

igus® offers a large modular kit for dryspin® lead screw drives. Bearing housing for lead screws and lead screw nuts enable the design of a custom linear system. With drylin® E lead screw motors, dryspin® combines the highest precision with a longer service life.



#### Lead screw nut housings

- Universal support for dryspin® lead screw nut with flange
- Material: anodised aluminium
- Available individually or completely pre-assembled
- ▶ [Page 1340](#)



#### Lead screw support blocks

- Lead screw support block including clamping rings and lubrication-free plain bearings
- Material: anodised aluminium
- Fixed and floating bearing version available
- ▶ [Page 1342](#)



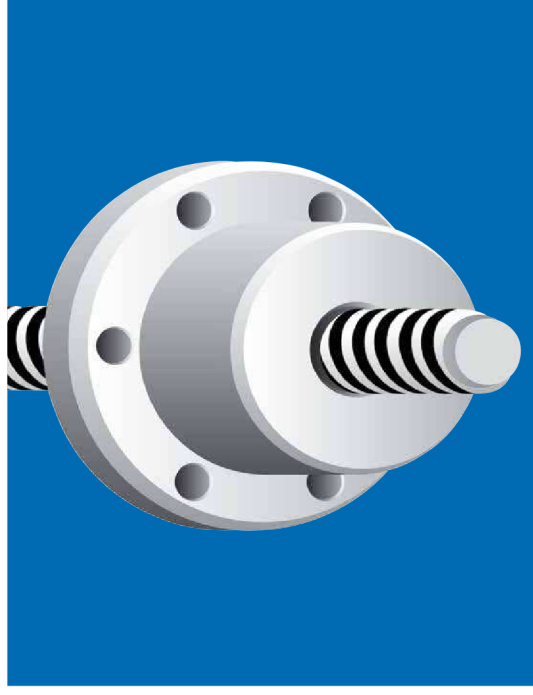
#### drylin® E lead screw motor with dryspin® technology

- NEMA 11/17/23 stepper motors
- Direct centring of the dryspin® lead screw for highest precision
- Many combination options
- ▶ [Page 1447](#)



#### Special components

- Special machined lead screw which can be configured online
- Custom machining nuts/lead screw upon request



## drylin® lead screw technology – Trapezoidal and metric threads

Self-locking

Maintenance-free dry operation

Resistant to dirt and long service life

Lead screw nuts made from lubrication-free  
**dry-tech®** polymers

Lead screws made from steel, stainless steel  
or aluminium



## Radial loads

drylin® lead screw nuts are designed to absorb axial forces. Any radial forces that may occur in the application should be absorbed by additional linear guides. ▶ **drylin® linear technology, from page 941**

## Temperature

drylin® lead screw nuts, which are manufactured from maintenance-free Igitidur® materials, are suited for use in temperatures ranging from  $-20^{\circ}\text{C}$  to  $+90^{\circ}\text{C}$  ( $+150^{\circ}\text{C}$ , depending on material). Please note that the temperature also has an effect on the clearance of the nut, as well as the maximum load capacity. When the application is exposed to temperature and load extremes, we recommend testing the suitability of the lead screw nuts in this specific case by a practical test. In order to provide for the use in all temperature ranges, we have lead screw nuts available in various clearance classes.

## Wet environments

Trapezoidal lead screw nuts made from Igitidur® J or Igitidur® A180 must be used for applications in humid environments, especially for wet applications. These materials are characterised by very low moisture absorption. ▶ **Igitidur® J, page 159 and ▶ Igitidur® A180, page 401**

## Dirt

With the use of the maintenance-free Igitidur® materials for lead screw nut production, drylin® lead screw drives feature completely dry operation. Due to the deliberate avoidance of lubricants, the adhesion of soft particles such as dust and fibres is reduced. When compared to conventional, lubricated materials, it is common to see significant improvements in the service life in contaminated environments. However, in environments with significant contamination and hard particles, such as metal swarf or granite dust, the lead screw should be covered.

## Noise

Noise can generally occur with the use of lead screw drives. In particular, long lead screws and long travel distances can cause self-induced vibrations in the systems. Due to their good sliding properties, lead screw nuts made from the tribologically optimised Igitidur® materials tend to develop less noise than conventional plastics or metallic materials, such as bronze or brass. If your lead screw drive develops noise, please contact us to discuss this with our experts.

### ▶ Anti-backlash lead screw nut, page 1324

## Clearance

The reliable operation of lead screw drives requires a basic amount of clearance. Application-specific parameters must be observed in addition to the lead screw drive clearance caused by manufacturing tolerances. In addition to thermal and hygroscopic environmental influences, the minimum clearance to be accounted for in the application must also take into account the friction heat generated by the application. The use of lead screw drives is therefore not recommended for precision drives without conducting practical tests. In practice, pre-tests prove to be an effective counter-measure for undesirable clearance. In addition to the solutions from our standard product range, our technical support team will be pleased to discuss other options.

## Levels of efficiency

Efficiency is the ratio between the output and input power rating. drylin® lead screw nuts are characterised by a low coefficient of friction, resulting in high efficiencies. Single start trapezoidal lead screw nuts achieve efficiencies between 20 and 48% in dry operation.

High helix lead screw nuts achieve efficiencies between 50 and 80% in dry operation.

Even though drylin® lead screw nuts were developed for completely dry operation, lubrication can help to additionally increase efficiency.

## Self-locking

Single start trapezoidal lead screw drives are self-locking. This means that the flank, angle and the sliding friction prevent movement of the nut or the lead screw without the application of outside forces. As soon as the static friction is exceeded, the components are no longer self-locking. Multi start trapezoidal screw systems have a "residual self-locking" feature: high helix screw drives have no self-locking feature.

## Anti-backlash lead screw nuts

Backlash is the phenomenon created on the lead screw drives by the axial clearance. By adding a radial pre-load, vibrations are significantly reduced.



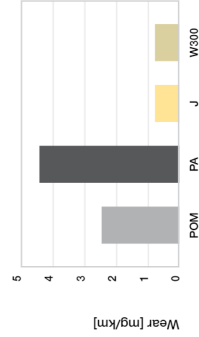
**Anti-backlash lead screw nuts in a glue application system of a seam gluing machine (wood industry).** These ensure the utmost precision for this clearance-free adjustment drive.



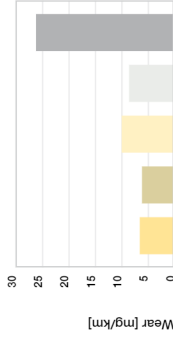
**Format adjustment in the paper industry with anti-backlash lead screw nut**

## Zero-backlash lead screw nuts

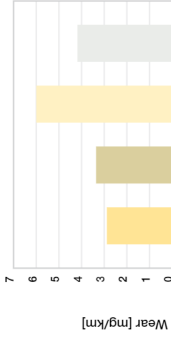
Lead screw drives with high helix thread for quick adjustments of small loads. The zero-backlash principle provides for minimal backlash for the life of the product. Ideal for precise positioning and feed movements in medical, laboratory and printing systems and other life science fields. High helix lead screw nuts without zero-backlash feature or trapezoidal threads should be used for high loads, dirt accumulation or extreme external influences.



**Diagram 01: Wear test on a rolled trapezoidal lead screw**



**Diagram 02: Wear test on a C15 lead screw**  
Stroke 140mm, 50N, lead screw C15 rolled, 450rpm



**Diagram 03: Wear test on a VA lead screw**  
Stroke 140mm, 50N, lead screw VA rolled, 450rpm

## Lead screw drive inspection

drylin® lead screw drives are manufactured in accordance with DIN 103. Inspection is performed with standard thread plug gauges after production. The DIN 103 standard is converted to the corresponding size for any thread sizes that are not shown in the standard table. The hygroscopic and thermal properties of the material must be taken into account during selection. Dimensional changes can occur as a result of moisture and/or thermal exposure at the point of use. For these reasons, general DIN compatibility cannot be guaranteed.

### Installation of lead screw nuts

drylin® lead screw nuts must be secured against twisting and sag.

#### Lead screw nuts with flange

The maximum tightening torque for the assembly of lead screw nuts with flange is 2,5Nm. We recommend that assembly screws are secured with a semi-permanent thread locking glue. Metallic ferrules should be used for even higher tightening torques.



#### Cylindrical lead screw nuts

The outer diameter of cylindrical lead screw nuts is not designed for a press fit. We therefore recommend the use of spanner flats. In practice, a screw mount has proven to be effective with low forces. Gluing lead screws nuts is not recommended. If however, the securing of the lead screw nuts by adhesives is planned, individual tests are necessary in each case.

#### Lead screw selection

The suitability and the operating behaviour of the system largely depend on the lead screws used with the nut. We recommend purchasing the nut and lead screw as a system from a single source. Lead screws are inspected with DIN 103-compliant gauges. In principle, drylin® lead screw drives can be used with lead screws made from steel, stainless steel or hard-anodised aluminium. "Split" lead screws (right and left-handed threads on one lead screw) are available in addition to right-hand and left-hand versions.

#### Custom lead screws

Take advantage of our machining service - we manufacture ready-to-fit lead screws based on your requirements. Please send us your drawing. We can then provide a quotation quickly.



Custom lead screw example

### Custom nuts

Take advantage of our machining service - we manufacture ready-to-fit lead screw nuts based on your requirements. Please send us your drawing. We can then provide a quotation quickly.

#### Custom nut examples

#### Material selection

drylin® lead screw nuts are supplied in 7 standard materials:

#### High efficiency at all speeds:

- High speed
- Low wear
- Best coefficient of friction

#### For heavy duty applications up to 5MPa:

- High static strength

#### For temperatures up to +150°C:

- For high temperatures
- Good coefficient of friction with medium loads

#### For medium to high speeds:

- High wear resistance for low loads
- Low moisture absorption
- Vibration-dampening

#### FDA-compliant for the food and pharmaceutical industry:

- FDA-compliant
- For contact with food

#### Best running partner for hard anodised aluminium:

- Low coefficient of friction and wear
- Long service life

#### For high speeds:

- Page 287
- Low loads up to 200N
- Speeds up to 1,200rpm

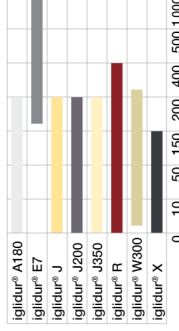
### Service life

drylin® lead screw nuts are made from tribologically optimised materials. Already during the development phase, the focus is on optimising the friction properties of the drylin® lead screw drives, with the objective of attaining the lowest possible coefficient of wear and friction. In order to make the most precise statements about service life and wear resistance, several hundred tests are conducted each year on the test equipment at the igus® test lab in Cologne. Our experts will gladly test your application as well.

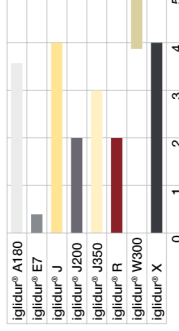
igidur® material	Max. surface pressure [MPa]
igidur® J	4.0
igidur® W300	5.0
igidur® J350	3.0
igidur® R	2.0
igidur® A180	3.5
igidur® E7	0.5
igidur® J200	2.0

Table 01: Permitted continuous surface pressure in the threads

#### Correct choice of material



Speed [rpm]

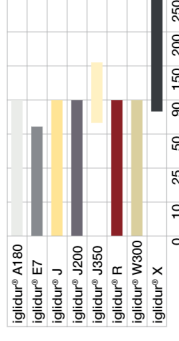


Surface pressure in thread [MPa]

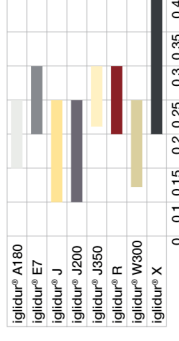
### Tightening torque for drylin® connections between metal parts

Metric thread (Da)	Tightening torque [Nm]	Recommended tightening torque [Nm]
M3	0.5–1.1	0.7
M4	1.0–2.8	1.5
M5	2.0–5.5	3.0
M6	4.0–10.0	6.0
M8	8.0–23.0	15.0
M10	22.0–46.0	30.0

Please be aware of the minimal screw-in depth for aluminium and zinc parts: 1.5Da



Temperature [°C]



Coefficient of friction [μ]

Surface pressure in combination with dryspin® high helix thread, igidur® J200 only available in combination with aluminium

### Required drive torque

The required drive torque of the lead screw nut is obtained from the axial load, the lead screw pitch, the coefficient of surface friction of the lead screw drive and the lead screw support. At high speeds, the acceleration torque must be taken into account, which may cause increased breakaway torque on the installation. Dirt, dust and the surface or the condition of the lead screw can increase the drive torque. However, lubrication can temporarily reduce the required drive forces.

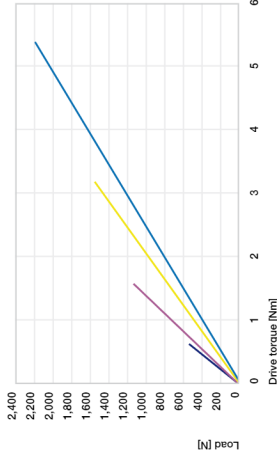


Diagram 06:  
Required drive torque of lead screw drives Ø 8 to Ø 14 – assuming  $\mu = 0.25$ , without considering the lead screw support

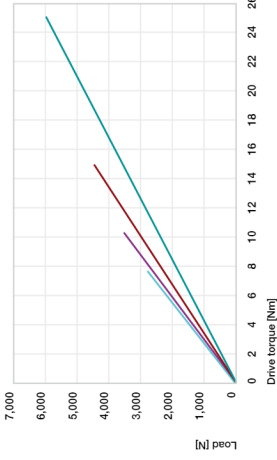


Diagram 07:  
Required drive torque of lead screw drives Ø 16 to Ø 24 – assuming  $\mu = 0.25$ , without considering the lead screw support

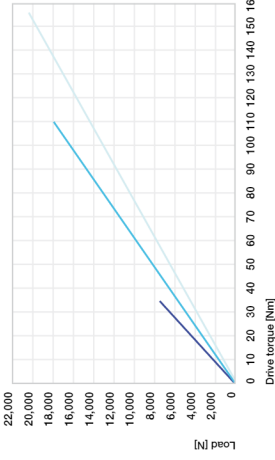


Diagram 08:  
Required drive torque of lead screw drives Ø 30 to Ø 50 – assuming  $\mu = 0.25$ , without considering the lead screw support

### Max. permissible pv value

With the pv value and the effective support surface stated in the dimensions tables, the permissible sliding speed and from it the feed rate for each thread size can be determined.

Operating time (ESD)	pv value <sub>max.</sub> [MPa · m/s]	(applicable for iglidur® J, W300, A180, R and J350)
100%	0.03	
50%	0.2	
10%	0.4	

Table 03: Standard values when using drylin® plastic nuts without lubrication (with 500mm stroke).  
A correction factor must be reckoned for very short or long strokes.

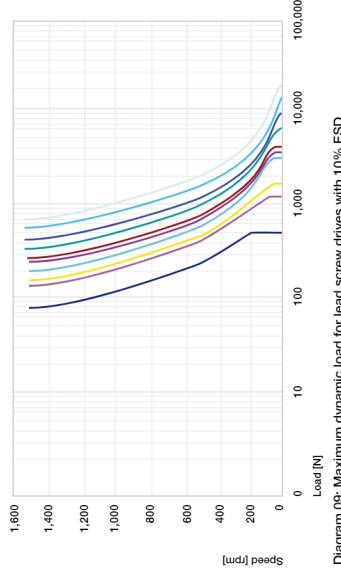


Diagram 09: Maximum dynamic load for lead screw drives with 10% ESD

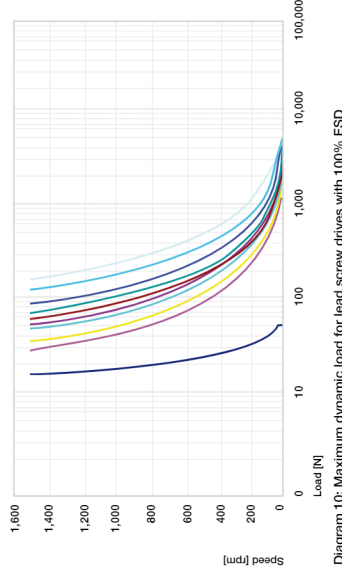


Diagram 10: Maximum dynamic load for lead screw drives with 100% ESD



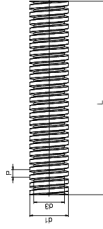
## Single start lead screws



CF15, rolled, AISI 1015

Stainless steel, rolled, AISI 304

Aluminium, rolled (EN AW 6082)



## Technical data

Pitch variation	0.1mm to 300mm
Straightness (standard)	0.3mm to 300mm
Aligned	<0.1mm to 300mm
Tolerance (according to DIN 103)	7e
The tensile/compressive strength of the EN AW 6082 lead screw material is 160MPa per mm <sup>2</sup> (elongation limit 0.2mm).	



## Order key

Part number	Thread	Options
PTGSG-10X2-01-R-1000-ES		
	Lead screw	Diameter
	Pitch	Number of thread pitches
	Hand of rotation	Length [mm]
	Lead screw material	

## Options:

Hand of rotation

R: Right-hand thread

L: Left-hand thread

Length in mm: Freely selectable (see table)

Lead screw material

Blank: C15, rolled

ES: Stainless steel, rolled

AL: Aluminium, rolled

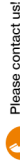


ACME thread (US standard)

▶ page 1620

## Technical data

Thread	Hand of rotation	Material				Pitch	Pitch angle $\alpha$
		C15	Stainless steel AISI 304	Stainless steel AISI 316L	Aluminium EN AW 6082		
Tr8x1.5	●	●	-	-	1.5	3.42	
Tr10x2	●	●	-	-	2	3.64	
Tr10x3	●	●	-	-	3	5.45	
Tr12x3	●	●	-	-	3	4.55	
Tr14x3	●	●	-	-	3	3.90	
Tr14x4	●	●	●	-	4	5.20	
Tr16x2	●	●	●	-	2	2.28	
Tr16x4	●	●	●	-	4	4.55	
Tr18x4	●	●	●	-	4	4.05	
Tr20x4	●	●	●	-	4	3.64	
Tr24x5	●	●	●	-	5	3.79	
Tr26x5	●	●	●	-	5	3.50	
Tr28x5	●	●	●	-	5	3.25	
Tr30x6	●	●	●	-	6	3.64	
Tr32x6	●	●	●	-	6	3.42	
Tr36x6	●	●	●	-	6	3.04	
Tr40x7	●	●	●	-	7	3.19	
Tr50x8	●	●	●	-	8	2.92	



Please contact us!

All drylin® lead screws can be custom machined. Please send us your drawing or configure online.

We can then provide a quotation quickly.

▶ [www.igus-asean.com/leadcrew-configurator](http://www.igus-asean.com/leadcrew-configurator)

## Dimensions [mm]

C15	Weight stainless steel	Outer Ø d1		Core Ø d3		Max. total length L	Part No.		
		min.	max.	min.	max.				
0.39	0.40	0.14	7.8	8	5.4	6.2	1,500	-	PTGSG-8X1.5-01-□-□
0.62	0.62	0.21	9.8	10	7.2	7.5	3,000	1,000	PTGSG-10X2-01-□-□
0.62	0.62	0.21	9.8	10	6.2	6.5	3,000	-	PTGSG-10X3-01-□-□
0.89	0.89	0.31	11.8	12	7.7	8.5	3,000	1,000	PTGSG-12X3-01-□-□
1.21	1.22	0.42	13.8	14	9.7	10.5	3,000	-	PTGSG-14X3-01-□-□
1.21	1.22	0.42	13.7	14	9.1	9.5	3,000	-	PTGSG-14X4-01-□-□
1.58	1.59	0.54	15.8	16	11.8	12.8	3,000	-	PTGSG-16X2-01-□-□
1.58	1.59	0.54	15.7	16	10.5	11.5	3,000	1,000	PTGSG-16X4-01-□-□
2.00	2.01	0.69	17.7	18	12.5	13.5	3,000	2,000	PTGSG-18X4-01-□-□
2.47	2.48	0.85	19.7	20	14.5	15.5	3,000	2,000	PTGSG-20X4-01-□-□
3.55	3.57	1.22	23.7	24	17.3	18.5	3,000	-	PTGSG-24X5-01-□-□
4.17	4.19	1.43	25.7	26	19.3	20.5	3,000	-	PTGSG-26X5-01-□-□
4.83	4.86	1.66	27.7	28	21.3	22.5	3,000	-	PTGSG-28X5-01-□-□
5.55	5.58	1.91	29.6	30	21.6	23.0	3,000	-	PTGSG-30X6-01-□-□
6.31	6.35	2.17	31.6	32	24.5	25.0	3,000	-	PTGSG-32X6-01-□-□
7.99	8.04	2.75	35.6	36	27.6	29.0	3,000	-	PTGSG-36X6-01-□-□
9.86	9.93	3.39	39.6	40	30.4	32.0	3,000	-	PTGSG-40X7-01-□-□
15.41	15.51	5.30	49.6	50	39.2	41.0	3,000	-	PTGSG-50X8-01-□-□



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