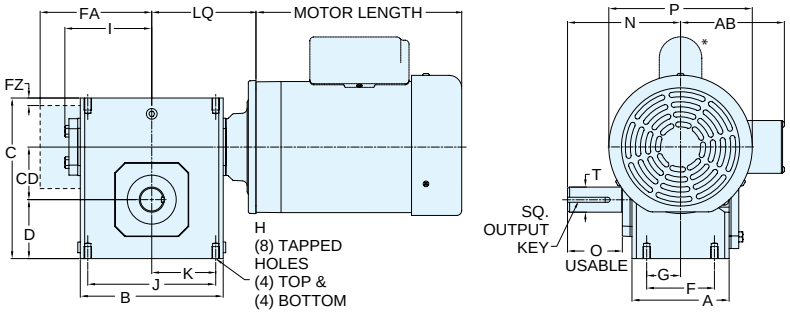
GEAR+MOTOR™ DIMENSIONS



MQ & BM STYLE GEARMOTOR DIMENSIONS (Inches)

Series	A	B	C	D	CD	F	FA	FZ	G	H Tap	H Depth	I	J	K	N	O	T	Output Key
813	2.82	3.80	4.66	1.72	1.33	2.00	N/A	N/A	1.00	5/16-18	0.50	2.61	3.25	1.63	4.00	2.16	0.625	3/16 X 1.50
815	3.44	4.88	5.38	1.91	1.54	2.75	N/A	N/A	1.38	5/16-18	0.63	3.14	4.19	2.09	4.31	2.11	0.750	3/16 X 1.50
818	3.56	5.06	5.75	2.06	1.75	2.75	N/A	N/A	1.38	5/16-18	0.63	3.24	4.19	2.09	4.31	2.05	0.875	3/16 X 1.38
821	3.81	5.80	6.38	2.28	2.06	2.88	N/A	N/A	1.44	3/8-16	0.60	3.61	5.00	2.50	4.68	2.29	1.000	1/4 X 1.44
824	4.06	6.12	6.94	2.50	2.38	2.88	N/A	N/A	1.44	3/8-16	0.69	3.77	5.00	2.50	5.14	2.66	1.125	1/4 X 1.75
826	4.84	7.12	8.00	2.94	2.63	3.38	N/A	N/A	1.69	3/8-16	0.69	4.34	6.38	3.19	5.63	2.73	1.125	1/4 X 1.75
830	5.25	8.12	8.88	3.25	3.00	4.00	N/A	N/A	2.00	7/16-14	0.88	4.84	7.00	3.50	6.75	3.60	1.250	1/4 X 2.25
832	5.75	8.50	9.38	3.50	3.25	4.00	N/A	N/A	2.00	7/16-14	0.88	5.02	7.50	3.75	7.06	3.66	1.375	5/16 X 2.50
842	6.13	10.25	11.38	4.44	4.25	5.00	N/A	N/A	2.50	5/8-11	1.00	6.10	8.50	4.25	8.12	4.50	1.875	1/2 X 3.06
852	7.19	13.00	14.00	5.12	5.25	5.81	N/A	N/A	2.91	5/8-11	1.25	7.50	11.00	5.50	9.06	4.78	2.000	1/2 X 3.50
860	8.13	14.25	16.50	6.50	6.00	6.38	11.13	0.33	3.19	5/8-11	1.00	N/A	12.75	6.38	10.00	4.65	2.500	5/8 X 4.00

* Capacitor housing, single phase only, 2-1/4" high

MOTOR LENGTH – See page 182 for motor length dimensions of individual ratings.

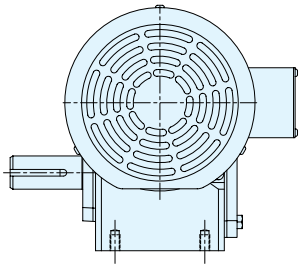
MOTOR MOUNTING DIMENSIONS

Series	LQ BMQ 48CZ	LQ BMQ 56C/140TC	LQ BMQ 180TC	LQ BMQ 210TC	LQ BM 48CZ	LQ BM 56C/140TC	LQ BM 180TC	LQ BM 210TC	P 48CZ	P 56C/140TC	P 180TC	P 210TC	AB 48CZ	AB 56C/140TC	AB 180TC	AB 210TC
813	3.46	3.46	N/A	N/A	5.63	6.07	N/A	N/A	5.88	7.16	N/A	N/A	4.88	5.31	N/A	N/A
815	3.99	3.99	N/A	N/A	6.16	6.60	N/A	N/A	5.88	7.16	N/A	N/A	4.88	5.31	N/A	N/A
818	4.09	4.09	N/A	N/A	6.26	6.70	N/A	N/A	5.88	7.16	N/A	N/A	4.88	5.31	N/A	N/A
821	4.46	4.46	N/A	N/A	6.63	7.07	N/A	N/A	5.88	7.16	N/A	N/A	4.88	5.31	N/A	N/A
824	N/A	4.63	5.06	N/A	N/A	7.76	8.76	8.76	N/A	7.16	9.22	10.81	N/A	5.31	6.44	7.59
826	N/A	5.19	5.62	N/A	N/A	8.32	9.32	9.32	N/A	7.16	9.22	10.81	N/A	5.31	6.44	7.59
830	N/A	5.69	6.12	6.56	N/A	8.82	9.82	9.82	N/A	7.16	9.22	10.81	N/A	5.31	6.44	7.59
832	N/A	5.88	6.31	6.75	N/A	9.01	10.01	10.01	N/A	7.16	9.22	10.81	N/A	5.31	6.44	7.59
842	N/A	6.45	7.21	7.21	N/A	11.81	12.90	12.90	N/A	7.16	9.22	10.81	N/A	5.31	6.44	7.59
852	N/A	7.85	8.61	8.61	N/A	13.21	14.30	14.30	N/A	7.16	9.22	10.81	N/A	5.31	6.44	7.59
860	N/A	10.45	9.33	9.33	N/A	N/A	15.88	15.88	N/A	7.16	9.22	10.81	N/A	5.31	6.44	7.59

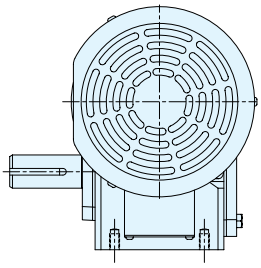
MOTOR MOUNTING POSITIONS

Conduit box position viewed from input side of reducer.

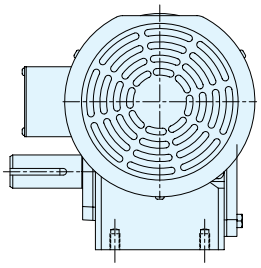
STANDARD MOUNTING POSITION



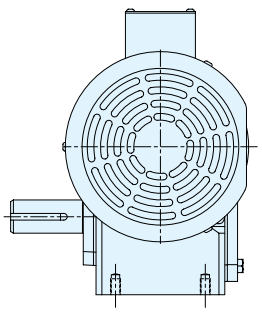
1 Conduit box horizontal on right side.



2 Conduit box vertical on bottom side.



3 Conduit box horizontal on left side.



4 Conduit box vertical on top side.

CONDENSED GLOSSARY OF MOTOR AND GEARING TERMS

Axial Movement - Often called "endplay." The endwise movement of motor or gear shafts. Usually expressed in thousandths of an inch.

Back Driving - Driving the output shaft of a reducer — using it to increase speed rather than reduce speed. Worm gear reducers are not suitable for service as speed increasers.

Backlash - Rotational movement of the output shaft clockwise and counter clockwise, while holding the input shaft stationary. Usually expressed in thousandths of an inch and measure at a specific radius at the output shaft.

Center Distance - A basic measurement or size reference for worm gear reducers, measured from the centerline of the worm to the centerline of the worm wheel.

Drip-Proof - Venting in end frame and/or main frame located to prevent drops of liquid from falling into motor within 15 angle from vertical. Designed for use in areas that are reasonably dry, clean, and well ventilated (usually indoors). If installed outdoors, it is recommended that the motor be protected with a cover that does not restrict the flow of air to the motor.

Efficiency - A ratio of the input power compared to the output, usually expressed as a percentage.

Explosion-Proof Motors - These motors meet Underwriters Laboratories and Canadian Standards Association standards for use in hazardous (explosive) locations, as indicated by the UL label affixed to the motor. Locations are considered hazardous because the atmosphere does or may contain gas, vapor, or dust in explosive quantities.

Flanged Reducer - Usually used to refer to a reducer having provisions for close coupling of a motor either via a hollow (quill) shaft or flexible coupling. Most often a NEMA C face motor is used.

Gear+Motor™ - LEESON's registered trademark for a separable gear and NEMA C face motor as opposed to an integral gearmotor. Integral gearmotors suffer from lack of application and availability constraints as well as having inherent service issues when one or the other component needs replacement.

Input Horsepower - The power applied to the input shaft of a reducer. The input horsepower rating of a reducer is the maximum horsepower the reducer can safely handle.

Mechanical Rating - The maximum power or torque a reducer can transmit. LEESON reducers typically have a safety margin equal to 200% or more of its mechanical rating allowing momentary overloads during start-up or other transient overload conditions.

Motor Selection - See the technical section of LEESON's Stock Motor Catalog 1050, request LEESON's book, Practical Motor Basics or contact LEESON's District Office for expert assistance.

Mounting Position - The relationship of the input and output shafts of a reducer relative to horizontal.

Output Horsepower - The amount of horsepower available at the output shaft of the reducer. Output horsepower is always less than the input horsepower due to the efficiency of the reducer.

Overhung Load - A force applied at right angles to a shaft beyond the shaft's outermost bearing. This shaft-bending load must be supported by the bearing. Overhung load ratings are listed for each reducer size and should not be exceeded.

Prime Mover - In industry, the prime mover is most often an electric motor. Occasionally engines, hydraulic or air motors are used. Special application considerations are called for when other than an electric motor is the prime mover.

Self-Locking - The inability of a reducer to be driven backwards by its load. As a matter of safety, no LEESON reducer should be considered self-locking.

Service Factor for Gearing - A method of adjusting a reducer's load carrying characteristics to reflect the application's load characteristics. AGMA (American Gear Manufacturer's Association) has established standardized service factor information.

Service Factor for Motors - Refers to a motor's ability to handle a load greater than the motor's rated HP on a continuous basis. Most LEESON motors have a continuous duty service factor of 1.15 or higher. This ability of the motor is intended to handle momentary or transient overloads or unusual service conditions and should not be utilized when sizing motors for continuous service. For assistance in motor selection please contact your LEESON's District Office.

Thermal Rating - The power or torque a reducer can transmit continuously. This rating is based upon the reducer's ability to dissipate the heat caused by friction.

Thrust Load - Force imposed on a shaft parallel to a shaft's axis. Thrust loads are often induced by the driven machine. Take care to be sure the thrust load rating of the reducer is sufficient that it's shafts and bearings can absorb the load without premature failure.

Totally Enclosed Non-Ventilated (TENV) - No vent openings, tightly enclosed to prevent the free exchange of air, but not airtight. Has no external cooling fan and relies on convection for cooling. Suitable for use where exposed to dirt or dampness, but not for hazardous (explosive) locations.

Totally Enclosed Fan Cooled (TEFC) - Same as the TENV except has external fan as an integral part of the motor, to provide cooling by blowing air around the outside frame of the motor.

WORM GEAR REDUCER SERVICE FACTORS

Proper determination of an application's service factor characteristics is critical for maximum reducer life and trouble free service. See the definition of service factor in the glossary.

All worm reducers and LEESON Gear+Motor motorized reducers are sized for applications having an AGMA defined service of 1.0, unless otherwise stated. (Alternately, 1.0 service factor is sometimes expressed as "Class I Service".) Reducers in such applications operate on a continuous duty basis, for 10 hours per day or less, and are free of recurrent shock loads. When operating characteristics are different than noted, the input horsepower and torque ratings listed must be divided by the service factor selected from the table below. This table applies to reducers with an electric or hydraulic motor input.

SPECIAL APPLICATION CONSIDERATIONS

CAUTION: Please contact LEESON for assistance in applications not listed or for applications with unusual characteristics. Including the following:

- Input speeds not listed in catalog
- Frequent starting or repetitive shock applications
- Selection of reducers for man lifts or people moving equipment
- High energy loads, including stalling
- Starting or momentary overloads exceeding 200% of gear reducer mechanical capacity (100% overload)

SERVICE FACTOR TABLE

Duration of Service (Hours per day)	Uniform Load	Moderate Shock	Heavy Shock	Extreme Shock
Occasional 1/2 Hour	—*	—*	1.00	1.25
Less than 3 Hours	1.00	1.00	1.25	1.50
3 - 10 Hours	1.00	1.25	1.50	1.75
Over 10 Hours	1.25	1.50	1.75	2.00

* Unspecified service factors should be 1.00 or as agreed upon by the user and manufacturer.

When a single or multi-cylinder engine is the input power, the service factor selected from the table above should be increased by multiplying the value by the factor selected from the table below.

Service Factor Conversion Table for Engine Driven Applications.

Hydraulic or Electric Motor	Single Cylinder Engines	Multi-Cylinder Engines
1.00	1.50	1.25
1.25	1.75	1.50
1.50	2.00	1.75
1.75	2.25	2.00
2.00	2.50	2.25

On the next page, AGMA standardized service factor data is listed for a wide variety of applications operating 3 to 10 hours per day and for 10 hours or more per day.

A.G.M.A. SERVICE FACTORS

Application	Service Factor 3-10 Hours	Service Factor Over 10 Hours
AGITATORS		
Pure Liquids	1.00	1.25
Liquids & Solids	1.25	1.50
Liquids-Variable Density	1.25	1.50
APRON CONVEYORS		
Uniformly Loaded or Fed	1.00	1.25
Heavy Duty	1.25	1.50
APRON FEEDERS	1.25	1.50
ASSEMBLY CONVEYORS		
Uniformly Loaded or Fed	1.00	1.25
Heavy Duty	1.25	1.50
BARGE HAUL PULLERS	1.50	1.75
BARKING		
Drums (Coupling Connected)		1.75
Mechanical		1.75
BAR SCREENS (Sewage)	1.00	1.25
BELT CONVEYORS		
Uniformly Loaded or Fed	1.00	1.25
Heavy Duty	1.25	1.50
BELT FEEDERS	1.25	1.50
BLOWERS		
Centrifugal	1.00	1.25
Lobe	1.25	1.50
Vane	1.00	1.25
BOLTING MACHINERY	1.00	1.25
BREWING & DISTILLING		
Bottling Machinery	1.00	1.25
Brew Kettles, Cont. Duty	1.00	1.25
Can Filling Machines	1.00	1.25
Cookers-Cont. Duty	1.00	1.25
Mash Tubs-Cont. Duty	1.00	1.25
Scale Hoppers-Frequent Starts	1.25	1.50
BUCKET		
Conveyors Uniform	1.00	1.25
Conveyors Heavy Duty	1.25	1.50
Elevators Cont.	1.00	1.25
Elevators Uniform	1.00	1.25
Elevators Heavy Duty	1.25	1.50
CALENDARS		
Rubber		1.50
Textile	1.25	1.50
CANE KNIVES		1.50
CAN FILLING MACHINES	1.00	1.25
CAR DUMPERS	1.50	1.75
CAR PULLERS	1.25	1.50
CENTRIFUGAL		
Blowers, Compressors, Discharge Elevator, Fans or Pumps	1.00	1.25
CHAIN CONVEYORS		
Uniformly Loaded or Fed	1.00	1.25
Heavy Duty	1.25	1.50
CLARIFIERS	1.00	1.25
CLASSIFIERS	1.25	1.50
CLAY WORKING INDUSTRY		
Brick Press	1.75	2.00
Briquette Machines	1.75	2.00
Clay Working Machinery	1.25	1.50
Plug Mills	1.25	1.50
COMPRESSORS		
Centrifugal	1.00	1.25
Lobe	1.25	1.50
Reciprocating:		
Multi-Cylinder	1.25	1.50
Single Cylinder	1.50	1.75
CONCRETE MIXERS		
Continuous	1.25	1.50
Intermittent	1.25	1.50
CONVEYORS-Uniformly Loaded or Fed Apron, Assembly, Belt, Bucket, Chain, Flight, Oven, Screw	1.00	1.25
CONVEYORS-Severe Duty		
Live Roll		Contact Factory
Reciprocating, Shaker	1.50	1.75
COOLING TOWER FANS		Contact Factory
CRANES		
Dry Dock Cranes		Contact Factory
Main Hoist	1.00	1.25
Bridge and Trolley Travel		Contact Factory
CRUSHERS		
Ore or Stone	1.50	1.75
Sugar		1.50
DISC FEEDERS	1.00	1.25
DOUBLE ACTING PUMPS		
2 or more Cylinders	1.25	1.50
Single Cylinder		Contact Factory
DRAW BENCH (Metal Mills)		
Carriage & Main Drive	1.25	1.50
DREDGES		
Cable Reels, Conveyors	1.25	1.50
Cutter Head & Jig Drives	1.75	2.00
Maneuvering Winches, Pumps	1.25	1.50
Screen Drives	1.50	1.75
Stackers, Utility Winches	1.25	1.50
ELEVATORS		
Bucket-Uniform Load	1.00	1.25
Bucket-Heavy Duty	1.25	1.50
Bucket-Continuous	1.00	1.25
Centrifugal Discharge	1.00	1.25
Escalators		Not Approved
Freight		Not Approved
Gravity Discharge	1.00	1.25
Man Lifts, Passenger		Not Approved
EXTRUDERS (Plastic)		
Film Sheet, Coating, Rods, Pipe Tubing	1.25	1.25
Blow Molders, Pre-plasticizers		1.50
FANS		
Centrifugal	1.00	1.25
COOLING TOWERS		Contact Factory
Forced Draft		1.25
Induced Draft	1.25	1.50
Large (Mine, etc.)	1.25	1.50
Large Industrial	1.25	1.50
Light (Small Diameter)	1.00	1.25
FEEDERS		
Apron, Belt	1.25	1.50
Disc	1.00	1.25
Reciprocating	1.75	2.00
Screw	1.25	1.50
FLIGHT		
Conveyors, Uniform	1.00	1.25
Conveyors, Heavy	1.25	1.50
FOOD INDUSTRY		
Beet Slicers	1.25	1.50
Bottling, Can Filling Mach.	1.00	1.25
Cereal Cookers	1.00	1.25
Dough Mixers, Meat Grinders	1.25	1.50
HAMMER MILLS	1.50	1.75
HOISTS		
Heavy Duty	1.75	2.00
Medium Duty	1.25	1.50
Skip Hoist	1.25	1.50
INDUCED DRAFT FANS	1.25	1.50
LAUNDRY WASHERS AND TUMBLERS	1.25	1.50
LINE SHAFTS		
Driving Processing Equipment	1.25	1.50
Other Line Shafts, Light	1.00	1.25
LUMBER INDUSTRY		
Barkers-Spindle Feed	1.25	1.50
Barkers-Main Drive	1.75	1.75
Carriage Drive		Contact Factory
CONVEYORS		
Burner	1.25	1.50
Main or Heavy Duty	1.50	1.50
Main Log	1.75	2.00
Re-saw Merry-Go-Round	1.25	1.50
Slab	1.75	2.00
Transfer	1.25	1.50
Chains-Floor	1.50	1.50
Chains-Green	1.50	1.75
Cut-Off Saws-Chain & Drag	1.50	1.75
Debarking Drums	1.75	2.00
Feeds-Edger	1.25	1.50
Feeds-Gang	1.50	1.50
Feeds-Trimmer	1.25	1.50
Log Deck	1.50	1.50
Log Hauls-Incline Well Type	1.50	1.50
Log Turning Devices	1.50	1.50
Planer Feed	1.25	1.50
Planer Tilting Hoist	1.50	1.50
Rolls-Live-Off Bearing-Roll Cases	1.50	1.50
Sorting Table, Tipple Hoist	1.25	1.50
Transfers-Chain & Craneway	1.50	1.75
Tray Drives	1.25	1.50
Veneer Lathe Drives		Contact Factory
MACHINE TOOLS		
Auxiliary Drives	1.00	1.25
Bending Rolls	1.25	1.50
Main Drives	1.25	1.50
Notching Press (Belted)		Contact Factory
Plate Planers	1.50	1.75
Punch Press (Geared)	1.50	1.75
Tapping Machines	1.50	1.75
METAL MILLS		
Draw Bench Carriages & Main Drives	1.25	1.50
Pinch, Dryer and Scrubber Rolls Reversing		Contact Factory
Slitters	1.25	1.50
Table Conveyors Non-Reversing Group Drives	1.25	1.50
Individual Drives	1.50	1.75
Reversing Wire Drawing & Flattening Machines	1.25	1.50
Wire Winding Machines	1.25	1.50
MILLS, ROTARY		
Ball and Rod Mills with		
Spur Ring Gear		1.75
with Helical Ring Gear		1.50
Direct Connect		1.50
Cement Kilns, Dryers, Coolers, Pebble, Plain & Wedge Bar Mills		1.50
Tumbling Barrels	1.50	1.75
MIXERS (Also see Agitators)		
Concrete, Cont. & Int.	1.25	1.50
Constant Density	1.00	1.25
Variable Density	1.25	1.50
OIL INDUSTRY		
Chillers	1.25	1.50
Oil Well Pumping		Contact Factory
Paraffin Filter Press	1.25	1.50
Rotary Kilns	1.25	1.50
PAPER MILLS		Contact Factory
PASSENGER ELEVATORS		Contact Factory
PLATE PLANERS	1.50	1.75
PRINTING PRESSES		Contact Factory
PUMPS		
Centrifugal	1.00	1.25
Proportioning	1.25	1.50
Reciprocating		
Single Act, 3 or more Cyl.	1.25	1.50
Double Act, 2 or more Cyl.	1.25	1.50
Single Act, 1 or 2 Cyl		Contact Factory
Double Act, 1 Cyl.		Contact Factory
Rotary: Gear, Lobe, Vane	1.00	1.25
PUNCH PRESSES (Gear Driven)	1.50	1.75
RUBBER & PLASTIC INDUSTRIES		
Calendars		1.50
Crackers		1.75
Laboratory Equipment	1.25	1.50
Mills (2 on line)	1.50	
Mills (3 on line)	1.25	
Mixing Mills	1.50	1.50
Refiners		1.50
Sheeters		1.50
Tire Building & Machines		Contact Factory
Tire & Tube Press Openers		Contact Factory
Tubers & Strainers		1.50
Warming Mills		1.50
SCREENS		
Air Washing	1.00	1.25
Rotary-Sand or Gravel	1.25	1.50
Traveling Water Intake	1.00	1.25
SEWAGE DISPOSAL		
Bar Screens	1.00	1.25
Chemical Feeders	1.00	1.25
Collectors	1.00	1.25
Dewatering Screens	1.25	1.50
Scum Breakers	1.25	1.50
Slow or Rapid Mixers	1.25	1.50
Thickeners	1.25	1.50
Vacuum Filters	1.25	1.50
SKI TOWS & LIFTS		Not Approved
STOKERS	1.00	1.25
STONE CRUSHERS	1.50	1.75
SUGAR INDUSTRY		
Cane Knives, Crushers, Mills		1.50
TABLE CONVEYORS (Non-Reversing)		
Group Drives	1.25	1.50
Individual Drives	1.50	1.75
Reversing		Contact Factory
TEXTILE INDUSTRY		
Batchers, Calendars	1.25	1.50
Card Machines	1.25	1.50
Dry Cans, Dryers	1.25	1.50
Dyeing Machinery	1.25	1.50
Knitting Machinery		Contact Factory
Looms, Mangles, Nappers, Pads	1.25	1.50
Range Drives		Contact Factory
Slashers, Soapers, Spinners	1.25	1.50
Tenter Frames, Washers, Winders	1.25	1.50
TUMBLING BARRELS	1.50	1.75
VANE BLOWERS	1.00	1.25
WINDLASS		Contact Factory
WIRE		
Drawing Machines	1.25	1.50
Winding Machines	1.25	1.50