

GENERAL DESCRIPTION AND ACCESSORIES

Pneumatic knocker from singold



- Replaces the famous silo hammer: always effective when a hand hammer would work
- Reliably removes bridging, shafting, and residue buildup in containers and silos
- The world's most powerful knocker: maximum impact with minimum weight

Pneumatic singold-knocker – General information

1 USAGE

The pneumatic singold knocker is used on bulk goods with material flow problems such as bridging, shafting, and residue buildup 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 famous 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 40

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.

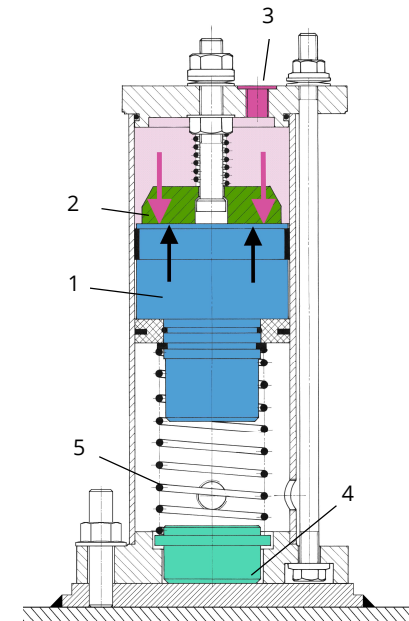


Figure 2 sectional view of knocker K 80

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.

The online configurator at www.singold.tech also offers help with the selection.

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

4 SPECIAL DEVELOPMENT: DISTANCE-KNOCKER TYPE QJ

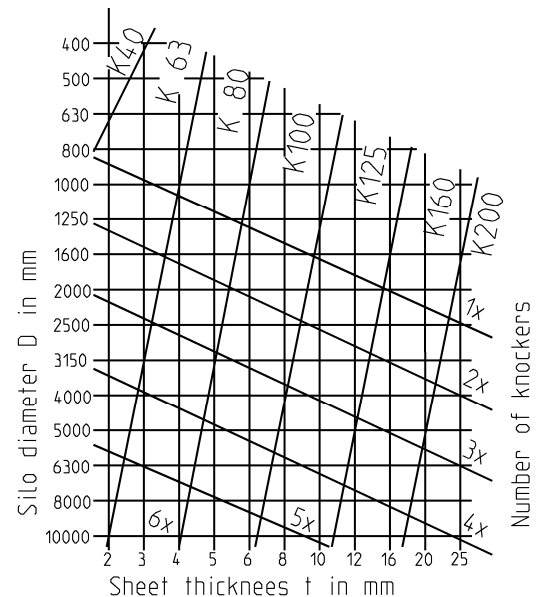


Figure 3 pneumatic distance-knocker QJ

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.

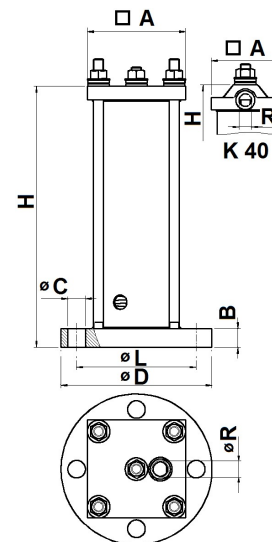


5 TECHNICAL DATA PNEUMATIC SINGOLD-KNOCKER TYPE K

Type	Dimensions in mm							Impact-energy	Impact Weight *1	Impulse	Impact equivalent weight *2	Air consumption per impact at 3 bar	Own weight
	A	B	C	D	H	L	R	Nm	kg	Ns	kg	Liter	kg
K 40	54	11	9,5	85	174	65	G 1/8"	8,4	0,34	2,4	0,86	0,18	1,35
K 63	78	15	14	120	208	95	G 1/4"	25,6	1,30	8,2	2,61	0,70	3,60
K 80	92	19	14	140	249	115	G 1/4"	60,9	2,44	17,2	6,21	1,30	6,60
K100	115	22	18	182	320	145	G 3/8"	97,2	4,99	31,2	9,91	2,90	13,5
K125	150	27	18	205	405	170	G 1/2"	206,1	9,13	61,3	21,01	6,20	26,5
K160	190	33	26	300	486	240	G 3/4"	442,0	16,45	120,6	45,06	12,00	62,0

*1 The equivalent impact weight can be used for comparison with hand hammer tests. Approximately twice the hand hammer weight is required for similar impact energy.

*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.



6 CONTROL AND NECESSARY ACCESSORIES

The components shown in Fig. 4 are required to install and operate the pneumatic knocker:

- Welding plate for mounting the pneumatic knocker
- Electrically actuated, pneumatic 3/2-way solenoid valve*3
- Impulser (TG)*3 (electrical control for solenoid valve) - an existing PLC control unit can also be used.
- Pneumatic connections and lines
- Maintenance unit with filter, pressure regulator, water separator and mist lubricator for relubricating the knocker (oil-free singold knockers with lifetime lubrication on request)

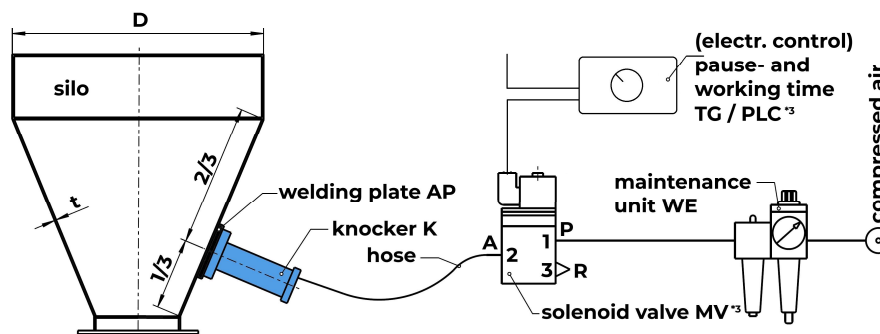


Figure 4 Mounting and connection diagram

*3 In the case of manual operation, this is replaced by a pneumatic 3/2-way valve with manual actuation.

7 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. The knockers are not approved for ATEX areas.

Pneumatic singold-knocker							
Pneumatic magnet system knocker	Type	Version		Operating temp. max. [°C]	Material		
					Lid and bottom plate	Striker bolt	Tube
	K 40	Standard design		60	Aluminium	Galvanized steel	Steel powder-coated on the outside
		-N	2	80			
	K 63		3	120			
	K 80	-S		1	60		
			4	140	Stainless steel		
	K100	-T	1	60			
	K125		4	140			
	K160	-K	1	60	Stainless steel		
4			140				

e. g. knocker K 80-K4 in stainless steel version for operating temperature up to 140 °C

For all knockers, a variant with a Vulkollan (PU) striker bolt (e.g. K 80-K1PU) is available as a sound insulation measure, see also point 8.2.2 on the next page. This dampens the noise development, but also minimally reduces the effect of the knocker (only suitable for temperatures up to max. 80 °C). The reduction in efficiency is generally not relevant to the process.

8 AVAILABLE ACCESSORIES FOR INSTALLATION AND OPERATION OF KNOCKERS

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.



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.



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.



8.2 Soundproofing accessories and soundproofing measures

8.2.1 Sound Insulation Hood (KSH)

To reduce the noise emission of the knocker..
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 Knocker variant with striker bolt made of Vulkollan (PU), e.g. K 80-K1PU

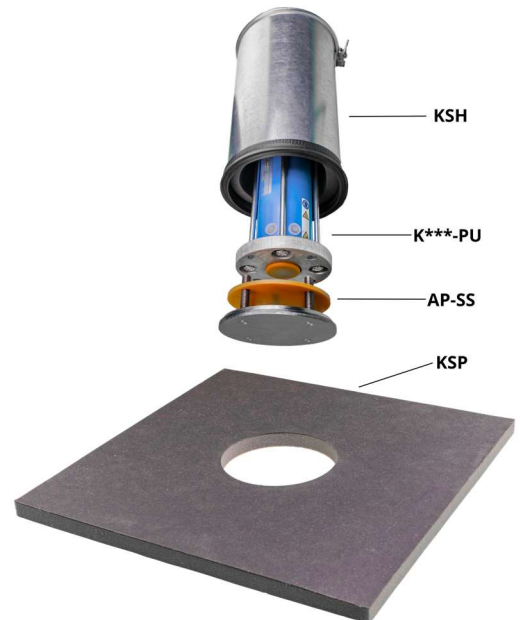
Reduces the noise, but also reduces the impact of the knocker (suitable for temperature up to 80 °C)

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 variant PU (8.2.2, up to 80 °C).

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. It is glued directly onto the silo.



8.3 Pneumatic solenoid valves (MV)

In 24 V DC and 230 V 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 24 V DC and 230 V 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.

