

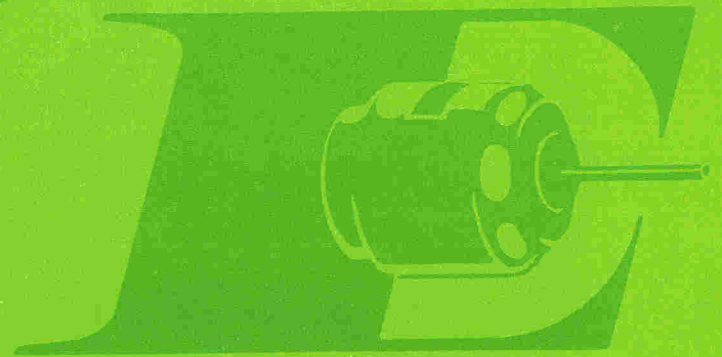
D. C. GENERATORS

D. C. PERMANENT MAGNET TACHOMETER GENERATORS • D. C. WOUND FIELD GENERATORS

A. C. GENERATORS

A. C. PERMANENT MAGNET GENERATORS • A. C. SINE WAVE GENERATORS

F R A C T I O N A L



H O R S E P O W E R

DUNCO

MOTORS • GENERATORS • PRECISION PRODUCTS SINCE 1926

This catalog provides complete electrical characteristics and physical specifications on approximately 175 representative ELINCO A.C. and D.C. generators.

ELINCO's large Engineering Staff has worked for many years with leading engineers on difficult problems of heat, humidity, shock, vibration, torque, acceleration, weight, mounting, and special design. This engineering is available to assist you with your problems.

NOTE: A large stock of standard parts is maintained, but the great variety of units offered precludes carrying an inventory of completed motors. Standard catalog items require reasonable time for assembly and testing, units of special design proportionately longer.



GUARANTEES: The general guarantees as recommended by N.E.M.A., by which this Company has always abided, are as follows:

"The manufacturer agrees to correct, and shall have the right to correct, by repair or replacement, at his own expense, at his option, F.O.B., his works, any defects in said apparatus which may develop under normal and proper use within twelve months after date of shipment, when inspection proves the claim; providing the purchaser gives the manufacturer immediate written notice of such defects, and provided further that during said period said apparatus is properly cared for, operated under normal conditions and with competent supervision. The correction of such defects by repair or replacement by the manufacturer shall constitute a fulfillment of all his obligations to the purchaser.

"The manufacturer shall not be responsible for any damage resulting from improper storage or handling prior to placing the apparatus in service, and the manufacturer shall not assume any expense or liability for repairs made outside his works, without his written consent.

"The manufacturer shall not be liable for consequential damage in case of any failure to meet the conditions of any guarantee."

Electric Indicator Company, Inc., 272 Main Ave., Norwalk, Conn. 06851, Phone (203) 847-5861

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DC PM TACHOMETER GENERATORS

"ELINCO" D.C. Permanent Magnet Tachometers are used mainly as speed indicating devices. The primary requisites of a speed indicator are: good linearity, minimum temperature variations, minimum ripple voltage, minimum driving torque, variation due to slot lock, repeatability, no aging effects and good life. "ELINCO" D.C. tachometers incorporate the best of all these features and still remain in an economic price range.

CHARACTERISTICS

ELECTRICAL

VOLTAGE RANGE

CB frame 0.25 to 25 volts per 1000 RPM.
B frame 1.0 to 47 volts per 1000 RPM.
BL frame 0.8 to 100 volts per 1000 RPM.
A frame .66 to 170 volts per 1000 RPM.

BRUSHES

The brushes used on tachometers can be either square or rectangular with springs and shunts. Finger brushes with finger type of springs are also used.

- A. Finger type brushes recommended when:
1. Voltage generated must be equal in either direction of rotation.
 2. Speeds do not exceed 3000 RPM.
- B. Square or rectangular brushes recommended when:
1. Speeds are in excess of 3000 RPM.
 2. Lower driving torque.
 3. High currents are required.

COMMUTATORS

For severe environments and for most stable output, silver can be supplied in place of copper.

WINDINGS

The units listed are representative of electrical rating and mechanical configuration which can be furnished.

LINEARITY

Output voltage is linear with speed to $\pm 1\frac{1}{2}\%$ between 200 and 500 RPM and $\pm 1\%$ between 500 and 7000 RPM.

TEMPERATURE COMPENSATED

Tachometers can be temperature compensated to provide outputs proportional to generator speeds over a temperature range of -50°C to $+100^{\circ}\text{C}$ without external temperature compensating networks.

All magnetic materials experience a decrease of flux with increase in temperature. The average flux change in ELINCO Units is .033% per degree C, depending on material, (ie) 150°C change in ambient temperature equals a 5% change in the voltage gradient and accuracy.

Temperature compensation of 1/10% or 1/4% for 150°C temperature range can be furnished at additional cost.

When ordering any of the units listed to be temperature compensated specify the following:

1. % compensation required.
2. Electric load (ohms).
3. Voltage gradient.
4. Temperature range.
5. Operating speed range.

MECHANICAL

FRAME SIZES

Three basic frame sizes with various mounting arrangements are shown in the tachometer section.
CB frame is 1 3/4 inch diameter.

B-F-R-BL-FL-RL frames are 2 1/4 inch diameter.

ASC-ALC frames are 3 3/8 inch diameter.

MOUNTING

Units can be mounted by tapped holes provided in the base on the side of the frame or by tapped or clearance holes on the end of the frame. Ring mounting is provided on some units and special mounting can be provided upon request.

MATERIALS

All frames are aluminum with a black finish. Shafts are machined from steel and ground to size. Laminated stacks are wound with insulated copper wire, impregnated with varnish and baked until cured.

SPECIAL TREATMENT

Treatment for humidity, altitude, high or low temperature, fungus, salt spray, vibration, shock and explosion proof may be provided.

Special lubricant and finish may be furnished if required.

ENCLOSURE

The "A" types of tachometers shown on pages 6, 7 & 8 can be furnished as an open frame or totally enclosed. The other frames are all designed as enclosed units.

PRECISION BALL BEARINGS

All armatures are mounted on ball bearings, lubricated for the life of the unit with appropriate lubrication. The lubrication is selected to match the temperature rise and ambient temperature conditions.

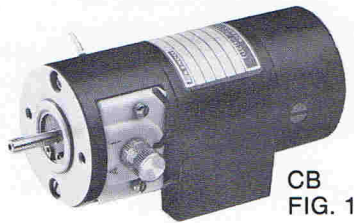
WEIGHT OF UNITS

CB frame 20 ounces.	or	567 grams
B-F-R frame 18.5 ounces.	or	524 grams
BL-FL-RL frames 32 ounces.	or	907 grams
ASC frames 3 to 4 lbs.	or	1360 to 1800 grams
ALC frames 4 to 5 lbs.	or	1800 to 2270 grams

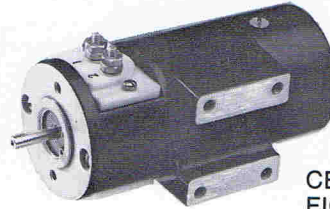
ARMATURE MOMENT OF INERTIA

CB frame .52 oz. in ² or 95 gm cm ² .
B-F-R frame .52 oz. in ² or 95 gm cm ² .
BL-FL-RL frames 1.01 oz. in ² or 185 gm cm ² .
ASC frame 3.0 oz. in ² or 549 gm cm ² .
ALC frame 4.2 oz. in ² or 770 gm cm ² .

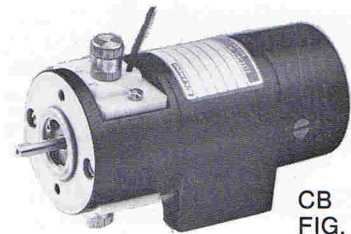
DC PM TACHOMETER GENERATORS



CB
FIG. 1



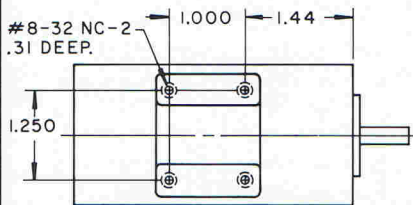
CB
FIG. 2



CB
FIG. 3

CB FRAMES

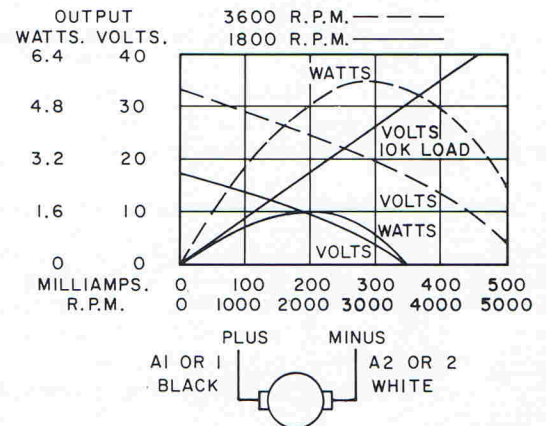
TYPE NO.	*VOLTS PER 1000 RPM	ARMATURE RESIS. OHMS $\pm 15\%$	CONT. MAX. AMPS	COMMUTATOR MATERIAL	MAX. RIPPLE %	TYPE OF BRUSH	MAX. SPEED RPM
514	.25	.046	3		7		10000
521	2.5	4	.43		4		10000
597	2.67	4.8	.43		4		10000
616	4.5	12.2	.15		4		10000
549	9	48	.10		4		10000
930	15	286	.05		2		10000
481	15	286	.05	†	2	+	3000
482	15	286	.05		2	+	3000
29	24.3	286	.05		4		10000
47	24.3	286	.05		4	+	3000
247	24.3	286	.05	†	4	+	3000
619	24.3	286	.05	†	4		10000



STANDARD BASE DIMENSIONS.

- 1-SYMBOL † INDICATES UNIT WITH A SILVER COMMUTATOR, ALL OTHER ARE COPPER.
- 2-SYMBOL + INDICATES UNIT WITH FINGER TYPE BRUSHES, ALL OTHER ARE SQUARE.
- 3-SYMBOL * INDICATES DATA OF VOLTS PER 1000 R.P.M. WITH 10000 OHM LOAD.
- 4-STEEL SHAFT.
- 5-BALL BEARING UNITS.
- 6-SHAFT RUNOUT, .001 T.I.R.
- 7-ENCLOSED UNITS.
- 8-SEE DRIVING TORQUE CURVE ON PAGE 4.

LINEARITY & REGULATION CURVE CB-549



CLOCKWISE ROTATION AT SHAFT END

- 9-√ NO PAINT
- 10-⊙ CONCENTRIC TO SHAFT WITHIN .005 T.I.R.
- 11-⊥ PERPENDICULAR TO SHAFT WITHIN .005 T.I.R.
- 12-LEADS 12 INCHES LONG.
- 13-BLACK FINISH

TOLERANCE
.XX $\pm .03$
.XXX $\pm .005$

FIGURE 1 CB

SQUARE BRUSH STANDARD.

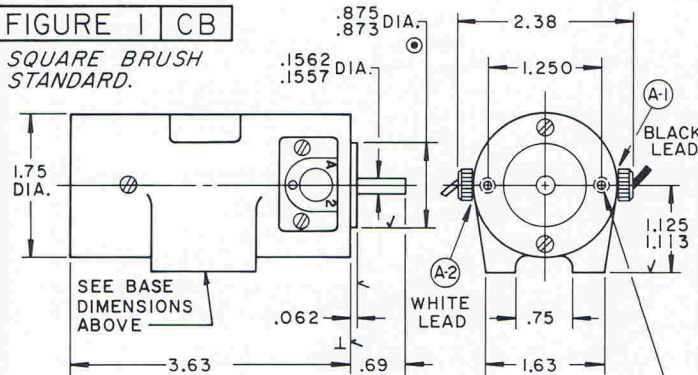


FIGURE 2 CB

FINGER BRUSH STANDARD.

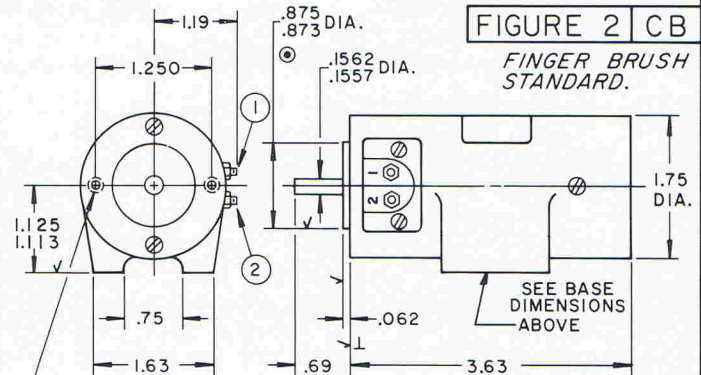
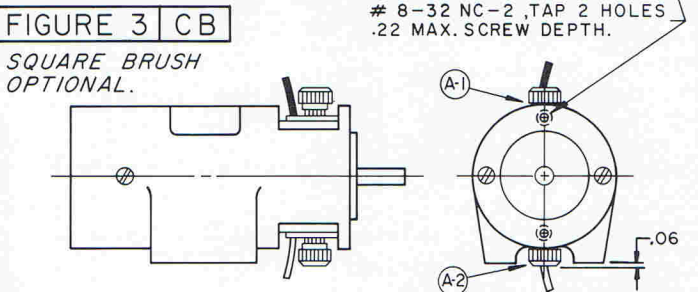


FIGURE 3 CB

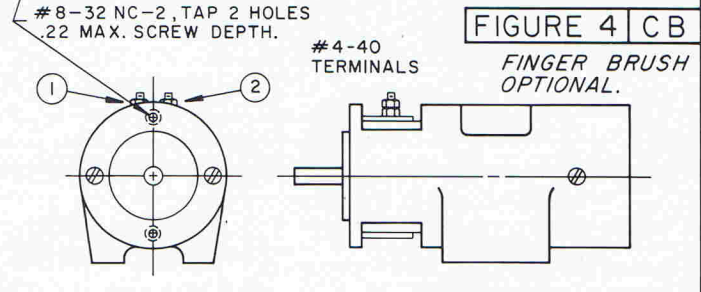
SQUARE BRUSH OPTIONAL.



(ALL DIMENSIONS SAME AS FIG.1)

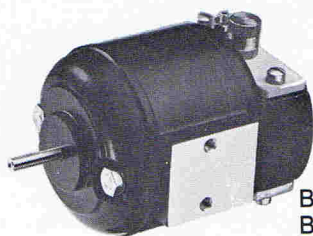
FIGURE 4 CB

FINGER BRUSH OPTIONAL.

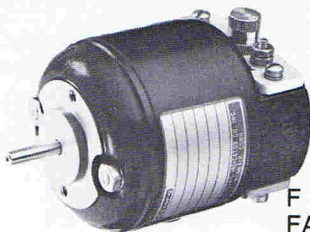


(ALL DIMENSIONS SAME AS FIG.2)

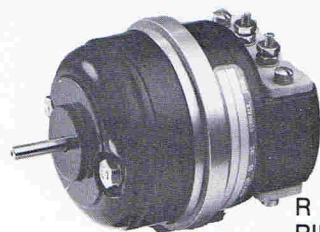
DC PM TACHOMETER GENERATORS



B
BASE



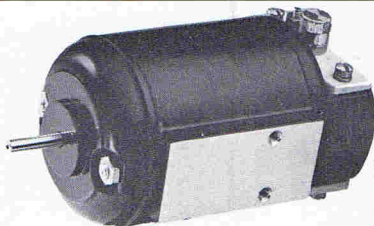
F
FACE



R
RING

B-F-R FRAMES

TYPE NO.	*VOLTS PER 1000 RPM	ARMATURE RESIS. OHMS ± 15%	CONT. MAX. AMPS	COMMUTATOR MATERIAL	MAX. RIPPLE %	TYPE OF BRUSH	MAX. SPEED RPM
348	1	0.8	.85		7		10000
159	1.65	1.6	.60		7		10000
363	4.2	17.3	.30		4	+	3000
646	4.5	20	.25		4		10000
501	7.5	55	.10		4		10000
582	9	56	.10	†	4		10000
107	11	104	.10		4		10000
472	16	228	.05	†	4	+	3000
81	16.7	240	.05		4		10000
442	20	286	.05	†	4		10000
500	20	286	.05	†	4	+	3000
400	29.2	450	.04	†	4	+	3000
1044	38	450	.04		4	+	3000
1182	38	450	.04	†	4		6000
950	47	640	.02		4		5000
1256	47	640	.02		4	+	5000



BL
BASE



RL
RING

BL-FL-RL FRAMES

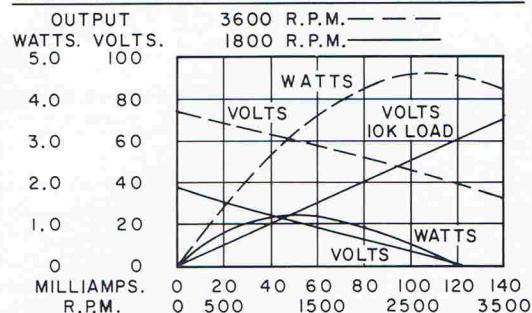
TYPE NO.	*VOLTS PER 1000 RPM	ARMATURE RESIS. OHMS ± 15%	CONT. MAX. AMPS	COMMUTATOR MATERIAL	MAX. RIPPLE %	TYPE OF BRUSH	MAX. SPEED RPM
236	0.8	0.22	2		7		10000
362	1.6	0.9	1		7		10000
182	2.9	1.9	.80		7		10000
186	4.4	3.6	.50		4		10000
462	12	55	.15		4		10000
183	21	80	.10		4		10000
139	24.5	136	.08		4		10000
533	24.5	136	.08	†	4	+	3000
95	28.5	138	.08		4		10000
742	30	158	.08		4		10000
364	30	280	.05	†	2	+	3000
465	45	385	.05	†	4		7500
506	45	385	.05		4	+	3000
633	45	385	.05		3		7500
570	48	474	.04		4		7000
769	60	380	.04		4	+	3000
1036	75	580	.04	†	4		4000
771	75	580	.04		4	+	3000
772	100	930	.04		4		3000

1—CONNECTION DIAGRAM: PAGE 16, NUMBER 1.

2—SYMBOL † INDICATES UNIT WITH A SILVER COMMUTATOR, ALL OTHER ARE COPPER.

3—SYMBOL + INDICATES UNIT WITH FINGER TYPE BRUSHES, ALL OTHER ARE SQUARE.

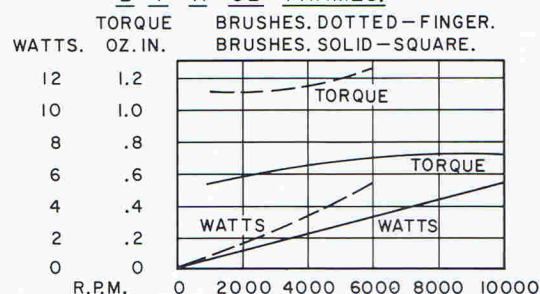
LINEARITY & REGULATION CURVE B-500



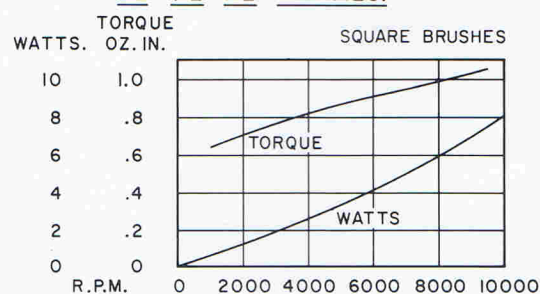
DRIVING TORQUE & WATTS VS. R.P.M.

DRIVING WATTS AND TORQUE INCLUDES ALL LOSSES (ie) FRICTION WINDAGE & IRON LOSS. TO GET ACTUAL LOAD TORQUE & WATTS FOR VARIOUS LOAD CONDITIONS, ADD ACTUAL LOAD TO BE USED PLUS $I^2 R$ OF ARMATURE.

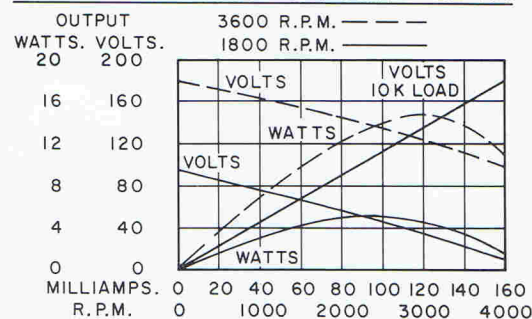
"B"-F"-R"-CB" FRAMES.



"BL"-FL"-RL" FRAMES.



LINEARITY & REGULATION CURVE BL-465



FRAME DIMENSIONS

FIGURE 1 | B-BL

BASE MOUNTING.

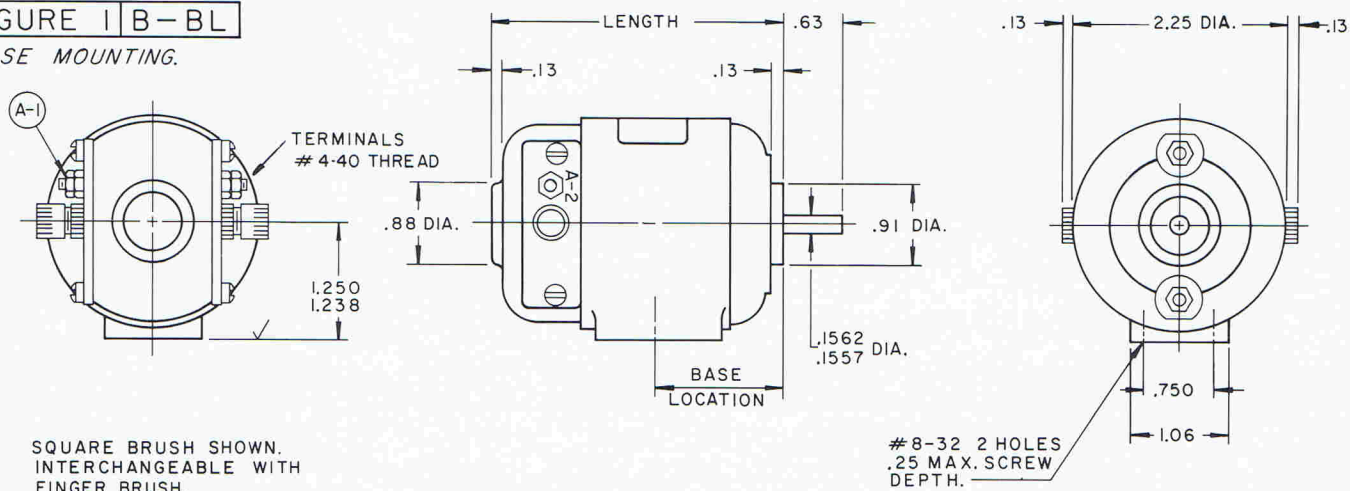


FIGURE 2 | F-FL

FACE MOUNTING WITH PILOT.

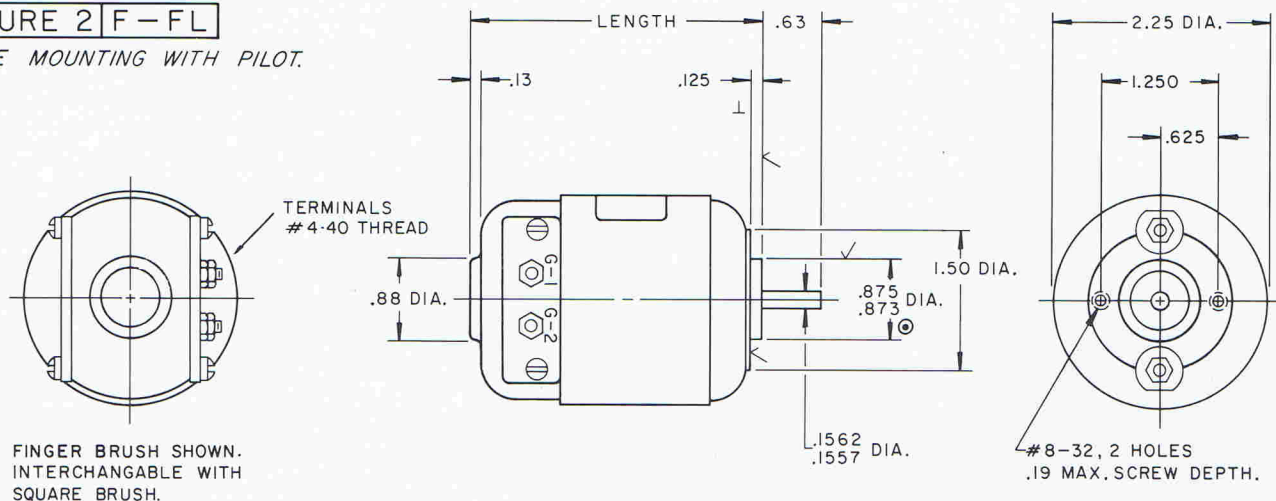
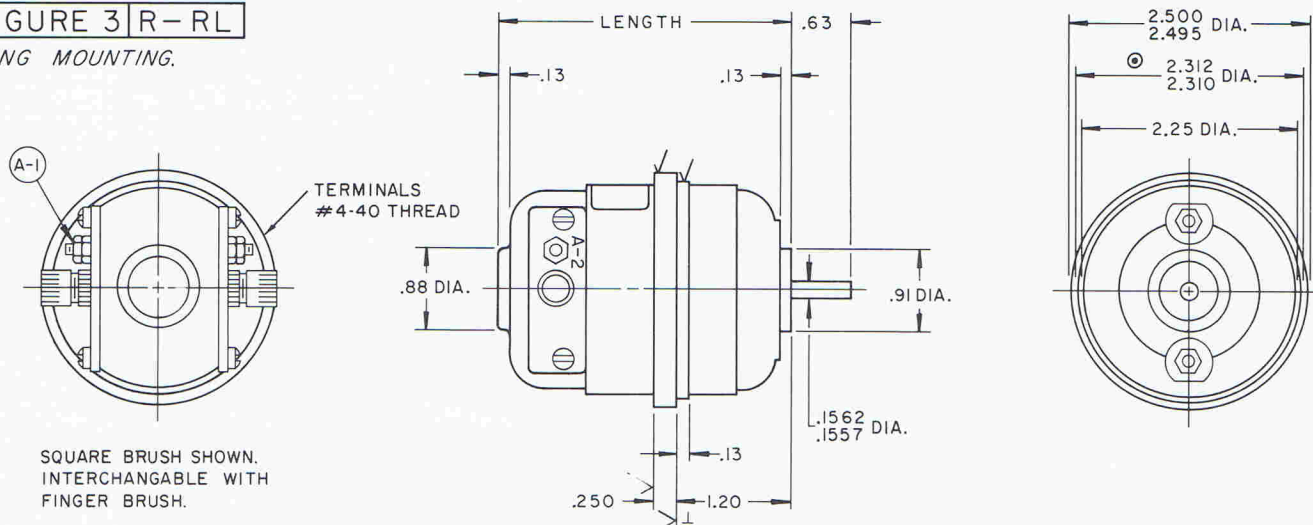


FIGURE 3 | R-RL

RING MOUNTING.



NOTES.

- 1-ALUMINUM FRAME.
- 2-STEEL SHAFT.
- 3-BALL BEARING UNITS.
- 4-BLACK FINISH.
- 5-SHAFT RUNOUT .001 T.I.R.

- 6-✓ NO PAINT.
- 7-⊙ CONCENTRIC TO SHAFT
WITHIN .005 T.I.R.
- 8-⊥ PERPENDICULAR TO SHAFT
WITHIN .005 T.I.R.

FRAME	LENGTH	BASE LOCATION
B - F - R	3.13	1.19
BL-FL-RL	4.00	2.06

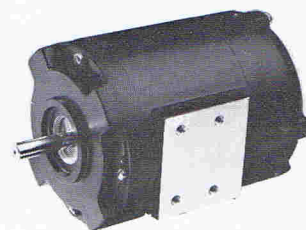
TOLERANCE
.XX ± .03
.XXX ± .005

DC PM TACHOMETER GENERATORS

J
FLANGE



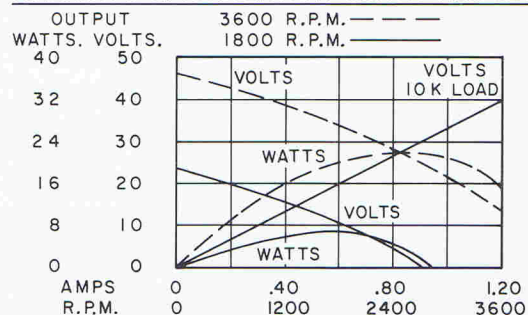
B
BASE



ASC FRAMES

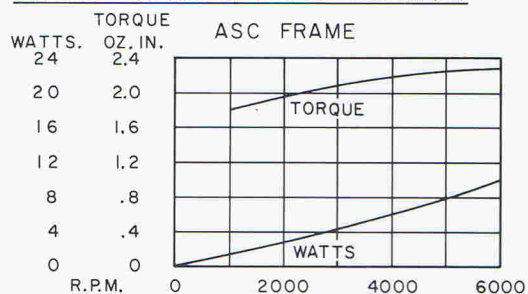
TYPE NO.	*VOLTS PER 1000 RPM	ARMATURE RESISTANCE OHMS $\pm 15\%$	CONT. MAX. AMPS	MAX. RIPPLE %	MAX. SPEED RPM
282	.66	3.8	3.5	4	10000
605	5.9	22	.5	4	10000
635	5.9	9.2	.85	4	10000
520	11	67	.25	4	10000
2702	50	72	.25	4	3000
588	87	1300	.05	4	4000
560	120	2750	.025	4	3000

LINEARITY & REGULATION CURVE ASC-520

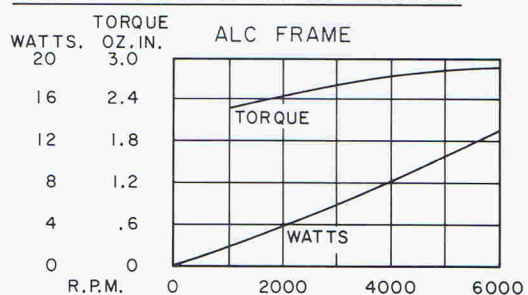


DRIVING TORQUE & WATTS VS. R.P.M.
DRIVING WATTS AND TORQUE INCLUDES ALL LOSSES (ie) FRICTION WINDAGE & IRON LOSS. TO GET ACTUAL LOAD TORQUE & WATTS FOR VARIOUS LOAD CONDITIONS, ADD ACTUAL LOAD TO BE USED PLUS $I^2 R$ OF ARMATURE.

DRIVING TORQUE & WATTS VS. R.P.M.



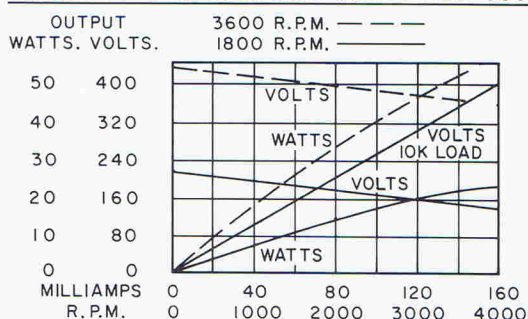
DRIVING TORQUE & WATTS VS. R.P.M.



ALC FRAMES

TYPE NO.	*VOLTS PER 1000 RPM	ARMATURE RESISTANCE OHMS $\pm 15\%$	CONT. MAX. AMPS	MAX. RIPPLE %	MAX. SPEED RPM
1523	21.5	25	.32	4	6000
726	50	95	.16	4	6000
634	75	425	.07	4	4000
639	100	375	.085	4	3600
575	170	3150	.025	4	2000
638	170	1350	.040	4	2000

LINEARITY & REGULATION CURVE ALC-639



NOTES

- 1 - *VOLTAGE OUTPUT PER 1000 R.P.M. WITH 10000 OHM LOAD.
- 2 - CONNECTION DIAGRAM SEE PAGE 16 NUMBER 1

FRAME DIMENSIONS

FIGURE 1 | ASCJ-ALCJ

FLANGE MOUNTING.

FRAME	LENGTH
ASCJ	4.61
ALCJ	5.11

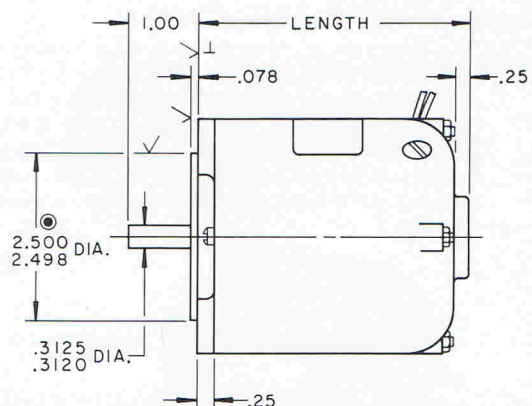
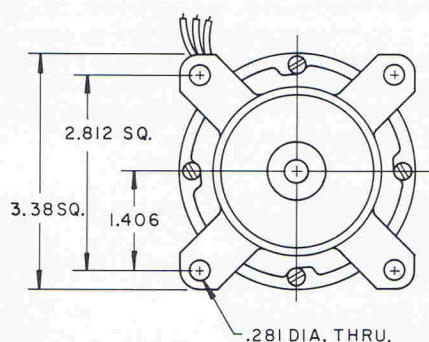


FIGURE 2 | ASCB-ALCB

BASE MOUNTING.

FRAME	LENGTH
ASCB	4.61
ALCB	5.11

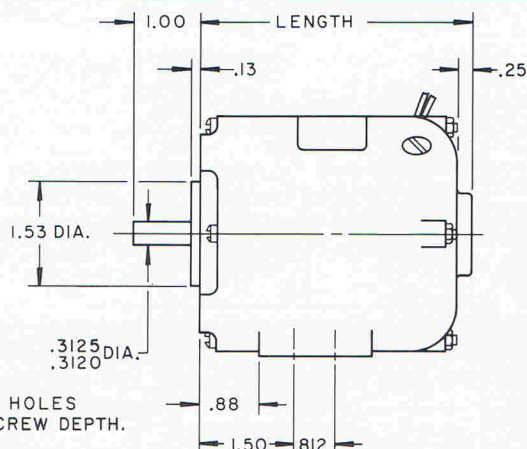
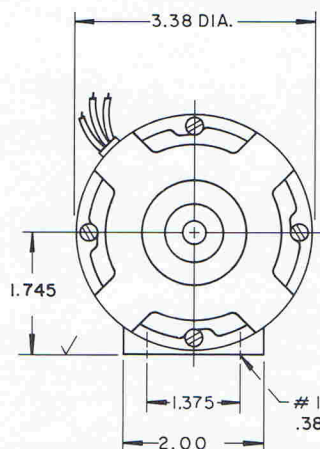


FIGURE 3 | ASCF-ALCF

FACE MOUNTING, WITH PILOT.

FRAME	LENGTH
ASCF	4.61
ALCF	5.11

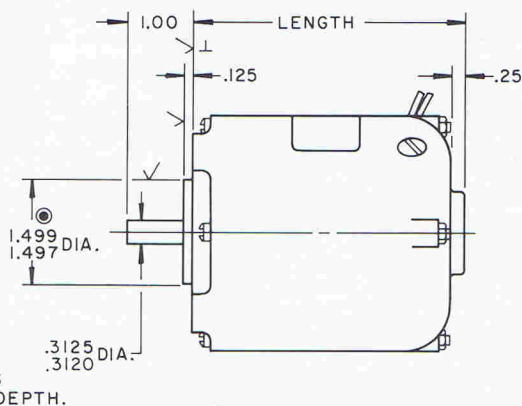
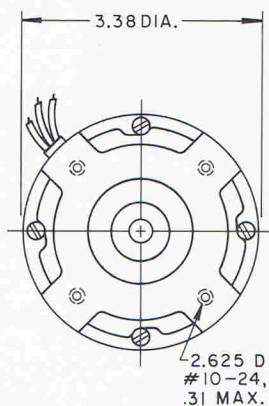
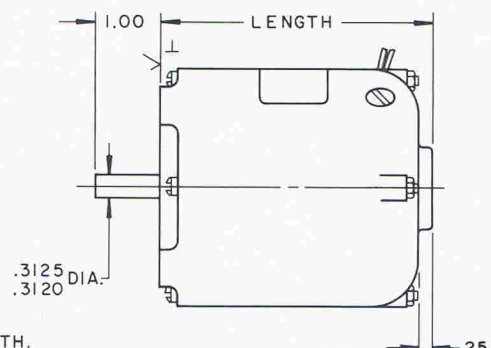
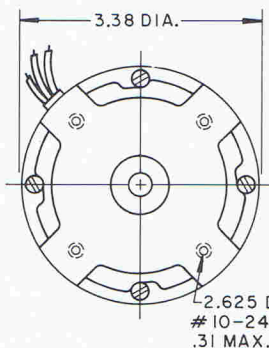


FIGURE 4 | ASCM-ALCM

FACE MOUNTING, NO PILOT.

FRAME	LENGTH
ASCM	4.61
ALCM	5.11



NOTES.

1-ALUMINUM FRAME.

2-STEEL SHAFT.

3-BALL BEARING UNITS.

4-LEADS 12" LONG.

5-BLACK FINISH.

6-SHAFT RUNOUT .001 T.I.R.

7-✓ NO PAINT.

8-● CONCENTRIC TO SHAFT

WITHIN .005 T.I.R.

9-⊥ PERPENDICULAR TO SHAFT

WITHIN .005 T.I.R.

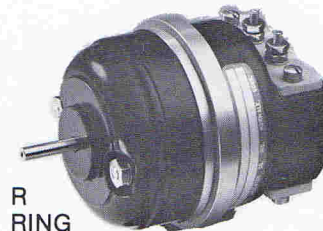
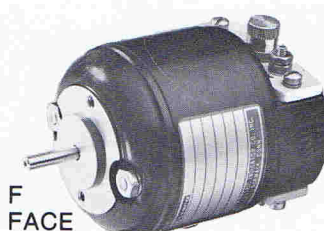
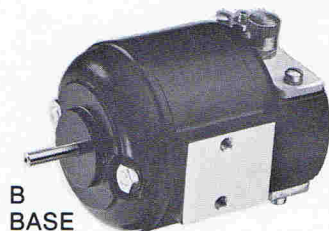
TOLERANCE

.XX ± .03

.XXX ± .005

DC WOUND FIELD GENERATORS

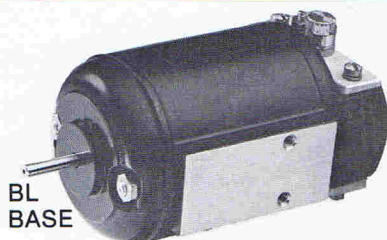
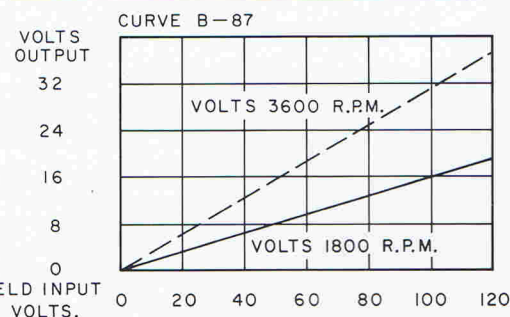
"ELINCO" wound field generators are D.C. shunt wound generators. They can be used as D.C. generators either for constant voltage or where it is desired to vary the output depending on field excitation. They can be wound as split field units where it is desirable to change the armature polarity and amplitude depending on differential current in the two fields. They can be used as tachometers where higher outputs are required and linearity requirements are not too critical, since variation in field resistance due to heating will introduce linearity errors. Units can be compensated for field variations due to heating if required. An infinite number of voltage outputs and field windings can be made.



B-F-R FRAMES

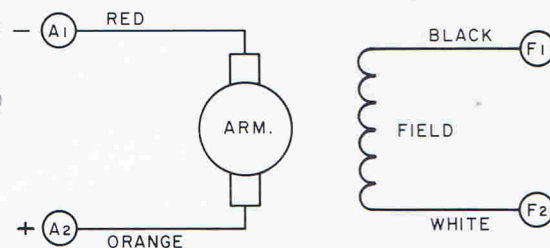
TYPE NO.	NOMINAL FIELD VOLTS	ARM. V./1000 RPM AT 10K LOAD	ARM. MAX. LOAD MA	MAX. RPM	FIELD RESIS. OHMS	ARM. RESIS. OHMS	FRAME DIMENSIONS SEE PAGE
99	100	2.5	50	15000	5140	8.8	5
694	28	4	50	10000	216	11.1	5
87	100	6.6	20	15000	5140	115	5
459	24	19.7	30	10000	74	154	5
466	120	19.7	30	10000	1270	154	5
448	80	21.4	25	10000	1270	286	5
360	28	22	20	10000	192	286	5

VOLTAGE OUTPUT VS. FIELD VOLTS.



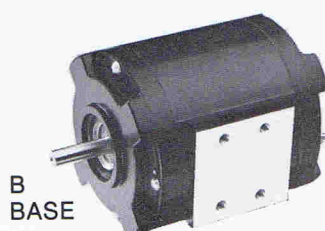
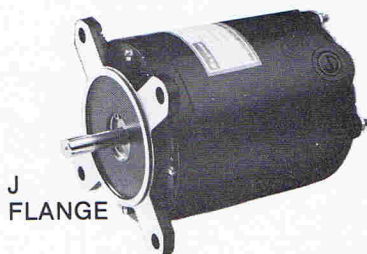
BL-FL-RL FRAMES

TYPE NO.	NOMINAL FIELD VOLTS	ARM. V./1000 RPM AT 10K LOAD	ARM. MAX. LOAD MA	MAX. RPM	FIELD RESIS. OHMS	ARM. RESIS. OHMS	FRAME DIMENSIONS SEE PAGE
528	20	6	50	15000	127	14.1	5



NOTES.

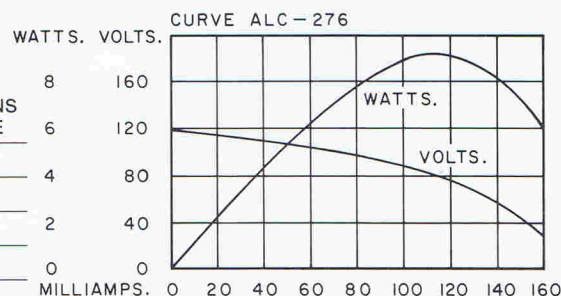
1. B-F-R-BL-FL-RL FRAMES:
SEE PAGE 5 FOR FRAME DIMENSIONS.
TERMINALS MARKED PER ABOVE CONNECTION DIAGRAM WILL BE PROVIDED.
2. ALC FRAMES: SEE PAGE 7
FOR FRAME DIMENSIONS.
LEADS COLOR CODED PER ABOVE CONNECTION DIAGRAM WILL BE PROVIDED.
3. SEE DRIVING TORQUE CURVES ON PAGE 4 AND 6.



ALC FRAMES

TYPE NO.	NOMINAL FIELD VOLTS	ARM. V./1000 RPM AT 10K LOAD	ARM. MAX. LOAD MA	MAX. RPM	FIELD RESIS. OHMS	ARM. RESIS. OHMS	FRAME DIMENSIONS SEE PAGE
692	100	3.4	50	10000	1460	7.4	7
276	115	58.5	50	3000	835	190	7
738	125	140	28	2000	3450	780	7
1277	5	59.2	35	4000	6.5	125	7

LOAD REGULATION 2000 R.P.M.



A C PERMANENT MAGNET GENERATORS

"ELINCO" A.C. Permanent Magnet Generators are designed to give trouble free operation, withstand rugged usage and provide a high degree of voltage stability. These units consist of a permanent magnet rotor and a wound stator, units may be used as phase reference, potential or sinusoidal wave form sources and may also be used to advantage in electronic equipment. The voltage output and frequency varies directly with speed. They may be used as a power supply at a constant frequency by driving at a constant speed. Their use in speed control equipment is becoming increasingly popular, where frequency is used as a base for speed control.

CHARACTERISTICS

ELECTRICAL

PHASE & POLES

1. BS-FS-RS-BLS-FLS-RLS-Frames
Single phase 2-4-6-12 poles
Two phase 2-4-6 poles
Three phase 2-4 poles.
2. AS and AL Frames
Single phase 2-4-6-8-12-16-24 poles.
Two phase 2-4-6-8-12 poles.
Three phase 2-4-6-8 poles.
3. G Frames
Single phase 2-4-6-8-12-24 poles.
Two phase 2-4-6-12 poles.
Three phase 2-4-6-8 poles.

POWER

The power output of these generators will vary considerably depending on operating loads, speed and design. The power output will vary as the square of the speed. The following figures are intended only as a guide as to what power may be expected from various frames with approximately 20% voltage regulation.

FRAME	Watts at 1800 RPM (Phase)			Watts at 3600 RPM (Phase)		
	1	2	3	1	2	3
BS-FS-RS	.4	.4	.8	1.3	2	3
BLS-FLS-RLS	1	1.3	1.6	3.3	4	5
AS	5	8	10	16	22	28
AL	11	15	18	28	40	48
G	25	35	42	54	75	90

FREQUENCY

If desired speed and frequency are known, number of poles can be determined from the formulas

$$P = \frac{120 f}{\text{RPM}}$$

P = number of poles

f = frequency in Hertz

$$f = \frac{P \times \text{RPM}}{120}$$

RPM = revolutions per minute

VOLTAGE

Units can be wound for a wide variety of voltages, other than those listed in the tables.

SPEED

Units are designed for operating speeds up to 12000 RPM.

HARMONICS

Harmonic content of various units will increase with the number of poles. The values listed in the tables are the maximum % harmonics for the number of poles.

MECHANICAL

FRAME SIZES

Three basic frame sizes with various mounting arrangements are shown in the generator section.

BS-FS-RS-BLS-FLS and RLS frames are 2-1/4 inch diameter.

AS and AL frames are 3-3/8 inch diameter.

G frames are 4-3/8 inch diameter.

MOUNTING

Units can be mounted by tapped holes provided in the base of the side of the frame or by tapped or clearance holes on the end of the frame. Ring mounting is provided on some units and special mounting can be provided upon request.

MATERIALS

All frames are aluminum with a black finish. Shafts are machined from steel and ground to size. Laminated stacks are wound with insulated copper wire, impregnated with varnish and baked until cured.

SPECIAL TREATMENT

Treatment for humidity, altitude, high or low temperature, fungus, salt spray, vibration, shock and explosion proof may be provided. Special lubricant and finish may be furnished if required.

ENCLOSURE

The "A" and "G" types of generators shown on pages 12, 13, and 14 can be furnished as an open frame or totally enclosed. The other frames are all designed as enclosed units.

PRECISION BALL BEARINGS

All rotors are mounted on ball bearings, lubricated for life of the unit with appropriate lubrication. The lubrication is selected to match the temperature rise and ambient temperature conditions.

WEIGHT OF UNITS

BS-FS-RS 19 oz.	or	540 grams
BLS-FLS-RLS frames 30 oz.	or	850 grams
AS frames 3 to 4 lbs.	or	1360 to 1800 grams
AL frames 4 to 5 lbs.	or	1800 to 2270 grams
G frame 8-1/4 lbs.	or	9800 grams

ARMATURE MOMENT OF INERTIA

BS-FS-RS .52 oz. in. ² or 95 gm cm ²
BLS-FLS-RLS 1.01 oz. in. ² or 185 gm cm ²
AS 3.0 oz. in. ² or 549 gm cm ²
AL 4.2 oz. in. ² or 770 gm cm ²
G 7.5 oz. in. ² or 1373 gm cm ²

A C PERMANENT MAGNET GENERATORS

BS-FS-RS FRAMES

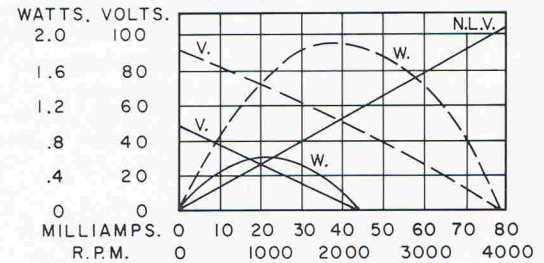
TYPE NO.	NO. PHASES	NO. POLES	NO. LOAD V./1000 RPM	D.C. PHASE RESISTANCE OHMS ± 10%	MAX. % HARMONICS	*DESIGNED FOR THE FOLLOWING CHARACTERISTICS					
						VOLTS ± 5%	MA	HZ	RPM	WATTS	
165	1	2	5.2	27.5	2	18	20	60	3600	.36	
577	1	2	5.9	20.5	2	10		30	1800	1	
380	1	2	6.3	70	2	10		30	1800		
269	1	2	10.8	190	2	18		30	1800		
15	1	2	26	992	2						
1143	1	2	98	4860	2						
851	1	4	8.5	22.6	4	20		120	3600	5	
91	1	4	8.6	41	4						
650	1	4	10	73.2	4	60	10	200	6000	.6	
117	1	4	13.8	172	4	50	50	150	4500	2.5	
96	1	4	28	685	4	50		60	1800		
143	1	4	45	2670	4	80		60	1800		
381	1	6	8.3	27	8	10	190	90	1800	1.9	
673	1	6	28	270	8	10	190	90	1800	1.9	
863	1	12	6.5	23.3	10	10		180	1800	.1	
382	1	12	8.7	126	10	10	190	180	1800	1.9	
1071	1	12	10	110	10						
1234	1	12	86	1720	10						
603	2	2	3.6	16.7	2	26	200	133	8000		
559	2	2	3.9	13.8	2	25	20	116	7000		
601	2	2	6.1	53.5	2	20	50	60	3600		
16	2	2	14	260	2						
347	2	2	25	1000	2	125		83.5	5000		
672	3	2	1.2	1.7	2	10	250	133	8000		
109	3	2	4.6	28.7	2						
725	3	2	9	90	2						
17	3	2	14	215	2	40	50	60	3600		
1072	3	4	10	56	4						
311	3	4	13.3	—	4						

BLS-FLS-RLS FRAMES

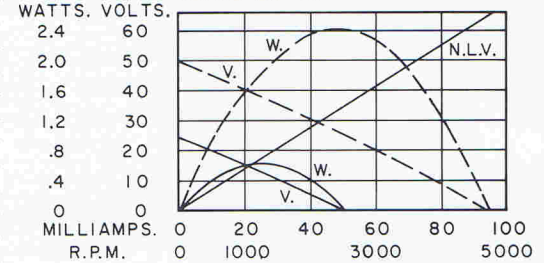
TYPE NO.	NO. PHASES	NO. POLES	NO. LOAD V./1000 RPM	D.C. PHASE RESISTANCE OHMS ± 10%	MAX. % HARMONICS	*DESIGNED FOR THE FOLLOWING CHARACTERISTICS					
						VOLTS ± 5%	MA	HZ	RPM	WATTS	
708	1	2	30	275	3						
132	1	2	50	1280	5						
656	1	4	10	40	5	115	174	400	12000	20	
674	1	4	20	120	5						
507	1	12	33.5	926	10						
258	2	2	30	556	2						
256	2	2	33.8	470	2						
581	2	4	24	398	4						
114	3	2	24	280	2						
1212	3	2	48	840	2						
508	3	2	55	1270	2						
1035	3	4	4.2	7.8	4						
1228	3	4	50	520	4						

LINEARITY AND REGULATION CURVES.

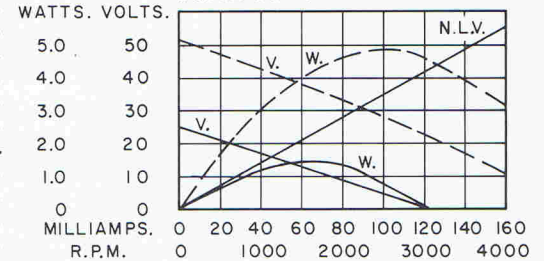
CURVE BS-15



CURVE BS-16

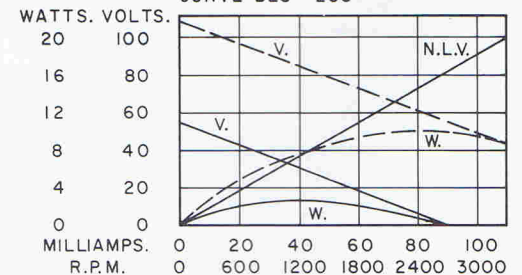


CURVE BS-17

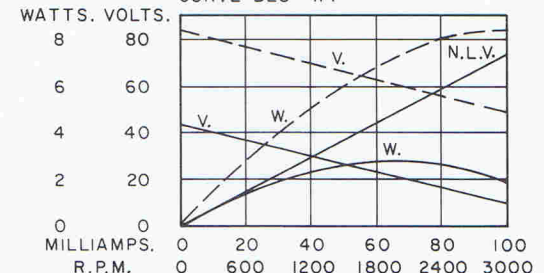


- 1-ALL DOTTED CURVE LINES INDICATE VALUES TAKEN AT 3600 R.P.M. (---) AND THE SOLID LINES ARE 1800 R.P.M. VALUES (—).
- 2-V=VOLTS W=WATTS N.L.V.=NO LOAD VOLTS.
- 3-* DESIGNED COLUMN INDICATES SOME OF THE WAYS THE GENERATORS MAY BE USED.
- 4-SEE FORMULA ON PAGE 9 FOR FREQUENCY.
- 5-NO LOAD VOLTAGE AND FREQUENCY VARY DIRECTLY WITH SPEED.
- 6-CONNECTION DIAGRAMS: SEE PAGE 16.

CURVE BLS-258



CURVE BLS-114



FRAME DIMENSIONS

FIGURE 1 BS-BLS

BASE MOUNTING.

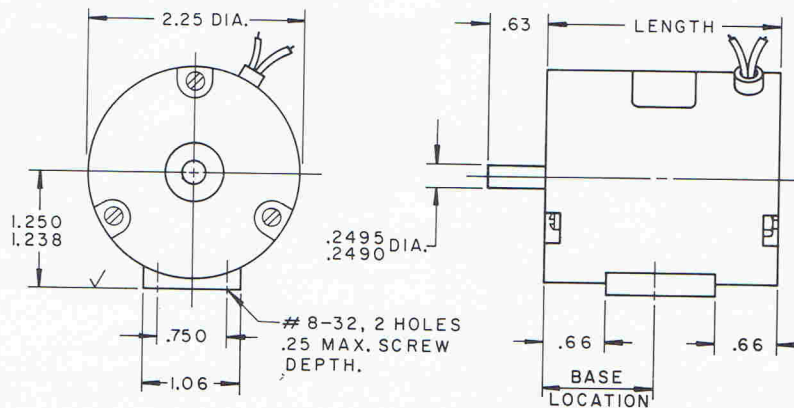
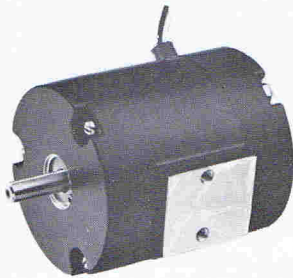


FIGURE 2 FS-FLS

FACE MOUNTING WITH PILOT.

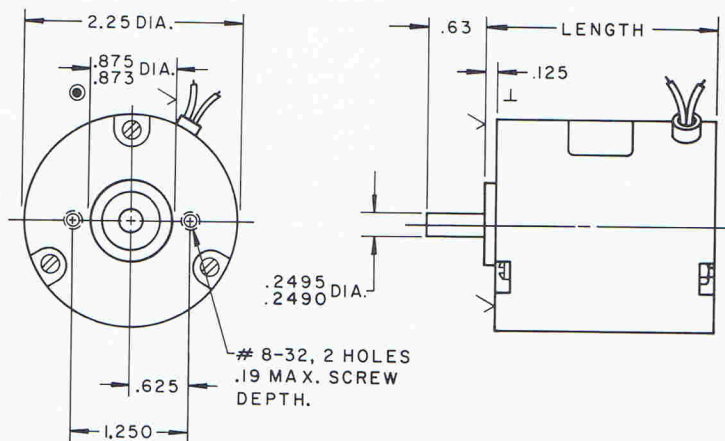
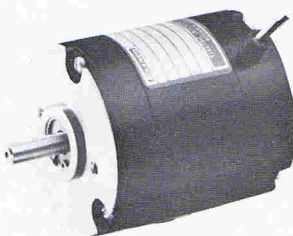
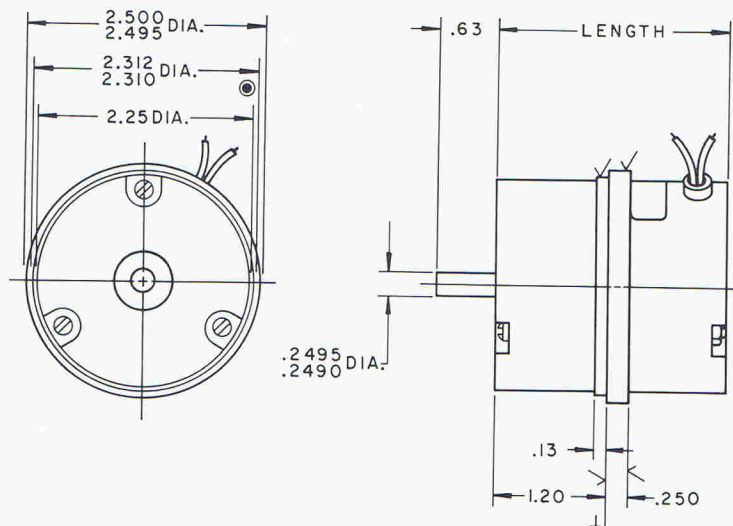
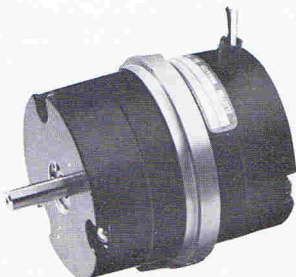


FIGURE 3 RS-RLS

RING MOUNTING.



NOTES

- 1.-ALUMINUM FRAME.
- 2.-STEEL SHAFT.
- 3.-BALL BEARING UNITS.
- 4.-LEADS 12" LONG.
- 5.-BLACK FINISH.

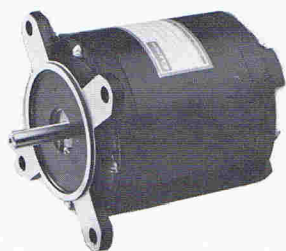
- 6.-SHAFT RUNOUT, .001 T.I.R.
- 7.-✓ NO PAINT
- 8.-⊙ CONCENTRIC TO SHAFT WITHIN .005 T.I.R.
- 9.-⊥ PERPENDICULAR TO SHAFT WITHIN .005 T.I.R.

TOLERANCE

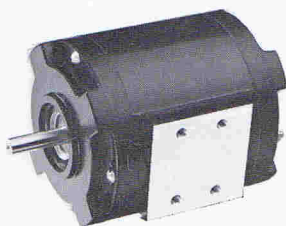
- .XX ± .03
.XXX ± .005

FRAME	LENGTH	BASE LOCATION
BS — FS — RS	2.50	1.19
BLS-FLS-RLS	3.37	2.06

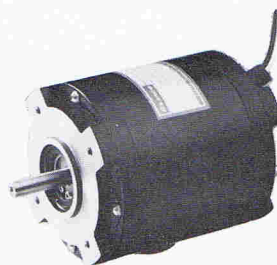
A C PERMANENT MAGNET GENERATORS



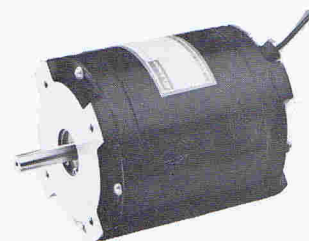
J
FLANGE



B
BASE



F
FACE/PILOT



M
FACE

AS FRAMES

TYPE NO.	NO. PHASES	NO. POLES	NO. LOAD V./1000 RPM	D.C. PHASE RESISTANCE OHMS $\pm 10\%$	MAX. % HARMONICS	*DESIGNED FOR THE FOLLOWING CHARACTERISTICS			
						VOLTS $\pm 5\%$	HZ	RPM	WATTS
332	1	2	32	485	2	115	60	3600	15
305	1	2	72.5	775	2				
620	1	2	85	770	2	10	2	120	
479	1	4	6.2	4	5	15	120	3600	17
890	1	4	9.4	3.6	5	115	418	12540	15
607	1	4	19	33	5	85	150	4500	10
1230	1	12	35	132	10	115	400		
308	2	2	59	750	2				

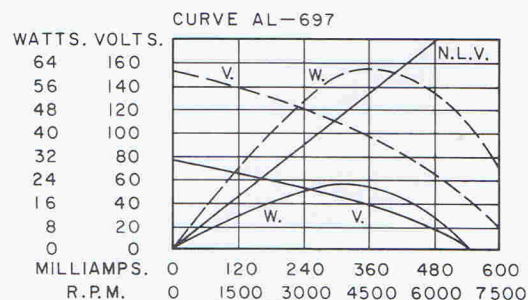
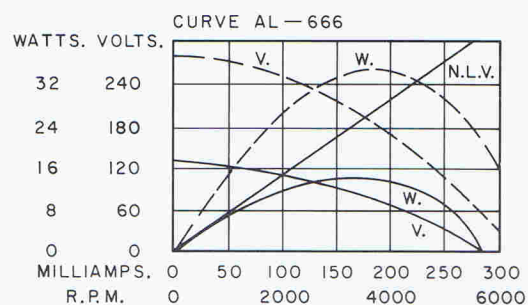
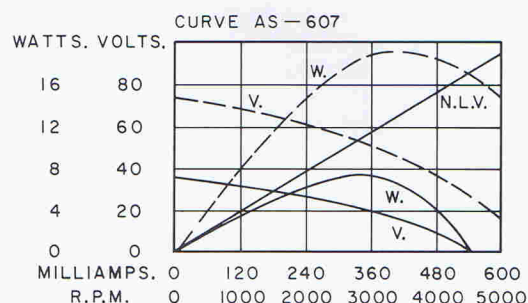
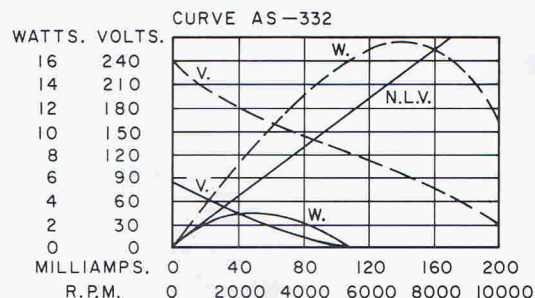
NOTES.

- 1-ALL DOTTED (---) CURVE LINES INDICATE VALUES TAKEN AT 3600 R.P.M. AND SOLID (—) LINES ARE 1800 R.P.M. VALUES.
- 2-V=VOLTS W=WATTS N.L.V.=NO LOAD VOLTS.
- 3-* DESIGN COLUMN INDICATES SOME OF THE WAYS THE GENERATORS MAY BE USED.
- 4-SEE FORMULA ON PAGE 9 FOR FREQUENCY.
- 5-NO LOAD VOLTAGE AND FREQUENCY VARY DIRECTLY WITH SPEED.
- 6-CONNECTION DIAGRAM: SEE PAGE 16.

AL FRAMES

TYPE NO.	NO. PHASES	NO. POLES	NO. LOAD V./1000 RPM	D.C. PHASE RESISTANCE OHMS $\pm 10\%$	MAX. % HARMONICS	*DESIGNED FOR THE FOLLOWING CHARACTERISTICS			
						VOLTS $\pm 5\%$	HZ	RPM	WATTS
339	1	2	2.1	0.58	2	7	60	3600	5
1050	1	2	40	1	2	115		3600	25
1106	1	2	160	11	2	8.8	1	60	
637	1	4	9.8	4.4	3	115	400	12000	20
446	1	4	10	5.2	4	3	18	540	1.5
666	1	4	65	180	4	115	60	1800	10
534	1	4	96	445	4	110	60	1800	10
1186	1	4	120	530	4	400	133.3	4000	25
663	1	12	20	38.5	10	20	100	1000	3
562	1	12	16.7	218	10	100	600	6000	3
564	1	12	30	138	10	100	400	4000	7
590	1	12	35	731	10	100	60	6000	20
352	2	2	61	240	2	25	8.4	500	1
697	2	4	30	70.5	5	54	60	1800	10
2998	3	2	25	14.2		30	20	1200	25
3002	3	2	30	68.1		150	83.3	5000	15
2187	4	2	15	22.2	2	27	30	1800	10

LINEARITY AND REGULATION CURVES.



FRAME DIMENSIONS

FIGURE 1 ASJ-ALJ

FLANGE MOUNTING.

FRAME	LENGTH
ASJ	3.81
ALJ	4.31

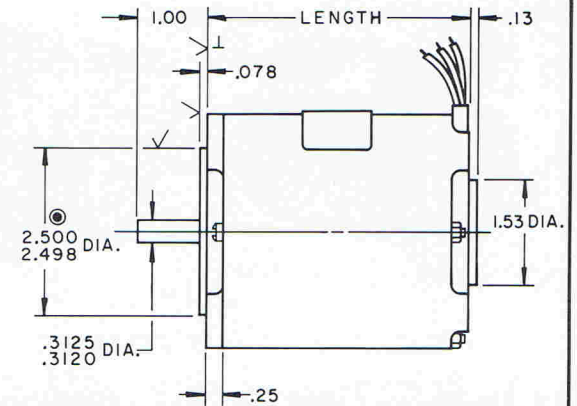
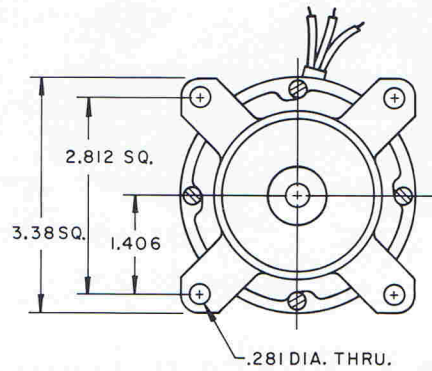


FIGURE 2 ASB-ALB

BASE MOUNTING.

FRAME	LENGTH
ASB	3.81
ALB	4.31

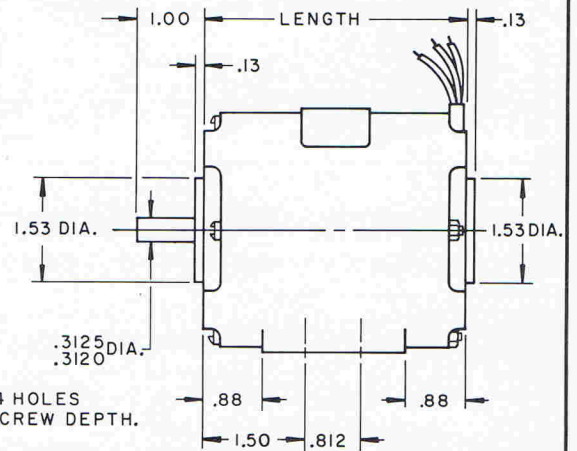
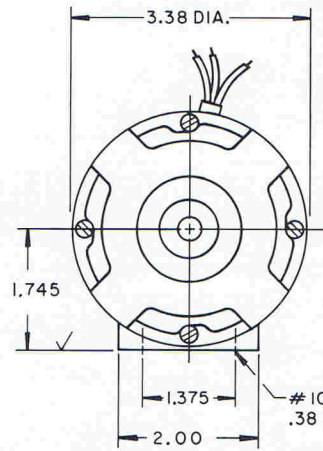


FIGURE 3 ASF-ALF

FACE MOUNTING, WITH PILOT.

FRAME	LENGTH
ASF	3.81
ALF	4.31

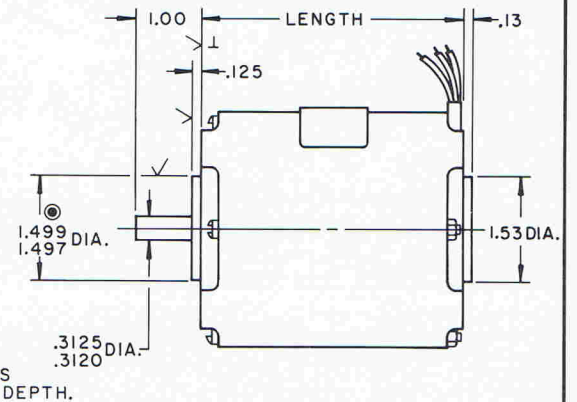
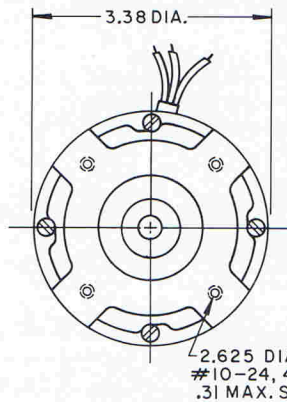
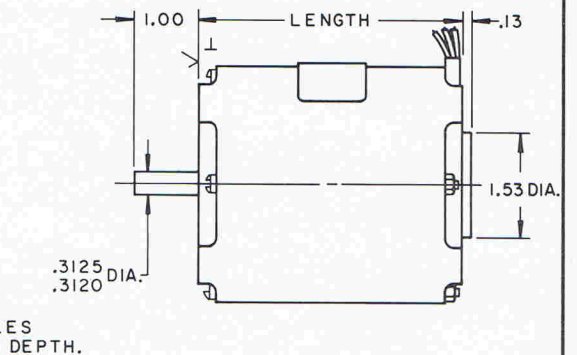
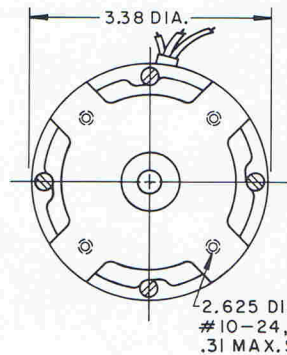


FIGURE 4 ASM-ALM

FACE MOUNTING, NO PILOT.

FRAME	LENGTH
ASM	3.81
ALM	4.31



NOTES.

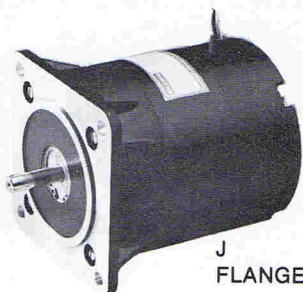
1-ALUMINUM FRAME.
2-STEEL SHAFT.
3-BALL BEARING UNITS.

4-LEADS 12" LONG.
5-BLACK FINISH.
6-SHAFT RUNOUT .001 T.I.R.
7-✓ NO PAINT.

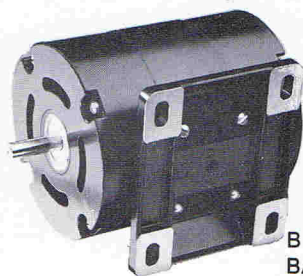
8-◎ CONCENTRIC TO SHAFT
WITHIN .005 T.I.R.
9-⊥ PERPENDICULAR TO SHAFT
WITHIN .005 T.I.R.

TOLERANCE
.XX ± .03
.XXX ± .005

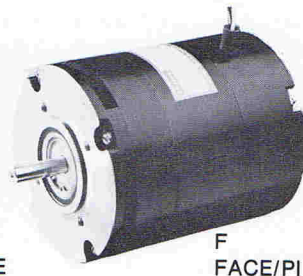
A C PERMANENT MAGNET GENERATORS



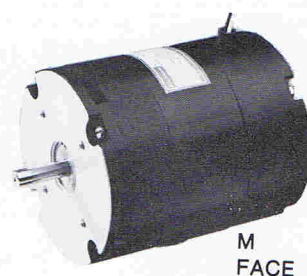
J
FLANGE



B
BASE



F
FACE/PILOT

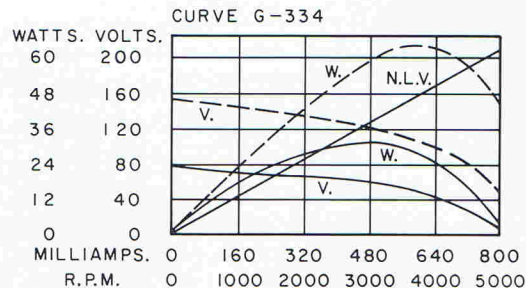


M
FACE

GS FRAMES

LINEARITY AND REGULATION CURVE.

TYPE NO.	NO. PHASES	NO. POLES	NO. LOAD V./1000 RPM	D.C. PHASE RESISTANCE OHMS $\pm 10\%$	MAX. % HARMONICS	* DESIGNED FOR THE FOLLOWING CHARACTERISTICS			
						VOLTS $\pm 5\%$	HZ	RPM	WATTS
367	1	2	6.1	0.8	2	12	80	4800	84.
981	1	2	42	22	2	135	60	3600	50
334	1	2	42.5	40		115	60	3600	40
632	1	2	190	322	2	8	1	60	.16
403	1	4	148	925	4	450	133	4000	45
1614	1	6	13	2.3		110	500	10000	120
1024	2	2	26.5	10.5	2	120	80	4800	60
1232	2	4	39	11.6	4	115	120	3600	90
617	3	2	36	24.5	2	10	10	600	4



SEE NOTES 1 THRU 6 ON PAGE 12

FIGURE 1 GSJRN FLANGE MOUNTING.

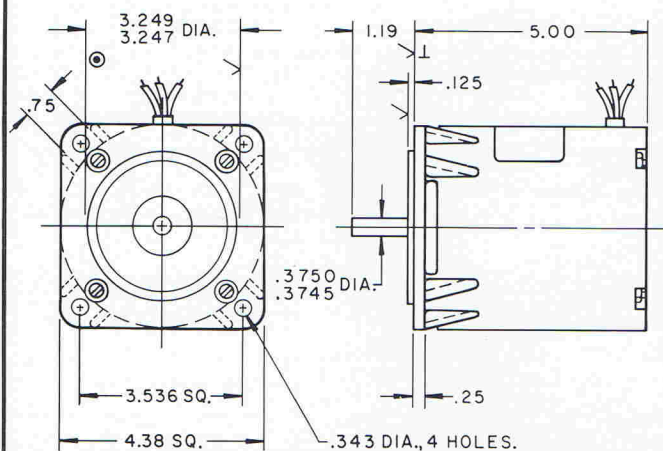


FIGURE 2 GSNNB BASE MOUNTING.

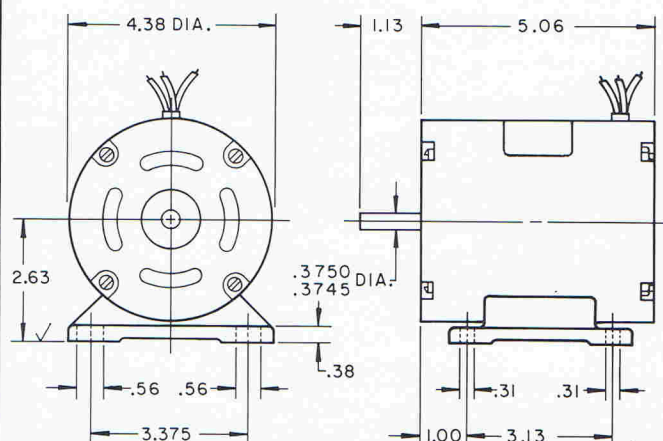


FIGURE 3 GSFRN FACE MOUNTING, WITH PILOT.

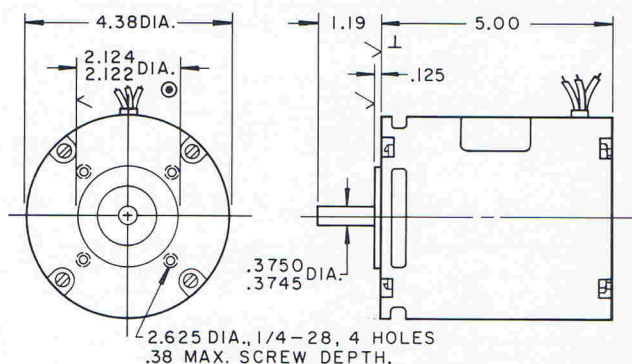
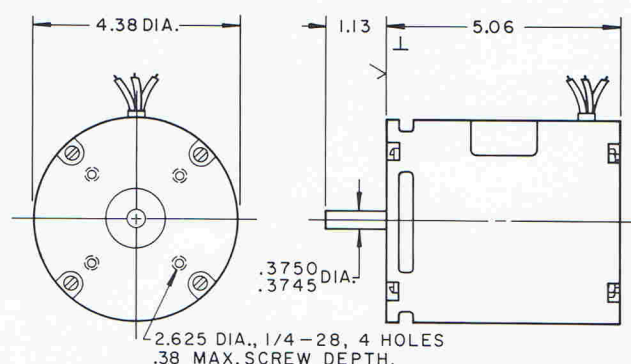


FIGURE 4 GSMRN FACE MOUNTING, NO PILOT.



NOTES.

- 1-ALUMINUM FRAME.
- 2-STEEL SHAFT.
- 3-BALL BEARING UNITS.

- 4-LEADS 12" LONG.
- 5-BLACK FINISH.
- 6-SHAFT RUNOUT .001 T.I.R.
- 7-✓ NO PAINT.

- 8-⊙ CONCENTRIC TO SHAFT WITHIN .005 T.I.R.
- 9-⊥ PERPENDICULAR TO SHAFT WITHIN .005 T.I.R.

TOLERANCE
.XX $\pm .03$
.XXX $\pm .005$

A C LOW INERTIA SIGNAL GENERATORS

Where an A.C. signal proportional to speed, and low inertia is required, the drag cup generator is recommended. They incorporate low inertia rotors, high output to null ratios, linear relationship of output voltage to speed, and minimum phase shift between the output and input voltages. No brushes or slip ring are required.

"ELINCO" low inertia signal generators are made in the BS, FS and RS frames. They consist of a laminated stator wound two phase, a stationary laminated pole and an aluminum cup rotating between the stator and pole. Single phase voltage up to 120 volts is applied to one phase. The induced voltage in the other phase is linear to speed up to approximately 6000 RPM and its frequency is equal to the line frequency. For more voltage where linearity is not as important, a copper cup is used and the induced voltage is almost twice that of aluminum.

BS-FS-RS FRAMES

TYPE NO.	HERTZ	VOLTS PER 1000 RPM	INPUT WATTS	INPUT VOLTS
3366	60	3.2	4	115
3367	60	3.8	8.7	115
3368	60	5	7	115
3369	60	7.5	4.5	115
3370	400	.6	3	115
3371	400	1	3.3	55
3372	400	2	3.3	115
3373	400	7.6	5	120
3374	400	11	5.5	115

60 HERTZ UNITS DESIGNED FOR 6000 R.P.M. MAX.,
AND 400 HERTZ UNITS FOR 12000 R.P.M. MAX.

NOTES.

- 1-ALUMINUM FRAME.
- 2-STEEL SHAFT.
- 3-BALL BEARING UNITS.
- 4-LEADS 12" LONG.
- 5-BLACK FINISH.
- 6-SHAFT RUNOUT .001 T.I.R.
- 7-MOMENT OF INERTIA
COPPER 46 GM CM²
BRASS 44 GM CM²
ALUMINUM 14 GM CM²
- 8-✓ NO PAINT.
- 9-⊙ CONCENTRIC TO SHAFT
WITHIN .005 T.I.R.
- 10-⊥ PERPENDICULAR TO SHAFT
WITHIN .005 T.I.R.

TOLERANCE
.XX .03
.XXX .005

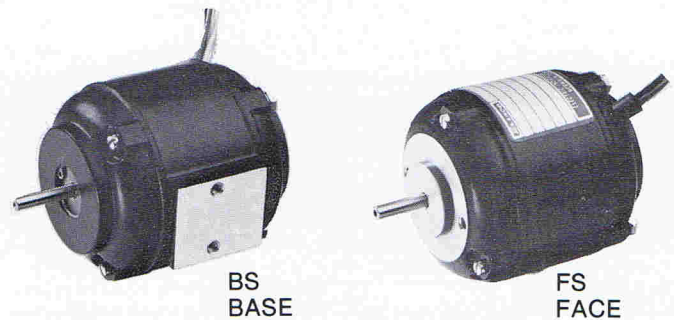
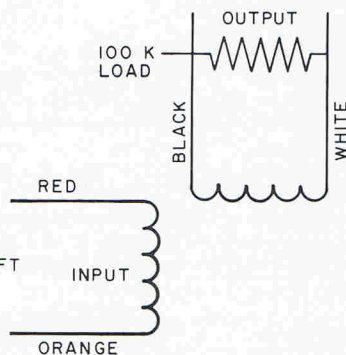


FIGURE 1 BS BASE MOUNTING.

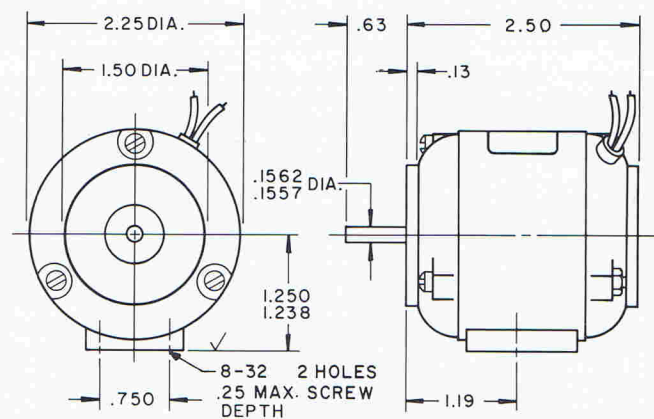


FIGURE 2 FS FACE MOUNTING WITH PILOT.

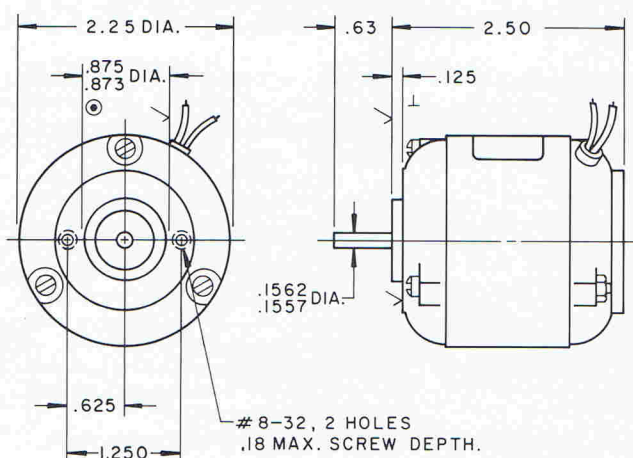
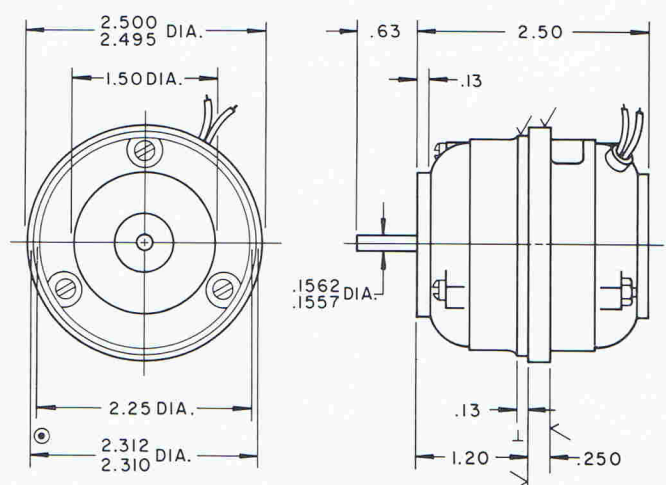


FIGURE 3 RS RING MOUNTING.



SINE WAVE P M A C GENERATORS

For application where waveform is of prime importance, "ELINCO" sine wave generators are recommended. These units are intended only to supply a signal voltage, they are not capable of delivering any power. The harmonic content is less than 1/2 of 1%. The difference in harmonic content between a standard two pole unit and a sine wave unit is not too great. Units with a greater number of poles have a higher harmonic content so that if a good sine wave is desired, the sine wave units are a great improvement. However, it must be remembered that they are to be used only as a source of signal voltage, and that they are not capable of any power output.

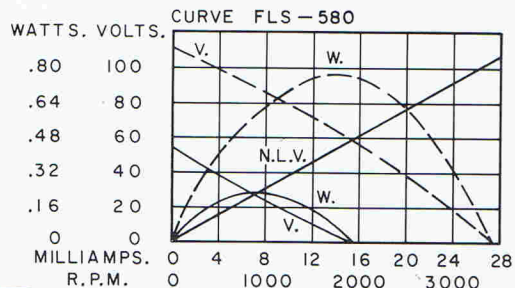
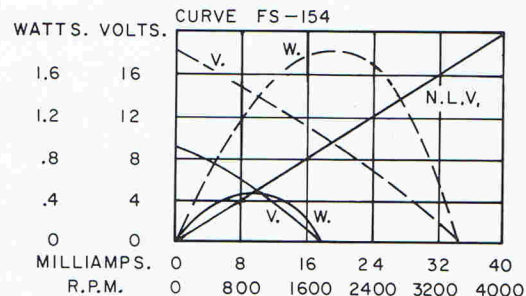
When a good sine wave with low harmonic is required on units with more than two poles, the special wound sine wave generators with low power output are recommended.

FS-FLS FRAMES

TYPE NO.	NO. PHASES	NO. POLES	NO LOAD V./1000 RPM	D.C. PHASE RESISTANCE OHMS $\pm 10\%$	PAGE 11 FRAME DIMENSIONS
668	1	2	15	2300	FS
1058	1	6	6.2	990	FS
868	1	6	14	3300	FS
580	1	2	30	3600	FLS
154	2	2	5	365	FS
458	2	6	2	124	FS
273	2	2	5	270	FLS
376	2	2	10	1010	FLS
243	3	2	5.8	514	FS
1056	3	4	2	115	FS
511	3	2	8.7	356	FLS
585	3	2	23	288	FLS

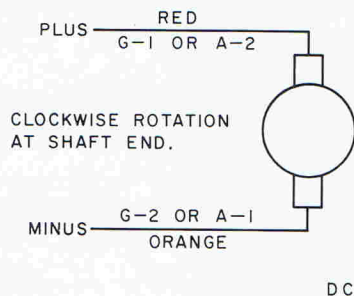
1—ALL DOTTED (---) CURVE LINES INDICATE VALUES TAKEN AT 3600 R.P.M., 60 HERTZ AND THE SOLID (—) LINES ARE 1800 R.P.M., 30 HERTZ VALUES.
2—FOR FRAME DIMENSIONS SEE PAGE 11, FIGURE 2 (FS-FLS).

LINEARITY AND REGULATION CURVES.

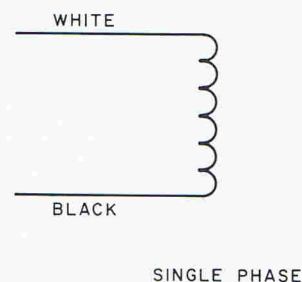


CONNECTION DIAGRAMS

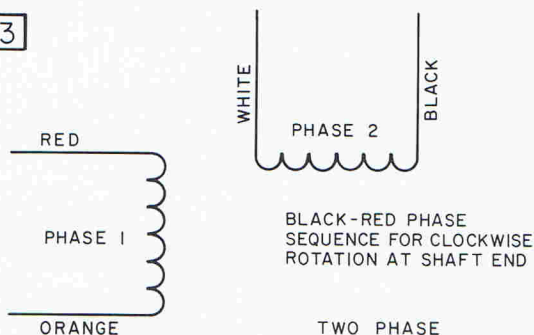
NUMBER 1



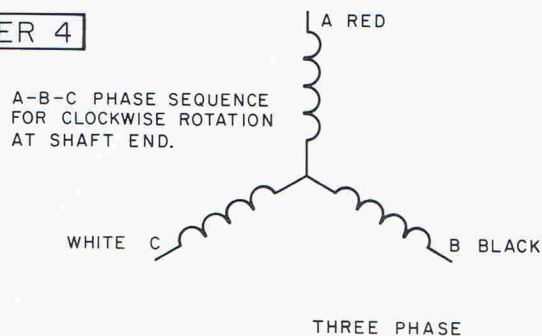
NUMBER 2



NUMBER 3



NUMBER 4



ELINCO DESIGNATION SYSTEM

ELINCO DESIGNATION SYSTEM OR TYPE NUMBERS

"ELINCO" alpha-numerical designation defines each unit as to its electrical and mechanical characteristics. All catalog units have a set of letters and a set of numbers. Units with special shaft extensions have a third set of letters or numbers.

EXAMPLE: 1st Set 2nd Set 3rd Set
 CB - 514
 ALCF - 1523
 B - 99 - 4F2

The first set of letters (CB, ALCF or B) indicates a specific size, mounting and mechanical type of unit.

The second set of numbers (514, 1523 or 99) indicates an electrical design as specified in the various tables throughout the catalog.

The third set of letters and/or numbers indicates a special shaft and must be requested when ordering if a special shaft is required.

The first set of letters are broken down in the following manner.

DC UNITS

CB = 1-3/4 inch diameter unit as shown on page 3. They are totally enclosed and cannot be supplied with a shaft extension out the end opposite the terminal boards. Either Figure 1 or Figure 2 will always be supplied, depending on type of brush, unless otherwise requested by customer. Special shaft extension diameters, up to .2495 inch, in any length with flats, holes, threads, etc. can be supplied.

B-F-R-BL-FL-RL = 2-1/4 inch diameter unit as shown on pages 4, 5 and 8. They are totally enclosed and can be supplied with shaft extension at either end of the unit. Special shaft extensions up to .2495 inch diameter with flats, holes, threads, etc. can be ordered.

B = Base mounting, 3.13" long

F = Face mounting with pilot, 3.13" long

R = Ring mounting, 3.13" long

BL = Base mounting, 4" long

FL = Face mounting with pilot, 4" long

RL = Ring mounting, 4" long

D = Double shaft extensions

X = Special construction (per customer request)

ASC-ALC = 3-3/8 inch diameter unit as shown on pages 6, 7 and 8. They will be supplied as an open frame but can be totally enclosed if requested. Shaft extensions, up to .3125 inch diameter, with flats, holes, threads, etc. can be supplied at either end of the unit.

A = 3-3/8 inch diameter

S = 4.61 inch long

L = 5.11 inch long

C = DC commutator unit

J = Open type flange mounting (Figure 1, page 7)

B = Open type base mounting (Figure 2, page 7)

F = Open type face mounting with pilot (Figure 3, page 7)

M = Open type face mounting, no pilot (Figure 4, page 7)

E = Totally enclosed (JE, BE, FE, ME)

D = Double shaft extensions

X = Special construction (per customer request)

AC UNITS

BS-FS-RS-BLS-FLS-RLS = 2-1/4 inch diameter unit as shown on pages 10 and 11. They are totally enclosed and can be supplied with shaft extensions at either end of the unit.

BS-FS-RS units shown on page 15 are totally enclosed and cannot be supplied with shaft extensions at the lead end of the unit.

FS-FLS units shown on page 16 are totally enclosed and cannot be supplied with base or ring mounting. They can be supplied with shaft extensions at either end of unit.

All shaft extensions can be supplied up to .2495 inch diameter with flats, holes, threads, etc. if requested.

BS = Base mounting, 2.5 inch long

FS = Face mounting with pilot, 2.5 inch long

RS = Ring mounting, 2.5 inch long

BLS = Base mounting, 3.37 inch long

FLS = Face mounting with pilot, 3.37 inch long

RLS = Ring mounting, 3.37 inch long

D = Double shaft extensions

X = Special construction (per customer request)

AS-AL = 3-3/8 inch diameter unit as shown on pages 12 and 13. They will be supplied as an open frame but can be totally enclosed if requested. Shaft extensions, up to .3125 inch diameter, with flats, holes, threads, etc. can be supplied at either end of the unit.

A = 3-3/8 inch diameter

S = 3.81 inch long

L = 4.31 inch long

J = Open type flange mounting (Figure 1, page 13)

B = Open type base mounting (Figure 2, page 13)

F = Open type face mounting with pilot (Figure 3, page 13)

M = Open type face mounting, no pilot (Figure 4, page 13)

E = Totally enclosed (JE, BE, FE, ME)

D = Double shaft extension

X = Special construction

GS = 4-3/8 inch diameter unit 5 or 5.06 inch long as shown on page 14. They will be supplied as an open frame but can be totally enclosed if requested. Shaft extensions up to .500 inch diameter can be supplied with flats, holes, threads, etc. at either end of the unit.

GS = 4-3/8 inch diameter 5 or 5-1/16 long

JR = Open type flange mounting (Figure 1, page 14)

B = Open type base mounting (Figure 2, page 14)

FR = Open type face mounting, with pilot (Figure 3, page 14)

MR = Open type face mounting, no pilot (Figure 4, page 14)

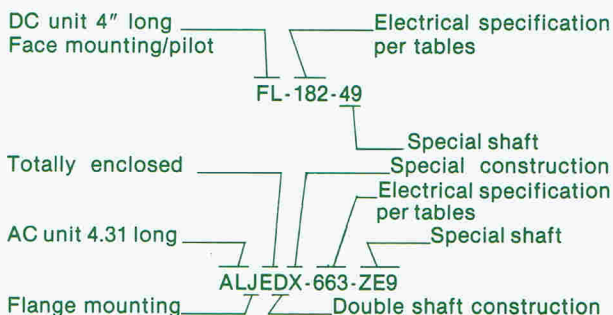
N = Open type at ends (Figure 2, page 14)

E = Totally enclosed (drop letter R in type number)

D = Double shaft extensions

X = Special construction (per customer request)

EXAMPLES:



ELINCO ENGINEERING AVAILABLE

ELINCO's Engineering Staff maintains a constant development program which, during the past year alone, developed in excess of a hundred new units to meet difficult commercial and military specifications.

The **ELINCO** catalogues referred to below contain complete electrical characteristics and physical specifications on hundreds of representative motors and generators:

A.C. AND D.C. COMMUTATOR MOTORS CATALOGUE EI-2

More than 200 representative Commutator Motors of the following types:

- A.C. and D.C. Universal Motors
- A.C. and D.C. Split Field Universal Motors
- D.C. Governor Motors
- D.C. Permanent Magnet Motors
- D.C. Series Motors
- D.C. Split Field Series Motors
- D.C. Separately Excited Shunt Motors
- D.C. Shunt Motors
- D.C. Split Field Shunt Motors

A.C. INDUCTION AND A.C. TORQUE MOTORS CATALOGUE EI-3

Approximately 100 representative Induction Motors from 15 to 400 cycles, available in one, two or three phase, single or dual speeds, single or dual voltages.

Also included is complete data on approximately 100 Torque Motors for continuous or intermittent duty, single or multiphase, 60 cycle or odd frequency, and 115 or odd voltage.

SYNCHRONOUS MOTORS CATALOGUE EI-4

Nearly 200 Hysteresis and Salient Pole Induction Synchronous Motors are described. Hysteresis motors are available in single speed, dual speed, three, four and five speeds. Ratings are from 1/750 to 1/4 HP at speeds from 300 to 24000 RPM, frequencies from 15 to 400 cycles, voltages up to 440 volts, 1,2, or 3 phase. Frame sizes are available from 2-1/4 in. in diameter by 2-1/2 in. long, to 4-3/8 in. in diameter by 10 in. long. Face, flange or base mountings can be supplied. All types are supplied with ball bearings.

A.C. SELF-SYNCHRONOUS MOTORS CATALOGUE EI-5

More than two dozen representative motors of the following types:

- A.C. Differential Motors
- A.C. Phase Shifting Rotary Transformers
- A.C. One and Three Phase Rotating Transformers
- A.C. Rotating Self-Synchronous Motors



A.C. AND D.C. GEAR MOTORS

Gear Ratios 5:1 to 1800:1
Up to 1/15 HP
Torque to 1500 oz. in.
Precision Spur Gears
Permanently Lubricated
Reversible
Quiet Operation

Hysteresis Synchronous
Reluctance Synchronous
Permanent Magnet
Induction
Universal
Shunt
Series

ELINCO's Engineering Staff, with over 30 years experience in the specialized field of sub-fractional electrical rotary equipment, is available to tackle the toughest problems of heat, humidity, shock, vibration, torque, acceleration, weight, mounting and special design. Fast delivery on proto-type units — forward complete electrical and mechanical requirements to:

Electric Indicator Company, Inc., 272 Main Ave., Norwalk, Conn. 06851, Phone (203) 847-5861