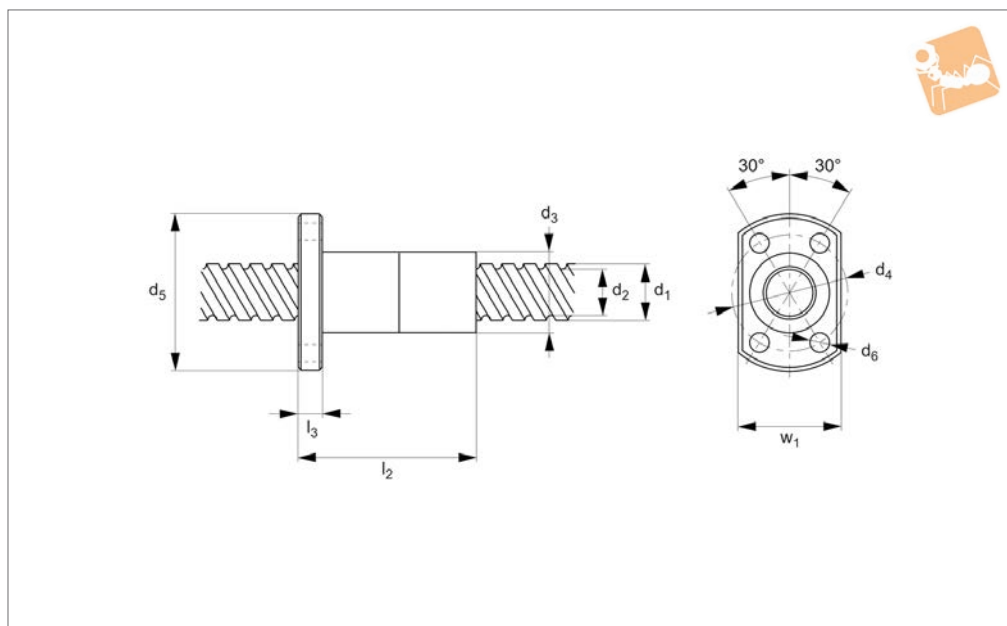




# Anti-backlash High Helix Lead Screws

full assembly

## Lead Screws & Nuts



## L1351

LEAD SCREWS & NUTS

### Material

Stainless steel screw (SUS 304),  
resin nut (PPS).

### Technical Notes

High precision. No backlash.

The 'lead' refers to the distance the nut will  
travel for one complete revolution of the  
thread.

Nut fitted to screw, to ensure anti-backlash  
- unlike L1349 and L1350 which can be

ordered separately.

Order No.	Lead	d <sub>1</sub> nom.	l <sub>1</sub>	w <sub>1</sub>	l <sub>2</sub>	d <sub>2</sub> core	d <sub>3</sub>	d <sub>4</sub> pcd	d <sub>5</sub>	d <sub>6</sub>	l <sub>3</sub>	Axial clearance µm	Thrust load N max.	rpm max.	Torque screw to Nm
L1351.04-01-0.2	1	4	200	15	17,5	3,3	10	15	23	2,9	3,5	50	50	2000	0,25
L1351.04-02-0.2	2	4	200	15	17,5	3,3	10	15	23	2,9	3,5	50	60	2000	0,25
L1351.06-01-0.3	1	6	300	17	23,5	5,3	12	18	26	3,4	3,5	50	120	2000	0,6
L1351.06-02-0.3	2	6	300	17	23,5	5,3	12	18	26	3,4	3,5	50	60	2000	0,6
L1351.06-09-0.3	9	6	300	17	23,5	5,4	12	18	26	3,4	3,5	100	90	2000	0,6
L1351.06-18-0.3	18	6	300	17	23,5	5,6	12	18	26	3,4	3,5	100	70	2000	0,6
L1351.08-01-0.3	1	8	300	18	29,0	7,3	14	21	29	4,5	4,0	50	200	2000	0,6
L1351.08-02-0.3	2	8	300	18	29,0	6,6	14	21	29	4,5	4,0	50	290	2000	0,6
L1351.08-12-0.4	12	8	400	18	29,0	6,7	14	21	29	4,5	4,0	100	210	2000	0,6
L1351.08-24-0.4	24	8	400	18	29,0	7,5	14	21	29	4,5	4,0	100	210	2000	0,6
L1351.10-02-0.3	2	10	300	21	35,0	8,6	16	24	33	4,5	5,0	50	460	1500	0,8
L1351.10-06-1.0	6	10	1000	21	35,0	8,0	16	24	33	4,5	5,0	100	370	1500	0,8
L1351.10-10-1.0	10	10	1000	21	35,0	8,0	16	24	33	4,5	5,0	100	250	1500	0,8
L1351.10-15-0.5	15	10	450	21	35,0	8,4	16	24	33	4,5	5,0	100	410	1500	0,8
L1351.10-30-0.5	30	10	450	21	35,0	8,9	16	24	33	4,5	5,0	100	410	1500	0,8
L1351.12-02-0.3	2	12	300	22	40,0	10,6	18	26	35	4,5	5,0	50	660	1000	0,8
L1351.12-04-1.0	4	12	1000	22	40,0	10,0	18	26	35	4,5	5,0	100	620	1000	0,8
L1351.12-08-1.0	8	12	1000	22	40,0	9,8	18	26	35	4,5	5,0	100	820	1000	0,8
L1351.12-12-1.0	12	12	1000	22	40,0	10,3	18	26	35	4,5	5,0	100	470	1000	0,8
L1351.12-18-0.5	18	12	500	22	40,0	10,6	18	26	35	4,5	5,0	100	750	1000	0,8
L1351.12-36-0.5	36	12	500	22	40,0	10,9	18	26	35	4,5	5,0	100	540	1000	0,8
L1351.15-05-2.0	5	15	2000	27	48,0	12,2	24	33	42	4,5	6,0	100	890	800	0,8
L1351.15-10-2.0	10	15	2000	27	48,0	12,3	24	33	42	4,5	6,0	100	1040	800	0,8
L1351.15-20-2.0	20	15	2000	27	48,0	12,6	24	33	42	4,5	6,0	100	1100	800	0,8
L1351.20-10-2.0	10	20	2000	32	57,0	17,5	30	40	50	5,5	7,0	100	1240	600	1,0
L1351.20-20-2.0	20	20	2000	32	57,0	17,6	30	40	50	5,5	7,0	100	1420	600	1,0



#### Precision lead screws

The high lead thread form maximises linear motion and minimises shaft rotation. The close tolerance, free running nuts are individually matched to their lead screws and are ideal for miniature applications requiring rotary to linear, or linear to rotary actuation.

#### Anti-backlash nuts

For applications requiring precision positioning there is now a newly patented Anti-backlash nut. This device, consisting of only three components, utilises the constant force of a compression spring to push two halves apart. This action eliminates any play (backlash) which exists between the internal thread of the nut and the external screw thread.

To ensure accuracy and repeatability the nut can be fine tuned through the use of many available spring constants, to meet any preload design requirements.

<b>Lead screw specification</b>	High precision lead screw
<b>Lead error</b>	±0,2mm/300mm
<b>Repeatability</b>	0,01mm
<b>Straightness</b>	0,03mm/100mm
<b>Backlash</b>	0,08mm (zero when using anti-backlash nut)
<b>Temperature range</b>	-30°C to +90°C

#### Design considerations

##### Critical speed

The critical speed of a lead screw is the maximum speed (rpm) before the screw will become dynamically unstable. This results when the forced frequency of the rotating screw corresponds to its natural frequency. Its value is dependent on the length of the screw, the diameter of the thread, and the support configuration. The critical speed value is governed by the following equation.

$$\text{Critical screw speed (RPM)} = K \times C \times 10^6 \times (d/L^2)$$

Where;

K = End support factor

0,36 one end fixed, other free

1,00 simple supports both ends

1,47 one end fixed, one simple

2,23 both ends fixed

C = Material factor

4,5 for Stainless Steel screws

1,6 for Aluminium screws

d = Root diameter of the screws

L = Length between bearing supports

### Load

In order to properly incorporate a lead screw into a design, load requirements must be taken into account. These numbers are based on the shear of the nuts and does not take shaft buckling into account. Wherever possible, nuts should be positioned so as to be put in tension, pulling the load. This eliminates the need for buckling considerations.

Listed below are some helpful formulae to assist in proper lead screw selection.

$$\text{Critical load (N)} = K \times C \times 10^6 \times (d^4/D^2)$$

Where;

K = End support factor

0,25 one end fixed, other free  
(figure 1)

1,00 simple supports both ends  
(figure 2)

2,00 one end fixed, one simple  
(figure 3)

4,00 both ends fixed (figure 4)

C = Material factor

13,4 for Stainless Steel screws

4,8 for Aluminium screws

d = Root diameter of the screws

D = Length between bearing supports

$$\text{Torque to move a load (T)} = F \times L/2 \times \pi \times E$$

Where;

F = Load

L = Lead

E = Efficiency (see product pages)

### End fixing configurations

Figure 1



Double bearing,  
one end only

Figure 3



Double bearing one end,  
single bearing other end

Figure 2



Single bearing both ends

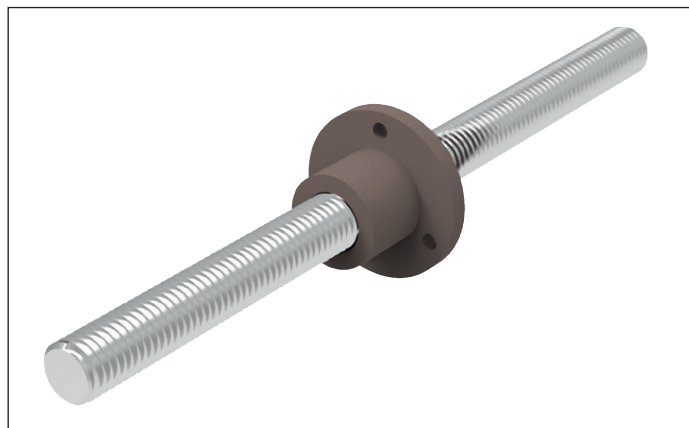
Figure 4



Double bearing both ends



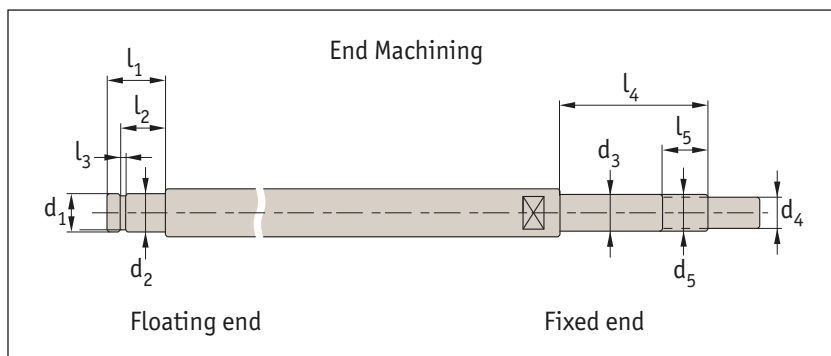
- Select the relevant size lead screw diameter and load required.



- These are precision, high helix lead screws from stainless steel (304 grade)
- We can cut length to suit and/or machine the ends to your requirements
- They have an accumulative lead error of  $\pm 0.20/300\text{mm}$  (C10 grade)
- The actual clearance depends on the nut selected L1350 standard flanged nut or L1351 anti-backlash nut
- Nuts are very smooth running with little friction. They are made from plastic resin (PPS).
- The anti-backlash nuts are longer than the standard length nuts as they incorporate a spring pushing the two halves of the unit apart.

Lead screw Ø	Lead (distance travelled per revolution)														
	1	2	4	5	6	8	9	10	12	15	18	20	24	30	36
4	●	●													
6	●	●					●				●				
8	●	●							●				●		
10		●			●			●		●				●	
12		●	●			●			●		●				●
15				●				●				●			
20								●				●			

### End machining to suit miniature bearing support units



Screw Ø	Type	Floating	Fixed	d <sub>1</sub>	d <sub>2</sub>	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	d <sub>3</sub>	d <sub>4</sub>	l <sub>4</sub>	l <sub>5</sub>	d <sub>5</sub> x p
4	Pillow	L1355.030	L1353.030	2	1,59	5	4	+0,05	+0,05	3	17,5	6,5	M3x0,5
4	Flanged	L1356.030	L1354.030										
6	Pillow	L1355.040	L1353.040	3	2,73	5,5	4,5	0	0,5	4	18,5	7	M4x0,5
6	Flanged	L1356.040	L1354.040										
6	Pillow	L1355.050	L1353.050	4	3,73	6,5	5,5	0,5	0	5	19,5	7	M5x0,5
6	Flanged	L1356.050	L1354.050										
8	Pillow	L1355.060	L1353.060	6	5,7	8	6,8	+0,1	0,8	6	23	7	M6x0,75
8	Flanged	L1356.060	L1354.060										
10	Pillow	L1355.080	L1353.080	6	5,7	8	6,8	0	0,8	8	27	8,5	M8x1,0
10	Flanged	L1356.080	L1354.080										