

TORCAL

SOLIMAR

Air Knocker

Original Pneumatic Hammering Technology

Sticky and compacted material is loosened by the impact of the Knocker piston with adjustable force provided by variable air pressure.

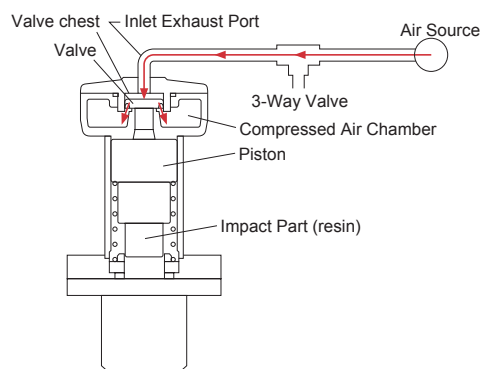
Design Features

- Impact force can be adjusted by input pressure. 44-102 PSI (0.3-0.7MPa)
- Relay piping function allows operation of multiple Knockers by one controlling valve.
- Simple design, excellent durability and easy maintenance.
- Simple working principle eliminates complicated operating circuits. Remote operation is also easy.

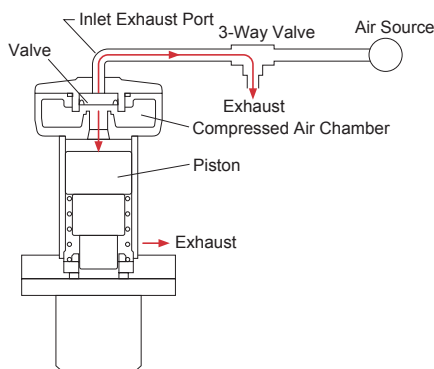


Operating Principle

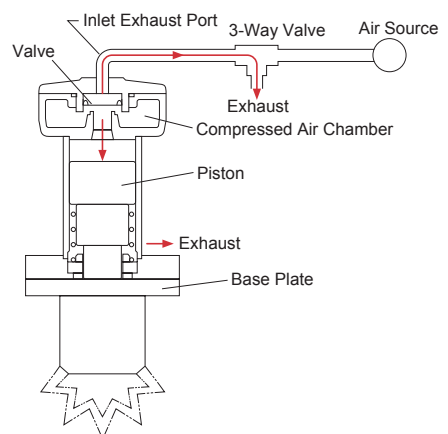
- 1** Compressed air delivered to Knocker is supplied into the valve chest, which pushes the valve down.



- 2** The 3-way valve exhausts air and compressed air in the chamber closes the valve.



- 3** As the valve moves, compressed air in the chamber forces piston down on the base plate, which results in vibration that eliminates clinging materials.



Knocker Models & Specifications

Indirect Impact Type

APPLICATIONS:

- Sewage sludge fuel production facilities
- Dust hopper in waste treatment plants
- Recycle fuel (compressed wood) supply hoppers
- Glass cullet storage hoppers
- Livestock forage silos
- Ejection of silica gel
- Calcination of raw material on walls
- Ash in recycling plants and ejection of aluminum powder
- Piping in pharmaceutical plants



KNR-20



KNR-30 / KNR-40



KNR-60 / KNR-80



KNR-100

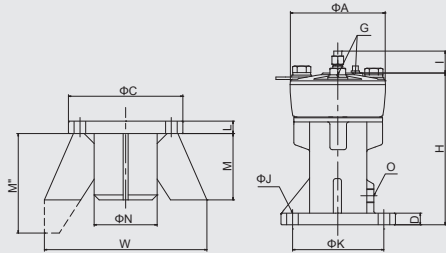
Model	Working Pressure (PSI)	Stroke Cycle (cycle/min)	Air Consumption (cf/cycle)	Stroke Energy (lbf • ft)	Impulsive Force		Weight (lb)
					ft • lbf/s	Converts into Hammer pound (lb)	
KNR-20	44 - 102	1 - 60	0.001 - 0.004	3.2 - 6.1	4.3 - 5.8	Below 0.6	1.8
KNR-30			0.002 - 0.005	4.1 - 9.7	8.7 - 13.0	Below 1.0	3.1
KNR-40			0.005 - 0.013	6.8 - 16.4	18.8 - 28.9	1.0 - 1.5	7.7
KNR-60			0.012 - 0.027	15.2 - 36.1	49.9 - 76.7	1.5 - 3.0	20.5
KNR-80			0.021 - 0.049	33.3 - 80.4	109.9 - 171.4	3.0 - 8.0	32.0
KNR-100			0.034 - 0.080	60.8 - 148.3	217.0 - 339.2	6.0 - 15.0	75.1

Weight includes base.

Dimensions Table (inches)

Model	ΦA	ΦC	D	ΦE	F	G	H	I	ΦJ
KNR-20	2.25	2.25	0.25	-	-	0.13	2.75	{1.02}	0.25
KNR-30	2.59	2.75	0.31	-	-		3.73		0.33
KNR-40	3.39	3.73	0.47	-	-		5.52		0.48
KNR-60	4.53	5.44	0.55	-	-	0.25	7.2	{1.11}	0.58
KNR-80	5.75	5.83	0.63	-	-		8.73		0.67
KNR-100	6.89	8.19	0.78	-	-		10.63		0.83
KNR-30-DI	2.59	2.75	0.31	0.59	1.5	0.13	3.73	{0.98}	0.33
KNR-40-DI	3.39	3.73	0.47	0.92	2.17		5.52		0.48
KNR-60-DI	4.53	5.44	0.55	1.38	2.56		7.2		0.58
KNR-80-DI	5.75	5.83	0.63	1.88	2.36	0.25	8.73	{1.11}	0.67
KNR-100-DI	6.89	8.19	0.78	2.14	1.97		10.63		0.83

M" means curve surface dimension



Direct Impact Type

APPLICATIONS:

- Remove material from molds
- Rotary driers
- Powdered paint
- Furnaces



KNR-30-DI / KNR-40-DI



KNR-60-DI / KNR-80-DI

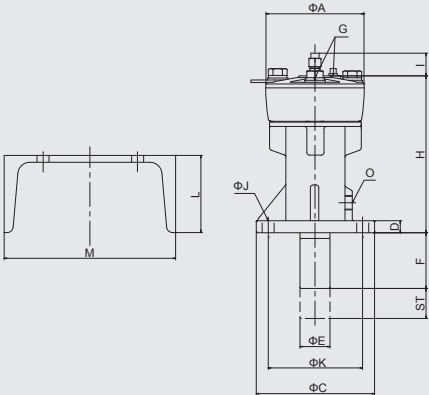


KNR-100-DI

Model	Working Pressure (PSI)	Stroke Cycle (cycle/min)	Air Consumption (cf/cycle)	Stroke Energy (lbf • ft)	Impulsive Force		Weight (lb)
					ft • lbf/s	Converts into Hammer pound (lb)	
KNR-30-DI	44 - 102	1 - 60	0.002 - 0.005	4.1 - 9.7	8.7 - 13.0	Below 1.0	4.6
KNR-40-DI			0.005 - 0.013	6.8 - 16.4	18.8 - 28.9	1.0 - 1.5	12.3
KNR-60-DI			0.012 - 0.027	15.2 - 36.1	49.9 - 76.7	1.5 - 3.0	28.9
KNR-80-DI			0.021 - 0.049	33.3 - 80.4	109.9 - 171.4	3.0 - 8.0	40.6
KNR-100-DI			0.034 - 0.080	60.8 - 148.3	217.0 - 339.2	6.0 - 15.0	78.3

Weight includes base.

ΦK	ST	L	M	M"	ΦN	O	W	Tube Size				
1.73	-	0.23	1.11	-	0.86	Rp1/8	-	Φ1/4 × Φ1/8				
2.17	-	0.31	1.38	-	1.09	Rp1/4		Φ5/16 × Φ1/4				
2.75	-	0.52	2.36	-	1.34							
4.33	-	0.59	3.16	4.72	3	Rp3/8	7.72					
4.72	-	0.7	3.55	4.53	3	Rp1/2	8.5					
6.69	-	0.91	4.53	5.31	4.5	Rp3/4	12.13					
2.17	0.67	1.97	3.94	-	-	Rp1/4	-					
2.75	0.98	2.95	5.91			Rp3/8						
4.33	1.38	3.55	7.88									
4.72	1.58		Rp1/2									
6.69	1.97		9.84			Rp3/4						



Knocker Models & Specifications

Stainless Steel

APPLICATIONS:

- Coffee bean roasting machines
- Resin pellet hoppers
- Ejection of film materials
- Salt and sugar clogging



KNR-15-SS



KNR-20-SS



KNR-30-SS / KNR-40-SS



KNR-60-SS

Model	Working Pressure (PSI)	Stroke Cycle (cycle/min)	Air Consumption (cf/cycle)	Stroke Energy (lbf • ft)	Impulsive Force		Weight (lb)
					ft • lbf/s	Converts into Hammer pound (lb)	
KNR-15-SS	44 - 102	1 - 60	0.001 - 0.002	2.0 - 4.4	2.2 - 3.6	Mini Hammer	0.9
KNR-20-SS			0.001 - 0.004	3.2 - 6.1	4.3 - 5.8	Below 0.6	1.8
KNR-30-SS			0.002 - 0.005	4.1 - 9.7	8.7 - 13.0	Below 1.0	3.5
KNR-40-SS			0.005 - 0.013	6.8 - 16.4	18.8 - 28.9	1.0-1.5	9.3
KNR-60-SS			0.012 - 0.027	15.2 - 36.1	49.9 - 76.7	1.5-3.0	22.9

Stainless Steel (Ferrule Type)

APPLICATIONS:

- Pharmaceutical factory SUS hopper
- Ceramic material hoppers
- Anti-Corrosion and hygienic environments



KNR-15-F



KNR-20-F



Ferrule Clamp For Sanitary Use

Model	Working Pressure (PSI)	Stroke Cycle (cycle/min)	Air Consumption (cf/cycle)	Stroke Energy (lbf • ft)	Impulsive Force		Weight (lb)
					ft • lbf/s	Converts into Hammer pound (lb)	
KNR-15-F	44 - 102	1 - 60	0.001 - 0.002	2.0 - 4.4	2.2 - 3.6	Mini Hammer	2.1
KNR-20-F			0.001 - 0.004	3.2 - 6.1	4.3 - 5.8	Below 0.6	2.0

Control Panel Models & Specifications

AOC Control Panel

- Air-only (no electric) Knocker operation
- Knocker's operation interval can be easily adjusted with the speed controller
- If relay piping is used, up to three knockers are controllable

Model	Installation Scope	Power Supply	Working Pressure (PSI)	Working Fluid Temperature (°F)	Working Times Per/min.	Approx. Dimensions (L × W × H)(in)	Weight (lb)
KNR-CONTROL AOC	Indoor/Outdoor	Air Control	44 - 102	41 - 122	12 - 60	6.75 × 2.75 × 8.25	3.1



HKA Control Panel

- Alternate air-only controller with integrated panel

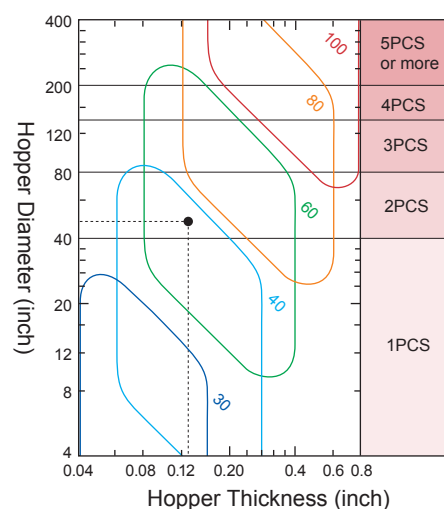
Model	Protection Class	Power Supply	Working Pressure (PSI)	Timer's Set Time	Number of Units That Can Be Operated	Approx. Dimensions (L × W × H)(in)	Weight (lb)
KNR-CONTROL HKA	IP54	Air Control	44 - 102	On Timer: 10s - 180s	KNR-15: 10 units KNR-20 / 30: 8 units KNR-40 / 60: 6 units KNR-80 / 100: 4 units (Per 1 System)	17 × 15 × 8.63	26.5
				Off Timer: 0.1s - 30s			



Use & Installation

Model Selection Guide

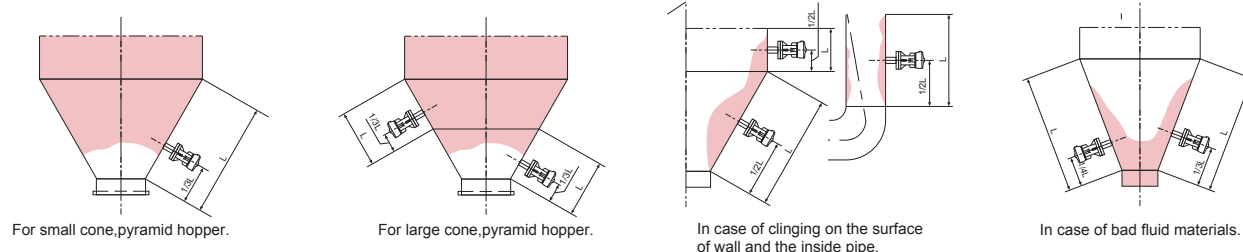
The model and the quantity having the optimum impact force are selected according to the type, shape, size and application. For instance, when installing on the conical hopper of 48" dia. 0.125" thick, find the point of intersection according to the figure on the right. If the point is within the range of KNR-40 2 nos, and KNR-60 2 nos, select KNR-40 2 nos, for small clinging strength, and KNR-60 2 nos, for large clinging strength.



Caution On Operating

The larger conical and pyramid hoppers collect more material and may require multiple knockers. Choose smaller knockers in these cases.

INSTALLING POSITION

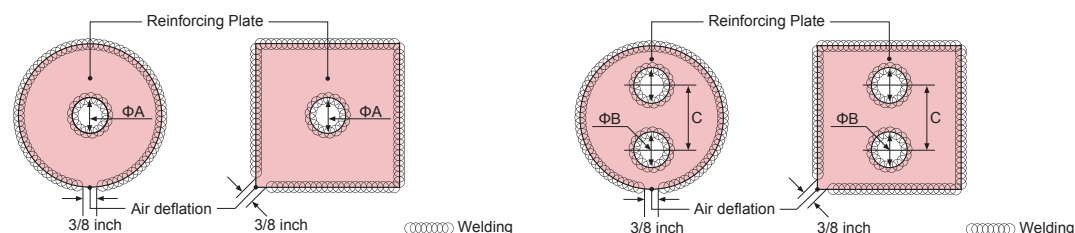


Installation Method

1. Prepare/weld reinforcing plate
2. Weld around the whole circumference of the base
3. For the model larger than KNR-60, weld reinforcing rib (usually unnecessary for KNR-30 and KNR-40)
4. Tighten the body thoroughly, using bolt, spring washer, and lock nut
5. To prevent Klocker from dropping, secure with wire rope assembly

Caution On Operating

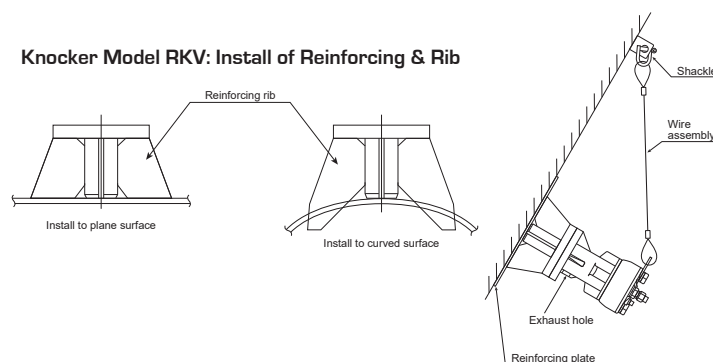
When operating, considerable impact is applied to welds. Make sure that welds are adequate.



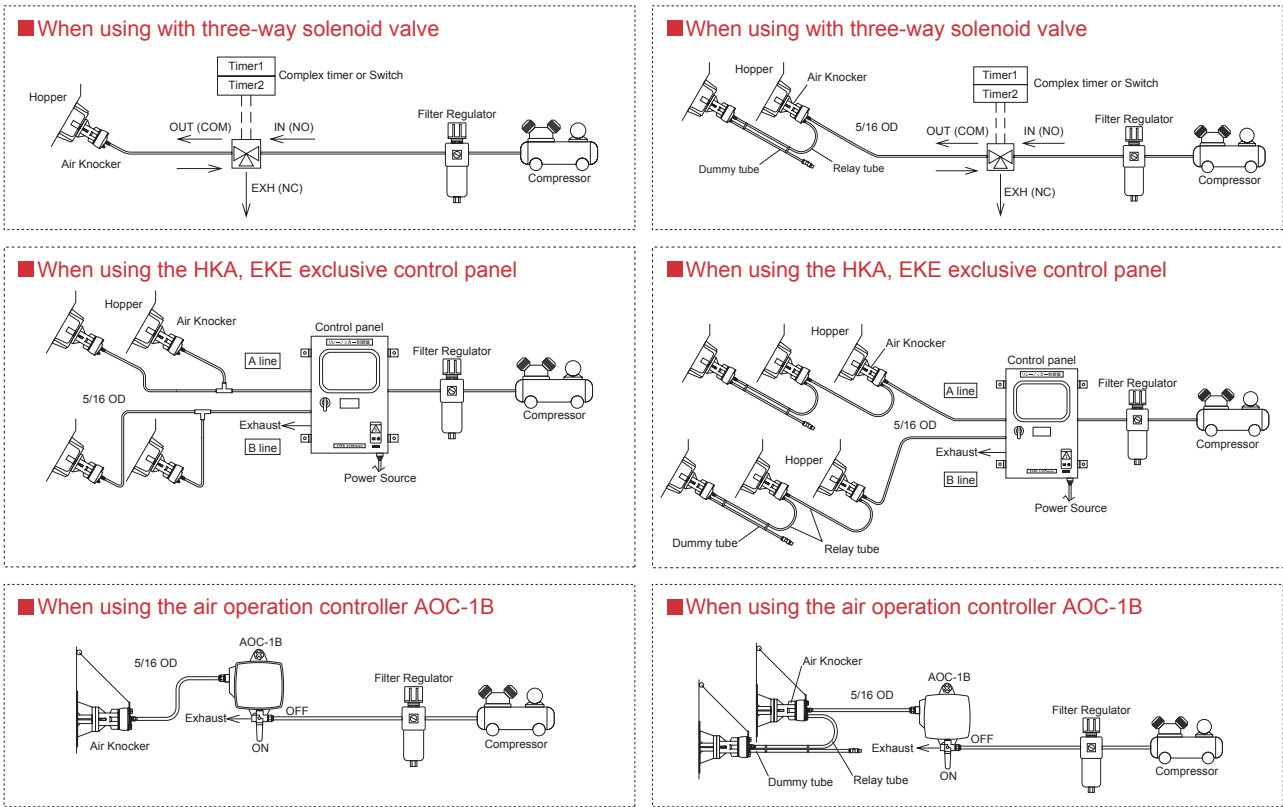
Reinforcing Plate Size [in]

Model [KNR-]	Square Type	Round Type	ΦA	ΦB	C
30 / 30-SS / 30-DI	□6 × t1/8	Φ6 × t1/8	5/8	3/4	2
40 / 40-SS / 40-DI	□8 × t1/8	Φ8 × t1/8			3
60 / 60-SS / 60-DI	□12 × t3/8	Φ12 × t3/8	2		3 1/2
80 / 80-DI	□16 × t3/8	Φ16 × t3/8		1	4 3/4
100 / 100-DI	□20 × t1/4	Φ20 × t1/4	3 3/8		5 1/2

Knocker Model RKV: Install of Reinforcing & Rib



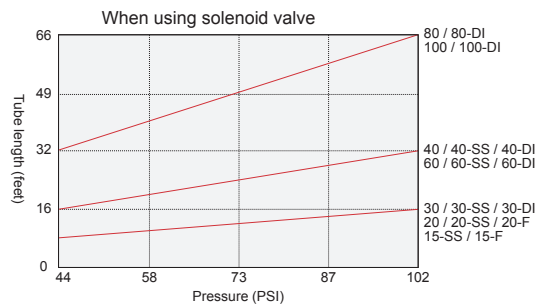
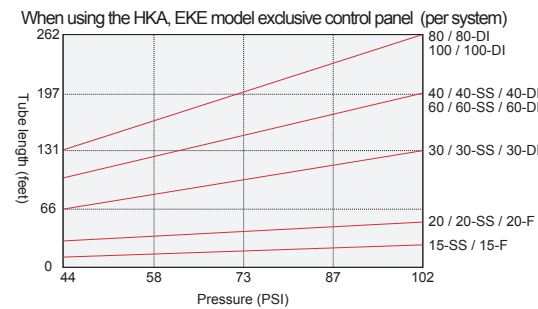
Control Method



- ▲ Please make piping tubes as short as possible.
- ▲ The maximum length of a piping tube changes with model, air pressure, and control unit, and may decrease knocker effectiveness by 10 to 20%.
- ▲ When adding another pipe, the length of the tube from the branch point to each knocker should be equal.

Selection of Extension Tube

Extension tube from solenoid valve to control panel uses nylon tube of outside diameter 5/16" and inside diameter 1/4". Perform piping not to exceed the border line shown in the following figure:



Maximum Tube Length (ft) between AOC-1B and Kocker

Model (KNR-)	Tube Length (ft)
15-SS / 15-F	6.5
20 / 20-SS / 20-F	6.5
30 / 30-SS / 30-DI	6.5
40 / 40-SS / 40-DI	9.75
60 / 60-SS / 60-DI	26.25
80 / 80-DI	32.75
100 / 100-DI	32.75

Length of Relay Tube in Relay System Piping and Air Pressure

Model (KNR-)	Tube Length (ft)	Working Pressure (PSI)
20 / 20-SS / 20-F	3.25 or less	44 or below
30 / 30-SS / 30-DI	3.25 or less	44 or below
40 / 40-SS / 40-DI	16.5 or less	58 or below
60 / 60-SS / 60-DI	16.5 or less	73 or below
80 / 80-DI	32.75 or less	73 or below
100 / 100-DI	32.75 or less	80 or below



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