



# Modified and Custom Designed Nuts

## Modified, custom and multi-functional nuts

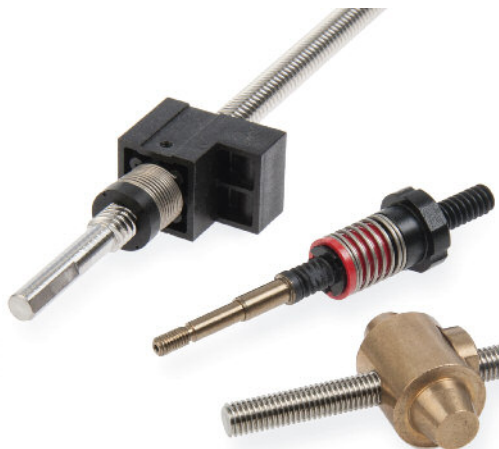
In addition to the standard nut types, custom configurations are available as well as simple modifications such as different mounting hole patterns or mounting threads, small dimensional changes or special materials.

Custom nut designs can offer multi-functionality, eliminating additional components, simplifying product manufacture, saving space and reducing cost. Multi-functional nuts can be produced using custom moulds and special machining to integrate components into the nut, such as guide bushings, carriages, timing pulleys, gears, syringe components, sensor mounts and flags, encoder features, clamps and many other complementary elements. In addition, custom designed nuts can offer quick release mounts, partial thread engagement, half nut construction or alternative shapes and geometries.

Special materials are available to extend the performance of the assemblies. We offer a range of Kerkite® composite polymers. Each member of the Kerkite® family is compounded with lubricants, reinforcements and thermoplastic polymers formulated to provide optimum performance in its target conditions and applications. In addition to the Kerkite® composite polymers, materials such as PEEK, polyester, Torlon, Vespel, PVDF, UHMW, Ertalyte® are available. Materials can be chosen for extreme temperature, chemical compatibility, autoclaving, agency approvals, special loadings and many other specific requirements.

Custom geometries and materials can be combined for a wide variety of product application requirements. Small quantities of custom nuts can be machined individually to suit specific requirements, alternatively large quantities can be moulded for reduced costs.

To achieve the most effective nut design we consider a combination of tolerancing and geometric shape of the nut. Tighter tolerances can be achieved by designing in geometric features to control important diameters, for example use of a ribbed feature on a bearing location diameter will reduce the need for tighter manufacturing tolerances.



# Leadscrew End Machining

## End modifications

Leadscrews are supplied with cut ends as standard. Alternatively we supply a selection of standard machined ends suitable for interfacing with a range of associated products including; bearings, circlips, couplings, pulleys and gears.

End **A** - Ball bearing : [page 7-28](#)

End **B** - Ball bearing & circlip : [page 7-29](#)

End **C** - Ball bearing & coupling : [page 7-30](#)

End **D** - Twin bearings & coupling : [page 7-31](#)

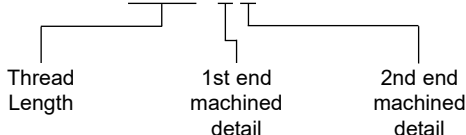
End **E** - Ball bearing & pulley : [page 7-32](#)

End **F** - Ball bearing & gear : [page 7-33](#)

## Ordering your modified end detail

To order a leadscrew with machined ends, use the ordering example below. If only one end is to be machined leave the 2nd end machining suffix blank.




Example part no. - **LPX10 - M050 - 350MM - C A**



## Custom machined leadscrew ends




We are also able to supply custom machined ends to drawing; the drawing and specification details required and tolerances available are provided on [page 7-34](#) and [7-35](#). Please contact us to discuss your requirements.

## Associated products

Leadscrew Diameter	Standard Bearing P/No. <sup>1</sup> 	Standard Circlip P/No. 	Standard Coupling P/No. <sup>2</sup> 
6	B1-104-S-P4	D1400-0040-SS	RCLA13C-*.*
10	B1-106-S-P4	D1400-0060-SS	RCLA16C-*.*
11	B1-108-S-P4	D1400-0080-SS	RCLA20C-*.*
13	B1-108-S-P4	D1400-0080-SS	RCLA20C-*.*

<sup>1</sup> Bearings for low to medium loads, see [page 12-2](#). For high loads please contact us.

<sup>2</sup> Add bore diameters to complete part number, see [pages 8-10, 8-12, 8-14](#)

Leadscrew Diameter	Standard Pulley P/No. <sup>3</sup> 	Standard Shim P/No. 	Standard Gear P/No. <sup>4</sup> 
6	TPMP25 F6-**.*	SS1-104	P**S1B4 F4A**
10	TPMP25 F6-**.*	SS1-108	P**S1B6 F4A**
11	TPMP25 F6-**.*	SS1-112	P**S1B8 F6A**
13	TPMP25 F6-**.*	SS1-112	P**S1B8 F6A**

<sup>3</sup> Add required number of teeth to complete part number, see [page 10-3](#)

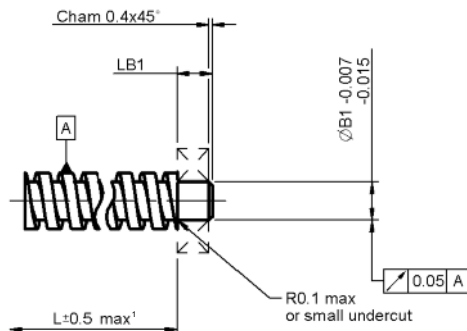
<sup>4</sup> Add gear module and required number of teeth to complete part number, see from [page 4-1](#)

For all other accessories shown above, please refer to [sections 12 and 13](#).



All dimensions in mm  
General tolerances  $\pm 0.13$  mm

## Ball bearing journal, End A



## Drawing dimension table

Leadscrew Diameter	Screw Diameter	Journal	
		Diameter ØB1	Length LB1
6	6.35	4	4.5
10	9.53	6	5.5
11	11.11	8	6.5
13	12.70	8	6.5

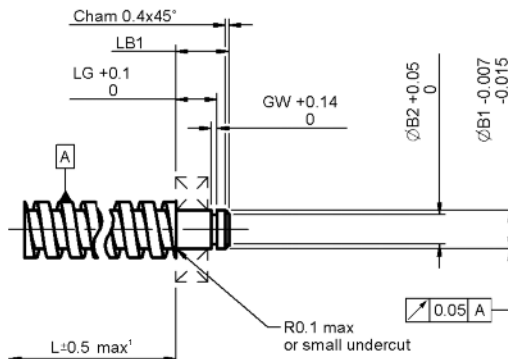
¹ L tolerance is dependent on the length of the leadscrew - see [page 7-35](#) for actual tolerance.



### **i** Information

- Ordering instructions - see [page 7-3](#) and [7-27](#)
- Associated products - see [page 7-27](#)
- Custom end machining - see [page 7-34](#) and [7-35](#)
- Technical information - see [pages T7-1 to T7-5](#)

## Ball bearing journal with circlip groove, End B



## Drawing dimension table

Leadscrew Diameter	Screw Diameter	Journal		Groove		Length
		Dia ØB1	Length LG	Dia ØB2	Width GW	
6	6.35	4	4.8	3.75	0.5	7.0
10	9.53	6	6.1	5.65	0.8	8.5
11	11.11	8	7.2	7.54	0.9	9.5
13	12.70	8	7.2	7.54	0.9	9.5

¹ L tolerance is dependent on the length of the leadscrew - see [page 7-35](#) for actual tolerance.



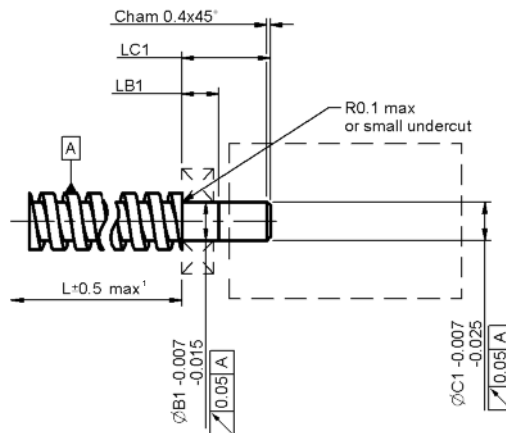
## Information

- Ordering instructions - see [page 7-3](#) and [7-27](#)
- Associated products - see [page 7-27](#)
- Custom end machining - see [page 7-34](#) and [7-35](#)
- Technical information - see [pages T7-1 to T7-5](#)



All dimensions in mm  
General tolerances  $\pm 0.13$  mm

## Ball bearing journal for coupling, End C



## Drawing dimension table

Leadscrew Diameter	Screw Diameter	Journal		Coupling Diameter ØC1	Length LC1
		Dia ØB1	Length LB1		
6	6.35	4	4.5	4	14.0
10	9.53	6	5.5	6	15.0
11	11.11	8	6.5	8	20.5
13	12.70	8	6.5	8	20.5

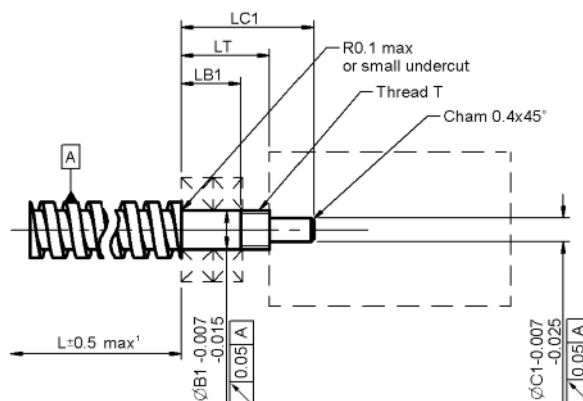
¹ L tolerance is dependent on the length of the leadscrew - see [page 7-35](#) for actual tolerance.



## Information

- Ordering instructions - see [page 7-3](#) and [7-27](#)
- Associated products - see [page 7-27](#)
- Custom end machining - see [page 7-34](#) and [7-35](#)
- Technical information - see [pages T7-1 to T7-5](#)

## Twin ball bearing journal for coupling, End D



## Drawing dimension table

Leadscrew Diameter	Screw Dia	Journal		Thread		Coupling	
		Dia ØB1	Length LB1	Distance LT	T	Dia ØC1	Length LC1
6	6.35	4	7.5	11.2	M4	3	17.5
10	9.53	6	9.5	15.0	M6	4	22.5
11	11.11	8	11.5	18.5	M8	6	28.5
13	12.70	8	11.5	18.5	M8	6	28.5

<sup>1</sup> L tolerance is dependent on the length of the leadscrew - see [page 7-35](#) for actual tolerance.



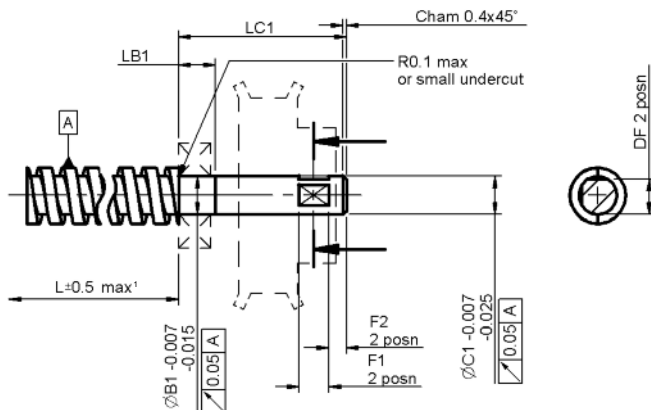
## Information

- Ordering instructions - see [page 7-3](#) and [7-27](#)
- Associated products - see [page 7-27](#)
- Custom end machining - see [page 7-34](#) and [7-35](#)
- Technical information - see [pages T7-1](#) to [T7-5](#)



All dimensions in mm  
General tolerances  $\pm 0.13$  mm

## Ball bearing journal for drive pulley, End E



## Drawing dimension table

Leadscrew Diameter	Screw Dia	Journal		Pulley Dia ØC1	Length LC1	Flats		
		Dia ØB1	Length LB1			Width F1	Length F2	Distance DF
6	6.35	4	4.5	4	27.5	4	3	3.5
10	9.53	6	5.5	6	28.5	5	3	5.5
11	11.11	8	6.5	8	29.5	6	3	7.5
13	12.70	8	6.5	8	29.5	6	3	7.5

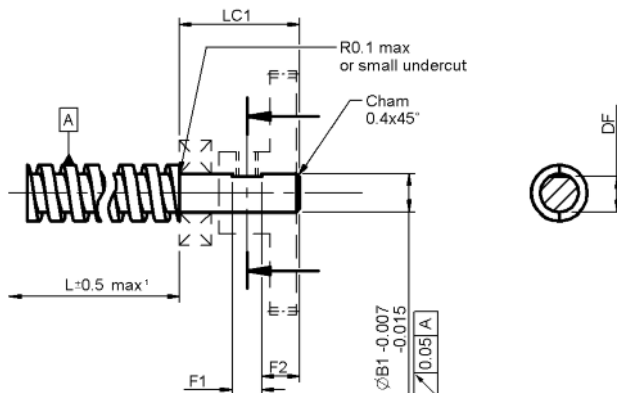
¹ L tolerance is dependent on the length of the leadscrew - see [page 7-35](#) for actual tolerance.



## Information

- Ordering instructions - see [page 7-3](#) and [7-27](#)
- Associated products - see [page 7-27](#)
- Custom end machining - see [page 7-34](#) and [7-35](#)
- Technical information - see [pages T7-1](#) to [T7-5](#)

## Ball bearing journal for drive gear, End F



## Drawing dimension table

Leadscrew Diameter	Screw Dia	Journal		Flat Width F1	Length F2	Flat Distance DF
		Dia ØB1	Length LC1			
6	6.35	4	17.5	4	5.0	3.5
10	9.53	6	20.5	5	6.5	5.5
11	11.11	8	21.5	6	6.0	7.5
13	12.70	8	21.5	6	6.0	7.5

¹ L tolerance is dependent on the length of the leadscrew - see [page 7-35](#) for actual tolerance.



## Information

- Ordering instructions - see [page 7-3](#) and [7-27](#)
- Associated products - see [page 7-27](#)
- Custom end machining - see [page 7-34](#) and [7-35](#)
- Technical information - see [pages T7-1 to T7-5](#)



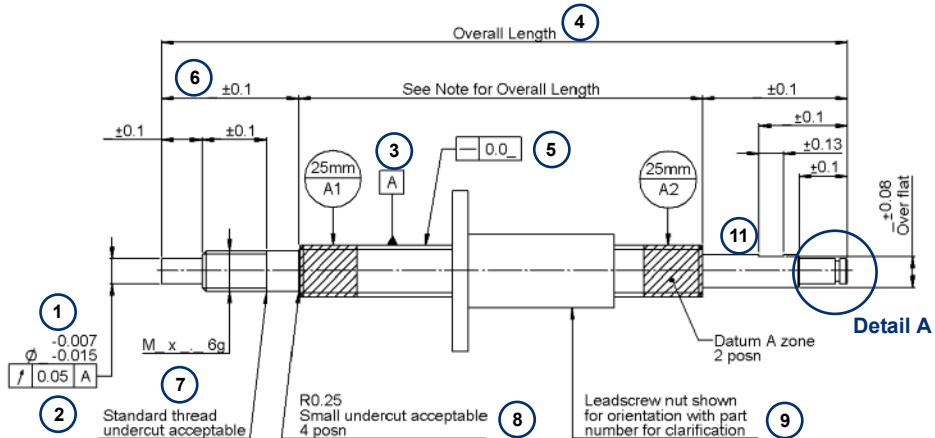


# Custom Leadscrew End Machining

All dimensions in mm

## Required drawing details

To order a leadscrew with custom machined ends please provide the following drawing information:

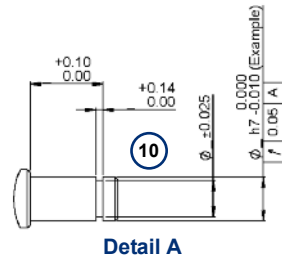


## Drawing tolerances

General manufacturing tolerance ISO2768-mK.

If a shoulder is required for bearing location at the extremities of the leadscrew thread then a bearing journal diameter of less than the leadscrew thread root should be selected.

All journals that are larger than the thread root of the leadscrew will have the scroll of the leadscrew thread root evident.



## Further machined features

Cross holes: Symmetry 0.25mm  
 Hole position 0.1mm  
 Hole diameter 0.025mm

Bored end holes; drilled depth 0.5mm

Bored hole depth 0.25mm

For bored holes up to a length of 4 x the diameter a tolerance of 0.013mm can be achieved.

For bored holes over a length of 4 x the diameter a tolerance of 0.025mm can be achieved.

Width of keyways 0.025mm.

- 1 Machined journal recommended tolerances**

For journals over Ø3.2 mm and under 19 mm long and for use with Reliance bearings and gears for the optimum assembly and function we recommend a tolerance of or greater than:  
-0.005  
-0.017

For journals under Ø3.2 mm and over 19mm long and for use with Reliance couplings, pulleys etc. we recommend a diameter tolerance of or greater than:  
-0.005  
-0.027

For an additional charge Reliance can provide a minimum journal tolerance of 0.008 mm. This is dependant upon the journal length, geometry, diameter and material.
- 2 Runout**

To geometrically control journals and end machined features, Reliance measure runout as opposed to concentricity. The standard runout tolerance is 0.05 mm referenced to the datum A zones.  
0.035 mm is available for precision journals of lengths less than 25 mm.  
0.025 mm is achievable for journals less than 13 mm.
- 3 Datum**

The leadscrews are manufactured using a cold rolling process therefore a datum is located on the outside diameter of the leadscrew thread. The datum is specified at the marked datum 1 zones which are as standard 25 mm from each end of the leadscrew thread.
- 4 Overall length and leadscrew thread length**

Tolerancing for lengths:  
From 25.4 mm to 228 mm tolerance  $\pm 0.25$   
Over 228 mm to 812 mm tolerance  $\pm 0.5$   
Over 812 mm tolerance  $\pm 1.0$
- 5 Straightness**

0.025 mm per 100mm of length.  
For screws less than 300 mm long the default value is 0.075 mm.
- 6 Journal length**

The tolerance of  $\pm 0.1$  or greater should be used in general. For shorter journals of less than 25 mm  $\pm 0.06$  can be achieved.
- 7 Secondary threads**

Include the size and pitch of the required thread e.g. M6x1, and include the thread fit tolerance i.e. 6g. A standard thread undercut may be used at the discretion of Reliance, the undercut will be 1-3 x thread pitches wide and to the thread root diameter.
- 8 Corner radius**

A small manufacturing undercut may be required to achieve the required corner radius, dependant upon the manufacturing method used. In general this will be for a corner radius of 0.25 mm or smaller.
- 9 Leadscrew nut**

Reliance strongly recommends that wherever possible the leadscrew nut is included on the leadscrew drawing and they are supplied as an assembly. This ensures the fit between leadscrew nut and leadscrew is completely controlled. The orientation of the nut should be defined.
- 10 Circlip grooves**

Circlip grooves can be achieved when manufactured in line with the tolerances shown above.
- 11 Flats**

If the flat is for location purposes then we recommend specification of a flatness of 0.03 mm across the face.