

ELINGO

MOTORS AND GENERATORS

ELECTRIC INDICATOR CO.

STAMFORD

U. S. A.

CONN.

"ELINCO" CATALOG NO. 43-D

Introduction

A catalog of "ELINCO" Motors and Generators must of necessity be of a general nature. Although the models included herein may rightly be called 'standard', this would be somewhat of a misnomer in a field where the demands of Research Laboratories and others are continually leading to new types and improvements. It would be better, perhaps, to call these catalog models 'basic', for the widest majority of uses and requirements will be met by them.

The exigencies of producing specialized equipment for war purposes has led to the establishment of our laboratory engineering department, specializing in the development of experimental models, manufactured to a customer's specifications, or to meet his own unique requirements. As few as one or two models can be furnished in a minimum period of time. Upon acceptance of the trial unit, production can be made available quickly for turning out quantity with the same laboratory precision.

Our design of this catalog in loose-leaf form does allow the very necessary expansion of the models which should be included as they are developed by our engineers.

One feature, however, is common to all "ELINCO" units: They are all manufactured from the finest materials, produced by experienced technicians, resulting in precision surpassed by none. Improvements suggested by experience, or by our customers, are being constantly incorporated into the construction of these units to produce consistently improved models.

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"ELINCO" Permanent Magnet A.C. Generators are available in the following frames: "B" or "F" print A-753; "BS" or "FS" print A-930; "FB" print A-751, and "FBS" print A-944. The electrical output characteristics of "B", "F", "BS" and "FS" frames are identical. Frames "FB" and "FBS" have approximately twice the output of shorter frames. Data on these units is given in the Bulletin 44.

Any of these units can be wound two pole to generate one, two or three phase, six pole for one or two phase, and twelve pole single phase.

The permanent magnet pole is made of Alnico #2 magnet steel, cast in cylindrical form with a soft steel insert. This insert is pinned to a non-magnetic stainless steel shaft which rotates on lubricated, shielded, precision ball bearings. After mounting, the outside diameter of the magnet steel pole is finished ground to close tolerances; then, the rotor assembly is dynamically and statically balanced, and, except for bearing seats and shaft extension, finished with a baked, protective coating.

The stator is made up of laminations with twelve slots. The coils are form wound and assembled into position. The stator assembly is impregnated with a clear, insulating varnish, baked, and finished with a red insulator.

The housings and end bells of all types are cast aluminum and are anodized after machining. The entire unit, except for mounting surfaces, is finished with a baked, blue, mottletone enamel.

Characteristics of some typical generators are as follows:

Type 15, in frames "B", "F", "BS" or "FS", a two pole, single phase A.C. Generator, has the following characteristics: Generates about 45 volts at 1800 RPM; sine wave good, but slight slot effect. Complete characteristics are given on Curve #229. A typical four pole, single phase A.C. Generator is Type 96, electrical characteristics of which are shown on Curve #231.

A two pole, two phase A.C. Generator, Type 16, generates approximately 25 volts per phase at 1800 RPM. Generated phases are 90° apart electrically and mechanically. Wave form and other characteristics are similar to single phase generator. Electrical output characteristics are shown on Curve #230. The two pole, three phase A.C. Generator, Type 17, generates approximately 25 volts per phase at 1800 RPM. Electrical output characteristics are shown on Curve #233. Wave form and other characteristics generally same as Type 15.

Where wave form of output voltage is of prime importance, we recommend use of our Sine Wave Generator. These generators are identified by letter "P" in type designation; i.e., "FSP" or "FBSP". The front and rear end bells and shaft extension are identical with those shown on drawings for "FS" or "FBS". The frame is $2\frac{1}{4}$ " in diameter mounted by tapped holes in front end bell, or by clamp about frame. The frames of these generators have no base or flange for mounting. The overall lengths are same as "FS" or "FBS" types.

Any of these units can be wound to meet other voltage or load requirements.

"ELINCO" MIDGET Self-Synchronous Motors are made in two frames. The numbers 1 and 2 appearing in the type numbers represent the style of frame. Number 1 is a housing provided with a mounting base, while number 2 is a housing with a mounting flange. All other dimensions and electrical characteristics are the same for both units. Drawing A-828 dimensions these units.

"ELINCO" MIDGET Self-Synchronous Motors have a single phase stator and a three phase "Y" connected wound rotor. All windings are impregnated with a high quality, insulating varnish and baked, making them impervious to dampness, oil and acid. After baking, they are finished with a red, protective coating. The cast aluminum housing is anodized after machining and then finished, except for mounting surfaces, with baked, black, synthetic enamel. The entire unit weighs approximately 17 ounces.

TYPES MI-1 & MI-2

These are indicating types of Self-Synchronous Motors. The slip ring assembly is made of three coin silver rings on molded bakelite separators. Three silver brushes are mounted on beryllium copper fingers fastened to a molded bakelite terminal board. Orders for these units should state quantity needed for transmitter or generator motors, and quantity needed as receiver or follower motors; because, to expedite deliveries, transmitter motors, which are mechanically driven, may be equipped with standard, lubricated, precision ball bearings, while receiver motors have armature rotating on specially selected, lubricated, precision ball bearings. Before shipment, motors are marked with yellow ink, either "T" for transmitter or "R" for receiver, depending upon type of service for which they have been manufactured. Using one "MI" transmitter and one "MI" receiver, the ordinary run of production is accurate within a total spread of 4°.

TYPES B or F-409

These motors are for continuous rotating service in remote counters, etc. The slip ring assembly consists of three paladium silver alloy rings, mounted on molded bakelite separators. The brushes are paladium silver alloy, mounted on beryllium copper fingers, fastened to molded terminal board. The brushes are set considerably tighter on these units than on the indicating type of motor, and therefore, the "MR" units are not as sensitive or accurate as the "MI" units. They are not recommended for speeds exceeding 400 RPM. From start to full speed should take not less than five seconds; otherwise, receiver may slip a phase and stall. All other dimensions and electrical characteristics of these units are the same as the "MI" units described above.

The "ELINCO" "FB" Frame Self-Synchronous Motor is dimensioned on Print A-751. This unit will be available both in the indicating and rotating types. Construction will be same as respective "MIDGET" units.

It is expected that the Self-Synchronous Motor in the "FB" frame will have 50% more torque at maximum phase displacement than the "MIDGET" types. Accuracy will be the same as shown for the smaller units. The "FB" frame weighs approximately 26 ounces.

Final acceptance tests of the "FB" frame are now being made. As soon as these tests are finished, complete data will be available.

TYPES B or F-407 & B-411 or F-411

Types B-407 and F-407 are differential type receivers, wound with a three phase stator and a three phase rotor. They are designed to operate as receivers for two, specially wound, Type "J-1/34" units. External dimensions are the same as respective "MI" types. These units can also be wound as Phase Shifters or Voltage Regulators, with a distributed stator winding and leads as required. Types B-411 and F-411 are similar to Types 407 except brushes and brush fingers are designed for continuous rotating service, subject to limitations as to speed.

GENERAL

All of the "MIDGET" or "FB" Self-Synchronous Motors, when required, can be furnished with shaft extension on both ends of motor. The unit type number, in this case, is followed by the suffix "D".

"ELINCO" MIDGET Self-Synchronous Units are wound to operate on a primary voltage of 110-120 volts, 60 cycle, single phase supply. The secondary voltage is 34 volts. On special order, these motors can be wound to operate on lower primary voltages or other secondary voltages. Electrical and torque characteristics of these units are shown on Curve #C-1038.

ACCURACY OF "ELINCO" MIDGET SELF-SYNCHRONOUS MOTORS

Type Transmitter	Type Repeater	Number of Repeaters	Accuracy Spread
J-1/34	MI-1	1 to 5	3°
MI-1	MI-1	1	4°
MI-1	MI-1	2	6°
409	409	1	8°

Type "J" Self-Synchronous Motors are much larger and heavier than the "ELINCO" MIDGET Motors and are recommended when higher torque and greater accuracy are required.

The "J" Type Motors have a single phase rotor mounted on lubricated, shielded, specially selected, precision ball bearings, and a three phase stator. The slip ring assembly consists of two solid coin silver rings, molded in bakelite. The brushes are solid silver stampings and are mounted on a molded bakelite terminal board. The end caps of the "J" units are fine grain, gray iron castings. Provision is made for mounting these units by an accurately machined front face. When required, a mounting base can be furnished.

Standard "J" units are wound for operation on primary supply of 110-120 volts, 60 cycle, single phase, and secondary of 105 volts, 60 cycle. For use as transmitters, with the "ELINCO" MIDGET types, the "J" motors are wound with primary of 110-120 volts, 60 cycle, and secondary of 34 volts, 60 cycle. In this case, the unit number of the motor is followed by the suffix "/34", and the nameplate is stamped 110/34. "J" units may also be wound for 220 volts, 60 cycle, or 110 volts, 25 cycle supply, on special order. When wound for these last two voltages, they cannot be used as transmitters for the "MIDGET" type motors.

The "J" units are made in two styles of frames. The "J-W" units, shown on Drawing A-487, are equipped with weather-proof end cap protecting the terminal end of the motor. The motor leads are brought through the motor and out the front face. If the unit is mounted by this machined face, these units are weather-tight and suitable for outdoor operation. The mounting base, shown on this drawing, is supplied only when specified on order.

The "J" units, shown on Drawing A-496, are totally enclosed and dust-tight. They are designed for use indoors or in a protected case. The mounting base, shown on this drawing, is also supplied only when specified.

The torque characteristics of these two types are identical and are shown on Curve #C-1038.

The weights of these units are as follows:

<u>TYPE</u>		<u>WEIGHT</u>
J-1	or J-1/34	8.0 lbs.
J-1-W	or J-1-W/34	10.0 lbs.
J-2.5	or J-2.5/34	9.75 lbs.
J-2.5-W	or J-2.5-W/34	11.75 lbs.

ACCURACY OF "ELINCO" TYPE "J" SELF-SYNCHRONOUS MOTORS

Type Transmitter	Type Repeater	Number of Repeaters	Accuracy Spread
J-1/34	MI-1	1 to 5	3°
J-1	J-1	1	2°
J-2.5	J-2.5	1	2°

"J" units, when required, can be furnished with a shaft extension on both ends. Also, any of the "J" units can be supplied in a special cast steel housing, for use as explosion-proof in Class D hazardous locations.

"ELINCO" MIDGET Permanent Magnet D.C. Voltage Generators are made in several frame types. Type "PM-1" is designed with a mounting base provided with two holes tapped for #8-32 machine screws, or this unit may be mounted by the finished face, which is also tapped for two #8-32 machine screws. Type "PM-2" is provided with an accurately machined flange for mounting. Electrical characteristics of these two units are identical. Drawing A-642 gives the dimensions of these generators.

The housings for all types are of aluminum alloy, and are anodized in accordance with Army and Navy Specifications, after machining. The completed unit, except for mounting surfaces, is finished with a baked, black, synthetic enamel.

The rotor contains nine slots and the coils wound thereon are connected to a nine bar commutator. When required, coils may be double wound in each slot and connected to an 18 bar commutator. Standard commutators are built up copper, but for special applications a paladium silver commutator can be furnished. The rotor is mounted on specially selected and lubricated, shielded, precision ball bearings. The windings are impregnated with a clear varnish and, after baking, are finished with a protective, insulating coating. Standard units have resistance across the brushes of 286 ohms plus or minus 10%. After baking, the rotors are subjected to a breakdown test of 500 volts, 60 cycle A.C., for a period of one minute.

The stator is a soft steel ring, containing two segments of high quality, cast magnet steel Alnico #2. These segments are ground to close tolerances, then carefully assembled and held permanently in position by cerromatrix. The entire assembly is mounted on an arbor and the outside diameter machined concentric to the inside diameter of the magnet steel. After all machining is completed, the assembly is finished with a red, protective coating.

The brush assembly consists of two heat-treated beryllium copper fingers, tipped with special, silver graphite brushes and mounted on a molded bakelite terminal board. At speeds in excess of 2000 RPM we recommend use of square brushes, as shown on "ELINCO" D.C. Motors, Page 9-1, Print A-585.

The assembled unit is given a 500 volt, 60 cycle A.C., high potential test for one minute, and is tested at 1800 RPM to meet specifications of generating 37.5 volts plus or minus 10% at this speed. Electrical characteristics of these units are shown on Curve #208.

A more powerful generator, our "FB" Frame, is described and dimensioned in our Bulletin 44.

When required for other applications, any of these units may be wound to meet other voltage specifications.

"ELINCO" MIDGET Wound Field D.C. Voltage Generators have been replaced in most instances with the permanent magnet field units, but, when specified, a wound field generator can be supplied in any frame.

Type "CB" Permanent Magnet D.C. Machines are dimensioned on Print A-1043 and can be used either as motors or as generators. They are furnished with either square motor type brushes or light finger type brushes. The finger type brushes are recommended when (a) only light torque is available to drive unit; (b) voltage generated must be closely equal operated in either direction, or (c) speeds do not exceed 2500 RPM. The square motor type brushes are recommended when (a) on low voltage motors; (b) speeds are in excess of 2500 RPM, or (c) high currents are required.

The body housing and the end caps are aluminum die castings, and are anodized in accordance with Army and Navy Specifications after machining. The unit is furnished in natural aluminum anodized color, or, except for mounting surfaces, finished with baked synthetic gloss black enamel.

The stator is a high quality cast magnetic alloy disc mounted against two soft steel pole pieces that extend the length of the body over the armature windings. The steel poles are accurately positioned to provide maximum effect on windings and are die cast in place. The finished die casting is machined to closely held tolerances with the poles bored for concentricity with the armature iron.

The armature has nine slots and the coils wound therein are connected to a nine bar copper commutator. On special order, when required, the coils can be double wound in each slot and connected to an eighteen bar commutator. When necessary, a paladium silver alloy commutator can be furnished. The armature is mounted on selected, lubricated single shield, precision ball bearings. The windings are impregnated with a clear varnish and, after baking, are finished with a protective insulating covering. When specified, armatures can be wound with resistance as high as 1300 ohms. All completed armatures are subjected to a 500 volt, 60 cycle current, one minute, as a high potential test.

The brush boxes used with the square brushes are made of brass and extend through the molded terminal boards very close to the commutator to support the brush throughout entire length. The finger type brushes are made of silver impregnated graphite and are soldered to heat-treated beryllium copper fingers. The entire assembly is mounted on a molded block.

The finished unit is given a high potential test of 500 volts, 60 cycle, for one minute. Insulation resistance to ground with 500 volts D. C. is 50 megohms minimum. The complete "CB" unit weighs about 20-1/2 ounces.

The electrical characteristics of Type "CB-47" are very similar to Types "PM-1" and "PM-2". However, due to design, these "CB" units operate more smoothly and with less "slot-lock" effect. Generally, Curve #208 also applies to Type "CB-47". Characteristics of some of these units are given on following Page 7-2.

Typical example of a "CB" unit operating as a motor is Type "CB-47", which has finger type brushes. Operating from 115 volts D.C. input, characteristics are as follows:

Load In. Oz.	Speed RPM	Current in Ma.	
0	4250	40	18 bar commutator
2	3200	80	Finger type brushes
4	2250	150	Armature resistance
6	1420	250	286 ohms plus or
8	Stalled	300	minus 10%

At 1800 RPM this unit generates 37.5 volts plus or minus 10%.

An example of a low voltage motor that can be wound in this frame is Type "CB-75". Characteristics of this unit operating from 14 volts D.C. input are:

Load In. Oz.	Speed RPM	Current in Amps.	
0	4925	.32	9 bar commutator
2	3850	1.05	Square brushes
4	2830	1.6	Armature resistance
6	1830	2.3	4 ohms plus or minus 10%
8	Stalled	3.1	

Other low voltage examples are:

CB-218 12 Volt

Load In. Oz.	Speed RPM	Current in Amps.
0	6050	.18
2	4800	1.05
4	3000	2.00
5	1800	2.55
6.3	Stalled	3.50

CB-219 24 Volt

Load In. Oz.	Speed RPM	Current in Amps.
0	6000	.10
2	4800	.51
4	3400	1.0
6	1000	1.5
6.7	Stalled	1.65

These frames can be wound to operate from other voltages or to generate different voltages.

"ELINCO" A.C. Drag Cup Generators are made in both the "B" and "F" frames, as dimensioned on Print A-812. The dimension of the boss on the front cap of the Drag Cup Generator is 1-1/2" diameter, and is not a finished machined mounting surface.

The body and cap are die cast aluminum alloy, anodized in accordance with Army and Navy Specifications after machining. The complete unit, except where noted, is finished with a baked, black, synthetic enamel.

The "ELINCO" A.C. Drag Cup Generator consists of a laminated stator wound two phase, a stationary steel pole and an aluminum cup pinned to shaft rotating on precision, shielded, ball bearings between stator and pole. 120 volts, 60 cycle, single phase, is applied to terminals of one of the two stator phases. As the shaft and cup are rotated, voltage is induced at terminals of the second phase. The induced voltage is lineal with speed to approximately 6000 RPM. The shaft and aluminum cup weigh .85 oz. The torque required to start shaft rotating is approximately 25 grains at 1" radius. The entire base mounted unit weighs 19 oz. For more voltage, where linearity of induced voltage is not of great importance, a copper cup can be substituted for aluminum. Using copper cup, the induced voltages are approximately twice that shown for aluminum.

The laminated stator is formed and assembled from low core loss, high grade, electrical silicon steel. The coils are form wound and assembled into position. The stator assembly is impregnated with clear insulating varnish, baked, and then finished with a protective insulating covering. The leads from the stator are fastened with brass screws to molded, black, bakelite terminal boards. On one board the terminals are numbered G-1 and G-2, while the terminals on opposite board are numbered 3 and 4 or 4 and 5. These numbers are branded into board and filled with white enamel.

The stationary pole can be either solid steel or laminated. The solid steel pole is machined to accurate dimensions and finished with zinc plating. The laminated pole is made of an aluminum core and washer type, electrical silicon steel laminations. Laminations are stacked on core and edge of core spun riveted to hold laminations. Types "68" and "101" are usually supplied with solid pole, and Type "103" with laminated pole. However, either pole can be used in any unit. The induced output voltages are generally 10-20% higher using a laminated pole. The pole is accurately centered in recess in cap and securely fastened with four steel screws. When the cap and pole are assembled to the body, the precision machined lands on both pieces centrally locate the pole with the stator for maximum electrical effect. The outside diameter of the pole and the inside diameter of the stator must be concentric and the clearance at a minimum.

The cup which rotates between the stator and the steel pole on standard units is made of aluminum and is fastened to shaft. The shaft clears through hole in stationary pole and rotates on specially selected, shielded, ball bearings.

Characteristics of most popular units are shown on Page 8-2.

Development of a 400 cycle, 115 volt Generator, Type "215", is now being completed. Data will be available shortly.

A.C. DRAG CUP INDUCTION GENERATORS (cont.)

With 120 volts, 60 cycle, single phase supplied to one phase, the opposite winding shall induce the voltages listed below with a resistance load of 100,000 ohms and with generator being turned in either direction. All output voltages measured with a vacuum tube voltmeter or suitable equivalent with an input impedance of not less than two megohms.

TYPE	CUP MAT'L.	POLE MAT'L.	INPUT VOLTS TO TERM.	60 CYCLE VOLTS	INPUT CURR. MA.	D.C. OHMS INPUT PHASE	D.C. OHMS OUTPUT PHASE	HEAT RISE °C	OUTPUT VOLTAGE MEASURED ON TERMINALS G-1 & G-2					
									0 RPM	600 RPM	900 RPM	1800 RPM	3600 RPM	7200 RPM
68	ALUM.	SOLID	4-5	120	96	770	770	42	0.15	1.75	2.70	5.4	11.0	20.5
	ALUM.	LAM.	4-5	120	96	770	770	42	0.15	2.30	3.50	7.0	13.5	24.5
	COPPER	SOLID	4-5	120	96	770	770	42	0.15	3.00	5.10	10.0	20.0	32.0
	COPPER	LAM.	4-5	120	96	770	770	42	0.15	3.90	6.20	12.0	24.0	36.0
101	ALUM.	SOLID	3-4	120	82	850	1520	37	0.15	2.20	3.80	7.4	15.0	28.0
	ALUM.	LAM.	3-4	120	82	850	1520	37	0.15	3.00	4.60	9.0	18.5	33.0
	COPPER	SOLID	3-4	120	82	850	1520	37	0.15	4.40	7.40	15.0	28.0	49.0
	COPPER	LAM.	3-4	120	82	850	1520	37	0.15	5.80	9.00	18.0	36.0	53.0
103	ALUM.	SOLID	3-4	120	70	1420	948	25	0.16	1.74	2.60	5.1	10.5	19.3
	ALUM.	LAM.	3-4	120	70	1420	940	25	0.16	2.25	3.40	6.7	13.0	24.5
	COPPER	SOLID	3-4	120	70	1420	940	25	0.16	2.80	4.80	10.5	20.0	35.0
	COPPER	LAM.	3-4	120	70	1420	940	25	0.16	3.80	6.40	13.0	25.0	40.0

Notes 1 & 2 - These units are production types and will be furnished unless otherwise specified on order.

3 - In "F" frame this generator is Navy Ordnance #257468-2. The shaft in this unit has a diameter of .1245" and extends .608" from cap face. Otherwise, dimensions as shown on Print A-812. Standard shaft can be furnished on special order. Unless otherwise specified, this unit is furnished on orders for Type "103".

When required, these units can be wound to meet other specifications.

"ELINCO" MIDGET D.C. and Universal Motors are made in two frames as dimensioned on Dwg. A-585. The D.C. units are made with either permanent magnet or wound field. Note that, for service requiring instant reversal ("plugging"), permanent magnet field motors are not recommended. Universal motors are made only with a wound field. Motors can be wound to operate on any voltage from 3 through 115 volts. These motors can also be wound with fields to operate from one voltage source and armature to operate from another different voltage source. Either or both voltages can be variable. Terminal connections can be arranged to meet requirements. When motors are to operate from vacuum tubes or other limited current sources, special high resistance windings can be furnished which will minimize input current required.

When constant speed is necessary, these same units can be furnished with governor. With this governor, standard units have 1% or less change in speed for 20% change in load or voltage. Dwg. A-752 dimensions the governor controlled motors.

The end bell and frame on these units are aluminum, and outside surfaces, except where noted, are finished with a baked, black, synthetic enamel.

On permanent magnet field motors, the stator consists of two segments of Alnico #2 magnet steel, which are centered and permanently fixed in a soft steel ring by cerromatrix. The wound field stator consists of thin, two pole, silicon steel laminations and form wound coils. The coils are bound with insulating tape and fitted to lamination stack. The assembly is then impregnated and baked. In both units the stator assembly is finished with a red, protective, insulating coating.

The rotor is made of thin silicon steel laminations with nine slots. The laminations are skewed at assembly to provide a smooth, steady rotation with minimum "slot-lock". The coils are machine wound and connected to a nine bar copper commutator. For high voltage, and on special order, coils can be double wound in each slot and connected to an 18 bar commutator. For special applications a paladium silver commutator can be furnished. After winding, the armature is impregnated in clear insulating varnish, baked, and then finished with a red, protective coating. The armature assembly rotates on single shield type precision ball bearings.

The brush boxes are machined brass and extend through the molded bakelite terminal board very close to the commutator so that the square brushes are strongly supported through their entire length. Beryllium copper brush springs and brushes of the proper grade and cross section for the service intended, complete the assembly.

Each unit is individually tested throughout manufacture and assembly, and final tests are made on each unit before shipment. Standard units must pass a high potential test of 500 volts, 60 cycle, terminals to frame, for one minute. In addition, measured with 500 volts D.C., insulation resistance to ground must be 50 megohms minimum.

Characteristics of some typical motors furnished in these frames are given below.

SHUNT WOUND D.C. MOTORS

<u>Type</u>	<u>Frame</u>	<u>Voltage</u>	<u>Continuous Duty Rating</u>
78	B or F	6	1/150 HP, 3 Amps, 3400 RPM
76	B or F	24	1/200 HP, 0.6 Amps, 3500 RPM
163	B or F	115	1/125 HP, 0.13 Amps, 4000 RPM

SPLIT FIELD SERIES D.C. MOTORS

<u>Type</u>	<u>Frame</u>	<u>Voltage</u>	<u>Continuous Duty Rating</u>
83	B or F	6	1/175 HP, 3 Amps, 3000 RPM
228	B or F	65	1/1000 HP, 0.12 Amps, 1200 RPM
37	B or F	115	1/75 HP, 0.25 Amps, 3600 RPM

PERMANENT MAGNET FIELD D.C. MOTORS

<u>Type</u>	<u>Frame</u>	<u>Voltage</u>	<u>Continuous Duty Rating</u>
98	B or F	6	1/250 HP, 1.05 Amps, 2000 RPM
13	B or F	12	1/60 HP, 2.2 Amps, 4200 RPM
14	B or F	24	1/150 HP, 0.75 Amps, 1800 RPM
38	B or F	115	1/70 HP, 0.22 Amps, 3000 RPM

UNIVERSAL MOTORS

<u>Type</u>	<u>Frame</u>	<u>Voltage</u>	<u>Continuous Duty Rating</u>
239	B or F	115	1/100 HP, .170 Amps, 10,000 RPM (Split Field)
220	B or F	115	1/250 HP, .110 Amps, 3600 RPM
240	B or F	115	1/50 HP, 0.41 Amps, 8000 RPM (Intermittent Duty)

GOVERNOR CONTROLLED CONSTANT SPEED MOTORS

<u>Type</u>	<u>Frame</u>	<u>Voltage</u>	<u>Continuous Duty Rating</u>
51-R	B or F	6 V. DC	1/175 HP, 2.9 Amps, 4000 RPM
171-R	B or F	24 V. DC	1/500 HP, 0.20 Amps, 1600 RPM (Permanent Magnet Field)
235-R	B or F	24 V. DC	1/150 HP, 0.75 Amps, 4000 RPM (Permanent Magnet Field)
61-R	B or F	27.5 V. DC	1/85 HP, 1.3 Amps, 6000 RPM
88-R	B or F	110 V. DC	1/125 HP, 0.21 Amps, 4000 RPM

Where more output is required, we suggest consideration of either our "FB" frame, described in Bulletin 44, or our "A" frame, described in Bulletin 46.

"ELINCO" CATALOGS AND BULLETINS

Including Descriptive Material, Drawings and
General Performance Data on Units Shown.

Catalog #43

A.C. Voltage and Sine Wave Generators in frames B, F, BS and FS.
D.C. Motors and Voltage Generators in frames B, F and CB.
Drag Cup Motors and Induction Generators in frames B and F.
Self-Synchronous Units in frames B, F, FB and J.

Bulletin #44

Permanent Magnet A.C. and D.C. Generators and D.C. Motors.
Shunt and Series Wound D.C. Motors and Generators.
Split Field Series Motors for A.C. and D.C.
Split Field Separately Excited Motors for servo applications.
Universal Motors.

Bulletin #45

Midget Induction and Synchronous Units, not including Hysteresis types, in frames BS, FS and FBS. Ratings range from 1/200 to 1/1000 HP.

Bulletin #46

A.C. and Sine Wave Generators in frames ASP and ALP.
D.C. Motors and Generators, series, shunt, separately excited and permanent magnet fields in frames ASC and ALC.
Induction and Synchronous Motors, not including Hysteresis types, in 1/20 to 1/250 HP in ASP, ALP, ASPS, or ALPS, single value capacitor, split phase, two or three phase units.
Governor Controlled Constant Speed Motors in D.C. shunt, series or permanent magnet field, and A.C. or Universal series motors.

Bulletin #47

Induction and Synchronous Motors, not including Hysteresis types, in 1/6 to 1/90 horsepower range in G frame.
Single, two and three phase A.C. Generators, bi-polar or multi-polar with permanent magnet fields in G frame.

Bulletin #49

All Hysteresis Units for both synchronous and sub-synchronous applications. This bulletin, at present, lists single speed units in horsepower ranges from 1/13 to 1/750, built in frames from 2-1/4" to 4-3/8" in diameter.
Dual Speed Units from 1/20 to 1/1200 HP are listed.
A new, three speed motor, Type GH-371, is described with characteristics and ratings.

Bulletin #50

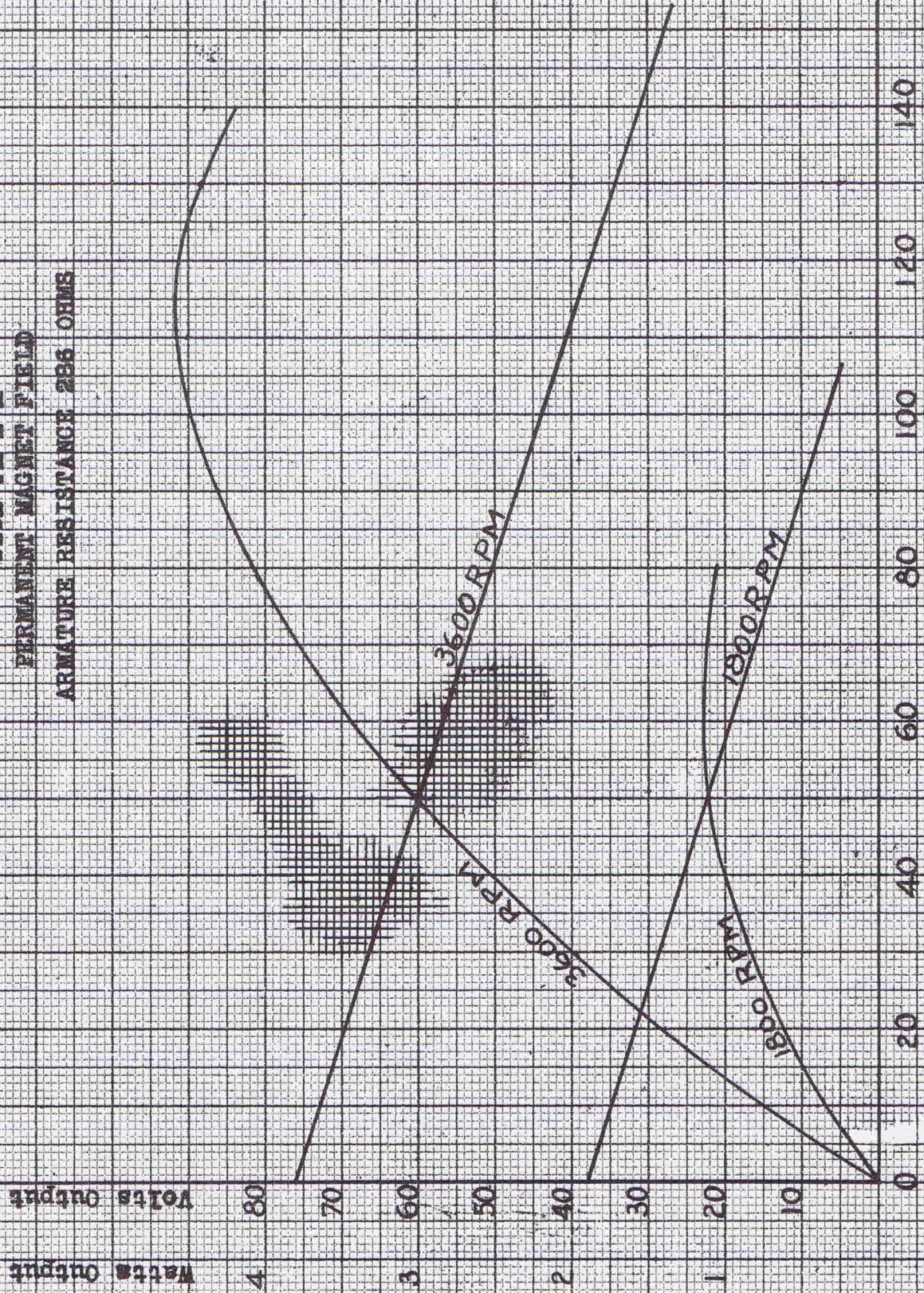
Describes and dimensions our five speed Hysteresis Synchronous Motor.

MELINGO MIDGET D.C. GENERATOR
 TYPE PM-1-M
 PERMANENT MAGNET FIELD
 ARMATURE RESISTANCE 286 OHMS

Watts Output
 Volts Output

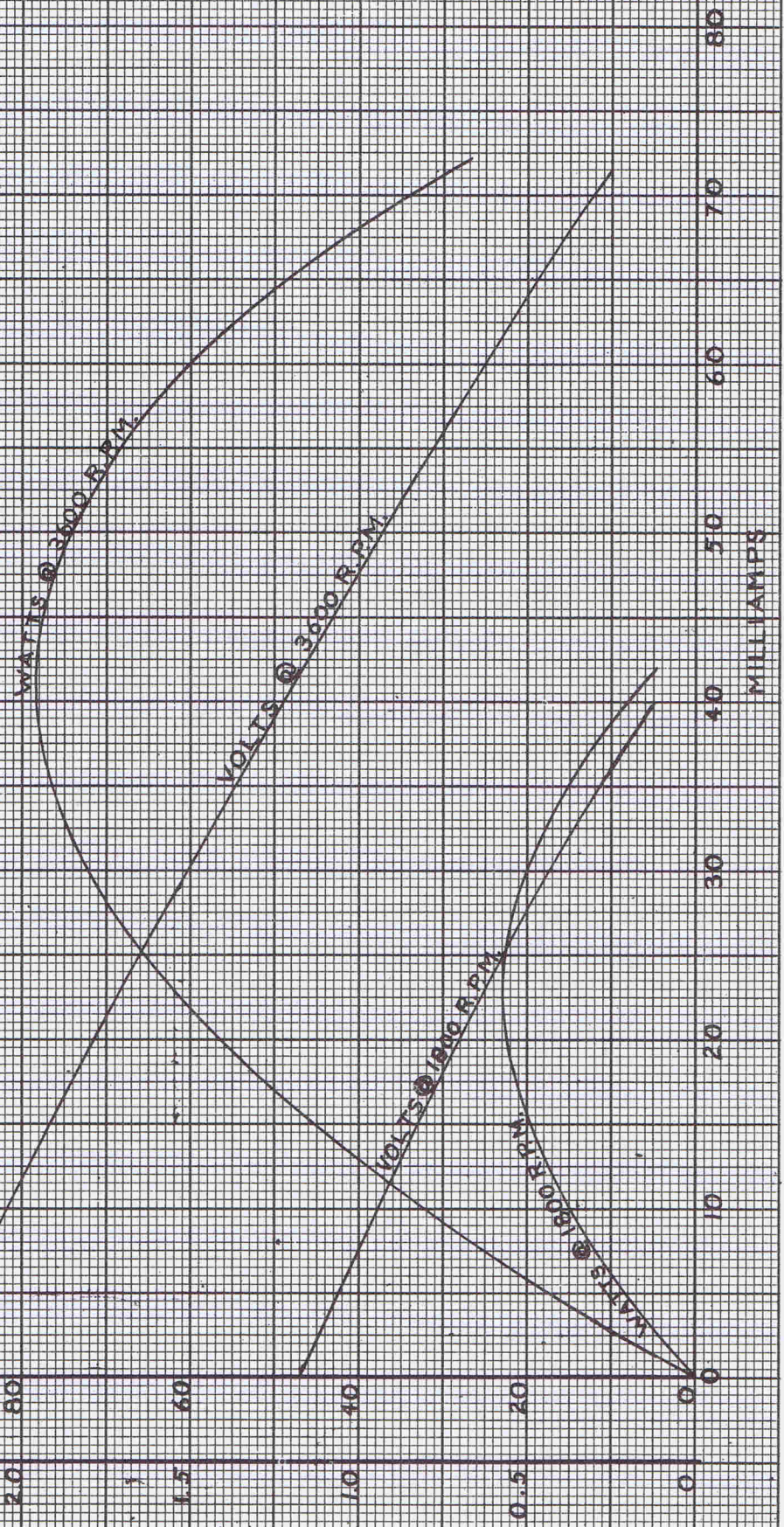
Milliamperes

Curve #208

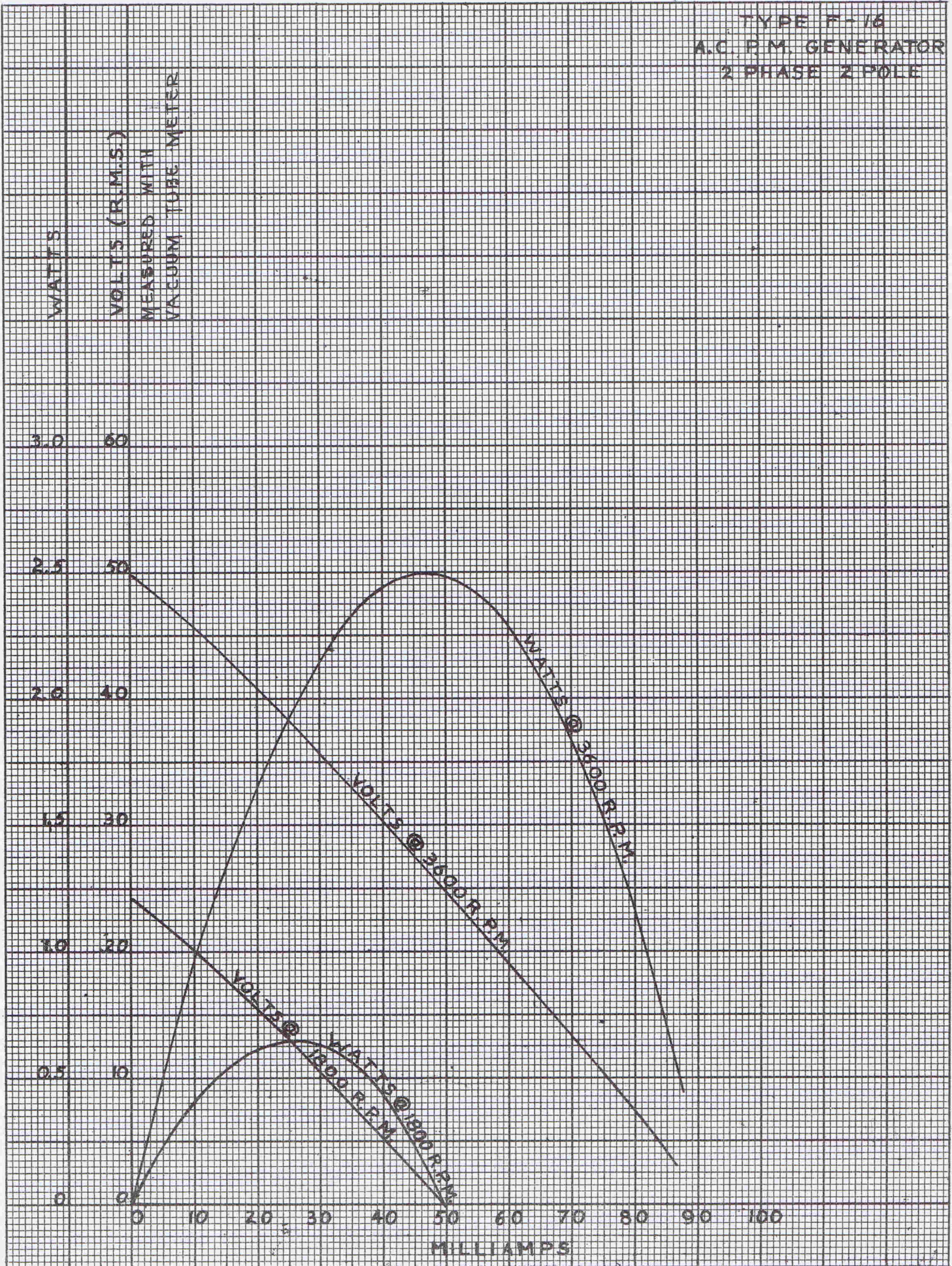


WATTS
VOLTS (R.M.S.)
TAKEN WITH VACUUM
TUBE VOLT METER

TYPE 15
AC. P.M. GENERATOR
1 PHASE 2 POLE



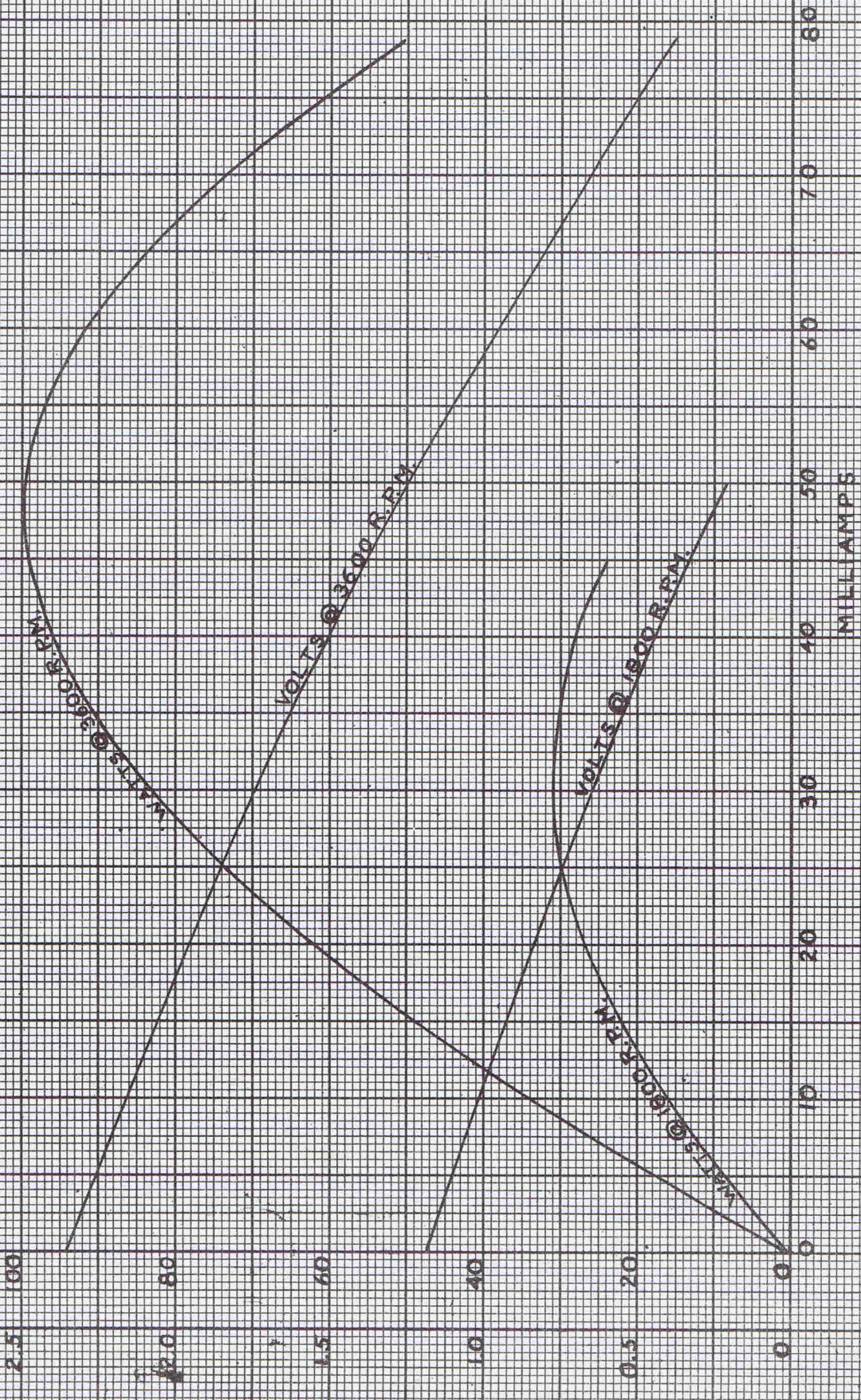
TYPE F-16
A.C. P.M. GENERATOR
2 PHASE 2 POLE



CURVE NO. 230

TYPE 96
A.C. R.M. GENERATOR
1 PHASE 4 POLE

WATTS
VOLTS (R.M.S.)
TAKEN WITH VACUUM
TUBE VOLT METER



CURVE NO. 231

TYPE F-17
A.C. P.M. GENERATOR
3 PHASE 2 POLE

MEASURED WITH
VACUUM TUBE METER

WATTS

VOLTS (R.M.S.)

50

40

30

20

10

0

20

40

60

80

100

120

140

160

MILLIAMPS

WATTS @ 3600 R.P.M.

VOLTS @ 3600 R.P.M.

VOLTS @ 1800 R.P.M.

WATTS @ 1800 R.P.M.

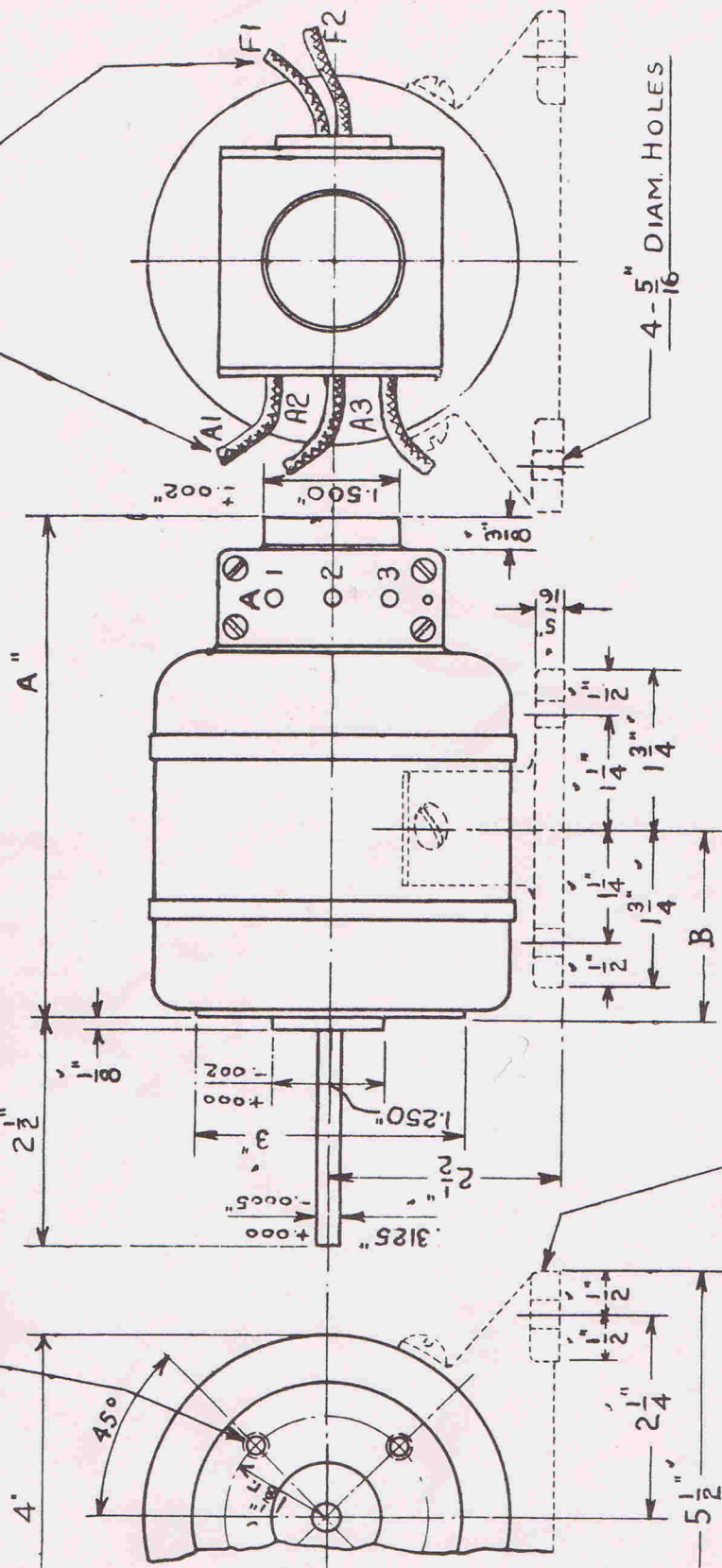
CURVE NO. 233

5 FLEXIBLE LEADS

18" LONG

4-5/16 DIAM. HOLES

4 HOLES #10-32 TAP SCREWS MUST NOT ENTER THIS MOUNTING FACE MORE THAN 3/8".



MOUNTING BASE FURNISHED ONLY
WHEN SPECIFIED ON ORDER

ALSO BE FURNISHED WITH ONE STANDARD
ELINCO FRONT END BELLS FOLLOWS "A5", "A1", "A"

TYPE	DIMENSIONS	
	A	B
J-1	5 5/8"	2 1/16"
J-2.5	6 3/8"	2 7/16"
*J-1/34	5 5/8"	2 1/16"
*J-2.5/34	6 3/8"	2 7/16"

*Note: These Motors have 34 Volt Secondary for Operation With "MIDGETS".

PART LIST DWG. C-988

ELECTRIC INDICATOR COMPANY - STAMFORD, CONN.

HIGH TORQUE "ELINCO" TYPE J-1 & J-2.5 SELF-SYNCHRONOUS MOTORS.

REVISED DATE APPROVED

TABLE
Added Screw
Note

12-11-42
8-23-43

J. J. K.
R. J. K.

THIS DRAWING MUST NOT BE USED
FOR CONSTRUCTION UNTIL DATED
AND SIGNED AS CHECKED AND
APPROVED

DESTROY ALL PRINTS MADE
PREVIOUS TO DATE OF LAST REVISION

MADE: ☒ DATE: 3-31-37

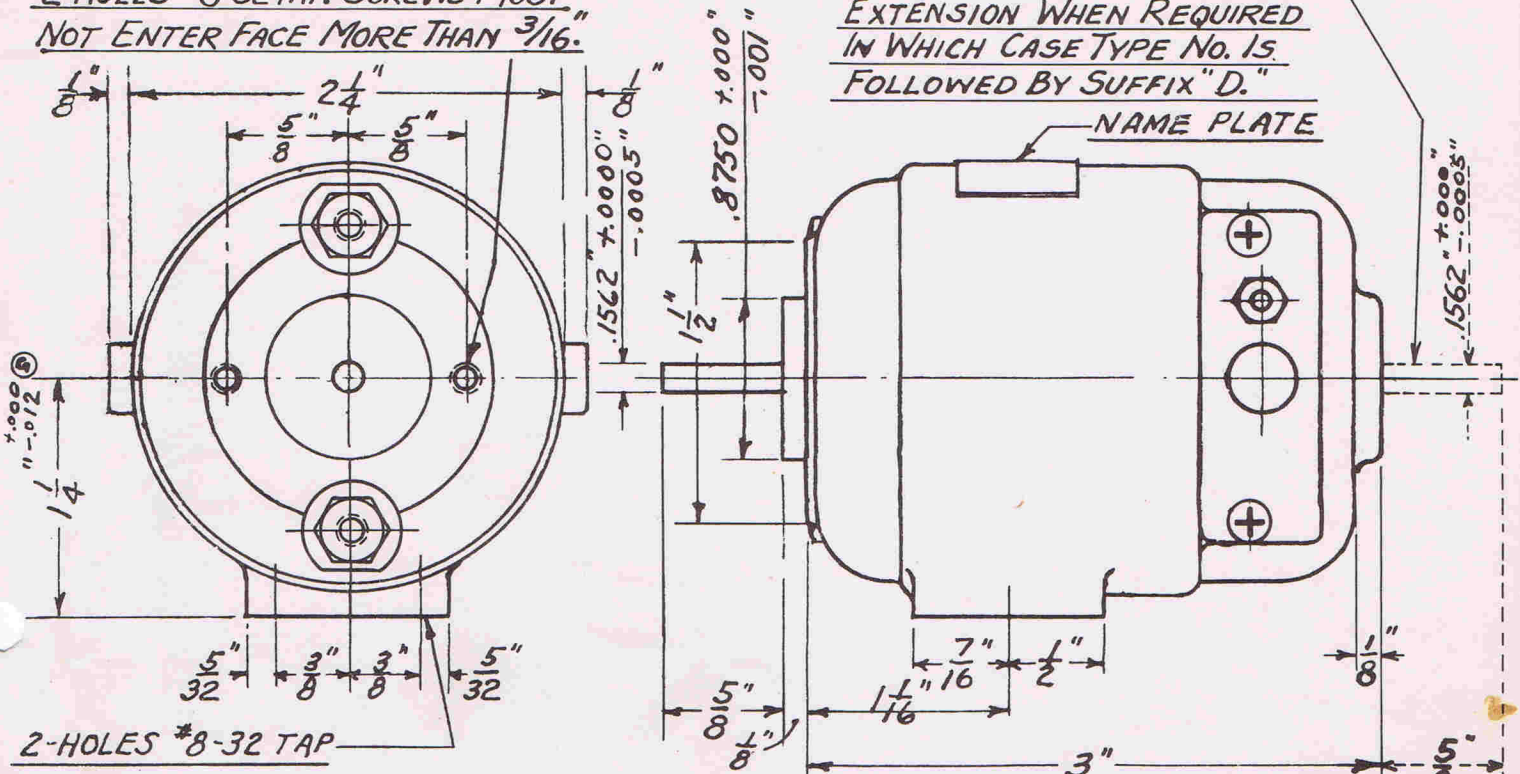
CHECKED: ☒ APPROVED: ☒

SCALE = HALF SIZE

No. A-496 C

2 HOLES #8-32 TAP. SCREWS MUST
NOT ENTER FACE MORE THAN $\frac{3}{16}$ "

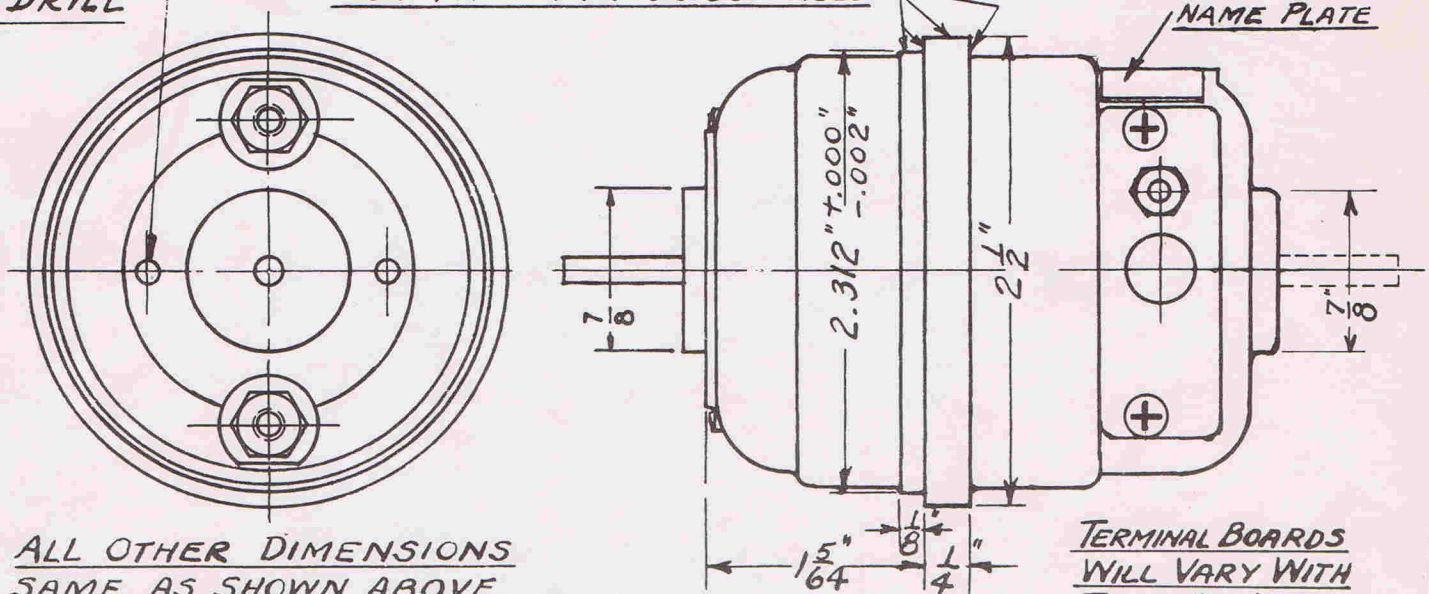
MADE WITH DOUBLE SHAFT
EXTENSION WHEN REQUIRED
IN WHICH CASE TYPE NO. 15
FOLLOWED BY SUFFIX "D."



— TYPE "B" BASE MOUNTED —

2 HOLES
#29 DRILL

NO PAINT ON THESE SURFACES



ALL OTHER DIMENSIONS
SAME AS SHOWN ABOVE

TERMINAL BOARDS
WILL VARY WITH
TYPE OF MOTOR.

— TYPE "F" FLANGE MOUNTED —

ELECTRIC INDICATOR COMPANY - STAMFORD, CONN.

"ELINCO" MIDGET D.C. MOTORS

REVISED	DATE	APPROVED
E.F.B.	3-3-42	
WAS 5/8 AGE	10-26-42	
CHANGED BASE	10-15-43	
Added Note	11-5-43	
Added Rear	6-30-44	
REVISOR		

THIS DRAWING MUST NOT BE USED
FOR CONSTRUCTION UNTIL DATED
AND SIGNED AS CHECKED AND
APPROVED

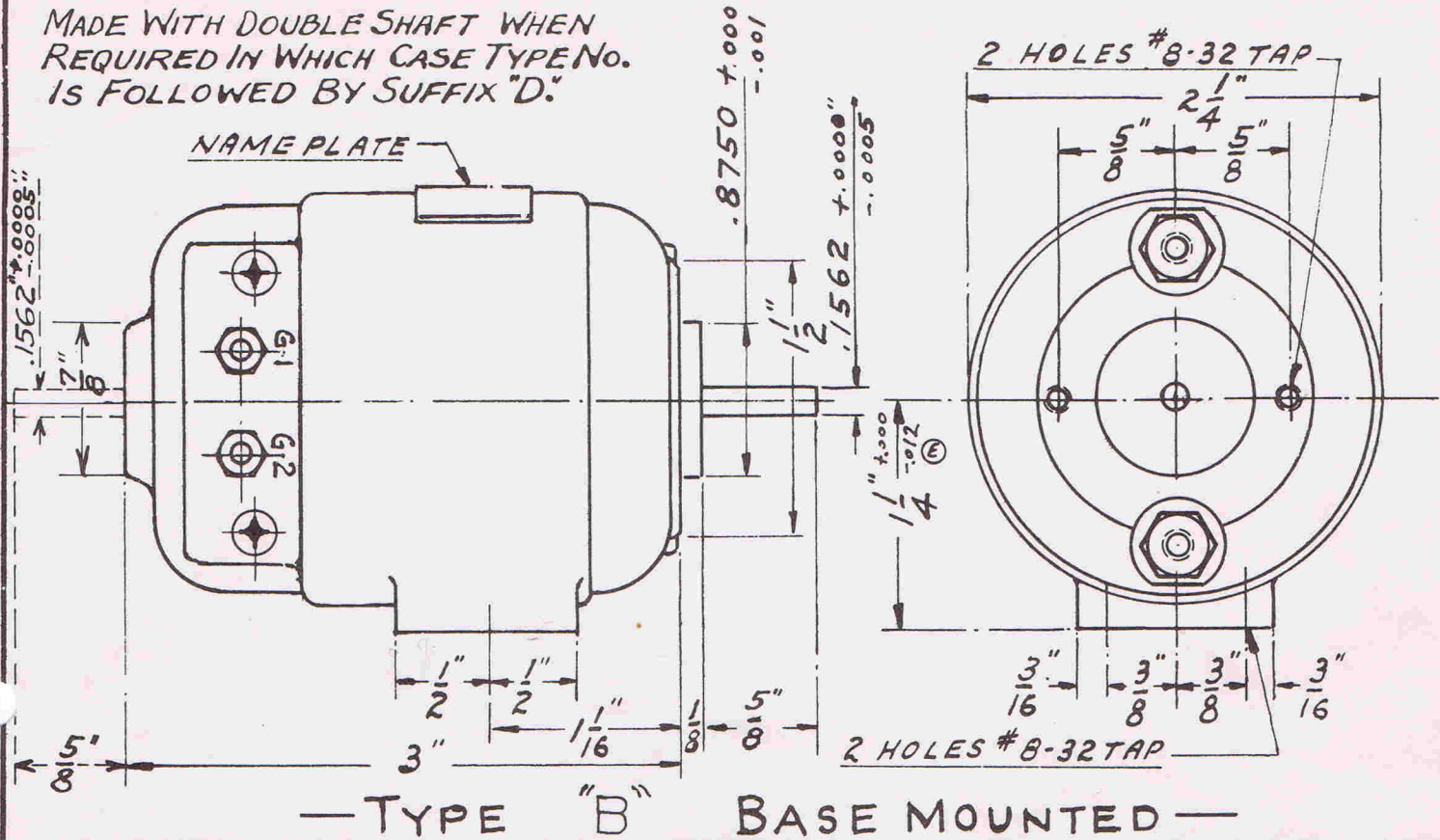
DESTROY ALL PRINTS MADE
PREVIOUS TO DATE OF LAST REVISION

MADE: J.B.A	DATE: 8-19-40
CHECKED: T	APPROVED: R.T.
SCALE: -	

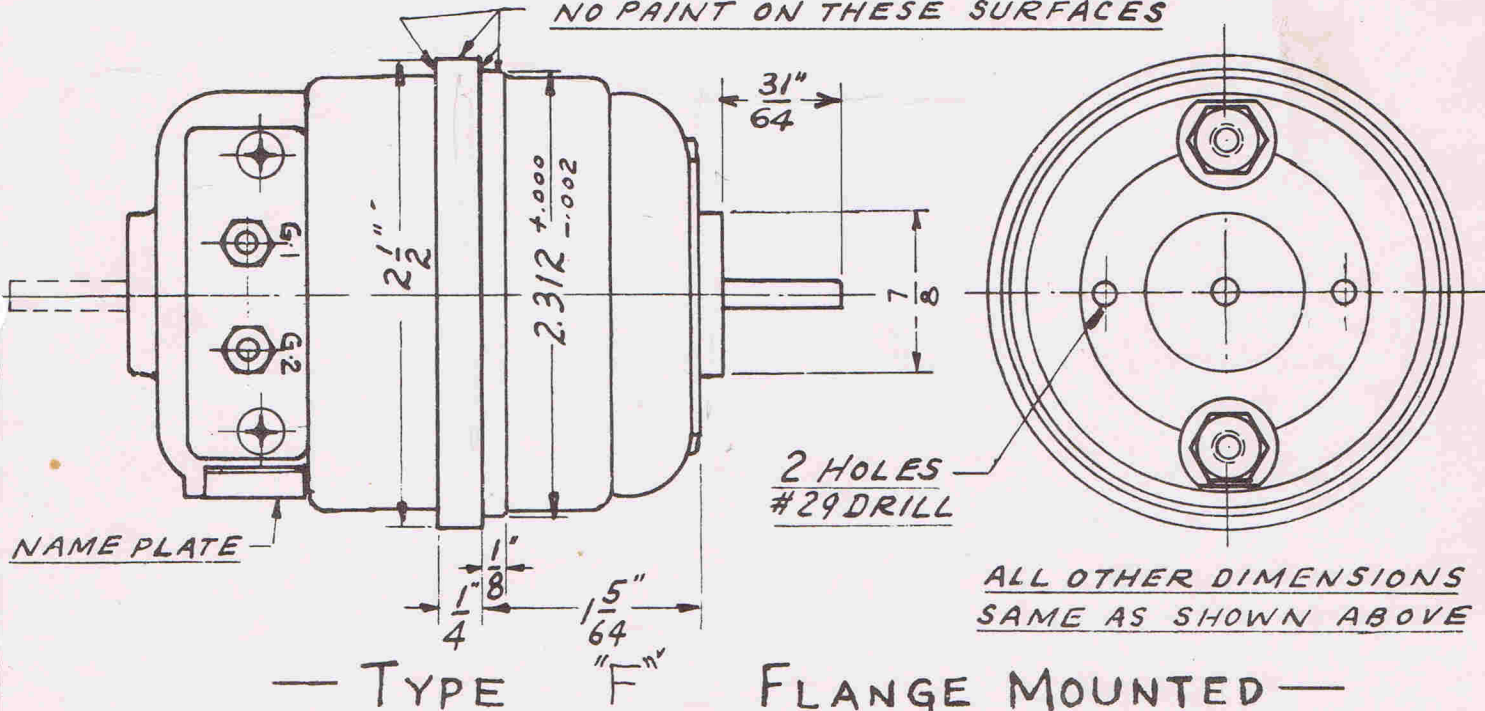
No. A-585G

MADE WITH DOUBLE SHAFT WHEN
REQUIRED IN WHICH CASE TYPE No.
IS FOLLOWED BY SUFFIX "D."

NAME PLATE



NO PAINT ON THESE SURFACES



ELECTRIC INDICATOR COMPANY - STAMFORD, CONN.

ELINCO MIDGET D.C. PERMANENT MAGNET GENERATORS

REVISED DATE APPROVED

E.F.B. 3-3-42

AWAG SR AGE 10-26-42

REVISED REAR CAP

ADDED Tol. 2-12-47

THIS DRAWING MUST NOT BE USED
FOR CONSTRUCTION UNTIL DATED
AND SIGNED AS CHECKED AND
APPROVED

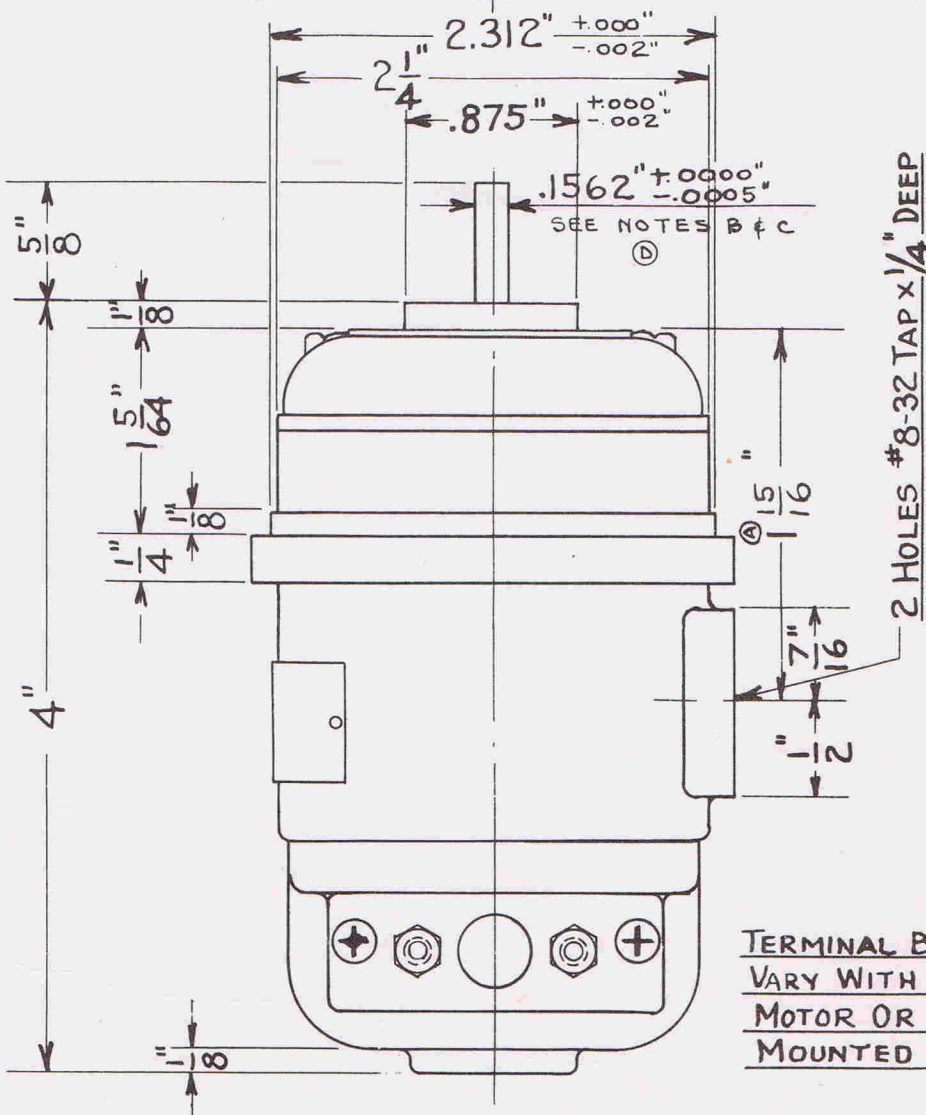
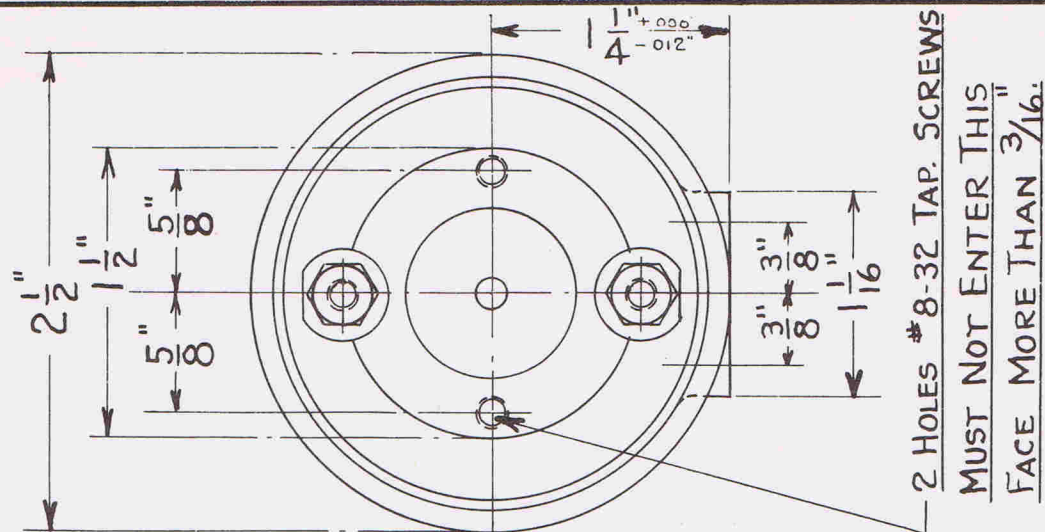
DESTROY ALL PRINTS MADE
PREVIOUS TO DATE OF LAST REVISION

MADE: E.F.B. DATE: 2-19-42

CHECKED: T APPROVED: E.F.B.

SCALE =

No. A-642 E



② CERTAIN "FB" FRAME UNITS
MADE WITH SHAFT EXTENSION
DIAMETER OF $.2188"$ $+\frac{.0000}{-.0005}$
③ OR $.2495"$ $+\frac{.0000}{-.0005}$

ELECTRIC INDICATOR CO.

STAMFORD, CONN.

ELINCO TYPE "FB" FRAME

REVISED	DATE	APPROVED
① WAS $1\frac{27}{32}"$	5-29-44	ES
Added note	5-8-45	ES
ADDED	6-12-46	ES
Added Note	2-12-47	ES

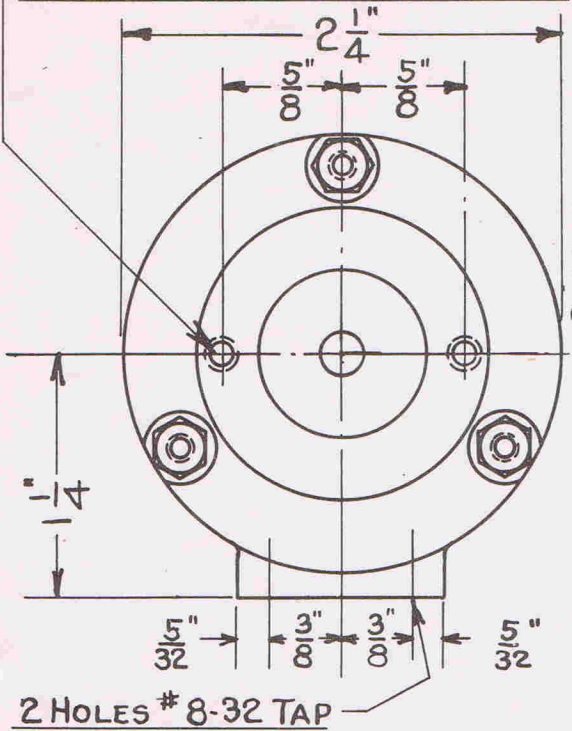
THIS DRAWING MUST NOT BE USED
FOR CONSTRUCTION UNTIL DATED
AND SIGNED AS CHECKED AND
APPROVED

DESTROY ALL PRINTS MADE
PREVIOUS TO DATE OF LAST REVISION

MADE: **J** DATE: 10-2-43
CHECKED: APPROVED: **J**
SCALE = **M.T.S.**

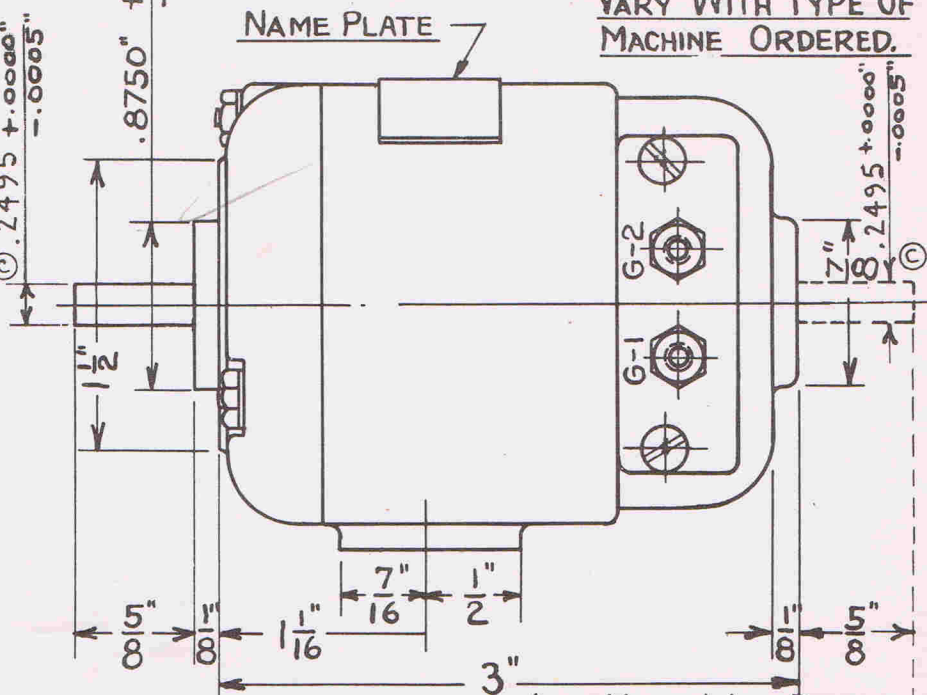
No. **A-751D**

2 HOLES #8-32 TAP. SCREWS MUST NOT ENTER FACE MORE THAN $\frac{3}{16}$ ".



① PREFERRED FRAME SHOWN ON DWG. NO. A-930

TERMINAL BOARD WILL VARY WITH TYPE OF MACHINE ORDERED.

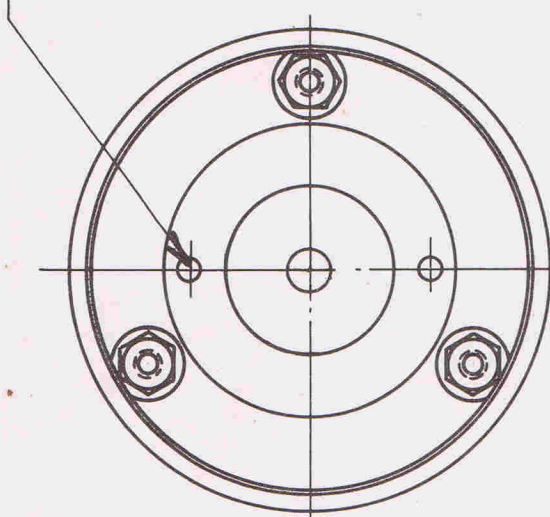


TYPE "B" BASE MOUNTED

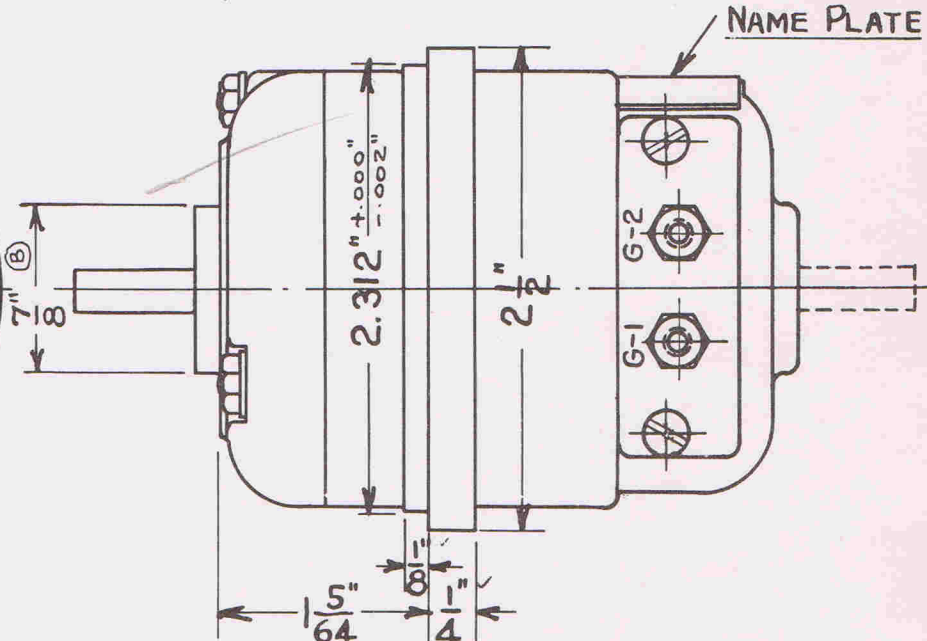
ALSO MADE WITH DOUBLE EXTENSION WHEN REQ'D.

2 HOLES #29 DRILL

① PREFERRED FRAME SHOWN ON DWG. NO. A-930



ALL OTHER DIMENSIONS SAME AS SHOWN ABOVE



TYPE "F" FLANGE MOUNTED

ELECTRIC INDICATOR CO.,

STAMFORD, CONN.

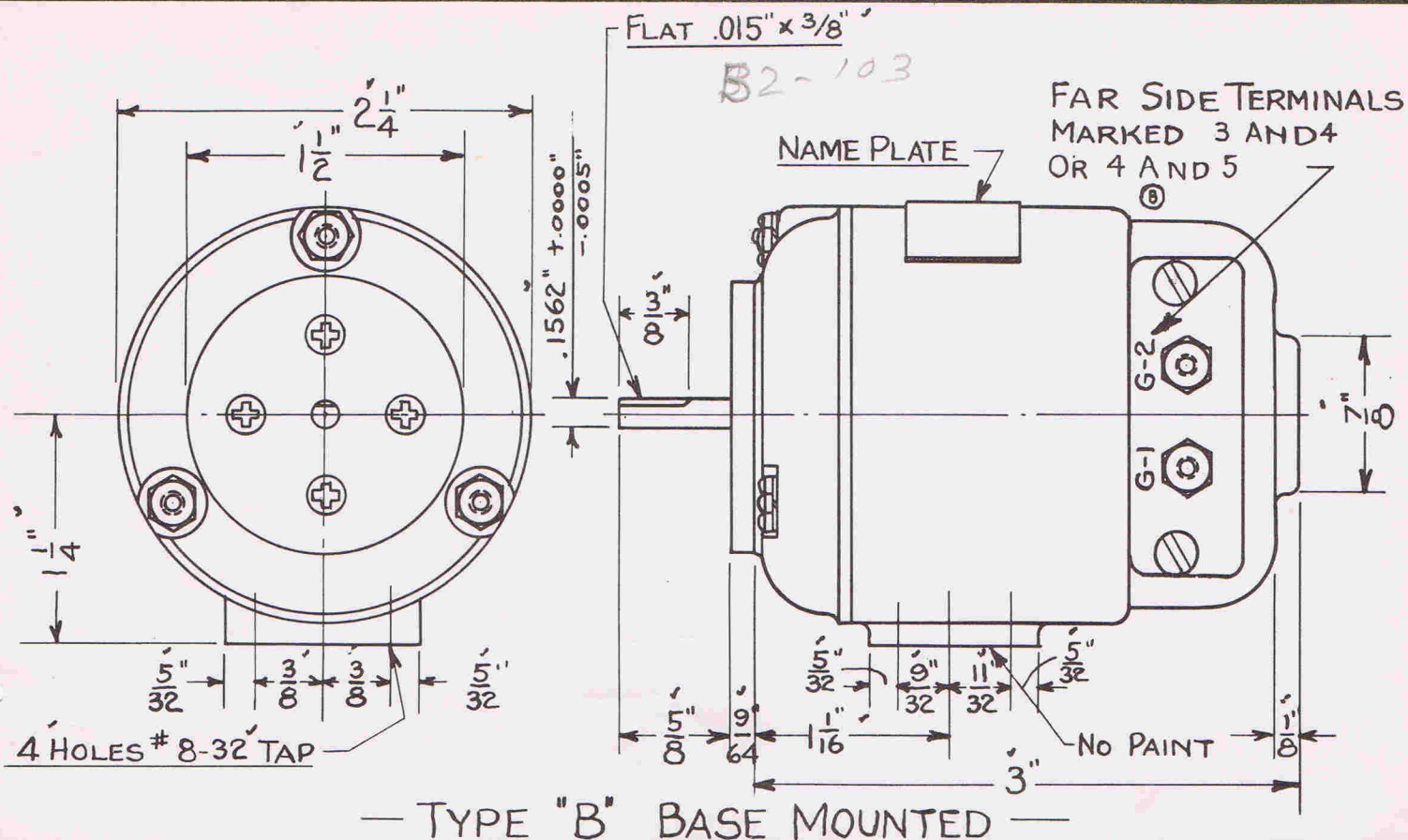
ELINCO MIDGET A.C. MOTORS & GENERATORS

REVISED	DATE	APPROVED
Was .1562"	9-22-44	R. J. H.
Added dimension	5-1-45	P. J. H.
Was .2188	2-12-47	R. J. H.
Added notes	7-27-48	

THIS DRAWING MUST NOT BE USED FOR CONSTRUCTION UNTIL DATED AND SIGNED AS CHECKED AND APPROVED

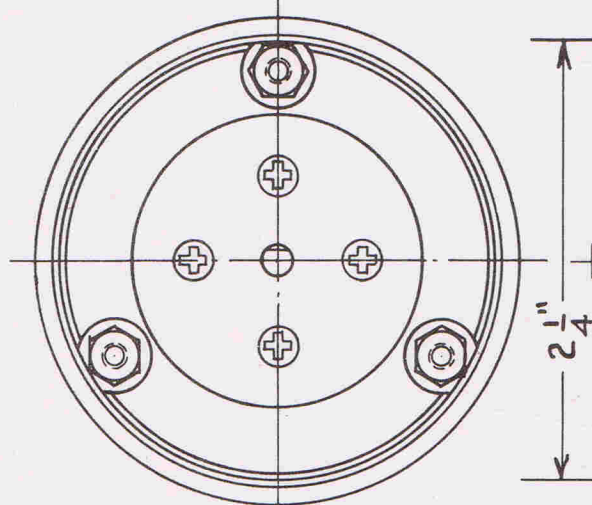
DESTROY ALL PRINTS MADE PREVIOUS TO DATE OF LAST REVISION

MADE: A	DATE: 10-13-43
CHECKED: T	APPROVED: R. J. H.
SCALE =	NONE
No.	A-7530

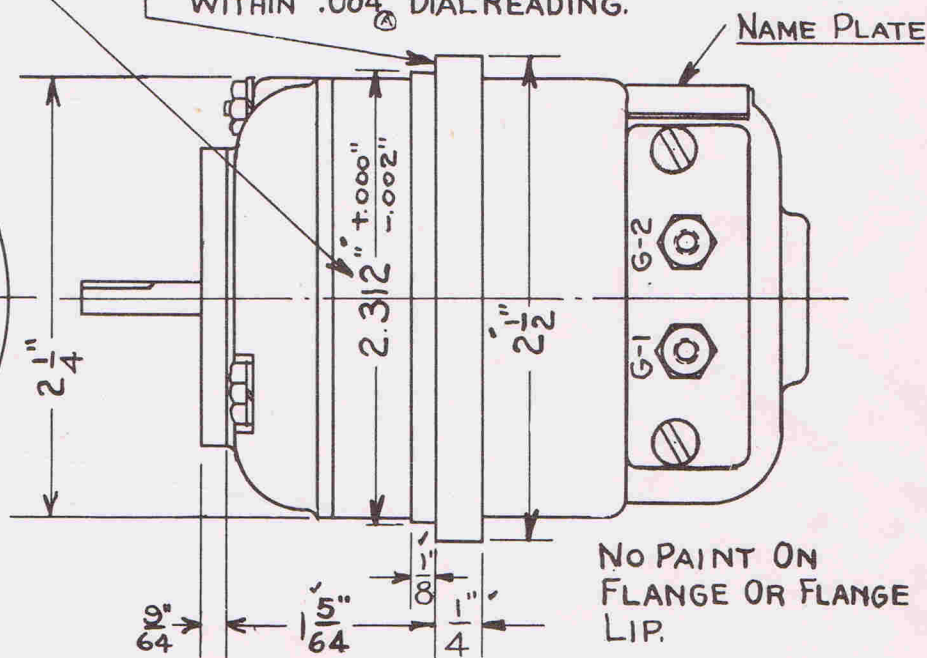


THIS DIAMETER CONCENTRIC WITH SHAFT WITHIN .004" DIAL READING

THIS SURFACE SQUARE WITH SHAFT WITHIN .004" DIAL READING.



ALL OTHER DIMENSIONS SAME AS SHOWN ABOVE



— TYPE "F" FLANGE MOUNTED —

ELECTRIC INDICATOR CO.,

STAMFORD, CONN.

ELINCO DRAG CUP GENERATORS & MOTORS

REVISED	DATE	APPROVED
WAS .002"	10-2-44	EDJ
REVISED & ADDED	6-1-49	

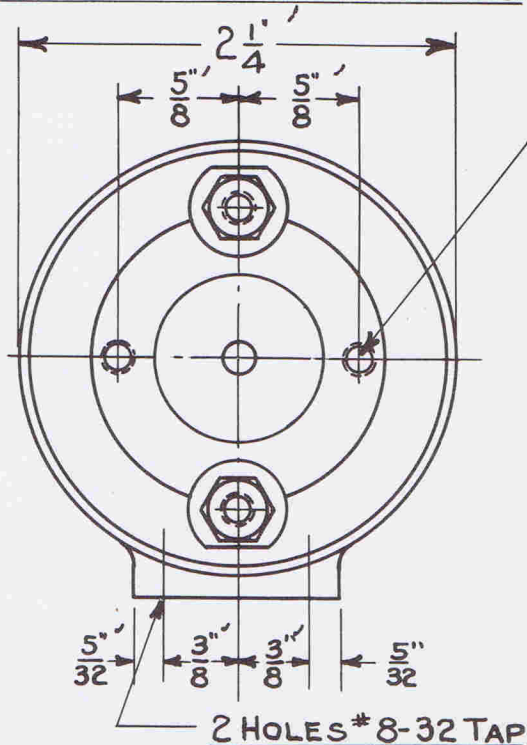
THIS DRAWING MUST NOT BE USED FOR CONSTRUCTION UNTIL DATED AND SIGNED AS CHECKED AND APPROVED

DESTROY ALL PRINTS MADE PREVIOUS TO DATE OF LAST REVISION

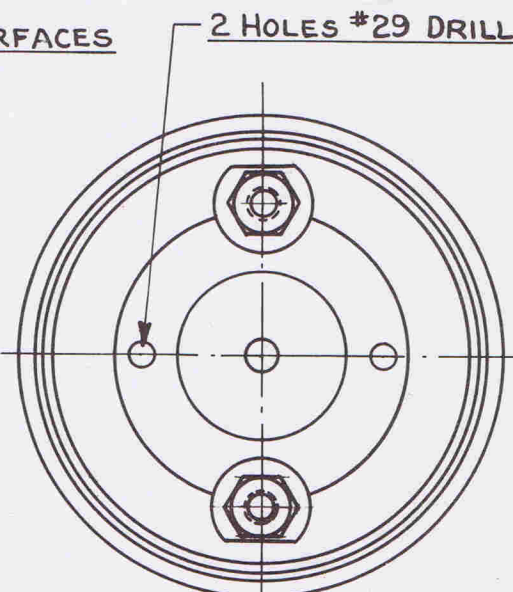
MADE: *HL* DATE: 5-19-44
CHECKED: *7* APPROVED: *EDJ*
SCALE = *—*

No. A-812 B

2 HOLES #8-32 TAP, 'SCREWS MUST
NOT ENTER FACE MORE THAN $\frac{3}{16}$ "



TYPE "MI-1" BASE MOUNTED



ALL OTHER DIMENSIONS
SAME AS SHOWN ABOVE

TYPE "M1-2" FLANGE MOUNTED

ELECTRIC INDICATOR CO.

STAMFORD, CONN.

ELINCO MIDGET SELF-SYNCHRONOUS MOTORS

THIS DRAWING MUST NOT BE USED
FOR CONSTRUCTION UNTIL DATED
AND SIGNED AS CHECKED AND
APPROVED

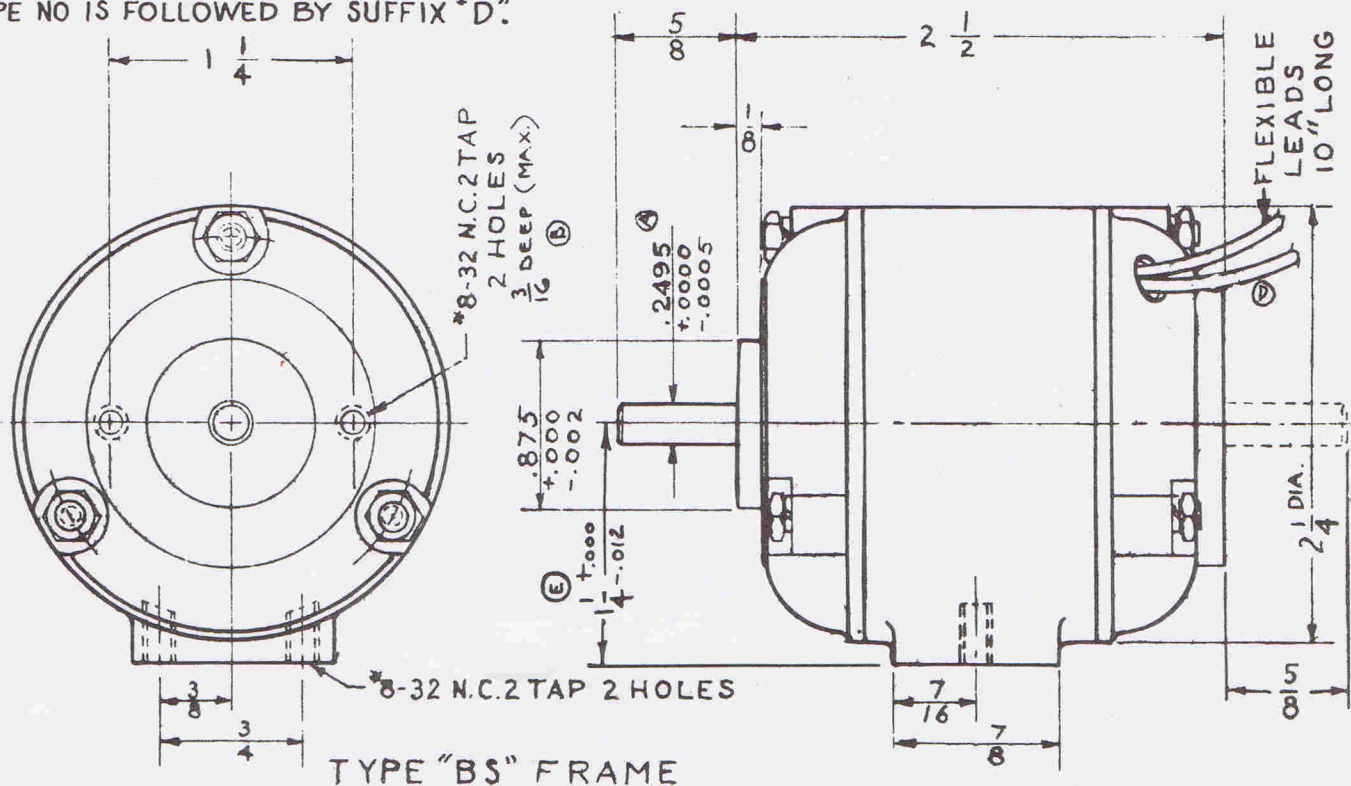
DESTROY ALL PRINTS MADE
PREVIOUS TO DATE OF LAST REVISION

MADE: H DATE: 7-3-44
CHECKED: APPROVED [Signature]
SCALE = NTS

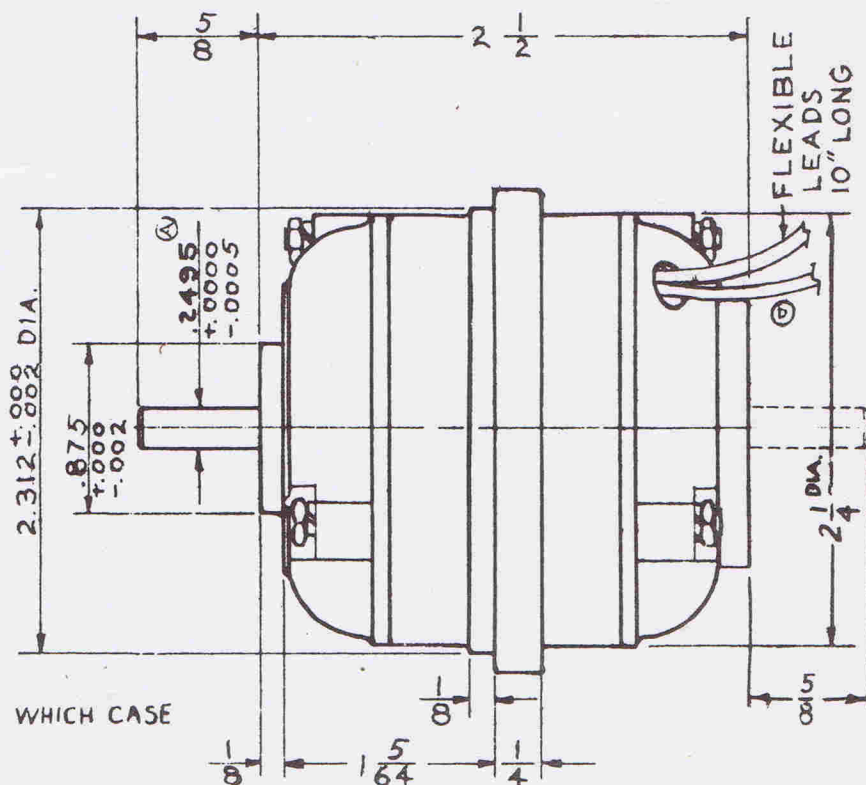
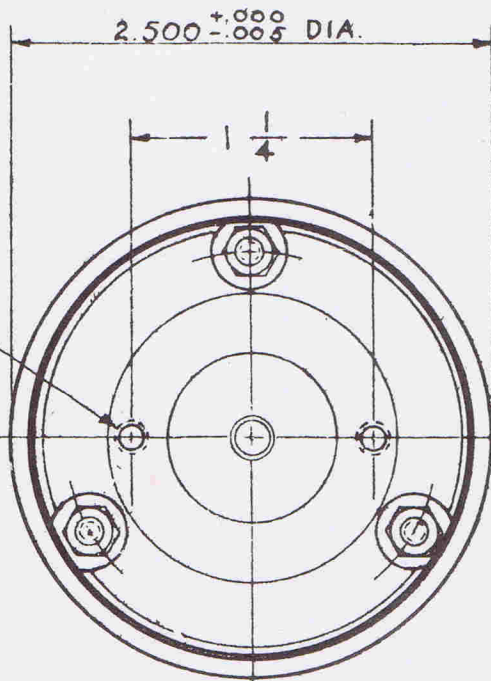
No. A-828 C

MADE WITH DOUBLE END SHAFT WHEN REQ. IN WHICH
CASE TYPE NO IS FOLLOWED BY SUFFIX "D".

①



*8-32 N.C.2 TAP
2 HOLES $\frac{3}{16}$ DEEP (MAX.)



②
MADE WITH DOUBLE END SHAFT WHEN REQ. IN WHICH
TYPE NO. IS FOLLOWED BY SUFFIX "D".

TYPE "FS" FRAME

ELECTRIC INDICATOR COMPANY - STAMFORD, CONN.

"ELINCO" TYPES "BS" & "FS" FRAMES

REVISED	DATE	APPROVED
WAS. 2188	1-21-46	R.A.J.
ADDED NOTE	8-23-46	R.A.J.
REV. BASE	1-12-47	R.A.J.
ADDED	6-1-49	
ADDED TOL.	5-1-50	

THIS DRAWING MUST NOT BE USED
FOR CONSTRUCTION UNTIL DATED
AND SIGNED AS CHECKED AND
APPROVED

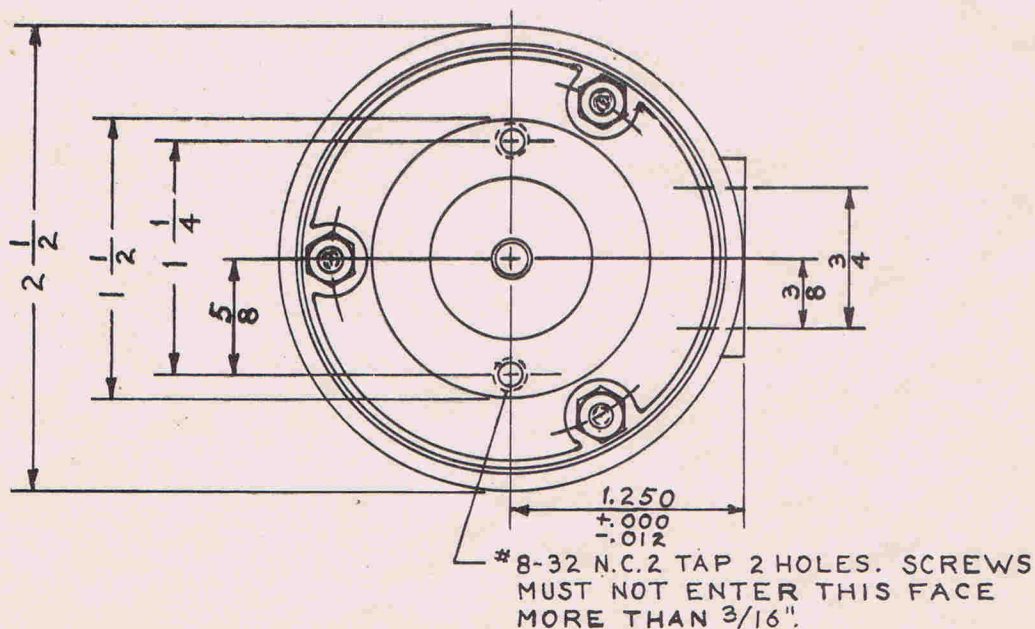
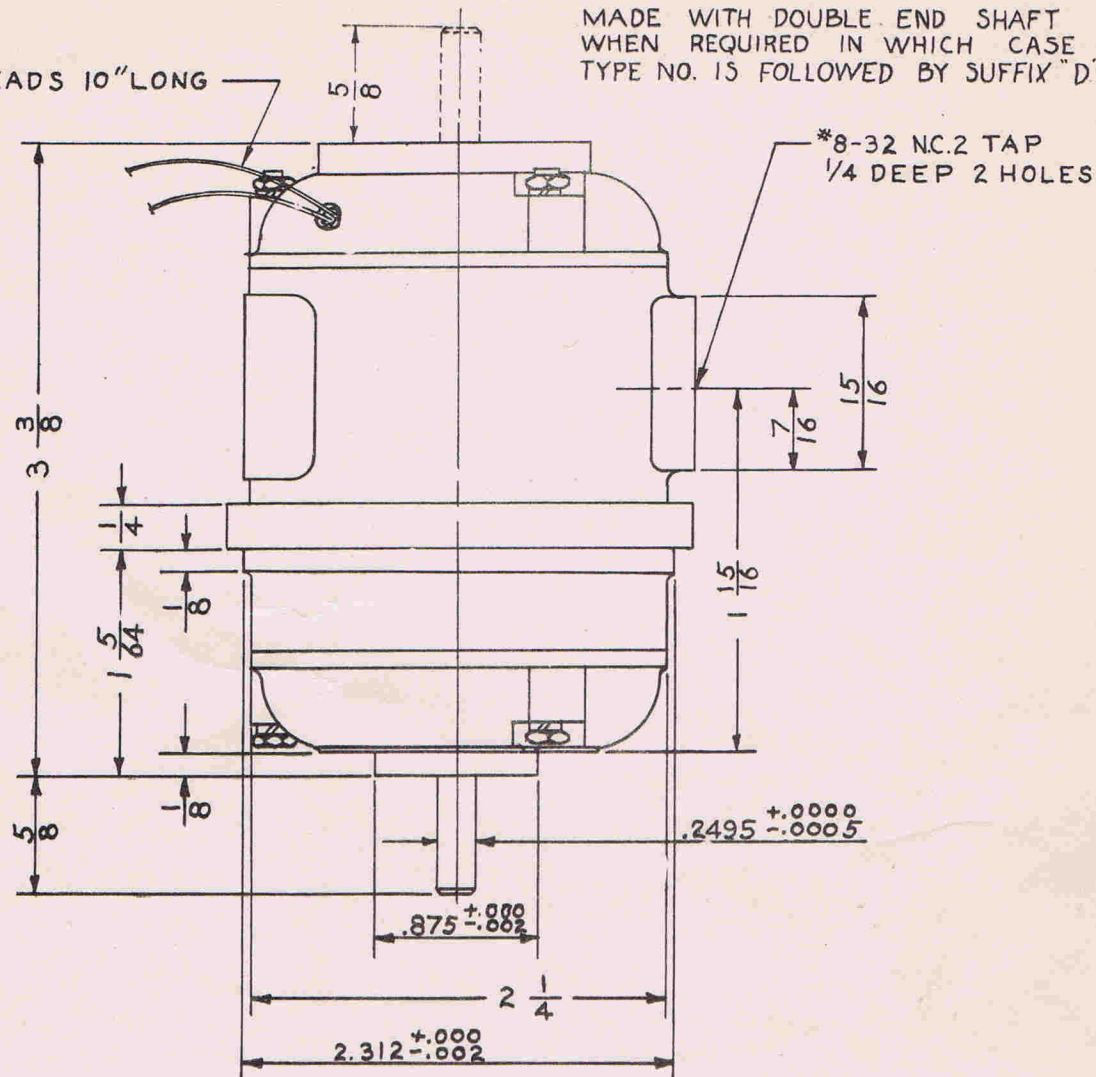
DESTROY ALL PRINTS MADE
PREVIOUS TO DATE OF LAST REVISION

MADE: F.S.P. DATE: 9-4-45
CHECKED: APPROVED R.A.J.
SCALE = 1:1

No. A-930 E

FLEXIBLE LEADS 10" LONG

MADE WITH DOUBLE END SHAFT
WHEN REQUIRED IN WHICH CASE
TYPE NO. IS FOLLOWED BY SUFFIX "D"



"ELINCO" TYPE "FBS" FRAME

MADE:

F.S.P.

CH. KD.

B. L.

DATE:

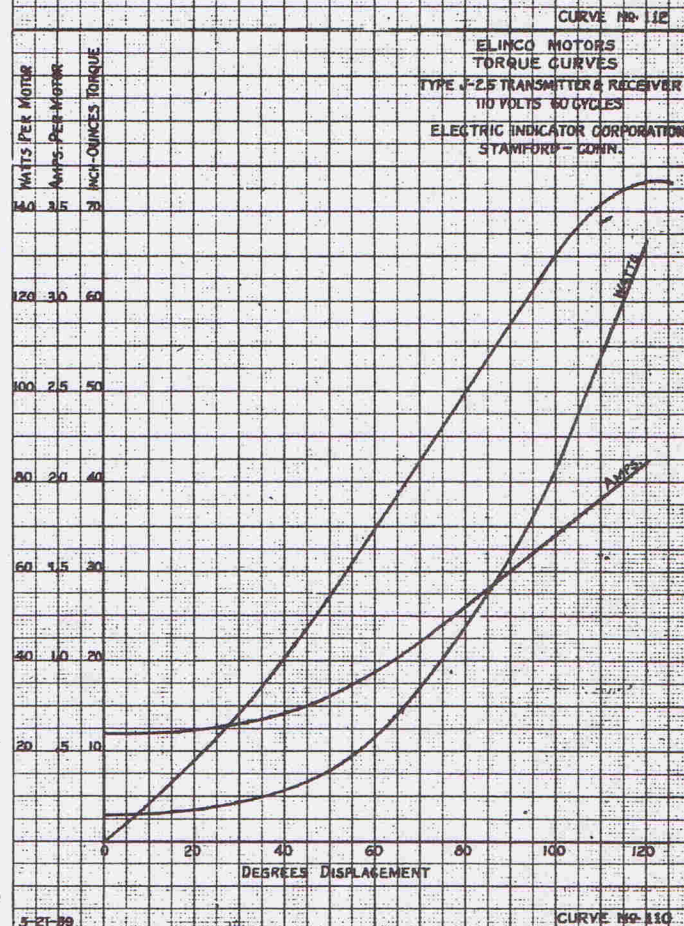
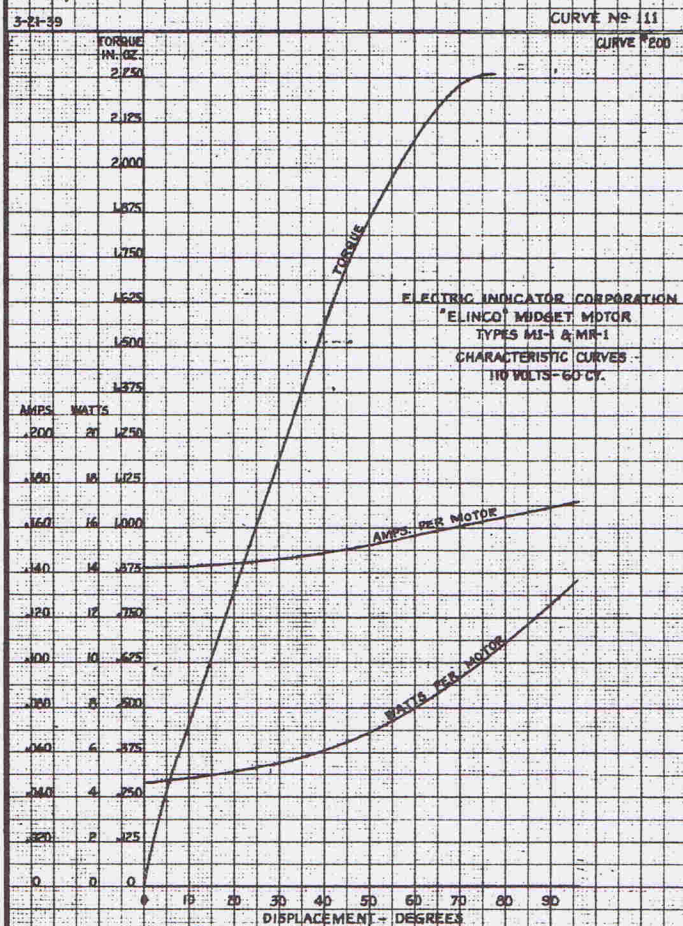
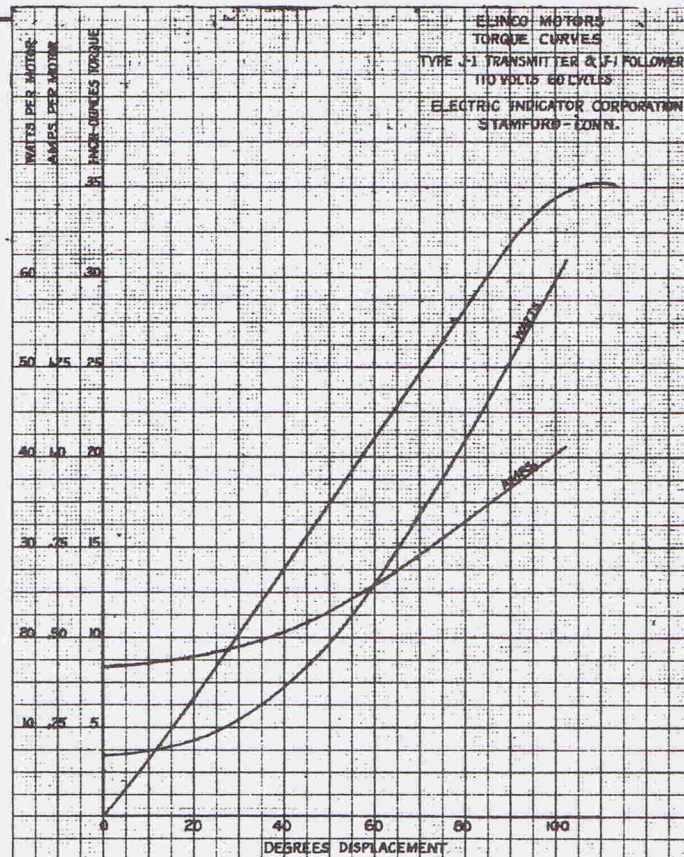
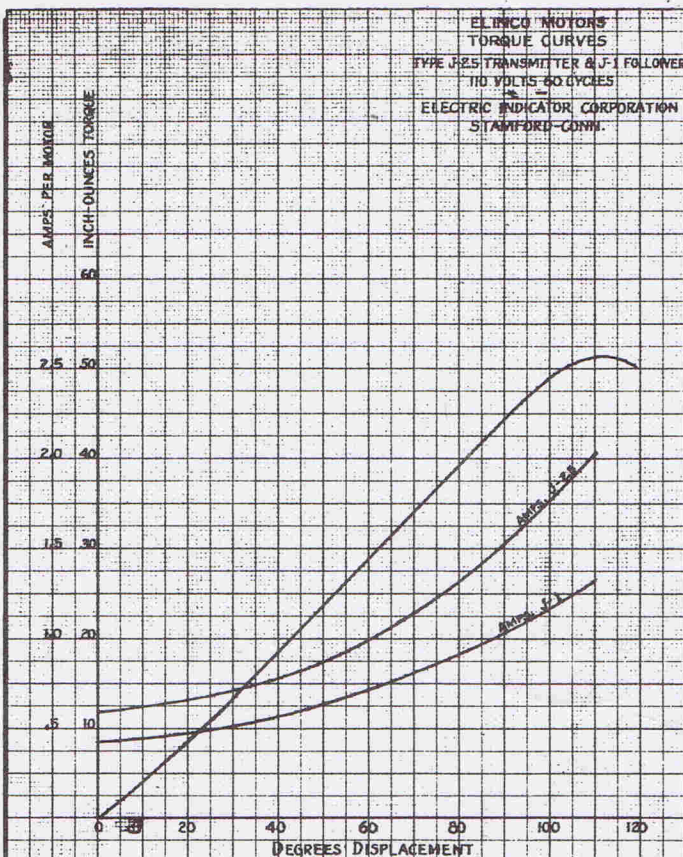
10-25-45

APP'D.

R. J. H.

No. A-944

ELECTRIC INDICATOR CO. - STAMFORD, CONN.

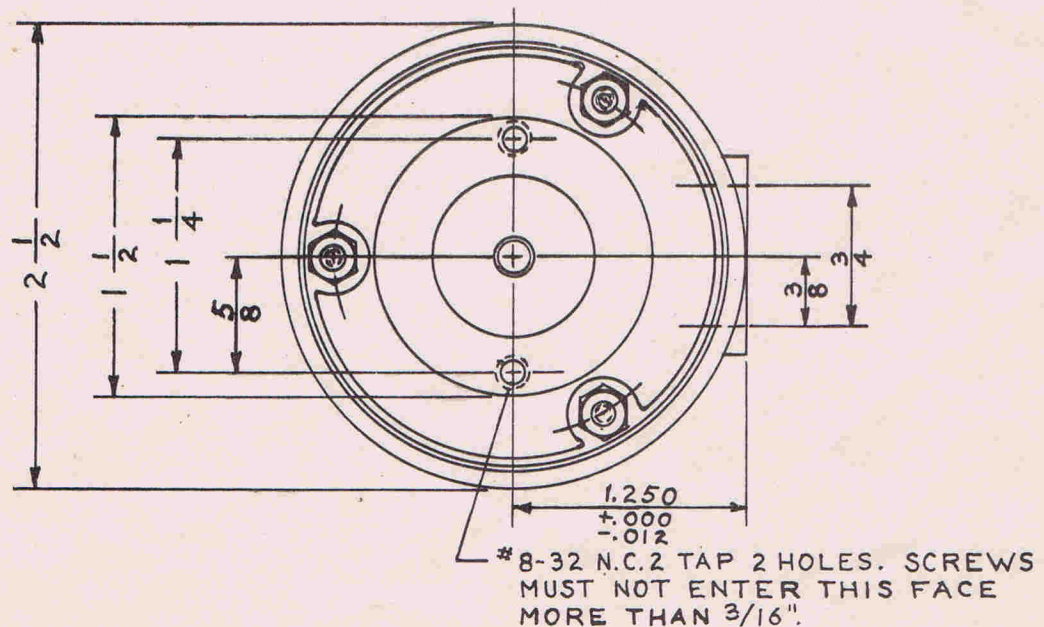
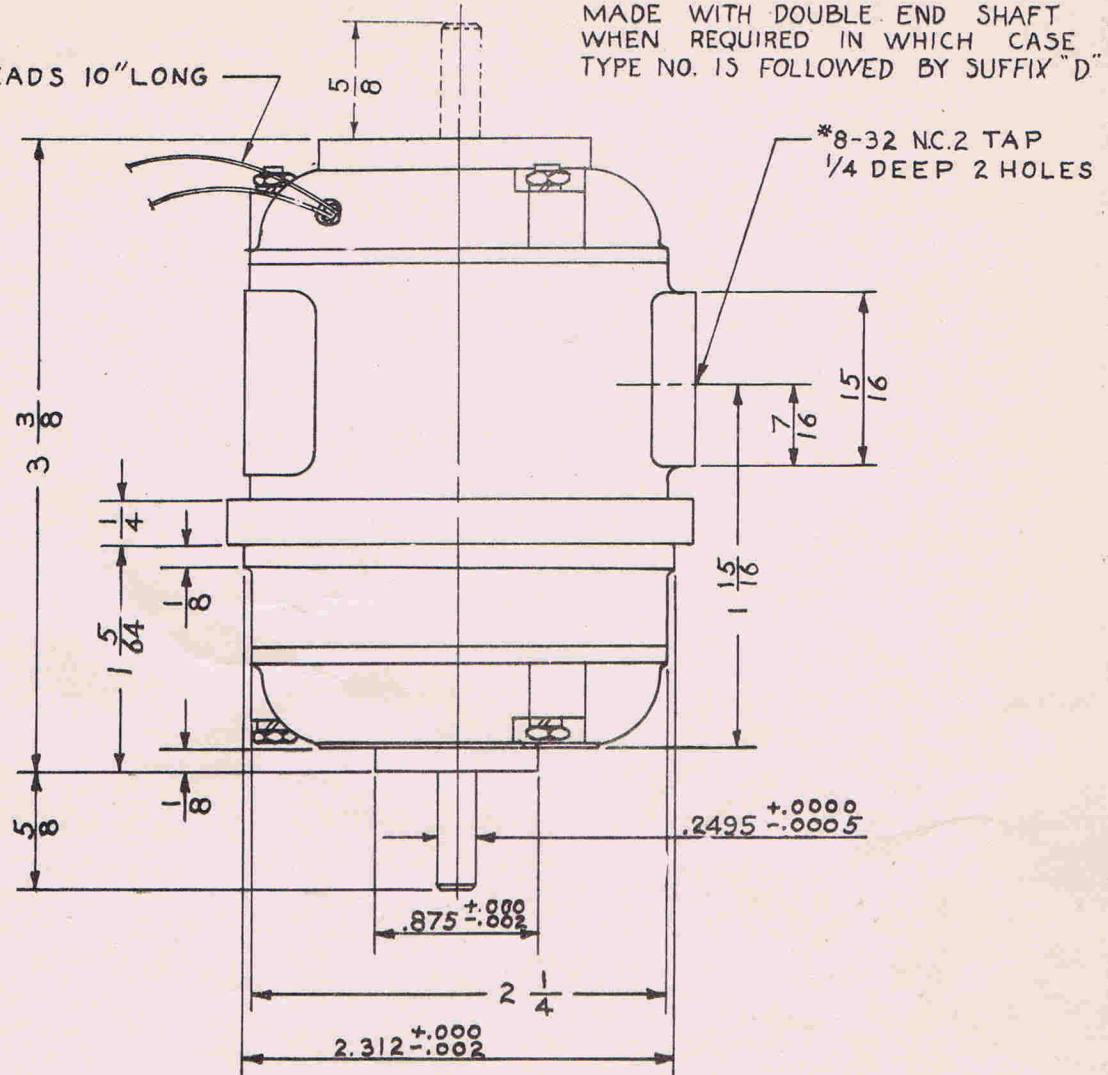


SELF SYNCHRONOUS MOTOR CURVES

MADE J.M.R.	APP D	DATE 6-22-46	SCALE	NO. C-1038
ELECTRIC INDICATOR COMPANY - STAMFORD, CONN.				

FLEXIBLE LEADS 10" LONG

MADE WITH DOUBLE END SHAFT
WHEN REQUIRED IN WHICH CASE
TYPE NO. IS FOLLOWED BY SUFFIX "D"



"ELINCO" TYPE "FBS" FRAME

MADE:

F.S.P.

CH'KD.

B.L.

DATE:

10-25-45

APP'D.

R.J.H.

ELECTRIC INDICATOR CO. - STAMFORD, CONN.

No. A-944

