PRODUCT RANGE PUMPS

CENTRIFUGAL / TWIN SCREW PUMPS
ACC. DIN EN ISO / API / ASME

www.klaus-union.com
Quality Assurance

A major element of the Klaus Union ethos is to ensure highest product quality. Existing quality assurance procedures with Klaus Union suppliers are constantly monitored from order placement to goods receipt and final assembly. This quality assurance system, developed on latest technologies, complies with the requirements of international regulations. Klaus Union products and processes are certified according to:

- DIN EN ISO 9001
- DIN EN ISO 50001
- EC Pressure Equipment Directive 2014 / 68 / EU
- Machinery Directive 2006 / 42 / EC
- EAC Certificate – Certificate of conformity with requirements of technical regulations CU TR 004/010/012/020/2011, Russia
PRODUCT PORTFOLIO
MAGNET DRIVE PUMPS & MECHANICALLY SEALED PUMPS

Pumps with Magnet Drive

SLM NV
Single-Stage Centrifugal Pump
Acc. DIN EN ISO 2858 / DIN EN ISO 15783

SLM AV
Single-Stage Centrifugal Pump
Acc. ASME B73.3M

SLM AP
Single-Stage Centrifugal Pump
Acc. API 685 2nd Ed.

SLM SV
Multi-Stage Side Channel Pump
Acc. DIN EN ISO 15783

SLM GV
Multi-Stage Centrifugal Pump
Barrel Design
Acc. DIN EN ISO 15783

SLM NVT
Vertically Suspended Pump
Single- & Multi-Stage
Acc. DIN EN ISO 15783

SLM DSP-2C
Single Volute Twin Screw Pump
Acc. API 676 3rd Ed.

Mechanically Sealed Pumps

NOV
Single-Stage Centrifugal Pump
Acc. DIN EN ISO 2858 / DIN EN ISO 5199

GOV
Multi-Stage Centrifugal Pump
Acc. DIN EN ISO 5199

P
Single-Stage Propeller Pump

TP NO
Single-Stage Submerged Pump
Acc. DIN EN ISO 5199

DSP-2C
Single Volute Twin Screw Pump
Acc. API 676 3rd Ed.

DSP-4CL
Double Volute Twin Screw Pump
Acc. API 676 3rd Ed.

All Klaus Union magnet drive pumps (excl. series SLM NVT) are also available in close-coupled design (page 08/09).
THE MODULAR SYSTEM FOR MAGNET DRIVE PUMPS

The Modular System

Klaus Union’s modular pump system consists of three different elements:
- Pump Hydraulic
- Magnet Coupling
- Bearing Bracket

The combination of these components allows a large operating envelope with few differing parts. The parts are even interchangeable between the screw pump and centrifugal pump series. Over 100 different pump sizes and magnet drives cover operation parameters up to 3,500 m³/h and 400 bar. Interchangeability, stack size and servicing equipment become easy to handle subjects.
CLOSE-COUPLING DESIGN FOR MAGNET DRIVE PUMPS

Klaus Union Pumps in Close-Coupled Design

Close-coupled pumps are the result of the continuous development of the proven Klaus Union pumps with magnet drive and without shaft seal.

Pumps in close-coupled design meet highest technical and economic requirements that refineries and the [petro-]chemical industry expect today from pumps without shaft seal.

The design without shaft seal but with magnet drive guarantees that the pump operates leak-free, in accordance with the TA-Luft specification (German Technical Instruction on Air Quality Control). In comparison to pumps with mechanical seal, Klaus Union’s sealless magnet drive pumps operate maintenance-free.

Klaus Union’s leak-free pumps are particularly suitable for pumping toxic, aggressive, inflammable and other environmentally hazardous liquids particularly in the following industries:

- Refineries
- On-/Offshore
- Petrochemical
- Chemical

The close-coupled design offers significant cost savings because of the following advantages:

- No alignment between pump and motor
- No coupling and coupling guard
- No ball bearings
  - Pump does not require scheduled maintenance
  - No oil lubrication necessary
  - Lower noise level
- High stiffness of the pump shaft because of small overhug compared to pumps with shaft seal
- Use of standard high efficient IEC and NEMA motors contrary to canned motors
  - Better availability with standard motors
  - Maintenance of motors is standardized and can be done by the customer on site
- Base plates for close-coupled design do not need to be rigid acc. to API 685 - 7.3

All Klaus Union magnet drive pumps (excl. series SLM NVT) are available in close-coupled design.

The design covers the complete performance range of centrifugal and twin screw pumps. Multistage centrifugal pumps and pumps designed for high pressure applications are also available as special designs.

Tailor-Made Solutions

Fig. 6. Magnet Drive Centrifugal Pump SLM NVB (Close-Coupled Design)

Fig. 7. Magnet Drive Centrifugal Pump SLM APC (Close-Coupled Design)
ENERGY EFFICIENT DESIGN FOR MAGNET DRIVE PUMPS

Enhancing Pump Efficiency without Compromising its Performance

Through the use of non-metallic containment shells instead of the traditionally used metallic containment shells, Klaus Union eliminates eddy current losses and increases the efficiency of magnet drive pumps significantly.

Thanks to the leak-free magnet drive concept, pumps with magnet drives have a huge market share in the chemical and petrochemical industry.

For many years, Klaus Union has used nonmetallic containment shells and particularly those made from ceramics for various applications due to their high chemical resistance. Until recently, the operative range has been limited due to the specific material characteristics. However, pump applications increasingly demand higher operating pressures, temperatures and flow rates whilst still offering maximum efficiency.

Klaus Union’s ceramic containment shells meet this challenge and provide the following application coverage:

- **Nom. Pressure Range:** PN 40
  (PN 50 / PN 63 available on request)
- **Temperature Range:** -200 °C to +400 °C
- **Transmittable Power:** 1 MW

Performance, Technology and Innovation

Klaus Union offers a modular system for all sealless centrifugal and screw pumps.

This system consists of the pump hydraulic, the magnet coupling and the bearing bracket. All pump types in this system have an universal casing cover, which easily allows to change an existing containment shell regardless of its material.

Within the modularity, containment shells made of ceramic are available for every magnet coupling size (09E/P/T - 31E/P/T).

Our containment shell design is based on the modern Finite Element Method (FEM). This simulation method allows to detect and analyze accurate approximations of tensions and deformations. The result is an optimization of structural parts and its quality as well as the elimination of the risk of failure.

The graphics show a displacement analysis (Fig. 9) and a stress analysis on the (Fig. 10) in a 60 bar pressure test.
ENERGY EFFICIENT DESIGN FOR MAGNET DRIVE PUMPS

Advantages of Ceramic Containment Shells

Containment Shells made of Zirconium Oxide are not magnetizable. Due to this quality there are no eddy currents impacting the pump’s performance. In consequence, the pumping fluid is not being heated in the process.

This has the following advantages:

- Enables for dry run capable executions (RTZ-design) and executions without flush flow to cool the containment shell (OTZ-design).
- Enables for applications with high gas content.
- Pumps can handle fluids close to vapor pressure curve, e.g. liquid gas applications.
- Instrumentation to monitor the isolation shell temperature is not required anymore, since eddy current losses are eliminated.

Further advantages:

- High mechanical strength;
- Extension of the application through higher pump speed.
- Vacuum tight up to 0.1 bar absolute.
- Large corrosion and erosion allowance;
- Zirconium Oxide is resistant against most lyes and acids.
- Excellent thermal shock resistance.
- Enhanced energy efficiency.

Retrofit of pumps with shaft seal:

- As there are no eddy current losses, shaft powers comparable to pumps with shaft seals can be achieved.

For quality control purposes, all Klaus Union containment shells are equipped with an individual, engraved serial number. Furthermore, Klaus Union provides material certificates on request.

Cost Savings through the Application of Zirconium Oxide

- Ceramic containment shells are an important part of Klaus Union’s modular pump system. Due to the universal casing cover containment shells can be easily and safely mounted or replaced. The operator saves stock capacities and service costs.
- Energy consumption can be lowered as there are no performance-impairing eddy currents. In fact, the required motor power can be reduced by 10 to 15 %.
- Due to the lower power requirement, smaller electric motors can be installed.
- The ceramic containment shell per se guarantees an absolute leak-free operation. In conjunction with the high durability of the material, both the risk and the maintenance costs are minimized.

Energy-saving potential by eliminating eddy current power losses

Case study during 8800 operating hours illustrating the energy saving potential

Cost-comparison pump with 10 kW magnet drive

- Return on investment achieved after one year
  Centrifugal pump with magnet drive ▶ Energy-efficient design ▶ Standard design

Cost-comparison pump with 100 kW magnet drive

- Return on investment achieved after half a year.
  Centrifugal pump with magnet drive ▶ Energy-efficient design ▶ Standard design
CENTRIFUGAL PUMP WITH MAGNET DRIVE SERIES SLM NV

Fig. 11. Magnet Drive Centrifugal Pump SLM NVO, Oil-Lubricated Bearing Bracket

Fig. 12. 3-D Cross-Section of Magnet Drive Centrifugal Pump SLM NVO, Oil-Lubricated Bearing Bracket

According
DIN EN ISO 2858
DIN EN ISO 15783

Industries
▶ Chemical Industry
▶ Petrochemical Industry
▶ Refrigeration and Heat Transfer
▶ Oil & Gas
▶ Power

Typical Applications
▶ Acids
▶ Lyes
▶ Hydrocarbons
▶ Heat Transfer Liquids
▶ Coolants
▶ Liquid Gases
▶ Aggressive, Explosive and Toxic Liquids
▶ Liquids Containing Solids
▶ High-Viscosity Liquids

Operating Range
▶ Flow Rate: max. 3,500 m³/h
▶ Delivery Head: max. 220 m L.C.
▶ Temperature Range: -120 °C to +450 °C
▶ Pressure Rating: max. PN 400

Design
▶ Single-Stage, Horizontal Centrifugal Pump in Process Design
▶ Hydraulic Performance and Dimensions according to DIN EN ISO 2858
▶ Design based on DIN EN ISO 15783
▶ Permanent Magnet Drive
  - Maintenance-Free
  - Separation of Liquid Chamber and Atmosphere by Means of Containment Shell
  - Synchronous Design
▶ Materials: Steel, Stainless Steel, Nickel-Based Materials, Titanium
▶ Bearing Bracket with Oil-Lubricated or Greased-for-Life Anti-Friction Bearings
▶ Optional: Close-Coupled Design (SLM NVB)
▶ Product-Lubricated Journal Bearings; made of Silicon Carbide (SiC) or Customized Materials

Fig. 11. Magnet Drive Centrifugal Pump SLM NVO, Oil-Lubricated Bearing Bracket
CENTRIFUGAL PUMP WITH MAGNET DRIVE SERIES SLM AV

According
ASME 73.3M

Industries
- Chemical Industry
- Petrochemical Industry
- Oil & Gas
- Power
- Refrigeration and Heat Transfer

Typical Applications
- Acids
- Lyes
- Hydrocarbons
- Aggressive, Explosive and Toxic Liquids
- Liquid Gases
- Heat Transfer Liquids
- Coolants
- Liquids Containing Solids
- High-Viscosity Liquids

Operating Range
- Flow Rate: max. 150 m³/h
- Delivery Head: max. 100 m L.C.
- Temperature Range: -120 °C to +450 °C
- Pressure Rating: max. PN 400

Design
- Single-Stage, Horizontal Centrifugal Pump in Process Design
- Hydraulic Performance and Dimensions according to ASME B73.3 M
- Permanent Magnet Drive
  - Maintenance-Free
  - Separation of Liquid Chamber and Atmosphere by Means of Containment Shell
  - Synchronous Design
- Materials: Steel, Stainless Steel, Nickel-Based Materials, Titanium
- Bearing Bracket with Oil-Lubricated or Greased-for-Life Anti-Friction Bearings
- Optional: Close-Coupled Design
- Product-Lubricated Journal Bearings; made of Silicon Carbide (SSiC) or Customized Materials
CENTRIFUGAL PUMP WITH MAGNET DRIVE SERIES SLM AP

According
API 685 2nd Edition

Industries
- Chemical Industry
- Petrochemical Industry
- Refrigeration and Heat Transfer
- Oil & Gas
- Power
- On-/Offshore Plants

Typical Applications
- Hydrocarbons
- Liquid Gases
- Aggressive, Explosive and Toxic Liquids
- Heat Transfer Liquids
- Coolants
- Acids
- Lyes

Operating Range
- Flow Rate: max. 3,500 m³/h
- Delivery Head: max. 220 m L.C.
- Temperature Range: -120 °C to +350 °C (SLM APC)
- Pressure Rating: max. PN 400

Design
- Single-Stage, Horizontal Centrifugal Pump in
  - Process Design (SLM APL)
  - Close-Coupled Design (SLM APC)
- Hydraulic Performance and Dimensions with reference to ASME B73.3 M
- Technical Design according to API 685
- Flanges according to ANSI / ASME B16.5, Class 150 (PN 20), Class 300 (PN 50)
- Permanent Magnet Drive
  - Maintenance-Free
  - Separation of Liquid Chamber and Atmosphere by Means of Containment Shell
  - Synchronous Design
- Materials: Steel, Stainless Steel, Nickel-Based Material, Titanium
- Bearing Bracket with Oil-Lubricated Anti-Friction Bearings (optional: Greased-for-Life)
- Optional: Close-Coupled Design
- Centreline Support
- Product-Lubricated Journal Bearings; made of Silicon Carbide (SSiC) or Customized Materials

Fig. 15. Magnet Drive Centrifugal Pump SLM APL (Process Design)

Fig. 16. 3-D Cross-Section of Magnet Drive Centrifugal Pump SLM APL (Process Design)
SIDE CHANNEL PUMP WITH MAGNET DRIVE
SERIES SLM SV

Industries
- Chemical Industry
- Petrochemical Industry
- Refrigeration Engineering
- Oil & Gas
- Vacuum Technology

Typical Applications
- Acids
- Lyes
- Hydrocarbons
- Solvents
- Liquid Gases
- Refrigerants

Operating Range
- Flow Rate: max. 42 m³/h
- Delivery Head: max. 470 m L.C.
- Temperature Range: -120 °C to +250 °C
- Pressure Rating: max. PN 400

Design
- Multi-Stage, Horizontal Side Channel Pump in Process Design
- Design based on DIN EN ISO 15783
- Maximum Number of Stages: 8
- Self-Priming
- Barrel Design Housing with just Two Gaskets
- Gas Handling
- First Low-NPSH Stage for Improved Suction Performance
- Permanent Magnet Drive
  - Maintenance-Free
  - Separation of Liquid Chamber and Atmosphere by Means of Containment Shell
  - Synchronous Design
- Material: Stainless Steel
- Bearing Bracket with Oil-Lubricated or Greased-for-Life Anti-Friction Bearings
- Optional: Close-Coupled Design
- Product-Lubricated Journal Bearings; made of Silicon Carbide (SiC) or Customized Materials

According
DIN EN ISO 15783
MULTI-STAGE PUMP WITH MAGNET DRIVE SERIES SLM GV

According
DIN EN ISO 15783

Industries
- Chemical Industry
- Petrochemical Industry
- Refrigeration and Heat Transfer
- Oil & Gas
- Power

Typical Applications
- Acids
- Lyes
- Hydrocarbons
- Hot Water
- Heat Transfer Liquids
- Liquid Gases
- Aggressive, Explosive and Toxic Liquids

Operating Range
- Flow Rate: max. 350 m³/h
- Delivery Head: max. 700 m L.C.
- Temperature Range: -120 °C to +350 °C
- Pressure Rating: max. PN 200

Design
- Multi-Stage, Horizontal Centrifugal Pump in Process Design
- Design based on DIN EN ISO 15783
- Impeller Arrangement in Series; Maximum Number of Stages: 6
- First Low-NPSH Stage for Improved Suction Performance
- Barrel Design Housing with just Two Gaskets
- Centreline Support
- Permanent Magnet Drive
  - Maintenance-Free
  - Separation of Liquid Chamber and Atmosphere by Means of Containment Shell
  - Synchronous Design
- Materials: Steel, Stainless Steel
- Bearing Bracket with Oil-Lubricated or Greased-for-Life Anti-Friction Bearings
- Optional: Close-Coupled Design
- Optional: Features acc. to API 685 2nd Edition
- Product-Lubricated Journal Bearings; made of Silicon Carbide (SiC) or Customized Materials
- Designs: Barrel Design Housing or Tension Rod Design

Fig. 19. Multi-Stage Magnet Drive Centrifugal Pump SLM GVOT, Oil-Lubricated Bearing Bracket

Fig. 20. 3-D Cross-Section of Multi-Stage Magnet Drive Centrifugal Pump SLM GVOT, Oil-Lubricated Bearing Bracket
SUBMERGED PUMP WITH MAGNET DRIVE SERIES SLM NVT

According
DIN EN ISO 2858
DIN EN ISO 15783

Industries
- Chemical Industry
- Petrochemical Industry
- Power

Typical Applications
- Acids
- Lyes
- Hydrocarbons
- Heat Transfer Liquids
- Aggressive, Explosive and Toxic Liquids
- Industrial Effluent

Operating Range
- Flow Rate: max. 900 m³/h
- Delivery Head: max. 200 m L.C.
- Temperature Range: -50 °C to +200 °C
- Pressure Rating: max. PN 40
- Submerging Depth: max. 10,000 mm

Design
- Single-Stage Submerged Centrifugal Pump
- Hydraulic Performance according to DIN EN ISO 2858
- Design based on DIN EN ISO 15783
- Permanent Magnet Drive
  - Maintenance-Free
  - Separation of Liquid Chamber and Atmosphere by Means of Containment Shell
  - Synchronous Design
- Materials: Steel, Stainless Steel, Nickel-Based Material, Titanium
- Bearing Bracket with Greased-for-Life Anti-Friction Bearings
- Product-Lubricated Journal Bearings; made of Silicon Carbide (SSiC) or Customized Materials
- Multi-Stage Design available (Series SLM GVTT)
TWIN SCREW PUMP WITH MAGNET DRIVE SERIES SLM DSP-2C

Industries
- Chemical Industry
- Petrochemical Industry
- Sugar Industry
- Paint
- Oil & Gas
- Power

Typical Applications
- Acids
- Lyes
- Hydrocarbons
- Bitumen / Asphalt
- Tar
- Fuel Oils (Light and Heavy)
- Polymers
- Aggressive, Explosive and Toxic Liquids
- Liquids Containing Solids
- High-Viscosity Liquids

Operating Range
- Flow Rate: max. 1,800 m³/h
- Diff. Pressure: max. 40 bar
- Temperature Range: -120 °C to +350 °C
- Pressure Rating: max. PN 400

Design
- Single Volute Twin Screw Pump in Process or in Tank Farm Design
- Design based on API 676, 3rd Ed.
- Axial Split Modular Casing
- Pressure Limiting Valve using Klaus Union Valve Series Internals
- Centerline Mounting
- Permanent Magnet Drive
  - Maintenance Free
  - Separation of Liquid Chamber and Atmosphere by Means of Containment Shell
  - Synchronous Design
- Magnet Drive acc. API 685 available
- High Viscosity optimized design available
- Materials: Steel, Stainless steel, nickel-based material or Titanium
- Bearing Bracket with Oil-Lubricated or Greased-for-Life Anti-Friction Bearings
- Optional: Close-coupled design [SLM DSP-2CB]
- Spare parts of magnetic coupling and bearing brackets are interchangeable with centrifugal pump series

According
API 676 3rd Edition

Fig. 23.
Twin Screw Pump SLM DSP-2C, Process Design

Fig. 24.
3-D Cross-Section of Magnet Drive
Twin Screw Pump SLM DSP-2C, Process Design
CENTRIFUGAL PUMP WITH MECHANICAL SEAL SERIES NOV

Fig. 25. Centrifugal Pump NOV with Shaft Sealing, Oil-Lubricated

Fig. 26. 3-D Cross-Section of Centrifugal Pump NOV with Shaft Sealing, Oil-Lubricated

According
DIN EN ISO 2858
DIN EN ISO 5199

Industries

- Chemical Industry
- Petrochemical Industry
- Refrigeration and Heat Transfer
- Oil & Gas
- Paper and Cellulose Plants
- Power
- Sugar Industry
- Coking Plants

Typical Applications

- Acids
- Lyes
- Hydrocarbons
- Heat Transfer Liquids
- Coolants
- Liquid Gases
- Sewage
- Colouring Matters
- Salt Solutions
- Pulp

Operating Range

- Flow Rate: max. 3,500 m³/h
- Delivery Head: max. 220 m L.C.
- Temperature Range: -120 °C to +450 °C
- Pressure Rating: max. PN 100

Design

- Single-Stage, Horizontal Centrifugal Pump
- Hydraulic Performance and Dimensions according to DIN EN ISO 2858
- Design according to DIN EN ISO 5199
- Shaft Sealing Space for Installation of Mechanical Seals according to DIN EN 12756 or Stuffing Box Packings
- Materials: Steel, Stainless Steel, Nickel-Based Material, Titanium
- Bearing Bracket with Oil-Lubricated Anti-Friction Bearings
MULTI-STAGE PUMP WITH MECHANICAL SEAL SERIES GOV

According DIN EN ISO 5199

Industries
- Chemical Industry
- Petrochemical Industry
- Refrigeration and Heat Transfer
- Oil & Gas
- Power

Typical Applications
- Liquid Gases
- Acids
- Lyes
- Hydrocarbons
- Hot Water
- Heat Transfer Liquids

Operating Range
- Flow Rate: max. 350 m³/h
- Delivery Head: max. 700 m L.C.
- Temperature Range: -120 °C to +350 °C
- Pressure Rating: max. PN 100

Design
- Multi-Stage, Horizontal Centrifugal Pump in Process Design
- Technical Design based on DIN EN ISO 5199
- Impeller Arrangement in Series, Maximum Number of Stages: 6
- First Low-NPSH Stage for Improved Suction Performance
- Shaft Sealing Space for Installation of Mechanical Seals according to DIN EN 12756 or Stuffing Box Packings
- Materials: Steel, Stainless Steel
- Bearing Bracket with Oil-Lubricated Anti-Friction Bearings
- Designs: Barrel Design Housing or Tension Rod Design
SUBMERGED PUMP WITH MECHANICAL SEAL SERIES TP NO

According
DIN EN ISO 2858
DIN EN ISO 5199

Industries
- Chemical Industry
- Petrochemical Industry
- Refrigeration and Heat Transfer
- Power
- Coking Plants

Typical Applications
- Acids
- Lyes
- Hydrocarbons
- Heat Transfer Liquids
- Liquid Gases

Operating Range
- Flow Rate: max. 1,600 m³/h
- Delivery Head: max. 200 m L.C.
- Temperature Range: -50 °C to +250 °C
- Pressure Rating: max. PN 40
- Submerging Depth: max. 10,000 mm

Design
- Single-Stage Submerged Centrifugal Pump
- Hydraulic Performance according to DIN EN ISO 2858
- Design based on DIN EN ISO 5199
- Shaft Sealing Space for Installation of Mechanical Seals according to DIN EN 12756 or Stuffing Box Packings
- Materials: Steel, Stainless Steel, Nickel-Based Material, Titanium
- Product-Lubricated Journal Bearings, made of Silicon Carbide (SSiC) or Customized Materials
- Multi-Stage Design available (Series TP GO)
**PROPELLER PUMP WITH MECHANICAL SEAL SERIES P**

**Operating Range**
- Flow Rate: max. 12,000 m³/h
- Delivery Head: max. 12 m L.C.
- Temperature Range: -120 °C to +250 °C
- Pressure Rating: max. PN 100

**Industries**
- Power
- Chemical Industry
- Petrochemical Industry
- Paper and Cellulose Industry
- Cooling Water Plants
- Sea Water Treatments

**Design**
- Horizontal Axial Flow Pump
- Pump Casing in Cast or Welded Construction
- Shaft Sealing Space for Installation of Mechanical Seals according to DIN EN 12756 or Stuffing Box Packings
- Materials: Steel, Stainless Steel
- Bearing Bracket with Oil- or Grease-Lubricated Anti-Friction Bearings
- Pumping Direction Freely Selectable
- Modification of Performance Possible by Means of Adjusting Propeller Blades

**Typical Applications**
- Acids
- Lyes
- Paper and Cellulose Mash
- Brine (Evaporation Plants)
- Mineral Fertilisers (liquid)
- Sea Water
- Cooling Water
- Dyes

Fig. 31: Propeller Pump P
TWIN SCREW PUMP WITH MECHANICAL SEAL SERIES DSP-2C

According
API 676 3rd Edition

Industries
- Chemical Industry
- Petrochemical Industry
- Sugar Industry
- Paint
- Oil & Gas
- Power

Typical Applications
- Acids
- Lyes
- Hydrocarbons
- Bitumen / Asphalt
- Tar
- Fuel Oils (Light and Heavy)
- Polymers
- Aggressive, Explosive and Toxic Liquids
- Liquids Containing Solids
- High-Viscosity Liquids

Operating Range
- Flow Rate: max. 1,800 m³/h
- Diff. Pressure: max. 40 bar
- Temperature Range: -120 °C to +350 °C
- Pressure Rating: max. PN 400

Design
- Single Volute Twin Screw Pump in Process or in Tank Farm Design
- Technical Design based on API 676, 3rd Ed.
- Axial Split Modular Casing
- Pressure Limiting Valve using Klaus Union Valve Series Internals
- Centerline Mounting
- Materials: Steel, Stainless steel, nickel based materials or Titanium
- Bearing Bracket with Oil-Lubricated or Greased-for-Life Anti-Friction Bearings
- Mechanical Seals acc. EN 12756 or API 682 / ISO 21049 as per customer preferences
TWIN SCREW PUMP
WITH MECHANICAL SEAL
SERIES DSP-4CL

According
API 676 3rd Edition

Industries
- Oil & Gas
- Shipbuilding
- Chemical Industry
- Power
- Sugar Industry
- Paints

Typical Applications
- Viscous Liquids Containing Considerable Amount of Solids
- Lube, Crude or Fuel Oils
- Bitumen
- Tar
- Asphalt
- Fats
- Resins
- Residues
- Multiphase Products Containing Liquids, Gas and Solids

Operating Range
- Flow Rate: max. 5,000 m³/h
- Differential Pressure: max. 100 bar
- Temperature Range: -120 °C to +350 °C
- Viscosity: max. 100,000 mPas

Design
- Horizontal, Double Volute Twin Screw Pump
- ‘Plug & Pump’ Cartridge Design
- Drive Torque Transfer by Timing Gear located outside of Pumping Chamber
- Materials: Steel, Stainless Steel
- Rotors Manufactured from Single Piece Bar Stock
- Bearings located outside of Pumping Chamber
- Inline or Side in / Top out
- Improved NPSH / NPIP
- Casted Design
CUSTOM MATERIALS OF CONSTRUCTION

Klaus Union
Quality is our Success

Customized Solutions
- Magnet Drives adapted to Individual Applications
- Pump Retrofitting
  - Reverse Engineering
  - Standard Replacement
- Multi-Stage Centrifugal Pump for Delivery Heads of up to 1.000 m SLM HV/H
- Multi-Stage Submerged Pump with Magnet Drive SLM GVTT

Steel

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Nickel-Based Materials

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<td>2.4365 G-NiCu30Nb</td>
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Titanium

<table>
<thead>
<tr>
<th>Castings</th>
<th>Rolled Material</th>
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<tbody>
<tr>
<td>3.7031 G-Ti2</td>
<td>3.7035 Ti2</td>
</tr>
<tr>
<td>3.7032 G-Ti2Pd</td>
<td>3.7165 Ti6Al4V</td>
</tr>
</tbody>
</table>

Further materials upon request
KLAUS UNION
GLOBAL PRESENCE

Sales Offices
Worldwide

- Klaus Union Center of Competence
- Klaus Union Subsidiary
- Klaus Union Sales Office

- Germany, Bochum
- India, Pune
- China, Ningbo
- USA, Houston
- England
- France
- Italy
- The Netherlands
- Poland
- Romania
- Russia
- Spain
- Ukraine
- Algeria
- Australia
- Austria
- Belarus
- Belgium
- Brazil
- Cambodia
- Canada
- Chile
- Colombia
- Cuba
- Czech Republic
- Denmark
- Egypt
- Finland
- Hungary
- Indonesia
- Iraq
- Israel
- Japan
- Kazakhstan
- Kuwait
- Malaysia
- Mexico
- New Zealand
- Nigeria
- Norway
- Oman
- Papua New Guinea
- Peru
- Portugal
- Saudi Arabia
- Singapore
- Slovakia
- South Korea
- Sudan
- Sweden
- Switzerland
- Taiwan
- Thailand
- Turkey
- UAE / Abu Dhabi
- UAE / Dubai
- Venezuela
- Vietnam
KLAUS UNION SERVICE

Klaus Union Worldwide Service

Following our service philosophy „worldwide – close to the customer“, Klaus Union presents itself with affiliates, subsidiaries, marketing agencies and representatives as well as selected co-operation partners worldwide.

Since the founding of Klaus Union Service GmbH in 2006 we focus our efforts to provide service and support for you as our customer quickly and comprehensively.

As an independent service company with exceptionally strong customer orientation, full service, using state of the art technologies and a high level of competence, Klaus Union Service draws on 70 years of process engineering with pumps, valves and agitator drives made by Klaus Union.

We are your partners for advice service and planning, clearly arranged documentation and other required services, including the quick delivery of spare parts and a high level of readiness for delivery.

Our individual service and maintenance contracts provide safety, regardless of where you happen to be.

Experienced, thoroughly trained maintenance personnel and highly specialised product experts are available to you worldwide in our companies, distribution offices and with our co-operation partners. Workshops throughout the world complying with the strict criteria of Klaus Union offer you our services, training classes and on site service.

An important part of our company policy is assuring the high quality of our products. The quality assurance measures are introduced already at the level of our subsuppliers, and further inspections are made as from the receiving inspection to the final assembly. The quality assurance system, developed according to modern principles complying with DIN EN ISO 9001, fulfils the requirements our customers have on our products.

Our Range of Service

Analysis of technical problems and devising an attractively priced technically sound solution belong to our range of services, just like scheduled maintenance and quick assistance in the case of failures.

Production and operational reliability, maximising of plant availability and risk management are becoming increasingly important for our customers.

To successfully work together with the plant operators in these areas, close co-operation on the basis of partnership is indispensable for mutual benefits.

Klaus Union Service GmbH through the direct co-operation with Klaus Union as manufacturer has the unique advantage of access to state of the art production and processing techniques.

Spare parts are managed worldwide by the Klaus Union Service GmbH’s logistics.

In the future our distribution centre cooperating with a global logistics company will be available to you worldwide with a quick delivery of spare parts.

Service Performance

- Workshop Repairs
- On-Site Repairs
- Genuine Spare Part Delivery Worldwide
- Spare Parts Storage
- Customized Spare Parts Management
- On-Site Maintenance
- Installation
- Retrofitting
- On-Site Testing
- Customer Advisory Service
- Laser Alignment
- Start Up & Commissioning
- Individual 24/7-Service
- Trouble-Shooting
- In-House & On-Site Training
- On-Site Assembly and Disassembly
- Long-Term Maintenance Contracts
- On-Site Monitoring
- Maintenance Planning and Consulting
- Diagnostics
Testing Facilities

In our modern testing facility, pumps are tested in realistic environment up to DN 1200. Testing of the repaired pumps with appropriate test reports gives you optimum plant safety.

- Testing range:
  - $Q = 0.1 \text{ m}^3/\text{h}$ up to $5,000 \text{ m}^3/\text{h}$
  - $H = 2 \text{ m L.C.}$ up to $1,000 \text{ m L.C.}$
  - $\Delta P = \text{up to 100 bar}$
  - Motor power: up to $1,800 \text{ kW}$
  - $n = \text{up to max. 3,500 rpm}$
- NPSH-measurements
- Axial thrust measurements
- Vibration measurements
- Noise measurements
- Test run according to HI 14.6 / DIN EN ISO 9906 and API 685 2nd Edition.

Workshop Repairs

All required chip cutting and processing machines are available to Klaus Union Service for the production and repair of pumps and valves. The following different types of welding processes can be carried out:

- TIG
- MIG/MAG
- E
- Plasma

Plant-specific modifications and changes of pumps are accompanied, executed and documented by the design department of Klaus Union.

Commissioning

Klaus Union Service GmbH accompanies you from the offer complying with the specifications, via the commissioning of complete plants, to the assurance of plant availability with scheduled maintenance intervals and process optimisations.

How to find us ...

Klaus Union Service GmbH & Co. KG
Blumenfeldstr. 18  P.O. Box 10 13 49
44795 Bochum  44713 Bochum
Germany                 Germany

Phone   +49 (0) 234 45 95-0
Fax     +49 (0) 234 45 95 7016
E-Mail   service@klaus-union.com
Service Helpdesk  +49 700 55 28 77 37
Product Range Pumps:

- Pumps with Magnet Drive
  - Centrifugal Pumps acc. to DIN EN ISO 2858 & DIN EN ISO 15783, SLM NV
  - Centrifugal Pumps acc. to ASME B73.3M, SLM AV
  - Centrifugal Pumps for Petrochemical Applications acc. to API 685, SLM APL / SLM APC
  - Centrifugal Pumps for High Pressure Applications, SLM SV / SLM GV
  - Centrifugal Pumps for High Temperature Applications, SLM NHO
  - Self-Priming Centrifugal Pumps, SLM SV
  - Multi-Stage Centrifugal Pumps, Tension-Rod or Barrel-Type Design, SLM GV
  - Submerged Centrifugal Pumps, SLM NVT
  - Twin Screw Pumps acc. API 676, SLM DSP-2C

- Pumps with Shaft Sealing
  - Centrifugal Pumps acc. to DIN EN ISO 2858 & DIN EN ISO 5199, NOV
  - Multi-Stage Centrifugal Pumps, Tension-Rod or Barrel-Type Design, GOV / GOVT
  - Horizontal and Vertical Propeller Pumps, P
  - Bottom-Flange Propeller Pumps, UP
  - Submerged Centrifugal Pumps, TP NO
  - Submerged, Multi-Stage Centrifugal Pumps, TP GO
  - Twin Screw Pumps acc. API 676, DSP-2C / DSP-4CL

Product Range Valves:

- Globe Valves, T-Pattern
- Globe Valves, Y-Pattern
- Control Valves
- Gate Valves, Isomorphous Construction Series
- Gate Valves, Wedge or Wedge Plates
- Relief Valves
- Check Valves
- Sight Glasses
- Strainers
- Bottom Valves
- Butterfly Valves, Metal Seated
- Control Butterfly Valves, Metal Seated

Klaus Union Service Performance:

- Workshop / On-Site Repairs
- Genuine Spare Part Delivery Worldwide
- Spare Parts Storage
- Customized Spare Parts Management
- On-Site Maintenance
- Installation
- Retrofitting
- On-Site Testing / Monitoring
- Customer Advisory Service
- Start Up & Commissioning
- Individual 24 / 7-Service
- Trouble-Shooting
- In-House & On-Site Training
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- Long-Term Maintenance Contracts
- Maintenance Planning and Consulting
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