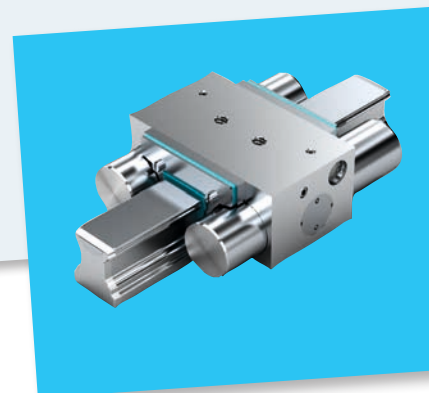
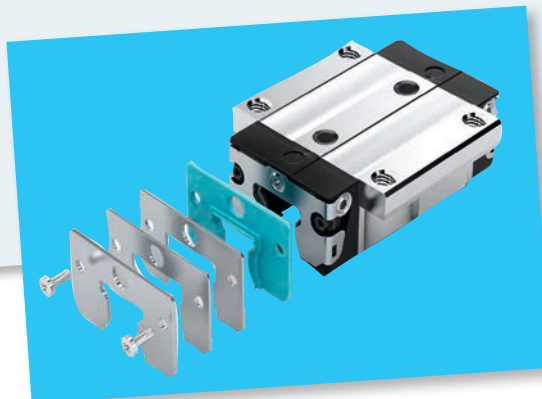
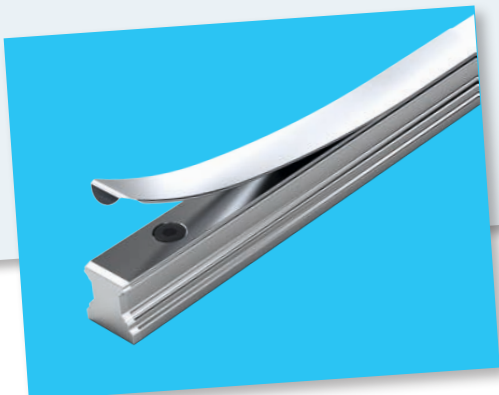
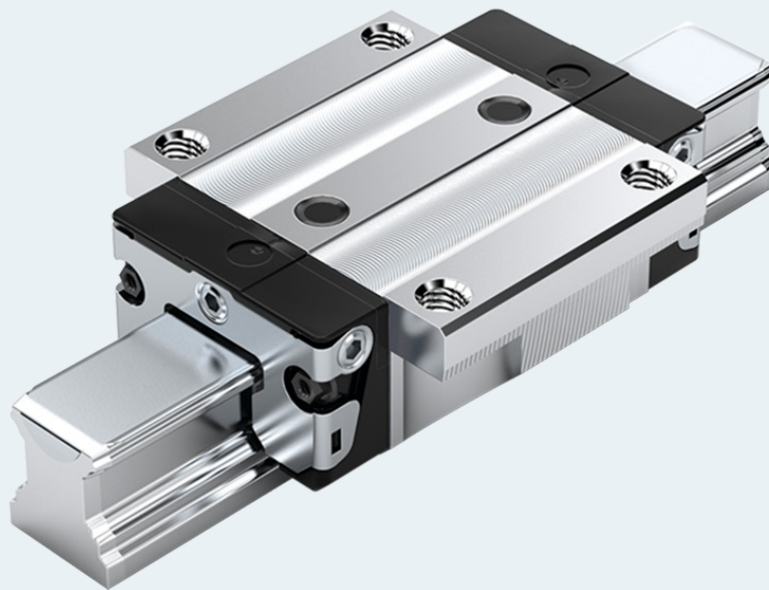


Ball rail systems

ball runner blocks, ball guide rails, accessories



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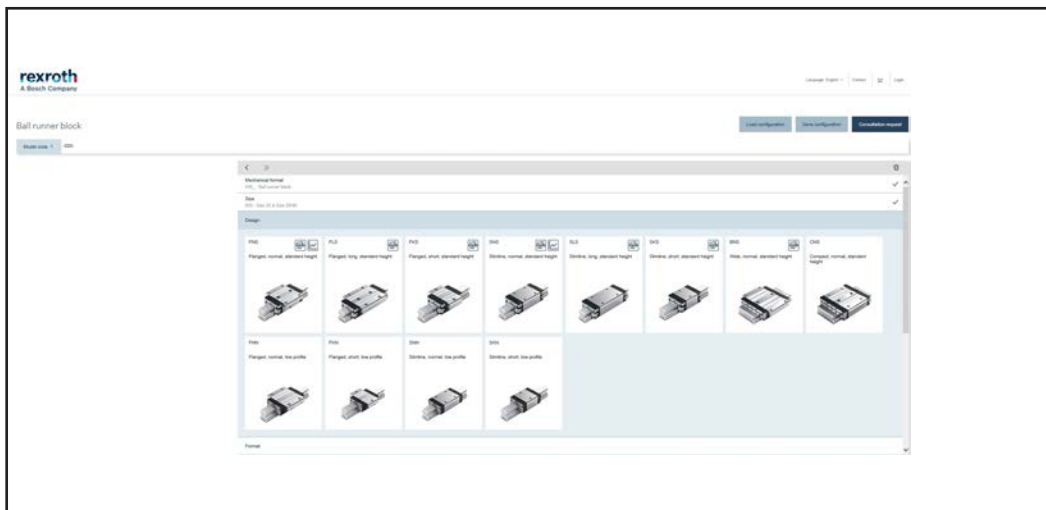
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New features at a glance

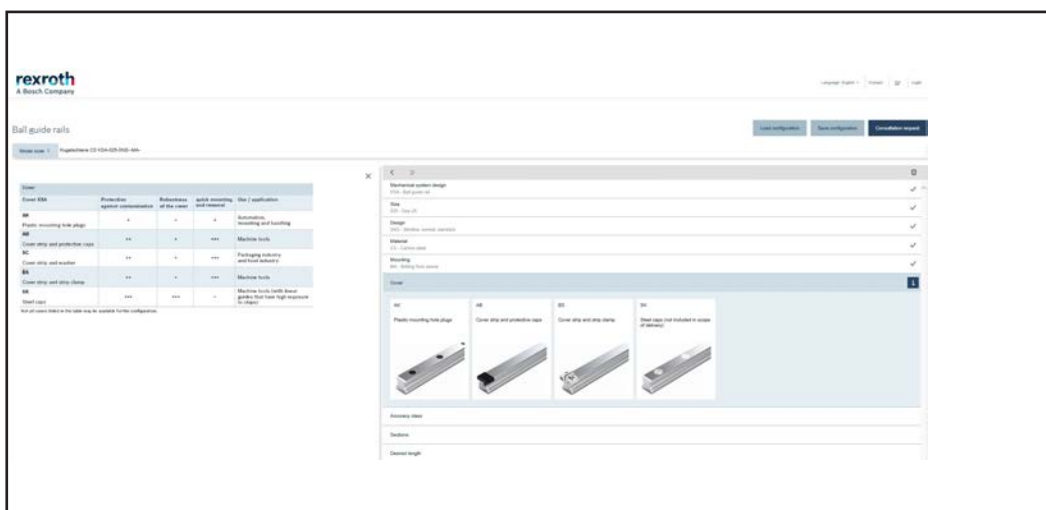
Runner block and guide rail configurator

With the new configurators, Bosch Rexroth accelerates the selection and configuration of ball runner blocks and ball guide rails. A built-in plausibility check monitors each decision in real time to ensure that the individual configuration can be implemented. Then the selected components can be ordered directly from the Bosch Rexroth eShop.

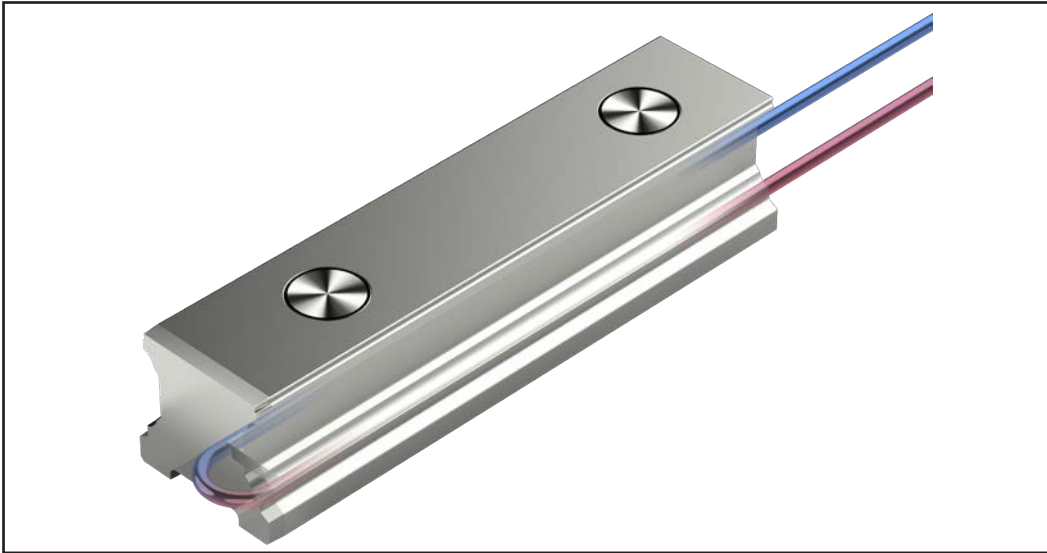
[Link to the runner block configurator](#)



[Link to the ball guide rail configurator](#)



Temperature-controlled rail



Extension of relubrication intervals for grease lubrication

The latest investigations in the Bosch Rexroth testing prove that under certain operating conditions, significantly longer relubrication intervals are possible with grease lubrication. If small loads, normal ambient temperatures and medium to high travel speeds are present, up to 20,000 km can be realized without relubrication in ball rail systems. This enormous increase has been made possible by continuous improvements in the manufacturing processes for runner blocks and guide rails, which have resulted in better surfaces and higher geometrical dimensional accuracy of the running tracks.

Mounting runner block

Mounting runner block for high-precision parallel alignment and joint alignment of multi-piece ball guide rails.



Product description

Characteristic features

Complete guide units can also be designed by combining interchangeable elements from stock...

Rexroth manufactures ball guide rails and ball runner blocks especially for the ball raceway sector with such high precision that each individual component element is fully interchangeable. As a result, any combination is possible within each accuracy class. This enables globally unique, premium logistics. Each element can be individually planned and separately stocked. On ball guide rails, both sides can be used as reference edges.

Highlights

- ▶ The same high load ratings in all four main directions of loading
- ▶ Minimal noise level and optimum travel behavior
- ▶ Excellent dynamic characteristics:
Travel speed: v_{\max} up to 10 m/s
Acceleration: $a_{\max} = 500 \text{ m/s}^2$
- ▶ Long-term lubrication is possible over several years
- ▶ Minimum quantity lubrication system with integrated reservoir for oil lubrication¹⁾
- ▶ Lube fittings with metal threads on all sides¹⁾
- ▶ Limitless interchangeability as all ball guide rail versions can be combined at will with all ball runner block versions
- ▶ Maximum system rigidity due to preloaded O-arrangement
- ▶ Maximum installation error compensation with super ball runner blocks
- ▶ 60% less gravity with aluminum all runner blocks (compared to ball runner blocks made of steel)

Further highlights

- ▶ Interchangeability with roller rail system
- ▶ Optional integrated, inductive and wear-free measuring system
- ▶ Wide range of accessories
- ▶ Attachments on the ball runner block can be mounted from above and below¹⁾
- ▶ Improved rigidity under lift-off and side loading conditions due to two additional mounting screw holes at the center of the ball runner block¹⁾
- ▶ End-face fastening thread for all attachments
- ▶ High rigidity in all load directions – permits applications with just one runner block per rail
- ▶ Integrated all-round sealing
- ▶ High torque load capacity
- ▶ Optimized entry-zone geometry and high number of balls minimize variation in elastic deflection
- ▶ Quiet, smooth running thanks to optimally designed ball and ball chain return and guideway
- ▶ Different preload classes

Corrosion protection (optional)¹⁾

- ▶ Resist NR: Ball runner block body made of corrosion resistant steel as per DIN EN 10088
- ▶ Resist NR II: Ball runner block body and ball guide rail as well as all steel parts made of corrosion resistant steel in accordance with DIN EN 10088
- ▶ Resist CR: Ball runner block body or ball guide rail made of steel with corrosion resistant coating, matte-silver finish, hard chrome plated

1) Type-dependent

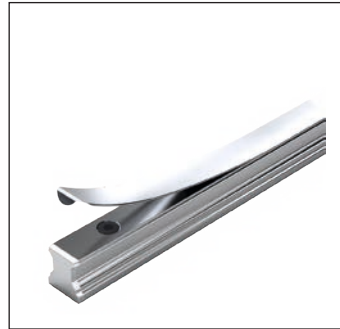
Ball chain (optional)

- ▶ Optimized noise level



Proven cover strip for the ball guide rail mounting holes

- ▶ One cover for all bore holes saves time and costs
- ▶ Made of corrosion resistant spring steel DIN EN 10088
- ▶ Easy and safe during mounting
- ▶ Clip on and secure



Separate catalogs are available for other products in the field of ball rail systems:



Integrated measuring system
IMS for ball and roller rail
systems



IMScompact integrated
measuring system for BSHP
ball rail systems



Miniature ball guide rail
systems



Ball rail systems NFRG for
use in the packaging
industry and food industry
areas.



Cam roller guides

Notes

General notes

- ▶ Combinations of different accuracy classes
Combining ball guide rails and ball runner blocks of different accuracy classes results in different tolerances for the dimensions H and A3. See “Accuracy classes and their tolerances.”

Intended use

- ▶ The ball rail systems are linear guideways capable of absorbing forces from all transverse directions and moments about all axes. The ball rail system is intended exclusively for guiding and positioning tasks when installed in a machine.
- ▶ The product is intended exclusively for professional use and not for private use.
- ▶ Use for the intended purpose also includes the requirement that users must have read and understood the related documentation completely, in particular the “Safety instructions”.

Misuse

Use of the product in any other way than as described under “Intended use” is considered to be misuse and is therefore not permitted. If unsuitable products are installed or used in safety-critical applications, this may lead to uncontrolled operating statuses in the application which can cause personal injury and/or damage to property. The product may only be used in safety-critical applications if this use has been expressly specified and permitted in the product documentation. Bosch Rexroth AG will not accept any liability for injury or damage caused by misuse of the product. The risks associated with any misuse of the product shall be borne by the user alone.

Misuse of the product includes:

- ▶ The transport of persons

General safety instructions

- ▶ The safety rules and regulations of the country in which the product is used must be observed.
- ▶ All current and applicable accident prevention and environmental regulations must be adhered to.
- ▶ The product may only be used when it is in technically perfect condition.
- ▶ The technical data and environmental conditions stated in the product documentation must be complied with.
- ▶ The product must not be put into service until it has been verified that the final product (for example a machine or system) into which the product has been installed complies with the country-specific requirements, safety regulations and standards for the application.
- ▶ Rexroth ball rail systems may not be used in zones with potentially explosive atmospheres as defined in ATEX directive 94/9/EC.
- ▶ Rexroth ball rail systems must never be altered or modified. The user may only perform the work described in the “Quick User Guide” or the “Mounting instructions for ball rail systems”.
- ▶ The product is never allowed to be disassembled.
- ▶ At high travel speeds a certain amount of noise is caused by the product. If necessary, appropriate measures should be taken to protect hearing.
- ▶ The special safety requirements for specific sectors (e.g. crane construction, theaters, food technology) set forth in laws, directives and standards must be complied with.
- ▶ In all cases, the provisions of the following standard should be noted and followed. DIN 637, Safety regulations for dimensioning and operation of Profiled Rail Systems with recirculating rolling elements.

Directives and standards

Rexroth ball rail systems BSHP are designed for reliability and high precision in dynamic, linear applications. The machine tool industry and other sectors must observe a series of standards and directives. These requirements can vary significantly worldwide. It is therefore essential to understand the legislation and standards that apply in each particular region.

DIN EN ISO 12100

This standard describes the safety of machinery – general principles for design, risk assessment and risk reduction. It gives a general overview and contains a guide to the major developments governing machines and their intended use.

Directive 2006/42/EC

The European Machinery Directive describes the basic safety and health requirements for the design and manufacture of machinery. The manufacturer of a machine or his authorized representative has a duty to ensure that a risk assessment has been performed in order to determine the health and safety requirements which have to be fulfilled for that machine. The machine must be designed and built taking into account the results of the risk assessment.

Directive 2001/95/EC

This directive covers general safety requirements for any product placed on the market and intended for consumers, or likely to be used by consumers under reasonably foreseeable conditions, including products that are made available to consumers in the context of service provision for use by them

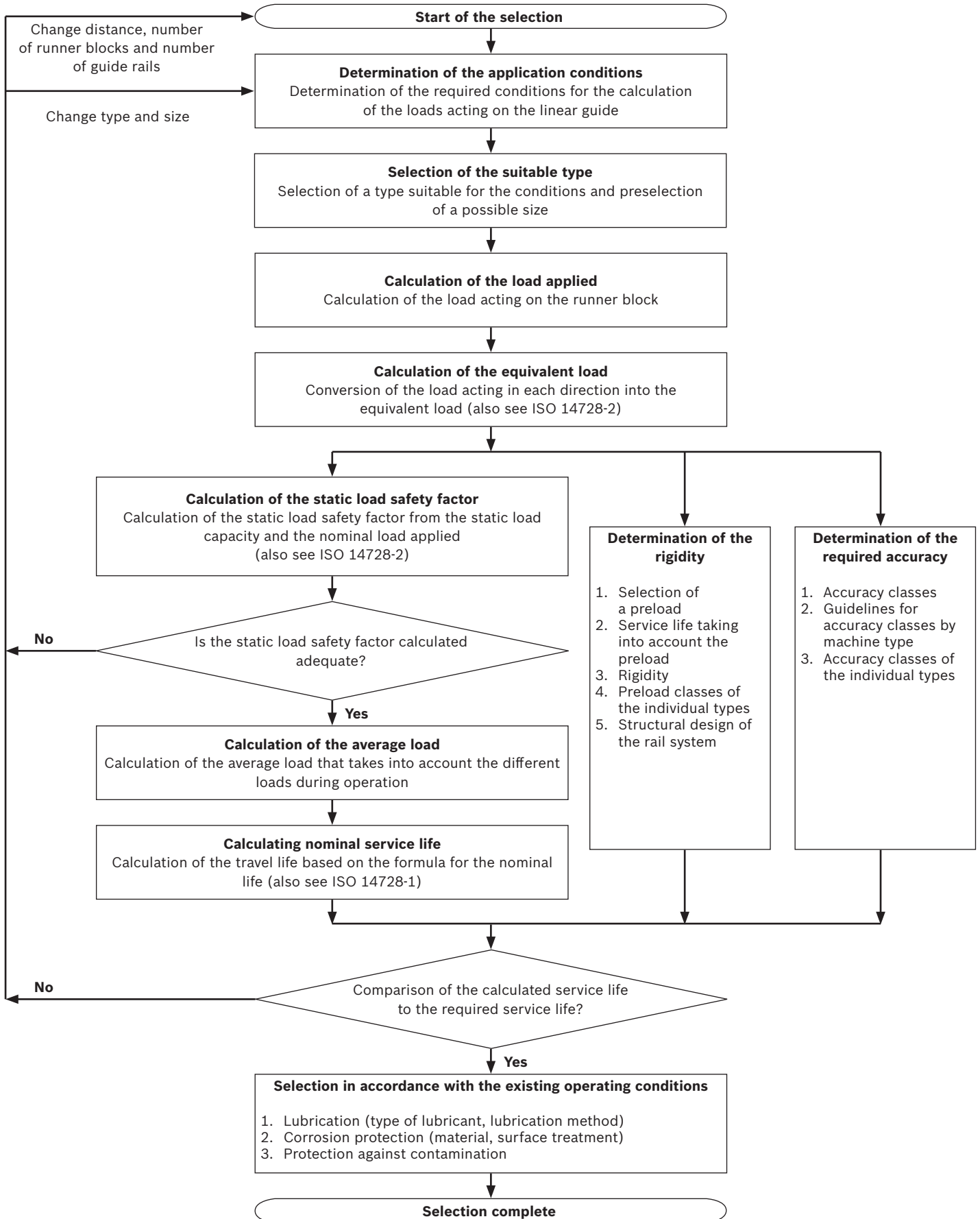
Directive 1999/34/EC

This directive concerns the liability for defective products and applies to industrially manufactured movable objects, irrespective of whether or not they have been incorporated into another movable or immovable object.





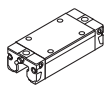





REGULATION (EC) No. 1907/2006 (REACH)




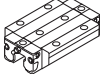



This directive describes the restrictions on the marketing and use of certain dangerous substances and preparations. “Substances” means chemical elements and their compounds as they occur in the natural state or as produced by industry. “Preparations” means mixtures or solutions composed of two or more substances.

Selection of a linear guide according to DIN 637



Product overview ball runner blocks with load ratings and load moments

| Ball runner blocks | Page | Size | Load ratings (N) and load moments (Nm) | | | | | | | | | |
|---|---|--|--|-------------------------------------|--------------|--------------|--------------|--------------|---------------|---------------|---------------|---------------|
| | | | 15 | 20 | 25 | 30 | 35 | 45 | 55 | 65 | | |
| Standard, heavy duty, ball runner blocks⁷⁾ made of steel³⁾ Resist NR⁴⁾ Resist CR⁶⁾    | FNS R1651³⁾⁶⁾ R2001⁴⁾ 48 ³⁾ 99 ⁴⁾ | 106 ⁶⁾ | C ¹⁾ | 9860 | 23400 | 28600 | 36500 | 51800 | 86400 | 109000 | 172000 | |
| | | | C ²⁾ | 8 850 | 22 200 | 26 700 | 34 800 | 49 400 | 82 400 | – | – | |
| | | | C₀ ¹⁾ | 12700 | 29800 | 35900 | 48100 | 80900 | 132000 | 174000 | 280000 | |
| | SNS R1622³⁾⁶⁾ R2011⁴⁾ 54 ³⁾ 99 ⁴⁾ | 106 ⁶⁾ | M_t ¹⁾ | 95 | 300 | 410 | 630 | 1110 | 2330 | 3480 | 6810 | |
| | | | M_t ²⁾ | 85 | 280 | 380 | 600 | 1060 | 2 220 | – | – | |
| | | | M_{t0} ¹⁾ | 120 | 380 | 510 | 830 | 1740 | 3560 | 5550 | 11100 | |
| | SNH R1621³⁾⁶⁾ 60 ³⁾ | 106 ⁶⁾ | M_L ¹⁾ | 68 | 200 | 290 | 440 | 720 | 1540 | 2320 | 4560 | |
| | | | M_L ²⁾ | 62 | 190 | 270 | 420 | 700 | 1 480 | – | – | |
| | | | M_{Lo} ¹⁾ | 87 | 260 | 360 | 580 | 1130 | 2350 | 3690 | 7400 | |
| | Standard ball runner block ⁷⁾ made of steel³⁾ Resist NR⁴⁾ Resist CR⁶⁾    | FLS R1653³⁾⁶⁾ R2002⁴⁾ 50 ³⁾ 99 ⁴⁾ | 106 ⁶⁾ | C ¹⁾ | 12800 | 29600 | 37300 | 46000 | 66700 | 111000 | 139000 | 223000 |
| | | | | C ²⁾ | 11 500 | 28 200 | 34 800 | 43 800 | 63 600 | 106 000 | – | – |
| | | | | C₀ ¹⁾ | 18400 | 41800 | 52500 | 66900 | 116000 | 190000 | 245000 | 404000 |
| | | SLS R1623³⁾⁶⁾ R2012⁴⁾ 56 ³⁾ 99 ⁴⁾ | 106 ⁶⁾ | M_t ¹⁾ | 120 | 380 | 530 | 800 | 1440 | 3010 | 4410 | 8810 |
| | | | | M_t ²⁾ | 110 | 360 | 500 | 760 | 1 370 | 2 870 | – | – |
| | | | | M_{t0} ¹⁾ | 180 | 540 | 750 | 1160 | 2500 | 5120 | 7780 | 16000 |
| SLH R1624³⁾⁶⁾ 62 ³⁾ | | 106 ⁶⁾ | M_L ¹⁾ | 120 | 340 | 530 | 740 | 1290 | 2730 | 3960 | 8160 | |
| | | | M_L ²⁾ | 110 | 330 | 500 | 710 | 1 230 | 2 630 | – | – | |
| | | | M_{Lo} ¹⁾ | 180 | 490 | 740 | 1080 | 2240 | 4660 | 6990 | 14800 | |
| Standard ball runner block ⁷⁾ made of steel³⁾ Resist NR⁴⁾ Resist CR⁶⁾   | | FKS R1665³⁾ R2000⁴⁾ 52 ³⁾ 99 ⁴⁾ | 106 | C ¹⁾ | 6720 | 15400 | 19800 | 25600 | 36600 | – | – | – |
| | | | | C ²⁾ | 6 030 | 14 700 | 18 500 | 24 400 | 34 900 | – | – | – |
| | | | | C₀ ¹⁾ | 7340 | 16500 | 21200 | 28900 | 49300 | – | – | – |
| | | SKS R1666³⁾ R2010⁴⁾ 58 ³⁾ 99 ⁴⁾ | 106 | M_t ¹⁾ | 65 | 200 | 280 | 440 | 790 | – | – | – |
| | | | | M_t ²⁾ | 58 | 190 | 260 | 420 | 750 | – | – | – |
| | | | | M_{t0} ¹⁾ | 71 | 210 | 300 | 500 | 1060 | – | – | – |
| | FNN R1693³⁾⁶⁾⁸⁾ 64 ³⁾ | 106 ⁶⁾ | M_{t0} ²⁾ | 60 | 200 | 270 | 470 | 980 | – | – | – | |
| | | | M_L ¹⁾ | 29 | 83 | 130 | 200 | 340 | – | – | – | |
| | | | M_L ²⁾ | 27 | 81 | 120 | 200 | 330 | – | – | – | |
| | SNN R1694³⁾⁶⁾⁸⁾ 68 ³⁾ | 106 ⁶⁾ | M_{Lo} ¹⁾ | 32 | 89 | 140 | 230 | 460 | – | – | – | |
| | | | M_{Lo} ²⁾ | 28 | 84 | 130 | 220 | 430 | – | – | – | |
| | | | C ¹⁾ | – | 14500 | 28600 | – | – | – | – | – | |
| | SNN R1694³⁾⁶⁾⁸⁾ 68 ³⁾ | 106 ⁶⁾ | C₀ ¹⁾ | – | 24400 | 35900 | – | – | – | – | – | |
| | | | M_t ¹⁾ | – | 190 | 410 | – | – | – | – | – | |
| | | | M_{t0} ¹⁾ | – | 310 | 510 | – | – | – | – | – | |
| FKN R1663³⁾⁶⁾⁸⁾ 66 ³⁾ | 106 ⁶⁾ | M_L ¹⁾ | – | 100 | 290 | – | – | – | – | – | | |
| | | M_{Lo} ¹⁾ | – | 165 | 360 | – | – | – | – | – | | |
| | | C ¹⁾ | – | 9600 | 19800 | – | – | – | – | – | | |
| SKN R1664³⁾⁶⁾⁸⁾ 70 ³⁾ | 106 ⁶⁾ | C₀ ¹⁾ | – | 13600 | 21200 | – | – | – | – | – | | |
| | | M_t ¹⁾ | – | 120 | 280 | – | – | – | – | – | | |
| | | M_{t0} ¹⁾ | – | 170 | 300 | – | – | – | – | – | | |
| Super Ball Runner Block made of steel³⁾ Resist CR⁶⁾   | FKS 1661³⁾⁶⁾ 88 ³⁾ | 107 ⁶⁾ | C ¹⁾ | 3900 | 10100 | 11400 | 15800 | 21100 | – | – | – | |
| | | | F_{max} ¹⁾ | 1500 | 3900 | 4400 | 6100 | 8100 | – | – | – | |
| | SKS 1662³⁾⁶⁾ 90 ³⁾ | 107 ⁶⁾ | M_t ¹⁾ | 39 | 130 | 170 | 270 | 450 | – | – | – | |
| M_{tmax} ¹⁾ | | | 15 | 50 | 65 | 105 | 175 | – | – | – | | |




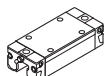


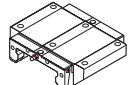
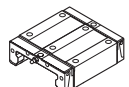
| Ball runner blocks | | | Page | Size | 15 | 20 | 25 | 30 | 35 | 45 | 55 | 65 | |
|--|---|---|------------------------------------|---|--|--------|--------|--------|--------|------|----|----|---|
| | | | |  | Load ratings (N) and load moments (Nm) | | | | | | | | |
| High-speed ball runner block made of steel ⁷⁾ |  | FNS R2001 ... 9. | 85 | C ¹⁾ | 6880 | 16300 | 20000 | 25500 | 36200 | - | - | - | |
| | | | | C ₀ ¹⁾ | 8860 | 20800 | 25100 | 33500 | 56500 | - | - | - | |
| | | | | M _t ¹⁾ | 66 | 210 | 280 | 440 | 780 | - | - | - | |
| | | | | M _{t0} ¹⁾ | 85 | 270 | 360 | 580 | 1210 | - | - | - | |
| | | | | M _L ¹⁾ | 47 | 140 | 200 | 310 | 510 | - | - | - | |
| | |  | SNS R2011 ... 9. | 85 | M _{L0} ¹⁾ | 61 | 180 | 250 | 400 | 790 | - | - | - |
| |  | FLS R2002 ... 9. | 85 | C ¹⁾ | 8930 | 20700 | 26000 | 32100 | 46600 | - | - | - | |
| | | | | C ₀ ¹⁾ | 12800 | 29200 | 36600 | 46700 | 81100 | - | - | - | |
| | | | | M _t ¹⁾ | 86 | 260 | 370 | 560 | 1000 | - | - | - | |
| | | | | M _{t0} ¹⁾ | 120 | 370 | 520 | 810 | 1740 | - | - | - | |
| | | | M _L ¹⁾ | 85 | 240 | 370 | 520 | 900 | - | - | - | | |
| | |  | SLS R2012... 9. | 85 | M _{L0} ¹⁾ | 120 | 340 | 520 | 750 | 1560 | - | - | - |
| Aluminum ball runner block ⁷⁾ |  | FNS R1631 | 94 | C ¹⁾ | 9860 | 23400 | 28600 | 36500 | 51800 | - | - | - | |
| | | | | C ²⁾ | 8 850 | 22 200 | 26 700 | 34 800 | 49 400 | - | - | - | |
| | | | | F _{max} ^{1) 2)} | 3000 | 7200 | 8800 | 12200 | 16200 | - | - | - | |
| | | | | M _t ¹⁾ | 95 | 300 | 410 | 630 | 1110 | - | - | - | |
| | | | M _t ²⁾ | 85 | 280 | 380 | 600 | 1060 | - | - | - | | |
| | | | M _{tmax} ^{1) 2)} | 29 | 92 | 125 | 210 | 345 | - | - | - | | |
| | | | M _L ¹⁾ | 68 | 200 | 290 | 440 | 720 | - | - | - | | |
| | | | M _L ²⁾ | 62 | 190 | 270 | 420 | 700 | - | - | - | | |
| |  | SNS R1632 | 96 | M _{Lmax} ^{1) 2)} | 16 | 50 | 70 | 110 | 170 | - | - | - | |

The determination of the dynamic load ratings and load moments is based on a 100,000 m stroke according to DIN ISO14728-1. However, the values are often based on only 50 000 m. For comparison: Multiply the values **C**, **M_t** and **M_L** by 1.26 according to the table.

- 1) Ball runner block **without** ball chain.
- 2) Ball runner block **with** ball chain.
- 3) Steel: All steel parts made of carbon steel.
- 4) Resist NR size 15 – 35: Ball Runner Block body made of corrosion resistant steel as per DIN EN 10088.
- 5) Resist NR II: All steel components are made from corrosion resistant steel in accordance with DIN EN 10088.
- 6) Resist CR: Steel ball runner block body with corrosion resistant coating, matte-silver finish, hard chrome plated.
- 7) BSHP ball runner block
- 8) BSHP ball runner block size 25 only

For short product names of the design styles, see the product description

Product overview ball runner blocks with load ratings and load moments

| Ball runner blocks | | Page | Size | 15 | 20 | 25 | 30 | 35 | 45 | 55 | 65 | | |
|--|--|---|-------------------------|--|------------------------|--------------|---------------|--------------|--------------|--------------|----|---|---|
| | | | | Load ratings (N) and load moments (Nm) | | | | | | | | | |
| Ball runner blocks Resist NR II⁵⁾⁷⁾   | FNS R2001 ... 0. | 102 | C ¹⁾ | 5100 | 12300 | 15000 | 20800 | 27600 | - | - | - | | |
| | | | C ²⁾ | 4 700 | 11400 | 14000 | 19300 | 27600 | - | - | - | | |
| | | C₀ ¹⁾ | 9300 | 16900 | 21000 | 28700 | 37500 | - | - | - | | | |
| | | C₀ ²⁾ | 8 400 | 15000 | 18 900 | 25 800 | 37500 | - | - | - | | | |
| | | M_t ¹⁾ | 63 | 205 | 270 | 460 | 760 | - | - | - | | | |
| | | M_t ²⁾ | 58 | 190 | 250 | 425 | 760 | - | - | - | | | |
| | | M_{t0} ¹⁾ | 90 | 215 | 295 | 500 | 805 | - | - | - | | | |
| | | M_{t0} ²⁾ | 81 | 190 | 265 | 450 | 805 | - | - | - | | | |
| | | M_L ¹⁾ | 34 | 110 | 150 | 245 | 375 | - | - | - | | | |
| | | M_L ²⁾ | 31 | 100 | 140 | 225 | 375 | - | - | - | | | |
| | | M_{Lo} ¹⁾ | 49 | 115 | 165 | 265 | 390 | - | - | - | | | |
| | | M_{Lo} ²⁾ | 44 | 100 | 150 | 240 | 390 | - | - | - | | | |
| |  FLS R2002 ... 0.  SLS R2012 ... 0. | | 102 | C ¹⁾ | 8500 | 16000 | 20000 | 26300 | 36500 | - | - | - | |
| | | | | C ²⁾ | 7 600 | 15 200 | 18 100 | 25 000 | 34 800 | - | - | - | |
| | | C₀ ¹⁾ | 14000 | 24400 | 31600 | 40100 | 56200 | - | - | - | | | |
| | | C₀ ²⁾ | 12 100 | 22 500 | 27 400 | 37300 | 52500 | - | - | - | | | |
| | | M_t ¹⁾ | 82 | 265 | 365 | 590 | 1025 | - | - | - | | | |
| | | M_t ²⁾ | 73 | 250 | 330 | 560 | 975 | - | - | - | | | |
| | | M_{t0} ¹⁾ | 132 | 310 | 450 | 695 | 1210 | - | - | - | | | |
| | | M_{t0} ²⁾ | 118 | 295 | 410 | 660 | 1 150 | - | - | - | | | |
| | | M_L ¹⁾ | 64 | 190 | 290 | 420 | 710 | - | - | - | | | |
| | | M_L ²⁾ | 58 | 180 | 265 | 400 | 675 | - | - | - | | | |
| | | M_{Lo} ¹⁾ | 104 | 230 | 350 | 495 | 840 | - | - | - | | | |
| | | M_{Lo} ²⁾ | 93 | 215 | 320 | 470 | 805 | - | - | - | | | |
|  FKS R2000 ... 0.  SKS R2010 ... 0. | | | 102 | C ¹⁾ | 4500 | 8200 | 10500 | 14500 | 19300 | - | - | - | |
| | | | | C ²⁾ | 3900 | 8200 | 9 200 | 14500 | 19300 | - | - | - | |
| | | C₀ ¹⁾ | 5600 | 9400 | 12600 | 17200 | 22400 | - | - | - | | | |
| | | C₀ ²⁾ | 4 600 | 9400 | 10500 | 17200 | 22400 | - | - | - | | | |
| | | M_t ¹⁾ | 44 | 125 | 195 | 320 | 545 | - | - | - | | | |
| | | M_t ²⁾ | 37 | 125 | 175 | 320 | 545 | - | - | - | | | |
| | | M_{t0} ¹⁾ | 55 | 115 | 180 | 295 | 485 | - | - | - | | | |
| | | M_{t0} ²⁾ | 48 | 115 | 160 | 295 | 485 | - | - | - | | | |
| | | M_L ¹⁾ | 16 | 45 | 70 | 110 | 170 | - | - | - | | | |
| | | M_L ²⁾ | 13 | 45 | 60 | 110 | 170 | - | - | - | | | |
| | | M_{Lo} ¹⁾ | 19 | 40 | 65 | 105 | 150 | - | - | - | | | |
| | | M_{Lo} ²⁾ | 16 | 40 | 55 | 105 | 150 | - | - | - | | | |
| | Wide ball runner blocks made of steel³⁾⁷⁾ Resist CR⁶⁾⁷⁾   | BNS R1671³⁾⁶⁾ | 126³⁾ | 126⁶⁾ | C ¹⁾ | - | 14900 | 36200 | - | 70700 | - | - | - |
| | | | | | C ²⁾ | - | 13 700 | 33 700 | - | - | - | - | - |
| | | C₀ ¹⁾ | - | 20600 | 50200 | - | 126000 | - | - | - | - | | |
| | | C₀ ²⁾ | - | 18 200 | 45 200 | - | - | - | - | - | - | | |
| | | M_t ¹⁾ | - | 340 | 1350 | - | 3500 | - | - | - | - | | |
| | | M_t ²⁾ | - | 310 | 1 260 | - | - | - | - | - | - | | |
| | | M_{t0} ¹⁾ | - | 470 | 1870 | - | 6240 | - | - | - | - | | |
| | | M_{t0} ²⁾ | - | 410 | 1 680 | - | - | - | - | - | - | | |
| | | M_L ¹⁾ | - | 140 | 490 | - | 1470 | - | - | - | - | | |
| | | M_L ²⁾ | - | 130 | 460 | - | - | - | - | - | - | | |
| | | M_{Lo} ¹⁾ | - | 190 | 680 | - | 2620 | - | - | - | - | | |
| | | M_{Lo} ²⁾ | - | 170 | 620 | - | - | - | - | - | - | | |












The determination of the dynamic load ratings and load moments is based on a 100,000 m stroke according to DIN ISO14728-1. However, the values are often based on only 50 000 m. For comparison: Multiply the values **C**, **M_t** and **M_L** by 1.26 according to the table.

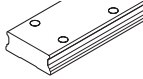
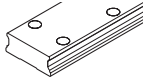
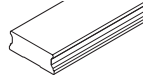
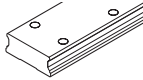
- 1) Ball runner block **without** ball chain.
- 2) Ball runner block **with** ball chain.
- 3) Steel: All steel parts made of carbon steel.
- 4) Resist NR size 15 – 35: Ball Runner Block body made of corrosion resistant steel as per DIN EN 10088.
- 5) Resist NR II: All steel components are made from corrosion resistant steel in accordance with DIN EN 10088.
- 6) Resist CR: Steel ball runner block body with corrosion resistant coating, matte-silver finish, hard chrome plated.
- 7) BSHP ball runner block
- 8) BSHP ball runner block size 25 only

For short product names of the design styles, see the product description

Product overview ball guide rails with rail lengths

Ball guide rails can be cut to length as desired by the customer. The maximum lengths for a one-piece rail section can be found in the following table and in the “Ball guide rails” section. If longer rails are required, Bosch Rexroth will supply them as multi-piece ball guide rails.

| Ball guide rails | | Page | Size | | | | | | | |
|--|--|------------|------------------|-------|-------|-------|-------|-------|-------|-------|
| | | | 15 | 20 | 25 | 30 | 35 | 45 | 55 | 65 |
| | | | Rail length (mm) | | | | | | | |
| Standard ball guide rails made of steel  | SNS / SNO R1605 .3. .. / R1605 .B. .. For mounting from above with cover strip and strip clamps | 110 | 3 836 | 5 816 | 5 816 | 5 836 | 5 836 | 5 771 | 3 836 | 3 746 |
| |  SNS / SNO R1605 .6. .. / R1605 .D. .. For mounting from above with cover strip and protective caps | 112 | 3 836 | 5 816 | 5 816 | 5 836 | 5 836 | 5 771 | 3 836 | 3 746 |
| |  SNS / SNO R1605 .0. .. / R1605 .C. .. For mounting from above with plastic mounting hole plugs | 114 | 3 836 | 5 816 | 5 816 | 5 836 | 5 836 | 5 771 | 3 836 | 3 746 |
| |  SNS R1606 .5. .. For mounting from above, for mounting hole plugs made of steel | 116 | – | – | 5 816 | 5 836 | 5 836 | 5 771 | 3 836 | 3 746 |
| |  SNS R1607 .0. .. For mounting from below | 118 | 3 836 | 5 816 | 5 816 | 5 836 | 5 836 | 5 771 | 3 836 | 3 746 |
| Standard ball guide rails Resist NR II¹⁾  | SNS R2045 .3. .. For mounting from above with cover strip and strip clamps | 120 | 1 856 | 3 836 | 3 836 | 3 836 | 3 836 | – | – | – |
| |  SNS R2045 .0. .. For mounting from above with plastic mounting hole plugs | 121 | 1 856 | 3 836 | 3 836 | 3 836 | 3 836 | – | – | – |
| |  SNS R2047 .0. .. For mounting from below | 121 | 1 856 | 3 836 | 3 836 | 3 836 | 3 836 | – | – | – |
| Standard ball guide rails Resist CR²⁾  | SNS R1645 .3. .. For mounting from above with cover strip and strip clamps | 122 | 3 836 | 3 836 | 3 836 | 3 836 | 3 836 | 3 776 | 3 836 | 3 746 |
| |  SNS R1645 .0. .. For mounting from above with plastic mounting hole plugs | 123 | 3 836 | 3 836 | 3 836 | 3 836 | 3 836 | 3 776 | 3 836 | 3 746 |
| |  SNS R1647 .0. .. For mounting from below | 123 | 3 836 | 3 836 | 3 836 | 3 836 | 3 836 | 3 776 | 3 836 | 3 746 |

| Ball guide rails | | Page | Size | | |
|---|--|------------------|-------|-------|-------|
| | | | 20/40 | 25/70 | 35/90 |
| | | Rail length (mm) | | | |
| Wide ball guide rails made of steel  | BNS R1675 .0. ... For mounting from above with plastic mounting hole plugs | 134 | 3 836 | 3 836 | 3 836 |
| |  BNS R1676 .5. ... For mounting from above, for mounting hole plugs made of steel | 136 | – | 3 836 | 3 836 |
| |  BNS R1677 .0. ... For mounting from below | 137 | 3 836 | 3 836 | 3 836 |
| Wide ball guide rails Resist CR²⁾  | BNS R1673 .0. ... For mounting from above with plastic mounting hole plugs | 134 | 3 836 | 3 836 | 3 836 |

- 1) Resist NR II: Ball guide rail made of corrosion resistant steel as per DIN EN 10088
- 2) Resist CR: Ball guide rail made of steel with corrosion resistant coating, matte-silver finish, hard chrome plated

For short product names of the design styles, see the product description

General technical data and calculations

General notes

The general technical data and calculations apply to all ball rail systems i.e. to all ball runner blocks and ball guide rails. Specific technical data relating to the individual ball runner blocks and ball guide rails is given separately.

Preload classes

To cover the widest possible range of applications, Rexroth ball runner blocks are available in different preload classes.

The following preload classes are available:

- ▶ ball runner block without preload (preload class C0)
- ▶ ball runner blocks with moderate preload (preload class C1)
- ▶ ball runner blocks with average preload (preload class C2)
- ▶ ball runner blocks with high preload (preload class C3)

To prevent reductions to the service life, the preload should not exceed 1/3 of the load on bearing F.

In general, the rigidity of the ball runner block rises with increasing preload. If vibrations occur, select a correspondingly high preload (\geq preload class C2).

Guide systems with parallel rails

When choosing the preload class, also pay attention to the permissible parallelism offset of the rails ("Accuracy class selection criterion"). When assembling ball rail systems of accuracy class N, we recommend preload class C0 or C1 in order to avoid distortive stress due to the tolerances.

Travel speed

$$v_{\max} : 3-10 \text{ m/s}$$

For exact values, see the individual ball runner blocks.

Acceleration

$$a_{\max} : 250-500 \text{ m/s}^2$$

For exact values, see the individual ball runner blocks.

(If $F_{\text{comb}} > 2.8 \cdot F_{\text{pr}} : a_{\max} = 50 \text{ m/s}^2$)

If preload force F_{pr} is canceled, $a_{\max} = 50 \text{ m/s}^2$ applies

Operating temperature range

$$t : 0-80 \text{ }^{\circ}\text{C}$$

Up to 100°C is permissible for a short time.

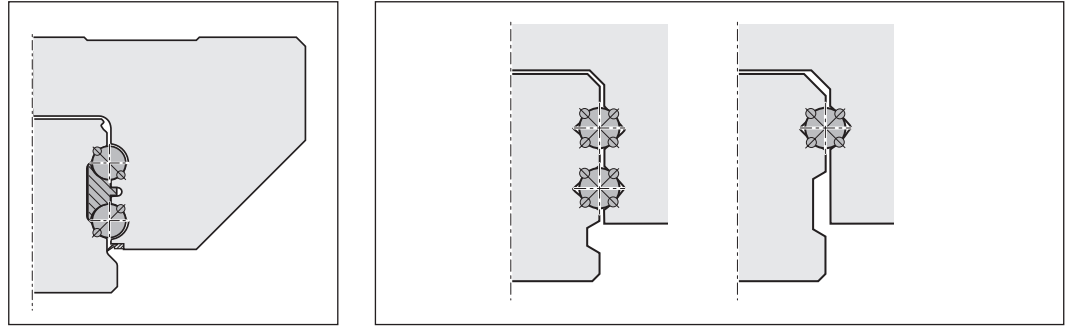
For operation at negative temperatures, please consult us.

For ball runner blocks without ball chain:

Lower limit - 10 °C.

Friction

The friction coefficient μ of Rexroth's ball rail system is approximately 0.002 to 0.003 (without the friction of the seal).



Due to the Rexroth design with four rows of balls, there are always **two points of contact** in all the directions of loading. This reduces the friction to a minimum.

Other ball rails with two or four rows of balls with **four points of contact** have multiple friction: due to the differential slip with lateral loading and with a comparable preload without load, the gothic raceway profile causes higher friction (depending on the conformity and the load, up to five times the friction coefficient). This high friction leads correspondingly to greater heat.

Seals

Seals are used to prevent dirt, chips and coolants, etc. from working their way into the inside of the ball runner block, thereby preventing reductions to its service life. For further information, see "Selection criteria/seals".

Standard seal (SS)

Universal seals are fitted as standard in Rexroth ball runner blocks. They have a uniform sealing effect for ball guide rails with and without cover strips. Low friction and a good sealing effect have both been taken into account in the design. For applications where effective sealing is required.

Low-friction (LS)

For special requirements with regard to ease of movement.

Double-lip seal (DS)

For increased exposure to media

Front seal

For applications in environments with fine dirt or metal particles, as well as coolants or cutting fluids.

Interchangeable during servicing.

Front seals are available as accessories for mounting by the customer.

FKM seal

For applications in extreme environments with fine dirt or metal particles, as well as heavy use of coolants or cutting fluids.

Interchangeable during servicing.

FKM front seals are available as accessories for mounting by the customer.

Cover plate wiper

For use in environments with coarse dirt or chips.

Cover plate wiper are available as accessories for mounting by the customer.

General technical data and calculations

How to select a linear guide system according to DIN 637 is described on page 10. The necessary calculations are explained in the following chapter. They are integrated in the “Linear Motion Designer” calculation program. You will find the link to the download in the chapter “further information”.

Forces and moments

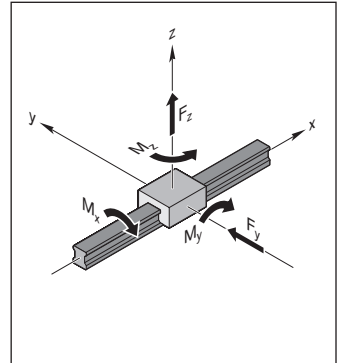
In Rexroth ball rail systems the raceways are arranged at a pressure angle of 45°. This results in the same high load capacity of the entire system in all four main directions of loading. The ball runner blocks may be subjected to both forces and load moments.

Forces in the four main directions of loading

- ▶ Tension F_z (positive z-direction)
- ▶ Pressure $-F_z$ (negative z-direction)
- ▶ Side load F_y (positive y-direction)
- ▶ Side load $-F_y$ (negative y-direction)

Moments

- ▶ Torsional moment M_x (around the y-axis)
- ▶ Longitudinal moment M_y (around the y-axis)
- ▶ Longitudinal moment M_z (around the z-axis)



Definition of load capacities

Dynamic load capacity C

The radial load (whose extent and direction does not change) that a linear anti-friction bearing can theoretically absorb for a nominal life covering 10^5 m (according to DIN ISO 14728-1).

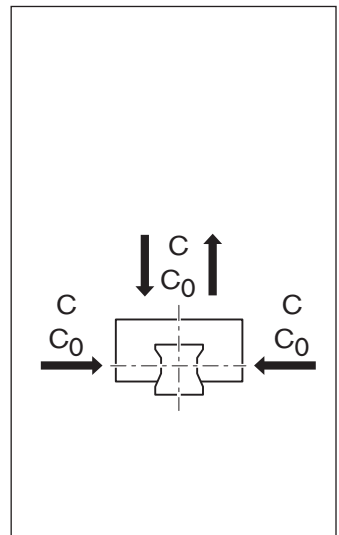
Note: The dynamic load capacities in the tables are above the DIN or ISO values.

These values have been confirmed in tests.

Static load rating C_0

Static load in the load direction that corresponds to a calculated load in the center of the contact point with the greatest load between the ball and raceway of 4200 MPa.

Note: With this stress at the contact point, permanent overall deformation of the ball and the track zone occurs that corresponds to about 0.0001 times the ball diameter (according to DIN ISO 14 728-1).



Definition of load moment capacities

Dynamic torsional moment load capacity M_t

Comparative dynamic moment around the X-axis, which causes a load equivalent to the dynamic load capacity C.

Static torsional moment load capacity M_{t0}

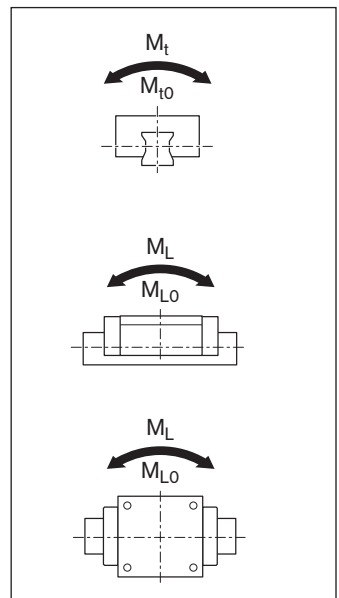
The comparable static moment around the x-axis that induces a load corresponding to the static load capacity C_0 .

Dynamic longitudinal moment load capacity M_L

The dynamic comparable dynamic moment around the transverse axis y or the vertical axis z that induces a load corresponding to the dynamic load capacity C.

Static longitudinal moment load capacity M_{L0}

The static comparable dynamic moment around the transverse axis y or the vertical axis z that induces a load corresponding to the static load capacity C_0 .



Definition and calculation of the nominal service life

The calculated service life which an individual linear rolling bearing, or a group of apparently identical rolling element bearings operating under the same conditions, can attain with a 90% probability, with contemporary, commonly used materials and manufacturing quality under conventional operating conditions (as per ISO 14728-1).

Nominal life in meters

$$(1) L_{10} = \left(\frac{C}{F_m} \right)^3 \cdot 10^5 \text{ m}$$

Service life in operating hours with constant stroke and constant stroke repetition rate

$$(2) L_{h10} = \frac{L_{10}}{2 \cdot s \cdot n \cdot 60}$$

If the stroke length s and the stroke repetition rate n are constant over the total service life, you can use formula (2) to determine the service life in operating hours.

Nominal service life at variable travel speed

$$(3) L_{h10} = \frac{L_{10}}{60 \cdot v_m}$$

As an alternative, it is possible to use formula (3) to calculate the service life in operating hours using the average travel speed v_m .

This average travel speed v_m is calculated with speeds that can be changed on a stepwise basis using discrete time steps q_{tn} of the individual load stages (4).

$$(4) v_m = \frac{|v_1| \cdot q_{t1} + |v_2| \cdot q_{t2} + \dots + |v_n| \cdot q_{tn}}{100\%}$$

Modified life expectancy

$$L_{na} = a_1 \cdot \left(\frac{C}{F_m} \right)^3 \cdot 10^5 \text{ m}$$

If a 90 percent requisite reliability is not enough, you must reduce the service life values by a factor of a_1 in accordance with the table below.

$$L_{ha} = \frac{L_{na}}{2 \cdot s \cdot n \cdot 60}$$

| Requisite reliability (%) | L_{na} | Factor a_1 |
|---------------------------|-----------|--------------|
| 90 | L_{10a} | 1.00 |
| 95 | L_{5a} | 0.64 |
| 96 | L_{4a} | 0.55 |
| 97 | L_{3a} | 0.47 |
| 98 | L_{2a} | 0.37 |
| 99 | L_{1a} | 0.25 |

Notes

DIN ISO 14728-1 limits the validity of the formula (1) to dynamically equivalent loads $F_m < 0.5$. However, in our tests we verified that under ideal operating conditions this service life formula can be applied up to loads of $F_m = C$. Under some circumstances, with stroke lengths below $2 \cdot$ ball runner block length B_1 (see the dimension tables) a load rating reduction may be required. Please consult us.

General technical data and calculations

Load on bearing for calculating the service life

Note

In general, both the static and dynamic load ratios should not be below the minimum value of 4.0. In the case of applications that place high demands on rigidity and/or the service life, a higher load ratio is required. With tensile loads, check the screw stability. See the chapter entitled "Instruction for mounting".

Dynamic load ratio

$$\frac{C}{F_{m', \max}}$$

Static load ratio

$$\frac{C_0}{F_{\text{eff}, \max}}$$

Combined equivalent bearing load

In the case of a combined vertical and horizontal external load, calculate the dynamic equivalent load F_{comb} according to formula (5).

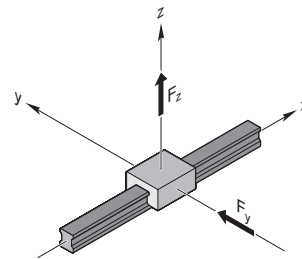
Note

The structure of the ball rail system permits this simplified calculation.

Note

Reduce an external load that affects the ball runner block at any angle with the correct sign to F_y and F_z and insert the amounts into formula (5) or (6).

$$(5) \quad F_{\text{comb}} = |F_y| + |F_z|$$



Combined equivalent load on bearing in conjunction with moments

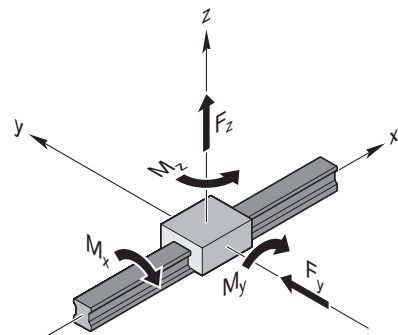
Using formula (6), you can combine all the partial loads that occur in a load case into one single comparison load, i.e. the combined equivalent load on bearing.

Notes

Including moments as stated in formula (6) only applies to an individual ball guide rail with just one ball runner block. The formula is simpler for other combinations.

The forces and moments plotted in the coordinate system can also have an effect in the opposite direction. Reduce an external load that affects the ball runner block at any angle to F_y and F_z and insert the amounts into formula (6). The structural design of the ball runner blocks allows this simplified calculation.

$$(6) \quad F_{\text{comb}} = |F_y| + |F_z| + C \cdot \frac{|M_x|}{M_t} + C \cdot \frac{|M_y|}{M_L} + C \cdot \frac{|M_z|}{M_L}$$

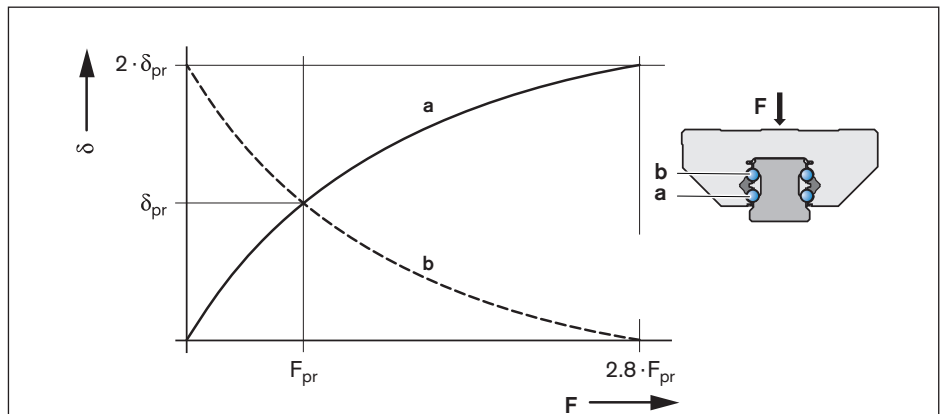


Considering the internal

Preload force F_{pr}

To increase the rigidity and precision of the guide system, it is advisable to use preloaded ball runner blocks (cf. “System preload selection criterion”).

When using ball runner blocks of preload classes C2 and C3, it may be necessary to consider the internal preload force; this is because both rows of balls a and b are preloaded against one another by a specific oversize at an internal preload force F_{pr} and deform by the amount δ_{pr} (see the diagram).



- a = Loaded (lower) row of balls (N)
- b = Non-loaded (upper) row of balls (N)
- δ = Deformation of rolling contact at F (-)
- δ_{pr} = Deformation of rolling contact at F_{pr} (-)
- F = Load on the ball runner block (N)
- F_{pr} = Internal preload force (N)

Effective equivalent load on bearing

From an external load amounting to 2.8 times the internal preload force F_{pr} onward, a row of balls becomes preload-free.

Note

Under highly dynamic load conditions, the combined equivalent bearing load should be $F_{comb} < 2.8 \cdot F_{pr}$ to prevent damage to anti-friction bearings due to slippage.

$$(7) \quad F_{eff} = F_{comb}$$

Case 1

$F_{comb} > 2.8 \cdot F_{pr}$
In this case, the internal preload force F_{pr} does not affect the service life.

$$(8) \quad F_{eff} = \left(\frac{F_{comb}}{2.8 \cdot F_{pr}} + 1 \right)^{3/2} \cdot F_{pr}$$

Case 2

$F_{comb} \leq 2.8 \cdot F_{pr}$
The preload force F_{pr} is included in the calculation of the effective equivalent load on bearing.

General technical data and calculations

Dynamic equivalent load on bearing

The determination of the dynamic equivalent load on bearing F_m for the calculation of the service life is implemented according to track ratios q_m according to formula (9).

$$(9) \quad F_m = \sqrt[3]{(F_{\text{eff } 1})^3 \cdot \frac{q_{s1}}{100 \%} + (F_{\text{eff } 2})^3 \cdot \frac{q_{s2}}{100 \%} + \dots + (F_{\text{eff } n})^3 \cdot \frac{q_{sn}}{100 \%}}$$

Equivalent static load on bearing

With a combined vertical and horizontal external static load in conjunction with a static torsional or longitudinal moment, calculate the static equivalent load on bearing $F_{0 \text{ comb}}$ according to formula (10).

$$(10) \quad F_{0 \text{ comb}} = |F_{0y}| + |F_{0z}| + C_0 \cdot \frac{|M_{0x}|}{M_{t0}} + C_0 \cdot \frac{|M_{0y}|}{M_{L0}} + C_0 \cdot \frac{|M_{0z}|}{M_{L0}}$$

Notes

The static equivalent load on bearing $F_{0 \text{ comb}}$ must not exceed the static load capacity C_0 . Formula (10) only applies when using a single ball guide rail. Reduce an external load that affects the ball runner block at any angle to F_{0y} and F_{0z} and insert the amounts into formula (10).

Definitions and calculation for dynamic and static load ratios

Using the ratio of load rating to load of the ball runner blocks, you can make a preselection of the guideway. The dynamic loading ratio C/F_{max} and the static loading ratio $C_0/F_{0 \text{ max}}$ should be selected according to the application. The necessary load ratings are calculated from this. The load rating overview yields the corresponding dimensions and format.

Recommended values for load ratios

The table below contains guideline values for the load ratios. The values are offered merely as a rough guide reflecting typical customer requirements (e.g. service life, accuracy, rigidity) by sector and application.

Case 1: Static load $F_{0 \text{ max}} > F_{\text{max}}$:

Case 2: Static load $F_{0 \text{ max}} < F_{\text{max}}$:

$$\text{Dynamic ratio} = \frac{C}{F_{\text{max}}}$$

$$\text{Static ratio} = \frac{C_0}{F_{0 \text{ max}}}$$

$$\text{Static ratio} = \frac{C_0}{F_{\text{max}}}$$

| Machine type/sector | Application example | C/Fmax | C ₀ /F _{0max} |
|--|---------------------|----------|-----------------------------------|
| Machine tools | General | 6 ... 9 | > 4 |
| | Turning | 6 ... 7 | > 4 |
| | Milling | 6 ... 7 | > 4 |
| | Grinding | 9 ... 10 | > 4 |
| | Engraving | 5 | > 3 |
| Rubber and plastics processing machinery | Injection molding | 8 | > 2 |
| Woodworking and wood processing machines | Sawing, milling | 5 | > 3 |
| Area of mounting/handling technology and industrial robots | Handling | 5 | > 3 |
| Oil hydraulics and pneumatics | Lifting/lowering | 6 | > 4 |

Static load safety factor S_0

You must verify mathematically any structural design involving rolling contact with regard to the static load safety factor. The static load safety factor for a linear guide results from the following equation:

$$S_0 = \frac{C_0}{F_{0 \max}}$$

In this connection, $F_{0 \max}$ represents the maximum load amplitude that can occur, which can affect the linear guide. It does not matter whether this load is exerted only for a short period. It may represent the peak amplitude of an overall dynamic loading. For dimensioning, the data shown in the table applies.

| Static load safety factor S_0 | Conditions of use |
|---|-------------------|
| Overhead hanging arrangements or applications with serious potential risks | ≥ 12 |
| High dynamic load when at standstill, contamination. | 8 – 12 |
| Normal dimensioning of machinery and plant without full knowledge of the load parameters or connection details. | 5 – 8 |
| Full knowledge of all the load data. Vibration-free operation is ensured. | 3 – 5 |


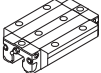


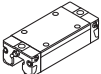


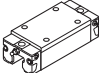




Key to formulas

| Formula | Unit | Designation |
|-----------------------|------|---|
| a_1 | – | Life expectancy factor |
| C | N | Dynamic load capacity |
| C_0 | N | Static load capacity |
| F_{\max} | N | Maximum dynamic load |
| $F_{0 \max}$ | N | Maximum static load |
| F_{comb} | N | Combined equivalent bearing load |
| $F_{0 \text{comb}}$ | N | Equivalent static load on bearing |
| F_{eff} | N | Effective equivalent load on bearing |
| $F_{\text{eff } 1-n}$ | N | Uniform effective individual loads |
| F_m | N | Dynamic equivalent load on bearing |
| F_{pr} | N | Preload force |
| F_y | N | External load due to a resulting force in the y-direction |
| F_{0y} | N | External load due to a static force in the y-direction |
| F_z | N | External load due to a resulting force in the z-direction |
| F_{0z} | N | External load due to a static force in the z-direction |
| M_t | Nm | Dynamic torsional moment load capacity ¹⁾ |
| M_{t0} | Nm | Static torsional moment load capacity ¹⁾ |
| M_L | Nm | Dynamic longitudinal moment load capacity ¹⁾ |
| M_{L0} | Nm | Static longitudinal moment load capacity ¹⁾ |
| M_x | Nm | Load due to the resultant moment around the x-axis |

| Formula | Unit | Designation |
|-----------------------|-------------------|---|
| M_{0x} | Nm | Load due to the static moment around the x-axis |
| M_y | Nm | Load due to the resultant moment around the y-axis |
| M_{0y} | Nm | Load due to the static moment around the y-axis |
| M_z | Nm | Load due to the resultant moment around the z-axis |
| M_{0z} | Nm | Load due to the static moment around the z-axis |
| L_{10} | m | Nominal life (travel range) |
| $L_{h 10}$ | h | Nominal life (time) |
| L_{na} | m | Modified life expectancy (travel range) |
| L_{ha} | h | Modified life expectancy (time) |
| n | min^{-1} | Stroke repetition rate (full cycles) |
| s | m | Stroke length |
| S_0 | – | Static load safety factor |
| v_m | m/min | Average linear speed |
| $v_1 \dots v_n$ | m/min | Travel speeds of phases 1 ... n |
| $q_{t1} \dots q_{tn}$ | % | Discrete time steps for $v_1 \dots v_n$ of phases 1 ... n |







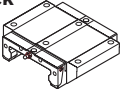
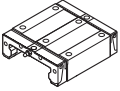
Refer to the table for the values

Design and version


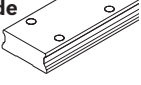
| Ball runner blocks | | Application area | Load-bearing capacity | Special feature | |
|---|---|---|---|-----------------------------|---|
| Standard ball runner block made of steel |  | FNS R1651 ¹⁾²⁾⁵⁾ R2001 ³⁾⁴⁾ | For high rigidity requirements | High (H) | For mounting from above and below |
| |  | FLS R1653 ¹⁾²⁾⁵⁾ R2002 ³⁾ | For the most demanding rigidity requirements | Very high | For mounting from above and below |
| |  | FKS R1665 R2000 ³⁾ | For restricted space in the longitudinal direction | Middle | For mounting from above and below Supplementary to DIN 645-1 |
| |  | SNS R1622 ¹⁾²⁾⁵⁾ R2011 ³⁾⁴⁾ | For restricted space in the transverse direction | High (H) | For mounting from above |
| |  | SLS R1623 ¹⁾²⁾⁵⁾ R2012 ³⁾ | For restricted space in the transverse direction | Very high | For mounting from above |
| |  | SKS R1666 R2010 ³⁾ | For restricted space in longitudinal and transverse direction | Middle | For mounting from above |
| |  | SNH R1621 ¹⁾²⁾⁵⁾ | For restricted space in the transverse direction and high rigidity requirements | High (H) | Higher rigidity than SNS |
| |  | SLH R1624 ¹⁾²⁾⁵⁾ | For restricted space in the transverse direction and high rigidity requirements | Very high | Higher rigidity than SLS |
| | Standard ball runner block made of steel and Resist CR |  | FNN R1693 ²⁾ | For restricted upward space | High (H) |
|  | | FKN R1663 ²⁾ | For cases of restricted space availability in the upward and longitudinal direction | Middle | Lower rigidity than FKS Not defined in DIN 645-1 |
|  | | SNN R1694 ²⁾ | For restricted upward and longitudinal space | High (H) | Lower rigidity than SNS Not defined in DIN 645-1 |
|  | | SKN R1664 ²⁾ | For restricted space in the upward, longitudinal and transverse direction | Middle | Lower rigidity than SKS Not defined in DIN 645-1 |

- 1) Heavy-duty ball runner block
- 2) BSHP ball runner block
- 3) Resist NR
- 4) Resist NR II
- 5) Resist CR

For short product names of the design styles, see the product description

| Ball runner blocks | | Application area | Load-bearing capacity | Special feature |
|---|---|--|-----------------------|---|
| Super ball runner block made of steel and Resist CR  | FKS R1661 | For compensating large tolerances in the adjoining structure | Middle | At least 2 ball runner blocks required per rail |
| | SKS R1662  | For compensating large tolerances in the adjoining structure | Middle | At least 2 ball runner blocks required per rail |
| Aluminum ball runner block  | FNS R1631²⁾ | For light-weight construction type for compensating low tolerances with connected structures | High (H) | For mounting from above and below |
| | SNS R1632²⁾  | For light-weight construction type for compensating low tolerances with connected structures | High (H) | For mounting from above |
| High-speed ball runner block made of steel  | FNS R2001 ... 9.2) | For maximum travel speeds (up to 10 m/s) | High (H) | For mounting from above and below |
| | SNS R2011 ... 9.2)  | For maximum travel speeds (up to 10 m/s) | High (H) | For mounting from above |
| Wide Ball Runner Block made of steel and Resist CR  | BNS R1671²⁾ | For high torsional moments on rails | Very high | For mounting from above and below |
| | CNS R1672²⁾  | For high torsional moments on rails with restricted lateral space | Very high | For mounting from above |

Design and version

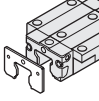
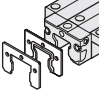
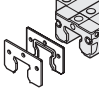
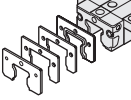
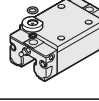
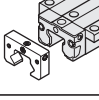
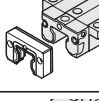
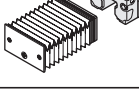
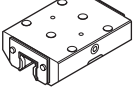
| Ball guide rails | | Application area | Fastening type | Special feature |
|---|--|--|-------------------------|--|
| Standard ball guide rail made of steel  | SNS / SNO R1605 .3. .. R1605 .B. .. R1645 .3. ..²⁾ R2045 .3. ..¹⁾ | Standard version Very harsh environments Robust strip clamp | For mounting from above | With cover strip and strip clamp. A single cover for all holes. No end-face hole required for strip clamp. |
| | SNS / SNO R1605 .6. .. R1605 .D. .. | Harsh environments Compact strip clamp | For mounting from above | With cover strip and protective cap. A single cover for all holes. |
| | SNS / SNO R1605 .0. .. R1605 .C. .. R1645 .0. ..²⁾ R2045 .0. ..¹⁾ | Inexpensive | For mounting from above | With plastic mounting hole plugs. No extra space required at rail ends. |
| | SNS R1606 .5. .. | More resistant to mechanical influences (e.g. shocks) Very harsh environments | For mounting from above | With steel mounting hole plugs. No extra space required at rail ends. |
| | SNS R1607 .0. .. R1647 .0. ..²⁾ R2047 .0. ..¹⁾ | Easy access to the mounting base underside, best sealing action of end seals | For mounting from below | Use of larger screws than for mounting from above. Greater side loads permitted. No extra space required at rail ends. |
| Wide ball guide rails made of steel  | BNS R1675 .0. .. R1673 .0. ..²⁾ | High moment rigidity | For mounting from above | With plastic mounting hole plugs. No extra space required at rail ends. |
| | BNS R1676 .5. .. | More moment rigidity, more resistant to mechanical influences (e.g. shocks) Very harsh environments | For mounting from above | With steel mounting hole plugs. No extra space required at rail ends. |
| | BNS R1677 .0. .. | High moment rigidity Best sealing action of end seals | For mounting from below | Use of larger screws than for mounting from above. Larger side loads are permitted than for the single-row series. No extra space required at rail ends. |

1) Resist NR II

2) Resist CR

For short product names of the design styles, see the product description

Accessories

| Accessories Connection elements are available as options for the ball runner blocks | Application area |
|--|--|
| Cover plate wiper  | The cover plate wiper is an additional element for wiping off coarse particles or dealing with contamination that has been deposited on the ball guide rail. When making your selection, please note whether the ball guide rail is used with or without cover strips. |
| Front seal Two-piece  | The front seal effectively prevents dirt, liquid or small particles from entering the ball runner block. This means that the sealing effect is improved even more. The two-part front seal can also be retrofitted via the ball guide rail. |
| FKM seal One and two-piece  | Better sealing effect than front seal but higher friction. Used for very heavy contamination, cooling lubricants or aggressive media. Chemical and temperature resistant. |
| Seal kit  | When using cover plate wiper and front seal simultaneously, the seal kit is recommended. |
| Lubrication adapter  | For oil and grease lubrication from above for SNH and SLH ball runner blocks (high versions). |
| Lubrication plate  | Enables further variations for lubrication of ball runner blocks; Available for lube connection with metric thread or pipe thread. |
| Front lube unit  | For applications requiring very long relubrication intervals. They allow travel distances of up to 25,000 km without relubrication under normal loads. The function is only assured where there is no exposure to liquids and little contamination. The maximum operating temperature is 60 °C. |
| Bellows  | Bellows are available in various versions, with or without lubrication plate. Bellows in heat-resistant design are metalized on one side and are therefore not flammable, resistant to sparks, welding spatter or hot chips. Temperature stability briefly up to 200 °C and operating temperature of 80 °C possible. |
| Clamping and braking units  | Clamping elements can be used to secure the ball rail system against displacement in the static state. With braking units, the ball rail system can be braked in the dynamic state and secured against displacement in the resting state. The following versions are available: Hydraulic, pneumatic and manual clamping units. |

System preload

Definition of preload

Ball Runner Blocks can be preloaded to increase rigidity. The internal preload forces that occur in this connection must be considered in the life expectancy calculation. You can choose the preload class to match the area of application. Refer to the table for preload force F_{pr} .

Example

- ▶ Area of application: Precise guide systems with low external load and high overall rigidity requirements. This results in preload class C1.
- ▶ Selected ball runner block FNS R1651 314 20
- ▶ The selected ball runner block yields a preload force F_{pr} according to the table.
- ▶ It is installed at 840 N internal preload force F_{pr} .

| Code | Preload | Application area |
|------------------------|------------------------------------|--|
| C0¹⁾ | Without preload (clearance) | For particularly smooth-running guide systems with the lowest possible friction for applications with large installation tolerances. Clearance versions are available only in accuracy classes N and H. |
| C1 | Moderate preload | For precise guide systems with low external loads and high demands on overall rigidity. |
| C2 | Medium preload | For precise guide systems with both high external loading and high demands on overall rigidity; also recommended for single-rail systems. Above average moment loads can be absorbed without significant elastic deflection. Further improved overall rigidity with only medium moment loads. |
| C3 | High preload | For highly rigid guide systems, e.g. precision tooling machines etc. Above-average loads and moments are caught with the lowest possible elastic deformation. Ball runner blocks with preload C3 only available in accuracy classes UP, SP and XP, heavy duty ball runner blocks only available in UP, SP and P. |

1) In the case of ball runner blocks without preload (preload class C0), there is a clearance between the ball runner block and the rail of 1 to 10 μm . When using two rails and more than one ball runner block per guide rail, this clearance is usually equalized by parallelism tolerances.

Preload force F_{pr}

| Ball runner blocks | Material numbers | Format | Preload class | Size | | | | | | | | |
|---|---|---|------------------|----------------------------|-------|-------|-------|-------|--------|--------|-------|--|
| | | | | 15 | 20 | 25 | 30 | 35 | 45 | 55 | 65 | |
| | | | | Preload force F_{pr} (N) | | | | | | | | |
| Standard ball runner blocks Heavy-duty ball runner blocks - Steel ³⁾ - Resist NR ⁴⁾ - Resist CR ⁶⁾ | R1651 ³⁾⁶⁾ R2001 ⁴⁾ | FNS | C1 ¹⁾ | 160 | 380 | 460 | 630 | 840 | 1 360 | 1 960 | 2 460 | |
| | R1622 ³⁾⁶⁾ R2011 ⁴⁾ | SNS | C1 ²⁾ | 150 | 350 | 430 | 590 | 840 | 1 270 | | | |
| | R1621 ³⁾⁶⁾ | SNH | C2 ¹⁾ | 620 | 1500 | 1 820 | 2 540 | 3 350 | 5 450 | 7 860 | 9 840 | |
| | | | C2 ²⁾ | 580 | 1390 | 1700 | 2 340 | 3 350 | 5 060 | | | |
| | | | C3 ¹⁾ | 1 010 | 2 440 | 2 960 | 4 120 | 5 450 | 8 850 | 12800 | 16000 | |
| | | | C3 ²⁾ | 950 | 2 260 | 2 770 | 3 810 | 5 450 | 8 230 | | | |
| | | | | | | | | | | | | |
| | R1653 ³⁾⁶⁾ R2002 ⁴⁾ | FLS | C1 ¹⁾ | 200 | 490 | 610 | 800 | 1110 | 1 810 | 2 480 | 3 260 | |
| | R1623 ³⁾⁶⁾ R2012 ⁴⁾ | SLS | C1 ²⁾ | 180 | 460 | 550 | 760 | 1060 | 1 640 | | | |
| | R1624 ³⁾⁶⁾ | SLH | C2 ¹⁾ | 800 | 1 950 | 2 430 | 3 200 | 4 450 | 7 230 | 9940 | 13000 | |
| | | | C2 ²⁾ | 720 | 1 850 | 2 200 | 3 040 | 4 240 | 6 550 | | | |
| | | | C3 ¹⁾ | 1 300 | 3 170 | 3 950 | 5 200 | 7 230 | 11 800 | 16 100 | 21200 | |
| | | | C3 ²⁾ | 1 170 | 3000 | 3 580 | 4 940 | 6 890 | 10 600 | | | |
| | Standard ball runner blocks - Steel ³⁾ - Resist NR ⁴⁾ - Resist CR ⁶⁾ | R1665 ³⁾⁶⁾ R2000 ⁴⁾ | FKS | C1 ¹⁾ | 110 | 250 | 320 | 440 | 590 | | | |
| R1666 ³⁾⁶⁾ R2010 ⁴⁾ | | SKS | C1 ²⁾ | 90 | 250 | 280 | 440 | 590 | | | | |
| R1693 ³⁾⁶⁾ | | FNN | C1 ¹⁾ | | 290 | 460 | | | | | | |
| R1694 ³⁾⁶⁾ | | SNN | | | | | | | | | | |
| R1663 ³⁾⁶⁾ R1664 ³⁾⁶⁾ | | FKN SKN | C1 ¹⁾ | | 190 | 320 | | | | | | |
| Super Ball Runner Blocks - Steel ³⁾ - Resist CR ⁶⁾ | R1661 ³⁾⁶⁾ | FKS | C1 ¹⁾ | 80 | 200 | 230 | 320 | 420 | | | | |
| | R1662 ³⁾⁶⁾ | SKS | | | | | | | | | | |
| Standard high speed ball runner blocks - Steel | R2001...9. | FNS | C2 ¹⁾ | 420 | 1 020 | 1 240 | 1 720 | 2 280 | | | | |
| | R2011...9. | SNS | | | | | | | | | | |
| | R2002...9. R2012...9. | FLS SLS | C2 ¹⁾ | 700 | 1 330 | 1 660 | 2 180 | 3 020 | | | | |
| Standard ball runner blocks - Aluminum | R1631 | FNS | C1 ¹⁾ | 160 | 380 | 460 | 630 | 840 | | | | |
| | R1632 | SNS | C1 ²⁾ | 150 | 350 | 430 | 590 | 840 | | | | |
| Standard ball runner blocks - Resist NR II ⁵⁾ | R2001...0. | FNS | C1 ¹⁾ | 100 | 250 | 300 | 420 | 550 | | | | |
| | R2011...0. | SNS | C1 ²⁾ | 90 | 230 | 280 | 390 | 550 | | | | |
| | | | C2 ¹⁾ | 410 | 980 | 1 200 | 1 660 | 2 210 | | | | |
| | | | C2 ²⁾ | 380 | 910 | 1 120 | 1540 | 2 210 | | | | |
| | | | | | | | | | | | | |
| | R2002...0. R2012...0. | FLS SLS | C1 ¹⁾ | 170 | 320 | 400 | 530 | 730 | | | | |
| | | | C1 ²⁾ | 150 | 300 | 360 | 500 | 700 | | | | |
| | | | C2 ¹⁾ | 680 | 1 280 | 1 600 | 2 100 | 2 920 | | | | |
| | | | C2 ²⁾ | 610 | 1 220 | 1 450 | 2 000 | 2 780 | | | | |
| | R2000...0. R2010...0. | FKS SKS | C1 ¹⁾ | 90 | 160 | 210 | 290 | 390 | | | | |
| C1 ²⁾ | | | 80 | 160 | 180 | 290 | 390 | | | | | |
| Wide Ball Runner Blocks - Steel ³⁾ - Resist CR ⁶⁾ | R1671 ³⁾⁶⁾ | CNS | C1 ¹⁾ | | 270 | 580 | | 1160 | | | | |
| | | | C1 ²⁾ | | 260 | 550 | | | | | | |
| | R1672 ³⁾⁶⁾ | BNS | C1 ¹⁾ | | 270 | 580 | | | | | | |
| | | | C1 ²⁾ | | 260 | 550 | | | | | | |

- 1) Ball runner block **without** ball chain.
- 2) Ball runner block **with** ball chain.
- 3) Steel: All steel parts made of carbon steel.
- 4) Resist NR size 15 – 35: Ball Runner Block body made of corrosion resistant steel as per DIN EN 10088.
- 5) Resist NR II: All steel components are made from corrosion resistant steel in accordance with DIN EN 10088.
- 6) Resist CR: Steel ball runner block body with corrosion resistant coating, matte-silver finish, hard chrome plated.

Rigidity ball runner block

Due to the large number of variants only one type is listed. Further rigidity diagrams are available on request.

Rigidity of ball rail system with preloading

Example

Ball runner blocks FNS

Flanged, normal, standard height

Size 35:

- a) Ball runner blocks R1651 31. 20 for preload C1
- b) Ball runner blocks R1651 32. 20 for preload C2
- c) Ball runner blocks R1651 33. 20 for preload C3

Example

Ball runner blocks FLS

Flanged, long, standard height

Size 35:

- a) Ball runner blocks R1653 31. 20 for preload C1
- b) Ball runner blocks R1653 32. 20 for preload C2
- c) Ball runner blocks R1653 33. 20 for preload C3

Example

Ball runner blocks SNS

Slimline, normal, standard height

Size 35:

- a) Ball runner blocks R1622 31. 20 for preload C1
- b) Ball runner blocks R1622 32. 20 for preload C2
- c) Ball runner blocks R1622 33. 20 for preload C3

Example

Ball runner blocks SLS

Slimline, long, standard height

Size 35:

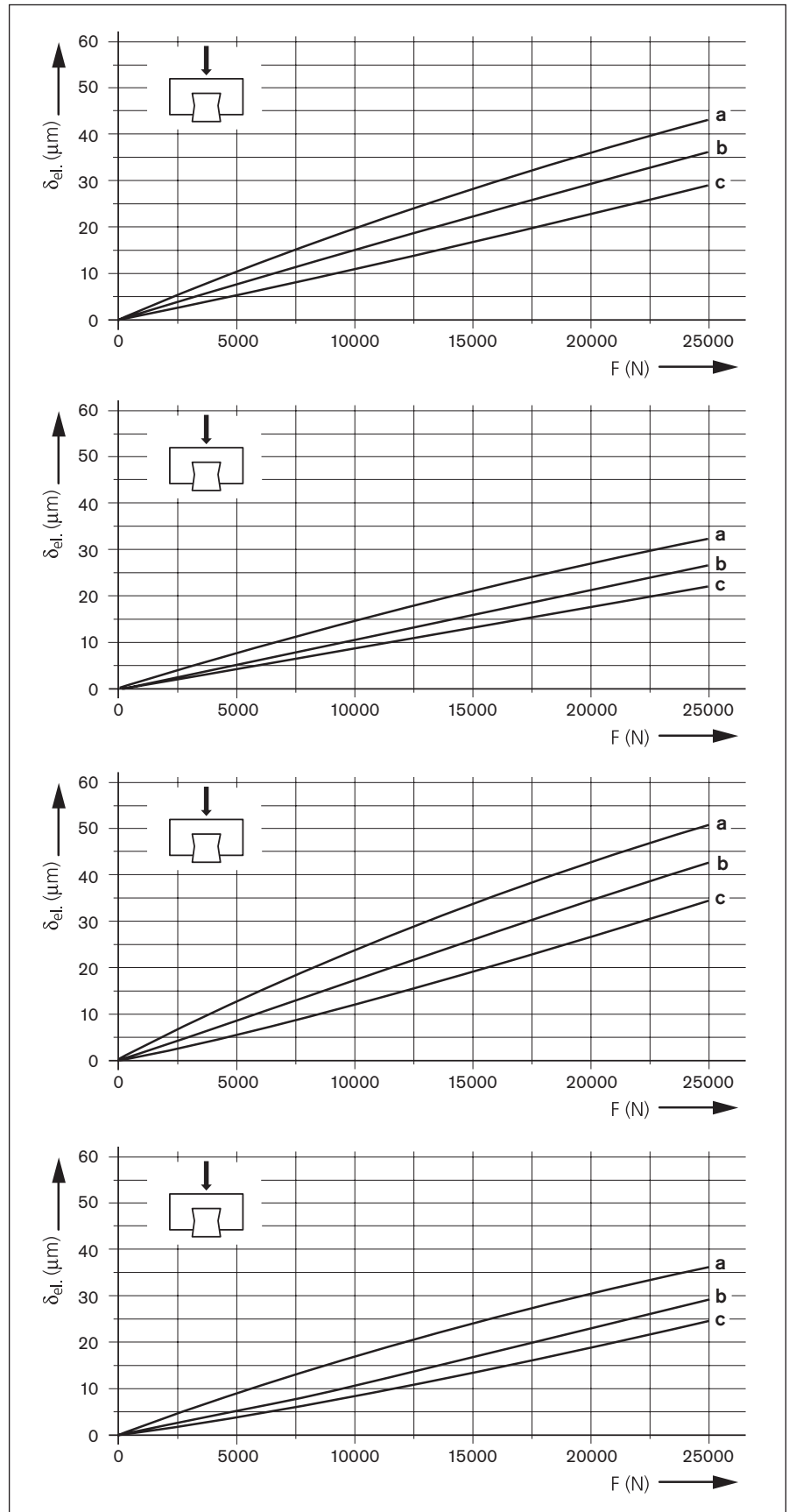
- a) Ball runner blocks R1623 31. 20 for preload C1
- b) Ball runner blocks R1623 32. 20 for preload C2
- c) Ball runner blocks R1623 33.20 for preload C3

Preload

C1/C2/C3 = in accordance with table for preload force F_{pr}

Key

δ_{el} = Elastic deformation (μm)
 F = Load (N)

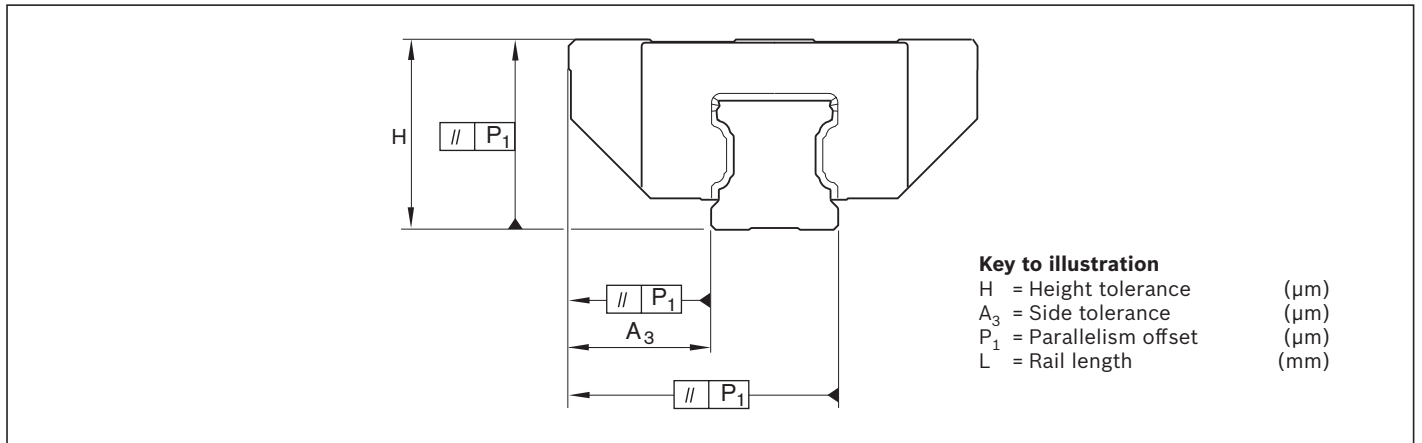


Accuracy classes

Accuracy classes and their tolerances

Ball rail systems are available in six accuracy classes for ball runner blocks and five for ball guide rails.

For details of the available ball runner blocks and ball guide rails, see the “Material numbers” tables.



Precision manufacturing process makes interchangeability easy

Rexroth manufactures its ball guide rails and ball runner blocks with such high precision, especially in the ball raceway zone, that each individual component element is fully interchangeable. For example, a ball runner block can be used without problems on various ball guide rails of the same size. Similarly, different ball runner blocks can also be used on one and the same ball guide rail.

| | H | A ₃ | ΔH, ΔA ₃ |
|---|---|---|---------------------|
| Measured in middle of runner block | | | |
| | For any ball runner block/rail combination at any position along the entire rail length | For different ball runner blocks at same position on rail | |

Ball rail system made of steel, aluminum, Resist NR and Resist NR II

| Accuracy classes | Tolerances of the dimensions (µm) | | Max. differences of dimensions H and A ₃ on one rail (µm) | |
|------------------------|-----------------------------------|----------------|--|----|
| | H | A ₃ | ΔH, ΔA ₃ | |
| N | ±100 | ±40 | | 30 |
| H | ±40 | ±20 | | 15 |
| P | ±20 | ±10 | | 7 |
| XP¹⁾ | ±11 | ±8 | | 7 |
| SP | ±10 | ±7 | | 5 |
| UP | ±5 | ±5 | | 3 |

1) Ball runner block with accuracy class XP, ball guide rail with accuracy class SP

Ball rail system, Resist CR, matte-silver, hard chrome plated

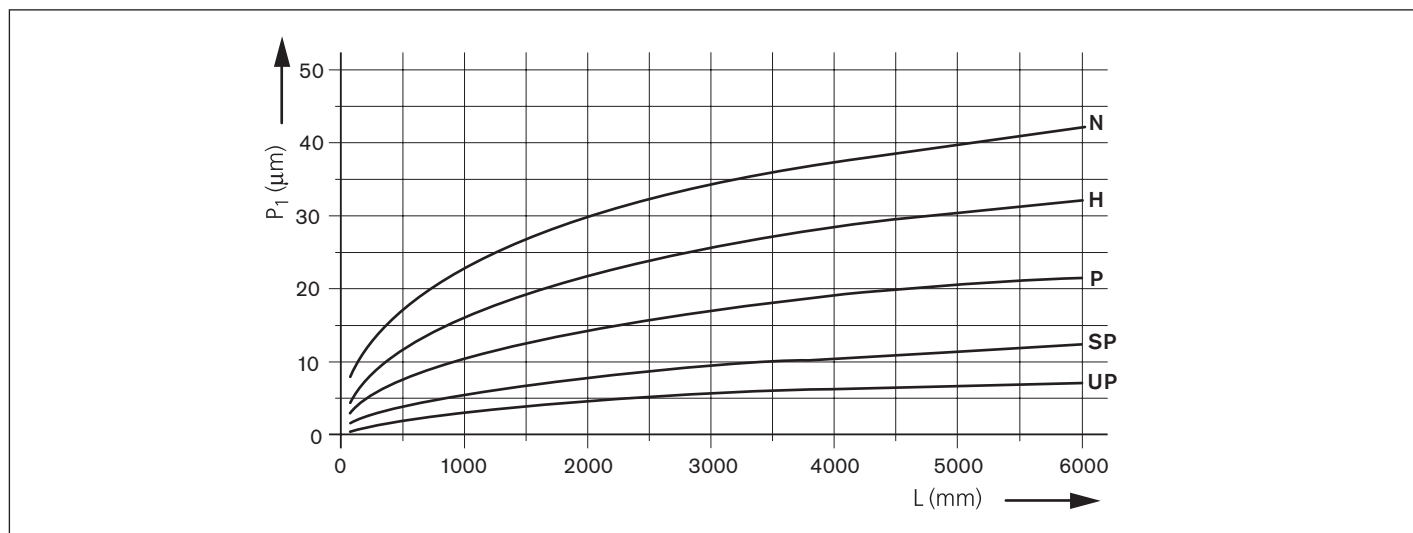
| Accuracy classes | Tolerances of the dimensions (µm) | | | | Max. differences of dimensions H and A ₃ (µm) on rails | |
|------------------|---------------------------------------|-----------------|---------------------------------------|-----------------|---|---------------------|
| | H | | A ₃ | | Ball runner block/ Ball guide rail | Ball guide rail |
| | Ball runner block/ ball guide rail | Ball guide rail | Ball runner block/ ball guide rail | Ball guide rail | | ΔH, ΔA ₃ |
| H | +47 -38 | +44 -39 | ± 23 | +19 -24 | 18 | 15 |

Accuracy classes

Parallelism offset P_1 of the ball rail system in operation

Values measured at middle of runner block with ball rail systems without surface coating.

For hard chrome plated ball guide rails Resist CR, the values can increase up to 2 μm .



Tolerances for combination of accuracy classes

| Ball runner blocks | | Ball guide rails | | | | |
|--------------------|---|------------------------|------------------------|------------------------|-------------------------|-------------------------|
| | | N (μm) | H (μm) | P (μm) | SP (μm) | UP (μm) |
| N | Tolerance of dimension H (μm) | ± 100 | ± 48 | ± 32 | ± 23 | ± 19 |
| | Tolerance of dimension A_3 (μm) | ± 40 | ± 28 | ± 22 | ± 20 | ± 19 |
| | Max. diff. dimensions H and A_3 on one rail (μm) | 30 | 30 | 30 | 30 | 30 |
| H | Tolerance of dimension H (μm) | ± 92 | ± 40 | ± 24 | ± 15 | ± 11 |
| | Tolerance of dimension A_3 (μm) | ± 32 | ± 20 | ± 14 | ± 12 | ± 11 |
| | Max. diff. dimensions H and A_3 on one rail (μm) | 15 | 15 | 15 | 15 | 15 |
| P | Tolerance of dimension H (μm) | ± 88 | ± 36 | ± 20 | ± 11 | ± 7 |
| | Tolerance of dimension A_3 (μm) | ± 28 | ± 16 | ± 10 | ± 8 | ± 7 |
| | Max. diff. dimensions H and A_3 on one rail (μm) | 7 | 7 | 7 | 7 | 7 |
| XP | Tolerance of dimension H (μm) | ± 88 | ± 36 | ± 20 | ± 11 | ± 7 |
| | Tolerance of dimension A_3 (μm) | ± 28 | ± 16 | ± 10 | ± 8 | ± 7 |
| | Max. diff. dimensions H and A_3 on one rail (μm) | 7 | 7 | 7 | 7 | 7 |
| SP | Tolerance of dimension H (μm) | ± 87 | ± 35 | ± 19 | ± 10 | ± 6 |
| | Tolerance of dimension A_3 (μm) | ± 27 | ± 15 | ± 9 | ± 7 | ± 6 |
| | Max. diff. dimensions H and A_3 on one rail (μm) | 5 | 5 | 5 | 5 | 5 |
| UP | Tolerance of dimension H (μm) | ± 86 | ± 34 | ± 18 | ± 9 | ± 5 |
| | Tolerance of dimension A_3 (μm) | ± 26 | ± 14 | ± 8 | ± 6 | ± 5 |
| | Max. diff. dimensions H and A_3 on one rail (μm) | 3 | 3 | 3 | 3 | 3 |

Recommendations for combining accuracy classes

Recommended with **relatively large ball runner block distances** and long strokes:

Ball guide rail in higher accuracy class than ball runner blocks.

Recommended with **small ball runner block distances** and short strokes:

Ball runner blocks in higher accuracy class than ball guide rail.

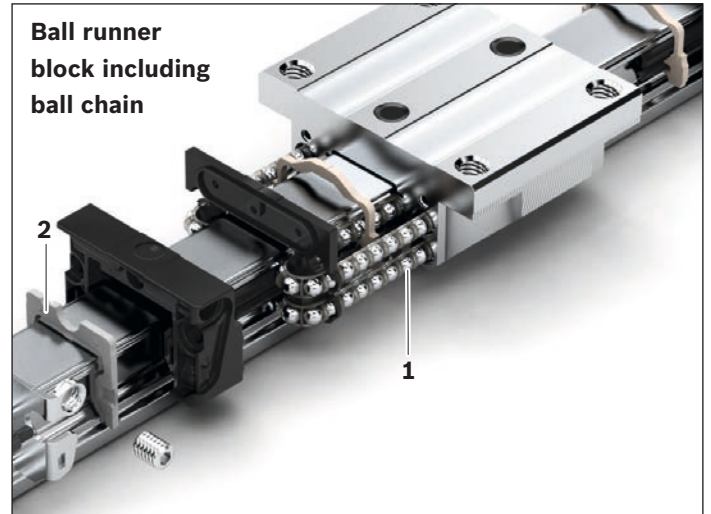
Sequence accuracy selection criterion

By means of perfected ball inlet and outlet zones in the ball runner blocks and the optimized pitch of the mounting holes in the ball guide rails, a very high sequence accuracy with lowest pulsation is achieved. Particularly suitable for highly precise, chipping processing, measuring technique, high-precision scanners, eroding technology etc. (See chapter Product Description High-precision Ball Runner Block BSHP made of steel, Application examples)

Ball chain

Rexroth recommends the ball chain especially for applications where a low noise level is required.

Ball runner blocks including ball chain (1) are available as an option. The ball chain prevents the balls from colliding with each other and helps to achieve a calmer and smoother running. A lower noise level is achieved. Due to the smaller number of load-bearing balls in the ball runner block with ball chain, lower load ratings and load moments can result (“Product overview with load ratings and load moments”).



Seals

The sealing plate on the front side (2) protects the interior of the ball runner block against dirt, chips and fluids. Additionally, it prevents the discharge of lubricant. Due to the optimized form of the sealing lips, the occurring friction is reduced to a minimum. Sealing plates are optionally available with black standard seals (SS), beige low-friction seals (LS) or green double-lip seals (DS).

Low-friction seal (LS) (seal with very low friction)

For special requirements with regard to ease of movement and reduced lubricant application, the low-friction seal has been developed. It consists of an open-pored polyurethane foam and features only limited wiping action.

Standard seal (SS) (universal sealing with good sealing effect)

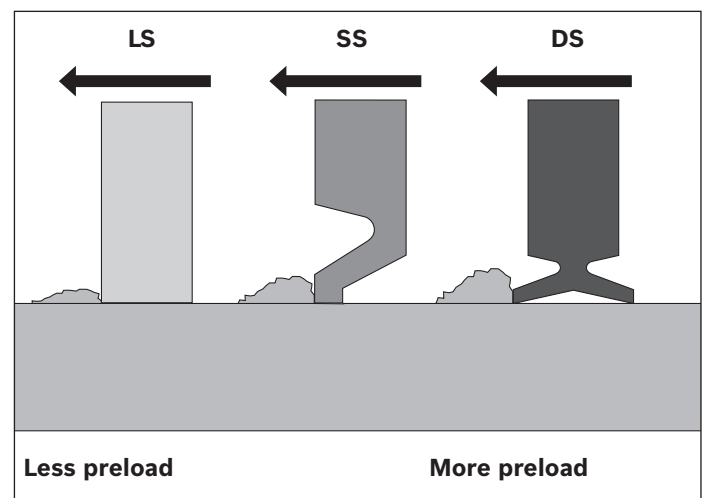
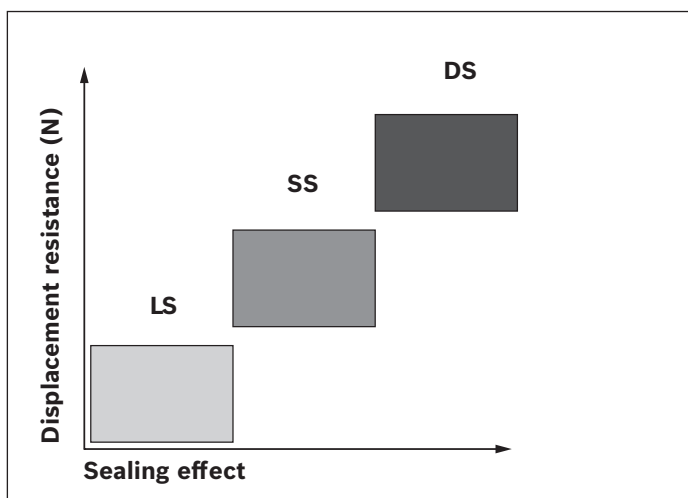
For most application cases, the standard seal is suitable. It comprises of a good wiping action but also enables long relubrication intervals.

Double-lip seal (DS) (sealing with very good sealing effect)

For applications in which the rail guide is heavily charged with chips, wood dust, cooling lubricants etc., Rexroth recommends the double-lip sealing. It comprises an excellent wiping action but a greater friction force and lower relubrication interval.

Sealing effect and displacement resistance

The displacement resistance can be impacted by the geometry and the material. The diagram shows the effects of different sealing versions on the sealing effect and the displacement resistance.



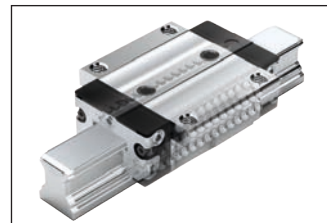
Materials

Rexroth offers ball runner blocks made of different materials for the different requirements in the various applications.

A Standard ball runner block made of steel

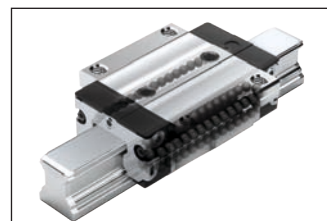
The most widely used carbon steel version.

Low-cost variant, but does not provide protection against corrosion. Is usually sufficient for general mechanical engineering.



B High-speed ball runner block made of steel

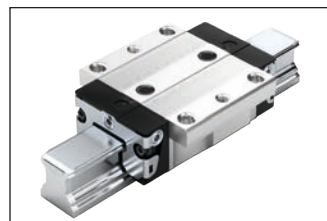
In this variant, the steel balls are replaced by ceramic balls compared to the standard ball runner blocks made of steel. Since ceramic has a lower density than steel, the same forces result in the deflections of the ball circuits at the increased permissible travel speed. This means that even at travel speeds of up to 10 m/s, the expected service life is not limited. Load ratings and load moments are slightly reduced compared to the standard design.



Limited corrosion resistant ball runner blocks

C Aluminum ball runner block

The ball runner block body consists of a wrought aluminum alloy. Balls, steel bearing plate and frontal fixing screws are made of carbon steel. The ball runner blocks have the same load rating as the standard version. As the yield point of aluminum is lower than that of steel, the maximum load capacity of the ball runner blocks is limited by F_{\max} and M_{\max} . Most cost-effective alternative with limited corrosion protection.



Corrosion resistant ball runner blocks

D Resist NR

The ball runner block body is made of corrosion resistant material. Offers limited corrosion protection. Balls, steel bearing plate and frontal fixing screws are made of carbon steel. The ball runner blocks have the same basic load ratings and load moments as the standard version.

Rexroth recommends this version for applications requiring corrosion protection.

Fast delivery.

E Resist NR II

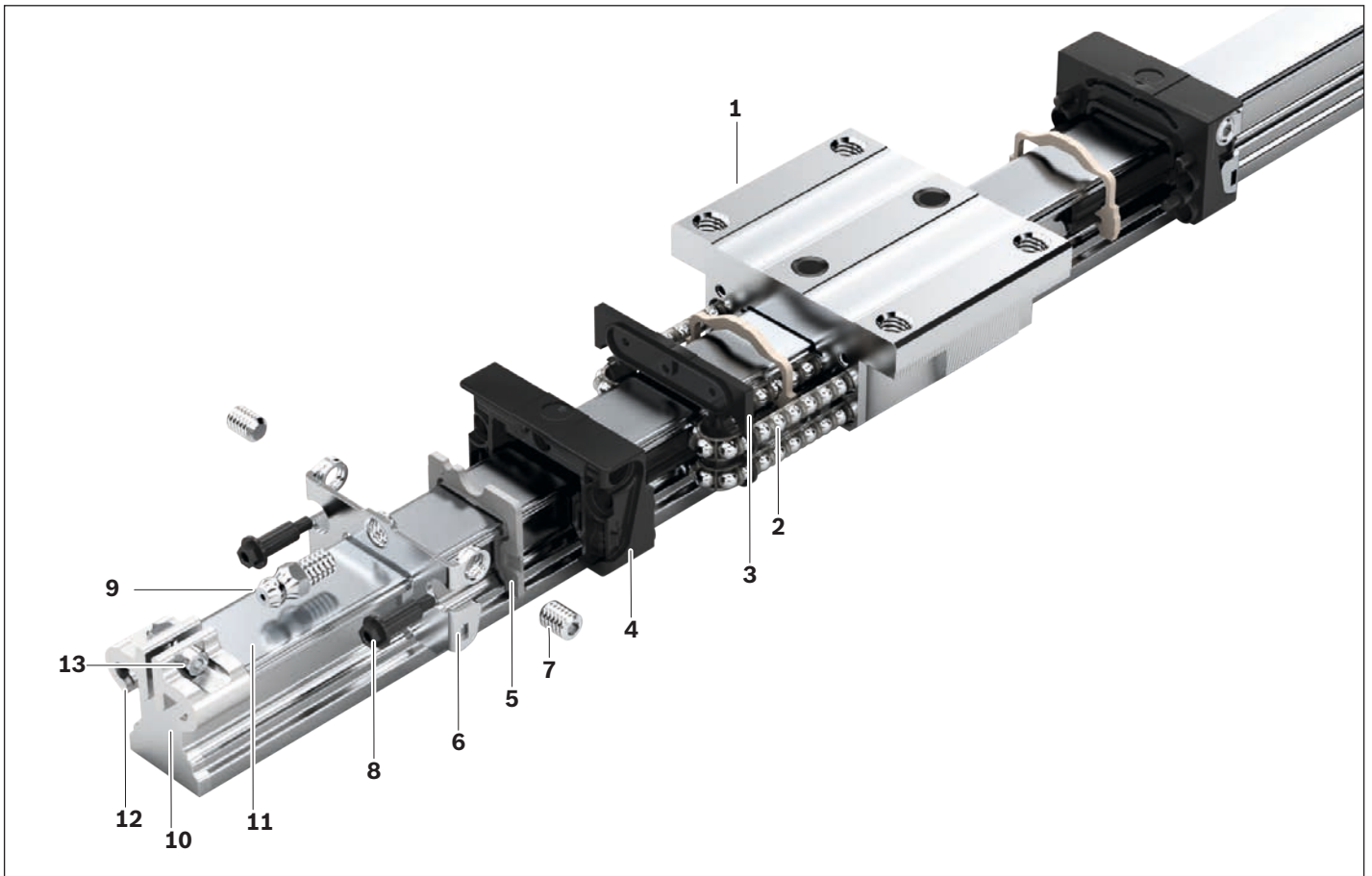
All parts of the ball runner block are made of corrosion resistant material. These ball runner blocks offer the greatest possible protection against corrosion with only slightly reduced load ratings and load moments.

F Resist CR

The ball runner block body is coated with a corrosion-resistant coating, matte-silver, hard chrome plated. Balls, steel bearing plate and frontal fixing screws are made of carbon steel. The ball runner blocks have the same basic load ratings and load moments as the standard version.

Alternative if the NR version is not available.

Material specifications



| Item | Component | Ball runner blocks | | | | | |
|------|-------------------------|----------------------------------|--------------------------------|-----------------------------|----------------------------------|----------------------------------|-------------------------------------|
| | | A Steel | B Steel (high-speed) | C Aluminum | D Resist NR | E Resist NR II | F Resist CR |
| 1 | Ball runner block body | Heat-treated steel | Heat-treated steel | Wrought aluminum alloy | Corrosion resistant steel 1.4122 | Corrosion resistant steel 1.4122 | Heat-treated steel Chrome plated |
| 2 | Balls | Anti-friction bearing steel | Si ₃ N ₄ | Anti-friction bearing steel | Anti-friction bearing steel | Corrosion resistant steel 1.4112 | Anti-friction bearing steel |
| 3 | Diversion plate | Plastic TEE-E | | | | | |
| 4 | Ball guide | Plastic strip POM (PA6.6) | | | | | |
| 5 | Sealing plate | Plastic TEE-E | | | | | |
| 6 | Thread plate | Corrosion resistant steel 1.4306 | | | | | |
| 7 | Set screws | Corrosion resistant steel 1.4301 | | | | | |
| 8 | Flanged screws | Carbon steel | | | | Corrosion resistant steel 1.4303 | Carbon steel |
| 9 | Lube nipple | | | | | Corrosion resistant steel 1.4305 | |
| Item | Component | Ball guide rail | | | | | |
| 10 | Ball guide rail | Heat-treated steel | | | | Corrosion resistant steel 1.4116 | Heat-treated steel |
| 11 | Cover strip | Corrosion resistant steel 1.4310 | | | | | |
| 12 | Strip clamp | Aluminum, anodized | | | | | |
| 13 | Clamping screw with nut | Corrosion resistant steel 1.4301 | | | | | |

Product description

Characteristic features

- ▶ The same high load ratings in all four main directions of loading
- ▶ Low noise level and outstanding travel behavior
- ▶ Excellent dynamic characteristics:
Travel speed: $v_{\max} = 5 \text{ m/s}$
Acceleration: $a_{\max} = 500 \text{ m/s}^2$
- ▶ Long-term lubrication is possible over several years
- ▶ Minimum quantity lubrication system with integrated reservoir for oil lubrication¹⁾
- ▶ Lube fittings with metal threads on all sides¹⁾
- ▶ Limitless interchangeability as all ball guide rail systems can be combined at will with all ball runner block versions within each accuracy class.
- ▶ Maximum system rigidity due to preloaded O-arrangement
- ▶ Optional integrated, inductive and wear-free measuring system
- ▶ First-class logistics unique worldwide thanks to universal interchangeability of the components within any accuracy class
- ▶ Attachments on the ball runner block can be mounted from above and below¹⁾
- ▶ Improved rigidity under lift-off and side loading conditions due to two additional mounting screw holes at the center of the ball runner block¹⁾
- ▶ Wide range of accessories
- ▶ End-face fastening thread for all attachments

Further highlights

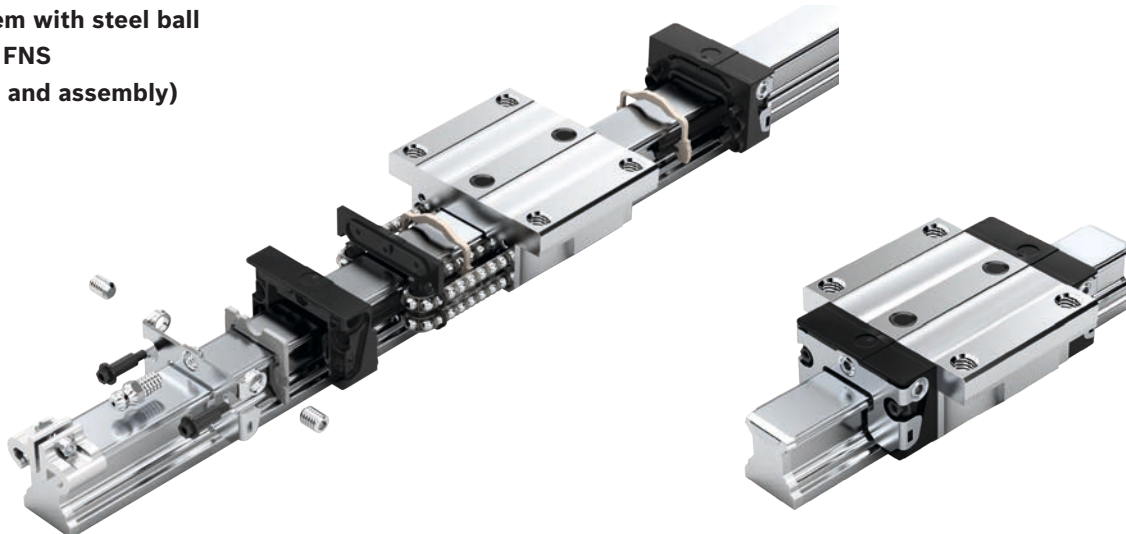
- ▶ High rigidity in all load directions – permits applications with just one runner block per rail
- ▶ Integrated all-round sealing
- ▶ High torque load capacity
- ▶ Optimized entry-zone geometry and high number of balls minimize variation in elastic deflection
- ▶ Quiet, smooth running thanks to optimally designed ball and ball chain return and guideway
- ▶ Different preload classes
- ▶ Ball runner block pre-lubricated at the factory¹⁾
- ▶ Optionally available with ball chain¹⁾

Corrosion protection (optional)¹⁾

- ▶ Resist NR:
Ball runner block body made of corrosion resistant steel as per DIN EN 10088
- ▶ Resist NR II:
Ball runner block body and ball guide rail as well as all steel parts made of corrosion resistant steel in accordance with DIN EN 10088
- ▶ Resist CR:
Ball runner block body or ball guide rail made of steel with corrosion resistant coating, matte-silver finish, hard chrome plated

1) Type-dependent

Ball rail system with steel ball runner block FNS (components and assembly)



Highlights of the ball runner blocks BSHP

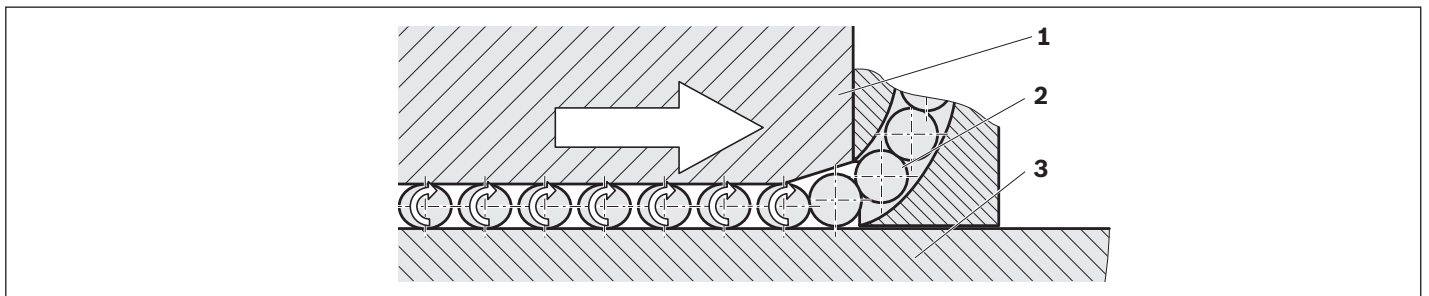
- ▶ Further increased travel accuracy up to a factor of six
- ▶ Significantly reduced frictional oscillations and low friction force level, particularly under external load
- ▶ Maximum precision
- ▶ Selected qualities
- ▶ Minimum quantity preservation in the accuracy classes XP; SP; UP.
(Impairment of the environment is reduced by the preserving agent)
- ▶ Patented entry zone increases the sequence accuracy
- ▶ All other advantages of Rexroth precision ball runner blocks integrated

Comparison

Conventional ball runner blocks

If the ball runner block comprises of a conventional entry zone, this may only be designed for a specific load point.

Entry-zone geometry for conventional ball runner blocks



1) Ball runner blocks 2) Ball 3) Ball guide rail

Ball entry

- ▶ The balls are guided up to the start of the entry zone via the roller deflection.
- ▶ If the distance between the ball runner block (1) and the ball guide rail (3) is smaller than the ball diameter, the ball (2) is put under load (preload) in pulses.
- ▶ The preload is increased in the entry zone and reaches its maximum in the load bearing zone. By doing so, the ball transmits its force from the ball runner block to the ball guide rail.
- ▶ Due to the kinematic and geometric relations, a distance between the individual balls is set.

Entry zone

The conventional ball runner blocks comprise of a fix entry zone. The depth of the entry zone shall be suitable for a high load, since a fault-free ball entry is to be guaranteed under very high loads, as well.

- ▶ On the one hand, as many load-bearing balls as possible should be in the ball runner block in order to reach an ideal load-carrying capacity.
⇒ Entry zone as short as possible
- ▶ On the other hand, the load during the entry of the balls should be increased as slowly as possible and thus in a harmonic manner in order to reach the maximum of the geometric travel accuracy.
⇒ Entry zone which is as flat (long) as possible

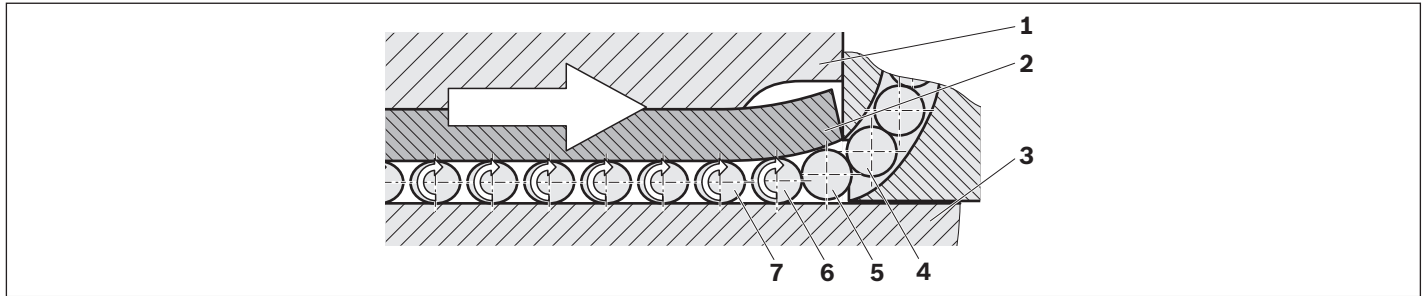
There is a conflict of aims between short and long entry zones.

Product description

High-precision Ball Runner Block BSHP

New entry-zone geometry for ball runner block in high-precision version

The ball runner blocks in high-precision version comprise of an innovative entry zone. The steel bearing plates are not supported by the ball runner block in the end area and can therefore deform elastically. The entry zone adjusts itself individually to the current operating load of the ball runner block. I.e the balls run smoothly into the bearing zone without loading pulsations.



- | | |
|------------------------|--------------------|
| 1) Ball runner blocks | 3) Ball guide rail |
| 2) Steel bearing plate | 4) – 7) Balls |

Ball entry

- ▶ The balls (4) are guided up to the start of the entry zone via the roller deflection.
- ▶ The ball (5) can enter without load.
- ▶ The ball (6) elastically deforms the end of the steel bearing plate (2). This deformation results from the total yielding of the ball deformation and the deformation of the free ends of the steel bearing plates.
- ▶ If the distance between the steel bearing plate and the ball guide rail (3) is smaller than the ball diameter, the ball is put under load (preload) slowly and evenly.
- ▶ The preload is increased harmonically until the ball (7) has reached its maximum preload.

Innovative solutions by Rexroth:

The load dependent entry zone

The functionality of the entry zone is decisive. The steel bearing plates are manufactured with such precision that they deflect by the ideal amount according to the load. Thus, the balls can enter particularly smoothly. Due to the precise manufacture of the steel bearing plates, they are only deformed by an entering ball to such an extent that the following ball can run in without load. The balls thus no longer enter the load-bearing zone through a fixed entry zone, rather transition smoothly on a tangential, ideally angled elastic line into the load-bearing zone. The smooth entry of the balls and the continuous adaptation of the entry zone to the load represent the most decisive benefits of the High-precision Ball Runner Blocks.

Characteristic features

- 1 Maximum travel accuracy
- 2 Reduced friction force oscillations
- 3 The conflict of aims is resolved

Fluctuation of friction forces

Definition

The overall driving force of a ball runner block consist of the following components:

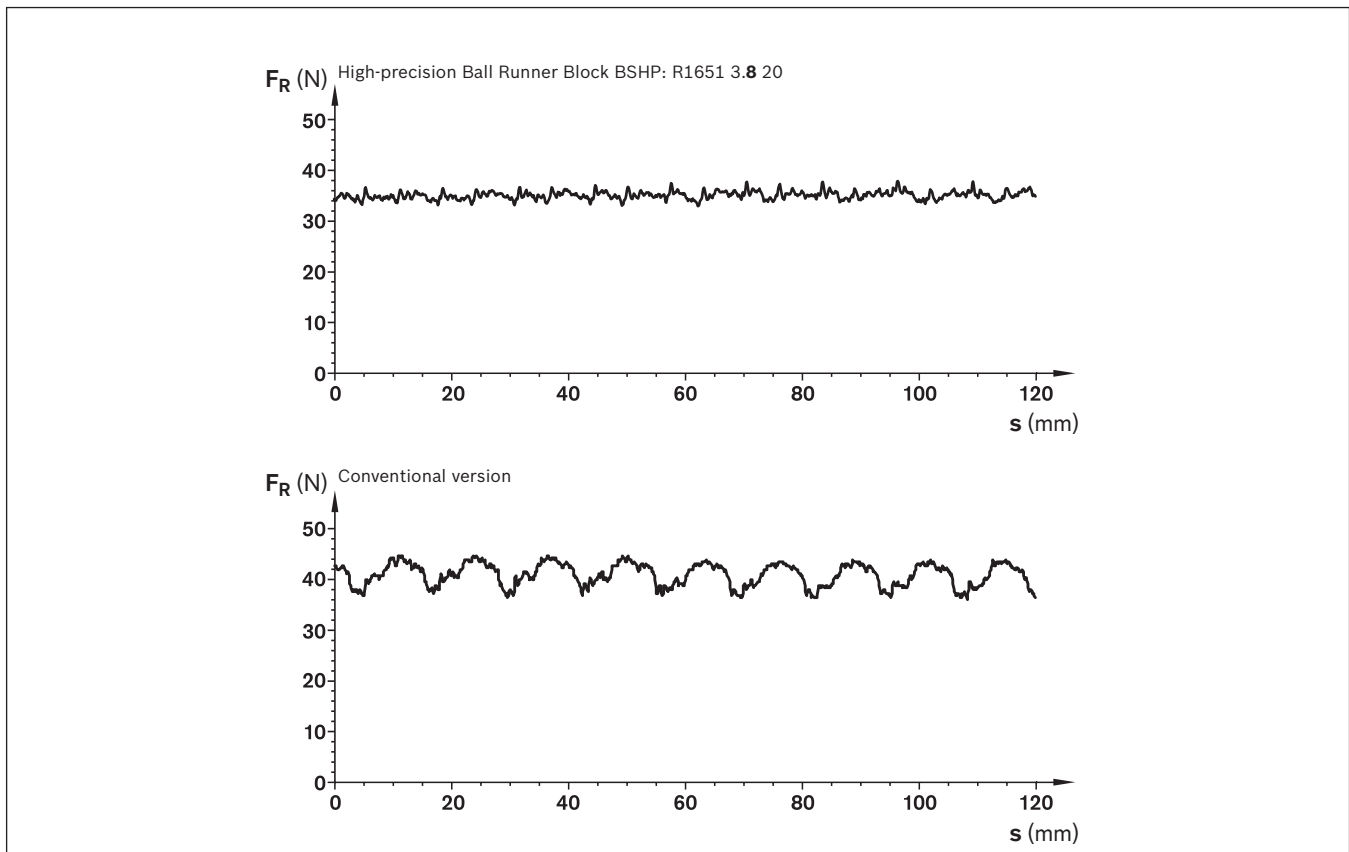
- 1 Ball friction
- 2 Sealing friction
- 3 Friction in the ball deflections and ball returns

In operation, the fluctuations of the friction force can be particularly disturbing.

These fluctuations are essentially impacted by the following effect:

The balls need to be brought into the loaded load-bearing zone from the load-free zone. The harmonic entry zone and the innovative ball feed are used to reduce the fluctuations to a minimum, which means that the linear drive will also be easier to control.

Friction force comparison of ball runner block size 35 with an external load of 10,000 N



⇒ Reduced friction force value

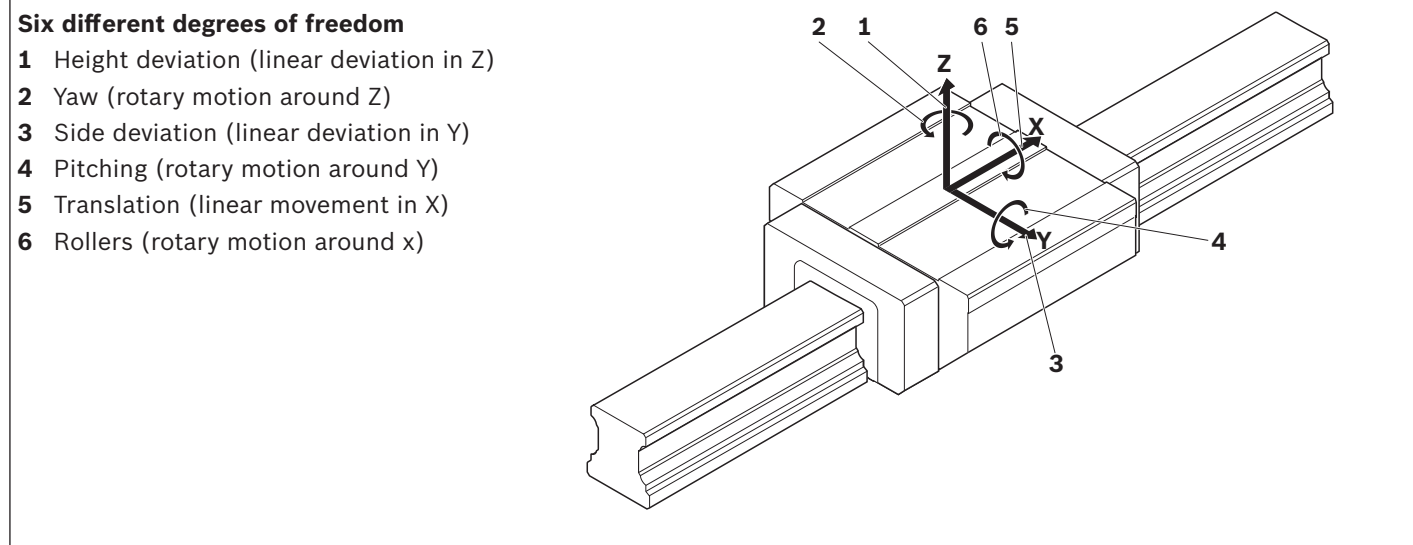
⇒ Significantly reduced fluctuation of friction forces

Product description

Travel accuracy

Definition

In an ideal case, a ball runner block moves transitively in relation to the x-axis over the ball guide rail. In practice, however, deviations occur in all six degrees of freedom. The term travel accuracy describes the deviation from this ideal line.



Causes of travel inaccuracy

The Travel inaccuracy is impacted by the following points.

1. Inaccurate mounting base on which the ball guide rail is mounted.
2. Parallelism error between the contact areas of the ball guide rail and the running tracks.
3. Elastic deformations of the ball guide rail by the mounting screws.
4. Accuracy fluctuations caused by the balls entering and exiting.

Potential for optimization

With respect to 1: Contact surfaces of the ball guide rail should be produced as precisely as possible (outside of the scope of influence of Rexroth).

With respect to 2: Any deviation should be equalized by the selection of the accuracy class of the ball guide rail.

With respect to 3: Reduce the tightening torque. The tightening torque of the fastening screws has a proportional impact.

A reduction of the tightening torque decreases the compressive strain of the rail material.

⇒ Lower geometric process fluctuations

With respect to 4: The patented, innovative entry zone of Rexroth - High-precision Ball Runner Blocks reduces the speed fluctuations to a minimum.

⚠ With this measure, the transferable forces and moments can be reduced.

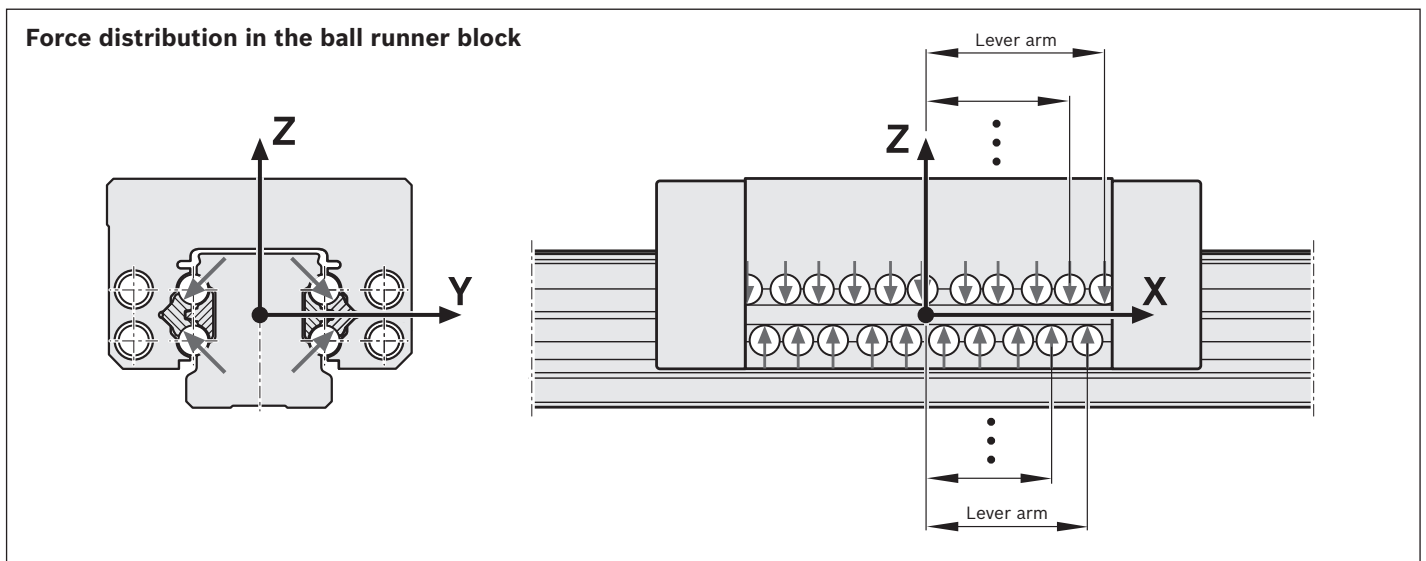
Further potential for improvement:

- ▶ Use of long ball runner blocks
- ▶ Installation of additional ball runner blocks per ball guide rail.

The measured deviations have the following cause

A ball circulation contains a number n of supporting balls which are under load. If the ball runner block is moved into the direction of travel, via the entry zone, a new ball enters the load-bearing zone and $n + 1$ balls are supporting. This disturbs the internal balance of the four supporting rows of balls. The ball runner block enters a rotational movement since the balls can arbitrarily enter the supporting rows of balls. In order to restore the balance, the ball runner block is moving into a new balance position. If the ball runner block is moved further, a supporting ball exits the load-bearing zone at the ball exit. Thus, the internal balance of the four supporting rows of balls is disturbed again and the ball runner block enters a rotational movement. This effect can be clearly seen in the diagram on the next page.

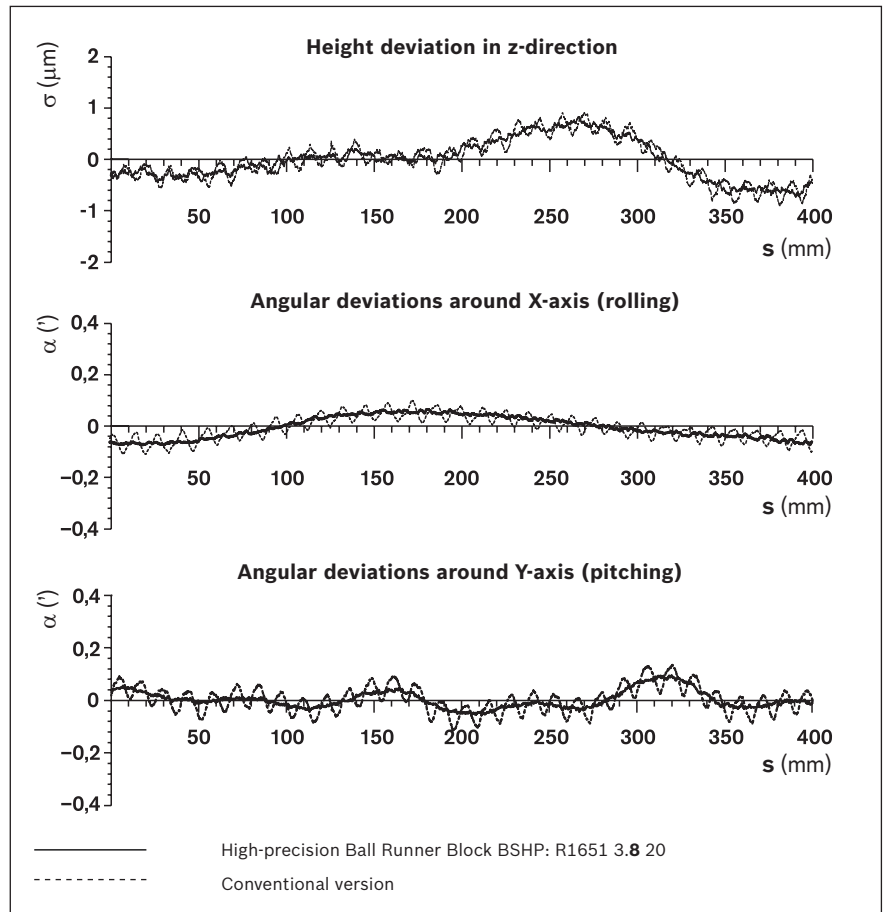
As it has been verified in practical applications, the period of short-wave inaccuracies roughly corresponds to twice the ball diameter. The remaining long-wave deviation is caused by the described causes 1, 2 and 3 (inaccurate support, parallelism errors and elastic deformation of the ball guide rail due to the mounting screws).



Product description

Direct comparison of the sequence accuracy of two ball runner blocks

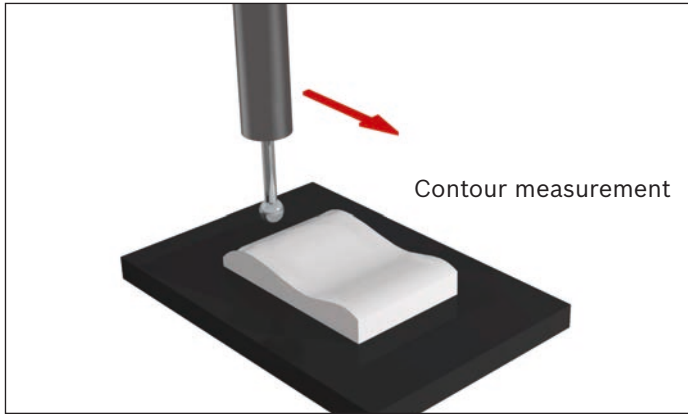
It can be clearly seen that the short-wave inaccuracy (dashed) can be significantly reduced by the new innovative design of the entry zone (continuous line).



Application examples

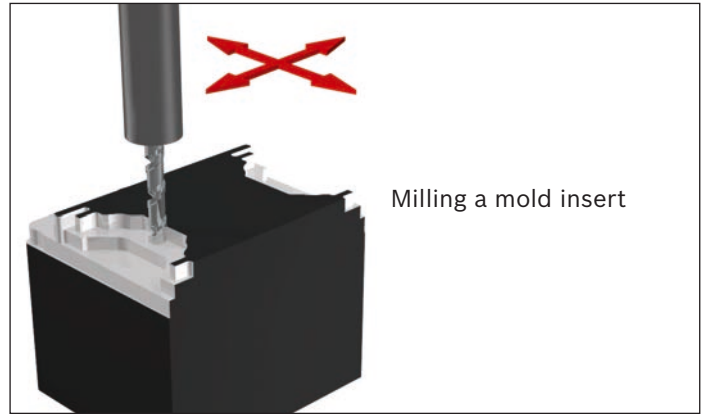
Rexroth high-precision ball runner blocks are particularly suited for the following applications:

Measuring



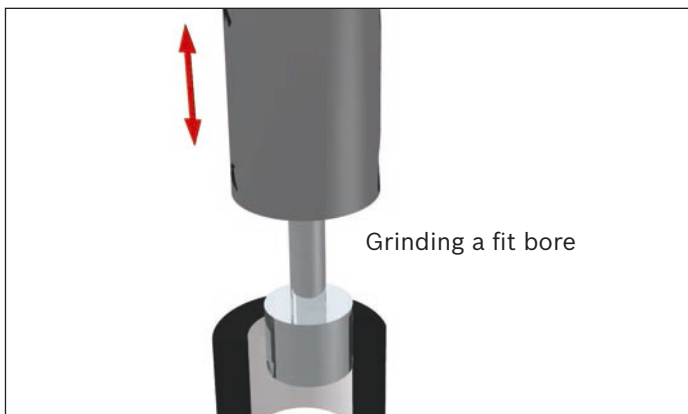
3D Coordinate Measuring Machine

Milling



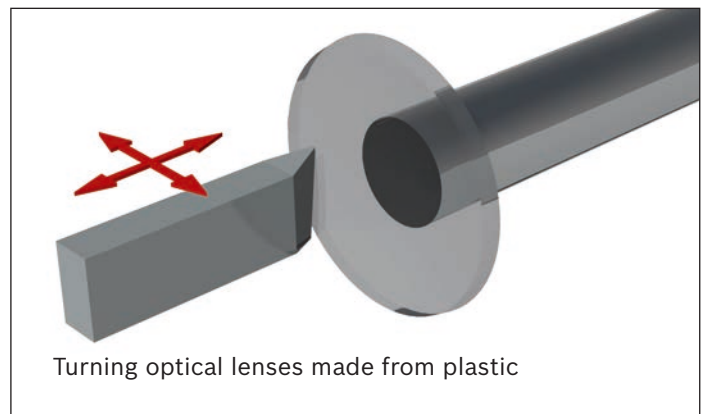
Hard milling

Grinding



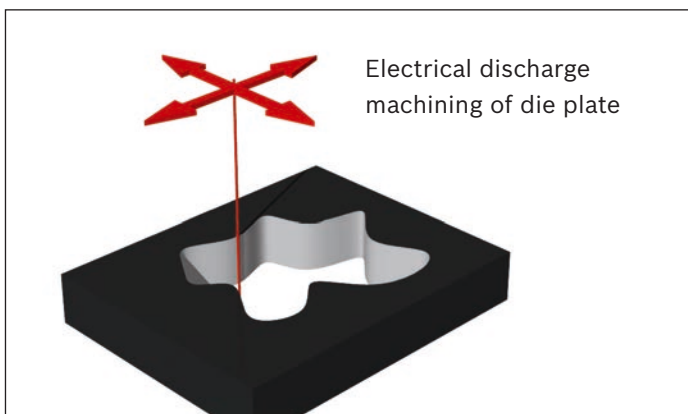
Internal cylindrical grinding

Turning



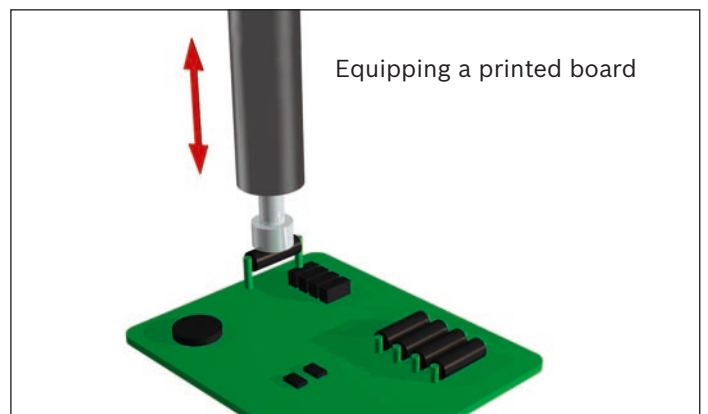
High-precision turning

Electrical discharge machining



Wire electrical discharge machining

Microelectronics

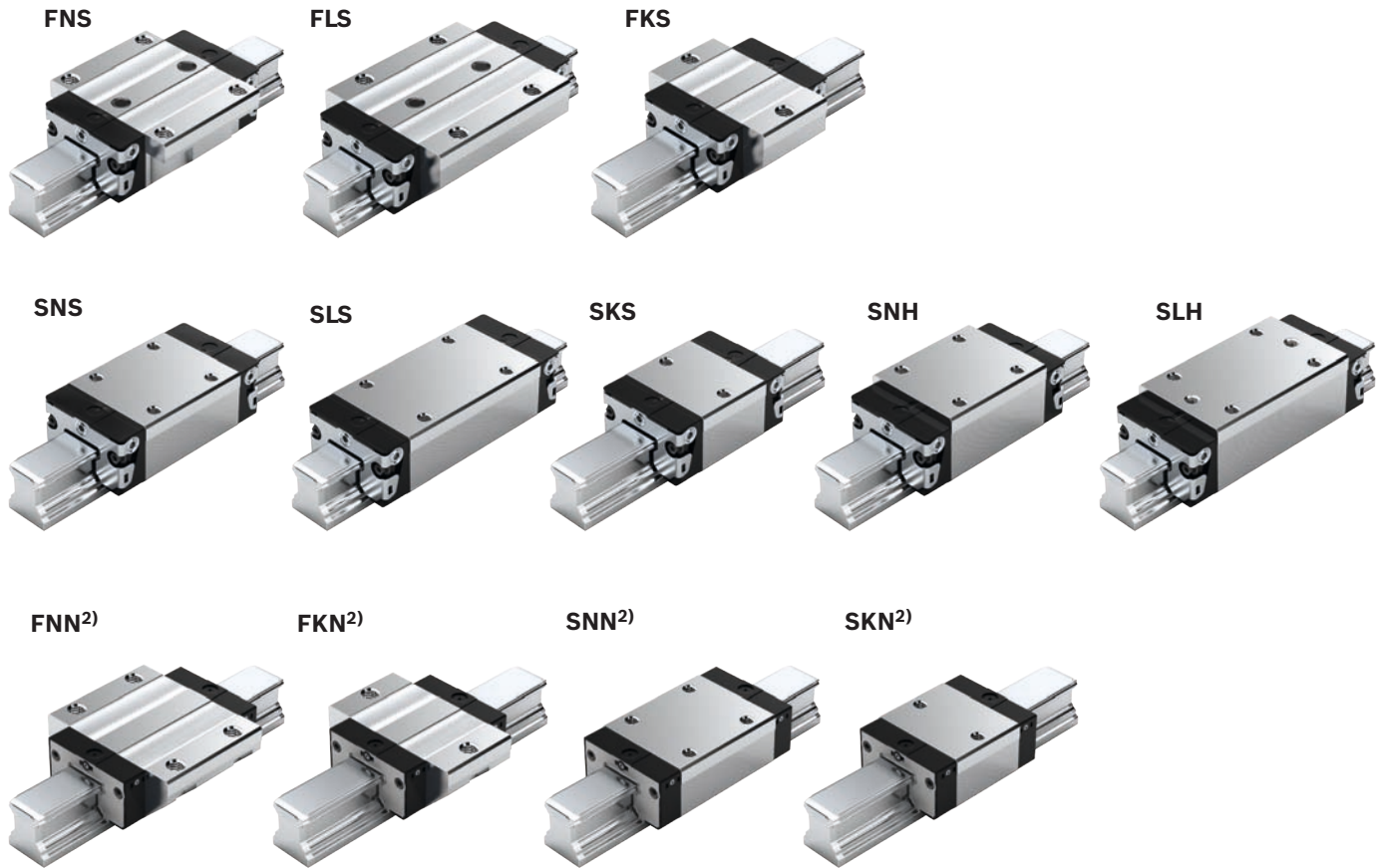


Printed board mounting machine

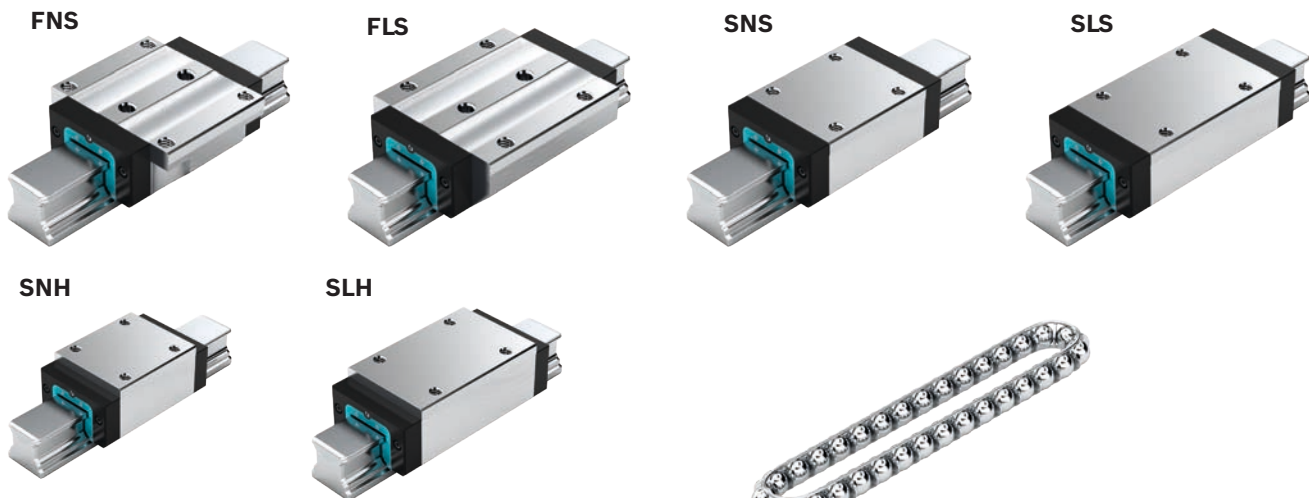
These are only a few examples. Naturally, other applications can be realized. Feel free to ask any questions that you may have. We have an appropriate solution.

Overview of formats

Standard ball runner blocks¹⁾ BSHP up to size 45



Heavy-duty ball runner blocks²⁾ BSHP from size 55



- 1) With ball chain
- 2) Without ball chain

Ball chain (optional)

- ▶ Optimized noise level

Order example

Ordering ball runner blocks

The material number is composed of the code numbers for the individual options. Each option (highlighted in gray) is coded in a material number digit (on a white background). The following ordering example applies to all ball runner blocks.


Explanation of option “Ball runner blocks with size”

The design style of the ball runner block – in this example, a standard ball runner block FNS – is specified on the respective product page.

Coding in the part number:

R1651 7
 Format Size

Order example

Options: 

- ▶ Ball runner blocks FNS
- ▶ Size 30
- ▶ Preload class C1
- ▶ Accuracy class H
- ▶ With standard seal, without ball chain

Material number: R1651 713 20

Options and part numbers

| Size | Ball runner block with size | Preload class | | | | Accuracy class | | | | | | Seal with ball runner blocks | | | | | |
|------|-----------------------------|---------------|----|----|----|----------------|---|---|----|----|----|------------------------------|----|----|------------------|----|----|
| | | C0 | C1 | C2 | C3 | N | H | P | XP | SP | UP | without ball chain | | | with ball chain | | |
| | | | | | | | | | | | SS | LS ¹⁾ | DS | SS | LS ¹⁾ | DS | |
| 15 | R1651 1 | 9 | | | | 4 | 3 | - | - | - | - | 20 | 21 | - | 22 | 23 | - |
| | | | 1 | | | 4 | 3 | 2 | 8 | 1 | 9 | 20 | 21 | - | 22 | 23 | - |
| | | | | 2 | | - | 3 | 2 | 8 | 1 | 9 | 20 | 21 | - | 22 | 23 | - |
| 20 | R1651 8 | 9 | | | | 4 | 3 | - | - | - | - | 20 | 21 | - | 22 | 23 | - |
| | | | 1 | | | 4 | 3 | 2 | 8 | 1 | 9 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| | | | | 2 | | - | 3 | 2 | 8 | 1 | 9 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| 25 | R1651 2 | 9 | | | | 4 | 3 | - | - | - | - | 20 | 21 | - | 22 | 23 | - |
| | | | 1 | | | 4 | 3 | 2 | 8 | 1 | 9 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| | | | | 2 | | - | 3 | 2 | 8 | 1 | 9 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| 30 | R1651 7 | 9 | | | | 4 | 3 | - | - | - | - | 20 | 21 | - | 22 | 23 | - |
| | | | 1 | | | 4 | 3 | 2 | 8 | 1 | 9 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| | | | | 2 | | - | 3 | 2 | 8 | 1 | 9 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| 35 | R1651 3 | 9 | | | | 4 | 3 | - | - | - | - | 20 | 21 | - | 22 | 23 | - |
| | | | 1 | | | 4 | 3 | 2 | 8 | 1 | 9 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| | | | | 2 | | - | 3 | 2 | 8 | 1 | 9 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| 45 | R1651 4 | 9 | | | | 4 | 3 | - | - | - | - | 20 | - | - | 22 | - | - |
| | | | 1 | | | 4 | 3 | 2 | 8 | 1 | 9 | 20 | - | 2Z | 22 | - | 2Y |
| | | | | 2 | | - | 3 | 2 | 8 | 1 | 9 | 20 | - | 2Z | 22 | - | 2Y |
| e.g. | R1651 7 | | 1 | | | | 3 | | | | | | 20 | | | | |

Preload classes

- C0 = Without preload (clearance)
- C1 = Moderate preload
- C2 = Average preload
- C3 = High preload

Seals

- SS = Standard seal
- LS = Low-friction seal
- DS = Double-lip seal

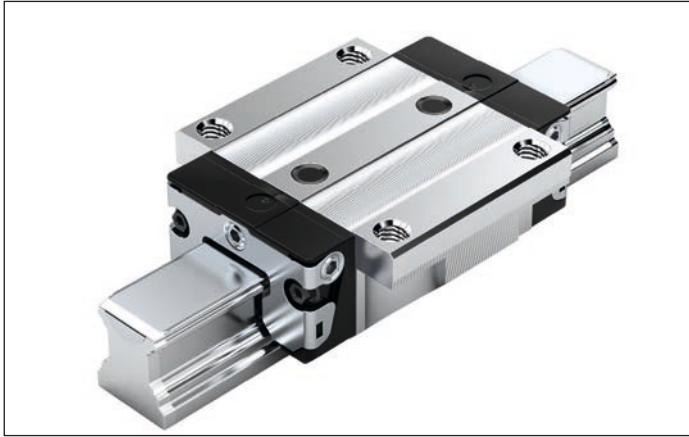
Key

- gray numbers
- = No Preferred Variant / Combination
- (partially longer delivery times)

Definition of the format of ball runner blocks

| Criterion | Designation | Code (example) | | |
|-----------|---------------------|----------------|---|---|
| | | F | N | S |
| Width | Flange (F) | F | | |
| | Slimline (S) | S | | |
| | Wide (B) | B | | |
| | Compact (C) | C | | |
| Length | Normal (N) | | N | |
| | Long (L) | | L | |
| | Short (K) | | K | |
| Height | Standard height (S) | | | S |
| | High (H) | | | H |
| | Low (N) | | | N |

FNS – Flanged, normal, standard height R1651 ... 2.

**Dynamic characteristics**Travel speed: $v_{\max} = 5 \text{ m/s}$ Acceleration: $a_{\max} = 500 \text{ m/s}^2$ (If $F_{\text{comb}} > 2.8 \cdot F_{\text{pr}}$: $a_{\max} = 50 \text{ m/s}^2$)**Note on lubrication**

► Pre-lubricated

Note

Can be used on all SNS/SNO ball guide rails. Ball runner blocks of size 55 and size 65 can be found in chapter “Heavy-duty ball runner block BSHP made of steel” after this chapter.

Options and material numbers

| Size | Ball runner blocks with size | Preload class | | | | Accuracy class | | | | | | Seals on ball runner blocks | | | | | |
|--------------|------------------------------|---------------|----|----|----|----------------|---|---|----|----|----|-----------------------------|------------------|----|-----------------|------------------|----|
| | | C0 | C1 | C2 | C3 | N | H | P | XP | SP | UP | without ball chain | | | with ball chain | | |
| | | | | | | | | | | | | SS | LS ¹⁾ | DS | SS | LS ¹⁾ | DS |
| 15 | R1651 1 | 9 | | | | 4 | 3 | – | – | – | – | 20 | 21 | – | 22 | 23 | – |
| | | | 1 | | | 4 | 3 | 2 | 8 | 1 | 9 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| | | | | 2 | | – | 3 | 2 | 8 | 1 | 9 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| | | | | | 3 | – | – | – | 8 | 1 | 9 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| 20 | R1651 8 | 9 | | | | 4 | 3 | – | – | – | – | 20 | 21 | – | 22 | 23 | – |
| | | | 1 | | | 4 | 3 | 2 | 8 | 1 | 9 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| | | | | 2 | | – | 3 | 2 | 8 | 1 | 9 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| | | | | | 3 | – | – | – | 8 | 1 | 9 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| 25 | R1651 2 | 9 | | | | 4 | 3 | – | – | – | – | 20 | 21 | – | 22 | 23 | – |
| | | | 1 | | | 4 | 3 | 2 | 8 | 1 | 9 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| | | | | 2 | | – | 3 | 2 | 8 | 1 | 9 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| | | | | | 3 | – | – | – | 8 | 1 | 9 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| 30 | R1651 7 | 9 | | | | 4 | 3 | – | – | – | – | 20 | 21 | – | 22 | 23 | – |
| | | | 1 | | | 4 | 3 | 2 | 8 | 1 | 9 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| | | | | 2 | | – | 3 | 2 | 8 | 1 | 9 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| | | | | | 3 | – | – | – | 8 | 1 | 9 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| 35 | R1651 3 | 9 | | | | 4 | 3 | – | – | – | – | 20 | 21 | – | 22 | 23 | – |
| | | | 1 | | | 4 | 3 | 2 | 8 | 1 | 9 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| | | | | 2 | | – | 3 | 2 | 8 | 1 | 9 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| | | | | | 3 | – | – | – | 8 | 1 | 9 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| 45 | R1651 4 | 9 | | | | 4 | 3 | – | – | – | – | 20 | – | – | 22 | – | – |
| | | | 1 | | | 4 | 3 | 2 | 8 | 1 | 9 | 20 | – | 2Z | 22 | – | 2Y |
| | | | | 2 | | – | 3 | 2 | 8 | 1 | 9 | 20 | – | 2Z | 22 | – | 2Y |
| | | | | | 3 | – | – | – | 8 | 1 | 9 | 20 | – | 2Z | 22 | – | 2Y |
| E.g.: | R1651 7 | | 1 | | | 3 | | | | | | 20 | | | | | |

1) Only for accuracy classes N and H and for XP in preload class C1.

Order example

Options:

- Ball runner blocks FNS
- Size 30
- Preload class C1
- Accuracy class H
- With standard seal, without ball chain

Material number:

R1651 713 20

Preload classes

C0 = Without preload (clearance)
 C1 = Moderate preload
 C2 = Average preload
 C3 = High preload

Seals

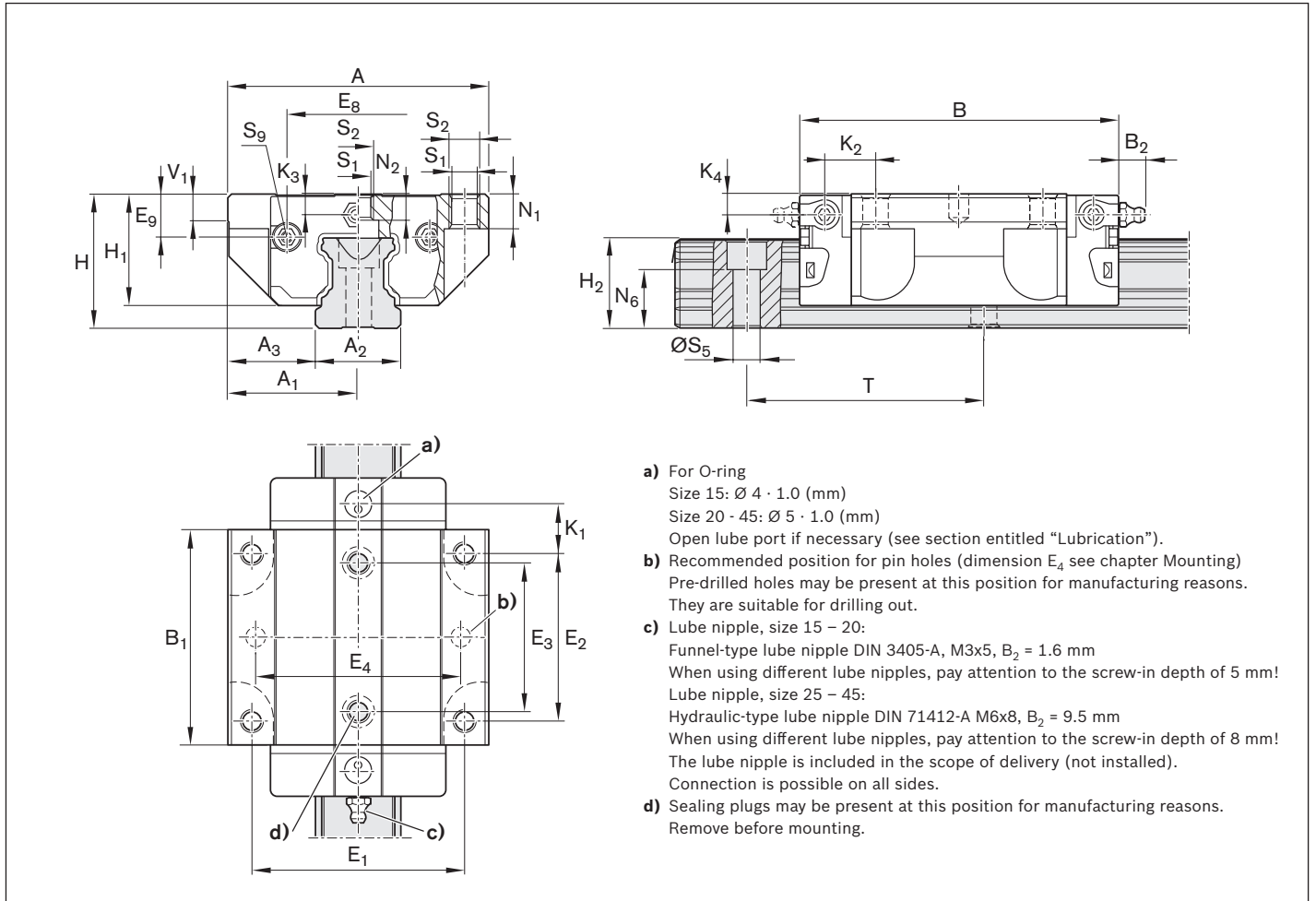
SS = Standard seal
 LS = Low-friction seal
 DS = Double-lip seal

Key

gray numbers

= No preferred variant / combination

(partially longer delivery times)



| Size | Dimensions (mm) | | | | | | | | | | | | | | | | | | |
|------|-----------------|----------------|----------------|----------------|-------------------|----------------|----------------|----------------|----------------|----------------|----------------|----|----------------|------------------------------|------------------------------|----------------|----------------|----------------|----------------|
| | A | A ₁ | A ₂ | A ₃ | B ^{+0.5} | B ₁ | E ₁ | E ₂ | E ₃ | E ₈ | E ₉ | H | H ₁ | H ₂ ¹⁾ | H ₂ ²⁾ | K ₁ | K ₂ | K ₃ | K ₄ |
| 15 | 47 | 23.5 | 15 | 16.0 | 58.2 | 39.2 | 38 | 30 | 26 | 24.55 | 6.70 | 24 | 19.90 | 16.30 | 16.20 | 8.00 | 9.6 | 3.20 | 3.20 |
| 20 | 63 | 31.5 | 20 | 21.5 | 75.0 | 49.6 | 53 | 40 | 35 | 32.50 | 7.30 | 30 | 25.35 | 20.75 | 20.55 | 11.80 | 11.8 | 3.35 | 3.35 |
| 25 | 70 | 35.0 | 23 | 23.5 | 86.2 | 57.8 | 57 | 45 | 40 | 38.30 | 11.50 | 36 | 29.90 | 24.45 | 24.25 | 12.45 | 13.6 | 5.50 | 5.50 |
| 30 | 90 | 45.0 | 28 | 31.0 | 97.7 | 67.4 | 72 | 52 | 44 | 48.40 | 14.60 | 42 | 35.35 | 28.55 | 28.35 | 14.00 | 15.7 | 6.05 | 6.05 |
| 35 | 100 | 50.0 | 34 | 33.0 | 110.5 | 77.0 | 82 | 62 | 52 | 58.00 | 17.35 | 48 | 40.40 | 32.15 | 31.85 | 14.50 | 16.0 | 6.90 | 6.90 |
| 45 | 120 | 60.0 | 45 | 37.5 | 137.6 | 97.0 | 100 | 80 | 60 | 69.80 | 20.90 | 60 | 50.30 | 40.15 | 39.85 | 17.30 | 19.3 | 8.20 | 8.20 |

| Size | Dimensions (mm) | | | | | | | | | | Mass (kg) | Load capacities ³⁾ (N) | | Load moments ³⁾ (Nm) | | | |
|------|-----------------|----------------|--------------------------------|----------------|----------------|----------------|----------------|-----|----------------|------|-----------|-----------------------------------|----------------|---------------------------------|-----------------|----------------|-----------------|
| | N ₁ | N ₂ | N ₆ ^{+0.5} | S ₁ | S ₂ | S ₅ | S ₉ | T | V ₁ | m | | C | C ₀ | M _t | M _{t0} | M _L | M _{L0} |
| 15 | 5.2 | 4.40 | 10.3 | 4.3 | M5 | 4.5 | M2.5x3.5 | 60 | 5.0 | 0.20 | 9860 | 12700 | 95 | 120 | 68 | 87 | |
| 20 | 7.7 | 5.20 | 13.2 | 5.3 | M6 | 6.0 | M3x5 | 60 | 6.0 | 0.45 | 23400 | 29800 | 300 | 380 | 200 | 260 | |
| 25 | 9.3 | 7.00 | 15.2 | 6.7 | M8 | 7.0 | M3x5 | 60 | 7.5 | 0.65 | 28600 | 35900 | 410 | 510 | 290 | 360 | |
| 30 | 11.0 | 7.90 | 17.0 | 8.5 | M10 | 9.0 | M3x5 | 80 | 7.0 | 1.10 | 36500 | 48100 | 630 | 830 | 440 | 580 | |
| 35 | 12.0 | 10.15 | 20.5 | 8.5 | M10 | 9.0 | M3x5 | 80 | 8.0 | 1.60 | 51800 | 80900 | 1110 | 1740 | 720 | 1130 | |
| 45 | 15.0 | 12.40 | 23.5 | 10.4 | M12 | 14.0 | M4x7 | 105 | 10.0 | 3.00 | 86400 | 132000 | 2330 | 3560 | 1540 | 2350 | |

1) Dimension H₂ with cover strip

2) Dimension H₂ without cover strip

3) Load ratings and load moments for ball runner block **without** ball chain. Load ratings and load moments for ball runner block **with** ball chain 12

Determination of the dynamic load capacities and load moments is based on a stroke travel of 100,000 m according to DIN ISO 14728-1.

Often only 50,000 m are actually stipulated. For comparison: Multiply the values **C**, **M_t** and **M_L** by 1.26 according to the table.

FLS – Flanged, long, standard height R1653 ... 2.

**Dynamic characteristics**

Travel speed: $v_{\max} = 5 \text{ m/s}$
 Acceleration: $a_{\max} = 500 \text{ m/s}^2$
 (If $F_{\text{comb}} > 2.8 \cdot F_{\text{pr}}$: $a_{\max} = 50 \text{ m/s}^2$)

Note on lubrication

► Pre-lubricated

Note

Can be used on all SNS/SNO ball guide rails. Ball runner blocks of size 55 and size 65 can be found in chapter “Heavy-duty ball runner block BSHP made of steel” after this chapter.

Options and material numbers

| Size | Ball runner blocks with size | Preload class | | | | Accuracy class | | | | | | Seals on ball runner blocks | | | | | |
|--------------|------------------------------|---------------|----|----|----|----------------|---|---|----|----|----|-----------------------------|------------------|----|-----------------|------------------|----|
| | | C0 | C1 | C2 | C3 | N | H | P | XP | SP | UP | without ball chain | | | with ball chain | | |
| | | | | | | | | | | | | SS | LS ¹⁾ | DS | SS | LS ¹⁾ | DS |
| 15 | R1653 1 | 9 | | | | 4 | 3 | – | – | – | – | 20 | 21 | – | 22 | 23 | – |
| | | | 1 | | | 4 | 3 | 2 | 8 | 1 | 9 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| | | | | 2 | | – | 3 | 2 | 8 | 1 | 9 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| | | | | | 3 | – | – | – | 8 | 1 | 9 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| 20 | R1653 8 | 9 | | | | 4 | 3 | – | – | – | – | 20 | 21 | – | 22 | 23 | – |
| | | | 1 | | | 4 | 3 | 2 | 8 | 1 | 9 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| | | | | 2 | | – | 3 | 2 | 8 | 1 | 9 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| | | | | | 3 | – | – | – | 8 | 1 | 9 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| 25 | R1653 2 | 9 | | | | 4 | 3 | – | – | – | – | 20 | 21 | – | 22 | 23 | – |
| | | | 1 | | | 4 | 3 | 2 | 8 | 1 | 9 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| | | | | 2 | | – | 3 | 2 | 8 | 1 | 9 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| | | | | | 3 | – | – | – | 8 | 1 | 9 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| 30 | R1653 7 | 9 | | | | 4 | 3 | – | – | – | – | 20 | 21 | – | 22 | 23 | – |
| | | | 1 | | | 4 | 3 | 2 | 8 | 1 | 9 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| | | | | 2 | | – | 3 | 2 | 8 | 1 | 9 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| | | | | | 3 | – | – | – | 8 | 1 | 9 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| 35 | R1653 3 | 9 | | | | 4 | 3 | – | – | – | – | 20 | 21 | – | 22 | 23 | – |
| | | | 1 | | | 4 | 3 | 2 | 8 | 1 | 9 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| | | | | 2 | | – | 3 | 2 | 8 | 1 | 9 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| | | | | | 3 | – | – | – | 8 | 1 | 9 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| 45 | R1653 4 | 9 | | | | 4 | 3 | – | – | – | – | 20 | – | – | 22 | – | – |
| | | | 1 | | | 4 | 3 | 2 | 8 | 1 | 9 | 20 | – | 2Z | 22 | – | 2Y |
| | | | | 2 | | – | 3 | 2 | 8 | 1 | 9 | 20 | – | 2Z | 22 | – | 2Y |
| | | | | | 3 | – | – | – | 8 | 1 | 9 | 20 | – | 2Z | 22 | – | 2Y |
| E.g.: | R1653 7 | | 1 | | | | 3 | | | | | | | 20 | | | |

1) Only for accuracy classes N and H and for XP in preload class C1.

Order example

Options:

- Ball runner blocks FLS
- Size 30
- Preload class C1
- Accuracy class H
- With standard seal, without ball chain

Material number:

R1653 713 20

Preload classes

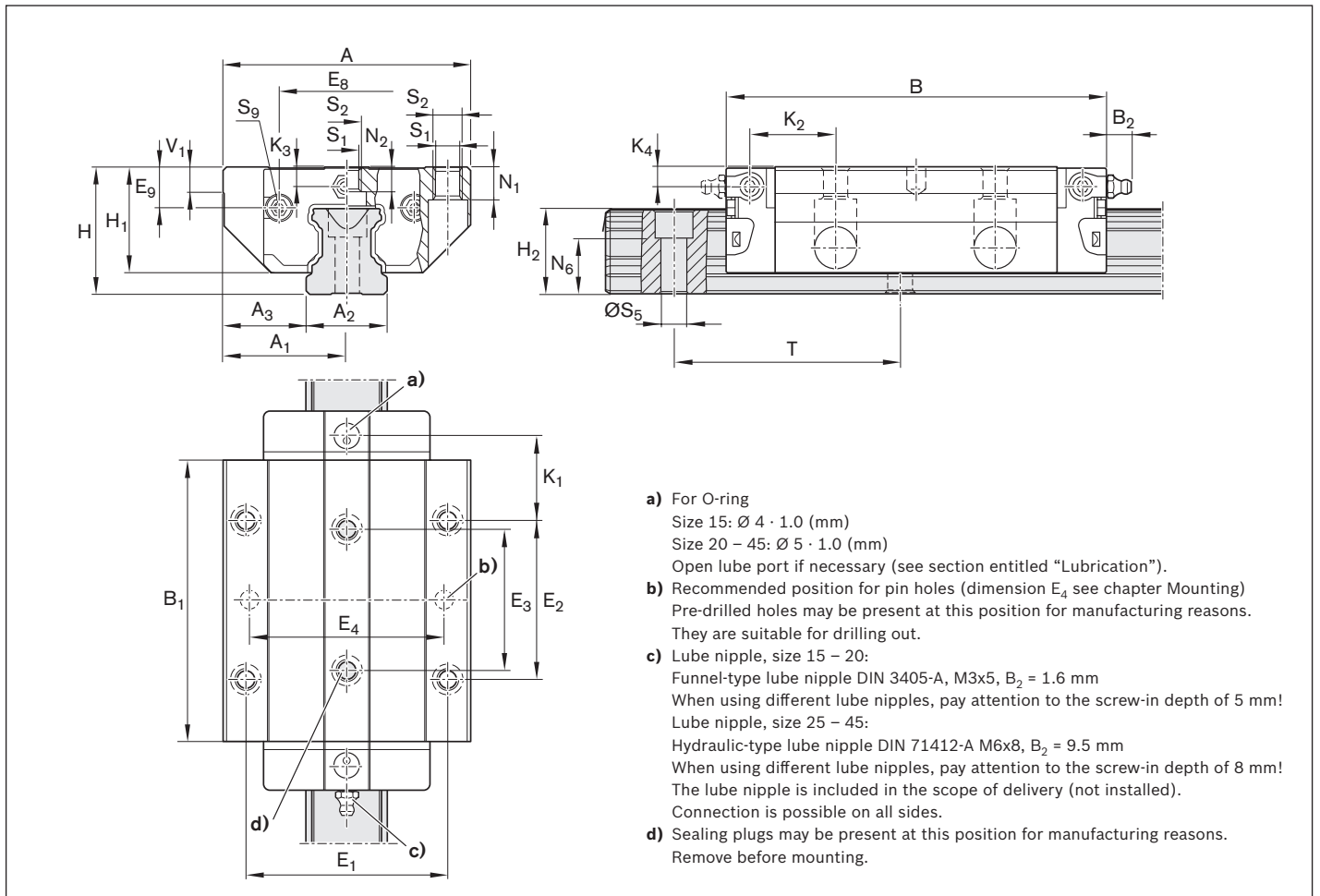
C0 = Without preload (clearance)
 C1 = Moderate preload
 C2 = Average preload
 C3 = High preload

Seals

SS = Standard seal
 LS = Low-friction seal
 DS = Double-lip seal

Key

gray numbers
 = No preferred variant / combination
 (partially longer delivery times)



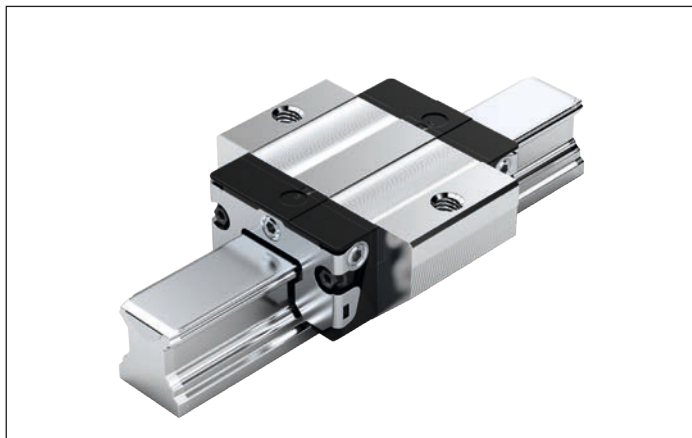
| Size | Dimensions (mm) | | | | | | | | | | | | | | | | | | |
|------|-----------------|----------------|----------------|----------------|-------------------|----------------|----------------|----------------|----------------|----------------|----------------|----|----------------|------------------------------|------------------------------|----------------|----------------|----------------|----------------|
| | A | A ₁ | A ₂ | A ₃ | B ^{+0.5} | B ₁ | E ₁ | E ₂ | E ₃ | E ₈ | E ₉ | H | H ₁ | H ₂ ¹⁾ | H ₂ ²⁾ | K ₁ | K ₂ | K ₃ | K ₄ |
| 15 | 47 | 23.5 | 15 | 16.0 | 72.6 | 53.6 | 38 | 30 | 26 | 24.55 | 6.70 | 24 | 19.90 | 16.30 | 16.20 | 15.20 | 16.80 | 3.20 | 3.20 |
| 20 | 63 | 31.5 | 20 | 21.5 | 91.0 | 65.6 | 53 | 40 | 35 | 32.50 | 7.30 | 30 | 25.35 | 20.75 | 20.55 | 19.80 | 19.80 | 3.35 | 3.35 |
| 25 | 70 | 35.0 | 23 | 23.5 | 107.9 | 79.5 | 57 | 45 | 40 | 38.30 | 11.50 | 36 | 29.90 | 24.45 | 24.25 | 23.30 | 24.45 | 5.50 | 5.50 |
| 30 | 90 | 45.0 | 28 | 31.0 | 119.7 | 89.4 | 72 | 52 | 44 | 48.40 | 14.60 | 42 | 35.35 | 28.55 | 28.35 | 25.00 | 26.70 | 6.05 | 6.05 |
| 35 | 100 | 50.0 | 34 | 33.0 | 139.0 | 105.5 | 82 | 62 | 52 | 58.00 | 17.35 | 48 | 40.40 | 32.15 | 31.85 | 28.75 | 30.25 | 6.90 | 6.90 |
| 45 | 120 | 60.0 | 45 | 37.5 | 174.1 | 133.5 | 100 | 80 | 60 | 69.80 | 20.90 | 60 | 50.30 | 40.15 | 39.85 | 35.50 | 37.50 | 8.20 | 8.20 |

| Size | Dimensions (mm) | | | | | | | | | | Mass (kg) | Load capacities ³⁾ (N) | | Load moments ³⁾ (Nm) | | | |
|------|-----------------|----------------|--------------------------------|----------------|----------------|----------------|----------------|-----|----------------|------|-----------|-----------------------------------|----------------|---------------------------------|-----------------|----------------|-----------------|
| | N ₁ | N ₂ | N ₆ ^{+0.5} | S ₁ | S ₂ | S ₅ | S ₉ | T | V ₁ | m | | C | C ₀ | M _t | M _{t0} | M _L | M _{L0} |
| 15 | 5.2 | 4.40 | 10.3 | 4.3 | M5 | 4.5 | M2.5x3.5 | 60 | 5.0 | 0.30 | 12800 | 18400 | 120 | 180 | 120 | 180 | |
| 20 | 7.7 | 5.20 | 13.2 | 5.3 | M6 | 6.0 | M3x5 | 60 | 6.0 | 0.55 | 29600 | 41800 | 380 | 540 | 340 | 490 | |
| 25 | 9.3 | 7.00 | 15.2 | 6.7 | M8 | 7.0 | M3x5 | 60 | 7.5 | 0.90 | 37300 | 52500 | 530 | 750 | 530 | 740 | |
| 30 | 11.0 | 7.90 | 17.0 | 8.5 | M10 | 9.0 | M3x5 | 80 | 7.0 | 1.50 | 46000 | 66900 | 800 | 1160 | 740 | 1080 | |
| 35 | 12.0 | 10.15 | 20.5 | 8.5 | M10 | 9.0 | M3x5 | 80 | 8.0 | 2.25 | 66700 | 116000 | 1440 | 2500 | 1290 | 2240 | |
| 45 | 15.0 | 12.40 | 23.5 | 10.4 | M12 | 14.0 | M4x7 | 105 | 10.0 | 4.30 | 111000 | 190000 | 3010 | 5120 | 2730 | 4660 | |

- 1) Dimension H_2 with cover strip
- 2) Dimension H_2 without cover strip
- 3) Load ratings and load moments for ball runner block **without** ball chain. Load ratings and load moments for ball runner block **with** ball chain 12

Determination of the dynamic load capacities and load moments is based on a stroke travel of 100,000 m according to DIN ISO 14728-1. Often only 50,000 m are actually stipulated. For comparison: Multiply the values C , M_t and M_L by 1.26 according to the table.

FKS – flange, short, standard height R1665 ... 2.

**Dynamic characteristics**

Travel speed: $v_{\max} = 5 \text{ m/s}$
 Acceleration: $a_{\max} = 500 \text{ m/s}^2$
 (If $F_{\text{comb}} > 2.8 \cdot F_{\text{pr}}$: $a_{\max} = 50 \text{ m/s}^2$)

Note on lubrication

► Pre-lubricated

Note

Can be used on all SNS/SNO ball guide rails.

Options and material numbers

| Size | Ball runner blocks with size | Preload class | | Accuracy class | | Seals on ball runner blocks | | | | | |
|--------------|------------------------------|---------------|----|----------------|---|-----------------------------|----|----|-----------------|----|----|
| | | C0 | C1 | N | H | without ball chain | | | with ball chain | | |
| | | | | | | SS | LS | DS | SS | LS | DS |
| 15 | R1665 1 | 9 | | 4 | 3 | 20 | 21 | – | 22 | 23 | – |
| | | | 1 | 4 | 3 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| 20 | R1665 8 | 9 | | 4 | 3 | 20 | 21 | – | 22 | 23 | – |
| | | | 1 | 4 | 3 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| 25 | R1665 2 | 9 | | 4 | 3 | 20 | 21 | – | 22 | 23 | – |
| | | | 1 | 4 | 3 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| 30 | R1665 7 | 9 | | 4 | 3 | 20 | 21 | – | 22 | 23 | – |
| | | | 1 | 4 | 3 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| 35 | R1665 3 | 9 | | 4 | 3 | 20 | 21 | – | 22 | 23 | – |
| | | | 1 | 4 | 3 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| E.g.: | R1665 7 | | 1 | | 3 | 20 | | | | | |

Order example

Options:

- Ball runner blocks FKS
- Size 30
- Preload class C1
- Accuracy class H
- With standard seal, without ball chain

Material number:

R1665 713 20

Preload classes

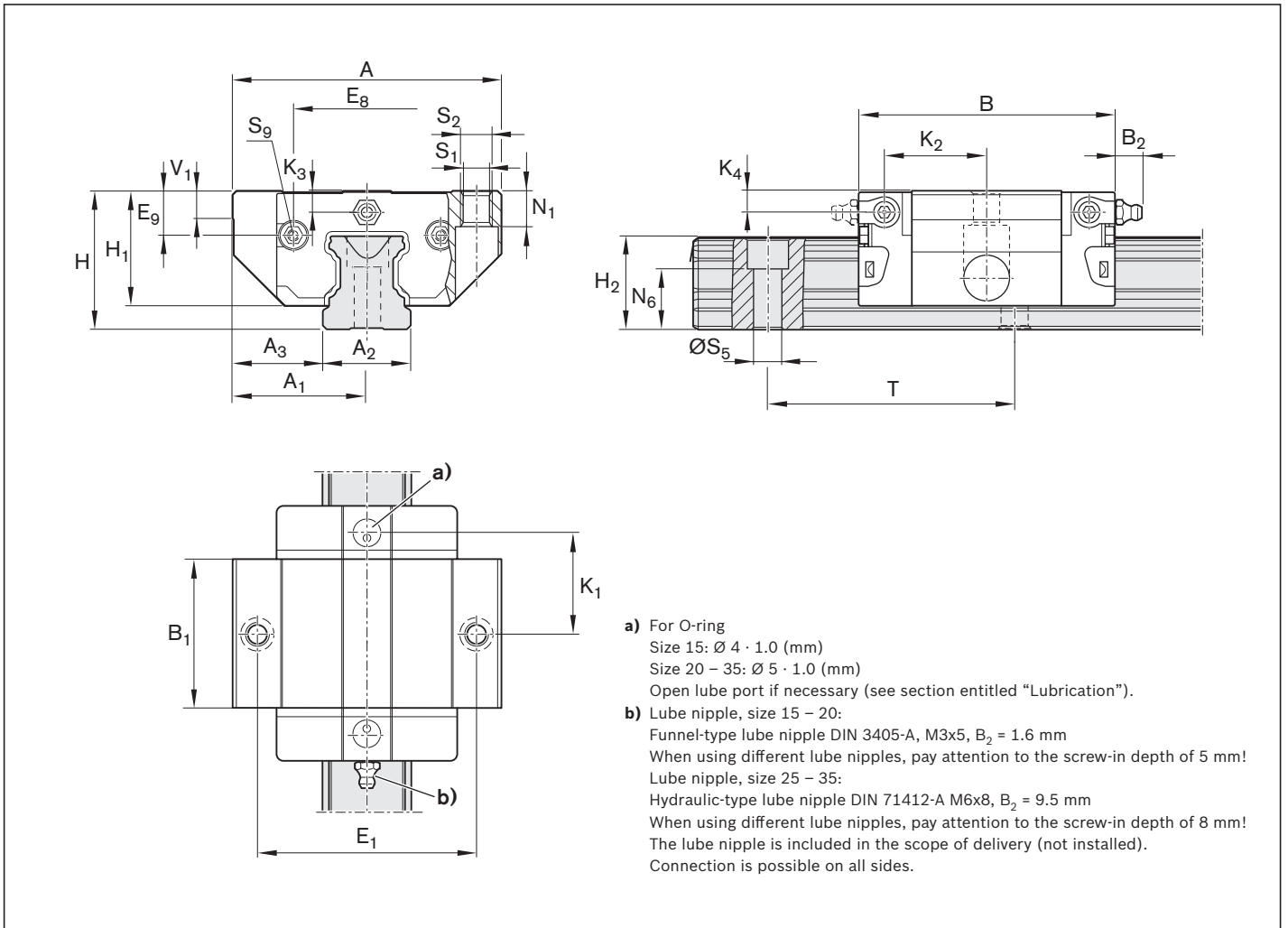
C0 = Without preload (clearance)
 C1 = Moderate preload

Seals

SS = Standard seal
 LS = Low-friction seal
 DS = Double-lip seal

Key

gray numbers
 = No preferred variant / combination
 (partially longer delivery times)




| Size | Dimensions (mm) | | | | | | | | | | | | | | | | |
|------|-----------------|----------------|----------------|----------------|-------------------|----------------|----------------|----------------|----------------|----|----------------|------------------------------|------------------------------|----------------|----------------|----------------|----------------|
| | A | A ₁ | A ₂ | A ₃ | B ^{+0.5} | B ₁ | E ₁ | E ₈ | E ₉ | H | H ₁ | H ₂ ¹⁾ | H ₂ ²⁾ | K ₁ | K ₂ | K ₃ | K ₄ |
| 15 | 47 | 23.5 | 15 | 16.0 | 44.7 | 25.7 | 38 | 24.55 | 6.70 | 24 | 19.90 | 16.30 | 16.20 | 16.25 | 17.85 | 3.20 | 3.20 |
| 20 | 63 | 31.5 | 20 | 21.5 | 57.3 | 31.9 | 53 | 32.50 | 7.30 | 30 | 25.35 | 20.75 | 20.55 | 22.95 | 22.95 | 3.35 | 3.35 |
| 25 | 70 | 35.0 | 23 | 23.5 | 67.0 | 38.6 | 57 | 38.30 | 11.50 | 36 | 29.90 | 24.45 | 24.25 | 25.35 | 26.50 | 5.50 | 5.50 |
| 30 | 90 | 45.0 | 28 | 31.0 | 75.3 | 45.0 | 72 | 48.40 | 14.60 | 42 | 35.35 | 28.55 | 28.35 | 28.80 | 30.50 | 6.05 | 6.05 |
| 35 | 100 | 50.0 | 34 | 33.0 | 84.9 | 51.4 | 82 | 58.00 | 17.35 | 48 | 40.40 | 32.15 | 31.85 | 32.70 | 34.20 | 6.90 | 6.90 |

| Size | Dimensions (mm) | | | | | | | | | Mass (kg) | Load capacities ³⁾ (N) | | Load moments ³⁾ (Nm) | | | |
|------|-----------------|--------------------------------|----------------|----------------|----------------|----------------|----|----------------|------|-----------|-----------------------------------|----------------|---------------------------------|-----------------|----------------|-----------------|
| | N ₁ | N ₆ ^{±0.5} | S ₁ | S ₂ | S ₅ | S ₉ | T | V ₁ | m | | C | C ₀ | M _t | M _{t0} | M _L | M _{L0} |
| 15 | 5.2 | 10.3 | 4.3 | M5 | 4.5 | M2.5x3.5 | 60 | 5.0 | 0.15 | 6720 | 7340 | 65 | 71 | 29 | 32 | |
| 20 | 7.7 | 13.2 | 5.3 | M6 | 6.0 | M3x5 | 60 | 6.0 | 0.30 | 15400 | 16500 | 200 | 210 | 83 | 89 | |
| 25 | 9.3 | 15.2 | 6.7 | M8 | 7.0 | M3x5 | 60 | 7.5 | 0.50 | 19800 | 21200 | 280 | 300 | 130 | 140 | |
| 30 | 11.0 | 17.0 | 8.5 | M10 | 9.0 | M3x5 | 80 | 7.0 | 0.80 | 25600 | 28900 | 440 | 500 | 200 | 230 | |
| 35 | 12.0 | 20.5 | 8.5 | M10 | 9.0 | M3x5 | 80 | 8.0 | 1.20 | 36600 | 49300 | 790 | 1060 | 340 | 460 | |

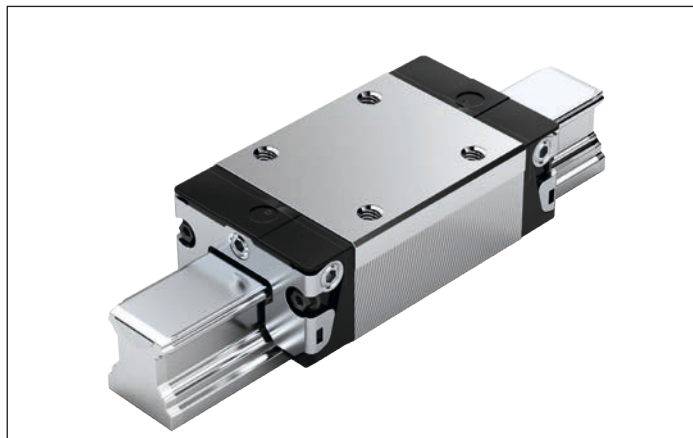
1) Dimension H₂ with cover strip

2) Dimension H₂ without cover strip

3) Load ratings and load moments for ball runner block **without** ball chain. Load ratings and load moments for ball runner block **with** ball chain  12

Determination of the dynamic load capacities and load moments is based on a stroke travel of 100,000 m according to DIN ISO 14728-1. Often only 50,000 m are actually stipulated. For comparison: Multiply the values **C**, **M_t** and **M_L** by 1.26 according to the table.

SNS – Slimline, normal, standard height R1622 ... 2.

**Dynamic characteristics**

Travel speed: $v_{\max} = 5 \text{ m/s}$
 Acceleration: $a_{\max} = 500 \text{ m/s}^2$
 (If $F_{\text{comb}} > 2.8 \cdot F_{\text{pr}}$: $a_{\max} = 50 \text{ m/s}^2$)

Note on lubrication

► Pre-lubricated

Note

Can be used on all SNS/SNO ball guide rails. Ball runner blocks of size 55 and size 65 can be found in chapter “Heavy-duty ball runner block BSHP made of steel” after this chapter.

Options and material numbers

| Size | Ball runner blocks with size | Preload class | | | | Accuracy class | | | | Seals on ball runner blocks | | | | | |
|--------------|------------------------------|---------------|----|----|----|----------------|---|---|----|-----------------------------|------------------|----|-----------------|------------------|----|
| | | C0 | C1 | C2 | C3 | N | H | P | XP | without ball chain | | | with ball chain | | |
| | | | | | | | | | | SS | LS ¹⁾ | DS | SS | LS ¹⁾ | DS |
| 15 | R1622 1 | 9 | | | | 4 | 3 | – | – | 20 | 21 | – | 22 | 23 | – |
| | | | 1 | | | 4 | 3 | 2 | 8 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| | | | | 2 | | – | 3 | 2 | 8 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| | | | | | 3 | – | – | – | 8 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| 20 | R1622 8 | 9 | | | | 4 | 3 | – | – | 20 | 21 | – | 22 | 23 | – |
| | | | 1 | | | 4 | 3 | 2 | 8 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| | | | | 2 | | – | 3 | 2 | 8 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| | | | | | 3 | – | – | – | 8 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| 25 | R1622 2 | 9 | | | | 4 | 3 | – | – | 20 | 21 | – | 22 | 23 | – |
| | | | 1 | | | 4 | 3 | 2 | 8 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| | | | | 2 | | – | 3 | 2 | 8 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| | | | | | 3 | – | – | – | 8 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| 30 | R1622 7 | 9 | | | | 4 | 3 | – | – | 20 | 21 | – | 22 | 23 | – |
| | | | 1 | | | 4 | 3 | 2 | 8 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| | | | | 2 | | – | 3 | 2 | 8 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| | | | | | 3 | – | – | – | 8 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| 35 | R1622 3 | 9 | | | | 4 | 3 | – | – | 20 | 21 | – | 22 | 23 | – |
| | | | 1 | | | 4 | 3 | 2 | 8 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| | | | | 2 | | – | 3 | 2 | 8 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| | | | | | 3 | – | – | – | 8 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| 45 | R1622 4 | 9 | | | | 4 | 3 | – | – | 20 | – | – | 22 | – | – |
| | | | 1 | | | 4 | 3 | 2 | 8 | 20 | – | 2Z | 22 | – | 2Y |
| | | | | 2 | | – | 3 | 2 | 8 | 20 | – | 2Z | 22 | – | 2Y |
| | | | | | 3 | – | – | – | 8 | 20 | – | 2Z | 22 | – | 2Y |
| E.g.: | R1622 7 | | 1 | | | | 3 | | | 20 | | | | | |

1) Only for accuracy classes N and H and for XP in preload class C1.

Order example

Options:

- Ball runner blocks SNS
- Size 30
- Preload class C1
- Accuracy class H
- With standard seal, without ball chain

Material number:

R1622 713 20

Preload classes

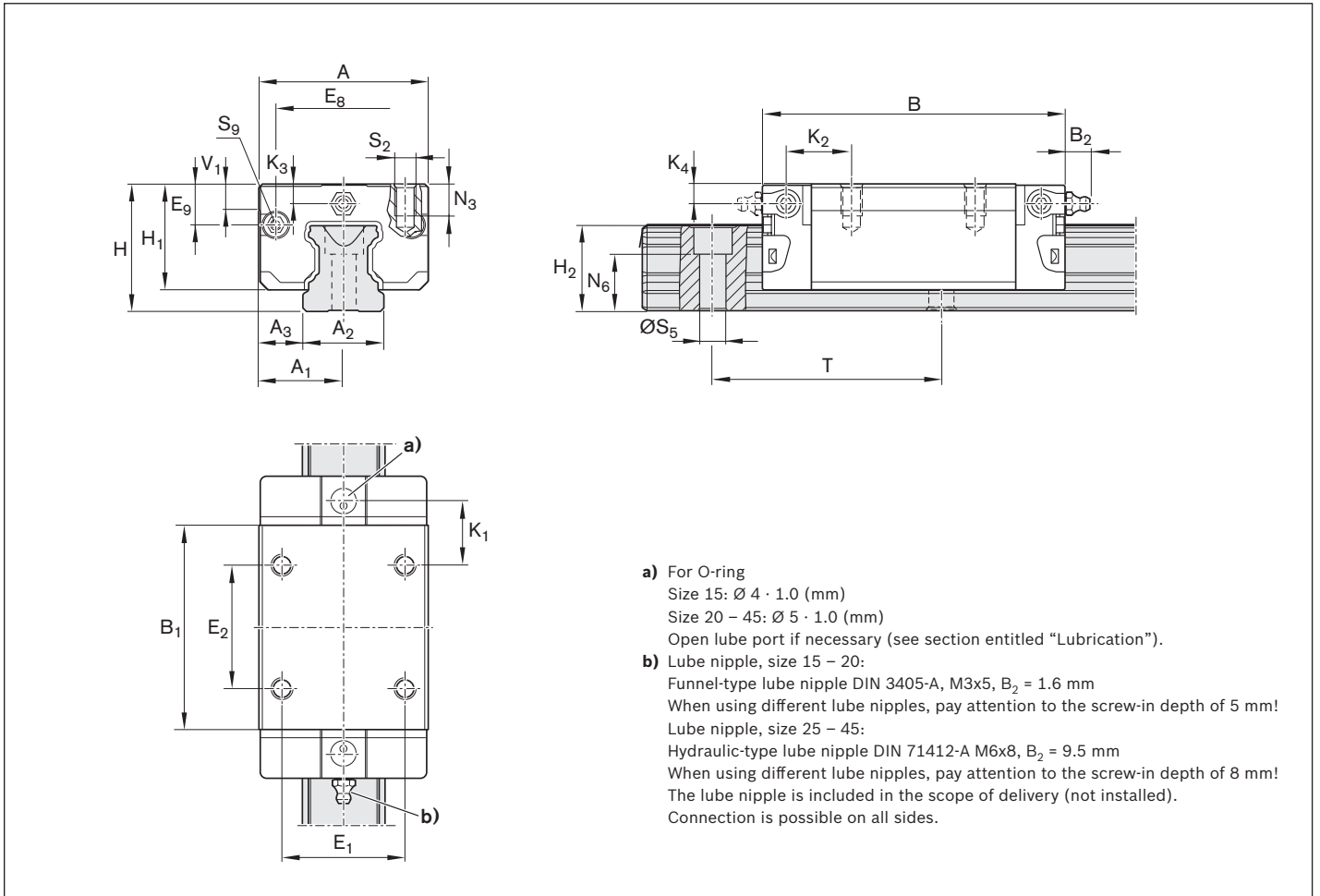
C0 = Without preload (clearance)
 C1 = Moderate preload
 C2 = Average preload
 C3 = High preload

Seals

SS = Standard seal
 LS = Low-friction seal
 DS = Double-lip seal

Key

gray numbers
 = No preferred variant / combination
 (partially longer delivery times)



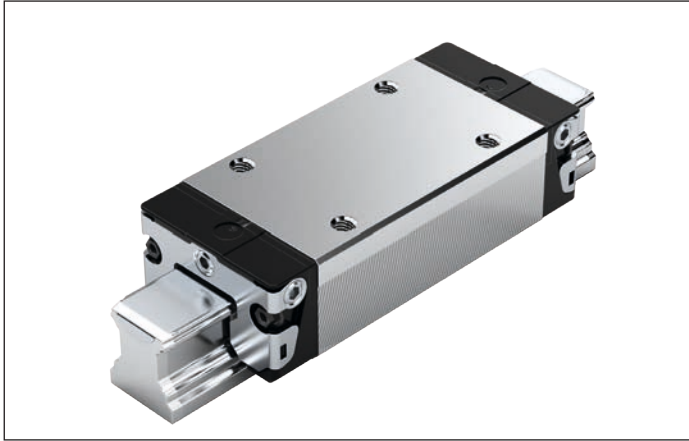
| Size | Dimensions (mm) | | | | | | | | | | | | | | | | | |
|------|-----------------|----------------|----------------|----------------|-------------------|----------------|----------------|----------------|----------------|----------------|----|----------------|------------------------------|------------------------------|----------------|----------------|----------------|----------------|
| | A | A ₁ | A ₂ | A ₃ | B ^{+0.5} | B ₁ | E ₁ | E ₂ | E ₈ | E ₉ | H | H ₁ | H ₂ ¹⁾ | H ₂ ²⁾ | K ₁ | K ₂ | K ₃ | K ₄ |
| 15 | 34 | 17 | 15 | 9.5 | 58.2 | 39.2 | 26 | 26 | 24.55 | 6.70 | 24 | 19.90 | 16.30 | 16.20 | 10.00 | 11.60 | 3.20 | 3.20 |
| 20 | 44 | 22 | 20 | 12.0 | 75.0 | 49.6 | 32 | 36 | 32.50 | 7.30 | 30 | 25.35 | 20.75 | 20.55 | 13.80 | 13.80 | 3.35 | 3.35 |
| 25 | 48 | 24 | 23 | 12.5 | 86.2 | 57.8 | 35 | 35 | 38.30 | 11.50 | 36 | 29.90 | 24.45 | 24.25 | 17.45 | 18.60 | 5.50 | 5.50 |
| 30 | 60 | 30 | 28 | 16.0 | 97.7 | 67.4 | 40 | 40 | 48.40 | 14.60 | 42 | 35.35 | 28.55 | 28.35 | 20.00 | 21.70 | 6.05 | 6.05 |
| 35 | 70 | 35 | 34 | 18.0 | 110.5 | 77.0 | 50 | 50 | 58.00 | 17.35 | 48 | 40.40 | 32.15 | 31.85 | 20.50 | 22.00 | 6.90 | 6.90 |
| 45 | 86 | 43 | 45 | 20.5 | 137.6 | 97.0 | 60 | 60 | 69.80 | 20.90 | 60 | 50.30 | 40.15 | 39.85 | 27.30 | 29.30 | 8.20 | 8.20 |

| Size | Dimensions (mm) | | | | | | | | Mass (kg) | Load capacities ³⁾ (N) | | Load moments ³⁾ (Nm) | | | |
|------|-----------------|--------------------------------|----------------|----------------|----------------|-----|----------------|------|-----------|-----------------------------------|----------------|---------------------------------|-----------------|----------------|-----------------|
| | N ₃ | N ₆ ^{±0.5} | S ₂ | S ₅ | S ₉ | T | V ₁ | m | | C | C ₀ | M _t | M _{t0} | M _L | M _{L0} |
| 15 | 6.0 | 10.3 | M4 | 4.5 | M2.5x3.5 | 60 | 5.0 | 0.15 | 9860 | 12700 | 95 | 120 | 68 | 87 | |
| 20 | 7.5 | 13.2 | M5 | 6.0 | M3x5 | 60 | 6.0 | 0.35 | 23400 | 29800 | 300 | 380 | 200 | 260 | |
| 25 | 9.0 | 15.2 | M6 | 7.0 | M3x5 | 60 | 7.5 | 0.50 | 28600 | 35900 | 410 | 510 | 290 | 360 | |
| 30 | 12.0 | 17.0 | M8 | 9.0 | M3x5 | 80 | 7.0 | 0.85 | 36500 | 48100 | 630 | 830 | 440 | 580 | |
| 35 | 13.0 | 20.5 | M8 | 9.0 | M3x5 | 80 | 8.0 | 1.25 | 51800 | 80900 | 1110 | 1740 | 720 | 1130 | |
| 45 | 18.0 | 23.5 | M10 | 14.0 | M4x7 | 105 | 10.0 | 2.40 | 86400 | 132000 | 2330 | 3560 | 1540 | 2350 | |

- 1) Dimension H₂ with cover strip
- 2) Dimension H₂ without cover strip
- 3) Load ratings and load moments for ball runner block **without** ball chain. Load ratings and load moments for ball runner block **with** ball chain 12

Determination of the dynamic load capacities and load moments is based on a stroke travel of 100,000 m according to DIN ISO 14728-1. Often only 50,000 m are actually stipulated. For comparison: Multiply the values **C**, **M_t** and **M_L** by 1.26 according to the table.

SLS – Slimline, long, standard height R1623 ... 2.

**Dynamic characteristics**

Travel speed: $v_{\max} = 5 \text{ m/s}$
 Acceleration: $a_{\max} = 500 \text{ m/s}^2$
 (If $F_{\text{comb}} > 2.8 \cdot F_{\text{pr}}$: $a_{\max} = 50 \text{ m/s}^2$)

Note on lubrication

► Pre-lubricated

Note

Can be used on all SNS/SNO ball guide rails. Ball runner blocks of size 55 and size 65 can be found in chapter “Heavy-duty ball runner block BSHP made of steel” after this chapter.

Options and material numbers

| Size | Ball runner blocks with size | Preload class | | | | Accuracy class | | | | Seals on ball runner blocks | | | | | |
|--------------|------------------------------|---------------|----|----|----|----------------|---|---|----|-----------------------------|------------------|----|-----------------|------------------|----|
| | | C0 | C1 | C2 | C3 | N | H | P | XP | without ball chain | | | with ball chain | | |
| | | | | | | | | | | SS | LS ¹⁾ | DS | SS | LS ¹⁾ | DS |
| 15 | R1623 1 | 9 | | | | 4 | 3 | – | – | 20 | 21 | – | 22 | 23 | – |
| | | | 1 | | | 4 | 3 | 2 | 8 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| | | | | 2 | | – | 3 | 2 | 8 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| | | | | | 3 | – | – | – | 8 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| 20 | R1623 8 | 9 | | | | 4 | 3 | – | – | 20 | 21 | – | 22 | 23 | – |
| | | | 1 | | | 4 | 3 | 2 | 8 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| | | | | 2 | | – | 3 | 2 | 8 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| | | | | | 3 | – | – | – | 8 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| 25 | R1623 2 | 9 | | | | 4 | 3 | – | – | 20 | 21 | – | 22 | 23 | – |
| | | | 1 | | | 4 | 3 | 2 | 8 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| | | | | 2 | | – | 3 | 2 | 8 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| | | | | | 3 | – | – | – | 8 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| 30 | R1623 7 | 9 | | | | 4 | 3 | – | – | 20 | 21 | – | 22 | 23 | – |
| | | | 1 | | | 4 | 3 | 2 | 8 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| | | | | 2 | | – | 3 | 2 | 8 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| | | | | | 3 | – | – | – | 8 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| 35 | R1623 3 | 9 | | | | 4 | 3 | – | – | 20 | 21 | – | 22 | 23 | – |
| | | | 1 | | | 4 | 3 | 2 | 8 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| | | | | 2 | | – | 3 | 2 | 8 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| | | | | | 3 | – | – | – | 8 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| 45 | R1623 4 | 9 | | | | 4 | 3 | – | – | 20 | – | – | 22 | – | – |
| | | | 1 | | | 4 | 3 | 2 | 8 | 20 | – | 2Z | 22 | – | 2Y |
| | | | | 2 | | – | 3 | 2 | 8 | 20 | – | 2Z | 22 | – | 2Y |
| | | | | | 3 | – | – | – | 8 | 20 | – | 2Z | 22 | – | 2Y |
| E.g.: | R1623 7 | | 1 | | | | 3 | | | 20 | | | | | |

1) Only for accuracy classes N and H and for XP in preload class C1.

Order example

Options:

- Ball runner blocks SLS
- Size 30
- Preload class C1
- Accuracy class H
- With standard seal, without ball chain

Material number:

R1623 713 20

Preload classes

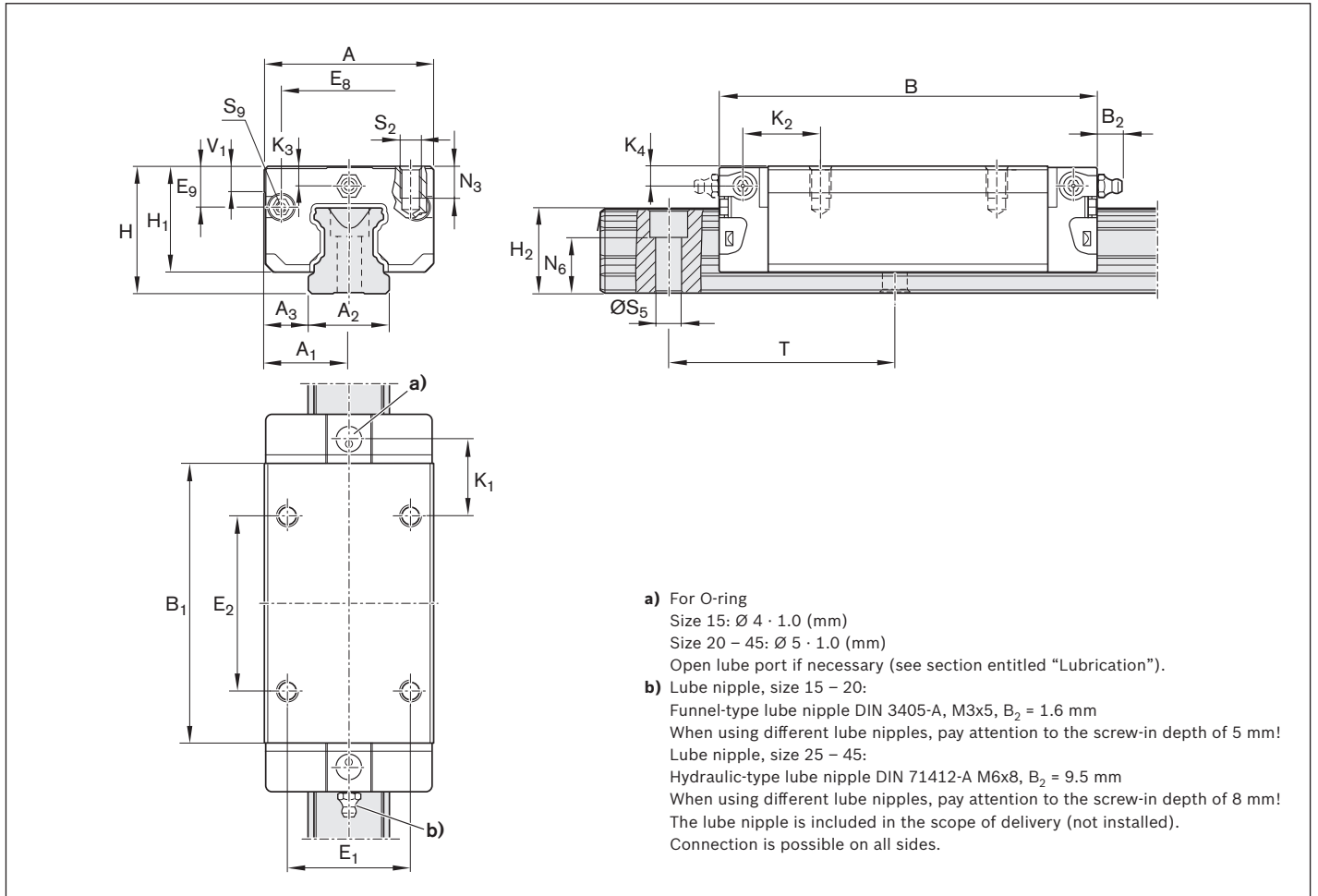
C0 = Without preload (clearance)
 C1 = Moderate preload
 C2 = Average preload
 C3 = High preload

Seals

SS = Standard seal
 LS = Low-friction seal
 DS = Double-lip seal


Key

gray numbers
 = No preferred variant / combination
 (partially longer delivery times)



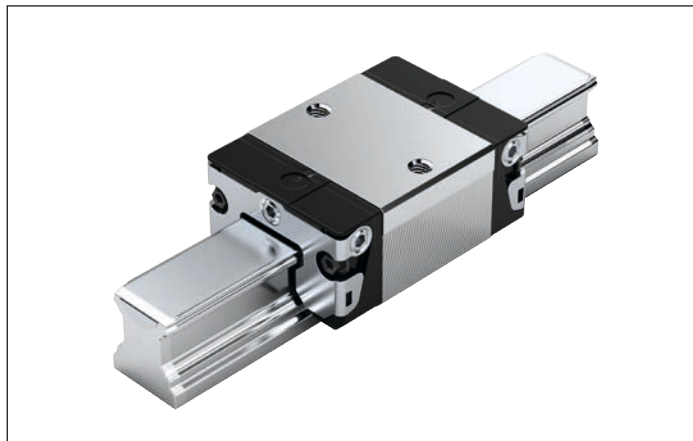
| Size | Dimensions (mm) | | | | | | | | | | | | | | | | | |
|------|-----------------|----------------|----------------|----------------|-------------------|----------------|----------------|----------------|----------------|----------------|----|----------------|------------------------------|------------------------------|----------------|----------------|----------------|----------------|
| | A | A ₁ | A ₂ | A ₃ | B ^{+0.5} | B ₁ | E ₁ | E ₂ | E ₈ | E ₉ | H | H ₁ | H ₂ ¹⁾ | H ₂ ²⁾ | K ₁ | K ₂ | K ₃ | K ₄ |
| 15 | 34 | 17 | 15 | 9.5 | 72.6 | 53.6 | 26 | 26 | 24.55 | 6.70 | 24 | 19.90 | 16.30 | 16.20 | 17.20 | 18.80 | 3.20 | 3.20 |
| 20 | 44 | 22 | 20 | 12.0 | 91.0 | 65.6 | 32 | 50 | 32.50 | 7.30 | 30 | 25.35 | 20.75 | 20.55 | 14.80 | 14.80 | 3.35 | 3.35 |
| 25 | 48 | 24 | 23 | 12.5 | 107.9 | 79.5 | 35 | 50 | 38.30 | 11.50 | 36 | 29.90 | 24.45 | 24.25 | 20.80 | 21.95 | 5.50 | 5.50 |
| 30 | 60 | 30 | 28 | 16.0 | 119.7 | 89.4 | 40 | 60 | 48.40 | 14.60 | 42 | 35.35 | 28.55 | 28.35 | 21.00 | 22.70 | 6.05 | 6.05 |
| 35 | 70 | 35 | 34 | 18.0 | 139.0 | 105.5 | 50 | 72 | 58.00 | 17.35 | 48 | 40.40 | 32.15 | 31.85 | 23.75 | 25.25 | 6.90 | 6.90 |
| 45 | 86 | 43 | 45 | 20.5 | 174.1 | 133.5 | 60 | 80 | 69.80 | 20.90 | 60 | 50.30 | 40.15 | 39.85 | 35.50 | 37.50 | 8.20 | 8.20 |

| Size | Dimensions (mm) | | | | | | | Mass (kg) | Load capacities ³⁾ (N) | | Load moments ³⁾ (Nm) | | | |
|------|-----------------|--------------------------------|----------------|----------------|----------------|-----|----------------|-----------|-----------------------------------|--------|---------------------------------|----------------|-----------------|----------------|
| | N ₃ | N ₆ ^{±0.5} | S ₂ | S ₅ | S ₉ | T | V ₁ | | m | C | C ₀ | M _t | M _{t0} | M _L |
| 15 | 6.0 | 10.3 | M4 | 4.5 | M2.5x3.5 | 60 | 5.0 | 0.20 | 12800 | 18400 | 120 | 180 | 120 | 180 |
| 20 | 7.5 | 13.2 | M5 | 6.0 | M3x5 | 60 | 6.0 | 0.45 | 29600 | 41800 | 380 | 540 | 340 | 490 |
| 25 | 9.0 | 15.2 | M6 | 7.0 | M3x5 | 60 | 7.5 | 0.65 | 37300 | 52500 | 530 | 750 | 530 | 740 |
| 30 | 12.0 | 17.0 | M8 | 9.0 | M3x5 | 80 | 7.0 | 1.10 | 46000 | 66900 | 800 | 1160 | 740 | 1080 |
| 35 | 13.0 | 20.5 | M8 | 9.0 | M3x5 | 80 | 8.0 | 1.70 | 66700 | 116000 | 1440 | 2500 | 1290 | 2240 |
| 45 | 18.0 | 23.5 | M10 | 14.0 | M4x7 | 105 | 10.0 | 3.20 | 111000 | 190000 | 3010 | 5120 | 2730 | 4660 |

- 1) Dimension H₂ with cover strip
- 2) Dimension H₂ without cover strip
- 3) Load ratings and load moments for ball runner block **without** ball chain. Load ratings and load moments for ball runner block **with** ball chain  12

Determination of the dynamic load capacities and load moments is based on a stroke travel of 100,000 m according to DIN ISO 14728-1. Often only 50,000 m are actually stipulated. For comparison: Multiply the values **C**, **M_t** and **M_L** by 1.26 according to the table.

SKS – Slimline, short, standard height R1666 ... 2.

**Dynamic characteristics**

Travel speed: $v_{\max} = 5 \text{ m/s}$
 Acceleration: $a_{\max} = 500 \text{ m/s}^2$
 (If $F_{\text{comb}} > 2.8 \cdot F_{\text{pr}}$: $a_{\max} = 50 \text{ m/s}^2$)

Note on lubrication

► Pre-lubricated

Note

Can be used on all SNS/SNO ball guide rails.

Options and material numbers

| Size | Ball runner blocks with size | Preload class | | Accuracy class | | Seals on ball runner blocks | | | | | |
|--------------|------------------------------|---------------|----|----------------|---|-----------------------------|----|----|-----------------|----|----|
| | | C0 | C1 | N | H | without ball chain | | | with ball chain | | |
| | | | | | | SS | LS | DS | SS | LS | DS |
| 15 | R1666 1 | 9 | | 4 | 3 | 20 | 21 | – | 22 | 23 | – |
| | | | 1 | 4 | 3 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| 20 | R1666 8 | 9 | | 4 | 3 | 20 | 21 | – | 22 | 23 | – |
| | | | 1 | 4 | 3 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| 25 | R1666 2 | 9 | | 4 | 3 | 20 | 21 | – | 22 | 23 | – |
| | | | 1 | 4 | 3 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| 30 | R1666 7 | 9 | | 4 | 3 | 20 | 21 | – | 22 | 23 | – |
| | | | 1 | 4 | 3 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| 35 | R1666 3 | 9 | | 4 | 3 | 20 | 21 | – | 22 | 23 | – |
| | | | 1 | 4 | 3 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| E.g.: | R1666 7 | | 1 | | 3 | 20 | | | | | |

Order example

Options:

- Ball runner block SKS
- Size 30
- Preload class C1
- Accuracy class H
- With standard seal, without ball chain

Material number:

R1666 713 20

Preload classes

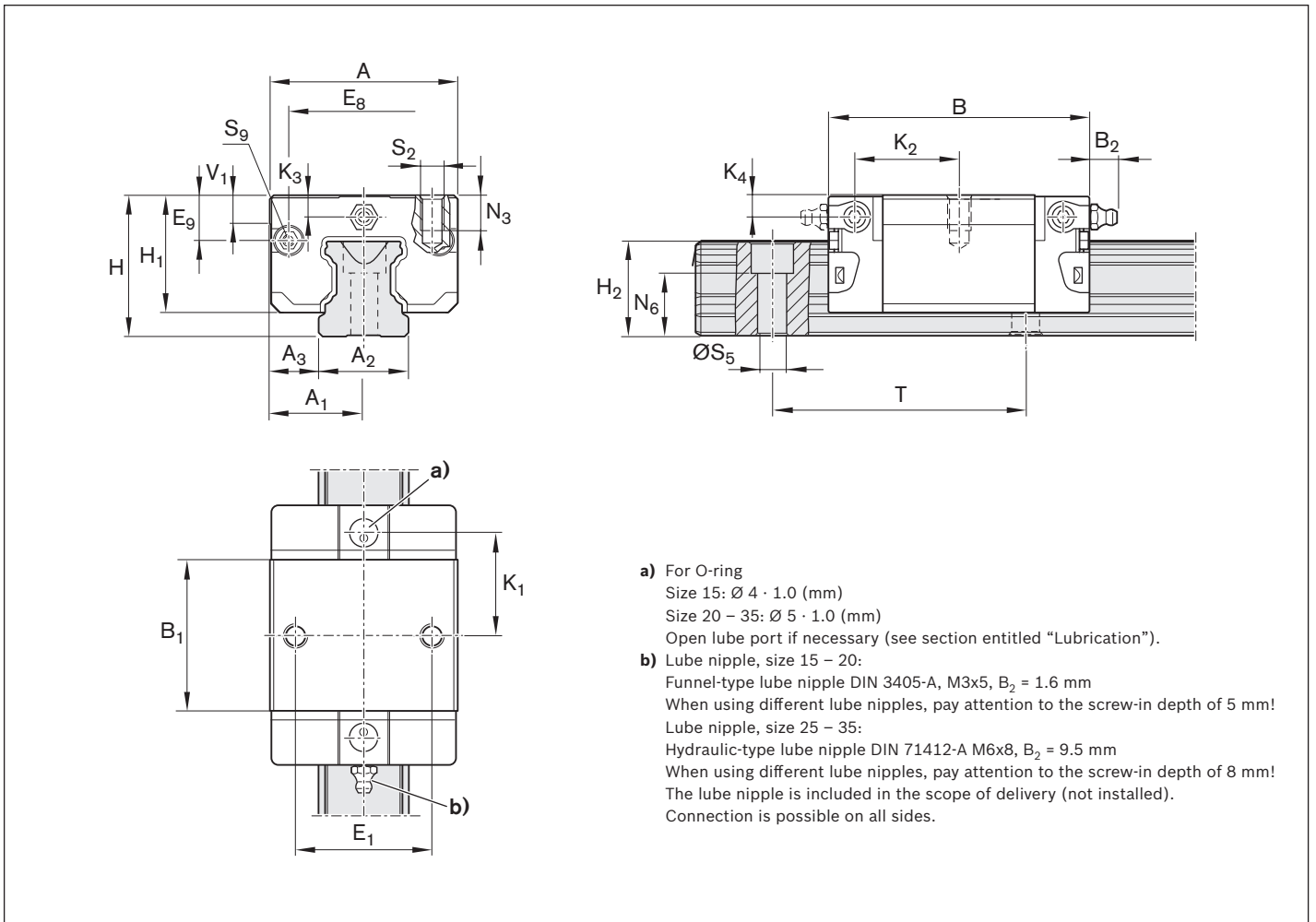
C0 = Without preload (clearance)
 C1 = Moderate preload

Seals

SS = Standard seal
 LS = Low-friction seal
 DS = Double-lip seal

Key

gray numbers
 = No preferred variant / combination
 (partially longer delivery times)




| Size | Dimensions (mm) | | | | | | | | | | | | | | | | |
|------|-----------------|----------------|----------------|----------------|-------------------|----------------|----------------|----------------|----------------|----|----------------|------------------------------|------------------------------|----------------|----------------|----------------|----------------|
| | A | A ₁ | A ₂ | A ₃ | B ^{+0.5} | B ₁ | E ₁ | E ₈ | E ₉ | H | H ₁ | H ₂ ¹⁾ | H ₂ ²⁾ | K ₁ | K ₂ | K ₃ | K ₄ |
| 15 | 34 | 17 | 15 | 9.5 | 44.7 | 25.7 | 26 | 24.55 | 6.70 | 24 | 19.90 | 16.30 | 16.20 | 16.25 | 17.85 | 3.20 | 3.20 |
| 20 | 44 | 22 | 20 | 12.0 | 57.3 | 31.9 | 32 | 32.50 | 7.30 | 30 | 25.35 | 20.75 | 20.55 | 22.95 | 22.95 | 3.35 | 3.35 |
| 25 | 48 | 24 | 23 | 12.5 | 67.0 | 38.6 | 35 | 38.30 | 11.50 | 36 | 29.90 | 24.45 | 24.25 | 25.35 | 26.50 | 5.50 | 5.50 |
| 30 | 60 | 30 | 28 | 16.0 | 75.3 | 45.0 | 40 | 48.40 | 14.60 | 42 | 35.35 | 28.55 | 28.35 | 28.80 | 30.50 | 6.05 | 6.05 |
| 35 | 70 | 35 | 34 | 18.0 | 84.9 | 51.4 | 50 | 58.00 | 17.35 | 48 | 40.40 | 32.15 | 31.85 | 32.70 | 34.20 | 6.90 | 6.90 |

| Size | Dimensions (mm) | | | | | | | Mass (kg) | Load capacities ³⁾ (N) | | Load moments ³⁾ (Nm) | | | |
|------|-----------------|--------------------------------|----------------|----------------|----------------|----|----------------|-----------|-----------------------------------|-------|---------------------------------|----------------|-----------------|----------------|
| | N ₃ | N ₆ ^{±0.5} | S ₂ | S ₅ | S ₉ | T | V ₁ | | m | C | C ₀ | M _t | M _{t0} | M _L |
| 15 | 6.0 | 10.3 | M4 | 4.5 | M2.5x3.5 | 60 | 5.0 | 0.10 | 6720 | 7340 | 65 | 71 | 29 | 32 |
| 20 | 7.5 | 13.2 | M5 | 6.0 | M3x5 | 60 | 6.0 | 0.25 | 15400 | 16500 | 200 | 210 | 83 | 89 |
| 25 | 9.0 | 15.2 | M6 | 7.0 | M3x5 | 60 | 7.5 | 0.35 | 19800 | 21200 | 280 | 300 | 130 | 140 |
| 30 | 12.0 | 17.0 | M8 | 9.0 | M3x5 | 80 | 7.0 | 0.60 | 25600 | 28900 | 440 | 500 | 200 | 230 |
| 35 | 13.0 | 20.5 | M8 | 9.0 | M3x5 | 80 | 8.0 | 0.90 | 36600 | 49300 | 790 | 1060 | 340 | 460 |

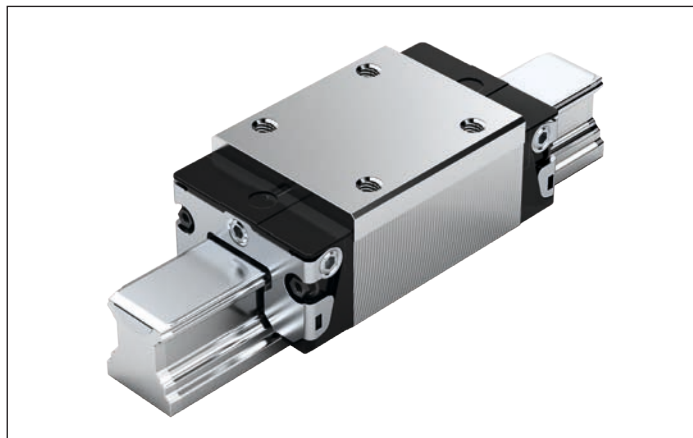
1) Dimension H₂ with cover strip

2) Dimension H₂ without cover strip

3) Load ratings and load moments for ball runner block **without** ball chain. Load ratings and load moments for ball runner block **with** ball chain  12

Determination of the dynamic load capacities and load moments is based on a stroke travel of 100,000 m according to DIN ISO 14728-1. Often only 50,000 m are actually stipulated. For comparison: Multiply the values **C**, **M_t** and **M_L** by 1.26 according to the table.

SNH – Slimline, normal, high R1621 ... 2.

**Dynamic characteristics**

Travel speed: $v_{\max} = 5 \text{ m/s}$
 Acceleration: $a_{\max} = 500 \text{ m/s}^2$
 (If $F_{\text{comb}} > 2.8 \cdot F_{\text{pr}}$: $a_{\max} = 50 \text{ m/s}^2$)

Note on lubrication

► Pre-lubricated

Note

Can be used on all SNS/SNO ball guide rails. Ball runner blocks of size 55 can be found in chapter “Heavy-duty ball runner block BSHP made of steel” after this chapter.

Options and material numbers

| Size | Ball runner blocks with size | Preload class | | | | Accuracy class | | | | Seals on ball runner blocks | | | | | | |
|--------------|------------------------------|---------------|----|----|----|----------------|---|---|----|-----------------------------|------------------|----|-----------------|------------------|----|---|
| | | C0 | C1 | C2 | C3 | N | H | P | XP | without ball chain | | | with ball chain | | | |
| | | | | | | | | | | SS | LS ¹⁾ | DS | SS | LS ¹⁾ | DS | |
| 15 | R1621 1 | 9 | | | | 4 | 3 | – | – | 20 | 21 | – | – | 22 | 23 | – |
| | | | 1 | | | 4 | 3 | 2 | 8 | 20 | 21 | 2Z | 22 | 23 | 2Y | |
| | | | | 2 | | – | 3 | 2 | 8 | 20 | 21 | 2Z | 22 | 23 | 2Y | |
| | | | | | 3 | – | – | – | 8 | 20 | 21 | 2Z | 22 | 23 | 2Y | |
| 25 | R1621 2 | 9 | | | | 4 | 3 | – | – | 20 | 21 | – | – | 22 | 23 | – |
| | | | 1 | | | 4 | 3 | 2 | 8 | 20 | 21 | 2Z | 22 | 23 | 2Y | |
| | | | | 2 | | – | 3 | 2 | 8 | 20 | 21 | 2Z | 22 | 23 | 2Y | |
| | | | | | 3 | – | – | – | 8 | 20 | 21 | 2Z | 22 | 23 | 2Y | |
| 30 | R1621 7 | 9 | | | | 4 | 3 | – | – | 20 | 21 | – | – | 22 | 23 | – |
| | | | 1 | | | 4 | 3 | 2 | 8 | 20 | 21 | 2Z | 22 | 23 | 2Y | |
| | | | | 2 | | – | 3 | 2 | 8 | 20 | 21 | 2Z | 22 | 23 | 2Y | |
| | | | | | 3 | – | – | – | 8 | 20 | 21 | 2Z | 22 | 23 | 2Y | |
| 35 | R1621 3 | 9 | | | | 4 | 3 | – | – | 20 | 21 | – | – | 22 | 23 | – |
| | | | 1 | | | 4 | 3 | 2 | 8 | 20 | 21 | 2Z | 22 | 23 | 2Y | |
| | | | | 2 | | – | 3 | 2 | 8 | 20 | 21 | 2Z | 22 | 23 | 2Y | |
| | | | | | 3 | – | – | – | 8 | 20 | 21 | 2Z | 22 | 23 | 2Y | |
| 45 | R1621 4 | 9 | | | | 4 | 3 | – | – | 20 | – | – | – | 22 | – | – |
| | | | 1 | | | 4 | 3 | 2 | 8 | 20 | – | 2Z | 22 | – | 2Y | |
| | | | | 2 | | – | 3 | 2 | 8 | 20 | – | 2Z | 22 | – | 2Y | |
| | | | | | 3 | – | – | – | 8 | 20 | – | 2Z | 22 | – | 2Y | |
| E.g.: | R1621 7 | | 1 | | | | 3 | | | 20 | | | | | | |

1) Only for accuracy classes N and H and for XP in preload class C1.

Order example

Options:

- Ball runner blocks SNH
- Size 30
- Preload class C1
- Accuracy class H
- With standard seal, without ball chain

Material number:

R1621 713 20

Preload classes

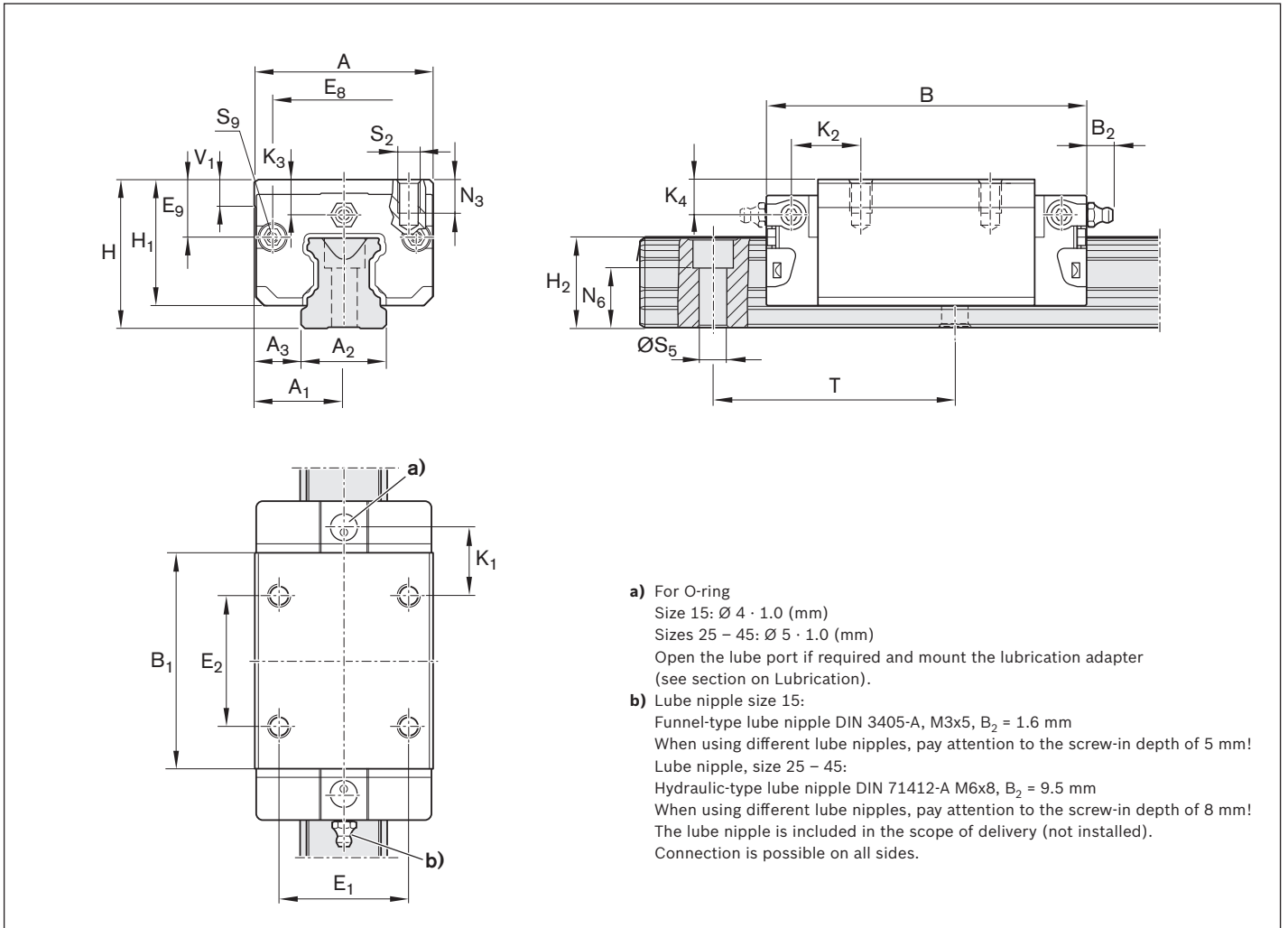
C0 = Without preload (clearance)
 C1 = Moderate preload
 C2 = Average preload
 C3 = High preload

Seals

SS = Standard seal
 LS = Low-friction seal
 DS = Double-lip seal

Key

gray numbers
 = No preferred variant / combination
 (partially longer delivery times)




| Size | Dimensions (mm) | | | | | | | | | | | | | | | | | | |
|------|-----------------|----------------|----------------|----------------|-------------------|----------------|----------------|----------------|----------------|----------------|----|----------------|------------------------------|------------------------------|----------------|----------------|----------------|----------------|--|
| | A | A ₁ | A ₂ | A ₃ | B ^{+0.5} | B ₁ | E ₁ | E ₂ | E ₈ | E ₉ | H | H ₁ | H ₂ ¹⁾ | H ₂ ²⁾ | K ₁ | K ₂ | K ₃ | K ₄ | |
| 15 | 34 | 17 | 15 | 9.5 | 58.2 | 39.2 | 26 | 26 | 24.55 | 10.70 | 28 | 23.90 | 16.30 | 16.20 | 10.00 | 11.60 | 7.20 | 7.20 | |
| 25 | 48 | 24 | 23 | 12.5 | 86.2 | 57.8 | 35 | 35 | 38.30 | 15.50 | 40 | 33.90 | 24.45 | 24.25 | 17.45 | 18.60 | 9.50 | 9.50 | |
| 30 | 60 | 30 | 28 | 16.0 | 97.7 | 67.4 | 40 | 40 | 48.40 | 17.60 | 45 | 38.35 | 28.55 | 28.35 | 20.00 | 21.70 | 9.05 | 9.05 | |
| 35 | 70 | 35 | 34 | 18.0 | 110.5 | 77.0 | 50 | 50 | 58.00 | 24.35 | 55 | 47.40 | 32.15 | 31.85 | 20.50 | 22.00 | 13.90 | 13.90 | |
| 45 | 86 | 43 | 45 | 20.5 | 137.6 | 97.0 | 60 | 60 | 69.80 | 30.90 | 70 | 60.30 | 40.15 | 39.85 | 27.30 | 29.30 | 18.20 | 18.20 | |

| Size | Dimensions (mm) | | | | | | | Mass (kg) | Load capacities ³⁾ (N) | | Load moments ³⁾ (Nm) | | | |
|------|-----------------|--------------------------------|----------------|----------------|----------------|-----|----------------|-----------|-----------------------------------|--------|---------------------------------|----------------|-----------------|----------------|
| | N ₃ | N ₆ ^{±0.5} | S ₂ | S ₅ | S ₉ | T | V ₁ | | m | C | C ₀ | M _t | M _{to} | M _L |
| 15 | 6.0 | 10.3 | M4 | 4.5 | M2.5x3.5 | 60 | 5.0 | 0.20 | 9860 | 12700 | 95 | 120 | 68 | 87 |
| 25 | 9.0 | 15.2 | M6 | 7.0 | M3x5 | 60 | 7.5 | 0.60 | 28600 | 35900 | 410 | 510 | 290 | 360 |
| 30 | 12.0 | 17.0 | M8 | 9.0 | M3x5 | 80 | 7.0 | 0.95 | 36500 | 48100 | 630 | 830 | 440 | 580 |
| 35 | 13.0 | 20.5 | M8 | 9.0 | M3x5 | 80 | 8.0 | 1.55 | 51800 | 80900 | 1110 | 1740 | 720 | 1130 |
| 45 | 18.0 | 23.5 | M10 | 14.0 | M4x7 | 105 | 10.0 | 3.00 | 86400 | 132000 | 2330 | 3560 | 1540 | 2350 |

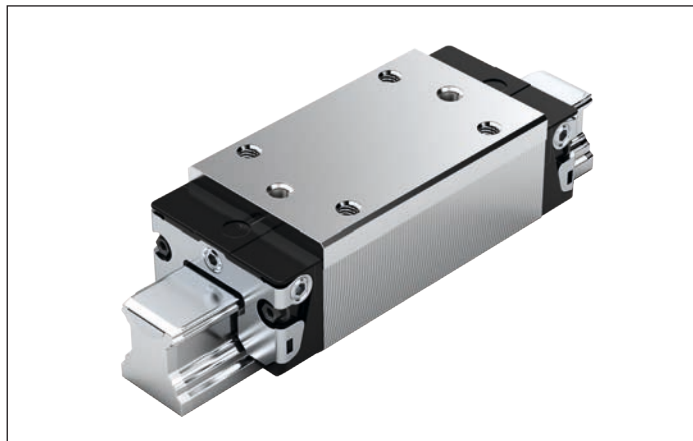
1) Dimension H₂ with cover strip

2) Dimension H₂ without cover strip

3) Load ratings and load moments for ball runner block **without** ball chain. Load ratings and load moments for ball runner block **with** ball chain  12

Determination of the dynamic load capacities and load moments is based on a stroke travel of 100,000 m according to DIN ISO 14728-1. Often only 50,000 m are actually stipulated. For comparison: Multiply the values **C**, **M_t** and **M_L** by 1.26 according to the table.

SLH – Slimline, long, high R1624 ... 2.

**Dynamic characteristics**

Travel speed: $v_{\max} = 5 \text{ m/s}$
 Acceleration: $a_{\max} = 500 \text{ m/s}^2$
 (If $F_{\text{comb}} > 2.8 \cdot F_{\text{pr}}$: $a_{\max} = 50 \text{ m/s}^2$)

Note on lubrication

► Pre-lubricated

Note

Can be used on all SNS/SNO ball guide rails. Ball runner blocks of size 55 can be found in chapter “Heavy-duty ball runner block BSHP made of steel” after this chapter.

Options and material numbers

| Size | Ball runner blocks with size | Preload class | | | | Accuracy class | | | | Seals on ball runner blocks | | | | | |
|--------------|------------------------------|---------------|----|----|----|----------------|---|---|----|-----------------------------|------------------|----|-----------------|------------------|----|
| | | C0 | C1 | C2 | C3 | N | H | P | XP | without ball chain | | | with ball chain | | |
| | | | | | | | | | | SS | LS ¹⁾ | DS | SS | LS ¹⁾ | DS |
| 25 | R1624 2 | 9 | | | | 4 | 3 | – | – | 20 | 21 | – | 22 | 23 | – |
| | | | 1 | | | 4 | 3 | 2 | 8 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| | | | | 2 | | – | 3 | 2 | 8 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| | | | | | 3 | – | – | – | 8 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| 30 | R1624 7 | 9 | | | | 4 | 3 | – | – | 20 | 21 | – | 22 | 23 | – |
| | | | 1 | | | 4 | 3 | 2 | 8 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| | | | | 2 | | – | 3 | 2 | 8 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| | | | | | 3 | – | – | – | 8 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| 35 | R1624 3 | 9 | | | | 4 | 3 | – | – | 20 | 21 | – | 22 | 23 | – |
| | | | 1 | | | 4 | 3 | 2 | 8 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| | | | | 2 | | – | 3 | 2 | 8 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| | | | | | 3 | – | – | – | 8 | 20 | 21 | 2Z | 22 | 23 | 2Y |
| 45 | R1624 4 | 9 | | | | 4 | 3 | – | – | 20 | – | – | 22 | – | – |
| | | | 1 | | | 4 | 3 | 2 | 8 | 20 | – | 2Z | 22 | – | 2Y |
| | | | | 2 | | – | 3 | 2 | 8 | 20 | – | 2Z | 22 | – | 2Y |
| | | | | | 3 | – | – | – | 8 | 20 | – | 2Z | 22 | – | 2Y |
| E.g.: | R16247 | | 1 | | | 3 | | | | 20 | | | | | |

1) Only for accuracy classes N and H and for XP in preload class C1.

Order example

Options:

- Ball runner blocks SLH
- Size 30
- Preload class C1
- Accuracy class H
- With standard seal, without ball chain

Material number:

R1624 713 20

Preload classes

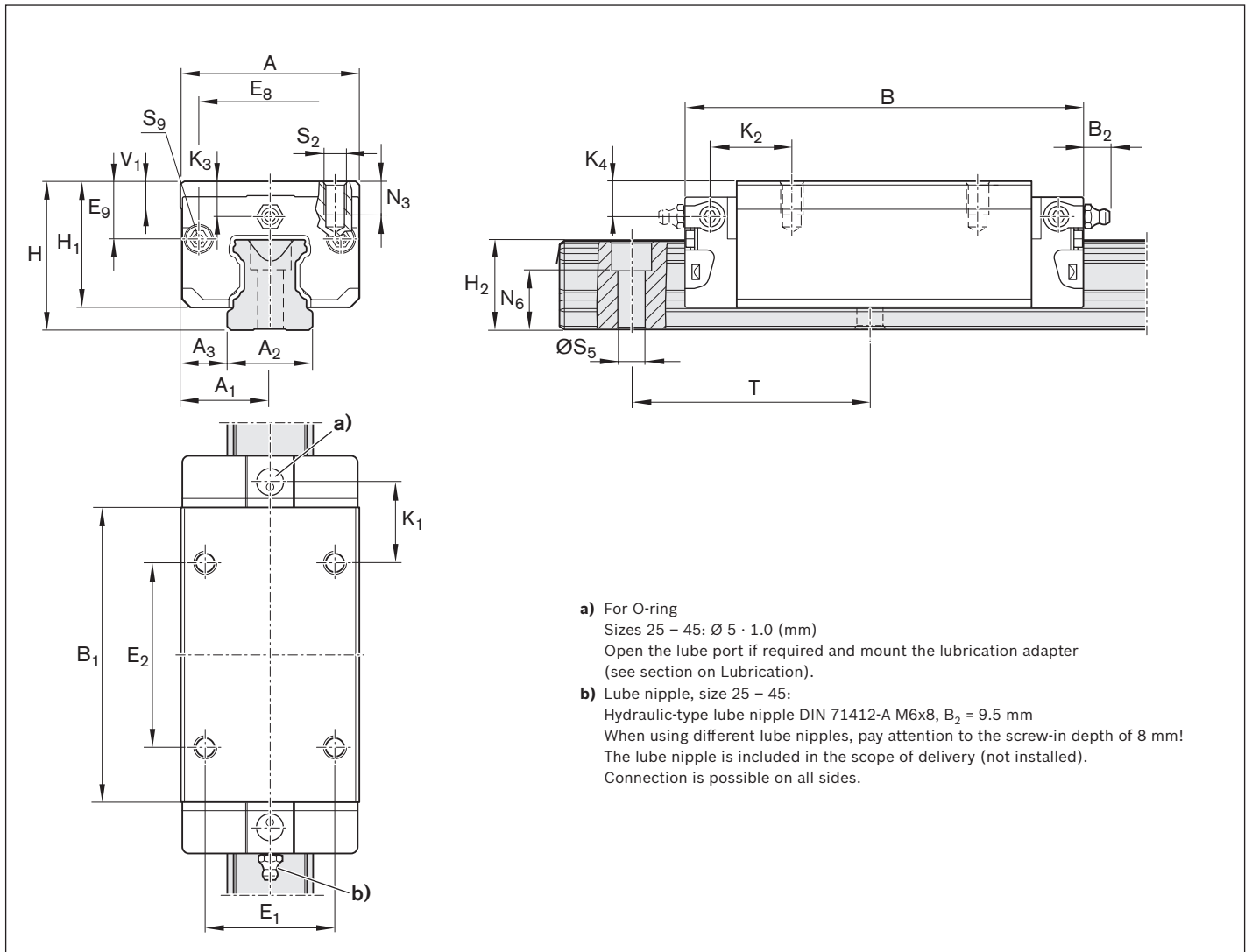
C0 = Without preload (clearance)
 C1 = Moderate preload
 C2 = Average preload
 C3 = High preload

Seals

SS = Standard seal
 LS = Low-friction seal
 DS = Double-lip seal

Key

gray numbers
 = No preferred variant / combination
 (partially longer delivery times)




| Size | Dimensions (mm) | | | | | | | | | | | | | | | | | |
|------|-----------------|----------------|----------------|----------------|-------------------|----------------|----------------|----------------|----------------|----------------|----|----------------|------------------------------|------------------------------|----------------|----------------|----------------|----------------|
| | A | A ₁ | A ₂ | A ₃ | B ^{+0.5} | B ₁ | E ₁ | E ₂ | E ₈ | E ₉ | H | H ₁ | H ₂ ¹⁾ | H ₂ ²⁾ | K ₁ | K ₂ | K ₃ | K ₄ |
| 25 | 48 | 24 | 23 | 12.5 | 107.9 | 79.5 | 35 | 50 | 38.30 | 15.50 | 40 | 33.90 | 24.45 | 24.25 | 20.80 | 21.95 | 9.50 | 9.50 |
| 30 | 60 | 30 | 28 | 16.0 | 119.7 | 89.4 | 40 | 60 | 48.40 | 17.60 | 45 | 38.35 | 28.55 | 28.35 | 21.00 | 22.70 | 9.05 | 9.05 |
| 35 | 70 | 35 | 34 | 18.0 | 139.0 | 105.5 | 50 | 72 | 58.00 | 24.35 | 55 | 47.40 | 32.15 | 31.85 | 23.75 | 25.25 | 13.90 | 13.90 |
| 45 | 86 | 43 | 45 | 20.5 | 174.1 | 133.5 | 60 | 80 | 69.80 | 30.90 | 70 | 60.30 | 40.15 | 39.85 | 35.50 | 37.50 | 18.20 | 18.20 |

| Size | Dimensions (mm) | | | | | | | | Mass (kg) | Load capacities ³⁾ (N) | | Load moments ³⁾ (Nm) | | | |
|------|-----------------|--------------------------------|----------------|----------------|----------------|-----|----------------|------|--------------|--------------------------------------|----------------|---------------------------------|-----------------|----------------|-----------------|
| | N ₃ | N ₆ ^{+0.5} | S ₂ | S ₅ | S ₉ | T | V ₁ | m | | C | C ₀ | M _t | M _{t0} | M _L | M _{L0} |
| 25 | 9.0 | 15.2 | M6 | 7.0 | M3x5 | 60 | 7.5 | 0.80 | 37300 | 52500 | 530 | 750 | 530 | 740 | |
| 30 | 12.0 | 17.0 | M8 | 9.0 | M3x5 | 80 | 7.0 | 1.20 | 46000 | 66900 | 800 | 1160 | 740 | 1080 | |
| 35 | 13.0 | 20.5 | M8 | 9.0 | M3x5 | 80 | 8.0 | 2.10 | 66700 | 116000 | 1440 | 2500 | 1290 | 2240 | |
| 45 | 18.0 | 23.5 | M10 | 14.0 | M4x7 | 105 | 10.0 | 4.10 | 111000 | 190000 | 3010 | 5120 | 2730 | 4660 | |

1) Dimension H₂ with cover strip

2) Dimension H₂ without cover strip

3) Load ratings and load moments for ball runner block **without** ball chain. Load ratings and load moments for ball runner block **with** ball chain  12

Determination of the dynamic load capacities and load moments is based on a stroke travel of 100,000 m according to DIN ISO 14728-1. Often only 50,000 m are actually stipulated. For comparison: Multiply the values **C**, **M_t** and **M_L** by 1.26 according to the table.

FNN – flange, normal, low R1693 ... 1.

**Dynamic characteristics**

Travel speed: $v_{\max} = 3 \text{ m/s}$
 Acceleration: $a_{\max} = 250 \text{ m/s}^2$
 (If $F_{\text{comb}} > 2.8 \cdot F_{\text{pr}}$: $a_{\max} = 50 \text{ m/s}^2$)

Note on lubrication

► No initial lubrication

Note

Can be used on all SNS/SNO ball guide rails.

Options and material numbers

| Size | Ball runner blocks with size | Preload class | | Accuracy class | | Seals on ball runner blocks without ball chain | |
|------------------|---------------------------------|---------------|----|----------------|---|---|----|
| | | C0 | C1 | N | H | SS | LS |
| 20 | R1693 8 | 9 | 1 | 4 | 3 | 10 | 11 |
| 25 ¹⁾ | R1693 2 | 9 | 1 | 4 | 3 | 10 | 11 |
| E.g.: | R1693 8 | | 1 | | 3 | 10 | |

1) BSHP ball runner block

Order example

Options:

- Ball runner block FNN
- Size 20
- Preload class C1
- Accuracy class H
- With standard seal,
without ball chain

Material number:

R1693 813 10

Preload classes

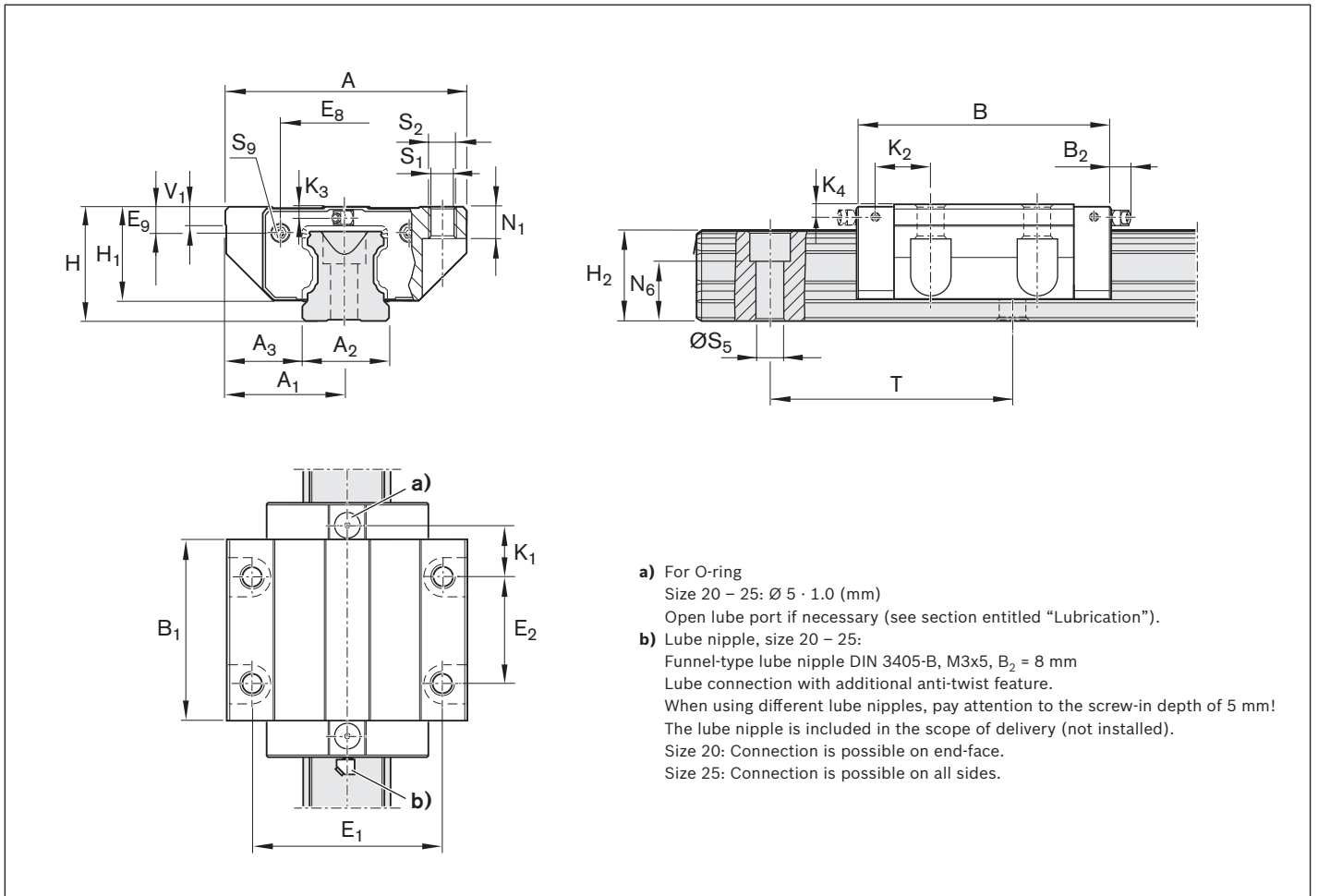
C0 = Without preload (clearance)
 C1 = Moderate preload

Seals

SS = Standard seal
 LS = Low-friction seal

Key

gray numbers
 = No preferred variant /
 combination
 (partially longer delivery times)



| Size | Dimensions (mm) | | | | | | | | | | | | | | | | | |
|------|-----------------|----------------|----------------|----------------|-------------------|----------------|----------------|----------------|----------------|----------------|----|----------------|------------------------------|------------------------------|----------------|----------------|----------------|----------------|
| | A | A ₁ | A ₂ | A ₃ | B ^{+0.5} | B ₁ | E ₁ | E ₂ | E ₈ | E ₉ | H | H ₁ | H ₂ ¹⁾ | H ₂ ²⁾ | K ₁ | K ₂ | K ₃ | K ₄ |
| 20 | 59 | 29.5 | 20 | 19.5 | 72.5 | 49.6 | 49 | 32 | 30.5 | 5.6 | 28 | 23.0 | 20.75 | 20.55 | 13.0 | - | 3.6 | - |
| 25 | 73 | 36.5 | 23 | 25.0 | 81.0 | 57.8 | 60 | 35 | 38.3 | 8.5 | 33 | 26.5 | 24.45 | 24.25 | 16.6 | 17.0 | 4.1 | 4.1 |

| Size | Dimensions (mm) | | | | | | | | | Mass (kg) | Load capacities ³⁾ (N) | | Load moments ³⁾ (Nm) | | | |
|------|-----------------|--------------------------------|----------------|----------------|----------------|----------------|----|----------------|------|-----------|-----------------------------------|----------------|---------------------------------|-----------------|----------------|-----------------|
| | N ₁ | N ₆ ^{±0.5} | S ₁ | S ₂ | S ₅ | S ₉ | T | V ₁ | m | | C | C ₀ | M _t | M _{t0} | M _L | M _{L0} |
| 20 | 7.7 | 13.2 | 5.3 | M6 | 6.0 | M3x5 | 60 | 6.0 | 0.40 | 14500 | 24400 | 190 | 310 | 100 | 165 | |
| 25 | 9.3 | 15.2 | 6.7 | M8 | 7.0 | M3x5 | 60 | 7.5 | 0.60 | 28600 | 35900 | 410 | 510 | 290 | 360 | |

1) Dimension H₂ with cover strip

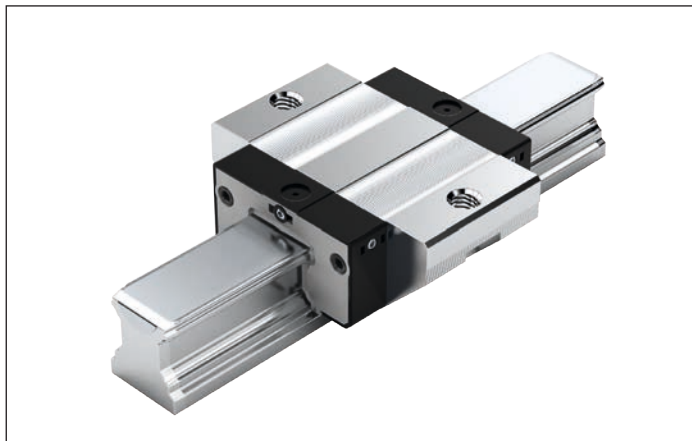
2) Dimension H₂ without cover strip

3) Load ratings and load moments for ball runner block **without** ball chain.

Determination of the dynamic load capacities and load moments is based on a stroke travel of 100,000 m according to DIN ISO 14728-1.

Often only 50,000 m are actually stipulated. For comparison: Multiply the values **C**, **M_t** and **M_L** by 1.26 according to the table.

FKN – flange, short, low R1663 ... 1.

**Dynamic characteristics**

Travel speed: $v_{\max} = 3 \text{ m/s}$
 Acceleration: $a_{\max} = 250 \text{ m/s}^2$
 (If $F_{\text{comb}} > 2.8 \cdot F_{\text{pr}}$: $a_{\max} = 50 \text{ m/s}^2$)

Note on lubrication

▶ No initial lubrication

Note

Can be used on all SNS/SNO ball guide rails.

Options and material numbers

| Size | Ball runner blocks with size | Preload class | | Accuracy class | | Seals on ball runner blocks without ball chain | |
|------------------|------------------------------|---------------|----|----------------|---|--|----|
| | | C0 | C1 | N | H | SS | LS |
| 20 | R1663 8 | 9 | 1 | 4 | 3 | 10 | 11 |
| 25 ¹⁾ | R1663 2 | 9 | 1 | 4 | 3 | 10 | 11 |
| E.g.: | R1663 8 | | 1 | | 3 | 10 | |

1) BSHP ball runner block

Order example

Options:

- ▶ Ball runner block FKN
- ▶ Size 20
- ▶ Preload class C1
- ▶ Accuracy class H
- ▶ With standard seal, without ball chain

Material number:

R1663 813 10

Preload classes

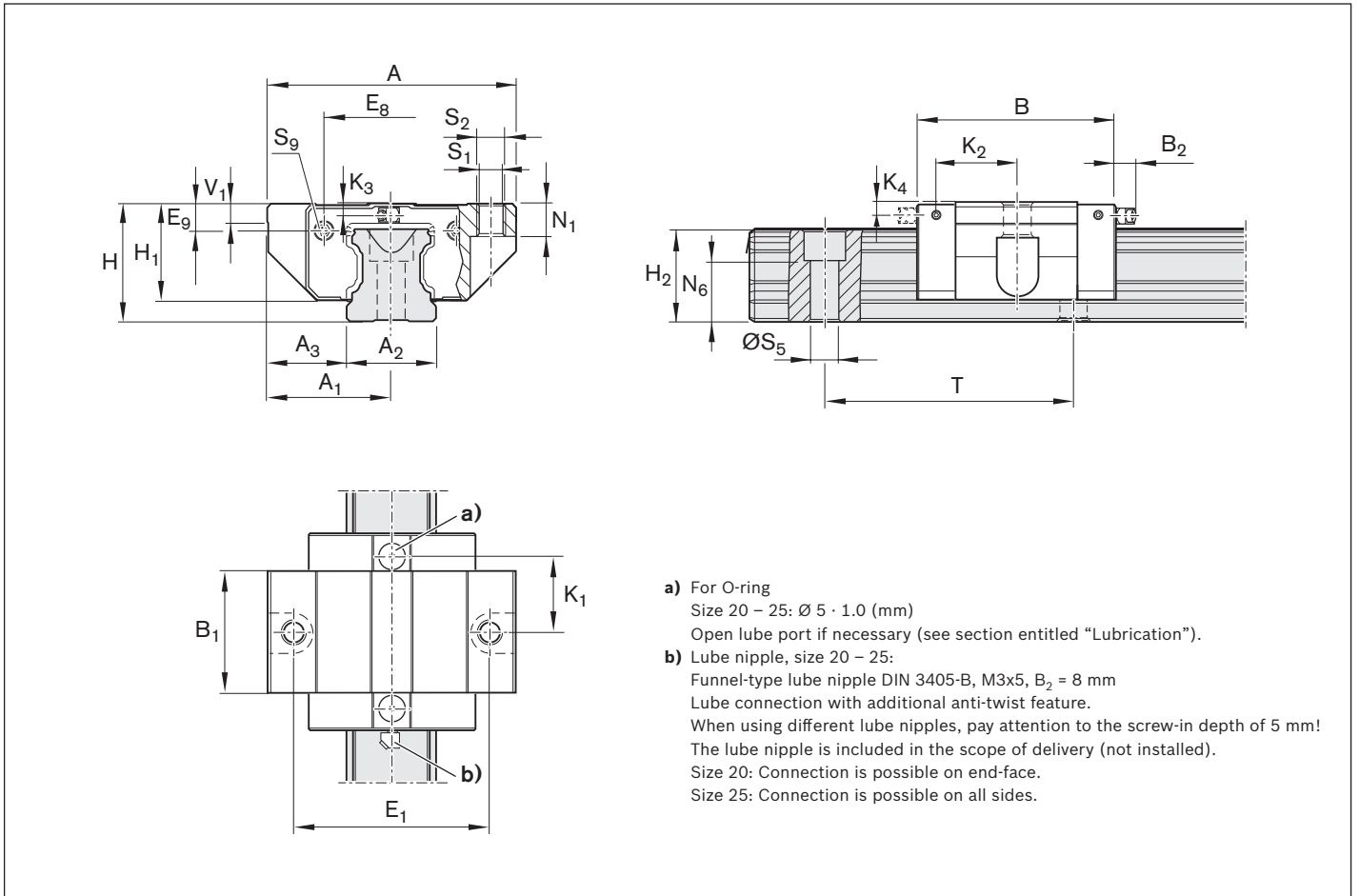
C0 = Without preload (clearance)
 C1 = Moderate preload

Seals

SS = Standard seal
 LS = Low-friction seal

Key

gray numbers
 = No preferred variant / combination
 (partially longer delivery times)



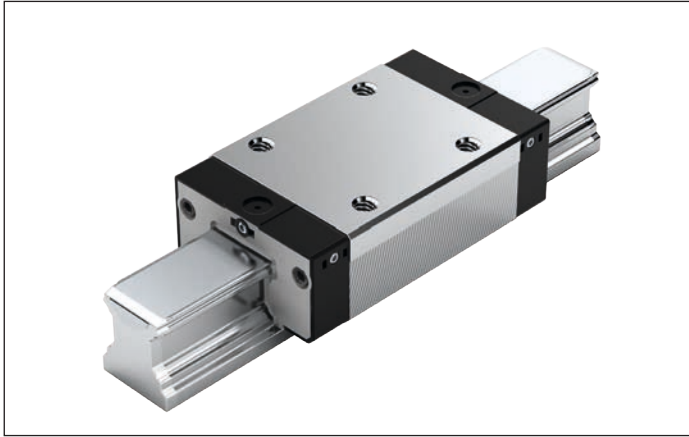
| Size | Dimensions (mm) | | | | | | | | | | | | | | | | |
|------|-----------------|----------------|----------------|----------------|-------------------|----------------|----------------|----------------|----------------|----|----------------|------------------------------|------------------------------|----------------|----------------|----------------|----------------|
| | A | A ₁ | A ₂ | A ₃ | B ^{+0.5} | B ₁ | E ₁ | E ₈ | E ₉ | H | H ₁ | H ₂ ¹⁾ | H ₂ ²⁾ | K ₁ | K ₂ | K ₃ | K ₄ |
| 20 | 59 | 29.5 | 20 | 19.5 | 55 | 31.9 | 49 | 30.5 | 5.6 | 28 | 23.0 | 20.75 | 20.55 | 20.1 | – | 3.6 | – |
| 25 | 73 | 36.5 | 23 | 25.0 | 62 | 38.6 | 60 | 38.3 | 8.5 | 33 | 26.5 | 24.45 | 24.25 | 24.5 | 25.0 | 4.1 | 4.1 |

| Size | Dimensions (mm) | | | | | | | | | Mass (kg) | Load capacities ³⁾ (N) | | Load moments ³⁾ (Nm) | | | |
|------|-----------------|--------------------------------|----------------|----------------|----------------|----------------|----|----------------|------|-----------|-----------------------------------|----------------|---------------------------------|-----------------|----------------|-----------------|
| | N ₁ | N ₆ ^{±0.5} | S ₁ | S ₂ | S ₅ | S ₉ | T | V ₁ | m | | C | C ₀ | M _t | M _{t0} | M _L | M _{L0} |
| 20 | 7.7 | 13.2 | 5.3 | M6 | 6.0 | M3x5 | 60 | 6.0 | 0.25 | 9600 | 13600 | 120 | 170 | 40 | 58 | |
| 25 | 9.3 | 15.2 | 6.7 | M8 | 7.0 | M3x5 | 60 | 7.5 | 0.45 | 19800 | 21200 | 280 | 300 | 130 | 140 | |

- 1) Dimension H₂ with cover strip
- 2) Dimension H₂ without cover strip
- 3) Load ratings and load moments for ball runner block **without** ball chain.

Determination of the dynamic load capacities and load moments is based on a stroke travel of 100,000 m according to DIN ISO 14728-1. Often only 50,000 m are actually stipulated. For comparison: Multiply the values **C**, **M_t** and **M_L** by 1.26 according to the table.

SNN – Slimline, normal, low R1694 ... 1.

**Dynamic characteristics**

Travel speed: $v_{\max} = 3 \text{ m/s}$
 Acceleration: $a_{\max} = 250 \text{ m/s}^2$
 (If $F_{\text{comb}} > 2.8 \cdot F_{\text{pr}}$: $a_{\max} = 50 \text{ m/s}^2$)

Note on lubrication

► No initial lubrication

Note

Can be used on all SNS/SNO ball guide rails.

Options and material numbers

| Size | Ball runner blocks with size | Preload class | | Accuracy class | | Seals on ball runner blocks without ball chain | |
|------------------|------------------------------|---------------|----|----------------|---|--|----|
| | | C0 | C1 | N | H | SS | LS |
| 20 | R1694 8 | 9 | 1 | 4 | 3 | 10 | 11 |
| 25 ¹⁾ | R1694 2 | 9 | 1 | 4 | 3 | 10 | 11 |
| E.g.: | R1694 8 | | 1 | | 3 | 10 | |

1) BSHP ball runner block

Order example

Options:

- Ball runner block SNN
- Size 20
- Preload class C1
- Accuracy class H
- With standard seal, without ball chain

Material number:

R1694 813 10

Preload classes

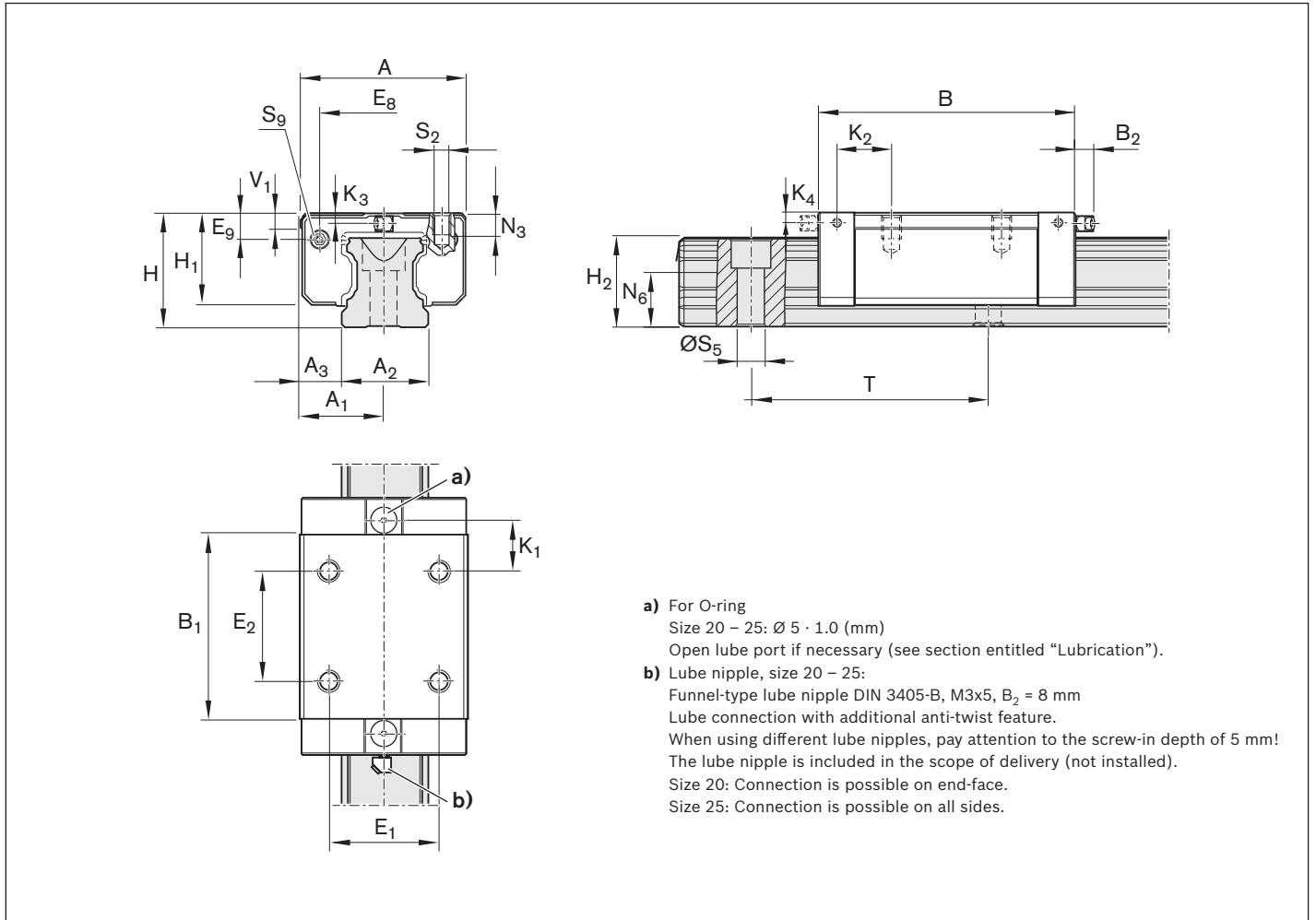
C0 = Without preload (clearance)
 C1 = Moderate preload

Seals

SS = Standard seal
 LS = Low-friction seal

Key

gray numbers
 = No preferred variant / combination
 (partially longer delivery times)



| Size | Dimensions (mm) | | | | | | | | | | | | | | | | | |
|------|-----------------|----------------|----------------|----------------|-------------------|----------------|----------------|----------------|----------------|----------------|----|----------------|------------------------------|------------------------------|----------------|----------------|----------------|----------------|
| | A | A ₁ | A ₂ | A ₃ | B ^{+0.5} | B ₁ | E ₁ | E ₂ | E ₈ | E ₉ | H | H ₁ | H ₂ ¹⁾ | H ₂ ²⁾ | K ₁ | K ₂ | K ₃ | K ₄ |
| 20 | 42 | 21 | 20 | 11.0 | 72.5 | 49.6 | 32 | 32 | 30.5 | 5.6 | 28 | 23.0 | 20.75 | 20.55 | 13.0 | – | 3.6 | – |
| 25 | 48 | 24 | 23 | 12.5 | 81.0 | 57.8 | 35 | 35 | 38.3 | 8.5 | 33 | 26.5 | 24.45 | 24.25 | 16.6 | 17.0 | 4.1 | 4.1 |

| Size | Dimensions (mm) | | | | | | | | Mass (kg) | Load capacities ³⁾ (N) | | Load moments ³⁾ (Nm) | | | |
|------|-----------------|--------------------------------|----------------|----------------|----------------|----|----------------|------|-----------|-----------------------------------|----------------|---------------------------------|-----------------|----------------|-----------------|
| | N ₃ | N ₆ ^{±0.5} | S ₂ | S ₅ | S ₉ | T | V ₁ | m | | C | C ₀ | M _t | M _{t0} | M _L | M _{L0} |
| 20 | 6.3 | 13.2 | M5 | 6.0 | M3x5 | 60 | 6.0 | 0.30 | 14500 | 24400 | 190 | 310 | 100 | 165 | |
| 25 | 7.0 | 15.2 | M6 | 7.0 | M3x5 | 60 | 7.5 | 0.45 | 28600 | 35900 | 410 | 510 | 290 | 360 | |

1) Dimension H₂ with cover strip

2) Dimension H₂ without cover strip

3) Load ratings and load moments for ball runner block **without** ball chain.

Determination of the dynamic load capacities and load moments is based on a stroke travel of 100,000 m according to DIN ISO 14728-1. Often only 50,000 m are actually stipulated. For comparison: Multiply the values **C**, **M_t** and **M_L** by 1.26 according to the table.

SKN – Slimline, short, low R1664 ... 1.

**Dynamic characteristics**

Travel speed: $v_{\max} = 3 \text{ m/s}$
 Acceleration: $a_{\max} = 250 \text{ m/s}^2$
 (If $F_{\text{comb}} > 2.8 \cdot F_{\text{pr}}$: $a_{\max} = 50 \text{ m/s}^2$)

Note on lubrication

▶ No initial lubrication

Note

Can be used on all SNS/SNO ball guide rails.

Options and material numbers

| Size | Ball runner blocks with size | Preload class | | Accuracy class | | Seals on ball runner blocks without ball chain | |
|------------------|---------------------------------|---------------|----|----------------|---|---|----|
| | | C0 | C1 | N | H | SS | LS |
| 20 | R1664 8 | 9 | 1 | 4 | 3 | 10 | 11 |
| 25 ¹⁾ | R1664 2 | 9 | 1 | 4 | 3 | 10 | 11 |
| E.g.: | R1664 8 | | 1 | | 3 | 10 | |

1) BSHP ball runner block

Order example

Options:

- ▶ Ball runner block SKN
- ▶ Size 20
- ▶ Preload class C1
- ▶ Accuracy class H
- ▶ With standard seal,
without ball chain

Material number:

R1664 813 10

Preload classes

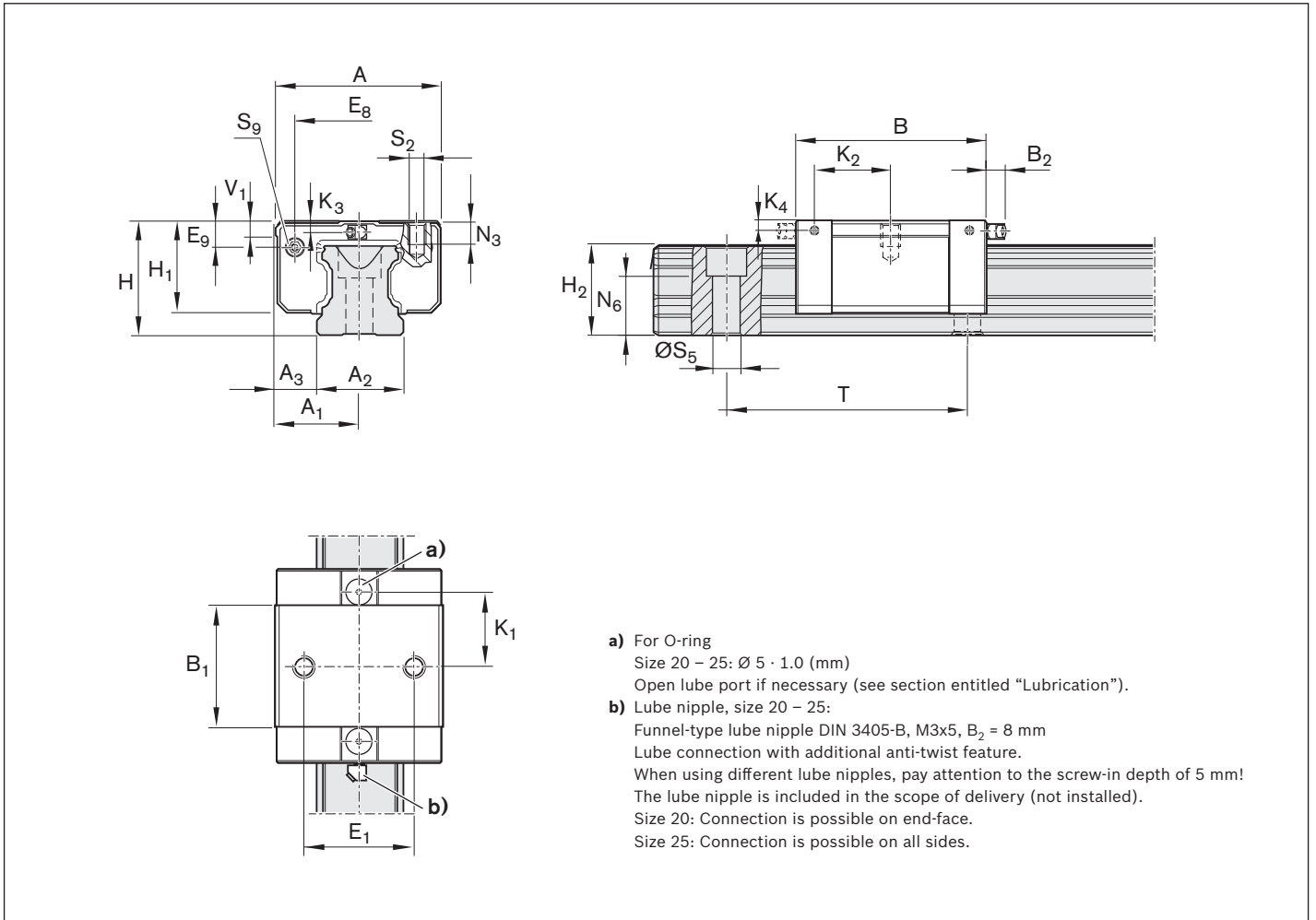
C0 = Without preload (clearance)
 C1 = Moderate preload

Seals

SS = Standard seal
 LS = Low-friction seal

Key

gray numbers
 = No preferred variant /
 combination
 (partially longer delivery times)



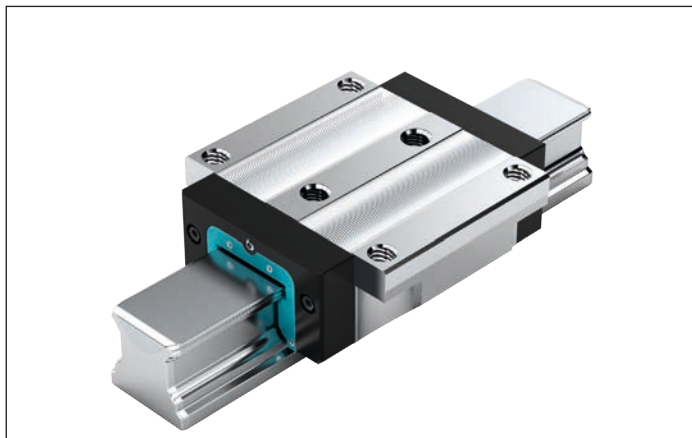
| Size | Dimensions (mm) | | | | | | | | | | | | | | | | |
|------|-----------------|----------------|----------------|----------------|-------------------|----------------|----------------|----------------|----------------|----|----------------|------------------------------|------------------------------|----------------|----------------|----------------|----------------|
| | A | A ₁ | A ₂ | A ₃ | B ^{+0.5} | B ₁ | E ₁ | E ₈ | E ₉ | H | H ₁ | H ₂ ¹⁾ | H ₂ ²⁾ | K ₁ | K ₂ | K ₃ | K ₄ |
| 20 | 42 | 21 | 20 | 11.0 | 55 | 31.9 | 32 | 30.5 | 5.6 | 28 | 23.0 | 20.75 | 20.55 | 20.1 | – | 3.6 | – |
| 25 | 48 | 24 | 23 | 12.5 | 62 | 38.6 | 35 | 38.3 | 8.5 | 33 | 26.5 | 24.45 | 24.25 | 24.5 | 25.0 | 4.1 | 4.1 |

| Size | Dimensions (mm) | | | | | | | Mass (kg) | Load capacities ³⁾ (N) | | Load moments ³⁾ (Nm) | | | |
|------|-----------------|--------------------------------|----------------|----------------|----------------|----|----------------|-----------|-----------------------------------|-------|---------------------------------|----------------|-----------------|----------------|
| | N ₃ | N ₆ ^{±0.5} | S ₂ | S ₅ | S ₉ | T | V ₁ | | m | C | C ₀ | M _t | M _{t0} | M _L |
| 20 | 6.3 | 13.2 | M5 | 6.0 | M3x5 | 60 | 6.0 | 0.20 | 9600 | 13600 | 120 | 170 | 40 | 58 |
| 25 | 7.0 | 15.2 | M6 | 7.0 | M3x5 | 60 | 7.5 | 0.30 | 19800 | 21200 | 280 | 300 | 130 | 140 |

- 1) Dimension H₂ with cover strip
- 2) Dimension H₂ without cover strip
- 3) Load ratings and load moments for ball runner block **without** ball chain.

Determination of the dynamic load capacities and load moments is based on a stroke travel of 100,000 m according to DIN ISO 14728-1. Often only 50,000 m are actually stipulated. For comparison: Multiply the values **C**, **M_t** and **M_L** by 1.26 according to the table.

FNS – flanged, normal, standard height, R1651 ... 1.

**Dynamic characteristics**

Travel speed: $v_{\max} = 3 \text{ m/s}$
 Acceleration: $a_{\max} = 250 \text{ m/s}^2$
 (If $F_{\text{comb}} > 2.8 \cdot F_{\text{pr}}$: $a_{\max} = 50 \text{ m/s}^2$)

Note on lubrication

► No initial lubrication

Note

Can be used on all SNS ball guide rails.

Options and material numbers

| Size | Ball runner blocks with size | Preload class | | | | Accuracy class | | | | | Seals on ball runner blocks without ball chain |
|--------------|------------------------------|---------------|----|----|----|----------------|---|---|----|----|--|
| | | C0 | C1 | C2 | C3 | N | H | P | SP | UP | |
| 55 | R1651 5 | 9 | | | | 4 | 3 | – | – | – | 10 |
| | | | 1 | | | 4 | 3 | 2 | 1 | 9 | 10 |
| | | | | 2 | | – | 3 | 2 | 1 | 9 | 10 |
| | | | | | 3 | – | – | 2 | 1 | 9 | 10 |
| 65 | R1651 6 | 9 | | | | 4 | 3 | – | – | – | 10 |
| | | | 1 | | | 4 | 3 | 2 | 1 | 9 | 10 |
| | | | | 2 | | – | 3 | 2 | 1 | 9 | 10 |
| | | | | | 3 | – | – | 2 | 1 | 9 | 10 |
| E.g.: | R1651 5 | | 1 | | | 3 | | | | 10 | |

Order example

Options:

- Ball runner blocks FNS
- Size 55
- Preload class C1
- Accuracy class H
- With standard seal, without ball chain

Material number:

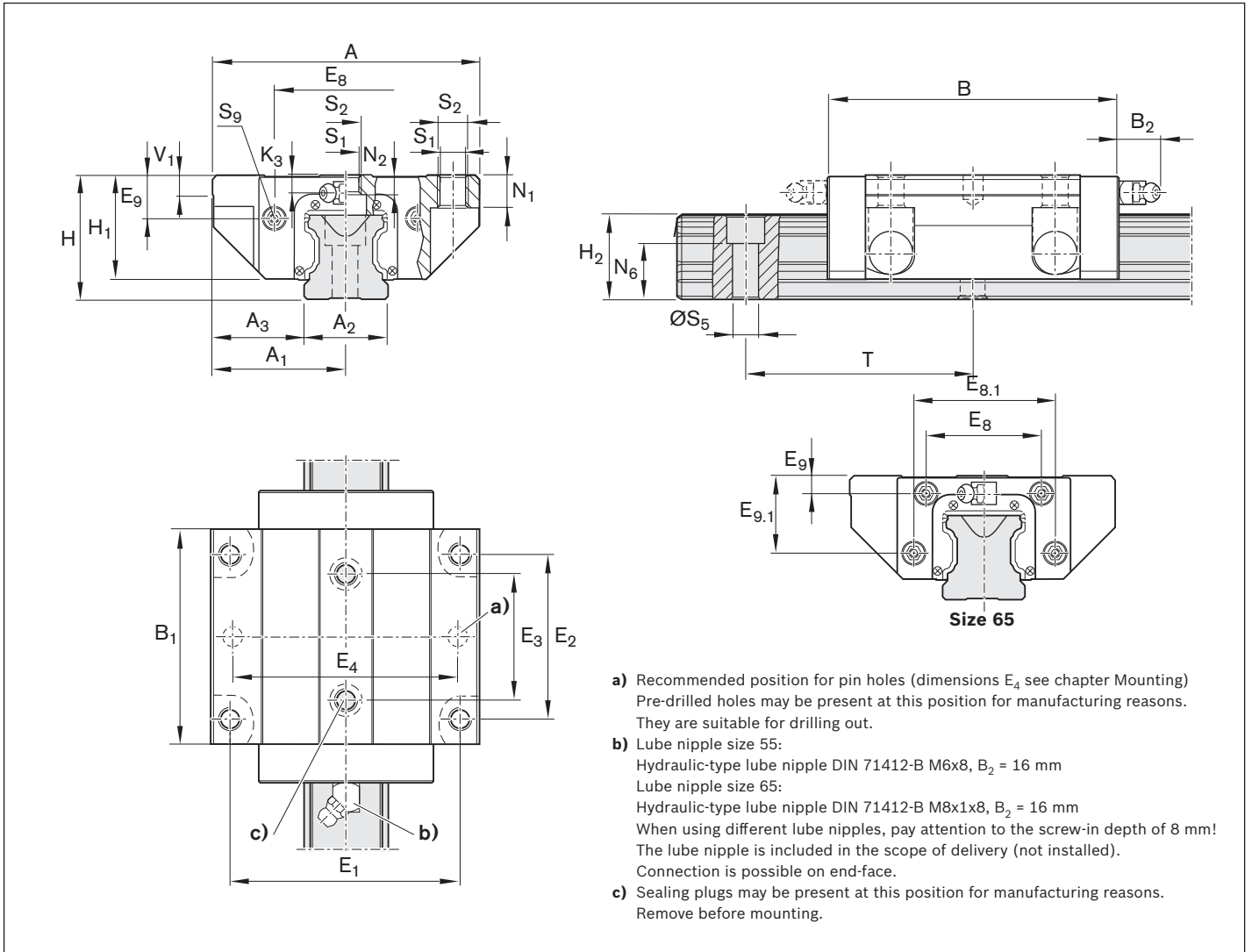
R1651 513 10

Preload classes

C0 = Without preload (clearance)
 C1 = Moderate preload
 C2 = Average preload
 C3 = High preload

Seals

SS = Standard seal



| Size | Dimensions (mm) | | | | | | | | | | | | | | | | |
|------|-----------------|----------------|----------------|----------------|-------------------|----------------|----------------|----------------|----------------|----------------|------------------|----------------|------------------|----|----------------|------------------------------|------------------------------|
| | A | A ₁ | A ₂ | A ₃ | B ^{+0.5} | B ₁ | E ₁ | E ₂ | E ₃ | E ₈ | E _{8.1} | E ₉ | E _{9.1} | H | H ₁ | H ₂ ¹⁾ | H ₂ ²⁾ |
| 55 | 140 | 70 | 53 | 43.5 | 159 | 115.5 | 116 | 95 | 70 | 80 | - | 22.3 | - | 70 | 57 | 48.15 | 47.85 |
| 65 | 170 | 85 | 63 | 53.5 | 188 | 139.6 | 142 | 110 | 82 | 76 | 100 | 11.0 | 53.5 | 90 | 76 | 60.15 | 59.85 |

| Size | Dimensions (mm) | | | | | | | | | | | Mass (kg) | Load capacities ³⁾ (N) | | Load moments ³⁾ (Nm) | | | |
|------|-----------------|----------------|----------------|--------------------------------|----------------|----------------|----------------|----------------|-----|----------------|-------|-----------|-----------------------------------|----------------|---------------------------------|-----------------|----------------|-----------------|
| | K ₃ | N ₁ | N ₂ | N ₆ ^{±0.5} | S ₁ | S ₂ | S ₅ | S ₉ | T | V ₁ | m | | C | C ₀ | M _t | M _{t0} | M _L | M _{L0} |
| 55 | 9 | 18 | 13.5 | 29.0 | 12.4 | M14 | 16 | M5x8 | 120 | 12 | 5.20 | 109000 | 174000 | 3480 | 5550 | 2320 | 3690 | |
| 65 | 16 | 23 | 14.0 | 38.5 | 14.6 | M16 | 18 | M4x7 | 150 | 15 | 10.25 | 172000 | 280000 | 6810 | 11100 | 4560 | 7400 | |

1) Dimension H_2 with cover strip.

2) Dimension H_2 without cover strip.

3) Load ratings and load moments for ball runner block **without** ball chain.

Determination of the dynamic load capacities and load moments is based on a stroke travel of 100,000 m according to DIN ISO 14728-1. Often only 50,000 m are actually stipulated. For comparison: Multiply the values **C**, **M_t** and **M_L** by 1.26 according to the table.

FLS – flanged, long, standard height, R1653 ... 1.

**Dynamic characteristics**

Travel speed: $v_{\max} = 3 \text{ m/s}$
 Acceleration: $a_{\max} = 250 \text{ m/s}^2$
 (If $F_{\text{comb}} > 2.8 \cdot F_{\text{pr}}$: $a_{\max} = 50 \text{ m/s}^2$)

Note on lubrication

► No initial lubrication

Note

Can be used on all SNS ball guide rails.

Options and material numbers

| Size | Ball runner blocks with size | Preload class | | | | Accuracy class | | | | | Seals on ball runner blocks without ball chain |
|--------------|------------------------------|---------------|----|----|----|----------------|---|---|----|----|--|
| | | C0 | C1 | C2 | C3 | N | H | P | SP | UP | |
| 55 | R1653 5 | 9 | | | | 4 | 3 | – | – | – | 10 |
| | | | 1 | | | 4 | 3 | 2 | 1 | 9 | 10 |
| | | | | 2 | | – | 3 | 2 | 1 | 9 | 10 |
| | | | | | 3 | – | – | 2 | 1 | 9 | 10 |
| 65 | R1653 6 | 9 | | | | 4 | 3 | – | – | – | 10 |
| | | | 1 | | | 4 | 3 | 2 | 1 | 9 | 10 |
| | | | | 2 | | – | 3 | 2 | 1 | 9 | 10 |
| | | | | | 3 | – | – | 2 | 1 | 9 | 10 |
| E.g.: | R1653 5 | | 1 | | | 3 | | | | | 10 |

Order example

Options:

- Ball runner blocks FLS
- Size 55
- Preload class C1
- Accuracy class H
- With standard seal, without ball chain

Material number:

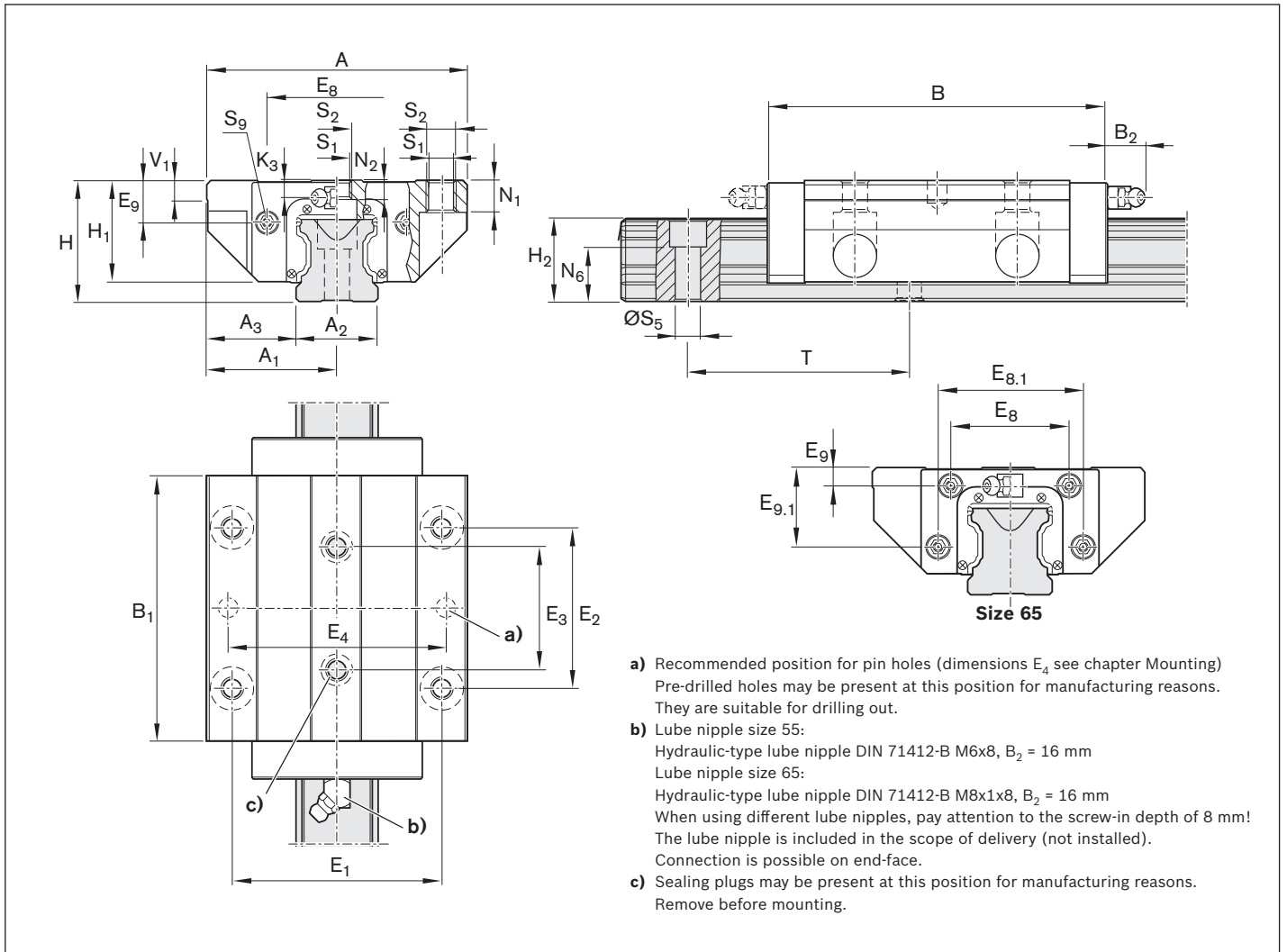
R1653 513 10

Preload classes

C0 = Without preload (clearance)
 C1 = Moderate preload
 C2 = Average preload
 C3 = High preload

Seals

SS = Standard seal



| Size | Dimensions (mm) | | | | | | | | | | | | | | | | |
|------|-----------------|----------------|----------------|----------------|-------------------|----------------|----------------|----------------|----------------|----------------|------------------|----------------|------------------|----|----------------|------------------------------|------------------------------|
| | A | A ₁ | A ₂ | A ₃ | B ^{+0.5} | B ₁ | E ₁ | E ₂ | E ₃ | E ₈ | E _{8.1} | E ₉ | E _{9.1} | H | H ₁ | H ₂ ¹⁾ | H ₂ ²⁾ |
| 55 | 140 | 70 | 53 | 43.5 | 199 | 155.5 | 116 | 95 | 70 | 80 | – | 22.3 | – | 70 | 57 | 48.15 | 47.85 |
| 65 | 170 | 85 | 63 | 53.5 | 243 | 194.6 | 142 | 110 | 82 | 76 | 100 | 11.0 | 53.5 | 90 | 76 | 60.15 | 59.85 |

| Size | Dimensions (mm) | | | | | | | | | | | Mass (kg) | Load capacities ³⁾ (N) | | Load moments ³⁾ (Nm) | | | |
|------|-----------------|----------------|----------------|--------------------------------|----------------|----------------|----------------|----------------|-----|----------------|-------|-----------|-----------------------------------|----------------|---------------------------------|-----------------|----------------|-----------------|
| | K ₃ | N ₁ | N ₂ | N ₆ ^{±0.5} | S ₁ | S ₂ | S ₅ | S ₉ | T | V ₁ | m | | C | C ₀ | M _t | M _{t0} | M _L | M _{L0} |
| 55 | 9 | 18 | 13.5 | 29.0 | 12.4 | M14 | 16 | M5x8 | 120 | 12 | 7.50 | 139000 | 245000 | 4410 | 7780 | 3960 | 6990 | |
| 65 | 16 | 23 | 14.0 | 38.5 | 14.6 | M16 | 18 | M4x7 | 150 | 15 | 14.15 | 223000 | 404000 | 8810 | 16000 | 8160 | 14800 | |

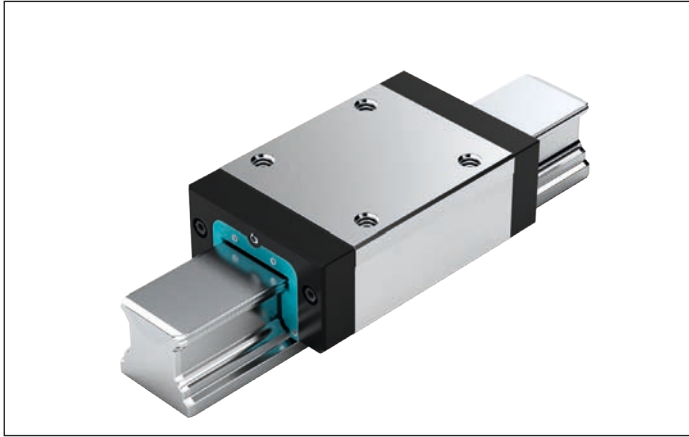
1) Dimension H_2 with cover strip

2) Dimension H_2 without cover strip

3) Load ratings and load moments for ball runner block **without** ball chain.

Determination of the dynamic load capacities and load moments is based on a stroke travel of 100,000 m according to DIN ISO 14728-1. Often only 50,000 m are actually stipulated. For comparison: Multiply the values **C**, **M_t** and **M_L** by 1.26 according to the table.

SNS – Slimline, normal, standard height, R1622...1.

**Dynamic characteristics**

Travel speed: $v_{\max} = 3 \text{ m/s}$
 Acceleration: $a_{\max} = 250 \text{ m/s}^2$
 (If $F_{\text{comb}} > 2.8 \cdot F_{\text{pr}}$: $a_{\max} = 50 \text{ m/s}^2$)

Note on lubrication

► No initial lubrication

Note

Can be used on all SNS ball guide rails.

Options and material numbers

| Size | Ball runner blocks with size | Preload class | | | | Accuracy class | | | Seals on ball runner blocks without ball chain | |
|--------------|------------------------------|---------------|----|----|----|----------------|---|---|--|--|
| | | C0 | C1 | C2 | C3 | N | H | P | SS | |
| 55 | R1622 5 | 9 | | | | 4 | 3 | – | 10 | |
| | | | 1 | | | 4 | 3 | 2 | 10 | |
| | | | | 2 | | – | 3 | 2 | 10 | |
| | | | | | 3 | – | – | 2 | 10 | |
| 65 | R1622 6 | 9 | | | | 4 | 3 | – | 10 | |
| | | | 1 | | | 4 | 3 | 2 | 10 | |
| | | | | 2 | | – | 3 | 2 | 10 | |
| | | | | | 3 | – | – | 2 | 10 | |
| E.g.: | R1622 5 | | 1 | | | | 3 | | 10 | |

Order example

Options:

- Ball runner blocks SNS
- Size 55
- Preload class C1
- Accuracy class H
- With standard seal, without ball chain

Material number:

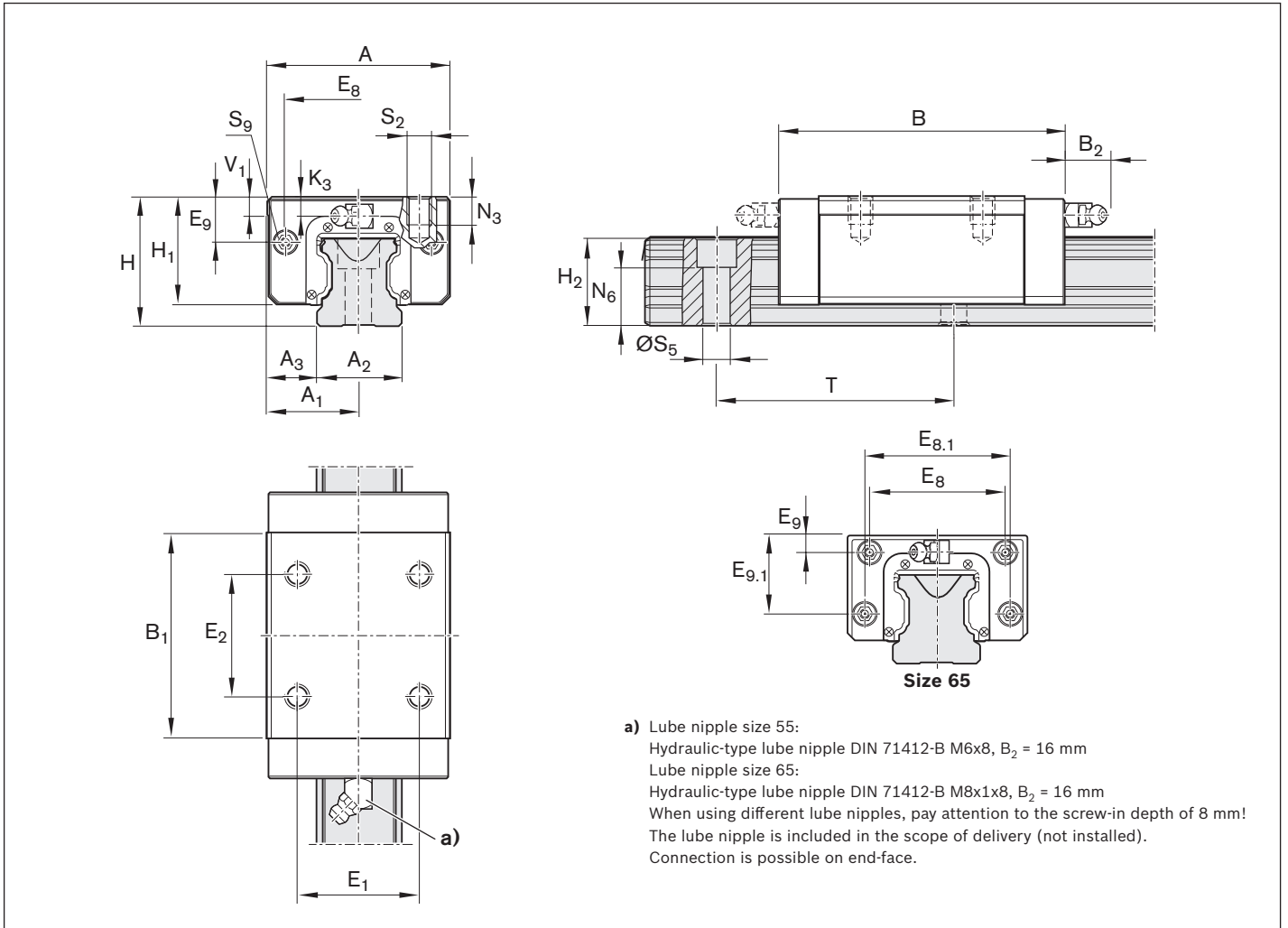
R1622 513 10

Preload classes

C0 = Without preload (clearance)
 C1 = Moderate preload
 C2 = Average preload
 C3 = High preload

Seals

SS = Standard seal



| Size | Dimensions (mm) | | | | | | | | | | | | | | | |
|------|-----------------|----------------|----------------|----------------|-------------------|----------------|----------------|----------------|----------------|------------------|----------------|------------------|----|----------------|------------------------------|------------------------------|
| | A | A ₁ | A ₂ | A ₃ | B ^{+0.5} | B ₁ | E ₁ | E ₂ | E ₈ | E _{8.1} | E ₉ | E _{9.1} | H | H ₁ | H ₂ ¹⁾ | H ₂ ²⁾ |
| 55 | 100 | 50 | 53 | 23.5 | 159 | 115.5 | 75 | 75 | 80 | – | 22.3 | – | 70 | 57 | 48.15 | 47.85 |
| 65 | 126 | 63 | 63 | 31.5 | 188 | 139.6 | 76 | 70 | 76 | 100 | 11.0 | 53.5 | 90 | 76 | 60.15 | 59.85 |

| Size | Dimensions (mm) | | | | | | | | Mass (kg) | Load capacities ³⁾ (N) | | Load moments ³⁾ (Nm) | | | |
|------|-----------------|----------------|--------------------------------|----------------|----------------|----------------|-----|----------------|-----------|-----------------------------------|--------|---------------------------------|----------------|-----------------|----------------|
| | K ₃ | N ₃ | N ₆ ^{±0.5} | S ₂ | S ₅ | S ₉ | T | V ₁ | | m | C | C ₀ | M _t | M _{t0} | M _L |
| 55 | 9 | 19 | 29.0 | M12 | 16 | M5x8 | 120 | 12 | 3.80 | 109000 | 174000 | 3480 | 5550 | 2320 | 3690 |
| 65 | 16 | 21 | 38.5 | M16 | 18 | M4x7 | 150 | 15 | 6.90 | 172000 | 280000 | 6810 | 11100 | 4560 | 7400 |

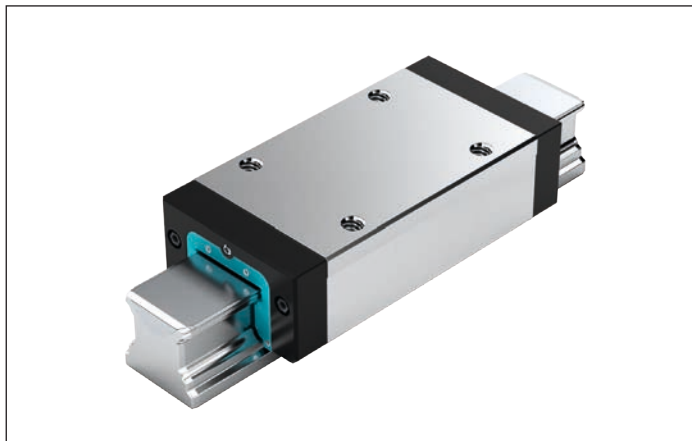
1) Dimension H₂ with cover strip

2) Dimension H₂ without cover strip

3) Load ratings and load moments for ball runner block **without** ball chain.

Determination of the dynamic load capacities and load moments is based on a stroke travel of 100,000 m according to DIN ISO 14728-1. Often only 50,000 m are actually stipulated. For comparison: Multiply the values **C**, **M_t** and **M_L** by 1.26 according to the table.

SLS – Slimline, long, standard height, R1623...1.

**Dynamic characteristics**

Travel speed: $v_{\max} = 3 \text{ m/s}$
 Acceleration: $a_{\max} = 250 \text{ m/s}^2$
 (If $F_{\text{comb}} > 2.8 \cdot F_{\text{pr}}$: $a_{\max} = 50 \text{ m/s}^2$)

Note on lubrication

► No initial lubrication

Note

Can be used on all SNS ball guide rails.

Options and material numbers

| Size | Ball runner blocks with size | Preload class | | | | Accuracy class | | | Seals on ball runner blocks without ball chain | |
|--------------|------------------------------|---------------|----|----|----|----------------|---|---|--|--|
| | | C0 | C1 | C2 | C3 | N | H | P | SS | |
| 55 | R1623 5 | 9 | | | | 4 | 3 | – | 10 | |
| | | | 1 | | | 4 | 3 | 2 | 10 | |
| | | | | 2 | | – | 3 | 2 | 10 | |
| | | | | | 3 | – | – | 2 | 10 | |
| 65 | R1623 6 | 9 | | | | 4 | 3 | – | 10 | |
| | | | 1 | | | 4 | 3 | 2 | 10 | |
| | | | | 2 | | – | 3 | 2 | 10 | |
| | | | | | 3 | – | – | 2 | 10 | |
| E.g.: | R1623 5 | | 1 | | | | 3 | | 10 | |

Order example

Options:

- Ball runner blocks SLS
- Size 55
- Preload class C1
- Accuracy class H
- With standard seal, without ball chain

Material number:

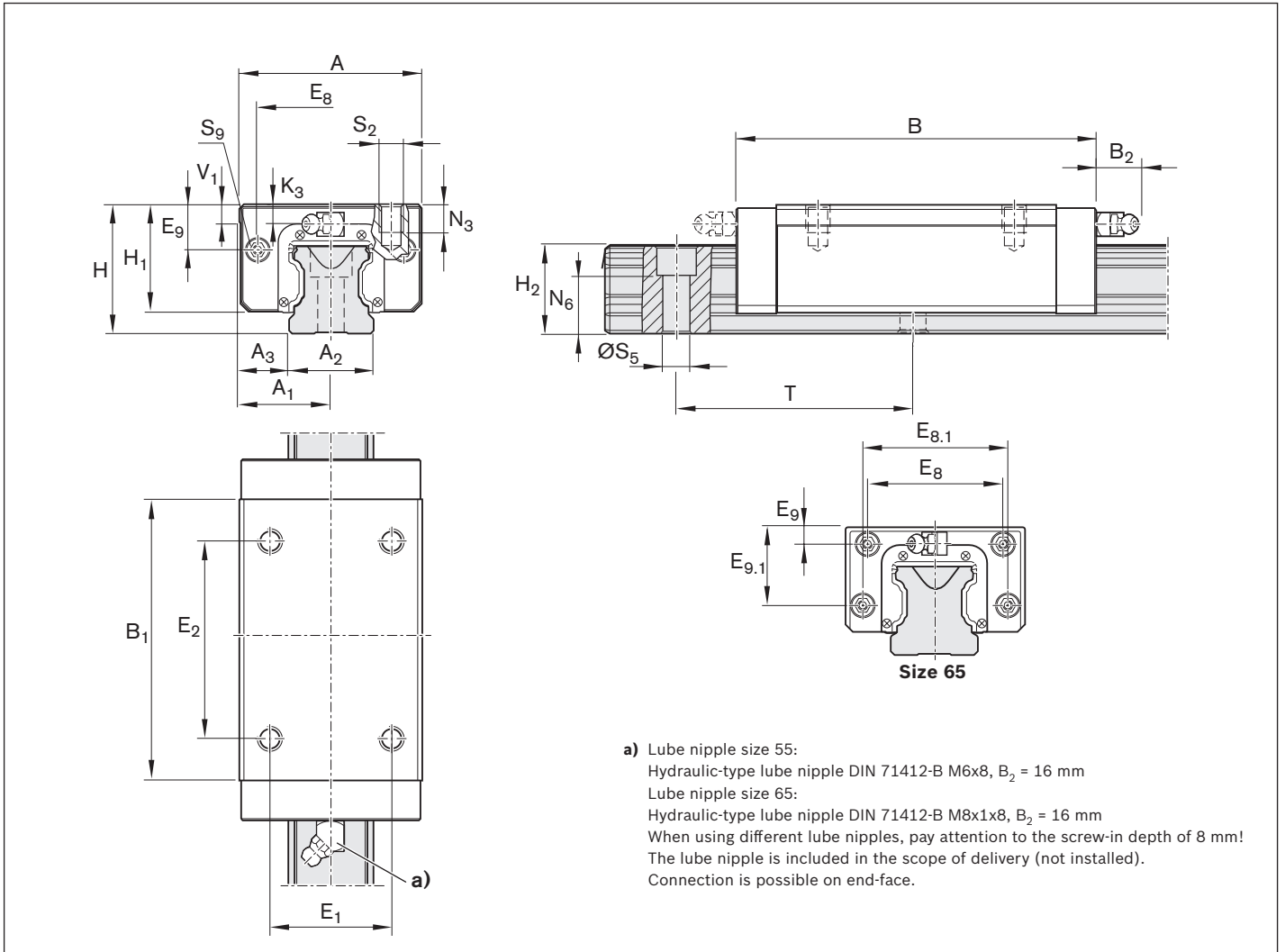
R1623 513 10

Preload classes

C0 = Without preload (clearance)
 C1 = Moderate preload
 C2 = Average preload
 C3 = High preload

Seals

SS = Standard seal



| Size | Dimensions (mm) | | | | | | | | | | | | | | | |
|------|-----------------|----------------|----------------|----------------|-------------------|----------------|----------------|----------------|----------------|------------------|----------------|------------------|----|----------------|------------------------------|------------------------------|
| | A | A ₁ | A ₂ | A ₃ | B ^{+0.5} | B ₁ | E ₁ | E ₂ | E ₈ | E _{8.1} | E ₉ | E _{9.1} | H | H ₁ | H ₂ ¹⁾ | H ₂ ²⁾ |
| 55 | 100 | 50 | 53 | 23.5 | 199 | 155.5 | 75 | 95 | 80 | - | 22.3 | - | 70 | 57 | 48.15 | 47.85 |
| 65 | 126 | 63 | 63 | 31.5 | 243 | 194.6 | 76 | 120 | 76 | 100 | 11.0 | 53.5 | 90 | 76 | 60.15 | 59.85 |

| Size | Dimensions (mm) | | | | | | | | Mass (kg) | Load capacities ³⁾ (N) | | Load moments ³⁾ (Nm) | | | |
|------|-----------------|----------------|--------------------------------|----------------|----------------|----------------|-----|----------------|-----------|-----------------------------------|--------|---------------------------------|----------------|-----------------|----------------|
| | K ₃ | N ₃ | N ₆ ^{±0.5} | S ₂ | S ₅ | S ₉ | T | V ₁ | | m | C | C ₀ | M _t | M _{t0} | M _L |
| 55 | 9 | 19 | 29.0 | M12 | 16 | M5x8 | 120 | 12 | 4.8 | 139000 | 245000 | 4410 | 7780 | 3960 | 6990 |
| 65 | 16 | 21 | 38.5 | M16 | 18 | M4x7 | 150 | 15 | 9.8 | 223000 | 404000 | 8810 | 16000 | 8160 | 14800 |

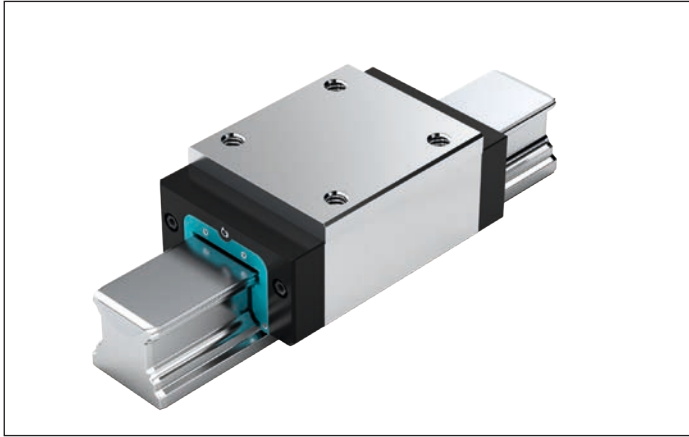
1) Dimension H₂ with cover strip

2) Dimension H₂ without cover strip

3) Load ratings and load moments for ball runner block **without** ball chain.

Determination of the dynamic load capacities and load moments is based on a stroke travel of 100,000 m according to DIN ISO 14728-1. Often only 50,000 m are actually stipulated. For comparison: Multiply the values **C**, **M_t** and **M_L** by 1.26 according to the table.

SNH – Slimline, normal, high, R1621 ... 1.

**Dynamic characteristics**

Travel speed: $v_{\max} = 3 \text{ m/s}$
 Acceleration: $a_{\max} = 250 \text{ m/s}^2$
 (If $F_{\text{comb}} > 2.8 \cdot F_{\text{pr}}$: $a_{\max} = 50 \text{ m/s}^2$)

Note on lubrication

► No initial lubrication

Note

Can be used on all SNS ball guide rails.

Options and material numbers

| Size | Ball runner blocks with size | Preload class | | | | Accuracy class | | | Seals on ball runner blocks without ball chain | |
|--------------|------------------------------|---------------|----|----|----|----------------|---|----|--|--|
| | | C0 | C1 | C2 | C3 | N | H | P | SS | |
| 55 | R1621 5 | 9 | | | | 4 | 3 | – | 10 | |
| | | | 1 | | | 4 | 3 | 2 | 10 | |
| | | | | 2 | | – | 3 | 2 | 10 | |
| | | | | | 3 | – | – | 2 | 10 | |
| E.g.: | R1621 5 | | 1 | | | 3 | | 10 | | |

Order example

Options:

- Ball runner blocks SNH
- Size 55
- Preload class C1
- Accuracy class H
- With standard seal, without ball chain

Material number:

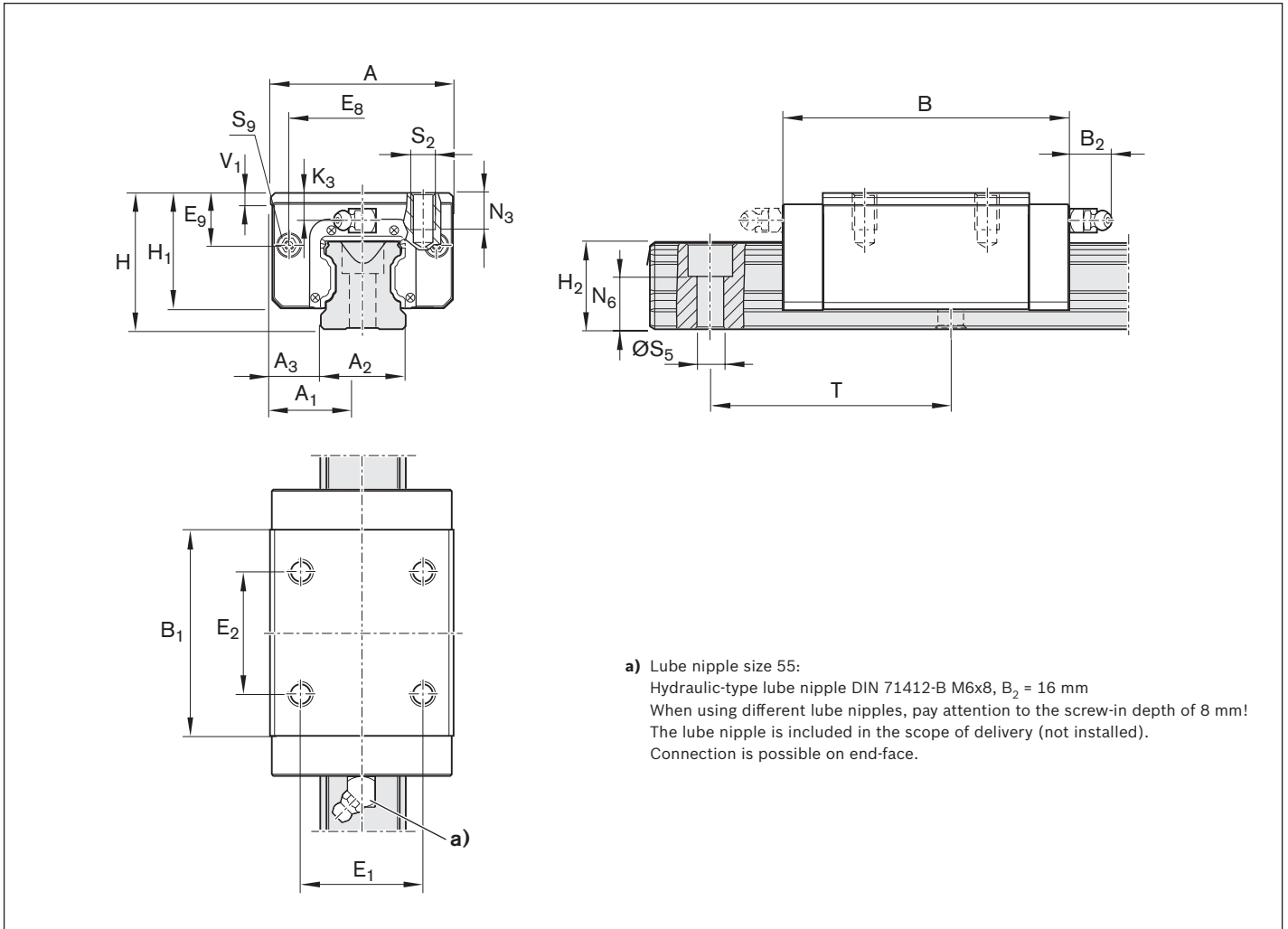
R1621 513 10

Preload classes

C0 = Without preload (clearance)
 C1 = Moderate preload
 C2 = Average preload
 C3 = High preload

Seals

SS = Standard seal

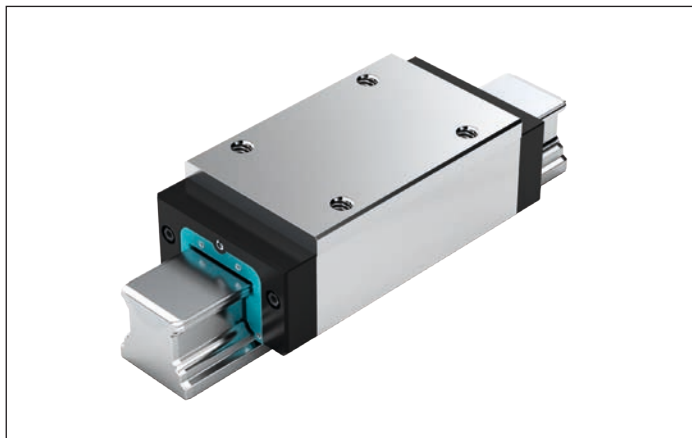


| Size | Dimensions (mm) | | | | | | | | | | | | | |
|------|-----------------|----------------|----------------|----------------|-------------------|----------------|----------------|----------------|----------------|----------------|----|----------------|------------------------------|------------------------------|
| | A | A ₁ | A ₂ | A ₃ | B ^{+0.5} | B ₁ | E ₁ | E ₂ | E ₈ | E ₉ | H | H ₁ | H ₂ ¹⁾ | H ₂ ²⁾ |
| 55 | 100 | 50 | 53 | 23.5 | 159 | 115.5 | 75 | 75 | 80 | 32.3 | 80 | 67 | 48.15 | 47.85 |

| Size | Dimensions (mm) | | | | | | | | Mass (kg) | Load capacities ³⁾ (N) | | Load moments ³⁾ (Nm) | | | |
|------|-----------------|----------------|--------------------------------|----------------|----------------|----------------|-----|----------------|-----------|-----------------------------------|--------|---------------------------------|----------------|-----------------|----------------|
| | K ₃ | N ₃ | N ₆ ^{±0.5} | S ₂ | S ₅ | S ₉ | T | V ₁ | | m | C | C ₀ | M _t | M _{t0} | M _L |
| 55 | 19 | 19 | 29 | M12 | 16 | M5x8 | 120 | 12 | 4.70 | 109000 | 174000 | 3480 | 5550 | 2320 | 3690 |

- 1) Dimension H₂ with cover strip
- 2) Dimension H₂ without cover strip
- 3) Load ratings and load moments for ball runner block **without** ball chain.
 Determination of the dynamic load capacities and load moments is based on a stroke travel of 100,000 m according to DIN ISO 14728-1. Often only 50,000 m are actually stipulated. For comparison: Multiply the values **C**, **M_t** and **M_L** by 1.26 according to the table.

SLH – Slimline, long, high, R1624 ... 1.

**Dynamic characteristics**

Travel speed: $v_{\max} = 3 \text{ m/s}$
 Acceleration: $a_{\max} = 250 \text{ m/s}^2$
 (If $F_{\text{comb}} > 2.8 \cdot F_{\text{pr}}$: $a_{\max} = 50 \text{ m/s}^2$)

Note on lubrication

► No initial lubrication

Note

Can be used on all SNS ball guide rails.

Options and material numbers

| Size | Ball runner blocks with size | Preload class | | | | Accuracy class | | | Seals on ball runner blocks without ball chain | |
|--------------|------------------------------|---------------|----|----|----|----------------|---|----|--|--|
| | | C0 | C1 | C2 | C3 | N | H | P | SS | |
| 55 | R1624 5 | 9 | | | | 4 | 3 | – | 10 | |
| | | | 1 | | | 4 | 3 | 2 | 10 | |
| | | | | 2 | | – | 3 | 2 | 10 | |
| | | | | | 3 | – | – | 2 | 10 | |
| E.g.: | R1624 5 | | 1 | | | 3 | | 10 | | |

Order example

Options:

- Ball runner blocks SLH
- Size 55
- Preload class C1
- Accuracy class H
- With standard seal, without ball chain

Material number:

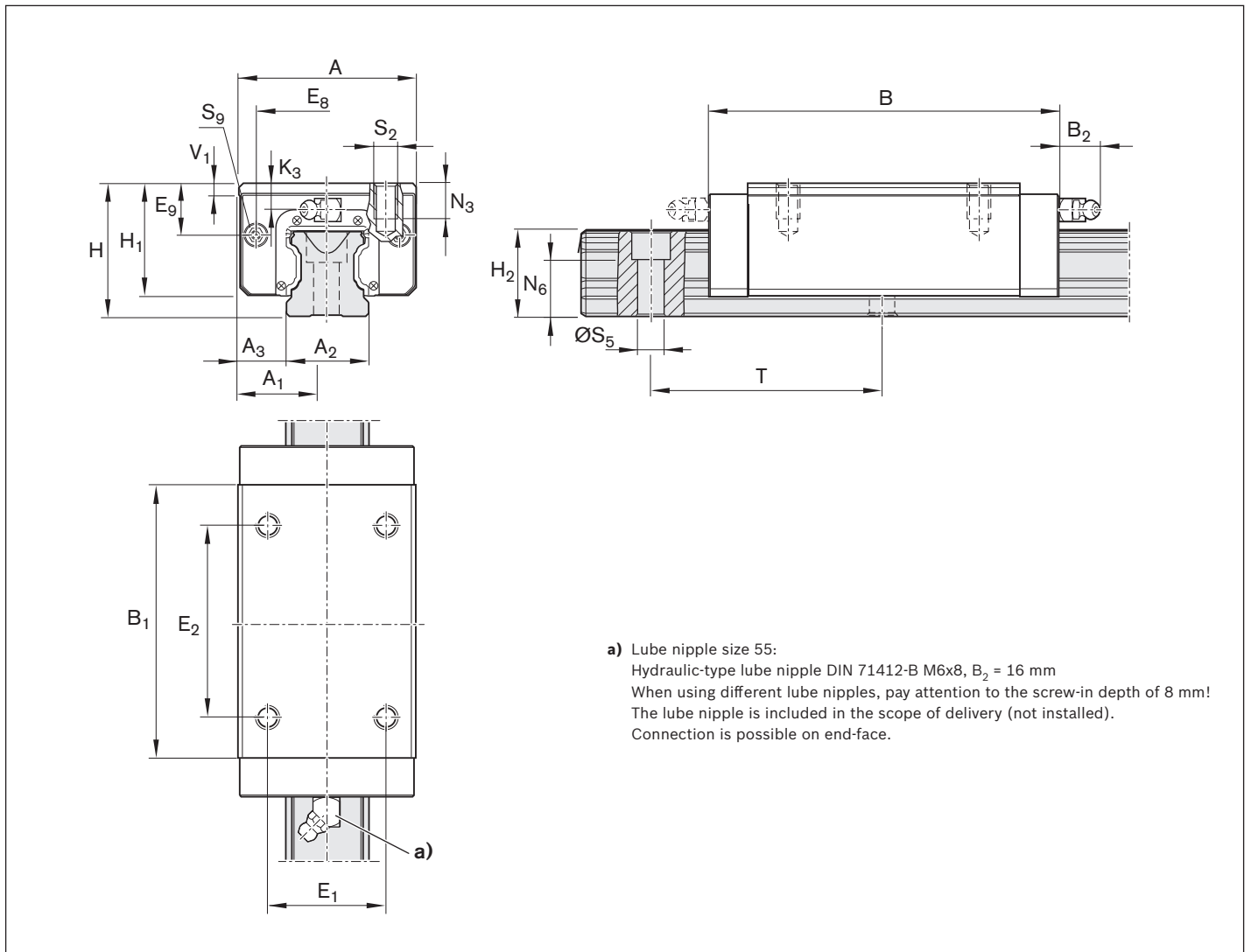
R1624 513 10

Preload classes

C0 = Without preload (clearance)
 C1 = Moderate preload
 C2 = Average preload
 C3 = High preload

Seals

SS = Standard seal



| Size | Dimensions (mm) | | | | | | | | | | | | | |
|------|-----------------|----------------|----------------|----------------|-------------------|----------------|----------------|----------------|----------------|----------------|----|----------------|------------------------------|------------------------------|
| | A | A ₁ | A ₂ | A ₃ | B ^{+0.5} | B ₁ | E ₁ | E ₂ | E ₈ | E ₉ | H | H ₁ | H ₂ ¹⁾ | H ₂ ²⁾ |
| 55 | 100 | 50 | 53 | 23.5 | 199 | 155.5 | 75 | 95 | 80 | 32.3 | 80 | 67 | 48.15 | 47.85 |

| Size | Dimensions (mm) | | | | | | | | | Mass (kg) | Load capacities ³⁾ (N) | | Load moments ³⁾ (Nm) | | | |
|------|-----------------|----------------|--------------------------------|----------------|----------------|----------------|-----|----------------|------|-----------|-----------------------------------|----------------|---------------------------------|-----------------|----------------|-----------------|
| | K ₃ | N ₃ | N ₆ ^{±0.5} | S ₂ | S ₅ | S ₉ | T | V ₁ | m | | C | C ₀ | M _t | M _{t0} | M _L | M _{L0} |
| 55 | 19 | 19 | 29 | M12 | 16 | M5x8 | 120 | 12 | 6.00 | 139000 | 245000 | 4410 | 7780 | 3960 | 6990 | |

1) Dimension H₂ with cover strip

2) Dimension H₂ without cover strip

3) Load ratings and load moments for ball runner block **without** ball chain.

Determination of the dynamic load capacities and load moments is based on a stroke travel of 100,000 m according to DIN ISO 14728-1. Often only 50,000 m are actually stipulated. For comparison: Multiply the values **C**, **M_t** and **M_L** by 1.26 according to the table.

Product description

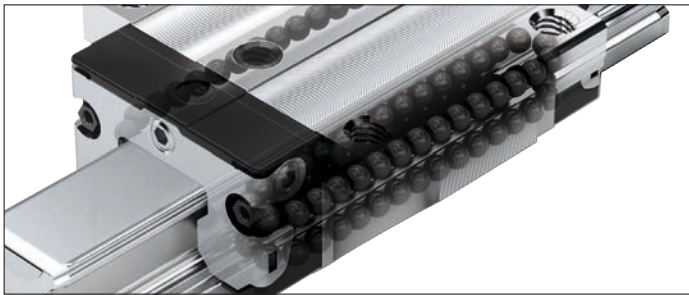
Characteristic features

- ▶ Excellent dynamic characteristics:
Travel speed: $v_{\max} = 10 \text{ m/s}$
Acceleration: $a_{\max} = 500 \text{ m/s}^2$
- ▶ The same high load ratings in all four main directions of loading
- ▶ Long-term lubrication is possible over several years
- ▶ Minimum quantity lubrication system with integrated reservoir for oil lubrication
- ▶ Lube fittings with metal threads on all sides
- ▶ Limitless interchangeability as all ball guide rail systems can be combined at will with all ball runner block versions within each accuracy class.
- ▶ Maximum system rigidity due to preloaded O-arrangement
- ▶ Electrically insulating due to use of ceramic balls
- ▶ Existing range of accessories fully usable
- ▶ Globally unique, premium logistics

Further highlights:

- ▶ High speed thanks to the low weight of ceramic balls
- ▶ Attachments on the ball runner block can be mounted from above and below¹⁾
- ▶ Improved rigidity under lift-off and side loading conditions due to two additional mounting screw holes at the center of the ball runner block
- ▶ End-face fastening thread for all attachments
- ▶ High rigidity in all load directions – permits applications with just one runner block per rail
- ▶ Integrated all-round sealing
- ▶ High torque load capacity
- ▶ Optimized entry-zone geometry and high number of balls minimize variation in elastic deflection
- ▶ Smooth, quiet running thanks to optimally designed ball return and guideway
- ▶ Available in five common sizes
- ▶ Ball runner block pre-lubricated at the factory

1) Type-dependent



Ceramic balls

- ▶ Enable maximum travel speeds

Definition of the format of ball runner blocks

| Criterion | Designation | Code (example) | | |
|-----------|------------------------------|----------------|---|---|
| | | F | N | S |
| Width | Flange (F) | F | | |
| | Slimline (S) | S | | |
| | Wide (B) | B | | |
| | Compact (C) | C | | |
| Length | Normal (N) | | N | |
| | Long (L) | | L | |
| | Short (K) | | K | |
| Height | Standard height (S) | | | S |
| | High (H) | | | H |
| | Low (N) | | | N |

Note

Can be used on all SNS/SNO ball guide rails.

Overview of formats



FNS, FLS, SNS, SLS

| Format | Size | Ball runner blocks with size | Preload class | Accuracy class | | | Seal ball runner block, without ball chain | Load capacities ¹⁾ (N) | | Load moments ¹⁾ (Nm) | | | | Mass (kg) |
|------------|--------------|------------------------------|---------------|----------------|---|----|--|-----------------------------------|----------------|---------------------------------|-----------------|----------------|-----------------|-----------|
| | | | | C2 | H | P | | C | C ₀ | M _t | M _{t0} | M _L | M _{L0} | |
| FNS | 15 | R2001 1 | 2 | 3 | 2 | 90 | 6880 | 8860 | 66 | 85 | 47 | 61 | 0.20 | |
| | 20 | R2001 8 | 2 | 3 | 2 | 90 | 16300 | 20800 | 210 | 270 | 140 | 180 | 0.45 | |
| | 25 | R2001 2 | 2 | 3 | 2 | 90 | 20000 | 25100 | 280 | 360 | 200 | 250 | 0.60 | |
| | 30 | R2001 7 | 2 | 3 | 2 | 90 | 25500 | 33500 | 440 | 580 | 310 | 400 | 1.05 | |
| | 35 | R2001 3 | 2 | 3 | 2 | 90 | 36200 | 56500 | 780 | 1210 | 510 | 790 | 1.50 | |
| | E.g.: | R2001 7 | 2 | 3 | | 90 | | | | | | | | |
| FLS | 15 | R2002 1 | 2 | 3 | 2 | 90 | 8930 | 12800 | 86 | 120 | 85 | 120 | 0.30 | |
| | 20 | R2002 8 | 2 | 3 | 2 | 90 | 20700 | 29200 | 260 | 370 | 240 | 340 | 0.55 | |
| | 25 | R2002 2 | 2 | 3 | 2 | 90 | 26000 | 36600 | 370 | 520 | 370 | 520 | 0.80 | |
| | 30 | R2002 7 | 2 | 3 | 2 | 90 | 32100 | 46700 | 560 | 810 | 520 | 750 | 1.45 | |
| | 35 | R2002 3 | 2 | 3 | 2 | 90 | 46600 | 81100 | 1000 | 1740 | 900 | 1560 | 2.15 | |
| SNS | 15 | R2011 1 | 2 | 3 | 2 | 90 | 6880 | 8860 | 66 | 85 | 47 | 61 | 0.15 | |
| | 20 | R2011 8 | 2 | 3 | 2 | 90 | 16300 | 20800 | 210 | 270 | 140 | 180 | 0.35 | |
| | 25 | R2011 2 | 2 | 3 | 2 | 90 | 20000 | 25100 | 280 | 360 | 200 | 250 | 0.45 | |
| | 30 | R2011 7 | 2 | 3 | 2 | 90 | 25500 | 33500 | 440 | 580 | 310 | 400 | 0.80 | |
| | 35 | R2011 3 | 2 | 3 | 2 | 90 | 36200 | 56500 | 780 | 1210 | 510 | 790 | 1.15 | |
| SLS | 15 | R2012 1 | 2 | 3 | 2 | 90 | 8930 | 12800 | 86 | 120 | 85 | 120 | 0.20 | |
| | 20 | R2012 8 | 2 | 3 | 2 | 90 | 20700 | 29200 | 260 | 370 | 240 | 340 | 0.45 | |
| | 25 | R2012 2 | 2 | 3 | 2 | 90 | 26000 | 36600 | 370 | 520 | 370 | 520 | 0.60 | |
| | 30 | R2012 7 | 2 | 3 | 2 | 90 | 32100 | 46700 | 560 | 810 | 520 | 750 | 1.05 | |
| | 35 | R2012 3 | 2 | 3 | 2 | 90 | 46600 | 81100 | 1000 | 1740 | 900 | 1560 | 1.60 | |

1) Load ratings and load moments for ball runner block **without** ball chain.

Determination of the dynamic load capacities and load moments is based on a stroke travel of 100,000 m according to DIN ISO 14728-1. Often only 50,000 m are actually stipulated. For comparison: Multiply the values **C**, **M_t** and **M_L** by 1.26 according to the table.

Note

Dimensions, dimensional drawing, load ratings, rigidity and moments see standard ball runner block BSHP

Order example FNS

Preload classes
C2 = Average preload

Seals
SS = Standard seal

Options:

- ▶ Ball runner blocks FNS
- ▶ Size 30
- ▶ Preload class C2
- ▶ Accuracy class H
- ▶ With standard seal, without ball chain

Material number:

R2001 723 90

Product description

Characteristic features

- ▶ Compensates own misalignments (for deviations up to 10' in 2 levels)
- ▶ Extra-compact design
- ▶ The same high load ratings in all four main directions of loading
- ▶ Enables greater parallelism and height offsets of mounting bases
- ▶ Accuracy classes H and N
- ▶ Preload classes:
 - C0 (without preload, clearance)
 - C1 (moderate preload)
- ▶ Smooth operation due to optimal return and ball pick-up and entry design
- ▶ Low noise level and outstanding travel behavior
- ▶ Excellent dynamic characteristics:
 - Travel speed: $v_{\max} = 5 \text{ m/s}$
 - Acceleration: $a_{\max} = 500 \text{ m/s}^2$
- ▶ Minimum quantity lubrication system with integrated reservoir for oil lubrication
- ▶ Lube fittings with metal threads on all sides
- ▶ Ball runner block pre-lubricated at the factory
- ▶ Limitless interchangeability as all ball guide rail systems can be combined at will with all ball runner block versions within each accuracy class.

Self-aligning

Rexroth Super ball runner blocks with self-aligning feature automatically compensate misalignments up to 10 ft. No reduction in load capacity occurs as a result of angular pressure.

The centers of the matching surfaces supporting the steel bearing plates serve as a rocking fulcrum.

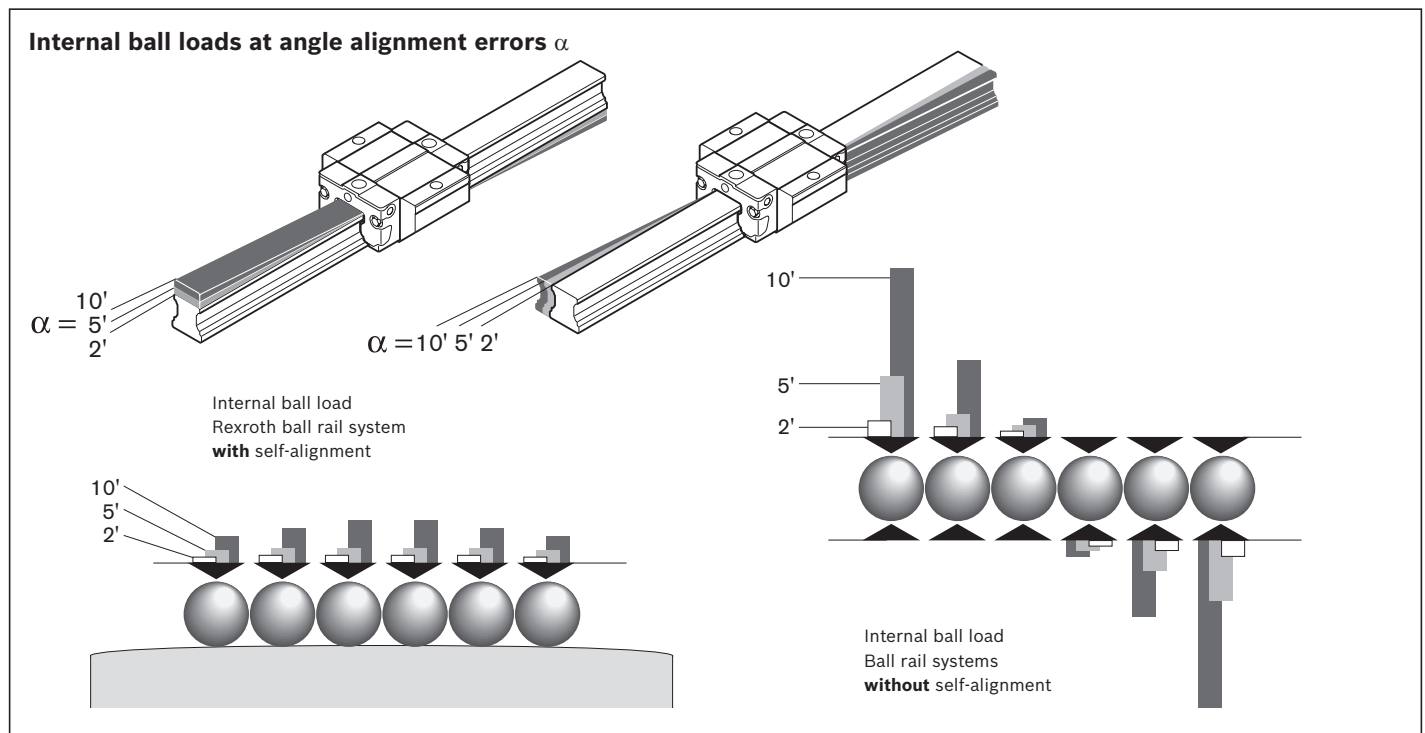
Misalignments between ball runner blocks and ball guide rails are therefore not problematic since machining inaccuracies, mounting errors or rail deflections are automatically compensated.

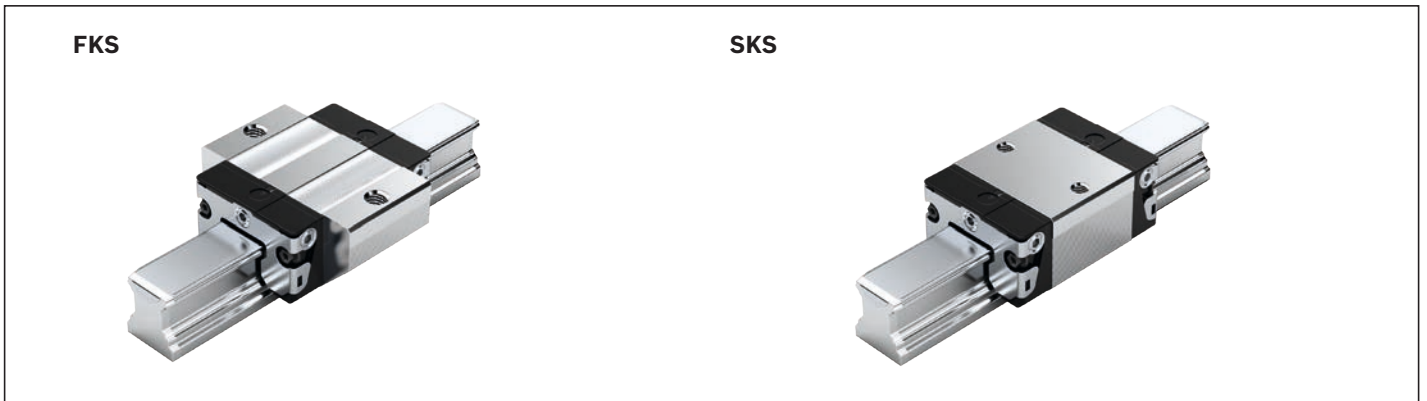
The self-aligning feature ensures that the balls enter the load-bearing zone smoothly and that the load is distributed evenly across the entire row of balls.

This results in extra-smooth running and considerably longer service life.

Using two Super Ball Runner Blocks on one ball guide rail, a system of high-load bearing and stabilized ball rail systems can be created that is particularly suitable for the handling sector.

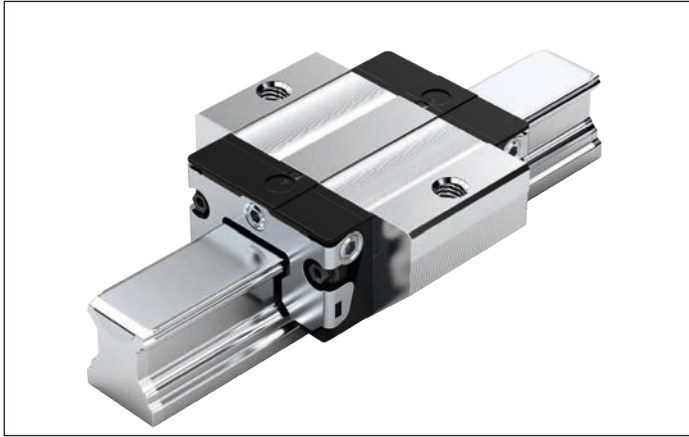
Two runner blocks must always be mounted on one rail.



Overview of formats**Definition of the format of ball runner blocks**

| Criterion | Designation | Code (example) | | |
|---------------|------------------------------|----------------|---|---|
| | | F | K | S |
| Width | Flange (F) | F | | |
| | Slimline (S) | S | | |
| | Wide (B) | B | | |
| | Compact (C) | C | | |
| Length | Normal (N) | | N | |
| | Long (L) | | L | |
| | Short (K) | | K | |
| Height | Standard height (S) | | | S |
| | High (H) | | | H |
| | Low (N) | | | N |

FKS – flange, short, standard height

**R1661 ... 2.****Dynamic characteristics**Travel speed: $v_{\max} = 5 \text{ m/s}$ Acceleration: $a_{\max} = 500 \text{ m/s}^2$ (If $F_{\text{comb}} > 2.8 \cdot F_{\text{pr}}$: $a_{\max} = 50 \text{ m/s}^2$)**Note on lubrication**

▶ Pre-lubricated

Note

Can be used on all SNS ball guide rails.

Options and material numbers

| Size | Ball runner blocks with size | Preload class | | Accuracy class | | Seals on ball runner blocks without ball chain | |
|--------------|------------------------------|---------------|----|----------------|---|--|----|
| | | C0 | C1 | N | H | SS | LS |
| 15 | R1661 1 | 9 | 1 | 4 | 3 | 20 | 21 |
| 20 | R1661 8 | 9 | 1 | 4 | 3 | 20 | 21 |
| 25 | R1661 2 | 9 | 1 | 4 | 3 | 20 | 21 |
| 30 | R1661 7 | 9 | 1 | 4 | 3 | 20 | 21 |
| 35 | R1661 3 | 9 | 1 | 4 | 3 | 20 | 21 |
| E.g.: | R1661 7 | | 1 | | 3 | 20 | |

Order example

Options:

- ▶ Ball runner blocks FKS
- ▶ Size 30
- ▶ Preload class C1
- ▶ Accuracy class H
- ▶ With standard seal, without ball chain

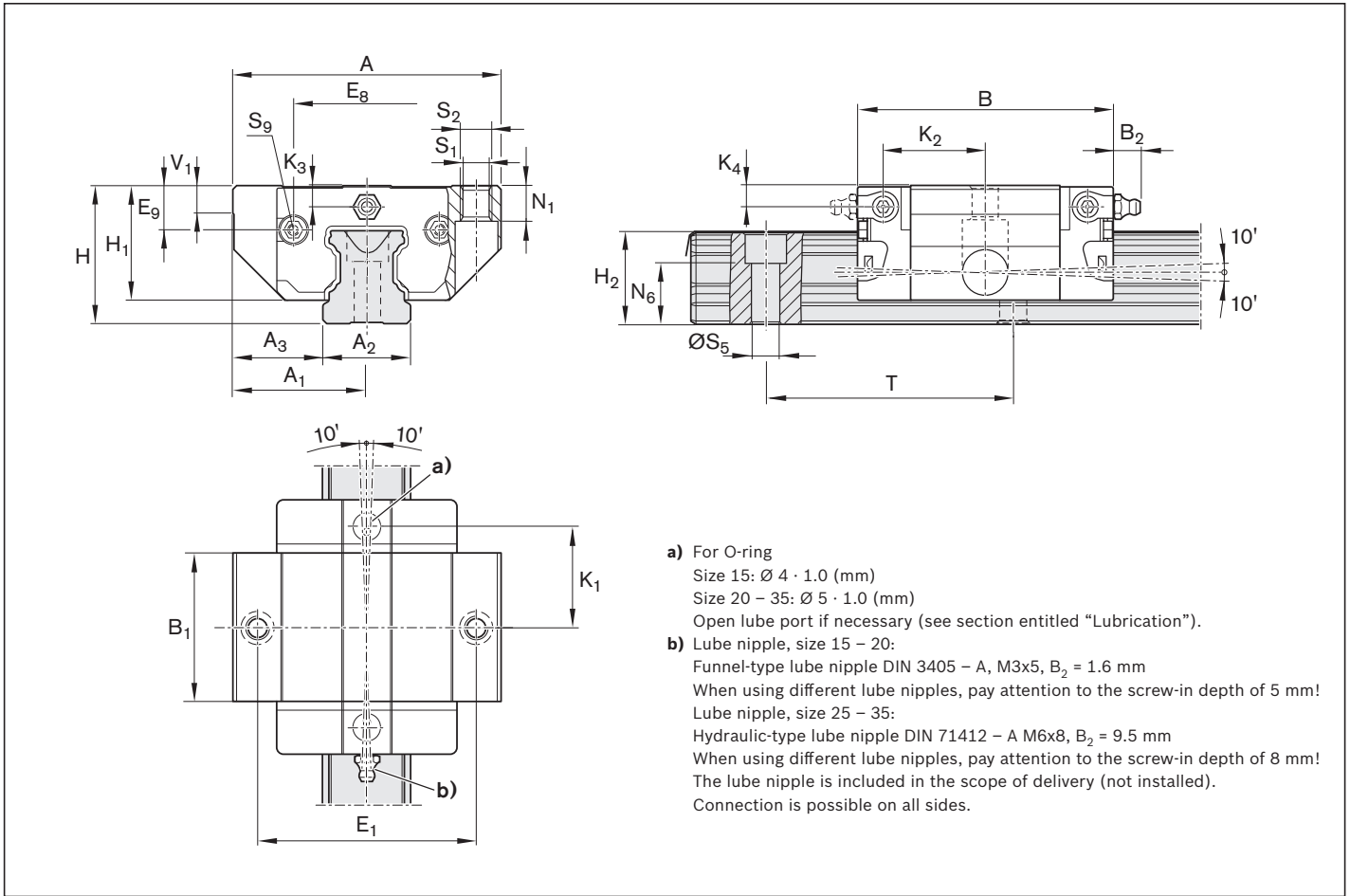
Material number:

R1661 713 20

Preload classesC0 = Without preload (clearance)
C1 = Moderate preload**Seals**SS = Standard seal
LS = Low-friction seal**Key**

gray numbers

= No preferred variant / combination
(partially longer delivery times)

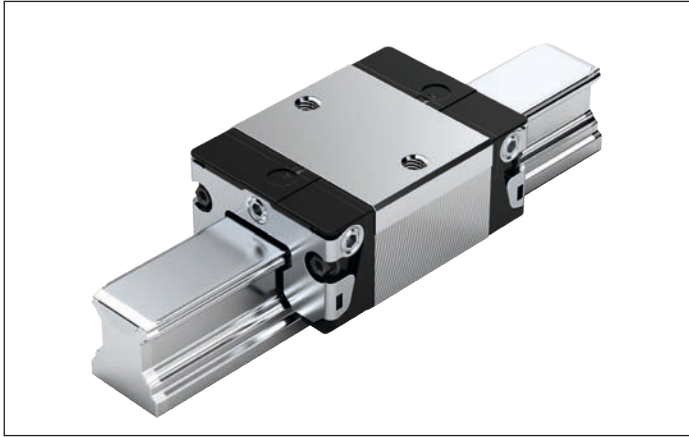


| Size | Dimensions (mm) | | | | | | | | | | | | | | | | |
|------|-----------------|----------------|----------------|----------------|-------------------|----------------|----------------|----------------|----------------|----|----------------|------------------------------|------------------------------|----------------|----------------|----------------|----------------|
| | A | A ₁ | A ₂ | A ₃ | B ^{+0.5} | B ₁ | E ₁ | E ₈ | E ₉ | H | H ₁ | H ₂ ¹⁾ | H ₂ ²⁾ | K ₁ | K ₂ | K ₃ | K ₄ |
| 15 | 47 | 23.5 | 15 | 16.0 | 44.7 | 25.7 | 38 | 24.55 | 6.70 | 24 | 19.90 | 16.30 | 16.20 | 16.25 | 17.85 | 3.20 | 3.20 |
| 20 | 63 | 31.5 | 20 | 21.5 | 57.3 | 31.9 | 53 | 32.50 | 7.30 | 30 | 25.35 | 20.75 | 20.55 | 22.95 | 22.95 | 3.35 | 3.35 |
| 25 | 70 | 35.0 | 23 | 23.5 | 67.0 | 38.6 | 57 | 38.30 | 11.50 | 36 | 29.90 | 24.45 | 24.25 | 25.35 | 26.50 | 5.50 | 5.50 |
| 30 | 90 | 45.0 | 28 | 31.0 | 75.3 | 45.0 | 72 | 48.40 | 14.60 | 42 | 35.35 | 28.55 | 28.35 | 28.80 | 30.50 | 6.05 | 6.05 |
| 35 | 100 | 50.0 | 34 | 33.0 | 84.9 | 51.4 | 82 | 58.00 | 17.35 | 48 | 40.40 | 32.15 | 31.85 | 32.70 | 34.20 | 6.90 | 6.90 |

| Size | Dimensions (mm) | | | | | | | | | Weight (kg) | Load ratings ³⁾ (N) | Permissible load (N) | Load moments ³⁾ (Nm) | |
|------|-----------------|--------------------------------|----------------|----------------|----------------|----------------|----|----------------|------|-------------|--------------------------------|----------------------|---------------------------------|----------------|
| | N ₁ | N ₆ ^{±0.5} | S ₁ | S ₂ | S ₅ | S ₉ | T | V ₁ | C | | | | F _{max} | M _t |
| 15 | 5.2 | 10.3 | 4.3 | M5 | 4.5 | M2.5x3.5 | 60 | 5.0 | 0.15 | 3900 | 1500 | 39 | 15 | |
| 20 | 7.7 | 13.2 | 5.3 | M6 | 6.0 | M3x5 | 60 | 6.0 | 0.30 | 10100 | 3900 | 130 | 50 | |
| 25 | 9.3 | 15.2 | 6.7 | M8 | 7.0 | M3x5 | 60 | 7.5 | 0.50 | 11400 | 4400 | 170 | 65 | |
| 30 | 11.0 | 17.0 | 8.5 | M10 | 9.0 | M3x5 | 80 | 7.0 | 0.80 | 15800 | 6100 | 270 | 105 | |
| 35 | 12.0 | 20.5 | 8.5 | M10 | 9.0 | M3x5 | 80 | 8.0 | 1.20 | 21100 | 8100 | 450 | 175 | |

- 1) Dimension H₂ with cover strip
- 2) Dimension H₂ without cover strip
- 3) Load ratings and load moments for ball runner block **without** ball chain.
 Determination of the dynamic load capacities and load moments is based on a stroke travel of 100,000 m according to DIN ISO 14728-1. Often only 50,000 m are actually stipulated. For comparison: Multiply the values **C** and **M_t** by 1.26 according to the table.

SKS – Slimline, short, standard height

**R1662 ... 2.****Dynamic characteristics**Travel speed: $v_{\max} = 5 \text{ m/s}$ Acceleration: $a_{\max} = 500 \text{ m/s}^2$ (If $F_{\text{comb}} > 2.8 \cdot F_{\text{pr}}$: $a_{\max} = 50 \text{ m/s}^2$)**Note on lubrication**

▶ Pre-lubricated

Note

Can be used on all SNS ball guide rails.

Options and material numbers

| Size | Ball runner blocks with size | Preload class | | Accuracy class | | | Seals on ball runner blocks without ball chain | | |
|--------------|------------------------------|---------------|----|----------------|---|----|--|--|--|
| | | C0 | C1 | N | H | SS | LS | | |
| 15 | R1662 1 | 9 | 1 | 4 | 3 | 20 | 21 | | |
| 20 | R1662 8 | 9 | 1 | 4 | 3 | 20 | 21 | | |
| 25 | R1662 2 | 9 | 1 | 4 | 3 | 20 | 21 | | |
| 30 | R1662 7 | 9 | 1 | 4 | 3 | 20 | 21 | | |
| 35 | R1662 3 | 9 | 1 | 4 | 3 | 20 | 21 | | |
| E.g.: | R1662 7 | | 1 | | 3 | 20 | | | |

Order example

Options:

- ▶ Ball runner block SKS
- ▶ Size 30
- ▶ Preload class C1
- ▶ Accuracy class H
- ▶ With standard seal, without ball chain

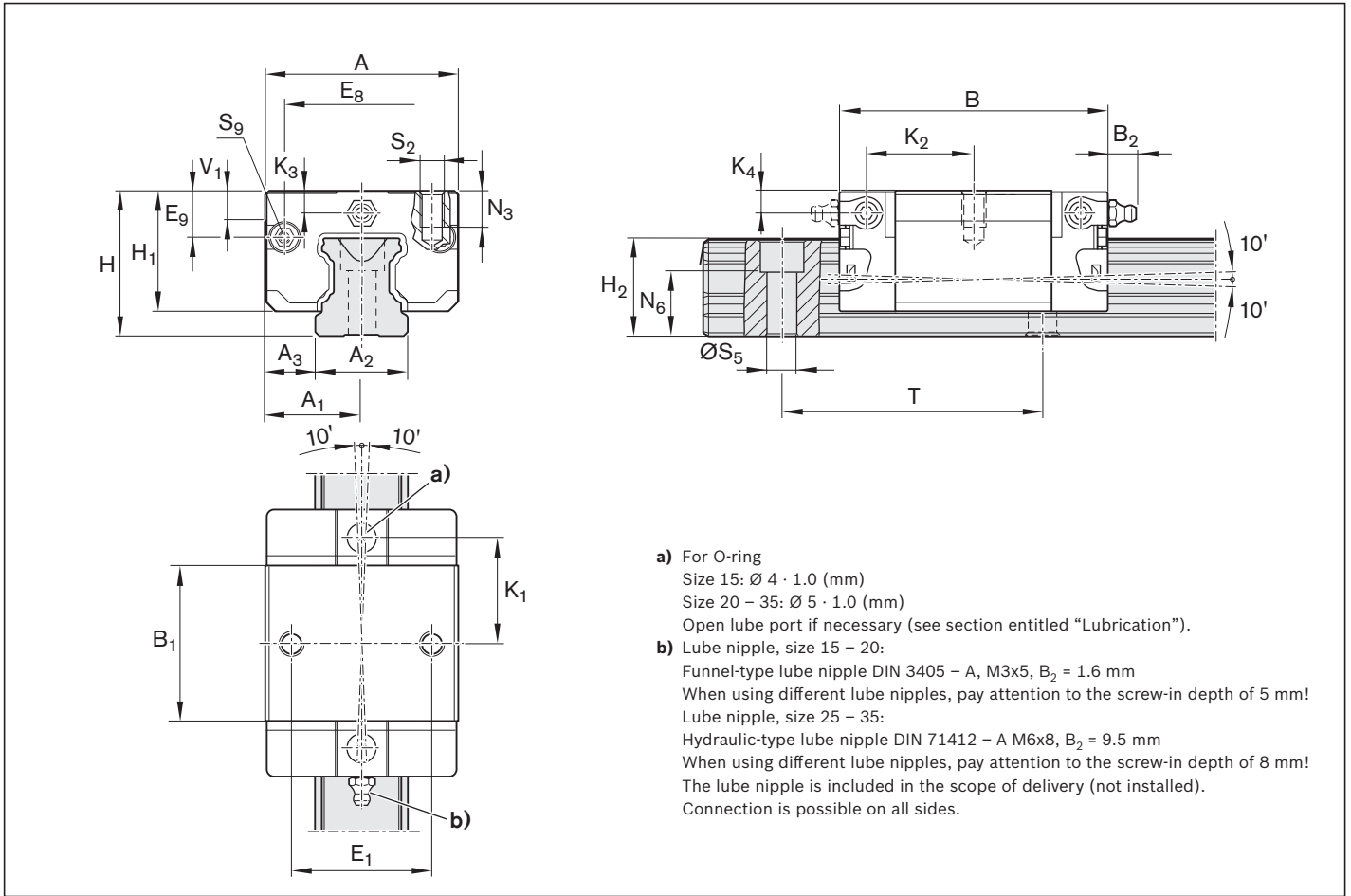
Material number:

R1662 713 20

Preload classesC0 = Without preload (clearance)
C1 = Moderate preload**Seals**SS = Standard seal
LS = Low-friction seal**Key**

gray numbers

= No preferred variant / combination
(partially longer delivery times)



- a) For O-ring
 Size 15: $\varnothing 4 \cdot 1.0$ (mm)
 Size 20 – 35: $\varnothing 5 \cdot 1.0$ (mm)
 Open lube port if necessary (see section entitled “Lubrication”).
- b) Lube nipple, size 15 – 20:
 Funnel-type lube nipple DIN 3405 – A, M3x5, $B_2 = 1.6$ mm
 When using different lube nipples, pay attention to the screw-in depth of 5 mm!
 Lube nipple, size 25 – 35:
 Hydraulic-type lube nipple DIN 71412 – A M6x8, $B_2 = 9.5$ mm
 When using different lube nipples, pay attention to the screw-in depth of 8 mm!
 The lube nipple is included in the scope of delivery (not installed).
 Connection is possible on all sides.

| Size | Dimensions (mm) | | | | | | | | | | | | | | | | |
|------|-----------------|----------------|----------------|----------------|-------------------|----------------|----------------|----------------|----------------|----|----------------|------------------------------|------------------------------|----------------|----------------|----------------|----------------|
| | A | A ₁ | A ₂ | A ₃ | B ^{+0.5} | B ₁ | E ₁ | E ₈ | E ₉ | H | H ₁ | H ₂ ¹⁾ | H ₂ ²⁾ | K ₁ | K ₂ | K ₃ | K ₄ |
| 15 | 34 | 17 | 15 | 9.5 | 44.7 | 25.7 | 26 | 24.55 | 6.70 | 24 | 19.90 | 16.30 | 16.20 | 16.25 | 17.85 | 3.20 | 3.20 |
| 20 | 44 | 22 | 20 | 12.0 | 57.3 | 31.9 | 32 | 32.50 | 7.30 | 30 | 25.35 | 20.75 | 20.55 | 22.95 | 22.95 | 3.35 | 3.35 |
| 25 | 48 | 24 | 23 | 12.5 | 67.0 | 38.6 | 35 | 38.30 | 11.50 | 36 | 29.90 | 24.45 | 24.25 | 25.35 | 26.50 | 5.50 | 5.50 |
| 30 | 60 | 30 | 28 | 16.0 | 75.3 | 45.0 | 40 | 48.40 | 14.60 | 42 | 35.35 | 28.55 | 28.35 | 28.80 | 30.50 | 6.05 | 6.05 |
| 35 | 70 | 35 | 34 | 18.0 | 84.9 | 51.4 | 50 | 58.00 | 17.35 | 48 | 40.40 | 32.15 | 31.85 | 32.70 | 34.20 | 6.90 | 6.90 |

| Size | Dimensions (mm) | | | | | | | | Mass (kg) | Load ratings ³⁾ (N) | Permissible load (N) | Load moments ³⁾ (Nm) | |
|------|-----------------|--------------------------------|----------------|----------------|----------------|----|----------------|------|-----------|--------------------------------|----------------------|---------------------------------|----------------|
| | N ₃ | N ₆ ^{±0.5} | S ₂ | S ₅ | S ₉ | T | V ₁ | C | | | | F _{max} | M _t |
| 15 | 6.0 | 10.3 | M4 | 4.5 | M2.5x3.5 | 60 | 5.0 | 0.10 | 3,900 | 1500 | 39 | 15 | |
| 20 | 7.5 | 13.2 | M5 | 6.0 | M3x5 | 60 | 6.0 | 0.25 | 10,100 | 3,900 | 130 | 50 | |
| 25 | 9.0 | 15.2 | M6 | 7.0 | M3x5 | 60 | 7.5 | 0.35 | 11,400 | 4,400 | 170 | 65 | |
| 30 | 12.0 | 17.0 | M8 | 9.0 | M3x5 | 80 | 7.0 | 0.60 | 15,800 | 6,100 | 270 | 105 | |
| 35 | 13.0 | 20.5 | M8 | 9.0 | M3x5 | 80 | 8.0 | 0.90 | 21,100 | 8,100 | 450 | 175 | |

- 1) Dimension H₂ with cover strip
- 2) Dimension H₂ without cover strip
- 3) Load ratings and load moments for ball runner block **without** ball chain.
 Determination of the dynamic load capacities and load moments is based on a stroke travel of 100,000 m according to DIN ISO 14728-1. Often only 50,000 m are actually stipulated. For comparison: Multiply the values **C** and **M_t** by 1.26 according to the table.

Product description

Characteristic features

Rexroth ball rail systems with aluminum ball runner blocks have been developed specially for industrial robots and general machine building requiring compact, ball bearing-mounted longitudinal guides in various accuracy classes with very high load capacity and low gravity. The extremely small and lightweight guide units in five common sizes have the same high load ratings in all four main directions of loading.

Highlights

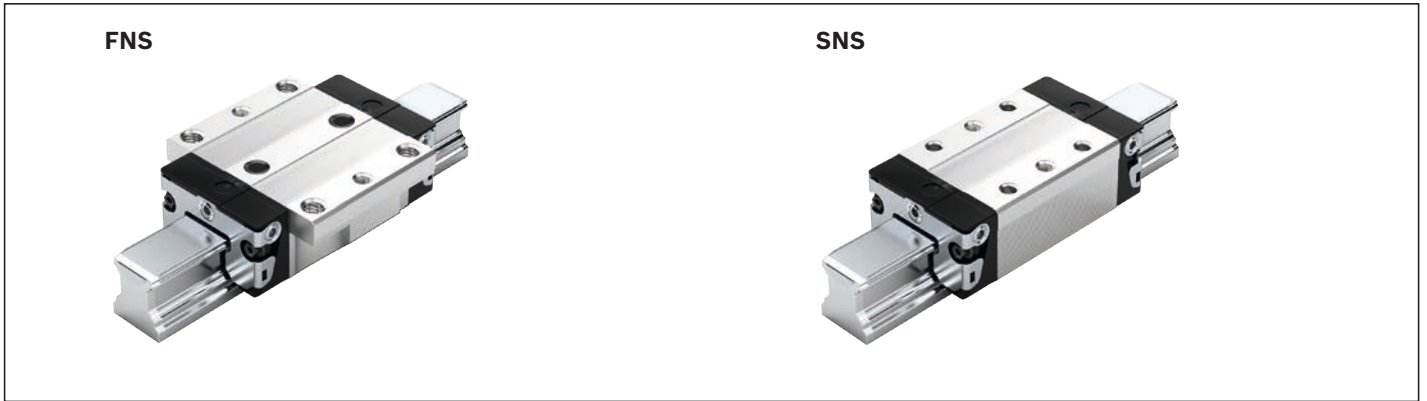
- ▶ High torque load capacity
- ▶ Optimized entry-zone geometry and high number of balls minimize variation in elastic deflection
- ▶ Extra-compact lightweight design 60% less gravity due to aluminum compared to the ball runner blocks made of steel
- ▶ Limitless interchangeability as all ball guide rail systems can be combined at will with all ball runner block versions within each accuracy class.

Further highlights

- ▶ Low noise level and outstanding travel behavior
- ▶ Excellent dynamic characteristics:
Travel speed: $v_{\max} = 5 \text{ m/s}$
Acceleration: $a_{\max} = 500 \text{ m/s}^2$
- ▶ Long-term lubrication is possible over several years
- ▶ Minimum quantity lubrication with integrated reservoir for oil lubrication
- ▶ Enables greater parallelism and height offsets of mounting bases
- ▶ Accuracy classes H and N are combinable with all rails in each accuracy class
- ▶ Lube connection with metal thread on all sides
- ▶ End-face fastening thread for all attachments
- ▶ Ball guide rails of accuracy class H are also available with coated Resist CR (matt silver finish, hard chrome plated)
- ▶ Quiet, smooth running thanks to optimally designed ball and ball chain return and guideway
- ▶ Improved rigidity under lift-off and side loading conditions due to two additional mounting screw holes at the center of the ball runner block¹⁾
- ▶ Attachments on the ball runner block can be mounted from above and below¹⁾
- ▶ Predrilled holes on the ball runner block for pinned fitting
- ▶ Optionally available with ball chain
- ▶ Ball runner block pre-lubricated at the factory

1) Type-dependent

Overview



Definition of the format of ball runner blocks

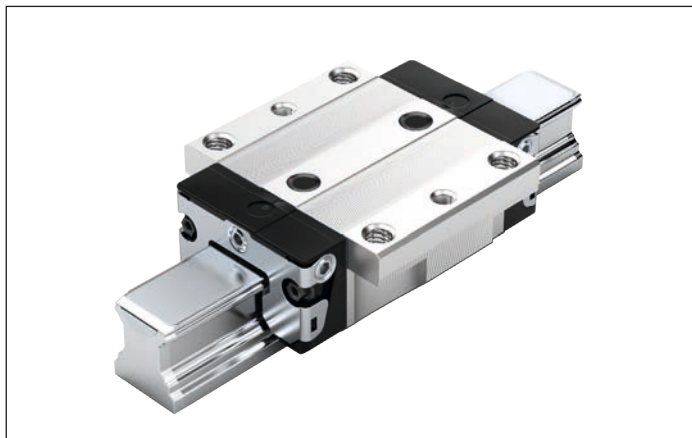
| Criterion | Designation | Code (example) | | |
|---------------|------------------------------|----------------|---|---|
| | | F | N | S |
| Width | Flange (F) | F | | |
| | Slimline (S) | S | | |
| | Wide (B) | B | | |
| | Compact (C) | C | | |
| Length | Normal (N) | | N | |
| | Long (L) | | L | |
| | Short (K) | | K | |
| Height | Standard height (S) | | | S |
| | High (H) | | | H |
| | Low (N) | | | N |



Ball chain (optional)

- ▶ Optimized noise level

FNS – flanged, normal, standard height, R1631 ... 2.

**R1631 ... 2.****Dynamic characteristics**

Travel speed: $v_{\max} = 5 \text{ m/s}$
 Acceleration: $a_{\max} = 500 \text{ m/s}^2$
 (If $F_{\text{comb}} > 2.8 \cdot F_{\text{pr}}$: $a_{\max} = 50 \text{ m/s}^2$)

Note on lubrication

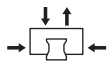
► Pre-lubricated

Note


Can be used on all SNS ball guide rails.

Options/material numbers/technical data

| Size | Ball runner blocks with size | Preload class | | Accuracy class | | Seals on ball runner blocks | | | | |
|--------------|------------------------------|---------------|----|----------------|---|-----------------------------|-----------------|----|----|----|
| | | C0 | C1 | N | H | without ball chain | with ball chain | | SS | LS |
| 15 | R1631 1 | 9 | 1 | 4 | 3 | 20 | 21 | 22 | 23 | 23 |
| 20 | R1631 8 | 9 | 1 | 4 | 3 | 20 | 21 | 22 | 23 | 23 |
| 25 | R1631 2 | 9 | 1 | 4 | 3 | 20 | 21 | 22 | 23 | 23 |
| 30 | R1631 7 | 9 | 1 | 4 | 3 | 20 | 21 | 22 | 23 | 23 |
| 35 | R1631 3 | 9 | 1 | 4 | 3 | 20 | 21 | 22 | 23 | 23 |
| E.g.: | R1631 7 | | 1 | | 3 | 20 | | | | |

| Size | Load capacities ¹⁾ (N)  | Permissible load (N) F_{\max} | Load moments ¹⁾ (Nm) | | | |
|------|--|------------------------------------|---------------------------------|--------------|-------|--------------|
| | | | M_t | $M_{t \max}$ | M_L | $M_{L \max}$ |
| 15 | 9860 | 3000 | 95 | 29 | 68 | 16 |
| 20 | 23400 | 7200 | 300 | 92 | 200 | 50 |
| 25 | 28600 | 8800 | 410 | 125 | 290 | 70 |
| 30 | 36500 | 12200 | 630 | 210 | 440 | 110 |
| 35 | 51800 | 16200 | 1110 | 345 | 720 | 170 |

1) Load ratings and load moments for ball runner block **without** ball chain.

Load ratings and load moments for ball runner block **with** ball chain  13

Determination of the dynamic load capacities and load moments is based on a stroke travel of 100,000 m according to DIN ISO 14728-1.

Often only 50,000 m are actually stipulated. For comparison: Multiply the values **C**, **M_t** and **M_L** by 1.26 according to the table.

Order example

Options:

- Ball runner blocks FNS
- Size 30
- Preload class C1
- Accuracy class H
- With standard seal, without ball chain

Material number:

R1631 713 20

Preload classes

C0 = Without preload (clearance)
 C1 = Moderate preload

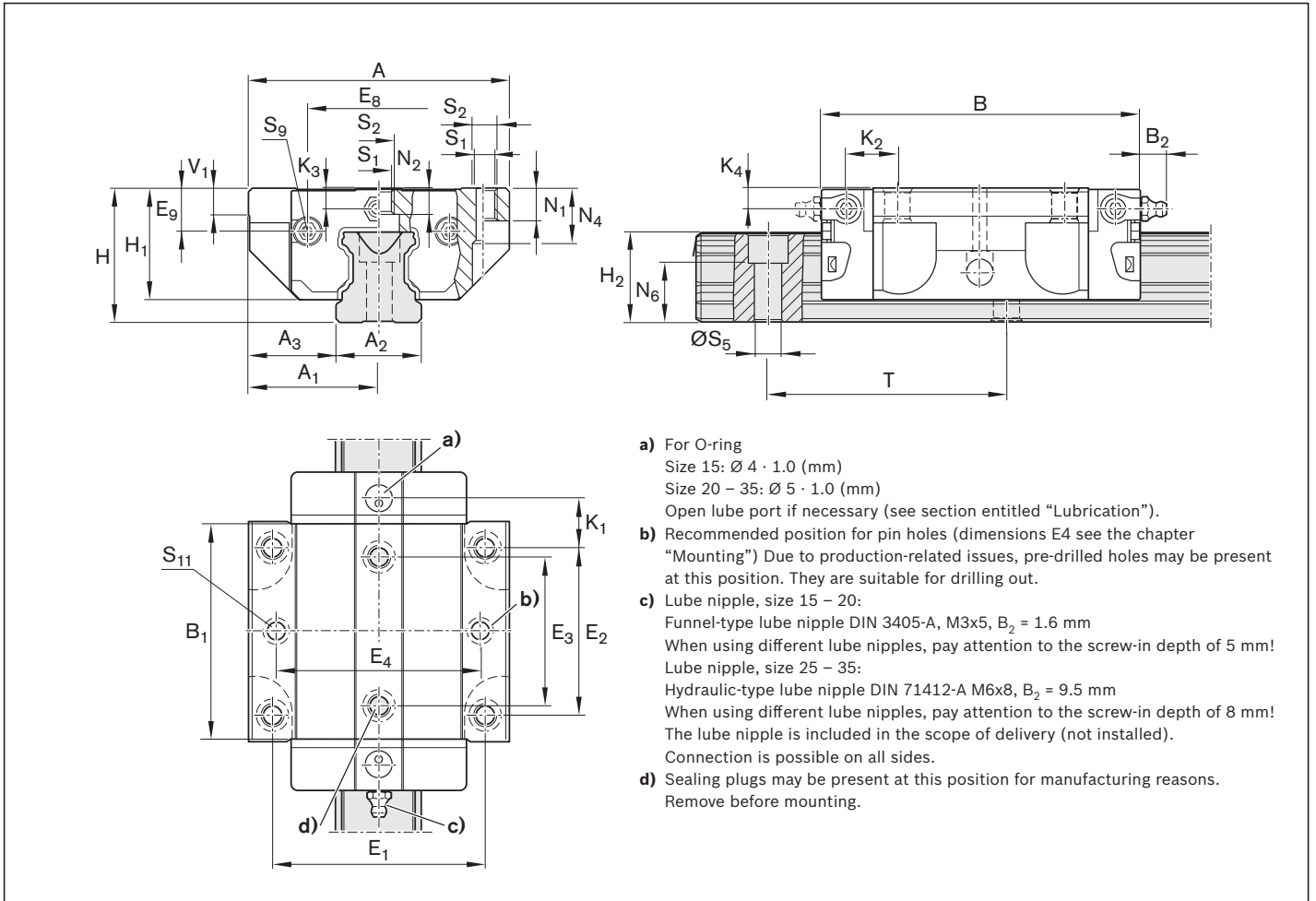
Seals

SS = Standard seal
 LS = Low-friction seal

Key

gray numbers

= No preferred variant / combination
 (partially longer delivery times)

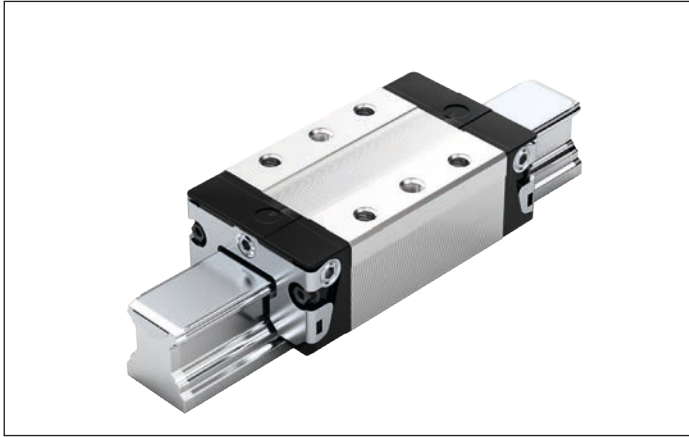


| Size | Dimensions (mm) | | | | | | | | | | | | | | | | | | | |
|------|-----------------|----------------|----------------|----------------|-------------------|----------------|----------------|----------------|----------------|----------------|----------------|----|----------------|------------------------------|------------------------------|----------------|----------------|----------------|----------------|--|
| | A | A ₁ | A ₂ | A ₃ | B ^{+0.5} | B ₁ | E ₁ | E ₂ | E ₃ | E ₈ | E ₉ | H | H ₁ | H ₂ ¹⁾ | H ₂ ²⁾ | K ₁ | K ₂ | K ₃ | K ₄ | |
| 15 | 47 | 23.5 | 15 | 16.0 | 58.2 | 39.2 | 38 | 30 | 26 | 24.55 | 6.70 | 24 | 19.90 | 16.30 | 16.20 | 8.00 | 9.6 | 3.20 | 3.20 | |
| 20 | 63 | 31.5 | 20 | 21.5 | 75.0 | 49.6 | 53 | 40 | 35 | 32.50 | 7.30 | 30 | 25.35 | 20.75 | 20.55 | 11.80 | 11.8 | 3.35 | 3.35 | |
| 25 | 70 | 35.0 | 23 | 23.5 | 86.2 | 57.8 | 57 | 45 | 40 | 38.30 | 11.50 | 36 | 29.90 | 24.45 | 24.25 | 12.45 | 13.6 | 5.50 | 5.50 | |
| 30 | 90 | 45.0 | 28 | 31.0 | 97.7 | 67.4 | 72 | 52 | 44 | 48.40 | 14.60 | 42 | 35.35 | 28.55 | 28.35 | 14.00 | 15.7 | 6.05 | 6.05 | |
| 35 | 100 | 50.0 | 34 | 33.0 | 110.5 | 77.0 | 82 | 62 | 52 | 58.00 | 17.35 | 48 | 40.40 | 32.15 | 31.85 | 14.50 | 16.0 | 6.90 | 6.90 | |

| Size | Dimensions (mm) | | | | | | | | | | | Mass (kg) |
|------|-----------------|----------------|----------------|--------------------------------|----------------|----------------|----------------|----------------|-----------------|----|----------------|-----------|
| | N ₁ | N ₂ | N ₄ | N ₆ ^{±0.5} | S ₁ | S ₂ | S ₅ | S ₉ | S ₁₁ | T | V ₁ | |
| 15 | 5.2 | 4.40 | 10.3 | 10.3 | 4.3 | M5 | 4.5 | M2.5x3.5 | 3.7 | 60 | 5.0 | 0.10 |
| 20 | 7.7 | 5.20 | 13.5 | 13.2 | 5.3 | M6 | 6.0 | M3x5 | 4.7 | 60 | 6.0 | 0.24 |
| 25 | 9.3 | 7.00 | 17.8 | 15.2 | 6.7 | M8 | 7.0 | M3x5 | 5.7 | 60 | 7.5 | 0.30 |
| 30 | 11.0 | 7.90 | 20.5 | 17.0 | 8.5 | M10 | 9.0 | M3x5 | 7.7 | 80 | 7.0 | 0.55 |
| 35 | 12.0 | 10.15 | 24.0 | 20.5 | 8.5 | M10 | 9.0 | M3x5 | 7.7 | 80 | 8.0 | 0.75 |

- 1)** Dimension H₂ with cover strip
2) Dimension H₂ without cover strip

SNS – Slimline, normal, standard height, R1632 ... 2.

**R1632 ... 2.****Dynamic characteristics**

Travel speed: $v_{\max} = 5 \text{ m/s}$
 Acceleration: $a_{\max} = 500 \text{ m/s}^2$
 (If $F_{\text{comb}} > 2.8 \cdot F_{\text{pr}}$: $a_{\max} = 50 \text{ m/s}^2$)

Note on lubrication

► Pre-lubricated

Note

Can be used on all SNS ball guide rails.

Options/material numbers/technical data

| Size | Ball runner blocks with size | Preload class | | Accuracy class | | Seals on ball runner blocks | | | |
|--------------|------------------------------|---------------|----|----------------|---|-----------------------------|-----------------|----|----|
| | | C0 | C1 | N | H | without ball chain | with ball chain | | |
| | | | | | | SS | LS | SS | LS |
| 15 | R1632 1 | 9 | 1 | 4 | 3 | 20 | 21 | 22 | 23 |
| 20 | R1632 8 | 9 | 1 | 4 | 3 | 20 | 21 | 22 | 23 |
| 25 | R1632 2 | 9 | 1 | 4 | 3 | 20 | 21 | 22 | 23 |
| 30 | R1632 7 | 9 | 1 | 4 | 3 | 20 | 21 | 22 | 23 |
| 35 | R1632 3 | 9 | 1 | 4 | 3 | 20 | 21 | 22 | 23 |
| E.g.: | R1632 7 | | 1 | | 3 | 20 | | | |

| Size | Load capacities ¹⁾ (N) | Permissible load (N) | Load moments ¹⁾ (Nm) | | | |
|------|-----------------------------------|----------------------|---------------------------------|-------|--------------|-------|
| | C | | F_{\max} | M_t | $M_{t \max}$ | M_L |
| 15 | 9860 | 3000 | 95 | 29 | 68 | 16 |
| 20 | 23400 | 7200 | 300 | 92 | 200 | 50 |
| 25 | 28600 | 8800 | 410 | 125 | 290 | 70 |
| 30 | 36500 | 12200 | 630 | 210 | 440 | 110 |
| 35 | 51800 | 16200 | 1110 | 345 | 720 | 170 |

1) Load ratings and load moments for ball runner block **without** ball chain.

Load ratings and load moments for ball runner block **with** ball chain  13

Determination of the dynamic load capacities and load moments is based on a stroke travel of 100,000 m according to DIN ISO 14728-1. Often only 50,000 m are actually stipulated. For comparison: Multiply the values **C**, **M_t** and **M_L** by 1.26 according to the table.

Order example

Options:

- Ball runner blocks SNS
- Size 30
- Preload class C1
- Accuracy class H
- With standard seal, without ball chain

Material number:

R1632 713 20

Preload classes

C0 = Without preload (clearance)
 C1 = Moderate preload

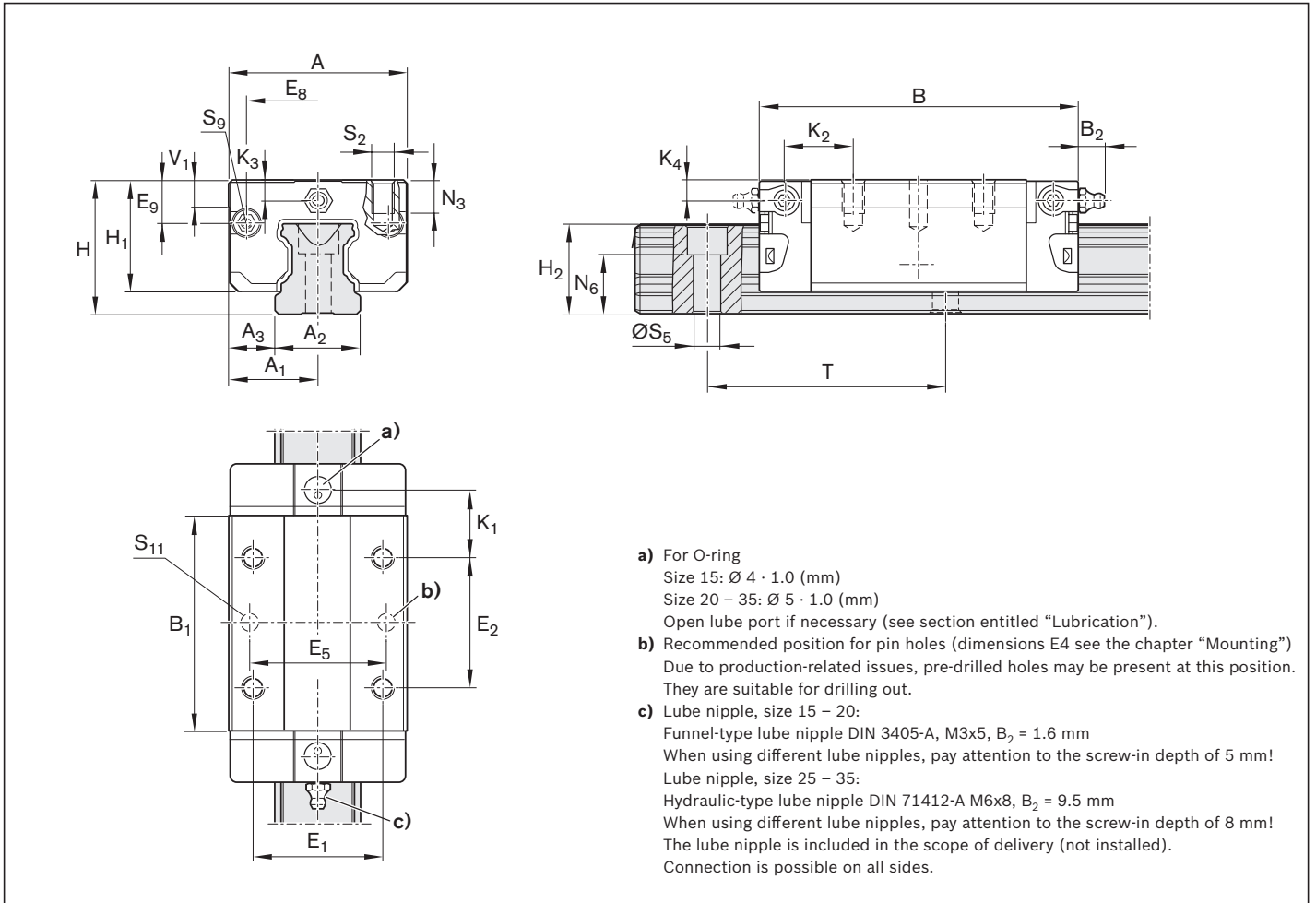
Seals

SS = Standard seal
 LS = Low-friction seal

Key

gray numbers

= No preferred variant / combination (partially longer delivery times)



| Size | Dimensions (mm) | | | | | | | | | | | | | | | | | | |
|------|-----------------|----------------|----------------|----------------|-------------------|----------------|----------------|----------------|----------------|----------------|----|----------------|------------------------------|------------------------------|----------------|----------------|----------------|----------------|--|
| | A | A ₁ | A ₂ | A ₃ | B ^{+0.5} | B ₁ | E ₁ | E ₂ | E ₈ | E ₉ | H | H ₁ | H ₂ ¹⁾ | H ₂ ²⁾ | K ₁ | K ₂ | K ₃ | K ₄ | |
| 15 | 34 | 17 | 15 | 9.5 | 58.2 | 39.2 | 26 | 26 | 24.55 | 6.70 | 24 | 19.90 | 16.30 | 16.20 | 10.00 | 11.60 | 3.20 | 3.20 | |
| 20 | 44 | 22 | 20 | 12.0 | 75.0 | 49.6 | 32 | 36 | 32.50 | 7.30 | 30 | 25.35 | 20.75 | 20.55 | 13.80 | 13.80 | 3.35 | 3.35 | |
| 25 | 48 | 24 | 23 | 12.5 | 86.2 | 57.8 | 35 | 35 | 38.30 | 11.50 | 36 | 29.90 | 24.45 | 24.25 | 17.45 | 18.60 | 5.50 | 5.50 | |
| 30 | 60 | 30 | 28 | 16.0 | 97.7 | 67.4 | 40 | 40 | 48.40 | 14.60 | 42 | 35.35 | 28.55 | 28.35 | 20.00 | 21.70 | 6.05 | 6.05 | |
| 35 | 70 | 35 | 34 | 18.0 | 110.5 | 77.0 | 50 | 50 | 58.00 | 17.35 | 48 | 40.40 | 32.15 | 31.85 | 20.50 | 22.00 | 6.90 | 6.90 | |

| Size | Dimensions (mm) | | | | | | | | | Mass (kg) |
|------|-----------------|--------------------------------|----------------|----------------|----------------|-----------------|----|----------------|------|-----------|
| | N ₃ | N ₆ ^{+0.5} | S ₂ | S ₅ | S ₉ | S ₁₁ | T | V ₁ | | |
| 15 | 6.0 | 10.3 | M4 | 4.5 | M2.5x3.5 | 3.7 | 60 | 5.0 | 0.10 | |
| 20 | 7.5 | 13.2 | M5 | 6.0 | M3x5 | 4.7 | 60 | 6.0 | 0.20 | |
| 25 | 9.0 | 15.2 | M6 | 7.0 | M3x5 | 5.7 | 60 | 7.5 | 0.35 | |
| 30 | 12.0 | 17.0 | M8 | 9.0 | M3x5 | 7.7 | 80 | 7.0 | 0.45 | |
| 35 | 13.0 | 20.5 | M8 | 9.0 | M3x5 | 7.7 | 80 | 8.0 | 0.65 | |

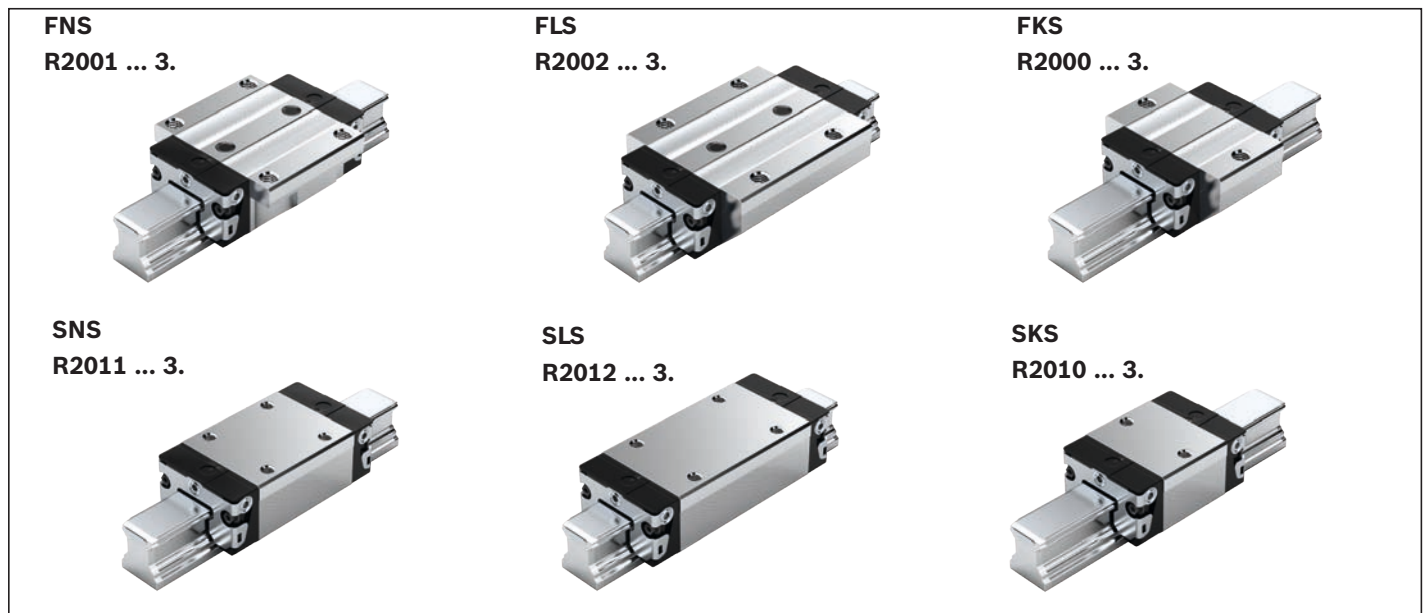
- 1)** Dimension H₂ with cover strip
2) Dimension H₂ without cover strip

Product description

General notes on corrosion resistant ball runner block, Resist NR

- ▶ As Resist NR is not a coating, all dimensions and tolerances, dynamic characteristics, load capacities, rigidity and moments are identical to the standard steel version.
For material numbers, please refer to the following page.
- ▶ Can be used on all SNS/SNO ball guide rails.
- ▶ Ball runner block body made of corrosion resistant steel as per DIN EN 10088 Version recommended by Rexroth if corrosion protection is required. Fast delivery.
- ▶ Pre-lubricated

Overview of formats



Definition of the format of ball runner blocks

| Criterion | Designation | Code (example) | | |
|-----------|---------------------|----------------|---|---|
| | | F | N | S |
| Width | Flange (F) | F | | |
| | Slimline (S) | S | | |
| | Wide (B) | B | | |
| | Compact (C) | C | | |
| Length | Normal (N) | | N | |
| | Long (L) | | L | |
| | Short (K) | | K | |
| Height | Standard height (S) | | | S |
| | High (H) | | | H |
| | Low (N) | | | N |



Ball chain (optional)

- ▶ Optimized noise level

FNS, FLS, FKS, SNS, SLS, SKS

| Format | Size | Ball runner blocks with size | Preload class | | Accuracy class | Seals on ball runner blocks | | | | | |
|--------------|------|------------------------------|---------------|----|----------------|-----------------------------|--------------------|----|----|-----------------|----|
| | | | C0 | C1 | | H | without ball chain | | | with ball chain | |
| | | | | | | SS | LS | DS | SS | LS | DS |
| FNS | 15 | R2001 1 | 9 | - | 3 | 30 | 31 | - | 32 | 33 | - |
| | 20 | R2001 8 | 9 | - | 3 | 30 | 31 | - | 32 | 33 | - |
| | 25 | R2001 2 | 9 | - | 3 | 30 | 31 | - | 32 | 33 | - |
| | 30 | R2001 7 | 9 | | 3 | 30 | 31 | - | 32 | 33 | - |
| | 35 | R2001 3 | 9 | | 3 | 30 | 31 | 3Z | 32 | 33 | 3Y |
| | | | | 1 | 3 | 30 | 31 | - | 32 | 33 | - |
| | | | | 1 | 3 | 30 | 31 | 3Z | 32 | 33 | 3Y |
| E.g.: | | R2001 7 | | 1 | 3 | 30 | | | | | |
| FLS | 15 | R2002 1 | 9 | - | 3 | 30 | 31 | - | 32 | 33 | - |
| | 20 | R2002 8 | 9 | - | 3 | 30 | 31 | - | 32 | 33 | - |
| | 25 | R2002 2 | 9 | - | 3 | 30 | 31 | - | 32 | 33 | - |
| | 30 | R2002 7 | 9 | | 3 | 30 | 31 | - | 32 | 33 | - |
| | 35 | R2002 3 | 9 | | 3 | 30 | 31 | 3Z | 32 | 33 | 3Y |
| | | | | 1 | 3 | 30 | 31 | - | 32 | 33 | - |
| | | | | 1 | 3 | 30 | 31 | 3Z | 32 | 33 | 3Y |
| FKS | 15 | R2000 1 | 9 | - | 3 | 30 | 31 | - | 32 | 33 | - |
| | 20 | R2000 8 | 9 | - | 3 | 30 | 31 | - | 32 | 33 | - |
| | 25 | R2000 2 | 9 | - | 3 | 30 | 31 | - | 32 | 33 | - |
| | 30 | R2000 7 | 9 | | 3 | 30 | 31 | - | 32 | 33 | - |
| | 35 | R2000 3 | 9 | | 3 | 30 | 31 | 3Z | 32 | 33 | 3Y |
| | | | | 1 | 3 | 30 | 31 | - | 32 | 33 | - |
| | | | | 1 | 3 | 30 | 31 | 3Z | 32 | 33 | 3Y |
| SNS | 15 | R2011 1 | 9 | - | 3 | 30 | 31 | - | 32 | 33 | - |
| | 20 | R2011 8 | 9 | - | 3 | 30 | 31 | - | 32 | 33 | - |
| | 25 | R2011 2 | 9 | - | 3 | 30 | 31 | - | 32 | 33 | - |
| | 30 | R2011 7 | 9 | | 3 | 30 | 31 | - | 32 | 33 | - |
| | 35 | R2011 3 | 9 | | 3 | 30 | 31 | 3Z | 32 | 33 | 3Y |
| | | | | 1 | 3 | 30 | 31 | - | 32 | 33 | - |
| | | | | 1 | 3 | 30 | 31 | 3Z | 32 | 33 | 3Y |
| SLS | 15 | R2012 1 | 9 | | 3 | 30 | 31 | - | 32 | 33 | - |
| | 20 | R2012 8 | 9 | | 3 | 30 | 31 | - | 32 | 33 | - |
| | 25 | R2012 2 | 9 | | 3 | 30 | 31 | - | 32 | 33 | - |
| | 30 | R2012 7 | 9 | | 3 | 30 | 31 | - | 32 | 33 | - |
| | 35 | R2012 3 | 9 | | 3 | 30 | 31 | 3Z | 32 | 33 | 3Y |
| | | | | 1 | 3 | 30 | 31 | - | 32 | 33 | - |
| | | | | 1 | 3 | 30 | 31 | 3Z | 32 | 33 | 3Y |
| SKS | 15 | R2010 1 | 9 | - | 3 | 30 | 31 | - | 32 | 33 | - |
| | 20 | R2010 8 | 9 | - | 3 | 30 | 31 | - | 32 | 33 | - |
| | 25 | R2010 2 | 9 | - | 3 | 30 | 31 | - | 32 | 33 | - |
| | 30 | R2010 7 | 9 | | 3 | 30 | 31 | - | 32 | 33 | - |
| | 35 | R2010 3 | 9 | | 3 | 30 | 31 | 3Z | 32 | 33 | 3Y |
| | | | | 1 | 3 | 30 | 31 | - | 32 | 33 | - |
| | | | | 1 | 3 | 30 | 31 | 3Z | 32 | 33 | 3Y |

Order example FNS

Options:

- ▶ Ball runner block BSHP Resist NR, FNS
- ▶ Size 30
- ▶ Preload class C1
- ▶ Accuracy class H
- ▶ With standard seal, without ball chain

Material number: R2001 713 30

Note

Dimensions, dimensional drawing, load ratings, rigidity and moments see standard ball runner block BSHP

Preload classes

C0 = Without preload (clearance)
C1 = Moderate preload

Seals

SS = Standard seal
LS = Low-friction seal
DS = Double-lip seal

Key

gray numbers
= No preferred variant / combination
(partially longer delivery times)

Product description

Characteristic features

Ball rail systems Resist NR II made of corrosion resistant steel¹⁾ are used specifically in conjunction with water-based media, heavily diluted acidic materials, alkali or saline solutions. These guideways are also ideally suitable for use at relative humidities above 70 % and temperatures exceeding 30 °C.

Such conditions are found mainly in cleaning plants, electroplating and pickling lines, vapor degreasing plants and refrigeration systems.

Since no additional corrosion protection is required, ball rail systems Resist NR II are ideally suited for use in clean rooms and general printed circuit board manufacturing. They are also suitable for other applications in the general packaging industry.

General notes on ball runner blocks Resist NR II

- ▶ Can be used on all SNS ball guide rails, not initially lubricated, not preserved
- ▶ For dimensions see corresponding ball runner blocks made of steel

Highlights

- ▶ All metal parts are made of corrosion resistant steel
- ▶ Available in five common sizes
- ▶ Excellent dynamic characteristics:
 - Travel speed: $v_{\max} = 5 \text{ m/s}$
 - Acceleration: $a_{\max} = 500 \text{ m/s}^2$
- ▶ The same high load ratings in all four main directions of loading
- ▶ Available in accuracy classes N, H and P, up to preload class C2
- ▶ Long-term lubrication is possible over several years
- ▶ Minimum quantity lubrication system with integrated reservoir for oil lubrication
- ▶ Lube fittings with metal threads on all sides
- ▶ Optionally available with ball chain

1) Resist NR II:

Ball runner block body and ball guide rail as well as all steel parts made of corrosion resistant steel in accordance with DIN EN 10088

General notes

- ▶ Ball rail systems for sectors of the food industry, see the ball rail systems NRRFG catalog R310DE2226 (2011.04).
- ▶ Combinations of different accuracy classes
 - Combining ball guide rails and ball runner blocks of different accuracy classes results in different tolerances for the dimensions H and A3. See “Accuracy classes and their tolerances.”
- ▶ Combinations of different materials
 - Combining ball guide rails and ball runner blocks made of different materials will change the load ratings, permitted loads and load moments. The lower value must be used in each case.

Further highlights

- ▶ Limitless interchangeability as all ball guide rail systems can be combined at will with all ball runner block versions within each accuracy class (also made of steel, aluminum, Resist NR or Resist CR).
- ▶ Maximum system rigidity due to preloaded O-arrangement
- ▶ Existing range of accessories fully usable
- ▶ Attachments on the ball runner block can be mounted from above and below²⁾
- ▶ Improved rigidity under lift-off and side loading conditions due to two additional mounting screw holes at the center of the ball runner block²⁾
- ▶ End-face fastening thread for all attachments
- ▶ High rigidity in all load directions – permits applications with just one runner block per rail
- ▶ Integrated all-round sealing
- ▶ Optimized entry-zone geometry and high number of balls minimize variation in elastic deflection
- ▶ Quiet, smooth running thanks to optimally designed ball and ball chain return and guideway
- ▶ Ball guide rail Resist NR II, with or without cover strip, available for mounting from above and below
- ▶ Ball runner block also available with chrome-plated ball guide rails

2) Type-dependent

Overview of formats



Definition of the format of ball runner blocks

| Criterion | Designation | Code (example) | | |
|-----------|---------------------|----------------|---|---|
| | | F | N | S |
| Width | Flange (F) | F | | |
| | Slimline (S) | S | | |
| | Wide (B) | B | | |
| | Compact (C) | C | | |
| Length | Normal (N) | | N | |
| | Long (L) | | L | |
| | Short (K) | | K | |
| Height | Standard height (S) | | | S |
| | High (H) | | | H |
| | Low (N) | | | N |



Ball chain (optional)

- ▶ Optimized noise level

FNS, FLS, FKS, SNS, SLS, SKS

| Size | Ball runner blocks with size | Preload class | | | Accuracy class | | | Seals on ball runner blocks | | | | | | Mass (kg) m | Load ratings ²⁾ (N) | | Load moments ²⁾ (Nm) | | | |
|------------|------------------------------|---------------|----|----|----------------|---|---|-----------------------------|------------------|----|-----------------|------------------|----|----------------|-----------------------------------|----------------|---------------------------------|-----------------|----------------|-----------------|
| | | C0 | C1 | C2 | N | H | P | without ball chain | | | with ball chain | | | | C | C ₀ | M _t | M _{t0} | M _L | M _{L0} |
| | | | | | | | | SS | LS ¹⁾ | DS | SS | LS ¹⁾ | DS | | | | | | | |
| FNS | | | | | | | | | | | | | | | | | | | | |
| 15 | R2001 1 | 9 | | | 4 | 3 | - | 04 | 05 | - | 06 | 07 | - | 0.20 | 5100 | 9300 | 63 | 90 | 34 | 49 |
| | | | 1 | | 4 | 3 | 2 | 04 | 05 | 0X | 06 | 07 | 0W | | | | | | | |
| | | | | 2 | - | 3 | 2 | 04 | - | 0X | 06 | - | 0W | | | | | | | |
| 20 | R2001 8 | 9 | | | 4 | 3 | - | 04 | 05 | - | 06 | 07 | - | 0.45 | 12300 | 16900 | 205 | 215 | 110 | 115 |
| | | | 1 | | 4 | 3 | 2 | 04 | 05 | 0X | 06 | 07 | 0W | | | | | | | |
| | | | | 2 | - | 3 | 2 | 04 | - | 0X | 06 | - | 0W | | | | | | | |
| 25 | R2001 2 | 9 | | | 4 | 3 | - | 04 | 05 | - | 06 | 07 | - | 0.65 | 15000 | 21000 | 270 | 295 | 150 | 165 |
| | | | 1 | | 4 | 3 | 2 | 04 | 05 | 0X | 06 | 07 | 0W | | | | | | | |
| | | | | 2 | - | 3 | 2 | 04 | - | 0X | 06 | - | 0W | | | | | | | |
| 30 | R2001 7 | 9 | | | 4 | 3 | - | 04 | 05 | - | 06 | 07 | - | 1.10 | 20800 | 28700 | 460 | 500 | 245 | 265 |
| | | | 1 | | 4 | 3 | 2 | 04 | 05 | 0X | 06 | 07 | 0W | | | | | | | |
| | | | | 2 | - | 3 | 2 | 04 | - | 0X | 06 | - | 0W | | | | | | | |
| 35 | R2001 3 | 9 | | | 4 | 3 | - | 04 | 05 | - | 06 | 07 | - | 1.60 | 27600 | 37500 | 760 | 805 | 375 | 390 |
| | | | 1 | | 4 | 3 | 2 | 04 | 05 | 0X | 06 | 07 | 0W | | | | | | | |
| | | | | 2 | - | 3 | 2 | 04 | - | 0X | 06 | - | 0W | | | | | | | |
| FLS | | | | | | | | | | | | | | | | | | | | |
| 15 | R2002 1 | 9 | | | 4 | 3 | - | 04 | 05 | - | 06 | 07 | - | 0.30 | 8500 | 14000 | 82 | 132 | 64 | 104 |
| | | | 1 | | 4 | 3 | 2 | 04 | 05 | 0X | 06 | 07 | 0W | | | | | | | |
| | | | | 2 | - | 3 | 2 | 04 | - | 0X | 06 | - | 0W | | | | | | | |
| 20 | R2002 8 | 9 | | | 4 | 3 | - | 04 | 05 | - | 06 | 07 | - | 0.55 | 16000 | 24400 | 265 | 310 | 190 | 230 |
| | | | 1 | | 4 | 3 | 2 | 04 | 05 | 0X | 06 | 07 | 0W | | | | | | | |
| | | | | 2 | - | 3 | 2 | 04 | - | 0X | 06 | - | 0W | | | | | | | |
| 25 | R2002 2 | 9 | | | 4 | 3 | - | 04 | 05 | - | 06 | 07 | - | 0.90 | 20000 | 31600 | 365 | 450 | 290 | 350 |
| | | | 1 | | 4 | 3 | 2 | 04 | 05 | 0X | 06 | 07 | 0W | | | | | | | |
| | | | | 2 | - | 3 | 2 | 04 | - | 0X | 06 | - | 0W | | | | | | | |
| 30 | R2002 7 | 9 | | | 4 | 3 | - | 04 | 05 | - | 06 | 07 | - | 1.50 | 26300 | 40100 | 590 | 695 | 420 | 495 |
| | | | 1 | | 4 | 3 | 2 | 04 | 05 | 0X | 06 | 07 | 0W | | | | | | | |
| | | | | 2 | - | 3 | 2 | 04 | - | 0X | 06 | - | 0W | | | | | | | |
| 35 | R2002 3 | 9 | | | 4 | 3 | - | 04 | 05 | - | 06 | 07 | - | 2.25 | 36500 | 56200 | 1 025 | 1210 | 710 | 840 |
| | | | 1 | | 4 | 3 | 2 | 04 | 05 | 0X | 06 | 07 | 0W | | | | | | | |
| | | | | 2 | - | 3 | 2 | 04 | - | 0X | 06 | - | 0W | | | | | | | |
| FKS | | | | | | | | | | | | | | | | | | | | |
| 15 | R2000 1 | 9 | | | 4 | 3 | - | 04 | 05 | - | 06 | 07 | - | 0.15 | 4500 | 5600 | 44 | 55 | 16 | 19 |
| | | | 1 | | 4 | 3 | - | 04 | 05 | 0X | 06 | 07 | 0W | | | | | | | |
| | | | | - | - | - | - | - | - | - | - | - | - | | | | | | | |
| 20 | R2000 8 | 9 | | | 4 | 3 | - | 04 | 05 | - | 06 | 07 | - | 0.30 | 8200 | 9400 | 125 | 115 | 45 | 40 |
| | | | 1 | | 4 | 3 | - | 04 | 05 | 0X | 06 | 07 | 0W | | | | | | | |
| | | | | - | - | - | - | - | - | - | - | - | - | | | | | | | |
| 25 | R2000 2 | 9 | | | 4 | 3 | - | 04 | 05 | - | 06 | 07 | - | 0.50 | 10500 | 12600 | 195 | 180 | 70 | 65 |
| | | | 1 | | 4 | 3 | - | 04 | 05 | 0X | 06 | 07 | 0W | | | | | | | |
| | | | | - | - | - | - | - | - | - | - | - | - | | | | | | | |
| 30 | R2000 7 | 9 | | | 4 | 3 | - | 04 | 05 | - | 06 | 07 | - | 0.80 | 14500 | 17200 | 320 | 295 | 110 | 105 |
| | | | 1 | | 4 | 3 | - | 04 | 05 | 0X | 06 | 07 | 0W | | | | | | | |
| | | | | - | - | - | - | - | - | - | - | - | - | | | | | | | |
| 35 | R2000 3 | 9 | | | 4 | 3 | - | 04 | 05 | - | 06 | 07 | - | 1.20 | 19300 | 22400 | 545 | 485 | 170 | 150 |
| | | | 1 | | 4 | 3 | - | 04 | 05 | 0X | 06 | 07 | 0W | | | | | | | |
| | | | | - | - | - | - | - | - | - | - | - | - | | | | | | | |

Order example

Options:

- ▶ Ball runner block BSHP Resist NR II, SKS
- ▶ Size 30
- ▶ Preload class C1
- ▶ Accuracy class H
- ▶ With standard seal, without ball chain

Material number: R2010 713 04

Preload classes

- C0 = Without preload (clearance)
- C1 = Moderate preload
- C2 = Average preload

Seals


- SS = Standard seal
- LS = Low-friction seal
- DS = Double-lip seal

Key

- gray numbers = No preferred variant / combination (partially longer delivery times)

| Size | Ball runner blocks with size | Preload class | | | Accuracy class | | | Seals on ball runner blocks | | | | | | Mass (kg) m | Load ratings ²⁾ (N) | | Load moments ²⁾ (Nm) | | | | |
|--------------|------------------------------|---------------|----|----|----------------|---|---|-----------------------------|------------------|----|-----------------|------------------|----|----------------|-----------------------------------|----------------|---------------------------------|-----------------|----------------|-----------------|--|
| | | C0 | C1 | C2 | N | H | P | without ball chain | | | with ball chain | | | | C | C ₀ | M _t | | M _L | | |
| | | | | | | | | SS | LS ¹⁾ | DS | SS | LS ¹⁾ | DS | | | | M _t | M _{t0} | M _L | M _{L0} | |
| SNS | | | | | | | | | | | | | | | | | | | | | |
| 15 | R2011 1 | 9 | | | 4 | 3 | - | 04 | 05 | - | 06 | 07 | - | 0.15 | 5100 | 9300 | 63 | 90 | 34 | 49 | |
| | | | 1 | | 4 | 3 | 2 | 04 | 05 | OX | 06 | 07 | OW | | | | | | | | |
| | | | | 2 | - | 3 | 2 | 04 | - | OX | 06 | - | OW | | | | | | | | |
| 20 | R2011 8 | 9 | | | 4 | 3 | - | 04 | 05 | - | 06 | 07 | - | 0.35 | 12300 | 16900 | 205 | 215 | 110 | 115 | |
| | | | 1 | | 4 | 3 | 2 | 04 | 05 | OX | 06 | 07 | OW | | | | | | | | |
| | | | | 2 | - | 3 | 2 | 04 | - | OX | 06 | - | OW | | | | | | | | |
| 25 | R2011 2 | 9 | | | 4 | 3 | - | 04 | 05 | - | 06 | 07 | - | 0.50 | 15000 | 21000 | 270 | 295 | 150 | 165 | |
| | | | 1 | | 4 | 3 | 2 | 04 | 05 | OX | 06 | 07 | OW | | | | | | | | |
| | | | | 2 | - | 3 | 2 | 04 | - | OX | 06 | - | OW | | | | | | | | |
| 30 | R2011 7 | 9 | | | 4 | 3 | - | 04 | 05 | - | 06 | 07 | - | 0.85 | 20800 | 28700 | 460 | 500 | 245 | 265 | |
| | | | 1 | | 4 | 3 | 2 | 04 | 05 | OX | 06 | 07 | OW | | | | | | | | |
| | | | | 2 | - | 3 | 2 | 04 | - | OX | 06 | - | OW | | | | | | | | |
| 35 | R2011 3 | 9 | | | 4 | 3 | - | 04 | 05 | - | 06 | 07 | - | 1.25 | 27600 | 37500 | 760 | 805 | 375 | 390 | |
| | | | 1 | | 4 | 3 | 2 | 04 | 05 | OX | 06 | 07 | OW | | | | | | | | |
| | | | | 2 | - | 3 | 2 | 04 | - | OX | 06 | - | OW | | | | | | | | |
| SLS | | | | | | | | | | | | | | | | | | | | | |
| 15 | R2012 1 | 9 | | | 4 | 3 | - | 04 | 05 | - | 06 | 07 | - | 0.20 | 8500 | 14000 | 82 | 132 | 64 | 104 | |
| | | | 1 | | 4 | 3 | 2 | 04 | 05 | OX | 06 | 07 | OW | | | | | | | | |
| | | | | 2 | - | 3 | 2 | 04 | - | OX | 06 | - | OW | | | | | | | | |
| 20 | R2012 8 | 9 | | | 4 | 3 | - | 04 | 05 | - | 06 | 07 | - | 0.45 | 16000 | 24400 | 265 | 310 | 190 | 230 | |
| | | | 1 | | 4 | 3 | 2 | 04 | 05 | OX | 06 | 07 | OW | | | | | | | | |
| | | | | 2 | - | 3 | 2 | 04 | - | OX | 06 | - | OW | | | | | | | | |
| 25 | R2012 2 | 9 | | | 4 | 3 | - | 04 | 05 | - | 06 | 07 | - | 0.65 | 20000 | 31600 | 365 | 450 | 290 | 350 | |
| | | | 1 | | 4 | 3 | 2 | 04 | 05 | OX | 06 | 07 | OW | | | | | | | | |
| | | | | 2 | - | 3 | 2 | 04 | - | OX | 06 | - | OW | | | | | | | | |
| 30 | R2012 7 | 9 | | | 4 | 3 | - | 04 | 05 | - | 06 | 07 | - | 1.10 | 26300 | 40100 | 590 | 695 | 420 | 495 | |
| | | | 1 | | 4 | 3 | 2 | 04 | 05 | OX | 06 | 07 | OW | | | | | | | | |
| | | | | 2 | - | 3 | 2 | 04 | - | OX | 06 | - | OW | | | | | | | | |
| 35 | R2012 3 | 9 | | | 4 | 3 | - | 04 | 05 | - | 06 | 07 | - | 1.70 | 36500 | 56200 | 1 025 | 1210 | 710 | 840 | |
| | | | 1 | | 4 | 3 | 2 | 04 | 05 | OX | 06 | 07 | OW | | | | | | | | |
| | | | | 2 | - | 3 | 2 | 04 | - | OX | 06 | - | OW | | | | | | | | |
| SKS | | | | | | | | | | | | | | | | | | | | | |
| 15 | R2010 1 | 9 | | | 4 | 3 | - | 04 | 05 | - | 06 | 07 | - | 0.10 | 4500 | 5600 | 44 | 55 | 16 | 19 | |
| | | | 1 | | 4 | 3 | - | 04 | 05 | OX | 06 | 07 | OW | | | | | | | | |
| | | | | - | - | - | - | - | - | - | - | - | - | | | | | | | | |
| 20 | R2010 8 | 9 | | | 4 | 3 | - | 04 | 05 | - | 06 | 07 | - | 0.25 | 8200 | 9400 | 125 | 115 | 45 | 40 | |
| | | | 1 | | 4 | 3 | - | 04 | 05 | OX | 06 | 07 | OW | | | | | | | | |
| | | | | - | - | - | - | - | - | - | - | - | - | | | | | | | | |
| 25 | R2010 2 | 9 | | | 4 | 3 | - | 04 | 05 | - | 06 | 07 | - | 0.35 | 10500 | 12600 | 195 | 180 | 70 | 65 | |
| | | | 1 | | 4 | 3 | - | 04 | 05 | OX | 06 | 07 | OW | | | | | | | | |
| | | | | - | - | - | - | - | - | - | - | - | - | | | | | | | | |
| 30 | R2010 7 | 9 | | | 4 | 3 | - | 04 | 05 | - | 06 | 07 | - | 0.60 | 14500 | 17200 | 320 | 295 | 110 | 105 | |
| | | | 1 | | 4 | 3 | - | 04 | 05 | OX | 06 | 07 | OW | | | | | | | | |
| | | | | - | - | - | - | - | - | - | - | - | - | | | | | | | | |
| 35 | R2010 3 | 9 | | | 4 | 3 | - | 04 | 05 | - | 06 | 07 | - | 0.90 | 19300 | 22400 | 545 | 485 | 170 | 150 | |
| | | | 1 | | 4 | 3 | - | 04 | 05 | OX | 06 | 07 | OW | | | | | | | | |
| | | | | - | - | - | - | - | - | - | - | - | - | | | | | | | | |
| E.g.: | R2010 7 | | 1 | | | 3 | | 04 | | | | | | | | | | | | | |

1) Only for accuracy classes N and H

2) Load ratings and load moments for ball runner block **without** ball chain. Load ratings and load moments for ball runner block **with** ball chain  14

Determination of the dynamic load capacities and load moments is based on a stroke travel of 100,000 m according to DIN ISO 14728-1. Often only 50,000 m are actually stipulated. For comparison: Multiply the values **C**, **M_t** and **M_L** by 1.26 according to the table.

Note

Dimensions, dimensional drawing see standard ball runner block BSHP

Product description

General notes on the

Resist CR ball runner block

- ▶ For material numbers, please refer to the following pages.
- ▶ Dimensions, dimensional drawing, dynamic characteristics, load ratings, rigidity and moments see corresponding standard ball runner blocks made of steel
- ▶ Steel ball runner block body with corrosion resistant coating, matte-silver finish, hard chrome plated.
- ▶ Pre-lubricated

For ball runner blocks and ball guide rails Resist CR, matte-silver, hard chrome plated, deviating tolerances of the dimensions H and A_3 are to be observed (see “Accuracy classes and their tolerances”).

Recommended ball runner blocks for Resist CR ball guide rails of accuracy class H and preload class C0 and C1

Recommended ball runner blocks
 Sizes 15 – 65
 ▶ Accuracy class H
 ▶ Preload class C0

Recommended ball runner blocks
 Sizes 30 – 65
 ▶ Accuracy class H
 ▶ Preload class C1

Definition of the format of ball runner blocks

| Criterion | Designation | Code (example) | | |
|-----------|----------------------------|----------------|---|---|
| | | F | N | S |
| Width | Flange (F) | F | | |
| | Slimline (S) | S | | |
| | Wide (B) | B | | |
| | Compact (C) | C | | |
| Length | Normal (N) | | N | |
| | Long (L) | | L | |
| | Short (K) | | K | |
| Height | Standard height (S) | | | S |
| | High (H) | | | H |
| | Low (N) | | | N |



Ball chain (optional)

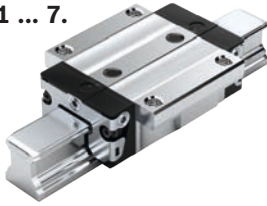
- ▶ Optimized noise level

Overview of formats

Standard ball runner blocks¹⁾ BSHP up to size 45

FNS

R1651 ... 7.



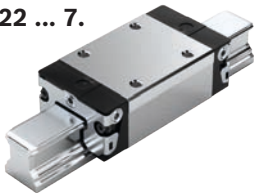
FLS

R1653 ... 7.



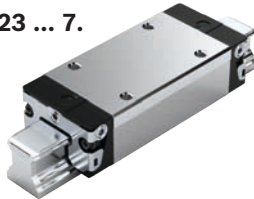
SNS

R1622 ... 7.



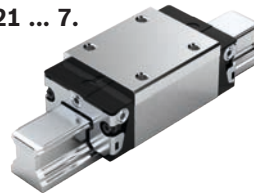
SLS

R1623 ... 7.



SNH

R1621 ... 7.



SLH

R1624 ... 7.



FNN

R1693 ... 6.²⁾



FKN

R1663 ... 6.²⁾



SNN

R1694 ... 6.²⁾



SKN

R1664 ... 6.²⁾



Heavy-duty ball runner blocks²⁾ BSHP from size 55

FNS

R1651 ... 6.



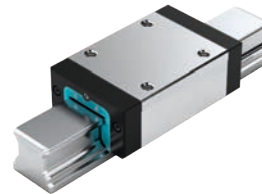
FLS

R1653 ... 6.



SNS

R1622 ... 6.



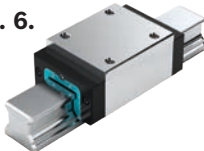
SLS

R1623 ... 6.



SNH

R1621 ... 6.



SLH

R1624 ... 6.



Super ball runner blocks²⁾

FKS

R1661 ... 7.



SKS

R1662 ... 7.



- 1) With ball chain
- 2) Without ball chain

FNS, FLS, SNS, SLS, SNH, SLH, FNN, FKN, SNN, SKN, FKS, SKS

Standard ball runner blocks BSHP

| Format | Size | Ball runner blocks with size | Preload class | | Accuracy class | Seals on ball runner blocks | | | | | |
|--------|--------------|------------------------------|---------------|----|----------------|-----------------------------|----|----|-----------------|----|----|
| | | | C0 | C1 | | without ball chain | | | with ball chain | | |
| | | | | | H | SS | LS | DS | SS | LS | DS |
| FNS | 45 | R1651 4 | 9 | 1 | 3 | 70 | – | – | 72 | – | – |
| | | | | | 3 | 70 | – | 7Z | 72 | – | 7Y |
| | E.g.: | R1651 4 | | 1 | 3 | 70 | | | | | |
| FLS | 45 | R1653 4 | 9 | 1 | 3 | 70 | – | – | 72 | – | – |
| | | | | | 3 | 70 | – | 7Z | 72 | – | 7Y |
| SNS | 45 | R1622 4 | 9 | 1 | 3 | 70 | – | – | 72 | – | – |
| | | | | | 3 | 70 | – | 7Z | 72 | – | 7Y |
| SLS | 45 | R1623 4 | 9 | 1 | 3 | 70 | – | – | 72 | – | – |
| | | | | | 3 | 70 | – | 7Z | 72 | – | 7Y |
| SNH | 15 | R1621 1 | 9 | – | 3 | 70 | 71 | – | 72 | 73 | – |
| | 25 | R1621 2 | 9 | – | 3 | 70 | 71 | – | 72 | 73 | – |
| | 30 | R1621 7 | 9 | 1 | 3 | 70 | 71 | – | 72 | 73 | – |
| | | | | | 3 | 70 | 71 | 7Z | 72 | 73 | 7Y |
| | 35 | R1621 3 | 9 | 1 | 3 | 70 | 71 | – | 72 | 73 | – |
| | 45 | R1621 4 | 9 | 1 | 3 | 70 | 71 | 7Z | 72 | 73 | 7Y |
| 3 | | | | | 70 | – | – | 72 | – | – | |
| SLH | 25 | R1624 2 | 9 | – | 3 | 70 | 71 | – | 72 | 73 | – |
| | 30 | R1624 7 | 9 | 1 | 3 | 70 | 71 | – | 72 | 73 | – |
| | | | | | 3 | 70 | 71 | 7Z | 72 | 73 | 7Y |
| | 35 | R1624 3 | 9 | 1 | 3 | 70 | 71 | – | 72 | 73 | – |
| | | | | | 3 | 70 | 71 | 7Z | 72 | 73 | 7Y |
| | 45 | R1624 4 | 9 | 1 | 3 | 70 | – | – | 72 | – | – |
| 3 | | | | | 70 | – | 7Z | 72 | – | 7Y | |
| FNN | 20 | R1693 8 | 9 | – | 3 | 60 | – | – | – | – | – |
| | 25 | R1693 2 | 9 | – | 3 | 60 | – | – | – | – | – |
| FKN | 20 | R1663 8 | 9 | – | 3 | 60 | – | – | – | – | – |
| | 25 | R1663 2 | 9 | – | 3 | 60 | – | – | – | – | – |
| SNN | 20 | R1694 8 | 9 | – | 3 | 60 | – | – | – | – | – |
| | 25 | R1694 2 | 9 | – | 3 | 60 | – | – | – | – | – |
| SKN | 20 | R1664 8 | 9 | – | 3 | 60 | – | – | – | – | – |
| | 25 | R1664 2 | 9 | – | 3 | 60 | – | – | – | – | – |

Order example

Options:

- ▶ Ball runner block BSHP Resist CR, FNS
- ▶ Size 45
- ▶ Preload class C1
- ▶ Accuracy class H
- ▶ With standard seal, without ball chain

Material number: R1651 413 70

Preload classesC0 = Without preload (clearance)
C1 = Moderate preload**Seals**SS = Standard seal
LS = Low-friction seal
DS = Double-lip seal**Key**gray numbers
= No preferred variant / combination
(partially longer delivery times)

Heavy-duty BSHP ball runner blocks

| Format | Size | Ball runner blocks with size | Preload class | | Accuracy class | Seals on ball runner blocks without ball chain | |
|--------|------|------------------------------|---------------|----|----------------|--|----|
| | | | C0 | C1 | H | SS | DS |
| FNS | 55 | R1651 5 | 9 | 1 | 3 | | 60 |
| | 65 | R1651 6 | 9 | 1 | 3 | | 60 |
| FLS | 55 | R1653 5 | 9 | 1 | 3 | | 60 |
| | 65 | R1653 6 | 9 | 1 | 3 | | 60 |
| SNS | 55 | R1622 5 | 9 | 1 | 3 | | 60 |
| | 65 | R1622 6 | 9 | 1 | 3 | | 60 |
| SLS | 55 | R1623 5 | 9 | 1 | 3 | | 60 |
| | 65 | R1623 6 | 9 | 1 | 3 | | 60 |
| SNH | 55 | R1621 5 | 9 | 1 | 3 | | 60 |
| SLH | 55 | R1624 5 | 9 | 1 | 3 | | 60 |

Super ball runner blocks

| Format | Size | Ball runner blocks with size | Preload class | | Accuracy class | Seals on ball runner blocks without ball chain | | | |
|--------|------|------------------------------|---------------|----|----------------|--|----|----|--|
| | | | C0 | C1 | H | SS | LS | DS | |
| FKS | 15 | R1661 1 | 9 | - | 3 | 70 | 71 | - | |
| | 20 | R1661 8 | 9 | - | 3 | 70 | 71 | - | |
| | 25 | R1661 2 | 9 | - | 3 | 70 | 71 | - | |
| | 30 | R1661 7 | 9 | 1 | 3 | 70 | 71 | - | |
| | 35 | R1661 3 | 9 | 1 | 3 | 70 | 71 | 7Z | |
| SKS | 15 | R1662 1 | 9 | - | 3 | 70 | 71 | - | |
| | 20 | R1662 8 | 9 | - | 3 | 70 | 71 | - | |
| | 25 | R1662 2 | 9 | - | 3 | 70 | 71 | - | |
| | 30 | R1662 7 | 9 | 1 | 3 | 70 | 71 | - | |
| | 35 | R1662 3 | 9 | 1 | 3 | 70 | 71 | 7Z | |

Note

Dimensions, dimensional drawing, load ratings, rigidity and moments see standard/heavy-duty ball runner block BSHP and super ball runner block.

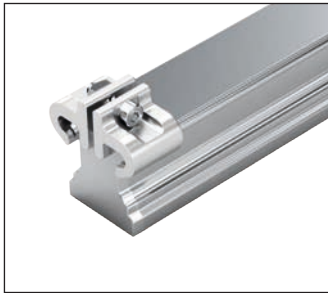
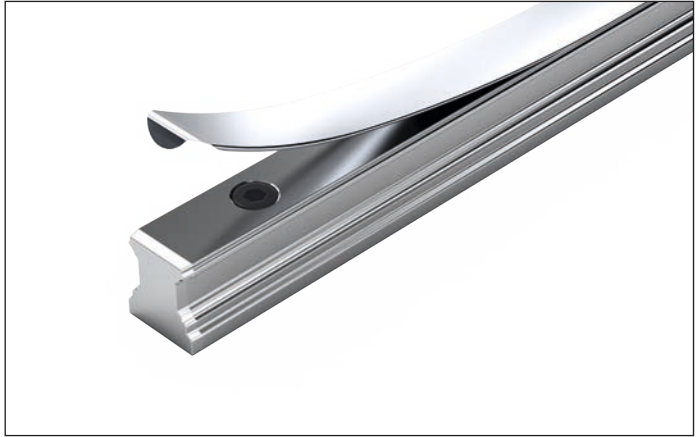
Product description

Characteristic features

- ▶ Maximum rigidity in all load directions
- ▶ High torque load capacity

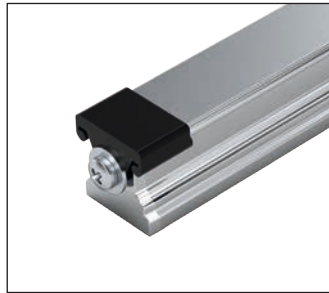
Proven cover strip for the ball guide rail mounting holes

- ▶ **One** cover for all bore holes saves time and costs
- ▶ Made of corrosion resistant spring steel as per DIN EN 10088
- ▶ Easy and safe during mounting
- ▶ Clip and secure



Ball guide rails with cover strip and strip clamps made of aluminum

- ▶ Without end-face threaded holes (not required)

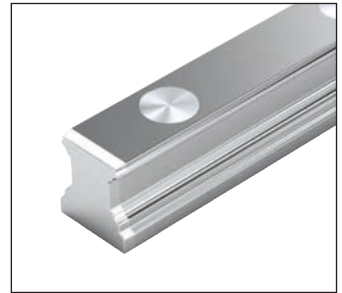


Ball guide rails with cover strip and screwed plastic protective caps

- ▶ With threaded holes at the end faces



Ball guide rails with plastic mounting hole plugs



Ball guide rails with steel mounting hole plugs



Ball guide rails for mounting from below

Definition of the format of ball guide rails

| Criterion | Designation | Code (example) | | |
|-----------|------------------------------|----------------|---|---|
| | | S | N | S |
| Width | Slimline (S) | S | | |
| | Wide (B) | B | | |
| Length | Normal (N) | | N | |
| Height | Standard height (S) | | | S |
| | Without groove (O) | | | O |

Ordering guide rails in the recommended rail lengths

Ordering ball guide rails in the recommended rail lengths

The procedure shown in the following ordering examples applies to all ball guide rails. Recommended rail lengths are more cost effective.

| Options and part numbers | | | | | | | | | | | |
|--------------------------|---------------------------|----------------|---|---|----|----|---|-----------|--------------|---|--|
| Size | Ball guide rail with size | Accuracy class | | | | | Number of sections, rail length L (mm), ... | | Pitch T (mm) | Recommended rail length in accordance with formula $L = n_B \cdot T - 4$ mm | |
| | | N | H | P | SP | UP | One-piece | Composite | | Maximum number of holes n_B | |
| 15 | R1605 13 | 4 | 3 | 2 | 1 | 9 | 31, ... | 3, ... | 60 | 64 | |
| 20 | R1605 83 | 4 | 3 | 2 | 1 | 9 | 31, ... | 3, ... | 60 | 64 | |
| 25 | R1605 23 | 4 | 3 | 2 | 1 | 9 | 31, ... | 3, ... | 60 | 64 | |
| 30 | R1605 73 | 4 | 3 | 2 | 1 | 9 | 31, ... | 3, ... | 80 | 48 | |
| 35 | R1605 33 | 4 | 3 | 2 | 1 | 9 | 61, ... | 6, ... | 80 | 48 | |
| 45 | R1605 43 | 4 | 3 | 2 | 1 | 9 | 61, ... | 6, ... | 105 | 36 | |
| 55 | R1605 53 | 4 | 3 | 2 | 1 | 9 | 61, ... | 6, ... | 120 | 32 | |
| 65 | R1605 63 | 4 | 3 | 2 | 1 | 9 | 61, ... | 6, ... | 150 | 25 | |
| e.g. | R1605 73 | 3 | | | | | 31, 1676 | | | | |

Excerpt from table with part numbers and recommended rail lengths for ordering example

From the desired rail length to the recommended length

$$L = \left(\frac{L_W}{T} \right)^* \cdot T - 4$$

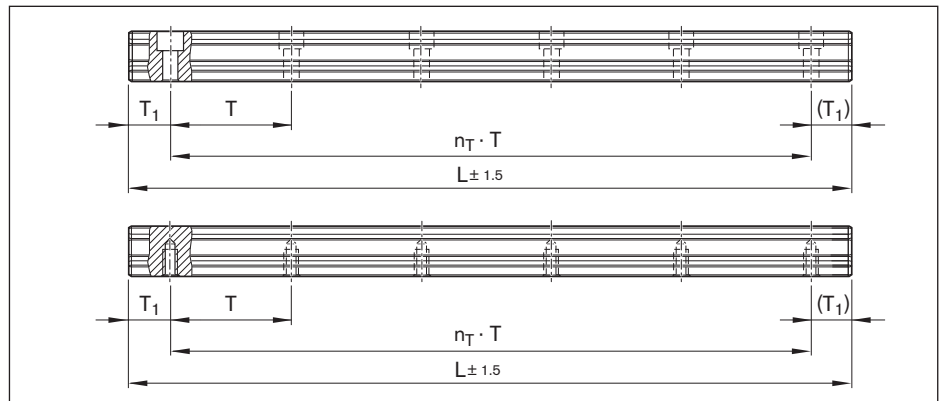
* Round up quotient L_W/T to the nearest whole number!

Calculation example

$$L = \left(\frac{1660}{80} \right) \cdot 80 \text{ mm} - 4 \text{ mm}$$

$$L = 21 \cdot 80 \text{ mm} - 4 \text{ mm}$$

$$L = 1676 \text{ mm}$$



Basis: Number of holes

$$L = n_B \cdot T - 4 \text{ mm}$$

Basis: Number of spaces

$$L = n_T \cdot T + 2 \cdot T_{1S}$$

L = Recommended rail length (mm)

L_W = Desired rail length (mm)

T = Pitch (mm)

T_{1S} = Preferred dimension (mm)

n_B = Number of holes (-)

n_T = Number of spaces (-)

Notes on ordering examples

If preferred dimension T_{1S} is not used, it is possible to choose between:

- ▶ Select end spacing T_1 between T_{1S} and T_{1min}
- ▶ As an alternative, it is possible to choose end spacings T_1 to T_{1max}

Ordering example 1 (to L_{max})

- ▶ Ball guide rail SNS size 30 with cover strip and strip clamps
- ▶ Accuracy class H
- ▶ Calculated rail length 1676 mm, ($20 \cdot T$, preferred dimension $T_{1S} = 38$ mm; number of holes $n_B = 21$)

Ordering data

Part number; rail length (mm)

T_1 / $n_T \cdot T$ / T_1 (mm)

R1605 733 31, 1676 mm

38 / 20 · 80 / 38 mm

Ordering example 2 (above L_{max})

- ▶ Ball guide rail SNS size 30 with cover strip and strip clamps
- ▶ Accuracy class H
- ▶ Calculated rail length 5116 mm, 2 partial sections ($63 \cdot T$, preferred dimension $T_{1S} = 38$ mm; number of holes $n_B = 64$)

Ordering data

Material number with number of partial sections, rail length (mm)

T_1 / $n_T \cdot T$ / T_1 (mm)

R1605 733 32, 5116 mm

38 / 63 · 80 / 38 mm

In the case of rail lengths above L_{max} , partial sections approved by Rexroth are joined together.

SNS/SNO with cover strip and strip clamps

**R1605 .3. .. / R1605 .B. ..**

For mounting from above, with cover strip made of corrosion-resistant spring steel as per DIN EN 10088 and aluminium strip clamps (without threaded holes on end faces)

Notes

- ▶ Secure the cover strip!
- ▶ Strip clamps included in scope of delivery.
- ▶ Observe the instruction for mounting!
Please request the “Mounting instructions for ball rail systems” and “Mounting instructions for cover strip”.
- ▶ Composite ball guide rail also available.

Further ball guide rails SNS/SNO and accessories available.

- ▶ Cover strip, protective caps (see accessories for ball guide rails)

**Ball guide rails SNO R1605 .B. .. with smooth base area for mounting surfaces from cast mineral parts
In sizes 25-45 and available in accuracy class P and SP.**

Options and material numbers

| Size | Ball guide rail with size | Accuracy class | | | | | Number of partial sections ., Rail length L (mm), | | Spacing T (mm) | Recommended rail length in accordance with formula $L = n_B \cdot T - 4 \text{ mm}$ | | |
|--------------|---------------------------|----------------|---|---|----|----|--|-----------|----------------|---|--|--|
| | | N | H | P | SP | UP | One-piece | Composite | | Maximum number of holes n_B | | |
| 15 | R1605 13 | 4 | 3 | 2 | 1 | 9 | 31, | 3, | 60 | 64 | | |
| 20 | R1605 83 | 4 | 3 | 2 | 1 | 9 | 31, | 3, | 60 | 64 | | |
| 25 | R1605 23 | 4 | 3 | 2 | 1 | 9 | 31, | 3, | 60 | 64 | | |
| 30 | R1605 73 | 4 | 3 | 2 | 1 | 9 | 31, | 3, | 80 | 48 | | |
| 35 | R1605 33 | 4 | 3 | 2 | 1 | 9 | 61, | 6, | 80 | 48 | | |
| 45 | R1605 43 | 4 | 3 | 2 | 1 | 9 | 61, | 6, | 105 | 36 | | |
| 55 | R1605 53 | 4 | 3 | 2 | 1 | 9 | 61, | 6, | 120 | 32 | | |
| 65 | R1605 63 | 4 | 3 | 2 | 1 | 9 | 61, | 6, | 150 | 25 | | |
| E.g.: | R1605 73 | 3 | | | | | 31, 1676 | | | | | |

Ordering example 1 (to L_{max})

Options:

- ▶ Ball guide rail SNS
- ▶ Size 30
- ▶ Accuracy class H
- ▶ One-piece
- ▶ Rail length
L = 1676 mm

Material number:

R1605 733 31, 1676 mm

Ordering example 2 (above L_{max})

Options:

- ▶ Ball guide rail SNS
- ▶ Size 30
- ▶ Accuracy class H
- ▶ **2 partial sections**
- ▶ Rail length
L = 5116 mm

Material number:

R1605 733 32, 5116 mm

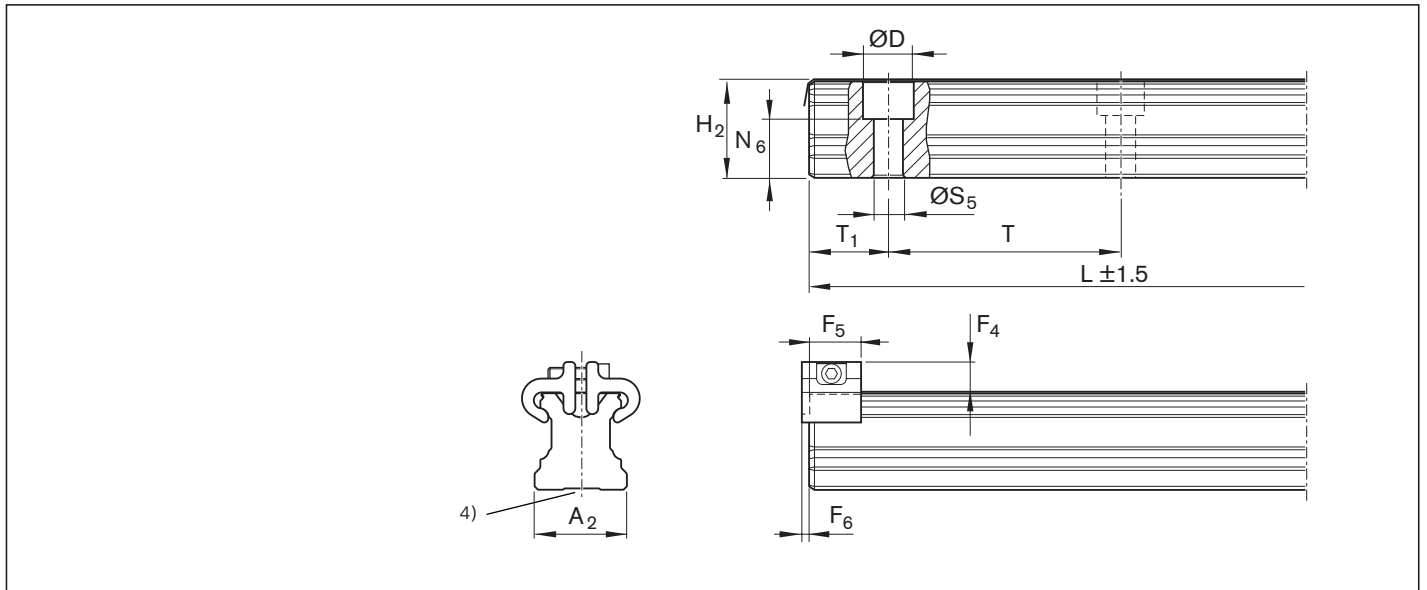
Ordering example 3**(up to L_{max} , with smooth surface)**

Options:

- ▶ Ball guide rail SNO
- ▶ Size 30
- ▶ Accuracy class H
- ▶ One-piece
- ▶ Rail length
L = 1676 mm

Material number:

R1605 7B3 31, 1676 mm



| Size | Dimensions (mm) | | | | | | | | | | | | | | Mass m (kg/m) |
|------|-----------------|------|------------------------------|----------------|----------------|------------------------------|------------------|--------------------------------|----------------|-----|--------------------|-------------------------------|--------------------|------|------------------|
| | A ₂ | D | F ₄ ²⁾ | F ₅ | F ₆ | H ₂ ¹⁾ | L _{max} | N ₆ ^{±0.5} | S ₅ | T | T _{1 min} | T _{1S} ³⁾ | T _{1 max} | | |
| 15 | 15 | 7.4 | 7.3 | 12 | 2.0 | 16.30 | 3 836 | 10.3 | 4.5 | 60 | 12 | 28.0 | 50 | 1.4 | |
| 20 | 20 | 9.4 | 7.1 | 12 | 2.0 | 20.75 | 5 816 | 13.2 | 6.0 | 60 | 13 | 28.0 | 50 | 2.4 | |
| 25 | 23 | 11.0 | 8.2 | 13 | 2.0 | 24.45 | 5 816 | 15.2 | 7.0 | 60 | 13 | 28.0 | 50 | 3.2 | |
| 30 | 28 | 15.0 | 8.7 | 13 | 2.0 | 28.55 | 5 836 | 17.0 | 9.0 | 80 | 16 | 38.0 | 68 | 5.0 | |
| 35 | 34 | 15.0 | 11.7 | 16 | 2.2 | 32.15 | 5 836 | 20.5 | 9.0 | 80 | 16 | 38.0 | 68 | 6.8 | |
| 45 | 45 | 20.0 | 12.5 | 18 | 2.2 | 40.15 | 5 771 | 23.5 | 14.0 | 105 | 18 | 50.5 | 89 | 10.5 | |
| 55 | 53 | 24.0 | 14.0 | 17 | 3.2 | 48.15 | 3 836 | 29.0 | 16.0 | 120 | 20 | 58.0 | 102 | 16.2 | |
| 65 | 63 | 26.0 | 15.0 | 17 | 3.2 | 60.15 | 3 746 | 38.5 | 18.0 | 150 | 21 | 73.0 | 130 | 22.4 | |

- 1) Dimension H₂ with cover strip
 Size 15 with cover strip 0.1 mm
 Size 20 – 30 with cover strip 0.2 mm
 Size 35 – 65 with cover strip 0.3 mm
- 2) Dimension H₄ with cover strip
- 3) Preferred dimension T_{1S} with tolerances ± 0.75 recommended.
- 4) Ball guide rails SNO with smooth base surface (without base groove).

SNS/SNO with cover strip and protective caps



R1605 .6. .. / R1605 .D. ..

For mounting from above, with cover strip made of corrosion-resistant spring steel as per DIN EN 10088 and screw-down plastic protective caps (with threaded mounting holes on end faces)

Notes

- ▶ Secure the cover strip!
- ▶ Protective caps with screws and washers are included in the scope of delivery.
- ▶ Observe the instruction for mounting!
Please request the “Mounting instructions for ball rail systems” and “Mounting instructions for cover strip”.
- ▶ Composite ball guide rail also available.

Further ball guide rails SNS/SNO and accessories

- ▶ Cover strip, protective caps (see accessories for ball guide rails)

**Ball guide rails SNO R1605 .D. .. with smooth base area for mounting surfaces from cast mineral parts
In sizes 25-45 and available in accuracy class P and SP.**

Options and material numbers

| Size | Ball guide rail with size | Accuracy class | | | | | Number of partial sections, Rail length L (mm), | | Spacing T (mm) | Recommended rail length in accordance with formula $L = n_B \cdot T - 4 \text{ mm}$ | |
|-------|---------------------------|----------------|---|---|----|----|--|-----------|----------------|---|-------------------------------|
| | | N | H | P | SP | UP | One-piece | Composite | | | Maximum number of holes n_B |
| 15 | R1605 16 | 4 | 3 | 2 | 1 | 9 | 31, | 3., | 60 | 64 | |
| 20 | R1605 86 | 4 | 3 | 2 | 1 | 9 | 31, | 3., | 60 | 64 | |
| 25 | R1605 26 | 4 | 3 | 2 | 1 | 9 | 31, | 3., | 60 | 64 | |
| 30 | R1605 76 | 4 | 3 | 2 | 1 | 9 | 31, | 3., | 80 | 48 | |
| 35 | R1605 36 | 4 | 3 | 2 | 1 | 9 | 61, | 6., | 80 | 48 | |
| 45 | R1605 46 | 4 | 3 | 2 | 1 | 9 | 61, | 6., | 105 | 36 | |
| 55 | R1605 56 | 4 | 3 | 2 | 1 | 9 | 61, | 6., | 120 | 32 | |
| 65 | R1605 66 | 4 | 3 | 2 | 1 | 9 | 61, | 6., | 150 | 25 | |
| E.g.: | R1605 76 | 3 | | | | | 31, 1676 | | | | |

Ordering example 1 (to L_{\max})

Options:

- ▶ Ball guide rail SNS
- ▶ Size 30
- ▶ Accuracy class H
- ▶ One-piece
- ▶ Rail length
L = 1676 mm

Material number:

R1605 763 31, 1676 mm

Ordering example 2 (above L_{\max})

Options:

- ▶ Ball guide rail SNS
- ▶ Size 30
- ▶ Accuracy class H
- ▶ **2 partial sections**
- ▶ Rail length
L = 5116 mm

Material number:

R1605 763 32, 5116 mm

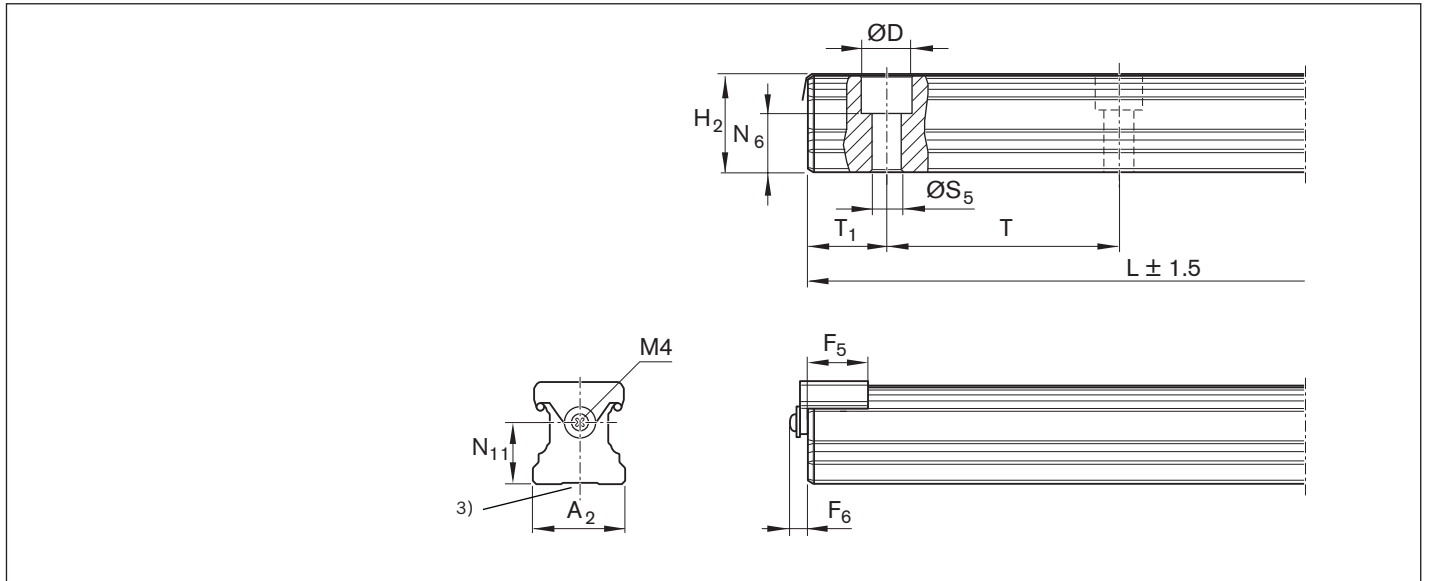
Ordering example 3 (up to L_{\max} , with smooth surface)

Options:

- ▶ Ball guide rail SNO
- ▶ Size 30
- ▶ Accuracy class H
- ▶ One-piece
- ▶ Rail length
L = 1676 mm

Material number:

R1605 7D3 31, 1676 mm



| Size | Dimensions (mm) | | | | | | | | | | | | | | Mass m (kg/m) |
|-----------|-----------------|------|----------------|----------------|------------------------------|------------------|--------------------------------|-----------------|----------------|-----|----------------------------------|-------------------------------|--------------------|------|------------------|
| | A ₂ | D | F ₅ | F ₆ | H ₂ ¹⁾ | L _{max} | N ₆ ^{±0.5} | N ₁₁ | S ₅ | T | T _{1 min} ²⁾ | T _{1S} ⁴⁾ | T _{1 max} | | |
| 15 | 15 | 7.4 | 14.0 | 6.5 | 16.30 | 3 836 | 10.3 | 9.8 | 4.5 | 60 | 12 | 28.0 | 50 | 1.4 | |
| 20 | 20 | 9.4 | 14.0 | 6.5 | 20.75 | 5 816 | 13.2 | 13.0 | 6.0 | 60 | 13 | 28.0 | 50 | 2.4 | |
| 25 | 23 | 11.0 | 15.2 | 6.5 | 24.45 | 5 816 | 15.2 | 15.0 | 7.0 | 60 | 13 | 28.0 | 50 | 3.2 | |
| 30 | 28 | 15.0 | 15.2 | 7.0 | 28.55 | 5 836 | 17.0 | 18.0 | 9.0 | 80 | 16 | 38.0 | 68 | 5.0 | |
| 35 | 34 | 15.0 | 18.0 | 7.0 | 32.15 | 5 836 | 20.5 | 22.0 | 9.0 | 80 | 16 | 38.0 | 68 | 6.8 | |
| 45 | 45 | 20.0 | 20.0 | 7.0 | 40.15 | 5 771 | 23.5 | 30.0 | 14.0 | 105 | 18 | 50.5 | 89 | 10.5 | |
| 55 | 53 | 24.0 | 20.0 | 7.0 | 48.15 | 3 836 | 29.0 | 30.0 | 16.0 | 120 | 20 | 58.0 | 102 | 16.2 | |
| 65 | 63 | 26.0 | 20.0 | 7.0 | 60.15 | 3 746 | 38.5 | 40.0 | 18.0 | 150 | 21 | 73.0 | 130 | 22.4 | |

- 1) Dimension H₂ with cover strip
 Size 15 with cover strip 0.1 mm
 Size 20 – 30 with cover strip 0.2 mm
 Size 35 – 65 with cover strip 0.3 mm
- 2) For end spaces below T_{1 min}, no threaded holes in end faces possible. Secure the cover strip.
- 3) Ball guide rails SNO with smooth base surface (without base groove).
- 4) Preferred dimension T1S with tolerances ± 0.75 recommended.

SNS/SNO with plastic mounting hole plugs

**R1605 .0. .. / R1605 .C. ..**

For mounting from above with plastic mounting hole plugs

Notes

- ▶ Plastic mounting hole plugs included in scope of supply.
- ▶ Observe the instruction for mounting!
Please request the “Mounting instructions for ball rail systems.”
- ▶ Composite ball guide rail also available.

Further ball guide rails SNS and accessories

- ▶ Corrosion resistant ball guide rails Resist NR, Resist CR
- ▶ Mounting hole plugs made of plastic, see accessories for ball guide rails

Ball guide rails SNO R1605 .C. .. with smooth base area for mounting surfaces from cast mineral parts

In sizes 25-45 and available in accuracy class P and SP.

Options and material numbers

| Size | Ball guide rail with size | Accuracy class | | | | | Number of partial sections .. Rail length L (mm), | | Spacing T (mm) | Recommended rail length in accordance with formula $L = n_B \cdot T - 4 \text{ mm}$ | |
|--------------|---------------------------|----------------|---|---|----|----|---|-----------|----------------|---|-------------------------------|
| | | N | H | P | SP | UP | One-piece | Composite | | | Maximum number of holes n_B |
| 15 | R1605 10 | 4 | 3 | 2 | 1 | 9 | 31, | 3., | 60 | 64 | |
| 20 | R1605 80 | 4 | 3 | 2 | 1 | 9 | 31, | 3., | 60 | 64 | |
| 25 | R1605 20 | 4 | 3 | 2 | 1 | 9 | 31, | 3., | 60 | 64 | |
| 30 | R1605 70 | 4 | 3 | 2 | 1 | 9 | 31, | 3., | 80 | 48 | |
| 35 | R1605 30 | 4 | 3 | 2 | 1 | 9 | 31, | 3., | 80 | 48 | |
| 45 | R1605 40 | 4 | 3 | 2 | 1 | 9 | 31, | 3., | 105 | 36 | |
| 55 | R1605 50 | 4 | 3 | 2 | 1 | 9 | 31, | 3., | 120 | 32 | |
| 65 | R1605 60 | 4 | 3 | 2 | 1 | 9 | 31, | 3., | 150 | 25 | |
| E.g.: | R1605 70 | 3 | | | | | 31, 1676 | | | | |

**Ordering example 1
(to L_{\max})**

Options:

- ▶ Ball guide rail SNS
- ▶ Size 30
- ▶ Accuracy class H
- ▶ One-piece
- ▶ Rail length
L = 1676 mm

Material number:

R1605 703 31, 1676 mm

**Ordering example 2
(above L_{\max})**

Options:

- ▶ Ball guide rail SNS
- ▶ Size 30
- ▶ Accuracy class H
- ▶ **2 partial sections**
- ▶ Rail length
L = 5116 mm

Material number:

R1605 703 32, 5116 mm

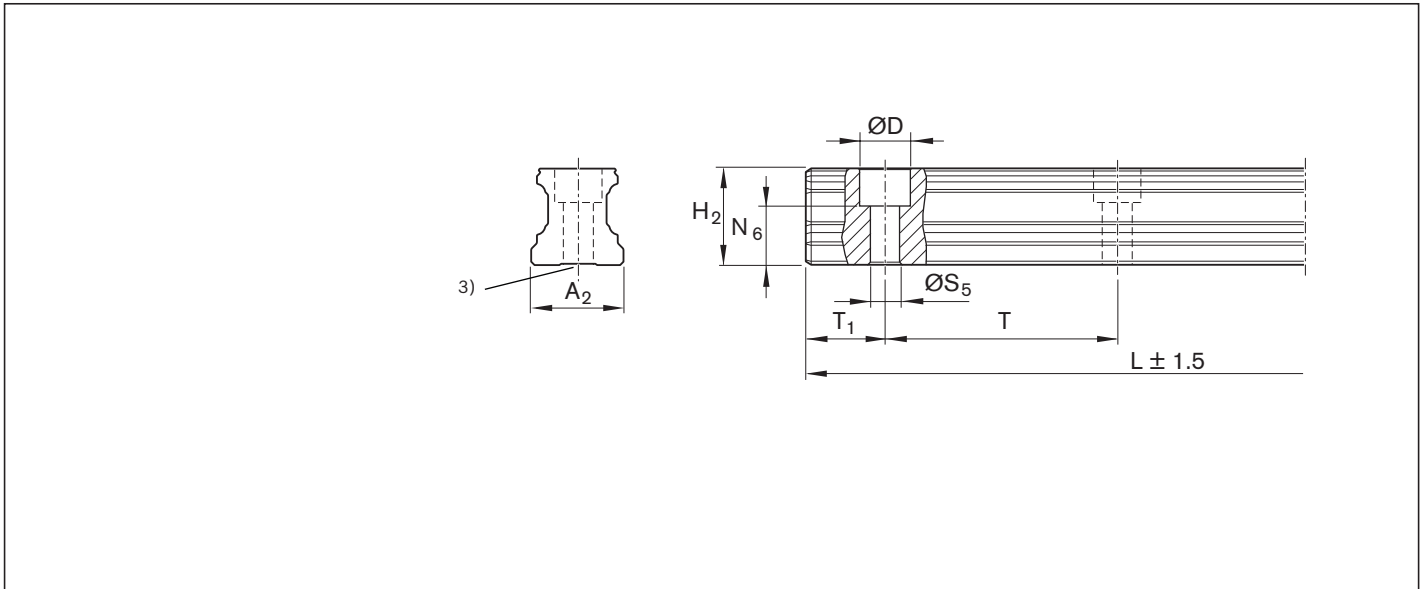
**Ordering example 3
(up to L_{\max} , with smooth surface)**

Options:

- ▶ Ball guide rail SNO
- ▶ Size 30
- ▶ Accuracy class H
- ▶ One-piece
- ▶ Rail length
L = 1676 mm

Material number:

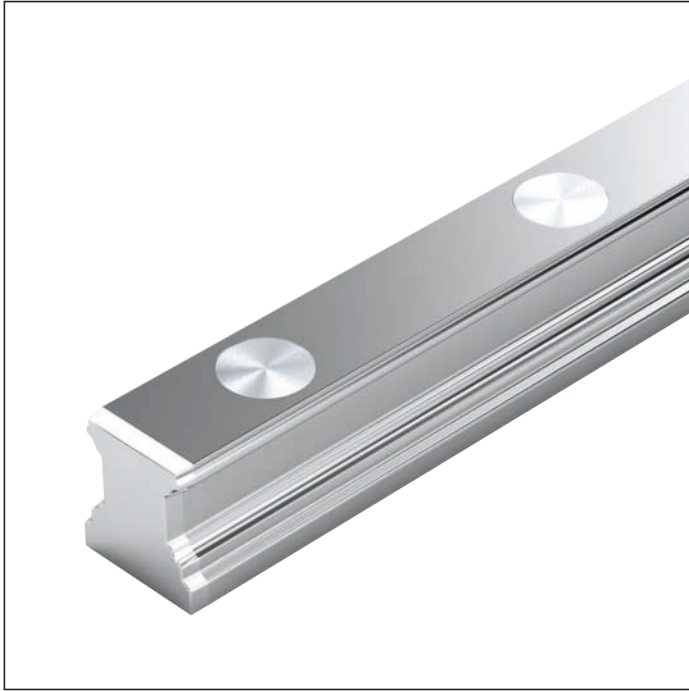
R1605 7C3 31, 1676 mm



| Size | Dimensions (mm) | | | | | | | | | | Mass m (kg/m) |
|-----------|-----------------|------|------------------------------|------------------|--------------------------------|----------------|-----|--------------------|-------------------------------|--------------------|------------------|
| | A ₂ | D | H ₂ ¹⁾ | L _{max} | N ₆ ^{±0.5} | S ₅ | T | T _{1 min} | T _{1S} ²⁾ | T _{1 max} | |
| 15 | 15 | 7.4 | 16.20 | 3 836 | 10.3 | 4.5 | 60 | 10 | 28.0 | 50 | 1.4 |
| 20 | 20 | 9.4 | 20.55 | 5 816 | 13.2 | 6.0 | 60 | 10 | 28.0 | 50 | 2.4 |
| 25 | 23 | 11.0 | 24.25 | 5 816 | 15.2 | 7.0 | 60 | 10 | 28.0 | 50 | 3.2 |
| 30 | 28 | 15.0 | 28.35 | 5 836 | 17.0 | 9.0 | 80 | 12 | 38.0 | 68 | 5.0 |
| 35 | 34 | 15.0 | 31.85 | 5 836 | 20.5 | 9.0 | 80 | 12 | 38.0 | 68 | 6.8 |
| 45 | 45 | 20.0 | 39.85 | 5 771 | 23.5 | 14.0 | 105 | 16 | 50.5 | 89 | 10.5 |
| 55 | 53 | 24.0 | 47.85 | 3 836 | 29.0 | 16.0 | 120 | 18 | 58.0 | 102 | 16.2 |
| 65 | 63 | 26.0 | 59.85 | 3 746 | 38.5 | 18.0 | 150 | 20 | 73.0 | 130 | 22.4 |

- 1) Dimension H₂ without cover strip
- 2) Preferred dimension T_{1S} with tolerances ± 0.75 recommended.
- 3) Ball guide rails SNO with smooth base surface (without base groove).

SNS with mounting hole plugs made of steel

**R1606 .5. ..**

For mounting from above, for mounting hole plugs made of steel

Notes

- ▶ Mounting hole plugs made of steel not included in scope of delivery.
- ▶ Observe the instruction for mounting!
Please request the “Mounting instructions for ball rail systems.”
- ▶ Composite ball guide rail also available.

Further ball guide rails SNS and accessories

- ▶ Mounting hole plugs made of steel, mounting device for mounting hole plugs made of steel see accessories for ball guide rails

Options and material numbers

| Size | Ball guide rail with size | Accuracy class | | | | Number of partial sections .., Rail length L (mm), | | Spacing T (mm) | Recommended rail length in accordance with formula $L = n_B \cdot T - 4 \text{ mm}$ | |
|--------------|---------------------------|----------------|---|---|----|---|-----------|----------------|---|--|
| | | N | H | P | SP | One-piece | Composite | | Maximum number of holes n_B | |
| 25 | R1606 25 | 4 | 3 | 2 | 1 | 31, | 3., | 60 | 64 | |
| 30 | R1606 75 | 4 | 3 | 2 | 1 | 31, | 3., | 80 | 48 | |
| 35 | R1606 35 | 4 | 3 | 2 | 1 | 31, | 3., | 80 | 48 | |
| 45 | R1606 45 | 4 | 3 | 2 | 1 | 31, | 3., | 105 | 36 | |
| 55 | R1606 55 | 4 | 3 | 2 | 1 | 31, | 3., | 120 | 32 | |
| 65 | R1606 65 | 4 | 3 | 2 | 1 | 31, | 3., | 150 | 25 | |
| E.g.: | R1606 75 | 3 | | | | 31, 1676 | | | | |

Ordering example 1 (to L_{\max})

Options:

- ▶ Ball guide rail SNS
- ▶ Size 30
- ▶ Accuracy class H
- ▶ One-piece
- ▶ Rail length
L = 1676 mm

Material number:

R1606 753 31, 1676 mm

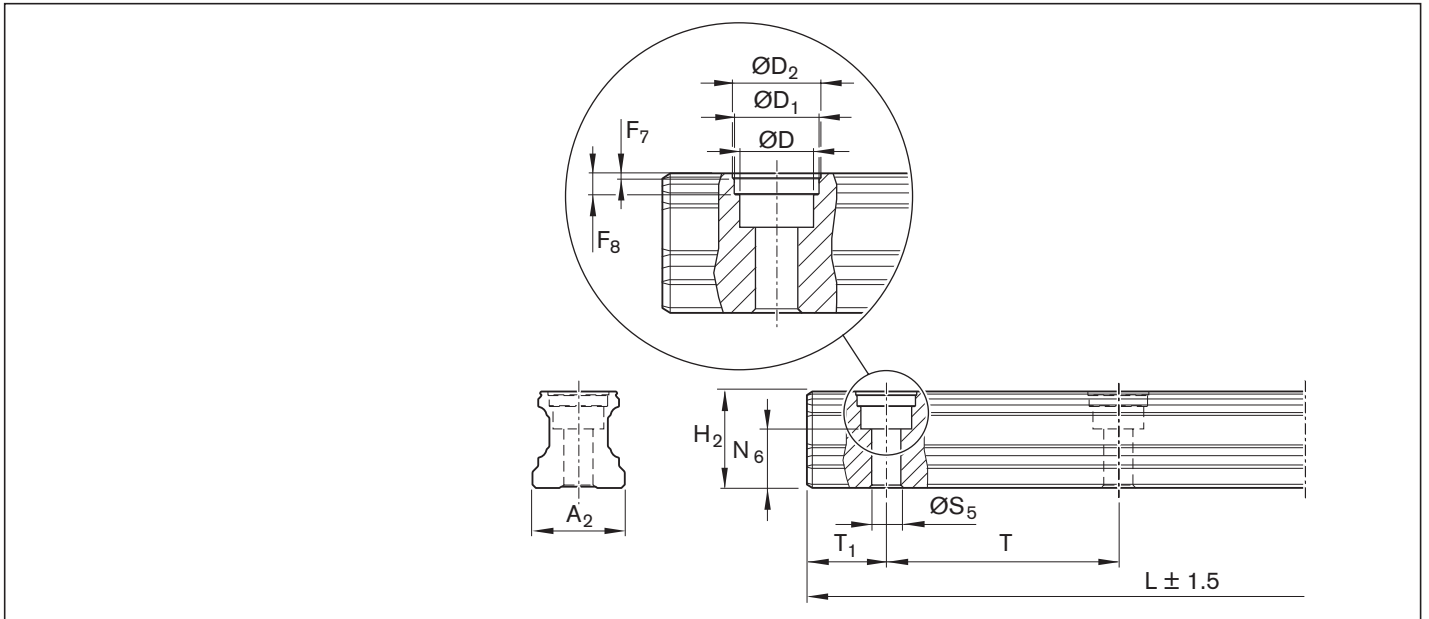
Ordering example 2 (above L_{\max})

Options:

- ▶ Ball guide rail SNS
- ▶ Size 30
- ▶ Accuracy class H
- ▶ **2 partial sections**
- ▶ Rail length
L = 5116 mm

Material number:

R1606 753 32, 5116 mm

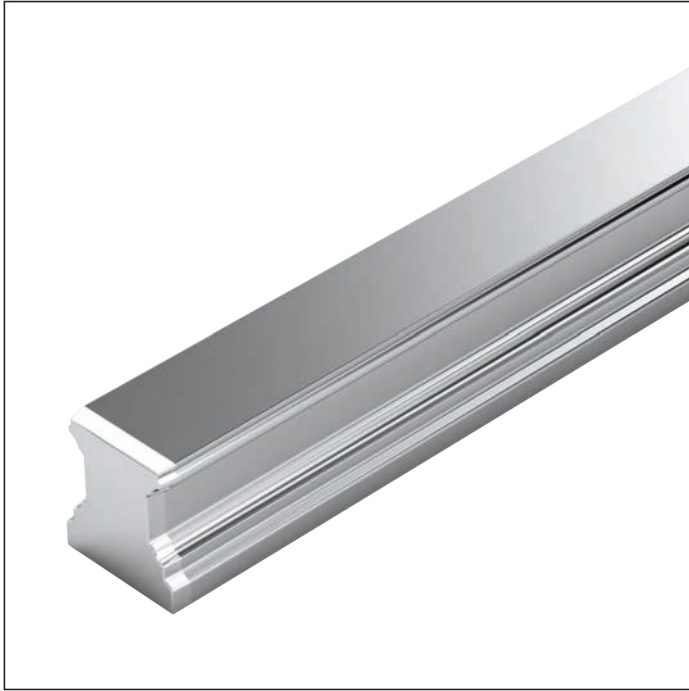


| Size | Dimensions (mm) | | | | | | | | | | | | | | | Mass m (kg/m) |
|-----------|-----------------|------|----------------|----------------|----------------|----------------|------------------------------|------------------|--------------------------------|----------------|-----|--------------------|-------------------------------|--------------------|------|------------------|
| | A ₂ | D | D ₁ | D ₂ | F ₇ | F ₈ | H ₂ ¹⁾ | L _{max} | N ₆ ^{±0.5} | S ₅ | T | T _{1 min} | T _{1s} ²⁾ | T _{1 max} | | |
| 25 | 23 | 11.0 | 12.55 | 13.0 | 0.90 | 3.7 | 24.25 | 5 816 | 15.2 | 7.0 | 60 | 13 | 28.0 | 50 | 3.2 | |
| 30 | 28 | 15.0 | 17.55 | 18.0 | 0.90 | 3.6 | 28.35 | 5 836 | 17.0 | 9.0 | 80 | 16 | 38.0 | 68 | 5.0 | |
| 35 | 34 | 15.0 | 17.55 | 18.0 | 0.90 | 3.6 | 31.85 | 5 836 | 20.5 | 9.0 | 80 | 16 | 38.0 | 68 | 6.8 | |
| 45 | 45 | 20.0 | 22.55 | 23.0 | 1.45 | 8.0 | 39.85 | 5 771 | 23.5 | 14.0 | 105 | 18 | 50.5 | 89 | 10.5 | |
| 55 | 53 | 24.0 | 27.55 | 28.0 | 1.45 | 8.0 | 47.85 | 3 836 | 29.0 | 16.0 | 120 | 20 | 58.0 | 102 | 16.2 | |
| 65 | 63 | 26.0 | 29.55 | 30.0 | 1.45 | 8.0 | 59.85 | 3 746 | 38.5 | 18.0 | 150 | 21 | 73.0 | 130 | 22.4 | |

1) Dimension H₂ without cover strip

2) Preferred dimension T_{1s} with tolerances ± 0.75 recommended.

SNS for mounting from below

**R1607 .0. ..****For mounting from below****Notes**

► Observe the instruction for mounting!
Please request the “Mounting instructions for ball rail systems.”

► Composite ball guide rail also available.

Further ball guide rails SNS and accessories

► Corrosion resistant ball guide rails Resist NR, Resist CR

Options and material numbers

| Size | Ball guide rail with size | Accuracy class | | | | | Number of partial sections, Rail length L (mm), | | Spacing T (mm) | Recommended rail length in accordance with formula $L = n_B \cdot T - 4 \text{ mm}$ | | |
|--------------|---------------------------|----------------|---|---|----|----|--|-----------|----------------|---|--|--|
| | | N | H | P | SP | UP | One-piece | Composite | | Maximum number of holes n_B | | |
| 15 | R1607 10 | 4 | 3 | 2 | 1 | 9 | 31, | 3., | 60 | 64 | | |
| 20 | R1607 80 | 4 | 3 | 2 | 1 | 9 | 31, | 3., | 60 | 64 | | |
| 25 | R1607 20 | 4 | 3 | 2 | 1 | 9 | 31, | 3., | 60 | 64 | | |
| 30 | R1607 70 | 4 | 3 | 2 | 1 | 9 | 31, | 3., | 80 | 48 | | |
| 35 | R1607 30 | 4 | 3 | 2 | 1 | 9 | 31, | 3., | 80 | 48 | | |
| 45 | R1607 40 | 4 | 3 | 2 | 1 | 9 | 31, | 3., | 105 | 36 | | |
| 55 | R1607 50 | 4 | 3 | 2 | 1 | 9 | 31, | 3., | 120 | 32 | | |
| 65 | R1607 60 | 4 | 3 | 2 | 1 | 9 | 31, | 3., | 150 | 25 | | |
| E.g.: | R1607 70 | 3 | | | | | 31, 1676 | | | | | |

**Ordering example 1
(to L_{max})**

Options:

- Ball guide rail SNS
- Size 30
- Accuracy class H
- One-piece
- Rail length
L = 1676 mm

Material number:

R1607 703 31, 1676 mm

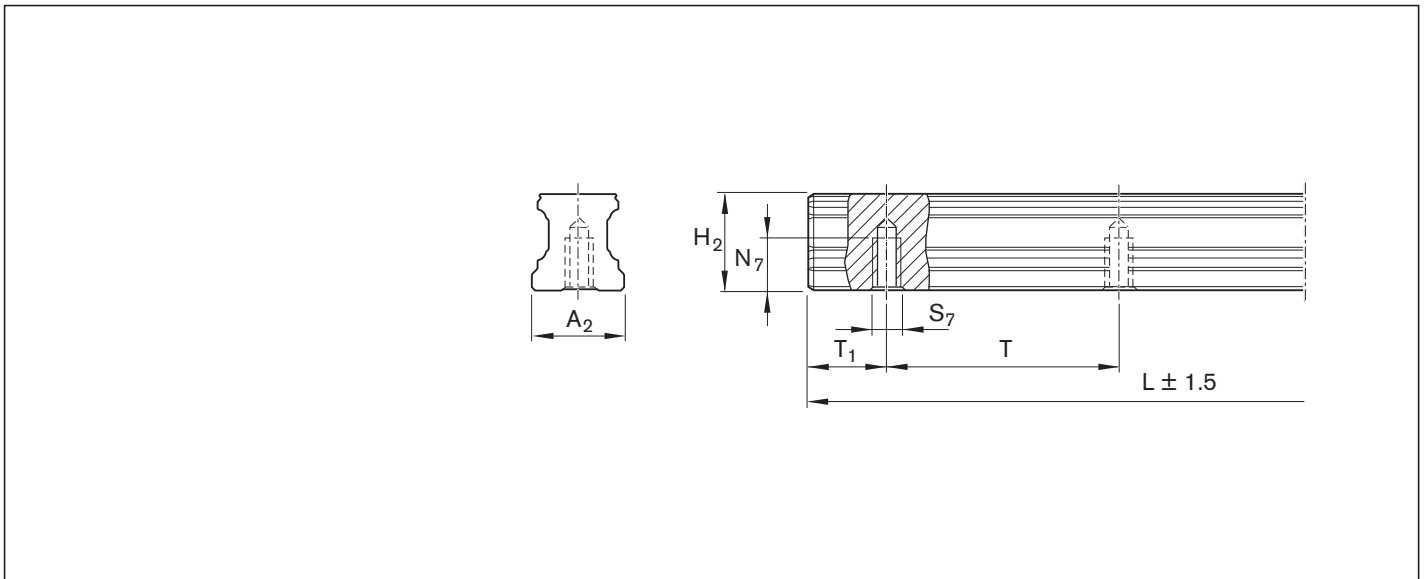
**Ordering example 2
(above L_{max})**

Options:

- Ball guide rail SNS
- Size 30
- Accuracy class H
- **2 partial sections**
- Rail length
L = 5116 mm

Material number:

R1607 703 32, 5116 mm



| Size | Dimensions (mm) | | | | | | | | | Mass m (kg/m) |
|-----------|-----------------|------------|-----------|-------|-------|-----|------------|---------------|------------|------------------|
| | A_2 | $H_2^{1)}$ | L_{max} | N_7 | S_7 | T | T_{1min} | $T_{1S}^{2)}$ | T_{1max} | |
| 15 | 15 | 16.20 | 3 836 | 7.5 | M5 | 60 | 10 | 28.0 | 50 | 1.4 |
| 20 | 20 | 20.55 | 5 816 | 9.0 | M6 | 60 | 10 | 28.0 | 50 | 2.4 |
| 25 | 23 | 24.25 | 5 816 | 12.0 | M6 | 60 | 10 | 28.0 | 50 | 3.2 |
| 30 | 28 | 28.35 | 5 836 | 15.0 | M8 | 80 | 12 | 38.0 | 68 | 5.0 |
| 35 | 34 | 31.85 | 5 836 | 15.0 | M8 | 80 | 12 | 38.0 | 68 | 6.8 |
| 45 | 45 | 39.85 | 5 771 | 19.0 | M12 | 105 | 16 | 50.5 | 89 | 10.5 |
| 55 | 53 | 47.85 | 3 836 | 22.0 | M14 | 120 | 18 | 58.0 | 102 | 16.2 |
| 65 | 63 | 59.85 | 3 746 | 25.0 | M16 | 150 | 20 | 73.0 | 130 | 22.4 |

1) Dimension H_2 without cover strip

2) Preferred dimension T_{1S} with tolerances ± 0.75 recommended.

Product description

General notes on ball guide rails Resist NR II

For material numbers, please refer to the following pages. For recommended rail lengths, dimensions and gravity, see corresponding standard steel ball guide rails. Observe the chapter “Instruction for mounting”!

Please request the “Mounting instructions for ball rail systems” and “Mounting instructions for cover strip”.

Accessories: Cover strip, strip clamps, mounting hole plugs, ... for ball guide rails, see chapter “Accessories for ball guide rails”

Corrosion resistance and conditions of use

Ball guide rails Resist NR II as well as all steel parts are made of corrosion resistant steel according to DIN EN 10088, strip clamps are made of aluminum. Ball guide rails Resist NR II are used specifically in conjunction with water-based media, heavily diluted acidic materials, alkali or saline solutions. These guideways are also ideally suitable for use at relative humidities above 70 % and temperatures exceeding 30 °C. Such conditions are found mainly in cleaning plants, electroplating and pickling lines, vapor degreasing plants and refrigeration systems. Since no additional corrosion protection is required, ball rail systems Resist NR II are ideally suited for use in clean rooms and general printed circuit board manufacturing. Other possible areas of application include the pharmaceutical and food industries.

Recommended ball runner blocks for Resist NR II ball guide rails, see the “Ball Runner Block Resist NR II” section

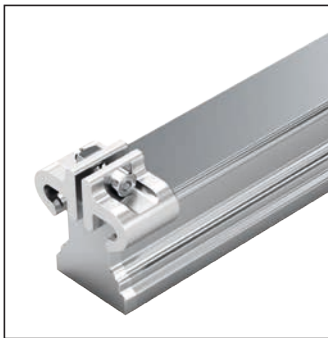
When using NR II ball guide rails, always use the lower load ratings of the NR II ball runner blocks.

Combinations of different accuracy classes

When combining ball guide rail and ball runner block of different accuracy classes, the tolerances for dimensions H and A_3 change (see “Accuracy classes and their tolerances”).

Ball guide rails Resist NR II

R2045 .3. ..., SNS can be screwed from above, with cover strip and strip clamps



Options and material numbers

| Size | Ball guide rail with size | Accuracy class | | | Number of partial sections .. | |
|------------------|---------------------------|----------------|---|---|--------------------------------------|-----------|
| | | N | H | P | Rail length L (mm), ... One-piece | Composite |
| 15 ¹⁾ | R2045 13 | 4 | 3 | 2 | 31, ... | 3., ... |
| 20 | R2045 83 | 4 | 3 | 2 | 31, ... | 3., ... |
| 25 | R2045 23 | 4 | 3 | 2 | 31, ... | 3., ... |
| 30 | R2045 73 | 4 | 3 | 2 | 31, ... | 3., ... |
| 35 | R2045 33 | 4 | 3 | 2 | 61, ... | 6., ... |
| E.g.: | R2045 73 | 3 | | | 31, 1676 | |

1) Maximum rail length 1856 mm, maximum number of holes n_b 30

Instruction for mounting

- ▶ Secure the cover strip!
- ▶ Strip clamps included in scope of delivery.
- ▶ Composite ball guide rail also available.

Ordering example 1 (to L_{max})

Options:

- ▶ Ball guide rail NR II, SNS
- ▶ Size 30
- ▶ Accuracy class H
- ▶ One-piece
- ▶ Rail length
L = 1676 mm

Material number:
R2045 733 31, 1676 mm

Ordering example 2 (above L_{max})

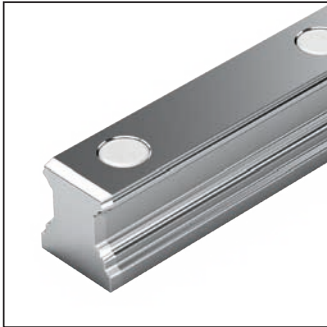
Options:

- ▶ Ball guide rail NR II, SNS
- ▶ Size 30
- ▶ Accuracy class H
- ▶ **2 partial sections**
- ▶ Rail length
L = 5116 mm

Material number:
R2045 733 32, 5116 mm

Ball guide rails Resist NR II

R2045 .0. ..., SNS can be screwed from above, with plastic mounting hole plugs



Options and material numbers

| Size | Ball guide rail with size | Accuracy class | | | Number of partial sections ., Rail length L (mm), ... | |
|------------------|---------------------------|----------------|---|---|---|-----------|
| | | N | H | P | One-piece | Composite |
| 15 ¹⁾ | R2045 10 | 4 | 3 | 2 | 31, ... | 3., ... |
| 20 | R2045 80 | 4 | 3 | 2 | 31, ... | 3., ... |
| 25 | R2045 20 | 4 | 3 | 2 | 31, ... | 3., ... |
| 30 | R2045 70 | 4 | 3 | 2 | 31, ... | 3., ... |
| 35 | R2045 30 | 4 | 3 | 2 | 31, ... | 3., ... |
| E.g.: | R2045 70 | 3 | | | 31, 1676 | |

1) Maximum rail length 1856 mm, maximum number of holes n_B 30

Instruction for mounting

- ▶ Plastic mounting hole plugs included in scope of supply.
- ▶ Composite ball guide rail also available.

Ordering example 1 (to L_{max})

Options:

- ▶ Ball guide rail NR II, SNS
- ▶ Size 30
- ▶ Accuracy class H
- ▶ One-piece
- ▶ Rail length
L = 1676 mm

Material number:

R2045 703 31, 1676 mm

Ordering example 2 (above L_{max})

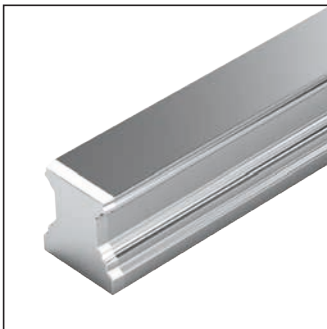
Options:

- ▶ Ball guide rail NR II, SNS
- ▶ Size 30
- ▶ Accuracy class H
- ▶ **2 partial sections**
- ▶ Rail length
L = 5116 mm

Material number:

R2045 703 **32**, 5116 mm

R2047 .0. ..., SNS, for mounting from below



Options and material numbers

| Size | Ball guide rail with size | Accuracy class | | | Number of partial sections ., Rail length L (mm), ... | |
|------------------|---------------------------|----------------|---|---|---|-----------|
| | | N | H | P | One-piece | Composite |
| 15 ¹⁾ | R2047 10 | 4 | 3 | 2 | 31, ... | 3., ... |
| 20 | R2047 80 | 4 | 3 | 2 | 31, ... | 3., ... |
| 25 | R2047 20 | 4 | 3 | 2 | 31, ... | 3., ... |
| 30 | R2047 70 | 4 | 3 | 2 | 31, ... | 3., ... |
| 35 | R2047 30 | 4 | 3 | 2 | 31, ... | 3., ... |
| E.g.: | R2047 70 | 3 | | | 32, 5116 | |

1) Maximum rail length 1856 mm, maximum number of holes n_B 30

Instruction for mounting

- ▶ Composite ball guide rail also available.

Ordering example 1 (to L_{max})

Options:

- ▶ Ball guide rail NR II, SNS
- ▶ Size 30
- ▶ Accuracy class H
- ▶ One-piece
- ▶ Rail length
L = 1676 mm

Material number:

R2047 703 31, 1676 mm

Ordering example 2 (above L_{max})

Options:

- ▶ Ball guide rail NR II, SNS
- ▶ Size 30
- ▶ Accuracy class H
- ▶ **2 partial sections**
- ▶ Rail length
L = 5116 mm

Material number:

R2047 703 **32**, 5116 mm

Product description

General notes on ball guide rails Resist CR

For material numbers, please refer to the following pages. For recommended rail lengths, dimensions and gravity, see corresponding standard steel ball guide rails. Observe the chapter “Instruction for mounting”!

Please request the “Mounting instructions for ball rail systems” and “Mounting instructions for cover strip”.

Accessories: Cover strip, strip clamps, mounting hole plugs, ... for ball guide rails,

see chapter “Accessories for ball guide rails”

Corrosion resistant Resist CR coating

Steel ball guide rail with corrosion resistant coating, matte-silver finish, hard chrome plated.

Ball guide rails with coated end faces

▶ Coated end faces, chamfers and end-face thread, material numbers: – R16.. ... 41 or R16.. ... 71

▶ Multi-part ball guide rails are chamfered on two sides at the joints.

Recommended ball runner blocks for Resist CR ball guide rails of accuracy class H and preload class C0 and C1

Sizes 15 – 65: Accuracy class H, preload class C0

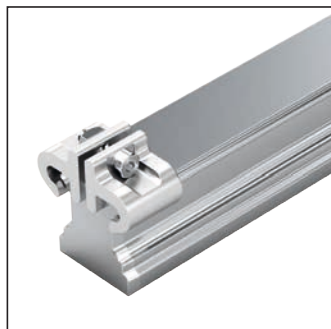
Sizes 30 – 65: Accuracy class H, preload class C1

Combinations of different accuracy classes

Combining ball guide rails and ball runner blocks of different accuracy classes results in different tolerances for the dimensions H and A3 (see chapter “Accuracy classes and their tolerances”).

Ball guide rails Resist CR

R1645 .3. ..., SNS can be screwed from above, with cover strip and strip clamps



Options and material numbers

| Size | Ball guide rail with size | Accuracy class | Number of partial sections .. Rail length L (mm), ... | |
|--------------|---------------------------|----------------|--|-------------------------------|
| | | | One-piece Coated end faces | Composite Coated end faces |
| 15 | R1645 13 | H | 3 | 41, |
| 20 | R1645 83 | H | 3 | 41, |
| 25 | R1645 23 | H | 3 | 41, |
| 30 | R1645 73 | H | 3 | 41, |
| 35 | R1645 33 | H | 3 | 71, |
| 45 | R1645 43 | H | 3 | 71, |
| 55 | R1645 53 | H | 3 | 71, |
| 65 | R1645 63 | H | 3 | 71, |
| E.g.: | R1645 73 | H | 3 | 41, 1676 |

Instruction for mounting

- ▶ Secure the cover strip!
- ▶ Strip clamps included in scope of delivery.
- ▶ Composite ball guide rail also available.

Ordering example 1 (to L_{max})

Options:

- ▶ Ball guide rail CR, SNS
- ▶ Size 30
- ▶ Accuracy class H
- ▶ One-piece
- ▶ End faces coated
- ▶ Rail length
L = 1676 mm

Material number:
R1645 733 41, 1676 mm

Ordering example 2 (above L_{max})

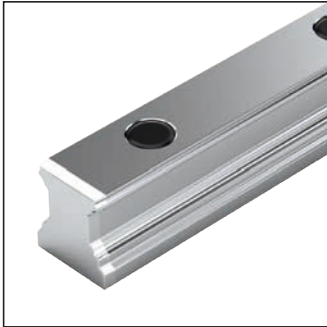
Options:

- ▶ Ball guide rail CR, SNS
- ▶ Size 30
- ▶ Accuracy class H
- ▶ **2 partial sections**
- ▶ End faces coated
- ▶ Rail length
L = 5116 mm

Material number:
R1645 733 42, 5116 mm

Ball guide rails Resist CR

R1645 .0. ... SNS can be screwed from above, with plastic mounting hole plugs



Options and material numbers

| Size | Ball guide rail with size | Accuracy class | Number of partial sections .., Rail length L (mm), | |
|--------------|---------------------------|----------------|---|----------------------------|
| | | | One-piece Coated end faces | Composite Coated end faces |
| 15 | R1645 10 | | 3 | 41, |
| 20 | R1645 80 | | 3 | 41, |
| 25 | R1645 20 | | 3 | 41, |
| 30 | R1645 70 | | 3 | 41, |
| 35 | R1645 30 | | 3 | 41, |
| 45 | R1645 40 | | 3 | 41, |
| 55 | R1645 50 | | 3 | 41, |
| 65 | R1645 60 | | 3 | 41, |
| E.g.: | R1645 70 | | 3 | 41, 1676 |

Instruction for mounting

- ▶ Plastic mounting hole plugs included in scope of supply.
- ▶ Composite ball guide rail also available.

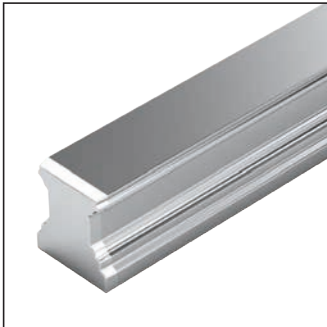
Ordering example 1 (to L_{max})

- Options:
- ▶ Ball guide rail CR, SNS
 - ▶ Size 30
 - ▶ Accuracy class H
 - ▶ One-piece
 - ▶ End faces coated
 - ▶ Rail length L = 1676 mm
- Material number:
R1645 703 41, 1676 mm

Ordering example 2 (above L_{max})

- Options:
- ▶ Ball guide rail CR, SNS
 - ▶ Size 30
 - ▶ Accuracy class H
 - ▶ **2 partial sections**
 - ▶ End faces coated
 - ▶ Rail length L = 5116 mm
- Material number:
R1645 703 42, 5116 mm

R1647 .0. ... SNS for mounting from below



Options and material numbers

| Size | Ball guide rail with size | Accuracy class | Number of partial sections .., Rail length L (mm), | |
|--------------|---------------------------|----------------|---|----------------------------|
| | | | One-piece Coated end faces | Composite Coated end faces |
| 15 | R1647 10 | | 3 | 41, |
| 20 | R1647 80 | | 3 | 41, |
| 25 | R1647 20 | | 3 | 41, |
| 30 | R1647 70 | | 3 | 41, |
| 35 | R1647 30 | | 3 | 41, |
| 45 | R1647 40 | | 3 | 41, |
| 55 | R1647 50 | | 3 | 41, |
| 65 | R1647 60 | | 3 | 41, |
| E.g.: | R1647 70 | | 3 | 42, 5116 |

Instruction for mounting

- ▶ Composite ball guide rail also available.

Ordering example 1 (to L_{max})

- Options:
- ▶ Ball guide rail CR, SNS
 - ▶ Size 30
 - ▶ Accuracy class H
 - ▶ One-piece
 - ▶ End faces coated
 - ▶ Rail length L = 1676 mm
- Material number:
R1647 703 41, 1676 mm

Ordering example 2 (above L_{max})

- Options:
- ▶ Ball guide rail CR, SNS
 - ▶ Size 30
 - ▶ Accuracy class H
 - ▶ **2 partial sections**
 - ▶ End faces coated
 - ▶ Rail length L = 5116 mm
- Material number:
R1647 703 42, 5116 mm

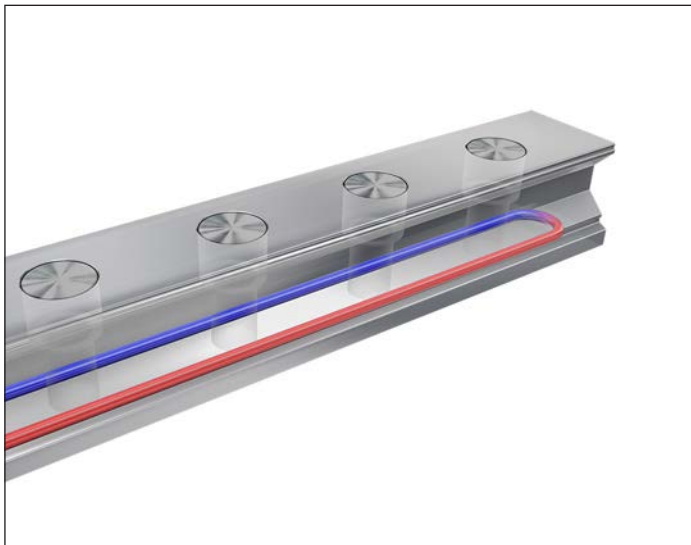
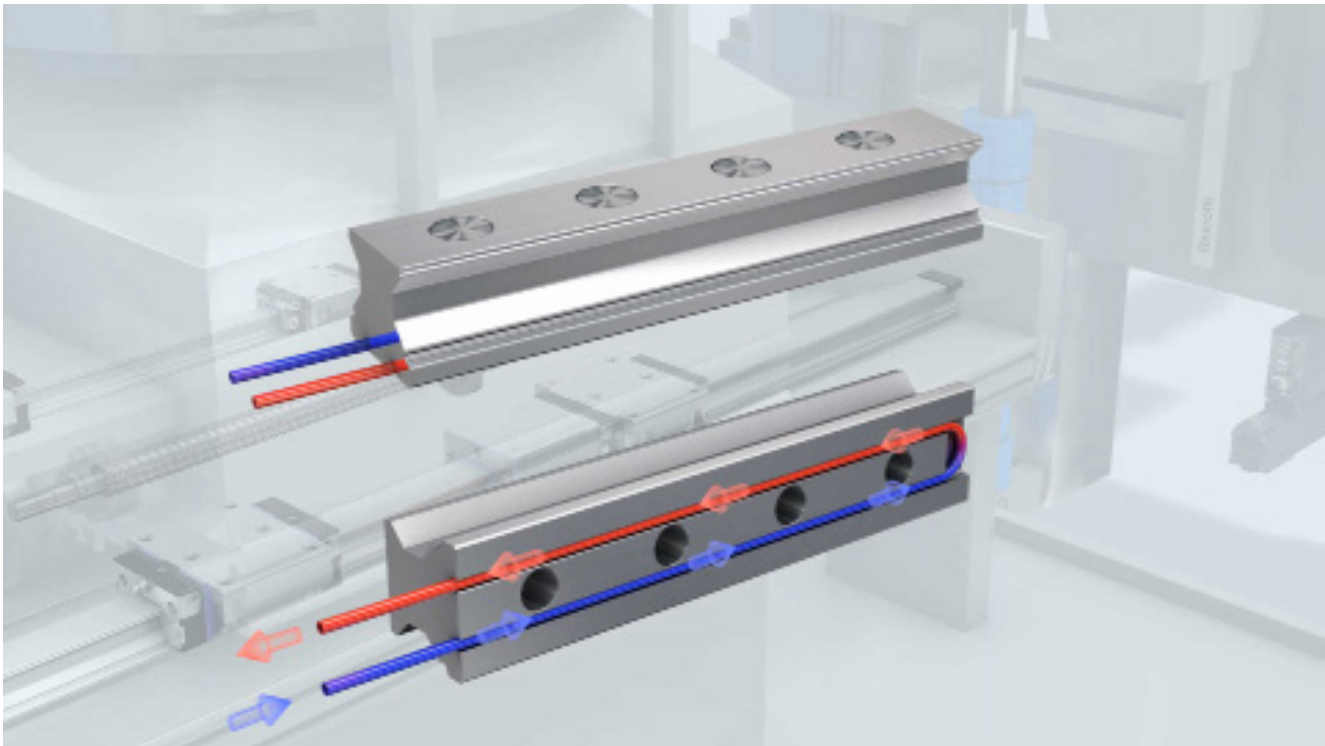
Ball guide rails with temperature control

Product description

Characteristic features

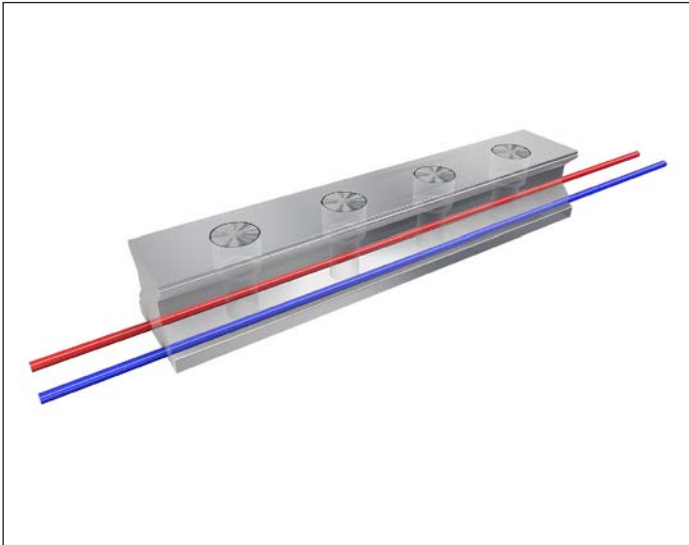
Faster starting, more precise movement, simple conversion

What used to only be possible with a lot of effort and special solutions is now available for the first time as standard: Rexroth has integrated temperature control into the Guide Rail. Wherever fast travel cycles and the highest precision are required, Guide Rails can now be started without any run-in time. Always at the perfect temperature and thermally stable. And with less waste. Ideal for retrofitting: simply replace the rail and connect to the existing cooling circuit. You can turn your standard machines into precision machines in no time at all!



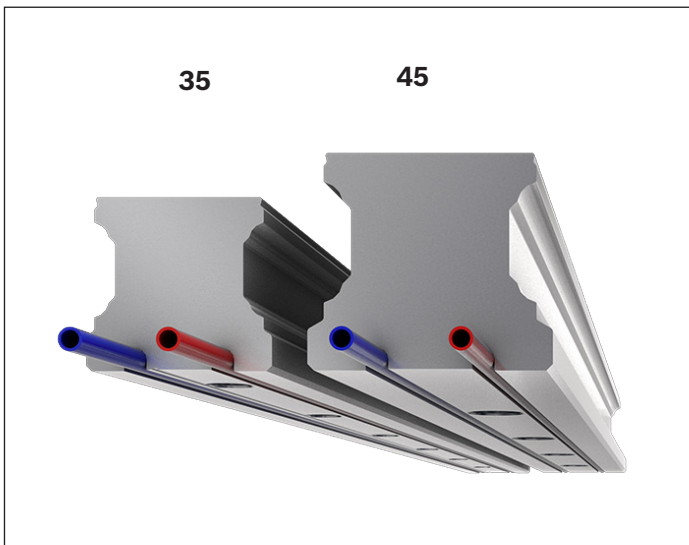
Extremely precise movement, flexible adjustment

Since the new Guide Rails by Rexroth remove the heat from where it is created or supplies it to where it is needed you have complete freedom. No matter where your machine is positioned or what material the machine bed is made from, the linear guide rails work with high precision and are thermally stable. No run-in time, with good parts right from the first part onwards. This ensures the greatest availability and increases part accuracy by up to 75%. Even with existing machines: rails can be easily connected to existing cooling circuits with ready to connect piping. Finished.



Further highlights

- ▶ High precision: up to 75% higher part accuracy, regardless of environment
- ▶ Always available: no run-in to the operating temperature
- ▶ Flexible: can be adjusted to changes as required
- ▶ Can be retrofitted: compatible with existing systems
- ▶ Simple: pipes are ready to connect, uses existing cooling circuits



Technical features

- ▶ Ball guide sizes: 35/45
- ▶ Formats: R1605
- ▶ Rail covers: Cover strip, plastic caps
- ▶ Series with groove
- ▶ Accuracy classes: P/SP
- ▶ Rail lengths: up to max. 4000 mm
- ▶ Redirecting temperature control: to the rails or universal
- ▶ Patent pending

Ball guide rails with temperature control are available on request.
The illustrations partly show the roller guide rail version

Product description

Characteristic features

- ▶ Limitless interchangeability as all ball guide rail systems can be combined at will with all ball runner block versions within each accuracy class.
- ▶ Very high torsional moment load capacity and very high torsion resistance – therefore primarily used as an individual guide
- ▶ High torque load capacity
- ▶ The same high load ratings in all four main directions of loading
- ▶ Integrated all-round sealing
- ▶ Low noise level and optimum travel behavior
- ▶ Excellent dynamic characteristics:
Travel speed: v_{\max} up to 5 m/s ¹⁾
Acceleration: a_{\max} up to 500 m/s² ¹⁾
- ▶ Long-term lubrication is possible over several years
- ▶ Minimum quantity lubrication system with integrated reservoir for oil lubrication¹⁾
- ▶ Lube fittings with metal threads on all sides¹⁾
- ▶ Maximum system rigidity due to preloaded O-arrangement
- ▶ Wide range of accessories

Further highlights

- ▶ Optimized entry-zone geometry and high number of balls minimize variation in elastic deflection
- ▶ End-face fastening thread for all attachments
- ▶ Linear guideway with low clearance or moderate preload
- ▶ Quiet, smooth running thanks to optimally designed ball and ball chain return and guideway¹⁾
- ▶ Attachments on the ball runner block can be mounted from above and below¹⁾
- ▶ Improved rigidity under lift-off and side loading conditions due to two additional mounting screw holes at the center of the ball runner block
- ▶ Ball runner block pre-lubricated at the factory¹⁾
- ▶ Optionally available with ball chain¹⁾
- ▶ Can be used on all BNS ball guide rails.

Corrosion protection (optional)

- ▶ Resist CR:
Ball runner block body or ball guide rail made of steel with corrosion resistant coating, matte-silver finish, hard chrome plated

1) Type-dependent

Size 20/40:

New ball rail system with different ball diameters. Not interchangeable with the old 20/40 size!

Overview of formats**Sizes 20/40 and 25/70**

- ▶ With ball chain
- ▶ Pre-lubricated

**Sizes 35/90****Sizes 20/40 and 25/70**

- ▶ With ball chain
- ▶ Pre-lubricated

Definition of the format of ball runner blocks

| Criterion | Designation | Code (example) | | |
|-----------|------------------------------|----------------|---|---|
| | | B | N | S |
| Width | Flange (F) | F | | |
| | Slimline (S) | S | | |
| | Wide (B) | B | | |
| | Compact (C) | C | | |
| Length | Normal (N) | | N | |
| | Long (L) | | L | |
| | Short (K) | | K | |
| Height | Standard height (S) | | | S |
| | High (H) | | | H |
| | Low (N) | | | N |

**Ball chain (optional)**

- ▶ Optimized noise level

BNS – wide, normal, standard height



Ball runner block made of steel R1671 ... 2.

Dynamic characteristics

Travel speed: $v_{\max} = 5 \text{ m/s}$

Acceleration: $a_{\max} = 500 \text{ m/s}^2$

(If $F_{\text{comb}} > 2.8 \cdot F_{\text{pr}}$: $a_{\max} = 50 \text{ m/s}^2$)

Note on lubrication:

- ▶ Pre-lubricated

Further ball runner blocks BNS

- ▶ Corrosion resistant ball runner blocks see below

Order example

Options:

- ▶ Ball runner blocks BNS
- ▶ Sizes 25/70
- ▶ Preload class C1
- ▶ Accuracy class H
- ▶ With standard seal, without ball chain

Material number:

R1671 213 20

Options and material numbers

| Size | Ball runner blocks with size | Preload class | | Accuracy class | | | Seals on ball runner blocks | | | |
|---------------------|------------------------------|---------------|----|----------------|---|---|-----------------------------|----|-----------------|----|
| | | C0 | C1 | N | H | P | without ball chain | | with ball chain | |
| | | | | | | | SS | DS | SS | DS |
| 20/40 ¹⁾ | R1671 5 | 9 | | 4 | 3 | – | 20 | – | 22 | – |
| | | | 1 | 4 | 3 | 2 | 20 | 2Z | 22 | 2Y |
| 25/70 | R1671 2 | 9 | | 4 | 3 | – | 20 | – | 22 | – |
| | | | 1 | 4 | 3 | 2 | 20 | 2Z | 22 | 2Y |
| E.g.: | R1671 2 | | 1 | | 3 | | 20 | | | |

Ball runner block, Resist CR

R1671 ... 7.

Note on lubrication:

- ▶ Pre-lubricated

Order example

Options:

- ▶ Ball runner blocks BNS
- ▶ Sizes 25/70
- ▶ Preload class C0
- ▶ Accuracy class H
- ▶ With standard seal, without ball chain

Material number:

R1671 293 70

Options and material numbers

| Size | Ball runner blocks with size | Preload class | Accuracy class | Seals on ball runner blocks | | | | | |
|---------------------|------------------------------|---------------|----------------|-----------------------------|----|--------------------|----|-----------------|----|
| | | | | C0 | H | without ball chain | | with ball chain | |
| | | | | | | SS | DS | SS | DS |
| 20/40 ¹⁾ | R1671 5 | 9 | 3 | 70 | 7Z | 72 | 7Y | | |
| 25/70 | R1671 2 | 9 | 3 | 70 | 7Z | 72 | 7Y | | |
| E.g.: | R1671 2 | 9 | 3 | 70 | | | | | |

1) Caution: Ball runner blocks, not combinable with ball guide rail R167.8.. ...!

Preload classes

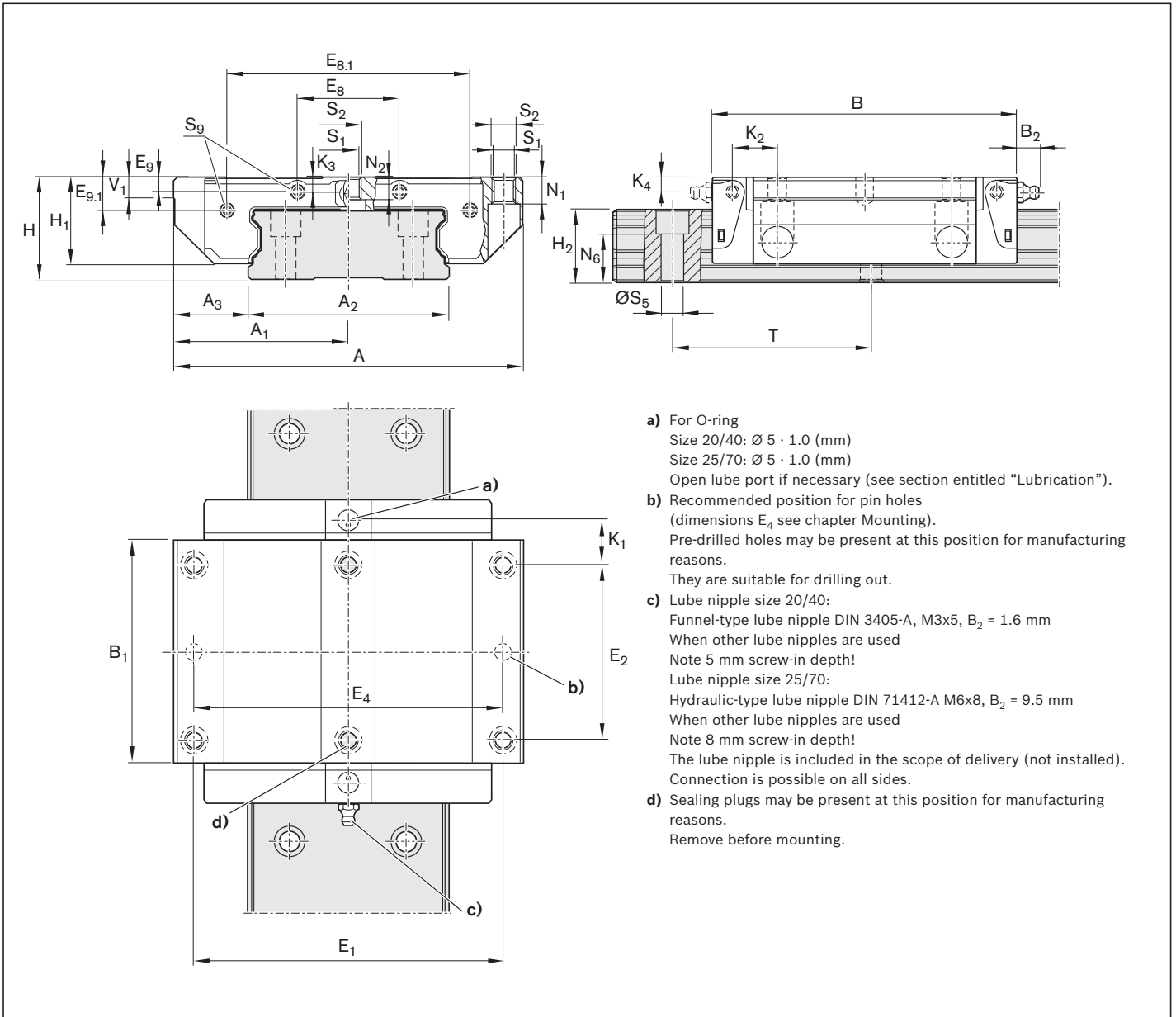
C0 = Without preload (clearance)
C1 = Moderate preload

Seals

SS = Standard seal
DS = Double-lip seal

Key

gray numbers
= No preferred variant / combination
(partially longer delivery times)



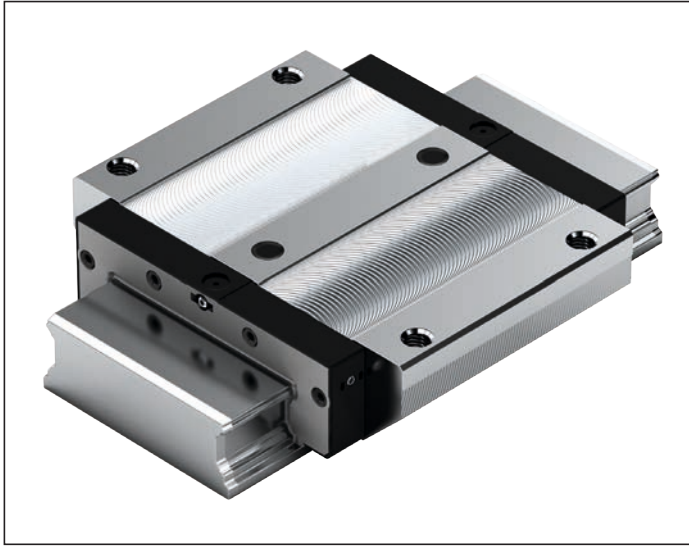
| Size | Dimensions (mm) | | | | | | | | | | | | | | | | | | |
|-------|-----------------|----------------|----------------|----------------|-----|----------------|----------------|----------------|----------------|------------------|----------------|------------------|----|----------------|----------------|----------------|----------------|----------------|----------------|
| | A | A ₁ | A ₂ | A ₃ | B | B ₁ | E ₁ | E ₂ | E ₈ | E _{8.1} | E ₉ | E _{9.1} | H | H ₁ | H ₂ | K ₁ | K ₂ | K ₃ | K ₄ |
| 20/40 | 80 | 40 | 42 | 19.0 | 73 | 51.3 | 70 | 40 | 18 | 53.4 | 3.4 | 8.1 | 27 | 22.50 | 18.30 | 10.6 | 11.0 | 3.5 | 3.5 |
| 25/70 | 120 | 60 | 69 | 25.5 | 105 | 76.5 | 107 | 60 | 35 | 83.5 | 4.9 | 11.3 | 35 | 29.75 | 23.55 | 15.4 | 15.5 | 5.2 | 5.2 |

| Size | Dimensions (mm) | | | | | | | | | | Mass (kg) | Load capacities ¹⁾ (N) | | Load moments ¹⁾ (Nm) | | | |
|-------|-----------------|----------------|--------------------------------|----------------|----------------|----------------|------------------------|----|----------------|-----|-----------|-----------------------------------|----------------|---------------------------------|----------------|-----------------|--|
| | N ₁ | N ₂ | N ₆ ^{±0.5} | S ₁ | S ₂ | S ₅ | S ₉ | T | V ₁ | C | | C ₀ | M _t | M _{t0} | M _L | M _{L0} | |
| 20/40 | 7.70 | 3.70 | 12.5 | 5.3 | M6 | 4.4 | M2.5x1.5 ⁺³ | 60 | 6.0 | 0.4 | 14900 | 20600 | 340 | 470 | 140 | 190 | |
| 25/70 | 9.35 | 7.05 | 14.4 | 6.7 | M8 | 7.0 | M3x2 ^{+4.5} | 80 | 7.5 | 1.2 | 36200 | 50200 | 1 350 | 1870 | 490 | 680 | |

1) Load ratings and load moments for ball runner block **without** ball chain. Load ratings and load moments for ball runner block **with** ball chain 14

Determination of the dynamic load capacities and load moments is based on a stroke travel of 100,000 m according to DIN ISO 14728-1. Often only 50,000 m are actually stipulated. For comparison: Multiply the values **C**, **M_t** and **M_L** by 1.26 according to the table.

BNS – wide, normal, standard height



Ball runner block made of steel R1671 ... 1.

Dynamic characteristics

Travel speed: $v_{\max} = 3 \text{ m/s}$

Acceleration: $a_{\max} = 250 \text{ m/s}^2$

(If $F_{\text{comb}} > 2.8 \cdot F_{\text{pr}}$: $a_{\max} = 50 \text{ m/s}^2$)

Note on lubrication:

- ▶ No initial lubrication

Further ball runner blocks BNS

- ▶ Corrosion-resistant ball runner blocks see below

Order example

Options:

- ▶ Ball runner blocks BNS
- ▶ Sizes 35/90
- ▶ Preload class C1
- ▶ Accuracy class H
- ▶ With standard seal, without ball chain

Material number:

R1671 313 10

Options and material numbers

| Size | Ball runner blocks with size | Preload class | | | Accuracy class | | | Seals on ball runner blocks without ball chain | |
|-------|------------------------------|---------------|----|----|----------------|---|---|--|--|
| | | C0 | C1 | C2 | N | H | P | SS | |
| 35/90 | R1671 3 | 9 | | | 4 | 3 | - | 10 | |
| | | | 1 | | 4 | 3 | 2 | 10 | |
| | | | | 2 | | 3 | 2 | 10 | |
| E.g.: | R1671 3 | | 1 | | | 3 | | 10 | |

Ball runner block, Resist CR

R1671 ... 6.

Order example

Options:

- ▶ Ball runner blocks BNS
- ▶ Sizes 35/90
- ▶ Preload class C1
- ▶ Accuracy class H
- ▶ With standard seal, without ball chain

Material number:

R1671 313 60

Options and material numbers

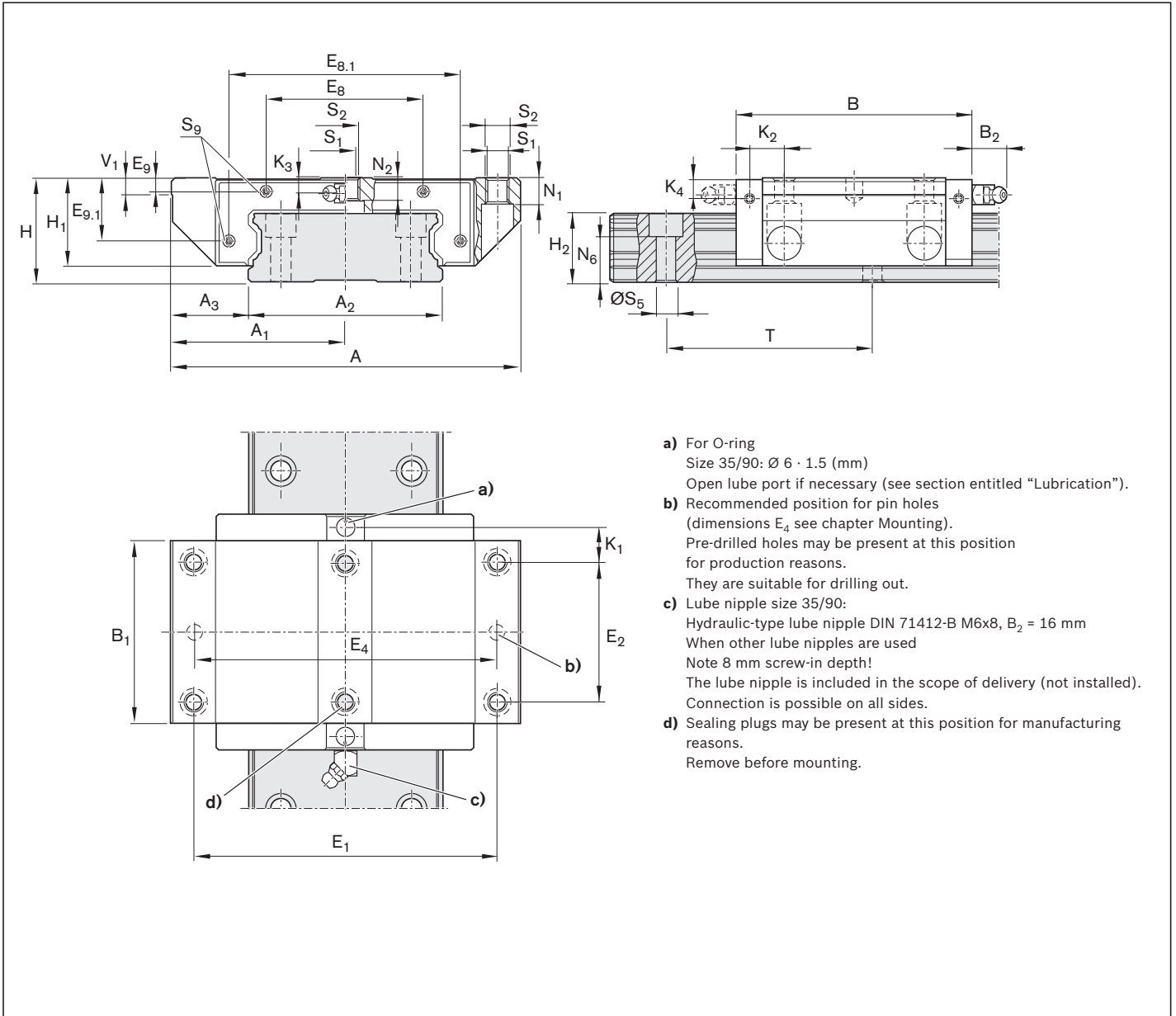
| Size | Ball runner blocks with size | Preload class | | Accuracy class | Seals on ball runner blocks without ball chain | SS |
|-------|------------------------------|---------------|----|----------------|--|----|
| | | C0 | C1 | | | |
| 35/90 | R1671 3 | 9 | 1 | | 3 | 60 |
| E.g.: | R1671 3 | | 1 | | 3 | 60 |

Preload classes

C0 = Without preload (clearance)
C1 = Moderate preload

Seals

SS = Standard seal



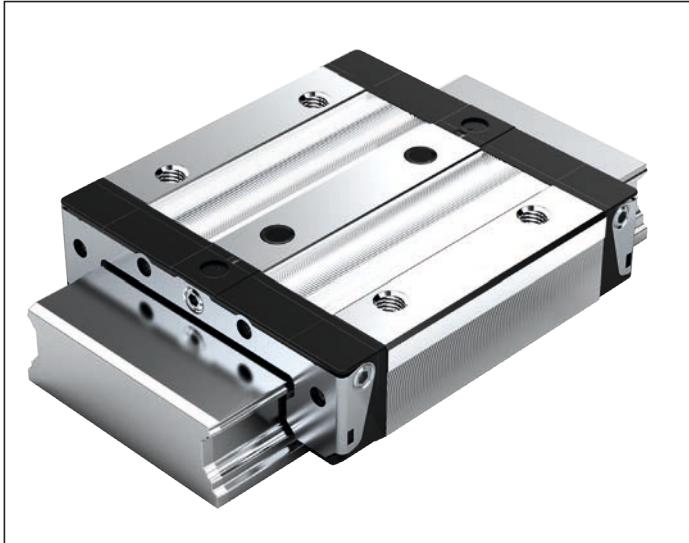
- a) For O-ring
Size 35/90: Ø 6 · 1.5 (mm)
Open lube port if necessary (see section entitled “Lubrication”).
- b) Recommended position for pin holes
(dimensions E₄ see chapter Mounting).
Pre-drilled holes may be present at this position for production reasons.
They are suitable for drilling out.
- c) Lube nipple size 35/90:
Hydraulic-type lube nipple DIN 71412-B M6x8, B₂ = 16 mm
When other lube nipples are used
Note 8 mm screw-in depth!
The lube nipple is included in the scope of delivery (not installed).
Connection is possible on all sides.
- d) Sealing plugs may be present at this position for manufacturing reasons.
Remove before mounting.

| Size | Dimensions (mm) | | | | | | | | | | | | | | | | | |
|-------|-----------------|----------------|----------------|----------------|-----|----------------|----------------|----------------|----------------|------------------|----------------|------------------|----|----------------|----------------|----------------|----------------|--|
| | A | A ₁ | A ₂ | A ₃ | B | B ₁ | E ₁ | E ₂ | E ₈ | E _{8.1} | E ₉ | E _{9.1} | H | H ₁ | H ₂ | K ₁ | K ₂ | |
| 35/90 | 162 | 81 | 90 | 36 | 142 | 113.6 | 144 | 80 | 79 | 116 | 6.8 | 29.9 | 50 | 42.5 | 31.85 | 22.8 | 24.8 | |

| Size | Dimensions (mm) | | | | | | | | | | | Mass (kg) | Load capacities ¹⁾ (N) | | Load moments ¹⁾ (Nm) | | | |
|-------|-----------------|----------------|----------------|----------------|--------------------------------|----------------|----------------|----------------|----------------|----|----------------|-----------|-----------------------------------|----------------|---------------------------------|-----------------|----------------|-----------------|
| | K ₃ | K ₄ | N ₁ | N ₂ | N ₆ ^{±0.5} | S ₁ | S ₂ | S ₅ | S ₉ | T | V ₁ | | C | C ₀ | M _t | M ₁₀ | M _L | M _{L0} |
| 35/90 | 9 | 9 | 14 | 12 | 20.5 | 8.4 | M10 | 9 | M3x5 | 80 | 8.0 | 3.70 | 70700 | 126000 | 3500 | 6240 | 1470 | 2620 |

1) Load ratings and load moments for ball runner block **without** ball chain.
Determination of the dynamic load capacities and load moments is based on a stroke travel of 100,000 m according to DIN ISO 14728-1.
Often only 50,000 m are actually stipulated. For comparison: Multiply the values **C**, **M_t** and **M_L** by 1.26 according to the table.

CNS – compact, normal, standard height



Ball runner block made of steel R1672 ... 2.

Dynamic characteristics

Travel speed: $v_{\max} = 5 \text{ m/s}$

Acceleration: $a_{\max} = 500 \text{ m/s}^2$

(If $F_{\text{comb}} > 2.8 \cdot F_{\text{pr}} : a_{\max} = 50 \text{ m/s}^2$)

Note on lubrication:

- ▶ Pre-lubricated

Further ball runner blocks CNS

- ▶ Corrosion-resistant ball runner blocks see below

Order example

Options:

- ▶ Ball runner blocks CNS
- ▶ Sizes 25/70
- ▶ Preload class C1
- ▶ Accuracy class H
- ▶ With standard seal, without ball chain

Material number:

R1672 213 20

Options and material numbers

| Size | Ball runner blocks with size | Preload class | | Accuracy class | | | Seals on ball runner blocks | | | |
|---------------------|------------------------------|---------------|----|----------------|---|---|-----------------------------|----|-----------------|----|
| | | C0 | C1 | N | H | P | without ball chain | | with ball chain | |
| | | | | | | | SS | DS | SS | DS |
| 20/40 ¹⁾ | R1672 5 | 9 | | 4 | 3 | – | 20 | – | 22 | – |
| | | | 1 | 4 | 3 | – | 20 | 2Z | 22 | 2Y |
| 25/70 | R1672 2 | 9 | | 4 | 3 | – | 20 | – | 22 | – |
| | | | 1 | 4 | 3 | – | 20 | 2Z | 22 | 2Y |
| E.g.: | R1672 2 | | 1 | | 3 | | 20 | | | |

Ball runner block

Resist CR²⁾

R1672 ... 7.

Order example

Options:

- ▶ Ball runner blocks CNS
- ▶ Sizes 25/70
- ▶ Preload class C0
- ▶ Accuracy class H
- ▶ With standard seal, without ball chain

Material number:

R1672 293 70

Options and material numbers

| Size | Ball runner blocks with size | Preload class | Accuracy class | Seals on ball runner blocks | | | |
|---------------------|------------------------------|---------------|----------------|-----------------------------|----|-----------------|----|
| | | | | without ball chain | | with ball chain | |
| | | C0 | H | SS | DS | SS | DS |
| 20/40 ¹⁾ | R1672 5 | 9 | 3 | 70 | 7Z | 72 | 7Y |
| 25/70 | R1672 2 | 9 | 3 | 70 | 7Z | 72 | 7Y |
| E.g.: | R1672 2 | 9 | 3 | 70 | | | |

1) Caution: Ball runner blocks, not combinable with ball guide rail R167.8... ..!

Preload classes

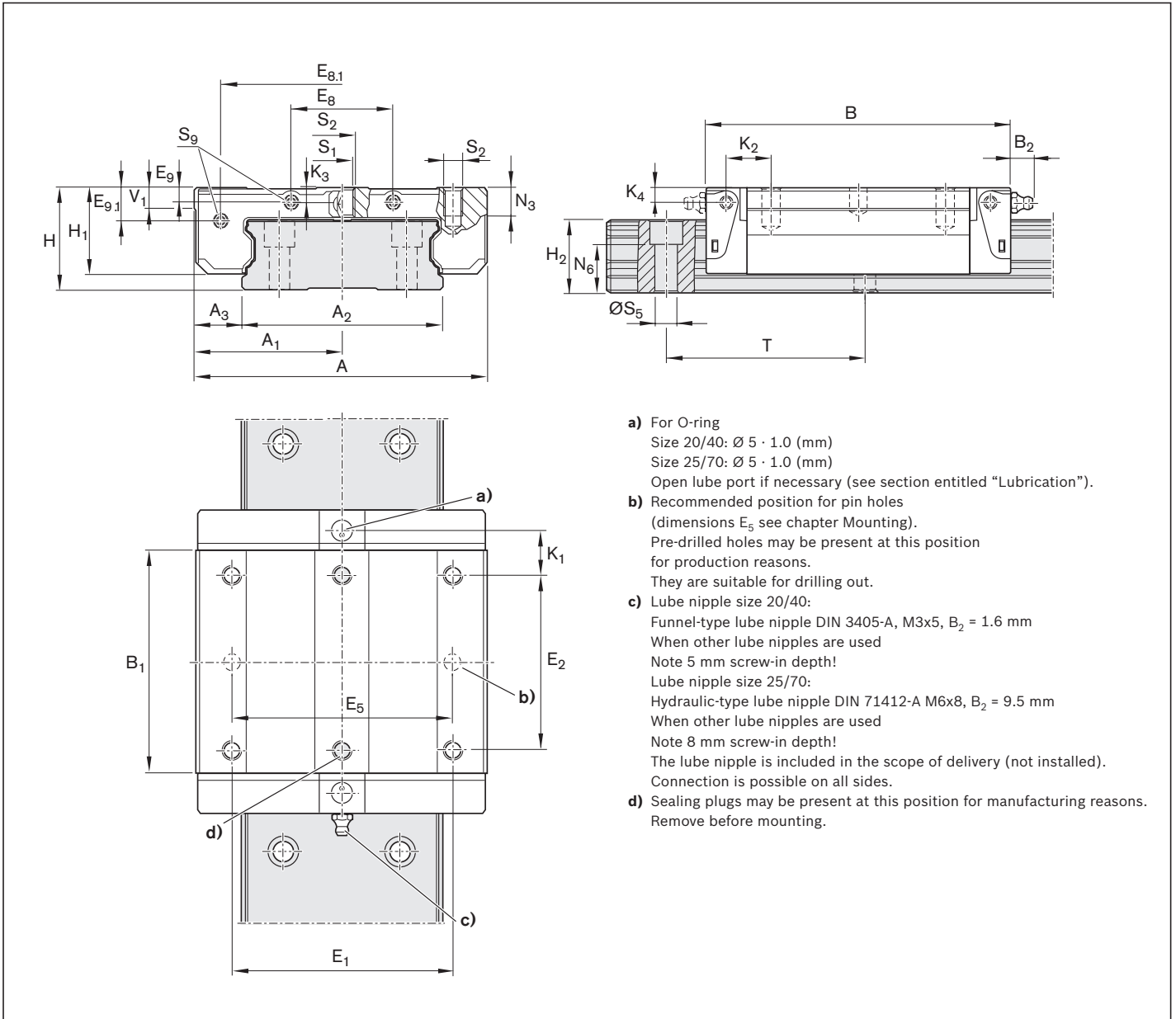
C0 = Without preload (clearance)
C1 = Moderate preload

Seals

SS = Standard seal
DS = Double-lip seal

Key

gray numbers
= No preferred variant / combination
(partially longer delivery times)



- a) For O-ring
Size 20/40: Ø 5 · 1.0 (mm)
Size 25/70: Ø 5 · 1.0 (mm)
Open lube port if necessary (see section entitled "Lubrication").
- b) Recommended position for pin holes
(dimensions E₅ see chapter Mounting).
Pre-drilled holes may be present at this position for production reasons.
They are suitable for drilling out.
- c) Lube nipple size 20/40:
Funnel-type lube nipple DIN 3405-A, M3x5, B₂ = 1.6 mm
When other lube nipples are used
Note 5 mm screw-in depth!
Lube nipple size 25/70:
Hydraulic-type lube nipple DIN 71412-A M6x8, B₂ = 9.5 mm
When other lube nipples are used
Note 8 mm screw-in depth!
The lube nipple is included in the scope of delivery (not installed).
Connection is possible on all sides.
- d) Sealing plugs may be present at this position for manufacturing reasons.
Remove before mounting.

| Size | Dimensions (mm) | | | | | | | | | | | | | | | | | | |
|-------|-----------------|----------------|----------------|----------------|-------|----------------|----------------|----------------|----------------|------------------|----------------|------------------|----|----------------|----------------|----------------|----------------|----------------|----------------|
| | A | A ₁ | A ₂ | A ₃ | B | B ₁ | E ₁ | E ₂ | E ₈ | E _{8.1} | E ₉ | E _{9.1} | H | H ₁ | H ₂ | K ₁ | K ₂ | K ₃ | K ₄ |
| 20/40 | 62 | 31 | 42 | 10.0 | 73.0 | 51.3 | 46 | 32 | 18 | 53.4 | 3.4 | 8.1 | 27 | 22.50 | 18.30 | 14.6 | 15.00 | 3.5 | 3.5 |
| 25/70 | 100 | 50 | 69 | 15.5 | 104.7 | 76.5 | 76 | 50 | 35 | 83.5 | 4.9 | 11.3 | 35 | 29.75 | 23.55 | 19.4 | 20.45 | 5.2 | 5.2 |

| Size | Dimensions (mm) | | | | | | | | | Mass (kg) | Load capacities ¹⁾ (N) | | Load moments ¹⁾ (Nm) | | | |
|-------|-----------------|--------------------------------|----------------|----------------|----------------|------------------------|----|----------------|-----|-----------|-----------------------------------|----------------|---------------------------------|----------------|-----------------|--|
| | N ₃ | N ₆ ^{±0.5} | S ₁ | S ₂ | S ₅ | S ₉ | T | V ₁ | C | | C ₀ | M _t | M _{t0} | M _L | M _{L0} | |
| 20/40 | 6 | 12.5 | 5.3 | M6 | 4.4 | M2.5x1.5 ⁺³ | 60 | 6.0 | 0.3 | 14900 | 20600 | 340 | 470 | 140 | 190 | |
| 25/70 | 8 | 14.4 | 6.7 | M8 | 7.0 | M3x2 ^{+4.5} | 80 | 7.5 | 1.0 | 36200 | 50200 | 1 350 | 1870 | 490 | 680 | |

1) Load ratings and load moments for ball runner block **without** ball chain. Load ratings and load moments for ball runner block **with** ball chain 14

Determination of the dynamic load capacities and load moments is based on a stroke travel of 100,000 m according to DIN ISO 14728-1. Often only 50,000 m are actually stipulated. For comparison: Multiply the values **C**, **M_t** and **M_L** by 1.26 according to the table.

Product description

Characteristic features

- ▶ Maximum rigidity in all load directions
- ▶ Maximum torque load capacity

Corrosion protection (optional)

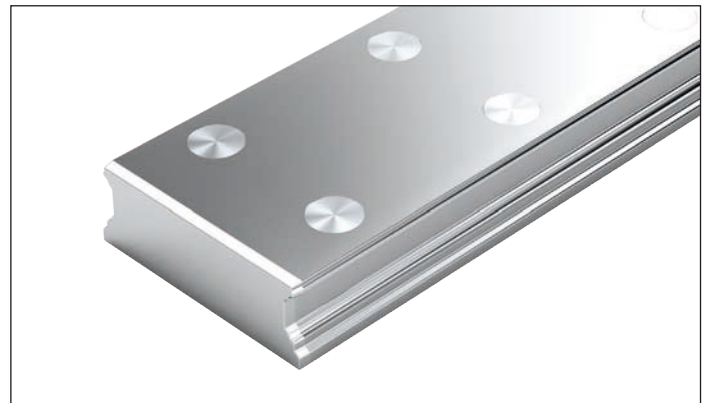
- ▶ Resist CR:
Ball guide rail made of steel with corrosion resistant coating, matte-silver finish, hard chrome plated, accuracy class H



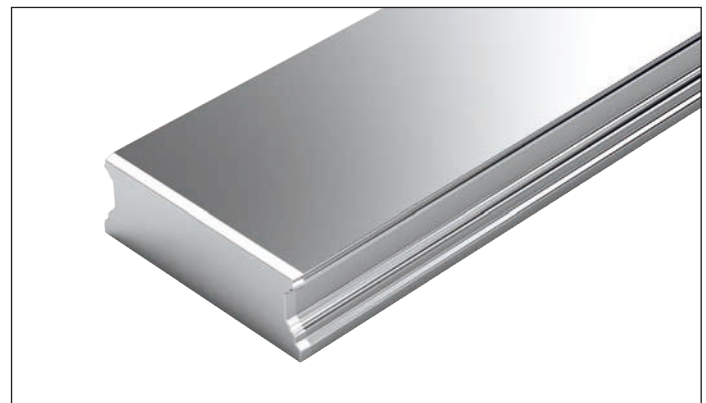
Ball guide rails with plastic mounting hole plugs

⚠ Size 20/40:

ball rail system with other ball diameters.
Not interchangeable with the old 20/40 size!



Ball guide rails with steel mounting hole plugs



Ball guide rails for mounting from below

Definition of the format of ball guide rails

| Criterion | Designation | Code (example) | | |
|---------------|------------------------------|----------------|----------|----------|
| | | B | N | S |
| Width | Slimline (S) | S | | |
| | Wide (B) | B | | |
| Length | Normal (N) | | N | |
| Height | Standard height (S) | | | S |

Ordering guide rails in the recommended rail lengths

Ordering ball guide rails in the recommended rail lengths

The procedure shown in the following ordering examples applies to all ball guide rails. Recommended rail lengths are more cost effective.

From the desired rail length to the recommended length

$$L = \left(\frac{L_W}{T} \right)^* \cdot T - 4$$

* Round up quotient L_W/T to the nearest whole number!

Calculation example

$$L = \left(\frac{1660 \text{ mm}}{80 \text{ mm}} \right) \cdot 80 \text{ mm} - 4 \text{ mm}$$

$$L = 21 \cdot 80 \text{ mm} - 4 \text{ mm}$$

$$L = 1676 \text{ mm}$$

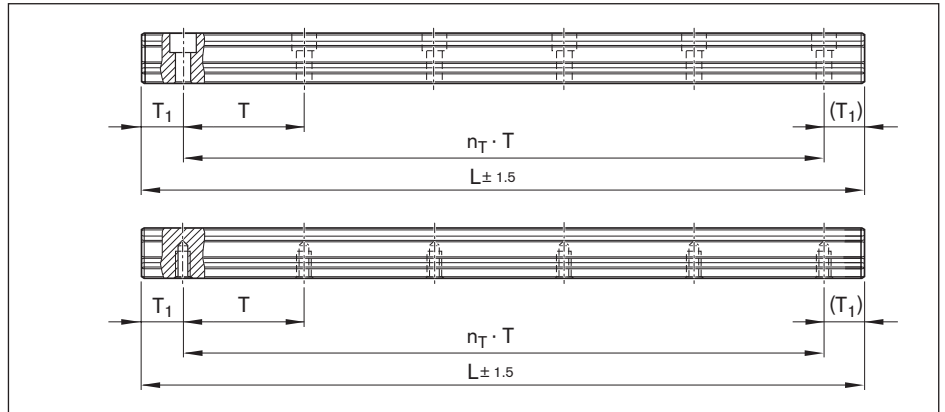
Notes on ordering examples

If preferred dimension T_{1S} is not used, it is possible to choose between:

- ▶ Select end spacing T_1 between T_{1S} and $T_{1 \min}$
- ▶ As an alternative, it is possible to choose end spacings T_1 to $T_{1 \max}$

| Options and part numbers | | | | | | | | |
|--------------------------|---------------------------|----------------|---|---|---|-----------|---------------------|--|
| Size | Ball guide rail with size | Accuracy class | | | Number of sections, rail length L (mm), ... | | Hole spacing T (mm) | Recommended rail length in accordance with formula $L = n_B \cdot T - 4$ Maximum number of holes per row of holes n_B |
| | | N | H | P | One-piece | Composite | | |
| 20/40 ¹⁾ | R1675 50 | 4 | 3 | 2 | 31, ... | 3, ... | 60 | 64 |
| 25/70 | R1675 20 | 4 | 3 | 2 | 31, ... | 3, ... | 80 | 48 |
| 35/90 | R1675 30 | 4 | 3 | 2 | 31, ... | 3, ... | 80 | 48 |
| e.g. | R1675 30 | 3 | | | 31, 1676 | | | |

Excerpt from table with part numbers and recommended rail lengths for ordering example



Basis: Number of holes per drill row

$$L = n_B \cdot T - 4$$

Basis: Number of spaces

$$L = n_T \cdot T + 2 \cdot T_{1S}$$

L = Recommended rail length (mm)

L_W = Desired rail length (mm)

T = Pitch (mm)

T_{1S} = Preferred dimension (mm)

n_B = Number of holes per drill row (-)

n_T = Number of spaces (-)

Ordering example 1 (to L_{\max})

- ▶ Ball guide rail BNS size 35/90 with plastic mounting hole plugs
- ▶ Accuracy class H
- ▶ Calculated rail length 1676 mm, ($20 \cdot T$, preferred dimension $T_{1S} = 38$ mm; Number of holes per drill row $n_B = 21$)

Ordering data

Part number; rail length (mm)

$T_1 / n_T \cdot T / T_1$ (mm)

R1675 303 31, 1676 mm

38 / 20 · 80 / 38 mm

Ordering example 2 (above L_{\max})

- ▶ Ball guide rail BNS size 35/90 with plastic mounting hole plugs
- ▶ Accuracy class H
- ▶ Calculated rail length 5116 mm, 2 sections ($63 \cdot T$, preferred dimension $T_{1S} = 38$ mm; Number of holes per drill row $n_B = 64$)

Ordering data

Material number with number of partial sections, rail length (mm)

$T_1 / n_T \cdot T / T_1$ (mm)

R1675 303 32, 5116 mm

38 / 63 · 80 / 38 mm

In the case of rail lengths above L_{\max} , factory-coordinated partial sections are joined together.

BNS with plastic mounting hole plugs



Ball guide rails made of steel

R1675 .0. ..

With two-row hole pattern, for mounting from above with plastic mounting hole plugs

Notes

- ▶ Plastic mounting hole plugs included in scope of supply.
- ▶ Observe the instruction for mounting!
Please request the "Mounting instructions for ball rail systems."
- ▶ Composite ball guide rail also available.

Further ball guide rails BNS and accessories

- ▶ Corrosion resistant ball guide rails see below
- ▶ Mounting hole plugs see chapter "Accessories for ball guide rails"

Options and material numbers

| Size | Ball guide rail with size | Accuracy class | | | Number of partial sections .., Rail length L (mm), | | Hole spacing T (mm) | Recommended rail length in accordance with formula $L = n_B \cdot T - 4$ Maximum number of holes per drill row n_B |
|---------------------|---------------------------|----------------|---|---|---|-----------|---------------------|---|
| | | N | H | P | One-piece | Composite | | |
| 20/40 ¹⁾ | R1675 50 | 4 | 3 | 2 | 31, | 3., | 60 | 64 |
| 25/70 | R1675 20 | 4 | 3 | 2 | 31, | 3., | 80 | 48 |
| 35/90 | R1675 30 | 4 | 3 | 2 | 31, | 3., | 80 | 48 |
| E.g.: | R1675 30 | 3 | | | 31, 1676 | | | |

Ball guide rails Resist CR

R1673 .0. ..

Options and material numbers

| Size | Ball guide rail with size | Accuracy class | Number of partial sections .., Rail length L (mm), | | | Hole spacing T (mm) | Recommended rail length in accordance with formula $L = n_B \cdot T - 4$ Maximum number of holes per drill row n_B | |
|---------------------|---------------------------|----------------|---|------------------------------|------------------|---------------------|---|----------------------------|
| | | | H | One-piece Uncoated end faces | Coated end faces | | | Composite Coated end faces |
| 20/40 ¹⁾ | R1673 50 | | 3 | 31, | 41, | 4., | 60 | 64 |
| 25/70 | R1673 20 | | 3 | 31, | 41, | 4., | 80 | 48 |
| 35/90 | R1673 30 | | 3 | 31, | 41, | 4., | 80 | 48 |
| E.g.: | R1673 30 | | 3 | 42, 5116 | | | | |

1) Caution: Ball guide rail cannot be combined with ball runner block R1671 8.. ..!

Ordering example 1 (to L_{max})

Options:

- ▶ Ball guide rail BNS
- ▶ Sizes 35/90
- ▶ Accuracy class H
- ▶ One-piece
- ▶ End faces uncoated
- ▶ Rail length L = 1676 mm

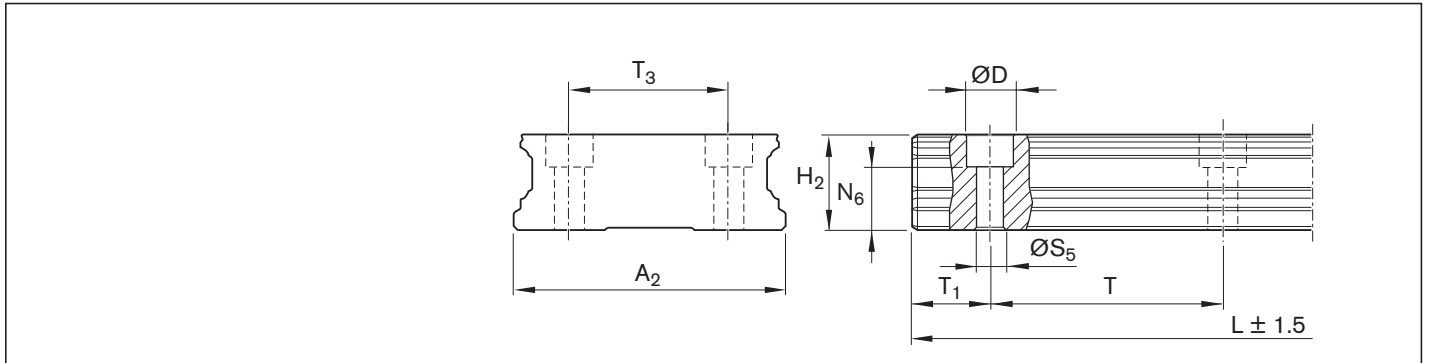
Material number: R1675 303 31, 1676 mm

Ordering example 2 (above L_{max})

Options:

- ▶ Ball guide rail CR, BNS
- ▶ Sizes 35/90
- ▶ Accuracy class H
- ▶ **2 partial sections**
- ▶ End faces coated
- ▶ Rail length L = 5116 mm

Material number: R1673 303 42, 5116 mm

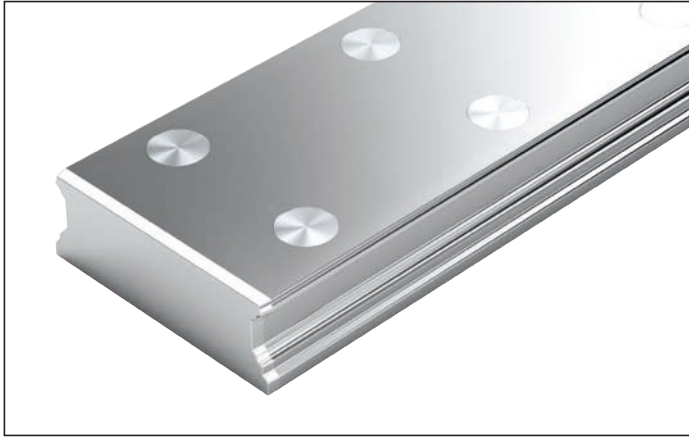


| Size | Dimensions (mm) | | | | | | | | | | Mass (kg/m) | |
|--------------|-----------------|------|------------|-----------|-----------------|-------|----|-------------|---------------|-------------|----------------|-------|
| | A_2 | D | $H_2^{1)}$ | L_{max} | $N_6^{\pm 0.5}$ | S_5 | T | $T_{1 min}$ | $T_{1S}^{2)}$ | $T_{1 max}$ | | T_3 |
| 20/40 | 42 | 7.4 | 18.30 | 3 836 | 12.45 | 4.4 | 60 | 10 | 28 | 50 | 24 | 5.3 |
| 25/70 | 69 | 11.0 | 23.55 | 3 836 | 14.50 | 7.0 | 80 | 10 | 38 | 70 | 40 | 11.6 |
| 35/90 | 90 | 15.0 | 31.85 | 3 836 | 20.50 | 9.0 | 80 | 12 | 38 | 68 | 60 | 21.0 |

1) Dimension H_2 without cover strip

2) Recommended: preferred dimension T_{1S} with tolerances ± 0.75 .

BNS with mounting hole plugs made of steel



Ball guide rails made of steel R1676 .5. ..

With two-row hole pattern, for mounting from above with mounting hole plugs made of steel

Notes

- ▶ Mounting hole plugs made of steel not included in scope of delivery.
- ▶ Observe the instruction for mounting!
Please request the “Mounting instructions for ball rail systems.”
- ▶ Composite ball guide rail also available.

Accessories

- ▶ Mounting hole plugs, mounting tool for mounting hole plugs see chapter “Accessories for ball guide rails”

Options and material numbers

| Size | Ball guide rail with size | Accuracy class | | | Number of partial sections ., Rail length L (mm), | | Hole spacing T (mm) | Recommended rail length in accordance with formula $L = n_B \cdot T - 4$ |
|--------------|---------------------------|----------------|---|---|--|-----------|---------------------|--|
| | | N | H | P | One-piece | Composite | | |
| 25/70 | R1676 25 | 4 | 3 | 2 | 31, | 3., | 80 | 48 |
| 35/90 | R1676 35 | 4 | 3 | 2 | 31, | 3., | 80 | 48 |
| E.g.: | R1676 35 | | 3 | | 31, 1676 | | | |

Ordering example 1 (to L_{max})

Options:

- ▶ Ball guide rail BNS
- ▶ Sizes 35/90
- ▶ Accuracy class H
- ▶ One-piece
- ▶ Rail length L = 1676 mm

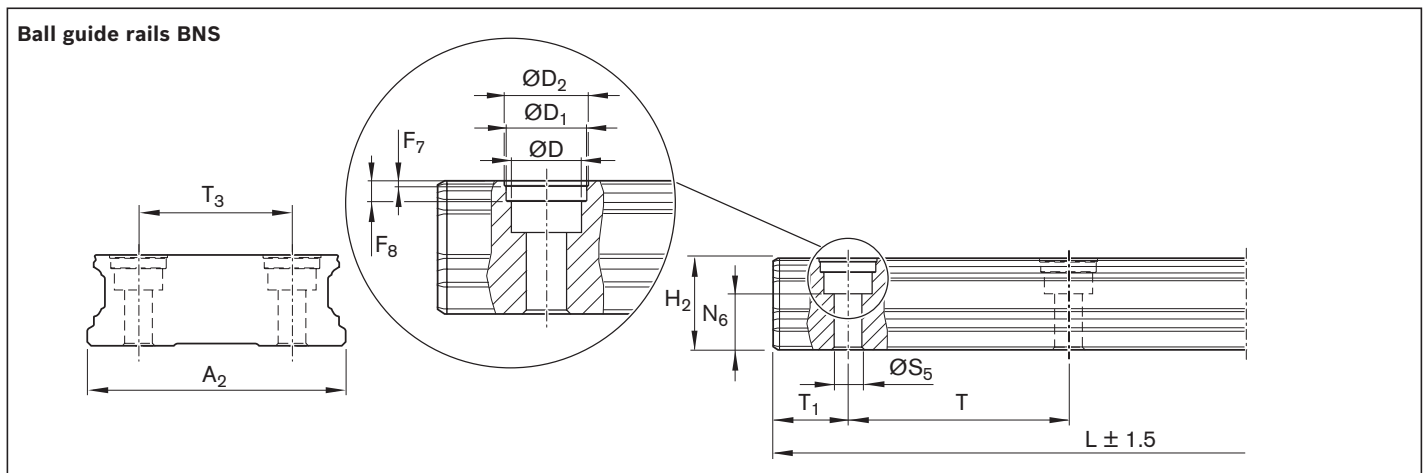
Material number: R1676 353 31, 1676 mm

Ordering example 2 (above L_{max})

Options:

- ▶ Ball guide rail BNS
- ▶ Sizes 35/90
- ▶ Accuracy class H
- ▶ **2 partial sections**
- ▶ Rail length L = 5116 mm

Material number: R1676 353 32, 5116 mm

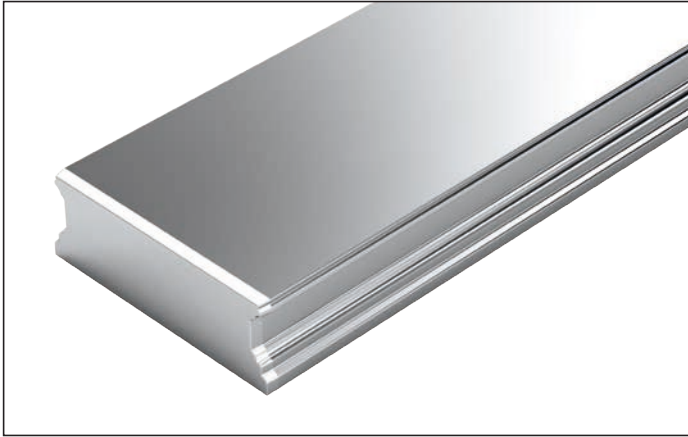


| Size | Dimensions (mm) | | | | | | | | | | | | | | | | Mass (kg/m) |
|-------|-----------------|------|----------------|----------------|----------------|----------------|------------------------------|------------------|--------------------------------|----------------|----|--------------------|-------------------------------|--------------------|----------------|------|-------------|
| | A ₂ | D | D ₁ | D ₂ | F ₇ | F ₈ | H ₂ ¹⁾ | L _{max} | N ₆ ^{±0.5} | S ₅ | T | T _{1 min} | T _{1S} ²⁾ | T _{1 max} | T ₃ | | |
| 25/70 | 69 | 11.0 | 12.55 | 13 | 0.9 | 3.7 | 23.55 | 3 836 | 14.5 | 7.0 | 80 | 10 | 38 | 70 | 40 | 11.6 | |
| 35/90 | 90 | 15.0 | 17.55 | 18 | 0.9 | 3.6 | 31.85 | 3 836 | 20.5 | 9.0 | 80 | 12 | 38 | 68 | 60 | 21.0 | |

1) Dimension H₂ without cover strip

2) Recommended: preferred dimension T_{1S} with tolerances ± 0.75.

BNS for mounting from below



Ball guide rails made of steel R1677 .0. .. With double-row mounting hole for mounting from below

Notes

- ▶ Observe the instruction for mounting!
Please request the “Mounting instructions for ball rail systems.”
- ▶ Composite ball guide rail also available.

Options and material numbers

| Size | Ball guide rail with size | Accuracy class | | | Number of partial sections .. Rail length L (mm), | | Hole spacing T (mm) | Recommended rail length in accordance with formula $L = n_B \cdot T - 4$ Maximum number of holes per drill row n_B |
|---------------------|---------------------------|----------------|---|---|---|-----------|---------------------|---|
| | | N | H | P | One-piece | Composite | | |
| 20/40 ¹⁾ | R1677 50 | 4 | 3 | 2 | 31, | 3, | 60 | 64 |
| 25/70 | R1677 20 | 4 | 3 | 2 | 31, | 3, | 80 | 48 |
| 35/90 | R1677 30 | 4 | 3 | 2 | 31, | 3, | 80 | 48 |
| E.g.: | R1677 30 | 3 | | | 31, 1676 | | | |

1) Caution: Ball guide rail cannot be combined with ball runner block R1671 8.. ..!

Ordering example 1 (to L_{max})

Options:

- ▶ Ball guide rail BNS,
- ▶ Size 35/90,
- ▶ Accuracy class H,
- ▶ One-piece
- ▶ Rail length L = 1676 mm

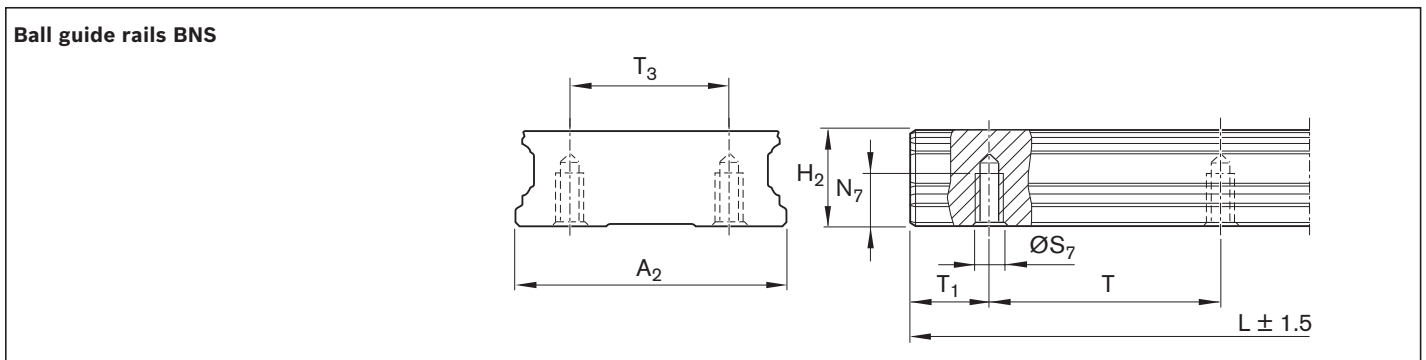
Material number: R1677 303 31, 1676 mm

Ordering example 2 (above L_{max})

Options:

- ▶ Ball guide rail BNS,
- ▶ Size 35/90,
- ▶ Accuracy class H,
- ▶ **2 partial sections**
- ▶ Rail length L = 5116 mm

Material number: R1677 303 32, 5116 mm



| Size | Dimensions (mm) | | | | | | | | | | Mass (kg/m) |
|-------|-----------------|------------------------------|------------------|----------------|----------------|----|-------------------|-------------------------------|-------------------|----------------|-------------|
| | A ₂ | H ₂ ¹⁾ | L _{max} | N ₇ | S ₇ | T | T _{1min} | T _{1s} ²⁾ | T _{1max} | T ₃ | |
| 20/40 | 42 | 18.30 | 3 836 | 7.5 | M5 | 60 | 10 | 28 | 50 | 24 | 5.3 |
| 25/70 | 69 | 23.55 | 3 836 | 12.0 | M6 | 80 | 10 | 38 | 70 | 40 | 11.6 |
| 35/90 | 90 | 31.85 | 3 836 | 15.0 | M8 | 80 | 12 | 38 | 68 | 60 | 21.0 |


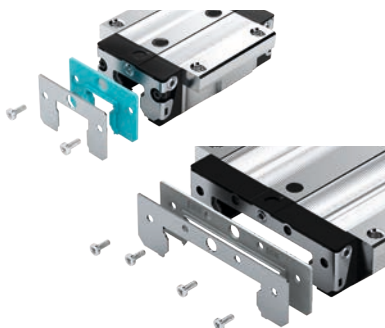



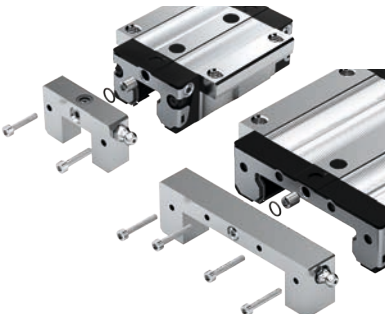


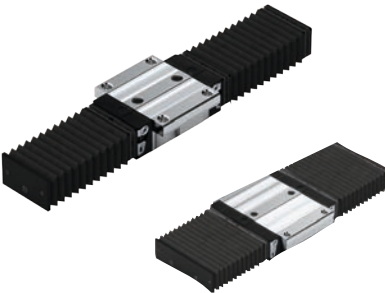




1) Dimension H₂ without cover strip

2) Recommended: preferred dimension T_{1s} with tolerances ± 0.75.

Product description

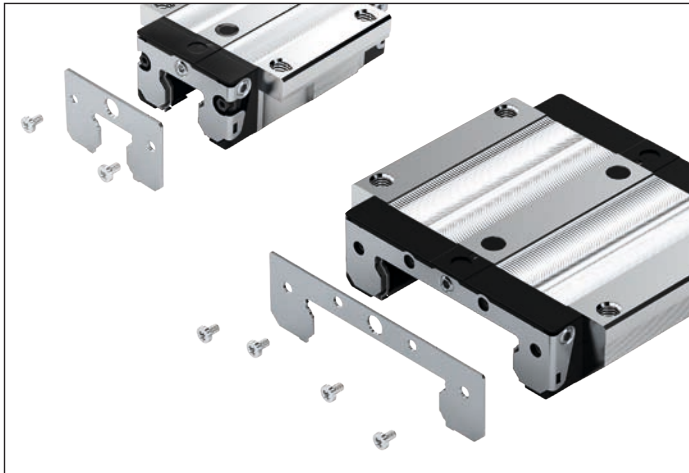
Rexroth offers limitless interchangeability as all ball runner block versions can be combined at will with all accessories within each size. The entire range is ideally geared to enable a top performance and meet all special requirements. Accessories can also be supplied ready-mounted on request.

Overview of ball runner block accessories

| | | |
|--|---|--|
| <p>Cover plate wiper</p>  | <p>Two-piece front seal¹⁾</p>  | <p>One and two-piece FKM seal¹⁾</p>  |
| <p>Seal kit¹⁾</p>  | <p>Lubrication adapter only for existing systems with high ball runner blocks SNH or SLH¹⁾</p>  | <p>Lubrication plate¹⁾</p>  |
| <p>Transport lock</p>  | <p>Front lube unit</p>  | <p>Bellows</p>  |
| <p>Lube nipple</p>  | <p>Plastic tube for lube connection</p>  <p>O-rings</p>  | <p>Lube fittings</p>  <ul style="list-style-type: none"> ▶ Reducers ▶ Extensions ▶ Connectors ▶ Swivel fittings ▶ Swivel screw joints for plastic tubes |

¹⁾ For ball runner blocks F.N (flange ... low) and S.N. (slimline ... low) not available

Cover plate wiper

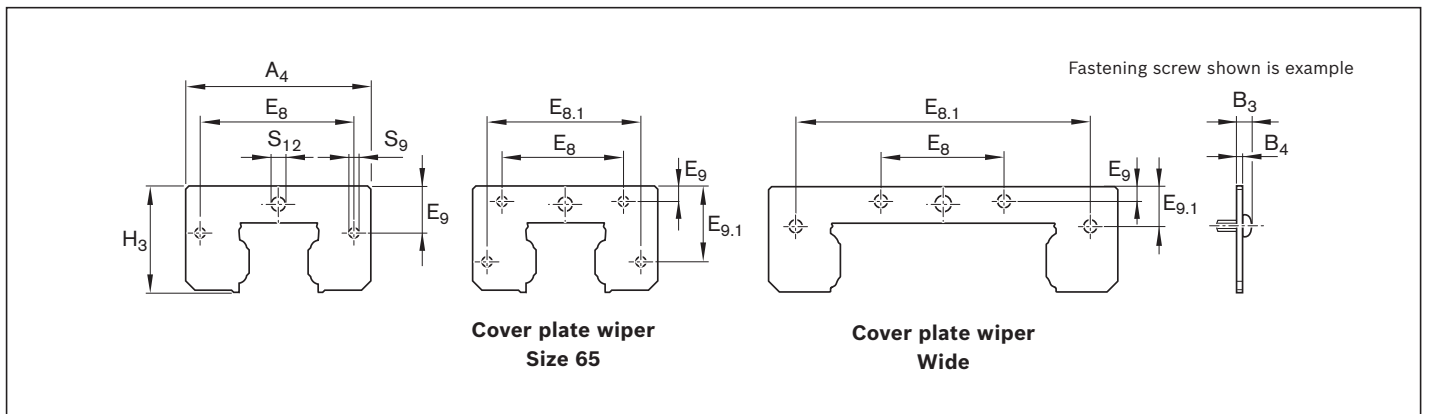


Cover plate wiper R16.0 .10 ..

- ▶ Material: Corrosion resistant steel as per DIN EN 10088
- ▶ Design: bright
- ▶ Precision design with a maximum gap dimension of 0.1 and 0.3 mm

Instruction for mounting

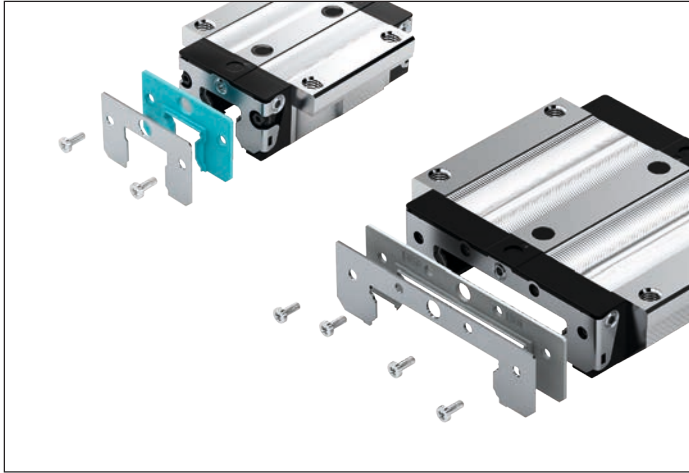
- ▶ When combining with two-piece front seals, use seal kit: See seal kit for part numbers
- ▶ The fastening screws are included.
- ▶ When mounting, make sure that there is a uniform gap between the ball guide rail and the cover plate wiper.
- ▶ Observe the minimum screw-in depth for the end-face lube connection.
- ▶ Observe the mounting instructions.



| Size | Part number for ball guide rail with cover strip | Dimensions (mm) | | | | | | | | | | Mass (g) |
|-----------------------|--|-----------------|----------------|----------------|----------------|------------------|----------------|------------------|----------------|----------------|-----------------|----------|
| | | A ₄ | B ₃ | B ₄ | E ₈ | E _{8.1} | E ₉ | E _{9.1} | H ₃ | S ₉ | S ₁₂ | |
| 15 | R1620 110 30 | 33.0 | 3.1 | 1.0 | 24.55 | – | 6.30 | – | 19.2 | 3.5 | 4.6 | 5 |
| 20 | R1620 810 30 | 42.0 | 3.4 | 1.0 | 32.40 | – | 6.80 | – | 24.8 | 4.0 | 5.1 | 6 |
| | R1620 810 35 ³⁾ | 41.0 | 3.4 | 1.0 | 30.50 | – | 5.10 | – | 22.8 | 4.0 | 4.0 | 5 |
| 25 | R1620 210 30 | 47.0 | 3.4 | 1.0 | 38.30 | – | 11.00 | – | 29.5 | 4.0 | 7.0 | 8 |
| | R1620 210 35 ³⁾ | 47.0 | 3.4 | 1.0 | 38.30 | – | 8.00 | – | 26.5 | 4.0 | 4.0 | 7 |
| 30 | R1620 710 30 | 59.0 | 3.4 | 1.0 | 48.40 | – | 14.10 | – | 34.7 | 4.0 | 7.0 | 12 |
| 35 | R1620 310 40 ¹⁾ | 69.0 | 3.4 | 1.0 | 58.00 | – | 17.00 | – | 40.1 | 4.0 | 7.0 | 16 |
| 45 | R1620 410 40 ¹⁾ | 85.0 | 5.1 | 2.0 | 69.80 | – | 20.50 | – | 50.0 | 5.0 | 7.0 | 50 |
| 55 | R1620 510 40 ¹⁾ | 98.0 | 5.7 | 2.0 | 80.00 | – | 21.80 | – | 56.4 | 6.0 | 7.0 | 65 |
| 65 | R1620 610 40 ¹⁾ | 124.0 | 5.6 | 2.5 | 76.00 | 100.0 | 10.00 | 52.50 | 74.7 | 5.0 | 9.0 | 140 |
| 20/40 ⁴⁾⁵⁾ | R1670 510 00 ²⁾ | 60.0 | 3.1 | 1.0 | 18.00 | 53.4 | 2.65 | 7.35 | 21.7 | 3.5 | 4.0 | 7 |
| 25/70 ⁴⁾ | R1670 210 10 ²⁾ | 101.0 | 3.4 | 1.0 | 35.00 | 83.5 | 4.35 | 10.75 | 29.1 | 4.0 | 7.0 | 14 |
| 35/90 ⁴⁾ | R1670 310 10 ²⁾ | 129.0 | 3.4 | 1.0 | 79.00 | 116.0 | 5.60 | 28.70 | 40.8 | 4.0 | 7.0 | 25 |

- 1) Part number for ball guide rail **without** cover strip: R1620 .10 30
- 2) Ball guide rail **without** cover strip
- 3) For ball runner blocks F.N (flange ... low) and S.N. (slimline ... low)
- 4) Wide ball rail system
- 5) Caution: Cover plate wiper, not combinable with ball guide rail R167.8.. ...!

Front seal

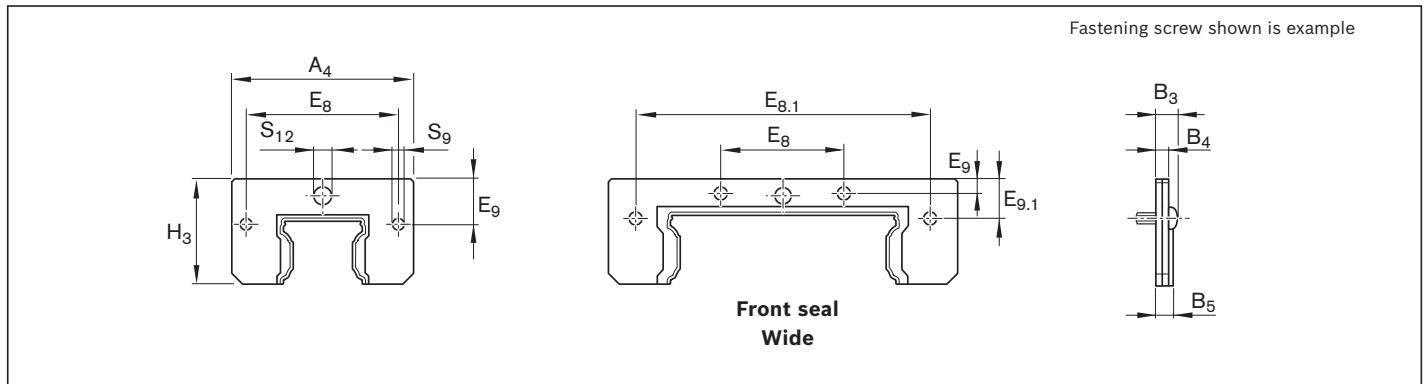


Two-piece

- ▶ Material: Corrosion-resistant steel as per DIN EN 10088 with plastic seals
- ▶ Design: bright

Instruction for mounting

- ▶ The fastening screws are included.
- ▶ Observe the minimum screw-in depth for the end-face lube connection.
- ▶ Observe the mounting instructions.



| Size | Material number | Dimensions (mm) | | | | | | | | | | | Mass (g) |
|-----------------------|-----------------|-----------------|----------------|----------------|----------------|----------------|------------------|----------------|------------------|----------------|----------------|-----------------|----------|
| | | A ₄ | B ₃ | B ₄ | B ₅ | E ₈ | E _{8.1} | E ₉ | E _{9.1} | H ₃ | S ₉ | S ₁₂ | |
| 15 | R1619 121 20 | 32.0 | 4.3 | 2.2 | 3.0 | 24.55 | – | 6.30 | – | 19.0 | 3.5 | 4.3 | 6.0 |
| 20 ¹⁾ | R1619 821 20 | 42.0 | 4.9 | 2.5 | 3.3 | 32.40 | – | 6.80 | – | 24.3 | 4.0 | 5.1 | 8.0 |
| 25 ¹⁾ | R1619 221 30 | 47.0 | 4.9 | 2.5 | 3.3 | 38.30 | – | 11.00 | – | 29.0 | 4.0 | 7.0 | 10.0 |
| 30 | R1619 721 30 | 59.0 | 5.7 | 3.3 | 4.5 | 48.40 | – | 14.10 | – | 34.5 | 4.0 | 7.0 | 18.0 |
| 35 | R1619 321 30 | 69.0 | 5.7 | 3.3 | 4.5 | 58.00 | – | 17.00 | – | 39.5 | 4.0 | 7.0 | 25.0 |
| 45 | R1619 421 30 | 85.0 | 7.1 | 4.0 | 5.5 | 69.80 | – | 20.50 | – | 49.5 | 5.0 | 7.0 | 55.0 |
| 55 | R1619 521 30 | 98.0 | 7.7 | 4.0 | 5.5 | 80.00 | – | 21.50 | – | 56.0 | 6.0 | 7.0 | 65.0 |
| 20/40 ²⁾³⁾ | R1619 522 20 | 60.0 | 4.6 | 2.5 | 3.3 | 18.00 | 53.4 | 2.65 | 7.35 | 21.7 | 3.5 | 4.0 | 7.5 |
| 25/70 ²⁾ | R1619 222 20 | 99.0 | 4.9 | 2.5 | 3.3 | 35.00 | 83.5 | 4.30 | 10.70 | 28.6 | 4.0 | 7.3 | 14.5 |
| 35/90 ²⁾ | R1619 322 20 | 128.6 | 5.7 | 3.3 | 4.5 | 79.00 | 116.0 | 5.80 | 28.90 | 41.0 | 4.0 | 7.0 | 40.0 |

1) Not for ball runner blocks F.N (flange ... low) and S.N. (slimline ... low)

2) Wide ball rail system

3) Caution: The new front seal is not combinable with existing ball guide rail R167. 8.. ..!

FKM seal

Two-piece

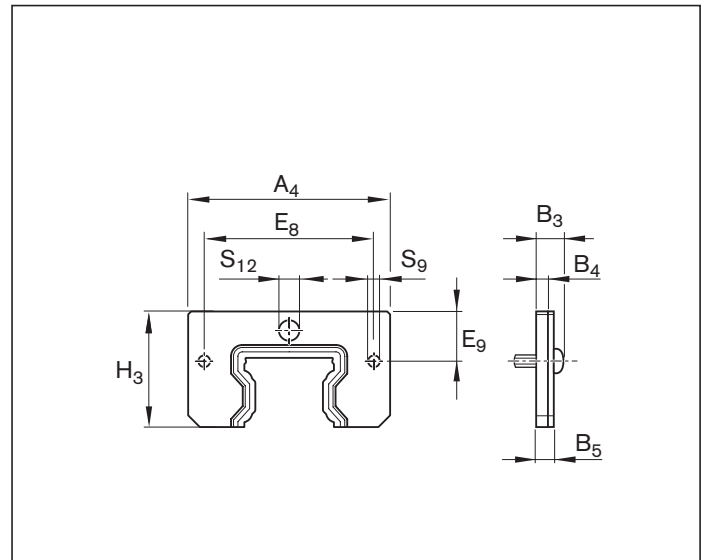
- ▶ Material: Corrosion-resistant steel as per DIN EN 10088 and seal made of FKM
- ▶ See Selection criteria/Seals for the area of application and resistance

Special feature

Simple assembly/removal on fixed ball guide rail

Instruction for mounting

- ▶ The fastening screws are included.
- ▶ Observe the minimum screw-in depth for the end-face lube connection.
- ▶ Observe the mounting instructions.



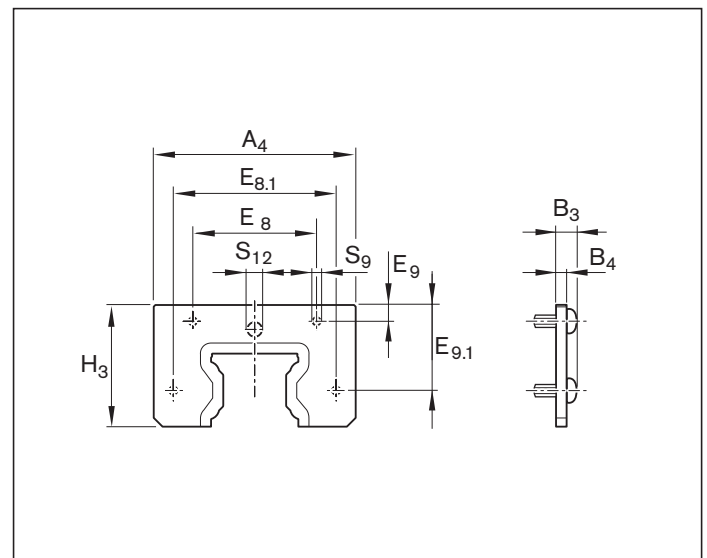
| Size | Material number | Dimensions (mm) | | | | | | | | | Mass (g) |
|------|-----------------|-----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|-----------------|----------|
| | | A ₄ | B ₃ | B ₄ | B ₅ | E ₈ | E ₉ | H ₃ | S ₉ | S ₁₂ | |
| 35 | R1619 320 30 | 69 | 8.4 | 4 | 6 | 58.0 | 17.0 | 39.5 | 4 | 7 | 39.0 |
| 45 | R1619 420 30 | 85 | 9.1 | 4 | 6 | 69.8 | 20.5 | 49.5 | 5 | 7 | 61.0 |
| 55 | R1619 520 30 | 98 | 9.7 | 4 | 6 | 80.0 | 21.8 | 56.4 | 6 | 7 | 80.5 |

One-piece

- ▶ Material: Corrosion-resistant steel as per DIN EN 10088 and seal made of FKM.

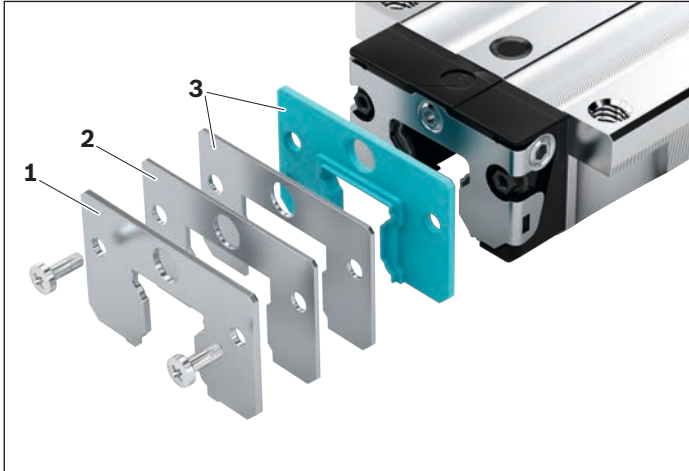
Instruction for mounting

- ▶ The fastening screws are included.
- ▶ Observe the minimum screw-in depth for the end-face lube connection.
- ▶ Observe the mounting instructions.



| Size | Material number | Dimensions (mm) | | | | | | | | | Mass (g) | |
|------|-----------------|-----------------|----------------|----------------|----------------|------------------|----------------|------------------|----------------|----------------|----------|-----------------|
| | | A ₄ | B ₃ | B ₄ | E ₈ | E _{8.1} | E ₉ | E _{9.1} | H ₃ | S ₉ | | S ₁₂ |
| 65 | R1619 620 30 | 124 | 9.6 | 6.5 | 76 | 100 | 10 | 52.5 | 74.7 | 5 | 9 | 146 |

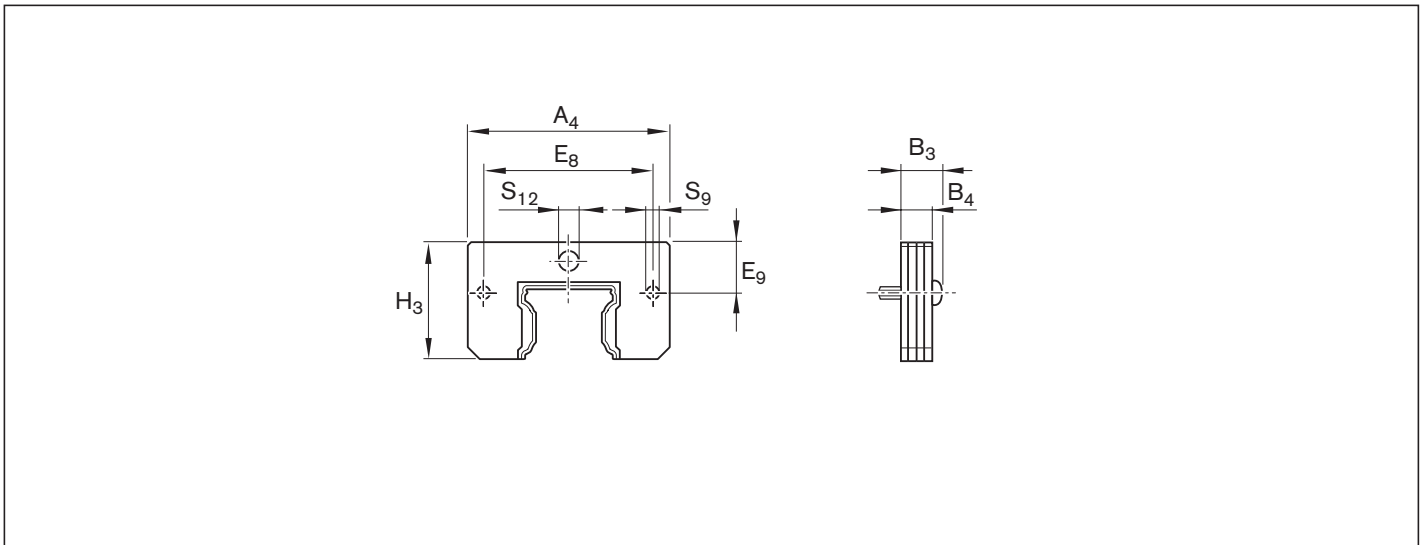
Seal kit



- 1** Cover plate wiper
- 2** Reinforcing plate
- 3** Two-piece front seal

Instruction for mounting

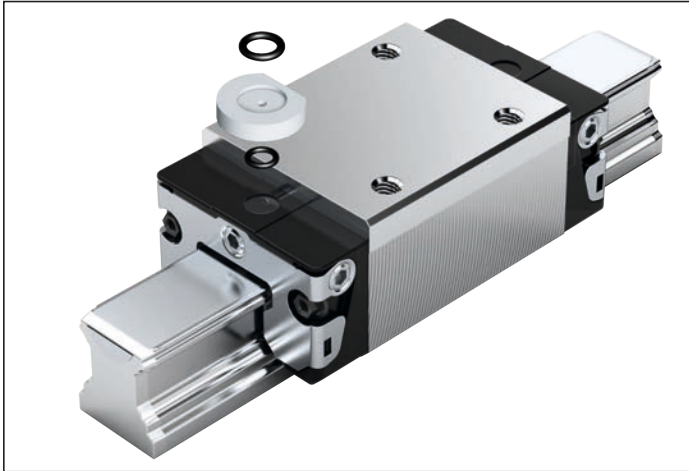
- ▶ The seal kit is recommended when combining the cover plate wiper with a two-piece front seal.
- ▶ The fastening screws are included.
- ▶ Observe the minimum screw-in depth for the end-face lube connection.
- ▶ Observe the mounting instructions.



| Size | Part number for ball guide rail | | Dimensions (mm) | | | | | | | | Mass (g) |
|------------------------|---------------------------------|------------------|-----------------|----------------|----------------|----------------|----------------|----------------|----------------|-----------------|----------|
| | without cover strip | with cover strip | A ₄ | B ₃ | B ₄ | E ₈ | E ₉ | H ₃ | S ₉ | S ₁₂ | |
| 15 | R1619 120 50 | R1619 120 50 | 32.0 | 6.3 | 4.2 | 24.55 | 6.30 | 19.0 | 3.5 | 4.3 | 16 |
| 20¹⁾ | R1619 820 50 | R1619 820 50 | 42.0 | 6.9 | 4.5 | 32.40 | 6.80 | 24.3 | 4.0 | 5.1 | 20 |
| 25¹⁾ | R1619 220 50 | R1619 220 50 | 47.0 | 6.9 | 4.5 | 38.30 | 11.00 | 29.0 | 4.0 | 7.0 | 26 |
| 30 | R1619 720 50 | R1619 720 50 | 59.0 | 8.2 | 5.8 | 48.40 | 14.10 | 34.5 | 4.0 | 7.0 | 42 |
| 35 | R1619 320 40 | R1619 320 50 | 69.0 | 8.2 | 5.8 | 58.00 | 17.00 | 39.5 | 4.0 | 7.0 | 57 |
| 45 | R1619 420 40 | R1619 420 50 | 85.0 | 11.1 | 8.0 | 69.80 | 20.50 | 49.5 | 5.0 | 7.0 | 155 |
| 55 | R1619 520 40 | R1619 520 50 | 98.0 | 11.7 | 8.0 | 80.00 | 21.50 | 56.0 | 6.0 | 7.0 | 195 |

1) Not for ball runner blocks F.N (flange ... low) and S.N. (slimline ... low)

Lubrication adapter

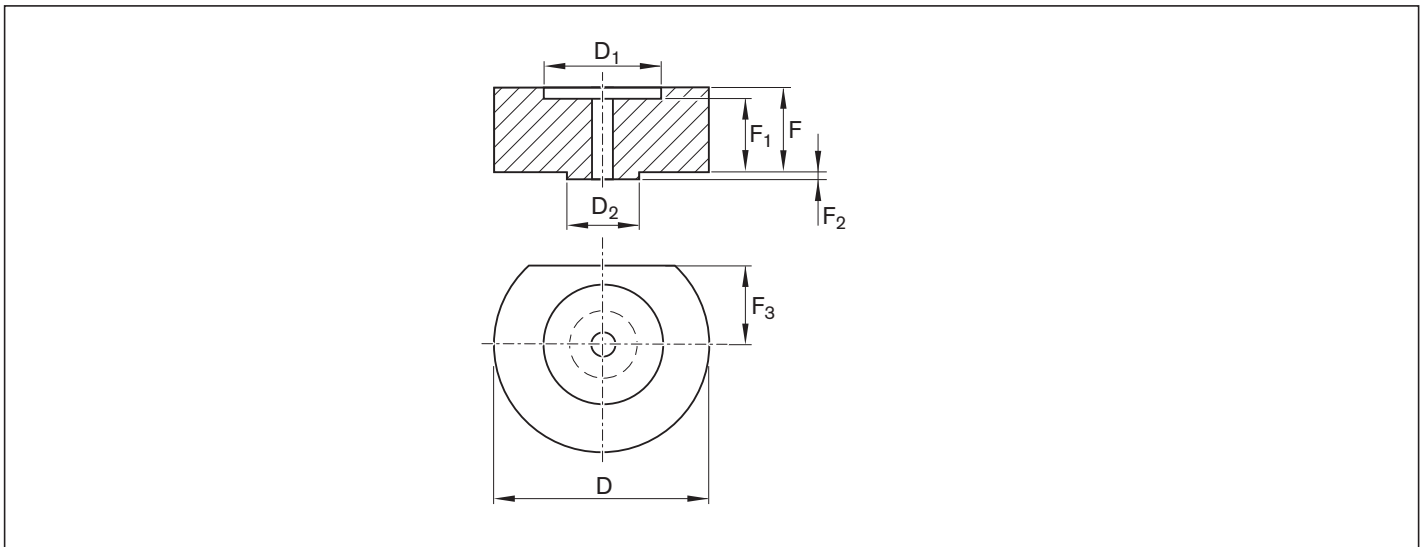


**For oil and grease lubrication from above,
only for high ball runner blocks
SNH R1621 or SLH R1624**

- ▶ Material: Plastic
- ▶ Packaging unit: 1 unit

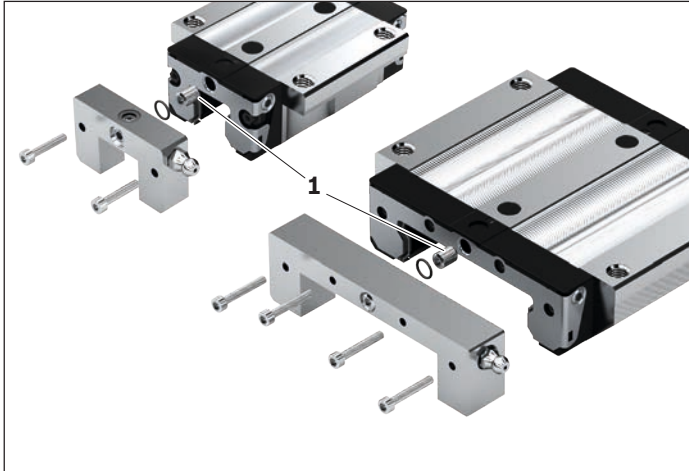
Instruction for mounting

- ▶ O-rings are provided.
- ▶ Before mounting, use a heated pointed metal tool to open the lube hole on the ball runner block (but not a drill).
- ▶ For more details, see the “Lubrication and maintenance” chapter.



| Size | Material number | Dimensions (mm) | | | | | | | Mass (g) |
|------|-----------------|-----------------|----------------|----------------|-----|----------------|----------------|----------------|----------|
| | | D | D ₁ | D ₂ | F | F ₁ | F ₂ | F ₃ | |
| 15 | R1621 100 05 | 12 | 6.2 | 3.4 | 3.7 | 3.1 | 0.5 | 3.20 | 0.5 |
| 25 | R1621 200 05 | 15 | 7.2 | 4.4 | 3.8 | 3.2 | 0.5 | 5.85 | 0.9 |
| 30 | R1621 700 05 | 16 | 7.2 | 4.4 | 2.8 | 2.2 | 0.5 | 6.10 | 0.7 |
| 35 | R1621 300 05 | 18 | 7.2 | 4.4 | 6.8 | 6.2 | 0.5 | 6.80 | 2.2 |
| 45 | R1621 400 05 | 20 | 7.2 | 4.4 | 9.8 | 9.2 | 0.5 | 8.30 | 4.1 |

Lubrication plate



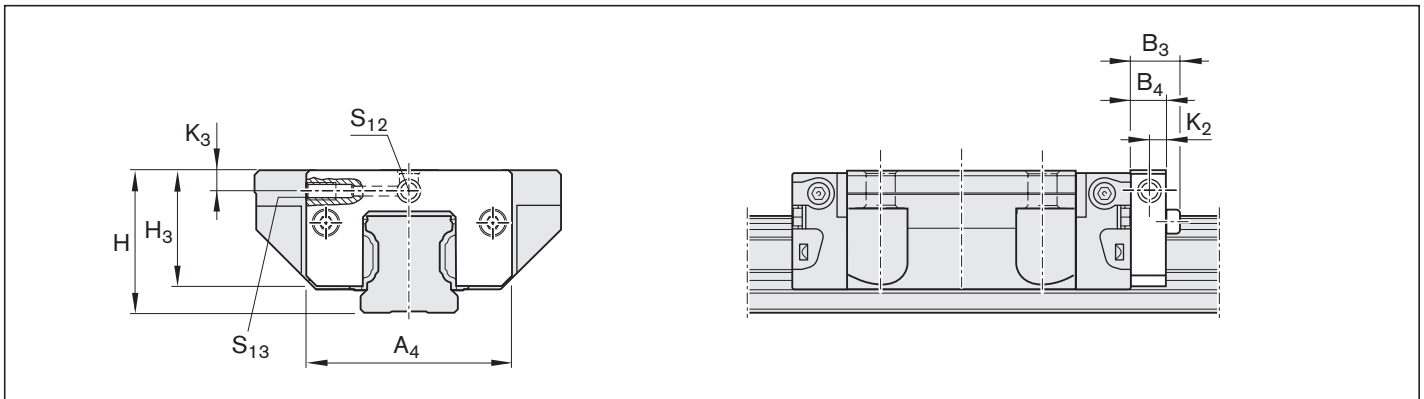
For standard lube nipples

► Material: Aluminum

Instruction for mounting

- The required mounting parts are included.
- Sizes 15 – 20:
A funnel-type lube nipple with a knock-in spigot is included.
- Sizes 25 – 65:
The lube nipple of the ball runner block can be used.
- Observe the mounting instructions.

⚠ The enclosed lube pin (1) must be mounted between the lubrication plate and the ball runner block!
(It contains a lubrication hole.)



| Size | Material number | Dimensions (mm) | | | | | | | | | Mass (g) |
|------------------|-----------------|-----------------|----------------|----------------|------------------------|------------------------------|----------------|------------------------------|-----------------|-----------------|----------|
| | | A ₄ | B ₃ | B ₄ | H | H ₃ ²⁾ | K ₂ | K ₃ ²⁾ | S ₁₂ | S ₁₃ | |
| 15 | R1620 111 20 | 32 | 13.1 | 11 | 24 28 ³⁾ | 19.0 | 5.5 | 3.4 7.4 ³⁾ | M3 | Ø3 | 15 |
| 20 ¹⁾ | R1620 811 20 | 42 | 15.0 | 12 | 30 | 24.8 | 6.0 | 3.5 | M3 | Ø3 | 25 |
| 25 ¹⁾ | R1620 211 20 | 47 | 15.0 | 12 | 36 40 ³⁾ | 28.3 | 6.0 | 6.0 10.0 ³⁾ | M6 | M6 | 30 |
| 30 | R1620 711 20 | 59 | 15.0 | 12 | 42 45 ³⁾ | 33.8 | 6.0 | 8.0 11.0 ³⁾ | M6 | M6 | 45 |
| 35 | R1620 311 20 | 69 | 15.0 | 12 | 48 55 ³⁾ | 39.1 | 6.0 | 8.0 15.0 ³⁾ | M6 | M6 | 60 |
| 45 | R1620 411 20 | 85 | 16.0 | 12 | 60 70 ³⁾ | 48.5 | 6.0 | 8.0 18.0 ³⁾ | M6 | M6 | 85 |
| 55 | R1620 511 20 | 98 | 17.0 | 12 | 70 80 ³⁾ | 56.0 | 6.0 | 9.0 19.0 ³⁾ | M6 | M6 | 115 |
| 65 | R1620 611 20 | 124 | 18.0 | 14 | 90 | 75.7 | 7.0 | 18.0 | M8x1 | M8x1 | 250 |

1) Not for ball runner blocks F.N (flange ... low) and S.N. (slimline ... low)

2) Based on the mounting face of the ball runner block

3) For ball runner blocks S.H (slimline ... high)

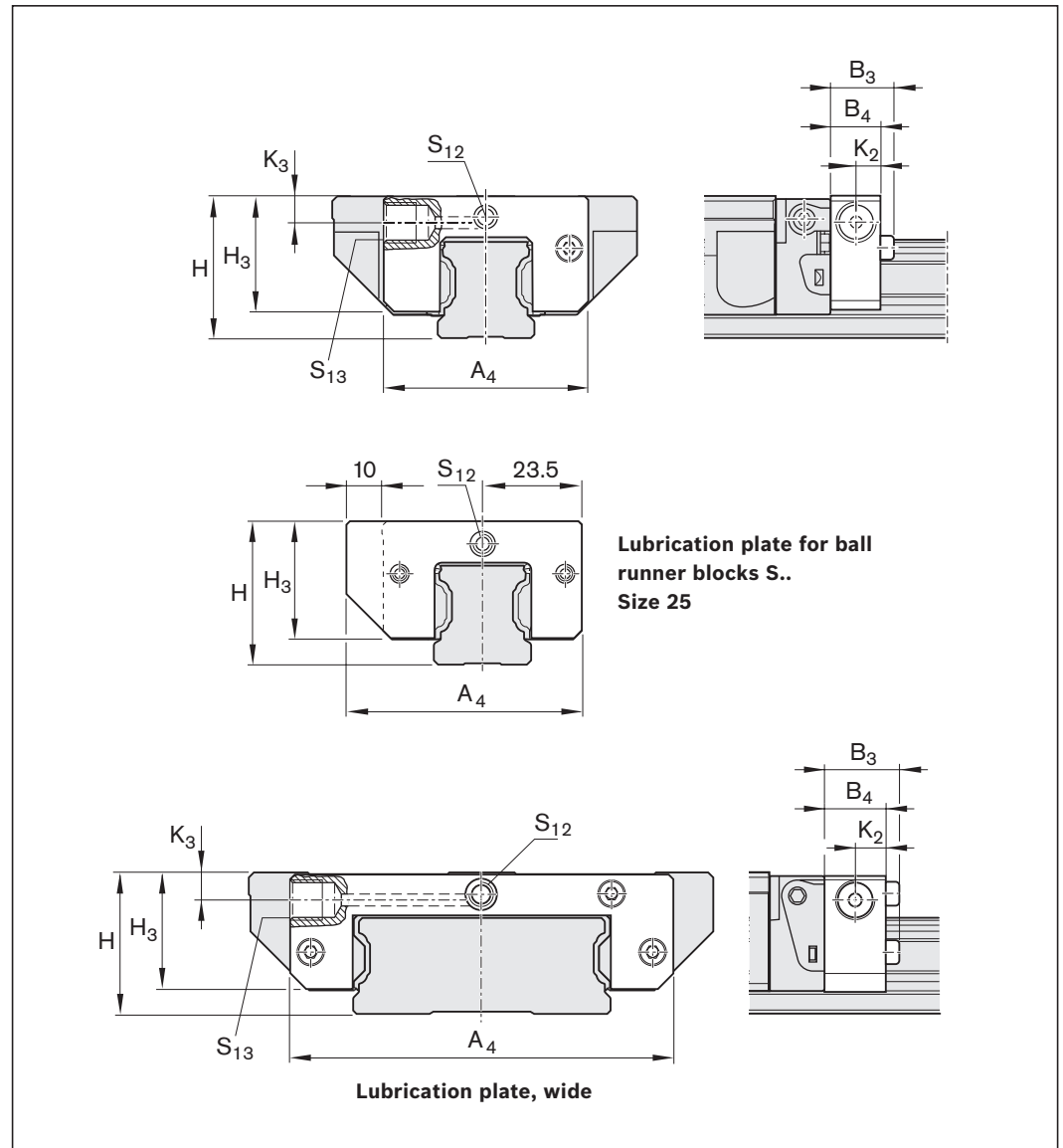
Lubrication plate G 1/8

For lube nipples G 1/8

- ▶ Material: Aluminum

Instruction for mounting

- ▶ The required mounting parts are included.
- ▶ Ball runner block S.. (slimline)
Size 25: Observe the side projection of the lubrication plate.
- ▶ Observe the mounting instructions.



| Size | Material number | Dimensions (mm) | | | | | | | | | Mass (g) |
|---------------------|-----------------|-----------------|----------------|----------------|------------------------|------------------------------|----------------|------------------------------|-----------------|-----------------|----------|
| | | A ₄ | B ₃ | B ₄ | H | H ₃ ²⁾ | K ₂ | K ₃ ²⁾ | S ₁₂ | S ₁₃ | |
| 25 ¹⁾ | R1620 211 30 | 57 | 19.0 | 16 | 36 40 ³⁾ | 28.3 | 8 | 7.0 11.0 ³⁾ | M6 | G 1/8x8 | 40 |
| 30 | R1620 711 30 | 59 | 19.0 | 16 | 42 45 ³⁾ | 33.8 | 8 | 7.0 10.0 ³⁾ | M6 | G 1/8x8 | 59 |
| 35 | R1620 311 30 | 69 | 19.0 | 16 | 48 55 ³⁾ | 39.1 | 8 | 8.0 15.0 ³⁾ | M6 | G 1/8x8 | 79 |
| 45 | R1620 411 30 | 85 | 20.0 | 16 | 60 70 ³⁾ | 48.5 | 8 | 8.0 18.0 ³⁾ | M6 | G 1/8x8 | 112 |
| 55 | R1620 511 30 | 98 | 21.0 | 16 | 70 80 ³⁾ | 56.0 | 8 | 9.0 19.0 ³⁾ | M6 | G 1/8x8 | 152 |
| 65 | R1620 611 30 | 124 | 20.0 | 16 | 90 | 75.7 | 8 | 18.0 | M6 | G 1/8x8 | 285 |
| 25/70 ⁴⁾ | R1670 211 40 | 99 | 19.0 | 16 | 35 | 29.6 | 8 | 8.4 | M6 | G 1/8x8 | 65 |
| 35/90 ⁴⁾ | R1670 311 30 | 129 | 19.0 | 16 | 50 | 42.0 | 8 | 9.5 | M6 | G 1/8x8 | 120 |

- 1) **Not** for ball runner blocks F.N (flange ... low) and S.N. (slimline ... low)
- 2) Based on the mounting face of the ball runner block
- 3) For ball runner blocks S.H (slimline ... high)
- 4) Wide ball rail system

Transport lock

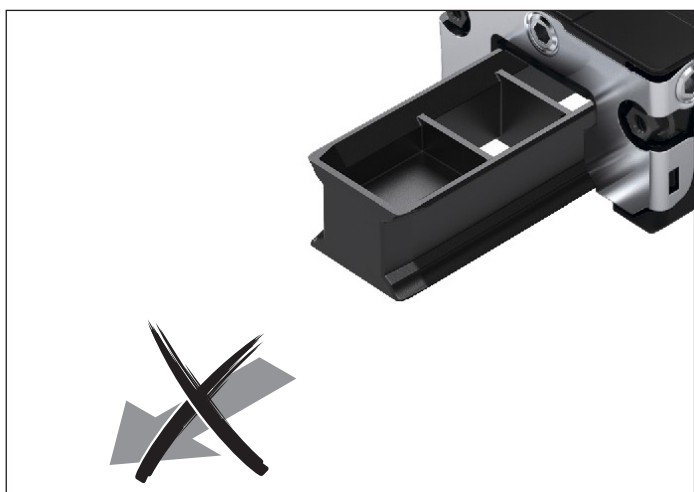


Transport lock for ball runner blocks

For transporting and as a mounting device

► Material: Plastic

| Size | Material numbers | Mass (g) |
|-------|------------------|----------|
| 15 | R1653 101 89 | 2 |
| 20 | R1653 801 89 | 3 |
| 25 | R1653 202 89 | 4 |
| 30 | R1653 702 89 | 10 |
| 35 | R1653 302 89 | 10 |
| 45 | R1653 402 89 | 20 |
| 55 | R1653 502 89 | 31 |
| 65 | R1653 602 89 | 58 |
| 20/40 | R1671 505 89 | 7 |
| 25/70 | R1671 201 89 | 13 |
| 35/90 | R1671 301 89 | 33 |



Notes

The ball runner block is slid from the transport lock onto the rail. See the chapter entitled “Instruction for mounting”.

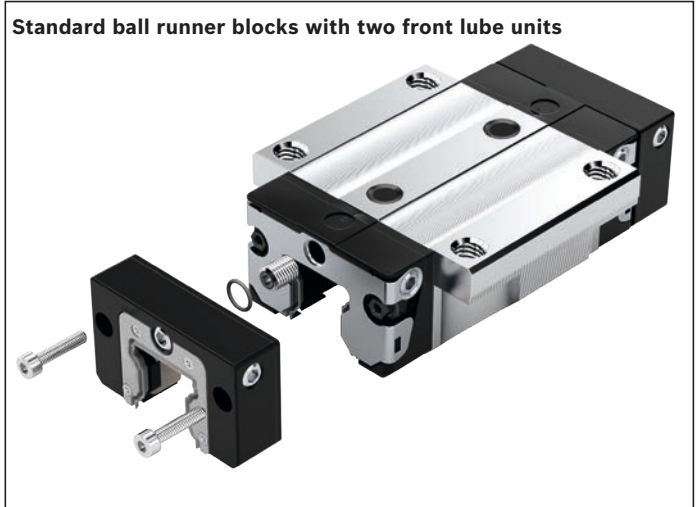
⚠ The transport lock must remain in the ball runner block until it slides onto the ball guide rail! Otherwise it is possible to lose the balls!

Front lube units

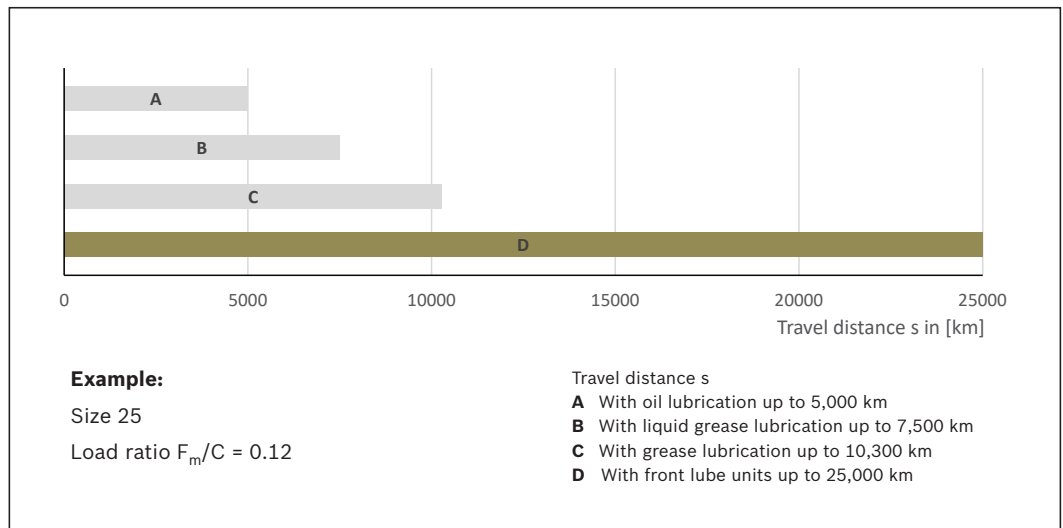
For travel up to 25 000 km without relubrication

Advantages for mounting and operation

- ▶ For a travel distance of up to 25,000 km without re-lubrication
- ▶ Ball runner block only requires initial lubrication with grease
- ▶ Front lube units on both sides of the ball runner block
- ▶ Low lubricant loss
- ▶ Reduced oil consumption
- ▶ No lubrication lines
- ▶ Max. operating temperature 60°C
- ▶ Front lube unit can be refilled using the lube nipple on the end-face or at the side.
- ▶ Lube connection on the end-face of the front lube unit is suitable for lubricating the ball runner block with grease.



| Size | Possible travel distance s with front lubrication units (km) |
|------|--|
| 15 | 15000 |
| 20*) | 15000 |
| 25*) | 25 000 |
| 30 | 25 000 |
| 35 | 25 000 |
| 45 | 25 000 |
| 55 | 1500 |
| 65 | 1000 |

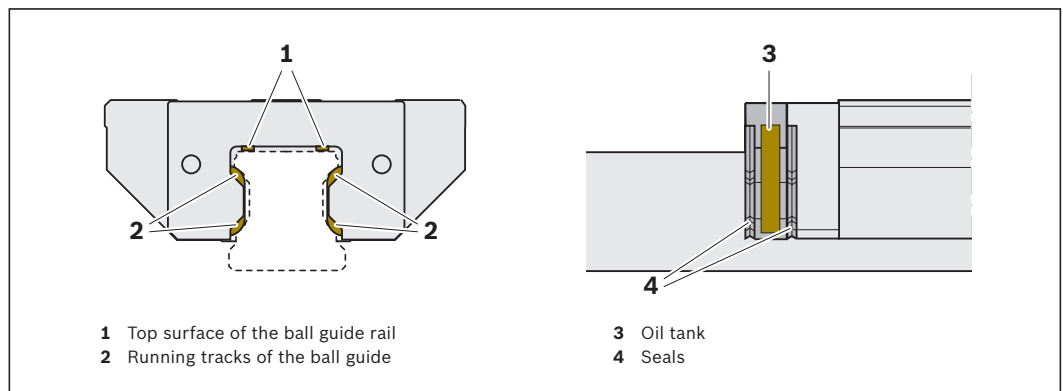


Part numbers, dimensional drawing, dimensions and technical data see following page.

*) Low ball runner blocks of type FNN, SNN, FKN and SKN have shorter travel distances. See diagram 1 “Load-dependent relubrication intervals for ball runner blocks with front lube units”.

Lubricant distribution

Due to the special design of the lubricant distribution, lubrication occurs primarily where it is needed: directly on the raceways and the top surfaces of the ball guide rails.



**Front lube unit
R1619 .2. 00**

Material:
special plastic

The front lube units R1619 .2. 00 are supplied ready-filled with oil (Mobil SHC 639) and can be mounted after basic lubrication of the ball runner blocks.

**Front lube unit
R1619 .2. 10**

Material:
special plastic

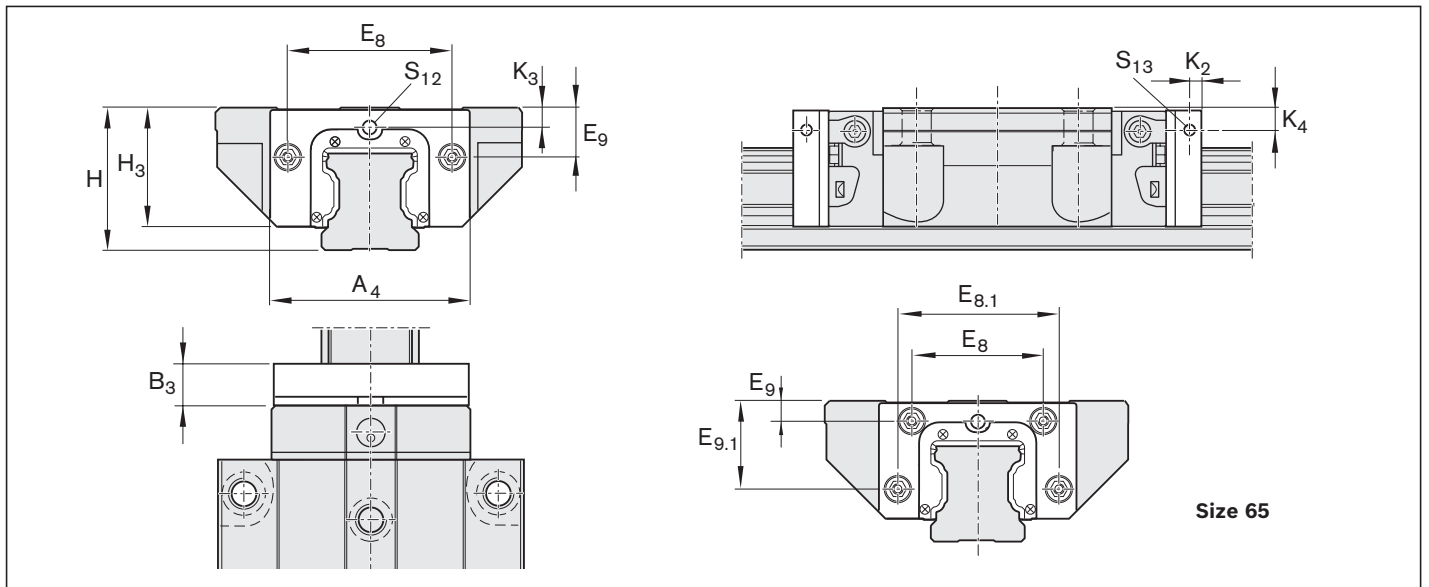
The front lube units R1619 .2. 10 are not filled at the factory.

**Recommended lubricant oil
for initial filling:**

- ▶ Mobil SHC 639
(viscosity 1000 mm²/s
at 40 °C)

An initial lubrication of the ball runner blocks **with grease lubricant** is required before mounting the front lube units!
See section “Lubrication”.

If other types of lubricant oil are used, please consider the compatibility of the lubricants and the travel distance!



| Size | Material number | Dimensions (mm) | | | | | | | | | | | Oil (cm ³) | Mass (g) | |
|------|----------------------------|-----------------|----------------|----------------|------------------|------------------------------|--------------------------------|------------------|------------------------------|----------------|---|-----------------|---------------------------|-------------|-----------------|
| | | A ₄ | B ₃ | E ₈ | E _{8.1} | E ₉ ²⁾ | E _{9.1} ²⁾ | H | H ₃ ²⁾ | K ₂ | K ₃ ^{2)/K₄²⁾} | S ₁₂ | | | S ₁₃ |
| 15 | R1619 125 00 | 31.8 | 11.5 | 24.55 | – | 6.70 | – | 24 | 19.40 | 5 | 3.35 | M3 | M3 | 1.00 | 15 |
| | | | | | | 10.70 ³⁾ | | 28 ³⁾ | 23.40 ³⁾ | | 7.35 ³⁾ | | | | |
| 20 | R1619 825 00 | 43.0 | 12.5 | 32.50 | – | 7.30 | – | 30 | 24.90 | 5 | 3.70 | M3 | M3 | 2.20 | 20 |
| | R1619 826 00 ¹⁾ | 41.0 | 12.5 | 30.50 | – | 5.60 | – | 28 | 22.90 | – | 3.10 | – | M3 | 1.80 | 20 |
| 25 | R1619 225 00 | 47.0 | 13.0 | 38.30 | – | 11.50 | – | 36 | 29.30 | 5 | 5.50 | M6 | M6 | 2.60 | 25 |
| | | | | | | 15.50 ³⁾ | | 40 ³⁾ | 33.30 ³⁾ | | 9.50 ³⁾ | | | | |
| | R1619 226 00 ¹⁾ | 47.0 | 13.0 | 38.30 | – | 8.50 | – | 33 | 26.30 | 5 | 4.10 | M3 | M3 | 2.50 | 25 |
| 30 | R1619 725 00 | 58.8 | 14.5 | 48.40 | – | 14.60 | – | 42 | 35.05 | 6 | 6.05 | M6 | M6 | 3.85 | 35 |
| | | | | | | 17.60 ³⁾ | | 45 ³⁾ | 38.05 ³⁾ | | 9.05 ³⁾ | | | | |
| 35 | R1619 325 00 | 69.0 | 16.0 | 58.00 | – | 17.35 | – | 48 | 39.85 | 6 | 6.90 | M6 | M6 | 5.70 | 50 |
| | | | | | | 24.35 ³⁾ | | 55 ³⁾ | 46.85 ³⁾ | | 13.90 ³⁾ | | | | |
| 45 | R1619 425 00 | 84.0 | 17.0 | 69.80 | – | 20.90 | – | 60 | 49.80 | 7 | 8.20 | M6 | M6 | 9.60 | 70 |
| | | | | | | 30.90 ³⁾ | | 70 ³⁾ | 59.80 ³⁾ | | 18.20 ³⁾ | | | | |
| 55 | R1619 525 00 | 99.0 | 18.0 | 80.00 | – | 22.30 | – | 70 | 57.05 | 8 | 8.90 | M6 | M6 | 14.50 | 90 |
| | | | | | | 32.30 ³⁾ | | 80 ³⁾ | 67.05 ³⁾ | | 18.90 ³⁾ | | | | |
| 65 | R1619 625 00 | 124.2 | 19.0 | 76.00 | 100 | 11.00 | 53.5 | 90 | 75.70 | 8 | 16.00 | M8 | M8 | 30.00 | 130 |

- 1) For ball runner blocks F.N (flange ... low) and S.N. (slimline ... low)
- 2) Based on the mounting face of the ball runner block
- 3) For ball runner blocks S.H (slimline ... high)

Front lube units

Initial filling of a front lube unit without oil

- ▶ Remove the set screw from the lubrication hole (Fig. 1, item 1) and keep for later use.
- ▶ Screw in lube nipple (2).
- ▶ Lie the front lube unit (3) down flat, fill with quantity of oil as per table 1, and leave it to lie for around 36 hours.
- ▶ Check whether the lube insert is completely soaked with oil. If necessary, add oil.
- ▶ Remove lube nipple.
- ▶ Screw in the set screw
- ▶ For size 20 low profile: Stand the front lube units in 10 mm of oil for approx. 36 hours (see fig. 2).

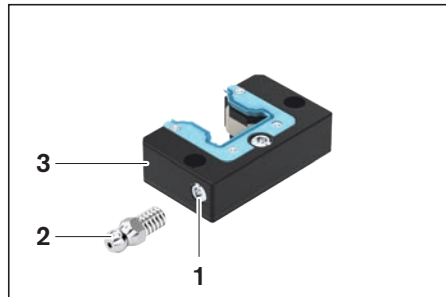


Figure 1

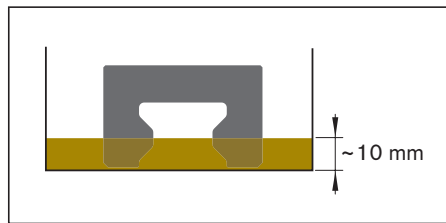


Figure 2

| Size | Oil quantity for initial filling of a front lube unit without oil (cm ³) |
|------|--|
| 15 | 0.90 |
| 20 | 2.00 |
| 25 | 2.40 |
| 30 | 3.85 |
| 35 | 5.70 |
| 45 | 9.60 |
| 55 | 14.50 |
| 65 | 30.00 |

Table 1

Relubrication of front lube units

If the relubrication interval according to diagram 1 has been reached, relubricate the amount stated in table 1.

- ▶ The units can be relubricated through the lube connection at the side.
- ▶ The front lube unit size 20 low is **not** refillable via the lube connection (see figure 2).

Note

Rexroth recommends replacing the front lube units every 3 years at the latest and re-lubricating the ball runner block before mounting the new front lube unit.

Relubrication of the ball runner blocks

In clean operating environments, the ball runner blocks can be relubricated with grease (Dynalub 510) at the end-face. Relubrication of the ball runner blocks **with grease lubricant** see the “Lubrication” chapter

⚠ If other lubricants are used, this may lead to a reduction in the lubrication intervals, performance losses in short stroke applications and the load capacities. Possible chemical interactions between the plastic materials, lubricants and preservative oils must also be taken into account.

The recommended lubrication intervals depend on environmental factors, load and load type.

Examples of environmental factors include swarf, mineral abrasion (or similar), solvent and temperature. Examples of loads and stress types are oscillations, shocks and tilting.

⚠ The conditions of use are unknown to the manufacturer. Only the user's own trials or accurate monitoring can yield safety across lubrication intervals.

⚠ Do not use water-based coolant/lubricant on the ball guide rails and ball runner block!

Load-dependent relubrication intervals for ball runner blocks with front lube units

This applies to the following conditions:

- ▶ Ball runner block lubricants:
Dynalub 510 (grease NLGI 2),
alternatively Castrol Tribol GR 100-2 PD
or Elkalube GLS 135/N2
- ▶ Front lube units lubricant:
Mobil SHC 639 (synthetic oil)
- ▶ Maximum speed: $v_{max} = 2 \text{ m/s}$
- ▶ No media pressurization
- ▶ Standard seals (SS)
- ▶ Ambient temperature: $T = 10 - 40 \text{ }^\circ\text{C}$

Key

- C = dynamic load capacity (N)
- F_m = dynamic equivalent load on bearing (N)
- F_m/C = load ratio (-)
- s = lubrication interval as travel distance (km)

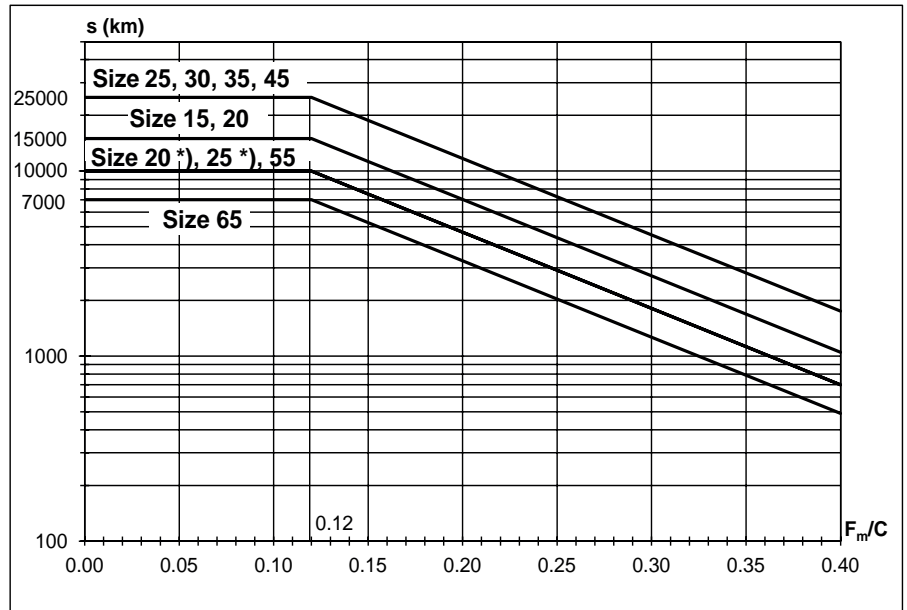


Diagram 1

*)ball runner blocks F.N (flange ... low) and S.N. (slimline ... low)

Mounting of front lube units

Instruction for mounting

The required mounting accessories (coated screws, seals and lube nipples) are supplied along with the units.

Mount a front lube unit on both sides of the ball runner block (fig. 3, pos. 3)!

Do not remove the ball runner block from the ball guide rail!

Ball runner blocks up to size 45 (fig. 3a):

The enclosed lube pin (2) must be mounted between the lubrication plate and the ball runner block! (It contains a lubrication hole.)

- ▶ Remove the set screws (1).
- ▶ Screw in the lube pin (2).
- ▶ Slide on the front lube units (3).
- ▶ Insert o-rings (5) between the ball runner block and front lube units.
- ▶ Tighten screws (4) to tightening torque M_A (see table 2).

Ball runner blocks from size 55 (fig. 3b):

- ▶ Slide on the front lube units (3).
- ▶ Remove the set screws (1) and insert the o-rings (5) between the ball runner block and front lube units.
- ▶ Tighten screws (4) to tightening torque M_A (see table 2).


| Size |  Pos. 4 | Tightening torque M_A (Nm) |
|------|---|------------------------------|
| 15 | M2.5 x 12 | 0.3 |
| 20 | M3 x 14 | 0.6 |
| 25 | M3 x 14 | 0.6 |
| 30 | M3 x 14 | 1.2 |
| 35 | M3 x 16 | 1.2 |
| 45 | M4 x 18 | 1.6 |
| 55 | M5 x 18 | 2.0 |
| 65 | M4 x 20 | 1.6 |

Table 2

Figure 3a (up to size 45)

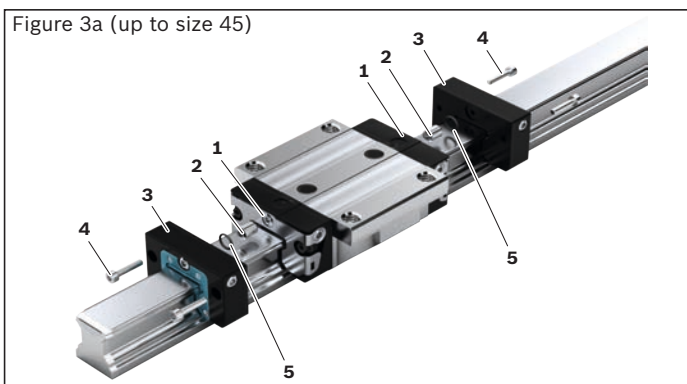
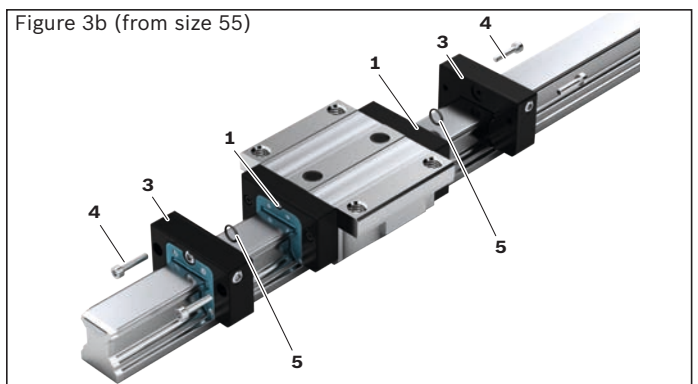
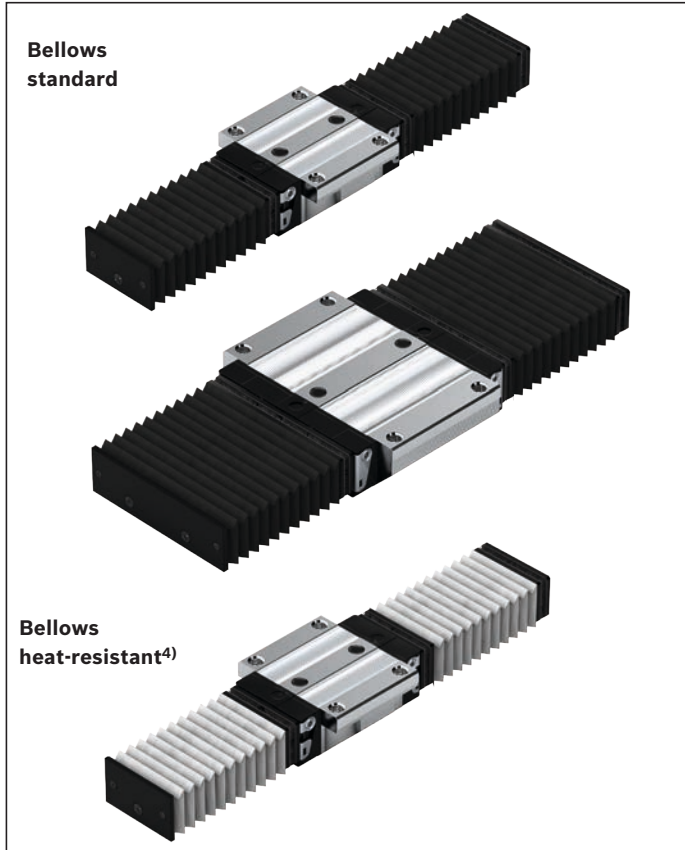


Figure 3b (from size 55)



Bellows



Standard bellows

R1620 .0. 00

- ▶ Material: Polyurethane-coated polyester fabric
- ▶ Aluminum lubrication plate

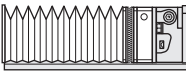
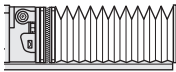
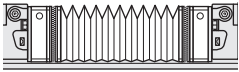
Heat-resistant bellows⁴⁾

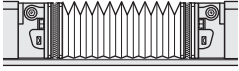
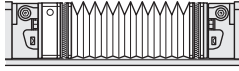
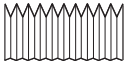
R1620 .5. 00

- ▶ Material: Nomex fabric, metalized

Temperature stability

- ▶ Non combustible, non flammable
- ▶ Resistant to sparks, welding spatter and hot chips
- ▶ The protective metal coating can withstand peak temperatures of up to 200 °C
- ▶ Operating temperature for the total bellows max. 80 °C

| Size | Part number, fold count | | |
|---------------------------|--|--|--|
| |  Type 1: with lubrication plate¹⁾ and end plate Type 6: with VSE²⁾ and end plate Standard bellows |  Type 2: with fastening frame and end plate |  Type 3: with 2 lubrication plates¹⁾ Type 7: with 2 VSE²⁾ |
| 15 | R1620 10. 00, ... | R1620 102 00, ... | R1620 10. 00, ... |
| 20 | R1620 80. 00, ... | R1620 802 00, ... | R1620 80. 00, ... |
| 25 | R1620 20. 00, ... | R1620 202 00, ... | R1620 20. 00, ... |
| 30 | R1620 70. 00, ... | R1620 702 00, ... | R1620 70. 00, ... |
| 35 | R1620 30. 00, ... | R1620 302 00, ... | R1620 30. 00, ... |
| 45 | R1620 40. 00, ... | R1620 402 00, ... | R1620 40. 00, ... |
| 55 | R1620 50. 00, ... | R1620 502 00, ... | R1620 50. 00, ... |
| 65 | R1620 60. 00, ... | R1620 602 00, ... | R1620 60. 00, ... |
| 20/40³⁾ | – | R1670 502 00, ... | – |
| 25/70³⁾ | – | R1670 202 00, ... | – |
| 35/90³⁾ | – | R1670 302 00, ... | – |
| | Heat-resistant bellows⁴⁾ | | |
| 25 | R1620 25. 00, ... | R1620 252 00, ... | R1620 25. 00, ... |
| 30 | R1620 75. 00, ... | R1620 752 00, ... | R1620 75. 00, ... |
| 35 | R1620 35. 00, ... | R1620 352 00, ... | R1620 35. 00, ... |
| 45 | R1620 45. 00, ... | R1620 452 00, ... | R1620 45. 00, ... |
| 55 | R1620 55. 00, ... | R1620 552 00, ... | R1620 55. 00, ... |
| 65 | R1620 65. 00, ... | R1620 652 00, ... | R1620 65. 00, ... |

| Size | Part number, fold count | | |
|--|--|--|---|
| |  Type 4: with 2 fastening frames |  Type 5: with lubrication plate ¹⁾ and fastening frame Type 8: with VSE ²⁾ and fastening frame |  Type 9: Loose bellows (spare part) |
| Standard bellows | | | |
| 15 | R1620 104 00, ... | R1620 10. 00, ... | R1600 109 00, ... |
| 20 | R1620 804 00, ... | R1620 80. 00, ... | R1600 809 00, ... |
| 25 | R1620 204 00, ... | R1620 20. 00, ... | R1600 209 00, ... |
| 30 | R1620 704 00, ... | R1620 70. 00, ... | R1600 709 00, ... |
| 35 | R1620 304 00, ... | R1620 30. 00, ... | R1600 309 00, ... |
| 45 | R1620 404 00, ... | R1620 40. 00, ... | R1600 409 00, ... |
| 55 | R1620 504 00, ... | R1620 50. 00, ... | R1600 509 00, ... |
| 65 | R1620 604 00, ... | R1620 60. 00, ... | R1600 609 00, ... |
| 20/40 ³⁾ | R1670 504 00, ... | - | R1670 509 00, ... |
| 25/70 ³⁾ | R1670 204 00, ... | - | R1670 209 00, ... |
| 35/90 ³⁾ | R1670 304 00, ... | - | R1670 309 00, ... |
| Heat-resistant bellows⁴⁾ | | | |
| 25 | R1620 254 00, ... | R1620 25. 00, ... | R1600 259 00, ... |
| 30 | R1620 754 00, ... | R1620 75. 00, ... | R1600 759 00, ... |
| 35 | R1620 354 00, ... | R1620 35. 00, ... | R1600 359 00, ... |
| 45 | R1620 454 00, ... | R1620 45. 00, ... | R1600 459 00, ... |
| 55 | R1620 554 00, ... | R1620 55. 00, ... | R1600 559 00, ... |
| 65 | R1620 654 00, ... | R1620 65. 00, ... | R1600 659 00, ... |

Weights on request

- 1) No lubrication plate necessary for ball runner blocks with side lube ports
- 2) VSE = front lube unit
- 3) Wide ball rail system
- 4) Note overall height (see dimensional drawing/dimensions of heat-resistant bellows)

Order example:

- ▶ Bellows
- ▶ Size 35
- ▶ Standard
- ▶ Type 6 with VSE and end plate
- ▶ Number of folds: 36

Example: R1620 3 0 6 00, 36 Folding

Standard = 0
Heat-resistant = 5
Type 1 - 9

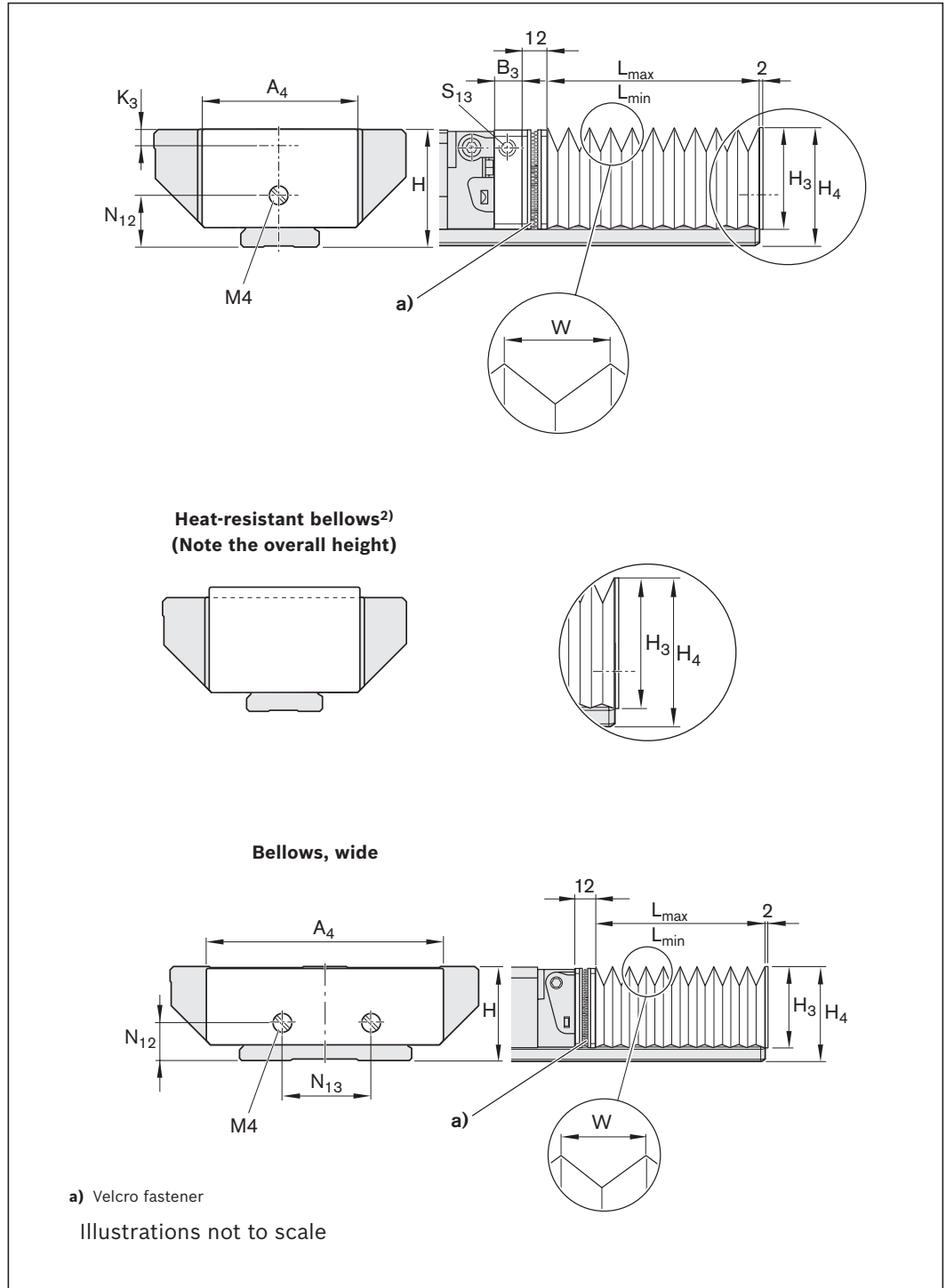
Bellows

Instruction for mounting

- ▶ The bellows are pre-assembled.
- ▶ The fastening screws are included.
- ▶ Bellows with lubrication plate (type 1, 3 - 5)
Sizes 15 – 20:
 A funnel-type lube nipple with a knock-in spigot is included.
Sizes 25 – 65 and wide:
 The lube nipple of the ball runner block can be used.

- ▶ For type 1 and type 2, an M4x10 thread with 2 x 45° countersink must be placed in the end face of the ball guide rail SNS in each case.
 For ball guide rail BNS:
 Tap two threads at each end face.

- ▶ Observe the mounting instructions



Standard bellows

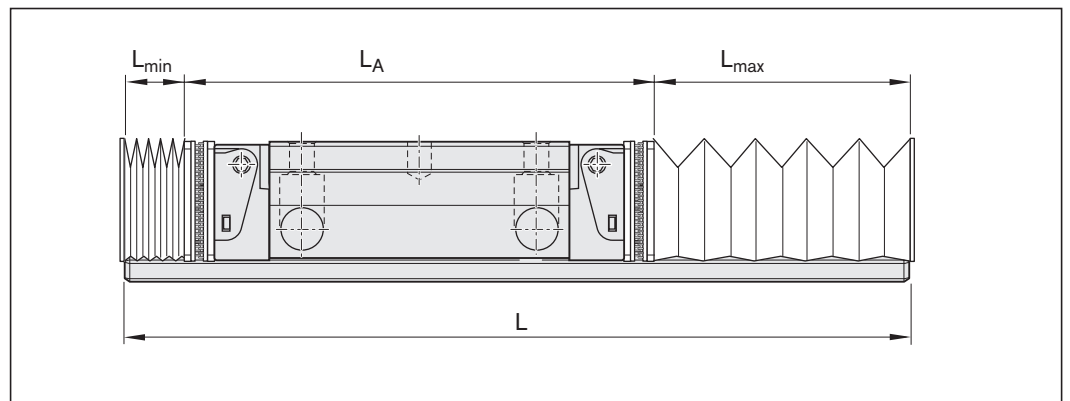
| Size | Dimensions (mm) | | | | | | | | | | Factor U |
|---------------------|-----------------|----------------|----|----------------|----------------|----------------|-----------------|-----------------|-----------------|------|----------|
| | A ₄ | B ₃ | H | H ₃ | H ₄ | K ₃ | N ₁₂ | N ₁₃ | S ₁₃ | W | |
| 15 | 45 | 11 | 24 | 26.5 | 31.5 | 3.4 | 11.0 | - | M3 | 19.9 | 1.18 |
| 20 | 42 | 12 | 30 | 24.0 | 29.2 | 3.5 | 13.0 | - | M3 | 10.3 | 1.33 |
| 25 | 45 | 12 | 36 | 28.5 | 35.0 | 6.0 | 15.0 | - | M3 | 12.9 | 1.32 |
| 30 | 55 | 12 | 42 | 34.0 | 41.0 | 8.0 | 18.0 | - | M6 | 15.4 | 1.25 |
| 35 | 64 | 12 | 48 | 39.0 | 47.0 | 8.0 | 22.0 | - | M6 | 19.9 | 1.18 |
| 45 | 83 | 12 | 60 | 49.0 | 59.0 | 8.0 | 30.0 | - | M6 | 26.9 | 1.13 |
| 55 | 96 | 12 | 70 | 56.0 | 69.0 | 9.0 | 30.0 | - | M6 | 29.9 | 1.12 |
| 65 | 120 | 14 | 90 | 75.0 | 89.0 | 18.0 | 40.0 | - | M8x1 | 40.4 | 1.08 |
| 20/40 ¹⁾ | 73 | - | 27 | 31.0 | 35.0 | - | 11.5 | - | - | 19.9 | 1.12 |
| 25/70 ¹⁾ | 101 | - | 35 | 29.0 | 35.0 | - | 14.0 | 26 | - | 12.9 | 1.25 |
| 35/90 ¹⁾ | 128 | - | 50 | 42.0 | 49.0 | - | 21.5 | 40 | - | 19.9 | 1.18 |

Heat-resistant bellows²⁾

| Size | Dimensions (mm) | | | | | | | | | | Factor U |
|------|-----------------|----------------|----|----------------|----------------|----------------|-----------------|-----------------|-----------------|------|----------|
| | A ₄ | B ₃ | H | H ₃ | H ₄ | K ₃ | N ₁₂ | N ₁₃ | S ₁₃ | W | |
| 25 | 62 | 12 | 36 | 39.0 | 44.5 | 6.0 | 15 | - | M6 | 25.9 | 1.25 |
| 30 | 67 | 12 | 42 | 42.0 | 47.5 | 8.0 | 18 | - | M6 | 25.9 | 1.25 |
| 35 | 74 | 12 | 48 | 47.0 | 54.0 | 8.0 | 22 | - | M6 | 29.9 | 1.21 |
| 45 | 88 | 12 | 60 | 55.0 | 64.0 | 8.0 | 30 | - | M6 | 32.9 | 1.18 |
| 55 | 102 | 12 | 70 | 63.0 | 75.0 | 9.0 | 30 | - | M6 | 37.9 | 1.16 |
| 65 | 134 | 14 | 90 | 86.0 | 99.0 | 18.0 | 40 | - | M8x1 | 52.4 | 1.11 |

1) Wide ball rail system

 2) Observe the overall height (dimension H₄ compared with dimension H)

Calculation

Bellows

$$L_{\max} = (\text{stroke} + 30) \cdot U$$

$$L_{\min} = L_{\max} - \text{stroke}$$

$$\text{Number of folds} = \frac{L_{\max}}{W} + 2$$

 L_{max} = Bellows, elongated (mm)

 L_{min} = Bellows, contracted (mm)

Stroke = Stroke (mm)

U = Calculation factor (-)

W = Maximum bellows extraction (mm)

L = Ball guide rail length (mm)

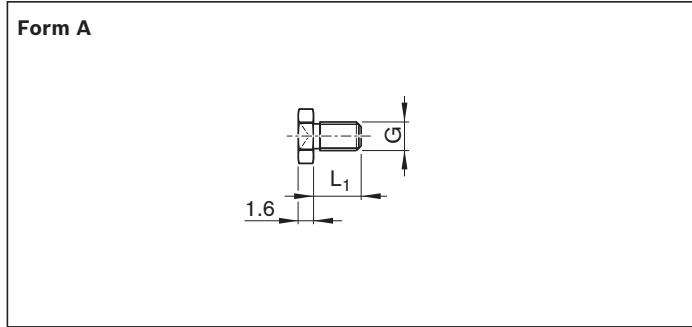
 L_A = Ball runner block length with fastening frame (mm)

Ball guide rail length

$$L = L_{\min} + L_{\max} + L_A$$

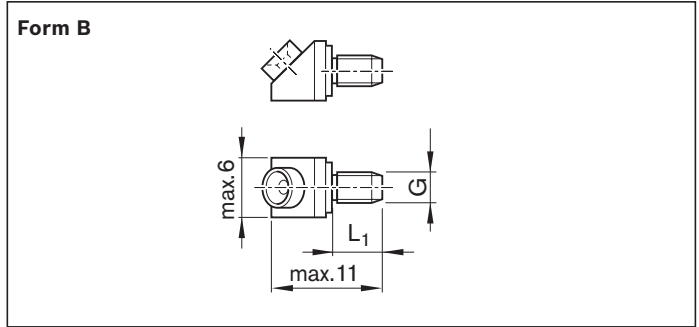
Lube nipple, lube fittings, extensions

Funnel-type lube nipple according to DIN 3405



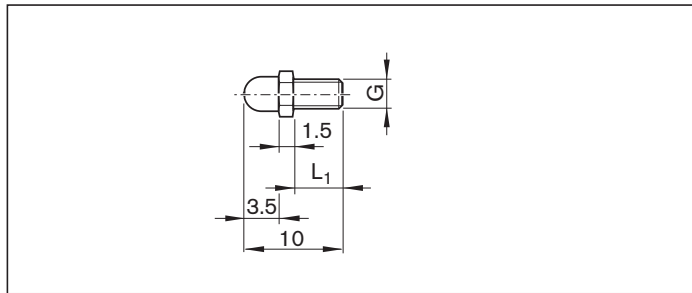
| Material number | Dimensions (mm) | | Mass (g) |
|----------------------------|-----------------|----------------|----------|
| | G | L ₁ | |
| R3417 029 09 | M3 | 5 | 0.3 |
| R3417 032 09 ¹⁾ | | | |

1) Lube nipple Resist NR II
made of corrosion resistant steel as per DIN EN 10088



| Material number | Dimensions (mm) | | Mass (g) |
|-----------------|-----------------|----------------|----------|
| | G | L ₁ | |
| R3417 004 09 | M3 | 5 | 1.5 |

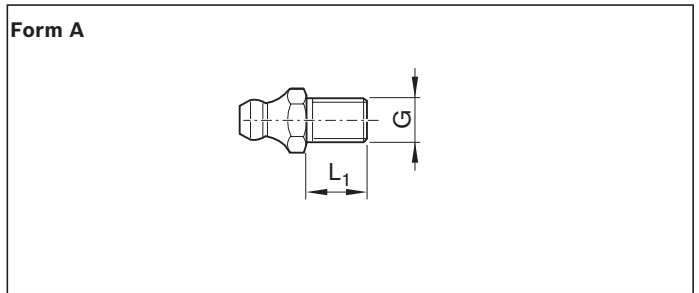
Ball-type lube nipple



| Material number | Dimensions (mm) | | Mass (g) |
|----------------------------|-----------------|----------------|----------|
| | G | L ₁ | |
| R3417 005 01 ¹⁾ | M3 | 5 | 0.5 |

1) Material: Brass

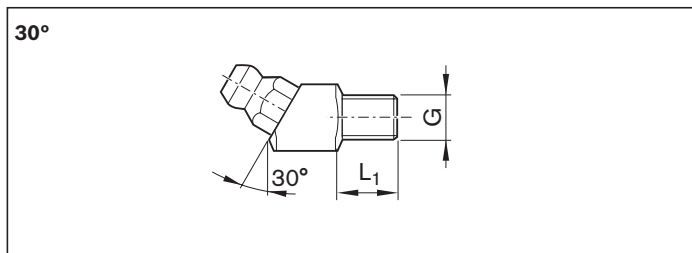
Hydraulic-type lube nipple according to DIN 71412



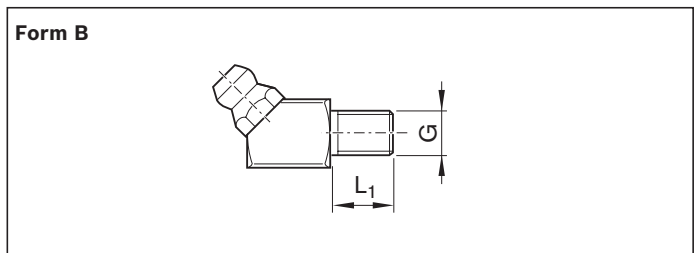
| Material number | Dimensions (mm) | | Mass (g) |
|----------------------------|-----------------|----------------|----------|
| | G | L ₁ | |
| R3417 008 02 | M6 | 8 | 2.6 |
| R3417 016 02 ¹⁾ | | | |

1) Lube nipple Resist NR II
made of corrosion resistant steel as per DIN EN 10088

Hydraulic-type lube nipple according to DIN 71412



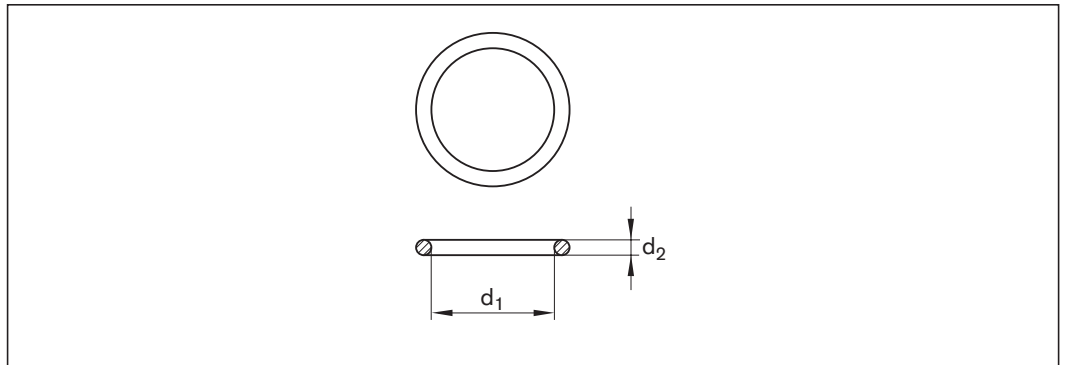
| Material number | Dimensions (mm) | | Mass (g) |
|-----------------|-----------------|----------------|----------|
| | G | L ₁ | |
| R3417 023 02 | M6 | 8 | 7.4 |



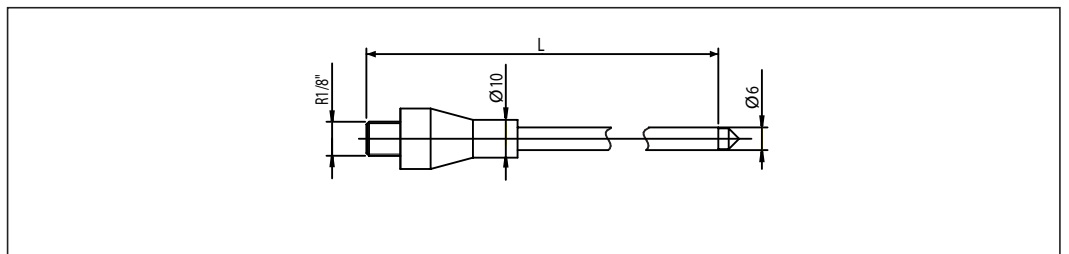
| Material number | Dimensions (mm) | | Mass (g) |
|-----------------|-----------------|----------------|----------|
| | G | L ₁ | |
| R3417 007 02 | M6 | 8 | 7.4 |
| R3417 006 02 | M8x1 | 8 | 8.0 |

Lube fittings
Plastic tube for lube connection
Plastic tube \varnothing 3 mm


| Material number | Dimensions | | | Mass (kg) |
|-----------------|-----------------------------|-----------------------------|------------|-----------|
| | External \varnothing (mm) | Internal \varnothing (mm) | Length (m) | |
| R3499 287 00 | 3 | 1.7 | 50 | 0.4 |

O-rings


| Material number | $d_1 \times d_2$ (mm) | Mass |
|-----------------|-----------------------|------|
| R3411 130 01 | 4 x 1.0 | |
| R3411 131 01 | 5 x 1.0 | |
| R3411 003 01 | 6 x 1.5 | 0.03 |

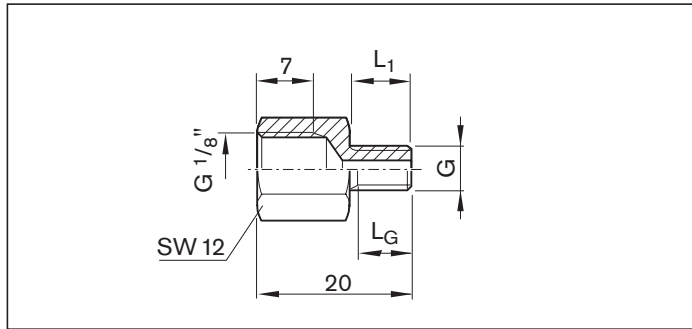
Nozzle pipe


| Material number | Dimensions (mm) | Mass (g) |
|-----------------|-----------------|----------|
| R3455 030 44 | L 200 | 158 |

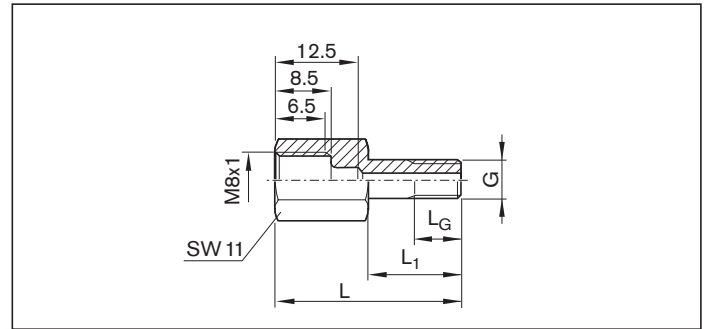
Lube nipple, lube fittings, extensions

Lube fittings

Reducers

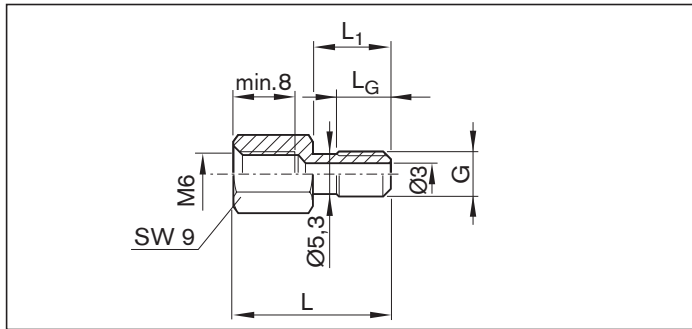


| Material number | Dimensions (mm) | | | Mass (g) |
|-----------------|-----------------|----------------|----------------|----------|
| | G | L ₁ | L _G | |
| R3455 030 34 | M6 | 8 | 6.5 | 7.5 |

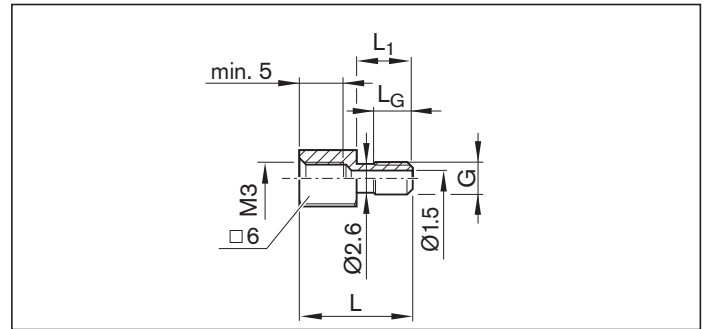


| Material number | Dimensions (mm) | | | | Mass (g) |
|-----------------|-----------------|------|----------------|----------------|----------|
| | G | L | L ₁ | L _G | |
| R3455 030 53 | M8x1 | 28.5 | 14.5 | 8 | 10 |

Extensions

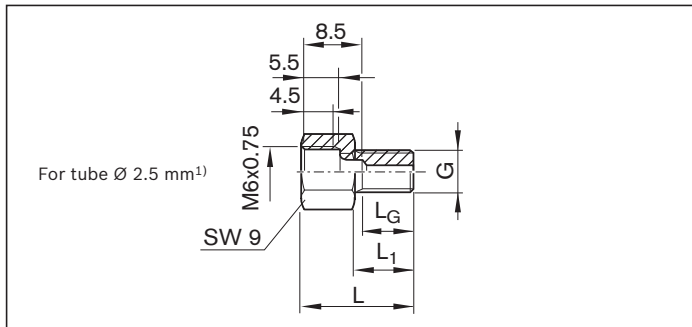


| Material number | Dimensions (mm) | | | | Mass (g) |
|-----------------|-----------------|------|----------------|----------------|----------|
| | G | L | L ₁ | L _G | |
| R3455 030 69 | M6 | 21.0 | 10.5 | 7 | 5.0 |
| R3455 030 87 | M6 | 25.0 | 14.5 | 8 | 5.5 |
| R3455 030 85 | M6 | 26.5 | 16.0 | 7 | 5.0 |

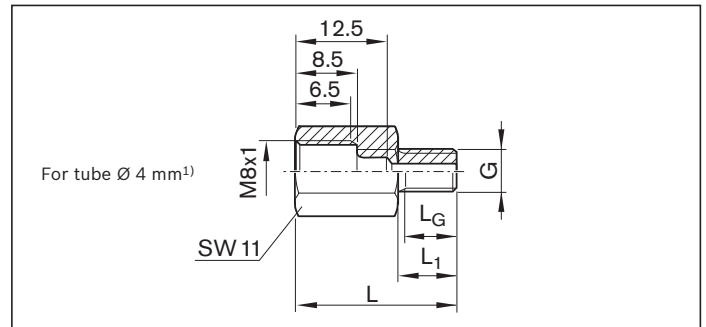


| Material number | Dimensions (mm) | | | | Mass (g) |
|-----------------|-----------------|------|----------------|----------------|----------|
| | G | L | L ₁ | L _G | |
| R3455 030 78 | M3 | 16.5 | 8.5 | 6 | 2.5 |

Connectors

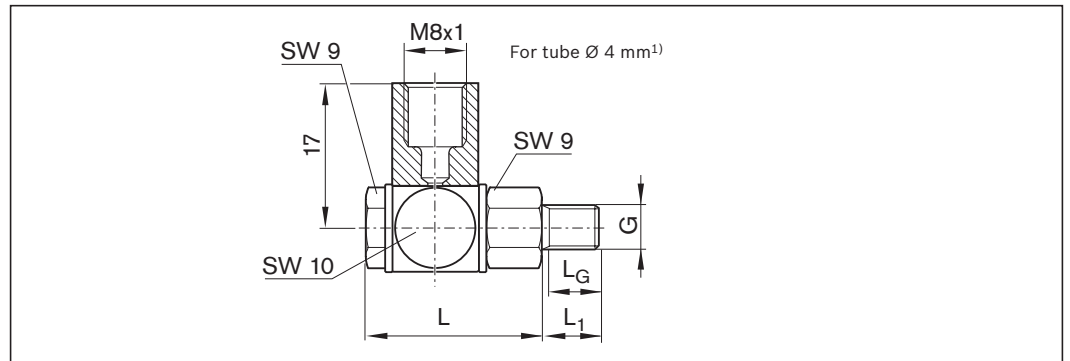


| Material number | Dimensions (mm) | | | | Mass (g) |
|-----------------|-----------------|------|----------------|----------------|----------|
| | G | L | L ₁ | L _G | |
| R3455 030 38 | M6 | 15.5 | 8 | 6.5 | 4.1 |



| Material number | Dimensions (mm) | | | | Mass (g) |
|-----------------|-----------------|----|----------------|----------------|----------|
| | G | L | L ₁ | L _G | |
| R3455 030 37 | M6 | 22 | 8 | 6.5 | 8.8 |

1) For connections according to DIN 2353 (solderless tube fittings)

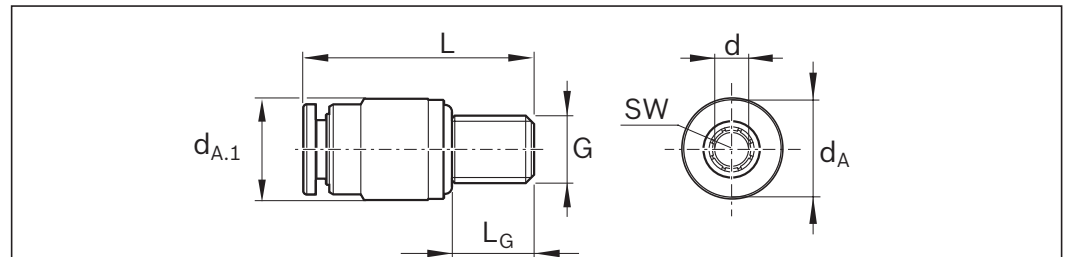
Swivel fittings


| Material number | Dimensions (mm) | | | | Mass (g) |
|-----------------|-----------------|------|----------------|----------------|----------|
| | G | L | L ₁ | L _G | |
| R3417 018 09 | M6 | 21.5 | 8 | 6.5 | 18.6 |

1) For connections according to DIN 2353 (solderless tube fittings)

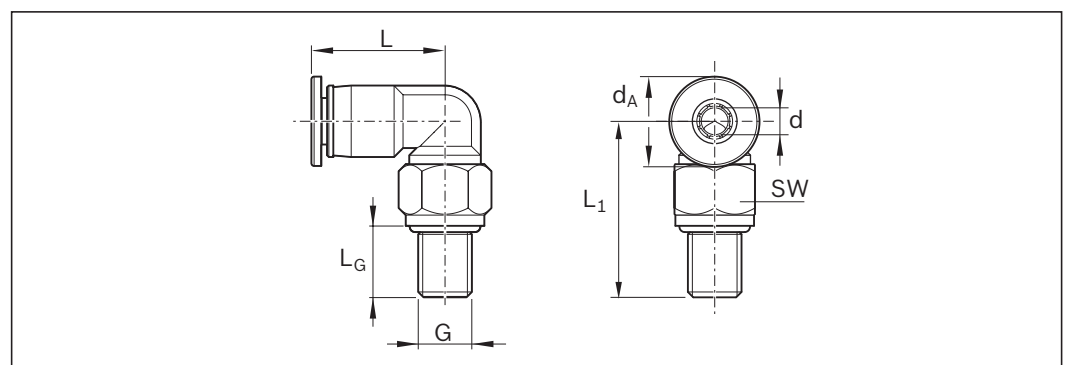
Straight connectors
Push-in fittings for plastic tubes and metal pipes

⚠ Not permitted for ball runner blocks with accessories on the end face



| Material number | Dimensions (mm) | | | | | | | Mass (g) |
|-----------------|-----------------|------------------|-------------------|----|------|----------------|-------------------|----------|
| | d _A | d _{A.1} | d _{±0.1} | G | L | L _G | SW | |
| R3417 073 09 | 6.5 | 6.5 | 3 | M3 | 16 | 5 | 1.5 ¹⁾ | 1.6 |
| R3417 074 09 | 6.5 | 8 | 3 | M5 | 16 | 5 | 2 | 2.5 |
| R3417 075 09 | 9 | 9 | 4 | M6 | 24.5 | 8 | 2.5 | 4.9 |
| R3417 076 09 | 11 | 11 | 6 | M6 | 26 | 8 | 2.5 | 6.2 |

1) Max. tightening torque M_A = 0.5 Nm

Elbow plug-in connections turnable¹⁾


| Material number | Dimensions (mm) | | | | | | | Mass (g) |
|-----------------|-----------------|-------------------|----|------|----------------|----------------|-----------------|----------|
| | d _A | d _{±0.1} | G | L | L ₁ | L _G | SW | |
| R3417 077 09 | 6.5 | 3 | M3 | 11.2 | 14.7 | 5 | 6 ²⁾ | 3.8 |
| R3417 078 09 | 9 | 4 | M6 | 18.1 | 18.1 | 8 | 9 | 10.8 |
| R3417 079 09 | 11 | 6 | M6 | 20.8 | 18.1 | 8 | 9 | 12.9 |

1) Max. lubrication pressure: 30 bar (exerting slow pressure with manual grease gun)

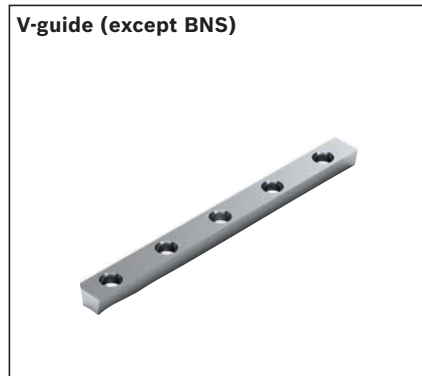
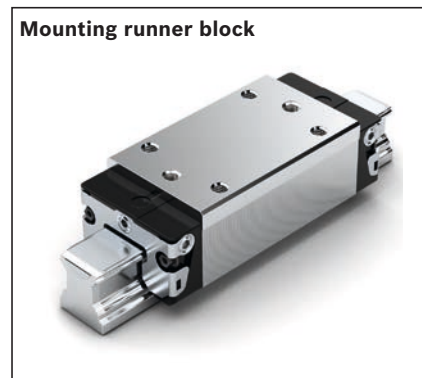
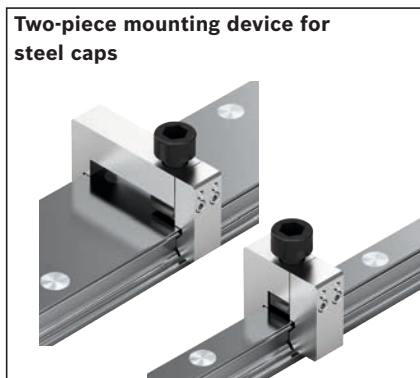
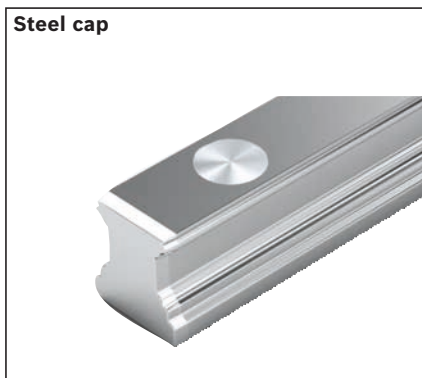
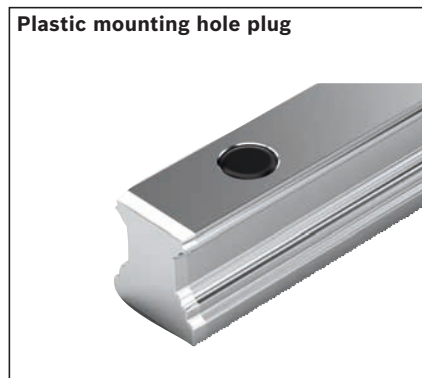
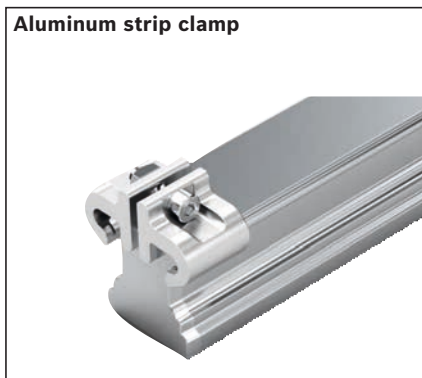
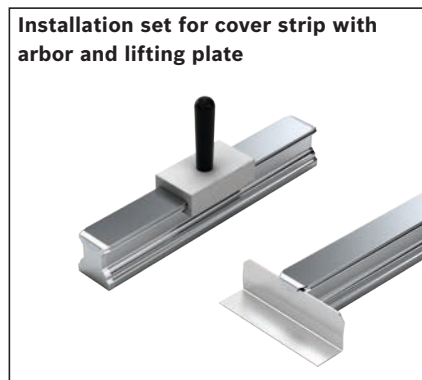
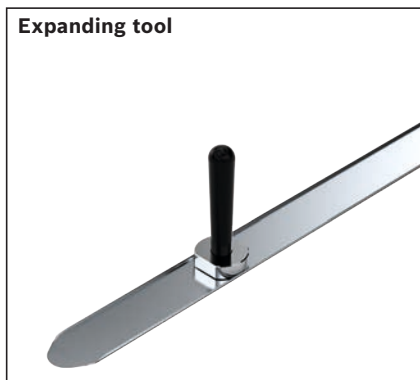
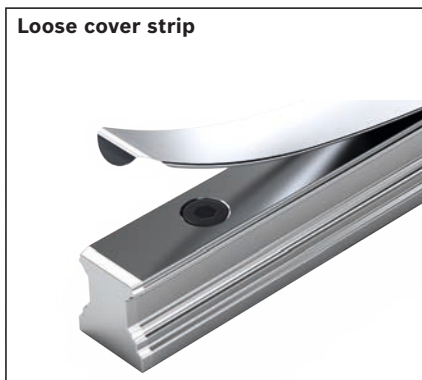
2) Max. tightening torque M_A = 0.5 Nm

Product description

Rexroth offers limitless interchangeability as all ball guide rail versions can be combined at will with all accessories within each size.

The entire range is ideally geared to enable a top performance and meet all special requirements.

Overview of accessories for ball guide rails



Cover strip

Instruction for mounting the cover strip

Secure the cover strip!

- ▶ Observe the instruction for mounting!
Please request the “Mounting instructions for cover strip”.

Advantages

The cover strip is easy to clip on and remove.

- ▶ This considerably facilitates and speeds up the mounting process:
 - ▶ No need to plug every single hole.
 - ▶ No time delay while waiting for adhesive to harden when using adhesive tape.
- ▶ Can be mounted and removed several times (up to four times).

Designs and functions

A Cover strip with snap fit (standard)

- ▶ The cover strip is clipped on before the ball runner block is mounted and fits tightly.

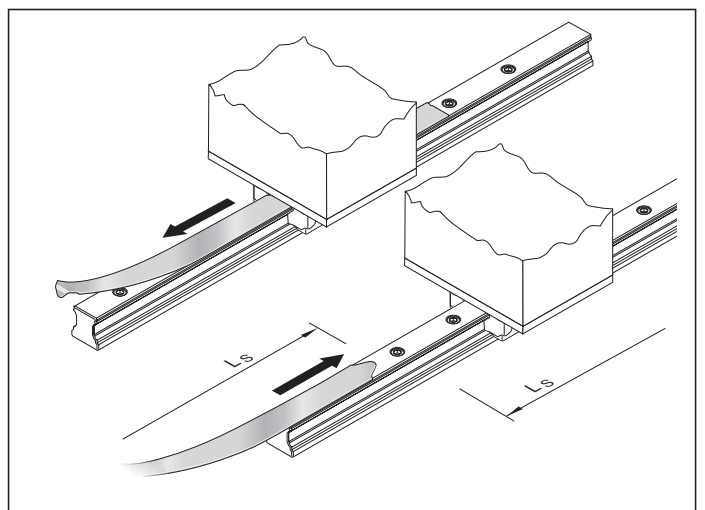
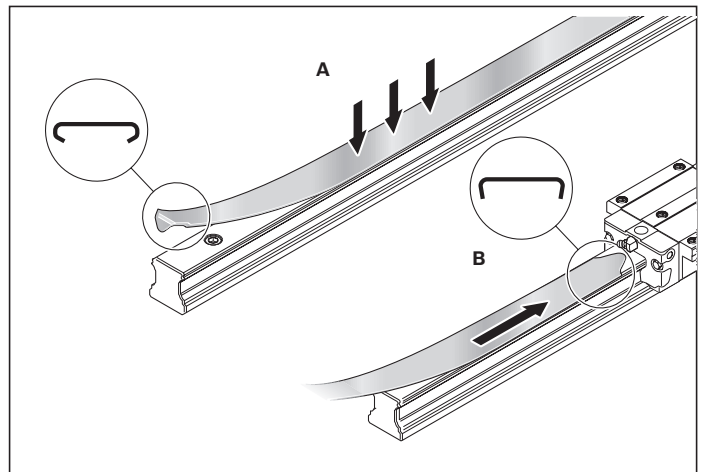
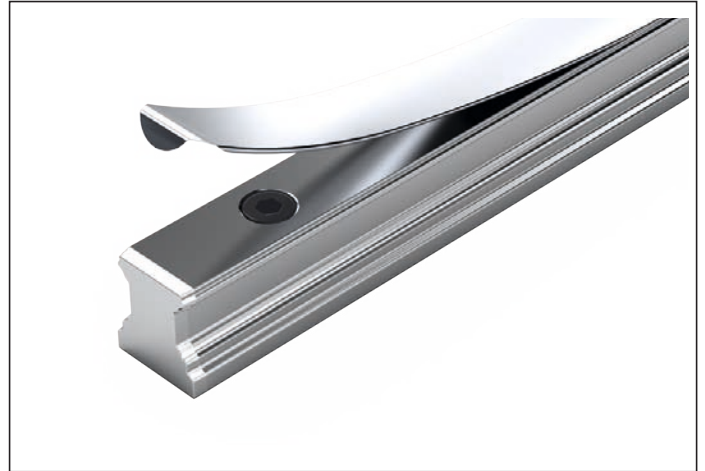
B Cover strip with sliding fit

- ▶ For mounting or replacing a cover strip, if the ball runner block or connection structure cannot be removed.
- ▶ A section of the snap fit cover strip is very slightly widened and can then be easily slid under the ball runner block.

An expanding tool for cover strips can be used to create a sliding fit after installation. In particular, the sliding length L_s can be adapted in accordance with the installation case.

- ⚠ The cover strip is a precision-machined part that requires careful handling. Above all, it must not be bent. Risk of injury at the edges and ends of the cover strip! Wear gloves.

Part numbers, dimensional drawing, dimensions and gravity see following pages.



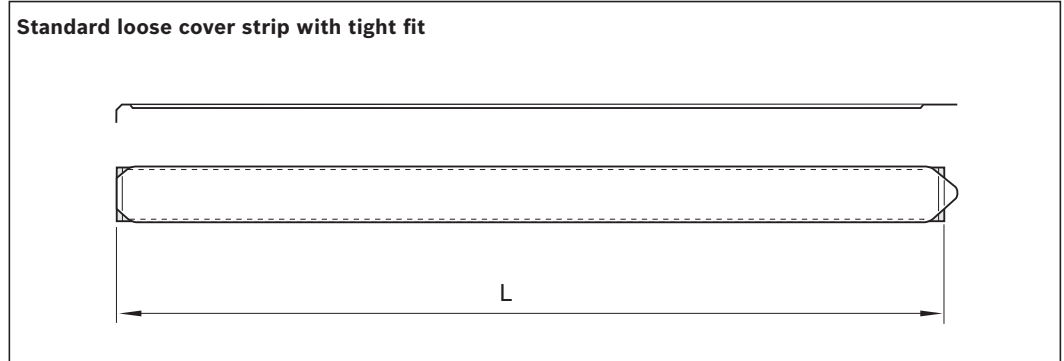
Cover strip

Loose cover strip

For initial installation, storage and replacement

Note

A suitable cover strip with snap fit or with sliding fit is available for each ball guide rail SNS.



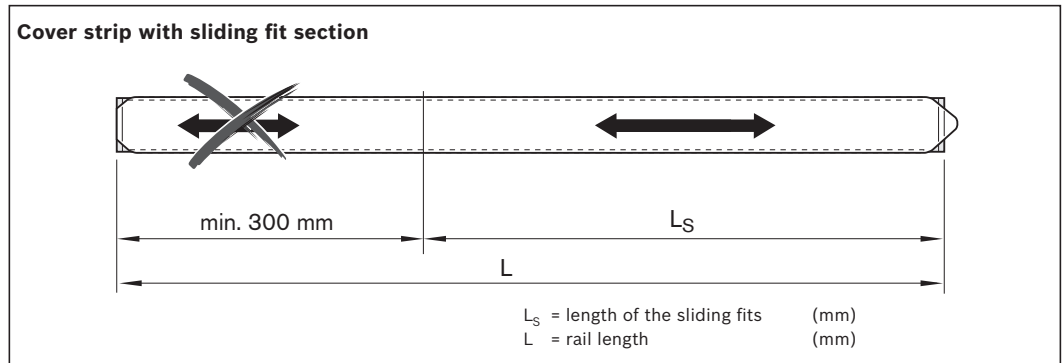
Ordering example 1 (standard cover strip with tight fit)

- ▶ Ball guide rail SNS
- ▶ Size 35
- ▶ Rail length
L = 2696 mm

Material number:

R1619 330 20, 2696 mm

| Size | Standard loose cover strip with tight fit Part number, rail length L (mm) | Mass (g/m) |
|------|--|---------------|
| 15 | R1619 130 00, | 10 |
| 20 | R1619 830 00, | 29 |
| 25 | R1619 230 00, | 32 |
| 30 | R1619 730 00, | 40 |
| 35 | R1619 330 20, | 80 |
| 45 | R1619 430 20, | 100 |
| 55 | R1619 530 20, | 120 |
| 65 | R1619 630 20, | 148 |



Ordering example 2 (cover strip with sliding fit section)

- ▶ Ball guide rail SNS
- ▶ Size 35
- ▶ Rail length
L = 2696 mm
- ▶ Length of sliding fit section
L_S = 1200 mm

Material number:

R1619 330 30, 2696, 1200 mm

| Size | Cover strip with sliding fit section Part number, rail length L (mm), Length of sliding fit section L _S (mm) | Mass (g/m) |
|------|---|---------------|
| 15 | R1619 130 10, | 10 |
| 20 | R1619 830 10, | 29 |
| 25 | R1619 230 10, | 32 |
| 30 | R1619 730 10, | 40 |
| 35 | R1619 330 30, | 80 |
| 45 | R1619 430 30, | 100 |
| 55 | R1619 530 30, | 120 |
| 65 | R1619 630 30, | 148 |

Expanding tool

For creating a sliding fit in the cover strip



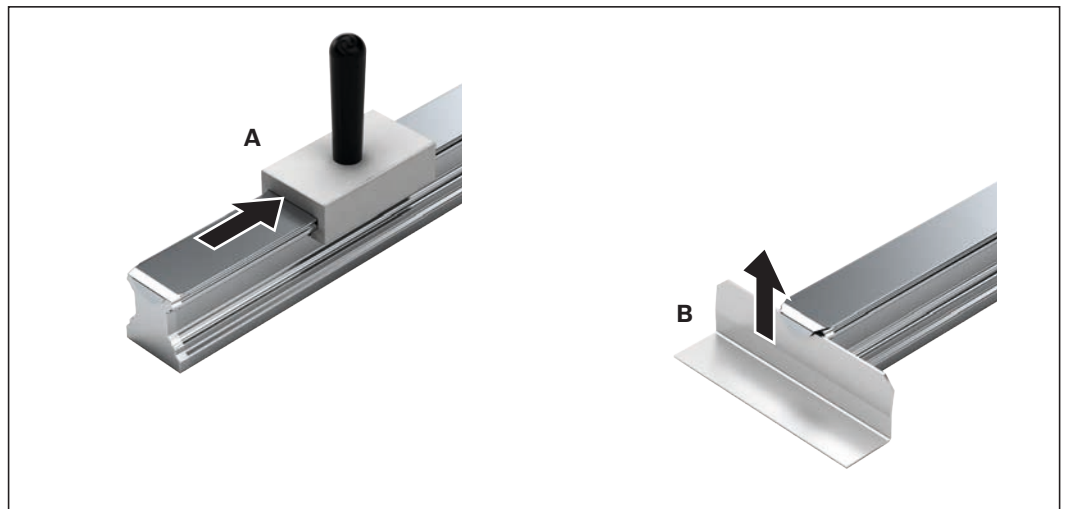
| Size | Material number | Mass (g) |
|------|-----------------|----------|
| 15 | R1619 115 10 | 40 |
| 20 | R1619 815 10 | 50 |
| 25 | R1619 215 10 | 80 |
| 30 | R1619 715 10 | 100 |
| 35 | R1619 315 30 | 100 |
| 45 | R1619 415 30 | 130 |
| 55 | R1619 515 30 | 210 |
| 65 | R1619 615 30 | 270 |

Cover strip mounting kit

Mounting device and lift-off plate

Instruction for mounting

- ▶ To clip on the cover strip, a mounting device (A) is available; for removal, there is a lift-off plate (B).



| Size | Material number | Mass (g) |
|------|-----------------|----------|
| 25 | R1619 210 80 | 170 |
| 30 | R1619 710 80 | 200 |
| 35 | R1619 310 60 | 200 |
| 45 | R1619 410 60 | 210 |
| 55 | R1619 510 60 | 210 |
| 65 | R1619 610 60 | 280 |

Observe the instruction for mounting!

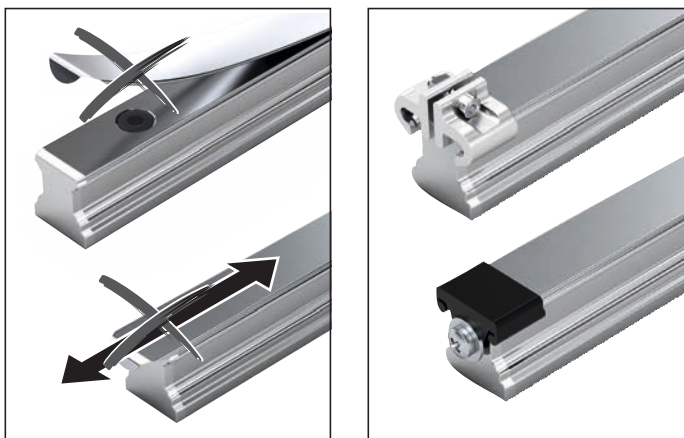
- ▶ Please request the "Mounting instructions for cover strip".

Cover strip

Retainer for cover strip

Instruction for mounting

- ▶ Rexroth recommends the use of strip clamps:
- ▶ this prevents accidental lifting of the rail seal and infiltration of dirt
- ▶ Secures the cover strip



Strip clamps

For ball guide rails without threaded holes at the end faces

Material:

- ▶ Aluminum strip clamps (anodized)
- ▶ Clamping screw and nut made of corrosion resistant steel as per DIN EN 10088

| Size | Set (2 pieces per unit) | | Bulk packaging (100 pieces per unit) | |
|------|-------------------------|----------|--------------------------------------|-----------|
| | Material number (unit) | Mass (g) | Material number (unit) | Mass (kg) |
| 15 | R1619 139 50 | 11 | R1619 139 60 | 0.55 |
| 20 | R1619 839 50 | 13 | R1619 839 60 | 0.65 |
| 25 | R1619 239 50 | 14 | R1619 239 60 | 0.70 |
| 30 | R1619 739 50 | 22 | R1619 739 60 | 1.10 |
| 35 | R1619 339 50 | 30 | R1619 339 60 | 1.50 |
| 45 | R1619 439 50 | 56 | R1619 439 60 | 2.80 |
| 55 | R1619 539 50 | 62 | R1619 539 60 | 3.10 |
| 65 | R1619 639 50 | 84 | R1619 639 60 | 4.20 |

Protective caps

For ball guide rails with threaded holes at the end faces

Material:

- ▶ Plastic protective cap, black
- ▶ Screw made of corrosion resistant steel as per DIN EN 10088
- ▶ Washer made of galvanized steel

| Size | Single cap | | Set (2 pieces per unit with screw) | | Bulk packaging | |
|------|---------------------------------|------------|------------------------------------|----------|------------------------------------|-----------|
| | Material number (without screw) | Weight (g) | Material number (unit) | Mass (g) | Part number/piece (without screws) | Mass (kg) |
| 15 | R1619 139 00 | 0.8 | R1619 139 20 | 5.5 | R1619 139 01 / 1000 | 0.8 |
| 20 | R1619 839 00 | 0.9 | R1619 839 20 | 6.0 | R1619 839 01 / 1000 | 0.9 |
| 25 | R1619 239 00 | 1.0 | R1619 239 20 | 7.0 | R1619 239 01 / 1000 | 1.3 |
| 30 | R1619 739 00 | 1.7 | R1619 739 20 | 9.0 | R1619 739 01 / 1000 | 1.7 |
| 35 | R1619 339 00 | 2.0 | R1619 339 20 | 10.0 | R1619 339 01 / 1000 | 2.5 |
| 45 | R1619 439 00 | 4.0 | R1619 439 20 | 13.0 | R1619 439 01 / 700 | 2.6 |
| 55 | R1619 539 00 | 4.0 | R1619 539 20 | 20.0 | R1619 539 01 / 500 | 2.1 |
| 65 | R1619 639 00 | 6.0 | R1619 639 20 | 20.0 | R1619 639 01 / 300 | 1.7 |

Mounting hole plugs

Plastic mounting hole plugs

| Size | Single cap Material numbers | Mass (g) |
|-------|--------------------------------|----------|
| 15 | R1605 100 80 | 0.05 |
| 20 | R1605 800 80 | 0.10 |
| 25 | R1605 200 80 | 0.30 |
| 30 | R1605 300 80 | 0.60 |
| 35 | R1605 300 80 | 0.60 |
| 45 | R1605 400 80 | 1.00 |
| 55 | R1605 500 80 | 1.70 |
| 65 | R1605 600 80 | 2.10 |
| 20/40 | R1605 100 80 | 0.05 |
| 25/70 | R1605 200 80 | 0.30 |
| 35/90 | R1605 300 80 | 0.60 |



Note

- ▶ Observe the instruction for mounting!
Please request the “Mounting instructions for ball rail systems.”

Mounting hole plugs made of steel

| Size | Single cap made of machining steel Material numbers | Mass (g) |
|-------|--|----------|
| 25 | R1606 200 75 | 2 |
| 30 | R1606 300 75 | 3 |
| 35 | R1606 300 75 | 3 |
| 45 | R1606 400 75 | 6 |
| 55 | R1606 500 75 | 8 |
| 65 | R1606 600 75 | 9 |
| 25/70 | R1606 200 75 | 2 |
| 35/90 | R1606 300 75 | 3 |



Notes

- ▶ Mounting hole plugs made of steel are not included in the scope of delivery of the ball guide rails.
Order the mounting tool too!
- ▶ Observe the instruction for mounting!
Please request the “Mounting instructions for ball rail systems.”

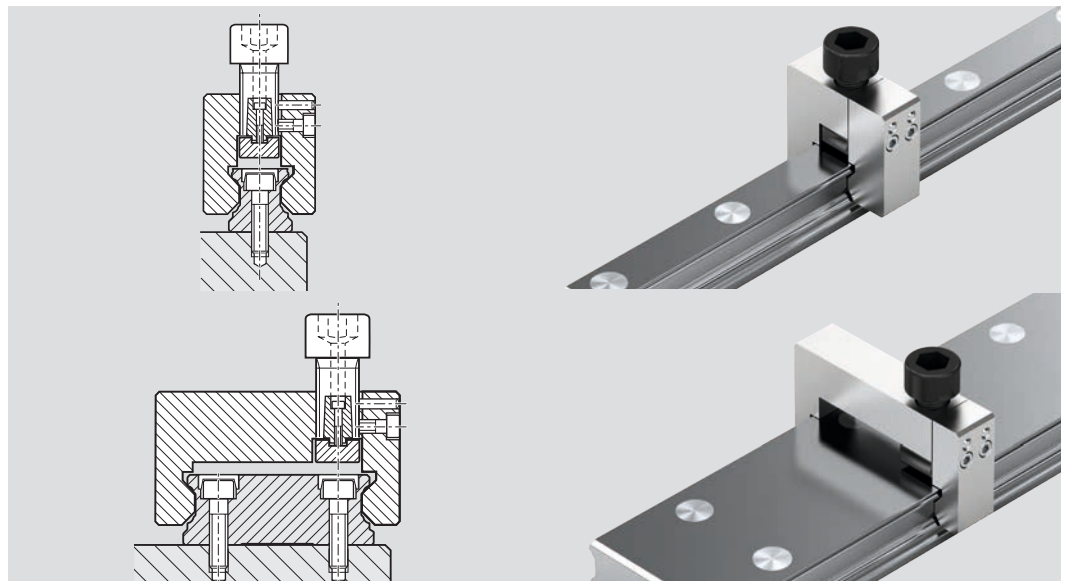
Mounting tool for mounting hole plugs made of steel

Two-piece, with assembly instructions

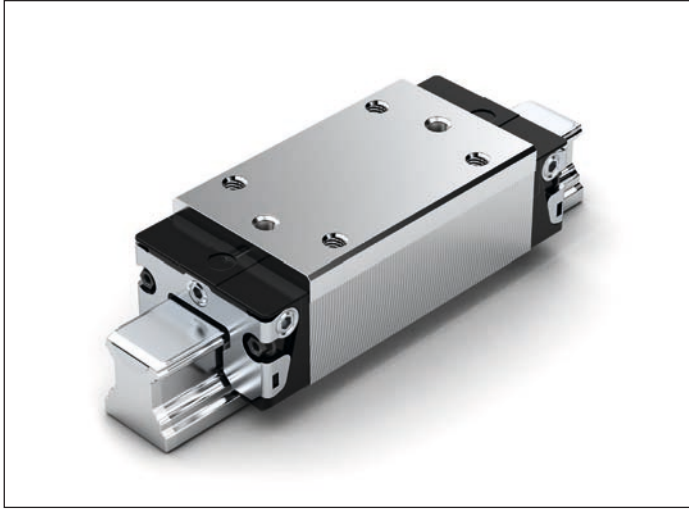
The two-piece mounting tool is suitable for mounting hole plugs in built-in ball guide rail.

| Size | Material numbers | Mass (kg) |
|-------|----------------------------|-----------|
| 25 | R1619 210 00 ¹⁾ | 0.37 |
| 30 | R1619 710 00 ¹⁾ | 0.37 |
| 35 | R1619 310 10 | 0.57 |
| 45 | R1619 410 10 | 0.85 |
| 55 | R1619 510 10 | 1.50 |
| 65 | R1619 610 00 ¹⁾ | 1.85 |
| 25/70 | R1619 210 40 | 0.75 |
| 35/90 | R1619 310 40 | 1.05 |

- 1) Can only be delivered as one part.



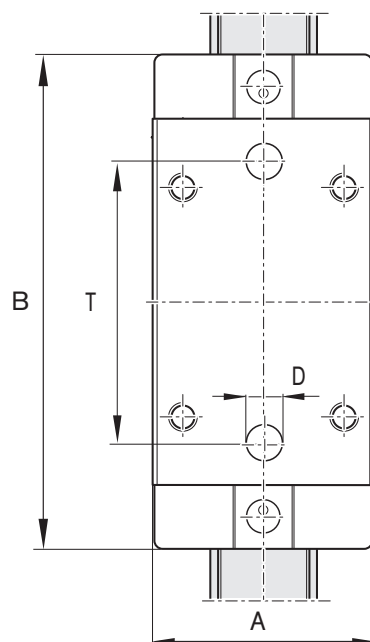
Mounting runner block



Mounting runner block

- ▶ For highly accurate parallel alignment of ball rail systems (types SNS and SNO)
- ▶ For joint alignment of multi-piece ball guide rails (types SNS and SNO).

| Size | Material numbers | Dimensions (mm) | | | | Mass (kg) |
|------|------------------|-----------------|-------|-----|----|-----------|
| | | A | B | T | D | |
| 15 | R1629 121 90 | 34 | 72.6 | 43 | 6 | 0.2 |
| 20 | R1629 821 90 | 44 | 91 | 55 | 6 | 0.5 |
| 25 | R1629 221 90 | 48 | 107.9 | 60 | 8 | 0.8 |
| 30 | R1629 721 90 | 60 | 119.7 | 75 | 10 | 1.1 |
| 35 | R1629 321 90 | 70 | 139 | 80 | 10 | 2.2 |
| 45 | R1629 421 90 | 86 | 174.1 | 105 | 15 | 4.1 |
| 55 | R1629 521 90 | 100 | 199 | 120 | 18 | 6.0 |
| 65 | R1629 621 90 | 126 | 243 | 150 | 20 | 9.8 |



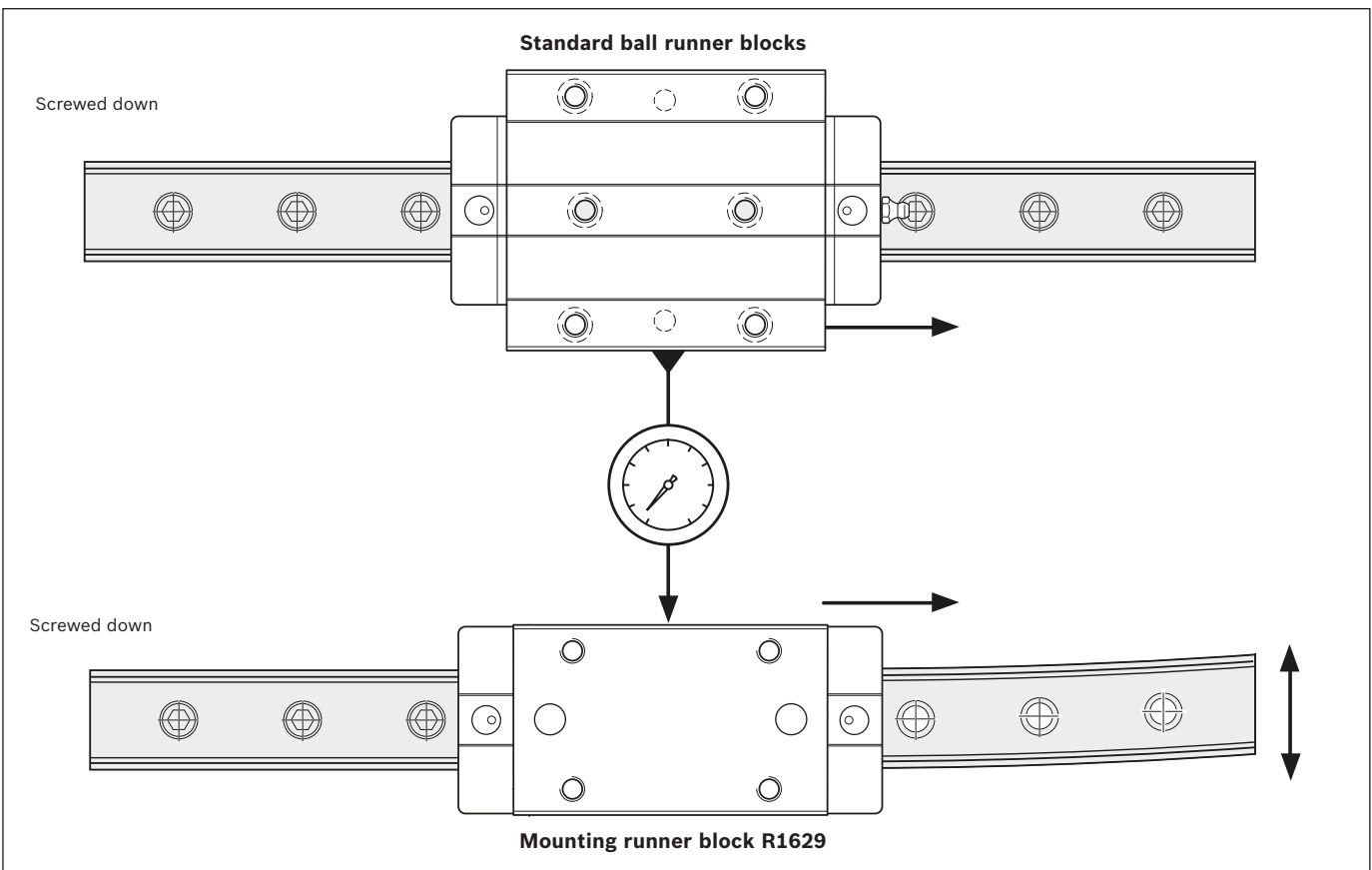
Mounting with mounting runner block

Alignment of parallel rails

- 1 Align and mount the first ball guide rail using a graduated straightedge.
- 2 Set up a mounting bridge with dial gauge between the ball runner blocks.
- 3 Move both ball runner blocks in parallel until the holes D of the mounting runner block are exactly over two mounting holes of the rail (provided that the drilling distances of the rail correspond to the spacing T).
- 4 Align the ball guide rail manually until the dial gauge shows the correct dimension.
- 5 Tighten the screws through the mounting runner block.

Alignment of the multi-piece rails

- 1 Slide the multi-piece rails together at the joint.
- 2 Slide the mounting runner block over the center of the joint until both screw heads are visible. This is the case when the hole center distance of the joint corresponds to hole spacing T. If this is not the case, continue with point 5.
- 3 The mounting runner block automatically aligns the rails at the joint.
- 4 Tighten the screws through the mounting runner block.
- 5 If the screw center distances of the guide rail at the joint are not equal to the spacing and deviate from the hole spacing of the mounting runner block, each screw must be tightened individually and then moved to the next hole.



V-guide

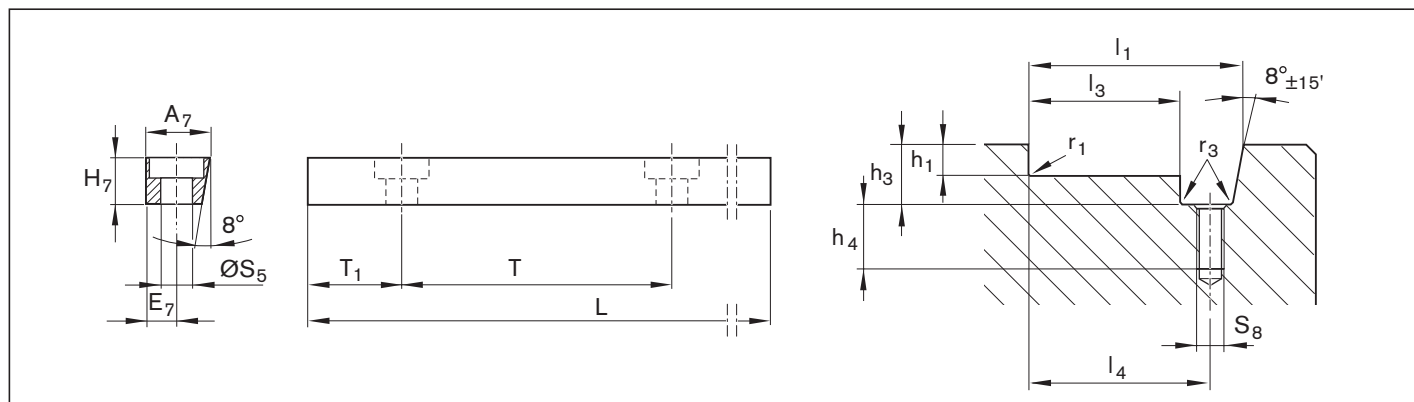
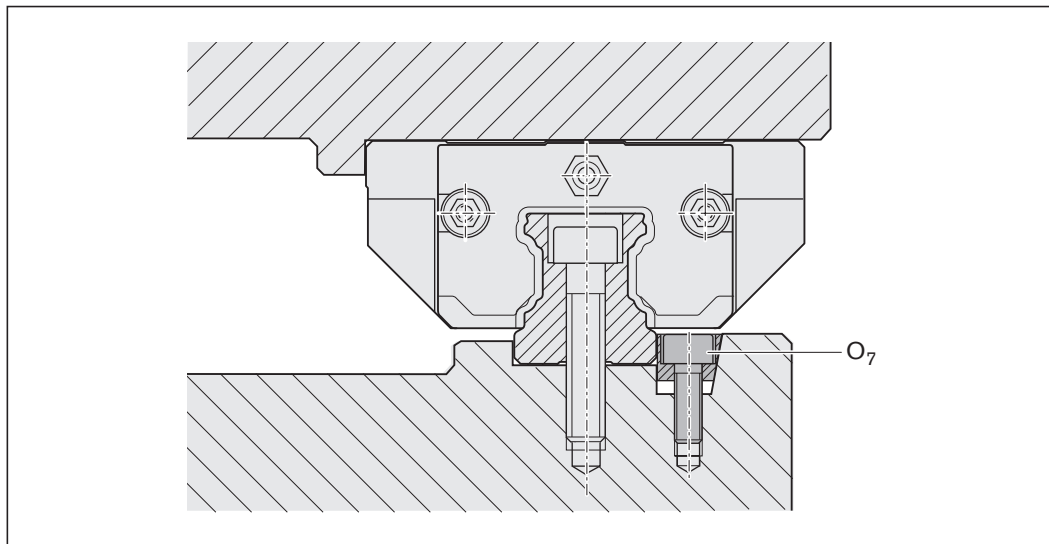
V-guide

Lateral retention of ball guide rails

- ▶ Material: Steel
- ▶ Design: black finished

Note

- ▶ Observe the instruction for mounting!
Please request the "Mounting instructions for ball rail systems."



V-guide

| Size | Material number | Dimensions (mm) | | | | | | | | Mass (kg) |
|------|-----------------|-----------------|----------------|----------------|-----|------------------------------|----------------|-----|----------------|-----------|
| | | A ₇ | E ₇ | H ₇ | L | O ₇ ¹⁾ | S ₅ | T | T ₁ | |
| 15 | R1619 200 01 | 12.0 | 6 | 10 | 957 | M5x20 | 6.0 | 60 | 28.5 | 0.8 |
| 20 | | | | | | | | | | |
| 25 | | | | | | | | | | |
| 30 | | | | | | | | | | |
| 35 | | | | | | | | | | |
| 45 | R1619 400 01 | 19.0 | 9 | 16 | 942 | M8x25 | 9.0 | 105 | 51.0 | 2.0 |
| 55 | | | | | | | | | | |
| 65 | | | | | | | | | | |

1) Screw O₇ according to DIN 6912

V-guide groove

| Size | Dimensions (mm) | | | | | | | | |
|------|--------------------|------------------------------|------------------------------|---------------------------------|--------------------------------|--------------------------------|--------------------|--------------------|----------------|
| | h _{1-0.2} | h ₃ ⁺¹ | h ₄ ⁺² | l ₁ ^{±0.05} | l ₃ ^{-0.1} | l ₄ ^{±0.1} | r _{1 max} | r _{3 max} | S ₈ |
| 15 | 3.5 | 12.5 | 15 | 27 | 14.9 | 21 | 0.4 | 0.5 | M5 |
| 20 | 4.0 | 12.5 | 15 | 32 | 19.9 | 26 | 0.5 | 0.5 | M5 |
| 25 | 4.0 | 12.5 | 15 | 35 | 22.9 | 29 | 0.8 | 0.5 | M5 |
| 30 | 5.0 | 12.5 | 15 | 40 | 27.9 | 34 | 0.8 | 0.5 | M5 |
| 35 | 6.0 | 12.5 | 15 | 46 | 33.9 | 40 | 0.8 | 0.5 | M5 |
| 45 | 8.0 | 19.0 | 16 | 64 | 44.9 | 54 | 0.8 | 0.5 | M8 |
| 55 | 10.0 | 19.0 | 16 | 72 | 52.9 | 62 | 1.2 | 0.5 | M8 |
| 65 | 10.0 | 19.0 | 16 | 82 | 62.9 | 72 | 1.2 | 0.5 | M8 |

Cardboard box opener



- ▶ Tool for opening the guide rails packaging.
- ▶ Prevents risk of injury

Ordering data

Material number R320105175

Product description hydraulic clamping and braking units

Areas of application

Clamping

- ▶ During mounting work and standstill of the machine **with** energy with hydraulic clamping and braking units of heavy handling systems
- ▶ Clamping of machine tables from heavily machined machining centers

Brakes

- ▶ Support as brake for linear motors of heavy handling systems

Characteristic features

- ▶ Very high axial holding forces
- ▶ Dynamic and static stabilization in the axial direction
- ▶ Heavy-duty brake

Further highlights

- ▶ Up to 1 million clamping cycles.
- ▶ Up to 2,000 emergency braking operations
- ▶ Threaded on both sides for the hydraulic connection
- ▶ Solid, rigid steel housing, chemically nickel-plated
- ▶ High positioning accuracy
- ▶ Release pressure 150 bar
- ▶ Integrated all-round sealing
- ▶ Special pressure diaphragm technology for maximum functional reliability without pressure losses or leakage
- ▶ Brake shoes with integrated positive-locking, large-surface contact profiles for maximum axial rigidity
- ▶ Super heavy-duty model

Special features of hydraulic clamping and braking units:

- ▶ Low displacement
- ▶ Compact design, compatible with DIN 645
- ▶ 10 million clamping cycles (B10d value)

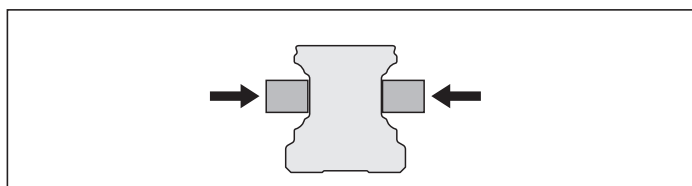
⚠ Observe the safety instructions on clamping and braking units.

Functional principle

Hydraulic pressure: 50 – 150 bar

Clamps and brakes with compression

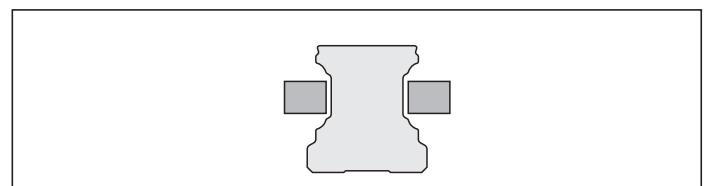
The large-scale clamping profiles are pressed directly through the hydraulic oil via a piston principle to the flanks of the ball guide rail.



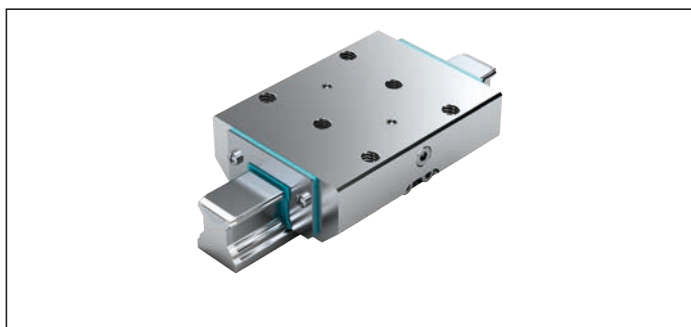
Hydraulic pressure: 0 bar

Decompression with spring force

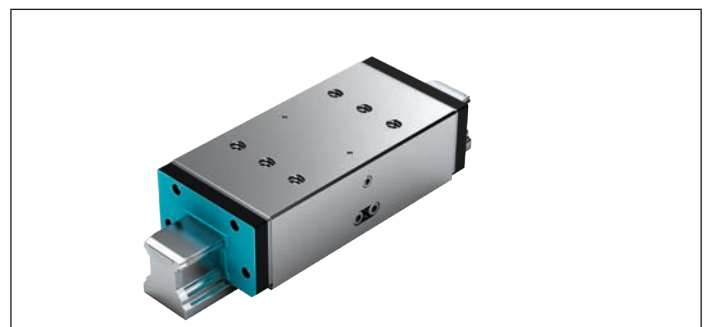
A preloaded return spring allows for short decompression cycles.



KBH, FLS



KBH, SLS



Additional information

Hydraulic connections

The hydraulic clamping units are pre-filled with HLP 46 at the factory. The hydraulic connection is attached on two sides. One connection is suitable for pressurization. Take care when venting fixed and flexible hydraulic lines because air ports can damage sealing elements.

Connection structure, mounting the clamping units

To prevent detrimental effects, e.g. permanent grinding on the linear guide, the connection structure must be rigid and in accordance with its load and requirements. If the clamping units tilt, this can result in contact, wear and therefore damage to the linear guide.

The setting at the factory is adapted for the linear guide and may not be altered when mounting. It is imperative to observe the mounting instructions for the clamping and braking units and the linear guides.

Some spring-loaded accumulators are equipped with a transport lock between the contact profiles.

This must be removed when mounting by pressurizing the unit. When pressure is removed, the transport lock or the associated linear guide must always lie between the contact profiles.

The clamping units do not have any guiding function. A runner block can therefore not be replaced with a clamping unit.

The ideal position of the clamping unit lies between two runner blocks.

When using several clamping units, these should be distributed evenly on both guide rails in order to attain a maximum rigidity of the overall construction.

Lubrication

When using the prescribed pressurizing medium, lubrication is not required.

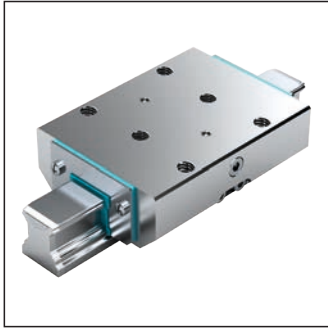
Surface protection

All housings of the Clamping Units are chemically nickel-plated and therefore have limited rust protection. Aluminum subsections are chemically nickel-plated or hard-coated according to their requirement.

B10d value

The B10d-value specifies the number of switching cycles until 10% of components fail dangerously.

Hydraulic clamping and braking units, KBH, FLS



FLS

Flanged, long, standard height

R1619 .40 21

Note

Can be used on all SNS ball guide rails.

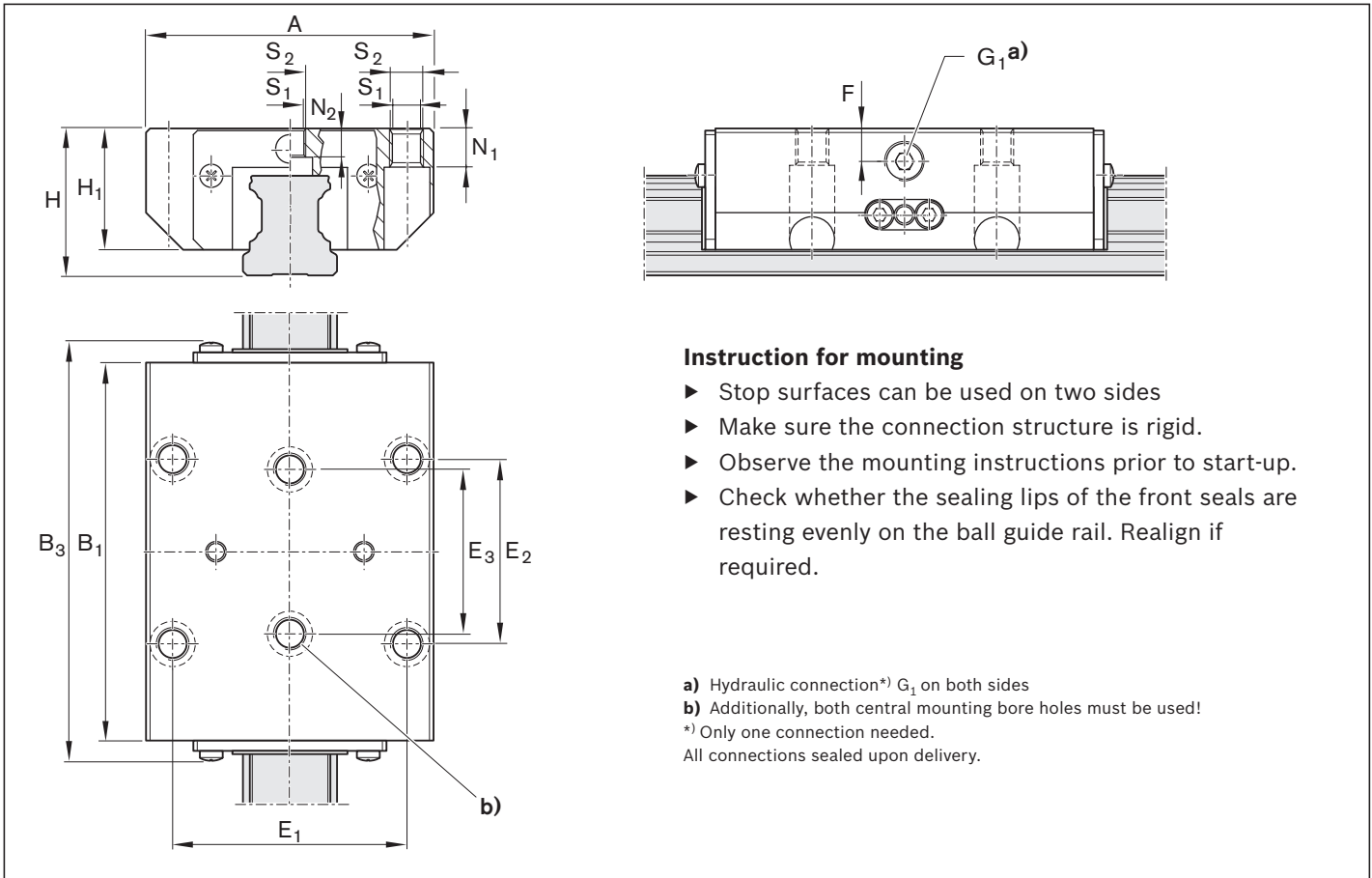
Clamps and brakes with compression

- ▶ Max. hydraulic operating pressure:
 - ▶ Size 25: 100 bar
 - ▶ Size 35–65: 150 bar
- ▶ Operating temperature range t: 0 – 70 °C

Note on lubrication

- ▶ Initial filling of hydraulic oil HLP46
- ▶ Check for compatibility when using different oils

⚠ Observe the safety instructions on clamping and braking units.



Instruction for mounting

- ▶ Stop surfaces can be used on two sides
- ▶ Make sure the connection structure is rigid.
- ▶ Observe the mounting instructions prior to start-up.
- ▶ Check whether the sealing lips of the front seals are resting evenly on the ball guide rail. Realign if required.

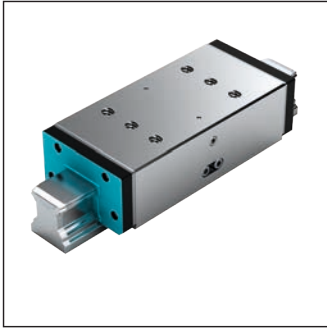
a) Hydraulic connection*) G₁ on both sides
 b) Additionally, both central mounting bore holes must be used!
 *) Only one connection needed.
 All connections sealed upon delivery.

| Size | Material number | Holding force ¹⁾ (N) | Dimensions (mm) | | | | | | | | | | | | | | Displacement ⁶⁾ (cm ³) | Mass (kg) |
|------|-----------------|------------------------------------|-----------------|----------------|--------------------|----|----------------|----------------|----------------|----------------|----|----------------|------------------------------|------------------------------|----------------|----------------|--|--------------|
| | | | A | B ₁ | B _{3 max} | H | H ₁ | E ₁ | E ₂ | E ₃ | F | G ₁ | N ₁ ⁴⁾ | N ₂ ⁵⁾ | S ₁ | S ₂ | | |
| 25 | R1619 240 21 | 2,200 ²⁾ | 70 | 92.0 | 102.3 | 36 | 29.5 | 57 | 45 | 40 | 8 | 1/8" | 9 | 7.0 | 6.8 | M8 | 0.6 | 1.10 |
| 35 | R1619 340 21 | 5,700 ³⁾ | 100 | 120.5 | 141.0 | 48 | 40.0 | 82 | 62 | 52 | 12 | 1/8" | 12 | 10.2 | 8.6 | M10 | 1.1 | 2.69 |
| 45 | R1619 440 21 | 9,900 ³⁾ | 120 | 155.0 | 178.0 | 60 | 50.0 | 100 | 80 | 60 | 15 | 1/8" | 15 | 12.4 | 10.5 | M12 | 1.8 | 5.20 |
| 55 | R1619 540 21 | 13,700 ³⁾ | 140 | 184.0 | 209.0 | 70 | 57.0 | 116 | 95 | 70 | 16 | 1/8" | 18 | 13.5 | 12.5 | M14 | 2.4 | 8.40 |
| 65 | R1619 640 21 | 22,700 ³⁾ | 170 | 227.0 | 264.0 | 90 | 76.0 | 142 | 110 | 82 | 20 | 1/4" | 23 | 14.0 | 14.5 | M16 | 3.8 | 17.30 |

1) The inspection is done in a mounted state with a lubricated layer (ISO-VG 68).
 2) At 100 bar
 3) At 150 bar

4) For mounting from below with ISO 4762
 5) For mounting from below with DIN 7984
 6) Per clamping

Hydraulic clamping and braking units, KBH, SLS

**SLS****Slimline, long, standard height****R1619 .40 20****Note**

Can be used on all SNS ball guide rails.

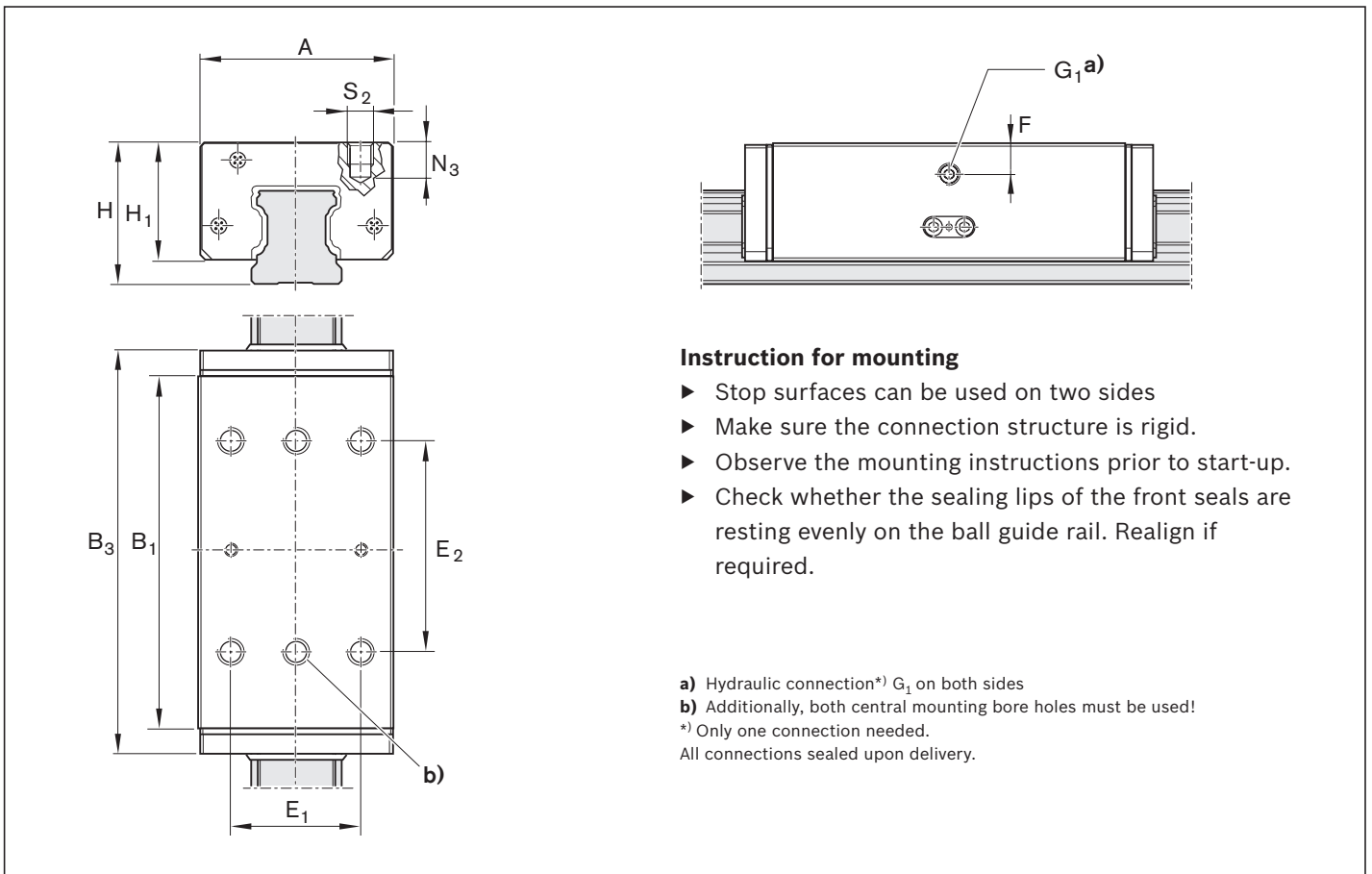
Clamps and brakes with compression

- ▶ Max. hydraulic operating pressure:
- ▶ Size 65: 150 bar
- ▶ Operating temperature range t: 0 – 70 °C

Note on lubrication

- ▶ Initial filling of hydraulic oil HLP46
- ▶ Check for compatibility when using different oils

⚠ Observe the safety instructions on clamping and braking units.

**Instruction for mounting**

- ▶ Stop surfaces can be used on two sides
- ▶ Make sure the connection structure is rigid.
- ▶ Observe the mounting instructions prior to start-up.
- ▶ Check whether the sealing lips of the front seals are resting evenly on the ball guide rail. Realign if required.

a) Hydraulic connection*) G₁ on both sides

b) Additionally, both central mounting bore holes must be used!

*) Only one connection needed.

All connections sealed upon delivery.

| Size | Material number | Holding force ¹⁾ (N) | Dimensions (mm) | | | | | | | | | | | Displacement ³⁾ (cm ³) | Mass (kg) |
|------|-----------------|------------------------------------|-----------------|----------------|--------------------|----|----------------|----------------|----------------|----|----------------|----------------|----------------|--|--------------|
| | | | A | B ₁ | B _{3 max} | H | H ₁ | E ₁ | E ₂ | F | G ₁ | N ₃ | S ₂ | | |
| 65 | R1619 640 20 | 22,700 ²⁾ | 126 | 227 | 264 | 90 | 76 | 76 | 120 | 20 | 1/4" | 21 | M16 | 3.8 | 14.40 |

1) The inspection is done in a mounted state with a lubricated layer (ISO-VG 68).

2) At 100 bar

3) Per clamping

Hydraulic clamping units product description

Areas of application

- ▶ Clamping of heavy handling systems
- ▶ Clamping of machine tables from heavily machined machining centers

Characteristic features

- ▶ Very high axial holding forces
- ▶ Compact design, compatible with DIN 645
- ▶ Dynamic and static stabilization in the axial direction

⚠ Observe the safety instructions on clamping and braking units.

Further highlights

- ▶ Threaded on both sides for the hydraulic connection
- ▶ Solid, rigid steel housing, chemically nickel-plated
- ▶ High positioning accuracy
- ▶ Continuously adjustable pressure from 50 – 150 bar
- ▶ Integrated all-round sealing
- ▶ Special pressure diaphragm technology for maximum functional reliability without pressure losses or leakage
- ▶ Integrated positive-locking, large-surface contact profiles for maximum axial rigidity

Special features of the Hydraulic Clamping and Braking Units:

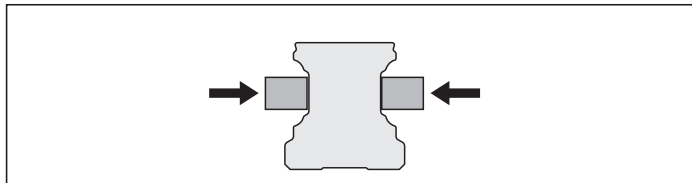
- ▶ 10 million clamping cycles (B10d value)

Functional principle

Hydraulic pressure: 50 – 150 bar

Clamps with compression

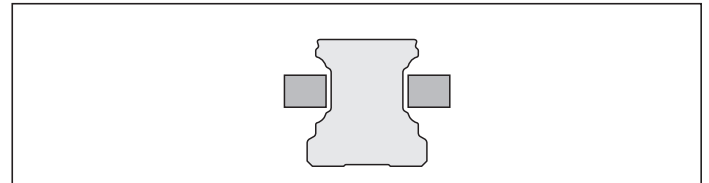
The large-scale clamping profiles are pressed directly through the hydraulic oil via a piston principle to the flanks of the ball guide rail.



Hydraulic pressure: 0 bar

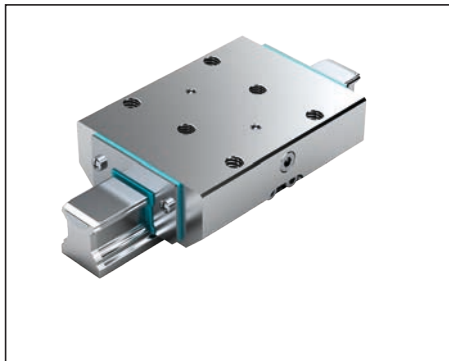
Decompression with spring force

A preloaded return spring allows for short decompression cycles.

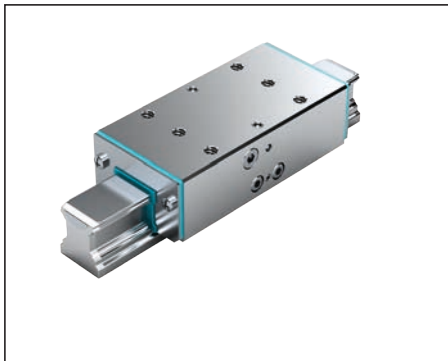


Model overview of accessories for hydraulic clamping units

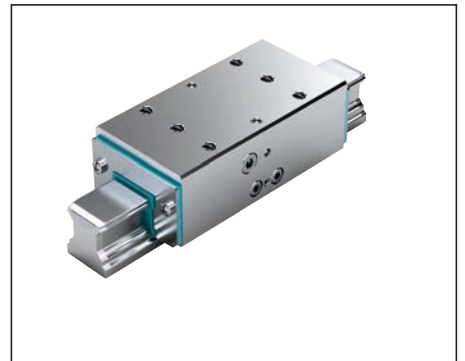
Hydraulic Clamping and Braking Units, FLS



Hydraulic Clamping and Braking Units, SLS



Hydraulic Clamping and Braking Units, SLH



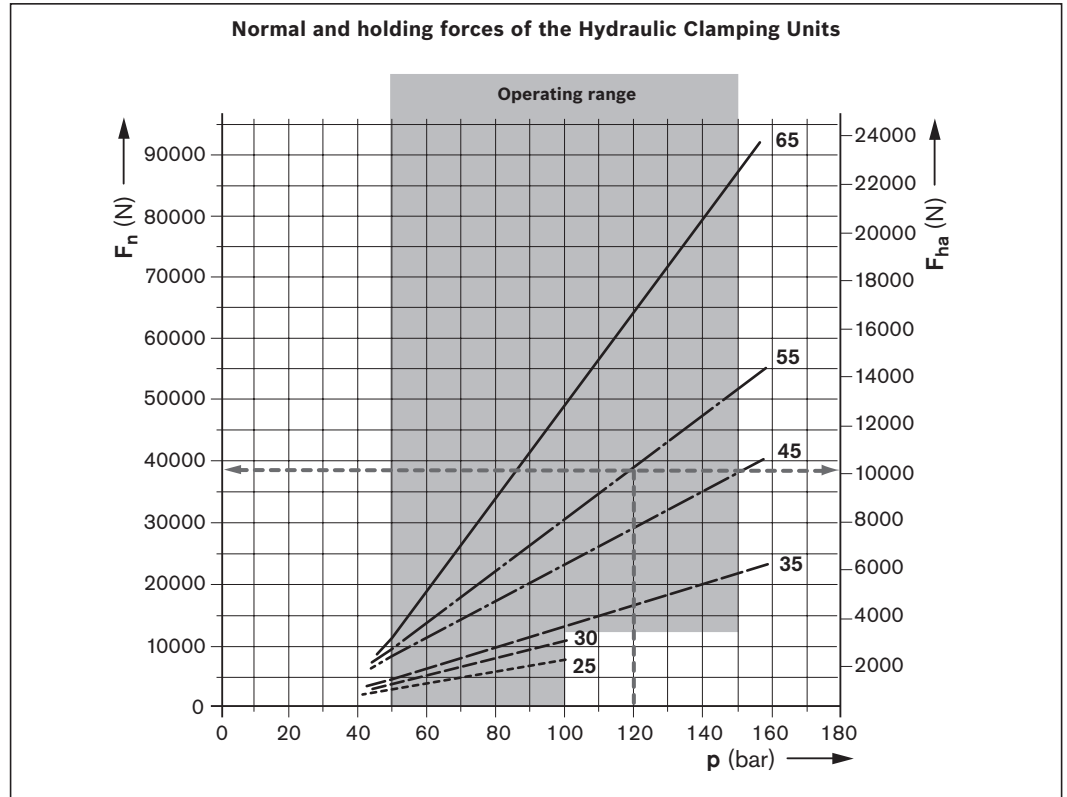
Technical data and calculations

Normal forces and retaining forces

Measured values with the hydraulic clamping unit KWH, FLS, flanged, long, standard height
Sizes 25 – 65

Max. hydraulic operating pressure:

- ▶ Sizes 25 – 30: 100 bar
- ▶ Sizes 35 – 65: 150 bar



Calculation of the holding force

Holding force for Hydraulic Clamping Units

$$F_{ha} = F_n \cdot 2 \cdot \mu_0$$

Normal (perpendicular) force (measured): F_n see diagram
 Stiction coefficient: $\mu_0 = 0.13$ (approx.) for steel/steel, oiled,
 in relation to the ball guide rail

Calculation example: Clamping unit KWH, size 55

Pressure: $p = 120$ bar
 Normal (perpendicular) force: $F_n = 38500$ N (see diagram)
 Holding force: $F_{ha} = 38500 \text{ N} \cdot 2 \cdot 0.13 = 10010$ N

Permissible holding force for Hydraulic Clamping Units

$$F_{ha, perm} = F_{ha} / f_s$$

The safety factor f_s depends on:

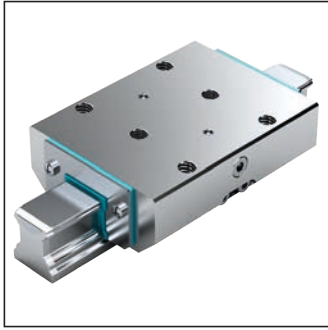
- ▶ Vibrations
- ▶ Force surges
- ▶ Application-specific requirements etc.

Example: Clamping unit KWH, size 55

Holding force: $F_{ha} = 10010$ N
 (see calculation example)
 Safety factor: $f_s = 1.25$ (assumed)
 Permissible holding force: $F_{ha, perm} = 10010 \text{ N} / 1.25 \approx 8,000$ N

f_s = Safety factor (–)
 F_{ha} = Holding force (N)
 (with $\mu_0 = 0.13$)
 $F_{ha, perm}$ = Permissible holding force (N)
 F_n = Normal (perpendicular) force (N)
 μ_0 = Stiction coefficient (–)
 p = Pressure (bar)

Hydraulic clamping units KWH, FLS



**FLS, flanged, long, standard height
R1619 .42 11**

Note

Can be used on all SNS ball guide rails.

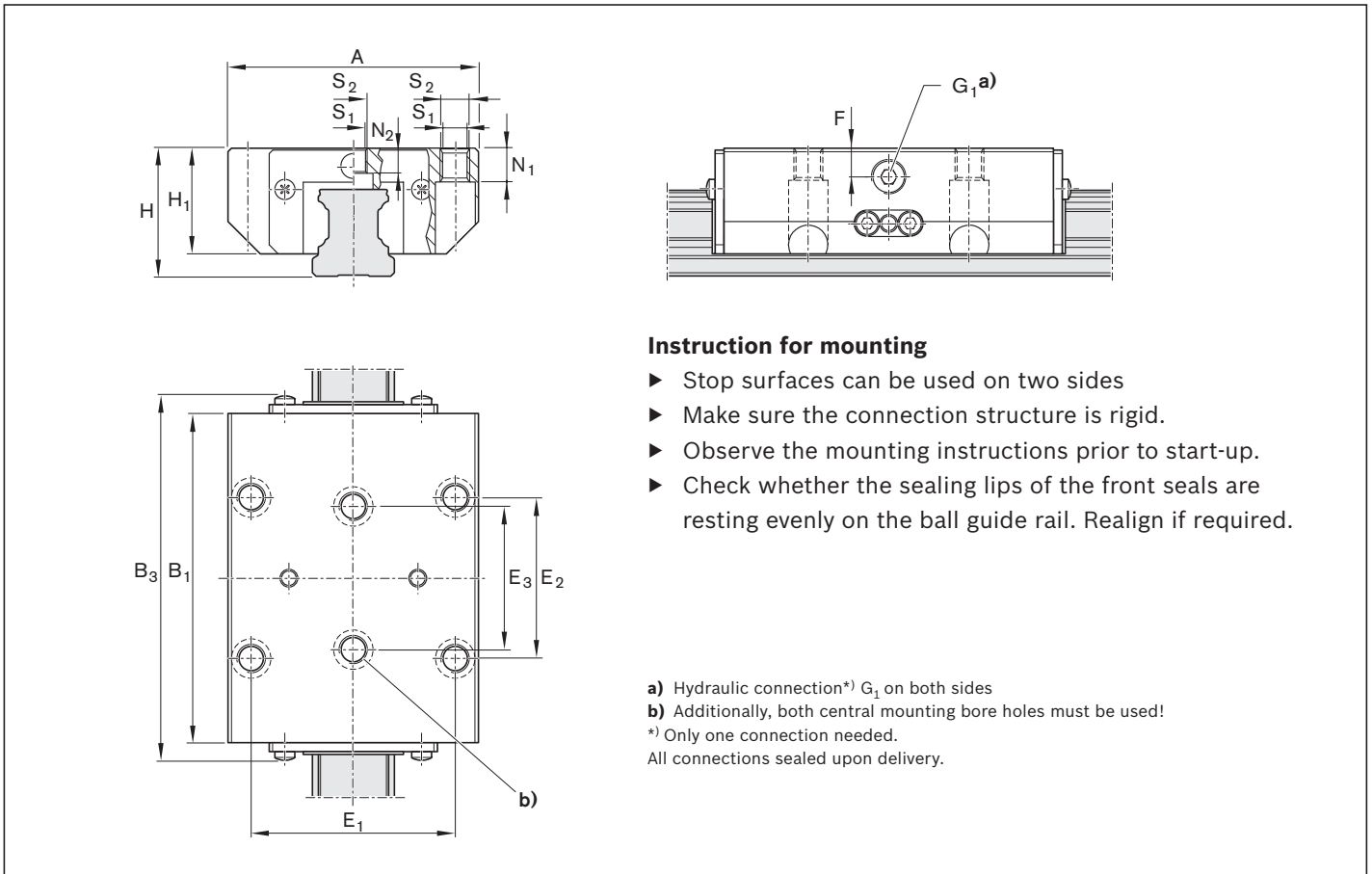
Clamps with compression

- ▶ Max. hydraulic operating pressure:
 - ▶ Sizes 25 – 30: 100 bar
 - ▶ Sizes 35 – 65: 150 bar
- ▶ Operating temperature range t: 0 – 70 °C

Note on lubrication

- ▶ Initial filling of hydraulic oil HLP46
- ▶ Check for compatibility when using different oils

⚠ Observe the safety instructions on clamping and braking units.



Instruction for mounting

- ▶ Stop surfaces can be used on two sides
- ▶ Make sure the connection structure is rigid.
- ▶ Observe the mounting instructions prior to start-up.
- ▶ Check whether the sealing lips of the front seals are resting evenly on the ball guide rail. Realign if required.

a) Hydraulic connection*) G₁ on both sides
 b) Additionally, both central mounting bore holes must be used!
 *) Only one connection needed.
 All connections sealed upon delivery.

| Size | Material number | Holding force ¹⁾ (N) | Dimensions (mm) | | | | | | | | | | | | | | Displacement ⁶⁾ (cm ³) | Mass (kg) |
|------|-----------------|---------------------------------|-----------------|----------------|-------------------|----|----------------|----------------|----------------|----------------|------|----------------|------------------------------|------------------------------|----------------|----------------|---|-----------|
| | | | A | B ₁ | B _{3max} | H | H ₁ | E ₁ | E ₂ | E ₃ | F | G ₁ | N ₁ ⁴⁾ | N ₂ ⁵⁾ | S ₁ | S ₂ | | |
| 25 | R1619 242 11 | 2,200 ²⁾ | 70 | 92.0 | 102.3 | 36 | 29.5 | 57 | 45 | 40 | 8.0 | 1/8" | 9 | 7.0 | 6.8 | M8 | 0.6 | 1.22 |
| 30 | R1619 742 11 | 3,000 ²⁾ | 90 | 103.5 | 115.4 | 42 | 35.0 | 72 | 52 | 44 | 10.5 | 1/8" | 11 | 8.0 | 8.6 | M10 | 0.7 | 2.09 |
| 35 | R1619 342 11 | 5,700 ³⁾ | 100 | 120.5 | 133.0 | 48 | 40.0 | 82 | 62 | 52 | 12.0 | 1/8" | 12 | 10.2 | 8.6 | M10 | 1.1 | 2.69 |
| 45 | R1619 442 11 | 9,900 ³⁾ | 120 | 155.0 | 170.0 | 60 | 50.0 | 100 | 80 | 60 | 15.0 | 1/8" | 15 | 12.4 | 10.5 | M12 | 1.8 | 5.32 |
| 55 | R1619 542 11 | 13,700 ³⁾ | 140 | 184.0 | 201.0 | 70 | 57.0 | 116 | 95 | 70 | 16.0 | 1/8" | 18 | 13.5 | 12.5 | M14 | 2.4 | 8.40 |
| 65 | R1619 642 11 | 22,700 ³⁾ | 170 | 227.0 | 256.0 | 90 | 76.0 | 142 | 110 | 82 | 20.0 | 1/4" | 23 | 14.0 | 14.5 | M16 | 3.8 | 17.30 |

1) The inspection is done in a mounted state with a lubricated layer (ISO-VG 68). Permissible holding force 173

2) At 100 bar

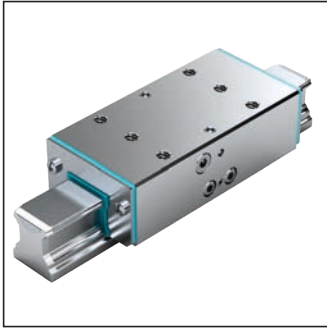
3) At 150 bar

4) For mounting from below with ISO 4762

5) For mounting from below with DIN 7984

6) Per clamping

Hydraulic clamping units KWH, SLS



SLS - Slimline, long, standard height

R1619 .42 51

Note

Can be used on all SNS ball guide rails.

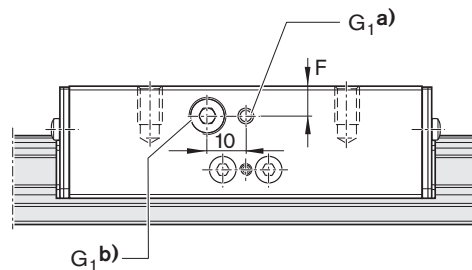
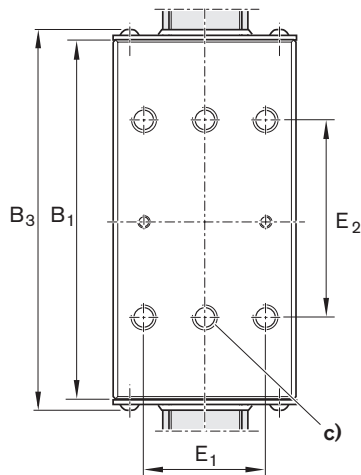
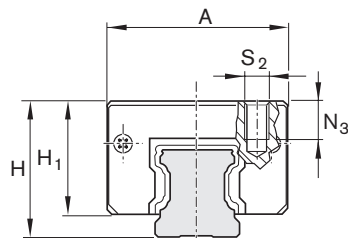
Clamps with compression

- ▶ Max. hydraulic operating pressure:
 - ▶ Sizes 25 – 30: 100 bar
 - ▶ Size 35, 55, 65: 150 bar
 - ▶ Size 45: 110 bar
- ▶ Operating temperature range t: 0 – 70 °C

Note on lubrication

- ▶ Initial filling of hydraulic oil HLP46
- ▶ Check for compatibility when using different oils

! Observe the safety instructions on clamping and braking units.



Instruction for mounting

- ▶ Stop surfaces can be used on two sides
- ▶ Make sure the connection structure is rigid.
- ▶ Observe the mounting instructions prior to start-up.
- ▶ Check whether the sealing lips of the front seals are resting evenly on the ball guide rail. Realign if required.

a) Hydraulic connection*) G₁ on both sides

b) Hydraulic connection*) G₁ on both sides for sizes 25 – 30

c) In addition, both mounting holes must be used!

*) Only one connection needed.

All connections sealed upon delivery.

| Size | Material number | Holding force ¹⁾ (N) | Dimensions (mm) | | | | | | | | | | | Displacement ⁴⁾ (cm ³) | Mass (kg) |
|------|-----------------|---------------------------------|-----------------|----------------|-------------------|----|----------------|----------------|----------------|----|----------------|----------------|----------------|---|-----------|
| | | | A | B ₁ | B _{3max} | H | H ₁ | E ₁ | E ₂ | F | G ₁ | N ₃ | S ₂ | | |
| 25 | R1619 242 51 | 1,600 ²⁾ | 48 | 92.0 | 102.3 | 36 | 29.5 | 35 | 50 | 8 | 1/8" | 8 | M6 | 0.6 | 1.22 |
| 30 | R1619 742 51 | 3,000 ²⁾ | 60 | 103.5 | 115.4 | 42 | 35.0 | 40 | 60 | 9 | 1/8" | 8 | M8 | 0.7 | 2.09 |
| 35 | R1619 342 51 | 3,500 ²⁾ | 70 | 120.5 | 134.0 | 48 | 40.0 | 50 | 72 | 12 | 1/8" | 13 | M8 | 1.1 | 2.02 |
| 45 | R1619 442 51 | 7,400 ²⁾ | 86 | 155.0 | 170.0 | 60 | 50.0 | 60 | 80 | 15 | 1/8" | 15 | M10 | 1.8 | 4.00 |
| 55 | R1619 542-51 | 13,700 ³⁾ | 100 | 184.0 | 201.0 | 70 | 57.0 | 75 | 95 | 16 | 1/8" | 18 | M12 | 2.4 | 6.10 |
| 65 | R1619 642 51 | 22,700 ³⁾ | 126 | 227.0 | 256.0 | 90 | 76.0 | 76 | 120 | 20 | 1/4" | 21 | M16 | 3.8 | 14.40 |

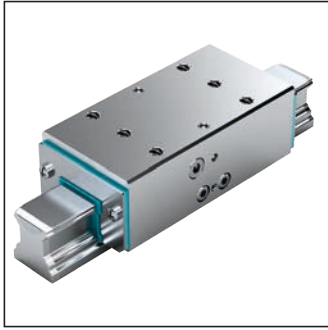
1) The inspection is done in a mounted state with a lubricated layer (ISO-VG 68). Permissible holding force φ 173

2) At 100 bar

3) At 150 bar

4) Per clamping

Hydraulic clamping units KWH, SLH



SLH - Slimline, long, high

R1619 .42 31

Note

Can be used on all SNS ball guide rails.

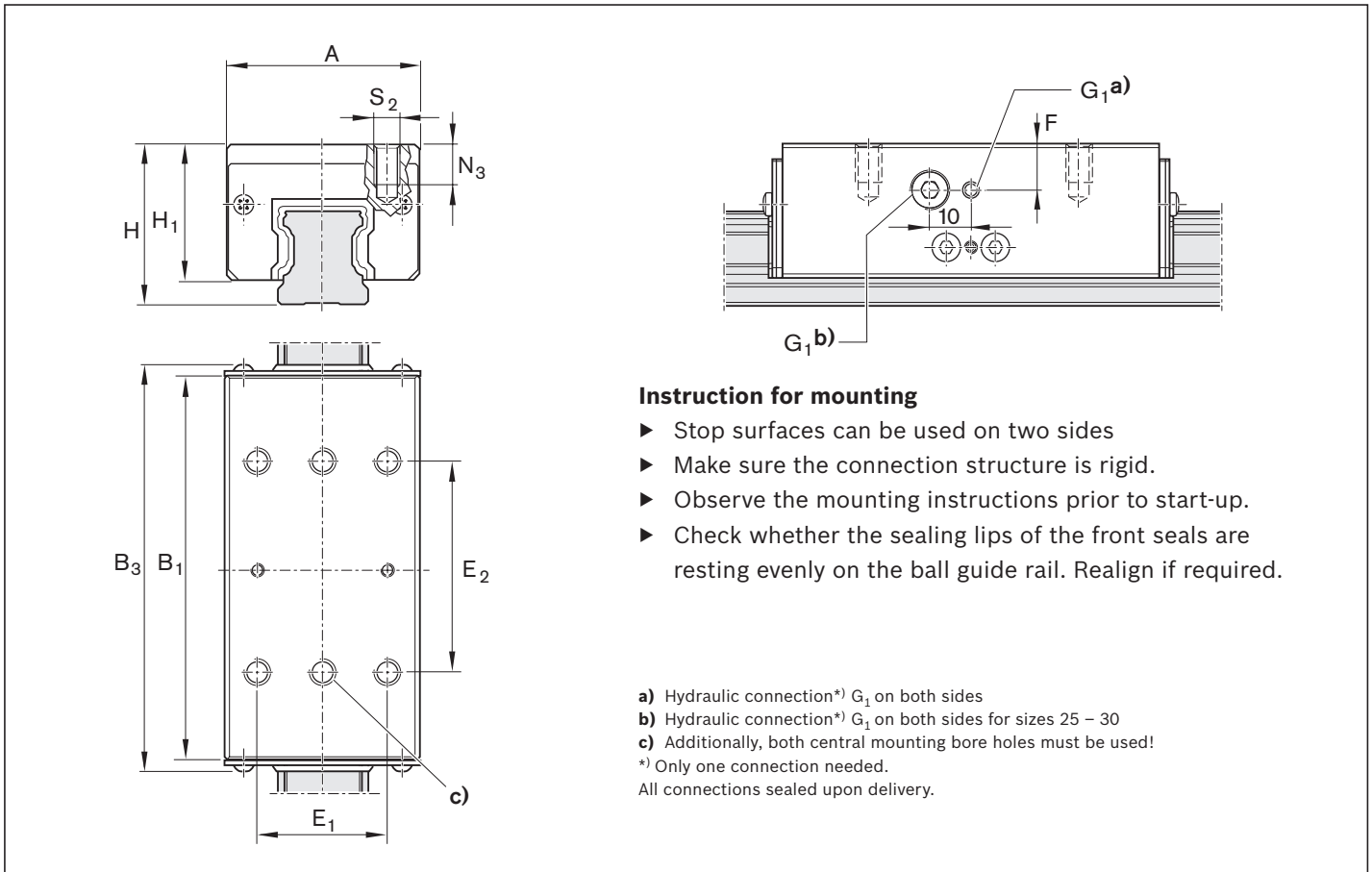
Clamps with compression

- ▶ Max. hydraulic operating pressure:
 - ▶ Sizes 25 – 30: 100 bar
 - ▶ Sizes 35, 55, 65: 150 bar
 - ▶ Size 45: 110 bar
- ▶ Operating temperature range t: 0 – 70 °C

Note on lubrication

- ▶ Initial filling of hydraulic oil HLP46
- ▶ Check for compatibility when using different oils

⚠ Observe the safety instructions on clamping and braking units.



Instruction for mounting

- ▶ Stop surfaces can be used on two sides
- ▶ Make sure the connection structure is rigid.
- ▶ Observe the mounting instructions prior to start-up.
- ▶ Check whether the sealing lips of the front seals are resting evenly on the ball guide rail. Realign if required.

- a) Hydraulic connection*) G₁ on both sides
 - b) Hydraulic connection*) G₁ on both sides for sizes 25 – 30
 - c) Additionally, both central mounting bore holes must be used!
- *) Only one connection needed.
All connections sealed upon delivery.

| Size | Material number | Holding force ¹⁾ (N) | Dimensions (mm) | | | | | | | | | | | Displacement ⁴⁾ (cm ³) | Mass (kg) |
|------|-----------------|---------------------------------|-----------------|----------------|-------------------|----|----------------|----------------|----------------|----|----------------|----------------|----------------|---|-----------|
| | | | A | B ₁ | B _{3max} | H | H ₁ | E ₁ | E ₂ | F | G ₁ | N ₃ | S ₂ | | |
| 25 | R1619 242 31 | 1,600 ²⁾ | 48 | 92.0 | 102.3 | 40 | 33.5 | 35 | 50 | 12 | 1/8" | 12 | M6 | 0.6 | 1.10 |
| 30 | R1619 742 31 | 3,000 ²⁾ | 60 | 103.5 | 115.4 | 45 | 38.0 | 40 | 60 | 12 | 1/8" | 11 | M8 | 0.7 | 1.90 |
| 35 | R1619 342 31 | 3,500 ²⁾ | 70 | 120.5 | 134.0 | 55 | 47.0 | 50 | 72 | 18 | 1/8" | 13 | M8 | 1.1 | 2.46 |
| 45 | R1619 442 31 | 7,400 ²⁾ | 86 | 155.0 | 170.0 | 70 | 60.0 | 60 | 80 | 24 | 1/8" | 18 | M10 | 1.8 | 4.95 |
| 55 | R1619 542 31 | 13,700 ³⁾ | 100 | 184.0 | 201.0 | 80 | 67.0 | 75 | 95 | 26 | 1/8" | 19 | M12 | 2.4 | 7.90 |

1) The inspection is done in a mounted state with a lubricated layer (ISO-VG 68). Permissible holding force 173
 2) At 100 bar
 3) At 150 bar
 4) Per clamping

Pneumatic clamping and braking units, product description

Areas of application

Clamping

- ▶ In the event of loss of pressure
- ▶ During assembly work and standstill of the machine without energy
- ▶ of machine tables from machining centers
- ▶ of z-axis positioning in the resting position

Brakes

- ▶ In the event of energy failure
- ▶ In the event of a pressure drop
- ▶ Support of the emergency stop function
- ▶ Support as brake for linear motors

Characteristic features

- ▶ Clamps and brakes with spring energy accumulator
- ▶ Positive-locking integrated contact profiles ensure maximum axial and horizontal rigidity, and thus an excellent braking effect
- ▶ Dynamic and static stability in axial direction

Special features MBPS/UBPS:

- ▶ 5 million clamping cycles (B10d value)

⚠ Observe the safety instructions on clamping and braking units.

Functional principle

Air pressure: 0 bar

Clamps and brakes with spring force

In the event of a pressure drop, the clamping or braking effect is generated via a dual acting gate valve gear mechanism, each with one spring assembly (spring energy accumulator).

An integrated quick-exhaust valve ensures short response times.

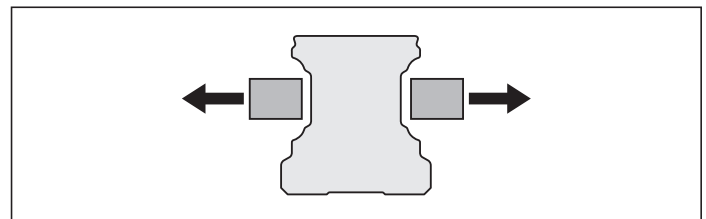
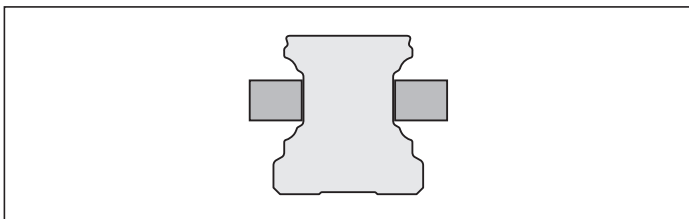
Air pressure: 4.5 – 8 bar (MBPS)

5.5 – 8 bar (UBPS)

Decompression with air pressure

The clamping profiles are held apart by the compressed air.

- ▶ Free movement is possible



Further highlights

- ▶ Up to 1 million clamping cycles
- ▶ Up to 2,000 emergency braking operations
- ▶ Integrated all-round sealing
- ▶ High continuous output
- ▶ High positioning accuracy
- ▶ Mechanical gate valve gear mechanism
- ▶ Solid, rigid steel housing, chemically nickel-plated
- ▶ Low air consumption
- ▶ Maintenance-free

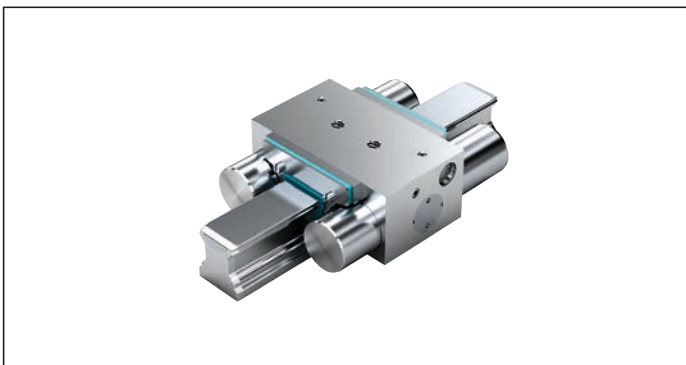
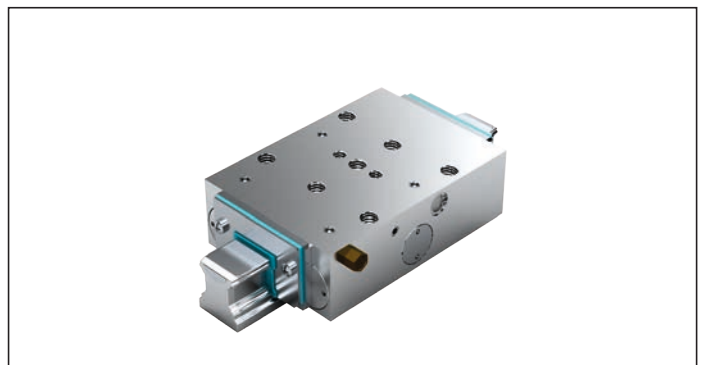
Special features of MBPS:

- ▶ Clamping and Braking Units in short format
- ▶ Add-ons with three pistons connected in series combined with strong springs result in holding forces up to 3 800 N at just 4.5 bar release pressure.
- ▶ 5 million clamping cycles (B10d value)¹⁾

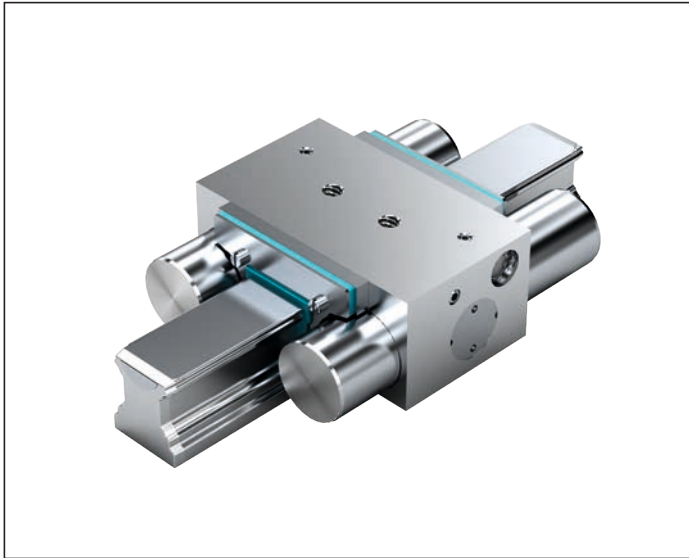
Special features of UBPS:

- ▶ Very high axial holding forces of up to 7 700 N at 5.5 bar release pressure with high-power spring energy accumulator
- ▶ Increased holding force of up to 9,200 N thanks to additional pressurization on the air-plus port
- ▶ Extremely low air consumption
- ▶ Compact design, compatible with DIN 645
- ▶ 5 million clamping cycles (B10d value)¹⁾

1) B10d value is not achieved on air-plus port

MBPS**UBPS**

Pneumatic clamping and braking units MBPS



R1619 .40 31

Note

Can be used on all SNS ball guide rails.

Clamps and brakes without pressurization (spring energy)

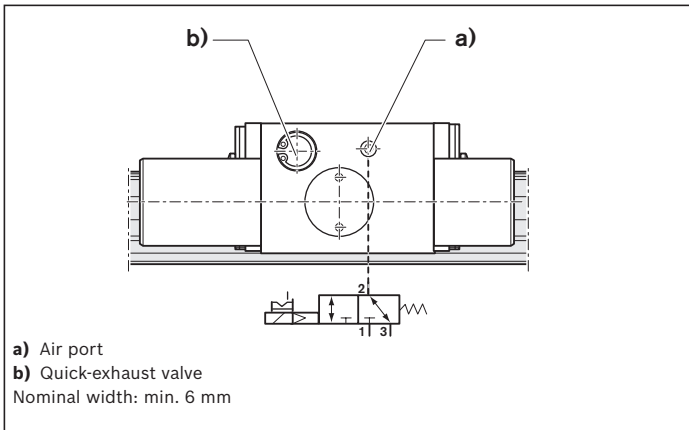
- ▶ Minimum release pressure 4.5 bar
- ▶ Maximum pneumatic operating pressure: 8 bar
- ▶ Operating temperature range t: 0 – 70°C

Instruction for mounting

- ▶ Make sure the connection structure is rigid.
- ▶ Use only purified and lubricated air. The prescribed filter mesh size is 25 µm.
- ▶ Observe the mounting instructions prior to start-up.
- ▶ Check whether the sealing lips of the front seals are resting evenly on the ball guide rail. Realign if required.

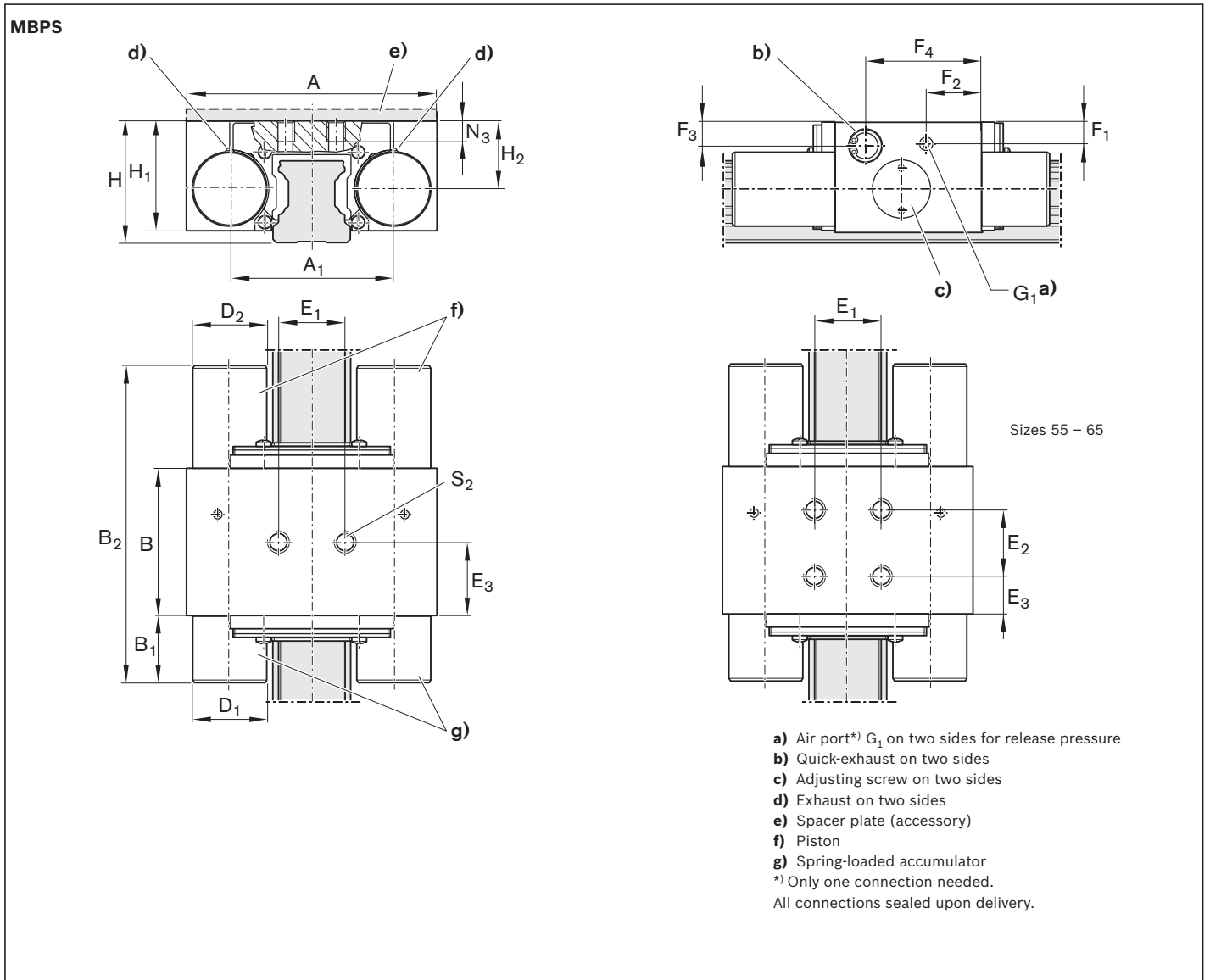
- ⚠ Observe the safety instructions on clamping and braking units.

Circuitry¹⁾ for standard air port



| Size | Material number | Holding force Spring energy ¹⁾ (N) | Air consumption (normal liter) Air port (dm ³ /stroke) |
|------|-----------------|---|---|
| 20 | R1619 840 31 | 1000 | 0.034 |
| 25 | R1619 240 31 | 1 300 | 0.048 |
| 30 | R1619 740 31 | 2 000 | 0.065 |
| 35 | R1619 340 31 | 2 600 | 0.093 |
| 45 | R1619 440 31 | 3 600 | 0.099 |
| 55 | R1619 540 31 | 4 700 | 0.244 |
| 65 | R1619 640 31 | 4 700 | 0.244 |

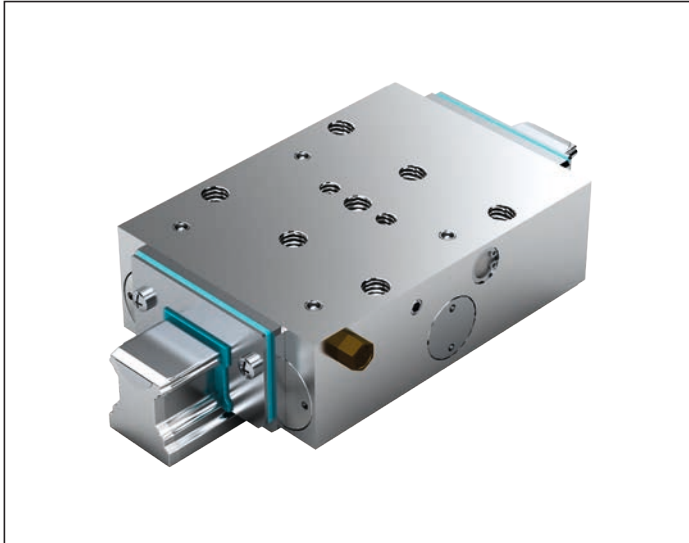
1) Holding force by spring energy at 6 bar. The inspection is done in a mounted state with a lubricated layer (ISO-VG 68).



| Size | Dimensions (mm) | | | | | | | | | | | | | | | | | | | | Mass (kg) |
|-----------|-----------------|----------------|----|----------------|--------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----|------------------------------|----------------|----------------|----------------|-----------|
| | A | A ₁ | B | B ₁ | B _{2 max} | D ₁ | D ₂ | E ₁ | E ₂ | E ₃ | F ₁ | F ₂ | F ₃ | F ₄ | G ₁ | H | H ₁ ¹⁾ | H ₂ | N ₃ | S ₂ | |
| 20 | 66 | 45.7 | 44 | 19.0 | 94.5 | 16 | 18 | 20 | - | 22.0 | 5.5 | 15.5 | 6.0 | 35.5 | M5 | 30 | 25.8 | 16.2 | 8.6 | M6 | 0.7 |
| 25 | 75 | 49.0 | 44 | 20.2 | 95.5 | 22 | 22 | 20 | - | 22.0 | 6.5 | 16.5 | 7.0 | 34.7 | M5 | 36 | 32.5 | 20.0 | 8.0 | M6 | 1.0 |
| 30 | 90 | 58.0 | 47 | 29.0 | 107.5 | 25 | 25 | 22 | - | 23.0 | 7.2 | 30.5 | 7.2 | 40.0 | M5 | 42 | 38.5 | 24.0 | 9.0 | M8 | 1.8 |
| 35 | 100 | 68.0 | 46 | 27.7 | 106.2 | 28 | 28 | 24 | - | 24.5 | 9.0 | 19.0 | 9.5 | 38.0 | G1/8" | 48 | 42.0 | 26.5 | 10.0 | M8 | 1.9 |
| 45 | 120 | 78.8 | 49 | 32.2 | 113.7 | 30 | 30 | 26 | - | 24.5 | 15.0 | 31.1 | 12.2 | 41.6 | G1/8" | 60 | 52.0 | 35.5 | 15.0 | M10 | 2.3 |
| 55 | 140 | 97.0 | 62 | 41.0 | 145.0 | 39 | 39 | 38 | 38 | 12.0 | 11.0 | 23.0 | 11.0 | 40.0 | M5 | 70 | 59.0 | 38.0 | 18.0 | M10 | 3.7 |
| 65 | 150 | 106.0 | 62 | 41.0 | 145.0 | 39 | 38 | 38 | 38 | 12.0 | 16.0 | 23.0 | 16.0 | 40.0 | M5 | 90 | 75.5 | 53.5 | 18.0 | M10 | 4.2 |

1) For ball runner block .H. (...high...) Spacer plate necessary.

Pneumatic clamping and braking units UBPS



R1619 .40 51

Very high axial holding forces due to three pistons connected in series combined with strong spring energy accumulator; increased holding force thanks to additional pressure through the air-plus port.

Note

Can be used on all SNS ball guide rails.

Clamps and brakes without pressurization (spring energy)

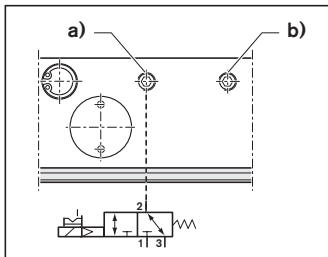
- ▶ Minimum release pressure 5.5 bar
- ▶ Maximum pneumatic operating pressure: 8 bar
- ▶ Operating temperature range t:0 – 70 °C

Instruction for mounting

- ▶ Stop surfaces can be used on two sides.
- ▶ Make sure the connection structure is rigid.
- ▶ Use only purified and lubricated air. The prescribed filter mesh size is 25 µm.
- ▶ Observe the mounting instructions prior to start-up.
- ▶ Check whether the sealing lips of the front seals are resting evenly on the ball guide rail. Realign if required.

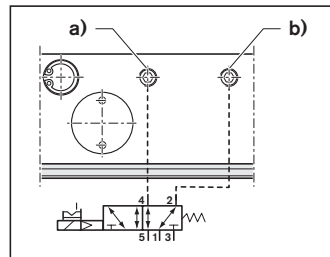
⚠ Observe the safety instructions on clamping and braking units.

Circuit type¹⁾ for standard air port



a) Air port
b) Air filter
Nominal width: min. 6 mm

Circuit type²⁾ for air-plus port

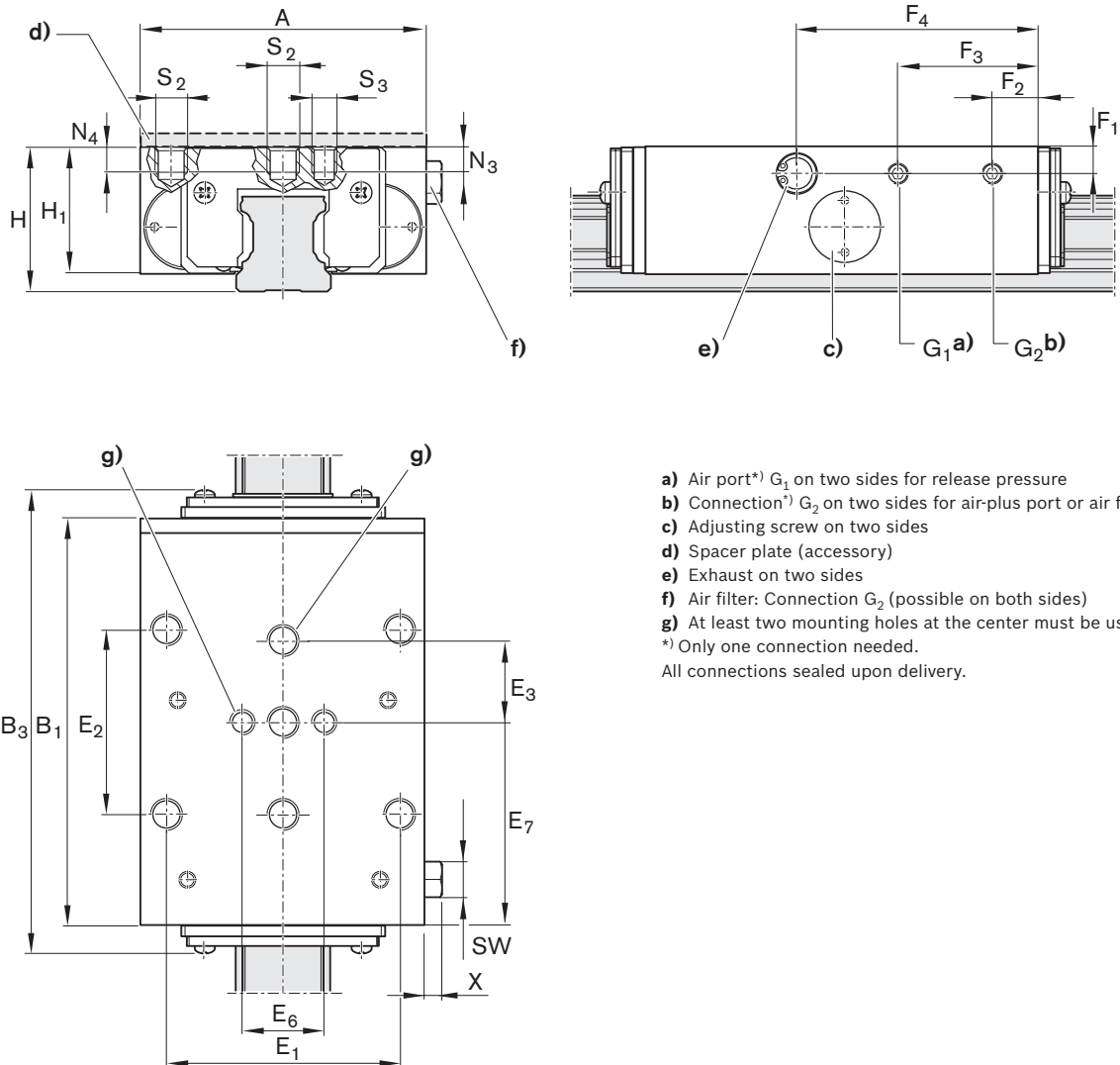


a) Air port
b) Air-plus port
Nominal width: min. 6 mm

| Size | Material number | Holding force Spring energy ¹⁾ (N) | with air-plus port ²⁾ (N) | Air consumption (normal liter) | |
|------|-----------------|---|---|---------------------------------------|--|
| | | | | Air port (dm ³ /stroke) | Air-plus port (dm ³ /stroke) |
| 25 | R1619 240 51 | 1 500 | 2 650 | 0.080 | 0.165 |
| 30 | R1619 740 51 | 2 500 | 3 300 | 0.111 | 0.274 |
| 35 | R1619 340 51 | 2 800 | 3 800 | 0.139 | 0.303 |
| 45 | R1619 440 51 | 5 200 | 7 600 | 0.153 | 0.483 |
| 55 | R1619 540 51 | 7 700 | 9 200 | 0.554 | 0.952 |

1) Holding force achieved by spring energy. The inspection is done in a mounted state with a lubricated layer (ISO-VG 68).

2) Increased holding force by additional air admission at air-plus port with 6.0 bar. Switching via 5/2 or 5/3-way directional control valve.

UBPS

- a) Air port*) G₁ on two sides for release pressure
 - b) Connection¹⁾ G₂ on two sides for air-plus port or air filter
 - c) Adjusting screw on two sides
 - d) Spacer plate (accessory)
 - e) Exhaust on two sides
 - f) Air filter: Connection G₂ (possible on both sides)
 - g) At least two mounting holes at the center must be used!
- *) Only one connection needed.
All connections sealed upon delivery.

| Size | Dimensions (mm) | | | | | | | | | | | |
|------|-----------------|----------------|--------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| | A | B ₁ | B _{3 max} | E ₁ | E ₂ | E ₃ | E ₆ | E ₇ | F ₁ | F ₂ | F ₃ | F ₄ |
| 25 | 70 | 99 | 115.1 | 57 | 45 | 20 | 20 | 49.5 | 6.5 | 11 | 34.3 | 59.0 |
| 30 | 90 | 109 | 128.7 | 72 | 52 | 22 | 22 | 54.5 | 6.5 | 11 | 40.8 | 66.5 |
| 35 | 100 | 109 | 131.0 | 82 | 62 | 26 | 24 | 54.5 | 8.0 | 11 | 40.8 | 66.5 |
| 45 | 120 | 197 | 220.1 | 100 | 80 | 30 | - | 98.5 | 12 | 32 | 167 | 106.5 |
| 55 | 140 | 197 | 221.6 | 116 | 95 | 35 | - | 98.5 | 13 | 32 | 165 | 103.5 |

| Size | Dimensions (mm) | | | | | | | | | | Mass (kg) |
|------|-----------------|----------------|----|------------------------------|----------------|----------------|----------------|----------------|-----|-----------|-----------|
| | G ₁ | G ₂ | H | H ₁ ¹⁾ | N ₃ | N ₄ | S ₂ | S ₃ | X | SW | |
| 25 | M5 | M5 | 36 | 31 | 7 | 7 | M8 | M6 | 5.5 | Ø8, SW7 | 1.20 |
| 30 | M5 | M5 | 42 | 37 | 8 | 8 | M10 | M8 | 5.5 | Ø8, SW7 | 1.80 |
| 35 | G1/8" | G1/8" | 48 | 42 | 10 | 10 | M10 | M8 | 6.5 | Ø15, SW13 | 2.25 |
| 45 | G1/8" | G1/8" | 60 | 52 | - | 12 | M12 | - | 6.5 | Ø15, SW13 | 6.20 |
| 55 | G1/8" | G1/8" | 70 | 60 | - | 14 | M14 | - | 6.5 | Ø15, SW13 | 9.40 |

1) For ball runner block .H. (...high...) Spacer plate necessary. Available on request.

Product description pneumatic clamping units

Areas of application

- ▶ Pneumatic clamping of machine axes
- ▶ Table crossbars in the timber industry
- ▶ Positioning of lifting gear

Characteristic features

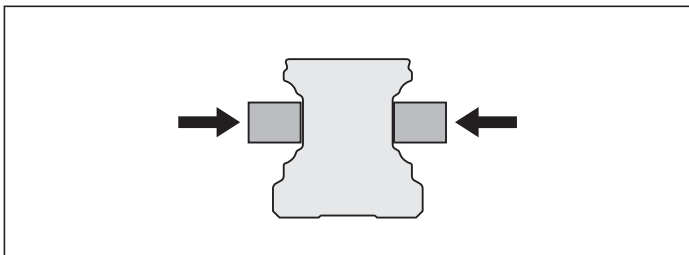
- ▶ High axial holding forces with short format
- ▶ Dynamic and static stability in axial direction
- ▶ Simple mechanical gripping principle in LCP and LCPS with good price/performance ratio

Further highlights

- ▶ Easy mounting
- ▶ Chemically nickel-plated steel housing
- ▶ High axial and horizontal rigidity
- ▶ Precise positioning

⚠ Observe the safety instructions on clamping and braking units.

Functional principle



Clamping with air pressure or spring force

- ▶ The clamping profiles are pressed to the web surfaces of the ball guide rail.

Special features of MK:

- ▶ Clamps with compression (pneumatic) The clamping profiles are pressed by compressed air onto the web surfaces of the ball guide rail via a dual acting gate valve gear mechanism.
- ▶ Continuously adjustable pressure from 4 – 8 bar
- ▶ Decompression with spring force. A preloaded return spring allows for short decompression cycles.
- ▶ 5 million clamping cycles (B10d value)

Special features of MKS:

- ▶ Clamps without pressurization (spring energy). In the event of a pressure drop, it clamps via the dual-action gate valve gear mechanism with two spring assemblies.
- ▶ An integrated quick-exhaust valve ensures short response times.
- ▶ Higher holding force due to the air-plus port
- ▶ Pneumatic decompression Release pressure 5.5 – 8 bar
- ▶ 5 million clamping cycles (B10d value) *)

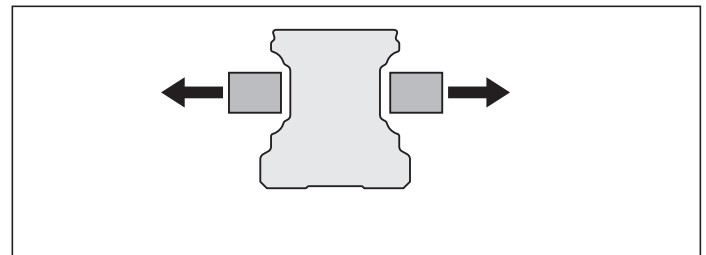
Special features of LCP:

- ▶ Clamps with compression (pneumatic) by means of mechanical gripping
- ▶ Continuously adjustable pressure from 5.5 – 8 bar
- ▶ Short decompression cycles
- ▶ Decompression with spring force. A preloaded return spring allows for short decompression cycles.

Special features of LCPS:

- ▶ Clamps without pressurization (with spring energy) by means of mechanical gripping with a spring assembly (spring energy accumulator)
- ▶ Release pressure 5.5 – 8 bar (pneumatic)
- ▶ Higher holding force due to the air-plus port
- ▶ Decompression with air pressure.

*) with the air-plus port, the B10d value cannot be achieved.

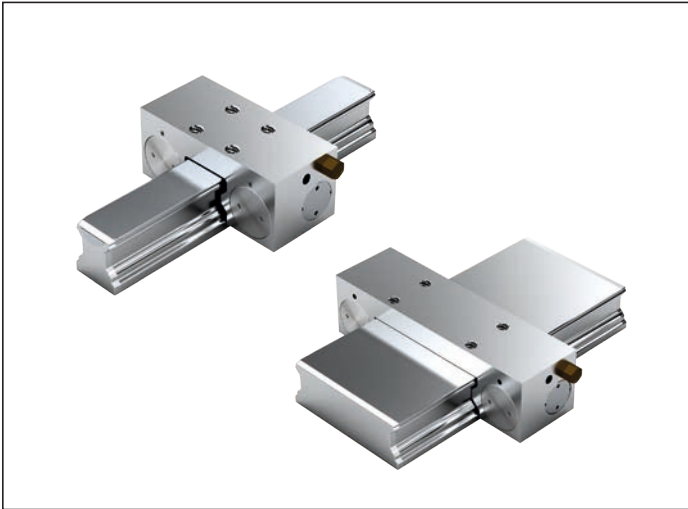


Decompression with air pressure or spring force

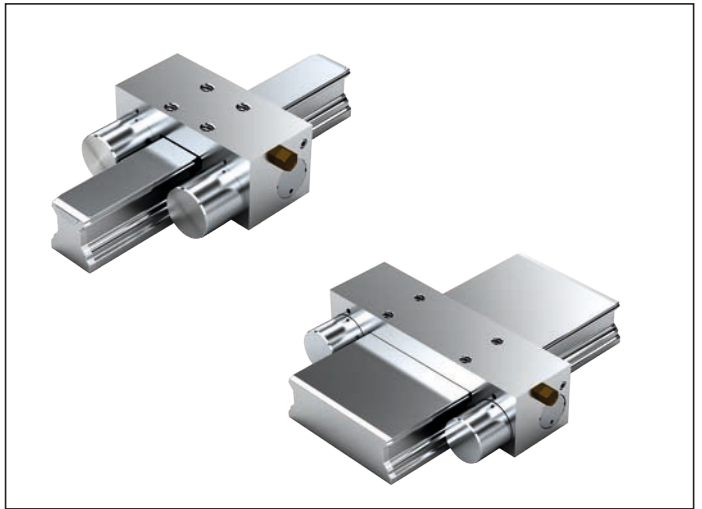
- ▶ The clamping profiles are held apart.
- ▶ Free movement is possible

Model overview of accessories for pneumatic clamping units

MK



MKS



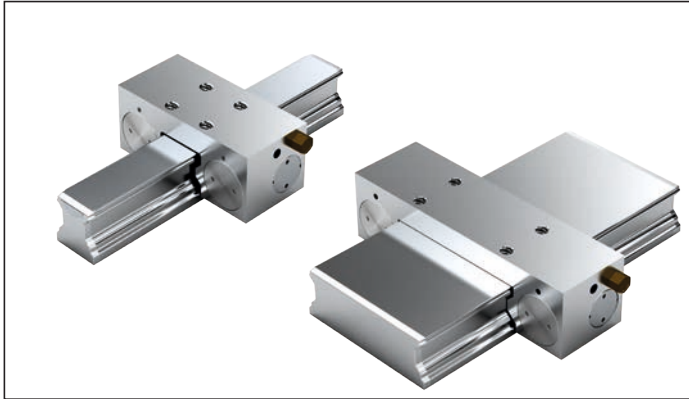
LCP



LCPS



Pneumatic clamping units MK



R1619 .42 60

Note

Can be used on all SNS ball guide rails.

R1619 .42 62

Note

Can be used on all BNS ball guide rails.

Clamps with compression

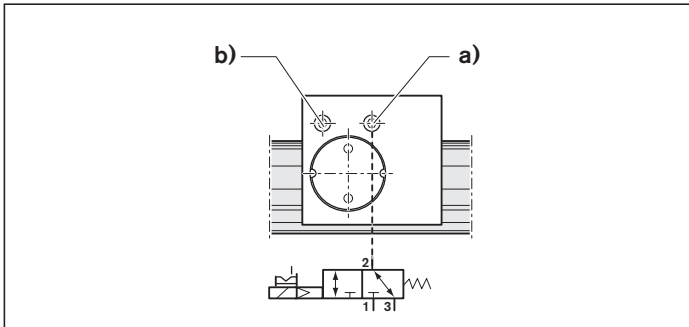
- ▶ Maximum pneumatic operating pressure: 8 bar
- ▶ Operating temperature range t: 0 – 70°C

Instruction for mounting

- ▶ Make sure the connection structure is rigid.
- ▶ Use only purified and lubricated air. The prescribed filter mesh size is 25 µm.
- ▶ Observe the mounting instructions prior to start-up.

⚠ Observe the safety instructions on clamping and braking units.

Circuit type¹⁾ for standard air port



a) Air port

b) Air filter

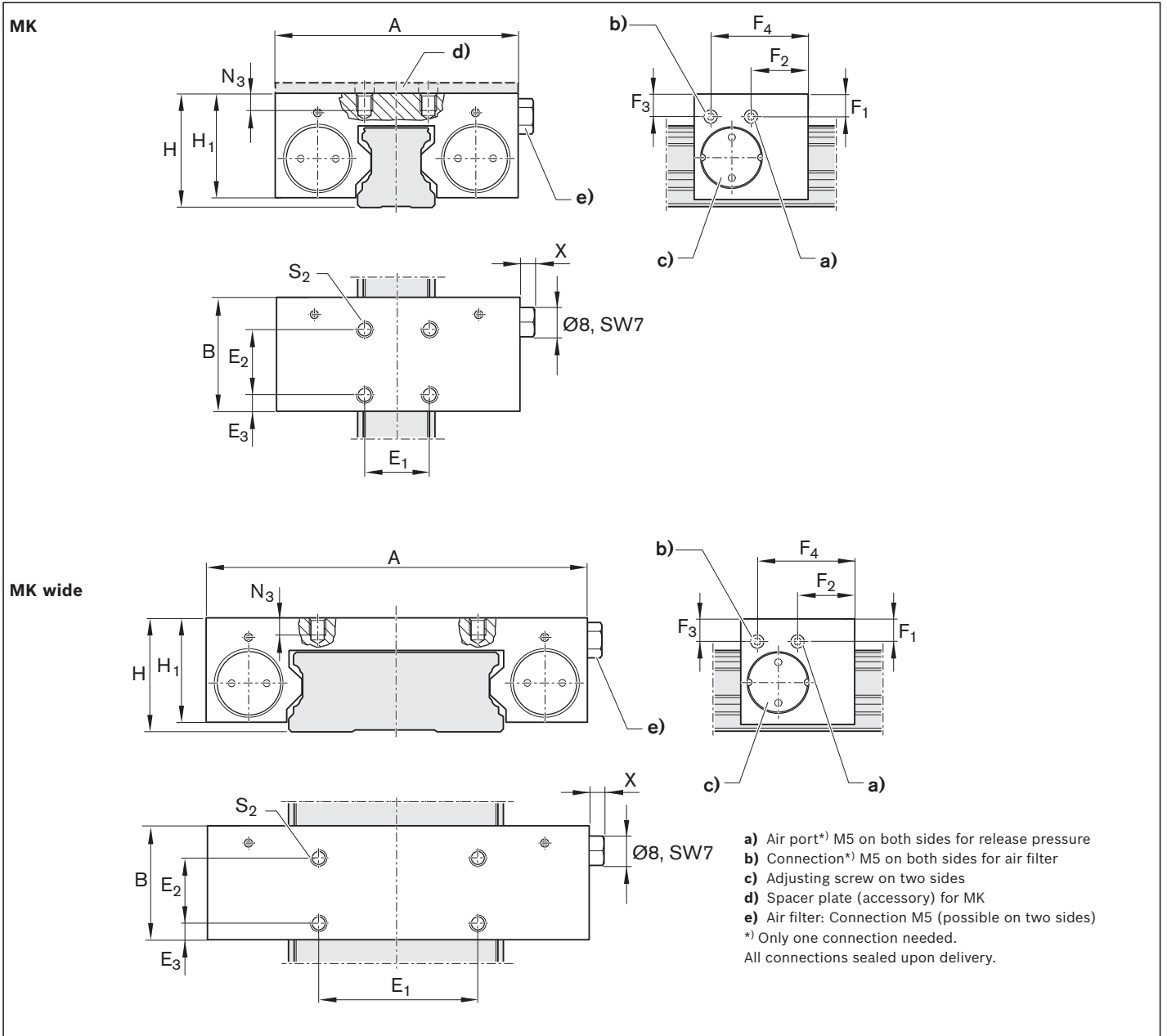
Nominal width:

Sizes 15 – 20: min. 4 mm

Sizes 25 – 65: min. 6 mm

| Size | Material number | Holding force pneumatic ¹⁾ (N) | Air consumption (normal liter) Air port (dm ³ /stroke) |
|-------|-----------------|---|---|
| 15 | R1619 142 60 | 650 | 0.011 |
| 20 | R1619 842 60 | 1 000 | 0.019 |
| 25 | R1619 242 60 | 1 200 | 0.021 |
| 30 | R1619 742 60 | 1 750 | 0.031 |
| 35 | R1619 342 60 | 2 000 | 0.031 |
| 45 | R1619 442 60 | 2 250 | 0.041 |
| 55 | R1619 542 60 | 2 250 | 0.041 |
| 65 | R1619 642 60 | 2 250 | 0.041 |
| 20/40 | R1619 842 62 | 650 | 0.019 |
| 25/70 | R1619 242 62 | 1 200 | 0.021 |
| 35/90 | R1619 342 62 | 2 000 | 0.031 |

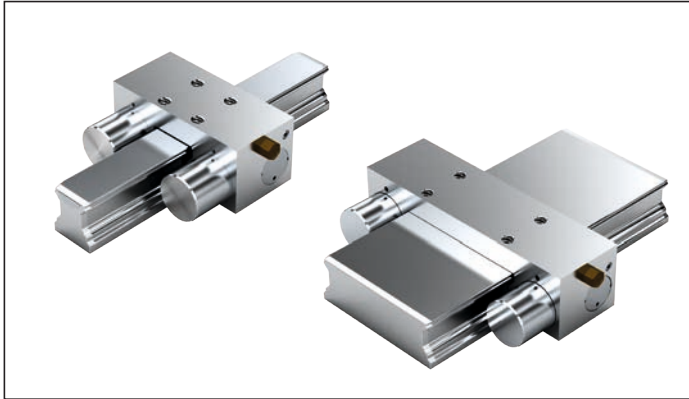
1) Holding force at 6 bar. The inspection is done in a mounted state with a lubricated layer (ISO-VG 68).



| Size | Dimensions (mm) | | | | | | | | | | | | Mass (kg) | | |
|-------|-----------------|----|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----|------------------------------|----------------|-----------|----------------|------|
| | A | B | E ₁ | E ₂ | E ₃ | F ₁ | F ₂ | F ₃ | F ₄ | H | H ₁ ¹⁾ | N ₃ | | S ₂ | X |
| 15 | 55 | 39 | 15 | 15 | 15.5 | 5.6 | 34.0 | 16.1 | 34.0 | 24 | 20.8 | 4.5 | M4 | 6.5 | 0.25 |
| 20 | 66 | 39 | 20 | 20 | 9.0 | 4.5 | 17.3 | 6.0 | 34.5 | 30 | 27.0 | 6.0 | M6 | 5.5 | 0.36 |
| 25 | 75 | 35 | 20 | 20 | 5.0 | 7.0 | 17.5 | 7.0 | 30.0 | 36 | 32.5 | 8.0 | M6 | 5.5 | 0.45 |
| 30 | 90 | 39 | 22 | 22 | 8.5 | 8.5 | 15.0 | 10.3 | 24.5 | 42 | 38.5 | 9.0 | M8 | 5.5 | 0.72 |
| 35 | 100 | 39 | 24 | 24 | 7.5 | 11.0 | 14.5 | 12.0 | 24.5 | 48 | 44.0 | 10.0 | M8 | 5.5 | 0.88 |
| 45 | 120 | 49 | 26 | 26 | 11.5 | 14.5 | 19.5 | 14.5 | 29.5 | 60 | 52.0 | 15.0 | M10 | 5.5 | 1.70 |
| 55 | 128 | 49 | 30 | 30 | 9.5 | 17.0 | 19.5 | 17.0 | 29.5 | 70 | 57.0 | 15.0 | M10 | 5.5 | 1.95 |
| 65 | 138 | 49 | 30 | 30 | 9.5 | 14.5 | 19.5 | 14.5 | 29.5 | 90 | 73.5 | 20.0 | M10 | 5.5 | 2.68 |
| 20/40 | 80 | 39 | 20 | 20 | 15.5 | 5.0 | 4.5 | 5.0 | 31.0 | 27 | 23.5 | 4.5 | M4 | 5.5 | 0.37 |
| 25/70 | 120 | 35 | 50 | 20 | 5.0 | 7.0 | 17.5 | 9.0 | 30.0 | 35 | 32.5 | 8.0 | M6 | 5.5 | 0.62 |
| 35/90 | 156 | 42 | 60 | 20 | 9.5 | 11.5 | 18.0 | 14.0 | 36.5 | 50 | 45.5 | 10.0 | M10 | 5.5 | 0.88 |

1) For ball runner block .H. (...high...) Spacer plate necessary

Pneumatic clamping units MKS



R1619 .40 60

Note

Can be used on all SNS ball guide rails.

R1619 .40 62

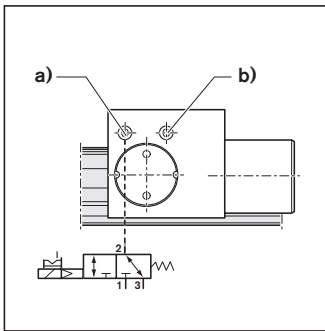
Note

Can be used on all BNS ball guide rails.

Clamps without pressurization (spring energy)

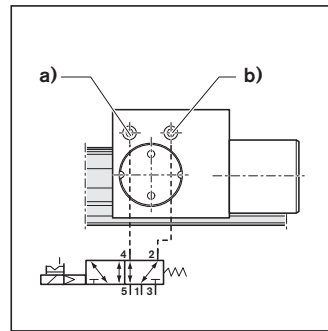
- ▶ Minimum release pressure 5.5 bar
- ▶ Maximum pneumatic operating pressure: 8 bar
- ▶ Operating temperature range t: 0 – 70°C

Circuit type¹⁾ for standard air port



a) Air port
b) Air filter
Nominal width:
Sizes 15 – 20: min. 4 mm
Sizes 25 – 65: min. 6 mm

Circuit type²⁾ for air-plus port



a) Air port
b) Air-plus port
Nominal width:
Sizes 15 – 20: min. 4 mm
Sizes 25 – 65: min. 6 mm

Instruction for mounting

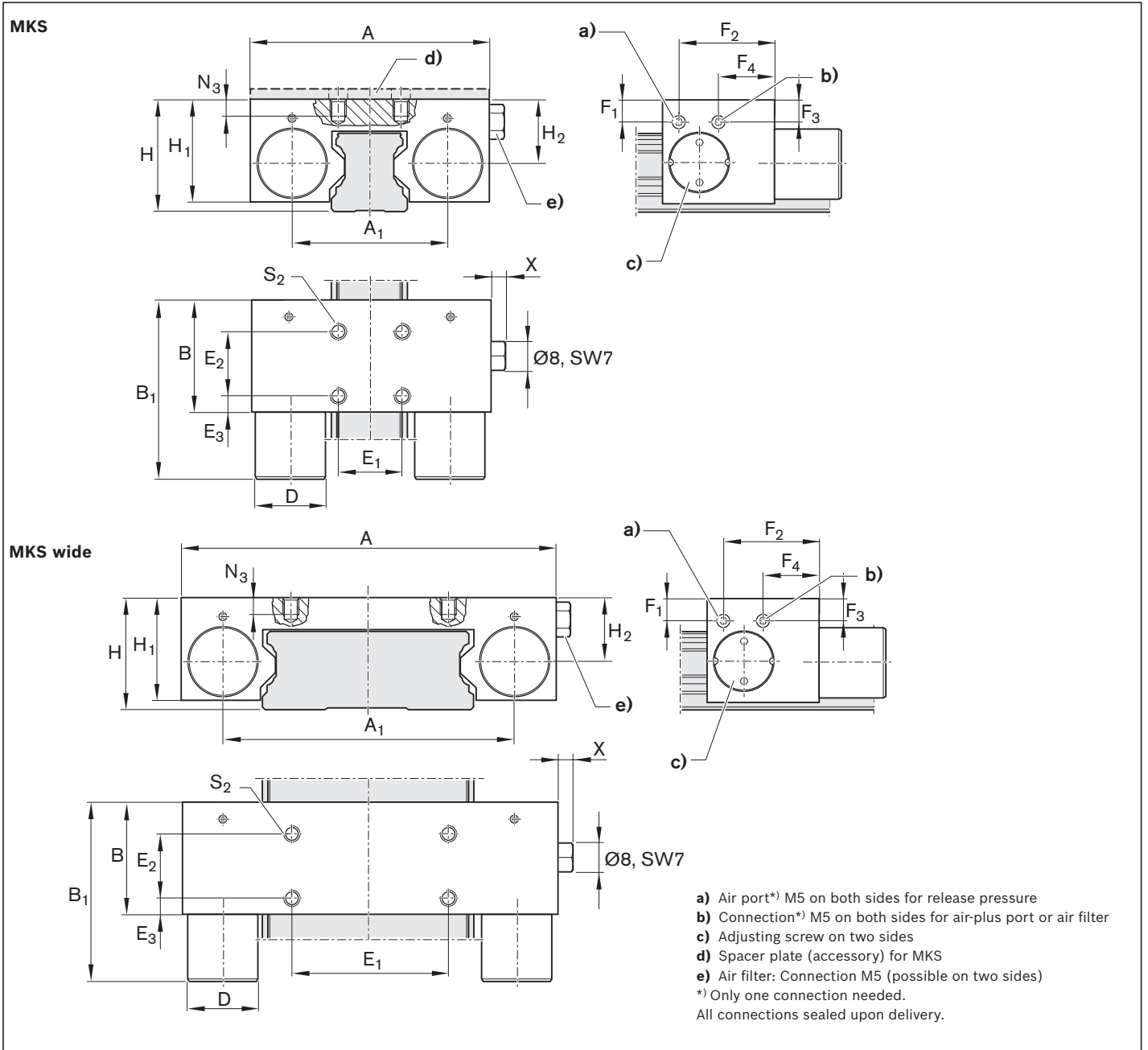
- ▶ Make sure the connection structure is rigid.
- ▶ Use only purified and lubricated air. The prescribed filter mesh size is 25 µm.
- ▶ Observe the mounting instructions prior to start-up.

⚠ Observe the safety instructions on clamping and braking units.

| Size | Material number | Holding force | | Air consumption (normal liter) | |
|--------------|-----------------|------------------------------------|---|---------------------------------------|--|
| | | Spring energy ¹⁾ (N) | with air-plus port ²⁾ (N) | Air port (dm ³ /stroke) | Air-plus port (dm ³ /stroke) |
| 15 | R1619 140 60 | 400 | 1 050 | 0.011 | 0.035 |
| 20 | R1619 840 60 | 600 | 1 300 | 0.019 | 0.063 |
| 25 | R1619 240 60 | 750 | 1 500 | 0.021 | 0.068 |
| 30 | R1619 740 60 | 1 050 | 2 600 | 0.031 | 0.121 |
| 35 | R1619 340 60 | 1 250 | 2 200 | 0.031 | 0.129 |
| 45 | R1619 440 60 | 1 450 | 3 300 | 0.041 | 0.175 |
| 55 | R1619 540 60 | 1 450 | 3 300 | 0.041 | 0.175 |
| 65 | R1619 640 60 | 1 450 | 3 300 | 0.041 | 0.175 |
| 20/40 | R1619 840 62 | 400 | 1 050 | 0.019 | 0.063 |
| 25/70 | R1619 240 62 | 750 | 1 950 | 0.021 | 0.068 |
| 35/90 | R1619 340 62 | 1 250 | 2 200 | 0.031 | 0.129 |

1) Holding force achieved by spring energy. The inspection is done in a mounted state with a lubricated layer (ISO-VG 68).

2) Increased holding force by additional air admission at air-plus port with 6.0 bar. Switching via 5/2 or 5/3-way directional control valve.



| Size | Dimensions (mm) | | | | | | | | | | | | | | | | Mass (kg) | | |
|--------------|-----------------|----------------|----|--------------------|----|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----|------------------------------|----------------|----------------|-----------|----------------|------|
| | A | A ₁ | B | B _{1 max} | D | E ₁ | E ₂ | E ₃ | F ₁ | F ₂ | F ₃ | F ₄ | H | H ₁ ¹⁾ | H ₂ | N ₃ | | S ₂ | X |
| 15 | 55 | 34.0 | 39 | 58.5 | 16 | 15 | 15 | 15.5 | 16.1 | 34.0 | 5.6 | 34.0 | 24 | 20.8 | 11.6 | 4.5 | M4 | 6.5 | 0.29 |
| 20 | 66 | 43.0 | 39 | 61.5 | 20 | 20 | 20 | 9.0 | 6.0 | 34.5 | 4.5 | 17.3 | 30 | 27.0 | 15.5 | 6.0 | M6 | 5.5 | 0.41 |
| 25 | 75 | 49.0 | 35 | 56.5 | 22 | 20 | 20 | 5.0 | 7.0 | 30.0 | 7.0 | 17.5 | 36 | 32.5 | 20.0 | 8.0 | M6 | 5.5 | 0.50 |
| 30 | 90 | 58.0 | 39 | 68.5 | 25 | 22 | 22 | 8.5 | 10.3 | 24.5 | 8.5 | 15.0 | 42 | 38.5 | 24.0 | 9.0 | M8 | 5.5 | 0.81 |
| 35 | 100 | 68.0 | 39 | 67.5 | 28 | 24 | 24 | 7.5 | 12.0 | 24.5 | 11.0 | 14.5 | 48 | 44.0 | 28.0 | 10.0 | M8 | 5.5 | 1.00 |
| 45 | 120 | 78.8 | 49 | 82.5 | 30 | 26 | 26 | 11.5 | 14.5 | 29.5 | 14.5 | 19.5 | 60 | 52.0 | 35.5 | 15.0 | M10 | 5.5 | 1.84 |
| 55 | 128 | 86.8 | 49 | 82.5 | 30 | 30 | 30 | 9.5 | 17.0 | 29.5 | 17.0 | 19.5 | 70 | 57.0 | 40.0 | 15.0 | M10 | 5.5 | 2.08 |
| 65 | 138 | 96.8 | 49 | 82.5 | 30 | 30 | 30 | 9.5 | 14.5 | 29.5 | 14.5 | 19.5 | 90 | 73.5 | 55.0 | 20.0 | M10 | 5.5 | 2.86 |
| 20/40 | 80 | 59.0 | 39 | 58.5 | 16 | 20 | 20 | 15.5 | 5.0 | 31.0 | 5.0 | 4.5 | 27 | 23.5 | 14.0 | 4.5 | M4 | 5.5 | 0.39 |
| 25/70 | 120 | 94.0 | 35 | 56.5 | 22 | 50 | 20 | 5.0 | 9.0 | 30.0 | 7.0 | 17.5 | 35 | 32.5 | 20.0 | 8.0 | M6 | 5.5 | 0.68 |
| 35/90 | 156 | 124.0 | 42 | 70.5 | 28 | 60 | 20 | 9.5 | 14.0 | 36.5 | 11.5 | 18.0 | 50 | 45.5 | 30.0 | 10.0 | M10 | 5.5 | 0.89 |

1) For ball runner block .H. (...high...) Spacer plate necessary

Pneumatic clamping units LCP



R1619 .42 74

Note

Can be used on all SNS ball guide rails.

Clamps with compression

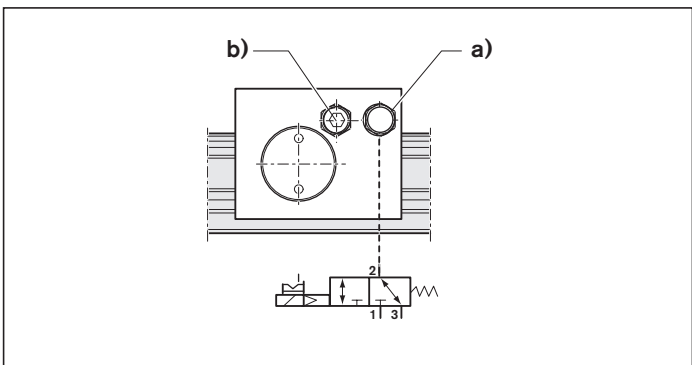
- ▶ Maximum pneumatic operating pressure: 8 bar
- ▶ Operating temperature range t: 0 – 60 °C

Instruction for mounting

- ▶ Make sure the connection structure is rigid.
- ▶ Use only purified and lubricated air. The prescribed filter mesh size is 25 µm.
- ▶ Observe the mounting instructions prior to start-up.

⚠ Observe the safety instructions on clamping and braking units.

**Circuit type¹⁾
for standard air port**



- a) Air port
- b) Air filter

Nominal width:

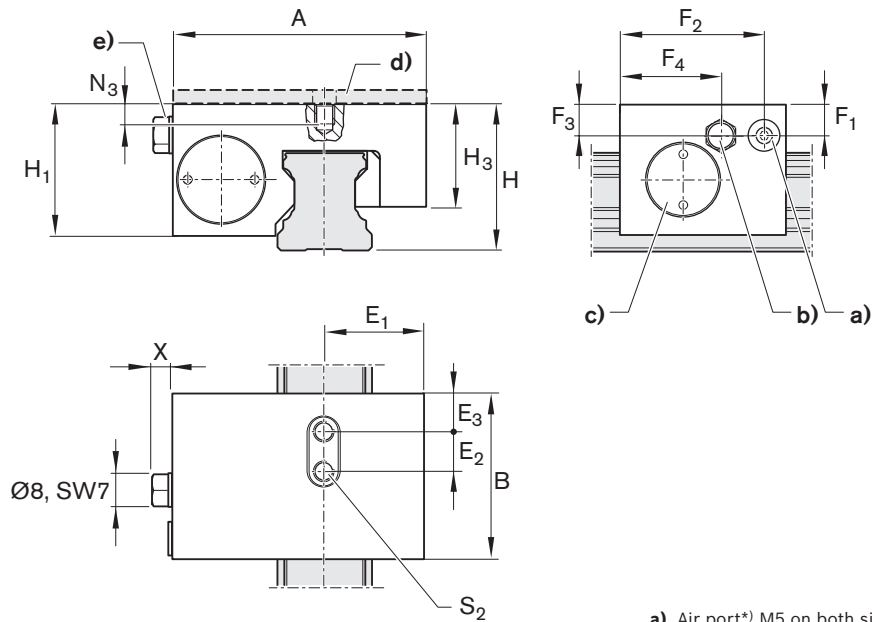
Sizes 15 – 20: min. 4 mm

Sizes 25 – 65: min. 6 mm

| Size | Material number | Holding force pneumatic ¹⁾ (N) | Air consumption (normal liter) Air port (dm ³ /stroke) |
|------|-----------------|---|---|
| 25 | R1619 242 74 | 850 | 0.015 |

1) Holding force at 6 bar. The inspection is done in a mounted state with a lubricated layer (ISO-VG 68).

LCP



- a) Air port^{*)} M5 on both sides for release pressure
 - b) Connection^{*)} M5 on both sides for air filter
 - c) Adjusting screw on two sides
 - d) Spacer plate (accessory)
 - e) Air filter: Connection M5 (possible on two sides)
- ^{*)} Only one connection needed.
All connections sealed upon delivery.

| Size | Dimensions (mm) | | | | | | | | | | | | | | | Mass (kg) |
|------|-----------------|----|----------------|----------------|----------------|----------------|----------------|----------------|----------------|------|------------------------------|----------------|----------------|----------------|-----|-----------|
| | A | B | E ₁ | E ₂ | E ₃ | F ₁ | F ₂ | F ₃ | F ₄ | H | H ₁ ¹⁾ | H ₃ | N ₃ | S ₂ | X | |
| 25 | 61.4 | 41 | 23.9 | 9.5 | 9.75 | 6.5 | 36.0 | 6.5 | 24.5 | 36.0 | 32.5 | 24.55 | 7.7 | M5 | 6.5 | 0.27 |

1) For ball runner block .H. (...high...) Spacer plate necessary.

Pneumatic clamping units LCPS



R1619 .40 70

Note

Can be used on all SNS ball guide rails.

Clamps without pressurization (spring energy)

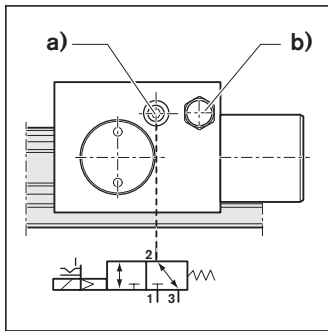
- ▶ Release pressure min.: 5.5 bar
- ▶ Maximum pneumatic operating pressure 8 bar
- ▶ Operating temperature range t: 0 – 60 °C

Instruction for mounting

- ▶ Make sure the connection structure is rigid.
- ▶ Use only purified and lubricated air. The prescribed filter mesh size is 25 µm.
- ▶ Observe the mounting instructions prior to start-up.

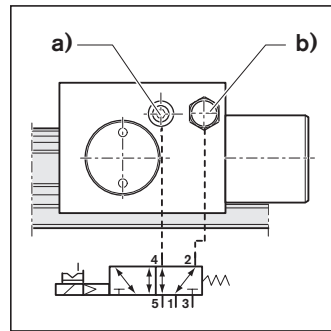
⚠ Observe the safety instructions on clamping and braking units.

Circuit type¹⁾ for standard air port



- a) Air port
 - b) Air filter
- Nominal width:
 Sizes 15 – 20: min. 4 mm
 Sizes 25 – 65: min. 6 mm

Circuit type²⁾ for air-plus port

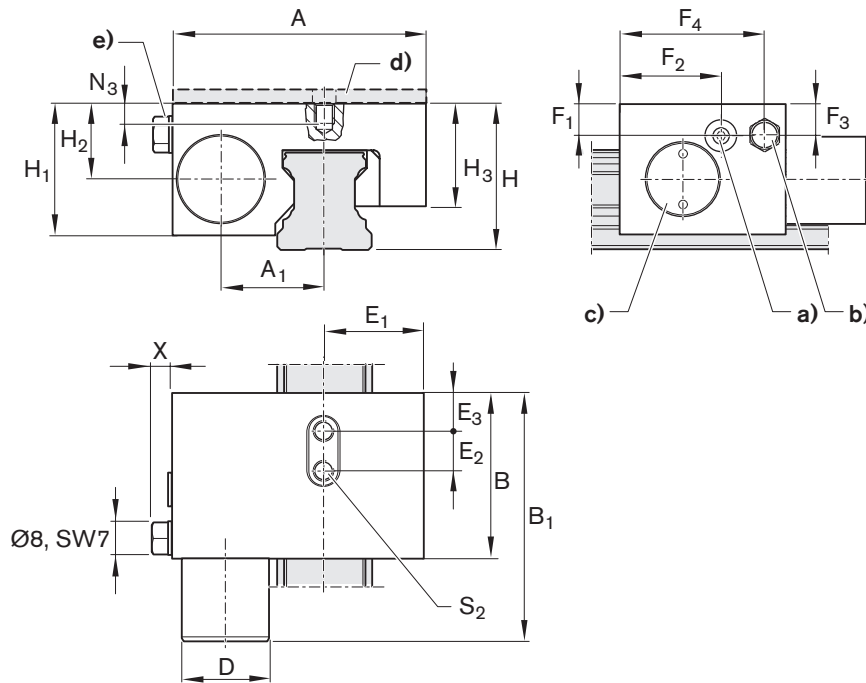


- a) Air port
 - b) Air-plus port
- Nominal width:
 Sizes 15 – 20: min. 4 mm
 Sizes 25 – 65: min. 6 mm

| Size | Material number | Holding force | | Air consumption (normal liter) | |
|------|-----------------|------------------------------------|---|---------------------------------------|--|
| | | Spring energy ¹⁾ (N) | with air-plus port ²⁾ (N) | Air port (dm ³ /stroke) | Air-plus port (dm ³ /stroke) |
| 25 | R1619 240 70 | 650 | 1 050 | 0.015 | 0.082 |

1) Holding force achieved by spring energy. The inspection is done in a mounted state with a lubricated layer (ISO-VG 68).

2) Increased holding force by additional air admission at air-plus port with 6.0 bar. Switching via 5/2 or 5/3-way directional control valve.

LCPS

- a)** Air port^{*)} M5 on both sides for release pressure
 - b)** Connection^{*)} M5 on both sides for air-plus port or air filter
 - c)** Adjusting screw on two sides
 - d)** Spacer plate (accessory)
 - e)** Air filter: Connection M5 (possible on two sides)
- ^{*)} Only one connection needed.
All connections sealed upon delivery.

| Size | Dimensions (mm) | | | | | | | | | | | | | | | | | | Mass (kg) | |
|-----------|-----------------|----------------|----|-------------------|----|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----|------------------------------|----------------|----------------|----------------|----------------|--------------|------|
| | A | A ₁ | B | B _{1max} | D | E ₁ | E ₂ | E ₃ | F ₁ | F ₂ | F ₃ | F ₄ | H | H ₁ ¹⁾ | H ₂ | H ₃ | N ₃ | S ₂ | | X |
| 25 | 61.4 | 24.5 | 41 | 62.5 | 22 | 23.9 | 9.5 | 9.75 | 6.5 | 24.5 | 6.5 | 36.0 | 36 | 32.5 | 20.0 | 24.55 | 7.7 | M5 | 6.5 | 0.35 |

1) For ball runner block .H. (...high...) Spacer plate necessary.

Manual clamping units, product description

Areas of application

- ▶ Table crossbars and carriage
- ▶ Width adjustment
- ▶ Stops
- ▶ Positioning on optical devices and measuring tables

Characteristic features

- ▶ Simple and safe design in compact format
- ▶ Manually operated Clamping Unit without auxiliary power

Special features of HK:

- ▶ 500,000 clamping cycles (B10d value)

⚠ Observe the safety instructions on clamping and braking units.

Model overview of accessories for manual clamping units, spacer plate

HK



HK



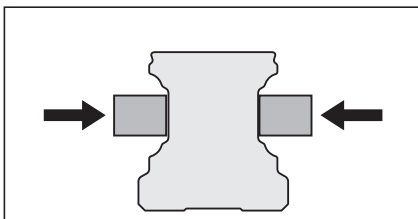
Spacer plate



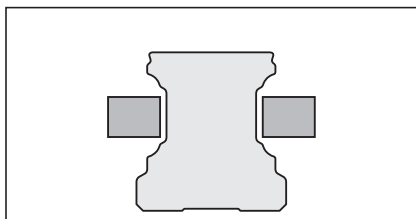
Clamps with manual compression

The clamping profiles are pressed to the web surfaces of the ball guide rail by the hand lever.

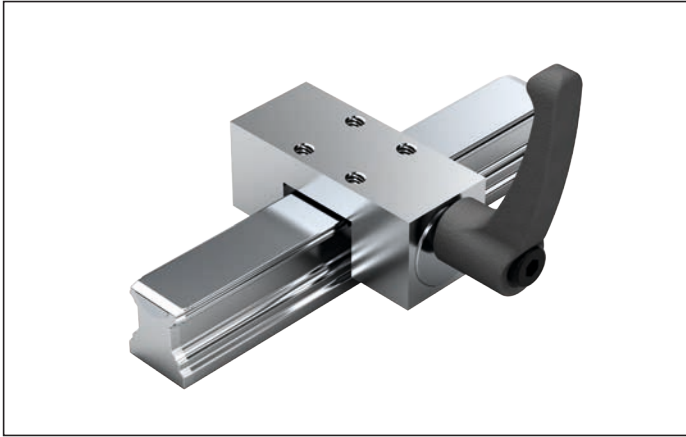
Compression via hand lever



Hand lever disengaged



Manual clamping units HK



R1619 .42 82

Note

Can be used on all SNS ball guide rails.

Manual Clamping Unit

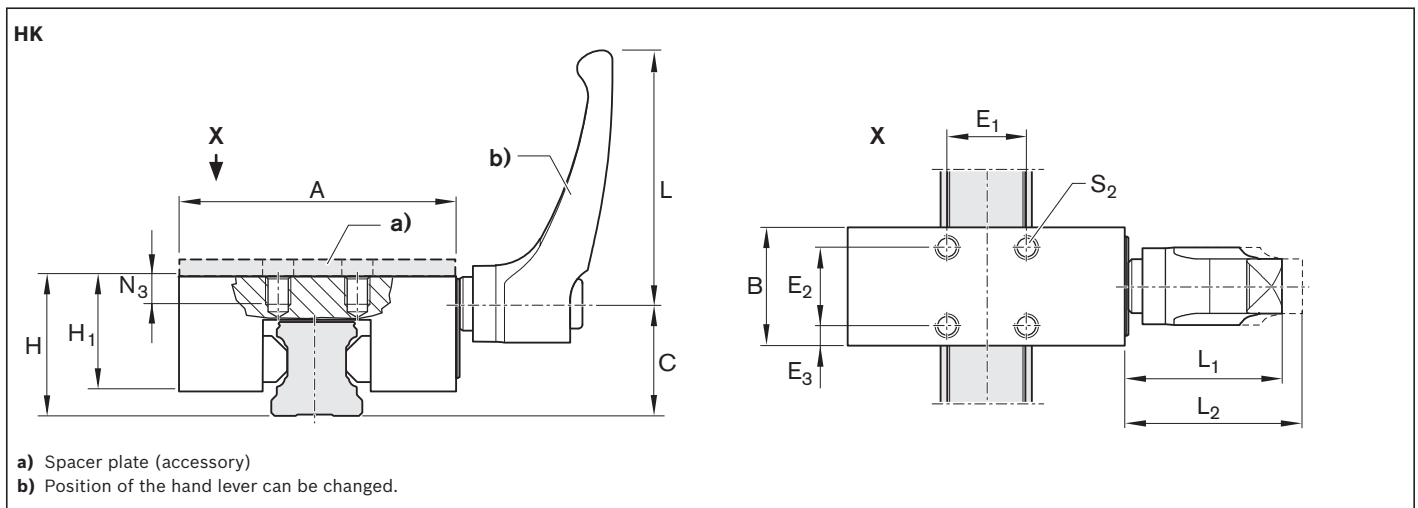
► Operating temperature range t : 0 – 70°C

Instruction for mounting

- Make sure the connection structure is rigid.
- Observe the mounting instructions prior to start-up.

▲ Observe the safety instructions on clamping and braking units.

| Size | Material number | Holding force ¹⁾ (N) | Tightening torque (Nm) |
|------|-----------------|------------------------------------|---------------------------|
| 15 | R1619 142 82 | 1 200 | 4 |
| 20 | R1619 842 82 | 1 200 | 5 |
| 25 | R1619 242 82 | 1 200 | 7 |
| 30 | R1619 742 82 | 2 000 | 15 |
| 35 | R1619 342 82 | 2 000 | 15 |
| 45 | R1619 442 82 | 2 000 | 15 |
| 55 | R1619 542 82 | 2 000 | 22 |
| 65 | R1619 642 82 | 2 000 | 22 |



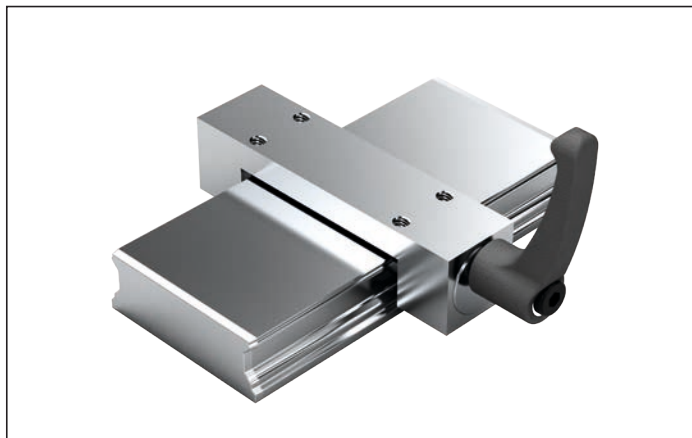
| Size | Dimensions (mm) | | | | | | | | | | | | Mass (kg) | |
|------|-----------------|----|------|----------------|----------------|----------------|----|------------------------------|----|----------------|------------------------------|----------------|--------------|----------------|
| | A | B | C | E ₁ | E ₂ | E ₃ | H | H ₁ ³⁾ | L | L ₁ | L ₂ ²⁾ | N ₃ | | S ₂ |
| 15 | 47 | 25 | 19.0 | 17 | 17 | 4.0 | 24 | 19 | 44 | 30.0 | 33.0 | 5 | M4 | 0.16 |
| 20 | 60 | 24 | 24.5 | 15 | 15 | 4.5 | 30 | 23 | 44 | 30.0 | 33.0 | 6 | M5 | 0.23 |
| 25 | 70 | 30 | 29.3 | 20 | 20 | 5.0 | 36 | 29 | 64 | 38.5 | 41.5 | 7 | M6 | 0.43 |
| 30 | 90 | 39 | 34.0 | 22 | 22 | 8.5 | 42 | 33 | 78 | 46.5 | 50.5 | 8 | M6 | 0.82 |
| 35 | 100 | 39 | 38.0 | 24 | 24 | 7.5 | 48 | 41 | 78 | 46.5 | 50.5 | 10 | M8 | 1.08 |
| 45 | 120 | 44 | 47.0 | 26 | 26 | 9.0 | 60 | 48 | 78 | 46.5 | 50.5 | 14 | M10 | 1.64 |
| 55 | 140 | 49 | 56.5 | 30 | 30 | 9.5 | 70 | 51 | 95 | 56.5 | 61.5 | 14 | M14 | 1.71 |
| 65 | 160 | 64 | 69.5 | 35 | 35 | 14.5 | 90 | 66 | 95 | 56.5 | 61.5 | 20 | M16 | 2.84 |

1) The inspection is done in a mounted state with a lubricated layer (ISO-VG 68).

2) Hand lever disengaged

3) For ball runner block .H. (...high...) Spacer plate necessary

Manual clamping units HK



R1619 .42 83

Note

Can be used on all BNS ball guide rails.

Manual Clamping Unit

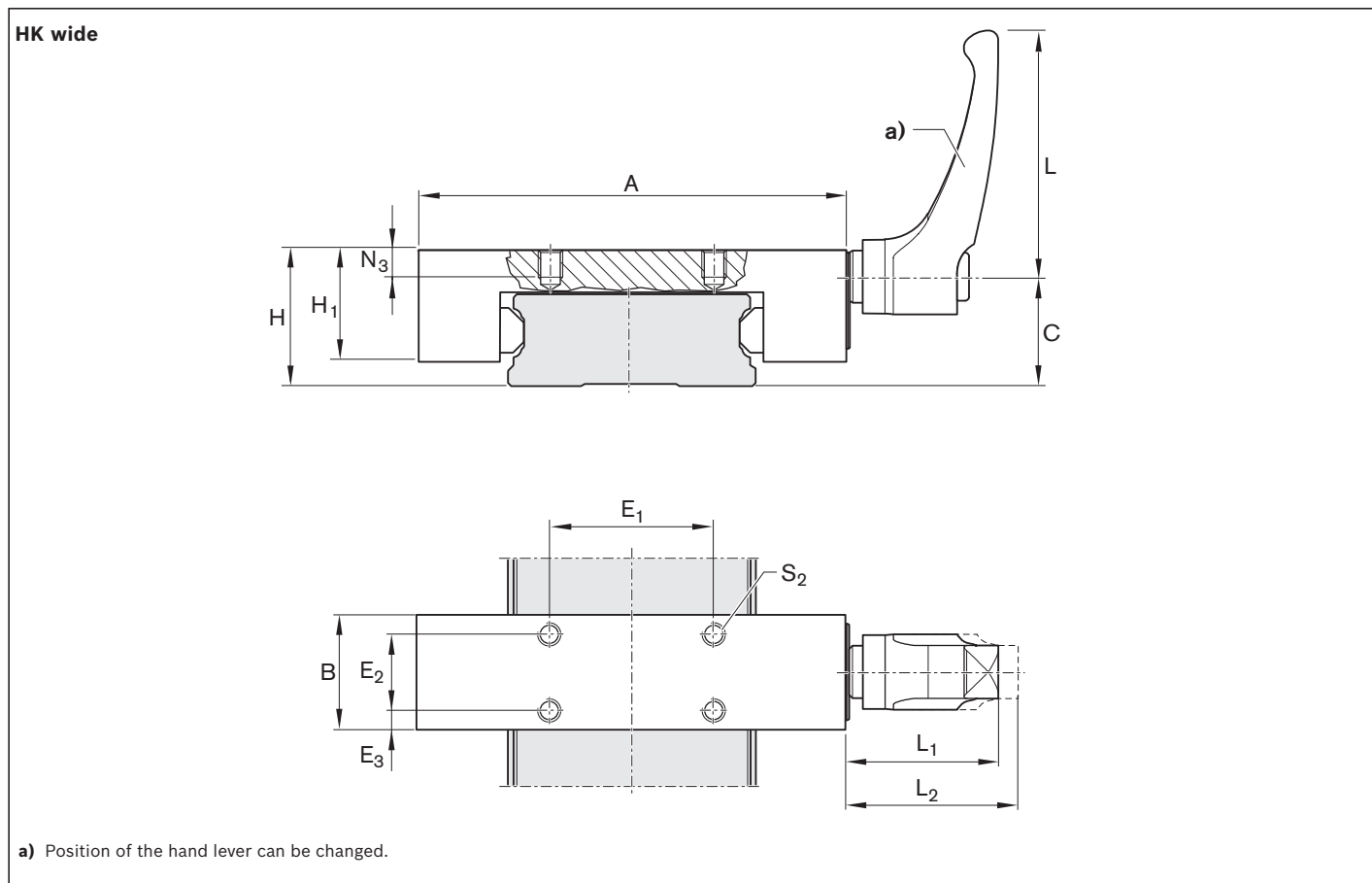
- ▶ Operating temperature range t: 0 – 70°C

Instruction for mounting

- ▶ Make sure the connection structure is rigid.
- ▶ Observe the mounting instructions prior to start-up.

⚠ Observe the safety instructions on clamping and braking units.

| Size | Material number | Holding force ¹⁾ (N) | Tightening torque (Nm) |
|-------|-----------------|------------------------------------|---------------------------|
| 25/70 | R1619 242 83 | 1 200 | 7 |
| 35/90 | R1619 342 83 | 2 000 | 15 |



| Size | Dimensions (mm) | | | | | | | | | | | | Mass (kg) | |
|-------|-----------------|----|------|----------------|----------------|----------------|----|----------------|----|----------------|------------------------------|----------------|--------------|----------------|
| | A | B | C | E ₁ | E ₂ | E ₃ | H | H ₁ | L | L ₁ | L ₂ ²⁾ | N ₃ | | S ₂ |
| 25/70 | 120 | 39 | 28.2 | 50 | 25 | 7.0 | 35 | 30 | 64 | 38.5 | 41.5 | 11 | M6 | 0.77 |
| 35/90 | 145 | 39 | 38.0 | 60 | 20 | 9.5 | 50 | 39 | 78 | 46.5 | 50.5 | 11 | M8 | 1.38 |

1) The inspection is done in a mounted state with a lubricated layer (ISO-VG 68).

2) Hand lever disengaged

Spacer plate

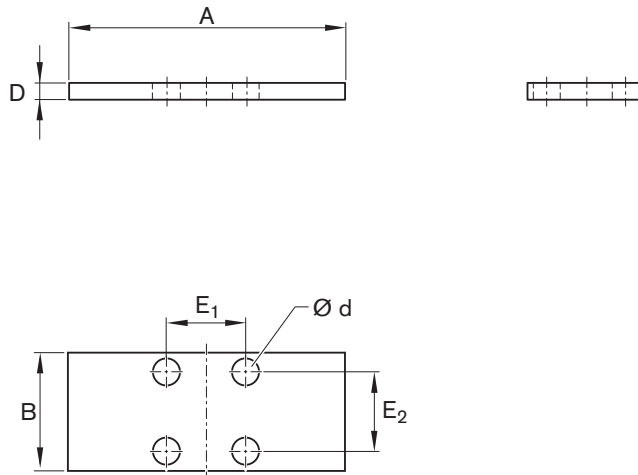


for clamping units **MK, MKS and HK**

Note

Suitable for mounting with high ball runner block SNH R1621 and SLH R1624.

Spacer plate



R1619 .40 65

Suitable for Clamping

Units:

- ▶ R1619 .42 60 (MK)
- ▶ R1619 .40 60 (MKS)

| Size | Material number | Dimensions (mm) | | | | | | Mass (kg) |
|------|-----------------|-----------------|----|----|------|----------------|----------------|-----------|
| | | A | B | D | d | E ₁ | E ₂ | |
| 15 | R1619 140 65 | 55 | 39 | 4 | 4.5 | 15 | 15 | 0.065 |
| 25 | R1619 240 65 | 75 | 35 | 4 | 6.5 | 20 | 20 | 0.078 |
| 30 | R1619 740 65 | 90 | 39 | 3 | 8.5 | 22 | 22 | 0.077 |
| 35 | R1619 340 65 | 100 | 39 | 7 | 8.5 | 24 | 24 | 0.202 |
| 45 | R1619 440 65 | 120 | 49 | 10 | 10.5 | 26 | 26 | 0.434 |
| 55 | R1619 540 65 | 128 | 49 | 10 | 10.5 | 30 | 30 | 0.465 |

R1619 .42 .5

Suitable for Clamping

Units:

- ▶ R1619 .42 82 (HK)

| Size | Material number | Dimensions (mm) | | | | | | Mass (kg) |
|------|-----------------|-----------------|----|----|------|----------------|----------------|-----------|
| | | A | B | D | d | E ₁ | E ₂ | |
| 15 | R1619 142 85 | 47 | 25 | 4 | 4.5 | 17 | 17 | 0.035 |
| 25 | R1619 242 85 | 70 | 30 | 4 | 6.5 | 20 | 20 | 0.062 |
| 30 | R1619 742 85 | 90 | 39 | 3 | 6.5 | 22 | 22 | 0.080 |
| 35 | R1619 340 65 | 100 | 39 | 7 | 8.5 | 24 | 24 | 0.202 |
| 45 | R1619 442 85 | 120 | 44 | 10 | 10.5 | 26 | 26 | 0.387 |
| 55 | R1619 542 85 | 140 | 49 | 10 | 14.5 | 30 | 30 | 0.511 |

Safety instructions clamping and braking units

General safety instructions

- ⚠ During all work on the clamping units, the respective valid accident prevention regulations, as well as the VDE safety instructions and instruction for mounting are to be observed!
- ⚠ The clamping units do not have any guiding function. A runner block can therefore not be replaced with a clamping unit. The ideal position of the clamping unit lies between two runner blocks. When using several clamping elements, these should be distributed evenly on both guide rails in order to attain maximum rigidity for the overall construction.
- ⚠ For Hydraulic Clamping and Braking Units, the return pressure in the tank line must be lower than 1.5 bar!
- ⚠ Consider the response times of the Clamping and Braking Units!
- ⚠ The Clamping Unit is not intended for securing suspended loads!
- ⚠ Do not remove the cover of the safety clamping unit - spring under tension!
- ⚠ The transport lock may only be removed if:
 - The hydraulic port has been pressurized with the operating pressure according to instructions.
 - The air port has been pressurized with compressed air to at least 4.5 bar (MBPS) or 5.5 bar (UBPS, MKS) according to instructions.
- ⚠ The Clamping Unit may only be de-pressurized when the appropriate ball guide rail or transport lock is in position between the contact profiles!
- ⚠ The use of clamping and braking units is not permissible on ball guide rails with integrated measuring systems.

Additional notes for Clamping and Braking Units

- ⚠ The clamping and braking units are suitable for usage in safety-critical applications for braking and clamping. The safe function of the total system in which the Clamping and Braking Units are used is primarily defined by the controller for this system. The technical dimensioning of this system and the controller is to be undertaken by the manufacturer of the higher level system, assembly, plant or machine. During this process the safety-related requirements for functional safety are to be observed.

Additional notes for Clamping Units

- ⚠ The unit may not be used as a Braking Unit! For use only when the axis is at a standstill!
- ⚠ Pressure may only be applied when the unit is properly mounted on the ball guide rail!

General instruction for mounting

The following notes relating to mounting apply to all ball rail systems. However, different specifications exist with regard to the parallelism of the ball guide rails and to mounting the ball runner blocks with screws and locating pins. This information is provided separately alongside the descriptions of the individual types of ball rail systems.

- ⚠ In the case of overhead installation (hanging installation) or vertical installation, the ball runner block can release from the ball guide rail due to the balls being lost or broken. Secure the ball runner block from falling! Risk of death!
We recommend protection against falling loads!
- ⚠ Rexroth ball rail systems are high-quality products. Use with extreme care during transport and mounting. The same care must be taken with cover strips. All steel parts are protected with anti-corrosion oil.
It is not necessary to remove this oil, provided that the recommended lubricants are used.

Installation examples

Ball guide rails

Each ball guide rail has ground reference surfaces on both sides.

Possibilities for side fixing:

- 1 Reference edges
- 2 Clamping strips
- 3 V-guides

Note

- ▶ Ball guide rails without side fixing have to be aligned straight and parallel when mounting, preferably using a straightedge.
- ▶ For guide values for permissible lateral force without additional lateral retention, see corresponding ball runner blocks and instructions for mounting, page 206.

Ball runner blocks

Each ball runner block has a ground reference edge on one side (see dimension V_1 in the dimension drawings).

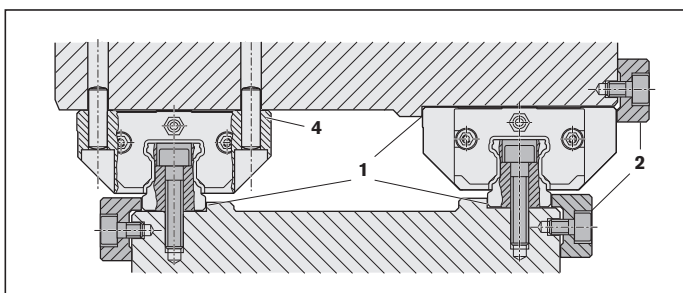
Possibilities for additional fixing:

- 1 Reference edges
- 2 Clamping strips
- 4 Locating pins

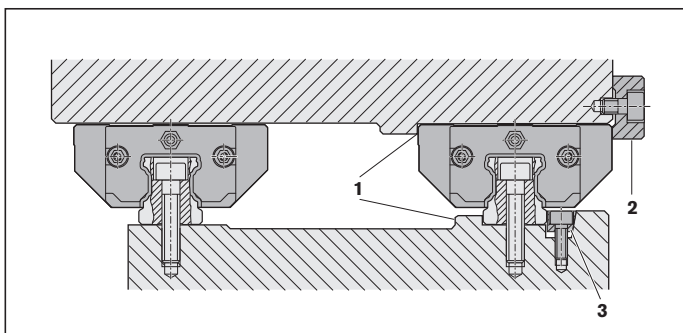
Notes

- ▶ Before installing the components, clean and degrease all mounting surfaces.
- ▶ Please ask for the “Mounting Instructions for ball rail systems”.
- ▶ After mounting, it should be possible to move the ball runner block easily.

Mounting with fixing of both ball guide rails and both ball runner blocks



Mounting with fixing of one ball guide rail and one ball runner block



Fastener

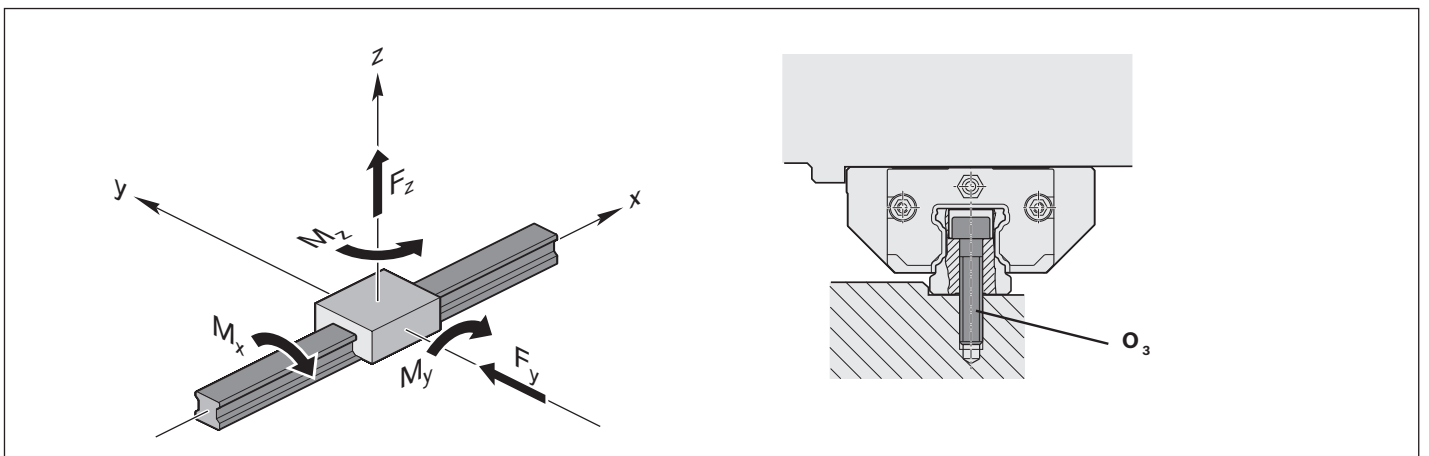
Calculating threaded connections

The threaded connections in runner blocks and roller guide rails produce maximum traction forces $F_{0z \max}$, maximum static torsional moments $M_{0x \max}$ and maximum static side load $F_{0y \max}$, without stop strips that the linear guide can transfer. The maximum load on a profiled rail system is defined not only by the static load-bearing capacity C_0 in accordance with ISO 14728 Part 2 and the static load moments M_{t0} from the rolling contact, but also by the threaded connections. As a rule, ball runner blocks are fastened using 4 or 6 screws. Ball guide rails have one or two rows of threaded connections in regular distances, whereby the screws located directly under the runner block are subject to the most stress. If the runner block and rail are fastened with screws in the same strength class, the connection between the rail and the mounting base (O3 or O6) is critical to the maximum forces and moments that can be transferred. Calculation of the values in the table for strength class 8.8, 10.9 and 12.9 are taken from DIN 637 (August 2013): Ball bearings – safety regulations for dimensioning and operation of Profiled Rail Systems with recirculating rolling elements. In comparison to the standard, the values determined by Bosch Rexroth include a higher safety factor. Threaded connections are calculated based on the dimensions in the catalog (screw sizes, runner block lengths, clamping lengths, screw-in depths, bore diameters, rail separations of the rail bore holes, rail width, etc.). Deviant screw connections are to be recalculated according to VDI 2230. The maximum static traction force and maximum static torsional moment of a ball guide rail system are the product of the sum of the axial forces on the rail screws within the flow of forces. However, for the maximum static side load, the sum of the clamping forces on the rail screws within the flow of forces is crucial.

Input values for calculation:

- Friction coefficient in the thread $\mu_G = 0.125$
- Friction coefficient at the head surface $\mu_K = 0.125$
- Friction coefficient in the joint $\mu_T = 0.2$
- Tightening torque for torque wrench $\alpha_A = 1.5$

The applied friction coefficients and the tightening torque are common values in practice. Depending on the customer application and mounting procedure, the actual input parameters may deviate considerably from the assumptions. This must be checked after each dimensioning and tightening connections must be recalculated with actual values according to VDI 2230 as necessary. Even slight deviations from the assumptions in the Bosch Rexroth calculations lead to variations in tightening torque and maximum transferable static tension forces, torsional moments and lateral forces.



Fastener

Tightening torques for profiled rail systems

The tightening torques for screw strength classes 8.8, 10.9 and 12.9 were calculated for the dimensions of a Rexroth ball rail system. Detailed descriptions of the possible tightening connections O1 to O6 can be found on the following pages.

Runner block

| Size | FKS, FNS, FLS, FKN, FNN, BNS, CNS | | | | | | | | SKS, SNS, SLS, SKN, SNN,SNH,SLH | | | |
|------|-----------------------------------|-----|------|------|-------------------------|-----|------|------|---------------------------------|-----|------|------|
| | for mounting from above | | | | for mounting from below | | | | for mounting from above | | | |
| | O4 | | | | O1&O2 | | | | O5 | | | |
| | | 8.8 | 10.9 | 12.9 | | 8.8 | 10.9 | 12.9 | | 8.8 | 10.9 | 12.9 |
| 15 | M5 | 6.3 | 9.2 | 11 | M4 | 3.3 | 4.8 | 4.9 | M4 | 3.1 | 4.6 | 5.4 |
| 20 | M6 | 11 | 16 | 18 | M5 | 6.5 | 9.5 | 11 | M5 | 6.3 | 9.2 | 11 |
| 25 | M8 | 26 | 38 | 44 | M6 | 8.4 | 8.4 | 8.4 | M6 | 11 | 16 | 18 |
| 30 | M10 | 51 | 74 | 87 | M8 | 27 | 28 | 28 | M8 | 26 | 38 | 44 |
| 35 | M10 | 51 | 74 | 87 | M8 | 27 | 28 | 28 | M8 | 26 | 38 | 44 |
| 45 | M12 | 87 | 130 | 130 | M10 | 52 | 66 | 66 | M10 | 51 | 74 | 87 |
| 55 | M14 | 140 | 200 | 220 | M12 | 81 | 81 | 81 | M12 | 87 | 130 | 130 |
| 65 | M16 | 210 | 310 | 340 | M14 | 140 | 150 | 150 | M14 | 210 | 310 | 340 |

Guide rail

| Size | for mounting from above | | | | for mounting from below | | | |
|------|-------------------------|-----|------|------|-------------------------|-----|------|------|
| | O3 | | | | O6 | | | |
| | | 8.8 | 10.9 | 12.9 | | 8.8 | 10.9 | 12.9 |
| 15 | M4 | 3.1 | 4.6 | 5.4 | M5 | 6.3 | 9.2 | 11 |
| 20 | M5 | 6.4 | 9.4 | 11 | M6 | 11 | 16 | 18 |
| 25 | M6 | 11 | 16 | 18 | M6 | 11 | 16 | 18 |
| 30 | M8 | 26 | 38 | 44 | M8 | 26 | 38 | 44 |
| 35 | M8 | 26 | 38 | 44 | M8 | 26 | 38 | 44 |
| 45 | M12 | 88 | 110 | 110 | M12 | 87 | 130 | 140 |
| 55 | M14 | 140 | 190 | 190 | M14 | 140 | 200 | 230 |
| 65 | M16 | 220 | 300 | 300 | M16 | 210 | 310 | 360 |

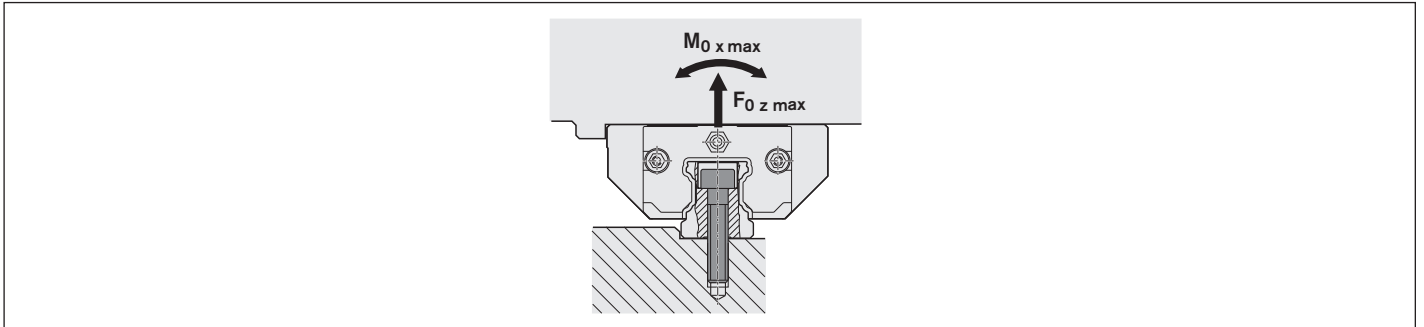
Maximum static traction forces and torsional moments on profiled rail systems

The threaded connections in a profiled rail system can only transfer a limited traction force F_z or a limited torsional moment M_x . If these limit values are exceeded, the guideway will lift off of the adjacent structure. The permissible values for a guideway are the product of the maximum possible axial force on a threaded connection in the Guide Rail. Exceeding the indicated maximum static load is not permissible.




The table values are guidelines for the permissible static traction force $F_{0z \max}$ and torsional moments $M_{0x \max}$ that are only applicable when the following conditions are met:

- Screw sizes, screw quantity and connecting dimensions as listed in the catalog
- Same mounting screw strength class for blocks and rails
- Steel adjacent structure
- Traction force F_z or torsional moment M_x are static
- Traction force F_z and torsional moment M_x do not occur simultaneously
- No interaction with side load F_y or longitudinal moment M_y/M_z




If these conditions are not met, recalculate the threaded connection in accordance with VDI 2230. If the applied loads are just below the limit values, Bosch Rexroth also recommends checking the threaded connections.



Tensile forces

| Size | Maximum static tensile forces $F_{0z \max}$ in [N] | | | | | | | | |
|------|--|-------|-------|--|-------|-------|---|-------|--------|
| |  Short | | |  Normal length | | |  Long | | |
| | xKx | | | xNx | | | xLx | | |
| | 8.8 | 10.9 | 12.9 | 8.8 | 10.9 | 12.9 | 8.8 | 10.9 | 12.9 |
| 15 | 2410 | 3900 | 4700 | 2410 | 3900 | 4700 | 2410 | 3900 | 4700 |
| 20 | 4220 | 6690 | 8010 | 4220 | 6690 | 8010 | 4600 | 7300 | 8730 |
| 25 | 5520 | 8740 | 10500 | 5520 | 8740 | 10500 | 7340 | 11600 | 13900 |
| 30 | 10100 | 16000 | 19200 | 10100 | 16000 | 19200 | 11300 | 17900 | 21500 |
| 35 | 10500 | 16400 | 19600 | 10500 | 16400 | 19600 | 13900 | 21700 | 25900 |
| 45 | 25400 | 34900 | 34900 | 25400 | 34900 | 34900 | 32300 | 44300 | 44300 |
| 55 | 36500 | 53700 | 53700 | 36500 | 53700 | 53700 | 47400 | 69800 | 69800 |
| 65 | 50600 | 76400 | 77500 | 50600 | 76400 | 77500 | 65800 | 99400 | 101000 |

Torsional moments

| Size | Maximum static torsional moments $M_{0x \max}$ in [Nm] | | | | | | | | |
|------|--|------|------|--|------|------|---|------|------|
| |  Short | | |  Normal length | | |  Long | | |
| | xKx | | | xNx | | | xLx | | |
| | 8.8 | 10.9 | 12.9 | 8.8 | 10.9 | 12.9 | 8.8 | 10.9 | 12.9 |
| 15 | 16 | 26 | 31 | 16 | 26 | 31 | 16 | 26 | 31 |
| 20 | 38 | 60 | 72 | 38 | 60 | 72 | 41 | 66 | 79 |
| 25 | 58 | 92 | 110 | 58 | 92 | 110 | 77 | 120 | 150 |
| 30 | 130 | 210 | 250 | 130 | 210 | 250 | 150 | 230 | 280 |
| 35 | 170 | 260 | 310 | 170 | 260 | 310 | 220 | 350 | 410 |
| 45 | 550 | 750 | 750 | 550 | 750 | 750 | 690 | 950 | 950 |
| 55 | 910 | 1340 | 1340 | 910 | 1340 | 1340 | 1190 | 1740 | 1740 |
| 65 | 1490 | 2250 | 2290 | 1490 | 2250 | 2290 | 1940 | 2930 | 2970 |

Fastener

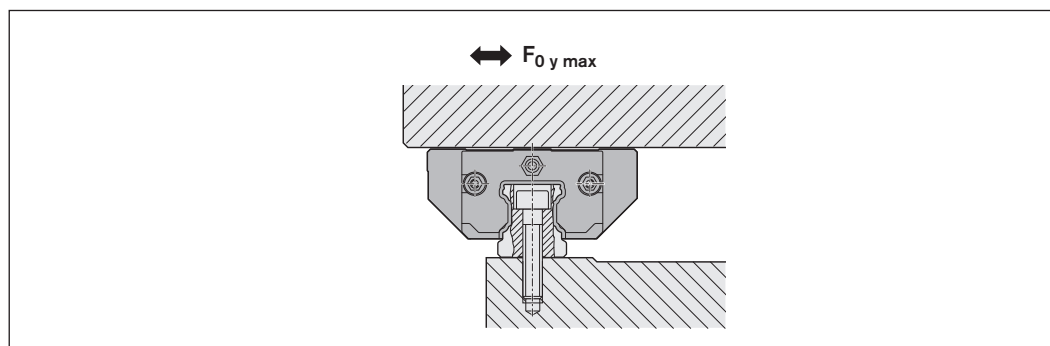
Maximum static side load without stop strips

For a secure structure, Rexroth recommends using stop strips on the Runner Block and Guide Rail. If stop strips are not used on the runner block or the rail, then if a load is applied in the transverse direction the guideway may slip. The clamping force on the threaded connection is too low as soon as the side loads in the table are exceeded.




The table values are guidelines for the permissible static side loads $F_{0y \max}$ that are only applicable when the following conditions are met:

- Screw sizes, screw quantity and connecting dimensions as listed in the catalog
- Same mounting screw strength class for blocks and rails
- Steel adjacent structure
- No interaction with traction force F_z , torsional moments M_x or longitudinal moments M_y/M_z

If these conditions are not met, recalculate the threaded connection in accordance with VDI 2230. If the applied loads are just below the limit values, Bosch Rexroth also recommends checking the threaded connections.



Lateral forces

| Size | Maximum static lateral forces $F_{0y \max}$ in [N] | | | | | | | | |
|------|--|-------|-------|--|-------|-------|---|-------|-------|
| |  Short | | |  Normal length | | |  Long | | |
| | xKx | | | xNx | | | xLx | | |
| | 8.8 | 10.9 | 12.9 | 8.8 | 10.9 | 12.9 | 8.8 | 10.9 | 12.9 |
| 15 | 370 | 600 | 720 | 370 | 600 | 720 | 370 | 600 | 720 |
| 20 | 640 | 1010 | 1210 | 640 | 1010 | 1210 | 690 | 1100 | 1320 |
| 25 | 900 | 1430 | 1710 | 900 | 1430 | 1710 | 1200 | 1900 | 2270 |
| 30 | 1630 | 2600 | 3110 | 1630 | 2600 | 3110 | 1830 | 2910 | 3480 |
| 35 | 1710 | 2670 | 3190 | 1710 | 2670 | 3190 | 2260 | 3530 | 4210 |
| 45 | 4110 | 5330 | 5330 | 4110 | 5330 | 5330 | 5220 | 6770 | 6770 |
| 55 | 5920 | 8220 | 8220 | 5920 | 8220 | 8220 | 7700 | 10700 | 10700 |
| 65 | 8210 | 11800 | 11800 | 8210 | 11800 | 11800 | 10700 | 15300 | 15300 |

**Reference edges,
corner radii**

Combination examples

The combinations shown here are examples.

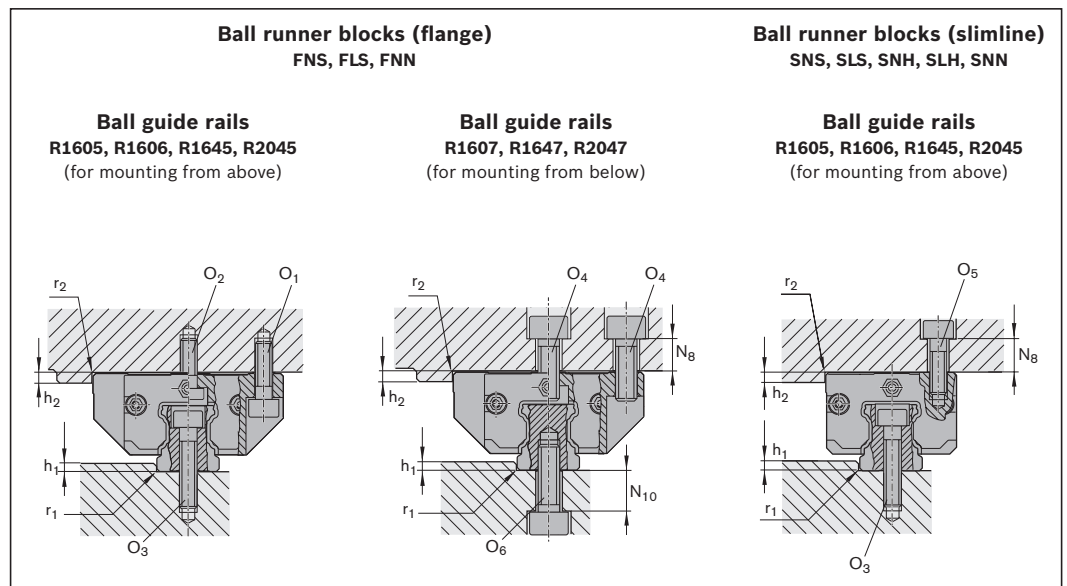
Basically, any ball runner block may be combined with any of the ball guide rail types offered.

Mounting screws

! Always make sure the screws are secure where there are high screw loads!

For more information on this topic, see the “General mounting instructions” section.

Ball guide rail with normal and long ball runner blocks



| Size | Dimensions (mm) | | | | | | |
|------|-----------------|-------------------|-------|------------------|----------|--------------|--------------|
| | $h_{1 \min}$ | $h_{1 \max}^{1)}$ | h_2 | N_8 | N_{10} | $r_{1 \max}$ | $r_{2 \max}$ |
| 15 | 2.5 | 3.5 | 4 | 6 | 7.0 | 0.4 | 0.6 |
| 20 | 2.5 | 4.0 | 5 | 9 | 9.5 | 0.6 | 0.6 |
| | | | | 10 ³⁾ | - | | |
| 25 | 3.0 | 5.0 | 5 | 10 | 12.0 | 0.8 | 0.8 |
| | | | | 11 ³⁾ | - | | |
| 30 | 3.0 | 5.0 | 6 | 10 | 9.0 | 0.8 | 0.8 |
| 35 | 3.5 | 6.0 | 6 | 13 | 13 | 0.8 | 0.8 |
| 45 | 4.5 | 8.0 | 8 | 14 | 13 | 0.8 | 0.8 |
| 55 | 7.0 | 10.0 | 10 | 20 | 23 | 1.2 | 1.0 |
| 65 | 7.0 | 10.0 | 14 | 22 | 26 | 1.2 | 1.0 |

1) When using clamping and braking units, please take account of the values H1.

| Size | Screw sizes | | | | | |
|------|-------------------------------|------------------------------------|---------------------------------------|-------------------------------|-------------------|-------------------|
| | Ball runner blocks | | | | Ball guide rail | |
| | O_1 ISO 4762 4 pieces | $O_2^{2)}$ DIN 6912 2 pieces | $O_4^{1) 2)}$ ISO 4762 6 pieces | O_5 ISO 4762 4 pieces | O_3 ISO 4762 | O_6 ISO 4762 |
| 15 | M4x12 | M4x10 | M5x12 | M4x12 | M4x20 | M5x12 |
| 20 | M5x16 | M5x12 | M6x16 | M5x16 | M5x25 | M6x16 |
| 25 | M6x20 | M6x16 | M8x20 | M6x18 | M6x30 | M6x20 |
| 30 | M8x25 | M8x16 | M10x20 | M8x20 | M8x30 | M8x20 |
| 35 | M8x25 | M8x20 | M10x25 | M8x25 | M8x35 | M8x25 |
| 45 | M10x30 | M10x25 | M12x30 | M10x30 | M12x45 | M12x30 |
| 55 | M12x40 | M12x30 | M14x40 | M12x35 | M14x50 | M14x40 |
| 65 | M14x45 | M14x35 | M16x45 | M16x40 | M16x60 | M16x45 |

- 1) For fixing the ball runner block from above with only 4 O_4 screws:
Permissible side load 1/3 lower, and lower rigidity
- 2) When fastening the ball runner block with 6 screws:
Tighten centerline screws to tightening torque M_A of strength class 8.8
- 3) Ball runner block SNN

Fastener

Locating pins

▲ If the guideline values for the permissible lateral force are exceeded (see the corresponding ball runner blocks), you must fix them additionally by pinning.

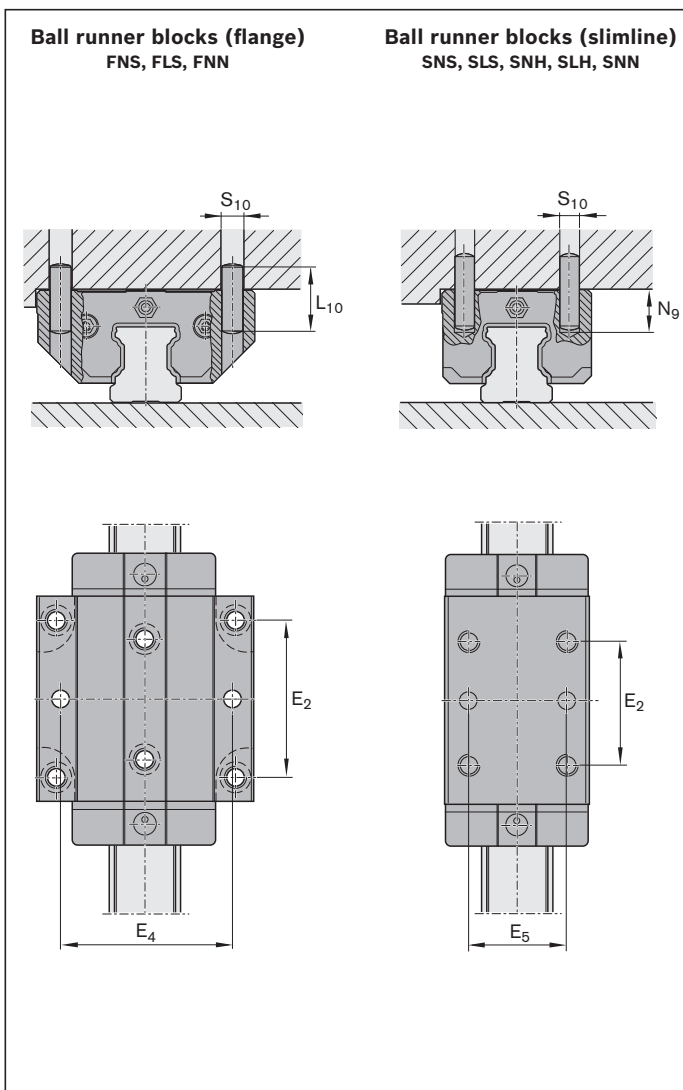
For the recommended dimensions for pin holes, refer to the dimension drawing and the dimensions.

Possible pin types

- ▶ Tapered pin (hardened)
or
- ▶ Straight pin (DIN ISO 8734)

Note

- ▶ At the recommended positions for pin holes, there may be pre-drilled holes in the middle of the ball runner block due to production-related issues ($\varnothing < S_{10}$). They are suitable for drilling out.
- ▶ If it is necessary to carry out pinning at a different position (e.g. the middle lube connection), dimension E_2 must not be exceeded in the longitudinal direction (for dimension E_2 , refer to the dimension tables of the corresponding ball runner blocks). Comply with dimensions E_1 and E_4 !
- ▶ Do not finish the pin holes until after installation.
- ▶ Please request the "Mounting instructions for ball rail systems."



| Size | Dimensions (mm) | | | | |
|------|------------------------|-------|---------------|--------------------------|---------------|
| | E_4 | E_5 | $L_{10}^{1)}$ | $N_{9 \max}$ | $S_{10}^{1)}$ |
| 15 | 38 | 26 | 18 | 6.0 | 4 |
| 20 | 53 49 ²⁾ | 32 | 24 | 7.5 6.5 ²⁾ | 5 |
| 25 | 55 60 ²⁾ | 35 | 32 | 9.0 7.0 ²⁾ | 6 |
| 30 | 70 | 40 | 36 | 12.0 | 8 |
| 35 | 80 | 50 | 40 | 13.0 | 8 |
| 45 | 98 | 60 | 50 | 18.0 | 10 |
| 55 | 114 | 75 | 60 | 19.0 | 12 |
| 65 | 140 | 76 | 60 | 22.0 | 14 |

- 1) Tapered pin (hardened) or straight pin (DIN ISO 8734)
- 2) Ball runner blocks FNN and SNN

**Reference edges,
corner radii**

Combination examples

The combinations shown here are examples.

Basically, any ball runner block may be combined with any of the ball guide rail types offered.

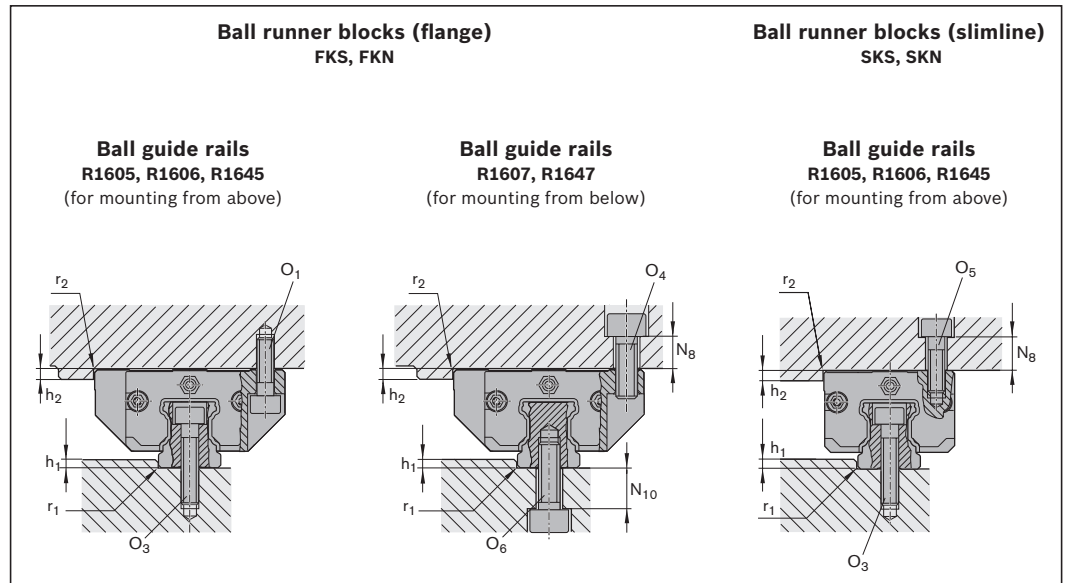
The tightening of the ball runner blocks with 2 screws is completely sufficient up to the maximum load. (For maximum load capacity and load moments, see corresponding ball runner blocks).

Mounting screws

⚠ Always make sure the screws are secure where there are high screw loads!

For more information on this topic, see the “General mounting instructions” section.

Ball guide rail with ball runner block, short and super.



| Size | Dimensions (mm) | | | | | | |
|------|-----------------|-------------------|-------|------------------|----------|--------------|--------------|
| | $h_{1 \min}$ | $h_{1 \max}^{1)}$ | h_2 | N_8 | N_{10} | $r_{1 \max}$ | $r_{2 \max}$ |
| 15 | 2.5 | 3.5 | 4 | 6 | 7.0 | 0.4 | 0.6 |
| 20 | 2.5 | 4.0 | 5 | 9 | 9.5 | 0.6 | 0.6 |
| 25 | 3.0 | 5.0 | 5 | 10 ²⁾ | – | 0.8 | 0.8 |
| | | | | 11 ²⁾ | – | | |
| 30 | 3.0 | 5.0 | 6 | 10 | 9.0 | 0.8 | 0.8 |
| 35 | 3.5 | 6.0 | 6 | 13 | 13.0 | 0.8 | 0.8 |

- 1) When using clamping and braking units, please take account of the values H1.
- 2) Ball runner block SKN

| Size | Screw sizes | | | | |
|------|-------------------------------|-------------------------------|-------------------------------|-------------------|-------------------|
| | Ball runner blocks | | | Ball guide rail | |
| | O_1 ISO 4762 2 pieces | O_4 ISO 4762 2 pieces | O_5 ISO 4762 2 pieces | O_3 ISO 4762 | O_6 ISO 4762 |
| 15 | M4x12 | M5x12 | M4x12 | M4x20 | M5x12 |
| 20 | M5x16 | M6x16 | M5x16 | M5x25 | M6x16 |
| 25 | M6x20 | M8x20 | M6x18 | M6x30 | M6x20 |
| 30 | M8x25 | M10x20 | M8x20 | M8x30 | M8x20 |
| 35 | M8x25 | M10x25 | M8x25 | M8x35 | M8x25 |

Fastener

Locating pins

▲ If the guideline values for the permissible lateral force are exceeded (see the corresponding ball runner blocks), you must fix them additionally by pinning.

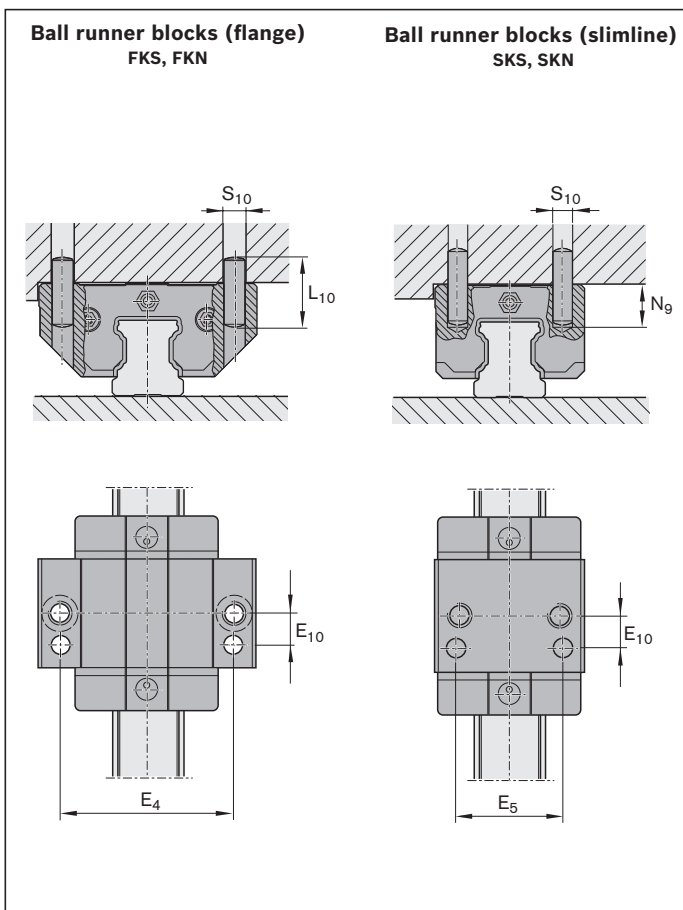
For the recommended dimensions for pin holes, refer to the dimension drawing and the dimensions.

Possible pin types

- ▶ Tapered pin (hardened)
or
- ▶ Straight pin (DIN ISO 8734)

Note

- ▶ At the recommended positions for pin holes, there may be pre-drilled holes in the middle of the ball runner block due to production-related issues ($\varnothing < S_{10}$). They are suitable for drilling out. Comply with dimensions E_4 and E_5 !
- ▶ Do not complete the pin holes until after mounting. Please request the “Mounting instructions for ball rail systems.”

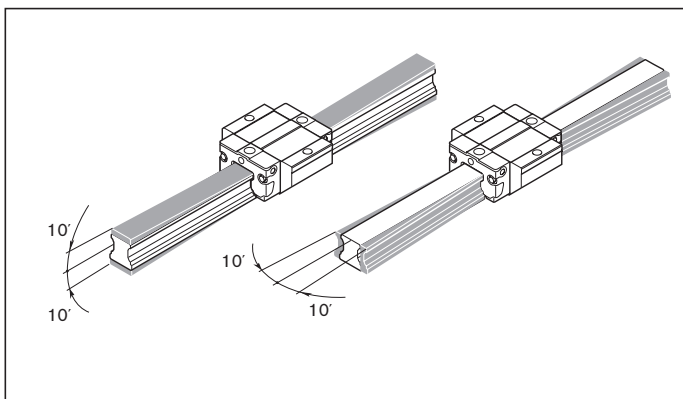


| Size | Dimensions (mm) | | | | | |
|------|------------------|-------|----------|---------------|-------------------|---------------|
| | E_4 | E_5 | E_{10} | $L_{10}^{1)}$ | $N_{9 \max}$ | $S_{10}^{1)}$ |
| 15 | 38 | 26 | 9 | 18 | 3.0 | 4 |
| 20 | 53 | 32 | 10 | 24 | 3.5 | 5 |
| | 49 ²⁾ | | | | 2.0 ²⁾ | |
| 25 | 55 | 35 | 11 | 32 | 7.0 | 6 |
| | 60 ²⁾ | | | | 5.0 ²⁾ | |
| 30 | 70 | 40 | 14 | 36 | 10.0 | 8 |
| 35 | 80 | 50 | 15 | 40 | 12.0 | 8 |

- 1) Tapered pin (hardened) or straight pin (DIN ISO 8734)
- 2) Ball runner blocks FKN and SKN

Permissible misalignments for super ball runner blocks

On the ball guide rail and on the ball runner block



Ball guide rail with ball runner block, wide

**Reference edges,
corner radii, screw sizes**

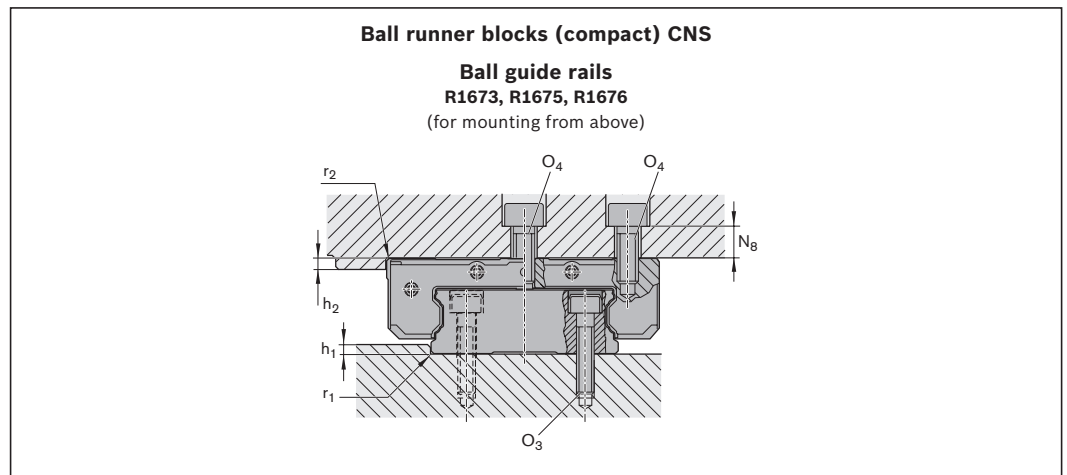
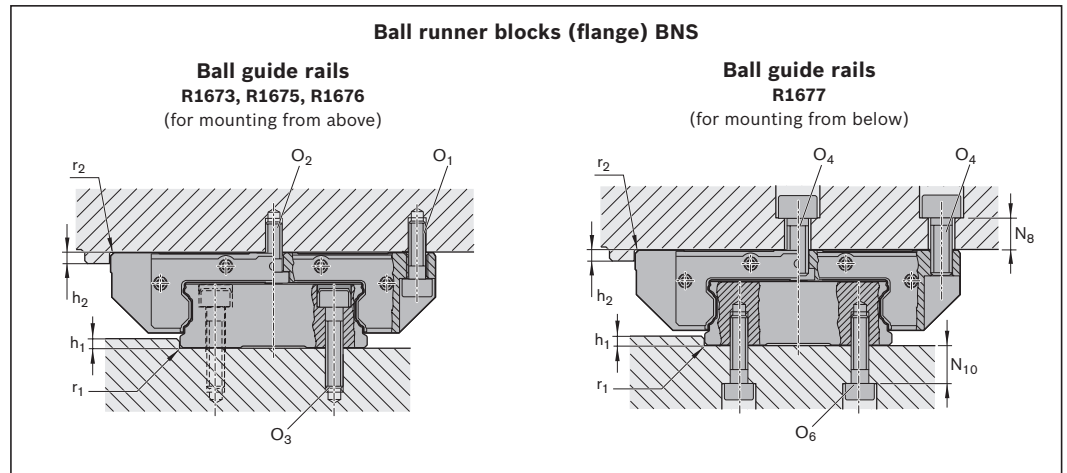
Combination examples

The combinations shown here are examples. Basically, any ball runner block may be combined with any of the ball guide rail types offered.

Mounting screws

⚠ Always make sure the screws are secure where there are high screw loads!

For more information on this topic, see the “General mounting instructions” section.



| Size | Dimensions (mm) | | | | | | | |
|--------------|-----------------|-------------------|-------|-------|------------|----------|--------------|--------------|
| | $h_{1 \min}$ | $h_{1 \max}^{1)}$ | h_2 | N_8 | $N_8^{2)}$ | N_{10} | $r_{1 \max}$ | $r_{2 \max}$ |
| 20/40 | 2.0 | 2.5 | 4 | 9.5 | 11 | 5.5 | 0.5 | 0.5 |
| 25/70 | 3.0 | 4.5 | 5 | 10.0 | 13 | 9.0 | 0.8 | 0.8 |
| 35/90 | 3.5 | 6.0 | 6 | 13.0 | – | 11.0 | 0.8 | 0.8 |

| Size | Screw sizes | | | | |
|--------------|-------------------------------|------------------------------------|------------------------------------|-------------------|-------------------|
| | Ball runner blocks | | | Ball guide rail | |
| | O_1 ISO 4762 4 pieces | $O_2^{3)}$ DIN 6912 2 pieces | $O_4^{3)}$ ISO 4762 6 pieces | O_3 ISO 4762 | O_6 ISO 4762 |
| 20/40 | M5x16 | – | M6x16 | M4x20 | M5x12 |
| 25/70 | M6x20 | M6x16 | M8x20 | M6x30 | M6x20 |
| 35/90 | M8x25 | M8x20 | M10x25 | M8x35 | M8x25 |

- 1) When using clamping and braking units, please take account of the values H1.
- 2) Ball runner blocks CNS
- 3) When fastening the ball runner block with 6 screws:
Tighten centerline screws to tightening torque M_A of strength class 8.8.
As a matter of principle, centerline fixing screws should be used as well, otherwise there is a risk of a decreasing preload.

Fastener

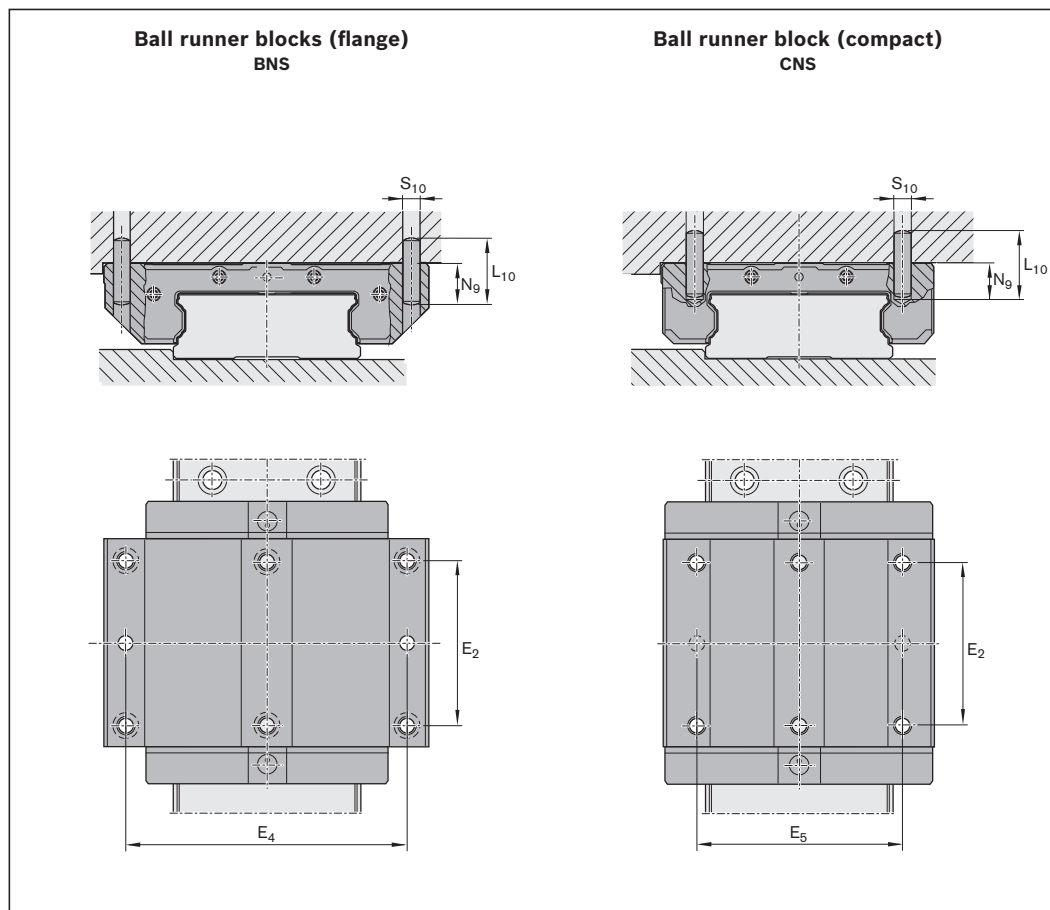
Locating pins

▲ If the guideline values for the permissible lateral force are exceeded (see the corresponding ball runner blocks), you must fix them additionally by pinning.

For the recommended dimensions for pin holes, refer to the dimension drawing and the dimensions.

Possible pin types

- ▶ Tapered pin (hardened) or
- ▶ Straight pin (DIN ISO 8734)



| Size | Dimensions (mm) | | | | |
|-------|-----------------|-------|---------------|--------------|---------------|
| | E_4 | E_5 | $L_{10}^{1)}$ | $N_{g \max}$ | $S_{10}^{1)}$ |
| 20/40 | 70 | 46 | 24 | 7 | 5 |
| 25/70 | 107 | 76 | 32 | 8 | 6 |
| 35/90 | 144 | – | 32 | 8 | 8 |

1) Tapered pin (hardened) or straight pin (DIN ISO 8734)

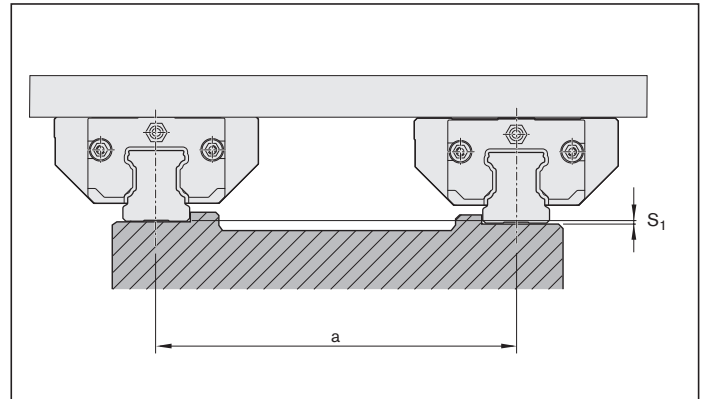
Note

- ▶ At the recommended positions for pin holes, there may be pre-drilled holes in the middle of the ball runner block due to production-related issues ($\varnothing < S_{10}$). They are suitable for drilling out.
- ▶ If it is necessary to carry out pinning at a different position (e.g. the middle lube connection), dimension E_2 must not be exceeded in the longitudinal direction (for dimension E_2 , refer to the dimension tables of the corresponding ball runner blocks). Comply with dimensions E_4 and E_5 !
- ▶ Do not complete the pin holes until after mounting.
- ▶ Please request the “Mounting instructions for ball rail systems.”

Installation tolerances

Vertical offset

If you comply with the permissible vertical offset S_1 and S_2 , the effect on the service life is, in general, negligible.



Permissible vertical offset in transverse direction S_1

The tolerance for dimension H is to be deducted from the permissible vertical offset S_1 of the ball guide rails according to the table containing the accuracy classes in the “General product description” chapter.

If $S_1 < 0$ applies, in the event of a combination of accuracy classes, select other tolerances in the “General product description” chapter.

| Ball runner blocks | Calculation factor Y for preload class | | | |
|--------------------------|---|---------------------|---------------------|---------------------|
| | C0 | C1 | C2 | C3 |
| made of steel | $4.3 \cdot 10^{-4}$ | $2.8 \cdot 10^{-4}$ | $1.7 \cdot 10^{-4}$ | $1.2 \cdot 10^{-4}$ |
| Short made of steel | $5.2 \cdot 10^{-4}$ | $3.4 \cdot 10^{-4}$ | - | - |
| Super ball runner blocks | $8.0 \cdot 10^{-4}$ | $6.0 \cdot 10^{-4}$ | - | - |
| made of aluminum | $7.0 \cdot 10^{-4}$ | $5.0 \cdot 10^{-4}$ | - | - |

$$S_1 = a \cdot Y$$

Key

- S_1 = Permissible vertical offset of the ball guide rails (mm)
- a = Centerline-to-centerline distance between the ball guide rails (mm)
- Y = Calculation factor transverse direction (-)

Preload classes

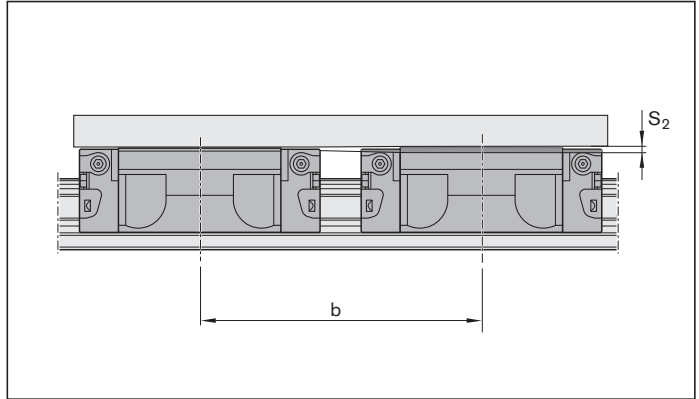
- C0 = Without preload (clearance)
- C1 = Moderate preload
- C2 = Average preload
- C3 = High preload

Installation tolerances

Permissible vertical offset in longitudinal direction S_2

You must deduct from the permissible vertical offset S_2 of the ball runner blocks the “Max. difference of dimension ΔH on one rail” tolerance according to the table containing the accuracy classes in the “General product description” chapter.

If $S_2 < 0$ applies, in the event of a combination of accuracy classes select other tolerances in the “General product description” chapter.



| Ball runner blocks | Calculation factor X for ball runner block length | | |
|--------------------|--|---------------------|---------------------|
| | Short | Normal | Long |
| made of steel | $6.0 \cdot 10^{-5}$ | $4.3 \cdot 10^{-5}$ | $3.0 \cdot 10^{-5}$ |
| made of aluminum | - | $6.0 \cdot 10^{-5}$ | - |

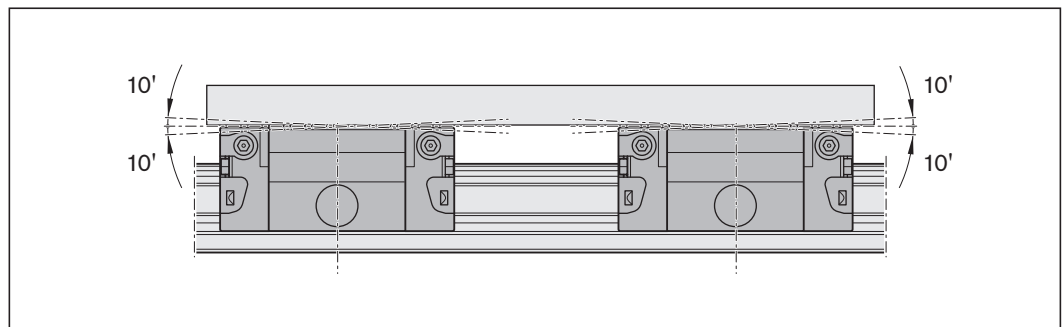
$$S_2 = b \cdot X$$

Key

- S_2 = Permissible vertical offset of the ball runner blocks (mm)
- b = Centerline-to-centerline distance between the ball runner blocks (mm)
- X = Calculation factor longitudinal direction (-)

Permissible nonlinearity in longitudinal direction for two consecutive super ball runner blocks

The ball runner blocks can automatically compensate for nonlinearities of 10' in the longitudinal direction.



General notes

The following notes on mounting apply to all ball rail systems.

Rexroth ball rail systems are high-quality products.

Use with extreme care during transport and mounting. The same care must be taken with cover strips.

All steel parts are protected with anti-corrosion oil.

It is not necessary to remove this oil, provided that the recommended lubricants are used.

⚠ In the case of overhead installation (hanging installation), the ball runner block can release from the guide rail due to the balls being lost or broken. Secure the ball runner block from falling!

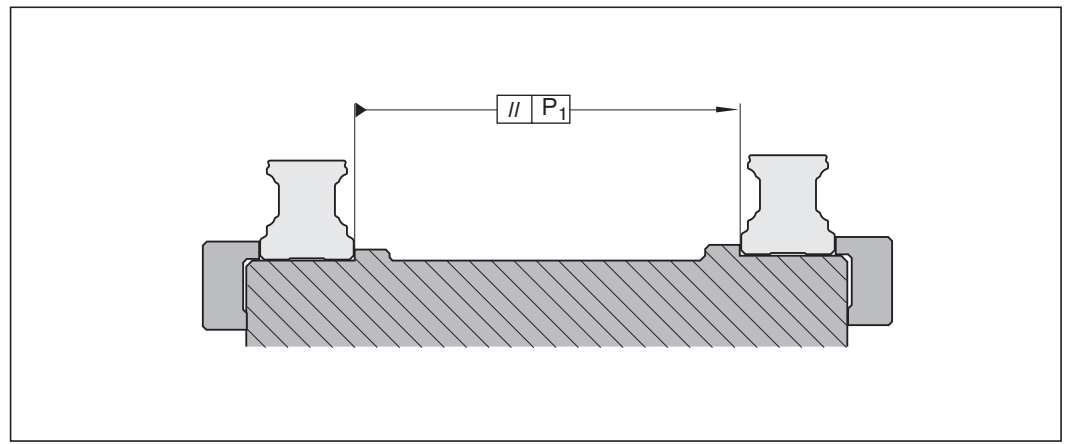
Parallelism offset of the installed rails

Values measured on the ball guide rails and the ball runner blocks

The values for the parallelism offset P_1 apply to the entire standard range of ball runner blocks.

The parallelism offset P_1 causes a slight rise in the preload.

As long as the values specified in the table are met, the effect of parallelism offsets on the service life can generally be neglected.



| Ball runner blocks | Size | Parallelism offset P_1 (mm) for preload class | | | |
|---|------|---|-------|-------|-------|
| | | C0 | C1 | C2 | C3 |
| Ball runner block made of steel with precision installation ¹⁾ | 15 | 0.015 | 0.009 | 0.005 | 0.004 |
| | 20 | 0.018 | 0.011 | 0.006 | 0.004 |
| | 25 | 0.019 | 0.012 | 0.007 | 0.005 |
| | 30 | 0.021 | 0.014 | 0.009 | 0.006 |
| | 35 | 0.023 | 0.015 | 0.010 | 0.007 |
| | 45 | 0.028 | 0.019 | 0.012 | 0.009 |
| | 55 | 0.035 | 0.025 | 0.016 | 0.011 |
| Ball runner block, short, made of steel | 15 | 0.018 | 0.011 | - | - |
| | 20 | 0.022 | 0.013 | - | - |
| | 25 | 0.023 | 0.014 | - | - |
| | 30 | 0.025 | 0.017 | - | - |
| | 35 | 0.028 | 0.018 | - | - |
| Super ball runner blocks | 15 | 0.025 | 0.017 | - | - |
| | 20 | 0.029 | 0.021 | - | - |
| | 25 | 0.032 | 0.023 | - | - |
| | 30 | 0.035 | 0.026 | - | - |
| | 35 | 0.040 | 0.030 | - | - |
| Aluminum ball runner block | 15 | 0.021 | 0.014 | - | - |
| | 25 | 0.026 | 0.017 | - | - |
| | 30 | 0.029 | 0.019 | - | - |
| | 35 | 0.035 | 0.022 | - | - |

Preload classes

C0 = Without preload (clearance)

C1 = Moderate preload

C2 = Average preload

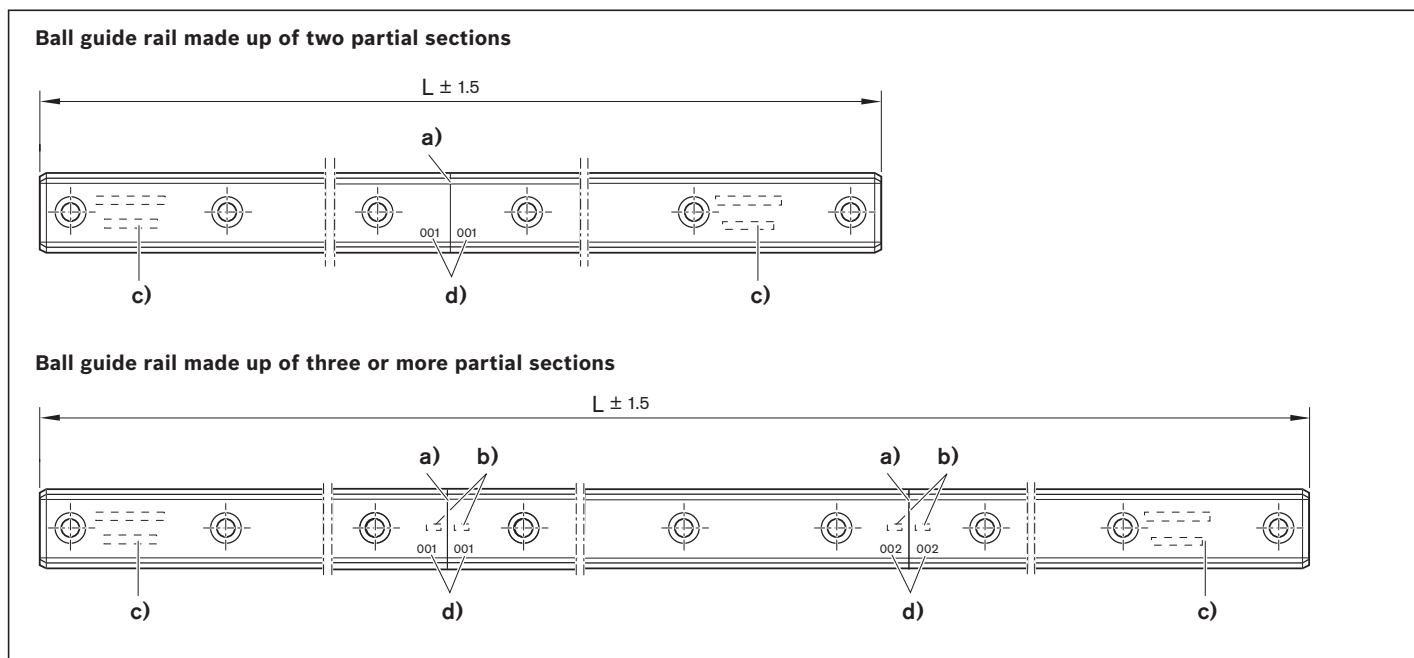
C3 = High preload

- 1)** The precision installation unit is a rigid, high-precision surrounding structure. With standard installation, the surrounding structure is of flexible design and it is possible to work with **double** the tolerance values of the parallelism offset.

Composite ball guide rails

Notes on ball guide rails

- ▶ Matching partial sections of a composite ball guide rail are identified as such by a label on the packaging. All partial sections of the same rail have the same serial rail number.
- ▶ The numbering is marked on the top of the ball guide rail.



L = rail length (mm)
 n_B = number of holes (-)

- a) Joint
- b) Rail number
- c) Full rail identification on first and last sections
- d) Joint identification number

Note on cover strip

- ▶ For composite ball guide rails, a one-piece cover strip to cover the total length L is supplied separately.
- ▶ Secure the cover strip!

Note on adjacent structures

Permissible mounting hole tolerances for adjacent structures

| Size | Hole position tolerance (mm) |
|---------|------------------------------|
| 15 - 35 | ∅ 0.2 |
| 45 - 65 | ∅ 0.3 |

For composite ball guide rails, the actual tolerances of the individual sections may sum up. In such case, the fastening bore holes in the connecting structure may lie outside of the tolerances and a rework of the connecting structure may be required.

Notes on lubrication

- ▶ All specifications on lubrication are based on experimental values and field experience are recommendations by Bosch Rexroth.
 - ▶ The service life of the ball rail system crucially depends on the lubrication. For this purpose, the documentation, especially the chapter on lubrication, must be read and understood completely.
 - ▶ The operator is responsible for the selection and supply of the ball rail system with sufficient and suitable lubricant. These notes do not exempt the operator from the individual examination of the conformity and suitability of the lubricant for its application.
 - ▶ For recommended lubricants, see the chapter “Notes on Dynalub”.
- ⚠ To safeguard the supply of lubricant the lube fittings from the chapter “Accessories” must be used. When using other lube fittings it must be ensured that they are identical to Rexroth lube fittings.
- ⚠ If using a progressive lubrication system, with grease lubrication, please pay attention to the minimum dosing amount for relubrication stated in table 9.
- ⚠ We recommend carrying out initial lubrication separately using a grease gun before connecting to the central lubrication system.
If using a central lubrication system, you must make sure that all the pipes and elements are filled with lubricant and do not contain any air pockets until they are connected to the consumer (ball runner block).
The number of pulses results from the partial amounts and the piston distributor size.
- ▶ **With fluid grease lubrication according to table 9**
 - ▶ **With oil lubrication according to table 14**
- ⚠ **The seals on the ball runner block must be oiled or greased with the respective lubricant before mounting.**
- ⚠ If using different lubricants than the ones specified, relubrication intervals may be shorter and performance may decrease with short stroke and load ratio; in addition, chemical interactions can take place between the plastics, lubricants and preservative agents. Single-line central lubrication systems also need to be able to pump these lubricants.
- ⚠ Lubricant reservoirs should contain an agitator to ensure the lubricant can flow (avoids hardening in the reservoir).
- ⚠ Do not use lubricants with solid particles (e.g. graphite or MoS₂).
- ⚠ With basic lubrication at the factory, both grease and oil lubrication is possible. In the case of relubrication, it is not possible to change from grease to oil lubrication, as the lubrication channels are already filled with grease and are therefore impermeable to oil.
- ⚠ Ball runner blocks without factory basic lubrication must be lubricated before commissioning.
- ⚠ When applying metalworking fluids at the start or after a relatively long standstill, carry out 2 to 5 lubrication pulses in succession. When the system is in operation, 3 to 4 pulses per hour are recommended, irrespective of the distance traveled. If possible, carry out lubrication in one lubricating stroke. Carry out cleaning cycles (see “Maintenance”).
- ⚠ An unfavorable selection of coolant/lubricant may lead to damage to the ball rail system. We recommend getting in touch with the manufacturer of the coolant/lubricant. Bosch Rexroth accepts no liability. Lubricant and metalworking fluids must be coordinated.
- ⚠ If environmental factors such as contamination, vibrations, impact loads, etc. are present, we recommend shorter lubrication intervals. Even under normal operating conditions, relubrication is required every 2 years due to grease aging.

- ▶ If your application involves more demanding environmental requirements (such as clean room, vacuum, food industry applications, increased exposure to fluids or aggressive media, extreme temperatures), please consult us. Each application must be considered on its own merits in order to choose the most appropriate lubricant. Special requirements call for special seals and wipers (see chapter “Ball runner block accessories”). Be sure to have all the information concerning your application at hand when contacting us. Pay attention to the chapter “Maintenance”.
- ▶ Rexroth recommends piston distributors by SKF. These should be installed as close as possible to the lube fittings of the ball runner blocks. Long lines and small line diameters should be avoided, and the lines should be laid on an upward slant. Install the lines at a gradient.
- ▶ Refer to the chapter entitled “Ball runner block accessories” for a selection of possible lube ports (in this connection, contact the manufacturer of your lubrication system too).
- ▶ If other consumers are connected to the single-line lubrication system, the weakest link in this chain determines the lubrication cycle.

Notes on Dynalub

(Approved for EU countries only; not approved outside of the EU)

⚠ Pay attention to the assignment of the ball rail system.

Under conventional environmental conditions, this short-fibred, homogeneous grease is ideally suited for the lubrication of linear elements:

- ▶ With loads up to 50 % C
- ▶ With short-stroke applications > 1 mm
- ▶ For the permissible travel speed range of ball rail systems

The product and safety data sheets can be found on our website at: www.boschrexroth.com.

Dynalub 510

Grease lubricant

Features:

- ▶ Lithium-based, high-performance grease of NLGI grade 2 according to DIN 51818 (KP2K-20 according to DIN 51825)
- ▶ Good water resistance
- ▶ Corrosion protection
- ▶ Temperature range: -20 to +80 °C

Material numbers for Dynalub 510:

- ▶ R3416 037 00 (cartridge 400 g)
- ▶ R3416 035 00 (hobcock 25 kg)

Alternative greases:

- ▶ Castrol Tribol GR 100-2 PD*) or Elkalub GLS 135/N2*).

Dynalub 520

Liquid grease

Features:

- ▶ Lithium-based, high-performance grease of NLGI grade 00 according to DIN 51818 (GP00K-20 according to DIN 51826)
- ▶ Good water resistance
- ▶ Corrosion protection
- ▶ Temperature range: -20 to +80 °C

Material numbers for Dynalub 520:

- ▶ R3416 043 00 (cartridge 400 g)
- ▶ R3416 042 00 (bucket 5 kg)

Alternative greases:

- ▶ Castrol Tribol GR 100-00 PD*) or Elkalub GLS 135/N00*)

Notes on lubricant oil

We recommend **Shell Tonna S3 M 220** *) or similar products with the following properties:

- ▶ Special demulsifying oil CLP or CGLP as per DIN 51517-3 for machine bed tracks and tool guides
- ▶ A blend of highly refined mineral oils and additives. Can be used even when mixed with significant quantities of metalworking fluids

*) No liability is accepted for changes to the product properties of these lubricants.

Lubrication

Grease lubrication with grease guns or progressive lubrication systems

▲ Observe chapter “Note on lubrication”

Grease lubricant: We recommend using **Dynalub 510**. For further information, please refer to chapter “Note on lubrication”.

▲ Never put ball runner blocks into operation without basic lubrication. No initial lubrication is required if pre-lubricated at the factory. Rexroth ball rail systems are supplied with preservation.

Initial lubrication of the ball runner blocks (basic lubrication)

Stroke $\geq 2 \cdot$ ball runner block length B_1 (normal stroke)

- ▶ One lube connection per ball runner block, attach optionally on the left **or** right ball guide and lubricate!

The initial lubrication is done three times with the partial quantities according to table 1:

1. Pre-lubricate the ball runner block with an initial partial amount according to table 1 by slowly applying pressure to the grease gun.
2. Move ball runner blocks with three double strokes of $3 \cdot$ ball runner block length B_1 .
3. Repeat steps 1 and 2 twice.
4. Check whether a film of grease is visible on the ball guide rail.

| Size | Initial lubrication (normal stroke) Part numbers (not exhaustive) | | | | |
|-------|--|-----------------|----------------------------|-----------------|-----------------|
| | (no initial lubrication) | | (with initial lubrication) | | |
| | R16.. ... 10 | R20.. ... 04/0Z | R16.. ... 20/2Z | R20.. ... 30/3Z | R16.. ... 70/7Z |
| | R16.. ... 11 | R20.. ... 05 | R16.. ... 21 | R20.. ... 31 | R16.. ... 71 |
| | R16.. ... 60 | R20.. ... 06/0Y | R16.. ... 22/2Y | R20.. ... 32/3Y | R16.. ... 72/7Y |
| | | R20.. ... 07 | R16.. ... 23 | R20.. ... 33 | R16.. ... 73 |
| | Partial quantity (cm ³) | | | | |
| 15 | 0.4 (3x) | | | | |
| 20 | 0.7 (3x) | | | | |
| 25 | 1.4 (3x) | | | | |
| 30 | 2.2 (3x) | | | | |
| 35 | 2.2 (3x) | | | | |
| 45 | - | | | | |
| 55 | 9.4 (3x) | | | | |
| 65 | 15.4 (3x) | | | | |
| 20/40 | - | | | | |
| 25/70 | - | | | | |
| 35/90 | 2.7 (3x) | | | | |

Table 1

Stroke $< 2 \cdot$ ball runner block length B_1 (short stroke)

- ▶ Two lube connections per ball runner block, attach one connection on the left **and** right ball guide and lubricate!


The initial lubrication is done three times for each connection with the partial quantities according to table 2:

1. Lubricate the ball runner block for each connection with an initial partial quantity according to table 2 by slowly applying pressure to the grease gun.
2. Move ball runner blocks with three double strokes of $3 \cdot$ ball runner block length B_1 .
3. Repeat steps 1 and 2 twice.
4. Check whether a film of grease is visible on the ball guide rail.

| Size | Initial lubrication (short stroke) Part numbers (not exhaustive) | | | | |
|-------|---|-----------------|----------------------------|-----------------|-----------------|
| | (no initial lubrication) | | (with initial lubrication) | | |
| | R16.. ... 10 | R20.. ... 04/0Z | R16.. ... 20/2Z | R20.. ... 30/3Z | R16.. ... 70/7Z |
| | R16.. ... 11 | R20.. ... 05 | R16.. ... 21 | R20.. ... 31 | R16.. ... 71 |
| | R16.. ... 60 | R20.. ... 06/0Y | R16.. ... 22/2Y | R20.. ... 32/3Y | R16.. ... 72/7Y |
| | | R20.. ... 07 | R16.. ... 23 | R20.. ... 33 | R16.. ... 73 |
| | left | right | | | |
| 15 | 0.4 (3x) | 0.4 (3x) | | | |
| 20 | 0.7 (3x) | 0.7 (3x) | | | |
| 25 | 1.4 (3x) | 1.4 (3x) | | | |
| 30 | 2.2 (3x) | 2.2 (3x) | | | |
| 35 | 2.2 (3x) | 2.2 (3x) | | | |
| 45 | - | | | | |
| 55 | 9.4 (3x) | 9.4 (3x) | | | |
| 65 | 15.4 (3x) | 15.4 (3x) | | | |
| 20/40 | - | | | | |
| 25/70 | - | | | | |
| 35/90 | 2.7 (3x) | 2.7 (3x) | | | |

Table 2


Grease lubrication with grease guns or progressive lubrication systems (continued)
Relubrication of the ball runner blocks
**Stroke $\geq 2 \cdot$ ball runner block length B_1
(normal stroke)**

- ▶ Wenn das Relubrication interval In accordance with Diagram 1 or 2  216 erreicht ist, die Nachschmiermenge in accordance with Table 3 einbringen.

| Size | Relubrication (normal stroke) | | | | |
|-------|-------------------------------------|-----------------|-------------------------------------|-----------------|-----------------|
| | Part numbers (not exhaustive) | | | | |
| | R16.. ... 10 | R20.. ... 04/0Z | R16.. ... 20/2Z | R20.. ... 30/3Z | R16.. ... 70/7Z |
| | R16.. ... 11 | R20.. ... 05 | R16.. ... 21 | R20.. ... 31 | R16.. ... 71 |
| | R16.. ... 60 | R20.. ... 06/0Y | R16.. ... 22/2Y | R20.. ... 32/3Y | R16.. ... 72/7Y |
| | | R20.. ... 07 | R16.. ... 23 | R20.. ... 33 | R16.. ... 73 |
| | | | | R20.. ... 90 | |
| | Partial quantity (cm ³) | | Partial quantity (cm ³) | | |
| 15 | 0.4 (1x) | | 0.4 (2x) | | |
| 20 | 0.7 (1x) | | 0.7 (2x) | | |
| 25 | 1.4 (1x) | | 1.4 (2x) | | |
| 30 | 2.2 (1x) | | 2.2 (2x) | | |
| 35 | 2.2 (1x) | | 2.2 (2x) | | |
| 45 | - | | 4.7 (2x) | | |
| 55 | 9.4 (1x) | | | | |
| 65 | 15.4 (1x) | | - | | |
| 20/40 | | | 1.0 (2x) | | |
| 25/70 | - | | 1.4 (2x) | | |
| 35/90 | 2.7 (1x) | | - | | |

Table 3

**Stroke $< 2 \cdot$ ball runner block length B_1
(short stroke)**

- ▶ When the relubrication interval in accordance with diagram 1 or 2  216 is reached, apply the relubrication quantity according to table 3.
- ▶ For each lubrication cycle, the ball runner block should be moved with a double stroke of 3 ball runner block length B_1 ; as minimum stroke, however, ball runner block length B_1 should be moved.

| Size | Relubrication (short stroke) | | | | |
|-------|--|-----------------|--|-----------------|-----------------|
| | Part numbers (not exhaustive) | | | | |
| | R16.. ... 10 | R20.. ... 04/0Z | R16.. ... 20/2Z | R20.. ... 30/3Z | R16.. ... 70/7Z |
| | R16.. ... 11 | R20.. ... 05 | R16.. ... 21 | R20.. ... 31 | R16.. ... 71 |
| | R16.. ... 60 | R20.. ... 06/0Y | R16.. ... 22/2Y | R20.. ... 32/3Y | R16.. ... 72/7Y |
| | | R20.. ... 07 | R16.. ... 23 | R20.. ... 33 | R16.. ... 73 |
| | | | | R20.. ... 90 | |
| | Partial quantity per connection (cm ³) | | Partial quantity per connection (cm ³) | | |
| | left | right | left | right | |
| 15 | 0.4 (1x) | 0.4 (1x) | 0.4 (2x) | 0.4 (2x) | |
| 20 | 0.7 (1x) | 0.7 (1x) | 0.7 (2x) | 0.7 (2x) | |
| 25 | 1.4 (1x) | 1.4 (1x) | 1.4 (2x) | 1.4 (2x) | |
| 30 | 2.2 (1x) | 2.2 (1x) | 2.2 (2x) | 2.2 (2x) | |
| 35 | 2.2 (1x) | 2.2 (1x) | 2.2 (2x) | 2.2 (2x) | |
| 45 | - | | 4.7 (2x) | 4.7 (2x) | |
| 55 | 9.4 (1x) | 9.4 (1x) | - | | |
| 65 | 15.4 (1x) | 15.4 (1x) | - | | |
| 20/40 | | | 1.0 (2x) | 1.0 (2x) | |
| 25/70 | - | | 1.4 (2x) | 1.4 (2x) | |
| 35/90 | 2.7 (1x) | 2.7 (1x) | - | | |

Table 4

Lubrication

Grease lubrication with grease guns or progressive lubrication systems (continued)

Load-dependent relubrication intervals

This applies to the following conditions:

- ▶ dynalub 510 grease or Castrol Tribol GR 100-2 PD or Elkalube GLS 135/N2
- ▶ no media pressurization
- ▶ standard seals (SS)
- ▶ ambient temperature:
T = 10 – 40 °C

Key

- C = Dynamic load capacity (N)
- F_m = Dynamically equivalent Load on bearing (N)
- F_m/C = Load ratio (-)
- s = Relubrication interval as travel distance (km)

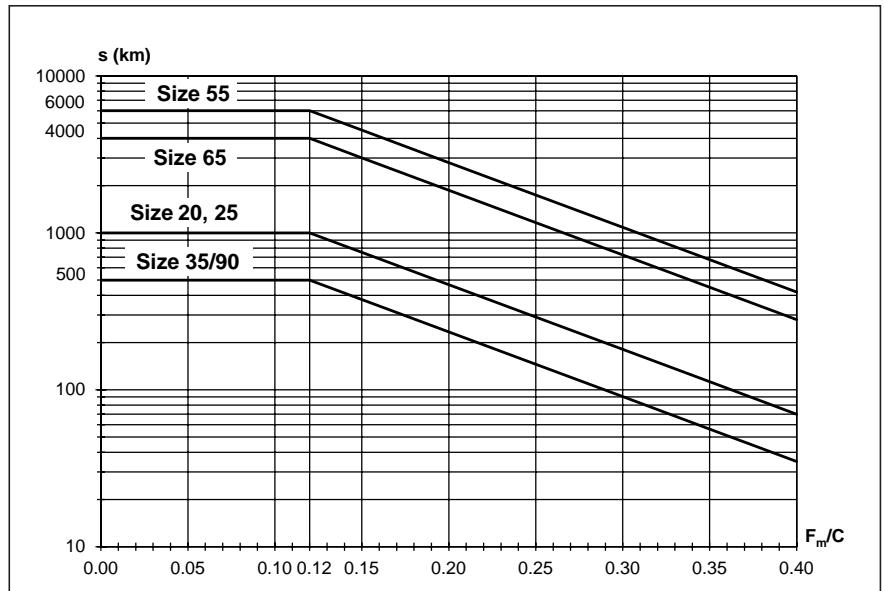


Diagram 1

| Material number | | |
|-----------------|--------------|--------------|
| R16.. ... 10 | R16.. ... 11 | R16.. ... 60 |

For relubrication intervals, please consult us:

- ▶ in case of exposure to cooling lubricants
- ▶ in case of exposure to dust (wood, paper,...)
- ▶ with use of a double-lip seal (DS)
- ▶ with standard seal (SS) in combination with front seal or FKM seal or seal kit
- ▶ at low mean travel speed v_m
- ▶ at a raised ambient temperature
- ▶ at high loads $F_m/C > 0.4$

⚠ Pay attention to the notes on lubrication!

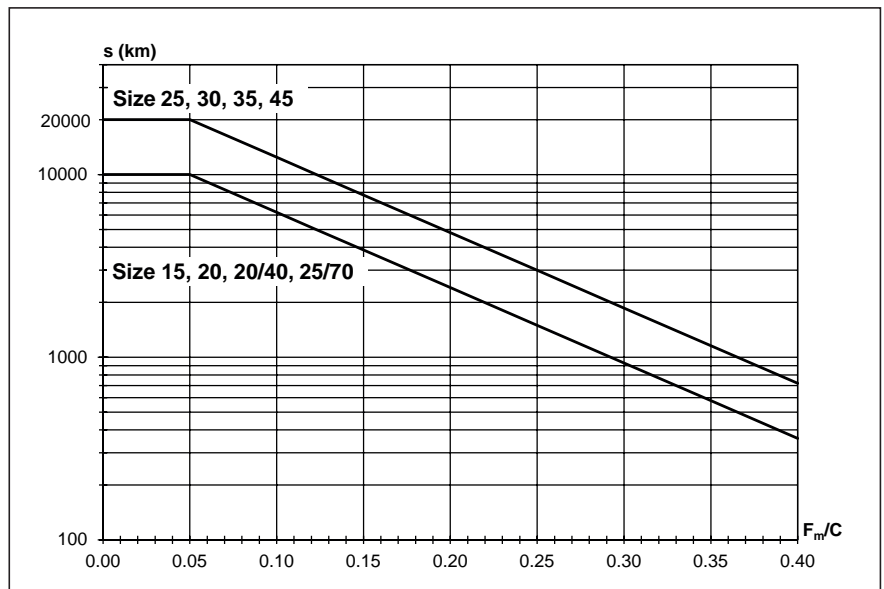


Diagram 2

| Material number | | | | |
|-----------------|--------------|--------------|--------------|--------------|
| R20.. ... 04 | R16.. ... 20 | R20.. ... 30 | R16.. ... 70 | R20.. ... 90 |
| R20.. ... 05 | R16.. ... 21 | R20.. ... 31 | R16.. ... 71 | |
| R20.. ... 06 | R16.. ... 22 | R20.. ... 32 | R16.. ... 72 | |
| R20.. ... 07 | R16.. ... 23 | R20.. ... 33 | R16.. ... 73 | |

Liquid grease lubrication with single-line piston distributor systems

⚠ Observe chapter “Note on lubrication”

Grease lubricant: We recommend using **Dynalub 520**. For further information, please refer to chapter “Note on lubrication”.

⚠ Never put ball runner blocks into operation without basic lubrication. No initial lubrication is required if pre-lubricated at the factory. Rexroth ball rail systems are supplied with preservation.

Initial lubrication of the ball runner blocks (basic lubrication)

Stroke $\geq 2 \cdot$ ball runner block length B_1 (normal stroke)

- ▶ One lube connection per ball runner block, attach optionally on the left or right ball guide and lubricate!

The initial lubrication is done three times with the partial quantities according to table 5:

1. Lubricate the ball runner block with an initial partial amount according to table 5 by slowly applying pressure to the grease gun.
2. Move ball runner blocks with three double strokes of $3 \cdot$ ball runner block length B_1 .
3. Repeat steps 1 and 2 twice.
4. Check whether a film of grease is visible on the ball guide rail.

Stroke $< 2 \cdot$ ball runner block length B_1 (short stroke)

- ▶ Two lube connections per ball runner block, attach one connection on the left and right ball guide and lubricate!

The initial lubrication is done three times for each connection with the partial quantities according to table 6:

1. Lubricate the ball runner block for each connection with an initial partial quantity according to table 6 by slowly applying pressure to the grease gun.
2. Move ball runner blocks with three double strokes of $3 \cdot$ ball runner block length B_1 .
3. Repeat steps 1 and 2 twice.
4. Check whether a film of grease is visible on the ball guide rail.

| Size | Initial lubrication (normal stroke) | | | | |
|-------|---|-----------------|---|-----------------|-----------------|
| | Part numbers (not exhaustive) (no initial lubrication) | | Part numbers (not exhaustive) (with initial lubrication) | | |
| | R16.. ... 10 | R20.. ... 04/0Z | R16.. ... 20/2Z | R20.. ... 30/3Z | R16.. ... 70/7Z |
| | R16.. ... 11 | R20.. ... 05 | R16.. ... 21 | R20.. ... 31 | R16.. ... 71 |
| | R16.. ... 60 | R20.. ... 06/0Y | R16.. ... 22/2Y | R20.. ... 32/3Y | R16.. ... 72/7Y |
| | | R20.. ... 07 | R16.. ... 23 | R20.. ... 33 | R16.. ... 73 |
| | | | | R20.. ... 90 | |
| | Partial quantity (cm³) | | | | |
| 15 | 0.4 (3x) | | | | |
| 20 | 0.7 (3x) | | | | |
| 25 | 1.4 (3x) | | | | |
| 30 | 2.2 (3x) | | | | |
| 35 | 2.2 (3x) | | | | |
| 45 | - | | | | |
| 55 | 9.4 (3x) | | | | |
| 65 | 15.4 (3x) | | | | |
| 20/40 | - | | | | |
| 25/70 | - | | | | |
| 35/90 | 2.7 (3x) | | | | |

Table 5

| Size | Initial lubrication (short stroke) | | | | |
|-------|---|-----------------|---|-----------------|-----------------|
| | Part numbers (not exhaustive) (no initial lubrication) | | Part numbers (not exhaustive) (with initial lubrication) | | |
| | R16.. ... 10 | R20.. ... 04/0Z | R16.. ... 20/2Z | R20.. ... 30/3Z | R16.. ... 70/7Z |
| | R16.. ... 11 | R20.. ... 05 | R16.. ... 21 | R20.. ... 31 | R16.. ... 71 |
| | R16.. ... 60 | R20.. ... 06/0Y | R16.. ... 22/2Y | R20.. ... 32/3Y | R16.. ... 72/7Y |
| | | R20.. ... 07 | R16.. ... 23 | R20.. ... 33 | R16.. ... 73 |
| | | | | R20.. ... 90 | |
| | Partial quantity per connection (cm³) | | | | |
| | left | right | | | |
| 15 | 0.4 (3x) | 0.4 (3x) | Initial lubrication in the factory with Dynalub 510 | | |
| 20 | 0.7 (3x) | 0.7 (3x) | | | |
| 25 | 1.4 (3x) | 1.4 (3x) | | | |
| 30 | 2.2 (3x) | 2.2 (3x) | | | |
| 35 | 2.2 (3x) | 2.2 (3x) | | | |
| 45 | - | | - | | |
| 55 | 9.4 (3x) | 9.4 (3x) | | | |
| 65 | 15.4 (3x) | 15.4 (3x) | | | |
| 20/40 | - | | Initial lubrication in the factory with Dynalub 510 | | |
| 25/70 | - | | | | |
| 35/90 | 2.7 (3x) | 2.7 (3x) | - | | |

Table 6

Lubrication

Liquid grease lubrication with single-line piston distributor systems (continued)

Relubrication of the ball runner blocks

Stroke $\geq 2 \cdot$ ball runner block length B_1 (normal stroke)

- ▶ If the relubrication interval according to diagram 3 or 4 has been reached, relubricate the amount stated in table 7.

Note

The number of pulses required for this purpose is the integer quotient of the minimum relubrication amount as per table 7 and the smallest permissible piston distributor size ($\hat{=}$ minimum pulse quantity) according to table 9.

The smallest permissible piston distributor size also depends on the installation position.

The lubricating cycle time is the result of dividing the lubrication interval by the determined pulse count (see dimensioning example).

| Size | Relubrication (normal stroke) | | | | |
|-------|-------------------------------------|-----------------|-----------------|-------------------------------------|-----------------|
| | Part numbers (not exhaustive) | | | | |
| | R16.. ... 10 | R20.. ... 04/0Z | R16.. ... 20/2Z | R20.. ... 30/3Z | R16.. ... 70/7Z |
| | R16.. ... 11 | R20.. ... 05 | R16.. ... 21 | R20.. ... 31 | R16.. ... 71 |
| | R16.. ... 60 | R20.. ... 06/0Y | R16.. ... 22/2Y | R20.. ... 32/3Y | R16.. ... 72/7Y |
| | | R20.. ... 07 | R16.. ... 23 | R20.. ... 33 | R16.. ... 73 |
| | | | | R20.. ... 90 | |
| | Partial quantity (cm ³) | | | Partial quantity (cm ³) | |
| 15 | 0.4 (1x) | | | 0.4 (2x) | |
| 20 | 0.7 (1x) | | | 0.7 (2x) | |
| 25 | 1.4 (1x) | | | 1.4 (2x) | |
| 30 | 2.2 (1x) | | | 2.2 (2x) | |
| 35 | 2.2 (1x) | | | 2.2 (2x) | |
| 45 | - | | | 4.7 (2x) | |
| 55 | 9.4 (1x) | | | | |
| 65 | 15.4 (1x) | | | - | |
| 20/40 | | | | 1.0 (2x) | |
| 25/70 | - | | | 1.4 (2x) | |
| 35/90 | 2.7 (1x) | | | - | |

Table 7

Stroke $< 2 \cdot$ ball runner block length B_1 (short stroke)

- ▶ When the relubrication interval according to diagram 3 or 4 is reached, apply the relubrication quantity according to table 8 per lube connection.
- ▶ The number of pulses required and the lubrication cycle are to be determined in a similar way as the relubrication (normal stroke).
- ▶ For each lubrication cycle, the ball runner block should be moved with a double stroke of 3 ball runner block length B_1 ; as minimum stroke, however, ball runner block length B_1 should be moved.

⚠ Pay attention to the notes on lubrication!

| Size | Relubrication (short stroke) | | | |
|-------|--|-----------------|--|-----------------|
| | Part numbers (not exhaustive) | | | |
| | R16.. ... 10 | R20.. ... 04/0Z | R16.. ... 20/2Z | R20.. ... 30/3Z |
| | R16.. ... 11 | R20.. ... 05 | R16.. ... 21 | R20.. ... 31 |
| | R16.. ... 60 | R20.. ... 06/0Y | R16.. ... 22/2Y | R20.. ... 32/3Y |
| | | R20.. ... 07 | R16.. ... 23 | R20.. ... 33 |
| | | | | R20.. ... 90 |
| | Partial quantity per connection (cm ³) | | Partial quantity per connection (cm ³) | |
| | left | right | left | right |
| 15 | 0.4 (1x) | 0.4 (1x) | 0.4 (2x) | 0.4 (2x) |
| 20 | 0.7 (1x) | 0.7 (1x) | 0.7 (2x) | 0.7 (2x) |
| 25 | 1.4 (1x) | 1.4 (1x) | 1.4 (2x) | 1.4 (2x) |
| 30 | 2.2 (1x) | 2.2 (1x) | 2.2 (2x) | 2.2 (2x) |
| 35 | 2.2 (1x) | 2.2 (1x) | 2.2 (2x) | 2.2 (2x) |
| 45 | - | | 4.7 (2x) | 4.7 (2x) |
| 55 | 9.4 (1x) | 9.4 (1x) | - | |
| 65 | 15.4 (1x) | 15.4 (1x) | - | |
| 20/40 | | | 1.0 (2x) | 1.0 (2x) |
| 25/70 | - | | 1.4 (2x) | 1.4 (2x) |
| 35/90 | 2.7 (1x) | 2.7 (1x) | - | |

Table 8

Liquid grease lubrication with single-line piston distributor systems (continued)

Load-dependent relubrication intervals

This applies to the following conditions:

- ▶ liquid grease Dynalub 520
alternatively Castrol Tribol
GR 100-00 PD or Elkalube
GLS 135/N00
- ▶ no media pressurization
- ▶ standard seals (SS)
- ▶ ambient temperature:
T = 10 – 40 °C

Key

- C = Dynamic load capacity (N)
- F_m = Dynamically equivalent
Load on bearing (N)
- F_m/C = Load ratio (-)
- s = Relubrication interval
as travel distance (km)

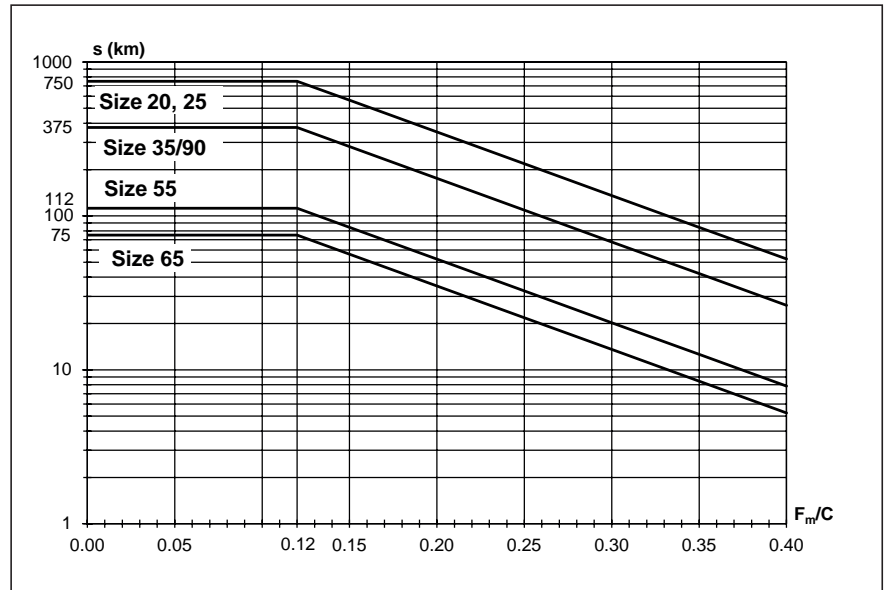


Diagram 3

| Material number | | |
|-----------------|--------------|--------------|
| R16.. ... 10 | R16.. ... 11 | R16.. ... 60 |

For relubrication intervals, please consult us:

- ▶ in case of exposure to cooling lubricants
- ▶ in case of exposure to dust
(wood, paper,...)
- ▶ with use of a double-lip seal (DS)
- ▶ with standard seal (SS) in combination
with front seal
or FKM seal
or seal kit
- ▶ at low mean travel speed v_m
- ▶ at a raised ambient temperature
- ▶ at high loads $F_m/C > 0.4$

⚠ Pay attention to the notes on lubrication!

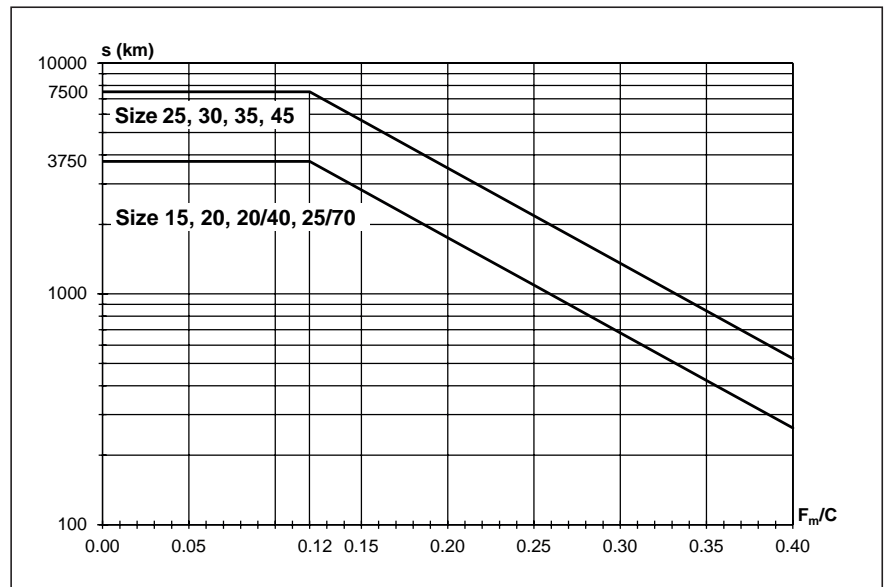


Diagram 4

| Material number | | | | |
|-----------------|--------------|--------------|--------------|--------------|
| R20.. ... 04 | R16.. ... 20 | R20.. ... 30 | R16.. ... 70 | R20.. ... 90 |
| R20.. ... 05 | R16.. ... 21 | R20.. ... 31 | R16.. ... 71 | |
| R20.. ... 06 | R16.. ... 22 | R20.. ... 32 | R16.. ... 72 | |
| R20.. ... 07 | R16.. ... 23 | R20.. ... 33 | R16.. ... 73 | |

Lubrication

Liquid grease lubrication with single-line piston distributor systems (continued)

Installation position I – Normal stroke
Horizontal
 1 lube connection, either on the left **or** on the right ball guide

Horizontal over head
Same connection

Installation position II – Normal stroke
Vertical to inclined horizontal
 1 lube connection at the upper ball guide

Vertical to inclined over head
Same connection

Installation position III – Normal stroke
Wall mounting
 1 lube connection, either on the left **or** on the right ball guide

Same connection

Installation position IV – short stroke
Horizontal
 2 lube connections, 1 connection each on the left **and** right ball guide

Horizontal over head
Same connections

Installation position V – short stroke
Vertical to inclined horizontal
 2 lube connections, 1 connection each on the top **and** bottom ball guide

Vertical to inclined over head
Same connections

Installation position VI – short stroke
Wall mounting
 2 lube connections, 1 connection each on the left **and** right ball guide

Same connections

Smallest permissible piston distributor size for liquid grease lubrication via single-line piston distributor¹⁾

| Ball runner blocks | | | | Smallest permissible piston distributor size (≅ minimum impulse quantity) for each connection (cm ³) with liquid grease of NLGI grade 00 | | | | | | | | | | | |
|--|--------------|--------------|--------------|--|------|------|------|------|------|------|------|------|-------|-------|-------|
| | | | | Size | | | | | | | | | | | |
| Material number | | | | Installation positions | 15 | 20 | 25 | 30 | 35 | 45 | 55 | 65 | 20/40 | 25/70 | 35/90 |
| R16.. ... 10 R16.. ... 11 R16.. ... 60 | | | | Horizontal I, IV Vertical II, V Wall mounting III, VI | - | 0.30 | 0.30 | - | - | - | 0.30 | 0.30 | - | - | 0.30 |
| R20.. ... 04 | R16.. ... 20 | R20.. ... 30 | R16.. ... 70 | Horizontal I, IV | 0.03 | 0.03 | 0.03 | 0.06 | 0.10 | 0.10 | - | - | 0.03 | 0.03 | - |
| R20.. ... 0Z | R16.. ... 2Z | R20.. ... 3Z | R16.. ... 7Z | Vertical II, V | | | | | | | | | 0.06 | 0.06 | |
| R20.. ... 05 | R16.. ... 21 | R20.. ... 31 | R16.. ... 71 | Wall mounting III, VI | | | | | | | | | 0.10 | 0.10 | |
| R20.. ... 06 | R16.. ... 22 | R20.. ... 32 | R16.. ... 72 | Wall mounting III, VI | 0.03 | 0.06 | 0.06 | 0.10 | 0.20 | 0.20 | - | - | 0.06 | 0.06 | - |
| R20.. ... 0Y | R16.. ... 2Y | R20.. ... 3Y | R16.. ... 7Y | | | | | | | | | | 0.06 | 0.06 | |
| R20.. ... 07 | R16.. ... 23 | R20.. ... 33 | R16.. ... 73 | | | | | | | | | | 0.10 | 0.10 | |
| | | R20.. ... 90 | | | | | | | | | | | | | |

Table 9

1) This applies to the following conditions:

- Liquid grease Dynalub 520 (alternatively Castrol Tribol GR 100-00 PD or Elkalube GLS 135/N00) and piston distributors by SKF.
- Lubrication channels must be filled
- Ambient temperature T = 10 – 40 °C

Oil lubrication with single-line piston distributor systems

⚠ Observe chapter “Note on lubrication”

Lubricant oil: We recommend **Shell Tonna S3 M220**. For further information, please refer to chapter “Note on lubrication”.

⚠ Never put ball runner blocks into operation without basic lubrication. No initial lubrication is required if pre-lubricated at the factory. Rexroth ball rail systems are supplied with preservation.

Initial lubrication of the ball runner blocks (basic lubrication)

Stroke $\geq 2 \cdot$ ball runner block length B_1 (normal stroke)

- ▶ One lube connection per ball runner block, attach optionally on the left **or** right ball guide and lubricate!

The initial lubrication is done two times with the partial quantity according to table 10:

1. Oil the ball runner block with the initial partial quantity according to table 10.
2. Move ball runner blocks with three double strokes of $3 \cdot$ ball runner block length B_1 .
3. Repeat steps 1 and 2 once.
4. Check whether a film of grease is visible on the ball guide rail.

| Size | Initial lubrication (normal stroke) Part numbers (not exhaustive) | | | | |
|-------|--|---------------------------------|---------------------------------|---|---------------------------------|
| | (no initial lubrication) | | (with initial lubrication) | | |
| | R16.. ... 10 | R20.. ... 04/0Z | R16.. ... 20/2Z | R20.. ... 30/3Z | R16.. ... 70/7Z |
| | R16.. ... 11 | R20.. ... 05 | R16.. ... 21 | R20.. ... 31 | R16.. ... 71 |
| | R16.. ... 60 | R20.. ... 06/0Y R20.. ... 07 | R16.. ... 22/2Y R16.. ... 23 | R20.. ... 32/3Y R20.. ... 33 R20.. ... 90 | R16.. ... 72/7Y R16.. ... 73 |
| | Partial quantity (cm ³) | | | | |
| 15 | 0.4 (2x) | | | | |
| 20 | 0.7 (2x) | | | | |
| 25 | 1.0 (2x) | | | | |
| 30 | 1.1 (2x) | | | | |
| 35 | 1.2 (2x) | | | | |
| 45 | - | | | | |
| 55 | 3.6 (2x) | | | | |
| 65 | 6.0 (2x) | | | | |
| 20/40 | - | | | | |
| 25/70 | - | | | | |
| 35/90 | 1.8 (2x) | | | | |

Table 10

Stroke $< 2 \cdot$ ball runner block length B_1 (short stroke)

- ▶ Two lube connections per ball runner block, attach one connection on the left **and** right ball guide and lubricate!

The initial lubrication is done two times for each connection with the partial quantities according to table 11:

1. Oil the ball runner block for each connection with the initial partial quantity according to table 11.
2. Move ball runner blocks with three double strokes of $3 \cdot$ ball runner block length B_1 .
3. Repeat steps 1 and 2 once.
4. Check whether a film of grease is visible on the ball guide rail.

| Size | Initial lubrication (short stroke) Part numbers (not exhaustive) | | | | |
|-------|---|---------------------------------|---------------------------------|---|---------------------------------|
| | (no initial lubrication) | | (with initial lubrication) | | |
| | R16.. ... 10 | R20.. ... 04/0Z | R16.. ... 20/2Z | R20.. ... 30/3Z | R16.. ... 70/7Z |
| | R16.. ... 11 | R20.. ... 05 | R16.. ... 21 | R20.. ... 31 | R16.. ... 71 |
| | R16.. ... 60 | R20.. ... 06/0Y R20.. ... 07 | R16.. ... 22/2Y R16.. ... 23 | R20.. ... 32/3Y R20.. ... 33 R20.. ... 90 | R16.. ... 72/7Y R16.. ... 73 |
| | Partial quantity per connection (cm ³) | | | | |
| | left | right | | | |
| 15 | 0.4 (2x) | 0.4 (2x) | | | |
| 20 | 0.7 (2x) | 0.7 (2x) | | | |
| 25 | 1.0 (2x) | 1.0 (2x) | | | |
| 30 | 1.1 (2x) | 1.1 (2x) | | | |
| 35 | 1.2 (2x) | 1.2 (2x) | | | |
| 45 | - | | | | |
| 55 | 3.6 (2x) | 3.6 (2x) | | | |
| 65 | 6.0 (2x) | 6.0 (2x) | | | |
| 20/40 | - | | | | |
| 25/70 | - | | | | |
| 35/90 | 1.8 (2x) | 1.8 (2x) | | | |

Table 11

Lubrication

Oil lubrication with single-line piston distributor systems (continued)

Relubrication of the ball runner blocks

Stroke $\geq 2 \cdot$ ball runner block length B_1 (normal stroke)

- ▶ If the relubrication interval according to diagram 5 or 6 has been reached, relubricate the amount stated in table 12.

Note

The required number of pulses is the integral quotient of the minimum relubrication quantity as per table 12 and the smallest permissible piston distributor size ($\hat{=}$ minimum pulse quantity) according to table 14.

The smallest permissible piston distributor size also depends on the installation position. The lubricating cycle time is the result of dividing the lubrication interval by the determined number of pulses (see dimensioning example).

| Size | Relubrication (normal stroke) | | | | | |
|-------|-------------------------------------|-----------------|-----------------|-------------------------------------|-----------------|--|
| | Part numbers (not exhaustive) | | | | | |
| | R16.. ... 10 | R20.. ... 04/0Z | R16.. ... 20/2Z | R20.. ... 30/3Z | R16.. ... 70/7Z | |
| | R16.. ... 11 | R20.. ... 05 | R16.. ... 21 | R20.. ... 31 | R16.. ... 71 | |
| | R16.. ... 60 | R20.. ... 06/0Y | R16.. ... 22/2Y | R20.. ... 32/3Y | R16.. ... 72/7Y | |
| | | R20.. ... 07 | R16.. ... 23 | R20.. ... 33 | R16.. ... 73 | |
| | | | | R20.. ... 90 | | |
| | Partial quantity (cm ³) | | | Partial quantity (cm ³) | | |
| 15 | 0.4 (1x) | | | 0.4 (1x) | | |
| 20 | 0.7 (1x) | | | 0.7 (1x) | | |
| 25 | 1.0 (1x) | | | 1.0 (1x) | | |
| 30 | 1.1 (1x) | | | 1.1 (1x) | | |
| 35 | 1.2 (1x) | | | 1.2 (1x) | | |
| 45 | - | | | 2.2 (1x) | | |
| 55 | 3.6 (1x) | | | | | |
| 65 | 6.0 (1x) | | | - | | |
| 20/40 | | | | 0.7 (1x) | | |
| 25/70 | - | | | 1.1 (1x) | | |
| 35/90 | 1.8 (1x) | | | - | | |

Table 12

Stroke $< 2 \cdot$ ball runner block length B_1 (short stroke)

- ▶ When the relubrication interval according to diagram 5 or 6 is reached, apply the relubrication quantity according to table 13 **per** lube connection.
- ▶ The number of pulses required and the lubrication cycle are to be determined in a similar way as the relubrication (normal stroke).
- ▶ For each lubrication cycle, the ball runner block should be moved with a double stroke of 3 ball runner block length B_1 ; as minimum stroke, however, ball runner block length B_1 should be moved.

⚠ Pay attention to the notes on lubrication!

| Size | Relubrication (short stroke) | | | | | |
|-------|--|-----------------|-----------------|--|-----------------|--|
| | Part numbers (not exhaustive) | | | | | |
| | R16.. ... 10 | R20.. ... 04/0Z | R16.. ... 20/2Z | R20.. ... 30/3Z | R16.. ... 70/7Z | |
| | R16.. ... 11 | R20.. ... 05 | R16.. ... 21 | R20.. ... 31 | R16.. ... 71 | |
| | R16.. ... 60 | R20.. ... 06/0Y | R16.. ... 22/2Y | R20.. ... 32/3Y | R16.. ... 72/7Y | |
| | | R20.. ... 07 | R16.. ... 23 | R20.. ... 33 | R16.. ... 73 | |
| | | | | R20.. ... 90 | | |
| | Partial quantity per connection (cm ³) | | | Partial quantity per connection (cm ³) | | |
| | left | right | left | right | | |
| 15 | 0.4 (1x) | 0.4 (1x) | 0.4 (1x) | 0.4 (1x) | | |
| 20 | 0.7 (1x) | 0.7 (1x) | 0.7 (1x) | 0.7 (1x) | | |
| 25 | 1.0 (1x) | 1.0 (1x) | 1.0 (1x) | 1.0 (1x) | | |
| 30 | 1.1 (1x) | 1.1 (1x) | 1.1 (1x) | 1.1 (1x) | | |
| 35 | 1.2 (1x) | 1.2 (1x) | 1.2 (1x) | 1.2 (1x) | | |
| 45 | - | | | 2.2 (1x) | 2.2 (1x) | |
| 55 | 3.6 (1x) | 3.6 (1x) | - | | | |
| 65 | 6.0 (1x) | 6.0 (1x) | | | | |
| 20/40 | | | | 0.7 (1x) | 0.7 (1x) | |
| 25/70 | - | | | 1.1 (1x) | 1.1 (1x) | |
| 35/90 | 1.8 (1x) | 1.8 (1x) | - | | | |

Table 13

Oil lubrication with single-line piston distributor systems (continued)

Load-dependent relubrication intervals for oil lubrication via single-line piston distributor systems (“dry axes”)

This applies to the following conditions:

- ▶ lubricant oil Shell Tonna S3 M220
- ▶ no media pressurization
- ▶ standard seals (SS)
- ▶ ambient temperature:
T = 10 – 40 °C

Key

- C = Dynamic load capacity (N)
- F_m = Dynamically equivalent Load on bearing (N)
- F_m/C = load ratio (-)
- s = Relubrication interval as travel distance (km)

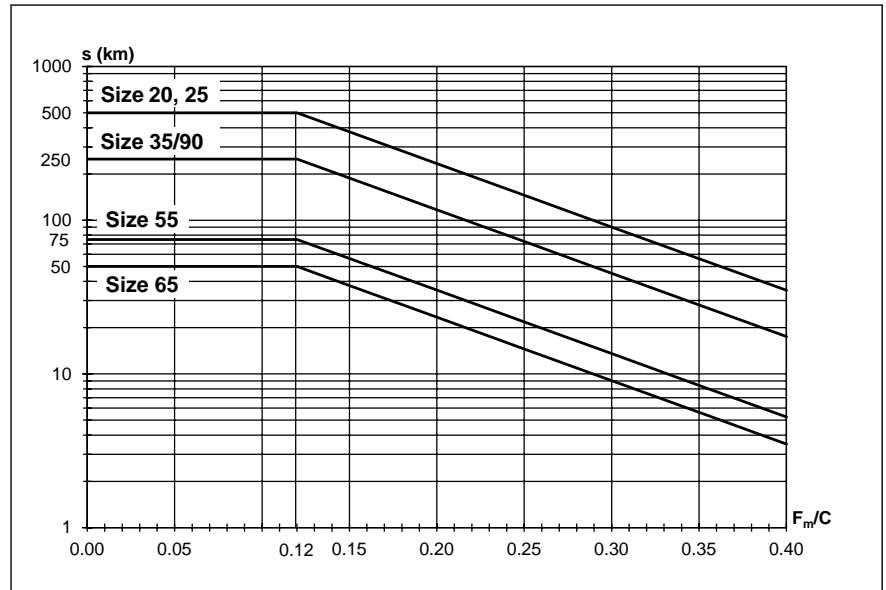


Diagram 5

| Material number | | |
|-----------------|--------------|--------------|
| R16.. ... 10 | R16.. ... 11 | R16.. ... 60 |

For relubrication intervals, please consult us:

- ▶ in case of exposure to cooling lubricants
- ▶ in case of exposure to dust (wood, paper,...)
- ▶ with use of a double-lip seal (DS)
- ▶ with standard seal (SS) in combination with front seal or FKM seal or seal kit
- ▶ at low mean travel speed v_m
- ▶ at a raised ambient temperature
- ▶ at high loads F_m/C > 0.4

⚠ Pay attention to the notes on lubrication!

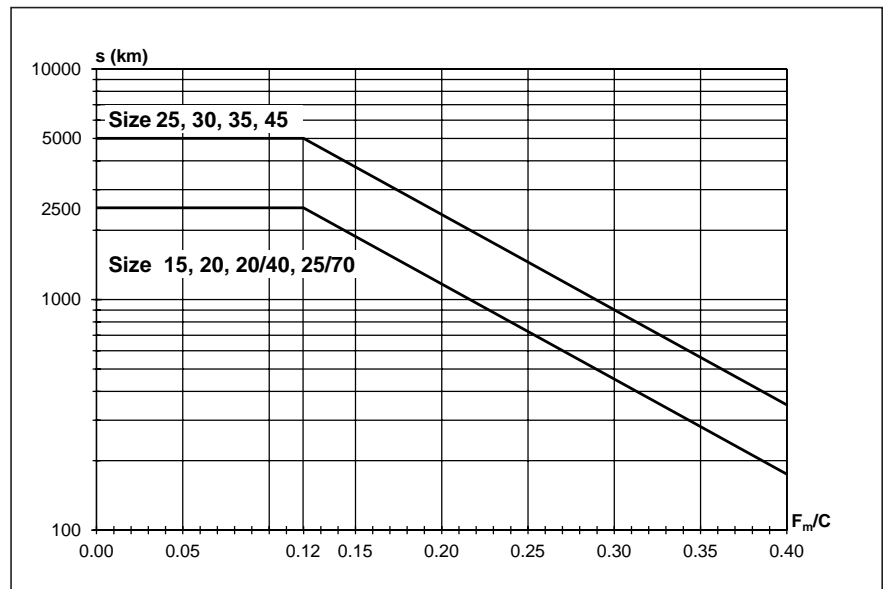
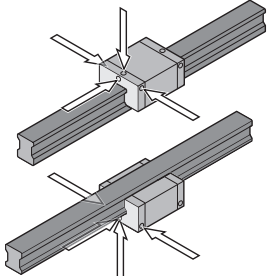
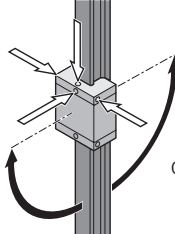
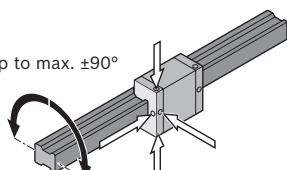
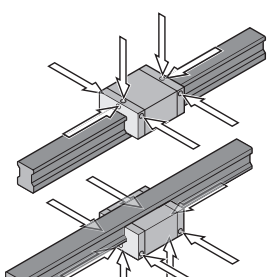
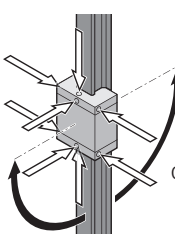
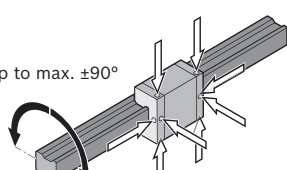


Diagram 6

| Material number | | | | |
|-----------------|--------------|--------------|--------------|--------------|
| R20.. ... 04 | R16.. ... 20 | R20.. ... 30 | R16.. ... 70 | R20.. ... 90 |
| R20.. ... 05 | R16.. ... 21 | R20.. ... 31 | R16.. ... 71 | |
| R20.. ... 06 | R16.. ... 22 | R20.. ... 32 | R16.. ... 72 | |
| R20.. ... 07 | R16.. ... 23 | R20.. ... 33 | R16.. ... 73 | |

Lubrication

Oil lubrication with single-line piston distributor systems (continued)

| | | |
|--|--|--|
| <p>Installation position I – Normal stroke Horizontal 1 lube connection, either on the left or on the right ball guide</p>  <p>Horizontal over head Same connection</p> | <p>Installation position II – Normal stroke Vertical to inclined horizontal 1 lube connection at the upper ball guide</p>  <p>Vertical to inclined over head Same connection</p> | <p>Installation position III – Normal stroke Wall mounting 1 lube connection, either on the left or on the right ball guide</p>  <p>Wall mounting Same connection</p> |
| <p>Installation position IV – short stroke Horizontal 2 lube connections, 1 connection each on the left and right ball guide</p>  <p>Horizontal over head Same connections</p> | <p>Installation position V – short stroke Vertical to inclined horizontal 2 lube connections, 1 connection each on the top and bottom ball guide</p>  <p>Vertical to inclined over head Same connections</p> | <p>Installation position VI – short stroke Wall mounting 2 lube connections, 1 connection each on the left and right ball guide</p>  <p>Wall mounting Same connections</p> |

Smallest permissible piston distributor size for oil lubrication via single-line piston distributor¹⁾

| Ball runner blocks | | | | Smallest permissible piston distributor size (≠ minimum impulse quantity) for each connection (cm ³) with oil viscosity of 220 mm ² /s | | | | | | | | | | | |
|--------------------|--------------|--------------|--------------|---|------|------|------|------|------|------|------|----|-------|-------|-------|
| | | | | Size | | | | | | | | | | | |
| Material number | | | | Installation positions | 15 | 20 | 25 | 30 | 35 | 45 | 55 | 65 | 20/40 | 25/70 | 35/90 |
| R16.. ... 10 | | | | Horizontal I, IV | - | 0.60 | | | | | 1.50 | | - | | 0.60 |
| R16.. ... 11 | | | | Vertical II, V | | | | | | | | | | | |
| R16.. ... 60 | | | | Wall mounting III, VI | | | | | | | | | | | |
| R20.. ... 04 | R16.. ... 20 | R20.. ... 30 | R16.. ... 70 | Horizontal I, IV | 0.03 | 0.03 | 0.03 | 0.06 | 0.10 | 0.10 | | | 0.03 | 0.03 | |
| R20.. ... 02 | R16.. ... 22 | R20.. ... 32 | R16.. ... 72 | Vertical II, V | | | | | | | | | | | |
| R20.. ... 05 | R16.. ... 21 | R20.. ... 31 | R16.. ... 71 | Wall mounting III, VI | | | | | | | | | | | |
| R20.. ... 06 | R16.. ... 22 | R20.. ... 32 | R16.. ... 72 | | | | | | | | | | | | |
| R20.. ... 0Y | R16.. ... 2Y | R20.. ... 3Y | R16.. ... 7Y | | | | | | | | | | | | |
| R20.. ... 07 | R16.. ... 23 | R20.. ... 33 | R16.. ... 73 | | | | | | | | | | | | |
| | | R20.. ... 90 | | | | | | | | | | | | | |

Table 14

- 1) This applies to the following conditions:
- Lubricant oil Shell Tonna S3 M 220 and piston distributor from SKF
 - Lubrication channels must be filled
 - Ambient temperature T = 10 – 40 °C

Dimensioning example of lubrication a typical 2-axes application using central lubrication
X-axis

| Component or characteristic value | Specifications |
|---|--|
| Ball runner blocks | Size 35, 4 pieces, C = 51,800 N, part numbers: R1651 323 20 |
| Ball guide rail | Size 35, 2 pieces, L = 1,500 mm; part numbers: R1605 333 61 |
| Dynamic equivalent load on bearing | $F_m = 12,570$ N (per ball runner block) with consideration of the preload (here C2) |
| Stroke | 500 mm |
| Average linear speed | $v_m = 1$ m/s |
| Temperature | 20 – 30 °C |
| Installation position | Horizontal |
| Lubrication | Single-line distributor system for all axes with liquid grease Dynalub 520 |
| Exposure to contaminants | No exposure to media, chips, dust |

Dimensioning sizes

1. Normal stroke or short stroke?

Dimensioning (for each ball runner block)

Normal stroke:

 $\text{Stroke} \geq 2 \cdot \text{ball runner block length } B_1$
 $500 \text{ mm} \geq 2 \cdot 77 \text{ mm}$
 $500 \text{ mm} \geq 154 \text{ mm!}$

i.e. normal stroke applies!

Sources of information

- ▶ Normal-stroke formula, Ball runner block length B_1

2. Initial lubrication amount

1 lube connection, initial lubrication quantity: pre-lubricated at the factory with Dynalub 510

- ▶ Initial lubrication amount from table 5

3. Relubrication quantity

 1 lube connection, relubrication quantity: 2.2 cm^3 (2x)

- ▶ Relubrication amount from table 7

4. Installation position

Installation position I – Normal stroke (horizontal)

- ▶ Installation position from overview

5. Piston distributor size

 Permissible piston distributor size: 0.1 cm^3

- ▶ Piston distributor size from table 9 Size 35, installation position I (horizontal)

6. Number of pulses

$$\text{Number of pulses} = \frac{2 \cdot 2.2 \text{ cm}^3}{0.1 \text{ cm}^3} = 44$$

- ▶ Number of pulses = $\frac{\text{Number} \cdot \text{relubrication quantity}}{\text{Permissible Piston distributor size}}$

7. Load ratio

$$\text{Load ratio} = \frac{12,570 \text{ N}}{51,800 \text{ N}} = 0.24$$

- ▶ Load ratio = F_m/C
 F_m and C from specifications

8. Relubrication interval

Relubrication interval: 2,150 km

- ▶ Relubrication interval from diagram 4: Curve size 35 with load ratio of 0.24

9. Lubrication cycle

$$\text{Lubrication cycle} = \frac{2,150 \text{ km}}{44} = 48$$

- ▶ Lubrication cycle = $\frac{\text{Relubrication interval}}{\text{Number of pulses}}$

Interim result (X-axis)

 For the x-axis, for each ball runner block, a minimum quantity of 0.1 cm^3 of Dynalub 520 is to be supplied every 48 km.

Lubrication

Y-axis

| Component or characteristic value | Specifications |
|---|---|
| Ball runner blocks | Size 25, 4 pieces, C = 28,600 N, part numbers: R1651 223 20 |
| Ball guide rail | Size 25; 2 pieces; L = 1 000 mm, Material numbers: R1605 232 31 |
| Dynamic equivalent load on bearing | $F_m = 3,420$ N (per ball runner block) with consideration of the preload (here C2) |
| Stroke | 50 mm (short stroke) |
| Average linear speed | $v_m = 1$ m/s |
| Temperature | 20 – 30 °C |
| Installation position | Vertical |
| Lubrication | Single-line distributor system for all axes with liquid grease Dynalub 520 |
| Exposure to contaminants | No exposure to media, chips, dust |

Dimensioning sizes

1. Normal stroke or short stroke?

Dimensioning (for each ball runner block)

Normal stroke:

Stroke $\geq 2 \cdot$ ball runner block length B_1

50 mm $\geq 2 \cdot 57.8$ mm

50 mm < 115.6 mm!

i.e. short stroke applies!

Sources of information

- ▶ Normal-stroke formula, Ball runner block length B_1

2. Initial lubrication amount

2 lube connections, initial lubrication quantity for each connection: pre-lubricated at the factory with Dynalub 510

- ▶ Initial lubrication amount from table 6

3. Relubrication quantity

2 lube connections, relubrication quantity for each connection: 1.4 cm^3 (2x)

- ▶ Relubrication amount from table 8

4. Installation position

Installation position V – short stroke (vertical to inclined horizontal)

- ▶ Installation position from overview

5. Piston distributor size

Permissible piston distributor size: 0.03 cm^3

- ▶ Piston distributor size from table 9, size 25, mounting position V (vertical to inclined horizontal)

6. Number of pulses

$$\text{Number of pulses} = \frac{2 \cdot 1.4 \text{ cm}^3}{0.03 \text{ cm}^3} = 94$$

- ▶ Number of pulses = $\frac{\text{Number} \cdot \text{relubrication quantity}}{\text{Permissible Piston distributor size}}$

7. Load ratio

$$\text{Load ratio} = \frac{3,420 \text{ N}}{28,600 \text{ N}} = 0.12$$

- ▶ Load ratio = F_m/C
 F_m and C from specifications

8. Relubrication interval

Relubrication interval: 7,500 km

- ▶ Relubrication interval from diagram 4: Curve size 25 with load ratio of 0.12

9. Lubrication cycle

$$\text{Lubrication cycle} = \frac{7,500 \text{ km}}{94} = 80 \text{ km}$$

- ▶ Lubrication cycle = $\frac{\text{Relubrication interval}}{\text{Number of pulses}}$

Interim result (Y-axis)

For the y-axis, for each ball runner block and each lube connection, a minimum quantity of 0.03 cm^3 of Dynalub 520 is to be supplied every 80 km.

Final result (Two-axes lubrication)

Since, in this example, both axes are to be supplied by a single-line distributor system, the x-axis with its smaller lubrication cycle (48 km) determines the total lubrication cycle of the system, i.e. the y-axis is lubricated every 48 km as well.

The number of connections and minimum quantities determined for each individual axis remain valid.

Lubrication from above without lubrication adapter

For all ball runner blocks with preparation for lubrication from above.

(Exceptions: High ball runner block SNH R1621 and SLH R1624)

In the groove for the O-ring, another small groove (1) is pre-fitted.

Do not open this with a drill.

Risk of contamination!

1. Heat up a metal tip (2) with a diameter of 0.8 mm.
2. Carefully open and pierce the groove (1) with the metal tip.
Observe the maximum permissible depth T_{max} according to the table!
3. Insert the o-ring (3) into the groove (the o-ring is not included in the scope of delivery of the ball runner block. Ball runner block accessories)

with lubrication adapter

(Ball runner block accessories)

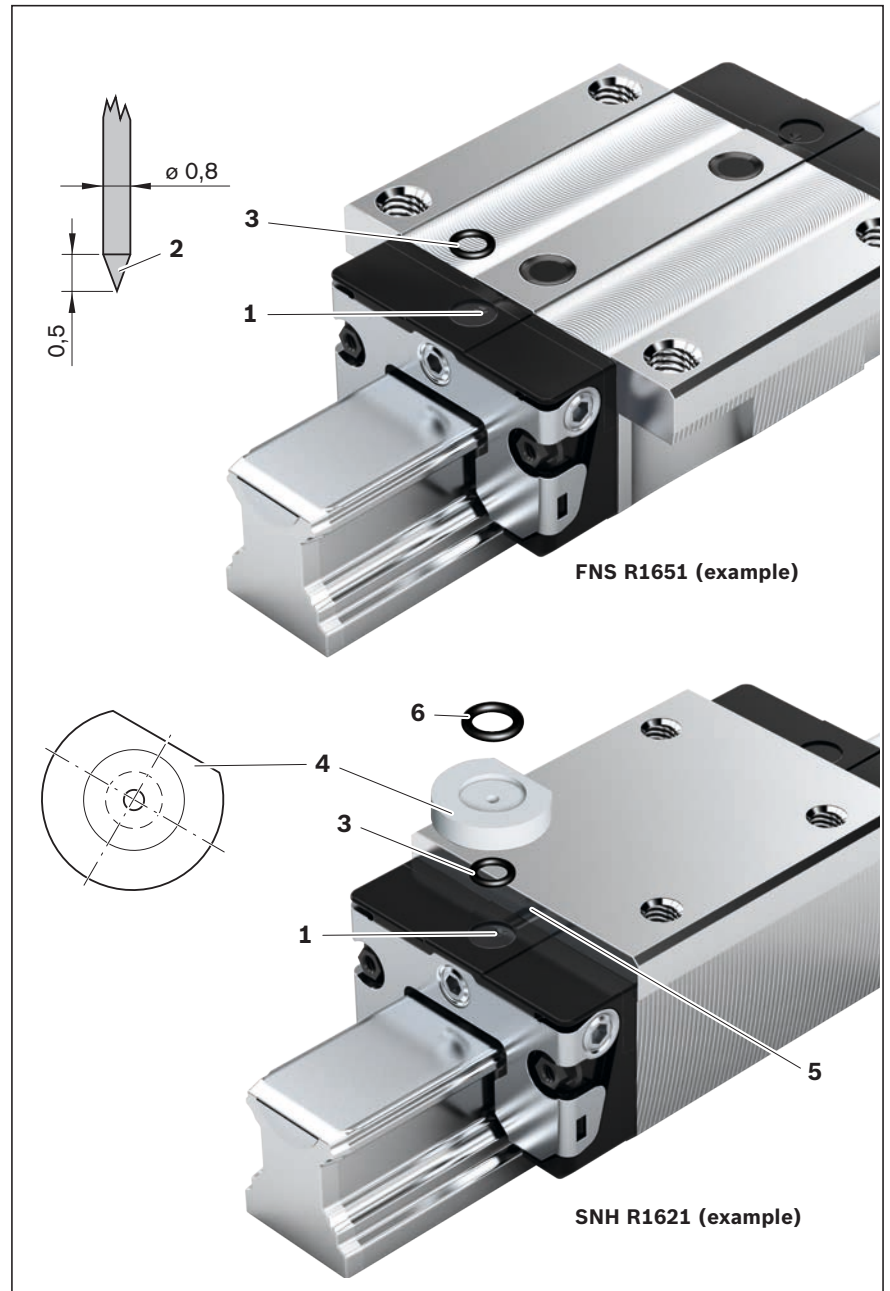
A lubrication adapter is necessary for high ball runner blocks if lubrication is to be carried out from the carriage.

In the groove for the O-ring, another small groove (1) is pre-fitted.

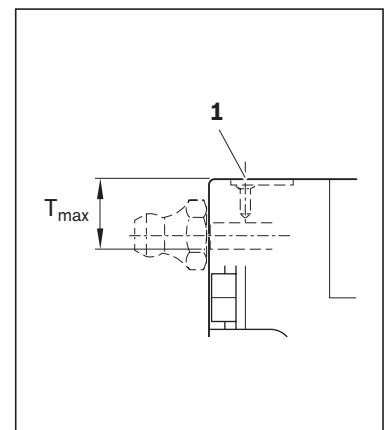
Do not open this with a drill.

Risk of contamination!

1. Heat up a metal tip (2) with a diameter of 0.8 mm.
2. Carefully open and pierce the groove (1) with the metal tip.
Observe the maximum permissible depth T_{max} according to the table!
3. Insert the o-ring (3) into the groove (the o-ring is not included in the scope of delivery of the lubrication adapter).
4. Insert the lubrication adapter at a slant into the groove and press the straight side (4) against the steel part (5). Use grease to fix the adapter in place.
5. Insert the o-ring (6) into the lubrication adapter (the o-ring is not included in the scope of delivery of the lubrication adapter).



| Size | Lubrication opening, top: Maximum permissible depth for piercing T_{max} (mm) | |
|-------|---|--------------------------|
| | Ball runner block standard height/high | Ball runner block low |
| 15 | 3.6 | - |
| 20 | 3.9 | 4.4 |
| 25 | 3.3 | 4.9 |
| 30 | 6.6 | - |
| 35 | 7.5 | - |
| 45 | 8.8 | - |
| 20/40 | 4.0 | - |
| 25/70 | 2.1 | - |
| 35/90 | 7.9 | - |



Maintenance

Cleaning cycle

Dirt can settle and encrust on ball guide rails, especially when these are not enclosed. To ensure that seals and cover strips retain their functionality, this dirt must be removed at regular intervals.

It is advisable to perform at least one full cleaning cycle over the entire stroke at least twice a day or every 8 hours at the latest.

Before shutting down the machine, always perform a cleaning cycle.

Shorter maintenance intervals in case of exposure to cooling lubricants.

Maintenance of accessories

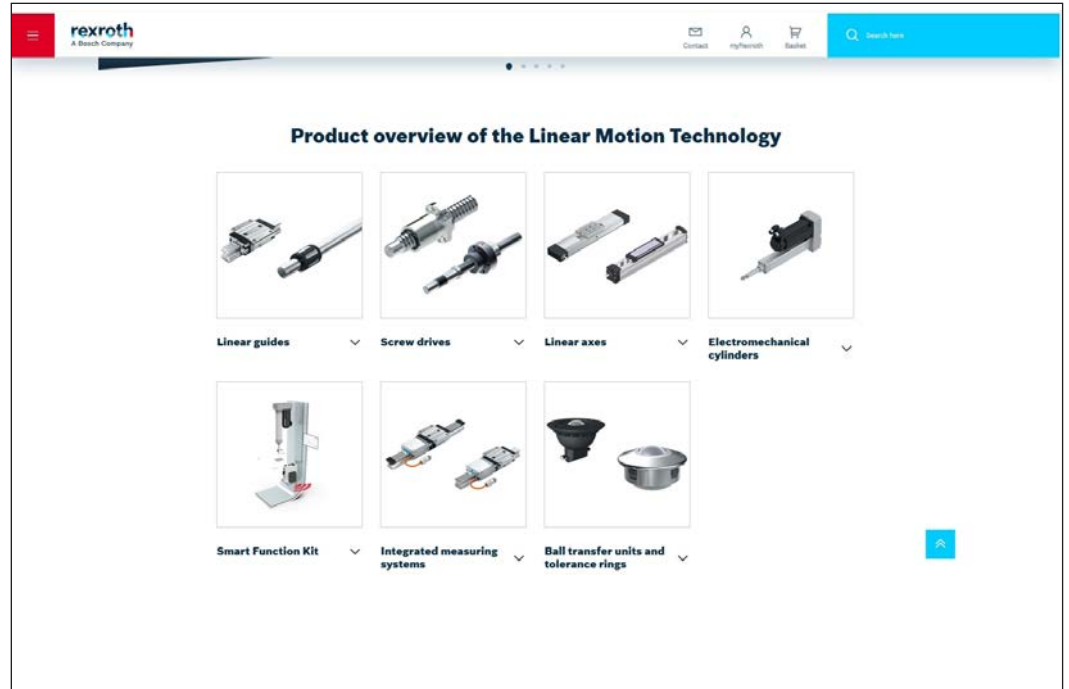
All accessories used for scraping the ball guide rail shall be subject to regular maintenance.

In environments with heavy contamination, it is advisable to replace all the parts directly exposed to such contamination.

We recommend annual maintenance.

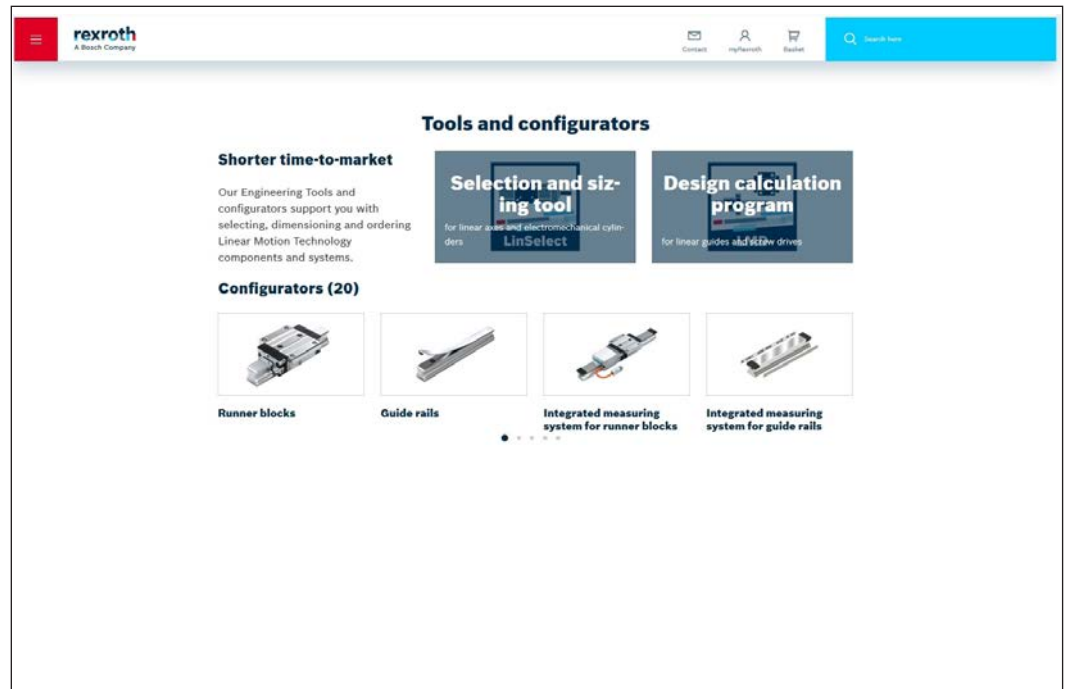
Bosch Rexroth Linear Motion Technology homepage

<https://www.boschrexroth.com/en/xc/products/product-groups/linear-motion-technology/index>



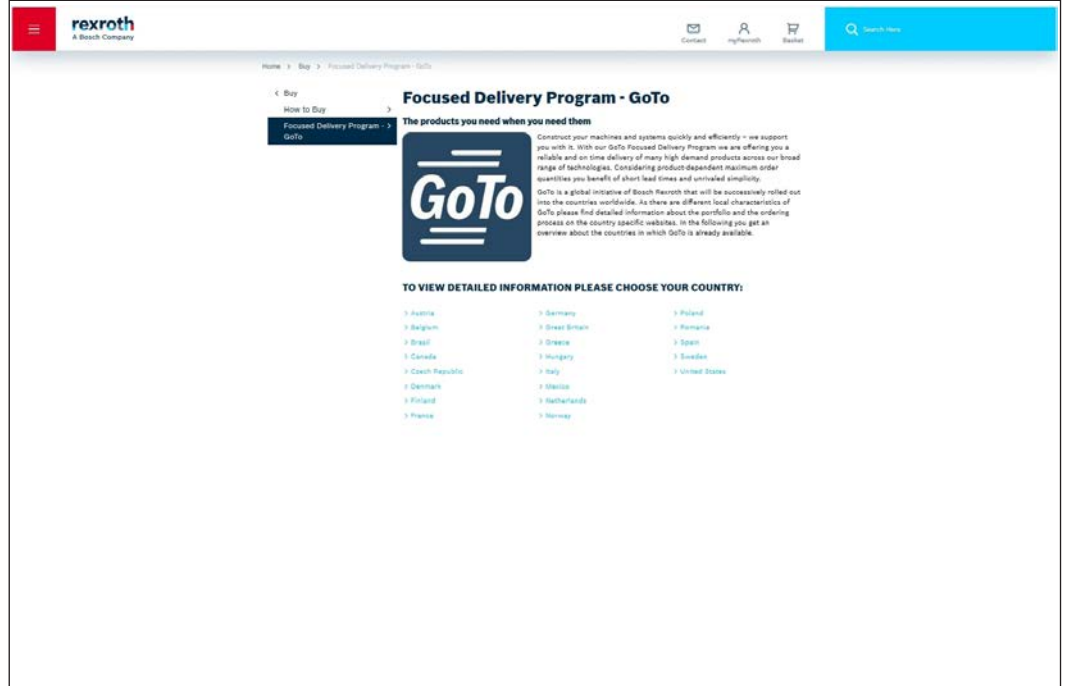
Configurators and tools

<https://www.boschrexroth.com/en/xc/products/engineering/econfigurators-and-tools/econfigurators>



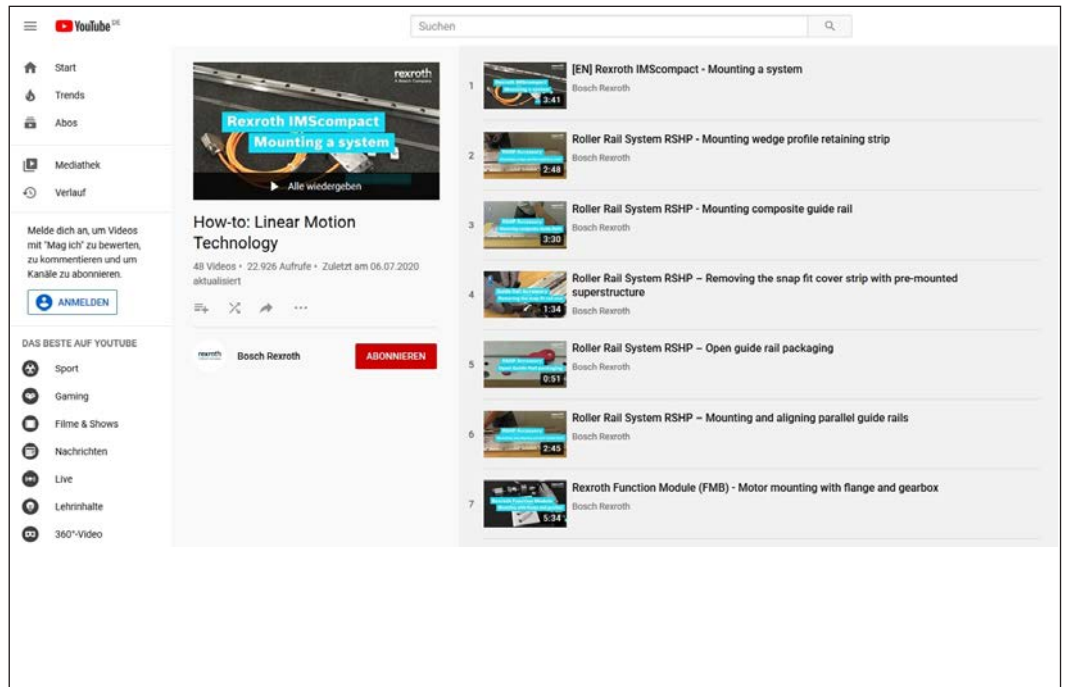
GoTo Europe

<http://www.boschrexroth.com/goto>



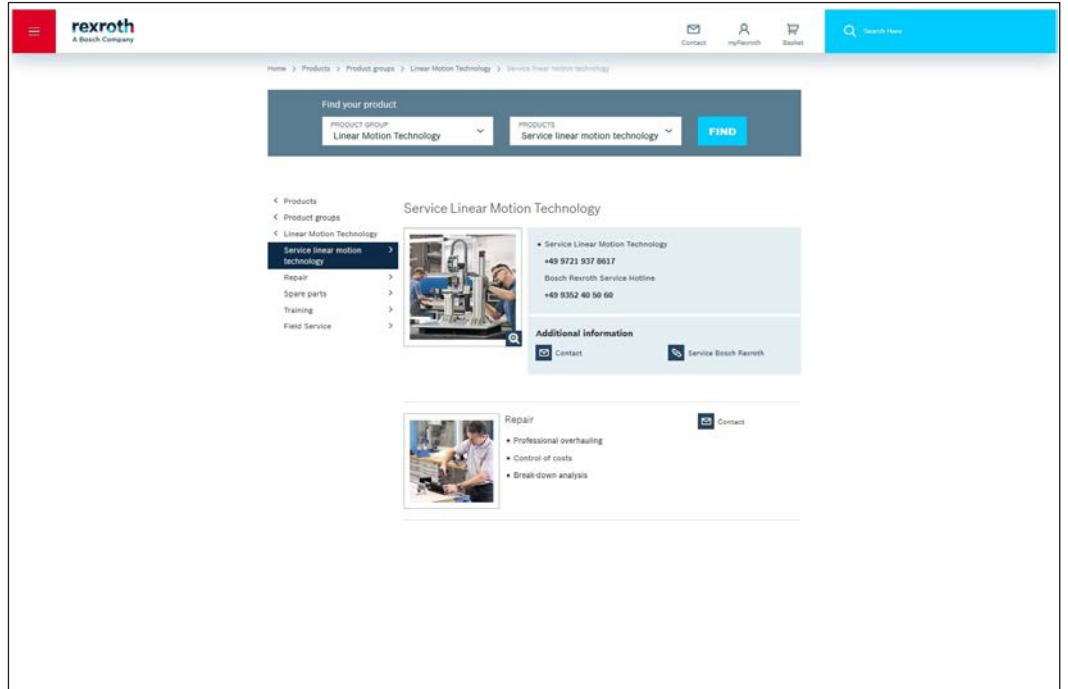
How-to: Linear Motion Technology

<https://www.youtube.com/playlist?list=PLRO3LeFQeLyMF6evW4E7kR93JHzpJIV4r>



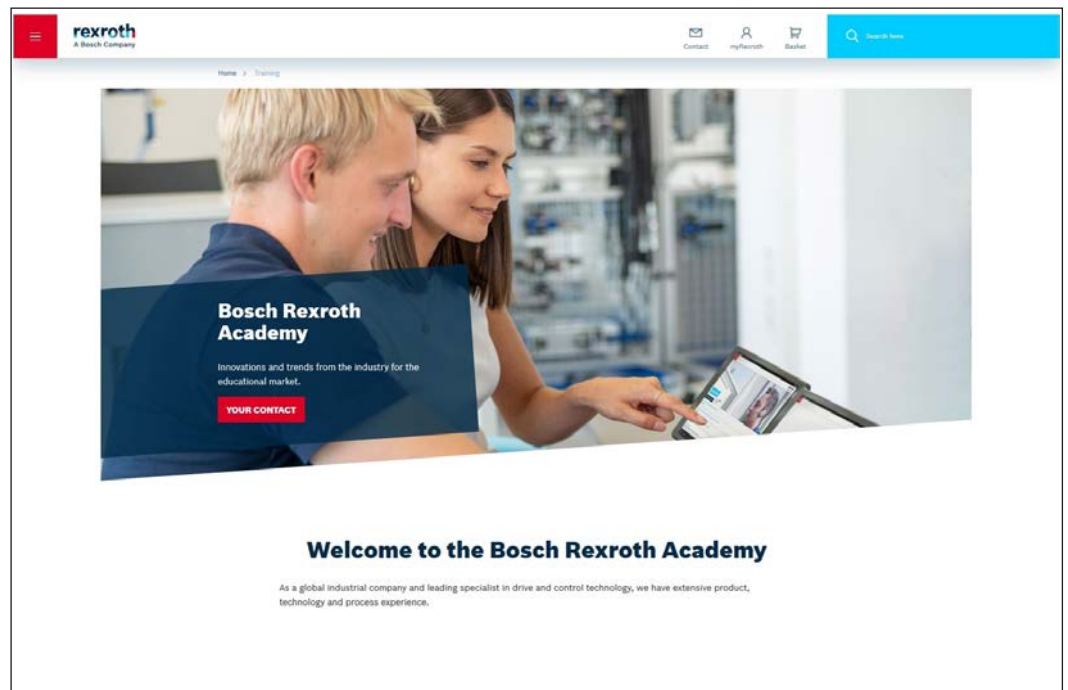
Service

<https://www.boschrexroth.com/en/xc/products/product-groups/linear-motion-technology/service-linear-motion-technology>



Training

<https://www.boschrexroth.com/en/xc/training/training>



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