

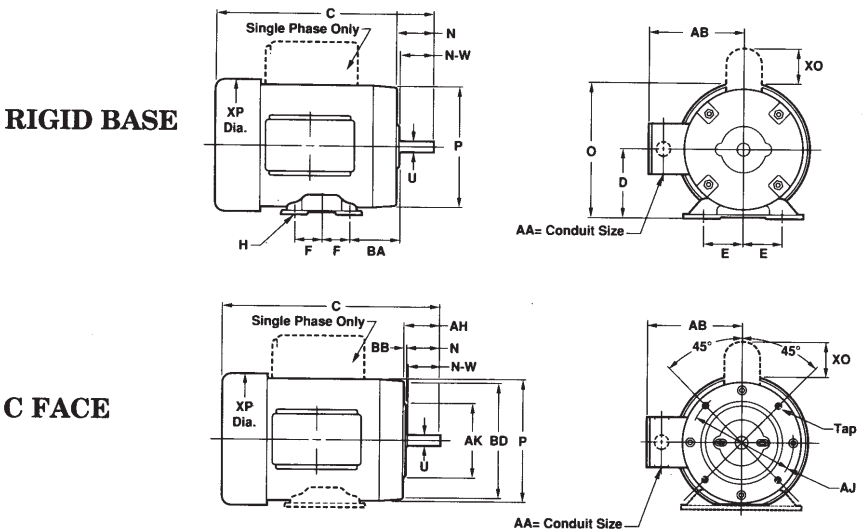
## NEMA Frame/Shaft Sizes

Frame numbers are not intended to indicate electrical characteristics such as horsepower. However, as a frame number becomes higher so in general does the physical size of the motor and the horsepower. There are many motors of the same horsepower built in different frames. NEMA (National Electrical Manufacturers Association) frame size refers to mounting only and has no direct bearing on the motor body diameter.

In any standard frame number designation there are either two or three numbers. Typical examples are frame numbers 48, 56, 145, and 215. The frame number relates to the "D" dimension (distance from center of shaft to center bottom of mount). For example, in the two-digit 56 frame, the "D" dimension is  $3\frac{1}{2}$ ", 56 divided by 16 =  $3\frac{1}{2}$ ". For the "D" dimension of a three-digit frame number, consider only the first two digits and use the divisor 4. In frame number 145, for example, the first two digits divided by the constant 4 is equal to the "D" dimension. 14 divided by 4 =  $3\frac{1}{2}$ ". Similarly, the "D" dimension of a 213 frame motor is  $5\frac{1}{4}$ ", 21 divided by 4 =  $5\frac{1}{4}$ ".

By NEMA definition, two-digit frame numbers are fractional frames even though 1 HP or larger motors may be built in them. Three-digit frame numbers are by definition integral frames. The third numeral indicates the distance between the mounting holes parallel to the base. It has no significance in a footless motor.

A summary of NEMA standard dimensions is on the facing page.



# Motor Frame Dimensions (inches)

NEMA Frame Size ▲	D	E	F	H	N	O	P	U	N-W	AA	AB	AH	AJ	AK	BA	BB	BD	XO	XP	TAP ▲	KEY
42	2.5/8	1.3/4	2/32	9/32 Slot	1.1/4	5.1/16	4.7/8	3/8	1.1/8	3/8	4.1/2	1.5/16	3.3/4	3	2.1/16	1/8	4.7/8	1.5/8	5.1/8	1/4-20	3/64 Flat
48	3	2.1/8	1.3/8	1/32 Slot	1.9/16	5.13/16	5.19/32	1/2	1.1/2	1/2	4.7/8	1.11/16	3.3/4	3	2.1/2	1/8	5	2.1/4	5.7/8	1/4-20	3/64 Flat
S56	3 1/2	2.7/16	1.1/2	1/32 Slot	1.15/16	6.5/16	6.19/32	5/8	1.7/8	1/2	4.7/8	2.1/16	5.7/8	4.1/2	2.3/4	1/8	6.1/2	2.1/4	5.7/8	3/8-16	3/16
56						6.13/16	6.19/32				5.5/16								7.5/32		
143T	3 1/2	2.3/4	2	1/32	2.3/8	6.13/16	6.19/32	7/8	2.1/4	3/4	5.5/16	2.1/8	5.7/8	4.1/2	*2.1/4	1/8	6.1/2	2.1/4	7.5/32	3/8-16	3/16
145T																					
182T	4 1/2	3.3/4	2.1/4	1/32	2.7/8	8.3/4	8.15/32	1.1/8	2.3/4	3/4	6.3/8	2.5/8	7.1/4	8.1/2	*2.3/4	1/4	8.7/8	2.1/4	9.3/32	1/2-13	5/16
184T																					
S213T	5 1/4	4.1/4	2.3/4	1/32	3.1/2	9.15/16	8.15/32	1.3/8	3.3/8	3/4	6.3/8	3.1/8	7.1/4	8.1/2	*3.1/2	1/4	9	2.1/4	9.3/32	1/2-13	5/16
213T						10.11/16	10.13/16			1	8.5/16								11.3/32		
215T																					
254T	6 1/4	5	4.1/8	1/32	—	12.15/16	13.1/4	1.5/8	4	1.1/4	11.5/8	3.3/4	7.1/4	8.1/2	*4.1/4	1/4	9.5/8	—	12.7/8	1/2-13	3/8
256T																					
284TS			4.3/4					1.5/8	3.1/4			3									3/8
284T	7	5.1/2		1/32	—	14.1/2	14.3/4	1.7/8	4.5/8	1.1/2	11.3/4	4.3/8	9	10.1/2	4.3/4	1/4	11	—	14.1/2	1/2-13	1/2
286TS								1.5/8	3.1/4			3									3/8
286T			5.1/2					1.7/8	4.5/8			4.3/8									1/2
324TS			5.1/4	2/32	—	15.3/4	15.3/4	1.7/8	3.3/4			3.1/2									1/2
324T	8	6.1/4	6					2.1/8	5.1/4	2	13.1/2	5	11	12.1/2	5.1/4	1/4	13.3/8	—	15.3/4	5/8-11	1/2
326TS								2.1/8	5.1/4			5									
326T																					
364TS			5.5/8	2/32				1.7/8	3.3/4			3.1/2									1/2
364T	9	7	6.1/8		—	17.13/16	17.3/8	2.3/8	5.7/8	3	15.7/16	5.5/8	11	12.1/2	5.7/8	1/4	14	—	17.3/4	5/8-11	5/8
365TS								2.3/8	5.7/8			5.5/8									1/2
365T																					5/8
404TS			6.1/8	13/16	—	19.5/16	19.1/8	2.1/8	7.1/4	3	16.5/16	7	11	12.1/2	6.5/8	1/4	15.1/2	—	19.3/8	5/8-11	1/2
404T	10	8	6.7/8					2.1/8	7.1/4			4									3/4
405TS								2.1/8	7.1/4			4									1/2
405T								2.7/8	7.1/4			7									3/4
444TS			7.1/4	13/16	—	22.1/4	22	2.3/8	8.3/4	3	21.11/16	8.1/4	14	16	7.1/2	1/4	18	—	19.3/8	5/8-11	5/8
444T	11	9	7.1/4					8.1/2	8.1/4			8.1/4									7/8
445T								3.3/8	8.1/2			8.1/4									7/8
447TZ			10					10.1/8	10.1/8												7/8

Shaded area denotes dimensions established by NEMA standard MG-1. Other dimensions will vary among manufactures.

## NEMA Frame Suffixes

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- C = NEMA C face mounting (specify with or without rigid base)
- D = NEMA D flange mounting (specify with or without rigid base)
- H = Indicates a frame with a rigid base having an F dimension larger than that of the same frame without the suffix H. For example, combination 56H base motors have mounting holes for NEMA 56 and NEMA 143-5T and a standard NEMA 56 shaft
- J = NEMA C face, threaded shaft pump motor
- JM = Close-coupled pump motor with specific dimensions and bearings
- JP = Close-coupled pump motor with specific dimensions and bearings
- M = 6<sup>3</sup>/<sub>4</sub>" flange (oil burner)
- N = 7<sup>1</sup>/<sub>4</sub>" flange (oil burner)
- T,TS = Integral horsepower NEMA standard shaft dimensions if no additional letters follow the "T" or "TS".
- TS = Motor with NEMA standard "short shaft" for belt-driven loads.
- Y = Non-NEMA standard mount; a drawing is required to be sure of dimensions. Can indicate a special base, face or flange.
- Z = Non-NEMA standard shaft; a drawing is required to be sure of dimensions.

## Frame Prefixes

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Letters or numbers appearing in front of the NEMA frame number are those of the manufacturer. They have no NEMA frame significance. The significance from one manufacturer to another will vary. For example, the letter in front of LEESON's frame number, L56, indicates the overall length of the motor.

## Mounting

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Unless specified otherwise, motors can be mounted in any position or any angle. However, unless a drip cover is used for shaft-up or shaft-down applications, drip proof motors must be mounted in the horizontal or side-wall position to meet the enclosure definition. Mount motor securely to the mounting base of equipment or to a rigid, flat surface, preferably metallic.