Resulting and equivalent bearing loads

For angular-contact thrust ball bearings LGN and LGF6

Angular-contact thrust ball bearings are preloaded. The chart shows the resulting axial bearing load F_{ax} as a function of preload and axial operating load F_{Lax}.
For a purely axial load $F_{comb} = F_{ax}$.

$$F_{comb} = X \cdot F_{rad} + Y \cdot F_{ax} \quad (20)$$

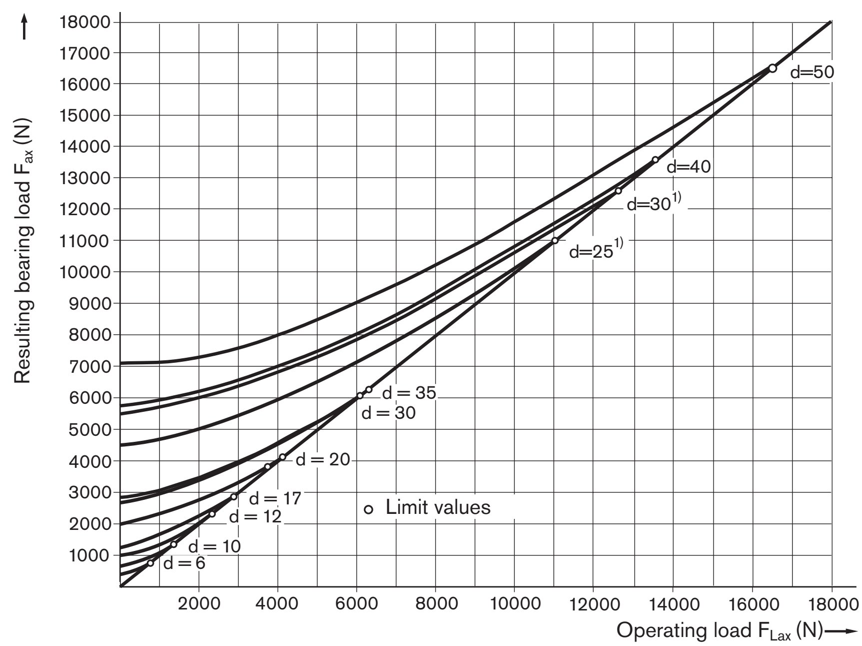
F_{ax}	= resulting axial bearing load	(N)
F_{comb}	= combined equivalent load	(N)
F_{rad}	= radial bearing load	(N)

$\alpha = 60°$	X	Y
$\frac{F_{ax}}{F_{rad}} \leq 2.17$	1.90	0.55
$\frac{F_{ax}}{F_{rad}} > 2.17$	0.92	1.00

α = pressure angle
F_{ax} = resulting bearing load
F_{Lax} = operating load
X, Y = dimensionless factor

If the radial operating forces are not insignificant, the equivalent bearing loads are calculated according to formula 20.
Bearings for Panetary Screw Assemblies are also able to accommodate tilting moments. The moments that usually occur due to the weight and drive motion of the screw do not generally need to be incorporated into the calculation of the equivalent bearing load.

Internal preload limit and resulting bearing load



[1)] Four row version

⚠ **Separate technical dimensioning to determine the limit values is absolutely necessary for all attachments (e.g. pillow block units, bearing assembly, etc.)**

Permissible static axial load for bearing series LGF

The permissible static axial load of LGF series bearings in screw-down direction is:

$$F_{0ax\ p} \leq \frac{C_0}{2}$$

The static axial load rating C_0 is stated in the Dimension Tables.

Average speed and average bearing load

When the bearing load varies in steps over a specific period of time (22), calculate the dynamic equivalent bearing.

When the speed varies, use formula (23). In these formulas $\mathbf{q_t}$ denotes the discrete time steps for the individual phases in %.

$$F_m = \sqrt[3]{F_{comb1}^3 \cdot \frac{|n_1|}{n_m} \cdot \frac{q_{t1}}{100} + F_{comb2}^3 \cdot \frac{|n_2|}{n_m} \cdot \frac{q_{t2}}{100} + \ldots + F_{combn}^3 \cdot \frac{|n_n|}{n_m} \cdot \frac{q_{tn}}{100}} \quad (22)$$

$$n_m = \frac{q_{t1}}{100} \cdot |n_1| + \frac{q_{t2}}{100} \cdot |n_2| + \ldots + \frac{q_{tn}}{100} \cdot |n_n| \quad (23)$$

Service life and load safety factor

$$L = \left(\frac{C}{F_{comb}}\right)^3 \cdot 10^6 \quad (24)$$

Nominal service life

The nominal service life is calculated as follows:

$$L_h = \frac{16\,666}{n_m} \cdot \left(\frac{C}{F_{comb}}\right)^3 \quad (25)$$

Attention:

take the dynamic load rating of the nut into account!

Static load safety factor

The static load safety factor for machine tools should not be lower than 4.

$$S_0 = \frac{C_0}{F_{0max}} \quad (26)$$

C	=	dynamic bearing load rating	(N)
$F_{0ax\ p}$	=	permissible static axial bearing load	(N)
F_{comb}	=	combined equivalent load	(N)
$F_{comb1} \ldots F_{combn}$	=	combined equivalent axial load in phases 1 … n	(N)
F_m	=	dynamic equivalent bearing load	(N)
L	=	nominal service life in revolutions	(–)
L_h	=	nominal service life in operating hours	(h)
$n_1 \ldots n_n$	=	speeds in phases 1 … n	(rpm)
n_m	=	average speed	(rpm)
$q_{t1} \ldots q_{tn}$	=	discrete time steps in phases 1 … n	(%)

Planetary Screw Assemblies PLSA

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Find your local contact person here: www.boschrexroth.com/adressen

Application

New design ☐ Revised design ☐

Operating conditions

Discrete time step parameters

Discrete time steps (%)	**Speed** (1/min)	**Action of force x**
$T_1 =$	$n_1 =$	
$T_2 =$	$n_2 =$	
$T_3 =$	$n_3 =$	
$T_4 =$	$n_4 =$	
$T_5 =$	$n_5 =$	
$T_6 =$	$n_6 =$	

or

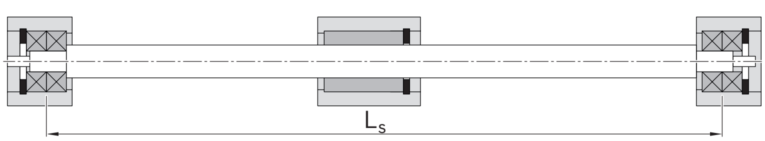
Dynamic cycle parameters

Section	**T1**	**T2**	**T3**	**T4**	**T5**	**T6**	**T7**	**T8**	**T9**	**T10**	**T11**	**T12**
Path (mm)												
V (m/s)												
a (m/s^2)												
Time (s)												
Action of force x												

	F1	**F2**	**F3**	**F4**	**F5**	**F6**
Forces (N) =						
Mass (kg) =						
Max. stroke (mm) =						

Bearing type

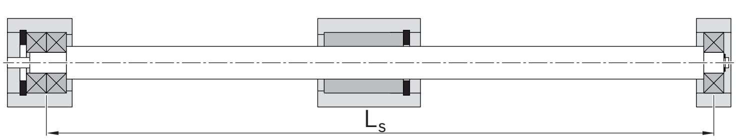
1. ☐ Tight



Tight

Installation Position
Horizontal ☐
Vertikal ☐

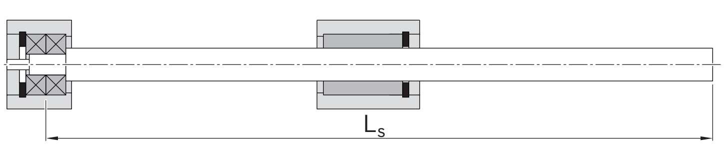
2. ☐ Tight



Loose

Drawing enclosed (recommended) ☐

3. ☐ Tight



Free

Delivery with bearing ☐

Required life: Operating temperature: °C Up to °C

Type of lubrication:

Short description of the application / unusual operating conditions:

Visit out official homepage and use the provided configurators and our dimensioning program Linear Motion Designer free of charge.