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|--------------------------|-----------------------------------|-------------------------|
| 1 Pneumatic Knocker K 40 | 6 Pneumatic Knocker K160          | 11 Solenoid Valve MV314 |
| 2 Pneumatic Knocker K 63 | 7 Pneumatic Impulse Knocker QJ 63 | 12 Impulser TG-BC       |
| 3 Pneumatic Knocker K 80 | 8 Welding Plate AP 80             | 13 Impulser TGES-BC     |
| 4 Pneumatic Knocker K100 | 9 Maintenance Unit WE38 CP        | 14 Stepping Relay SR    |
| 5 Pneumatic Knocker K125 | 10 Sound Insulation Hood KSH 63   |                         |

## Pneumatic Knocker

# Pneumatic Knocker

## 1. Structure and Operating Mode

The Pneumatic Knocker achieves a high grade of impact energy by the spontaneous release of the accumulated compressed air. **Figure 1** shows the structure of the knocker. The percussion piston (1) is a permanent magnet adhere in its starting-position to the anchor plate (2) until the compressed air fed in through the lid (3) overcomes the magnetic force. The impact piston (1) loosens from the anchor plate (2), is very highly speeded by the accumulated compressed air and hits onto the striker (4) with a speed = 6 – 7 m/s, which transmits the impact to the silo wall. If the knocker is ventilated, then the spring (5) pressed back the impact piston (1) into the starting position.

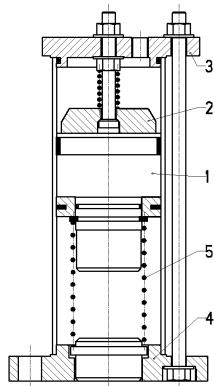


Figure 1

## 2. Application

The Pneumatic Knocker is used for bulk goods with material flow problems of bridging, rat-holes, residue formations, when high-speed vibrators with soft sinusoidal oscillations are not efficient. The effect of the knocker is comparable to the effect of the infamous "silo hammer", but without dented silo cones additionally impeding the material flow. The Pneumatic Knocker produces an ideal elastic impact called impact energy  $E = m / 2 \cdot v^2$  [kgm/s<sup>2</sup> = Nm] and impulse  $J = m \cdot v$  [kgm/s = Ns]. There is no impact force or unbalance such as the vibrators generate. The following rule applies to the effectiveness of the Pneumatic Knocker: **If the product can be made to flow with a hand hammer, then the "Pneumatic Knocker" is also effective.** Normally the Pneumatic Knocker is activated over an electric control with a solenoid valve. The size and the number of Pneumatic Knockers for a round 60° cone are indicated in **Figure 2** as approximate values. Rectangular silos are equipped with at least two knockers on both the flatter sides. The Pneumatic Knockers are mounted at rectangular silos on the flatter walls. During conveying out of silos cycle times of 5 to 20 seconds are chosen. Too much mustn't be knocked since otherwise the product increases. Continuously accumulate products in filters and spraying towers are regularly knocked off with cycle times up to 30 minutes. Too thick product layers can induce an avalanche-like break-off and block the outlet or overload the following machines. If several knockers are mounted at the silo, they are to be actuated one after the other. The product flow and the air consumption is then more equally. Rests in container scales are emptied by 2 – 4 impacts within a cycle time = 1 – 4 s. **For the electrical control of the Pneumatic Knockers we can deliver the required timing relays.**

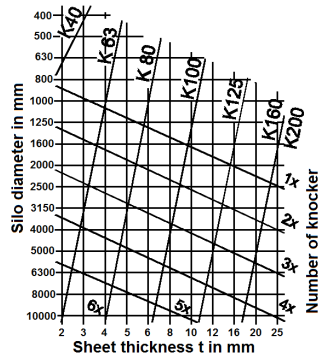


Figure 2

## 3. Sound Insulation

The Pneumatic Knocker has the greatest effect, when the impact is transmitted without damping to the silo wall. It is, therefore senseless to damp the impact for reducing the noise.

## Technical data:

Type	Dimensions in mm							Magnetic adhesion N	Impact weight kg	Storke mm	Impact energy Nm	Impuls Ns	Weight kg	Air consumption per impact at 3 bar Liter
	A	B	C	D	H	L	R							
K 40	54	11	9,5	85	174	65	G 1/8"	220	0,34	35	7,7	2,2	1,35	0,18
K 63	78	15	14	120	208	95	G 1/4"	640	1,30	40	25,6	7,5	3,60	0,70
K 80	92	19	14	140	249	115	G 1/4"	1160	2,44	55	58,0	16,7	6,60	1,30
K100	115	22	18	182	320	145	G 3/8"	1620	4,99	57	97,0	28,5	13,50	2,90
K125	150	27	18	205	405	170	G 1/2"	2560	9,13	80	205,0	60,5	26,50	6,20
K160	190	33	26	300	486	240	G 3/4"	4150	16,45	102	415,0	115,0	62,00	12,00

## 4. Mounting and Operating Instructions

4.1 The **Pneumatic Knocker** may only be mounted and operated as knocking-off and discharging aid on silos, containers, etc. consideration the technical description and technical data. The mounting, the maintenance, the starting apparatus, the operating and the disposal of the appliances and accessories shall only be carried out by trained and qualified personnel in compliance with the legal prescriptions and safety regulations. The knocker has to be mounted, secured and checked in such a way that self-loosening of screwings, cracking of welded joints or other disturbing there will be no danger for persons, animals, products or objects to be damaged or polluted.

4.2 For protection from injuries for person and damage of the pneumatic Knocker, he must be before using screwed and mounted.

4.3 The area to be knocked off must be able to swing so that the impact can expand in all directions. Reinforcements on silo walls and additional ribs must be avoided, because the weight and the stability of the silo walls is increased with that and reduce the effect of the knocker strongly.

4.4 The knocking action may only take place when the silo outlet is open and the following conveyors are at working, otherwise the product will be compacted.

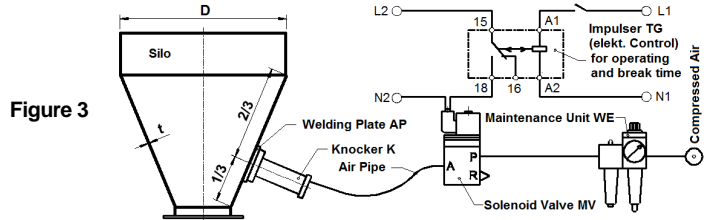


Figure 3

4.5 The Pneumatic Knocker will be mounted as shown in **Figure 3**. The welding plate AP is to be welded directly onto the silo cone. In case of smaller diameters the welding plate of type **APTxxx** will be used. In case of insulated or rubberized walls as well as in case of silos of aluminum special fastening plates are required.

4.6 The **Pneumatic Knocker** has to be mounted in such a way that the vent holes are oriented downwards. Dust, humidity and aggressive steams may not enter through the vent holes. The **inserted dust caps** for protection against dirt in the vent holes at the bottom side at guide tube, must be **removed before using**.

4.7 The compressed air is adjusted at 0.5 bar the trigger pressure of the knocker (approx. 2.5 – 3.5 bar). The working time will be adjusted at a value exceeding the triggering time of the knocker (approx. 0.5 – 2 s). The interval time is to be adjusted according to the product flow. She may not be too short so that the **Pneumatic Knocker** has time for ventilating and should be as long as possible in order to reduce the abrasion and the compressed air consumption. Quicker impact sequences can be obtained by means of a larger valve or with the help of the quick-action ventilating valve (SE).

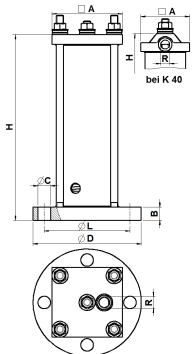
4.8 All screws and nuts must be checked with a torque wrench on the correct screw tension.

4.9 The maintenance unit has to be serviced as follows: drain the condensate from the filter, refill one hydraulic oil HLP 46 (normal operating temperature), check the adjusted pressure (approx. 3 bar) and the function of the oiler (approx. 1 drop in 2 to 5 minutes).

## 5. Special Versions

The **Pneumatic Knocker** can be delivered in various materials and for temperatures up to 140 °C.

6. The **Pneumatic Impulse Knocker** is appropriate for knocking-off of slow-rotating drums and on filling-or discharging stations with changing containers. The **Pneumatic Impulse Knocker** is described in a separate leaflet.



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