

Modular multistage pumps



SIHI^{multi}

Reliable under Pressure ...

Design and manufacture of high quality multi-stage pumps for almost 100 years strengthens the ability of SIHI to provide customer centric solutions on a global scale.

Application knowledge and consultation form the basis of optimized product selection, simple process integration, and long-term reliability.

Life-Cycle Cost understanding is fundamental to the optimization of: Power consumption; Integration; Reliability, and; Maintenance, throughout the concept-to-integration process.

Ongoing innovation underpins customer satisfaction, continual improvement, and ensures that the strong SIHI client base benefits from the latest proven technology.

Senior-level project management, communication, and product excellence from the SIHI team results in simple and timely integration of any engineered systems.

Customised high-quality systems range from small boiler feed skids through to extensive power-station systems complete with onerous instrumentation, FAT testing, documentation, and site commissioning.



Industries/Markets

Bio-Energy
Power Generation
Water Distribution
Steel Production
Geo-Thermal
Solar Energy
Irrigation
Bio-Fuels
Oil Transfer
Chemical Processing



Applications

Boiler Feed
Pressure Boosting
Reverse Osmosis
Cleaning
De-scaling
Cooling
Vehicle washing
Drainage
District Heating
Condensate Systems



Flexible options

- + Variable speed drive
- + Condition monitoring SIHI^{detect}
- + Interstage discharge
- + Mechanical sealing

- + High end sealant systems
- + Bypass valves
- + Distributed Control System (DCS)
- + ...

The SIHI^{multi} range of horizontal, ring-section multistage pumps have been designed for long-term reliability when pumping high pressure liquids.

Patented design features within this range of high pressure pumps, provide our customers with unique solutions to long term concerns about power consumption, efficiency, and reliability.

Meeting the technical requirements of ISO 5199/EN25199, they have a modular concept in order to reduce the number of parts, and consequently our customers' inventory.

Reducing Life-Cycle Costs ...

Reduced Power Consumption

- + Enhanced hydraulic efficiency
- + innovative axial thrust balancing device

Improved Reliability

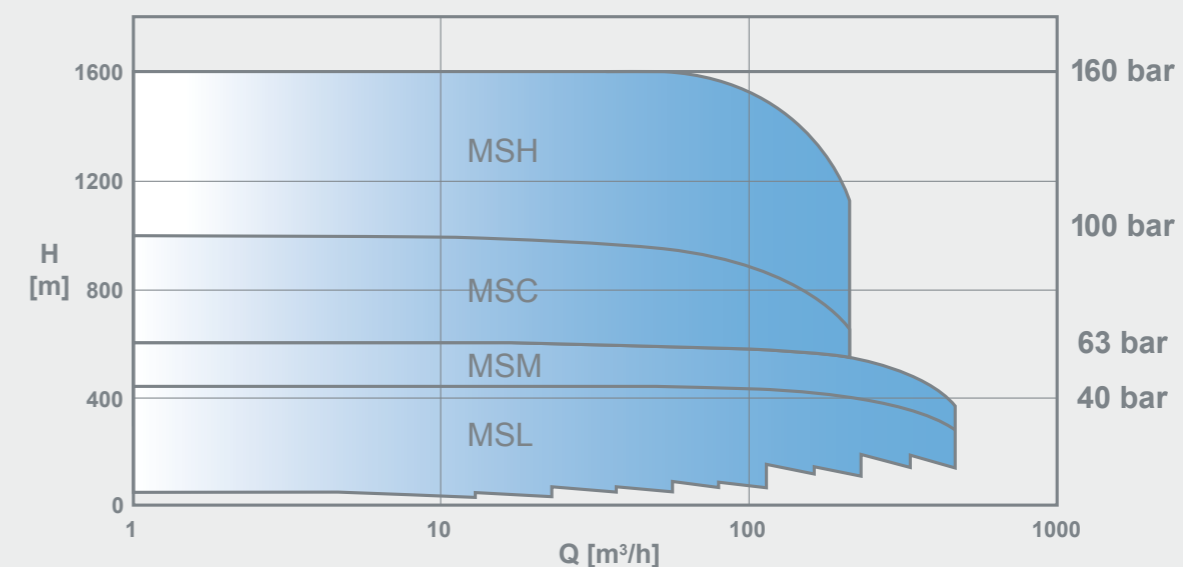
- + Minimised wear
- + Reduced inventory
- + Low NPSH
- + Low velocity sleeve bearing
- + High stage quantity vs diameter ratio

Easy Maintenance and Operation

- + Simple dismantling and assembly
- + Only one shaft seal
- + Easy commissioning

Global Support Network

- + Local Service Centres around the world



Premium levels of efficiency are available by selecting an appropriate set of impellers and diffusers that give an ideal fit to the process requirement.

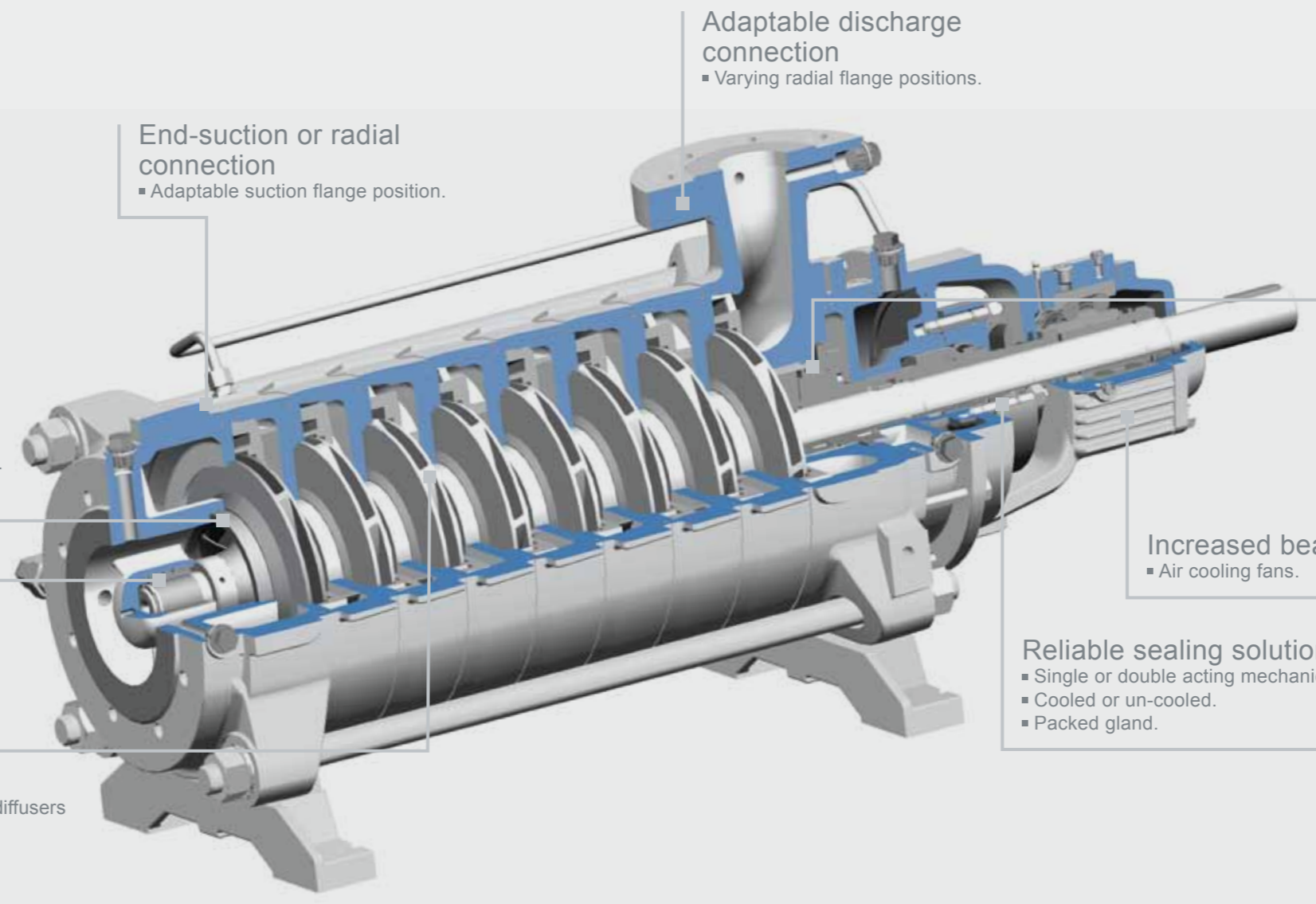
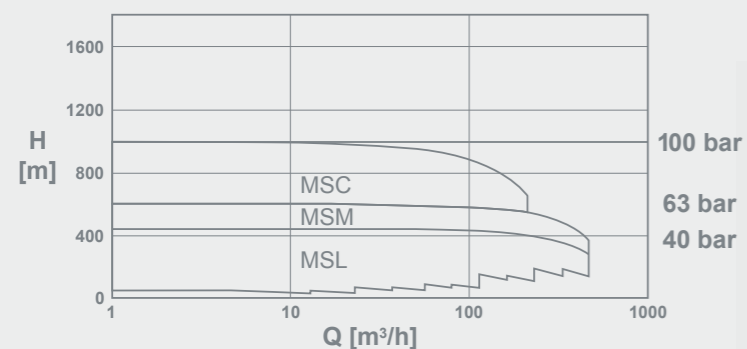
Unique to the multi-stage arena is the, SIHI patented drum-and-disc style of axial thrust balancing. The MSL, MSM, and MSC all employ a device that reduces the bypass flow to an absolute minimum, while not being susceptible to long(er) term wear-sensitive clearances.

With pressures up to 160 bar, the MSH range accommodates axial thrust by a design that combines a balance drum and disc. Lift-off device options are available for applications with frequent stop-starts.



SIHI^{multi} Type MSL, MSM, MSC

Performance Range



Reliability with low NPSH
 ■ Enhanced first stage suction impeller size and geometry.

Only one shaft seal
 ■ Self-adjusting sleeve bearing with forced product lubrication.

Optimum process fit
 ■ Modular sets of impellers & diffusers for perfect duty match.

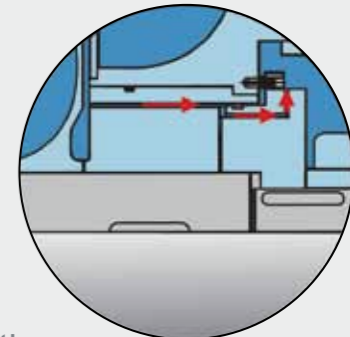
End-suction or radial connection
 ■ Adaptable suction flange position.

Adaptable discharge connection
 ■ Varying radial flange positions.

Increased bearing life time
 ■ Air cooling fans.

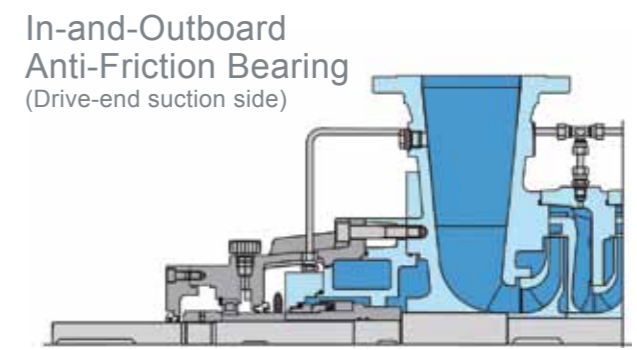
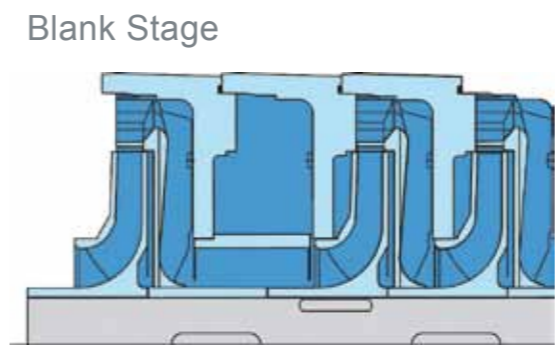
Reliable sealing solutions
 ■ Single or double acting mechanical seals.
 ■ Cooled or un-cooled.
 ■ Packed gland.

Long-term premium efficiency
 ■ Patented drum-and-disc style of axial thrust balancing.
 ■ Reduced internal bypass flow, and associated losses.
 ■ Long-term bypass flow regulation.
 ■ Eliminated tight wear-sensitive clearances.



Combining the benefits of balance drum *and* disc... Patented by SIHI

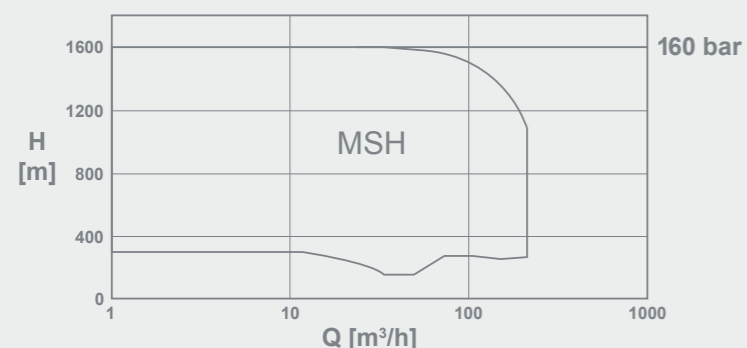
Options





Type MSH

Performance Range



Reliability with low NPSH

- Enhanced first stage suction impeller size and geometry.

Only one shaft seal

- Self-adjusting sleeve bearing with forced product lubrication.

Optimum process fit

- Modular sets of impellers & diffusers for perfect duty match.

End-suction or radial connection

- Adaptable suction flange position.

Adaptable discharge connection

- Varying radial flange positions.

Long-term premium efficiency

- Combining drum and disc technology
- Balanced across the operating range
- Proven technology
- Lift-off devices available for frequent start-stops

Labyrinth Seals

- Bearing protection for extended life.

Extended bearing life at elevated temperatures

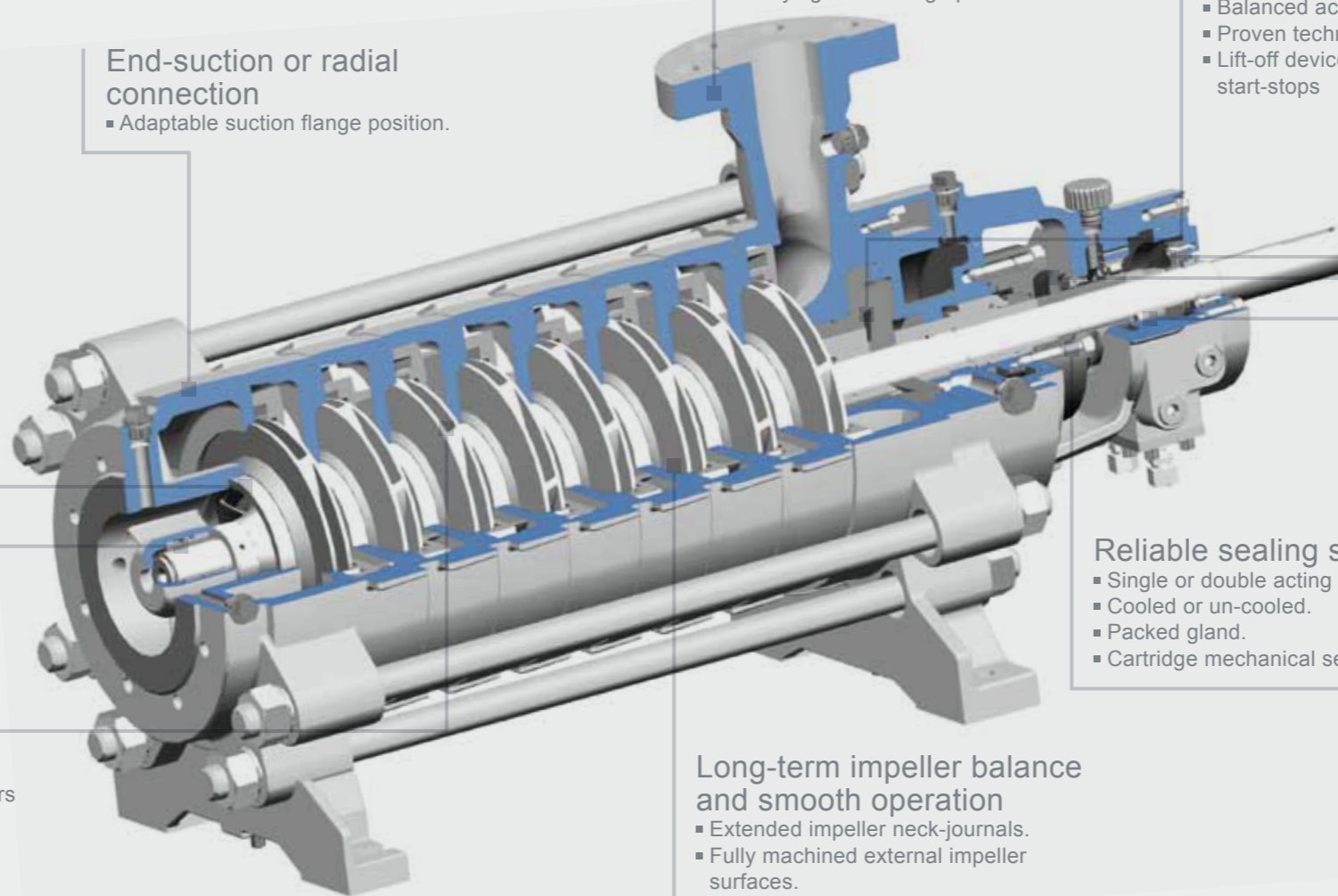
- Oil lubricated roller bearing.
- Labyrinth seals.

Reliable sealing solutions

- Single or double acting mechanical seals.
- Cooled or un-cooled.
- Packed gland.
- Cartridge mechanical seals.

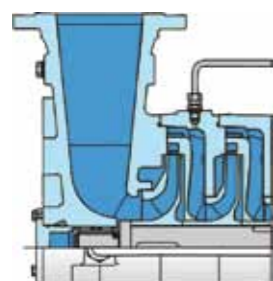
Long-term impeller balance and smooth operation

- Extended impeller neck-journals.
- Fully machined external impeller surfaces.

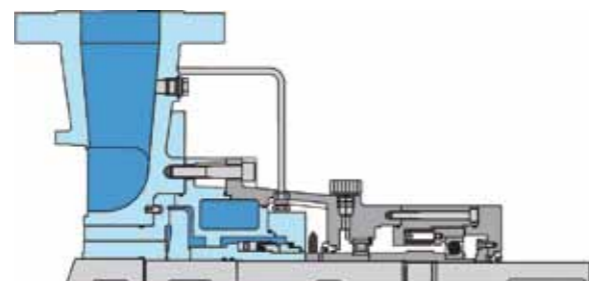


Options

Radial Inlet



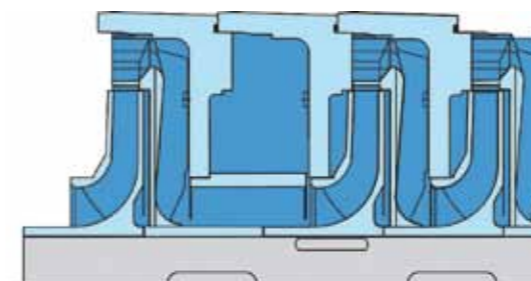
Balance Disc Lift-Off Device



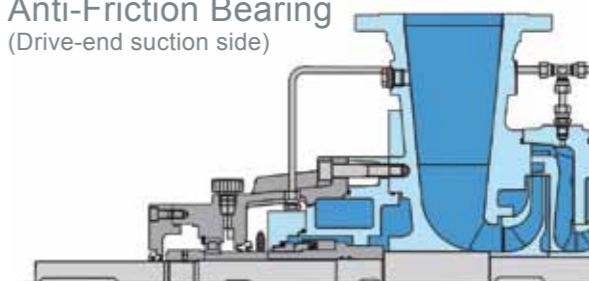
Interstage Discharge



Blank Stage



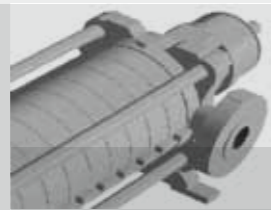
In-and-Outboard Anti-Friction Bearing (Drive-end suction side)



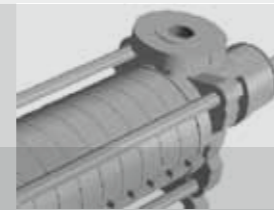
Options

Nozzle Position MSL, MSM, MSC, MSH (viewed from drive-end)

Discharge Casing



radial horizontal left



radial top



radial horizontal right

Every combination of suction and discharge casing is available

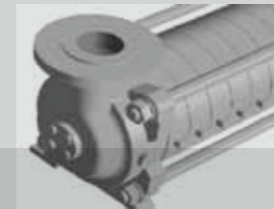
Suction Casing



axial



radial horizontal left



radial top



radial horizontal right

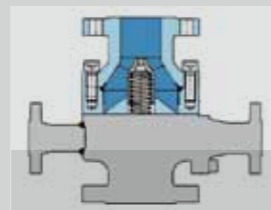
Special flow-harmonizing profile for stable NPSH

Ancillaries



Low pressure-drop suction filter.

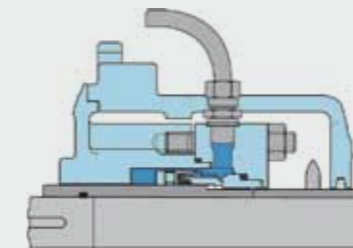
Stable NPSH



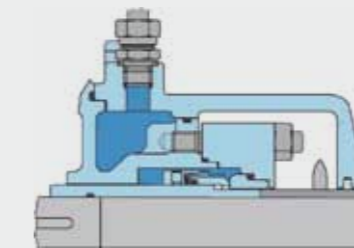
Minimum flow by-pass valve.

Mechanically operated without needing external energy

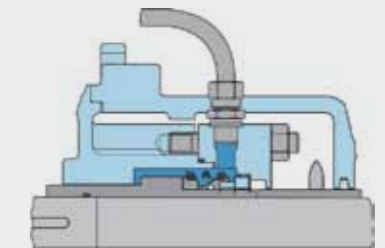
Shaft Sealing: Single and double cartridge seal



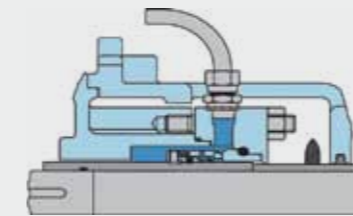
un-cooled, balanced



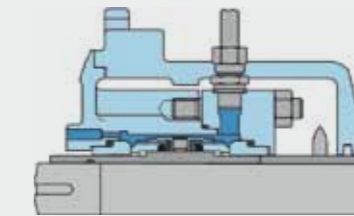
cooled, balanced



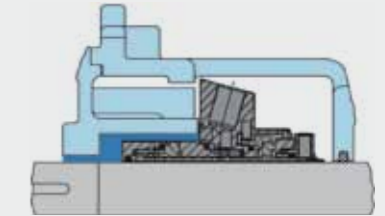
un-cooled, unbalanced



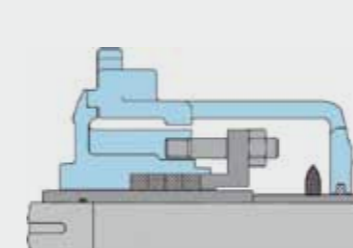
un-cooled, balanced
SIHI^{GNZ} seal



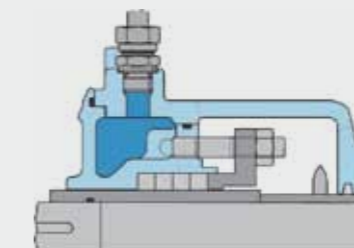
un-cooled double back-to-back



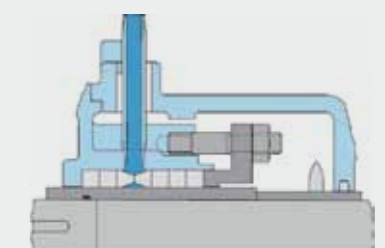
Cartridge seal



un-cooled



with jacket-cooling



with external flushing

Performance Range

Capacity
Head
Speed
Temperature
Pressure Rating

MSL

max. 450 m³/h
max. 400 m
max. 3600 rpm
-10 °C to +180 °C
max. 40 bar

MSM

max. 450 m³/h
max. 630 m
max. 3600 rpm
-10 °C to +180 °C
max. 63 bar

MSC

max. 250 m³/h
max. 1000 m
max. 3600 rpm
-10 °C to +180 °C
max. 100 bar

MSH

max. 250 m³/h
max. 1600 m
max. 3600 rpm
-10 °C to +180 °C
max. 160 bar

Materials

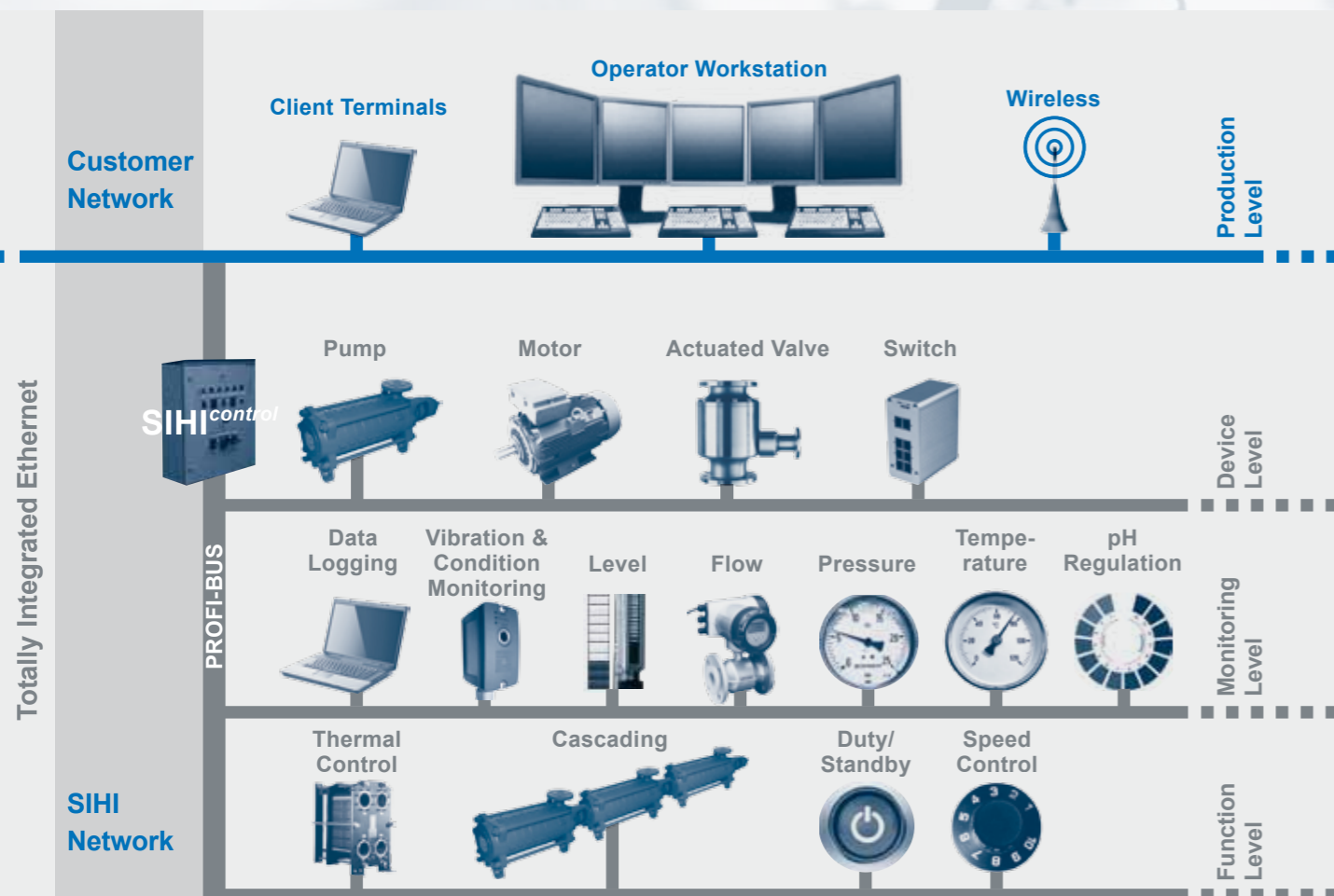
Suction Casing
Stage Casing
Discharge Casing
Impeller, Diffuser
Shaft

Cast Iron, Ductile Iron, Stainless Steel, Chrome Steel
Cast Iron, Ductile Iron, Stainless Steel, Chrome Steel
Cast Iron, Ductile Iron, Stainless Steel, Chrome Steel
Cast Iron, Stainless Steel
Chrome Steel, Duplex



From concept to integration

Your process partner Committed to engineering excellence



Permitting our customers to save precious time and money, SIHI offers a complete digital control system. Employing the Process Field-Bus standard communication platform, PROFI-BUS, simple

operator connectivity is possible via a SIHI^{control}. Available with local panel and screen, the pumping system has pre-programmed logic control, monitoring, and data logging facilities.

Understanding the process

- + 100 years of experience
- + Staff trained to communicate at all levels
- + Deep application knowledge
- ... Solutions with minimal customer effort

Testing & Documentation

- + Factory and Site Acceptance Tests
- + Certified documentation
- + Witnessed customised testing
- ... Reduced validation and commissioning costs

Optimum product range

- + Unique process can be treated with simplicity
- + Reduced cost of design, manufacture, and documentation
- + Predictable site testing and commissioning
- ... Customised solutions for standard capital costs

Quality assurance

- + Total Quality Management
- + ISO9000
- + Rigorous health and safety culture
- ... Long term security

Design

- + Advanced design tools
- + Highest level of machine efficiency
- + Long lasting reliability
- ... Reduced energy, maintenance, and environmental costs

Aftermarket – a local approach

- + Dedication to process uptime
- + Locally positioned service & technical centres
- + Easy access to support, on a worldwide level
- ... Highest level of customer care

Manufacturing

- + Centre of excellence structure
- + High level of skill and competence
- + Ongoing people and process development
- ... Reduced integration costs



Reduce Life Cycle Cost ...

- Capital Cost _____
- Energy (Power) _____
- Installation & Alignment _____
- Maintenance & Operation _____
- Down time _____
- Environmental Cost _____



detect – Condition Based Monitoring

Detect wear before damage occurs

- + Cavitation and process turbulence
- + Simple to connect
- + LED display
- + Available Ex
- + All rotating machinery
- + DCS integration and continual monitoring

Noise and Vibration analysis allows this compact device to diagnose the (often hidden) symptoms of longer term damage *even* before vibration occurs.

