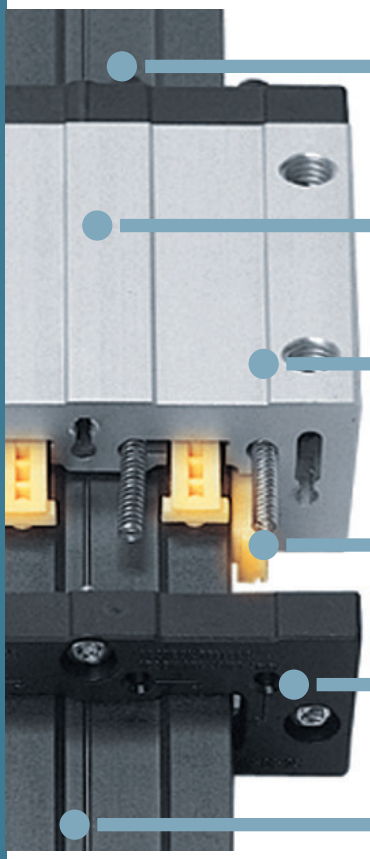
drylin® T Rail Guide Systems

- 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.



Customized clearance adjustment

Profile rail and main body of the carriage are made of aluminum

All steel parts are made of durable stainless steel

Gliding elements in high-performance polymer iglidur® J serve as a guide bearing and guarantee optimum running properties

Cover made of solid plastic or stainless steel

Profile rail with hard anodized surface

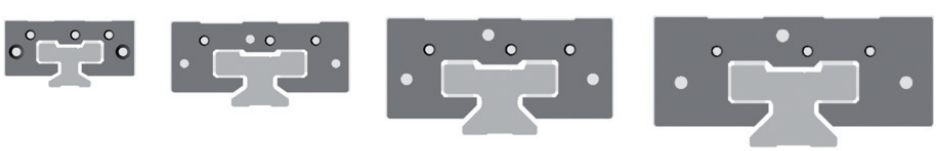
Advantages:

- 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 821, ▶ drylin® W, page 835
- When I need a pure stainless steel solution
  ▶ drylin® W, page 835, ▶ drylin® R, page 869
- When I want to incorporate a drive
  ▶ drylin® SHT, page 1021, ▶ drylin® E, page 1089

Size 15 Size 20 Size 25 Size 30



same dimensions as most recirculating ball bearing guides

Lubrication-free

Cleanroom certificated IPA Fraunhofer ▶ page 798

Free of toxins ROHS 2002/95/EC

ESD compatible (electrostatic discharge)

+90°
−40°

Temperature

drylin® T | Product Overview

Standard

- supplied preset and can be put into operation at once
- Manual clearance adjustment or fine tuning
- Maintenance-free without lubrication
- Corrosion-resistant

▶ **page 807**

Automatic

- With a mechanism that automatically adjusts the bearing clearance after removal of the preload key and adjusts during operation
- Maintenance-free without lubrication
- Corrosion-resistant

▶ **page 807**

With manual clamp

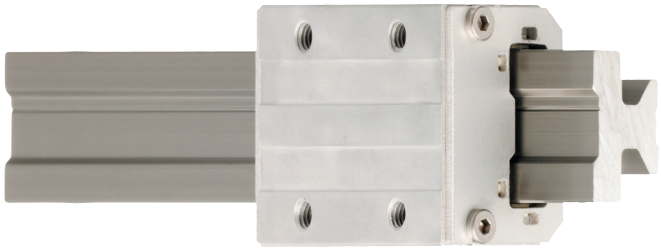
- Manual hand clamp
- Maintenance-free dry-running
- Corrosion-resistant

▶ **page 808**

Heavy Duty

- Used for the most extreme conditions (dirt, adhesive residues, chips, mud, etc.)
- Plastic gliding elements are fixed in the cover plate and are therefore permanent

▶ **page 809**



Compact

- Narrow linear guide carriage for small installation space
- Plastic gliding elements are fixed in the cover plate and are therefore permanent

▶ **page 809**

Miniature

- small, compact, lubrication-free
- Easy to adjust
- robust and cost-effective

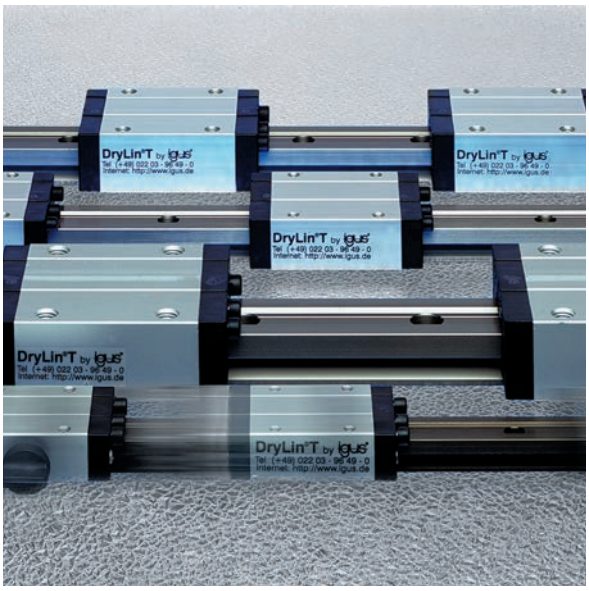
▶ **page 810**

Clamps

- Compact and strong clamps for all sizes – holding forces up to 500 N

▶ **page 811**

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

Grinding machine

Mail room equipment

► www.igus.co.uk/automotive

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	AlMgSi055
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

Typ	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-/02-20	7.4	7.4	3.7	85	45	45
01-/02-25	10	10	5	125	65	65
01-/02-30	14	14	7	200	100	100

Table 02: drylin® – permissible static load capacity

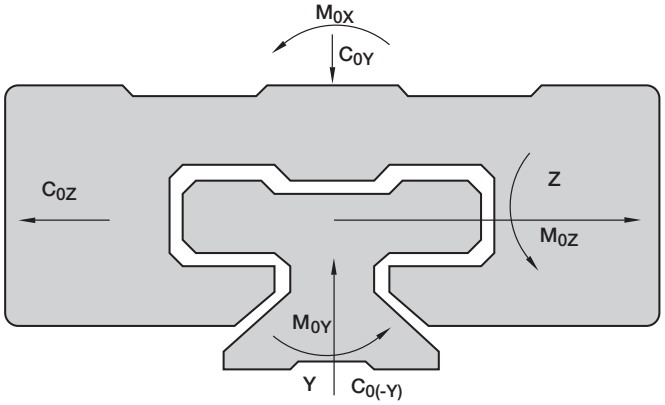


Diagram 01: Designation of load directions

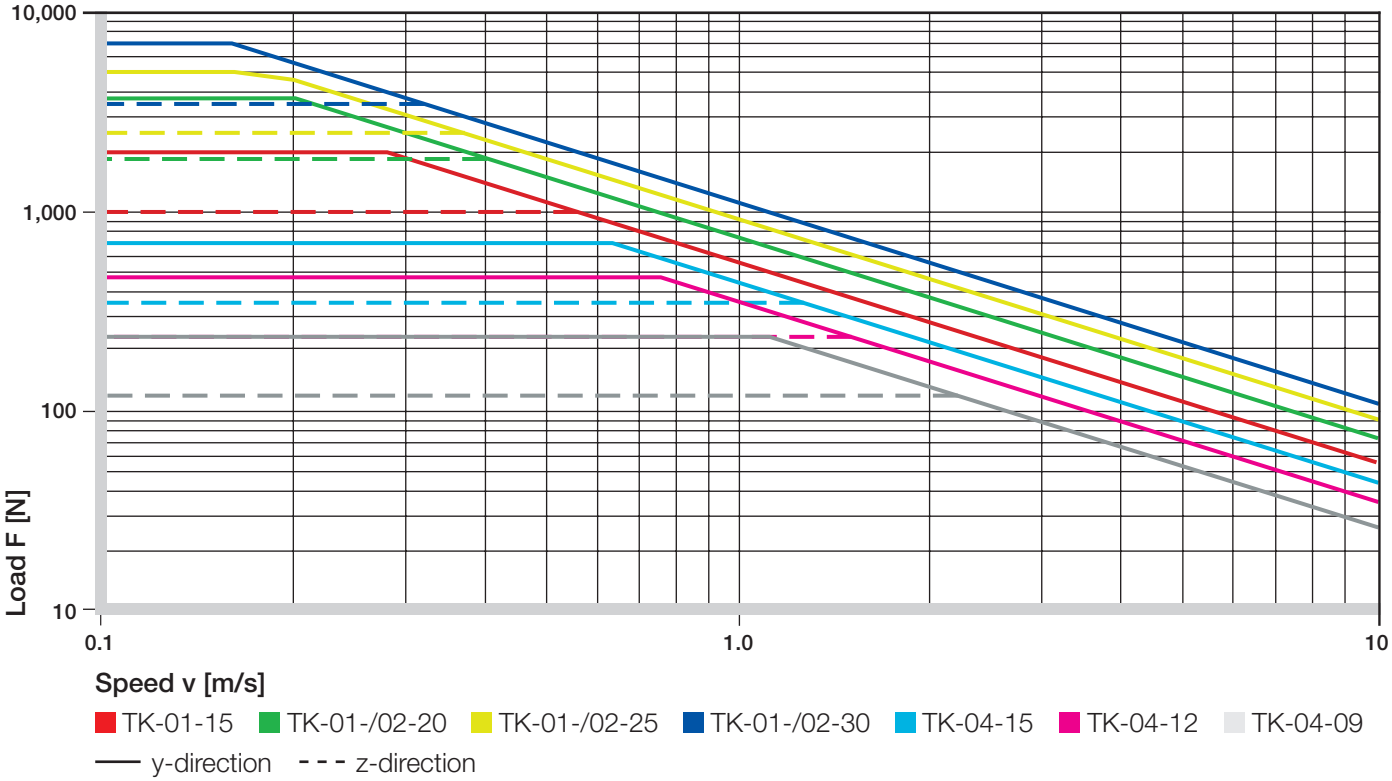


Diagram 02: drylin® T – permissible dynamic load

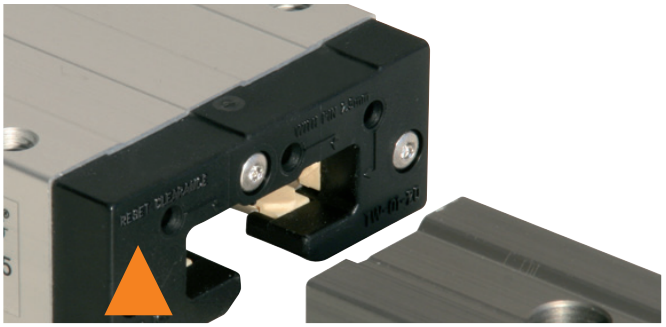
drylin® T | Design rules

Installation Notes

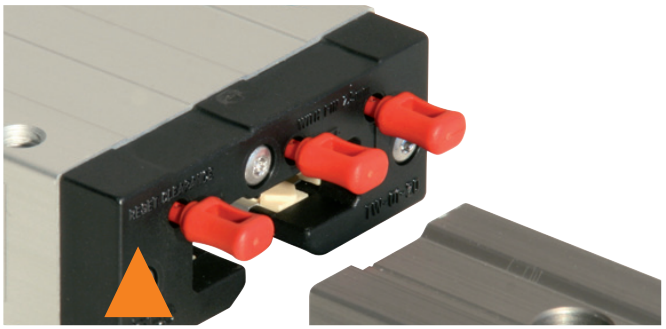
The compensation of parallelism errors up to a maximum of 0.5mm between mounted rails is possible with a fixed/floating bearing. During installation, take care that the floating bearing has the same clearance on both sides.
In the adjacent designs you can see the version of the fixed/floating bearing system recommended by us.
The mounting surfaces of the rails and carriages should be very flat (e. g. machined surface) to prevent twisting in the system. Small discrepancies in the mounting surfaces can be individually compensated up to a certain amount (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 technical support.

Installation drylin® T linear guide system:

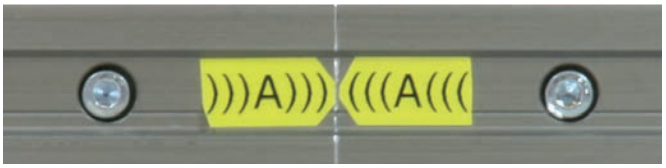
Make sure to assemble the side of the carriage saying “Reset Clearance” onto the rail first (see picture).



TW-series, adjustable clearance



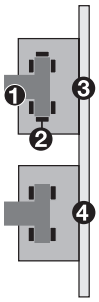
TWA-series, Automatic



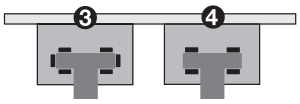
Rail joint

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

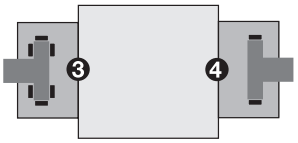
❶ Rail
❷ Sliding elements
❸ Fixed bearing
❹ Floating bearing LLZ or LLY



Horizontal installation with floating bearing in the z-direction



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



drylin® T | Design rules

Floating bearings for linear slide guides

In the case of a system with two rails, one side needs to be fitted 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 created 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, machined) to prevent stresses 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.

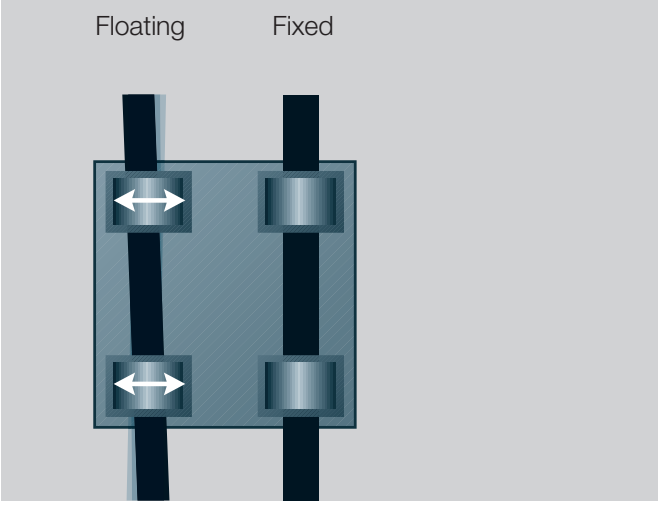


Diagram 03: Automatic compensation of parallelism errors

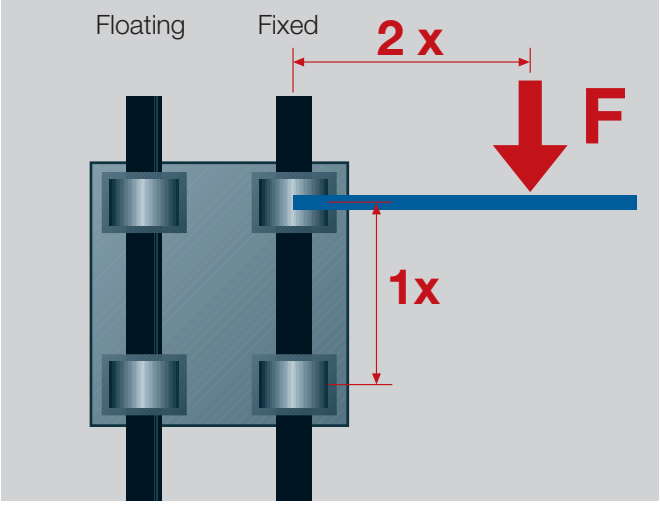


Diagram 04: The 2:1 rule

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

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

drylin® T Rail Guide Systems | Product Range

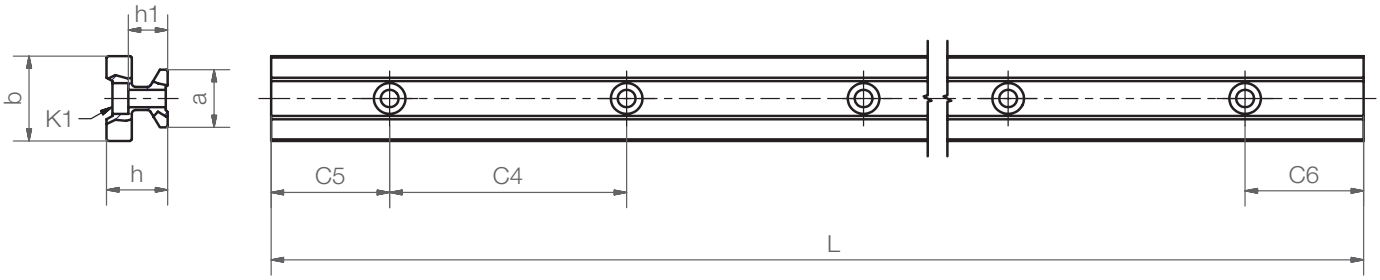
drylin® T guide rails

TS-01-...

TS-11-...*

- Rail made of anodized aluminum
- Standard bore pattern symmetrical C5 = C6
- Rails without mounting holes available (suffix “no holes”)
- Guide rails clear anodized available (suffix “CA”: e.g. TS-01-15-CA)
- * TS-11-20: Clear anodized and weight- reduced guide rail as an alternative to TS-01-20

Hard anodized surface ▶ page 788



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-11-20*	0.5	4,000	20	120	20	49	20	49	19.0	12.3	M5	31	12,140	6,360	780	620
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

In combination with

TW-01 Linear Guide Carriage - Adjustable clearance ▶ page 807

TWA-01 Linear Guide Carriage - Automatic ▶ page 807

TW-01-HKA Linear Guide Carriage with manual clamp ▶ page 808

TW-02 Linear Guide Carriage - Heavy Duty ▶ page 809

TW-03 Linear Guide Carriage - compact ▶ page 809

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TS rails (single)
TW guide carriages (single)
TK complete system (TS+TW assembled)

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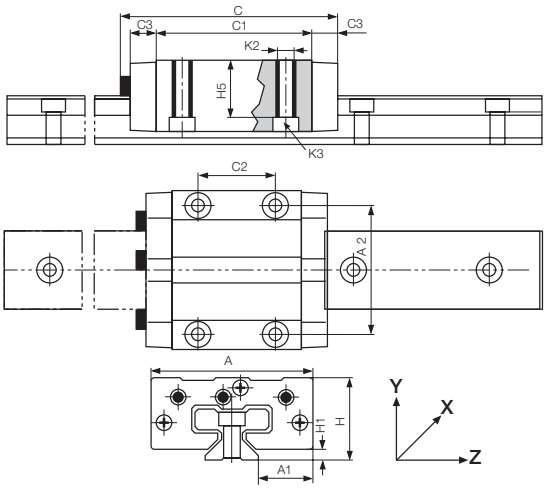
drylin® T Linear Guide Carriage – Adjustable clearance

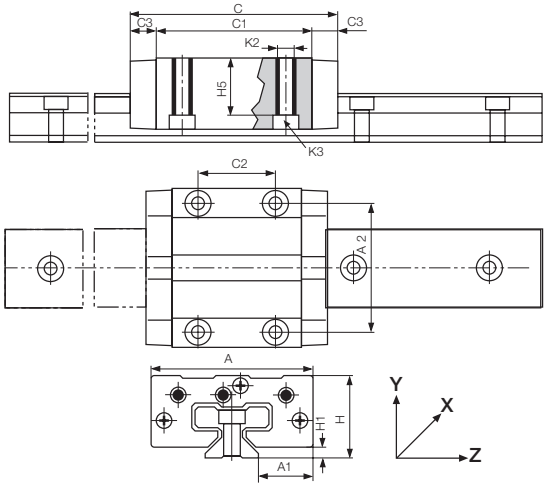


- linear guide carriage with manual adjustable clearance
- Suffix "-LLY" for a guide carriage with floating bearing in y-direction
- Suffix "-LLZ" for a guide carriage with floating bearing in z-direction
- In combination with drylin® T Rails TS-01

Dimensions [mm]

Part number	Weight [kg]	H ±0.35	A	C	A1 ±0.35	A2	C1	C2	C3	H1 ±0.35	H5	K2-Thread	Torque max. [Nm]	K3 for Screw DIN 912
TW-01-15	0.11	24	47	74	16.0	38	50	30	9	4.0	160	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

drylin® T Linear Guide Carriage – Automatic



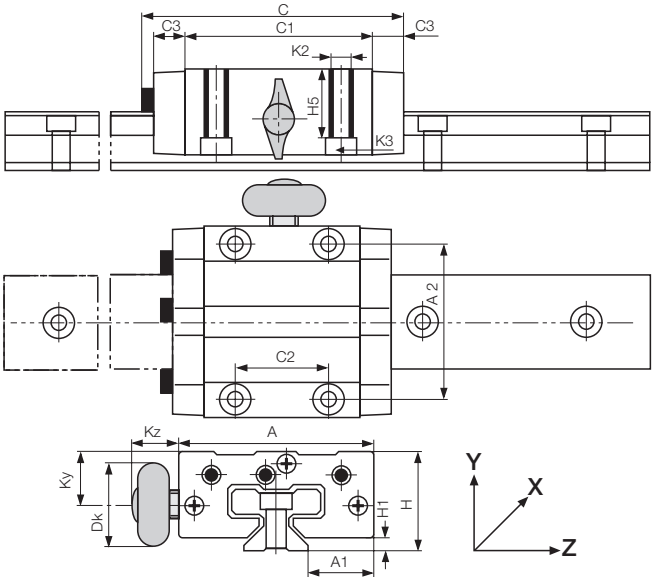
- Self-adjusting carriage (automatic clearance adjustment)
- Suffix "-LLY" for a guide carriage with floating bearing in y-direction
- Suffix "-LLZ" for a guide carriage with floating bearing in z-direction
- In combination with drylin® T Rails TS-01

Dimensions [mm]

Part number	Weight [kg]	H ±0.35	A	C	A1 ±0.35	A2	C1	C2	C3	H1 ±0.35	H5	K2-Thread	Torque max. [Nm]	K3 for Screw 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

drylin® T Rail Guide Systems | Product Range

drylin® T Linear Guide Carriage with manual clamp



- Linear Guide Carriage with manual clamp
- Manual adjustable clearance
- In combination with drylin® T Rails TS-01
  ▶ page 806
- other dimensions as Standard Linear guide carriage
  ▶ page 807

Dimensions [mm]

Part number	Size	Kz	Ky	Dk	Clamp thread
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

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

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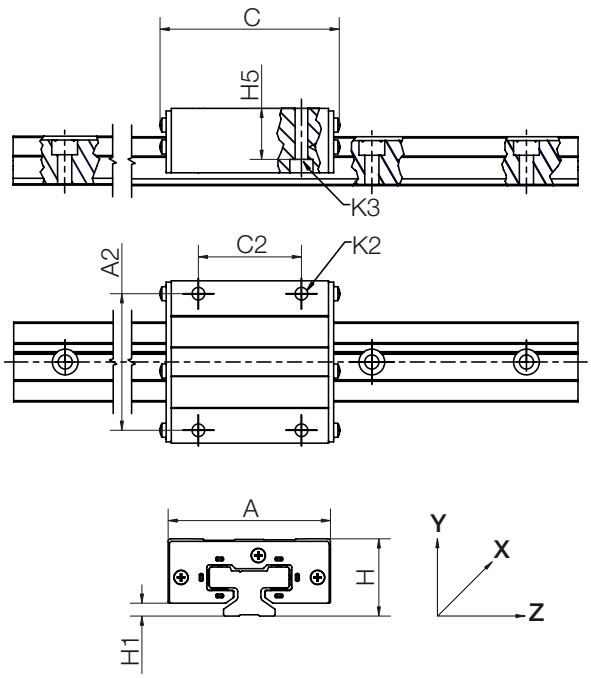
drylin® T Linear Guide Carriage – Heavy Duty



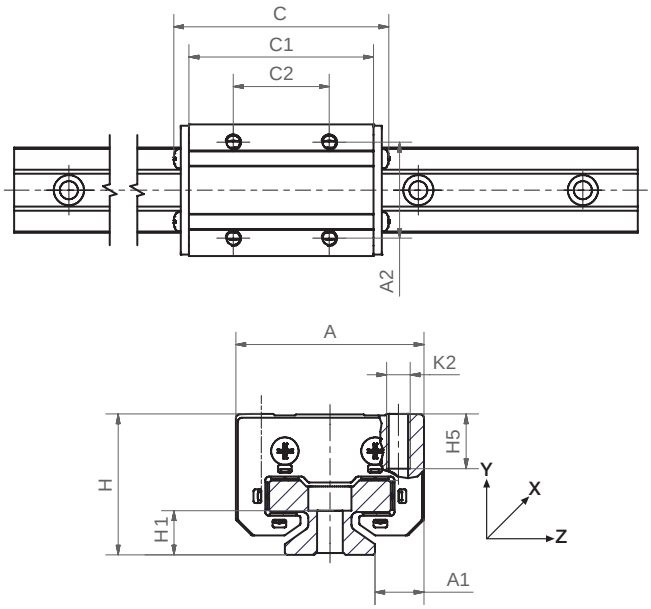
- Linear guide carriage for extreme conditions (dirt, glue resins, chips, mud etc.)
- Carriage with floating bearing on request
- In combination with drylin® T Rails TS-01

▶ page 806

Dimensions [mm]

Part number	Weight [kg]	H ±0.35	H5	A	C	A2	C2	H1 ±0.35	K2	K3
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

drylin® T Linear Guide Carriage – Compact



- Compact linear guide carriage for tough applications (clearance not adjustable)
- Narrow design, compatible with commercially available recirculating ball bearing systems
- In combination with drylin® T Rails Size 20 (TS-01-20 and TS-11-20)

▶ page 806

Dimensions [mm]

Part number	Weight [kg]	H ±0.35	A	C	A1	A2	C1	C2 ±0.35	H1	H5	K2	Torque max. [Nm]
TW-03-25	0.16	36	48	84	12.5	35	68	35	5	13	M6	6.0

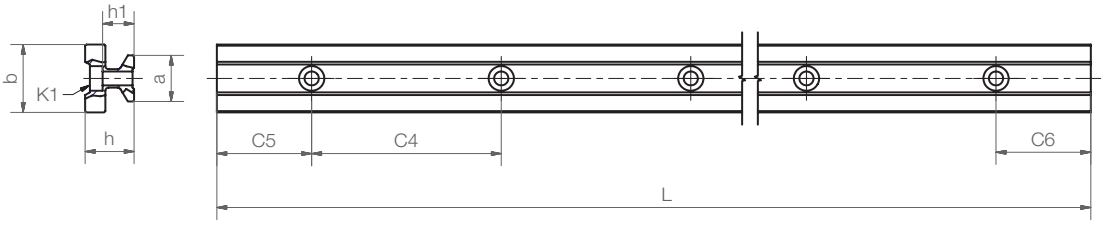
Order example: TS-03-25, for a narrow and tall carriage design

drylin® T Rail Guide Systems | Product Range

drylin® T Miniature Guide Systems

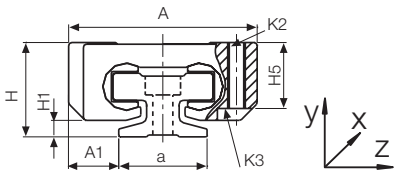
TS-04-...

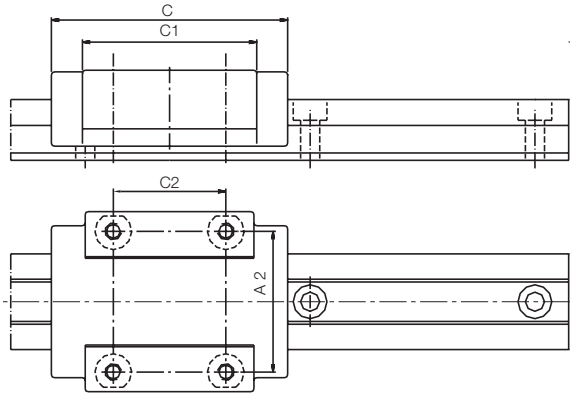
- Rails made of hard anodized aluminium
- Slide carriage housing is a chromated zinc casting
- Wear-resistant and replaceable gliding elements made of iglidur® J
- Rails without mounting holes available (suffix “no holes”)
- Small mounting height and width
- easy to fit
- maintenance- and lubrication-free



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-04-07 New!	0.08	2,000	7	1	5	12	5	12	5.5	3.7	M2	8	131	90	32	29
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





drylin® T Miniature Carriages – Dimensions [mm]

Part number	Weight	H	A	C	A1	A2	C1	C2	H1	H5	K2-Thread	Torque	K3 for Screw
		±0.2	-0.2	±0.3	±0.35				±0.35				
	[g]											max. [Nm]	DIN 912
TW-04-07 New!	8	8	17	23	5	12	21	8	1,5	-	M2	0,25	-
TW-04-09	17	10	20	29	5.5	15	18	13	1.7	7.2	M2	0.25	M2
TW-04-12	34	13	27	34	7.5	20	22	15	2.2	9.5	M3	0.50	M2 (M3)*
TW-04-15	61	16	32	42	8.5	25	31	20	2.8	11	M3	0.50	M2 (M3)*

* (M...) = bored out

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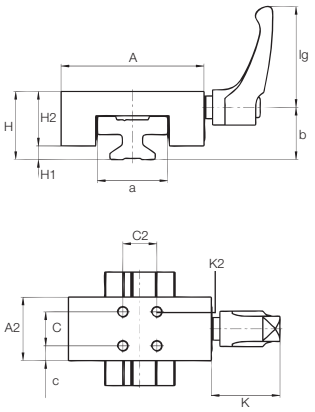
TW guide carriages (single)
TK complete system (TS+TW assembled)

drylin® T Rail Guide Systems | Product Range

Manual clamps for quick positioning

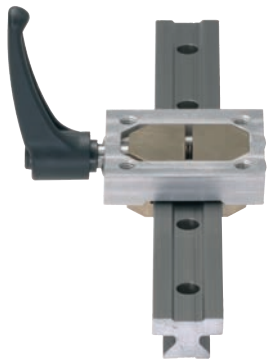
- Compact clamping for high loads, for all sizes (15–30) – holding force up to 500 N
- Pneumatic clamping – (on request)
- Simple assembly



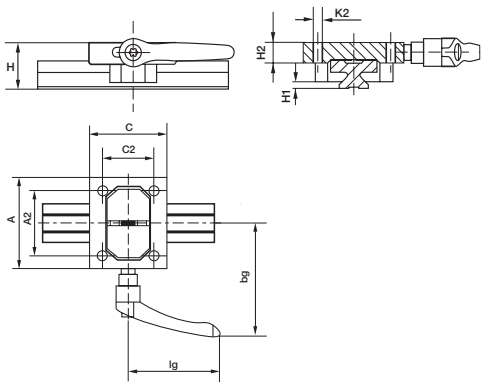
Clamps for drylin® T Rail Guide Systems – Dimensions [mm]

TWBM-11: narrow design with plastic clamp components

Part number	A	a	A2	H	H1	H2	K	K2	C	C2	c	lg	b
TWBM-11-15	47	22	23	24	4	20	30	M4	15	15	4	44	18.9
TWBM-11-20	63	31	28	30	6	24	30	M5	15	15	6.5	44	23
TWBM-11-25	70	34	35	36	5	31	39	M6	20	20	7.5	63.63	26.2
TWBM-11-30	90	40	38	42	6.5	35.5	47	M6	20	20	9	78	32.4



- High clamp force up to 500 N per clamp
- Brass clamping components
- Location bores as TW-01-25



drylin® T Manual clamps – Dimensions [mm]

TWBM-01: solid design with brass clamping components, 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**

delivery time from stock

€ prices price list online
www.igus.co.uk/en/drylinT

Order notice ▶ page 812
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-HKA-2-2000

Length of rail (mm)
Number of carriages
Options
blank: Standard
-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 clamp
(only for Type 01)
Size
Type
01: Standard
02: Heavy Duty
04: Miniature
Complete Set
TK: Complete set with rail and carriage
TKA: Complete set automatic version

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 respective 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 carriages:

For rails without mounting holes, please use part number suffix “no holes”.
drylin® T guide rails as clear anodised version. Please use suffix “CA”.

drylin® T replacement liners (set)

Material iglidur® J ▶ page 93

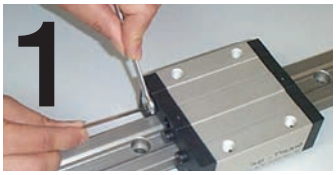
Guide carriages	Part number sliding part set
TW-01-15	TEK-01-15
TW-01-20	TEK-01-20
TW-01-25	TEK-01-25
TW-01-30	TEK-01-30
TW-02-20	TEK-02-20
TW-02-25	TEK-02-25
TW-02-30	TEK-02-30
TW-04-09	TEK-04-09
TW-04-12	TEK-04-12
TW-04-15	TEK-04-15

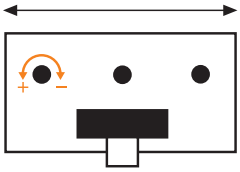
drylin® T | Adjusting and Installation

drylin® T – Adjusting the Clearance

drylin® T is delivered ready to fit. Clearance of the carriage is adjusted at the factory. The preadjustment is determined by the friction forces on each individual system. If you have special requirements, please indicate this 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 and TW-01-20
- SW 7 for TW-01-25 and TW-01-30

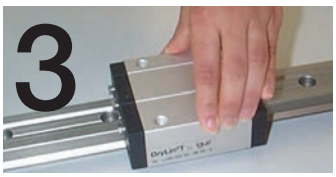


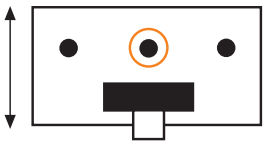


2. Adjust the bearing clearance for the 3 guide points with an Allen key – Allen key size:
- 1.5 mm for TW-01-15 and TW-01-20
- 2.0 mm for TW-01-25 and TW-01-30

Lateral guide:
– less clearance
+ more clearance

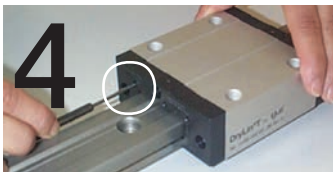
3. Check the clearance of the carriage after adjusting the 3 levels. If it is sufficient, tighten the locknuts and put on the cover.

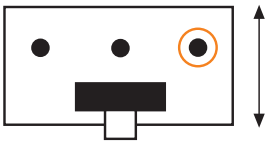




Vertical guide left

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-01-15 and TW-01-20
- 3.0 mm for TW-01-25 and TW-01-30





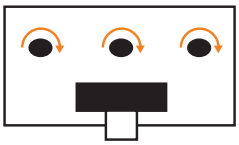
Vertical guide right

drylin® T | Adjusting and Installation

drylin® T Automatic – Adjusting the Clearance

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

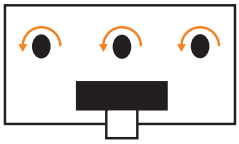
1. The system will be delivered with 3 red keys which are already plugged in. They are necessary for mounting the carriage onto the rail. If these keys are removed, then the keys should be replaced into the openings and turned right by 90°.



locked

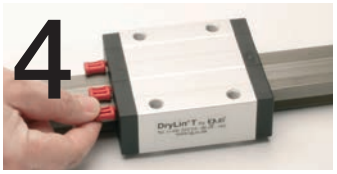
2. When the carriage is on the rail, loosen the keys by turning them left 90° and remove them. The clearance will be adjusted automatically.

3. Check the clearance of the carriage.



unlocked

4. You can remove the carriage at any time. In order to do so, simply replace the keys 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 ignored.

Variables in the calculations:

Fa:	Drive Force	[N]
Fs:	Applied Mass	[N]
Fy, Fz:	Bearing Load in y- or z-direction	[N]
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|

drylin® T | System Design

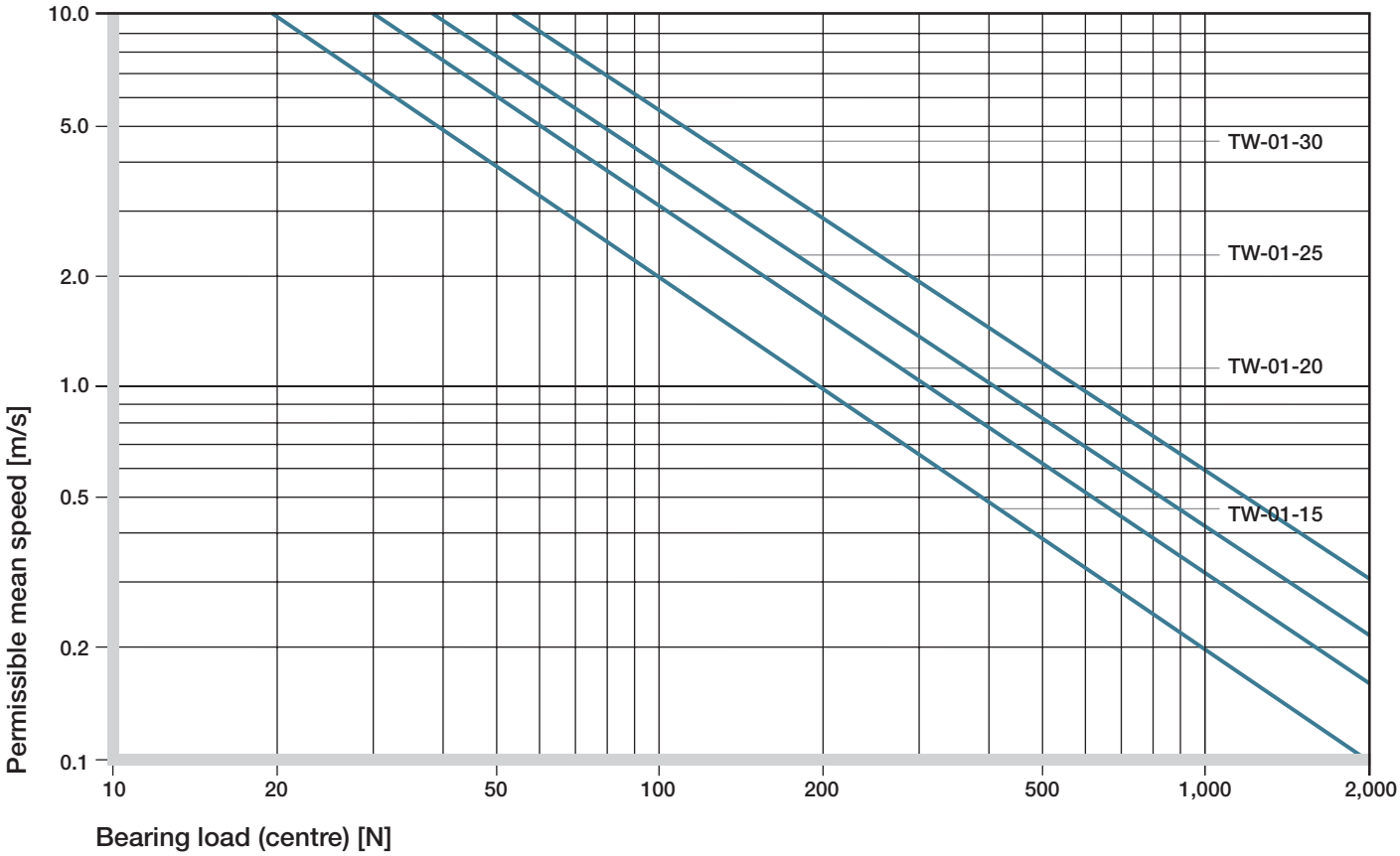


Diagram 05: Graph to determine the maximum permissible speed for the calculated bearing load

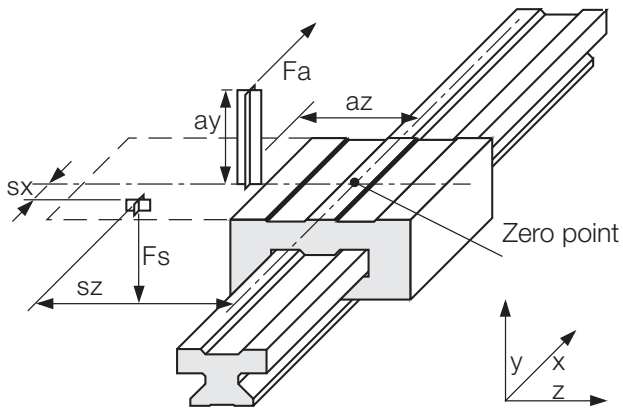
Part number	F_{ymax}, F_{zmax} [N]
TW-01-15	2,000
TW-01-20	3,700
TW-01-25	5,000
TW-01-30	7,000

Table 03: Maximum permissible load

drylin® T | Mounting Version Horizontal

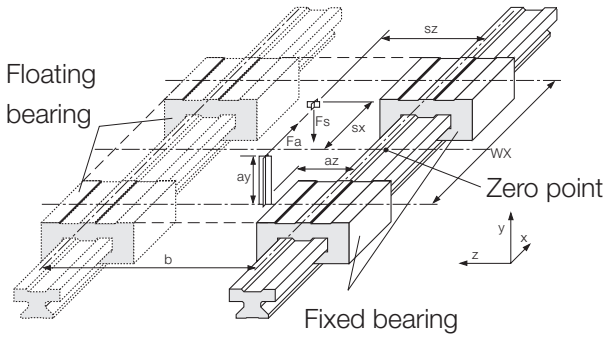
Maximum permissible distances:

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**

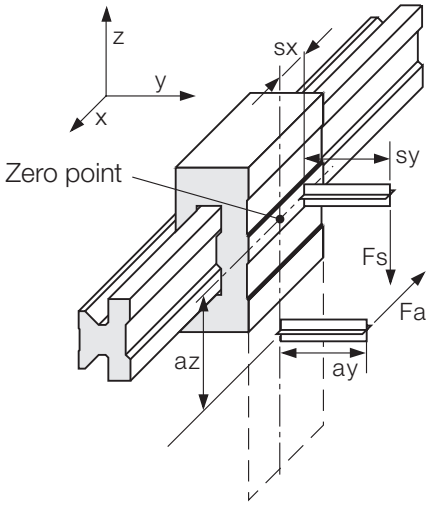
$$Fy_{max} = \frac{Fs\,K_5}{Zw} + \frac{2Fa\,K_1}{Zw^2}$$

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

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

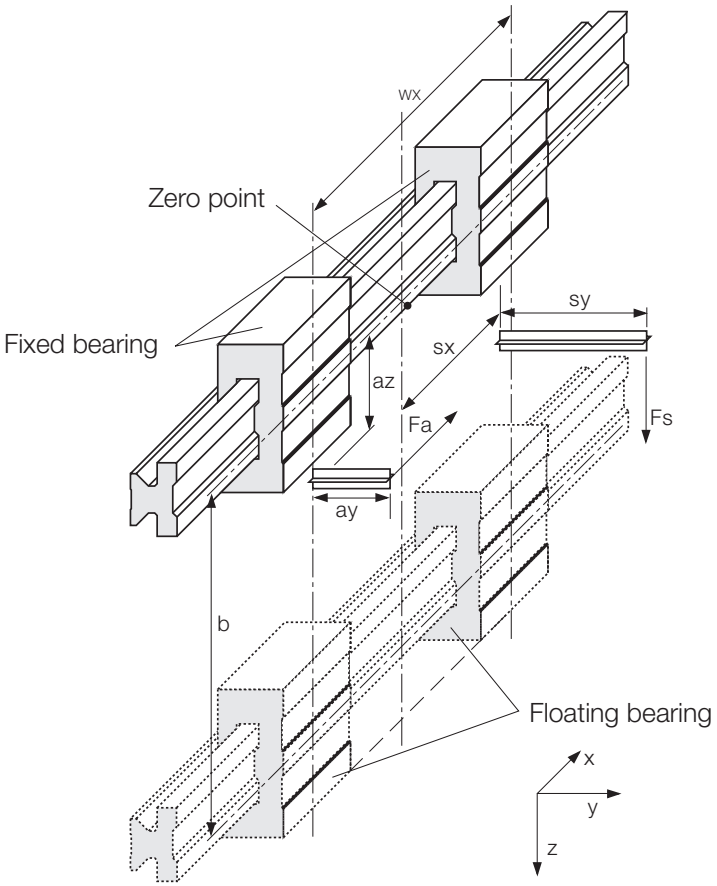
Maximum permissible distances:

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:

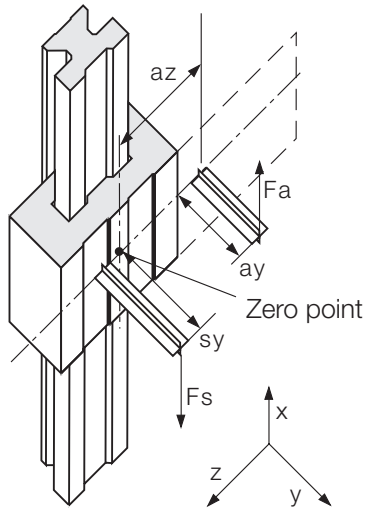
Variation: 1 rail, 2 carriages Variation: 2 rails, 4 carriages		
sy + sz	<	2 wx – Y0
ay + az	<	2 wx – Y0



drylin® T | Mounting Version Vertical

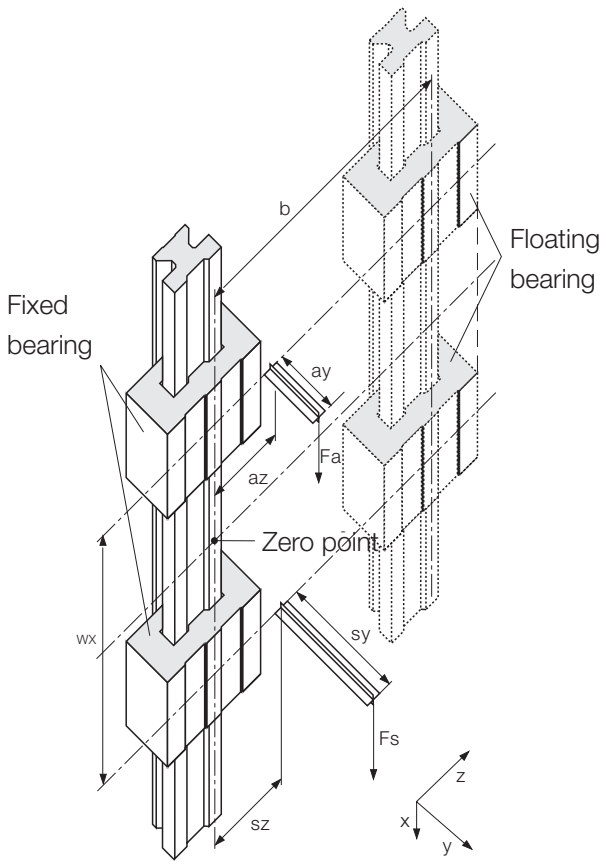
Maximum permissible distances:

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