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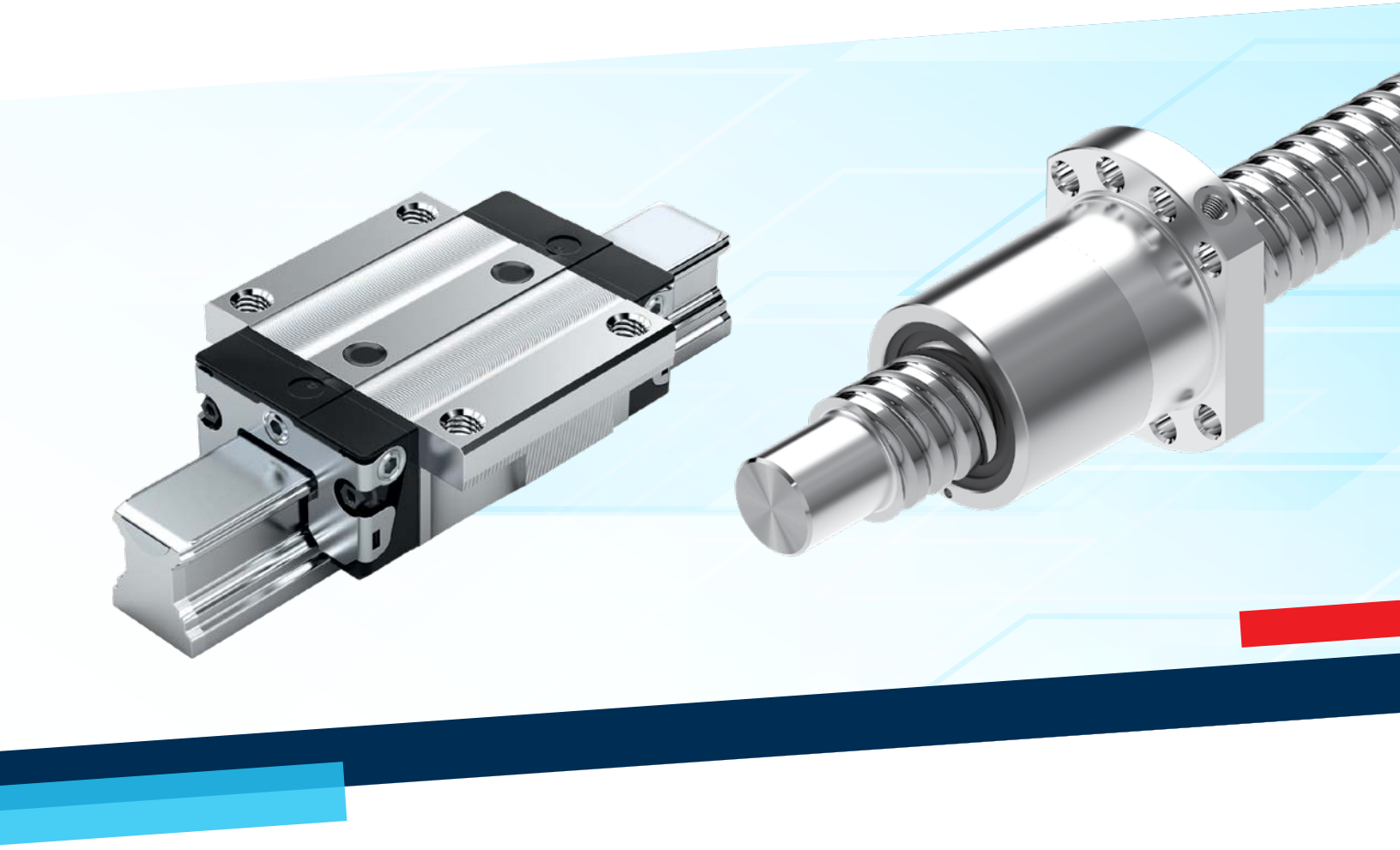

Long-lasting linear motion technology: 20,000 km without relubrication

Ball rail systems and ball screw assemblies should be productive and require little maintenance. Bosch Rexroth has now looked into how technical progress is affecting lubrication intervals. The results are impressive: runner blocks with basic lubrication cover a distance twice what was previously assumed, while screws can cover up to four times the distance. This is good for your budget and the environment.

Quality components are worth the money – all automation specialists, mechanical engineers and plant engineers who value lasting performance and low-maintenance operation know this. For the linear guides and screw drives used, this means that the relubrication intervals should be as long as possible. Ideally, the basic lubrication should last the full life of the linear motion product, making it practically maintenance-free.

WHY LUBRICATE AT ALL?

Essentially, linear motion components are lubricated to reduce the friction between the rolling elements and tracks and thus to minimize wear. This is achieved with a film of lubricant which forms during motion. Whether or when relubrication is required depends on the particular loads involved. Tables and diagrams provided by manufacturers show what distance a runner block for example can travel maintenance-free under a specific load and normal environmental conditions. With screw drives, the number of revolutions is given instead.

Because lubrication intervals become longer with each technical development, they are reviewed from time to time. During the latest practical tests under various operating conditions, the linear motion technology experts at Bosch Rexroth determined the current values. Basically, three factors decide how long the lubrication intervals are:

FACTOR 1: the design

During the check, Bosch Rexroth looked at the ball rail systems BSHP and the ball screw assemblies BASA in particular. Both product groups are designed for optimum running, with rolling elements which move from the load zone into the load-free return zone in an optimum manner. This way, the BSHP ball runner blocks achieve the best possible values when it comes to precision, friction forces and friction force fluctuations. In the nuts of the ball screw assemblies, deflectors at the transition to the load zone ensure optimum guideway and smooth-running rolling elements.

Both the ball rail systems BSHP and the ball screw assemblies BASA benefit from a continually improved surface and the geometric accuracy of the tracks. As a result, the lubrication intervals are longer, but at the same time the load ratings are higher and the range of maintenance-free applications is greater.

FACTOR 2: the lubricant

The job of any lubricant is to separate rolling elements and tracks, to minimize friction and to prevent corrosion. Various lubricants can be used for linear motion applications. The most important ones are grease, liquid grease and lubricant oil. Within the first group, the grease from Bosch Rexroth is particularly attractive from an economic point of view because it is permanently effective at the specific point of contact between the rubbing surfaces and allows particularly long lubrication intervals. The solid consistency also reduces the ingress of dirt and makes sealing or stripping elements more effective.

The liquid grease recommended by Bosch Rexroth is easily moved and is therefore often used in central lubrication systems. Lubricant oils have even better flow characteristics. They can dissipate more friction-induced heat but can also leak out more easily. The technical documentation or the product catalog from Bosch Rexroth provides information about which lubricants are approved for which product and are suitable for which operating conditions. In case of doubt, the relevant country unit can provide further advice.

FACTOR 3: Operating and environmental conditions

Whether long lubrication intervals are possible with a preferred linear component depends not only on the operating conditions such as load and travel speed – it depends on the environment too. For example, relubrication is necessary earlier or more often if the environmental conditions are characterized by high temperatures or vibrations or if the linear motion components are frequently in contact with cooling lubricants, dust or chippings during operation. If relubrication is necessary, the lubricant connections should be positioned according to the recommendations in the product catalogs. After all, easy accessibility makes maintaining the machine easier later on. As part of its flexible design, the BSHP ball runner blocks are accessible from eight locations.

A GOOD BASIS: BASIC LUBRICATION

If linear motion components are to function correctly, the lubrication intervals specified in the product catalog as well as the quantity and specifications of the lubricant must be observed. Mechanical and plant engineers who have stringent requirements as regard the life cycle of their machines should pay particular attention to the basic lubrication. The linear guides and the ball screw assemblies from Bosch Rexroth are normally given basic lubrication in the factory using the optimum lubricant.

Pester pac automation GmbH, a successful packaging machine manufacturer, is one of the companies taking advantage of this benefit. “The ready-to-install linear guides and ball screw assemblies save time and money when installing and commissioning systems. In addition, they offer longer maintenance intervals and require almost zero maintenance,” explains Hans Haug, head of development at pester pac automation GmbH. “Together with Bosch Rexroth’s global presence, this is an important asset for our international customers.”

LUBRICATION INTERVALS UP TO FOUR TIMES LONGER

With its decades of production experience, Bosch Rexroth has now optimized its ball guide rails and ball screw assemblies so much that the lubrication intervals with grease lubrication are up to four times longer. As a result of limit value shifting, many applications with smaller loads can be achieved with minimal maintenance. Test results revealed that the lubrication intervals for the latest ball rail systems BSHP in the sizes 15 to 45 have now doubled. The runner blocks can now cover distances of up to 20,000 km – the same distance as from Germany to New Zealand – with the basic lubrication.

200 MILLION REVOLUTIONS WITHOUT RELUBRICATION

The latest generation of ball screw assemblies BASA with diameters up to 40 mm achieves up to 200 million revolutions – up to four times the previous values – with basic lubrication. For size 32 with a 64 mm lead, this equates to a distance of around 12,800 km – the same distance as from Germany to Hawaii. Clear comparisons like these go down well with

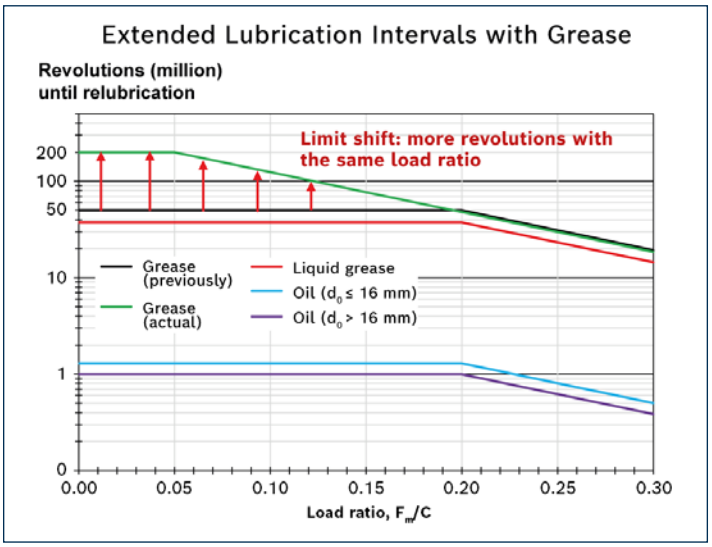

Fig. 1: *Thanks to optimized production processes, the lubrication intervals for ball screw assemblies BASA in size 40 or smaller are up to four times longer.*

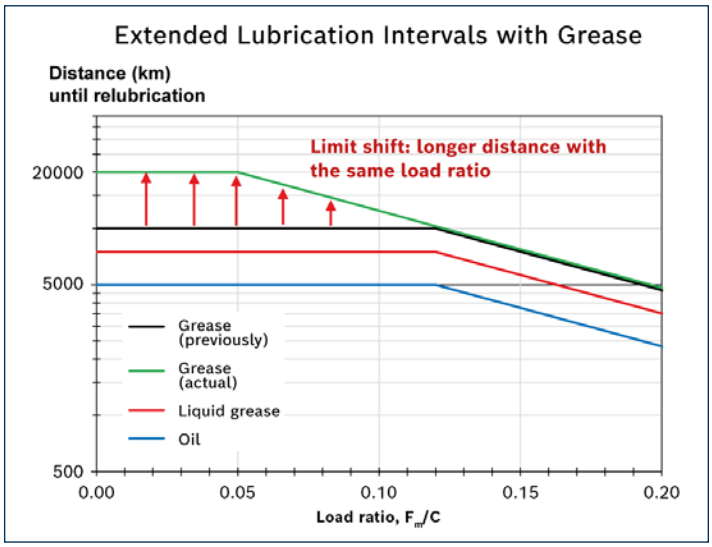

Fig. 3: *The result of continual improvements: ball rail systems BSHP in the sizes 25 to 45 with grease lubrication can run twice as long as they could previously before requiring relubrication.*

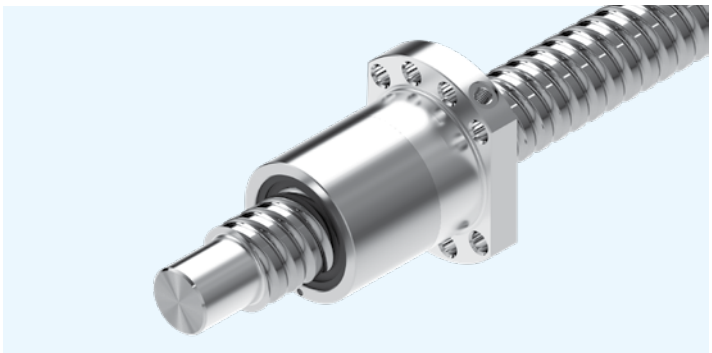

Fig. 2: *With extra rolling elements and a preloaded single nut, ball screw assemblies BASA achieve higher load ratings in spite of their short design.*

Fig. 4: *Ball rail systems BSHP achieve a high level of precision, lower friction forces and quieter running under load.*

users, said Managing Director Martin Albrecht from albrecht Elektrotechnik, an automation specialist and manufacturer of special machines. “The maintenance-free linear motion technology from Bosch Rexroth is an important unique selling point when competing in the international market.”

GO EASY ON YOUR BUDGET AND THE ENVIRONMENT

Because lubrication intervals are now up to four times longer, many applications at machine manufacturers such as albrecht Elektrotechnik and pester pac automation GmbH now require no relubrication. As a result, lubricant consumption falls and operating costs are reduced. The ball rail systems now require only half as much lubricant, while the ball screw assemblies use only a quarter of the previous amount of grease. The new lubrication requirements not only conserve valuable resources – they reduce operating costs, increase availability and help to protect the environment, an important sales argument.

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