

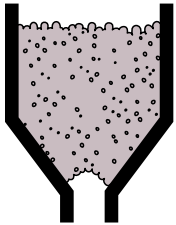
# FLOW AID SYSTEMS

EXEN CORPORATION Responds to Solution of Material Flow Material



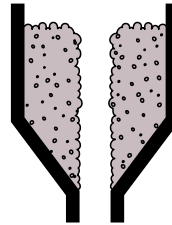
# Flow Aid System

## TROUBLE PHENOMENON



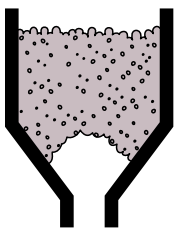
### BRIDGING

Bridging occurs when materials cling to the wall or compact above the discharge opening of the lower part in the hopper, and the flow of materials in the upper part is interrupted.



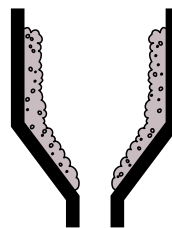
### RATHOLING

Ratholing occurs when materials flow only above the exit, and form a tube that leaves the hopper filled with "dead" materials which will not move.



### ARCHING

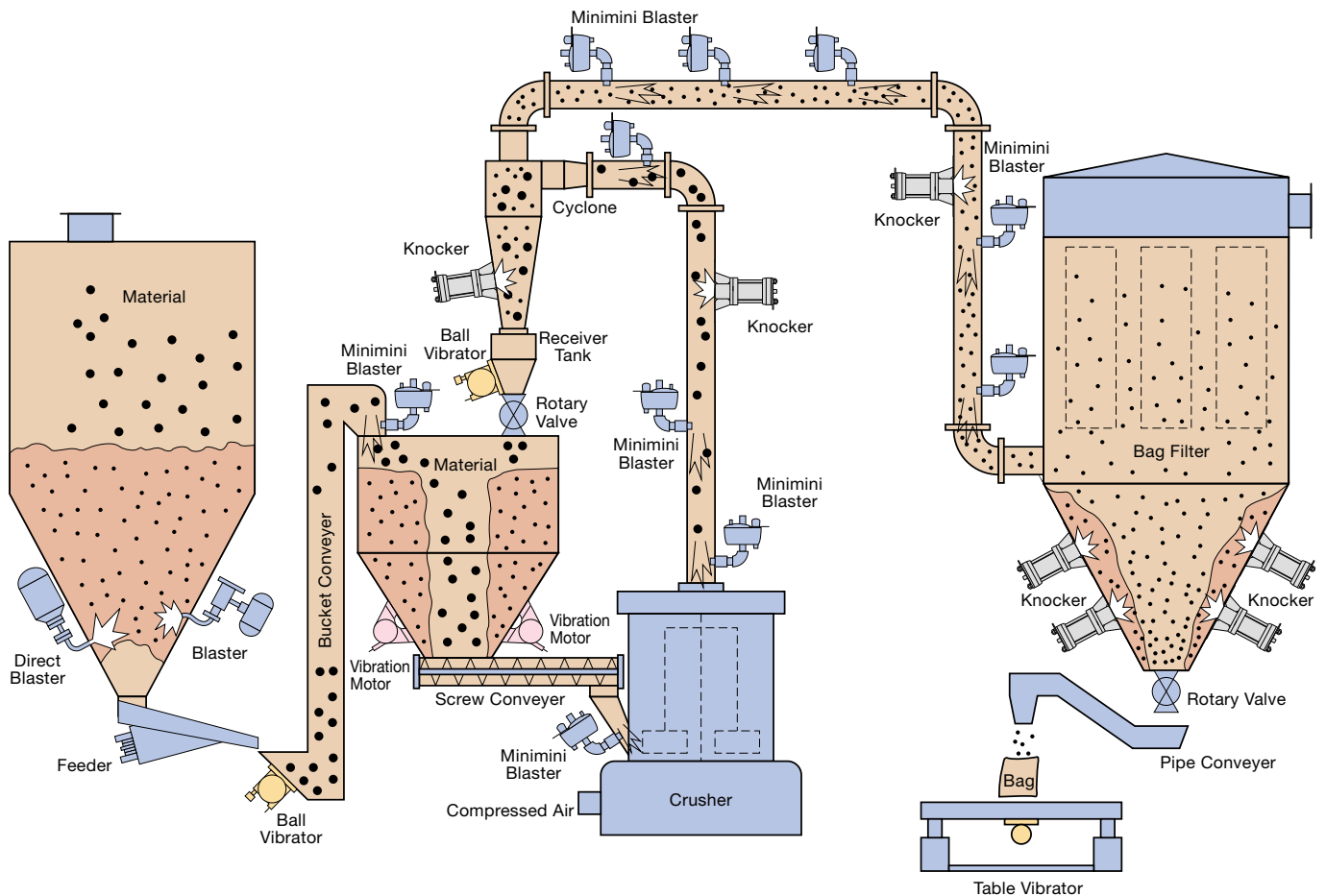
Arching occurs when materials in the lower part of the hopper flow out from the discharge opening, and an arch strong enough to support the entire headload in the hopper is formed.



### ADHERENCE TO WALL

Clinging materials and also materials easily influenced by the moisture and the temperature adhere to the wall and refuse to flow.

## EXAMPLE OF TYPICAL FLOW AID SYSTEM INSTALLATION



# Knocker / Reference of installation



Food and pharmaceutical plant  
SS304 Storage tank

Clinging and compacted materials are broken loose by the impact force of the knocker piston. The impact force can be adjusted as necessary by adjusting the air pressure.

### Features

1. Impact force can be adjustable by input pneumatic pressure. ( 0.3Mpa – 0.7Mpa )
2. Relay piping function allows operation of multiple knockers by one valve.
3. Simple design, excellent durability and easy maintenance.
4. Simple working principle eliminates complicate operation circuit. Remote operation is also easy.



Iron works  
Coal Banker

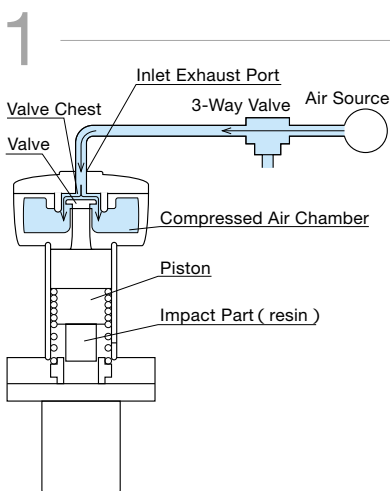


Petrochemical plant  
Storage tank  
Plastics pellet

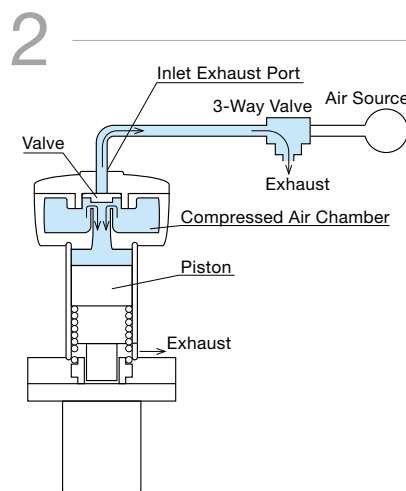


Flour mill plant  
Chute

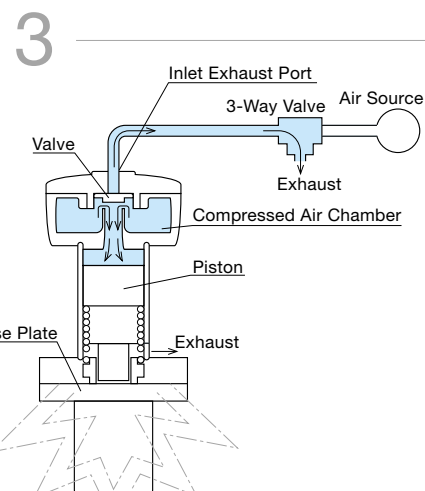
## Operating principle



Compressed air delivered to Knocker is supplied into the valve chest at first, pushes the valve down, and is accumulated in the compressed air chamber.



On operating the 3-way valve and exhausting air in the valve chest, compressed air in the chamber makes the valve travel upward.



As soon as the valve moves, compressed air in the chamber forces piston down energetically, and beats base plate, Its percussive force eliminates clinging and blocking of materials.

# Relay Knocker

Relay piping function allows operation of multiple knockers by one valve.  
See page 6, "Control method"



RKV30PA

RKV40PA

RKV60PA

RKV80PA

RKV100PA

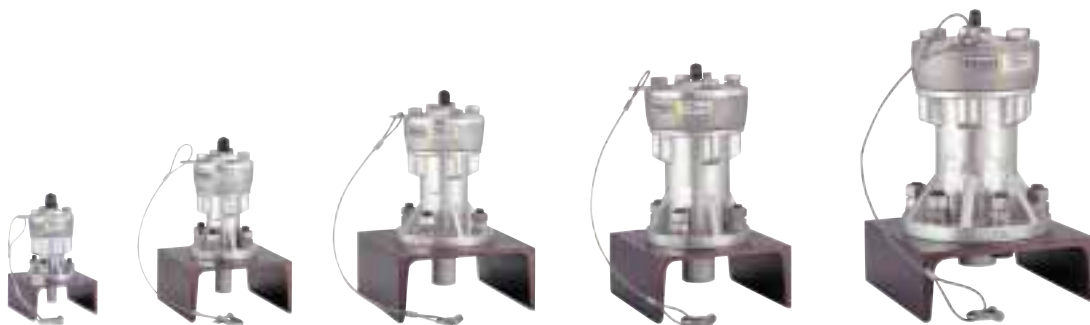
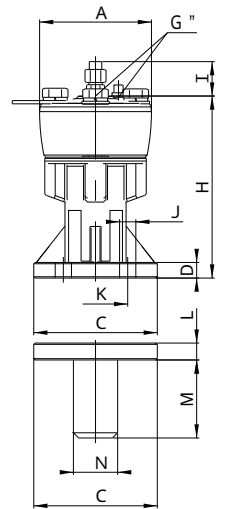
**SPECIFICATIONS**

| Model    | Working Pressure (MPa) | Stroke Cycle (time/min) | Air Consumption (NL/time) | Stroke Energy (N·m) | Impulsive Force |                      | Weight* (kg) |
|----------|------------------------|-------------------------|---------------------------|---------------------|-----------------|----------------------|--------------|
|          |                        |                         |                           |                     | (kg·m/s)        | Converts into hammer |              |
| RKV30PA  | 0.3 - 0.7              | 1 - 60                  | 0.05 - 0.13               | 5.49 - 13.1         | 1.70 - 2.60     | below 1.0 lb         | 1.3          |
| RKV40PA  |                        |                         | 0.15 - 0.37               | 9.22 - 22.3         | 2.86 - 4.42     | 1.0 - 1.5 lbs        | 3.4          |
| RKV60PA  |                        |                         | 0.33 - 0.77               | 20.60 - 49.0        | 6.80 - 10.50    | 1.5 - 3.0 lbs        | 8.8          |
| RKV80PA  |                        |                         | 0.60 - 1.40               | 45.10 - 109.0       | 15.00 - 23.30   | 3.0 - 8.0 lbs        | 13.7         |
| RKV100PA |                        |                         | 0.98 - 2.28               | 82.40 - 201.0       | 28.70 - 44.50   | 6.0 - 15.0 lbs       | 30.8         |

\*Weight includes base.

**DIMENSIONS CHART (mm)**

| Model    | A   | C   | D  | G"  | H   | I    | J    | K   | L  | M   | N     |
|----------|-----|-----|----|-----|-----|------|------|-----|----|-----|-------|
| RKV30PA  | 66  | 70  | 8  | 1/8 | 95  | (25) | 8.5  | 55  | 8  | 35  | 27.2  |
| RKV40PA  | 86  | 95  | 12 |     | 140 |      | 12.5 | 70  | 13 | 60  | 34.0  |
| RKV60PA  | 115 | 138 | 14 |     | 183 |      | 14.5 | 110 | 15 | 80  | 76.3  |
| RKV80PA  | 146 | 148 | 16 | 1/4 | 222 | (28) | 17.0 | 120 | 18 | 90  | 114.3 |
| RKV100PA | 175 | 208 | 20 |     | 270 |      | 21.0 | 170 | 23 | 115 |       |



RKD30PA

RKD40PA

RKD60PA

RKD80PA

RKD100PA

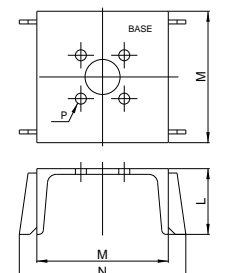
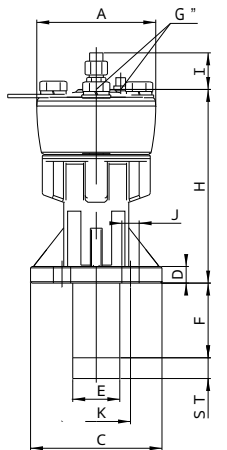
**SPECIFICATIONS**

| Model    | Working Pressure (MPa) | Stroke Cycle (time/min) | Air Consumption (NL/time) | Stroke Energy (N·m) | Impulsive Force |                      | Weight* (kg) |
|----------|------------------------|-------------------------|---------------------------|---------------------|-----------------|----------------------|--------------|
|          |                        |                         |                           |                     | (kg·m/s)        | Converts into hammer |              |
| RKD30PA  | 0.3 - 0.7              | 1 - 60                  | 0.05 - 0.13               | 5.49 - 13.1         | 1.70 - 2.60     | below 1.0 lb         | 1.9          |
| RKD40PA  |                        |                         | 0.15 - 0.37               | 9.22 - 22.3         | 2.86 - 4.42     | 1.0 - 1.5 lbs        | 5.4          |
| RKD60PA  |                        |                         | 0.33 - 0.77               | 20.60 - 49.0        | 6.80 - 10.50    | 1.5 - 3.0 lbs        | 12.7         |
| RKD80PA  |                        |                         | 0.60 - 1.40               | 45.10 - 109.0       | 15.00 - 23.30   | 3.0 - 8.0 lbs        | 17.7         |
| RKD100PA |                        |                         | 0.98 - 2.28               | 82.40 - 201.0       | 28.70 - 44.50   | 6.0 - 15.0 lbs       | 34.1         |

\*Weight includes base.

**DIMENSIONS CHART (mm)**

| Model    | A   | C   | D  | E    | F  | G"  | H    | I    | J    | K     | ST       | L  | M   | N     | P       |          |
|----------|-----|-----|----|------|----|-----|------|------|------|-------|----------|----|-----|-------|---------|----------|
| RKV30PA  | 66  | 70  | 8  | 15.0 | 38 | 1/8 | 95   | (25) | 8.5  | 55    | 17       | 50 | 100 | (140) | 4 - 8.5 |          |
| RKV40PA  | 86  | 95  | 12 | 23.5 | 55 |     | 140  |      | 12.5 | 70    | 25       | 75 | 75  | 150   | (190)   | 4 - 12.5 |
| RKV60PA  | 115 | 138 | 14 | 35.0 | 65 |     | 183  |      | 14.5 | 110   | 35       | 90 | 200 | 200   | (280)   | 4 - 15.0 |
| RKV80PA  | 146 | 148 | 16 | 47.5 | 60 | 222 | 17.0 | 120  | 40   | (330) | 4 - 17.0 |    |     |       |         |          |
| RKV100PA | 175 | 208 | 20 | 54.5 | 50 | 270 | 21.0 | 170  | 50   | (410) | 6 - 21.0 |    |     |       |         |          |

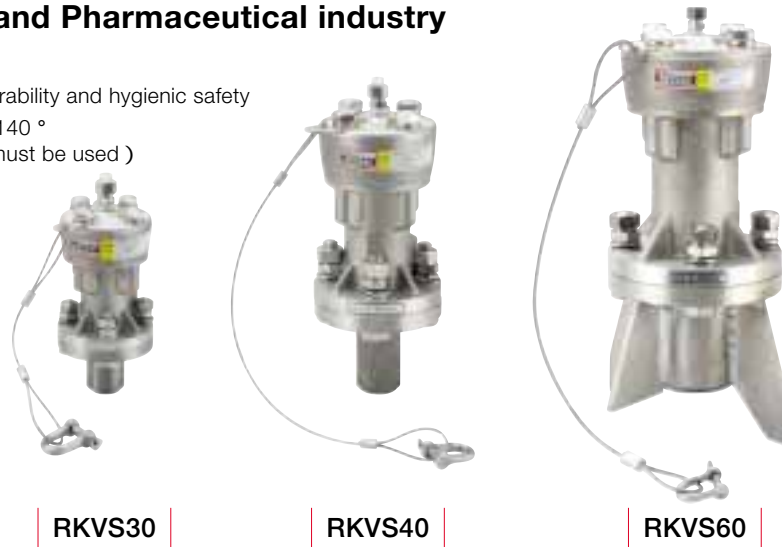


# Stainless Steel Knocker

For Food, Chemistry, and Pharmaceutical industry

Features

- a. Anticorrosion body to increase durability and hygienic safety
- b. Heat resistance: Maximum up to 140 °  
( Note: Heat resistance coupling must be used )



SPECIFICATIONS

| Model  | Working Pressure ( MPa ) | Stroke Cycle ( time/min ) | Air Consumption ( NL/time ) | Stroke Energy ( N·m ) | Impulsive Force |                      | Weight* ( kg ) |
|--------|--------------------------|---------------------------|-----------------------------|-----------------------|-----------------|----------------------|----------------|
|        |                          |                           |                             |                       | ( kg·m/s )      | Converts into hammer |                |
| RKVS30 | 0.3 - 0.7                | 1 - 60                    | 0.05 - 0.13                 | 5.49 - 13.1           | 1.70 - 2.60     | below 1.0 lb         | 1.7            |
| RKVS40 |                          |                           | 0.15 - 0.37                 | 9.22 - 22.3           | 2.86 - 4.42     | 1.0 - 1.5 lbs        | 4.3            |
| RKVS60 |                          |                           | 0.33 - 0.77                 | 20.6 - 49.0           | 6.80 - 10.5     | 1.5 - 3.0 lbs        | 10.6           |

\* Weight includes base.

Note: Dimensions of stainless steel knockers are the same as these of RKV knockers. Please refer to the chart of page3.

# Control panel for Air Knocker



SPECIFICATIONS

| Model    | Installation Scope | Power supply | Working Pressure ( MPa ) | Working Fluid Temperature ( ) | Working Times Per/min. | Dimensions ( L x W x H ) ( mm ) | Weight ( kg ) |
|----------|--------------------|--------------|--------------------------|-------------------------------|------------------------|---------------------------------|---------------|
| AOC - 1B | Indoor,Outdoor     | Air control  | 0.3 - 0.7                | 5 - 50                        | 12 - 60                | 171 x 67 x 200                  | 1.3           |

| Model   | Installation Scope | Protection class | Input Voltage     | Timer setup period          | Number of units can be operated                 | Dimensions ( L x W x H ) ( mm ) | Weight ( kg ) |
|---------|--------------------|------------------|-------------------|-----------------------------|---|---------------------------------|---------------|
| HSE1100 | Indoor             | IP2X             | 100V Single phase | On timer:0.5sec. - 100hrs.  | 10 sets when using solenoid valve AG44 - 02 - 3 | 264 x 175 x 250                 | 5.0           |
| HSE1200 |                    |                  | 200V Single phase | Off timer:0.5sec. - 100hrs. |   |                                 |               |

SPECIFICATIONS

| Model   | Installation Scope | Protection class | Input Voltage     | Power consumption ( W ) | Timer setup period                                      | Working Pressure ( Mpa ) | Number of units can be operated        | Dimensions ( L x W x H ) ( mm ) | Weight ( kg ) |
|---------|--------------------|------------------|-------------------|-------------------------|---|--------------------------|--|---------------------------------|---------------|
| HKE1100 | Indoor             | IP2X             | 100V Single phase | 16W                     | On timer:1sec. - 6hrs.<br>Off timer:1sec. - 6hrs.       | 0.3 - 0.7                | RKV/D/S30PA 8sets<br>RKV/D/S40PA 6sets | 264 x 173 x 400                 | 7.0           |
| HKE1200 |                    |                  | 200V Single phase |                         |   |                          |  |                                 |               |
| HKE5100 | Indoor, Outdoor    | IP44             | 100V Single phase |                         | RKV/D/S60PA 6sets<br>RKV/D80PA 4sets                    |                          | 390 x 220 x 450                        | 13.0                            |               |
| HKE5200 |                    |                  | 200V Single phase |                         |   |                          |  |                                 |               |
| HKA5000 | Indoor, Outdoor    | IP54             | Air Control       |                         | On timer:10sec. - 180sec.<br>Off timer:0.1sec. - 30sec. |                          | RKV/D100PA 4sets ( per 1 system )      | 390 x 220 x 400                 | 12.0          |

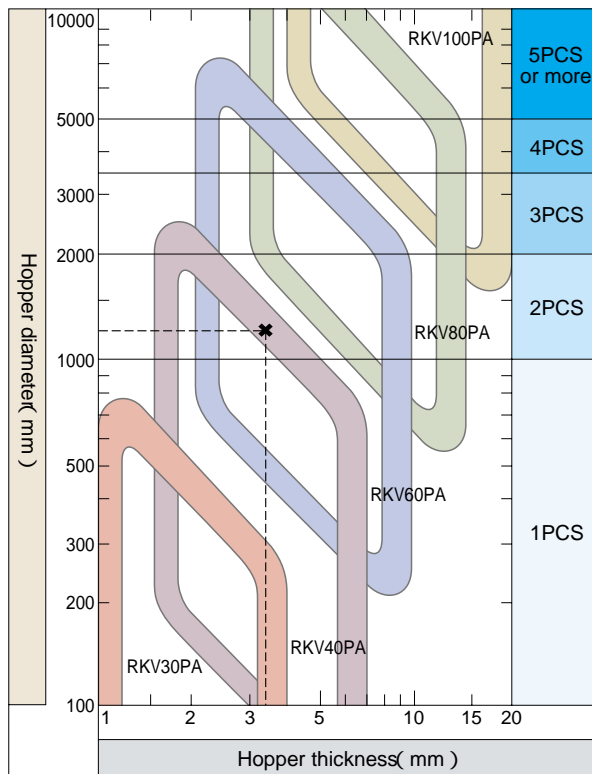
# Example for use / Air Knocker

## MODEL SELECTION GUIDE

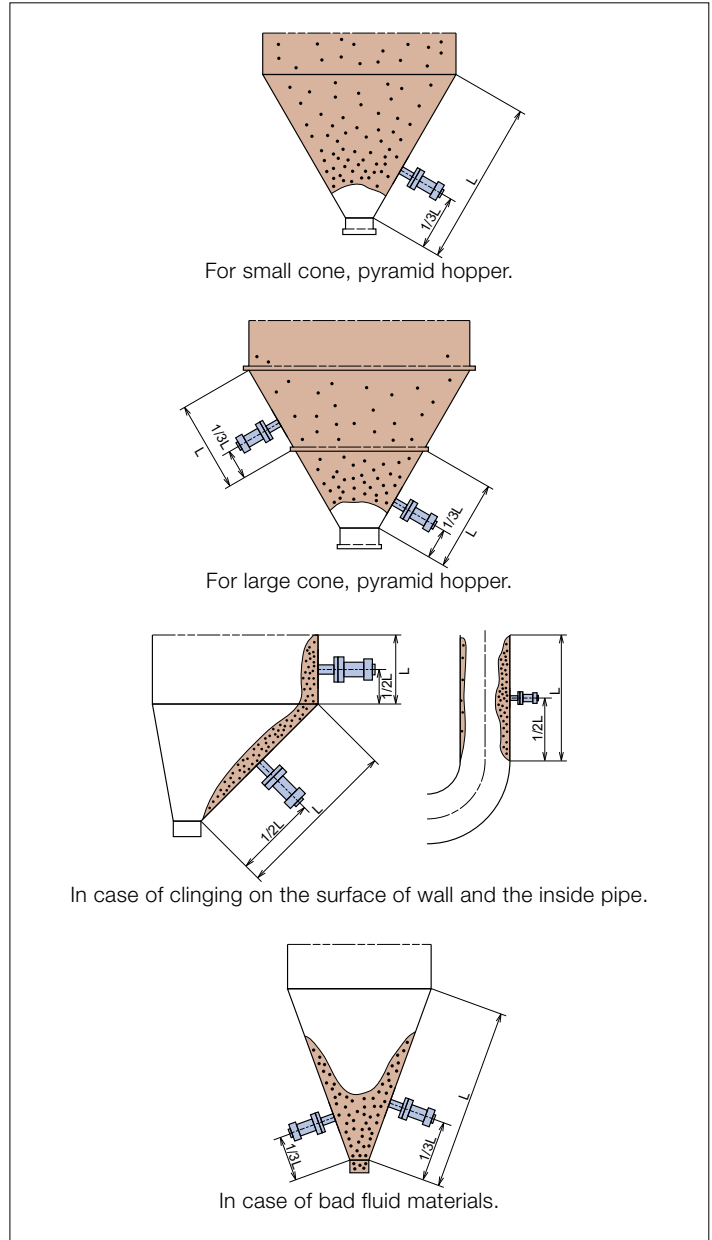
The model and the quantity having the optimum impact force are selected according to the type, the shape, the size, and clinging and blocking condition in silo, hopper etc. For instance, when installing on the conical hopper of 1,200mm dia. 3.2mm thick, find the point of intersection X according to the figure below. As the point X is within the range of RKV40 2 nos, and RKV60 2 nos, select RKV40 2 nos, for small clinging strength, and RKV60 2 nos, for large clinging strength.

## CAUTION ON OPERATION

The larger conical and pyramid hoppers are, the easier segregation is caused and also dead stock is apt to be occurred to the corner of pyramid. In this care, it is better that plural number of knocker below one rank are installed rather than large knocker.



## INSTALLING POSITION



## OPTIONAL EQUIPMENT FOR PIPING

### Solenoid Valve Assy (AG44)

used for electric operation of knocker.

(Compressor side)

(Knocker side)



### Quick Exhaust Valve Assy

used when the distance from solenoid valve to knocker is long.

(Solenoid Valve side)

(Knocker side)



### Regulator Assy

used for individual adjustment of air pressure supplied to knocker.



N2 Tube 8 x 6



Union Connector



Service tee



Union tee



Elbow



## INSTALLATION METHOD

When wall thickness in the installation part is thin, prepare the reinforcing plate of 3.2 to 6 mm thick, and weld the center and around the whole reinforcing plate in front fillet welding to the hopper for transmitting impact force more efficiently.

Weld around the whole circumference of the base.

For the model larger than RKV60, weld accessory reinforcing rib. Usually unnecessary for RKV30P and 40P.

Tighten the body thoroughly, using accessory bolt, spring washer, and hard lock nut.

Secure the knocker by suspending with wire rope to prevent the knocker from dropping.

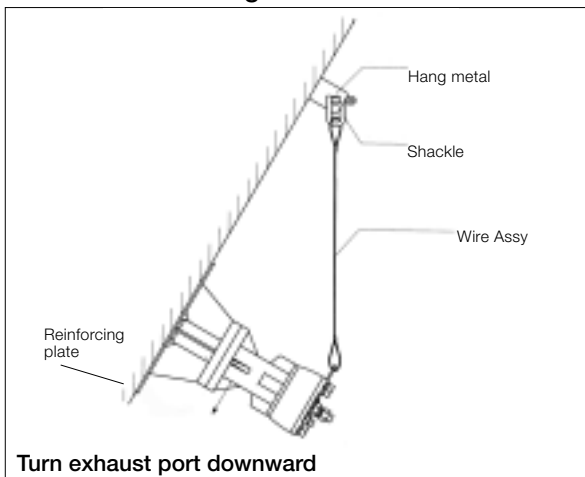
## CAUTION ON WELDING

When operating, considerable impact is given to welds. When welding, pad as much as possible to eliminate damage which may be caused.

### REINFORCING PLATE DIMENSIONS

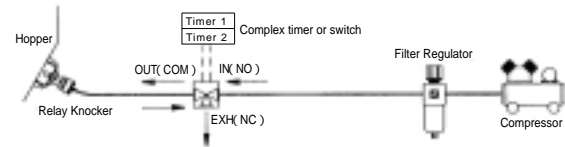
| Model    | Square Plate | Round Plate |
|----------|--------------|-------------|
| RKV30PA  | 150 x t3.2   | 150 x t3.2  |
| RKV40PA  | 200 x t3.2   | 200 x t3.2  |
| RKV60PA  | 300 x t4.5   | 300 x t4.5  |
| RKV80PA  | 400 x t4.5   | 400 x t4.5  |
| RKV100PA | 500 x t6.0   | 500 x t6.0  |

## Prevention of falling



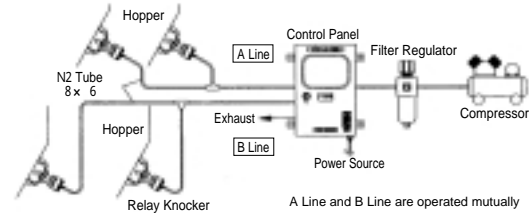
## CONTROL METHOD

### A. When use 3-way solenoid valve " AG44 "



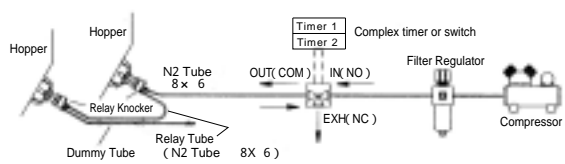
\* ( ) are symbols of " AG44 "

### B. When use control panel " HKE,HKA "



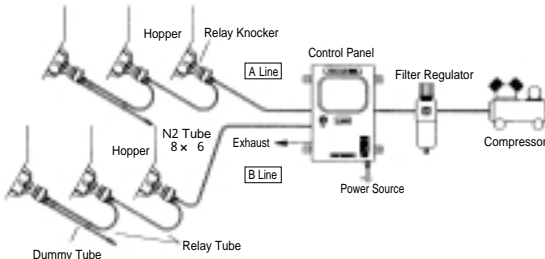
### C. When use 3-way solenoid valve " AG44 "

( Max. 5sets of knockers can be connected )



### D. When use control panel " HKE,HKA "

( Max.10 sets of knockers can be connected per line )



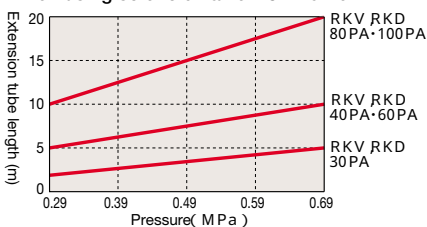
### Maximum Tube Length( m )between AOC and Kocker

|         |   |          |    |
|---------|---|----------|----|
| RKV30PA | 2 | RKV80PA  | 10 |
| RKV40PA | 3 | RKV100PA | 10 |
| RKV60PA | 8 |          |    |

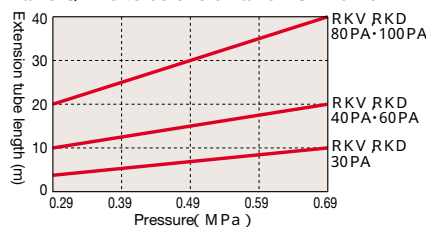
## SELECTION OF EXTENSION TUBE

Extension tube from solenoid valve to control panel uses nylon tube of outside diameter 8mm inside diameter 6mm. Perform piping not to exceed the border line shown in the following figure.

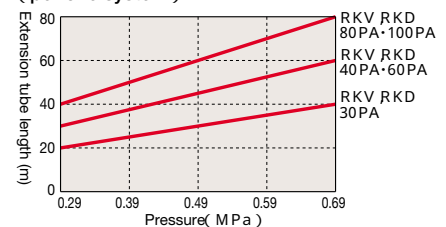
### When using solenoid valve AG44-02-3



### When using in connecting quick exhaust valve QEV-8 to solenoid valve AG44-02-3



### When using control panel HKE ( per one system )



# Blaster / Reference of installation



Incinerator plant  
Incinerator ash silo

Infusing compressed air instantaneously into the clinging material restores flow problems in silos. The use of compressed air eliminates the potential of ruining the quality of the bulk material.

Features

1. Since energy source is compressed air, safety is assured, and quality of stored material is not spoiled.
2. Easy to operate
3. Intermittent operation minimizes air consumption
4. The use of nitrogen gas instead of air prevents dust explosion



Industrial waste treatment  
Plastic piece treatment

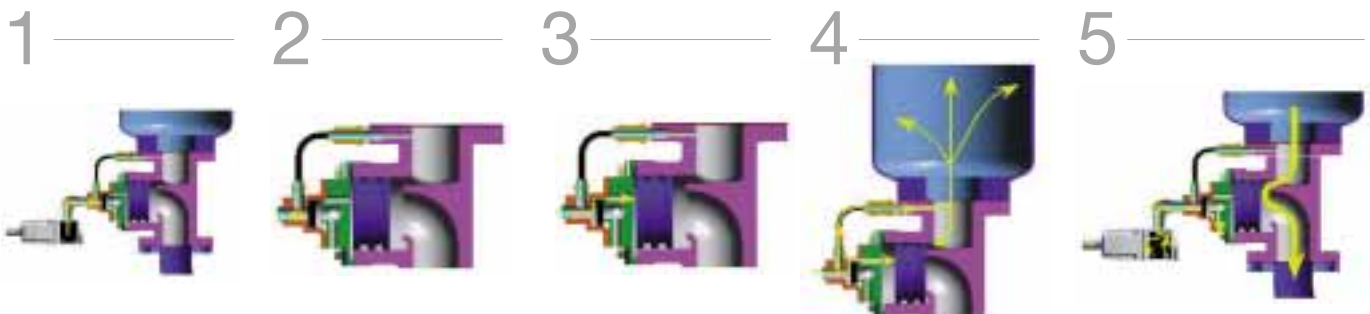


Recycling plant  
Glasses powder silo



Concrete mix plant  
Sand silo

## Operating principle



1. Mushroom valve is pushed to exhaust port when apply compressed air by use of 3-way valve.

2. Piston is pushed to injection port by compressed air that passed through valve.

3. Injection port is closed by piston that is fully pushed, then compressed air is charged into the tank through tube.

4. Air charge is finished when air pressure in the tank becomes equal to supplied air pressure.

5. Compressed air that charged in mushroom valve and piston is exhausted, then is pulled to the opposite side when change 3-way valve.  
At this time, compressed air that is charged into the tank is spouted instantaneously from injection port.



# Twin Valve Blaster



### Features

- 2 discharge ports are provided, and 2 blockades are canceled by 1 unit.
- Price is reduced while having function for 2 units.
- The greatest effect is acquired by the minimum space.

### SPECIFICATIONS

| Model      | Outlet dia. (inch) | Tank capacity (Liter) | Working pressure (Mpa) | Available gas                  | Coating             |               | Weight (kg) |
|------------|--------------------|-----------------------|------------------------|--------------------------------|---------------------|---------------|-------------|
|            |                    |                       |                        |                                | Outer surface       | Inner surface |             |
| EDB2.5-20T | 2.5                | 20                    | 0.3 - 0.7              | Compressed air or Nitrogen gas | Epoxy resin coating |               | 57          |
| EDB2.5-30T | 2.5                | 30                    |                        |                                |                     |               | 58          |
| EDB4-60T   | 4.0                | 60                    |                        |                                |                     |               | 114         |
| EDB4-130T  | 4.0                | 130                   |                        |                                |                     |               | 134         |
| EDB6-230T  | 6.0                | 230                   |                        |                                |                     |               | 231         |

# Direct Blaster



EDB2.5-20

EDB2.5-30

EDB4-60

EDB4-130

EDB6-230

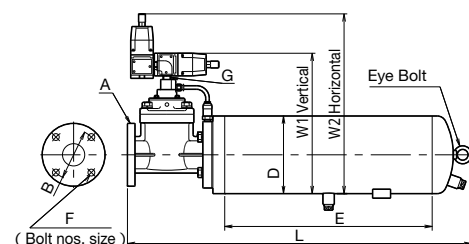
EDB2.5-20S  
EDB2.5-30S  
Stainless steel Blaster

### SPECIFICATIONS

| Model      | Outlet dia. (inch) | Tank capacity (Liter) | Working pressure (Mpa) | Available gas                  | Coating             |                     | Weight (kg) |
|------------|--------------------|-----------------------|------------------------|--------------------------------|---------------------|---------------------|-------------|
|            |                    |                       |                        |                                | Outer surface       | Inner surface       |             |
| EDB2.5-20  | 2.5                | 20                    | 0.3 - 0.7              | Compressed air or Nitrogen gas | Epoxy resin coating |                     | 38          |
| EDB2.5-30  | 2.5                | 30                    |                        |                                |                     |                     | 42          |
| EDB4-60    | 4.0                | 60                    |                        |                                |                     |                     | 81          |
| EDB4-130   | 4.0                | 130                   |                        |                                |                     |                     | 103         |
| EDB6-230   | 6.0                | 230                   |                        |                                |                     |                     | 168         |
| EDB2.5-20S | 2.5                | 20                    |                        |                                | SUS304 (SS304)      | SUS304 #200 buffing | 30          |
| EDB2.5-30S | 2.5                | 30                    | 32                     |                                |                     |                     |             |

### DIMENSIONS CHART (mm)

| Model     | Outlet Dia. |     |       | L    | W1  | W2  | Tank size |      | Inlet G    | Eye Bolt |
|-----------|-------------|-----|-------|------|-----|-----|-----------|------|------------|----------|
|           | A           | B   | F     |      |     |     | D         | E    |            |          |
| EDB2.5-20 | 65A         | 140 | 4-M16 | 959  | 390 | 500 | 216       | 566  | 15A (1/2B) | M12      |
| EDB2.5-30 |             |     |       | 949  | 417 | 527 | 267       | 494  |            | M16      |
| EDB4-60   | 100A        | 175 | 8-M16 | 1296 | 494 | 604 | 319       | 712  |            | M16      |
| EDB4-130  |             |     |       | 1338 | 566 | 676 | 462       | 685  |            | M20      |
| EDB6-230  | 150A        | 240 | 8-M20 | 1779 | 664 | 774 | 512       | 1011 |            | M20      |



# Stainless Steel Mini Blaster

Features

1. Compact design and lightweight
2. Easy installation and removal
3. Durable simple structure allows easy maintenance
4. Using stainless steel material as standard specification

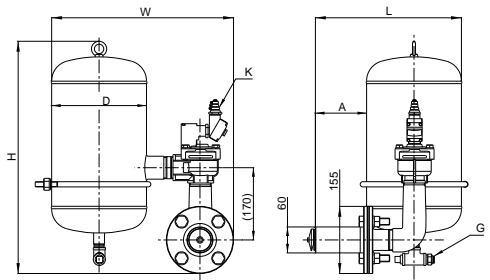


SPECIFICATIONS

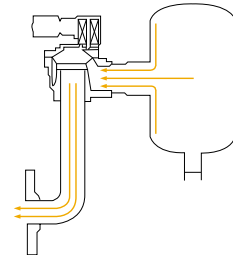
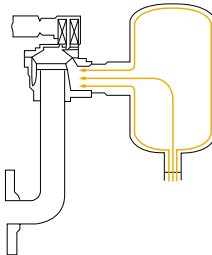
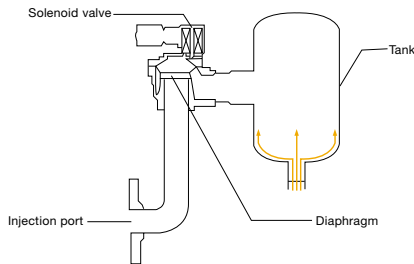
| Model          | Outlet dia. (inch) | Valve port | Valve voltage          | Working pressure (Mpa) | Available gas                  | Tank capacity (Liter) | Material |                | Weight (kg) |
|----------------|--------------------|------------|------------------------|------------------------|--------------------------------|-----------------------|----------|----------------|-------------|
|                |                    |            |                        |                        |                                |                       | Valve    | Tank           |             |
| EMB 1.5 - 3 A  | 1.5                | 2          | 100V/200V single phase | 0.1 - 0.7              | Compressed air or Nitrogen gas | 3                     | ADC12    | SUS304 (SS304) | 10.2        |
| EMB 1.5 - 6 A  |                    |            |                        |                        |                                | 6                     |          |                | 12.4        |
| EMB 1.5 - 10 A |                    |            |                        |                        |                                | 10                    |          |                | 17.8        |

DIMENSIONS CHART (mm)

| Model          | A   | C   | H   | W   | L   | Inlet port G | Wiring port K |
|----------------|-----|-----|-----|-----|-----|--------------|---------------|
| EMB 1.5 - 3 A  | 160 | 133 | 425 | 340 | 295 | 10<br>15A    | G1/2          |
| EMB 1.5 - 6 A  |     |     | 645 |     |     |              |               |
| EMB 1.5 - 10 A | 120 | 219 | 540 | 425 | 338 | ( 1/2B )     |               |



Operating principle



1. Diaphragm blocks up the injection port at the condition of the power source of the solenoid valve " OFF ", and compressed air is supplied in the tank.

2. The supplied compressed air is charged into the tank, the piping and the solenoid valve. Air charge is finished when air pressure in the tank, the piping and the solenoid valve becomes equal to supplied air pressure.

3. When the power source of the solenoid valve is turned " ON ", the diaphragm will separate from the injection port. At this time, compressed air in the tank is spouted instantaneously from the injection port.

Calculation method for air volume required

$$V = \frac{V_0 \times (0.1 + P)}{M} \times 10$$

V : Required Air volume ( NL / min )

V<sub>0</sub> : Total Tank Capacity ( ℓ ) of Blaster

P : Working Pressure ( MPa )

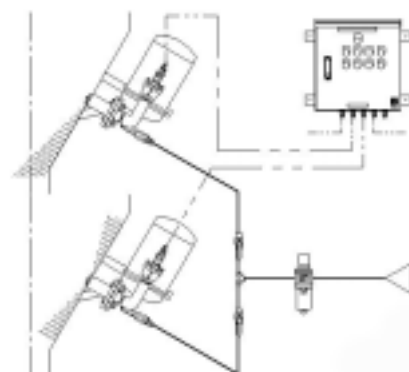
M : Operation Cycle ( min )

( Example ) in case of using 6 nos. EDB2.5-30 at 0.69Mpa of working pressure, 5 minutes interval.

$$V = \frac{30 \times 6 \times (0.1 + 0.7) \times 10}{5} = 288 \text{ ( NL / min )}$$

( Available in 2.2 KW compressor )

Installation reference for Mini Blaster

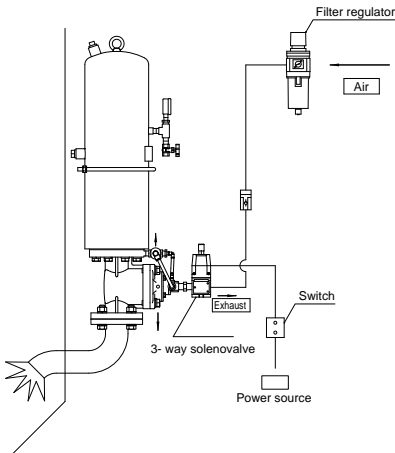


# Example for use

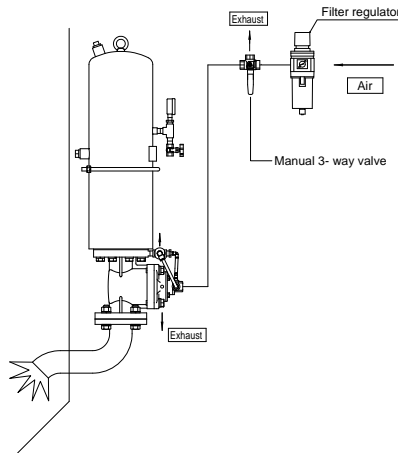
## For Direct Blaster

More than one units of direct blaster can be controlled remotely by using control panel. In case of one unit only, any of manual or electric operation is available. If there is danger of dust explosion in electric control, safe operation can be achieved by changing 3-way solenoid valve to air type.

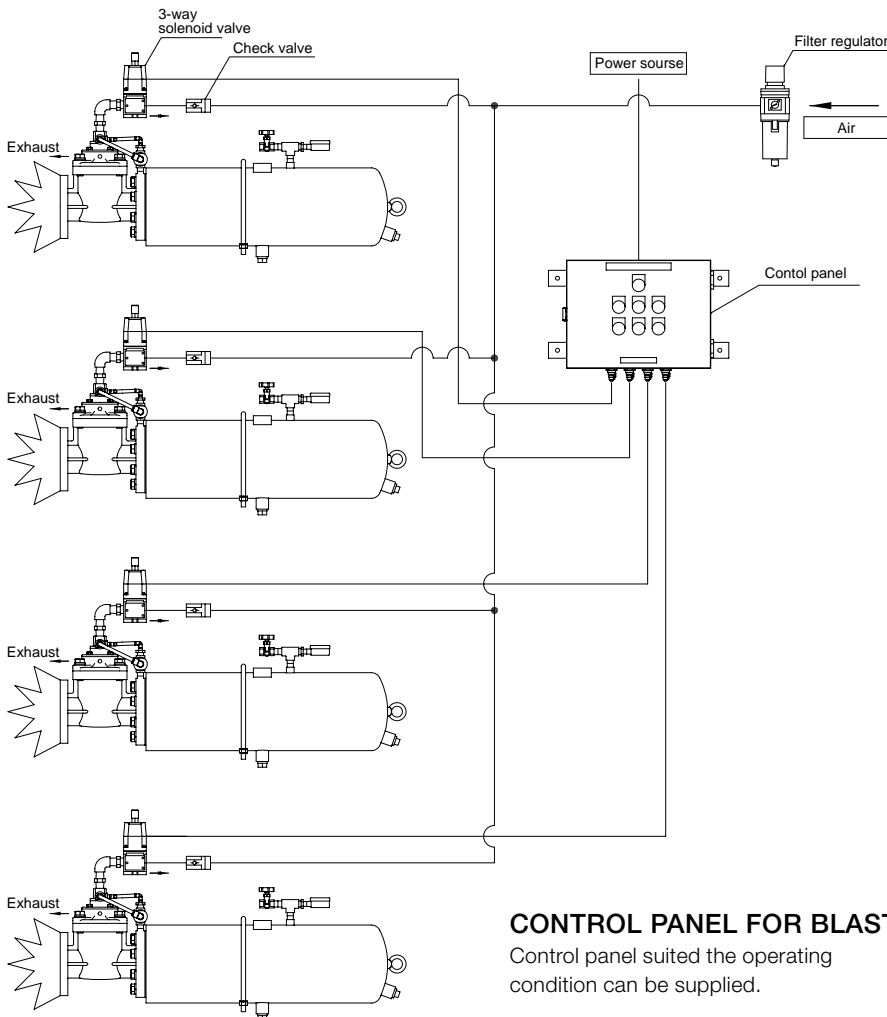
### REMOTE CONTROL



### MANUAL CONTROL

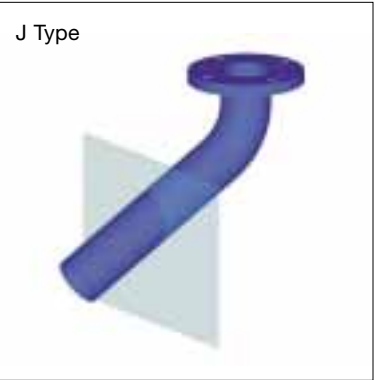


### ELECTRIC



**CONTROL PANEL FOR BLASTER**  
Control panel suited the operating condition can be supplied.

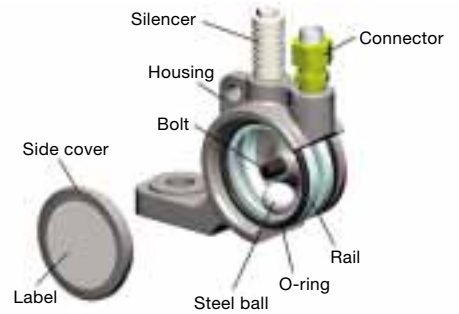
## NOZZLE( Optional )



# Pneumatic Ball Vibrator Series



Pneumatic rotary ball vibrators generate powerful centrifugal force by the high speed rotation of a chrome steel ball driven by compressed air. The force and speed of these units can easily be adjusted by adjusting the input air pressure. These units are available in 3 different cast iron styles, BH, CH, UH and in a polycarbonate UP series providing a variety of selections to fit most applications.



**BH8  
BH10A  
BH19A**



**CH19A  
CH25A  
CH32A**



**UH13A  
UH19A  
UH25A**



**UP Plastic  
ball vibrator**

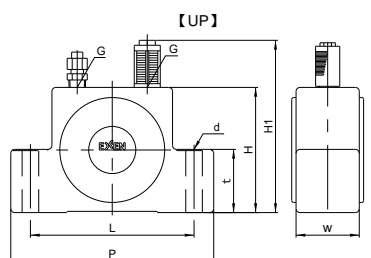
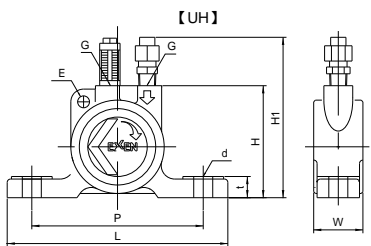
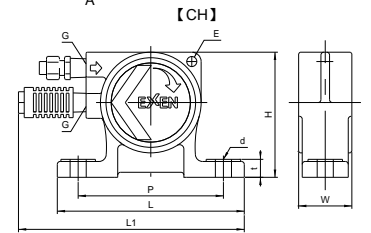
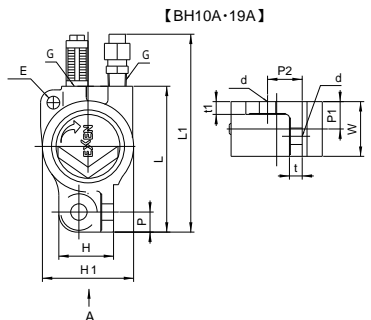
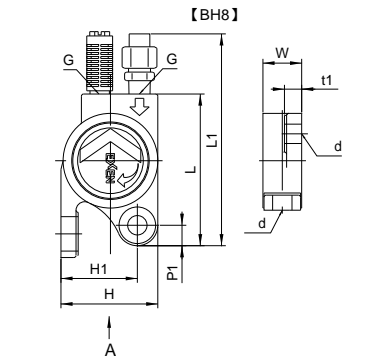
## SPECIFICATIONS

| Model | Required to start (Mpa) |       | Frequency (Hz) - Centrifugal force (kN) - Air consumption (m³/min) |      |         |        |      |         | Weight (kg) |
|-------|-------------------------|-------|--|------|---------|--------|------|---------|-------------|
|       | Vert.                   | Horz. | 0.2Mpa   |      |         | 0.6Mpa |      |         |             |
|       |                         |       | Hz   | kN   | Nm³/min | Hz     | kN   | Nm³/min |             |
| BH8   | 0.02                    | 0.01  | 322  | 0.09 | 0.04    | 499    | 0.22 | 0.10    | 0.3         |
| BH10A | 0.03                    |       | 285  | 0.13 | 0.07    | 451    | 0.33 | 0.17    | 0.5         |
| BH19A | 0.06                    | 0.02  | 174  | 0.60 | 0.14    | 259    | 1.33 | 0.37    | 1.1         |
| CH19A |                         |       | 162  | 0.52 | 0.13    | 240    | 1.15 | 0.35    | 1.2         |
| CH25A | 0.11                    | 0.02  | 110  | 0.79 | 0.17    | 164    | 1.76 | 0.43    | 2.6         |
| CH32A | 0.20                    |       | -  | -    | -       | 137    | 2.11 | 0.40    | 2.4         |
| UH13A | 0.03                    |       | 0.01   | 264  | 0.30    | 0.11   | 383  | 0.63    | 0.28        |
| UH19A | 0.06                    | 0.02  | 163  | 0.53 | 0.13    | 246    | 1.20 | 0.34    | 1.2         |
| UH25A | 0.13                    |       | 110  | 0.67 | 0.11    | 162    | 1.46 | 0.28    | 1.9         |
| UP110 | 0.03                    |       | 0.03   | 303  | 0.17    | 0.13   | 423  | 0.33    | 0.33        |
| UP113 | 0.07                    | 0.04  | 260  | 0.25 | 0.18    | 364    | 0.49 | 0.31    | 0.9         |
| UP216 |                         |       | 158  | 0.29 |         | 243    | 0.69 |         |             |
| UP219 |                         |       | 137  | 0.34 |         | 216    | 0.84 |         |             |
| UP325 | 0.13                    | 0.03  | 92   | 0.46 | -       | 162    | 1.43 | -       | 1.4         |
| UP335 | 0.23                    |       | 96   | 0.96 | 0.19    | 146    | 2.22 | 0.44    | 1.5         |
| UP441 | 0.27                    |       | -  | -    | -       | 97     | 3.66 | 0.88    | 3.4         |
| UP451 | 0.48                    | 0.03  | -  | -    | -       | 85     | 4.47 | 1.04    | 3.6         |

## DIMENSIONS CHART (mm)

| Model | L   | L1      | H     | H1    | W  | t    | t1  | P   | P1 | P2   | d       | E | G    |   |   |   |   |   |   |   |
|-------|-----|---------|-------|-------|----|------|-----|-----|----|------|---------|---|------|---|---|---|---|---|---|---|
| BH8   | 76  | (105)   | 45    | 35.5  | 18 | 8.5  | 8.5 | 11  | 15 | 12.5 | ∅(M8)   | - | 1/8B |   |   |   |   |   |   |   |
| BH10A | 80  | (109)   | 30    | 51    | 30 | 7    | 7   |     | 19 | 19   |         |   |      |   |   |   |   |   |   |   |
| BH19A | 110 | (148)   | 40    | 70    | 37 | 14   | 11  | 14  | 24 | 27   | 11(M10) | 7 | 1/4B |   |   |   |   |   |   |   |
| CH19A | 130 |         | 87    | -     | -  | 12.5 | -   |     | -  | -    |         |   |      | - |   |   |   |   |   |   |
| CH25A | 135 | (159.5) | 106.5 | -     | 51 | 15.5 | -   | 101 | -  | -    | 13(M12) | - | -    |   |   |   |   |   |   |   |
| CH32A |     |         |       |       |    |      |     |     |    |      |         |   |      | - | - | - | - | - | - | - |
| UH13A | 130 | -       | 66    | (95)  | 29 | 12.5 | -   | -   | -  | -    | 11(M10) | - | 1/8B |   |   |   |   |   |   |   |
| UH19A | 128 | -       | 84    | (122) | 37 |      |     |     |    |      |         |   |      | - | - | - | - |   |   |   |
| UH25A | 160 | -       | 100   | (138) | 41 | 15.5 | -   | 126 | -  | -    | 13(M12) | - | 1/4B |   |   |   |   |   |   |   |
| UP110 | 126 | -       | 67    | 96    | 34 | 33   | -   | 101 | -  | -    | 10(M8)  | - | 1/8B |   |   |   |   |   |   |   |
| UP113 | 141 | -       | 87    | 123   | 45 | 41   | -   | 115 | -  | -    | 12(M10) | - | -    |   |   |   |   |   |   |   |
| UP216 |     |         |       |       |    |      |     |     |    |      |         |   |      | - | - | - | - | - | - | - |
| UP219 |     |         |       |       |    |      |     |     |    |      |         |   |      | - | - | - | - | - | - | - |
| UP325 | 164 | -       | 101   | 137   | 56 | 51   | -   | 132 | -  | -    | 13(M12) | - | -    |   |   |   |   |   |   |   |
| UP335 |     |         |       |       |    |      |     |     |    |      |         |   |      | - | - | - | - | - | - | - |
| UP441 | 225 | -       | 155   | 204   | 70 | 78   | -   | 187 | -  | -    | 16(M14) | - | 1/2B |   |   |   |   |   |   |   |
| UP451 |     |         |       |       |    |      |     |     |    |      |         |   |      | - | - | - | - | - | - | - |

Note: Please must use lubricator since it is especially important to maintain the performance of ball vibrator.

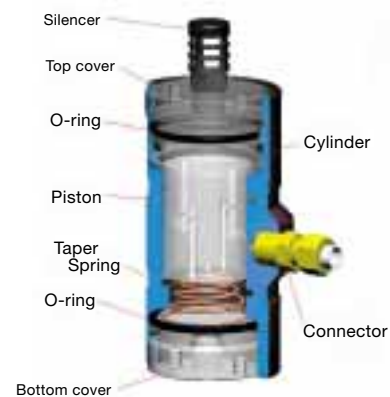


# Piston Vibrator Series



### Features ( EPV Model )

1. Low noise, Low air consumption, Eco-friendly oil free design.
2. The liner vibration allows applying it to vibration feeder or vibration filling.
3. Installation can be made by one bolt.



### SPECIFICATIONS

| Model  | Working pressure (Mpa) | Frequency (HZ) | Centrifugal force (N) | Air consumption (NL/min) | Total length (mm) | Vibration area (mm) | Bolt size | Weight (kg) |
|--------|------------------------|----------------|-----------------------|--------------------------|-------------------|---------------------|-----------|-------------|
| EPV18  | 0.2 - 0.6              | 102 - 149      | 66 - 186              | 17 - 62                  | 116               | 38                  | M10       | 0.34        |
| EPV18L |                        | 58 - 93        | 82 - 265              | 15 - 54                  | 153               |                     |           | 0.48        |
| EPV35  |                        | 78 - 117       | 304 - 778             | 45 - 145                 | 138               | 56                  | M12       | 1.03        |
| EPV35L |                        | 51 - 73        | 347 - 921             | 44 - 125                 | 184               |                     |           | 1.48        |



### SPECIFICATIONS

| Model | Working pressure (Mpa) | Frequency (HZ) | Centrifugal force (N) | Air consumption (NL/min) | Total length (mm) | Vibration area L x W (mm) | Coupling specification | Installation method | Weight (kg) |
|-------|------------------------|----------------|-----------------------|--------------------------|-------------------|---------------------------|------------------------|---------------------|-------------|
| PSA   | 0.3 - 0.6              | 79 - 110       | 160 - 300             | 110 - 310                | 107               | 65 x 110                  | 1/4B x 11.0            | Holder              | 1.4         |
| PLA   |                        | 53 - 70        | 410 - 710             | 180 - 500                | 148               | 65 x 190                  | 1/4B x 13.5            | Holder or Bolt      | 4.1         |

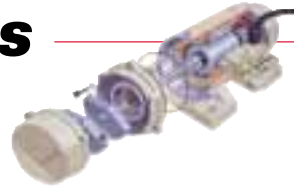
Note: Please must use lubricator since it is especially important to maintain the performance of ball vibrator. ( For Model PS, PL )

# Vibration Motor Series

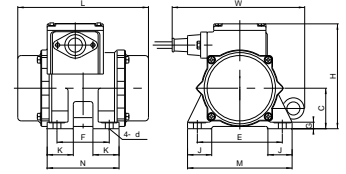
Vibration motors generate powerful centrifugal vibration by the rotation of the eccentric weight on both ends of the rotor shaft of 3-phase induction motor.

**Features**

- 1.Capable of installing even in dusty places because of totally enclosed structure, and also hardly generating noise in the motor itself.
- 2.Easily making possible non-step adjustment of centrifugal force from 0 to 100% by moving eccentric weight except KM2.8S-2P.
- 3.Capable of installing in every direction and at every angle.



**KMA**



**SPECIFICATIONS**

| Model     | Output (W) | Voltage (V)      | Current |      | Input Frequency (Hz) | Frequency (Hz) | Centrifugal force |      | Set bolt (mm) | Weight (kg) |
|-----------|------------|------------------|---------|------|----------------------|----------------|-------------------|------|---------------|-------------|
|           |            |                  | 50Hz    | 60Hz |                      |                | 50Hz              | 60Hz |               |             |
| KM3S-2PC  | 30         | 100 single phase | 0.70    | 0.85 | 50/60                | 47.4/58.8      | 0.49              | 0.71 | 8             | 5.3         |
| KM10S-2PC | 100        |                  | 2.00    | 1.70 |                      | 47.5/56.5      | 1.08              | 1.57 | 12            | 10.0        |

| Model      | Output (W) | Voltage (V)  | Current (A) | Input Frequency (Hz) | Frequency (Hz) | Centrifugal force |             | Hopper thickness (mm) | Set bolt (mm) | Weight (kg) |
|------------|------------|--------------|-------------|----------------------|----------------|-------------------|-------------|-----------------------|---------------|-------------|
|            |            |              |             |                      |                | 50Hz              | 60Hz        |                       |               |             |
| KMA 1-2    | 75         | 200 3-phases | 0.55        | 0.83                 | 47.5/57.5      | 0.98              | 0.98        | 2.0 - 3.2             | 8             | 7.8         |
| KMA 2-2    | 150        |              | 1.96        |                      |                | 1.96              | 3.2 - 4.5   | 10                    | 10.3          |             |
| KMA 3.5-2  | 250        |              | 3.43        |                      |                | 3.43              | 4.5 - 6.0   | 12                    | 14.7          |             |
| KM2.8S-2PA | 28         |              | 0.23        |                      |                | 0.25              | 0.35        | 1.6 - 2.3             | 8             | 2.7         |
| KM2.8-2PA  |            |              |             |                      |                |                   |             |                       |               |             |
| KM5-2PA    | 50         |              | 0.49        |                      |                | 0.71              | 1.6 - 3.2   | 10                    | 5.5           |             |
| KM10-2PA   | 100        |              | 0.98        |                      |                | 1.42              | 2.0 - 3.2   | 12                    | 7.9           |             |
| KM20-2PA   | 200        |              | 1.96        |                      |                | 2.84              | 3.2 - 4.5   |                       | 11.0          |             |
| KM25-2PA   | 250        |              | 2.45        |                      |                | 3.53              | 3.2 - 4.5   |                       | 14.6          |             |
| KM40-2PA   | 400        |              | 3.92        |                      |                | 5.69              | 4.5 - 6.0   | 16                    | 25.7          |             |
| KM55-2PA   | 550        |              | 5.39        |                      |                | 7.85              | 6.0 - 9.0   |                       | 34.0          |             |
| KM75-2PA   | 750        |              | 7.35        |                      |                | 10.60             | 9.0 - 12.0  | 18                    | 42.0          |             |
| KM110-2PA  | 1,100      |              | 10.80       |                      |                | 15.70             | 12.0 - 16.0 |                       | 62.0          |             |
| KM170-2PA  | 1,700      |              | 22.60       |                      |                | 22.60             | -           | 24                    | 82.0          |             |
| KM300-2PA  | 3,000      |              | 39.20       |                      |                | 39.20             | -           |                       | 120.0         |             |
| KM10-4PA   | 100        | 200 3-phases | 0.75        | 50/60                | 24.2/29.2      | 2.45              | -           | -                     | 12            | 20.5        |
| KM20-4PA   | 200        |              | 1.10        |                      |                | 4.90              |             |                       | 16            | 30.0        |
| KM40-4PA   | 400        |              | 2.10        |                      |                | 7.85              |             |                       | 18            | 49.0        |
| KM75-4PA   | 750        |              | 3.40        |                      |                | 15.70             |             |                       | 24            | 83.0        |
| KM150-4PA  | 1,500      |              | 7.60        |                      |                | 27.50             |             |                       | 30            | 135.0       |
| KM220-4PA  | 2,200      |              | 11.70       |                      |                | 39.20             |             |                       |               | 173.0       |

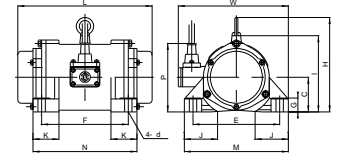
Any Voltage available ( KMA, KM-2PA, KM-4PA )

**DIMENSIONS CHART(mm)**

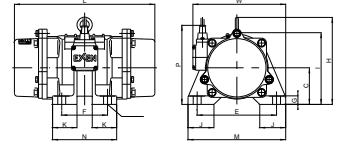
| Model      | E   | F   | G  | H   | I   | J   | K   | L   | M   | N   | W   | P    | P   | C    | d    |
|------------|-----|-----|----|-----|-----|-----|-----|-----|-----|-----|-----|------|-----|------|------|
| KM3S-2PC   | 120 | 120 | 15 | 136 |     | 35  | 37  | 201 | 144 | 144 | 178 | -    |     | 47   | 10.0 |
| KM10S-2PC  | 160 | 160 |    | 170 |     | 50  | 50  | 218 | 190 | 190 | 201 | -    |     | 65   | 14.0 |
| KMA 1-2    | 120 | 40  | 9  | 148 |     | 35  | -   | 195 | 145 | 65  | 176 | -    |     | 56   | 10.0 |
| KMA 2-2    | 130 | 80  | 10 | 162 |     | 37  | 40  | 200 | 160 | 110 | 202 | -    |     | 62   | 12.0 |
| KMA 3.5-2  | 150 | 90  | 12 | 178 |     | 40  | 40  | 243 | 180 | 120 | 207 | -    |     | 71   | 13.0 |
| KM2.8S-2PA | 105 | 60  | 10 | 113 | 40  | 27  | 141 | 125 | 80  | 149 | 162 | -    | -   | 42   | 8.5  |
| KM2.8-2PA  |     |     |    |     |     |     |     |     |     |     |     |      |     | 123  | 35   |
| KM5-2PA    | 125 | 125 | 22 | 136 | 40  | 50  | 243 | 170 | 170 | 197 | 161 | 161  | 72  | 14.0 |      |
| KM10-2PA   | 140 | 140 | 25 | 167 | 42  | 65  | 235 | 200 | 190 | 225 | 162 | 162  | 76  | 14.0 |      |
| KM20-2PA   | 160 | 160 |    | 151 | 276 | 200 | 224 | 200 | 224 | 162 | 80  | 17.0 |     |      |      |
| KM25-2PA   | 200 | 200 | 34 | 218 | 177 | 60  | 310 | 240 | 240 | 254 | 164 | 164  | 82  | 20.0 |      |
| KM40-2PA   | 215 | 215 | 37 | 223 | 182 | 42  | 65  | 330 | 255 | 255 | 266 | 172  | 90  | 20.0 |      |
| KM55-2PA   | 230 | 230 |    | 241 | 199 | 50  | 70  | 345 | 280 | 280 | 286 | 187  | 187 | 105  | 26.0 |
| KM75-2PA   | 250 | 170 | 42 | 269 | 227 | 80  | 60  | 388 | 310 | 230 | 316 | 187  | 120 | 26.0 |      |
| KM110-2PA  | 260 | 150 | 28 | 285 | 234 | 85  | 80  | 460 | 320 | 210 | 305 | 272  | 140 | 32.0 |      |
| KM170-2PA  | 310 | 170 | 33 | 330 | 279 | 90  | 96  | 500 | 390 | 250 | 351 | 300  | 160 | 87   | 14.0 |
| KM300-2PA  | 160 | 90  | 20 | 175 |     | 58  | 47  | 316 | 190 | 125 | 222 | 170  | 187 | 95   | 17.0 |
| KM10-4PA   | 190 | 110 |    | 192 |     | 65  | 55  | 354 | 230 | 150 | 248 | 178  | 187 | 110  | 20.0 |
| KM20-4PA   | 240 | 140 | 28 | 231 |     | 80  | 60  | 414 | 290 | 190 | 293 | 190  | 212 | 110  | 20.0 |
| KM40-4PA   | 300 | 165 |    | 315 | 264 | 70  | 70  | 434 | 350 | 215 | 342 | 263  | 267 | 140  | 26.0 |
| KM75-4PA   | 345 | 180 | 31 | 349 | 298 | 95  | 80  | 509 | 410 | 245 | 386 | 299  | 295 | 150  | 32.0 |
| KM150-4PA  | 370 | 210 | 36 | 396 | 336 |     |     | 554 | 435 | 275 | 413 | 319  | 336 | 170  | 170  |

**KM40-2PA**

[KM-2PA]

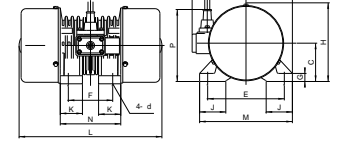


[KM170/300-2PA]

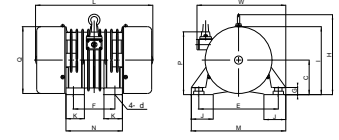


**KM40-4PA**

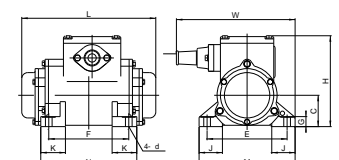
[KM10 ~ 40-4PA]



[KM75 ~ 220-4PA]



**KM3S-2PC**



# Survey for EXEN flow aid system

|  |  |
|--|--|
| <b>Name of company</b>   |  |
| <b>Address</b>   | <b>Phone No.</b>   |
| <b>E-mail address</b>  | <b>Fax No.</b>   |
| <b>Section</b>   | <b>Responsible person</b>  |
| <b>Material</b>  | Name   |
|  | Specific gravity ( ) g/m <sup>3</sup> Temperature ( )  |
|  | Moisture content %      Grading ( ) ~ ( ) m/m, μm, mesh  |
|  | Fluidity      Good      or      Normal      or      Bad      ( )   |
|  | Adhesion      Strong      or      Middle      or      Weak      ( )  |
|  | Any problem cause to the material by blowing compressed air into the material?      Yes      or      No      ( )                 |
|  | If Yes, the reason   |
| <b>Storage tank</b>  | Name   |
|  | Establishes      Newly      or      Existing      ( )  |
|  | Shape structure      Round      or      Square      or      Other      ( )   |
|  | Capacity      ( ) t , ( ) m <sup>3</sup> , ( ) L   |
|  | Board thickness ( ) mm      Material      SS or      SUS or      Other      ( )  |
|  | Inner lining      Yes      or      No      ( )      If yes   |
| <b>Installation place</b>  | I      Indoor      or      Outdoor      ( )      II      High humidity      Dusty      Special area      Anti-explosion      ( ) |
|  | Temperature      Summertime      ( )      Wintertime      ( )  |
|  | Power supply      ( ) / ( ) V/Hz      Phase      ( )   |
| <b>Compressor</b>  | Yes      No      Newly install      ( )      Normal pressure      ( ) Mpa  |
|  | Air consumption      ( ) kw , L/min      Rate used for other equipments      ( ) %   |
| <b>Trouble phenomenon</b>  | Bridging      Natural cling and adhesion of bulk material      Possibility of generating gas                                     |
|  | Arching      Clogging when starting discharge      Injurious material  |
|  | Rat hole      Clogging gradually, after starting discharge      Dusty bulk material  |
|  | Funnel      Clogging due to freezing      High hygroscopic ( )   |
|  | Clinging to wall surface      Easily influenced depending on the charge of atmospheric condition                                 |
| <b>Present measurement</b>   | Screw system      Vibration motor      Air      Diaphragm  |
|  | Manual * How:      * e.g: Size of hammer used ( ) kg., lb.      Other      ( )   |
| <b>The supplies injection method</b>   | continuation<br>intermittence  |
|  | Belt conveyer      Feeder      Bucket loader      Elevator      Dump track      Chute<br>Crane      Others:      ( )             |
| <b>The supplies discharge method</b>   | continuation<br>intermittence  |
|  | Screw conveyer      Belt conveyer      Feeder      Freight car      Hopper car<br>Others:      ( )                               |
| <b>Drawing and/or sketch of bin, hopper etc.:</b>  |  |
| *Submission of a detailed drawing of silo separately is recommended for our suggestion of installation position. |  |
| <b>Request items:</b>  |  |
| Model selection  |  |
| Recommendation for installation position   |  |
| Price estimate   |  |
| Specifications ( )   |  |
| Specified color:      Yes      No<br>( )   |  |
| Others   |  |

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## **EXEN helps you to eliminate your material flow problems.**

When discharging stored material from your bin or hopper,  
do you experience problems such as bridging,  
arching, rat holes, or funnels?

Effective utilization of raw material handling can be experienced  
by using the principle " First In, First Out " .

At EXEN, it is our goal to help you optimize this principle  
with the use of products such as the EXEN Direct Blaster,  
Pneumatic Vibration Knocker,  
and electric Vibration Motors.

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