

These operating instructions apply to:

PKL 190
PKL 450
PKL 740

PKL 2100
PKL 5000
PKL 10000



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Scope of delivery

Please refer to the delivery note for the scope of delivery.
 Check the packaging for possible transport damage. In the event of damage to the packaging, check the contents for completeness and possible damage. Inform the carrier in the case of damage.

Designation

The pneumatic impactors of the series PKL are hereafter referred to as „PKL“.

Version number

document no.	1468E
version no.	1
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1 General information


Use and storage	Before installing the PKL read these operating instructions carefully. It is the basis for any action when dealing with the PKL, and may be used for training purposes. The operating instructions should be subsequently stored at the operation site.
Target group	The target group for these operating instructions is technical staff, who have basic knowledge in pneumatics and mechanics. Therefore, only staff who are trained in these fields may work on the PKL. The PKL may only be installed, put into operation, maintained, troubleshot and disassembled by persons authorised by the operator.
Copyright	This documentation is protected by copyright. NetterVibration reserves all rights such as translations, reprinting and reproduction of the operating instructions, as well as parts thereof.
Limitation of liability	All technical information, data and instructions for installation, operation and maintenance in these operating instructions are based on the latest information available at the time of printing and take our past experience to the best of our knowledge into account. No claims can be derived from the information, illustrations and descriptions in these operating instructions. The manufacturer does not assume liability for damages resulting from: <ul style="list-style-type: none">• failure to observe the operating instructions,• improper use,• unauthorised repairs,• technical modifications,• use of non-permissible spare parts. Translations are made to the best of our knowledge. NetterVibration does not assume liability for translation errors, even if the translation was made by us or on our behalf. Only the original German text remains binding.
Directives / standards observed	The pneumatic impactors of the series PKL comply with the EC Machinery Directive 2006/42/EC. In particular, the standard EN ISO 12100 has been observed.
Special features of the PKL	<ul style="list-style-type: none">• high impact force• low air consumption• reduced sound level due to an elastomer impact plate


Instruction and warning symbols

The following instruction and warning symbols are used in these operating instructions:

Personal injuries

⚠ DANGER	
	signifies an immediate danger. Disregard of this notice will result in death or severe bodily injuries.

⚠ WARNING	
	signifies a potential danger. Disregard of this notice can result in death or severe bodily injuries.


⚠ CAUTION	
	signifies a potentially dangerous situation. Disregard of this notice can result in minor or moderate bodily injuries.

Material damages

NOTICE	
signifies potential material damage. Disregard of this notice can result in material damage.	

Notes

IMPORTANT	
indicates actions, methods or notes that are not relative to safety, e.g. useful information and tips.	

	Environmentally safe disposal indicates the obligation of environmentally safe disposal.
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2 Safety

Intended use

General areas of application of the PKL are for knocking off adhesive bulk materials from container walls (e.g. silos, hoppers, filter outlets, pipelines and reactors) and for emptying residues from weighing containers. The PKL also prevent bridging and rat-holing, so that the material can continuously flow.

The PKL can be used outdoors and in dusty environments, however not in water or any other liquids.

PKL may only be operated with a timed on/off sequence.

Any other use is considered improper.

Qualification of qualified personnel

Installation, commissioning, maintenance and troubleshooting of the PKL may only be performed by authorised qualified personnel

All handling of the PKL is the responsibility of the operator.

Liability

IMPORTANT

NetterVibration assumes no liability for personal injuries and material damages if technical changes to the product were made or the notices and regulations in these operating instructions were not observed.

Falling parts

⚠ DANGER



Falling parts


The PKL, construction parts as well as fastening and locking screws can come loose due to vibration. Falling parts lead to severe personal injuries.

- Use only Netter fastening kits (NBS) to fasten the PKL.
- The PKL 190, PKL 450 and PKL 740 are open on the side of impactation. During installation ensure that the impact piston remains in the housing.
- Mount the PKL 2100, PKL 5000 and PKL 10000 additionally with an impact plate and two damper rings (flange and impact plate) or with an EE kit and a damper ring (flange).
- Check the fastening and locking screws after one hour of operation and thereafter at regular intervals (generally monthly).
- Retighten the fastening and locking screws, if necessary.
- A safety device with a safety cable is mandatory for critical mounting situations.

Compressed air

⚠ WARNING	
Compressed air	
A loosened hose which is under pressure can lead to personal injuries.	
<ul style="list-style-type: none"> ➤ Screw the hose lines on carefully. ➤ Check the hose lines and connections after one hour of operation and thereafter regularly (generally monthly). ➤ Retighten the hose lines, if necessary. ➤ Ensure that the compressed air is disconnected from the supply lines during all work on the PKL. ➤ Prevent the PKL from being switched back on during all work. 	

Sound level

⚠ WARNING	
	Sound level Near the PKL or near constructions connected to the PKL E the sound pressure level may exceed 80 dB(A). Human hearing can be permanently damaged by high noise levels. <ul style="list-style-type: none"> ➤ Use hearing protection during work in a noisy area if 80 dB(A) is exceeded. ➤ Mount the PKL preferably with an EE kit.

Loose parts

⚠ CAUTION	
Loose parts	
The PKL are not mechanically closed on the side of impact. The impact piston and/or the impact plate are loosely mounted. Falling parts can lead to personal injuries and material damage.	
<ul style="list-style-type: none"> ➤ Ensure that the impact piston and/or impact plate remain in the housing when mounting and dismantling. 	

3 Technical data

Parameters

Type: PKL...	Weight of piston [kg]	Force of impact * [kg]	Optimum operating pressure [bar]	Air consumption/impact at optimum pressure [NI]	Overall weight [kg]	Suitable for wall thickness of... [mm]
190/4	0.19	0.43	4.0	0.20	0.8	1 - 2
190/6	0.19	0.60	6.0	0.20	0.8	1 - 2
450/4	0.44	0.56	4.0	0.40	1.6	1 - 3
450/6	0.44	0.92	6.0	0.60	1.6	1 - 3
740/3	0.74	1.30	3.0	0.50	2.6	2 - 4
740/4	0.74	1.80	4.0	0.70	2.6	2 - 4
740/5	0.74	2.10	5.0	0.80	2.6	2 - 4
740/6	0.74	2.70	6.0	1.00	2.6	2 - 4
2100/4	2.10	4.20	4.0	5.20	6.7	3 - 5
2100/5	2.10	6.20	5.0	6.50	6.9	3 - 5
5000/4	4.96	6.60	4.0	5.70	16.0	4 - 8
5000/6	4.96	10.60	6.0	8.60	16.5	6 - 12
10000/6	10.00	17.50	6.0	15.10	34.0	> 10

*) The force of impact corresponds to the impact of the given weight falling from a height of 1 m.

Type designation

The type designation of the PKL has the suffix /3, /4, /5 or /6. The suffix is derived from the optimum operating pressure, i.e. the PKL 740/4 achieves the optimal effect at an operating pressure of 4 bar.

Permissible operating conditions

Drive medium	NetterVibration recommends operating the PKL with clean, oiled compressed air. Filter ≤ 5 µm, quality class in accordance with ISO 8573-1 The PKL are, in principle, suitable for operation with oil-free compressed air or nitrogen .	
Lubrication	ISO viscosity class in accordance with DIN 3448, VG 5 bis 15 Fill mist lubricator with acid- and resin-free compressed air oil.	
	Recommendation for temperatures of up to 60 °C: Klüber „AIRPRESS 15"	Recommendation for temperatures over 60 °C with HT-versions: Aral „Farolin U“ lubrication oil
Ambient temperature*	Standard: -20 °C to 60 °C	HT versions: -20 °C to 160 °C depending on version
	The permissible ambient temperatures must not fall below or exceed the above temperatures during operation.	
Operating pressure*	Operating pressures must be between 2,0 bar and 6,0 bar. The actual air pressure set on the regulator must not exceed the optimum operating pressure by more than 1 bar.	
Impact frequency	The following impact sequence must not be exceeded: Maximum 10 strokes in sequence at an impact frequency of 15 strokes/min and 180 strokes/h.	

*) Higher operating pressures and temperatures are permitted only after consultation with and written consent by the application technicians of **NetterVibration**.

Noise level

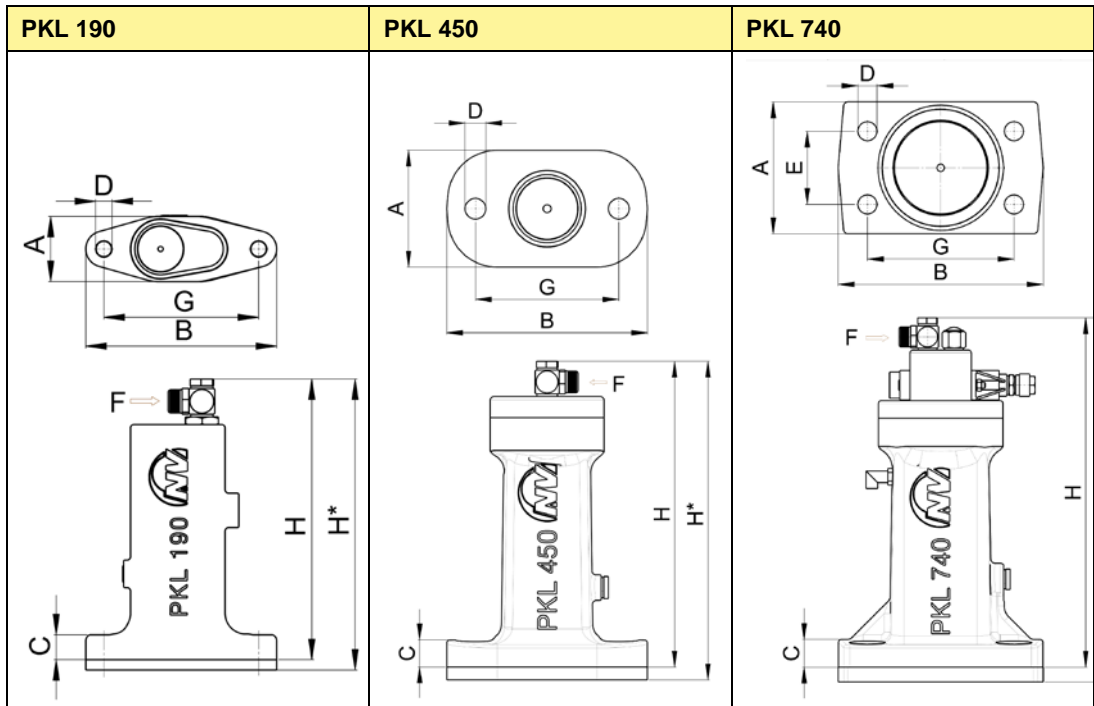
The noise level of the PKL may exceed 80 dB(A) (single noise incident). Depending on the impact sequence the continuous noise level is below this value.

The PKL should be preferably mounted with the EE kit. The noise reduction is about ca. 5 dB(A) (single noise incident).

The sound emitted by the PKL can be dampened by hoods (on request). This is only worthwhile if the impacted sheet metal is also insulated (e.g. by heat insulation material).

Dimensions

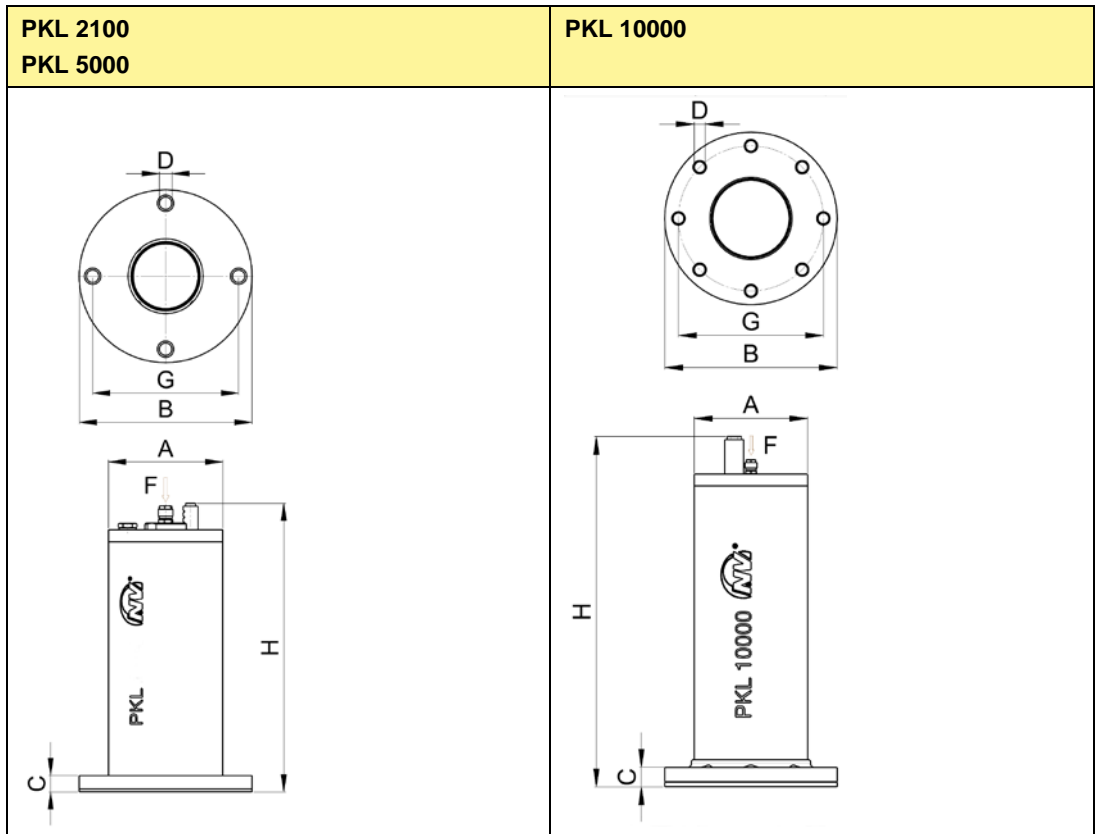
**PKL
190 /
450 /
740**



Type: PKL...	A [mm]	B [mm]	C [mm]	Ø D [mm]	E [mm]	F	G [mm]	H [mm]	H* [mm]
190	38.0	111	15	9.0	-	G 1/8, NW 6 × 1	90.0	163.5	169.5
450	73.5	126	14	13.0	-		90.0	192.0	200.0
740	90.0	140	15	13.0	50		100.0	238.5	248.5

*) with EE kit

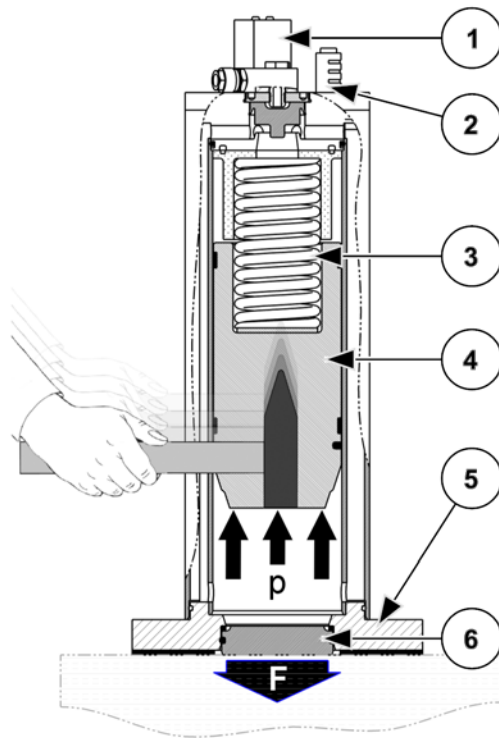
Dimensions
PKL
2100 /
5000 /
10000



Type: PKL...	A [mm]	B [mm]	C [mm]	Ø D [mm]	E [mm]	F	G [mm]	H [mm]
2100	Ø120.0	Ø180	17	13.0	-	G 1/8, NW 6 x 1	Ø152	300.5
5000	Ø114.3	Ø180	22	17.0	-		Ø152	376.5
10000	Ø 145.0	Ø220	25	17.0	-		Ø185	445.0

4 Design and function

Design



- 1 Quick air-exhaust valve
- 2 Silencer
- 3 Springs
- 4 Piston
- 5 Flange
- 6 Impact plate
- p Compressed air
- F Impact force

Function

The PKL is a pneumatic „hammer“. Compressed air (p) goes under the piston (4) and presses it against one or two springs (3).

When exhausting, the air chamber beneath the piston empties abruptly via the quick air-exhaust valve (1).

The piston (4) (hammer) is struck by the spring force against an impact plate (6), which then passes the impact force (F) on. For PKL without an impact plate (PKL 190, PKL 450 and PKL 740), the piston strikes directly against the fastening surface. The impact plate in the standard types (PKL 2100, PKL 5000 and PKL 10000) is always made of steel and can also be replaced by an elastomer impact plate, if necessary.

The air escapes via the silencer (2).

The PKL only work when mounted, as the piston chamber is then sealed by a built-in O-ring in the mounting surface.

Features of PKL 740

A quick-air exhaust valve and a 3/2-way valve are integrated in the valve head of the PKL 740. Therefore, the control valve on the customer's site can be mounted at any distance away from the PKL 740.

The control air must be connected at the side. A silencer is mounted on the exhaust air outlet.

ST kit

The ST kit allows a continuous impact sequence with permanent compressed air supply.

EE kit

The EE kit reduces the noise level and generates a rubber hammer effect.

5 Transport and storage

Transport conditions

Special transport conditions are not required.

When moving the PKL 10000, use the mounted transport lugs at the top of the housing.

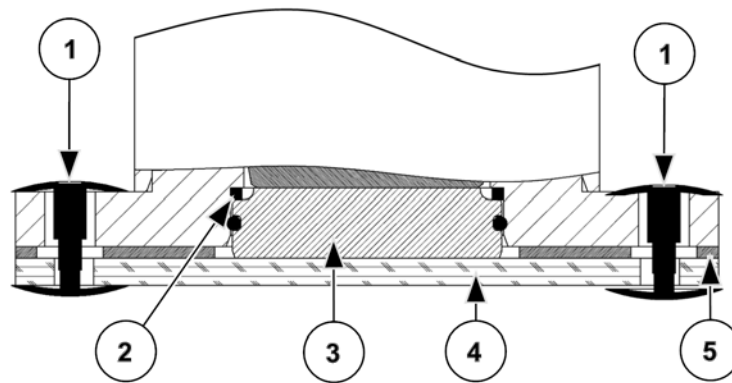
Packaging

The PKL are packed and ready for assembly. Accessories and add-on parts are delivered unmounted, unless otherwise agreed upon.

The packaging protects the PKL from transport damage. The packaging material has been selected from an environmentally safe and technically disposable point of view and is therefore recyclable.

The return of packaging to the material cycle conserves raw materials and reduces the amount of waste.

Transport safety device PKL 2100 / 5000 / 10000



- | | | | |
|---|--------------------------------------|---|---------------------------|
| 1 | Plastic fastening | 4 | Corrugated cardboard disc |
| 2 | Damper ring (for steel impact plate) | 5 | Damper plate (flange) |
| 3 | Impact plate | | |

The PKL 2100, PKL 5000 and PKL 10000 are delivered with a transport safety device at the bottom. The transport safety device consists of 2 plastic fastenings and a corrugated cardboard disc. It prevents the impact plate from falling out during transport and must be removed before installation. Take care that the impact plate and damper plate retain their position on the PKL, as they must be mounted with the PKL.

Storage

- Store the PKL in a dry and clean environment.
- The storage temperature is between -20 °C and +60 °C.
- Close all openings when re-storing.
- Preserve the PKL before storage:
 1. Screw or clamp the PKL on a plate. The impact plate of the PKL 2100, PKL 5000 and PKL 10000 must be inserted.
 2. Apply anti-corrosion oil to the air inlet and briefly activate the PKL.

6 Installation

Safety instructions

IMPORTANT

Observe the safety instructions in Ch. Safety, page 5.

Procedure

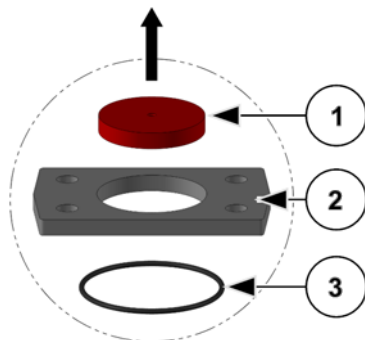
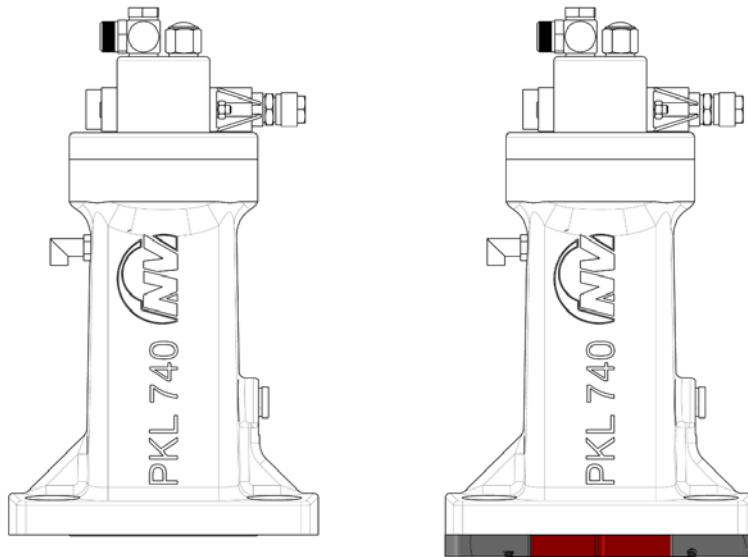
When installing the PKL carry out the following steps in succession:

Instructions for EE kit

PKL
190 /
450 /
740

Install the EE kit on the PKL 190 / 450 / 740 between the flange of the PKL and the mounting surface so that

- the piston of the PKL strikes the elastomer disc (1).
- the O-ring (3) is between the spacer plate (2) and the mounting surface.



EE kit:

- 1 Elastomer disc
- 2 Spacer plate
- 3 O-ring

The spacer plate is delivered together with the O-ring.

Example: PKL740

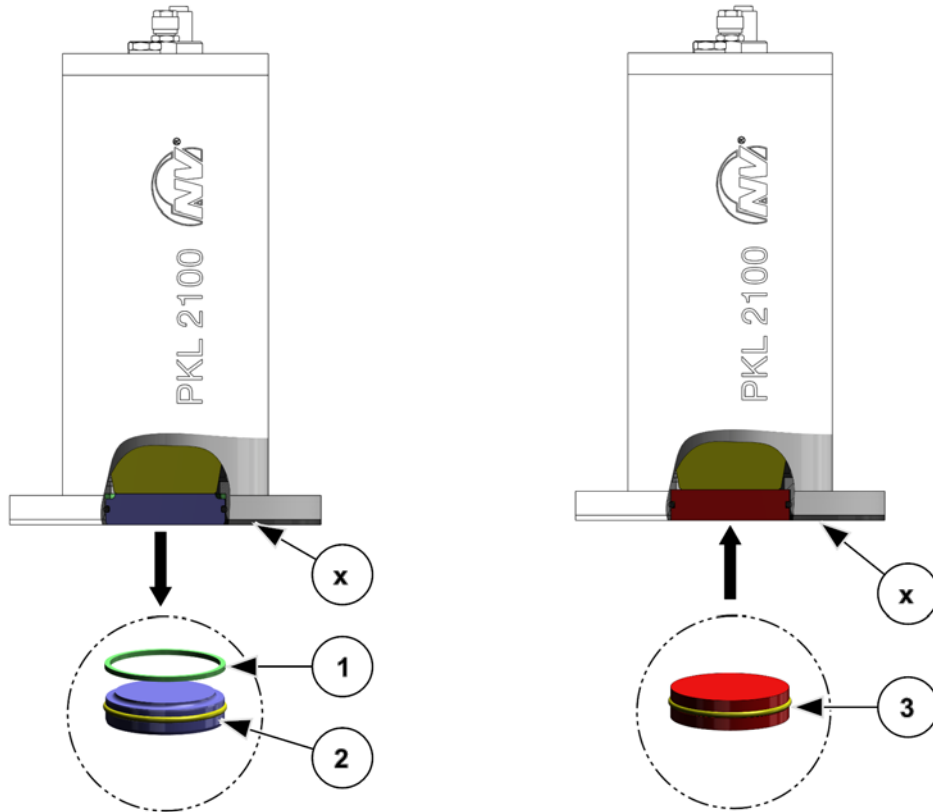
For detailed information, please refer to the mounting instructions for the respective PKL type.

**Instructions
for EE kit
PKL
2100 /
5000**

Install the EE kit on the PKL 2100 / 5000 as follows:

1. Remove the steel impact plate with the O-ring (2) and the damper ring (impact plate, 1).
2. Insert the EE impact plate with the O-ring (3) in such a way that the piston of the PKL strikes against the EE impact plate (3).

Ensure that the damper ring (flange, x) is between the flange of the PKL and the mounting surface.



- 1 Damper ring (impact plate)
- 2 Steel impact plate with O-ring
- x Damper ring (flange)

- 3 EE kit:
EE impact plate with O-ring
 - x Damper ring (flange)
- The EE impact plate is delivered together with the O-ring.

Example: PKL 2100

For detailed information, please refer to the EE kit mounting instructions for PKL 2100 / 5000.

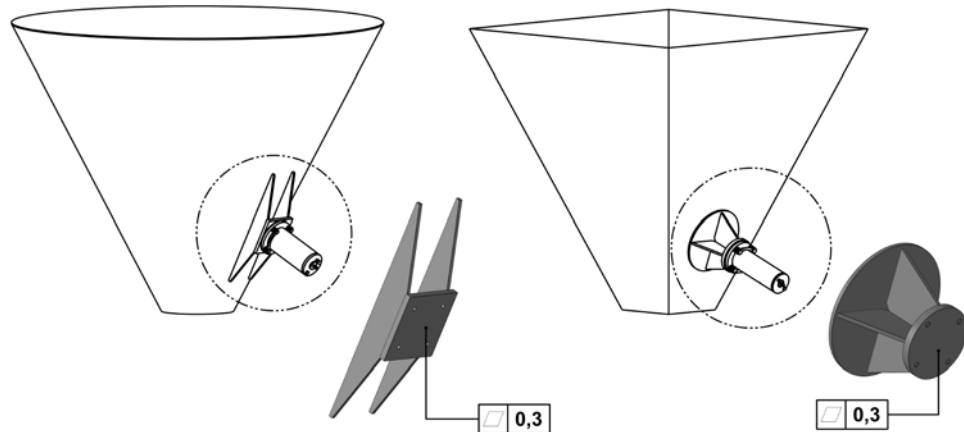
Fastening devices

NetterVibration delivers the appropriate fastening devices for installation of the PKL:

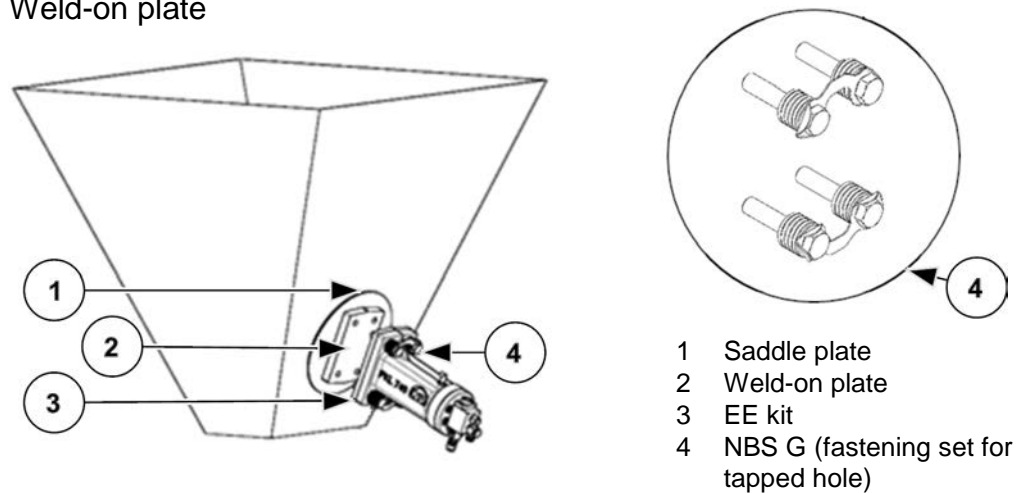
weld-on consoles or weld-on plates (± 0.3 mm flatness)

- Weld the consoles directly onto the container walls.
- Weld the plates onto previously mounted saddle plates (1.5 times the sheet thickness of the container).

Weld-on console, plane (left) and round (right)



Weld-on plate



Fastening kits

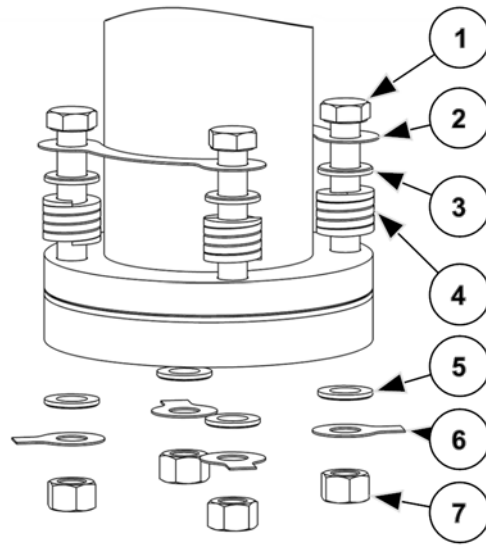
For safe and permanent fixation of the PKL to the device use the compulsory fastening kits.

The following versions are available for every PKL type:

Description	Difference
NBS ... G (e.g. NBS 5000 G)	for tapped hole
NBS ... D (e.g. NBS 740 D)	for through-hole
NBS ... (e.g. NBS 190)	without screws

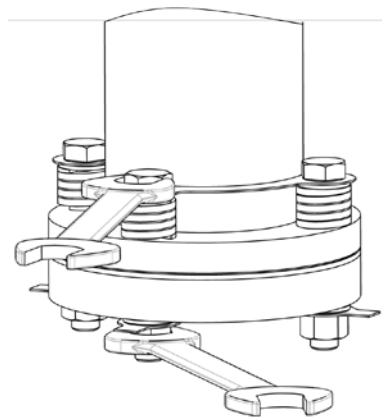
... corresponds to the PKL type: 190 / 450 / 740 / 2100 / 5000 / 10000

Instructions fastening kit



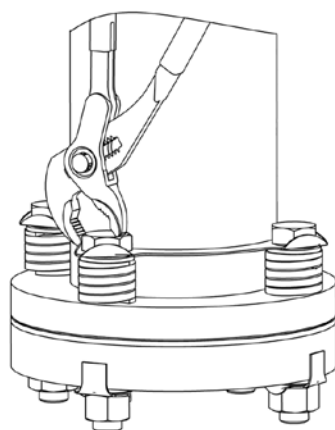
Components of the fastening kit using the example NBS D:

- 1 Hexagon bolt
- 2 NBS lock plate
- 3 Washer
- 4 Damper spring
- 5 Washer (only for NBS D)
- 6 Tab washer with long tap (only with NBS D)
- 7 Nut (only for NBS D)

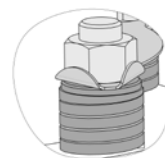


The damping springs must be mounted on the flange of the PKL.

1. Tighten the screw connections evenly, until the damping springs are completely pressed together.
2. Loosen the screw connections by one revolution.



Then fold **all** protruding roundings of the lock plates towards all bolt heads, with NBS D also towards all nuts, as follows:



For NBS D fold all long taps of the tab washers towards the mounting plate.

For detailed information, please refer to the respective Mounting Instructions (NBS G mounting kits or D mounting kits).

Instructions for ST kit

The ST kit connects the control port to the piston chamber. The PKL equipped with the ST kit strikes as long as there is compressed air.

- For PKL 190 / 450 proceed as follows:
 - Mount the ST screw fitting (after the NBS).
 - A 3/2-way valve with air supply is necessary.
- For PKL 740 proceed as follows:
 - Replace the silencer with the compressed air connection.
 - Only one air supply is necessary.
- Order the PKL 2100 directly with the ST control.
- For PKL 5000 proceed as follows:
 - Mount the control valve of the ST control to the PKL.
 - The control valve is connected internally to the piston chamber, the ST control is integrated in the PKL.

For detailed information, please refer to the Assembly Instructions for the ST kit.

Components for all installations

For all installations, use a ball valve to shut off the main line and a maintenance unit.

The maintenance unit should comprise a filter, a regulator and a mist lubricator (see Ch. Technical data, page 7; "Drive medium").

Connect the PKL with the pneumatic hose according to the following depicted pneumatic circuit diagrams.

Define the impact sequence of the PKL with an electrical control, e.g. the Netter Electronic Timer AP 117. Electrical or pneumatic controls are available on request.

Specifications for valves and hoses

Recommended cross-sections for control lines, control valves and main air supply: NW 6 × 1

To connect the control valve to the PKL:

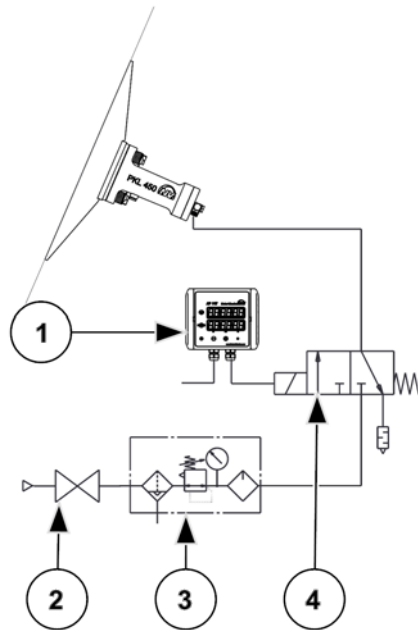
- NW 6 should be used and
- a length of 15 m should not be exceeded.

For simultaneous operation of several PKL

- larger cross-sections are to be provided for the main line up to distribution to the individual PKL.
- the total length of the compressed air supplies is max. 50 m.

**Standard installation
PKL 190 /
450 /
2100 /
5000 /
10000**

Example: PKL 450



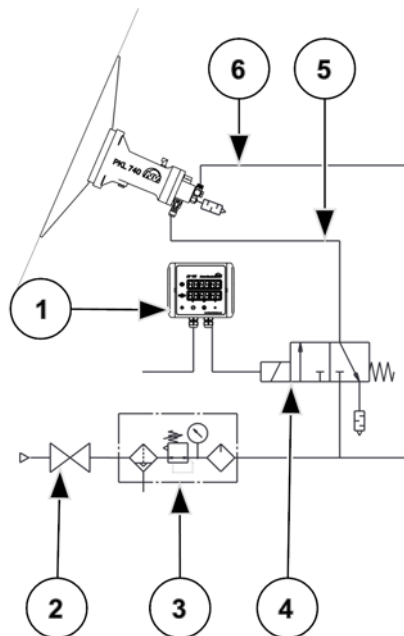
- 1 Electronic Timer AP
- 2 Ball valve
- 3 Maintenance unit
- 4 3/2-way valve

Use a 3/2-way valve (4) for actuation.

By switching the valve, the piston chamber is vented and exhausted and the PKL therefore strikes.

Mount the 3/2-way valve (4) at a distance of max. 15 m.

**Standard installation
PKL 740**



- 1 Electronic Timer AP
- 2 Ball valve
- 3 Maintenance unit
- 4 Actuating valve on customer's site
- 5 Control line
- 6 Main air

The PKL 740 is the only PKL with a 3/2-way valve integrated in the valve head.

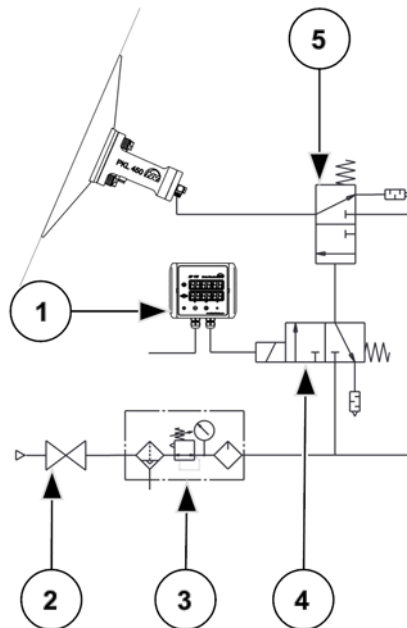
By switching the valve, the piston chamber is vented and exhausted and the PKL therefore strikes.

The main air (6) is present at the valve head. The control line (5) from the actuating valve on the customer's site (4) to the PKL may be very long (e.g. 50 m). The charging time of the PKL is several seconds for longer supply and control lines.

For long air lines, set a pause and duty time on the Electronic Timer AP (1) to a minimum of at least 5 seconds. If shorter lines are used, reduce these times accordingly, e.g. to 2-3 seconds.

**Installation with long supply line
PKL
190 /
450 /
2100 /
5000**

Example: PKL 450



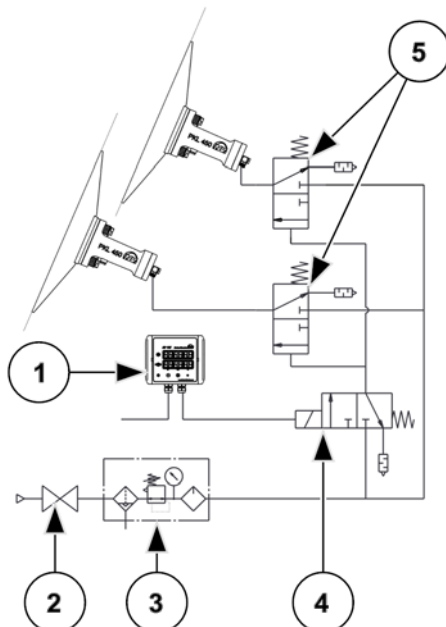
- 1 Electronic Timer AP
- 2 Ball valve
- 3 Maintenance unit
- 4 Actuating valve on customer's site
- 5 3/2-way air valve

The main air is always at the 3/2-way air valve (5) max. 1 m away from the PKL. The control line from the actuating valve (4) on the customer's site to the PKL may be longer (e.g. 50 m).

For longer supply and control lines, the charging time of the PKL is several seconds. For long air lines, set a pause and duty time on the Electronic Timer AP (1) to a minimum of at least 5 seconds. If shorter lines are used, reduce these times accordingly, e.g. to 2-3 seconds.

Installation of several PKL

Example: PKL 450



- 1 Electronic Timer AP
- 2 Ball valve
- 3 Maintenance unit
- 4 Actuating valve on customer's site
- 5 3/2-way air valve

Operate several PKL in parallel with just one control and an actuating valve (4), if required.

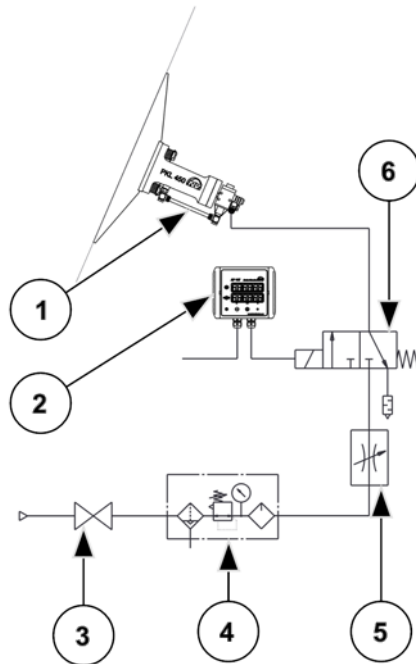
The connection lines from the 3/2-way valve (5) to the PKL must be max. 1 m long, otherwise the control piston or the membrane in the PKL moves too slowly and does not reach the end position.

If required, install the actuating valve (4) at a larger distance if additional 3/2-way air valves (5) are used.

If several PKL are in operation, the supply line must not be longer than 50 m.

**Installation with ST kit
PKL 190 / 450 /
2100 / 5000 /
10000**

Example: PKL 450

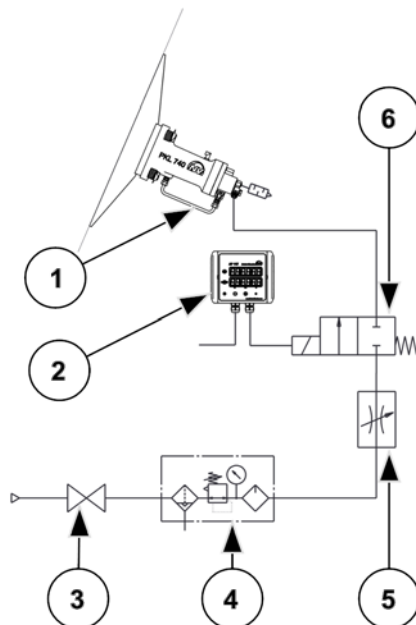


- 1 ST kit
- 2 Electronic Timer AP
- 3 Ball valve
- 4 Maintenance unit
- 5 Non-return throttle valve
- 6 3/2-way valve

The PKL, equipped with an ST kit (1), strikes as long as pressure is applied. The PKL thereby achieves a maximum impact frequency of up to one strike/second, which must be reduced to the permissible impact frequency (e.g. with a non-return throttle valve (5) inserted in the supply line).

A 3/2-way valve (6) enables operation of the PKL equipped with an ST kit at a larger distance (up to 50 m).

**Installation with ST kit
PKL 740**



- 1 ST kit
- 2 Electronic Timer AP
- 3 Ball valve
- 4 Maintenance unit
- 5 Non-return throttle valve
- 6 2/2-way valve

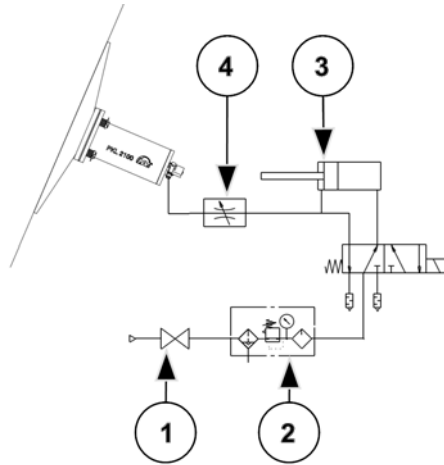
The PKL 740, equipped with an ST kit (1), strikes as long as pressure is applied.

The PKL thereby achieves a maximum impact frequency of up to one strike/second, which must be reduced to the permissible impact frequency (e.g. with a non-return throttle valve (5) inserted in the supply line).

A 2/2- or 3/2-way valve (6) enables operation of the PKL 740 equipped with an ST kit at a larger distance (up to 50 m).

Installation with coupling to other functions

Example: PKL 2100



- 1 Ball valve
- 2 Maintenance unit
- 3 Opening cylinder
- 4 Non-return throttle valve

If the PKL is equipped with an ST kit, then it can be coupled with another function without a control or a pulse generator. The adjacent illustration shows the coupling with an opening cylinder (3) of a weighing container.

The PKL is now not actuated. When opened, it strikes at the set number of cycles on the non-return throttle valve (4), as long as the flap is open.

Checklist installation

Check that the following steps have been carried out:

- Permissible ambient temperatures observed?
- Fastening device mounted (± 0.3 mm flatness)?
- PKL mounted with NBS fastening set?
- PKL 2100, PKL 5000 and PKL 10000 mounted with damper ring (flange)?
- Ball valve, maintenance unit (filter, regulator, mist lubricator), valve and supply line mounted?
- Information on hose length and nominal width observed?
- Fastening screws and hose lines secured with an adhesive (e.g. Loctite®), **if required**?
- PKL in critical assembly situations secured against falling by means of a safety cable?

7 Start-up and operation

Safety instructions	IMPORTANT	
	Observe the safety instructions in Ch. Safety, page 5.	
Permissible operating conditions	Please refer to Ch. Technical data, page 7 for permissible operating conditions.	
Design of mist lubricator	<p>When selecting the mist lubricator, take into consideration that the air consumption of the PKL is very low. The choice of mist lubricator depends on how many PKL are operated simultaneously.</p> <p>Mist lubricators with 1/8"- and 1/4"-connections are recommended. Larger mist lubricators may not react.</p>	
Setting mist lubricator	Set the mist lubricator to the smallest safely adjustable number of drops while the PKL is running. The PKL is ready for operation only after adjustment and correct functioning of the mist lubricator.	
Regulation impact frequency	<p>PKL with ST control: impact frequency can be set by the non-return throttle valve.</p> <p>PKL without ST control: regulation of impact frequency is set by an external control, e.g. a 3/2-way valve and a Netter Electronic Timer (AP).</p>	
Regulation impact force	The impact force can be reduced by lowering the pressure (exception PKL with ST kit). Throttling the air supply (by using a non-return throttle valve, shut-off valve, etc.) does not reduce the impact force but delays the charging time.	
Checklist start-up	Check that the following steps have been carried out:	
	Hose connections checked before installation?	<input type="checkbox"/>
	For installation without ST kit:	
	Desired impact force set on pressure regulator?	<input type="checkbox"/>
	For installation with ST kit and impact frequency control with a non-return throttle valve:	
	Impact frequency set optimally?	<input type="checkbox"/>
	Note that a high impact frequency reduces the service life and leads to a high sound level.	
	Mist lubricator set, if applicable?	<input type="checkbox"/>
	After one hour of operation:	
	Hose supply connections, fastening and locking screws checked and tightened, if necessary?	<input type="checkbox"/>
	Observe the maintenance plan.	

8 Maintenance and servicing

Safety instructions

IMPORTANT	
Observe the safety instructions in Ch. Safety, page 5.	

Maintenance plan

Maintenance of the PKL must be carried out as follows:

Interval	Action
After one hour of operation after initial commissioning	Check fastening and locking screws.
	Check hose screw connections and hose connections and retighten, if necessary.
Monthly	Check fastening and locking screws.
	Check hose screw connections and hose connections and retighten, if necessary.
	Check hose supply connections for permeability and kinks. If necessary, clean and remove kinks.
	Check the function of the silencer.
	Check impact effect.
	Ensure that mist lubricator operates according to regulations (content decreases? number of drops/h? Refill oil.
At the latest after a total of 500,000 strokes	Empty the filter of the maintenance unit if necessary, clean the filter insert (wash out) and replace if necessary.
	Carry out the general overhaul, in which all wear parts must be replaced.

Cleaning

In the course of its service life, a film can form due to wear, which impairs functioning. If loss in performance or standstill is noticed, proceed as follows:

1. Remove piston.
2. Clean piston.
3. Replace guide ring and piston seal, if necessary.
4. Reinsert piston.

Special tools are needed for inserting piston, guide rings and piston seal (available on request).

Maintenance intervals

The maintenance intervals depend essentially on the service life, how clean the drive medium is and the lubricant used. Unfiltered compressed air leads to high wear, blockage of the silencer and complete breakdown of the PKL.

Implementation by Netter

Maintenance, repair and general overhaul of the PKL may alternatively be performed by **NetterVibration**.

9 Troubleshooting

Disturbances and causes

In the case of disturbances of the PKL proceed as follows:

Possible causes	Troubleshooting	Corrective actions
Disturbance: does not function		
Mounting surface not flat	Loss of pressure via O-ring?	Establish ± 0.3 mm flatness on mounting surface.
Malfunction of valve and control	Check PKL without valve and control.	Check 3/2-way valve and control, and replace if necessary.
Air supply	Check pressure.	Set operating pressure.
	Check valve connection.	Replace valve, if necessary.
Disturbance: does not function and has leakage at top		
Wear of seals	Check seals of impact piston and control piston (PKL 190).	Replace seals of impact piston and control piston.
General wear	Housing, membranes and control piston worn out?	Replace affected parts and seals.
Disturbance: does not function and has leakage on mounting surface		
PKL incorrectly mounted	Check fastening screws.	Tighten fastening screws and replace, if necessary.
Mounting surface not flat	Check mounting surface.	Establish ± 0.3 mm flatness on mounting surface.
	Check O-ring.	Insert O-ring in groove, replace if damaged.
Disturbance: does not function with ST kit		
Operating pressure insufficient	Check PKL model. Check pressure.	Increase pressure.
Disturbance: impact weak		
Air supply	Check pressure.	Set pressure.
Contamination of control valve	Check control valve.	Clean control valve or replace, if necessary.
Contamination of silencer	Check silencer.	Clean silencer.
Wear, leakage		Replace seals.

10 Spare parts and accessories

Ordering of spare parts

Please provide the following details when ordering spare parts:

- required amount
- description and position of spare part
- type designation of PKL

Possible accessories

Following accessories for the PKL are available:

Component	Description
NBS fastening sets	Compulsory for safe and permanent mounting (see Ch. Installation, page 14)
ST kit	When using these controls, sufficiently long pauses must be maintained between the individual impact sequences (see Ch. Installation, page 19).
Hose material and hose screw connections	For air supply (operational air, control air), in various qualities and dimensions
Way valves	Electrical, pneumatic, manual
Non-return throttle valves	For clock control of PKL with ST kit
Maintenance units	Filter, control unit with manometer, mist lubricator
Netter Electronic Timers	Electric (also for special voltages) or pneumatic controls
Fastening consoles	For round and rectangular containers, also for application on insulated containers, hoppers, etc.
Vacuum mounts, quick clamp devices	For quick relocation on containers, etc.
Sound protection hoods, EE kit	For noise reduction
Safety cable	For critical mounting situations
Flange in other dimensions; NBS in stainless steel	Special versions; further information on request

Following special models available on request:

- PKL for ATEX area,
- high and low temperature versions,
- stainless steel versions.

11 Disposal

Disposal costs



All parts of the PKL must be properly disposed of according to the material specifications. The valid disposal costs of the PKL are available on request.

Material specifications

Type	Stainless steel	Steel	Aluminium	PTFE, PU, VITON®, NBR
PKL 190		impact piston, compression springs	housing, control piston, EE spacer plate	seals, spring guide, impact ring
PKL 450 / 740		impact piston, compression springs, screws (galvanised)	housing, top cover, EE spacer plate	seals, membranes
PKL 2100	ST pipe PKL 2100 S: top cover, flange, outer pipe, reducer	impact piston, compression springs, impact plate, screws (galvanised)	inner pipe, top cover, flange, outer pipe, reducer, ST ring, ST plate PKL 2100 S: inner pipe	seals, damper rings, EE impact plate
PKL 5000	outer pipe, reducer, ST pipe, ST plate, ST connection angle PKL 5000 S: outer pipe, reducer, ST pipe, ST plate, ST connection angle, top cover, flange	impact piston, compression springs, impact plate, inner pipe, top cover, flange, screws (galvanised) PKL 5000 S: impact piston, compression springs, impact plate, inner pipe, screws (galvanised)		seals, damper rings, EE impact plate
PKL 10000		impact piston, compression springs, impact plate, inner pipe, top cover, flange, outer pipe, reducer, screws (galvanised)		seals, damper rings, EE impact plate

The valves and screw connections used for all types of PKL are made of plastics, brass and/or aluminium.

12 Annex

NetterVibration



Declaration of Incorporation
Pneumatic Impactors

21.12.2016
No. 4838E

**Declaration of Incorporation
according to the EC Directive 2006/42/EC, Annex II 1 B**

We hereby declare, that the

Pneumatic Impactors of the Series PKL

are partly completed machinery. They cannot function on their own. For this reason, they do not correspond in all respects to the relevant provisions of the above Machinery Directive. They correspond with the basic safety and health requirements of the Machinery Directive up to the interfaces described in the technical documentation.

When mounting in a machine or completing a machine that can function on its own, the specifications in the assembly instructions must be observed. Commissioning is not permitted until it is determined that the machine, which is to be mounted into an assembly, is functioning and corresponds to the protective requirements of the Machinery Directive.

The relevant technical documentation is compiled in accordance with Annex VII, Part B. The authorised persons as defined in Annex II, Part 1, Section B, No. 2, 2006/42/EC for the compilation of the technical documentation are Charlotte Mears and Ina Mertesdorf.

In response to a founded request by individual state departments, we will transmit a hardcopy of the technical documents by mail.

Mainz-Kastel, 21.12.2016



p.p. S. Tretner
(Head of Drive Engineering)

Serving industry with vibration

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