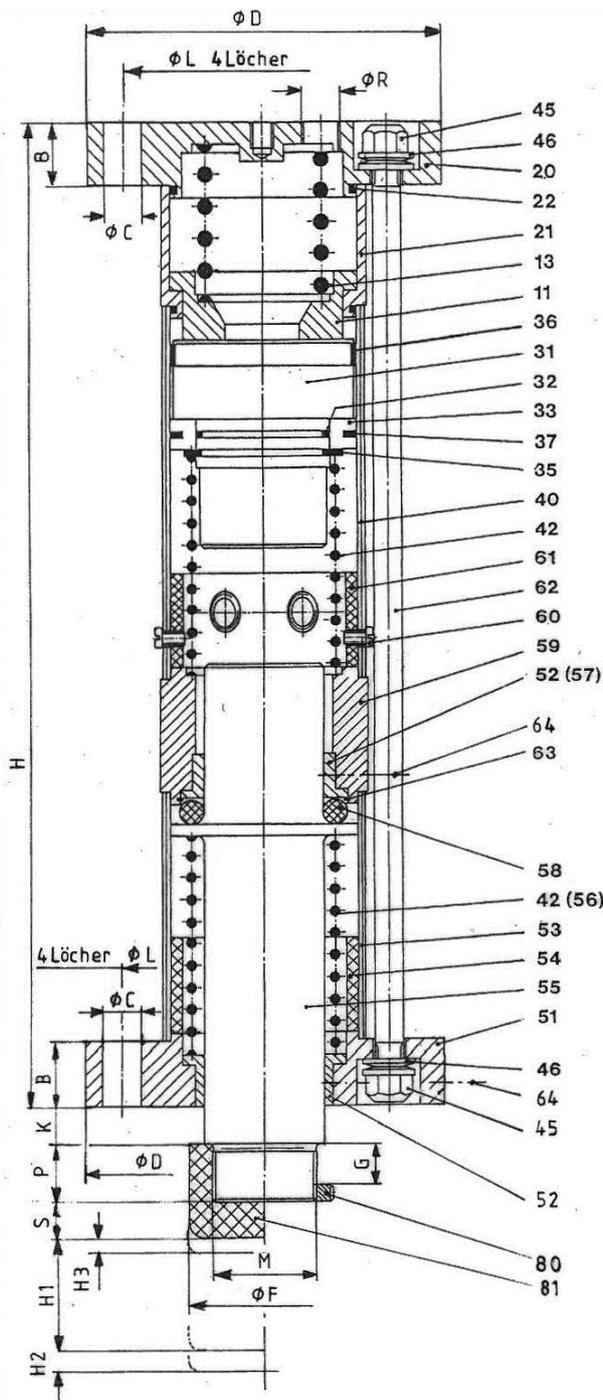


The Impulse Knocker is a Pneumatic Knocker with an additional Impulse Part. The mechanism of action is identical to the standard pneumatic knocker.

The descriptions and terms of our leaflet „Pneumatic Knocker“ are valid for the Impulse Knocker as well and have exactly to be taken into account.

The numbers in brackets refer to the spare parts list and list of parts. The so-called „(impact) piston“ of our leaflet „Pneumatic Knocker“ consists of pos. 31 to 37.



1. Construction and way of function

The picture shows the general construction principles.

The impact piston that is a permanent magnet (31 - 37) clings to the anchor plate (11) at its end-position. The compressed air is led through the lid (20). If the piston force gets stronger than the cling force of the magnet the impact piston tears off the anchor plate (11), gets extremely accelerated by the expanding compressed air and hits at a very high speed onto the piston rod (55).

The piston rod (55) is accelerated spontaneously following the momentum equation. It transfers the energy to the silo wall, bounces off and back against the impact piston (31 to 37).

As the Impulse Knocker gets deaerated the spring (42) is pushing back the impact piston (31 to 37) to the anchor plate (11) and the spring (56) is pushing back the piston rod (55) into its starting position with stroke way H3.

The speed of the piston rod is faster than the human eyes are capable to see

To be avoided:

If the piston rod is not stopped by any solid object it will hit against the rubber spring packing (54) after the stroke way H1. It will be stopped within stroke way H2 by the rubber spring packing (54) and be moved back to the impact piston (31 to 37). → See point 5.16

2. Application

The Impulse Knocker is especially designed to knock off moving or changing containers and drums rotating at low speed as well as for hot walls.

3.Noise protection

We have matching noise reducing hoods type QJSH. If possible the space between base plate (51) and the wall to be knocked off should be insulated or screened at the location to get a better result of noise reduction.

4. Ex-Protection

At the spot of the knock there may occur sparks due to mechanical energy especially on oxidised surfaces and/or tangential strokes. By using external aeration (e.g. with nitrogen) the existence of explosion capable mixtures can be avoided.

5. Installation and operating instructions

5.11 Attention: The Impulse Knocker must only be operated with protection device. Do not reach into the stroke area of the Impulse Knocker. During maintenance the connection to the compressed air line has to be interrupted.

The forged edge at the end of the piston rod, has to be removed time to time.

5.12 The Impulse Knocker has to be securely installed to a greater mass (e.g. machine-construction, U-steel filled with concrete) to cover the recoil.

5.13 The distance between Impulse Knocker and the object to be knocked off has to be in-between $a_{max} = H1 - H3$ and $a_{min} = H3 + H3$ ($H3 =$ safety distance). When using the vulkollan buffer measure S is observe. See point 8. Installation dimensions.

5.14 The wall to be knocked off has to be reinforced but still has to be elastically for that the momentum can be transferred in the wall.

Additional weights on the piston rod (55) will change the speed according the momentum equation. At higher additional weights you have to replace the spring (42) against a stronger one or support it with an additional spring.

5.15 The Impulse Knocker is - like the standard Pneumatic Knocker - not maintenance-free. Additionally the fanged bushes have to be lubricated. Piston-rod and deaeration holes have to be protected against dust and dirt. Clean piston-rod and check if it is moving easily.

5.16 If the piston rod (55) does not return to its end position the impact piston will hit against the emergency rubber spring packing (61). If this one is destroyed it will hit the spring (56) down to its block-length and will finally destroy the whole knocker. This can be avoided if the knocker is only operated if the piston rod has returned into its end position, e.g. by using a light barrier.

5.17 On rotating drums the Impulse Knocker should knock from on top (Mounting position vertical!) into a small reinforcement ring or ring segments.

5.18 There is working a sidestroke momentum to the Impulse Knocker within the rotation direction of the drum. On installing the Impulse Knocker at an angel of about $\tan \alpha = \text{rotation speed [m/sec]} / 6.5 \text{ [m/sec]}$ to the rotation axis against the rotation direction the sidestroke momentum will be neutralised.

5.19 The fixing unit should be designed in this case the Impulse Knocker may be moved ridgeless against the rotating direction or that it can be pivoted around α .

The momentum must work against the rotation direction.

5.20 The installation of the Impulse Knocker should be executed that way, that it can be removed even when the drum is rotating.

6. Types

Type	Temperature	Piston rod end	Accessories (to be ordered separately):
QJ...A	0 to 70 °C	set off without threads	Buffer made of PE to be fixed on the end of the piston rod
QJ...B		set off whit threads and wrench nut	Buffer made of PE to be screwed on the end of the piston rod. grooved nut
QJ...A-S4	to 140 °C	set off without threads	Buffer made of PE to be fixed on the end of the piston rod
QJ...B-S4		set off whit threads and wrench nut	Buffer made of PE to be screwed on the end of the piston rod. grooved nut

7. Dimensions

Dimensions in mm																	Magnet-cling - force N	Dynam. Energy Nm	weights in [kg]		
TYPE	B	C	D	E	F	G	H	H1	H2	H3	K	L	M	P	R	S			SW	piston-rod	total
QJ 63	22	14	120	35	50	7	345	30	10	3	10	95	M30x1,5	20	1/4"	15	30	640	25	1,4	9,2
QJ 80	24	18	150	45	60	9	425	35	12	4	12	120	M40x1,5	25	1/4"	15	41	1160	58	2,9	17,4
QJ100	31	22	190	64	80	11	515	40	15	5	20	150	M55x2,0	35	3/8"	20	55	1620	97	6,8	33,5
QJ125	45	26	240	80	100	12	670	45	20	9	20	190	M70x2,0	40	1/2"	25	70	2560	205	14,5	70,1

to be changed without notice

8. Installation dimensions.

Distance (a) piston rod end (Pos 55) - point of impact

a_{min} (mm)	a_{max} (mm)	with Vulkollan Buffer (mm)	
H3+H3	H1-H3	+ S	
QJ 63	6	27	+ 15
QJ 80	8	31	+ 15
QJ100	10	35	+ 20
QJ125	18	36	+ 25

Distance (a) bottom flange (Pos 51) - point of impact

a_{min} (mm)	a_{max} (mm)	with Vulkollan Buffer (mm)	
H3+H3+P+K	H1-H3+P+K	+ S	
QJ 63	36	57	+15
QJ 80	45	68	+15
QJ100	65	90	+ 20
QJ125	73	96	+ 25

Subject to change without notice

9. Lubricants recommendations

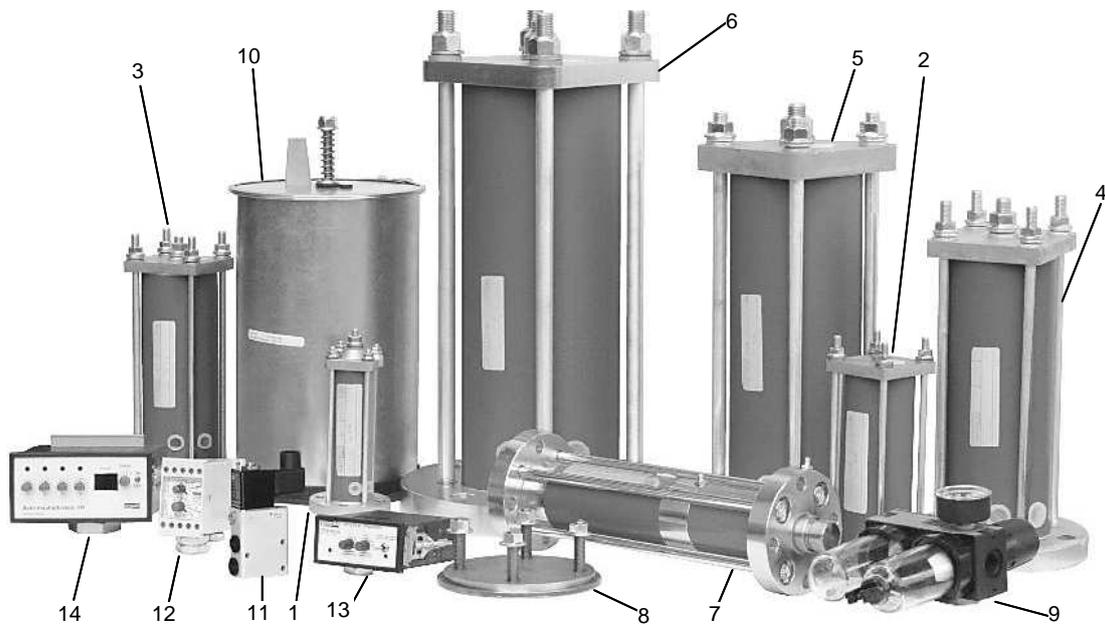
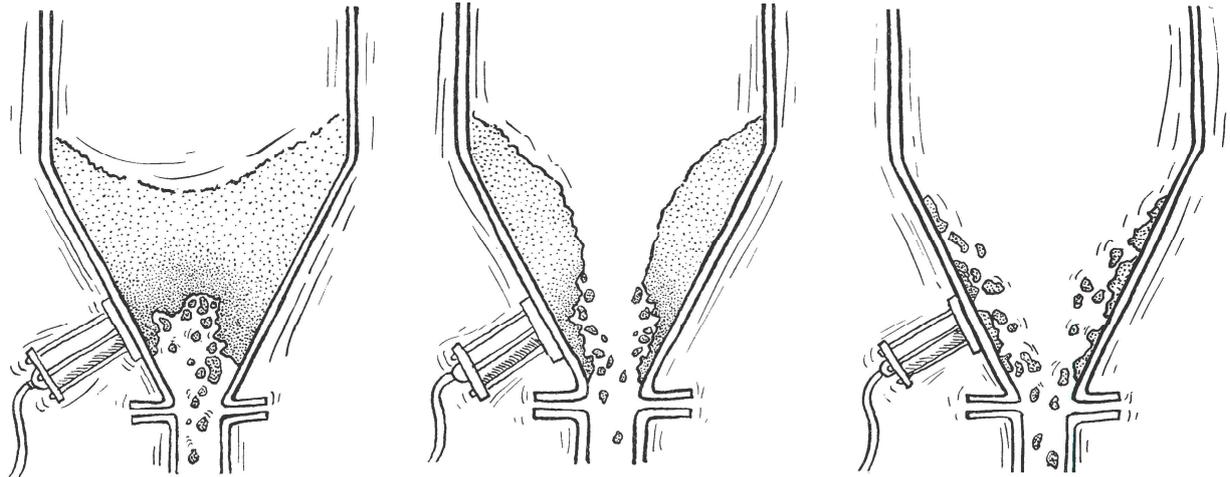
Temperature in degr. C	Used Material	For assembly and maintenance		Re-lubricate	
		Parts of Knocker	For Momentum part	Parts of Knocker	For Momentum part
0 to 140	all		lubricate sliding parts with assembly paste e.g.: Klüber HEL 46-450 Part No. 812010		
0 to 40	POM / NBR / PUR	better grease G 00 DIN 51826 ESSO Fibrax 370 EP Part no.: 810050		better oil HLP 32 ESSO Nuto HLP 32 Part No.: 81001-032	better grease G 00 DIN 51826 ESSO Fibrax 370 EP Part No.: 810050
20 to 70	POM / NBR / PUR			better oil HLP 46 ESSO Nuto HLP 46 Part No.: 81001-046	
0 to 140 Type QJ...-S4	Al Sn / FKM	Silicone grease 0 Klüber TK44 N0 Part No. 811001	better cylinder oil ZD DIN 51510 ESSO Cyclesso 1500 Part No.: 810061-ZD	Silicone oil 100 Klüber TK002/100 Part No.: 810001	better cylinder oil ZD DIN 51510 ESSO Cyclesso 1500 Part No.: 810061-ZD

* Dew-point of compressed air has to be 20° C below operation temperature.

** The resistance of the sealings have to be taken into account

The DIN-Standards indicate the minimum quality of the main characteristics. The characteristics of brand mark lubricants (ESSO, SHELL, Klüber etc.) often are significantly better and should be preferred therefore. If required we deliver the here mentioned brand mark lubricants even in small quantities.

Subject to change without notice



- | | | | | | |
|---------------------|------|-----------------------------|---------|--------------------|---------|
| 1 Pneumatic Knocker | K 40 | 6 Pneumatic Knocker | K160 | 11 Solenoide 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.

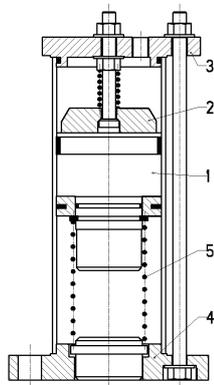


Figure 1

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/s² = 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.**

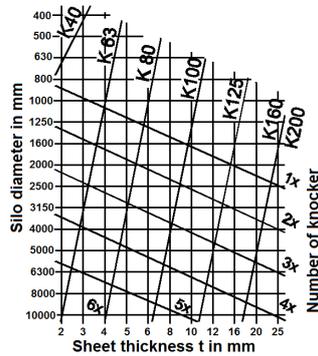


Figure 2

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.

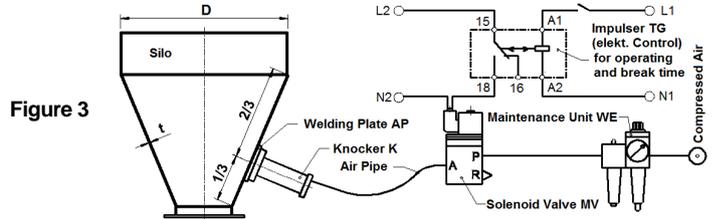


Figure 3

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).

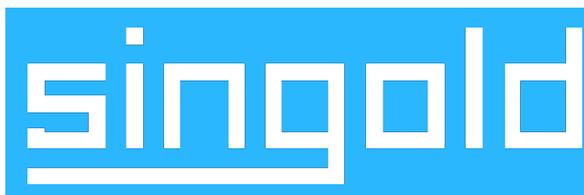
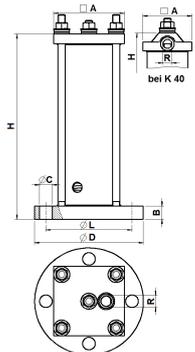
4.8 All screws and nuts must be checked with a torque wrench on the correct screw tension.

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.



singold gerätetechnik gmbh

DE 86830 Schwabmünchen

Telefon +49(0)8232/71036 www.singold-tech.de Fax+49(0)8232/71036