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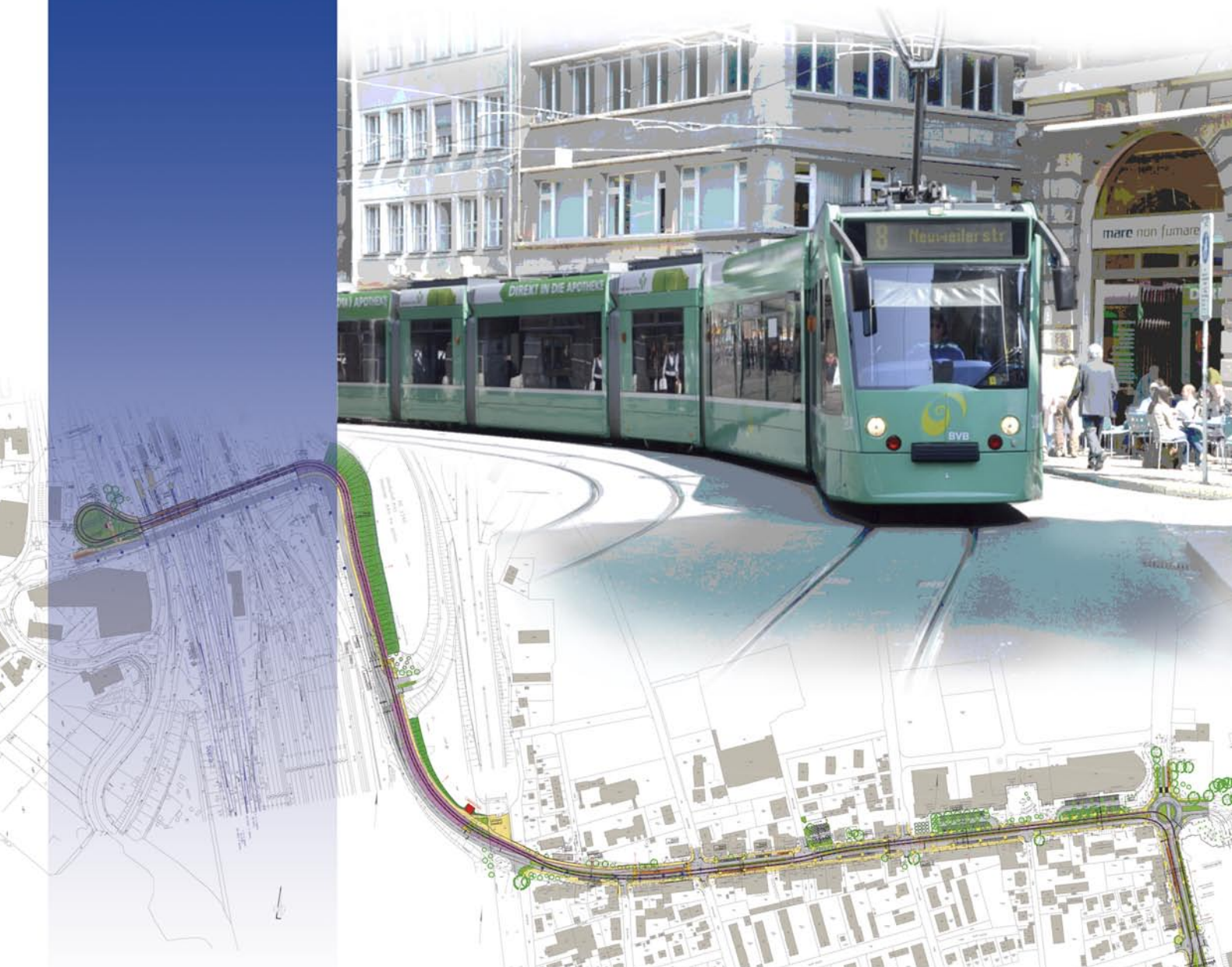
E3S

Electronic
Rail Lubrication System



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E3S

The effective system against wear and noise

Points and curves – they are the nerve centre of railway traffic. Here, there is increased wear on rails, switch tongues, check rails and wheels. In addition, residents are disturbed by considerable noise pollution.

Intelligent lubrication of the rail- and guide flank, as well as check rails, can help. Through the installation of E3S, wheels and rails are protected and wear on track-guiding components is significantly reduced. As a result, less maintenance work is necessary and the life of the tracks and points is extended. Also to minimise noise, the precisely dosed rail head wetting system (SKBS) is the best choice.

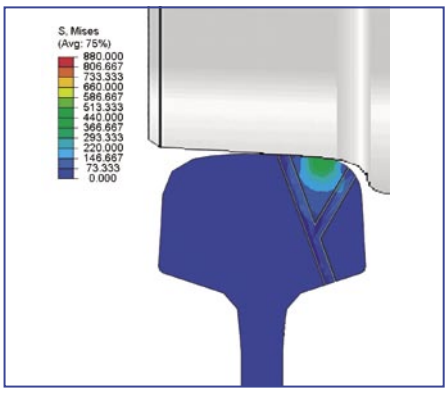
Residents will be grateful: considerably reduced noise improves acceptance of rail traffic.

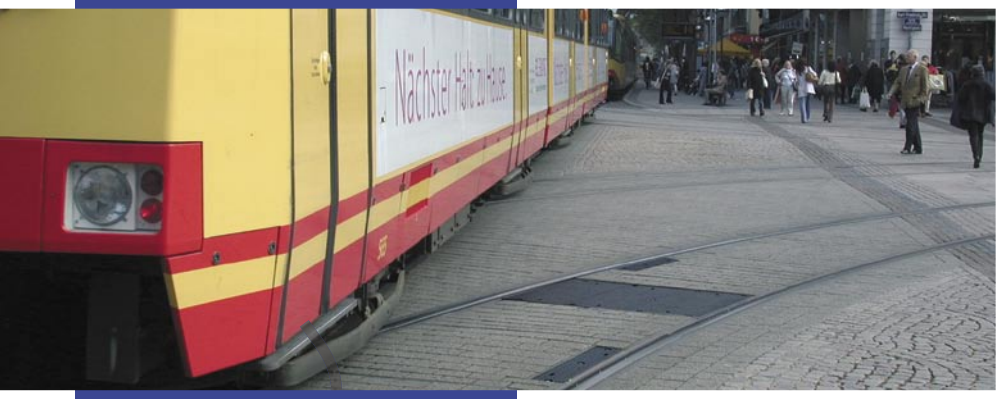
The Electronic Rail Lubrication System E3S has established itself in the past years in continuous use at DB AG (German Railways) and with rail operators, local traffic services and industry all over the world. The principle is compelling: lubricant precisely dosed to requirement is applied between the wheel and track or track-guiding element; the passing wheel takes up the lubricant, rolls it over, and thus distributes it along the key wear areas.

The Y drilling does not result in a track weakening that could lead to a break. Even an axle load of 30 tons is no problem. With new installations, our finite element calculations are frequently used as a basis for acceptance.

A special E3S model with EBA approval is available to the Deutsche Bahn AG (German Railways). EBA = German Federal Railway Office.

Eisenbahn-Bundesamt





The complete system, considered in detail

The E3S is suitable for all common rail profiles and wheel flange types. It comprises three components:

- The **installation core**: the box or cabinet contains the controls, the hydraulics, and the interchangeable grease reservoirs.
- The **sensor station**: here, the approaching rail vehicle is registered and classified based on its wheels. A message is sent to the control centre, which triggers the lubrication process.
- The **lubrication path**: from the aligned lubrication channels/lubrication ridges, the lubricant is applied to the passing wheels. The length of the lubrication path corresponds with the maximum wheel diameter.

Bus system

The bus system ensures that the grease is immediately conveyed to the grease channels after request through the rail vehicle. In combination with a minimum quantity output, the multiple lubrication of a vehicle with the smallest possible grease quantities has been optimally solved.

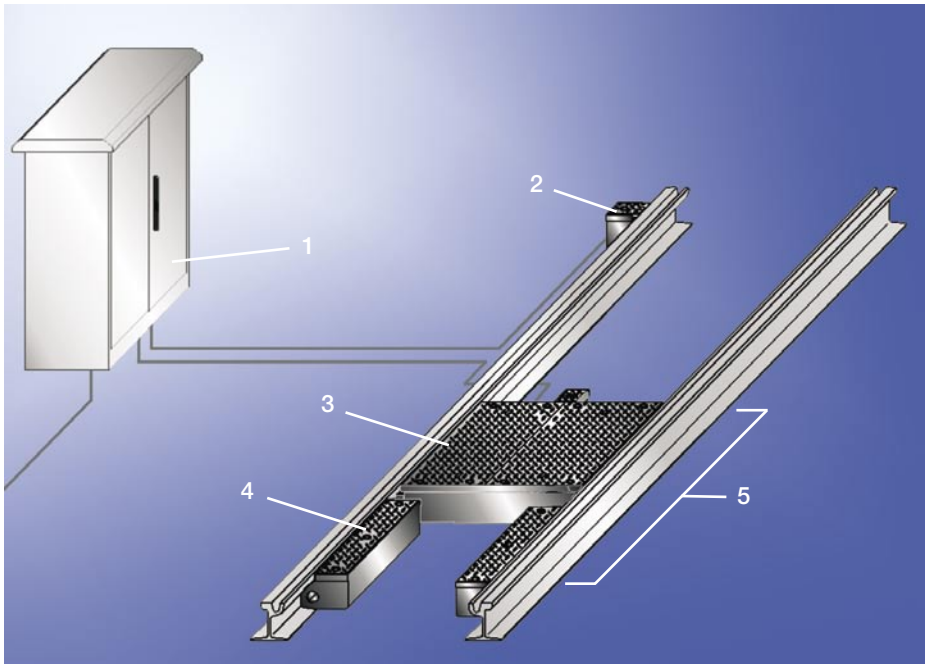
Multiple lubrication paths can be supplied at set intervals or simultaneously, as well as separately. The distance between lubrication path and installation core can extend up to 80 metres. This allows the supply of track lubricant to double-track curves, complete Y-tracks or entire track harps by only one installation core.

Grease switch

Systems with grease switch are suitable for branches, e.g. the tip of a Y-track. Here as well, an installation core supplies the lubrication paths for two tracks independently.

Adjustable lubrication ridge

With the adjustable lubrication ridge, wheel lubrication is achieved for reduction of wear on guide flanks in tight curves (sideways running).



System overview

1 Installation core (cabinet design)
2 Sensor station
3 Terminal box
4 Connector box
5 Lubrication path

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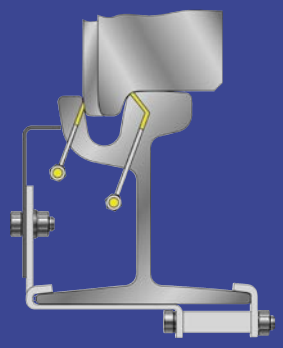
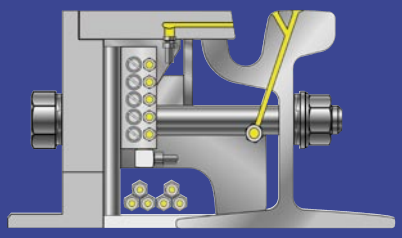
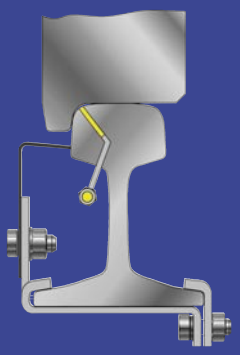


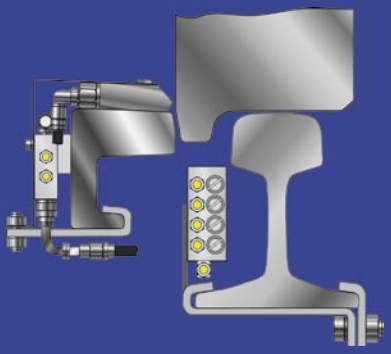
Arrangement of lubrication channels on grooved rail profile



Arrangement of the mobile lubrication ridge for wheel lubrication



Arrangement of lubrication channels on vignol rail profile



Arrangement of lubrication ridges on the chekc rail

The optimal system for grooved and Vignol rails

Lubrication channels

With a special drilling technique, lubrication channels are drilled into the track so precisely that the outlets are then perfectly positioned on the rail flank, guide flank or on the rail head. For wheel lubrication, very flat lubrication ridges with integrated quantity distribution are attached to the check rails. In addition, mobile (feedable) lubrication ridges are available. They can be used in combination with grooved rails, even on covered tracks. By aligning the lubrication channel connections toward the centre of the track, high-pressure pipes can be safely installed under protective cover strips, in inspection boxes or in connector boxes.

Precise dosage

The grease quantities released by the lubrication channels are absolutely identical, regardless of hose length or temperature fluctuations. The flow rate can be precisely adjusted and kept constant at all times. The stored-programme control processes all relevant operating parameters. Lubricant flow rate, lubrication intervals and the number of lubrication impulses per vehicle are variable. A temperature-dependent quantity- and cycle control ensures output of comparable lubrication quantities in every season. The system can be individually adjusted to the respective operating requirements. The settings and operating conditions are shown on a display panel.

Economical, clean and safe

The Electronic Rail Lubrication System E3S dispenses the specially developed lubricant extremely sparingly. The supply is used economically; track bed and vehicle remain clean. A robust gear pump is responsible for the conveyance of lubricants and the generation of pressure. This pump, which has been modified for the conveyance of lubricants, has been applied in the field of oil hydraulics many hundreds of thousands of times. A sensor ensures monitoring of the hydraulic system and, if required, malfunction messages.

Film lubrication of the track

The precise dosage of E3S enables even the most accurate moistening of driving surfaces. In combination with the rail flank lubrication, a rail head wetting (SKBS) of the inner curved rails enables noiseless driving in bends. Various supervisory authorities of the German federal states have approved operation with head wetting.

The right system for every requirement

We offer the Electronic Rail Lubrication System E3S in the following versions:

- cabinet design with up to three grease reservoirs; the system cabinet can be positioned up to 80 m away from the lubrication path.
- box design with one or two grease reservoirs:
  - assembly next to the track system on a base or jig
  - assembly under the ground in the ground box in the middle of the track or next to the track system

With the multi-reservoir system, larger quantities of lubricant can be made available, allowing less frequent and more flexible refill intervals. This system variant allows exchange of the empty reservoirs even during system operation. In due time before complete emptying of the grease reservoirs, a warning message appears on the display that is transferred via GSM with remote maintained systems.

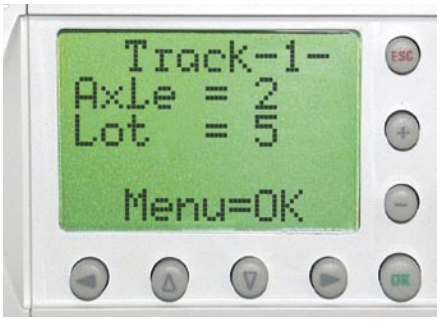
Maintenance-friendly exchangeable reservoirs

Refilling the E3S grease reservoirs is extremely simple: the reservoirs are replaced in no time, with no mess or spillage. Breakdowns due to contaminated rail flank grease can be practically ruled out. The refillable pressure reservoirs with optimised membrane technology enormously increase economic efficiency: through the higher filling pressure, the remaining quantities are reduced and the process sequence is optimised. The reservoirs are available in two sizes. Many customers make use of the moklansa filling service; however, filling stations are also available as an accessory.

Reliable control

Continuous operation of the E3S can be monitored via the operating control centre. The processing of external information is also possible.

The display of the control unit has a text display that indicates all operating states and settings. All operating parameters of the system can be conveniently monitored and, if necessary, modified.



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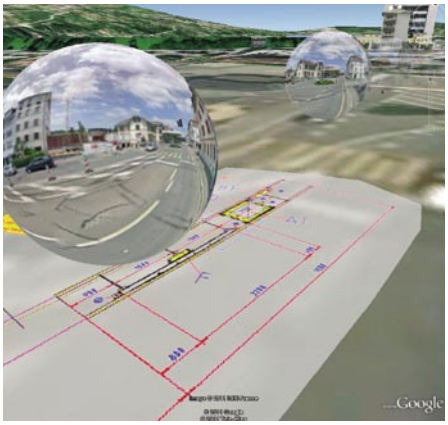
System planning

Our consultant engineers will assist you right from the design phase and the selection of a suitable location, bringing with them extensive experience from a variety of projects.

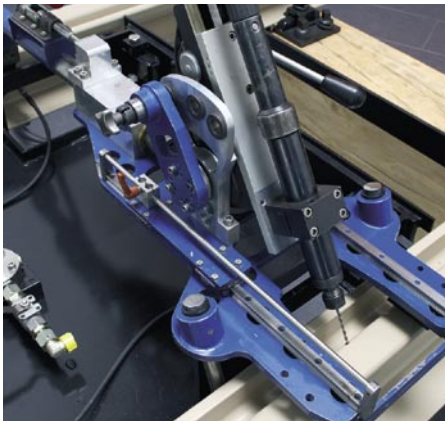
CAD support in the planning phase, combined with satellite images of the installation site, ensure optimal positioning of all system components.



Service on site

E3S is delivered ready for operation, then installed and connected. The lubrication channels can be fitted on site, or a pre-assembled track panel is delivered. Then our service technicians instruct your personnel and hand over the entire system.

With individual service packages extending to full service, we offer inspection and maintenance that ensure uninterrupted operability of your system.



Service for your personnel

We train your specialists in our training rooms in Dortmund or in in-house seminars.

Remote monitoring

Via mobile radio, you can conveniently monitor the E3S. Operating parameters can be modified by text message; malfunction messages can be forwarded along an alarm chain to several recipients until the message has been confirmed. Modified operating parameters can be automatically sent to a preset fax address for documentation.

Remote monitoring via mobile radio

DC/DC transformer

Power supply

The E3S is connected to the 230 V AC mains supply. No further power sources are required.

If the locations are too far away from the power supply, the following variants are available:

- solar energy 24 V DC
- current transformer 400...1050 V/24 V DC
- interchangeable battery pack 24 V DC

Solar energy

Ground, distributor and connector boxes

Accessories

With our comprehensive range of accessories, the system can be adapted for individual site conditions:

- mid-track, low-level ground boxes, distributor boxes and connector boxes
- protective cover strips attached to the lower flange of the rail
- photovoltaic driving terminals
- DC/DC transformer
- battery pack
- rain sensors
- breeze concrete plates
- underframes
- filling stations

Based on the requirement, we offer additional special structures.

Filling station

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Short overview

Dimensions	
Box design 1 or 2 reservoirs	housing box B 800 x T 600 x H 350 mm mounted on foundation base, mounting frame or fitted in a ground box.
Cabinet design 1 or 2 reservoirs	housing box B 800 x T 450 x H 1150 mm assembled on base, concrete slab or breeze concrete plate
Cabinet design 3 reservoirs	housing box B 1100 x T 400 x H 1150 mm assembled on base, concrete slab or breeze concrete plate
Power supply	230 V AC, 24 V/DC, DC/DC transformer 400 ... 1050/24 V solar technology or interchangeable battery pack
Control	compact PLC with key operation, operating states and inputs can be read on the display. Function diodes, potential-free contact for remote transmission.
Vehicle detection	Inductive approach initiators, installed in a sensor terminal box or a sensor station. Alternative: By external signalling.
Grease reservoir	Two-chamber reusable container that complies with the provisions of the Directive 97/23/EC Nominal volume 12 l, effective volume 9 l, Operating pressure 16 bar
Lubricant transfer	Directly on the contact surfaces by - special lubrication channels integrated into the rail, - check rail, - for the lubrication of the wheel with feedable lubrication ridges.
Rail flank lubricant	KUB 1 K-30 – with even better moistening properties compared to the previous lubricant KUB 2 K-20 with only an extremely small amount. Is particularly suitable for moistening the head if the dosage is accordingly small. If external products are used, we recommend a compatibility test with the polymers used.
Options	Temperature-dependent quantity and cycle control, functional control, BCD-coded interfaces for data exchange, complete data exchange including alarm chain with GSM technology.

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09/2011