



# PRECISION SUB-FHP MOTORS

- Stock and Custom
- AC and DC





# Precision Sub-FHP Motors Custom or Off-The-Shelf



LEESON Electric is one of North America's youngest and fastest-growing motor companies. From its founding in 1972, the company has grown to have one of the broadest and most accessible ranges of AC and DC electric motors available anywhere.

From precision sub-fractional HP motors and gearmotors -- to motors through 1,000 HP and beyond, LEESON has a motor solution for most needs. Nearly 3,000 different ratings are available off-the-shelf, from our network of 33 North American warehouses.

Where a custom motor is needed, few can match LEESON's speed and ingenuity in designing and delivering prototypes that meet the fit and performance needs of the application. Specialized manufacturing facilities allow us to build custom motors economically—yet provide the flexibility of short runs needed by many of our customers.

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## Delivery In Time™ Adds Even More Value

For manufacturers, it only makes sense to take delivery of electric motors *as they're needed* to fill production schedules, rather than weeks or months earlier. LEESON's Delivery In Time (DIT) program does just that—operating from the customer's forecast and responding to the customer's changing production requirements. The result is unmatched flexibility and the assurance of a steady supply of motors, with almost zero inventory investment.

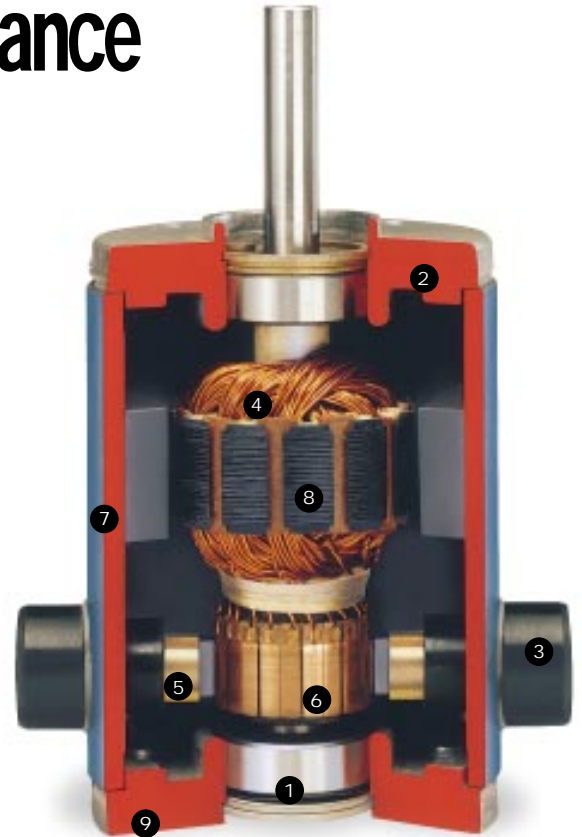


For information on LEESON sub-fractional and fractional HP **GEARMOTORS**, see Bulletin 1830.

# LEESON Motors: Top Performance In Demanding Applications

TYPICAL LEESON PM DC MOTOR FEATURES:

- 1 **Ball bearings (sealed or shielded)** ensure positive shaft alignment, increased reliability, and all-angle mounting flexibility. Preload spring with washer minimizes end play, reduces vibration and noise.
- 2 **380 alloy aluminum end shields** are high-pressure die cast. Mating surfaces are machined for precise alignment and bearing fit, allowing accurate brush tracking and maximum motor life.
- 3 **Brushes are accessible** for easy inspection and replacement, without disassembly of motor.
- 4 **UL recognized insulation system** rated Class F or Class H. Copper magnet wire protected by solventless polyester varnish, for a homogenous, vibration-resistant winding with environmental resistance and high overload capacity.
- 5 **Brass cartridge-type brush holders** with constant pressure stainless steel spring for positive alignment of high current capacity brushes. Provides for "black band" commutation even in reversing applications.
- 6 **Molded commutator** of silver-bearing copper with high temperature, fusion-welded connections for vibration resistance and enhanced reliability.
- 7 **Heavy-gauge, painted steel frame** for maximum structural integrity.
- 8 **Dynamically balanced armature/rotor** for vibration-free, quiet performance.
- 9 **Choice of mountings** includes foot, face, flange, or thru-bolt styles.



**NEW!**

# Tru-Torq Motors: Maximum Value In PM DC Motors

TYPICAL TRU-TORQ PM DC MOTOR FEATURES:

- 1 **Self-aligning sleeve bearings** of sintered bronze, with wide temperature range oil impregnation for quiet operation and long life. Ball bearing designs optional.
- 2 **Zinc alloy endplates** are high-pressure cast for rigidity and reduced cost.
- 3 **Internal brushes are standard** for lower cost. A wide range of brush grades and sizes are available to match application voltages and life expectations. Cartridge-type brush holders also available.
- 4 **UL recognized insulation system.** Copper magnet wire is varnish-impregnated, yielding a vibration-resistant winding with environmental protection.
- 5 **Molded commutator** of silver-bearing copper with high temperature, fusion welded tang connections for reduced cost. Epoxy reinforcement available for vibration resistance and enhanced reliability.
- 6 **Zinc-plated steel frame** for extra corrosion resistance. Unpainted endcaps are standard. Painted frame and endcaps available. Ceramic magnets are bonded to the frame with high-strength, single component epoxy, for structural integrity and performance.
- 7 **Wide variety of mountings** available, including customer-specific custom designs. Motor-mounted gearheads, brakes, tachometers, and encoders available.



# LEESON

## Permanent Magnet DC Motors

### 1/50 through 1/4 HP

#### Design Specifications

Permanent magnet DC motors are well suited for both rectified alternating current input, as from SCR type adjustable speed controls, or for "pure" DC supplies such as produced by generators or batteries.

The high starting torques and linear speed torque characteristics of permanent magnet DC motors are ideal for constant torque and diminishing torque loads. The output speed of the motor may be adjusted by changing the voltage to the motor. This is illustrated in the typical speed torque curves shown.

#### Typical Options

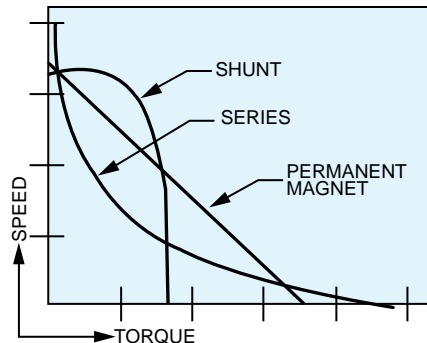
The options listed are those most frequently requested. However, LEESON welcomes the opportunity to quote on motors having the special mechanical and electrical features suiting your application.

#### Mechanical Options

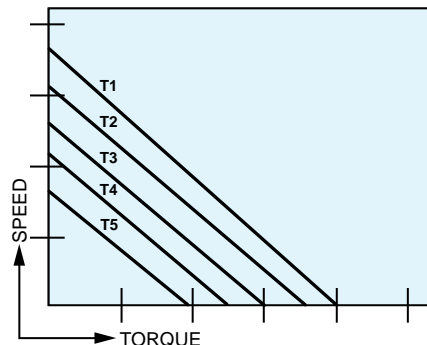
- Open, enclosed or fan-cooled construction
- Band or strap mountings
- Extended, threaded, keyed or double shaft extensions
- Hollow shafts or with pinion on the shaft
- NEMA 42C, 48C, or 56C face mountings
- IEC face or flange mountings and metric dimensions
- Motor-mounted gearheads, brakes, tachometers or encoders

#### Electrical Options

- Low voltage ratings 12 through 72V.
- SCR ratings include 90 or 180V and 115 or 220V (half-wave).
- Filtered and pulse width modulated (PWM) motor ratings also available.
- Choice of thermostats
- Built-in rectifier system
- Special duty cycles, time-rated motors
- Cords and plugs, spade terminals, extended leads
- Conduit box for connections



Comparison of typical speed torque curves of permanent magnet field DC motors versus wound field shunt and series-type motors, showing the linear characteristics of the PM-type motor. Starting torques exceed that of the shunt design and the PM motor offers a flatter speed torque curve than the series-type motor.



Family of typical speed torque curves produced by applying different voltages to a permanent magnet DC motor. Curves demonstrate the linear torque advantages of the PM design, making it ideal for adjustable speed drive duty, using armature voltage control (as with SCR controls).

## SCR RATED MOTORS



### General Specifications:

Precision sub-fractional horsepower DC permanent magnet motors designed for use with full wave non-filtered SCR controls for adjustable speed applications requiring dynamic braking and constant torque throughout the speed range.

### Mechanical Features:

Compact space saving designs. Ball bearings. Long-life brushes for demanding applications. Brushes easily replaced without disassembly of the motor. Standard mounted conduit box on 31 and 34 frame models simplifies connections.

### Electrical Features:

Continuous duty with full wave un-filtered rectified SCR (thyristor) controls.

Linear speed torque characteristics throughout the speed range.

High starting torques.

Reversible rotation from a simple two lead connection.

Class F insulated with high temperature welded commutators.

## SCR RATED (90 & 180 V) • TENV • SQUARE FLANGE OR C FACE

HP	Full Load RPM	Frame	Catalog Number	App. Wgt. (lbs.)	Arm. Volts DC	Control Volts AC Input	F.L. Amps DC
1/25	3500	24AS	<b>M1110014</b>	3	90	115	0.5
	1750	24CS	<b>M1110003</b>	4	90	115	0.5
	1750	31AS	<b>M1120064</b>	6	180	230	0.3
1/15	3500	24CS	<b>M1110015</b>	6	90	115	0.8
	1750	31BS	<b>M1120013</b>	7	90	115	0.8
	1750	31BS	<b>M1120039</b>	7	180	230	0.4
1/10	3500	31BS	<b>M1120060</b>	7	90	115	1.3
	1750	31CS	<b>M1120014</b>	8	90	115	1.1
	1750	31CS	<b>M1120041</b>	8	180	230	0.6
1/8	3500	31CS	<b>M1120059</b>	8	90	115	1.5
	1750	31ES	<b>M1120027</b>	9	90	115	1.5
	1750	31ES	<b>M1120045</b>	9	180	230	0.8
	1750	34D42CZ <sup>②</sup>	<b>M1130053</b>	9	90	115	1.4
	1750	34D42CZ <sup>②</sup>	<b>M1130118</b>	9	180	230	0.7
1/6	3500	31ES	<b>M1120058</b>	9	90	115	1.9
	1750	31GS	<b>M1120042</b>	11	90	115	1.7
	1750	31GS	<b>M1120043</b>	11	180	230	0.9
	1750	34E56C <sup>②</sup>	<b>M1130054</b>	11	90	115	1.7
	1750	34E56C <sup>②</sup>	<b>M1130119</b>	11	180	230	0.9
1/4	3500	31GS	<b>M1120062</b>	12	90	115	2.6
	1750	34G56C <sup>②</sup>	<b>M1130055**</b>	13	90	115	2.7
	1750	34G56C <sup>②</sup>	<b>M1130120**</b>	13	180	230	1.4

For dimensions, see drawings [A](#) or [B](#)

## LOW VOLTAGE MOTORS



### General Specifications:

Precision sub-fractional horsepower low voltage direct current permanent magnet motors designed for battery or solar powered operations, or generator supplied low voltage DC.

### Mechanical Features:

Compact space saving designs.  
Standard conduit box simplifies connections.

Ball bearings.

Long-life brushes for demanding applications.

Brushes easily replaced without disassembly of motor.

### Electrical Features:

High starting torques for heavy load applications.

Linear speed/torque characteristics over entire speed range.

Capable of dynamic braking for faster stops.

Reversible rotation from a simple two lead connection.

Class F insulated with high temperature welded commutators.

## LOW VOLTAGE (12 OR 24V) • TENV • SQUARE FLANGE

HP	Full Load RPM	Frame	Catalog Number	App. Wgt. (lbs.)	Input Volts DC	F.L. Amps DC
1/20	1750	24CS	<b>M1110006</b>	4	12	4.4
1/10	4200				24	4.4
1/14	1750	31AS	<b>M1120040</b>	6	12	7.7
1/7	4200				24	7.7
1/7	1750	31ES	<b>M1120044</b>	9	12	13.0
1/4	3500				24	13.0
1/6	1800	31GS	<b>M1120046</b>	10	12	14.0
1/3	3900				24	14.0

For dimensions, see drawing [A](#)

**These motors may be operated at 12, 24V, or at intermediate voltages between 12 and 24V, within horsepower ranges noted.**

<sup>②</sup> NEMA 42C or 56C face.

**]** 24 frame motors have provision for conduit box, currently supplied without conduit box.

\*\* These motors are totally enclosed fan cooled.

**SCR RATED MOTORS**

**SUB-FHP FRAMES 24, 31 & 34**

**90 or 180 VOLTS, 1.3 TO 1.4 FORM FACTOR**

HP	RPM	Full Load Amperage		Torque (oz-in)	TENV Frame & Type*
		90V	180V		
1/25	1500	0.5	①	27	24D
	1800	0.5	①	22	24C
	2500	0.5	0.2	16	24B
	3000	0.5	0.2	13	24A
1/20	1500	0.5	①	34	24E
	1800	0.5	①	28	24D
	2500	0.5	0.3	20	24D
	3000	0.5	0.3	17	24C
1/15	1500	0.8	0.4	45	31C
	1800	0.8	0.4	37	31B
	2500	0.8	0.4	27	31A
	3000	0.8	0.4	22	31A
1/12	1500	1.0	0.5	56	31D
	1800	1.0	0.5	47	31C
	2500	1.0	0.5	34	31B
	3000	1.0	0.5	28	31A
1/10	1500	1.2	0.6	67	31E
	1800	1.2	0.6	56	31D
	2500	1.2	0.6	40	31B
	3000	1.2	0.6	34	31B
1/8	1500	1.5	0.8	84	34F
	1800	1.5	0.8	70	34D
	2500	1.5	0.8	50	34C
	3000	1.5	0.8	42	34C
1/5	1500	2.2	1.1	134	34G**
	1800	2.2	1.1	112	34G
	2500	2.2	1.1	81	34G
	3000	2.2	1.1	67	34E
1/4	1800	2.7	1.4	140	34G**
	2500	2.7	1.4	101	34G
	3000	2.7	1.4	84	34G

For dimensions, see drawings **C**, **D**, **E** or **F**



24 Frame, 2.38" diameter



31 Frame, 3.11" diameter



34 Frame, 3.38" diameter

**General Specifications:**

The ratings listed are typical designs in continuous and periodic intermittent duty rated motors. Various additional speeds, voltages and duty ratings are possible.

Precision sub-fractional horsepower, permanent magnet DC motors designed for use with full-wave, non-filtered SCR controls for adjustable speed applications requiring dynamic braking and constant torque throughout the speed range.

**Electrical Features:**

Continuous duty with full-wave, unfiltered rectified SCR (thyristor) controls.

Filtered and pulse width modulated (PWM) motor ratings also available.

Linear speed torque characteristics throughout the speed range.

High starting torques.

Reversible rotation from a simple two lead connection.

Class F insulated with high temperature welded commutators.

**Mechanical Features:**

Compact space-saving designs. Ball bearings. Long-life brushes for demanding applications. Brushes easily replaced without disassembly of the motor. Standard mounted conduit box simplifies connections.

Worm-type and parallel shaft speed reducers also available.

**Engineering Services:**

LEESON's application engineering staff is available, at no additional cost, to assist in developing the motor design best suited for applications.

① Consult factory, since 31 frame needed for 180V designs.

\* 24 frame diameter is 2.38 inches.

31 frame diameter is 3.11 inches.

34 frame diameter is 3.38 inches.

\*\* These motors are totally enclosed fan cooled.

## LOW VOLTAGE MOTORS

### SUB-FHP FRAMES 24, 31 & 34

12, 24 or 36 VOLTS<sup>④</sup>, 1.0 FORM FACTOR

HP	RPM	Full Load Amperage			TENV Frame & Type*	15 Minute Duty▲ Approximate Amperage			
		12V	24V	36V		HP	12V	24V	36V
1/25	1500	3.5	1.8	1.2	24C	1/12	7	3.5	2.5
	1800	3.5	1.8	1.2	24B		7	3.5	2.5
	2500	3.5	1.8	1.2	24B		7	3.5	2.5
	3000	3.5	1.8	1.2	24A		7	3.5	2.5
1/20	1500	4.3	2.1	1.4	24C	1/10	8.5	4	3
	1800	4.3	2.1	1.4	24C		8.5	4	3
	2500	4.3	2.1	1.4	24B		8.5	4	3
	3000	4.3	2.1	1.4	24B		8.5	4	3
1/15	1500	5.7	2.8	1.6	24D	1/8	10	5.5	3.5
	1800	5.7	2.8	1.6	24C		10	5.5	3.5
	2500	5.7	2.8	1.6	24C		10	5.5	3.5
	3000	5.7	2.8	1.6	24B		10	5.5	3.5
1/12	1500	7.1	3.5	2.4	24E	1/6	15	7	5
	1800	7.1	3.5	2.4	24E		15	7	5
	2500	7.1	3.5	2.4	24D		15	7	5
	3000	7.1	3.5	2.4	24C		15	7	5
1/10	1500	8.5	4.3	2.8	31C	1/5	15	8.5	5.5
	1800	8.5	4.3	2.8	31B		15	8.5	5.5
	2500	8.5	4.3	2.8	31B		15	8.5	5.5
	3000	8.5	4.3	2.8	31A		15	8.5	5.5
1/8	1500	10	5.2	3.5	31E	1/4	20	10	7
	1800	10	5.2	3.5	31C		20	10	7
	2500	10	5.2	3.5	31B		20	10	7
	3000	10	5.2	3.5	31B		20	10	7
1/5	1500	16 <sup>③</sup>	7.8	5.2	34G**	1/3	25	15	8.5
	1800	16 <sup>③</sup>	7.8	5.2	34G		25	15	8.5
	2500	16 <sup>③</sup>	7.8	5.2	34D		25	15	8.5
	3000	16 <sup>③</sup>	7.8	5.2	34C		25	15	8.5
1/4	1800	19 <sup>③</sup>	9.7	6.5	34F**	1/2	40	20	15
	2500	19 <sup>③</sup>	9.7	6.5	34G		40	20	15
	3000	19 <sup>③</sup>	9.7	6.5	34E		40	20	15

For dimensions, see drawings [C](#), [D](#), [E](#) or [F](#)



24 Frame, 2.38" diameter



31 Frame, 3.11" diameter



34 Frame, 3.38" diameter

#### General Specifications:

The ratings listed are typical designs in continuous and periodic intermittent duty rated motors. Various additional speeds, voltages and duty ratings are possible.

Low voltage direct current motors are well suited for intermittent duty applications requiring peak torques of several times the rated dead load capability of the motor. Proper application of motors to loads having these characteristics will result in the most compact, cost effective motor design. A detailed description of the duty cycle, including off time and running time with or without load, and duration and repetition of the cycle per hour or day is required.

#### Electrical Specifications:

These motors are intended for direct current input having a form factor of 1.0 to 1.05 such as is provided by a battery, generator or solar power. They have linear speed torque characteristics. The output speed can be adjusted by voltage change using series/parallel battery connections or adjustable voltage controls having a form factor of 1.05 or lower.

#### Mechanical Features:

In addition to the standardized mountings pictured here, many application specific modifications have been developed for close coupling of hydraulic pumps and gear reducers.

Worm-type and parallel shaft speed reducers also available.

#### Engineering Services:

LEESON's application engineering staff is available, at no additional cost, to assist in developing the motor design best suited for applications.

③ Consult factory, since amps exceed brush current density for continuous duty.  
▲ Periodic intermittent duty of 15 minutes on at rated load followed by 30 minutes off.  
\* 24 frame diameter is 2.38 inches.  
31 frame diameter is 3.11 inches.  
34 frame diameter is 3.38 inches.  
④ Additional voltage ratings of 48, 60, 72 or other inputs also available.  
\*\* These motors are totally enclosed fan cooled.



# CUSTOM DC MOTORS

SCR RATED

**NEW!**

## SCR RATED MOTORS

SUB-FHP FRAMES 2.25", 2.50", 3.00", & 3.13"

90 or 180 VOLTS, 1.3 TO 1.4 FORM FACTOR

HP	Rated Torque (oz-in)	RPM	Amperage 90V	TENV Frame & Type (inches dia.)
1/60	10	1750	0.25	2.25 A
1/40	10	2500	0.35	2.25 B
1/35	15	1750	0.34	2.25 B
	17	1750	0.36	2.50 A
1/30	15	2500	0.48	2.25 B
	20	1750	0.42	2.25 B
	21	1750	0.44	2.50 B
1/25	17	2500	0.52	2.50 A
	25	1750	0.50	2.50 C
	25	1750	0.50	3.00 A
	25	1750	0.50	3.13 A
1/20	20	2500	0.59	2.25 B
	21	2500	0.62	2.50 C
	28	1750	0.54	3.00 B
	28	1750	0.54	3.13 B
1/17	25	2500	0.71	2.50 C
	25	2500	0.71	3.00 A
	25	1750	0.71	3.13 A
	34	1750	0.64	3.00 C
	34	1750	0.64	3.13 C
1/15	28	2500	0.77	3.00 B
	28	2500	0.77	3.13 B
	40	1750	0.73	3.00 D
	40	1750	0.73	3.13 D
1/12	34	2500	0.91	3.00 C
	34	2500	0.91	3.13 C
1/10	40	2500	1.04	3.00 D
	40	2500	1.04	3.13 D



2.50" Frame



3.00" Frame



3.13" Frame

For dimensions, see drawings [K](#), [L](#), [M](#) or [N](#)



TYPICAL TRU-TORQ CUSTOM MOTORS

### General Specifications:

The ratings listed are typical designs in continuous and periodic intermittent duty rated motors. Various additional speeds, voltages and duty ratings are possible.

### Electrical Options:

- SCR ratings include 90 or 180V and 115 or 220V (half-wave)
- Filtered and pulse width modulated (PWM) motor ratings also available
- Reversible
- Thermal protection
- Cartridge-type brush holders

### Mechanical Options:

- Ball bearing design
- Special shafts
- Custom mounting configurations
- Worm-type and parallel shaft speed reducers also available
- Custom finish/painted
- Metric thru-bolts & shafts
- Vented housing
- Dynamically balanced armature

### Engineering Services:

LEESON's application engineering staff is available, at no additional cost, to assist in developing the motor design best suited for applications.



**NEW!**



**LOW VOLTAGE MOTORS**  
SUB-FHP FRAMES 2.25", 2.50", 3.00", & 3.13"  
12, 24 & 36 VOLTS, 1.0 FORM FACTOR

HP	Rated Torque (oz-in)	RPM	Amperage 12V	TENV Frame & Type* (inches dia.)
1/50	10	1800	1.91	2.25 A
1/40	10	2400	2.55	2.25 B
1/30	18	1800	3.12	2.25 B
	20	1800	3.41	2.50 A
1/25	18	2400	4.16	2.25 B
	23	1800	3.75	2.25 B
	24	1800	3.92	2.50 B
	25	1800	4.08	3.00 A
	25	1800	4.08	3.13 A
1/20	20	2400	4.55	2.50 A
	28	1800	4.44	2.50 C
1/17	23	2400	5.00	2.25 B
	24	2400	5.22	2.50 B
	25	2400	5.44	3.00 A
	32	1800	4.93	3.00 B
	25	2400	5.44	3.13 A
	32	1800	4.93	3.13 B
1/15	28	2400	5.92	2.50 C
	32	2400	6.57	3.00 B
	38	1800	5.62	3.00 C
	32	2400	6.57	3.13 B
	38	1800	5.62	3.13 C
1/12	38	2400	7.50	3.00 C
	48	1800	6.83	3.00 D
	38	2400	7.50	3.13 C
	48	1800	6.83	3.13 D
1/10	48	2400	9.10	3.00 D
	48	2400	9.10	3.13 D

For dimensions, see drawings [K](#), [L](#), [M](#) or [N](#)



2.25" Frame



2.50" Frame



3.00" Frame

**General Specifications:**

The ratings listed are typical designs in continuous and periodic intermittent duty rated motors. Various additional speeds, voltages and duty ratings are possible.

**Electrical Options:**

- Low voltage ratings 12 through 72V
- Reversible
- Thermal protection
- Cartridge-type brush holders

**Mechanical Options:**

- Ball bearing design
- Special shafts
- Worm-type and parallel shaft speed reducers also available
- Custom mounting configurations
- Custom finish/painted
- Metric thru-bolts & shafts
- Vented housing
- Dynamically balanced armature

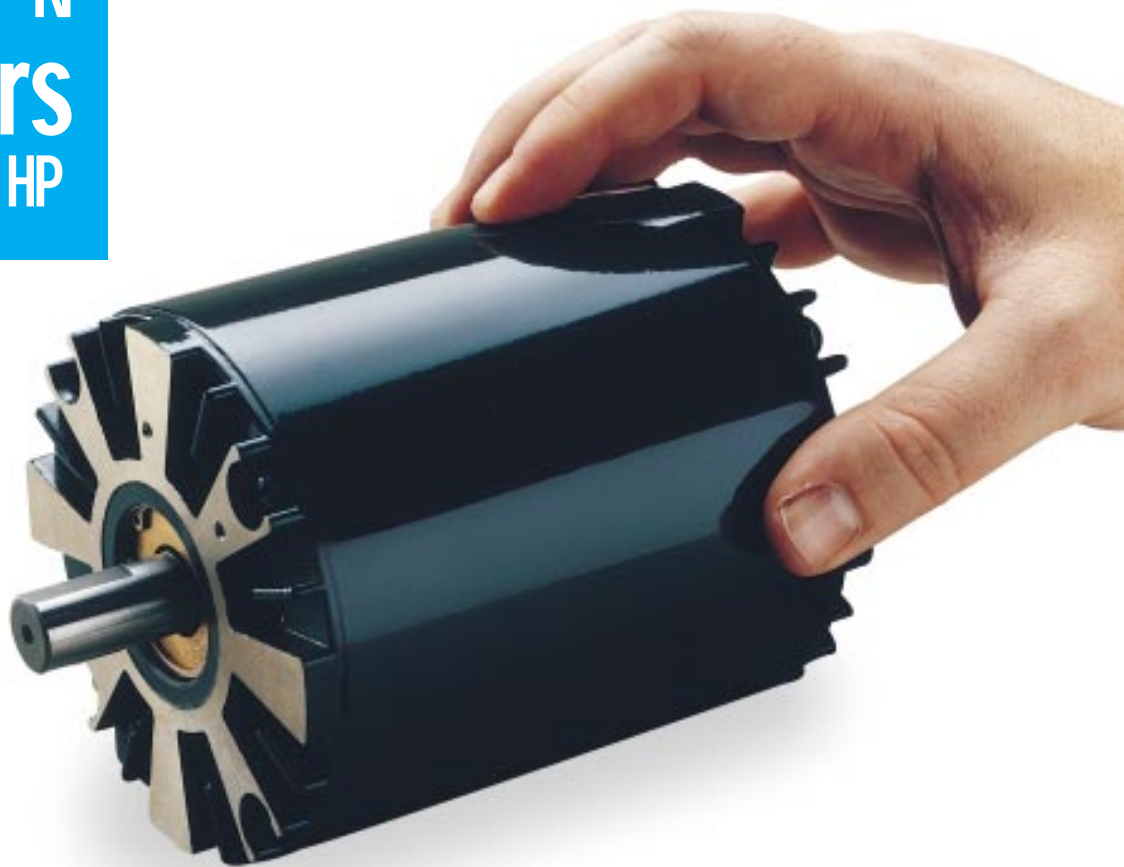
**Engineering Services:**

LEESON's application engineering staff is available, at no additional cost, to assist in developing the motor design best suited for applications.



DRQ CUSTOM MOTORS

# LEESON AC Motors 1/125 through 1/4 HP



## Design Specifications

### SINGLE PHASE

Totally enclosed non-ventilated and open self-ventilated, permanent split capacitor type motors for continuous duty service. These motors have speed torque characteristics typical of the performance curve shown on this page.

### THREE PHASE

Motors wound for three phase service are also available in the same horsepower and speed ranges. Standard voltage for three phase is 230 VAC, 60 hertz.

### Typical Options

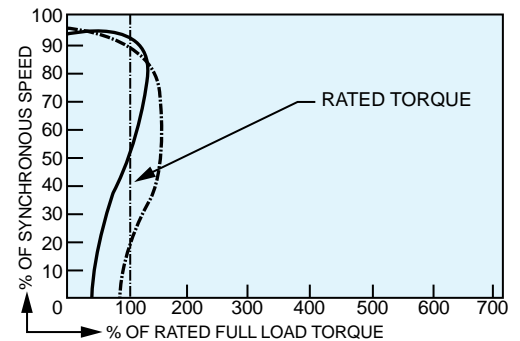
The options listed are those most frequently requested. However, LEESON invites the opportunity to quote on motors having the special mechanical and electrical features suiting your application.

## Mechanical Options

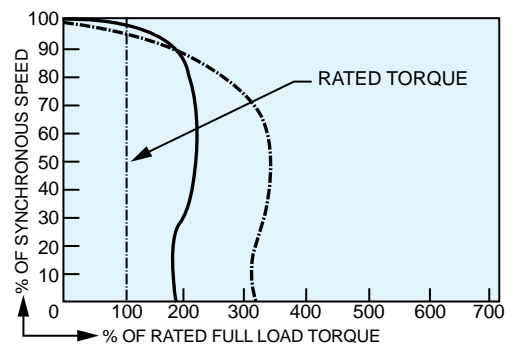
- Mounting brackets for capacitors
- Band or strap mountings
- Extended, threaded, keyed or double shaft extensions
- Hollow shafts or with pinion on the shaft
- NEMA 42C or 48C face mountings
- IEC face mountings and metric dimensions
- Motor mounted brakes and gearheads

## Electrical Options

- Motors for 50 hertz service
- Three phase designs
- Overload or over temperature protection
- Special duty cycles, time-rated motors
- Cords and plugs, spade terminals, extended leads
- Conduit box for connections



Permanent Split Capacitor Motors



Three Phase Motors

**SINGLE PHASE AC MOTORS**  
SUB-FHP FRAMES 31 & 38  
115 & 230 VOLTS

HP	RPM	Full Load Amperage		Torque (oz-in)	ODP Frame	TENV Frame & Type*
		115V	230V			
1/40	1075	0.5	0.2	23	–	31C
	1650	0.5	0.2	15	–	31A
	3350	0.4	0.2	7.5	–	31A
1/25	1075	0.6	0.3	38	–	31E
	1650	0.6	0.3	24	–	31B
	3350	0.5	0.3	12	–	31B
1/15	1075	1.0	0.5	63	–	38C
	1650	0.9	0.5	41	–	31D
	3350	0.8	0.4	20	–	31C
1/12	1075	1.2	0.6	78	–	38C
	1650	1.2	0.6	51	–	38B
	3350	1.2	0.6	25	–	31D
1/10	1075	1.4	0.7	94	–	38D
	1650	1.4	0.7	61	–	38B
	3350	1.4	0.7	30	–	38B
1/8	1075	1.6	0.8	117	–	38F
	1650	1.6	0.8	76	38B	38D
	3350	1.6	0.8	38	38B	38C
1/6	1650	2.0	1.0	102	38D	38E**
	3350	2.0	1.0	50	38B	38B**
1/4	1650	3.0	1.5	152	38F	38G**
	3350	3.0	1.5	75	38D	38D**

For dimensions, see drawings [G](#), [H](#), [I](#) or [J](#)



31 Frame, 3.07" diameter



31 Frame, 3.07" diameter



38 Frame, 3.85" diameter

**THREE PHASE AC MOTORS**  
SUB-FHP FRAMES 31 & 38  
230 & 460 VOLTS

HP	RPM	Full Load Amperage		Torque (oz-in)	ODP Frame	TENV Frame & Type*
		230V	460V			
1/25	1650	0.2	0.1	24	–	31A
	3350	0.2	0.1	12	–	31A
1/15	1650	0.3	0.2	41	–	31B
	3350	0.3	0.2	20	–	31B
1/12	1650	0.4	0.2	51	–	31C
	3350	0.4	0.2	25	–	31C
1/10	1650	0.5	0.3	61	–	31D
	3350	0.5	0.3	30	–	31C
1/8	1650	0.6	0.3	76	–	31E
	3350	0.6	0.3	38	–	31D
1/6	1650	0.8	0.4	102	–	38B
	3350	0.8	0.4	50	–	38B
1/4	1650	1.0	0.5	152	38C	38C**
	3350	1.0	0.5	75	38B	38B**
1/3	1650	1.2	0.6	204	38D	38E**
	3350	1.2	0.6	100	38C	38C**

For dimensions, see drawings [G](#), [H](#), [I](#) or [J](#)

**General Specifications:**

The ratings listed are typical designs in continuous and periodic intermittent duty rated motors. Various additional speeds, voltages and duty ratings are possible.

**Electrical Specifications:**

**Permanent split capacitor (PSC) motors** have starting torques equal to or less than running torques, making them suitable only for certain driven-load characteristics. No starting mechanism is required, but a separately mounted run capacitor is needed. Because the run capacitor is continuous duty and the starting currents are low, this type of motor is excellent for frequent starting duty applications.

**Three phase motors** have high starting torques and low starting currents. They are more efficient than single phase designs and have lower vibration and noise. They are a good choice where frequent starting, dynamic braking, or reversing at speed is required.

**Mechanical Features:**

- Copper windings
- UL and CSA recognized insulation system
- High pressure die cast endshields of 380 aluminum
- Open and totally enclosed designs
- Precision machined shafts of all types
- Shielded or sealed ball bearings
- Numerous mounting options
- Heavy-gauge steel frame
- Dynamically balanced rotor
- Special paint colors
- Custom flanges and faces
- Worm-type and parallel shaft speed reducers also available

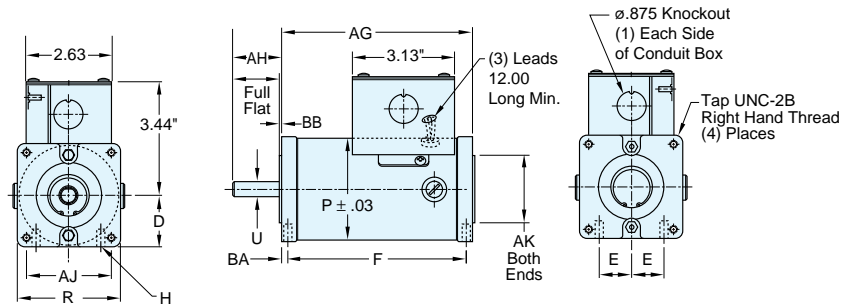
**Engineering Services:**

LEESON's application engineering staff is available, at no additional cost, to assist in developing the motor design best suited for applications.

\* 31 frame diameter is 3.07 inches.  
38 frame diameter is 3.85 inches.  
\*\* These motors are totally enclosed fan cooled.

**A**

DC SQUARE FLANGE MOUNT



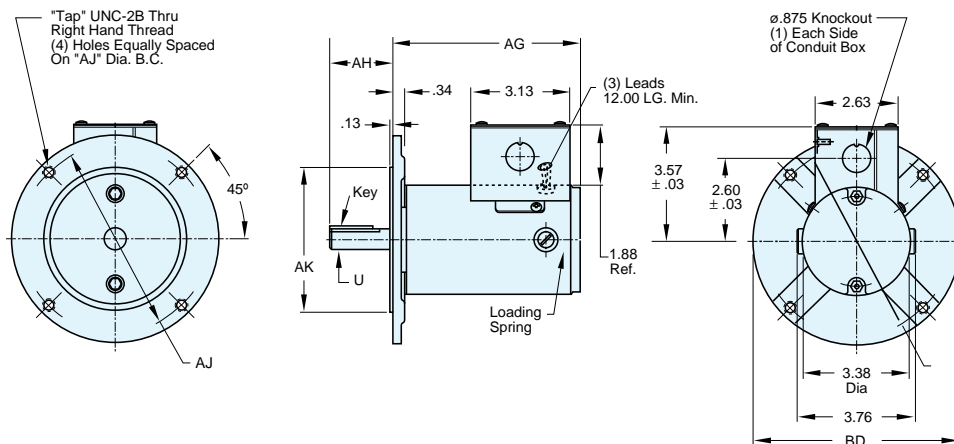
LEESON STOCK DC MOTORS - SQUARE FLANGE (Inches)

Frame & Type	AG	P	BD	U	AH	N-W	AJ	TAP	R	AK	BB	D	BA	E	F	H
24 AS	3.93	2.38	2.88	.375	1.5	1.00	1.73	8-32	2.47	1.00	.03	1.23	.125	.625	3.70	8-32
	4.93	2.38	2.88	.375	1.5	1.00	1.73	8-32	2.47	1.00	.03	1.23	.125	.625	4.70	8-32
31 AS	4.88	3.11	3.50	.500	1.5	1.00	2.63	1/4-20	3.16	2.00	.07	1.57	.235	1.000	4.40	1/4-20
	5.38	3.11	3.50	.500	1.5	1.00	2.63	1/4-20	3.16	2.00	.07	1.57	.235	1.000	4.90	1/4-20
	5.88	3.11	3.50	.500	1.5	1.00	2.63	1/4-20	3.16	2.00	.07	1.57	.235	1.000	5.40	1/4-20
	6.88	3.11	3.50	.500	1.5	1.00	2.63	1/4-20	3.16	2.00	.07	1.57	.235	1.000	6.40	1/4-20
GS	7.88	3.11	3.50	.500	1.5	1.00	2.63	1/4-20	3.16	2.00	.07	1.57	.235	1.000	7.40	1/4-20

Conduit box not included on 24 frame models.

**B**

DC 34-FRAME, 42C OR 56C FACE MOUNT



LEESON STOCK DC MOTORS - 42C FACE (Inches)

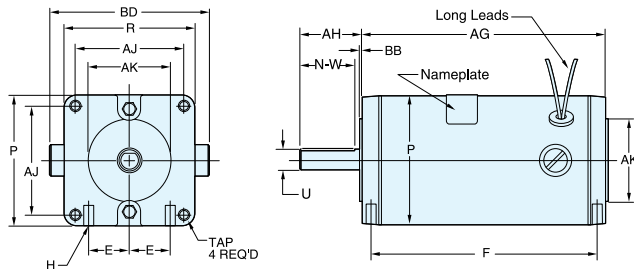
Frame	AG	U	AH	N-W	KEY	AJ	TAP	AK	BD
34D42C	6.37	.375	1.31	1.13	.13 SQ	3.750	1/4-20	3.00	4.25

LEESON STOCK DC MOTORS - 56C FACE (Inches)

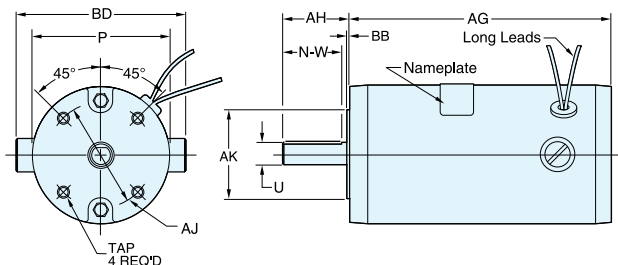
Frame	AG	U	AH	N-W	KEY	AJ	TAP	AK	BD
34E56C	6.93	.625	2.06	1.88	.19 SQ	5.875	3/16-18	4.50	6.50
34G56C	7.93	.625	2.06	1.88	.19 SQ	5.875	3/16-18	4.50	6.50

For 34 frame TEFC designs, add .70" to AG dimension and change P dimension to 3.88" diameter. These dimensions are the usual maximum shaft diameter and shaft length available. For greater length or shaft dimensions, please contact LEESON.

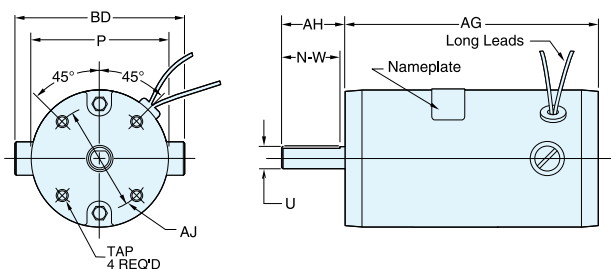
**C**  
DC SQUARE FLANGE MOUNT



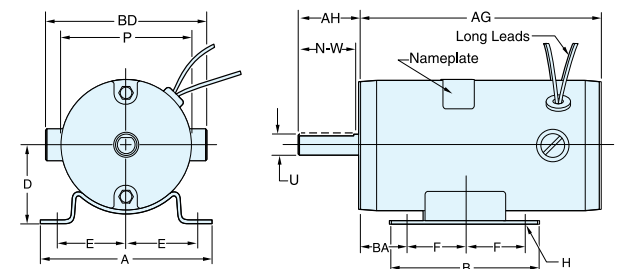
**D**  
DC FLANGE MOUNT



**E**  
DC FACE MOUNT



**F**  
DC BASE MOUNT



LEESON CUSTOM DC MOTORS - SQUARE FLANGE (Inches)

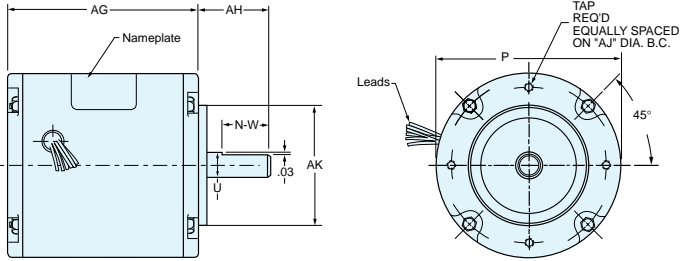
Frame & Type	AG	P	BD	U	AH	N-W	AJ	TAP	R	AK	BB	D	BA	E	F	H	
<b>24</b>	A	3.93	2.38	2.88	.375	1.50	1.00	1.73	8-32	2.47	1.00	.03	1.23	.125	.625	3.70	8-32
	B	4.43	2.38	2.88	.375	1.50	1.00	1.73	8-32	2.47	1.00	.03	1.23	.125	.625	4.20	8-32
	C	4.93	2.38	2.88	.375	1.50	1.00	1.73	8-32	2.47	1.00	.03	1.23	.125	.625	4.70	8-32
	D	5.43	2.38	2.88	.375	1.50	1.00	1.73	8-32	2.47	1.00	.03	1.23	.125	.625	5.20	8-32
	E	5.93	2.38	2.95	.375	1.50	1.00	1.73	8-32	2.47	1.00	.03	1.23	.125	.625	5.70	8-32
<b>31</b>	A	4.88	3.11	3.50	.500	1.50	1.00	2.63	1/4-20	3.16	2.00	.07	1.57	.235	1.000	4.40	1/4-20
	B	5.38	3.11	3.50	.500	1.50	1.00	2.63	1/4-20	3.16	2.00	.07	1.57	.235	1.000	4.90	1/4-20
	C	5.88	3.11	3.50	.500	1.50	1.00	2.63	1/4-20	3.16	2.00	.07	1.57	.235	1.000	5.40	1/4-20
	D	6.38	3.11	3.50	.500	1.50	1.00	2.63	1/4-20	3.16	2.00	.07	1.57	.235	1.000	5.90	1/4-20
	E	6.88	3.11	3.50	.500	1.50	1.00	2.63	1/4-20	3.16	2.00	.07	1.57	.235	1.000	6.40	1/4-20
	F	7.38	3.11	3.50	.500	1.50	1.00	2.63	1/4-20	3.16	2.00	.07	1.57	.235	1.000	6.90	1/4-20
	G	7.88	3.11	3.50	.500	1.50	1.00	2.63	1/4-20	3.16	2.00	.07	1.57	.235	1.000	7.40	1/4-20

LEESON CUSTOM DC MOTORS - FLANGE, FACE, AND BASE MOUNT (Inches)

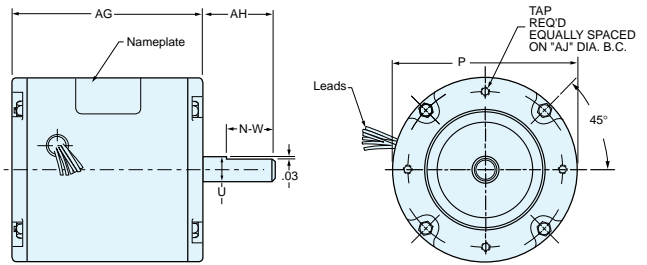
Frame & Type	AG	P	BD	U	AH	N-W	AJ	TAP	AK	BB	D	BA	A	B	E	F	H	
<b>24</b>	A	3.84	2.38	2.88	.375	1.50	1.00	1.79	8-32	1.00	.12	--	--	--	--	--	--	
	B	4.34	2.38	2.88	.375	1.50	1.00	1.79	8-32	1.00	.12	--	--	--	--	--	--	
	C	4.84	2.38	2.88	.375	1.50	1.00	1.79	8-32	1.00	.12	--	--	--	--	--	--	
	D	5.34	2.38	2.88	.375	1.50	1.00	1.79	8-32	1.00	.12	--	--	--	--	--	--	
	E	5.84	2.38	2.88	.375	1.50	1.00	1.79	8-32	1.00	.12	--	--	--	--	--	--	
<b>31</b>	A	4.83	3.11	3.56	.500	1.50	1.00	2.63	8-32	2.00	.12	1.63	.75	3.50	3.13	1.40	1.25	.22x.31
	B	5.33	3.11	3.56	.500	1.50	1.00	2.63	8-32	2.00	.12	1.63	.75	3.50	3.13	1.40	1.25	.22x.31
	C	5.83	3.11	3.56	.500	1.50	1.00	2.63	8-32	2.00	.12	1.63	.75	3.50	3.13	1.40	1.25	.22x.31
	D	6.33	3.11	3.56	.500	1.50	1.00	2.63	8-32	2.00	.12	1.63	.75	3.50	3.13	1.40	1.25	.22x.31
	E	6.83	3.11	3.56	.500	1.50	1.00	2.63	8-32	2.00	.12	1.63	.75	3.50	3.13	1.40	1.25	.22x.31
	F	7.33	3.11	3.56	.500	1.50	1.00	2.63	8-32	2.00	.12	1.63	.75	3.50	3.13	1.40	1.25	.22x.31
	G	7.83	3.11	3.56	.500	1.50	1.00	2.63	8-32	2.00	.12	1.63	.75	3.50	3.13	1.40	1.25	.22x.31
<b>34</b>	A	4.83	3.38	4.00	.500	1.50	1.00	2.63	8-32	2.00	.12	1.88	.75	4.19	3.56	1.688	1.406	.25 dia.
	B	5.33	3.38	4.00	.500	1.50	1.00	2.63	8-32	2.00	.12	1.88	.75	4.19	3.56	1.688	1.406	.25 dia.
	C	5.83	3.38	4.00	.500	1.50	1.00	2.63	8-32	2.00	.12	1.88	.75	4.19	3.56	1.688	1.406	.25 dia.
	D	6.33	3.38	4.00	.500	1.50	1.00	2.63	8-32	2.00	.12	1.88	.75	4.19	3.56	1.688	1.406	.25 dia.
	E	6.83	3.38	4.00	.500	1.50	1.00	2.63	8-32	2.00	.12	1.88	.75	4.19	3.56	1.688	1.406	.25 dia.
	F	7.33	3.38	4.00	.500	1.50	1.00	2.63	8-32	2.00	.12	1.88	.75	4.19	3.56	1.688	1.406	.25 dia.
	G	7.83	3.38	4.00	.500	1.50	1.00	2.63	8-32	2.00	.12	1.88	.75	4.19	3.56	1.688	1.406	.25 dia.

For 34 frame TEFC designs, add .70" to AG dimension and change P dimension to 3.88" diameter. These dimensions are the usual maximum shaft diameter and shaft length available. For greater length or shaft dimensions, please contact LEESON.

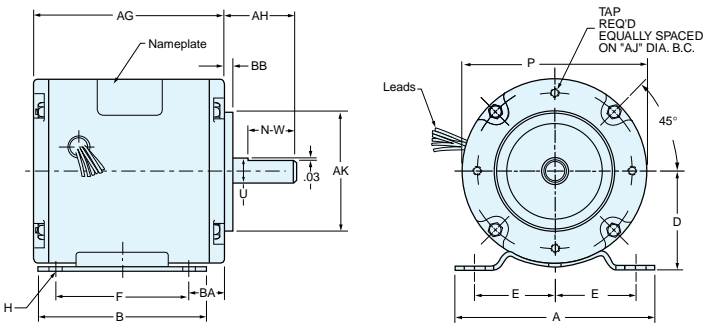
**G**  
AC FLANGE MOUNT



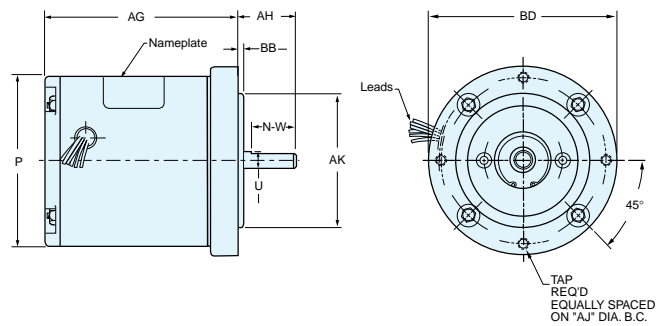
**H**  
AC FACE MOUNT



**I**  
AC BASE MOUNT



**J**  
AC NEMA 42C FACE



LEESON CUSTOM AC MOTORS - FLANGE, FACE & BASE MOUNT (Inches)

Frame & Type	AG	P	U	AH	N-W	AJ	TAP	AK	BB	D	BA	A	B	E	F	H	
31	A	4.32	3.07	.50	1.50	1.00	2.500	8-32	1.625	.13	---	---	---	---	---	---	
	B	4.82	3.07	.50	1.50	1.00	2.500	8-32	1.625	.13	---	---	---	---	---	---	
	C	5.32	3.07	.50	1.50	1.00	2.500	8-32	1.625	.13	---	---	---	---	---	---	
	D	5.82	3.07	.50	1.50	1.00	2.500	8-32	1.625	.13	---	---	---	---	---	---	
	E	6.32	3.07	.50	1.50	1.00	2.500	8-32	1.625	.13	---	---	---	---	---	---	
	F	6.82	3.07	.50	1.50	1.00	2.500	8-32	1.625	.13	---	---	---	---	---	---	
38	A	4.02	3.85	.50	1.50	1.00	3.250	8-32	2.500	.13	2.07	.75	4.19	3.56	1.69	1.41	.28 x.44
	B	4.52	3.85	.50	1.50	1.00	3.250	8-32	2.500	.13	2.07	.75	4.19	3.56	1.69	1.41	.28 x.44
	C	5.02	3.85	.50	1.50	1.00	3.250	8-32	2.500	.13	2.07	.75	4.19	3.56	1.69	1.41	.28 x.44
	D	5.52	3.85	.50	1.50	1.00	3.250	8-32	2.500	.13	2.07	.75	4.19	3.56	1.69	1.41	.28 x.44
	E	6.02	3.85	.50	1.50	1.00	3.250	8-32	2.500	.13	2.07	.75	4.19	3.56	1.69	1.41	.28 x.44
	F	6.52	3.85	.50	1.50	1.00	3.250	8-32	2.500	.13	2.07	.75	4.19	3.56	1.69	1.41	.28 x.44
	G	7.02	3.85	.50	1.50	1.00	3.250	8-32	2.500	.13	2.07	.75	4.19	3.56	1.69	1.41	.28 x.44

LEESON CUSTOM AC MOTORS - NEMA 42C FACE (Inches)

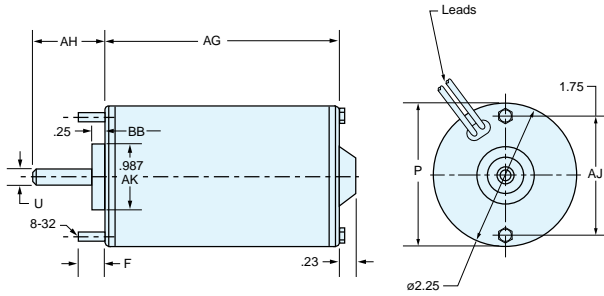
Frame & Type	AG	P	BD	U	AH	N-W	AJ	TAP	AK	BB	D	BA	A	B	E	F	H
38	A	4.40	3.85	4.25	.375	1.31	1.00	3.750	1/4-20	3.000	.13	.13	---	---	---	---	---
	B	4.90	3.85	4.25	.375	1.31	1.00	3.750	1/4-20	3.000	.13	.13	---	---	---	---	---
	C	5.40	3.85	4.25	.375	1.31	1.00	3.750	1/4-20	3.000	.13	.13	---	---	---	---	---
	D	5.90	3.85	4.25	.375	1.31	1.00	3.750	1/4-20	3.000	.13	.13	---	---	---	---	---
	E	6.40	3.85	4.25	.375	1.31	1.00	3.750	1/4-20	3.000	.13	.13	---	---	---	---	---
	F	6.90	3.85	4.25	.375	1.31	1.00	3.750	1/4-20	3.000	.13	.13	---	---	---	---	---
	G	7.40	3.85	4.25	.375	1.31	1.00	3.750	1/4-20	3.000	.13	.13	---	---	---	---	---

For 38 frame TEFC designs, add .97" to AG dimension and change P dimension to 4.43".  
These dimensions are the usual maximum shaft diameter and shaft length available.  
For greater length or shaft dimensions, please contact LEESON.



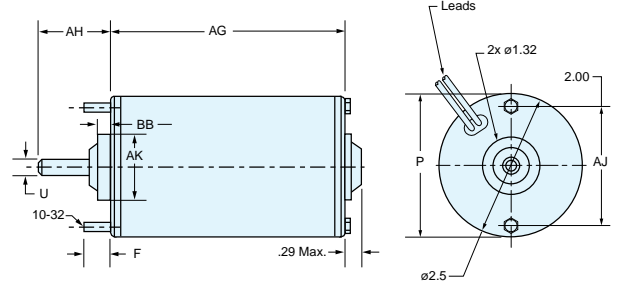
**K**

TRU-TORQ DC 2.25" FRAME



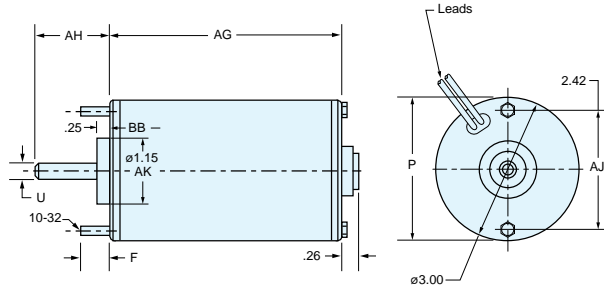
**L**

TRU-TORQ DC 2.50" FRAME



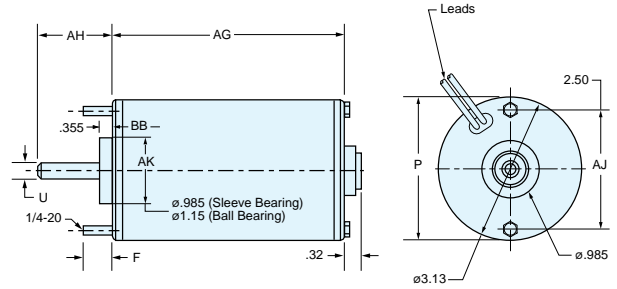
**M**

TRU-TORQ DC 3.00" FRAME



**N**

TRU-TORQ DC 3.13" FRAME



TRU-TORQ CUSTOM DC MOTORS (Inches)

Frame & Type	AG	P	U	AH	AJ	TAP	AK	BB	F	
2.25"	A	3.00	2.25	.25	1.50	1.75	8-32	.987	.25	.50
	B	3.67	2.25	.25	1.50	1.75	8-32	.987	.25	.50
2.50"	A	3.34	2.50	.31	1.50	2.00	10-32	1.02	.42	.75
	B	3.68	2.50	.31	1.50	2.00	10-32	1.02	.42	.75
	C	4.41	2.50	.31	1.50	2.00	10-32	1.02	.42	.75
3.00"	A	3.78	3.00	.375	1.50	2.42	10-32	1.15	.25	.75
	B	4.33	3.00	.375	1.50	2.42	10-32	1.15	.25	.75
	C	4.78	3.00	.375	1.50	2.42	10-32	1.15	.25	.75
	D	5.68	3.00	.375	1.50	2.42	10-32	1.15	.25	.75
3.13"	A	3.64	3.13	.375	1.50	2.50	1/4-20	.985	.36	.75
	B	4.85	3.13	.375	1.50	2.50	1/4-20	.985	.36	.75
	C	5.11	3.13	.375	1.50	2.50	1/4-20	.985	.36	.75
	D	5.60	3.13	.375	1.50	2.50	1/4-20	.985	.36	.75

These dimensions are the usual maximum shaft diameter and shaft length available. For greater length or shaft dimensions, please contact LEESON.



## Worldwide Network of Support

### Nearly 3,000 off-the-shelf ratings.

High-quality LEESON industrial motors are available off-the-shelf for almost any application. From precision-manufactured sub-FHP gearmotors to premium efficiency cast iron WATTSaver® motors, all are available for immediate shipment from our 33 warehouses located throughout North America. Nearly 3,000 different off-the-shelf ratings. All types of enclosures and mountings, including hard-to-find direct replacement models. Both AC and DC, from 1/50 through 1,000 HP. Quick-turnaround Mod-Squad™ modification center for fast shipment of certain modified motors.

### Custom motors...a LEESON specialty.

When a special motor solution is required, look to LEESON for the answer. We've been designing and building special motors for more than 25 years and welcome production orders in lots as small as 25 motors. LEESON's custom motor product range includes:

- Permanent Magnet DC Motors
- Single Phase AC Motors
- Three Phase AC Motors
- AC and DC Gearmotors

For additional information regarding our custom motor capabilities, request Bulletin 1200 or contact the LEESON District office nearest to you.



**LEESON ELECTRIC CORPORATION**

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