Belt Rip Detection System
Type BPS-A1
and BEPROS-S1
Both steel and fabric belts may be damaged by foreign objects. For the protection of conveyor belts, Coal Control offers a chance to secure any danger zones on the conveyor by monitoring conveyor belts. Danger zones on a belt conveyor are the areas of loading and unloading the belt. These are the zones which are especially prone to rips.

Rips in the belt occurs mostly as longitudinal rips caused by foreign objects, which attach themselves to the conveyor belt or belt construction. For the most part in such a case, not only the damage to the conveyor belt should be considered, but also the downtime caused by stopping production for repairs.

Coal Control belt rip detection systems can minimize a possible longitudinal rip by limiting its size and save you this hassle. Sensor loops which are vulcanized into the conveyor belt are assessed with the belt rip detection system and switch off the unit to prevent larger longitudinal rips.
Belt Rip Detection
Type BPS-A1 und BEPROS-S1

Construction
Belt Rip Detection
Type BPS-A1 and BEPROS-S1

Construction

Both, a transmitter and receiver are mounted offset to one another in a determined distance on the running side of the belt (see picture on page 12). The transmitter sends a continuous signal, which is transmitted to the receiver whenever a sensor loop is passed. The sensor loop is vulcanized into the belt in a way that for one moment both sensors are covered up by the sensor loop. After the receiver receives the signal, it is then transmitted to the master unit and assessed. If the signal’s strength is sufficient, the system continues to run as usual and the described process is repeated at each individual sensor loop, vulcanized into the conveyor belt.

If the master unit’s assessment is negative, the conveyor is immediately stopped and an error message is displayed in the unit’s display. The extensive readouts on a large display screen facilitate the security system’s operation and data collection. Through the system’s self-diagnosis the most important errors are directly displayed on the screen and offer easy handling to the user. Furthermore, if necessary, there is the possibility to take out of the system up to 30 sensor loops from monitoring during operation.
The BPS-A1 control was specifically developed for use in rough areas such as mining. This is a fully automated computer-supported belt rip detection system to monitor for lengthwise rips in steel belt and fabric belt conveyors.
A longitudinal rip may be reduced to an economically tolerable minimum with the belt rip detection system type BPS-A1, if inductive sensor loops are installed in existing conveyor belts.

The existing sensor loops in the conveyor belt are electronically monitored and in case of damage the conveyor system is stopped immediately to prevent a larger rip to the belt.

The new generation of control technology complies with the newest technological standard and due to its modular construction may at any time be retro-fitted to customer demands.

The robust stainless steel housing (computer unit), as well as the generously sized sensors and brackets are designed ideally for the tough mechanical wear in mining operations.

One computer unit is enough to monitor up to four individual danger zones on a conveyor belt system.

This saves time for maintenance and reduces costs.

The new BPS-A1 is fitted with new innovative hardware, such as implementation of industrial-use PC-technology with a 12.1 inch large colour display, operating on Windows XP®. This allows an animated display including of the conveyor belt with the fitted belt rip detection system. The help function supports entering parameters and provides information about the function and system status of individual components. Operating the system is done with a special industrial track ball, which makes working with the control easy like a breeze. All error messages are saved with date and time, and may be retrieved again later to look for errors.

In case of damage, the control can be switched to two additional operating modes, allowing monitoring during maintenance work.

This saves long downtimes and secures production without the risk of operating the conveyor system without monitoring. After any damage or defect is rectified, the BPS-A1 may easily be switched back to full monitoring.
The optional connection of a field bus allows retrieving the system status from the master unit, changing the parameters, displaying information, and making a remote diagnosis. Problems during operation are recognized as soon as they arise; they can be localized and corrected precisely.

**Dimensions of BPS-A1**
Belt Rip Detection
Type BPS-A1

Components

Master unit type BPS-A1
- 12.1 inch colour display
- Connecting up to 4 transmitters and receivers
- Automatic learning process
- Ignoring defective sensor loops
- Monitoring function
- Easy to use
- Self-diagnosis
- IP 54

Transmitter type BPS A1/T
- Pluggable connection
- Adjustable bracket
- Solid construction
- IP 67

Receiver type BPS A1/R
- Pluggable connection
- Adjustable bracket
- Solid construction
- IP 67

Proximity switch type Bi10G28Y1
- Solid proximity switch
- 2 meter connector cable
- Easily mounted
- IP 68
The new belt rip detection system Type BEPROS-S1 was specifically developed for short and medium-length belt conveyors. Lengthwise rips can be monitored by acquiring data of the sensor loops which are vulcanized into the belt. Monitoring is done by a Midi computer system with only one transmitter and one receiver, which is installed behind the danger zone. It immediately stops the conveyor belt once a possible rip has been detected. Both, transmitter and receiver, come pre-assembled with transmission cables allowing operators to install the BEPROS-S1 monitoring system by themselves. The BEPROS-S1 is just as the belt rip detection system BPS-A1 equipped with LEDs, which serve the monitoring function during operations.

Operational and monitoring processes are optimized by allowing the taking out of up to 30 belt sensors during the monitoring process. Newest SMD-technology allows compact construction in the smallest spaces with outstanding computing capacities and an excellent cost performance ratio. The belt rip detection system BEPROS-S1 helps you protect your investment and provide production safety in belt conveyor systems for the future.
Master unit type BEPPOS-S1
- Automatic learning process
- Ignoring defective sensor loops
- Monitoring function
- Easy to use
- Self-diagnosis
- IP 54

Transmitter type BPS S1/T
- Pluggable connection
- Adjustable bracket
- Solid construction
- IP 67

Receiver type BPS S1/R
- Pluggable connection
- Adjustable bracket
- Solid construction
- Adjustable sensitivity
- IP 67

Proximity switch type Bi10G28Y1
- Solid proximity switch
- 2 meter connector cable
- Easily mounted
- IP 68
The belt rip detection system BEPROS-S1, with ATEX certification, is suitable for use in areas with explosion danger. This version is delivered with an additional external 12 volt adapter, which is, of course, also certified by ATEX for protection class EEx ib I.

For implementing the control system in areas with explosion danger, connector cables for transmitter and receiver are included in the shipment.

The belt conveyor can easily be handled and protected from lengthwise rips with a minimum on effort in areas with explosion danger.

- ATEX-Certification
- Solid housing
- 42 VAC to 230 VAC input voltage
- 12 VDC output voltage
- Primary cable length up to a maximum of 20 meter
- Length of secondary cable is 5 meter
- Easily mounted
- IP 54
- Protection Class EEx ib I
Belt Rip Detection

Position of Sensors
The sensor loops produced by Coal Control are electrical scanning components designed to transmit information signals in connection with belt rip detection systems:

type BPS-A1 and
type BEPROS -S1.

The sensor loops are manufactured with transmission wire, coated in a special alloy and are “endless. “ Every sensor loop has two transmission wires. Therefore, in case of one wire malfunctioning, e.g. due to overloading, the function of transmission is guaranteed further.
Our sensor loops are available in two versions:
a) Standard (consisting of STG – material)
b) V – quality (flame retarding material)
Both versions, a) and b), do not differ in functionality, but in the various qualities of rubber in which the transmitting wires are embedded. The complete sensor loops with transmission wire and rubber are called package. The sensor packages have an overall thickness of about 3.5 to 4.5 mm. This thickness must be considered when retrofitting existing belts.

The sensor loop packages are made of non-vulcanized raw rubber and generally have to be vulcanized hot. They cannot be vulcanized cold, because belt and raw rubber cannot be fused with one another.

The monitoring system is usable for both steel and fabric belts. In general, each belt may be monitored as long as it has a sensor loop embedded.

When adding sensor loops to fabric belts, attention should be paid, that the fabric inserts are not damaged, because it would lower the tear resistance of the belt.

For use with sensor loops, we recommend belts with a minimum cover thickness of 6 mm. The thickness of the cover depends on the grain size of the material to be transported as well as on the height at the point where the material is loaded.
If the load is too large with a relative large grain size, it can damage the sensor loop.
This is not a defect in quality, but ultimately a safety system monitoring strong external factors which may have an impact on belt surfaces. Please tell us the specifications of your existing or planned belt conveying systems. You will receive a fast response with a recommendation for use and implementation.

**How does one determine the distance between sensor loops and therefore, the total amount of sensor loops needed for vulcanization into the belt conveyor?**

Of course, it is up to each individual customer to choose the distance for vulcanization of the sensor loops into the belt conveyor. However, Coal Control recommends not exceeding a distance of 50 to 150 meters from standard belts to high-end conveyor belts. Two factors should be taken into consideration:

- The financial loss resulting from a possible lengthwise rip in the belt.
- The rather low investment for sensor loops.
**Dimensions for sensor loops (sizes)**

Sensor loop  
Thickness 3.5 mm +/- 0.5  
Version 1: Standard quality  
Version 2: In fire-retardant quality

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<th>Width x length</th>
<th>m²</th>
<th>E1</th>
<th>E2</th>
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(All specifications are in mm)
The mobile hand-held device BSE-12/HIS (transmitter) and BSE-12/HIE (receiver) is for monitoring production and function of sensor loops manufactured by us.

Function and production can be tested with this hand-held device after a conveyor belt with vulcanized sensor loops by Coal Control is completed and after vulcanizing sensor loops in an already existing conveyor belt. This makes your final check-up easy.

Those hand-held devices in version BSE-12/H1 are nearly indispensable for all customers who already use an existing conveyor belt with sensor loops. Whenever a problem with individual sensor loops may arise, a quick function test can be performed, having the belt conveyor under the best possible control and only having to intervene in the conveying process for a short time.

Similar to the fixed transmitter and receiver pair of the belt rip detection systems BPS-A1 and BEPROS-S1, the two hand-held devices are also put in staggered positions on one of the existing sensor loops. The display in the hand-held receiver will immediately show the test results. Both hand-held devices are battery-operated.

The batteries function during continuous operations for about 12 hours. With the battery charger, which is included in the shipment, the hand-held devices may be re-charged at any time. The hand-held device BSE-12/H1 comes in a handy carrying case which makes transporting the device easy.
In order to provide you with a specific proposal, we ask you to fill out this questionnaire as complete as possible.
Please add all that applies.

Name of Company

____________________________________________________________________________________

Date: ____________________________

Tel.: ____________________________

Fax.: ____________________________

Contact person: ____________________________

Information about the belt conveyor

Description of belt (e.g. ST 2000) ____________________________ ST-Belt ☐ fabric ☐

Belt width: ____________________________ m  Belt length: ____________________________ m

Belt speed: ____________________________ m/s

Type of material transported: ____________________________

Grain size: ____________________________

Height of load: ____________________________ m

Features: ____________________________

Coatings

Load carrying side: ____________________________ mm  Running side: ____________________________ mm

Distance of sensor loops

Please read also the explanation on page 14.

Sensor loop distance: ____________________________ m

The result is the total number of

of ____________________________ sensor loops.