Rotary Electric Vibrators

Applications for Flow Aids, Densification and Metering

UP TO 25 TONS OF FORCE OUTPUT

Sizing examples and equations for selecting vibrators

KBM models match competitive mounting holes

Factory support engineering

More value and quality per pound of force output

Continuous duty

Inverter duty rated

CE certification

Thermal protection option

RENOLD

Superior Technology

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AJAX R/KBM and R/KBC Series

Rotary Electric Vibrators

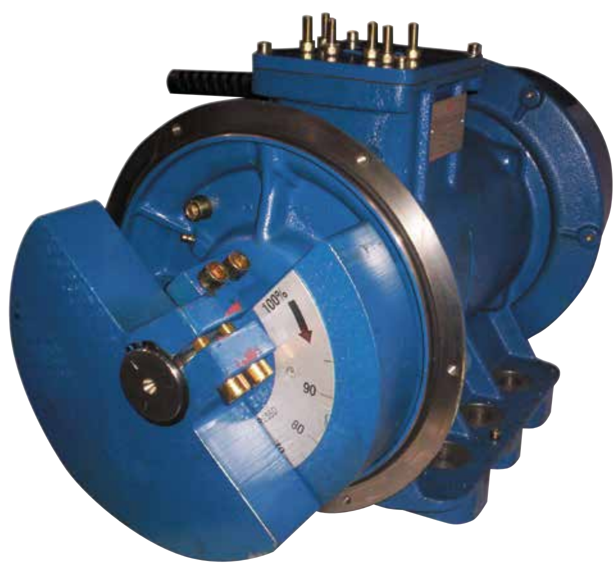
The Renold AJAX R/KBM and R/KBC Series is the most economical vibrator drive available in the North American market today. No other electric vibrator motor delivers more value and quality per pound of force output. The new KBM series matches competitive mounting holes. Our full line consists of models operating at frequencies of 900, 1200, 1800 and 3600 RPM. Eccentric weights can be manually adjusted to vary the centrifugal force from 0 through 100%. A suitable model can be supplied for most any type application or environment, and are rated for continuous operation. Special features include: foot mounting, cast metal housing, O'ring groove sealed end covers, increased corrosion protection, external ground lug with CE certification and optional 304SS end covers.

Applications

The AJAX R/KBM and R/KBC Series Rotary Electric Vibrators are specifically suited for flow aids, densification, shake-out and metering of solid materials. Examples defined are related to Brute Force designs.

Flow Aids (page 3)

When moisture, temperature or grain size of material causes irregular flow through bins, hoppers, chutes, etc., vibration can be introduced to solve problems. AJAX vibrators break up bridging in storage vessels, keeping material in continuous motion and thus minimizing friction along the transporting body. As a general rule, both 1800 and 3600 RPM are utilized pending the type of application.



Densification or Shakeout (page 4)

Dual counter-rotating vibrators produce a rectilinear motion, which is ideal for increasing the density of material in a container. The result is 20-50% more material in the container and a reduction in containers, warehouse space and freight costs. The same principle in reverse will shake-out foundry molds. Refer to the densification chart for recommended frequencies and G-level. When using vibrators in a shake-out mode, add one (1.0) G-level to the densification chart.

Metering or Transporting (page 5)

Dual counter rotating vibrators attached to feeders, screeners, sorters and conveyors will meter and transport materials. Both vibrators synchronize producing a rectilinear motion at 30 degrees to the flow path. Special consideration must be given to fabricating a rugged mounting drive triangle as the vibrators must be attached to the same one-piece mounting structure. Here, 1200 and 900 RPM are generally the recommend frequency choices. Special attention must be given to the structures moment of inertia when exceeding 1200 RPM. A dual magnetic starter having a single starter with two overloads is required for operation (refer to page 11 diagram). Other enhancements include: variable speed control for tuning the flow rate or fast/dribble feed control and dynamic braking to cut off the flow immediately.

Why buy competitive brands whose services offer limited experience using vibrators? Renold offers personal or group training sessions reviewing the dynamics of designing vibratory structures critical to sizing vibrators.

Flow Aids

Model selection or sizing of Renold AJAX electric motor vibrators for bins, hoppers and silos is based upon a ratio of product weight in the sloped wall portion of the vessel and the force output (Fo) of the vibrator. The general rule should be 10:1, i.e., ten pounds of product to one pound of force output. Generally, the following frequencies are used as flow aids:

FREQUENCY	CONDITION	PROBLEM
3600	free flowing	dry, continuous discharging, uniform product size
1800	irregular flow	high moisture content, sticky, intervals between discharges

Determine the volume (V) of product in the sloped wall:

[Conical Shape]

$V = 1.0472 \times \text{vertical height} \times (R^2 + (Rr) + r^2)$

Where: R = radius of the cone at the inlet
r = radius of the cone at the discharge

[Square or Rectangular Shape]

$$V = \frac{\text{vertical height}}{3} \times (B + \sqrt{Bb} + b)$$

Where: B = area of the pyramid at the inlet
b = area of the pyramid at the discharge

Convert all dimensions to feet. Multiply the calculated volume by the bulk density of the product to find the total weight.

Determine the vertical height (Vh):

Where: $Vh = \tan \Theta \times X$

Example

Find the weight of material in the sloped wall of a 10 ft diameter silo having a 60 degree slope and a 12 inch discharge. The product will be dry free flowing plastic pellets uniform in size with a bulk density of 33 pcf.

Find the vertical height:

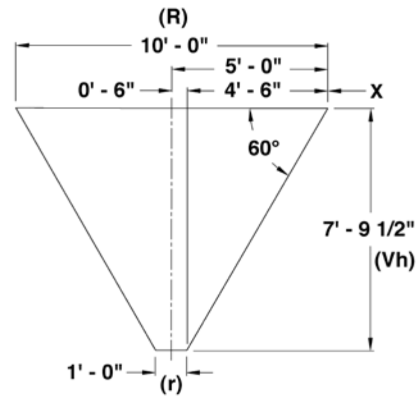
$Vh = \tan 60 \text{ degrees} \times 4.5 \text{ ft}$
$= 1.732 \times 4.5 \text{ ft}$
$= 7.794 \text{ ft}$

Find the volume of a conical vessel:

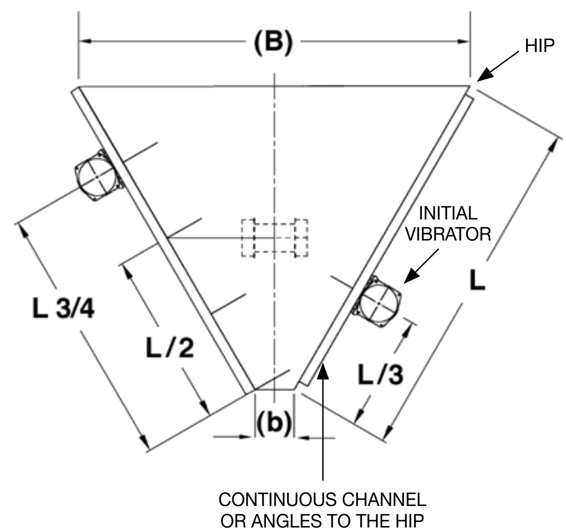
$V = 1.0472 \times 7.794 \text{ ft} \times (5^2 + (5 \times 1) + 1^2)$
$= 1.0472 \times 7.794 \text{ ft} \times (31)$
$= 253 \text{ cu ft}$

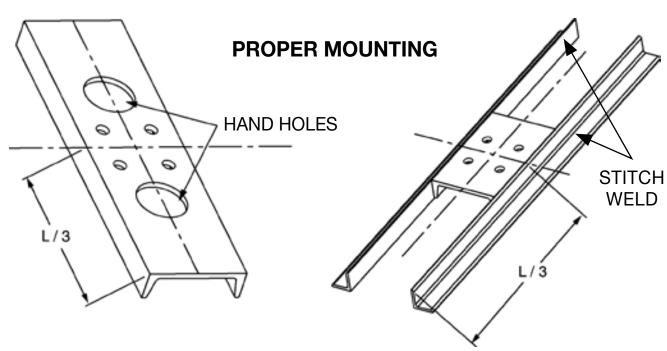
Find the weight of product:

$W = 253 \times 33 \text{ pcf}$
$= 8{,}349 \text{ lbs}$



Most bins and hoppers only require one (1) vibrator mounted 1/3 the total sloped distance from the discharge as shown. When product is very difficult to flow or the capacity in the sloped portion exceeds 25 tons, two or three vibrators may be required. The vibrators should be staggered at 90 degrees about the initial vibrator at 1/4 intervals thereafter. When in operation each vibrator should not be permitted to turn on simultaneously, but rather intermittently. The use of an on/off timer will be required.



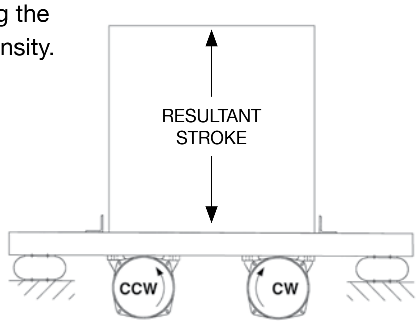


Densification or Shake Out

Vibration is created by applying an alternating force to an isolated mass. The two critical factors when determining the proper vibration are amplitude and frequency. Amplitude is the distance through which the mass is moved from one extreme to another. Frequency is the number of times the mass is moved in a given period of time (RPMs). ***G-level** is referred to as the ratio of force required to change the motion of a body (mass).* Whereby, mass resists any change in motion. When dual vibrators are used to produce a rectilinear motion (up/down) for densification, we can calculate the size/model of a vibrator by knowing the material and its bulk density.

$$\text{Stroke} = \frac{Fo \times C}{Twt \times f^2}$$

$$\text{G-level} = \frac{Fo}{Twt}$$



Pre-Design

Example: Find the vibrator size for a packer needed to densify a 48" square container with pallet having a target weight of 2500 lbs. The material is a granular powder @ 60 pcf. Assume the vibratory deck weight to be 850 lbs, and vibrators weighing 200 lbs each. Refer to the chart below and scan the density column with respect to type of material. We find the optimum frequency is **1200 RPM @ 2.5 G's.**

Twt = 850 lbs deck + 400 lbs vibrators + 2500 lbs load
= 3750 lbs

If G-level equals Fo divided by Twt, then
Fo = G-level x Twt

Find the vibrator Fo: $Fo = \frac{2.5 \text{ G's} \times 3750 \text{ lbs}}{2 \text{ vibrators}}$
= 4687.5 lbs each vibrator

Refer to the 1200 RPM chart (page 8) and scan down the force output column and match the Fo calculated. We find the vibrators should be **R/KBC-3-400-6**. The maximum Fo of each vibrator is 5628 lbs. Therefore, the eccentric setting should be set at the following percentage:

$$\% = \frac{4687.5}{5628}$$
$$= 83\%$$

NOTE: The energy level of 2.5 G's is very large, and in this case we calculated for a full load vibration cycle. If the container requires vibration at various steps during the filling process, *the eccentric setting should be reduced to match the first vibration setpoint.* Side restraints may be required to contain the pallet/container to prevent walking off the vibratory deck, as the flow into the box may not be directly into the center.

Type Industry	Product (general)	Density (ppcf)	Recommended Frequency/G-Level		
			Optimum	Acceptable	Not Recommended
Foods Feeds Chemicals	Croutons	1-15	1200/2.5	1800/2.5	900/3600
	Powders/Resins	20-60	900/2.0	1200/2.0	1800/3600
	Pellets/Feed Plastic	35-50	900/2.0 1200/2.0	1800/2.0	3600
	Powders/Lime	60-90	1200/2.5 1800/2.0	900/2.0 3600/2.0	———
	Powders/Metal	100-200	3600/2.0	1800/2.0	900/1200
Foundry Refractory	Sand (air set)	100	3600/1.0	1800/2.0	900/1200
	Sand (green)	80-100	1800/1.5	3600/1.0	900/1200
	Mixes	90-110	1800/2.5 3600/2.0	1200/2.5	900
Industrial	Hard Goods (misc parts) Stampings	50/150	900/1.5 1200/1.5	1800/1.5	3600

Metering or Transporting

When dual motor vibrators are directly attached to a trough it is referred to as a “Brute Force” design. It is very simple to calculate the necessary vibrator size/model by finding the required force output (Fo), if you can project the desired stroke. The stroke, also referred to as amplitude (peak to peak), is the resultant action produced by these vibrators when properly isolated. The following chart depicts the maximum stroke electric vibrators should operate at a specific frequency in a brute force design. As a rule of thumb, the feed rate will most likely be considered to be approximately 35 FPM.

RPM	MAX. STROKE
900	0.375”
1200	0.250”
1800	0.125”
3600	0.063”

$$\text{Stroke} = \frac{Fo \times C}{Twt \times f^2}$$

Where: Fo = the total force output of the vibrator(s)
C = a constant having a numerical value of 70470.91
Twt = total weight, combined value of the trough, vibrator(s) weight and load
f^2 = frequency squared

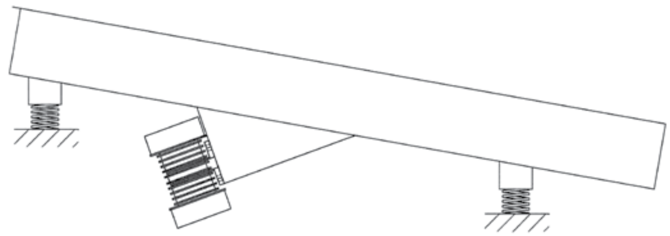
Pre-Design

Example: Find the vibrator size for a feeder needing to deliver 75 TPH of sand @ 100 pcf. Assume the pan width to be 30” wide and 72” long. Also for this example assume the trough weight is 495 lbs and 1200 RPM vibrators @ 150 lbs each.

Find the depth of product flow:

$$75 \text{ TPH} = \frac{60 \text{ sec.} \times 1.0 \times 30\text{” wide} \times \text{depth} \times 100 \text{ pcf} \times 35 \text{ FPM}}{144 \text{ in.}^2 \times 2000 \text{ lbs}}$$

Depth = 3.43”, your sides on the trough should be a minimum of twice this value.



Find the load of material in the trough:

$$\frac{3.43” \times 30” \times 72”}{12” \times 12” \times 12”} \times 100 \text{ pcf} = 428.75 \text{ lbs}$$

Find the total vibrated weight Twt:

495 lbs trough + 300 lbs vibrators + 428 lbs load = 1223 lbs

$$\text{Stroke } 0.25” = \frac{2Fo \times 70470.91}{1223 \text{ lbs} \times 1200^2} \quad \text{2 vibrators}$$

Fo = 3123 lbs minimum for each vibrator

Refer to the 1200 RPM chart (page 8) and scan down the force output column and match the Fo calculated. We find the vibrators should be **R/KBC3-350-6**, having a maximum force output of **3988** lbs. Since the calculated Fo needs to be 3123 lbs, the vibrators can be set to the following percentage.

NOTE: In this pre-design there were assumptions made such as trough and vibrator weight. Always re-check your calculations with real values.

$$\% = \frac{3123}{3988} = 78\%$$

Remove the end covers and change the eccentric percentage (page 10). Keep the covers off and start the vibrators (momentarily) to verify each vibrator is counter rotating, i.e. one running CW and the other CCW.
BE SAFE – insure there isn’t any person or obstacle near the vibrators during this check. Once rotation is correct, disconnect power, and install both end covers. The equipment is ready for final testing.

See page 10 (Setting Eccentric Weights) for mounting orientation of vibrators on feeders.

R/KBM

3600 RPM

Single Phase 110/1/60

Mode	HP	Max Force (lbs)	Amp Draw 115/1/60	Wt (lbs)	Unbal (in-lbs)	Draw Ref	A	B	C	D	E	F	H	K	N	P	S	S Metric
R/VBM 2MS	0.04	71	0.15	3.5	0.2	#1	1.26	3.62	0.35	2.40	2.17	4.37	1.34	5.75	0.87	2.76	0.28	7
R/KBM 1.5-2S	0.20	226	1.40	10	0.6	#1	2.44	4.17	0.39	4.13	3.89	5.91	2.36	8.35	1.38	5.71	0.35	9
R/KBM 2.5-2S	0.24	421	1.50	11	1.1	#1	2.95	4.13	0.39	4.13	3.89	5.91	2.36	8.35	1.38	5.71	0.35	9
R/KBM 4-2S	0.24	615	1.50	12	1.7	#1	2.76	5.12	0.39	4.13	3.89	5.91	2.36	8.35	1.38	5.71	0.35	9
R/KBM 6-2S	0.36	1003	2.80	20	2.7	#1	3.54	4.92	0.47	5.12	4.72	6.54	2.95	10.24	1.57	7.28	0.51	13
R/KBM 12-2S	0.68	2168	4.50	46	5.9	#1	3.94	6.29	0.63	5.95	5.35	7.48	3.35	11.34	1.57	8.07	0.51	13

R/KBM

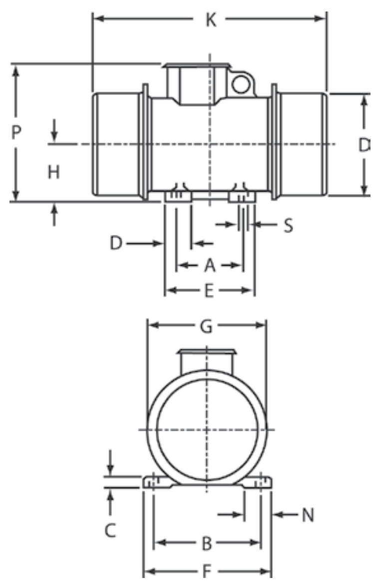
1800 RPM

Single Phase 110/1/60

R/KBM 6-4S	0.14	259	1.0	12	0.7	#1	2.44	4.17	0.39	4.13	3.89	5.91	2.36	9.06	1.38	5.71	0.35	9
R/KBM 16-4S	0.27	679	1.8	22	1.8	#1	3.54	4.92	0.47	5.12	4.72	6.54	2.95	11.73	1.57	7.28	0.51	13

** Technical data upon request*

TYPE R/KBM
110/1/60 w/CAPACITOR



TYPE R/KBM DWG #1

TYPE R/KBM
230/460/3/60

3600 RPM

2 Pole 230/460/3/60

Model	HP Force (lbs)	Max Force (lbs)	Amp Draw 230	Amp Draw 460	Wt (lbs)	Unbal (in-lbs)	Draw Ref	A	B	C	D	E	F	H	K	N	P	S Dia	S Metric
R/VBM 2M	0.04	71	0.2	.08	3.5	0.2	#1	1.26	3.62	0.35	2.40	2.17	4.37	1.34	5.75	0.87	2.76	0.28	7
R/KBM 1.5-2	0.20	226	0.6	0.3	10	0.6	#1	2.44	4.17	0.39	4.13	3.89	5.91	2.36	8.35	1.38	5.71	0.35	9
R/KBM 2.5-2	0.24	421	0.6	0.3	11	1.1	#1	2.95	4.13	0.39	4.13	3.89	5.91	2.36	8.35	1.38	5.71	0.35	9
R/KBM 4-2	0.24	615	0.6	0.3	12	1.7	#1	2.76	5.12	0.39	4.13	3.89	5.91	2.36	8.35	1.38	5.71	0.35	9
R/KBM 6-2	0.36	1003	1.0	0.5	20	2.7	#1	3.54	4.92	0.47	5.12	4.72	6.54	2.95	10.24	1.57	7.28	0.51	13
R/KBM 12-2	0.68	2168	1.6	0.8	46	5.9	#1	3.94	6.29	0.63	5.95	5.35	7.48	3.35	11.34	1.57	8.07	0.51	13
R/KBM 18-2	0.81	2783	1.8	0.9	71	7.6	#1	4.72	6.69	0.79	7.13	6.29	8.27	3.98	13.98	1.69	9.29	0.67	17
R/KBM 20-2	1.08	3397	2.2	1.1	75	9.2	#1	4.72	6.69	0.79	7.13	6.29	8.27	3.98	13.98	1.69	9.29	0.67	17

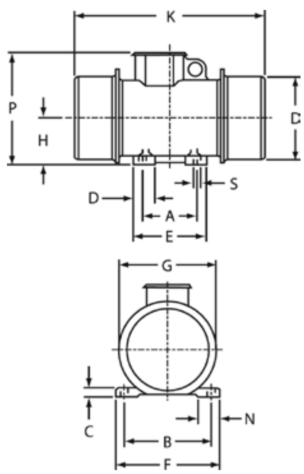
1800 RPM

4 Pole 230/460/3/60

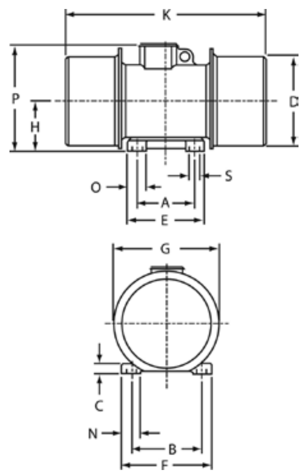
TYPE R/KBM

TYPE R/KBC1 – R/KBC3

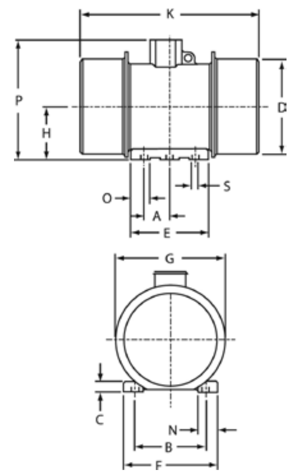
TYPE R/KBC5 – R/KBC11



TYPE R/KBM DWG #1



TYPE R/KBC1 – R/KBC3 DWG #2



TYPE R/KBC5 – R/KBC11 DWG #3

Model	HP	Max Force (lbs)	Amp Draw 230	Amp Draw 460	Wt (lbs)	Unbal (in-lbs)	Draw Ref	A	B	C	D	E	F	G	H	K	N	O	P	S Dia	S Metric
R/KBM 2.5-4	0.11	97	0.4	0.2	10	1.1	#1	2.44	4.17	0.39	4.13	3.89	5.91	5.12	2.36	8.35	1.38	1.18	5.71	0.35	9
R/KBM 4-4	0.14	194	0.4	0.2	11	2.1	#1	2.44	4.17	0.39	4.13	3.89	5.91	5.12	2.36	8.35	1.38	1.18	5.71	0.35	9
R/KBM 6-4	0.14	259	0.4	0.2	13	2.8	#1	2.44	4.17	0.39	4.13	3.89	5.91	5.12	2.36	9.06	1.38	1.18	5.71	0.35	9
R/KBM 16-4	0.24	679	0.8	0.4	24	7.4	#1	3.54	4.92	0.47	5.12	4.72	6.54	6.3	2.95	11.73	1.57	1.18	7.28	0.51	13
R/KBM 30-4	0.42	1294	1.1	0.6	55	14.1	#1	3.94	6.29	0.63	5.95	5.35	7.48	7.36	3.35	13.78	1.57	1.30	8.07	0.51	13
R/KBM 40-4	0.46	1618	1.2	0.6	57	17.6	#1	3.94	6.29	0.63	5.95	5.35	7.48	7.36	3.35	13.78	1.57	1.30	8.07	0.51	13
R/KBM 55-4	0.68	2297	1.6	0.8	77	25	#1	4.72	6.69	0.79	7.13	6.29	8.27	8.5	3.98	13.98	1.69	1.57	9.29	0.67	17
R/KBM 90-4	0.81	3559	2.0	1.0	90	38.7	#1	4.72	6.69	0.79	7.13	6.29	8.27	8.5	3.98	16.34	1.69	1.57	9.29	0.67	17
R/KBC 1-55-4	0.7	1516	1.8	0.9	76	16.5	#2	5.51	6.69	0.79	7.13	6.89	8.27	8.5	3.98	13.98	1.69	1.38	9.29	0.67	20
R/KBC 1-90-4	0.9	2447	2.28	1.14	90	26.6	#2	5.51	6.69	0.79	7.13	6.89	8.27	8.5	3.98	16.34	1.69	1.38	9.29	0.67	20
R/KBC 2-120-4	1.5	3224	3	1.5	112	35.1	#2	5.51	6.69	0.98	8.62	7.36	8.66	10.16	4.8	17.56	1.77	1.77	10.24	0.87	25
R/KBC 2-160-4	1.7	4311	4	2	128	46.9	#2	5.51	6.69	0.98	8.62	7.36	8.66	10.16	4.8	19.21	1.77	1.77	10.24	0.87	25
R/KBC 3-200-4	2.4	5399	6.2	3.1	187	58.7	#2	5.51	6.69	1.06	9.41	8.27	10.83	10.16	5.2	20.47	2.76	2.17	12.2	0.87	27
R/KBC 5-300-4	3.2	8079	9.4	4.7	254	87.9	#3	3.27	9.02	1.38	11.14	9.84	12.2	12.8	6.77	22.83	2.56	2.44	15.35	0.87	35
R/KBC 5-400-4	4.4	10798	9.8	4.9	342	117.4	#3	3.27	9.02	1.38	12.17	9.84	12.2	13.98	6.77	23.62	2.56	2.44	15.35	0.87	35
R/KBC 8-500-4	8	14138	19	9.5	454	153.8	#3	4.13	11.02	1.38	13.66	10.63	14.17	15.67	7.52	25.12	2.76	2.36	16.3	1.02	26
R/KBC 8-650-4	10.7	17245	23	11.5	516	187.5	#3	4.13	11.02	1.38	13.66	10.63	14.17	15.67	7.52	25.67	2.76	2.36	16.3	1.02	26
R/KBC 11-650-4	10.7	17517	23	11.5	650	190.5	#3	4.92	12.6	1.65	16.18	13.78	15.75	18.11	8.86	27.8	3.35	3.15	17.64	1.26	42
R/KBC 11-700-4	11.4	18877	24	12	684	205.3	#3	4.92	12.6	1.65	16.18	13.78	15.75	18.11	8.86	27.8	3.35	3.15	17.64	1.26	42
R/KBC 11-900-4	14.8	24275	32	16	827	264	#3	4.92	12.6	1.65	16.18	13.78	15.75	18.11	8.86	30.83	3.35	3.15	17.64	1.26	42

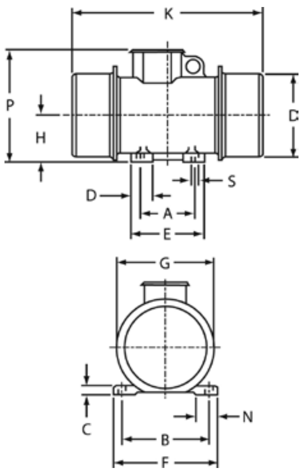
1200 RPM

6 Pole 230/460/3/60

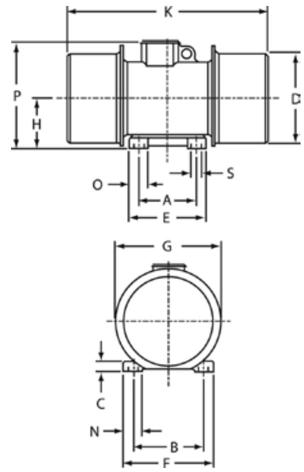
TYPE R/KBM

TYPE R/KBC1 – R/KBC3

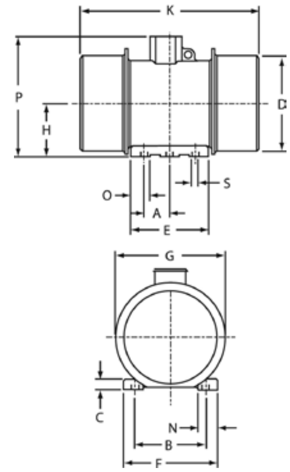
TYPE R/KBC5 – R/KBC11



TYPE R/KBM DWG #1



TYPE R/KBC1 – R/KBC3 DWG #2



TYPE R/KBC5 – R/KBC11 DWG #3

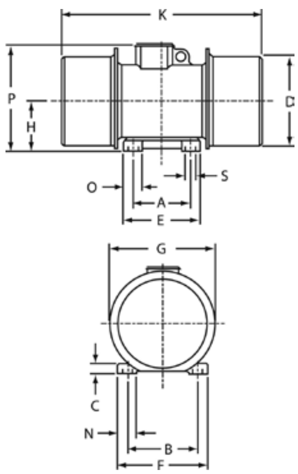
Model	HP	Max Force (lbs)	Amp Draw		Wt (lbs)	Unbal (in-lbs)	Draw Ref	A	B	C	D	E	F	G	H	K	N	O	P	S Dia	S Metric
			230	460																	
R/KBM 6-6	0.12	129	0.6	0.3	13	3.2	#1	2.44	4.17	0.39	4.13	3.89	5.91	–	2.36	9.06	1.38	–	5.71	0.35	9
R/KBM 15-6	0.19	291	1.2	0.6	25	7.1	#1	3.54	4.92	0.47	5.12	4.72	6.54	–	2.95	11.73	1.57	–	7.28	0.51	13
R/KBM 30-6	0.32	582	0.8	0.4	55	14.2	#1	3.94	6.29	0.63	5.95	5.35	7.48	–	3.35	13.78	1.57	–	8.07	0.51	13
R/KBM 40-6	0.35	712	1.0	0.5	57	17.4	#1	3.94	6.29	0.63	5.95	5.35	7.48	–	3.35	13.78	1.57	–	8.07	0.51	13
R/KBM 60-6	0.43	1035	1.2	0.6	77	25.3	#1	4.72	6.69	0.79	7.13	6.29	8.27	8.5	3.98	13.98	1.69	1.57	9.29	0.67	17
R/KBM 90-6	0.61	1535	1.8	0.9	90	37.6	#1	4.72	6.69	0.79	7.13	6.29	8.27	8.5	3.98	16.34	1.69	1.57	9.29	0.67	17
R/KBC 1-60-6	0.5	967	1.36	0.68	76	23.7	#2	5.51	6.69	0.79	7.13	6.89	8.27	8.5	3.98	13.98	1.69	1.38	9.29	0.67	20
R/KBC 1-90-6	0.7	1226	1.9	0.95	90	30	#2	5.51	6.69	0.79	7.13	6.89	8.27	8.5	3.98	16.34	1.69	1.38	9.29	0.67	20
R/KBC 2-165-6	1.1	1985	2.6	1.3	126	48.6	#2	5.51	6.69	0.98	8.62	7.36	8.66	10.16	4.8	19.21	1.77	1.77	10.24	0.87	25
R/KBC 2-200-6	1.2	2279	3.2	1.6	143	55.8	#2	5.51	6.69	0.98	8.62	7.36	8.66	10.16	4.8	21.42	1.77	1.77	10.24	0.87	25
R/KBC 2-240-6	1.2	2848	3.2	1.6	154	69.7	#2	5.51	6.69	0.98	8.62	7.36	8.66	10.16	4.8	21.42	1.77	1.77	10.24	0.87	25
R/KBC 3-325-6	1.9	4264	4.6	2.3	209	104.3	#2	5.51	6.69	1.06	9.41	8.27	10.83	10.94	5.2	22.83	2.76	2.17	12.2	0.87	27
R/KBC 3-350-6	1.9	4592	4.6	2.3	227	112.4	#2	5.51	6.69	1.06	9.41	8.27	10.83	10.94	5.2	25	2.76	2.17	12.2	0.87	27
R/KBC 3-400-6	1.9	5628	4.6	2.3	238	137.7	#2	5.51	6.69	1.06	9.41	8.27	10.83	10.94	5.2	25	2.76	2.17	12.2	0.87	27
R/KBC 5-520-6	2.8	7009	8.4	4.2	304	171.5	#3	3.27	9.02	1.38	11.14	9.84	12.2	12.8	6.18	25.59	2.56	2.44	15.35	0.87	35
R/KBC 5-815-6	4	10755	10	5	423	263.2	#3	3.27	9.02	1.38	12.17	9.84	12.2	13.98	6.77	27.83	2.56	2.44	15.35	0.87	35
R/KBC 8-1250-6	8	14121	19	9.5	551	345.5	#3	4.13	11.02	1.38	13.66	10.63	14.17	15.67	7.52	30.79	2.76	2.36	16.3	1.02	26
R/KBC 8-1530-6	11.4	18229	26	13	637	446.1	#3	4.92	12.6	1.65	16.18	13.78	15.75	18.11	8.86	33.31	3.35	3.15	17.64	1.26	32
R/KBC 11-1550-6	11.4	18229	26	13	816	446.1	#3	4.92	12.6	1.65	16.18	13.78	15.75	18.11	8.86	34.02	3.35	3.15	17.64	1.26	42
R/KBC 11-1730-6	11.8	20404	28.6	14.3	849	499.3	#3	4.92	12.6	1.65	16.18	13.78	15.75	18.11	8.86	34.02	3.35	3.15	17.64	1.26	42
R/KBC 11-2150-6	14.5	26412	33.4	16.7	891	646.3	#3	4.92	12.6	1.65	16.18	13.78	15.75	18.11	8.86	35.43	3.35	3.15	17.64	1.26	42
R/KBC 11-2400-6	14.6	27344	33	16.5	926	669.1	#3	4.92	12.6	1.65	16.18	13.78	15.75	18.11	8.86	35.43	3.35	3.15	17.64	1.77	42
R/KBC 15-2700-6	16.1	31090	37.2	18.6	1433	760.7	#4	5.51	18.9	1.77	19.57	20.47	22.64	21.46	10.63	37.44	3.94	3.54	21.65	1.77	45
R/KBC 15-3200-6	18.8	36459	43.4	21.7	1566	892.1	#4	5.51	18.9	1.77	19.57	20.47	22.64	21.46	10.63	37.44	3.94	3.54	21.65	1.77	45
R/KBC 20-4120-6	26.8	43105	56.8	28.4	2029	1054.7	#4	5.51	20.47	1.97	21.3	21.46	24.21	23.43	11.81	43.31	3.94	3.54	23.62	1.97	50

900 RPM

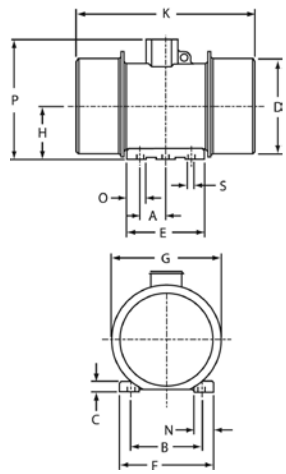
8 Pole 230/460/3/60

TYPE R/KBC1 – R/KBC3

TYPE R/KBC5 – R/KBC11



TYPE R/KBC1 – R/KBC3 DWG #2



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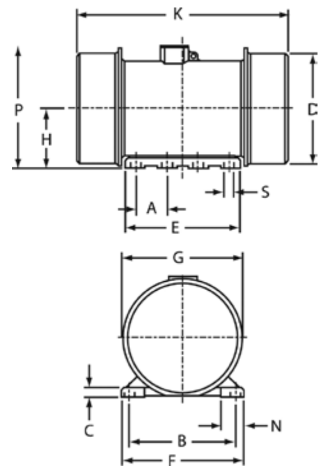


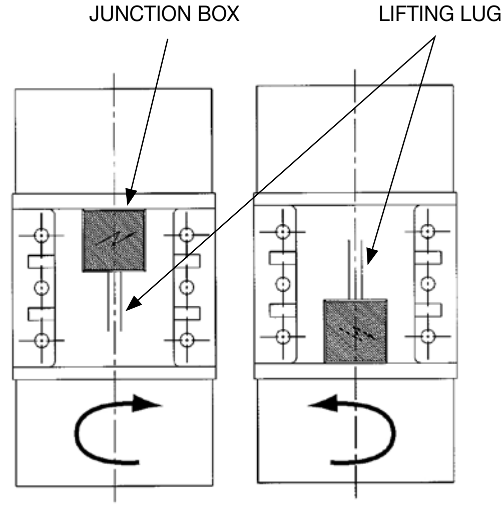
TYPE R/KBC15 and R/KBC20 DWG #4

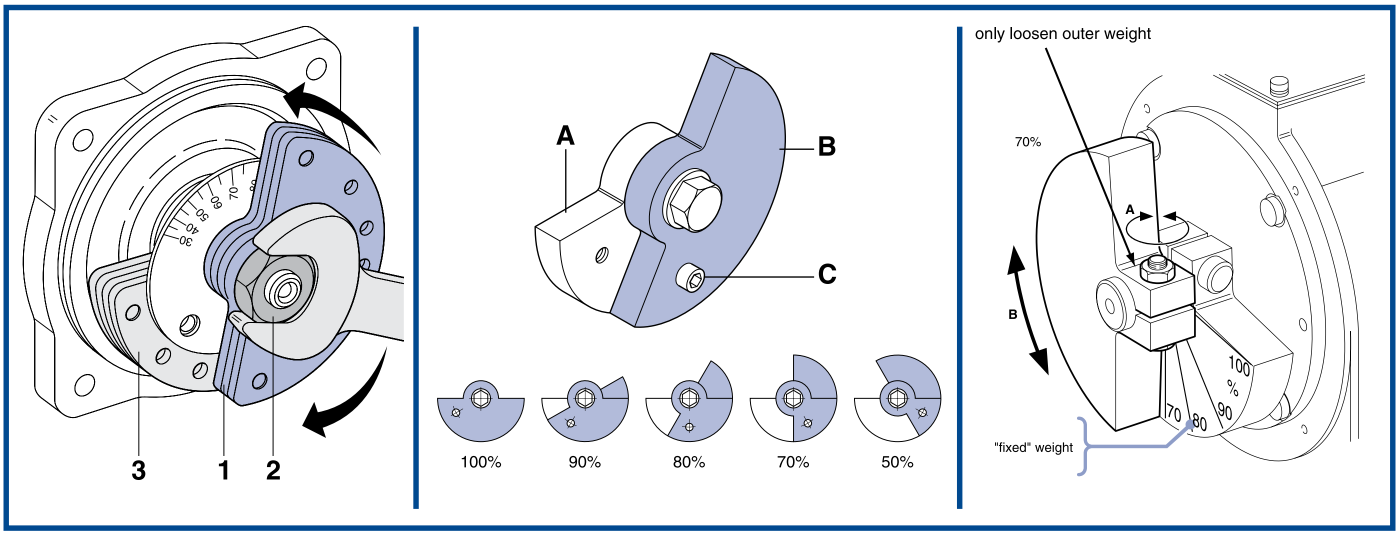
Model	HP	Max Force (lbs)	Amp Draw 230	Amp Draw 460	Wt (lbs)	Unbal (in-lbs)	Draw Ref	A	B	C	D	E	F	G	H	K	N	O	P	S Dia	S Metric
R/KBC 1-60-8	0.4	544	1.3	0.65	76	23.7	#2	5.51	6.69	0.79	7.13	6.89	8.27	8.5	3.98	13.98	1.69	1.38	9.29	0.67	20
R/KBC 1-90-8	0.5	845	1.5	0.75	90	36.7	#2	5.51	6.69	0.79	7.13	6.89	8.27	8.8	3.98	16.34	1.69	1.38	9.29	0.67	20
R/KBC 2-165-8	0.7	1602	2.4	1.2	126	69.7	#2	5.51	6.69	0.98	8.62	7.36	8.66	10.16	4.8	19.21	1.77	1.77	10.24	0.87	25
R/KBC 2-200-8	0.8	1971	2.8	1.4	143	85.7	#2	5.51	6.69	0.98	8.62	7.36	8.66	10.16	4.8	21.42	1.77	1.77	10.24	0.87	25
R/KBC 2-240-8	0.8	2350	2.8	1.4	154	102.2	#2	5.51	6.69	0.98	8.62	7.36	8.66	10.16	4.8	21.42	1.77	1.77	10.24	0.87	25
R/KBC 3-325-8	1.7	3166	4.8	2.4	209	137.7	#2	5.51	6.69	1.06	9.41	8.27	10.83	10.94	5.2	22.83	2.76	2.17	12.2	0.87	27
R/KBC 3-350-8	1.7	3544	4.8	2.4	227	154.2	#2	5.51	6.69	1.06	9.41	8.27	10.83	10.94	5.2	25	2.76	2.17	12.2	0.87	27
R/KBC 3-400-8	1.7	3923	4.8	2.4	238	170.6	#2	5.51	6.69	1.06	9.41	8.27	10.83	10.94	5.2	25	2.76	2.17	12.2	0.87	27
R/KBC 5-520-8	2.4	5040	7.8	3.9	304	219.2	#3	3.27	9.02	1.38	11.14	9.84	12.2	12.8	6.77	25.59	2.56	2.44	15.35	0.87	35
R/KBC 5-815-8	3.2	7943	10.6	5.3	423	345.5	#3	3.27	9.02	1.38	12.17	9.84	12.2	12.8	6.77	27.83	2.56	2.44	15.35	0.98	35
R/KBC 8-1250-8	6.7	12118	17.6	8.8	604	528	#3	4.13	11.02	1.38	13.66	10.63	14.17	15.67	7.52	30.79	2.76	2.36	16.3	1.02	26
R/KBC 8-1530-8	8.7	14857	21	10.5	699	646.3	#3	4.92	12.6	1.65	16.18	13.78	15.75	18.11	8.86	33.31	3.35	3.15	17.64	1.26	32
R/KBC 11-1550-8	9.1	15090	22	11	816	656.4	#3	4.92	12.6	1.65	16.18	13.78	15.75	18.11	8.86	34.02	3.35	3.15	17.64	1.26	42
R/KBC 11-1730-8	9.4	16799	22.4	11.2	849	730.8	#3	4.92	12.6	1.65	16.18	13.78	15.75	18.11	8.86	34.02	3.35	3.15	17.64	1.26	42
R/KBC 11-2150-8	10.7	20877	26	13	891	908.2	#3	4.92	12.6	1.65	16.18	13.78	15.75	18.11	8.86	35.43	3.35	3.15	17.64	1.26	42
R/KBC 11-2400-8	11.4	23334	26.8	13.4	926	1015	#3	4.92	12.6	1.65	16.18	13.78	15.75	18.11	8.86	35.43	3.35	3.15	17.64	1.26	42
R/KBC 15-3600-8	13	30102	34.8	17.4	1566	1309.4	#4	5.51	18.9	1.77	19.57	20.47	22.64	21.46	10.63	37.44	3.94	3.54	21.65	1.77	45
R/KBC 15-4300-8	15.4	38355	42	21	1676	1668.5	#4	5.51	18.9	1.77	19.57	20.47	22.64	21.46	10.63	39.96	3.94	3.54	21.65	1.77	45
R/KBC 20-6000-8	18.5	48269	48.8	24.4	2205	2099.8	#4	5.51	20.47	1.97	21.3	21.46	24.21	23.43	11.81	43.31	3.94	3.54	23.62	1.77	50

Setting of Eccentric Weight

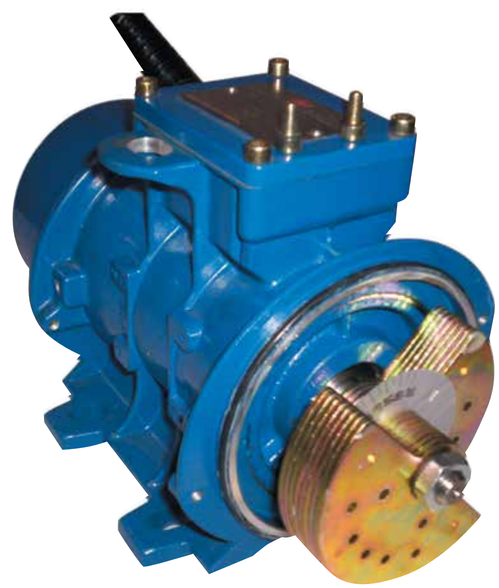
If adjustments are made:

- insure both ends of the vibrators' eccentric weights equal the same percentage value
- when utilizing dual vibrators in a configuration to produce a rectilinear motion; insure one is running CW, and one is running CCW
- when utilizing dual vibrators for feeders, and the outer eccentric weight is thinner than the inner weight, one vibrator must be rotated 180˚ so the vibrators synchronize when settings are less than 100% (It is a good rule to do this all of the time)

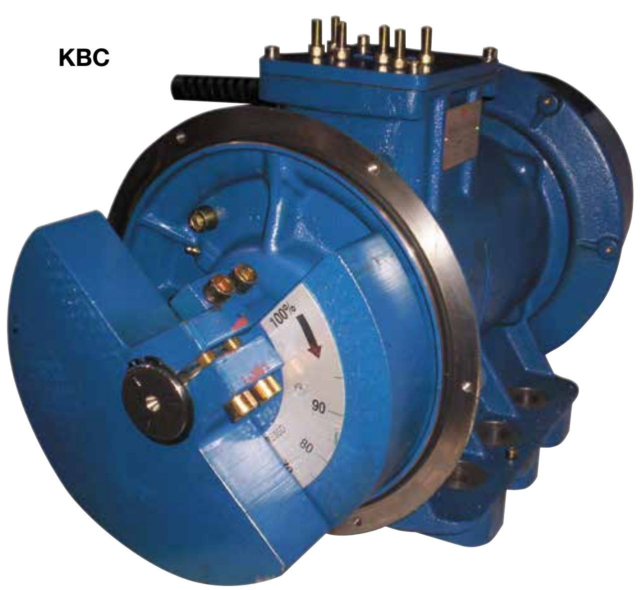




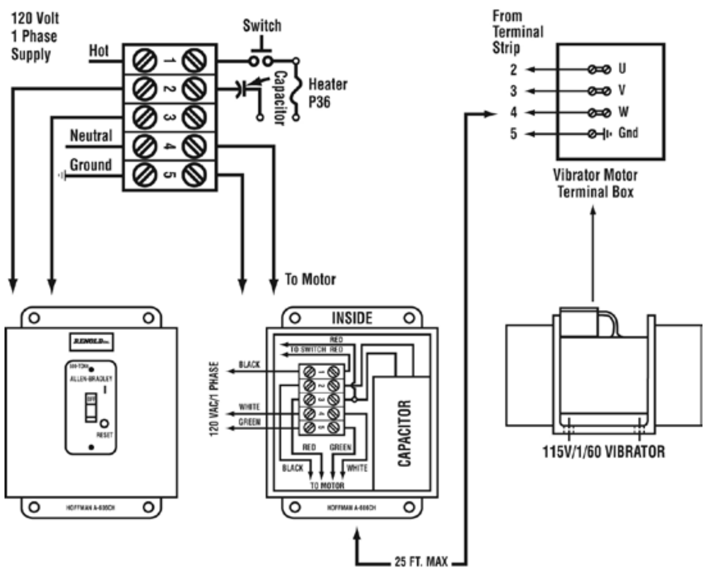
KBM



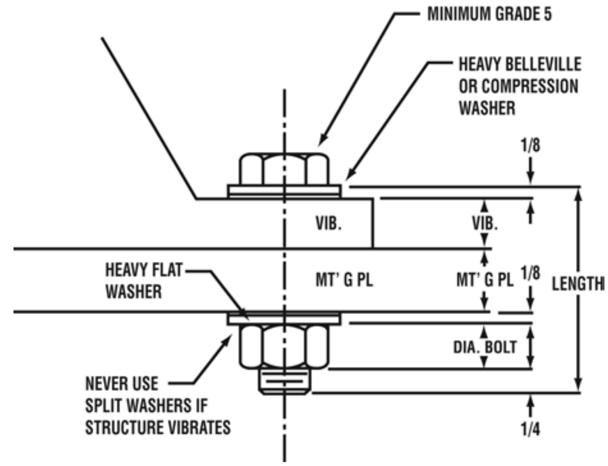
KBC



Capacitor Starter Wiring Diagram KBM, 115V



Proper Hardware/Bolt Sizing

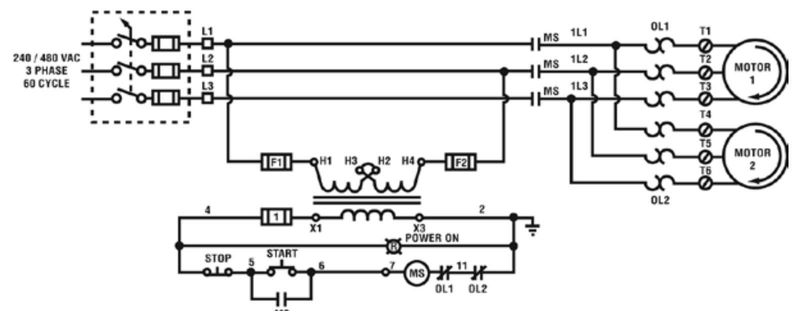


DETERMINING BOLT LENGTHS
- Add 1/8" for all washers
- Add bolt diameter for nut height
- Add 1/4" for thread past nut
- Round stack-up dimensions to largest quarter

EXAMPLE:
2 1/16" = next size = 2 1/4" large bolt

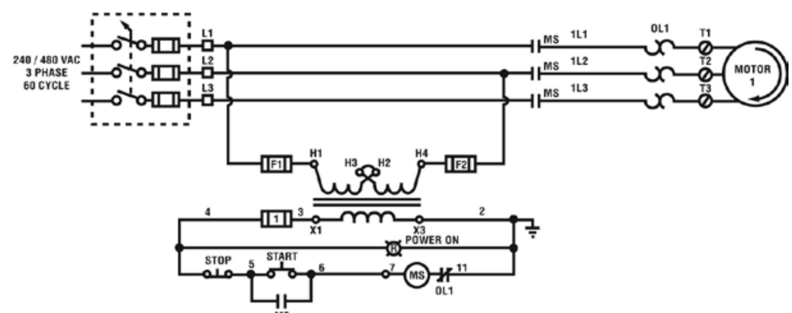
Dual Magnetic Starter

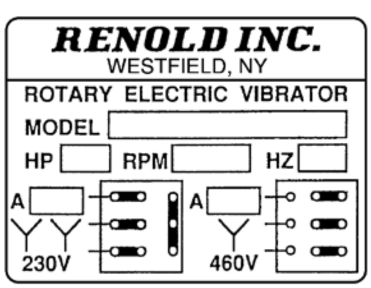
Notes:
1. Fusible disconnect supplied by others.
2. Control transformer always wired to customer stated input voltage.
3. Control wires are 18 awg.
4. Overload size based upon amperage draw and voltage.
5. Motors should always be wired counter rotating.



Single Magnetic Starter

Notes:
1. Fusible disconnect supplied by others.
2. Control transformer always wired to customer stated input voltage.
3. Control wires are 18 awg.
4. Overload size based upon amperage draw and voltage.
5. Motor should always be wired to rotate into the product load or flow.





Note:
1. You can not synchronize (2) vibrators with a single starter.
2. You can hookup (2) vibrators to most VFD's, variable speed controllers to synchronize.
3. If you require a VFD, but also need Dynamic Braking Model, you must include a dual magnetic starter in your controls.

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