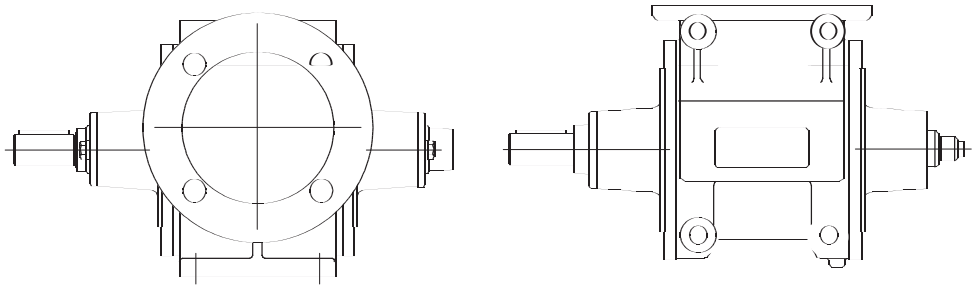
Vane pumps

High-pressure vane pumps

Alfons Haar

Operating instructions HFPCG 65 - ... HFPFC 65 - ... HFPAG 65 - ... HFPFG 65 - ...



Ex II 2G cT3 CE

ALFONS HAAR MASCHINENBAU GMBH & CO. KG • Postfach 530 160 • D-22531 Hamburg • FAX (49) 40 844 910 • TEL (49) 40 833 91-0

Sales -183 -144 -214 Service -164 -229 -244 Spare parts -129 Repairs -137 • INTERNET www.alfons-haar.de • E-MAIL sales@alfons-haar.de

Edition 12/2005

HFPCG 65 - ... HFPFC 65 - ...
HFPAG 65 - ... HFPFG 65 - ...

Proper use

Failure to use the devices correctly may cause injury to personnel or damage to property.

The vane pump is used to pump low-viscosity mineral oil products and non-corrosive and/or suspension-free liquids up to a viscosity of approx. 76 cSt.
In the case of positively actuated vanes (Z designs), it is also possible to pump viscous mineral oil products. It is suitable for installation for zone 1 TRbF.

Each modification of the vane pump and every alteration of the use, that was arranged at the sale, requires consultation with Alfons Haar.

Type code

Example: **HFP C G 65 - 289 Z R**

HFP: High-pressure vane pump

C: Housing design (dimensinal)
C = with TW flanges according to DIN 28459
A = with flanges according to DIN 2501
F = for manifold ANST

G: Shaft design (dimensional)
C = free cylindrical drive shaft end
G = as C, but other shaft end for additional drive for a hydraulic pump
X = special shaft for slim line vari pump

65: Nominal bore of suction and discharge end

289: Theoretical delivery in litres/1000 revolutions or cm³/revolution
(289, 343 or 407 cm³/revolution)

Z: Special·designs
Z = Positive actuation of the vanes
A 134 = version for solvents

R: Directional rotation (viewed from the pump drive shaft)
R = clockwise directional rotation,
L = counterclockwise directional rotation
R L = reversible

Technical data

Delivery volume:		between 100 and 600 l/min
Speed:	n_{max}	= 1500 rpm
	n_{min}	= 600 rpm
with pos. actuation of vanes:	n_{min}	= < 600 rpm
Viscosity:	ν_{max}	= 76 cSt
With pos. actuation:	ν_{max}	= to approx. 50000 cSt
Delivery pressure: (depends on operating pressure of by-pass valve)	p_{max}	= 1,0 MPa (= 10 bar)
Nominal pressure:	p	= 1 MPa (= 10 bar)
Weight:	m	= 36 kg
Temperature range:	t	= - 25 °C to + 70 °C

Installation

Danger - Do not place hands etc. into the vane pump openings!

Preparation

- Remove all transport packaging.
- Check the pump for external transport damage.
- Check that the pump functions correctly by manually turning the pump shaft. (It should be possible to hear all 12 vanes falling).

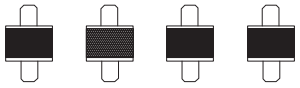
Location

- Install the pump tension-free and horizontally. The shaft may deviate by up to 5° from the horizontal.
- The drain holes in the pump cover must always face downwards so that no moisture can accumulate.
- The pump shall be installed upright, fixed on its base. If this is not possible, please contact Alfons Haar for advice.
- Leave adequate space for service and maintenance access. The housing cover opposite the drive unit must be accessible.

HFPCG 65 - ... HFPFC 65 - ...
HFPAG 65 - ... HFPFG 65 - ...

Mounting

If possible, the vane pump and drive motor should be mounted on a base plate.
The connection between the pump and the drive motor is made using a shock-absorbent coupling (base plate version).
To prevent vibration, it is advisable to attach the pump unit using shock-absorbent elastic mounts.



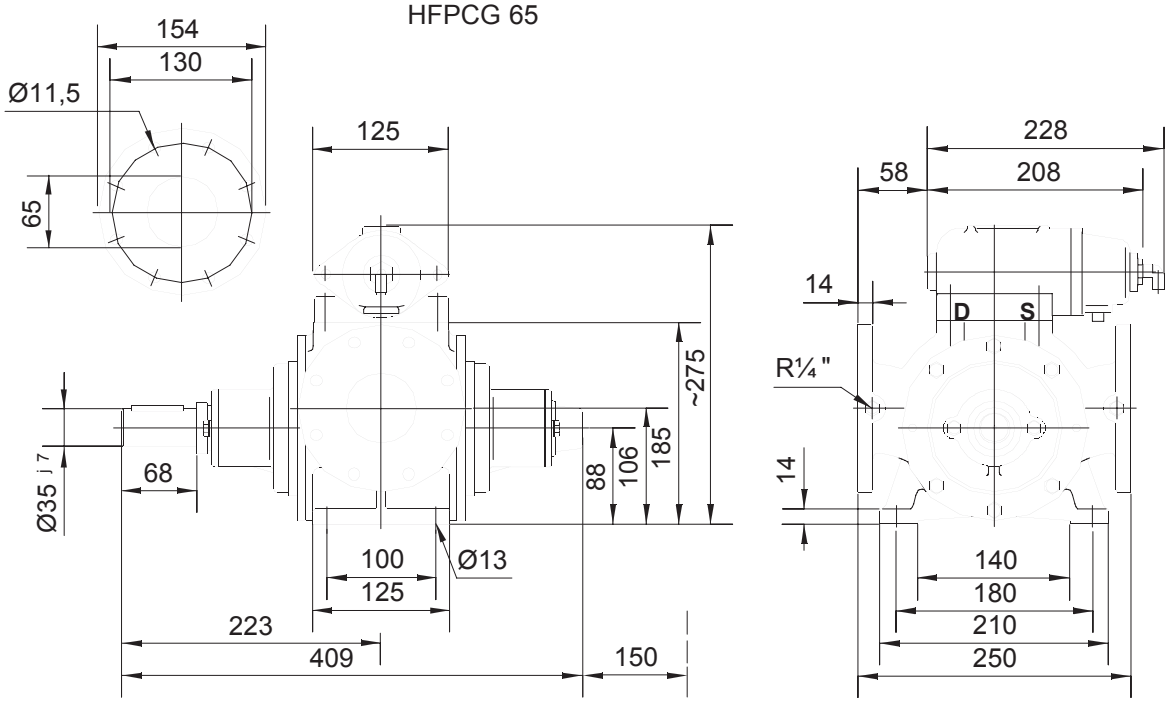
Set of elastic mounts
(4 pcs.)

Alternatively, the pump can be attached, for example, to an electric motor using a coupling (flanged version).

Prop shaft driven pumps are attached to the truck chassis (for operation on tank trucks).

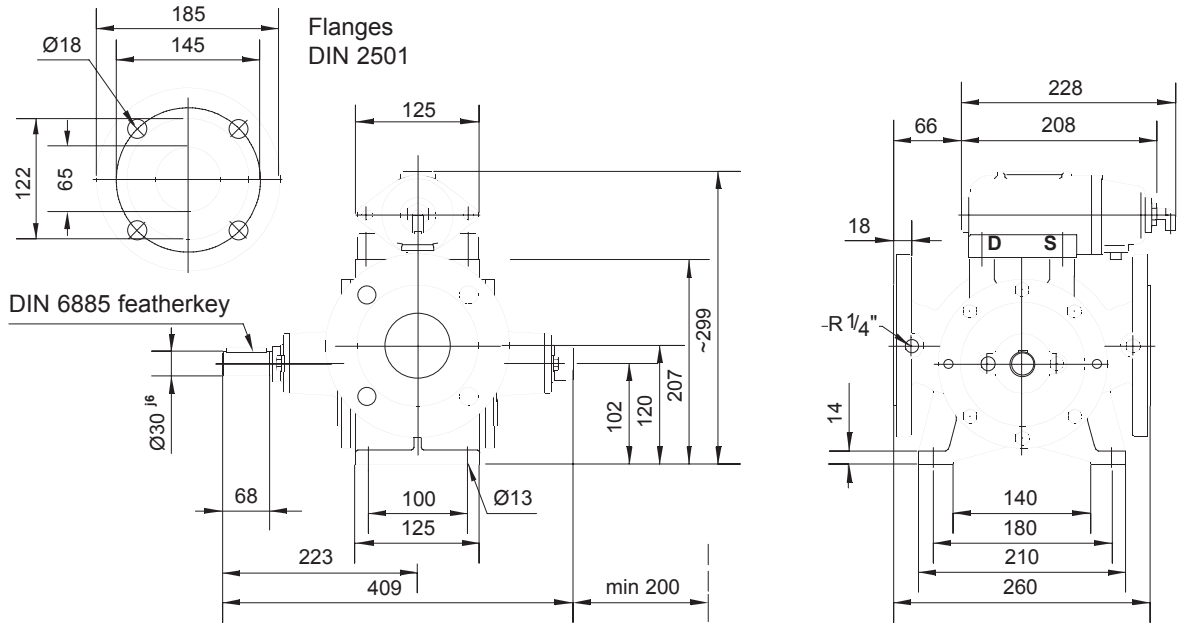
Dimensions

HFPCG 65



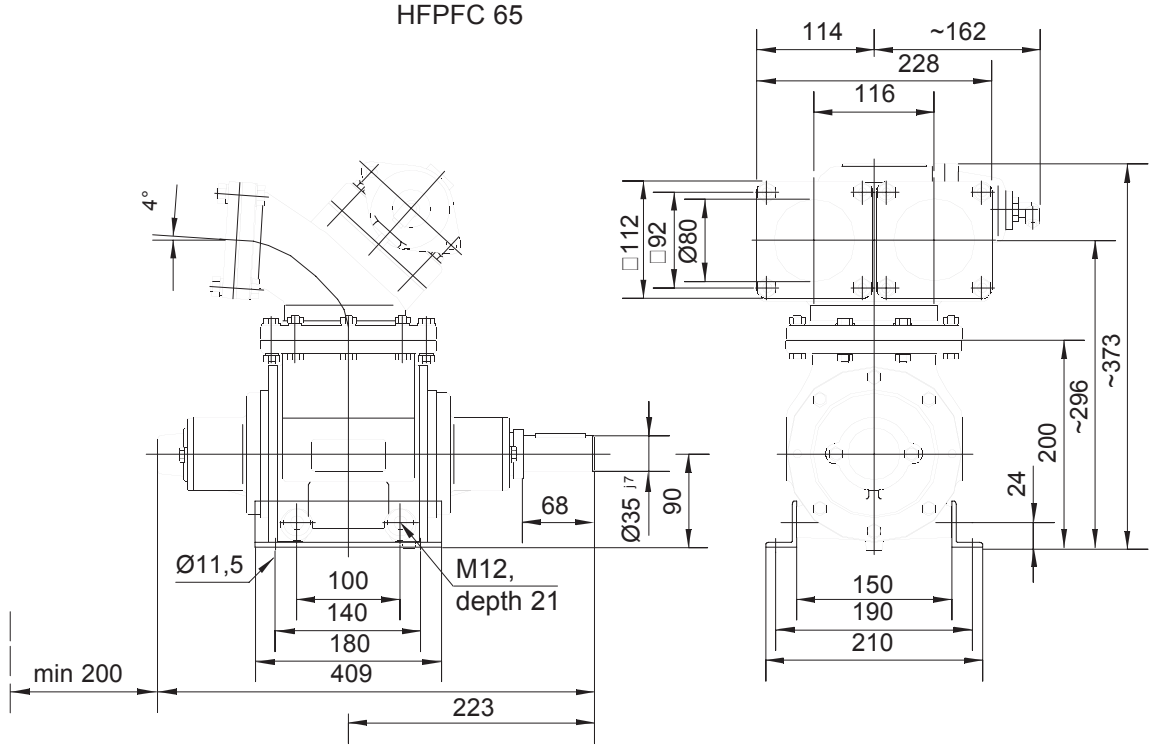
Illustrated: *High-pressure vane pump HFPCG 65 - ... with pneumatic by-pass valve type PÜVA 65 E*

HFPAG 65



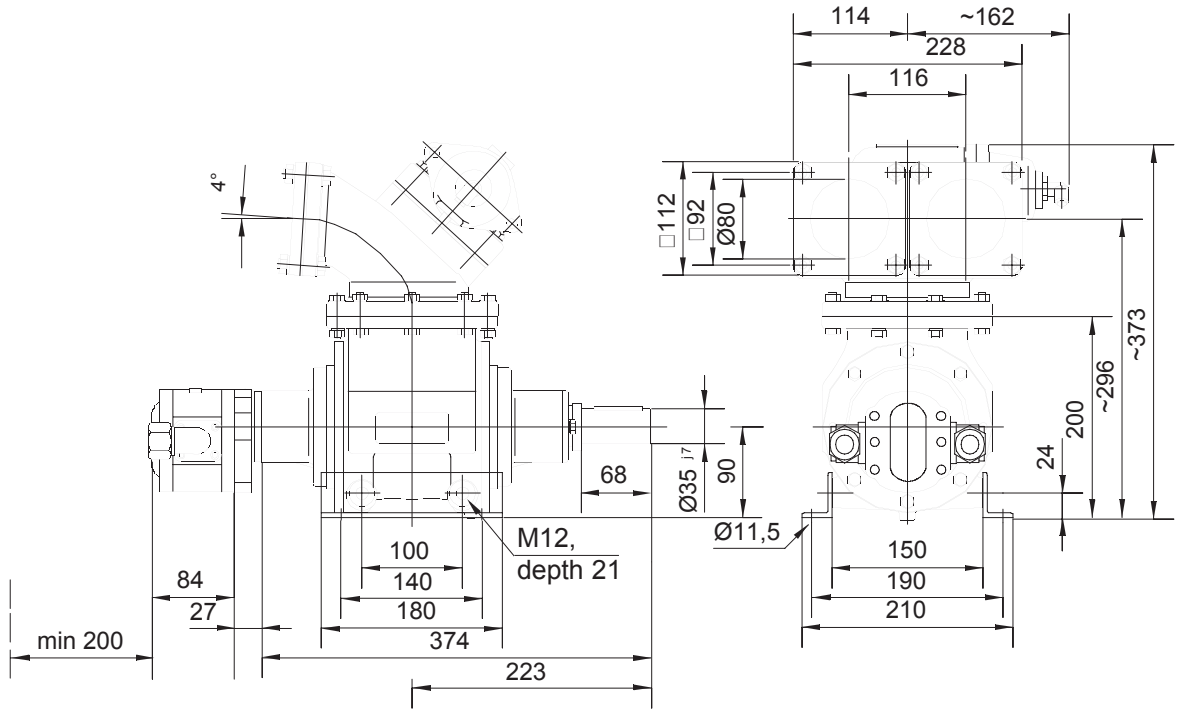
Illustrated: *High-pressure vane pump HFPAG 65 - ... with pneumatic by-pass valve type PÜVA 65 E*

HFPFC 65



Illustrated: *High-pressure vane pump HFPFC 65 - ... with manifold and pneumatic by-pass valve type PÜVA 65 E*

HFPFG 65



Illustrated: *High-pressure vane pump HFPFG 65 - ... with manifold, pneumatic by-pass valve type PÜVA 65 E and hydraulic pump type ZFS 0/... with drive connection G-HFP65/FP80.2*

Pipeline connection

If mineral oils of hazard class AI or AII are being pumped, and depending on operating conditions, anti-explosion seals must be fitted in the suction line in accordance with TRbF 100 No. 9.

The pipelines should be attached using flexible pipe connectors. A filter (mesh size ≤ 1000 µm) must be installed to protect the pump against mechanical damage caused at the suction end by foreign bodies.

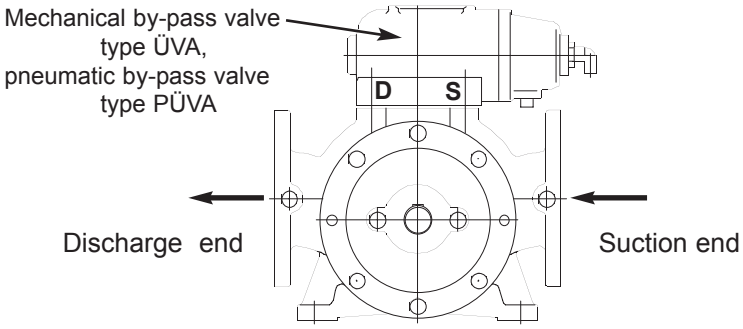
Pump accessories (order separately):

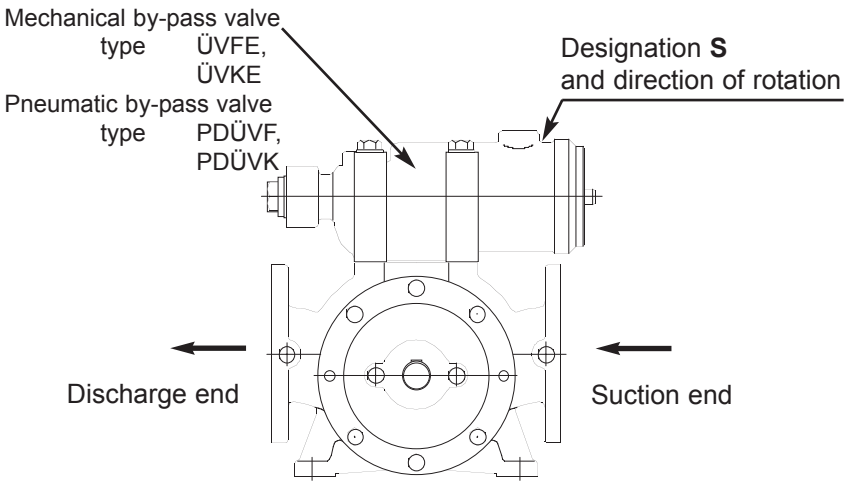
- mechanical or pneumatic by-pass valve
- manifold
- hydraulic pump with drive connection
- bi-directional by-pass valve for reversible pump operations
- pump strainer
- adapter for by-pass return
- adapter flange
- anti-explosion device
- dry operation protection (thermostat and intermediate plate)
- pressure gauge for suction and discharge
- vacuum controller
- starting aid star/delta electric motor
- starting aid (e.g. for diesel engine drive)
- mechanical by-pass control
- elastic mounts
- Lubrication line extension

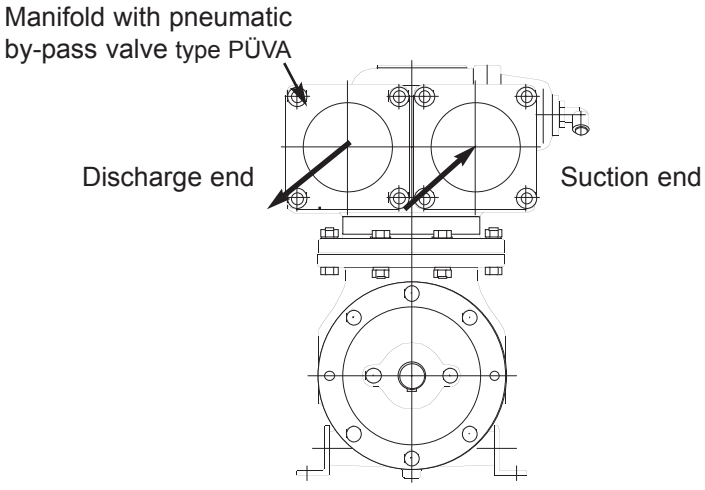
- The suction line must be as short and as straight as possible and have a sufficient nominal width. To avoid cavitation, the line should be sized in accordance with NSPH calculations.
- The discharge line is to be installed in such a way that it is vented when the pump starts up.
- The suction line must be prevented from running dry if venting before each commissioning is not envisaged on the discharge side.
- For safety reasons, the vane pump must only be used if it has a permanently mounted by-pass valve or a by-pass valve that has been integrated in the system. It must be ensured that this valve is assembled correctly.
- The suction and discharge line must be connected to the pump according to the directional rotation of the drive.

Vane pumps supplied with by-pass valves have a S for suction and a D for discharge embossed on the by-pass valve.

The suction end of the by-pass valve is indicated by an S and must correspond to the pump's suction end.

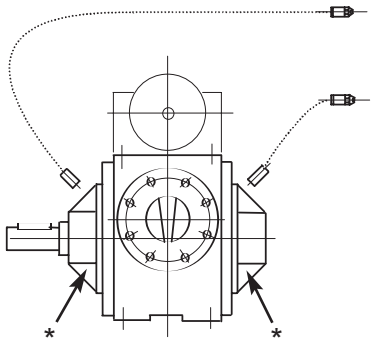






Assembly at inaccessible locations

Locate the pump's lubrication points to allow safe maintenance.



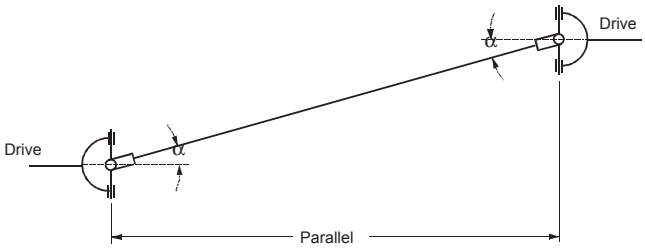
Lubrication line extension, part no. 1017442

* Discharge of excess lubrication

Preventing overheating

Allowing the pump to run for a relatively long period (> 5 min) against the closed discharge end will cause overheating.
To prevent overheating, a product line (8x1) can be led back to the tank or a dry operation protection device should be fitted to the pump (see pump accessories).

Prop shaft drive (for use in tankers)



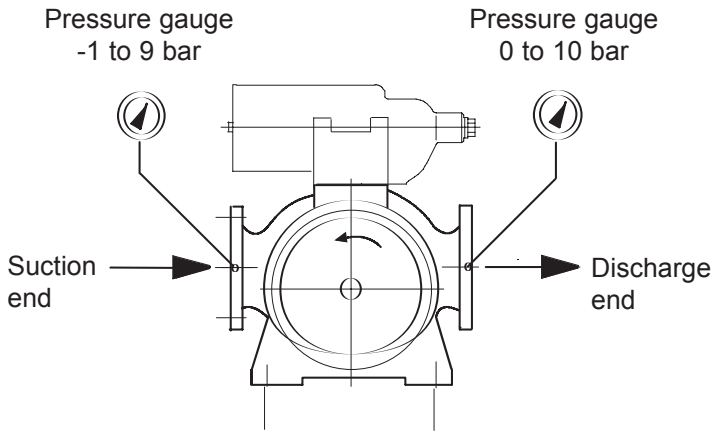
- Do not use force when fitting the coupling halves and prop shaft flange to the pump shaft (use lubricant and a rubber mallet).
- In the case of prop shaft drives, follow the manufacturer's instructions and do not exceed the specified angle of inclination α.
- The drive flanges must be parallel.
- No thrust should be transmitted from the drive to the pump shaft.
- If the pump is being driven via a vehicle engine, make sure that the pump is switched off when the vehicle is in motion.

Temperature monitoring

The maximum permissible temperature is 70 °C. A temperature monitoring system should be fitted if there is any danger of exceeding this value.

Pressure monitoring

To allow the pump to be set and monitored, a pressure gauge should be installed at the discharge end and a vacuum meter at the suction end.



Commissioning

Failure to observe these guidelines may cause injury to personnel and damage to property! Allowing the pump to run dry will cause overheating.

Checking the direction of rotation

Assure correct direction of rotation by checking the markings on the by-pass valve: S for suction, D for discharge.

To change the direction of rotation of the pump, turn the by-pass valve on the pump through 180° and, in the case of types FP...**R** or **L**, turn the pump-impeller vanes through 180° before inserting them in the rotor.
In the case of the FP...**RL**, the pump-impeller vanes do not need to be turned.

Initial commissioning

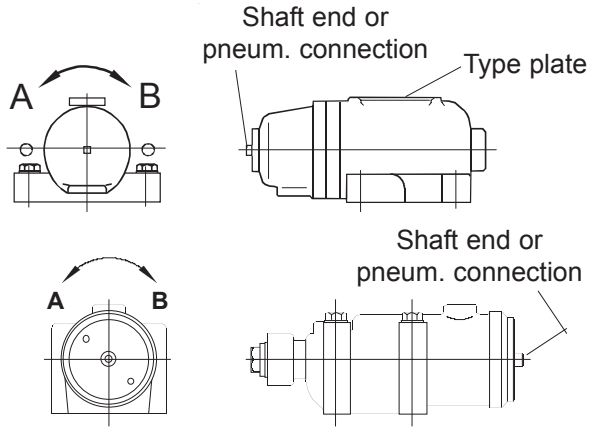
When using a mechanical by-pass control, this has to be turned in a clockwise direction up to the stop. After the pump has been started, the mechanical by-pass control has to be turned out.

In the case of complete units, the by-pass valve is already fitted to the pump and set in the factory to the required operating pressure.
The operating pressure can be modified within the range of values specified on the type plate.

Start the pump only when there is sufficient pumping medium available. Maximum dry pumping time is 5 minutes.

The pressure line should be vented when the pump starts up if required.

In the case of mechanical by-pass valves, this is achieved by turning the shaft end (this changes the tension on the spring). On pneumatic by-pass valves, the pneumatic pressure must be changed.



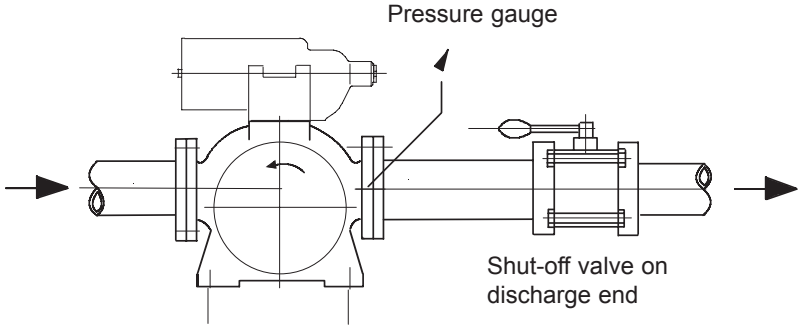
Direction A = Reduction in pressure
Direction B = Increase in pressure

If the operating pressure is increased (by increase of by-pass pressure), the required shaft power should be determined from the pump characteristic curve and compared against the drive output in order to avoid overload.

Setting of the by-pass valve

If the customer has to adjust the operating pressure of the by-pass valve, a pressure gauge and stopcock must be fitted on the discharge end.
Slowly closing the stopcock while observing the pressure indicated on the pressure gauge enables the selected operating pressure to be checked. (recommended value: operating pressure = required delivery pressure + 0.5 bar)

If the pressure exceeds the permissible value or the operating pressure is not achieved, the by-pass valve setting must be corrected.



The shut-off valve must be reopened.
If the gauge shows a higher value than the predetermined by-pass pressure the spindel should be turned counter clockwise (direction A). If the gauge shows a lower value than the predetermined by-pass pressure the spindel should be turned clockwise (direction B).
To control correct adjustment close the shut-off valve slowly. The procedure is to be repeated until correct adjustment.

Note down the setting.

Open the shut-off valve.

In the case of pneumatic by-pass valves, the pressure applied to the by-pass valve is reduced or increased accordingly. A pressure regulating valve must therefore be installed in the pneumatic line (recommended value for the ratio between air pressure and operating pressure approx. 1:1.3).

Maintenance

Lubrication	The vane-type pump is to be lubricated at the bearing positions.
Intervals	Every 600 operating hours or 3 years, whatever happens earlier.
Lubricant	For standard operations: Beacon EP2 (part no. 1000189). For low temperature operations (e.g. for type X1): Molyduval Aero 14 (part no. 2067578).
Procedure	Apply lubrication to the lubricating points during pump is running (without load, min. 300 rpm) until the grease is discharged at the exit points. **Danger - Be careful for running pumps!**
Central lubrication	This is permitted providing a suitable lubricant is used.

Troubleshooting

Fault	Cause	Remedy
Pump does not draw/ Pump becomes louder	Filter blocked	Clean filter
	Pump excessively worn (high gap leakage)	Consult Service dept. Change vanes if necessary
Hydraulic by-pass valve installed in the hydr. system by-passes	Pump by-pass valve incorrectly installed	Turn pump by-pass valve
	Pump by-pass valve set too high	Check pump by-pass valve setting, adjust if necessary
Pump makes knocking sound and its performance is reduced	Vanes broken	Consult Service dept.
		Check pump filter for damage
Pump pressure too high	By-pass valve incorrectly installed	Turn by-pass valve
	By-pass valve set too high	Check by-pass valve setting, adjust if necessary
Pump pressure too low/ no pump pressure	Seal between by-pass valve and pump missing or fitted incorrectly	Check seals, replace if necessary
	Rotational speed too low	Increase rotational speed (n_{max})