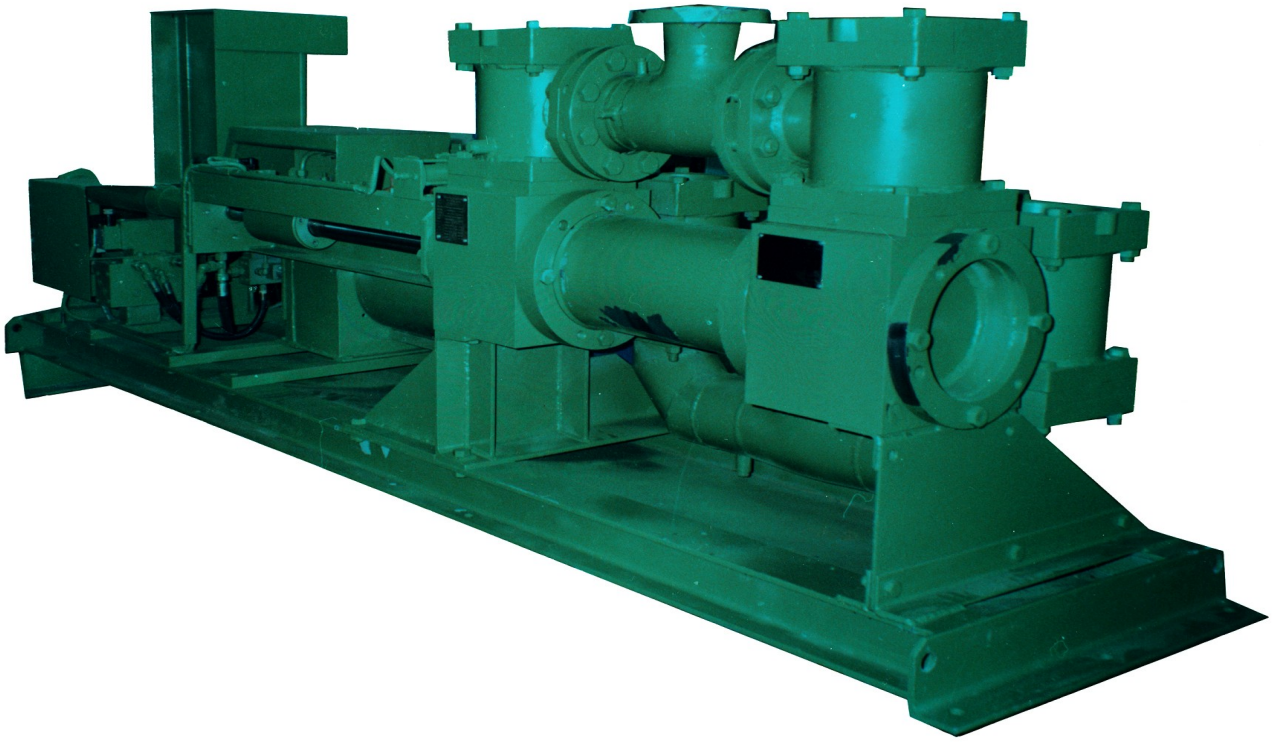
Korthaus

Piston Pump Type KH

hydraulically driven

slurry pump ***for handling of***

gas, fluids, sludge, slurries of high viscosity, media with high contents of solids and filter cake



Applications:

- Feeding of **filter presses**
- abrasive, viscous fluids and sludges
- abrasive **solvents**
- Dosing of sludges, fluids, etc.
- Sewage sludge
- Drain swamps and pumping of mud and oilslick out of oiltanks
- Suction of flotation-foam
- Pumping of **viscous solids** like **filter cake**

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Examples of Application

Pumping of **sewage sludge with 50% ground coal grain size 0-15mm** (0-0.6 in.) in a municipal water treatment plant. Controlling of the calorific power of the sewage sludge via electronic capacity control of the pump.

Korthaus-High-Pressure-Machines pump **extremely abrasive residues of sugar beets.**

Feeding of a **30 bar (430 psi) high pressure chamber filter press** in a municipal water treatment plant with **Korthaus KH** pumps.

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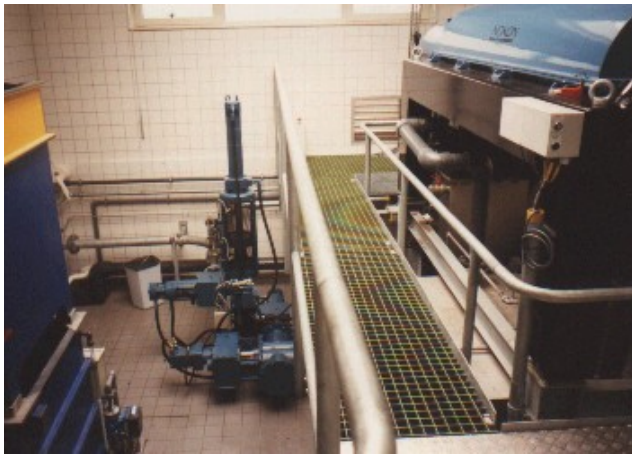
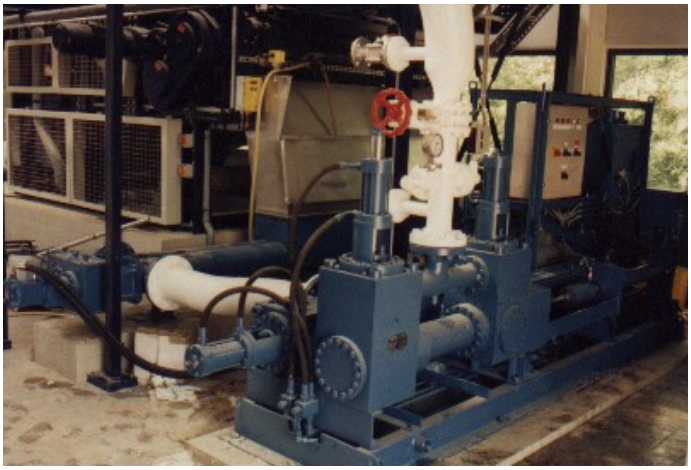
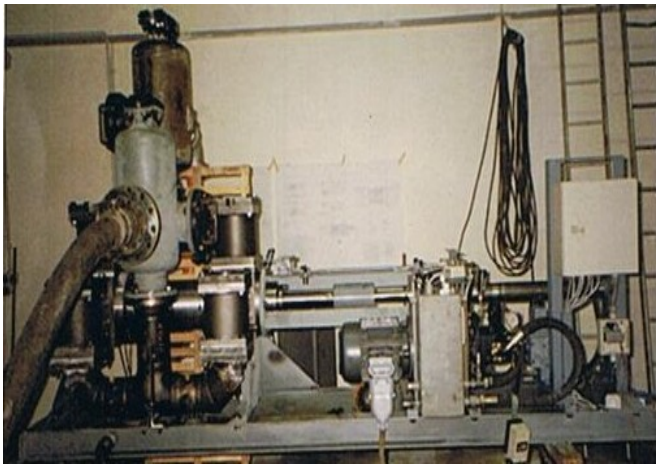
Examples of Application



Korthaus KH one cylinder **Filter Cake Plunger-Pump** with **Korthaus double feeding screw DS** transports dewatered sludge of a **centrifuge** through a pipeline in a municipal water treatment plant.

Korthaus Filter Cake Pump KH with **Korthaus double feeding screw DS** transports dewatered sludge of a **belt filter press** through a pipeline in a municipal water treatment plant.





Korthaus KH Pump feeds a filterpress with **highly viscous oil** containing **20% ironoxide** as a catalyst, grain size 0-3 mm (0-0.1 in), **temperature 120-240°C (248-464 °F)** in a **coal liquifaction plant.**
24 hour service since 1991.

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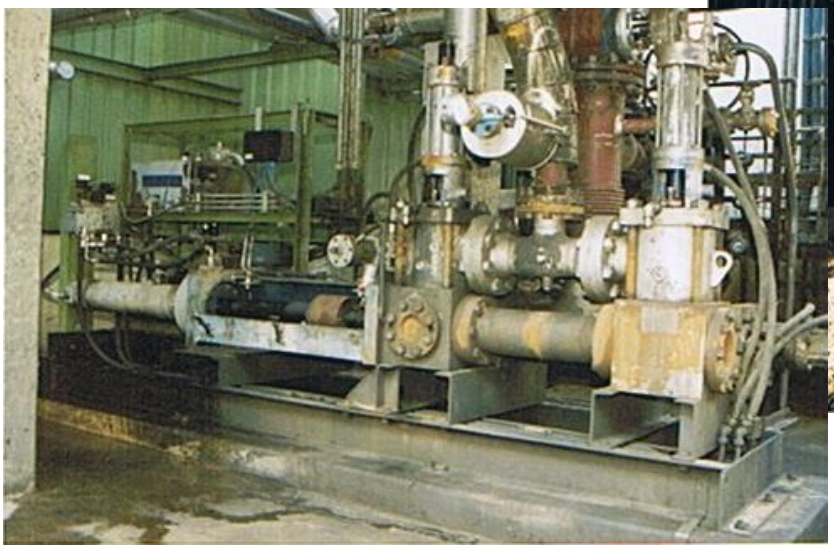
Examples of Application

Suction of **residues from a crude oil tank** with explosion proof **Korthaus KH pump**.
Liquid: Highly viscous crude oil residues containing sand and stone.
Pumping Data: Q=90m³/h (Q=118 cu.yd./h),
gas: vacuum 80%,
p=90 psi (p=6 bar)
Dry running period: possible without limit

Pumping of **oil residues with solvents** and **solids like spark plugs** into an incinerator with **Korthaus KH pumps**.



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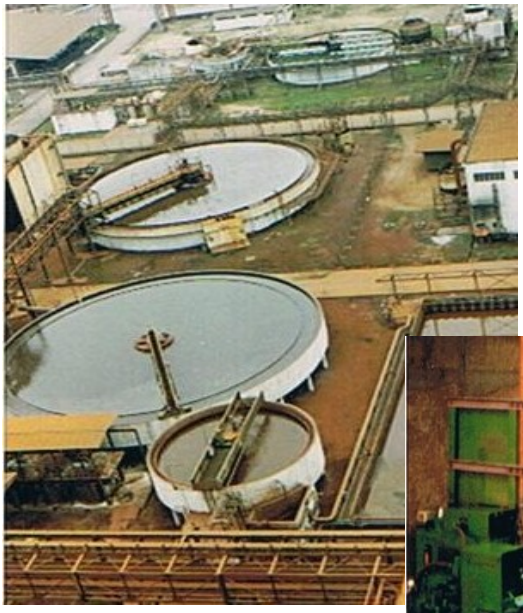
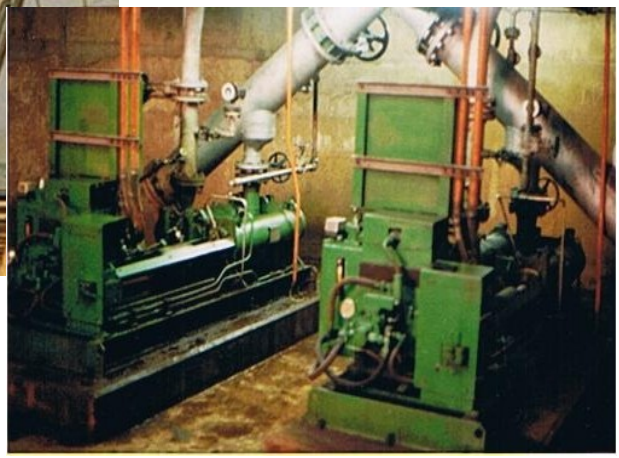
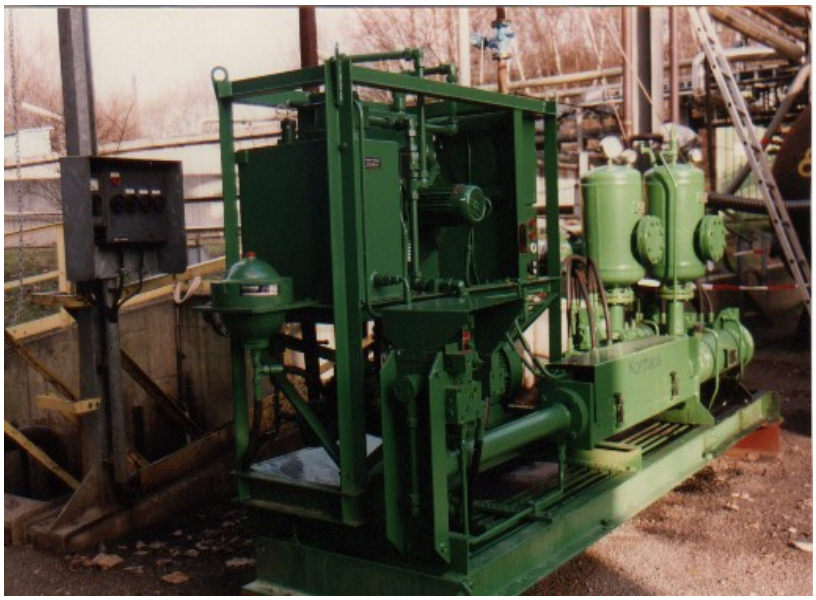
Examples of Application





Pumping of **filter ash** in a steel production plant with **Korthaus KH pumps**.
Grain size: **0 µm – 1 mm** (0 – 0.04 in)

Suction and pumping of **slop tar with solvents** with **Korthaus KH pumps.**
Liquid: The fluid is a sedimentated sludge from the bottom of a tank. The viscosity is like light honey up to a viscosity of warm tar. It is a mixture of several partially unknown solvents (tar derivative, phenol, methyl-naphthalene, bases and others) that is coming from the sewage plant of the aromatic hydrocarbon industry.



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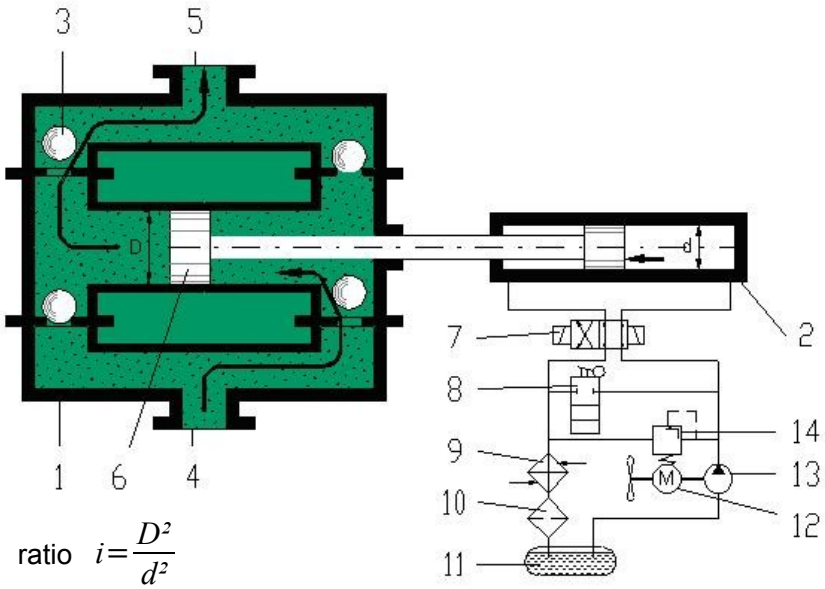
General Design

1. Pump housing
2. Hydraulic cylinder
3. Valves, fluid end
4. Suction nozzle
5. Discharge nozzle
6. Piston, fluid end
7. Directional control valve
8. Start-stop-valve
9. Cooler
10. Filter
11. Oil tank
12. Motor
13. Hydraulic Pump
14. Pressure relief valve

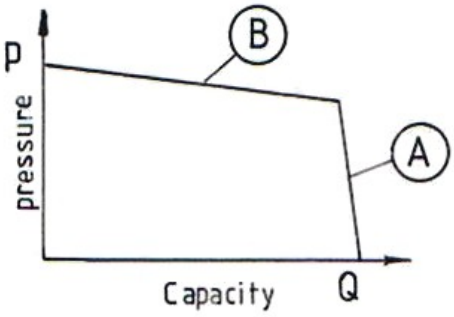


ratio $i = \frac{D^2}{d^2}$

A hydraulic cylinder (2) is driven by a hydraulic pump (13). The **Korthaus**-designed control unit (7) guarantees a smooth and noiseless reversal of the cylinder (2). The slurry-piston (6) is fixed to the piston rod and pumps the sludge. **As a result of a special design, hydraulic oil cannot be contaminated by the slurry** and the slurry cannot be contaminated by hydraulic oil. The valves of the fluid end (3) are designed as check-valves or as plate valves, actuated by hydraulic-cylinders. The pump can be stopped while the motor is running via the start-stop-valve. The pressure relief valve (14) limits the max. pressure on both the hydraulic and the slurry-side.
The hydraullic circuit is hermetically sealed and resistant to cotamination by e.g. dust of the surrounding atmosphere.

Characteristic

The characteristic line part A is typical for a positive displacement pump. When operating in part B, the pressure relief valve (14) is partially open and a heating of the oil is the result. When using a variable disaplacement pump (control systems R4, R5) as a driving pump, operating in part B of the characteristic is possible without losses of energy.
Characteristic lines of every pump are available on special request.



Pulsation of flow

Korthaus Cushion chambers, non-clog **Korthaus pipe dampers SP** or **Korthaus Plunger Accumulators** have to be arranged before and after the pump in order to avoid strong pulsations.

NPSH (Net postive suction head)

The extremely smooth hydraulic **Korthaus**-control unit allows values down to

NPSH ~ 1m

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Design Features

1. Valve designs

Ball-Valves for fluids with contents of long fibres, like hair.

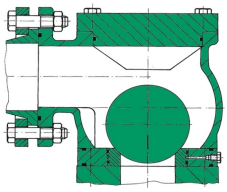
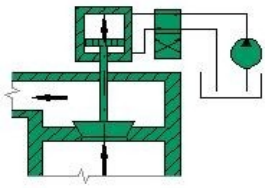
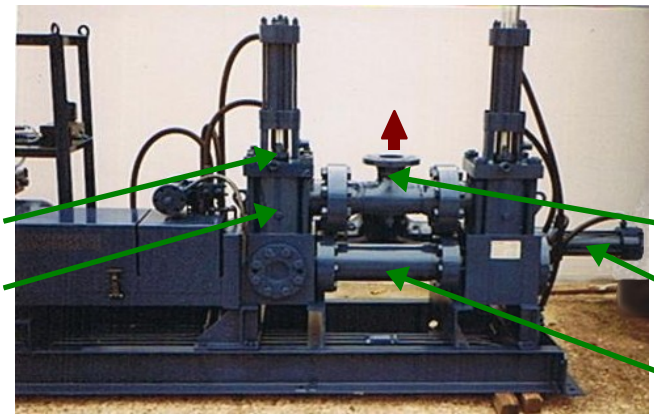


Plate-Valves, actuated by small **hydraulic cylinders** for highest viscosity and fluids with extreme contents best – and often the only – solution.

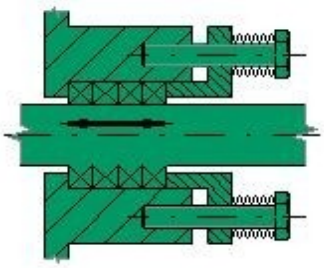


Korthaus KH pump with hydraullically actuated plate valves.



2. Sealings

For the sealing on the slurry-side, including the piston sealing, self-adjusting gland packing made of high strength material are used. Rubber is avoided because of short life time when working with abrasive media, solvents or high temperature.
An external indicator allows for the monitoring of the piston´s gland packing without opening the machine.



3. Liner, Piston-Rod

Liners and piston-rods are always hard-chrome-coated. Depending on the slurry requirements special coating materials are possible.

4. Temperature

Standard: 120 °C (248°F) or 240 °C (464 °F); On special request:max. 400 °C (750 °F)

5. Solvents

All standard machines are resistant to most solvents.

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Characteristics of Pumping

As a slow running displacement pump the **Korthaus KH piston pump** generally is able to handle all marterials that can be pumped. Longstroke-design, valves adapted to the fluids, armored liners and self-adjusting seals resulting in low wear.

Fluids with sedimentary solid, e.g. water/coal, water/chalk or oil/ferric oxide can be pumped easily through the self-cleaning design of the housing. Can be restarted from a dead stop.

Fluids with high viscostities are easily pumped because of the low velocities and low pressure losses of the valves.

Sewage with solids or long fibers (hair) will have no problem with ball valves. Large aggregate solids can be handled with hydraulically actuated plate valves.

Highly viscous slurries coming out of centrifuges or filter presses (e.g. rests of paint, dewatered sewages) have to be transported to the suction nozzle by a double feeding screw conveyor and can be pumped with hydraulically actuated plate valves.

When pumping **abrasive slurries** like sand or ferric oxide, low wear is expected because of armored liners and self-adjusting gland packing.

Suction of oil slick, requirements:

- dry-running for 3 hours
- (gas-)vacuum of **-0,8 bar** (-11 psi) (below atmospheric)
- pumping of high viscous oilslick (which will stay on the blade of a shovel) with desert sand and stones.

Dry running

For sealing of **piston pumps KH** only wear resistant materials are used. Therefore pumps **KH** can run dry for a short time or can start dry.
The **design F** is provided with a Korthaus-designed cooling system, which transfers the friction heat to the oil circuit. Therefore the design F is suitable **for service as a dry running vacuum-compressor for air and gas** for a pressure up to **8 bar** (114 psi).
Machines with design V can be delivered in dry running version as a special design.

Flotation Slurries (Foam of Sewage) can be suctioned even against counter presses, when using design F of **Korthaus piston pumps KH**.

For **evacuating the suction line** with the design F, a vacuum up to 8 m (9 yards) is already availabe when the machine is dry.

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Control system of Piston Pumps

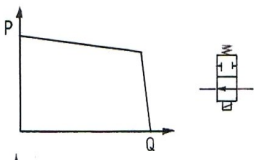
A relation between slurry-pressure/-capacity an oil-pressure/-capacity via ratio $i=D^2/d^2$ is given by the design of the type **KH**. Therefore all control sytems are located on the “clean“ oil-side.

Standard-Version:

- Start-stop-valve manually operated
- pressure relief valve is manually adjusted
- hydraulic pump is manually adjusted. Piston pump KH is a variable displacement pump, Q=0 ... Q=Qmax.

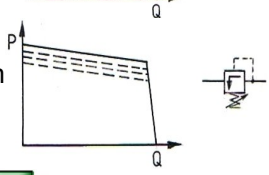
R 1: Start-stop-valve with remote-control

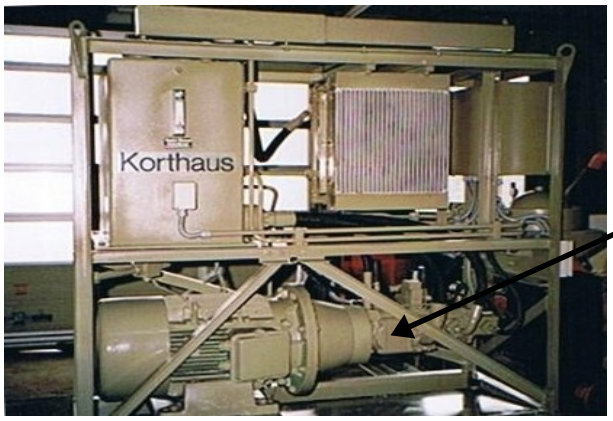
The start-stop-valve in a remote control version is suitable, if the motor should start running without load or if the pump should stop while the motor is still running.

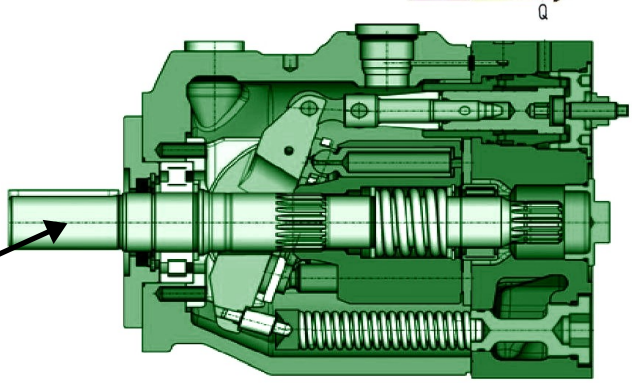


R 2: Adjustable Operating Pressure

The pressure relief valve is adjustable by (electrical) remote control. The maximum (slurry-) operating-pressure is remotely adjustable.



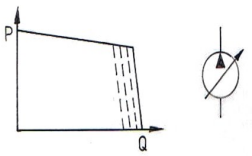




Hydraulic unit with variable displacement hydro-pump.

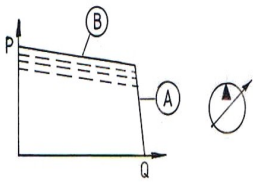
R 3: Capacity control system

The hydraulic-pump is a variable displacement-pump. Manual adjustment of the flow is standard. Hydraulic or electrical versions are available as an option. The control system is free of energy loss allowing the slurry capacity to be adjusted from Q=0 to Q=Qmax.



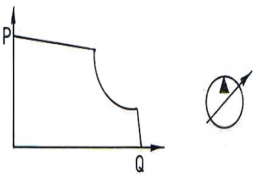
R 4: Pressure Control System

A hydraulic pump with pressure-control-system is used for powering the machine. When system-pressure is lower than the pressure compensator setting, the pump will deliver maximum capacity. When the system pressure reaches the adjusted pressure, the capacity will be reduced without losses of energy and the pressure will be maintained. A capacity of Q=0 and maintaining pressure is also possible.
This control system is sensible when operating permanently in part B of the characteristic line, as it is necessary for feeding a filter press.



R 5: Power Control System

This control system is a subversion of the pressure control system R 4. The pump reduces the capacity before max. pressure is reached. By this the max. power consumption is reduced and a smaller motor size is sufficient.



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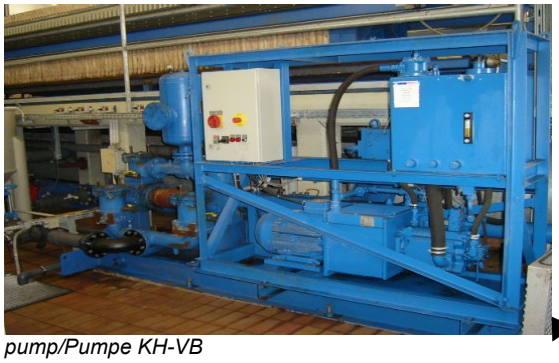
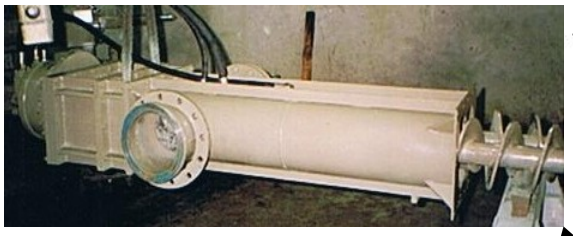
Korthaus delivers all components for the filtration of slurries and keeps your plant running

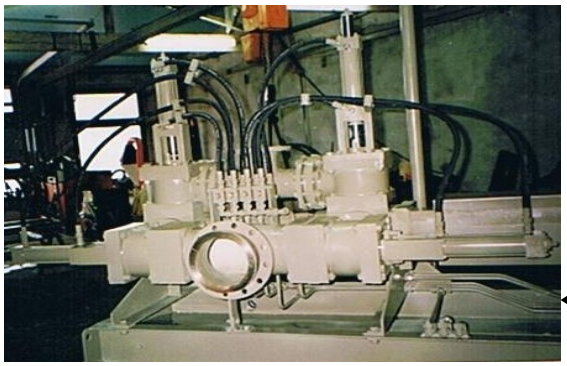
Low pressure pumps, type **KH-F** or **KH-V** feed the chamber filter press. The automatic **pressure control system (R 4)** ensures constant pressure even if capacity reduces to zero.
The filter cake e.g. of a centrifuge or bandfilter press is handled by a self-clearing **Korthaus** double feeding screw, type **DS** even if the dry content of the cake is up to 50%. The **DS**-screw presses the cake with power into the **Korthaus-High-Pressure-Pump**, type **KH-DD**.
The type **KH-DD** is especially designed for abrasive filter cake with high dry contents. The available pressure up to 250 bar (3,500 psi) allows the pump to push long distances.



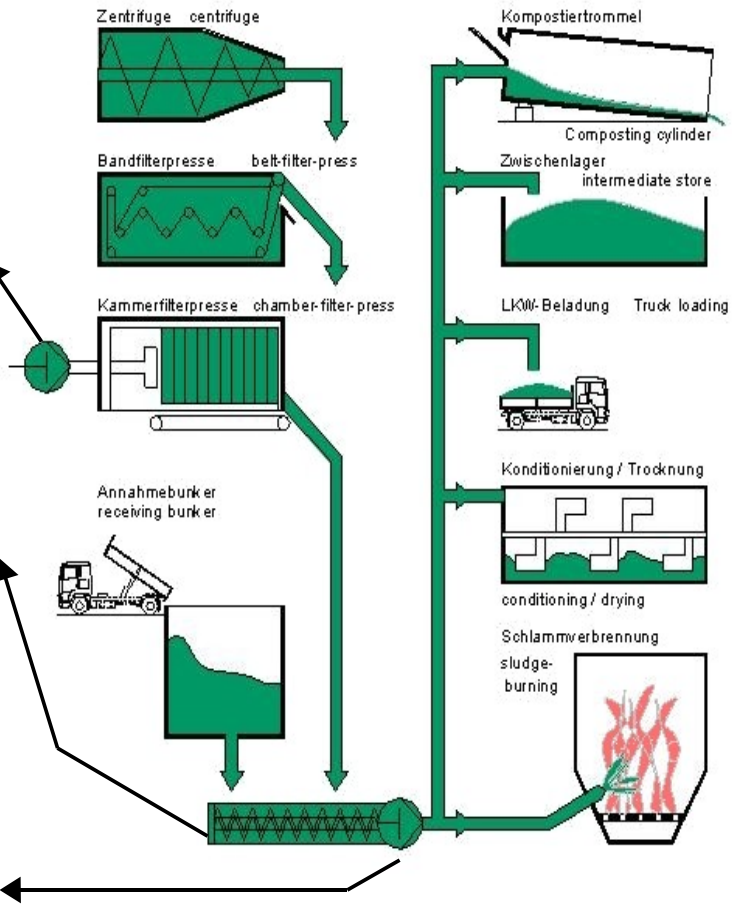
pump/Pumpe KH-VB



double feeding screw/Doppelschnecke DS



pump/Pumpe KH-DD



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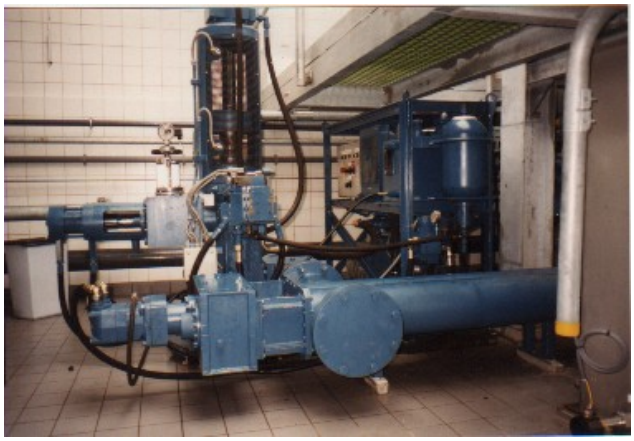
Accessories for KH Pumps

Double Feeding Screws *DS*

crumble the filter cake and transport it to the suction valve of the filter cake pump with pressures up to 5 bar (75 psi).

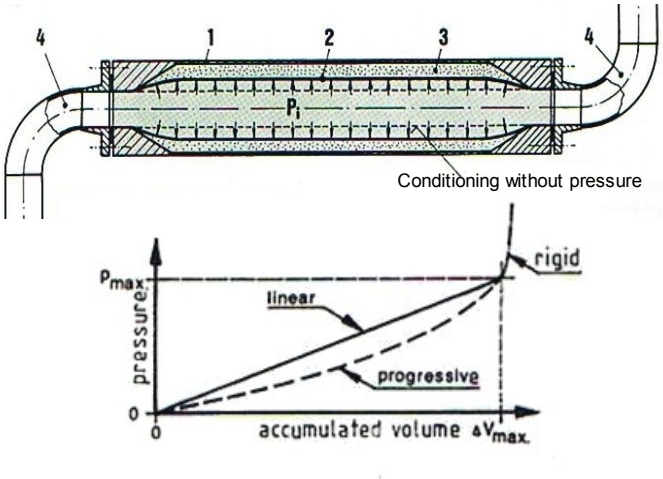


Double feeding screw DS with filter cake Plunger Pump

feeding hopper pf DS-double feeding screw

Non-clogging Pipe Dampeners *SP*

are maintenance-free and create a steady flow in the pipeline.



1 steel housing
2 rubber hose
3 elastic fillings
4 pipeline

pipe dampener in suction and discharge line of KH-Pumps

*For more details see separate leaflets **DS** and **SP***

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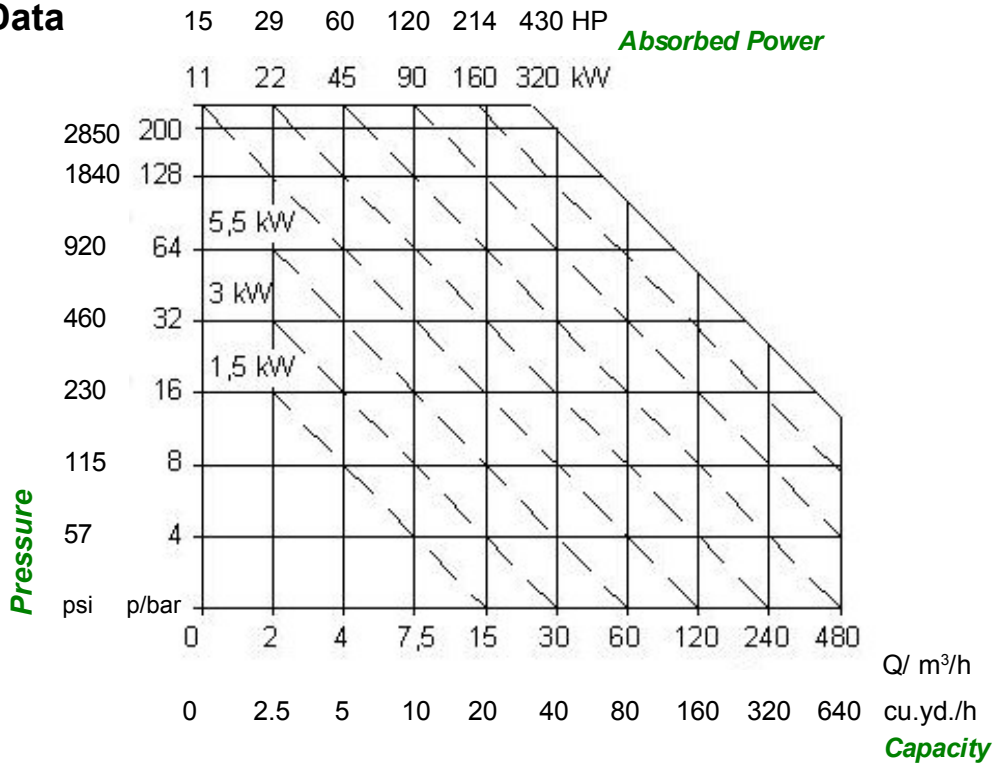
Standard-Version

Korthaus **piston pumps KH** wil be delivered with the following standard equipment:

- capacity manually adjustable
- start-stop-valve manually operated
- pressure relief valve manually adjusted
- hermetically closed oil circuit
- 2 oil filters
- oil-level-switch
- temperature switch
- self-adjusting packing sealing at the fluid end
- liner and piston rod thick hard chrome plated
- long stroke design
- housing without dead ends with self-clearing effect
- DIN-flanges
- design F with cooling jacket for dry running for machines up to 8 bar (115 psi) delivery pressure

Performance Data



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Prospekt KH Januar 2009

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