Medical technology

Integrated medical solutions by HOERBIGER
Innovations for lasting customer benefits

HOERBIGER is active throughout the world as a leading player in the fields of compression technology, drive technology and hydraulics. In 2014, its 7,004 employees achieved sales of 1.1 billion euros. The HOERBIGER brand is synonymous with performance-defining components in compressors, industrial engines and turbines, automobile transmissions, and multifaceted mechanical engineering applications.

Innovations in attractive technological market niches are the basis for components, systems and services that offer unique selling propositions and long-term benefits for the customer.

We set standards.
We offer customized components, electronic controllers and entire lift columns in a compact design for the medical technology field.
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HOERBIGER lift columns

Lift columns made by HOERBIGER offer a wide performance range for operating tables. They are synonymous with high operating comfort, safe operation, and maximum quality. These are the key requirements in regard to our components and systems, regardless of size, use or system complexity. HOERBIGER lift columns offer diverse functions, a wide range of adjustment options and optimized space requirements. HOERBIGER lift columns are typically electrically operated, but can also be fitted with a manual emergency actuation function.

All versions are delivered fully functional and undergo comprehensive testing prior to shipping. As a result, they are ready to use immediately.

- Ready-to-use: filled with oil and tested
- Leak-free and minimal maintenance

CTL, CCL and CHL lift columns offer three basic functions:
- Height up/down
- Trendelenburg and Reverse Trendelenburg
- Tilt left/right

They can be supplemented with up to five additional functions:
- Leg plates
- Back plates
- Slide
- Kidney bridge
- Floor lock

When low height and cost efficiency are key

The most compelling feature of the CTL lift columns is the excellent combination of torsional rigidity and low installation height. Standardized hydraulic components ensure exceptional functional reliability and density of the lift columns.

- Up to seven functions offer high functional density in a small space
- High torsional rigidity
- Compact and low installation height
- Price-performance ratio

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal load Trendelenburg</td>
<td>± 925 Nm</td>
</tr>
<tr>
<td>Stroke height</td>
<td>350 mm</td>
</tr>
<tr>
<td>Installation height</td>
<td>496 mm</td>
</tr>
<tr>
<td>Block height</td>
<td>449 mm</td>
</tr>
<tr>
<td>Patient weight</td>
<td>up to 300 kg (centric)</td>
</tr>
</tbody>
</table>
The CCL lift columns feature a finely tuned balance of torsional rigidity, installation space, and flexibility, made possible by the simple and robust guide mechanism using standard mechanical and hydraulic components manufactured by HOERBIGER.

- Up to 8 functions offer optimized functional density in the smallest space
- Very high torsional rigidity

**C3 variant**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal load Trendelenburg</td>
<td>± 1500 Nm</td>
</tr>
<tr>
<td>Stroke height</td>
<td>360 mm</td>
</tr>
<tr>
<td>Installation height</td>
<td>540 mm</td>
</tr>
<tr>
<td>Patient weight</td>
<td>up to 450 kg (centric)</td>
</tr>
</tbody>
</table>

**C6 variant**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal load Trendelenburg</td>
<td>± 1100 Nm</td>
</tr>
<tr>
<td>Stroke height</td>
<td>360 mm</td>
</tr>
<tr>
<td>Installation height</td>
<td>580 mm</td>
</tr>
<tr>
<td>Patient weight</td>
<td>up to 450 kg (centric)</td>
</tr>
</tbody>
</table>

The CHL lift columns are developed for maximum patient weights and slide adjustments, and their extensive scope of functions ensures the desired flexibility in daily use. In addition to their enormous load-bearing capacity, they guarantee high functional reliability with compact dimensions. The two-stage mechanism allows a low height.

- Minimal installation height variant
- Maximum torsional rigidity
- Maximum slide adjustments possible, e.g. for radiological or orthopedic uses
- Up to 8 functions offer excellent functional density

**Nominal load Trendelenburg**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>C3 variant</td>
<td>± 1500 Nm</td>
</tr>
<tr>
<td>C6 variant</td>
<td>± 1100 Nm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
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<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stroke height</td>
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<td>Installation height</td>
<td>580 mm</td>
</tr>
<tr>
<td>Patient weight</td>
<td>up to 450 kg (centric)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal load Trendelenburg</td>
<td>± 2000 Nm</td>
</tr>
<tr>
<td>Stroke height</td>
<td>513 mm</td>
</tr>
<tr>
<td>Installation height</td>
<td>478 mm</td>
</tr>
<tr>
<td>Patient weight</td>
<td>up to 600 kg (centric)</td>
</tr>
</tbody>
</table>
Customized lift columns

Our extensive experience with individual needs, combined with the modular base components of our CTL, CCL and CHL lift columns, allow us to quickly and efficiently implement customer-specific requirements. A variety of parameters allow the lift columns to be adapted to the particular customer needs.

Parameters:
- Interfaces
- Stroke height
- Pivot angle Trend and Tilt
- Number of functions

Special solutions

Safety is the top priority in ongoing clinic operation. During use, beds or mobile medical devices must be secured, supported and leveled regardless of flooring. HOERBIGER's hydraulic components make it possible with their compact integration in the particular bed or medical device. The multifaceted special hydraulic solutions made by HOERBIGER ensure a secure footing and absolutely horizontal orientation.

HOERBIGER offers competent solutions in regard to
- floor lock
- vibration damping for robotic surgical systems and
- hydraulic sets for operating tables

for the medical technology field. Take advantage of our long-standing experience in designing and combining hydraulic components to ensure that they offer added value in a variety of medical technology fields.
Customer benefits at a glance

- **Ready-to-use:** fully preassembled and function-tested lift columns
- **High functionality:** selection among a wide variety of functions
- **High variability:** a multitude of setting options is available within a wide range of operating methods
- **Safe surgeries:** manual emergency functions available through foot-operated pump and rotary valve
- **High power density:** use of high-pressure hydraulics
- **Sequences of motions:** improved patient safety due to smooth and steady sequences of motion
- **Low noise:** power unit and actuator are impressively quiet to operate

**Costs and maintenance:**
- **Power unit/actuator:** low power consumption
- **Low maintenance:** leak-free hydraulic components and virtually wear-resistant guide system
- **Low costs:** perfect assembly processes and reduced manufacturing costs due to carryover parts/common parts

**Comfort:**
- **Improved comfort:** optimal freedom of movement for the medical staff due to small column cross-sections
- **Compact design:** more space for surgical accessories and utensils

**HOERBIGER moreover offers:**
- **Expertise:** 30 years of experience in hydraulic lifting systems for operating tablese
- **Customer support:** comprehensive assistance and support even during the development phase
- **Time to market:** shorter development periods
- **Optimal price-performance ratio:** focus on essential features and technologies
- **Presence in Asia:** in-house production in China and consulting for customers in Asia
“I WAS IMMEDIATELY CONVINCED BY WHAT I SAW DURING MY VISIT TO BARBING.”

Ville Laine, CEO LOJER OY
HOERBIGER lift columns ensure secure and versatile patient positioning in the operating room

Ville Laine, CEO and owner of LOJER OY, attaches utmost importance to sustainable, organic growth. Founded 95 years ago in Vammala, Finland, LOJER has been consistently owner operated. The company’s development was spurred on above all by reliability and flexibility: LOJER evolved from a metal-working operation for agricultural machinery to a foundry and then to a leading medical equipment manufacturer. Premium operating tables, senior care equipment and medical wellness tables have been the supporting pillars of the portfolio for some 30 years now.

THE LIFT COLUMN AS CENTERPIECE
Important competencies that LOJER is not able to cover with its in-house process are contributed by reliable partners. The core of an operating table is the lift column; during surgery, it moves the table and patient with precision and reliability—and it does so in six possible axes. This requires specialized knowledge—expertise that LOJER found in HOERBIGER, who has already installed more than 50,000 lift columns worldwide.

RELIABLE AND GEARED TOWARD BENEFIT
Operating tables must be designed to last a minimum of 15 years, which necessitates maximum reliability. HOERBIGER ensures this reliability with the core of an operating table, the lift column. The combination of tried-and-tested components results in a performance-defining operating table system, which is primarily geared toward the needs of the surgical teams and patients.

Industry background
The health-care market is booming. Aside from medical progress, double-digit growth rates in the health-care industry can be attributed in particular to a steady rise in life expectancy. According to forecasts, the worldwide health-care market is scheduled to triple from 5 trillion euros in 2011 to 15 trillion euros by 2030. This trend will be driven to a great extent by medical technology.
HOERBIGER piezo valve technology

Valves for medical applications

The most compelling features of HOERBIGER’s sophisticated piezo technology for medical technology applications are low power consumption, compact lightweight design and extraordinary durability.

Despite minimal electric power consumption, this allows even the most advanced solutions to be implemented.

Process and medical technology always require exact metering of gases and liquid as well as maximum flexibility and accuracy in terms of flow rate, temperature and pressure.

The use of HOERBIGER piezo valve technology in fluidic control processes of renowned medical technology manufacturers ensures that intensive care patients and premature babies are safely ventilated, blood pressure measurement is exact, but non-invasive, and operating systems function reliably.

Our products are employed by renowned manufacturers for

- Non-invasive blood pressure measurement
- Home care respiration
- Intensive care respiration
- Operating systems
Switching valves P9/P10
The HOERBIGER P9 and P10 piezo-controlled switching valves are worldwide leaders in their fields of application.

- Free of self-heating
- High dynamics and resolution
- No control noise
- Compact and low weight
- Price-performance ratio

P9 activation energy 28.8 × 10⁻⁶ J
P9 nominal pressure 1.2 ± 0.05 bar
P9 nominal flow rate 2.0 ± 0.5 @ -30°C l/min
  0.8 ± 0.3 @ +80°C l/min
P10 operating pressure range 0 to 1.2 bar
P10 nominal flow rate 0.5 to 1.5 NI/min

P20 switching valve
With the P20, HOERBIGER offers a piezo-controlled switching valve that stands out over the P9 and P10 variants by a significantly increased flow rate and pressure range.

- Free of self-heating
- Flange-mountable for fast installation
- Compatible with microcontrollers
- Compatible with actuating modules
- No control noise
- Compact and low weight
- Price-performance ratio

Activation energy 28.8 × 10⁻⁶ J
Operating pressure range min. 1.5 bar to max. 8 bar
Nominal pressure 6 bar
Nominal flow rate > 110 l/min
3-way proportional pressure regulating valves
The high precision control valve for pneumatic systems

3-way proportional valves of the tecno product line are piezo-controlled pressure regulating valves with electronic pressure control. They offer maximum dynamics at minimized power consumption and extremely precise control. The product portfolio encompasses three different solutions:

- tecno easy
- tecno basic
- tecno plus

The operating principle is simplicity itself: the proportional pressure regulating valve controls pneumatic output pressure as a function of an electrical control signal. An internal pressure sensor and the electronics ensure that the output pressure is regulated with high precision, allowing the pressure to be set as a function of the process by way of system control.

This opens up a wide variety of practical application options for HOERBIGER 3-way proportional pressure regulating valves. In equipment for sleep apnea treatment, pain treatment, ventilation technology, surgery or physical therapy, there are virtually limitless applications for our products.
**Features/Product**

<table>
<thead>
<tr>
<th></th>
<th><strong>tecno easy</strong></th>
<th><strong>tecno basic</strong></th>
<th><strong>tecno plus</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Dynamics</td>
<td>&lt; 20 ms</td>
<td>&lt; 7 ms</td>
<td>&lt; 10 ms</td>
</tr>
<tr>
<td>Pressure control range</td>
<td>0 to 8 bar</td>
<td>0 to 8 bar</td>
<td>0 to 10 bar</td>
</tr>
<tr>
<td>Flow rate</td>
<td>up to 350 l/min</td>
<td>up to 350 l/min</td>
<td>up to 1,600 l/min</td>
</tr>
<tr>
<td>Vakuum:</td>
<td>-1 to +6 bar</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supply</td>
<td>24 V DC</td>
<td>24 V DC or 4 mA</td>
<td>24 V DC</td>
</tr>
</tbody>
</table>

(two wire technology)

**Customer benefits at a glance**

- Dynamic and precise control
- Customized pressure control ranges possible
- Extremely low electric power consumption
- Free of self-heating and waste heat
- Reliable base component for a wide range of medical technology applications
- Control starting at 0 bar (vacuum version available)
- Very high pressure control stability
- Virtually infinite resolution
- Battery operation possible
- Lightweight and compact design of the control valve

**Safety-related advantages**

- Made exclusively from premium materials
- Automated production on precision equipment in clean room environment
- 100% outgoing inspection and calibration
- Common traceability of all manufacturing and testing processes

You can find detailed technical information available for download here
Practical example: Piezo technology

RELIABLE PATIENT MANAGEMENT

HOERBIGER piezo technology ensures control precision in CNAP® blood pressure measurement from CNSystems Medizintechnik AG

The CNAP® Monitor 500 HD was designed for continuous, non-invasive hemodynamic patient monitoring in a variety of medical applications, such as electrophysiology, anesthesia, surgery, critical care and intermediate care, emergency room, and patient transport. HOERBIGER furnishes CNSystems Medizintechnik AG with proportional valve technology from the tecno product family. Because of the valves’ constant control accuracy and reliability, they constitute an important part of the CNAP® blood pressure monitor.

CNAP® HD technology enables rapid response to temporary changes in hemodynamics for improved patient management. The non-invasive, safe monitoring process additionally increases patient comfort and avoids risks of complications associated with arterial measurement. CNAP® makes non-invasive, reliable measurement possible where arterial lines are not indicated, but continuous readings are desirable. Readings are available within 90 seconds or less. Its ease of use makes only brief user training necessary. In addition, the finger sensors are reusable.

You can find detailed technical information available for download here
Contact persons

We have contacts available to assist you around the globe

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Americas: North + South

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