

GENERAL DESCRIPTION AND ACCESSORIES

Pneumatic knockers from singold



- World's most powerful knockers
- Greatest possible impact effect
- Lowest own weight
- Reliably remove product residues, caking, as well as shaft and bridge formation in containers and silos

Pneumatic singold-knocker – General information

1 USAGE

The pneumatic singold knocker is used on bulk solids with material flow disturbances such as bridging and rest formation when high speed vibrators or shakers with soft sinusoidal oscillations are not effective. singold-knockers achieve the greatest possible impact effect with the lowest possible weight. The effect of the knocker is comparable to the effect of the infamous "silo hammer", without having dented silo spouts making the material flow even more difficult.

The effectiveness of the knocker is evaluated with the following rule: If the product can be made to flow with a hand hammer, the pneumatic Knocker is also effective.

The knocker is attached directly to the silo cone via a welding plate and lies with its striker bolt directly on the welding plate and thus on the silo wall.



Figure 1 pneumatic singold-knocker K 63

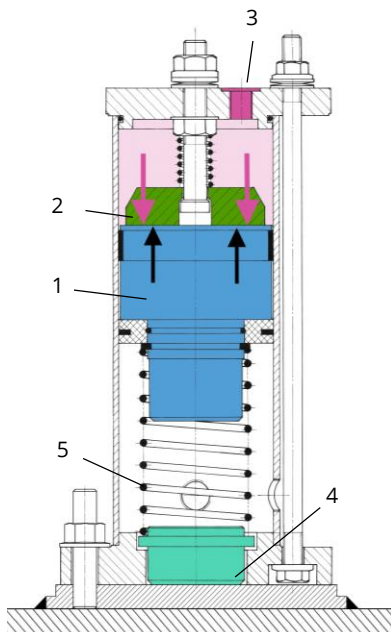


Figure 2 sectional view of knocker K 80

2 CONSTRUCTION AND FUNCTIONING

With **pneumatic singold magnet system knockers**, a very high impact work is achieved through spontaneously released stored compressed air energy. In Figure 2 the knocker is shown in section.

The **magnetic impact piston (1)**, designed as a permanent magnet, adheres to the **anchor plate (2)** in the basic position by means of magnetic force (**↑**). Compressed air is supplied through the **connecting thread (3)**. After a short time, the pressure force (**↓**) overcomes the magnetic force and the magnetic impact piston suddenly detaches itself from the anchor plate.

It is accelerated very forcefully by the stored compressed air and hits the **striker bolt (4)** with a speed of 6 to 7 m/s. The striker bolt transmits the impact via the welding plate directly to the silo wall. After venting the knocker, the **spring (5)** pushes the magnetic impact piston back into its initial position.

The magnet system knocker generates an ideal elastic shock, which is specified as impact energy

$$E = \frac{1}{2}mv^2 \left[\frac{\text{kgm}^2}{\text{s}^2} = \text{Nm} \right] \text{ and as impulse } \vec{I} = mv \left[\frac{\text{kgm}}{\text{s}} = \text{Ns} \right].$$

There is no impact force or imbalance like with vibrators or shakers.

The pneumatic knocker has the greatest effect when the impact is transferred undamped to the silo wall. singold offers Sound

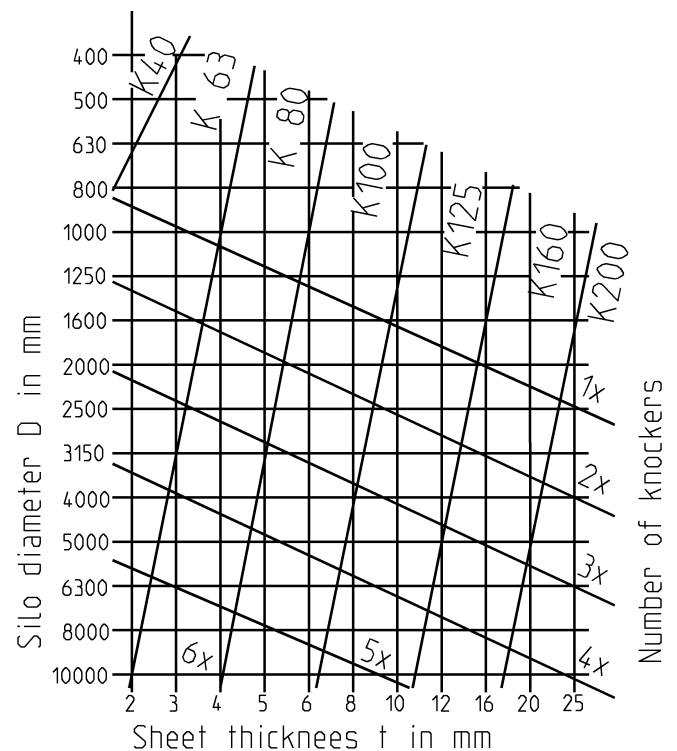
Insulation Hoods for the reduction of noise emission of the pneumatic knocker.

The surface to be knocked should be able to swing, so that the impact can spread to all sides. Reinforcements of the silo walls and additional ribs are to be avoided, as this increases the weight and strength of the silo walls and reduces the impact of the knocker.

3 SELECTION KNOCKER SIZE AND REQUIRED NUMBER

The size and required number of pneumatic knockers for a round 60° cone can be taken as a guide from the adjacent diagram.

On rectangular containers, at least two knockers are mounted on the two flatter sides.

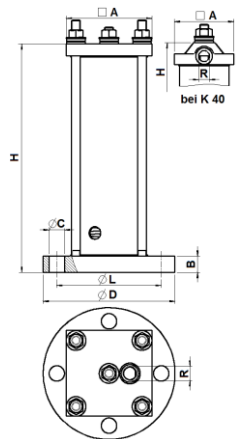


4 TECHNICAL DATA PNEUMATIC SINGOLD-KNOCKER TYPE K:

Type	Dimensions in mm							Magnetic adhesion N	Impact weight kg	Internal stroke *1 mm	Impact energy Nm	Impulse Ns	Impact equivalent weight *2 kg	Own 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	38	8,4	2,4	0,86	1,35	0,18
K 63	78	15	14	120	208	95	G 1/4"	640	1,30	40	25,6	8,2	2,61	3,60	0,70
K 80	92	19	14	140	249	115	G 1/4"	1160	2,44	52	60,9	17,2	6,21	6,60	1,30
K100	115	22	18	182	320	145	G 3/8"	1620	4,99	60	97,2	31,2	9,91	13,5	2,90
K125	150	27	18	205	405	170	G 1/2"	2560	9,13	80	206,1	61,3	21,01	26,5	6,20
K160	190	33	26	300	486	240	G 3/4"	4150	16,45	106	442,0	120,6	45,06	62,0	12,00

*1 The internal stroke describes the distance covered by the magnetic impact piston, i.e. the acceleration distance until it hits the striker bolt.

*2 The impact equivalent weight, often also called impact force, corresponds to the effect of the weight specified here, which falls from a height of one meter.



5 CONTROL AND NECESSARY ACCESSORIES

The knocker is controlled by an electrical control with a 3/2-way solenoid valve. It requires a working time for the function (pressurized) and a pause time for returning to the initial position (exhausted).

Working time is the time that the knocker must be pressurized to trip. Pause time is the time in which the knocker is vented and returns to its initial position. See the table below for the accessories required for manual, electrical or remote-controlled operation:

Manual operation	Automatic operation
Welding and mounting plate for the knocker	
Maintenance unit with oiler and pressure reducer	
Pneumatic connection fittings and pneumatic hoses	
Pneumatic 3/2 way valve with hand lever	Electrical control for the timing of compressed air and electro-pneumatic 3/2 directional solenoid valve

More about available accessories - see point 8.

6 AVAILABLE VERSIONS

The pneumatic knocker is available in different materials and for different temperature ranges up to a maximum operating temperature of 140°C. It is intended for use in industrial interiors. The device is not splash-proof. In outdoor areas, where there is moisture and where there is extreme dirt and dust, we recommend using the noise protection hood (KSH), which is available as an accessory.

Pneumatic singold-knocker K									
	Typ Size 40 - 160 - Version	Version	Temp. [°C]		Material				
			From	to	Lid and bottom plate	Tube	Striker bolt		
Pneumatic magnet system knocker	K__	Standard design	0	60	Aluminium	Steel powder-coated on the outside	Galvanized steel		
	K__ - N2		0	80					
	K__ - N3	Special design	0	120	Galvanized steel			Stainless steel 1.4541	Stainless steel 1.4021
	K__ - S1		0	60					
	K__ - S4		0	140					
	K__ - T1		0	60	Aluminium				
	K__ - T4		0	140					
	K__ - V1		0	60	Stainless steel 1.4541	Stainless steel 1.4541	Stainless steel 1.4021		
	K__ - K1		0	60					
	K__ - K1PU		0	60					
	K__ - K4	0	140						

Not approved in ATEX areas.

7 PNEUMATIC DISTANCE-KNOCKER TYPE QJ

The standard singold knocker must be permanently mounted on the container. Therefore, singold offers the special development pneumatic distance knockers QJ. The QJ is suitable for knocking off slowly rotating drums and at filling or emptying stations with changing containers.

It can be mounted at a distance from the rotating drum or a container. The functional principle is identical to the knocker type K, but the impact impulse is transferred to a piston rod that moves to the container. The drum or container wall is touched only briefly during beating and transmits the impact pulse. The distance knocker type QJ is described in detail in a separate brochure.

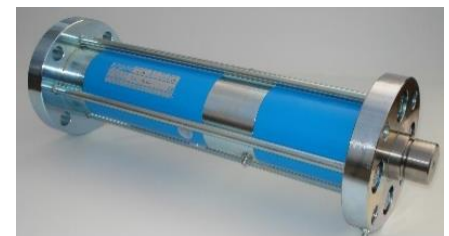


Figure 3 pneumatic distance-knocker QJ

8 AVAILABLE ACCESSORIES FOR INSTALLATION AND OPERATION KNOCKER

8.1 Welding and mounting plates for attaching the knocker on the silo

8.1.1 For welding to round, conical or rectangular containers

Standard Type AP

The knocker is screwed over 4 existing studs on the Welding Plate. Available in steel and stainless steel. See also dimension sheet 100-089DE.



8.1.2 For welding to small diameters, e.g. pipes or insulated containers

Type APT

It is a small bridge welded. The knocker is mounted at a distance with four screw connections on a flange plate. Available in steel, stainless steel and mixed construction. See dimension sheets 100-089DE and 100-075C.



8.1.3 For mounting the knocker to rubberized containers

Type APK

For this purpose, the studs must be passed through the container wall to the outside. Available in steel and stainless steel. See also dimension sheet 100-075D_E.



8.2 Soundproofing accessories and soundproofing measures

8.2.1 Sound Insulation Hood (KSH)

to reduce the noise emission of the knocker. See also dimension sheet 100-088.

Can also be used as protection against entrainment of the ventilation holes and protection against parts which are loosened if the knocker is damaged.

8.2.2 Using knocker variant V 1 with striker bolt made of Vulkollan (PU)

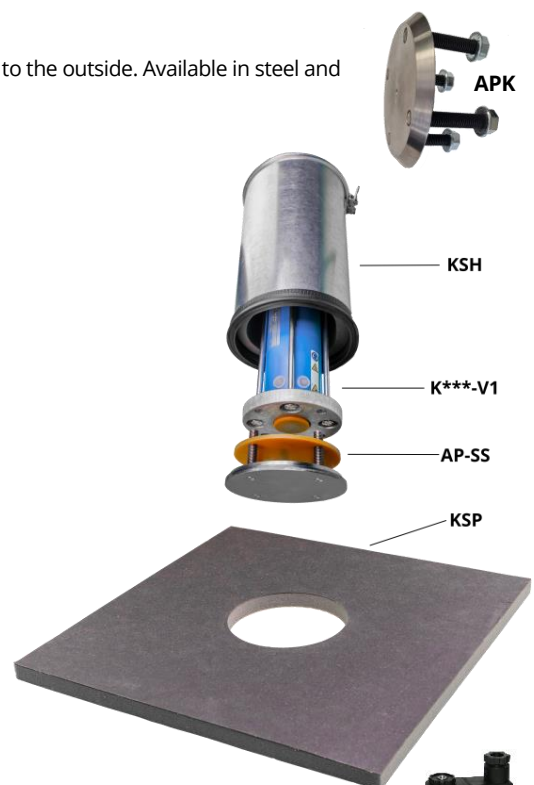
Reduces the noise, but also reduces the impact of the knocker

8.2.3 Sound insulation disc made of Vulkollan (AP-SS)

Can also be clamped between the weld plate and knocker. Similar effect as with V1 knockers (8.2.2).

8.2.4 Sound insulation plate (KSP)

The KSP plate insulates the sound radiation from the container in the vicinity of the knocker, but without dampening the vibrations generated by the knocker. They are glued directly onto the silo.



8.3 Pneumatic solenoid valves (MV)

in 24V DC and 230V AC. Special voltages on request.

Depending on the type used and the number of knockers available in 1/8", 1/4", 1/2".



8.4 Impulser (TG)

For easy control and adjustment of the pause and working times for the timing of the Pneumatic Knocker.

Available in 24V DC and 230V AC. Quick installation and setting into operation of the knocker. Particularly suitable if the optimal setting times are not known yet. Pauses and working times can be changed manually at any time via two potentiometers.



8.5 Maintenance unit (WE)

With pressure reducer and oiler for cleaned and oiled compressed air supply.

