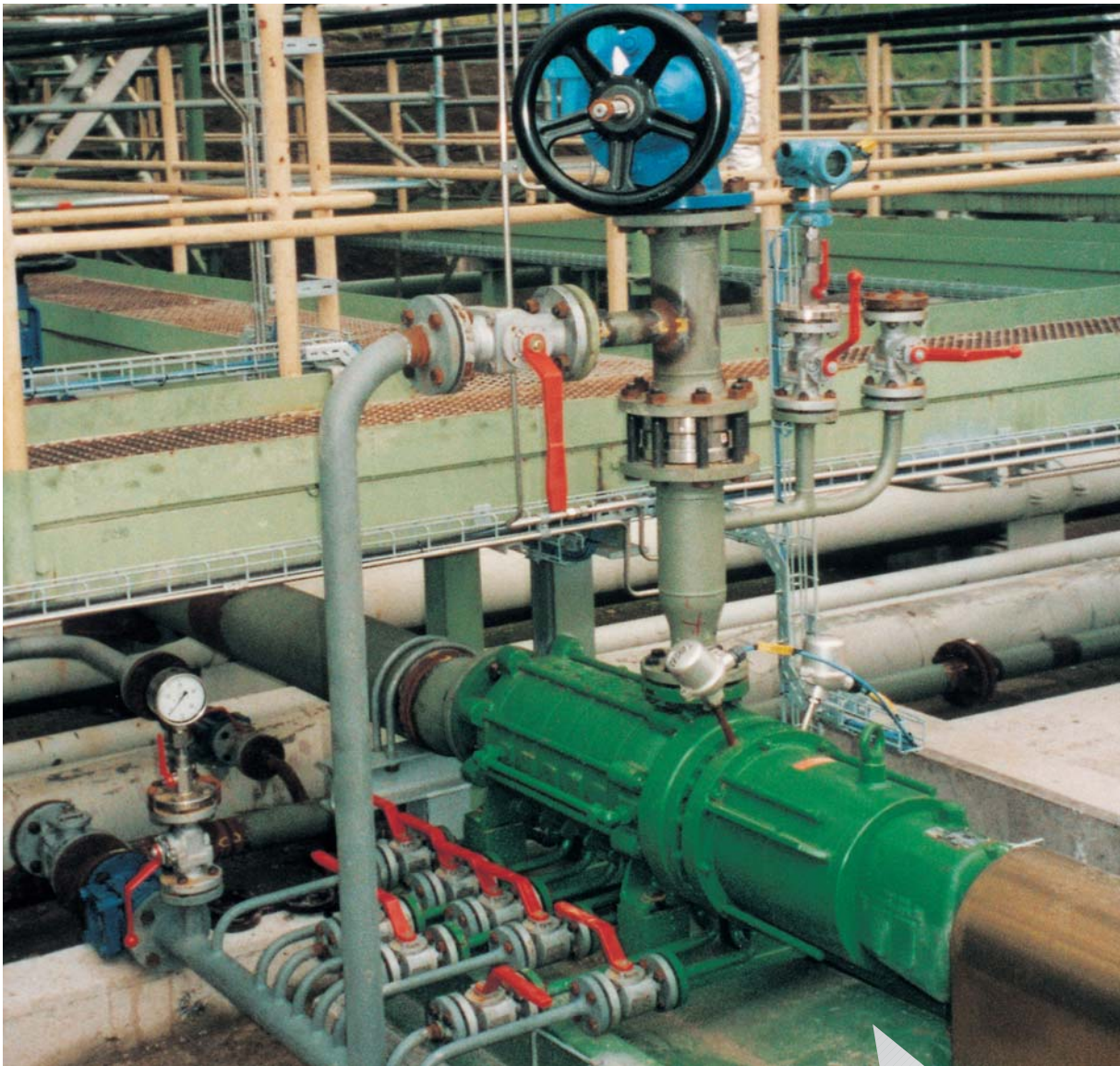
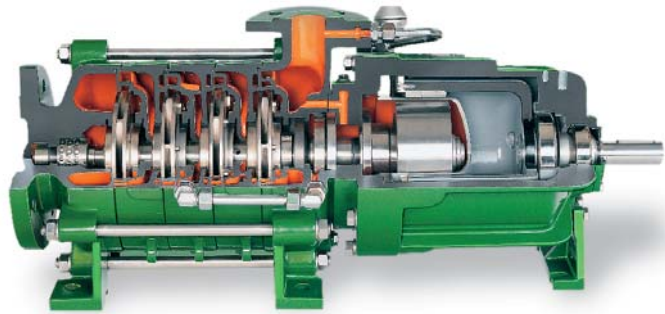




**DICKOW  
PUMPEN**



**Sealless Magnetic Coupled  
Multistage Centrifugal Pumps  
Type HZM / HZMR / HZMB**

*our  
contribution  
for  
environmental  
protection*

## General

DICKOW-pumps of series HZM are sealless multistage horizontal centrifugal pumps, driven by a synchronous permanent magnetic coupling. The static containment shell forms a closed system with hermetically sealed liquid end.

## Application

Magnetic driven HZM-pumps are designed to improve plant and personnel safety, especially when handling toxic, explosive or other dangerous liquids which react on contact with the atmosphere. For all these services the containment shell replaces the double acting mechanical seal with external fluid reservoirs and the necessary control equipment. HZM-pumps therefore offer exceptional benefits to the chemical, petrochemical and allied industries, and protect the environment.

Max. capacity and differential head:

50 Hz - appr. 500 m<sup>3</sup>/h and appr. 380 m  
60 Hz - appr. 500 m<sup>3</sup>/h and appr. 460 m  
(appr. 2200 gpm and 1500 ft)

The maximum operating temperature is 200°C.

## Hazardous area

Together with the required Ex-drive motors, the HZM-pumps can be applied in hazardous area Group II, Category 2. The pumps meet the basic safety and health requirements of Explosion-proof Directive 94/9 EC and are suitable for plants with increased safety requirement.

For close coupled pumps (HZMB) the containment shell temperature is limited when using ex-motors. The values are available on request.

## Design / Casing

HZM-pumps are multistage between bearings ring section pumps with closed impeller, end suction and top discharge flange. Suction and discharge casing are provided with sturdy feet for mounting on base plate.

## Containment shell

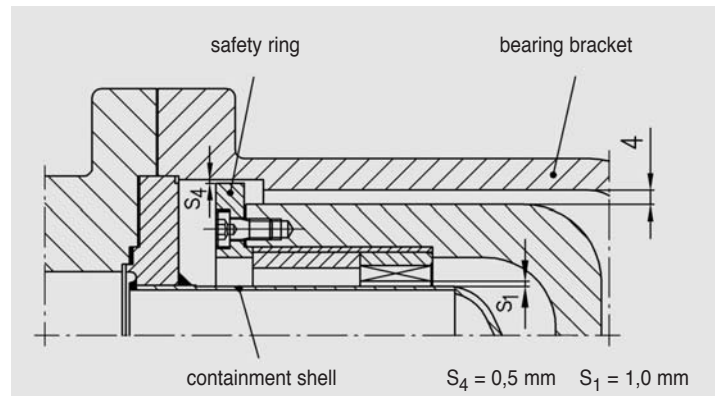
The containment shell is designed as a pressurized vessel to separate the pumpage from the atmosphere.

The containment shell is not used as an additional bearing holder. No dynamic stress occurs.

The containment shell is bolted to the bearing housing in a manner that allows removal of the bearing bracket (HZM-pumps) respectively of the drive motor (HZMB-pumps) together with the drive rotor without draining the pump.

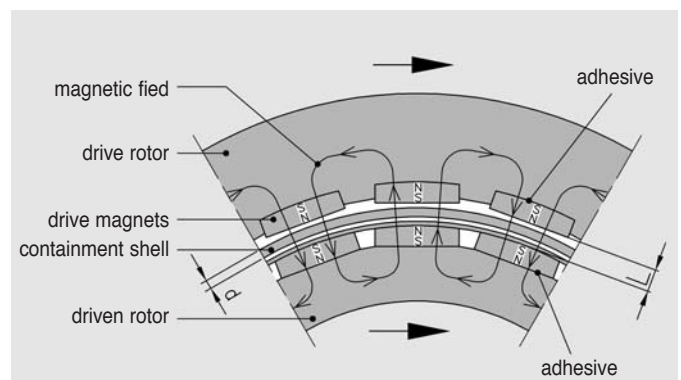
## Containment shell protection

The clearances between drive rotor and motor support lantern respectively between bearing bracket and containment shell are arranged such that rubbing of the magnets on the containment shell will be avoided, even in the case of worn out ball bearings.



## Magnetic coupling

The single elements of the multipolar magnetic coupling are manufactured of permanent magnet material "Cobalt Samarium" with unlimited life-time. The magnets in the driven rotor are completely encapsulated, not in contact with liquid. Power is transmitted to the hermetically sealed liquid end by a bank of external magnets. Inner and outer magnet rings are locked together by magnetic forces and work as a synchronous coupling. The inner magnet ring transmits the required torque direct to the impeller. Overload of the magnetic coupling and slipping will not cause demagnetization if temperature monitoring is available. The magnetic drives are designed for electric motors, direct on line starting. Should a subsequent increase of motor power be required, i.e. when installing larger impellers, the nominal power of coupling can be increased with additional magnets.



The maximum drive power of HZM / HZMR-pumps is approximately 220 kW @ 2900 rpm (350 HP @ 3500 rpm).

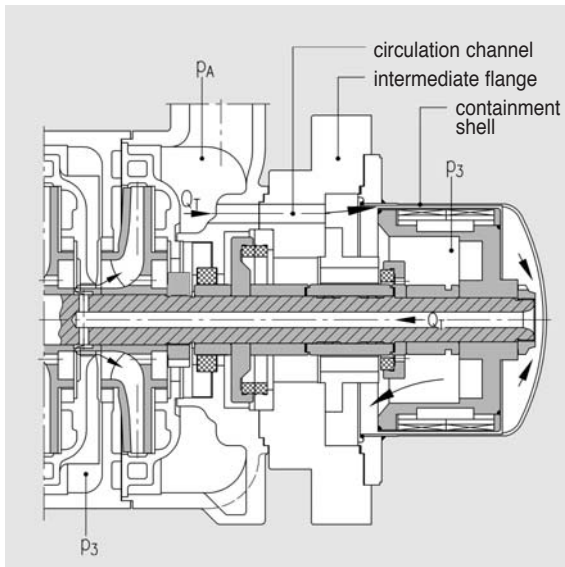
### Double sleeve bearings

The pump shaft is carried by wetted sleeve bearings. Standard material is pure Silicon Carbide with diamond layer, providing limited dry-run capability. SiC is highly resistant to corrosion and wear and can be used for all kind of liquids, also for solid containing products. The SiC-components are shrinkfitted or elastically beared by tolerance rings and therefore protected against shock and thermal stress.

### Internal cooling flow

When the pump is in operation, eddy currents are developed inside the metallic containment shells and converted into heat in the magnet area.

In order to avoid inadmissible temperature rise of the pumped fluid, this heat is dissipated through an internal cooling flow.



### Outer ball bearings

The drive shaft of the HZM-pumps is carried by generously dimensioned antifriction bearings, grease filled for lifetime and protected against the atmosphere by a lip seal.

The drive rotor of HZMB-pumps is mounted on the motor shaft. That means, additional bearings, elastic coupling and coupling alignment are not required.

The drive shaft of HZMR-pumps is carried by generously dimensioned oil lubricated antifriction bearings. The bearings are rated for 25000 operating hours. The oil bath is protected against the atmosphere by a contactless labyrinth seal. Oil level is controlled by constant level oiler. The oil chamber is sealed from the magnet chamber also by labyrinth seal.

### Impellers, NPSH-values

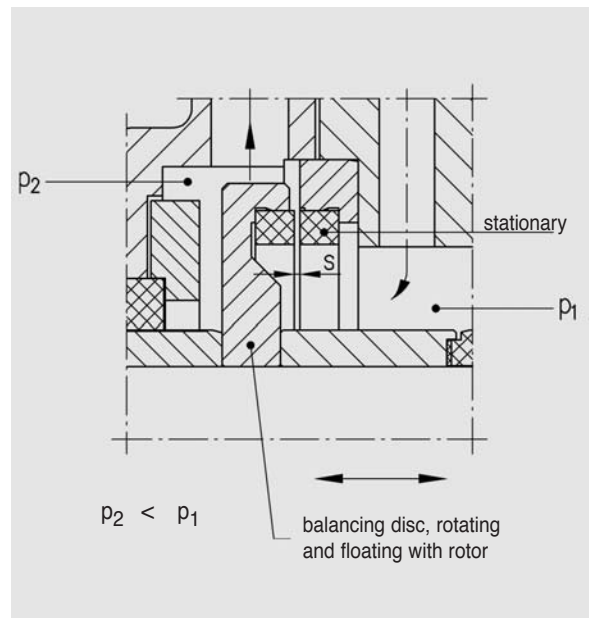
When operating hermetically sealed pumps, cavitation must be avoided by all means. This applies especially for handling hydrocarbons, condensates and other low boiling liquids.

For lowest NPSH-values, the impeller of the first stage is designed as a suction impeller with enlarged eye.

### Balanced thrust loads

The thrust loads of the closed impellers are balanced by throttle gap and relief holes. The balancing of residual loads is effected by the balancing disc on pressure side.

The front side of the balancing disc is pressurized by the pump pressure  $p_1$ . The rear disc side



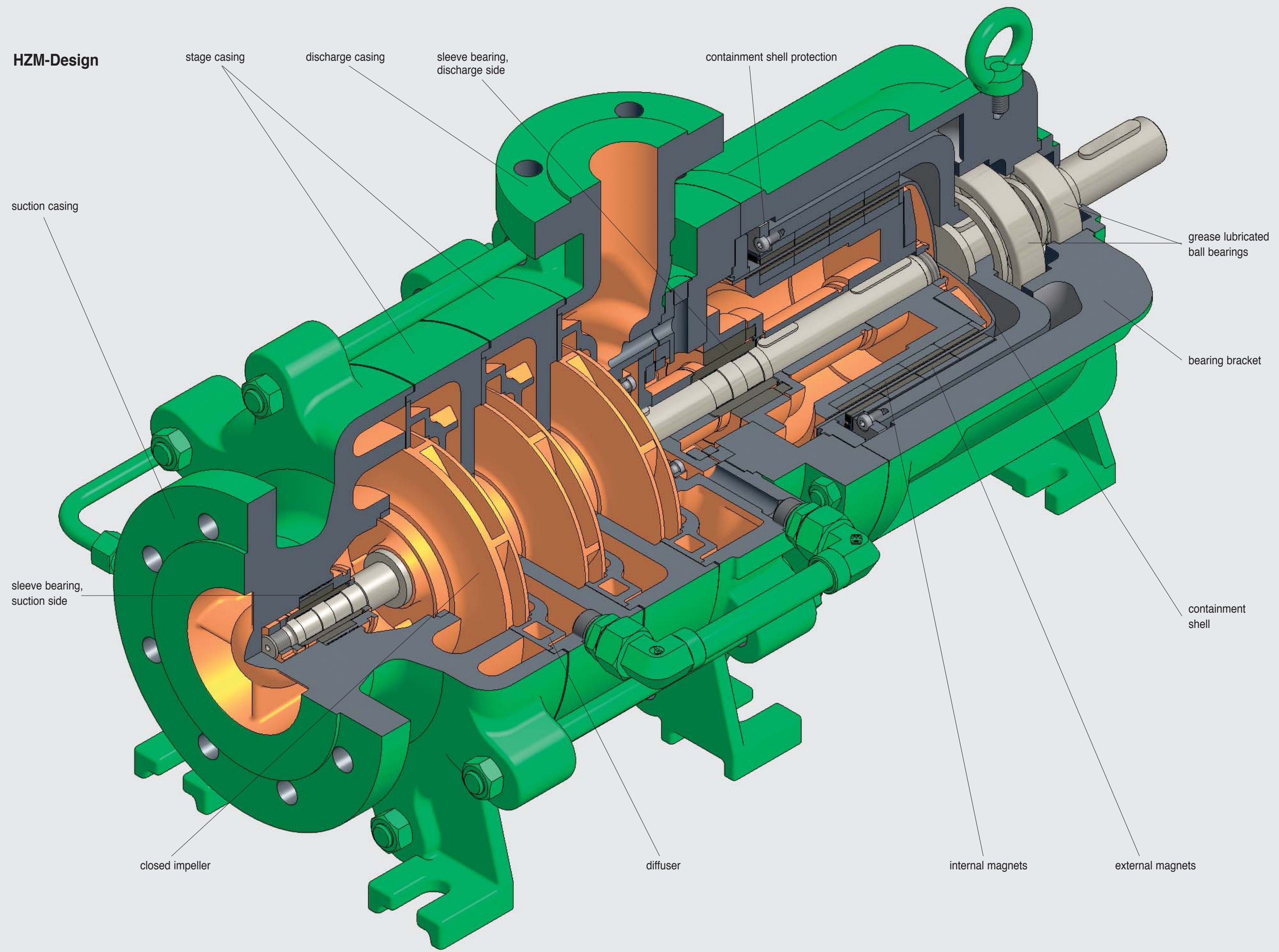
is connected with the pressure side of the first pump stage via an external pipe. According to the rotor position and the adjusting gap  $S$ , a counter force is created by the differential pressure between front and rear side of the balancing disc. This counter force acts against the residual load towards the containment shell such that no thrust loads occur. No thrust bearings are required. The start-up rings keep the pump shaft in position during start-up and shut-off.

### Monitoring

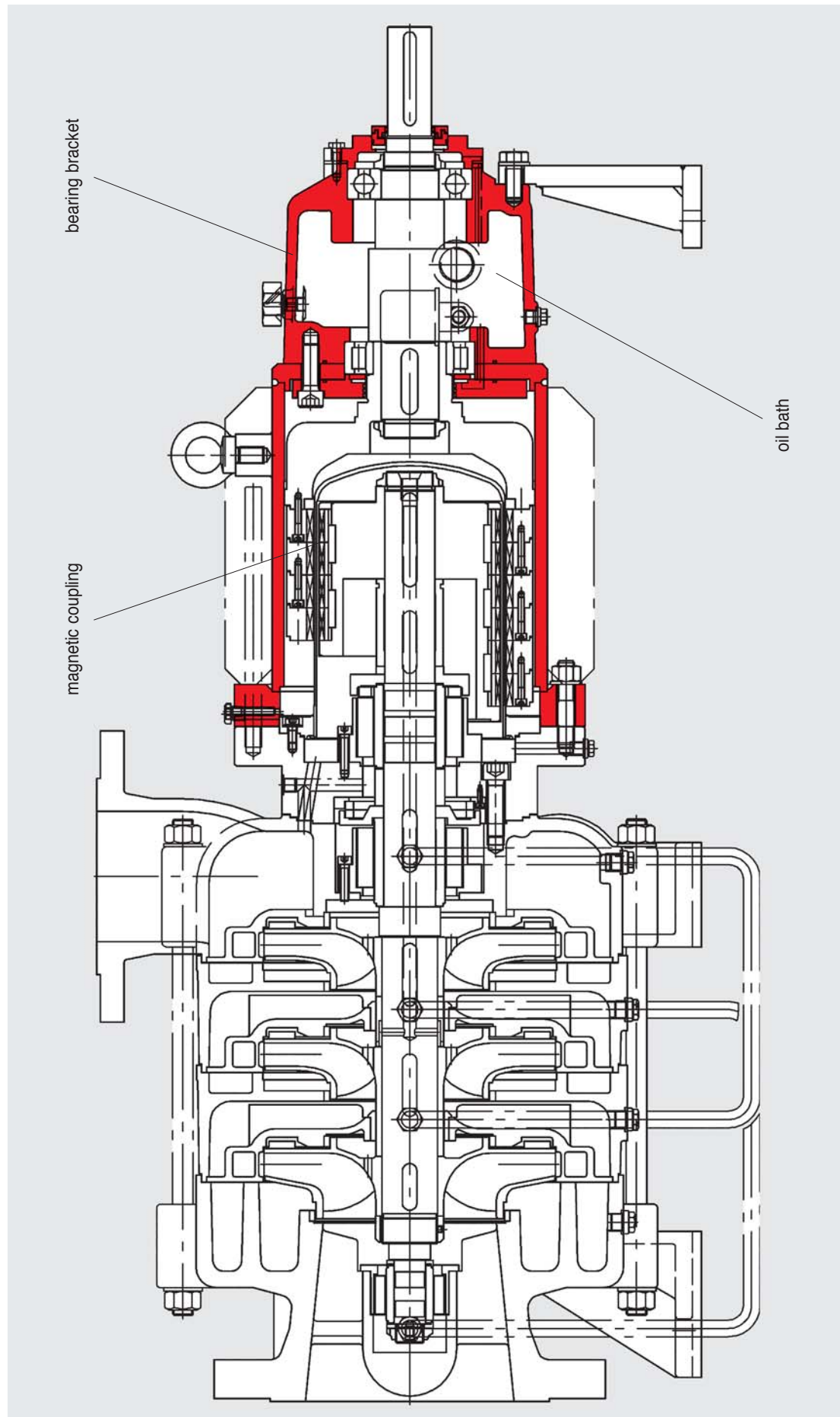
Connection for temperature detection element for containment shell surface temperature is available as standard. Dry running protection and monitoring of ball bearings and containment shell temperature with the patented "mag-safe" system is highly recommended.



# HZM-Design

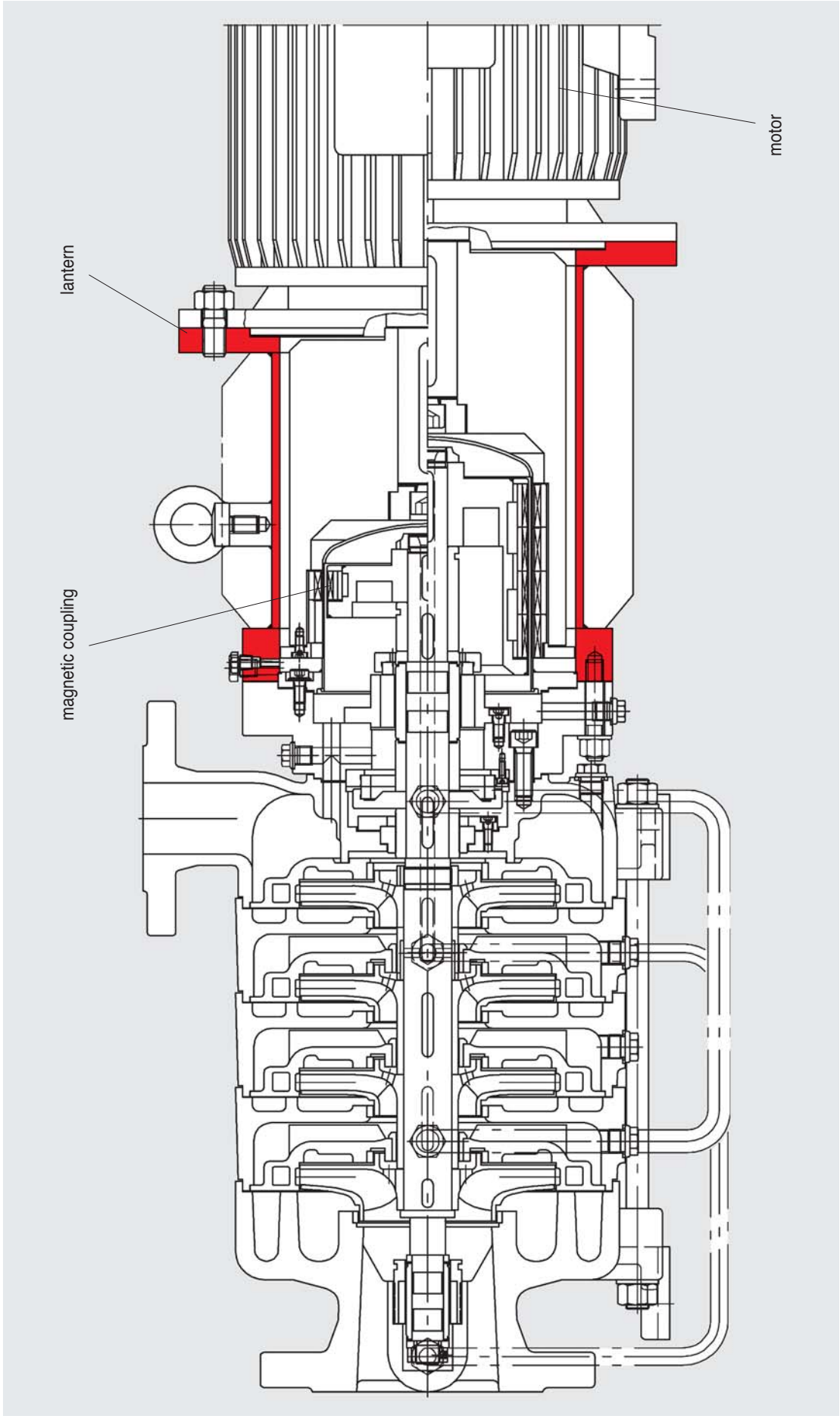


**Optional designs**  
**Type HZMR – with oil lubricated bearing bracket**

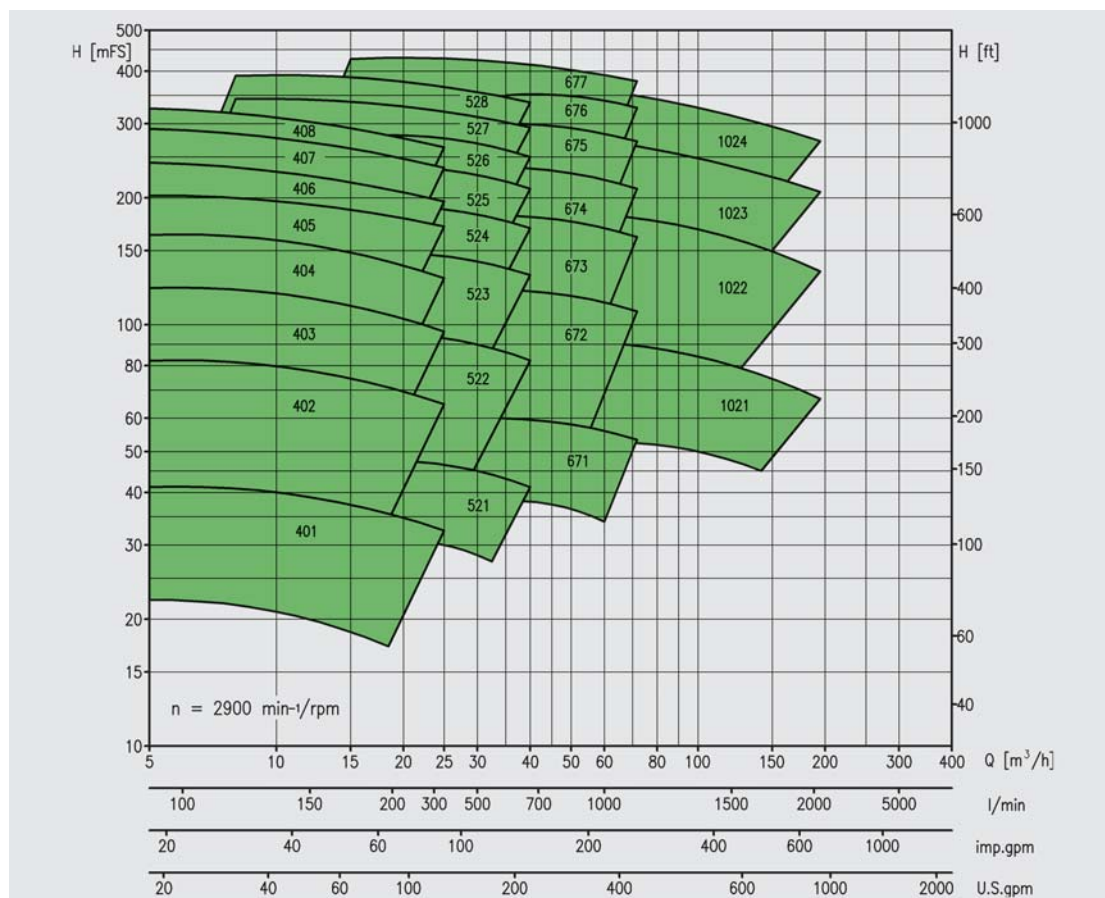
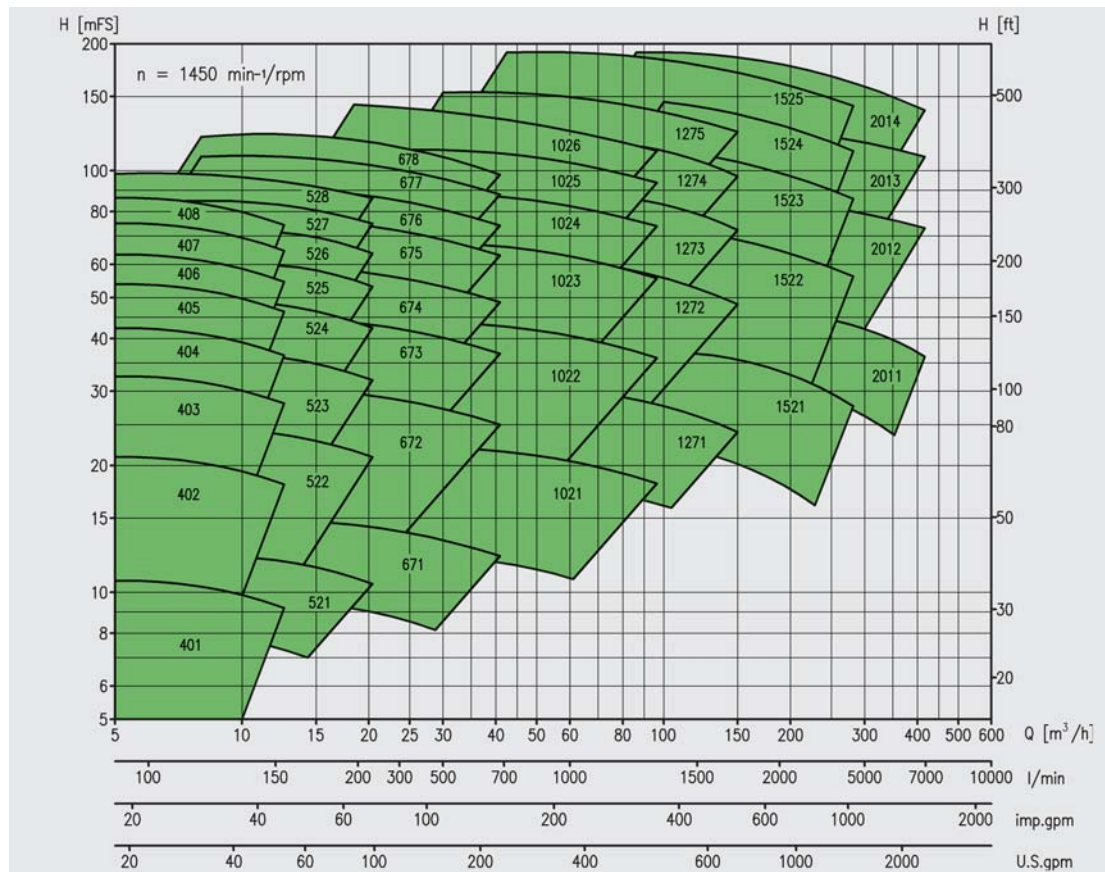




Type HZMB – close coupled design



## Performance range



Performance curves for the individual pump sizes, also for 1750 / 3500 rpm, with NPSH-values and power consumption, are available on request.

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