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GUIDE ELEMENTS

GUIDE ELEMENTS

Faster work machines, more complex tools and the increasing use of tungsten carbide make the issue of the ideal tool guidance system more important than ever in terms of the basic considerations for the designer.

A basic distinction is made between rolling guides and sliding guides. The rolling guide has a very high accuracy and operates almost backlash-free under preload.

As ideal as rolling friction is in terms of friction, the disadvantage will always be a certain amount of guide displacement. This disadvantage is particularly noticeable in tools with unfavourable geometry and pressure distribution. The aforementioned weaknesses of the roller bearing can be countered by oversizing to a certain extent.

Today, sliding guides of any kind can be manufactured with the narrowest tolerances in cylindricity and circularity. When properly paired with selected play, they give the tool greater rigidity than the rolling guide.

An uncertainty factor with sliding guides is always the possibility of tearing off the lubricating film with the associated short transition from liquid friction to mixed and dry friction. Even automatic pressure oil lubrication does not always make it possible to hold the lubricating film securely, especially with short stroke movements.
From these and similar problems the FIBRO guide element program has been developed, which is intended make it easier for the design engineer to select suitable and standardised components for solving guide problems in tools, fixtures and special machines.

We reserve the right to make changes, as technology is subject to change due to new findings and further developments.

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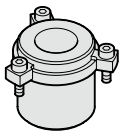

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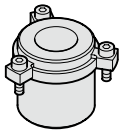

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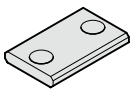

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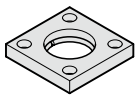

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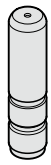

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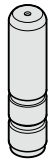

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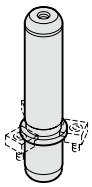

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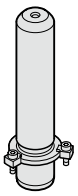

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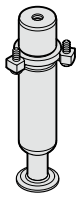

2021.44. **D68-69**

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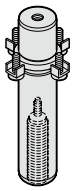

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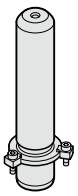

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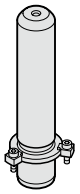

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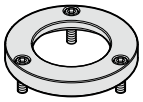

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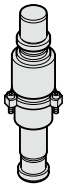

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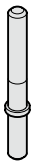

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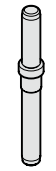
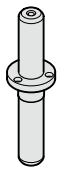


2020.63. **D81**

Demountable guide pillar with centre fixing



2020.62. **D82-83**

Demountable guide pillar with centre fixing

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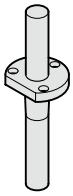

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Demountable guide pillar with conical centre fixing

2021.64. **D86**

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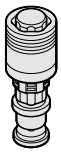
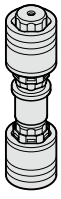
Slotted nut DIN 1804



2024.94. **D88-89**

Guide unit with collar
MILLION GUIDE



2024.96. **D90-91**

Guide unit with center fixing
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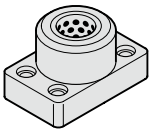

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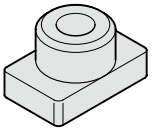
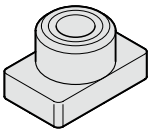
Guide bearing with solid lubricant



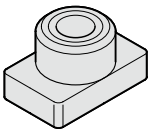
2031.01. **D93**

Retention bearing



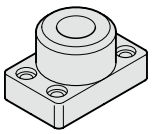
2031.31. **D94**

Guide bearing, sintered guide



2031.41. **D95**

Guide bearing for ball bearing guide



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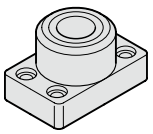
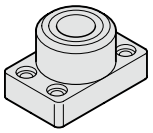
Retention bearing with screw holes



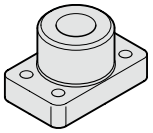
2031.34. **D97**

Guide bearing with screw holes, sintered guide



2031.42. **D98**

Guide bearing with screw holes, for ball bearing guide



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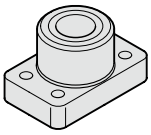
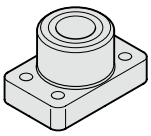


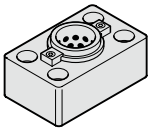
2031.38. **D100**

Guide bearing, low build height, sintered guide



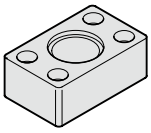
2031.44. **D101**

Guide bearing low build height, for ball bearing guide



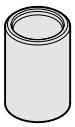
2032.70. **D102**

Guide bearing with headed guide bush with solid lubricant



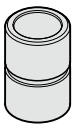
2032.02. **D103**

Retention bearing for guide pillars for large tools



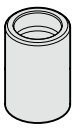
2051.32. **D104**

Guide bush, sintered ferrite carbonitrided with long-term lubrication, ISO 9448-2



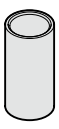
2051.92. **D105**

Guide bush ECO-LINE, bronzeplated, ISO 9448-2



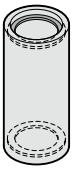
2051.72. **D106**

Guide bush ECO-LINE, Bronze with solid lubrication rings, ISO 9448-2



206.49. **D108**

Guide bush for ball bearing, AFNOR



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Guide bush for ball bearing, with stroke limitation

206.71. **D110**

Ball cage with circlip groove, Brass

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Ball cage with circlip groove, Aluminium

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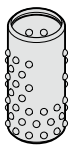
Ball cage with circlip groove, plastic

206.73. **D114**

Ball cage with assembly aid, Brass

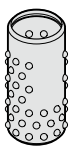
2060.63. **D115**

Ball cage with assembly aid, Aluminium



206.75. **D116**

Ball cage with circlip and fastening ring groove, Brass



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Ball cage with circlip and fastening ring groove, Aluminium

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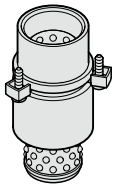
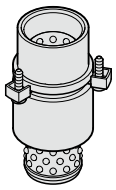


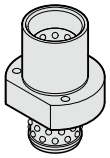
2081.67. **D118**

Headed guide bush with ball cage retainer



2081.68. **D119**

Headed guide bush with ball cage retainer



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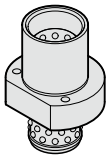
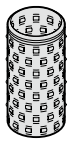


2091.68. **D121**

Flanged guide bush with ball cage retainer

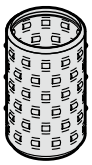


2061.82. **D122**

Roller cage with circlip groove, Brass

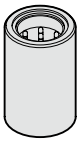
206.72. **D123**

Circlip DIN 471



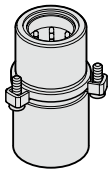
2061.84. **D124**

Roller cage with assembly aid, Brass



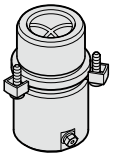
2061.69. .1 **D125**

Recirculating ball bush ~ISO9448-3



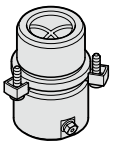
2081.69. .1 **D126**

Recirculating ball bush with collar ~ISO9448-7



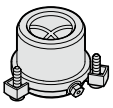
2081.81. **D127**

Headed guide bush, bronze coated, ISO 9448-6



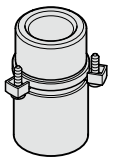
2081.84. **D128**

Headed guide bush, bronze coated, ISO 9448-6



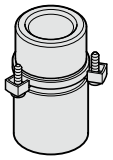
2081.85. **D129**

Headed guide bush, bronze coated, ISO 9448-6



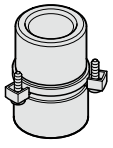
2081.31. **D130**

Headed guide bush, sintered ferrite carbonitrided with long-term lubrication, ISO 9448-6



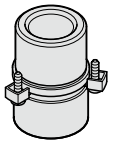
2081.32. **D131**

Headed guide bush, sintered ferrite carbonitrided with long-term lubrication, ISO 9448-6



2081.33. **D132**

Headed guide bush, sintered ferrite carbonitrided with long-term lubrication, ISO 9448-6



2081.34. **D133**

Headed guide bush, sintered ferrite carbonitrided with long-term lubrication, ISO 9448-6

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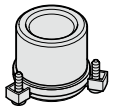
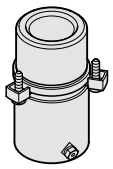


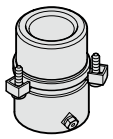
2081.35. **D134**

Headed guide bush, sintered ferrite carbonitrided with long-term lubrication, ISO 9448-6



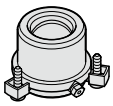
2081.91. **D135**

Headed guide bush ECO-LINE, bronzeplated, ISO 9448-6



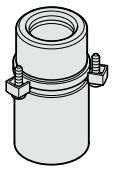
2081.94. **D136**

Headed guide bush ECO-LINE, bronzeplated, ISO 9448-6



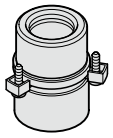
2081.95. **D137**

Headed guide bush ECO-LINE, bronzeplated, ISO 9448-6



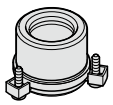
2081.71. **D138**

Headed guide bush ECO-LINE, Bronze with solid lubricant rings, ISO 9448-6



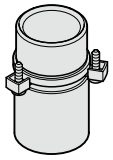
2081.74. **D139**

Headed guide bush ECO-LINE, Bronze with solid lubricant rings, ISO 9448-6



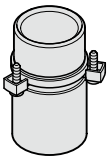
2081.75. **D140**

Headed guide bush ECO-LINE, Bronze with solid lubricant rings, ISO 9448-6



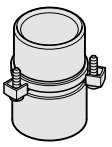
2081.44. **D141**

Headed guide bush for ball bearing, ISO 9448-7



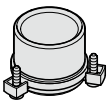
2081.45. **D142**

Headed guide bush for ball bearing, ISO 9448-7



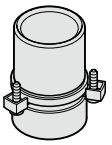
2081.46. **D143**

Headed guide bush for ball bearing, ISO 9448-7



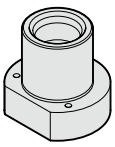
2081.47. **D144**

Headed guide bush for ball bearing, ISO 9448-7



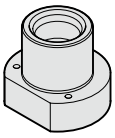
2081.49. **D145**

Headed guide bush for ball bearing, ISO 9448-7



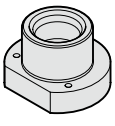
2091.31. **D146**

Flanged guide bush, sintered ferrite carbonitrided with long-term lubrication, ISO 9448-4



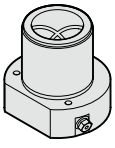
2091.32. **D147**

Flanged guide bush, sintered ferrite carbonitrided with long-term lubrication, ISO 9448-4



2091.34. **D148**

Flanged guide bush, sintered ferrite carbonitrided with long-term lubrication, ISO 9448-4



2091.91. **D149**

Flanged guide bush ECO-LINE, bronzeplated, ISO 9448-4

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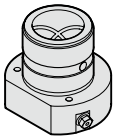
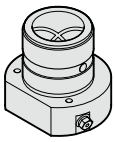


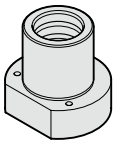
2091.92. **D150**

Flanged guide bush ECO-LINE, bronzeplated, ISO 9448-4



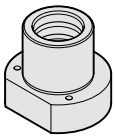
2091.94. **D151**

Flanged guide bush ECO-LINE, bronzeplated, ISO 9448-4



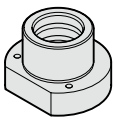
2091.71. **D152**

Flanged guide bush ECO-LINE, Bronze with solid lubricant rings, ISO 9448-4



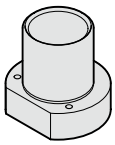
2091.72. **D153**

Flanged guide bush ECO-LINE, Bronze with solid lubricant rings, ISO 9448-4



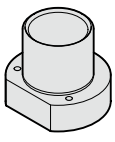
2091.74. **D154**

Flanged guide bush ECO-LINE, Bronze with solid lubricant rings, ISO 9448-4



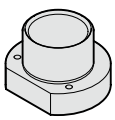
2091.44. **D155**

Flanged guide bush for ball bearing, ISO 9448-5



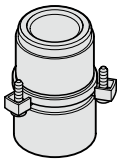
2091.45. **D156**

Flanged guide bush for ball bearing, ISO 9448-5



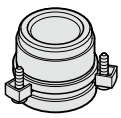
2091.46. **D157**

Flanged guide bush for ball bearing, ISO 9448-5



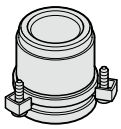
210.31. **D158**

Headed guide bush, sintered ferrite carbonitrided with long-term lubrication, ~AFNOR



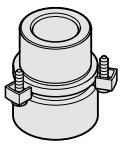
210.34. **D159**

Headed guide bush, sintered ferrite carbonitrided with long-term lubrication, ~AFNOR



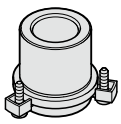
210.35. **D160**

Headed guide bush, sintered ferrite carbonitrided with long-term lubrication, ~AFNOR



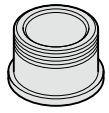
210.44. **D162-163**

Headed guide bush for ball bearing, ~AFNOR



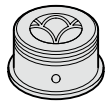
210.46. **D164-165**

Headed guide bush for ball bearing, ~AFNOR



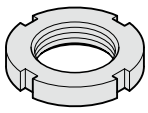
210.45. **D166**

Guide bush with collar, for ball bearing, ~AFNOR



210.85. **D167**

Guide bush with collar, bronze coated, ~AFNOR



207.48. **D168**

Slotted nut

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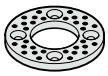
Oilless guide elements **D170**



2053.70. **D171**

Thrust washer, Bronze with solid lubricant

2052.70. **D172-173**

Guide bush, Bronze with solid lubricant

2085.70. **D174**

Guide bush with collar, Bronze with solid lubricant

2085.71. **D175**

Guide bush with collar, Bronze with solid lubricant

2086.70. **D176**

Guide bush with collar, Bronze with solid lubricant

2085.72. **D177**

Guide bush with collar, Bronze with solid lubricant

2082.70. **D178**

Guide bush with collar, Bronze with solid lubricant, DIN 9834/ISO 9448

2082.71. **D179**

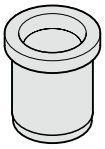
Guide bush with collar, Bronze with solid lubricant, NAAMS

2086.71. **D180**

Guide bush with collar, Bronze with solid lubricant, NAAMS

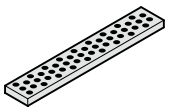
2102.70. **D181**

Guide bush with collar, Bronze with solid lubricant, CNOMO



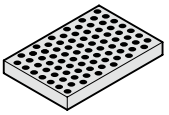
2102.71. **D182**

Guide bush with collar, Bronze, CNOMO



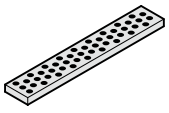
2961.71. **D183**

Flat guide bar, Bronze with solid lubricant



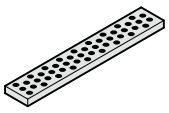
2961.76. **D184**

Flat guide bar, Bronze with solid lubricant



2961.77. **D185**

Flat guide bar, Bronze with solid lubricant



2961.73. **D186**

Flat guide bar with two sliding surfaces, Bronze with solid lubricant

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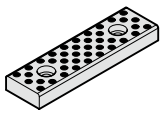
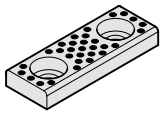


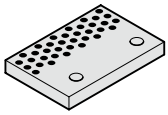
2961.70. **D187**

Flat guide bar, Bronze with solid lubricant



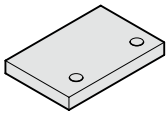
2961.75. **D188**

Flat guide bar, Bronze with solid lubricant



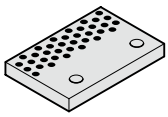
2961.74. **D189**

Retaining plate, Bronze with solid lubricant, VDI 3357



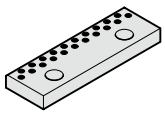
2961.79. **D190**

Retaining plate, Steel, VDI 3357



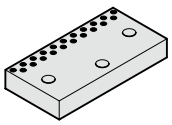
2961.81. **D191**

Retaining plate, Steel with solid lubricant, VDI 3357



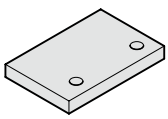
2961.78. **D192**

Retaining plate, Bronze with solid lubricant



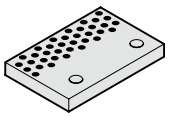
2961.82. **D193**

Retaining plate, Steel with solid lubricant, NAAMS



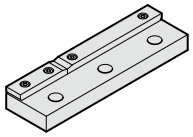
2961.79.45. **D194**

Retaining plate, Steel, CNOMO



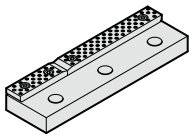
2961.81.45. **D195**

Retaining plate, Bronze with solid lubricant, CNOMO



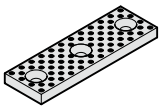
2961.30.55. **D196-197**

Retaining plate with sliding pad, Steel / Steel with sinterlayer, according to VW



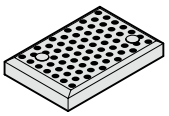
2961.74.55. **D198-199**

Retaining plate with sliding pad, Steel / Bronze with solid lubricant, according to VW



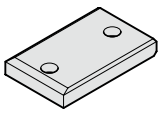
2960.72. **D200**

Sliding pad, small dimension, Bronze with solid lubricant



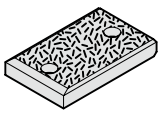
2960.71. **D202-203**

Sliding pad, Bronze with solid lubricant, VDI 3357 / ISO 9183-1



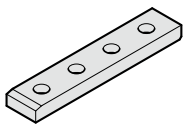
2960.87. **D204-205**

Sliding pad, Steel, VDI 3357



2960.30. **D206-207**

Sliding pad, Steel with sinterlayer, VDI 3357



2960.31. **D208**

Sliding pad, Steel with sinterlayer, VDI 3357

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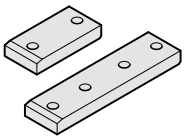
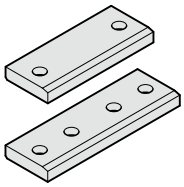


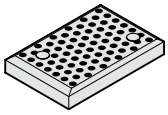
2960.32. **D209**

Sliding pad, Steel with sinterlayer, VDI 3357



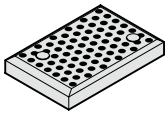
2960.33. **D210**

Sliding pad, Steel with sinterlayer, VDI 3357



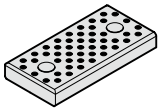
2960.70. **D212-213**

Sliding pad, Bronze with solid lubricant



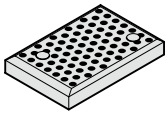
2960.85. **D214**

Sliding pad, Bronze with solid lubricant



2960.86. **D215**

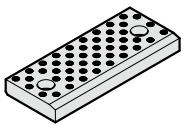
Sliding pad, Bronze with solid lubricant



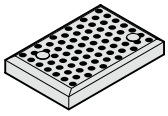
2960.76. **D216**

Sliding pad, Bronze with solid lubricant

2960.77. **D217**

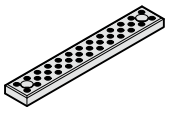


Sliding pad, Bronze with solid lubricant, VDI 3357



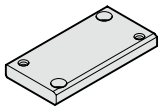
2962.78.45. **D218**

Sliding pad, Bronze with solid lubricant, CNOMO



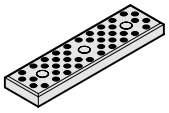
2962.78. **D220-221**

Sliding pad, Bronze with solid lubricant



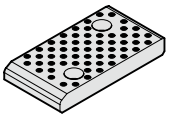
2962.84.45. **D222**

Sliding pad, Steel, CNOMO



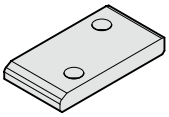
2962.85. **D223**

Sliding pad, Steel with solid lubricant



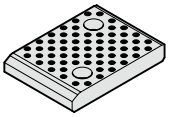
2960.79. **D224**

Sliding pad, Bronze with solid lubricant, NAAMS



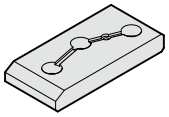
2960.80. **D225**

Sliding pad, Steel, NAAMS



2960.74. **D226-227**

Sliding pad, Bronze with solid lubricant, AFNOR/ISO 9183-2



2960.44.45. **D230-231**

Sliding pad, Steel with oil groove, CNOMO

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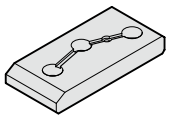
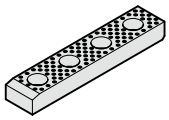


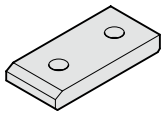
2960.54.45. **D232**

Sliding pad, Bronze with oil groove, CNOMO



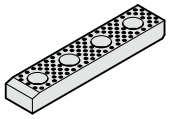
2960.81. **D234-235**

Sliding pad, Bronze with solid lubricant, VDI 3357



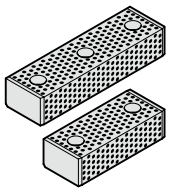
2960.88. **D236-237**

Sliding pad, Steel, VDI 3357



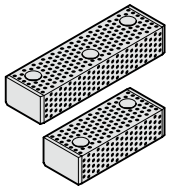
2960.93. **D238**

Sliding pad, Bronze with solid lubricant, VDI 3357



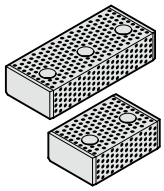
2962.75. **D239**

Guide bar with two sliding surfaces, Bronze with solid lubricant, VDI 3357



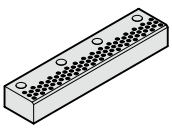
2962.75.45. **D240**

Guide bar with two sliding surfaces, Bronze with solid lubricant, CNOMO



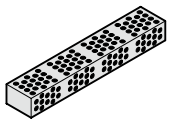
2962.76. **D241**

Guide bar with three sliding surfaces, Bronze with solid lubricant



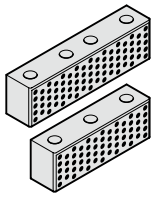
2962.77. **D242**

Guide bar with two sliding surfaces, Bronze with solid lubricant



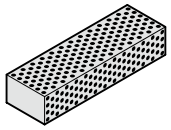
2962.74. **D243**

Guide bar with four sliding surfaces, Bronze with solid lubricant



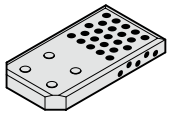
2962.79. **D244**

Guide bar with one sliding surfaces, Bronze with solid lubricant



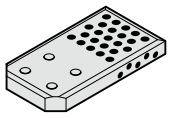
2962.80. **D245**

Guide bar with three sliding surfaces, Bronze with solid lubricant



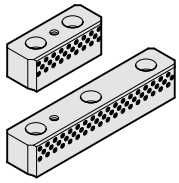
2960.73. **D246**

Guide bracket, Steel with solid lubricant, VDI 3387



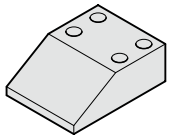
2960.89. **D247**

Guide bracket, Bronze with solid lubricant, VDI 3387



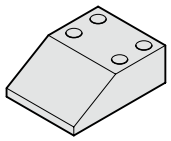
2966.72. **D248**

Slide centre guide, Bronze with solid lubricant



2960.90. **D249**

Overrun Cam, Steel hardened, VDI 3357



2960.91. **D250**

Overrun Cam, Steel hardened and gas nitrided, VDI 3357

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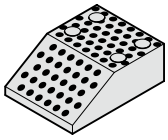
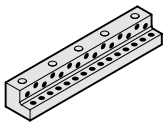


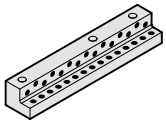
2960.92. **D251**

Overrun Cam, Bronze with solid lubricant, VDI 3357



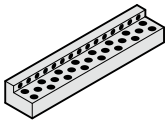
2962.70. **D252**

Angled guide gib, Bronze with solid lubricant



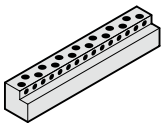
2962.70.45. **D253**

Angled guide gib, Bronze with solid lubricant, CNOMO



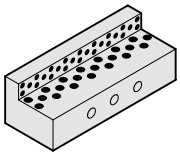
2962.71. **D254**

Angled guide gib, Bronze with solid lubricant



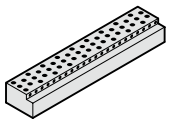
2962.72. **D255**

Angled guide gib, Bronze with solid lubricant



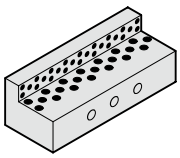
2962.73. **D256**

Angled guide gib, Bronze with solid lubricant, VDI 3357



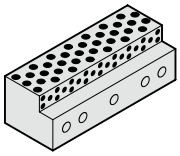
2962.81. **D257**

Angled guide gib, Bronze with solid lubricant



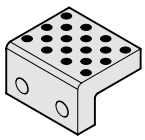
2962.82. **D258**

Angled guide gib, Bronze with solid lubricant



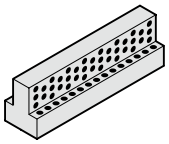
2962.83. **D259**

Angled guide gib, Bronze with solid lubricant



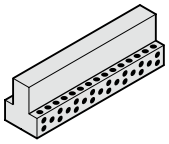
2962.86. **D260**

Angled guide gib, Bronze with solid lubricant



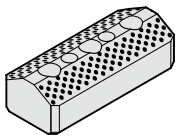
2964.77. **D261**

T-Guide bar, Bronze with solid lubricant



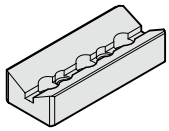
2964.78. **D261**

T-Guide bar, Bronze with solid lubricant



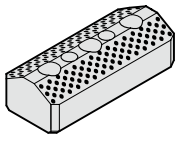
2963.82. **D262**

Sliding block, Bronze with solid lubricant, NAAMS



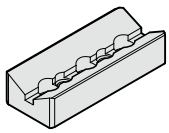
2963.83. **D262**

Prismatic guide, Steel, NAAMS



2963.84. **D263**

Sliding block, Bronze with solid lubricant, VDI 3357



2963.85. **D263**

Prismatic guide, Steel, VDI 3357

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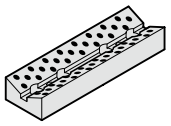
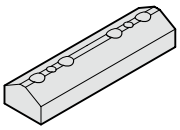


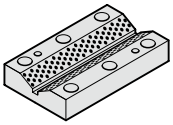
2963.70. **D264**

Prismatic guide, Bronze with solid lubricant



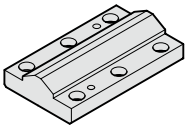
2963.71. **D264**

Sliding block, Steel



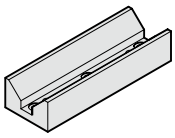
2963.72. **D265**

Prismatic guide, Bronze with solid lubricant



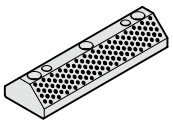
2963.73. **D265**

Sliding block, Steel



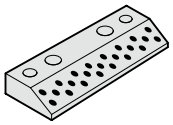
2963.81. **D266**

Prismatic guide, Steel



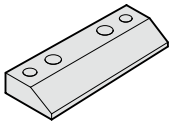
2963.80. **D267**

Sliding block, Bronze with solid lubricant



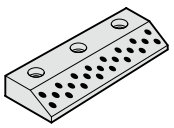
2965.81. **D268**

Single-sided prismatic guide, Bronze with solid lubricant



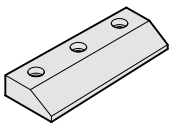
2965.83. **D269**

Single-sided prismatic sliding block, Steel



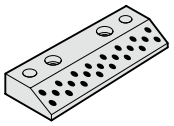
2965.80.45. **D270**

Single-sided prismatic guide, Bronze with solid lubricant, CNOMO



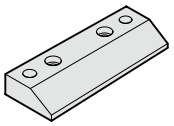
2965.82.45. **D271**

Single-sided prismatic sliding block, Steel, CNOMO



2965.80. **D272**

Single-sided prismatic guide, Bronze with solid lubricant



2965.82. **D273**

Single-sided prismatic sliding block, Steel

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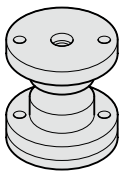
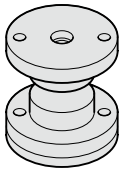
Oilless guide elements - Mounting examples



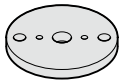
2441.11.0. **D278**

Centering unit with adjusting washer



2441.11. **D279**

Centering unit



2441.11.3. **D280**

Adjusting washer

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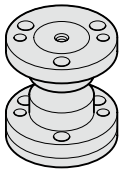
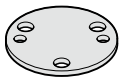


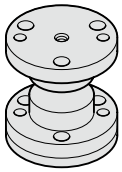
2441.13.45. **D281**

Centering unit, CNOMO



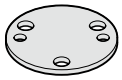
2441.13.3.45. **D282**

Adjusting washer, CNOMO



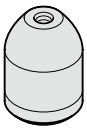
2441.13. **D283**

Centering unit, CNOMO



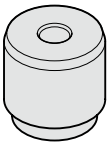
2441.13.3. **D284**

Adjusting washer, CNOMO



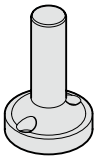
2445.10. **D285**

Centering pin



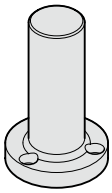
2445.11. **D286**

Centering pin to Mercedes-Benz Standard



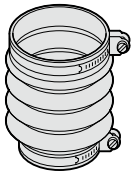
2446.10.55. **D287**

Pressure bolt with base, according to VW



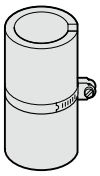
2446.11.55. **D288**

Air pin, according to VW standard



206.91. **D289**

Concertina shroud with spacer bush

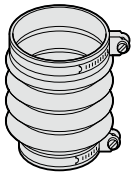


206.94. **D290**

Spacer tube

206.93. **D290**

Spacer bush

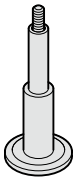


206.92. **D291**

Concertina shroud with spacer tube

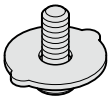
241.18. **D292**

Helical spring for ball cage retention



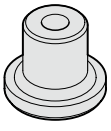
202.91. **D293**

Cage retainer



202.92.1. **D294**

Cage retainer



202.93. **D295**

Cage retainer

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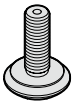
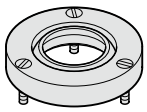


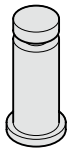
202.94. **D296**

Cage retainer



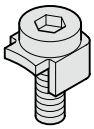
206.95./2061.95. **D297**

Pillar wiper



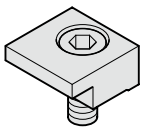
244.00.2. **D298**

Lifter pin for press tool strips



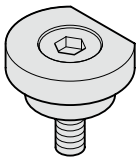
207.45 **D300**

Screw clamp with screw



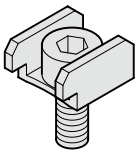
2072.45. **D300**

Screw clamp with screw



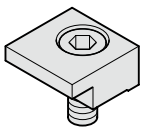
2071.45 **D301**

Screw clamp with screw



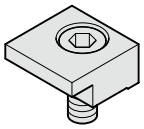
2072.47 **D302**

Screw clamp with screw, NAAMS



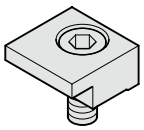
2072.46.30. **D302**

Screw clamp with screw, GM Standard



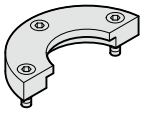
2072.46 **D302**

Screw clamp with screw



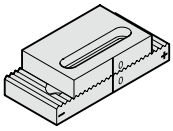
2072.48.45. **D303**

Screw clamp with screw, CNOMO



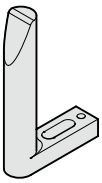
2073.45. **D303**

Securing flange with screws, CNOMO



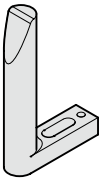
2444.12 / 2444.13 **D304**

Spacer plate toothed, with adjusting plate



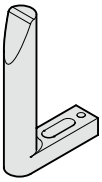
2443.10. **D305**

Guide



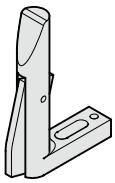
2443.10.20. **D306**

Guide to Mercedes-Benz Standard - unhardened



2443.10.20. .1 **D307**

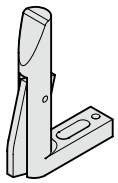
Guide to Mercedes-Benz Standard - hardened



2443.12. **D308**

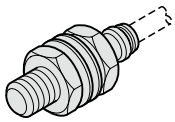
Guide with part position control and spring

CONTENTS



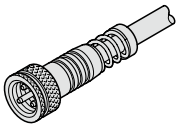
2443.13. **D309**

Guide with part position control, VDI



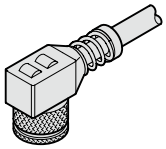
2018.00.60.08.030 **D310**

Inductive proximity switch



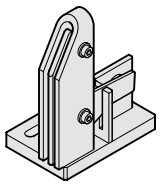
2018.00.60.23.01. **D311**

Cable - straight



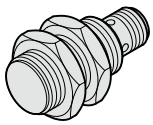
2018.00.60.23.02. **D311**

Cable, 90° connector



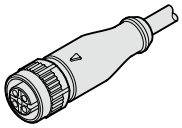
2443.14.55. **D313**

Position monitor for boards



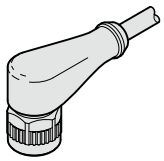
2443.14.00.60.18.044 **D314**

Inductive proximity switch



2443.14.00.60.23.01. **D315**

Cable - straight



2443.14.00.60.23.02. **D315**

Cable, 90° connector

D316

Ball guides - load diagram

D317-319

Ball guides - calculation table

D320-327

Guide elements - Installation guidelines, dimension tables

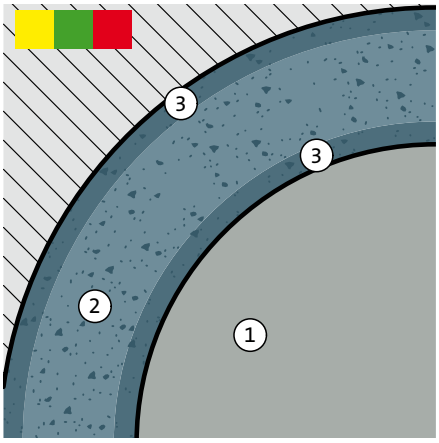
NOTES ON GUIDE ELEMENTS

Precision slide guide, sintered ferrites

This guide type consists of self-lubricating sintered ferrites with carbonitrided surface.

The sintered material used has a porosity content of 18-20 by volume that is filled with an oil under vacuum. In ongoing operation, this oil enters the sliding zone, facilitating long-term lubrication (depending on the usage conditions). As initial and additional lubrication, a suitable grease can be filled into the supply grooves, which reduces the maintenance intervals.
Carbonitriding - a case hardening process - considerably increases the wear resistance of the sliding layer. The precision ground running surface achieves very high quality in terms of dimensional and shape tolerances and low roughness. The guidance accuracy can be changed via pairing classification.
☞ For bearing clearance ranges, see chapter D.

(1) Guide pillar (2) Sintered ferrite guide bush (3) Carbonitriding

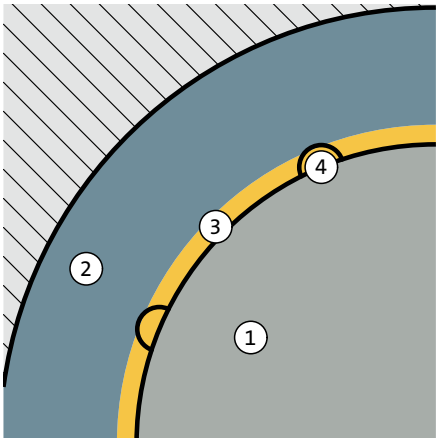


Precision slide guide, bronze-coated

This guide type consists of a steel body with bronze-coated running surface with helical oil groove and a lubricating nipple for ongoing lubrication.

The steel body used ensures a high level of intrinsic stability even with high side and edge loads due to its high tensile strength.
The bronze running surface is optimally connected to the steel body and has very good emergency running properties. A permanent lubricant supply with grease is necessary for reliable continuous operation.
The precision ground running surface achieves very high quality in terms of dimensional and shape tolerances and low roughness.

(1) Guide pillar (2) Guide bushing (3) Bronze coating (4) Oil groove

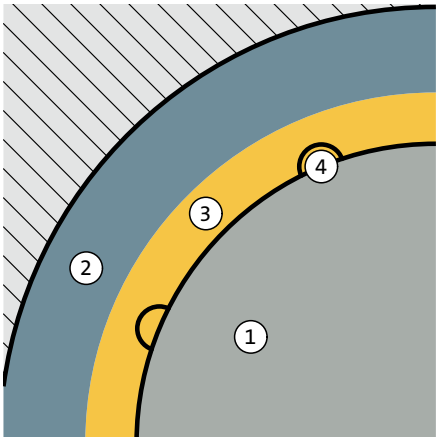


Slide guide, bronze-coated (ECO-LINE)

This guide type consists of a steel body with bronze-coated running surface with helical oil groove and a lubricating nipple for ongoing lubrication.

The steel body used ensures a high level of intrinsic stability even with high side and edge loads due to its high tensile strength.
The bronze running surface is optimally connected to the steel body and has very good emergency running properties. A permanent lubricant supply with grease is necessary for reliable continuous operation.
The precision ground running surface achieves high quality in terms of dimensional and shape tolerances and low roughness.

(1) Guide pillar (2) Guide bushing (3) Bronze coating (4) Oil groove

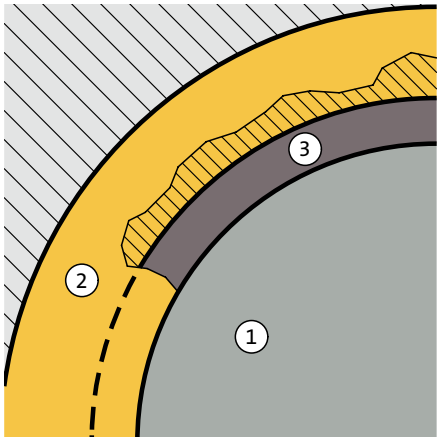


Slide guide with solid lubrication rings (ECO-LINE)

This low-maintenance guide type consists of a copper alloy with integrated solid lubrication rings.

The base frame material used offers good guide stability and very good emergency running properties. Following initial lubrication, the solid lubrication is slowly distributed into the sliding zone in ongoing operation of the solid lubrication and provides low-maintenance operation (depending on the usage conditions). The solid lubrication rings take up 25-35% of the total guide surface (depending on the design) and only permit linear movements.
The ground running surface achieves good quality in terms of dimensional and shape tolerances and optimal roughness.
☞ see low-maintenance sliding elements - description

(1) Guide pillar (2) Guide bushing (3) Solid lubrication ring



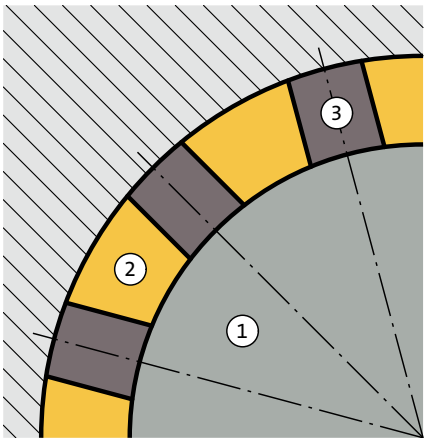
NOTES ON GUIDE ELEMENTS

Slide guide with non-liquid lubricant pockets

This low-maintenance guide type consists of a copper alloy with integrated non-liquid lubricant pockets.

The base frame material used offers good guide stability and very good emergency running properties. Following initial lubrication, the solid lubrication slowly enters the sliding zone in ongoing operation of the solid lubrication and provides low-maintenance operation (depending on the usage conditions). The non-liquid lubricant pockets take up 25-35% of the total guide surface (depending on the design) and permit linear and/or rotational movements (depending on the organisation of the non-liquid lubricant pockets).
The ground running surface achieves good quality in terms of dimensional and shape tolerances and optimal roughness.
☞ see low-maintenance sliding elements - description

(1) Guide pillar (2) Guide bushing (3) Non-liquid lubricant pocket

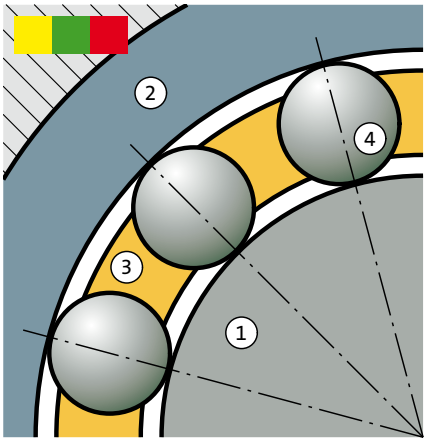


Precision roller bearing

This guide type is backlash-free with high stability due to pre-stressed roll barrels (balls) and suitable for maximum speeds thanks to the low rolling friction.

The base frame material used for the guide bushes offers very good guide stability. Together with the hardened precision balls and corresponding gliding pins, this creates smooth-running and precise guidance. Due to the point contact of the rollers, this is not completely rigid under load, however. This can be influenced via the pairing classification.
The ball cages are made from brass or aluminium and due to the high number of rollers have a high dynamic load index – a significant factor for long service life.
The precision ground running surface achieves very high quality in terms of dimensional and shape tolerances and minimal roughness.
☞ For bearing clearance ranges, see chapter D.

(1) Guide pillar (2) Guide bushing (3) Brass or aluminium cage (4) Ball

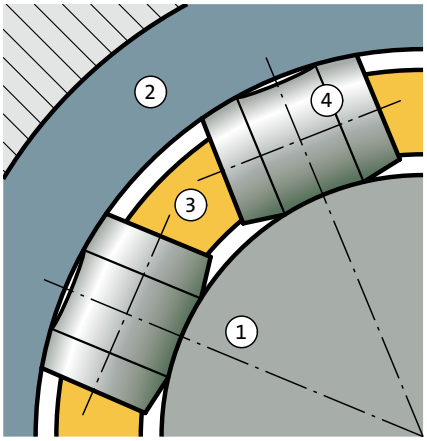


Precision roller guide

This guide type is backlash-free with very high stability due to pre-stressed roll barrels (rolls) and suitable for maximum speeds thanks to the low rolling friction.

The guide bushes for ball guides are also used here. Together with the hardened precision rollers and corresponding gliding pins, this creates smooth-running and very precise guidance. Due to the linear contact of the rollers this is not completely rigid under load, but is considerably more stable than ball guides.
The roller cages are made from brass and due to the optimum number of rollers have a high dynamic load index – a significant factor for long service life.
The precision ground running surface achieves very high quality in terms of dimensional and shape tolerances and minimal roughness.
To achieve optimal bias, only gliding pins red = .30 and gliding pins yellow = .10 are used!

(1) Guide pillar (2) Guide bushing (3) Cage (4) Roller

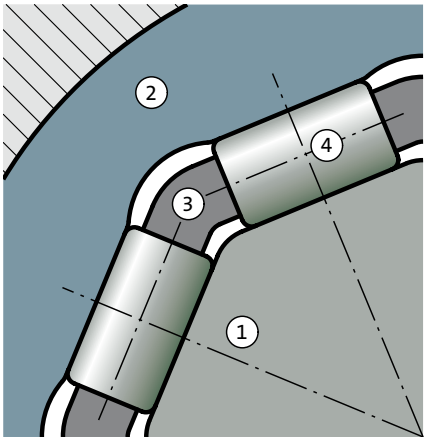


Precision needle roller guide (Million Guide)

This guide type is back-lash free with maximum stability due to pre-stressed roll barrels (needle rolls) and suitable for maximum speeds due to the low rolling friction.

The Million Guide units represent the tip of the guide units. Together with the hardened precision needle rollers and corresponding gliding pins and bushes, this creates smooth-running and maximum precision guidance. Due to the linear contact of the rollers this is not completely rigid under load, but is more stable than roller guides.
The needle roller cages are made from plastic and due to the optimum number of rollers have a high dynamic load index – a significant factor for long service life.
The high-precision ground running surface achieves maximum quality in terms of dimensional and shape tolerances and very low roughness.
The components of this guide unit are coordinated with one another and for optimum bias.

(1) Guide pillar (2) Guide bushing (3) Plastic ball cage (4) Needle roller



GUIDE TYPE SELECTION AID

Criteria / Guide type	Precision slide guide, sintered ferrites	Precision slide guide, bronze-coated	Slide guide, bronze-coated (ECO-LINE)	Slide guide with solid lubrication rings (ECO-LINE)	Slide guide with non-liquid lubricant pockets	Precision roller bearing	Precision roller guide	Precision needle roller guide (Million Guide)
Load capacity / High stresses	++	++	+	+++	+++	o	++	+++
Impact load / Pulsations	-	++	++	++	++	-	o	o
High stroke speed	o	-	-	-	-	+++	+++	++++
Ease of movement / Low friction	+[1]	+	+	+	+	+++[1]	++	++
Resistance to wear / Bearing life	++	+	+	++	++	+++	+++	++++
Low-maintenance operation	++	-	-	+++	+++	-	-	-
Tolerance to contamination and dust	-	o	o	+	++	-	-	-
Tolerance to pillar offset	o	+	+	++	++	-	-	-
Guide behaviour can change due to pairing classification	●					●		
Suitable for rotational movements	●	●	●		●[2]	●		
Low-corrosion designs (on request)						●		●

++++ = Excellent, +++ = excellent, ++ = good, + = satisfactory, o = adequate, - = Not as good

[1] Variable due to the pairing classification
[2] Depending on the arrangement of the solid lubricant deposits

The selection aid helps with orientation. Depending on the application, installation situation and ambient conditions, an advance check or test is essential.

PAIRING CLASSIFICATION
SLIDING GUIDE (SINTERED FERRITE)
ROLLER BEARING

Recommendation for pairing selection:

Cutting clearance	Sliding guide	Ball bearing guide	Description	Recommendation
small	small	large	Piece parts with small tolerances, closely specified cut edge properties and contours – also parts from thin material	Pairing 1
medium	medium	medium	Piece parts from sheet thicker than 1 mm – also preferably for progression dies	Pairing 2
large	large	small	Where demands on edges and burrs are not stringent; note that large die clearances require smaller shearing forces	Pairing 3

Selection of punch-matrix clearance is largely determined by piece part characteristics: percentage of sheared land versus breakaway, but also by demands on burr formation.
Further criteria are the part piece material, as well as the type and condition of the tooling and the press.

Combination possibilities guide pillars, cages and bushings:

	Sliding guide				Ball bearing guide			
	Guide pillar	Guide bushing	Guide pillar	Guide bushing				
	Colour	Order No.	Colour	Order No.	Colour	Order No.	Colour	Order No.
Pairing 1	yellow	.10	yellow	.10	yellow	.10	red	.30
	green	.20	yellow	.10	yellow	.10	green	.20
					green	.20	red	.30
Pairing 2	green	.20	green	.20	yellow	.10	yellow	.10
	red	.30	yellow	.10	green	.20	green	.20
	yellow	.10	green	.20	red	.30	red	.30
Pairing 3	red	.30	red	.30	green	.20	yellow	.10
	green	.20	red	.30	red	.30	green	.20
	yellow	.10	red	.30	red	.30	yellow	.10

Identification for tolerances with colour dots on the outside of the guide pillars and bushings.
Selection Criteria: die clearance – stock thickness – material

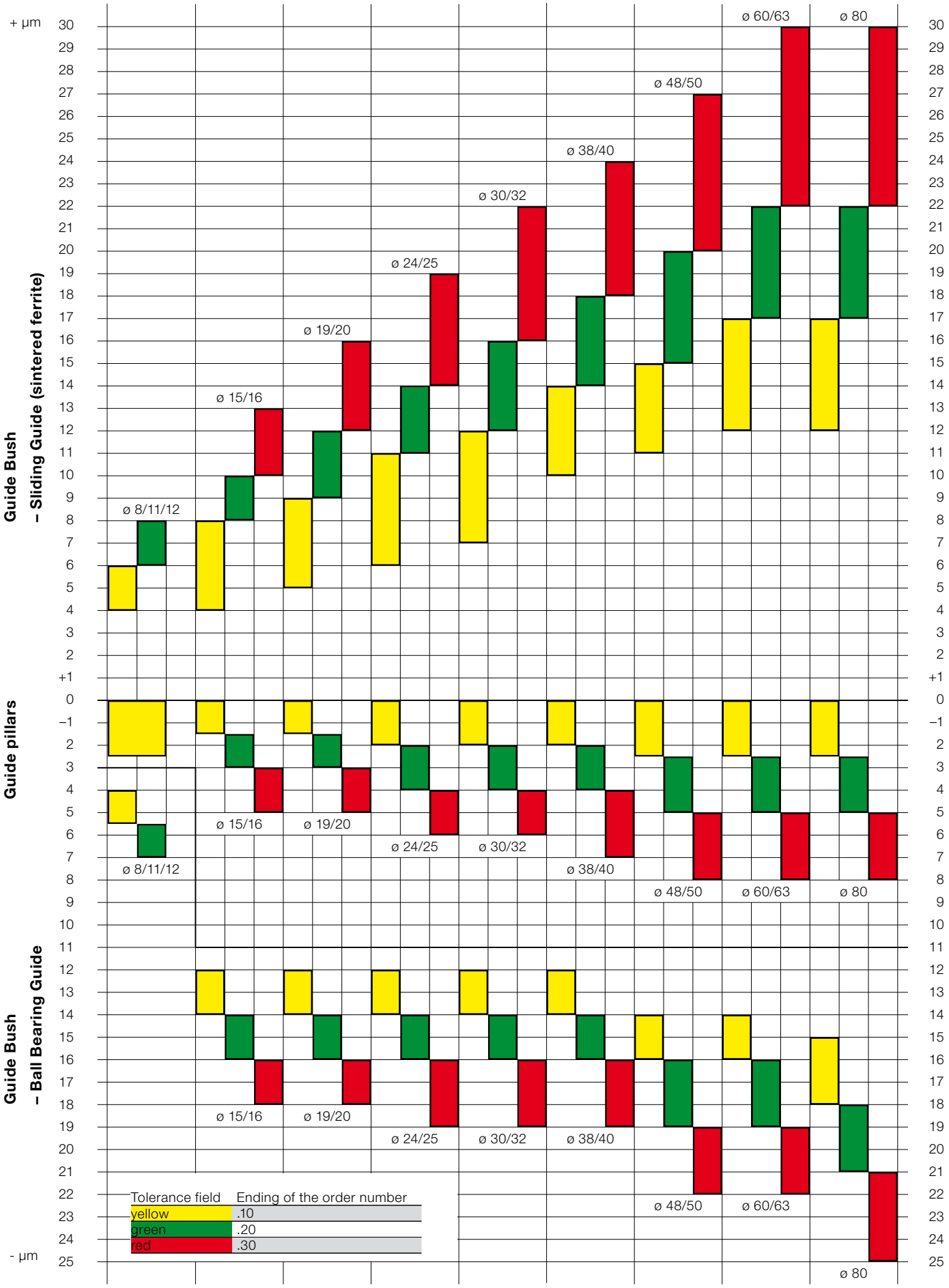
Note for 4-pillar die sets:

Please be aware that tight bushing clearances or high preloads are generally unsuitable for 4-pillar die sets.
Deviation from the bore geometry and from the perpendicularity requires a pairing classification of pairing 2 or even better pairing 3. The pairing classification does not signify any difference in quality, rather a selection of the optimum bushing clearance in the case of guide pillars or the optimum preloading in the case of ball bearings (see also chart next page).

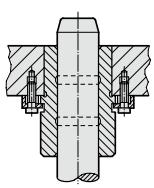
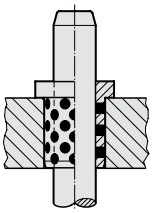
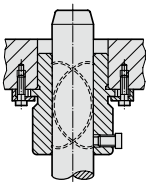
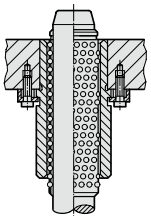
Ordering Code (example):

Guide pillar in tolerance code yellow = 202.19.040.260.10
Sintered ferrite bushing with tolerance code green = 2081.31.040.20

PAIRING CLASSIFICATION
SLIDING GUIDE (SINTERED FERRITE)
ROLLER BEARING



SELECTION MATRIX
GUIDE PILLARS - GUIDE BUSHES

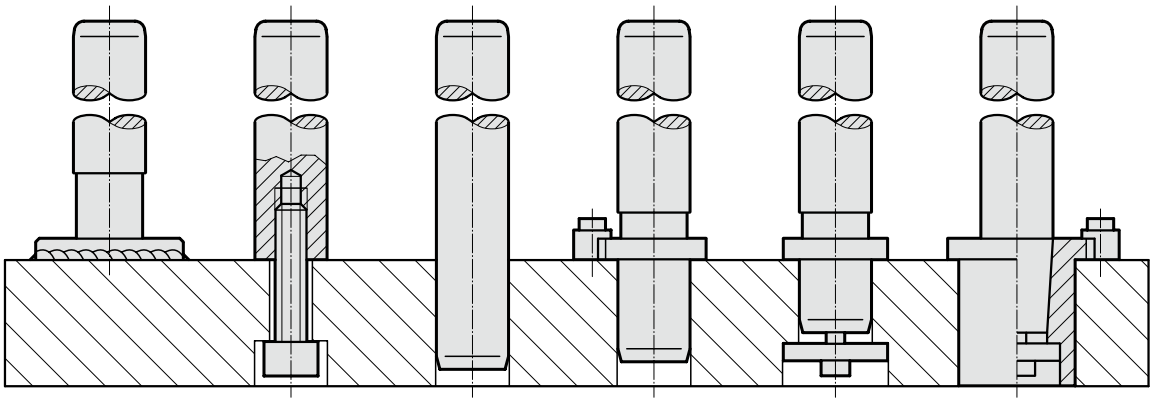





Guide bushes			Tolerance range	Guide pillars conforming to DIN 9825 Guide pillars, bolt-on type Pallet die sets 202.17. 202.19. 202.21. 202.22. 202.23. 202.24. 202.55. 2021.44. 2021.46. 2021.50. 2021.58.			Guide pillars with centre fixing 202.61. 2020.63. 2020.64.	Guide pillars with centre fixing 202.60. 2020.62.			Guide pillars to AFNOR 2022.25.	Guide pillars 2022.16.45. 2022.16.48.	Guide pillars for large tools 2021.28. 2022.12. 2022.13. 2022.15. 2022.17. 2022.19. 2022.29. 2022.16.	Guide pillars ECO-LINE 202.29. 202.31. 2021.29.	Guide pillars with cage retainer bore 202.19. 2021.46. .30.94 .30.94
				.30	.20	.10	h3	.30	.20	.10	h5	-0.010 -0.025	f6	h4	.30
Ball guide bushes Guide bearing for ball bearing guide	206.49. 210.44. 210.45. 210.46. 2031.41. 2031.42. 2031.44. 2061.44. 2061.47. 2081.44. 2081.45.	2081.46. 2081.47. 2081.49. 2081.67. 2081.68. 2091.44. 2091.45. 2091.46. 2091.67. 2091.68.	.10	●[1]	●[1]	●[1]	●[1]	●[1]	●[1]	●[1]	×	×	×	●[1]	●
			.20	●[1]	●[1]	●[1]	●[1]	●[1]	●[1]	●[1]	×	×	×	×	●
			.30	●[1]	●[1]	●[1]	●[1]	●[1]	●[1]	●[1]	×	×	×	×	●
Recirculating ball bush	2061.69.	2081.69.	-	●	×	×	×	●	×	×	×	×	×	×	×
Sintered ferrite guide bushes Guide bearing, sintered guide	210.31. 210.34. 210.35. 2031.31. 2031.34. 2031.38. 2051.32. 2081.31.	2081.32. 2081.33. 2081.34. 2081.35. 2091.31. 2091.32. 2091.34.	.10	●[1]	●[1]	●[1]	×	●[1]	●[1]	●[1]	×	×	×	●	×
			.20	●[1]	●[1]	●[1]	×	●[1]	●[1]	●[1]	×	×	×	●	×
			.30	●[1]	●[1]	●[1]	×	●[1]	●[1]	●[1]	×	×	×	●	×
Guide bushes ECO-LINE bronze with solid lubrication rings	2051.72. 2081.71. 2081.74. 2081.75.	2091.71. 2091.72. 2091.74.	H6	●	○	×	×	×	×	×	×	×	×	●	×
Guide bushes, bronze coated	210.85. 2081.81. 2081.84.	2081.85.	IT5	●	●	○	×	×	×	×	×	×	×	●	×
Guide bushes ECO-LINE bronze plated	2051.92. 2081.91. 2081.94. 2081.95.	2091.91. 2091.92. 2091.94.	H5	●	○	×	×	×	×	×	×	×	×	●	×
Guide bushes with solid lubrication Guide bearing with solid lubricant	2031.70. 2082.70. 2082.71. 2085.70. 2085.72.	2087.70. 2087.71. 2087.72. 2087.73.	H7	●	×	×	×	×	×	×	●	●	●	●	×
Guide bushes with solid lubrication	2085.71.		E7	●	●	●	×	×	×	×	●	●	●	●	×
Guide bushes with solid lubrication	2032.70. 2052.70.	2086.70.	F7	●	●	×	×	×	×	×	●	●	●	●	×
Guide bushes with solid lubrication	2102.70.	2102.71.	G7	●	●	×	×	×	×	×	●	●	●	●	×
Guide bushes with solid lubrication	2086.71.		C9	●	●	●	×	×	×	×	●	●	●	●	×

● = suitable
●[1] = suitable (see pairing classification at the beginning of chapter D)
○ = Limited suitability
× = Not suitable

The combinations should be considered as recommendations. Depending on the installation situation and type of use, a previous examination or test is mandatory, since different combinations may result in varying clearance (slide guide) or pretension (ball guides) values.

DEFLECTION OF PILLARS AND BENDING EQUATION

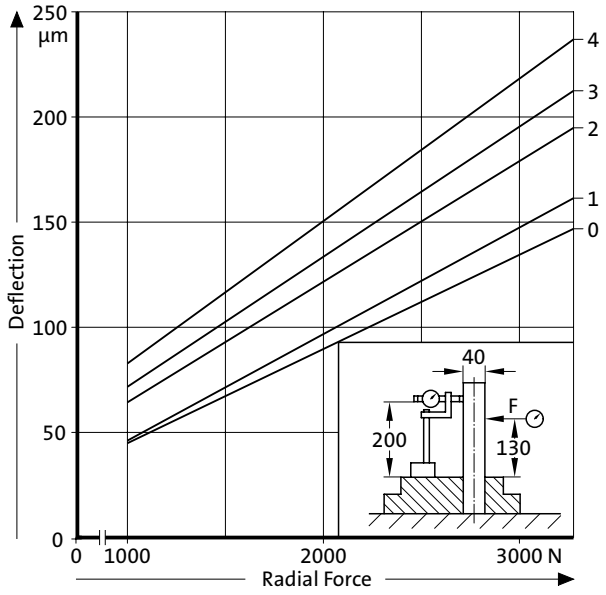


Deflection of Pillars

The practical use of this type of screw-on column with the technical advantages of bending stiffness shown requires a rethink in the design of the tool.

Mounting Instructions:

The friction surfaces of the screw connections (bearing surface and thread) must be lubricated with Molykote paste.
To compensate for the setting of the screws, the connection should be loosened at least twice and tightened again with a torque wrench (see tightening torque in table).



Bending equation

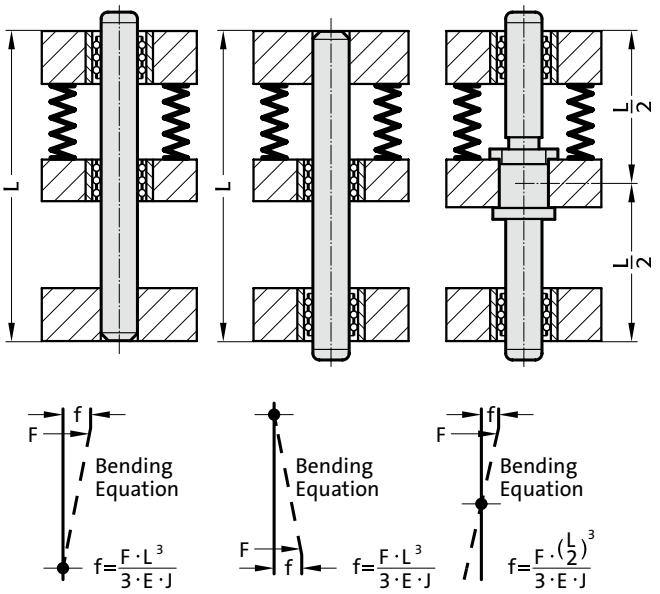
The transverse load resistance to tool guides is greatly influenced by the position of the guide pillar fixing.

For a tool with a spring-mounted die guide plate and pillar fixing at the top or bottom of the tool, the deflection and pillar bending values do not differ when the load is applied at the side since the distance (L) from the point of application of the force is the same.

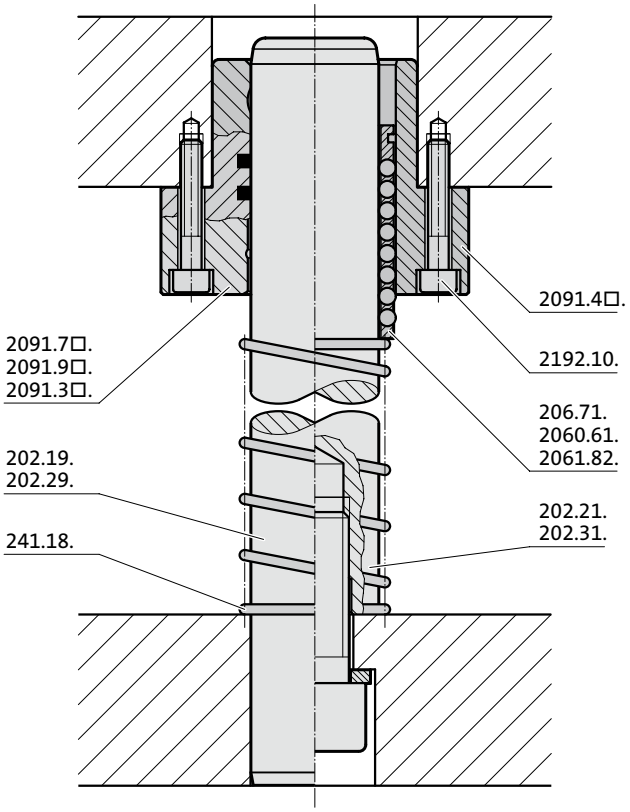
Significantly better pillar bending values can be achieved by fixing the guide pillars in the guide plate, i.e. in the centre of the pillar.

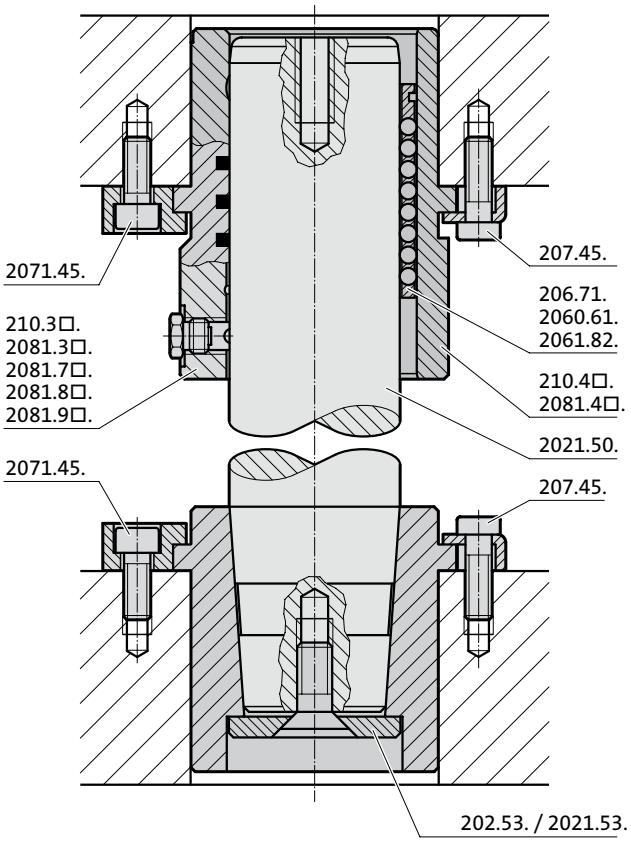
Since the distance (L/2) between the point of application of the force and the fixing surface is thus halved, the load-bearing capacity is increased by eight times.

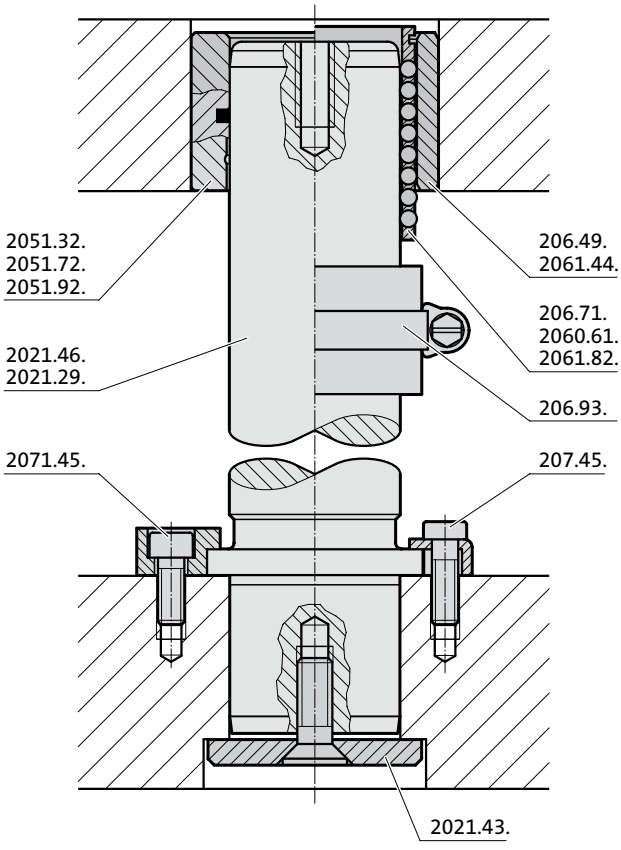
At stroke rates > 500 strokes/min., increased mass acceleration values arise due to the larger plate weight of the stamp guide plate (incl. weight of the guide pillars). To counteract this negative effect, these guide pillars are designed as hollow pillars.

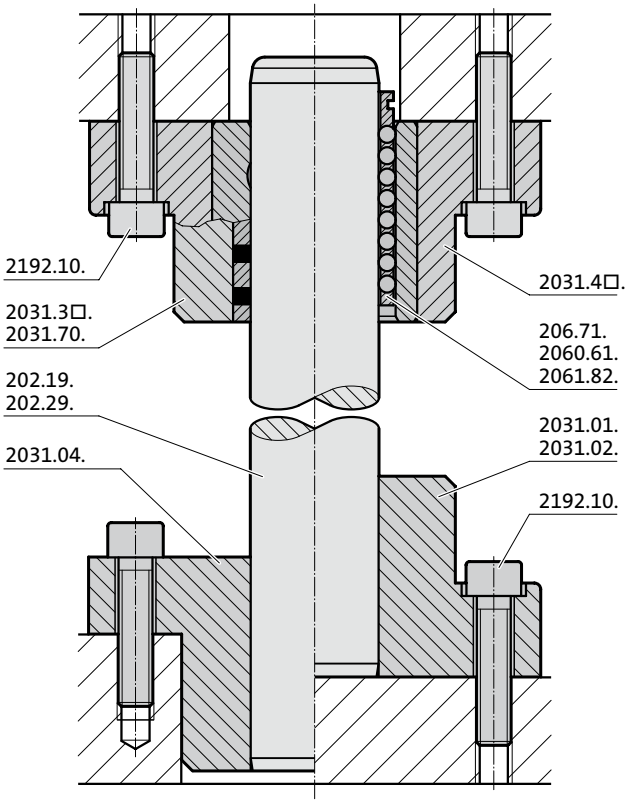


APPLICATION EXAMPLES
GUIDE ELEMENTS AND ACCESSORIES

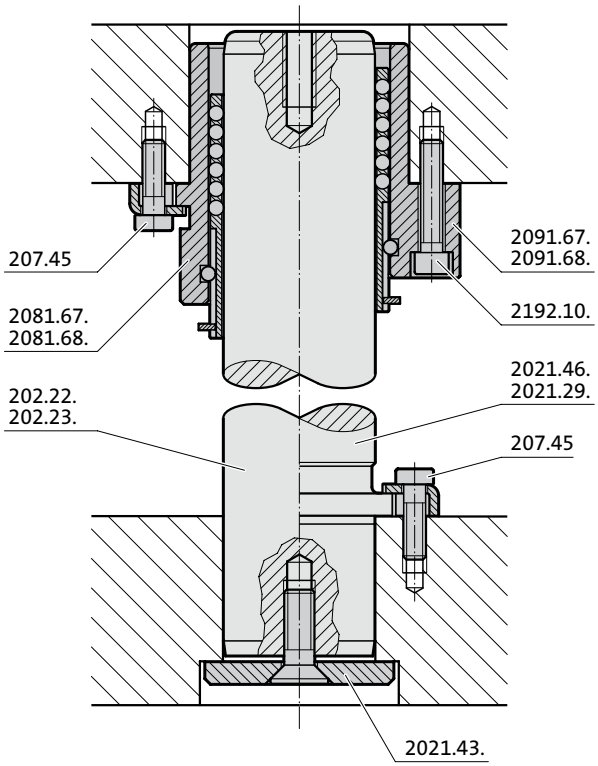


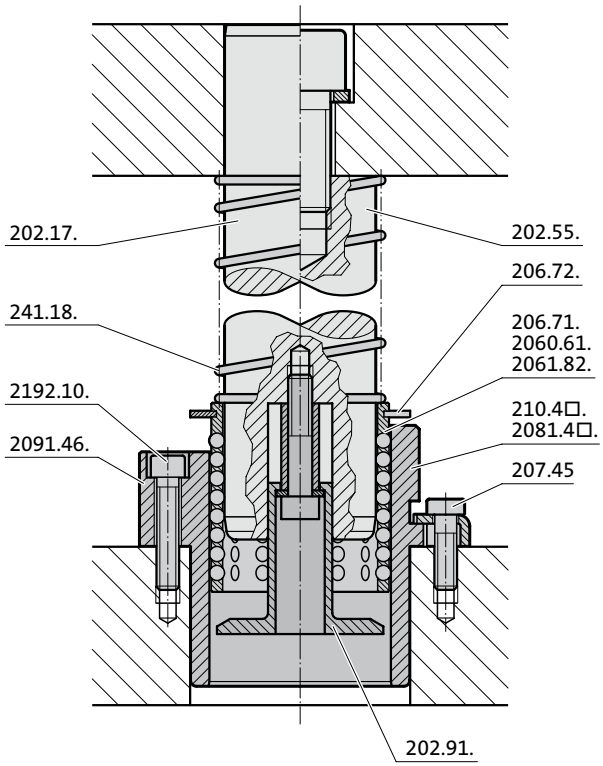


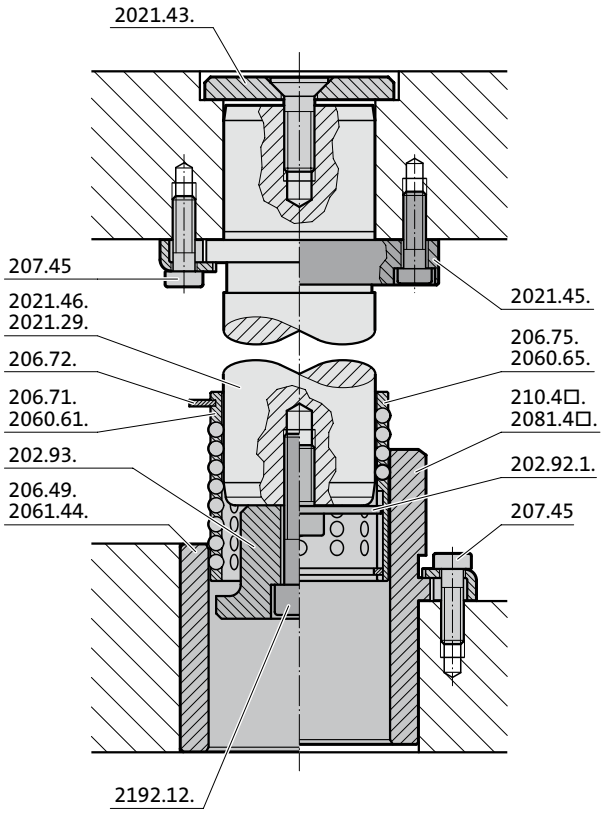


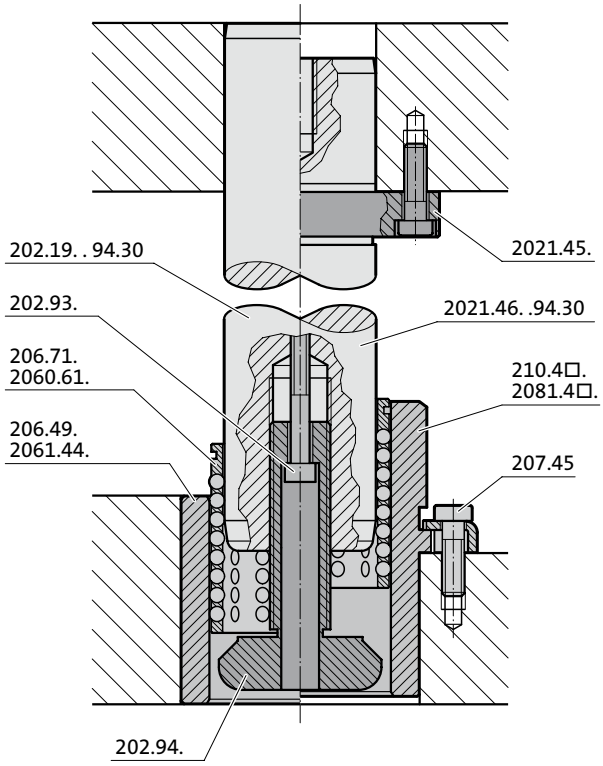


APPLICATION EXAMPLES
GUIDE ELEMENTS AND ACCESSORIES



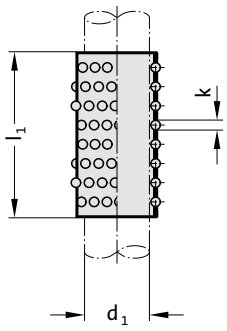






BALL CAGE, SMALL DIMENSION
GUIDE BUSH FOR BALL BEARING, SMALL DIMENSION

206.51.



Material:
Cage: Brass
Balls: Steel hardened (DIN 5401)

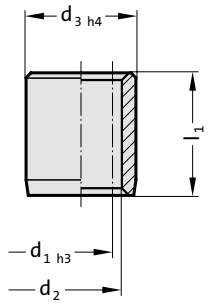
206.51. Ball cage, small dimension

d_1	3	4	5	6	8
k	1	1	1	1	1
l_1	Total number of balls				
10	24	30	36	42	
15	40	50	60	70	70
20	56	65	78	78	84
25		80	102	102	112
30		105	126	126	126
35		120	144	144	
40					175

Ordering Code (example):

Ball cage, small dimension		= 206.51.	
Diameter of conduit d_1	5 mm	=	005.
Length l_1	30 mm	=	030
Order No		= 206.51.	005. 030

206.54.



Material:
Roller bearing steel 100 Cr 6
Hardness: hardened to 60 + 4 HRC
Remarks: available in stainless steel on request

Execution:
Guide bush bores d_2 fine-honed to IT3

Note:
☞ Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.

206.54. Guide bush for ball bearing, small dimension

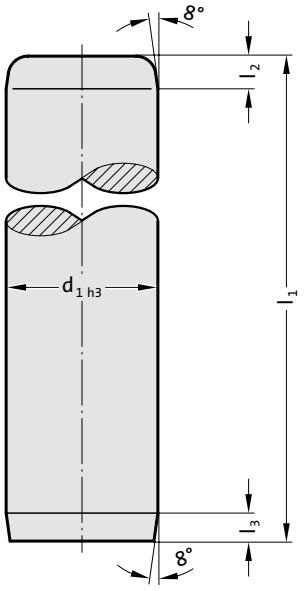
d_1	3	4	5	6	8
d_2	5	6	7	8	10
d_3	7	8	10	11	14
l_1					
10	●	●	●		
15	●	●	●	●	●
20	●	●	●	●	●
25		●	●	●	●
30			●	●	●
35				●	●
40					●

Ordering Code (example):

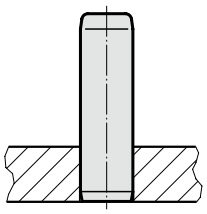
Guide bush for ball bearing, small dimension		= 206.54.	
Diameter of conduit d_1	5 mm	=	005.
Length l_1	10 mm	=	010
Order No		= 206.54.	005. 010

GUIDE PILLAR DIN 9825/ISO 9182-2

202.19.



Mounting example



Material:
Steel, (Core strength: ≥ 900 N/mm²) surface hardened
Surface hardness: 60 + 3 HRC, Hardness penetration ≥ 1,8 mm (up to ø 12, troughhardened)

Execution:
fine-ground and superfinished
Method of manufacturing entails that centre holes are not concentric with O.D.

Note:
ø3 to ø8 are not supplied classified.
ø10 to ø12 only available in tolerance range yellow = .10

☞Bearing clearance / Preloading see pairing classification at the beginning of chapter D.
☞Matching guide combinations, see selection matrix at the beginning of chapter D.
☞Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.
Tolerance range:
yellow = .10; green = .20; red = .30

202.19. Guide pillar DIN 9825/ISO 9182-2

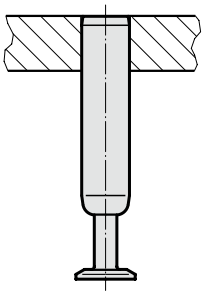
d_1	3	4 5	6	8	10	11 12	15 16	19 20	24 25	30 32	38 40	48 50	60 63	80
l_2	2	2	2	3	3	3	4	4	6	6	6	8	8	8
l_3	2	2	2	3	3	3	3	3	3	3	3	3	3	3
l_1														
30	●													
40	●	●	●											
50	●	●	●	●										
60	●	●	●	●										
80	●	●	●	●		●								
90					●	●	●							
100		●	●	●	●	●	●	●	●					
112					●	●	●	●	●					
125			●	●	●	●	●	●	●	●				
140			●	●	●	●	●	●	●	●				
160			●	●		●	●	●	●	●	●			
180							●	●	●	●	●	●		
200							●	●	●	●	●	●		
224							●	●	●	●	●	●		
250							●	●	●	●	●	●	●	
280							●	●	●	●	●	●	●	
315							●	●	●	●	●	●	●	
355							●	●	●	●	●	●	●	
400								●	●	●	●	●	●	
450									●	●	●	●	●	●
500									●	●	●	●	●	●
550											●	●	●	●
600											●	●	●	●
700											●	●	●	●
800											●	●	●	●

Ordering Code (example):

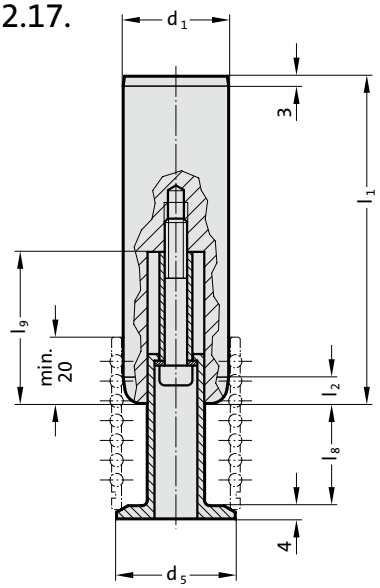
Guide pillar DIN 9825/ISO 9182-2		=	202.19.
Diameter of conduit d_1	25 mm	=	025.
Length l_1	224 mm	=	224.
Classification TOL	yellow	=	10
Order No		=	202.19. 025. 224. 10

GUIDE PILLAR WITH BALL CAGE RETAINER

Mounting example



202.17.



Material:
Steel, (Core strength: ≥ 900 N/mm²) surface hardened
Surface hardness: 60 + 3 HRC, Hardness penetration ≥ 1,8 mm

Execution:
fine-ground and superfinished

Note:
☞ Preloading see pairing classification at the beginning of chapter D
☞ Matching guide combinations, see selection matrix at the beginning of chapter D.

☞ Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.
Dimensions of ball cage retainer see 202.91.
Tolerance range:
yellow = .10
green = .20
red = .30

202.17. Guide pillar with ball cage retainer

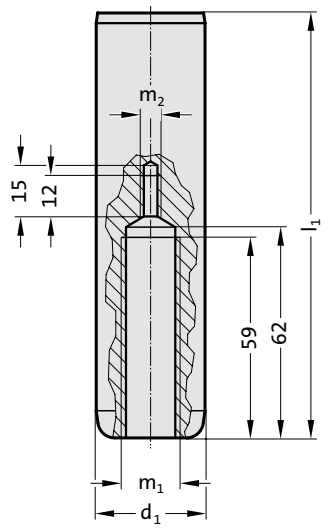
d_1	38	40	48	50	60	63
d_5	42	44	52	54	64	67
l_2	6	6	8	8	8	8
KG (l_8 / l_9)						
1 (31/46)	●	●	●	●	●	●
2 (41/56)	●	●	●	●	●	●
3 (51/66)	●	●	●	●	●	●
4 (61/76)	●	●	●	●	●	●
5 (73/89)	●	●	●	●	●	●
l_1						
160	●	●				
180	●	●	●	●		
200	●	●	●	●		
224	●	●	●	●		
250	●	●	●	●	●	●
280	●	●	●	●	●	●
315	●	●	●	●	●	●
355	●	●	●	●	●	●
400	●	●	●	●	●	●
450	●	●	●	●	●	●
500	●	●	●	●	●	●
550	●	●	●	●	●	●
600	●	●	●	●	●	●
700	●	●	●	●	●	●
800	●	●	●	●	●	●

Ordering Code (example):

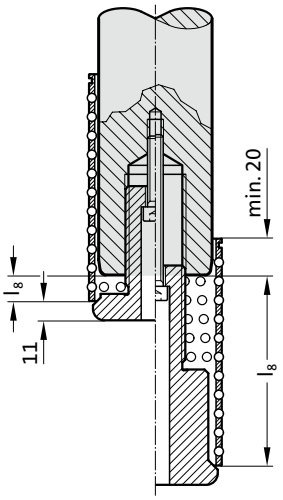
Guide pillar with ball cage retainer		=	202.17.
Diameter of conduit d_1	48 mm	=	048.
Length l_1	550 mm	=	550.
Cage unit size KG	1	=	1.
Classification TOL	yellow	=	10
Order No		=	202.17. 048. 550. 1. 10

GUIDE PILLAR WITH CAGE RETAINER BORE

202.19. .30.94



Mounting example



Material:
Steel, (Core strength: ≥ 900 N/mm²) surface hardened
Surface hardness: 60 + 3 HRC, Hardness penetration ≥ 1,8 mm

Execution:
fine-ground and superfinished

Note:
☞ Preloading see pairing classification at the beginning of chapter D
☞ Matching guide combinations, see selection matrix at the beginning of chapter D.

Dimensions of ball cage retainer see 202.94.
Tolerance range: red = .30
Delivery without cage retainer, ball cage and head cap screw.

202.19. .30.94 Guide pillar with cage retainer bore

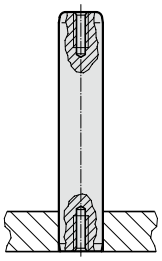
d_1	30 32	38 40	48 50	60 63	80
m_1	M16x1,5	M16x1,5	M20x1,5	M30x1,5	M30x1,5
m_2	M5	M5	M6	M8	M8
l_1					
125	●				
140	●				
160	●	●			
180	●	●	●		
200	●	●	●		
224	●	●	●		
250	●	●	●	●	
280	●	●	●	●	●
315	●	●	●	●	●
355	●	●	●	●	●
400	●	●	●	●	●
450	●	●	●	●	●
500	●	●	●	●	●
550		●	●	●	●
600		●	●	●	●
700		●	●	●	●
800		●	●	●	●

Ordering Code (example):

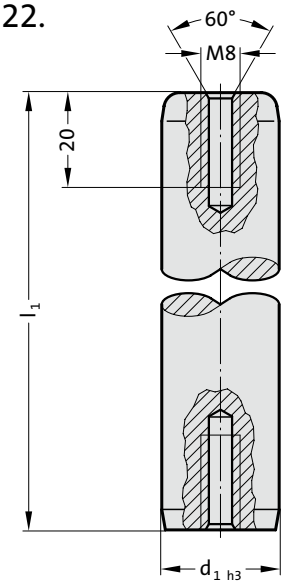
Guide pillar with cage retainer bore		=	202.19.
Diameter of conduit d_1	48 mm	=	048.
Length l_1	224 mm	=	224.
Classification red TOL	30	=	30.
Cage unit bore KHB		=	94
Order No		=	202.19. 048. 224. 30. 94

GUIDE PILLAR WITH INTERNAL THREAD ON BOTH SIDES, ~DIN 9825/~ISO 9182-2

Mounting example



202.22.



Material:
Steel, (Core strength: ≥ 900 N/mm²) surface hardened
Surface hardness: 60 + 3 HRC, Hardness penetration ≥ 1,8 mm

Execution:
fine-ground and superfinished
Method of manufacturing entails that centre holes are not concentric with O.D.

Note:
☞Bearing clearance / Preloading see pairing classification at the beginning of chapter D.

☞Matching guide combinations, see selection matrix at the beginning of chapter D.
☞Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.
Tolerance range:
yellow = .10
green = .20
red = .30

202.22. Guide pillar with internal thread on both sides, ~DIN 9825/~ISO 9182-2

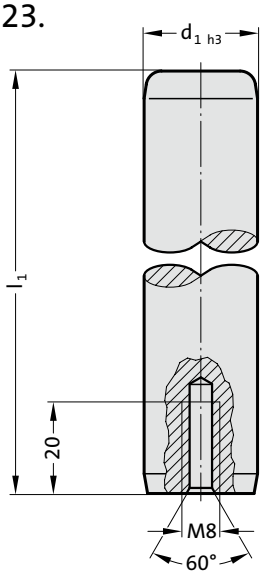
d_1	15 16	19 20	24 25	30 32	38 40	48 50	60 63	80
l_2	4	4	6	6	6	8	8	8
l_1								
90	●							
100	●	●	●					
112	●	●	●					
125	●	●	●	●				
140	●	●	●	●				
160	●	●	●	●	●			
180	●	●	●	●	●	●		
200	●	●	●	●	●	●		
224	●	●	●	●	●	●		
250	●	●	●	●	●	●	●	
280	●	●	●	●	●	●	●	●
315	●	●	●	●	●	●	●	●
355	●	●	●	●	●	●	●	●
400		●	●	●	●	●	●	●
450			●	●	●	●	●	●
500			●	●	●	●	●	●
550					●	●	●	●
600					●	●	●	●
700					●	●	●	●
800					●	●	●	●

Ordering Code (example):

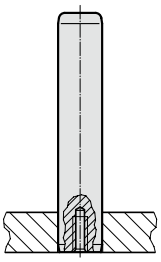
Guide pillar with internal thread on both sides, ~DIN 9825/~ISO 9182-2		=	202.22.
Diameter of conduit d_1	32 mm	=	032.
Length l_1	200 mm	=	200.
Classification TOL	yellow	=	10
Order No		=	202.22. 032. 200. 10

GUIDE PILLAR WITH INTERNAL THREAD ON BOTTOM, ~DIN 9825/~ISO 9182-2

202.23.



Mounting example



Material:
Steel, (Core strength: ≥ 900 N/mm²) surface hardened
Surface hardness: 60 + 3 HRC, Hardness penetration ≥ 1,8 mm

Execution:
fine-ground and superfinished
Method of manufacturing entails that centre holes are not concentric with O.D.

Note:
☞ Bearing clearance / Preloading see pairing classification at the beginning of chapter D.

☞ Matching guide combinations, see selection matrix at the beginning of chapter D.
☞ Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.
Tolerance range:
yellow = .10
green = .20
red = .30

202.23. Guide pillar with internal thread on bottom, ~DIN 9825/~ISO 9182-2

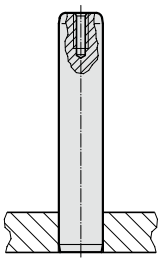
d_1	15 16	19 20	24 25	30 32	38 40	48 50	60 63	80
l_2	4	4	6	6	6	8	8	8
l_1								
90	●							
100	●	●	●					
112	●	●	●					
125	●	●	●	●				
140	●	●	●	●				
160	●	●	●	●	●			
180	●	●	●	●	●	●		
200	●	●	●	●	●	●		
224	●	●	●	●	●	●		
250	●	●	●	●	●	●	●	
280	●	●	●	●	●	●	●	●
315	●	●	●	●	●	●	●	●
355	●	●	●	●	●	●	●	●
400		●	●	●	●	●	●	●
450			●	●	●	●	●	●
500			●	●	●	●	●	●
550					●	●	●	●
600					●	●	●	●
700					●	●	●	●
800					●	●	●	●

Ordering Code (example):

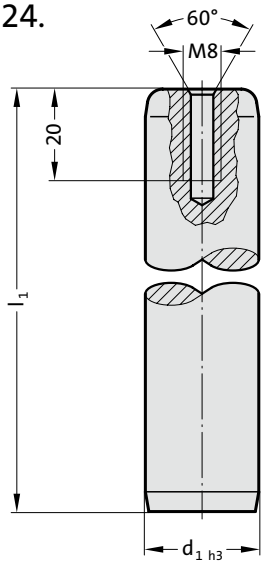
Guide pillar with internal thread on bottom,			
~DIN 9825/~ISO 9182-2		=	202.23.
Diameter of conduit d_1	32 mm	=	032.
Length l_1	200 mm	=	200.
Classification TOL	yellow	=	10
Order No		=	202.23. 032. 200. 10

GUIDE PILLAR WITH INTERNAL THREAD ON TOP, ~DIN 9825/~ISO 9182-2

Mounting example



202.24.



Material:
Steel, (Core strength: ≥ 900 N/mm²) surface hardened
Surface hardness: 60 + 3 HRC, Hardness penetration ≥ 1,8 mm

Execution:
fine-ground and superfinished
Method of manufacturing entails that centre holes are not concentric with O.D.

Note:
☞Bearing clearance / Preloading see pairing classification at the beginning of chapter D.

☞Matching guide combinations, see selection matrix at the beginning of chapter D.
☞Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.
Tolerance range:
yellow = .10
green = .20
red = .30

202.24. Guide pillar with internal thread on top, ~DIN 9825/~ISO 9182-2

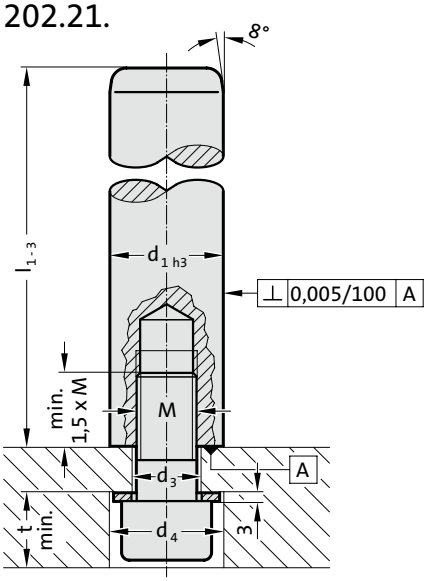
d_1	15 16	19 20	24 25	30 32	38 40	48 50	60 63	80
l_2	4	4	6	6	6	8	8	8
l_1								
90	●							
100	●	●	●					
112	●	●	●					
125	●	●	●	●				
140	●	●	●	●				
160	●	●	●	●	●			
180	●	●	●	●	●	●		
200	●	●	●	●	●	●		
224	●	●	●	●	●	●		
250	●	●	●	●	●	●	●	
280	●	●	●	●	●	●	●	●
315	●	●	●	●	●	●	●	●
355	●	●	●	●	●	●	●	●
400		●	●	●	●	●	●	●
450			●	●	●	●	●	●
500			●	●	●	●	●	●
550					●	●	●	●
600					●	●	●	●
700					●	●	●	●
800					●	●	●	●

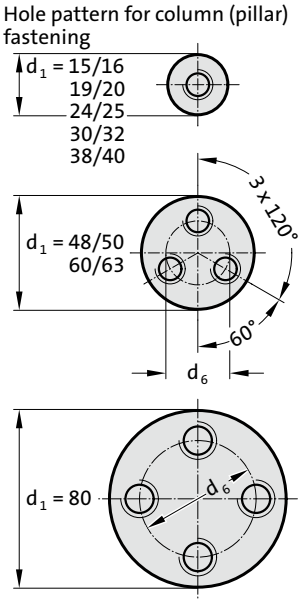
Ordering Code (example):

Guide pillar with internal thread on top, ~DIN 9825/~ISO 9182-2		=	202.24.
Diameter of conduit d_1	32 mm	=	032.
Length l_1	200 mm	=	200.
Classification TOL	yellow	=	10
Order No		=	202.24. 032. 200. 10

GUIDE PILLAR ENDWISE BOLT-ON TYPE, ~DIN 9825/~ISO 9182-2

202.21.





Material:
Steel, (Core strength: ≥ 900 N/mm²) surface hardened
Surface hardness: 60 + 3 HRC, Hardness penetration ≥ 1,8 mm

Execution:
fine precision ground
End face square within 0.005 mm in 100 mm

Note:
☞ Bearing clearance / Preloading see pairing classification at the beginning of chapter D.

☞ Matching guide combinations, see selection matrix at the beginning of chapter D.
Tolerance range:
yellow = .10
green = .20
red = .30

202.21. Guide pillar endwise bolt-on type, ~DIN 9825/~ISO 9182-2

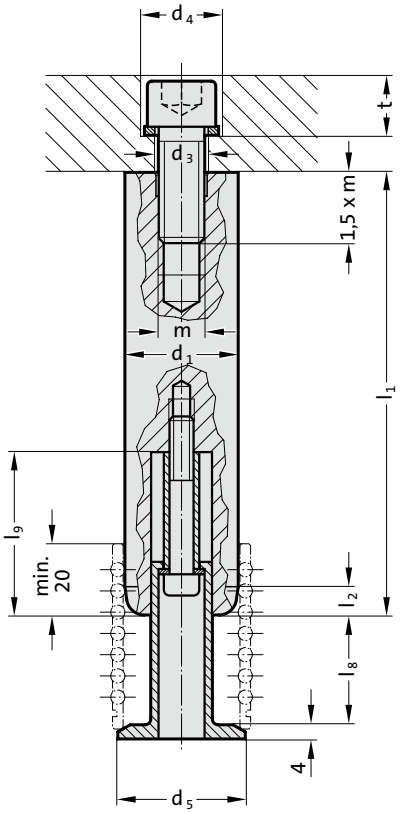
d_1	15 16	19 20	24 25	30 32	38 40	48 50	60 63	80
d_3	9	11	14	18	18	14	18	18
d_4	17	20	22	28	28	22	28	28
d_6	-	-	-	-	-	28	34	54
t	12	14	16	20.5	20.5	16	20.5	20.5
M	8	10	12	16	16	12	16	16
Screw	M8x35	M10x40	M12x40	M16x40	M16x40	M12x50	M16x60	M16x60
Tightening torque [Nm]	21	37	85	150	150	85	200	200
l_1								
90	●							
100	●	●	●					
112	●	●	●					
125	●	●	●	●				
140	●	●	●	●				
160	●	●	●	●	●			
180	●	●	●	●	●	●		
200	●	●	●	●	●	●		
224	●	●	●	●	●	●		
250	●	●	●	●	●	●	●	
280	●	●	●	●	●	●	●	●
315	●	●	●	●	●	●	●	●
355	●	●	●	●	●	●	●	●
400		●	●	●	●	●	●	●
450			●	●	●	●	●	●
500			●	●	●	●	●	●
550					●	●	●	●
600					●	●	●	●
700					●	●	●	●
800					●	●	●	●

Ordering Code (example):

Guide pillar endwise bolt-on type, ~DIN 9825/~ISO 9182-2		=	202.21.
Diameter of conduit d_1	32 mm	=	032.
Length l_1	200 mm	=	200.
Classification TOL	yellow	=	10
Order No		=	202.21. 032. 200. 10

GUIDE PILLAR ENDWISE BOLT-ON TYPE WITH BALL CAGE, ~DIN 9825/~ISO 9182-2

202.55.

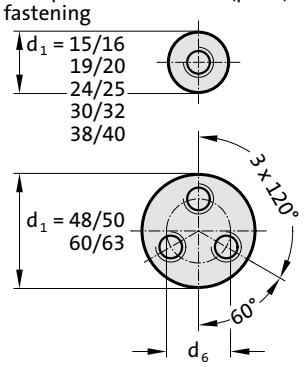


Material:
Steel, (Core strength: ≥ 900 N/mm²) surface hardened
Surface hardness: 60 + 3 HRC, Hardness penetration ≥ 1,8 mm

Execution:
fine precision ground
End face square within 0.005 mm in 100 mm

Note:
☞Preloading see pairing classification at the beginning of chapter D
☞Matching guide combinations, see selection matrix at the beginning of chapter D.
Dimensions of ball cage retainer see 202.91.
Tolerance range:
yellow = .10
green = .20
red = .30

Hole pattern for column (pillar) fastening



GUIDE PILLAR ENDWISE BOLT-ON TYPE WITH BALL CAGE, ~DIN 9825/~ISO 9182-2

202.55. Guide pillar endwise bolt-on type with ball cage, ~DIN 9825/~ISO 9182-2

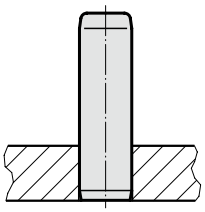
d_1	38	40	48	50	60	63
d_3	18	18	14	14	18	18
d_4	28	28	22	22	28	28
d_5	42	44	52	54	64	67
d_6	0	0	28	28	34	34
t	20.5	20.5	16	16	20.5	20.5
m	16	16	12	12	16	16
Screw	M16x40	M16x40	M12x50	M12x50	M16x60	M16x60
Tightening torque [Nm]	150	150	85	85	200	200
KG (l_8 / l_9)						
1 (31/46)	●	●	●	●	●	●
2 (41/56)	●	●	●	●	●	●
3 (51/66)	●	●	●	●	●	●
4 (61/76)	●	●	●	●	●	●
5 (73/89)	●	●	●	●	●	●
l_1						
160	●	●				
180	●	●	●	●		
200	●	●	●	●		
224	●	●	●	●		
250	●	●	●	●	●	●
280	●	●	●	●	●	●
315	●	●	●	●	●	●
355	●	●	●	●	●	●
400	●	●	●	●	●	●
450	●	●	●	●	●	●
500	●	●	●	●	●	●
550	●	●	●	●	●	●
600	●	●	●	●	●	●
700	●	●	●	●	●	●
800	●	●	●	●	●	●

Ordering Code (example):

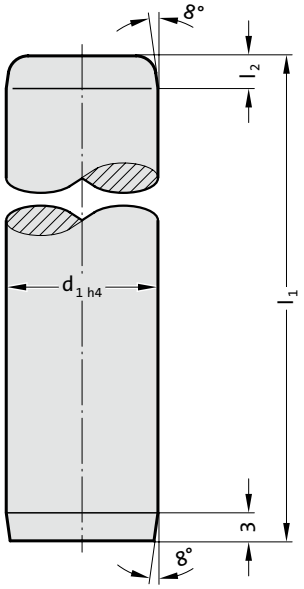
Guide pillar endwise bolt-on type with ball cage, ~DIN 9825/~ISO 9182-2		= 202.55.
Diameter of conduit d_1	48 mm	= 048.
Length l_1	550 mm	= 550.
Cage unit size KG	1	= 1.
Classification TOL	yellow	= 10
Order No		= 202.55. 048. 550. 1. 10

GUIDE PILLAR ECO-LINE, ~DIN 9825/~ISO 9182-2

Mounting example



202.29.



Material:
Steel, surface hardened
Surface hardness: 60 + 3 HRC, Hardness penetration ≥ 1,8 mm

Execution:
ground
Method of manufacturing entails that centre holes are not concentric with O.D.

Note:
Guide pillars only recommended for use with sliding guides!
☞Matching guide combinations, see selection matrix at the beginning of chapter D.
☞Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.

202.29. Guide pillar ECO-LINE, ~DIN 9825/~ISO 9182-2

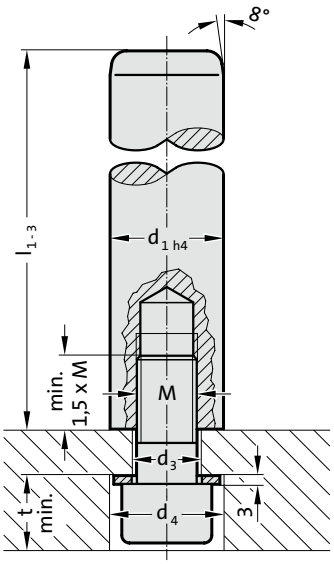
d_1	15 16	19 20	24 25	30 32	38 40	48 50	60 63	80
l_2	4	4	6	6	6	8	8	8
l_1								
90	●							
100	●	●	●					
112	●	●	●					
125	●	●	●	●				
140	●	●	●	●				
160	●	●	●	●	●			
180	●	●	●	●	●	●		
200	●	●	●	●	●	●		
224	●	●	●	●	●	●		
250	●	●	●	●	●	●	●	
280	●	●	●	●	●	●	●	●
315	●	●	●	●	●	●	●	●
355	●	●	●	●	●	●	●	●
400		●	●	●	●	●	●	●
450			●	●	●	●	●	●
500			●	●	●	●	●	●
550					●	●	●	●
600					●	●	●	●
700					●	●	●	●
800					●	●	●	●

Ordering Code (example):

Guide pillar ECO-LINE, ~DIN 9825/~ISO 9182-2		=	202.29.
Diameter of conduit d_1	32 mm	=	032.
Length l_1	125 mm	=	125
Order No		=	202.29. 032. 125

GUIDE PILLAR ECO-LINE ENDWISE BOLT-ON TYPE, ~DIN 9825/~ISO 9182-2

202.31.

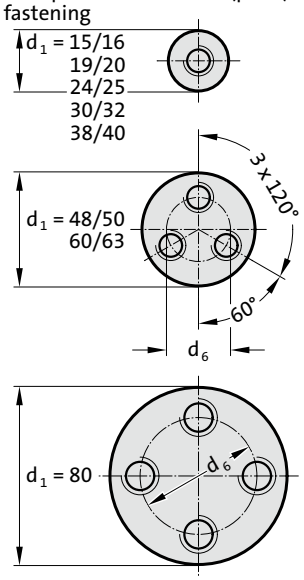


Material:
Steel, surface hardened
Surface hardness: 60 + 3 HRC, Hardness penetration ≥ 1,8 mm

Execution:
ground

Note:
Guide pillars only recommended for use with sliding guides!
☞Matching guide combinations, see selection matrix at the beginning of chapter D.

Hole pattern for column (pillar) fastening



GUIDE PILLAR ECO-LINE ENDWISE BOLT-ON TYPE, ~DIN 9825/~ISO 9182-2

202.31. Guide pillar ECO-LINE endwise bolt-on type, ~DIN 9825/~ISO 9182-2

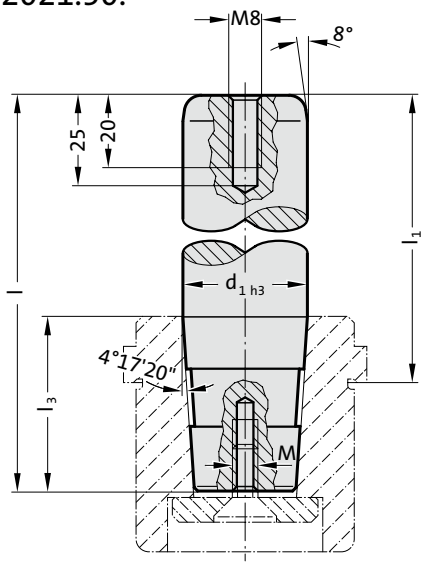
d_1	15 16	19 20	24 25	30 32	38 40	48 50	60 63	80
d_3	9	11	14	18	18	14	18	18
d_4	17	20	22	28	28	22	28	28
d_6	-	-	-	-	-	28	34	54
t	12	14	16	20.5	20.5	16	20.5	20.5
M	8	10	12	16	16	12	16	16
Screw	M8x35	M10x40	M12x40	M16x40	M16x40	M12x50	M16x60	M16x60
Tightening torque [Nm]	21	37	85	150	150	85	200	200
l_1								
90	●							
100	●	●	●					
112	●	●	●					
125	●	●	●	●				
140	●	●	●	●				
160	●	●	●	●	●			
180	●	●	●	●	●	●		
200	●	●	●	●	●	●		
224	●	●	●	●	●	●		
250	●	●	●	●	●	●	●	
280	●	●	●	●	●	●	●	●
315	●	●	●	●	●	●	●	●
355	●	●	●	●	●	●	●	●
400		●	●	●	●	●	●	●
450			●	●	●	●	●	●
500			●	●	●	●	●	●
550					●	●	●	●
600					●	●	●	●
700					●	●	●	●
800					●	●	●	●

Ordering Code (example):

Guide pillar ECO-LINE endwise bolt-on type, ~DIN 9825/~ISO 9182-2		=	202.31.
Diameter of conduit d_1	48 mm	=	032.
Length l_1	550 mm	=	125
Order No		=	202.31. 032. 125

GUIDE PILLAR, CONICAL, DIN 9825/ISO 9182-4/AFNOR

2021.50.



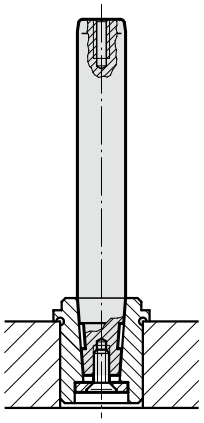
Description:
FIBRO demountable pillars with conical shaft 2021.50. are recommended where die sharpening etc. demands frequent demounting and re-fitting.

Material:
Steel, (Core strength: ≥ 900 N/mm²) surface hardened
Surface hardness: 60 + 3 HRC, Hardness penetration ≥ 1,8 mm

Execution:
fine-ground and superfinished
Method of manufacturing entails that centre holes are not concentric with O.D.

Note:
Matching retaining bushes 2021.39./210.39. and retaining discs 2021.53./202.53. to be ordered separately.
☞Preloading see pairing classification at the beginning of chapter D
☞Matching guide combinations, see selection matrix at the beginning of chapter D.
Tolerance range:
yellow = .10
green = .20
red = .30

Mounting example



GUIDE PILLAR, CONICAL, DIN 9825/ISO 9182-4/AFNOR

2021.50. Guide pillar, conical, DIN 9825/ISO 9182-4/AFNOR

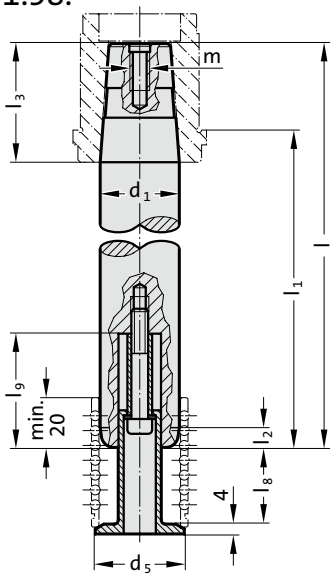
d_1	16	19 20	24 25	25	30 32	32	38 40	40	48 50	50	60 63	63	63
d_5	22	22	25	25	32	32	40	40	50	50	63	63	63
M	6	6	8	8	8	8	8	8	10	10	12	12	12
l_3	28	38	35	45	48	61	48	61	58	78	69	77	97
l_1	l												
82	100												
95	113												
100		126	123										
112	130	138	135		145								
125	143	151	148	158	158		158						
140		166	163		173	186	173		180				
160		186	183	193	193	206	193	206	200		211		
180		206	203	213	213	226	213	226	220		231	237	
200		226	223	233	233		233		240	260	251	257	
224			247		257	270	257	270	264		275		
250			273		283		283	296	290	310	301	307	327
280					313		313		320	340	331	337	
315							348		355	375	366	372	392
355									395		406		432
400													477

Ordering Code (example):

Guide pillar, conical, DIN 9825/ISO 9182-4/AFNOR		=	2021.50.
Diameter of conduit d_1	38 mm	=	038.
Guide length l_1	180 mm	=	180.
Cone length l_3	48 mm	=	048.
Classification TOL	yellow	=	10
Order No		=	2021.50. 038. 180. 048. 10

DEMOUNTABLE GUIDE PILLAR, CONICAL, WITH BALL CAGE RETAINER, DIN 9825/ISO 9182-4/AFNOR

2021.58.



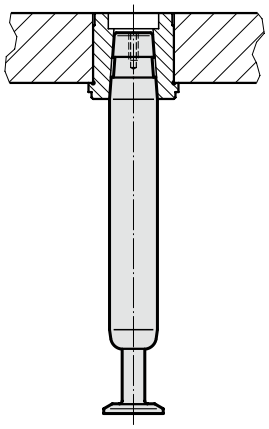
Description:
FIBRO demountable pillars with conical shaft 2021.58. are recommended where die sharpening etc. demands frequent demounting and re-fitting.

Material:
Steel, (Core strength: ≥ 900 N/mm²) surface hardened
Surface hardness: 60 + 3 HRC, Hardness penetration ≥ 1,8 mm

Execution:
fine-ground and superfinished

Note:
Matching retaining bushes 2021.39./210.39. and retaining discs 2021.53./202.53. to be ordered separately.
☞Preloading see pairing classification at the beginning of chapter D
☞Matching guide combinations, see selection matrix at the beginning of chapter D.
Dimensions of ball cage retainer see 202.91.
Tolerance range:
yellow = .10
green = .20
red = .30

Mounting example



DEMOUNTABLE GUIDE PILLAR, CONICAL, WITH BALL CAGE RETAINER, DIN 9825/ISO 9182-4/AFNOR

2021.58. Demountable guide pillar, conical, with ball cage retainer, DIN 9825/ISO 9182-4/AFNOR

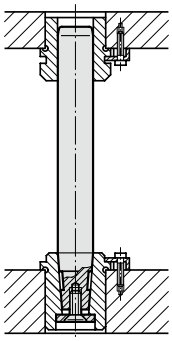
d_1	38	40	40	48	50	50	60	63	63	63
d_5	42	44	44	52	54	54	64	67	67	67
m	8	8	8	10	10	10	12	12	12	12
l_3	48	48	61	58	58	78	69	69	77	97
KG (l_8 / l_9)										
1 (31 / 46)	●	●	●	●	●	●	●	●	●	●
2 (41 / 56)	●	●	●	●	●	●	●	●	●	●
3 (51 / 66)	●	●	●	●	●	●	●	●	●	●
4 (61 / 76)	●	●	●	●	●	●	●	●	●	●
5 (73 / 89)	●	●	●	●	●	●	●	●	●	●
l_1	l									
125	158	158								
140	173	173		180	180					
160	193	193	206	200	200		211	211		
180	213	213	226	220	220		231	231	237	
200	233	233		240	240	260	251	251	257	
224	257	257	270	264	264		275	275		
250	283	283	296	290	290	310	301	301	307	327
280	313	313		320	320	340	331	331	337	
315	348	348		355	355	375	366	366	372	392
355				395	395		406	406		432
400										477

Ordering Code (example):

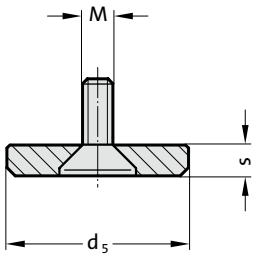
Demountable guide pillar, conical, with ball cage retainer,			
DIN 9825/ISO 9182-4/AFNOR		=	2021.58.
Diameter of conduit d_1	50 mm	=	050.
Guide length l_1	200 mm	=	200.
Cone length l_3	58 mm	=	058.
Cage unit size KG	1	=	1
Classification TOL	yellow	=	1
Order No		=	2021.58. 050. 200. 058. 1 1

RETAINING DISC WITH COUNTERSUNK HEAD CAP SCREW, DIN 9825/ISO 9182-4
RETAINING DISC WITH SOCKET CAP SCREW, ~AFNOR

Mounting example



2021.53.



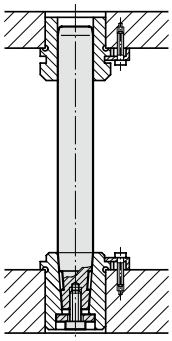
Material:
Retaining disc: Steel, burnished
Countersunk head cap screw DIN 7991/ISO 10642

Note:
Has to be ordered separately to guide pillar, conical according to DIN 9825 / ISO 9182-4 2021.50. or 2021.58.

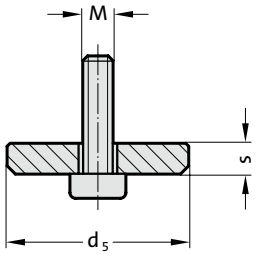
2021.53. Retaining disc with countersunk head cap screw, DIN 9825/ISO 9182-4

Order No	Nominal-ø	Pillar-ø	d_5	s	M
2021.53.020	20	19/20	22	3	M6
2021.53.025	25	24/25	25	3	M8
2021.53.032	32	30/32	32	3	M8
2021.53.040	40	38/40	40	5	M8
2021.53.050	50	48/50	50	5	M10
2021.53.063	63	60/63	63	6	M12

Mounting example



202.53.



Material:
Retaining disc: Steel, burnished
Socket head cap screw DIN 6912

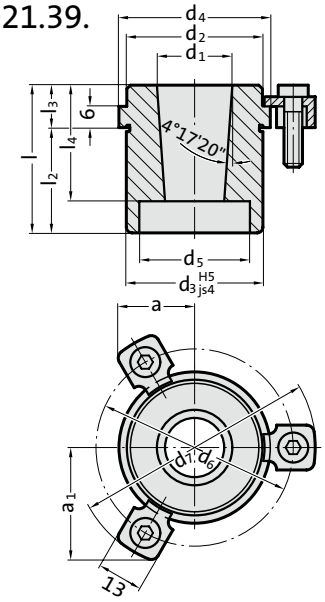
Note:
Has to be ordered separately to guide pillar, conical according to AFNOR 2021.50. or 2021.58.

202.53. Retaining disc with socket cap screw, ~AFNOR

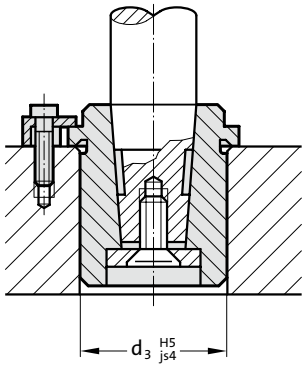
Order No	Pillar-ø	d_5	s	M
202.53.016	16	18	3	M6
202.53.020	20	22	3	M6
202.53.025	25	25	4	M8
202.53.032	32	32	4	M8
202.53.040	40	40	4	M8
202.53.050	50	50	5	M10
202.53.063	63	63	6	M12

RETAINING BUSH FOR GUIDE PILLAR CONICAL 2021.50., DIN 9825/ISO 9182-4

2021.39.



Mounting example



Material:
16 MnCr5,
case hardened 58 ± 2 HRC
Hardness penetration: ≥ 0,8 mm

Execution:
Retaining bore, outside diameter and shoulder precision ground.

Note:
Outside diameter d_3 same as that of guide bushes 2081. and 2091.
The attachment is with 3 Screw clamp, from ø d_1 = 38 with 4 Screw clamp , which are included in delivery (Order No: 207.45 - Screw clamp incl. socket cap screw DIN 6912, Head ø 13).
☞Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.

2021.39. Retaining bush for guide pillar conical 2021.50., DIN 9825/ISO 9182-4

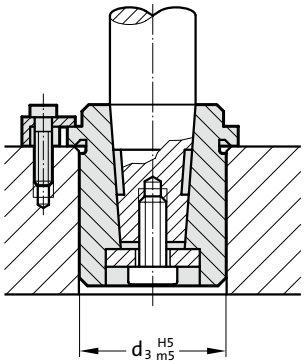
d_1	19 20	24 25	30 32	38 40	48 50	60 63
d_2	32	40	48	58	70	85
d_3	32	40	48	58	70	85
d_4	40	48	56	66	80	95
d_5	23	26	33	41	51	64
d_6	53	60	67	77	91	106
d_7	65.7	72.7	79.7	89.7	103.7	118.7
a	20.9	22.65	24.4	35.3	40.2	45.5
a_1	30.3	33.4	36.4	35.3	40.2	45.5
l	42 49	49 59	52 62	62 75	65 78	78 95
l_2	30 37	37 47	37 47	47 60	47 60	60 77
l_3	12	12	15	15	18	18
l_4	39	36	49	49	59	70

Ordering Code (example):

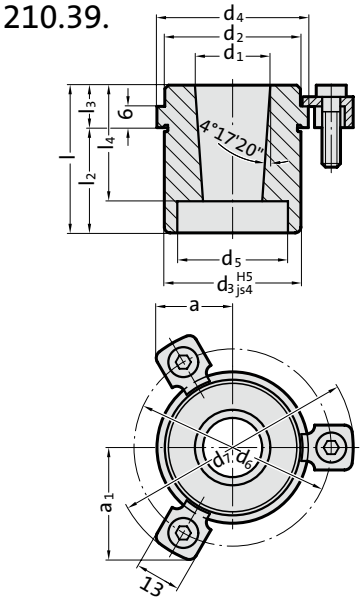
Retaining bush for guide pillar conical 2021.50.,			
DIN 9825/ISO 9182-4		= 2021.39.	
Nominal diameter d_1	38 mm	=	038.
Installation length l_2	47 mm	=	047
Order No		= 2021.39.	038. 047

RETAINING BUSH FOR GUIDE PILLAR CONICAL 2021.50.,~AFNOR

Mounting example



210.39.



Material:
16 MnCr5,
case hardened 58 ± 2 HRC
Hardness penetration: ≥ 0,8 mm

Execution:
Retaining bore, outside diameter and shoulder precision ground.

Note:
Outside diameter d_3 same as that of guide bush 210.
The attachment is with 3 Screw clamp, from ø d_1 = 38 with 4 Screw clamp , which are included in delivery (Order No: 207.45 - Screw clamp incl. socket cap screw DIN 6912, Head ø 13).
☞Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.

210.39. Retaining bush for guide pillar conical 2021.50.,~AFNOR

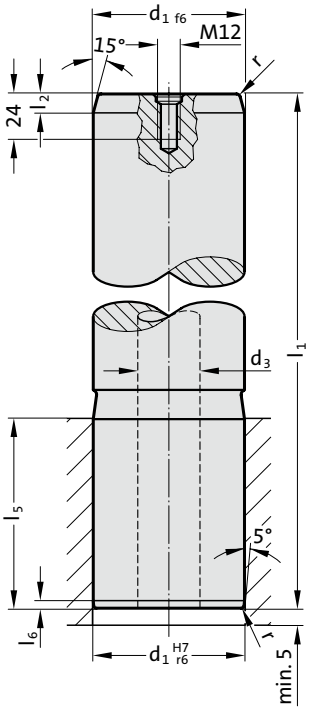
d_1	16	20	25	32	40	50	63
d_2	29	32	41	51	65	84	100
d_3	28	32	40	50	63	80	90
d_4	32	36	45	56	70	90	110
d_5	19	23	26	33	41	51	64
d_6	45	49	57	67	81	101	121
d_7	57.7	61.7	69.7	79.7	93.7	113.7	133.7
a	18.9	19.9	21.9	24.4	36	43	50.1
a_1	26.9	28.6	32.1	36.4	36	43	50.1
l	40	50	50 60	63 76	63 76	79 96	98 118
l_2	30	38	38 48	48 61	48 61	61 78	78 98
l_3	10	12	12	15	15	18	20
l_4	30	40	3747	5063	5063	6380	7999

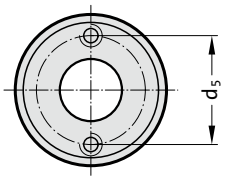
Ordering Code (example):

Retaining bush for guide pillar conical 2021.50.,~AFNOR		=	210.39.
Nominal diameter d_1	40 mm	=	040.
Installation length l_2	48 mm	=	048
Order No		=	210.39. 040. 048

GUIDE PILLAR FOR LARGE TOOLS, DIN 9833/ISO 9182-3

2022.19.





Material:
Steel, surface hardened
Surface hardness: 60 + 4 HRC, Hardness penetration 1,5 + 1 mm

Execution:
ground
up to ø d_1 = 80 without central hole
by ø d_1 = 80 with 1 lifting thread M12
from ø d_1 = 100 with central hole (through) and with 2 lifting threads M12

Note:
Guide pillar is recommended to be used only with guide elements with solid lubricant.
☞Matching guide combinations, see selection matrix at the beginning of chapter D.
☞Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.

2022.19. Guide pillar for large tools, DIN 9833/ISO 9182-3

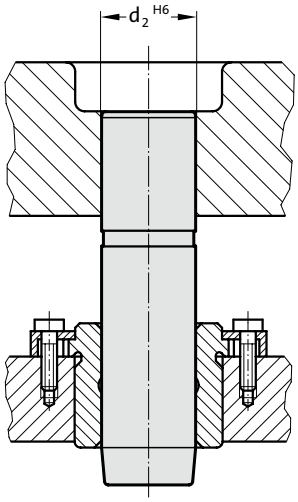
d_1	25	32	40	50	63	80	100	125	160
d_3	-	-	-	-	-	-	50	65	95
d_5	-	-	-	-	-	-	72	90	132
r	2	2	2	2.5	2.5	3	3	4	4
l_2	8	8	8	10	10	10	10	12	12
l_5	40	45	56	70	80	100	125	140	180
l_6	4	4	4	4	4	4	4	5	5
l_1									
125	●	●							
140	●	●	●						
160	●	●	●	●					
180	●	●	●	●	●				
200	●	●	●	●	●				
224	●	●	●	●	●	●			
250		●	●	●	●	●	●		
280			●	●	●	●	●		
315				●	●	●	●	●	
355				●	●	●	●	●	
400					●	●	●	●	●
450						●	●	●	●
500						●	●	●	●
560									●

Ordering Code (example):

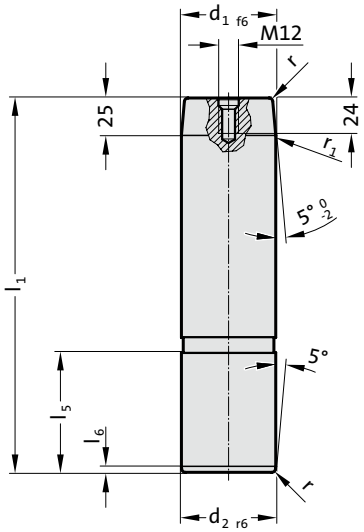
Guide pillar for large tools, DIN 9833/ISO 9182-3		=	2022.19.
Diameter of conduit d_1	63 mm	=	063.
Length l_1	180 mm	=	180
Order No		=	2022.19. 063. 180

GUIDE PILLAR WITH 5° PILOT TAPER, TO VW-STANDARD

Mounting example



2022.13.



Material:
Steel, surface hardened
Surface hardness: 60 + 4 HRC, Hardness penetration 1,5 + 1 mm

Execution:
precision ground
ø d_1 = 80 with 1 lifting thread M12

Note:
Guide pillar is recommended to be used only with guide elements with solid lubricant.

☞Matching guide combinations, see selection matrix at the beginning of chapter D.
☞Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.

Application:
Floating support in upper half of trimming tools.

2022.13. Guide pillar with 5° pilot taper, to VW-Standard

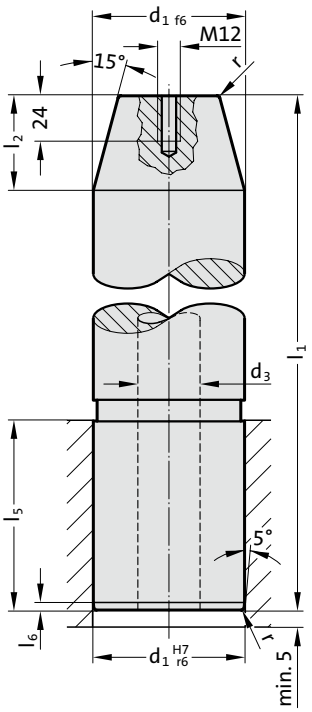
d_1	40	50	63	80
d_2	40	50	63	80
l_5	56	70	80	100
l_6	4	4	4	4
r	2	2.5	2.5	3
r_1	3	5	6	8
l_1				
140	●			
160	●	●		
180	●	●	●	
200	●	●	●	
224	●	●	●	●
250	●	●	●	●
280	●	●	●	●
315		●	●	●
355		●	●	●
400			●	●

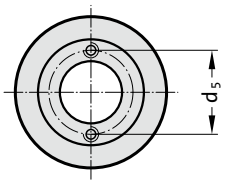
Ordering Code (example):

Guide pillar with 5° pilot taper, to VW-Standard		=	2022.13.
Diameter of conduit d_1	63 mm	=	063.
Length l_1	180 mm	=	180
Order No		=	2022.13. 063. 180

GUIDE PILLAR WITH PILOT TAPPER, VDI 3356

2022.15.





Material:
Steel, surface hardened
Surface hardness: 60 + 4 HRC, Hardness penetration 1,5 + 1 mm

Execution:
ground
ø d_1 = 80 without central hole with 1 lifting thread M12
from ø d_1 = 100 with central hole (through) and with 2 lifting threads M8

Note:
Guide pillar is recommended to be used only with guide elements with solid lubricant.
☞Matching guide combinations, see selection matrix at the beginning of chapter D.
☞Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.

2022.15. Guide pillar with pilot tapper, VDI 3356

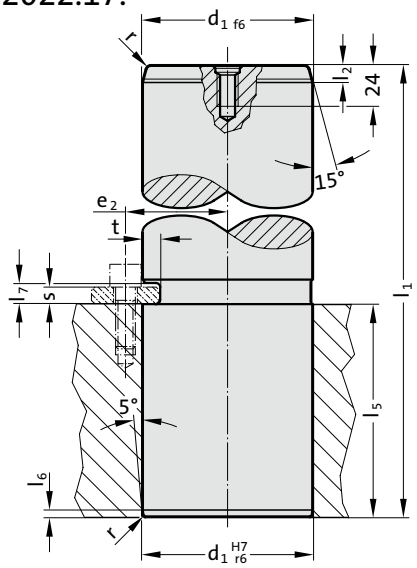
d_1	80	100	125	160
d_3	-	50	65	95
d_5	-	62	82	119
r	3	3	4	4
l_2	50	50	50	50
l_5	100	125	140	180
l_6	4	4	5	5
l_1				
280	●			
315	●	●		
355	●	●	●	
400	●	●	●	
450	●	●	●	●
500			●	●
560				●

Ordering Code (example):

Guide pillar with pilot tapper, VDI 3356		=	2022.15.
Diameter of conduit d_1	125 mm	=	125.
Length l_1	355 mm	=	355
Order No		=	2022.15. 125. 355

GUIDE PILLAR WITH GROOVE, TO VW

2022.17.



Material:
Steel, surface hardened
Surface hardness: 60 + 4 HRC, Hardness penetration 1,5 + 1 mm

Execution:
ground
ø d_1 = 80 with 1 lifting thread M12

Note:
Secure with locating plate 2022.40.1.
Guide pillar is recommended to be used only with guide elements with solid lubricant.

☞ Matching guide combinations, see selection matrix at the beginning of chapter D.
☞ Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.

2022.17. Guide pillar with groove, to VW

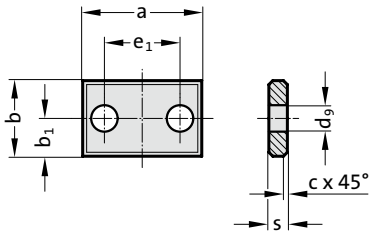
d_1	25	32	40	50	63	80
l_2	8	8	8	10	10	10
l_5	40	45	56	70	80	100
l_6	4	4	4	4	4	4
l_7	7	7	10	10	12	12
r	2	2	2	2.5	2.5	3
e_2	20.5	24	29.5	33.5	43	50
t	3	3	4	4	6.5	8
l_1						
125	●	●				
140	●	●	●			
160	●	●	●	●		
180	●	●	●	●	●	
200	●	●	●	●	●	
224	●	●	●	●	●	●
250		●	●	●	●	●
280			●	●	●	●
315				●	●	●
355				●	●	●
400					●	●
450						●
500						●

Ordering Code (example):

Guide pillar with groove, to VW		=	2022.17.
Diameter of conduit d_1	50 mm	=	050.
Length l_1	160 mm	=	160
Order No		=	2022.17. 050. 160

LOCATING PLATE FOR GUIDE PILLAR, TO VW

2022.40.1.



2022.40.1. Locating plate for guide pillar, to VW

Order No	Pillar-ø	a	b	s	c	b_1	e_1	d_9
2022.40.1.02	25/32	40	20	5	1	10	20	9
2022.40.1.04	40/50	48	25	8	2	12.5	24	11
2022.40.1.06	63/80	60	34	10	2	17	30	14

Material:
Steel

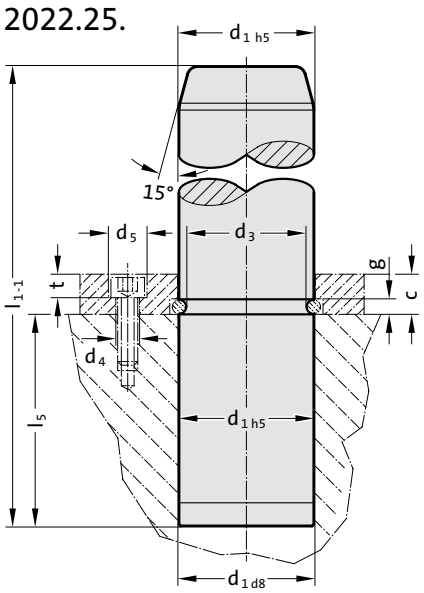
Note:
Screws are not included.

Fixing:
Use socket cap screws DIN EN ISO 4762.

Ordering Code (example):

Locating plate for guide pillar, to VW		=	2022.40.1.
Nominal size NENN	04	=	04
Order No		=	2022.40.1. 04

GUIDE PILLAR WITH RETAINING RING GROOVE, ~AFNOR



Material:
Steel, surface hardened
Surface hardness: 60 + 4 HRC, Hardness penetration 1,5 + 1 mm

Execution:
ground

Note:
Guide pillar is recommended to be used only with guide elements with solid lubricant.

☞ Matching guide combinations, see selection matrix at the beginning of chapter D.
☞ Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.

Fixing:
Clamping flange with retaining ring, without screws, 2073.46.□□□ order separately.

2022.25. Guide pillar with retaining ring groove, ~AFNOR

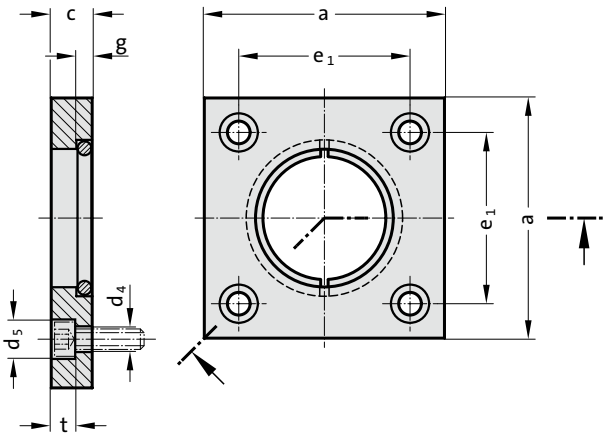
d_1	25	32	40	50	63	80	100
d_3	22.3	27.8	35.8	45.8	56.8	73.8	93.8
g	2.7	4.2	4.2	4.2	6.2	6.2	6.2
l_5	25	32	63	80	100	125	160
l_1							
100	●						
125	●	●					
140	●	●					
160	●	●					
180	●	●	●				
200	●	●	●	●			
220	●	●	●	●			
250		●	●	●	●		
280			●	●	●		
315			●	●	●	●	
355				●	●	●	●
400				●	●	●	●
450					●	●	●
500					●	●	●

Ordering Code (example):

Guide pillar with retaining ring groove, ~AFNOR		=	2022.25.
Diameter of conduit d_1	50 mm	=	050.
Length l_1	220 mm	=	220
Order No		=	2022.25. 050. 220

CLAMPING FLANGE WITH RETAINING RING, ~AFNOR

2073.46.



Material:
Clamping flange: Steel
Retaining ring: Spring steel wire

Note:
For fixing the guide pillar 2022.25.

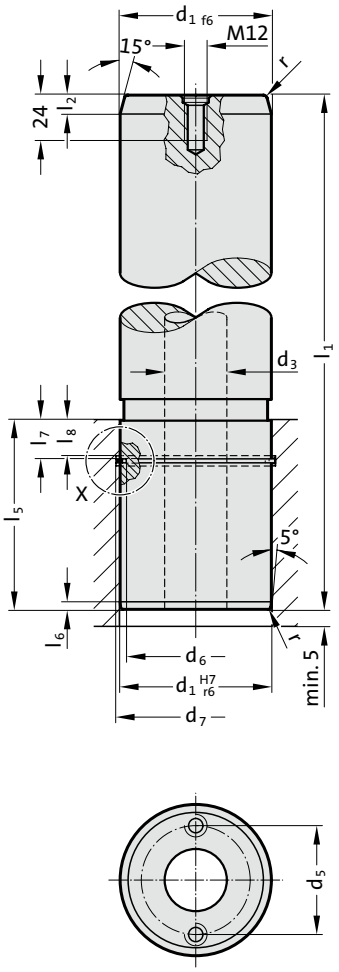
Order No. for reordering retaining ring: 2073.46.□□□.2

2073.46. Clamping flange with retaining ring, ~AFNOR

Order No	Pillar-ø d_1	d_4	d_5	a	c	g	e_1	t
2073.46.025	25	6.6	11	45	10	2.7	31	7
2073.46.032	32	6.6	11	56	10	4.2	36	7
2073.46.040	40	6.6	11	70	12	4.2	50	7
2073.46.050	50	9	15	80	14	4.2	55	9
2073.46.063	63	11	18	100	18	6.2	70	11
2073.46.080	80	13.5	20	110	20	6.2	80	13
2073.46.100	100	13.5	20	140	20	6.2	100	13

GUIDE PILLAR WITH SNAP RING GROOVE, TO MERCEDES-BENZ STANDARD

2022.16.

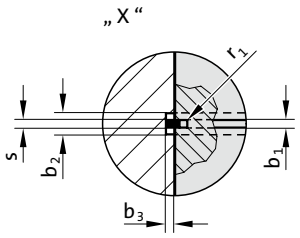


Material:
Steel, surface hardened
Surface hardness: 60 + 4 HRC, Hardness penetration 1,5 + 1 mm

Execution:
ground
up to ø d_1 = 80 without central hole
by ø d_1 = 80 with 1 lifting thread M12
from ø d_1 = 100 with central hole (through) and with 2 lifting threads M12

Note:
Secure with snap ring 2061.48.
Guide pillar is recommended to be used only with guide elements with solid lubricant.
☞Matching guide combinations, see selection matrix at the beginning of chapter D.
☞Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.

Mounting example



GUIDE PILLAR WITH SNAP RING GROOVE, TO MERCEDES-BENZ STANDARD

2022.16. Guide pillar with snap ring groove, to Mercedes-Benz Standard

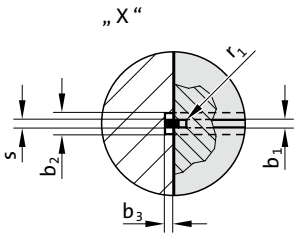
d_1	40	50	63	80	100	125	160
d_3	-	-	-	-	50	65	95
d_5	-	-	-	-	72	90	132
d_6	33	43	55.7	71.4	89.9	114.9	148.9
r	2	2.5	2.5	3	3	4	4
r_1	1	1	1	1.05	1.3	1.3	1.3
l_2	8	10	10	10	10	12	12
l_5	56	70	80	100	125	140	180
l_6	4	4	4	4	4	5	5
l_7	15	15	15	21	31	31	31
l_8	14	14	14	20	30	30	30
b_1	2	2	2	2.1	2.6	2.6	2.6
b_2	3.2	3.2	3.2	4.2	5.2	5.2	5.2
l_1							
140	●						
160	●	●					
180	●	●	●				
200	●	●	●				
224	●	●	●	●			
250	●	●	●	●	●		
280	●	●	●	●	●		
315		●	●	●	●	●	
355		●	●	●	●	●	
400			●	●	●	●	●
450				●	●	●	●
500				●	●	●	●
560							●

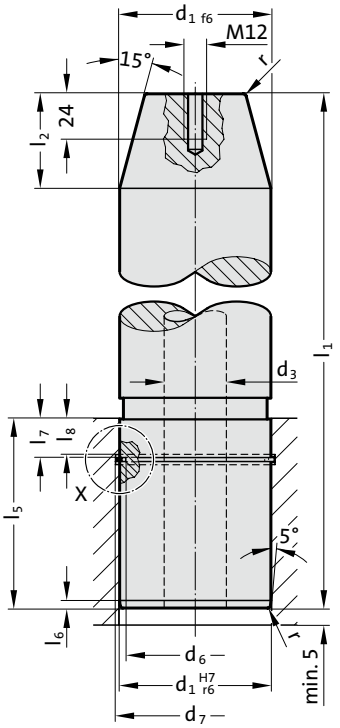
Ordering Code (example):

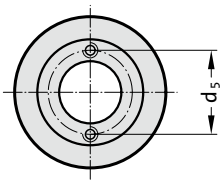
Guide pillar with snap ring groove, to Mercedes-Benz Standard		=	2022.16.
Diameter of conduit d_1	80 mm	=	080.
Length l_1	224 mm	=	224
Order No		=	2022.16. 080. 224

GUIDE PILLAR WITH PILOT TAPPER AND GROOVE, TO MERCEDES-BENZ STANDARD

Mounting example 2022.12.







Material:
Steel, surface hardened
Surface hardness: 60 + 4 HRC, Hardness penetration 1,5 + 1 mm

Execution:
ground
ø d_1 = 80 without central hole with 1 lifting thread M12
from ø d_1 = 100 with central hole (through) and with 2 lifting threads M8

Note:
Secure with snap ring 2061.48.
Guide pillar is recommended to be used only with guide elements with solid lubricant.
☞Matching guide combinations, see selection matrix at the beginning of chapter D.
☞Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.

2022.12. Guide pillar with pilot tapper and groove, to Mercedes-Benz Standard

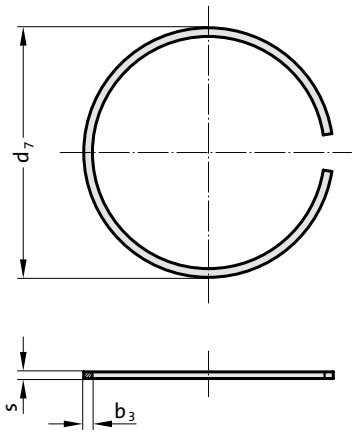
d_1	80	100	125	160
d_3	-	50	65	95
d_5	-	62	82	119
d_6	71.4	89.9	114.9	148.9
r	3	3	4	4
r_1	1.05	1.3	1.3	1.3
l_2	50	50	50	50
l_5	100	125	140	180
l_6	4	4	5	5
l_7	21	31	31	31
l_8	20	30	30	30
b_1	2.1	2.6	2.6	2.6
b_2	4.2	5.2	5.2	5.2
l_1				
280	●			
315	●	●		
355	●	●	●	
400	●	●	●	
450	●	●	●	●
500			●	●
560				●

Ordering Code (example):

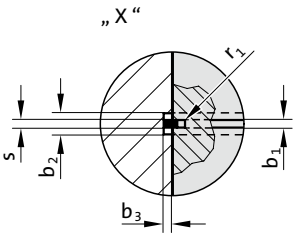
Guide pillar with pilot tapper and groove, to Mercedes-Benz Standard		=	2022.12.
Diameter of conduit d_1	125 mm	=	125.
Length l_1	355 mm	=	355
Order No		=	2022.12. 125. 355

SNAP RING

2061.48.



Mounting example



2061.48. Snap ring

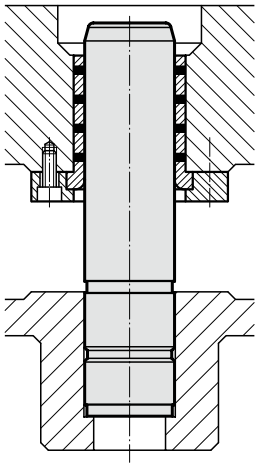
Order No	Pillar-ø	b_1	b_3	d_7	s
2061.48.40	40	2	2.3	43	1.5
2061.48.50	50	2	2.3	53	1.5
2061.48.63	63	2	2.3	66	1.5
2061.48.80	80	2.1	2.8	83.2	2
2061.48.100	100	2.6	3.4	103.8	2.5
2061.48.125	125	2.6	3.4	128.8	2.5
2061.48.160	160	2.6	4	164.3	2.5

Material:
Spring strip steel

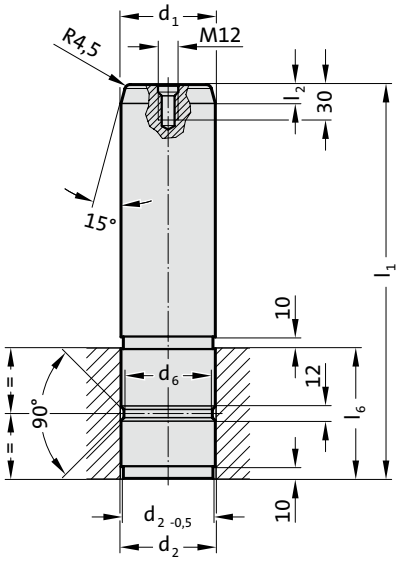
Note:
For securing guide pillars 2022.12. and 2022.16.

GUIDE PILLAR WITH GROOVE, TO CNOMO

Mounting example



2022.16.45.



Material:
Steel, surface hardened
Surface hardness: 60 + 3 HRC, Hardness penetration 2 + 1,6 mm

Execution:
precision ground

Note:
Fit for receiving bore H7.
Guide pillar is recommended to be used only with guide elements with solid lubricant.
☞Matching guide combinations, see selection matrix at the beginning of chapter D.

2022.16.45. Guide pillar with groove, to CNOMO

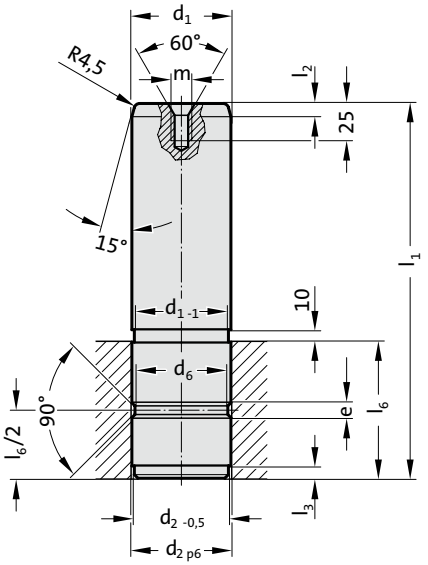
d_1	80	100
Tolerance	-0,010/-0,025	-0,010/-0,025
d_2	80	100
Tolerance	+0,04/+0,05	+0,045/+0,055
d_6	75	95
l_2	16	16
l_6	110	140
l_1		
350	●	
400	●	●
450		●

Ordering Code (example):

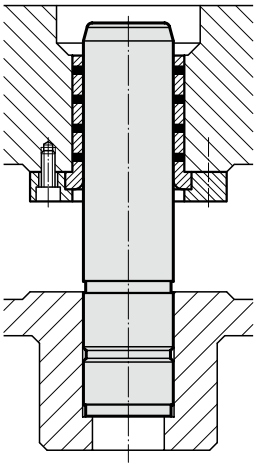
Guide pillar with groove, to CNOMO		=	2022.16.45.
Diameter of conduit d_1	100 mm	=	100.
Length l_1	400 mm	=	400
Order No		=	2022.16.45. 100. 400

GUIDE PILLAR WITH GROOVE

2022.16.48.



Mounting example



Material:
Steel, surface hardened
Surface hardness: 55 + 5 HRC, Hardness penetration 2 + 1,6 mm

Execution:
precision ground

Note:
Fit for receiving bore H7.
Guide pillar is recommended to be used only with guide elements with solid lubricant.
☞Matching guide combinations, see selection matrix at the beginning of chapter D.

2022.16.48. Guide pillar with groove

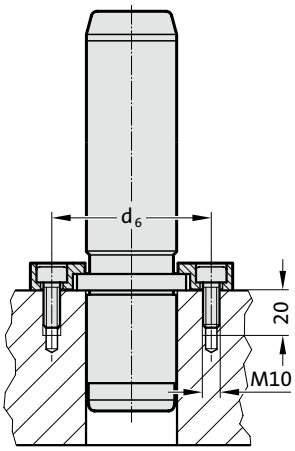
d_1	25	30	40	50	60	65	80	100
Tolerance	-0,005/-0,015	-0,005/-0,015	-0,005/-0,015	-0,005/-0,015	-0,01/-0,02	-0,01/-0,02	-0,01/-0,025	-0,01/-0,025
d_2	25	30	40	50	60	65	80	100
Tolerance	+0,022/+0,035	+0,022/+0,035	+0,026/+0,042	+0,026/+0,042	+0,032/+0.051	+0,032/+0.051	+0,032/+0.051	+0,037/+0,059
d_6	21	26	36	45	55	60	75	95
l_2	5	5	5	10	10	10	10	10
l_3	5	5	5	10	10	10	10	10
l_6	30	40	50	70	90	100	120	150
m	M8	M8	M8	M12	M12	M12	M12	M12
l_1								
80	●							
100	●	●						
120	●	●	●					
140		●	●					
160		●	●	●				
180		●	●	●				
200			●	●	●			
220					●			
250				●	●	●	●	
300				●	●	●	●	●
350					●	●	●	●
400							●	●

Ordering Code (example):

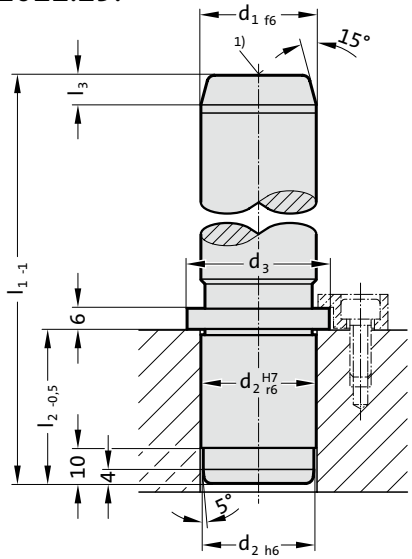
Guide pillar with groove		= 2022.16.48.	
Diameter of conduit d_1	60 mm	=	060.
Length l_1	200 mm	=	200
Order No		= 2022.16.48.	060. 200

GUIDE PILLAR WITH COLLAR, TO WDX

Mounting example



2022.29.



Material:
Steel, surface hardened
Surface hardness: 60 + 4 HRC, Hardness penetration 1,5 + 1 mm

Execution:
precision ground
Method of manufacturing entails that centre holes are not concentric with O.D.
1) from ø d_1 = 80 - with thread M12x18 deep

Note:
Guide pillar is recommended to be used only with guide elements with solid lubricant.
☞Matching guide combinations, see selection matrix at the beginning of chapter D.

☞Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.
Order No. for guide pillar with collar, to WDX, with screw clamps: 2022.29.□□□.□□□.A

Fixing:
(to be ordered separately)
Screw clamps with screws 2072.46 (M10 x 20 DIN EN ISO 4762)
up to ø d_1 = 50 - 2 screw clamps
from ø d_1 = 63 - 3 screw clamps

2022.29. Guide pillar with collar, to WDX

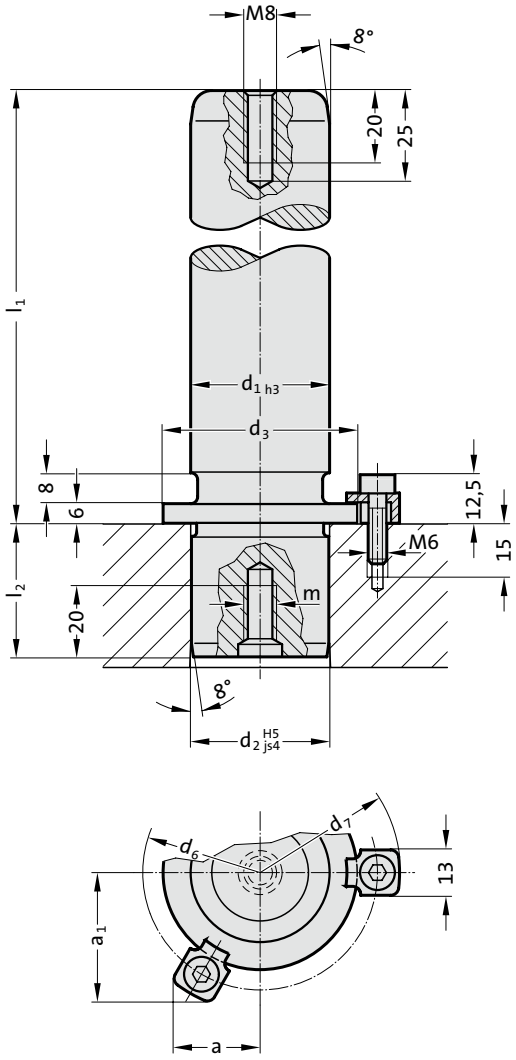
d_1	25	32	40	50	63	80	100
d_2	25	32	40	50	63	80	100
d_3	32	40	50	60	80	90	110
d_6	68	75	83	93	106	123	143
l_2	40	42	56	70	80	100	125
l_3	6	8	8	10	10	10	10
l_1							
125	●						
140	●	●					
160	●	●	●	●			
180	●	●	●	●			
200	●	●	●	●	●		
224	●	●	●	●	●	●	
250		●	●	●	●	●	
280			●	●	●	●	●
315				●	●	●	●
355					●	●	●
400					●	●	●
500						●	●

Ordering Code (example):

Guide pillar with collar, to WDX		=	2022.29.
Diameter of conduit d_1	50 mm	=	050.
Length l_1	160 mm	=	160
Order No		=	2022.29. 050. 160

GUIDE PILLAR WITH COLLAR, SCREW CLAMP RETENTION, DIN 9825/~ISO 9182-5

2021.46.



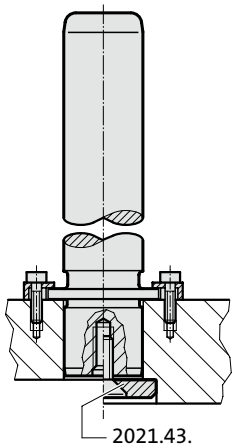
Description:
Demountable pillars with shoulder are suited to applications where die sharpening requires dismantling and re-fitting.

Material:
Steel, (Core strength: ≥ 900 N/mm²) surface hardened
Surface hardness: 60 + 3 HRC, Hardness penetration ≥ 1,8 mm

Execution:
fine precision ground
Method of manufacturing entails that centre holes are not concentric with O.D.

Note:
The attachment is with 3 Screw clamp, from ø d_1 = 38 with 4 Screw clamp , which are included in delivery (Order No: 207.45 - Screw clamp incl. socket cap screw DIN 6912, M6x20, Head ø 13).
Optionally, it is also possible to fix it with a central screw connection 2021.43. or supporting ring 2021.45. (order separately).
☞Bearing clearance / Preloading see pairing classification at the beginning of chapter D.
☞Matching guide combinations, see selection matrix at the beginning of chapter D.
☞Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.
Tolerance range:
yellow = .10
green = .20
red = .30

Mounting example



GUIDE PILLAR WITH COLLAR, SCREW CLAMP RETENTION, DIN 9825/~ISO 9182-5

2021.46. Guide pillar with collar, screw clamp retention, DIN 9825/~ISO 9182-5

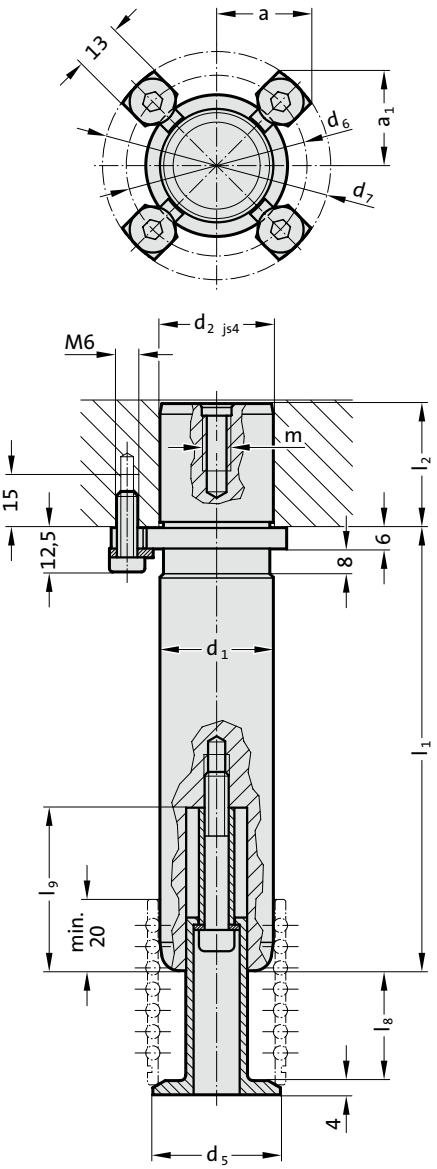
d_1	15 16	19 20	24 25	30 32	38 40	48 50	60 63	80
d_2	15 16	19 20	24 25	30 32	38 40	48 50	60 63	80
d_3	22	25	32	40	50	63	80	95
d_6	33	36	43	51	61	74	91	106
d_7	45.7	48.7	55.7	63.7	73.7	86.7	103.7	118.7
a	15.9	16.6	18.4	20.4	29.2	33.8	39.8	46.2
a_1	21.7	23	26	29.5	29.2	33.8	39.8	46.2
m	8	8	8	8	8	8	8	12
l_2	20	23	30	37	37	47	47	60
l_1								
100	●	●	●					
112	●	●	●	●				
125	●	●	●	●	●			
140	●	●	●	●	●	●		
160	●	●	●	●	●	●	●	
180	●	●	●	●	●	●	●	
200	●	●	●	●	●	●	●	●
224			●	●	●	●	●	●
250			●	●	●	●	●	●
280				●	●	●	●	●
315				●	●	●	●	●
355					●	●	●	●
400						●	●	●

Ordering Code (example):

Guide pillar with collar, screw clamp retention,			
DIN 9825/~ISO 9182-5		=	2021.46.
Diameter of conduit d_1	32 mm	=	032.
Length l_1	315 mm	=	315.
Classification TOL	yellow	=	10
Order No		=	2021.46. 032. 315. 10

GUIDE PILLAR WITH COLLAR AND BALL CAGE RETAINER

2021.44.



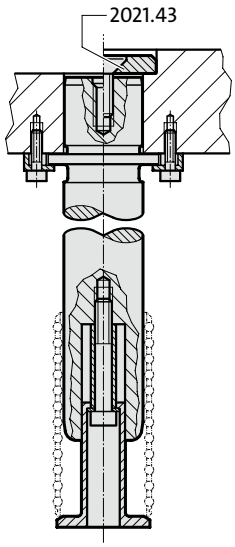
Description:
Demountable pillars with shoulder are suited to applications where die sharpening requires dismantling and re-fitting.

Material:
Steel, (Core strength: ≥ 900 N/mm²) surface hardened
Surface hardness: 60 + 3 HRC, Hardness penetration ≥ 1,8 mm

Execution:
fine precision ground

Note:
The attachment is with 3 Screw clamp, from ø d_1 = 38 with 4 Screw clamp , which are included in delivery (Order No: 207.45 - Screw clamp incl. socket cap screw DIN 6912, M6x20, Head ø 13).
Optionally, it is also possible to fix it with a central screw connection 2021.43. or supporting ring 2021.45. (order separately).
☞Preloading see pairing classification at the beginning of chapter D
☞Matching guide combinations, see selection matrix at the beginning of chapter D.
☞Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.
Dimensions of ball cage retainer see 202.91.
Tolerance range:
yellow = .10
green = .20
red = .30

Mounting example



GUIDE PILLAR WITH COLLAR AND BALL CAGE RETAINER

2021.44. Guide pillar with collar and ball cage retainer

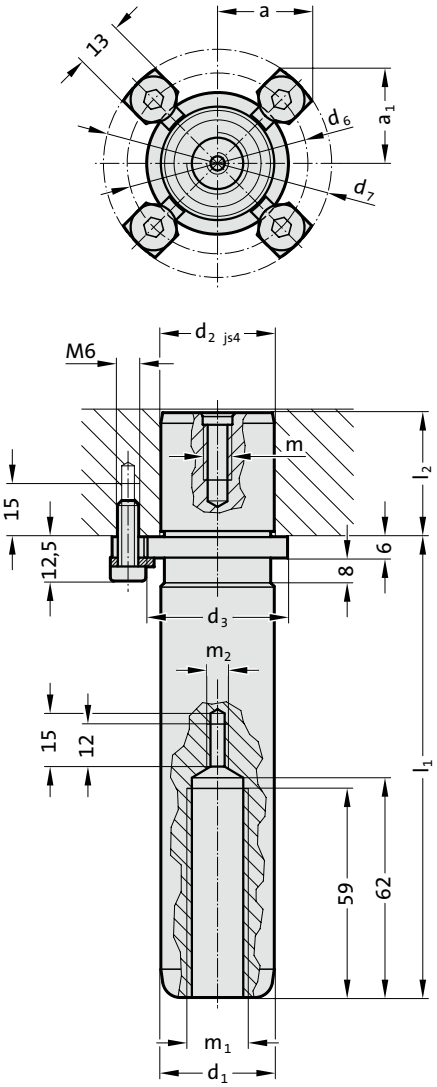
d_1	38	40	48	50	60	63
d_2	38	40	48	50	60	63
d_3	50	50	63	63	80	80
d_5	42	44	52	54	64	67
d_6	61	61	74	74	91	91
d_7	73.7	73.7	86.7	86.7	103.7	103.7
a	29.2	29.2	33.8	33.8	39.8	39.8
a_1	29.2	29.2	33.8	33.8	39.8	39.8
m	M8	M8	M8	M8	M8	M8
l_2	37	37	47	47	47	47
KG (l_8 / l_9)						
1 (31 / 46)	●	●	●	●	●	●
2 (41 / 56)	●	●	●	●	●	●
3 (51 / 66)	●	●	●	●	●	●
4 (61 / 76)	●	●	●	●	●	●
5 (73 / 89)	●	●	●	●	●	●
l_1						
125	●	●				
140	●	●	●	●		
160	●	●	●	●	●	●
180	●	●	●	●	●	●
200	●	●	●	●	●	●
224	●	●	●	●	●	●
250	●	●	●	●	●	●
280	●	●	●	●	●	●
315	●	●	●	●	●	●
355	●	●	●	●	●	●
400			●	●	●	●

Ordering Code (example):

Guide pillar with collar and ball cage retainer		=	2021.44.
Diameter of conduit d_1	48 mm	=	048.
Length l_1	400 mm	=	400.
Cage unit size KG	1	=	1.
Classification TOL	yellow	=	10
Order No		=	2021.44. 048. 400. 1. 10

GUIDE PILLAR WITH COLLAR, WITH CAGE UNIT BORE

2021.46. .30.94



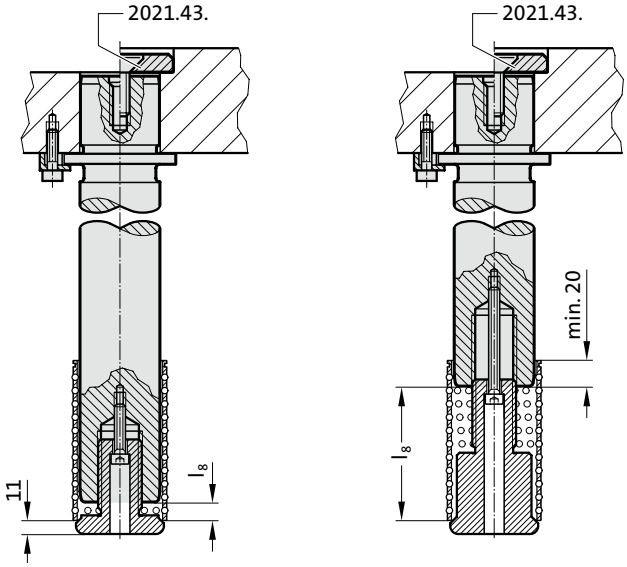
Description:
Demountable pillars with shoulder are suited to applications where die sharpening requires dismantling and re-fitting.

Material:
Steel, (Core strength: ≥ 900 N/mm²) surface hardened
Surface hardness: 60 + 3 HRC, Hardness penetration ≥ 1,8 mm

Execution:
fine precision ground

Note:
The attachment is with 3 Screw clamp, from ø d_1 = 38 with 4 Screw clamp , which are included in delivery (Order No: 207.45 - Screw clamp incl. socket cap screw DIN 6912, M6x20, Head ø 13).
Optionally, it is also possible to fix it with a central screw connection 2021.43. or supporting ring 2021.45. (order separately).
☞Preloading see pairing classification at the beginning of chapter D
☞Matching guide combinations, see selection matrix at the beginning of chapter D.
☞Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.
Dimensions of ball cage retainer see 202.94.
Tolerance range: red = .30
Delivery without cage retainer, ball cage and head cap screw.

Mounting example



GUIDE PILLAR WITH COLLAR, WITH CAGE UNIT BORE

2021.46. .30.94 Guide pillar with collar, with cage unit bore

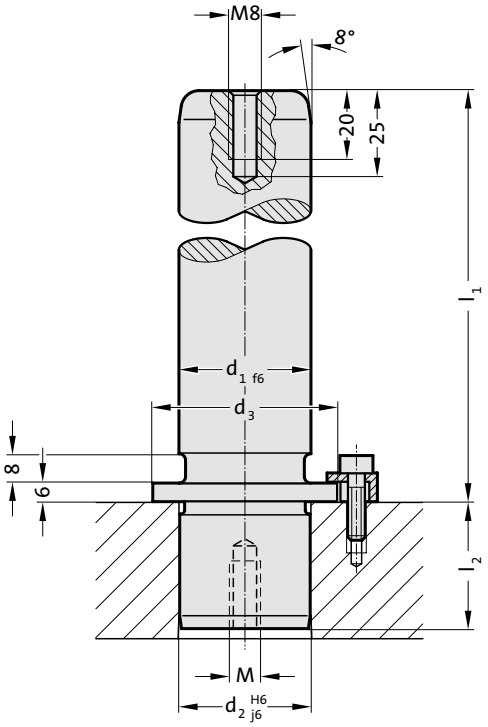
d_1	30 32	38 40	48 50	60 63	80
d_2	30 32	38 40	48 50	60 63	80
d_3	40	50	63	80	95
d_6	51	61	74	91	106
d_7	63.7	73.7	86.7	103.7	118.7
a	20.4	29.2	33.8	39.8	46.2
a_1	29.5	29.2	33.8	39.8	46.2
m_1	M16x1,5	M16x1,5	M20x1,5	M30x1,5	M30x1,5
m_2	M5	M5	M6	M8	M8
l_2	37	37	47	47	60
l_1					
112	●				
125	●	●			
140	●	●	●		
160	●	●	●	●	
180	●	●	●	●	
200	●	●	●	●	●
224	●	●	●	●	●
250	●	●	●	●	●
280	●	●	●	●	●
315	●	●	●	●	●
355		●	●	●	●
400			●	●	●

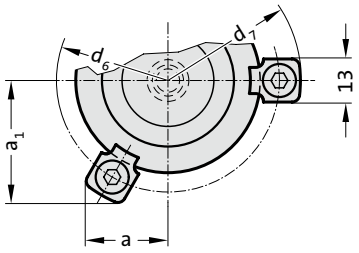
Ordering Code (example):

Guide pillar with collar, with cage unit bore		= 2021.46.	
Diameter of conduit d_1	48 mm	= 048.	
Length l_1	180 mm	= 180.	
Classification red TOL	30	= 30.	
Cage unit bore KHB	94	= 94	
Order No		= 2021.46. 048. 180. 30. 94	

GUIDE PILLAR WITH COLLAR

2021.28.



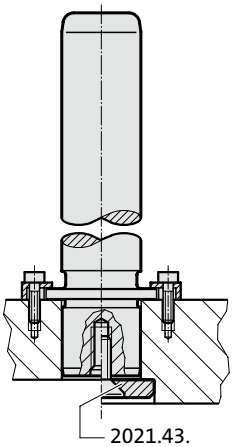


Material:
Steel, surface hardened
Surface hardness: 60 + 4 HRC, Hardness penetration 1,5 + 1 mm

Execution:
ground
Method of manufacturing entails that centre holes are not concentric with O.D.

Note:
Guide pillars only recommended for use with sliding guides!
The attachment is with 3 Screw clamp, from ø d_1 = 38 with 4 Screw clamp , which are included in delivery (Order No: 207.45 - Screw clamp incl. socket cap screw DIN 6912, M6x20, Head ø 13).
Optionally, it is also possible to fix it with a central screw connection 2021.43. or supporting ring 2021.45. (order separately).
☞Matching guide combinations, see selection matrix at the beginning of chapter D.
☞Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.

Mounting example



GUIDE PILLAR WITH COLLAR

2021.28. Guide pillar with collar

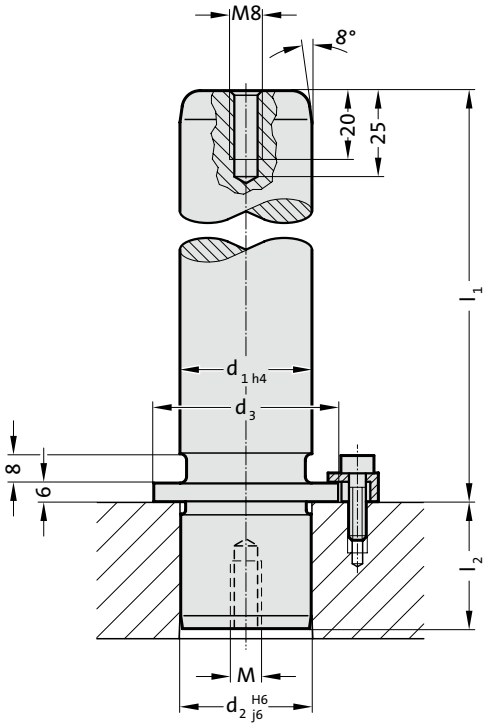
d_1	15 16	19 20	24 25	30 32	38 40	48 50	60 63	80
d_2	15 16	19 20	24 25	30 32	38 40	48 50	60 63	80
d_3	22	25	32	40	50	63	80	95
d_6	33	36	43	51	61	74	91	106
d_7	45.7	48.7	55.7	63.7	73.7	86.7	103.7	118.7
a	15.9	16.6	18.4	20.4	29.2	33.8	39.8	46.2
a_1	21.7	23	26	29.5	29.2	33.8	39.8	46.2
m	M8	M8	M8	M8	M8	M8	M8	M12
l_2	20	23	30	37	37	47	47	60
l_1								
100	●	●	●					
112	●	●	●	●				
125	●	●	●	●	●			
140	●	●	●	●	●	●		
160	●	●	●	●	●	●	●	
180	●	●	●	●	●	●	●	
200	●	●	●	●	●	●	●	●
224			●	●	●	●	●	●
250			●	●	●	●	●	●
280				●	●	●	●	●
315				●	●	●	●	●
355					●	●	●	●
400						●	●	●

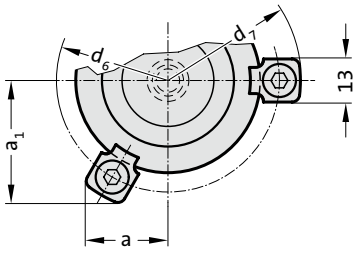
Ordering Code (example):

Guide pillar with collar		= 2021.28.	
Diameter of conduit d_1	32 mm	=	032.
Length l_1	112 mm	=	112
Order No		= 2021.28.	032. 112

GUIDE PILLAR WITH COLLAR ECO-LINE

2021.29.



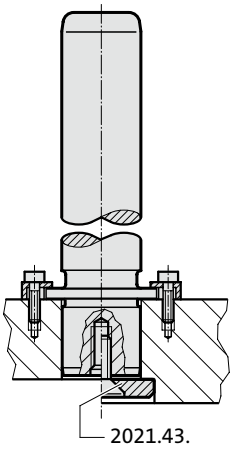


Material:
Steel, surface hardened
Surface hardness: 60 + 4 HRC, Hardness penetration 1,5 + 1 mm

Execution:
ground
Method of manufacturing entails that centre holes are not concentric with O.D.

Note:
Guide pillars only recommended for use with sliding guides!
The attachment is with 3 Screw clamp, from ø d_1 = 38 with 4 Screw clamp , which are included in delivery (Order No: 207.45 - Screw clamp incl. socket cap screw DIN 6912, M6x20, Head ø 13).
Optionally, it is also possible to fix it with a central screw connection 2021.43. or supporting ring 2021.45. (order separately).
☞Matching guide combinations, see selection matrix at the beginning of chapter D.
☞Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.

Mounting example



GUIDE PILLAR WITH COLLAR ECO-LINE

2021.29. Guide pillar with collar ECO-LINE

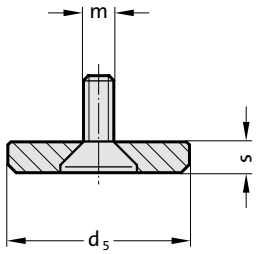
d_1	15 16	19 20	24 25	30 32	38 40	48 50	60 63	80
d_2	15 16	19 20	24 25	30 32	38 40	48 50	60 63	80
d_3	22	25	32	40	50	63	80	95
d_6	33	36	43	51	61	74	91	106
d_7	45.7	48.7	55.7	63.7	73.7	86.7	103.7	118.7
a	15.9	16.6	18.4	20.4	29.2	33.8	39.8	46.2
a_1	21.7	23	26	29.5	29.2	33.8	39.8	46.2
M	M8	M8	M8	M8	M8	M8	M8	M12
l_2	20	23	30	37	37	47	47	60
l_1								
100	●	●	●					
112	●	●	●	●				
125	●	●	●	●	●			
140	●	●	●	●	●	●		
160	●	●	●	●	●	●	●	
180	●	●	●	●	●	●	●	
200	●	●	●	●	●	●	●	●
224			●	●	●	●	●	●
250			●	●	●	●	●	●
280				●	●	●	●	●
315				●	●	●	●	●
355					●	●	●	●
400						●	●	●

Ordering Code (example):

Guide pillar with collar ECO-LINE		=	2021.29.
Diameter of conduit d_1	32 mm	=	032.
Length l_1	112 mm	=	112
Order No		=	2021.29. 032. 112

RETAINING DISC WITH SCREW
RETAINER RING FOR GUIDE PILLARS WITH COLLAR

2021.43.



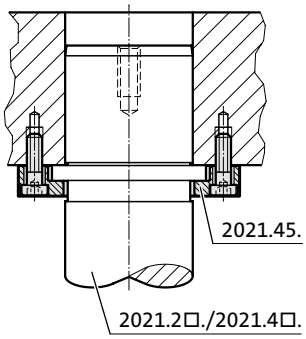
Material:
Retaining disc: Steel, burnished
Countersunk head cap screw DIN 7991/ISO 10642

Note:
For fixing the guide pillars 2021.28., 2021.29., 2021.44. und 2021.46.
☞Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.

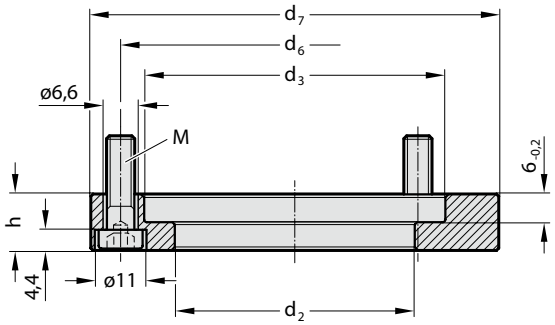
2021.43. Retaining disc with screw

Order No	Nominal-ø	Pillar-ø	d_5	s	m
2021.43.016	16	15/16	22	6	8
2021.43.020	20	19/20	25	6	8
2021.43.025	25	24/25	32	6	8
2021.43.032	32	30/32	40	6	8
2021.43.040	40	38/40	50	6	8
2021.43.050	50	48/50	60	6	8
2021.43.063	63	60/63	70	6	8
2021.43.080	80	80	93	12	12

Mounting example



2021.45.



Material:
Steel, burnished

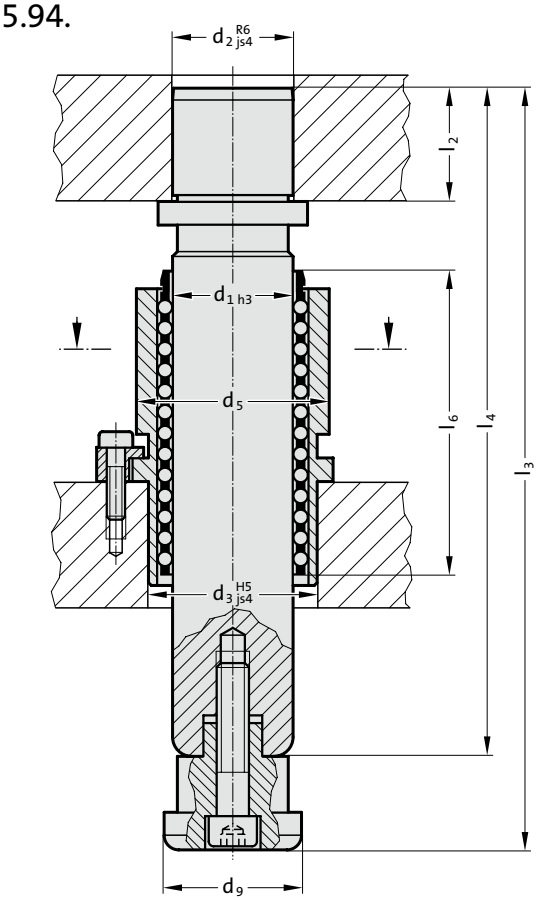
Note:
The retainer ring is used to attach guide pillars with collar (2021.28., 2021.29., 2021.44., 2021.46.).
The attachment is done using head cap screws according to DIN 6912-10.9, which are included in the delivery.
Same attachment position as for the standard screw clamps 207.45!

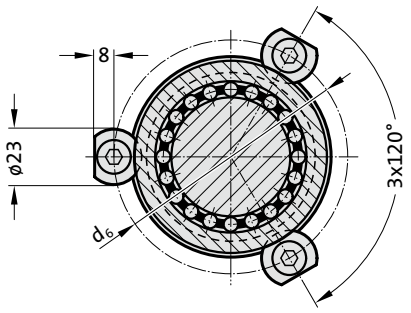
2021.45. Retainer ring for guide pillars with collar

Order No	Nominal-ø	Pillar-ø	d_2	d_3	d_6	d_7	h	M	Quantity Screws
2021.45.016	16	15/16	17	23	33	45.7	12	M6x20	3
2021.45.020	20	19/20	21	26	36	48.7	12	M6x20	3
2021.45.025	25	24/25	26	33	43	55.7	12	M6x20	3
2021.45.032	32	30/32	33	41	51	63.7	12	M6x20	3
2021.45.040	40	38/40	41	51	61	73.7	12	M6x20	4
2021.45.050	50	48/50	51	64	74	86.7	12	M6x20	4
2021.45.063	63	60/63	64	81	91	103.7	12	M6x20	4
2021.45.080	80	80	81	96	106	118.7	18	M6x25	4

BALL GUIDE UNIT TO MERCEDES-BENZ STANDARD

2025.94.





Material:
Demountable guide pillar: Steel, surface hardened
Guide bush: Tooling steel
Cage retainer: Steel
Ball cage: Brass

Execution:
Ball guide unit 2025.94. consisting of: Demountable guide pillar, guide bush, ball cage, cage retainer, clamps and socket cap screws to DIN EN ISO 4762.

2025.94. Ball guide unit to Mercedes-Benz Standard

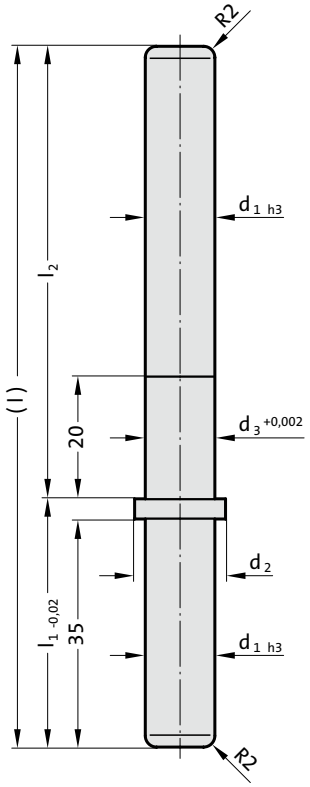
Column diameter d_1	50	80
d_2	50	80
d_3	70	105
d_5	80	118
d_6	97	135
d_9	57	91
l_2	47	75
l_3	316	450
l_4	271	400
l_6	128	160

Ordering Code (example):

Ball guide unit to Mercedes-Benz Standard		= 2025.94.	
Pillar diameter d_1	80 mm	=	080
Order No		= 2025.94.	080

GUIDE PILLAR WITH COLLAR

202.61.



Description:
On small modular die sets the combination plastic ball cage 206.41./ collared guide pillar 202.61. has indeed been successful for several years.

Material:
Steel, surface hardened
Surface hardness: 60 + 4 HRC, Hardness penetration 1 ± 0,2 mm

Execution:
precision ground

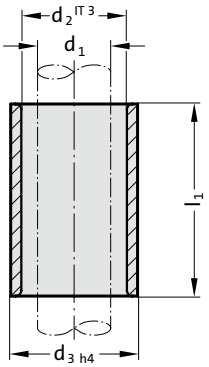
Note:
For use with ball cage 206.41. and guide bushes 2062.44.012. or 2061.44.015.

202.61. Guide pillar with collar

Order No	d_1	d_2	d_3	l	l_1	l_2
202.61.012.041.074	12	15.9	12.02	115	41	74
202.61.015.044.080	15	23.5	15.02	124	44	80

GUIDE BUSH FOR BALL BEARING, FOR HIGHEST STROKING SPEED
GUIDE BUSH FOR BALL BEARING, ISO 9448-3

2062.44.012.



2062.44.012. **Guide bush for ball bearing, for highest stroking speed**

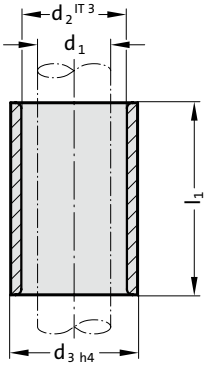
Order No	d_1	d_2	d_3	l_1	For ball ∅
2062.44.012.016.032	12	16	20	32	2
2062.44.012.017.032	12	17	20	32	2.5

Material:
Tool steel, hardened 62 ± 2 HRC

Execution:
Bearing surfaces honed,
outside diameter precision ground.

Note:
For use with ball cage 206.41. and guide pillar 202.61.

2061.44.015.



2061.44. **Guide bush for ball bearing, ISO 9448-3**

Order No	d_1	d_2	d_3	l_1
2061.44.015.023.10	15	21	28	23
2061.44.015.023.20	15	21	28	23
2061.44.015.030.10	15	21	28	30
2061.44.015.030.20	15	21	28	30
2061.44.015.037.10	15	21	28	37
2061.44.015.037.20	15	21	28	37
2061.44.015.047.10	15	21	28	47
2061.44.015.047.20	15	21	28	47
2061.44.015.060.10	15	21	28	60
2061.44.015.060.20	15	21	28	60

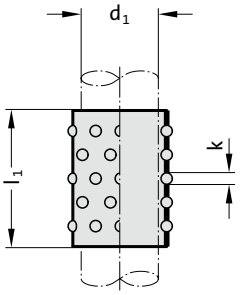
Material:
Tool steel, hardened 62 ± 2 HRC

Execution:
Bearing surfaces honed,
outside diameter precision ground.

Note:
For use with ball cage 206.41. and guide pillar 202.61.
Tolerance range:
yellow = .10
green = .20

BALL CAGE, PLASTIC, FOR HIGHEST STROKING SPEED

206.41.



Description:
Owing to its much lower inertia, the plastic ball cage of particular advantage in die sets operating at stroking speed of 1000 SPM and more.
The phenomenon of ball-drag at the reversal point of cage travel, set up by the cage inertia, no longer occurs. The negative influence of this drag is eliminated – and so are the wear symptoms associated with it.
On small modular die sets the combination plastic ball cage 206.41./ collared guide pillar 202.61. has indeed been successful for several years.

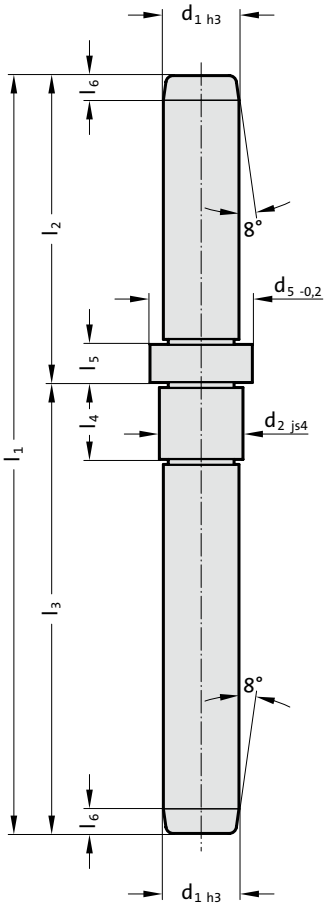
Material:
Cage: Plastic tube (Polyacetal - POM)
Balls: Steel hardened DIN 5401- Quality Class 1

206.41. Ball cage, plastic, for highest stroking speed

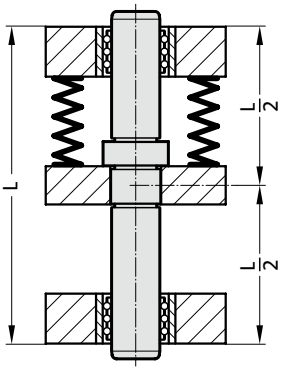
Order No	d_1	l_1	k
206.41.012.020.021	12	21	2
206.41.012.020.042	12	42	2
206.41.012.025.021	12	21	2.5
206.41.012.025.042	12	42	2.5
206.41.015.030.045	15	45	3
206.41.015.030.056	15	56	3
206.41.015.030.063	15	63	3
206.41.015.030.071	15	71	3

DEMOUNTABLE GUIDE PILLAR WITH CENTRE FIXING

2020.63.



Mounting example



Material:
Steel, surface hardened
Surface hardness: 62 + 2 HRC, Hardness penetration 1 ± 0,2 mm

Execution:
precision ground

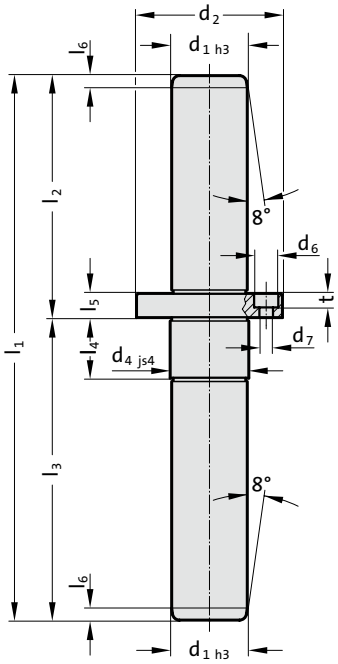
Note:
For press fit into register bore N5.
☞Bending equation see at the beginning of chapter D.
☞Matching guide combinations, see selection matrix at the beginning of chapter D.

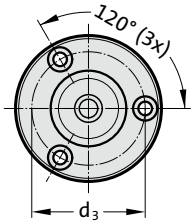
2020.63. Demountable guide pillar with centre fixing

Order No	d_1	d_2	d_5	l_1	l_2	l_3	l_4	l_5	l_6
2020.63.012.042.074	12	13	15.9	116	42	74	12.5	5	3
2020.63.016.064.094	16	18	21.9	158	64	94	16	8	5

DEMOUNTABLE GUIDE PILLAR WITH CENTRE FIXING

2020.62.



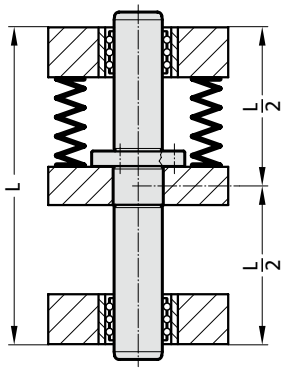


Material:
Steel, (Core strength: ≥ 900 N/mm²)
surface hardened
Surface hardness: 60 + 3 HRC, Hardness penetration 2 + 1,6 mm

Execution:
precision ground

Note:
Use socket cap screws DIN EN ISO 4762 12.9.
☞Bearing clearance / Preloading see pairing classification at the beginning of chapter D.
☞Matching guide combinations, see selection matrix at the beginning of chapter D.
☞Bending equation see at the beginning of chapter D.
ø 12 only available in tolerance range yellow = .10
Tolerance range:
yellow = .10
green = .20
red = .30

Mounting example



DEMOUNTABLE GUIDE PILLAR WITH CENTRE FIXING

2020.62. Demountable guide pillar with centre fixing

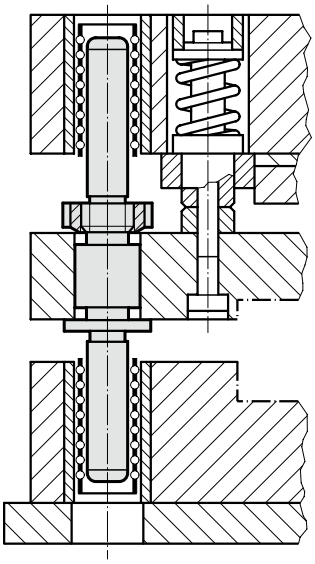
d_1	d_2	d_3	d_4	d_6	d_7	t	l_1	l_2	l_3	l_4	l_5	l_6
12	28	20	13	6	3.4	3.4	90	40	50	12	6	3
12	28	20	13	6	3.4	3.4	100	40	60	12	6	3
12	28	20	13	6	3.4	3.4	110	50	60	12	6	3
12	28	20	13	6	3.4	3.4	120	50	70	12	6	3
12	28	20	13	6	3.4	3.4	130	60	70	12	6	3
12	28	20	13	6	3.4	3.4	140	70	70	12	6	3
16	38	28	18	8	4.5	4.6	140	60	80	16	8	4
16	38	28	18	8	4.5	4.6	150	60	90	16	8	4
16	38	28	18	8	4.5	4.6	160	70	90	16	8	4
16	38	28	18	8	4.5	4.6	170	70	100	16	8	4
16	38	28	18	8	4.5	4.6	180	80	100	16	8	4
16	38	28	18	8	4.5	4.6	190	90	100	16	8	4
19	42	32	22	8	4.5	4.6	160	70	90	20	8	4
19	42	32	22	8	4.5	4.6	170	70	100	20	8	4
19	42	32	22	8	4.5	4.6	180	80	100	20	8	4
19	42	32	22	8	4.5	4.6	190	80	110	20	8	4
19	42	32	22	8	4.5	4.6	200	90	110	20	8	4
19	42	32	22	8	4.5	4.6	210	100	110	20	8	4
25	48	38	26	8	4.5	4.6	180	80	100	22	8	6
25	48	38	26	8	4.5	4.6	190	80	110	22	8	6
25	48	38	26	8	4.5	4.6	200	90	110	22	8	6
25	48	38	26	8	4.5	4.6	210	90	120	22	8	6
25	48	38	26	8	4.5	4.6	220	100	120	22	8	6
25	48	38	26	8	4.5	4.6	230	110	120	22	8	6
32	60	48	34	10	5.5	5.7	180	80	100	25	10	7
32	60	48	34	10	5.5	5.7	190	80	110	25	10	7
32	60	48	34	10	5.5	5.7	200	90	110	25	10	7
32	60	48	34	10	5.5	5.7	210	90	120	25	10	7
32	60	48	34	10	5.5	5.7	220	100	120	25	10	7
32	60	48	34	10	5.5	5.7	230	100	130	25	10	7
32	60	48	34	10	5.5	5.7	240	110	130	25	10	7
32	60	48	34	10	5.5	5.7	250	110	140	25	10	7
40	70	56	42	11	6.6	6.8	200	90	110	27	12	7
40	70	56	42	11	6.6	6.8	210	90	120	27	12	7
40	70	56	42	11	6.6	6.8	220	100	120	27	12	7
40	70	56	42	11	6.6	6.8	230	100	130	27	12	7
40	70	56	42	11	6.6	6.8	240	110	130	27	12	7
40	70	56	42	11	6.6	6.8	250	110	140	27	12	7
40	70	56	42	11	6.6	6.8	260	120	140	27	12	7

Ordering Code (example):

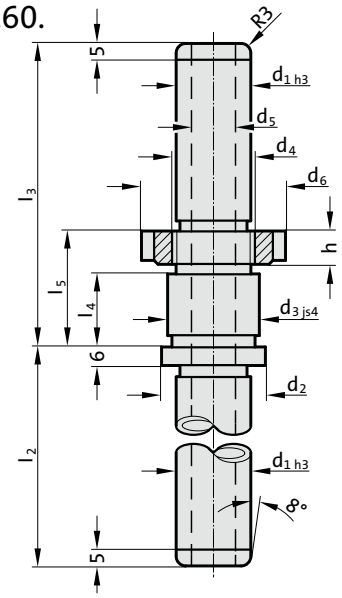
Demountable guide pillar with centre fixing		=	2020.62.
Diameter of conduit d_1	25 mm	=	025.
Length with bush (short) l_2	80 mm	=	080.
Length to bush (long) l_3	110 mm	=	110.
Classification TOL	yellow	=	10
Order No		=	2020.62. 025. 080. 110. 10

DEMOUNTABLE GUIDE PILLAR WITH CENTRE FIXING AND RING NUT

Mounting example



202.60.



Material:
Steel, (Core strength: ≥ 900 N/mm²) surface hardened
Surface hardness: 60 + 3 HRC, Hardness penetration ≥ 1,8 mm

Execution:
precision ground

Note:
☞ Bearing clearance / Preloading see pairing classification at the beginning of chapter D.
☞ Matching guide combinations, see selection matrix at the beginning of chapter D.
☞ Bending equation see at the beginning of chapter D.
☞ Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.
Tolerance range:
yellow = .10
green = .20
red = .30

202.60. Demountable guide pillar with centre fixing and ring nut

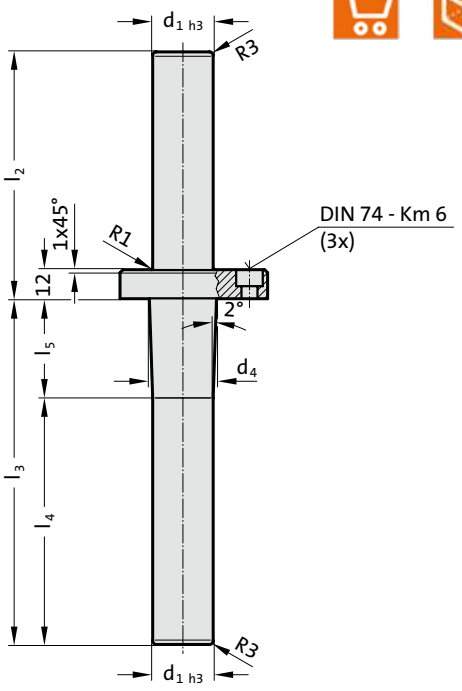
d_1	19	25	32	40
d_2	32	38	46	56
d_3	25	30	36	46
d_4	M22x1,5	M28x1,5	M35x1,5	M45x1,5
d_5	8	12	20	28
d_6	40	50	55	68
h	9	10	11	12
l_2	80	80	100	100
l_3	120	120	140	140
l_4	29	29	34	34
l_5	45	45	50	50

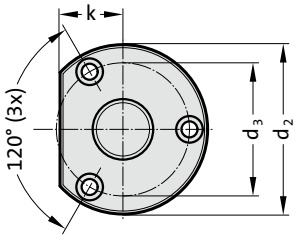
Ordering Code (example):

Demountable guide pillar with centre fixing and ring nut		=	202.60.
Diameter of conduit d_1	32 mm	=	032.
Length with bush l_2	100 mm	=	100.
Length to bush l_3	140 mm	=	140.
Classification TOL	yellow	=	10
Order No		=	202.60. 032. 100. 140. 10

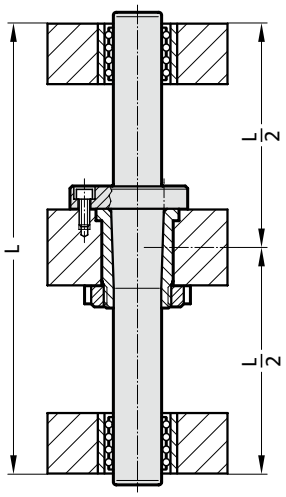
DEMOUNTABLE GUIDE PILLAR WITH CONICAL CENTRE FIXING

2020.64.





Mounting example



Material:
Steel, hardened 62 ± 2 HRC

Execution:
precision ground

Note:
Matching retaining bush 2021.64.
Use socket cap screws DIN EN ISO 4762 12.9.
☞Bearing clearance / Preloading see pairing classification at the beginning of chapter D.
☞Matching guide combinations, see selection matrix at the beginning of chapter D.
☞Bending equation see at the beginning of chapter D.
Tolerance range:
yellow = .10
green = .20

2020.64. Demountable guide pillar with conical centre fixing

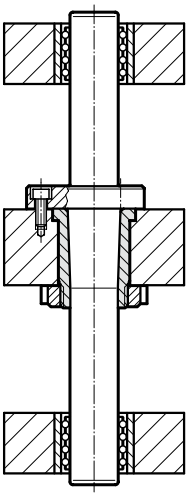
d_1	25	25	32	32	32	32	32	32
d_2	70	70	76	76	76	76	76	76
d_3	55	55	62	62	62	62	62	62
d_4	27.86	27.86	34.86	34.86	34.86	34.86	34.86	34.86
k	26	26	30	30	30	30	30	30
l_2	102	122	102	122	122	137	142	162
l_3	143	143	143	143	153	153	153	153
l_4	102	102	102	102	112	112	112	112
l_5	41	41	41	41	41	41	41	41

Ordering Code (example):

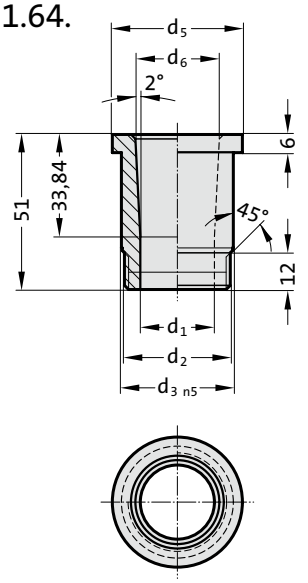
Demountable guide pillar with conical centre fixing		=	2020.64.
Diameter of conduit d_1	32 mm	=	032.
Length with bush (short) l_2	122 mm	=	122.
Length to bush (long) l_3	153 mm	=	153.
Classification TOL	yellow	=	10
Order No		=	2020.64. 032. 122. 153. 10

RETAINING BUSH FOR GUIDE PILLAR CONICAL 2020.64.

Mounting example



2021.64.



Material:

16 MnCr5

Surface hardness: 60 ± 2 HRC, Hardness penetration 0,8–1 mm

Execution:

Thread not hardenend

Fixing:

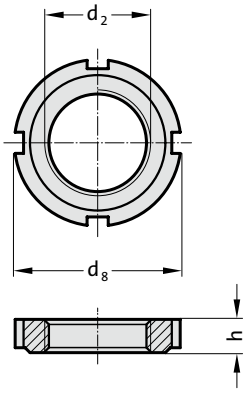
2073.48.□□15 order separately.

2021.64. Retaining bush for guide pillar conical 2020.64.

Order No	d_1	d_2	d_3	d_5	d_6
2021.64.025	25.5	M35x1,5	37	43	27.86
2021.64.032	32.5	M40x1,5	44	50	34.86

SLOTTED NUT DIN 1804

2073.48.



2073.48. **Slotted nut DIN 1804**

Order No	d_2	d_8	h
2073.48.35.15	M35x1,5	48	11
2073.48.40.15	M40x1,5	54	12

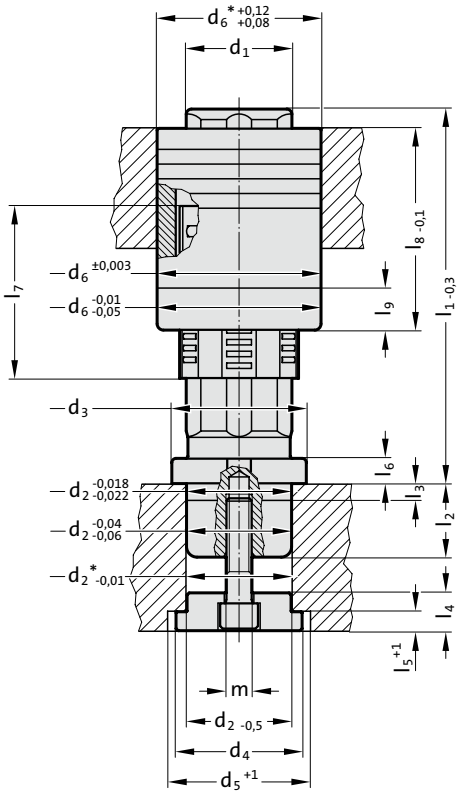
Material:
Steel, hardened

Note:
For fixing the retaining bush 2021.64.

GUIDE UNIT WITH COLLAR MILLION GUIDE

MOVIE

2024.94.



Description:
FIBRO Million Guide guide units are used wherever rigidity, robustness and a precision guide function is required.
The large supporting surface of the needle rollers ensures these properties.
For stroke speeds up to 50 m/min and temperatures up to 80°C.

Material:
Needle roller cage: Plastic
Needle rollers: Steel, hardened
Guide bush: Tool steel alloy, hardened, 60 ± 2 HRC
Guide pillar: Tool steel alloy, hardened, 60 ± 2 HRC
Disk: Steel

Execution:
Guide unit consisting of a paired guide pillar and guide bush, needle roller cage and disk for fixing the guide pillar. The fixing screw (2192.10./12.) is ordered separately as the screw required depends on the thickness of the base plate.

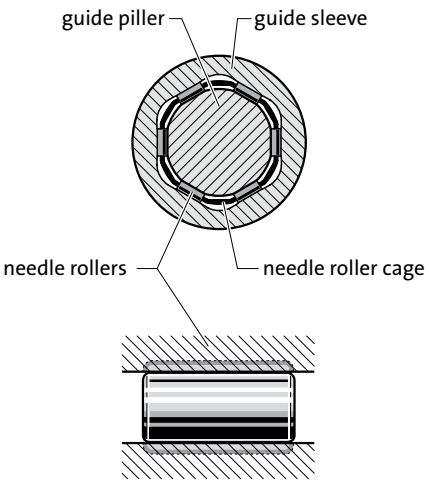
Guide pillar and bushes are executed at:
ø 16 with 4 running surfaces
ø 12, ø 20 - ø 60 with 6 running surfaces
ø 80 with 8 running surfaces

Note:
Install guide unit in accordance with the instructions.
Guide bush must be bonded.

* Mounting bore

Only the needle roller cage part is replaceable. For order number for needle roller cage spare part, see table.

Cross section of guide unit



GUIDE UNIT WITH COLLAR MILLION GUIDE

MOVIE

2024.94. Guide unit with collar MILLION GUIDE

d_1	12	16	20	25	32	40	50	60	80
d_2	12	16	20	25	32	40	50	60	80
d_3	18	24	29	35	42	54	64	74	98
d_4	16	22	26	32	40	50	60	72	105
d_5	18	24	28	34	40	50	60	72	105
d_6	23	30	37	44	54	68	78	95	120
m	M5x8	M6x10	M8x20	M8x20	M10x25	M12x30	M12x30	M14x30	M16x30
l_2	12	16	20	25	30	35	35	42	45
l_3	6	6	8	8	8	8	8	15	15
l_4	7	10	13	13	16	18	18	20	26
l_5	3	4	5	5	7	9	9	12	13
l_6	5	6	8	8	9	10	12	15	15
l_7	29.8	30	52	62	68	78	82	116	132
l_8	40	40	60	70	78	92	96	120	145
l_9	-	-	20	20	20	20	20	20	25
Order no.									
Needle roller cage	2024.94.012	2024.94.016	2024.94.020	2024.94.025	2024.94.032	2024.94.040	2024.94.050	2024.94.060	2024.94.080
l_1									
50	●								
60	●								
70	●								
80	●	●	●						
90	●	●	●						
100	●	●	●	●	●				
110	●	●	●	●	●				
120	●	●	●	●	●	●			
130		●	●	●	●	●			
140				●	●	●			
150				●	●	●	●	●	
160				●	●	●	●	●	
170					●	●	●	●	
180					●	●	●	●	●
190					●	●	●	●	●
200					●	●	●	●	●
210						●	●	●	●
220						●	●	●	●
230							●	●	●
240							●	●	●
250							●	●	●
260									●
270									●
280									●

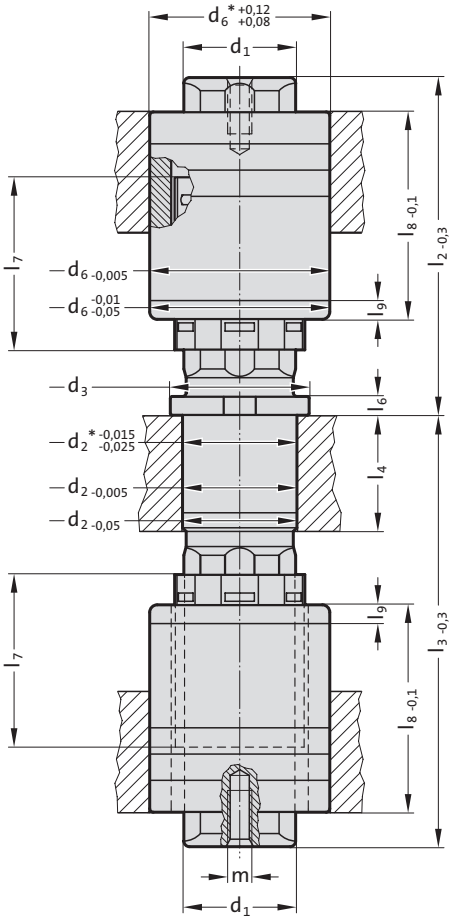
Ordering Code (example):

Guide unit with collar MILLION GUIDE		=2024.94.	
Diameter of conduit d_1	32 mm	=	032.
Guide length l_1	100 mm	=	100
Order No		=2024.94.	032. 100

GUIDE UNIT WITH CENTER FIXING MILLION GUIDE

MOVIE

2024.96.



Description:
FIBRO Million Guide guide units are used wherever rigidity, robustness and a precision guide function is required.
The large supporting surface of the needle rollers ensures these properties.
For stroke speeds up to 50 m/min and temperatures up to 80°C.

Material:
Needle roller cages: Plastic
Needle rollers: Steel, hardened
Guide bushes: Tool steel alloy, hardened, 60 ± 2 HRC
Guide pillar: Tool steel alloy, hardened, 60 ± 2 HRC
Disk: Steel

Execution:
Guide unit consisting of a paired guide pillar, guide bushes and needle roller cages.

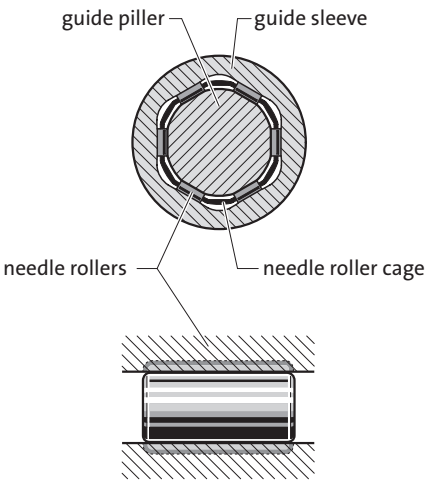
Guide pillar and bushes are executed at:
ø 16 with 4 running surfaces
ø 12, ø 20 - ø 30 with 6 running surfaces

Note:
Install guide unit in accordance with the instructions.
Guide bush must be bonded.

* Mounting bore

Only the needle roller cage part is replaceable. For order number for needle roller cage spare part, see table.

Cross section of guide unit



GUIDE UNIT WITH CENTER FIXING MILLION GUIDE

2024.96. Guide unit with center fixing MILLION GUIDE

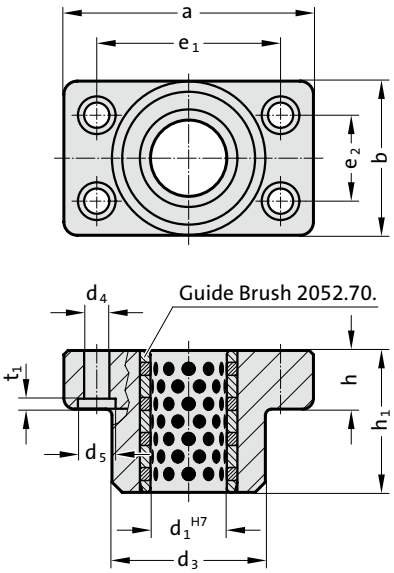
d_1	12	16	20	25	28
d_2	12.5	16.5	20.5	25.5	28.5
d_3	19	23	27	32	35
d_6	22	28	34	40	45
m	M5x8	M6x15	M8x20	M8x20	M8x20
l_4	12	16	20	25	28
l_6	4	5	5	5	5
l_7	30	30	46	56	66
l_8	30	40	50	60	65
l_9	-	-	20	20	20
Order no.	2024.94.012	2024.94.016	2024.96.020	2024.96.025	2024.96.028
Needle roller cage					
l_3	l_2				
50	40 50 60				
60	40 50 60				
70	40 50 60	40 50 60			
80		40 50 60 70	50 60 70		
90		50 60 70 80	50 60 70 80	60 70 80	70 80 90
100			60 70 80 90	60 70 80 90	70 80 90
110				70 80 90	70 80 90

Ordering Code (example):

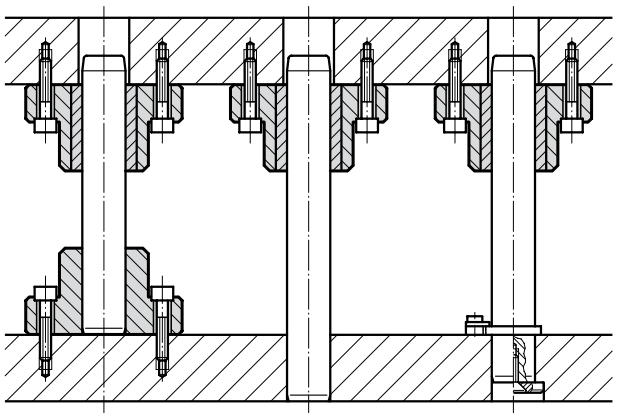
Guide unit with center fixing MILLION GUIDE		=	2024.96.
Diameter of conduit d_1	20 mm	=	020.
Length to bush l_3	80 mm	=	080.
Length with bush l_2	50 mm	=	050
Order No		=	2024.96. 020. 080. 050

GUIDE BEARING WITH SOLID LUBRICANT

2031.70.



Mounting example



Material:

Basic body: Special cast iron

Guide bush 2052.70.: Bronze with solid lubricant, oilless lubricating

Execution:

Face and top machined.

Note:

☞ Notes on sliding type guides at the beginning of chapter D.

☞ Matching guide combinations, see selection matrix at the beginning of chapter D.

2031.70. Guide bearing with solid lubricant

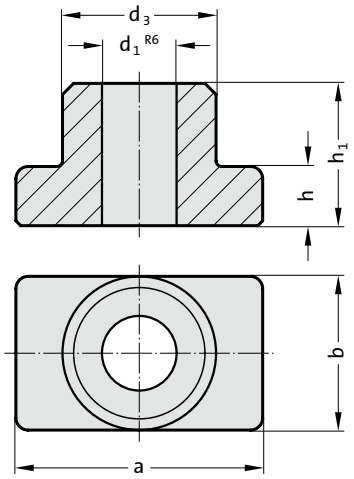
d_1	19 20	24 25	30 32	38 40	50	63	80
d_3	45	50	65	80	96	110	130
d_4	9	9	11	13.5	17.5	17.5	22
a	85	90	115	130	160	180	215
b	45	50	65	80	96	110	130
e_1	64	68	83	95	118	132	160
e_2	24	28	34	45	55	62	75
h	18	22	25	30	35	35	40
h_1	37	47	60	77	95	120	120
t_1	3	3	3	3	4	4	10

Ordering Code (example):

Guide bearing with solid lubricant		= 2031.70.	
Diameter of conduit d_1	32 mm	=	032
Order No		= 2031.70.	032

RETENTION BEARING

2031.01.

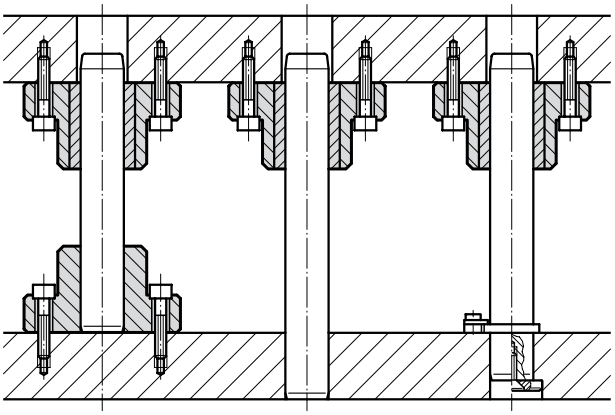


Material:
Special cast iron

Execution:
Face and top machined. Hole fine bored to d_1^{R6} fit.

Note:
Check squareness of pillars after press-fitting.

Mounting example



2031.01. Retention bearing

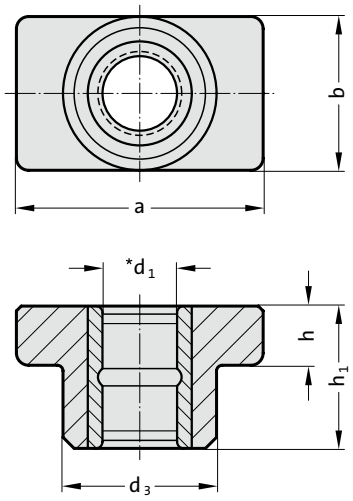
d_1	15 16	19 20	24 25	30 32	38 40	48 50	60 63	80
d_3	35	45	50	65	80	96	110	130
a	70	85	90	115	130	160	180	215
b	35	45	50	65	80	96	110	130
h	18	18	22	25	30	35	35	40
h_1	30	37	47	60	77	95	120	120

Ordering Code (example):

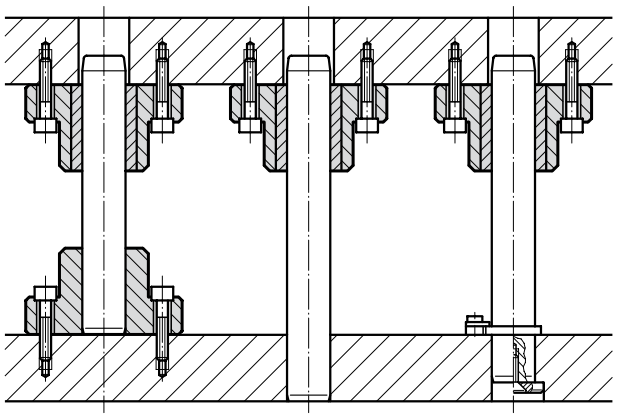
Retention bearing		=	2031.01.
Diameter of conduit d_1	32 mm	=	032
Order No		=	2031.01. 032

GUIDE BEARING, SINTERED GUIDE

2031.31.



Mounting example



Material:

Basic body: Special cast iron

Guide bush 2051.32.: Sintered ferrite of high purity, carbonitrided, long-term lubrication

Execution:

Face and top machined. Bores honed.

Note:

☞ Notes on sliding type guides at the beginning of chapter D.

☞ Bearing clearance see pairing classification at the beginning of chapter D.

☞ Matching guide combinations, see selection matrix at the beginning of chapter D.

Tolerance range:

yellow = .10

green = .20

red = .30

2031.31. Guide bearing, sintered guide

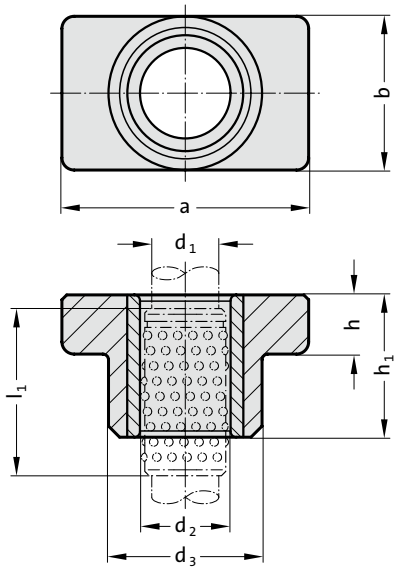
d_1	15 16	19 20	24 25	30 32	38 40	48 50	60 63	80
d_3	35	45	50	65	80	96	110	130
a	70	85	90	115	130	160	180	215
b	35	45	50	65	80	96	110	130
h	18	18	22	25	30	35	35	40
h_1	30	37	47	60	77	95	120	120

Ordering Code (example):

Guide bearing, sintered guide		=	2031.31.
Diameter of conduit d_1	32 mm	=	032.
Classification TOL	yellow	=	10
Order No		=	2031.31. 032. 10

GUIDE BEARING FOR BALL BEARING GUIDE

2031.41.

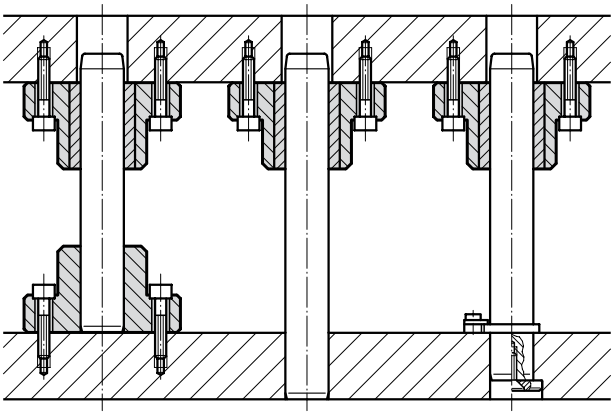


Material:
Basic body: Special cast iron
Guide bush 2061.44.: Tool steel, Hardness: 62 ± 2 HRC

Execution:
Face and top machined. Bores honed.

Note:
☞ Notes on ball bearing type guides at the beginning of chapter D.
☞ Preloading see pairing classification at the beginning of chapter D
☞ Matching guide combinations, see selection matrix at the beginning of chapter D.
Tolerance range:
yellow = .10
green = .20
red = .30

Mounting example



2031.41. Guide bearing for ball bearing guide

d_1	15 16	19 20	24 25	30 32	38 40	48 50	60 63
d_2	21 22	25 26	30 31	38 40	46 48	56 58	68 71
d_3	35	45	50	65	80	96	110
a	70	85	90	115	130	160	180
b	35	45	50	65	80	96	110
h	18	18	22	25	30	35	35
h_1	30	37	47	60	77	95	120
l_1	44	44	56	71	95	120	140
l*	45	45	56	71	95	120	140

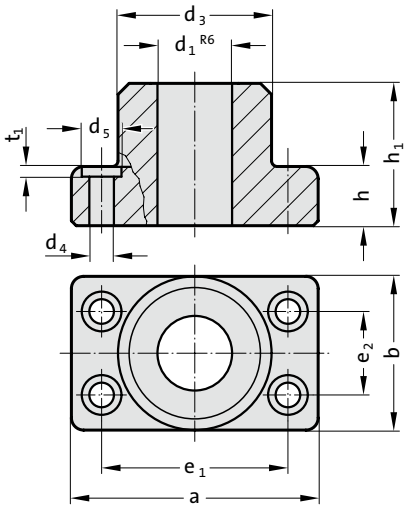
*l = Nominal ordering length of ball cage - prefered length

Ordering Code (example):

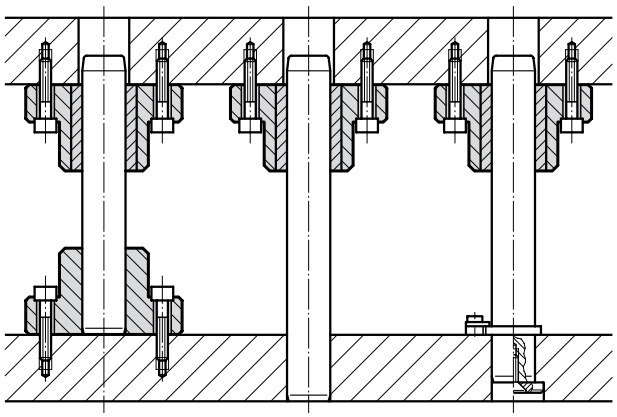
Guide bearing for ball bearing guide		=	2031.41.
Diameter of conduit d_1	32 mm	=	032.
Classification TOL	yellow	=	10
Order No		=	2031.41. 032. 10

RETENTION BEARING WITH SCREW HOLES

2031.02.



Mounting example



Material:
Special cast iron

Execution:
Face and top machined. Hole fine bored to d_1^{R6} fit.

Note:
Check squareness of pillars after press-fitting.

2031.02. Retention bearing with screw holes

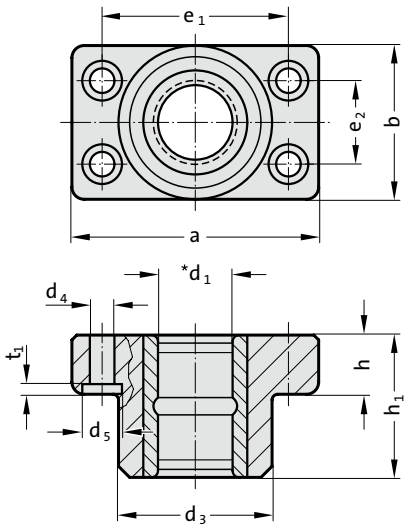
d_1	15 16	19 20	24 25	30 32	38 40	48 50	60 63	80
d_3	35	45	50	65	80	96	110	130
d_4	6.6	9	9	11	14	18	18	22
d_5	11	15	15	18	20	26	26	33
t_1	3	3	3	3	3	4	4	4
a	70	85	90	115	130	160	180	215
b	35	45	50	65	80	96	110	130
e_1	53	64	68	83	95	118	132	160
e_2	19	24	28	34	45	55	62	75
h	18	18	22	25	30	35	35	40
h_1	30	37	47	60	77	95	120	120

Ordering Code (example):

Retention bearing with screw holes		=	2031.02.
Diameter of conduit d_1	32 mm	=	032
Order No		=	2031.02. 032

GUIDE BEARING WITH SCREW HOLES, SINTERED GUIDE

2031.34.

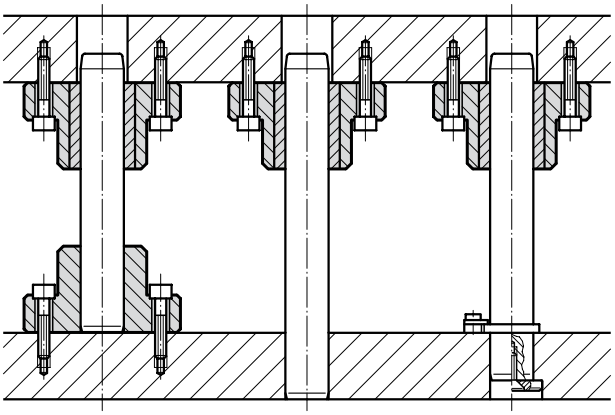


Material:
Basic body: Special cast iron
Guide bush 2051.32.: Sintered ferrite of high purity, carbonitrided, long-term lubrication

Execution:
Face and top machined. Bores honed.

Note:
☞ Notes on sliding type guides at the beginning of chapter D.
☞ Bearing clearance see pairing classification at the beginning of chapter D.
☞ Matching guide combinations, see selection matrix at the beginning of chapter D.
Tolerance range:
yellow = .10
green = .20
red = .30

Mounting example



2031.34. Guide bearing with screw holes, sintered guide

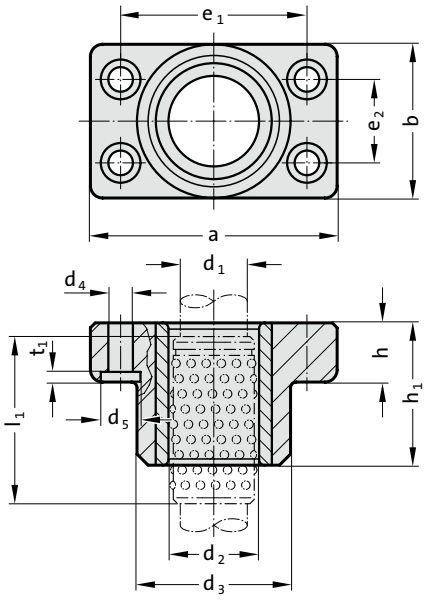
d_1	15 16	19 20	24 25	30 32	38 40	48 50	60 63	80
d_3	35	45	50	65	80	96	110	130
d_4	6.6	9	9	11	14	18	18	22
d_5	11	15	15	18	20	26	26	33
t_1	3	3	3	3	3	4	4	4
a	70	85	90	115	130	160	180	215
b	35	45	50	65	80	96	110	130
e_1	53	64	68	83	95	118	132	160
e_2	19	24	28	34	45	55	62	75
h	18	18	22	25	30	35	35	40
h_1	30	37	47	60	77	95	120	120

Ordering Code (example):

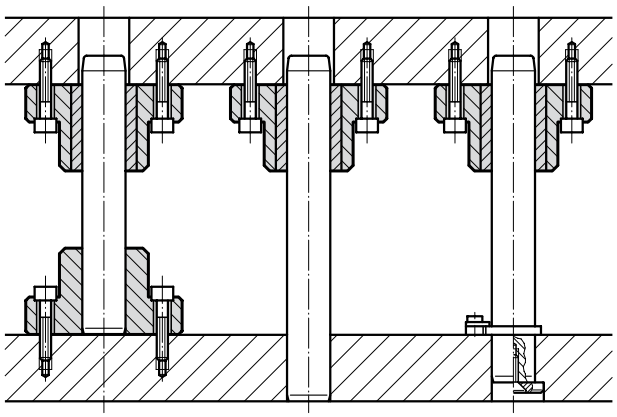
Guide bearing with screw holes, sintered guide		=	2031.34.
Diameter of conduit d_1	32 mm	=	032.
Classification TOL	yellow	=	10
Order No		=	2031.34. 032. 10

GUIDE BEARING WITH SCREW HOLES, FOR BALL BEARING GUIDE

2031.42.



Mounting example



Material:

Basic body: Special cast iron

Guide bush 2061.44.: Tool steel, Hardness: 62 ± 2 HRC

Execution:

Face and top machined. Bores honed.

Note:

☞ Notes on ball bearing type guides at the beginning of chapter D.

☞ Preloading see pairing classification at the beginning of chapter D

☞ Matching guide combinations, see selection matrix at the beginning of chapter D.

Tolerance range:

yellow = .10

green = .20

red = .30

2031.42. Guide bearing with screw holes, for ball bearing guide

d_1	15 16	19 20	24 25	30 32	38 40	48 50	60 63
d_2	21 22	25 26	30 31	38 40	46 48	56 58	68 71
d_3	35	45	50	65	80	96	110
d_4	6.6	9	9	11	14	18	18
d_5	11	15	15	18	20	26	26
t_1	3	3	3	3	3	4	4
a	70	85	90	115	130	160	180
b	35	45	50	65	80	96	110
e_1	53	64	68	83	95	118	132
e_2	19	24	28	34	45	55	62
h	18	18	22	25	30	35	35
h_1	30	37	47	60	77	95	120
l_1	44	44	56	70	95	120	140
l*	45	45	56	71	95	120	140

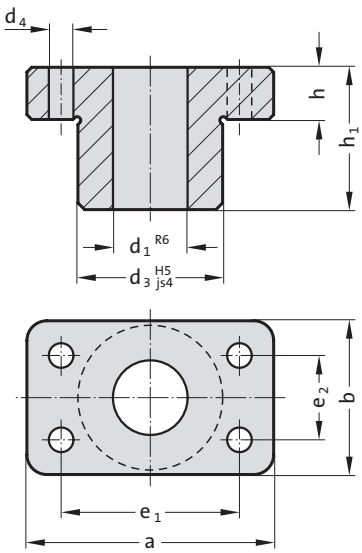
*l = Nominal ordering length of ball cage - prefered length

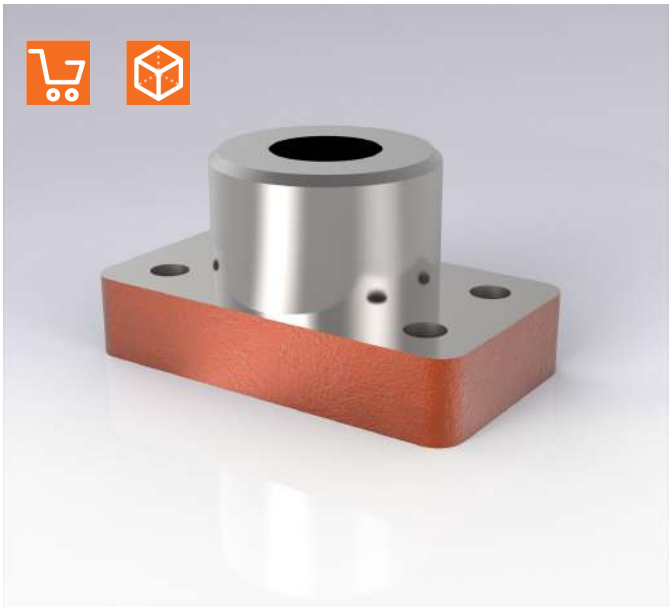
Ordering Code (example):

Guide bearing with screw holes, for ball bearing guide		=	2031.42.
Diameter of conduit d_1	32 mm	=	032.
Classification TOL	yellow	=	10
Order No		=	2031.42. 032. 10

RETENTION BEARING, LOW BUILD HEIGHT

2031.04.



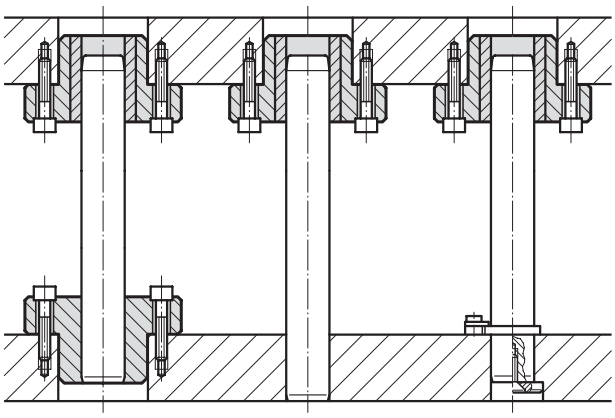


Material:
Special cast iron

Execution:
Both faces machined to dims. h; O. D. d_3 turned.
Hole fine bored to d_1^{R6} - fit.

Note:
Check squareness of pillars after press-fitting.

Mounting example



2031.04. Retention bearing, low build height

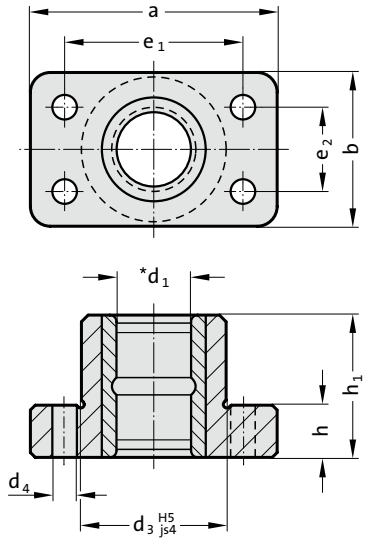
d_1	15 16	19 20	24 25	30 32	38 40	48 50	60 63	80
d_3	32	42	47	62	77	93	107	127
d_4	7	9	9	11	14	18	18	22
a	70	85	90	115	130	160	180	215
b	35	45	50	65	80	96	110	130
e_1	53	64	68	83	95	118	132	160
e_2	19	24	28	34	45	55	62	75
h	16	16	20	23	28	33	33	38
h_1	30	37	47	60	77	95	120	120

Ordering Code (example):

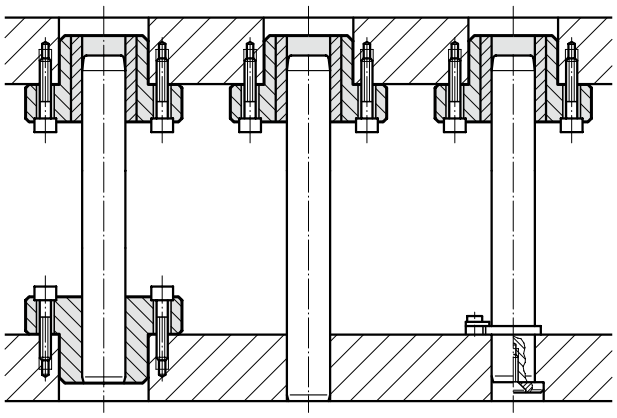
Retention bearing, low build height		= 2031.04.	
Diameter of conduit d_1	32 mm	=	032
Order No		= 2031.04.	032

GUIDE BEARING, LOW BUILD HEIGHT, SINTERED GUIDE

2031.38.



Mounting example



Material:

Basic body: Special cast iron

Guide bush 2051.32.: Sintered ferrite of high purity, carbonitrided, long-term lubrication

Execution:

Both faces machined to dims. h; O. D. d_3 turned.

Bores honed.

Note:

☞ Notes on sliding type guides at the beginning of chapter D.

☞ Bearing clearance see pairing classification at the beginning of chapter D.

☞ Matching guide combinations, see selection matrix at the beginning of chapter D.

Tolerance range:

yellow = .10

green = .20

red = .30

2031.38. Guide bearing, low build height, sintered guide

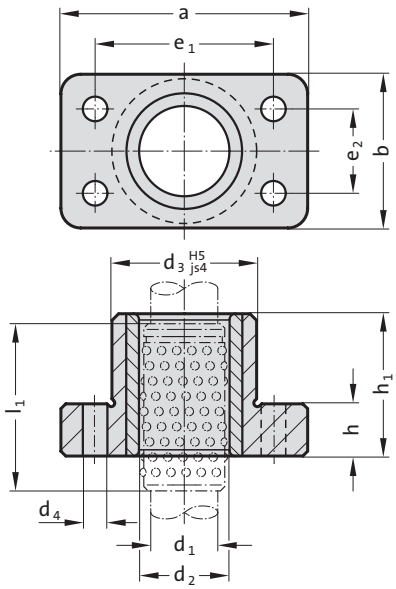
d_1	15 16	19 20	24 25	30 32	38 40	48 50	60 63	80
d_3	32	42	47	62	77	93	107	127
d_4	7	9	9	11	14	18	18	22
a	70	85	90	115	130	160	180	215
b	35	45	50	65	80	96	110	130
e_1	53	64	68	83	95	118	132	160
e_2	19	24	28	34	45	55	62	75
h	16	16	20	23	28	33	33	38
h_1	30	37	47	60	77	95	120	120

Ordering Code (example):

Guide bearing, low build height, sintered guide		=	2031.38.
Diameter of conduit d_1	32 mm	=	032.
Classification TOL	yellow	=	10
Order No		=	2031.38. 032. 10

GUIDE BEARING LOW BUILD HEIGHT, FOR BALL BEARING GUIDE

2031.44.

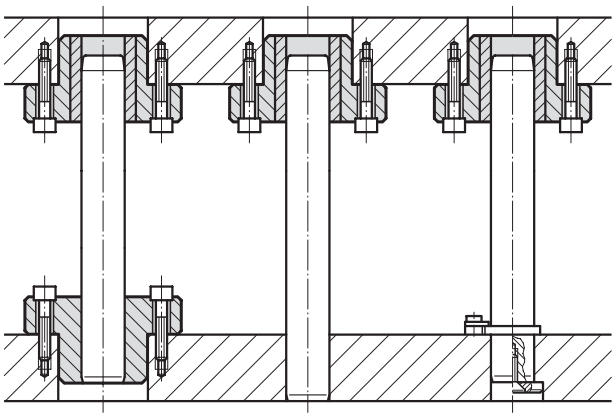


Material:
Basic body: Special cast iron
Guide bush 2061.44.: Tool steel, Hardness: 62 ± 2 HRC

Execution:
Both faces machined to dims. h; O. D. d_3 turned.
Bores honed.

Note:
☞ Notes on ball bearing type guides at the beginning of chapter D.
☞ Preloading see pairing classification at the beginning of chapter D
☞ Matching guide combinations, see selection matrix at the beginning of chapter D.
Tolerance range:
yellow = .10
green = .20
red = .30

Mounting example



2031.44. Guide bearing low build height, for ball bearing guide

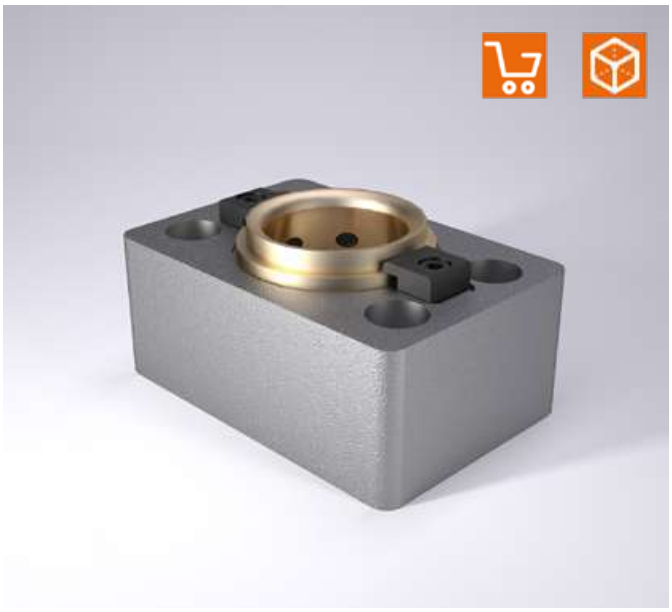
d_1	19 20	24 25	30 32	38 40	48 50
d_2	25 26	30 31	38 40	46 48	56 58
d_3	42	47	62	77	93
d_4	9	9	11	14	18
a	85	90	115	130	160
b	45	50	65	80	96
e_1	64	68	83	95	118
e_2	24	28	34	45	55
h	16	20	23	28	33
h_1	37	47	60	77	95
l_1	44	56	70	95	120
l*	45	56	71	95	120

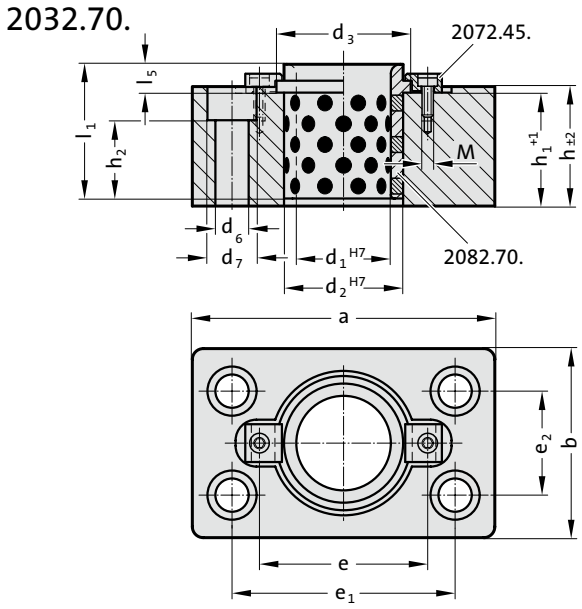
*l = Nominal ordering length of ball cage - prefered length

Ordering Code (example):

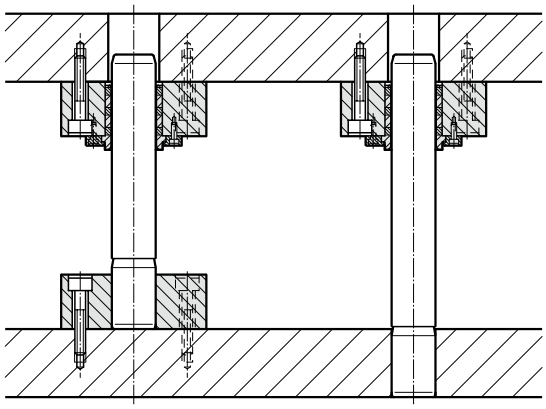
Guide bearing low build height, for ball bearing guide		=	2031.44.
Diameter of conduit d_1	32 mm	=	032.
Classification TOL	yellow	=	10
Order No		=	2031.44. 032. 10

GUIDE BEARING WITH HEADED GUIDE BUSH WITH SOLID LUBRICANT





Mounting example



Material:

Basic body: Steel, St 37

Guide bush 2082.70.: Bronze with solid lubricant, oilless lubricating

Execution:

Face machined.

Note:

☞ Notes on sliding type guides at the beginning of chapter D.

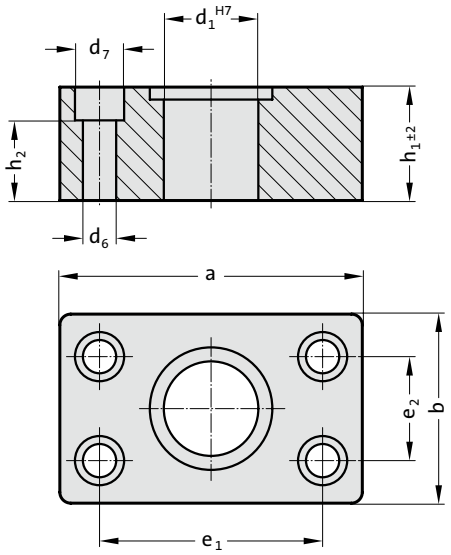
☞ Matching guide combinations, see selection matrix at the beginning of chapter D.

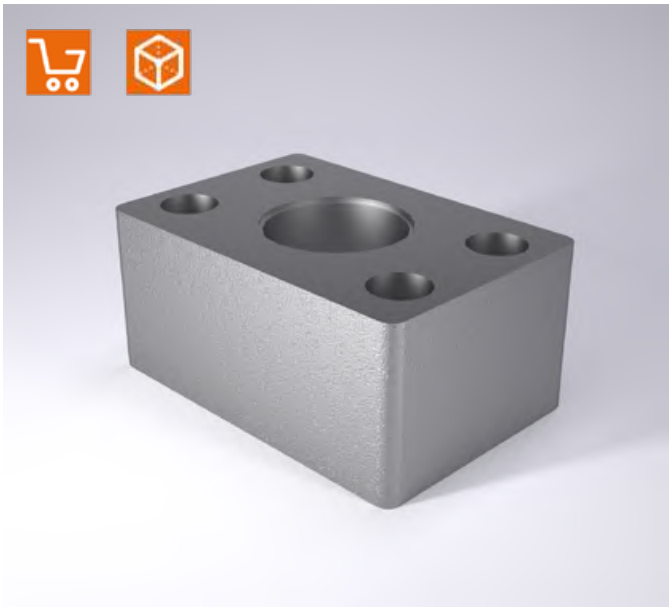
2032.70. Guide bearing with headed guide bush with solid lubricant

Order No	d_1	a	b	h	h_1	d_2	d_3	l_1	l_5	d_6	d_7	h_2	e	e_1	e_2	M
2032.70.050	50	160	100	60	57	63	71	71	17	17.5	26	40	89	118	55	M6
2032.70.063	63	180	125	70	67	80	90	80	19	17.5	26	50	123	132	62	M10
2032.70.080	80	215	145	90	87	100	112	100	22	22	33	66	143	160	75	M10
2032.70.100	100	230	170	110	107	125	140	125	21	22	33	86	168	168	110	M10
2032.70.125	125	270	205	140	137	160	180	160	30	26	40	112	203	203	142	M10
2032.70.160	160	315	250	180	177	200	220	200	32	26	40	152	243	243	170	M10

RETENTION BEARING FOR GUIDE PILLARS FOR LARGE TOOLS

2032.02.



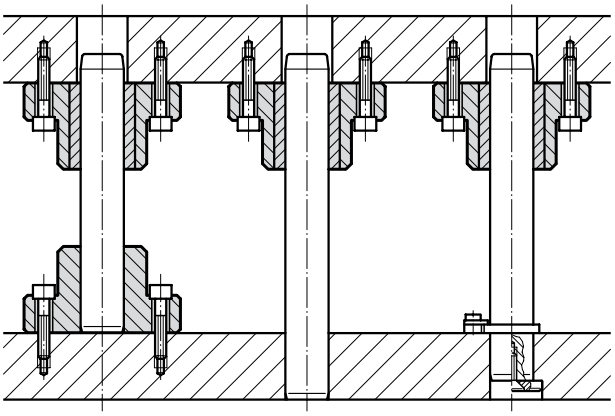


Material:
Steel, St 37

Execution:
Face machined. Hole fine bored to d_1^{H7} fit.

Note:
For guide pillars with mounting diameter r6.
Check squareness of pillars after press-fitting.

Mounting example

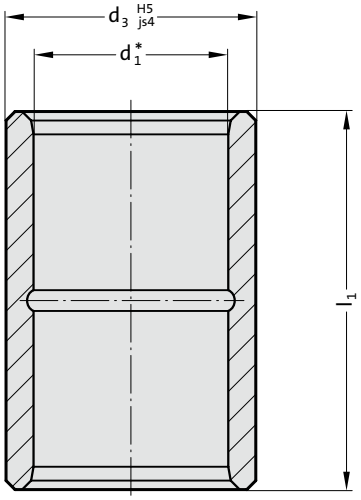


2032.02. Retention bearing for guide pillars for large tools

Order No	d_1	a	b	h_1	d_6	d_7	h_2	e_1	e_2
2032.02.050	50	160	100	70	17.5	26	40	118	55
2032.02.063	63	180	125	80	17.5	26	50	132	62
2032.02.080	80	215	145	100	22	33	66	160	75
2032.02.100	100	230	170	125	22	33	86	168	110
2032.02.125	125	270	205	140	26	40	112	203	142
2032.02.160	160	315	250	180	26	40	152	243	170

GUIDE BUSH, SINTERED FERRITE CARBONITRIDED WITH LONG-TERM LUBRICATION, ISO 9448-2

2051.32.



Material:
Sintered ferrite of high purity, carbonitrided, long-term lubrication

Execution:
Bearing surfaces and outside diameter precision ground.

Slip-Fit Bonding:
The position of the bearing is given by push fit holes tolerance H5. The adhesive (order no. 281.648) provides optimum push retention whilst offering the following **advantages:**
- high accuracy and stiffness
- no problems to find position when changing bushings

We do not recommend to press fit for the same reasons mentioned above.

Note:
☞Notes on sliding type guides at the beginning of chapter D.
*☞Bearing clearance see pairing classification at the beginning of chapter D.
☞Matching guide combinations, see selection matrix at the beginning of chapter D.
☞Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.
ø 8 - ø 12 not available in tolerance range red = .30.
Tolerance range:
yellow = .10; green = .20; red = .30

2051.32. Guide bush, sintered ferrite carbonitrided with long-term lubrication, ISO 9448-2

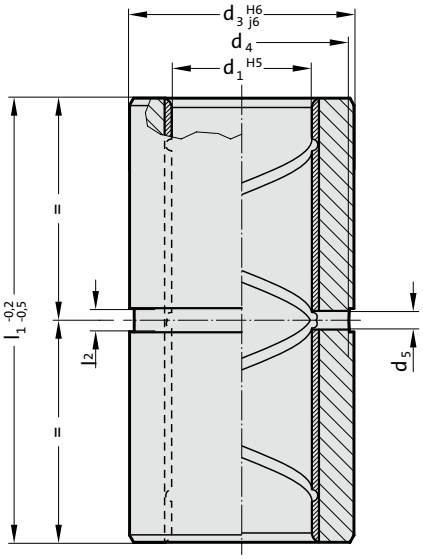
d_1	8	11 12	15 16	19 20	24 25	30 32	38 40	48 50	60 63	80
d_3	13.7	22	28	32	40	48	58	70	85	95.7
l_1										
15	●									
23		●	●	●	●					
30		●	●	●	●	●	●			
37		●	●	●	●	●	●	●		
47			●	●	●	●	●	●		
60			●	●	●	●	●	●	●	●
77				●	●	●	●	●	●	
95						●	●	●	●	
110										●
120							●	●	●	●

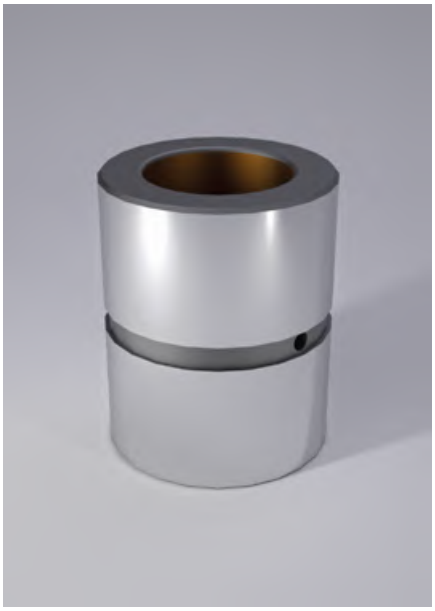
Ordering Code (example):

Guide bush, sintered ferrite carbonitrided with long-term lubrication, ISO 9448-2		=	2051.32.
Diameter of conduit d_1	30 mm	=	030.
Length l_1	30 mm	=	030.
Classification TOL	yellow	=	10
Order No		=	2051.32. 030. 030. 10

GUIDE BUSH ECO-LINE, BRONZEPLATED, ISO 9448-2

2051.92.





Material:
Steel, d_3 induction hardened

Execution:
Bronze coated internal bore.
Outside diameter fine-ground.

Slip-Fit Bonding:
The position of the bearing is given by push fit holes tolerance H5. The adhesive (order no. 281.648) provides optimum push retention whilst offering the following **advantages:**
- high accuracy and stiffness
- no problems to find position when changing bushings

We do not recommend to press fit for the same reasons mentioned above.

Note:
☞ Notes on sliding type guides at the beginning of chapter D.
☞ Matching guide combinations, see selection matrix at the beginning of chapter D.
☞ Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.

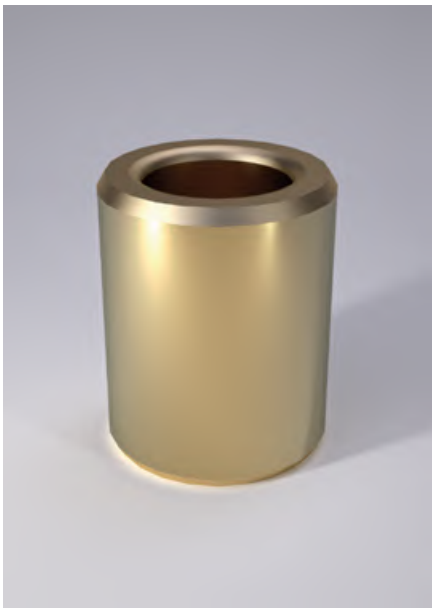
2051.92. Guide bush ECO-LINE, bronzeplated, ISO 9448-2

d_1	15 16	19 20	24 25	30 32	38 40	48 50	60 63	80
d_3	28	32	40	48	58	70	85	105
d_4	26	30	38	46	56	67	82	101
d_5	4	4	4	4	4	5	5	8
l_2	5	5	5	5	5	6	6	9
l_1								
23	●	●	●					
30	●	●	●	●	●			
37	●	●	●	●	●	●		
47	●	●	●	●	●	●		
60	●	●	●	●	●	●	●	
77		●	●	●	●	●	●	
95				●	●	●	●	
120					●	●	●	●
135								●

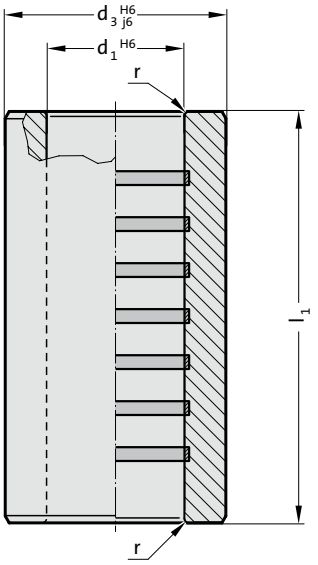
Ordering Code (example):

Guide bush ECO-LINE, bronzeplated, ISO 9448-2		=	2051.92.
Diameter of conduit d_1	32 mm	=	032.
Length l_1	30 mm	=	030
Order No		=	2051.92. 032. 030

GUIDE BUSH ECO-LINE, BRONZE WITH SOLID LUBRICATION RINGS, ISO 9448-2



2051.72.



Material:
Bronze with solid lubricant, oilless lubricating

Execution:
Contact surface with solid lubricant rings.
Outside diameter precision ground.

Slip-Fit Bonding:
The position of the bearing is given by push fit holes tolerance H5. The adhesive (order no. 281.648) provides optimum push retention whilst offering the following **advantages:**
- high accuracy and stiffness
- no problems to find position when changing bushings

We do not recommend to press fit for the same reasons mentioned above.

Note:
☞ Notes on sliding type guides at the beginning of chapter D.
☞ Matching guide combinations, see selection matrix at the beginning of chapter D.
☞ Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.

2051.72. Guide bush ECO-LINE, Bronze with solid lubrication rings, ISO 9448-2

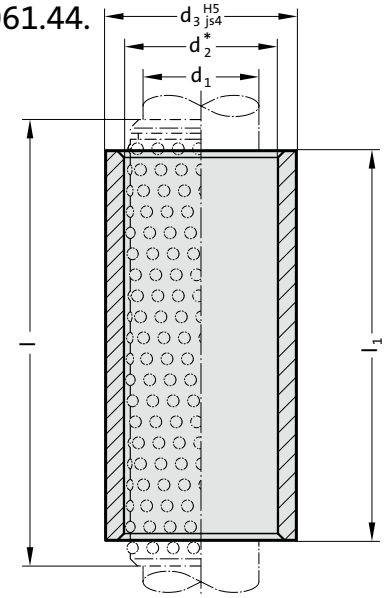
d_1	15 16	19 20	24 25	30 32	38 40	48 50	60 63	80
d_3	28	32	40	48	58	70	85	105
r	2	2	2.5	2.5	3	3	3.5	4
l_1								
23	●	●	●					
30	●	●	●	●	●			
37	●	●	●	●	●	●		
47	●	●	●	●	●	●		
60		●	●	●	●	●	●	
77			●	●	●	●	●	
95				●	●	●	●	
120						●	●	●
135								●

Ordering Code (example):

Guide bush ECO-LINE, Bronze with solid lubrication rings, ISO 9448-2		=	2051.72.
Diameter of conduit d_1	32 mm	=	032.
Length l_1	30 mm	=	030
Order No		=	2051.72. 032. 030

GUIDE BUSH FOR BALL BEARING, ISO 9448-3

2061.44.



Material:
Tool steel, hardened 62 ± 2 HRC

Execution:
Bearing surfaces honed,
outside diameter precision ground.

Slip-Fit Bonding:
The position of the bearing is given by push fit holes tolerance H5. The adhesive (order no. 281.648) provides optimum push retention whilst offering the following **advantages:**
- high accuracy and stiffness
- no problems to find position when changing bushings

We do not recommend to press fit for the same reasons mentioned above.

Note:
☞Notes on ball bearing type guides at the beginning of chapter D.
*☞Preloading see pairing classification at the beginning of chapter D
☞Matching guide combinations, see selection matrix at the beginning of chapter D.
☞Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.
Tolerance range:
yellow = .10
green = .20
red = .30

2061.44. Guide bush for ball bearing, ISO 9448-3

d_1	8	10	11	12	15	16	19	20	24	25	30	32	38	40	48	50	60	63	80
d_2	11	14	15	16	21	22	25	26	30	31	38	40	46	48	56	58	68	71	92
d_3	18	22	22	22	28	28	32	32	40	40	48	48	58	58	70	70	85	85	105
l_1 / l*																			
23 / 45					●	●	●	●	●	●									
23 / 39		●	●	●															
30 / 45					●	●	●	●	●	●	●	●	●	●					
30 / 39	●	●	●	●															
37 / 39		●	●	●															
37 / 45					●	●	●	●	●	●									
37 / 50											●	●	●	●	●	●			
47 / 56					●	●	●	●	●	●	●	●							
47 / 65													●	●	●	●			
60 / 80													●	●	●	●			
60 / 72					●	●	●	●	●	●									
60 / 70											●	●							
60 / 95																	●	●	
77 / 95							●	●	●	●	●	●	●	●	●	●	●	●	
95 / 120											●	●	●	●	●	●	●	●	
120 / 140													●	●	●	●	●	●	●

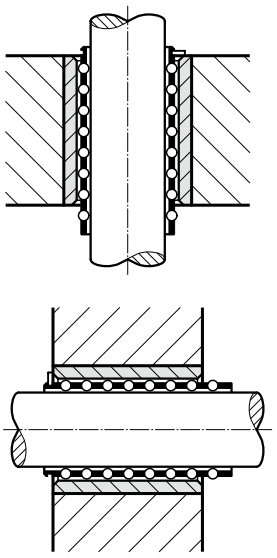
*l = Nominal ordering length of ball cage - prefered length

Ordering Code (example):

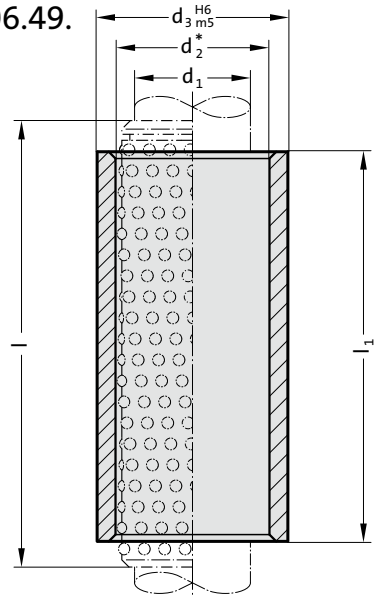
Guide bush for ball bearing, ISO 9448-3		=	2061.44.
Diameter of conduit d_1	25 mm	=	025.
Installation length l_1	23 mm	=	023.
Classification TOL	yellow	=	10
Order No		=	2061.44. 025. 023. 10

GUIDE BUSH FOR BALL BEARING, AFNOR

Mounting example



206.49.



Material:
Tool steel, hardened 62 ± 2 HRC

Execution:
Bearing surfaces honed,
outside diameter precision ground.

Slip-Fit Bonding:
The position of the bearing is given by push fit holes tolerance H6. The adhesive (order no. 281.648) provides optimum push retention whilst offering the following **advantages:**
- high accuracy and stiffness
- no problems to find position when changing bushings

We do not recommend to press fit for the same reasons mentioned above.

Note:
☞ Notes on ball bearing type guides at the beginning of chapter D.
*☞ Preloading see pairing classification at the beginning of chapter D
☞ Matching guide combinations, see selection matrix at the beginning of chapter D.
☞ Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.
Tolerance range:
yellow = .10
green = .20
red = .30

206.49. Guide bush for ball bearing, AFNOR

d_1	16	20	25	32	40	50
d_2	22	26	31	40	48	58
d_3	28	32	40	50	63	80
l_1 / l*						
35 / 45	●	●				
40 / 45	●	●	●			
45 / 56				●		
50 / 56	●	●	●			
55 / 63					●	
60 / 71	●	●	●	●		
70 / 80		●	●	●	●	●
80 / 95		●	●	●	●	●
90 / 105				●	●	●
90 / 95			●			
100 / 120				●	●	●
120 / 140					●	●

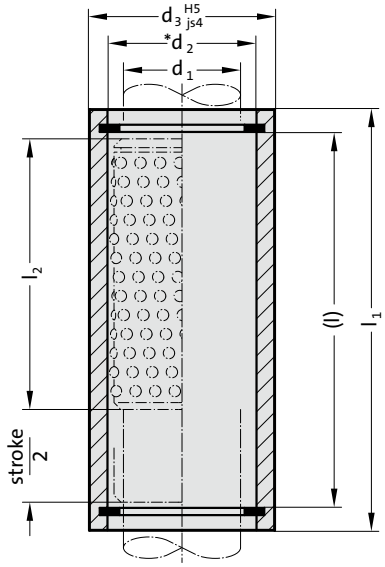
*l = Nominal ordering length of ball cage - prefered length

Ordering Code (example):

Guide bush for ball bearing, AFNOR		=	206.49.
Diameter of conduit d_1	32 mm	=	032.
Installation length l_1	45 mm	=	045.
Classification TOL	yellow	=	10
Order No		=	206.49. 032. 045. 10

GUIDE BUSH FOR BALL BEARING, WITH STROKE LIMITATION

2061.47.



Material:
Tool steel, hardened 62 ± 2 HRC

Execution:
Bearing surfaces honed,
outside diameter precision ground.

Slip-Fit Bonding:
The position of the bearing is given by push fit holes tolerance H5. The adhesive (order no. 281.648) provides optimum push retention whilst offering the following **advantages:**
- high accuracy and stiffness
- no problems to find position when changing bushings

We do not recommend to press fit for the same reasons mentioned above.

Note:
☞Notes on ball bearing type guides at the beginning of chapter D.
*☞Preloading see pairing classification at the beginning of chapter D
☞Matching guide combinations, see selection matrix at the beginning of chapter D.
☞Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.
Tolerance range:
yellow = .10
green = .20
red = .30

2061.47. Guide bush for ball bearing, with stroke limitation

d_1	15 16	19 20	24 25	30 32	38 40	48 50	60	63
d_2	21	25	30	38	46	56	68	71
d_3	28	32	40	48	58	70	85	85
(l)	55.6	72	70.8	88.2	113.2	112.2	112.2	107.2
l_1 / l_2*								
60 / 44	●							
77 / 44		●	●					
95 / 50				●				
120 / 65					●			
120 / 80						●		
120 / 95							●	●

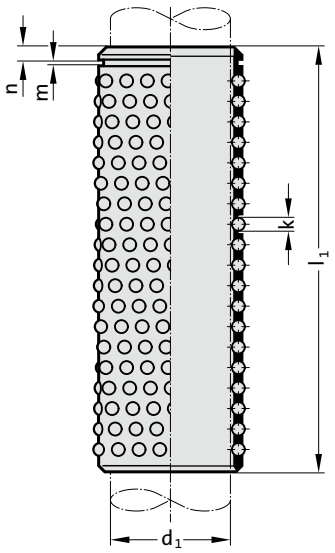
*l_2 = Manufacturing length of ball cage

Ordering Code (example):

Guide bush for ball bearing, with stroke limitation		=	2061.47.
Diameter of conduit d_1	32 mm	=	032.
Installation length l_1	95 mm	=	095.
Classification TOL	yellow	=	10
Order No		=	2061.47. 032. 095. 10

BALL CAGE WITH CIRCLIP GROOVE, BRASS

206.71.



Material:
Cage: Brass
Balls: Steel hardened (DIN 5401)

Note:
Ball cages from ø 10 has a groove for circlip to DIN 471 (206.72.).
☞ Notes on ball bearing type guides at the beginning of chapter D.
☞ Bearing life and dynamic load indexes see at the end of chapter D.
l = Nominal ordering length
l_1 = Manufacturing length

206.71. Ball cage with circlip groove, Brass

d_1	8	10 11 12	15 16	19 20	24 25	30 32	38 40	48 50	60 63	80
k	1.5	2	3	3	3	4	4	4	4	6
n		1.1	1.6	1.6	1.6	2.1	2.1	2.1	2.1	3
m		1.1	1.3	1.3	1.6	1.85	1.85	2.15	2.65	3.15
l / l_1	Total number of balls									
24 / 24		96	64	80						
28 / 27		112								
28 / 28			80	100						
31 / 30		128								
31 / 32			96	120	120					
40 / 39	136	176								
40 / 40			128	160	160	120				
45 / 44			144	180	180					
45 / 45		208				140	168			
50 / 48		224		200						
50 / 50						160	192	224		
50 / 52			176		220					
56 / 55						180	216	252		
56 / 56			192	240	240					
56 / 57		272								
63 / 64			224	280	280					
63 / 65						220	264	308		
71 / 70						240	288	336		
71 / 72			256	320	320					
80 / 80				360	360	280	336	392	448	
95 / 95						340	408	476	544	
95 / 96				440	440					
105 / 104					480					
105 / 105						380	456	532	608	
120 / 119										540
120 / 120					560	440	528	616	704	
140 / 140						520	624	728	832	648
160 / 160						600	720	840	960	
160 / 161										756
180 / 180							816	952	1,088	
180 / 182										864
200 / 200							912	1,064	1,216	
200 / 203										972
240 / 238										1,152
240 / 240							1,104	1,288	1,472	

Ordering Code (example):

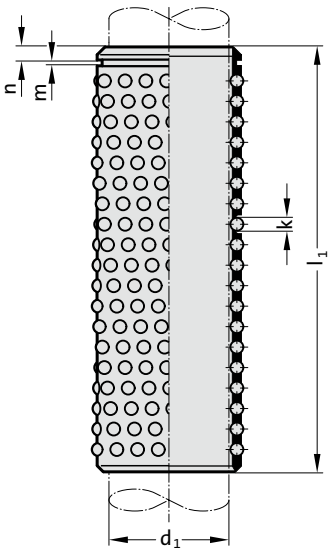
Ball cage with circlip groove, Brass		=	206.71.
Diameter of conduit d_1	30 mm	=	030.
Nominal order length for ball cage l	120 mm	=	120
Order No		=	206.71. 030. 120

BALL CAGE WITH CIRCLIP GROOVE, ALUMINIUM

Material:
Cage: Aluminium
Balls: Steel hardened (DIN 5401)

Note:
Ball cages from ø 10 has a groove for circlip to DIN 471 (206.72.).
☞ Notes on ball bearing type guides at the beginning of chapter D.
☞ Bearing life and dynamic load indexes see at the end of chapter D.
l = Nominal ordering length
l_1 = Manufacturing length

2060.61.



2060.61. Ball cage with circlip groove, Aluminium

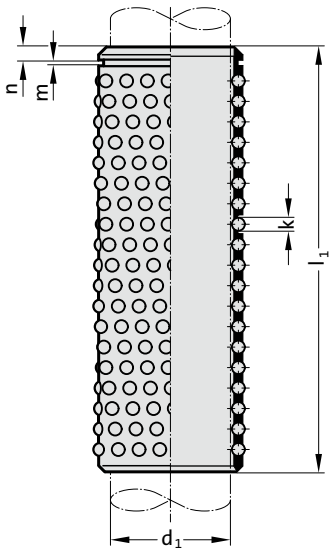
d_1	10 11 12	15	16	19	20	24 25	30 32	38 40	48 50	60 63	80
k	2	3	3	3	3	3	4	4	4	4	6
n	1.1	1.6	1.6	1.6	1.6	1.6	2.1	2.1	2.1	2.1	3
m	1.1	1.3	1.3	1.3	1.3	1.6	1.85	1.85	2.15	2.65	3.15
l / l_1	Total number of balls										
24 / 24			64		80						
28 / 28			80		100						
31 / 32				120	120	120					
40 / 39	176										
40 / 40						160	120				
45 / 44		144	144	180	180	180					
45 / 45							140	168			
50 / 50							160	192	224		
56 / 55							180	216			
56 / 56		192	192	240	240	240					
56 / 57	272										
63 / 64		224	224								
63 / 65								264	308		
71 / 70							240				
71 / 72		256	256	320	320	320					
80 / 80				360	360	360	280	336	392		
95 / 95							340	408	476	544	
95 / 96				440	440	440					
105 / 105							380	456	532	608	
120 / 119											540
120 / 120						560	440	528	616	704	
140 / 140							520	624	728	832	648
160 / 160							600	720	840	960	
160 / 161											756
180 / 180								816	952	1,088	
180 / 182											864
200 / 200								912	1,064	1,216	
200 / 203											972
240 / 238											1,152
240 / 240								1,104	1,288	1,472	

Ordering Code (example):

Ball cage with circlip groove, Aluminium		= 2060.61.	
Diameter of conduit d_1	38 mm	=	038.
Nominal order length for ball cage l	50 mm	=	050
Order No		= 2060.61.	038. 050

BALL CAGE WITH CIRCLIP GROOVE, PLASTIC

2060.41.



Material:
Cage: Plastic, POM
Balls: Steel hardened (DIN 5401)

Note:
Ball cages are implemented with one penetration hole for a lock ring DIN 471 (206.72.).
☞ Notes on ball bearing type guides at the beginning of chapter D.
☞ For lifetime and dynamic load figures, see the end of chapter D.
l = Nominal order length
l_1 = Production length

2060.41. Ball cage with circlip groove, plastic

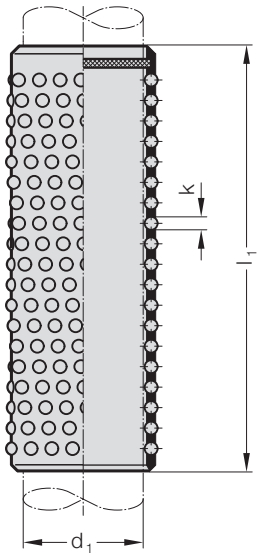
Guide diameter	12	15 16	19 20	24 25	30 32	38 40
k	2	3	3	3	4	4
n	1.1	1.6	1.6	1.6	2.1	2.1
m	1.1	1.3	1.3	1.6	1.85	1.85
l / l_1	Total number of balls					
24 / 24	84	56	64			
31 / 31	112	84	96	108	72	
45 / 45	182	126	144	162	126	140
56 / 56		168	192	216	162	180
71 / 71			256	288	216	240
95 / 95				378	306	340

Ordering Code (example):

Ball cage with circlip groove, plastic		= 2060.41.	
Diameter of conduit d_1	24 mm	= 024.	
Nominal order length for ball cage l	56 mm	=	056
Order No		= 2060.41. 024.	056

BALL CAGE WITH ASSEMBLY AID, BRASS

206.73.



Material:
Cage: Brass
Balls: Steel hardened (DIN 5401)

Note:
No assistant is needed for their assembly. These cages are equipped with a suitably positioned brake ring insert. That ensures equal cage spacing especially on die sets with multiple pillars.
☞ Notes on ball bearing type guides at the beginning of chapter D.
☞ Bearing life and dynamic load indexes see at the end of chapter D.
l = Nominal ordering length
l_1 = Manufacturing length

206.73. Ball cage with assembly aid, Brass

d_1	10	11 12	15	16	19	20	24 25	30 32	38 40	48 50	60 63	80
k	2	2	3	3	3	3	3	4	4	4	4	6
l / l_1	Total number of balls											
24 / 24				64		80						
28 / 28				80		100						
31 / 32					120	120	120					
40 / 39	176	176										
40 / 40							160	120				
45 / 44			144	144	180	180	180					
45 / 45								140	168			
50 / 50								160	192	224		
56 / 55								180	216			
56 / 56			192	192	240	240	240					
56 / 57	272	272										
63 / 64			224	224								
63 / 65									264	308		
71 / 70								240				
71 / 72			256	256	320	320	320					
80 / 80					360	360	360	280	336	392		
95 / 95								340	408	476	544	
95 / 96					440	440	440					
105 / 105								380	456	532	608	
120 / 119												540
120 / 120							560	440	528	616	704	
140 / 140								520	624	728	832	
160 / 160								600	720	840	960	
160 / 161												756
180 / 180									816	952	1,088	
180 / 182												864
200 / 200									912	1,064	1,216	
200 / 203												972
240 / 238												1,152
240 / 240									1,104	1,288	1,472	

Ordering Code (example):

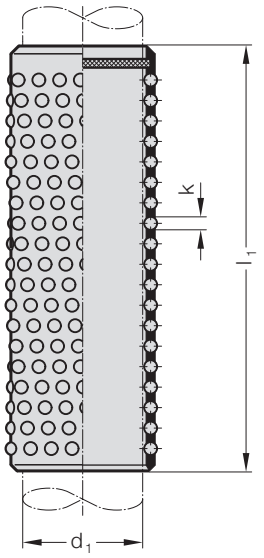
Ball cage with assembly aid, Brass		=	206.73.
Diameter of conduit d_1	38 mm	=	038.
Nominal order length for ball cage l	50 mm	=	050
Order No		=	206.73. 038. 050

BALL CAGE WITH ASSEMBLY AID, ALUMINIUM

Material:
Cage: Aluminium
Balls: Steel hardened (DIN 5401)

Note:
No assistant is needed for their assembly. These cages are equipped with a suitably positioned brake ring insert. That ensures equal cage spacing especially on die sets with multiple pillars.
☞ Notes on ball bearing type guides at the beginning of chapter D.
☞ Bearing life and dynamic load indexes see at the end of chapter D.
l = Nominal ordering length
l_1 = Manufacturing length

2060.63.



2060.63. Ball cage with assembly aid, Aluminium

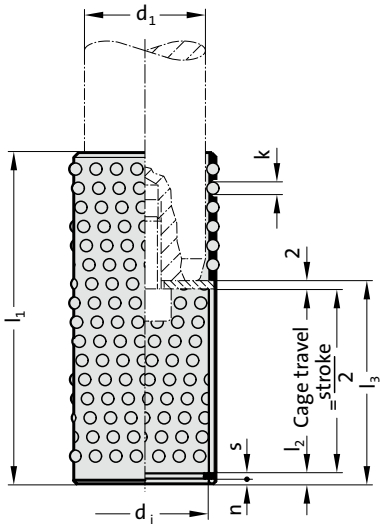
d_1	10	11 12	15	16	19	20	24 25	30 32	38 40	48 50	60 63	80
k	2	2	3	3	3	3	3	4	4	4	4	6
l / l_1	Total number of balls											
24 / 24				64		80						
28 / 28				80		100						
31 / 32					120	120	120					
40 / 39	176	176										
40 / 40							160	120				
45 / 44			144	144	180	180	180					
45 / 45								140	168			
50 / 50								160	192	224		
56 / 55								180	216			
56 / 56			192	192	240	240	240					
56 / 57	272	272										
63 / 64			224	224								
63 / 65									264	308		
71 / 70								240				
71 / 72			256	256	320	320	320					
80 / 80					360	360	360	280	336	392		
95 / 95								340	408	476	544	
95 / 96					440	440	440					
105 / 105								380	456	532	608	
120 / 119												540
120 / 120							560	440	528	616	704	
140 / 140								520	624	728	832	
160 / 160								600	720	840	960	
160 / 161												756
180 / 180									816	952	1,088	
180 / 182												864
200 / 200									912	1,064	1,216	
200 / 203												972
240 / 238												1,152
240 / 240									1,104	1,288	1,472	

Ordering Code (example):

Ball cage with assembly aid, Aluminium		= 2060.63.	
Diameter of conduit d_1	38 mm	=	038.
Nominal order length for ball cage l	50 mm	=	050
Order No		= 2060.63.	038. 050

BALL CAGE WITH CIRCLIP AND FASTENING RING GROOVE, BRASS

206.75.



Material:
Cage: Brass
Balls: Steel hardened (DIN 5401)

Note:
☞ Notes on ball bearing type guides at the beginning of chapter D.
☞ Bearing life and dynamic load indexes see at the end of chapter D.
l = Nominal ordering length
l_1 = Manufacturing length
Cage retainer 202.92.1. order separately

206.75. Ball cage with circlip and fastening ring groove, Brass

d_1	19	20	24	25	30	32	38	40	48	50	60	63
d_i x s	20 x 1	21 x 1	25 x 1.2	26 x 1.2	31 x 1.2	33 x 1.2	39 x 1.5	41 x 1.75	48 x 1.75	51 x 2	60 x 2	63 x 2
k	3	3	3	3	4	4	4	4	4	4	4	4
l_2	2.6	2.6	2.6	2.6	2.6	2.6	3.45	3.45	4.3	4.3	4.3	4.3
n	1.3	1.3	1.3	1.3	1.3	1.3	1.85	1.6	2.15	2.15	2.15	2.15
l / l_1	l_3											
56 / 56	31	31	31	31								
70 / 70					41	41						
72 / 72	41	41	41	41								
80 / 80	51	51	51	51	51	51	51	51	51	51		
95 / 95					61	61	61	61	61	61	61	61
105 / 105					61	61	61	61				
120 / 120							73	73	73	73	73	73
140 / 140											83	83

Ordering Code (example):

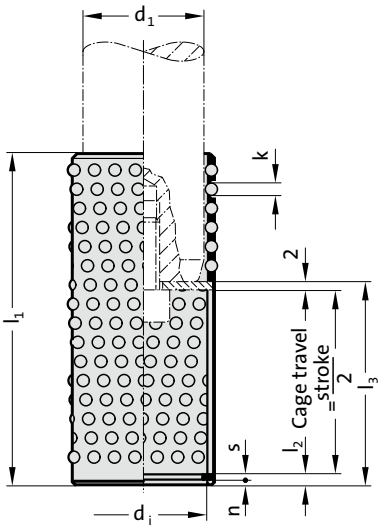
Ball cage with circlip and fastening ring groove, Brass		=	206.75.
Diameter of conduit d_1	38 mm	=	038.
Nominal order length for ball cage l	80 mm	=	080.
Slot length l_3	51 mm	=	051
Order No		=	206.75. 038. 080. 051

BALL CAGE WITH CIRCLIP AND FASTENING RING GROOVE, ALUMINIUM

Material:
Cage: Aluminium
Balls: Steel hardened (DIN 5401)

Note:
☞ Notes on ball bearing type guides at the beginning of chapter D.
☞ Bearing life and dynamic load indexes see at the end of chapter D.
l = Nominal ordering length
l_1 = Manufacturing length
Cage retainer 202.92.1. order separately

2060.65.



2060.65. Ball cage with circlip and fastening ring groove, Aluminium

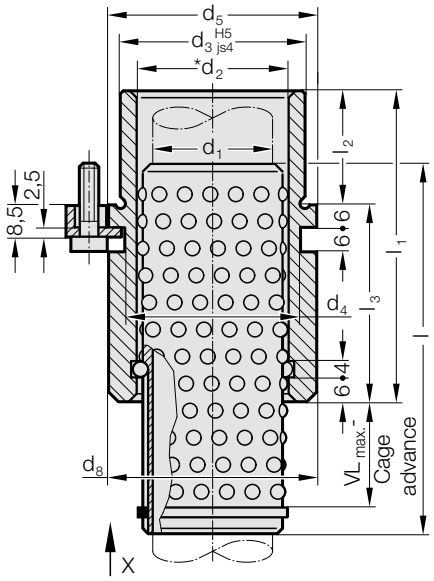
d_1	19	20	24	25	30	32	38	40	48	50	60	63
d_i x s	20 x 1	21 x 1	25 x 1.2	26 x 1.2	31 x 1.2	33 x 1.2	39 x 1.5	41 x 1.75	48 x 1.75	51 x 2	60 x 2	63 x 2
k	3	3	3	3	4	4	4	4	4	4	4	4
l_2	2.6	2.6	2.6	2.6	2.6	2.6	3.45	3.45	4.3	4.3	4.3	4.3
n	1.3	1.3	1.3	1.3	1.3	1.3	1.85	1.6	2.15	2.15	2.15	2.15
l / l_1	l_3											
56 / 56	31	31	31	31								
70 / 70					41	41						
72 / 72	41	41	41	41								
80 / 80	51	51	51	51	51	51	51	51	51	51		
95 / 95					61	61	61	61	61	61	61	61
105 / 105					61	61	61	61				
120 / 120							73	73	73	73	73	73
140 / 140											83	83

Ordering Code (example):

Ball cage with circlip and fastening ring groove, Aluminium		=	2060.65.
Diameter of conduit d_1	38 mm	=	038.
Nominal order length for ball cage l	80 mm	=	080.
Slot length l_3	51 mm	=	051
Order No		=	2060.65. 038. 080. 051

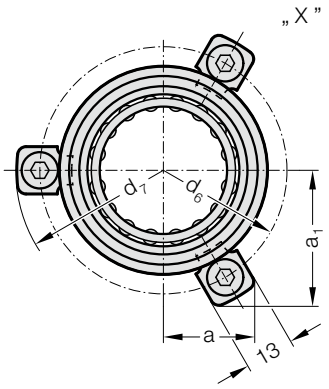
HEADED GUIDE BUSH WITH BALL CAGE RETAINER

2081.67.



Material:
Bush: Tool steel
Hardness: 62 ± 2 HRC
Cage: Brass
Balls: Steel hardened (DIN 5401)

Note:
Ball cage position - please specify the required cage advance with order. FIBRO Ball Cage Retainers ensure optimum starting position of ball cages on inverted die sets - even if pillars retract from guide bushes. The application determines the cage advance. Note that cage travel is half the stroke length.
In this context it is of importance to note the minimum constructional length. The cage advance should be chosen so that during normal operation of the tool, optimum position is achieved.
The attachment is with 3 Screw clamp, from ø d_1 = 38 with 4 Screw clamp , which are included in delivery (Order No: 207.45 - Screw clamp incl. socket cap screw DIN 6912, Head ø 13).
*☞Preloading see pairing classification at the beginning of chapter D
☞Matching guide combinations, see selection matrix at the beginning of chapter D.
Tolerance range:
yellow = .10; green = .20; red = .30



2081.67. Headed guide bush with ball cage retainer

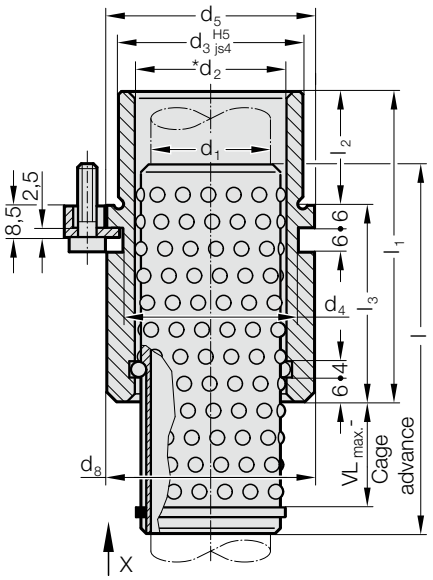
d_1	19 20	24 25	30 32	38 40	48 50	60 63
d_2	25 26	30 31	38 40	46 48	56 58	68 71
d_3	32	40	48	58	70	85
d_4	32	40	48	58	70	85
d_5	40	48	56	66	80	95
d_6	52	60	67	77	91	106
d_7	64.7	72.7	79.7	89.7	103.7	118.7
d_8	38.9	46	53	63	77	92
l_1	59	79	93	108	127	150
l_2	23	23	30	37	47	60
l_3	36	56	63	71	80	90
l	72	96	120	140	140	160
a	20.7	22.65	24.4	35.3	40.2	45.5
a_1	30	33.4	36.4	35.3	40.2	45.5
$VL_{max.}$	49	68	84	96	86	92

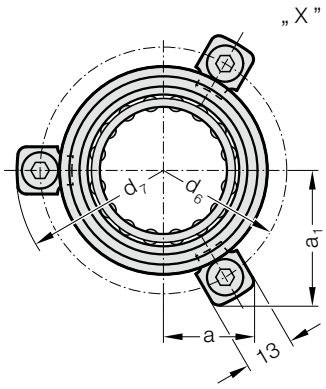
Ordering Code (example):

Headed guide bush with ball cage retainer		=	2081.67.
Diameter of conduit d_1	38 mm	=	038.
Feed length VL	5 mm	=	005.
Classification TOL	yellow	=	10
Order No		=	2081.67. 038. 005. 10

HEADED GUIDE BUSH WITH BALL CAGE RETAINER

2081.68.





Material:
Bush: Tool steel
Hardness: 62 ± 2 HRC
Cage: Aluminium
Balls: Steel hardened (DIN 5401)

Note:
Ball cage position - please specify the required cage advance with order.
FIBRO Ball Cage Retainers ensure optimum starting position of ball cages on inverted die sets - even if pillars retract from guide bushes. The application determines the cage advance. Note that cage travel is half the stroke length.
In this context it is of importance to note the minimum constructional length.
The cage advance should be chosen so that during normal operation of the tool, optimum position is achieved.
The attachment is with 3 Screw clamp, from ø d_1 = 38 with 4 Screw clamp , which are included in delivery (Order No: 207.45 - Screw clamp incl. socket cap screw DIN 6912, Head ø 13).
*☞Preloading see pairing classification at the beginning of chapter D
☞Matching guide combinations, see selection matrix at the beginning of chapter D.
Tolerance range:
yellow = .10; green = .20; red = .30

2081.68. Headed guide bush with ball cage retainer

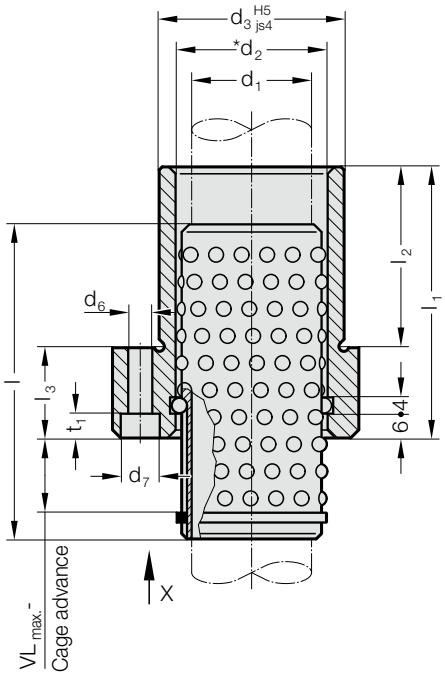
d_1	19 20	24 25	30 32	38 40	48 50	60 63
d_2	25 26	30 31	38 40	46 48	56 58	68 71
d_3	32	40	48	58	70	85
d_4	32	40	48	58	70	85
d_5	40	48	56	66	80	95
d_6	52	60	67	77	91	106
d_7	64.7	72.7	79.7	89.7	103.7	118.7
d_8	38.9	46	53	63	77	92
l_1	59	79	93	108	127	150
l_2	23	23	30	37	47	60
l_3	36	56	63	71	80	90
l	72	96	120	140	140	160
a	20.7	22.65	24.4	35.3	40.2	45.5
a_1	30	33.4	36.4	35.3	40.2	45.5
$VL_{max.}$	49	68	84	96	86	92

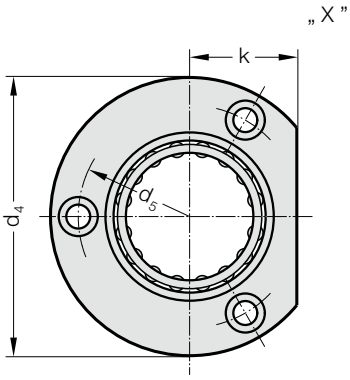
Ordering Code (example):

Headed guide bush with ball cage retainer		=	2081.68.
Diameter of conduit d_1	38 mm	=	038.
Feed length VL	5 mm	=	005.
Classification TOL	yellow	=	10
Order No		=	2081.68. 038. 005. 10

FLANGED GUIDE BUSH WITH BALL CAGE RETAINER

2091.67.





Material:
Bush: Tool steel
Hardness: 62 ± 2 HRC
Cage: Brass
Balls: Steel hardened (DIN 5401)

Note:
Ball cage position - please specify the required cage advance with order. FIBRO Ball Cage Retainers ensure optimum starting position of ball cages on inverted die sets - even if pillars retract from guide bushes. The application determines the cage advance. Note that cage travel is half the stroke length.
In this context it is of importance to note the minimum constructional length.
The cage advance should be chosen so that during normal operation of the tool, optimum position is achieved.
*☞Preloading see pairing classification at the beginning of chapter D
☞Matching guide combinations, see selection matrix at the beginning of chapter D.
Tolerance range:
yellow = .10
green = .20
red = .30

2091.67. Flanged guide bush with ball cage retainer

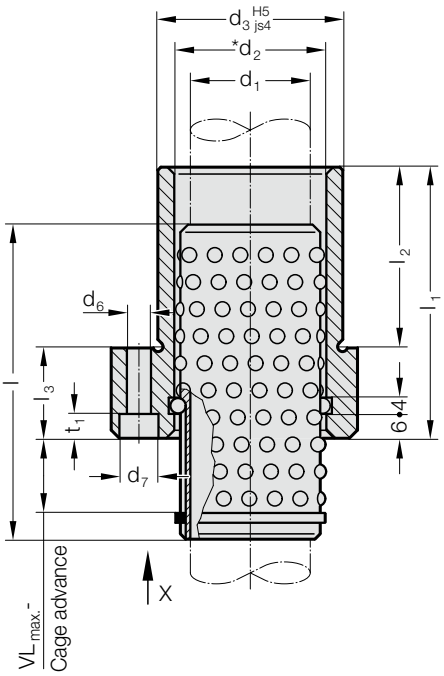
d_1	19 20	24 25	30 32	38 40	48 50	60 63	80
d_2	25 26	30 31	38 40	46 48	56 58	68 71	92
d_3	32	40	48	58	70	85	105
d_4	50	63	72	85	104	120	148
d_5	40	50	58	70	86	100	125
d_6	4.5	5.5	5.5	6.6	9	9	11
d_7	8	10	10	11	15	15	18
t_1	4.6	5.7	5.7	6.8	9	9	11
k	18	23	28	33	38	46	56
l_1	52	62	72	77	102	102	125
l_2	37	37	47	47	60	60	75
l_3	15	25	25	30	42	42	50
l	72	72	80	95	105	120	140
$VL_{max.}$	49	44	44	51	51	52	54

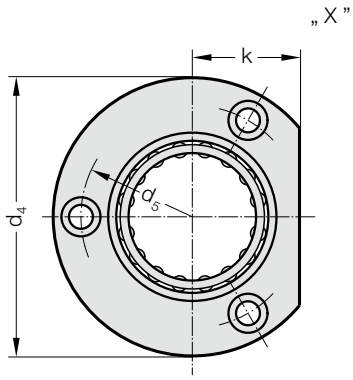
Ordering Code (example):

Flanged guide bush with ball cage retainer		=	2091.67.
Diameter of conduit d_1	38 mm	=	038.
Feed length VL	5 mm	=	005.
Classification TOL	gelb	=	10
Order No		=	2091.67. 038. 005. 10

FLANGED GUIDE BUSH WITH BALL CAGE RETAINER

2091.68.





Material:
Bush: Tool steel
Hardness: 62 ± 2 HRC
Cage: Aluminium
Balls: Steel hardened (DIN 5401)

Note:
Ball cage position - please specify the required cage advance with order. FIBRO Ball Cage Retainers ensure optimum starting position of ball cages on inverted die sets - even if pillars retract from guide bushes. The application determines the cage advance. Note that cage travel is half the stroke length.
In this context it is of importance to note the minimum constructional length.
The cage advance should be chosen so that during normal operation of the tool, optimum position is achieved.
*☞Preloading see pairing classification at the beginning of chapter D
☞Matching guide combinations, see selection matrix at the beginning of chapter D.
Tolerance range:
yellow = .10
green = .20
red = .30

2091.68. Flanged guide bush with ball cage retainer

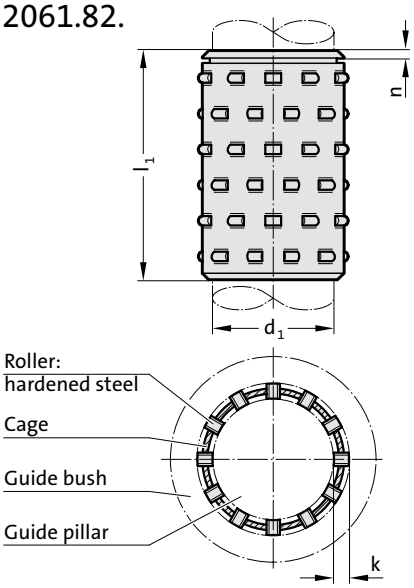
d_1	19 20	24 25	30 32	38 40	48 50	60 63	80
d_2	25 26	30 31	38 40	46 48	56 58	68 71	92
d_3	32	40	48	58	70	85	105
d_4	50	63	72	85	104	120	148
d_5	40	50	58	70	86	100	125
d_6	4.5	5.5	5.5	6.6	9	9	11
d_7	8	10	10	11	15	15	18
t_1	4.6	5.7	5.7	6.8	9	9	11
k	18	23	28	33	38	46	56
l_1	52	62	72	77	102	102	125
l_2	37	37	47	47	60	60	75
l_3	15	25	25	30	42	42	50
l	72	72	80	95	105	120	140
$VL_{max.}$	49	44	44	51	51	52	54

Ordering Code (example):

Flanged guide bush with ball cage retainer		=	2091.68.
Diameter of conduit d_1	38 mm	=	038.
Feed length VL	5 mm	=	005.
Classification TOL	yellow	=	10
Order No		=	2091.68. 038. 005. 10

ROLLER CAGE WITH CIRCLIP GROOVE, BRASS

2061.82.



Description:
Roller cages make linear contact with the guide bush and the guide pillar. This results in a load carrying capacity for each individual roller which is many times that of a ball of the same diameter. Roller bearings feature a FIBRO specific seal, similar to the ball bearings. The profile rollers are arranged in a spiral layout axially, so that every roller has its own path. The cages are grooved to accept a DIN 471 (206.72.) circlip.

Material:
Roller Cage: Brass
Rollers: Steel hardened, 100 Cr6, DIN 5402

Note:
☞ Preloading see at the beginning of Chapter D
For roller cages use only pairing class guide pillar red = .30 and guide sleeve yellow = .10.

2061.82. Roller cage with circlip groove, Brass

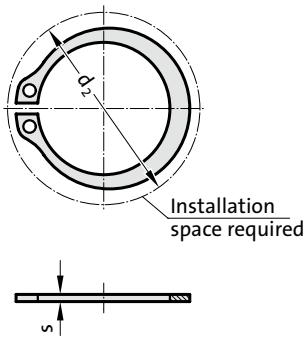
d_1	19	20	24 25	30 32	38 40	48 50	63
k	3	3	3	4	4	4	4
n	1.6	1.6	1.6	2.1	2.1	2.1	2.1
l_1	Total number of rollers						
45	32	32	40	48			
55	40	40	50	60	70		
65	48	48	60	72	84	108	
75	56	56	70	84	98	126	154
85	64	64	80	96	112	144	176
95	72	72	90	108	126	162	198
105	80	80	100	120	140	180	220
115			110	132	154	198	242
125			120	144	168	216	264
135				156	182	234	286
145				168	196	252	308
155				180	210	270	330
165				192	224	288	352
175					238	306	374
185					252	324	396
205					280	360	440

Ordering Code (example):

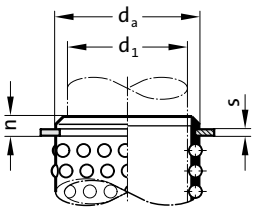
Roller cage with circlip groove, Brass		=	2061.82.
Diameter of conduit d_1	38 mm	=	038.
Length l_1	115 mm	=	115
Order No		=	2061.82. 038. 115

CIRCLIP DIN 471

206.72.



Mounting example



206.72. Circlip DIN 471

d_1	d_a x s	d_2	d_1	d_a x s	d_2
10	13 x 1	20.2	30	37 x 1.75	49
11	14 x 1	21.4	32	39 x 1.75	51.4
12	15 x 1	22.6	38	45 x 1.75	59.1
15	20 x 1.2	28.4	40	47 x 1.75	60.8
16	21 x 1.2	29.6	48	55 x 2	70.2
18	23 x 1.2	32.2	50	57 x 2	72.6
19	24 x 1.2	33.2	60	67 x 2.5	83.1
20	25 x 1.2	34.2	63	70 x 2.5	87
24	29 x 1.5	39.1	80	90 x 3	108.5
25	30 x 1.5	40.5			

Description:
For securing the ball and roller cages

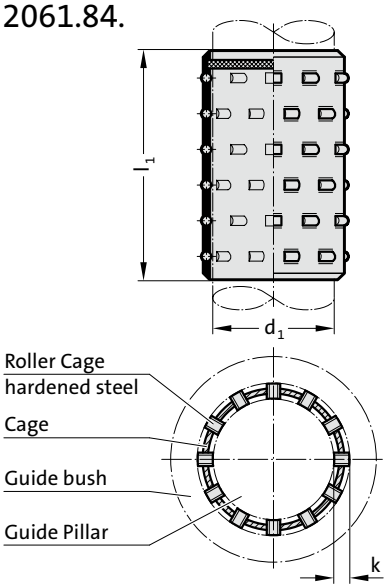
Execution:
to DIN 471

Ordering Code (example):

Circlip DIN 471		=	206.72.
Diameter of conduit d_1	25 mm	=	025
Order No		=	206.72. 025

ROLLER CAGE WITH ASSEMBLY AID, BRASS

2061.84.



Description:
Roller cages make linear contact with the guide bush and the guide pillar. This results in a load carrying capacity for each individual roller which is many times that of a ball of the same diameter. Roller bearings feature a FIBRO specific seal, similar to the ball bearings. The profile rollers are arranged in a spiral layout axially, so that every roller has its own path.

Material:
Roller Cage: Brass
Rollers: Steel hardened, 100 Cr6, DIN 5402

Note:
No assistant is needed for their assembly. These cages are equipped with a suitably positioned brake ring insert. That ensures equal cage spacing especially on die sets with multiple pillars.
☞Preloading see at the beginning of Chapter D
For roller cages use only pairing class guide pillar red = .30 and guide sleeve yellow = .10.

2061.84. Roller cage with assembly aid, Brass

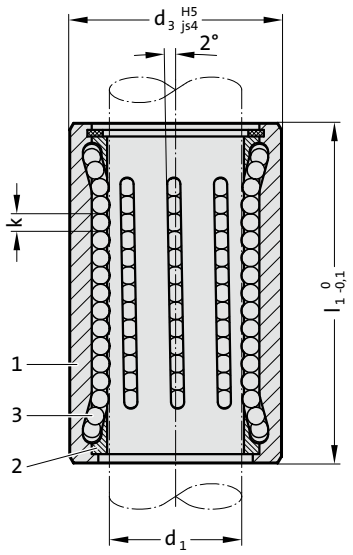
d_1	19 20	24 25	30 32	38 40	48 50	63
k	3	3	4	4	4	4
l_1	Total number of rollers					
45	32	40	48			
55	40	50	60	70		
65	48	60	72	84	108	
75	56	70	84	98	126	154
85	64	80	96	112	144	176
95	72	90	108	126	162	198
105	80	100	120	140	180	220
115		110	132	154	198	242
125		120	144	168	216	264
135			156	182	234	286
145			168	196	252	308
155			180	210	270	330
165			192	224	288	352
175				238	306	374
185				252	324	396
205				280	360	440

Ordering Code (example):

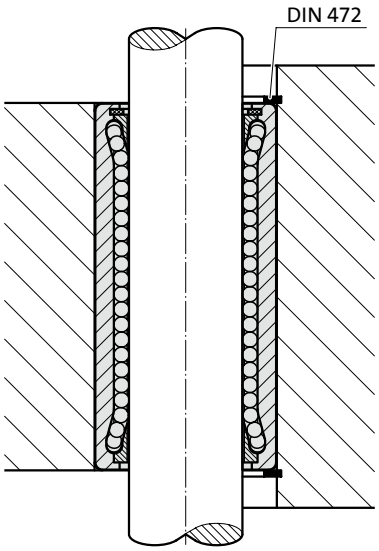
Roller cage with assembly aid, Brass		= 2061.84.	
Diameter of conduit d_1	38 mm	=	038.
Length l_1	115 mm	=	115
Order No		= 2061.84.	038. 115

RECIRCULATING BALL BUSH ~ISO9448-3

2061.69. .1



Mounting example



Description:

The recirculating ball bush is used when very large paths (strokes) are travelled. This is only limited by the mounting situation.
In comparison to guides with ball cage, however, the lower dynamic load figures (C) should be observed. Despite the high number of ball tracks, fewer balls are in usage.

For optimum service life, a movement path (stroke) of three times the length of the recirculating ball bush is recommended (3 x l_1).

Material:

Socket (1): Steel, hardened 62 ± 2 HRC
Ball carrier (2): Aluminium
Balls (3): Steel, hardened, conforming to DIN 5401

Execution:

Outside diameter precision ground.

Slip-Fit Bonding:

The bush is accurately positioned by means of H5 slip-fit hole. The slip-fit adhesive (order no. 281.648) is used solely to secure the bond.

Advantages of slip-fit bonding:

- High accuracy and stability
- Ease of interchangeability

We do not recommend press-fitting the bush since that causes unacceptable alteration to the shape of the bush.
Fastening within the locating hole using DIN 472 locking rings is possible.

Note:

☞ Matching guide combinations, see selection matrix at the beginning of chapter D.
☞ For service life calculation and dynamic load figures, see the end of chapter D.
☞ Assembly guidelines / size tables and tolerances at the end of chapter D.

Recirculating ball bushes only with red guide pillar = .30 combinable.

2061.69. .1 Recirculating ball bush ~ISO9448-3

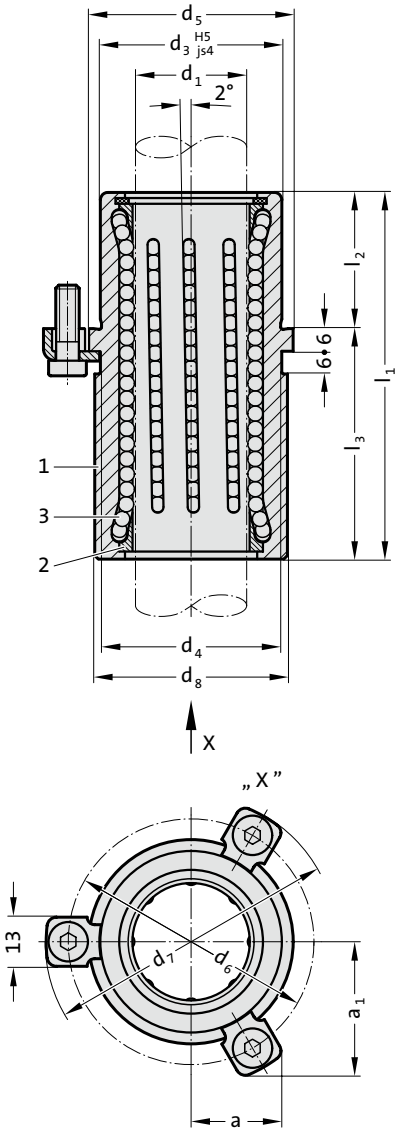
d_1	20	25	32	40	50	63
d_3	32	40	48	58	70	85
Ball tracks	8	8	8	10	10	12
k	3	3	4	4	4	4
l_1						
47	●					
60		●				
77			●			
95				●	●	
120						●

Ordering Code (example):

Recirculating ball bush ~ISO9448-3		= 2061.69.
Diameter of conduit d_1	25 mm	= 025.
Length l_1	60 mm	= 060.
Standard design		= 1
Order No		= 2061.69. 025. 060. 1

RECIRCULATING BALL BUSH WITH COLLAR ~ISO9448-7

2081.69. .1



Description:
The recirculating ball bush is used when very large paths (strokes) are travelled. This is only limited by the mounting situation.
In comparison to guides with ball cage, however, the lower dynamic load figures (C) should be observed. Despite the high number of ball tracks, fewer balls are in usage.

For optimum service life, a movement path (stroke) of three times the length of the recirculating ball bush is recommended (3 x l_1).

Material:
Socket (1): Steel, hardened 62 ± 2 HRC
Ball carrier (2): Aluminium
Balls (3): Steel, hardened, conforming to DIN 5401

Execution:
Outside diameter precision ground.

Note:
The attachment is with 3 retaining elements, from ø d_1 = 38 with 4 retaining elements , which are included in delivery (Order No: 207.45 - retaining element incl. socket head bolt DIN 6912, M6x20, head ø 13).

☞Matching guide combinations, see selection matrix at the beginning of chapter D.
☞For service life calculation and dynamic load figures, see the end of chapter D.
☞Assembly guidelines / size tables and tolerances at the end of chapter D.

Recirculating ball bushes only with red guide pillar = .30 combinable.

2081.69. .1 Recirculating ball bush with collar ~ISO9448-7

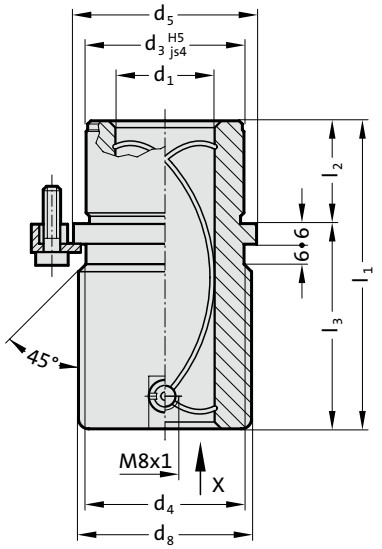
d_1	20	25	32	40	50	63
d_8	39	46	53	63	77	92
d_3	32	40	48	58	70	85
d_4	32	40	48	58	70	85
d_5	40	48	56	66	80	95
d_6	52	60	67	77	91	106
d_7	64.7	72.7	79.7	89.7	103.7	118.7
a	20.7	22.65	24.4	35.3	40.2	45.5
a_1	30	33.4	36.4	35.3	40.2	45.5
Ball tracks	8	8	8	10	10	12
l_1	47	60	77	95	95	120
l_2	23	23	30	37	47	60
l_3	24	37	47	58	48	60

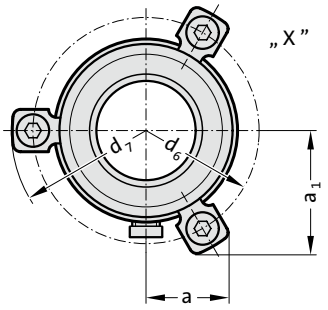
Ordering Code (example):

Recirculating ball bush with collar ~ISO9448-7		=	2081.69.
Diameter of conduit d_1	25 mm	=	025.
Length l_1	60 mm	=	060.
Standard design		=	1
Order No		=	2081.69. 025. 060. 1

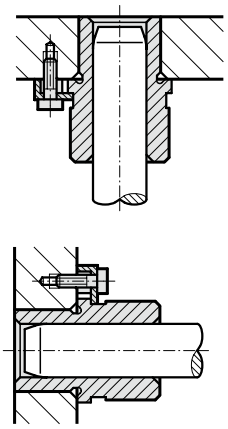
HEADED GUIDE BUSH, BRONZE COATED, ISO 9448-6

2081.81.





Mounting example



Material:
1.0503
ø d_3 and d_8 induction hardened to 500+100 HV 10.

Execution:
Bronze coated internal bore.
Outside diameter fine-ground.

Note:
The attachment is with 3 Screw clamp, from ø d_1 = 38 with 4 Screw clamp , which are included in delivery (Order No: 207.45 - Screw clamp incl. socket cap screw DIN 6912, Head ø 13).
Lubrication via funnel lubricating nipple with thread DIN 3405-A M8x1.
☞Notes on sliding type guides at the beginning of chapter D.
☞Matching guide combinations, see selection matrix at the beginning of chapter D.
☞Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.

2081.81. Headed guide bush, bronze coated, ISO 9448-6

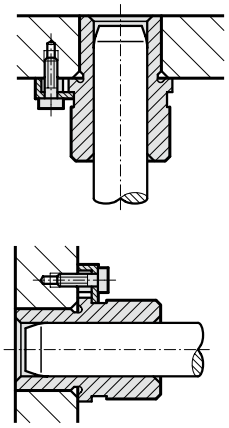
d_1	19 20	24 25	30 32	38 40	48 50	60 63	80
Tolerance	+0.003/+0.012	+0.003/+0.012	+0.004/+0.015	+0.004/+0.015	+0.004/+0.015	+0.005/+0.018	+0.005/+0.018
d_3	32	40	48	58	70	85	105
d_4	32	40	48	58	70	85	105
d_5	40	48	56	66	80	95	118
d_6	52	60	67	77	91	106	129
d_7	64.7	72.7	79.7	89.7	103.7	118.7	141
d_8	39	46	53	63	77	92	115
a	20.9	22.7	24.4	35.3	40.2	45.5	54.5
a_1	30.3	33.4	36.4	35.3	40.2	45.5	54.5
l_1	59	79	93	108	127	150	150
l_2	23	23	30	37	47	60	60
l_3	36	56	63	71	80	90	90

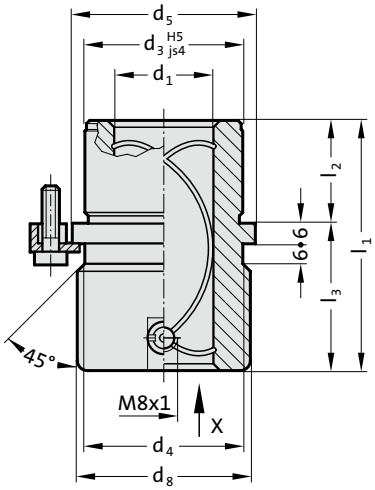
Ordering Code (example):

Headed guide bush, bronze coated, ISO 9448-6		=	2081.81.
Diameter of conduit d_1	38 mm	=	038
Order No		=	2081.81. 038

HEADED GUIDE BUSH, BRONZE COATED, ISO 9448-6

Mounting example 2081.84.

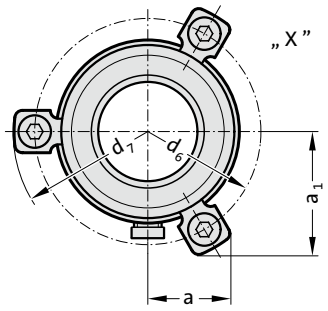




Material:
1.0503
ø d_3 and d_8 induction hardened to 500+100 HV 10.

Execution:
Bronze coated internal bore.
Outside diameter fine-ground.

Note:
The attachment is with 3 Screw clamp, from ø d_1 = 38 with 4 Screw clamp , which are included in delivery (Order No: 207.45 - Screw clamp incl. socket cap screw DIN 6912, Head ø 13).
Lubrication via funnel lubricating nipple with thread DIN 3405-A M8x1.
☞Notes on sliding type guides at the beginning of chapter D.
☞Matching guide combinations, see selection matrix at the beginning of chapter D.
☞Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.



2081.84. Headed guide bush, bronze coated, ISO 9448-6

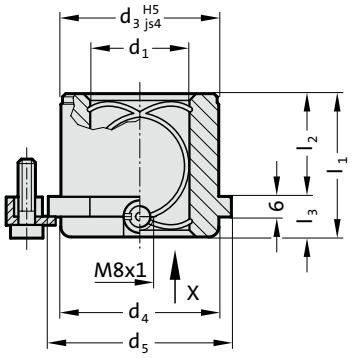
d_1	19 20	24 25	30 32	38 40	48 50	60 63	80
Tolerance	+0.003/+0.012	+0.003/+0.012	+0.004/+0.015	+0.004/+0.015	+0.004/+0.015	+0.005/+0.018	+0.005/+0.018
d_3	32	40	48	58	70	85	105
d_4	32	40	48	58	70	85	105
d_5	40	48	56	66	80	95	118
d_6	52	60	67	77	91	106	129
d_7	65.7	72.7	79.7	89.7	103.7	118.7	141
d_8	39	46	53	63	77	92	115
a	20.9	22.7	24.4	35.3	40.2	45.5	54.5
a_1	30.3	33.4	36.4	35.3	40.2	45.5	54.5
l_1	43	59	75	82	97	116	120
l_2	23	23	30	37	47	60	60
l_3	20	36	45	45	50	56	60

Ordering Code (example):

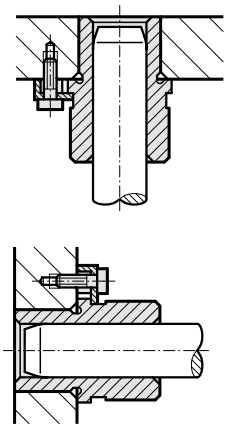
Headed guide bush, bronze coated, ISO 9448-6		=	2081.84.
Diameter of conduit d_1	38 mm	=	038
Order No		=	2081.84. 038

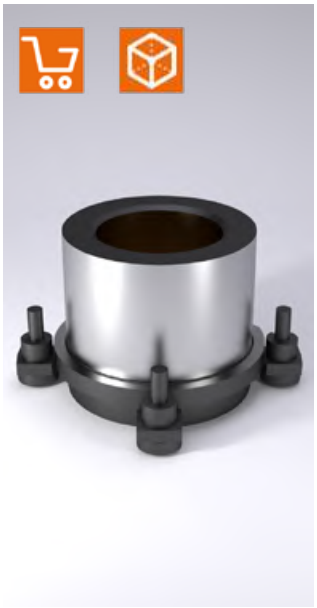
HEADED GUIDE BUSH, BRONZE COATED, ISO 9448-6

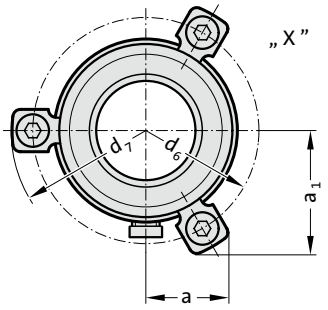
2081.85.



Mounting example







Material:
1.0503
ø d_3 and d_8 induction hardened to 500+100 HV 10.

Execution:
Bronze coated internal bore.
Outside diameter fine-ground.

Note:
The attachment is with 3 Screw clamp, from ø d_1 = 38 with 4 Screw clamp , which are included in delivery (Order No: 207.45 - Screw clamp incl. socket cap screw DIN 6912, Head ø 13).
Lubrication via funnel lubricating nipple with thread DIN 3405-A M8x1.
☞Notes on sliding type guides at the beginning of chapter D.
☞Matching guide combinations, see selection matrix at the beginning of chapter D.
☞Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.

2081.85. Headed guide bush, bronze coated, ISO 9448-6

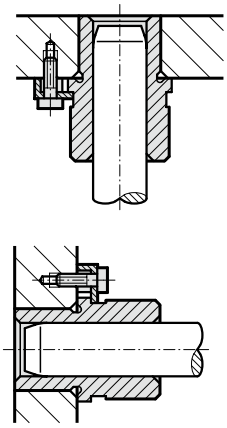
d_1	19 20	24 25	30 32	38 40	48 50	60 63	80
Tolerance	+0.003/+0.012	+0.003/+0.012	+0.004/+0.015	+0.004/+0.015	+0.004/+0.015	+0.005/+0.018	+0.005/+0.018
d_3	32	40	48	58	70	85	105
d_4	32	40	48	58	70	85	105
d_5	40	48	56	66	80	95	118
d_6	52	60	67	77	91	106	129
d_7	65.7	72.7	79.7	89.7	103.7	118.7	141
a	20.9	22.7	24.4	35.3	40.2	45.5	54.4
a_1	30.3	33.4	36.4	35.3	40.2	45.5	54.4
l_1	35	35	42	52	65	80	80
l_2	23	23	30	37	47	60	60
l_3	12	12	12	15	18	20	20

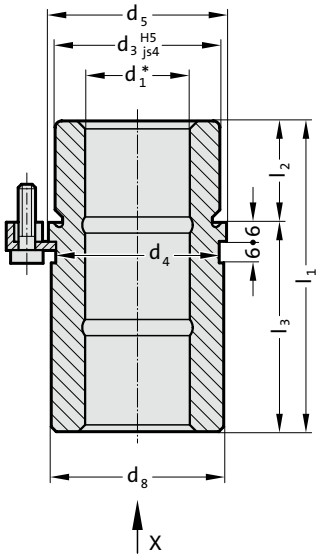
Ordering Code (example):

Headed guide bush, bronze coated, ISO 9448-6		=	2081.85.
Diameter of conduit d_1	38 mm	=	038
Order No		=	2081.85. 038

HEADED GUIDE BUSH, SINTERED FERRITE CARBONITRIDED WITH LONG-TERM LUBRICATION, ISO 9448-6

Mounting example 2081.31.

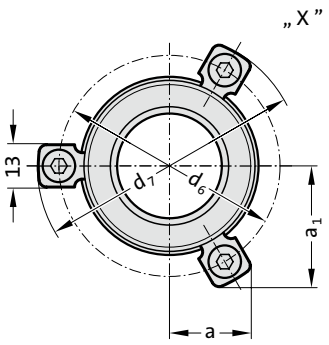




Material:
Sintered ferrite of high purity, carbonitrided, long-term lubrication

Execution:
Bearing surfaces and outside diameter precision ground.

Note:
The attachment is with 3 Screw clamp, from ø d_1 = 38 with 4 Screw clamp , which are included in delivery (Order No: 207.45 - Screw clamp incl. socket cap screw DIN 6912, Head ø 13).
☞Notes on sliding type guides at the beginning of chapter D.
*☞Bearing clearance see pairing classification at the beginning of chapter D.
☞Matching guide combinations, see selection matrix at the beginning of chapter D.
☞Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.
Tolerance range:
yellow = .10
green = .20
red = .30



2081.31. Headed guide bush, sintered ferrite carbonitrided with long-term lubrication, ISO 9448-6

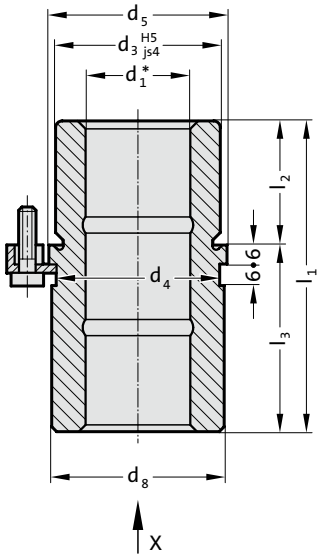
d_1	19 20	24 25	30 32	38 40	48 50	60 63
d_3	32	40	48	58	70	85
d_4	32	40	48	58	70	85
d_5	40	48	56	66	80	95
d_6	52	60	67	77	91	106
d_7	64.7	72.7	79.7	89.7	103.7	118.7
d_8	39	46	53	63	77	92
a	20.7	22.65	24.4	35.3	40.2	45.5
a_1	30	33.4	36.4	35.3	40.2	45.5
l_1	59	79	93	108	127	150
l_2	23	23	30	37	47	60
l_3	36	56	63	71	80	90

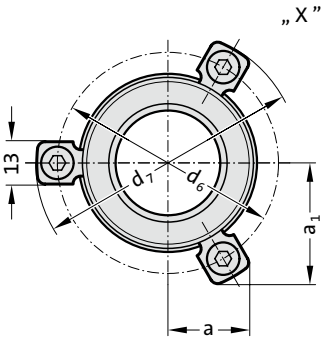
Ordering Code (example):

Headed guide bush, sintered ferrite carbonitrided with long-term lubrication, ISO 9448-6		=	2081.31.
Diameter of conduit d_1	38 mm	=	038.
Classification TOL	yellow	=	10
Order No		=	2081.31. 038. 10

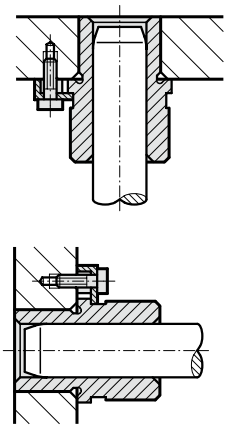
HEADED GUIDE BUSH, SINTERED FERRITE CARBONITRIDED WITH LONG-TERM LUBRICATION, ISO 9448-6

2081.32.





Mounting example



Material:
Sintered ferrite of high purity, carbonitrided, long-term lubrication

Execution:
Bearing surfaces and outside diameter precision ground.

Note:
The attachment is with 3 Screw clamp, from ø d_1 = 38 with 4 Screw clamp , which are included in delivery (Order No: 207.45 - Screw clamp incl. socket cap screw DIN 6912, Head ø 13).
☞Notes on sliding type guides at the beginning of chapter D.
*☞Bearing clearance see pairing classification at the beginning of chapter D.
☞Matching guide combinations, see selection matrix at the beginning of chapter D.
☞Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.
Tolerance range:
yellow = .10
green = .20
red = .30

2081.32. Headed guide bush, sintered ferrite carbonitrided with long-term lubrication, ISO 9448-6

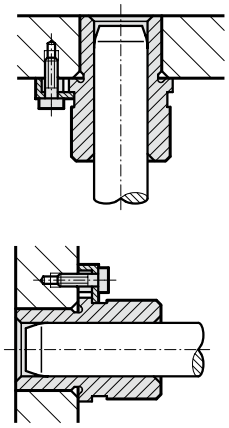
d_1	24 25	30 32	38 40	48 50
d_3	40	48	58	70
d_4	40	48	58	70
d_5	48	56	66	80
d_6	60	67	77	91
d_7	72.7	79.7	89.7	103.7
d_8	46	53	63	77
a	22.65	24.4	35.3	40.2
a_1	33.4	36.4	35.3	40.2
l_1	80	93	110	131
l_2	30	37	47	60
l_3	50	56	63	71

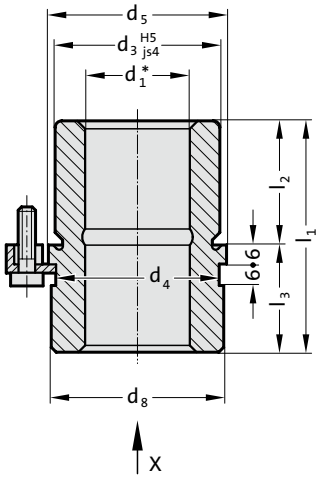
Ordering Code (example):

Headed guide bush, sintered ferrite carbonitrided with long-term lubrication, ISO 9448-6		=	2081.32.
Diameter of conduit d_1	38 mm	=	038.
Classification TOL	yellow	=	10
Order No		=	2081.32. 038. 10

HEADED GUIDE BUSH, SINTERED FERRITE CARBONITRIDED WITH LONG-TERM LUBRICATION, ISO 9448-6

Mounting example 2081.33.

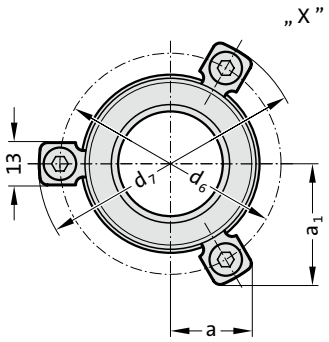




Material:
Sintered ferrite of high purity, carbonitrided, long-term lubrication

Execution:
Bearing surfaces and outside diameter precision ground.

Note:
The attachment is with 3 Screw clamp, from ø d_1 = 38 with 4 Screw clamp , which are included in delivery (Order No: 207.45 - Screw clamp incl. socket cap screw DIN 6912, Head ø 13).
☞Notes on sliding type guides at the beginning of chapter D.
*☞Bearing clearance see pairing classification at the beginning of chapter D.
☞Matching guide combinations, see selection matrix at the beginning of chapter D.
☞Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.
Tolerance range:
yellow = .10
green = .20
red = .30



2081.33. Headed guide bush, sintered ferrite carbonitrided with long-term lubrication, ISO 9448-6

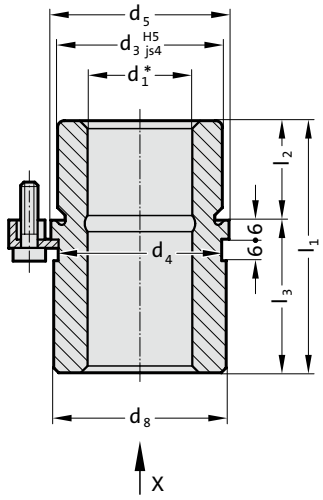
d_1	24 25	30 32	38 40	48 50
d_3	40	48	58	70
d_4	40	48	58	70
d_5	48	56	66	80
d_6	60	67	77	91
d_7	72.7	79.7	89.7	103.7
d_8	46	53	63	77
a	22.65	24.4	35.3	40.2
a_1	33.4	36.4	35.3	40.2
l_1	55	69	79	96
l_2	30	37	47	60
l_3	25	32	32	36

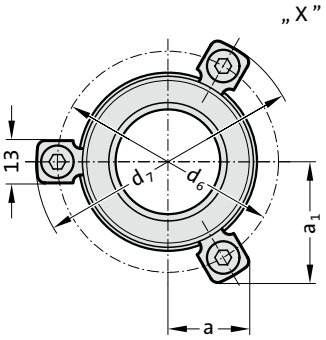
Ordering Code (example):

Headed guide bush, sintered ferrite carbonitrided with long-term lubrication, ISO 9448-6		=	2081.33.
Diameter of conduit d_1	38 mm	=	038.
Classification TOL	yellow	=	10
Order No		=	2081.33. 038. 10

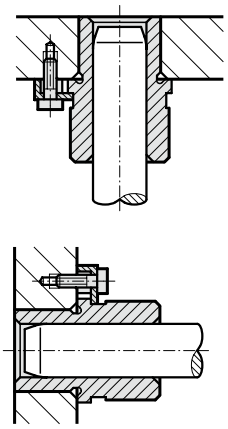
HEADED GUIDE BUSH, SINTERED FERRITE CARBONITRIDED WITH LONG-TERM LUBRICATION, ISO 9448-6

2081.34.





Mounting example



Material:
Sintered ferrite of high purity, carbonitrided, long-term lubrication

Execution:
Bearing surfaces and outside diameter precision ground.

Note:
The attachment is with 3 Screw clamp, from ø d_1 = 38 with 4 Screw clamp , which are included in delivery (Order No: 207.45 - Screw clamp incl. socket cap screw DIN 6912, Head ø 13).
☞Notes on sliding type guides at the beginning of chapter D.
*☞Bearing clearance see pairing classification at the beginning of chapter D.
☞Matching guide combinations, see selection matrix at the beginning of chapter D.
☞Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.
Tolerance range:
yellow = .10
green = .20
red = .30

2081.34. Headed guide bush, sintered ferrite carbonitrided with long-term lubrication, ISO 9448-6

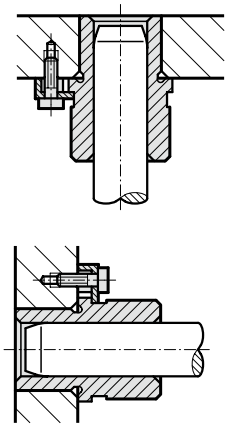
d_1	19 20	24 25	30 32	38 40	48 50	60 63
d_3	32	40	48	58	70	85
d_4	32	40	48	58	70	85
d_5	40	48	56	66	80	95
d_6	52	60	67	77	91	106
d_7	64.7	72.7	79.7	89.7	103.7	118.7
d_8	39	46	53	63	77	92
a	20.7	22.65	24.4	35.3	40.2	45.5
a_1	30	33.4	36.4	35.3	40.2	45.5
l_1	43	59	75	82	97	116
l_2	23	23	30	37	47	60
l_3	20	36	45	45	50	56

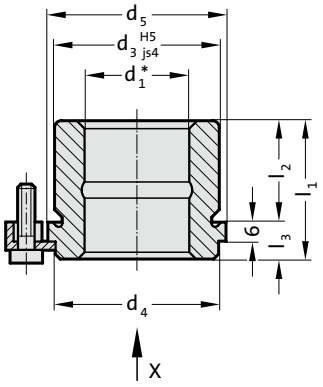
Ordering Code (example):

Headed guide bush, sintered ferrite carbonitrided with long-term lubrication, ISO 9448-6		=	2081.34.
Diameter of conduit d_1	38 mm	=	038.
Classification TOL	yellow	=	10
Order No		=	2081.34. 038. 10

HEADED GUIDE BUSH, SINTERED FERRITE CARBONITRIDED WITH LONG-TERM LUBRICATION, ISO 9448-6

Mounting example 2081.35.

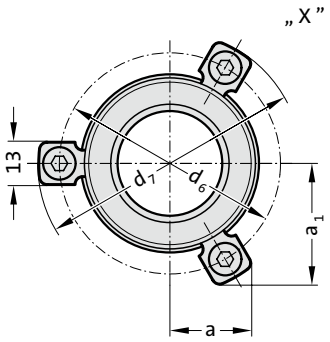




Material:
Sintered ferrite of high purity, carbonitrided, long-term lubrication

Execution:
Bearing surfaces and outside diameter precision ground.

Note:
The attachment is with 3 Screw clamp, from ø d_1 = 38 with 4 Screw clamp , which are included in delivery (Order No: 207.45 - Screw clamp incl. socket cap screw DIN 6912, Head ø 13).
☞Notes on sliding type guides at the beginning of chapter D.
*☞Bearing clearance see pairing classification at the beginning of chapter D.
☞Matching guide combinations, see selection matrix at the beginning of chapter D.
☞Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.
Tolerance range:
yellow = .10
green = .20
red = .30



2081.35. Headed guide bush, sintered ferrite carbonitrided with long-term lubrication, ISO 9448-6

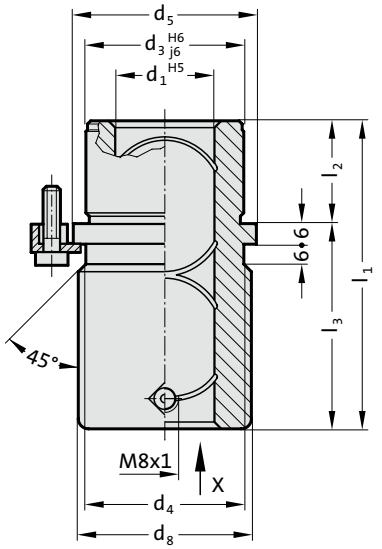
d_1	19 20	24 25	30 32	38 40	48 50	60 63
d_3	32	40	48	58	70	85
d_4	32	40	48	58	70	85
d_5	40	48	56	66	80	95
d_6	52	60	67	77	91	106
d_7	64.7	72.7	79.7	89.7	103.7	118.7
a	20.7	22.65	24.4	35.3	40.2	45.5
a_1	30	33.4	36.4	35.3	40.2	45.5
l_1	35	35	42	52	65	80
l_2	23	23	30	37	47	60
l_3	12	12	12	15	18	20

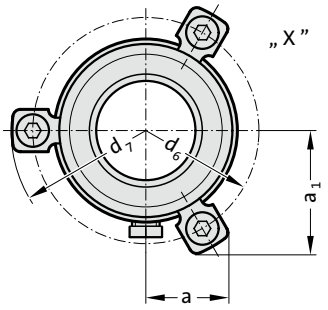
Ordering Code (example):

Headed guide bush, sintered ferrite carbonitrided with long-term lubrication, ISO 9448-6		=	2081.35.
Diameter of conduit d_1	38 mm	=	038.
Classification TOL	yellow	=	10
Order No		=	2081.35. 038. 10

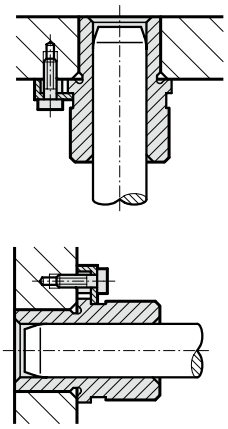
HEADED GUIDE BUSH ECO-LINE, BRONZEPLATED, ISO 9448-6

2081.91.





Mounting example



Material:
Steel, d_3 induction hardened

Execution:
Bronze coated internal bore.
Outside diameter fine-ground.

Note:
The attachment is with 3 Screw clamp, from ø d_1 = 38 with 4 Screw clamp , which are included in delivery (Order No: 207.45 - Screw clamp incl. socket cap screw DIN 6912, Head ø 13).
Lubrication via funnel lubricating nipple with thread DIN 3405-A M8x1.
☞ Notes on sliding type guides at the beginning of chapter D.
☞ Matching guide combinations, see selection matrix at the beginning of chapter D.
☞ Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.

2081.91. Headed guide bush ECO-LINE, bronzeplated, ISO 9448-6

d_1	19 20	24 25	30 32	38 40	48 50	60 63	80
d_3	32	40	48	58	70	85	105
d_4	32	40	48	58	70	85	105
d_5	40	48	56	66	80	95	118
d_6	52	60	67	77	91	106	129
d_7	64.7	72.7	79.7	89.7	103.7	118.7	141
d_8	39	46	53	63	77	92	115
a	20.7	22.7	24.4	35.3	40.2	45.5	54.5
a_1	30.3	33.4	36.4	35.3	40.2	45.5	54.5
l_1	59	79	93	108	127	150	150
l_2	23	23	30	37	47	60	60
l_3	36	56	63	71	80	90	90

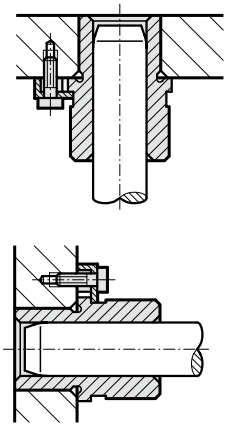
Ordering Code (example):

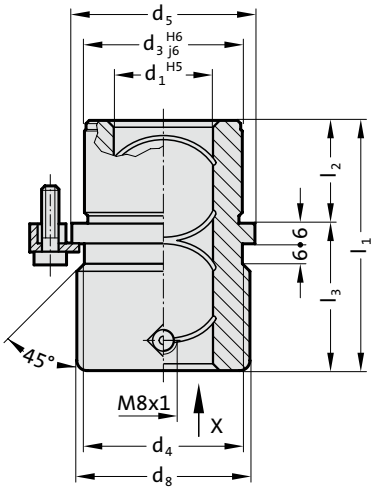
Headed guide bush ECO-LINE, bronzeplated, ISO 9448-6		=	2081.91.
Diameter of conduit d_1	38 mm	=	038
Order No		=	2081.91. 038

HEADED GUIDE BUSH ECO-LINE, BRONZEPLATED, ISO 9448-6

Mounting example

2081.94.

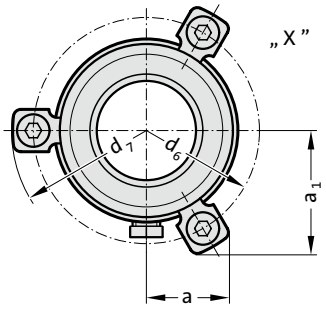




Material:
Steel, d_3 induction hardened

Execution:
Bronze coated internal bore.
Outside diameter fine-ground.

Note:
The attachment is with 3 Screw clamp, from ø d_1 = 38 with 4 Screw clamp , which are included in delivery (Order No: 207.45 - Screw clamp incl. socket cap screw DIN 6912, Head ø 13).
Lubrication via funnel lubricating nipple with thread DIN 3405-A M8x1.
☞ Notes on sliding type guides at the beginning of chapter D.
☞ Matching guide combinations, see selection matrix at the beginning of chapter D.
☞ Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.



2081.94. Headed guide bush ECO-LINE, bronzeplated, ISO 9448-6

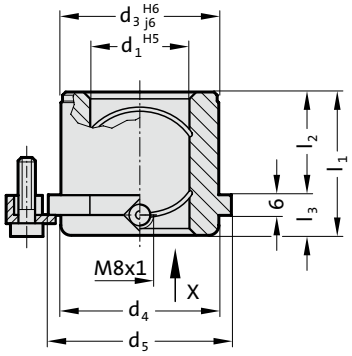
d_1	19 20	24 25	30 32	38 40	48 50	60 63	80
d_3	32	40	48	58	70	85	105
d_4	32	40	48	58	70	85	105
d_5	40	48	56	66	80	95	118
d_6	52	60	67	77	91	106	129
d_7	64.7	72.7	79.7	89.7	103.7	118.7	141
d_8	39	46	53	63	77	92	115
a	20.7	22.7	24.4	35.3	40.2	45.5	54.5
a_1	30.3	33.4	36.4	35.3	40.2	45.5	54.5
l_1	43	59	75	82	97	116	120
l_2	23	23	30	37	47	60	60
l_3	20	36	45	45	50	56	60

Ordering Code (example):

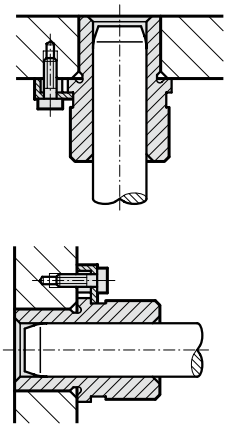
Headed guide bush ECO-LINE, bronzeplated, ISO 9448-6		= 2081.94.	
Diameter of conduit d_1	38 mm	=	038
Order No		= 2081.94.	038

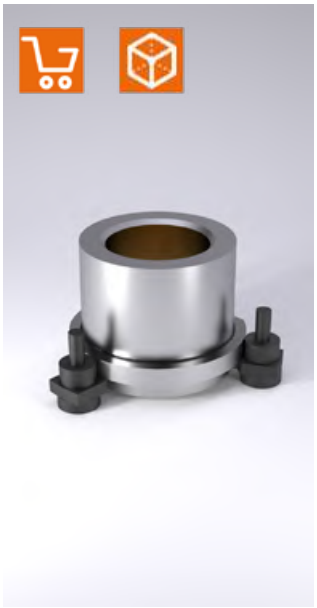
HEADED GUIDE BUSH ECO-LINE, BRONZEPLATED, ISO 9448-6

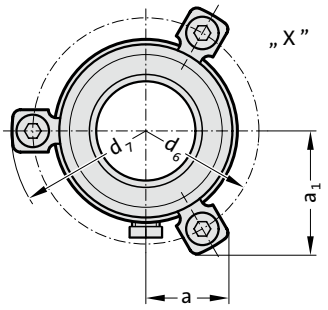
2081.95.



Mounting example







Material:
Steel, d_3 induction hardened

Execution:
Bronze coated internal bore.
Outside diameter fine-ground.

Note:
The attachment is with 3 Screw clamp, from ø d_1 = 38 with 4 Screw clamp , which are included in delivery (Order No: 207.45 - Screw clamp incl. socket cap screw DIN 6912, Head ø 13).
Lubrication via funnel lubricating nipple with thread DIN 3405-A M8x1.
☞Notes on sliding type guides at the beginning of chapter D.
☞Matching guide combinations, see selection matrix at the beginning of chapter D.
☞Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.

2081.95. Headed guide bush ECO-LINE, bronzeplated, ISO 9448-6

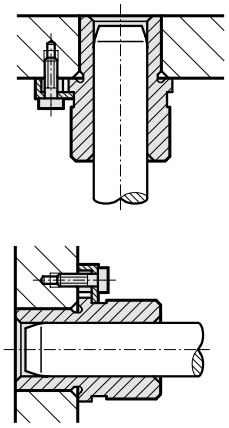
d_1	19 20	24 25	30 32	38 40	48 50	60 63	80
d_3	32	40	48	58	70	85	105
d_4	32	40	48	58	70	85	105
d_5	40	48	56	66	80	95	118
d_6	52	60	67	77	91	106	129
d_7	64.7	72.7	79.7	89.7	103.7	118.7	141
a	20.7	22.65	24.4	35.3	40.2	45.5	54.4
a_1	30	33.4	36.4	35.3	40.2	45.5	54.4
l_1	35	35	42	52	65	80	80
l_2	23	23	30	37	47	60	60
l_3	12	12	12	15	18	20	20

Ordering Code (example):

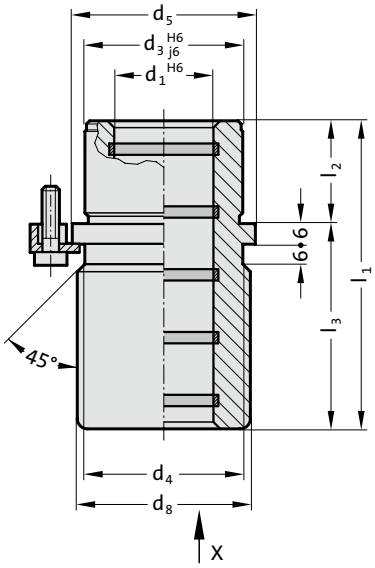
Headed guide bush ECO-LINE, bronzeplated, ISO 9448-6		= 2081.95.	
Diameter of conduit d_1	38 mm	=	038
Order No		= 2081.95.	038

HEADED GUIDE BUSH ECO-LINE, BRONZE WITH SOLID LUBRICANT RINGS, ISO 9448-6

Mounting example



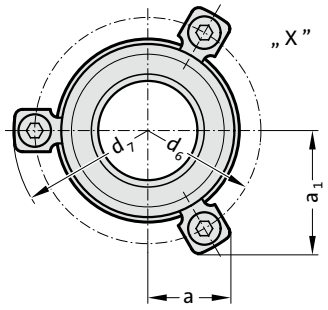
2081.71.



Material:
Bronze with solid lubricant, oilless lubricating

Execution:
Contact surface with solid lubricant rings.
Outside diameter precision ground.

Note:
The attachment is with 3 Screw clamp, from ø d_1 = 38 with 4 Screw clamp , which are included in delivery (Order No: 207.45 - Screw clamp incl. socket cap screw DIN 6912, Head ø 13).
☞Notes on sliding type guides at the beginning of chapter D.
☞Matching guide combinations, see selection matrix at the beginning of chapter D.
☞Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.



2081.71. Headed guide bush ECO-LINE, Bronze with solid lubricant rings, ISO 9448-6

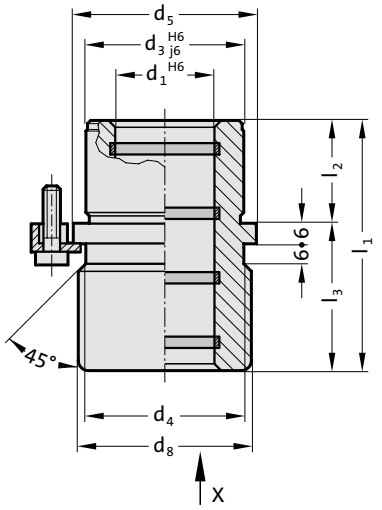
d_1	19 20	24 25	30 32	38 40	48 50	60 63	80
d_3	32	40	48	58	70	85	105
d_4	32	40	48	58	70	85	105
d_5	40	48	56	66	80	95	118
d_6	52	60	67	77	91	106	129
d_7	64.7	72.7	79.7	89.7	103.7	118.7	141
d_8	39	46	53	63	77	92	115
a	20.7	22.65	24.4	35.3	40.2	45.5	54.5
a_1	30	33.4	36.4	35.3	40.2	45.5	54.5
l_1	59	79	93	108	127	150	150
l_2	23	23	30	37	47	60	60
l_3	36	56	63	71	80	90	90

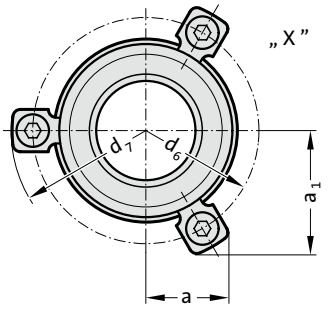
Ordering Code (example):

Headed guide bush ECO-LINE, Bronze with solid lubricant rings, ISO 9448-6		= 2081.71.
Diameter of conduit d_1	38 mm	= 038
Order No		= 2081.71. 038

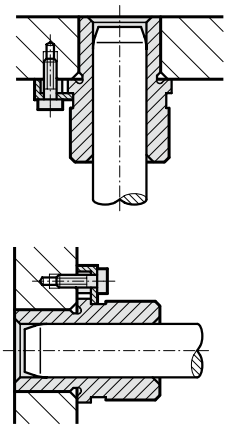
HEADED GUIDE BUSH ECO-LINE, BRONZE WITH SOLID LUBRICANT RINGS, ISO 9448-6

2081.74.





Mounting example



Material:
Bronze with solid lubricant, oilless lubricating

Execution:
Contact surface with solid lubricant rings.
Outside diameter precision ground.

Note:
The attachment is with 3 Screw clamp, from ø d_1 = 38 with 4 Screw clamp , which are included in delivery (Order No: 207.45 - Screw clamp incl. socket cap screw DIN 6912, Head ø 13).

☞Notes on sliding type guides at the beginning of chapter D.
☞Matching guide combinations, see selection matrix at the beginning of chapter D.
☞Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.

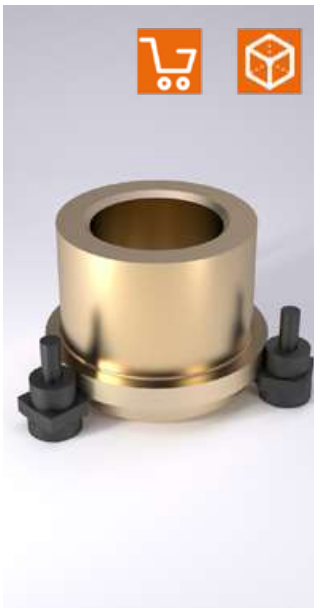
2081.74. Headed guide bush ECO-LINE, Bronze with solid lubricant rings, ISO 9448-6

d_1	19 20	24 25	30 32	38 40	48 50	60 63	80
d_3	32	40	48	58	70	85	105
d_4	32	40	48	58	70	85	105
d_5	40	48	56	66	80	95	118
d_6	52	60	67	77	91	106	129
d_7	64.7	72.7	79.7	89.7	103.7	118.7	141
d_8	39	46	53	63	77	92	115
a	20.7	22.65	24.4	35.3	40.2	45.5	54.5
a_1	30	33.4	36.4	35.3	40.2	45.5	54.5
l_1	43	59	75	82	97	116	120
l_2	23	23	30	37	47	60	60
l_3	20	36	45	45	50	56	60

Ordering Code (example):

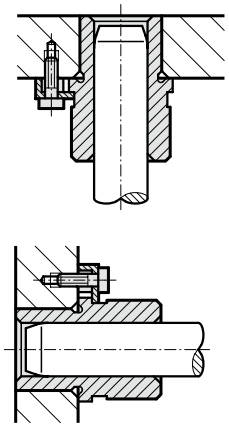
Headed guide bush ECO-LINE, Bronze with solid lubricant rings, ISO 9448-6		= 2081.74.	
Diameter of conduit d_1	38 mm	=	038
Order No		= 2081.74.	038

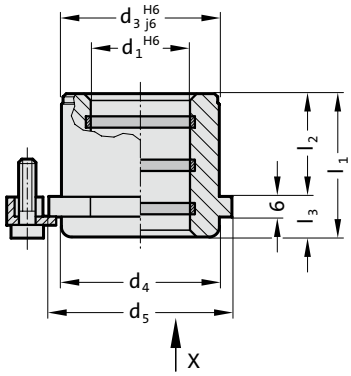
HEADED GUIDE BUSH ECO-LINE, BRONZE WITH SOLID LUBRICANT RINGS, ISO 9448-6



Mounting example

2081.75.

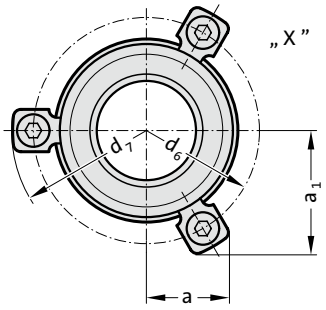




Material:
Bronze with solid lubricant, oilless lubricating

Execution:
Contact surface with solid lubricant rings.
Outside diameter precision ground.

Note:
The attachment is with 3 Screw clamp, from ø d_1 = 38 with 4 Screw clamp , which are included in delivery (Order No: 207.45 - Screw clamp incl. socket cap screw DIN 6912, Head ø 13).
☞Notes on sliding type guides at the beginning of chapter D.
☞Matching guide combinations, see selection matrix at the beginning of chapter D.
☞Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.



2081.75. Headed guide bush ECO-LINE, Bronze with solid lubricant rings, ISO 9448-6

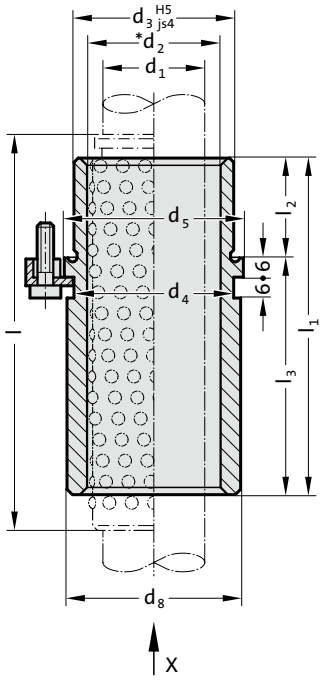
d_1	19 20	24 25	30 32	38 40	48 50	60 63	80
d_3	32	40	48	58	70	85	105
d_4	32	40	48	58	70	85	105
d_5	40	48	56	66	80	95	118
d_6	52	60	67	77	91	106	129
d_7	64.7	72.7	79.7	89.7	103.7	118.7	141
a	20.7	22.65	24.4	35.3	40.2	45.5	54.4
a_1	30	33.4	36.4	35.3	40.2	45.5	54.4
l_1	35	35	42	52	65	80	80
l_2	23	23	30	37	47	60	60
l_3	12	12	12	15	18	20	20

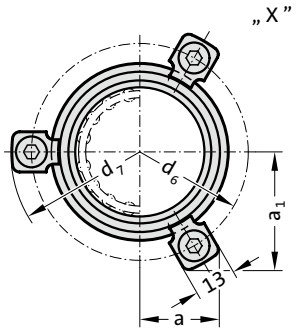
Ordering Code (example):

Headed guide bush ECO-LINE, Bronze with solid lubricant rings, ISO 9448-6		= 2081.75.
Diameter of conduit d_1	38 mm	= 038
Order No		= 2081.75. 038

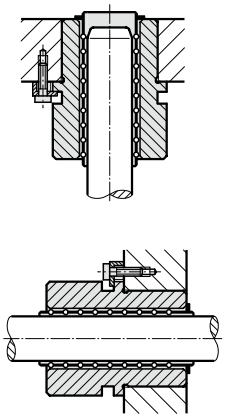
HEADED GUIDE BUSH FOR BALL BEARING, ISO 9448-7

2081.44.





Mounting example



Material:
Tool steel, hardened 62 ± 2 HRC

Execution:
Bearing surfaces honed,
outside diameter precision ground.

Note:
The attachment is with 3 Screw clamp, from ø d_1 = 38 with 4 Screw clamp , which are included in delivery (Order No: 207.45 - Screw clamp incl. socket cap screw DIN 6912, Head ø 13).
☞Notes on ball bearing type guides at the beginning of chapter D.
*☞Preloading see pairing classification at the beginning of chapter D
☞Matching guide combinations, see selection matrix at the beginning of chapter D.
☞Ball guide capacity calculations at the end of chapter D.
☞Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.
Tolerance range:
yellow = .10
green = .20
red = .30

2081.44. Headed guide bush for ball bearing, ISO 9448-7

d_1	19 20	24 25	30 32	38 40	48 50	60 63	80
d_3	32	40	48	58	70	85	105
d_4	32	40	48	58	70	85	105
d_5	40	48	56	66	80	95	118
d_6	52	60	67	77	91	106	129
d_7	64.7	72.7	79.7	89.7	103.7	118.7	141.7
d_8	39	46	53	63	77	92	115
a	20.7	22.65	24.4	35.3	40.2	45.5	54.5
a_1	30	33.4	36.4	35.3	40.2	45.5	54.5
l_1	59	79	93	108	127	150	150
l_2	23	23	30	37	47	60	60
l_3	36	56	63	71	80	90	90
l*	71	95	120	120	140	160	160

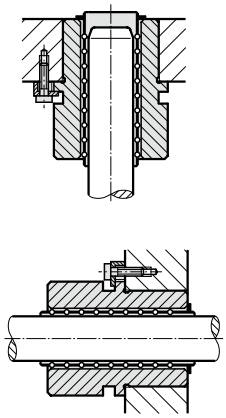
*l = Nominal ordering length of ball cage - prefered length

Ordering Code (example):

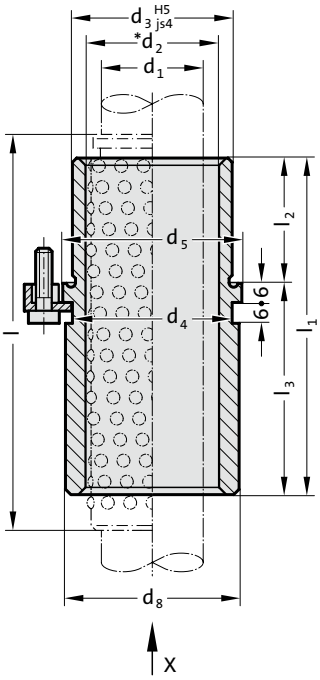
Headed guide bush for ball bearing, ISO 9448-7		=	2081.44.
Diameter of conduit d_1	38 mm	=	038.
Classification TOL	yellow	=	10
Order No		=	2081.44. 038. 10

HEADED GUIDE BUSH FOR BALL BEARING, ISO 9448-7

Mounting example



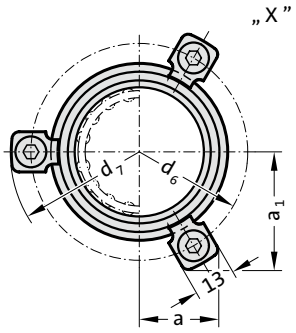
2081.45.



Material:
Tool steel, hardened 62 ± 2 HRC

Execution:
Bearing surfaces honed,
outside diameter precision ground.

Note:
The attachment is with 3 Screw clamp, from ø d_1 = 38 with 4 Screw clamp , which are included in delivery (Order No: 207.45 - Screw clamp incl. socket cap screw DIN 6912, Head ø 13).
☞Notes on ball bearing type guides at the beginning of chapter D.
*☞Preloading see pairing classification at the beginning of chapter D
☞Matching guide combinations, see selection matrix at the beginning of chapter D.
☞Ball guide capacity calculations at the end of chapter D.
☞Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.
Tolerance range:
yellow = .10
green = .20
red = .30



2081.45. Headed guide bush for ball bearing, ISO 9448-7

d_1	24 25	30 32	38 40	48 50
d_3	40	48	58	70
d_4	40	48	58	70
d_5	48	56	66	80
d_6	60	67	77	91
d_7	72.7	79.7	89.7	103.7
d_8	46	53	63	77
a	22.65	24.4	35.3	40.2
a_1	33.4	36.4	35.3	40.2
l_1	80	93	110	131
l_2	30	37	47	60
l_3	50	56	63	71
l*	95	120	140	160

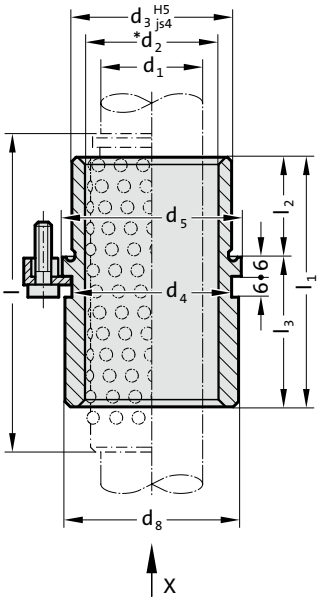
*l = Nominal ordering length of ball cage - prefered length

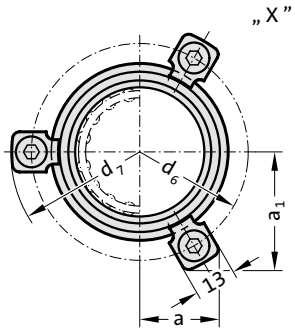
Ordering Code (example):

Headed guide bush for ball bearing, ISO 9448-7		=	2081.45.
Diameter of conduit d_1	38 mm	=	038.
Classification TOL	yellow	=	10
Order No		=	2081.45. 038. 10

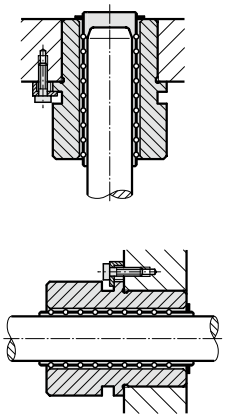
HEADED GUIDE BUSH FOR BALL BEARING, ISO 9448-7

2081.46.





Mounting example



Material:
Tool steel, hardened 62 ± 2 HRC

Execution:
Bearing surfaces honed,
outside diameter precision ground.

Note:
The attachment is with 3 Screw clamp, from ø d_1 = 38 with 4 Screw clamp , which are included in delivery (Order No: 207.45 - Screw clamp incl. socket cap screw DIN 6912, Head ø 13).
☞Notes on ball bearing type guides at the beginning of chapter D.
*☞Preloading see pairing classification at the beginning of chapter D
☞Matching guide combinations, see selection matrix at the beginning of chapter D.
☞Ball guide capacity calculations at the end of chapter D.
☞Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.
Tolerance range:
yellow = .10
green = .20
red = .30

2081.46. Headed guide bush for ball bearing, ISO 9448-7

d_1	19 20	24 25	30 32	38 40	48 50	60 63	80
d_3	32	40	48	58	70	85	105
d_4	32	40	48	58	70	85	105
d_5	40	48	56	66	80	95	118
d_6	52	60	67	77	91	106	129
d_7	64.7	72.7	79.7	89.7	103.7	118.7	141.7
d_8	39	46	53	63	77	92	115
a	20.7	22.65	24.4	35.3	40.2	45.5	54.5
a_1	30	33.4	36.4	35.3	40.2	45.5	54.5
l_1	43	59	75	82	97	116	120
l_2	23	23	30	37	47	60	60
l_3	20	36	45	45	50	56	60
l*	56	71	95	105	120	140	140

*l = Nominal ordering length of ball cage - prefered length

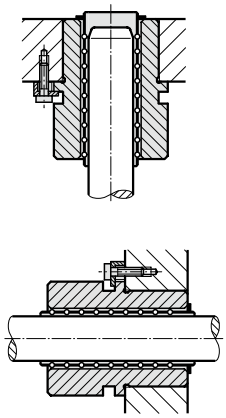
Ordering Code (example):

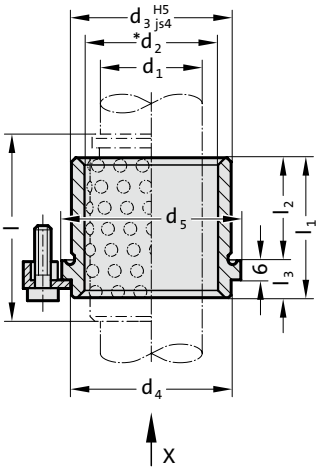
Headed guide bush for ball bearing, ISO 9448-7		=	2081.46.
Diameter of conduit d_1	38 mm	=	038.
Classification TOL	yellow	=	10
Order No		=	2081.46. 038. 10

HEADED GUIDE BUSH FOR BALL BEARING, ISO 9448-7

Mounting example

2081.47.

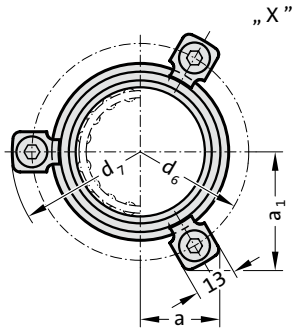




Material:
Tool steel, hardened 62 ± 2 HRC

Execution:
Bearing surfaces honed,
outside diameter precision ground.

Note:
The attachment is with 3 Screw clamp, from ø d_1 = 38 with 4 Screw clamp , which are included in delivery (Order No: 207.45 - Screw clamp incl. socket cap screw DIN 6912, Head ø 13).
☞Notes on ball bearing type guides at the beginning of chapter D.
*☞Preloading see pairing classification at the beginning of chapter D
☞Matching guide combinations, see selection matrix at the beginning of chapter D.
☞Ball guide capacity calculations at the end of chapter D.
☞Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.
Tolerance range:
yellow = .10
green = .20
red = .30



2081.47. Headed guide bush for ball bearing, ISO 9448-7

d_1	19 20	24 25	30 32	38 40	48 50	60 63	80
d_3	32	40	48	58	70	85	105
d_4	32	40	48	58	70	85	105
d_5	40	48	56	66	80	95	118
d_6	52	60	67	77	91	106	129
d_7	64.7	72.7	79.7	89.7	103.7	118.7	141.7
a	20.7	22.65	24.4	35.3	40.2	45.5	54.5
a_1	30	33.4	36.4	35.3	40.2	45.5	54.5
l_1	35	35	42	52	65	80	80
l_2	23	23	30	37	47	60	60
l_3	12	12	12	15	18	20	20
l*	45	45	56	63	80	95	120

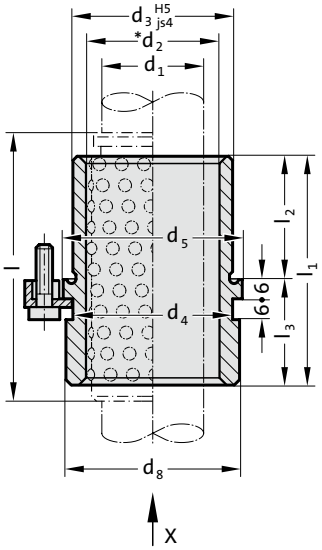
*l = Nominal ordering length of ball cage - prefered length

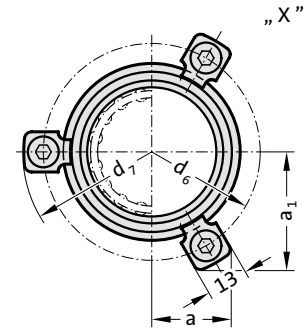
Ordering Code (example):

Headed guide bush for ball bearing, ISO 9448-7		=	2081.47.
Diameter of conduit d_1	38 mm	=	038.
Classification TOL	yellow	=	10
Order No		=	2081.47. 038. 10

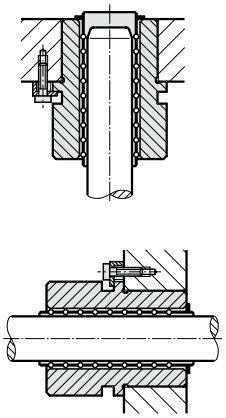
HEADED GUIDE BUSH FOR BALL BEARING, ISO 9448-7

2081.49.





Mounting example



Material:
Tool steel, hardened 62 ± 2 HRC

Execution:
Bearing surfaces honed,
outside diameter precision ground.

Note:
The attachment is with 3 Screw clamp, from ø d_1 = 38 with 4 Screw clamp , which are included in delivery (Order No: 207.45 - Screw clamp incl. socket cap screw DIN 6912, Head ø 13).
☞Notes on ball bearing type guides at the beginning of chapter D.
*☞Preloading see pairing classification at the beginning of chapter D
☞Matching guide combinations, see selection matrix at the beginning of chapter D.
☞Ball guide capacity calculations at the end of chapter D.
☞Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.
Tolerance range:
yellow = .10
green = .20
red = .30

2081.49. Headed guide bush for ball bearing, ISO 9448-7

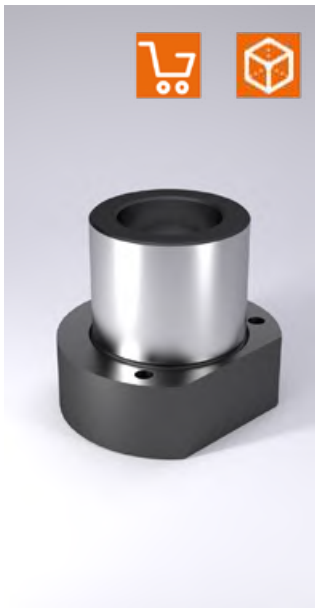
d_1	24 25	30 32	38 40	48 50
d_3	40	48	58	70
d_4	40	48	58	70
d_5	48	56	66	80
d_6	60	67	77	91
d_7	72.7	79.7	89.7	103.7
d_8	46	53	63	77
a	22.65	24.4	35.3	40.2
a_1	33.4	36.4	35.3	40.2
l_1	55	69	79	96
l_2	30	37	47	60
l_3	25	32	32	36
l*	71	80	95	120

*l = Nominal ordering length of ball cage - prefered length

Ordering Code (example):

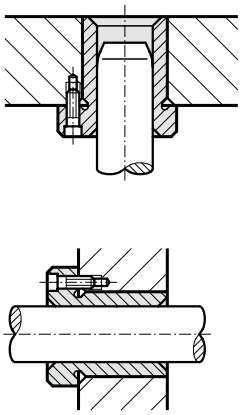
Headed guide bush for ball bearing, ISO 9448-7		=	2081.49.
Diameter of conduit d_1	38 mm	=	038.
Classification TOL	yellow	=	10
Order No		=	2081.49. 038. 10

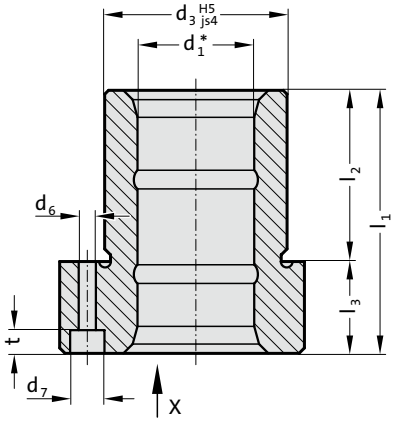
FLANGED GUIDE BUSH, SINTERED FERRITE CARBONITRIDED WITH LONG-TERM LUBRICATION, ISO 9448-4



Mounting example

2091.31.

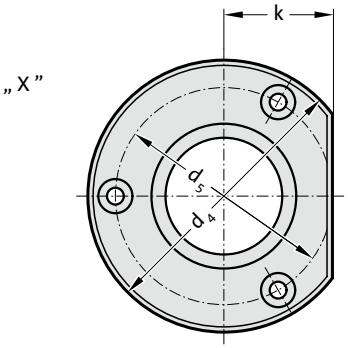




Material:
Sintered ferrite of high purity, carbonitrided, long-term lubrication

Execution:
Bearing surfaces and outside diameter precision ground.

Note:
The guide bush is fixed by means of 3 screws to DIN EN ISO 4762.
The screws are not contained in the scope of delivery.
☞Notes on sliding type guides at the beginning of chapter D.
*☞Bearing clearance see pairing classification at the beginning of chapter D.
☞Matching guide combinations, see selection matrix at the beginning of chapter D.
☞Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.
Tolerance range:
yellow = .10
green = .20
red = .30



2091.31. Flanged guide bush, sintered ferrite carbonitrided with long-term lubrication, ISO 9448-4

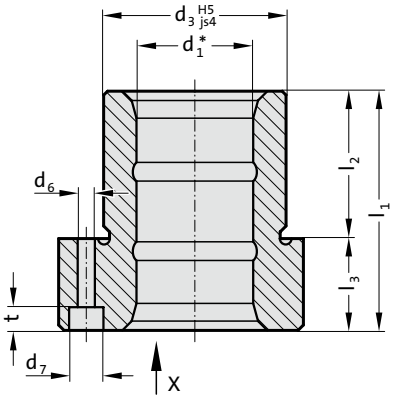
d_1	19 20	24 25	30 32	38 40	48 50	60 63	80
d_3	32	40	48	58	70	85	105
d_4	50	63	72	85	104	120	148
d_5	40	50	58	70	86	100	125
d_6	4.5	5.5	5.5	6.6	9	9	11
d_7	8	10	10	11	15	15	18
k	18	23	28	33	38	46	56
l_1	52	62	72	77	102	102	125
l_2	37	37	47	47	60	60	75
l_3	15	25	25	30	42	42	50
t	4.6	5.7	5.7	6.8	9	9	11

Ordering Code (example):

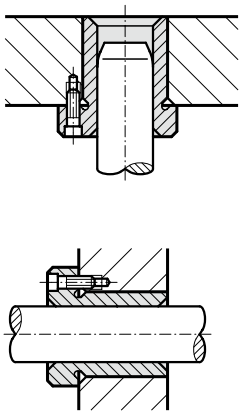
Flanged guide bush, sintered ferrite carbonitrided with long-term lubrication, ISO 9448-4		=	2091.31.
Diameter of conduit d_1	38 mm	=	038.
Classification TOL	yellow	=	10
Order No		=	2091.31. 038. 10

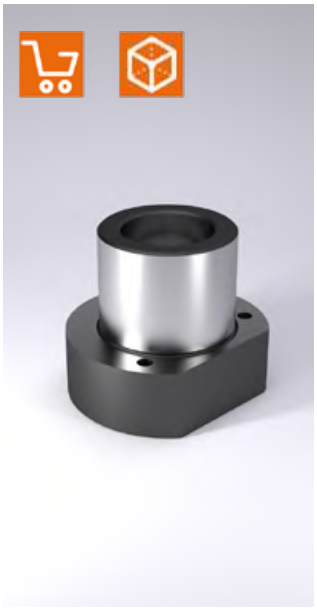
FLANGED GUIDE BUSH, SINTERED FERRITE CARBONITRIDED WITH LONG-TERM LUBRICATION, ISO 9448-4

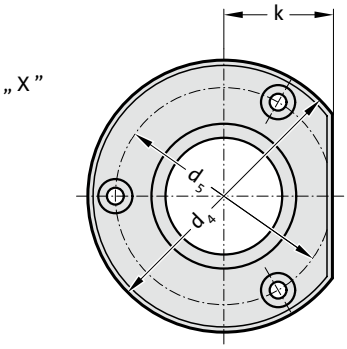
2091.32.



Mounting example







Material:
Sintered ferrite of high purity, carbonitrided, long-term lubrication

Execution:
Bearing surfaces and outside diameter precision ground.

Note:
The guide bush is fixed by means of 3 srews up to ø 16: with screws to DIN 6912, from ø 19: with screws to DIN EN ISO 4762.
The screws are not contained in the scope of delivery.
☞Notes on sliding type guides at the beginning of chapter D.
*☞Bearing clearance see pairing classification at the beginning of chapter D.
☞Matching guide combinations, see selection matrix at the beginning of chapter D.
☞Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.
Tolerance range:
yellow = .10
green = .20
red = .30

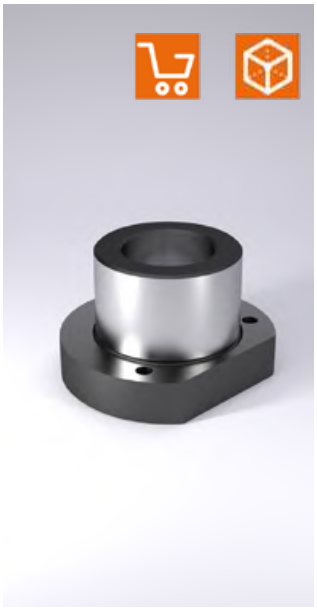
2091.32. Flanged guide bush, sintered ferrite carbonitrided with long-term lubrication, ISO 9448-4

d_1	15 16	19 20	24 25	30 32	38 40	48 50	60 63
d_3	28	32	40	48	58	70	85
d_4	45	50	63	72	85	104	120
d_5	35	40	50	58	70	86	100
d_6	4.5	4.5	5.5	5.5	6.6	9	9
d_7	8	8	10	10	11	15	15
k	15	18	23	28	33	38	46
l_1	36	45	55	62	67	89	89
l_2	30	30	30	37	37	47	47
l_3	6	15	25	25	30	42	42
t	3.4	4.6	5.7	5.7	6.8	9	9

Ordering Code (example):

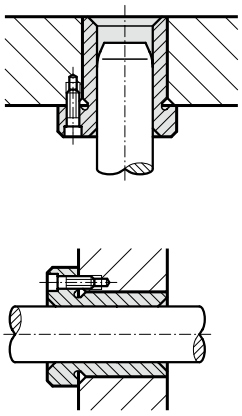
Flanged guide bush, sintered ferrite carbonitrided with long-term lubrication, ISO 9448-4		=	2091.32.
Diameter of conduit d_1	32 mm	=	032.
Classification TOL	yellow	=	10
Order No		=	2091.32. 032. 10

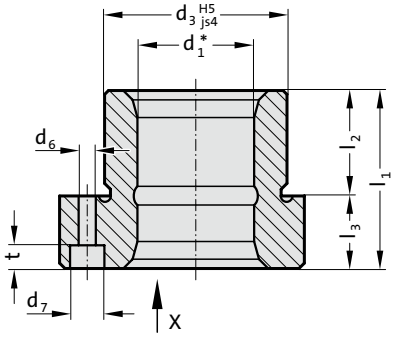
FLANGED GUIDE BUSH, SINTERED FERRITE CARBONITRIDED WITH LONG-TERM LUBRICATION, ISO 9448-4



Mounting example

2091.34.

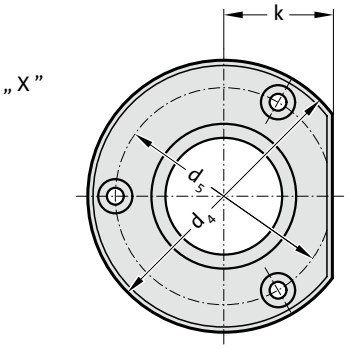




Material:
Sintered ferrite of high purity, carbonitrided, long-term lubrication

Execution:
Bearing surfaces and outside diameter precision ground.

Note:
The guide bush is fixed by means of 3 srews up to ø 16: with screws to DIN 6912, from ø 19: with screws to DIN EN ISO 4762.
The screws are not contained in the scope of delivery.
☞Notes on sliding type guides at the beginning of chapter D.
*☞Bearing clearance see pairing classification at the beginning of chapter D.
☞Matching guide combinations, see selection matrix at the beginning of chapter D.
☞Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.
Tolerance range:
yellow = .10
green = .20
red = .30



2091.34. Flanged guide bush, sintered ferrite carbonitrided with long-term lubrication, ISO 9448-4

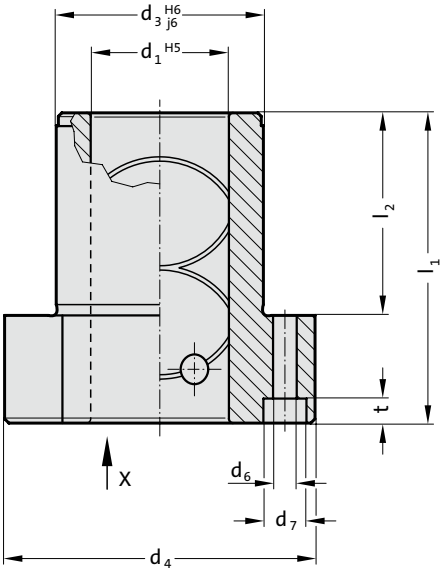
d_1	15 16	19 20	24 25	30 32	38 40	48 50
d_3	28	32	40	48	58	70
d_4	45	50	63	72	85	104
d_5	35	40	50	58	70	86
d_6	4.5	4.5	5.5	5.5	6.6	9
d_7	8	8	10	10	11	15
k	15	18	23	28	33	38
l_1	29	38	38	45	55	62
l_2	23	23	23	30	30	37
l_3	6	15	15	15	25	25
t	3.4	4.6	5.7	5.7	6.8	9

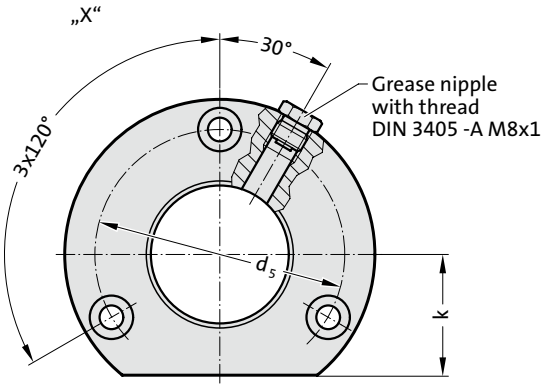
Ordering Code (example):

Flanged guide bush, sintered ferrite carbonitrided with long-term lubrication, ISO 9448-4		=	2091.34.
Diameter of conduit d_1	30 mm	=	030.
Classification TOL	yellow	=	10
Order No		=	2091.34. 030. 10

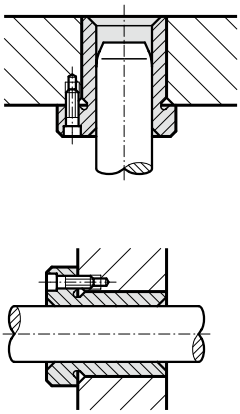
FLANGED GUIDE BUSH ECO-LINE, BRONZEPLATED, ISO 9448-4

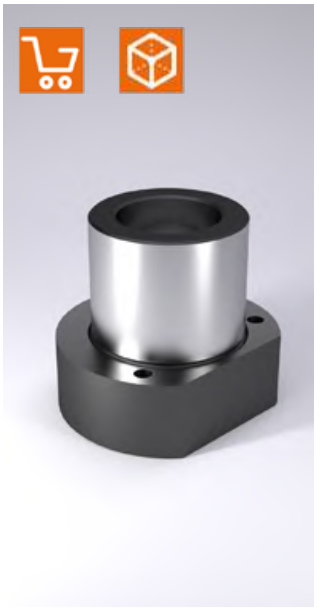
2091.91.





Mounting example





Material:
Steel, d_3 induction hardened

Execution:
Bronze coated internal bore.
Outside diameter fine-ground.

Note:
The guide bush is fixed by means of 3 screws to DIN EN ISO 4762.
The screws are not contained in the scope of delivery.
☞Notes on sliding type guides at the beginning of chapter D.
☞Matching guide combinations, see selection matrix at the beginning of chapter D.
☞Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.

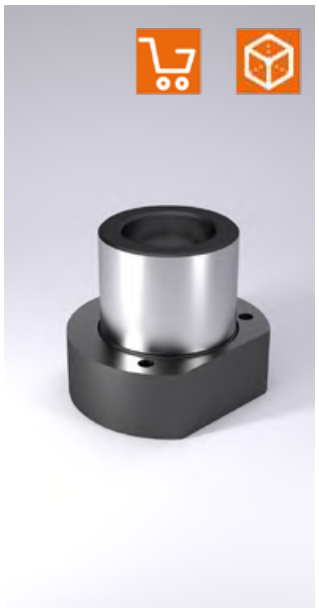
2091.91. Flanged guide bush ECO-LINE, bronzeplated, ISO 9448-4

d_1	19 20	24 25	30 32	38 40	48 50	60 63	80
d_3	32	40	48	58	70	85	105
d_4	50	63	72	85	104	120	146
d_5	40	50	58	70	86	100	125
d_6	4.5	5.5	5.5	6.6	9	9	11
d_7	8	10	10	11	15	15	18
k	18	23	28	33	38	46	56
l_1	52	62	72	77	102	102	125
l_2	37	37	47	47	60	60	75
t	4.6	5.7	5.7	6.8	9	9	11

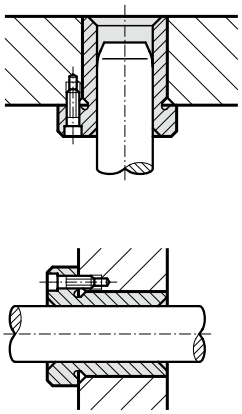
Ordering Code (example):

Flanged guide bush ECO-LINE, bronzeplated, ISO 9448-4		=	2091.91.
Diameter of conduit d_1	38 mm	=	038
Order No		=	2091.91. 038

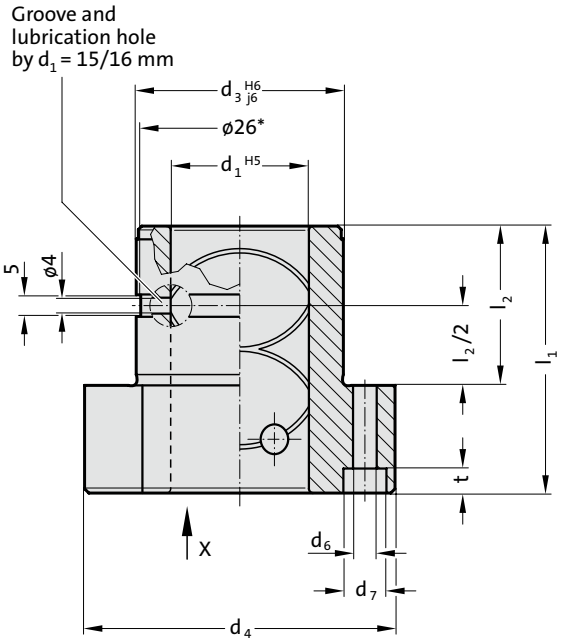
FLANGED GUIDE BUSH ECO-LINE, BRONZEPLATED, ISO 9448-4



Mounting example



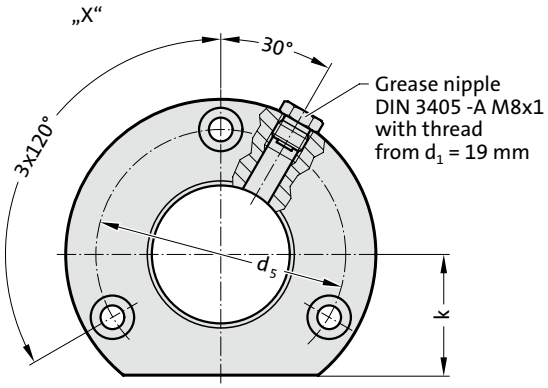
2091.92.



Material:
Steel, d_3 induction hardened

Execution:
Bronze coated internal bore.
Outside diameter fine-ground.

Note:
The guide bush is fixed by means of 3 srews up to ø 16: with screws to DIN 6912, from ø 19: with screws to DIN EN ISO 4762.
The screws are not contained in the scope of delivery.
☞Notes on sliding type guides at the beginning of chapter D.
☞Matching guide combinations, see selection matrix at the beginning of chapter D.
☞Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.



2091.92. Flanged guide bush ECO-LINE, bronzeplated, ISO 9448-4

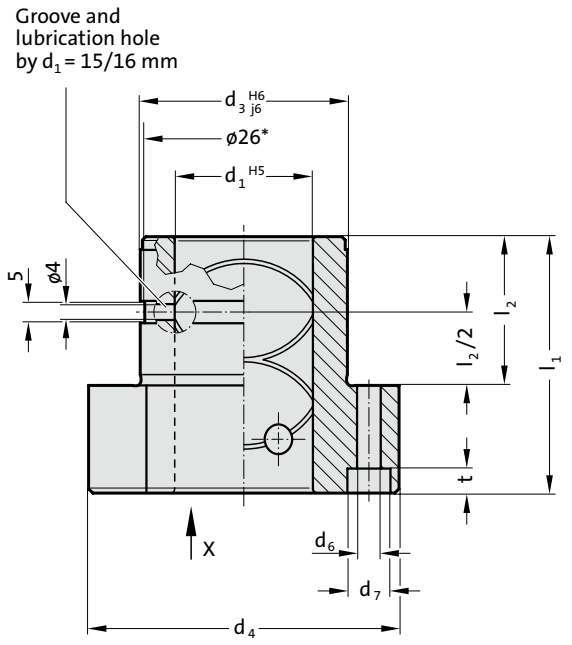
d_1	15 16	19 20	24 25	30 32	38 40	48 50	60 63
d_3	28	32	40	48	58	70	85
d_4	45	50	63	72	85	104	120
d_5	35	40	50	58	70	86	100
d_6	4.5	4.5	5.5	5.5	6.6	9	9
d_7	8	8	10	10	11	15	15
k	15	18	23	28	33	38	46
l_1	36	45	55	62	67	89	89
l_2	30	30	30	37	37	47	47
t	3.4	4.6	5.7	5.7	6.8	9	9

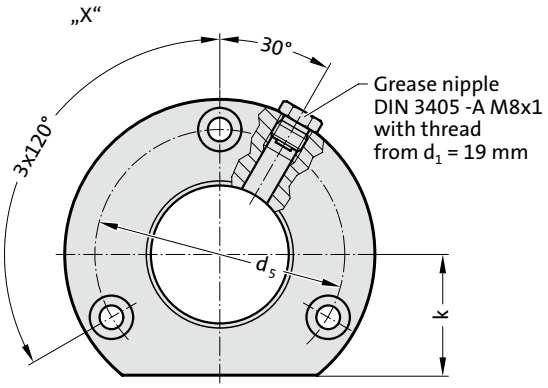
Ordering Code (example):

Flanged guide bush ECO-LINE, bronzeplated, ISO 9448-4		= 2091.92.	
Diameter of conduit d_1	32 mm	=	032
Order No		= 2091.92.	032

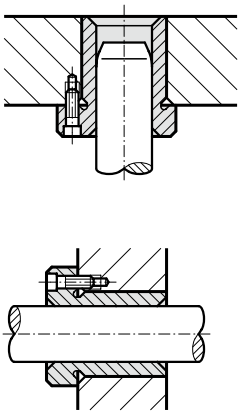
FLANGED GUIDE BUSH ECO-LINE, BRONZEPLATED, ISO 9448-4

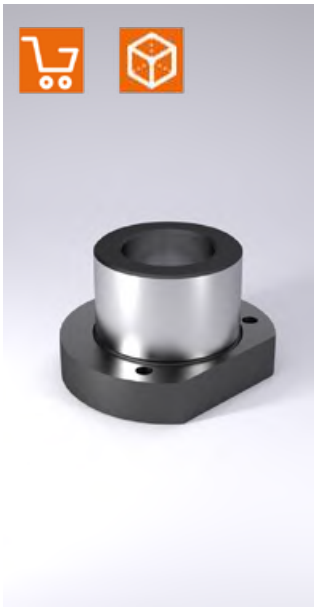
2091.94.





Mounting example





Material:
Steel, d_3 induction hardened

Execution:
Bronze coated internal bore.
Outside diameter fine-ground.

Note:
The guide bush is fixed by means of 3 srews up to ø 16: with screws to DIN 6912, from ø 19: with screws to DIN EN ISO 4762.
The screws are not contained in the scope of delivery.
☞Notes on sliding type guides at the beginning of chapter D.
☞Matching guide combinations, see selection matrix at the beginning of chapter D.
☞Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.

2091.94. Flanged guide bush ECO-LINE, bronzeplated, ISO 9448-4

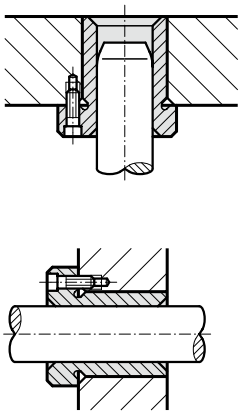
d_1	15 16	19 20	24 25	30 32	38 40	48 50
d_3	28	32	40	48	58	70
d_4	45	50	63	72	85	104
d_5	35	40	50	58	70	86
d_6	4.5	4.5	5.5	5.5	6.6	9
d_7	8	8	10	10	11	15
k	15	18	23	28	33	38
l_1	29	38	38	45	55	62
l_2	23	23	23	30	30	37
t	3.4	4.6	5.7	5.7	6.8	9

Ordering Code (example):

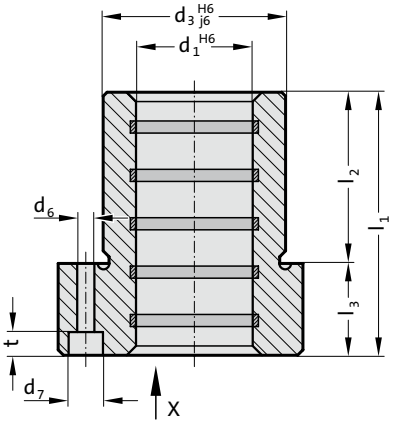
Flanged guide bush ECO-LINE, bronzeplated, ISO 9448-4		=	2091.94.
Diameter of conduit d_1	30 mm	=	030
Order No		=	2091.94. 030

FLANGED GUIDE BUSH ECO-LINE, BRONZE WITH SOLID LUBRICANT RINGS, ISO 9448-4

Mounting example



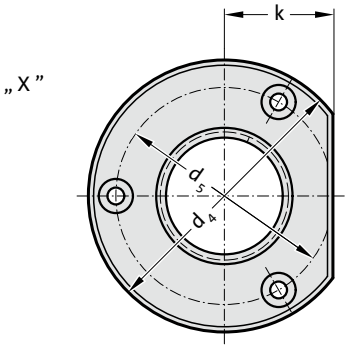
2091.71.



Material:
Bronze with solid lubricant, oilless lubricating

Execution:
Contact surface with solid lubricant rings.
Outside diameter precision ground.

Note:
The guide bush is fixed by means of 3 screws to DIN EN ISO 4762.
The screws are not contained in the scope of delivery.
☞Notes on sliding type guides at the beginning of chapter D.
☞Matching guide combinations, see selection matrix at the beginning of chapter D.
☞Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.



2091.71. Flanged guide bush ECO-LINE, Bronze with solid lubricant rings, ISO 9448-4

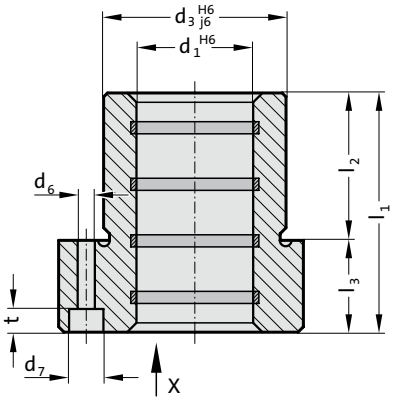
d_1	19 20	24 25	30 32	38 40	48 50	60 63	80
d_3	32	40	48	58	70	85	105
d_4	50	63	72	85	104	120	148
d_5	40	50	58	70	86	100	125
d_6	4.5	5.5	5.5	6.6	9	9	11
d_7	8	10	10	11	15	15	18
k	18	23	28	33	38	46	56
l_1	52	62	72	77	102	102	125
l_2	37	37	47	47	60	60	75
l_3	15	25	25	30	42	42	50
t	4.6	5.7	5.7	6.8	9	9	11

Ordering Code (example):

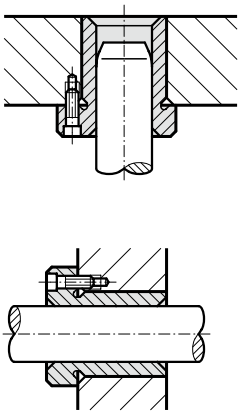
Flanged guide bush ECO-LINE, Bronze with solid lubricant rings, ISO 9448-4		= 2091.71.
Diameter of conduit d_1	38 mm	= 038
Order No		= 2091.71. 038

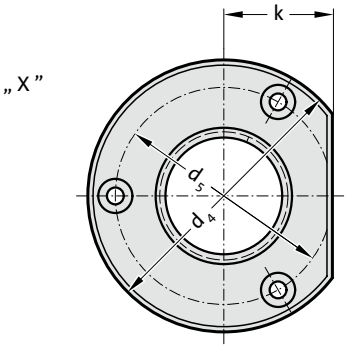
FLANGED GUIDE BUSH ECO-LINE, BRONZE WITH SOLID LUBRICANT RINGS, ISO 9448-4

2091.72.



Mounting example





Material:
Bronze with solid lubricant, oilless lubricating

Execution:
Contact surface with solid lubricant rings.
Outside diameter precision ground.

Note:
The guide bush is fixed by means of 3 srews up to ø 16: with screws to DIN 6912, from ø 19: with screws to DIN EN ISO 4762.
The screws are not contained in the scope of delivery.
☞Notes on sliding type guides at the beginning of chapter D.
☞Matching guide combinations, see selection matrix at the beginning of chapter D.
☞Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.

2091.72. Flanged guide bush ECO-LINE, Bronze with solid lubricant rings, ISO 9448-4

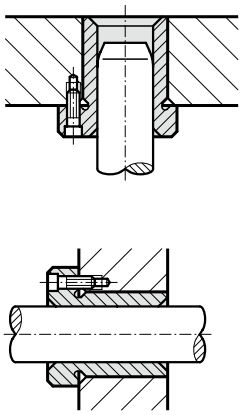
d_1	15 16	19 20	24 25	30 32	38 40	48 50	60 63
d_3	28	32	40	48	58	70	85
d_4	45	50	63	72	85	104	120
d_5	35	40	50	58	70	86	100
d_6	4.5	4.5	5.5	5.5	6.6	9	9
d_7	8	8	10	10	11	15	15
k	15	18	23	28	33	38	46
l_1	36	45	55	62	67	89	89
l_2	30	30	30	37	37	47	47
l_3	6	15	25	25	30	42	42
t	3.4	4.6	5.7	5.7	6.8	9	9

Ordering Code (example):

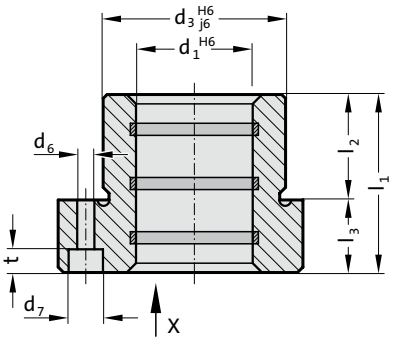
Flanged guide bush ECO-LINE, Bronze with solid lubricant rings, ISO 9448-4	= 2091.72.	
Diameter of conduit d_1	32 mm =	032
Order No	= 2091.72.	032

FLANGED GUIDE BUSH ECO-LINE, BRONZE WITH SOLID LUBRICANT RINGS, ISO 9448-4

Mounting example



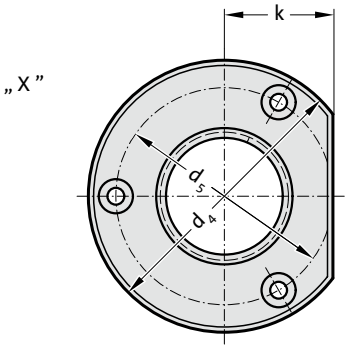
2091.74.



Material:
Bronze with solid lubricant, oilless lubricating

Execution:
Contact surface with solid lubricant rings.
Outside diameter precision ground.

Note:
The guide bush is fixed by means of 3 srews up to ø 16: with screws to DIN 6912, from ø 19: with screws to DIN EN ISO 4762.
The screws are not contained in the scope of delivery.
☞Notes on sliding type guides at the beginning of chapter D.
☞Matching guide combinations, see selection matrix at the beginning of chapter D.
☞Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.



2091.74. Flanged guide bush ECO-LINE, Bronze with solid lubricant rings, ISO 9448-4

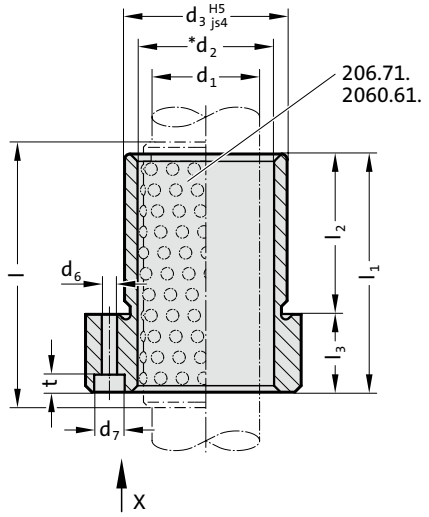
d_1	15 16	19 20	24 25	30 32	38 40	48 50
d_3	28	32	40	48	58	70
d_4	45	50	63	72	85	104
d_5	35	40	50	58	70	86
d_6	4.5	4.5	5.5	5.5	6.6	9
d_7	8	8	10	10	11	15
k	15	18	23	28	33	38
l_1	29	38	38	45	55	62
l_2	23	23	23	30	30	37
l_3	6	15	15	15	25	25
t	3.4	4.6	5.7	5.7	6.8	9

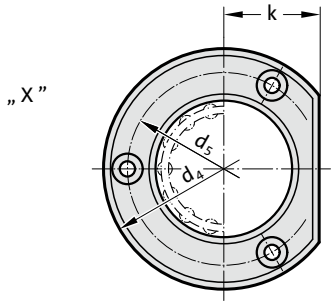
Ordering Code (example):

Flanged guide bush ECO-LINE, Bronze with solid lubricant rings, ISO 9448-4	= 2091.74.	
Diameter of conduit d_1	30 mm =	030
Order No	= 2091.74.	030

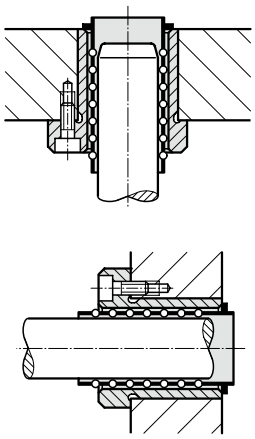
FLANGED GUIDE BUSH FOR BALL BEARING, ISO 9448-5

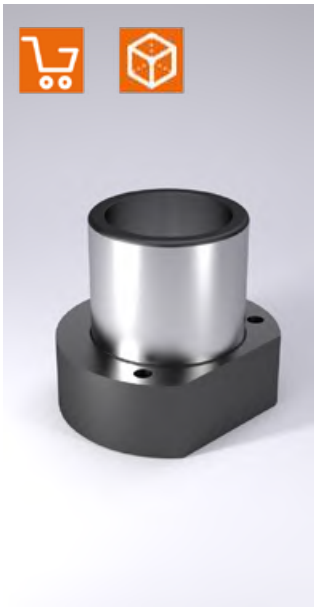
2091.44.





Mounting example





Material:
Tool steel, hardened 62 ± 2 HRC

Execution:
Bearing surfaces honed,
outside diameter precision ground.

Note:
The guide bush is fixed by means of 3 screws to DIN EN ISO 4762.
The screws are not contained in the scope of delivery.
☞ Notes on ball bearing type guides at the beginning of chapter D.
*☞ Preloading see pairing classification at the beginning of chapter D
☞ Matching guide combinations, see selection matrix at the beginning of chapter D.
☞ Ball guide capacity calculations at the end of chapter D.
☞ Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.
Tolerance range:
yellow = .10
green = .20
red = .30

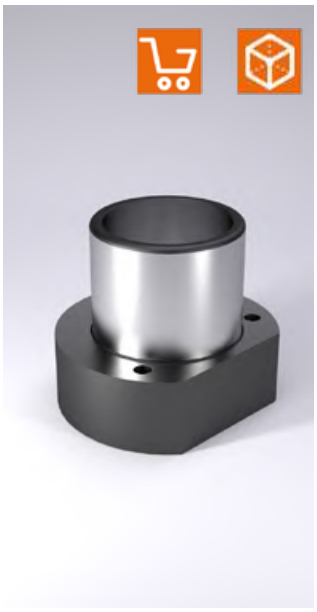
2091.44. Flanged guide bush for ball bearing, ISO 9448-5

d_1	19 20	24 25	30 32	38 40	48 50	60 63	80
d_3	32	40	48	58	70	85	105
d_4	50	63	72	85	104	120	148
d_5	40	50	58	70	86	100	125
d_6	4.5	5.5	5.5	6.6	9	9	11
d_7	8	10	10	11	15	15	18
l_1	52	62	72	77	102	102	125
l_2	37	37	47	47	60	60	75
l_3	15	25	25	30	42	42	50
l*	71	71	80	95	120	120	140

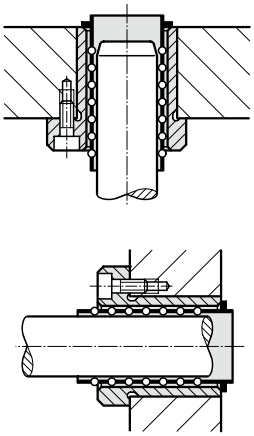
Ordering Code (example):

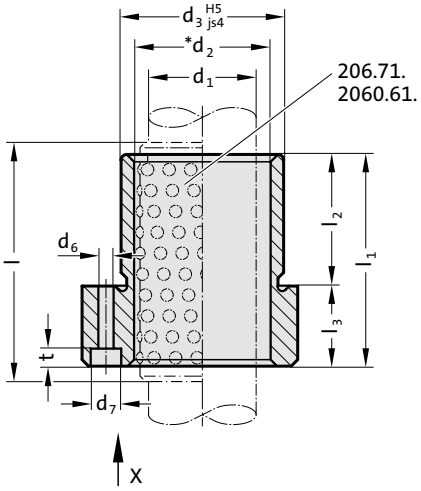
Flanged guide bush for ball bearing, ISO 9448-5		=	2091.44.
Diameter of conduit d_1	38 mm	=	038.
Classification TOL	yellow	=	10
Order No		=	2091.44. 038. 10

FLANGED GUIDE BUSH FOR BALL BEARING, ISO 9448-5



Mounting example 2091.45.

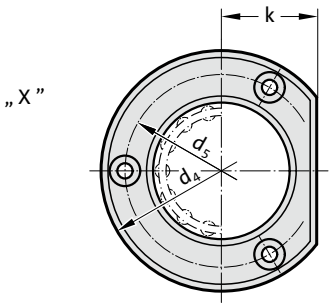




Material:
Tool steel, hardened 62 ± 2 HRC

Execution:
Bearing surfaces honed,
outside diameter precision ground.

Note:
The guide bush is fixed by means of 3 srews up to ø 16: with screws to DIN 6912, from ø 19: with screws to DIN EN ISO 4762.
The screws are not contained in the scope of delivery.
☞Notes on ball bearing type guides at the beginning of chapter D.
*☞Preloading see pairing classification at the beginning of chapter D
☞Matching guide combinations, see selection matrix at the beginning of chapter D.
☞Ball guide capacity calculations at the end of chapter D.
☞Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.
Tolerance range:
yellow = .10
green = .20
red = .30



2091.45. Flanged guide bush for ball bearing, ISO 9448-5

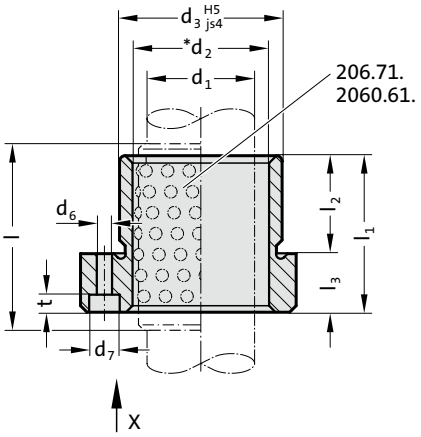
d_1	15 16	19 20	24 25	30 32	38 40	48 50	60 63
d_3	28	32	40	48	58	70	85
d_4	45	50	63	72	85	104	120
d_5	35	40	50	58	70	86	100
d_6	4.5	4.5	5.5	5.5	6.6	9	9
d_7	8	8	10	10	11	15	15
k	15	18	23	28	33	38	46
l_1	36	45	55	62	67	89	89
l_2	30	30	30	37	37	47	47
l_3	6	15	25	25	30	42	42
t	3.4	4.6	5.7	5.7	6.8	9	9
l*	45	56	71	71	80	95	95

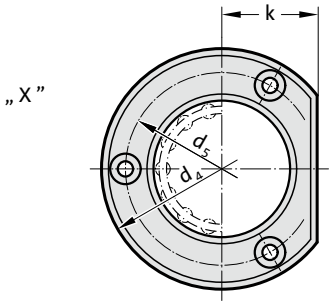
Ordering Code (example):

Flanged guide bush for ball bearing, ISO 9448-5		=	2091.45.
Diameter of conduit d_1	32 mm	=	032.
Classification TOL	yellow	=	10
Order No		=	2091.45. 032. 10

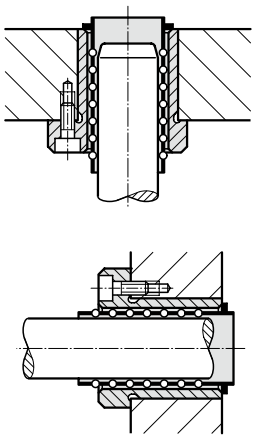
FLANGED GUIDE BUSH FOR BALL BEARING, ISO 9448-5

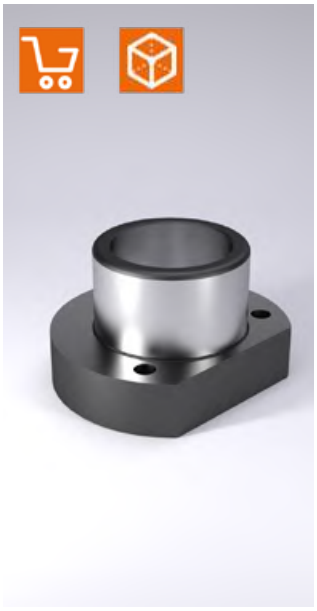
2091.46.





Mounting example





Material:
Tool steel, hardened 62 ± 2 HRC

Execution:
Bearing surfaces honed,
outside diameter precision ground.

Note:
The guide bush is fixed by means of 3 srews up to ø 16: with screws to DIN 6912, from ø 19: with screws to DIN EN ISO 4762.
The screws are not contained in the scope of delivery.
☞Notes on ball bearing type guides at the beginning of chapter D.
*☞Preloading see pairing classification at the beginning of chapter D
☞Matching guide combinations, see selection matrix at the beginning of chapter D.
☞Ball guide capacity calculations at the end of chapter D.
☞Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.
Tolerance range:
yellow = .10
green = .20
red = .30

2091.46. Flanged guide bush for ball bearing, ISO 9448-5

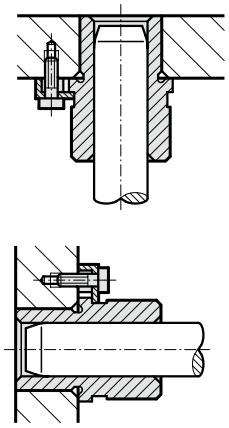
d_1	12	15 16	19 20	24 25	30 32	38 40	48 50
d_3	26	28	32	40	48	58	70
d_4	43	45	50	63	72	85	104
d_5	33	35	40	50	58	70	86
d_6	4.5	4.5	4.5	5.5	5.5	6.6	9
d_7	8	8	8	10	10	11	15
k	13	15	18	23	28	33	38
l_1	25	29	38	38	45	55	62
l_2	16	23	23	23	30	30	37
l_3	9	6	15	15	15	25	25
t	4.6	3.4	4.6	5.7	5.7	6.8	9
l*	40	45	45	45	56	63	80

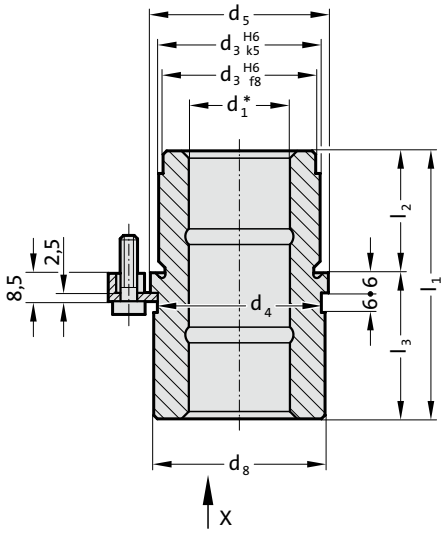
Ordering Code (example):

Flanged guide bush for ball bearing, ISO 9448-5		=	2091.46.
Diameter of conduit d_1	25 mm	=	025.
Classification TOL	yellow	=	10
Order No		=	2091.46. 025. 10

HEADED GUIDE BUSH, SINTERED FERRITE CARBONITRIDED WITH LONG-TERM LUBRICATION, ~AFNOR

Mounting example 210.31.

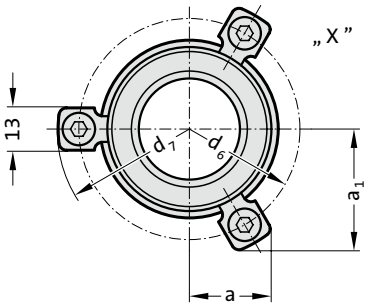




Material:
Sintered ferrite of high purity, carbonitrided, long-term lubrication

Execution:
Bearing surfaces and outside diameter precision ground.

Note:
The attachment is with 3 Screw clamp, from ø d_1 = 38 with 4 Screw clamp , which are included in delivery (Order No: 207.45 - Screw clamp incl. socket cap screw DIN 6912, Head ø 13).
☞Notes on sliding type guides at the beginning of chapter D.
*☞Bearing clearance see pairing classification at the beginning of chapter D.
☞Matching guide combinations, see selection matrix at the beginning of chapter D.
☞Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.
Tolerance range:
yellow = .10
green = .20
red = .30



210.31. Headed guide bush, sintered ferrite carbonitrided with long-term lubrication, ~AFNOR

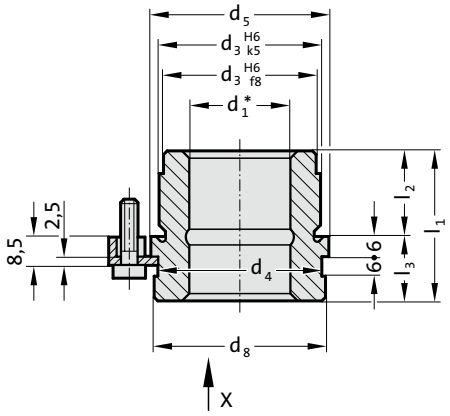
d_1	19 20	25	32	40	50
d_3	32	40	50	63	80
d_4	32	40	50	63	80
d_5	36	45	56	70	90
d_6	49	57	67	81	101
d_7	61.7	69.7	79.7	93.7	113.7
d_8	35	43.5	53	67	87
a	19.9	21.9	24.4	36	43
a_1	28.6	32.1	36.4	36	43
l_1	66	70	83	98	120
l_2	30	30	38	48	61
l_3	36	40	45	50	59

Ordering Code (example):

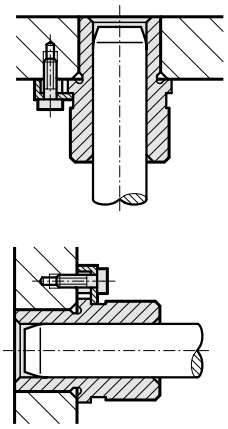
Headed guide bush, sintered ferrite carbonitrided with long-term lubrication, ~AFNOR		=	210.31.
Diameter of conduit d_1	32 mm	=	032.
Classification TOL	yellow	=	10
Order No		=	210.31. 032. 10

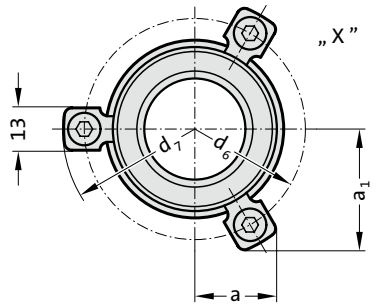
HEADED GUIDE BUSH, SINTERED FERRITE CARBONITRIDED WITH LONG-TERM LUBRICATION, ~AFNOR

210.34.



Mounting example





Material:
Sintered ferrite of high purity, carbonitrided, long-term lubrication

Execution:
Bearing surfaces and outside diameter precision ground.

Note:
The attachment is with 3 Screw clamp, from ø d_1 = 38 with 4 Screw clamp , which are included in delivery (Order No: 207.45 - Screw clamp incl. socket cap screw DIN 6912, Head ø 13).
☞Notes on sliding type guides at the beginning of chapter D.
*☞Bearing clearance see pairing classification at the beginning of chapter D.
☞Matching guide combinations, see selection matrix at the beginning of chapter D.
☞Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.
Tolerance range:
yellow = .10
green = .20
red = .30

210.34. Headed guide bush, sintered ferrite carbonitrided with long-term lubrication, ~AFNOR

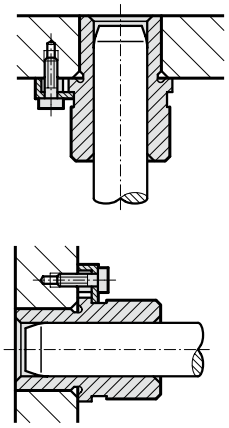
d_1	19 20	25	32	40	50
d_3	32	40	50	63	80
d_4	32	40	50	63	80
d_5	36	45	56	70	90
d_6	49	57	67	81	101
d_7	61.7	69.7	79.7	93.7	113.7
d_8	35	43.5	53	67	87
a	19.9	21.9	24.4	36	43
a_1	28.6	32.1	36.4	36	43
l_1	42	50	63	76	96
l_2	30	38	48	61	78
l_3	12	12	15	15	18

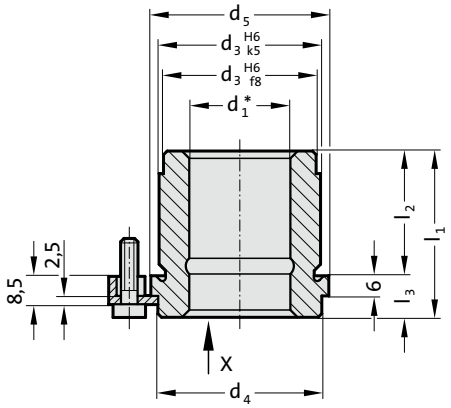
Ordering Code (example):

Headed guide bush, sintered ferrite carbonitrided with long-term lubrication, ~AFNOR		=	210.34.
Diameter of conduit d_1	32 mm	=	032.
Classification TOL	yellow	=	10
Order No		=	210.34. 032. 10

HEADED GUIDE BUSH, SINTERED FERRITE CARBONITRIDED WITH LONG-TERM LUBRICATION, ~AFNOR

Mounting example 210.35.

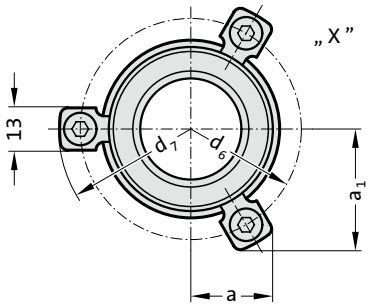




Material:
Sintered ferrite of high purity, carbonitrided, long-term lubrication

Execution:
Bearing surfaces and outside diameter precision ground.

Note:
The attachment is with 3 Screw clamp, from ø d_1 = 38 with 4 Screw clamp , which are included in delivery (Order No: 207.45 - Screw clamp incl. socket cap screw DIN 6912, Head ø 13).
☞Notes on sliding type guides at the beginning of chapter D.
*☞Bearing clearance see pairing classification at the beginning of chapter D.
☞Matching guide combinations, see selection matrix at the beginning of chapter D.
☞Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.
Tolerance range:
yellow = .10
green = .20
red = .30



210.35. Headed guide bush, sintered ferrite carbonitrided with long-term lubrication, ~AFNOR

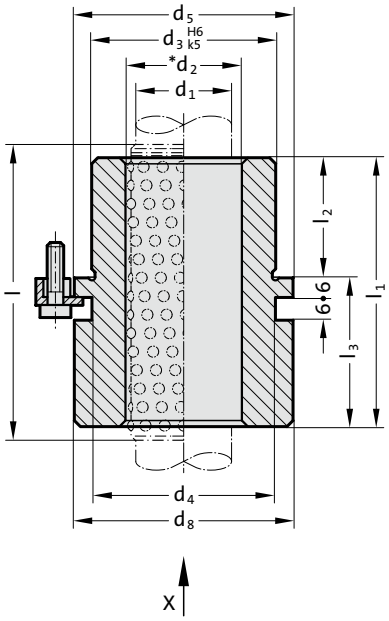
d_1	19 20	25	32	40	50
d_3	32	40	50	63	80
d_4	32	40	50	63	80
d_5	36	45	56	70	90
d_6	49	57	67	81	101
d_7	61.7	69.7	79.7	93.7	113.7
a	19.9	21.9	24.4	36	43
a_1	28.6	32.1	36.4	36	43
l_1	28	32	37	44	44
l_2	16	20	25	32	32
l_3	12	12	12	12	12

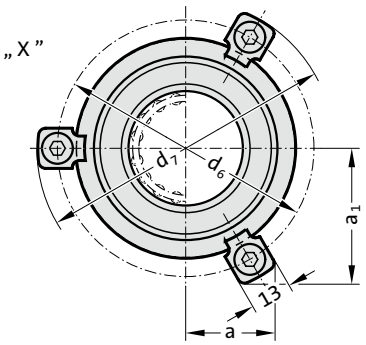
Ordering Code (example):

Headed guide bush, sintered ferrite carbonitrided with long-term lubrication, ~AFNOR		=	210.35.
Diameter of conduit d_1	32 mm	=	032.
Classification TOL	yellow	=	10
Order No		=	210.35. 032. 10

HEADED GUIDE BUSH FOR BALL BEARING, ~AFNOR

210.44.



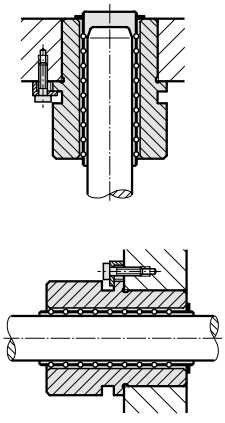


Material:
Tool steel, hardened 62 ± 2 HRC

Execution:
Bearing surfaces honed,
outside diameter precision ground.

Note:
The attachment is with 3 Screw clamp, from ø d_1 = 38 with 4 Screw clamp , which are included in delivery (Order No: 207.45 - Screw clamp incl. socket cap screw DIN 6912, Head ø 13).
☞Notes on ball bearing type guides at the beginning of chapter D.
*☞Preloading see pairing classification at the beginning of chapter D
☞Matching guide combinations, see selection matrix at the beginning of chapter D.
☞Ball guide capacity calculations at the end of chapter D.
☞Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.
Tolerance range:
yellow = .10
green = .20
red = .30

Mounting example



HEADED GUIDE BUSH FOR BALL BEARING, ~AFNOR

210.44. Headed guide bush for ball bearing, ~AFNOR

d_1	16	20	25	32	40	50	63
d_2	22	26	31	40	48	58	71
d_3	28	32	40	50	63	80	90
d_4	29	32	40	50	63	80	90
d_5	32	36	45	56	70	90	110
d_6	45	49	57	67	81	101	121
d_7	57.7	61.7	69.7	79.7	93.7	113.7	131.7
d_8	31	35	43.5	53.5	67	87	107
a	18.9	19.9	21.9	24.4	36	43	50.1
a_1	26.9	28.6	32.1	36.4	36	43	50.1
l_3	32	36	40	45	50	63	63
l_2	l_1 / l						
23	55 / 63		63 / 71	68 / 80			
30	62 / 71	66 / 71	70 / 80	75 / 80	80 / 95		
38	70 / 71	74 / 80	78 / 95	83 / 95	88 / 95	101 / 120	
48			88 / 100	93 / 105	98 / 105	111 / 120	
61			101 / 120	106 / 120	111 / 120	124 / 140	
78				123 / 120	128 / 140	141 / 160	
98					148 / 160	161 / 180	161 / 180
123							186 / 200

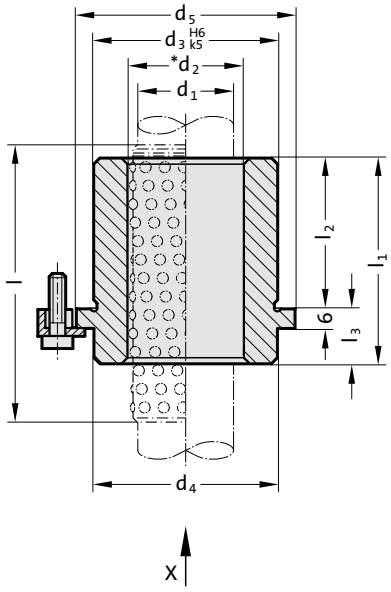
*l = Nominal ordering length of ball cage - prefered length

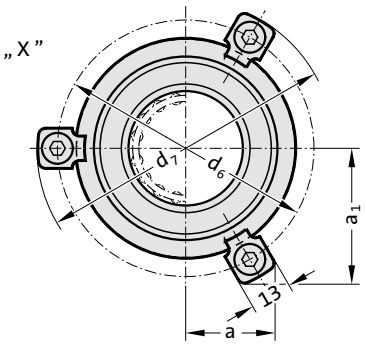
Ordering Code (example):

Headed guide bush for ball bearing, ~AFNOR		=	210.44.
Diameter of conduit d_1	32 mm	=	032.
Installation length l2	61 mm	=	061.
Classification TOL	yellow	=	10
Order No		=	210.44. 032. 061. 10

HEADED GUIDE BUSH FOR BALL BEARING, ~AFNOR

210.46.





Material:
Tool steel, hardened 62 ± 2 HRC

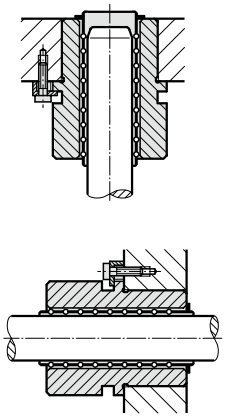
Execution:
Bearing surfaces honed, outside diameter fine-ground.

Note:
The attachment is with 3 Screw clamp, from ø d_1 = 38 with 4 Screw clamp , which are included in delivery (Order No: 207.45 - Screw clamp incl. socket cap screw DIN 6912, Head ø 13).

☞Notes on ball bearing type guides at the beginning of chapter D.
*☞Preloading see pairing classification at the beginning of chapter D
☞Matching guide combinations, see selection matrix at the beginning of chapter D.
☞Ball guide capacity calculations at the end of chapter D.
☞Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.

Tolerance range:
yellow = .10
green = .20
red = .30

Mounting example



HEADED GUIDE BUSH FOR BALL BEARING, ~AFNOR

210.46. Headed guide bush for ball bearing, ~AFNOR

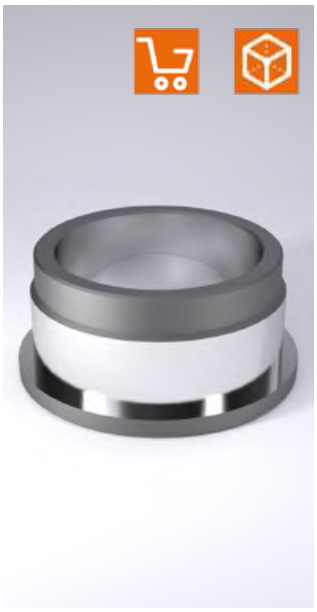
d_1	16	20	25	32	40	50	63
d_2	22	26	31	40	48	58	71
d_3	28	32	40	50	63	80	90
d_4	29	32	40	50	63	80	90
d_5	32	36	45	56	70	90	110
d_6	45	49	57	67	81	101	121
d_7	57.7	61.7	69.7	79.7	93.7	113.7	131.7
a	18.9	19.9	21.9	24.4	36	43	50.1
a_1	26.9	28.6	32.1	36.4	36	43	50.1
l_3	10	12	12	15	15	18	20
l_2*	l_1 / l						
23	33/45						
30	40/45	42/45	42/45	45/56			
38	48/56	50/56	50/56	53/71			
48	58/63	60/71	60/71	63/71	63/80		
61			73/80	76/80	76/95	79/95	
78			90/105	93/105	93/105	96/405	
98				113/120	113/120	116/140	118/120
123							143/160

*l = Nominal ordering length of ball cage - prefered length

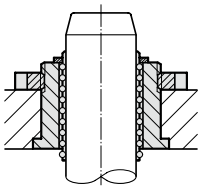
Ordering Code (example):

Headed guide bush for ball bearing, ~AFNOR		= 210.46.
Diameter of conduit d_1	32 mm	= 032.
Installation length l2	38 mm	= 038.
Classification TOL	yellow	= 10
Order No		= 210.46. 032. 038. 10

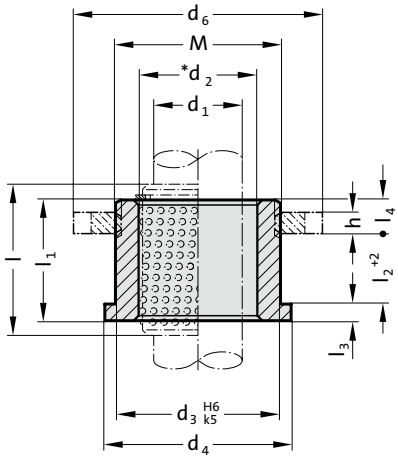
GUIDE BUSH WITH COLLAR, FOR BALL BEARING, ~AFNOR



Mounting example



210.45.



Material:
Tool steel, hardened 62 ± 2 HRC

Execution:
Bearing surfaces honed,
outside diameter precision ground.

Note:
The guide bush is fixed with slotted nut 207.48.
☞Notes on ball bearing type guides at the beginning of chapter D.
*☞Preloading see pairing classification at the beginning of chapter D
☞Matching guide combinations, see selection matrix at the beginning of chapter D.
☞Ball guide capacity calculations at the end of chapter D.
☞Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.
Tolerance range:
yellow = .10
green = .20
red = .30

210.45. Guide bush with collar, for ball bearing, ~AFNOR

d_1	16	16	20	20	20	25	25	25	32	32	32	40	40	40	50	50
d_2	22	22	26	26	26	31	31	31	40	40	40	48	48	48	58	58
d_3	28	28	32	32	32	40	40	40	50	50	50	63	63	63	80	80
d_4	32	32	36	36	36	45	45	45	56	56	56	70	70	70	90	90
d_6	40	40	44	44	44	55	55	55	65	65	65	81	81	81	100	100
M	M27x1	M27x1	M30x1	M30x1	M30x1	M39x1	M39x1	M39x1	M48x1	M48x1	M48x1	M60x1	M60x1	M60x1	M76x1	M76x1
h	3	3	4	4	4	4	4	4	5	5	5	6	6	6	8	8
l_1	16	20	17	21	25	22	26	31	26	31	38	32	39	47	41	49
l_2	8	12	8	12	16	12	16	21	15	20	27	20	27	35	26	34
l_3	3	3	3	3	3	3	3	3	4	4	4	4	4	4	5	5
l_4	5	5	6	6	6	7	7	7	7	7	7	8	8	8	10	10
l*	24	28	24	28	31	31	40	40	40	40	50	50	50	56	50	63

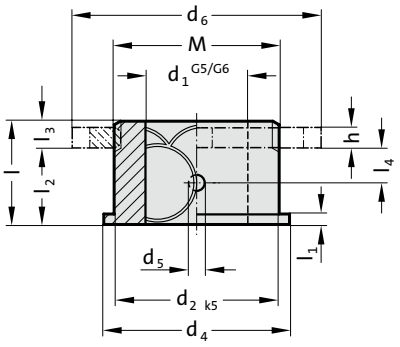
*l = Nominal ordering length of ball cage - prefered length

Ordering Code (example):

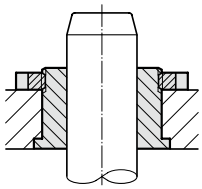
Guide bush with collar, for ball bearing, ~AFNOR		=	210.45.
Diameter of conduit d_1	32 mm	=	032.
total length l_1	26 mm	=	026.
Classification TOL	yellow	=	10
Order No		=	210.45. 032. 026. 10

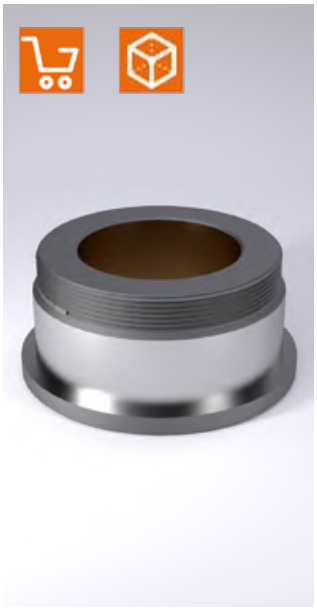
GUIDE BUSH WITH COLLAR, BRONZE COATED, ~AFNOR

210.85.



Mounting example





Material:
1.0503
ø d_2 induction hardened to 500+100 HV 10

Execution:
Bronze coated internal bore.
Diameter d_2 and collar face precision ground.
up to ø d_1 = 25 tolerance G6
from ø d_1 = 32 tolerance G5

Note:
The guide bush is fixed with slotted nut 207.48.
Lubrication via funnel lubricating nipple with thread DIN 3405-A M8x1.
☞Notes on sliding type guides at the beginning of chapter D.
☞Matching guide combinations, see selection matrix at the beginning of chapter D.
☞Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.

210.85. Guide bush with collar, bronze coated, ~AFNOR

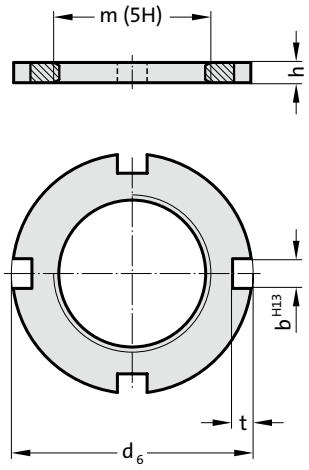
d_1	Tolerance	d_2	d_4	d_6	h	M	l	l_1	l_2	l_3	l_4
16	+0.006/+0.017	28	32	40	3	M27x1	16	3	11	5	5.5
16		28	32	40	3	M27x1	20	3	15	5	7.5
20	+0.007/+0.020	32	36	44	4	M30x1	21	3	15	6	5
20		32	36	44	4	M30x1	25	3	19	6	9.5
25		40	45	55	4	M39x1	26	3	19	7	9.5
25		40	45	55	4	M39x1	31	3	24	7	12
32	+0.009/+0.020	50	56	65	5	M48x1	31	4	24	7	12
32		50	56	65	5	M48x1	38	4	31	7	15.5
40		63	70	81	6	M60x1	39	4	31	8	15.5
40		63	70	81	6	M60x1	47	4	39	8	19.5
50		80	90	100	8	M76x1	41	5	31	10	15.5
50		80	90	100	8	M76x1	49	5	39	10	19.5

Ordering Code (example):

Guide bush with collar, bronze coated, ~AFNOR		=	210.85.
Diameter of conduit d_1	32 mm	=	032.
total length l	31 mm	=	031
Order No		=	210.85. 032. 031

SLOTTED NUT

207.48.



Material:
Steel

Note:
For fixing the guide bushes 210.45. and 210.85.

207.48. Slotted nut

Order No	d_6	b	t	h	m
207.48.016	40	5	3	3	M27 x 1
207.48.020	44	5	4	4	M30 x 1
207.48.025	55	6	4	4	M39 x 1
207.48.032	65	6	5	5	M48 x 1
207.48.040	81	7	6	6	M60 x 1
207.48.050	100	8	8	8	M76 x 1

OILLESS GUIDE ELEMENTS

OILLESS GUIDE ELEMENTS
DESCRIPTION

Low-maintenance sliding elements are used in the tool & die building as well as the machine building industries, for both linear and rotary motion applications. The material for these sliding elements is made of a base material (see chart), and an overlapping network of solid lubricant deposits. These deposits are embedded in a uniform geometric pattern in order to achieve the optimum lubrication coverage in the direction of the movement. The allowable directional movements can be found on the catalogue pages, and are marked with symbols.
The optimum sliding conditions are achieved when the sliding elements are combined with a hardened and ground opposing surface, which are a minimum of 100 HB harder than the base material. A surface roughness of approx. Rz6.3 is optimal. Suitable product combinations of guide pillars and low-maintenance guide bushings can be found in the selection matrix at the beginning of chapter D.
It is recommended to lightly lubricate the sliding surfaces of the low-maintenance sliding elements with lithium saponified grease, before usage. The solid lubricant will only be distributed from the pockets in the sliding zone during operation. In general, 25-35 % of the sliding surface is embedded with solid lubricant deposits, but deviations are possible due to the shape and size of a particular component. The size and arrangement of the solid lubricant deposits may also vary within the various products and sizes.
A repair of the slide elements is possible. The sliding surface is usually re-ground.

Advantages of oilless guide elements

- Low-maintenance, with optimum conditions maintenance-free
- low friction
- good emergency sliding properties
- „Stick - Slip“ effects are eliminted
- extremely wide temperature resistance – hot and cold
- damping properties in presence of vibration

Characteristics for base material

chemical composition	Cu 60–66% Al 5,0–7,5% Fe 2,0–4,0% Mn 2,5–5,0% Zn 17,5–31,5%
specific density [kg/dm³]	8,2
Tensile strength Rm [N/mm²]	750-800
Brinell hardness HB 10	180–210
Yield point Rp 0.2 [N/mm²]	450–550
Elongation to fracture A5 [%]	5–8
Elasticity module [kN/mm²]	105–115
Co-efficient of friction	0,04–0,15
Thermal conductivity [W/(m × K)]	45–55
Heat expansion coefficient [K⁻¹]	1,6–2,0 × 10-5
Electric conductance [m/(Ω × mm²)]	7–8
alt. flexural strength [N/mm²]	±150
ratio sliding surface to lubricant deposits (%)	25–30

Special version

Rebuilds and other specifications and designs upon request.

Surface pressure, temperature, speed and lubrication

max. surface pressing [N/cm²]	Temperature [C°]	Speed [m/min.]	PV value [N/cm² × m/min]	Lubrication
5000	80	30	10000	Initial

PV value

The permissible bearing load is determined from the pressure and the PV value, which defines the bearing wear.
The PV value is the product of surface pressure (P) and running velocity (V). Please keep in mind, that the maximum allowed speed and surface pressing can not be reached at the same time (see PV diagram)

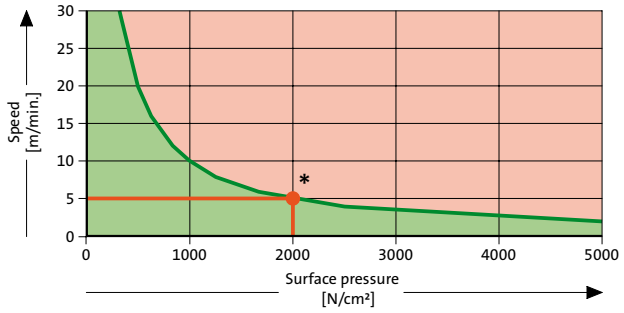
Calculation for the existing bushing load:

PV = P x V (N/cm² x m/min)
P = F/A (N/cm²)
F = Loading force (N)
A = Projection surface of the guide bushing/sliding surface [cm²]
V = Sliding speed [m/min]

Sliding speed with lifting motion:

V = 2 × H × nf/1000 [m/min]
H = Stroke [mm]
nf = Number of strokes [H/min]

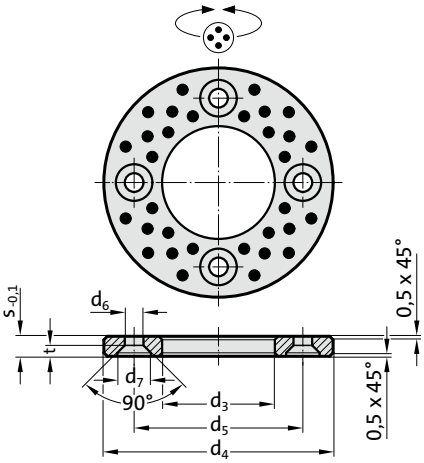
PV-diagramm



* Example: At a surface pressing of 2000 N/cm² is, because of the maximum PV-value of 10000 N/cm² x m/min. the maximum allowed speed 5 m/min.

THRUST WASHER, BRONZE WITH SOLID LUBRICANT

2053.70.



Material:
Bronze with solid lubricant, oilless lubricating

Note:
For combination loads use together with Bushes 2052.70.
Screws not included.

Fixing:
from d_3 = 10,2 2 X M3
from d_3 = 20,2 2 X M5
from d_3 = 40,2 2 X M6
from d_3 = 50,3 4 X M6
from d_3 = 60,3 4 X M8
from d_3 = 90,5 4 X M10

2053.70. Thrust washer, Bronze with solid lubricant

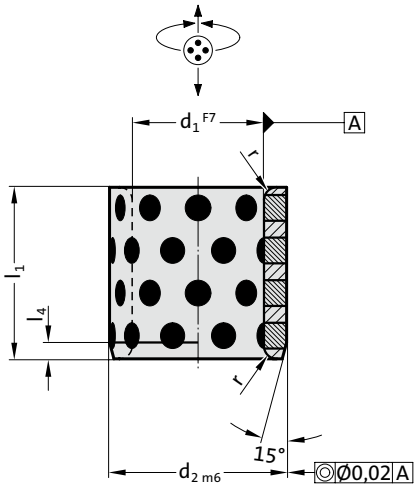
d_1	10	12	13	14	15	16	18	20	25	30	35	40	45	50	55	60	65	70	75	80	90	100	120
d_3	10.2	12.2	13.2	14.2	15.2	16.2	18.2	20.2	25.2	30.2	35.2	40.2	45.3	50.3	55.3	60.3	65.3	70.3	75.3	80.3	90.5	100.5	120.5
d_4	30	40	40	40	50	50	50	50	55	60	70	80	90	100	110	120	125	130	140	150	170	190	200
d_5	20	28	28	28	28	28	35	35	40	45	50	60	67.5	75	85	90	95	100	110	120	140	160	175
d_6	3.4	3.4	3.4	3.4	3.4	3.4	3.4	5.5	5.5	5.5	5.5	6.6	6.6	6.6	6.6	9	9	9	9	9	11	11	11
d_7	6.9	6.9	6.9	6.9	6.9	6.9	6.9	11.5	11.5	11.5	11.5	13.7	13.7	13.7	13.7	18.3	18.3	18.3	18.3	18.3	22.7	22.7	22.7
s	3	3	3	3	3	3	3	5	5	5	5	7	7	8	8	8	8	10	10	10	10	10	10
t	1.8	1.8	1.8	1.8	1.8	1.8	1.8	3	3	3	3	3.6	3.6	3.6	3.6	4.6	4.6	4.6	4.6	4.6	5.9	5.9	5.9

Ordering Code (example):

Thrust washer, Bronze with solid lubricant		=	2053.70.
Diameter of conduit d_1	40 mm	=	040
Order No		=	2053.70. 040

GUIDE BUSH, BRONZE WITH SOLID LUBRICANT

2052.70.



Material:
Bronze with solid lubricant, oilless lubricating

Note:
Bushes can be used with radial or axial motion.
☞Matching guide combinations, see selection matrix at the beginning of chapter D.
☞Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.

Attention:
Note that press fitment reduces inside bush diameter.

2052.70. Guide bush, Bronze with solid lubricant

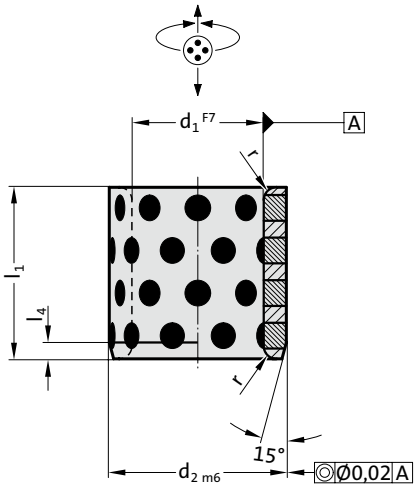
d_1	8	10	10	12	13	14	15	16	18	19	20	20	20	24	25	25	25	28	30	30	30	31.5	32	35	35	38	40	40
d_2	12	14	15	18	19	20	21	22	24	25	26	28	30	32	32	33	35	38	40	38	42	40	42	44	45	48	50	55
r	0.5	0.5	0.5	0.5	0.5	0.5	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	1.5	1.5	1.5
l_4	2	2	2	2	2	2	2	2	2	2	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
l_1																												
8	●	●																										
10	●	●	●	●	●	●	●	●																				
12	●	●		●		●	●	●																				
15	●	●		●	●	●	●	●	●			●																
16				●	●		●	●	●			●	●			●	●											
20		●		●	●	●	●	●	●			●	●			●	●		●	●					●		●		
25				●		●	●	●	●			●	●			●	●		●	●				●	●		●	●	●
30				●		●	●	●	●			●	●			●	●	●	●	●		●	●	●	●	●	●	●	●
35								●	●			●	●			●	●		●	●				●	●		●	●	●
37										●		●																	
40								●	●		●	●	●			●	●	●	●	●		●	●	●	●	●	●	●	●
47														●		●													
50												●			●	●	●		●	●				●	●		●	●	●
60																●			●	●	●		●	●	●		●	●	●
70																											●	●	
77																										●	●		
80																											●		

Ordering Code (example):

Guide bush, Bronze with solid lubricant		=	2052.70.
Diameter of conduit d_1	40 mm	=	040.
Outer diameter d_2	55 mm	=	055.
Installation length l_1	25 mm	=	025
Order No		=	2052.70. 040. 055. 025

GUIDE BUSH, BRONZE WITH SOLID LUBRICANT

2052.70.



Material:
Bronze with solid lubricant, oilless lubricating

Note:
Bushes can be used with radial or axial motion.
☞ Matching guide combinations, see selection matrix at the beginning of chapter D.
☞ Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.

Attention:
Note that press fitment reduces inside bush diameter.

2052.70. Guide bush, Bronze with solid lubricant

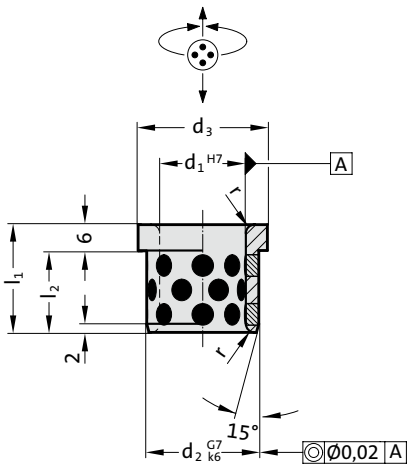
d_1	45	45	45	50	50	55	60	60	63	65	70	70	75	75	80	80	85	90	100	110	120	125	130	140	150	160
d_2	55	56	60	62	65	70	74	75	75	80	85	90	90	95	96	100	100	110	120	130	140	145	150	160	170	180
r	1.5	1.5	1.5	1.5	1.5	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
l_4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
l_1																										
30	●	●	●	●	●		●	●																		
35	●	●	●	●			●	●			●															
40	●	●	●	●	●	●	●	●			●				●	●										
50	●	●	●	●	●	●	●	●		●	●	●			●	●										
60	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		●	●							
70			●	●	●	●	●	●	●	●	●	●	●	●	●	●		●	●							
80			●		●		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●					
100					●			●			●		●	●	●	●		●	●	●	●	●	●	●	●	●
120									●						●	●		●	●	●	●	●	●			
130																							●			
140																●			●		●			●		
150																									●	●

Ordering Code (example):

Guide bush, Bronze with solid lubricant		= 2052.70.
Diameter of conduit d_1	40 mm	= 040.
Outer diameter d_2	55 mm	= 055.
Installation length l_1	25 mm	= 025
Order No		= 2052.70. 040. 055. 025

GUIDE BUSH WITH COLLAR, BRONZE WITH SOLID LUBRICANT

2085.70.



Material:
Bronze with solid lubricant, oilless lubricating

Note:
Bushes can be used with radial or axial motion.
Bushes can also be fitted with Loctite.
☞Matching guide combinations, see selection matrix at the beginning of chapter D.
☞Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.

2085.70. Guide bush with collar, Bronze with solid lubricant

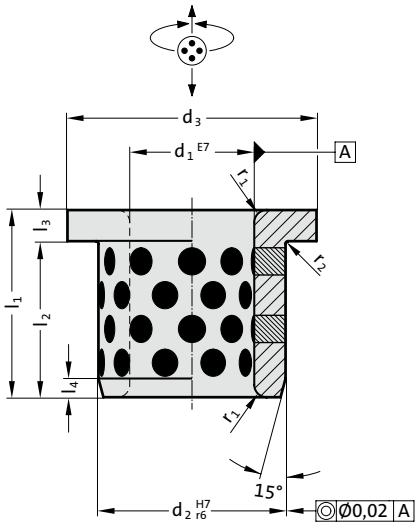
d_1	12	16	20	24
d_2	16	20	26	30
d_3	18	24	28	35
r	2	2	2	2
l_1 l_2				
20 14	●	●	●	●
25 19	●	●	●	●
30 24	●	●	●	●

Ordering Code (example):

Guide bush with collar, Bronze with solid lubricant		= 2085.70.	
Diameter of conduit d_1	20 mm	=	020.
Length l_1	20 mm	=	020
Order No		= 2085.70.	020. 020

GUIDE BUSH WITH COLLAR, BRONZE WITH SOLID LUBRICANT

2085.71.



Material:
Bronze with solid lubricant, oilless lubricating

Note:
Bushes can be used with radial or axial motion.
☞ Matching guide combinations, see selection matrix at the beginning of chapter D.
☞ Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.

Attention:
Note that press fitment reduces inside bush diameter.

2085.71. Guide bush with collar, Bronze with solid lubricant

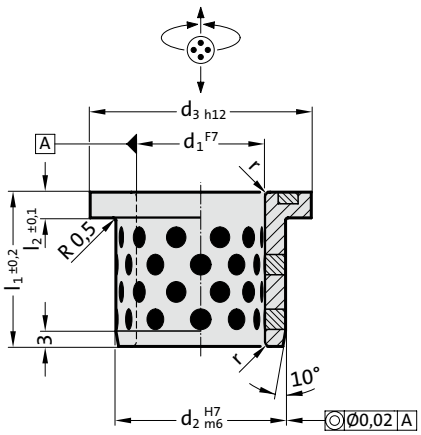
d_1	10	12	13	14	15	16	20	25	30	31.5	35	40	45	50	55	60	63	70	75	80	90	100	120
d_2	14	18	19	20	21	22	30	35	40	40	45	50	55	60	65	75	75	85	90	100	110	120	140
d_3	22	25	26	27	28	29	40	45	50	50	60	65	70	75	80	90	85	105	110	120	130	150	170
l_3	2	3	3	3	3	3	5	5	5	5	5	5	5	5	5	7.5	7.5	7.5	7.5	10	10	10	10
l_4	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	4	4	4	4	4	4	4	4
r_1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3
r_2	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.8
l_1	l_2																						
15	13	12	12	12	12	12	10	10															
20	18	17	17	17	17	17	15	15	15	15	15	15											
25					22	22	20	20	20														
30					27	27	25	25	25		25	25	25	25									
35									30	30													
40							35	35	35		35	35	35	35	35	32.5							
50									45		45	45	45	45		42.5		42.5					
60													55	55	55				52.5	50	50		
67.5																	60						
80																72.5		72.5		70	70	70	70
100																				90		90	90

Ordering Code (example):

Guide bush with collar, Bronze with solid lubricant		=	2085.71.
Diameter of conduit d_1	35 mm	=	035.
Length l_1	20 mm	=	020
Order No		=	2085.71. 035. 020

GUIDE BUSH WITH COLLAR, BRONZE WITH SOLID LUBRICANT

2086.70.



Material:
Bronze with solid lubricant, oilless lubricating

Note:
Bushes can be used with radial or axial motion.
☞Matching guide combinations, see selection matrix at the beginning of chapter D.
☞Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.

Attention:
Note that press fitment reduces inside bush diameter.

2086.70. Guide bush with collar, Bronze with solid lubricant

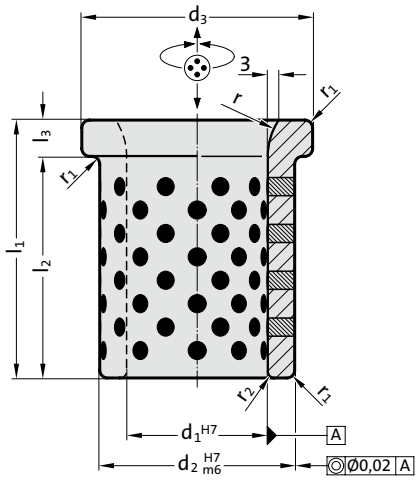
d_1	12	16	20	25	30	40	50	60
d_2	18	22	28	33	38	50	62	75
d_3	25	30	36	43	48	60	75	90
r	1	1	1	1	1	2	2	3
l_1	15	20	25	30	35	45	55	65
l_2	4	5	5	5	5	5	6	7

Ordering Code (example):

Guide bush with collar, Bronze with solid lubricant		=	2086.70.
Diameter of conduit d_1	30 mm	=	030.
total length l_1	35 mm	=	035
Order No		=	2086.70. 030. 035

GUIDE BUSH WITH COLLAR, BRONZE WITH SOLID LUBRICANT

2085.72.



Material:
Bronze with solid lubricant, oilless lubricating

Note:
Bushes can be used with radial or axial motion.
☞ Matching guide combinations, see selection matrix at the beginning of chapter D.
☞ Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.

Attention:
Note that press fitment reduces inside bush diameter.

2085.72. Guide bush with collar, Bronze with solid lubricant

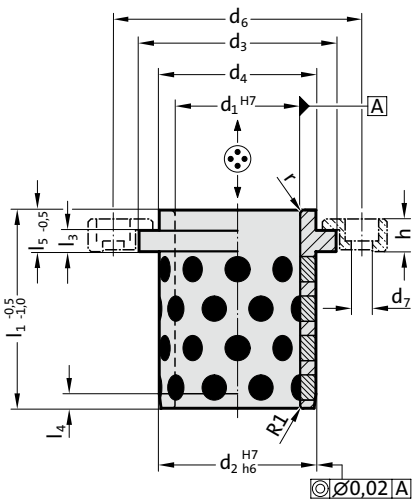
d_1	25	30	40	50	60	65	65	80	80	100	100
d_2	35	40	55	65	75	80	80	100	100	120	120
d_3	45	50	65	75	85	90	90	110	110	130	130
r	10	20	20	20	20	20	20	20	20	20	20
r_1	1	1	2	2	2	2	2	2	2	2	2
r_2	2	2	2	2	2	2	2	2	2	3	3
l_3	7	10	10	10	10	10	10	10	10	10	10
l_2	33	40	60	70	70	70	110	90	130	90	130
l_1	40	50	70	80	80	80	120	100	140	100	140

Ordering Code (example):

Guide bush with collar, Bronze with solid lubricant		=	2085.72.
Diameter of conduit d_1	60 mm	=	060.
Length l_1	80 mm	=	080
Order No		=	2085.72. 060. 080

GUIDE BUSH WITH COLLAR, BRONZE WITH SOLID LUBRICANT, DIN 9834/ISO 9448

2082.70.



Material:
Bronze with solid lubricant, oilless lubricating

Note:
☞Matching guide combinations, see selection matrix at the beginning of chapter D.
☞Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.

Fixing:
(to be ordered separately)
Screw clamps with screws,
up to ø d_1 = 50 - 2072.45.10 (M6 X 16 DIN EN ISO 4762)
from ø d_1 = 60 - 2072.45.16 (M10 X 20 DIN EN ISO 4762)

Attention:
Bushes can only be used with axial motion!

2082.70. Guide bush with collar, Bronze with solid lubricant, DIN 9834/ISO 9448

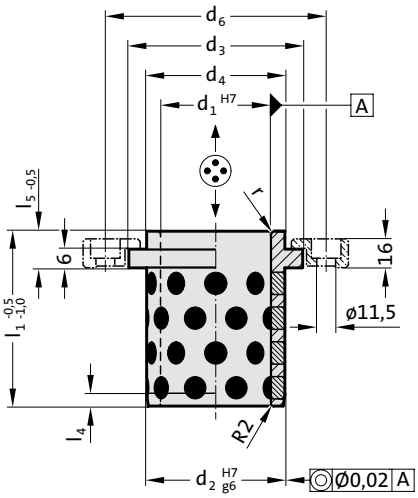
d_1	24 25	30 32	38 40	48 50	60 63	80	100	125	160
d_2	32	40	50	63	80	100	125	160	200
d_3	40	50	63	71	90	112	140	180	220
d_4	32	40	50	63	80	100	125	160	200
d_6	58	66	79	89	123	143	168	203	243
d_7	7	7	7	7	11.5	11.5	11.5	11.5	11.5
l_1	40	50	63	71	80	100	125	160	200
l_3	6.3	6.3	6.3	6.3	10	10	10	10	10
l_4	3	4	5	6.3	8	10	12.5	16	16
l_5	10	12	15	17	19	22	21	30	32
h	10	10	10	10	16	16	16	16	16
r	3	3	3	5	6	8	10	12	18

Ordering Code (example):

Guide bush with collar, Bronze with solid lubricant,			
DIN 9834/ISO 9448		= 2082.70.	
Diameter of conduit d_1	50 mm	=	050
Order No		= 2082.70.	050

GUIDE BUSH WITH COLLAR, BRONZE WITH SOLID LUBRICANT, NAAMS

2082.71.



Material:
Bronze with solid lubricant, oilless lubricating

Note:
☞ Matching guide combinations, see selection matrix at the beginning of chapter D.
☞ Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.

Fixing:
(to be ordered separately)
Screw clamps with screws 2072.46 (M10 x 20 DIN EN ISO 4762)

Attention:
Bushes can only be used with axial motion!

2082.71. Guide bush with collar, Bronze with solid lubricant, NAAMS

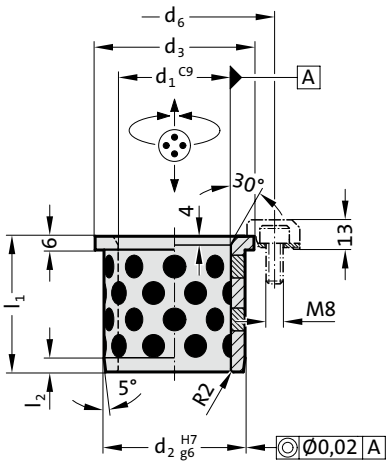
d_1	25	32	40	50	63	80	100	125
d_2	32	40	50	63	80	100	125	160
d_3	40	50	63	71	90	112	140	180
d_4	32	40	50	63	80	100	125	160
d_6	75	83	93	106	123	143	168	203
l_1	40	50	63	71	80	100	125	160
l_4	3	4	5	6.3	8	10	12.5	16
l_5	10	10	13	15	17	20	19	28
r	3	3	3	5	6	8	10	12

Ordering Code (example):

Guide bush with collar, Bronze with solid lubricant, NAAMS		= 2082.71.	
Diameter of conduit d_1	63 mm	=	063
Order No		= 2082.71.	063

GUIDE BUSH WITH COLLAR, BRONZE WITH SOLID LUBRICANT, NAAMS

2086.71.



Material:
Bronze with solid lubricant, oilless lubricating

Note:
Bushes can be used with radial or axial motion.
☞Matching guide combinations, see selection matrix at the beginning of chapter D.
☞Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.

Fixing:
(to be ordered separately)
Screw clamps with screws 2072.47 (M8 x 20 DIN EN ISO 4762)

2086.71. Guide bush with collar, Bronze with solid lubricant, NAAMS

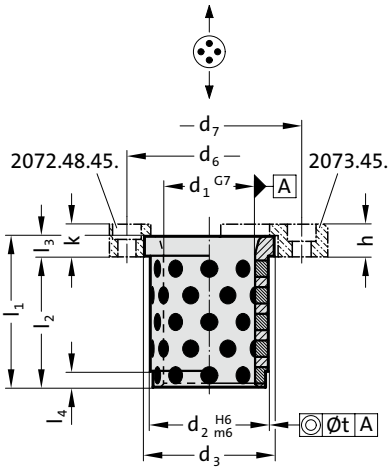
d_1	25	32	40	50	63	80	100	125
d_2	32	40	50	63	80	100	125	160
d_3	40	50	63	71	90	112	140	180
d_6	29	34	40.5	44.5	54	65	79	99
l_1	40	50	55	63	75	90	115	138
l_2	4	4	5	6	8	10	12	12

Ordering Code (example):

Guide bush with collar, Bronze with solid lubricant, NAAMS		= 2086.71.	
Diameter of conduit d_1	63 mm	=	063
Order No		= 2086.71.	063

GUIDE BUSH WITH COLLAR, BRONZE WITH SOLID LUBRICANT, CNOMO

2102.70.



Material:
Bronze with solid lubricant, oilless lubricating

Note:
☞ Matching guide combinations, see selection matrix at the beginning of chapter D.
☞ Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.

Fixing:
(to be ordered separately)
Screw clamps with screws 2072.48.45. or
Securing flange 2073.45.

Attention:
Bushes can only be used with axial motion!
Note that press fitment reduces inside bush diameter.

2102.70. Guide bush with collar, Bronze with solid lubricant, CNOMO

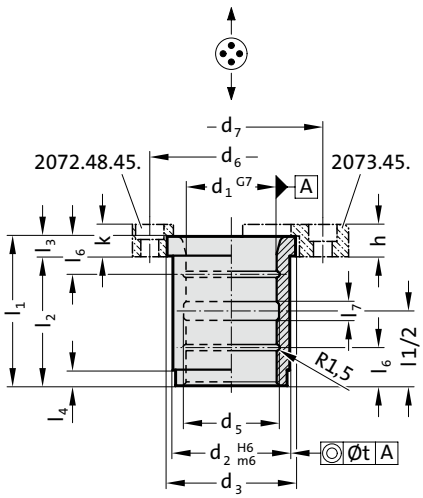
d_1	20	25	32	40	50	63	80	100
d_2	28	35	44	52	63	80	100	125
d_3	32	40	50	60	71	90	112	140
d_6	-	-	-	75	90	111	133	162
d_7	48	56	65	82	98	115	144	170
l_1	32	40	50	63	80	100	125	160
l_2	28	35	44	55	70	88	109	140
l_3	4	5	6	8	10	12	16	20
l_4	3	5	8	8	8	10	10	10
h	10	10	12	12	16	20	25	32
k	-	-	-	12	16	20	25	32
t	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02

Ordering Code (example):

Guide bush with collar, Bronze with solid lubricant, CNOMO		=	2102.70.
Diameter of conduit d_1	50 mm	=	050
Order No		=	2102.70. 050

GUIDE BUSH WITH COLLAR, BRONZE, CNOMO

2102.71.



Material:
Bronze

Note:
☞Matching guide combinations, see selection matrix at the beginning of chapter D.
☞Assembly guide lines / Dimensional requirements and tolerances at the end of chapter D.

Fixing:
(to be ordered separately)
Screw clamps with screws 2072.48.45. or
Securing flange 2073.45.

Attention:
Bushes can only be used with axial motion!
Note that press fitment reduces inside bush diameter.

2102.71. Guide bush with collar, Bronze, CNOMO

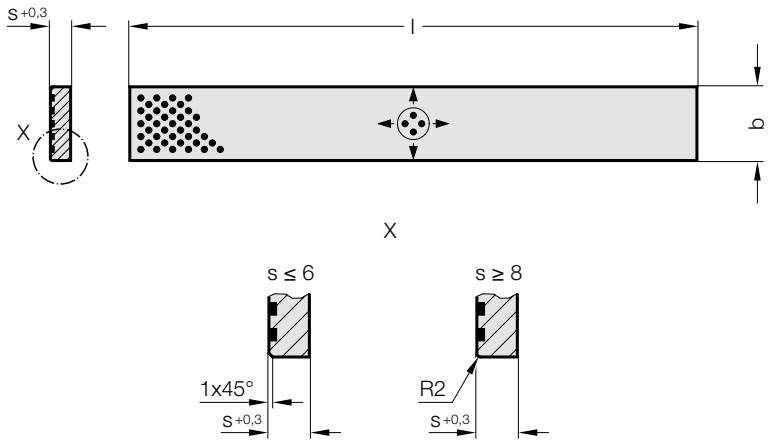
d_1	20	25	32	40	50	63	80	100
d_2	28	35	44	52	63	80	100	125
d_3	32	40	50	60	71	90	112	140
d_5	22	27	34	42	52	65	82	102
d_6	-	-	-	75	90	111	133	162
d_7	48	56	65	82	98	115	144	170
l_1	32	40	50	63	80	100	125	160
l_2	28	35	44	55	70	88	109	140
l_3	4	5	6	8	10	12	16	20
l_4	3	5	8	8	8	10	10	10
l_6	-	-	12	16	20	25	32	40
l_7	5	5	5	8	10	12	16	20
h	10	10	12	12	16	20	25	32
k	-	-	-	12	16	20	25	32
t	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02

Ordering Code (example):

Guide bush with collar, Bronze, CNOMO		=	2102.71.
Diameter of conduit d_1	50 mm	=	050
Order No		=	2102.71. 050

FLAT GUIDE BAR, BRONZE WITH SOLID LUBRICANT

2961.71.



2961.71. Flat guide bar, Bronze with solid lubricant

Order No	b	s	l	305	605	1,005
2961.71.020.004.	20	4		●		
2961.71.025.005.	25	5		●		
2961.71.030.004.	30	4		●		
2961.71.030.006.	30	6		●	●	
2961.71.030.008.	30	8		●	●	
2961.71.030.010.	30	10		●	●	●
2961.71.030.012.	30	12		●	●	●
2961.71.035.010.	35	10		●	●	●
2961.71.040.005.	40	5		●	●	
2961.71.040.006.	40	6		●	●	
2961.71.040.008.	40	8		●	●	●
2961.71.040.010.	40	10		●	●	●
2961.71.040.012.	40	12			●	●
2961.71.040.016.	40	16			●	●
2961.71.050.010.	50	10		●	●	●
2961.71.050.012.	50	12			●	●
2961.71.050.020.	50	20			●	●
2961.71.060.012.	60	12			●	●
2961.71.060.016.	60	16			●	●
2961.71.080.010.	80	10		●	●	●
2961.71.080.012.	80	12			●	●
2961.71.080.016.	80	16			●	●
2961.71.080.020.	80	20			●	●
2961.71.080.025.	80	25			●	●
2961.71.100.016.	100	16			●	●
2961.71.100.020.	100	20			●	●
2961.71.100.025.	100	25			●	●
2961.71.125.020.	125	20			●	●
2961.71.125.025.	125	25			●	●
2961.71.160.025.	160	25			●	●

Material:
Bronze with solid lubricant, oilless lubricating

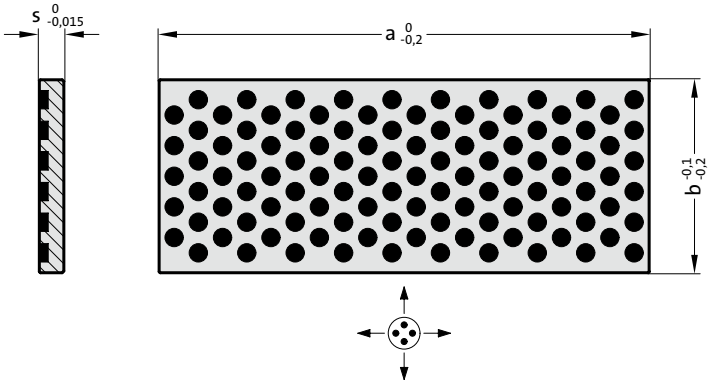
Execution:
Sliding faces ground.

Ordering Code (example):

Flat guide bar, Bronze with solid lubricant		=	2961.71.
Width b	50 mm	=	050.
Thickness s	10 mm	=	010.
Length l	1005 mm	=	1005
Order No		=	2961.71. 050. 010. 1005

FLAT GUIDE BAR, BRONZE WITH SOLID LUBRICANT

2961.76.



Material:
Bronze with solid lubricant, oilless lubricating

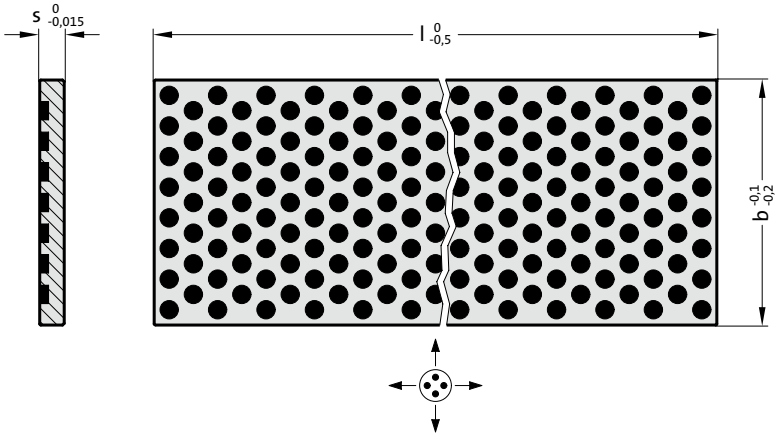
Execution:
Sliding faces ground.

2961.76. Flat guide bar, Bronze with solid lubricant

Order No	b	s	a
2961.76.025.005.050	25	5	50
2961.76.025.005.071	25	5	71
2961.76.025.005.090	25	5	90
2961.76.025.006.050	25	6	50
2961.76.025.006.063	25	6	63
2961.76.025.006.080	25	6	80
2961.76.025.006.100	25	6	100
2961.76.025.006.125	25	6	125
2961.76.040.005.050	40	5	50
2961.76.040.005.071	40	5	71
2961.76.040.005.090	40	5	90
2961.76.040.006.080	40	6	80
2961.76.040.006.100	40	6	100
2961.76.040.006.125	40	6	125
2961.76.040.006.160	40	6	160
2961.76.040.006.200	40	6	200
2961.76.063.006.080	63	6	80
2961.76.063.006.100	63	6	100
2961.76.063.006.125	63	6	125
2961.76.063.006.160	63	6	160
2961.76.063.008.125	63	8	125
2961.76.063.008.160	63	8	160
2961.76.063.008.200	63	8	200
2961.76.063.008.250	63	8	250
2961.76.063.008.315	63	8	315

FLAT GUIDE BAR, BRONZE WITH SOLID LUBRICANT

2961.77.



Material:
Bronze with solid lubricant, oilless lubricating

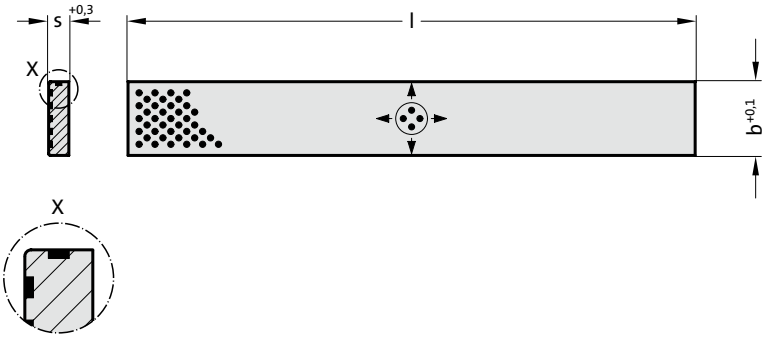
Execution:
Sliding faces ground.

2961.77. **Flat guide bar, Bronze with solid lubricant**

Order No	b	s	l
2961.77.025.006.500	25	6	500
2961.77.040.006.500	40	6	500
2961.77.063.008.500	63	8	500
2961.77.080.010.500	80	10	500

FLAT GUIDE BAR WITH TWO SLIDING SURFACES, BRONZE WITH SOLID LUBRICANT

2961.73.



Material:
Bronze with solid lubricant, oilless lubricating

Execution:
Sliding faces ground.

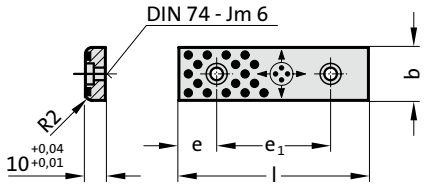
2961.73. Flat guide bar with two sliding surfaces, Bronze with solid lubricant

Order No	b	s	l
2961.73.025.005.0305	25	5	305
2961.73.030.006.0305	30	6	305
2961.73.035.010.0605	35	10	605
2961.73.040.008.0605	40	8	605
2961.73.040.012.0605	40	12	605
2961.73.050.010.0605	50	10	605
2961.73.060.016.0605	60	16	605
2961.73.080.012.0605	80	12	605
2961.73.080.020.0605	80	20	605
2961.73.100.020.0605	100	20	605

FLAT GUIDE BAR, BRONZE WITH SOLID LUBRICANT

2961.70.

A



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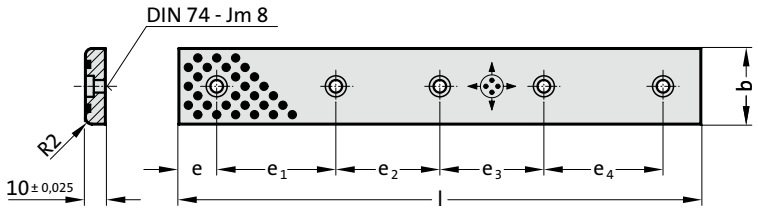
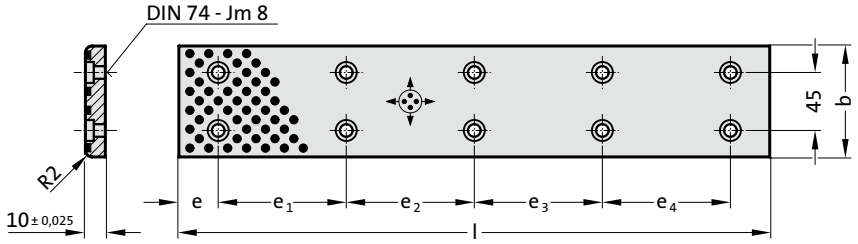


E



Material:
Bronze with solid lubricant, oilless lubricating

Execution:
Sliding faces ground.

Note:
Screws are not included.

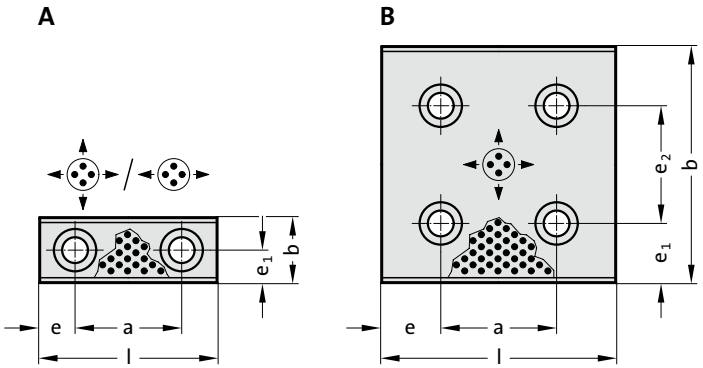
Fixing:
Use socket cap screws DIN 7984.

2961.70. Flat guide bar, Bronze with solid lubricant

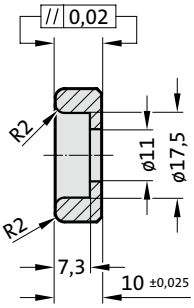
Order No	Shape	b	l	e	e_1	e_2	e_3	e_4	Number of screw holes
2961.70.018.075	A	18	75	15	45	-	-	-	2
2961.70.018.100	A	18	100	25	50	-	-	-	2
2961.70.018.125	A	18	125	25	75	-	-	-	2
2961.70.018.150	A	18	150	25	100	-	-	-	2
2961.70.028.075	A	28	75	15	45	-	-	-	2
2961.70.028.100	A	28	100	25	50	-	-	-	2
2961.70.028.125	A	28	125	25	75	-	-	-	2
2961.70.028.150	A	28	150	25	100	-	-	-	2
2961.70.035.100	F	35	100	20	60	-	-	-	2
2961.70.035.150	F	35	150	20	55	55	-	-	3
2961.70.035.200	F	35	200	20	55	50	55	-	4
2961.70.035.250	F	35	250	20	70	70	70	-	4
2961.70.035.300	F	35	300	20	65	65	65	65	5
2961.70.035.350	F	35	350	20	80	75	75	80	5
2961.70.038.075	A	38	75	15	45	-	-	-	2
2961.70.038.100	A	38	100	25	50	-	-	-	2
2961.70.038.125	A	38	125	25	75	-	-	-	2
2961.70.038.150	A	38	150	25	100	-	-	-	2
2961.70.048.075	A	48	75	15	45	-	-	-	2
2961.70.048.100	A	48	100	25	50	-	-	-	2
2961.70.048.125	A	48	125	25	75	-	-	-	2
2961.70.048.150	A	48	150	25	100	-	-	-	2
2961.70.050.100	F	50	100	20	60	-	-	-	2
2961.70.050.150	F	50	150	20	55	55	-	-	3
2961.70.050.200	F	50	200	20	55	50	55	-	4
2961.70.050.250	F	50	250	20	70	70	70	-	4
2961.70.050.300	F	50	300	20	65	65	65	65	5
2961.70.050.350	F	50	350	20	80	75	75	80	5
2961.70.050.400	F	50	400	20	90	90	90	90	5
2961.70.075.150	E	75	150	20	110	-	-	-	4
2961.70.075.200	E	75	200	20	80	80	-	-	6
2961.70.075.250	E	75	250	20	105	105	-	-	6
2961.70.075.300	E	75	300	20	85	90	85	-	8
2961.70.075.400	E	75	400	20	120	120	120	-	8
2961.70.075.500	E	75	500	20	115	115	115	115	10

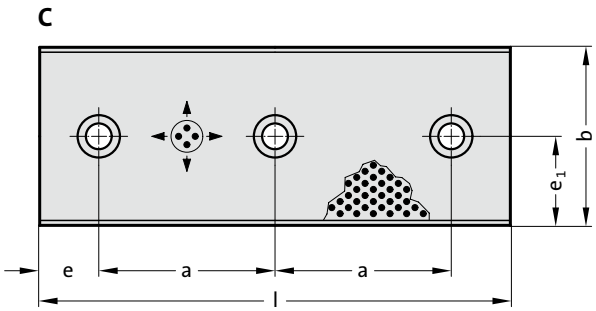
FLAT GUIDE BAR, BRONZE WITH SOLID LUBRICANT

2961.75.



2961.75.





Material:
Bronze with solid lubricant, oilless lubricating

Note:
Screws are not included.

Attention:
Direction of motion of flat guide bars with a width of b = 28 and 38 mm only in longitudinal direction.

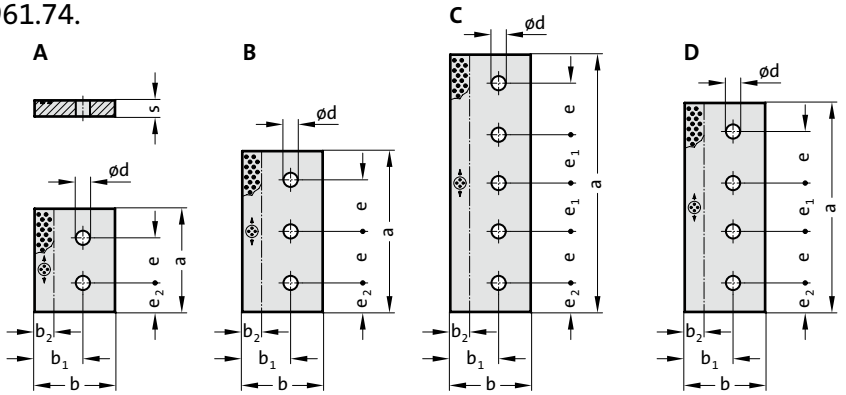
Fixing:
Use socket cap screws DIN 7984 M10.

2961.75. Flat guide bar, Bronze with solid lubricant

Order No	Shape	b	l	e	a	e_1	e_2	Number of screw holes
2961.75.028.075	A	28	75	15	45	14	-	2
2961.75.028.100	A	28	100	25	50	14	-	2
2961.75.028.125	A	28	125	25	75	14	-	2
2961.75.028.150	A	28	150	25	100	14	-	2
2961.75.038.075	A	38	75	15	45	19	-	2
2961.75.038.100	A	38	100	25	50	19	-	2
2961.75.038.125	A	38	125	25	75	19	-	2
2961.75.038.150	A	38	150	25	100	19	-	2
2961.75.048.075	A	48	75	15	45	24	-	2
2961.75.048.100	A	48	100	25	50	24	-	2
2961.75.048.125	A	48	125	25	75	24	-	2
2961.75.048.150	A	48	150	25	100	24	-	2
2961.75.048.200	A	48	200	50	100	24	-	2
2961.75.058.075	A	58	75	15	45	29	-	2
2961.75.058.100	A	58	100	25	50	29	-	2
2961.75.058.125	A	58	125	25	75	29	-	2
2961.75.058.150	A	58	150	25	100	29	-	2
2961.75.058.200	A	58	200	50	100	29	-	2
2961.75.075.075	A	75	75	15	45	37.5	-	2
2961.75.075.100	A	75	100	25	50	37.5	-	2
2961.75.075.125	A	75	125	25	75	37.5	-	2
2961.75.075.150	A	75	150	25	100	37.5	-	2
2961.75.075.200	C	75	200	25	75	37.5	-	3
2961.75.100.100	B	100	100	25	50	25	50	4
2961.75.100.125	B	100	125	25	75	25	50	4
2961.75.100.150	B	100	150	25	100	25	50	4
2961.75.100.200	B	100	200	25	150	25	50	4
2961.75.100.250	B	100	250	25	200	25	50	4
2961.75.125.150	B	125	150	25	100	37.5	50	4
2961.75.125.200	B	125	200	25	150	37.5	50	4
2961.75.125.250	B	125	250	25	200	37.5	50	4
2961.75.150.150	B	150	150	25	100	25	100	4
2961.75.150.200	B	150	200	25	150	25	100	4

RETAINING PLATE, BRONZE WITH SOLID LUBRICANT, VDI 3357

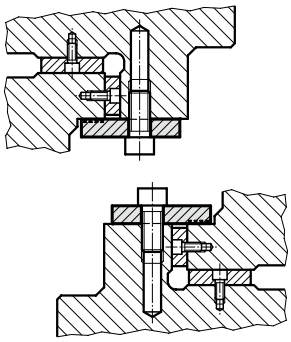
2961.74.



2961.74. Retaining plate, Bronze with solid lubricant, VDI 3357

Order No	Shape	b	s	a	b_2	b_1	d	e	e_1	e_2	Number of screw holes
2961.74.035.10.160	A	35	10	160	10	20	11	70	-	45	2
2961.74.035.10.200	A	35	10	200	10	20	11	110	-	45	2
2961.74.035.10.250	B	35	10	250	10	20	11	80	-	45	3
2961.74.045.15.160	A	45	15	160	15	30	13.5	70	-	45	2
2961.74.045.15.200	A	45	15	200	15	30	13.5	110	-	45	2
2961.74.045.15.250	B	45	15	250	15	30	13.5	80	-	45	3
2961.74.055.15.160	A	55	15	160	20	35	17.5	70	-	45	2
2961.74.055.15.200	A	55	15	200	20	35	17.5	110	-	45	2
2961.74.055.15.250	B	55	15	250	20	35	17.5	80	-	45	3
2961.74.075.25.160	A	75	25	160	25	40	17.5	70	-	45	2
2961.74.075.25.200	A	75	25	200	25	40	17.5	110	-	45	2
2961.74.075.25.250	B	75	25	250	25	40	17.5	80	-	45	3
2961.74.085.28.240	B	85	28	240	30	60	22	95	-	25	3
2961.74.085.28.300	D	85	28	300	30	60	22	85	80	25	4
2961.74.085.28.350	D	85	28	350	30	60	22	100	100	25	4
2961.74.085.28.400	D	85	28	400	30	60	22	115	120	25	4
2961.74.085.28.450	C	85	28	450	30	60	22	100	100	25	5
2961.74.085.30.160	A	85	30	160	30	60	22	70	-	45	2
2961.74.085.30.200	A	85	30	200	30	60	22	110	-	45	2
2961.74.085.30.250	B	85	30	250	30	60	22	80	-	45	3
2961.74.085.30.300	B	85	30	300	30	60	22	105	-	45	3
2961.74.085.30.350	B	85	30	350	30	60	22	130	-	45	3
2961.74.085.30.400	C	85	30	400	30	60	22	80	75	45	5
2961.74.100.25.160	A	100	25	160	30	60	17.5	70	-	45	2
2961.74.100.25.200	A	100	25	200	30	60	17.5	110	-	45	2
2961.74.100.25.250	B	100	25	250	30	60	17.5	80	-	45	3
2961.74.100.25.400	C	100	25	400	30	60	17.5	80	75	45	5
2961.74.100.30.160	A	100	30	160	30	60	22	70	-	45	2
2961.74.100.30.200	A	100	30	200	30	60	22	110	-	45	2
2961.74.100.30.250	B	100	30	250	30	60	22	80	-	45	3
2961.74.100.30.400	C	100	30	400	30	60	22	80	75	45	5
2961.74.125.25.160	A	125	25	160	30	75	17.5	70	-	45	2
2961.74.125.25.200	A	125	25	200	30	75	17.5	110	-	45	2
2961.74.125.25.250	B	125	25	250	30	75	17.5	80	-	45	3
2961.74.125.25.300	D	125	25	300	30	80	26	85	80	25	4
2961.74.125.25.350	D	125	25	350	30	80	26	100	100	25	4
2961.74.125.25.400.1	D	125	25	400	30	80	26	115	120	25	4
2961.74.125.25.400	C	125	25	400	30	75	17.5	80	75	45	5
2961.74.125.25.450	C	125	25	450	30	80	26	100	100	25	5
2961.74.125.25.500	C	125	25	500	30	80	26	110	115	25	5
2961.74.125.30.160	A	125	30	160	30	75	22	70	-	45	2
2961.74.125.30.200	A	125	30	200	30	75	22	110	-	45	2
2961.74.125.30.250	B	125	30	250	30	75	22	80	-	45	3
2961.74.125.30.300	B	125	30	300	30	75	22	105	-	45	3
2961.74.125.30.350	B	125	30	350	30	75	22	130	-	45	3
2961.74.125.30.400	C	125	30	400	30	75	22	80	75	45	5
2961.74.125.30.450	C	125	30	450	30	75	22	80	95	50	5
2961.74.125.30.500	C	125	30	500	30	75	22	80	120	50	5

Mounting example

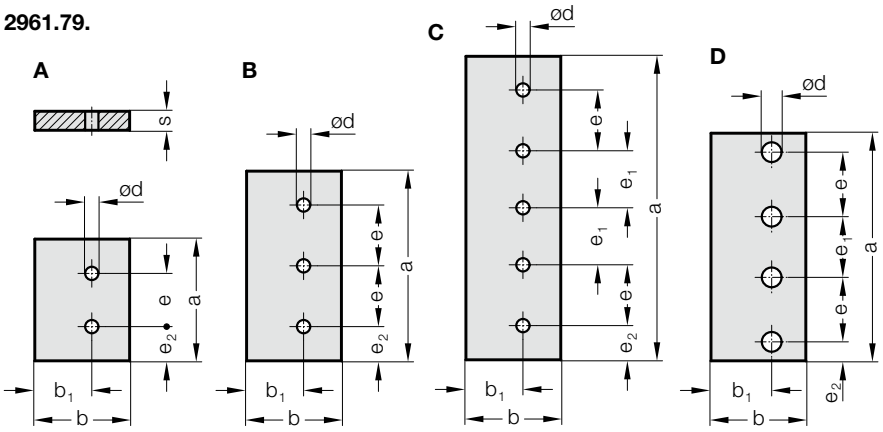


Material:
Bronze with solid lubricant, oilless lubricating

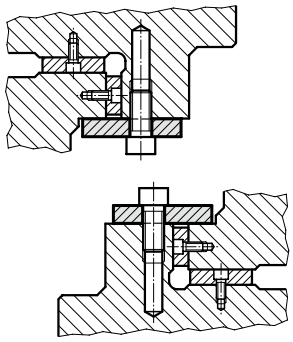
Note:
Screws are not included.

Fixing:
Use socket cap screws DIN EN ISO 4762.

RETAINING PLATE, STEEL, VDI 3357



Mounting example



Material:
Steel, surface hardened

Note:
Screws are not included.

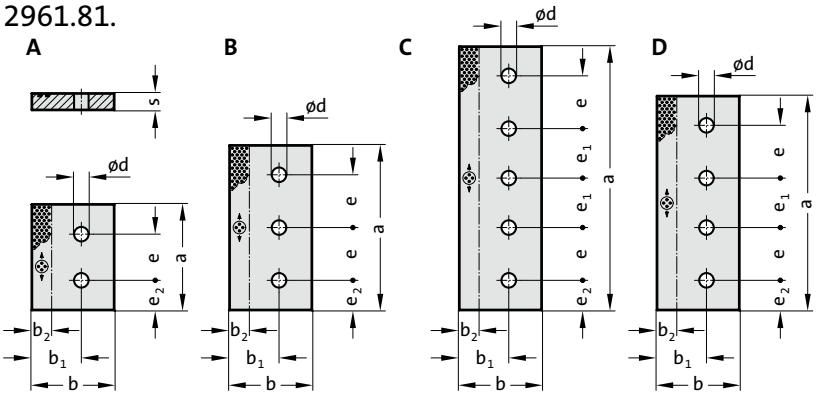
Fixing:
Use socket cap screws DIN EN ISO 4762.

2961.79. Retaining plate, Steel, VDI 3357

Order No	Shape	b	s	a	b_1	d	e	e_1	e_2	Number of screw holes
2961.79.035.10.160	A	35	10	160	20	11	70	-	45	2
2961.79.035.10.200	A	35	10	200	20	11	110	-	45	2
2961.79.035.10.250	B	35	10	250	20	11	80	-	45	3
2961.79.045.15.160	A	45	15	160	30	13.5	70	-	45	2
2961.79.045.15.200	A	45	15	200	30	13.5	110	-	45	2
2961.79.045.15.250	B	45	15	250	30	13.5	80	-	45	3
2961.79.055.15.160	A	55	15	160	35	17.5	70	-	45	2
2961.79.055.15.200	A	55	15	200	35	17.5	110	-	45	2
2961.79.055.15.250	B	55	15	250	35	17.5	80	-	45	3
2961.79.075.25.160	A	75	25	160	40	17.5	70	-	45	2
2961.79.075.25.200	A	75	25	200	40	17.5	110	-	45	2
2961.79.075.25.250	B	75	25	250	40	17.5	80	-	45	3
2961.79.085.28.240	B	85	28	240	60	22	95	-	25	3
2961.79.085.28.300	D	85	28	300	60	22	85	80	25	4
2961.79.085.28.350	D	85	28	350	60	22	100	100	25	4
2961.79.085.28.400	D	85	28	400	60	22	115	120	25	4
2961.79.085.28.450	C	85	28	450	60	22	100	100	25	5
2961.79.085.30.160	A	85	30	160	60	22	70	-	45	2
2961.79.085.30.200	A	85	30	200	60	22	110	-	45	2
2961.79.085.30.250	B	85	30	250	60	22	80	-	45	3
2961.79.085.30.300	B	85	30	300	60	22	105	-	45	3
2961.79.085.30.350	B	85	30	350	60	22	130	-	45	3
2961.79.085.30.400	C	85	30	400	60	22	80	75	45	5
2961.79.100.25.160	A	100	25	160	60	17.5	70	-	45	2
2961.79.100.25.200	A	100	25	200	60	17.5	110	-	45	2
2961.79.100.25.250	B	100	25	250	60	17.5	80	-	45	3
2961.79.100.25.400	C	100	25	400	60	17.5	80	75	45	5
2961.79.100.30.160	A	100	30	160	60	22	70	-	45	2
2961.79.100.30.200	A	100	30	200	60	22	110	-	45	2
2961.79.100.30.250	B	100	30	250	60	22	80	-	45	3
2961.79.100.30.400	C	100	30	400	60	22	80	75	45	5
2961.79.125.25.160	A	125	25	160	75	17.5	70	-	45	2
2961.79.125.25.200	A	125	25	200	75	17.5	110	-	45	2
2961.79.125.25.250	B	125	25	250	75	17.5	80	-	45	3
2961.79.125.25.400	C	125	25	400	75	17.5	80	75	45	5
2961.79.125.25.300	D	125	25	300	80	26	85	80	25	4
2961.79.125.25.350	D	125	25	350	80	26	100	100	25	4
2961.79.125.25.400.1	D	125	25	400	80	26	115	120	25	4
2961.79.125.25.450	C	125	25	450	80	26	100	100	25	5
2961.79.125.25.500	C	125	25	500	80	26	110	115	25	5
2961.79.125.30.160	A	125	30	160	75	22	70	-	45	2
2961.79.125.30.200	A	125	30	200	75	22	110	-	45	2
2961.79.125.30.250	B	125	30	250	75	22	80	-	45	3
2961.79.125.30.300	B	125	30	300	75	22	105	-	45	3
2961.79.125.30.350	B	125	30	350	75	22	130	-	45	3
2961.79.125.30.400	C	125	30	400	75	22	80	75	45	5
2961.79.125.30.450	C	125	30	450	75	22	80	95	50	5
2961.79.125.30.500	C	125	30	500	75	22	80	120	50	5

RETAINING PLATE, STEEL WITH SOLID LUBRICANT, VDI 3357

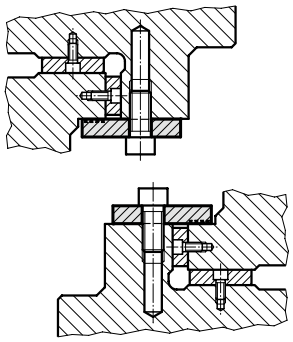
2961.81.



2961.81. Retaining plate, Steel with solid lubricant, VDI 3357

Order No	Shape	b	s	a	b_2	b_1	d	e	e_1	e_2	Number of screw holes
2961.81.035.10.160	A	35	10	160	10	20	11	70	-	45	2
2961.81.035.10.200	A	35	10	200	10	20	11	110	-	45	2
2961.81.035.10.250	B	35	10	250	10	20	11	80	-	45	3
2961.81.045.15.160	A	45	15	160	15	30	13.5	70	-	45	2
2961.81.045.15.200	A	45	15	200	15	30	13.5	110	-	45	2
2961.81.045.15.250	B	45	15	250	15	30	13.5	80	-	45	3
2961.81.055.15.160	A	55	15	160	20	35	17.5	70	-	45	2
2961.81.055.15.200	A	55	15	200	20	35	17.5	110	-	45	2
2961.81.055.15.250	B	55	15	250	20	35	17.5	80	-	45	3
2961.81.075.25.160	A	75	25	160	25	40	17.5	70	-	45	2
2961.81.075.25.200	A	75	25	200	25	40	17.5	110	-	45	2
2961.81.075.25.250	B	75	25	250	25	40	17.5	80	-	45	3
2961.81.085.28.240	B	85	28	240	30	60	22	95	-	25	3
2961.81.085.28.300	D	85	28	300	30	60	22	85	80	25	4
2961.81.085.28.350	D	85	28	350	30	60	22	100	100	25	4
2961.81.085.28.400	D	85	28	400	30	60	22	115	120	25	4
2961.81.085.28.450	C	85	28	450	30	60	22	100	100	25	5
2961.81.085.30.160	A	85	30	160	30	60	22	70	-	45	2
2961.81.085.30.200	A	85	30	200	30	60	22	110	-	45	2
2961.81.085.30.250	B	85	30	250	30	60	22	80	-	45	3
2961.81.085.30.300	B	85	30	300	30	60	22	105	-	45	3
2961.81.085.30.350	B	85	30	350	30	60	22	130	-	45	3
2961.81.085.30.400	C	85	30	400	30	60	22	80	75	45	5
2961.81.100.25.160	A	100	25	160	30	60	17.5	70	-	45	2
2961.81.100.25.200	A	100	25	200	30	60	17.5	110	-	45	2
2961.81.100.25.250	B	100	25	250	30	60	17.5	80	-	45	3
2961.81.100.25.400	C	100	25	400	30	60	17.5	80	75	45	5
2961.81.100.30.160	A	100	30	160	30	60	22	70	-	45	2
2961.81.100.30.200	A	100	30	200	30	60	22	110	-	45	2
2961.81.100.30.250	B	100	30	250	30	60	22	80	-	45	3
2961.81.100.30.400	C	100	30	400	30	60	22	80	75	45	5
2961.81.125.25.160	A	125	25	160	30	75	17.5	70	-	45	2
2961.81.125.25.200	A	125	25	200	30	75	17.5	110	-	45	2
2961.81.125.25.250	B	125	25	250	30	75	17.5	80	-	45	3
2961.81.125.25.300	D	125	25	300	30	80	26	85	80	25	4
2961.81.125.25.350	D	125	25	350	30	80	26	100	100	25	4
2961.81.125.25.400	C	125	25	400	30	75	17.5	80	75	45	5
2961.81.125.25.400.1	D	125	25	400	30	80	26	115	120	25	4
2961.81.125.25.450	C	125	25	450	30	80	26	100	100	25	5
2961.81.125.25.500	C	125	25	500	30	80	26	110	115	25	5
2961.81.125.30.160	A	125	30	160	30	75	22	70	-	45	2
2961.81.125.30.200	A	125	30	200	30	75	22	110	-	45	2
2961.81.125.30.250	B	125	30	250	30	75	22	80	-	45	3
2961.81.125.30.300	B	125	30	300	30	75	22	105	-	45	3
2961.81.125.30.350	B	125	30	350	30	75	22	130	-	45	3
2961.81.125.30.400	C	125	30	400	30	75	22	80	75	45	5
2961.81.125.30.450	C	125	30	450	30	75	22	80	95	50	5
2961.81.125.30.500	C	125	30	500	30	75	22	80	120	50	5

Mounting example



Material:
Steel, surface hardened. Sliding faces with embedded solid lubricant.

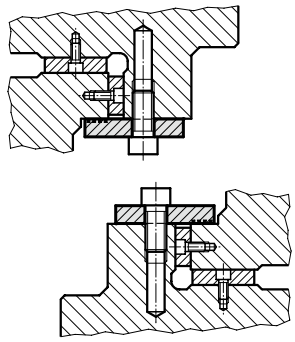
Note:
Screws are not included.

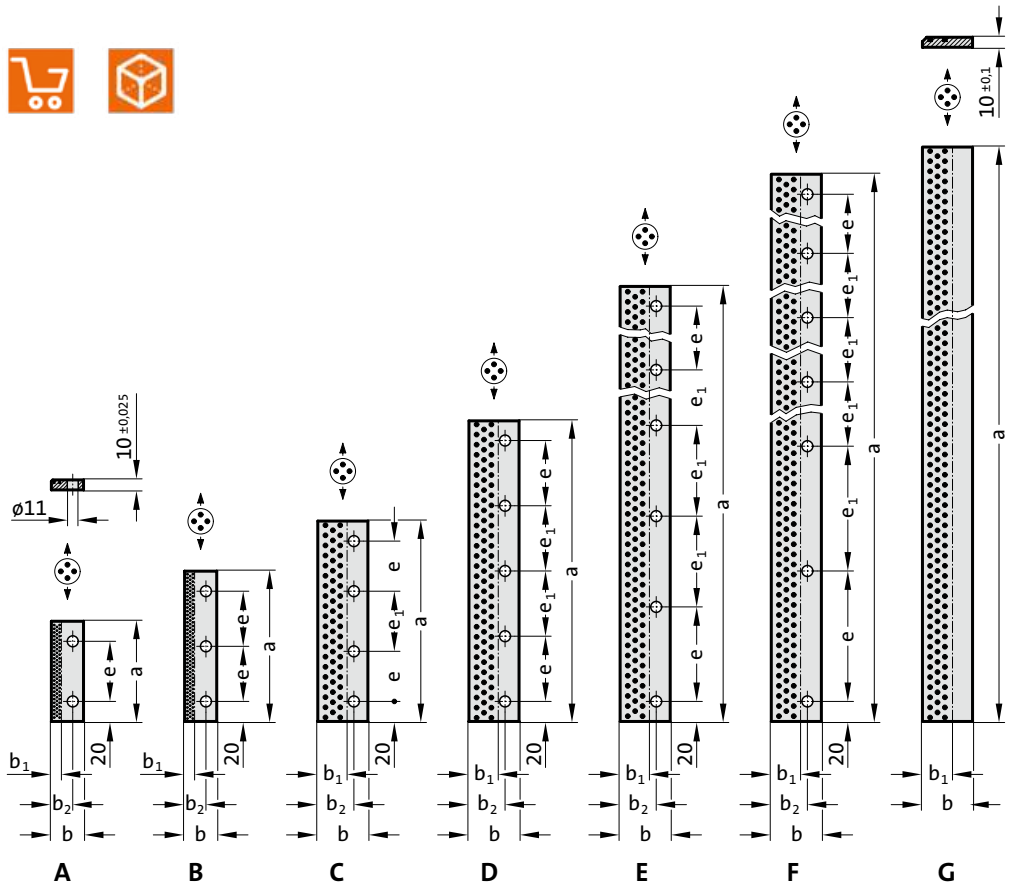
Fixing:
Use socket cap screws DIN EN ISO 4762.

RETAINING PLATE, BRONZE WITH SOLID LUBRICANT

2961.78.

Mounting example





Material:
Bronze with solid lubricant, oilless lubricating

Note:
Screws are not included.

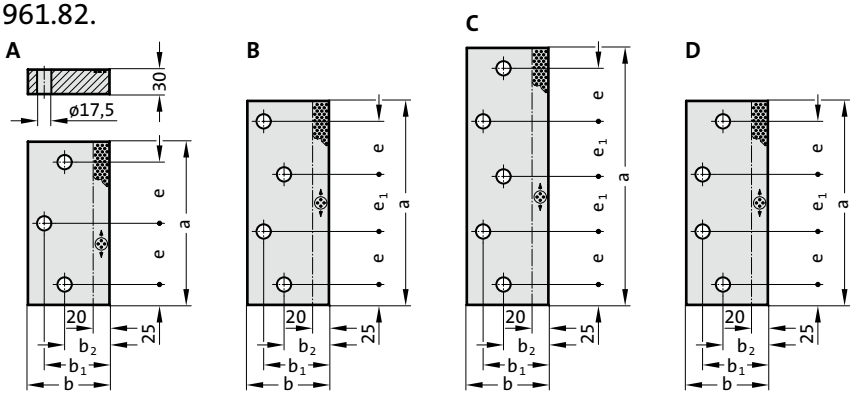
Fixing:
Use socket cap screws DIN EN ISO 4762 M10.

2961.78. Retaining plate, Bronze with solid lubricant

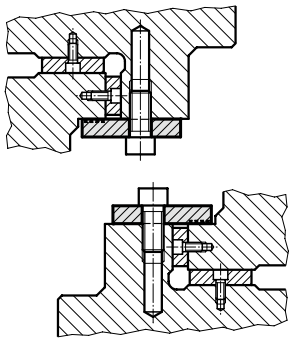
Order No	Shape	a	b	b_1	b_2	e	e_1	Number of screw holes
2961.78.032.0100	A	100	32	10	21	60	-	2
2961.78.032.0150	B	150	32	10	21	55	-	3
2961.78.032.0160	B	160	32	10	21	60	-	3
2961.78.050.0200	C	200	50	30	36	50	60	4
2961.78.050.0250	C	250	50	30	36	70	70	4
2961.78.050.0300	D	300	50	30	36	65	65	5
2961.78.050.0350	D	350	50	30	36	80	75	5
2961.78.050.0400	D	400	50	30	36	90	90	5
2961.78.050.0500	E	500	50	30	36	95	90	6
2961.78.050.0600	E	600	50	30	36	115	110	6
2961.78.050.0800	F	800	50	30	36	130	125	7
2961.78.050.0605	G	605	50	30	36	-	-	-
2961.78.050.1005	G	1,005	50	30	36	-	-	-

RETAINING PLATE, STEEL WITH SOLID LUBRICANT, NAAMS

2961.82.



Mounting example



2961.82. Retaining plate, Steel with solid lubricant, NAAMS

Order No	Shape	b	a	b_1	b_2	e	e_1	Number of screw holes
2961.82.075.200	A	75	200	55	40	75		3
2961.82.075.250	B	75	250	55	40	65	70	4
2961.82.075.250.1	D	75	250	55	40	65	70	4
2961.82.075.250.2	A	75	250	55	40	100		3
2961.82.075.315	C	75	315	55	40	65	67.5	5
2961.82.075.350	C	75	350	55	40	75	75	5
2961.82.075.400	C	75	400	55	40	90	85	5
2961.82.075.450	C	75	450	55	40	100	100	5
2961.82.100.200	A	100	200	80	55	75		3
2961.82.100.250	B	100	250	80	55	65	70	4
2961.82.100.250.1	D	100	250	80	55	65	70	4
2961.82.100.250.2	A	100	250	80	55	100		3
2961.82.100.315	C	100	315	80	55	65	67.5	5
2961.82.100.350	C	100	350	80	55	75	75	5
2961.82.100.400	C	100	400	80	55	90	85	5
2961.82.100.450	C	100	450	80	55	100	100	5
2961.82.125.200	A	125	200	105	65	75		3
2961.82.125.250	B	125	250	105	65	65	70	4
2961.82.125.250.1	D	125	250	105	65	65	70	4
2961.82.125.250.2	A	125	250	105	65	100		3
2961.82.125.315	C	125	315	105	65	65	67.5	5
2961.82.125.350	C	125	350	105	65	75	75	5
2961.82.125.400	C	125	400	105	65	90	85	5
2961.82.125.450	C	125	450	105	65	100	100	5
2961.82.150.200	A	150	200	130	65	75		3
2961.82.150.250	B	150	250	130	65	65	70	4
2961.82.150.250.1	D	150	250	130	65	65	70	4
2961.82.150.250.2	A	150	250	130	65	100		3
2961.82.150.315	C	150	315	130	65	65	67.5	5
2961.82.150.350	C	150	350	130	65	75	75	5
2961.82.150.400	C	150	400	130	65	90	85	5
2961.82.150.450	C	150	450	130	65	100	100	5

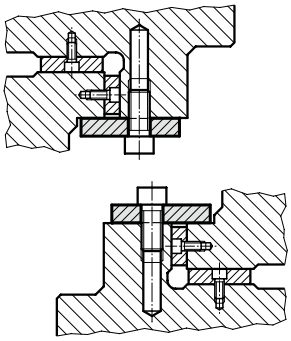
Material:
Steel, surface hardened. Sliding faces with embedded solid lubricant.

Note:
Screws are not included.

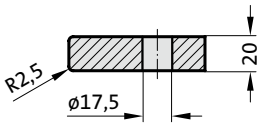
Fixing:
Use socket cap screws
DIN EN ISO 4762 M16.

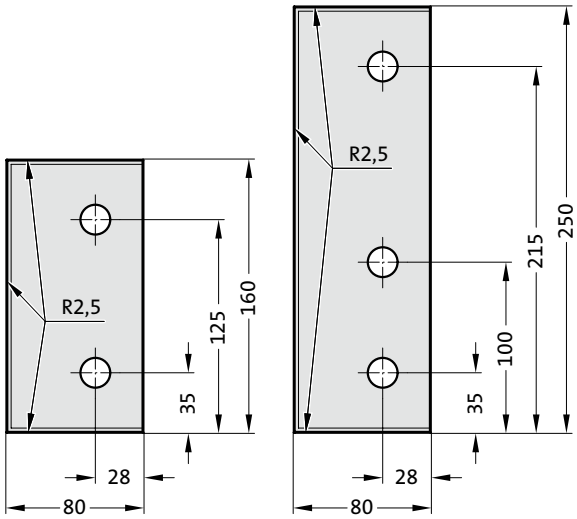
RETAINING PLATE, STEEL, CNOMO

Mounting example



2961.79.45.





Material:
Steel, surface hardened

Note:
Screws are not included.

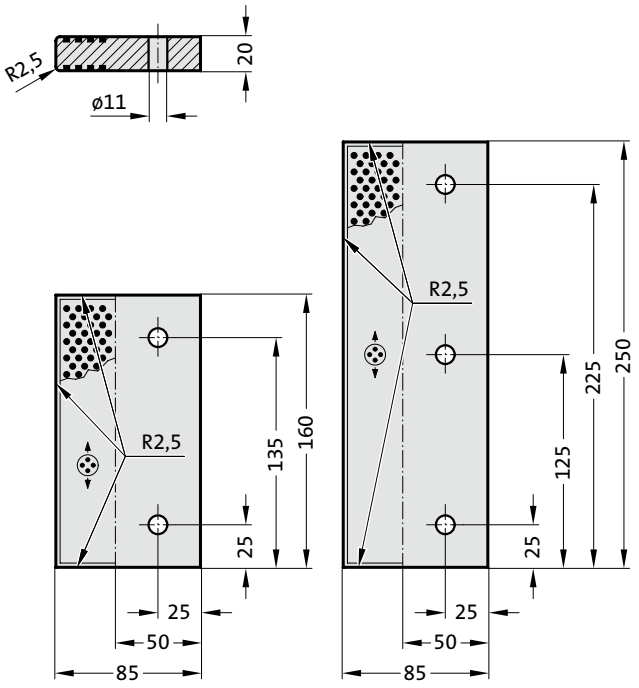
Fixing:
Use socket cap screws DIN EN ISO 4762 M16.

2961.79.45. Retaining plate, Steel, CNOMO

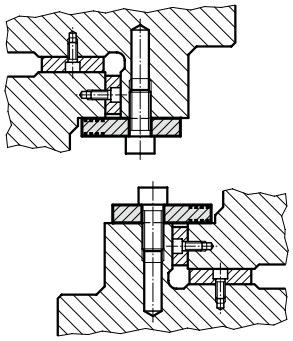
Order No	Number of screw holes
2961.79.45.080.20.160	2
2961.79.45.080.20.250	3

RETAINING PLATE, BRONZE WITH SOLID LUBRICANT, CNOMO

2961.81.45.



Mounting example



Material:
Bronze with solid lubricant, oilless lubricating

Note:
Screws are not included.

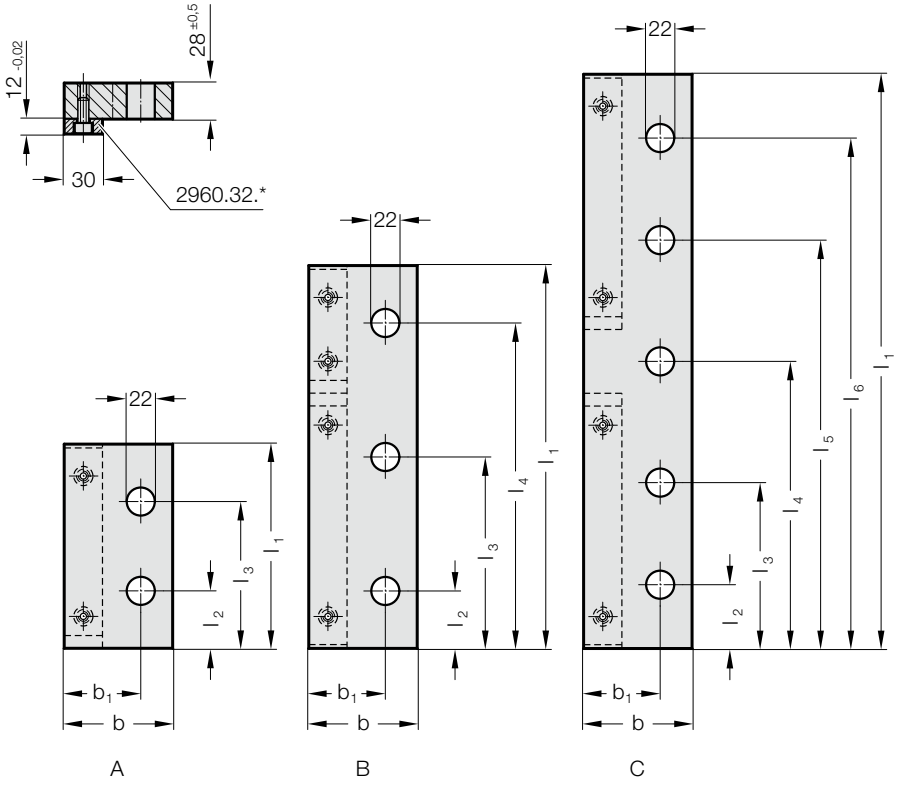
Fixing:
Use socket cap screws DIN EN ISO 4762 M10.

2961.81.45. Retaining plate, Bronze with solid lubricant, CNOMO

Order No	Number of screw holes
2961.81.45.085.20.160	2
2961.81.45.085.20.250	3

RETAINING PLATE WITH SLIDING PAD, STEEL / STEEL WITH SINTERLAYER, ACCORDING TO VW

2961.30.55.

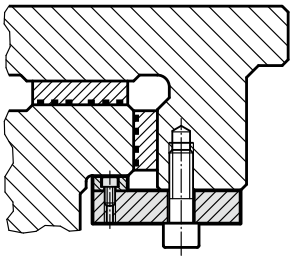


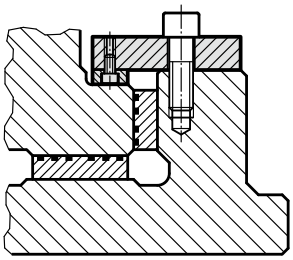
Material:
Retaining plate: Steel
Sliding pad: Steel with sinterlayer

Execution:
The retaining plate with sliding pad consists of:
- Retaining plate
- Sliding pad 2960.32.*
- Cylindrical screw according to DIN EN ISO 4762 M8x16 (x2, x4)

Note:
Supplied without screws.
Retaining plate cannot be ordered separately.
*Sliding pad 2960.32. can be ordered separately in case of wear.

Fixing:
Use socket cap screws DIN EN ISO 4762 M20.





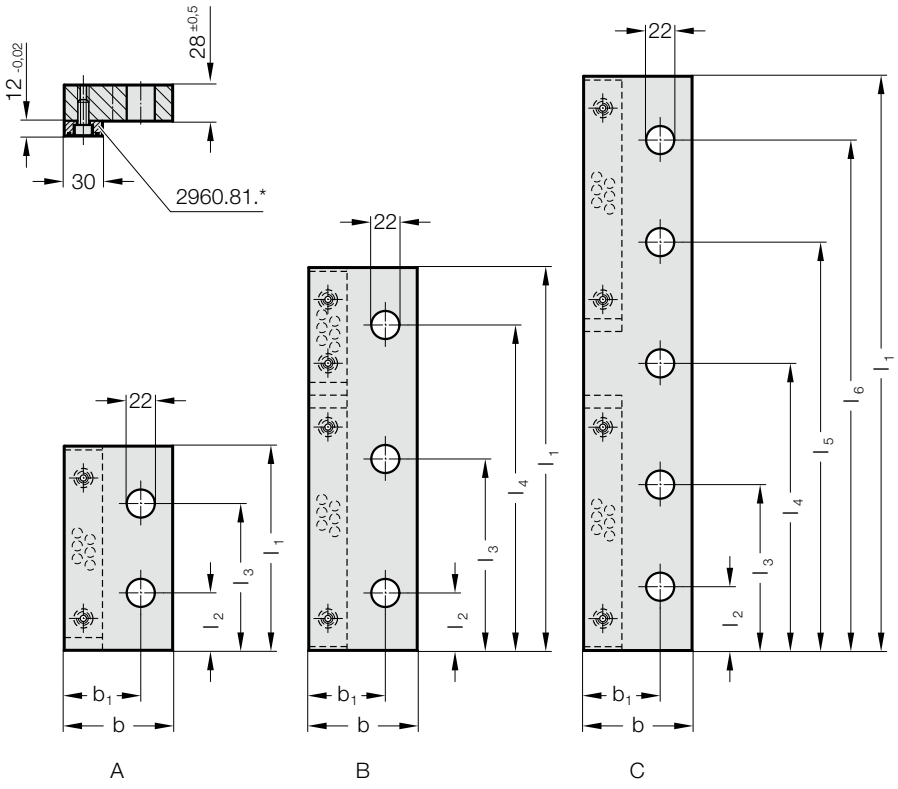
RETAINING PLATE WITH SLIDING PAD, STEEL / STEEL WITH SINTERLAYER, ACCORDING TO VW

2961.30.55. Retaining plate with sliding pad, Steel / Steel with sinterlayer, according to VW

Order No	Shape	b	b_1	l_1	l_2	l_3	l_4	l_5	l_6	Number of screw holes
2961.30.55.085.28.160	A	85	60	160	45	115	-	-	-	2
2961.30.55.085.28.200	A	85	60	200	45	155	-	-	-	2
2961.30.55.085.28.250	B	85	60	250	45	125	225	-	-	3
2961.30.55.085.28.300	B	85	60	300	45	150	255	-	-	3
2961.30.55.085.28.350	B	85	60	350	45	175	305	-	-	3
2961.30.55.085.28.400	C	85	60	400	45	125	200	275	355	5
2961.30.55.085.28.450	C	85	60	450	50	130	225	320	400	5
2961.30.55.085.28.500	C	85	60	500	50	130	250	370	450	5
2961.30.55.125.25.160	A	125	75	160	45	115	-	-	-	2
2961.30.55.125.25.200	A	125	75	200	45	155	-	-	-	2
2961.30.55.125.25.250	B	125	75	250	45	125	225	-	-	3
2961.30.55.125.25.300	B	125	75	300	45	150	255	-	-	3
2961.30.55.125.25.350	B	125	75	350	45	175	305	-	-	3
2961.30.55.125.25.400	C	125	75	400	45	125	200	275	355	5
2961.30.55.125.25.450	C	125	75	450	50	130	225	320	400	5
2961.30.55.125.25.500	C	125	75	500	50	130	250	350	450	5

RETAINING PLATE WITH SLIDING PAD, STEEL / BRONZE WITH SOLID LUBRICANT, ACCORDING TO VW

2961.74.55.

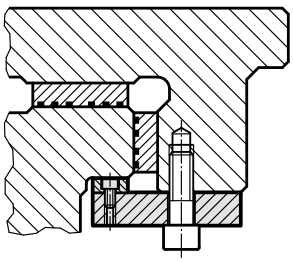


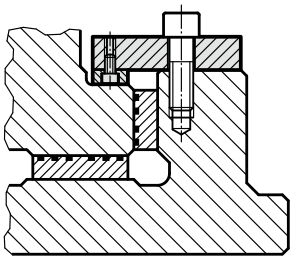
Material:
Retaining plate: Steel
Sliding pad: Bronze with solid lubricant, low-maintenance

Execution:
The retaining plate with sliding pad consists of:
- Retaining plate
- Sliding pad 2960.81.*
- Cylindrical screw according to DIN EN ISO 4762 M8x16 (x2, x4)

Note:
Supplied without screws.
Retaining plate cannot be ordered separately.
*Sliding pad 2960.81. can be ordered separately in case of wear.

Fixing:
Use socket cap screws DIN EN ISO 4762 M20.





RETAINING PLATE WITH SLIDING PAD, STEEL / BRONZE WITH SOLID LUBRICANT, ACCORDING TO VW

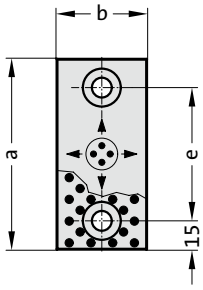
2961.74.55. Retaining plate with sliding pad, Steel / Bronze with solid lubricant, according to VW

Order No	Shape	b	b_1	l_1	l_2	l_3	l_4	l_5	l_6	Number of screw holes
2961.74.55.085.28.160	A	85	60	160	45	115	-	-	-	2
2961.74.55.085.28.200	A	85	60	200	45	155	-	-	-	2
2961.74.55.085.28.250	B	85	60	250	45	125	225	-	-	3
2961.74.55.085.28.300	B	85	60	300	45	150	255	-	-	3
2961.74.55.085.28.350	B	85	60	350	45	175	305	-	-	3
2961.74.55.085.28.400	C	85	60	400	45	125	200	275	355	5
2961.74.55.085.28.450	C	85	60	450	50	130	225	320	400	5
2961.74.55.085.28.500	C	85	60	500	50	130	250	370	450	5
2961.74.55.125.25.160	A	125	75	160	45	115	-	-	-	2
2961.74.55.125.25.200	A	125	75	200	45	155	-	-	-	2
2961.74.55.125.25.250	B	125	75	250	45	125	225	-	-	3
2961.74.55.125.25.300	B	125	75	300	45	150	255	-	-	3
2961.74.55.125.25.350	B	125	75	350	45	175	305	-	-	3
2961.74.55.125.25.400	C	125	75	400	45	125	200	275	355	5
2961.74.55.125.25.450	C	125	75	450	50	130	225	320	400	5
2961.74.55.125.25.500	C	125	75	500	50	130	250	350	450	5

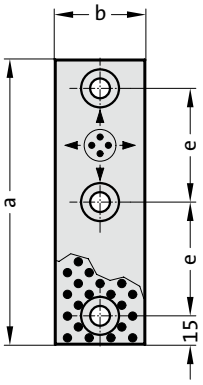
SLIDING PAD, SMALL DIMENSION, BRONZE WITH SOLID LUBRICANT

2960.72.

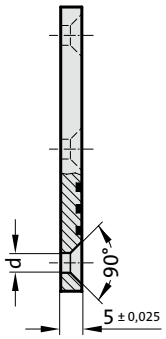
A



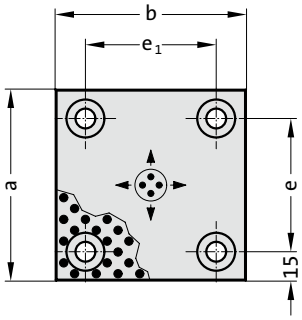
B



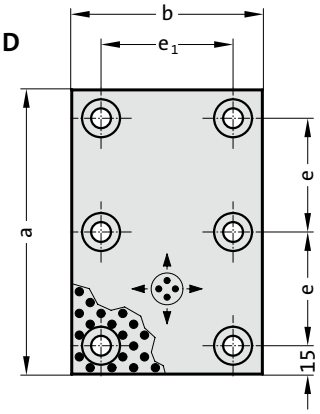
2960.72.



C



D



Material:
Bronze with solid lubricant, oilless lubricating

Note:
Screws are not included.

Fixing:
Use countersunk cap screws DIN 7991/ISO 10642.

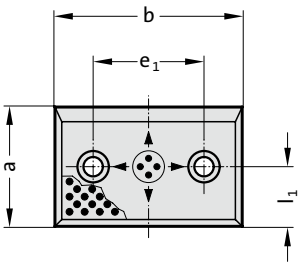
2960.72. Sliding pad, small dimension, Bronze with solid lubricant

Order No	Shape	b	a	e	e_1	d	Number of screw holes
2960.72.018.050	A	18	50	20	-	6.5	2
2960.72.018.075	A	18	75	45	-	6.5	2
2960.72.018.100	A	18	100	70	-	6.5	2
2960.72.018.150	B	18	150	60	-	6.5	3
2960.72.028.050	A	28	50	20	-	9	2
2960.72.028.075	A	28	75	45	-	9	2
2960.72.028.100	A	28	100	70	-	9	2
2960.72.028.150	B	28	150	60	-	9	3
2960.72.038.050	A	38	50	20	-	9	2
2960.72.038.075	A	38	75	45	-	9	2
2960.72.038.100	A	38	100	70	-	9	2
2960.72.038.150	B	38	150	60	-	9	3
2960.72.048.075	A	48	75	45	-	9	2
2960.72.048.100	A	48	100	70	-	9	2
2960.72.048.125	A	48	125	95	-	9	2
2960.72.048.150	B	48	150	60	-	9	3
2960.72.075.075	C	75	75	45	45	9	4
2960.72.075.100	C	75	100	70	45	9	4
2960.72.075.125	C	75	125	95	45	9	4
2960.72.075.150	D	75	150	60	45	9	6
2960.72.100.100	C	100	100	70	70	9	4
2960.72.100.125	C	100	125	95	70	9	4
2960.72.100.150	D	100	150	60	70	9	6

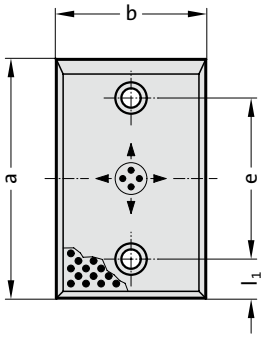
SLIDING PAD, BRONZE WITH SOLID LUBRICANT, VDI 3357 / ISO 9183-1

2960.71.

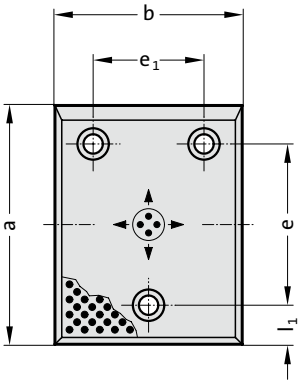
D



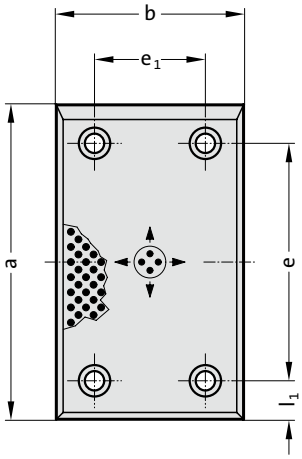
B



G



H

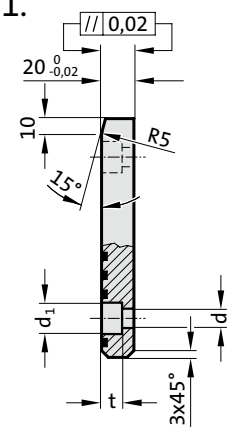


Material:
Bronze with solid lubricant, oilless lubricating

Note:
Screws are not included.

Fixing:
Use socket cap screws DIN EN ISO 4762.

2960.71.



SLIDING PAD, BRONZE WITH SOLID LUBRICANT, VDI 3357 / ISO 9183-1

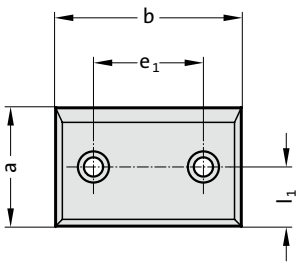
2960.71. Sliding pad, Bronze with solid lubricant, VDI 3357 / ISO 9183-1

Order No	Shape	b	a	l_1	e	e_1	d	d_1	t	Number of screw holes
2960.71.050.080	B	50	80	25	30	-	9	15	9	2
2960.71.050.100	B	50	100	25	50	-	13.5	20	13	2
2960.71.050.125	B	50	125	25	75	-	13.5	20	13	2
2960.71.050.160	B	50	160	25	110	-	13.5	20	13	2
2960.71.050.200	B	50	200	25	150	-	13.5	20	13	2
2960.71.080.050	D	80	50	25	-	30	9	15	9	2
2960.71.080.080	B	80	80	25	30	-	13.5	20	13	2
2960.71.080.100	B	80	100	25	50	-	13.5	20	13	2
2960.71.080.125	B	80	125	25	75	-	13.5	20	13	2
2960.71.080.160	B	80	160	25	110	-	13.5	20	13	2
2960.71.080.200	B	80	200	25	150	-	13.5	20	13	2
2960.71.080.250	B	80	250	40	170	-	13.5	20	13	2
2960.71.080.315	B	80	315	40	235	-	13.5	20	13	2
2960.71.100.050	D	100	50	25	-	50	13.5	20	13	2
2960.71.100.080	D	100	80	40	-	50	13.5	20	13	2
2960.71.100.100	B	100	100	25	50	-	13.5	20	13	2
2960.71.100.125	B	100	125	25	75	-	13.5	20	13	2
2960.71.100.160	B	100	160	25	110	-	13.5	20	13	2
2960.71.100.200	B	100	200	25	150	-	13.5	20	13	2
2960.71.100.250	B	100	250	40	170	-	13.5	20	13	2
2960.71.100.315	B	100	315	40	235	-	13.5	20	13	2
2960.71.125.050	D	125	50	25	-	75	13.5	20	13	2
2960.71.125.080	D	125	80	40	-	75	13.5	20	13	2
2960.71.125.100	G	125	100	25	50	75	13.5	20	13	3
2960.71.125.125	G	125	125	25	75	75	13.5	20	13	3
2960.71.125.160	G	125	160	25	110	75	13.5	20	13	3
2960.71.125.200	G	125	200	25	150	75	13.5	20	13	3
2960.71.125.250	G	125	250	40	170	75	13.5	20	13	3
2960.71.125.315	G	125	315	40	235	75	13.5	20	13	3
2960.71.160.050	D	160	50	25	-	110	13.5	20	13	2
2960.71.160.080	D	160	80	40	-	110	13.5	20	13	2
2960.71.160.100	G	160	100	25	50	110	13.5	20	13	3
2960.71.160.125	G	160	125	25	75	110	13.5	20	13	3
2960.71.160.160	G	160	160	25	110	110	13.5	20	13	3
2960.71.160.200	G	160	200	25	150	110	13.5	20	13	3
2960.71.160.250	H	160	250	40	170	110	13.5	20	13	4
2960.71.160.315	H	160	315	40	235	110	13.5	20	13	4

SLIDING PAD, STEEL, VDI 3357

2960.87.

D



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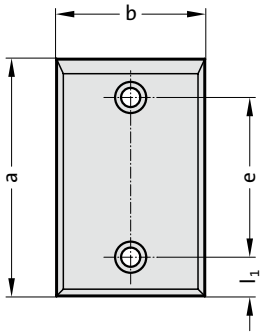

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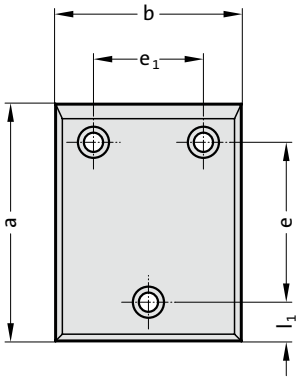

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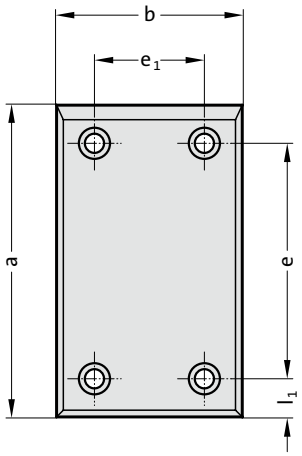
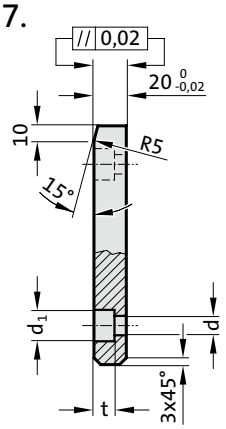


Material:
Steel, surface hardened

Note:
Screws are not included.

Fixing:
Use socket cap screws DIN EN ISO 4762.

2960.87.



SLIDING PAD, STEEL, VDI 3357

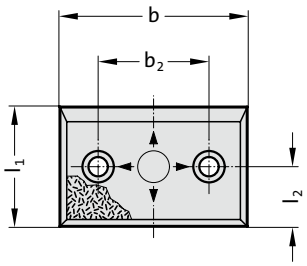
2960.87. Sliding pad, Steel, VDI 3357

Order No	Shape	b	a	l_1	e	e_1	d	d_1	t	Number of screw holes
2960.87.050.080	B	50	80	25	30	-	9	15	9	2
2960.87.050.100	B	50	100	25	50	-	13.5	20	13	2
2960.87.050.125	B	50	125	25	75	-	13.5	20	13	2
2960.87.050.160	B	50	160	25	110	-	13.5	20	13	2
2960.87.050.200	B	50	200	25	150	-	13.5	20	13	2
2960.87.080.050	D	80	50	25	-	30	9	15	9	2
2960.87.080.080	B	80	80	25	30	-	13.5	20	13	2
2960.87.080.100	B	80	100	25	50	-	13.5	20	13	2
2960.87.080.125	B	80	125	25	75	-	13.5	20	13	2
2960.87.080.160	B	80	160	25	110	-	13.5	20	13	2
2960.87.080.200	B	80	200	25	150	-	13.5	20	13	2
2960.87.080.250	B	80	250	40	170	-	13.5	20	13	2
2960.87.080.315	B	80	315	40	235	-	13.5	20	13	2
2960.87.100.050	D	100	50	25	-	50	13.5	20	13	2
2960.87.100.080	D	100	80	40	-	50	13.5	20	13	2
2960.87.100.100	B	100	100	25	50	-	13.5	20	13	2
2960.87.100.125	B	100	125	25	75	-	13.5	20	13	2
2960.87.100.160	B	100	160	25	110	-	13.5	20	13	2
2960.87.100.200	B	100	200	25	150	-	13.5	20	13	2
2960.87.100.250	B	100	250	40	170	-	13.5	20	13	2
2960.87.100.315	B	100	315	40	235	-	13.5	20	13	2
2960.87.125.050	D	125	50	25	-	75	13.5	20	13	2
2960.87.125.080	D	125	80	40	-	75	13.5	20	13	2
2960.87.125.100	G	125	100	25	50	75	13.5	20	13	3
2960.87.125.125	G	125	125	25	75	75	13.5	20	13	3
2960.87.125.160	G	125	160	25	110	75	13.5	20	13	3
2960.87.125.200	G	125	200	25	150	75	13.5	20	13	3
2960.87.125.250	G	125	250	40	170	75	13.5	20	13	3
2960.87.125.315	G	125	315	40	235	75	13.5	20	13	3
2960.87.160.050	D	160	50	25	-	110	13.5	20	13	2
2960.87.160.080	D	160	80	40	-	110	13.5	20	13	2
2960.87.160.100	G	160	100	25	50	110	13.5	20	13	3
2960.87.160.125	G	160	125	25	75	110	13.5	20	13	3
2960.87.160.160	G	160	160	25	110	110	13.5	20	13	3
2960.87.160.200	G	160	200	25	150	110	13.5	20	13	3
2960.87.160.250	H	160	250	40	170	110	13.5	20	13	4
2960.87.160.315	H	160	315	40	235	110	13.5	20	13	4

SLIDING PAD, STEEL WITH SINTERLAYER, VDI 3357

2960.30.

D



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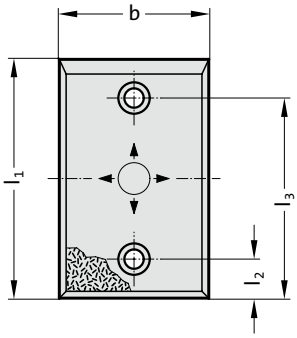

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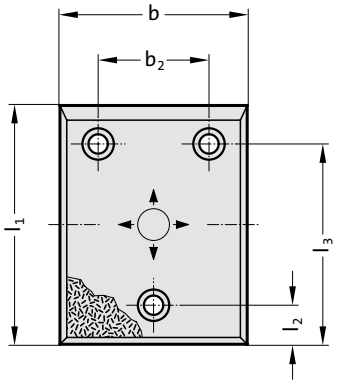

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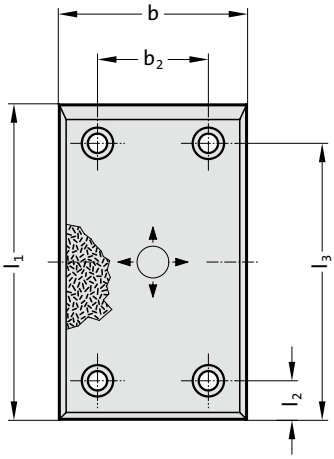


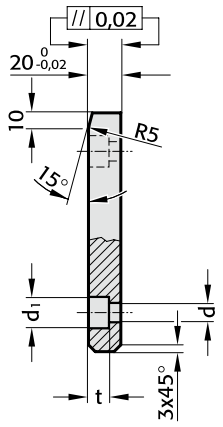
Description:
Steel with sinterlayer is a two-layer material. It ensures low maintenance, selflubricating service even in arduous multishift applications.

Material:
Steel plate with sinterlayer, part of lubricant 20-25%.

Note:
Screws are not included.

Fixing:
Use socket cap screws DIN EN ISO 4762.

2960.30.



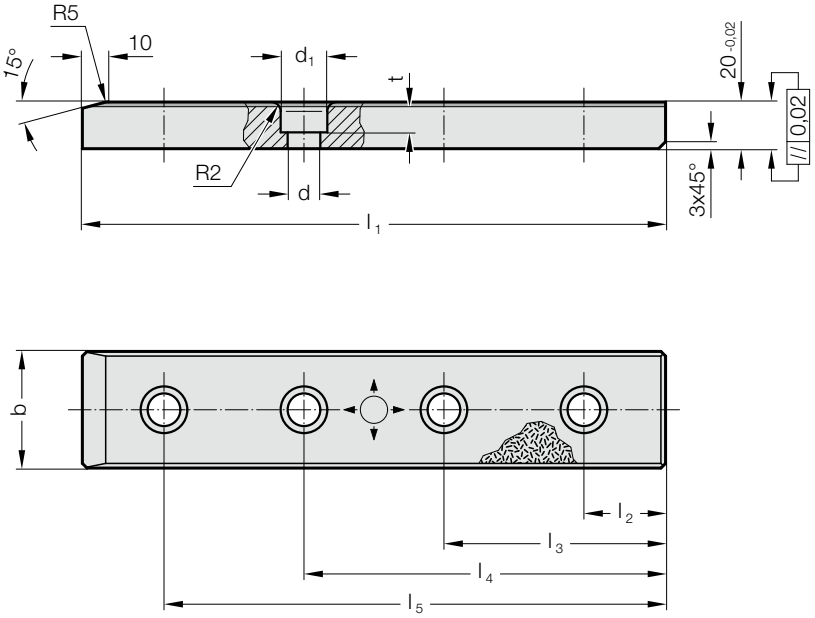
SLIDING PAD, STEEL WITH SINTERLAYER, VDI 3357

2960.30. Sliding pad, Steel with sinterlayer, VDI 3357

Order No	Shape	b	l_1	l_2	l_3	b_2	d	d_1	t	Number of screw holes
2960.30.050.080	B	50	80	25	55	-	9	15	9	2
2960.30.050.100	B	50	100	25	75	-	13.5	20	13	2
2960.30.050.125	B	50	125	25	100	-	13.5	20	13	2
2960.30.050.160	B	50	160	25	125	-	13.5	20	13	2
2960.30.050.200	B	50	200	25	175	-	13.5	20	13	2
2960.30.080.050	D	80	50	25	-	30	9	15	9	2
2960.30.080.080	B	80	80	25	55	-	13.5	20	13	2
2960.30.080.100	B	80	100	25	75	-	13.5	20	13	2
2960.30.080.125	B	80	125	25	100	-	13.5	20	13	2
2960.30.080.160	B	80	160	25	135	-	13.5	20	13	2
2960.30.080.200	B	80	200	25	175	-	13.5	20	13	2
2960.30.080.250	B	80	250	40	210	-	13.5	20	13	2
2960.30.080.315	B	80	315	40	275	-	13.5	20	13	2
2960.30.100.050	D	100	50	25	-	50	13.5	20	13	2
2960.30.100.080	D	100	80	40	-	50	13.5	20	13	2
2960.30.100.100	B	100	100	25	75	-	13.5	20	13	2
2960.30.100.125	B	100	125	25	100	-	13.5	20	13	2
2960.30.100.160	B	100	160	25	135	-	13.5	20	13	2
2960.30.100.200	B	100	200	25	175	-	13.5	20	13	2
2960.30.100.250	B	100	250	40	210	-	13.5	20	13	2
2960.30.100.315	B	100	315	40	275	-	13.5	20	13	2
2960.30.125.050	D	125	50	25	-	75	13.5	20	13	2
2960.30.125.080	D	125	80	40	-	75	13.5	20	13	2
2960.30.125.100	G	125	100	25	75	75	13.5	20	13	3
2960.30.125.125	G	125	125	25	100	75	13.5	20	13	3
2960.30.125.160	G	125	160	25	135	75	13.5	20	13	3
2960.30.125.200	G	125	200	25	175	75	13.5	20	13	3
2960.30.125.250	G	125	250	40	210	75	13.5	20	13	3
2960.30.125.315	G	125	315	40	275	75	13.5	20	13	3
2960.30.160.050	D	160	50	25	-	110	13.5	20	13	2
2960.30.160.080	D	160	80	40	-	110	13.5	20	13	2
2960.30.160.100	G	160	100	25	75	110	13.5	20	13	3
2960.30.160.125	G	160	125	25	100	110	13.5	20	13	3
2960.30.160.160	G	160	160	25	135	110	13.5	20	13	3
2960.30.160.200	G	160	200	25	175	110	13.5	20	13	3
2960.30.160.250	H	160	250	40	210	110	13.5	20	13	4
2960.30.160.315	H	160	315	40	275	110	13.5	20	13	4

SLIDING PAD, STEEL WITH SINTERLAYER, VDI 3357

2960.31.



Description:
Steel with sinterlayer is a two-layer material. It ensures low maintenance, selflubricating service even in arduous multishift applications.

Material:
Steel plate with sinterlayer, part of lubricant 20-25%.

Note:
Screws are not included.

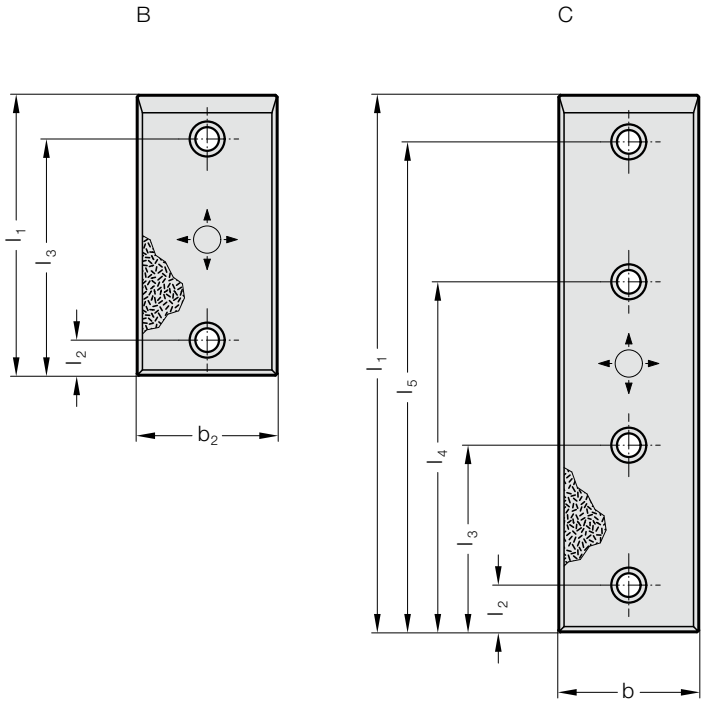
Fixing:
Use socket cap screws DIN EN ISO 4762 M12.

2960.31. Sliding pad, Steel with sinterlayer, VDI 3357

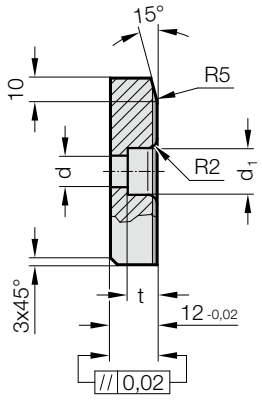
Order No	b	l_1	l_2	l_3	l_4	l_5	d	d_1	t	Number of screw holes
2960.31.050.250	50	250	25	85	165	225	13.5	20	13	4
2960.31.050.300	50	300	25	105	195	275	13.5	20	13	4
2960.31.050.350	50	350	25	125	225	325	13.5	20	13	4
2960.31.050.400	50	400	25	145	255	375	13.5	20	13	4
2960.31.050.450	50	450	25	165	285	425	13.5	20	13	4
2960.31.050.500	50	500	25	175	325	475	13.5	20	13	4
2960.31.080.250	80	250	25	85	165	225	13.5	20	13	4
2960.31.080.300	80	300	25	105	195	275	13.5	20	13	4
2960.31.080.350	80	350	25	125	225	325	13.5	20	13	4
2960.31.080.400	80	400	25	145	255	375	13.5	20	13	4
2960.31.080.450	80	450	25	165	285	425	13.5	20	13	4
2960.31.080.500	80	500	25	175	325	475	13.5	20	13	4
2960.31.100.250	100	250	25	85	165	225	13.5	20	13	4
2960.31.100.300	100	300	25	105	195	275	13.5	20	13	4
2960.31.100.350	100	350	25	125	225	325	13.5	20	13	4
2960.31.100.400	100	400	25	145	255	375	13.5	20	13	4
2960.31.100.450	100	450	25	165	285	425	13.5	20	13	4
2960.31.100.500	100	500	25	175	325	475	13.5	20	13	4
2960.31.125.250	125	250	25	85	165	225	13.5	20	13	4
2960.31.125.300	125	300	25	105	195	275	13.5	20	13	4
2960.31.125.350	125	350	25	125	225	325	13.5	20	13	4
2960.31.125.400	125	400	25	145	255	375	13.5	20	13	4
2960.31.125.450	125	450	25	165	285	425	13.5	20	13	4
2960.31.125.500	125	500	25	175	325	475	13.5	20	13	4
2960.31.160.250	160	250	25	85	165	225	13.5	20	13	4
2960.31.160.300	160	300	25	105	195	275	13.5	20	13	4
2960.31.160.350	160	350	25	125	225	325	13.5	20	13	4
2960.31.160.400	160	400	25	145	255	375	13.5	20	13	4
2960.31.160.450	160	450	25	165	285	425	13.5	20	13	4
2960.31.160.500	160	500	25	175	325	475	13.5	20	13	4

SLIDING PAD, STEEL WITH SINTERLAYER, VDI 3357

2960.32.



2960.32.



2960.32. Sliding pad, Steel with sinterlayer, VDI 3357

Order No	Shape	b	l_1	l_2	l_3	l_4	l_5	d	d_1	t	Number of screw holes
2960.32.030.080	B	30	80	25	55	-	-	9	15	9	2
2960.32.030.100	B	30	100	25	75	-	-	9	15	9	2
2960.32.030.125	B	30	125	25	100	-	-	9	15	9	2
2960.32.030.160	B	30	160	25	135	-	-	9	15	9	2
2960.32.030.200	B	30	200	25	175	-	-	9	15	9	2
2960.32.040.080	B	40	80	25	55	-	-	9	15	9	2
2960.32.040.100	B	40	100	25	75	-	-	9	15	9	2
2960.32.040.125	B	40	125	25	100	-	-	9	15	9	2
2960.32.040.160	B	40	160	25	135	-	-	9	15	9	2
2960.32.040.200	B	40	200	25	175	-	-	9	15	9	2
2960.32.050.080	B	50	80	25	55	-	-	9	15	9	2
2960.32.050.100	B	50	100	25	75	-	-	9	15	9	2
2960.32.050.125	B	50	125	25	100	-	-	9	15	9	2
2960.32.050.160	B	50	160	25	135	-	-	9	15	9	2
2960.32.050.200	B	50	200	25	175	-	-	9	15	9	2
2960.32.050.250	C	50	250	25	85	165	225	9	15	9	4
2960.32.050.300	C	50	300	25	105	195	275	9	15	9	4
2960.32.050.350	C	50	350	25	125	225	325	9	15	9	4
2960.32.050.400	C	50	400	25	145	255	375	9	15	9	4
2960.32.060.080	B	60	80	25	55	-	-	9	15	9	2
2960.32.060.100	B	60	100	25	75	-	-	9	15	9	2
2960.32.060.125	B	60	125	25	100	-	-	9	15	9	2
2960.32.060.160	B	60	160	25	135	-	-	9	15	9	2
2960.32.060.200	B	60	200	25	175	-	-	9	15	9	2
2960.32.080.080	B	80	80	25	55	-	-	9	15	9	2
2960.32.080.100	B	80	100	25	75	-	-	9	15	9	2
2960.32.080.125	B	80	125	25	100	-	-	9	15	9	2
2960.32.080.160	B	80	160	25	135	-	-	9	15	9	2
2960.32.080.200	B	80	200	25	175	-	-	9	15	9	2

Description:
Steel with sinterlayer is a two-layer material. It ensures low maintenance, selflubricating service even in arduous multishift applications.

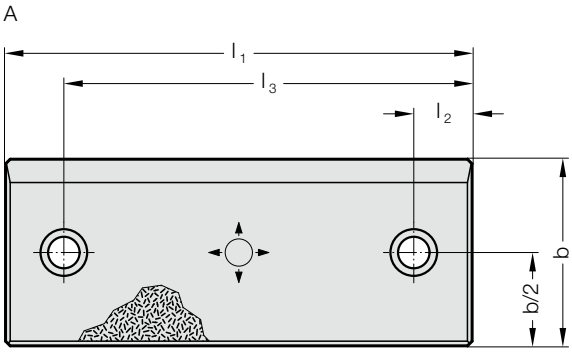
Material:
Steel plate with sinterlayer, part of lubricant 20-25%.

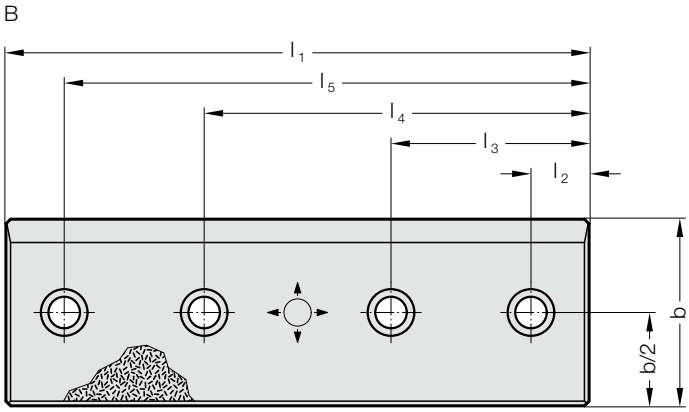
Note:
Screws are not included.

Fixing:
Use socket cap screws DIN EN ISO 4762 M8.

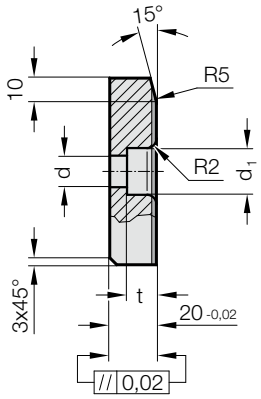
SLIDING PAD, STEEL WITH SINTERLAYER, VDI 3357

2960.33.





2960.33.



Description:
Steel with sinterlayer is a two-layer material. It ensures low maintenance, selflubricating service even in arduous multishift applications.

Material:
Steel plate with sinterlayer, part of lubricant 20-25%.

Note:
Screws are not included.

Fixing:
Use socket cap screws DIN EN ISO 4762 M12.

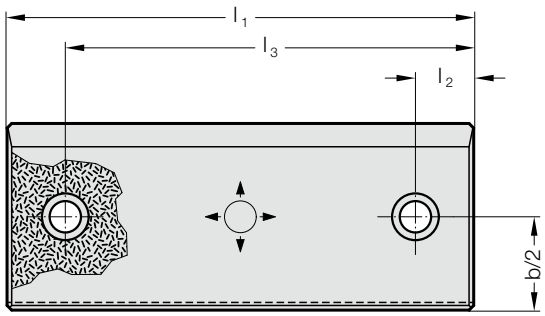
2960.33. Sliding pad, Steel with sinterlayer, VDI 3357

Order No	Shape	b	l_1	l_2	l_3	l_4	l_5	d	d_1	t	Number of screw holes
2960.33.080.200	A	80	200	25	175	-	-	13.5	20	13	2
2960.33.080.250	B	80	250	25	85	165	225	13.5	20	13	4
2960.33.080.300	B	80	300	25	105	195	275	13.5	20	13	4
2960.33.080.350	B	80	350	25	125	225	325	13.5	20	13	4
2960.33.080.400	B	80	400	25	145	255	375	13.5	20	13	4
2960.33.080.450	B	80	450	25	165	285	425	13.5	20	13	4
2960.33.080.500	B	80	500	25	175	325	475	13.5	20	13	4

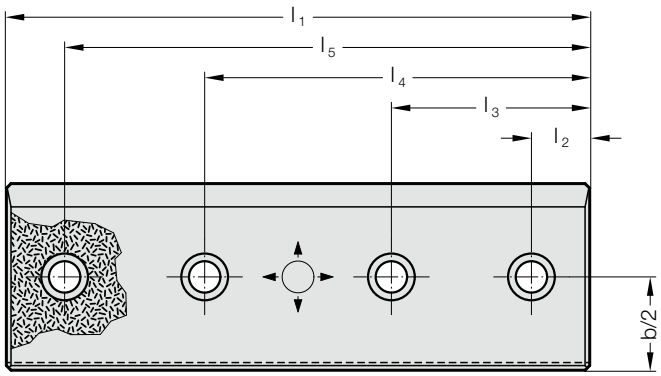
SLIDING PAD, STEEL WITH SINTERLAYER, ~VDI 3387

2960.34.

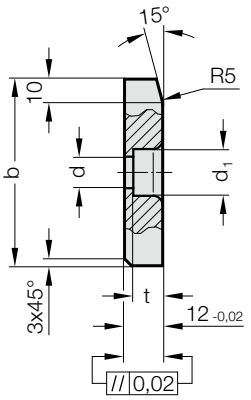
A



B



2960.34.



2960.34. Sliding pad, Steel with sinterlayer, ~VDI 3387

Order No	Shape	b	l_1	l_2	l_3	l_4	l_5	d	d_1	t	Number of screw holes
2960.34.080.200	A	80	200	25	175	-	-	9	15	9	2
2960.34.080.250	B	80	250	25	85	165	225	9	15	9	4
2960.34.080.300	B	80	300	25	105	195	275	9	15	9	4
2960.34.080.350	B	80	350	25	125	225	325	9	15	9	4
2960.34.080.400	B	80	400	25	145	255	375	9	15	9	4
2960.34.080.450	B	80	450	25	165	285	425	9	15	9	4
2960.34.080.500	B	80	500	25	175	325	475	9	15	9	4

Description:
Steel with sinterlayer is a two-layer material. It ensures low maintenance, selflubricating service even in arduous multishift applications.

Material:
Steel plate with sinterlayer, part of lubricant 20-25%.

Note:
Screws are not included.

Fixing:
Use socket cap screws DIN EN ISO 4762 M8.

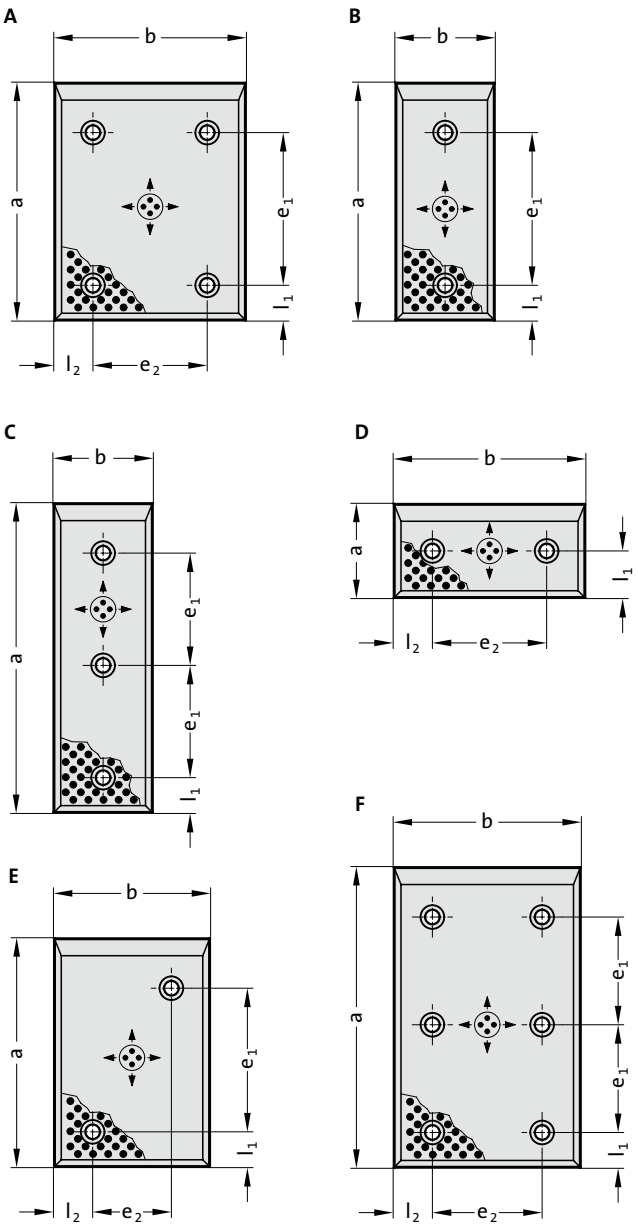
SLIDING PAD, BRONZE WITH SOLID LUBRICANT

Material:
Bronze with solid lubricant, oilless lubricating

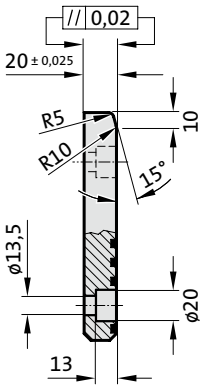
Note:
Screws are not included.

Fixing:
Use socket cap screws DIN EN ISO 4762 M12.

2960.70.



2960.70.



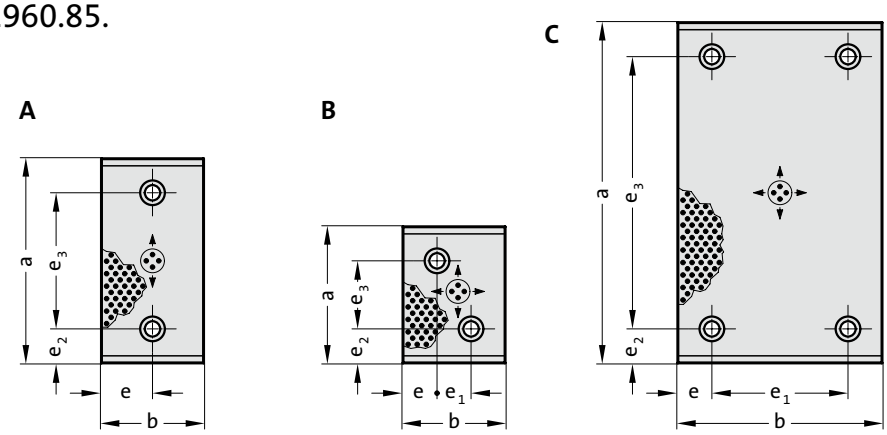
SLIDING PAD, BRONZE WITH SOLID LUBRICANT

2960.70. Sliding pad, Bronze with solid lubricant

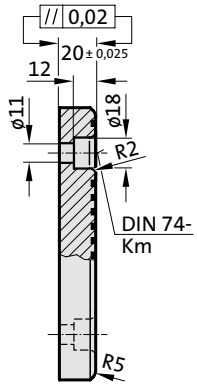
Order No	Shape	b	a	l_1	e_1	l_2	e_2
2960.70.050.080	B	50	80	20	35	25	-
2960.70.050.100	B	50	100	20	55	25	-
2960.70.050.125	B	50	125	20	80	25	-
2960.70.050.160	B	50	160	20	115	25	-
2960.70.050.200	B	50	200	20	155	25	-
2960.70.050.250	C	50	250	20	100	25	-
2960.70.080.050	D	80	50	25	-	20	40
2960.70.080.080	E	80	80	20	35	20	40
2960.70.080.100	E	80	100	20	55	20	40
2960.70.080.125	E	80	125	20	80	20	40
2960.70.080.160	A	80	160	20	115	20	40
2960.70.080.200	A	80	200	20	155	20	40
2960.70.080.250	F	80	250	20	100	20	40
2960.70.080.315	F	80	315	20	132	20	40
2960.70.100.050	D	100	50	25	-	20	60
2960.70.100.080	E	100	80	20	35	20	60
2960.70.100.100	E	100	100	20	55	20	60
2960.70.100.125	A	100	125	20	80	20	60
2960.70.100.160	A	100	160	20	115	20	60
2960.70.100.200	A	100	200	20	155	20	60
2960.70.100.250	F	100	250	20	100	20	60
2960.70.100.315	F	100	315	20	132	20	60
2960.70.125.050	D	125	50	25	-	20	85
2960.70.125.080	E	125	80	20	35	20	85
2960.70.125.100	A	125	100	20	55	20	85
2960.70.125.125	A	125	125	20	80	20	85
2960.70.125.160	A	125	160	20	115	20	85
2960.70.125.200	A	125	200	20	155	20	85
2960.70.125.250	F	125	250	20	100	20	85
2960.70.125.315	F	125	315	20	132	20	85
2960.70.160.050	D	160	50	25	-	20	120
2960.70.160.080	A	160	80	20	35	20	120
2960.70.160.100	A	160	100	20	55	20	120
2960.70.160.125	A	160	125	20	80	20	120
2960.70.160.160	A	160	160	20	115	20	120
2960.70.160.200	A	160	200	20	155	20	120
2960.70.160.250	F	160	250	20	100	20	120
2960.70.160.315	F	160	315	20	132	20	120

SLIDING PAD, BRONZE WITH SOLID LUBRICANT

2960.85.



2960.85.



Material:
Bronze with solid lubricant, oilless lubricating

Note:
Screws are not included.

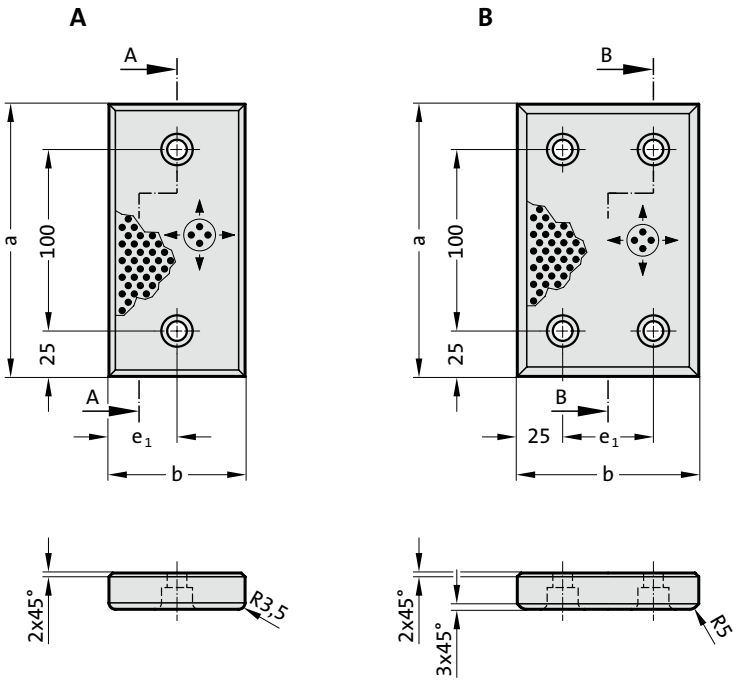
Fixing:
Use socket cap screws DIN EN ISO 4762 M10.

2960.85. Sliding pad, Bronze with solid lubricant

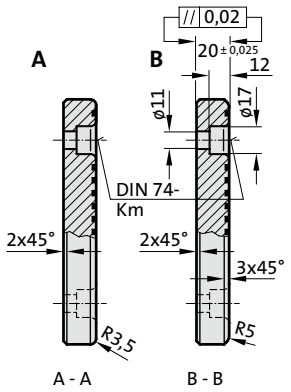
Order No	Shape	b	a	e	e_1	e_2	e_3	Number of screw holes
2960.85.028.075	A	28	75	14	-	15	45	2
2960.85.028.100	A	28	100	14	-	25	50	2
2960.85.028.125	A	28	125	14	-	25	75	2
2960.85.028.150	A	28	150	14	-	25	100	2
2960.85.038.075	A	38	75	19	-	15	45	2
2960.85.038.100	A	38	100	19	-	25	50	2
2960.85.038.125	A	38	125	19	-	25	75	2
2960.85.038.150	A	38	150	19	-	25	100	2
2960.85.038.200	A	38	200	19	-	25	150	2
2960.85.048.075	A	48	75	24	-	15	45	2
2960.85.048.100	A	48	100	24	-	25	50	2
2960.85.048.125	A	48	125	24	-	25	75	2
2960.85.048.150	A	48	150	24	-	25	100	2
2960.85.048.200	A	48	200	24	-	25	150	2
2960.85.058.075	A	58	75	29	-	15	45	2
2960.85.058.100	A	58	100	29	-	25	50	2
2960.85.058.150	A	58	150	29	-	25	100	2
2960.85.075.075.1	A	75	75	37.5	-	15	45	2
2960.85.075.075	B	75	75	25	25	25	25	2
2960.85.075.100.1	A	75	100	37.5	-	25	50	2
2960.85.075.100	B	75	100	25	25	25	50	2
2960.85.075.125	A	75	125	37.5	-	25	75	2
2960.85.075.150	A	75	150	37.5	-	25	100	2
2960.85.075.200	A	75	200	37.5	-	25	150	2
2960.85.100.100	C	100	100	25	50	25	50	4
2960.85.100.125	C	100	125	25	50	25	75	4
2960.85.100.150	C	100	150	25	50	25	100	4
2960.85.100.200	C	100	200	25	50	25	150	4
2960.85.100.250	C	100	250	25	50	25	200	4
2960.85.100.300	C	100	300	25	50	25	250	4
2960.85.125.125	C	125	125	37.5	50	25	75	4
2960.85.125.150	C	125	150	37.5	50	25	100	4
2960.85.125.200	C	125	200	37.5	50	25	150	4
2960.85.125.250	C	125	250	37.5	50	25	200	4
2960.85.125.300	C	125	300	37.5	50	25	250	4
2960.85.125.350	C	125	350	37.5	50	25	300	4
2960.85.150.150	C	150	150	25	100	25	100	4
2960.85.150.200	C	150	200	25	100	25	150	4
2960.85.150.250	C	150	250	25	100	25	200	4
2960.85.150.300	C	150	300	25	100	25	250	4
2960.85.200.200	C	200	200	25	150	25	150	4
2960.85.200.250	C	200	250	25	150	25	200	4
2960.85.200.300	C	200	300	25	150	25	250	4

SLIDING PAD, BRONZE WITH SOLID LUBRICANT

2960.86.



2960.86.



2960.86. Sliding pad, Bronze with solid lubricant

Order No	Shape	b	a	e_1	Number of screw holes
2960.86.038.150	A	38	150	19	2
2960.86.075.150	A	75	150	37.5	2
2960.86.100.150	B	100	150	50	4

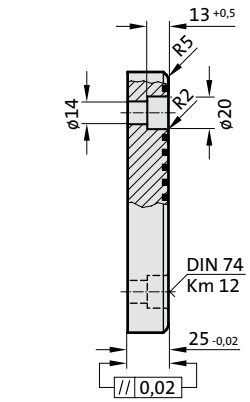
Material:
Bronze with solid lubricant, oilless lubricating

Note:
Screws are not included.

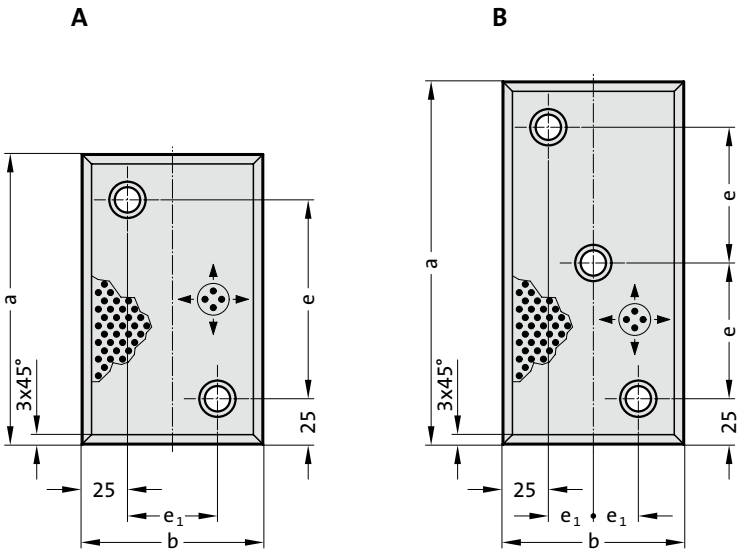
Fixing:
Use socket cap screws DIN EN ISO 4762 M10.

SLIDING PAD, BRONZE WITH SOLID LUBRICANT

2960.76.



2960.76.



Material:
Bronze with solid lubricant, oilless lubricating

Note:
Screws are not included.

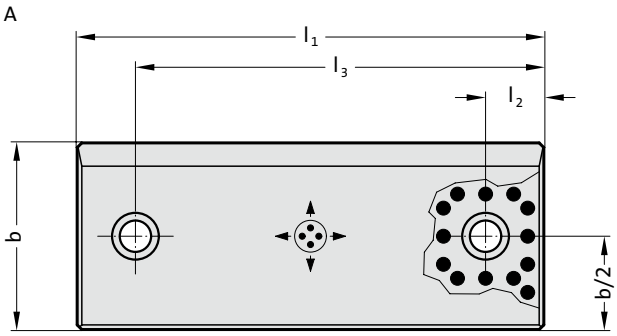
Fixing:
Use socket cap screws DIN EN ISO 4762 M12.

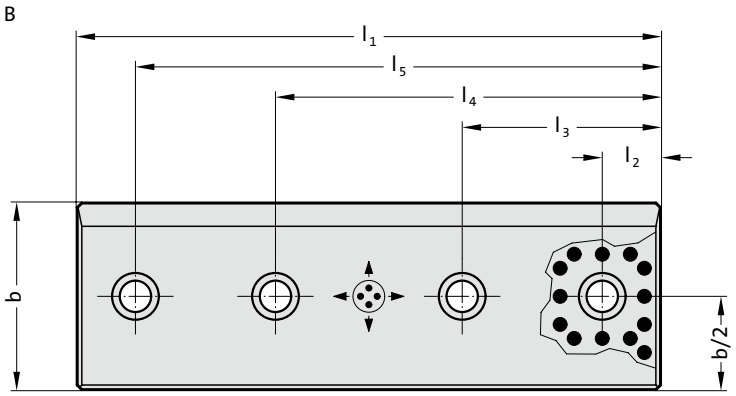
2960.76. Sliding pad, Bronze with solid lubricant

Order No	Shape	b	a	e	e_1	Number of screw holes
2960.76.080.100	A	80	100	50	30	2
2960.76.080.125	A	80	125	75	30	2
2960.76.080.160	A	80	160	110	30	2
2960.76.080.200	B	80	200	75	15	3
2960.76.100.125	A	100	125	75	50	2
2960.76.100.160	A	100	160	110	50	2
2960.76.100.200	B	100	200	75	25	3
2960.76.125.125	A	125	125	75	75	2

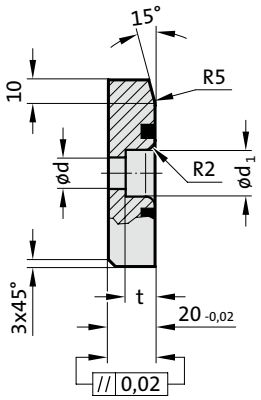
SLIDING PAD, BRONZE WITH SOLID LUBRICANT, VDI 3357

2960.77.





2960.77.



2960.77. Sliding pad, Bronze with solid lubricant, VDI 3357

Order No	Shape	b	l_1	l_2	l_3	l_4	l_5	d	d_1	t	Number of screw holes
2960.77.080.200	A	80	200	25	175	0	0	13.5	20	13	2
2960.77.080.250	B	80	250	25	85	165	225	13.5	20	13	4
2960.77.080.300	B	80	300	25	105	195	275	13.5	20	13	4
2960.77.080.350	B	80	350	25	125	225	325	13.5	20	13	4
2960.77.080.400	B	80	400	25	145	255	375	13.5	20	13	4
2960.77.080.450	B	80	450	25	165	285	425	13.5	20	13	4
2960.77.080.500	B	80	500	25	175	325	475	13.5	20	13	4

Material:
Bronze with solid lubricant, oilless lubricating

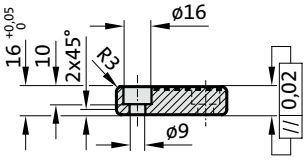
Note:
Screws not included.

Fixing:
Use socket cap screws DIN EN ISO 4762 M12.

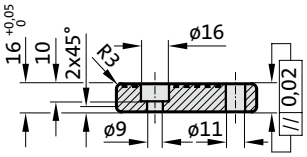
SLIDING PAD, BRONZE WITH SOLID LUBRICANT, CNOMO

2962.78.45.

A, B

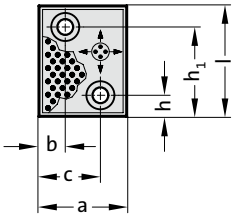


C, D

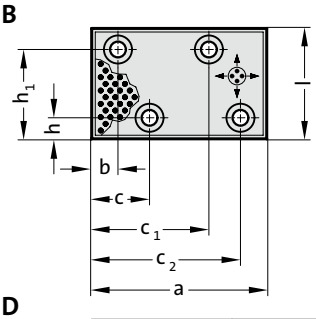


2962.78.45.

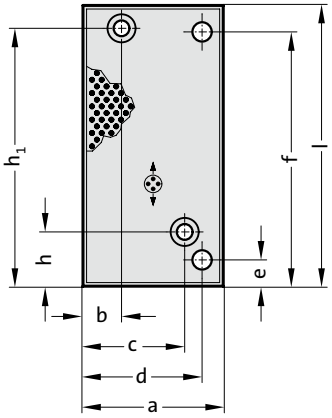
A



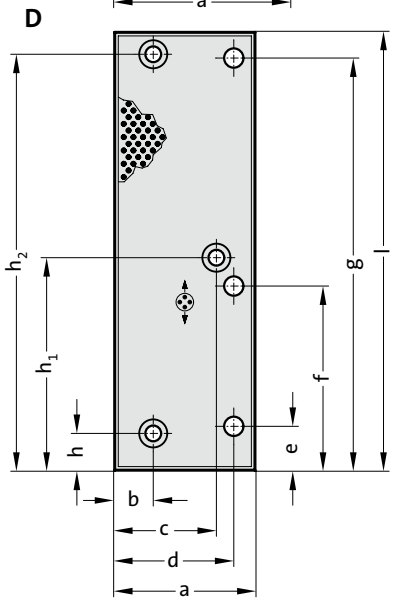
B



C



D



Material:
Bronze with solid lubricant, oilless lubricating

Note:
Screws are not included.

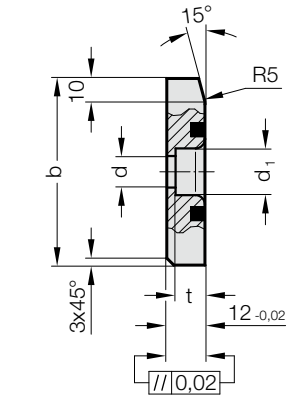
Fixing:
Use socket cap screws DIN EN ISO 4762 M8.

2962.78.45. Sliding pad, Bronze with solid lubricant, CNOMO

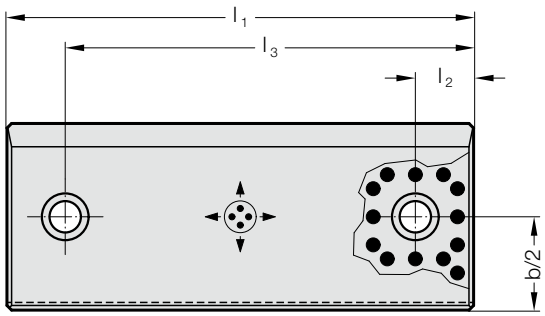
Order No	Shape	a	l	b	c	c_1	c_2	d	e	f	g	h	h_1	h_2	Number of screw counterbores	Number of screw holes
2962.78.45.050.16.063	A	50	63	15	35	-	-	-	-	-	-	12	51	-	2	-
2962.78.45.050.16.160	C	50	160	19	31	-	-	-	-	-	-	21	147	-	2	-
2962.78.45.050.16.250	D	50	250	19	31	-	-	-	-	-	-	21	121	237	3	-
2962.78.45.080.16.160	C	80	160	22	58	-	-	68	15	145	-	31	147	-	2	2
2962.78.45.080.16.250	D	80	250	22	58	-	-	68	25	105	235	21	121	237	3	3
2962.78.45.100.16.063	B	100	63	15	33	67	85	-	-	-	-	12	51	-	4	-

SLIDING PAD, BRONZE WITH SOLID LUBRICANT, ~VDI 3387

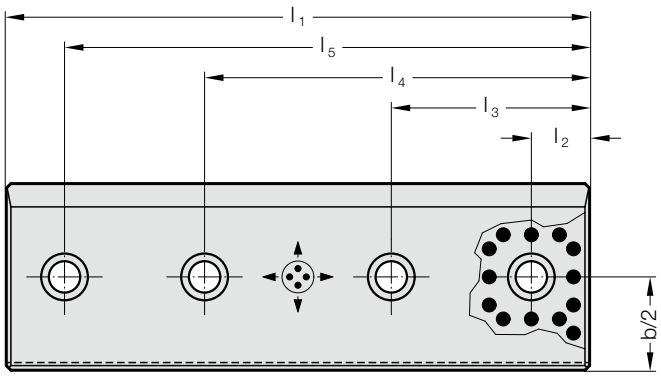
2960.84.



A



B



Material:
Bronze with solid lubricant, oilless lubricating

Note:
Screws are not included.

Fixing:
Use socket cap screws DIN EN ISO 4762 M8.

2960.84. Sliding pad, Bronze with solid lubricant, ~VDI 3387

Order No	Shape	b	l_1	l_2	l_3	l_4	l_5	d	d_1	t	Number of screw holes
2960.84.080.200	A	80	200	25	175	-	-	9	15	9	2
2960.84.080.250	B	80	250	25	85	165	225	9	15	9	4
2960.84.080.300	B	80	300	25	105	195	275	9	15	9	4
2960.84.080.350	B	80	350	25	125	225	325	9	15	9	4
2960.84.080.400	B	80	400	25	145	255	375	9	15	9	4
2960.84.080.450	B	80	450	25	165	285	425	9	15	9	4
2960.84.080.500	B	80	500	25	175	325	475	9	15	9	4

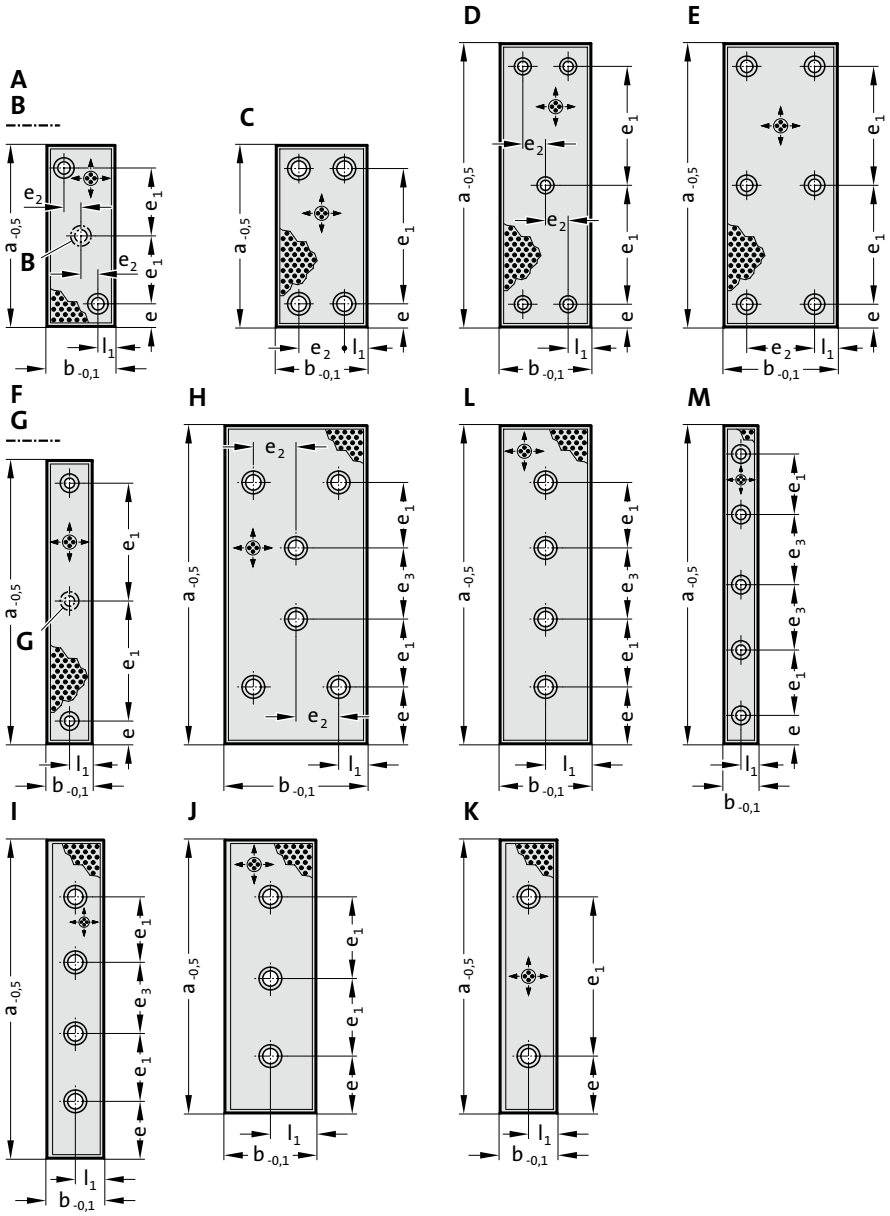
SLIDING PAD, BRONZE WITH SOLID LUBRICANT

Material:
Bronze with solid lubricant, oilless lubricating

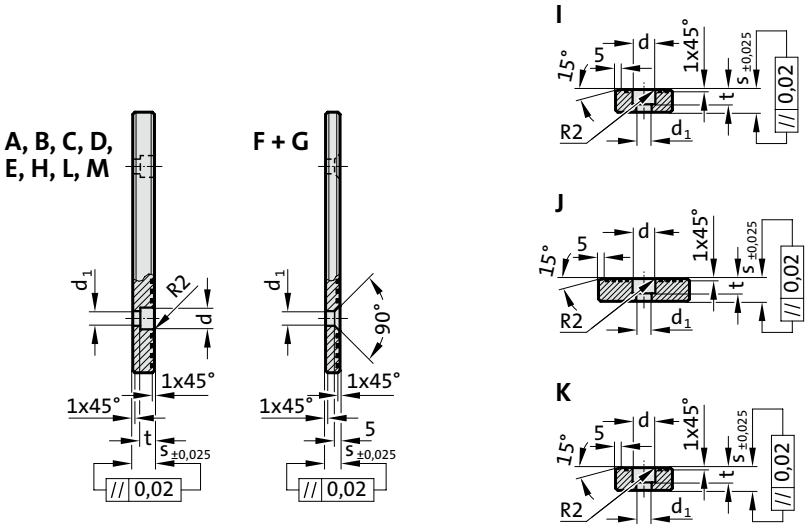
Note:
Screws are not included.

Fixing:
Use socket cap screws DIN EN ISO 4762, or countersunk cap screws DIN 7991/ISO 10642.

2962.78.



2962.78.



SLIDING PAD, BRONZE WITH SOLID LUBRICANT

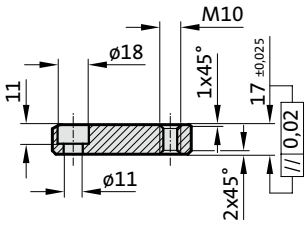
2962.78. Sliding pad, Bronze with solid lubricant

Order No	Shape	b	s	a	l_1	e	e_1	e_2	e_3	Number of screw holes	d	d_1	t
2962.78.030.12.100	A	30	12	100	15	20	60	-	-	2	15	9	9
2962.78.030.12.160	B	30	12	160	15	20	60	-	-	3	15	9	9
2962.78.030.12.240	B	30	12	240	15	25	95	-	-	3	15	9	9
2962.78.030.12.250	B	30	12	250	15	20	105	-	-	3	15	9	9
2962.78.030.12.300	L	30	12	300	15	25	85	-	80	4	15	9	9
2962.78.030.12.350	L	30	12	350	15	25	100	-	100	4	15	9	9
2962.78.030.12.400	L	30	12	400	15	25	115	-	120	4	15	9	9
2962.78.030.12.450	M	30	12	450	15	25	100	-	100	5	15	9	9
2962.78.030.12.500	M	30	12	500	15	25	110	-	115	5	15	9	9
2962.78.040.08.100	F	40	8	100	20	20	60	-	-	2	-	9	5
2962.78.040.08.160	G	40	8	160	20	20	60	-	-	3	-	9	5
2962.78.040.08.250	G	40	8	250	20	20	105	-	-	3	-	9	5
2962.78.040.12.100	A	40	12	100	20	20	60	-	-	2	15	9	9
2962.78.040.12.160	B	40	12	160	20	20	60	-	-	3	15	9	9
2962.78.040.12.250	B	40	12	250	20	20	105	-	-	3	15	9	9
2962.78.040.16.100	A	40	16	100	20	20	60	-	-	2	18	11	11
2962.78.040.16.160	B	40	16	160	20	20	60	-	-	3	18	11	11
2962.78.040.16.250	B	40	16	250	20	20	105	-	-	3	18	11	11
2962.78.050.20.100	A	50	20	100	15	20	60	20	-	2	20	13.5	13
2962.78.050.20.160	B	50	20	160	15	20	60	10	-	3	20	13.5	13
2962.78.050.20.240	A	50	20	240	25	50	140	-	-	2	20	13.5	13
2962.78.050.20.240.1	K	50	20	240	25	50	140	-	-	2	20	13.5	13
2962.78.050.20.250	B	50	20	250	15	20	105	10	-	3	20	13.5	13
2962.78.050.20.300	B	50	20	300	25	50	100	-	-	3	20	13.5	13
2962.78.050.20.300.1	J	50	20	300	25	50	100	-	-	3	20	13.5	13
2962.78.050.20.350	B	50	20	350	25	50	125	-	-	3	20	13.5	13
2962.78.050.20.350.1	J	50	20	350	25	50	125	-	-	3	20	13.5	13
2962.78.050.20.400.1	J	50	20	400	25	50	150	-	-	3	20	13.5	13
2962.78.050.20.450.1	I	50	20	450	25	50	115	-	120	4	20	13.5	13
2962.78.050.20.500.1	I	50	20	500	25	50	135	-	130	4	20	13.5	13
2962.78.060.16.100	A	60	16	100	15	20	60	30	-	2	18	11	11
2962.78.060.16.160	B	60	16	160	15	20	60	15	-	3	18	11	11
2962.78.060.16.250	B	60	16	250	15	20	105	15	-	3	18	11	11
2962.78.080.12.100	A	80	12	100	20	20	60	40	-	2	15	9	9
2962.78.080.12.160	C	80	12	160	20	20	120	40	-	4	15	9	9
2962.78.080.12.250	D	80	12	250	20	20	105	20	-	5	15	9	9
2962.78.080.20.100	A	80	20	100	20	20	60	40	-	2	20	13.5	13
2962.78.080.20.160	C	80	20	160	20	20	120	40	-	4	20	13.5	13
2962.78.080.20.250	D	80	20	250	20	20	105	20	-	5	20	13.5	13
2962.78.080.20.300	B	80	20	300	40	50	100	-	-	3	20	13.5	13
2962.78.080.20.300.1	J	80	20	300	40	50	100	-	-	3	20	13.5	13
2962.78.080.20.350	B	80	20	350	40	50	125	-	-	3	20	13.5	13
2962.78.080.20.350.1	J	80	20	350	40	50	125	-	-	3	20	13.5	13
2962.78.080.20.400	B	80	20	400	40	50	150	-	-	3	20	13.5	13
2962.78.080.20.400.1	J	80	20	400	40	50	150	-	-	3	20	13.5	13
2962.78.080.20.450	L	80	20	450	40	50	115	-	120	4	20	13.5	13
2962.78.080.20.450.1	I	80	20	450	40	50	115	-	120	4	20	13.5	13
2962.78.080.20.500	L	80	20	500	40	50	135	-	130	4	20	13.5	13
2962.78.080.20.500.1	I	80	20	500	40	50	135	-	130	4	20	13.5	13
2962.78.100.16.100	A	100	16	100	20	20	60	60	-	2	18	11	11
2962.78.100.16.160	C	100	16	160	20	20	120	60	-	4	18	11	11
2962.78.100.16.250	E	100	16	250	20	20	105	60	-	6	18	11	11
2962.78.125.20.100	C	125	20	100	20	20	60	85	-	4	20	13.5	13
2962.78.125.20.160	C	125	20	160	20	20	120	85	-	4	20	13.5	13
2962.78.125.20.250	E	125	20	250	20	20	105	85	-	6	20	13.5	13
2962.78.125.20.400	D	125	20	400	25	50	150	37.5	-	5	20	13.5	13
2962.78.125.20.450	H	125	20	450	25	50	115	37.5	120	6	20	13.5	13
2962.78.125.20.500	H	125	20	500	25	50	135	37.5	130	6	20	13.5	13

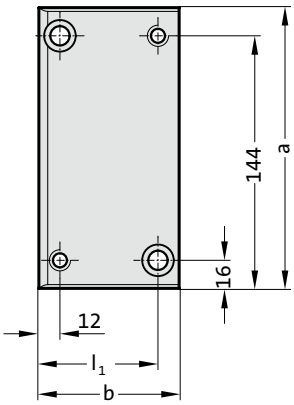
SLIDING PAD, STEEL, CNOMO

2962.84.45.

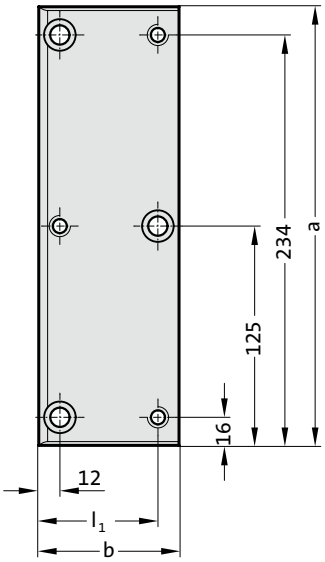
2962.84.45.



A



B



Material:
Steel, surface hardened

Note:
Screws are not included.

Fixing:
Use socket cap screws
DIN EN ISO 4762 M10.

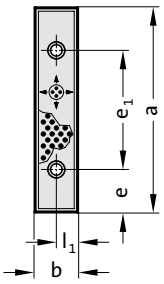
2962.84.45. Sliding pad, Steel, CNOMO

Order No	Shape	b	a	l_1	Number of screw counterbores	Number of threads
2962.84.45.050.17.160	A	50	160	38	2	2
2962.84.45.050.17.250	B	50	250	38	3	3
2962.84.45.080.17.160	A	80	160	68	2	2
2962.84.45.080.17.250	B	80	250	68	3	3

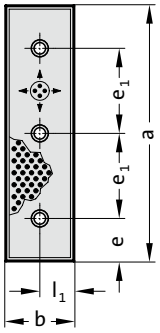
SLIDING PAD, STEEL WITH SOLID LUBRICANT

2962.85.

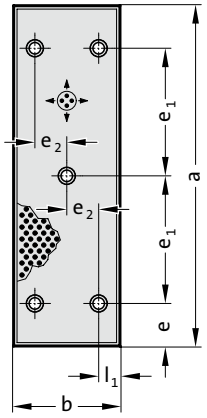
A



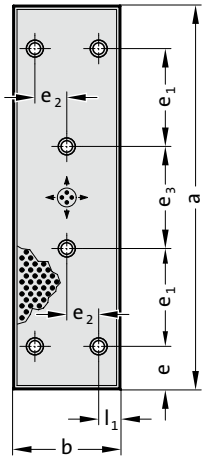
B



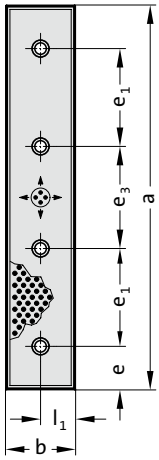
D



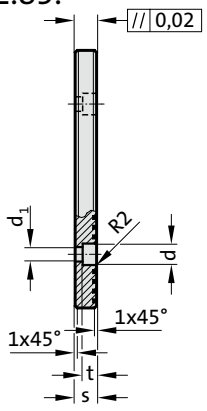
H



L



2962.85.



2962.85. Sliding pad, Steel with solid lubricant

Order No	Shape	b	s	a	l_1	e	e_1	e_2	e_3	Number of screw holes	d_1	d	t
2962.85.050.20.240	A	50	20	240	25	50	140	-	-	2	13.5	20	13
2962.85.050.20.300	B	50	20	300	25	50	100	-	-	3	13.5	20	13
2962.85.050.20.350	B	50	20	350	25	50	125	-	-	3	13.5	20	13
2962.85.080.20.300	B	80	20	300	40	50	100	-	-	3	13.5	20	13
2962.85.080.20.350	B	80	20	350	40	50	125	-	-	3	13.5	20	13
2962.85.080.20.400	B	80	20	400	40	50	150	-	-	3	13.5	20	13
2962.85.080.20.450	L	80	20	450	40	50	115	-	120	4	13.5	20	13
2962.85.080.20.500	L	80	20	500	40	50	135	-	130	4	13.5	20	13
2962.85.125.20.400	D	125	20	400	25	50	150	37.5	-	5	13.5	20	13
2962.85.125.20.450	H	125	20	450	25	50	115	37.5	120	6	13.5	20	13
2962.85.125.20.500	H	125	20	500	25	50	135	37.5	130	6	13.5	20	13

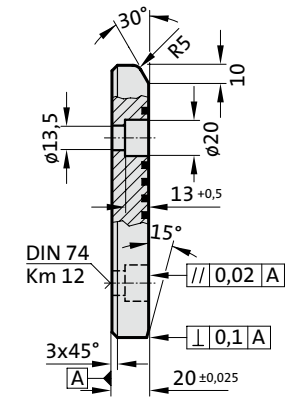
Material:
Steel, surface hardened. Sliding faces with embedded solid lubricant.

Note:
Screws are not included.

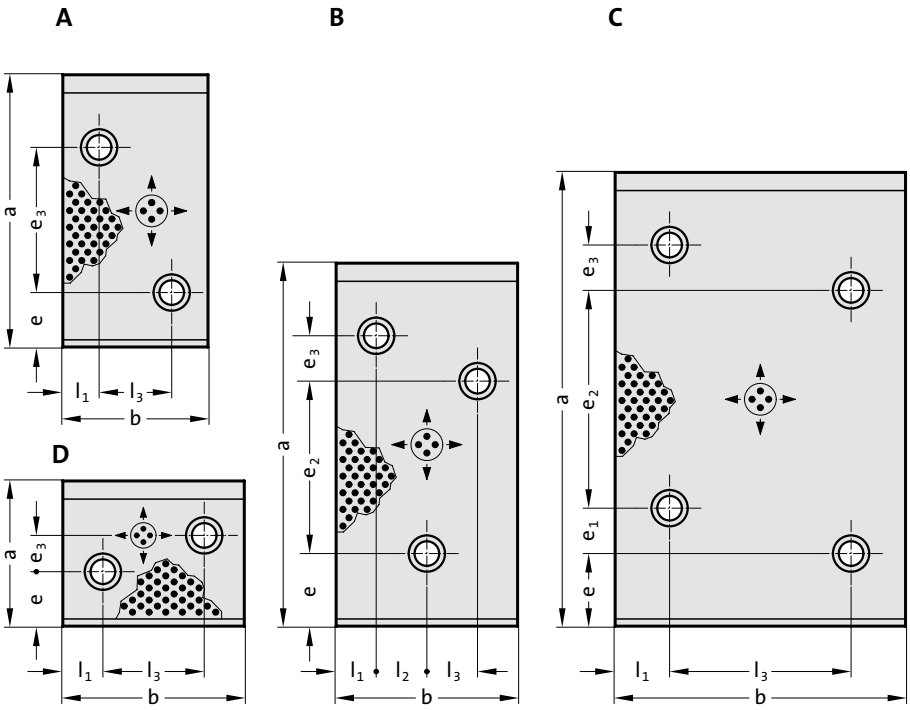
Fixing:
Use socket cap screws DIN EN ISO 4762 M12.

SLIDING PAD, BRONZE WITH SOLID LUBRICANT, NAAMS

2960.79.



2960.79.



Material:
Bronze with solid lubricant, oilless lubricating

Note:
Screws are not included.

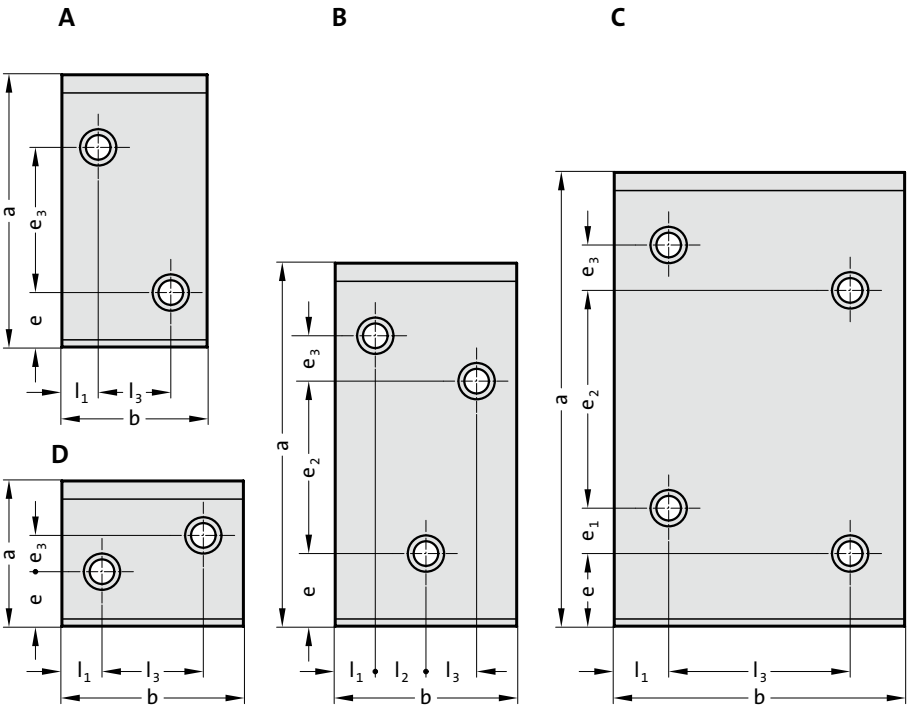
Fixing:
Use socket cap screws DIN EN ISO 4762 M12.

2960.79. Sliding pad, Bronze with solid lubricant, NAAMS

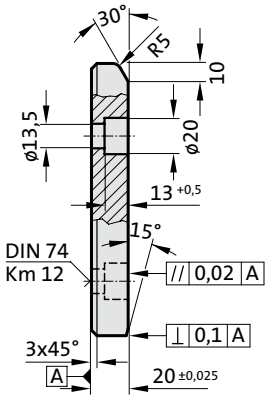
Order No	Shape	b	a	l_1	l_2	l_3	e	e_1	e_2	e_3	Number of screw holes
2960.79.050.100	A	50	100	25	-	-	30	-	-	30	2
2960.79.050.150	A	50	150	25	-	-	30	-	-	80	2
2960.79.050.200	A	50	200	25	-	-	40	-	-	120	2
2960.79.080.100	A	80	100	20	-	40	30	-	-	30	2
2960.79.080.150	A	80	150	20	-	40	30	-	-	80	2
2960.79.080.200	A	80	200	20	-	40	40	-	-	120	2
2960.79.080.250	A	80	250	20	-	40	40	-	-	170	2
2960.79.080.315	B	80	315	20	20	20	40	-	210	25	3
2960.79.100.050	D	100	50	22	-	56	14	-	-	13	2
2960.79.100.080	D	100	80	22	-	56	30	-	-	20	2
2960.79.100.100	A	100	100	22	-	56	30	-	-	30	2
2960.79.100.150	A	100	150	22	-	56	30	-	-	80	2
2960.79.100.200	B	100	200	22	28	28	40	-	95	25	3
2960.79.100.250	B	100	250	22	28	28	40	-	145	25	3
2960.79.100.315	B	100	315	22	28	28	40	-	210	25	3
2960.79.125.080	D	125	80	25	-	75	30	-	-	20	2
2960.79.125.100	A	125	100	25	-	75	30	-	-	30	2
2960.79.125.150	A	125	150	25	-	75	30	-	-	80	2
2960.79.125.200	B	125	200	25	37	38	40	-	95	25	3
2960.79.125.250	B	125	250	25	37	38	40	-	145	25	3
2960.79.125.315	C	125	315	25	-	75	40	25	165	25	4
2960.79.160.100	A	160	100	30	-	100	30	-	-	30	2
2960.79.160.150	A	160	150	30	-	100	30	-	-	80	2
2960.79.160.200	B	160	200	30	50	50	40	-	95	25	3
2960.79.160.250	C	160	250	30	-	100	40	25	120	25	4
2960.79.160.315	C	160	315	30	-	100	40	25	185	25	4

SLIDING PAD, STEEL, NAAMS

2960.80.



2960.80.



2960.80. Sliding pad, Steel, NAAMS

Order No	Shape	b	a	l_1	l_2	l_3	e	e_1	e_2	e_3	Number of screw holes
2960.80.050.100	A	50	100	25	-	-	30	-	-	30	2
2960.80.050.150	A	50	150	25	-	-	30	-	-	80	2
2960.80.050.200	A	50	200	25	-	-	40	-	-	120	2
2960.80.080.100	A	80	100	20	-	40	30	-	-	30	2
2960.80.080.150	A	80	150	20	-	40	30	-	-	80	2
2960.80.080.200	A	80	200	20	-	40	40	-	-	120	2
2960.80.080.250	A	80	250	20	-	40	40	-	-	170	2
2960.80.080.315	B	80	315	20	20	20	40	-	210	25	3
2960.80.100.050	D	100	50	22	-	56	14	-	-	13	2
2960.80.100.080	D	100	80	22	-	56	30	-	-	20	2
2960.80.100.100	A	100	100	22	-	56	30	-	-	30	2
2960.80.100.150	A	100	150	22	-	56	30	-	-	80	2
2960.80.100.200	B	100	200	22	28	28	40	-	95	25	3
2960.80.100.250	B	100	250	22	28	28	40	-	145	25	3
2960.80.100.315	B	100	315	22	28	28	40	-	210	25	3
2960.80.125.080	D	125	80	25	-	75	30	-	-	20	2
2960.80.125.100	A	125	100	25	-	75	30	-	-	30	2
2960.80.125.150	A	125	150	25	-	75	30	-	-	80	2
2960.80.125.200	B	125	200	25	37	38	40	-	95	25	3
2960.80.125.250	B	125	250	25	37	38	40	-	145	25	3
2960.80.125.315	C	125	315	25	-	75	40	25	165	25	4
2960.80.160.100	A	160	100	30	-	100	30	-	-	30	2
2960.80.160.150	A	160	150	30	-	100	30	-	-	80	2
2960.80.160.200	B	160	200	30	50	50	40	-	95	25	3
2960.80.160.250	C	160	250	30	-	100	40	25	120	25	4
2960.80.160.315	C	160	315	30	-	100	40	25	185	25	4

Material:
Steel, surface hardened

Note:
Screws are not included.

Fixing:
Use socket cap screws DIN EN ISO 4762 M12.

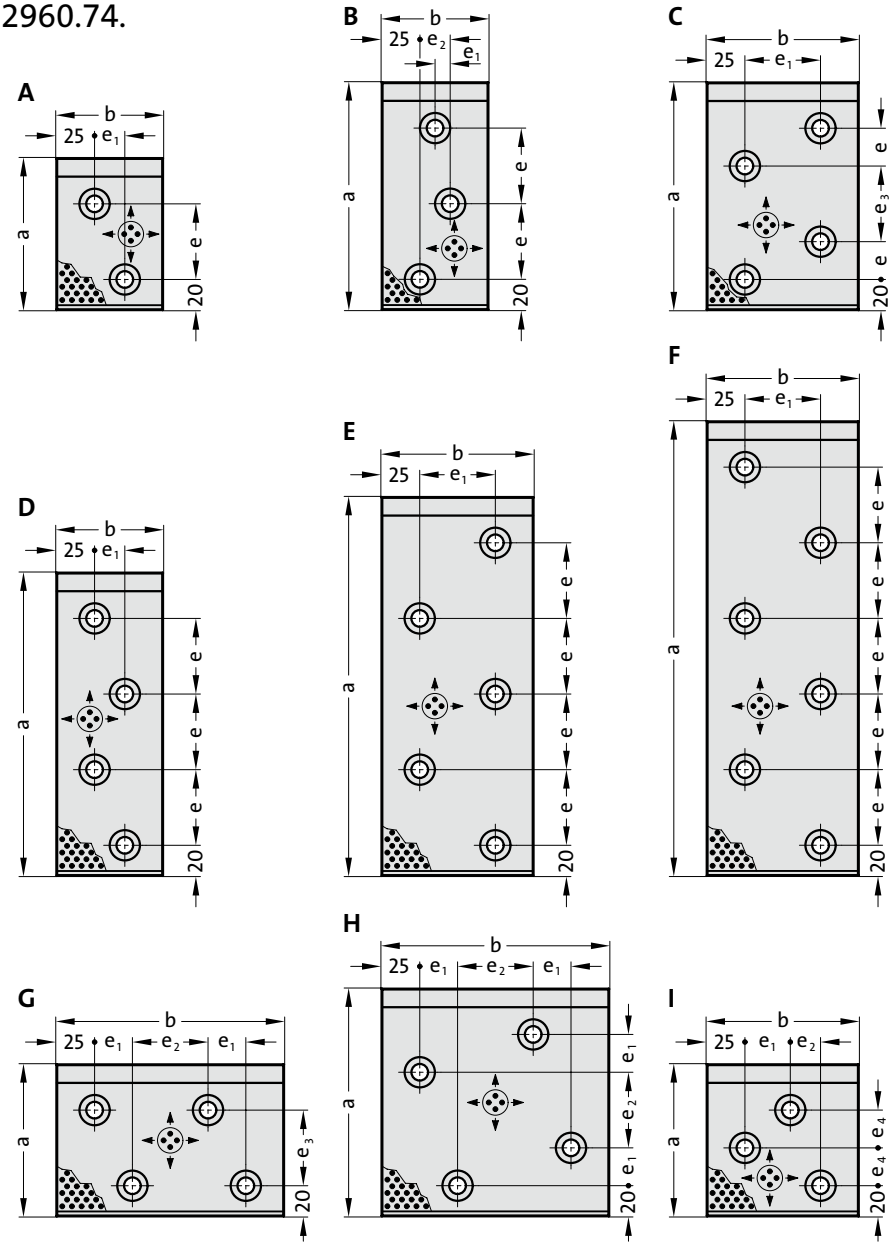
SLIDING PAD, BRONZE WITH SOLID LUBRICANT, AFNOR/ISO 9183-2

Material:
Bronze with solid lubricant, oilless lubricating

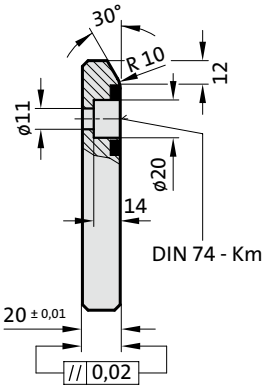
Note:
Screws are not included.

Fixing:
Use socket cap screws DIN EN ISO 4762 M10.

2960.74.



2960.74.



SLIDING PAD, BRONZE WITH SOLID LUBRICANT, AFNOR/ISO 9183-2

2960.74. Sliding pad, Bronze with solid lubricant, AFNOR/ISO 9183-2

Order No	Shape	b	a	e	e_1	e_2	e_3	e_4	Number of screw holes
2960.74.070.100	A	70	100	50	20	-	-	-	2
2960.74.070.150	B	70	150	50	10	20	-	-	3
2960.74.070.200	D	70	200	50	20	-	-	-	4
2960.74.100.100	I	100	100		30	20	-	25	3
2960.74.100.150	C	100	150	25	50	-	50	-	4
2960.74.100.200	D	100	200	50	50	-	-	-	4
2960.74.100.250	E	100	250	50	50	-	-	-	5
2960.74.100.300	F	100	300	50	50	-	-	-	6
2960.74.150.100	G	150	100		25	50	50	-	4
2960.74.150.150	H	150	150		25	50	-	-	4
2960.74.150.200	D	150	200	50	100	-	-	-	4
2960.74.150.250	E	150	250	50	100	-	-	-	5
2960.74.150.300	F	150	300	50	100	-	-	-	6
2960.74.200.100	G	200	100		50	50	50	-	4

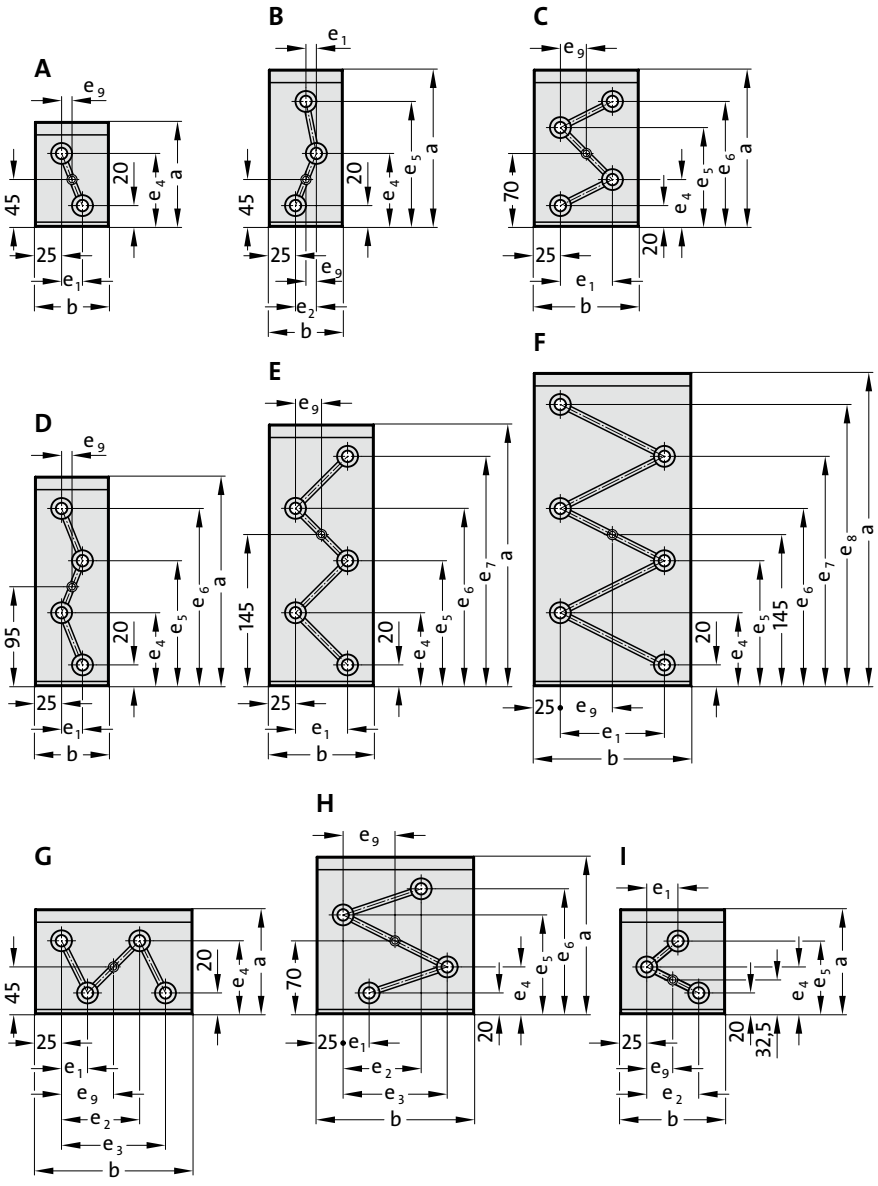
SLIDING PAD, STEEL WITH OIL GROOVE, CNOMO

Material:
Steel, surface hardened

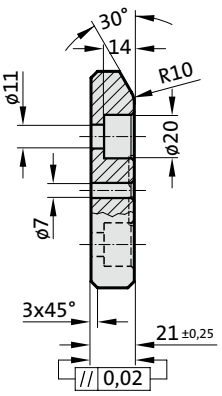
Note:
Screws are not included.

Fixing:
Use socket cap screws DIN EN ISO 4762 M10.

2960.44.45.



2960.44.45.



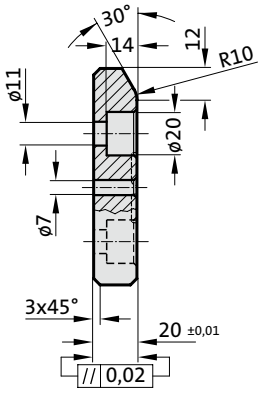
SLIDING PAD, STEEL WITH OIL GROOVE, CNOMO

2960.44.45. Sliding pad, Steel with oil groove, CNOMO

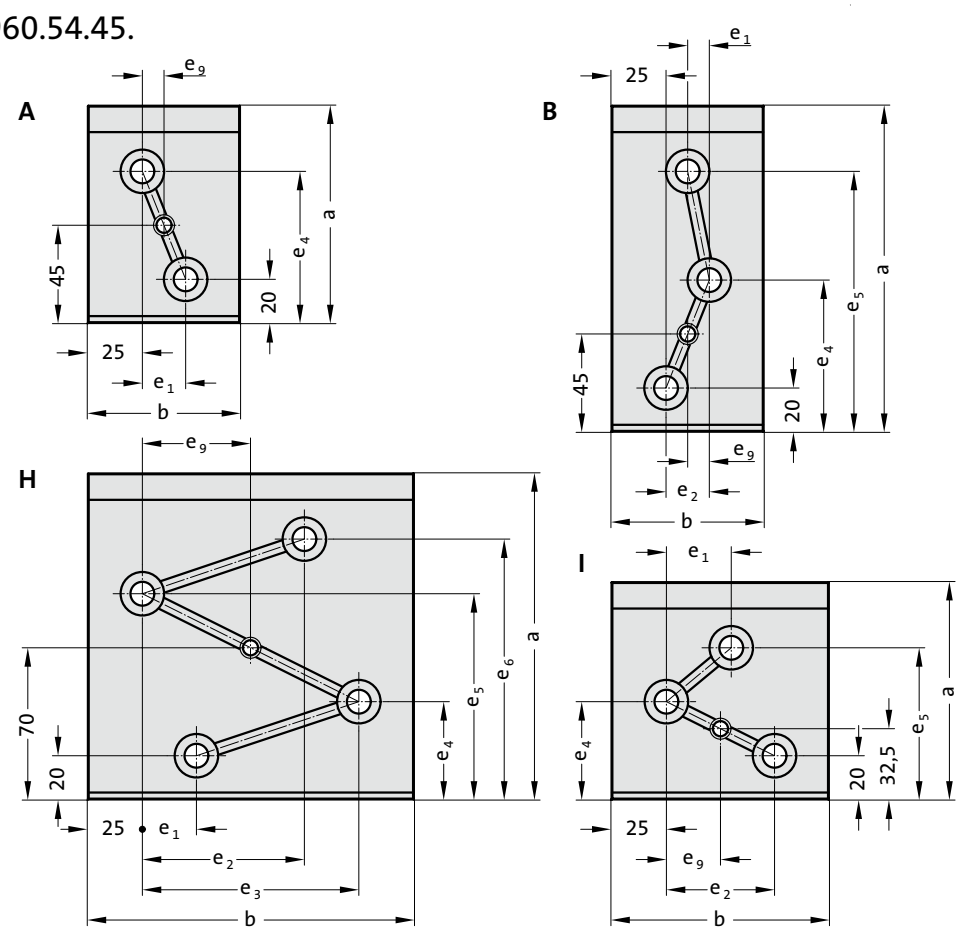
Order No	Shape	b	a	e	e_1	e_2	e_3	e_4	e_5	e_6	e_7	e_8	e_9	Number of screw holes
2960.44.45.070.100	A	70	100		20	-	-	70	-	-	-	-	10	2
2960.44.45.070.150	B	70	150		10	20	-	70	120	-	-	-	10	3
2960.44.45.070.200	D	70	200		20	-	-	70	120	170	-	-	10	4
2960.44.45.100.100	I	100	100		30	50	-	45	70	-	-	-	25	3
2960.44.45.100.150	C	100	150		50	-	-	45	95	120	-	-	25	4
2960.44.45.100.200	D	100	200		50	-	-	70	120	170	-	-	25	4
2960.44.45.100.250	E	100	250		50	-	-	70	120	170	220	-	25	5
2960.44.45.100.300	F	100	300		50	-	-	70	120	170	220	270	25	6
2960.44.45.150.100	G	150	100		25	75	100	70	-	-	-	-	50	4
2960.44.45.150.150	H	150	150		25	75	100	45	95	120	-	-	50	4
2960.44.45.150.200	D	150	200		100	-	-	70	120	170	-	-	50	4
2960.44.45.150.250	E	150	250		100	-	-	70	120	170	220	-	50	5
2960.44.45.150.300	F	150	300		100	-	-	70	120	170	220	270	50	6
2960.44.45.200.100	G	200	100		50	100	150	70	-	-	-	-	75	4

SLIDING PAD, BRONZE WITH OIL GROOVE, CNOMO

2960.54.45.



2960.54.45.



Material:
Bronze

Note:
Screws are not included.

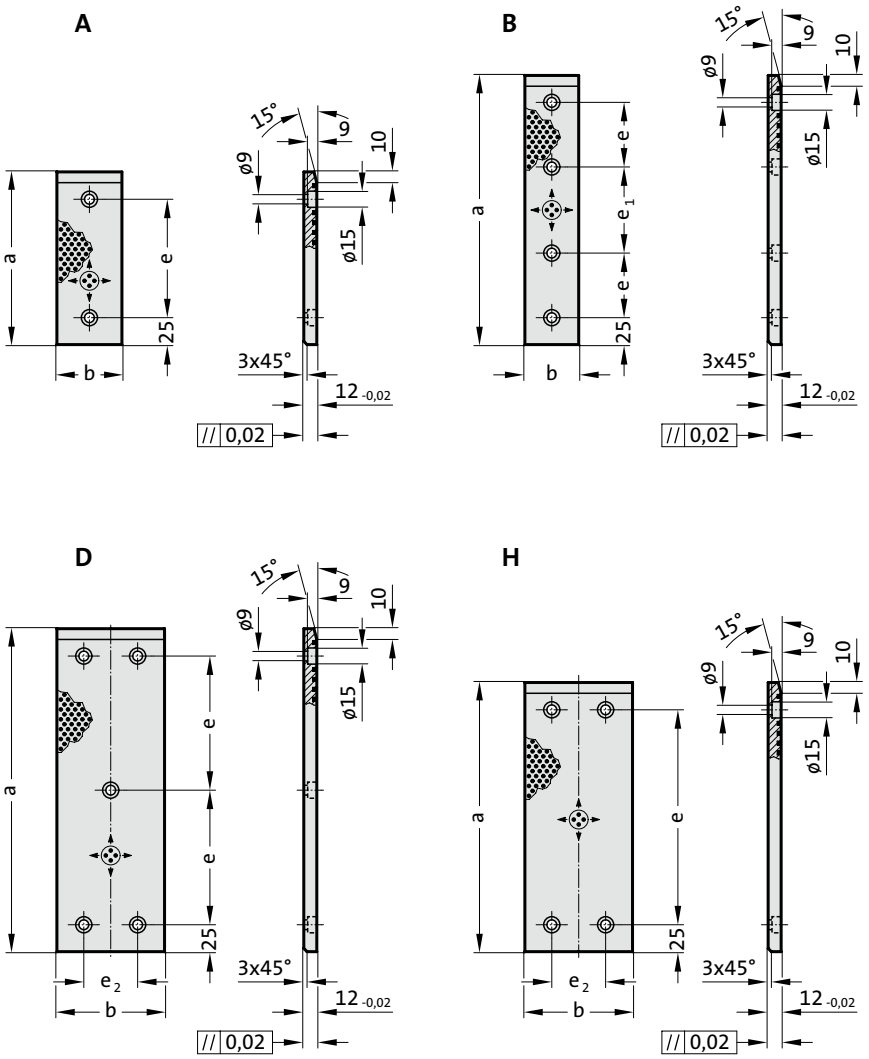
Fixing:
Use socket cap screws
DIN EN ISO 4762 M10.

2960.54.45. Sliding pad, Bronze with oil groove, CNOMO

Order No	Shape	b	a	e	e_1	e_2	e_3	e_4	e_5	e_6	e_7	e_8	e_9	Number of screw holes
2960.54.45.070.100	A	70	100		20	-	-	70	-	-	-	-	10	2
2960.54.45.070.150	B	70	150		10	20	-	70	120	-	-	-	10	3
2960.54.45.150.150	H	150	150		25	75	100	45	95	120	-	-	50	4
2960.54.45.100.100	I	100	100		30	50	-	45	70	-	-	-	25	3

SLIDING PAD, BRONZE WITH SOLID LUBRICANT, VDI 3357

2960.81.



Material:
Bronze with solid lubricant, oilless lubricating

Note:
Screws are not included.

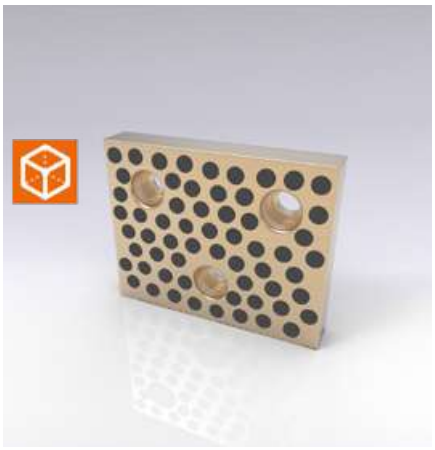
Fixing:
Use socket cap screws DIN EN ISO 4762 M8.

SLIDING PAD, BRONZE WITH SOLID LUBRICANT, VDI 3357

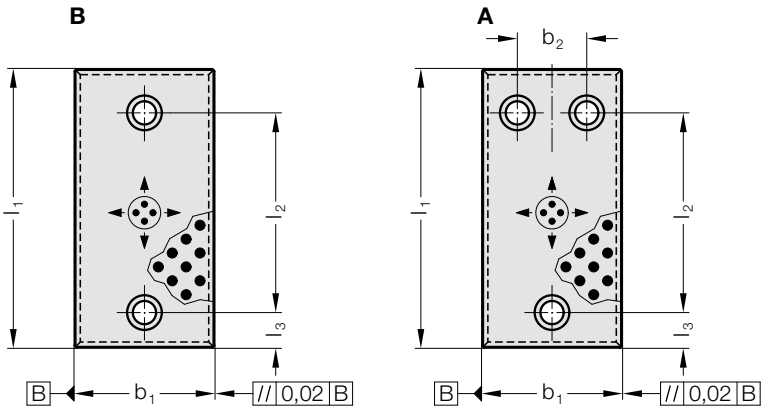
2960.81. Sliding pad, Bronze with solid lubricant, VDI 3357

Order No	Shape	b	a	e	e_1	e_2	Number of screw holes
2960.81.030.080	A	30	80	30	-	-	2
2960.81.030.100	A	30	100	50	-	-	2
2960.81.030.125	A	30	125	75	-	-	2
2960.81.030.160	A	30	160	110	-	-	2
2960.81.030.200	A	30	200	150	-	-	2
2960.81.030.225	A	30	225	175	-	-	2
2960.81.030.250	B	30	250	60	80	-	4
2960.81.030.260	B	30	260	60	90	-	4
2960.81.030.280	B	30	280	60	110	-	4
2960.81.030.300	B	30	300	80	90	-	4
2960.81.030.320	B	30	320	80	110	-	4
2960.81.040.080	A	40	80	30	-	-	2
2960.81.040.100	A	40	100	50	-	-	2
2960.81.040.125	A	40	125	75	-	-	2
2960.81.040.160	A	40	160	110	-	-	2
2960.81.040.200	A	40	200	150	-	-	2
2960.81.050.080	A	50	80	30	-	-	2
2960.81.050.100	A	50	100	50	-	-	2
2960.81.050.125	A	50	125	75	-	-	2
2960.81.050.160	A	50	160	110	-	-	2
2960.81.050.200	A	50	200	150	-	-	2
2960.81.050.225	A	50	225	175	-	-	2
2960.81.050.250	B	50	250	60	80	-	4
2960.81.050.300	B	50	300	80	90	-	4
2960.81.050.350	B	50	350	100	100	-	4
2960.81.050.400	B	50	400	120	110	-	4
2960.81.060.080	A	60	80	30	-	-	2
2960.81.060.100	A	60	100	50	-	-	2
2960.81.060.125	A	60	125	75	-	-	2
2960.81.060.160	A	60	160	110	-	-	2
2960.81.060.200	A	60	200	150	-	-	2
2960.81.060.225	A	60	225	175	-	-	2
2960.81.060.240	B	60	240	60	70	-	4
2960.81.060.250	B	60	250	60	80	-	4
2960.81.060.260	B	60	260	60	90	-	4
2960.81.060.280	B	60	280	60	110	-	4
2960.81.080.080	A	80	80	30	-	-	2
2960.81.080.100	A	80	100	50	-	-	2
2960.81.080.125	A	80	125	75	-	-	2
2960.81.080.160	A	80	160	110	-	-	2
2960.81.080.200	A	80	200	150	-	-	2
2960.81.080.225	A	80	225	175	-	-	2
2960.81.080.240	B	80	240	60	70	-	4
2960.81.080.250	B	80	250	60	80	-	4
2960.81.080.260	B	80	260	60	90	-	4
2960.81.080.280	B	80	280	60	110	-	4
2960.81.100.125	H	100	125	75	-	50	4
2960.81.100.160	H	100	160	110	-	50	4
2960.81.100.200	H	100	200	150	-	50	4
2960.81.100.240	B	100	240	60	70	-	4
2960.81.100.250	H	100	250	200	-	50	4
2960.81.100.260	B	100	260	60	90	-	4
2960.81.100.280	B	100	280	60	110	-	4
2960.81.100.300	D	100	300	125	-	50	5

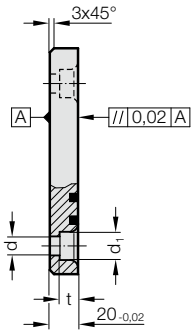
SLIDE PLATE, BRONZE WITH PERMANENT LUBRICANT, IN ACCORDANCE WITH WDX NORM



2960.82.25.



2960.82.25.



2960.82.25. Slide plate, bronze with permanent lubricant, in accordance with WDX norm

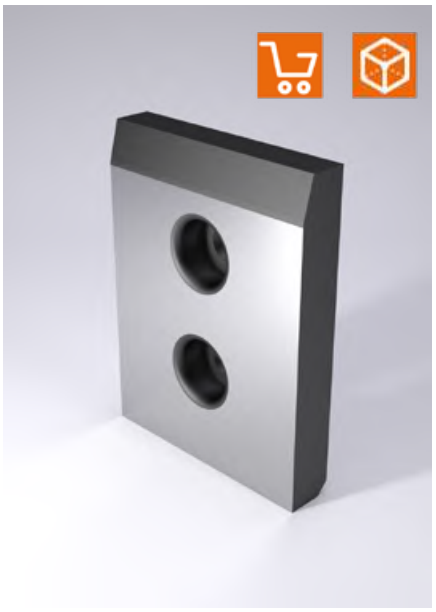
Order No	Shape	b	b_2	l_1	l_2	l_3	d	d_1	t	Number of screw holes
2960.82.25.050.100	B	50	-	100	50	25	13.5	20	13	2
2960.82.25.050.125	B	50	-	125	75	25	13.5	20	13	2
2960.82.25.050.160	B	50	-	160	110	25	13.5	20	13	2
2960.82.25.050.200	B	50	-	200	150	25	13.5	20	13	2
2960.82.25.080.100	B	80	-	100	50	25	13.5	20	13	2
2960.82.25.080.125	B	80	-	125	75	25	13.5	20	13	2
2960.82.25.080.160	B	80	-	160	110	25	13.5	20	13	2
2960.82.25.080.200	B	80	-	200	150	25	13.5	20	13	2
2960.82.25.080.250	B	80	-	250	170	40	13.5	20	13	2
2960.82.25.080.315	B	80	-	315	235	40	13.5	20	13	2
2960.82.25.125.100	A	125	75	100	50	25	13.5	20	13	3
2960.82.25.125.125	A	125	75	125	75	25	13.5	20	13	3
2960.82.25.125.160	A	125	75	160	110	25	13.5	20	13	3
2960.82.25.125.200	A	125	75	200	150	25	13.5	20	13	3
2960.82.25.125.250	A	125	75	250	170	40	13.5	20	13	3
2960.82.25.125.315	A	125	75	315	235	40	13.5	20	13	3
2960.82.25.160.100	A	160	110	100	50	25	13.5	20	13	3
2960.82.25.160.125	A	160	110	125	75	25	13.5	20	13	3
2960.82.25.160.160	A	160	110	160	110	25	13.5	20	13	3
2960.82.25.160.200	A	160	110	200	150	25	13.5	20	13	3
2960.82.25.160.250	A	160	110	250	170	40	13.5	20	13	3
2960.82.25.160.315	A	160	110	315	235	40	13.5	20	13	3

Material:
Bronze with solid lubricant, oilless lubricating

Note:
Screws are not included.

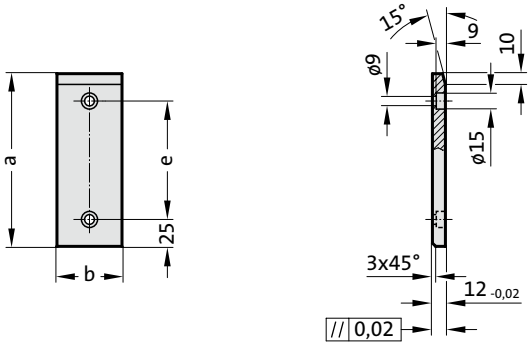
Fixing:
Use socket cap screws DIN EN ISO 4762 M12.

SLIDING PAD, STEEL, VDI 3357

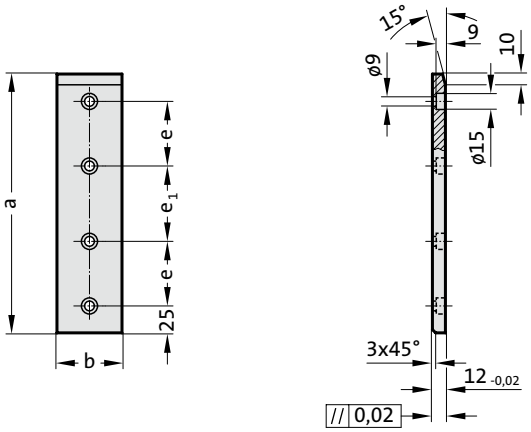


2960.88.

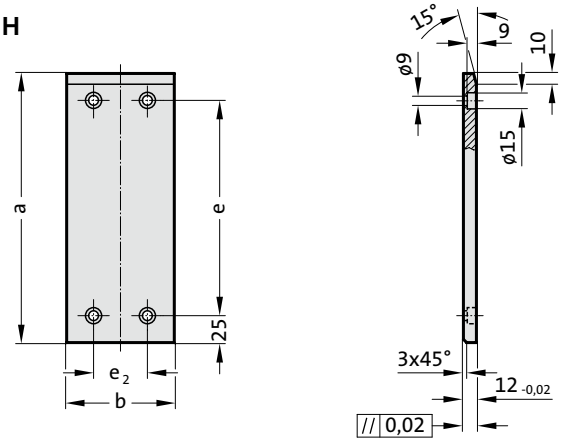
A



B



H



Material:
Steel, surface hardened

Note:
Screws are not included.

Fixing:
Use socket cap screws DIN EN ISO 4762 M8.

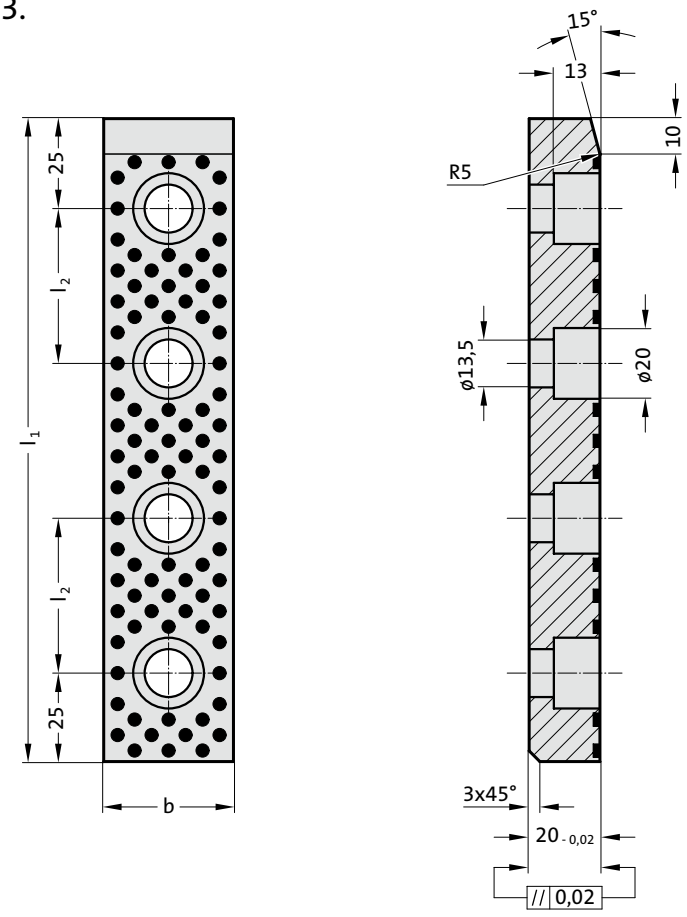
SLIDING PAD, STEEL, VDI 3357

2960.88. Sliding pad, Steel, VDI 3357

Order No	Shape	b	a	e	e_1	e_2	Number of screw holes
2960.88.030.080	A	30	80	30	-	-	2
2960.88.030.100	A	30	100	50	-	-	2
2960.88.030.125	A	30	125	75	-	-	2
2960.88.030.160	A	30	160	110	-	-	2
2960.88.030.200	A	30	200	150	-	-	2
2960.88.040.080	A	40	80	30	-	-	2
2960.88.040.100	A	40	100	50	-	-	2
2960.88.040.125	A	40	125	75	-	-	2
2960.88.040.160	A	40	160	110	-	-	2
2960.88.040.200	A	40	200	150	-	-	2
2960.88.040.225	A	40	225	175	-	-	2
2960.88.040.240	B	40	240	60	70	-	4
2960.88.040.250	B	40	250	60	80	-	4
2960.88.040.260	B	40	260	60	90	-	4
2960.88.040.280	B	40	280	60	110	-	4
2960.88.050.080	A	50	80	30	-	-	2
2960.88.050.100	A	50	100	50	-	-	2
2960.88.050.125	A	50	125	75	-	-	2
2960.88.050.160	A	50	160	110	-	-	2
2960.88.050.180	A	50	180	130	-	-	2
2960.88.050.200	A	50	200	150	-	-	2
2960.88.050.225	A	50	225	175	-	-	2
2960.88.050.240	B	50	240	60	70	-	4
2960.88.050.250	B	50	250	60	80	-	4
2960.88.050.260	B	50	260	60	90	-	4
2960.88.050.280	B	50	280	60	110	-	4
2960.88.060.080	A	60	80	30	-	-	2
2960.88.060.100	A	60	100	50	-	-	2
2960.88.060.125	A	60	125	75	-	-	2
2960.88.060.160	A	60	160	110	-	-	2
2960.88.060.180	A	60	180	130	-	-	2
2960.88.060.200	A	60	200	150	-	-	2
2960.88.060.225	A	60	225	175	-	-	2
2960.88.060.240	B	60	240	60	70	-	4
2960.88.060.250	B	60	250	60	80	-	4
2960.88.060.260	B	60	260	60	90	-	4
2960.88.060.280	B	60	280	60	110	-	4
2960.88.060.300	B	60	300	80	90	-	4
2960.88.060.320	B	60	320	80	110	-	4
2960.88.060.340	B	60	340	80	130	-	4
2960.88.060.350	B	60	350	100	100	-	4
2960.88.080.080	A	80	80	30	-	-	2
2960.88.080.100	A	80	100	50	-	-	2
2960.88.080.125	A	80	125	75	-	-	2
2960.88.080.160	A	80	160	110	-	-	2
2960.88.080.200	A	80	200	150	-	-	2
2960.88.080.225	A	80	225	175	-	-	2
2960.88.080.240	B	80	240	60	70	-	4
2960.88.080.250	B	80	250	60	80	-	4
2960.88.080.260	B	80	260	60	90	-	4
2960.88.080.280	B	80	280	60	110	-	4
2960.88.080.300	B	80	300	80	90	-	4
2960.88.080.320	B	80	320	80	110	-	4
2960.88.080.340	B	80	340	80	130	-	4
2960.88.080.350	B	80	350	100	100	-	4
2960.88.100.125	H	100	125	75	-	50	4
2960.88.100.160	H	100	160	110	-	50	4
2960.88.100.200	H	100	200	150	-	50	4
2960.88.100.225	H	100	225	175	-	50	4
2960.88.100.250	B	100	250	60	80	-	4
2960.88.100.250.1	H	100	250	200	-	50	4
2960.88.100.280	B	100	280	60	110	-	4
2960.88.100.300	B	100	300	80	90	-	4
2960.88.100.320	B	100	320	80	110	-	4
2960.88.100.340	B	100	340	80	130	-	4
2960.88.100.350	B	100	350	100	100	-	4

SLIDING PAD, BRONZE WITH SOLID LUBRICANT, VDI 3357

2960.93.



Material:
Bronze with solid lubricant, oilless lubricating

Note:
Screws are not included.

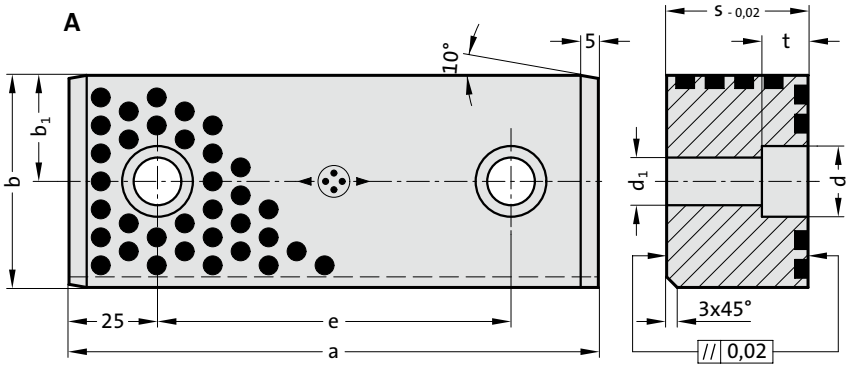
Fixing:
Use socket cap screws DIN EN ISO 4762 M12.

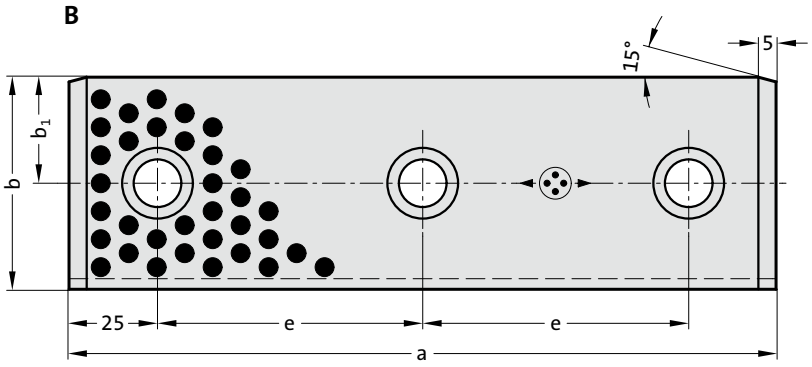
2960.93. Sliding pad, Bronze with solid lubricant, VDI 3357

Order No	b	l_1	l_2
2960.93.050.250	50	250	60
2960.93.050.300	50	300	80
2960.93.050.350	50	350	100
2960.93.050.400	50	400	120
2960.93.050.450	50	450	140
2960.93.050.500	50	500	150
2960.93.080.250	80	250	60
2960.93.080.300	80	300	80
2960.93.080.350	80	350	100
2960.93.080.400	80	400	120
2960.93.080.450	80	450	140
2960.93.080.500	80	500	150
2960.93.100.250	100	250	60
2960.93.100.300	100	300	80
2960.93.100.350	100	350	100
2960.93.100.400	100	400	120
2960.93.100.450	100	450	140
2960.93.100.500	100	500	150
2960.93.125.250	125	250	60
2960.93.125.300	125	300	80
2960.93.125.350	125	350	100
2960.93.125.400	125	400	120
2960.93.125.450	125	450	140
2960.93.125.500	125	500	150
2960.93.160.250	160	250	60
2960.93.160.300	160	300	80
2960.93.160.350	160	350	100
2960.93.160.400	160	400	120
2960.93.160.450	160	450	140
2960.93.160.500	160	500	150

GUIDE BAR WITH TWO SLIDING SURFACES, BRONZE WITH SOLID LUBRICANT, VDI 3357

2962.75.





Material:
Bronze with solid lubricant, oilless lubricating

Note:
Screws are not included.

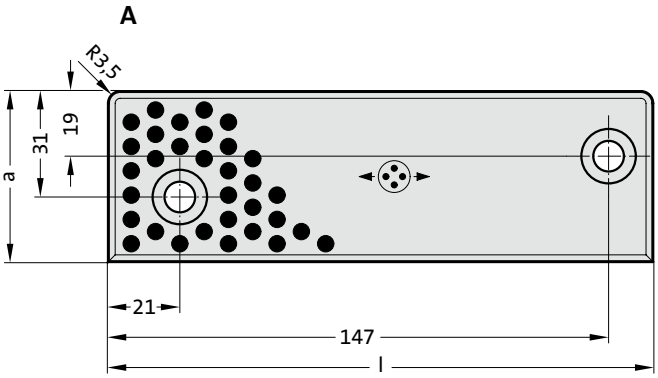
Fixing:
Use socket cap screws
DIN EN ISO 4762.

2962.75. Guide bar with two sliding surfaces, Bronze with solid lubricant, VDI 3357

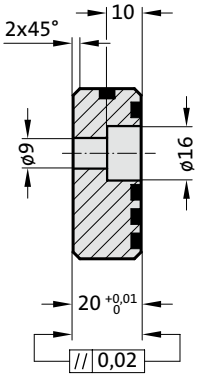
Order No	Shape	a	b	s	b_1	e	d	d_1	t	Number of screw holes
2962.75.025.012.0110	A	110	25	12	12.5	60	15	9	8.5	2
2962.75.025.012.0120	A	120	25	12	12.5	70	15	9	8.5	2
2962.75.025.015.0110	A	110	25	15	12.5	60	18	11	10.5	2
2962.75.025.015.0120	A	120	25	15	12.5	70	18	11	10.5	2
2962.75.060.030.0125	A	125	60	30	30	75	20	13.5	13	2
2962.75.060.030.0150	A	150	60	30	30	100	20	13.5	13	2
2962.75.060.030.0160	A	160	60	30	30	110	20	13.5	13	2
2962.75.060.030.0200	B	200	60	30	30	75	20	13.5	13	3
2962.75.060.040.0125	A	125	60	40	30	75	20	13.5	13	2
2962.75.060.040.0150	A	150	60	40	30	100	20	13.5	13	2
2962.75.060.040.0160	A	160	60	40	30	110	20	13.5	13	2
2962.75.060.040.0200	B	200	60	40	30	75	20	13.5	13	3

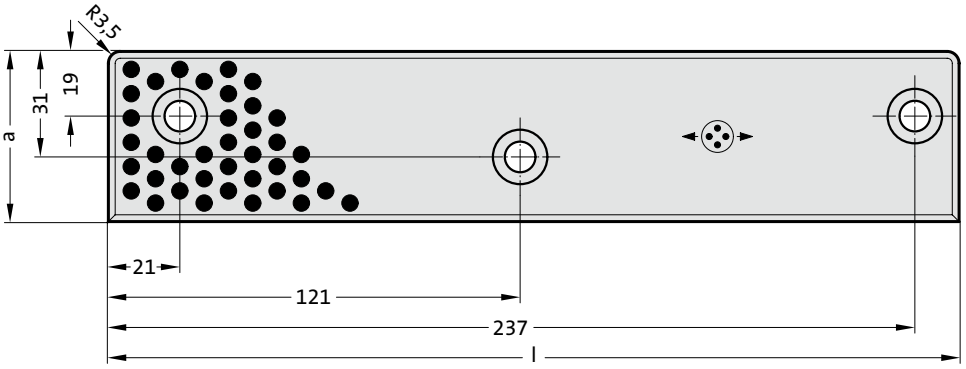
GUIDE BAR WITH TWO SLIDING SURFACES, BRONZE WITH SOLID LUBRICANT, CNOMO

2962.75.45.



2962.75.45.





Material:
Bronze with solid lubricant, oilless lubricating

Note:
Screws are not included.

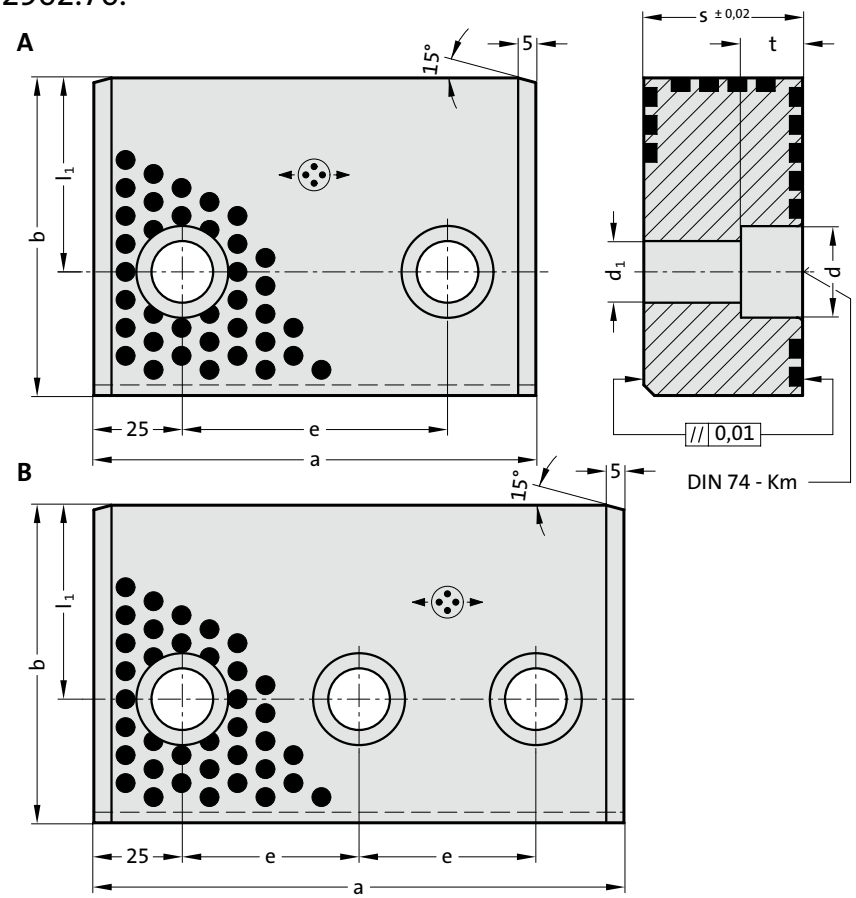
Fixing:
Use socket cap screws DIN EN ISO 4762 M8.

2962.75.45. Guide bar with two sliding surfaces, Bronze with solid lubricant, CNOMO

Order No	Shape	a	l	Number of screw holes
2962.75.45.050.20.160	A	50	160	2
2962.75.45.050.20.250	B	50	250	3

GUIDE BAR WITH THREE SLIDING SURFACES, BRONZE WITH SOLID LUBRICANT

2962.76.



Material:
Bronze with solid lubricant, oilless lubricating

Note:
Screws are not included.

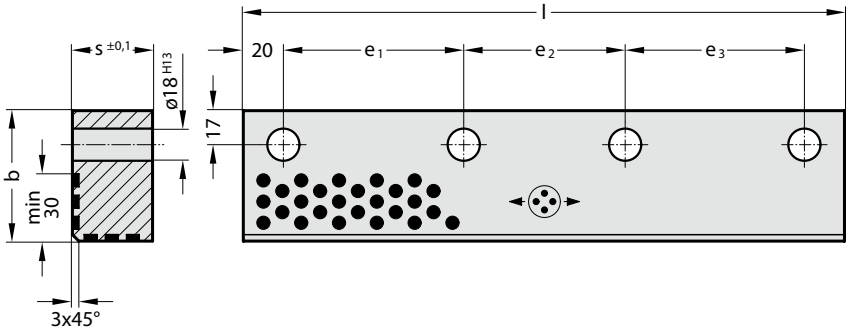
Fixing:
Use socket cap screws DIN EN ISO 4762.

2962.76. Guide bar with three sliding surfaces, Bronze with solid lubricant

Order No	Shape	a	b	s	e	l_1	d	d_1	t	Number of screw holes
2962.76.070.032.0125	A	125	70	32	75	40	20	13.5	13	2
2962.76.070.032.0150	A	150	70	32	100	40	20	13.5	13	2
2962.76.070.032.0200	B	200	70	32	75	40	20	13.5	13	3
2962.76.090.045.0125	A	125	90	45	75	55	26	17.5	17.5	2
2962.76.090.045.0150	B	150	90	45	50	55	26	17.5	17.5	3
2962.76.090.045.0200	B	200	90	45	75	55	26	17.5	17.5	3

GUIDE BAR WITH TWO SLIDING SURFACES, BRONZE WITH SOLID LUBRICANT

2962.77.



Material:
Bronze with solid lubricant, oilless lubricating

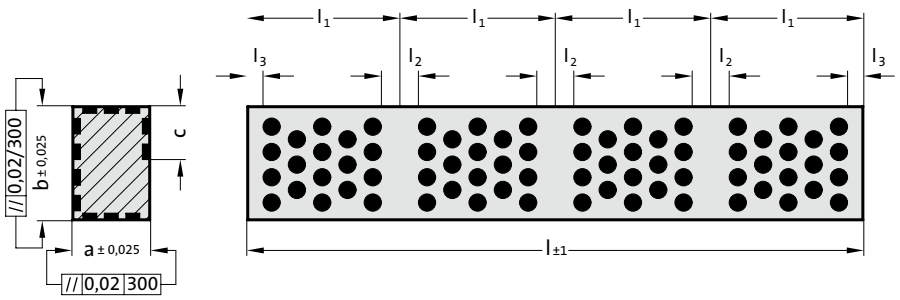
Note:
Screws are not included.

2962.77. Guide bar with two sliding surfaces, Bronze with solid lubricant

Order No	b	s	l	e_1	e_2	e_3	Number of screw holes
2962.77.065.040.0150	65	40	150	110	-	-	2
2962.77.065.040.0200	65	40	200	80	80	-	3
2962.77.065.040.0250	65	40	250	105	105	-	3
2962.77.065.040.0300	65	40	300	90	80	90	4
2962.77.065.040.0350	65	40	350	105	100	105	4
2962.77.065.065.0150	65	65	150	110	-	-	2
2962.77.065.065.0200	65	65	200	80	80	-	3
2962.77.065.065.0250	65	65	250	105	105	-	3
2962.77.065.065.0300	65	65	300	90	80	90	4
2962.77.065.065.0350	65	65	350	105	100	105	4

GUIDE BAR WITH FOUR SLIDING SURFACES, BRONZE WITH SOLID LUBRICANT

2962.74.



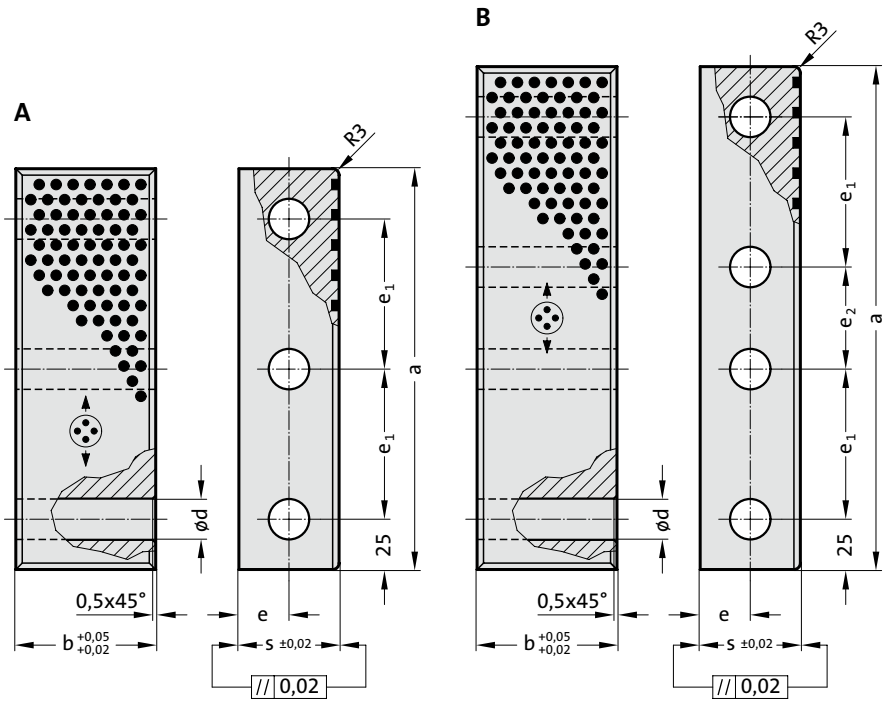
2962.74. Guide bar with four sliding surfaces, Bronze with solid lubricant

Order No	a	b	c	l	l_1	l_2	l_3
2962.74.015.010.075	10.3	15.3	6	75	25	6	3
2962.74.015.010.100	10.3	15.3	6	100	25	6	3
2962.74.015.010.125	10.3	15.3	6	125	25	6	3
2962.74.015.010.150	10.3	15.3	6	150	25	6	3
2962.74.015.010.175	10.3	15.3	6	175	25	6	3
2962.74.015.010.200	10.3	15.3	6	200	25	6	3
2962.74.015.010.225	10.3	15.3	6	225	25	6	3
2962.74.015.010.250	10.3	15.3	6	250	25	6	3
2962.74.015.010.275	10.3	15.3	6	275	25	6	3
2962.74.015.010.300	10.3	15.3	6	300	25	6	3
2962.74.025.015.105	15.3	25.3	8	105	35	8	4
2962.74.025.015.140	15.3	25.3	8	140	35	8	4
2962.74.025.015.175	15.3	25.3	8	175	35	8	4
2962.74.025.015.210	15.3	25.3	8	210	35	8	4
2962.74.025.015.245	15.3	25.3	8	245	35	8	4
2962.74.025.015.280	15.3	25.3	8	280	35	8	4
2962.74.025.015.315	15.3	25.3	8	315	35	8	4
2962.74.025.015.350	15.3	25.3	8	350	35	8	4
2962.74.025.015.385	15.3	25.3	8	385	35	8	4
2962.74.025.015.420	15.3	25.3	8	420	35	8	4
2962.74.025.015.455	15.3	25.3	8	455	35	8	4
2962.74.025.015.490	15.3	25.3	8	490	35	8	4
2962.74.035.025.135	25.3	35.3	12	135	45	10	5
2962.74.035.025.180	25.3	35.3	12	180	45	10	5
2962.74.035.025.225	25.3	35.3	12	225	45	10	5
2962.74.035.025.270	25.3	35.3	12	270	45	10	5
2962.74.035.025.315	25.3	35.3	12	315	45	10	5
2962.74.035.025.360	25.3	35.3	12	360	45	10	5
2962.74.035.025.405	25.3	35.3	12	405	45	10	5
2962.74.035.025.450	25.3	35.3	12	450	45	10	5
2962.74.035.025.495	25.3	35.3	12	495	45	10	5
2962.74.045.035.165	35.3	45.3	16	165	55	12	6
2962.74.045.035.220	35.3	45.3	16	220	55	12	6
2962.74.045.035.275	35.3	45.3	16	275	55	12	6
2962.74.045.035.330	35.3	45.3	16	330	55	12	6
2962.74.045.035.385	35.3	45.3	16	385	55	12	6
2962.74.045.035.440	35.3	45.3	16	440	55	12	6
2962.74.045.035.495	35.3	45.3	16	495	55	12	6

Material:
Bronze with solid lubricant, oilless lubricating

GUIDE BAR WITH ONE SLIDING SURFACES, BRONZE WITH SOLID LUBRICANT

2962.79.



Material:
Bronze with solid lubricant, oilless lubricating

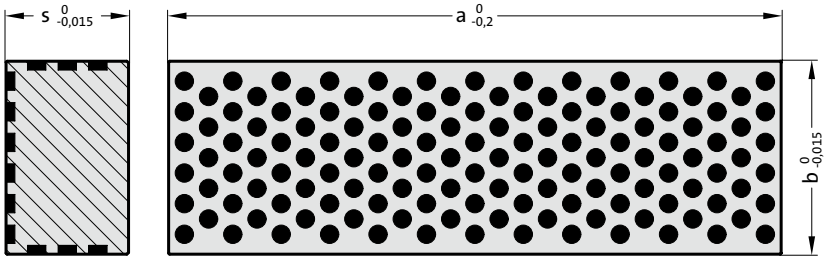
Note:
Screws are not included.

2962.79. Guide bar with one sliding surfaces, Bronze with solid lubricant

Order No	Shape	b	s	a	e	e_1	e_2	d	Number of screw holes
2962.79.030.040.150	A	30	40	150	20	50	-	14	3
2962.79.030.040.200	A	30	40	200	20	75	-	14	3
2962.79.030.040.250	B	30	40	250	20	75	50	14	4
2962.79.040.040.150	A	40	40	150	20	50	-	14	3
2962.79.040.040.200	A	40	40	200	20	75	-	14	3
2962.79.040.040.250	B	40	40	250	20	75	50	14	4
2962.79.045.050.150	A	45	50	150	25	50	-	18	3
2962.79.045.050.200	A	45	50	200	25	75	-	18	3
2962.79.045.050.250	B	45	50	250	25	75	50	18	4
2962.79.055.050.150	A	55	50	150	25	50	-	18	3
2962.79.055.050.200	A	55	50	200	25	75	-	18	3
2962.79.055.050.250	B	55	50	250	25	75	50	18	4
2962.79.060.050.150	A	60	50	150	25	50	-	18	3
2962.79.060.050.200	A	60	50	200	25	75	-	18	3
2962.79.060.050.250	B	60	50	250	25	75	50	18	4
2962.79.070.050.150	A	70	50	150	25	50	-	18	3
2962.79.070.050.200	A	70	50	200	25	75	-	18	3
2962.79.070.050.250	B	70	50	250	25	75	50	18	4

GUIDE BAR WITH THREE SLIDING SURFACES, BRONZE WITH SOLID LUBRICANT

2962.80.



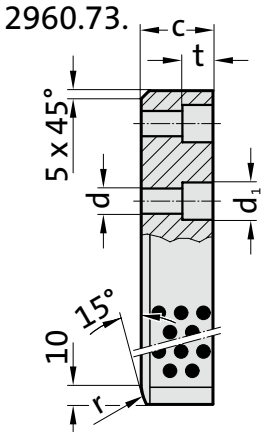
2962.80. Guide bar with three sliding surfaces, Bronze with solid lubricant

Order No	b	s	a
2962.80.025.016.080	25	16	80
2962.80.025.016.100	25	16	100
2962.80.025.016.125	25	16	125
2962.80.040.025.125	40	25	125
2962.80.040.025.160	40	25	160
2962.80.040.025.200	40	25	200
2962.80.063.040.200	63	40	200
2962.80.063.040.250	63	40	250
2962.80.063.040.315	63	40	315

Material:
Bronze with solid lubricant, oilless lubricating

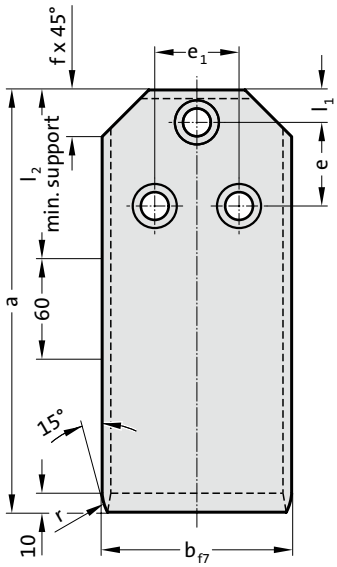
GUIDE BRACKET, STEEL WITH SOLID LUBRICANT, VDI 3387

2960.73.

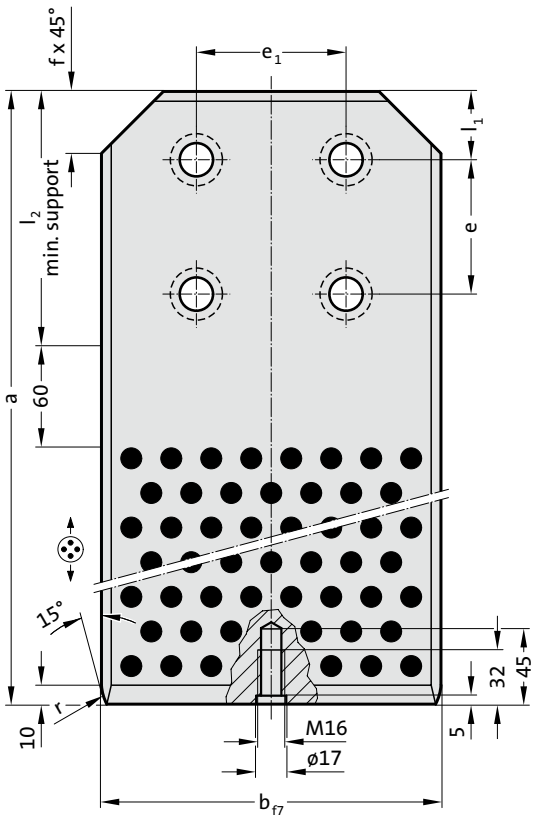


2960.73.

A



B



Material:
Steel, surface hardened. Sliding faces with embedded solid lubricant.

Note:
Screws are not included.

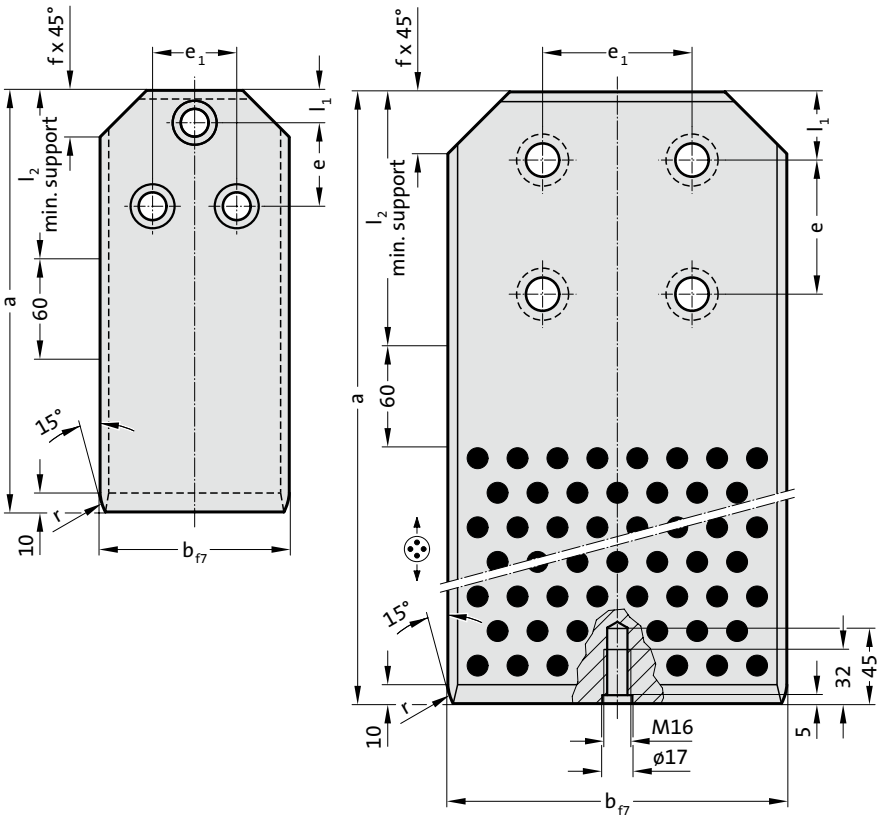
Fixing:
Use socket cap screws DIN EN ISO 4762.

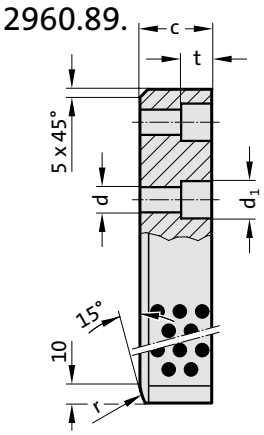
2960.73. Guide bracket, Steel with solid lubricant, VDI 3387

Order No	Shape	b	a	c	l_1	l_2	e	e_1	d	d_1	f	t	r	Number of screw holes
2960.73.063.180.036	A	63	180	36	20	90	50	36	14	20	18	16	16	3
2960.73.063.200.036	A	63	200	36	20	90	50	36	14	20	18	16	16	3
2960.73.063.224.036	A	63	224	36	20	90	50	36	14	20	18	16	16	3
2960.73.071.180.036	A	71	180	36	20	90	50	36	14	20	18	16	16	3
2960.73.071.200.036	A	71	200	36	20	90	50	36	14	20	18	16	16	3
2960.73.071.224.036	A	71	224	36	20	90	50	36	14	20	18	16	16	3
2960.73.090.200.045	A	90	200	45	20	100	50	50	18	26	28	21	25	3
2960.73.090.224.045	A	90	224	45	20	100	50	50	18	26	28	21	25	3
2960.73.090.250.045	A	90	250	45	20	100	50	50	18	26	28	21	25	3
2960.73.112.200.045	A	112	200	45	20	100	50	50	18	26	28	21	25	3
2960.73.112.224.045	A	112	224	45	20	100	50	50	18	26	28	21	25	3
2960.73.112.250.045	A	112	250	45	20	100	50	50	18	26	28	21	25	3
2960.73.140.315.045	B	140	315	45	40	150	80	90	22	33	36	25.5	31.5	4
2960.73.140.400.045	B	140	400	45	40	150	80	90	22	33	36	25.5	31.5	4
2960.73.140.400.056	B	140	400	56	40	150	80	90	22	33	36	25.5	31.5	4
2960.73.190.400.056	B	190	400	56	40	150	80	90	22	33	36	25.5	31.5	4
2960.73.240.500.056	B	240	500	56	40	250	160	160	26	40	36	30.5	31.5	4
2960.73.240.630.056	B	240	630	56	40	250	160	160	26	40	36	30.5	31.5	4

GUIDE BRACKET, BRONZE WITH SOLID LUBRICANT, VDI 3387

2960.89.





2960.89. Guide bracket, Bronze with solid lubricant, VDI 3387

Order No	Shape	b	a	l_1	l_2	e	e_1	d	d_1	f	c	t	r	Number of screw holes
2960.89.063.180	A	63	180	20	90	50	36	14	20	18	36	16	16	3
2960.89.063.200	A	63	200	20	90	50	36	14	20	18	36	16	16	3
2960.89.063.224	A	63	224	20	90	50	36	14	20	18	36	16	16	3
2960.89.071.180	A	71	180	20	90	50	36	14	20	18	36	16	16	3
2960.89.071.200	A	71	200	20	90	50	36	14	20	18	36	16	16	3
2960.89.071.224	A	71	224	20	90	50	36	14	20	18	36	16	16	3
2960.89.090.200	A	90	200	20	100	50	50	18	26	28	45	21	25	3
2960.89.090.224	A	90	224	20	100	50	50	18	26	28	45	21	25	3
2960.89.090.250	A	90	250	20	100	50	50	18	26	28	45	21	25	3
2960.89.112.200	A	112	200	20	100	50	50	18	26	28	45	21	25	3
2960.89.112.224	A	112	224	20	100	50	50	18	26	28	45	21	25	3
2960.89.112.250	A	112	250	20	100	50	50	18	26	28	45	21	25	3
2960.89.140.315	B	140	315	40	150	80	90	22	33	36	45	25.5	31.5	4
2960.89.190.400	B	190	400	40	150	80	90	22	33	36	56	25.5	31.5	4
2960.89.240.500	B	240	500	40	250	160	160	26	40	36	56	30.5	31.5	4
2960.89.240.630	B	240	630	40	250	160	160	26	40	36	56	30.5	31.5	4

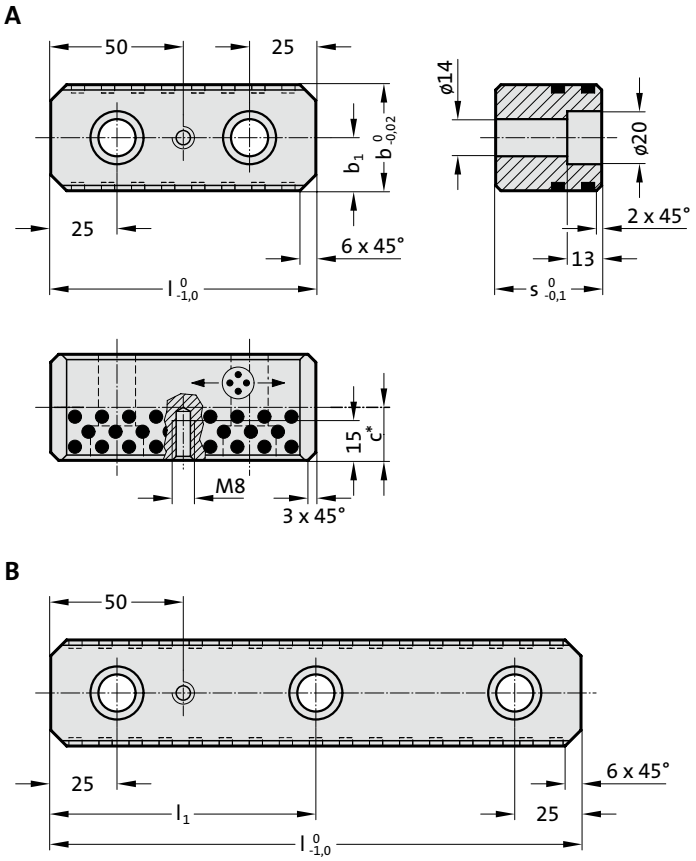
Material:
Bronze with solid lubricant, oilless lubricating

Note:
Screws are not included.

Fixing:
Use socket cap screws DIN EN ISO 4762.

SLIDE CENTRE GUIDE, BRONZE WITH SOLID LUBRICANT

2966.72.



Material:
Bronze with solid lubricant, oilless lubricating

Note:
Screws are not included.

Fixing:
Use socket cap screws DIN EN ISO 4762 M12.

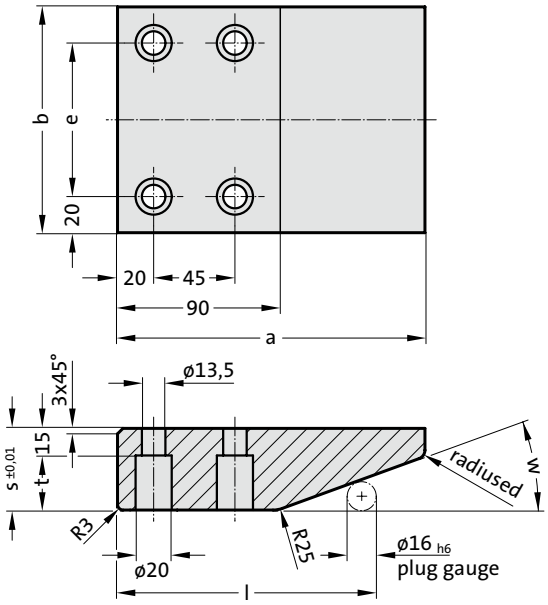
2966.72. Slide centre guide, Bronze with solid lubricant

Order No	Shape	b	l	s	b_1	l_1	c*	Number of screw holes
2966.72.030.100.030	A	30	100	30	15	-	18	2
2966.72.030.150.030	A	30	150	30	15	-	18	2
2966.72.030.200.030	B	30	200	30	15	100	18	3
2966.72.030.250.030	B	30	250	30	15	125	18	3
2966.72.030.300.030	B	30	300	30	15	150	18	3
2966.72.030.350.030	B	30	350	30	15	175	18	3
2966.72.040.100.030	A	40	100	30	20	-	18	2
2966.72.040.150.030	A	40	150	30	20	-	18	2
2966.72.040.200.030	B	40	200	30	20	100	18	3
2966.72.040.250.030	B	40	250	30	20	125	18	3
2966.72.040.300.030	B	40	300	30	20	150	18	3
2966.72.040.350.030	B	40	350	30	20	175	18	3
2966.72.040.100.040	A	40	100	40	20	-	20	2
2966.72.040.150.040	A	40	150	40	20	-	20	2
2966.72.040.200.040	B	40	200	40	20	100	20	3
2966.72.040.250.040	B	40	250	40	20	125	20	3
2966.72.040.300.040	B	40	300	40	20	150	20	3
2966.72.040.350.040	B	40	350	40	20	175	20	3

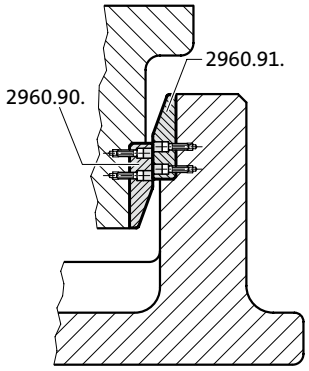
*Solid lubricant area

OVERRUN CAM, STEEL HARDENED, VDI 3357

2960.90.



Mounting example



2960.90. Overrun Cam, Steel hardened, VDI 3357

Order No	b	a	s	e	t	w	l
2960.90.100.170.045	100	170	45	60	30	20	143.37
2960.90.125.170.045	125	170	45	85	30	20	143.37
2960.90.150.170.045	150	170	45	110	30	20	143.37
2960.90.200.170.045	200	170	45	160	30	20	143.37
2960.90.100.150.045	100	150	45	60	30	30	127.86
2960.90.100.170.060	100	170	60	60	45	30	127.86
2960.90.125.150.045	125	150	45	85	30	30	127.86
2960.90.125.170.060	125	170	60	85	45	30	127.86
2960.90.150.150.045	150	150	45	110	30	30	127.86
2960.90.150.170.060	150	170	60	110	45	30	127.86
2960.90.200.150.045	200	150	45	160	30	30	127.86
2960.90.200.170.060	200	170	60	160	45	30	127.86

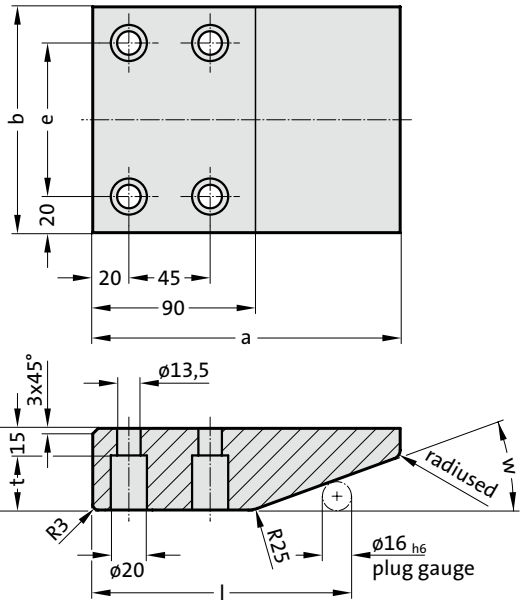
Material:
Steel, through-hardened

Note:
Screws are not included.

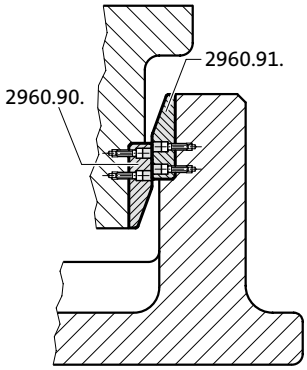
Fixing:
Use socket cap screws
DIN EN ISO 4762 M12.

OVERRUN CAM, STEEL HARDENED AND GAS NITRIDED, VDI 3357

2960.91.



Mounting example



Material:
Steel, through-hardened and gas nitrided

Note:
Screws are not included.

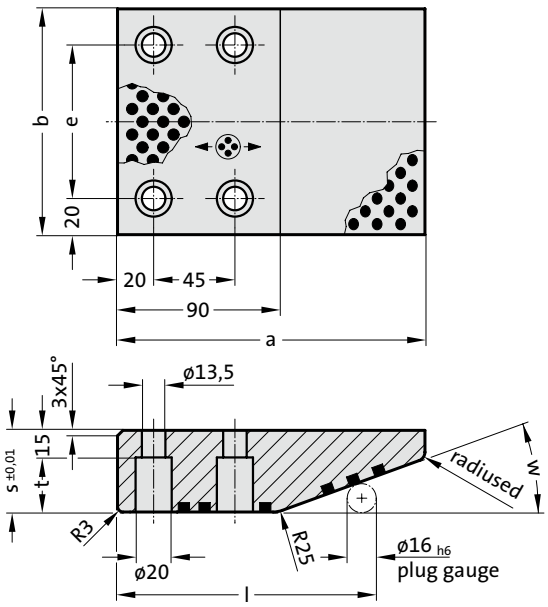
Fixing:
Use socket cap screws DIN EN ISO 4762 M12.

2960.91. Overrun Cam, Steel hardened and gas nitrided, VDI 3357

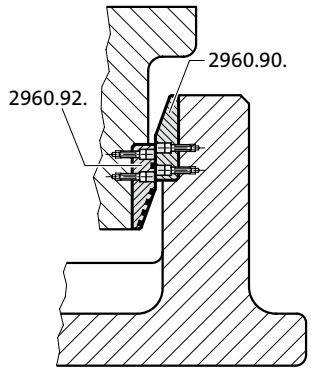
Order No	b	a	s	e	t	w	l
2960.91.100.170.045	100	170	45	60	30	20	143.37
2960.91.125.170.045	125	170	45	85	30	20	143.37
2960.91.150.170.045	150	170	45	110	30	20	143.37
2960.91.200.170.045	200	170	45	160	30	20	143.37
2960.91.100.150.045	100	150	45	60	30	30	127.86
2960.91.100.170.060	100	170	60	60	45	30	127.86
2960.91.125.150.045	125	150	45	85	30	30	127.86
2960.91.125.170.060	125	170	60	85	45	30	127.86
2960.91.150.150.045	150	150	45	110	30	30	127.86
2960.91.150.170.060	150	170	60	110	45	30	127.86
2960.91.200.150.045	200	150	45	160	30	30	127.86
2960.91.200.170.060	200	170	60	160	45	30	127.86

OVERRUN CAM, BRONZE WITH SOLID LUBRICANT, VDI 3357

2960.92.



Mounting example



2960.92. Overrun Cam, Bronze with solid lubricant, VDI 3357

Order No	b	a	s	e	t	w	l
2960.92.100.170.045	100	170	45	60	30	20	143.37
2960.92.125.170.045	125	170	45	85	30	20	143.37
2960.92.150.170.045	150	170	45	110	30	20	143.37
2960.92.200.170.045	200	170	45	160	30	20	143.37
2960.92.100.150.045	100	150	45	60	30	30	127.86
2960.92.100.170.060	100	170	60	60	45	30	127.86
2960.92.125.150.045	125	150	45	85	30	30	127.86
2960.92.125.170.060	125	170	60	85	45	30	127.86
2960.92.150.150.045	150	150	45	110	30	30	127.86
2960.92.150.170.060	150	170	60	110	45	30	127.86
2960.92.200.150.045	200	150	45	160	30	30	127.86
2960.92.200.170.060	200	170	60	160	45	30	127.86

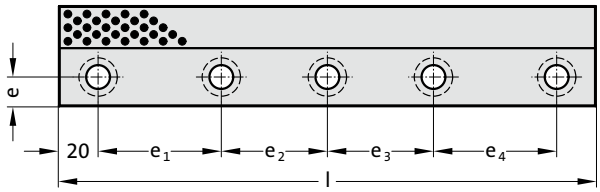
Material:
Bronze with solid lubricant, oilless lubricating

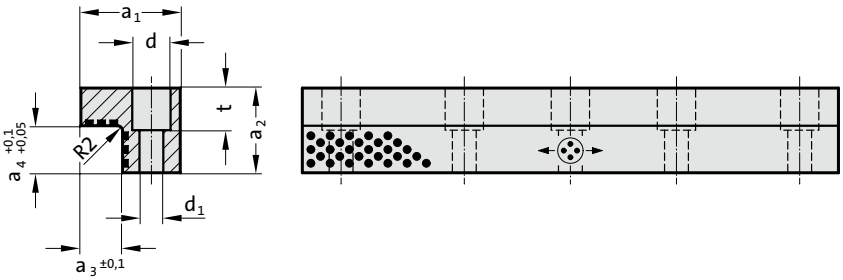
Note:
Screws are not included.

Fixing:
Use socket cap screws DIN EN ISO 4762 M12.

ANGLED GUIDE GIB, BRONZE WITH SOLID LUBRICANT

2962.70.





Material:
Bronze with solid lubricant, oilless lubricating

Note:
Screws are not included.

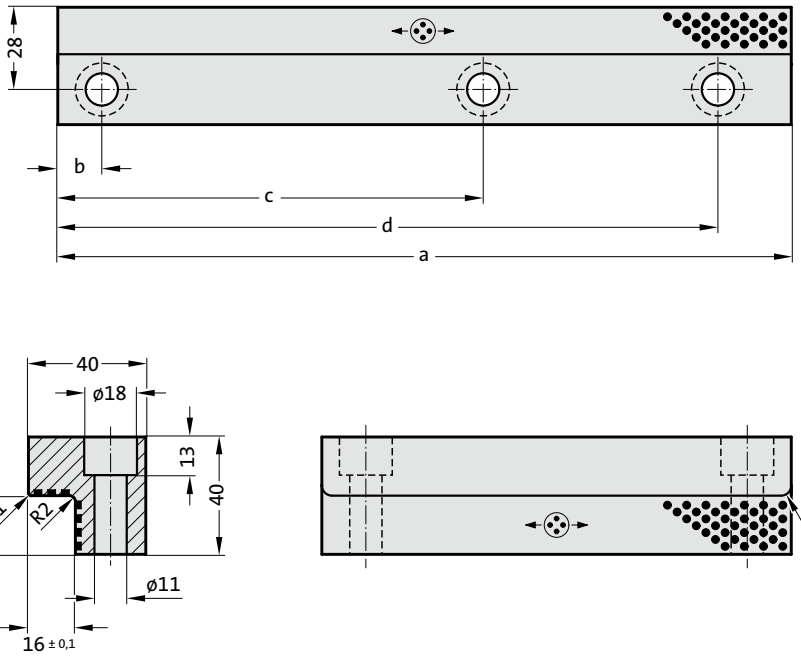
Fixing:
Use socket cap screws DIN EN ISO 4762.

2962.70. Angled guide gib, Bronze with solid lubricant

Order No	a_1	a_2	l	a_3	a_4	e	e_1	e_2	e_3	e_4	d	d_1	t	Number of screw holes
2962.70.026.100	26	20	100	8	10	9	60	-	-	-	15	9	9.6	2
2962.70.026.150	26	20	150	8	10	9	55	55	-	-	15	9	9.6	3
2962.70.026.200	26	20	200	8	10	9	55	50	55	-	15	9	9.6	4
2962.70.032.100	32	30	100	10	15	11	60	-	-	-	-	11	-	2
2962.70.032.150	32	30	150	10	15	11	55	55	-	-	-	11	-	3
2962.70.032.200	32	30	200	10	15	11	55	50	55	-	-	11	-	4
2962.70.032.250	32	30	250	10	15	11	70	70	70	-	-	11	-	4
2962.70.050.200	50	45	200	22	25	14	55	50	55	-	18	11	25	4
2962.70.050.250	50	45	250	22	25	14	70	70	70	-	18	11	25	4
2962.70.050.300	50	45	300	22	25	14	65	65	65	65	18	11	25	5
2962.70.050.350	50	45	350	22	25	14	80	75	75	80	18	11	25	5

ANGLED GUIDE GIB, BRONZE WITH SOLID LUBRICANT, CNOMO

2962.70.45.



Material:
Bronze with solid lubricant, oilless lubricating

Note:
Screws are not included.

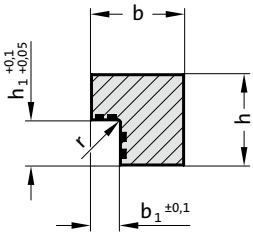
Fixing:
Use socket cap screws DIN EN ISO 4762 M10.

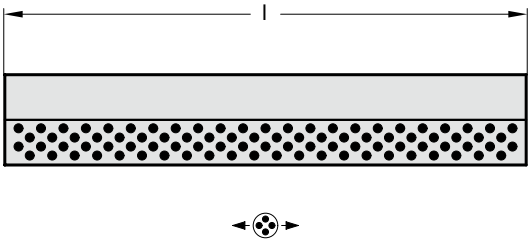
2962.70.45. Angled guide gib, Bronze with solid lubricant, CNOMO

Order No	a	b	c	d	Number of screw holes
2962.70.45.040.160	160	15	145	-	2
2962.70.45.040.250	250	15	145	225	3

ANGLED GUIDE GIB, BRONZE WITH SOLID LUBRICANT

2962.71.





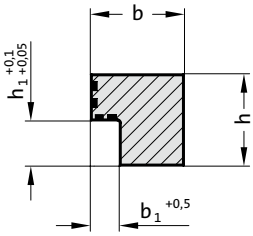
Material:
Bronze with solid lubricant, oilless lubricating

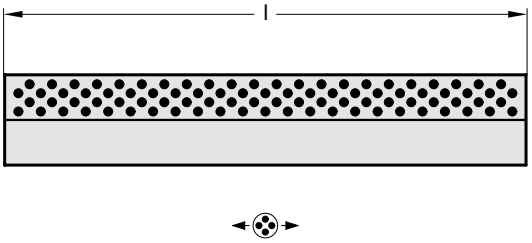
2962.71. Angled guide gib, Bronze with solid lubricant

Order No	b	h	b_1	h_1	l
2962.71.020.012.0305	20	12	5	6	305
2962.71.025.015.0305	25	15	7	8	305
2962.71.030.020.0305	30	20	9	12	305
2962.71.032.030.0605	32	30	10	15	605
2962.71.032.030.1005	32	30	10	15	1005
2962.71.035.035.0605	35	35	12	24	605
2962.71.035.035.1005	35	35	12	24	1005
2962.71.050.045.0605	50	45	22	25	605
2962.71.050.045.1005	50	45	22	25	1005
2962.71.050.050.0605	50	50	16	34	605
2962.71.050.050.1005	50	50	16	34	1005

ANGLED GUIDE GIB, BRONZE WITH SOLID LUBRICANT

2962.72.





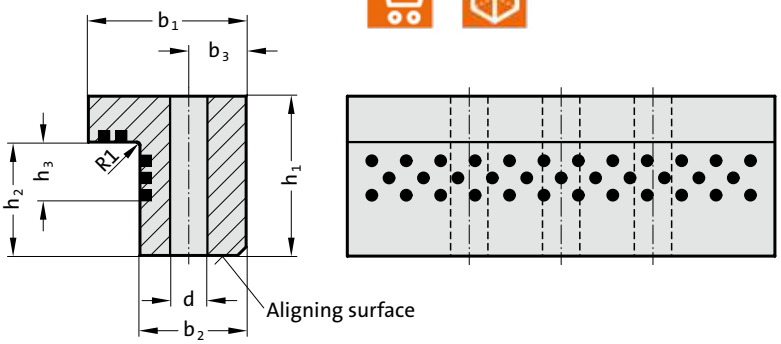
Material:
Bronze with solid lubricant, oilless lubricating

2962.72. Angled guide gib, Bronze with solid lubricant

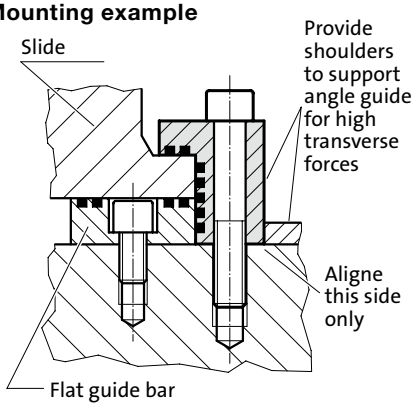
Order No	b	h	b_1	h_1	l
2962.72.015.012.0205	15	12	5	5	205
2962.72.020.022.0205	20	22	5	7	205
2962.72.020.017.0205	20	17	5	7	205
2962.72.020.017.0320	20	17	5	7	320
2962.72.020.022.0320	20	22	5	7	320
2962.72.028.027.0205	28	27	8	10	205
2962.72.028.036.0205	28	36	8	10	205
2962.72.028.046.0205	28	46	8	10	205
2962.72.028.027.0320	28	27	8	10	320
2962.72.028.036.0320	28	36	8	10	320
2962.72.028.046.0320	28	46	8	10	320
2962.72.028.027.0605	28	27	8	10	605
2962.72.028.036.0605	28	36	8	10	605
2962.72.028.046.0605	28	46	8	10	605
2962.72.040.066.0205	40	66	12	22	205
2962.72.040.066.0320	40	66	12	22	320
2962.72.040.066.0605	40	66	12	22	605
2962.72.040.086.0205	40	86	12	26	205
2962.72.040.086.0320	40	86	12	26	320
2962.72.040.086.0605	40	86	12	26	605

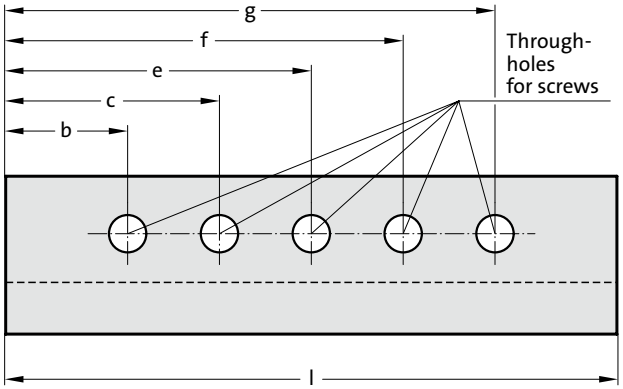
ANGLED GUIDE GIB, BRONZE WITH SOLID LUBRICANT, VDI 3357

2962.73.



Mounting example





Material:
Bronze with solid lubricant, oilless lubricating

Note:
Screws are not included.

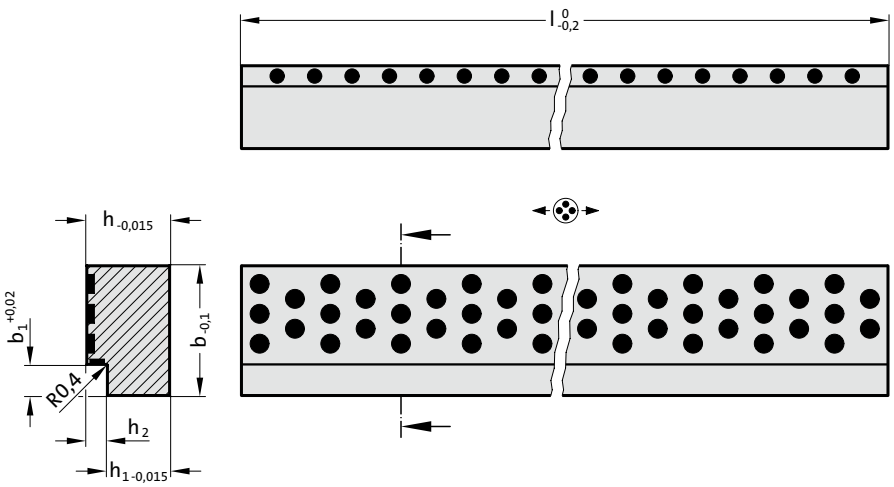
Fixing:
Use socket cap screws DIN EN ISO 4762.

2962.73. Angled guide gib, Bronze with solid lubricant, VDI 3357

Order No	b_1	h_1	l	b_2	b_3	h_2	h_3	b	c	e	f	g	d	Number of screw holes
2962.73.025.125	25	15.5	125	18	9	8.5	6	27.5	-	-	-	97.5	9	2
2962.73.025.160	25	15.5	160	18	9	8.5	6	27.5	-	-	-	132.5	9	2
2962.73.032.125	32	30.5	125	22	11	15.5	9	27.5	-	-	-	97.5	11	2
2962.73.032.160	32	30.5	160	22	11	15.5	9	27.5	-	-	-	132.5	11	2
2962.73.032.200	32	30.5	200	22	11	15.5	9	27.5	-	-	-	172.5	11	2
2962.73.045.100	45	50.5	100	30	15	34.5	18	27.5	-	-	-	72.5	13.5	2
2962.73.045.160	45	50.5	160	30	15	34.5	18	27.5	-	-	-	132.5	13.5	2
2962.73.055.100	55	55.5	100	37	20	39.5	23	27.5	-	-	-	72.5	13.5	2
2962.73.055.160	55	55.5	160	37	20	39.5	23	27.5	-	-	-	132.5	13.5	2
2962.73.070.160	70	75.5	160	50	30	55.5	35	35	-	-	-	125	17.5	2
2962.73.070.200	70	75.5	200	50	30	55.5	35	35	-	-	-	165	17.5	2
2962.73.070.250	70	75.5	250	50	30	55.5	35	35	-	125	-	215	17.5	3
2962.73.070.400	70	75.5	400	50	30	55.5	35	35	125	200	275	365	17.5	5
2962.73.085.160	85	90.5	160	63	38	65.5	45	42.5	-	-	-	117.5	22	2
2962.73.085.200	85	90.5	200	63	38	65.5	45	42.5	-	-	-	157.5	22	2
2962.73.085.250	85	90.5	250	63	38	65.5	45	42.5	-	125	-	207.5	22	3
2962.73.085.400	85	90.5	400	63	38	65.5	45	42.5	125	200	275	357.5	22	5

ANGLED GUIDE GIB, BRONZE WITH SOLID LUBRICANT

2962.81.



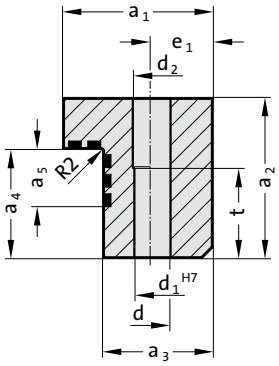
Material:
Bronze with solid lubricant, oilless lubricating

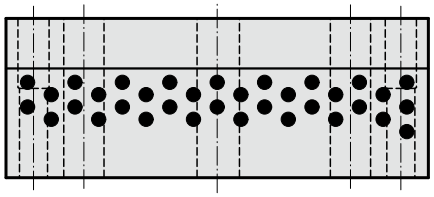
2962.81. Angled guide gib, Bronze with solid lubricant

Order No	h	b	l	h_1	h_2	b_1
2962.81.016.115.040	16	11.5	40	12	4	6
2962.81.016.115.050	16	11.5	50	12	4	6
2962.81.016.115.063	16	11.5	63	12	4	6
2962.81.016.115.080	16	11.5	80	12	4	6
2962.81.016.155.050	16	15.5	50	11	5	8
2962.81.016.155.063	16	15.5	63	11	5	8
2962.81.016.155.080	16	15.5	80	11	5	8
2962.81.016.155.100	16	15.5	100	11	5	8
2962.81.020.195.063	20	19.5	63	15	5	8
2962.81.020.195.080	20	19.5	80	15	5	8
2962.81.020.195.100	20	19.5	100	15	5	8
2962.81.020.195.125	20	19.5	125	15	5	8
2962.81.020.245.080	20	24.5	80	15	5	8
2962.81.020.245.100	20	24.5	100	15	5	8
2962.81.020.245.125	20	24.5	125	15	5	8
2962.81.020.245.160	20	24.5	160	15	5	8
2962.81.025.315.100	25	31.5	100	19	6	10
2962.81.025.315.125	25	31.5	125	19	6	10
2962.81.025.315.160	25	31.5	160	19	6	10
2962.81.025.315.200	25	31.5	200	19	6	10
2962.81.025.395.125	25	39.5	125	19	6	10
2962.81.025.395.160	25	39.5	160	19	6	10
2962.81.025.395.200	25	39.5	200	19	6	10
2962.81.025.395.250	25	39.5	250	19	6	10
2962.81.032.495.160	32	49.5	160	24	8	12
2962.81.032.495.200	32	49.5	200	24	8	12
2962.81.032.495.250	32	49.5	250	24	8	12
2962.81.032.495.315	32	49.5	315	24	8	12

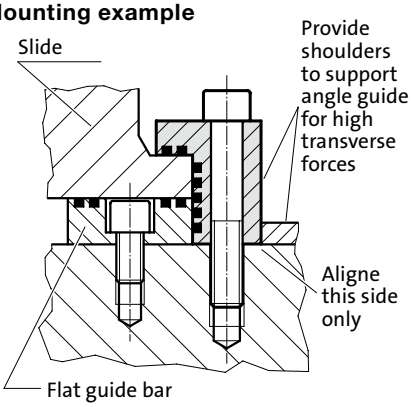
ANGLED GUIDE GIB, BRONZE WITH SOLID LUBRICANT

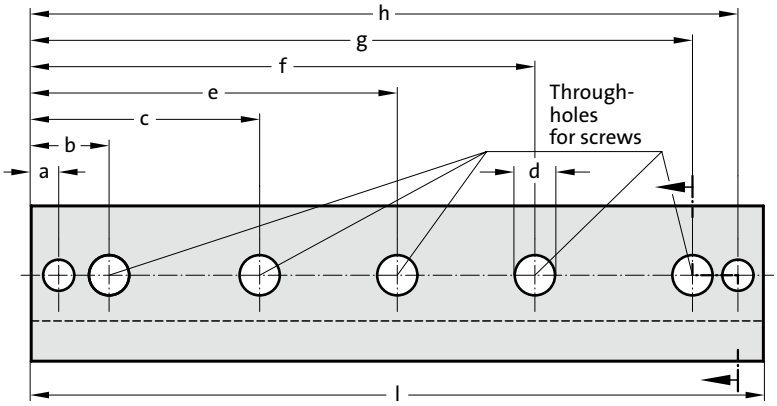
2962.82.





Mounting example





Material:
Bronze with solid lubricant, oilless lubricating

Note:
Screws and pins are not included.

Fixing:
Use socket cap screws DIN EN ISO 4762 and dowel pins DIN 7979.

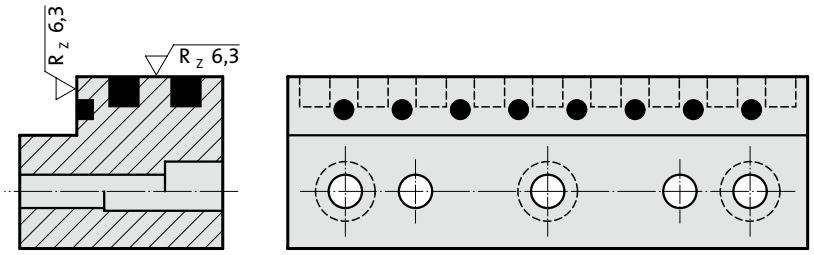
2962.82. Angled guide gib, Bronze with solid lubricant

Order No	a_1	a_2	l	a_3	a_4	a_5	a	b	c	e	e_1	f	g	h	d	d_1	d_2	t	Number of screw holes
2962.82.055.100	55	55	100	37	39	23	10	27.5	-	-	20	-	72.5	90	13.5	10	11	30	2
2962.82.055.160	55	55	160	37	39	23	10	27.5	-	-	20	-	132.5	150	13.5	10	11	30	2
2962.82.070.160	70	75	160	50	55	35	12.5	35	-	-	30	-	125	147.5	17.5	12	13	30	2
2962.82.070.200	70	75	200	50	55	35	12.5	35	-	-	30	-	165	187.5	17.5	12	13	30	2
2962.82.070.250	70	75	250	50	55	35	12.5	35	-	125	30	-	215	237.5	17.5	12	13	30	3
2962.82.070.400	70	75	400	50	55	35	12.5	35	125	200	30	275	365	387.5	17.5	12	13	30	5
2962.82.085.160	85	90	160	63	65	45	15	42.5	-	-	38	-	117.5	145	22	16	17	30	2
2962.82.085.200	85	90	200	63	65	45	15	42.5	-	-	38	-	157.5	185	22	16	17	30	2
2962.82.085.250	85	90	250	63	65	45	15	42.5	-	125	38	-	207.5	235	22	16	17	30	3
2962.82.085.400	85	90	400	63	65	45	15	42.5	125	200	38	275	357.5	385	22	16	17	30	5

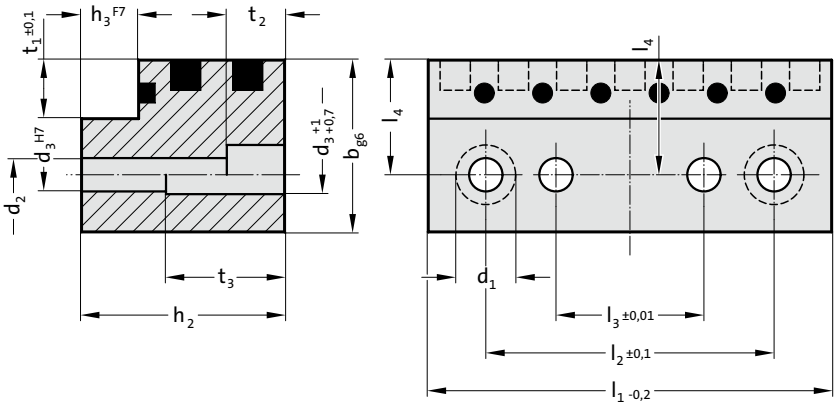
ANGLED GUIDE GIB, BRONZE WITH SOLID LUBRICANT

2962.83.

B



A



Material:
Bronze with solid lubricant, oilless lubricating

Note:
Screws and pins are not included.

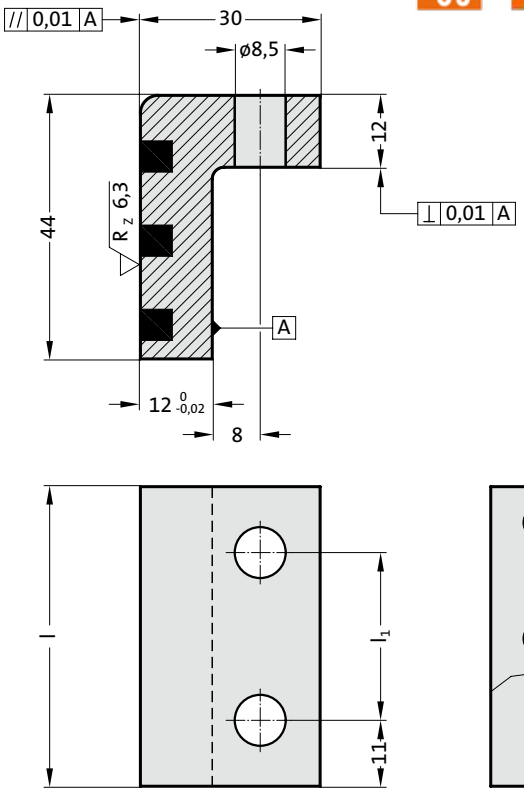
Fixing:
Use socket cap screws DIN EN ISO 4762 and dowel pins DIN 7979.

2962.83. Angled guide gib, Bronze with solid lubricant

Order No	Shape	b	h_1	h_2	l_1	h_3	t_1	l_2	l_3	l_4	d_1	d_2	d_3	t_2	t_3	Number of screw holes
2962.83.016.012.050	A	16	12	11	50	4	5	34	14	9.5	10	5.5	5	5.7	-	2
2962.83.016.012.071	A	16	12	11	71	4	5	55	35	9.5	10	5.5	5	5.7	-	2
2962.83.016.012.090	B	16	12	11	90	4	5	74	54	9.5	10	5.5	5	5.7	-	3
2962.83.020.020.080	A	20	20	19	80	5	5	64	40	12	11	6.6	6	6.8	9.5	2
2962.83.020.020.100	A	20	20	19	100	5	5	84	60	12	11	6.6	6	6.8	9.5	2
2962.83.020.020.125	B	20	20	19	125	5	5	109	85	12	11	6.6	6	6.8	9.5	3
2962.83.025.032.100	A	25	32	31	100	6	6	80	50	15.5	15	9	8	9	19	2
2962.83.025.032.125	A	25	32	31	125	6	6	105	75	15.5	15	9	8	9	19	2
2962.83.025.032.160	B	25	32	31	160	6	6	140	110	15.5	15	9	8	9	19	3
2962.83.030.050.125	A	30	50	49	125	8	7	95	55	18	18	11	10	11	34	2
2962.83.030.050.160	A	30	50	49	160	8	7	130	90	18	18	11	10	11	34	2
2962.83.030.050.200	B	30	50	49	200	8	7	170	130	18	18	11	10	11	34	3

ANGLED GUIDE GIB, BRONZE WITH SOLID LUBRICANT

2962.86.



Material:
Bronze with solid lubricant, oilless lubricating

Note:
Screws are not included.

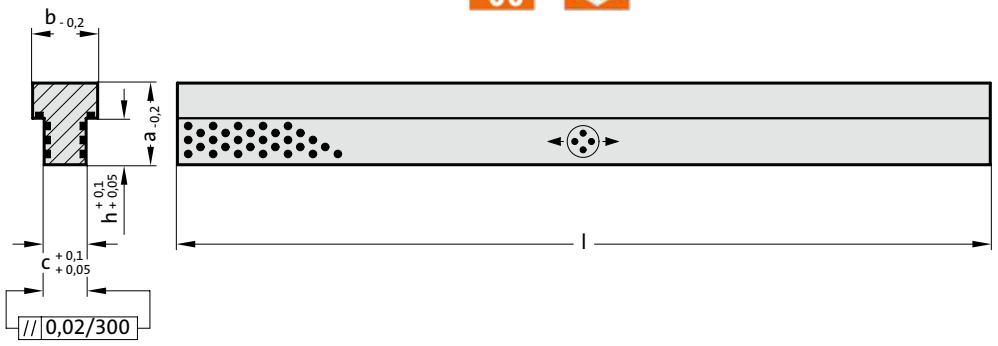
Fixing:
Use socket cap screws DIN EN ISO 4762.

2962.86. Angled guide gib, Bronze with solid lubricant

Order No	l	l_1
2962.86.044.030.050	50	28
2962.86.044.030.100	100	78
2962.86.044.030.150	150	128
2962.86.044.030.200	200	178

T-GUIDE BAR, BRONZE WITH SOLID LUBRICANT

2964.77.

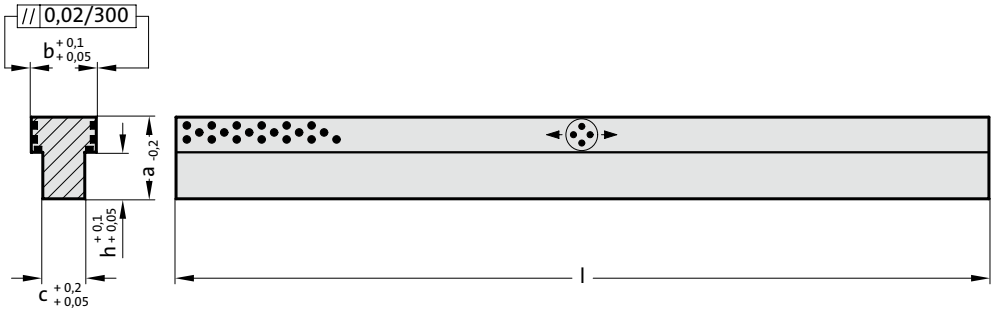


2964.77. T-Guide bar, Bronze with solid lubricant

Order No	a	b	c	h	l
2964.77.012.018.0350	12	18	8	5	350
2964.77.025.022.0350	25	22	12	15	350
2964.77.035.028.0350	35	28	18	20	350

Material:
Bronze with solid lubricant, oilless lubricating

2964.78.



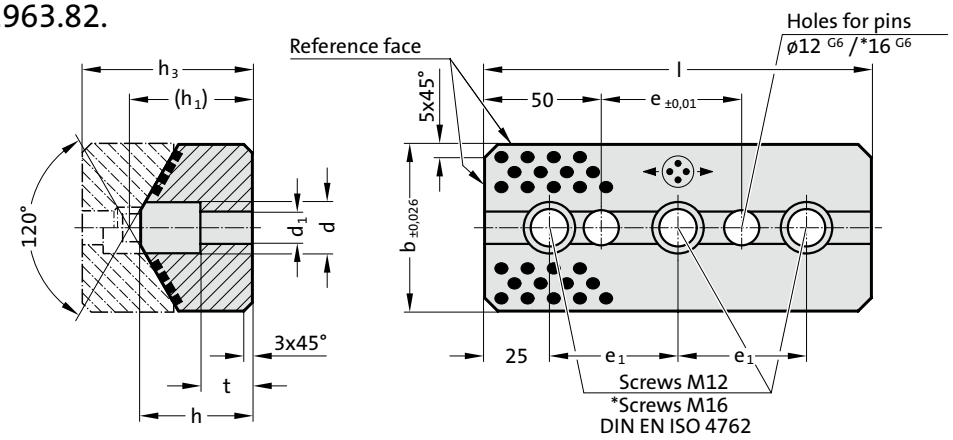
2964.78. T-Guide bar, Bronze with solid lubricant

Order No	a	b	c	h	l
2964.78.012.018.0350	12	18	8	5	350
2964.78.025.022.0350	25	22	12	15	350
2964.78.035.028.0350	35	28	18	20	350

Material:
Bronze with solid lubricant, oilless lubricating

SLIDING BLOCK, BRONZE WITH SOLID LUBRICANT, NAAMS
PRISMATIC GUIDE, STEEL, NAAMS

2963.82.



Material:
Bronze with solid lubricant, oilless lubricating

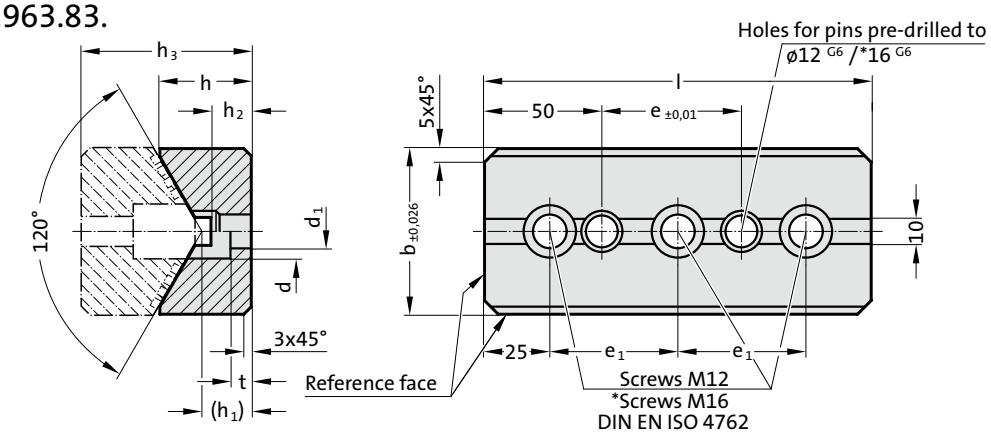
Note:
Screws and pins are not included.

* at 2963.82.125.

2963.82. Sliding block, Bronze with solid lubricant, NAAMS

Order No	b	h	h_1	h_3	l	e_1	e	d	d_1	t	Number of screw holes
2963.82.065.039.0150	65	39	(42)	65	150	100	50	20	13.5	13	2
2963.82.065.039.0200	65	39	(42)	65	200	150	100	20	13.5	13	2
2963.82.065.039.0250	65	39	(42)	65	250	100	150	20	13.5	13	3
2963.82.065.039.0300	65	39	(42)	65	300	125	200	20	13.5	13	3
2963.82.075.039.0150	75	39	(42)	65	150	100	50	20	13.5	13	2
2963.82.075.039.0200	75	39	(42)	65	200	150	100	20	13.5	13	2
2963.82.075.039.0250	75	39	(42)	65	250	100	150	20	13.5	13	3
2963.82.075.039.0300	75	39	(42)	65	300	125	200	20	13.5	13	3
2963.82.125.052.0150	125	52	(57)	85	150	100	50	26	17.5	15	2
2963.82.125.052.0200	125	52	(57)	85	200	150	100	26	17.5	15	2
2963.82.125.052.0250	125	52	(57)	85	250	100	150	26	17.5	15	3
2963.82.125.052.0300	125	52	(57)	85	300	125	200	26	17.5	15	3

2963.83.



Material:
Steel, sliding faces surface hardened

Note:
Screws and pins are not included.

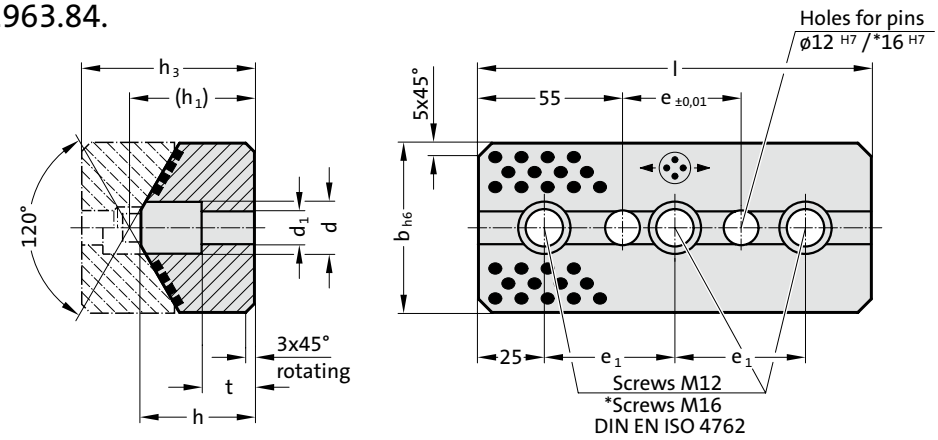
* at 2963.83.125.

2963.83. Prismatic guide, Steel, NAAMS

Order No	b	h	h_1	h_2	h_3	l	e	e_1	d	d_1	t	Number of screw holes
2963.83.065.040.0150	65	40	(23)	21	65	150	50	100	20	13.5	10	2
2963.83.065.040.0200	65	40	(23)	21	65	200	100	150	20	13.5	10	2
2963.83.065.040.0250	65	40	(23)	21	65	250	150	100	20	13.5	10	3
2963.83.065.040.0300	65	40	(23)	21	65	300	200	125	20	13.5	10	3
2963.83.075.040.0150	75	40	(23)	21	65	150	50	100	20	13.5	10	2
2963.83.075.040.0200	75	40	(23)	21	65	200	100	150	20	13.5	10	2
2963.83.075.040.0250	75	40	(23)	21	65	250	150	100	20	13.5	10	3
2963.83.075.040.0300	75	40	(23)	21	65	300	200	125	20	13.5	10	3
2963.83.125.060.0150	125	60	(28)	27	85	150	50	100	26	17.5	15	2
2963.83.125.060.0200	125	60	(28)	27	85	200	100	150	26	17.5	15	2
2963.83.125.060.0250	125	60	(28)	27	85	250	150	100	26	17.5	15	3
2963.83.125.060.0300	125	60	(28)	27	85	300	200	125	26	17.5	15	3

SLIDING BLOCK, BRONZE WITH SOLID LUBRICANT, VDI 3357
PRISMATIC GUIDE, STEEL, VDI 3357

2963.84.



2963.84. Sliding block, Bronze with solid lubricant, VDI 3357

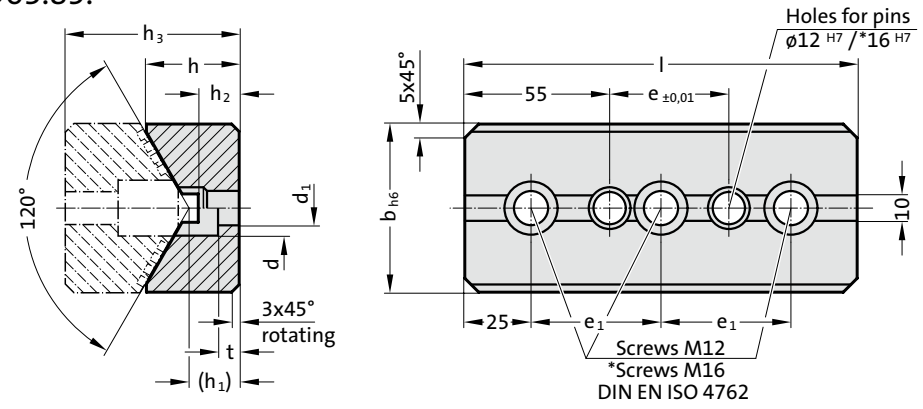
Order No	b	h	h_1	h_3	l	e	e_1	d	d_1	t	Number of screw holes
2963.84.065.044.0150	65	44	(47)	65	150	45	100	20	13.5	20	2
2963.84.065.044.0200	65	44	(47)	65	200	95	150	20	13.5	20	2
2963.84.065.044.0250	65	44	(47)	65	250	145	100	20	13.5	20	3
2963.84.065.044.0300	65	44	(47)	65	300	195	125	20	13.5	20	3
2963.84.125.047.0150	125	47	(52)	85	150	45	100	26	17.5	15	2
2963.84.125.047.0200	125	47	(52)	85	200	95	150	26	17.5	15	2
2963.84.125.047.0250	125	47	(52)	85	250	145	100	26	17.5	15	3
2963.84.125.047.0300	125	47	(52)	85	300	195	125	26	17.5	15	3
2963.84.125.052.0150	125	52	(57)	85	150	45	100	26	17.5	15	2
2963.84.125.052.0200	125	52	(57)	85	200	95	150	26	17.5	15	2
2963.84.125.052.0250	125	52	(57)	85	250	145	100	26	17.5	15	3
2963.84.125.052.0300	125	52	(57)	85	300	195	125	26	17.5	15	3

Material:
Bronze with solid lubricant, oilless lubricating

Note:
Screws and pins are not included.

* at 2963.84.125.

2963.85.



2963.85. Prismatic guide, Steel, VDI 3357

Order No	b	h	h_1	h_2	h_3	l	e	e_1	d	d_1	t	Number of screw holes
2963.85.065.035.0150	65	35	(18)	17	65	150	45	100	20	13.5	8	2
2963.85.065.035.0200	65	35	(18)	17	65	200	95	150	20	13.5	8	2
2963.85.065.035.0250	65	35	(18)	17	65	250	145	100	20	13.5	8	3
2963.85.065.035.0300	65	35	(18)	17	65	300	195	125	20	13.5	8	3
2963.85.125.060.0150	125	60	(33)	32	85	150	45	100	26	17.5	15	2
2963.85.125.060.0200	125	60	(33)	32	85	200	95	150	26	17.5	15	2
2963.85.125.060.0250	125	60	(33)	32	85	250	145	100	26	17.5	15	3
2963.85.125.060.0300	125	60	(33)	32	85	300	195	125	26	17.5	15	3
2963.85.125.060.0150.1	125	60	(28)	27	85	150	45	100	26	17.5	15	2
2963.85.125.060.0200.1	125	60	(28)	27	85	200	95	150	26	17.5	15	2
2963.85.125.060.0250.1	125	60	(28)	27	85	250	145	100	26	17.5	15	3
2963.85.125.060.0300.1	125	60	(28)	27	85	300	195	125	26	17.5	15	3

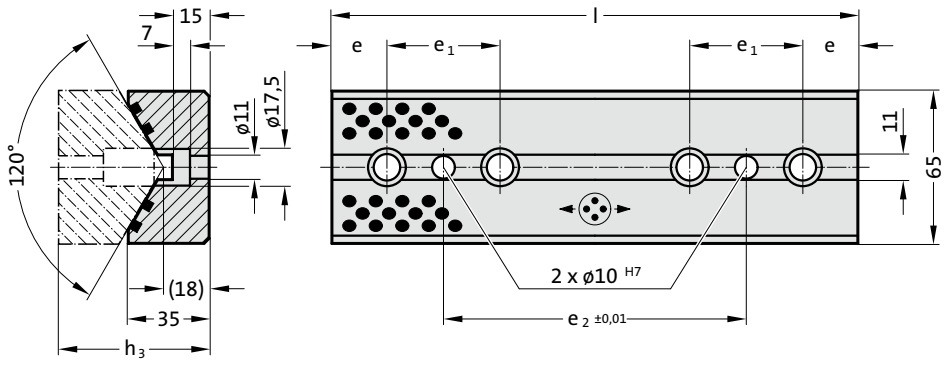
Material:
Steel, sliding faces surface hardened

Note:
Screws and pins are not included.

* at 2963.85.125.

PRISMATIC GUIDE, BRONZE WITH SOLID LUBRICANT
SLIDING BLOCK, STEEL

2963.70.



Material:
Bronze with solid lubricant, oilless lubricating

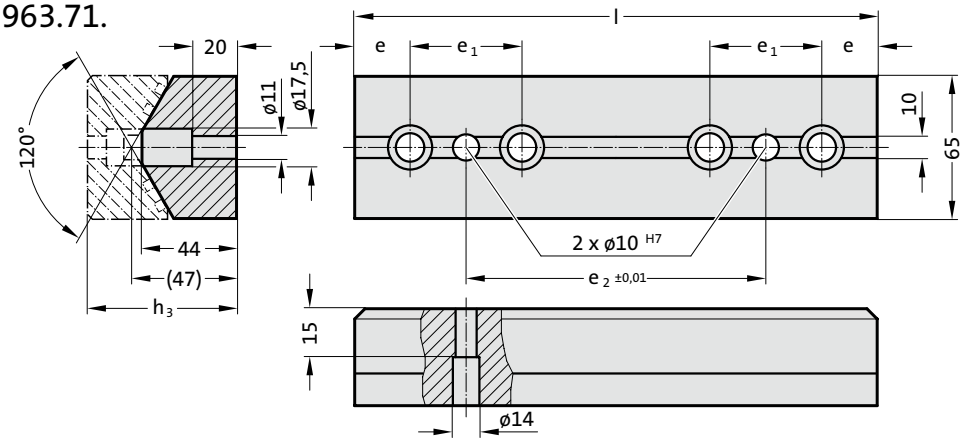
Note:
Screws and pins are not included.

Fixing:
Use socket cap screws DIN EN ISO 4762 M10.

2963.70. Prismatic guide, Bronze with solid lubricant

Order No	e	e_1	e_2	h_3	l	Number of screw holes
2963.70.065.035.0100	20	60	20	65	100	2
2963.70.065.035.0150	25	50	50	65	150	3
2963.70.065.035.0200	25	50	100	65	200	4
2963.70.065.035.0250	25	50	150	65	250	5
2963.70.065.035.0300	25	50	200	65	300	6

2963.71.



Material:
Steel, sliding faces surface hardened

Note:
Screws and pins are not included.

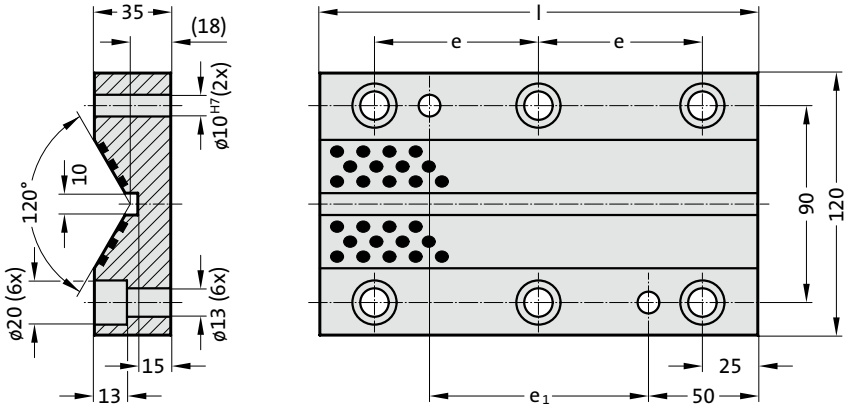
Fixing:
Use socket cap screws DIN EN ISO 4762 M10.

2963.71. Sliding block, Steel

Order No	e	e_1	e_2	h_3	l	Number of screw holes
2963.71.065.044.0100	20	60	20	65	100	2
2963.71.065.044.0150	25	50	50	65	150	3
2963.71.065.044.0200	25	50	100	65	200	4
2963.71.065.044.0250	25	50	150	65	250	5
2963.71.065.044.0300	25	50	200	65	300	6

PRISMATIC GUIDE, BRONZE WITH SOLID LUBRICANT
SLIDING BLOCK, STEEL

2963.72.



2963.72. Prismatic guide, Bronze with solid lubricant

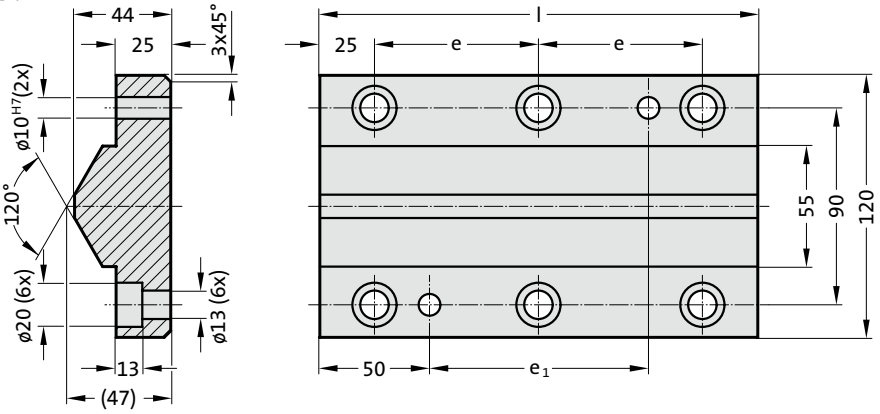
Order No	l	e	e_1	Number of screw holes
2963.72.120.035.0150	150	50	50	6
2963.72.120.035.0200	200	75	100	6
2963.72.120.035.0250	250	100	150	6
2963.72.120.035.0300	300	125	200	6

Material:
Bronze with solid lubricant, oilless lubricating

Note:
Screws and pins are not included.

Fixing:
Use socket cap screws DIN EN ISO 4762 M12.

2963.73.



2963.73. Sliding block, Steel

Order No	l	e	e_1	Number of screw holes
2963.73.120.044.0150	150	50	50	6
2963.73.120.044.0200	200	75	100	6
2963.73.120.044.0250	250	100	150	6
2963.73.120.044.0300	300	125	200	6

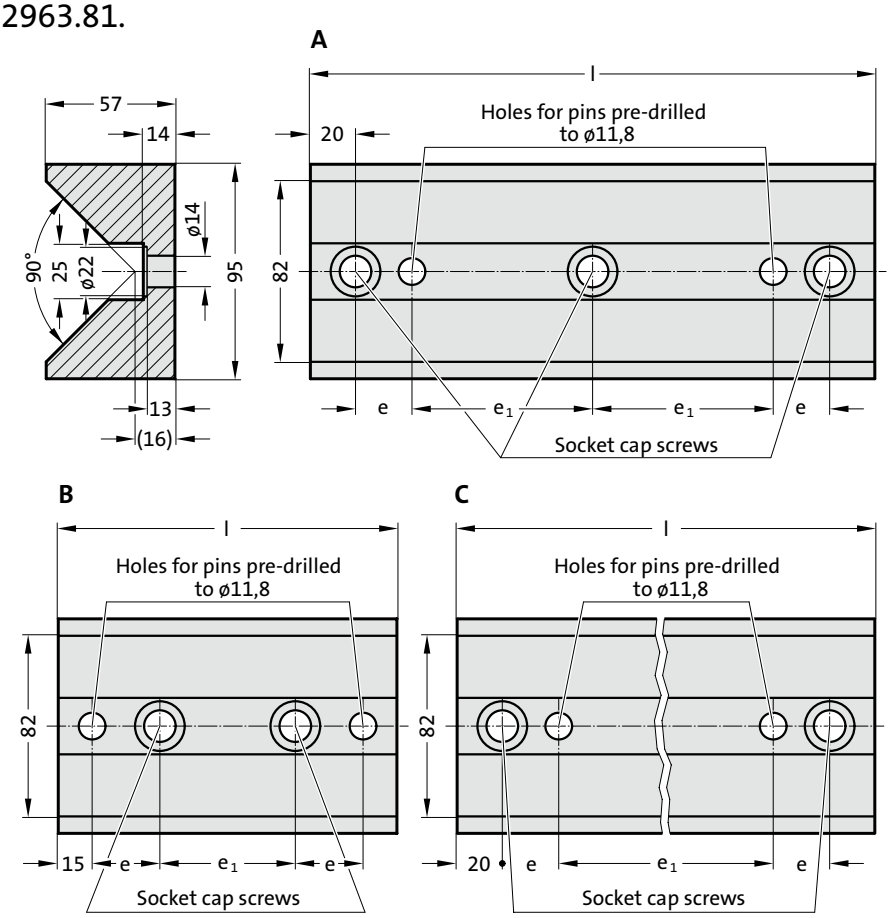
Material:
Steel, sliding faces surface hardened

Note:
Screws and pins are not included.

Fixing:
Use socket cap screws DIN EN ISO 4762 M12.

PRISMATIC GUIDE, STEEL

2963.81.



Material:
Steel, sliding faces surface hardened

Note:
Screws and pins are not included.

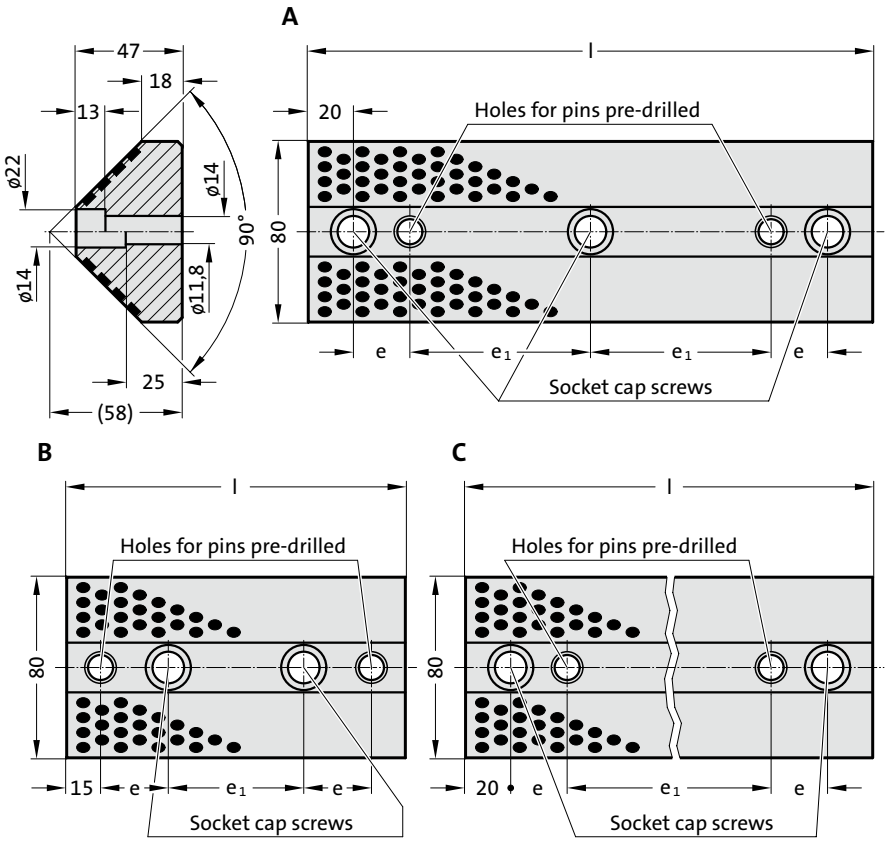
Fixing:
Use socket cap screws DIN EN ISO 4762 M12.

2963.81. Prismatic guide, Steel

Order No	Shape	l	e	e_1	Number of screw holes
2963.81.095.057.0150	B	150	30	60	2
2963.81.095.057.0200	C	200	25	110	2
2963.81.095.057.0250	A	250	25	80	3
2963.81.095.057.0300	A	300	30	100	3

SLIDING BLOCK, BRONZE WITH SOLID LUBRICANT

2963.80.



Material:
Bronze with solid lubricant, oilless lubricating

Note:
Screws and pins are not included.

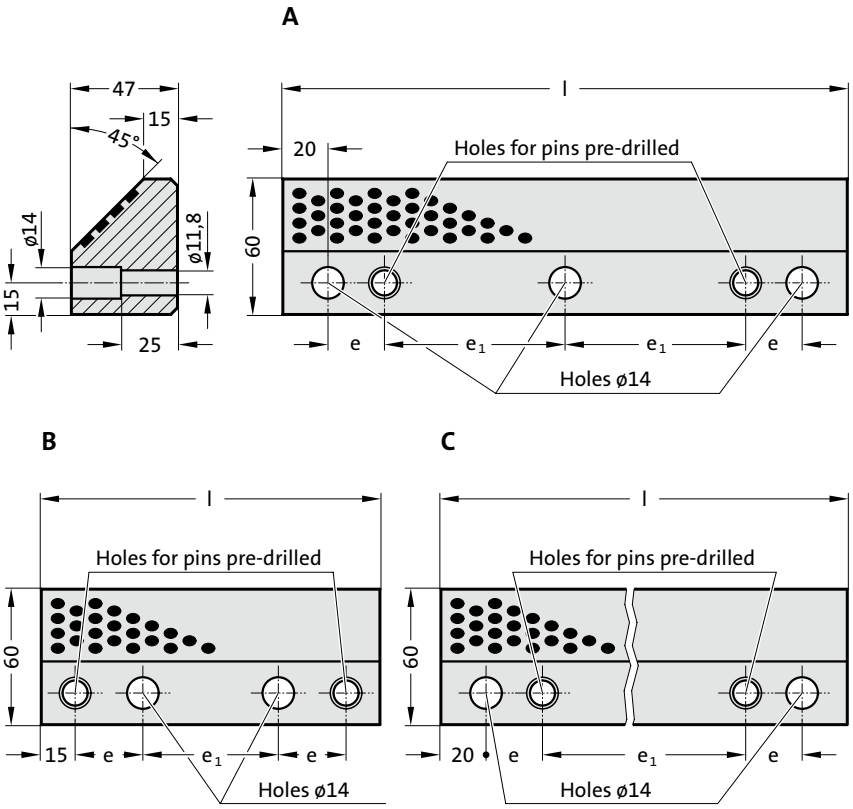
Fixing:
Use socket cap screws DIN EN ISO 4762 M12.

2963.80. Sliding block, Bronze with solid lubricant

Order No	Shape	l	e	e_1	Number of screw holes
2963.80.080.047.0150	B	150	30	60	2
2963.80.080.047.0200	C	200	25	110	2
2963.80.080.047.0250	A	250	25	80	3
2963.80.080.047.0300	A	300	30	100	3

SINGLE-SIDED PRISMATIC GUIDE, BRONZE WITH SOLID LUBRICANT

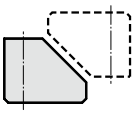
2965.81.



Material:
Bronze with solid lubricant, oilless lubricating

Note:
Matching single-sided prismatic sliding blocks 2965.83.
Screws and pins are not included.

Fixing:
Use socket cap screws DIN EN ISO 4762 M12.

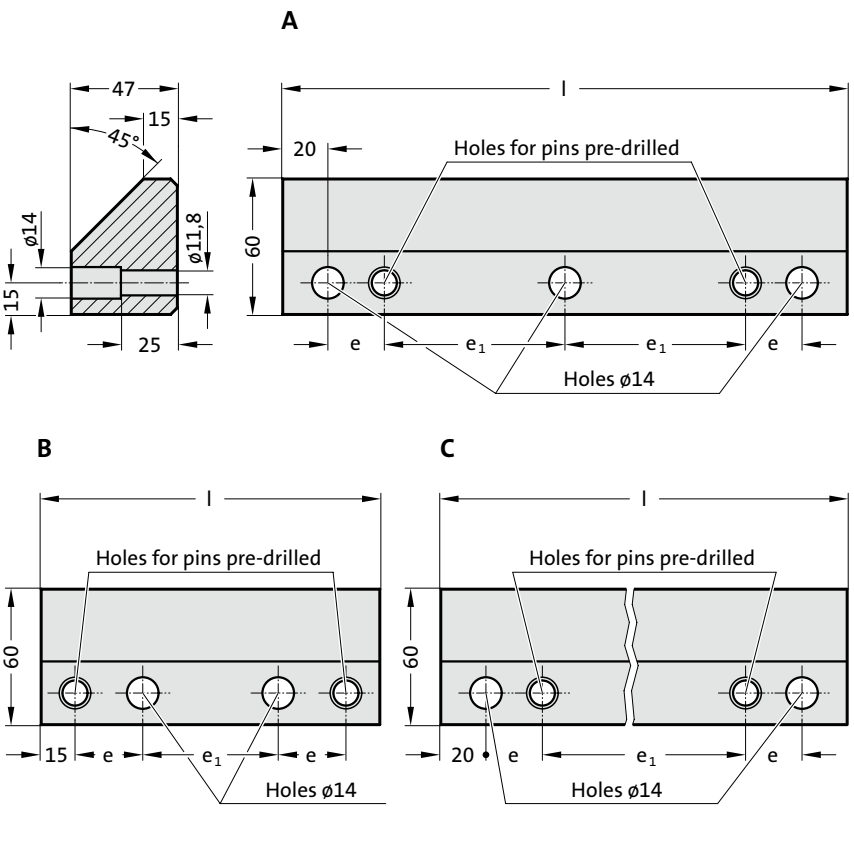


2965.81. Single-sided prismatic guide, Bronze with solid lubricant

Order No	Shape	l	e	e_1	Number of screw holes
2965.81.060.047.0150	B	150	30	60	2
2965.81.060.047.0200	C	200	25	110	3
2965.81.060.047.0250	A	250	25	80	3
2965.81.060.047.0300	A	300	30	100	3

SINGLE-SIDED PRISMATIC SLIDING BLOCK, STEEL

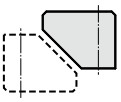
2965.83.



Material:
Steel, sliding faces surface hardened

Note:
Matching single-sided prismatic guides 2965.81.
Screws and pins are not included.

Fixing:
Use socket cap screws DIN EN ISO 4762 M12.

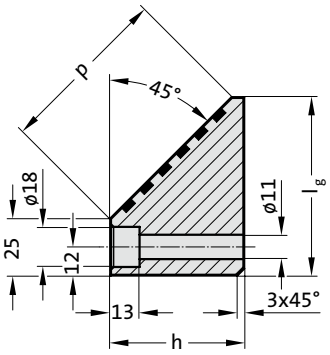


2965.83. Single-sided prismatic sliding block, Steel

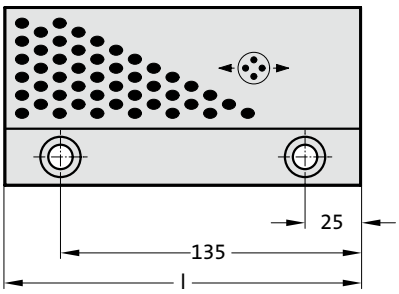
Order No	Shape	l	e	e_1	Number of screw holes
2965.83.060.047.0150	B	150	30	60	2
2965.83.060.047.0200	C	200	25	110	3
2965.83.060.047.0250	A	250	25	80	3
2965.83.060.047.0300	A	300	30	100	3

SINGLE-SIDED PRISMATIC GUIDE, BRONZE WITH SOLID LUBRICANT, CNOMO

2965.80.45.



A

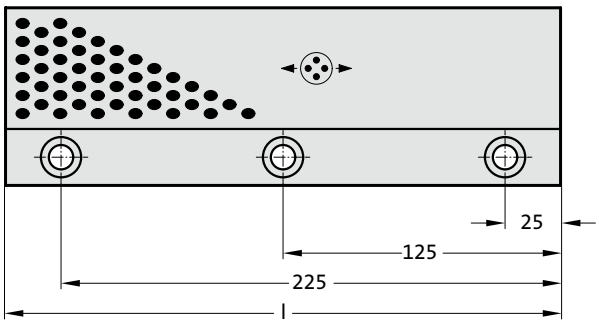


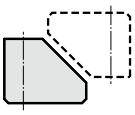
Material:
Bronze with solid lubricant, oilless lubricating

Note:
Matching single-sided prismatic sliding blocks 2965.82.45.
Screws and pins are not included.

Fixing:
Use socket cap screws DIN EN ISO 4762 M10.

B



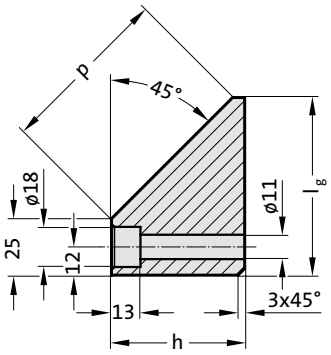


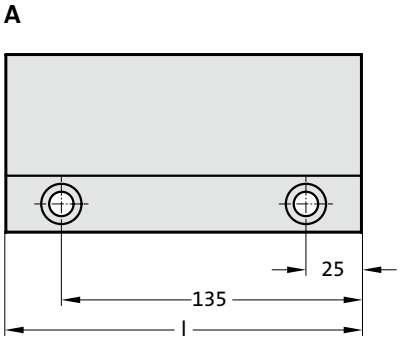
2965.80.45. Single-sided prismatic guide, Bronze with solid lubricant, CNOMO

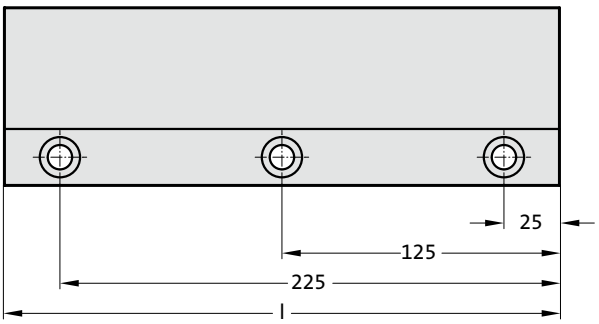
Order No	Shape	l_g	h	l	p	Number of screw holes
2965.80.45.060.045.160	A	60	45	160	50	2
2965.80.45.060.045.250	B	60	45	250	50	3
2965.80.45.080.060.160	A	80	60	160	80	2
2965.80.45.080.060.250	B	80	60	250	80	3

SINGLE-SIDED PRISMATIC SLIDING BLOCK, STEEL, CNOMO

2965.82.45.



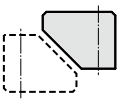




Material:
Steel, sliding faces surface hardened

Note:
Matching single-sided prismatic guides 2965.80.45.
Screws and pins are not included.

Fixing:
Use socket cap screws DIN EN ISO 4762 M10.

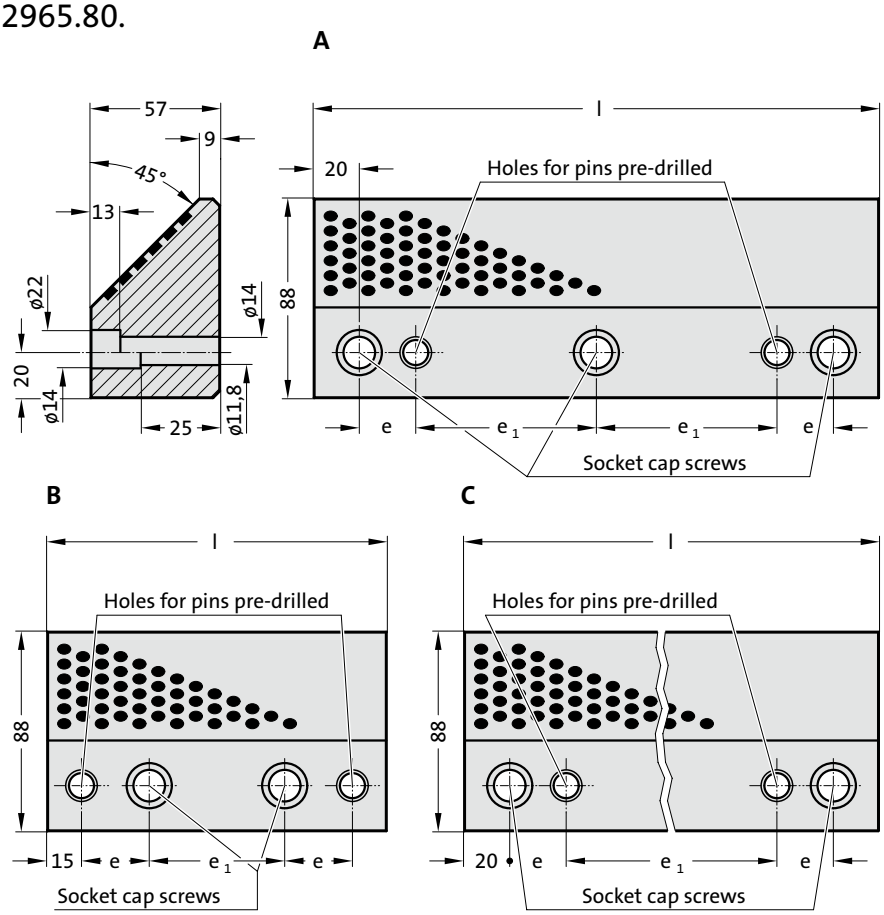


2965.82.45. Single-sided prismatic sliding block, Steel, CNOMO

Order No	Shape	l_g	h	l	p	Number of screw holes
2965.82.45.060.045.160	A	60	45	160	50	2
2965.82.45.060.045.250	B	60	45	250	50	3
2965.82.45.080.060.160	A	80	60	160	80	2
2965.82.45.080.060.250	B	80	60	250	80	3

SINGLE-SIDED PRISMATIC GUIDE, BRONZE WITH SOLID LUBRICANT

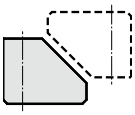
2965.80.



Material:
Bronze with solid lubricant, oilless lubricating

Note:
Matching single-sided prismatic sliding blocks 2965.82.
Screws and pins are not included.

Fixing:
Use socket cap screws DIN EN ISO 4762 M12.

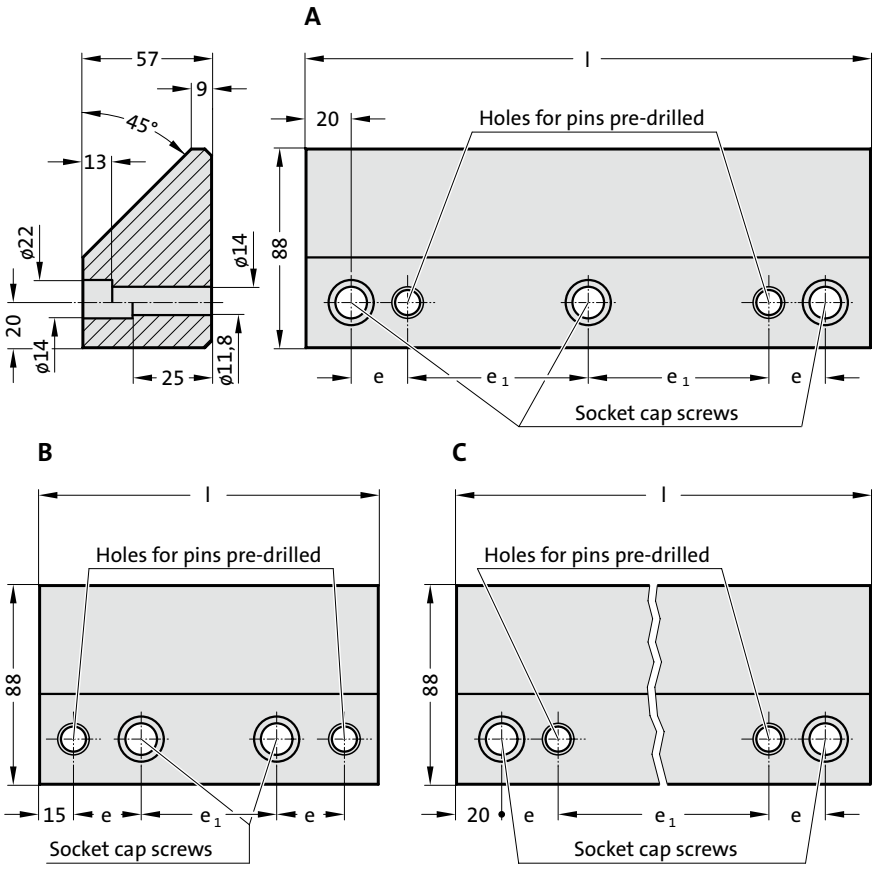


2965.80. Single-sided prismatic guide, Bronze with solid lubricant

Order No	Shape	l	e	e_1	Number of screw holes
2965.80.088.057.0150	B	150	30	60	2
2965.80.088.057.0200	C	200	25	110	3
2965.80.088.057.0250	A	250	25	80	3
2965.80.088.057.0300	A	300	30	100	3

SINGLE-SIDED PRISMATIC SLIDING BLOCK, STEEL

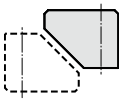
2965.82.



Material:
Steel, sliding faces surface hardened

Note:
Matching single-sided prismatic guides 2965.80.
Screws and pins are not included.

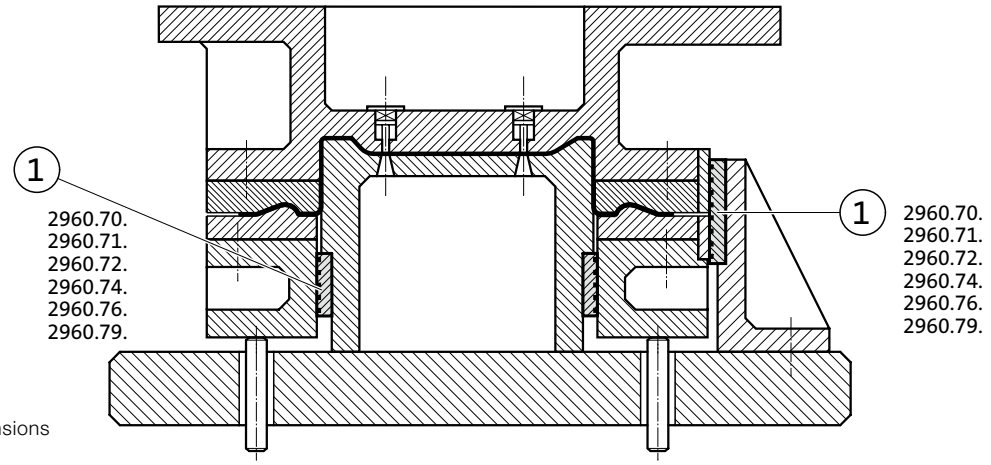
Fixing:
Use socket cap screws DIN EN ISO 4762 M12.



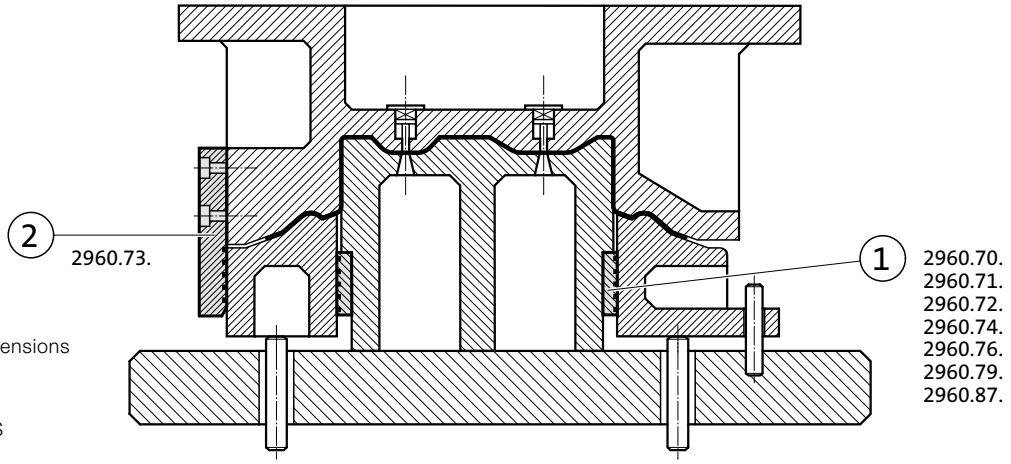
2965.82. Single-sided prismatic sliding block, Steel

Order No	Shape	l	e	e_1	Number of screw holes
2965.82.088.057.0150	B	150	30	60	2
2965.82.088.057.0200	C	200	25	110	3
2965.82.088.057.0250	A	250	25	80	3
2965.82.088.057.0300	A	300	30	100	3

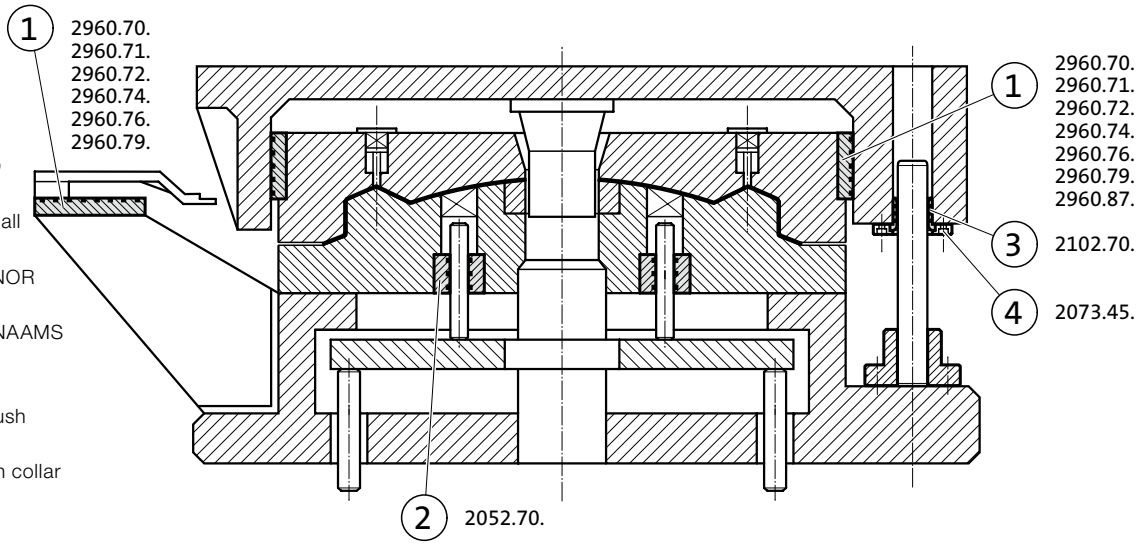
OILLESS GUIDE ELEMENTS - MOUNTING EXAMPLES



Pos. 1
2960.70. Sliding pad ISO
2960.71. Sliding pad VDI
2960.72. Sliding pad, small dimensions
2960.74. Sliding pad AFNOR
2960.76. Sliding pad
2960.79. Sliding pad to NAAMS

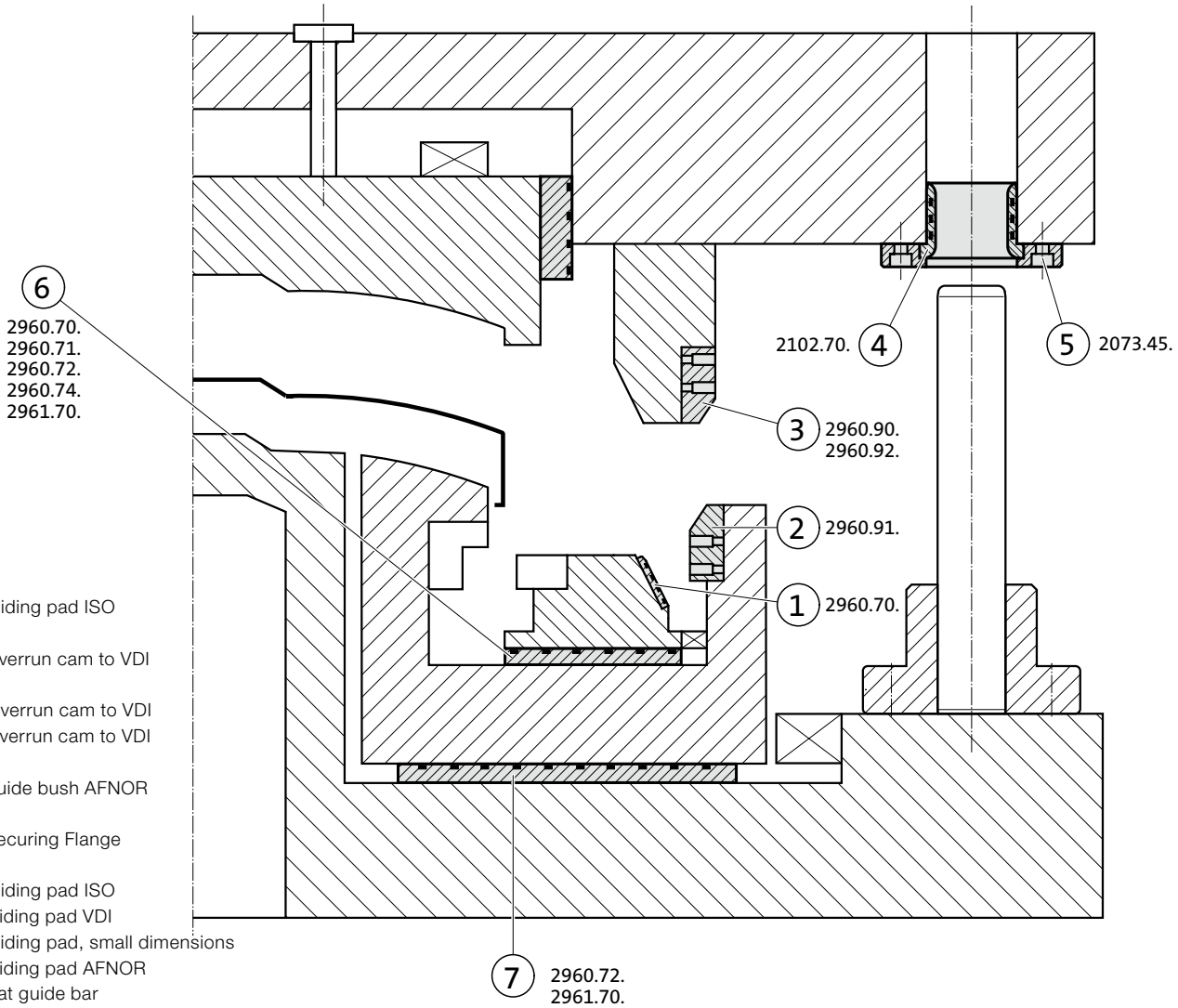


Pos. 1
2960.70. Sliding pad ISO
2960.71. Sliding pad VDI
2960.72. Sliding pad, small dimensions
2960.74. Sliding pad AFNOR
2960.76. Sliding pad
2960.79. Sliding pad to NAAMS
2960.87. Sliding pad VDI
Pos. 2
2960.73. Guide Bracket VDI

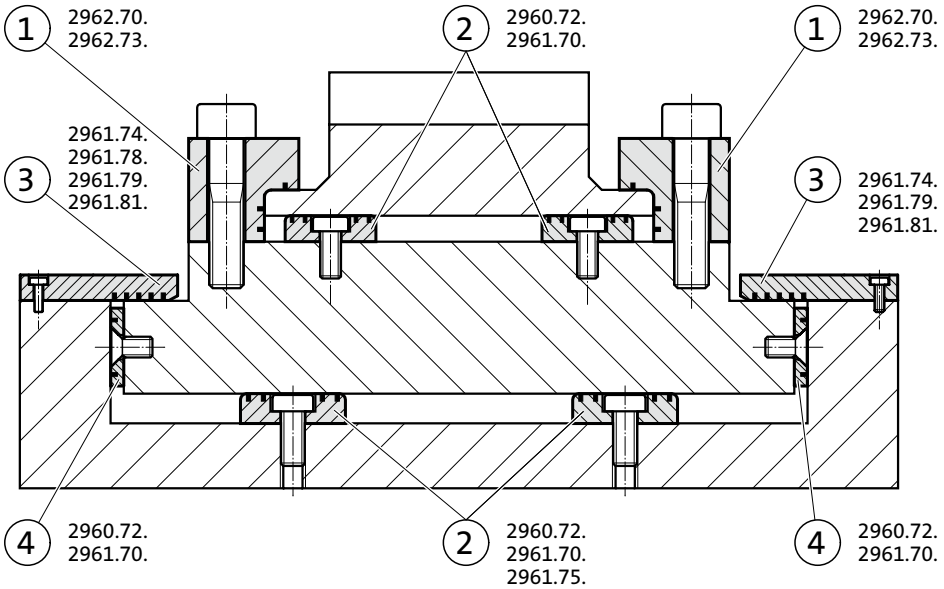


Pos. 1
2960.70. Sliding pad ISO
2960.71. Sliding pad VDI
2960.72. Sliding pad, small dimensions
2960.74. Sliding pad AFNOR
2960.76. Sliding pad
2960.79. Sliding pad to NAAMS
2960.87. Sliding pad VDI
Pos. 2
2052.70. Oilless guide bush
Pos. 3
2102.70. Guide bush with collar AFNOR
Pos. 4
2073.45. Securing flange

OILLESS GUIDE ELEMENTS - MOUNTING EXAMPLES

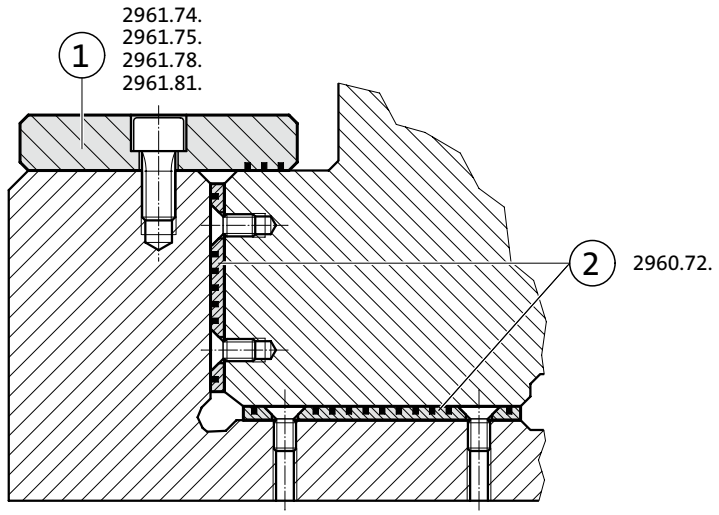


Pos. 1
2960.70. Sliding pad ISO
Pos. 2
2960.91. Overrun cam to VDI
Pos. 3
2960.90. Overrun cam to VDI
2960.92. Overrun cam to VDI
Pos. 4
2102.70. Guide bush AFNOR
Pos. 5
2073.45. Securing Flange
Pos. 6
2960.70. Sliding pad ISO
2960.71. Sliding pad VDI
2960.72. Sliding pad, small dimensions
2960.74. Sliding pad AFNOR
2961.70. Flat guide bar
Pos. 7
2960.72. Sliding pad, small dimensions
2961.70. Flat guide bar

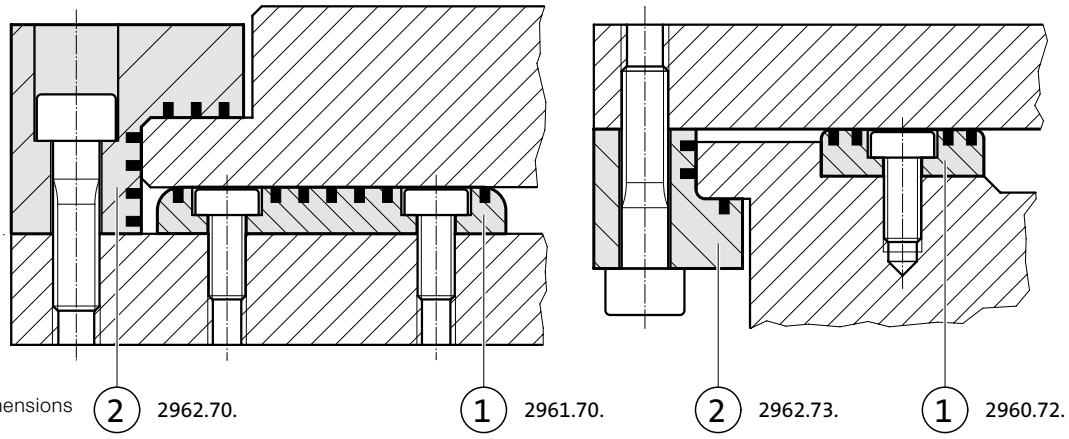


Pos. 1
2962.70. Angled guide gib
2962.73. Angled guide gib
Pos. 2
2960.72. Sliding pad, small dimensions
2961.70. Flat guide bar
2961.75.
Pos. 3
2961.74. Retaining plate to VDI
2961.79.
2961.81.
Pos. 4
2960.72. Sliding pad, small dimensions
2961.70. Flat guide bar

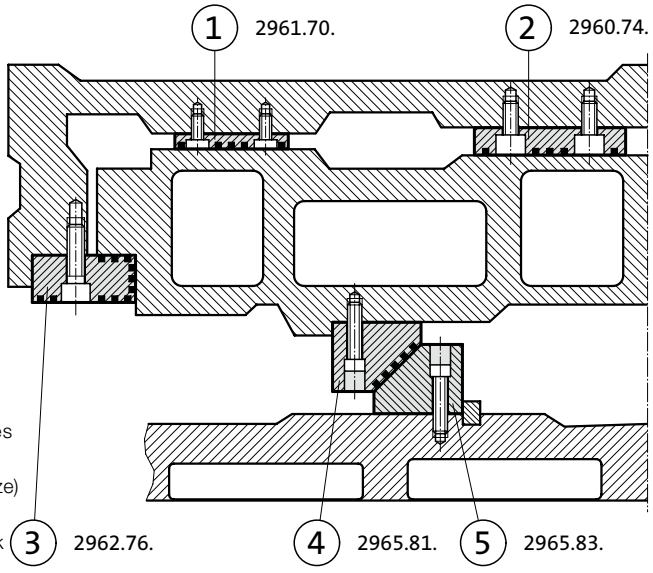
OILLESS GUIDE ELEMENTS - MOUNTING EXAMPLES



Pos. 1
2961.74. Retaining plate to VDI
Pos. 2
2960.72. Sliding pad, small dimensions



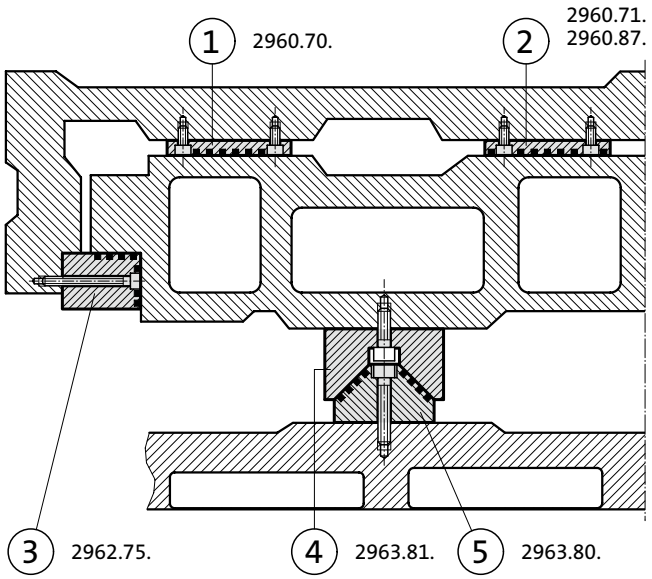
Pos. 1
2961.70. Flat guide bar
2960.72. Sliding pad, small dimensions
Pos. 2
2962.70. Angled guide gib
2962.73. Angled guide gib



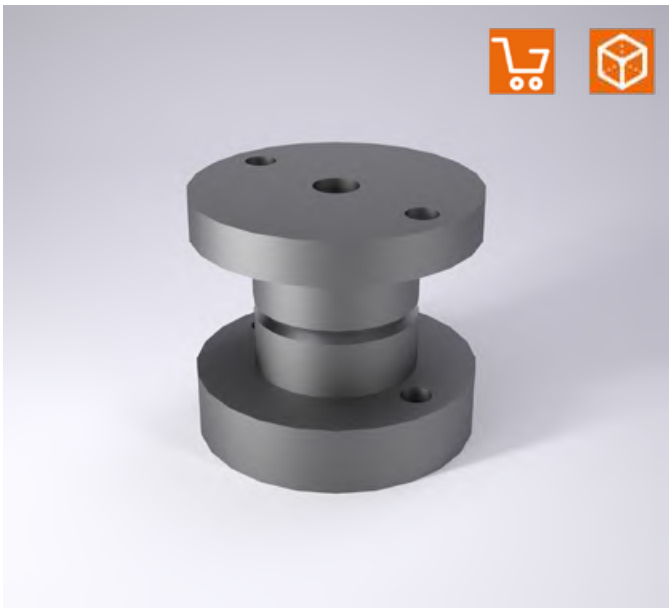
Pos. 1
2961.70. Guide bar
Pos. 2
2960.74. Sliding pad AFNOR
Pos. 3
2962.76. Guide bar with three sliding surfaces
Pos. 4
2965.81. Single-sided prismatic guide (Bronze)
Pos. 5
2965.83. Single-sided prismatic sliding block (Steel)

OILLESS GUIDE ELEMENTS - MOUNTING EXAMPLES

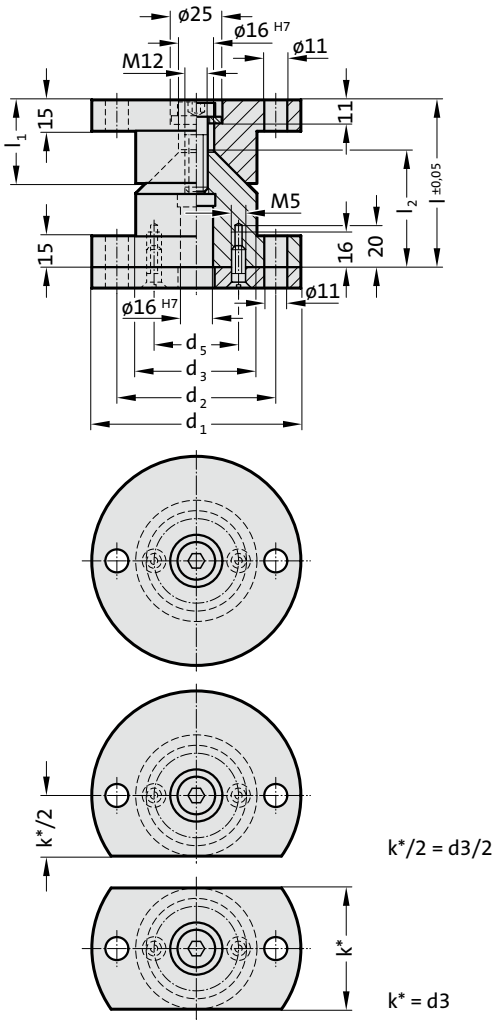
Pos. 1
2960.70. Sliding pad ISO
Pos. 2
2960.71. Sliding pad VDI
2960.87.
Pos. 3
2962.75. Guide bar with two sliding surfaces
Pos. 4
2963.81. Prismatic guide
Pos. 5
2963.80. Sliding block



CENTERING UNIT WITH ADJUSTING WASHER



2441.11.0.



Material:
Centring Units: 16MnCr5, heat treated
Conical surfaces induction hardened
Surface hardness: 60 + 4 HRC, Hardness penetration 1,0 + 0,5 mm
Adjusting washer: C45 or similar

Note:
Centring unit complete with adjusting washer.
Screws are included.

2441.11.0.□□□
Centring unit with adjusting washer

2441.11.0.□□□.1
Centring unit with one flat side with adjusting washer

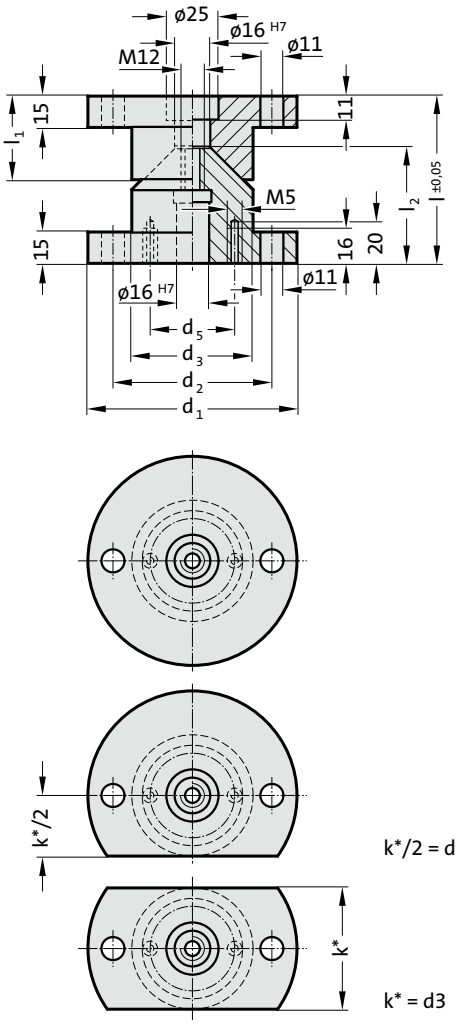
2441.11.0.□□□.2
Centring unit with two flat sides with adjusting washer

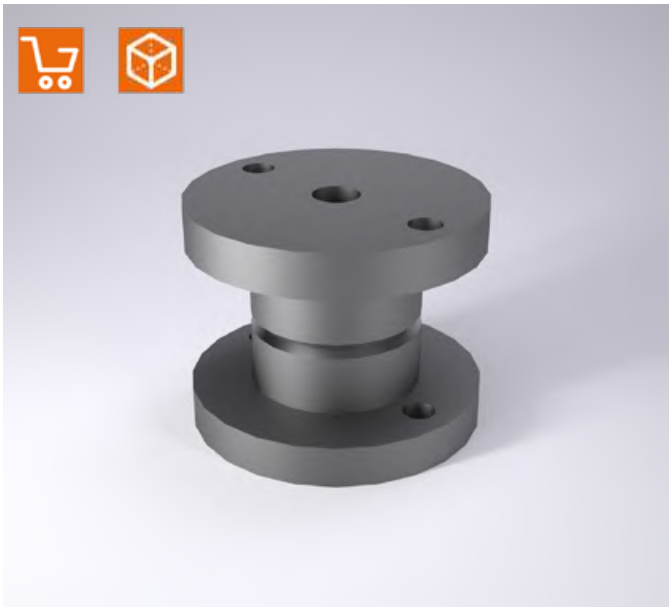
2441.11.0. Centering unit with adjusting washer

Order No	d_1	d_2	d_3	d_5	l	l_1	l_2
2441.11.0.100	100	76	58	40.5	80	40	55
2441.11.0.100.1	100	76	58	40.5	80	40	55
2441.11.0.100.2	100	76	58	40.5	80	40	55
2441.11.0.120	120	96	78	50.5	90	50	65
2441.11.0.120.1	120	96	78	50.5	90	50	65
2441.11.0.120.2	120	96	78	50.5	90	50	65

CENTERING UNIT

2441.11.





Material:
16MnCr5, heat treated
Conical surfaces induction hardened
Surface hardness: 60 + 4 HRC, Hardness penetration 1,0 + 0,5 mm

Note:
Adjusting washer 2441.11.3. to be ordered separately.
Screws are not included.

2441.11.□□□
Centring unit

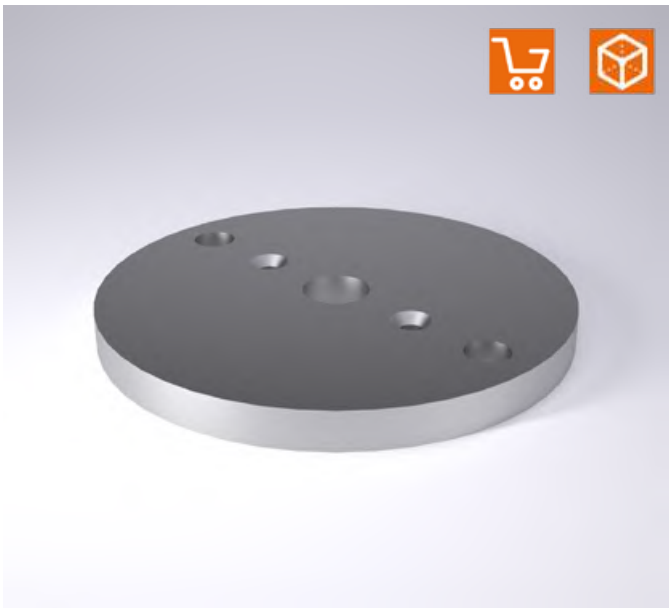
2441.11.□□□.1
Centring unit with one flat side

2441.11.□□□.2
Centring unit with two flat sides

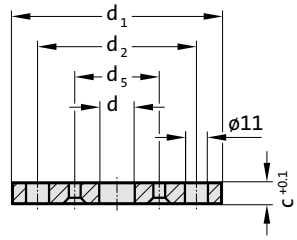
2441.11. Centering unit

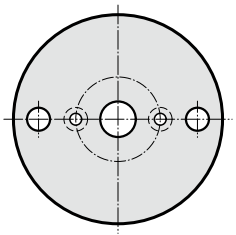
Order No	d_1	d_2	d_3	d_5	l	l_1	l_2
2441.11.100	100	76	58	40.5	80	40	55
2441.11.100.1	100	76	58	40.5	80	40	55
2441.11.100.2	100	76	58	40.5	80	40	55
2441.11.120	120	96	78	50.5	90	50	65
2441.11.120.1	120	96	78	50.5	90	50	65
2441.11.120.2	120	96	78	50.5	90	50	65

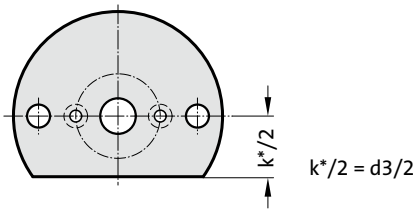
ADJUSTING WASHER

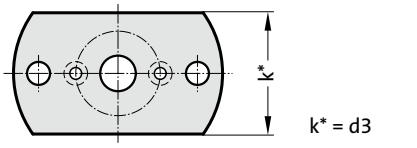


2441.11.3.









Material:
C45 or similar

Note:
2441.11.3.□□□
Adjusting washer

2441.11.3.□□□.1
Adjusting washer with one flat side

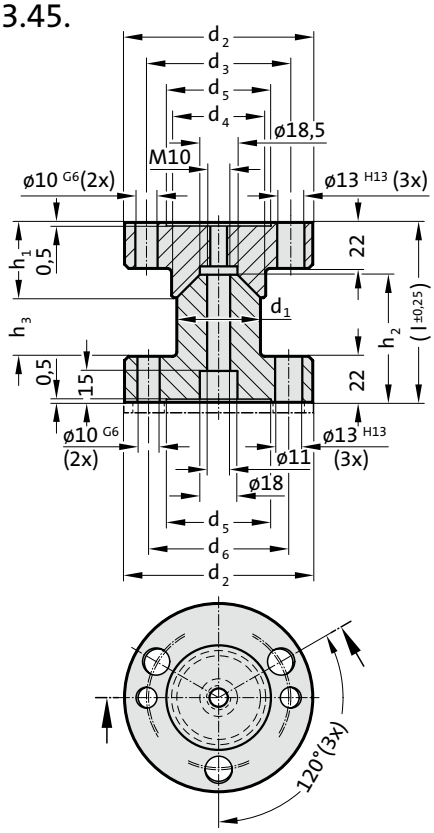
2441.11.3.□□□.2
Adjusting washer with two flat sides

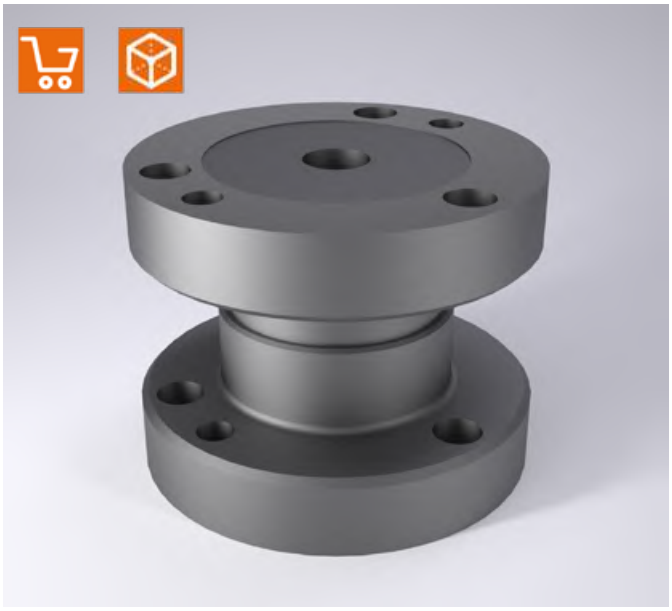
2441.11.3. Adjusting washer

Order No	d_1	d_2	d_4	d_5	c	k
2441.11.3.100	100	76	17	40.5	9.8	-
2441.11.3.100.1	100	76	17	40.5	9.8	58
2441.11.3.100.2	100	76	17	40.5	9.8	58
2441.11.3.105	105	76	18	40.5	5.5	-
2441.11.3.120	120	96	17	50.5	9.8	-
2441.11.3.120.1	120	96	17	50.5	9.8	78
2441.11.3.120.2	120	96	17	50.5	9.8	78
2441.11.3.125	125	96	18	50.5	5.5	-

CENTERING UNIT, CNOMO

2441.13.45.





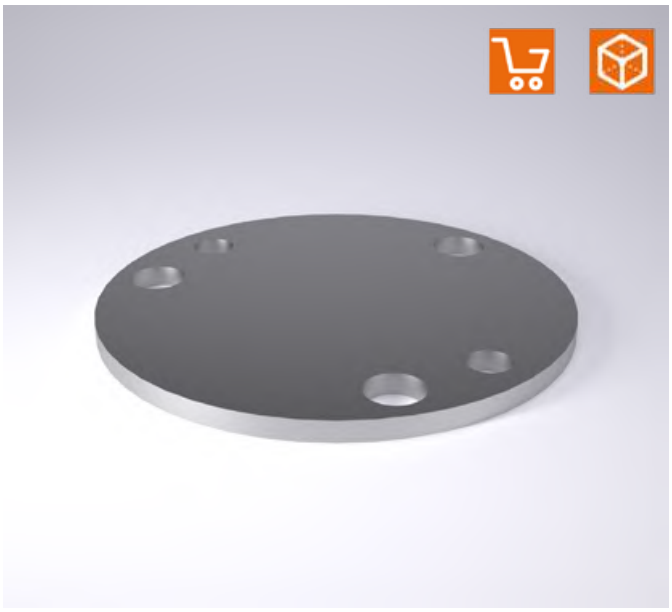
Material:
X153CrMoV12 (1.2379), hardened 58 ± 2 HRC

Note:
Order No for centring unit to CNOMO with adjusting washer: 2441.13.0.45.
Screws and pins are not included.

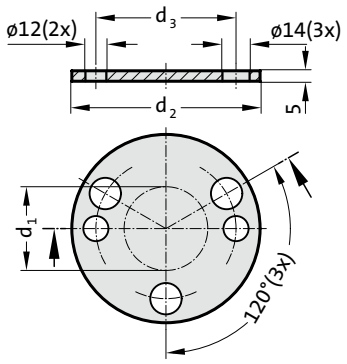
2441.13.45. Centering unit, CNOMO

Order No	d_1	d_2	d_3	d_4	d_5	d_6	h_1	h_2	h_3	l
2441.13.0.45.040	40	90	69	45	50	67	36	61	61	86
2441.13.0.45.060	60	110	89	65	70	89	46	61	61	86

ADJUSTING WASHER, CNOMO



2441.13.3.45.



Material:
Cf 70 (1.1249)

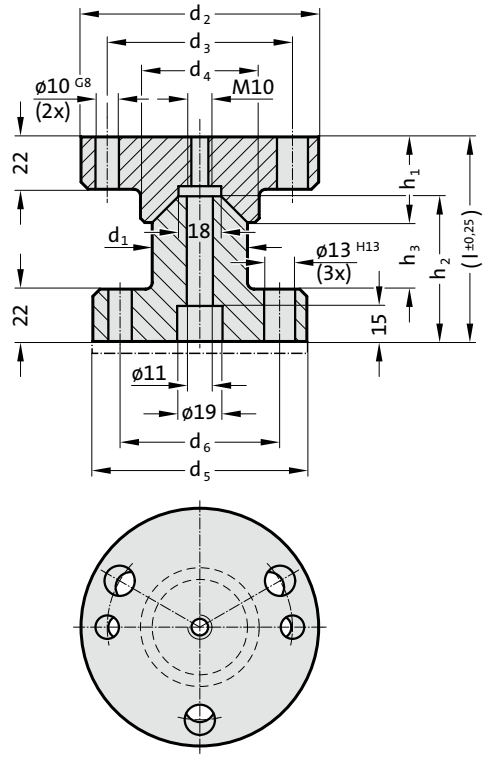
Note:
Adjusting washer for centring unit 2441.13.45.

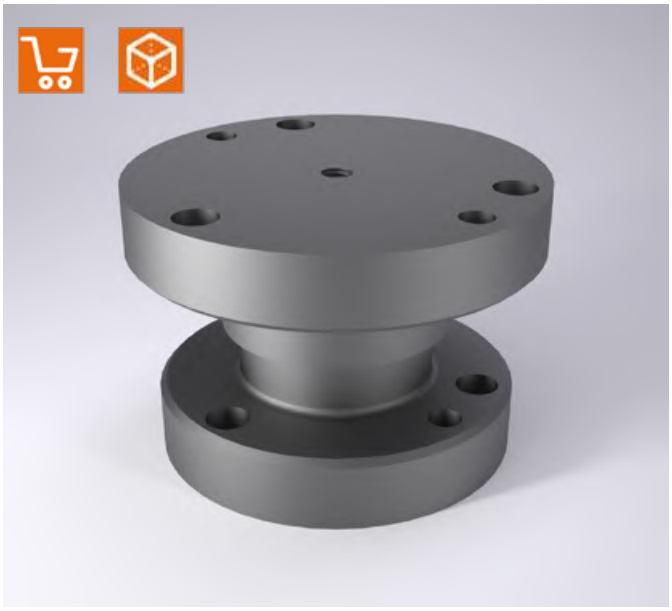
2441.13.3.45. Adjusting washer, CNOMO

Order No	d_1	d_2	d_3
2441.13.3.45.040	40	90	67
2441.13.3.45.060	60	110	89

CENTERING UNIT, CNOMO

2441.13.





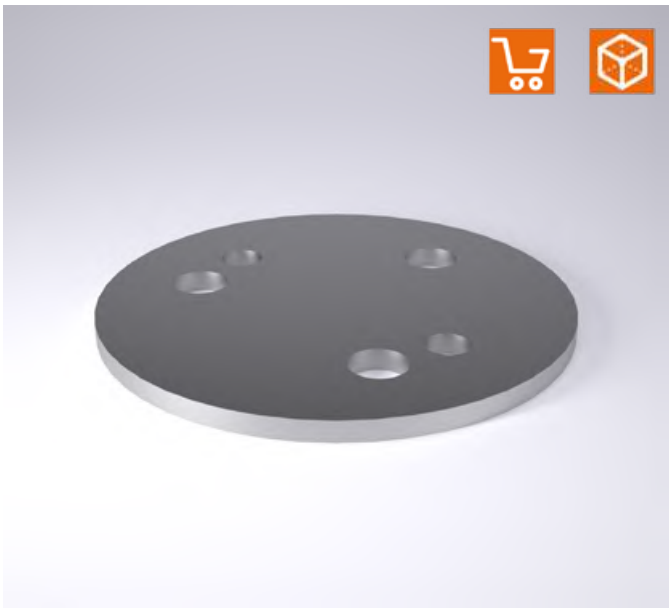
Material:
16MnCr5, heat treated
Conical surfaces induction hardened
Surface hardness: 60 + 4 HRC, Hardness penetration 1,0 + 0,5 mm

Note:
Order No for centring unit to CNOMO with adjusting washer: 2441.13.0.
Screws and pins are not included.

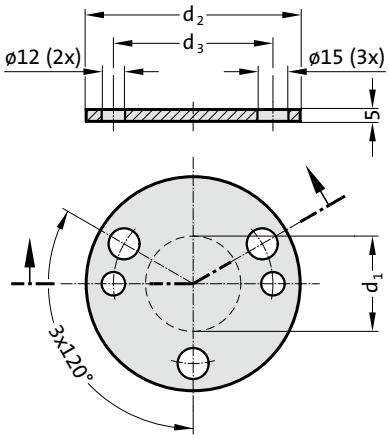
2441.13. Centering unit, CNOMO

Order No	d_1	d_2	d_3	d_4	d_5	d_6	h_1	h_2	h_3	l
2441.13.040	40	100	79	50	90	67	36	61	28	86
2441.13.060	60	125	104	70	110	89	46	61	18	86

ADJUSTING WASHER, CNOMO



2441.13.3.



Material:
100 Cr 6

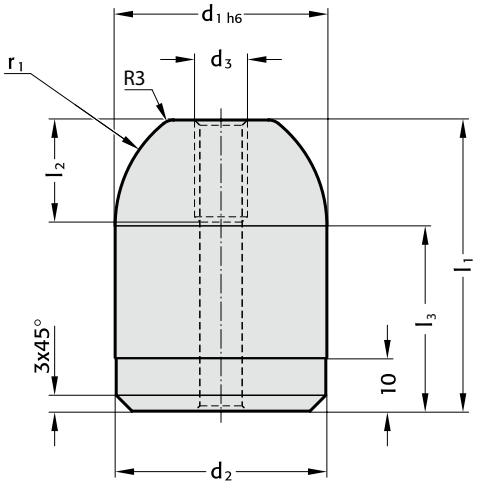
Note:
Adjusting washer for centring unit 2441.13.

2441.13.3. Adjusting washer, CNOMO

Order No	d_1	d_2	d_3
2441.13.3.040	40	90	67
2441.13.3.060	60	110	89

CENTERING PIN

2445.10.



2445.10. Centering pin

Order No		d_1	d_2	d_3	l_1	l_2	l_3	r_1
2445.10.022.045	1), 2)	22	21.95	M8	45	16	35	15
2445.10.022.055	2)	22	21.95	M8	55	16	45	15
2445.10.032.050	1)	32	31.95	M10	50	20	35	20
2445.10.040.055	1), 2)	40	39.95	M10	55	20	35	25
2445.10.040.065	2)	40	39.95	M10	65	20	45	25
2445.10.040.085	2)	40	39.95	M10	85	20	65	25
2445.10.050.055	1)	50	49.95	M10	55	20	35	25
2445.10.056.080	1)	56	55.95	M10	80	20	60	30

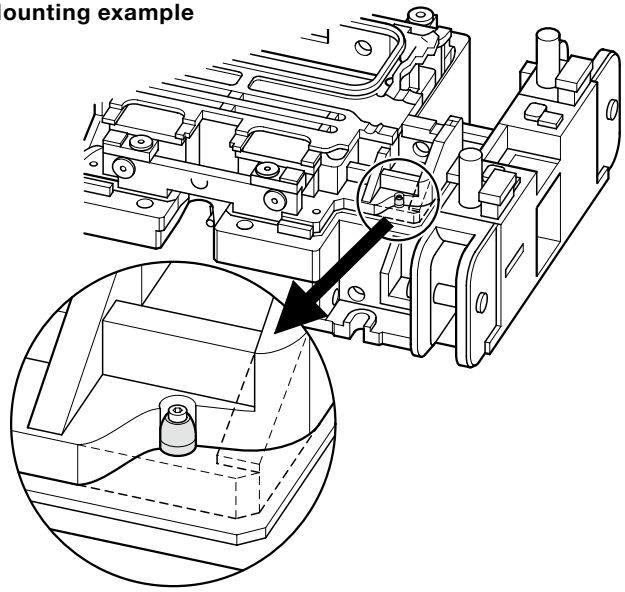
Description:
Using locating holes components, assemblies and tools can be repeatedly centred with high precision on processing machines, measuring equipment and tool components.

Material:
Steel, hardened

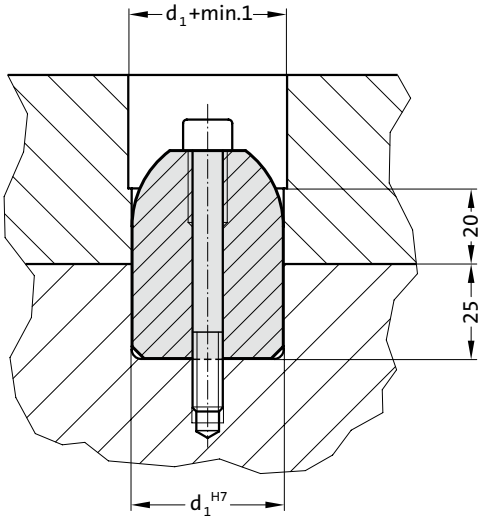
Note:
Screws are not included.
1) to BMW standard
2) to VW standard

Fixing:
Use socket cap screws DIN EN ISO 4762 M6/M8.

Mounting example

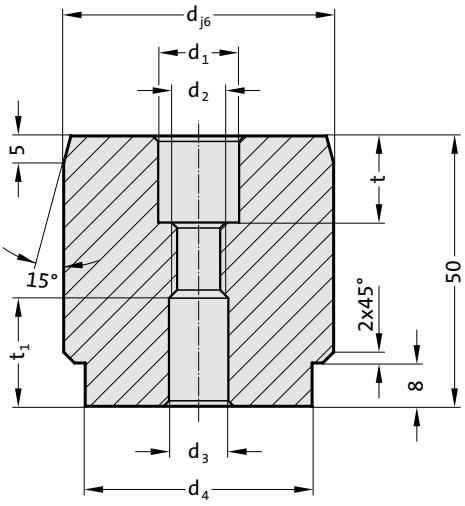


Mounting example



CENTERING PIN TO MERCEDES-BENZ STANDARD

2445.11.



Description:
Using locating holes components, assemblies and tools can be repeatedly centred with high precision on processing machines, measuring equipment and tool components.

Material:
Steel, hardened

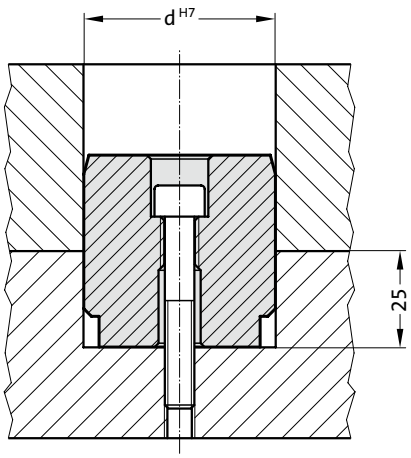
Note:
Screws are not included.

Fixing:
Use socket cap screws DIN EN ISO 4762 M6/M8.

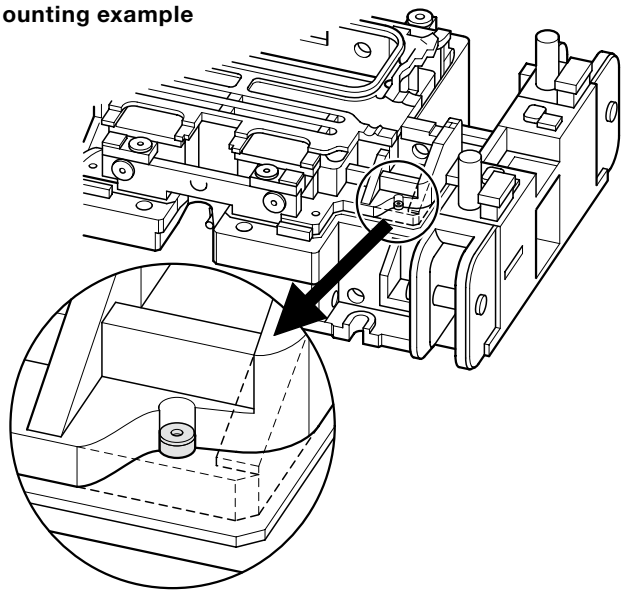
2445.11. Centering pin to Mercedes-Benz Standard

Order No	d	d_1	d_2	d_3	d_4	t	t_1
2445.11.022	22	11	M8	9	16	13	16
2445.11.025	25	11	M8	9	18	13	16
2445.11.032	32	11	M8	9	25	13	16
2445.11.040	40	15	M10	11	32	16	20
2445.11.050	50	15	M10	11	42	16	20

Mounting example

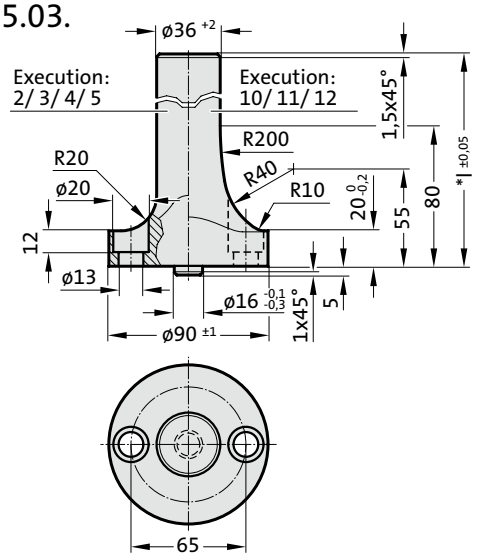


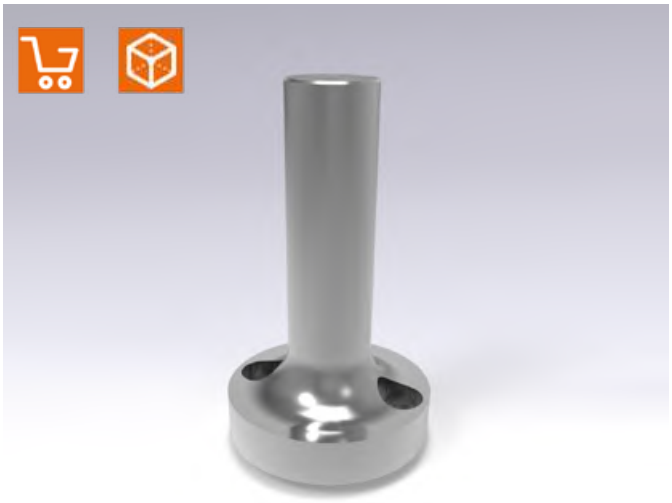
Mounting example



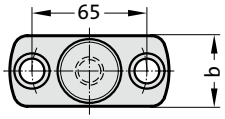
PRESSURE BOLT WITH BASE, ACCORDING TO VW

2446.10.55.03.

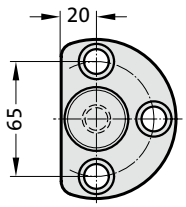




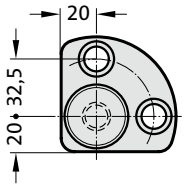
2446.10.55.02. / 2446.10.55.10. / 2446.10.55.11.



2446.10.55.04.



2446.10.55.05. / 2446.10.55.12.



Description:
Pressure bolts with base are used to transfer force from the pressure cushion of the press to the tool.

Material:
C45 (1.0503), heat-treated 800 - 1000 N/mm²

Execution:
drop-forged

Note:
Screws are not included.

2446.10.55. Pressure bolt with base, according to VW

Order No	Shape	b	l*	Gradation
2446.10.55.02.	2	40	150 - 360	1
2446.10.55.03.	3	0	150 - 360	1
2446.10.55.04.	4	0	150 - 360	1
2446.10.55.05.	5	0	150 - 360	1
2446.10.55.10.	10	60	150 - 360	1
2446.10.55.11.	11	40	150 - 360	1
2446.10.55.12.	12	0	150 - 360	1

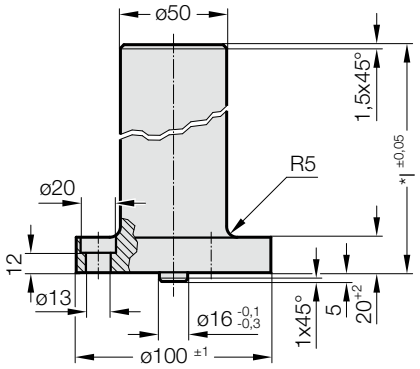
*to customer's specifications!

Ordering Code (example):

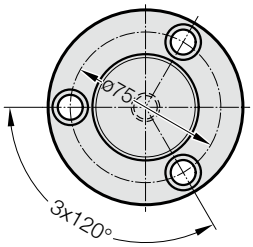
Pressure bolt with base, according to VW		= 2446.10.55.	
Execution Shape	4	=	04.
Length l	150 mm	=	150
Order No		= 2446.10.55.	04. 150

AIR PIN, ACCORDING TO VW STANDARD

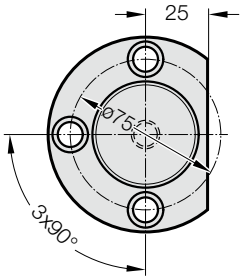
2446.11.55.



2446.11.55.11.



2446.11.55.12.



Description:
Air pins are used to transfer force from the pressure cushion of the press to the tool.

Material:
C45 (1.0503), heat-treated 800 - 1000 N/mm²
Alternatively C60 (1.0601)

Execution:
drop-forged

Note:
Screws are not included.

2446.11.55. Air pin, according to VW standard

Order No	Execution	l*	Gradation l
2446.11.55.11.150	11	150 - 440	1
2446.11.55.12.150	12	150 - 440	1

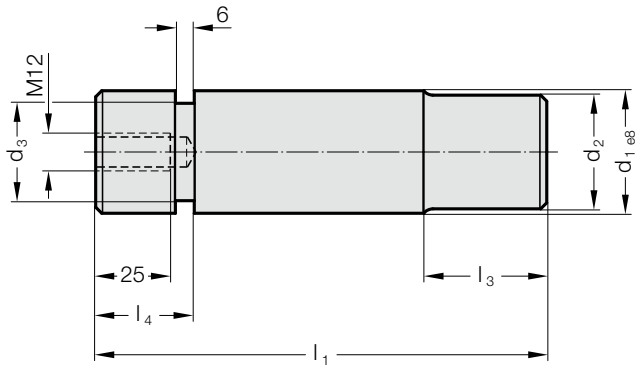
*to customer's specifications!

Ordering Code (example):

Air pin, according to VW standard		= 2446.11.55.	
Execution Shape	12	=	12.
Length l	150 mm	=	150
Order No		= 2446.11.55.	12. 150

LOCKING PIN, IN ACCORDANCE WITH VW NORM

2446.12.55.

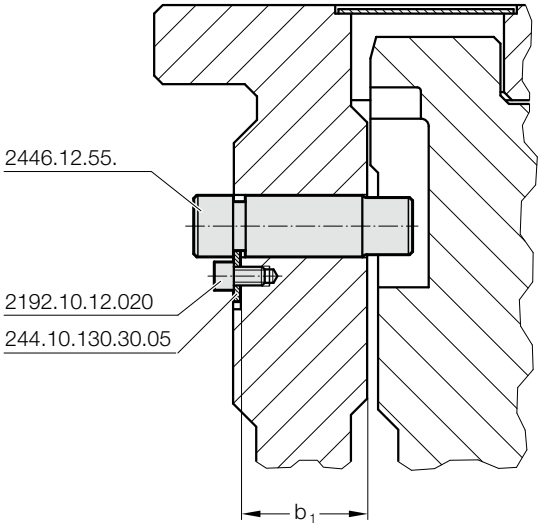


Description:
Locking pins are used to hold and secure the pad in tools

Material:
C45 (1.0503), heat-treated 800 - 1000 N/mm²

Note:
Supplied with sheave and screw

Mounting example

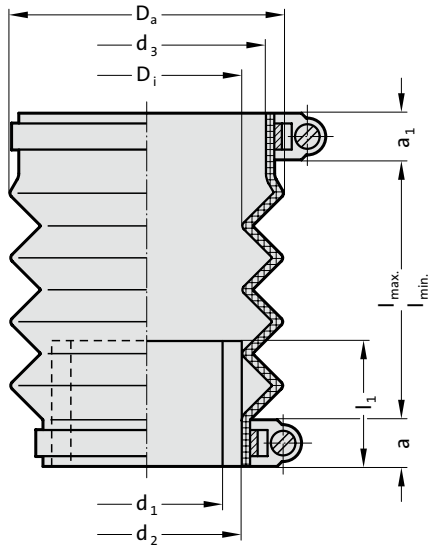


2446.12.55. Locking pin, in accordance with VW norm

Order No	d_1	d_2	d_3	l_1	l_3	l_4	r	b_1	max. load capacity per stud dyn. loading [kg]
2446.12.55.032.105	32	29	24	105	25	22	4	63	500
2446.12.55.032.122	32	29	24	122	25	22	4	80	500
2446.12.55.040.139	40	37	32	139	32	32	5	80	750
2446.12.55.040.159	40	37	32	159	32	32	5	100	750
2446.12.55.050.167	50	47	42	167	40	32	6	100	1250
2446.12.55.050.192	50	47	42	192	40	32	6	125	1250
2446.12.55.063.202	63	60	55	202	50	32	6	125	2500
2446.12.55.063.237	63	60	55	237	50	32	6	160	2500

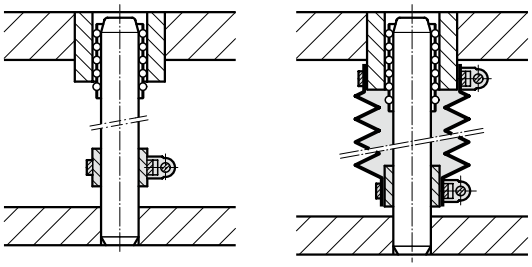
CONCERTINA SHROUD WITH SPACER BUSH

206.91.



Note:
Concertina Shrouds are supplied complete with spacer bush and two hose clamps.
Special sizes on request.

Mounting example



206.91. Concertina shroud with spacer bush

for guide bushes	2051. 2061.	2051. 2061.	2051. 2061.	2051. 2061.	2051. 2061.	2051. 2061.	2051. 2061.	2081.	2081.	2081.	2081.	2081.	2081.	2081.
Pillar-ø d_1	19 20	24 25	30 32	38 40	48 50	60	63	19 20	24 25	30 32	38 40	48 50	60	63
d*	20	25	32	40	50	60	63	20	25	32	40	50	60	63
d_2	25	30	40	50	60	70	70	25	30	40	50	60	70	70
d_3	32	38	46	55	64	76	76	39	45	54	63	74	94	94
d_4**	32	38	48	58	68	79	79	40	45	54	66	80	95	95
D_i	30	30	46	55	62	75	75	32	32	45	52	62	75	75
D_a	51	56	72	87	86	100	100	54	56	63	96	84	104	104
a	13	13	20	12	12	12	12	10	10	10	12	12	10	10
a_1	16	13	20	12	12	10	10	10	10	10	12	12	10	10
l_1	20	30	30	40	40	40	40	20	30	30	40	40	40	40
l_{min}	30	25	20	44	25	30	30	37	35	35	25	45	35	35
l_{max}	170	130	100	119	110	130	130	145	110	110	225	165	185	185

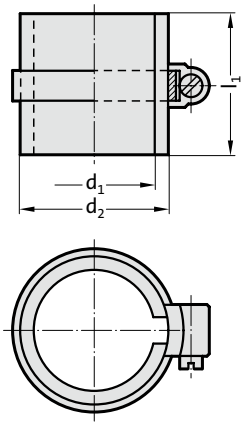
*d = Nominal diameter, **d_4 = Nominal ordering diameter for flange diameter

Ordering Code (example):

Concertina shroud with spacer bush		=	206.91.
Nominal diameter d	20 mm	=	020.
Nominal order diameter for flange connection diameter d_4	40 mm	=	040
Order No		=	206.91. 020. 040

SPACER BUSH
SPACER TUBE

206.93.



Material:
PMMA, PLEXIGLAS®

206.93. Spacer bush

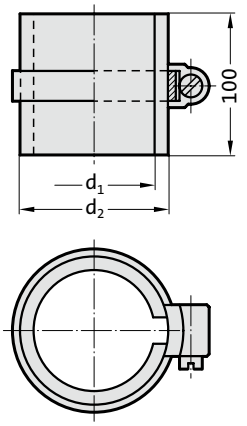
Pillar-ø d_1	15 16	19 20	24 25	30 32	38 40	48 50	60	63
d*	16	20	25	32	40	50	60	63
d_2	20	25	30	40	50	60	70	70
l_1	20	20	30	30	40	40	40	40

*d = Nominal diameter

Ordering Code (example):

Spacer bush		=206.93.	
Nominal diameter d	40 mm	=	040
Order No		=206.93.	040

206.94.



Material:
PMMA, PLEXIGLAS®

206.94. Spacer tube

Pillar-ø d_1	15 16	19 20	24 25	30 32	38 40	48 50	60	63
d*	16	20	25	32	40	50	60	63
d_2	20	25	30	40	50	60	70	70
l_1	100	100	100	100	100	100	100	100

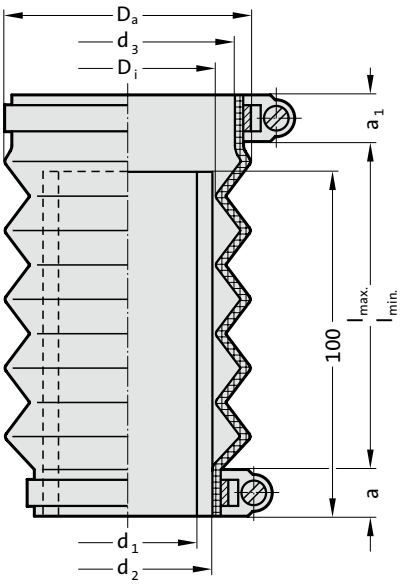
*d = Nominal diameter

Ordering Code (example):

Spacer tube		= 206.94.	
Nominal diameter d	40 mm	=	040
Order No		= 206.94.	040

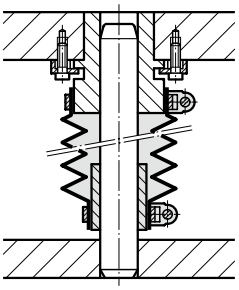
CONCERTINA SHROUD WITH SPACER TUBE

206.92.



Note:
Concertina Shrouds are supplied complete with spacer tube and two hose clamps.
Special sizes on request.

Mounting example



206.92. Concertina shroud with spacer tube

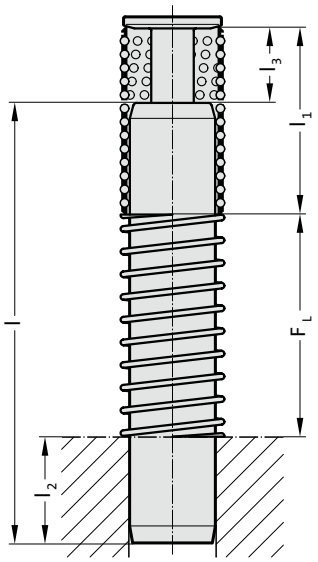
for guide bushes	2051. 2061.	2051. 2061.	2051. 2061.	2051. 2061.	2051. 2061.	2051. 2061.	2051. 2061.	2081.	2081.	2081.	2081.	2081.	2081.	2081.
Pillar-ø d_1	19 20	24 25	30 32	38 40	48 50	60	63	19 20	24 25	30 32	38 40	48 50	60	63
d*	20	25	32	40	50	60	63	20	25	32	40	50	60	63
d_2	25	30	40	50	60	70	70	25	30	40	50	60	70	70
d_3	32	38	46	55	64	76	76	39	45	54	63	74	94	94
d_4**	32	38	48	58	68	79	79	40	45	54	66	80	95	95
D_i	30	30	46	55	62	75	75	32	32	45	52	62	75	75
D_a	51	56	72	87	86	100	100	54	56	63	96	84	104	104
a	13	13	20	12	12	12	12	10	10	10	12	12	10	10
a_1	16	13	20	12	12	10	10	10	10	10	12	12	10	10
l_1	100	100	100	100	100	100	100	100	100	100	100	100	100	100
l_{min}	30	25	20	44	25	30	30	37	35	35	25	45	35	35
l_{max}	170	130	100	119	110	130	130	145	110	110	225	165	185	185

*d = Nominal diameter, **d_4 = Nominal ordering diameter for flange diameter

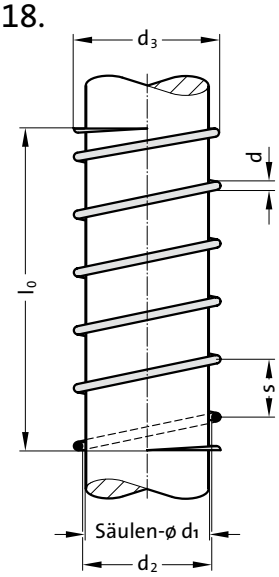
Ordering Code (example):

Concertina shroud with spacer tube		= 206.92.	
Nominal diameter d	20 mm	=	020.
Nominal order diameter for flange connection diameter d_4	40 mm	=	040
Order No		= 206.92.	020. 040

HELICAL SPRING FOR BALL CAGE RETENTION



241.18.



Calculation:

Formula for selecting spring 241.18.:

$F_L = [l - (l_2 + (l_1 - l_3))] \times 1{,}1$

Formula for calculating the block length L_{BL} of the selected spring:

$L_{BL} = (l_0 \times d : s) + 2 \times d$

F_L = Length of compressed spring

l = Length of guide pillar (Customer specified)

l_1 = Cage length (Customer specified)

l_2 = Compression length of guide pillar (Customer specified)

l_3 = Ball cage retainer size (Customer specified)

1.1 = Safety factor

l_0 = Length of uncompressed spring

d = Spring wire diameter

s = Pitch

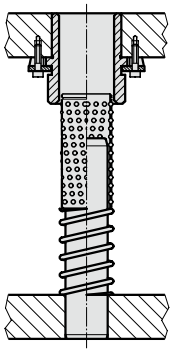
241.18. Helical spring for ball cage retention

d_1	d_2	d_3	s	d	l_0	Gradation l_0
19/20	20.5	22.5	14	1	40 - 140	10
24/25	25.5	27.9	14	1.2	40 - 160	10
30/32	32.5	35.7	16	1.6	50 - 230	10
38	38.5	42.5	18	2	60 - 230	10
40	40.5	45.1	20	2.3	60 - 230	10
48/50	50.5	55.7	20	2.6	70 - 280	10
60	60.5	66.9	20	3.2	80 - 250	10
63	63.5	69.9	20	3.2	80 - 250	10

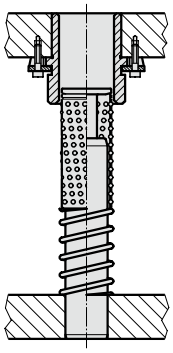
Ordering Code (example):

Helical spring for ball cage retention		=	241.18.
Inner diameter d_2	40.5 mm	=	405.
Length l_0	60 mm	=	060
Order No		=	241.18. 405. 060

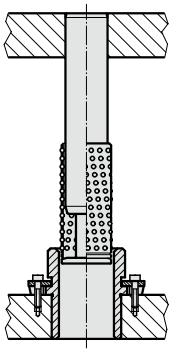
Mounting example



Without ball cage retainer

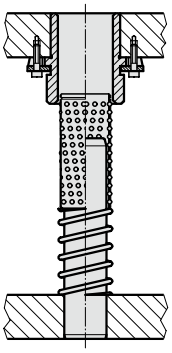


With ball cage retainer 202.91.

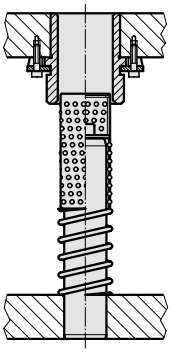


With ball cage retainer 202.91.

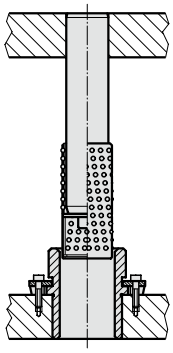
Mounting example



Without ball cage retainer



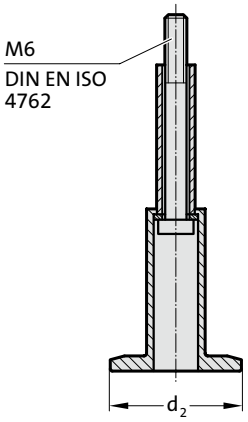
With ball cage retainer 202.92.1.



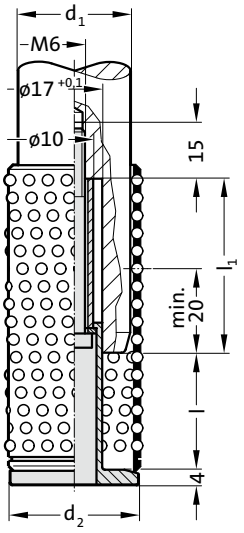
With ball cage retainer 202.92.1.

CAGE RETAINER

202.91.



Mounting example



Note:
The following guide pillars are equipped with this cage retainer:
202.17.
202.55.
2021.44.
2021.58.

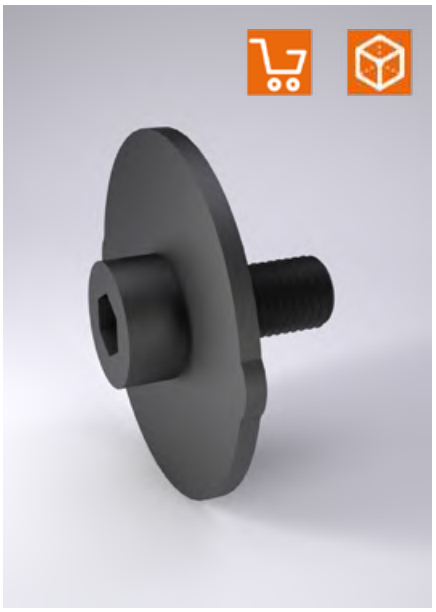
202.91. Cage retainer

d_1	38	40	48	50	60	63
d_2	42	44	52	54	64	67
KG (l / l_1)						
1 (31 / 46)	●	●	●	●	●	●
2 (41 / 56)	●	●	●	●	●	●
3 (51 / 66)	●	●	●	●	●	●
4 (61 / 76)	●	●	●	●	●	●
5 (73 / 89)	●	●	●	●	●	●

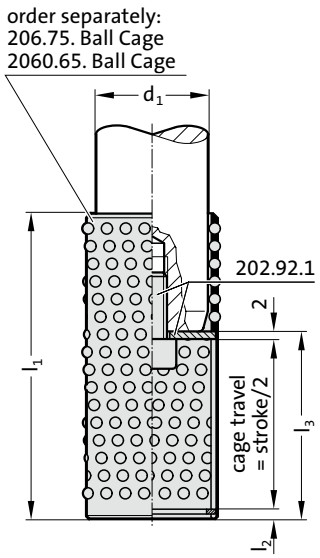
Ordering Code (example):

Cage retainer		=	202.91.
Diameter of conduit d_1	50 mm	=	050.
Cage unit size KG	1	=	1
Order No		=	202.91. 050. 1

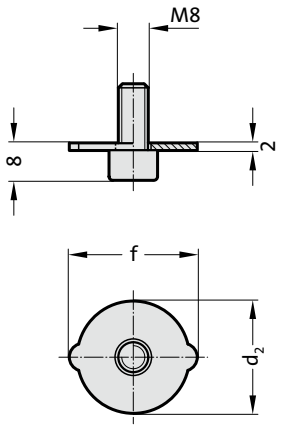
CAGE RETAINER



Mounting example



202.92.1.



Note:

The following guide pillars can be equipped with this cage retainer:

202.22.

202.24.

2021.46.

2021.50.

202.92.1. Cage retainer

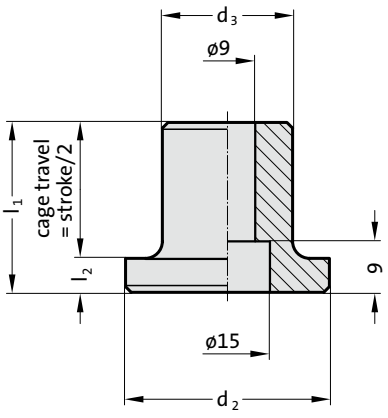
d_1	19	20	24	25	30	32	38	40	48	50	60	63
d_2	18	19	23	24	29	31	37	39	47	49	59	62
f	22	23	27	28	34	36	42	44	52	54	64	67

Ordering Code (example):

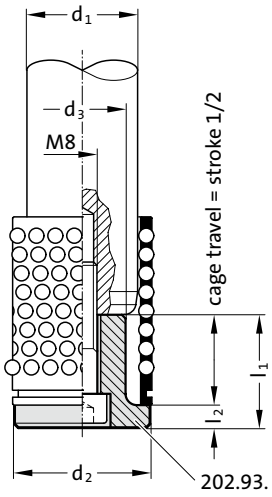
Cage retainer		= 202.92.1.	
Diameter of conduit d_1	38 mm	=	038
Order No		= 202.92.1.	038

CAGE RETAINER

202.93.



Mounting example



Note:
The following guide pillars can be equipped with this cage retainer:
202.22.
202.24.
2021.46.
2021.50.

Screws are not included.

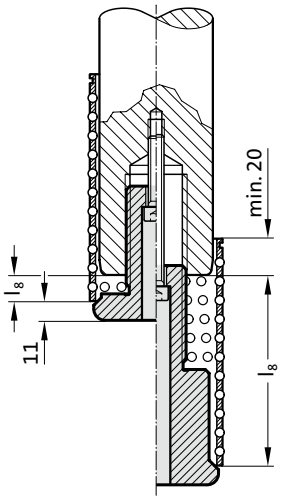
Fixing:
Use socket cap screws DIN EN ISO 4762 for ordering size:
03. - 2192.12.08.035
04. - 2192.12.08.045
05. - 2192.12.08.055
06. - 2192.12.08.070
08. - 2192.12.08.090

202.93. Cage retainer

Order No	d_1	d_2	d_3	l_1	l_2
202.93.3.030	30 32	36	23	30	6
202.93.4.040	38 40	44	31	40	6
202.93.5.050	48 50	54	39	50	8
202.93.6.060	60 63	66	51	60	8
202.93.8.080	80	89	71	80	8

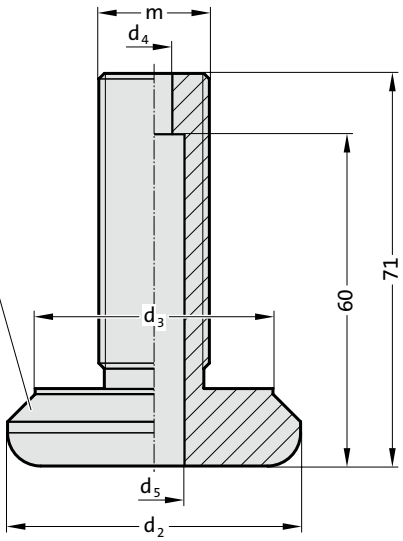
CAGE RETAINER

Mounting example

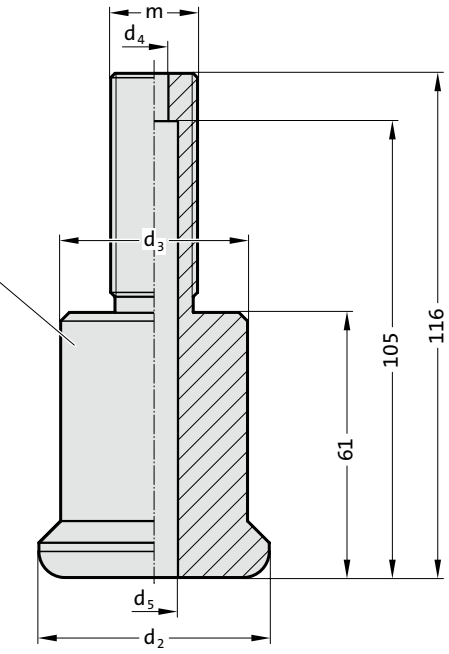


202.94.

202.94. .1



202.94. .2



Description:
Cage unit allows both accurate cage centring as well as a variably adjustable cage feed length (l_8). The cage feed length can be adjusted by turning the thread m in the column. A cheese head screw in accordance with DIN EN ISO 4762 serves as anti-rotation device.

Material:
Steel

Note:
The following guide pillars can be equipped with this cage retainer:
202.19. .30.94
2021.46. .30.94

Screws are not included.

Fixing:
Socket cap screws DIN EN ISO 4762 for nominal diameter ød :
32 / 40 = 2192.12.05.
50 = 2192.12.06.
63 / 80 = 2192.12.08.

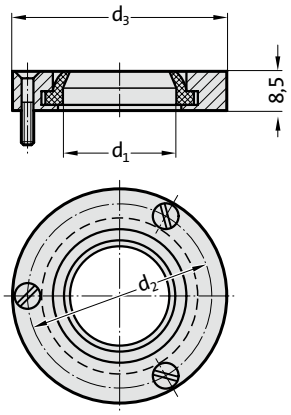
Length calculation of the safety screw fastening :
Cage retainer 202.94. .1 : Screw length = Cage feed length + 25 mm
Cage retainer 202.94. .2 : Screw length = Cage feed length - 20 mm

202.94. Cage retainer

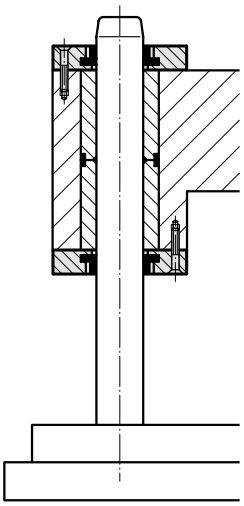
Order No	Nominal-ø	Pillar-ø	d_2	d_3	d_4	d_5	m	l_8 Cage feed length
202.94.032.1	32	30/32	35	25	5.5	10	M16x1,5	5-50
202.94.040.1	40	38/40	43	33	5.5	10	M16x1,5	5-50
202.94.050.1	50	48/50	53	43	6.6	11	M20x1,5	5-50
202.94.063.1	63	60/63	66	56	9	15	M30x1,5	5-50
202.94.080.1	80	80	88	74	9	15	M30x1,5	5-50
202.94.032.2	32	30/32	35	25	5.5	10	M16x1,5	50-100
202.94.040.2	40	38/40	43	33	5.5	10	M16x1,5	50-100
202.94.050.2	50	48/50	53	43	6.6	11	M20x1,5	50-100
202.94.063.2	63	60/63	66	56	9	15	M30x1,5	50-100
202.94.080.2	80	80	88	74	9	15	M30x1,5	50-100

PILLAR WIPER

206.95.
2061.95.



Mounting example



Description:
FIBRO Pillar Wipers protect against premature wear caused by the ingress of dirt into the die set guides.
Outside diameters match boss dias. on FIBRO Die Sets (Cast Iron). They can be fitted onto the bolster, or into a counterbore – flush with the bolster surface.

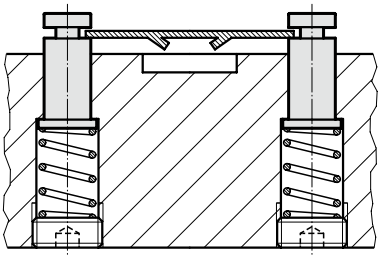
Note:
Pillar Wipers will be delivered with 3 screws M 4 × 16 DIN 963.

206.95./2061.95. Pillar wiper

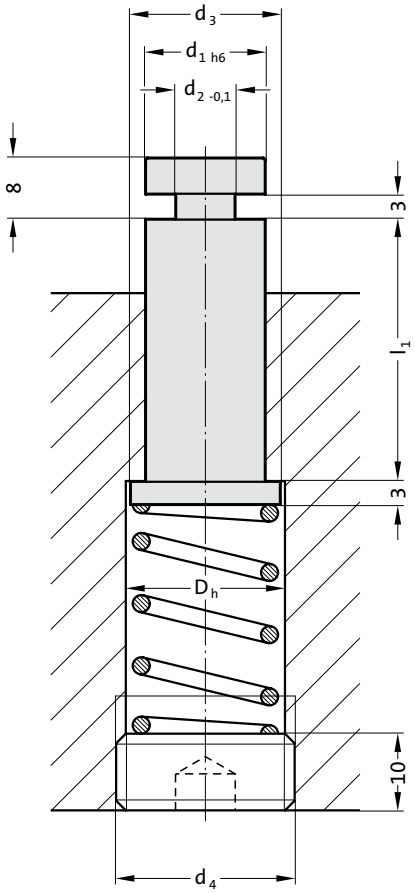
Order No	d_1	d_2	d_3
206.95.024	24	45	55
206.95.025	25	45	55
206.95.030	30	55	65
206.95.032	32	55	65
206.95.038	38	65	75
206.95.040	40	65	75
206.95.042	42	65	75
206.95.048	48	78	94
206.95.050	50	78	94
206.95.052	52	78	94
206.95.060	60	92	110
206.95.063	63	92	110
2061.95.024	24	50	60
2061.95.025	25	50	60

LIFTER PIN FOR PRESS TOOL STRIPS

Mounting example



244.00.2.



Description:
Combination progression dies with certain forming stages can be equipped advantageously with springloaded lifter pins. FIBRO Lifter Pins 244.00.2., available in four sizes, can be used to assume the double function of lifting and guiding the strip. The amount of lift is a function of the counterbore-depth.

Material:
No 1.7131, case-hardened

Execution:
ground

Note:
For ordering code of screw plug 241.00.1. and helical spring see spring range on pages chapter F.

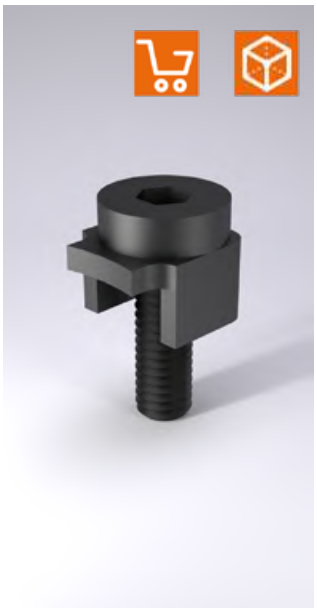
244.00.2. Lifter pin for press tool strips

d_1	8	10	13	16
d_2	5	6	7	8
d_3	10	12	16	20
D_h	10.5	12.5	16.5	20.5
d_4	M12x1.5	M14x1.5	M18x1.5	M22x1.5
l_1				
20	●			
25	●	●	●	
32	●	●	●	●
40	●	●	●	●
50		●	●	●

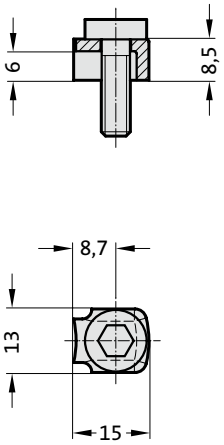
Ordering Code (example):

Lifter pin for press tool strips		= 244.00.2.	
Diameter of conduit d_1	13 mm	=	13.
Guide length l_1	25 mm	=	025
Order No		= 244.00.2.	13. 025

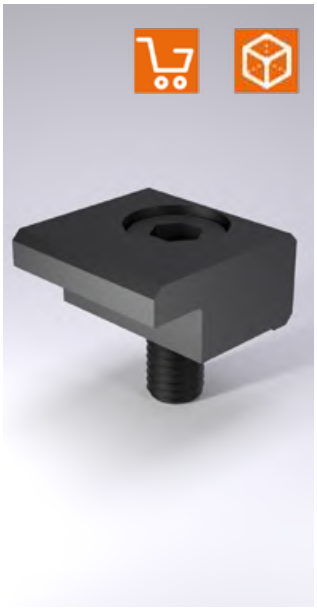
SCREW CLAMP WITH SCREW



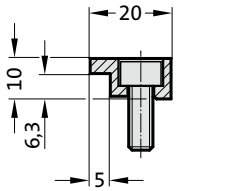
207.45

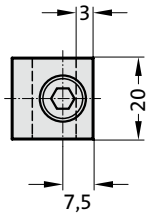


Screw clamp
incl. screw
– steel punched bent component
– clamping height 6 - 6,3 mm
– M6 screw

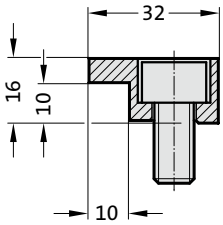


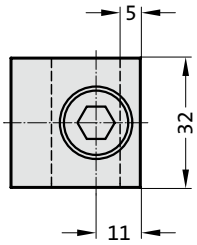
2072.45.10





2072.45.16



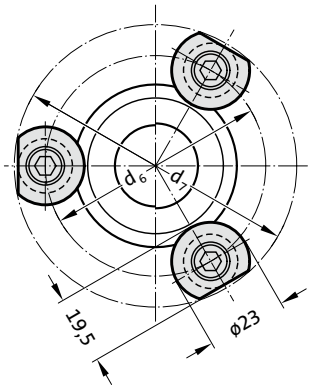


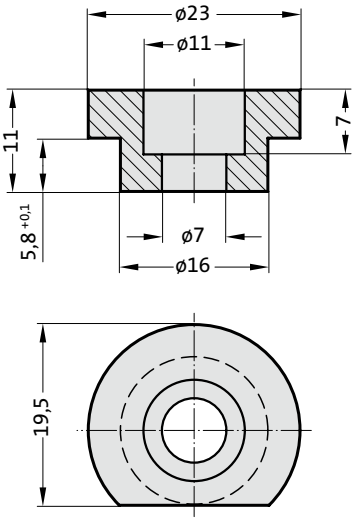
Screw clamp
incl. screw
2072.45.10
– steel, milled
– clamping height 6 - 6,3 mm
– M6 screw
2072.45.16
– steel, milled
– clamping height 10 mm
– M10 screw

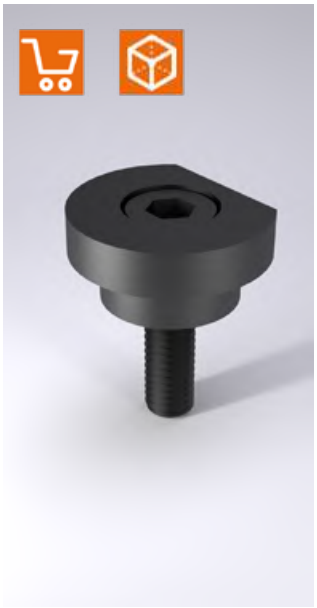
SCREW CLAMP WITH SCREW

Screw clamp
incl. screw
– clamping height 6 mm
– Socket cap screw DIN EN ISO 4762 M6x20

2071.45







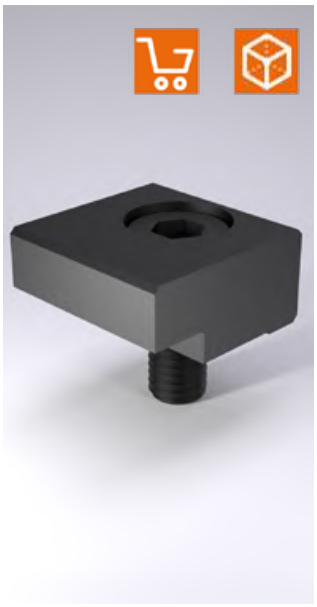
Description:
Strengthened holding piece 2071.45 alternative to holding piece 207.45

Note:
The fastening of the guide post/guide socket is carried out with 3 holding pieces, from ø d_1 = 38 with 4 holding pieces.

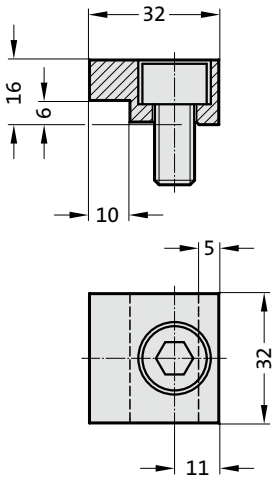
2071.45 Screw clamp with screw

Nominal diameter	15/16	19/20	24/25	30/32	38/40	48/50	60/63	80
usable for:	2021.28./ 29./ 44./ 46.							
d_6	38	42	49	57	67	80	97	112
d_7	56,5	60,3	67,1	74,9	84,6	97,4	114,2	129,1
usable for:	2021.39. - 2081.31./ 32./ 33./ 34./ 35. - 2081.44./ 45./ 46./ 47./ 49. - 2081.71./ 74./ 75. - 2081.81./ 84./ 85. - 2081.91./ 94./ 95.							
d_6	--	59	65	73	83	97	112	135
d_7	--	76,8	82,7	90,5	100,4	114,2	129,1	152
usable for:	210.31./ 34./ 35. - 210.39. - 210.44./ 45./ 46. - 210.85.							
d_6	53	56	64	75	87	107	127	--
d_7	71	73,9	81,7	92,5	104,3	124,1	144	--

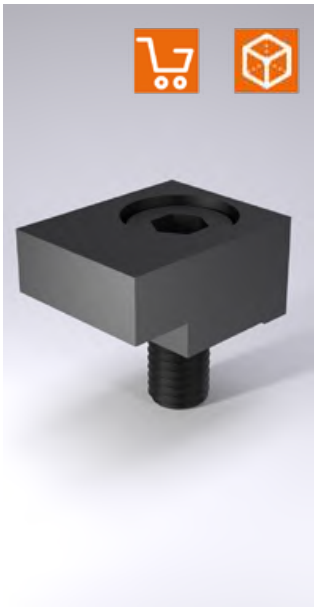
SCREW CLAMP WITH SCREW
SCREW CLAMP WITH SCREW, GM STANDARD
SCREW CLAMP WITH SCREW, NAAMS



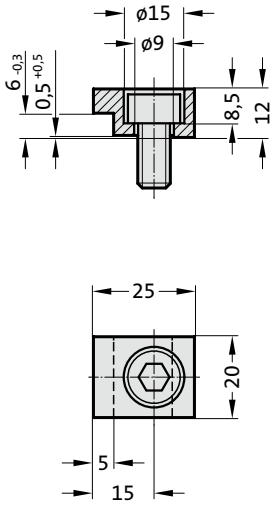
2072.46



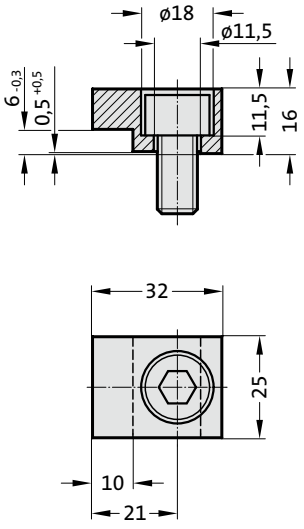
Screw clamp
incl. screw
– steel, milled
– clamping height 6 - 6,3 mm
– M10 screw



2072.46.30.12

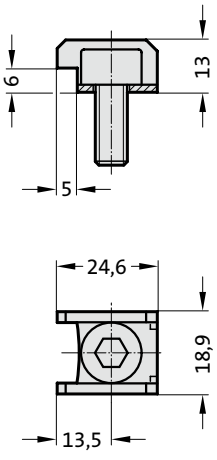


2072.46.30.16



Screw clamp
according to GM, incl. screw
2072.46.30.12
– steel, milled
– clamping height 6 mm
– M8 screw
2072.46.30.16
– steel, milled
– clamping height 6 mm
– M10 screw

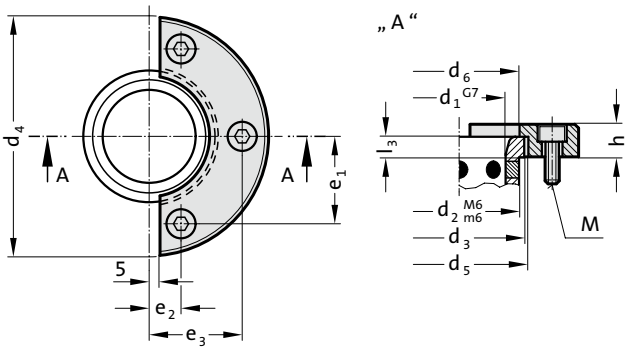
2072.47



Screw clamp
according to NAAMS, incl. screw
– steel punched bent component
– clamping height 6 - 6,3 mm
– M8 screw

SECURING FLANGE WITH SCREWS, CNOMO
SCREW CLAMP WITH SCREW, CNOMO

2073.45.

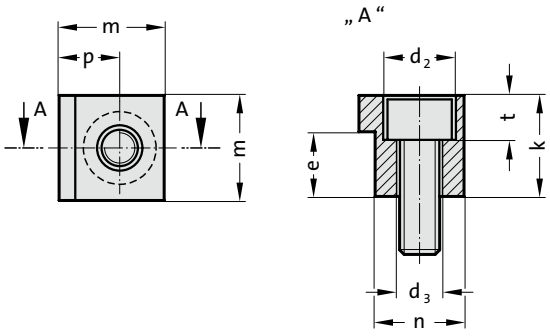


2073.45. Securing flange with screws, CNOMO

Order No	d_1	d_2	d_3	d_4	d_6	h	l_3	e_1	e_2	e_3	M
2073.45.020	20	28	32	63	25	10	4	16	18	0	6
2073.45.025	25	35	40	72	32	10	5	20	20	0	6
2073.45.032	32	44	50	80	40	12	6	25	21	0	6
2073.45.040	40	52	60	100	50	12	8	38.5	14	41	6
2073.45.050	50	63	71	125	63	16	10	46	17	49	8
2073.45.063	63	80	90	140	80	20	12	55	17	57.5	10
2073.45.080	80	100	112	180	100	25	16	70	20	72	12
2073.45.100	100	125	140	200	125	32	20	81	25	85	12

Securing flange
according to CNOMO, incl. screws
– steel, turned
– clamping height 4, 5, 6, 8, 10, 12, 16, 20 mm
– M6, M8, M10, M12 screws

2072.48.45.

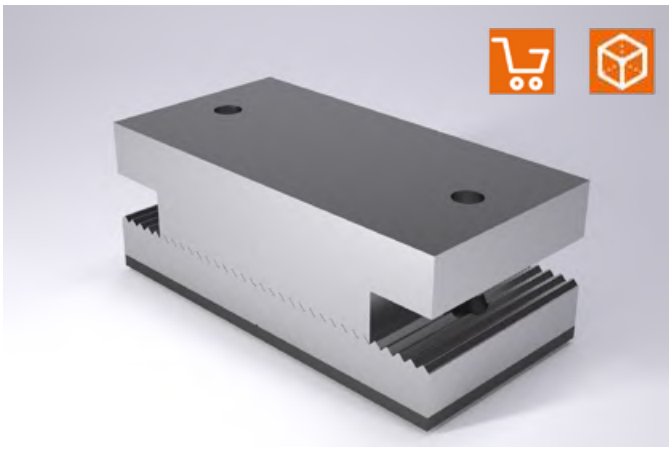


2072.48.45. Screw clamp with screw, CNOMO

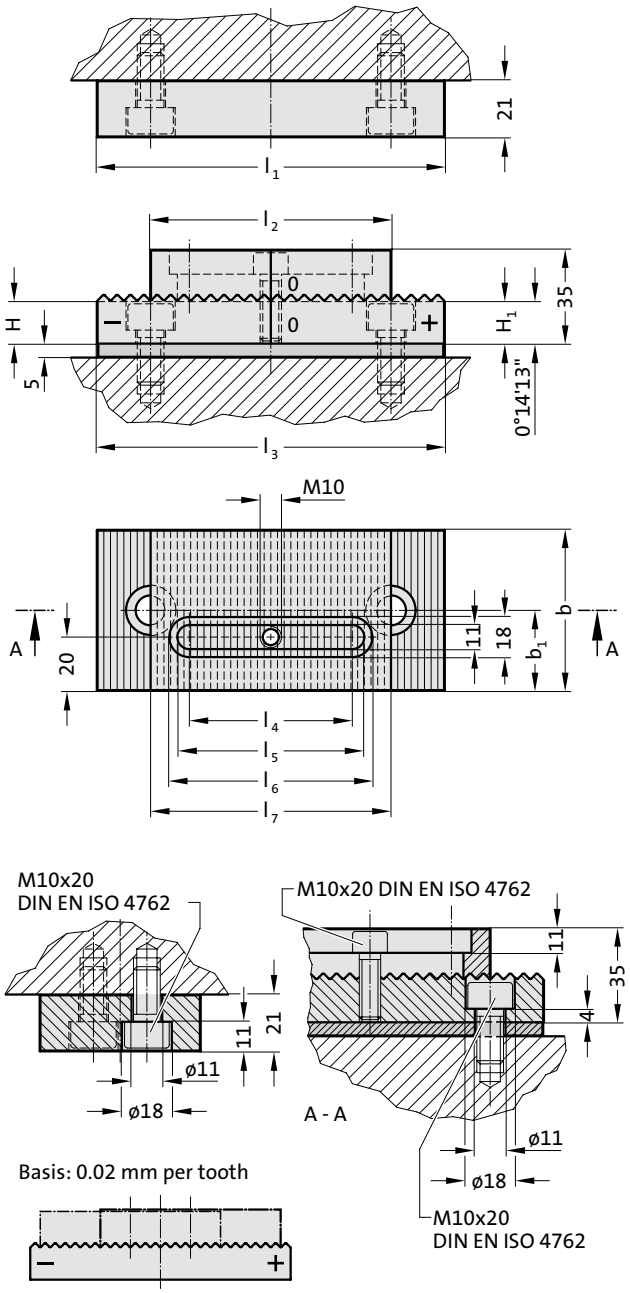
Order No	k	e	d_2	d_3	t	m	p	n	d_1	M
2072.48.45.12	12	8	11	6.6	6.8	18	9.5	15.5	40	6
2072.48.45.16	16	10	15	9	9	22	12	19	50	8
2072.48.45.20	20	12	18	11	11	26	15	21	63	10
2072.48.45.25	25	16	18	11	11	26	15	21	80	10
2072.48.45.32	32	20	18	11	11	26	15	21	100	10

Screw clamp
according to CNOMO, incl. screw
– steel, milled
– clamping height 8, 10, 12, 16, 20 mm
– M6, M8, M10 screw

SPACER PLATE TOOTHED, WITH ADJUSTING PLATE



2444.12 / 2444.13



Material:
Spacer plates: X 210 Cr 12 (1.2080), hardened 58 + 2 HRC
Adjusting plate: X 153 CrMoV 12 (1.2379)

Description:
For spacing out sheet metal retainers in tools for external skin parts.

Note:
Screws are not included.

'0'= basic setting in the middle (grinding-in)
'+'= adjustment to the right - plus
'-' = adjustment to the left - minus

Attention:
The bolsters are reversible.

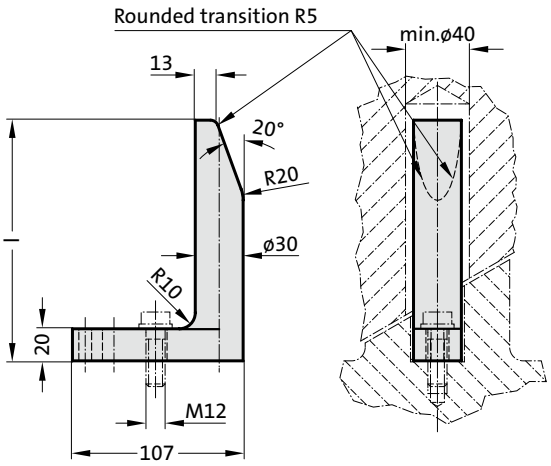
Adjustment range:
2444.12
12 increments each of 0.02 mm means an adjusting range of 0.24 mm with a minimum support area of 80 x 60 mm.
2444.13
14 increments each of 0.02 mm means an adjusting range of 0.28 mm with a minimum support area of 100 x 80 mm.

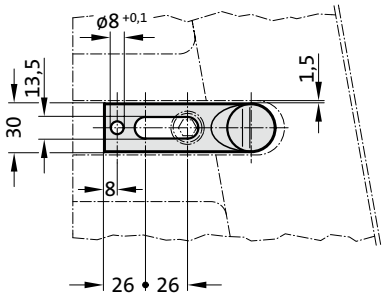
2444.12 / 2444.13 Spacer plate toothed, with adjusting plate

Order No	l_1	l_2	l_3	l_4	l_5	l_6	l_7	b	b_1	H	H_1
2444.12	130	90	130	61	72	79	90	60	30	15.5	16.04
2444.13	160	110	160	71	82	89	120	80	40	15.5	16.16

GUIDE

2443.10.





Material:
Ck 60, area of pilot taper hardened 58 + 2 HRC

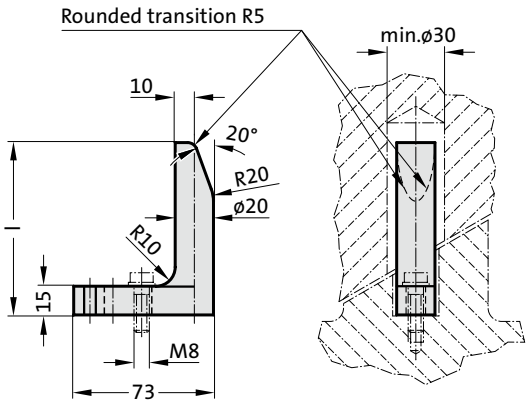
Execution:
forged

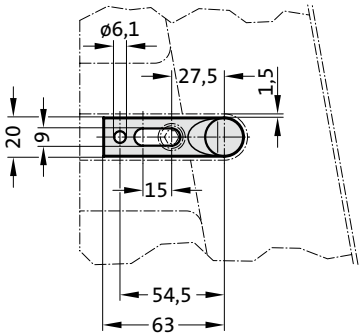
2443.10. Guide

Order No	l
2443.10.065	65
2443.10.090	90
2443.10.120	120
2443.10.150	150
2443.10.180	180
2443.10.250	250
2443.10.300	300
2443.10.350	350

GUIDE TO MERCEDES-BENZ STANDARD - UNHARDENED

2443.10.20.





Material:
Ck 60

Execution:
forged

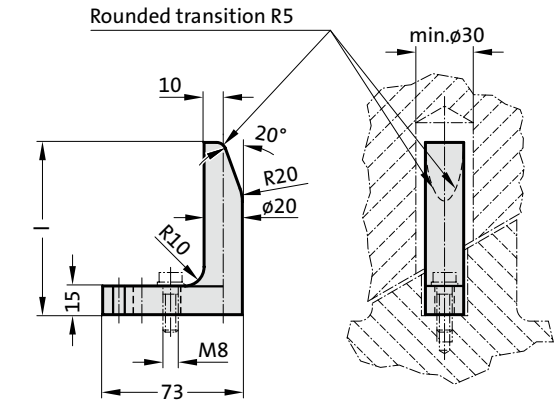
Note:
Guides are preferably used in confined spaces in sequential compound dies.

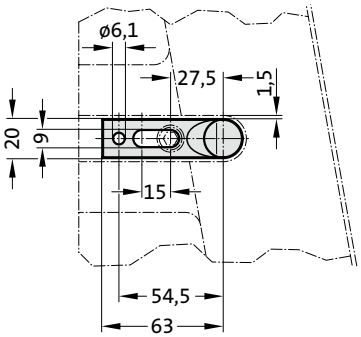
2443.10.20. Guide to Mercedes-Benz Standard - unhardened

Order No	l
2443.10.20.065	65
2443.10.20.090	90

GUIDE TO MERCEDES-BENZ STANDARD - HARDENED

2443.10.20. .1





Material:
Ck 60, area of pilot taper hardened 58 + 2 HRC

Execution:
forged

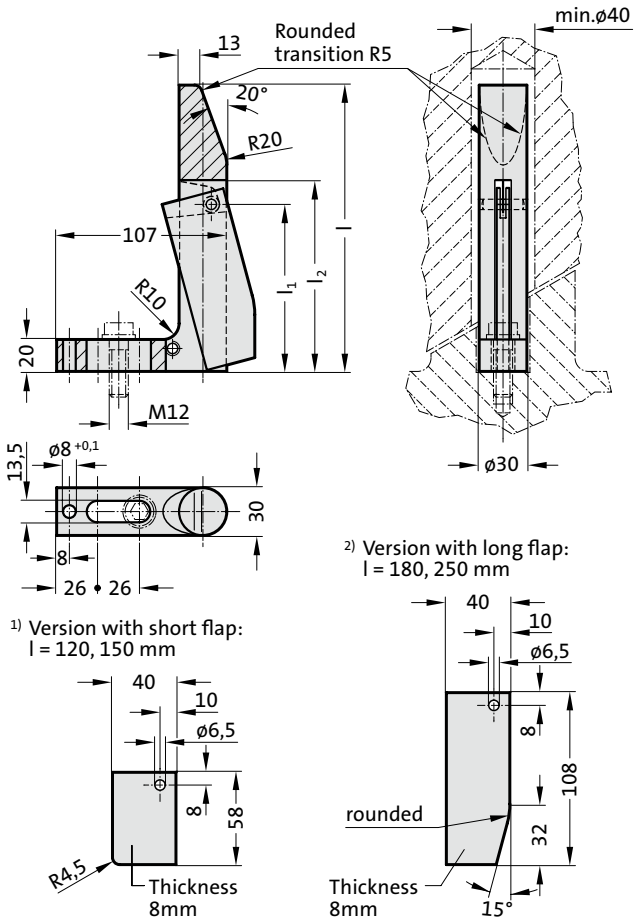
Note:
Guides are preferably used in confined spaces in sequential compound dies.

2443.10.20. .1 Guide to Mercedes-Benz Standard - hardened

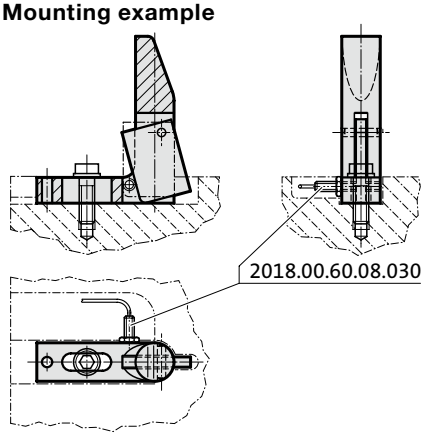
Order No	l
2443.10.20.065.1	65
2443.10.20.090.1	90

GUIDE WITH PART POSITION CONTROL AND SPRING

2443.12.



Mounting example



Material:
Guide: Ck 60, area of pilot taper hardened 50 + 5 HRC
Flap: St 37
Spring: Spring steel wire

Execution:
forged

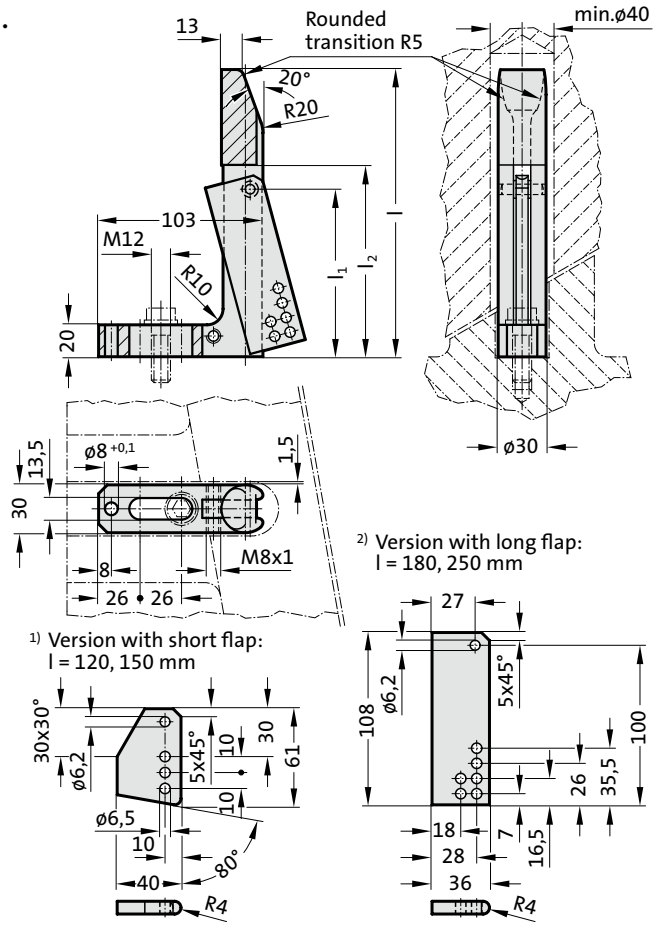
Note:
See following pages for accessories.

2443.12. Guide with part position control and spring

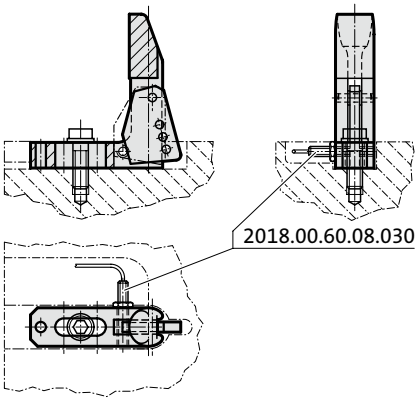
Order No	l	l_1	l_2
2443.12.120	120	55	70
2443.12.150	150	55	70
2443.12.180	180	105	120
2443.12.250	250	105	120

GUIDE WITH PART POSITION CONTROL, VDI

2443.13.



Mounting example



Material:
Guide: Ck 60, area of pilot taper hardened 50 + 5 HRC
Flap: St 37, hardened 58 + 2 HRC

Execution:
forged

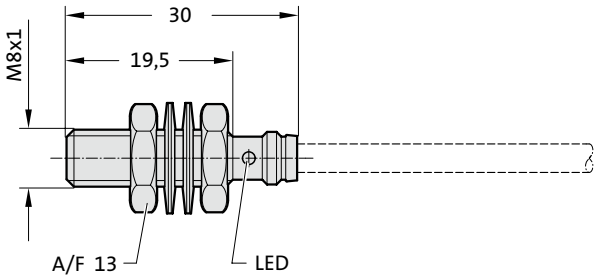
Note:
See following pages for accessories.

2443.13. Guide with part position control, VDI

Order No	l	l_1	l_2
2443.13.120	120	55	70
2443.13.150	150	55	70
2443.13.180	180	105	120
2443.13.250	250	105	120

INDUCTIVE PROXIMITY SWITCH

2018.00.60.08.030

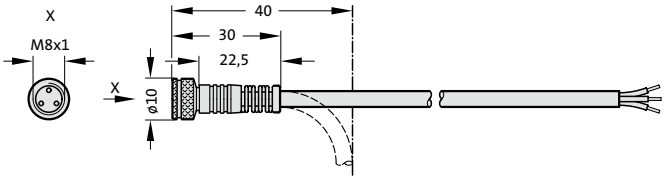


Technical data:
Rated operating voltage Ue: 24 V DC
Operating Voltage Us: 10 - 30 V DC
No load current I_0 damped/undamped: ≤ 8 mA/≤ 1 mA
Repeat accuracy R: ≤ 5%
Ambient temperature Ta: -40 to +85 °C
Switching frequency f: 3000 Hz
Degree of protection to IEC 529: IP 67
Casing material: Stainless steel
Connection: plug connector
Approvals: UL

2018.00.60.08.030	**Inductive proximity switch**

CABLE - STRAIGHT
CABLE, 90° CONNECTOR

2018.00.60.23.01.5

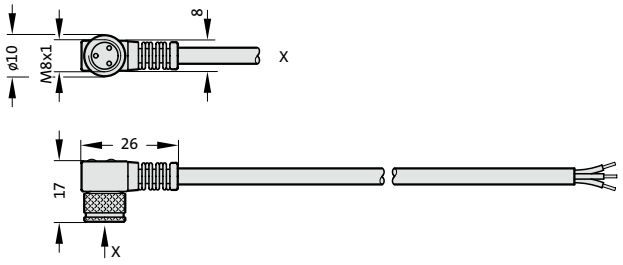


2018.00.60.23.01.5 **Cable - straight**

Technical data:
Cable type: 3 pole, M8, oil resistant
Standard length: 5 m

Other lengths on request

2018.00.60.23.02.5



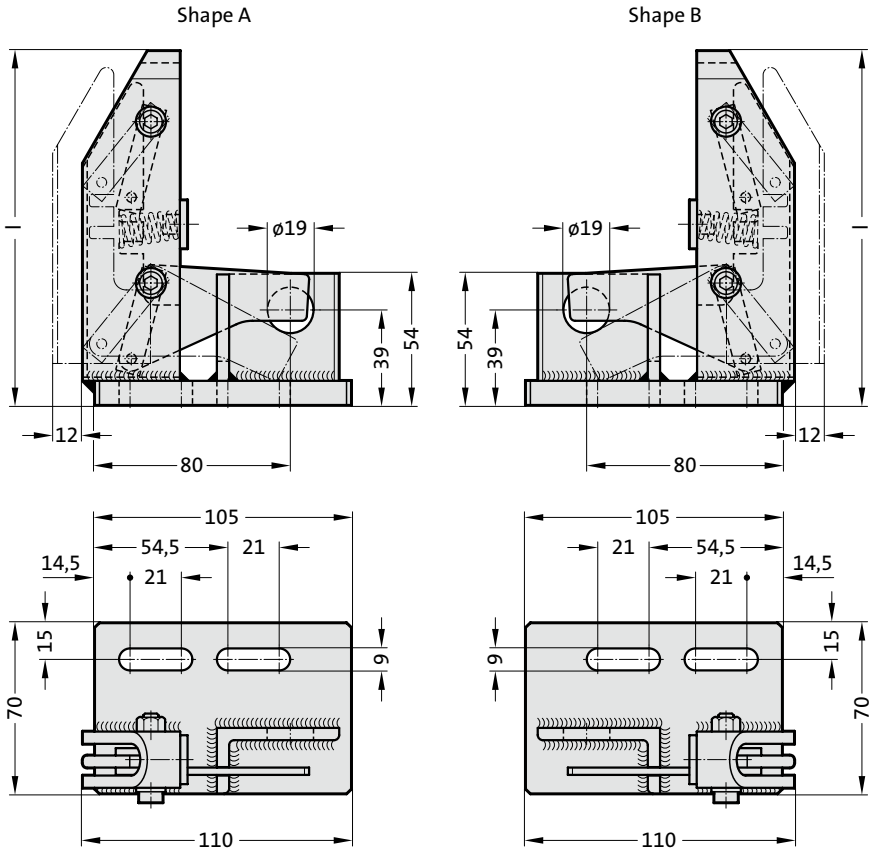
2018.00.60.23.02.5 **Cable, 90° connector**

Technical data:
Cable type: 3 pole, M8, oil resistant
Standard length: 5 m

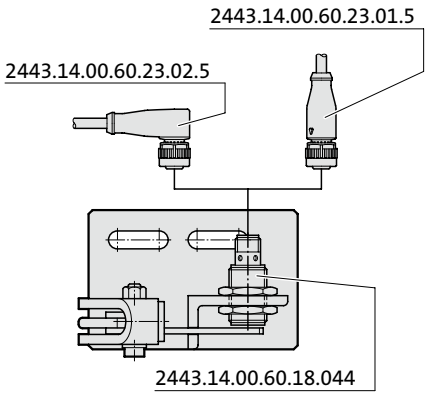
Other lengths on request

POSITION MONITOR FOR BOARDS

2443.14.55.



Mounting example



Material:
Steel

Note:
See following pages for accessories.

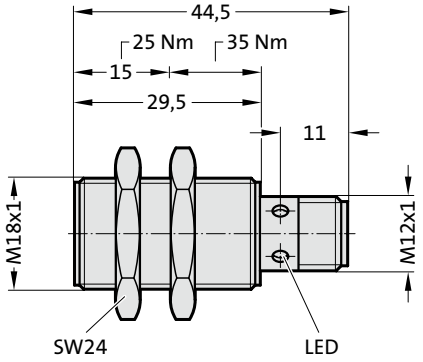
Attention:
At least two position monitors must be installed crosswise. In case of large parts, such as the side part, a third position monitor should be placed. The position monitors should be placed in such a way that a perfect querying of the sheet metal part is guaranteed. Position monitors should be arranged a minimum of 5 mm away from the pulling or locking bards and not within the range of strong sheet movement.

2443.14.55. Position monitor for boards

Order No	l	Shape
2443.14.55.1	145	A
2443.14.55.2	145	B
2443.14.55.3	185	A
2443.14.55.4	185	B
2443.14.55.25	225	A
2443.14.55.26	225	B

INDUCTIVE PROXIMITY SWITCH

2443.14.00.60.18.044



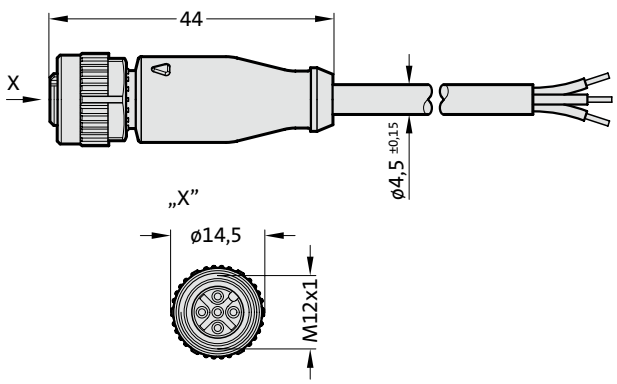
Technical data:

Rated operating voltage Ue: 24 V DC
Operating Voltage Us: 10 - 30 V DC
No load current I_0 damped/undamped: ≤ 10 mA/≤ 3 mA
Repeat accuracy R: max. (% v. Sr) 5%
Ambient temperature Ta: -25 to +70°C
Switching frequency f: max. 1000 Hz
Degree of protection to IEC 60529: IP 67
Casing material: CuZn
Connection: plug connector
Approvals: UL

2443.14.00.60.18.044 **Inductive proximity switch**

CABLE - STRAIGHT
CABLE, 90° CONNECTOR

2443.14.00.60.23.01.5

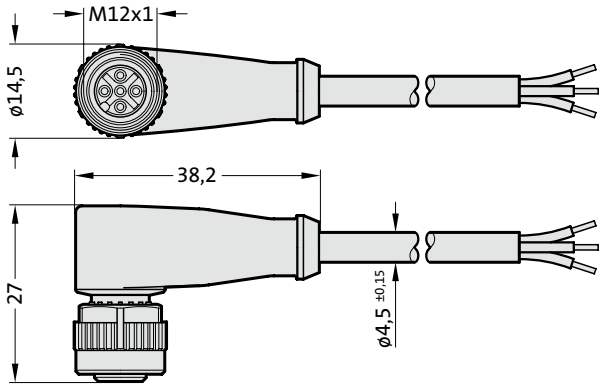


2443.14.00.60.23.01.5 **Cable - straight**

Technical data:
Cable type: 3 pole, M12x1
Standard length: 5m

Other lengths on request

2443.14.00.60.23.02.5



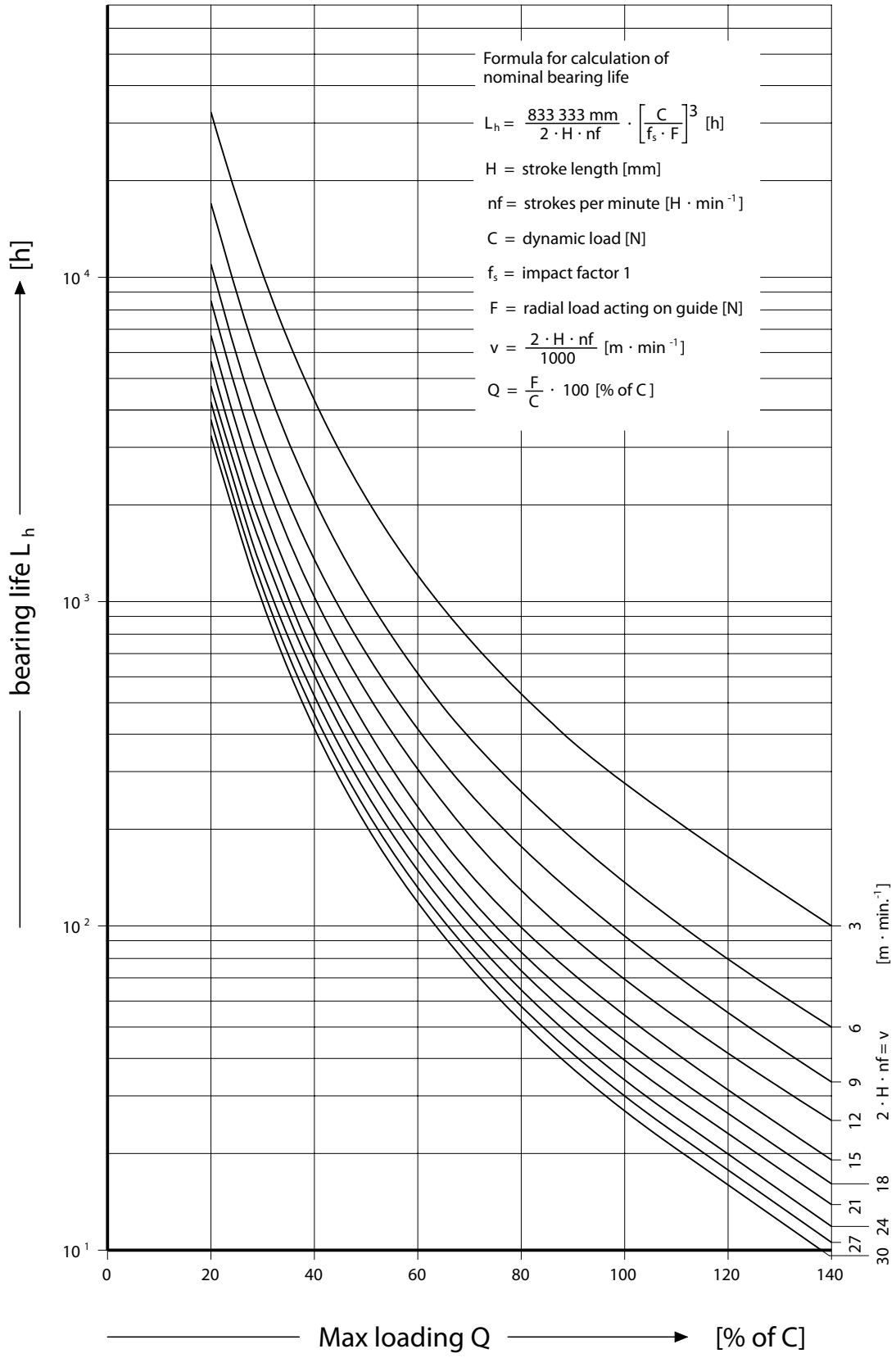
2443.14.00.60.23.02.5 **Cable, 90° connector**

Technical data:
Cable type: 3 pole, M12x1
Standard length: 5m

Other lengths on request

BALL GUIDES - LOAD DIAGRAM

Bearing life versus loading
Values shown are based on the Impact Factor of $f_s = 1$:
Application to normal conditions in respect of press and die set, with a maximum bearing temperature of 100 °C.



BALL GUIDES - CALCULATION TABLE
DYNAMIC LOAD FIGURES FOR BALL, BRASS OR ALUMINIUM

Definition:
The dynamic load index C in N constitutes a load with constant size and direction, at which 90 % of a sufficiently large quantity of equal bearings achieve a minimum of the service life of $+10^5$ m. This applies for solely longitudinal movement.

Pillar-ø d_1	Cage length l_1	Dynamic Load Index C for whole cage (N)
8	40	750
10	24	1070
10	28	1190
10	31	1300
10	40	1830
10	45	1830
10	50	1930
10	56	2210
11	24	1090
11	28	1210
11	31	1330
11	40	1660
11	45	1860
11	50	1960
11	56	2250
12	24	1100
12	28	1230
12	31	1350
12	40	1680
12	45	1890
12	50	1990
12	56	2280
15	24	1880
15	28	2200
15	31	2500
15	45	3300
15	40	3050
15	50	3800
15	56	4050
15	63	4550
15	71	4950
16	24	1910
16	28	2230
16	31	2550
16	40	3100
16	45	3350
16	50	3850
16	56	4100
16	63	4600
16	71	5000
19	24	2300
19	28	2700
19	31	3050
19	40	3750
19	45	4050
19	50	4350
19	56	4950
19	63	5500
19	71	6100
19	80	6600
19	95	7600
20	24	2320
20	28	2700
20	31	3100
20	40	3750
20	45	4100
20	50	4400
20	56	5000
20	63	5600
20	71	6100
20	80	6600
20	95	7600
24	31	3150
24	40	3850
24	45	4200
24	50	4850
24	56	5100
24	63	5700
24	71	6300
24	80	6800
24	95	7800
24	105	8300

Pillar-ø d_1	Cage length l_1	Dynamic Load Index C for whole cage (N)
24	120	9300
25	31	3200
25	40	3900
25	45	4200
25	50	4850
25	56	5200
25	63	5700
25	71	6300
25	80	6900
25	95	7900
25	105	8400
25	120	9300
30	40	5700
30	45	6400
30	50	7000
30	56	7600
30	63	8800
30	71	9300
30	75	9800
30	80	10400
30	95	11900
30	105	12800
30	120	14200
30	140	16000
30	160	17700
32	40	5800
32	45	6400
32	50	7100
32	56	7700
32	63	8800
32	71	9400
32	75	9900
32	80	10500
32	95	12000
32	105	12900
32	120	14300
32	140	16100
32	160	17800
38	45	7500
38	50	8200
38	56	8900
38	63	10300
38	71	10900
38	80	12100
38	95	13900
38	105	15000
38	120	16700
38	140	18700
38	160	20700
38	180	22600
38	200	24400
38	240	28000
40	45	7500
40	50	8200
40	56	9000
40	63	10300
40	71	11000
40	80	12200
40	95	14000
40	105	15100
40	120	16700
40	140	18800
40	160	20800
40	180	22700
40	200	24600
40	240	28000
48	50	9400
48	56	10200
48	63	11700
48	71	12400
48	80	13800
48	95	15900

Pillar-ø d_1	Cage length l_1	Dynamic Load Index C for whole cage (N)
48	105	17100
48	120	19000
48	140	21400
48	160	23600
48	180	26000
48	200	28000
48	240	32000
50	50	9400
50	56	10200
50	63	11700
50	71	12500
50	80	13900
50	95	15900
50	105	17200
50	120	19100
50	128	19700
50	140	21400
50	160	23700
50	180	26000
50	200	28000
50	240	32000
60	80	15500
60	95	17700
60	105	19200
60	120	21300
60	140	23900
60	160	26500
60	180	29000
60	200	31000
60	240	35500
63	80	15500
63	95	17800
63	105	19300
63	120	21300
63	140	24000
63	160	26500
63	180	29000
63	200	31500
63	240	35500
80	120	41000
80	140	46500
80	160	52000
80	180	57000
80	200	62000
80	240	70000

BALL GUIDES - CALCULATION TABLE
DYNAMIC LOAD FIGURES FOR BALL CAGES, PLASTIC

Definition:
The dynamic load index C in N constitutes a load with constant size and direction, at which 90 % of a sufficiently large quantity of equal bearings achieve a minimum of the service life of $+10^5$ m. This applies for solely longitudinal movement.

206.41.

Pillar-ø d_1	Cage length l_1	Dynamic Load Index C for whole cage (N)
12	21 (k*= ø 2)	740
12	42 (k*= ø 2)	1200
12	21 (k* = ø 2.5)	920
12	42 (k* = ø 2.5)	1600
15	45	2550
15	56	2850
15	63	3150
15	71	3450

2060.41.

Pillar-ø d_1	Cage length l_1	Dynamic Load Index C for whole cage (N)
12	24	1000
12	31	1230
12	45	1720
15	21	1710
15	31	2270
15	45	3000
15	56	3700
16	21	1750
16	31	2330
16	45	3100
16	56	3800
19	21	1960
19	31	2600
19	45	3450
19	56	4250
19	71	5200
20	21	1980
20	31	2650
20	45	3500
20	56	4250
20	71	5200
24	31	2950
24	45	3900
24	56	4750
24	71	5800
24	95	7000
25	31	2950
25	45	3900
25	56	4800
25	71	5900
25	95	7100
30	31	4000
30	45	5900
30	56	7100
30	71	8600
30	95	11000
32	31	4050
32	45	6000
32	56	7100
32	71	8700
32	95	11100
38	45	6600
38	56	7800
38	71	9600
38	95	12200
40	45	6600
40	56	7900
40	71	9600
40	95	12300

BALL GUIDES - CALCULATION TABLE
DYNAMIC LOAD FIGURES FOR RECIRCULATING BALL BUSH

Definition:
The dynamic load index C in N constitutes a load with constant size and direction, at which 90 % of a sufficiently large quantity of equal bearings achieve a minimum of the service life of $+10^5$ m. This applies for solely longitudinal movement.

Pillar-ø d_1	Cage length l_1	Dynamic Load Index C for whole cage (N)
20	47	2080
25	60	2960
32	77	5450

Pillar-ø d_1	Cage length l_1	Dynamic Load Index C for whole cage (N)
40	95	7600
50	95	8800
63	120	11800

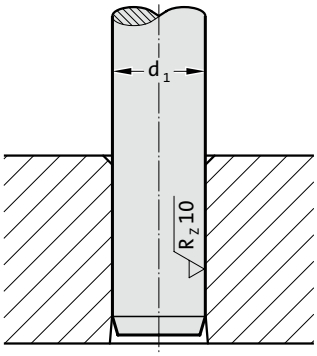
ASSEMBLY OF GUIDE ELEMENTS
DIMENSIONAL REQUIREMENTS AND TOLERANCES

202.17. / 202.19. / 202.22. /
202.23. / 202.24. / 202.29.

Guide pillar
DIN 9825/ISO 9182-2
~DIN 9825/

~ISO 9182-2

press fit



202.17. / 202.19. / 202.22. / 202.23. / 202.24. / 202.29.

Pillar-ø d_1*	Retaining bore d_1 (recommended values based on experiences)	
3-80	in grey cast iron: d_1	–0,025 –0,035
	in steel: d_1	–0,015 –0,025

*Pillars of d_1 = 50 mm and over should be frozen in dry ice before fitting

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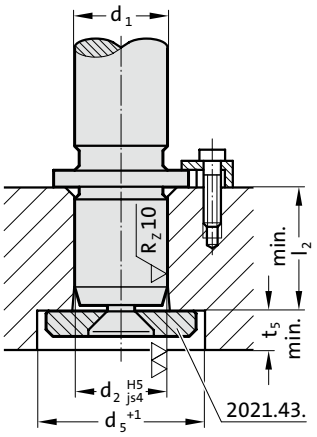
2021.46. / 2021.44.

Guide pillar with collar
DIN 9825/ ~ISO 9182-5
transition fit

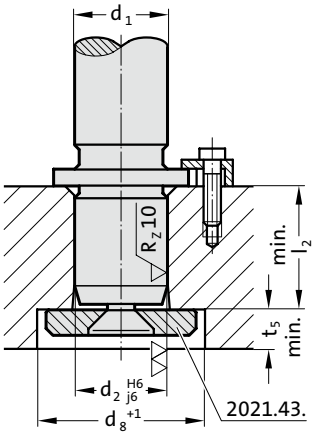


2021.46. / 2021.44.

Pillar-ø d_1	Retaining bore d_2^{H5}	d_5^{+1}	l_2	t_5
15/16	$15/16^{+0,008}$	24	20,5	6,5
19/20	$19/20^{+0,009}$	27	23,5	6,5
24/25	$24/25^{+0,009}$	34	30,5	6,5
30/32	$30/32^{+0,011}$	42	37,5	6,5
38/40	$38/40^{+0,011}$	52	37,5	6,5
48/50	$48/50^{+0,013}$	62	47,5	6,5
60/63	$60/63^{+0,013}$	72	47,5	6,5
80	$80^{+0,013}$	95	60,51	2,5

2021.29.

Guide pillar with collar
transition fit



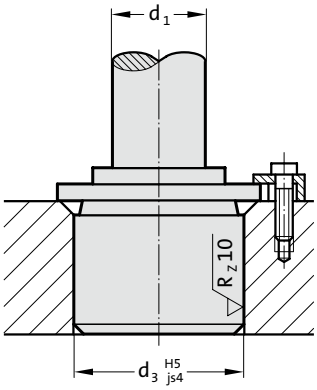
2021.29.

Pillar-ø d_1	Retaining bore d_2^{H6}	d_8^{+1}	l_2	t_5
15/16	$15/16^{+0,011}$	24	20,5	6,5
19/20	$19/20^{+0,013}$	27	23,5	6,5
24/25	$24/25^{+0,013}$	34	30,5	6,5
30/32	$30/32^{+0,016}$	42	37,5	6,5
38/40	$38/40^{+0,016}$	52	37,5	6,5
48/50	$48/50^{+0,019}$	62	47,5	6,5
60/63	$60/63^{+0,019}$	72	47,5	6,5
80	$80^{+0,019}$	95	60,5	12,5

2021.39.

Retaining bush

DIN 9825/ISO 9182-4
transition fit



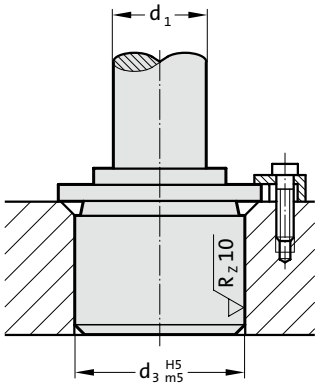
2021.39.

Pillar-ø d_1	Retaining bore d_3^{H5}
19/20	$32^{+0,011}$
24/25	$40^{+0,011}$
30/32	$48^{+0,011}$
38/40	$58^{+0,013}$
48/50	$70^{+0,013}$
60/63	$85^{+0,015}$

ASSEMBLY OF GUIDE ELEMENTS
DIMENSIONAL REQUIREMENTS AND TOLERANCES

210.39.

Pillar-ø d_1	Retaining bore d_3^{H5}
16	$28^{+0,009}$
20	$32^{+0,011}$
25	$40^{+0,011}$
32	$50^{+0,011}$
40	$63^{+0,013}$
50	$80^{+0,013}$
63	$90^{+0,015}$



210.39.

Retaining bush, similar AFNOR

transition fit

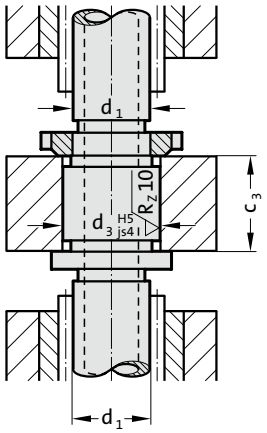
202.60.

Pillar-ø d_1	Retaining bore d_3^{H5}	Plate thickness c_3^{-1}
19	$25^{+0,009}$	33
25	$30^{+0,009}$	33
32	$36^{+0,011}$	38
40	$46^{+0,011}$	38

***Slip-Fit Bonding:**

The glue-line gap must not be smaller than 0,005 mm, or the adhesive will be wiped off the contact surfaces upon fitment.

This would result in an unreliable bond.
The available component tolerances do not always result in the minimum glue-line gap.
This fact has to be born in mind when machining receiving bores, mor alternatively corrections can be made on the assembly bench.



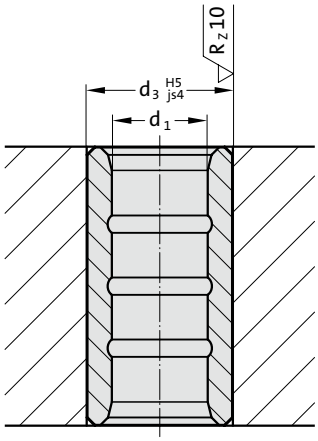
202.60.

Demountable guide pillar with centre fixing

transition fit

2051.32.

Pillar-ø d_1	Retaining bore d_3^{H5}
8	$13,7^{+0,008}$
11/12	$22^{+0,009}$
15/16	$28^{+0,009}$
19/20	$32^{+0,011}$
24/25	$40^{+0,011}$
30/32	$48^{+0,011}$
38/40	$58^{+0,013}$
48/50	$70^{+0,013}$
60/63	$85^{+0,015}$
80	$95,7^{+0,015}$



2051.32.

Guide bush, sintered ferrite carbonitrided with long-term lubricationDIN 9831 / ISO 9448-2

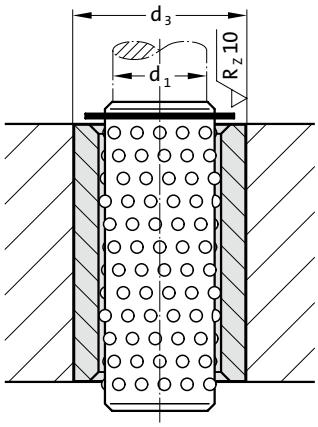
slip-fit bonding*

206.54.

Pillar-ø d_1	Retaining bore d_3^{H6}
3	$7^{+0,009}$
4	$8^{+0,009}$
5	$10^{+0,009}$
6	$11^{+0,011}$
8	$14^{+0,011}$

2061.44. / 2061.47.

Pillar-ø d_1	Retaining bore d_3^{H5}
8	$18^{+0,008}$
10	$22^{+0,009}$
11/12	$22^{+0,009}$
15/16	$28^{+0,009}$
19/20	$32^{+0,011}$
24/25	$40^{+0,011}$
30/32	$48^{+0,011}$
38/40	$58^{+0,013}$
48/50	$70^{+0,013}$
60/63	$85^{+0,015}$
80	$105^{+0,015}$



206.54.

2061.44./2061.47.

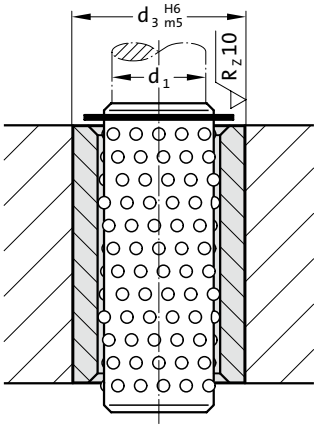
Guide bush for ball bearing DIN 9831 / ISO 9448-3

slip-fit bonding*

ASSEMBLY OF GUIDE ELEMENTS
DIMENSIONAL REQUIREMENTS AND TOLERANCES

206.49.

Guide bush for ball bearing, AFNOR
slip-fit bonding*



206.49.

Pillar-ø d_1	Retaining bore d_3 H6
16	$28^{+0,013}$
20	$32^{+0,016}$
25	$40^{+0,016}$
32	$50^{+0,016}$
40	$63^{+0,019}$
50	$80^{+0,019}$

***Slip-Fit Bonding:**

The glue-line gap must not be smaller than 0,005 mm, or the adhesive will be wiped off the contact surfaces upon fitment.

This would result in an unreliable bond.
The available component tolerances do not always result in the minimum glue-line gap.
This fact has to be born in mind when machining receiving bores, mor alternatively corrections can be made on the assembly bench.

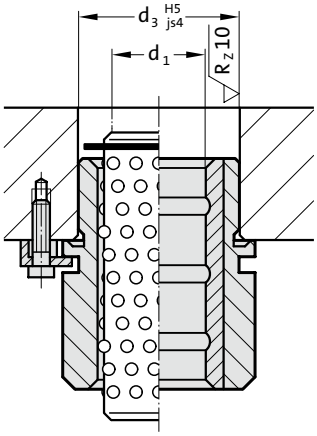
2081.3x. / 2081.4x. / 2081.8x.

Headed guide bush, sintered ferrite carbonitrided, bronze coated or for ball bearing

DIN 9831 / ISO 9448-6

DIN 9831 / ISO 9448-7

ISO 9448
transition fit

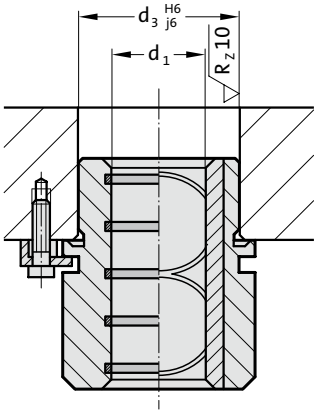


2081.3x. / 2081.4x. / 2081.8x.

Pillar-ø d_1	Retaining bore d_3 H6
19/20	$32^{+0,011}$
24/25	$40^{+0,011}$
30/32	$48^{+0,011}$
38/40	$58^{+0,013}$
48/50	$70^{+0,013}$
60/63	$85^{+0,015}$
80	$105^{+0,015}$

2081.7x. / 2081.9x.

Headed guide bush, Bronze with solid lubricant rings or bronzeplated
transition fit



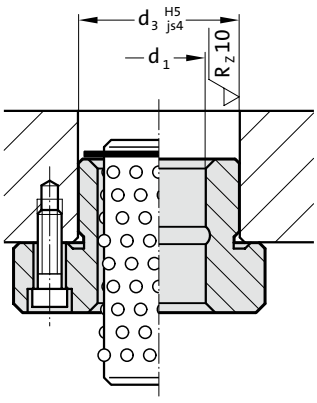
2081.7x. / 2081.9x.

Pillar-ø d_1	Retaining bore d_3 H6
19/20	$32^{+0,016}$
24/25	$40^{+0,016}$
30/32	$48^{+0,016}$
38/40	$58^{+0,019}$
48/50	$70^{+0,019}$
60/63	$85^{+0,022}$
80	$105^{+0,022}$

2091.3x. / 2091.4x.

Flanged guide bush, sintered ferrite carbonitrided, bronze coated or for ball bearing

DIN 9831 / ISO 9448-4
DIN 9831 / ISO 9448-5
transition fit



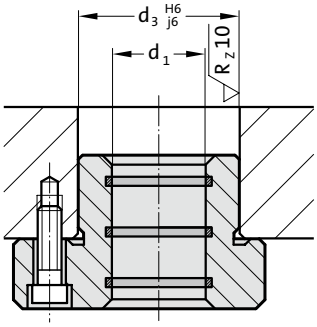
2091.3x. / 2091.4x.

Pillar-ø d_1	Retaining bore d_3 H5
12	$26^{+0,009}$
15/16	$28^{+0,009}$
19/20	$32^{+0,011}$
24/25	$40^{+0,011}$
30/32	$48^{+0,011}$
38/40	$58^{+0,013}$
48/50	$70^{+0,013}$
60/63	$85^{+0,015}$
80	$105^{+0,015}$

ASSEMBLY OF GUIDE ELEMENTS
DIMENSIONAL REQUIREMENTS AND TOLERANCES

2091.7x.

Pillar-ø d_1	Retaining bore d_3^{H6}
19/20	$32^{+0,016}$
24/25	$40^{+0,016}$
30/32	$48^{+0,016}$
38/40	$58^{+0,019}$
48/50	$70^{+0,019}$
60/63	$85^{+0,022}$
80	$105^{+0,022}$



2091.7x.

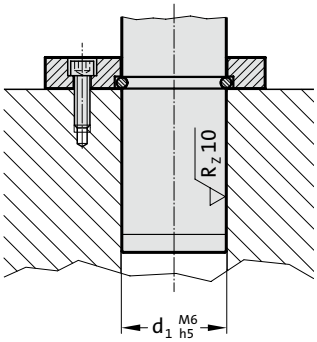
Flanged guide bush, Bronze with solid lubricant rings

DIN 9831 / ISO 9448-4

transition fit

2022.25.

Pillar-ø d_1	Retaining bore d_1^{M6}
25	-0,004 -0,017
32	
40	-0,004 -0,020
50	
63	-0,005
80	-0,024
100	-0,006 -0,028



2022.25.

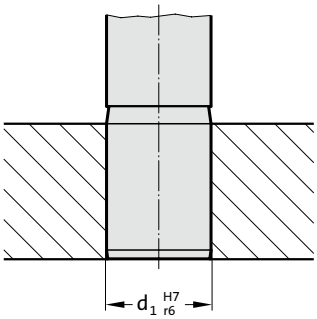
Guide pillar with retaining ring groove, ~AFNOR

transition fit

2022.12. / 2022.15. / 2022.16. / 2022.17. / 2022.19. / 2022.29.

Pillar-ø d_1	Retaining bore d_1^{H7}
25	+0,021 0
32	
40	+0,025 0
50	
63	+0,030
80	0
100	+0,035 0
125	+0,040
160	0

Pillars of d_1 = 50 mm and over should be frozen in dry ice before fitting



2022.12. / 2022.15. / 2022.16. / 2022.17. / 2022.19. / 2022.29.

Guide pillar DIN 9833/ ISO 9182-3

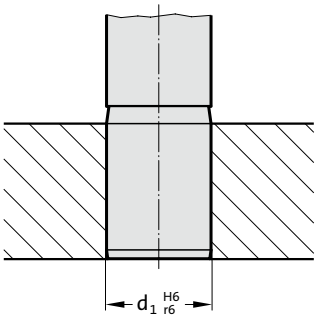
Mercedes-Benz / VDI / VW / WDX

press fit

2022.13.

Pillar-ø d_1	Retaining bore d_1^{H6}
40	+0,016
50	0
63	+0,019
80	0

Pillars of d_1 = 50 mm and over should be frozen in dry ice before fitting



2022.13.

Guide pillar VW

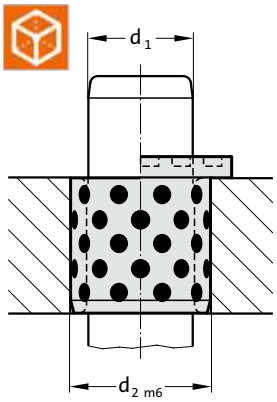
press fit

ASSEMBLY OF GUIDE ELEMENTS
DIMENSIONAL REQUIREMENTS AND TOLERANCES

2052.70. [1] / 2086.70. / 2085.72.

Guide bush / Guide bush with collar, Bronze with solid lubricant

slip-fit bonding*:
Retaining bore d_2 = G7
transition fit:
Retaining bore d_2 = H7
[1] if required secure with set screw



2052.70.[1] / 2086.70. / 2085.72.

Pillar-ø d_1	Retaining bore d_2	Slip-Fit Bonding Tolerance d_2^{G7}	transition fit Tolerance d_2^{H7}
8	12	+0,024 +0,006	+0,018 0
10	14/15		
12	18		
13	19	+0,028 +0,007	+0,021 0
14	20		
15	21		
16	22		
18/19	24/25		
20	26/28/30		
25	32/33/35	+0,034 +0,009	+0,025 0
28	38		
30	38/40/42		
31,5	40		
32	42		
35	44/45		
38	48		
40	50		
40	55	+0,040 +0,010	+0,030 0
45	55/56/60		
50	60/62/65		
55	70		
60	74/75		
63	75		
65	80		
70	85/90	+0,047 +0,012	+0,035 0
75	90/95		
80	96/100		
85	100		
90	110		
100	120		
110	130	+0,054 +0,014	+0,040 0
120	140		
125	145		
130	150		
140	160		
150	170		
160	180		

***Slip-Fit Bonding:**

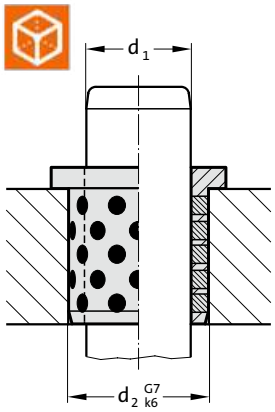
The glue-line gap must not be smaller than 0,005 mm, or the adhesive will be wiped off the contact surfaces upon fitment.

This would result in an unreliable bond.
The available component tolerances do not always result in the minimum glue-line gap.
This fact has to be born in mind when machining receiving bores, mor alternatively corrections can be made on the assembly bench.

2085.70.

Guide bush with collar, Bronze with solid lubricant

transition fit



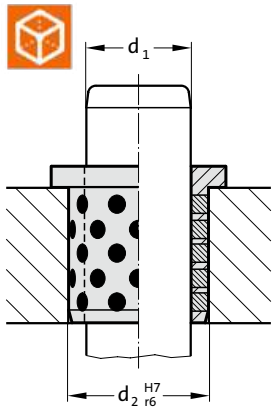
2085.70.

Pillar-ø d_1	Retaining bore d_2^{G7}	Tolerance d_2^{G7}
12	16	+0,024 +0,006
16	20	+0,028 +0,007
20	26	
24	30	

2085.71.

Guide bush with collar, Bronze with solid lubricant

press fit



2085.71.

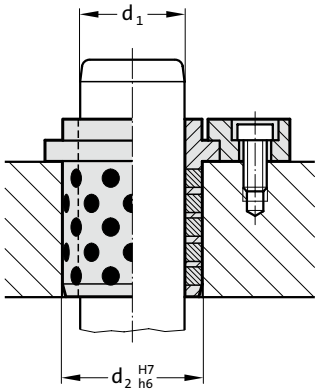
Pillar-ø d_1	Retaining bore d_2	Tolerance d_2^{H7}
10	14	+0,018 0
12	18	
13	19	+0,021 0
14	20	
15	21	
16	22	
20	30	
25	35	+0,025 0
30	40	
31,5	40	
35	45	
40	50	

Pillar-ø d_1	Retaining bore d_2	Tolerance d_2^{H7}
45	55	+0,030 0
50	60	
55	65	
60	75	
63	75	
70	85	+0,035 0
75	90	
80	100	
90	110	
100	120	
120	140	+0,040 0

ASSEMBLY OF GUIDE ELEMENTS
DIMENSIONAL REQUIREMENTS AND TOLERANCES

2082.70.

Pillar-ø d_1	Retaining bore d_2^{H7}	Tolerance d_2^{H7}
24/25	32/35	+0,025 0
30/32	40/42	
38/40	50	
48/50	63	+0,030 0
60/63	80	
80	100	+0,035 0
100	125	+0,040 0
125	160	
160	200	+0,046 0



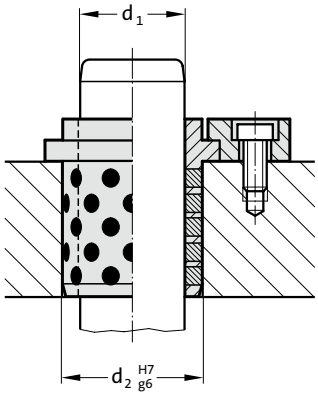
2082.70.

Guide bush with collar, Bronze with solid lubricant DIN 9834/ISO 9448

slip fit

2082.71. / 2086.71.

Pillar-ø d_1	Retaining bore d_2^{H7}	Tolerance d_2^{H7}
25/32/40	32/40/50	+0,025 0
50/63	63/80	+0,030 0
80	100	+0,035 0
100/125	125/160	+0,040 0



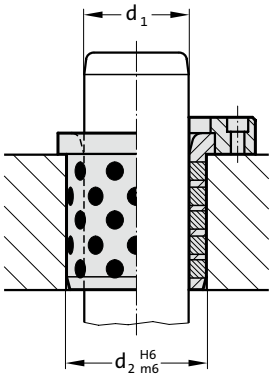
2082.71. / 2086.71.

Guide bush with collar, Bronze with solid lubricant, NAAMS

slip fit

2102.70. / 2102.71.

Pillar-ø d_1	Retaining bore d_2^{H6}	Tolerance d_2^{H6}
25	35	+0,016 0
32	44	
40	52	+0,019 0
50	63	
63	80	
80	100	+0,022 0
100	125	+0,025 0



2102.70. / 2102.71.

Guide bush with collar, Bronze with solid lubricant / Bronze, CNOMO

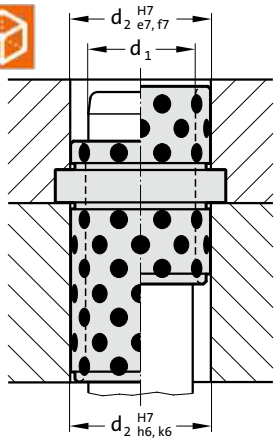
transition fit

ASSEMBLY OF GUIDE ELEMENTS
DIMENSIONAL REQUIREMENTS AND TOLERANCES

2087.70. / 2087.71. / 2087.73.

Guide bush with collar, Bronze with solid lubricant

e7 = slip fit
f7 = slip fit
h6 = slip fit
k6 = transition fit



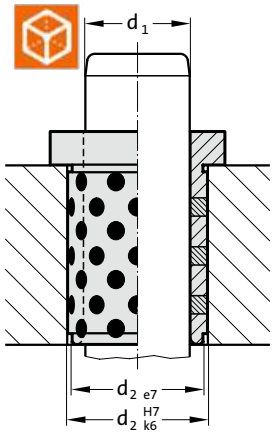
2087.70. / 2087.71. / 2087.73.

Pillar-ø d_1	Retaining bore d_2^{H7}	Tolerance d_2^{H7}
9/10	14	+0,018 0
14/15	20	+0,021 0
18/20	26	
22/24	30	
25	35	+0,025 0
30/32	42	
40	50	
40/42	54	+0,030 0
50	63	
60	80	
63	80	

2087.72.

Guide bush with collar, Bronze with solid lubricant

e7 = slip fit
k6 = transition fit



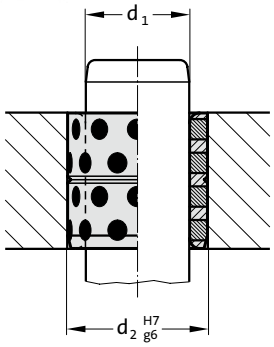
2087.72.

Pillar-ø d_1	Retaining bore d_2^{H7}	Tolerance d_2^{H7}
9/10	14	+0,018 0
12	18	
14/15	20	+0,021 0
16	22	
18/20	26	
22/24	30	
25	32	+0,025 0
30/32	42	
40/42	54	+0,030 0
50	66	
60	80	

3120.70. / 3120.71.

Guide bush with collar, Bronze with solid lubricant / Bronze

slip fit
Bond in or if required secure with set screw or flat mushroom head screw 2192.61.



3120.70. / 3120.71.

Pillar-ø d_1	Retaining bore d_2^{H7}	Tolerance d_2^{H7}
8	12	+0,018 0
10	14/15	
12	18	
13	19	+0,021 0
14	20	
15	21	
16	22	
18/19	24/25	
20	26/28/30	
25	32/33/35	+0,025 0
28	38	
30	38/40/42	
31,5	40	
32	42	
35	44/45	
38	48	
40	50	
40	55	+0,030 0
45	55/56/60	
50	60/62/65	
55	70	
60	74/75	
63	75	
65	80	
70	85/90	+0,035 0
75	90/95	
80	96/100	
85	100	
90	110	
100	120	
110	130	+0,040 0
120	140	
125	145	
130	150	
140	160	
150	170	
160	180	

ASSEMBLY OF GUIDE ELEMENTS
DIMENSIONAL REQUIREMENTS AND TOLERANCES

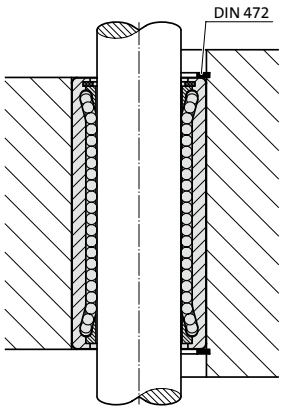
2061.69. .1

Pillar-ø d_1	Retaining bore d_3^{H5}
20	$32^{+0,011}$
25	$40^{+0,011}$
32	$48^{+0,011}$
40	$58^{+0,013}$
50	$70^{+0,013}$
63	$85^{+0,015}$

***Slip-Fit Bonding:**

The glue-line gap must not be smaller than 0,005 mm, or the adhesive will be wiped off the contact surfaces upon fitment.

This would result in an unreliable bond.
The available component tolerances do not always result in the minimum glue-line gap.
This fact has to be born in mind when machining receiving bores, mor alternatively corrections can be made on the assembly bench.



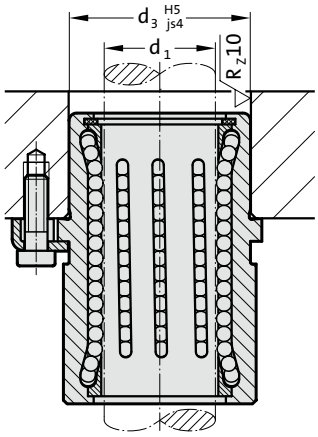
2061.69. .1

Recirculating ball bush

slip-fit bonding*

2081.69. .1

Pillar-ø d_1	Retaining bore d_3^{H5}
20	$32^{+0,011}$
25	$40^{+0,011}$
32	$48^{+0,011}$
40	$58^{+0,013}$
50	$70^{+0,013}$
63	$85^{+0,015}$



2081.69. .1

Recirculating ball bush with collar

transition fit