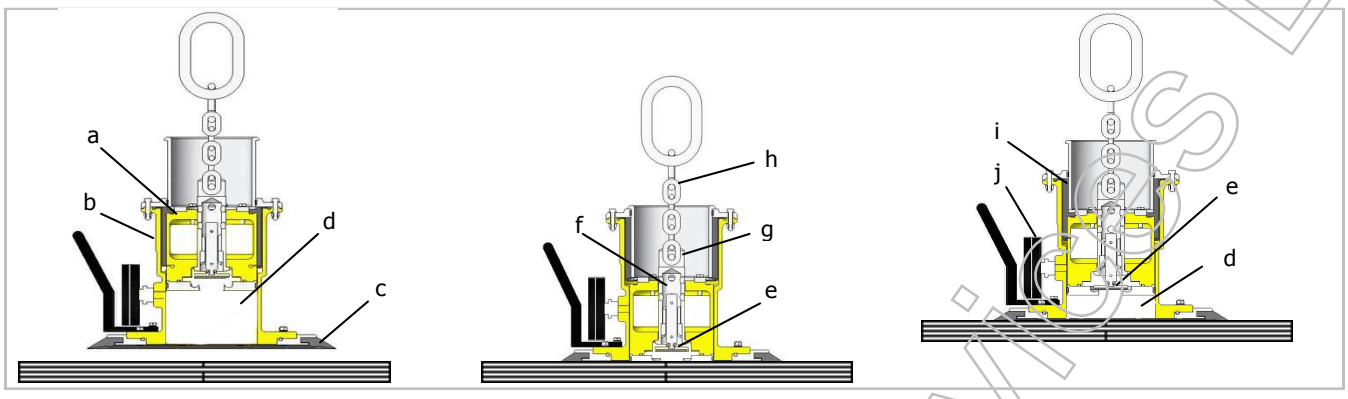
Functional principle

Self-suction Vacuum Lifter

Self-suction vacuum lifters are independent of electric current.
They use the lifting power of a hoisting device like e.g. a crane or a forklifter in combination with the load to generate a vacuum. The vacuum depends on the weight of the goods, more weight means higher vacuum. Main parts of the devices are a cylinder, a sealing ring, a piston, a rolling cuff and a valve.



a) piston b) cylinder c) sealing ring d) vacuum chamber e) valve f) switch g) tension rod h) chain i) rolling cuff j) vacuum gauge

Lifting a load

The vacuum lifter is lowered towards the load until the cylinder (b) with the sealing ring (c) is put down on the load. During the subsequent downward movement of the crane hook, the piston (a) is also lowered to the load and displaces the air inside the vacuum chamber (d). The air exhausts through the opened valve (e) in the piston head.

At the end of the downward movement, the chain (h) is totally relieved and the switch (f) located in the tension rod (g) is activated and shuts the valve (e).

If the crane hook lifts the vacuum lifter now, the piston (a) is lifted first and generates a “vacuum chamber” (d) which is sealed at the top by a rolling cuff (i) and at the bottom by a sealing ring (c).

The vacuum gauge (j) now shows the height of the created vacuum. The differing vacuum levels (load-dependent) in combination with the safety factors are always sufficient to lift the load and transport it (remind the min. load).

Due to the vacuum “between” load and vacuum lifter, the surrounding air is compressing the device and the load, simply and safely.

Depositing a load

After the load is deposed, the crane hook has to be lowered until the chain (h) is totally relieved. During the now following upward-movement of the crane hook, the piston (a) is lifted too and activates the switch (f) which opens the valve (e). The opened valve enables atmospheric air pressure to enter the vacuum chamber (d) and releases the load.

The vacuum lifter is now ready for another work-cycle after detachment.

Single-pad and multi-pad devices

The drawings above are showing a simplified cross-section of a single-pad device. This kind of device is suitable for compact, hard and stable loads. Multi-pad devices are required for larger and/or less stable loads.

A multi-pad device consists of a basic unit (single-pad device with a casing bottom and without a sealing ring) and a suction pad unit (e.g. beam with crossbeams and several suction pads). The vacuum is generated in the basic unit as explained and is transferred via a vacuum piping to the suction pads.

Warning / Safety unit

In conformity with DIN EN 13155 and the applicable regulations of work safety, all devices are equipped with a warning/safety unit. It indicates any drop in vacuum while handling a load by optical and acoustical signals.