Belt tensioning and tracking systems

Continuous tension and precision across the board
Optimum tensioning force and tracking precision

Temperature fluctuations, mechanical stress, contamination, and high pressure cause strain on steel belts during daily use. This can lead to premature wear of the belt and imperfect belt tracking, eventually leading to operational downtime.

To ensure smooth product processes, Berndorf Band Group has developed two systems for the tensioning and tracking of belts – the bernmatic® tensioning and tracking system and the berntrack® pure belt tracking system for installations that already have a tensioning system in place.
Increased system availability and higher system productivity
Time-saving due to eliminating belt tracking problems
Automatic adaptation of the system after the first few production runs
Ensure optimum belt tracking by continuous proportional control of the belt

“Customers often approach us, who have problems with belt damage and the resulting production downtime. During inspection by our experts, insufficient belt control and tension can quickly be identified as the cause of the fault. If all influence factors for optimum belt position and tension are not taken into consideration, incorrect belt control can occur over time. This in turn can lead to downtime. So it is important to address this topic in advance. With bernmatic® and berntrack®, we have developed optimum solutions to increase belt tracking precision.”

Patrick Kristen, MSc
Project Manager
Berndorf Band Engineering
Precision belt tracking with bernmatic® belt tensioning and tracking system

This technologically advanced solution for belt tracking relies on horizontal adjustment of the deflection drum position. The deflection drum is automatically brought to the perfect position to keep belt tension constant and ensure straight belt tracking. Should an incorrect belt tracking line arise, the system immediately corrects its position, ensuring a longer belt lifetime. Speed-independent control is particularly precise and reliable even at high speeds. The system also scores with its simple operation by graphical touch panel and ample analysis options for belt tracking.
**HIGHLIGHTS**

- Exact drum adjustment using position feedback
- Continuous control and monitoring of position and belt tension
- Compensation of belt tension during heating and cooling phases
- Real-time display of the most important data (positions of belt and drum, hydraulic pressure)
- Faster running-in of the belt after heating and cooling phases thanks to continuous control
- Speed-independent control
Technical data for bernmatic®

<table>
<thead>
<tr>
<th></th>
<th>Pneumatic*</th>
<th>Hydraulic*</th>
<th>Electric</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating media</td>
<td>Voltage: 380-480 V&lt;br&gt;Frequency: 50/60 Hz&lt;br&gt;Compressed air: min. 6 bar</td>
<td>Voltage: 380-480 V&lt;br&gt;Frequency: 50/60 Hz&lt;br&gt;Oil: about 200 bar</td>
<td>Voltage: 380-480 V&lt;br&gt;Frequency: 50/60 Hz</td>
</tr>
<tr>
<td>Belt widths</td>
<td>0.6-1.5 m</td>
<td>0.6-3 m</td>
<td></td>
</tr>
<tr>
<td>Belt tracking tolerance</td>
<td>± 2-4 mm</td>
<td>± 1-2 mm</td>
<td></td>
</tr>
<tr>
<td>Max. belt tension</td>
<td>5-50 N/mm²</td>
<td>5-200 N/mm²</td>
<td></td>
</tr>
<tr>
<td>Belt tension tolerance</td>
<td>± 5%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. belt speed</td>
<td></td>
<td>100 m/min**</td>
<td></td>
</tr>
<tr>
<td>Belt edge detection</td>
<td></td>
<td>Mechanical (rollers)&lt;br&gt;Optical (light curtain)</td>
<td></td>
</tr>
</tbody>
</table>

* Standard equipment
** Max. speed of the mechanical sensor 20 m/min
**Pneumatic tracking drum**
- Used at low tension forces
- Pneumatic belt tension
- Belt tracking by electric spindle jack
- Graphical operation and trend display
- Continuous tracking
- Electrical interfaces

**Hydraulic tracking drum**
- Used for medium to high tension and actuation forces
- Offset cylinder positioning on both sides for tensioning and tracking
- Pressure relief valves to protect the belt from overextension
- Graphical operation and trend display
- Continuous tracking
- Electrical interfaces

**Electrical tracking drum**
- Used for small to medium tension and actuation forces
- No belt temperature changes in the process
- No active protection against belt overstretching in case of power loss with heated belts
- Graphical operation and trend display
- Continuous belt tracking
- Electrical interfaces
Permanent monitoring of belt tracking using berntrack® belt tracking roller

The berntrack® adjustable support roll is used to control continuous steel, mesh, or plastic belts. Automatic horizontal or vertical adjustment ensures the optimum position of the belt throughout the process. Detection of the belt edge position and the positioning of the berntrack® belt tracking roller or steering drum depends on the variant. The control of the belt is independent of its speed.

The berntrack® belt tracking system is a compact, powerful addition to any belt machine. The system is used in a wide variety of areas, such as the food industry, clean rooms, and in areas at risk of explosion. Control usually depends on local conditions and the infrastructure available there. If there is already a hydraulic infrastructure, the hydraulic berntrack® is an option. Which components are installed to detect the belt edge position, is worked out by the experts at the Berndorf Band Group. The ideal solution can be found for any requirements.

* Depending on the variant of the berntrack® system, clocked or continuous control ensures precision belt tracking.
** In the electrical variant, the position of the belt edge is measured using an analog belt edge sensor and transmitted to the controller. The system uses the belt offset to calculate the optimum adjustment of the roll or spindle, then sends the adjustment signal to the model-dependent actuator.
HIGHLIGHTS

- Reliable belt tracking and long belt life
- Simple retrofit for precise belt tracking
- Contact-free detection of belt speed using an inductive sensor*
- Continuous detection of the belt edge position by optical or mechanical belt edge sensors*
- Simple installation and commissioning due to the compact construction
- Belt tracking control independent of speed*

* electrical variant

„The integration of the belt tracking system in our double belt presses led to a more stable production which increased our productivity and significantly reduced the risk of belt damages.“

Ing. Albert Fritz
Senior Manager TD
Isosport Verbundbauteile GmbH
## Technical data for berntrack®

<table>
<thead>
<tr>
<th>Control</th>
<th>Pneumatic*</th>
<th>Electric</th>
<th>Hydraulic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tilt Roller*</td>
<td>■ Used at low tension forces ■ Cost-effective ■ Simple to use</td>
<td>■ Used for low to high tension forces ■ Continuous control ■ Small actuation distances ■ Electrical interfaces ■ Graphical operation and trend display</td>
<td>■ Used with existing hydraulics and when high tension and actuation forces are required ■ Continuous control ■ Electrical interfaces ■ Graphical operation and trend display</td>
</tr>
<tr>
<td>Steering Roller</td>
<td>-</td>
<td>■ Continuous control ■ Electrical interfaces ■ Graphical operation and trend display</td>
<td>■ Continuous control ■ Electrical interfaces ■ Graphical operation and trend display</td>
</tr>
<tr>
<td>Steering Drum</td>
<td>-</td>
<td>■ Continuous control ■ Electrical interfaces ■ Graphical operation and trend display</td>
<td>■ Continuous control ■ Electrical interfaces ■ Graphical operation and trend display</td>
</tr>
<tr>
<td>Operating media</td>
<td>Compressed air: min. 6 bar</td>
<td>Voltage: 110-480 V Frequency: 50/60 Hz</td>
<td>Voltage: 380-480 V Frequency: 50/60 Hz Oil: at least 100 bar</td>
</tr>
<tr>
<td>Belt widths</td>
<td>0.6-2 m</td>
<td>0.6-3 m</td>
<td></td>
</tr>
<tr>
<td>Belt tension</td>
<td>Max. 5-50 N/mm²</td>
<td>Max. 5-100 N/mm²</td>
<td>■ Mechanical (rolls) ■ Optical (light curtain)</td>
</tr>
<tr>
<td>Belt edge detection</td>
<td>Mechanical (rolls)</td>
<td>■ Mechanical (rolls) ■ Optical (light curtain)</td>
<td>■ Mechanical (rolls) ■ Optical (light curtain)</td>
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<tr>
<td>Belt tracking tolerance</td>
<td>± 5-10 mm</td>
<td>± 1-2 mm</td>
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<tr>
<td>Belt speed</td>
<td>max. 100 m/min*</td>
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</tbody>
</table>

* By using the mechanical sensor, the max. speed is limited to 20 m/min
Tilt Roller (BTRV)
- The system most frequently used
- Very insensitive to belt contamination
- Installed as closely as possible to the infeed drum*
- Guidance of the belt by tilting the position of the belt tracking roller

*max. 1/3 of the axis spacing

Steering Roller (BTRH)
- Suitable for installations with limited space
- Horizontal control movement to guide the belt
- Belt guided by the friction between the belt steering roller and the belt
- Usage possible only in clean environment

Steering Drum (BTDH)
- Belt controlled by tilting the position of the tracking drum
- Drum controlled by electric spindle jack or hydraulics
- Suitable for large axis spacing or at discharge side when the use of a belt tracking roller is difficult
- Possible to install as a drum bearing block