Magnetic Driven Centrifugal Pump SLM AVP/NVP API 685

KLAUS UNION

Safety and Environmental Protection by Klaus Union to API 685

This pump, designed for use in refineries and the petrochemical industry, represents a further development in the range of sealless centrifugal pumps designed and manufactured by Klaus Union who have a proven reliability in this area. With the SLM AVP pump, Klaus Union introduces a further element of its modular pump series to comply with the latest requirements – and to offer new economic solutions.
Particularly in the refinery sector and the petrochemical industry where pumps transport aggressive, toxic and explosive liquids under the highest safety conditions, the requirements have increased and multiplied.

The new pump series designed to the standard of the **A**merican **P**etroleum **I**ndustry (**API 685**) is a further development with regard to safety regulations compared to the currently used pumps with mechanical seal to API 610.

The API 685 standard defines the standardized technology to successfully implement the advantages of sealless pump technology such as absolute integrity, operational dependability and reliability.

The SLM „API" series covers the entire performance range of single-stage centrifugal pumps. For special applications, multistage pumps and pumps of high-pressure design can also be supplied.

SLM AVP: Construction series to API 685 and hydraulic component to ANSI / ASME B.73.1M

SLM NVP: Construction series to API 685 and hydraulic component to DIN EN 22858

Construction

- magnet drive
- leak-free
- API 685
- horizontal pump
- process type
- modular system of standardized units
- centerline support

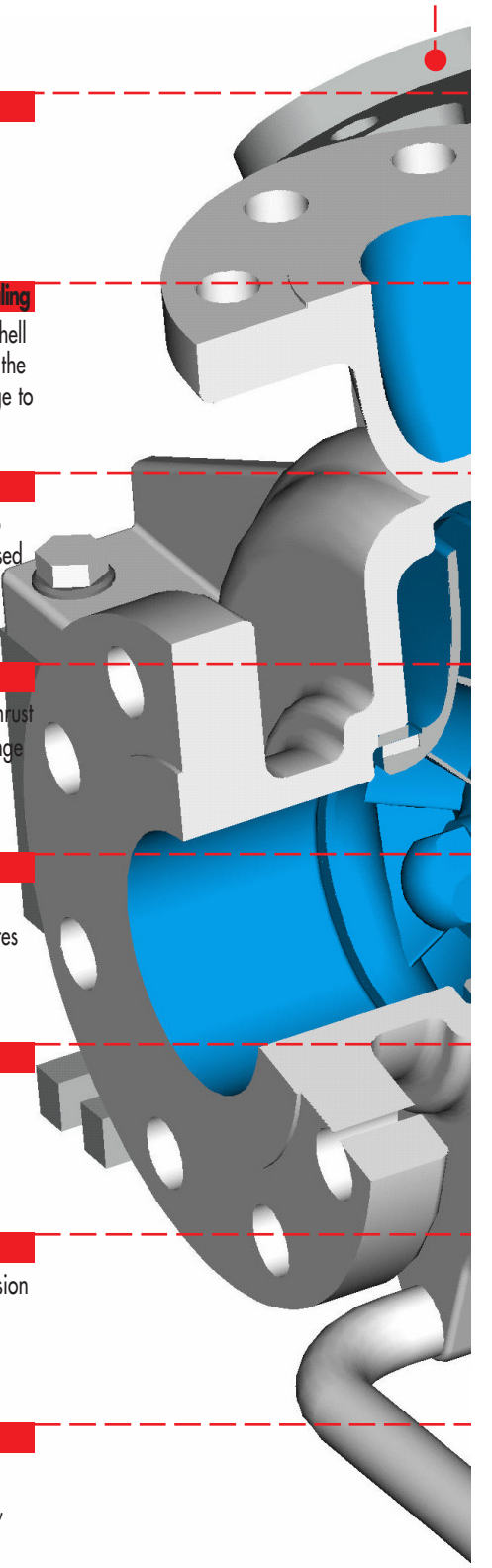
Secondary Sealing
Control connection-indication in case of leakage of the inner isolation shell

Temperature Monitoring
of the isolation shell temperature

Isolation Shell with Secondary Sealing
The **c**ontrol **d**ouble **s**kin isolation shell prevents the liquid from leaking to the atmosphere even in case of damage to the inner isolation shell

Flushing System
Sufficient pressure is maintained to safely control liquids being processed close to their boiling point

Thrust Bearing Load
Hydraulic measures reduce axial thrust over the complete performance range



Journal Bearings
Double bearing made of SSiC. Counter centred combination ensures their universal use over a wide temperature range

Wear Rings
- interchangeable

Static Gaskets
Static confined controlled compression gaskets

Outer Magnet Carrier
Hub fastened with screws
Short-circuit body with mechanical, non-sparking rub ring

Leakage Monitoring
and draining connection

Drain
with flange

Quality Assurance

It is the policy of Klaus Union to achieve adequate quality assurance for the manufacture of all products to ensure they comply with contractual requirements. All subsuppliers are totally committed to assure and achieve the contractual requirements through vigorous implementation of the quality assurance program. All purchased material is repeatedly inspected for conformity on receipt and after assembly.
The quality assurance system established according to latest state-of-the art principles fully complies with the requirements specified in international codes and regulations.
A quality assurance system that has been verified and certified to DIN EN ISO 9001 : 2000 warrants that the requirements imposed by you are fully complied.

Klaus Union is the holder of the following approval stamps:

- AD 2000 W0 / TRD 100
- AD 2000 HPO / DIN EN 729-2
- Inspection of a Production Facility for Pressure Vessels according to Directive 97/23 EC module F + G

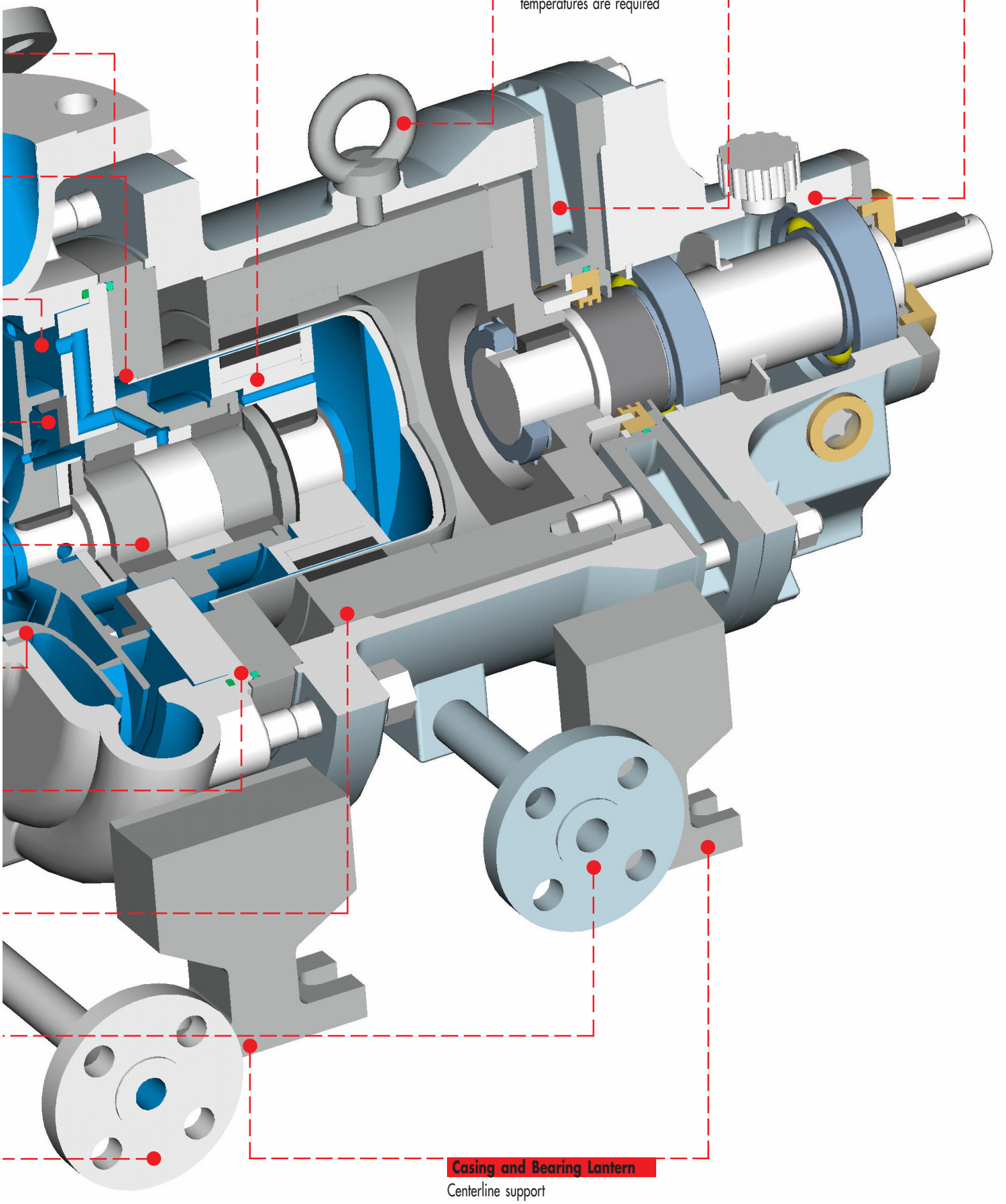

TÜV CERT
ZERTIFIKAT
Die TÜV CERT-Zertifizierungsstelle der RWTÜV Anlagentechnik GmbH
bescheinigt gemäß
TÜV CERT-Verfahren, dass das Unternehmen
KLAUS UNION GMBH& CO. KG
44795 Bochum
21244 Buchholz
für den Geltungsbereich
Entwicklung, Konstruktion und Herstellung von Pumpen und Armaturen
ein Qualitätsmanagementsystem eingeführt hat und anwendet.
RWTÜV

Inner Magnet Carrier
with mechanical rub ring

Transport Screw

Thermal Barrier
Reduces the heat transfer to the bearing support where high operating temperatures are required

Bearing Support
Oil lubrication with thermal barrier and labyrinth sealing



Casing and Bearing Lantern
Centerline support

Application profiles to API 610/685

Fields of Application:

The pumps of the SLM AVP and SLM NVP series are universally applicable heavy-duty process pumps with magnet drive. They meet the highest requirements with regard to integrity, environmental safety, and ease of maintenance.

The pumps are leak-free and particularly suitable for pumping toxic, aggressive, inflammable and other environmentally hazardous liquids in

- **refineries**
- **oil- and gas fields**
- **on-/offshore plants**
- **gas processes**
- **the processing of liquids**
- **the petrochemical industry**
- **the chemical industry**

Construction Features:

Construction and equipment of the single-stage, single-suction horizontal process-type centrifugal pumps correspond with the requirements of the API 685 standard. The pumps are of process-type design with radially split casing and flanged-on bearing support.

The volute casing and the bearing support are fastened with their centerline feet to the base frame.

By means of the centerline support, adverse consequences of thermal expansion and thus misalignment of the coupling are avoided.

The impeller is of closed radial design.

Magnet Drive:

The magnet drive eliminates the need for shaft passages since the motor torque is transmitted to the perfectly sealed chambers in the absence of any mechanical contact. This advanced technology involves the central coupling where the permanent magnets with the same even number of poles are alternating thus ensuring a perfect rotational symmetry.

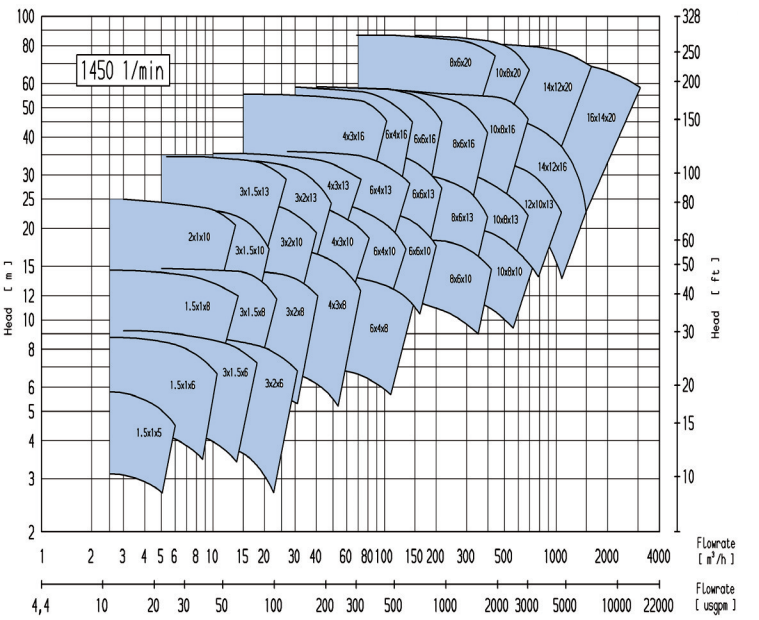
The concentric design of the coupling safely prevents any undesired radial and axial forces from acting on the journal bearings.

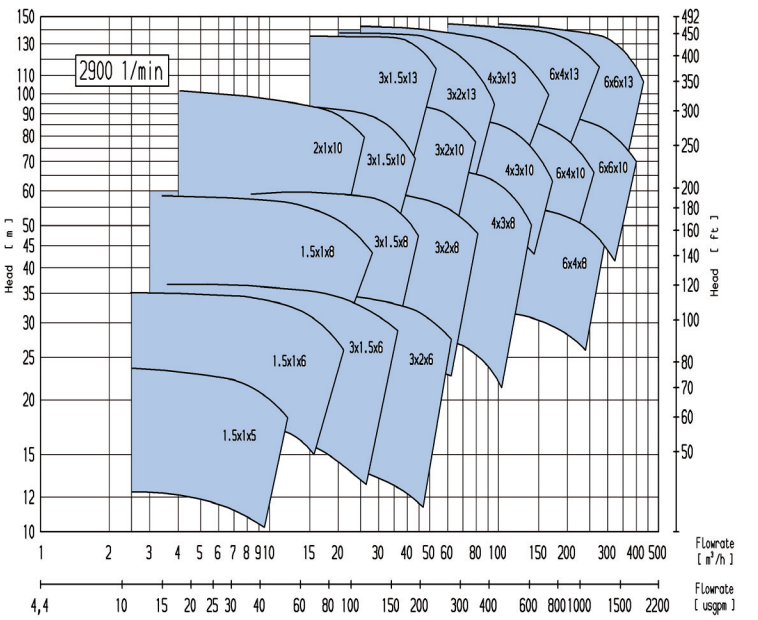
Variation of the torque to any required operational mode is made by varying the system diameter and its height.

Journal Bearings:

SLM AVP and SLM NVP pumps require the installation of a hydrodynamic journal bearing in the liquid chamber. These are lubricated by the pumped liquid. As a standard, the journal bearing combinations are manufactured of pure, sintered silicon carbide.

This material is characterized by high resistance to wear and excellent endurance.





Single-Stage Pumps:

Rate of flow:
Q = 2.5 to 2500 m³/h
11 USgpm to 11000 USgpm

Delivery head:
H = 6 to 200 m L.C.
20 to 650 ft. L.C.

Higher capacities on demand

Multistage Pumps:

Rate of flow:
Q = 5 m³/h to 450 m³/h
22 USgpm to 2000 USgpm

Delivery head:
H = up to 900 m L.C.
2950 ft. L.C.

Pressure Ratings:

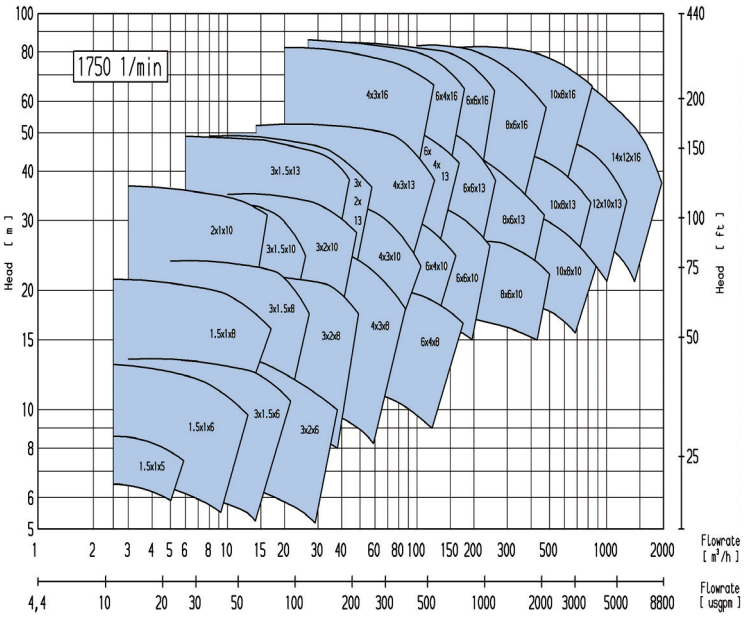
Flanges to ANSI / ASME B16.5, Class 300 (PN50)

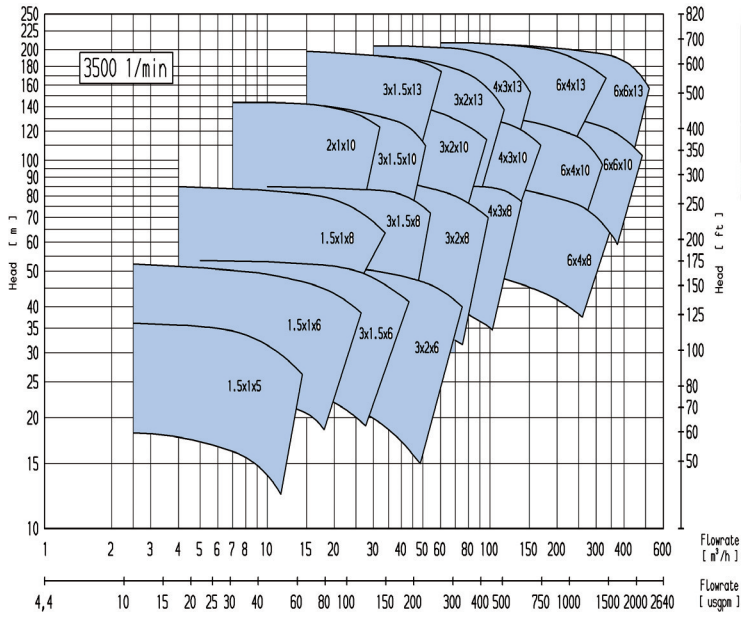
Temperature: -120 °C up to +450 °C max.

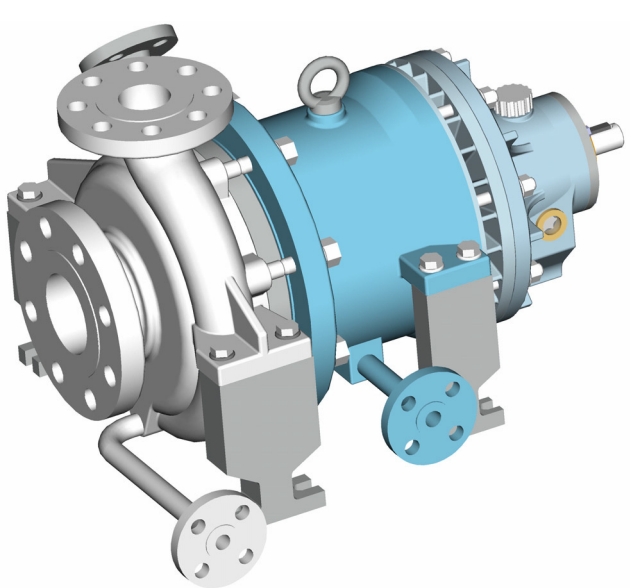
Higher requirements on demand

Materials:

On demand







SLM AVP/NVP

Systematic design with safety in mind

Klaus Union has taken full advantage of over 40 years experience in the design and manufacture of magnetic drive pumps.

We fully appreciate the high safety requirements demanded by the markets we serve and this is always reflected in the design and construction of the pumps and monitoring systems.

The design and concept of this completely new pumps takes full advantage of our experience and uses well proven techniques and technology.

Rub Ring Protection
In the event of journal bearing or ball bearing failure, the rub rings prevent immediate damage to the isolation shell from either the inside or outside. For the rub rings to be effective they must be used in conjunction with an input power monitoring arrangement on the drive motor. (LC Controller)

Replacement of Anti-friction Bearings without Draining of Pump
By splitting the bearing bracket into intermediate lantern and bearing support, wear parts (anti-friction bearings) can be replaced without costly disassembly or drainage of the pump.

Temperature Sensor
The internal recirculation can be monitored by measuring the temperature of the isolation shell.

Load Detector (LC)
This monitors the shaft power and trips the pump if it detects under-load caused by cavitation, flow interruption or desynchronisation of the magnet drive or overload due to mechanical contact of the rub rings.

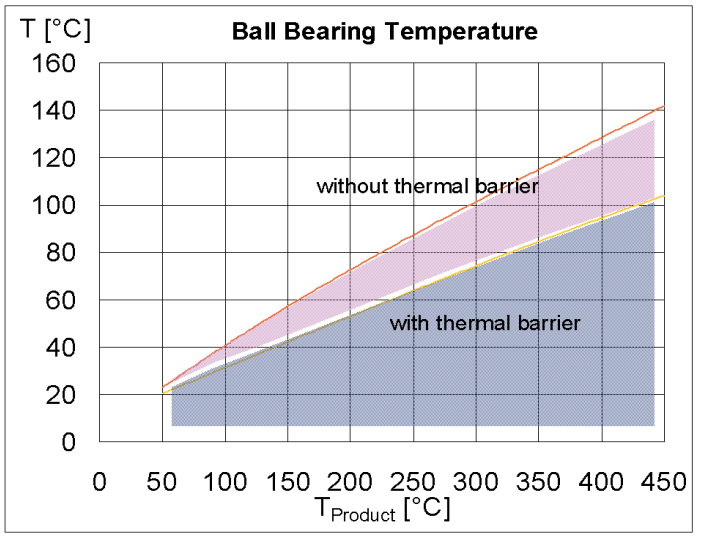
Secondary Sealing by CDS-System
The „**C**ontrol **D**ouble **S**kin Isolation Shell Monitoring“ (CDS) allows for the provision of a defined failure signal through the network path between the inner and the outer isolation shells. The indication of a leakage of the inner isolation shell is effected by means of a manometer or a pressure measurement. According to the API regulations, the pump is still considered sealed and operation can be continued with single safety.

Flush Flow Monitoring
By feeding the required flush flow rate via the external connection at the isolation shell flange, the flush flow can be monitored by a flowmeter. If the minimum flush flow rate is less than specified, the pump is de-energized.

Anti-Friction Bearings
By means of a **S**hock **P**ulse **M**easurement (SPM), onset of anti-friction bearing failures can be detected early. On customer's demand, the pump will be provided with appropriate test nipples in the area of the anti-friction bearings.

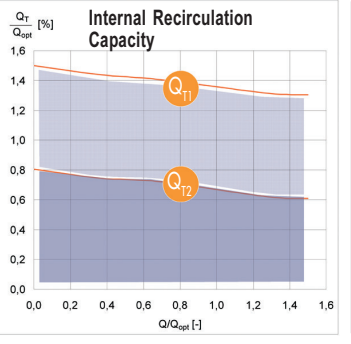
Thermal Barrier

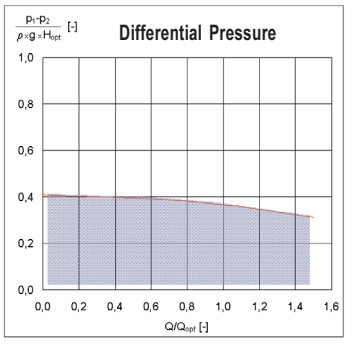
The thermal barrier protects the bearing support from high liquid or heating chamber temperatures. It works like an air cooler providing a large surface area for the dissipation of heat by convection. For the first time the thermal barrier permits the use of close coupled pumps at high operating temperatures.



Flushing System

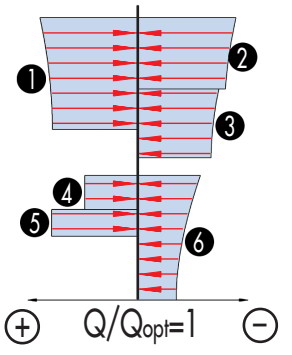
The internal recircualtion ensures that adequate pressure is maintained at all times permitting the safe use of the pump even on liquids close to their boiling point. The flush flow is taken from an area with reduced solids and is separated into two distinct flow paths. Flush flow QT1 dissipates the frictional heat generated by the journal bearing. Flush flow QT2 dissipates the heat generated by eddy current losses in the isolation shell. This flushing system provideds an almost constant flush flow rate and pressure even when the pump is misused.

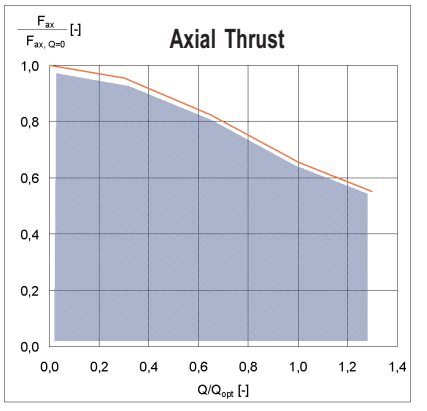




Thrust Bearing Load

With the new design system the axial loads in the thrust bearings are significantly reduced across the entire operating range of the pump.

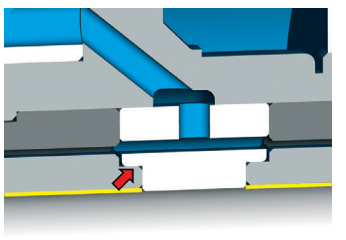




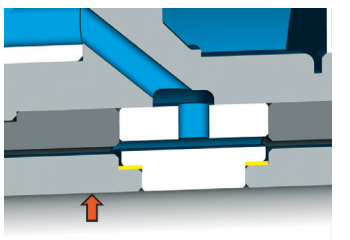
Journal Bearing

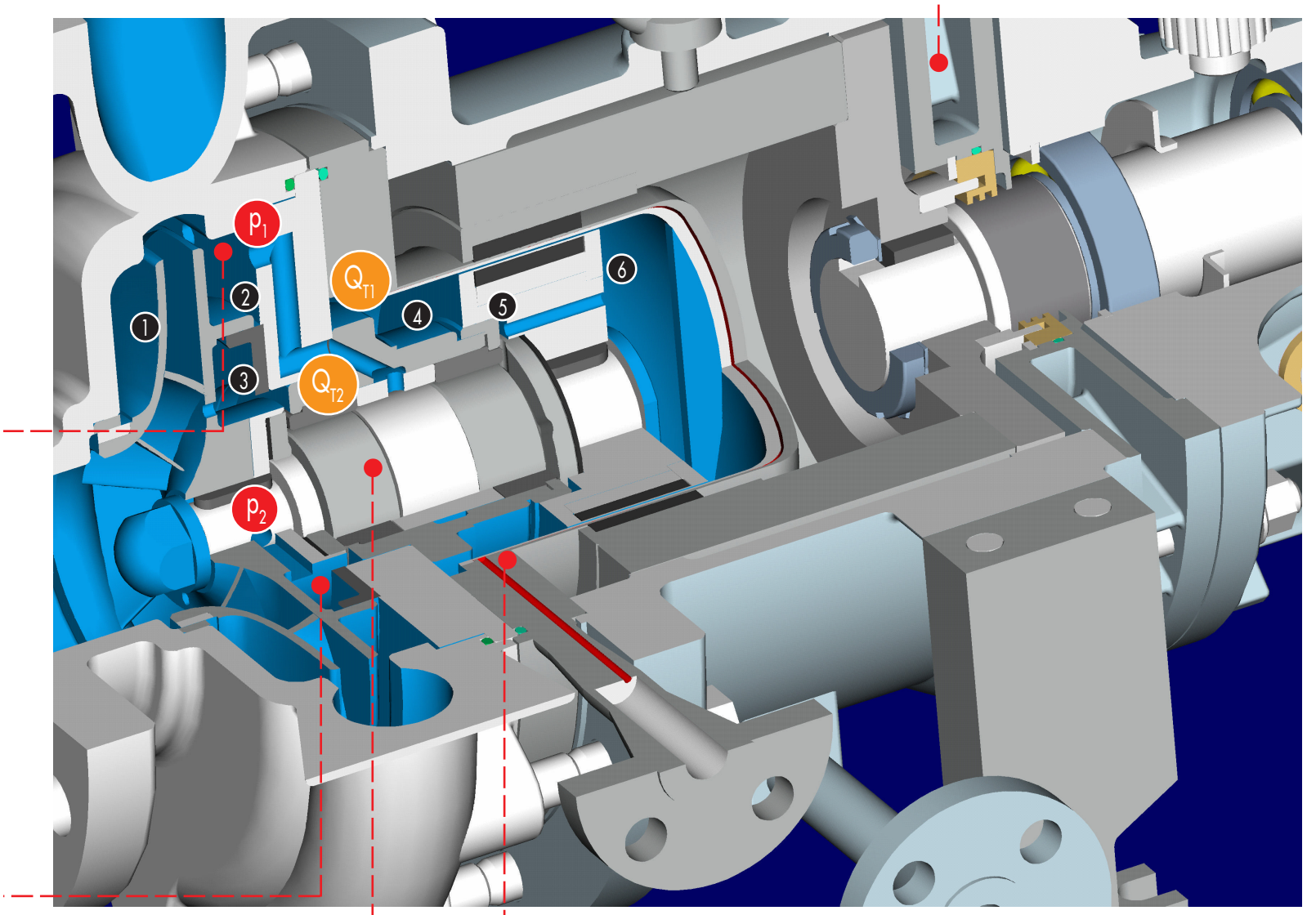
This completely new design of wear resistant journal bearing manufactured in SSiC is used universally across the range. The different coefficients of expansion of the materials used are compensated for both axially and radially by a counter centring design. The operating range of the new bearing cartridge is from -120°C up to +350°C.

20°C to 120°C



120°C to 350°C





Isolation Shell with Secondary Sealing (CDS-System patented)

The **C**ontrol **D**ouble **S**kin Isolation Shell (CDS) completely fulfils the requirements of API Standard 685, Section 6.8. Indication of a leakage of the inner isolation shell is effected through the network path between the inner and the outer isolation shells to the control connection flange. A further processing of the signals can be effected by a pressure measurement.

Production Programme Pumps

SLM-Pumps with magnet drives

Oil refinery centrifugal pumps acc. to API 685

Chemical centrifugal pumps acc. to DIN EN 22858

Chemical centrifugal pumps in close coupled design

Multistage casing pumps

Side channel pumps

Vertical centrifugal pumps

Submerged pumps

Self-priming spiral casing pumps

SLM CIP (cleaning in place) for food and pharmaceuticals industry

Screw pumps

Special designs

SLM agitator drives

Plastic chemical pumps acc. to DIN EN 22858

Pumps

Chemical centrifugal pumps acc. DIN EN 22858

Multistage casing pumps

Horizontal and vertical propeller pumps

Bottom flange propeller pumps

Vertical centrifugal pumps (Nobox system)

Submerged pumps

Double-suction chemical pumps

Special designs

Production Programme Valves

Globe valves with stuffing box

Globe valves bellow sealed

Check valves

Gate valves

Swing check valves

Strainers

Sight glasses

Bottom valves

Relief valves

Control valves

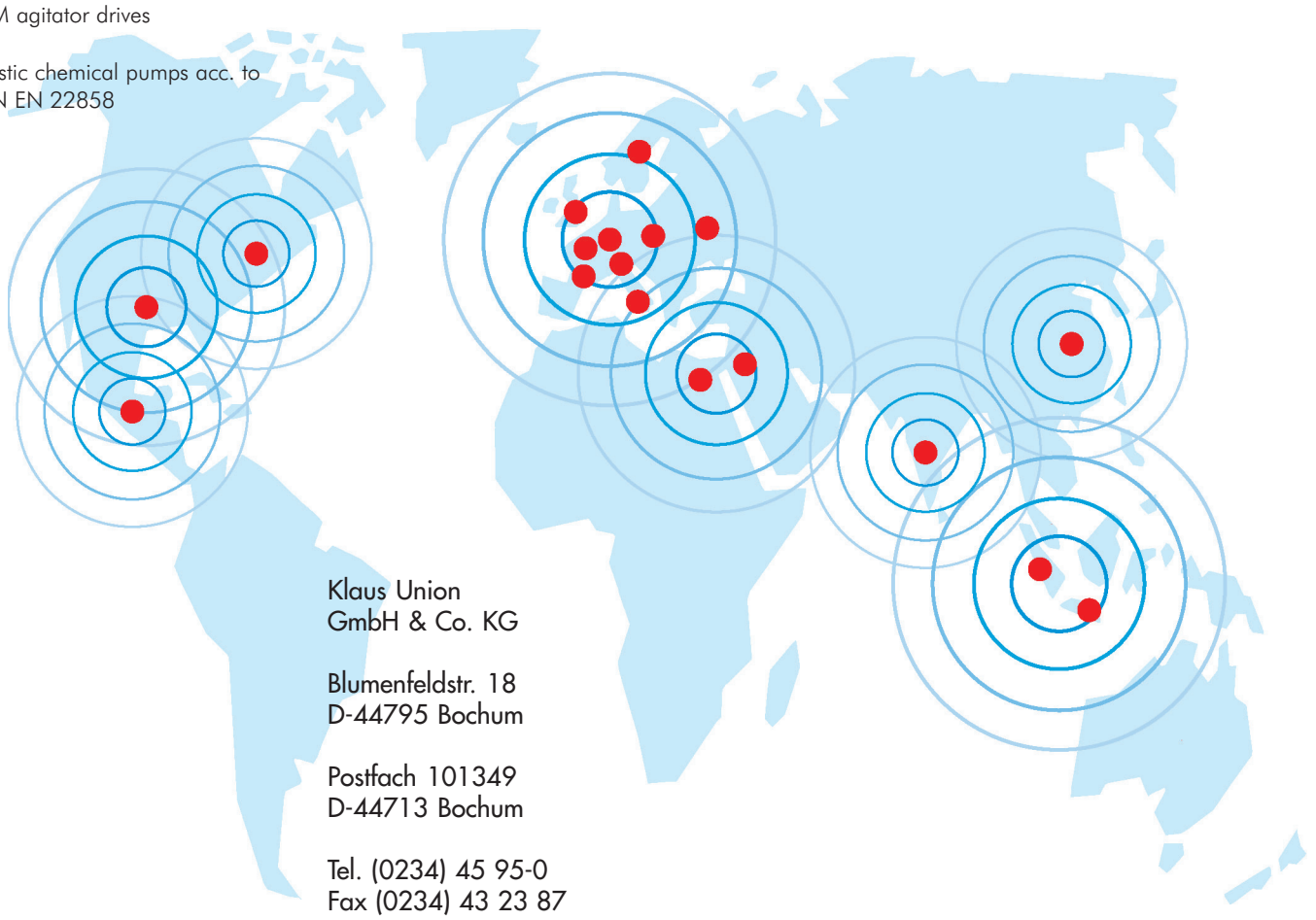
High pressure valves

Valves for cryogenics

Valves with electric or pneumatic drive

Our Service: Very close to customers – all over the world

This most unique drive system, a wide range of products in best quality as well as many years of experience have made KLAUS UNION a worldwide leading supplier of pumps with magnet drives and valves. All over the world we are represented with our own companies, sales offices and agencies. All over the world we are offering complete services from perfect proposals and advice up to technical after-sales service.



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