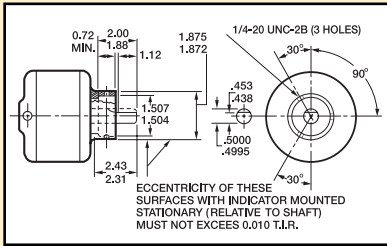


NEMA Guidelines

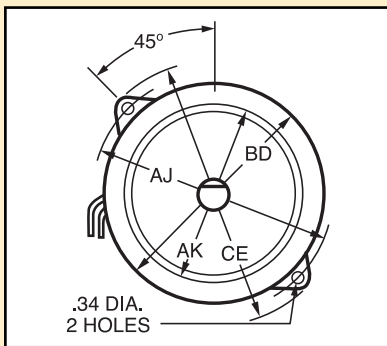
NEMA 48K AND 56K HUB DIMENSIONS FOR SUMP PUMP MOTORS



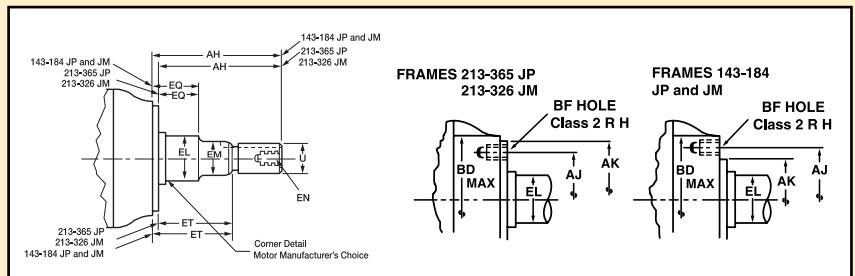
NEMA LETTER DESIGNATIONS FOLLOWING FRAME NUMBER

C	Face mount; see previous page.	T, U	Integral HP motor dimension standards set by NEMA in 1964 and 1953.
H	Designated 56H motors have two sets of 2F mounting holes—3" and 5".	Y	Nonstandard mounting; see manufacturer's drawing for mounting dimensions.
J	Face mount for jet pumps; see previous page for dimensions.	Z	Nonstandard shaft (N-W+U dimensions); see manufacturer's drawing for shaft dimensions.
K	Has hub for sump pump mounting; see column at left for dimensions.		
M, N	Flange mount for oil burner; see column at left for dimensions.		

NEMA 48M, 48N AND 56N FLANGE MOUNT DIMENSIONS



CLOSE-COUPLED PUMP SHAFT DIMENSIONS



Frame Designations	Dimensions (Inches)										
	U	EL	EM	EN	EQ	ET	AH	AJ	AK	BD	BF
143JM/145JM	7/8	1 1/2	1	3/8-16 x 3/4	5/8	2 1/2	4 1/4	5 1/2	4 1/2	6 1/2	3/8-16
143JP/145JP	7/8	1 1/2	1	3/8-16 x 3/4	1 1/16	5 1/16	7 3/16	5 1/2	4 1/2	6 1/2	3/8-16
182JM/184JM	7/8	1 1/4	1	3/8-16 x 3/4	5/8	2 1/2	4 1/4	5 1/2	4 1/2	6 1/2	3/8-16
182JP/184JP	7/8	1 1/4	1	3/8-16 x 3/4	1 1/16	5 1/16	7 3/16	5 1/2	4 1/2	6 1/2	3/8-16
213JM/215JM	7/8	1 1/4	1	3/8-16 x 3/4	5/8	2 1/2	4 1/4	7 1/4	8 1/2	9	1/2-13
213JP/215JP	1 1/4	1 3/4	1 3/8	1/2-13 x 1	2 3/8	5 1/2	8 1/2	7 1/4	8 1/2	9	1/2-13
254JM/256JM	1 1/4	1 3/4	1 3/8	1/2-13 x 1	5/8	3	5 1/4	7 1/4	8 1/2	9 1/4	1/2-13
254JP/256JP	1 1/4	1 3/4	1 3/8	1/2-13 x 1	2 3/8	5 1/2	8 1/2	7 1/4	8 1/2	9	1/2-13
284JM/286JM	1 1/4	1 3/4	1 3/8	1/2-13 x 1	5/8	3	5 1/4	11	12 1/2	13 1/2	5/8-11
284JP/286JP	1 1/4	1 3/4	1 3/8	1/2-13 x 1	2 3/8	5 1/2	8 1/2	11	12 1/2	13 1/2	5/8-11

OIL BURNER MOTORS

	48M	48N	56N
AJ	6 3/4"	7 1/4"	
BD	6 1/4 max.	7 max.	
AK	5 1/2	6 1/2	
CE	7 3/4 max.	8 1/4 max.	

Thermal Protection Information

Motors that start automatically (e.g. thermostat controlled) after tripping and are located out of operator sight must be protected against dangerous overheating due to failure-to-start or overloading. This protection may be a separate overcurrent device (e.g. motor starter) complying with Article 430 of the National Electrical Code (NEC), a thermally protected motor (internal motor protection), or an impedance protected motor.

Motors with automatic reset thermal protection MUST NOT be used where automatic or otherwise unexpected starting of the motor could be hazardous. Applications where automatic restarting could be hazardous include compressors, conveyors, power tools, farm equipment, and some fans and blowers. Where such a hazard exists, always use a manual reset, thermally-protected motor.

UL 507 Standard

Any motor used in a fan product, such as bathroom exhaust fans, wall-insert fans, ceiling-insert fans, attic-exhaust fans, whole-house fans, and duct fans, etc., which are built into or within the building structure and which are likely to operate unattended or in situations in which the operator may not detect a locked rotor (stalled motor) condition, must have either a manual reset thermal protector or a thermal cutoff (one-shot) device. Range hoods, circulating fans, pedestal fans, and ceiling-suspended fans are not included. Agricultural fans are included if they are built into the building structure and are likely to operate unattended or in situations in which the person operating the fan may not detect a locked rotor (stalled motor) condition; they must have either a manual reset thermal protector or a thermal cutoff (one-shot) device.

Premium Efficiency vs. Standard Efficiency

If you operate a 25 HP premium efficiency motor at full load for 24 hours a day (8760 hours per year) and your cost per kilowatt hour is 9 cents, you can save \$532.00 annually. This comparison is based on a premium efficiency motor with a 94.1 efficiency rating vs. a high efficiency motor with a 91.0 efficiency rating.

Increased efficiency leads to lower operating temperatures, resulting in longer life.

Cool Operation: The life of an insulation system doubles for each 10°C reduction in operating temperature.

Longer Bearing Life: The lower the temperature, the longer the bearing grease will last.

$$\text{Annual Savings} = 0.746 \times \text{HP} \times \text{L} \times \text{C} \times \text{N} \left(\frac{100\%E_1}{100\%E_2} - 1 \right)$$

- HP = Motor Horsepower
- L = Percent Load Divided by 100
- C = Energy Cost, Dollars per Kilowatt Hour
- N = Running Time, Hours per Year
- E1 = Efficiency (%) of Standard Efficiency Motor
- E2 = Efficiency (%) of Premium Efficiency Motor