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Proven to Be Better: INA Track Rollers Now in X-life Quality

INA track rollers LR52 and LR53 are the latest additions to the X-life product family. The two redesigned LR52 and LR53 series now deliver a significantly higher load carrying capacity and longer operating life than their predecessors. Dynamic load ratings that are 10% higher than those of competing products make them the best-performing track rollers currently on the market.

What is a track roller?

Track rollers are self-retaining double-row assemblies with particularly thick-walled outer rings. In addition to high radial forces, these bearings can also support axial forces in both directions. The outer rings have a crowned or cylindrical outside surface. Designs with a crowned outside surface are used wherever there is misalignment in relation to the raceway and edge stresses must be avoided.

In recent months, our **LR52 and LR53 track rollers** have been comprehensively redesigned and now feature an optimized internal structure that achieves a longer service life. As of now, the new LR52 and LR53 are part of the **X-life product range.**

The X-life upgrade has achieved the following benefits:

- **Outer dimensions unchanged**
  - ➔ 1 : 1 Interchangeability
  - ➔ No design changes necessary to customer application
- **Optimized internal structure**
  - ➔ Up to 10% higher dynamic load rating
  - ➔ Up to 15% higher static load rating
- **Environmentally compatible seal design**
  - ➔ Available as standard with the DEHP-free HRS seal
- **Innovative seal design with enhanced sealing function**
  - ➔ Available as an option with improved Z-type steel sealing shield
- **Optimized polyamide cage**
  - ➔ Depending on customer's preference available with an optimized polyamide cage or steel cage
- **Contact angle optimized for high radial loads**
  - ➔ Longer service life especially in main load direction

- **Reinforced outer ring**
  ➔ Higher load ratings

- **No design changes necessary in customer application:**
  ➔ External dimensions, lubricating grease and speed limits remain unchanged.

From this fall, both ranges will be available exclusively in **the new X-life quality**.

Customer benefits of new X-life INA track rollers:

- Higher load-carrying capacity
- Improved protection against contamination
- Low friction
- Low bearing temperatures
- Minimal lubricant stress

Important Note:
As the external dimensions have not changed, **the previous track rollers can be replaced on a 1:1 basis**. This means no design changes are necessary in the customer application when replacing the track rollers.

If you have any questions please contact your Schaeffler Field Sales Team.

Newly Published Assembly Manual MH 1 and Catalog IS1 for the Assembly and Maintenance of Rolling Bearings

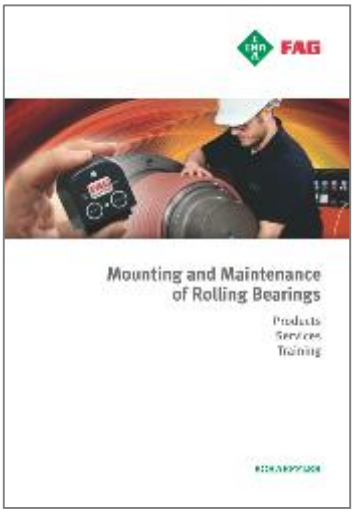
With its new MH1 Assembly Manual and IS1 Catalog for the assembly and maintenance of rolling bearings, Schaeffler's Industrial Service is providing a collective information package about the accessories for and correct use of roller bearings.

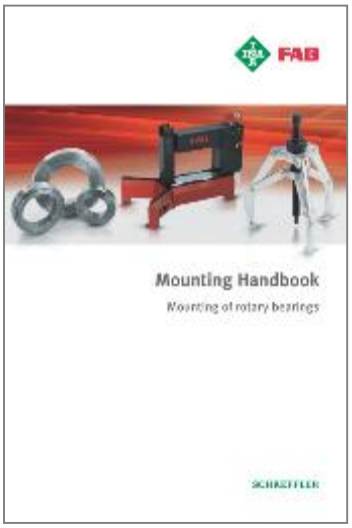
The **MH1** provides important advice on the proper handling of rotating bearing supports in assembly, disassembly and maintenance. It contains the basic technical principles of rolling bearings, information on how to install and remove them, services and tables.

The **IS1** is addressed to maintenance personnel and operators of systems in which the rolling bearings and other rotating machine elements are critical for product and process quality. This catalog provides an overview of tools for assembly and disassembly, lubricating devices and lubricating greases, instruments for condition monitoring and an outline of our services, e.g. reconditioning or condition monitoring of machines.

Both publications are available immediately in **German** and **English**.

For further information please contact your Schaeffler Sales Team.





Administrator Software for FAG DTECT X1s and FAG ProCheck Now Windows 8 and Cloud Capable

Industrial Service plans to publish **the new version 4.10.2** of the administrator software at the end of September 2015. This is the basis for the configuration of the multi-channel vibration monitors FAG DTECT X1s and FAG ProCheck. The major innovation is the Windows 8 capability, making the new version future-proof and capable of being installed in almost all PCs used in the industry.

Thanks to the use of the new SQL Server 2012, it will be possible to work with databases up to 10 GB instead of the mere 4 GB offered by the predecessor version.

As the transfer of data from the customer's measuring device to the Schaeffler Monitoring Center e.g. for analysis of the data by the Industrial Service is of major importance, the new "Transfer Link" module provides the option of using standard cloud services like Own Cloud, Microsoft Cloud, Google Drive or Amazon Cloud Drive. For those who do not want to use these services for security reasons, Schaeffler has its own cloud service located in Germany.

Fig. 1: FAG – vibration monitoring and measuring devices

As soon as the new version 4.10.2 is available you will find it here under the link to the respective products.
http://www.schaeffler.de/content.schaeffler.de/en/products_services/inafag products/maintenance_products/condition_monitoring/vibration/vibration.jsp?

If you have any questions on this topic please contact the Schaeffler Field Sales Team.

Conversion of Tender and Delivery Drawings

In accordance with the geometrical product specifications (GPS), all Schaeffler drawings will be converted to the new GPS language **on an ongoing basis**.

Indications of size, form, directional and locational tolerances and the surface properties of a work piece were redefined in a major revision of the international standards. They are described using the new GPS symbols and in accordance with the GPS standards. This is documented in ISO 14638.

Since mid-2014, the new technical terminology has also been used when referring to the tolerances of rolling bearings. Schaeffler played a significant part in developing these geometrical product specification standards (GPS). They apply to all technical drawings and provide internationally standardized descriptions of work pieces and the measuring methods to be used.

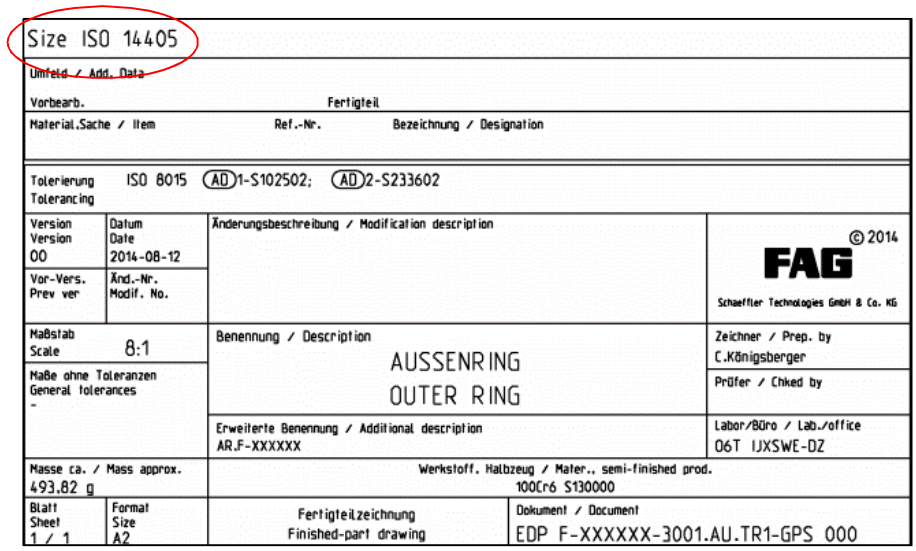


Fig. 2: Drawings produced according to current GPS standards are marked "Size ISO 14405" above the title block.

Background:

Independently of the rolling bearing standardization, there has been a parallel process of standardization in mechanical engineering in general. To bring these two worlds together and avoid misunderstandings, International rolling bearing manufacturers, with the support of ISO, pressed ahead with combining the different standards that had evolved over time. Specifically, this means that the two most important tolerance standards ISO 492 and ISO 199 specific to rolling bearings were converted to the GPS system that was already existing in the mechanical engineering sector.

Advantages:

- It is possible to provide legal certainty by providing information that is unambiguous, comprehensive, and consistent and has not been supplemented.
- Identical standards worldwide in mechanical engineering, automotive and rolling bearing segments.
- Quality improves due to consistent language used by Schaeffler, customers and sub-suppliers.
- Specification and verification (product description, definition of tolerance, definition of properties, determining deviation, measuring instruments and calibration) are presented in one document.

If you have any questions on this topic please contact the Schaeffler Field Sales Team.

Schaeffler at the EMO Trade Fair 2015

Under the theme "**Passion 4.0 Machine Tools**", Schaeffler will be exhibiting at the EMO in Milan, the world's biggest trade fair for metal processing. The company will be showcasing various new developments that ensure increases in efficiency, shortened "time-to-market" and greater machine flexibility. The focus will be on topics such as "big data", "networked production", and "self-organization along the value added chain".

Along with other partners, Schaeffler and DMG MORI Pfronten have developed the **"Machine Tool 4.0"** concept that connects existing technology with newly digitized components from sensor to cloud. To this end, two prototypes were built based on the fourth generation of the **DMC 80 FD duoBLOCK** milling-turning-universal machining center. The prototypes for this innovative project have extra sensors integrated into almost all bearing positions relevant to the machining process to measure vibration, forces, temperatures and pressure and therefore obtain the best possible information about the condition of the machine.

Fig. 3: Experts from Schaeffler and DMG MORI Pfronten at the technology demonstrator "Machine Tool 4.0"

Our technology demonstrator allows the added value of digitization specific to machine tool 4.0 to be visualized. The innovation project "Machine Tool 4.0" can be seen in action – connected live to our own manufacturing facility – at our trade show booth in Milan.

Schaeffler is the partner of choice for developing the future of the machine tool, on the one hand in its capacity as leading supplier and development partner for drive components, and on the other as a major user of machine tools. Together with its partners, Schaeffler is proactively promoting the added value generated by the digitization of such machine tools.

New edition of FAG needle bearing catalog

The **new edition of the FAG spindle bearing catalog (SP1)** is being published to coincide with the EMO 2015. Following the numerous product optimizations over the last three years, the new SP1 contains the latest performance data for FAG high-precision bearings for main spindles: high-performance angular contact ball bearings, precision cylindrical roller bearings, double direction axial angular contact ball bearings, and for the first time, the new axial bearings for high-speed main spindles from the BAX range. Information about special solutions is also provided.
http://www.schaeffler.de/content.schaeffler.de/en/mediathek/library/library-details.jsp?id=114230

In addition to the new spindle bearing catalog SP1, Schaeffler is also offering the **text book "Spindle Bearing Practice"**.

A detailed description of the highlights of Schaeffler's exhibition at the EMO 2015 is provided subsequently in this issue of Customer Information.

Further detailed information is also provided in the **Trade Fair Info**.

Precision Angular Measuring Systems for Rotary Axes

The inductive **YRTMA integrated absolute angular measuring system** with single-head technology introduced at EMO 2013 is now production-ready and will be showcased in Milan. With this measuring system integrated into rotary table bearings, positioning accuracies of just **2 angular seconds** are possible. **This value had been unrivaled to date worldwide and even exceeded the company's own expectations.**

The system is offered with the usual interfaces SSI+ 1 Vss, Siemens Drive-CliQ, Fanuc alpha and Heidenhain EnDat2.2 (in the preparation phase). **Its effectiveness could be confirmed in practical rotary table and milling head applications and completely convinced leading users in the sector.**

The patent-pending measuring head is designed so that the measuring gap adapts automatically to the bearing when the measuring head is being screwed on. Additional adjustment is not necessary. It is very maintenance-friendly, as the measuring head is easily accessible from the outside at all times.

The YRTMA integrated absolute angular measuring system offers the following benefits:

- Absolute interface, so no need for reference run
- Hollow shaft design, making the machine center available for other components
- Facilitates highly dynamic and precise control loops
- Less installation space required
- Simplification of design and assembly
- Resistance to environmental influences and media

One feature ensuring the high precision is the integration of the dimensional scale into the bearing. This is the system's zero position, i.e. the exact point at which the deformations and deflections due to machining forces are smallest and the scale can be executed with raceway accuracy. With the integration of a robust measuring system into the relatively large-diameter bearing, optimum use can be made of the graduation of the measuring system. Schaeffler offers both magneto-resistive measuring systems with pitch-coded reference marks as well as absolute inductive systems.

For more information please refer to the publication **“Absolute Angular Measuring System in machine tools” (SSD 30)** available from the following link:
ttp://www.schaeffler.com/remotemedien/media/_shared_media/08_media_library/01_publications/schaeffler_2/reprint/downloads_16/ssd_30_de_en.pdf
If you have any questions, please contact your Schaeffler Field Sales Team.

New Spindle Bearings for Maximum Machine Performance

By using new materials and manufacturing processes, Schaeffler has once again improved the performance of spindle bearings in several product ranges. The new X-life cylindrical roller bearings series N10 and NN30 with the newly developed low-friction polyamide cages for shaft diameters from 30 to 120 mm will be premiered at the EMO 2015.

The technical changes result in the following advantages:

- The dynamic load ratings of the Generation C bearings are up to 19% higher than previous bearing designs.
- The nominal bearing operating life L_{10} is up to 65% higher than the previous standard
- The window cage in high-performance PPA allows speeds up to 25% higher compared with brass cages in a speed limit test.
- With minimal oil lubrication, speed parameters of almost a million mm/min are possible.

This results in the following benefits for customers:

- Higher dynamic load-carrying capacity
- Longer rating life
- Longer operating life
- Reduced heat generation
- Reduced running noise
- Lower friction
- More design options
- No extra costs

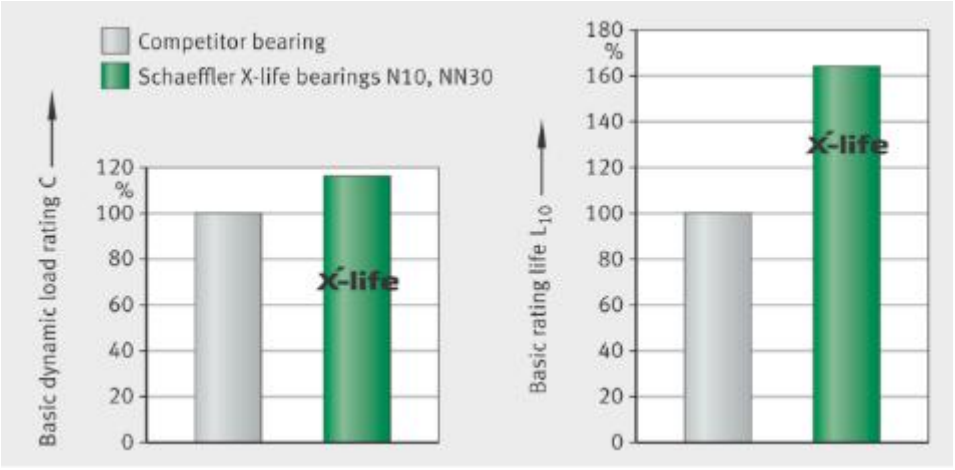


Fig. 4: Increase in nominal rating life due to comparatively higher dynamic load ratings

Further information is provided in the publication **"High precision cylindrical roller bearings N10 and NN30 in X-life design"** (SSD38) available from the following link:
http://www.schaeffler.com/remotemedien/media/_shared_media/08_media_library/01_publications/schaeffler_2/reprint/downloads_16/ssd_38_de_en.pdf

If you have any questions on these topics please contact the Schaeffler Field Sales Team.

Grease or Oil – FAG CONCEPT PRECISION for Accurate and Efficient Lubrication of Spindle Bearings

Schaeffler will be showcasing its newly developed lubricating systems at the EMO 2015 trade fair, FAG CONCEPT PRECISION GREASE and FAG CONCEPT PRECISION OIL supply spindle bearings with lubricant with the highest precision and efficiency. For these high-speed rolling bearings, development work focuses mainly on the correct supply and removal of lubricants, heat dissipation and the lubricants themselves.

Modern high-performance greases make it possible to safely and inexpensively supply lubricant to the spindle bearings over a long period even at very high speeds. This is why the majority of main spindles are lubricated with grease. In general, these bearings are sensitive to over-lubrication, so that solutions have to be found for reapplying a tolerable amount of grease to the right point on the spindle. Moreover, high-performance greases tend to harden and separate under pressure, so the relubricating unit has to take this into account.

FAG CONCEPT PRECISION GREASE

With its FAG CONCEPT PRECISION GREASE, Schaeffler is offering a lubricating system specially designed to meet the requirements of the main spindle in respect of delivery volume per stroke. Grease-filled hoses, which function as the actual grease reservoir for relubrication, are connected to the outlets. The cartridge only contains pressure oil, which is pumped into the hoses during operation. The grease and pressurizing medium are kept separate by means of a ball in the hose. A flow of 0.025 cm^3 per feed line is conveyed for each stroke. The grease is only pressurized during the relubrication process in order to prevent separation of the grease in the relubrication device.

Other compact lubricating systems from Schaeffler include the FAG CONCEPT2 system with one or two outlets, which is suitable for example for relubricating rotary table bearings. The FAG CONCEPT8, featuring up to eight outlets, can be used e.g. in the machine tool to lubricate the linear axes.

FAG CONCEPT Precision Grease

FAG CONCEPT PRECISION OIL – direct oil lubrication without compressed air

If the application requires very high speed parameters (more than 1.6 million mm/minute), the current state of the art dictates that pneumatic oil lubrication is used. However, one disadvantage of using pneumatic oil lubrication is the need for costly and resource-consuming compressed air. For a motor spindle in three-shift operation, annual costs of around €700 for compressed air can be incurred for bearing lubrication alone. Insufficiently filtered air or the formation of condensation due to insufficient drying can also cause sudden spindle failures.

FAG CONCEPT Precision Oil

The solution:

FAG CONCEPT PRECISION OIL provides direct oil lubrication in extremely small quantities without the use of compressed air as a transfer medium. The innovation lies in the use of a damper/throttle device that replaces the compressed air system as a means of conveying the lubricant to the bearing. This device allows a virtually continuous flow rate to the bearing. The concept was tested on a motor spindle in cooperation with Weiss Spindeltechnologie GmbH and has now proven its practical functionality in operation. Speed-based activation of the direct oil lubrication system also offers further optimization potential.

There will be one **flyer** each for FAG CONCEPT Precision Grease and FAG CONCEPT Precision Oil at the start of the EMO trade fair and they will be available online in the Schaeffler media library.

If you have any questions on these topics please contact the Schaeffler Field Sales Team.

RIB Series Torque Motor – More Driving Force and Less Power Loss

INA - Drives & Mechatronics AG & Co. KG (IDAM), the direct drive specialists within the Schaeffler Group, will be premiering the new **RIB series torque motors** at the EMO 2015 fair in Milan. The new RIB generation of torque motors consists of thermally optimized direct drives designed to achieve higher productivity or lower energy consumption in machine tools. Due to improved thermal management, and depending on operating strategy, these IDAM torque motors can be operated with **12% higher maximum torque** or with **30% less heat loss** compared with the previous series.

The new RIB series IDAM motors:

- are largely compatible with the corresponding RI predecessor models and with commercially available motor sizes
- are latching force optimized
- and can be used in most control systems.

The active magnet length can be adjusted in 25 mm increments to suit the application and make optimum use of the space gained.

In respect of ""maximum torque with minimum power loss" this direct drive is top of its class worldwide. It is ideal for use in rotary tables, swivel axes for rotary table swing arms and milling heads for highly dynamic and powerful milling, positioning, clocking and pivoting.

The RIB series is available in individual types and will go into volume production by the end of 2015.

Fig. 5: New generation IDAM RIB torque motors – maximum torque with minimum power loss

The functional principle of RIB motors is currently being transferred to a new linear motor. Initial L7 motor concepts are exhibiting much higher drive power or correspondingly lower power loss.

Implementing this principle in a linear motor means developing a completely new generation of motors. This is being pursued in the L7 linear motor concept; if the response from the market is good an L7 motor series will be realized. In the process, the resulting motor should be mechanically compatible with the current market leader in linear motors, but offer considerable technical advantages.

Currently, tests are showing 7% more power with 40% less heat loss compared with competitors. “Precision cooling” of the motor is not necessary and the magnetic circuit is optimized to provide the best synchronization. Options like the variants with three cable outlets, thermal motor decoupling and secondary cooling provide the range with the usual features.

The example of a five-axis milling machine with direct drives is proof that investing in these new RIB and L7 product ranges not only increases manufacturing accuracy but is also primarily of financial benefit. If all linear and torque motors are replaced by the new IDAM-RIB and/or L7 concept motors, heat losses in the main feed axes fall from 17 to 11.5 kW during 30% utilization in three-shift operation. This corresponds to a saving of 7.2 t of CO_2 per annum or 14.4 MWh per annum, which equates to €0.15/kWh.

If you have any questions on this topic please contact the Schaeffler Field Sales Team.

Monorail Guidance Systems 4.0 – Intelligent Components for Feed Axes

At the EMO 2015 in Milan, INA Linear Technology will present its fifth generation of **RUE-E series recirculating roller bearings** which for the first time feature integrated sensor units that enable on-demand lubrication and bearing condition monitoring. The sensor for lubrication status monitoring sends a status signal to the machine controller and initiates an automatic relubrication according to demand e.g. via the innovative **FAG CONCEPT8** multi-point lubrication system. To monitor bearing condition, a piezoelectric accelerometer is attached to the steel saddle plate on the carriage. This supplies the vibration velocity, vibration acceleration and the rolling bearing parameter to the connected signal converter and also monitors limit values.

With this concept for the new RUE-E, Schaeffler is developing a system that gives users direct feedback and communication with the control system, triggers automated lubrication where necessary and automatically initiates maintenance measures. Manual lubrication is no longer necessary and lubricant use can be reduced by up to 30%. The automated condition monitoring allows predictive maintenance, which is reflected in higher availability and reduced total cost of ownership.

Piezoelectric vibration monitoring

In its as-delivered condition, and during commissioning of a linear roller bearing and guideway assembly in a feed axle, the guideways are generally in an ideal condition in respect of running characteristics and lubricant condition. This can be observed through the vibration behavior of the saddle plate when the system is moving. To identify variations and deviations from this ideal set value, **piezoelectric accelerometers** have been attached to the steel saddle plate on the carriage.

Features of piezoelectric accelerometers:

- Well-suited for use with coolants and in contaminated environments
- The permanently connected, two-core separately shielded cable is encased in polyurethane.
- The sensor has:
  - a sensitivity of 100 mV/g,
  - a resolution of 0.001 g,
  - a frequency range of 5000 to 50,000 Hz for measuring spike energy.

The accelerometer supplies the **vibration velocity, vibration acceleration** and **rolling bearing parameter** via the cable to the connected signal converter and also monitors limit values. The signals are then separated here into different frequency ranges and/or an **energy evaluation of the impulse peaks is carried out using spike energy (gSE)**. Via analog outputs, the 4-20 mA and 0-

10 V signals are passed to the PLC, intelligent electronic evaluation system and lubricating unit.

This closes the monitoring and automated lubrication loop. An integral part of the lubrication loop is the innovative multi-point lubricator **FAG CONCEPT8**, a lubricating system for rolling bearings that ensures optimum lubricant feed to the bearing assemblies without necessitating any manual intervention. If the actual evaluated signal values sent back by the signal converter deviate from the nominal values, the FAG CONCEPT8 automatically initiates appropriate maintenance or relubrication measures.

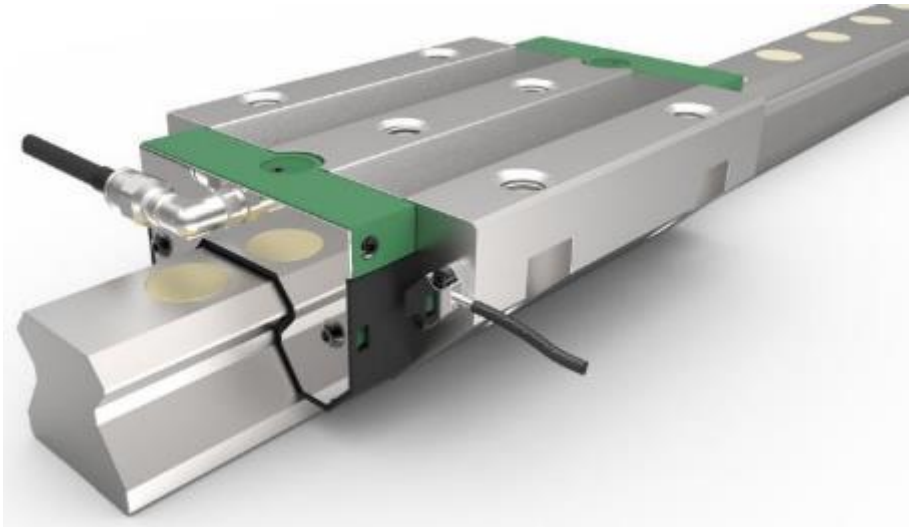


Fig. 6: INA Linear Recirculating Roller Bearing RUE-E 4.0 – with Integrated Accelerometer

If you have any questions on this topic please contact the Schaeffler Field Sales Team.

New: Schaeffler App for Super Precision Bearings

Schaeffler is launching its new "PrecisionDesk" app – which includes services for super precision rotary and linear bearings and is available free of charge – to coincide with the EMO 2015. The app can be used on mobile end devices with Android, iOS, and Windows operating systems and is designed to help service technicians and engineers when selecting bearings and installing components. One innovative feature is that the app allows the authenticity of the bearings to be checked in the case of rolling bearings provided with a data matrix code. Simply read the data matrix code on the bearing or the bearing packaging. This means that every app user can use the data matrix code to access all of the app's functions, regardless of whether they are using a smartphone or tablet. A web browser-based solution is also being developed that will allow the customer to make use of all the same functions from their PC using a corresponding handheld scanner.

Applications for high-precision rotary and linear bearings include machine tools and textile and printing machinery as well as food and packaging plants. In the future, options such as directly accessing bearing-specific measurement records for spindle and rotary table bearings and storing them for documentation purposes or sending them using the app will be available. For spindle bearings, bearing-specific electronic data records can also be generated and utilized in a logistics system, for example, using suitable interfaces. The app therefore offers Schaeffler customers the option of monitoring their own bearing inventory and improving quality in installation through more efficient pairing of bearing and shaft and/or housings. Catalog information, additional product information and direct access to the Schaeffler library are also possible using the app.

The app will initially be available in German and English (further languages are also planned at a later date).

Fig. 7: FAG P4S spindle bearing with data matrix code

The 'Precision Desk' Schaeffler app icon

For further information please contact your Schaeffler Sales Team.