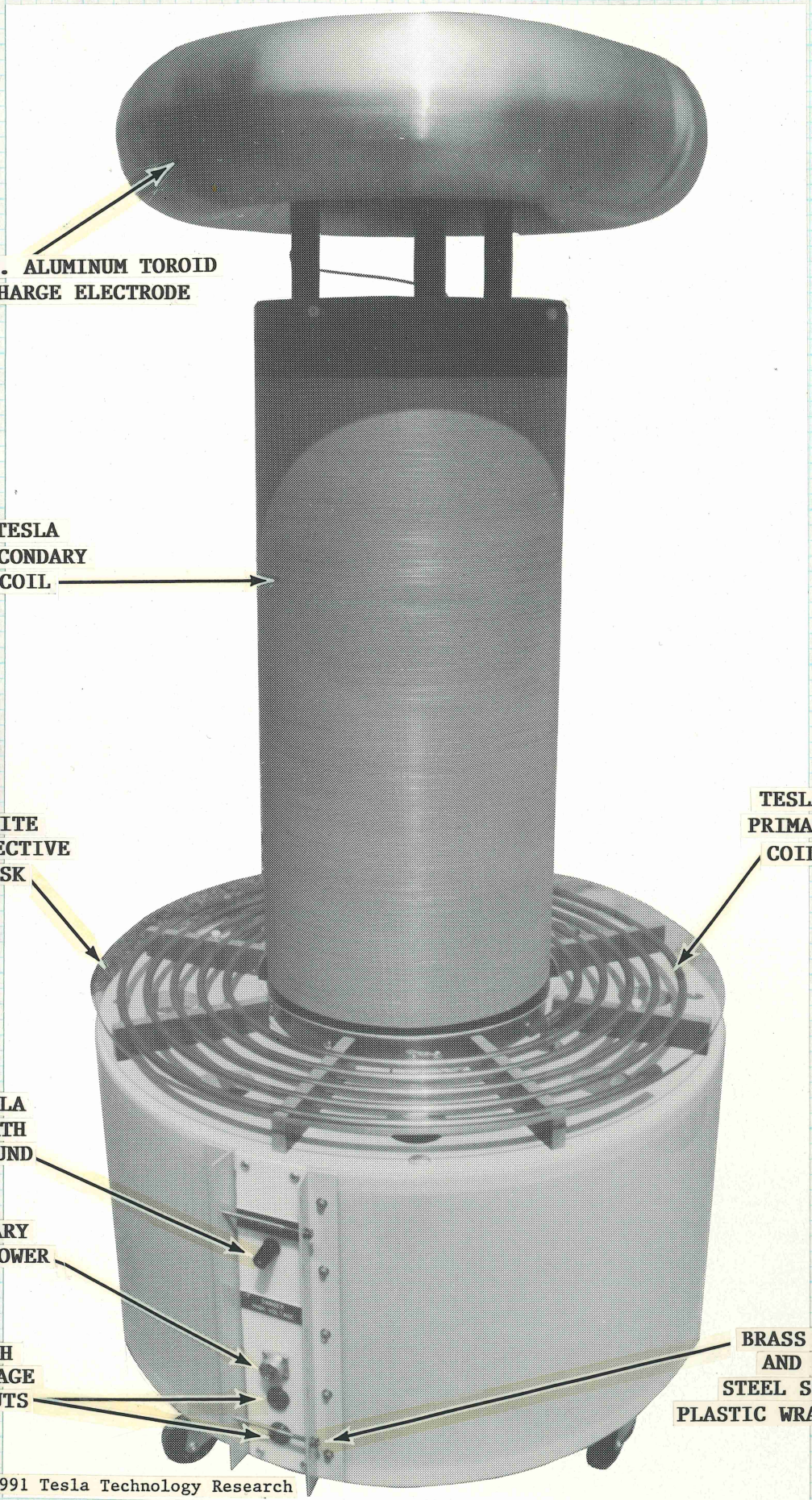
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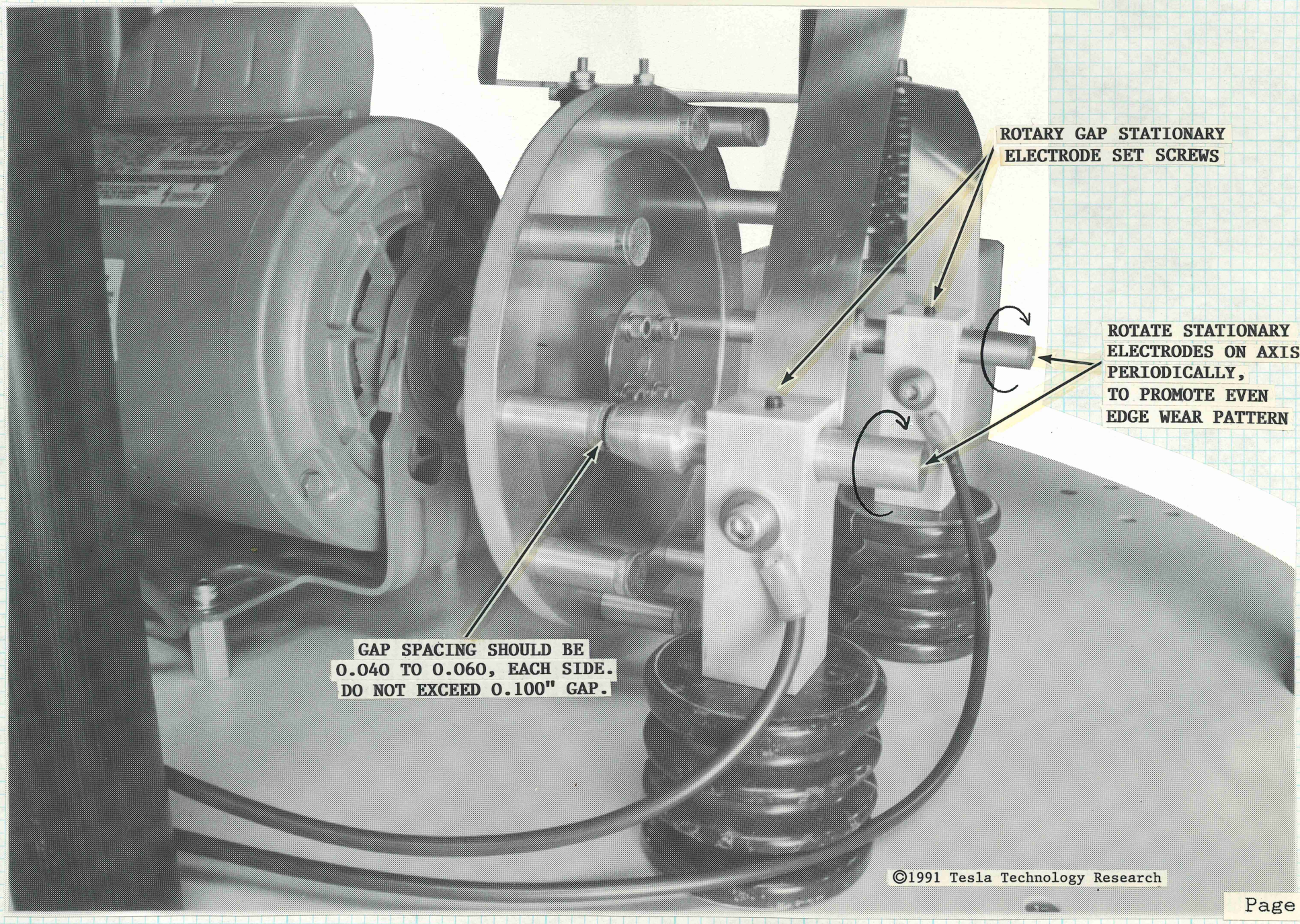
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MODEL 5D TESLA COIL



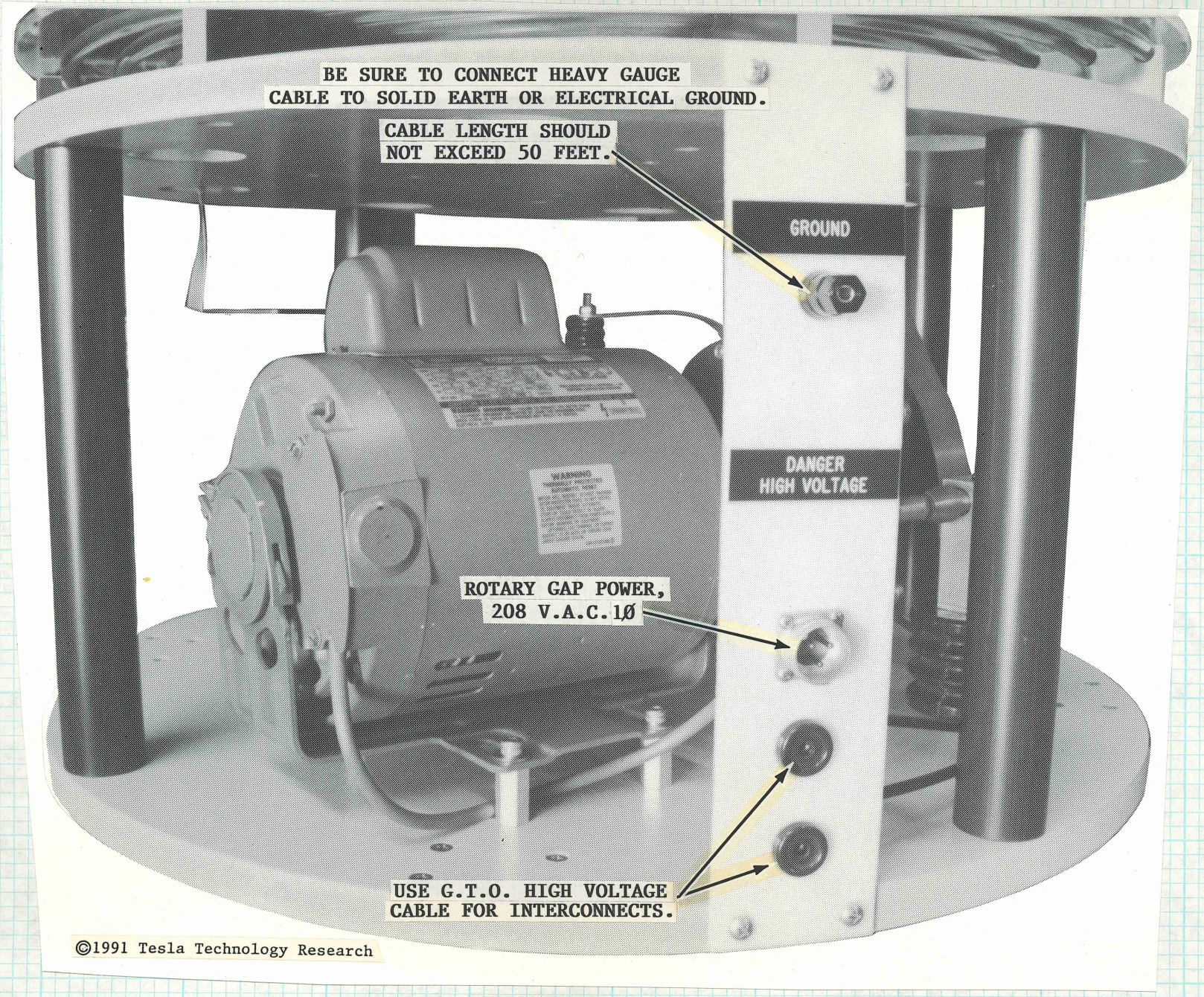
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MODEL 5D TESLA COIL • BASE UNIT • ROTARY GAP



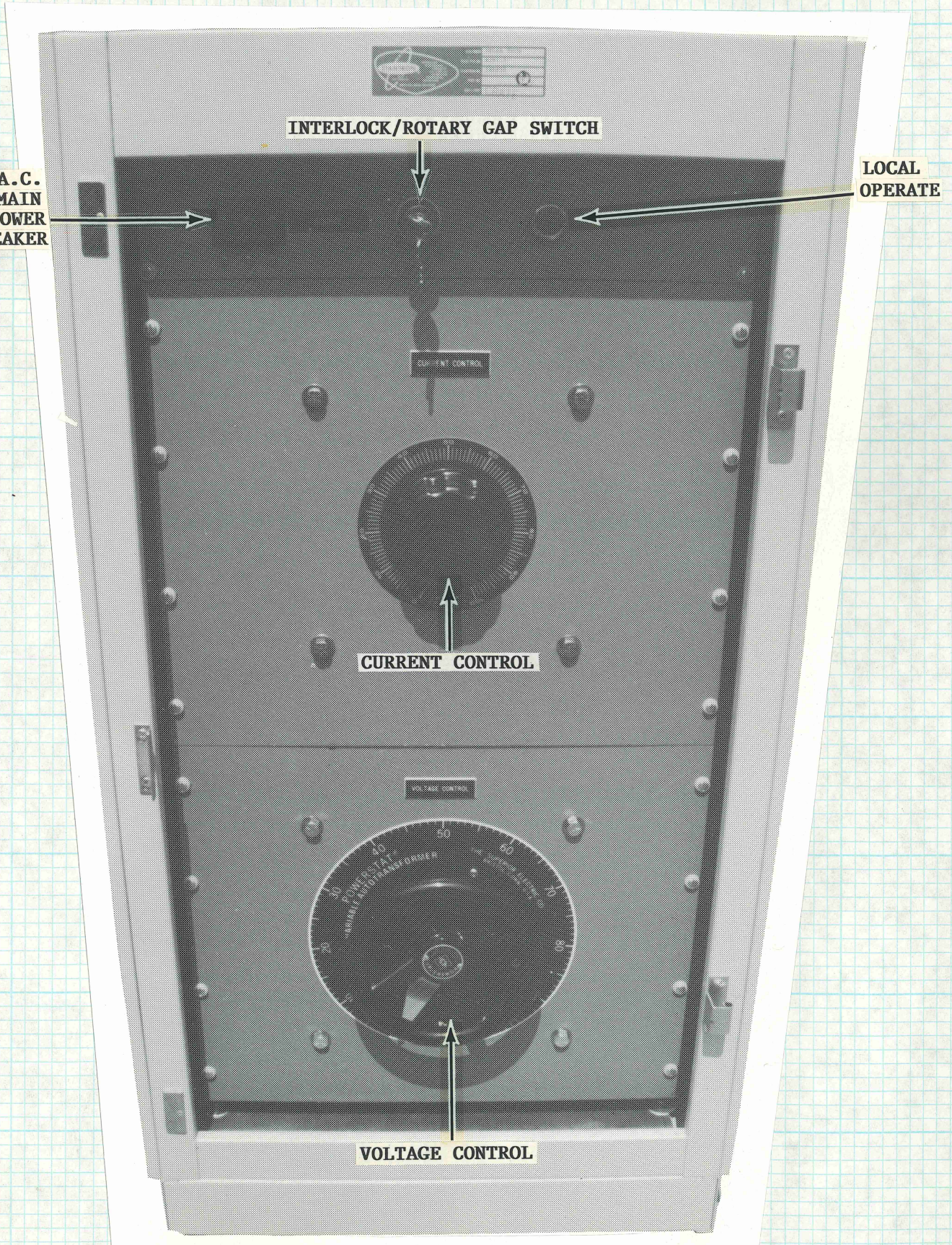
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MODEL 5D TESLA COIL BASE UNIT



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TESLA COIL SYSTEM 5D

MAINTENANCE MANUAL

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7. MODEL 5D BASE INTERCONNECTS PICTORIAL ILLUSTRATION Page 9

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WALT DISNEY IMAGINEERING

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At the time of writing of this manual, no further maintenance adjustment is specified for Model 5D.

3. WARRENTY OF THE MODEL 5D TESLA COIL SYSTEM.

Tesla Technology Research warrents the entire Model 5D Tesla Coil System to be free of defects, both in materials and workmanship, at the time of origional delivery to the origional customer. As stated in the origional contractual agreement and disclosure, this equipment IS A PROTOTYPE, and is designed for experimental project development use only. Due to the nature of intended operation, [and possible modification(s) to] this equipment, NO OTHER WARRENTY IS EITHER EXPRESSED OR IMPLIED. The customer shall bear ALL LIABILITY(S), both direct and indirect, for any use(s) of this equipment, after the point of origional delivery to the same. Tesla Technology Research RESERVES THE RIGHT TO DUPLICATE ANY AND ALL EQUIPMENTS as origionally supplied to the customer, for its own intended purposes in the indefinite future.

WALT DISNEY IMAGINEERING

TESLA COIL SYSTEM 5D

MAINTENANCE MANUAL

MANUFACTURED BY: TESLA TECHNOLOGY RESEARCH
2527 Treelane Ave., Monrovia, Ca. 91016
(818) 359-1373

WARNING:

THE ELECTRICAL CURRENT IN THE MACHINERY OF THIS INSTALLATION CARRIES A LETHAL ELECTRIC SHOCK HAZARD; DO NOT ATTEMPT ANY ADJUSTMENT OR MAINTENANCE TO THIS SYSTEM UNTIL ALL POWER IS COMPLETELY SHUT OFF AND LOCKED OUT. ALL WORK MUST BE PERFORMED ONLY BY QUALIFIED TECHNICAL PERSONNEL. READ THIS MANUAL COMPLETELY BEFORE ATTEMPTING ANY ADJUSTMENT TO THIS EQUIPMENT. SPARE PARTS AND ADDITIONAL TECHNICAL ASSISTANCE IS AVAILABLE THROUGH THE ABOVE ADDRESS.

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5. MODEL 5D TESLA COIL CONTROL RACK PICTORIAL ILLUSTRATION Page 7
6. MODEL 5D TESLA COIL ROTARY GAP PICTORIAL ILLUSTRATION Page 8
7. MODEL 5D BASE INTERCONNECTS PICTORIAL ILLUSTRATION Page 9
8. MODEL 5D TESLA COIL ASSEMBLY PICTORIAL ILLUSTRATION Page 10

1. MODEL 5D TECHNICAL DESCRIPTION AND SPECIFICATIONS.

Model 5D consists of a rack cabinet-enclosed power supply section and an enclosed Tesla Coil assembly, configured on a 24 inch diameter base. The power supply major operating components are; voltage control autotransformer, current control autotransformer, high voltage step-up power transformer, power and control relays. The Tesla Coil major operating components are; motor-driven rotary spark gap assembly, oscillation capacitors, Tesla primary and secondary coils, and a 20 inch diameter toroid discharge electrode. The voltage and current controls are adjustable for obtaining the desired result. The settings can be noted on the control dial plates. Refer to pictorial illustration on page 7.

The power requirement for System One is 208 V.A.C., single phase with a neutral leg (grounded,) and a current rating of 30 amps. The prototype model 5D coil utilizes manual controls for rotary gap and local operate functions. In the production version, to be perminently installed, four 24 V.D.C. feeds are required to operate the system relay logic; K3 relay emergency enable, K4 relay-rotary gap motor power on, K5 relay-high voltage on, and K6 relay-feedback signal indication of system main breaker switch energized. Relays K4 and K5 are sequentially latched in order to energize the system. K3 relay, the emergency stop relay, has override priority, and remains in a continuous ON state during normal conditions. This system requires a nominal current of 20 amps for full rated output. The Tesla Coil is designed to give a solid 24 inch long corona discharge as installed, yielding a potential output of approximately 250,000 volts at a resonate frequency of about 375 KHz.

The integrity of the Tesla secondary ground system deserves special attention to detail. It is absolutely essential to provide a SEPERATE EARTH GROUND to the GROUND TERMINAL, located on the side of the Model 5D Base Unit, which possess the following electrical characteristics; (1) low R.F. impedance at the fundemental operating frequency, and (2) non resonant physical length. Practice has shown that this is not as simple and straight forward as it might appear; the bottom line here is, "THE ONLY THING YOU CAN TAKE FOR GRANTED IS NOTHING AT ALL." Refer to the pictorial illustration on page 9.

2. MODEL 5D MAINTENANCE PROCEDURE.

Periodic maintenance is required on the rotary spark gap assembly, which is located in the bottom portion of the 24 inch diameter base housing. Access to this area is provided by removal of the lucite plastic skirt plate, which is held in place by two stainless steel screws and brass thumb nuts. The solid tungsten-faced stationary electrodes should be rotated about their axis, approximately 20 degrees, initially on a once-per-month basis, or more frequently if required, to promote an even wear pattern on their faces. This also insures the longest life of these parts. Use a 3/32 inch hex key wrench to loosen the mounting of the stationary electrodes, rotate to the new position, and tighten the set screws. Care should be taken to maintain the same gap spacing on each gap.
It is a good practice to first measure each gap with a feeler gauge, and reset to the same distance after rotation. The nominal setting should be held between 0.040 to 0.060 inch for each gap. Additional care should be taken not to over-tighten the set screws, to avoid galling these units.

Refer to the pictorial illustration of the rotary gap assembly on page 8. The only additional scheduled maintenance required for this system is a visual inspection of the interior area around the base plate, and the exposed external surfaces of the coil, including the exterior wiring and connections. The outside areas should be visually inspected for mechanical flaws such as loose connetions or broken wires BEFORE EACH OCCASION OF OPERATING THE EQUIPMENT.

A heavy build-up of dust and debris, or a wet surface on the coil, will very likely cause a high voltage short to develop. The interior area inspection need only be during gap re-positioning. This area should be observed to be relatively clean and dry at all times.

The permanently installed Model 5D Tesla Coil Base unit must be supplied with an air supply line that provides pressurized dry air to the base of enclosed portion of the Tesla Coil. A regulator should be placed in line, and maintained at about 5 p.s.i., during times of operation of the coil.

During periods of operation, concentrations of oxides of nitrogen and ozone are generated inside the Tesla Coil base assembly. These gases must be purged from the base interior via the dry air supply. FAILURE to maintain the air supply to the base assembly will significantly shorten the life expectancy of this system, and will void the manufacturer warranty, when the Model 5D Tesla Coil is permanently installed.

At the time of writing of this manual, no further maintenance adjustment is specified for Model 5D.

3. WARRENTY OF THE MODEL 5D TESLA COIL SYSTEM.

Tesla Technology Research warrents the entire Model 5D Tesla Coil System to be free of defects, both in materials and workmanship, at the time of origional delivery to the origional customer. As stated in the origional contractual agreement and disclosure, this equipment IS A PROTOTYPE, and is designed for experimental project development use only. Due to the nature of intended operation, [and possible modification(s) to] this equipment, NO OTHER WARRENTY IS EITHER EXPRESSED OR IMPLIED. The customer shall bear ALL LIABILITY(S), both direct and indirect, for any use(s) of this equipment, after the point of origional delivery to the same. Tesla Technology Research RESERVES THE RIGHT TO DUPLICATE ANY AND ALL EQUIPMENTS as origionally supplied to the customer, for its own intended purposes in the indefinite future.

TESLA TECHNOLOGY RESEARCH

UNIVERSAL STUDIOS TOUR-EARTHQUAKE

ORLANDO, FLORIDA

TESLA COIL, SYSTEM ONE

MAINTENANCE MANUAL

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2. System One Tesla Coil Maintenance Procedure Page 1, 2
3. Illustration, Control Console Rack, Front View Page 3
4. Illustration, Rotary Gap Assembly, System One Page 4
5. Schematic Diagram, System One Page 5

I. 1. SYSTEM ONE TECHNICAL DESCRIPTION AND SPECIFICATIONS.

System One consists of a rack cabinet-enclosed power supply section and an enclosed Tesla Coil assembly, configured to the inside space of a fiberglas tank, mounted on a fiberglas facsimile of a typical utility power pole. The power supply major operating components are; voltage control autotransformer, current control autotransformer, high voltage step-up power transformer, power and control relays. The Tesla Coil major operating components are; motor-driven rotary spark gap assembly, oscillation capacitors, Tesla primary and secondary coils, and a 20 inch diameter toroid discharge electrode. The voltage and current controls have been preset, and do not require any adjustment. The settings are noted on the control dial plates.

The power requirement for System One is 220 V.A.C., single phase with a neutral leg (grounded.) Four 24 V.D.C. feeds are required to operate the system relay logic; K3 relay-emergency enable, K4 relay-rotary gap motor power on, K5 relay-high voltage on, and K6 relay-feedback signal indication of system main breaker switch energized. Relays K4 and K5 are sequentially latched in order to energize the system. K3 relay, the emergency stop relay, has override priority, and remains in a continuous ON state during normal conditions. This system requires a nominal current of 20 amps for full rated output. The Tesla Coil is designed to give a solid 24 inch long corona discharge as installed, yeilding a potential output of approximately 250,000 volts at a resonate frequency of 375 KHz.

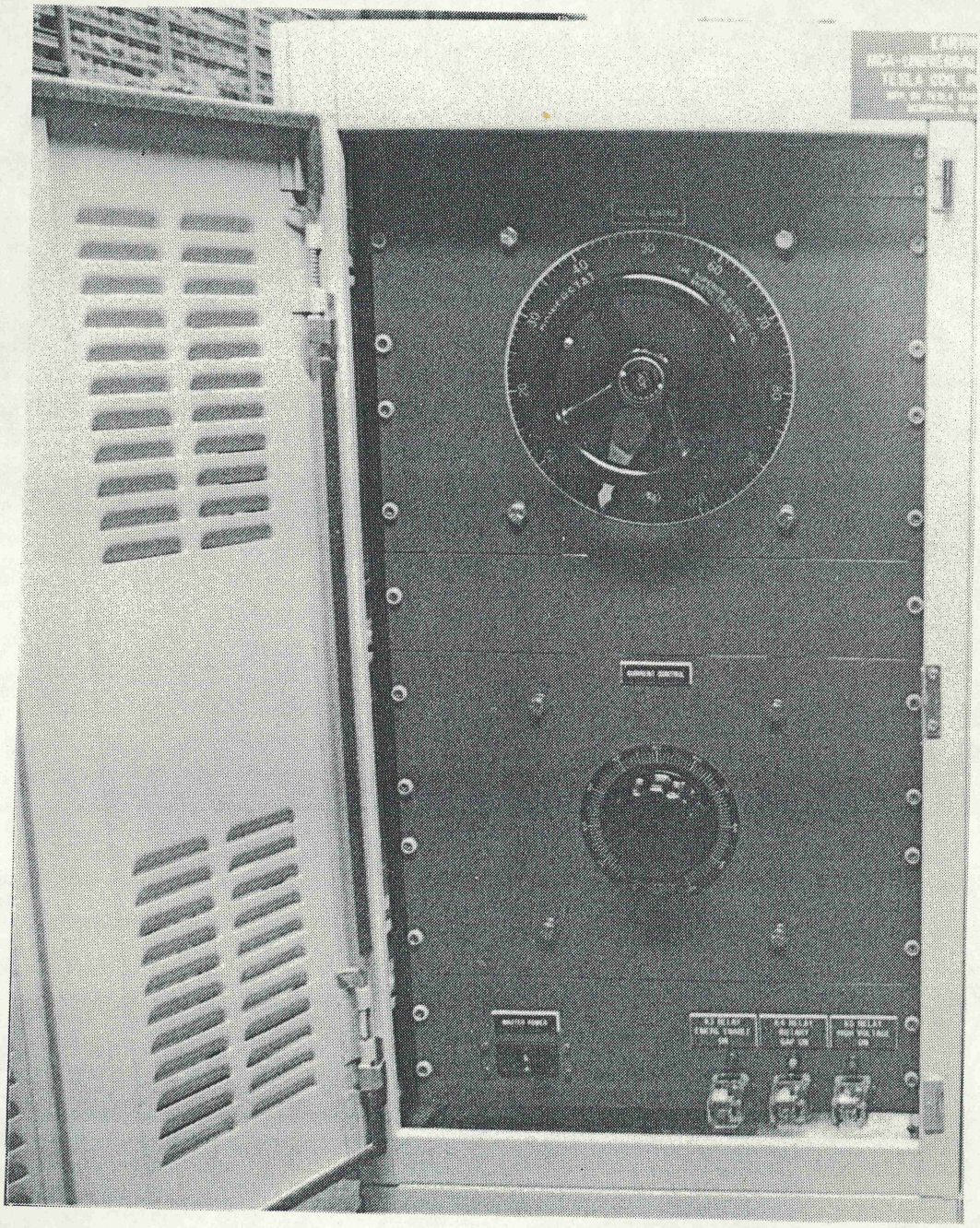
2. SYSTEM ONE MAINTENANCE PROCEDURE.

Periodic maintenance is required on the rotary spark gap assembly, which is located in the bottom portion of the pole-mounted fiberglas tank housing. Access to this area is provided by removal of a plexiglas inspection plate, using a 3/16 inch hex key wrench. The solid tungsten stationary electrodes should be rotated about their axis, approximately 20 degrees, initially on a once-per-month basis, or more frequently if required, to promote an even wear pattern on their faces. This also insures the longest life of these parts. Use a 3/32 inch hex key wrench to loosen the mounting of the stationary electrodes, rotate to the new position, and tighten the set screws. Care should be taken to maintain the same gap spacing on each gap. It is a good practice to first measure each gap with a feeler gauge, and reset to the same distance after rotation. The nominal setting should be held between 0.040 to 0.060 inch for each gap. Additional care should be taken not to over-tighten the set screws, to avoid galling these units.

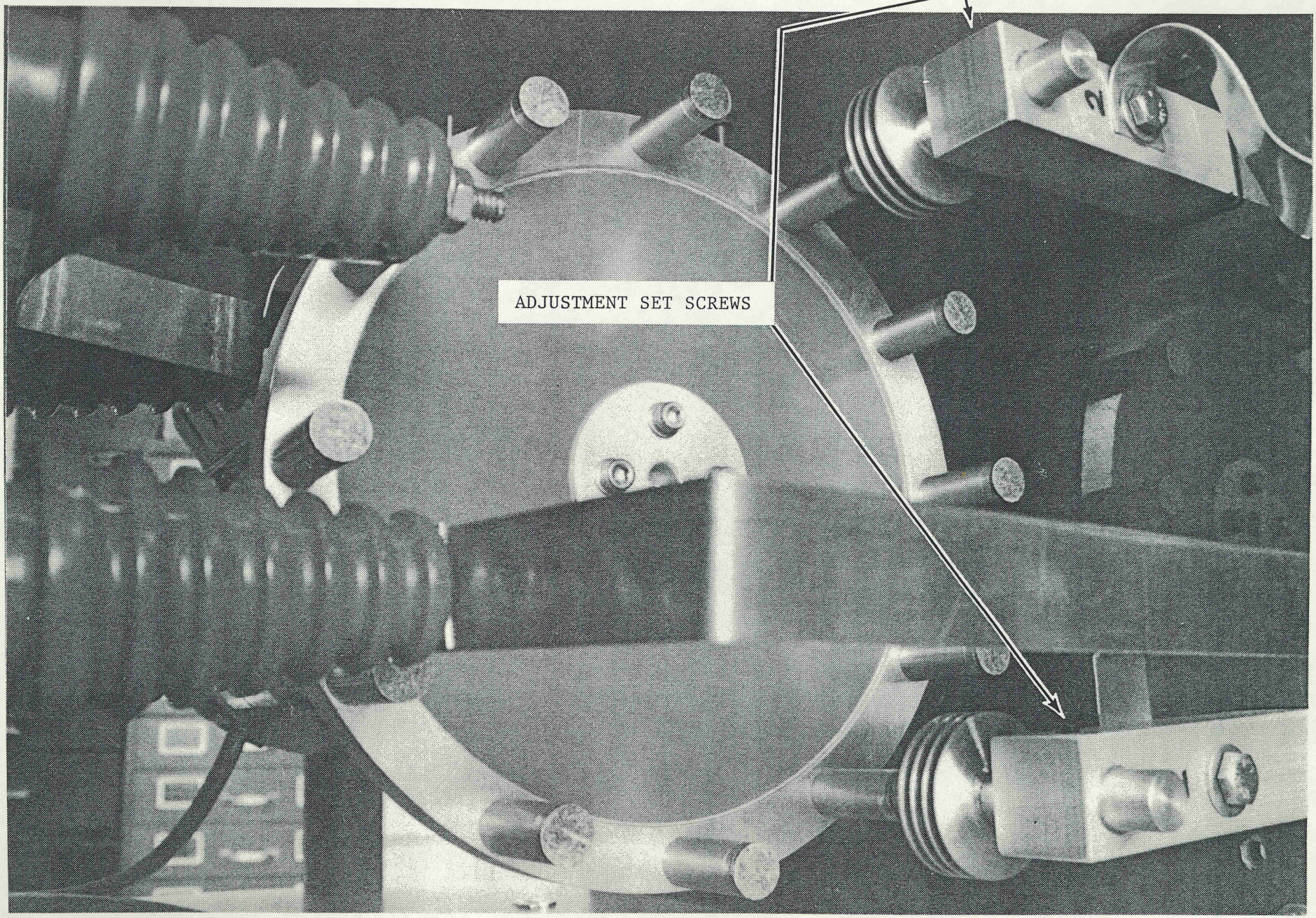
The only additional scheduled maintenance required for this system is a visual inspection of the interior area around the inspection plate, and the outside surfaces of the fiberglas tank, including the exterior wiring and connections. The outside areas should be visually inspected for mechanical flaws such as loose connetions or broken wires on a DAILY BASIS. This is necessary as this unit is being moved from a "raised" to a "fallen" position, many times each day. This visual inspection should also include checking the outside surfaces of the fiberglas tank, to insure that they are clean and dry. A heavy build-up of dust and debris and a wet surface will very likely cause a high voltage short to develop. The interior area inspection need only be during gap re-positioning. This area should be observed to be relatively clean and dry at all times.

The air supply line that provides pressurized dry air to the fiberglas tank must be checked on a regular basis. The regulator should be maintained at about 30 p.s.i., and the air supply must always be on. During periods of operation, concentrations of oxides of nitrogen and ozone are generated inside the Tesla Coil Tank assembly. These gases must be purged from the tank interior via the dry air supply. FAILURE to maintain the air supply to the tank assembly will significantly shorten the life expectancy of this system, and will void the manufacturer warranty.

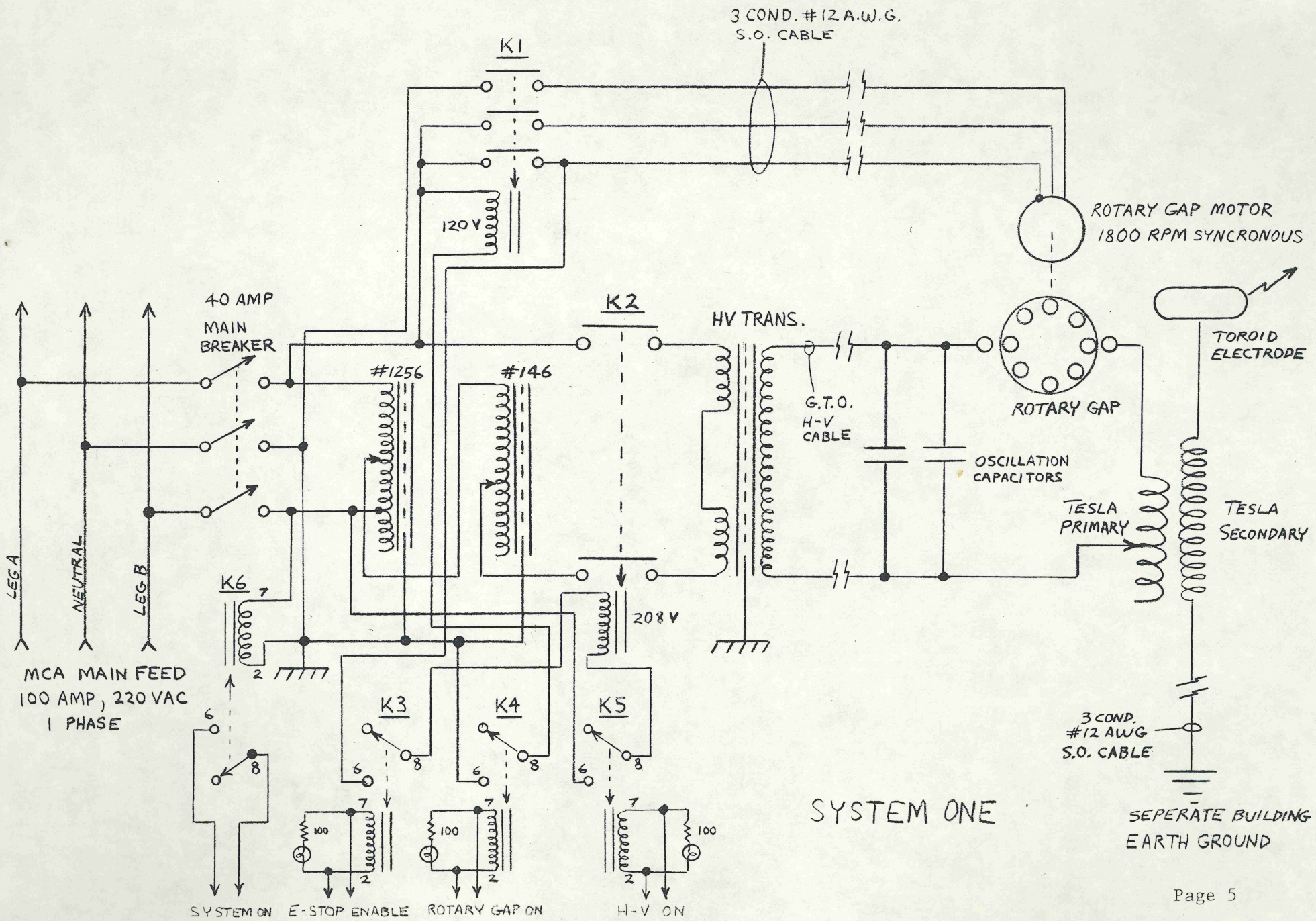
At the time of writing of this manual, no further maintenance adjustment is specified for System One.



CONTROL CONSOLE (FRONT VIEW)



SYSTEM ONE ROTARY GAP


3 COND. #12 A.W.G.
S.O. CABLE
K1
120 V
ROTARY GAP MOTOR
1800 RPM SYNCRONOUS
40 AMP
MAIN
BREAKER
K2
HV TRANS.
#1256
#146
G.T.O.
H-V
CABLE
ROTARY GAP
TOROID
ELECTRODE
OSCILLATION
CAPACITORS
TESLA
PRIMARY
TESLA
SECONDARY
LEG A
NEUTRAL
LEG B
K6
208 V
MCA MAIN FEED
100 AMP, 220 VAC
1 PHASE
K3
K4
K5
3 COND.
#12 AWG
S.O. CABLE
SEPERATE BUILDING
EARTH GROUND
SYSTEM ONE
SYSTEM ON
E-STOP ENABLE
ROTARY GAP ON
H-V ON

TESLA TECHNOLOGY RESEARCH

UNIVERSAL STUDIOS TOUR-EARTHQUAKE

ORLANDO, FLORIDA

TESLA COIL SYSTEM ONE

MAINTENANCE MANUAL

MANUFACTURED BY:

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I. 1. SYSTEM ONE TECHNICAL DESCRIPTION AND SPECIFICATIONS.

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The power requirement for System One is 220 V.A.C., single phase with a neutral leg (grounded.) Four 24 V.D.C. feeds are required to operate the system relay logic; K3 relay-emergency enable, K4 relay-rotary gap motor power on, K5 relay-high voltage on, and K6 relay-feedback signal indication of system main breaker switch energized. Relays K4 and K5 are sequentially latched in order to energize the system. K3 relay, the emergency stop relay, has override priority, and remains in a continuous ON state during normal conditions. This system requires a nominal current of 20 amps for full rated output. The Tesla Coil is designed to give a solid 24 inch long corona discharge as installed, yeilding a potential output of approximately 250,000 volts at a resonate frequency of 375 KHz.

2. SYSTEM ONE MAINTENANCE PROCEDURE.

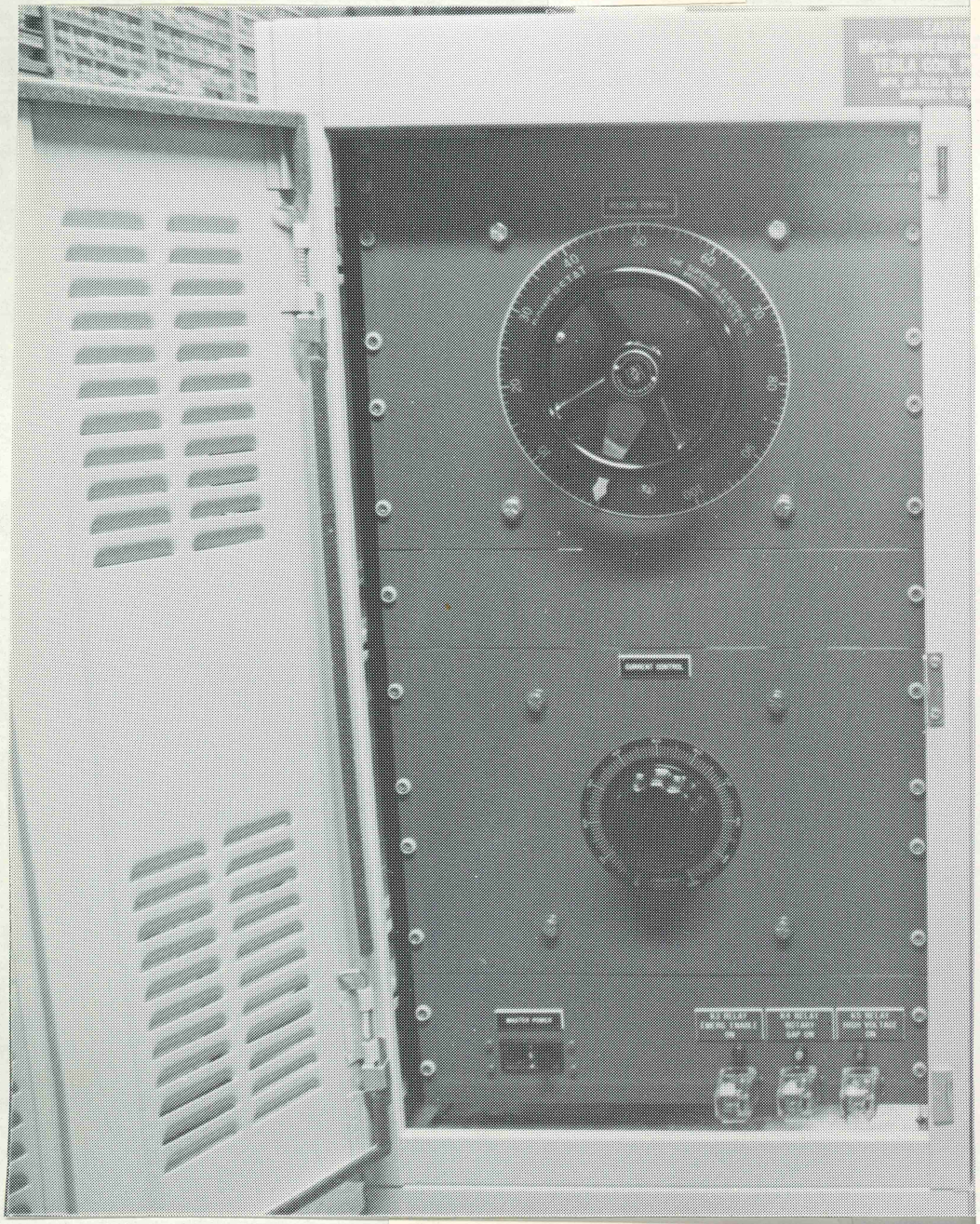
Periodic maintenance is required on the rotary spark gap assembly, which is located in the bottom portion of the pole-mounted fiberglas tank housing. Access to this area is provided by removal of a plexiglas inspection plate, using a 3/16 inch hex key wrench. The solid tungsten stationary electrodes should be rotated about their axis, approximately 20 degrees, initially on a once-per-month basis, or more frequently if required, to promote an even wear pattern on their faces. This also insures the longest life of these parts. Use a 3/32 inch hex key wrench to loosen the mounting of the stationary electrodes, rotate to the new position, and tighten the set screws. Care should be taken to maintain the same gap spacing on each gap. It is a good practice to first measure each gap with a feeler gauge, and reset to the same distance after rotation. The nominal setting should be held between 0.040 to 0.060 inch for each gap. Additional care should be taken not to over-tighten the set screws, to avoid galling these units.

The only additional scheduled maintenance required for this system is a visual inspection of the interior area around the inspection plate, and the outside surfaces of the fiberglas tank, including the exterior wiring and connections. The outside areas should be visually inspected for mechanical flaws such as loose connetions or broken wires on a DAILY BASIS. This is necessary as this unit is being moved from a "raised" to a "fallen" position, many times each day. This visual inspection should also include checking the outside surfaces of the fiberglas tank, to insure that they are clean and dry. A heavy build-up of dust and debris and a wet surface will very likely cause a high voltage short to develop. The interior area inspection need only be during gap re-positioning. This area should be observed to be relatively clean and dry at all times.

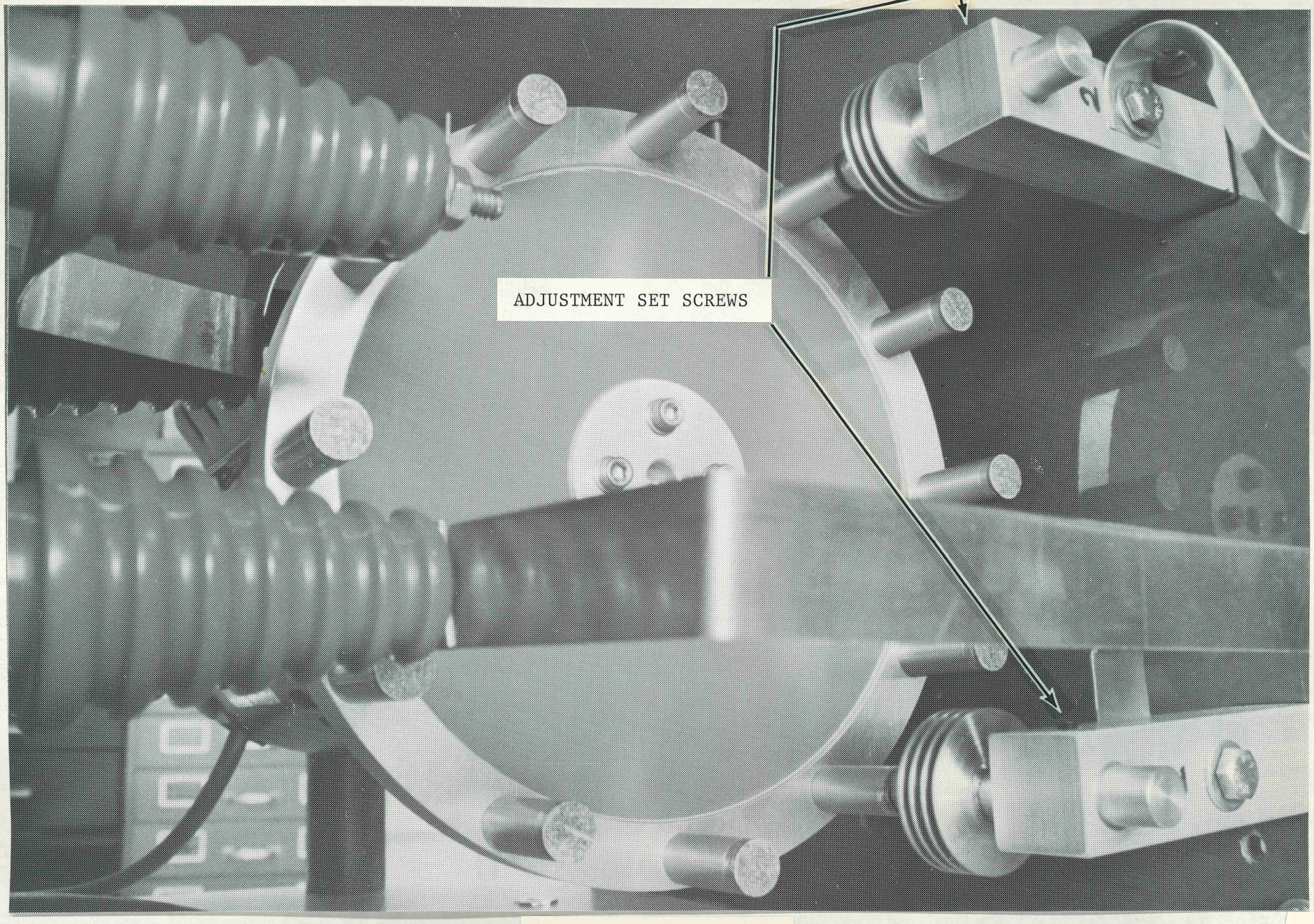
The air supply line that provides pressurized dry air to the fiberglas tank must be checked on a regular basis. The regulator should be maintained at about 30 p.s.i., and the air supply must always be on. During periods of operation, concentrations of oxides of nitrogen and ozone are generated inside the Tesla Coil Tank assembly. These gases must be purged from the tank interior via the dry air supply. FAILURE to maintain the air supply to the tank assembly will significantly shorten the life expectancy of this system, and will void the manufacturer warranty.

At the time of writing of this manual, no further maintenance adjustment is specified for System One.

SYSTEM ONE



CONTROL CONSOLE (FRONT VIEW)



SYSTEM ONE ROTARY GAP

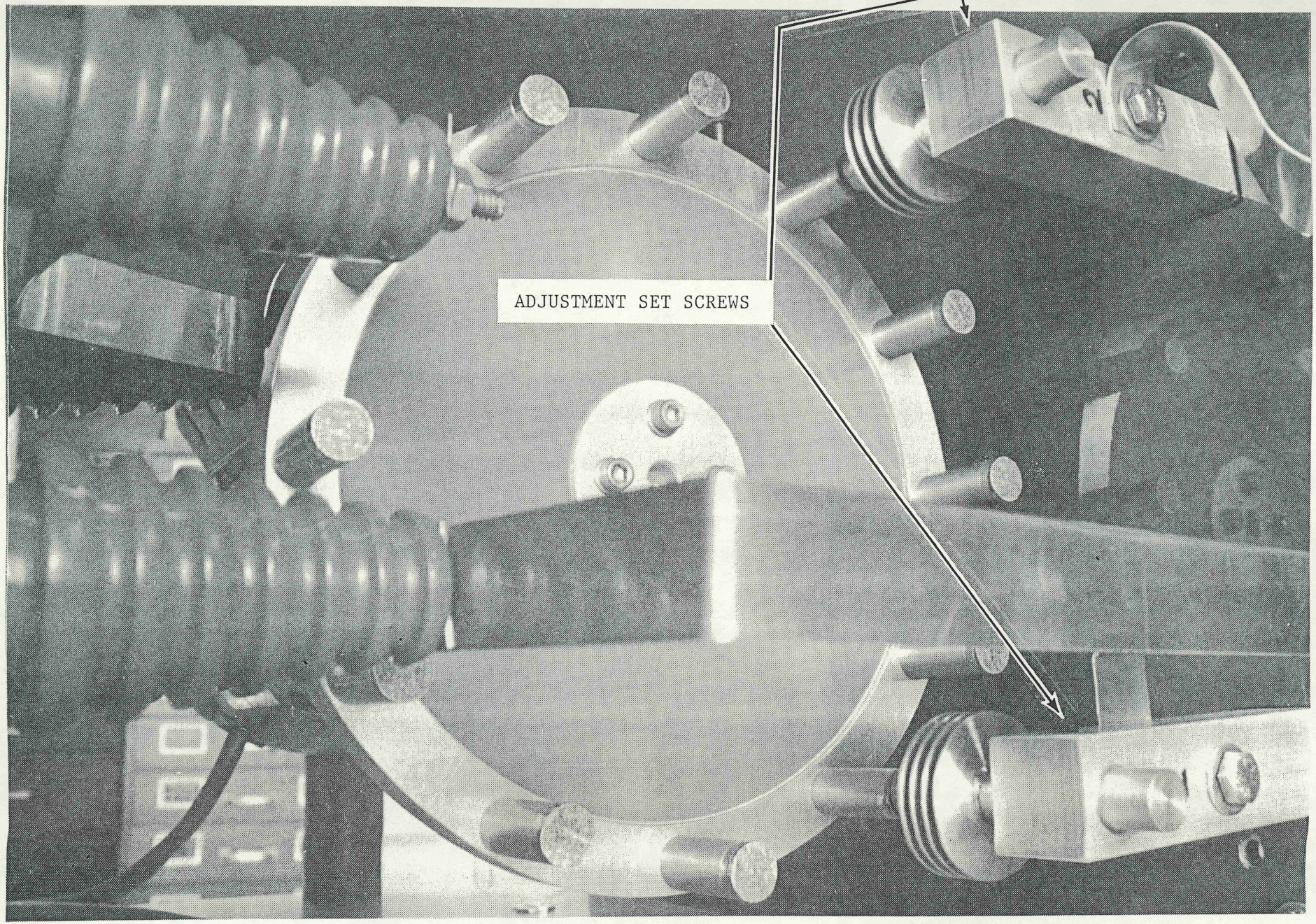
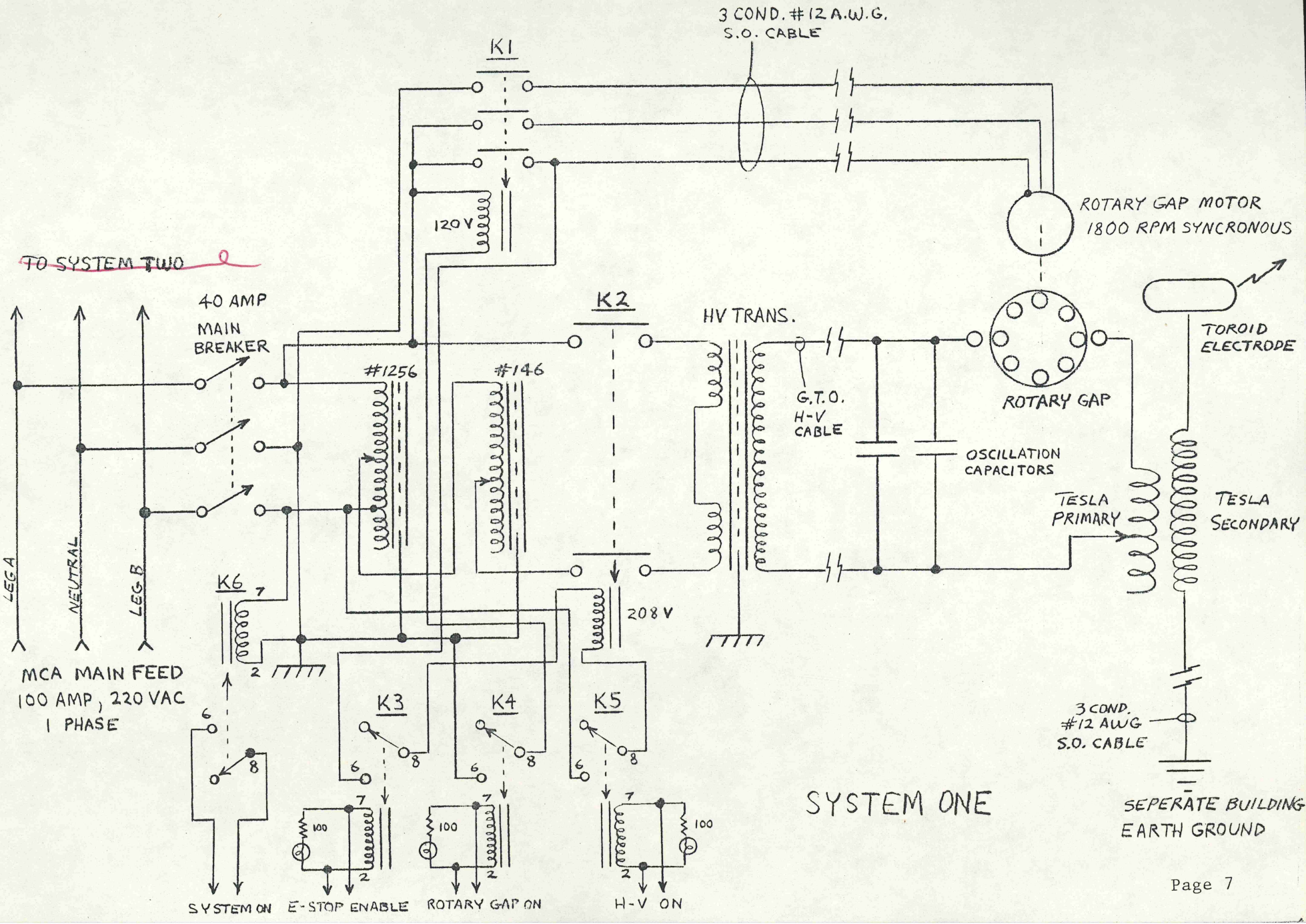

ADJUSTMENT SET SCREWS

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6. Illustration, Control Console Rack, rear view (panels removed). Page 4
7. Illustration, Rotary Gap Assembly, System One. Page 5
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3 COND. #12 A.W.G.
S.O. CABLE
K1
120 V
ROTARY GAP MOTOR
1800 RPM SYNCRONOUS
TO SYSTEM TWO
40 AMP
MAIN
BREAKER
K2
HV TRANS.
TOROID
ELECTRODE
#1256
#146
G.T.O.
H-V
CABLE
ROTARY GAP
OSCILLATION
CAPACITORS
TESLA
PRIMARY
TESLA
SECONDARY
LEG A
NEUTRAL
LEG B
K6
208 V
MCA MAIN FEED
100 AMP, 220 VAC
1 PHASE
K3
K4
K5
3 COND.
#12 AWG
S.O. CABLE
SEPERATE BUILDING
EARTH GROUND
SYSTEM ONE
100
SYSTEM ON
E-STOP ENABLE
ROTARY GAP ON
H-V ON

TESLA TECHNOLOGY RESEARCH

UNIVERSAL STUDIOS TOUR-EARTHQUAKE

~~UNIVERSAL CITY~~, ~~CALIFORNIA~~
ORLANDO, FLORIDA

TESLA COIL SYSTEMS ONE ~~AND TWO~~

MAINTENANCE MANUAL

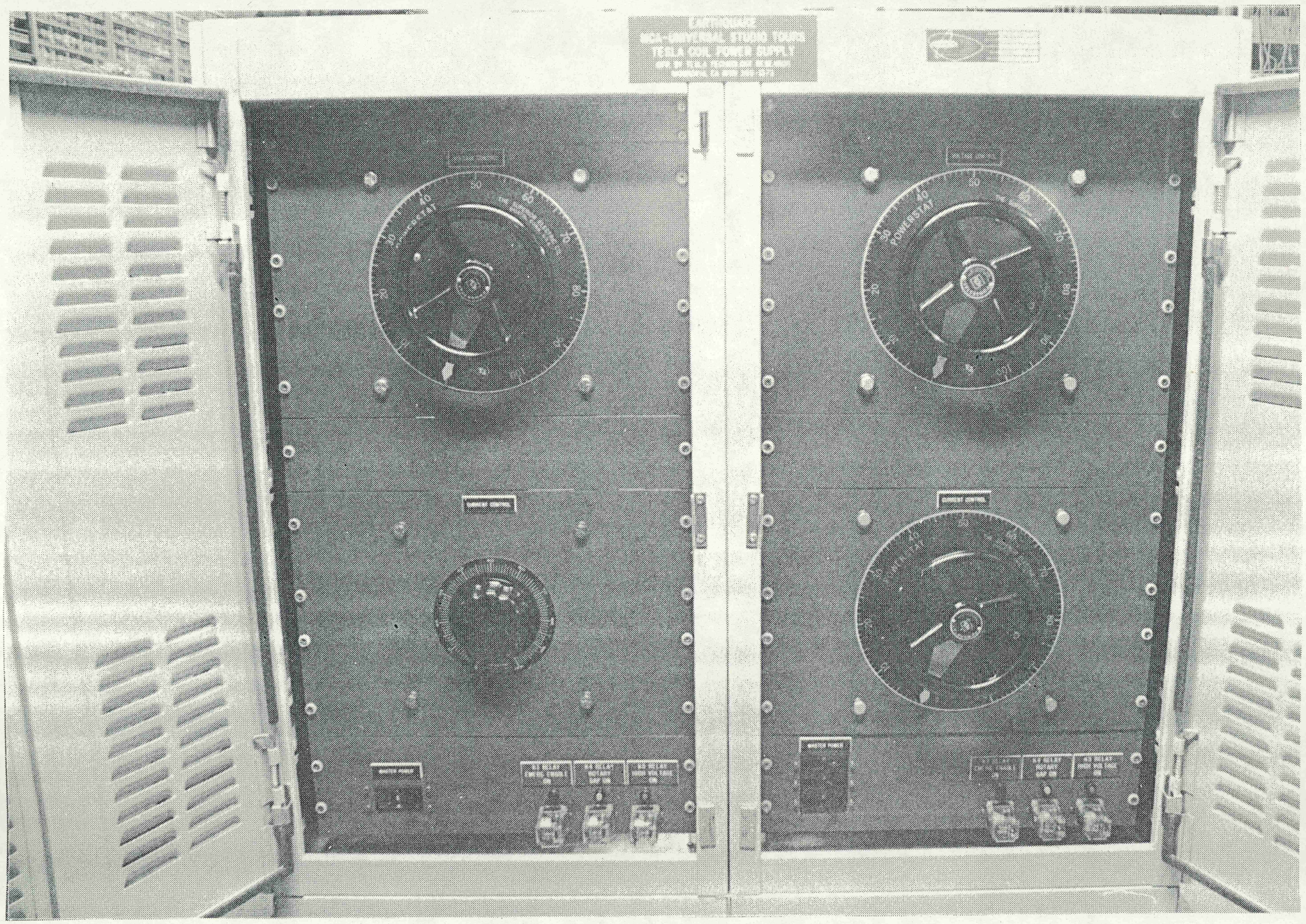
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SYSTEM ONE

SYSTEM TWO



CONTROL CONSOLE (FRONT VIEW)

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The power requirement for System One is 220 V.A.C., single phase with a neutral leg (grounded.) Four 24 V.D.C. feeds are required to operate the system relay logic; K3 relay-emergency enable, K4 relay-rotary gap motor power on, K5 relay-high voltage on, and K6 relay-feedback signal indication of system main breaker switch energized. Relays K4 and K5 are sequentially latched in order to energize the system. K3 relay, the emergency stop relay, has override priority, and remains in a continuous ON state during normal conditions. This system requires a nominal current of 20 amps for full rated output. The Tesla Coil is designed to give a solid 24 inch long corona discharge as installed, yeilding a potential output of approximately 250,000 volts at a resonate frequency of 375 KHz.

2. SYSTEM ONE MAINTENANCE PROCEDURE.

Periodic maintenance is required on the rotary spark gap assembly, which is located in the bottom portion of the pole-mounted fiberglas tank housing. Access to this area is provided by removal of a plexiglas inspection plate, using a 3/16 inch hex key wrench. The tungsten-faced stationary electrodes should be rotated about their axis, approximately 20 degrees, initially on a once-per-month basis, or more frequently if required, to promote an even wear pattern on the tungsten faces. This also insures the longest life of these parts. Use a 3/32 inch hex key wrench to loosen the mounting of the stationary electrodes, rotate to the new position, and tighten the set screws. Care should be taken to maintain the same gap spacing on each gap. It is a good practice to first measure each gap with a feeler gauge, and reset to the same distance after rotation. The nominal setting should be held between 0.040 to 0.060 inch for each gap. Additional care should be taken not to over-tighten the set screws, to avoid galling the brass rods. (Refer to pictorial illustration of System One rotary gap.)
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2. SYSTEM ONE MAINTENANCE PROCEDURE.

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The only additional scheduled maintenance required for this system is a visual inspection of the interior area around the inspection plate, and the outside surfaces of the fiberglas tank, including the exterior wiring and connections. The outside areas should be visually inspected for mechanical flaws such as loose connetions or broken wires on a DAILY BASIS. This is necessary as this unit is being moved from a "raised" to a "fallen" position, many times each day. This visual inspection should also include checking the outside surfaces of the fiberglas tank, to insure that they are clean and dry. A heavy build-up of dust and debris and a wet surface will very likely cause a high voltage short to develop. The interior area inspection need only be during gap re-positioning. This area should be observed to be relatively clean and dry at all times.

UNIVERSAL STUDIOS TOUR-EARTHQUAKE

ORLANDO, FLORIDA

TESLA COIL SYSTEM ONE

MAINTENANCE MANUAL

MANUFACTURED BY: TESLA TECHNOLOGY RESEARCH
2527 Treelane Ave., Monrovia, Ca. 91016
(818) 359-1373

WARNING:

THE ELECTRICAL CURRENT IN THE MACHINERY OF THIS INSTALLATION CARRIES A LETHAL ELECTRIC SHOCK HAZARD; DO NOT ATTEMPT ANY ADJUSTMENT OR MAINTENANCE TO THIS SYSTEM UNTIL ALL POWER IS COMPLETELY SHUT OFF AND LOCKED OUT. ALL WORK MUST BE PERFORMED ONLY BY QUALIFIED TECHNICAL PERSONNEL. READ THIS MANUAL COMPLETELY BEFORE ATTEMPTING ANY ADJUSTMENT TO THIS EQUIPMENT. SPARE PARTS AND ADDITIONAL TECHNICAL ASSISTANCE IS AVAILABLE THROUGH THE ABOVE ADDRESS.

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3. Schematic diagram, System One. Page 5

II. 1. SYSTEM TWO TECHNICAL DESCRIPTION AND SPECIFICATIONS.

System Two consists of a rack cabinet-enclosed power supply section (see illustrations of power supply console) and an enclosed Tesla Coil assembly, configured to the inside space of a fiberglas tank, which is positioned as a free standing upright unit. The power supply major operating components for this system are; voltage control autotransformer, current control autotransformer, high voltage step-up power transformer, power and control relays. The Tesla Coil major operating components are; motor-driven rotary spark gap assembly, oscillation capacitors, Tesla primary and secondary coils, and a 30 inch diameter toroid discharge electrode.

The power requirement for System Two is 220 V.A.C., single phase with a neutral leg (grounded.) Four 24 V.D.C. feeds are required to operate the system relay logic; K3, K4, K5, and K6. The designation and function of these relays are IDENTICAL to those of System One, except that separate control signals are required for each system. As in System One, K6 relay is a 24 volt D.C. voltage feedback loop, to indicate that System Two's main power breaker switch is energized. This system requires a nominal current of 30 amps for full rated output. The Tesla Coil of System Two is designed to give a solid 60 inch long corona discharge as installed, yeilding a potential output of approximately 1,000,000 volts at a resonate frequency of 120 Khz. The voltage and current controls have been preset and do not require any further adjustment. The settings of these controls are noted on the control panel dial plates.

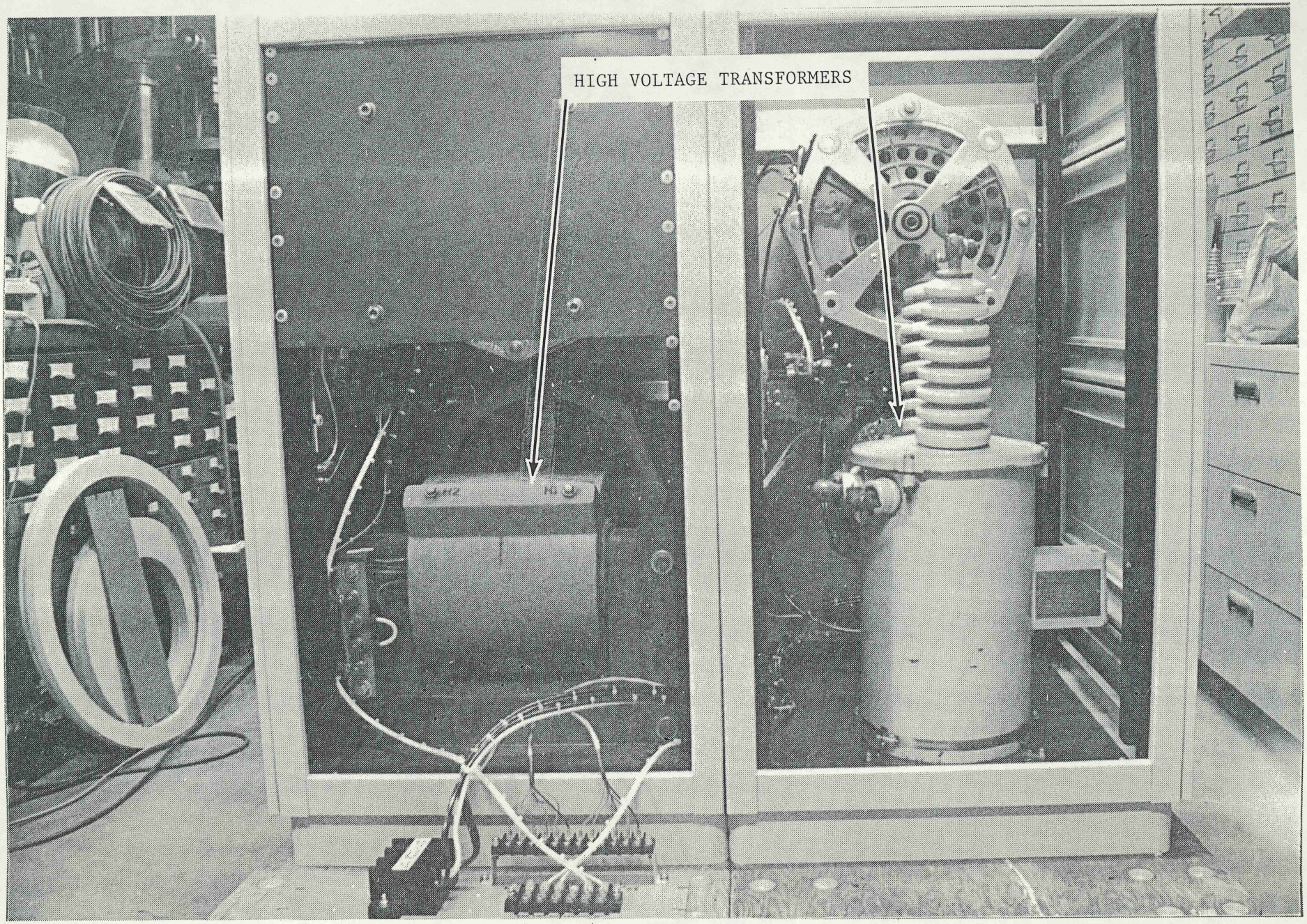
2. SYSTEM TWO MAINTENANCE PROCEDURE.

The periodic maintenance required for this system is essentially the same as outlined for System One, except as follows; On the fiberglas tank exterior, weekly visual inspection of the top cover plate, to insure that this surface is clean and dry. Since this unit is stationary and does not move, no inspection of the cabling connected at the base of the tank is required, except a visual inspection of the connectors (performed during regular schedualed rotary gap adjustment operations.)

At the time of writing of this manual, no further maintenance adjustment is specified for either System One or Two.

SYSTEM TWO

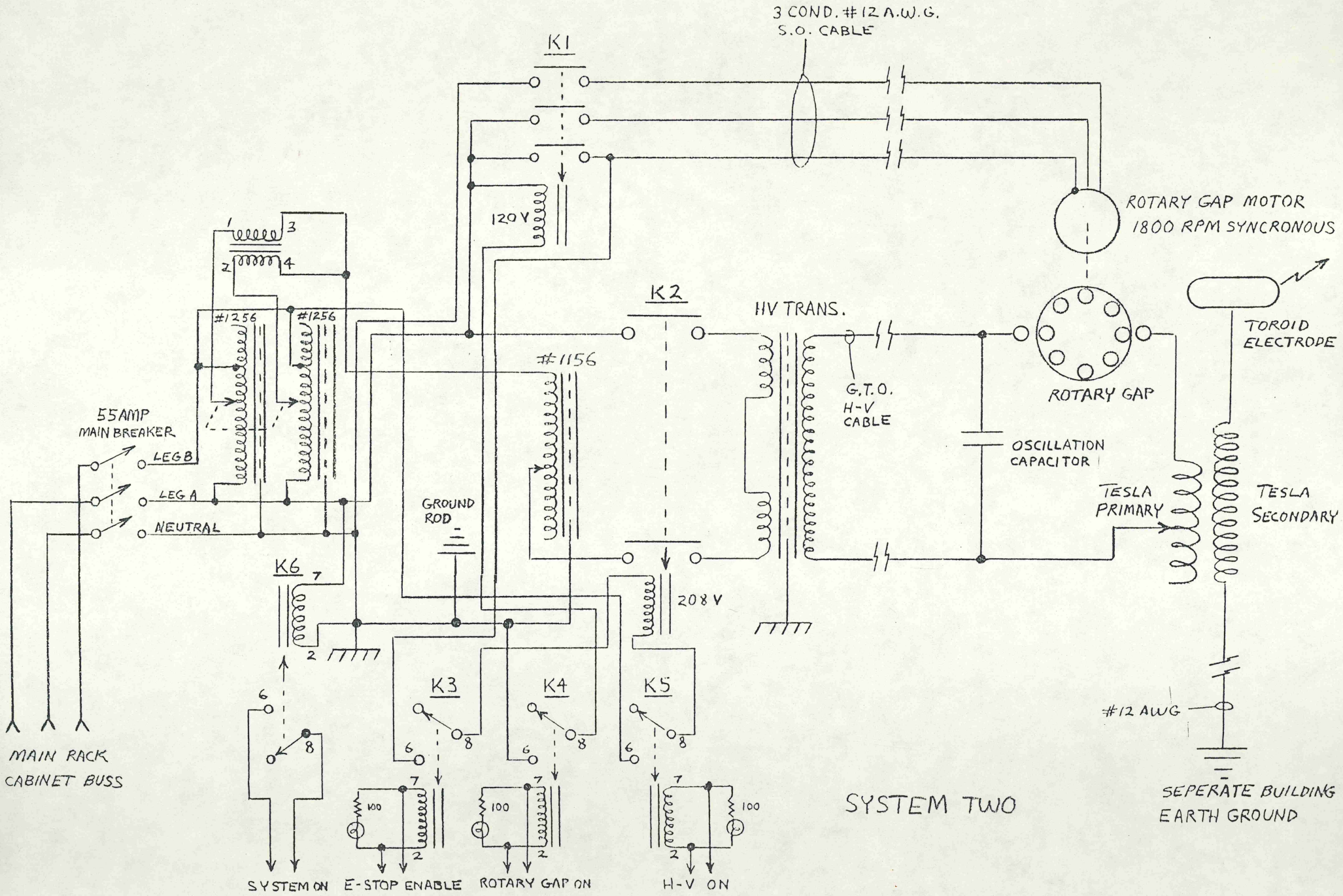
SYSTEM ONE



CONTROL CONSOLE (REAR VIEW)



SYSTEM TWO ROTARY GAP


3 COND. #12 A.W.G.
S.O. CABLE
K1
120 V
ROTARY GAP MOTOR
1800 RPM SYNCRONOUS
K2
HV TRANS.
#1256
#1256
#1156
G.T.O.
H-V
CABLE
ROTARY GAP
TOROID
ELECTRODE
OSCILLATION
CAPACITOR
TESLA
PRIMARY
TESLA
SECONDARY
55AMP
MAIN BREAKER
LEG B
LEG A
NEUTRAL
GROUND
ROD
K6
208 V
#12 AWG
MAIN RACK
CABINET BUSS
K3
K4
K5
100
100
100
SYSTEM ON
E-STOP ENABLE
ROTARY GAP ON
H-V ON
SEPERATE BUILDING
EARTH GROUND
SYSTEM TWO

TESLA TECHNOLOGY RESEARCH

UNIVERSAL STUDIOS TOUR-EARTHQUAKE

UNIVERSAL CITY, CALIFORNIA

TESLA COIL SYSTEMS ONE AND TWO

MAINTENANCE MANUAL

MANUFACTURED BY: TESLA TECHNOLOGY RESEARCH
2527 Treelane Ave., Monrovia, Ca. 91016
(818) 359-1373

WARNING:

THE ELECTRICAL CURRENT IN THE MACHINERY OF THIS INSTALLATION CARRIES A LETHAL ELECTRIC SHOCK HAZARD; DO NOT ATTEMPT ANY ADJUSTMENT OR MAINTENANCE TO THESE SYSTEMS UNTIL ALL POWER IS COMPLETELY SHUT OFF AND LOCKED OUT. ALL WORK MUST BE PERFORMED ONLY BY QUALIFIED TECHNICAL PERSONNEL. READ THIS MANUAL COMPLETELY BEFORE ATTEMPTING ANY ADJUSTMENT TO THIS EQUIPMENT. SPARE PARTS AND ADDITIONAL TECHNICAL ASSISTANCE IS AVAILABLE THROUGH THE ABOVE ADDRESS.

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I. 1. SYSTEM ONE TECHNICAL DESCRIPTION AND SPECIFICATIONS.

System One consists of a rack cabinet-enclosed power supply section (see illustrations of power supply console) and an enclosed Tesla Coil assembly, configured to the inside space of a fiberglas tank, mounted on a fiberglas facsimile of a typical utility power pole. The power supply major operating components are; voltage control autotransformer, current control autotransformer, high voltage step-up power transformer, power and control relays. The Tesla Coil major operating components are; motor-driven rotary spark gap assembly, oscillation capacitors, Tesla primary and secondary coils, and a 20 inch diameter toroid discharge electrode. The voltage and current controls have been preset, and do not require any adjustment. The settings are noted on the control dial plates.

The power requirement for System One is 220 V.A.C., single phase with a neutral leg (grounded.) Four 24 V.D.C. feeds are required to operate the system relay logic; K3 relay-emergency enable, K4 relay-rotary gap motor power on, K5 relay-high voltage on, and K6 relay-feedback signal indication of system main breaker switch energized. Relays K4 and K5 are sequentially latched in order to energize the system. K3 relay, the emergency stop relay, has override priority, and remains in a continuous ON state during normal conditions. This system requires a nominal current of 20 amps for full rated output. The Tesla Coil is designed to give a solid 24 inch long corona discharge as installed, yeilding a potential output of approximately 250,000 volts at a resonate frequency of 375 KHz.

2. SYSTEM ONE MAINTENANCE PROCEDURE.

Periodic maintenance is required on the rotary spark gap assembly, which is located in the bottom portion of the pole-mounted fiberglas tank housing. Access to this area is provided by removal of a plexiglas inspection plate, using a 3/16 inch hex key wrench. The tungsten-faced stationary electrodes should be rotated about their axis, approximately 20 degrees, initially on a once-per-month basis, or more frequently if required, to promote an even wear pattern on the tungsten faces. This also insures the longest life of these parts. Use a 3/32 inch hex key wrench to loosen the mounting of the stationary electrodes, rotate to the new position, and tighten the set screws. Care should be taken to maintain the same gap spacing on each gap. It is a good practice to first measure each gap with a feeler gauge, and reset to the same distance after rotation. The nominal setting should be held between 0.040 to 0.060 inch for each gap. Additional care should be taken not to over-tighten the set screws, to avoid galling the brass rods. (Refer to pictorial illustration of System One rotary gap.)
The only additional scheduled maintenance required for this system is a visual inspection of the interior area around the inspection plate, and the outside surfaces of the fiberglas tank, including the exterior wiring and connections. The outside areas should be visually inspected for mechanical flaws such as loose connetions or broken wires on a DAILY BASIS. This is necessary as this unit is being moved from a "raised" to a "fallen" position, many times each day. This visual inspection should also include checking the outside surfaces of the fiberglas tank, to insure that they are clean and dry. A heavy build-up of dust and debris and a wet surface will very likely cause a high voltage short to develop. The interior area inspection need only be during gap re-positioning. This area should be observed to be relatively clean and dry at all times.

II. 1. SYSTEM TWO TECHNICAL DESCRIPTION AND SPECIFICATIONS.

System Two consists of a rack cabinet-enclosed power supply section (see illustrations of power supply console) and an enclosed Tesla Coil assembly, configured to the inside space of a fiberglas tank, which is positioned as a free standing upright unit. The power supply major operating components for this system are; voltage control autotransformer, current control autotransformer, high voltage step-up power transformer, power and control relays. The Tesla Coil major operating components are; motor-driven rotary spark gap assembly, oscillation capacitors, Tesla primary and secondary coils, and a 30 inch diameter toroid discharge electrode.

The power requirement for System Two is 220 V.A.C., single phase with a neutral leg (grounded.) Four 24 V.D.C. feeds are required to operate the system relay logic; K3, K4, K5, and K6. The designation and function of these relays are IDENTICAL to those of System One, except that separate control signals are required for each system. As in System One, K6 relay is a 24 volt D.C. voltage feedback loop, to indicate that System Two's main power breaker switch is energized. This system requires a nominal current of 30 amps for full rated output. The Tesla Coil of System Two is designed to give a solid 60 inch long corona discharge as installed, yeilding a potential output of approximately 1,000,000 volts at a resonate frequency of 120 Khz. The voltage and current controls have been preset and do not require any further adjustment. The settings of these controls are noted on the control panel dial plates.

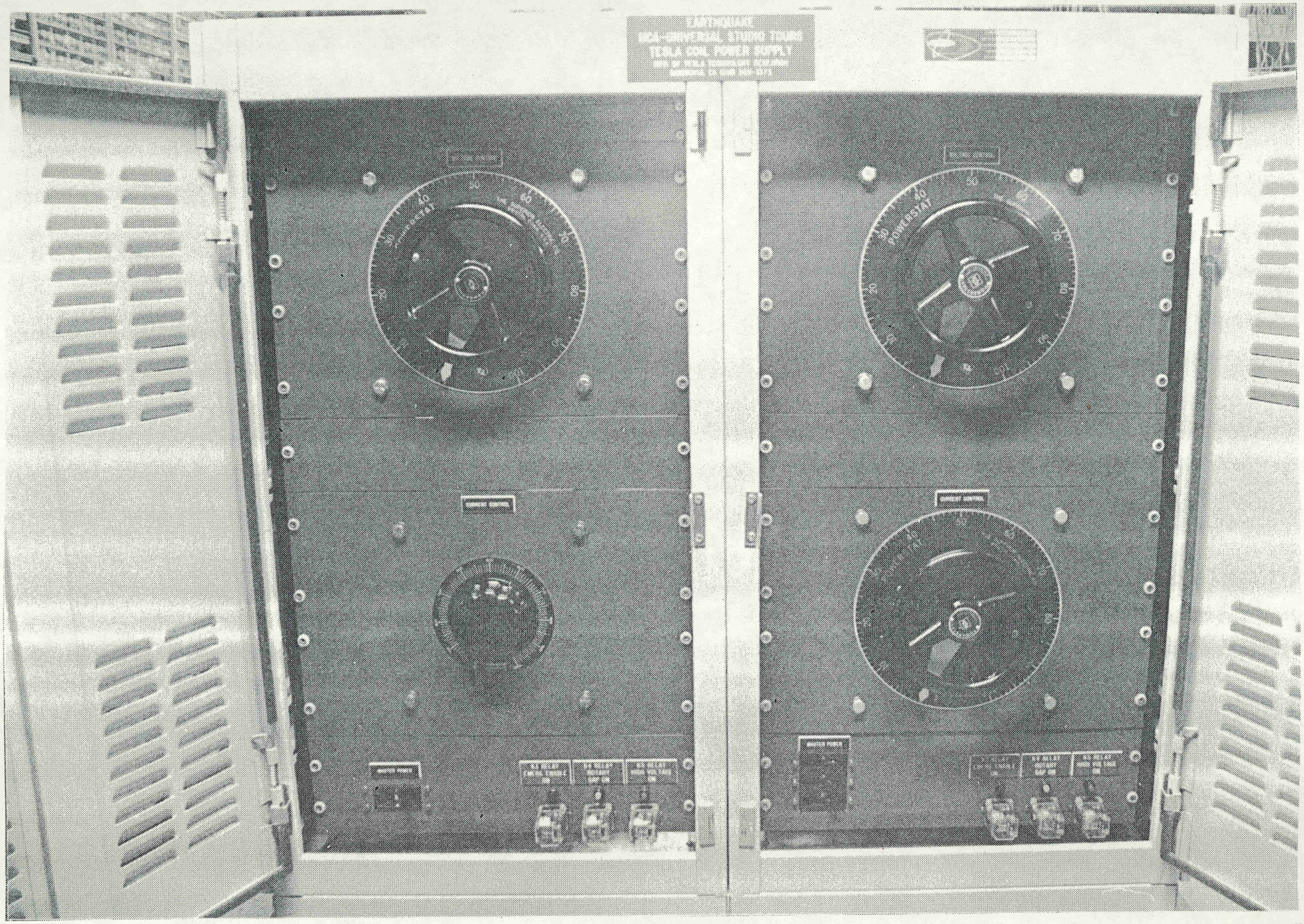
2. SYSTEM TWO MAINTENANCE PROCEDURE.

The periodic maintenance required for this system is essentially the same as outlined for System One, except as follows; On the fiberglas tank exterior, weekly visual inspection of the top cover plate, to insure that this surface is clean and dry. Since this unit is stationary and does not move, no inspection of the cabling connected at the base of the tank is required, except a visual inspection of the connectors (performed during regular schedualed rotary gap adjustment operations.)

At the time of writing of this manual, no further maintenance adjustment is specified for either System One or Two.

SYSTEM ONE

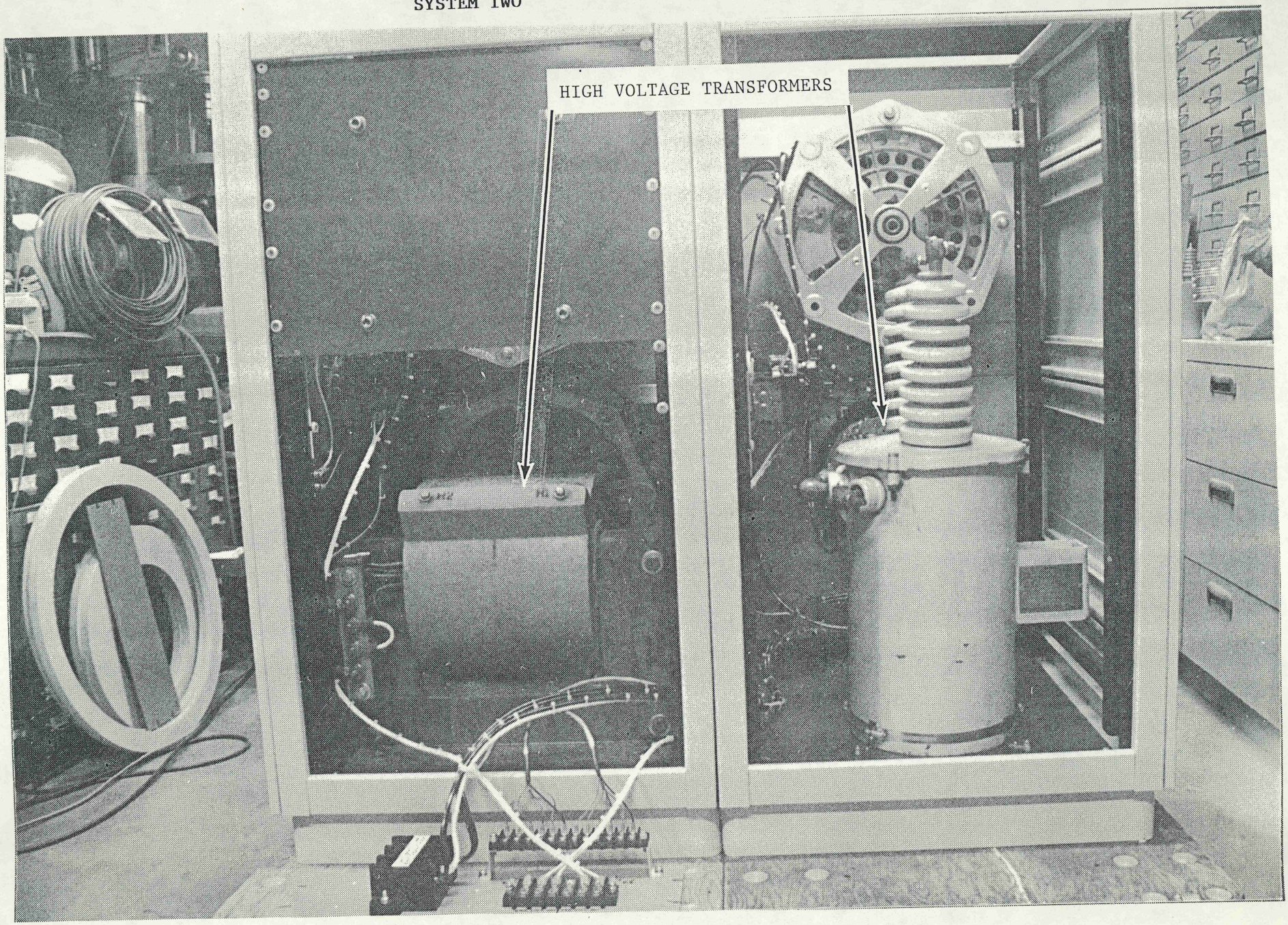
SYSTEM TWO



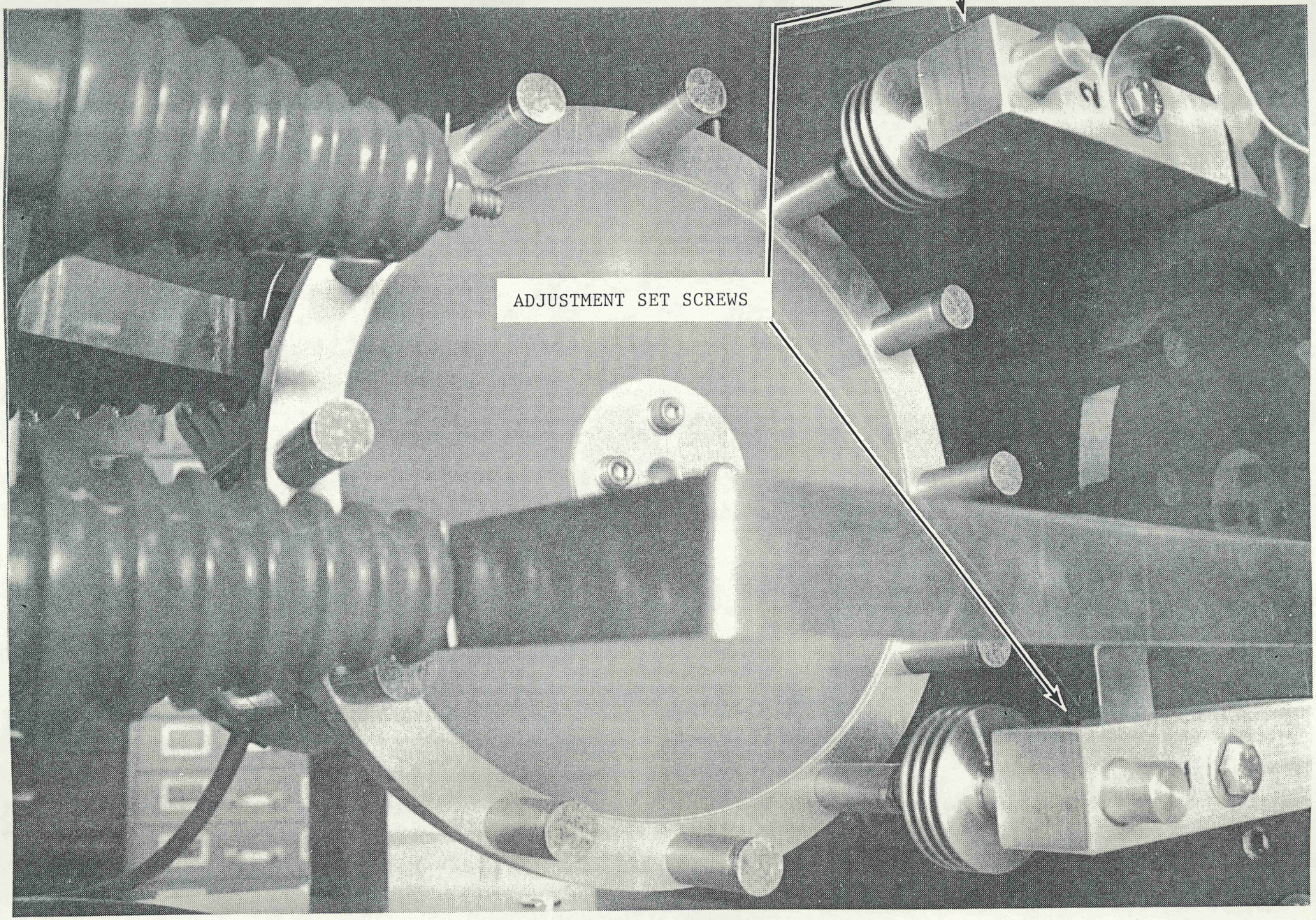
CONTROL CONSOLE (FRONT VIEW)

SYSTEM TWO

SYSTEM ONE



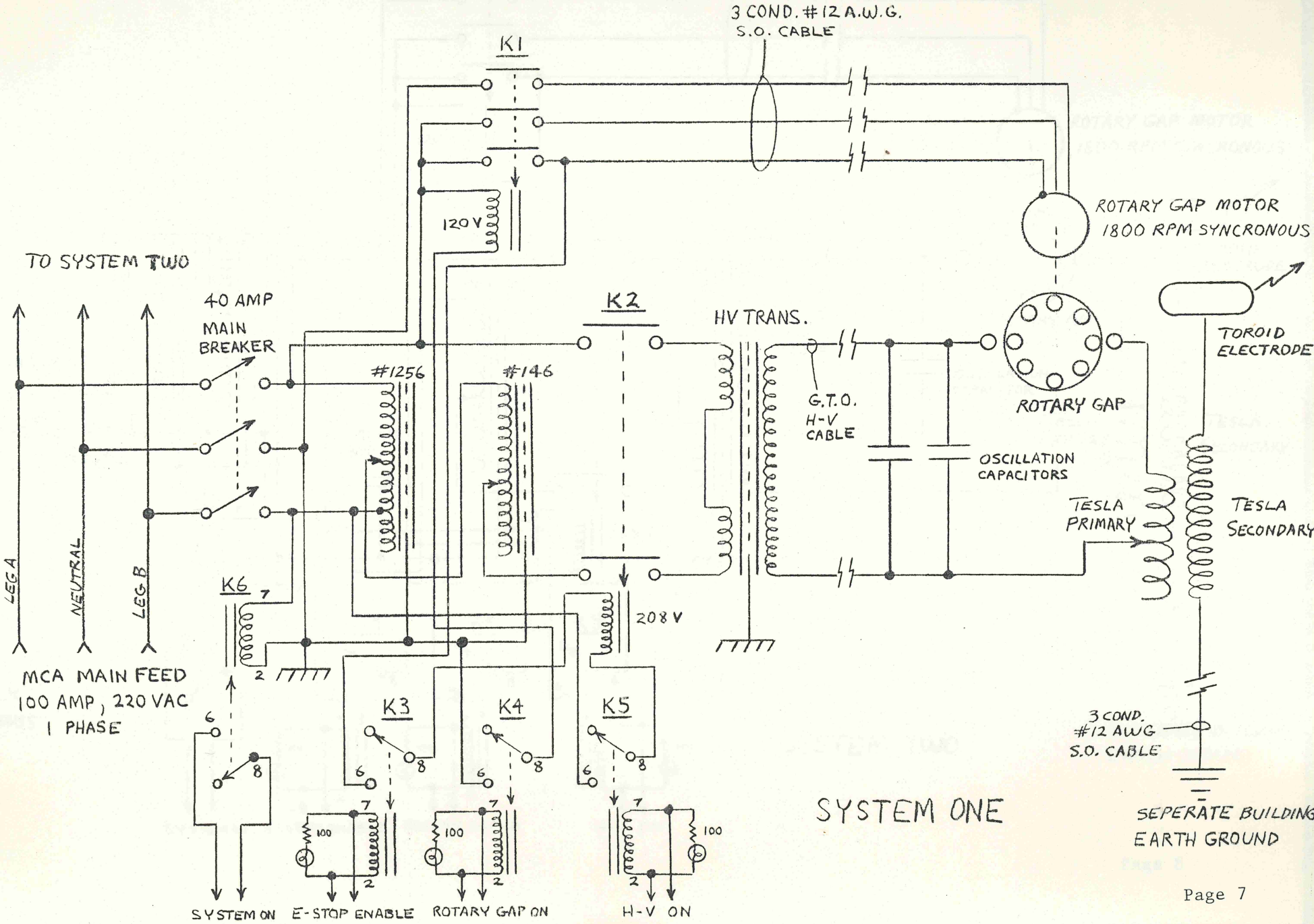
CONTROL CONSOLE (REAR VIEW)

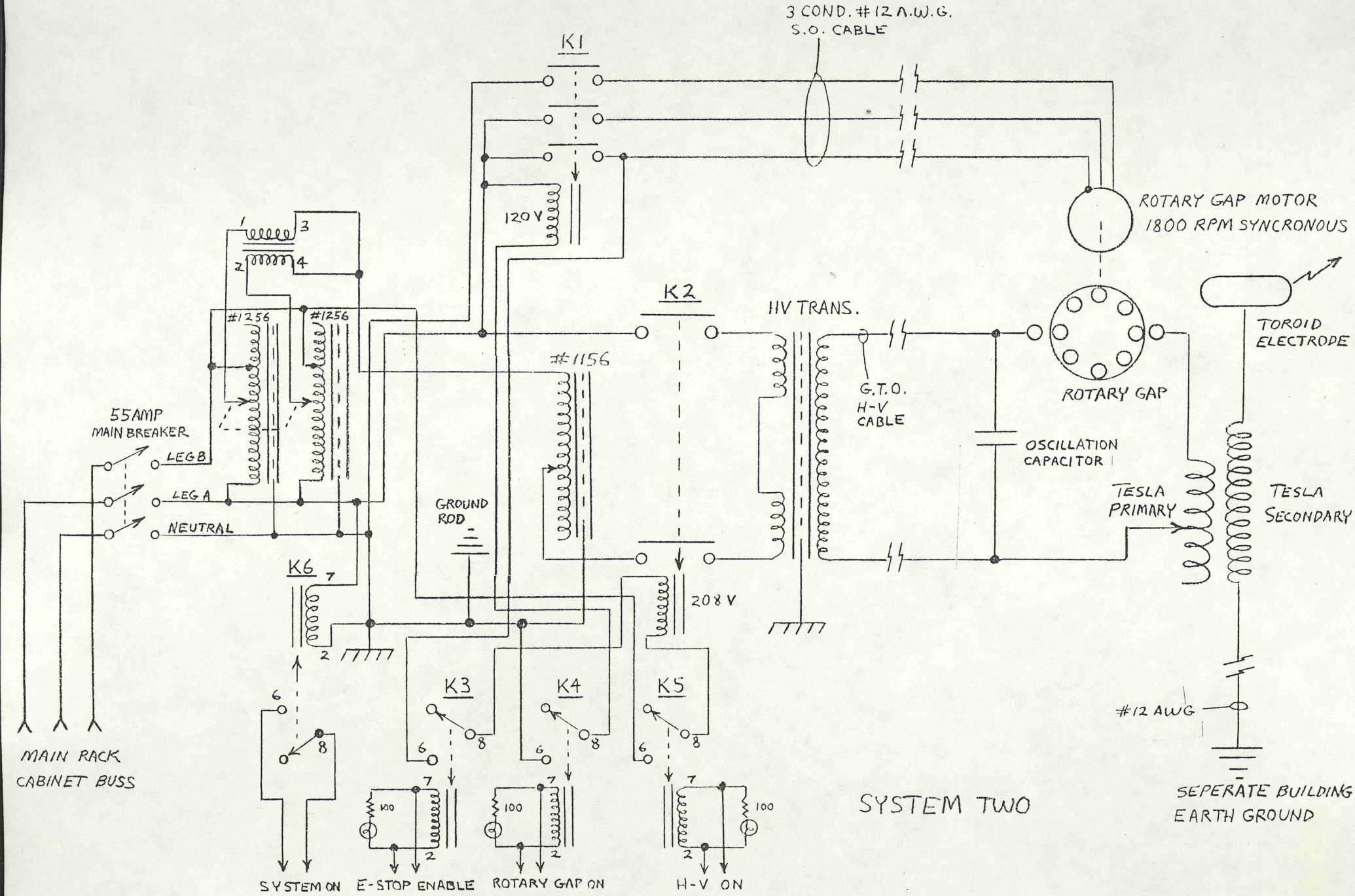


SYSTEM ONE ROTARY GAP



SYSTEM TWO ROTARY GAP


3 COND. #12 A.W.G.
S.O. CABLE
K1
120 V
ROTARY GAP MOTOR
1800 RPM SYNCRONOUS
TO SYSTEM TWO
40 AMP
MAIN
BREAKER
K2
HV TRANS.
#1256
#146
G.T.O.
H-V
CABLE
ROTARY GAP
TOROID
ELECTRODE
OSCILLATION
CAPACITORS
TESLA
PRIMARY
TESLA
SECONDARY
LEG A
NEUTRAL
LEG B
K6
208 V
MCA MAIN FEED
100 AMP, 220 VAC
1 PHASE
K3
K4
K5
3 COND.
#12 AWG
S.O. CABLE
SEPERATE BUILDING
EARTH GROUND
SYSTEM ONE
SYSTEM ON
E-STOP ENABLE
ROTARY GAP ON
H-V ON


3 COND. #12 A.W.G.
S.O. CABLE
K1
120 V
ROTARY GAP MOTOR
1800 RPM SYNCRONOUS
K2
HV TRANS.
#1256
#1256
#1156
G.T.O.
H-V
CABLE
ROTARY GAP
TOROID
ELECTRODE
OSCILLATION
CAPACITOR
TESLA
PRIMARY
TESLA
SECONDARY
55AMP
MAIN BREAKER
LEG B
LEG A
NEUTRAL
GROUND
ROD
K6
208 V
#12 AWG
K3
K4
K5
MAIN RACK
CABINET BUSS
SYSTEM ON
E-STOP ENABLE
ROTARY GAP ON
H-V ON
SEPERATE BUILDING
EARTH GROUND
SYSTEM TWO

II. 1. SYSTEM TWO TECHNICAL DESCRIPTION AND SPECIFICATIONS.

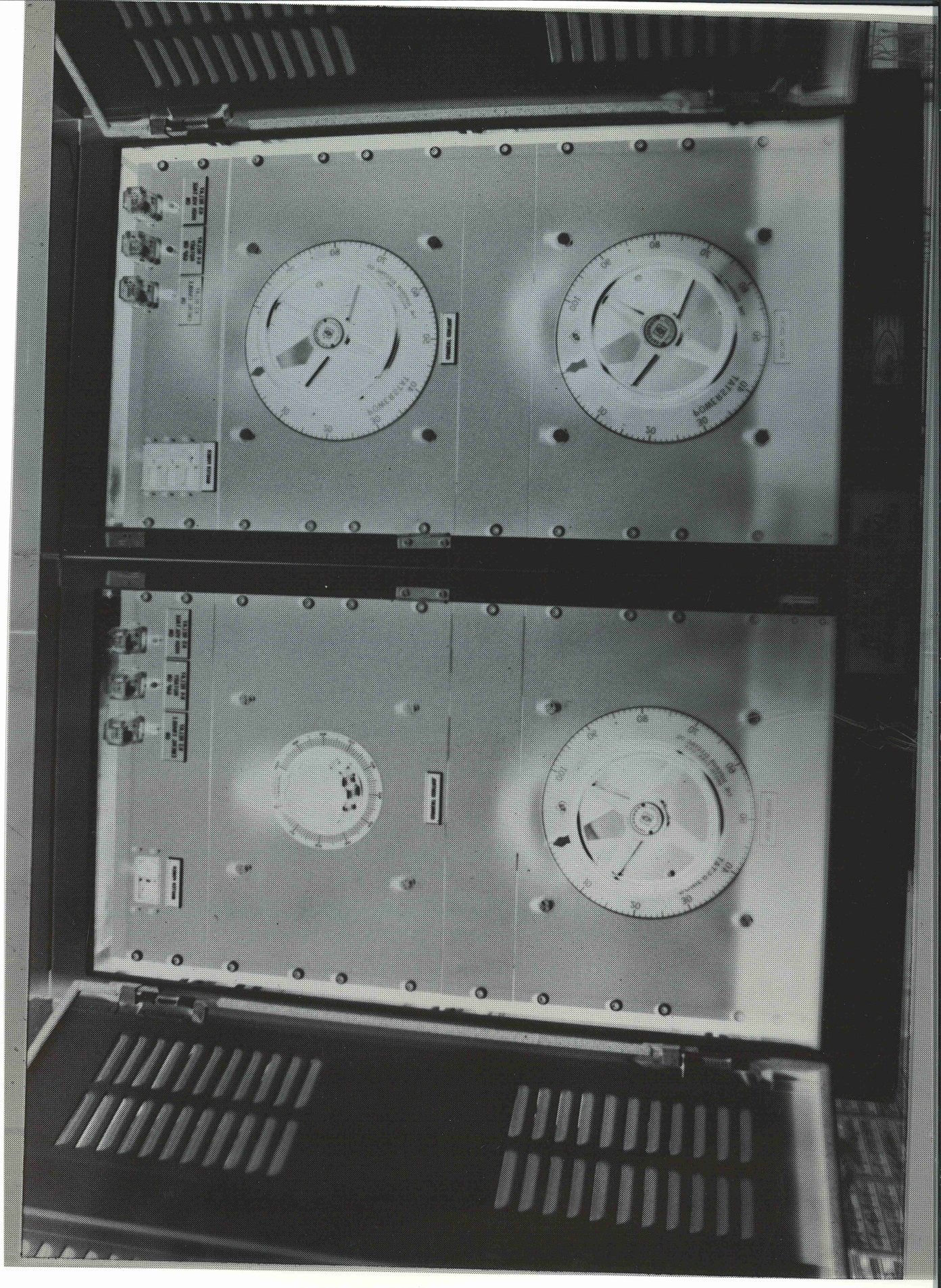
System Two consists of a rack cabinet-enclosed power supply section (see illustrations of power supply console) and an enclosed Tesla Coil assembly, configured to the inside space of a fiberglas tank, which is positioned as a free standing upright unit. The power supply major operating components for this system are; voltage control autotransformer, current control autotransformer, high voltage step-up power transformer, power and control relays. The Tesla Coil major operating components are; motor-driven rotary spark gap assembly, oscillation capacitors, Tesla primary and secondary coils, and a 30 inch diameter toroid discharge electrode.

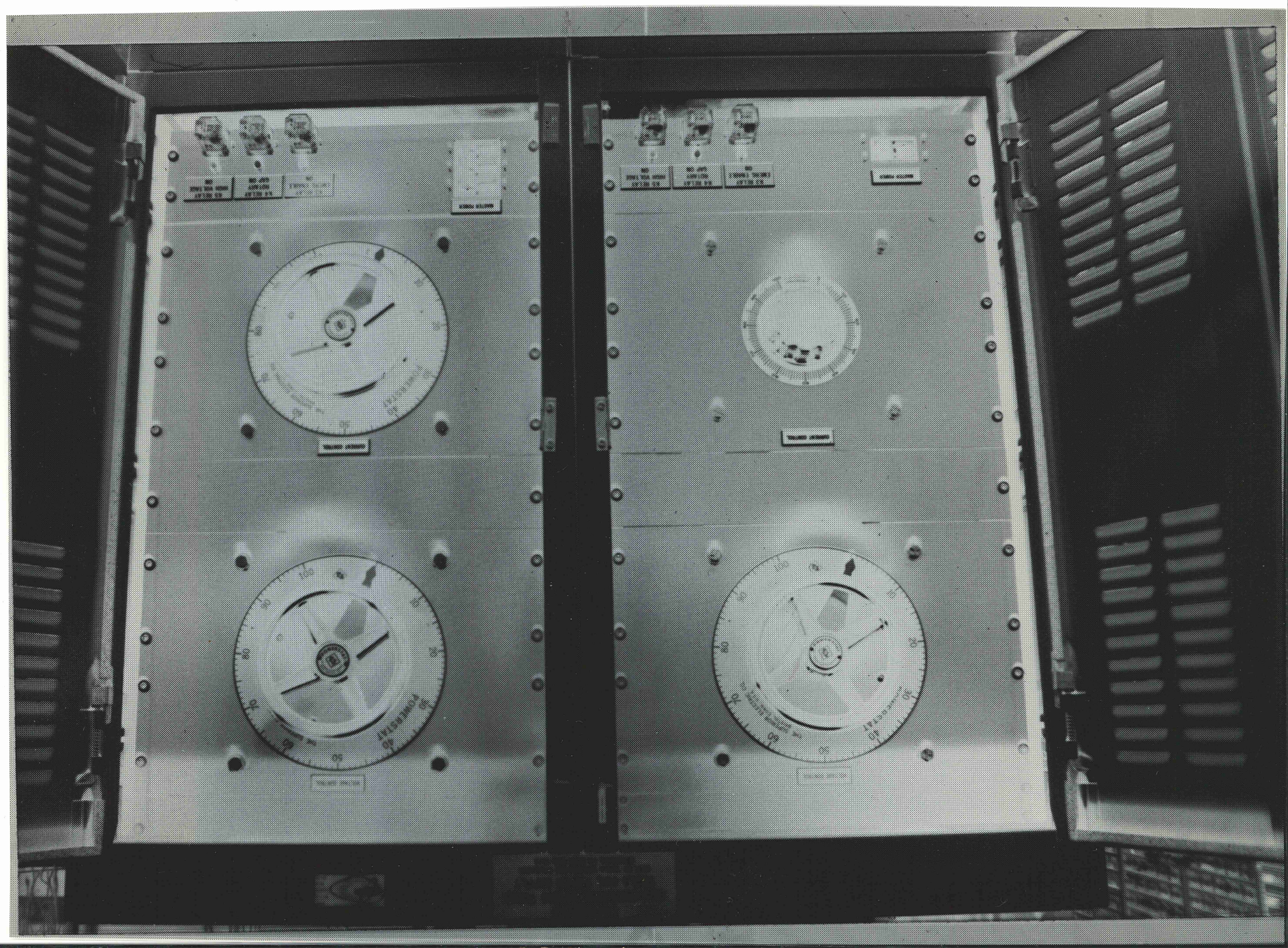
The power requirement for System Two is 220 V.A.C., single phase with a neutral leg (grounded.) Four 24 V.D.C. feeds are required to operate the system relay logic; K3, K4, K5, and K6. The designation and function of these relays are IDENTICAL to those of System One, except that separate control signals are required for each system. As in System One, K6 relay is a 24 volt D.C. voltage feedback loop, to indicate that System Two's main power breaker switch is energized. This system requires a nominal current of 30 amps for full rated output. The Tesla Coil of System Two is designed to give a solid 60 inch long corona discharge as installed, yeilding a potential output of approximately 1,000,000 volts at a resonate frequency of 120 Khz. The voltage and current controls have been preset and do not require any further adjustment. The settings of these controls are noted on the control panel dial plates.

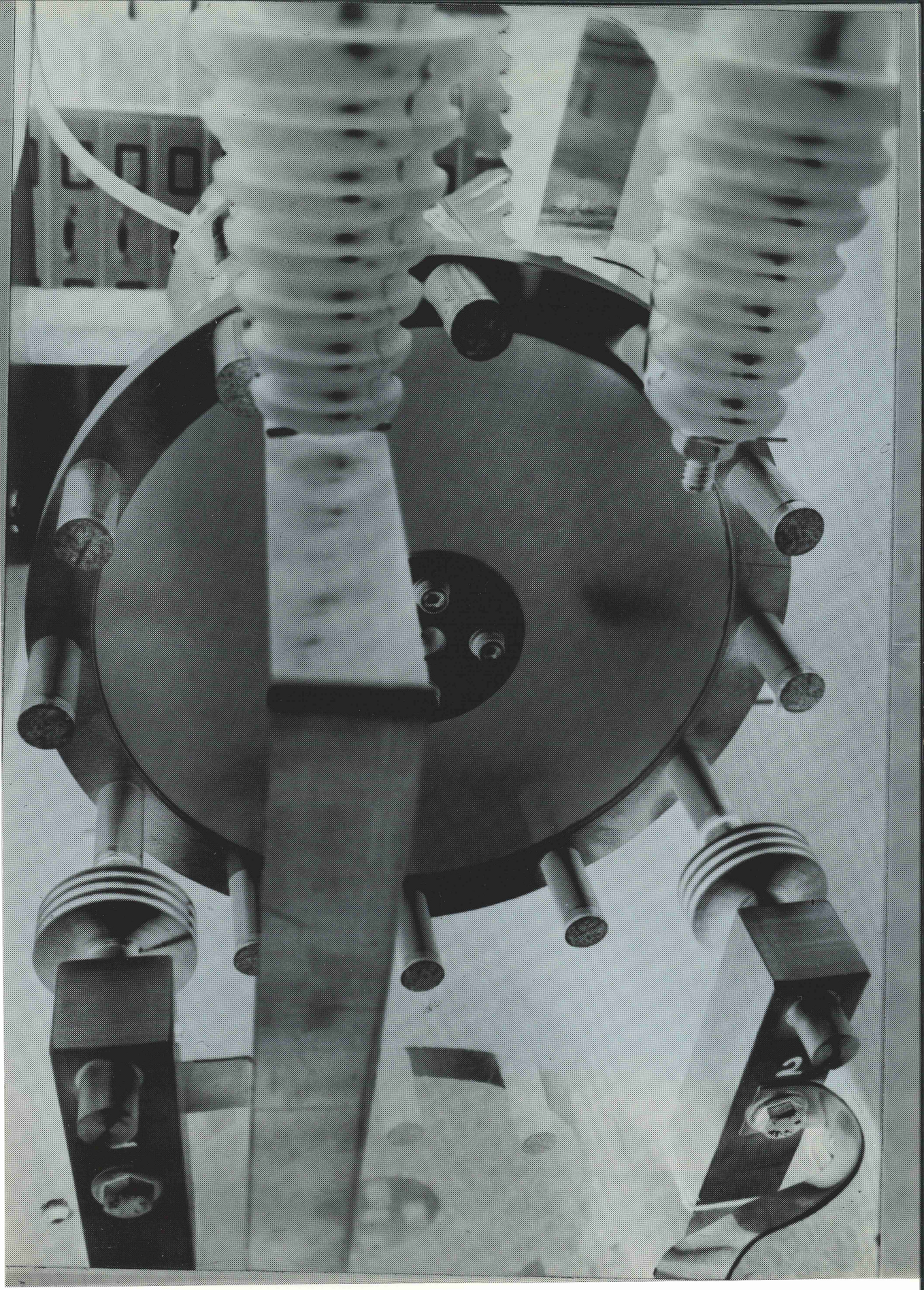
2. SYSTEM TWO MAINTENANCE PROCEDURE.

The periodic maintenance required for this system is essentially the same as outlined for System One, except as follows; On the fiberglas tank exterior, weekly visual inspection of the top cover plate, to insure that this surface is clean and dry. Since this unit is stationary and does not move, no inspection of the cabling connected at the base of the tank is required, except a visual inspection of the connectors (performed during regular schedualed rotary gap adjustment operations.)

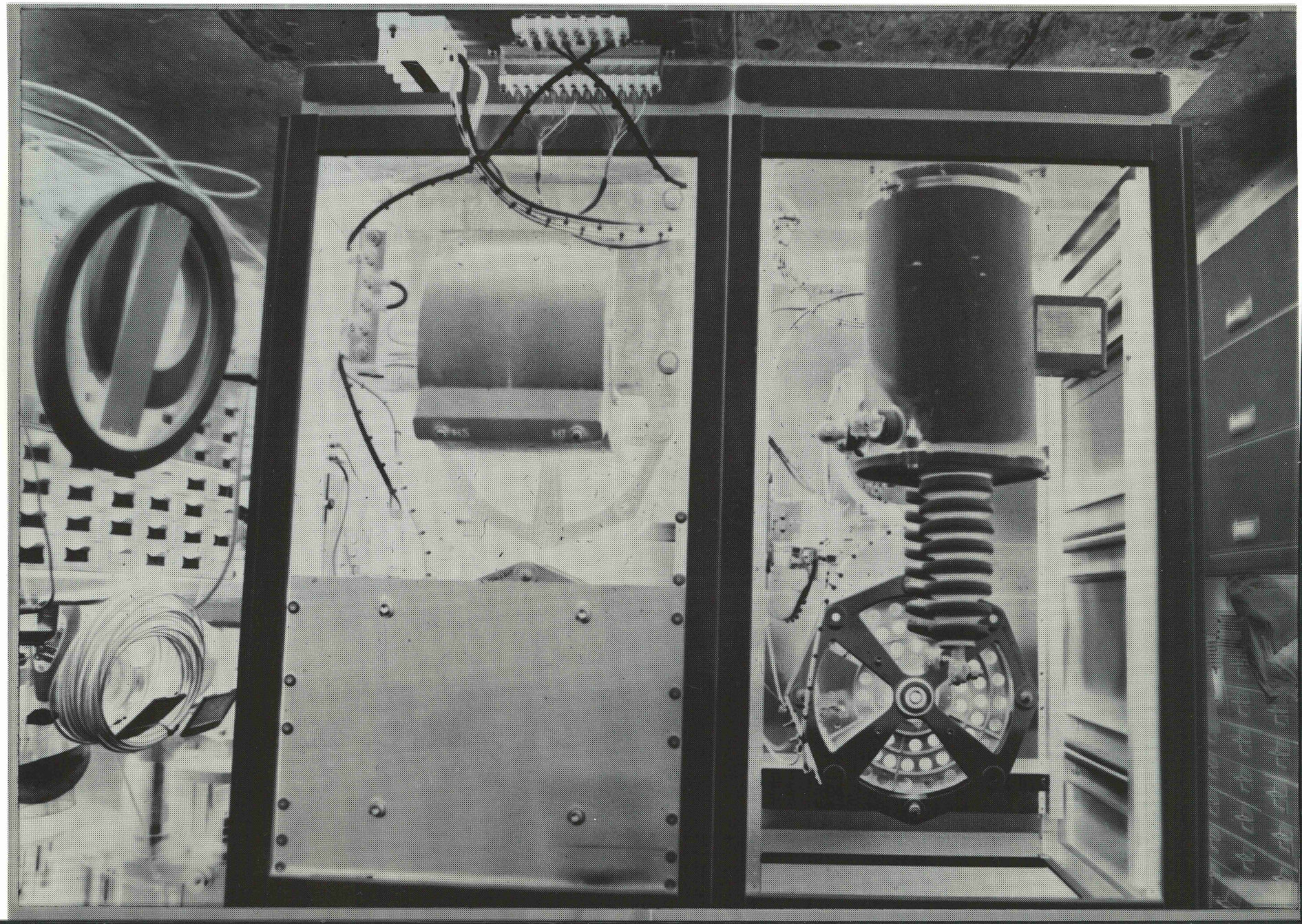
At the time of writing of this manual, no further maintenance adjustment is specified for either System One or Two.

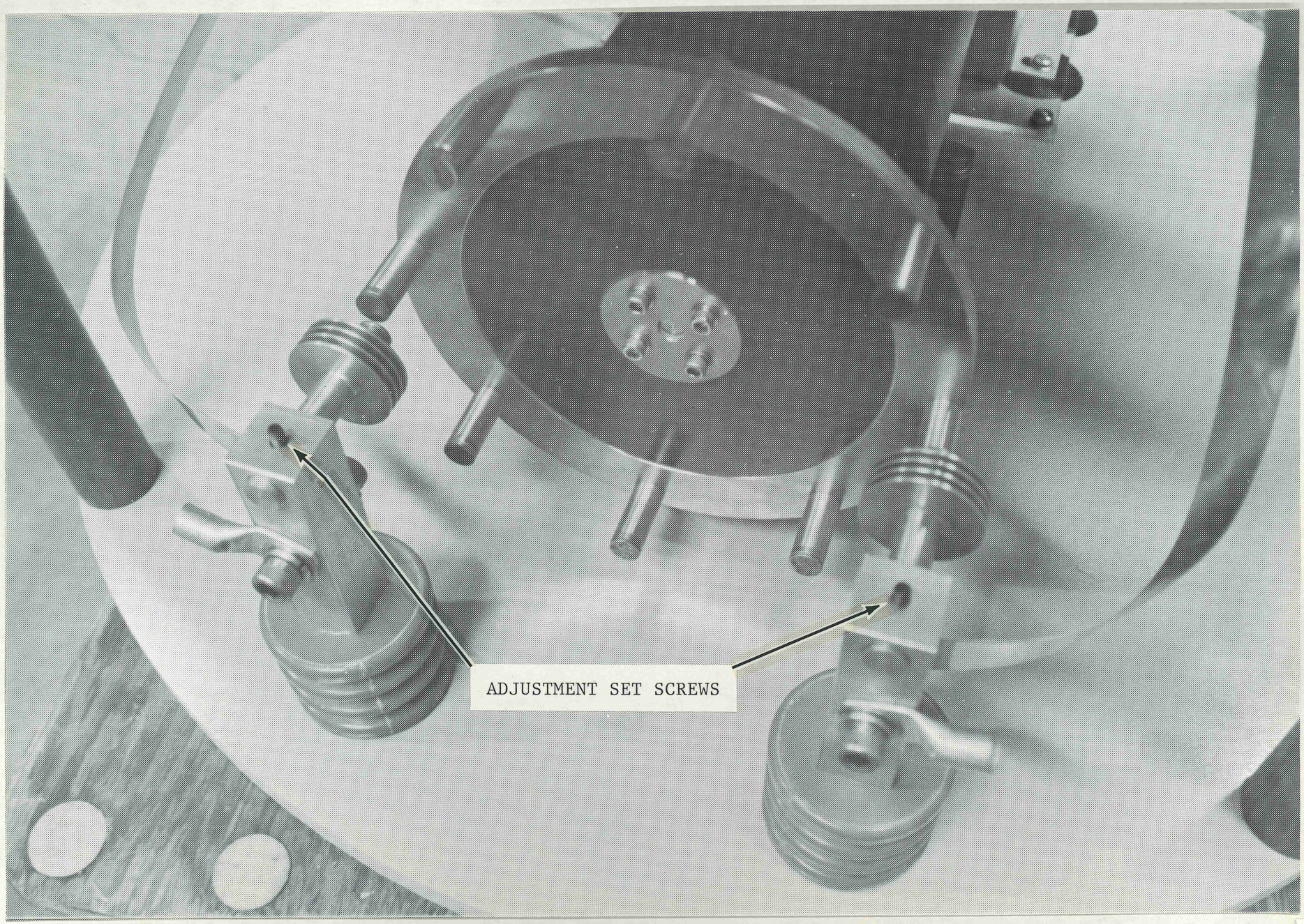




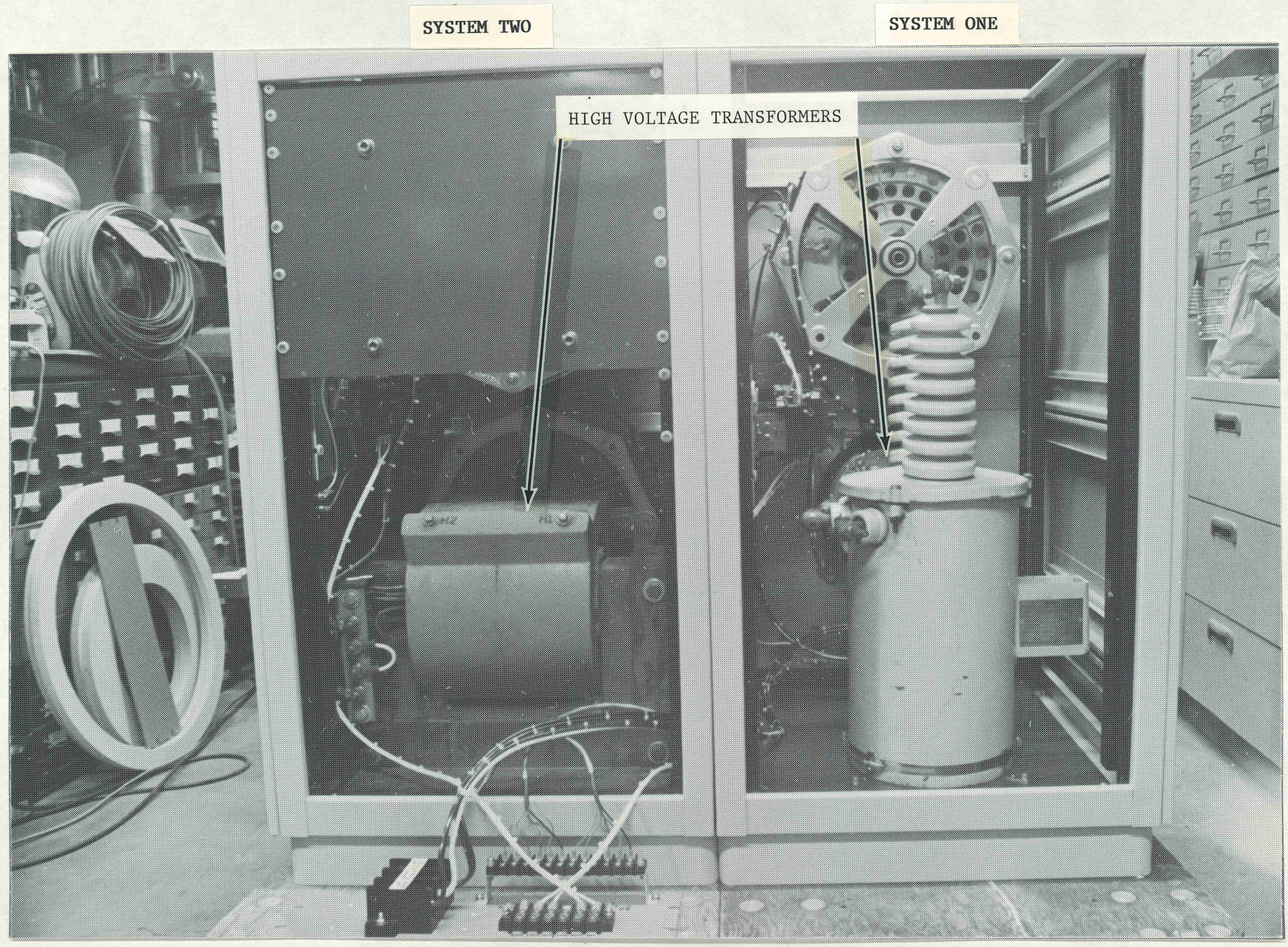




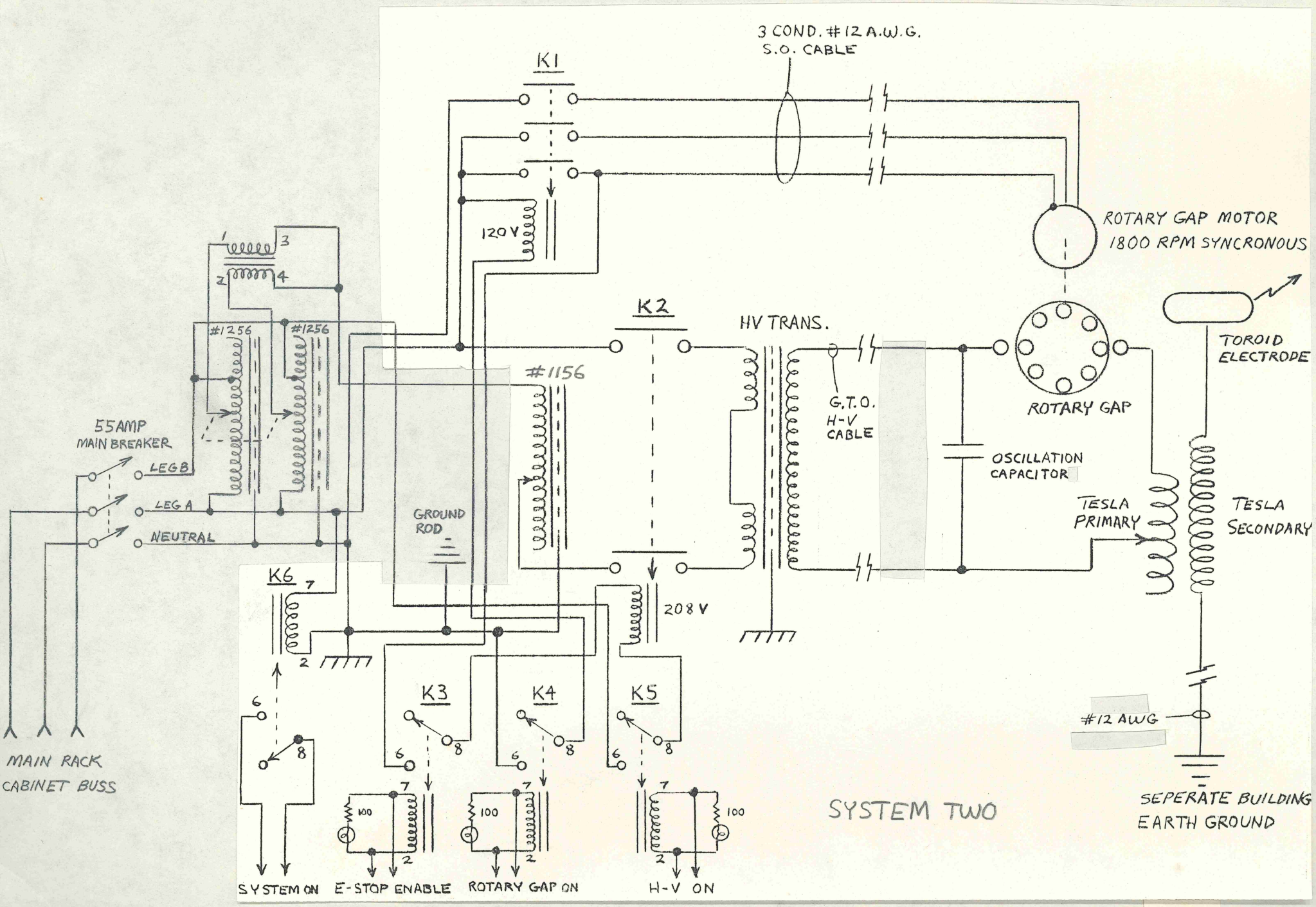


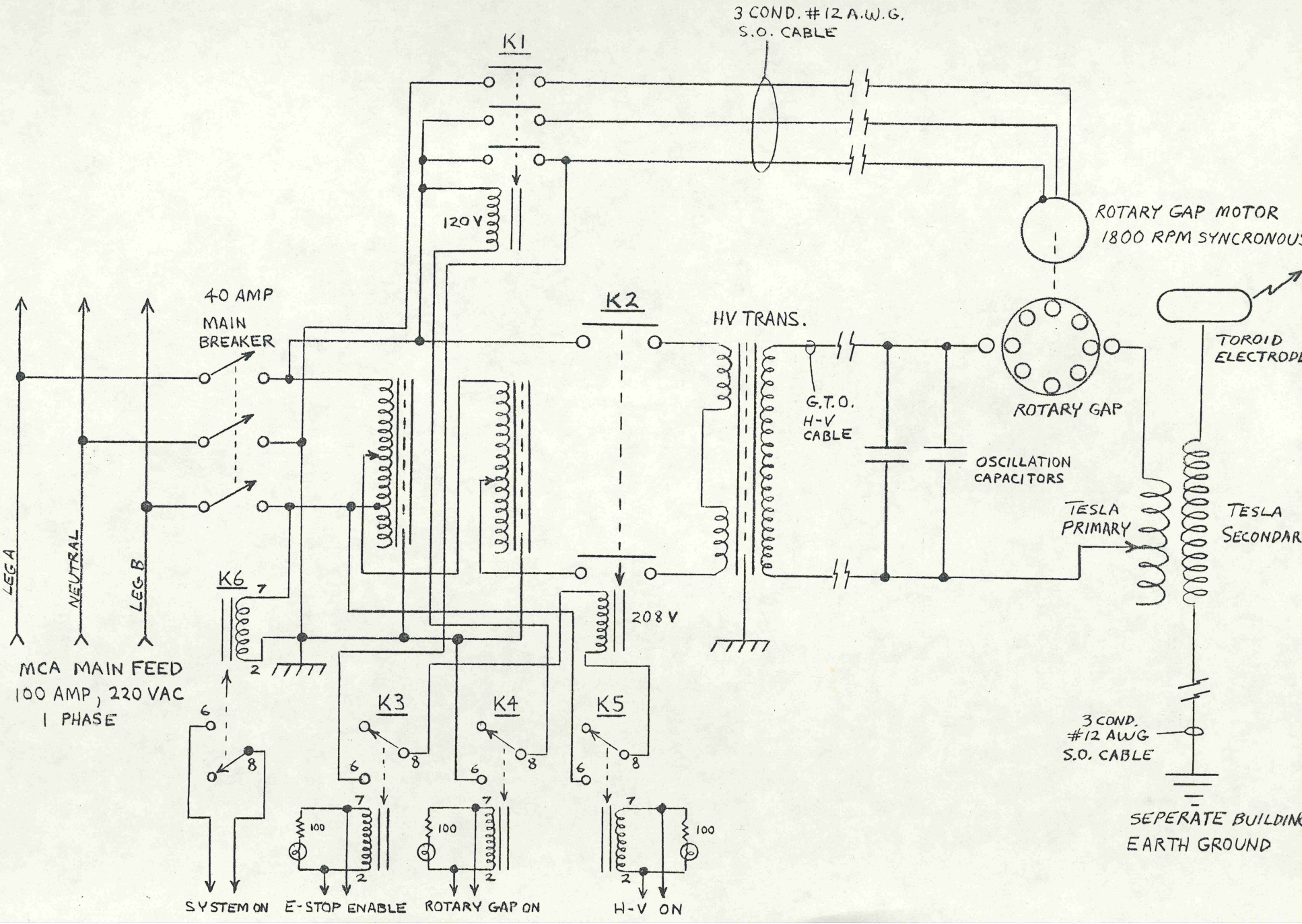


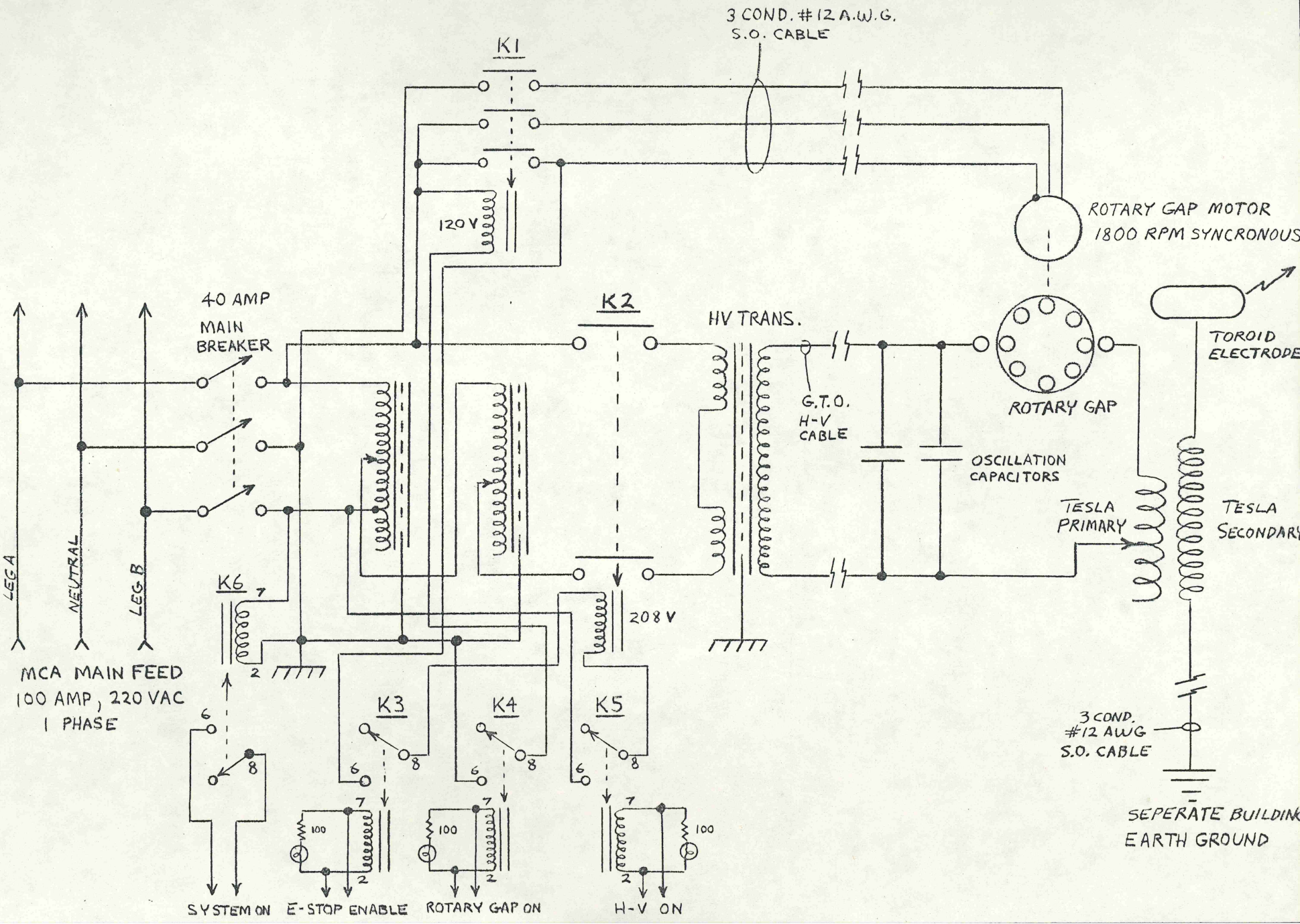
SYSTEM TWO ROTARY GAP



CONTROL CONSOLE (REAR VIEW)


3 COND. #12 A.W.G.
S.O. CABLE
K1
120 V
ROTARY GAP MOTOR
1800 RPM SYNCRONOUS
K2
HV TRANS.
#1256
#1256
#1156
G.T.O.
H-V
CABLE
ROTARY GAP
TOROID
ELECTRODE
55AMP
MAIN BREAKER
LEG B
LEG A
NEUTRAL
GROUND
ROD
OSCILLATION
CAPACITOR
TESLA
PRIMARY
TESLA
SECONDARY
K6
208 V
K3
K4
K5
#12 AWG
MAIN RACK
CABINET BUSS
SYSTEM TWO
SEPERATE BUILDING
EARTH GROUND
100
100
100
SYSTEM ON
E-STOP ENABLE
ROTARY GAP ON
H-V ON


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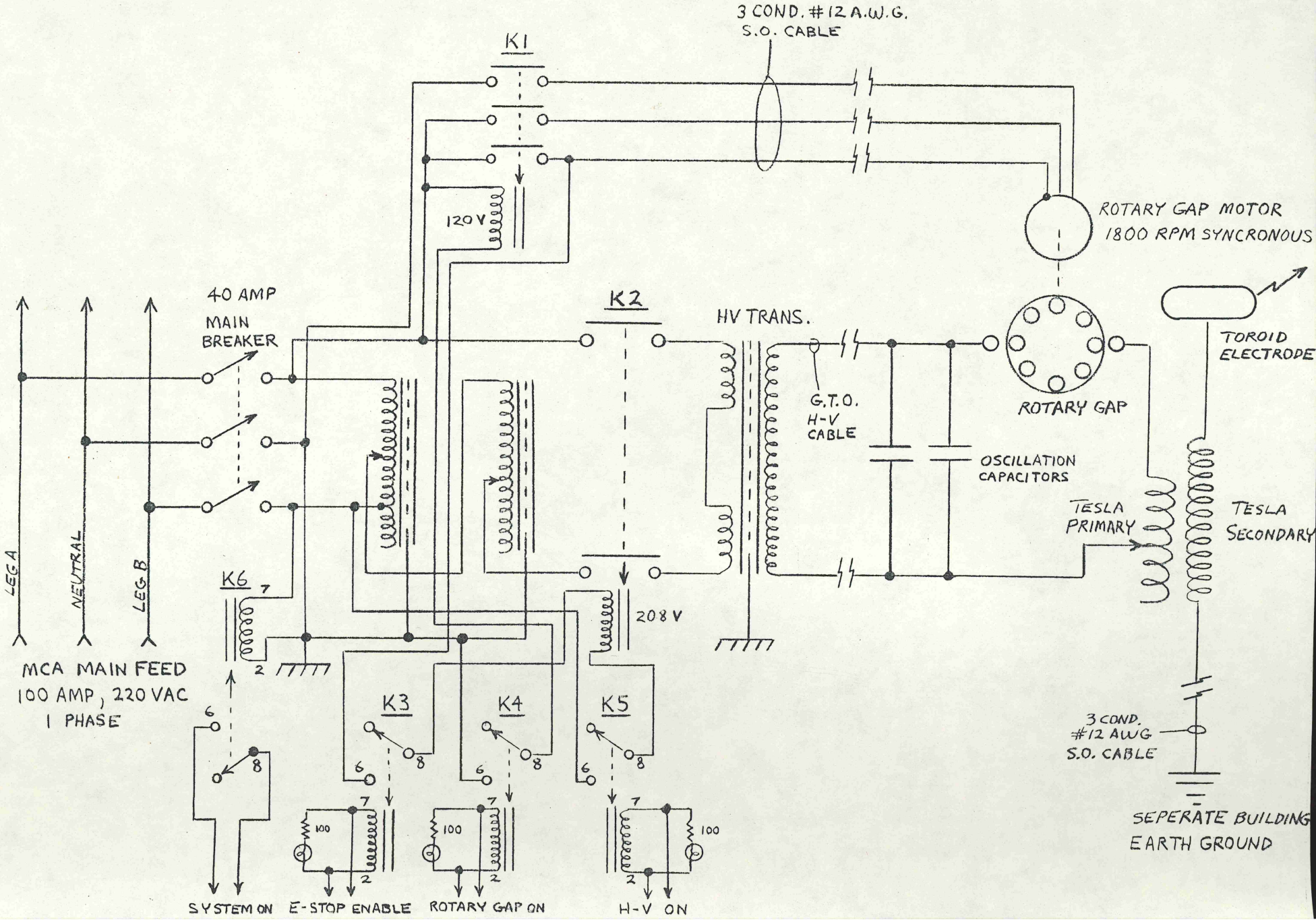

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SYSTEM ON
E-STOP ENABLE
ROTARY GAP ON
H-V ON

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