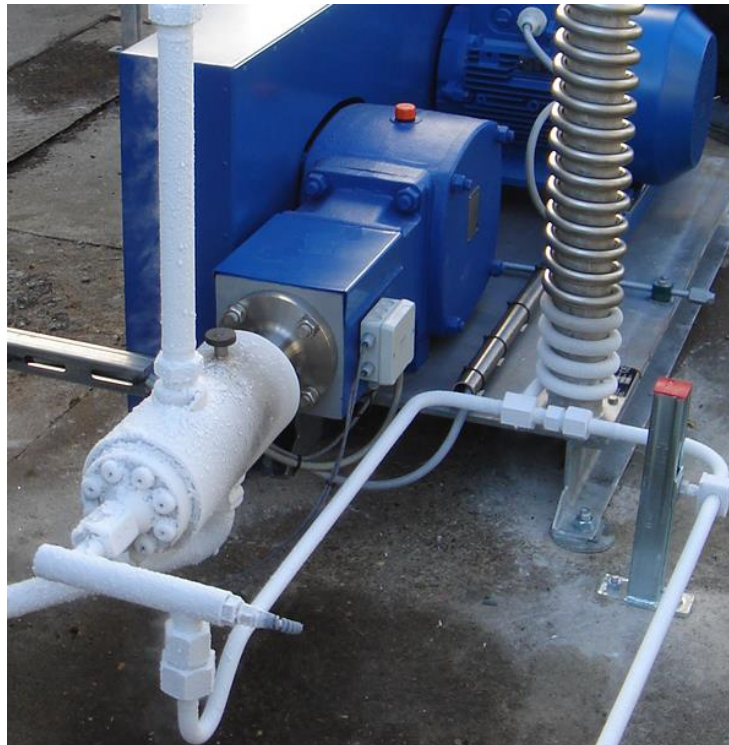
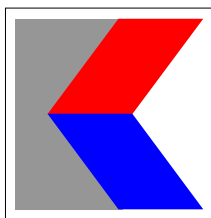


VHV- Reciprocating Pumps With Pre-load Stage



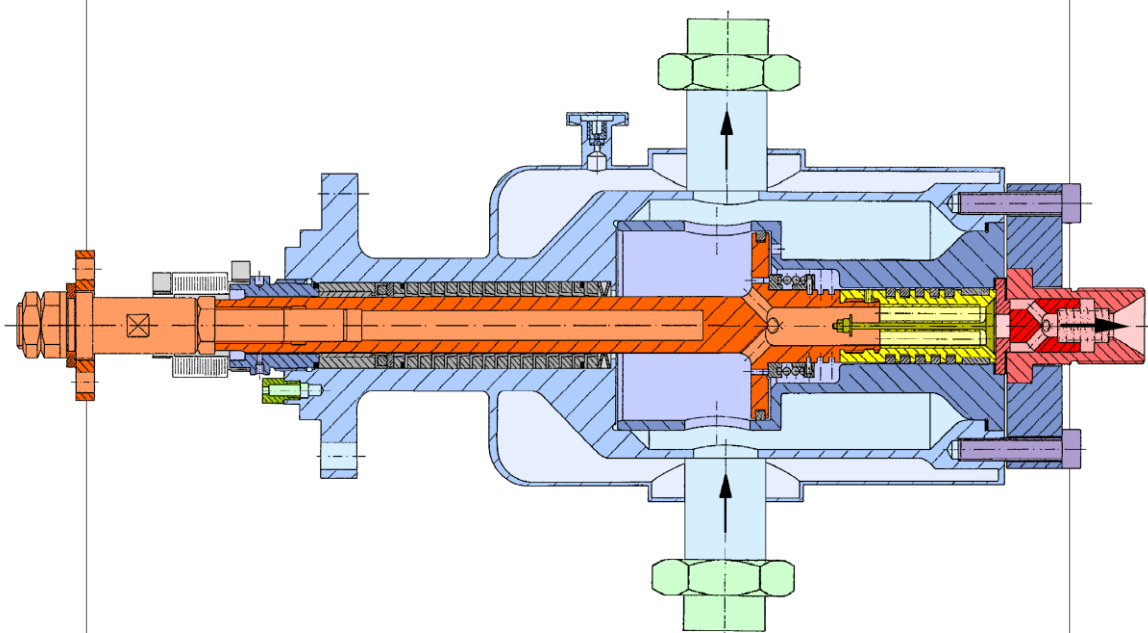
KRYTEM



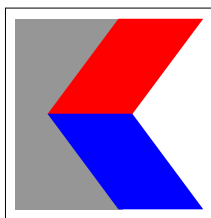
Krytem-VHV - Pumps for Cryogenic Media Under Difficult Supply Conditions

Sometimes, for structural reasons, it is not possible to make a suitable tank connection for the operation of single-acting low-temperature pumps (such as the TL, SA or HK types). This especially affects the available *net positive suction head* (NPSH) value at the level of the piston in the pump when connected to horizontal tanks or tanks near to the ground and when the liquids which are delivered are already boiling due to heat absorption from the outside. The VHV series of pumps with forced push-action cylinder filling was developed with these types of installations in mind.

The medium which enters from below circulates in the pump head due to natural convection and the movement of the piston. During the return



stroke of the piston rod, a larger volume of fluid is enclosed by the rear suction piston. As the piston moves towards bottom dead centre, this volume of liquid is propelled, gas-free, into the pressure cylinder through the suction valve integrated in the piston rod. An integrated relief valve prevents over-compression in the pressure cylinder while it is being filled. The medium is discharged via a pressure valve fitted centrally to the front.



The frictional heat being developed by the piston oscillation is withdrawn from the pump head by natural convection via the gas return feed fitted to the top.

The robust, non-wearing pressure-valve construction leads to low maintenance costs and high operating reliability.

VHV pumps can be used both for gas bottling and as process pumps. Ultimate pressures of up to 400 bar are reached in the standard version. VHV pumps are intended for use at temperatures down to -196°C with effective vacuum insulation.

Various simplex, duplex and triplex crank drive versions are available in order to cover any required pressure and flow rate range. VHV pumps are also available with speed controllers with or without explosion-protection design for flammable or explosive discharge media.

Design features:

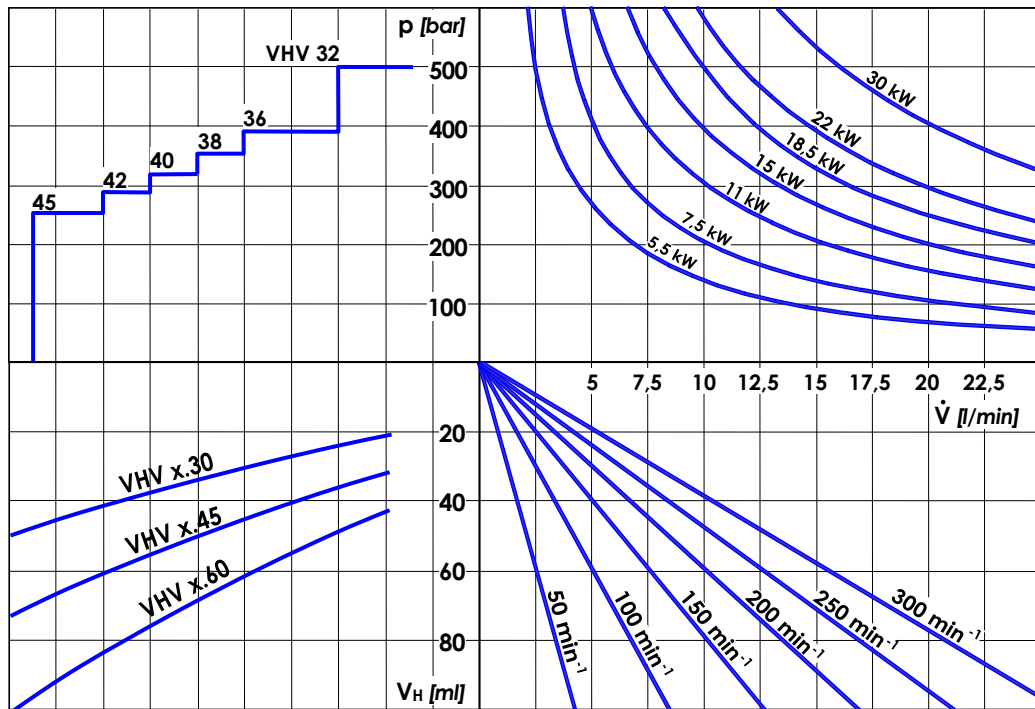
- Pressure cylinder filled by forced action from a suction piston, thus also facilitating the delivery of boiling liquid or delivery when the $\text{NPSH} \approx 0$.
- Structural separation of the pump head from the drive prevents any unacceptable contact between lubricant and discharge medium.
- Shear-ring coupling between the pump head and the drive protects the pump against unacceptable mechanical loading.
- The piston-rod seals are heated (vacuum-insulated types only) thus making it possible to stop without having to relieve the pressure and heating the suction side.
- PTFE bellow acts as additional protection for the piston rods against contamination from the outside and moisture from the atmosphere.
- Temperature-controlled warning system integrated in the pump head to protect against the unacceptable dispersion of cold due to leaks.
- Supervision of flow by means of a flow monitor on the pressure side.
- Pulsation damping on the pressure side

optional:

- Complete pump control set including automatic start routine (automatic valve control on suction side), stuffing box temperature control and dry running protection.



Data sheet VHV



media	all cryogenic liquids
operation temperature	-200°C ... 0°C
design pressure suction side	max. 25 bar
NPSH _{requ}	0,05 m at 200 min ⁻¹ (N ₂ liquid, -196°C)
gear type	DF-01
transmission	belt transmission SPA / SPB
stroke	60 mm
max. piston rod force	40 kN
drive	TEFC-motor, if required explosion proof
type	B3
pump design	"self-sucking" reciprocation piston pump with pre-load stage
pump head materials	1.4301, 1.4541, 1.4571, PTFE
bore diam. (main cylinder)	32 to 45 mm
max. design pressure	500 bar
capacity (at 300 min ⁻¹)	up to 26 l/min

KRYTEM GmbH • Kryotechnischer Service
Hans-Böckler-Str. 1 • D-47877 Willich
Tel.: +49/ 2154/ 9407-0 • Fax: +49/ 2154/ 9407-29.

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