TLR - TLQ

Data sheet - rev. 1.0

LINEAR COMPONENTS

myRollon

myRollon is Rollon's **digital working platform** designed to simplify the selection and configuration of linear and rotary motion solutions. It enables users to identify the most suitable motion system based on their specific application requirements, enhancing design precision and efficiency.

By centralizing essential tools and resources in a unified environment, myRollon empowers users to access all necessary services and information — saving time and boosting productivity in search of high-performance motion solutions.

SCAN ME!

Index

ORDERING KEY

▪ **TLR...P**

TLR	28P 28AP	-1490	Z	R
Series	Size	Length	**Surface treatment,** (if different from standard)	**Right (R) or left (L)**

Ordering example: **TLR43AP-1010ZR; TLR18P-1010L**

Note on ordering: the different surface treatments are not available for size 18. Please pad with zeroes to fill in for lengths with less than 4 digits, e.g. 550 mm length is “0550”.

▪ **TLQ...P**

TLQ	28P	F	-1490	Z
Series	Size	**F** = all threaded holes **C** = all passing holes (if different from standard)	Length	**Surface treatment,** (if different from standard)

Ordering example: **TLQ43P-1010Z; TLQ18PF-1010.**

Note on ordering: data related to F and C versions only if needed. The different surface treatments are not available for size 18. Please pad with zeroes to fill in for lengths with less than 4 digits, e.g. 550 mm length is “0550”.

FEATURES AND ADVANTAGES

Fig.1

TLR and TLQ are full-extension telescopic rails combining very compact dimensions with high flexural rigidity. The use of a double-row ball bearing system without ball cages reduces sensitivity to high dynamics and variable duty cycles, making them ideal for automated, vertical, or variable-stroke applications, even in the presence of dirt or debris.

TLR rails feature double-row ball bearings and a rigid S-shaped intermediate element, providing high load capacity, low deflection, and smooth, clearance-free motion. A self-aligning version is available for compensating minor misalignments. Size 18 rails are hardened using the Rollon-Nox nitriding and oxidation process, while sizes 28 and 43 feature induction-hardened and fine-ground raceways with multiple anticorrosion treatments available.

TLQ rails adopt a compact square cross-section with double-row ball bearings, offering high axial and radial load capacity with reduced dimensions and weight, particularly advantageous for vertical applications. The stroke/load capacity ratio can be customized by adjusting the distance between the sliders. Size 18 uses the Rollon-Nox nitriding and oxidation process, and sizes 28 and 43 are equipped with induction-hardened, fine-ground raceways with various anticorrosion treatment options.

The TLR and TLQ series are particularly suitable for automation systems, material handling equipment, and industrial and packaging machinery, especially in high-cycle environments requiring robust performance, low maintenance, and stable operation under demanding conditions.

Performance characteristics

- Available sizes: 18, 28, 43
- Max. operating speed: 1 m/s (39 in/s)*
- Temperature range: -20 °C + 110 °C (-4 °F + 230 °F)
- Surface treatments: see Pg.19

* depending on application and stroke

Rails

- Materials: cold drawn carbon steel with induction hardened and ground raceways.
- Available rail lengths: from 290 mm up to 1970 mm (from 11.4 in to 77.6 in)

Rollers

- Materials: Carbon steel 2RS shield and Stainless steel.
- Rollers lubricated for life

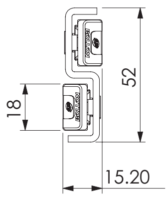
MAIN ADVANTAGES

Self-aligning system	Reliability	Low deflection	High load capacity	Long service life
The TLR self-aligning version compensates for misalignment, reducing assembly time.	The absence of a ball cage enables reliable operation in automated vertical and variable-stroke applications.	Sturdy profiles ensure minimal deflection under load.	Double-row ball bearings and rigid intermediate elements provide elevated axial and radial load capacities.	TLR and TLQ provide wear resistance and contribute to extended operational lifetime, even in high-cycle applications.

COMPONENTS AND DIMENSIONS

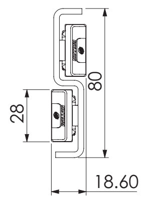
▪ TLR...P-TLQ...P series

▪ TLR18P...R - TLR18P...L



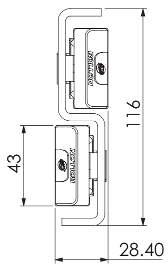
Load capacity Pg.8 **Fig.2**

▪ TLR28P...R - TLR28P...L



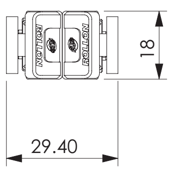
Load capacity Pg.9 **Fig.3**

▪ TLR43P...R - TLR43P...L



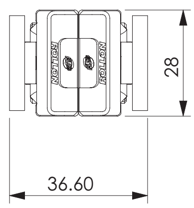
Load capacity Pg.10 **Fig.4**

▪ TLQ18P



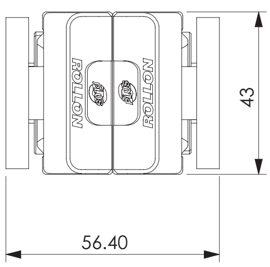
Load capacity Pg.11 **Fig.5**

▪ TLQ28P



Load capacity Pg.12 **Fig.6**

▪ TLQ43P



Load capacity Pg.13 **Fig.7**

■ **TLR18P**

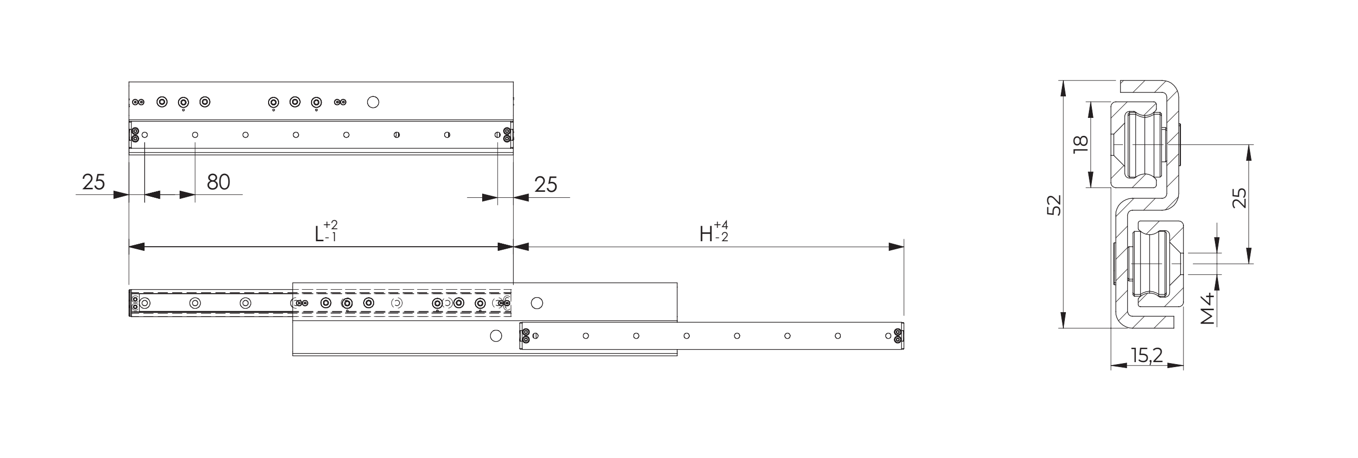


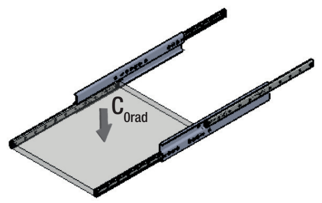
Fig.8

Type	Size	Length L [mm]	Stroke H [mm]	Load capacity for a pair of rails		No. of holes	Weight [kg]
				Dynamic load coefficient C* [N]	C_{0rad} [N]		
TLR...P	18	290	290	1510	732	4	0.9
		370	370	2001	970	5	1.2
		450	450	2291	1111	6	1.4
		530	530	2485	1205	7	1.6
		610	610	2623	1272	8	1.9
		690	690	2727	1322	9	2.1
		770	770	2808	1361	10	2.3

Tab.1

*Only for lifetime calculation, see pg.22
Rails in left and right version when used in pair:
TLR18P...L left version
TLR18P...R right version

Loads



■ **TLR28P**

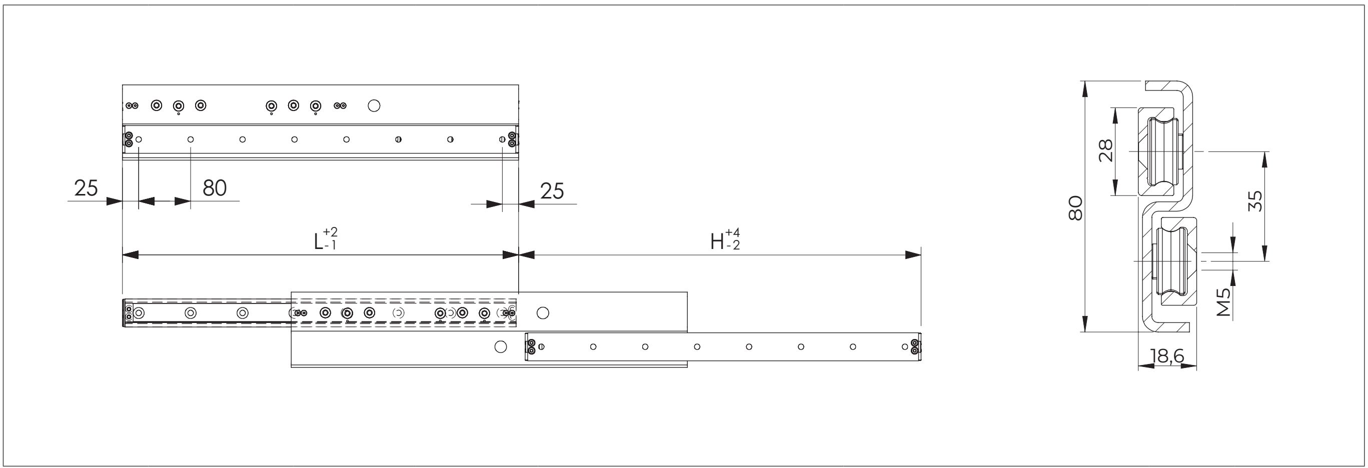
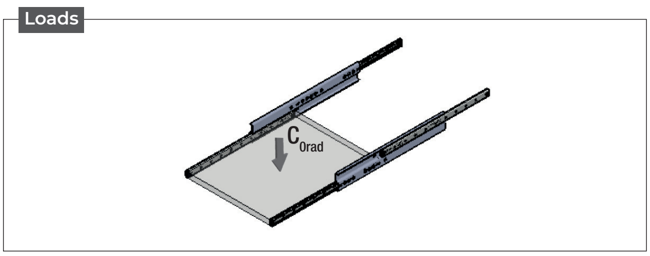


Fig.9

Type	Size	Length L [mm]	Stroke H [mm]	Load capacity for a pair of rails		No. of holes	Weight [kg]
				Dynamic load coefficient C* [N]	C_{0rad} [N]		
TLR...P	28	370	380	2362	1275	5	2.1
		450	460	3401	1835	6	2.5
		530	540	3893	2101	7	2.9
		610	620	5490	2963	8	3.3
		690	700	5981	3227	9	3.7
		770	780	6215	3354	10	4.1
		850	860	6403	3455	11	4.5
		930	940	6556	3267	12	4.9
		1010	1020	6684	3041	13	5.3
		1090	1100	6792	2844	14	5.7
		1170	1180	6885	2672	15	6.1
		1250	1260	6965	2519	16	6.5
		1330	1340	7035	2382	17	6.9
		1410	1420	7097	2260	18	7.3
		1490	1500	7152	2149	19	7.7

Tab.2

*Only for lifetime calculation, see pg.22
Rails in left and right version when used in pair:
TLR28P...L left version
TLR28P...R right version



▪ TLR43P

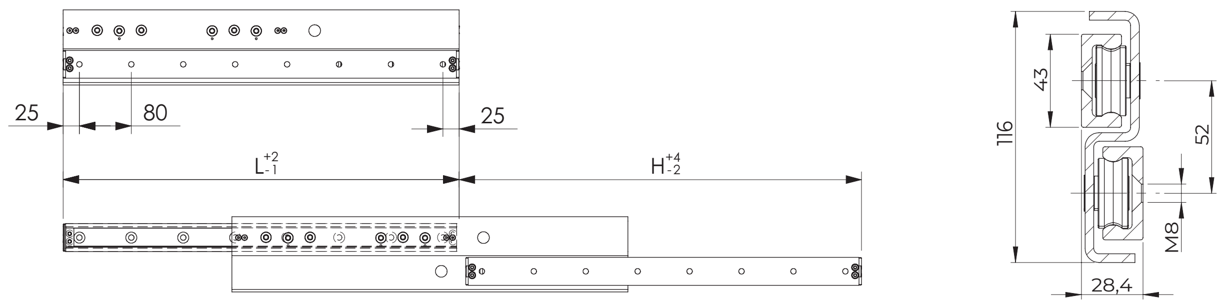


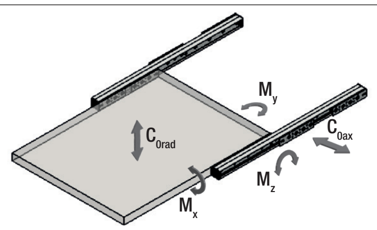
Fig.10

Type	Size	Length L [mm]	Stroke H [mm]	Load capacity for a pair of rails		No. of holes	Weight [kg]
				Dynamic load coefficient C* [N]	C_{0rad} [N]		
TLR...P	43	530	540	3891	2205	7	6.4
		610	620	7501	4251	8	7.3
		690	700	9725	4805	9	8.2
		770	780	10497	5949	10	9.1
		850	860	13428	7256	11	10.0
		930	940	14266	8085	12	10.9
		1010	1020	14691	8326	13	11.8
		1090	1100	15050	8040	14	12.7
		1170	1180	15356	7568	15	13.6
		1250	1260	15621	7148	16	14.5
		1330	1340	15852	6773	17	15.4
		1410	1420	16055	6435	18	16.3
		1490	1500	16235	6129	19	17.2
		1570	1580	16397	5851	20	18.1
		1650	1660	16541	5597	21	19.0
		1730	1740	16672	5364	22	19.9
		1810	1820	16791	5150	23	20.8
		1890	1900	16899	4952	24	21.7
		1970	1980	16998	4769	25	22.6

Tab.3

*Only for lifetime calculation, see pg.22
Rails in left and right version when used in pair:
TLR43P...L left version
TLR43P...R right version

Loads



▪ TLQ18P

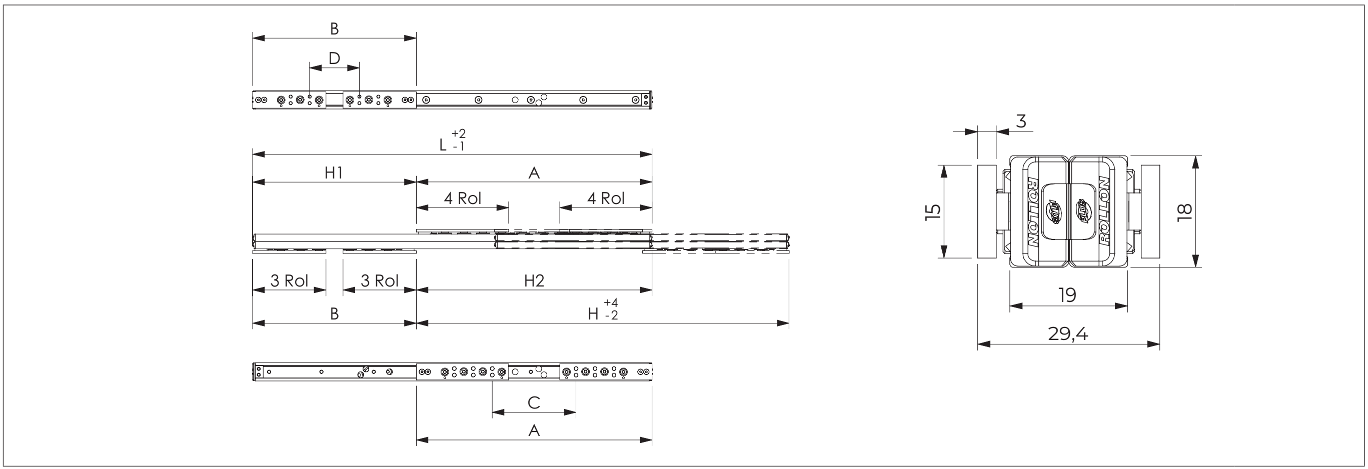
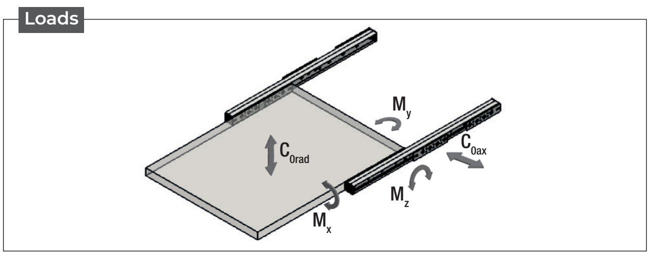


Fig.11

Type	Size	L [mm]	H [mm]	Fixed sliders*3			Mobile sliders*2			Load capacity and moments for a pair of rails					
				A [mm]	C [mm]	H1 [mm]	B [mm]	D [mm]	H2 [mm]	Dynamic load coefficient C*4 [N]	C_{0rad} [N]	C_{0ax} [N]	M_x*1 [Nm]	M_y [Nm]	M_z [Nm]
TLQ...P	18	370	370	185	47	185	185	47	185	1009	447	282	6	88	110
		450	450	270	132	180	180	42	270	1619	863	379	6	81	102
		530	530	318	180	212	212	74	318	1770	771	332	6	107	153
		610	610	366	228	244	244	106	366	1878	687	296	6	107	204
		690	690	414	276	276	276	138	414	1959	618	266	6	107	250
		770	770	462	324	308	308	170	462	2021	563	242	6	107	250

Tab.4

*1 The value Mx refers to a single rail
*2 All mobile sliders are of the three-roller type
*3 For size 18 all fixed sliders are 3 rollers type
*4 Only for lifetime calculation, see pg.22



▪ TLQ28P

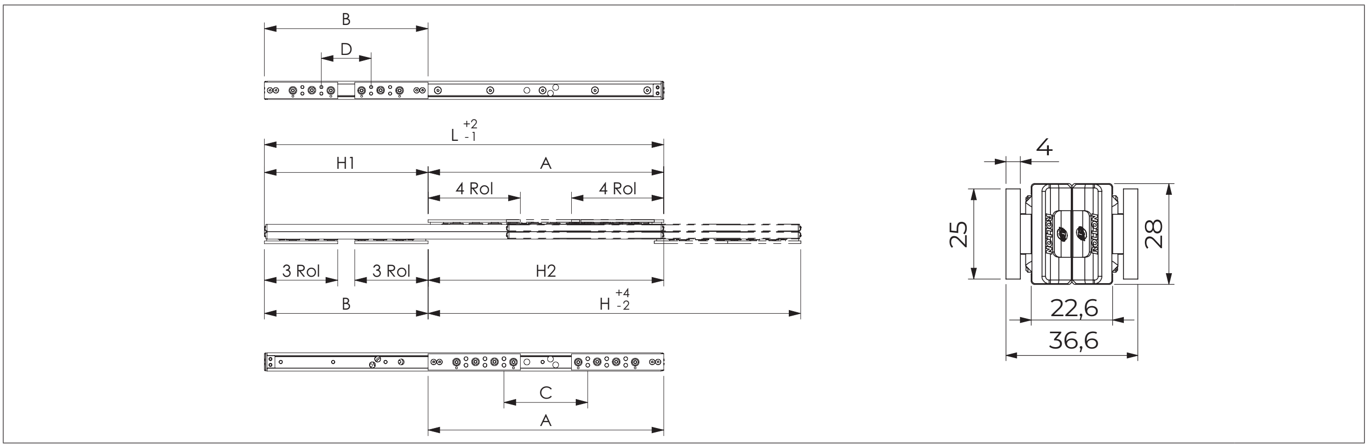
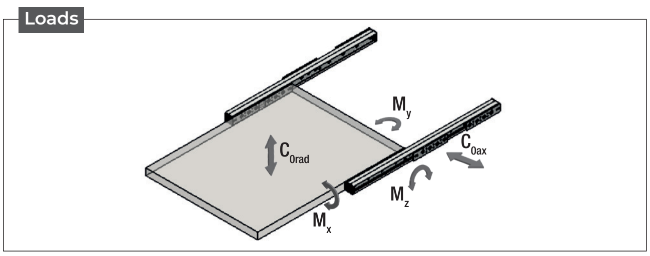


Fig.12

Type	Size	L [mm]	H [mm]	Fixed sliders*3			Mobile sliders*2			Load capacity and moments for a pair of rails					
				A [mm]	C [mm]	H1 [mm]	B [mm]	D [mm]	H2 [mm]	Dynamic load coefficient C*4 [N]	C_{0rad} [N]	C_{0ax} [N]	M_x*1 [Nm]	M_y [Nm]	M_z [Nm]
		450	450	227	53	223	223	49	227	1130	871	514	18	190	253
		530	530	307	133	223	223	49	307	1980	1527	775	18	190	253
		610	610	360	128	250	250	76	360	2672	2060	790	18	252	336
		690	690	408	176	282	282	108	408	2917	1875	717	18	310	438
		770	770	456	224	314	314	140	456	3105	1716	656	18	310	541
		850	850	504	272	346	346	172	504	3254	1582	605	18	310	643
TLQ...P	28	930	930	552	320	378	378	204	552	3374	1467	561	18	310	746
		1010	1010	600	368	410	410	236	600	3474	1368	523	18	310	810
		1090	1090	648	416	442	442	268	648	3558	1282	490	18	310	810
		1170	1170	696	464	474	474	300	696	3630	1205	461	18	310	810
		1250	1250	744	512	506	506	332	744	3691	1138	435	18	310	810
		1330	1330	792	560	538	538	364	792	3745	1077	412	18	310	810
		1410	1410	840	608	570	570	396	840	3792	1023	391	18	310	810
		1490	1490	888	656	602	602	428	888	3834	974	372	18	310	810

Tab.5

*1 The value Mx refers to a single rail
*2 All mobile sliders are of the three-roller type
*3 For size 28, fixed sliders with lengths of 450–530 mm are of the three-roller type; longer lengths are of the four-roller type
*4 Only for lifetime calculation, see pg.22



■ **TLQ43P**

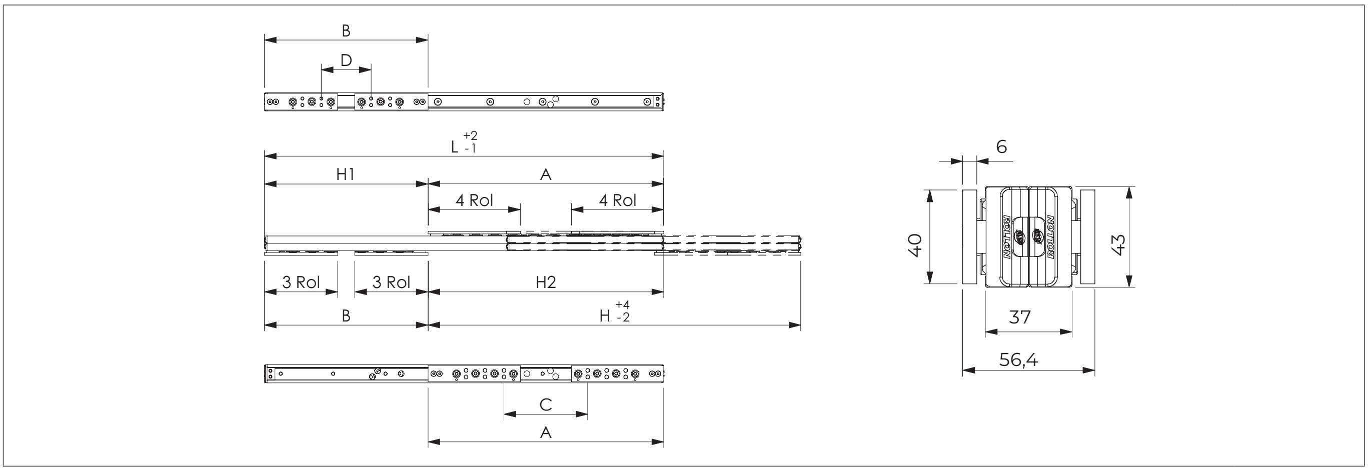


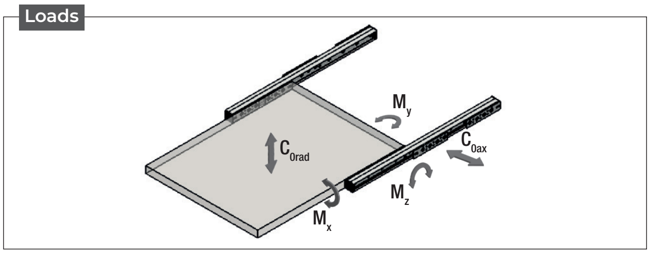
Fig.13

Type	Size	L [mm]	H [mm]	Fixed sliders*3			Mobile sliders*2			Load capacity and moments for a pair of rails					
				A [mm]	C [mm]	H1 [mm]	B [mm]	D [mm]	H2 [mm]	Dynamic load coefficient C*4 [N]	C_{0rad} [N]	C_{0ax} [N]	M_x*1 [Nm]	M_y [Nm]	M_z [Nm]
TLQ...P	43	610	600	310	78	300	310	78	300	2841	2300	1829	64	690	920
		690	690	374	142	316	316	84	374	4132	3345	2359	64	1044	1008
		770	770	456	140	314	314	82	456	6218	5034	2084	64	1044	944
		850	850	504	188	346	346	114	504	6708	5357	1930	64	1044	1200
		930	930	552	236	378	378	146	552	7103	4988	1797	64	1044	1456
		1010	1010	600	284	410	410	178	600	7428	4667	1681	64	1044	1712
		1090	1090	648	332	442	442	210	648	7701	4384	1579	64	1044	1968
		1170	1170	696	380	474	474	242	696	7932	4134	1489	64	1044	2224
		1250	1250	744	428	506	506	274	744	8131	3911	1409	64	1044	2480
		1330	1330	792	476	538	538	306	792	8304	3711	1337	64	1044	2736
		1410	1410	840	524	570	570	338	840	8456	3530	1272	64	1044	2898
		1490	1490	888	572	602	602	370	888	8590	3366	1213	64	1044	2898
		1570	1570	936	620	634	634	402	936	8710	3216	1159	64	1044	2898
		1650	1650	984	668	666	666	434	984	8817	3080	1109	64	1044	2898
		1730	1730	1032	716	698	698	466	1032	8914	2954	1064	64	1044	2898
		1810	1810	1080	764	730	730	498	1080	9001	2838	1023	64	1044	2898
		1890	1890	1128	812	762	762	530	1128	9081	2731	984	64	1044	2898
		1970	1970	1176	860	794	794	562	1176	9154	2632	948	64	1044	2898

Tab.6

*1 The value Mx refers to a single rail
*2 All mobile sliders are of the three-roller type
*3 For lengths 610-690mm fixed sliders are of the three-roller type; longer lengths are of the four-roller type
*4 Only for lifetime calculation, see pg.22

Loads



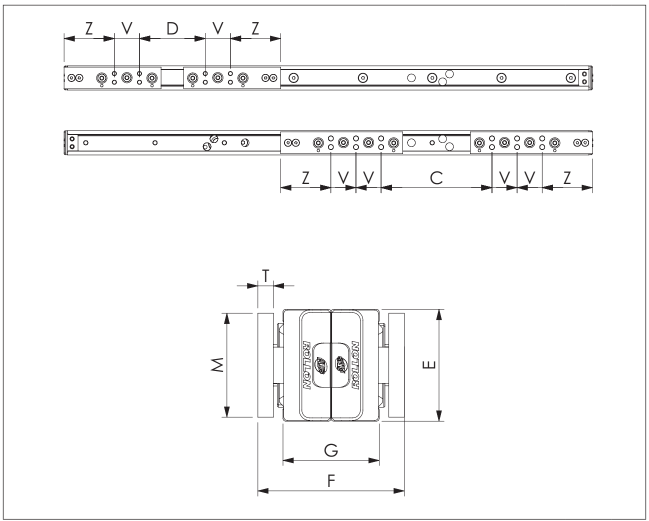
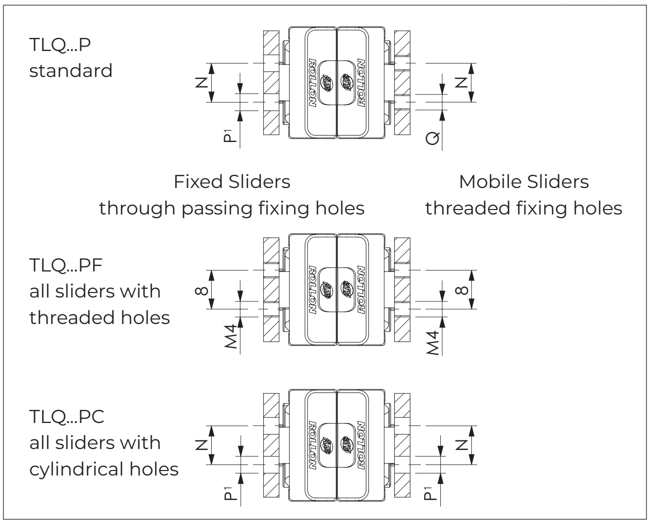


Fig.14



[1] Fixing holes (P) for fixing screw according to DIN 912.

Fig.15

Type	Size	E [mm]	F [mm]	G [mm]	M [mm]	T [mm]	N [mm]	P [mm]	Q	Sliders		Z [mm]	V [mm]	Weight [kg/m]	Weight 4 sliders [Kg]
										Num. of rollers	Length [mm]				
TLQ...P	18	18	29.4	19	15	3	8	-	M4	3	87	48	21	1.4	0.4
	28	28	36.6	22.6	25	4	10	Ø5.5	M5	3 4	112 141	58	29	2.5	1.5
	43	43	56.4	37	40	6	15	Ø6.5	M6	3 4	155 197	74	42	6	2.4

Tab.7

Three options for fixing holes available (see fig.15). Rail size 18 is only available in F version with all threaded holes. When used in pairs, the same rail can be installed left or right just by rotating it. See "Installation Instructions" on pg.20.

ACCESSORIES

▪ Fixing screws

TLR...P

We recommend countersunk head screws according to DIN 7991

Type	Size	V
TLR...P	18	M4
	28	M5
	43	M8

Tab.8

TLQ...P

We recommend fixing screws according to DIN 912 for the fixed sliders in TLQ...P and fixed and mobile sliders in TLQ...PC.

Type	Size	V
TLQ...P	18	M4
	28	M5
	43	M8

Tab.9

USE AND MAINTENANCE

■ Telescopic rail selection

Selecting the suitable telescopic rail should be done based on the load and the maximum permissible deflection in the extended state. The load capacity of a Telerace telescopic rail depends on two factors: the load capacity of the rollers and the rigidity of the intermediate element. For mainly short strokes, the load capacity is determined by the load-bearing capacity of the rollers; for average and long strokes, it is determined by the rigidity of the intermediate element.

■ Deflection

If the load P acts vertically on the pair of rails (see Fig.17), the expected elastic deflection in the extended state can be determined as follows:

$$f = \frac{q}{t} \cdot P$$

Fig.16

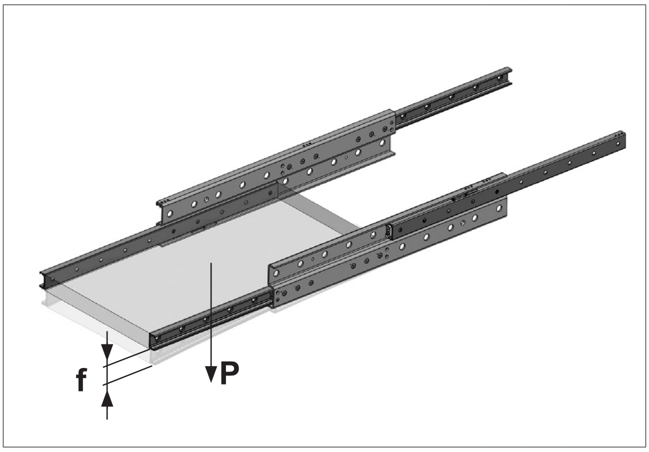


Fig.17

Whereby:

f is the expected elastic deflection [mm]

q is a stroke coefficient (see Fig.19)

t is a factor depending on the model of the telescopic rail (see Fig.18)

P is the actual load acting on the center of a pair of rails [N].

The value resulting from the formula above is an estimation and also assumes an absolutely rigid adjacent construction. If this rigidity is not present, or in case the deflection is a key application requirement, please contact our technical department for a precise calculation.

TLR18P t=300	TLQ18P t= 60
TLR28P t=500	TLQ28P t=120
TLR43P t=1200	TLQ43P t= 450

Fig.18

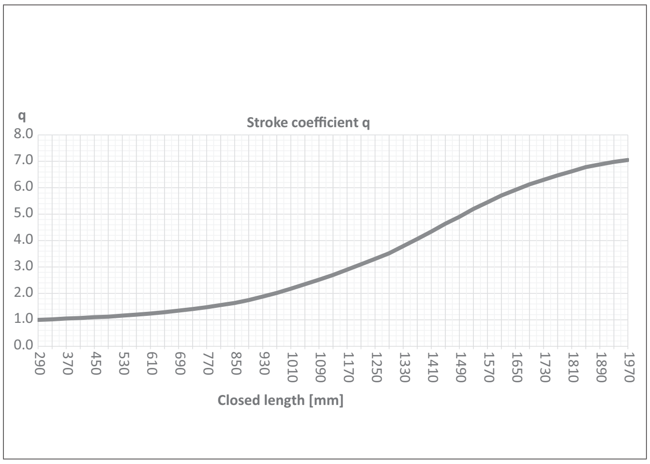


Fig.19

■ Opening and closing force

For applications requiring very low opening and closing forces, the rails series TLR...P and TLQ...P are recommended. The required force Fe to extend a pair of rails is determined by the friction of the rolling elements and the applied load P, according to the following formula:

$$Fe \approx k + 0.01 \cdot P$$

Fig.20

The required force Fc to close a pair of rails is also influenced by the deflection and the stroke, according the the following formula:

$$Fc \sim k + 0.01 \cdot P + 1.5 \cdot \frac{f}{H} \cdot P$$

Fig.21

Where :

P = radial load applied on the pair of rails

f = calculated deflection

H = stroke

k = friction force per pair of telescopic rails connected without load applied

TLR18P / TLQ18P	k=10 N
TLR28P / TLQ28P	k=15 N
TLR43P / TLQ43P	k=25 N

Fig.22

These calculated values may be influenced by some additional binding friction from non-precise assembly or structure. For a single rail, the same formulas can be used.

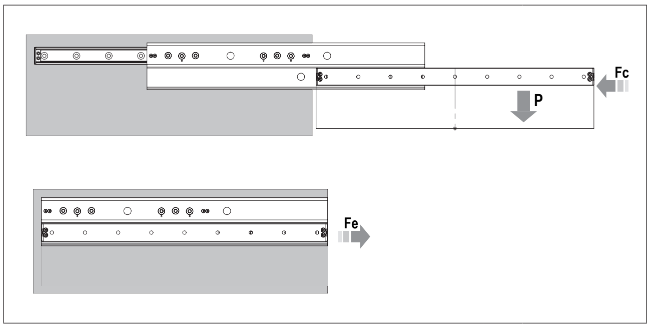


Fig.23

▪ Lubrication

TLR...P and TLQ...P rails are equipped with internal wipers with slow release felts that ensure a proper lubrication of the raceways for all the product's lifetime if the rail is used in indoor, clean, environments. The rollers are also lubricated for life. If used in harsh environments (eg. dirt, temperature, humidity) it is necessary to periodically clean and lubricate the raceways.

▪ Anticorrosion treatments

TLQ...P

Treatment	Characteristics
Rollon-Nox	Patented high depth nitride hardening and black oxidation treatment that provides good durability under high loads or frequencies. It is standard for size 18 and it's not available for other sizes.
Zinc Plating ISO 2081	Standard treatment for rails sizes 28-43, it is ideal for indoor applications. It is removed from the raceways by the subsequent grinding process. Zinc-plated telescopic rails are supplied with steel rollers.
ZincNickel ISO19598 (Z)	Ideal for outdoor applications. Telescopic rails with this treatment are supplied with stainless steel rollers to further increase the corrosion resistance.
Rollon E-coating (K)	Electro painting that provides a fine black finishing to the entire rail. It can be partially removed from the raceways on the running contact point of the rollers after a period of use. Telescopic rails with Rollon E-Coating are supplied with stainless steel rollers to further increase the corrosion resistance.
Nickel Plating (N)	Provides high resistance to chemical corrosion and is ideal for applications in medical or food related environments. Raceways are coated too. Telescopic rails with Nickel Plating treatment are supplied with stainless steel rollers to further increase the corrosion resistance.

Tab.10

▪ Speed

The speed of the rails is limited by the strength of the stoppers that take on the intermediate element with each opening/closing. At the same speed, the impact force increases proportionally to the length of the rail and the weight of the intermediate element.

All Telerace telescopic rails feature robust end-stoppers capable of sustaining high speeds. Besides highest speed, the telescopic rails with ball bearing rollers are also less sensitive to frequent and intense accelerations and decelerations due to absence of the ball cage.

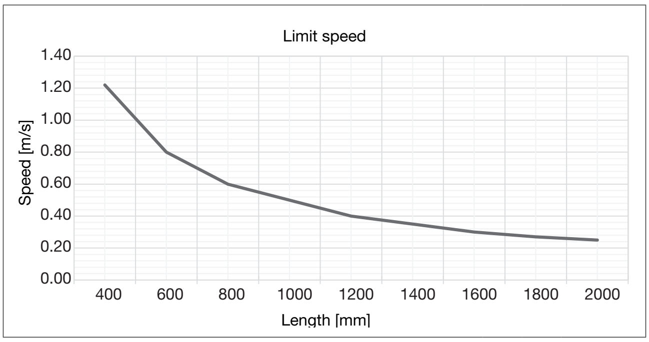


Fig.24

- **Self-aligning system with TLR...AP**

TLR...P telescopic rails are also available in the TLR...AP version that allows a slight rotation of the movable element around the longitudinal axis, with respect to the fixed element. This rotation is obtained by using a combination of floating and guiding rollers and allows the rail to adapt to mounting surfaces that are not perfectly aligned in their frontal part, avoiding the overload of the rollers and the deterioration of the motion quality. This same rotation also permits a slight compensation of an eventual dimensional gap between the fixed and mobile structures, that may occur due to manufacturing tolerances, with respect to the nominal dimensions of the rail.

The compensating rail TLR...AP must be used as a pair with a guiding rail TLR...P to ensure the perfect operation of the system and an optimal lateral stability.

Below are listed 3 examples of compensation of structural errors: A) Maximum angular compensation (α_1) of misaligned mounting surfaces of the mobile structure.

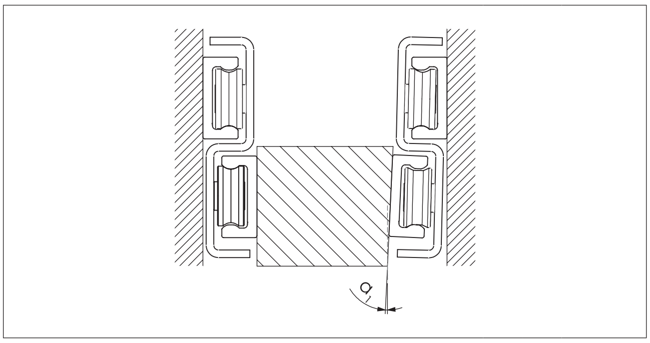


Fig.25

B) Maximum angular compensation (α_2) of misaligned mounting surfaces of the fixed structure

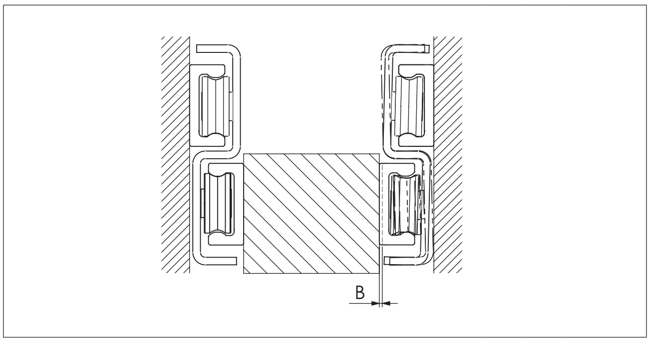


Fig.26

C) Maximum linear compensation (B) of the dimensional gap between mobile and fixed structure for a rail with parallel mounting surfaces.

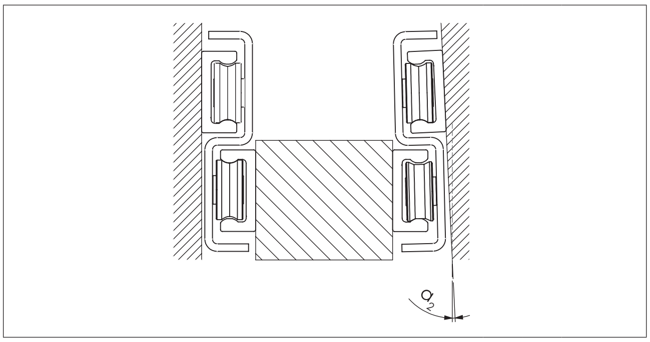


Fig.27

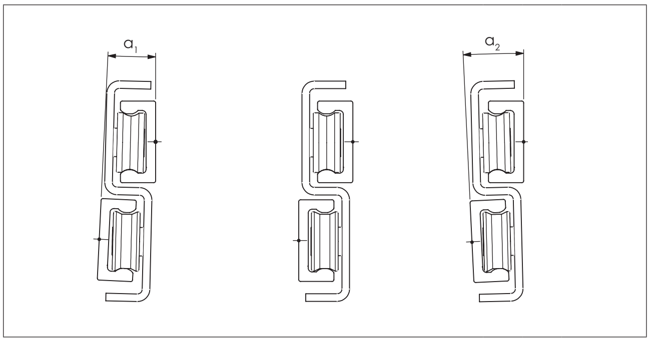


Fig.28

Size	α_1 [°]	α_2 [°]	B [mm]
18	1	1	0.3
28	0.85	0.85	0.3
43	1.3	1.3	0.5

Tab.11

■ **Stroke customization for TLQ...P**

TLQ...P series offer the unique possibility to easily customize the actual stroke H to individual needs. This is obtained by repositioning the slider distance “A” for “Fixed sliders” and distance “B” for “Mobile sliders” , with different distances than standard. Please consider that distance A should always be longer than distance B to maximize the load capacity. If the distance between fixed sliders "A" and mobile sliders "B" is reduced, the total stroke increases and the load capacity decreases. Vice versa, the total stroke decreases and the load capacity is improved. Please contact our technical department for load capacities according to customized stroke.

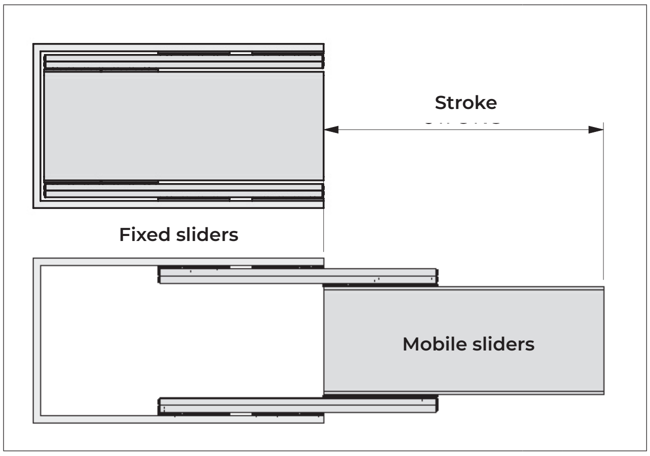


Fig.29

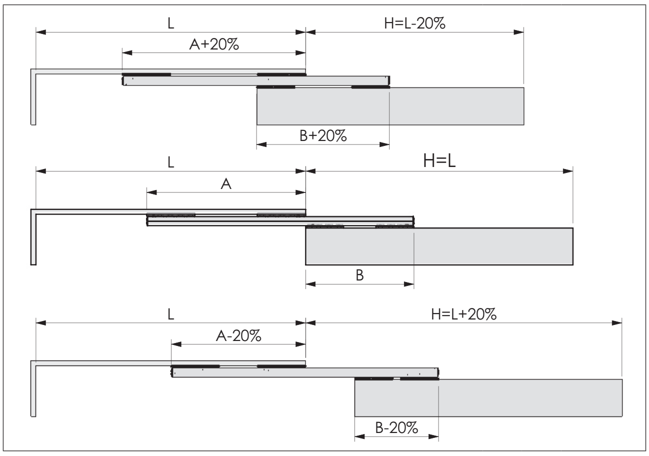
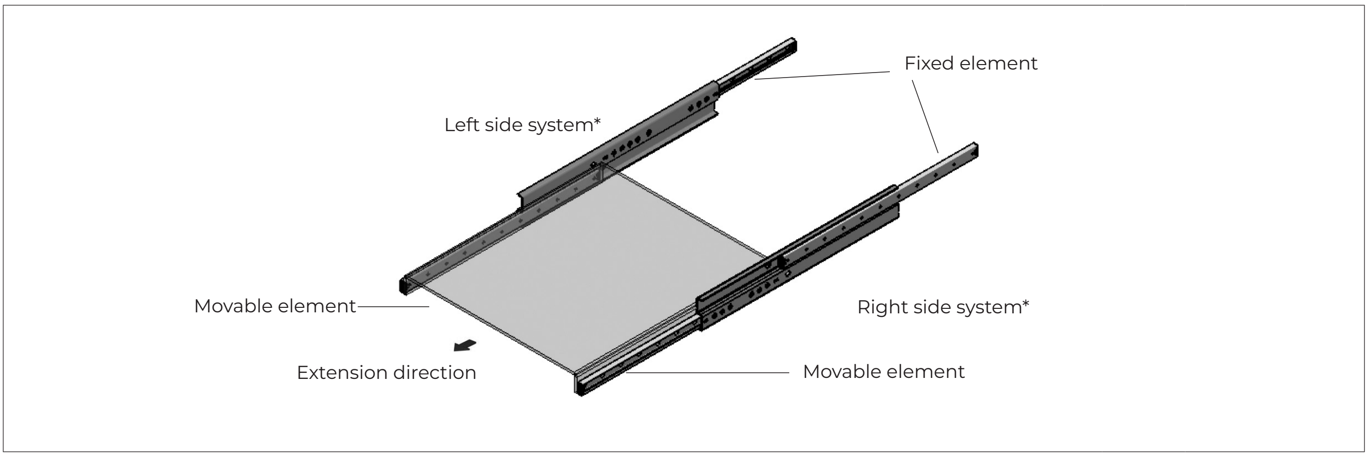


Fig.30

Installation instructions

In general and for specific product series



* For model TLR...P please observe right or left side use.

Fig.31

General

- To achieve optimum running properties, high service life and rigidity, it is necessary to fix the telescopic rails with all accessible holes on a rigid and level surface.
- Please observe the parallelism of the installation surfaces. The fixed and movable rails must be fit to a rigid assembly construction.
- Telerace rails are suitable for continuous use in automatic systems, even when the stroke is not constant. The operating speed must be checked (see Pg.17).

TLR...P

- This series accepts radial loads. This should act in the vertical cross-sectional axis on the movable rails.
- Horizontal and vertical application is possible. Prior to vertical installation, please contact our technical department.
- When installing, make sure that the load is placed on the movable element (the lower rail) (see fig. 31). The opposite assembly negatively affects the function.
- Installation must be done on a rigid structure using all accessible fixing holes.
- Pay attention to the parallel alignment during assembly with paired application. It is possible to compensate minor misalignment errors by pairing TLR...P with TLR...AP (see Pg.18)

TLQ...P

- This series accepts radial and axial loads and moments in all principal directions.
- Horizontal and vertical applications are possible. Prior to vertical installation, please contact our technical department.
- The rail must be installed with the label facing upward. The fixed sliders have the circular engraving mark facing upward, while on the mobile sliders the same mark is facing downward.
- When used in pairs, the same rail can be used as left or right rail, always keeping the mark facing upwards.

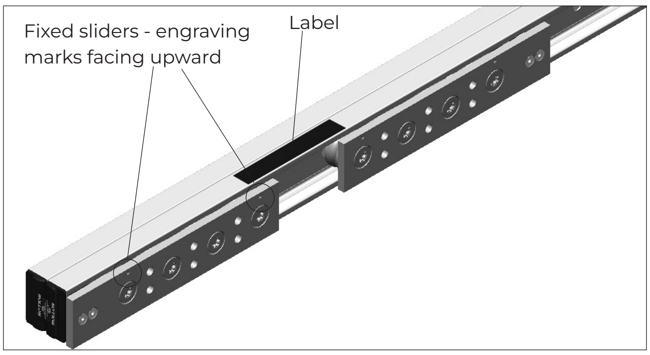


Fig.32

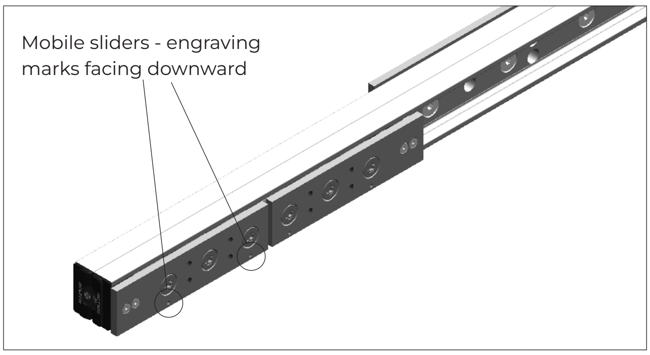


Fig.33

STATIC LOAD AND SERVICE LIFE

Sizing of telescopic applications

Selecting the suitable telescopic rail should be done based on the load and the maximum permissible deflection in the extended state. The load capacity of a Telerace telescopic rail depends on two factors: the load capacity of the rollers and the rigidity of the intermediate element. For mainly short strokes the load capacity is determined by the load-bearing capacity of the rollers; for average and long strokes it is determined by the rigidity of the intermediate element.

The main factors to consider while sizing the rail for a telescopic movement are:

- Weight of the mobile part and other appliable loads
- Presence of dynamic forces / eventual abuse
- Max. acceptable deflection
- Max. acceptable extraction/closing force of mobile part
- Environment, frequency and speed
- Expected lifetime

All load capacities C_{0rad} are indicated per pair of rails and with the load perfectly centered. Hereby the load P is acting as a radial point load, at half the extension and in the middle between the two rails. The load capacity for a single rail is obtained dividing the value C_{0rad} by half.

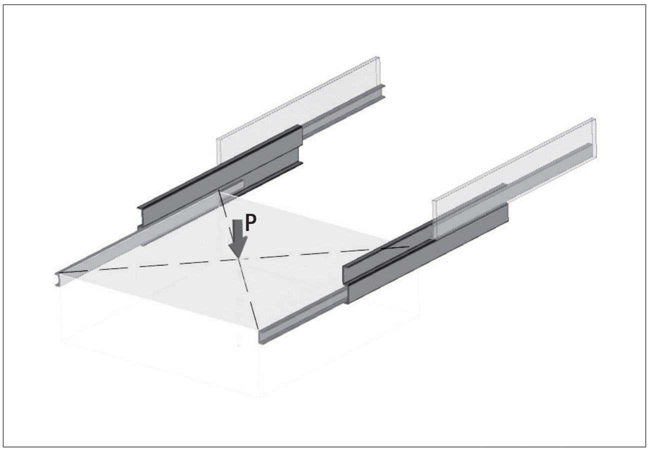


Fig.35

When sizing a telescopic application, consider the center of mass of the load and any external dynamic forces acting on the rails.

In case the actual load P isn't centered the equivalent load Pe must be calculated for the verification of load capacity explained on Pg.14.

$$Pe = 2 \cdot \frac{P \cdot d}{a + b}$$

Fig.34

Where :

P = Weight/load of mobile part [N]

a, b = distances of the load center with respect to left and right rail [mm].

d = the largest between "a" and "b", according to the load position [N].

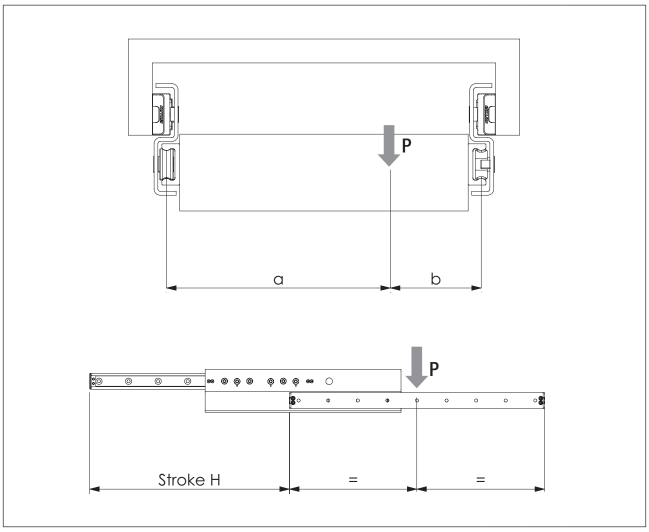


Fig.36

If the load is not positioned halfway on the mobile slider but with a deviation c from its center, contact the technical department.

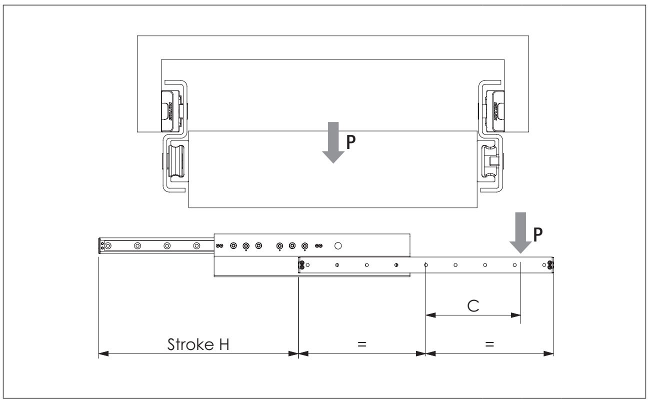


Fig.37

▪ Verification of load capacity

Verification of the load capacity assumes the knowledge of the forces acting on the rails in the different directions, divided into principal components correspondent to the values indicated in the tables of the product pages: radial loads, axial loads and moments.

For the telescopic rails TLR...P, the verification is mainly down to comparing the load capacity C_{0rad} to Pe, including a safety factor S_0.

$$Pe <= C_{0rad} / S_0$$

Fig.38

Where S_0 is the safety coefficient as per below table

Safety coefficient - S_0	Application conditions
1 - 1.5	Neither shocks nor vibrations, smooth and low-frequency reverse, high assembly accuracy, no elastic deformations
1.5 - 2	Normal installation conditions
2 - 3.5	Shocks and vibrations, high-frequency reverse, significant elastic deformation

Tab.12

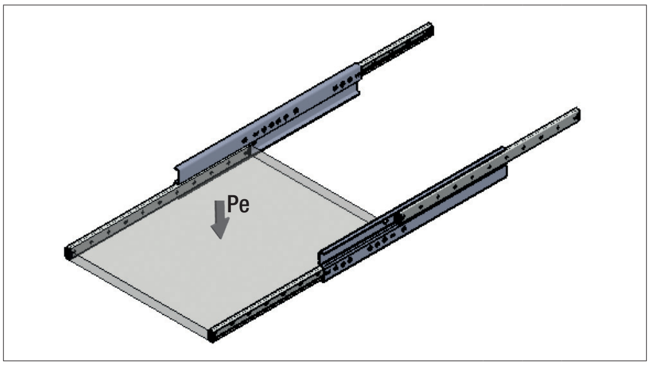


Fig.40

For telescopic rails TLQ...P the calculation might also include moments and axial load.

$$\left(\frac{Pe_{ax}}{C_{0ax}} + \frac{Pe_{rad}}{C_{0rad}} + \frac{Me_x}{M_x} + \frac{Me_y}{M_y} + \frac{Me_z}{M_z} <= \frac{1}{S_0} \right)$$

Fig.39

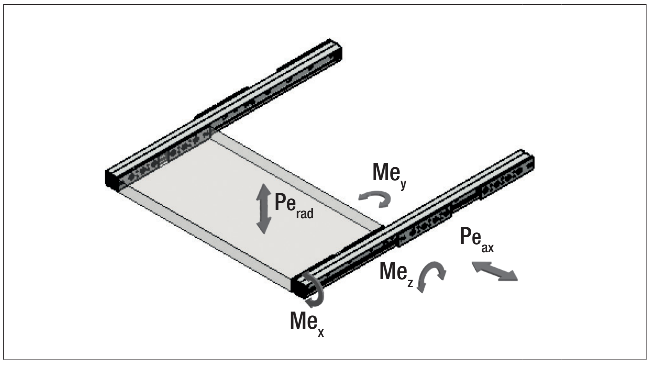


Fig.41

Where:

Pe_{rad} = applied radial load

Pe_{ax} = applied axial load

Me_x*, Me_y, Me_z = applied moments

C_{0rad} = radial load capacity

C_{0ax} = axial load capacity

M_x, M_y, M_z = moment capacities

*Me_x moment exist only in case of use a single telescopic rail

If using a single telescopic rail, the values C_{0rad}, C_{0ax}, M_y and M_z in the formula Fig.39 must be divided by 2 (M_x is always and only referred to a single rail).

Service life

The service life is defined as the time span between commissioning and the first sign of fatigue or wear indications on the raceways. The service life of a telescopic rail is dependent on several factors, such as the effective load, the installation precision, occurring shocks and vibrations, the operating temperature, the ambient conditions and the lubrication.

Calculation of the service life is based exclusively on the loaded ball bearings. In practice, the decommissioning of the bearing, due to its destruction or extreme wear of a component, represents the end of service life.

This is taken into account by an application coefficient (fi in the formula below), so the service life consists of:

$$Lcy = 50 \cdot \left(\frac{C}{Pe} \cdot \frac{1}{fi} \right)^3 \cdot \frac{1}{H} \cdot 10^6$$

$$Lkm = 100 \cdot \left(\frac{C}{Pe} \cdot \frac{1}{fi} \right)^3$$

Lcy = calculated service life [num. of cycles]
Lkm = calculated service life [Km]
C = Dynamic load coefficient
Pe = Equivalent load applied [N]
H = Stroke [mm]
fi = Application coefficient

Fig.42

Application coefficient fi

The correction factor fi applied to the theoretical calculation formula has the sole purpose of guiding the designer quantitatively on the influence in the lifetime estimation of the real application conditions without any pretense of precision. For more details please contact our technical department.

Coefficient fi	Operating conditions
1 - 1.5	Correct load sizing, rigid structures, routine lubrication, clean ambient
1.5 - 2	Intermediate conditions
2 - 3.5	Approximative load sizing, unprecise non rigid structures, dusty not clear ambient.

Tab.13

Equivalent load applied Pe

When the load P is not perfectly centered, the equivalent load Pe must be calculated as shown in Fig.43, otherwise, with the load perfecty centered:

$$Pe = P_{rad}$$

Fig.43

When using a pair of telescopic rails serie TLQ, in presence of simultaneous load P_{rad}, P_{ax} and moments M_y, M_z (M_x only in case of single rail) :

$$Pe = Co_{rad} \cdot \left(\frac{Pe_{rad}}{C_{0rad}} + \frac{Pe_{ax}}{C_{0ax}} + \frac{Me_x}{M_x} + \frac{Me_y}{M_y} + \frac{Me_z}{M_z} \right)$$

Fig.44

If using a single telescopic rail, the values C_{0rad}, C_{0ax}, M_y and M_z in the formula Fig.44 must be divided by 2 (M_x is always and only referred to a single rail).

beyond motion