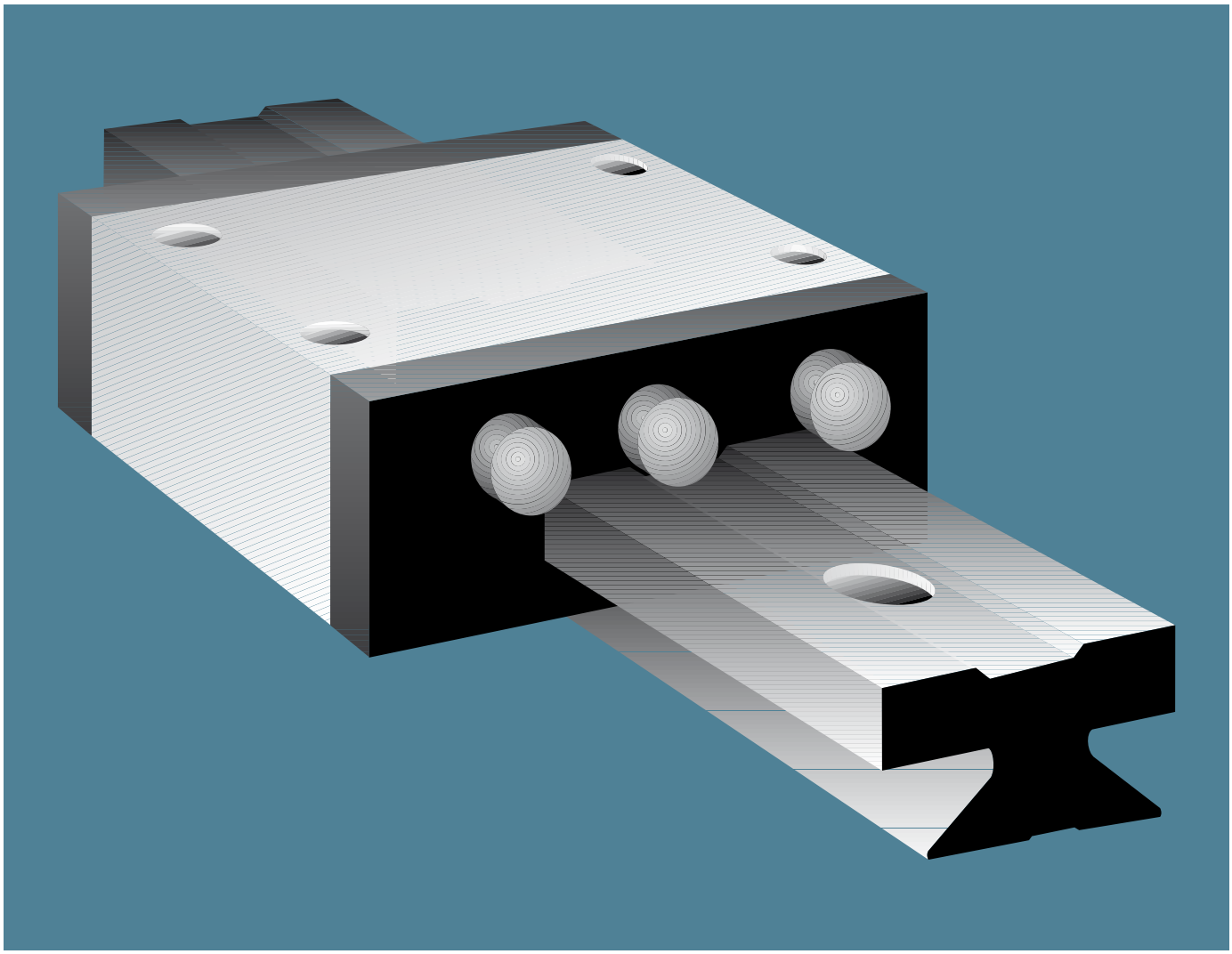
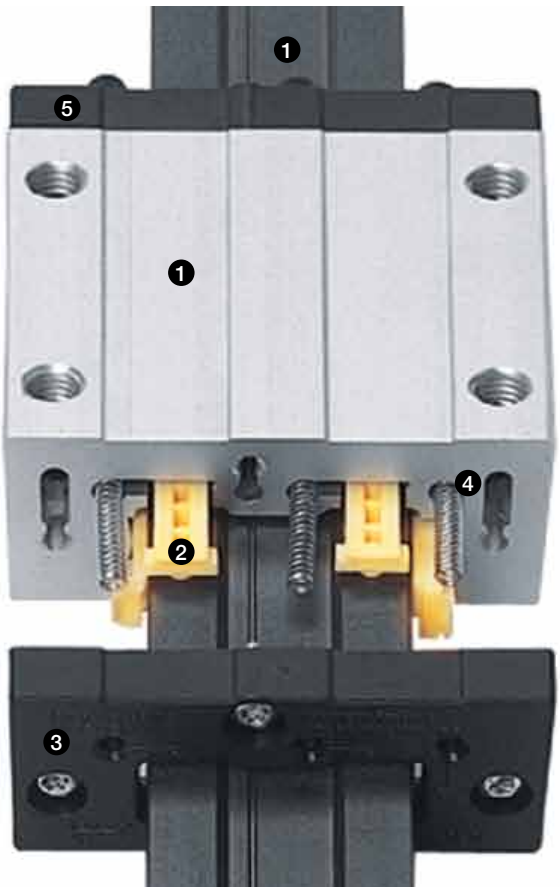


DryLin® T Rail Guide Systems

- Corrosion-resistant
- Wear-resistant
- Low friction
- Extremely quiet operation
- Lubrication-free

DryLin® T | Rail Guide Systems

DryLin® T rail guide systems were originally developed for applications in both automation and materials handling. The goal was to create a high performance, maintenance-free linear guide for use in the most diverse, even extreme environments. Their dimensions are identical to most recirculating ball guides.



❶ Profile rails and base structures of the carriages manufactured from aluminum. The rail is hard anodized, the aluminum housing of the carriage is clear anodized
❷ 6 sliding iglidur® J elements act as guide bearings, which are set in pairs opposite each other and act as three guide bearings altogether
❸ Each of the 3 guide bearings is continuously adjustable
❹ All steel parts are of stainless steel
❺ The end plate is solid plastic or stainless steel

Advantages:

- 100 % lubrication-free
- Adjustable clearance
- Automatic clearance adjustment
- High static load capacity
- Service life up to 50,000 km without lubrication
- High insensitivity to dirt
- Low vibration and quiet run

When not to use them?

- When I want to save installation space
  - ▶ **DryLin® N, page 749**
  - ▶ **DryLin® W, page 763**
- When I need a pure stainless steel solution
  - ▶ **DryLin® W, page 763**
  - ▶ **DryLin® R, page 787**
- When I want to build a minimum-cost solution
  - ▶ **DryLin® N, page 749**
  - ▶ **DryLin® W, page 763**

Clean-Room

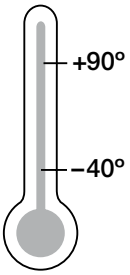
Cleanroom certificated – IPA Fraunhofer

RoHS 2002/95/EC

Free of toxins ROHS 2002/95/EC

ESD compatible (electrostatic discharge)

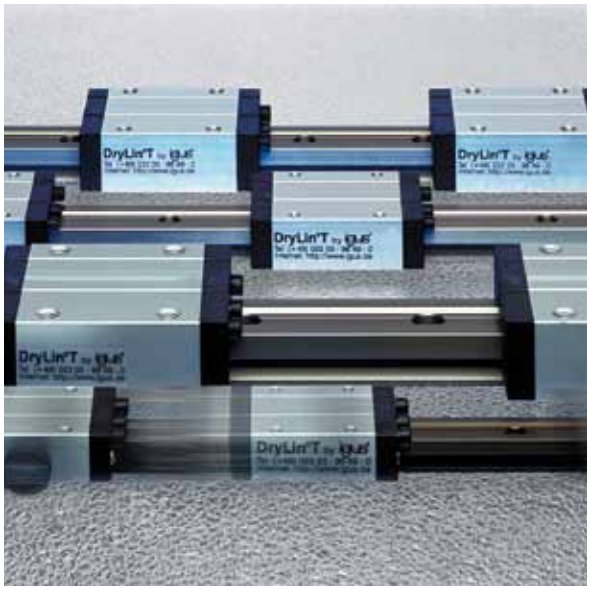
Temperature



Product range

7 rail sizes
40 guide carriages

DryLin® T | Application Examples



Typical sectors of industry and application areas

● Machine building ● Wood working industry ● Machine tools ● Handling etc.

Improve technology and reduce costs – 170 exciting examples online

▶ **www.igus.co.uk/drylin-applications**

▶ **www.igus.co.uk/packaging**

▶ **www.igus.co.uk/grinding-machine**

▶ **www.igus.co.uk/enveloping**

▶ **www.igus.co.uk/automotive**

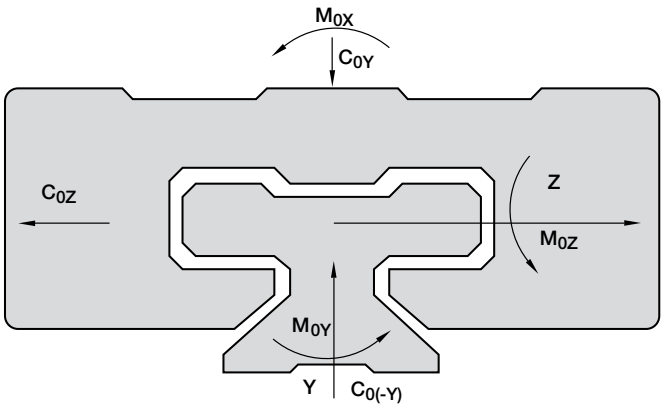
DryLin® T | Technical Data

Guide rails	
Material	Aluminum, extruded section
Substance	AlMgSi0,5
Coating	Hard anodized aluminum, 50 µm
Hardness	500 HV
Sliding carriage	
Base structure	Aluminum, extruded section
Material	AlMgSi0,5
Coating	Anodized aluminum
Sliding elements	Maintenance-free plain bearing iglidur® J
Bolts, springs	Stainless steel
Cover	Plastic
Max. surface speed	15 m/s
Temperature range	–40 °C to +90 °C

Table 01: DryLin® – technical data

Type	C_{0Y} [kN]	$C_{0(-Y)}$ [kN]	C_{0Z} [kN]	M_{0X} [Nm]	M_{0Y} [Nm]	M_{0Z} [Nm]
04-09	0.48	0.48	0.24	3.4	1.8	1.8
04-12	0.96	0.96	0.48	9.2	4.4	4.4
04-15	1.4	1.4	0.7	17	8	8
01-15	4	4	2	32	25	25
01-20	7.4	7.4	3.7	85	45	45
01-25	10	10	5	125	65	65
01-30	14	14	7	200	100	100

Table 02: DryLin® – permissible static load capacity



Graph 01: Designation of load directions

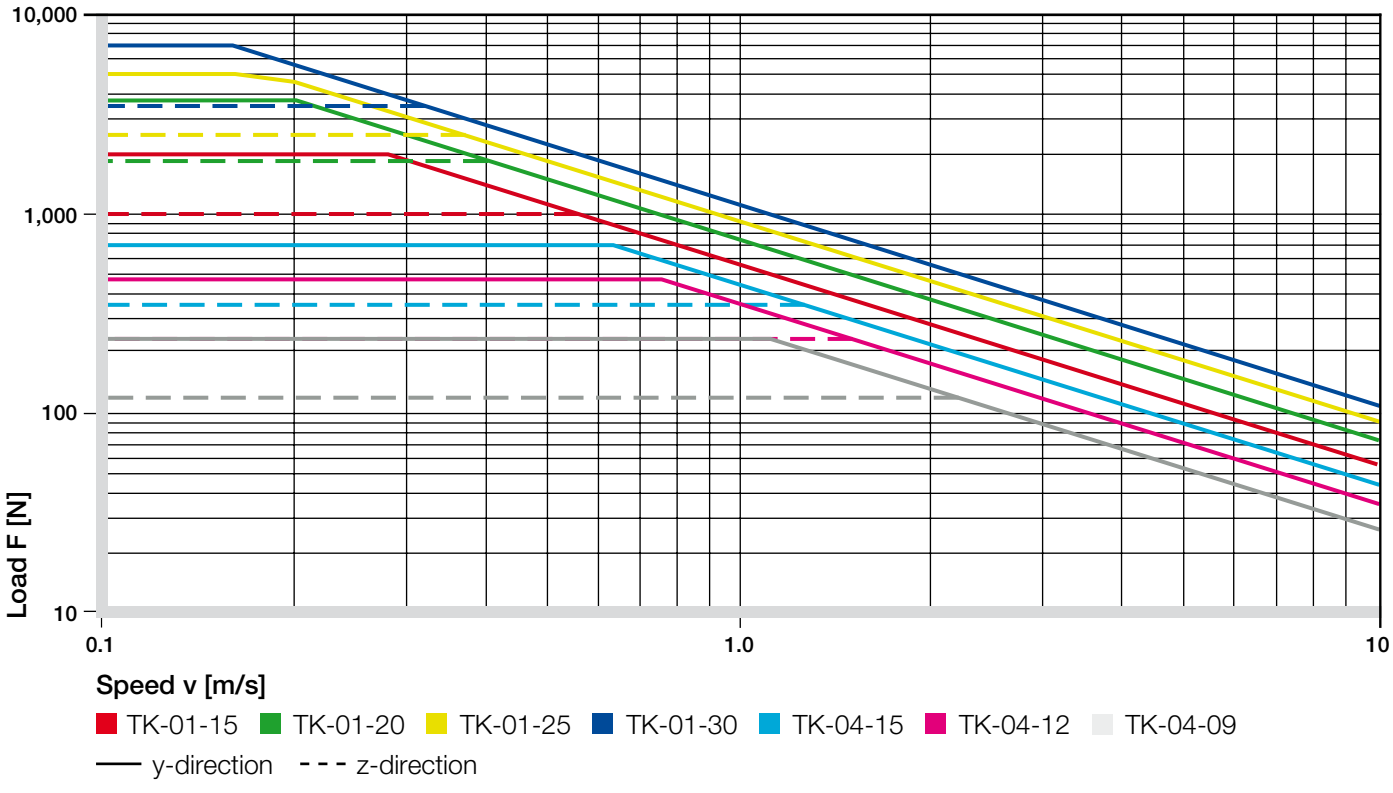


Abb. 02: DryLin® T – permissible dynamic load

DryLin® T | Design rules

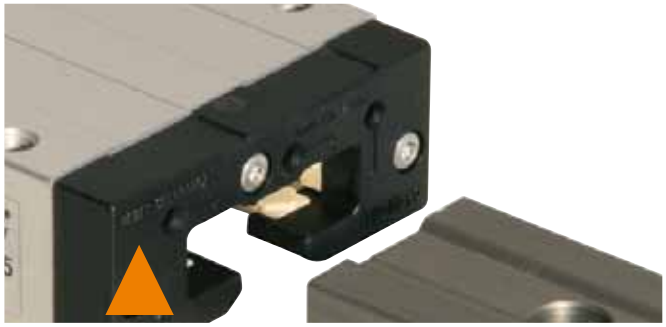
Installation Notes

The compensation of parallelism errors between mounted rails is possible with a fixed/floating bearing in the range up to maximum 0.5 mm. During installation, take care that the floating bearing has the same clearance on both sides. In the adjoining designs you can see the version of the fixed/floating bearing system recommended by us.

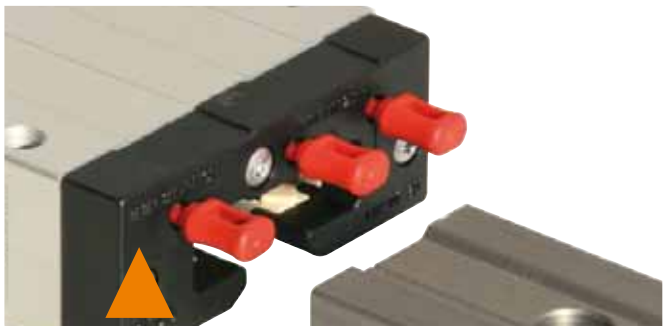
The mounting surfaces of the rails and carriages should possess a good evenness (e. g. machined surface) to prevent twisting in the system. Small unevennesses in the mounting surfaces can be individually compensated up to a certain measurement (0.5 mm) by a greater clearance adjustment. The clearance adjustment is possible only in unloaded state. If you have any questions on design and/or assembly, please make use of our applications consultancy.

Installation DryLin® T linear guide system:

Make sure to assemble the side of the carriage saying “Reset Clearance” onto the rail first (see picture).



TW-series, adjustable clearance

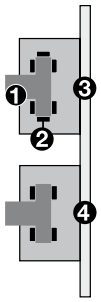


TWA-series, Automatic

Rail joint

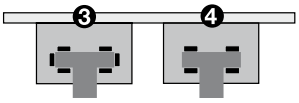
Lateral/vertical installation with floating bearing in the z-direction

❶ Rail
❷ Sliding elements
❸ Fixed bearing
❹ Floating bearing LLZ or LLY



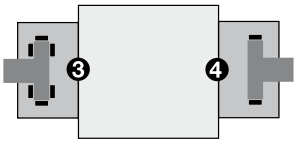
LLZ

Horizontal installation with floating bearing in the z-direction



LLZ

Horizontal mounting version with floating bearing in the y-direction and lateral mounting carriage



LLY

DryLin® T | Design rules

Floating bearings for linear slide guides

In the case of a system with two parallel guides, one side needs to be configured with floating bearings.

A suitable solution comprising fixed & floating bearings is available for every installation position, whether horizontal, vertical or lateral. This type of assembly prevents jamming and blockage on the guides resulting from discrepancies in parallelism. Floating bearings are realized through a controlled extension of play in the direction of the expected parallelism error. This creates an additional degree of freedom on one side.

During assembly, it must be ensured that the floating bearings exhibit a similar degree of play in both directions.

The systems of fixed & floating bearings we recommend are represented in various related chapters.

The contact surfaces on the guides and carriages should be sufficiently even (for instance, milled down) to prevent strains from occurring in the system.

Eccentric Forces

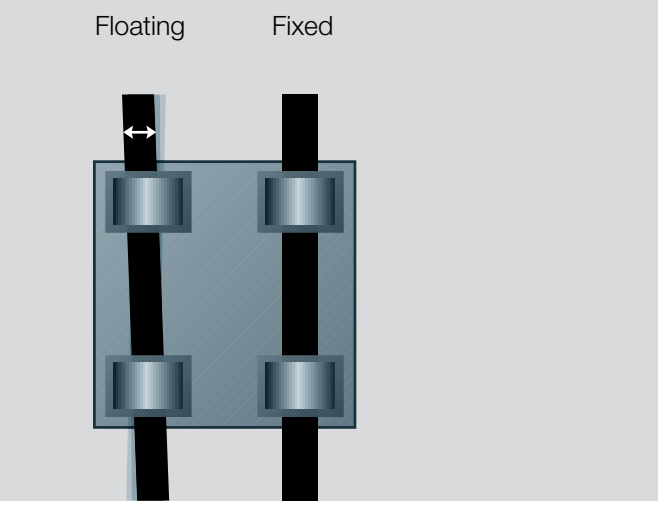
To ensure successful use of maintenance-free DryLin® linear bearings, it is necessary to follow certain recommendations:

If the distance between the driving force point and the fixed bearings is more than twice the bearing spacing (2:1 rule), a static friction value of 0.25 can theoretically result in jamming on the guides. This principle applies regardless of the value of the load or drive force.

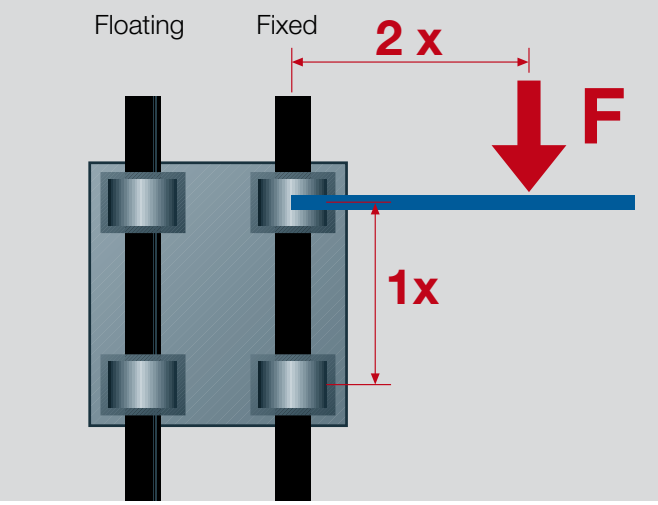
The friction product is always related to the fixed bearings. The greater the distance between the drive and guide bearings, the higher the degree of wear and required drive force.

Failure to observe the 2:1 rule during a use of linear slide bearings can result in uneven motion or even system blockage. Such situations can often be remedied with relatively simple modifications.

If you have any questions on design and/or assembly, please contact our application engineers.



Graph 02: Automatic compensation of parallelism errors



Graph 03: The 2:1 rule

DryLin® Expert & Lifetime calculation:
▶ **www.igus.co.uk/drylin-expert**

DryLin® CAD configurator:
▶ **www.igus.co.uk/drylin-cad-expert**

DryLin® T | Product Overview

DryLin® T – Variations

DryLin® T – Adjustable clearance

- supplied preset and can be put into operation at once
- Manual clearance adjustment or fine tuning

▶ page 734

DryLin® T – Automatic

- With a mechanism that automatically adjusts the bearing clearance after removal of the preload key and adjusts during operation

▶ page 735

DryLin® T – Heavy Duty

- Used for the most extreme conditions (dirt, adhesive residues, chips, mud, etc.)
- Plastic gliding elements made of iglidur® J are fixed in the lid and are therefore non-detachable
- compatible with many standard commercial recirculating ball bearing systems

▶ page 736

DryLin® T – Manual clamping

- Manual clamp for simple tasks
- Clamping by friction locking, not suitable for safety-related parts

▶ page 737

DryLin® T – Miniature

- Clearance not adjustable
- Gliding elements are mounted with positive fit in the chromated zinc carriage
- robust and cost-effective

▶ page 739

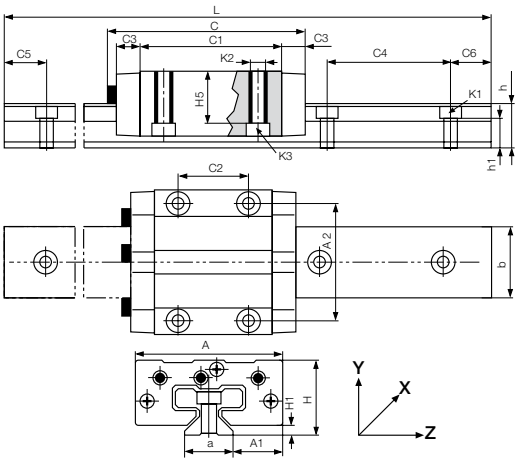
DryLin® T – Clamps

- Compact and strong clamping elements for all installation sizes – holding forces up to 500 N (pneumatically up to 600 N)

▶ page 738

DryLin® T Rail Guide Systems | Product Range

Adjustable clearance



- Slide carriage with manual adjustable clearance
- Maintenance-free, dry operation
- Resistant to corrosion
- Hard anodized aluminum rails
- Standard bore pattern symmetrical C5 = C6

DryLin® T Rail Guide Systems

Dimensions [mm]

Part number	Weight	L	a	C4	C5	C5	C6	C6	h	h1	K1 for screw	b	Iy	Iz	Wby	Wbz
		max.	–0,2		min.	max.	min.	max.								
	[kg/m]										DIN 912		[mm⁴]	[mm⁴]	[mm³]	[mm³]
TS-01-15	0.6	4,000	15	60	20	49	20	49	15.5	10.0	M4	22	6,440	4,290	585	488
TS-01-20	1.0	4,000	20	60	20	49	20	49	19.0	12.3	M5	31	22,570	11,520	1,456	1,067
TS-01-25	1.3	4,000	23	60	20	49	20	49	21.5	13.8	M6	34	34,700	19,300	2,041	1,608
TS-01-30	1.9	4,000	28	80	20	59	20	59	26.0	15.8	M8	40	70,040	40,780	3,502	2,832

For rails without mounting holes, please use bearing suffix “without holes”.
DryLin® T guide rails clear anodized available. Please add the suffix “CA”.
Order example: TS-01-15, 2,000 for a guide rail TS-01-15 of 2 m length

DryLin® T Guide Carriages

Dimensions [mm]

Part number	Weight	H	A	C	A1	A2	C1	C2	C3	H1	H5	K2	Torque	K3 for screw
		±0.35			±0.35					±0.35		Thread	max.	
	[kg]												[Nm]	DIN 912
TW-01-15	0.11	24	47	74	16.0	38	50	30	9	4.0	16.0	M5	1.5	M4
TW-01-20	0.19	30	63	87	21.5	53	61	40	10	5.0	19.8	M6	2.5	M5
TW-01-25	0.29	36	70	96	23.5	57	68	45	11	5.0	24.8	M8	6.0	M6
TW-01-30	0.50	42	90	109	31.0	72	79	52	12	6.5	27.0	M10	15.0	M8

Order examples:
TW-01-20 for a guide carriage
TW-01-20, LLY for a guide carriage with floating bearing in y-direction
TW-01-20, LLZ for a guide carriage with floating bearing in z-direction

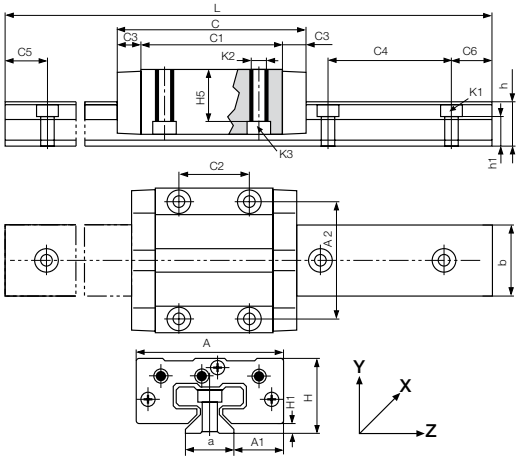
delivery time **available from stock**

prices **price list online** www.igus.co.uk/en/DryLinT

Order notice ▶ page 740
TS rails (single)
TW guide carriages (single)
TK complete system (TS+TW assembled)

DryLin® T Rail Guide Systems | Product Range

Automatic



- Self-adjusting carriage (automatic clearance adjustment)
- Maintenance-free, dry operation
- Resistant to corrosion
- Hard anodized aluminum rails
- Standard bore pattern symmetrical C5 = C6

DryLin® T Rail Guide Systems

Dimensions [mm]

Part number	Weight	L	a	C4	C5	C5	C6	C6	h	h1	K1 for screw	b	Iy	Iz	Wby	Wbz
		max.	–0.2		min.	max.	min.	max.								
	[kg/m]										DIN 912	[mm]	[mm⁴]	[mm⁴]	[mm³]	[mm³]
TS-01-15	0.6	4,000	15	60	20	49	20	49	15.5	10.0	M4	22	6,440	4,290	585	488
TS-01-20	1.0	4,000	20	60	20	49	20	49	19.0	12.3	M5	31	22,570	11,520	1,456	1,067
TS-01-25	1.3	4,000	23	60	20	49	20	49	21.5	13.8	M6	34	34,700	19,300	2,041	1,608
TS-01-30	1.9	4,000	28	80	20	59	20	59	26.0	15.8	M8	40	70,040	40,780	3,502	2,832

For rails without mounting holes, please use bearing suffix “without holes”.
DryLin® T guide rails clear anodized available. Please add the suffix “CA”.
Order example: TS-01-15, 2,000 for a guide rail TS-01-15 of 2 m length

DryLin® T Guide Carriages with Automatic Clearance Adjustment

Dimensions [mm]

Part number	Weight	H	A	C	A1	A2	C1	C2	C3	H1	H5	K2-Thread	Torque	K3 for screw
		±0.35			±0.35					±0.35			max.	
	[kg]												[Nm]	DIN 912
TWA-01-15	0.11	24	47	68	16.0	38	50	30	9	4.0	16.0	M5	1.5	M4
TWA-01-20	0.19	30	63	81	21.5	53	61	40	10	5.0	19.8	M6	2.5	M5
TWA-01-25	0.29	36	70	90	23.5	57	68	45	11	5.0	24.8	M8	6.0	M6
TWA-01-30	0.50	42	90	103	31.0	72	79	52	12	6.5	27.0	M10	15.0	M8

Order examples:
TWA-01-20 for a guide carriage
TWA-01-20, LLY for a guide carriage with floating bearing in y-direction
TWA-01-20, LLZ for a guide carriage with floating bearing in z-direction

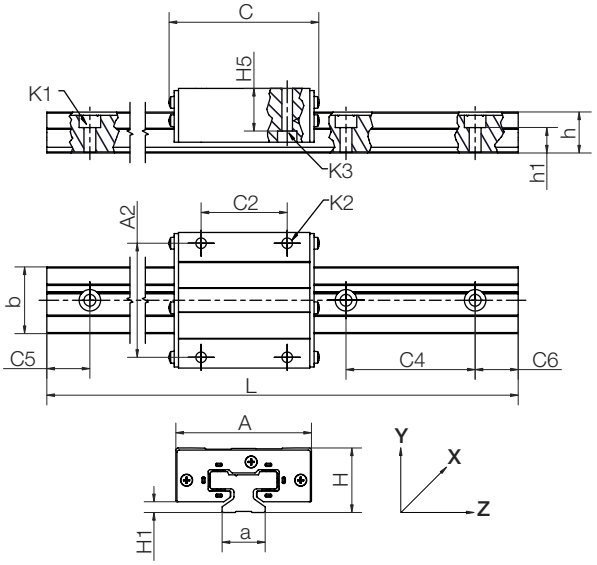
delivery time **available from stock**

prices **price list online** www.igus.co.uk/en/DryLinT

Order notice ▶ page 740
TS rails (single)
TW guide carriages (single)
TK complete system (TS+TW assembled)

DryLin® T Rail Guide Systems | Product Range

Heavy Duty



- Linear guide carriage for extreme conditions (dirt, glue resins, chips, mud etc.)
- Polymer sliding elements of iglidur® J are fixed by the metal end caps and cannot be lost
- Dimensions equivalent to the TW-01 design and standard recirculating ball bearings.

▶ page 734

DryLin® T Rail Guide Systems

Dimensions [mm]

Part number	Weight	L	a	C4	C5	C5	C6	C6	h	h1	K1 for screw	b	Iy	Iz	Wby	Wbz
		max.	–0.2		min.	max.	min.	max.								
	[kg/m]										DIN 912		[mm⁴]	[mm⁴]	[mm³]	[mm³]
TS-01-20	1.0	4,000	20	60	20	49	20	49	19.0	12.3	M5	31	22,570	11,520	1,456	1,067
TS-01-25	1.3	4,000	23	60	20	49	20	49	21.5	13.8	M6	34	34,700	19,300	2,041	1,608
TS-01-30	1.9	4,000	28	80	20	59	20	59	26.0	15.8	M8	40	70,040	40,780	3,502	2,832

For rails without mounting holes, please use bearing suffix “without holes”.
DryLin® T guide rails clear anodized available. Please add the suffix “CA”.
Order example: TS-01-20, 2,000 for a guide rail TS-01-20 of 2 m length

DryLin® T-Heavy Duty – Guide Carriages

Dimensions [mm]

Part number	Weight	H	H5	A	C	A2	C2	H1	K2	K3
		±0.35						±0.35		
	[kg]									
TW-02-20	0.19	30	19.8	63	70	53	40	5.0	M6	M5
TW-02-25	0.29	36	24.8	70	77	57	45	5.0	M8	M6
TW-02-30	0.50	42	27.0	90	92	72	52	6.5	M10	M8

Floating bearing on request

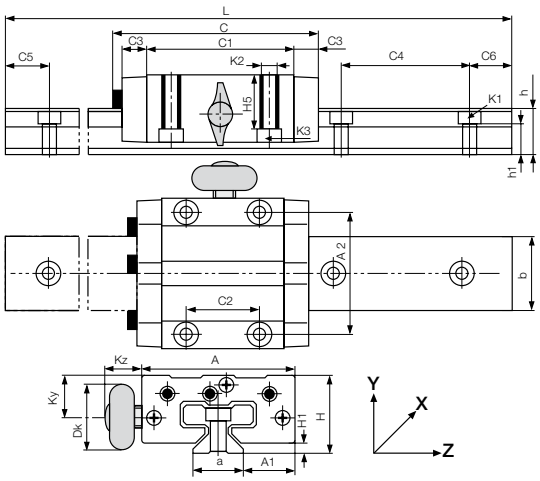
delivery time **available from stock**

prices **price list online** www.igus.co.uk/en/DryLinT

Order notice ▶ page 740
TS rails (single)
TW guide carriages (single)
TK complete system (TS+TW assembled)

DryLin® T Rail Guide Systems | Product Range

Manual Clamping



- With manual clamping
- Slide carriage with manual adjustable clearance
- Maintenance-free, dry operation
- Resistant to corrosion
- Hard anodized aluminum rails
- Standard bore pattern symmetrical C5 = C6

DryLin® T Rail Guide Systems

Dimensions [mm]

Part number	Weight	L	a	C4	C5	C5	C6	C6	h	h1	K1 for screw	b	Iy	Iz	Wby	Wbz
		max.	–0.2		min.	max.	min.	max.								
	[kg/m]										DIN 912		[mm⁴]	[mm⁴]	[mm³]	[mm³]
TS-01-15	0.6	4,000	15	60	20	49	20	49	15.5	10.0	M4	22	6,440	4,290	585	488
TS-01-20	1.0	4,000	20	60	20	49	20	49	19.0	12.3	M5	31	22,570	11,520	1,456	1,067
TS-01-25	1.3	4,000	23	60	20	49	20	49	21.5	13.8	M6	34	34,700	19,300	2,041	1,608
TS-01-30	1.9	4,000	28	80	20	59	20	59	26.0	15.8	M8	40	70,040	40,780	3,502	2,832

For rails without mounting holes, please use bearing suffix “without holes”.
DryLin® T guide rails clear anodized available. Please add the suffix “CA”.
Order example: TS-01-15, 2,000 for a guide rail TS-01-15 of 2 m length

DryLin® T Guid Carriages with Manual Clamping

Dimensions [mm]

Part number	Größe	Kz	Ky	Dk	Thread of the clamp
TW-01-15-HKA	15	19.0	11.5	20.0	M6
TW-01-20-HKA	20	18.0	15.0	28.0	M8
TW-01-25-HKA	25	17.0	19.0	28.0	M8
TW-01-30-HKA	30	20.0	21.5	28.0	M8

More dimensions for the DryLin® TW-Guide Carriage ▶ page 734

The manual clamp has been developed for simple tasks. The creep behavior of the clamped plastic causes a slackening in clamping force over time (up to 70 %). Therefore safety-related parts should not be clamped. Please contact our applications consultant if you require other options for the clamping.

delivery time **available from stock**

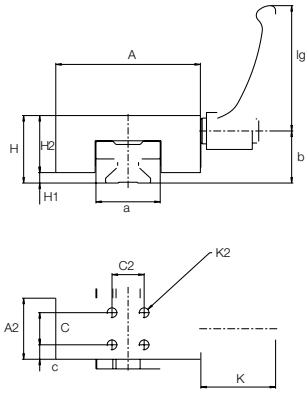
prices **price list online** www.igus.co.uk/en/DryLinT

Order notice ▶ page 740
TS rails (single)
TW guide carriages (single)
TK complete system (TS+TW assembled)

DryLin® T Rail Guide Systems | Product Range

Clamping Elements and Manual Clamping for quick positioning

- Compact clamping of high loads, for all sizes (15–30) – holding force up to 500 N
- Pneumatic clamping – holding force up to 600 N (on request)
- Simple assembly

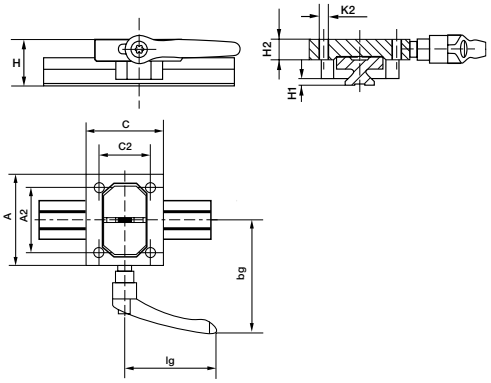


Clamping Elements for DryLin® T Rail Guide Systems – Dimensions [mm]

TWBM-11: narrow design with clamping elements made of plastic

Part number	A	a	A2	H	H1	H2	K2	C	C2	c	lg	b
TWBM-11-15	47	22	15	24	4	20	M4	15	15	4	44	18.9
TWBM-11-20	63	31	28	30	6	24	M5	15	15	6.5	44	23
TWBM-11-25	70	34	35	36	5	31	M6	20	20	7.5	63.63	26.2
TWBM-11-30	90	40	38	42	6.5	35.5	M6	20	20	9	78	32.4

- Clamping of high loads, up to 500 N per clamp
- Brass clamp elements
- Location bores as TW-01-25
- Removable hands



DryLin® T Manual Clamping – dimensions [mm]

TWBM-01: solid design with brass clamp elements, location bores as TW-01-25

Part number	A	A2	H	H1	H2	K2	C	C2	lg	bg
TWBM-01-25*	80	57	36	5	16	M8	68	45	80	99

*** Only for guide rails TS-01-25**

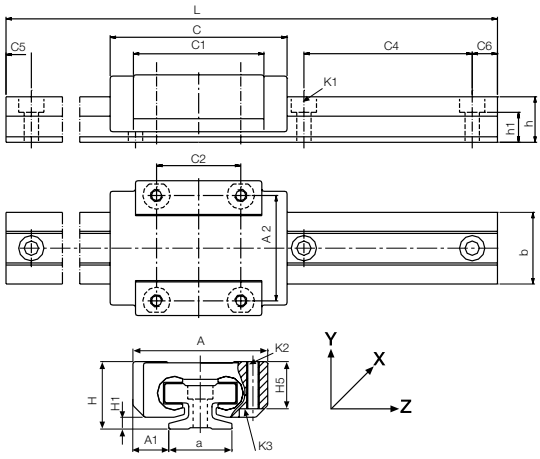
DryLin® T Guide Rails for TWBM – Dimensions [mm]

Part number	Weight	L	a	C4	C5	C5	C6	C6	h	h1	K1 for screw	b	Iy	Iz	Wby	Wbz
		max.	–0.2		min.	max.	min.	max.								
	[kg/m]										DIN 912		[mm⁴]	[mm⁴]	[mm³]	[mm³]
TS-01-15	0.6	4,000	15	60	20	49	20	49	15.5	10.0	M4	22	6,440	4,290	585	488
TS-01-20	1.0	4,000	20	60	20	49	20	49	19.0	12.3	M5	31	22,570	11,520	1,456	1,067
TS-01-25	1.3	4,000	23	60	20	49	20	49	21.5	13.8	M6	34	34,700	19,300	2,041	1,608
TS-01-30	1.9	4,000	28	80	20	49	20	59	26.0	15.8	M8	40	70,040	40,780	3,502	2,832

For rails without mounting holes, please use bearing suffix “without holes”.

DryLin® T Rail Guide Systems | Product Range

Miniature



- Maintenance-free, dry operation
- 3 sizes
- Slide carriage housing is a chromated zinc casting
- Wear-resistant and replaceable gliding elements made of iglidur® J
- Hard anodized aluminum rails
- Small mounting height and width
- Resistant to corrosion
- Standard bore pattern symmetrical C5 = C6

DryLin® T Miniature Rails – Dimensions [mm]

Part number	Weight	L	a	C4	C5	C5	C6	C6	h	h1	K1 for screw	b	Iy	Iz	Wby	Wbz
		max.	–0.2		min.	max.	min.	max.								
	[kg/m]										DIN 912		[mm⁴]	[mm⁴]	[mm³]	[mm³]
TS-04-09	0.11	2,000	9	20	5	14.5	5	14.5	6.3	4.6	M2	9.6	252	169	52	49
TS-04-12	0.20	2,000	12	25	5	17.0	5	17.0	8.6	5.9	M3	13	856	574	132	120
TS-04-15	0.33	3,000	15	40	10	29.5	10	29.5	10.8	7.0	M3	17	2,420	1,410	285	239

For rails without mounting holes, please use bearing suffix “without holes”.

DryLin® T Miniature Carriages – Dimensions [mm]

Part number	Weight	H	A	C	A1	A2	C1	C2	H1	H5	K2	Torque	K3 for screw
		±0.2	–0.2	±0.3	±0.35				±0.35		Thread	max.	
	[g]											[Nm]	DIN 912
TW-04-09	17	10	20	29	5.5	15	18	13	1.7	7.2	M2	25	M2
TW-04-12	34	13	27	34	7.5	20	22	15	2.2	9.5	M3	50	M2 (M3)
TW-04-15	61	16	32	42	8.5	25	31	20	2.8	11	M3	50	M2 (M3)

(M...) = bored out

delivery time **available from stock**

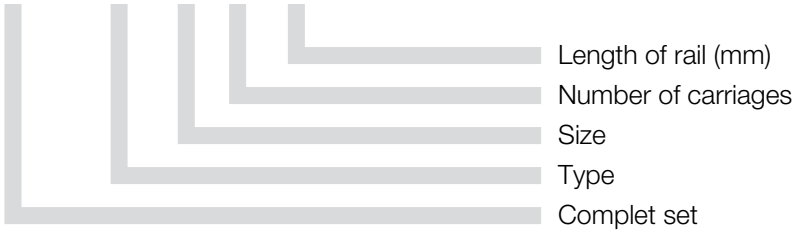
prices **price list online** www.igus.co.uk/en/DryLinT

Order notice ▶ page 740
TS rails (single)
TW guide carriages (single)
TK complete system (TS+TW assembled)

DryLin® T | Order key

Order key complete system:

TK(A)-01-15-2,500



Declaration:

This order example (TK-01-15-2,500) corresponds to a DryLin® T system (TKA = automatic) of size 15 with 2 carriages (for single part numbers see acc. pages) and 500 mm rail length.
Order TK-01-15-2,500, LLy(z) for a complete system with floating bearing in y(z)-direction

Valid for guide rails:

For rails without mounting holes, please use part number suffix “without mounting holes”.
DryLin® T guide rails as clear anodised version. Please use suffix “CA”.

Order example: TS-01-15,2000 for a guide rail TS-01-15 of 2 m length

Valid for guide carriages:

TW-01-... for a guide carriage
TWA-01-... for a guide carriage with automatic clearance adjustment
TW-02-... for Heavy-Duty design
TW-04-... for miniature guide carriages
-LLY for a guide carriage with floating bearing in y-direction
-LLZ for a guide carriage with floating bearing in z-direction
-HKA for a guide carriage with manual clamping

DryLin® T alternate plastic sliding parts (set)

Material iglidur® J

Guide carriages	Part number sliding part set
TW-01-15	TEK-01-15
TW-01-20	TEK-01-20
TW-01-25	TEK-01-25
TW-01-30	TEK-01-30
TW-02-20	TEK-02-20
TW-02-25	TEK-02-25
TW-02-30	TEK-02-30
TW-04-09	TEK-04-09
TW-04-12	TEK-04-12
TW-04-15	TEK-04-15

DryLin® T | Adjusting and Installation

DryLin® T – Adjusting the Clearance

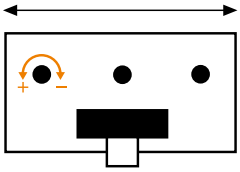
DryLin® T is delivered ready for installation. Clearance of the carriage is adjusted at the factory. The preadjustment is determined by the acting forces on each individual system. If you have special requirements, please indicate in your order whether particularly limited or extended bearing clearance is required. If necessary, clearance of the DryLin® T linear guide system can be readjusted. This should always take place when there is no load on the carriage.

1. After removing the protective cover, loosen the locknuts – Width across flats:
- SW 5 for TW-01-15
- SW 5 for TW-01-15 and TW-01-20
- SW 7 for TW-01-25 and TW-01-30

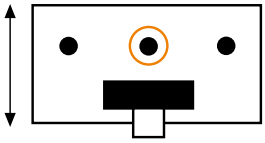
2. Adjust the bearing clearance for the 3 guide points with an Allen key – Allen key size:
- 1.5 mm for TW-01-15 and TW-01-20
- 2.0 mm for TW-01-25 and TW-01-30

3. Check the clearance of the carriage after adjusting the 3 levels. If it is sufficient, tighten the locknuts and put on the cover.

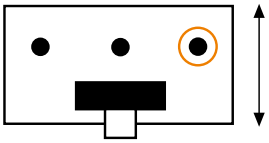
4. There is a danger that excessive reduction of the clearances can seize the gliding elements and that the clearance cannot be reset simply by loosening the adjustment screws. The gliding elements are then released by pressing the reset button on the opposite side. Press hard against the readjusting spring. You must have already loosened the respective adjustment screws. Use the correct size pin for this purpose:
- 2.5 mm for TW-01-20 and TW-01-15
- 3.0 mm for TW-01-25
- 3.0 mm for TW-01-30



Lateral guide:
– less clearance
+ more clearance



Vertical guide left



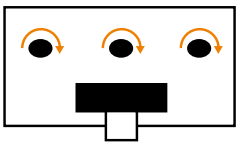
Vertical guide right

DryLin® T | Adjusting and Installation

DryLin® T Automatic – Adjusting the Clearance

The DryLin® T Automatic series offers you an automatic adjustment of the clearance. A readjustment can take place automatically in steps of 0.1 mm. Springs tighten the regulating wedge immediately as soon as the clearance is bigger than 0.1 mm and the system is unloaded.

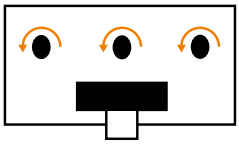
1. The system will be delivered with 3 spanners which are already plugged in. They are necessary for mounting the carriage onto the rail. In case these spanners are removed they need to be replugged into the openings and turned right by 90°.



locked

2. When the carriage is on the rail, loosen the spanners by turning them left 90° and remove them. The clearance will be adjusted automatically.

3. Check the clearance of the carriage. A fine adjusting can be done at this point.



unlocked

4. You can remove the carriage at any time. In order to do so, simply plug the spanners back into the openings (see step 1).

DryLin® T | System Design

For the exact calculation of the DryLin® T Linear Guide System it is essential to find out whether the position of the forces is within the allowable limits, and if the sliding pad where the highest forces occur is not overloaded.
The calculation of the necessary driving force and the maximum permissible speed is important. Each orientation requires a different formula for calculation.

Please note that the following calculations do not contain any guarantees with regard to impact loads and acceleration forces. The drive should always take place precisely in the x direction, as additional loads and increased drive resistances (danger of seizing) occur (for e. g. in crank drive) that cannot be neglected.

Variables in the calculations:

Fa:	Drive Force	[N]
Fs:	Applied Mass	[N]
Fy, Fz:	Bearing Load	[N]
	in y- or z-direction	[mm]
sx, sy, sz:	Location of the centre of gravity in x-, y- or z-direction	[mm]
ay, az:	Location of the driving force in y- or z-direction	[mm]
wx:	Distance between carriages, on a rail	[mm]
LX:	Constant from table below	[mm]
Zm:	Constant from table below	[mm]
Y0:	Constant from table below	[mm]
b:	Distance between guide rails	[mm]
μ:	Coefficient of friction, μ = 0 for static loads, μ = 0.2 for dynamic loads	
ZW:	Number of carriages per rail	

Recommended procedure

1st step:

Select the orientation

- horizontal

1 rail and 1 carriage
1 rail and 2 carriages
2 rails and 4 carriages

- lateral

1 rail and 1 carriage
1 rail and 2 carriages
2 rails and 4 carriages

- vertical

1 rail and 1 carriage
1 rail and 2 carriages
2 rails and 4 carriages

2nd step:

Check to see whether the offset distances of the applied forces are within the permissible values

3rd step:

Calculate the necessary drive force

4th step:

Calculate the maximum bearing load in y- and z-directions

5th step:

Check out the maximum bearing load of the most strongly affected bearing with the load calculated in step No. 4.

6th step:

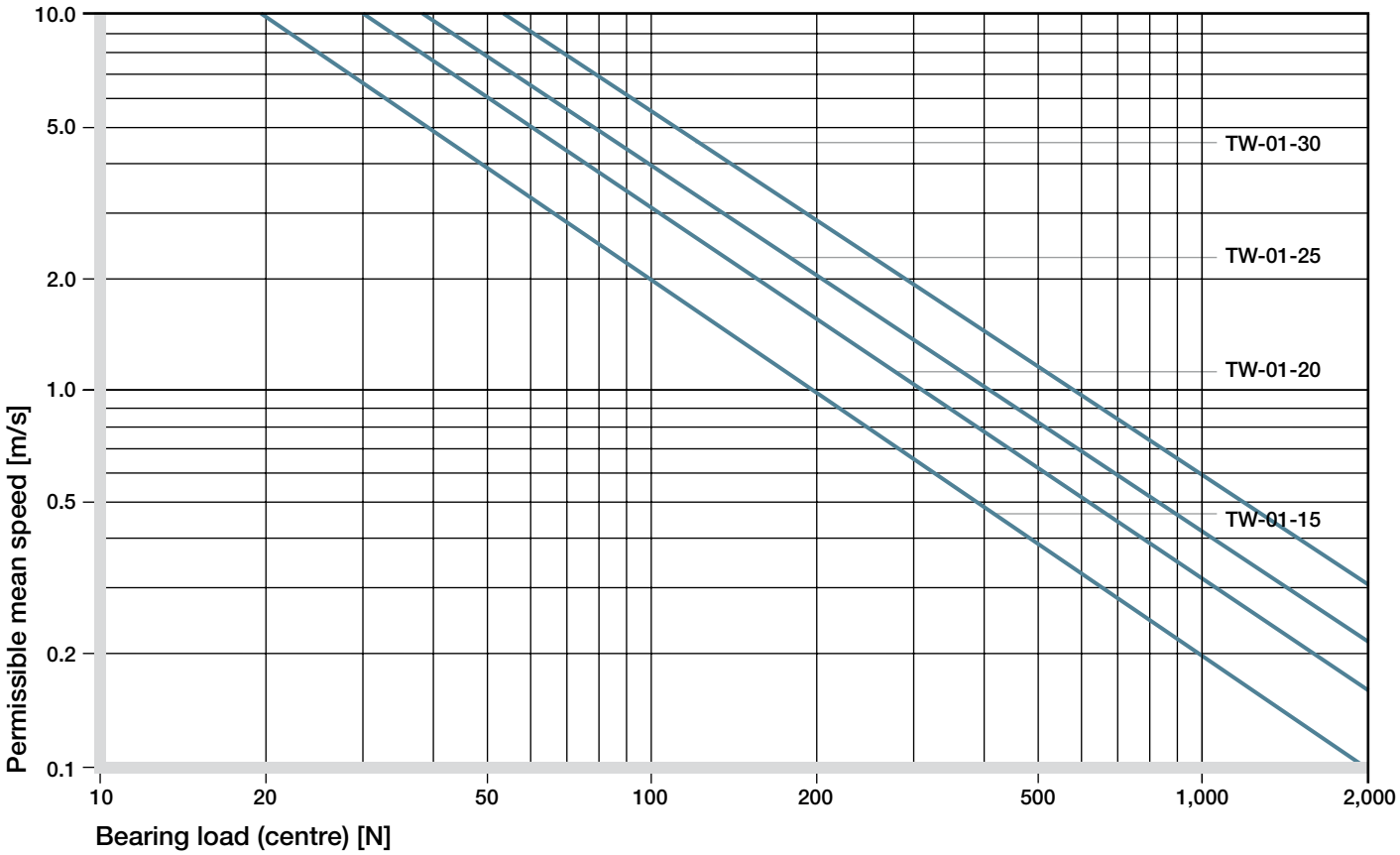
Determination of the maximum permitted speed for the load from step No. 4.

The constant values [mm]:

Part number	Lx	Zm	Y0
TW-01-15	29	16	11.5
TW-01-20	35	23	15.0
TW-01-25	41	25	19.0
TW-01-30	49	29	21.5

Coefficients

	1 rail, 1 carriage	1 rail, 2 carriages	2 rails, 3–4 carriages
K1	|(ay + Y0)/Lx|	|(ay + Y0)/Wx|	|(ay + Y0)/Wx|
K2	(sy + Y0)/Lx	(sy + Y0)/Wx	(sy + Y0)/Wx
K3	|az/Lx|	|az/Wx|	|az/Wx|
K4	|sx/Lx|	|sx/Wx|	|sx/Wx|
K5	sz/Lx	|sz/Wx|	|sz/Wx|
K6	|(sy + Y0)/Zm|	|(sy + Y0)/Zm|	|(sy + Y0)/b|
K7	|sz/Zm|	|sz/Zm|	|(sz/b) – 0.5|



Graph 04: Graph to determine the maximum permissible speed for the calculated bearing load

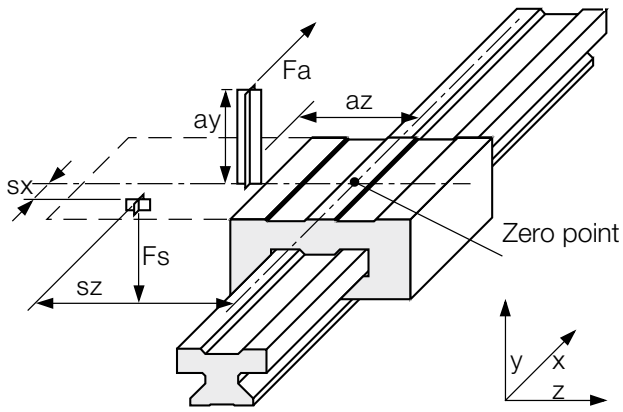
Part number	F_{ymax}, F_{zmax} [N]
TW-01-15	2,000
TW-01-20	3,700
TW-01-25	5,000
TW-01-30	7,000

Table 03: Maximum permissible load

DryLin® T | Mounting Version Horizontal

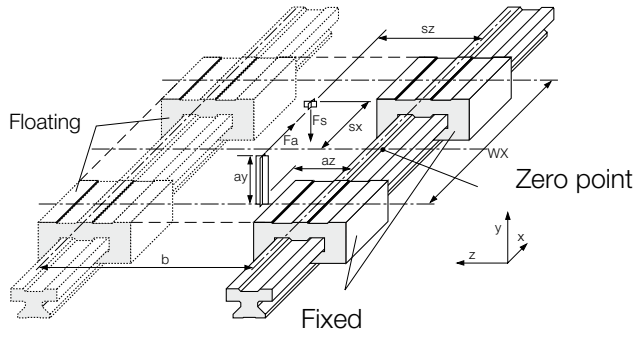
Maximum permissible distances:

Variation: 1 rail, 1 carriages		
sy + sz	<	2 Lx – Y0
ay + az	<	2 Lx – Y0
sy	<	5 Zm
sz	<	5 Zm



Maximum permissible distances:

Variation: 1 rail, 2 carriages Variation: 2 rails, 4 carriages		
sy + sz	<	2 wx – Y0
ay + az	<	2 wx – Y0



2nd step:

Check to see whether the maximum distances of the applied forces are within the permissible values. (See maximum permissible distances)

3rd step:

Calculate the necessary drive force

3.1 Maximum bearing load
in **x-** and **z-direction**
outside of the carriage(s)

$$Fa_1 = \frac{\mu}{1 - 2\mu K_3} \cdot Fs$$

3.2 Maximum bearing load
in **z-direction**
outside of the carriage(s)

$$Fa_2 = \frac{2\mu K_7}{1 - 2\mu K_3} \cdot Fs$$

3.3 Maximum bearing load
in **x-direction**
outside of the carriage(s)

$$Fa_3 = \frac{2\mu K_4}{1 - 2\mu K_3 - 2\mu K_1} \cdot Fs$$

If the position of the centre of gravity is not specified:

$$Fa = MAX\ (Fa_1, Fa_2, Fa_3)$$

4th step:

Calculate the maximum bearing load

4.1 Maximum bearing load
in **y-direction**

$$Fy_{max} = \frac{2\,Fs}{Zw}\left(\frac{2\,K_4}{Zw} + 0.5\right) \cdot \left(K_7 + 0.5\right) + \frac{2Fa\,K_1}{Zw^2}$$

4.2 Maximum bearing load
in **z-direction**

$$Fz_{max} = \frac{4Fa\,K_3}{Zw^2}$$

DryLin® T | Mounting Version Lateral

2nd step:

Check to see whether the maximum distances of the applied forces are within the permissible values. (See maximum permissible distances)

3rd step:

Calculate the necessary drive force
First two calculations must be made:

$$Fa_1 = \frac{(1+2K_6)\mu}{1-2\mu K_1} \cdot Fs$$

$$Fa_2 = \frac{(2K_4+2K_6)\mu}{1-2\mu K_1-2\mu K_3} \cdot Fs$$

The drive force Fa corresponds to the calculated maximum value:

$$Fa = MAX\,(Fa_1, Fa_2, Fa_3)$$

4th step:

Calculate the maximum bearing load

4.1 Maximum bearing load in **y-direction**

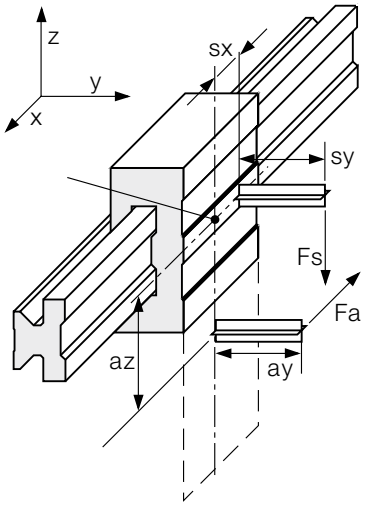
$$Fy_{max} = \frac{Fs\,K_5}{Zw} + \frac{2Fa\,K_1}{Zw^2}$$

4.2 Maximum bearing load in **z-direction**

$$Fz_{max} = \frac{2Fs}{Zw}\left(\frac{2K_4}{Zw}+0.5\right)+\frac{4Fa\,K_3}{Zw^2}$$

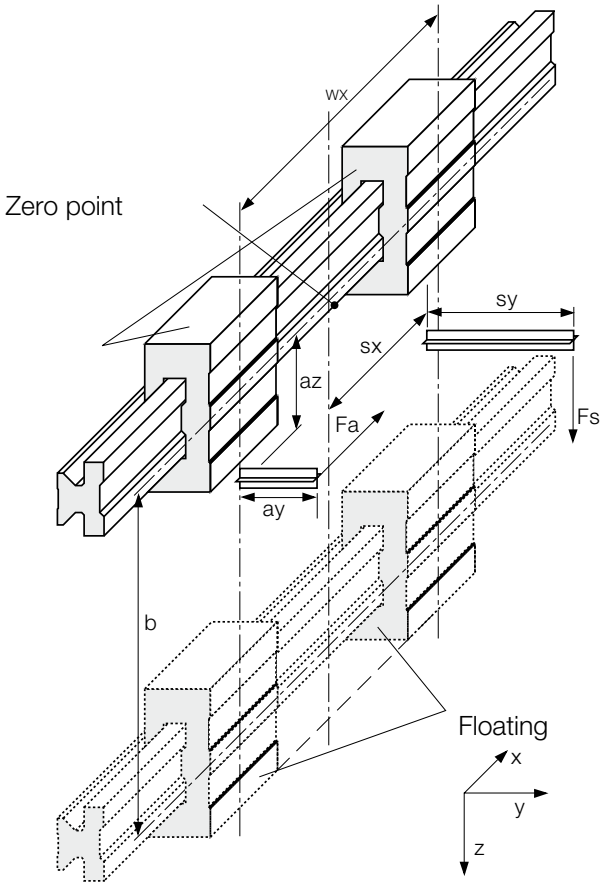
Maximum permissible distances:

Variation: 1 rail, 2 carriages Variation: 2 rails, 4 carriages		
sy + sz	<	2 Lx – Y0
ay + az	<	2 Lx – Y0
sy	<	5 Zm
sz	<	5 Zm



Maximum permissible distances:

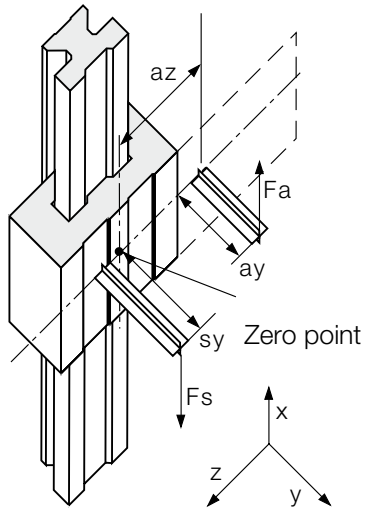
Variation: 1 rail, 2 carriages Variation: 2 rails, 4 carriages		
sy + sz	<	2 wx – Y0
ay + az	<	2 wx – Y0



DryLin® T | Mounting Version Vertical

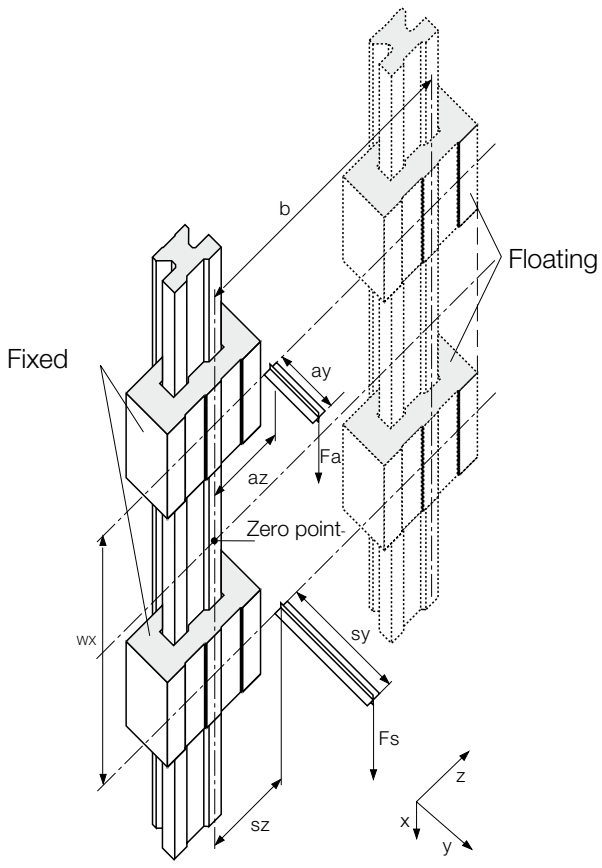
Maximum permissible distances:

Variation: 1 rail, 1 carriage		
sy + sz	<	2 Lx – Y0
ay + az	<	2 Lx – Y0
sy	<	5 Zm
sz	<	5 Zm



Maximum permissible distances:

Variation: 1 rail, 2 carriages Variation: 2 rails, 4 carriages		
sy + sz	<	2 wx – Y0
ay + az	<	2 wx – Y0



2nd step:

Check to see whether the maximum distances of the applied forces are within the permissible values. (See maximum permissible distances)

3rd step:

Calculate the necessary drive force
First four calculations must be made:

$$Fa_1 = \frac{2\mu(sz + sy + Y_0) - wx}{2\mu(az + ay + Y_0) - wx} \cdot Fs$$

$$Fa_2 = \frac{2\mu(-sz + sy + Y_0) - wx}{2\mu(-az + ay + Y_0) - wx} \cdot Fs$$

$$Fa_3 = \frac{2\mu(sz - sy - Y_0) - wx}{2\mu(az - ay - Y_0) - wx} \cdot Fs$$

$$Fa_4 = \frac{2\mu(sz + sy + Y_0) + wx}{2\mu(az + ay + Y_0) + wx} \cdot Fs$$

The drive force Fa corresponds to the calculated maximum value:

$$Fa = MAX\,(Fa_1, Fa_2, Fa_3, Fa_4)$$

4th step:

Calculate the maximum bearing load

4.1 Maximum bearing load in **y-direction**

$$Fy_{max} = \left| Fa\frac{ay + Y_0}{wx} - Fs\,K_2 \right| \cdot \frac{2}{Zw^2}$$

4.2 Maximum bearing load in **z-direction**

$$Fz_{max} = \left| Fa\frac{az}{wx} - Fs\,K_5 \right| \cdot \frac{4}{Zw^2}$$

My Sketches