SKF

HMS lock nuts



Contents

The SKF brand now stands for more than ever before, and means more to you as a valued customer.

While SKF maintains its leadership as the hallmark of quality bearings throughout the world, new dimensions in technical advances, product support and services have evolved SKF into a truly solutions-oriented supplier, creating greater value for customers.

These solutions encompass ways to bring greater productivity to customers, not only with breakthrough application-specific products, but also through leading-edge design simulation tools and consultancy services, plant asset efficiency maintenance programs, and the industry's most advanced supply management techniques.

The SKF brand still stands for the very best in rolling bearings, but it now stands for much more.

SKF – The knowledge engineering company.



Split HMS lock nuts 3

Design features 3
Advantages 3
Assortment 3
Applications 4

Mounting and dismounting 5

Mounting lever, eye bolts 5
Extension bar 5
Mounting instructions 6
Dismounting instructions 6

Product data 8

General data 8
Dimensions 8
Thread 8
Mating thread 8
Material 8
Storage 8
Product table 9

Split HMS lock nuts

Design features

HMS lock nuts permit simple, but nevertheless efficient and precise axial location of large-size bearings and other large components on the shaft. They are new to the SKF range of lock nuts but have already proved themselves, giving excellent performance under tough conditions in wind turbines.

The special design feature of this lock nut is its slotted ring body with internal clamping bolt in the slot (➔ **fig 1**). By tightening the clamping bolt, the slot is narrowed, and the nut located without clearance. The nut has a tight fit on the shaft thread so that it cannot turn.

This special feature not only facilitates mounting but also simplifies arrangement design. Additional locating elements are not required, nor is a keyway in the shaft, thus saving costs – an important consideration.

Advantages

The essential advantages of the split HMS lock nut are as follows:

- No keyway in the shaft is required, thus making the overall design more robust and reduce manufacturing cost.
- Easy to mount, which is especially important where large-size nuts are concerned. Mounting and dismounting can be facilitated by expanding the slot using the clampin bolt.
- There is no problem with fretting corrosion when dismounting, as the ring body can be slightly expanded.

Assortment

The current range of split HMS lock nuts is that shown in the product table on **page 9** with all product data. Please check the availablility before ordering of the remaining lock nuts.

Fig 1

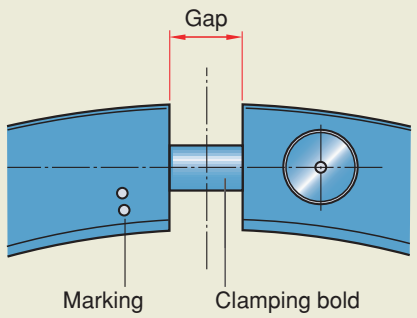
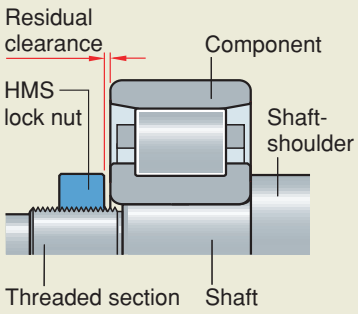


Fig 2





Applications

HMS lock nuts from SKF are suitable for the same applications as the HM lock nuts with locking clip. They can be used to

- axially locate large-size bearings or other components,
- secure a withdrawal sleeve with a mounted bearing, or
- axially locate other large-size components, e.g. gears or flywheels, on shafts (→ **fig 2**). As already mentioned they are in service in wind turbines. However, they should not be used at all to drive up bearings onto tapered seatings, even if the SKF oil injection method is to be used.



Mounting and dismounting

Mounting lever, eye bolts

HMS lock nuts have four to eight equally spaced threaded holes at the outside diameter to take

- the mounting lever (➔ **fig** 3) to ease mounting the lock nut on the mating thread, or
- eye bolts to facilitate or enable handling and mounting.

The mounting lever is supplied with each lock nut, but eye bolts are not supplied.

HMS lock nuts complete with mounting aids are identified by the suffix K, for example HMS 30/600 K. In this case the supply consists of:

- 1 lock nut HMS 30/600,
- 1 mounting lever and
- 1 extension bar TMFL 19/85.

Fig 3



Fig 4



Extension bar

Extension bars with internal square and external hexagon (➔ **fig** 4) for the reliable connection to the internal hexagon of the clamping bolt and the key hole of the torque wrench are also available from SKF. These extension bars are designed for individual lock nut sizes. They are designated TMFL followed by a size identification, e.g. for lock nut HMS 30/600, TMFL 19/85. On request the HMS lock nuts can be supplied with the appropriate extension bar.



Mounting instructions

To provide proper performance of the HMS lock nuts, it is important that the mating thread is produced to the tolerance e7, see recommendation under “Product data -- general”. The clamping bolt of new HMS lock nuts should not be removed.

Cleanliness of the threaded section on the shaft and in the lock nut is also of vital importance.

1. After the component that has to be located has been mounted, e.g. a rolling bearing, the shaft thread should be cleaned, checked for damages and then lightly oiled.
2. If necessary, the clamping bolt in the lock nut should be loosened until the gap width “b” quoted in the product table has been obtained. This facilitates subsequent mounting.
3. Move the lock nut onto the shaft thread with its unmarked side leading, preferably using a lifting tackle with spring attachment.
4. Using the mounting lever, screw the lock nut onto the shaft thread by hand until it abuts the component that it is to locate.
5. Check that the lock nut side face abuts the component over its whole surface.
6. Tighten the clamping bolt using a torque wrench and applying the corresponding “Tightening torque for premounting”, listed in the product table on **page 9**. Mark the relative position of the nut on the mating thread at the position of the “o” marking on the nut using a colour marker (➔ **fig** 5).
7. Loosen the clamping bolt in the lock nut until the gap width “b” is obtained. Unscrew the lock nut through approximately 90 °
(a quarter turn).
8. Again hand-tighten the lock nut until the position of the “oo” marking coincides with the coloured marking on the mating thread (➔ **fig** 6).
9. Tighten the clamping bolt using a torque wrench and apply the corresponding “Tightening torque for final mounting”.(➔ product table).
10. The residual clearance of approximately 0,05 mm (➔ **fig** 2 on **page 3**) has no influence on the functional reliability of the lock nut. This clearance serves to make sure that the HMS lock nut properly engages the mating thread.
11. Should this residual clearance be much larger, the lock nut must be loosened again and the relative position of the “oo” marking changed. Mounting steps 8 and 9 have then to be repeated.
12. Remove any mounting aids from the lock nut

Dismounting instructions

1. Clean the threaded section on the shaft and remove any rust or damage over the section that the nut has to be screwed.
2. Loosen the clamping bolt in the HMS lock nut until the gap width “b” specified in the product table is attained.
3. Unscrew the lock nut by hand using the mounting lever.
4. In case it is impossible to shift the nut by hand, blows should be applied around the circumference of the nut using a dead-blow hammer, e.g. the SKF hammer TMFT 33-H with double nylon heads, until the lock nut comes free. A further loosening of the clamping bolt can expand the gap width by max. 10 %.
5. Completely unscrew the lock nut from the shaft thread. Two service men are required for this, preferably using lifting tackle with spring attachment.

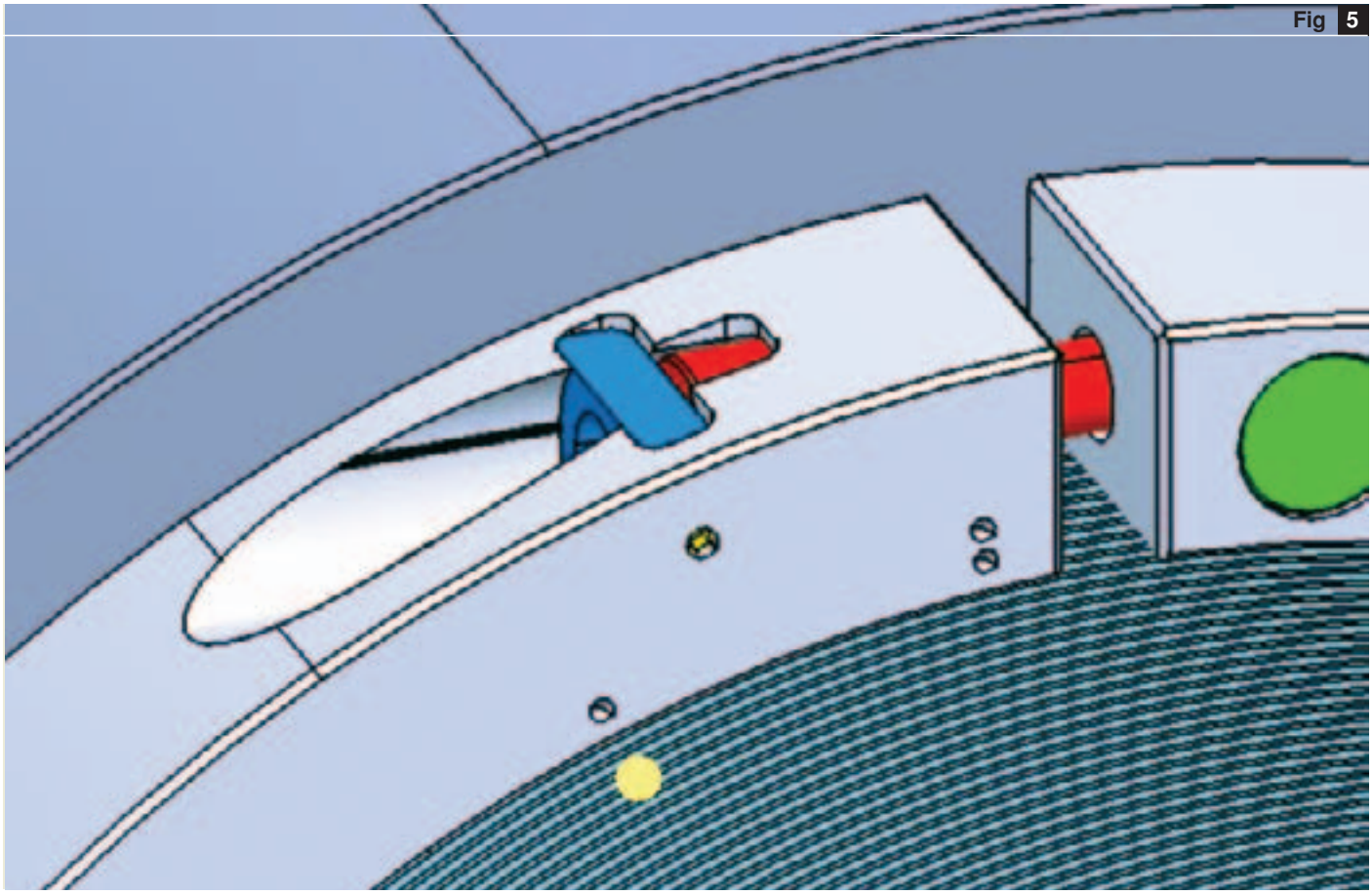


Fig 5

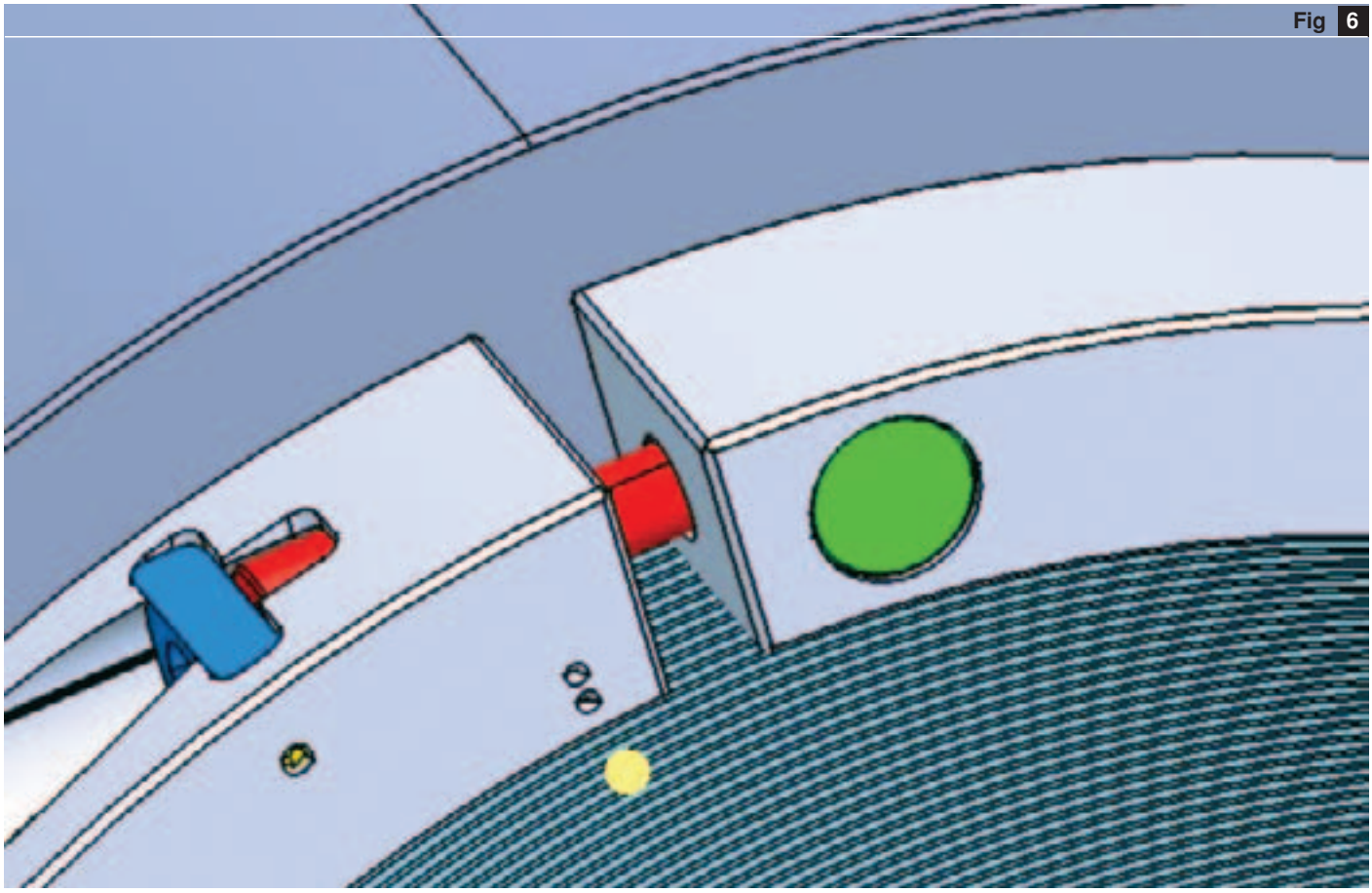


Fig 6

Product data

General data

Dimensions
The dimensions of HMS lock nuts correspond to those specified in ISO 2982-2:2001 for lock nuts in the HM 30 series.

Thread
HMS lock nuts have a metric trapezoidal thread to ISO 2903:1993, grade 7H.

The slot in the nut indicates the start of the thread.

Mating thread
SKF recommends the mating thread on the shaft to be made to tolerance 7e for metric trapezoidal threads as specified in ISO 2903:1993

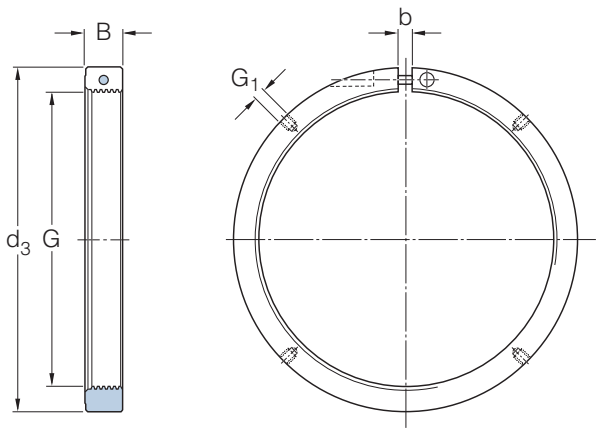
Material
The ring body of HMS lock nuts is of steel with a yield strength of at least 305 N/mm^2. The nuts are oiled. To enhance the protection against corrosion, the lock nuts can be specially surface treated to order.

It is also possible to coat the non-functional surfaces of the lock nut with paint or plastic. Make sure that the surfaces being coated are clean before any treatment.

The surfaces of the thread and ring side face, which abuts the component to be located should never be painted or coated.

Storage
HMS lock nuts are normally oiled and can, therefore, be stored in their original packaging for considerable periods. The relative humidity should, however, not exceed 60 %.

HMS lock nuts



Dimensions					Tightening torque for pre-mounting	Tightening torque for final mounting	Mass	Designation
G	d_3	B	b	G_1	T_t	T_m	≈	
mm					Nm		kg	–
Tr 480 x 5	560	60	18	M 16	30	270	28	**HMS 3096**
Tr 500 x 5	580	68	18	M 16			33	**HMS 30/500**
Tr 530 x 6	630	68	22	M 16			42	**HMS 30/530**
Tr 560 x 6	650	75	22	M 16			44	**HMS 30/560**
Tr 600 x 6	700	75	22	M 16	50	505	52	**HMS 30/600**
Tr 630 x 6	730	75	23	M 16	50	505	55	**HMS 30/630**
Tr 670 x 6	780	80	23	M 20			68	**HMS 30/670**
Tr 710 x 7	830	90	31	M 20			91	**HMS 30/710**
Tr 750 x 7	870	90	31	M 20			94	**HMS 30/750**
Tr 800 x 7	920	90	31	M 20			100	**HMS 30/800**
Tr 850 x 7	980	90	31	M 20	90	925	115	**HMS 30/850**

SKF – The knowledge engineering company

The business of the SKF Group consists of the design, manufacture and marketing of the world's leading brand of rolling bearings, with a global leadership position in complementary products such as radial seals. SKF also holds an increasingly important position in the market for linear motion products, high precision aerospace bearings, machine tool spindles, plant maintenance services and is an established producer of high-quality bearing steel.

The SKF Group maintains specialized businesses to meet the needs of the global marketplace. SKF supports specific market segments with ongoing research and development efforts that have led to a growing number of innovations, new standards and new products.

SKF Group has global ISO 14001 environmental certification. Individual divisions have been approved for quality certification in accordance with either ISO 9000 or appropriate industry specific standards.

Some 80 manufacturing sites worldwide and sales companies in 70 countries make SKF a truly international corporation. In addition, our 7 000 distributor and dealer partners around the world, e-business marketplace and global distribution system put SKF close to customers for the supply of both products and services. In essence, SKF solutions are available wherever and whenever our customers need them.

Overall, the SKF brand now stands for more than ever before. It stands for the knowledge engineering company ready to serve you with world-class product competences, intellectual resources and the vision to help you succeed.



Harnessing wind power
The growing industry of wind-generated electric power provides an environmentally compatible source of electricity. SKF is working closely with global industry leaders to develop efficient and trouble-free turbines, using SKF knowledge to provide highly specialized bearings and condition monitoring systems to extend equipment life in the extreme and often remote environments of wind farms.

Developing a cleaner cleaner
The electric motor and its bearings are the heart of many household appliances. SKF works closely with appliance manufacturers to improve their product's performance, cut costs and reduce weight. A recent



example produced a new generation of vacuum cleaners with substantially more suction. SKF's knowledge in small bearing technology is also applied to manufacturers of power tools and office equipment.



Delivering asset efficiency optimization
To optimize efficiency and boost productivity, many industrial facilities outsource some or all of their maintenance services to SKF, often with guaranteed performance contracts. Through the specialized capabilities and knowledge available from SKF Reliability Systems, SKF provides a comprehensive range of asset efficiency services, from maintenance strategies and engineering assistance, to operator-driven reliability and machine maintenance programs.



Creating a new "cold remedy"
In the frigid winters of northern China, sub-zero temperatures can cause rail car wheel assemblies and their bearings to seize due to lubrication starvation. SKF created a new family of synthetic lubricants formulated to retain their lubrication viscosity even at these extreme bearing temperatures. SKF's knowledge of lubricants and friction are unmatched through out the world.



Evolving by-wire technology
SKF has unique expertize and knowledge in fast growing by-wire technology, from fly-by-wire, to drive-by-wire, to work-by-wire. SKF pioneered practical fly-by-wire technology and is a close working partner with all aerospace industry leaders. As an example, virtually all aircraft of the Airbus design use SKF by-wire systems for cockpit flight control. SKF is also a leader in automotive drive-by-wire, having jointly developed the revolutionary Filo and Novanta concept cars which employ SKF mechatronics for steering and braking. Further by-wire development has led SKF to produce an all-electric forklift truck which uses mechatronics rather than hydraulics for all controls.



Planning for sustainable growth
By their very nature, bearings make a positive contribution to the natural environment. Reduced friction enables machinery to operate more efficiently, consume less power and require less lubrication. SKF is continually raising the performance bar, enabling new generations of high-efficiency products and equipment. With an eye to the future, SKF's global policies and manufacturing techniques are planned and implemented to help protect and preserve the earth's limited natural resources. We remain committed to sustainable, environmentally responsible growth.



Maintaining a 320 km/h R&D lab
In addition to SKF's renowned research and development facilities in Europe and the United States, Formula One car racing provides a unique environment for SKF to push the limits of bearing technology. For over 50 years, SKF products, engineering and knowledge have helped make Scuderia Ferrari a formidable force in F1 racing. (The average racing Ferrari utilizes more than 150 SKF components.) Lessons learned here are applied to the products we provide to automakers and the aftermarket worldwide.

® SKF is a registered trademark of the SKF Group.

© Copyright SKF 2003
The contents of this publication are the copyright of the publisher and may not be reproduced (even extracts) unless permission is granted. Every care has been taken to ensure the accuracy of the information contained in this publication, but no liability can be accepted for any loss or damage whether direct, indirect or consequential arising out of the use of the information contained herein.
www.skf.com

Publication **5356 E**

Printed in Germany on environmentally friendly, chlorine-free paper by Weppert GmbH & Co