Quick-Guide Linear Motion Designer
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Dimensioning / Calculation
- Profiled Rail System (PRS)
- Screw Assemblies (SA)
- PRS and SA in one step
- Linear Bushings
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Application

Applies to Profiled rail system and Linear bushing

If your application is not included you are welcome to contact Bosch Rexroth.

Choose the tab Project > Request of Information or visit www.boschrexroth.com/lmd
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System dimensions Runner Block

Applies to Profiled rail system and Linear bushing

1. **Drive**
   - Enter the position of the drive
     - Schematic representation
   - Stiffness in X-direction
     - Stiffness of the drive, if known (Influence on the displacement calculation in X-direction)

2. **Dimensioning**
   - Enter runner block/bushing distance
   - Enter guide rails/shafts distance (Required fields)

3. **Rotation angle**
   - Rotation angle α: Rotation around the X-axis (e.g. 90° at wall mounting)
   - Rotation angle β: Rotation around the Y-axis (e.g. 90° at vertical applications)

Text with dotted subline = Mouseover help text
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System dimensions Screw Assembly

Screw Assembly journal bearing
- Fixed - Floating
- Fixed - Fixed
- Fixed - Free

Lead of screw *(Required)*
- The lead can still be adjusted when selecting the nut

Bearing centre to centre distance *(Required)*
- The value is determined exactly after selection of the spindle ends

Rotation angle $\beta$
- f.e. 90° at vertical applications

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Dynamics

Input options

Dynamic cycle *

- Enter velocity, acceleration, time, distance

Part of time *

- Enter percentage duty cycle of the respective phases and average speed

Percentage of stroke *

- Distance of the respective phases and average speed

Motion profile

- Predefined cycles
- Input via stroke and time

* A change between the input options is possible

Text with dotted subline = mouseover help text
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Process

Process data

1. Masses
   - Input up to 9 masses
   - Masses activated in all phases, de-activate if not required
   - Acceleration forces in direction of travel are calculated automatically
   - For multi-axis applications, enter the lateral acceleration ($a_{quer, y}$ and $a_{quer, z}$) in the respective phases. The lateral forces are calculated automatically

2. Forces
   - Input up to 12 forces
   - Forces must still be activated in the active phases

3. Additional loads
   - The additional load is added to each carriage in each phase

4. Tips: calculation assumptions and design tips
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Result Runner Block

- Service Performance: Input data for service performance or required lifetime
- Lubrication: Calculation to lubrication interval and quantity
- Selection guide: Product proposal based on industry and application specifications

Calculation
- Automatic detection if the runner block distance is too small (deselected)
- Automatic detection from short stroke (deselected)
- Automatic matching from limiting values (max. acceleration, max. velocity, ...)
- Notes at low load ratio

Show Deflection (See next page)

Help
Shows the legend to descriptions and information about the various load ratios
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Deflection

Deflection values of the individual application force points in the respective phases

- Red values are max. values per phase, per appl. force point

Deflection of the application force points refer to unloaded condition
- Starting position is an unloaded condition on the runner blocks

Deflection of the application force points refer to phase T1…T18
- e.g. phase T2, the deflection values in phase T2 are set to zero
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Result Linear Bushing

Filter criteria
- Preselection for a much quicker bushing selection

Calculation
- Automatic detection if the bushing distance is to small (deselected)
- Automatic detection from short stroke (deselected)
- Automatic matching from limiting values (max. acceleration, max. velocity, …)
- Consideration of reduction factors due to shaft hardness >60HRC, temperature >100°C
- Notes at low load ratio

Help
- Shows the legend to descriptions and information about the various load ratios
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Result Screw Assembly - Nut

- Unit end bearing: Specification of spindle ends or end bearing
- Lubrication: Calculation of lubrication interval and quantity
- Service Performance: Input data for service performance, or required lifetime

**Calculation**
- Automatic detection of critical speed and max. permissible axial load
- Automatic detection from short stroke (deselected)
- Automatic matching from limiting values (max. acceleration, max. velocity, ...)
- Notes at low load ratio

**Show critical speed** (See next page)

**Help**
- Shows the legend to description and information about the various load ratios
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Critical speed

Depending on the position the critical speed can be read off the diagram. Thus in certain stroke ranges the permissible critical speed can be higher.
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Result Screw Assembly - Spindle

- **Selection of a suitable bearing unit**
  - Form and version are defined

- **Selection form and version of the spindle ends**
  - Details in the product catalogue

- **Bearing centre to centre distance**
  - Value from "system dimensions"

- **Minimum length**
  - The minimum bearing centre to centre distance calculated via stroke, length of the nut and non-usable spindle length

- **Warning messages**
  - Matching of the max. permissible drive torque on the spindle journal
  - Matching of the load capacity of the end bearing < load capacity of the nut

- **Help**
  - Shows the legend to description and information about the various load ratios
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Project

1. **Documentation**
   - Create a rtf-document (Print-out)

2. **CAD**
   - Link to the configurator
   - Transferring the existing parameters to the configurator

3. **Online catalogue**
   - Direct link to the calculated product at the online catalogue for additional information

4. **Request consultation**
   - Mailbox of the technical design and support centre at Bosch-Rexroth Linear technology
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General information, definitions

Zero point
- Centerline between the runner blocks/bushings in X-direction
- Centerline between the guide rails/shafts in Y-direction
- On the top mounting surface plane in Z-direction

Rotation of the axis
- The coordinate system also rotates

Definition moving direction
- Moving direction of the axis is always X-direction

System requirements at Profiled rails system
- Moving: Guide rails fixed; runner blocks are moving
- Mounting: Lateral retention for guide rails and runner blocks

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