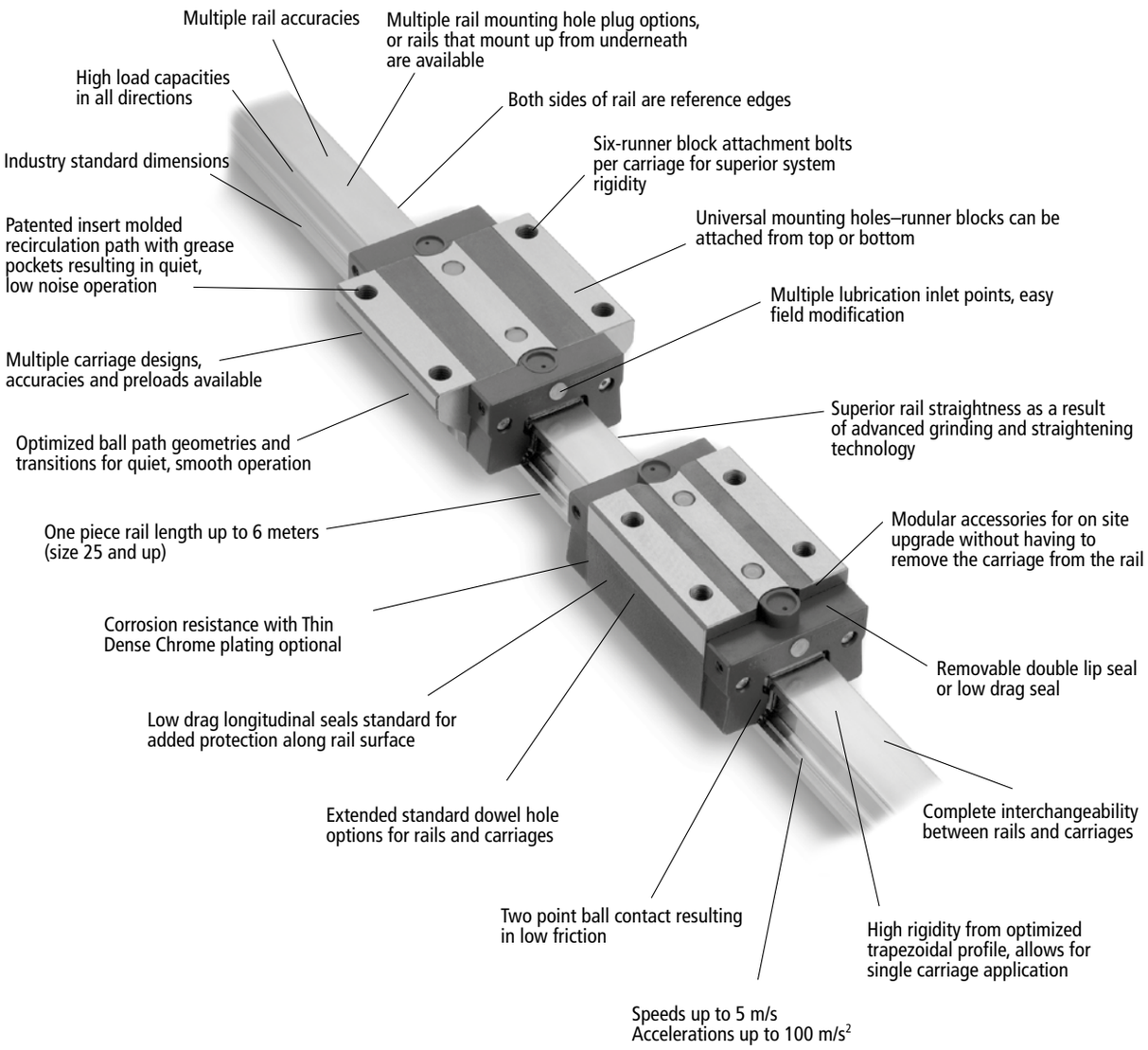
THOMSON
Linear Motion. Optimized.™

## 500 Series Ball Profile Rail Linear Guide



## 500 Series Ball Profile Rail Linear Guide

**Features**
The Thomson 500 Series Ball Linear Guide provides long life, exceptional rigidity, high dynamic and static load capacities, accommodation for high moment loads, high running accuracy, multiple sealing options and multiple lubrication inlet options. This allows for on-site field modifications, and interchangeability with competitor offering.

These properties result in improved machine accuracies and rigidity resulting in reduced vibration extending machine and tool life. This has a direct effect on operational efficiency resulting in cost savings for the user.

Available in 7 carriage designs, and sizes 15 to 45mm.

**Materials Linear Guides**
The 500 Series Ball Linear Guides are produced from high quality bearing steel. All carriages and rolling elements are through hardened and all rails are case hardened (except size 15 rail which is through hardened). The end cap is constructed of a high strength, glass filled nylon with nitrile rubber seal. Stringent quality controls are in place to ensure consistency of materials from the source, allowing us to ensure that we delivery the highest quality product.

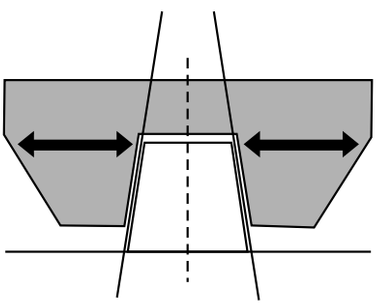
**Interchangeability**
The 500 Series Ball Linear Guides are completely interchangeable. Any carriage can be run on any rail of the same accuracy without compromising system accuracy. This is the result of our stringent manufacturing process controls.

**Accuracy and Preload**
The 500 Series Ball Linear Guides are available in three different accuracy classes, three different preload ranges and with clearance to allow for customization to your application needs.

**Straightness**
The 500 Series Ball rail is subjected to multiple straightening processes during and after grinding of the roller paths.

These added processes and inspections result in some of the straightest rails in the market today, improving machine accuracies wherever the 500 Series Ball is used.

**Rigidity**
The 500 Series Ball Linear Guide rail utilizes a special trapezoidal profile that maximizes the carriage cross section, resulting in the highest possible rigidity.

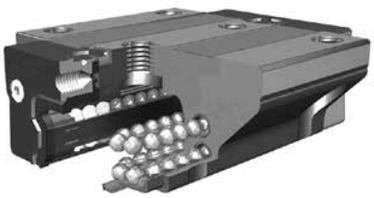


THOMSON
Linear Motion. Optimized.™

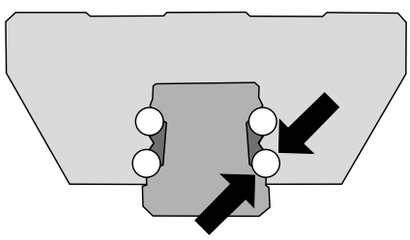
## 500 Series Ball Profile Rail Linear Guide

**Running Smoothness / Low Noise**
The running smoothness and low noise are the result of a patented, custom insert molded recirculation path that has an optimized geometric shape and minimal transitions, to ensure smooth and quiet operation in both low and high-speed operation.

In addition, the balls make contact at only two points between rail and carriage. As a result, friction is reduced to a minimum, resulting in quiet, smooth operation.

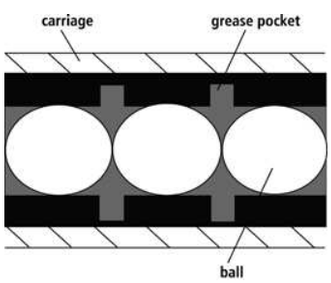


**Back-to-Back**
The 500 Series Linear Guide utilizes a back-to-back bearing arrangement, resulting in added rigidity. As a result, the 500 Series Ball can be used in single rail applications.



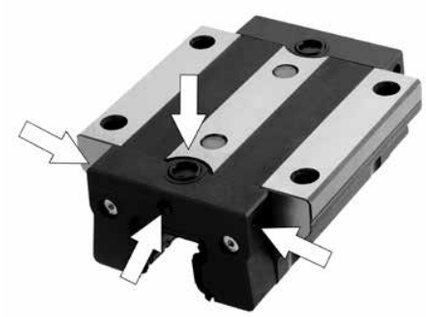
**Internal Grease Pockets**
The patented insert molded recirculation path has built in grease pockets. These provide an extra level of security by ensuring adequate lubrication is available to the ball bearings to help extend life.

The pocket and area between the balls provide greater grease quantities in the ball path than a conventional designed linear guide bearing.




**Multiple Lubrication Options**
The standard end cap is designed for flexibility. The end cap comes standard with four lubrication inlet options. These inlet options are easily changed on-site in the field or can be supplied from the factory.

Unsure of the best lubrication inlet location? These carriages allow the user to make these changes easily in the field to optimize the system performance. In addition, they allow for ease in maintenance – all without removing the carriage from the rail.



## 500 Series Ball Profile Rail Linear Guide


**Modular Accessory Options**
The standard carriage is supplied with low friction double lip seals and longitudinal seals that completely encase the bearing carriage to protect the balls and track surfaces and minimize lubrication loss.

Optional metal scrapers or wipers, lube blocks and oil reservoir components can be easily added on-site in the field or can be supplied assembled from the factory.

The trapezoidal rail profile allows for easy servicing and replacing or adding of the end cap, additional wiper and oil reservoir without removing the carriage from the rail.

These innovative design features allow users to easily, efficiently, and economically upgrade carriage sealing.

**Longitudinal Seals**
The carriage has built-in under carriage low drag longitudinal seals that protect the balls and ball path from contamination. These longitudinal seals are an added protection to increase the life and overall performance.

**Extended Standards**
Extended Standards are an assortment of Thomson dowel hole options for both carriage and rail products. Take the guesswork out of design by using our standard assortment of dowel hole options for ease of design and availability, another solution from Thomson. Refer to pages 34-35 for more information and detailed datasheets.

**Rail Accessories**
The rails have multiple options to protect the mounting holes to eliminate possible contamination entry into the bearing. Custom designed plastic plugs and stainless steel rail cover strip are available.

**Retained Balls**
The rolling elements of the carriages are retained within the bearing so the carriage can be removed from the rail without worrying about the balls falling out. It is recommended to place any removed carriage onto an assembly rail or shipping arbor to provide added protection to the rolling elements.

THOMSON
Linear Motion. Optimized.™

## 500 Series Profile Rail Enhanced Carriage

### 66% Smoother Running Design, with 50% Lower Drag Force* and Stainless Steel Options

**Features and Benefits**

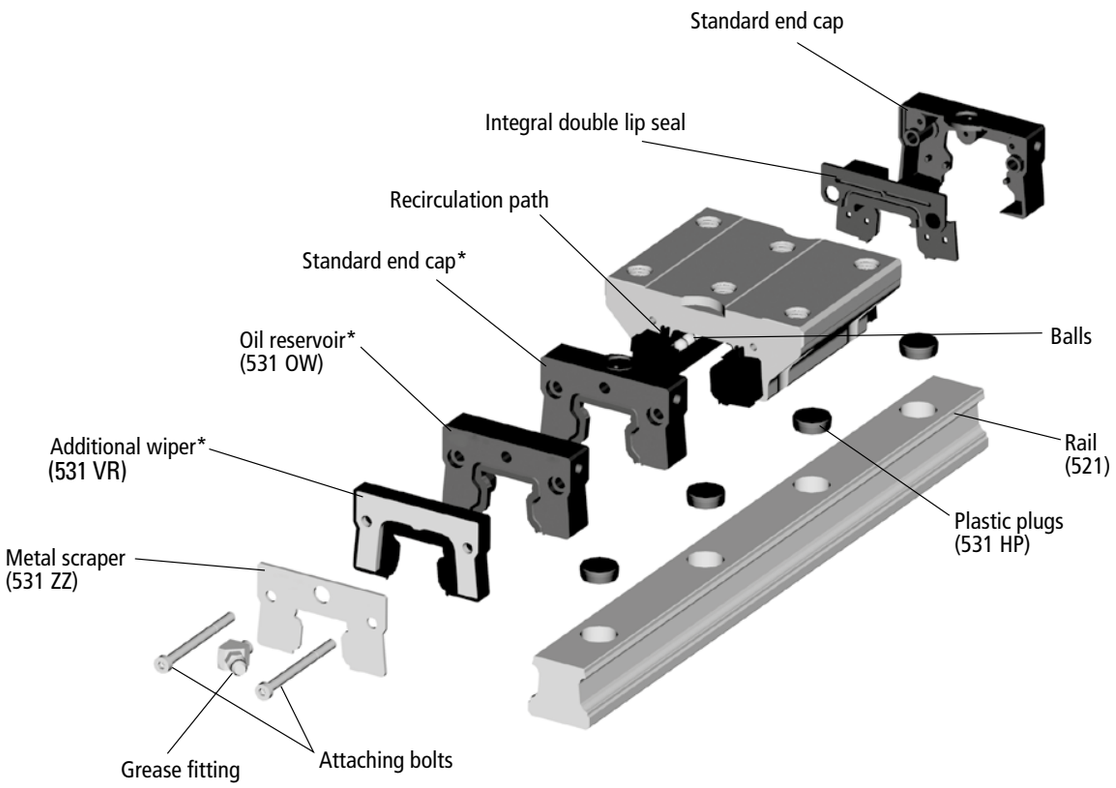
Now available in all sizes: the Thomson 500 Series Profile Rail enhanced carriage design can improve the smoothness and precision of your linear motion application. Optional 440B stainless carriages and rails provide corrosion resistance well-suited for medical, food, electronic assembly and semiconductor applications.

- Smoother running design optimizes the surface interfaces between steel and plastic transition areas along the ball bearing circulation path.
- Standard end seals provide twice the contaminant protection compared to competitive products. Optional low drag end seals are ideal for low push force requirements.
- Four longitudinal seals per carriage provide much better contaminant protection than competitive designs with only two longitudinal seals.
- Additional lubrication reservoir enables longer running time and easy change end caps & seals are quick to replace.
- 100% interchangeable with previous Thomson 500 Series carriage and rail.

** 66% smoothness increase measured as variability of drag force while the carriage is in motion. 50% lower drag force measured with new low drag seals option; 41% lower drag force measured with standard wiper option.*

## 500 Series Ball Profile Rail Linear Guide

### Modular Accessory Exploded View



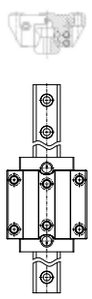
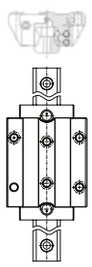
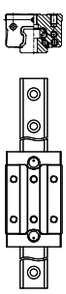
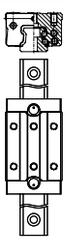

Also available (not shown):
- Lube Block (531 LL)
- Bolt up from bottom rail (521 Type U)
- Stainless Steel Rail, Cover Strip and Rail (521 Type C and 531RCS)

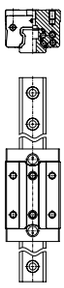
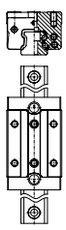
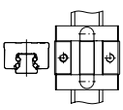
* Can be installed without removing carriage from the rail

The modular building block design of the 500 Series Ball Profile Rail Linear Guide assembly allows for easy on-site field upgrades for quick seal or lubrication changes, all without the need to remove the carriage from the rail.

## 500 Series Ball Standard Carriages

Thomson offers six carriage styles with six mounting holes allowing for additional mounting configurations in the field or for retrofitting. All provide superior rigidity and design flexibility.

| Style | | | Size | Accuracy | Basic Part Number | | | | Appropriate Rail Standard Style | Max. Single Piece Rail Length (mm) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Clearance | Preload 0.03C | Preload 0.08C | Preload 0.13C | | |
| Standard Carriage | A |  | 15 | H | 511H15A0 | 511H15A1 | 511H15A2 | – | – | 3000 |
| | | | | P | – | 511P15A1 | 511P15A2 | 511P15A3 | – | |
| | | | | U | – | 511U15A1 | 511U15A2 | 511U15A3 | 521U15A | |
| | | | 20 | H | 511H20A0 | 511H20A1 | 511H20A2 | – | 521H20A | 3000 |
| | | | | P | – | 511P20A1 | 511P20A2 | 511P20A3 | 521P20A | |
| | | | | U | – | 511U20A1 | 511U20A2 | 511U20A3 | 521U20A | |
| | | | 25 | H | 511H25A0 | 511H25A1 | 511H25A2 | – | 521H25A | 6000 |
| | | | | P | – | 511P25A1 | 511P25A2 | 511P25A3 | 521P25A | |
| | | | | U | – | 511U25A1 | 511U25A2 | 511U25A3 | 521U25A | |
| | | | 30 | H | 511H30A0 | 511H30A1 | 511H30A2 | – | 521H30A | 6000 |
| | | | | P | – | 511P30A1 | 511P30A2 | 511P30A3 | 521P30A | |
| | | | | U | – | 511U30A1 | 511U30A2 | 511U30A3 | 521U30A | |
| | | | 35 | H | 511H35A0 | 511H35A1 | 511H35A2 | – | 521H35A | 6000 |
| | | | | P | – | 511P35A1 | 511P35A2 | 511P35A3 | 521P35A | |
| | | | | U | – | 511U35A1 | 511U35A2 | 511U35A3 | 521U35A | |
| | | | 45 | H | 511H45A0 | 511H45A1 | 511H45A2 | – | 521H45A | 6000 |
| | | | | P | – | 511P45A1 | 511P45A2 | 511P45A3 | 521P45A | |
| | | | | U | – | 511U45A1 | 511U45A2 | 511U45A3 | 521U45A | |
| Standard Long Carriage | B |  | 20 | H | 511H20B0 | 511H20B1 | 511H20B2 | – | 521H20A | 3000 |
| | | | | P | – | 511P20B1 | 511P20B2 | 511P20B3 | 521P20A | |
| | | | | U | – | 511U20B1 | 511U20B2 | 511U20B3 | 521U20A | |
| | | | 25 | H | 511H25B0 | 511H25B1 | 511H25B2 | – | 521H25A | 6000 |
| | | | | P | – | 511P25B1 | 511P25B2 | 511P25B3 | 521P25A | |
| | | | | U | – | 511U25B1 | 511U25B2 | 511U25B3 | 521U25A | |
| | | | 30 | H | 511H30B0 | 511H30B1 | 511H30B2 | – | 521H30A | 6000 |
| | | | | P | – | 511P30B1 | 511P30B2 | 511P30B3 | 521P30A | |
| | | | | U | – | 511U30B1 | 511U30B2 | 511U30B3 | 521U30A | |
| | | | 35 | H | 511H35B0 | 511H35B1 | 511H35B2 | – | 521H35A | 6000 |
| | | | | P | – | 511P35B1 | 511P35B2 | 511P35B3 | 521P35A | |
| | | | | U | – | 511U35B1 | 511U35B2 | 511U35B3 | 521U35A | |
| | | | 45 | H | 511H45B0 | 511H45B1 | 511H45B2 | – | 521H45A | 6000 |
| | | | | P | – | 511P45B1 | 511P45B2 | 511P45B3 | 521P45A | |
| | | | | U | – | 511U45B1 | 511U45B2 | 511U45B3 | 521U45A | |
| Narrow Carriage | C |  | 15 | H | 511H15C0 | 511H15C1 | 511H15C2 | – | – | 3000 |
| | | | | P | – | 511P15C1 | 511P15C2 | 511P15C3 | – | |
| | | | | U | – | 511U15C1 | 511U15C2 | 511U15C3 | 521U15A | |
| | | | 20 | H | 511H20C0 | 511H20C1 | 511H20C2 | – | 521H20A | 3000 |
| | | | | P | – | 511P20C1 | 511P20C2 | 511P20C3 | 521P20A | |
| | | | | U | – | 511U20C1 | 511U20C2 | 511U20C3 | 521U20A | |
| | | | 25 | H | 511H25C0 | 511H25C1 | 511H25C2 | – | 521H25A | 6000 |
| | | | | P | – | 511P25C1 | 511P25C2 | 511P25C3 | 521P25A | |
| | | | | U | – | 511U25C1 | 511U25C2 | 511U25C3 | 521U25A | |
| | | | 30 | H | 511H30C0 | 511H30C1 | 511H30C2 | – | 521H30A | 6000 |
| | | | | P | – | 511P30C1 | 511P30C2 | 511P30C3 | 521P30A | |
| | | | | U | – | 511U30C1 | 511U30C2 | 511U30C3 | 521U30A | |
| | | | 35 | H | 511H35C0 | 511H35C1 | 511H35C2 | – | 521H35A | 6000 |
| | | | | P | – | 511P35C1 | 511P35C2 | 511P35C3 | 521P35A | |
| | | | | U | – | 511U35C1 | 511U35C2 | 511U35C3 | 521U35A | |
| Narrow Long Carriage | D |  | 20 | H | 511H20D0 | 511H20D1 | 511H20C2 | – | 521H20A | 3000 |
| | | | | P | – | 511P20D1 | 511P20D2 | 511P20D3 | 521P20A | |
| | | | | U | – | 511U20D1 | 511U20D2 | 511U20D3 | 521U20A | |
| | | | 25 | H | 511H25D0 | 511H25D1 | 511H25D2 | – | 521H25A | 6000 |
| | | | | P | – | 511P25D1 | 511P25D2 | 511P25D3 | 521P25A | |
| | | | | U | – | 511U25D1 | 511U25D2 | 511U25D3 | 521U25A | |
| | | | 30 | H | 511H30D0 | 511H30D1 | 511H30D2 | – | 521H30A | 6000 |
| | | | | P | – | 511P30D1 | 511P30D2 | 511P30D3 | 521P30A | |
| | | | | U | – | 511U30D1 | 511U30D2 | 511U30D3 | 521U30A | |
| | | | 35 | H | 511H35D0 | 511H35D1 | 511H35D2 | – | 521H35A | 6000 |
| | | | | P | – | 511P35D1 | 511P35D2 | 511P35D3 | 521P35A | |
| | | | | U | – | 511U35D1 | 511U35D2 | 511U35D3 | 521U35A | |

| Style | | | Size | Accuracy | Basic Part Number | | | | Appropriate Rail Standard Style | Max. Single Piece Rail Length (mm) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Clearance | Preload 0.03C | Preload 0.08C | Preload 0.13C | | |
| Narrow High Carriage | E |  | 15 | H | 511H15E0 | 511H15E1 | 511H15E2 | – | – | 3000 |
| | | | | P | – | 511P15E1 | 511P15E2 | 511P15E3 | – | |
| | | | | U | – | 511U15E1 | 511U15E2 | 511U15E3 | 521U15A | |
| | | | 25 | H | 511H25E0 | 511H25E1 | 511H25E2 | – | 521H25A | 6000 |
| | | | | P | – | 511P25E1 | 511P25E2 | 511P25E3 | 521P25A | |
| | | | | U | – | 511U25E1 | 511U25E2 | 511U25E3 | 521U25A | |
| | | | 30 | H | 511H30E0 | 511H30E1 | 511H30E2 | – | 521H30A | 6000 |
| | | | | P | – | 511P30E1 | 511P30E2 | 511P30E3 | 521P30A | |
| | | | | U | – | 511U30E1 | 511U30E2 | 511U30E3 | 521U30A | |
| | | | 35 | H | 511H35E0 | 511H35E1 | 511H35E2 | – | 521H35A | 6000 |
| | | | | P | – | 511P35E1 | 511P35E2 | 511P35E3 | 521P35A | |
| | | | | U | – | 511U35E1 | 511U35E2 | 511U35E3 | 521U35A | |
| | | | 45 | H | 511H45E0 | 511H45E1 | 511H45E2 | – | 521H45A | 6000 |
| | | | | P | – | 511P45E1 | 511P45E2 | 511P45E3 | 521P45A | |
| | | | | U | – | 511U45E1 | 511U45E2 | 511U45E3 | 521U45A | |
| Narrow High Long Carriage | F |  | 25 | H | 511H25F0 | 511H25F1 | 511H25F2 | – | 521H25A | 6000 |
| | | | | P | – | 511P25F1 | 511P25F2 | 511P20F3 | 521P25A | |
| | | | | U | – | 511U25F1 | 511U25F2 | 511U20F3 | 521U25A | |
| | | | 30 | H | 511H30F0 | 511H23F1 | 511H30F2 | – | 521H30A | 6000 |
| | | | | P | – | 511P30F1 | 511P30F2 | 511P30F3 | 521P30A | |
| | | | | U | – | 511U30F1 | 511U30F2 | 511U30F3 | 521U30A | |
| | | | 35 | H | 511H35F0 | 511H35F1 | 511H35F2 | – | 521H35A | 6000 |
| | | | | P | – | 511P35F1 | 511P35F2 | 511P35F3 | 521P35A | |
| | | | | U | – | 511U35F1 | 511U35F2 | 511U35F3 | 521U35A | |
| | | | 45 | H | 511H45F0 | 511H45F1 | 511H45F2 | – | 521H45A | 6000 |
| | | | | P | – | 511P45F1 | 511P45F2 | 511P45F3 | 521P45A | |
| | | | | U | – | 511U45F1 | 511U45F2 | 511U45F3 | 521U45A | |
| Narrow Short Carriage | G |  | 15 | H | 511H15G0 | 511H15G1 | 511H15G2 | – | – | 3000 |
| | | | | P | – | 511P15G1 | 511P15G2 | 511P15G3 | – | |
| | | | | U | – | 511U15G1 | 511U15G2 | 511U15G3 | 521U15A | |
| | | | 20 | H | 511H20G0 | 511H20G1 | 511H20G2 | – | 521H20A | 3000 |
| | | | | P | – | 511P20G1 | 511P20G2 | 511P20G3 | 521P20A | |
| | | | | U | – | 511U20G1 | 511U20G2 | 511U20G3 | 521U20A | |

**Extended Standard Carriage Options**

The carriages are also available with the Thomson standard dowel holes or lubrication inlets as shown on pages 30-33 or special lubricants either from stock or with a short lead-time.

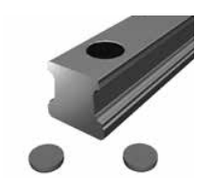
**Type A** **Type U**

**Rail Types and Accessories**

The rails are available in two configurations:

- Bolt down from the top – 521 Type A
- Bolt up from the bottom – 521 Type U

The standard 521 rail mounting holes can be plugged or sealed after installation with the options below.



**Plastic Plugs**

531HP plastic plugs are an inexpensive and simple method to seal the rail attachment bolt area. The plastic plugs are easily driven in place to any rail with a soft non-metallic drift. They can easily be removed.

**Stainless Steel Cover Strip**

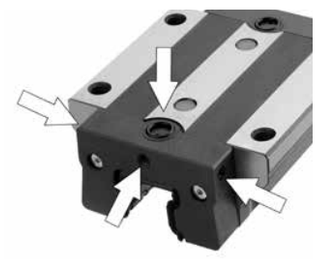
Option 531RCS utilizes a special rail (521 Type C) and stainless steel cover strip that is easily installed with the proper mounting tool.

THOMSON Linear Motion. Optimized.™

## Additional Seal Types and Lubrication Accessories

The carriage is designed with modular sealing and lubrication options for simple on-site field modification or can be supplied factory direct.

The standard carriage end cap has an integral low friction double lip seal and longitudinal seal that completely encase the bearing carriage. The double lip design keeps contaminants out and lubrication in. It also allows for grease to purge out of the carriage to prevent excessive lubrication, which can result in higher operating temperatures. This double lip design can be used with oil lubrication.



The standard carriage end cap is equipped with a lubrication inlet centered with a specially designed lubricant channel to direct the lubrication to individual ball tracks. The lubrication inlet can be easily changed in the field or supplied from the factory with a side inlet or top inlet.


**Additional Seal**
The **531 VR** seal provide an additional level of protection from contaminants to the assembly. This additional component can easily be added on-site without removing the carriage from the rail. It is supplied with the required screws to make the installation simple.

- 531 VR is constructed from durable Viton®

This seal can be used in conjunction with other optional modular accessories providing an easy upgrade to the standard seal. It can be easily installed on-site in the field or can be supplied from the factory.

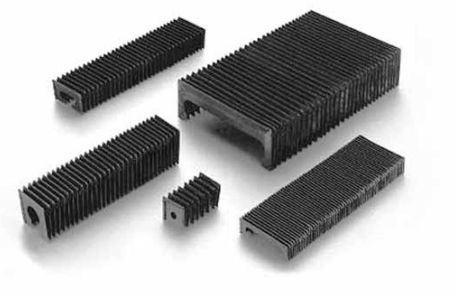
**Metal Scraper**
The Type **531 ZZ Metal Scraper** made of stainless steel, serves as an added protection to the seal lips against large dirt particles, metal shavings or chips. Large contaminants are easily pushed away providing an extra level of protection to the seal lips. The Metal Scraper is easily installed in conjunction with the other optional modular accessories providing you with an easy upgrade to the standard seal. These can be easily installed on-site in the field or can be supplied from the factory.

### Oil Reservoir

The Type **531 OW oil reservoir** is a cost effective, automatic lubrication system. It is constructed with an integrated oil reservoir that provides a uniform, consistent lubricating oil to the ball paths for extended periods of time. The Type 531 OW oil reservoir lubrication plate eliminates the need for a routine maintenance schedule, assures lubrication gets to the required points, can be refilled if required, and can operate up to 5000 km of travel. The Type 531 OW oil reservoir can be easily installed in conjunction with other optional modular accessories providing an easy upgrade to the standard seals. These can be easily installed on-site in the field or can be supplied from the factory.

### Lube Block

The **531 LL Lube Block** is a solid lubricant that is a mixture of polymers, oils and selected additives that reduce the penetration of dirt, grit, and liquids into the ball path, preventing premature failures. The oil diffuses, lubricating the ball path surfaces by capillary action. Additional oil is supplied to the ball path surfaces from the polymer. For additional protection the assembly is packed with EP2 grease. There is no need for maintenance or additional lubrication during the life of the Lube Block filled bearing. The 531 LL Lube Block can be easily installed in conjunction with the other optional modular accessories providing an easy upgrade to the standard seal. These can be easily installed on-site in the field or can be supplied from the factory.



### Bellows

**Standard bellows** are available for all assemblies. The bellows cover the entire length of the rail. The bellows are used to provide additional protection against dirt, dust and splashed liquids. Installation is simple and requires little time. Retrofitting is possible when the rail ends are drilled for the attachment of the end plate 531. Bellows are available in three styles:

- Type B “Low Profile” with outside dimensions that do not exceed the carriage
- Type C “High Compression”
- Type W “Walk On” capable of handling the harshest environments with a 90 kg load bearing capacity

The bellow can be easily installed in conjunction with other optional modular seals providing you with a simple upgrade to the standard seal. These can be installed on-site in the field or can be supplied from the factory.

Note: Additional modular accessories add additional drag to the carriage assembly resulting in increased start up friction and power consumption.

**Relative Drag Comparison for Design Consideration**

| Type | Relative Drag* |
|---|---|
| Standard carriage | • |
| Viton® Wiper (531 VR) | • • • |
| Metal Scraper (531 ZZ) | • |
| Oil Reservoir (531 OW) | • • |
| Lube Block (531 LL) | • • • • |

* • = Lowest / • • • • = Highest

**For ordering information or for additional Seal Types and Lubrication Accessories, see pages 42-43.**

THOMSON
Linear Motion. Optimized.™

# 500 Series Ball

## Part Numbering Description

**Ball Carriage**

| STANDARD | | | | | | | OPTIONS | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5 | 1 | 1 | H | 15 | A | 1 | D | L V | Z | ES1 | SM |

**500 Series Profile Carriage**

**Product Type**
**1** Carriage

**Type**[3]
**1** Ball

**Accuracy Class**[2]
**H** High Grade
**P** Precision Grade[4]
**U** Ultra Precision Grade[4]

**Size**
**15** **30**
**20** **35**
**25** **45**

**Carriage Style**[5]
**A** Standard
**B** Standard Long
**C** Narrow
**D** Narrow Long
**E** Narrow High
**F** Narrow Long High
**G** Narrow Short

**Preload**
**0** Clearance
**1** Approximately 0.03 C
**2** Approximately 0.08 C
**3** Approximately 0.13 C

**Corrosion-resistant Option**
**D** Duralloy
(H & P accuracy only)
**S** Stainless Steel Material
(Refer to page 30 for product availability and load ratings)

**Accessories**[1]
**L** Long Life Lube Block
**N** Additional Oil Reservoir
**V** Additional Viton Wiper
**Z** Metal Scraper
**C** Bellow Clips
**K** Low Drag Seal

**Extended Standards - Options**
**ES1** 6 mm Dowel Hole - Slip Fit
**ES2** 10 mm Dowel Hole - Slip Fit
**ES3** 1/4" Dowel Hole - Slip Fit
**ES4** 3/8" Dowel Hole - Slip Fit
**ES10** Side lubrication in end caps
**ES11** Top lubrication in end caps
**ES12** (2) 6 mm Dowel Holes - Press Fit
**ES13** (2) 10 mm Dowel Holes - Press Fit
**ES14** (2) 1/4"Dowel Holes - Press Fit
**ES15** (2) 3/8"Dowel Holes - Press Fit
**G1** Greased with Mobilux® EP2
**G2** Greased with Krytox® GPL227
**G3** Greased with Thomson Linear Lube
**GS** Greased per customer specification

**Specials**
**SM** Special per customer print

1. Accessory combination part numbers are listed from carriage end cap outward. Not all combinations are available. For specific combination availability see pages 40-41.

2. The 500 Series Ball lowest accuracy grade is High as a result of tight manufacturing controls and grinding capabilities. We do not offer Normal grade accuracy, our High grade is our Normal grade.

3. New enhanced carriage does not retain ball bearings when end cap is removed. Removal of end caps can result in loss of ball bearings.

4. Available with preload only.

5. Narrow High carriages are not available in a size 20".

# 500 Series Ball

## Part Numbering Description

**Ball Rail**

| STANDARD | | | | | | | OPTIONS | | STANDARD |
|---|---|---|---|---|---|---|---|---|---|
| 5 | 2 | 1 | H | 15 | A | D | DH1 | SM | +xxxx Y= (see note 1) |

**500 Series Profile Rail**

**Product Type**
**2** Rail

**Type**
**1** Ball

**Accuracy Class**
**H** High Grade
**P** Precision Grade
**U** Ultra Precision Grade

**Size**
**15** **30**
**20** **35**
**25** **45**

**Rail Style**
**A** Standard
**U** Bolt up from Bottom
C Cover Strip [4]

**Corrosion-resistant option**
**D** Thin Dense Chrome
**S** Stainless Steel Material [5]

**Machined Options**
**DH1** 6mm Dowel Hole + Slot
**DH2** 10mm Dowel Hole + Slot
**DH3** 1/4" Dowel Hole + Slot
**DH4** 3/8" Dowel Hole + Slot
**JT** [3] Butt Joint
**E** Bellow Clips Attached

**Specials**
**SM** Special Per Customer Print

**Length (mm)**
**xxxx** Customer Specified Length
**RL1500** Stock Length [2]

1. Y = Distance from end of rail to center of first mounting hole, Y1 = Y2 unless specified
2. Stock length rails are considered random length, total length may exceed specified length, and Y1/Y2 are not equal. To be used by customer who will cut to length.
3. Customer drawing required at time of quote and order. See page 155 for more information and templates.
4. Cover strip not available in combination with stainless steel.
5. Not available in size 45. Refer to page 14 for product availability and load ratings.

# 500 Series Part Numbering Description

## Part Numbering Description

**Ball Assembly**

| STANDARD | | | | | | | OPTIONS | STANDARD | | OPTIONS | | STANDARD | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5 | 4 | 1 | H | 25 | A | 1 | D LZES1 | 2 | A | D | DH1 | + xxx | Y= xx |

**500 Series Profile Carriage**

**Product Type**
**4** Assembly

**Type**
**1** Ball

**Accuracy Class**
**H** High Grade
**P** Precision Grade
**U** Ultra Precision Grade

**Size**
**15, 20, 25, 30, 35, 45**

**Carriage Style**
**A** Standard
**B** Standard Long
**C** Narrow
D Narrow Long
E Narrow High
F Narrow Long High
G Narrow Short

**Preload**
**0** Clearance
**1** Approximately 0.03 C
**2** Approximately 0.08 C
**3** Approximately 0.13 C

**Coating Option**
**D** Thin Dense Chrome
**S** Stainless Steel

**Number of carriages**

**Rail Style**
**A** Standard
**U** Bolt up from Bottom
**C** Cover Strip

**Accessories**
**L** Long Life Lube Block
**N** Additional Oil Reservoir
**V** Additional Viton Wiper
**Z** Metal Scraper
**C** Bellow Clips

**Extended Standards - Options**
**ES1** 6mm Dowel Hole - Slip Fit
**ES2** 10mm Dowel Hole - Slip Fit
**ES3** 1/4" Dowel Hole - Slip Fit
**ES4** 3/8" Dowel Hole - Slip Fit
**ES10** Side lubrication in end caps
**ES11** Top lubrication in end caps
**ES12** (2) 6mm Dowel Holes - Press Fit
**ES13** (2)10mm Dowel Holes - Press Fit
**ES14** (2) 1/4" Dowel Holes - Press Fit
**ES15** (2) 3/8" Dowel Holes - Press Fit
**G1** Greased with Mobilux® EP2
**G2** Greased with Kyrtox® GPL227
**G3** Greased with Thomson Linear Lube®
**GS** Greased per customer specification

**Coating Option**
**D** Thin Dense Chrome (H and P accuracy only)
**S** Stainless Steel

**Machined Options**
**DH1** 6mm Dowel Hole + Slot
**DH2** 10mm Dowel Hole + Slot
**DH3** 1/4" Dowel Hole + Slot
**DH4** 3/8" Dowel Hole + Slot
**JT** Butt Joint
**E** Bellow Clips Attached

**Length (mm)**
**xxx** Customer Specified Length

## 500 Series Part Numbering Description

### Part Numbering Description

**Ball Accessories**

**5 3 1 VR 15**

**500 Series Profile Rail**

**Product Type**
**3** Accessory

**Type**
**1** Ball

**Size**
**15** **30**
**20** **35**
**25** **45**

**Bellows**
**BB** Low Profile Bellow s[1]
**BC** High Compression Bellows [1]
**BW** Walk On Bellows [1]
**CC** Bellow clips for Carriage
**CR** Bellow clips for Rail

**Rail Hole Covers or Plugs**
**HP** Plastic Rail Plugs (25 pcs.)
**RCS** Rail Cover Strip [1 2]
**RCT** Rail Cover Strip Installation Tool
**RCP** Rail Cover End Cap

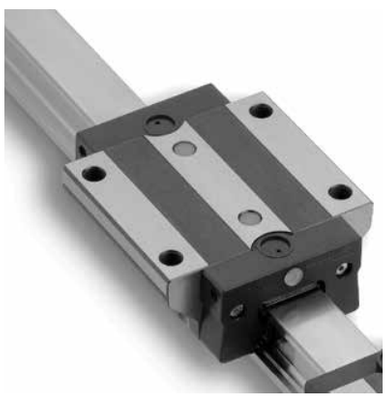
**Modular Seal Accessories** [2]
**VR** Viton® Wiper
**ZZ** Metal Scraper
**OW** Oil Reservoir
**LL** Lube Block
**LS** Replacement Spring for LL Option
**K** Low Drag Seal
**RS** Replacement Seals

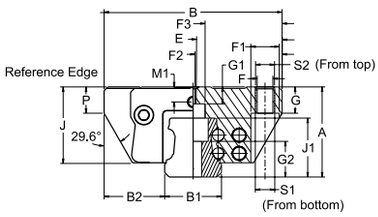
**Mounting Assembly T ools**
**MT** Mounting Rail

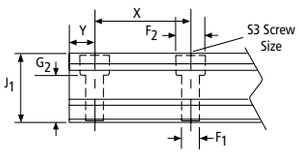
1. Bellows and rail cover strip must include length at time of order. Example: 531BB15 + 1000mm. See page 154 on how to calculate bellows length.
2. Cover strip not available in combination with stainless steel.
3. Two standard screws included with each item. Screws for attaching this accessory to carriage and not combinations of accessories.

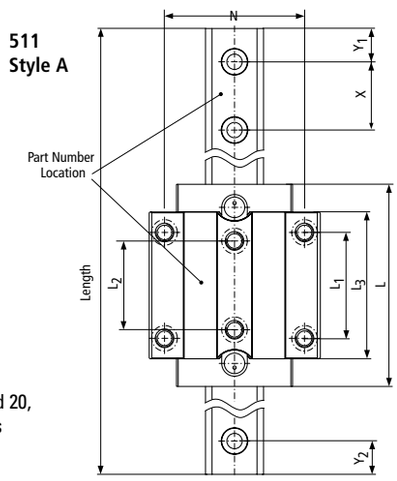
# 500 Series Ball

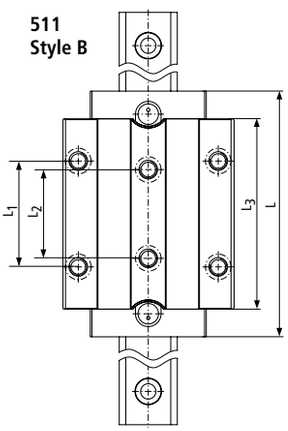
## 511 Style A and B






Stainless Steel Material
(available in sizes 15 and 20, and carriage style styles A and C only)

## 511 Style A – Standard Ball

| Size | Dimensions (mm) A | B +0.0 −0.4 | $B_1$* ±0.05 | $B_2$ | J | $J_1$ | L | $L_1$ | $L_2$ | $L_3$ | X | N | $S_1$ | $S_2$ | $S_3$ | F | $F_1$ | $F_2$ | $F_3$ | Ball Ø | G | $G_1$ | $G_2$ | $M_1$ | O | P |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 15 | 24 | 47 | 15 | 16 | 20.2 | 15.7 | 56.6 | 30 | 26 | 39.6 | 60 | 38 | M 4 | M 5 | M 4 | 4.4 | 4.5 | 8 | 7.5 | 3.2 | 7 | 4.5 | 9.5 | 4 | 7 | 7 |
| 20 | 30 | 63 | 20 | 21.5 | 25.5 | 19 | 71.5 | 40 | 35 | 49.5 | 60 | 53 | M 5 | M 6 | M 5 | 5.4 | 5.8 | 10 | 9.5 | 40 | 8 | 6.5 | 11.5 | 5.2 | 8 | 8 |
| 25 | 36 | 70 | 23 | 23.5 | 30.5 | 22.7 | 84.5 | 45 | 40 | 59.5 | 60 | 57 | M 6 | M 8 | M 6 | 6.8 | 7 | 11 | 11 | 4.8 | 9 | 8.7 | 14 | 5.5 | 7 | 11 |
| 30 | 42 | 90 | 28 | 31 | 35.9 | 26 | 97.4 | 52 | 44 | 69.4 | 80 | 72 | M 8 | M 10 | M 8 | 8.5 | 9 | 15 | 15 | 5.6 | 12 | 10 | 14.5 | 7 | 8 | 12 |
| 35 | 48 | 100 | 34 | 33 | 41 | 29.5 | 111.6 | 62 | 52 | 79.6 | 80 | 82 | M 8 | M 10 | M 8 | 8.5 | 9 | 15 | 15 | 6.4 | 12 | 12 | 18 | 7 | 8 | 14 |
| 45 | 60 | 120 | 45 | 37.5 | 50.8 | 37 | 137.1 | 80 | 60 | 99.1 | 105 | 100 | M 10 | M 12 | M 12 | 10.5 | 14 | 20 | 18 | 7.9 | 15 | 15 | 22 | 8 | 10 | 17.5 |

## 511 Style B – Standard Long Ball

| Size | Dimensions (mm) A | B +0.0 −0.4 | $B_1$* ±0.05 | $B_2$ | J | $J_1$ | L | $L_1$ | $L_2$ | $L_3$ | X | N | $S_1$ | $S_2$ | $S_3$ | F | $F_1$ | $F_2$ | $F_3$ | Ball Ø | G | $G_1$ | $G_2$ | $M_1$ | O | P |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 20 | 30 | 63 | 20 | 21.5 | 25.5 | 19 | 87.5 | 40 | 35 | 65.5 | 60 | 53 | M 5 | M 6 | M 5 | 5.4 | 5.8 | 10 | 9.5 | 4.0 | 8 | 6.5 | 11.5 | 5.2 | 8 | 8 |
| 25 | 36 | 70 | 23 | 23.5 | 30.5 | 22.7 | 103.5 | 45 | 40 | 78.5 | 60 | 57 | M 6 | M 8 | M 6 | 6.8 | 7 | 11 | 11 | 4.8 | 9 | 8 | 14 | 5.5 | 7 | 11 |
| 30 | 42 | 90 | 28 | 31 | 35.9 | 26 | 119.4 | 52 | 44 | 91.4 | 80 | 72 | M 8 | M 10 | M 8 | 8.5 | 9 | 15 | 15 | 5.6 | 12 | 10 | 14.5 | 7 | 8 | 12 |
| 35 | 48 | 100 | 34 | 33 | 41 | 29.5 | 137.1 | 62 | 52 | 105.1 | 80 | 82 | M 8 | M 10 | M 8 | 8.5 | 9 | 15 | 15 | 6.4 | 12 | 12 | 18 | 7 | 8 | 14 |
| 45 | 60 | 120 | 45 | 37.5 | 50.8 | 37 | 168.6 | 80 | 60 | 130.6 | 105 | 100 | M 10 | M 12 | M 12 | 10.5 | 14 | 20 | 18 | 7.9 | 15 | 15 | 22 | 8 | 10 | 17.5 |

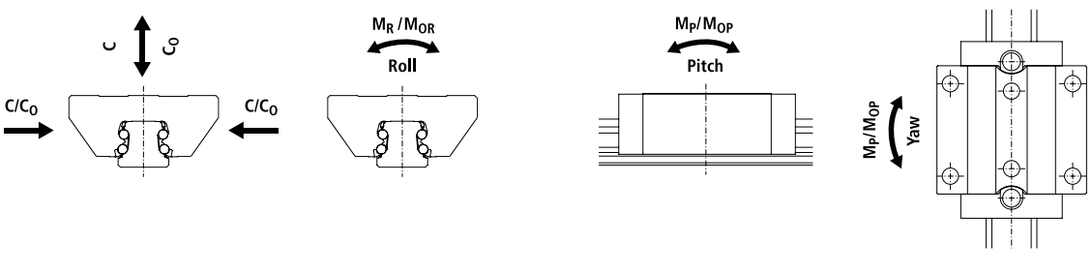
* Standard tolerance shown, special lower tolerances are available upon request. Please consult application engineering for additional information.
† All thread pitches will be ISO coarse.

## 500 Series Ball

### 511 Style A and B

**Dynamic Load and Moment Ratings**
C = Dynamic load rating
$M_P$ = Dynamic pitch and yaw moment rating
$M_R$ = Dynamic roll moment rating

**Static Load and Moment Ratings**
$C_O$ = Static load rating
$M_{OP}$ = Static pitch and yaw moment rating
$M_{OR}$ = Static roll moment rating




| 511 Style | Size | Load Rating | | | | | | | | | Weights | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Static | | | Dynamic | | | | | | Carriage | Rail |
| | | | | | 100 Km | | | 50 Km | | | | |
| | | $C_O$ (N) | $M_{OR}$ (Nm) | $M_{OP,OY}$ (Nm) | C (N) | $M_R$ (Nm) | $M_{P,Y}$ (Nm) | C (N) | $M_R$ (Nm) | $M_{P,Y}$ (Nm) | (kg) | (kg/m) |
| A | 15 | 19 600 | 181 | 146 | 9 000 | 83 | 67 | 11 339 | 105 | 84 | 0.2 | 1.4 |
| | 20 | 31 400 | 373 | 292 | 14 400 | 171 | 134 | 18 143 | 215 | 169 | 0.5 | 2.2 |
| | 25 | 46 100 | 631 | 513 | 21 100 | 289 | 235 | 26 584 | 364 | 296 | 0.7 | 3.0 |
| | 30 | 63 700 | 1 084 | 829 | 29 200 | 497 | 380 | 36 790 | 626 | 479 | 1.2 | 4.3 |
| | 35 | 84 400 | 1 566 | 1 252 | 38 700 | 718 | 574 | 48 759 | 905 | 723 | 1.8 | 5.4 |
| | 45 | 134 800 | 3 193 | 2 498 | 61 900 | 1466 | 1 147 | 77 989 | 1 847 | 1 445 | 3.3 | 8.8 |
| B | 20 | 41 100 | 490 | 495 | 17 400 | 206 | 208 | 21 923 | 260 | 262 | 0.6 | 2.2 |
| | 25 | 60 300 | 825 | 863 | 25 500 | 349 | 365 | 32 128 | 440 | 460 | 0.9 | 3.0 |
| | 30 | 83 300 | 1 414 | 1 390 | 35 300 | 599 | 589 | 44 475 | 755 | 742 | 1.5 | 4.3 |
| | 35 | 110 300 | 2 048 | 2 104 | 46 700 | 867 | 891 | 58 838 | 1 092 | 1 123 | 2.3 | 5.4 |
| | 45 | 176 300 | 4 175 | 4 199 | 74 700 | 1 769 | 1 779 | 94 116 | 2 229 | 2 241 | 4.2 | 8.8 |

1. The dynamic load and moment ratings are based on the travel life specified on the table (100 km or 50 km). When comparing these load ratings with other bearings you must take into consideration the proper travel life basis.
2. The static load and moment ratings are the maximum radial load and moment load that should be applied to the bearing when there is no relative motion between the carriage and the rail.

### Bearing Travel Life Comparison

**$L = (C/F)^3 \times 100km$**
**where:**
**L = travel life, km**
**C = 100 km dynamic load rating**
**F = applied dynamic load, N**

**$C_{min} = F \left(\frac{L}{100}\right)^{1/3}$**
**where:**
**Cmin = minimum required dynamic load rating, N**
**F = applied dynamic load, N**
**L = required travel life, km**

**Operating Parameters:**

| | | |
|---|---|---|
| **Maximum Velocity:** | **5 m/s** | |
| **Maximum Acceleration:** | **100 m/s²** | |
| **Temperature:** | **Min:** | **– 40° C** |
| | **Max:** | **80° C** |
| | **Max peak:** | **120° C short time*** |

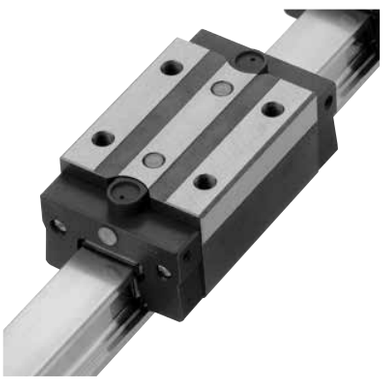
*without bellows

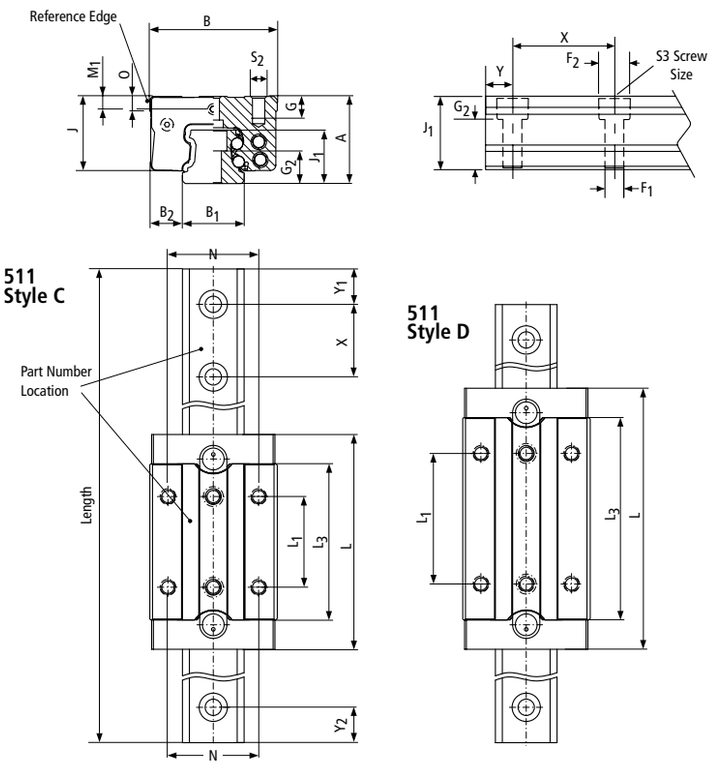
**Conversion Factors:** See Page 156

THOMSON
Linear Motion. Optimized.™

# 500 Series Ball Profile Rail Linear Guide

## 511 Style C and D






## 511 Style C Narrow

| Size | Dimensions (mm) A | B +0.0 −0.4 | $B_1$* ±0.05 | $B_2$ | J | $J_1$ | L | $L_1$ | $L_3$ | X | N | $S_2/S_3$ | $F_1$ | $F_2$ | Ball Ø | G | $G_2$ | $M_1$ | O |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 15 | 24 | 34 | 15 | 9.5 | 20.2 | 15.7 | 56.6 | 26 | 39.6 | 60 | 26 | M 4 | 4.5 | 8 | 3.2 | 5 | 9.5 | 4 | 5.5 |
| 20 | 30 | 44 | 20 | 12 | 25.5 | 19 | 71.5 | 36 | 49.5 | 60 | 32 | M 5 | 5.8 | 10 | 4.0 | 7 | 11.5 | 5.2 | 6 |
| 25 | 36 | 48 | 23 | 12.5 | 30.5 | 22.7 | 84.5 | 35 | 59.5 | 60 | 35 | M 6 | 7 | 11 | 4.8 | 9 | 14 | 5.5 | 7.5 |
| 30 | 42 | 60 | 28 | 16 | 35.9 | 26 | 97.4 | 40 | 69.4 | 80 | 40 | M 8 | 9 | 15 | 5.6 | 11 | 14.5 | 7 | 8 |
| 35 | 48 | 70 | 34 | 18 | 41 | 29.5 | 111.6 | 50 | 79.6 | 80 | 50 | M 8 | 9 | 15 | 6.4 | 12 | 18 | 7 | 8 |

## 511 Style D Narrow Long

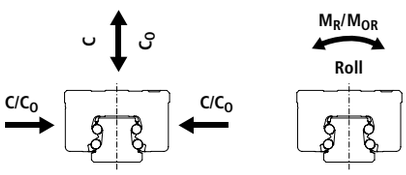
| Size | Dimensions (mm) A | B +0.0 −0.4 | $B_1$* ±0.05 | $B_2$ | J | $J_1$ | L | $L_1$ | $L_3$ | X | N | $S_2/S_3$ | $F_1$ | $F_2$ | Ball Ø | G | $G_2$ | $M_1$ | O |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 20 | 30 | 44 | 20 | 12 | 25.5 | 19 | 87.5 | 50 | 65.5 | 60 | 32 | M 5 | 5.8 | 10 | 4.0 | 7 | 11.5 | 5.2 | 6 |
| 25 | 36 | 48 | 23 | 12.5 | 30.5 | 22.7 | 103.5 | 50 | 78.5 | 60 | 35 | M 6 | 7 | 11 | 4.8 | 9 | 14 | 5.5 | 7.5 |
| 30 | 42 | 60 | 28 | 16 | 35.9 | 26 | 119.4 | 60 | 91.4 | 80 | 40 | M 8 | 9 | 15 | 5.6 | 11 | 14.5 | 7 | 8 |
| 35 | 48 | 70 | 34 | 18 | 41 | 29.5 | 137.1 | 72 | 105.1 | 80 | 50 | M 8 | 9 | 15 | 6.4 | 12 | 18 | 7 | 8 |

* Standard tolerance shown, special lower tolerances are available upon request. Please consult application engineering for additional information.

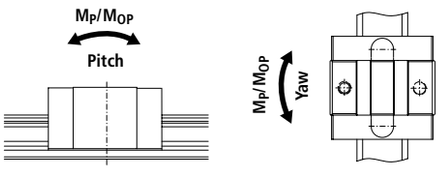
## 500 Series Ball

### 511 Style C and D

**Dynamic Load and Moment Ratings**
C = Dynamic load rating
$M_P$ = Dynamic pitch and yaw moment rating
$M_R$ = Dynamic roll moment rating




**Static Load and Moment Ratings**
$C_O$ = Static load rating
$M_{OP}$ = Static pitch and yaw moment rating
$M_{OR}$ = Static roll moment rating




| 511 Style | Size | Load Rating | | | | | | | | | Weights | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Static | | | Dynamic | | | | | | Carriage | Rail |
| | | | | | 100 Km | | | 50 Km | | | | |
| | | $C_O$ (N) | $M_{OR}$ (Nm) | $M_{OP,OY}$ (Nm) | C (N) | $M_R$ (Nm) | $M_{P,Y}$ (Nm) | C (N) | $M_R$ (Nm) | $M_{P,Y}$ (Nm) | (kg) | (kg/m) |
| C | 15 | 19 600 | 181 | 146 | 9 000 | 83 | 67 | 11 339 | 105 | 84 | 0.2 | 1.4 |
| | 20 | 31 400 | 373 | 292 | 14 400 | 171 | 134 | 18 143 | 215 | 169 | 0.5 | 2.2 |
| | 25 | 46 100 | 631 | 513 | 21 100 | 289 | 235 | 26 584 | 364 | 296 | 0.7 | 3.0 |
| | 30 | 63 700 | 1 084 | 829 | 29 200 | 497 | 380 | 36 790 | 626 | 479 | 1.2 | 4.3 |
| | 35 | 84 400 | 1 566 | 1 252 | 38 700 | 718 | 574 | 48 759 | 905 | 723 | 1.8 | 5.4 |
| D | 20 | 41 100 | 490 | 495 | 17 400 | 206 | 208 | 21 923 | 260 | 262 | 0.6 | 2.2 |
| | 25 | 60 300 | 825 | 863 | 25 500 | 349 | 365 | 32 128 | 440 | 460 | 0.9 | 3.0 |
| | 30 | 83 300 | 1 414 | 1 390 | 35 300 | 599 | 589 | 44 475 | 755 | 742 | 1.5 | 4.3 |
| | 35 | 110 300 | 2 048 | 2 104 | 46 700 | 867 | 891 | 58 838 | 1 092 | 1 123 | 2.3 | 5.4 |

1. The dynamic load and moment ratings are based on the travel life specified on the table (100 km or 50 km). When comparing these load ratings with other bearings you must take into consideration the proper travel life basis.

2. The static load and moment ratings are the maximum radial load and moment load that should be applied to the bearing when there is no relative motion between the carriage and the rail.

### Bearing Travel Life Comparison

**$L = (C/F)^3 \times 100$ km**
**where:**
**L = travel life, km**
**C = 100 km dynamic load rating**
**F = applied dynamic load, N**

**$C_{min} = F \left(\frac{L}{100}\right)^{1/3}$**
**where:**
**$C_{min}$ = minimum required dynamic load rating, N**
**F = applied dynamic load, N**
**L = required travel life, km**

**Operating Parameters:**

| | |
|---|---|
| **Maximum Velocity:** | **5 m/s** |
| **Maximum Acceleration:** | **100 m/s²** |
| **Temperature:** | |
| **Min:** | **– 40° C** |
| **Max:** | **80° C** |
| **Max peak:** | **120° C short time*** |

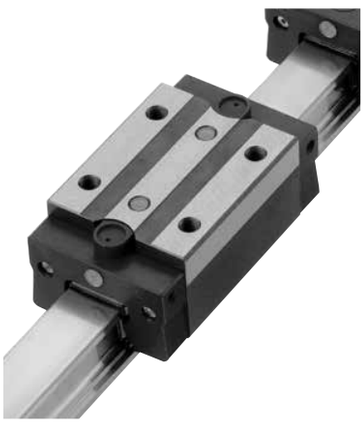
*without bellows

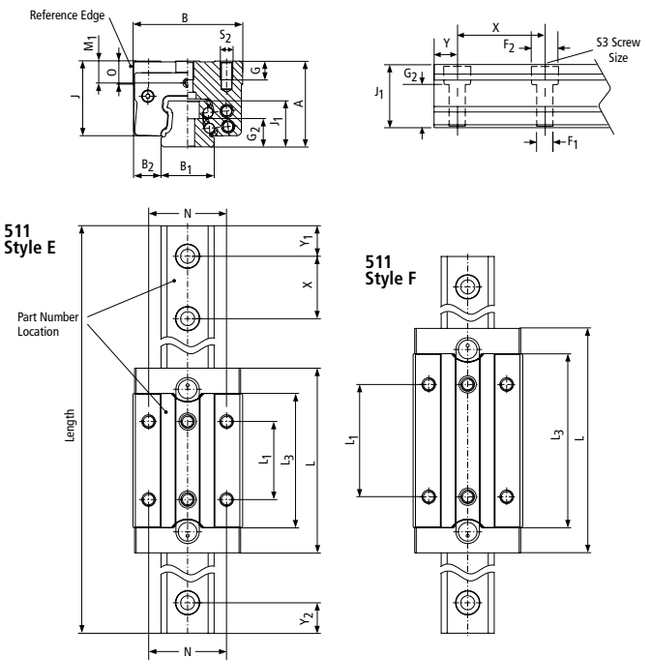
**Conversion Factors:** See Page 156

THOMSON
Linear Motion. Optimized.™

# 500 Series Ball Profile Rail Linear Guide

## 511 Style E and F






## 511 Style E Narrow High

| Size | Dimensions (mm) A | B +0.0 -0.4 | $B_1$* ±0.05 | $B_2$ | J | $J_1$ | L | $L_1$ | $L_3$ | X | N | $S_2/S_3$ | $F_1$ | $F_2$ | Ball Ø | G | $G_2$ | $M_1$ | O |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 15 | 28 | 34 | 15 | 9.5 | 24.2 | 15.7 | 56.6 | 26 | 39.6 | 60 | 26 | M 4 | 4.5 | 8 | 3.2 | 6 | 9.5 | 8 | 6 |
| 25 | 40 | 48 | 23 | 12.5 | 34.5 | 22.7 | 84.5 | 35 | 59.5 | 60 | 35 | M 6 | 7 | 11 | 4.8 | 9 | 14 | 9.5 | 11 |
| 30 | 45 | 60 | 28 | 16 | 38.9 | 26 | 97.4 | 40 | 69.4 | 80 | 40 | M 8 | 9 | 15 | 5.6 | 11 | 14.5 | 10 | 11 |
| 35 | 55 | 70 | 34 | 18 | 48 | 29.5 | 111.6 | 50 | 79.6 | 80 | 50 | M 8 | 9 | 15 | 6.4 | 12 | 18 | 14 | 15 |
| 45 | 70 | 86 | 45 | 20.5 | 60.8 | 37 | 137.1 | 60 | 99.1 | 105 | 60 | M 10 | 14 | 20 | 7.9 | 18 | 22 | 18 | 19 |

## 511 Style F Narrow Long High

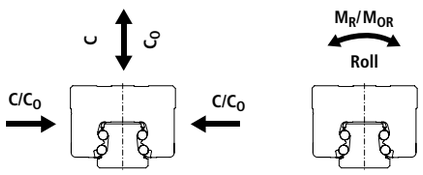
| Size | Dimensions (mm) A | B +0.0 -0.4 | $B_1$* ±0.05 | $B_2$ | J | $J_1$ | L | $L_1$ | $L_3$ | X | N | $S_2/S_3$ | $F_1$ | $F_2$ | Ball Ø | G | $G_2$ | $M_1$ | O |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 25 | 40 | 48 | 23 | 12.5 | 34.5 | 22.7 | 103.5 | 50 | 78.5 | 60 | 35 | M 6 | 7 | 11 | 4.8 | 9 | 14 | 9.5 | 11 |
| 30 | 45 | 60 | 28 | 16 | 38.9 | 26 | 119.4 | 60 | 91.4 | 80 | 40 | M 8 | 9 | 15 | 5.6 | 11 | 14.5 | 10 | 11 |
| 35 | 55 | 70 | 34 | 18 | 48 | 29.5 | 137.1 | 72 | 105.1 | 80 | 50 | M 8 | 9 | 15 | 6.4 | 12 | 18 | 14 | 15 |
| 45 | 70 | 86 | 45 | 20.5 | 60.8 | 37 | 168.6 | 80 | 130.6 | 105 | 60 | M 10 | 14 | 20 | 7.9 | 18 | 22 | 18 | 19 |

* Standard tolerance shown, special lower tolerances are available upon request. Please consult application engineering for additional information.

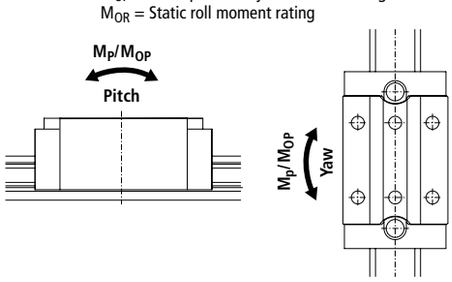
## 500 Series Ball

### 511 Style E and F

**Dynamic Load and Moment Ratings**
C = Dynamic load rating
$M_P$ = Dynamic pitch and yaw moment rating
$M_R$ = Dynamic roll moment rating




**Static Load and Moment Ratings**
$C_O$ = Static load rating
$M_{OP}$ = Static pitch and yaw moment rating
$M_{OR}$ = Static roll moment rating




| 511 Style | Size | Load Rating | | | | | | | | | Weights | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Static | | | Dynamic | | | | | | Carriage | Rail |
| | | | | | 100 Km | | | 50 Km | | | | |
| | | $C_O$ (N) | $M_{OR}$ (Nm) | $M_{OP, OY}$ (Nm) | C (N) | $M_R$ (Nm) | $M_{P,Y}$ (Nm) | C (N) | $M_R$ (Nm) | $M_{P,Y}$ (Nm) | (kg) | (kg/m) |
| E | 15 | 19 600 | 181 | 146 | 9 000 | 83 | 67 | 11 339 | 105 | 84 | 0.2 | 1.4 |
| | 25 | 46 100 | 631 | 513 | 21 100 | 289 | 235 | 26 584 | 364 | 296 | 0.5 | 3.0 |
| | 30 | 63 700 | 1 084 | 829 | 29 200 | 497 | 380 | 36 790 | 626 | 479 | 0.7 | 4.3 |
| | 35 | 84 400 | 1 566 | 1 252 | 38 700 | 718 | 574 | 48 759 | 905 | 723 | 1.2 | 5.4 |
| | 45 | 134 800 | 3 193 | 2 498 | 61 900 | 1 466 | 1 147 | 77 989 | 1 847 | 1 445 | 1.8 | 8.8 |
| F | 25 | 60 300 | 825 | 863 | 25 500 | 349 | 365 | 32 128 | 440 | 460 | 0.6 | 3.0 |
| | 30 | 83 300 | 1 414 | 1 390 | 35 300 | 599 | 589 | 44 475 | 755 | 742 | 0.9 | 4.3 |
| | 35 | 110 300 | 2 048 | 2 104 | 46 700 | 867 | 891 | 58 838 | 1 092 | 1 123 | 1.5 | 5.4 |
| | 45 | 176 300 | 4 175 | 4 199 | 74 700 | 1 769 | 1 779 | 94 116 | 2 229 | 2 241 | 2.3 | 8.8 |

1. The dynamic load and moment ratings are based on the travel life specified on the table (100 km or 50 km). When comparing these load ratings with other bearings you must take into consideration the proper travel life basis.

2. The static load and moment ratings are the maximum radial load and moment load that should be applied to the bearing when there is no relative motion between the carriage and the rail.

### Bearing Travel Life Calculation

**$L = (C/F)^3 \times 100$ km**
**where:**
**L = travel life, km**
**C = 100 km dynamic load rating**
**F = applied dynamic load, N**

**$C_{min} = \left(\frac{L}{100}\right)^{1/3} F$**
**where:**
**$C_{min}$ = minimum required dynamic load rating, N**
**F = applied dynamic load, N**
**L = required travel life, km**

**Operating Parameters:**

| | | |
|---|---|---|
| **Maximum Velocity:** | **5 m/s** | |
| **Maximum Acceleration:** | **100 m/s²** | |
| **Temperature:** | **Min:** | **– 40° C** |
| | **Max:** | **80° C** |
| | **Max peak:** | **120° C short time*** |

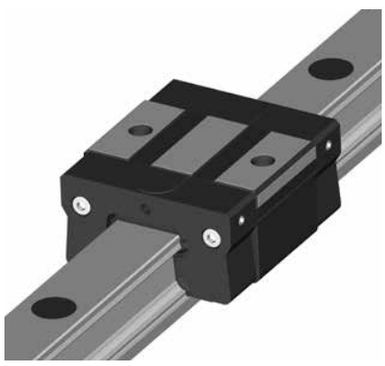
*without bellows

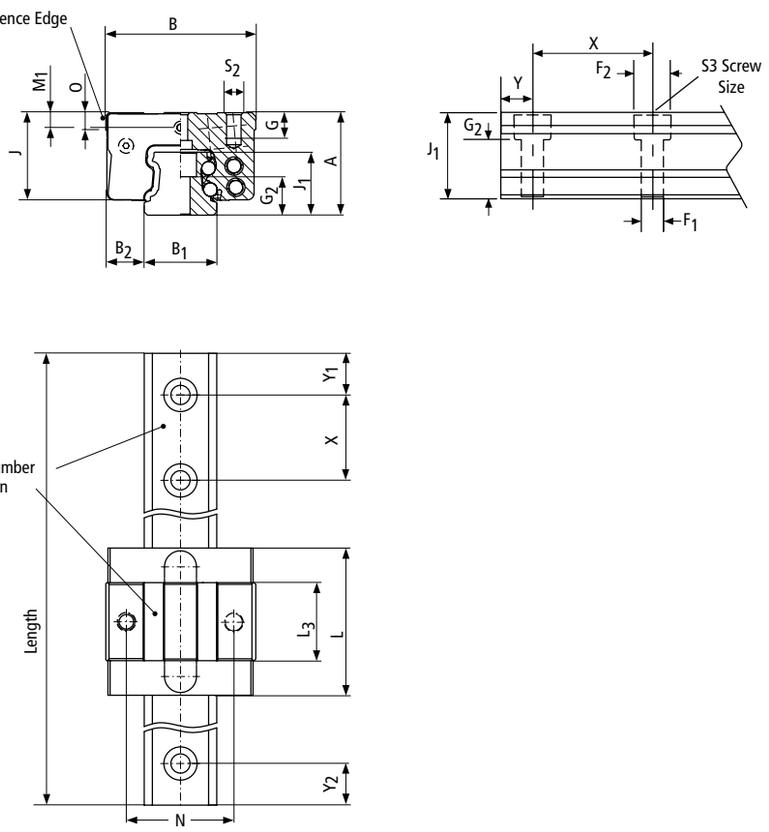
**Conversion Factors:** See Page 156

THOMSON Linear Motion. Optimized.™

# 500 Series Ball Profile Rail Linear Guide

## 511 Style G






## 511 Style G Narrow Short

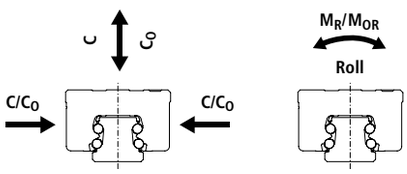
| Size | Dimensions (mm) A | B +0.0 -0.4 | $B_1$* ±0.05 | $B_2$ | J | $J_1$ | L | $L_3$ | X | N | $s_2/s_3$ | $F_1$ | $F_2$ | Ball Ø | G | $G_2$ | $M_1$ | O |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 15 | 24 | 34 | 15 | 9.5 | 20.2 | 15.7 | 37.6 | 20.6 | 60 | 26 | M4 | 4.5 | 8 | 3.2 | 6 | 9.5 | 4 | 6 |
| 20 | 28 | 44 | 20 | 12 | 23.5 | 19 | 47.7 | 25.7 | 60 | 32 | M5 | 5.8 | 10 | 4.0 | 6 | 11.5 | 4.2 | 4 |

* Standard tolerance shown, special lower tolerances are available upon request. Please consult application engineering for additional information.
** When using additional modular seals or lubrication plates, the total length L will increase. Consult page 42-43 for additional information.
Length of rail to be specified at time of order, Y1 will equal Y2 unless specified otherwise at time of order.

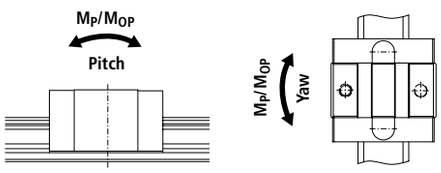
## 500 Series Ball

### 511 Style G

**Dynamic Load and Moment Ratings**
C = Dynamic load rating
$M_P$ = Dynamic pitch and yaw moment rating
$M_R$ = Dynamic roll moment rating




**Static Load and Moment Ratings**
$C_O$ = Static load rating
$M_{OP}$ = Static pitch and yaw moment rating
$M_{OR}$ = Static roll moment rating




| Style | Size | Load Rating | | | | | | | | | Weights | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Static | | | Dynamic | | | | | | Carriage | Rail |
| | | | | | 100 Km | | | 50 Km | | | | |
| | | $C_O$ (N) | $M_{OR}$ (Nm) | $M_{OP, OY}$ (Nm) | C (N) | $M_R$ (Nm) | $M_{P,Y}$ (Nm) | C (N) | $M_R$ (Nm) | $M_{P,Y}$ (Nm) | (kg) | (kg/m) |
| G | 15 | 8 500 | 78 | 30 | 5 200 | 48 | 18 | 6 552 | 60 | 23 | 0.2 | 1.4 |
| | 20 | 13 100 | 150 | 58 | 8 400 | 99 | 37 | 10 583 | 125 | 47 | 0.5 | 2.2 |

1. The dynamic load and moment ratings are based on the travel life specified on the table (100 km or 50 km). When comparing these load ratings with other bearings you must take into consideration the proper travel life basis.
2. The static load and moment ratings are the maximum radial load and moment load that should be applied to the bearing when there is no relative motion between the carriage and the rail.
3. Deflection charts are available on www.thomsonlinear.com.

### Bearing Travel Life Calculation

**$L = (C/F)^3 \times 100$ km**
**where:**
**L = travel life, km**
**C = 100 km dynamic load rating**
**F = applied dynamic load, N**

$$C_{min} = F \left(\frac{L}{100}\right)^{1/3}$$

**where:**
**$C_{min}$ = minimum required dynamic load rating, N**
**F = applied dynamic load, N**
**L = required travel life, km**

**Operating Parameters:**

| | | |
|---|---|---|
| **Maximum Velocity:** | **5 m/s** | |
| **Maximum Acceleration:** | **100 m/s²** | |
| **Temperature:** | **Min:** | **– 40° C** |
| | **Max:** | **80° C** |
| | **Max peak:** | **120° C short time*** |
| | *without bellows | |

**Conversion Factors:** See Page 156

# 500 Series Ball Stainless Steel

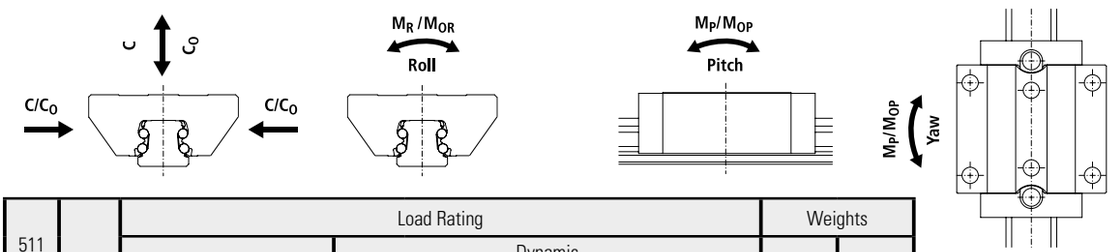
## Stainless Steel Availability

| Size | A | B | C | D | F | G |
|---|---|---|---|---|---|---|
| 15 | • | | • | | | • |
| 20 | • | • | • | • | | |
| 25 | • | • | • | • | • | |
| 30 | • | • | • | • | • | |
| 35 | • | • | • | • | • | |

## 511 Style A and B Stainless Steel

**Dynamic Load and Moment Ratings**
C = Dynamic load rating
$M_P$ = Dynamic pitch and yaw moment rating
$M_R$ = Dynamic roll moment rating

**Static Load and Moment Ratings**
$C_O$ = Static load rating
$M_{OP}$ = Static pitch and yaw moment rating
$M_{OR}$ = Static roll moment rating




| 511 SS Style | Size | Load Rating | | | | | | | | | Weights | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Static | | | Dynamic | | | | | | Carriage | Rail |
| | | | | | 100 Km | | | 50 Km | | | | |
| | | $C_O$ (N) | $M_{OR}$ (Nm) | $M_{OP,OY}$ (Nm) | C (N) | $M_R$ (Nm) | $M_{P,Y}$ (Nm) | C (N) | $M_R$ (Nm) | $M_{P,Y}$ (Nm) | (kg) | (kg/m) |
| A | 15 | 16 600 | 153 | 124 | 7 600 | 70 | 56 | 9 600 | 89 | 71 | 0.2 | 1.4 |
| | 20 | 26 600 | 317 | 248 | 12 200 | 145 | 113 | 15 400 | 182 | 143 | 0.5 | 2.2 |
| | 25 | 39 100 | 536 | 436 | 17 900 | 245 | 199 | 22 500 | 309 | 251 | 0.7 | 3.0 |
| | 30 | 54 100 | 921 | 704 | 24 800 | 422 | 323 | 31 200 | 532 | 407 | 1.2 | 4.3 |
| | 35 | 71 700 | 1 331 | 1 064 | 32 800 | 610 | 487 | 41 400 | 769 | 614 | 1.8 | 5.4 |
| B | 20 | 34 900 | 416 | 420 | 14 700 | 175 | 176 | 18 600 | 221 | 222 | 0.6 | 2.2 |
| | 25 | 51 200 | 701 | 733 | 21 600 | 296 | 310 | 27 300 | 374 | 391 | 0.9 | 3.0 |
| | 30 | 70 800 | 1 201 | 1 181 | 30 000 | 509 | 500 | 37 800 | 641 | 630 | 1.5 | 4.3 |
| | 35 | 93 700 | 1 740 | 1 788 | 39 600 | 736 | 757 | 50 000 | 954 | 954 | 2.3 | 5.4 |

1. The dynamic load and moment ratings are based on the travel life specified on the table (100 km or 50 km). When comparing these load ratings with other bearings you must take into consideration the proper travel life basis.
2. The static load and moment ratings are the maximum radial load and moment load that should be applied to the bearing when there is no relative motion between the carriage and the rail.

## Bearing Travel Life Comparison

**$L = (C/F)^3 \times 100km$**
**where:**
**L = travel life, km**
**C = 100 km dynamic load rating**
**F = applied dynamic load, N**

**$C_{min} = F \left(\frac{L}{100}\right)^{1/3}$**
**where:**
**Cmin = minimum required dynamic load rating, N**
**F = applied dynamic load, N**
**L = required travel life, km**

**Operating Parameters:**

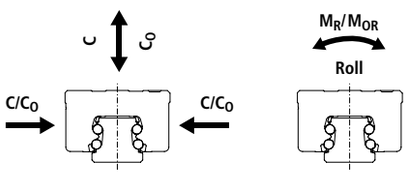
| | | |
|---|---|---|
| **Maximum Velocity:** | **5 m/s** | |
| **Maximum Acceleration:** | **100 m/s²** | |
| **Temperature:** | **Min:** | **– 40° C** |
| | **Max:** | **80° C** |
| | **Max peak:** | **120° C short time*** |
| | | *without bellows |

**Conversion Factors:** See Page 156

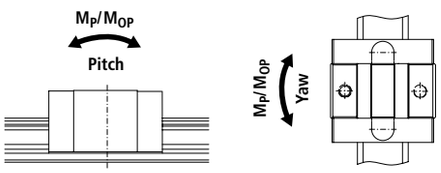
# 500 Series Ball Stainless Steel

## 511 Style C and D Stainless Steel

**Dynamic Load and Moment Ratings**
C = Dynamic load rating
$M_P$ = Dynamic pitch and yaw moment rating
$M_R$ = Dynamic roll moment rating




**Static Load and Moment Ratings**
$C_O$ = Static load rating
$M_{OP}$ = Static pitch and yaw moment rating
$M_{OR}$ = Static roll moment rating




| 511 SS Style | Size | Load Rating | | | | | | | | | Weights | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Static | | | Dynamic | | | | | | Carriage | Rail |
| | | | | | 100 Km | | | 50 Km | | | | |
| | | $C_O$ (N) | $M_{OR}$ (Nm) | $M_{OP,OY}$ (Nm) | C (N) | $M_R$ (Nm) | $M_{P,Y}$ (Nm) | C (N) | $M_R$ (Nm) | $M_{P,Y}$ (Nm) | (kg) | (kg/m) |
| C | 15 | 16 600 | 153 | 124 | 7 600 | 70 | 56 | 9 500 | 89 | 71 | 0.2 | 1.4 |
| | 20 | 26 600 | 317 | 248 | 12 200 | 145 | 113 | 15 400 | 182 | 143 | 0.5 | 2.2 |
| | 25 | 39 100 | 536 | 436 | 17 900 | 245 | 199 | 22 500 | 309 | 251 | 0.7 | 3.0 |
| | 30 | 54 100 | 921 | 704 | 24 800 | 422 | 323 | 31 200 | 532 | 407 | 1.2 | 4.3 |
| | 35 | 71 700 | 1 331 | 1 064 | 32 800 | 610 | 487 | 41 400 | 769 | 614 | 1.8 | 5.4 |
| D | 20 | 34 900 | 416 | 420 | 14 700 | 175 | 176 | 18 600 | 221 | 222 | 0.6 | 2.2 |
| | 25 | 51 200 | 701 | 733 | 21 600 | 296 | 310 | 27 300 | 374 | 391 | 0.9 | 3.0 |
| | 30 | 70 800 | 1 201 | 1 181 | 30 000 | 509 | 500 | 37 800 | 641 | 630 | 1.5 | 4.3 |
| | 35 | 93 700 | 1 740 | 1 788 | 39 000 | 736 | 757 | 50 000 | 928 | 954 | 2.3 | 5.4 |

1. The dynamic load and moment ratings are based on the travel life specified on the table (100 km or 50 km). When comparing these load ratings with other bearings you must take into consideration the proper travel life basis.
2. The static load and moment ratings are the maximum radial load and moment load that should be applied to the bearing when there is no relative motion between the carriage and the rail.

### Bearing Travel Life Comparison

**$L = (C/F)^3 \times 100$ km**
**where:**
**L = travel life, km**
**C = 100 km dynamic load rating**
**F = applied dynamic load, N**

**$C_{min} = F \left(\frac{L}{100}\right)^{1/3}$**
**where:**
**$C_{min}$ = minimum required dynamic load rating, N**
**F = applied dynamic load, N**
**L = required travel life, km**

**Operating Parameters:**

| | | |
|---|---|---|
| **Maximum Velocity:** | **5 m/s** | |
| **Maximum Acceleration:** | **100 m/s²** | |
| **Temperature:** | **Min:** | **– 40° C** |
| | **Max:** | **80° C** |
| | **Max peak:** | **120° C short time*** |

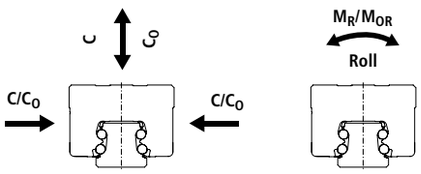
*without bellows

**Conversion Factors:** See Page 156

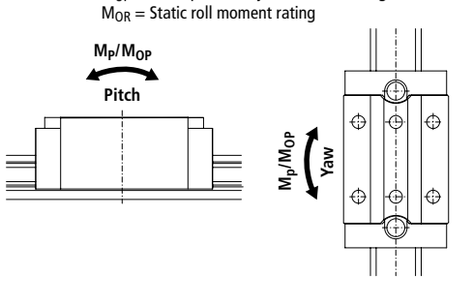
# 500 Series Ball Stainless Steel

## 511 Style F Stainless Steel

**Dynamic Load and Moment Ratings**
C = Dynamic load rating
$M_P$ = Dynamic pitch and yaw moment rating
$M_R$ = Dynamic roll moment rating




**Static Load and Moment Ratings**
$C_O$ = Static load rating
$M_{OP}$ = Static pitch and yaw moment rating
$M_{OR}$ = Static roll moment rating




| 511 SS Style | Size | Load Rating | | | | | | | | | Weights | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Static | | | Dynamic | | | | | | Carriage | Rail |
| | | | | | 100 Km | | | 50 Km | | | | |
| | | $C_O$ (N) | $M_{OR}$ (Nm) | $M_{OP,OY}$ (Nm) | C (N) | $M_R$ (Nm) | $M_{P,Y}$ (Nm) | C (N) | $M_R$ (Nm) | $M_{P,Y}$ (Nm) | (kg) | (kg/m) |
| F | 25 | 51 200 | 701 | 733 | 21 600 | 296 | 310 | 27 300 | 374 | 391 | 0.9 | 3.0 |
| | 30 | 70 800 | 1 201 | 1 181 | 30 000 | 509 | 500 | 37 800 | 641 | 630 | 1.5 | 4.3 |
| | 35 | 93 700 | 1 740 | 1 788 | 39 000 | 736 | 757 | 50 000 | 928 | 954 | 2.3 | 5.4 |

1. The dynamic load and moment ratings are based on the travel life specified on the table (100 km or 50 km). When comparing these load ratings with other bearings you must take into consideration the proper travel life basis.
2. The static load and moment ratings are the maximum radial load and moment load that should be applied to the bearing when there is no relative motion between the carriage and the rail.

## Bearing Travel Life Calculation

**$L = (C/F)^3 \times 100$ km**
**where:**
**L = travel life, km**
**C = 100 km dynamic load rating**
**F = applied dynamic load, N**

$$C_{min} = \left(\frac{L}{100}\right)^{1/3} F$$

**where:**
**$C_{min}$ = minimum required dynamic load rating, N**
**F = applied dynamic load, N**
**L = required travel life, km**

**Operating Parameters:**

| | | |
|---|---|---|
| **Maximum Velocity:** | **5 m/s** | |
| **Maximum Acceleration:** | **100 m/s²** | |
| **Temperature:** | **Min:** | **– 40° C** |
| | **Max:** | **80° C** |
| | **Max peak:** | **120° C short time*** |

*without bellows

**Conversion Factors:** See Page 156

# 500 Series Ball Stainless Steel

## 511 Style G Stainless Steel

**Dynamic Load and Moment Ratings**
C = Dynamic load rating
$M_P$ = Dynamic pitch and yaw moment rating
$M_R$ = Dynamic roll moment rating

**Static Load and Moment Ratings**
$C_O$ = Static load rating
$M_{OP}$ = Static pitch and yaw moment rating
$M_{OR}$ = Static roll moment rating


| 511 SS Style | Size | Load Rating | | | | | | | | | Weights | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Static | | | Dynamic | | | | | | Carriage | Rail |
| | | | | | 100 Km | | | 50 Km | | | | |
| | | $C_O$ (N) | $M_{OR}$ (Nm) | $M_{OP,OY}$ (Nm) | C (N) | $M_R$ (Nm) | $M_{P,Y}$ (Nm) | C (N) | $M_R$ (Nm) | $M_{P,Y}$ (Nm) | (kg) | (kg/m) |
| G | 15 | 7 200 | 66 | 25 | 4 400 | 40 | 15 | 5 500 | 51 | 19 | 0.2 | 1.4 |

1. The dynamic load and moment ratings are based on the travel life specified on the table (100 km or 50 km). When comparing these load ratings with other bearings you must take into consideration the proper travel life basis.
2. The static load and moment ratings are the maximum radial load and moment load that should be applied to the bearing when there is no relative motion between the carriage and the rail.
3. Deflection charts are available on www.thomsonlinear.com.

## Bearing Travel Life Calculation

**$L = (C/F)^3 \times 100$ km**
**where:**
**L = travel life, km**
**C = 100 km dynamic load rating**
**F = applied dynamic load, N**

**$C_{min} = F \left(\frac{L}{100}\right)^{1/3}$**
**where:**
**$C_{min}$ = minimum required dynamic load rating, N**
**F = applied dynamic load, N**
**L = required travel life, km**

**Operating Parameters:**

| | | |
|---|---|---|
| **Maximum Velocity:** | **5 m/s** | |
| **Maximum Acceleration:** | **100 m/s²** | |
| **Temperature:** | **Min:** | **– 40° C** |
| | **Max:** | **80° C** |
| | **Max peak:** | **120° C short time*** |
| | *without bellows | |

**Conversion Factors:** See Page 156

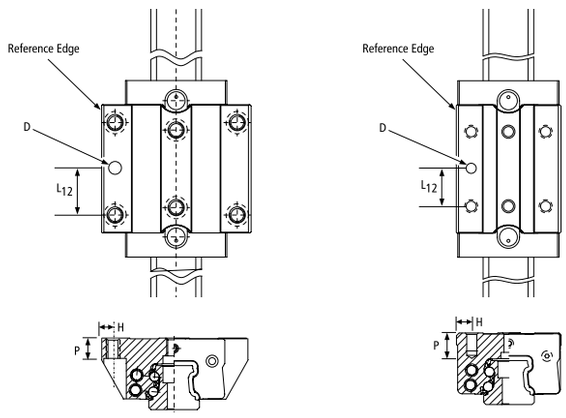
# Carriage Dowel Holes

## Carriage Dowel Holes

Dowel holes are commonly used to ensure proper alignment during installation and replacement of carriages and rails. The standard slip fit dowel hole options for the 500 series Standard Ball Carriages are:

**Style A and B** **Style C, D, E and F**

**Single Dowel**
**Slip Fit**




| 511 | | | ES1 | | | ES2 | | | ES3 | | | ES4 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Style | Size | $L_{12}$ | ØD | H | P | ØD | H | P | ØD | H | P | ØD | H | P |
| Type A | 15 | 15 | 6 | 4.5 | 7 | – | – | – | 1/4" | 4.5 | 7 | – | – | – |
| | 20 | 20 | 6 | 5 | 9 | – | – | – | 1/4" | 5 | 9 | – | – | – |
| | 25 | 22.5 | 6 | 6.5 | 9 | – | – | – | 1/4" | 6.5 | 9 | – | – | – |
| | 30 | 26 | 6 | 9 | 12 | 10 | 9 | 12 | 1/4" | 9 | 12 | 3/8" | 9 | 12 |
| | 35 | 31 | – | – | – | 10 | 9 | 14 | – | – | – | 3/8" | 9 | 14 |
| | 45 | 40 | – | – | – | 10 | 10 | 18 | – | – | – | 3/8" | 10 | 18 |
| Type B | 20 | 20 | 6 | 5 | 9 | – | – | – | 1/4" | 5 | 9 | – | – | – |
| | 25 | 22.5 | 6 | 6.5 | 9 | – | – | – | 1/4" | 6.5 | 9 | – | – | – |
| | 30 | 26 | 6 | 9 | 12 | 10 | 9 | 12 | 1/4" | 9 | 12 | 3/8" | 9 | 12 |
| | 35 | 31 | – | – | – | 10 | 9 | 14 | – | – | – | 3/8" | 9 | 14 |
| | 45 | 40 | – | – | – | 10 | 10 | 18 | – | – | – | 3/8" | 10 | 18 |
| Type C | 15 | 13 | 6 | 4 | 6 | – | – | – | 1/4" | 4 | 6 | – | – | – |
| | 20 | 18 | 6 | 6 | 9 | – | – | – | 1/4" | 6 | 9 | – | – | – |
| | 25 | 17.5 | 6 | 6.5 | 9 | – | – | – | 1/4" | 6.5 | 9 | – | – | – |
| | 30 | 20 | 6 | 10 | 12 | 10 | 10 | 12 | 1/4" | 10 | 12 | 3/8" | 10 | 12 |
| | 35 | 25 | – | – | – | 10 | 10 | 12 | – | – | – | 3/8" | 10 | 12 |
| Type D | 20 | 25 | 6 | 6 | 9 | – | – | – | 1/4" | 6 | 9 | – | – | – |
| | 25 | 25 | 6 | 6.5 | 9 | – | – | – | 1/4" | 6.5 | 9 | – | – | – |
| | 30 | 30 | 6 | 10 | 12 | 10 | 10 | 12 | 1/4" | 10 | 12 | 3/8" | 10 | 12 |
| | 35 | 36 | – | – | – | 10 | 10 | 12 | – | – | – | 3/8" | 10 | 12 |
| Type E | 15 | 13 | 6 | 4 | 6 | – | – | – | 1/4" | 4 | 6 | – | – | – |
| | 25 | 17.5 | 6 | 6.5 | 9 | – | – | – | 1/4" | 6.5 | 9 | – | – | – |
| | 30 | 20 | 6 | 10 | 12 | 10 | 10 | 12 | 1/4" | 10 | 12 | 3/8" | 10 | 12 |
| | 35 | 25 | – | – | – | 10 | 10 | 12 | – | – | – | 3/8" | 10 | 12 |
| | 45 | 30 | – | – | – | 10 | 13 | 12 | – | – | – | 3/8" | 13 | 12 |
| Type F | 25 | 25 | 6 | 6.5 | 9 | – | – | – | 1/4" | 6.5 | 9 | – | – | – |
| | 30 | 30 | 6 | 10 | 12 | 10 | 10 | 12 | 1/4" | 10 | 12 | 3/8" | 10 | 12 |
| | 35 | 36 | – | – | – | 10 | 10 | 12 | – | – | – | 3/8" | 10 | 12 |
| | 45 | 40 | – | – | – | 10 | 13 | 12 | – | – | – | 3/8" | 13 | 12 |

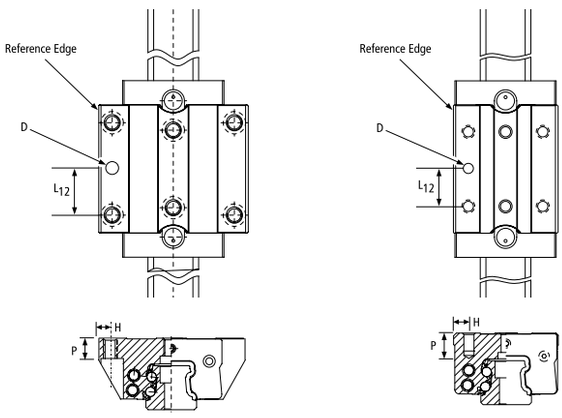
All dimension in mm, unless otherwise specified.
Hole tolerance øD +0.013/-0

# Carriage Dowel Holes

## Carriage Dowel Holes (continued)

**Style A and B** **Style C, D, E and F**

**Single Dowel**
**Press Fit**

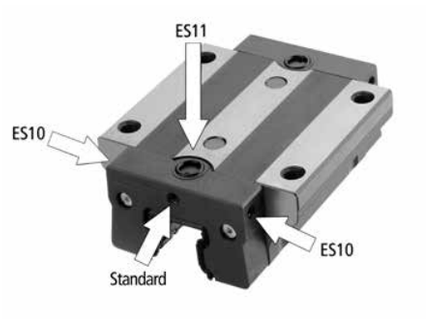



| 511 | | | ES12 | | | ES13 | | | ES14 | | | ES15 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Style | Size | $L_{12}$ | ØD | H | P | ØD | H | P | ØD | H | P | ØD | H | P |
| Type A | 15 | 15 | 6 | 4.5 | 7 | – | – | – | 1/4“ | 4.5 | 7 | – | – | – |
| | 20 | 20 | 6 | 5 | 9 | – | – | – | 1/4“ | 5 | 9 | – | – | – |
| | 25 | 22.5 | 6 | 6.5 | 9 | – | – | – | 1/4“ | 6.5 | 9 | – | – | – |
| | 30 | 26 | 6 | 9 | 12 | 10 | 9 | 12 | 1/4“ | 9 | 12 | 3/8“ | 9 | 12 |
| | 35 | 31 | – | – | – | 10 | 9 | 14 | – | – | – | 3/8“ | 9 | 14 |
| | 45 | 40 | – | – | – | 10 | 10 | 18 | – | – | – | 3/8“ | 10 | 18 |
| Type B | 20 | 20 | 6 | 5 | 9 | – | – | – | 1/4“ | 5 | 9 | – | – | – |
| | 25 | 22.5 | 6 | 6.5 | 9 | – | – | – | 1/4“ | 6.5 | 9 | – | – | – |
| | 30 | 26 | 6 | 9 | 12 | 10 | 9 | 12 | 1/4“ | 9 | 12 | 3/8“ | 9 | 12 |
| | 35 | 31 | – | – | – | 10 | 9 | 14 | – | – | – | 3/8“ | 9 | 14 |
| | 45 | 40 | – | – | – | 10 | 10 | 18 | – | – | – | 3/8“ | 10 | 18 |
| Type C | 15 | 13 | 6 | 4 | 6 | – | – | – | 1/4“ | 4 | 6 | – | – | – |
| | 20 | 18 | 6 | 6 | 9 | – | – | – | 1/4“ | 6 | 9 | – | – | – |
| | 25 | 17.5 | 6 | 6.5 | 9 | – | – | – | 1/4“ | 6.5 | 9 | – | – | – |
| | 30 | 20 | 6 | 10 | 12 | 10 | 10 | 12 | 1/4“ | 10 | 12 | 3/8“ | 10 | 12 |
| | 35 | 25 | – | – | – | 10 | 10 | 12 | – | – | – | 3/8“ | 10 | 12 |
| Type D | 20 | 25 | 6 | 6 | 9 | – | – | – | 1/4“ | 6 | 9 | – | – | – |
| | 25 | 25 | 6 | 6.5 | 9 | – | – | – | 1/4“ | 6.5 | 9 | – | – | – |
| | 30 | 30 | 6 | 10 | 12 | 10 | 10 | 12 | 1/4“ | 10 | 12 | 3/8“ | 10 | 12 |
| | 35 | 36 | – | – | – | 10 | 10 | 12 | – | – | – | 3/8“ | 10 | 12 |
| Type E | 15 | 13 | 6 | 4 | 6 | – | – | – | 1/4“ | 4 | 6 | – | – | – |
| | 25 | 17.5 | 6 | 6.5 | 9 | – | – | – | 1/4“ | 6.5 | 9 | – | – | – |
| | 30 | 20 | 6 | 10 | 12 | 10 | 10 | 12 | 1/4“ | 10 | 12 | 3/8“ | 10 | 12 |
| | 35 | 25 | 6 | 10 | 12 | 10 | 10 | 12 | 1/4“ | 10 | 12 | 3/8“ | 10 | 12 |
| | 45 | 30 | 6 | 13 | 12 | 10 | 13 | 12 | 1/4“ | 13 | 12 | 3/8“ | 13 | 12 |
| Type F | 25 | 25 | 6 | 6.5 | 9 | – | – | – | 1/4“ | 6.5 | 9 | – | – | – |
| | 30 | 30 | 6 | 10 | 12 | 10 | 10 | 12 | 1/4“ | 10 | 12 | 3/8“ | 10 | 12 |
| | 35 | 36 | – | – | – | 10 | 10 | 12 | – | – | – | 3/8“ | 10 | 12 |
| | 45 | 40 | – | – | – | 10 | 13 | 12 | – | – | – | 3/8“ | 13 | 12 |

All dimension in mm, unless otherwise specified.
Hole tolerance øD +0 / -0.013

## Lubrication Inlet Options

The standard carriage is supplied with a lubrication inlet centered over the rail. The carriage has multiple lubrication inlet point options. The options can be easily modified on-site in the field or can be supplied factory direct (Standard inlet hole is M3 for 15 mm, M6 for 20 mm, 25 mm, 30 mm 35 mm, 45 mm). See page 75 for available lubrication fittings.




**Option**

| | |
|---|---|
| ES10 | Inlets on side – both ends– all sides |
| ES11 | Inlet on top* – both ends |

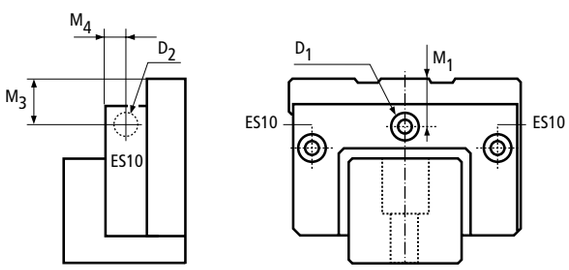
**Notes:**

1. *An O-Ring is required to properly seat the mating surfaces to prevent grease or oil from escaping.
   One is supplied with this option.
   Size 15 O-ring ID M3 x 1.78mm thick.
   Sizes 20–45 O-ring ID M6 x 1.78mm thick.
2. Set screw is installed in Standard inlet hole when ES10 and ES11 options are specified.
3. Inlets on side and top are solid plugs. When modified on-site, inlets must be punctured to be utilized.

**Lubrication inlet locates standard and ES10 option.**

| Size | Style | M1 | M3 | M4 | D1 | D2 |
|---|---|---|---|---|---|---|
| 15 | A | 4 | 4 | 4 | M3 | M3 |
| | C | | | | | |
| | E | 8 | 8 | | | |
| | G | 4 | 4 | | | |
| 20 | A | 5.2 | 5.2 | 5.2 | M6 | M3 |
| | B | | | | | |
| | C | | | | | |
| | D | | | | | |
| | G | 4.2 | 4.2 | 5 | M3 | M3 |
| 25 | A | 5.5 | 5.5 | 6 | M6 | M6 |
| | B | | | | | |
| | C | | | | | |
| | D | | | | | |
| | E | 9.5 | 9.5 | | | |
| | F | | | | | |
| 30 | A | 7 | 7 | 6 | M6 | M6 |
| | B | | | | | |
| | C | | | | | |
| | D | | | | | |
| | E | 10 | 10 | | | |
| | F | | | | | |
| 35 | A | 7 | 7 | 6 | M6 | M6 |
| | B | | | | | |
| | C | | | | | |
| | D | | | | | |
| | E | 14 | 14 | | | |
| | F | | | | | |
| 45 | A | 8 | 8 | 7.5 | M6 | M6 |
| | B | | | | | |
| | E | 18 | 18 | | | |
| | F | | | | | |

All dimensions in mm unless specified.



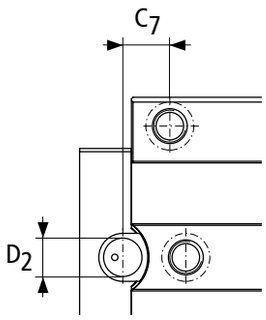

1. D1 and D2 are threaded holes in the end cap to ensure proper integrity and durability of connection.
2. Carriages are shipped with a grease fitting in the box.
   Size 15 and all G style carraiges include fitting 530LF3, Size 20 and up include fitting 530LN. See page 75 for more information.

## Lubrication Inlet Options

### Lubrication inlet location ES11 option

| Size | Style | C7 | D1 | D2 | D3 | D4 |
|---|---|---|---|---|---|---|
| 15 | A | 8.000 | 4.47 | 8 | 1.78 | 4 |
| | C | 10.000 | | | | |
| | E | 10.000 | | | | |
| 20 | A | 10.500 | 6.75 | 10 | 1.78 | 6 |
| | B | 18.500 | | | | |
| | C | 12.500 | | | | |
| | D | 13.500 | | | | |
| 25 | A | 13.200 | 8.75 | 12 | 1.78 | 8 |
| | B | 22.700 | | | | |
| | C | 18.200 | | | | |
| | D | 20.200 | | | | |
| | E | 18.200 | | | | |
| | F | 20.200 | | | | |
| 30 | A | 13.200 | 8.75 | 12 | 1.78 | 8 |
| | B | 22.700 | | | | |
| | C | 18.200 | | | | |
| | D | 20.200 | | | | |
| | E | 18.200 | | | | |
| | F | 20.200 | | | | |
| 35 | A | 14.500 | 8.75 | 12 | 1.78 | 8 |
| | B | 27.250 | | | | |
| | C | 20.500 | | | | |
| | D | 22.250 | | | | |
| | E | 20.500 | | | | |
| | F | 22.250 | | | | |
| 45 | A | 17.000 | 8.75 | 12 | 1.78 | 8 |
| | B | 32.750 | | | | |
| | E | 27.000 | | | | |
| | F | 32.750 | | | | |

All dimensions in mm.




**D1** = O-Ring internal diameter
**D2** = Counterbore diameter
**D3** = O-Ring thickness
**D4** = Max. recommended diameter of lubrication inlet from above plate

## Grease Lubricants

Standard carriages are sold with oil preservative to protect the balls from corrosion during storage and transit. The carriages are available with the following assortment of lubricants. Additional greases are available upon request, please consult Thomson Application Engineering.

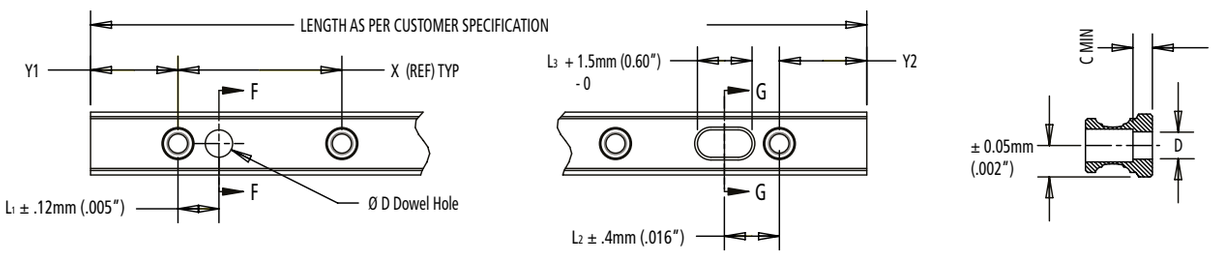
| Option | Type | Notes | Viscosity | Temperature Range |
|---|---|---|---|---|
| G1 | Mobilux® EP2 | All purpose NLGI2 grease | 160cSt @40°C | –20°C to 130°C |
| G2 | Krytox® GPL227 | High Temperature NLGI2 | 440cSt @40°C | –30°C to 288°C |
| G3 | Thomson LinearLube | Food Grade NLGI2 grease | 350cSt @40°C | –54°C to 230°C |
| GS | Customer specified at time of order | | | |

## Rail Length

### Maximum Length of One Piece Rail

| Size (mm) | 15 | 20 | 25 | 30 | 35 | 45 |
|---|---|---|---|---|---|---|
| One Piece Rail Length | 3000 mm | | 6000 mm | | | |

## Extended Standard Rail Options

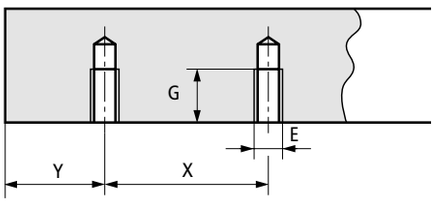



| Option | D | L1 | L2 | L3 | C |
|---|---|---|---|---|---|
| DH1 | 6mm | 30mm | 30mm | 10.2 mm | 9.5 mm |
| DH2 | 10mm | 30mm | 30mm | 13.8 mm | 9.5 mm |
| DH3 | 1/4" | 1.181" | 1.181" | .542" | 3/8" |
| DH4 | 3/8" | 1.181" | 1.181" | .542" | 3/8" |

Y1 = Y2 unless specified at time of ordering
*Size 25 and up step will be present around bottom of slot to control width tolerance during milling of slot.

The rail can be supplied with dowel holes, radial holes and coaxial holes to meet your application needs. Please provide a drawing of your requirement and our Application Engineering Team can provide a quote or select one of our extended standard options.

## 521 Type U Rail – Bolt Up From Bottom




| Size | X | E | G (mm) | Weight (kg/m) |
|---|---|---|---|---|
| 15 | 60 | M5 | 8 | 1.4 |
| 20 | 60 | M6 | 10 | 2.2 |
| 25 | 60 | M6 | 12 | 3 |
| 30 | 80 | M8 | 15 | 4.3 |
| 35 | 80 | M8 | 15 | 5.4 |
| 45 | 105 | M12 | 19 | 8.8 |

Customer to specify Y dimensions upon ordering $Y_1 = Y_2$ if not specified

## Thin Dense Chrome Plating

Rails and carriages are available with Thin Dense Chrome Plating with a thickness of 2–4 µm. As a result of the plating thickness range compared to the tolerance ranges in the different accuracy classes, it is only available in the High and Precision accuracy classes up to 3 meters long as a single rail; longer lengths require butt joints.

### Carriage assortment with Thin Dense Chrome

| | | | | | Preload | | |
|---|---|---|---|---|---|---|---|
| Type | Style | Size | Accuracy | Clearance | 0.03C | 0.08C | 0.13C |
| 511 | A | 15 | H | 511H15A0D | 511H15A1D | 511H15A2D | - |
| | | | P | - | 511P15A1D | 511P15A2D | 511P15A3D |
| | | 20 | H | 511H20A0D | 511H20A1D | 511H20A2D | - |
| | | | P | - | 511P20A1D | 511P20A2D | 511P20A3D |
| | | 25 | H | 511H25A0D | 511H25A1D | 511H25A2D | - |
| | | | P | - | 511P25A1D | 511P25A2D | 511P25A3D |
| | | 30 | H | 511H30A0D | 511H30A1D | 511H30A2D | - |
| | | | P | - | 511P30A1D | 511P30A2D | 511P30A3D |
| | | 35 | H | 511H35A0D | 511H35A1D | 511H35A2D | - |
| | | | P | - | 511P35A1D | 511P35A2D | 511P35A3D |
| | | 45 | H | 511H45A0D | 511H45A1D | 511H45A2D | - |
| | | | P | - | 511P45A1D | 511P45A2D | 511P45A3D |
| | B | 20 | H | 511H20B0D | 511H20B1D | 511H20B2D | - |
| | | | P | - | 511P20B1D | 511P20B2D | 511P20B3D |
| | | 25 | H | 511H25B0D | 511H25B1D | 511H25B2D | - |
| | | | P | - | 511P25B1D | 511P25B2D | 511P25B3D |
| | | 30 | H | 511H30B0D | 511H30B1D | 511H30B2D | - |
| | | | P | - | 511P30B1D | 511P30B2D | 511P30B3D |
| | | 35 | H | 511H35B0D | 511H35B1D | 511H35B2D | - |
| | | | P | - | 511P35B1D | 511P35B2D | 511P35B3D |
| | | 45 | H | 511H45B0D | 511H45B1D | 511H45B2D | - |
| | | | P | - | 511P45B1D | 511P45B2D | 511P45A3D |
| | C | 15 | H | 511H15C0D | 511H15C1D | 511H15C2D | - |
| | | | P | - | 511P15C1D | 511P15C2D | 511P15C3D |
| | | 20 | H | 511H20C0D | 511H20C1D | 511H20C2D | - |
| | | | P | - | 511P20C1D | 511P20C2D | 511P20C3D |
| | | 25 | H | 511H25C0D | 511H25C1D | 511H25C2D | - |
| | | | P | - | 511P25C1D | 511P25C2D | 511P25C3D |
| | | 30 | H | 511H30C0D | 511H30C1D | 511H30C2D | - |
| | | | P | - | 511P30C1D | 511P30C2D | 511P30C3D |
| | | 35 | H | 511H35C0D | 511H35C1D | 511H35C2D | - |
| | | | P | - | 511P35C1D | 511P35C2D | 511P35C3D |

| | | | | | Preload | | |
|---|---|---|---|---|---|---|---|
| Type | Style | Size | Accuracy | Clearance | 0.03C | 0.08C | 0.13C |
| 511 | D | 20 | H | 511H20D0D | 511H20D1D | 511H20D2D | - |
| | | | P | - | 511P20D1D | 511P20D2D | 511P20D3D |
| | | 25 | H | 511H25D0D | 511H25D1D | 511H25D2D | - |
| | | | P | - | 511P25D1D | 511P25D2D | 511P25D3D |
| | | 30 | H | 511H30D0D | 511H30D1D | 511H30D2D | - |
| | | | P | - | 511P30D1D | 511P30D2D | 511P30D3D |
| | | 35 | H | 511H35D0D | 511H35D1D | 511H35D2D | - |
| | | | P | - | 511P35D1D | 511P35D2D | 511P35D3D |
| | E | 15 | H | 511H15E0D | 511H15E1D | 511H15E2D | - |
| | | | P | - | 511P15E1D | 511P15E2D | 511P15E3D |
| | | 25 | H | 511H25E0D | 511H25E1D | 511H25E2D | - |
| | | | P | - | 511P25E1D | 511P25E2D | 511P25E3D |
| | | 30 | H | 511H30E0D | 511H30E1D | 511H30E2D | - |
| | | | P | - | 511P30E1D | 511P30E2D | 511P30E3D |
| | | 35 | H | 511H35E0D | 511H35E1D | 511H35E2D | - |
| | | | P | - | 511P35E1D | 511P35E2D | 511P35E3D |
| | | 45 | H | 511H45E0D | 511H45E1D | 511H45E2D | - |
| | | | P | - | 511P45E1D | 511P45E2D | 511P45E3D |
| | F | 25 | H | 511H25F0D | 511H25F1D | 511H25F2D | - |
| | | | P | - | 511P25F1D | 511P25F2D | 511P25F3D |
| | | 30 | H | 511H30F0D | 511H30F1D | 511H30F2D | - |
| | | | P | - | 511P30F1D | 511P30F2D | 511P30F3D |
| | | 35 | H | 511H35F0D | 511H35F1D | 511H35F2D | - |
| | | | P | - | 511P35F1D | 511P35F2D | 511P35F3D |
| | | 45 | H | 511H45F0D | 511H45F1D | 511H45F2D | - |
| | | | P | - | 511P45F1D | 511P45F2D | 511P45F3D |
| | G | 15 | H | 511H15G0D | 511H15G1D | 511H15G2D | - |
| | | | P | - | 511P15G1D | 511P15G2D | 511P15G3D |
| | | 20 | H | 511H20G0D | 511H20G1D | 511H20G2D | - |
| | | | P | - | 511P20G1D | 511P20G2D | 511P20G3D |

Chrome plated carriages and rails are designed and manufactured to be used together. If a non-chrome plated carriage is used on a chrome plated rail the clearance or preload of the carriage will be increased approximately one class. If a chrome plated carriage is used on a non-chrome plated rail the clearance or preload will be decreased approximately one class. This is the result of the coating thickness.

## Modular Accessory Combination Options and Screw Size

| Option | Description | Size | | | | | |
|---|---|---|---|---|---|---|---|
| | | 15 | | 20 | | 25 | |
| L[3] | "Lube for Life" Lube Block | Low/socket head screw | M2.5-0.45x20 | Low/socket head screw | M2.5-0.45x25 | Low/socket head screw | M4-0.7x35 |
| N[3] | Oil Reservoir | Low/socket head screw | M2.5-0.45x20 | Low/socket head screw | M2.5-0.45x25 | Low/socket head screw | M4-0.7x30 |
| V[3] | Viton Wiper | Low/socket head screw | M2.5-0.45x20 | Low/socket head screw | M2.5-0.45x20 | Low/socket head screw | M4-0.7x25 |
| Z[3] | Metal Scraper | Low/socket head screw | M2.5-0.45x15 | Low/socket head screw | M2.5-0.45x15 | Low/socket head screw | M4-0.7x20 |
| C[3] | Bellows Clips | Flat/socket head screw | M2.5-0.45x15 | Flat/socket head screw | M2.5-0.45x15 | Flat/socket head screw | M4-0.7x20 |
| LV | Lube Block + Wiper | Low/socket head screw | M2.5-0.45x25 | Low/socket head screw | M2.5-0.45x30 | Low/socket head screw | M4-0.7x35 |
| LVC | Lube Block, Wiper + Bellows Clip | Flat/socket head screw | M2.5-0.45x25 | Flat/socket head screw | M2.5-0.45x30 | Flat/socket head screw | M4-0.7x35 |
| LVZ | Lube Block, Wiper + Scraper | Low/socket head screw | M2.5-0.45x25 | Low/socket head screw | M2.5-0.45x30 | Low/socket head screw | M4-0.7x35 |
| LVZC | Lube Block, Wiper, Scraper + Bellows Clip | Flat/socket head screw | M2.5-0.45x25 | Flat/socket head screw | M2.5-0.45x30 | Flat/socket head screw | M4-0.7x35 |
| LZ | Lube Block + Scraper | Low/socket head screw | M2.5-0.45x20 | Low/socket head screw | M2.5-0.45x25 | Low/socket head screw | M4-0.7x35 |
| LZC | Lube Block, Scraper + Bellows Clip | Flat/socket head screw | M2.5-0.45x20 | Flat/socket head screw | M2.5-0.45x25 | Flat/socket head screw | M4-0.7x35 |
| LC | Lube Block + Bellows Clip | Flat/socket head screw | M2.5-0.45x20 | Flat/socket head screw | M2.5-0.45x25 | Flat/socket head screw | M4-0.7x35 |
| NV | Oil Reservoir + Wiper | Low/socket head screw | M2.5-0.45x30 | Low/socket head screw | M2.5-0.45x30 | Low/socket head screw | M4-0.7x40 |
| NVZ | Oil Reservoir, Wiper + Scraper | Low/socket head screw | M2.5-0.45x30 | Low/socket head screw | M2.5-0.45x35 | Low/socket head screw | M4-0.7x40 |
| NVC | Oil Reservoir, Wiper + Bellows Clip | Flat/socket head screw | M2.5-0.45x30 | Flat/socket head screw | M2.5-0.45x30 | Flat/socket head screw | M4-0.7x40 |
| NVZC | Oil Reservoir, Wiper, Scraper + Bellows Clip | Flat/socket head screw | M2.5-0.45x30 | Flat/socket head screw | M2.5-0.45x35 | Flat/socket head screw | M4-0.7x40 |
| NZ | Oil Reservoir + Scraper | Low/socket head screw | M2.5-0.45x25 | Low/socket head screw | M2.5-0.45x30 | Low/socket head screw | M4-0.7x35 |
| NZC | Oil Reservoir, Scraper + Bellows Clips | Flat/socket head screw | M2.5-0.45x25 | Flat/socket head screw | M2.5-0.45x30 | Flat/socket head screw | M4-0.7x35 |
| NC | Oil Reservoir + Bellows Clips | Flat/socket head screw | M2.5-0.45x20 | Flat/socket head screw | M2.5-0.45x25 | Flat/socket head screw | M4-0.7x35 |
| VC | Wiper + Bellows Clip | Flat/socket head screw | M2.5-0.45x20 | Flat/socket head screw | M2.5-0.45x20 | Flat/socket head screw | M4-0.7x25 |
| VZC | Wiper, Scraper + Bellows Clip | Flat/socket head screw | M2.5-0.45x20 | Flat/socket head screw | M2.5-0.45x25 | Flat/socket head screw | M4-0.7x30 |
| VZ | Viton Wiper + Scraper | Low/socket head screw | M2.5-0.45x20 | Low/socket head screw | M2.5-0.45x25 | Low/socket head screw | M4-0.7x25 |
| ZC | Scraper + Bellows Clip | Flat/socket head screw | M2.5-0.45x15 | Flat/socket head screw | M2.5-0.45x15 | Flat/socket head screw | M4-0.7x20 |

1. All fasteners are standard threads.
2. Consult Thomson for options not listed, engineering review is required.
3. When ordering component only, two screws include.

## Modular Accessory Combination Options and Screw Size

| Option | Description | Size | | | | | |
|---|---|---|---|---|---|---|---|
| | | 30 | | 35 | | 45 | |
| L | "Lube for Life" Lube Block | Low/socket head screw | M4-0.7x40 | Low/socket head screw | M4-0.7x45 | Low/socket head screw | M5-0.8x50 |
| N | Oil Reservoir | Low/socket head screw | M4-0.7x30 | Low/socket head screw | M4-0.7x35 | Low/socket head screw | M5-0.8x45 |
| V | Viton Wiper | Low/socket head screw | M4-0.7x25 | Low/socket head screw | M4-0.7x30 | Low/socket head screw | M5-0.8x35 |
| Z | Metal Scraper | Low/socket head screw | M4-0.7x20 | Low/socket head screw | M4-0.7x25 | Low/socket head screw | M5-0.8x30 |
| C | Bellows Clips | Flat/socket head screw | M4-0.7x20 | Flat/socket head screw | M4-0.7x25 | Flat/socket head screw | M5-0.8x30 |
| LV | Lube Block + Wiper | Low/socket head screw | M4-0.7x40 | Low/socket head screw | M4-0.7x45 | Low/socket head screw | M5-0.8x50 |
| LVC | Lube Block, Wiper + Bellows Clip | Flat/socket head screw | M4-0.7x40 | Flat/socket head screw | M4-0.7x45 | Flat/socket head screw | M5-0.8x50 |
| LVZ | Lube Block, Wiper + Scraper | Low/socket head screw | M4-0.7x40 | Low/socket head screw | M4-0.7x45 | Low/socket head screw | M5-0.8x50 |
| LVZC | Lube Block, Wiper, Scraper + Bellows Clip | Flat/socket head screw | M4-0.7x40 | Flat/socket head screw | M4-0.7x45 | Flat/socket head screw | M5-0.8x50 |
| LZ | Lube Block + Scraper | Low/socket head screw | M4-0.7x40 | Low/socket head screw | M4-0.7x45 | Low/socket head screw | M5-0.8x50 |
| LZC | Lube Block, Scraper + Bellows Clip | Flat/socket head screw | M4-0.7x40 | Flat/socket head screw | M4-0.7x45 | Flat/socket head screw | M5-0.8x50 |
| LC | Lube Block + Bellows Clip | Flat/socket head screw | M4-0.7x40 | Flat/socket head screw | M4-0.7x45 | Flat/socket head screw | M5-0.8x50 |
| NV | Oil Reservoir + Wiper | Low/socket head screw | M4-0.7x40 | Low/socket head screw | M4-0.7x45 | Low/socket head screw | M5-0.8x50 |
| NVZ | Oil Reservoir, Wiper + Scraper | Low/socket head screw | M4-0.7x40 | Low/socket head screw | M4-0.7x45 | Low/socket head screw | M5-0.8x55 |
| NVC | Oil Reservoir, Wiper + Bellows Clip | Flat/socket head screw | M4-0.7x40 | Flat/socket head screw | M4-0.7x45 | Flat/socket head screw | M5-0.8x55 |
| NVZC | Oil Reservoir, Wiper, Scraper + Bellows Clip | Flat/socket head screw | M4-0.7x45 | Flat/socket head screw | M4-0.7x50 | Flat/socket head screw | M5-0.8x55 |
| NZ | Oil Reservoir + Scraper | Low/socket head screw | M4-0.7x35 | Low/socket head screw | M4-0.7x40 | Low/socket head screw | M5-0.8x45 |
| NZC | Oil Reservoir, Scraper + Bellows Clips | Flat/socket head screw | M4-0.7x35 | Flat/socket head screw | M4-0.7x40 | Flat/socket head screw | M5-0.8x50 |
| NC | Oil Reservoir + Bellows Clips | Flat/socket head screw | M4-0.7x35 | Flat/socket head screw | M4-0.7x40 | Flat/socket head screw | M5-0.8x50 |
| VC | Wiper + Bellows Clip | Flat/socket head screw | M4-0.7x25 | Flat/socket head screw | M4-0.7x30 | Flat/socket head screw | M5-0.8x35 |
| VZC | Wiper, Scraper + Bellows Clip | Flat/socket head screw | M4-0.7x30 | Flat/socket head screw | M4-0.7x30 | Flat/socket head screw | M5-0.8x35 |
| VZ | Wiper + Scraper | Low/socket head screw | M4-0.7x25 | Low/socket head screw | M4-0.7x30 | Low/socket head screw | M5-0.8x35 |
| ZC | Scraper + Bellows Clip | Flat/socket head screw | M4-0.7x20 | Flat/socket head screw | M4-0.7x25 | Flat/socket head screw | M5-0.8x30 |

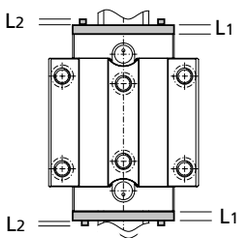
Consult Thomson for options not listed, engineering review required.

## Modular Accessories


### Additional Wiper

| Size | Viton® Part No. | L1 (mm) | L2 (mm) | Weight (kg) |
|---|---|---|---|---|
| 15 | 531VR15 | 7 | 4 | 0.005 |
| 20 | 531VR20 | 7 | 4 | 0.008 |
| 25 | 531VR25 | 7 | 4 | 0.010 |
| 30 | 531VR30 | 7 | 4 | 0.016 |
| 35 | 531VR35 | 7 | 4 | 0.022 |
| 45 | 531VR45 | 7 | 4 | 0.036 |

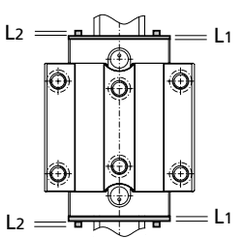
L1 – wiper thickness, L2 – max. screw head stickout
Can be installed without removing carriage from rail




### Metal Scraper

| Size | Scraper Part No. | L1 (mm) | L2 (mm) | Weight (kg) |
|---|---|---|---|---|
| 15 | 531ZZ15 | 1.5 | 4 | 0.005 |
| 20 | 531ZZ20 | 1.5 | 4 | 0.009 |
| 25 | 531ZZ25 | 1.5 | 4 | 0.011 |
| 30 | 531ZZ30 | 1.5 | 4 | 0.018 |
| 35 | 531ZZ35 | 1.5 | 4 | 0.024 |
| 45 | 531ZZ45 | 1.5 | 4 | 0.057 |

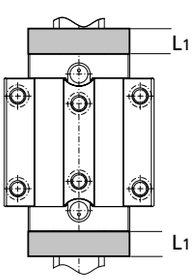
L1 – scraper thickness, L2 – max. screw head stickout

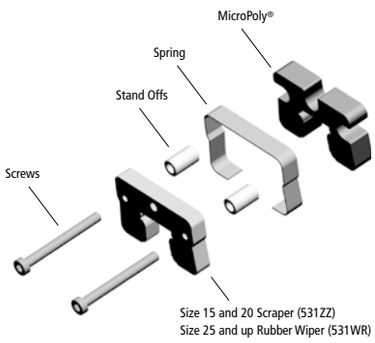



### Oil Reservoir

| Size | Lubrication Plate | L1 (mm) | Weight (kg) |
|---|---|---|---|
| 15 | 531OW15 | 8.5 | 0.004 |
| 20 | 531OW20 | 11 | 0.010 |
| 25 | 531OW25 | 12.7 | 0.017 |
| 30 | 531OW30 | 14 | 0.023 |
| 35 | 531OW35 | 16.2 | 0.039 |
| 45 | 531OW45 | 19.2 | 0.065 |

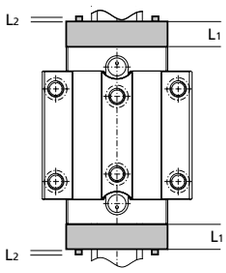
L1 = Oil reservoir thickness, screw heads are recessed in plate






## Lube Block

| Size | Lubrication Plate | L1 (mm) | L2 (mm) | Weight (kg) |
|---|---|---|---|---|
| 15 | 531 LL 15 | 9.9 | 4 | 0.009 |
| 20 | 531 LL 20 | 11.9 | 4 | 0.024 |
| 25 | 531 LL 25 | 19.5 | 4 | 0.083 |
| 30 | 531 LL 30 | 21.2 | 4 | 0.213 |
| 35 | 531 LL 35 | 24.7 | 4 | 0.069 |
| 45 | 531 LL 45 | 26.9 | 4 | 0.123 |




L1 = Lube Block thickness, L2 = max. screw head stickout

When supplied from the factory as a complete unit the carriage is packed with EP2 grease and spring is loose for customer to install after assembling carriage on the rail.

Z scraper included in lube block assembly on sizes 15 and 20.
W wiper included on sizes 25 and up.

## Example

| 511 Size 45 carriage with 531OW and 531WR modular seals on both sides: | |
|---|---|
| Carriage Length (L) | = 89.3 |
| 531 OW 45 $L_1$ x 2 | = 12.7 x 2 |
| 531 WR 45 $L_1$ x 2 | = 7 x 2 |
| 531 WR 45 $L_2$ x 2 | = 4 x 2 |
| Total Length | = 136.7 mm |

Each modular seal is supplied with the proper screws to install the seal over the standard end cap. When combinations of modular seals are used longer screws may be required, consult table on pages 40-41 for proper screw size.

## Bellows Dimensional Information

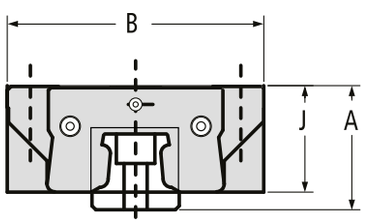
Bellows are available in three styles:

**531 BB** "Low Profile" with outside dimensions that do not exceed the carriage, constructed of polyurethane coated polyester, maximum ambient temperature of 80°C (175°F).

**531 BC** "High Compression" constructed of a spark resistant Teflon® coated fiberglass and designed to allow for higher compression, maximum ambient temperature exceeds maximum bearing peak temperatures.

**531 WC** "Walk On" capable of handling the harshest environments, including welding and grinding applications, with a 90 kg load bearing capacity.

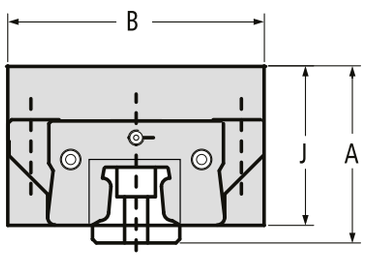
The bellows can be easily installed in conjunction with the other optional modular seals providing you with an easy upgrade to the standard seal. Installation is simple and requires little time. Retrofitting is possible. The rail ends have to be drilled for the attachment of the bellow clip adapter plate, 531 CR. These can be easily installed on-site in the field or can be supplied from the factory.




### 531 BB "Low Profile" Bellows

| Size | Part No. | B | J | A | CR |
|---|---|---|---|---|---|
| 15 | 531 BB15 | 45 | 23 | 26 | 0.17 |
| 20 | 531 BB20 | 41.6 | 24 | 29 | 0.17 |
| 25 | 531 BB25 | 43.7 | 29 | 35.5 | 0.17 |
| 30 | 531 BB30 | 51.2 | 33.3 | 40.3 | 0.17 |
| 35 | 531 BB35 | 64 | 39.5 | 47.5 | 0.15 |
| 45 | 531 BB45 | 76 | 48 | 58 | 0.15 |

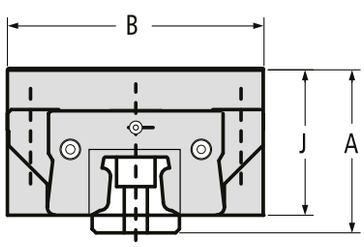
Customer to specify extended length at time of order, see page 154 for how to calculate.




### 531 BC "High Compression" Bellows

| Size | Part No. | B | J | A | CR |
|---|---|---|---|---|---|
| 15 | 531 BC15 | 59 | 33 | 36 | 0.10 |
| 20 | 531 BC20 | 61.6 | 34 | 39 | 0.10 |
| 25 | 531 BC25 | 63.7 | 39 | 45.5 | 0.10 |
| 30 | 531 BC30 | 71.5 | 43.3 | 50.3 | 0.10 |
| 35 | 531 BC35 | 84 | 49.5 | 57.5 | 0.07 |
| 45 | 531 BC45 | 76 | 58 | 68 | 0.07 |

Customer to specify extended length at time of order, see page 154 for how to calculate.




### 531 BW "Walk On" Bellows

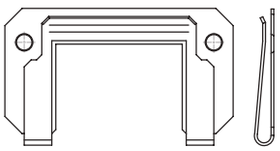
| Size | Part No. | B | J | A | CR |
|---|---|---|---|---|---|
| 15 | 531 BW15 | 55 | 30 | 31 | 0.19 |
| 20 | 531 BW20 | 61 | 33 | 34 | 0.19 |
| 25 | 531 BW25 | 65 | 36 | 40.5 | 0.19 |
| 30 | 531 BW30 | 70 | 39 | 44.2 | 0.19 |
| 35 | 531 BW35 | 77 | 42 | 48 | 0.19 |
| 45 | 531 BW45 | 101 | 53 | 61 | 0.15 |

Customer to specify extended length at time of order, see page 154 for how to calculate.

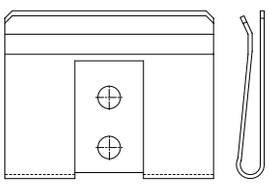
## Bellow Clip Adapter Plates

**531 CC Carriage Bellows Clips – Attachment Plate**
The 531 CC Carriage Bellows Clip – Attachment Plate is used to attach the bellows to the carriage. The bellows clip – adapter plate is made of steel.

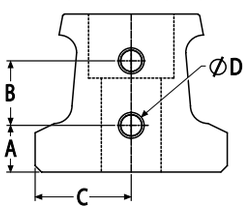
| Size | Part No. |
|---|---|
| 15 | 531 CC15 |
| 20 | 531 CC20 |
| 25 | 531 CC25 |
| 30 | 531 CC30 |
| 35 | 531 CC35 |
| 45 | 531 CC45 |



**531 CR Rail Bellows Clips – Attachment Plate**
The 531 CR Rail Bellow Clip – Attachment Plate is used to attach the bellows to the rail. The attaching holes can be drilled in the end of the rail if retrofitting or can be supplied from the factory. (Note: Size 15 rail is through hardened, annealing the end of the rail is required to properly drill end plate clip this results in an area on the end of the rail that will be soft and possibly out of tolerance). The bellows clip – adapter plate is made of steel.



**Rail End Machine Detail**




| Size | Part No. | Rail Machining Detail | | | | | Screw[1] | | | | MinY[2] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | A | B | C | Depth Min | Depth Max | Size | Pitch | Length | Type | |
| 15[3] | 531 CR15 | 3.50 | 8.00 | 7.50 | | | | | | | 14 |
| 20 | 531 CR20 | 5.00 | 8.00 | 10.00 | 5.70 | 7.70 | M3 | 0.5 | 8 | Button | 15 |
| 25 | 531 CR25 | 7.24 | 10.00 | 11.50 | | | | | | Head | 17 |
| 30 | 531 CR30 | 9.12 | 10.00 | 14.00 | 7.70 | 9.70 | M4 | 0.7 | 10 | Cap | 20 |
| 35 | 531 CR35 | 11.00 | 10.00 | 17.00 | | | | | | Screw | 20 |
| 45 | 531 CR45 | 15.01 | 10.00 | 22.50 | | | | | | | 22 |

All dimensions in mm, unless otherwise specified.
1. Two screws are supplied with each Rail Bellow Clip.
2. Min Y dimension to ensure drill depth does not break through rail mounting hole.
3. Rail end may require annealing, see note above.

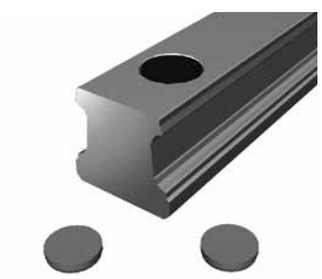
## Maintenance and Installation Tools and Accessories

The assembly rail is required when the carriage must be removed from the rail and then reinstalled to ensure proper installation. It is recommended to leave the carriage on the assembly rail when it is removed to protect the balls against contamination. If necessary, the two internal mounting screws for fastening runner blocks to the carriage can be tightened to ensure the carriage remains on the assembly rail. The assembly rail is made of plastic.

### Assembly Rail – 531 MT

| Part Number | Size | Length (mm) | Weight (kg) |
|---|---|---|---|
| 531 MT 15 | 15 | 80 | 0.010 |
| 531 MT 20 | 20 | 115 | 0.021 |
| 531 MT 25 | 25 | 130 | 0.031 |
| 531 MT 30 | 30 | 160 | 0.061 |
| 531 MT 35 | 35 | 165 | 0.076 |
| 531 MT 45 | 45 | 200 | 0.135 |

### Standard Rail Plugs for use with to 500 Series Ball Carriage Type A



| Type HP plastic plugs | Size |
|---|---|
| 531 HP 15 | 15 |
| 531 HP 20 | 20 |
| 531 HP 25 | 25 |
| 531 HP 30 | 30 |
| 531 HP 35 | 35 |
| 531 HP 45 | 45 |

Material: Nylon

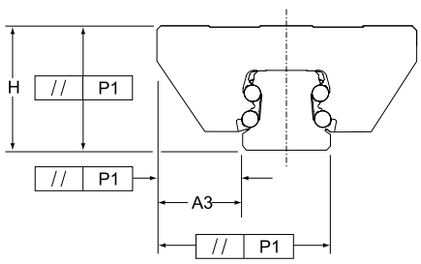
### 500 Series Rail with Stainless Steel Cover Strip

| | Rail Coverstrip End Caps | Mounting Tool | Replacement End Caps | Standard Coverstrip Rail | Coverstrip Width (mm) | Max Single PC Length (mm) |
|---|---|---|---|---|---|---|
| Size | Part Number[1] | Part Number | Part Number[2] | Part Number[3] | | |
| 25 | 531RCS25 | 531RCT25 | 531RCP25 | 521H25C | 15 | 6000 |
| 30 | 531RCS30 | 531RCT30 | 531RCP30 | 521H30C | 19 | 6000 |
| 35 | 531RCS35 | 531RCT35 | 531RCP35 | 521H35C | 25 | 6000 |
| 45 | 531RCS45 | 531RCT45 | 531RCP45 | 521H45C | 25 | 6000 |

1. Customer to specify length of rail to be used on at time of order. Delivered piece will be 2 to 3.5 mm longer in order to properly install and fit end caps.
2. Two end caps are supplied with each piece of 531RCS ordered.
3. H grade accuracy shown for example purposes, P and U grade accuracy are available.
4. Cover strip should not be installed more than 3 times.

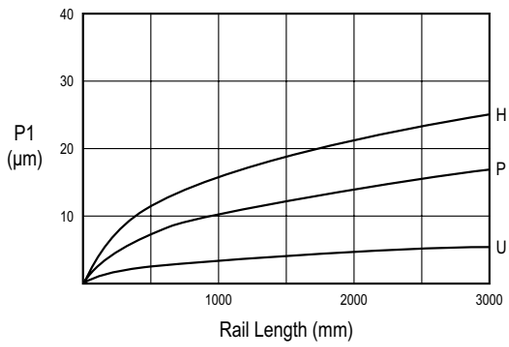
## Accuracy Class

Three tolerances describe the accuracy of a Profile Rail bearing: Running Parallelism, Pair Variation, and Assembly Accuracy. These are measured from the rail base to the center of the carriage top (H), and from the rail reference edge to the center of the carriage reference edge (A3).




Running Parallelism describes the tolerance on H and A3 as a function of axial travel, measured from one carriage down the length of the rail. This is analogous to straightness of travel. As such, parallelism describes attributes of the rail only.

Assembly Accuracy describes the tolerance on H and A3 as a function of a carriage – rail assembly, measured from the nominal dimensions.




Pair Variation describes tolerance on H and A3 as a function of carriages at the same position on a common rail. Pair variation describes carriage precision only.

The accuracy class selected will partially determine the accuracy of the system. Other factors such as mounting surface flatness and straightness also significantly affect system accuracy.

### Tolerances

| | Accuracy Class | | |
|---|---|---|---|
| | H - High | P - Precision | U - Ultra Precision |
| Assembly Accuracy Tolerance on dimension H and A3 (measured at middle of carriage at any point along rail) | ±50 | ±20 | ±5 |
| Pair Variation Max variation in dimensions H and A3 measured on multiple carriages mounted on the same rail (measured at the middle of carriage at same position on rail) | 15 | 7 | 3 |
| Running Parallelism | 100 | 40 | 10 |

All values in µm

## Preload

Three Preload classes and one clearance class are available with the 500 Series Ball Profile Rail carriages. Preload will minimize elastic deformation caused by external forces resulting in increased rigidity. Preload will eliminate internal clearances between the rail and carriage resulting in zero backlash.

### Preload Accuracy Combinations

| Accuracy Class | Clearance | Preload | | |
|---|---|---|---|---|
| | | 0.03C[1] | 0.08C[1] | 0.13C[1] |
| H | 0 | 1 | 2 | |
| P, U | | 1 | 2 | 3 |

1. C = Dynamic load capacity of the bearing
2. A preloaded bearing loaded beyond the preload value has the same characteristics as a clearance bearing. Example: Size 25 A style carriage has dynamic load capacity of 21.1kN,
Medium Preload = 0.08C = 0.08 x 21.1kN = 1.7kN;
if applied load is greater than 1.7kN preload has no benefit.