



**DICKOW
PUMPEN**



**Sealless Magnetic Coupled
Centrifugal Pumps acc. to EN 22858 / ISO 2858**

Type KML / KMB / KMR / KMV

General

DICKOW-pumps of the series KM are sealless centrifugal pumps.

The static containment shell forms a closed system with hermetically sealed liquid end.

Applications

Magnetic driven KM-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. The KM-pumps operate maintenance-free and the magnet couplings replace double acting mechanical seals with external fluid reservoirs and the necessary control equipment.

Maximum capacity appr. 70 m³/h (300 US-gpm), differential head 65 mLC (213 ft).
Temperature range -30°C to 200°C (-34°F to 390°F), working pressure 16 bar (232 psi).

Hazardous area

Together with the required Ex-drive motors, the KM-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 (KMB/KMV) the containment shell temperature is limited when using ex-motors. The values are available on request.

Designs

Horizontal design KML/KMB/KMR

The pumps are single stage, volute casing pumps with closed impellers, back-pull-out design, with end suction and top discharge flange. Sturdy legs are provided for foot mounting on the base plate. Capacity and casing dimensions comply with EN 22858 / ISO 2858.

Vertical design KMV

Type KMV is available as a space saving vertical inline-design.

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 (KML/KMR-pumps) respectively of the drive motor (KMB/KMV-pumps) together with the drive rotor without draining the pump.

Magnet coupling

The single elements of the multipolar magnet coupling are manufactured of permanent magnet material Cobalt Samarium with unlimited lifetime. 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 magnet forces and work as a synchronous coupling. The inner magnet ring transmits the required torque direct to the impeller. Overload of the magnet coupling and slipping will not cause demagnetization if temperature monitoring is available. The magnets are designed for electric motors, direct on line starting. Should a subsequent increase of motor power be required, i.e. when installing a larger impeller, the nominal power of coupling can be increased with additional magnets.

The maximum drive power is approx. 17 kW at 2900 min⁻¹ (28 HP at 3500 min⁻¹).

Internal clearances

The internal clearance between rotor and containment shell is appr. 1,0 mm.

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.

Casing drain

Complete drainage of casing and magnet end is possible through casing drain. No additional drain in the containment shell area is required.

Outer ball bearings

The drive shaft and the drive rotor of KML-pumps are made of one piece. The drive unit is supported by generously dimensioned antifriction bearings, grease filled for life and protected against environment by a radial seal ring.

KMB/KMV-pumps have the drive magnet fixed on the motor shaft in overhung position. No additional antifriction bearings (as needed in KML-pumps) and no flexible couplings are required.

The drive shaft of KMR-pumps is carried by generously dimensioned oil lubricated antifriction bearings, rated for 25000 operating hours. The oil bath is protected against the atmosphere by a labyrinth seal. Oil level is controlled by a constant level oiler and an additional sight glass. The oil chamber is sealed against the magnet coupling also by a labyrinth seal.

Sleeve bearings

The pump shaft is carried in a sleeve bearing, positioned in the pumped liquid. Standard material is pure sintered Silicon Carbide with diamond layer for dry-run capability. SiC is highly resistant to corrosion and wear and applicable for all kinds of liquid. Its high hardness and wear resistance grants best possible availability. The Silicon Carbide parts are shrink fitted or elastic mounted and therefore, protected against shock and thermal stress.

NPSH-conditions

The fact that the internal circulation flow with elevated temperature is led back to discharge has no influence on the NPSH-value. Special impeller design achieves low NPSH-conditions.

Balanced thrust loads

The thrust loads of the closed impellers are hydraulically balanced by impeller back vanes and injection holes. Any remaining loads are absorbed by the thrust bearings.

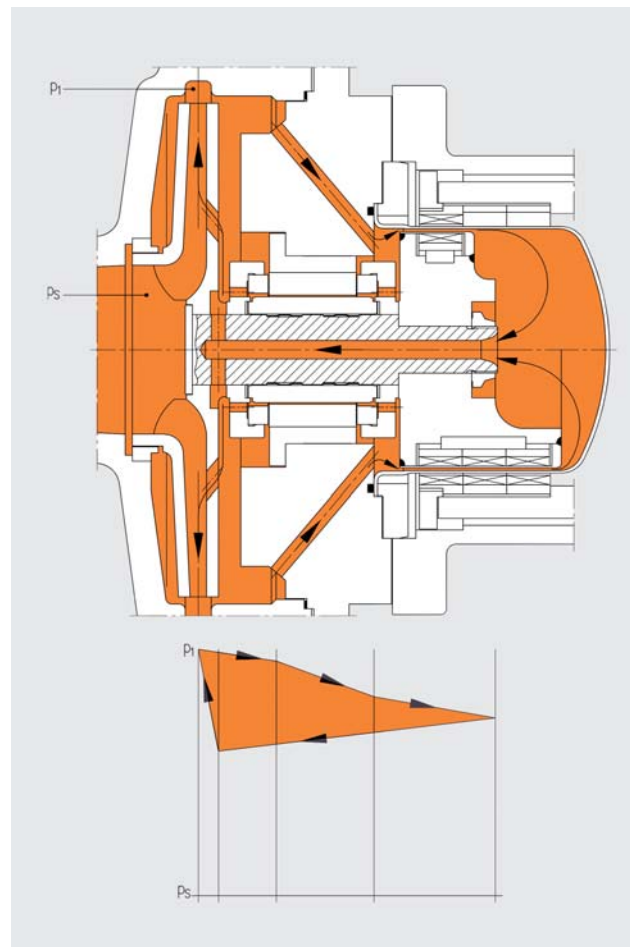
Monitoring

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.

Internal circulation

Pumps in operation generate eddy currents in the metallic containment shell which heat up the product in the gap between rotor and containment shell. This heat is dissipated through an internal circulation. The internal circulation flows from discharge, directly behind the impeller, through the magnet area and is led through the pump shaft. Shaft bores create a pressure increase forcing the circulation back to the volute casing.

The effect of pressurizing the magnet end and the sleeve bearing prevents vaporization of the pumpage in this area.



KML-Design

internal circulation

volute casing, foot mounted

casing wear ring

closed impeller

drain plug

sleeve bearing

containment shell protection

grease lubricated ball bearings

bearing bracket

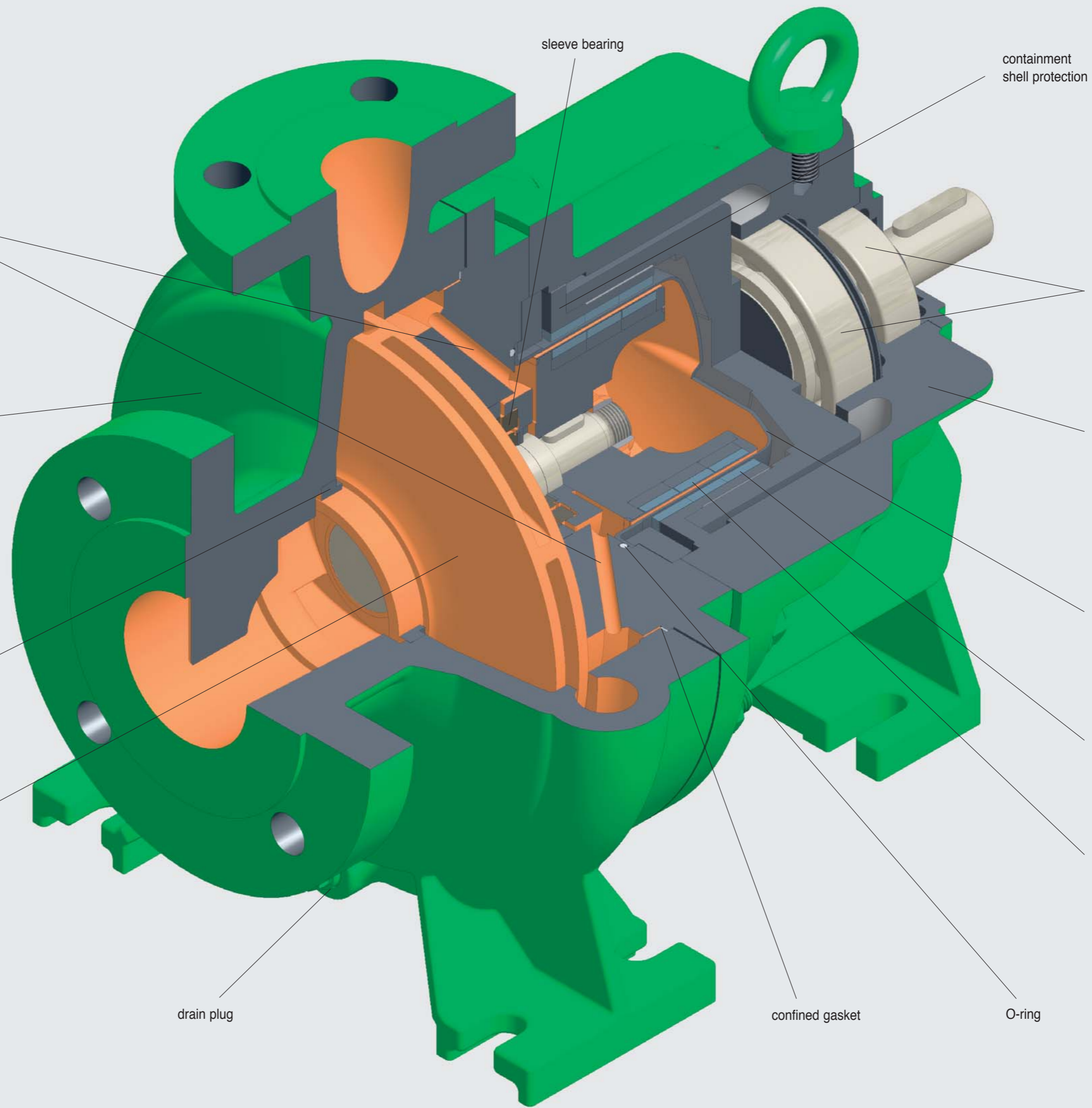
containment shell

external magnets

internal magnets

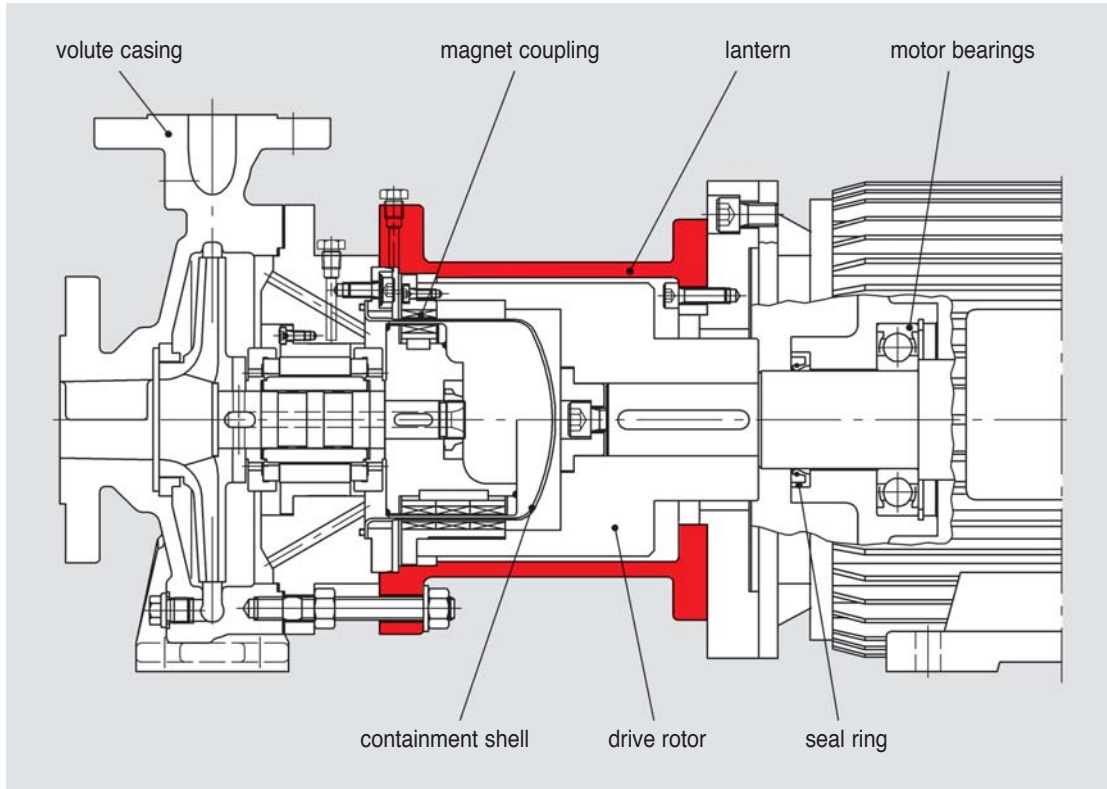
confined gasket

O-ring

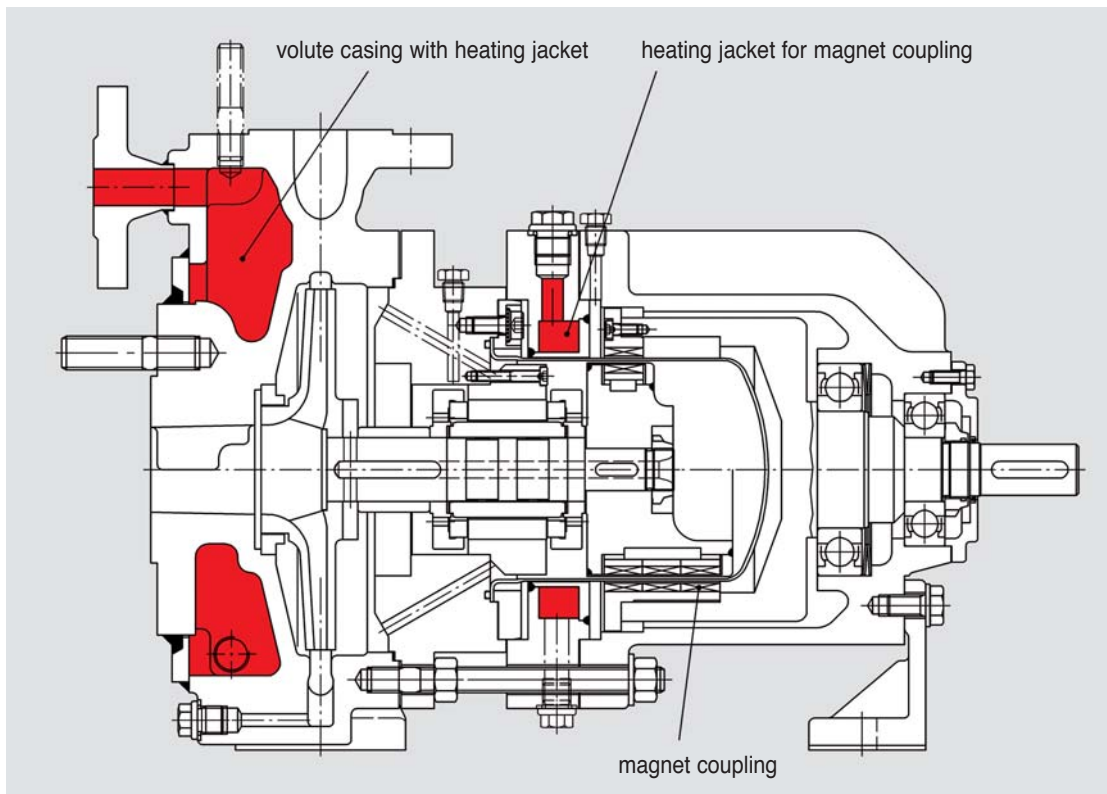


Optional designs

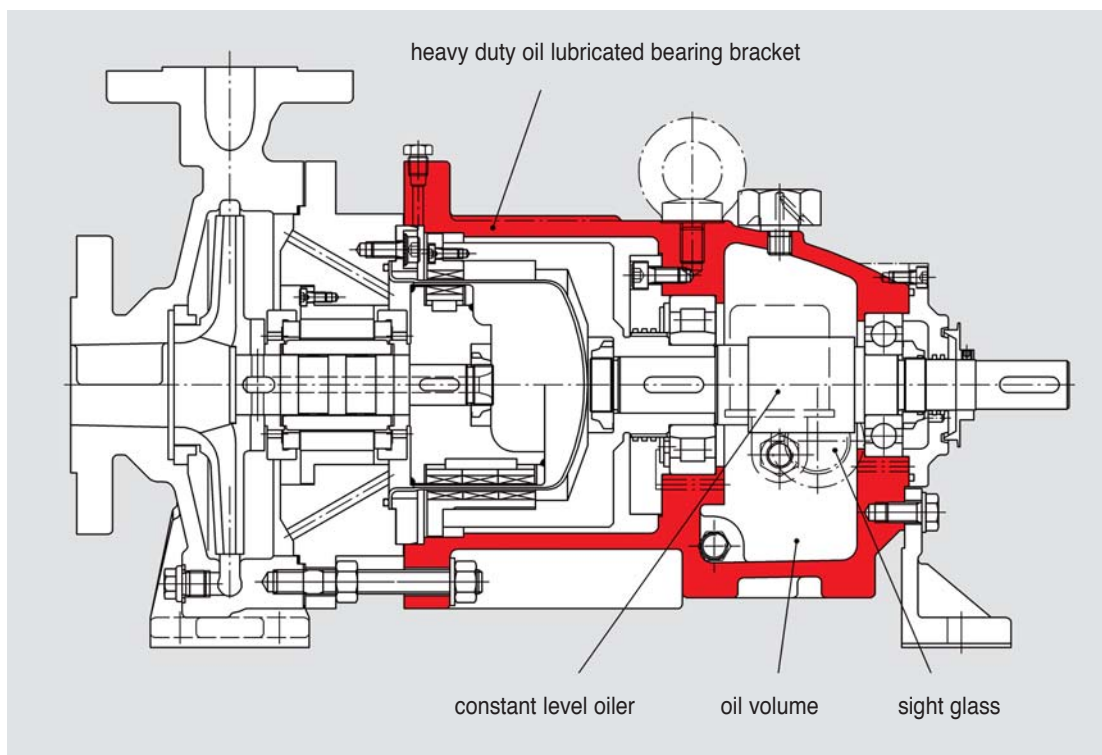
Type KMB - close coupled design



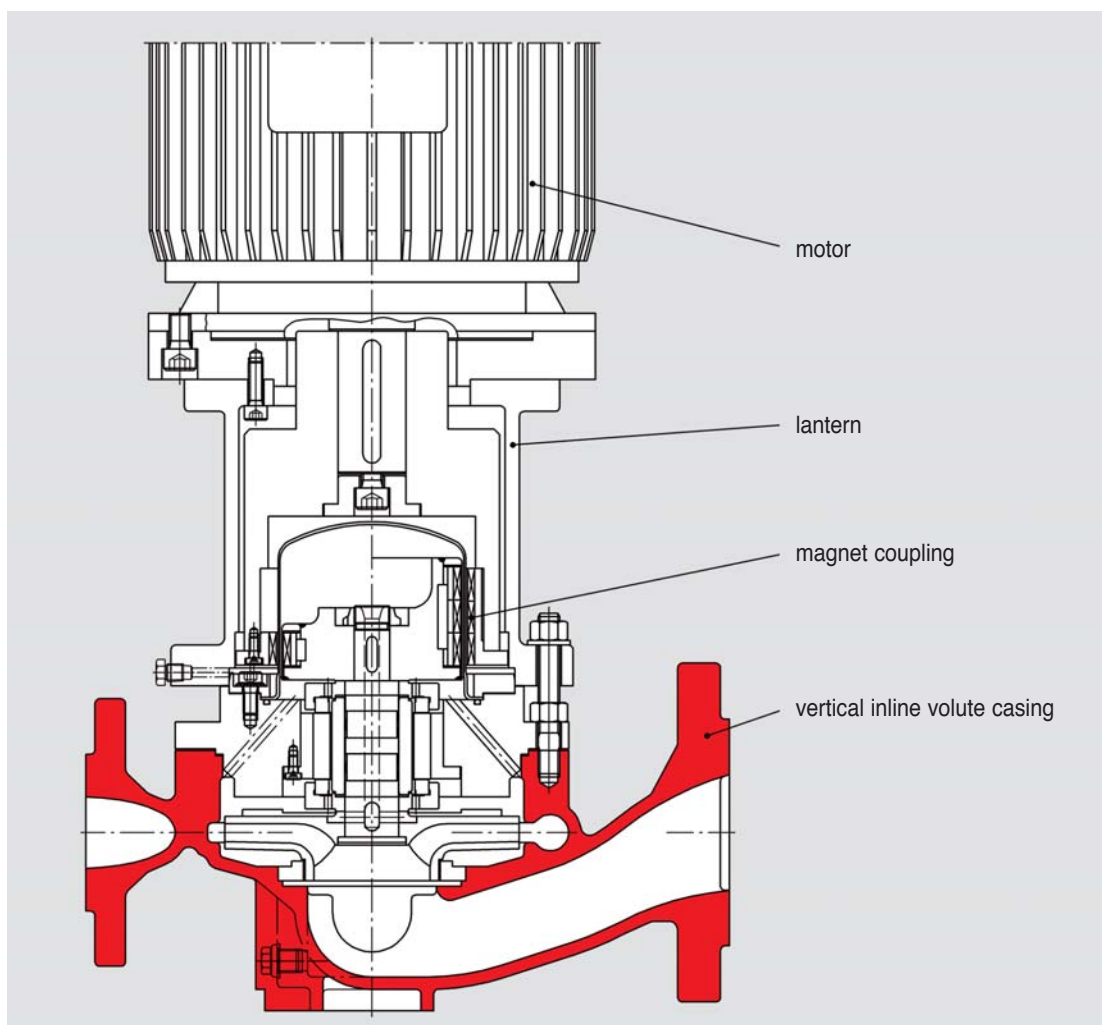
Type KML b - with heating jacket



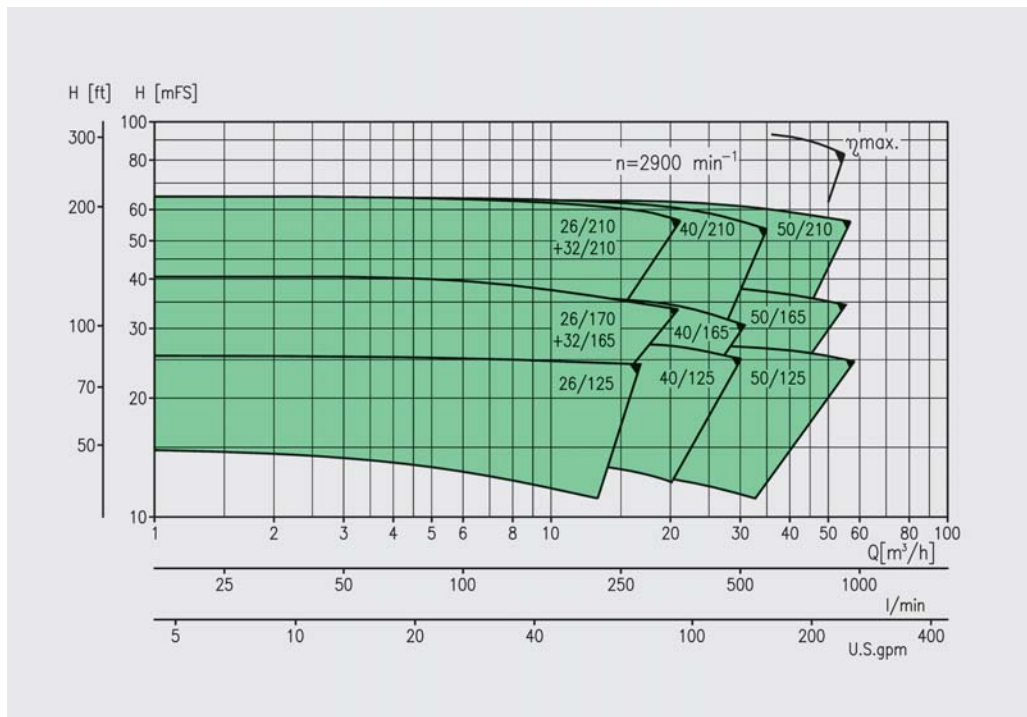
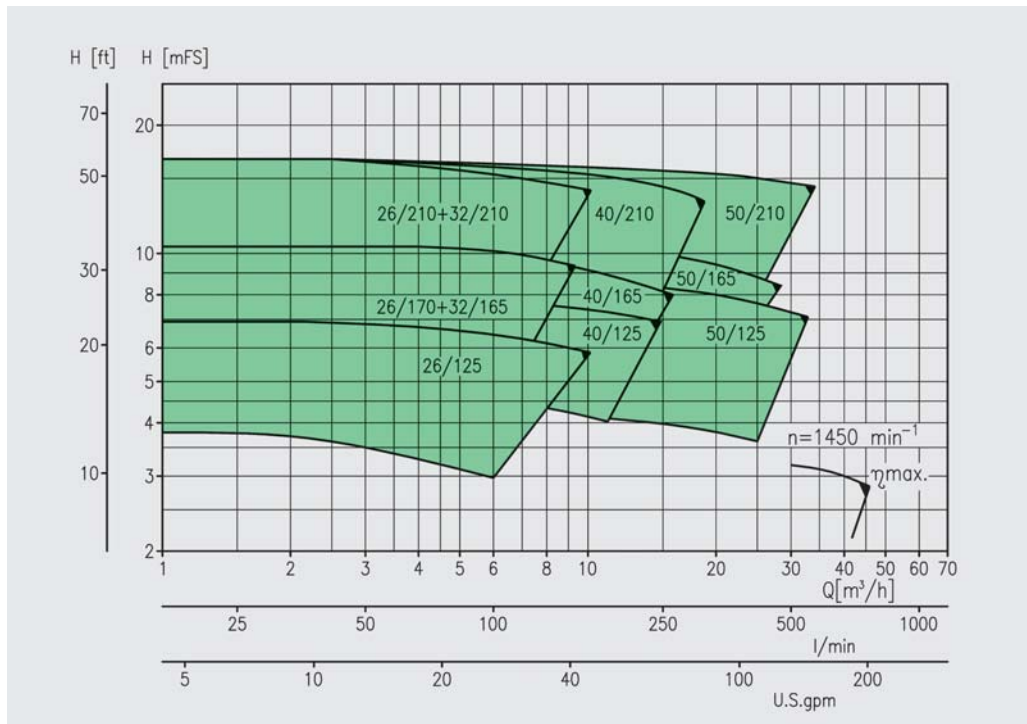
Type KMR - with oil lubricated bearing bracket



Type KMV - vertical design



Performance range



Performance curves for the different pump sizes are available on request and are supplied with our technical offers in general.