



Brute Force and Two Mass Vibratory Feeders

*Metering bulk materials into the process
at rates of 1000 lbs. per hour through 6000 TPH*



RENOLD

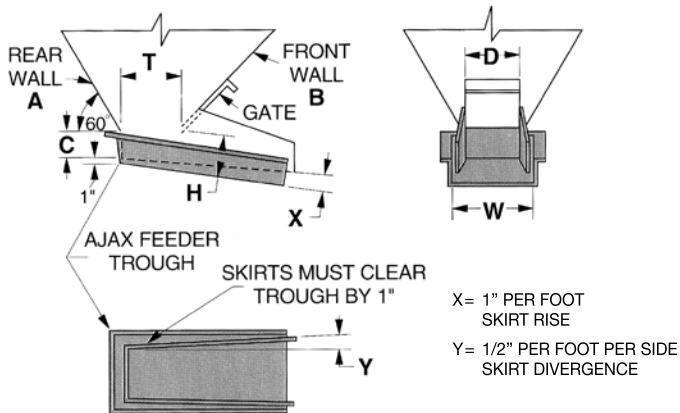
Superior Technology

www.renold.com

For more than 65 years, many industries have relied on AJAX Vibratory Feeders to introduce bulk materials from storage hoppers, silos, bags, or totes into process. For successful processing, all materials must be transported at a consistent rate of flow. Renold AJAX vibratory feeders are custom designed to meet the needs of your specific application. Three types of feeder designs and a variety of vibrators/ shakers can be provided to create flow rates from 1000lbs/hr to 6000 TPH. Additional hardware, such as hoppers, flow aids, variable speed controllers and starters are also available with our units. Rugged AJAX equipment produces the consistent flow rates and trouble-free operation you need to achieve efficient processing.

Hopper Design

Material characteristics and hopper design can restrict flow and hamper the performance of a vibratory feeder. Restrictions occur when the head load exceeds the capability of the suspension hangers or when product is trapped between the hopper skirts and trough. The following hopper design guidelines are offered to help prevent restrictions and improve process performance. This, in turn, will enhance feeder life and ensure consistent flow rates.



1. The slope angle of the rear wall (A) should be 60° or more to permit material flow along this wall.
2. Front wall slope (B) should be 5° less than the rear wall. Too shallow a slope may result in material build-up above the gate opening. Too steep a slope may disturb flow patterns within the hopper. Deflector angles may be necessary to eliminate head loads in larger hoppers.
3. A short vertical section (C) should be provided just above the rear of the trough, with a height at least equal to the height of the trough. A height of one foot is recommended in high tonnage applications. The bottom must not come into contact with the feeder during operation. Clearance of 1 inch is recommended.

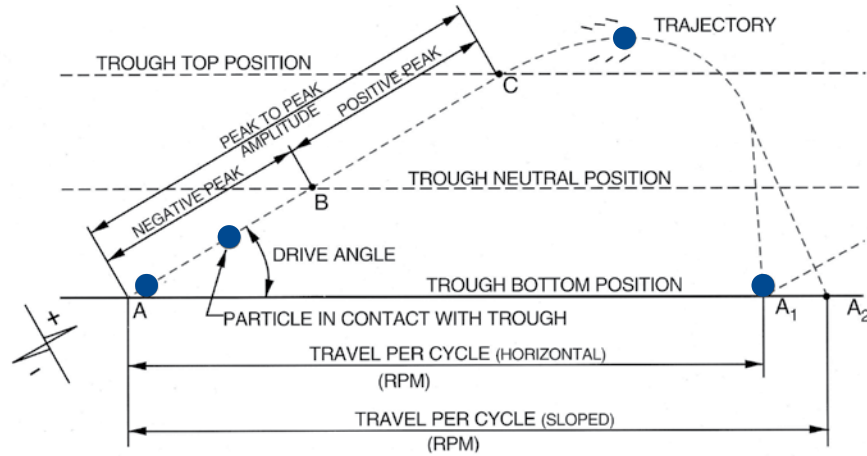
4. To prevent material from interlocking and lodging in the throat opening, this dimension (T) should be at least 2 ½ times the diameter of the largest particle of material for randomly sized particles, or 5 times the diameter if particles are nearly the same size.
5. The gate opening (H) should be at least twice the size of the largest particle of material. This dimension should be measured from the bottom of the trough with the trough hung in the declined position. For best flow patterns within the hopper, the throat dimension (T) should be equal to or slightly larger than half the gate opening (H). When possible, the trough slope should be 10-15°. Flow rate of a particle will accelerate across the trough when the trough is declined. The chart below depicts expected increase in flow rate as slope from the horizontal increases.

Slope in degrees	Increase factor
1°	103%
3°	110%
6°	120%
9°	130%
12°	140%
15°	150%

6. The width of opening (D) must be consistent with capacity requirements. For randomly sized particles, this should be 2 ½ times the diameter of the largest particle; for same-sized particles, the width should be 5 times the diameter.
7. The skirt board should diverge at approximately ½ inch per foot of length, so that the opening at the front of the feeder trough is greater than that at the hopper opening. Skirt boards should also rise slightly away from the trough bottom at a rate of ½ inch per foot of length from hopper to front of trough, to prevent material blockage between the skirts and trough.

Typical Materials Handled by AJAX Feeders

- Aggregate
- Abrasives
- Chemicals
- Ceramics
- Coal
- Castings
- Hot Dross
- Metal Parts, Stampings
- Hazardous Materials
- Explosives
- Food Products
- Fruit
- Vegetables
- Foundry Sand
- Crushed Glass, Cullet
- Scrap Metal
- Tobacco
- Plastics



How Material is Transported along a Vibratory Trough

A particle's direction of travel is determined by the angle of the shaker attached to the trough. The trough exhibits a sinusoidal motion. When the feeder is operating, the trough oscillates along a straight line with an amplitude and direction determined by the driving force of the shaker. This directed linear vibration results in a series of repetitive "throws and catches" that transport the material along the trough.

The particle contacts the trough surface from the lowest point (A) and while in an upward motion between points (A) to (B). At this point, the particle has been accelerated to its maximum horizontal velocity and leaves the trough surface

on a free flight trajectory. The trough is decelerating, or on its return cycle, from (C) to (B). The vertical velocity of the particle gradually decreases due to gravity, and the particle rejoins the trough surface at (A1). This completes one cycle, at the lowest point of amplitude. When troughs are sloped, particle trajectory is recovered, further along at point (A2).

Repeating this cycle several hundred times per minute produces a steady flow of material at rates from 0-50 feet per minute. Driving frequency (RPM); amplitude (inches); drive mounting angle (\emptyset); and trough slope affect how well particles are transported.

Types of Shakers/Vibrators Used



AJAX Shaker

A traditional mechanical shaker drive produces a force output by means of geared, oppositely rotating, eccentric weights. This unit is extremely rugged and operates well in harsh and dusty environments. Also used in two-mass designs to deliver high tonnage rates with very low horsepower requirements.



Rotary Electric Vibrators

Rotation of two sets of eccentric weights, mounted on motor shafts, offers easy adjustment of eccentric settings and a variety of force outputs. Generally, two vibrators are mounted in a pair to produce the rectilinear motion needed to create flow. A variety of frequencies (900, 1200, 1800 and 3600 RPM) allow versatile continuous operation.

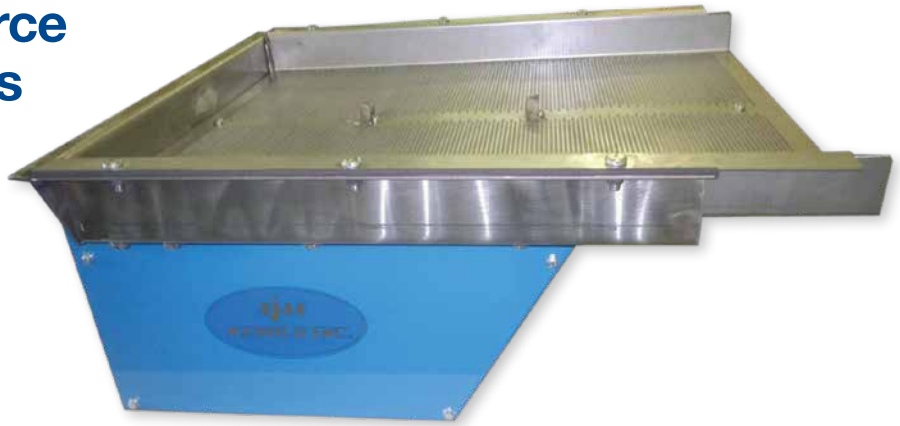


Air Piston Vibrators

For lower feed rate requirements (1000lbs/ hr-25 TPH). Reciprocating motion of a piston creates the necessary force. The piston is cushioned on a pad of air at both ends. This vibrator is air purged (explosion proof) and can be washed down during operation.

Model BFA Brute Force Air Operated Feeders

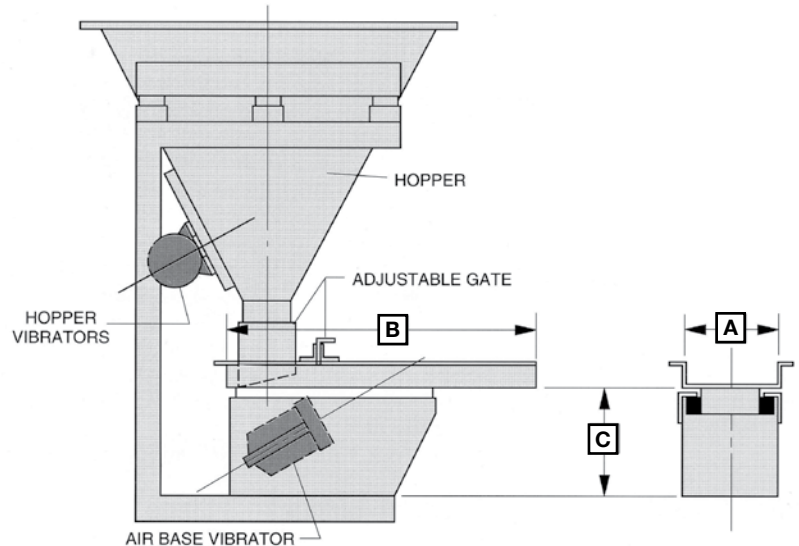
Powered by Air Piston/
Air Cushioned Vibrator



- Explosion proof design
- Variable frequency and flow rates
- Options: hoppers, gates, covers and a variety of control devices
- Custom trough designs

Quiet operating feeders offer unparalleled durability for a variety of applications and flow rates. Explosion proof design makes these feeders ideal for use in hazardous environments. Simple, trouble-free operation requires minimal maintenance.

- Any hopper capacity can be integrated with the selected feeder
- Renold can provide controls for manual or automatic operation
- Trough sizes can be changed to suit the application



Pneumatic Feeders

MODEL	TROUGH TYPE	APPROX. CAPACITY	A WIDTH OR DIA.	B LENGTH	C DISCHARGE HEIGHT	AIR CONSUMPTION SCFM	FREQUENCY	APPROX. SHIPPING WEIGHT
BFA-1.516-125	Flat	125#/HR	1.5	16	8	4.4	7600	43
BFA-216-125	Flat	1500#/HR	2	16	8	4.4	7600	43
BFA-216-125	Vee	300#/HR	2	16	8	4.4	7600	43
BFA-318-125	Flat	1500#/HR	3	18	8	4.4	7600	43
BFA-418-125	Flat	1500#/HR	4	18	8	4.4	7600	43
BFA-618-125	Flat	1500#/HR	6	18	8	4.4	7600	43
BFA-116-125	Tubular	1500#/HR	1	16	8	4.4	7600	43
BFA-218-125	Tubular	1500#/HR	2	18	8	4.4	7600	43
BFA-318-125	Tubular	1500#/HR	3	18	8	4.4	7600	43
BFA-420-200	Flat	4TPH	4	20	9	8.5	3500	64
BFA-524-200	Flat	5TPH	5	24	9	8.5	3500	64
BFA-620-200	Flat	6TPH	6	20	9	8.5	3500	64
BFA-820-200	Flat	8TPH	8	20	9	8.5	3500	64
BFA-330-200	Tubular	2TPH	3	30	9	8.5	3500	64
BFA-424-200	Tubular	3.5TPH	4	24	9	8.5	3500	64
BFA-630-300	Flat	8TPH	6	30	13	19.5	2400	90
BFA-830-300	Flat	10TPH	8	30	13	19.5	2400	90
BFA-1036-300	Flat	15TPH	10	36	13	19.5	2400	90
BFA-1230-300	Flat	18TPH	12	30	13	19.5	2400	90
BFA-336-300	Tubular	3.5TPH	3	36	13	19.5	2400	90
BFA-436-300	Tubular	3.5TPH	4	36	13	19.5	2400	90
BFA-536-300	Tubular	8.5TPH	5	36	13	19.5	2400	90
BFA-636-300	Tubular	4.5TPH	6	36	13	19.5	2400	90

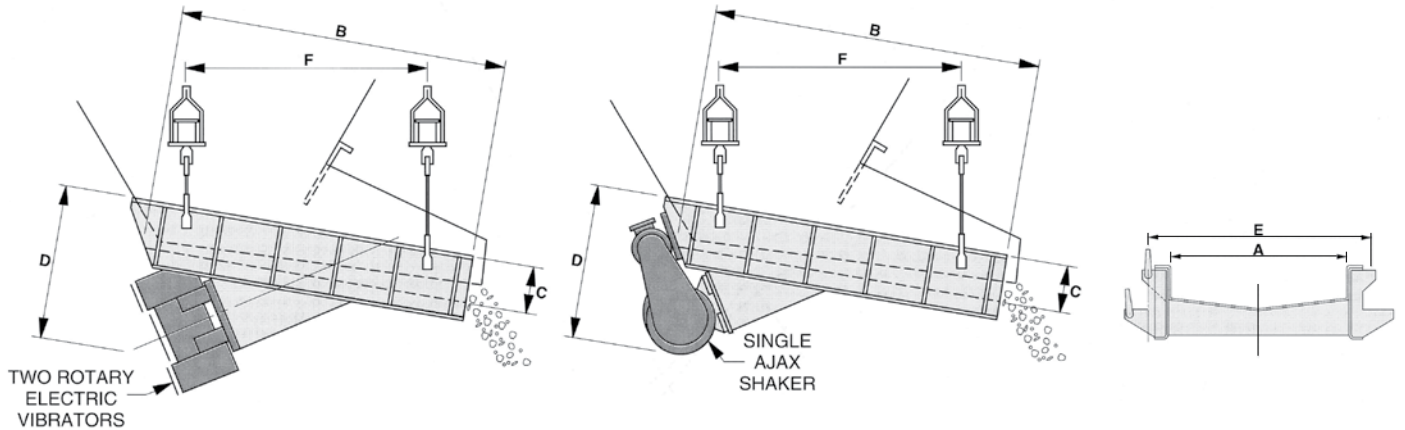
Model BF Brute Force Electro-Mechanical Feeders

BFE - Powered by AJAX Shaker

BFR - Powered by Rotary Electric Vibrators

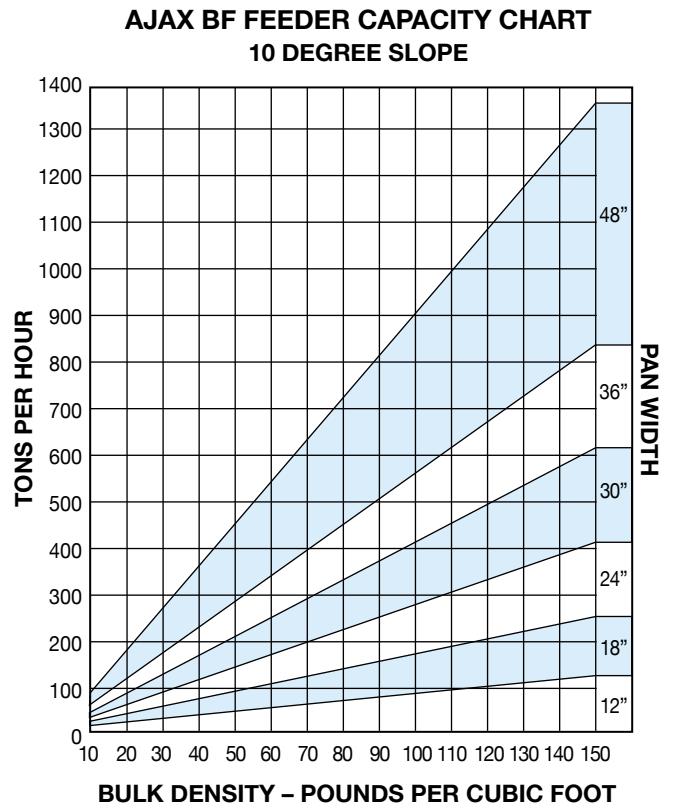


- Designed for new and existing operations
- Low frequency, heavy duty design offers greater life expectancy
- Low horsepower increases energy efficiency
- Easy to maintain and operate
- Explosion proof motors available



Renold AJAX offers a variety of shaker /vibrator designs to provide outputs from 25TPH to 1500TPH, based on engineering economics of horsepower to deliver a required rate. This feeder is extremely efficient and quiet operating.

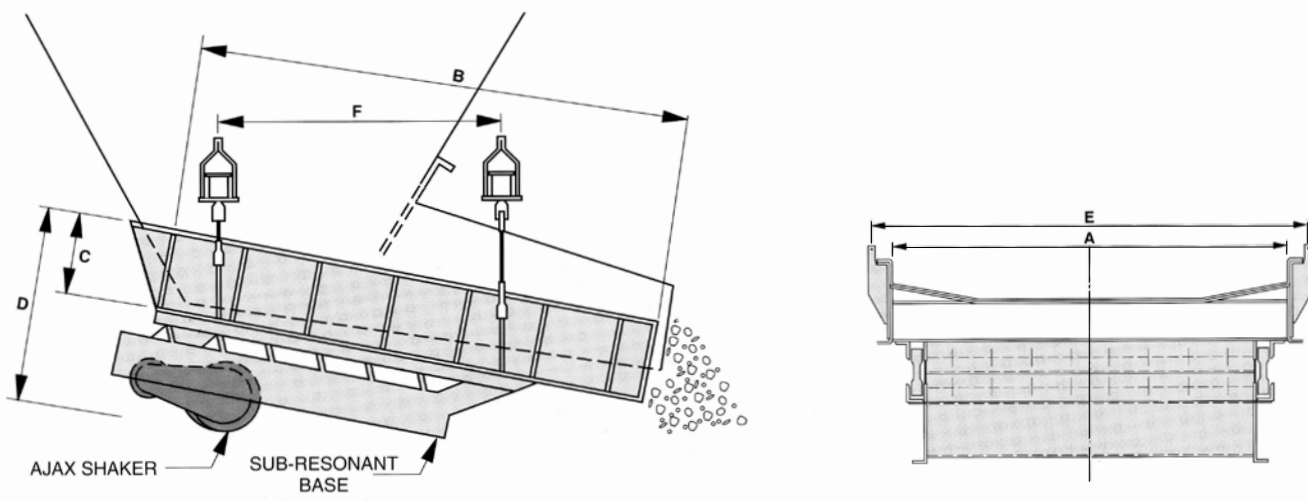
STANDARD UNIT BASED ON DRY SAND 100 PPCF, INSTALLED WITH PROPER SKIRTBOARDS									
MODEL	HP	A	B	C	D	E	F	CAPACITY TPH	SHIPPING WEIGHT
BF 1248	1/2	12	48	6	23	16	36	90	452
BF 1260	1/2	12	60	6	23	16	48	100	475
BF 1272	3/4	12	72	6	23	16	60	120	502
BF 1848	1/2	18	48	6	23	22	36	175	475
BF 1860	3/4	18	60	6	23	22	48	200	541
BF 1872	1	18	72	6	23	22	60	225	579
BF 1884	1	18	84	6	23	22	66	250	621
BF 2448	1-1/2	24	48	6	23	28	36	175	724
BF 2460	1-1/2	24	60	6	23	28	48	300	772
BF 2472	2	24	72	6	23	28	60	325	834
BF 2484	2	24	84	6	23	28	66	400	1014
BF 3060	2	30	60	6	32	34	48	400	972
BF 3072	3	30	72	6	32	34	60	400	1052
BF 3084	3	30	84	6	32	34	66	525	1395
BF 3096	5	30	96	6	32	34	80	625	1467
BF 3660	3	36	60	8	32	42	48	700	1174
BF 3672	3	36	72	8	32	42	60	700	1254
BF 3684	5	36	84	8	32	42	66	750	1484
BF 3696	5	36	96	8	32	42	80	750	1580
BF 4860	5	48	60	8	32	52	48	1000	1331
BF 4872	5	48	72	8	32	52	60	1100	1440
BF 4884	5	48	84	8	32	52	66	1100	1961
BF 4896	5	48	96	8	32	52	80	1200	2483



Model TM Two-Mass Electro-Mechanical Feeders

Powered by AJAX Shaker or Rotary Electric Vibrators

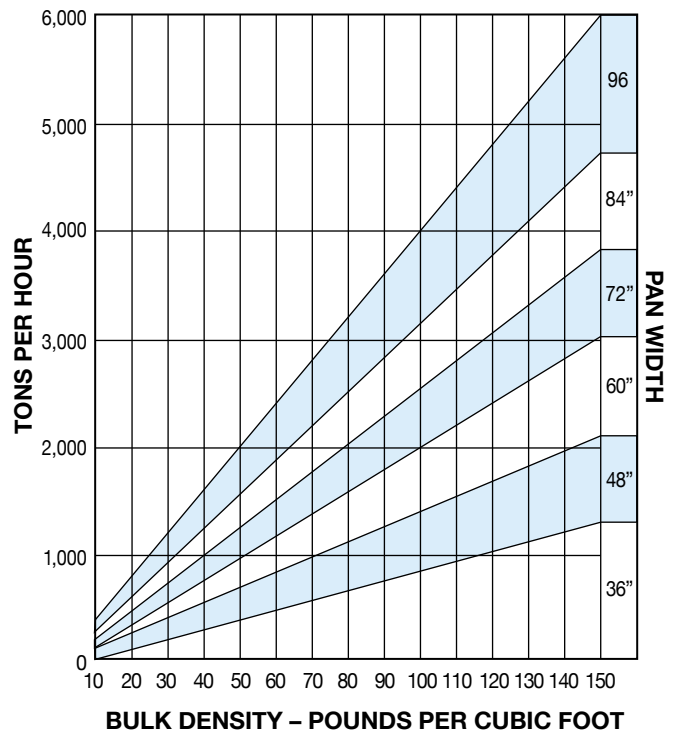
- Low horsepower, high tonnage rates
- Module design
- Single driving unit



The AJAX Shaker drive excites the natural frequency drive system to produce a straight line vibrating force. By compensating for head load, the feeder maintains a constant feed with considerable energy savings. With the addition of a voltage controller to vary the motor speed, the stroke of the feeder can be infinitely adjusted for variable rate applications.

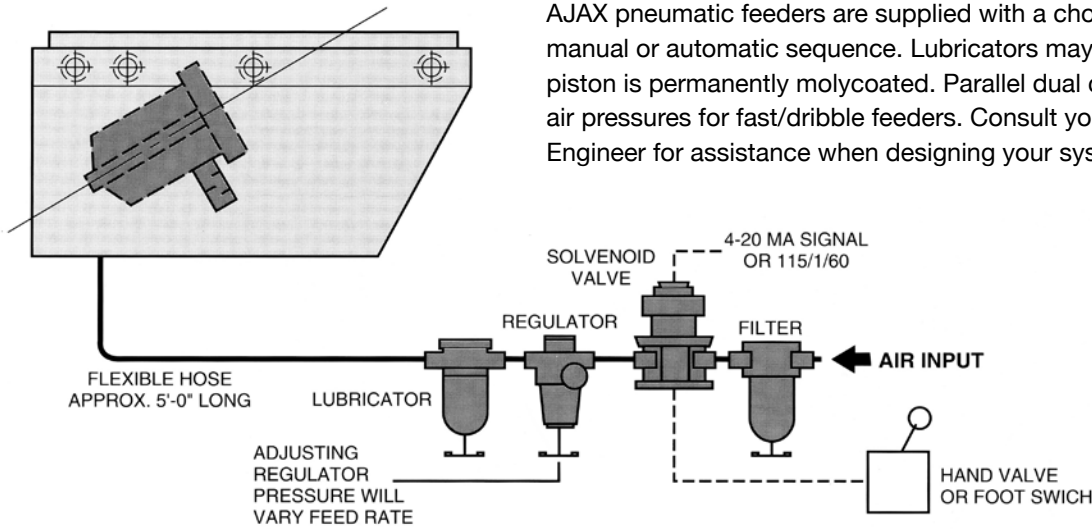
STANDARD UNIT BASED ON DRY SAND 100 PPCF, INSTALLED WITH PROPER SKIRTBOARDS									
MODEL	HP	A	B	C	D	E	F	CAPACITY TPH	SHIPPING WEIGHT
TM 3660	3	36	60	8	30	42	48	700	1563
TM 3672	3	36	72	8	30	42	60	700	1815
TM 3684	5	36	84	8	30	42	66	750	2068
TM 3696	5	36	96	8	30	42	80	750	2321
TM 4872	3	48	72	10	32	54	60	1100	2321
TM 4884	5	48	84	10	32	54	66	1200	2658
TM 4896	5	48	96	10	32	54	80	1200	2995
TM 48120	5	48	120	10	32	54	96	1500	3368
TM 48144	5	48	144	10	32	54	108	1600	4042
TM 6084	5	60	84	10	32	66	66	2000	2947
TM 6096	5	60	96	10	32	66	80	2000	3368
TM 60120	5	60	120	10	32	66	84	2300	4211
TM 60144	7-1/2	60	144	10	32	66	108	2600	5053
TM 7296	7-1/2	72	96	10	34	78	80	2600	4042
TM 72120	7-1/2	72	120	10	34	78	84	2600	5053
TM 72144	7-1/2	72	144	10	34	78	108	3000	6063
TM 72156	7-1/2	72	156	10	34	120	80	3000	6569
TM 8496	7-1/2	84	96	12	36	90	80	3200	4716
TM 84120	10	84	120	12	36	90	84	3500	5895
TM 84144	10	84	144	12	36	90	108	3500	7074
TM 84156	10	84	156	12	36	90	120	3500	7664
TM 96120	10	96	120	15	41	102	84	3775	6737
TM 96144	10	96	144	15	41	102	108	4000	8085
TM 96156	10	96	156	15	41	102	120	4000	8759

**AJAX TWO MASS FEEDER CAPACITY CHART
10 DEGREE SLOPE**



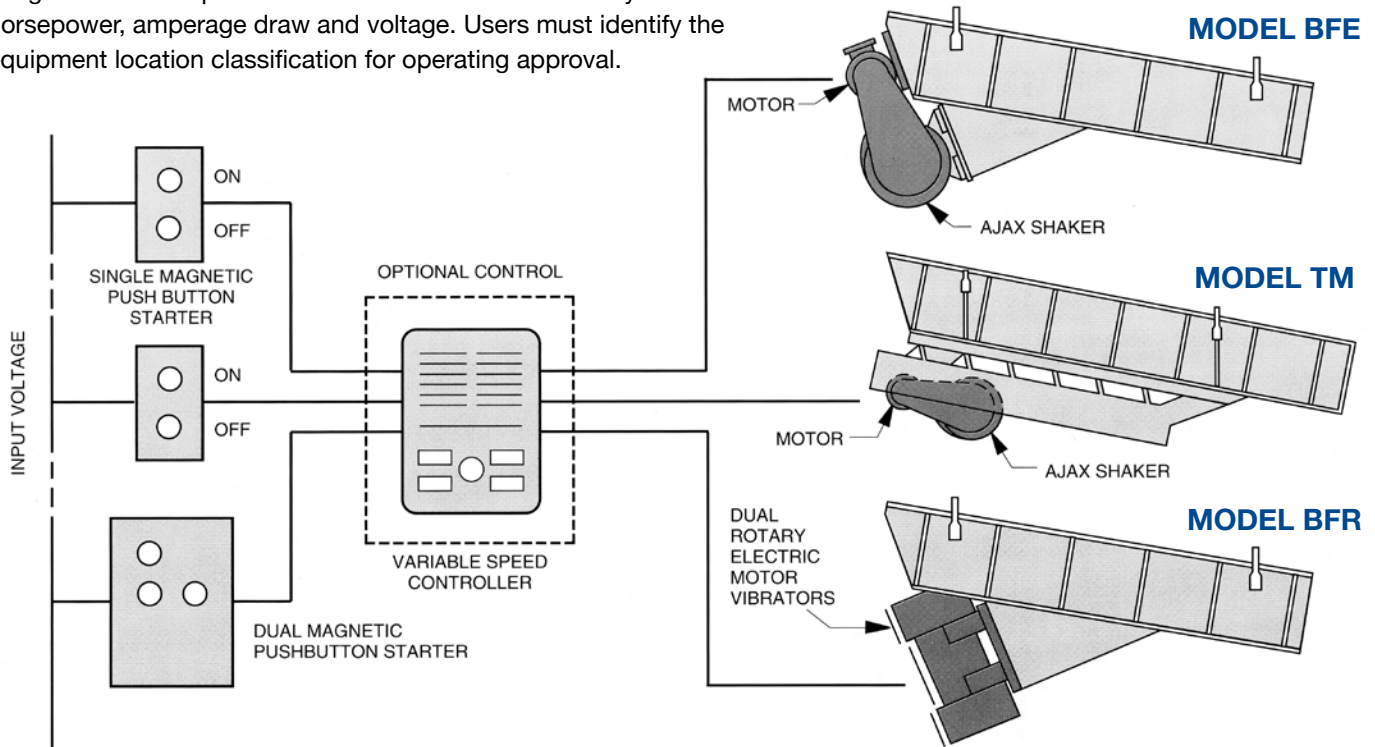
Operation of Feeders

AJAX pneumatic feeders are supplied with a choice of controls for manual or automatic sequence. Lubricators may be omitted if the vibrator piston is permanently molycoated. Parallel dual controls respond to two air pressures for fast/dribble feeders. Consult your Renold Application Engineer for assistance when designing your system.



Electrical Controls

Renold offers a variety of electrical controls to start/stop motors and integrate variable speed controllers. Controls are sized by motor horsepower, amperage draw and voltage. Users must identify the equipment location classification for operating approval.



Feeder Capacity Charts

AJAX feeder capacity charts are based on dry sand (100 ppcf) and feeder slope. The rate also depends on use of the proper hopper and skirt design, with respect to gate opening and feeder length. Trough length is determined by material flow characteristics (static/dynamic angle of repose). When the feeder is cut off, material must

stop short of the feeder discharge to prevent flushing. Material characteristics, such as type, bulk density and repose angle must be known to properly engineer the feeder. Renold engineers can test your product to determine these characteristics.

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