

ROLLON[®]
Linear Evolution

Telescopic Line



General catalogue
English

www.rollon.com

When you move. We move.

Rollon S.p.A. was founded in 1975 as a manufacturer of linear motion components. Today Rollon group is a leading name in the design, production, and sale of linear rails, telescopic rails, and actuators, with headquarters based in Italy and offices and distributors located throughout the world. Rollon products are used in many industries, providing creative and efficient solutions in a wide variety of applications.

Rollon solutions for linear motion

Linear Line



Telescopic Line



Actuator Line



Actuator System Line



Linear Rails

- Rails with roller bearings
- Rails with caged ball bearings
- Rails with recirculating ball bearing

Telescopic Rails

- Rails with partial/total extension
- Heavy duty rails
- Rails for automated and manual applications

Actuators

- Belt driven actuators
- Ball screw driven actuators
- Rack and pinion actuators

Solutions for industrial automation

- Multi-axis for pick and place
- Telescopic actuators
- Seventh axis for robots
- Solutions for metal sheet handling

Core Competencies

- > Full range of linear rails, telescopic rails and actuators
- > Worldwide presence with branches and distributors
- > Fast delivery all over the world
- > Large technical know-how for applications



> Standard solutions

Wide range of products and sizes
Linear rails with roller and caged ball bearings
Heavy duty telescopic rails
Belt or ball screw driven linear actuators
Multi-axis systems



> Collaboration

International know-how in several industries
Project consultancy
Maximizing performance and cost optimization



> Customization

Special products
Research and development of new solutions
Technologies dedicated to different sectors
Optimal surface treatment

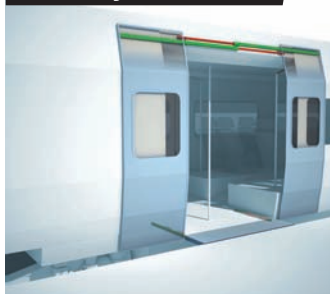


Applications

Aerospace



Railway



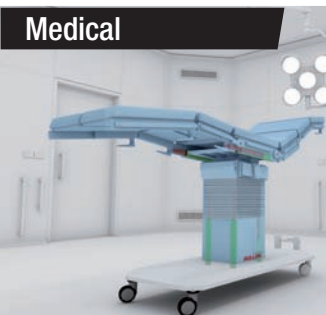
Logistics



Industrial Machines



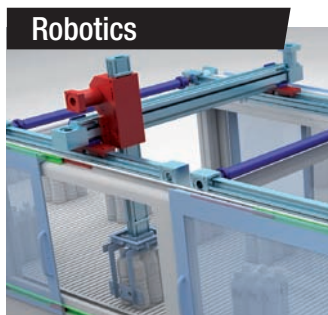
Medical



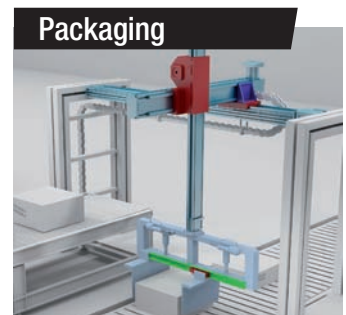
Specialty Vehicles



Robotics



Packaging



> **Telescopic Rail**



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Technical features overview



Reference		Section	Profile		Self alignment	Extension	Slider		Anticorrosion	
Family	Product		Type	Hardened raceways			Balls	Rollers		
Telescopic Rail		ASN		Cold Drawn	√	+	50%			
		DE		Cold Drawn	√	++	100%			
		DS		Cold Drawn	√	++	100%			
		DSE		Cold Drawn	√	++	150%			
		DSC		Cold Drawn	√	++	100%			
		DBN		Cold Drawn	√	++	100%			
		DMS		Cold Drawn	√	++	100%			
		DRT		Cold Drawn	√	+	100%			
	Opti Rail		LTH		Cold Drawn		++	100%		
		LTF		Cold Drawn		++	100%			
Light Rail		LPS		Formed Sheetmetal		++	50%			
		LFS		Formed Sheetmetal		++	100%			
		LFX		Formed Sheetmetal		++	100%			 <i>Available in stainless steel</i>
		DRX/DRS		Formed Sheetmetal		++	100%			 <i>Available in stainless steel</i>

The information shown must be verified for the specific application.
For a complete view of technical data, please consult our catalogs on www.rollon.com

* The maximum value is defined by the application.

** Different anti-corrosion treatments are available. For more information, please contact Rollon.

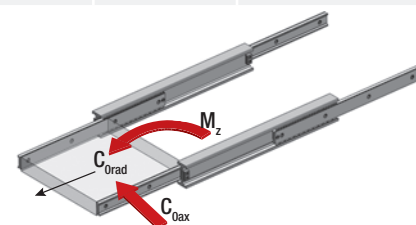
*** For more information, please contact Rollon.

Size	Max. load capacity per guida [N]		Max. dynamic load capacity [N] C 100	Max. stroke [mm]	Max. rail length [mm]	Max. extension speed [m/s]	Rigidity (deflection)	Operating temperature
	C ₀ rad	C ₀ ax						
22-28-35-43-63	44247	30973	61688	1013	1970	0,8	+++	-20°C/+170°C
22-28-35-43-63	7198	3062	26338	2026	1970	0,8	+++	-20°C/+170°C
28-35-43-63	12832		14483	2026	1970	0,8	++++	-20°C/+110°C
28-35-43-63	5672		16063	3039	1970	0,8	++++	-20°C/+110°C
43	5529	2075	14885	2028	1970	0,8	+++	-20°C/+110°C
22-28-35-43	1331	1279	14483	2026	1970	0,8	+	-20°C/+170°C
63	19812		30595	2266	2210	0,8	++++	-20°C/+110°C
43	2860		6053	1980	1970	0,8	+++	-20°C/+110°C
30-45	1673		***	1522	1500	0,3	++	-20°C/+170°C
44	648		1000	1010	1000	0,3	+	-20°C/+170°C
38	175	50	***	373	473	0,5	+	+10°C/+40°C
46-57-58-70	650	115	***	1100	1100	0,5	+	+10°C/+40°C
27	350	50	***	576	550	0,5	+	-30°C/+200°C
30	360		***	1120	1040	0,8	+	-20°C/+100°C

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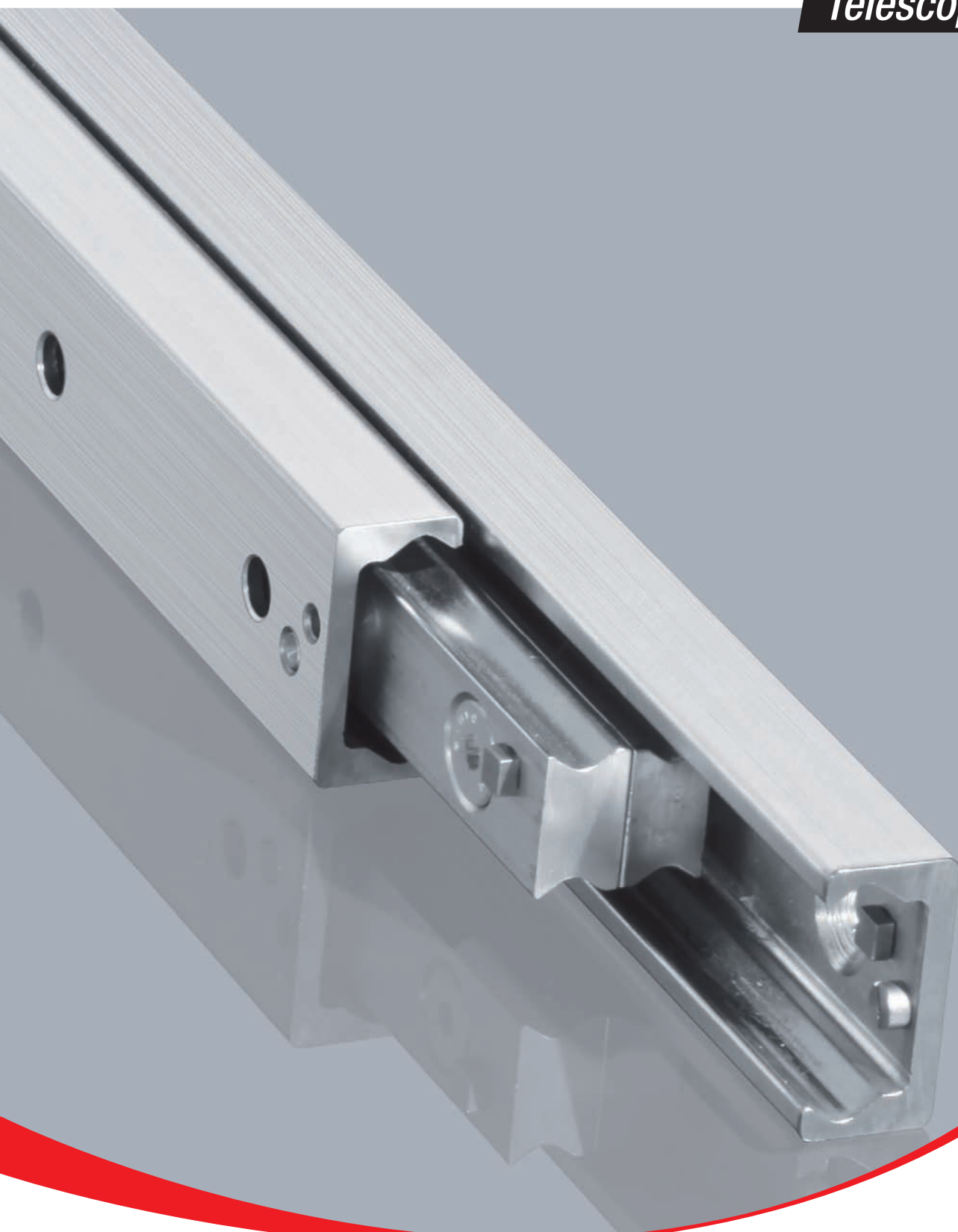
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ROLLON[®]
Linear Evolution

Telescopic Rail



Product explanation



> Telescopic Rail: Seven models with full and partial extension



Fig. 1

The Telescopic Rail product line is made up of seven models with full and partial extension and various cross-sections and intermediate elements in S-shape, I-beam or square. High loads in combination with cost-efficiency and free movement have long been the outstanding properties of the Telescopic Rail product line.

The most important characteristics:

- High load capacity with low deflection
- Rigid intermediate elements
- Standardized hole locations
- Zero-play running even with maximum load
- Space saving design
- High reliability

Preferred areas of application of the Telescopic Rail product family:

- Railcars (e. g. maintenance and battery extensions, doors)
- Construction and machine technology (e.g., housings and doors)
- Logistics (e.g., extensions for containers or gripper movements)
- Automotive technology
- Packaging machines
- Beverage industry
- Special machines

ASN

Partially extending telescopic rail consisting of a guide rail and a slider. This compact and simple design allows for very high load capacities. When the guide rail is mounted to a structure a very high rigidity system is created.



Fig. 2

DS

Fully extending telescopic rail consisting of a fixed guide rail, an identical moving guide rail, and an S-shaped intermediate element. This has a high moment of inertia and high rigidity in a slim size. This results in a high loading capacity with low deflection in the extended state.

The DS series is available in three different designs: DSS version with single direction stroke. DSB version with single direction stroke, and locking capability in the extended state, and the DSD version with double direction stroke.

...S version available with reinforced and damped stainless steel end stops.



Fig. 3

DSE

Telescopic rail with a 150% extension of its length, made by four elements. It has a high rigidity, thanks to the intermediate elements with a high moment of inertia, in a streamlined shape.

This results in a high load capacity, with reduced bending even when the telescopic guide is fully extended.

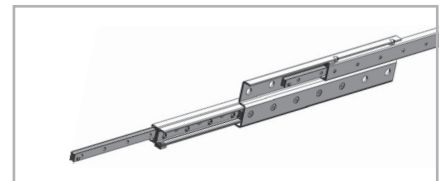


Fig. 4

DSC

Fully extending telescopic rail consisting of a compact and flexurally rigid intermediate element that connects two different sized guide rails with each other as a fixed and moving element.

This design makes it possible to reduce all components to the necessary size and length for achieving the full stroke. The DSC series features high rigidity and a high load capacity in a compact size. This results in an optimal combination of performance and weight reduction.



Fig. 5

DE

Fully extending telescopic rail consisting of two guide rails, which are mounted on an I-beam profile to form the intermediate element, one moveable slider and one fixed slider which mounts onto the structure. The square cross-section allows a compact size with high load capacities and low deflection, especially with radial loading. Also available with a double stroke design, which includes an eccentrically located driving disc for simultaneous movement. For double sided extensions, a dedicated DE...D version is available with a driving disc.

...S version available with reinforced and damped stainless steel end stops.



Fig. 6

DBN

Fully extending telescopic rail consisting of two guide rails, one which is fixed to a structure, and one which is moveable, and two sliders which are mounted together and form the intermediate element. The size is similar to the DE series and offers good protection from contamination of the ballcage.



Fig. 7

DMS

Heavy load telescopic consisting of elements from the ASN series and an extremely rigid I-beam profile as the intermediate element. This fully extending telescopic rail is used to accept very heavy loads with low deflection.



Fig. 8

DRT

Fully extending telescopic rail on a roller slide base consisting of the S-shaped intermediate element from the DS series, and elements of the proven Compact Rail roller slider system. The use of roller sliders instead of a linear bearing as the load accepting element, enables a large resistance to contamination and an extremely quiet motion.



Fig. 9

Technical data

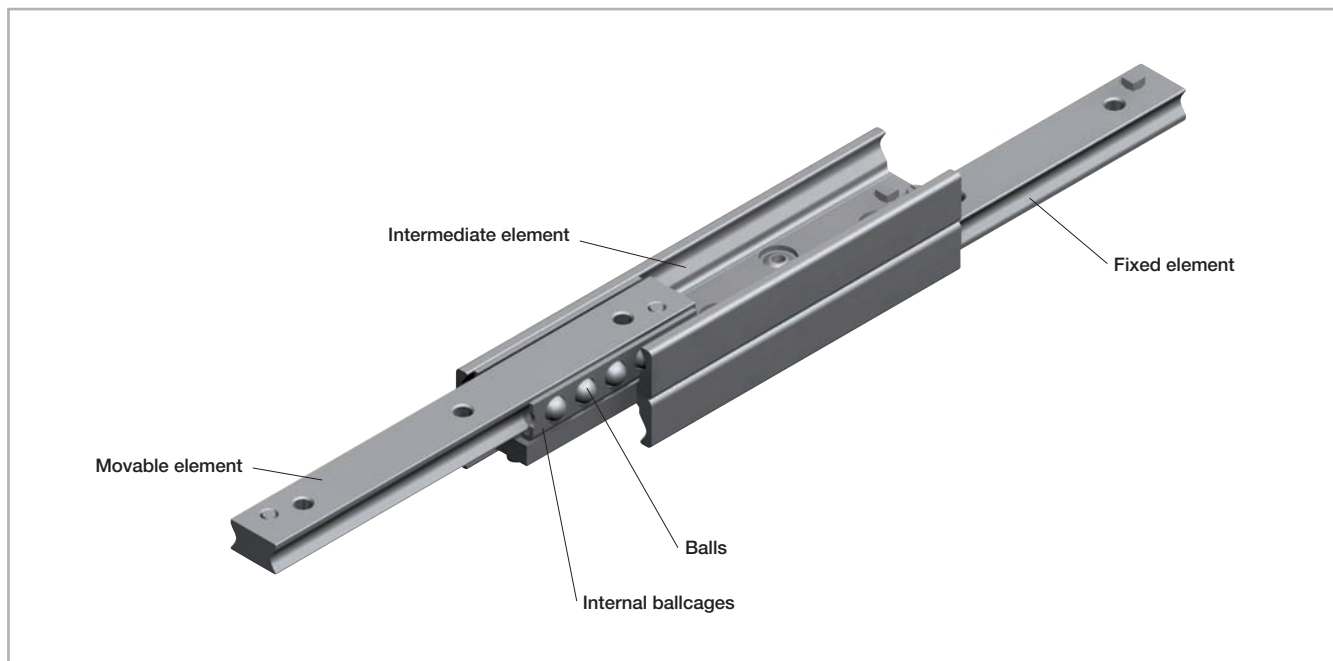


Fig. 10

Performance characteristics:

- Available sizes ASN / DE: 22, 28, 35, 43, 63
- Available sizes DS: 28, 35, 43, 63
- Available sizes DSE: 28, 35, 43, 63
- Available sizes DSC: 43
- Available sizes DBN: 22, 28, 35, 43
- Available size DMS: 63
- Available size DRT: 43
- Induction hardened raceways
- Rails and sliders made of cold-drawn roller bearing carbon steel
- Balls made of hardened roller bearing carbon steel
- Max. operating speed: 0.8 m/s (31.5 in/s)
(depending on application)
- ASN, DE, DBN, temperature range: -20 °C to +170 °C (-4 °F to +338 °F), DS, DSE, DSC, DRT: -20 °C to +110 °C (-4 °F to +230 °F)
- Electrolytic galvanised as per ISO 2081, increased anticorrosive protection on request (see pg. TR-43 Anticorrosive protection)

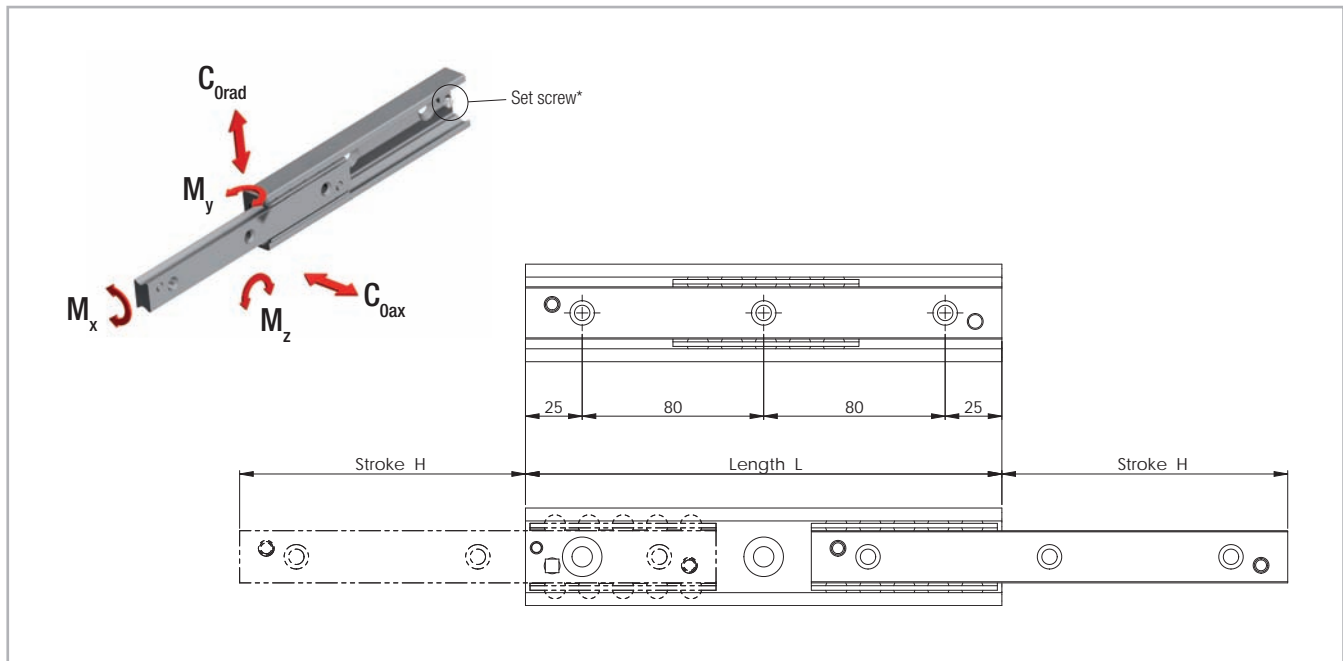
Remarks:

- Horizontal movement installation is recommended
- Vertical movement installation on request
- External end stops are recommended
- Double-sided stroke in ASN, DSD, DE, DBN series (DMS on request)
- Custom strokes on request
- All load capacity data is based on one telescopic rail
- All load capacity data is based on continuous operation
- Calculation of the service life is based exclusively on the loaded rows of balls
- For models DMS, DRT, DSB, and DSE, please observe right or left side use
- DRT 43 must be fixed with Torx® screws (custom design, included in delivery) ASN 63 and DMS 63 can be fixed with Torx® screws as an alternative
- Fixing screws of property class 10.9 must be used for all telescopic rails
- Internal stops are used to stop the unloaded slider and the ball cage. Please use external stops as end stops for a loaded system

Dimensions and load capacity



> ASN



* Remove the set screw to reach all the fixing holes. See also assembly instructions on page TR-41f.

Fig. 11

Type	Size	Length L [mm]	Stroke H [mm]	Load capacities and moments*					No. of holes
				C_{0rad} [N]	C_{0ax} [N]	M_x [Nm]	M_y [Nm]	M_z [Nm]	
ASN	22	130	76	313	219	5,7	10	15	2
		210	111	715	501	10,7	36	51	3
		290	154	994	696	14,9	69	99	4
		370	196	1278	895	19	113	162	5
		450	231	1701	1190	24	180	258	6
		530	274	1979	1385	28,2	248	355	7
		610	316	2262	1584	32,3	327	467	8
		690	351	2689	1882	37,3	436	623	9
		770	394	2967	2077	41,5	539	769	10

* The given load capacities and weights apply for a single extension

Tab. 1

Type	Size	Length L [mm]	Stroke H [mm]	Load capacities and moments*					No. of holes
				C_{0rad} [N]	C_{0ax} [N]	M_x [Nm]	M_y [Nm]	M_z [Nm]	
ASN	28	130	74	613	429	15,3	20	28	2
		210	116	1116	781	26,1	57	82	3
		290	148	1934	1354	39,6	132	188	4
		370	190	2445	1711	50,4	213	305	5
		450	232	2955	2069	61,2	314	449	6
		530	274	3466	2426	72	435	621	7
		610	316	3976	2783	82,8	575	821	8
		690	358	4487	3141	93,6	735	1050	9
		770	400	4997	3498	104,4	914	1306	10
		850	433	5828	4080	117,9	1165	1665	11
		930	475	6338	4436	128,7	1389	1984	12
		1010	517	6848	4793	139,5	1631	2330	13
		1090	559	7358	5150	150,3	1894	2705	14
1170	601	7868	5507	161,1	2175	3108	15		
ASN	35	210	127	1065	746	29,4	57	82	3
		290	159	2060	1442	46,9	146	208	4
		370	203	2638	1847	59,9	238	340	5
		450	247	3217	2252	73	354	505	6
		530	279	4282	2997	90,4	543	775	7
		610	323	4858	3401	103,5	711	1015	8
		690	367	5435	3804	116,6	902	1288	9
		770	399	6521	4565	134	1191	1702	10
		850	443	7095	4966	147,1	1435	2050	11
		930	487	7669	5368	160,2	1702	2431	12
		1010	519	8765	6136	177,6	2092	2989	13
		1090	563	9337	6536	190,7	2412	3445	14
		1170	607	9909	6937	203,8	2754	3934	15
		1250	639	11012	7708	221,2	3245	4636	16
		1330	683	11582	8107	234,3	3640	5200	17
1410	727	12153	8507	247,4	4058	5797	18		
1490	759	13260	9282	264,8	4650	6643	19		

* The given load capacities and weights apply for a single extension

Tab. 2

3 Dimensions and load capacity

Type	Size	Length L [mm]	Stroke H [mm]	Load capacities and moments*					No. of holes	
				C_{grad} [N]	C_{Oax} [N]	M_x [Nm]	M_y [Nm]	M_z [Nm]		
ASN	43	210	123	1595	1117	60.6	84	120	3	
		290	158	2872	2010	93.8	201	288	4	
		370	208	3377	2364	115.9	308	440	5	
		450	243	4690	3283	149.2	509	728	6	
		530	278	6039	4227	182.4	762	1088	7	
		610	313	7411	5188	215.6	1064	1521	8	
		690	363	7863	5504	237.8	1294	1849	9	
		770	398	9232	6463	271	1681	2402	10	
		850	433	10615	7431	304.2	2119	3027	11	
		930	483	11054	7738	326.4	2439	3484	12	
		1010	518	12434	8704	359.6	2961	4230	13	
		1090	568	12877	9014	381.8	3337	4767	14	
		1170	603	14254	9978	415	3943	5633	15	
		1250	638	15638	10947	448.2	4599	6571	16	
		1330	688	16075	11252	470.4	5065	7236	17	
		1410	723	17456	12219	503.6	5806	8295	18	
		1490	758	18845	13191	536.8	6598	9425	19	
		1570	793	20238	14167	570.1	7440	10628	20	
		1650	843	20661	14463	592.2	8029	11470	21	
		1730	878	22052	15436	625.5	8956	12794	22	
		1810	928	22479	15736	647.6	9601	13716	23	
		1890	963	23867	16707	680.8	10612	15160	24	
		1970	1013	24298	17009	703	11314	16162	25	
		ASN	63	610	333	10591	7414	474	1553	2219
690	373			12534	8774	547.5	2072	2960	9	
770	413			14489	10142	621	2666	3808	10	
850	453			16452	11516	694.5	3334	4763	11	
930	493			18421	12895	768	4077	5824	12	
1010	533			20395	14277	841.4	4894	6992	13	
1090	573			22373	15661	914.9	5787	8267	14	
1170	613			24354	17048	988.4	6754	9648	15	
1250	653			26337	18436	1061.9	7795	11136	16	
1330	693			28322	19825	1135.4	8912	12731	17	
1410	733			30309	21216	1208.9	10102	14432	18	
1490	773			32297	22608	1282.4	11368	16240	19	
1570	813			34287	24001	1355.9	12708	18155	20	
1650	853			36277	25394	1429.4	14123	20176	21	
1730	893			38268	26788	1502.8	15613	22304	22	
1810	933			40261	28182	1576.3	17177	24539	23	
1890	973			42253	29577	1649.8	18816	26880	24	
1970	1013	44247	30973	1723.3	20530	29328	25			

Tab. 3

* The given load capacities and weights apply for a single extension

> ASN

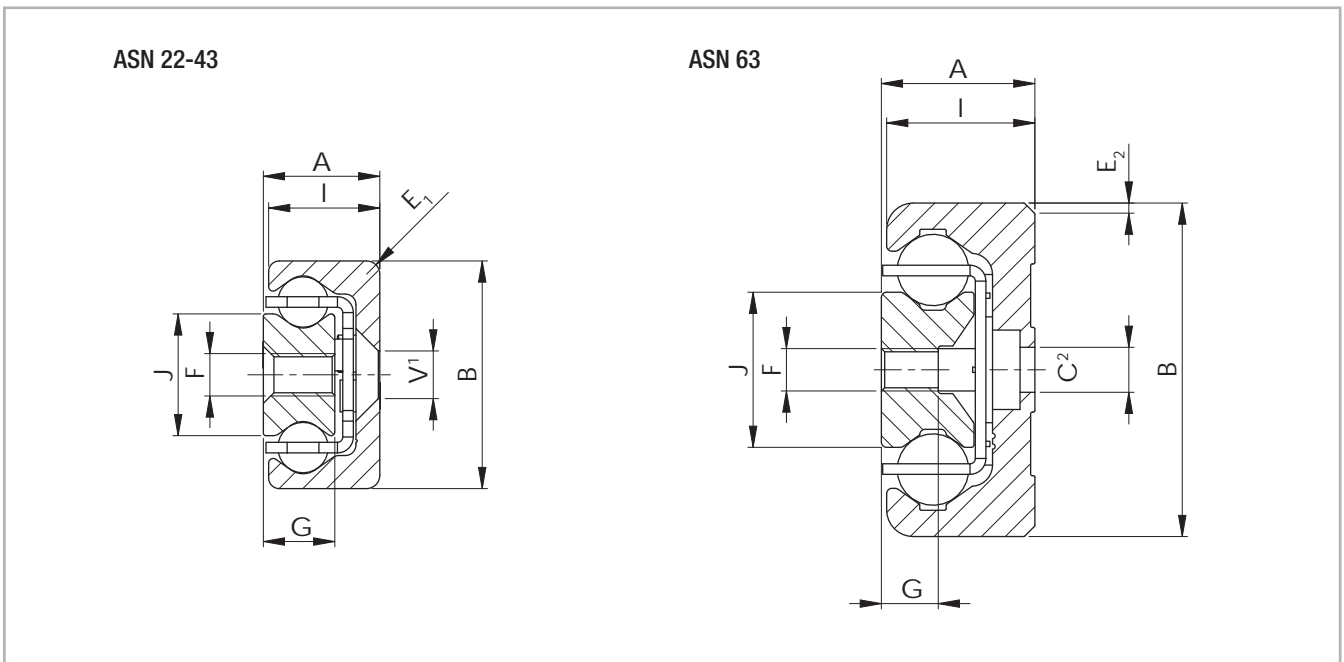


Fig. 12

¹ Fixing holes (V) for countersunk head screws according to DIN 7991

² Fixing holes (C) for socket cap screws according to DIN 7984. Alternative fixing with Torx® screws in special design with low head (on request)

Type	Size	Cross-section										Weight [kg/m]
		A [mm]	B [mm]	I [mm]	J [mm]	G [mm]	E ₁ [mm]	E ₂ [°]	V	C	F	
ASN	22	11	22	10.25	11.3	6.5	3	-	M4	-	M4	1.32
	28	13	28	12.25	15	7.5	1	-	M5	-	M5	2.02
	35	17	35	16	15.8	10	2	-	M6	-	M6	3.05
	43	22	43	21	23	13.5	2.5	-	M8	-	M8	5.25
	63	29	63	28	29.3	10.5	-	2 x 45	-	M8	M8	10.30

Tab. 4

> DSS

DSS with one-sided extension (single stroke)

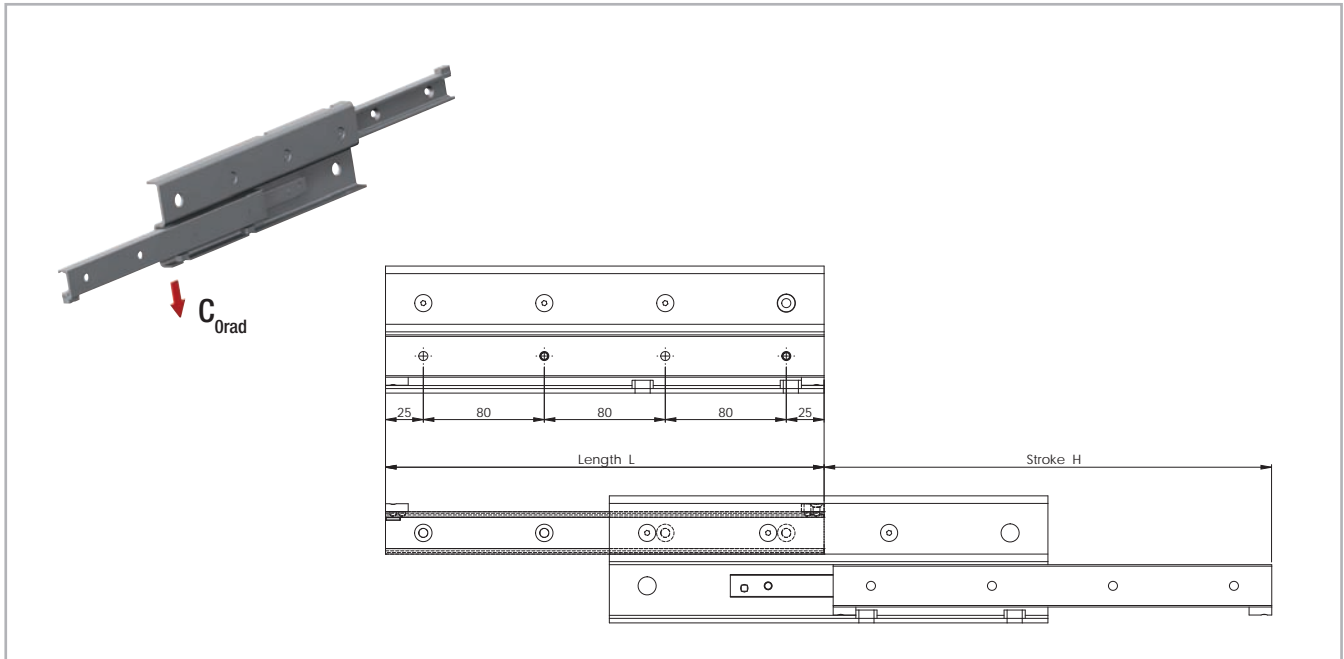


Fig. 13

Type	Size	Length L [mm]	Stroke H [mm]	Load capacity* C_{Orad} [N]	Accessible holes / total
DSS	28	290	296	570	3 / 4
		370	380	769	4 / 5
		450	464	969	4 / 6
		530	548	1170	6 / 7
		610	630	1376	6 / 8
		690	714	1577	7 / 9
		770	798	1778	7 / 10
		850	864	2111	9 / 11
		930	950	2240	9 / 12
		1010	1034	2054	10 / 13
		1090	1118	1896	10 / 14
		1170	1202	1761	12 / 15
		1250	1266	1695	12 / 16

* The given load capacities and weights apply for a single extension

Tab. 5

Type	Size	Length L [mm]	Stroke H [mm]	Load capacity* C_{Orad} [N]	Accessible holes / total
DSS	35	450	494	1250	5 / 6
		530	558	1685	6 / 7
		610	646	1908	6 / 8
		690	734	2132	7 / 9
		770	798	2579	8 / 10
		850	886	2801	9 / 11
		930	974	3024	9 / 12
		1010	1038	3476	10 / 13
		1090	1126	3508	11 / 14
		1170	1214	3240	12 / 15
		1250	1278	3121	12 / 16
		1330	1366	2907	13 / 17
		1410	1454	2721	14 / 18
		1490	1518	2636	15 / 19
		1570	1606	2482	15 / 20
		1650	1694	2345	16 / 21
		1730	1758	2282	17 / 22

* The given load capacities and weights apply for a single extension

Tab. 6

Type	Size	Length L [mm]	Stroke H [mm]	Load capacity* C_{Orad} [N]	Accessi- ble holes / total
DSS	43	530	556	2061	6 / 7
		610	626	2603	6 / 8
		690	726	2775	7 / 9
		770	796	3319	7 / 10
		850	866	3873	9 / 11
		930	966	4036	9 / 12
		1010	1036	4590	10 / 13
		1090	1106	4908	10 / 14
		1170	1206	4610	12 / 15
		1250	1276	4398	12 / 16
		1330	1376	4027	13 / 17
		1410	1446	3864	14 / 18
		1490	1516	3713	15 / 19
		1570	1616	3445	15 / 20
		1650	1686	3325	16 / 21
		1730	1756	3213	17 / 22
		1810	1856	3011	18 / 23
1890	1926	2919	18 / 24		
1970	2026	2750	19 / 25		

* The given load capacities and weights apply for a single extension

Tab. 7

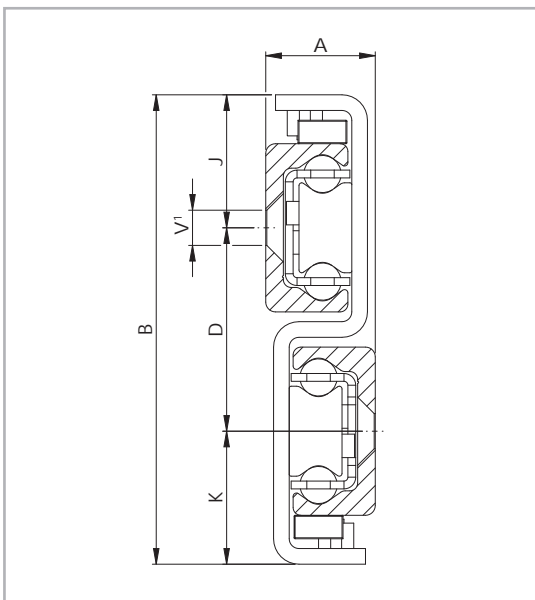
Type	Size	Length L [mm]	Stroke H [mm]	Load capacity* C_{Orad} [N]	Accessi- ble holes / total
DSS	63	610	666	3502	6 / 8
		690	746	4252	8 / 9
		770	826	5012	8 / 10
		850	906	5780	9 / 11
		930	986	6552	9 / 12
		1010	1066	7329	11 / 13
		1090	1146	8109	11 / 14
		1170	1226	8892	12 / 15
		1250	1306	9677	12 / 16
		1330	1386	10464	14 / 17
		1410	1466	11252	14 / 18
		1490	1546	12041	15 / 19
		1570	1626	12832	15 / 20
		1650	1706	12364	17 / 21
		1730	1786	11827	17 / 22
		1810	1866	11334	18 / 23
		1890	1946	10881	18 / 24
1970	2026	10463	20 / 25		

* The given load capacities and weights apply for a single extension

Tab. 8

> DSS

DSS with one-sided extension (single stroke)



¹ Fixing holes (V) for countersunk head screws according to DIN 7991 Fig. 14

Type	Size	Cross-section						Weight [kg/m]
		A [mm]	B [mm]	K [mm]	D [mm]	J [mm]	V	
DSS	28	17	84	24,5	35	24,5	M5	6,40
	35	22,5	104	30,5	43	30,5	M6	10,10
	43	28	120	34	52	34	M8	14,60
	63	40	208	64	80	64	M10	32,60

Tab. 9

> DSS...S

...S version with reinforced and damped stainless steel end stops

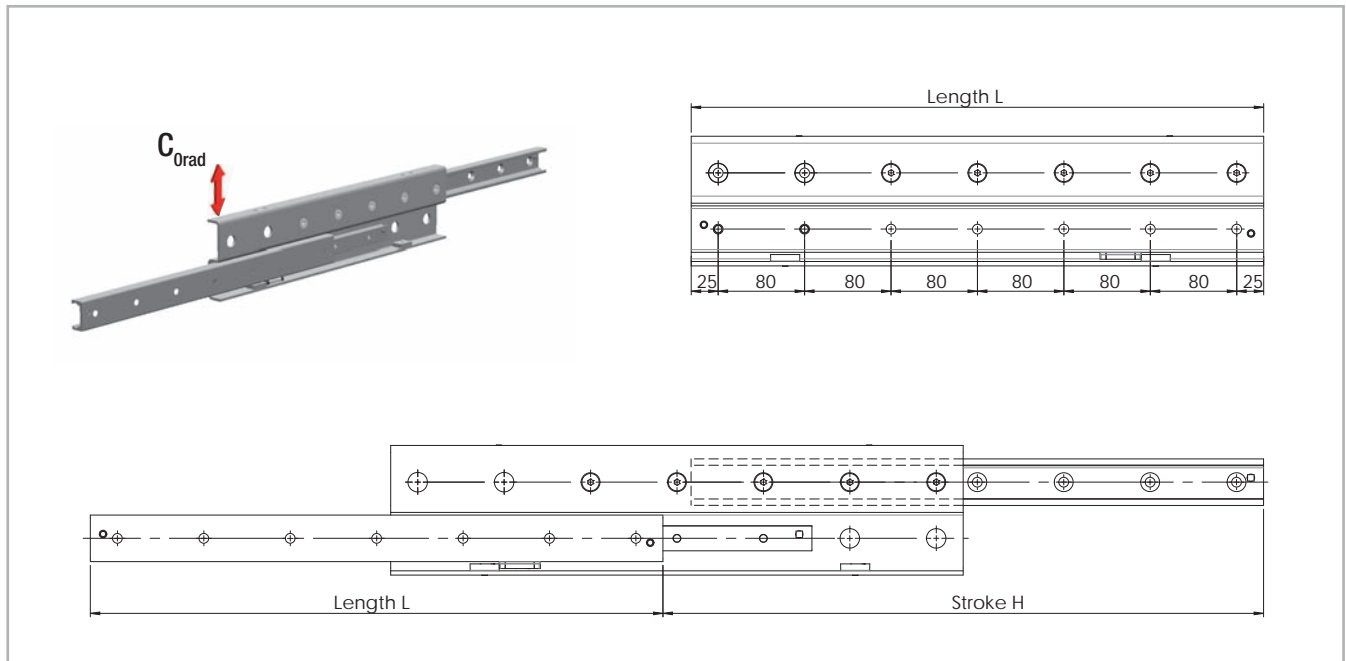


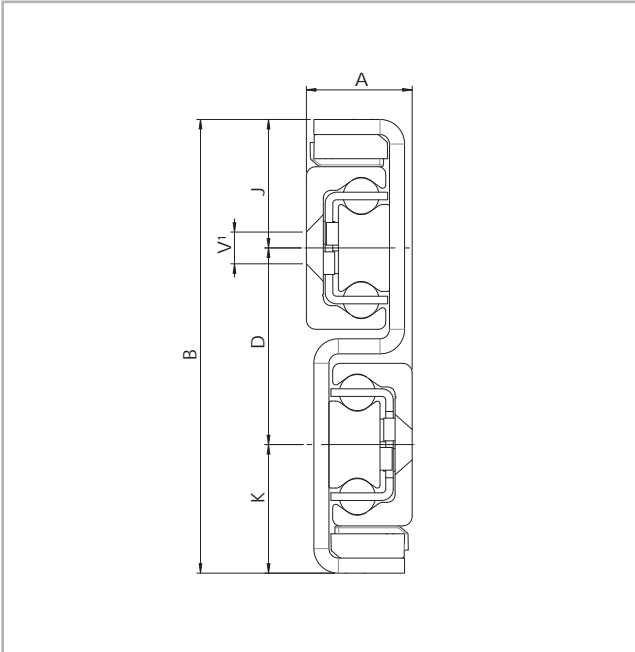
Fig. 15

Type	Size	Length L [mm]	Stroke H [mm]	Load capacity* C_{Orad} [N]	Accessible holes / total
DSS...S	43	530	556	2061	6 / 7
		610	626	2603	6 / 8
		690	726	2775	7 / 9
		770	796	3319	7 / 10
		850	866	3873	9 / 11
		930	966	4036	9 / 12
		1010	1036	4590	10 / 13
		1090	1106	5104	10 / 14
		1170	1206	4610	12 / 15
		1250	1276	4398	12 / 16
		1330	1376	4027	13 / 17
		1410	1446	3864	14 / 18
		1490	1516	3713	15 / 19
		1570	1616	3445	15 / 20
		1650	1686	3325	16 / 21
		1730	1756	3213	17 / 22
		1810	1856	3011	18 / 23
1890	1926	2919	18 / 24		
1970	2026	2750	19 / 25		

Tab. 10

> DSS...S

...S version with reinforced and damped stainless steel end stops



¹ Fixing holes (V) for countersunk head screws according to DIN 7991

Fig. 16

Type	Size	Cross-section						Weight [kg/m]
		A [mm]	B [mm]	K [mm]	D [mm]	J [mm]	V	
DSS...S	43	28	120	34	52	34	M8	14.60

Tab. 11

> DSB

B version with locking system for closed position

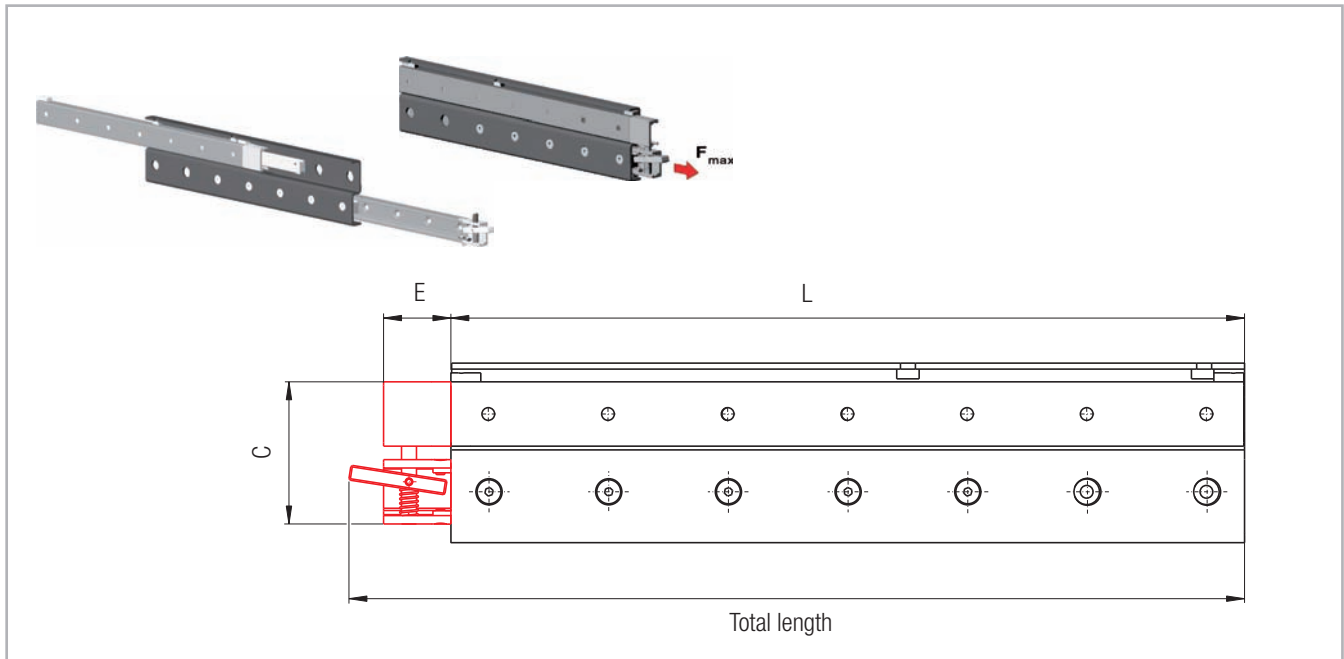


Fig. 17

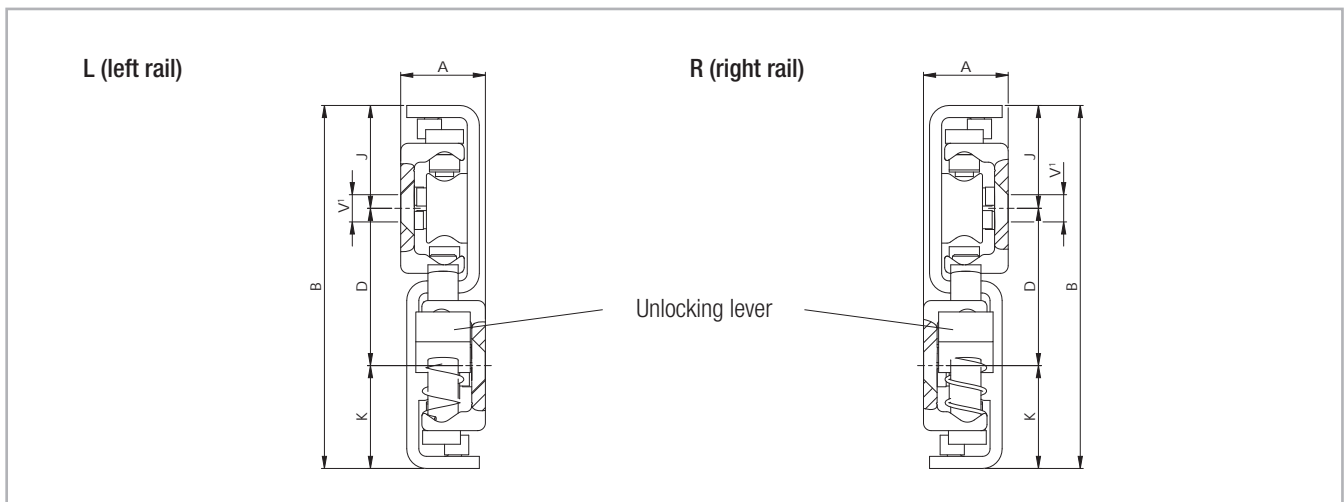


Fig. 18

¹ Fixing holes (V) for countersunk head screws according to DIN 7991

The DSB is built on the DSS design. The same load capacities, cross-sections and available rail lengths apply (see pg. TR-10ff). Data in Table 10 are based on the special features of the locking mechanism.

Please observe right or left installation for version DSB. The maximum load on the locking in the extension direction is indicated by F_{max} .

Type	Size	L [mm]	Total length [mm]	C [mm]	E [mm]	F_{max} [N]	Weight [kg/m]
DSB	28	from 290 to 1490*	L + 52	63	35	2460	6.51
	35	from 450 to 1730*	L + 53	78	33	3000	10.4
	43	from 530 to 1970*	L + 69	95	45	5630	14.98

* for available lengths, see pg. TR-10, tab. 5 and 7 (DSS)

Tab. 12

> DSD

DSD with double direction stroke (double stroke)

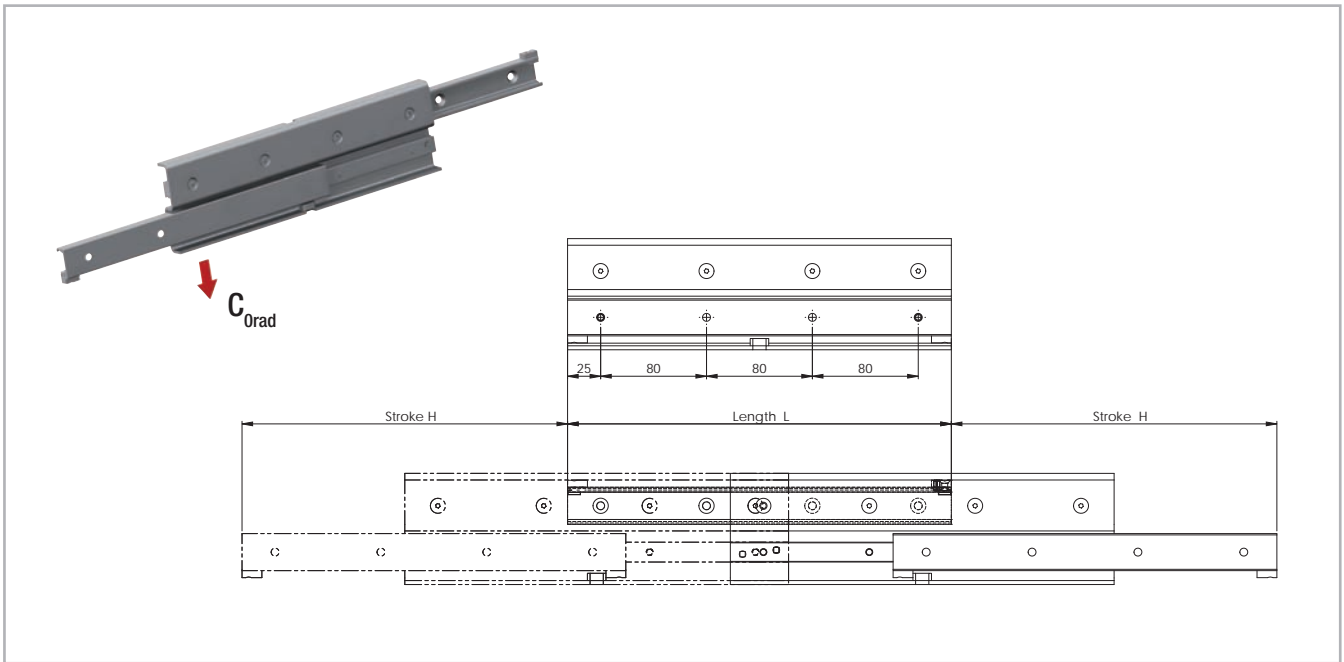


Fig. 19

Type	Size	Length L [mm]	Stroke H [mm]	Load capacity* C _{Orad} [N]	Accessible holes / total
DSD	28	290	246	895	4 / 4
		370	326	1105	4 / 5
		450	406	1317	6 / 6
		530	486	1626	6 / 7
		610	566	1837	8 / 8
		690	646	2050	8 / 9
		770	726	2262	10 / 10
		850	806	2475	10 / 11
		930	886	2581	12 / 12
		1010	966	2357	12 / 13
		1090	1046	2168	14 / 14
		1170	1126	2008	14 / 15
		1250	1206	1870	16 / 16
		1330	1286	1749	16 / 17

* The given load capacities and weights apply for a single extension

Tab. 13

Type	Size	Length L [mm]	Stroke H [mm]	Load capacity* C _{Orad} [N]	Accessible holes / total
DSD	35	450	350	3025	4 / 6
		530	430	3191	6 / 7
		610	510	3381	6 / 8
		690	590	3800	8 / 9
		770	670	4008	8 / 10
		850	750	4223	10 / 11
		930	830	4646	10 / 12
		1010	910	4868	12 / 13
		1090	990	4580	12 / 14
		1170	1070	4202	14 / 15
		1250	1150	3882	14 / 16
		1330	1230	3607	16 / 17
		1410	1310	3369	16 / 18
		1490	1390	3160	18 / 19
		1570	1470	2975	18 / 20
		1650	1550	2811	20 / 21
1730	1630	2664	20 / 22		

* The given load capacities and weights apply for a single extension

Tab. 14

Type	Size	Length L [mm]	Stroke H [mm]	Load capacity* C_{0rad} [N]	Accessi-ble holes / total
DSD	43	530	476	3018	6 / 7
		610	556	3265	8 / 8
		690	636	3781	8 / 9
		770	716	4297	10 / 10
		850	796	4547	10 / 11
		930	876	5063	12 / 12
		1010	956	5578	12 / 13
		1090	1036	5830	14 / 14
		1170	1116	5392	14 / 15
		1250	1196	5014	16 / 16
		1330	1276	4686	16 / 17
		1410	1356	4398	18 / 18
		1490	1436	4143	18 / 19
		1570	1516	3917	20 / 20
		1650	1596	3713	20 / 21
		1730	1676	3530	22 / 22
		1810	1756	3364	22 / 23
1890	1836	3213	24 / 24		
1970	1916	3075	24 / 25		

* The given load capacities and weights apply for a single extension

Tab. 15

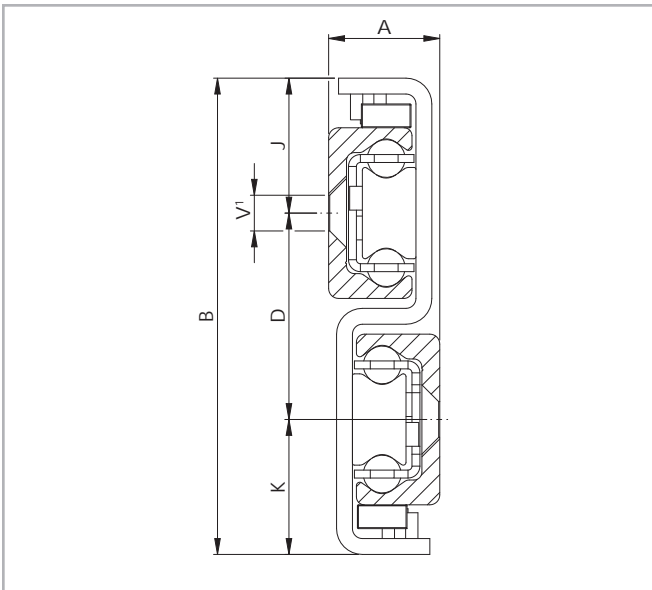
Type	Size	Length L [mm]	Stroke H [mm]	Load capacity* C_{0rad} [N]	Accessi-ble holes / total
DSD	63	610	398	11858	6 / 8
		690	478	12242	6 / 9
		770	558	12717	8 / 10
		850	638	13250	8 / 11
		930	718	13823	10 / 12
		1010	798	14424	10 / 13
		1090	878	15046	12 / 14
		1170	958	15684	12 / 15
		1250	1038	16334	14 / 16
		1330	1118	16994	14 / 17
		1410	1198	17661	16 / 18
		1490	1278	18335	16 / 19
		1570	1358	19009	18 / 20
		1650	1438	17769	18 / 21
		1730	1518	16680	20 / 22
		1810	1598	15718	20 / 23
		1890	1678	14860	22 / 24
1970	1758	14091	22 / 25		

* The given load capacities and weights apply for a single extension

Tab. 16

> DSD

DSD with double direction stroke (double stroke)



¹ Fixing holes (V) for countersunk head screws according to DIN 7991

Fig. 20

Type	Size	Cross-section						Weight [kg/m]
		A [mm]	B [mm]	K [mm]	D [mm]	J [mm]	V	
DSD	28	17	84	24,5	35	24,5	M5	6.40
	35	22,5	104	30,5	43	30,5	M6	10.10
	43	28	120	34	52	34	M8	14.60
	63	40	208	64	80	64	M10	32.60

Tab. 17

> DSE

E version with extra stroke

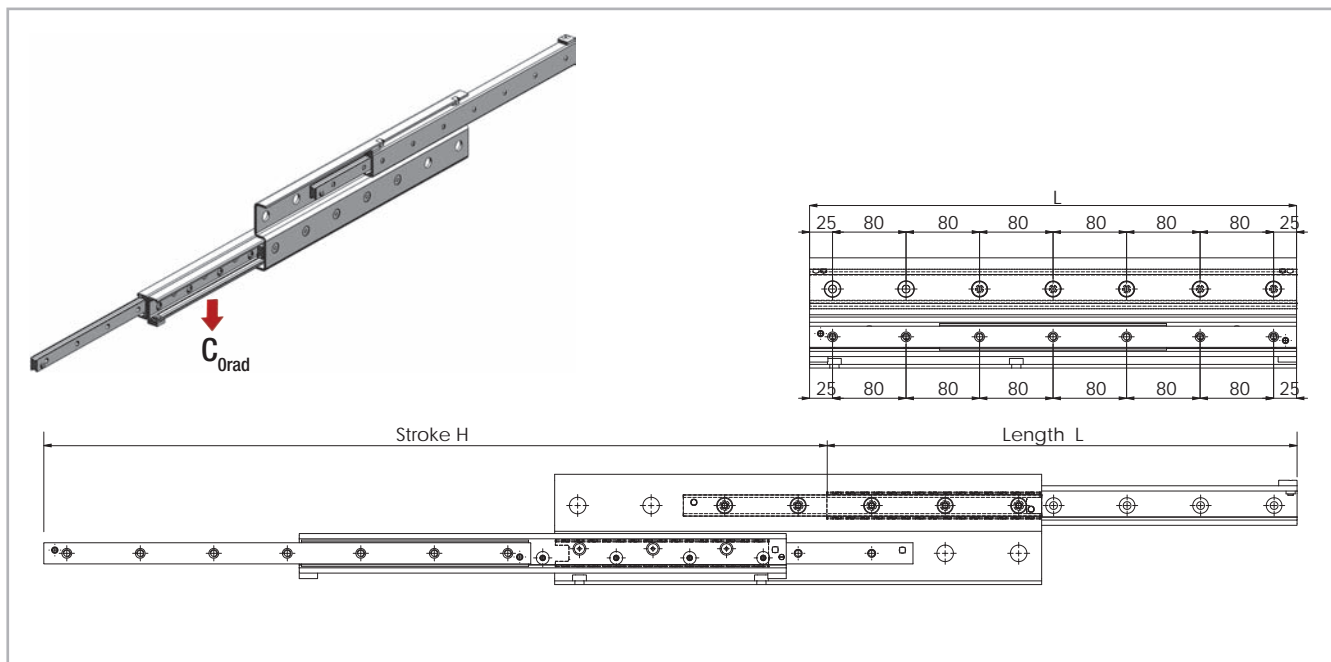


Fig. 21

Type	Size	Length L [mm]	Stroke H [mm]	Load capacity* C _{Orad} [N]	No. of holes fixed part	No. of holes mobile part
DSE	28	290	444	351	3 / 4	4
		370	570	476	4 / 5	5
		450	696	600	4 / 6	6
		530	822	725	6 / 7	7
		610	946,5	851	6 / 8	8
		690	1072,5	842	7 / 9	9
		770	1198,5	753	7 / 10	10
		850	1297	710	9 / 11	11
		930	1425	646	9 / 12	12
		1010	1551	592	10 / 13	13
		1090	1658	547	10 / 14	14
1170	1803	508	12 / 15	15		

* The given load capacities and weights apply for a single extension

Tab. 18

Type	Size	Length L [mm]	Stroke H [mm]	Load capacity* C _{Orad} [N]	No. of holes fixed part	No. of holes mobile part
DSE	35	450	741	776	5 / 6	6
		530	837	1049	6 / 7	7
		610	969	1188	6 / 8	8
		690	1101	1326	7 / 9	9
		770	1197	1591	8 / 10	10
		850	1329	1425	9 / 11	11
		930	1461	1291	9 / 12	12
		1010	1557	1233	10 / 13	13
		1090	1689	1131	11 / 14	14
		1170	1821	1045	12 / 15	15
		1250	1917	1006	12 / 16	16
		1330	2049	937	13 / 17	17
		1410	2181	877	14 / 18	18
		1490	2277	850	15 / 19	19

* The given load capacities and weights apply for a single extension

Tab. 19

Type	Size	Length L [mm]	Stroke H [mm]	Load capacity* C _{Orad} [N]	No. of holes fixed part	No. of holes mobile part
DSE	43	530	834	1291	6 / 7	7
		610	939	1632	6 / 8	8
		690	1109	1554	7 / 9	9
		770	1194	2077	7 / 10	10
		850	1299	2426	9 / 11	11
		930	1449	2506	9 / 12	12
		1010	1554	2364	10 / 13	13
		1090	1659	2238	11 / 14	14
		1170	1809	2022	12 / 15	15
		1250	1914	1928	12 / 16	16
		1330	2064	1766	13 / 17	17
		1410	2169	1694	13 / 18	18
		1490	2274	1628	15 / 19	19
		1570	2409	1567	15 / 20	20
		1650	2529	1458	16 / 21	21
		1730	2634	1409	16 / 22	22
		1810	2784	1320	18 / 23	23
1890	2889	1280	18 / 24	24		
1970	3039	1206	19 / 25	25		

* The given load capacities and weights apply for a single extension

Tab. 20

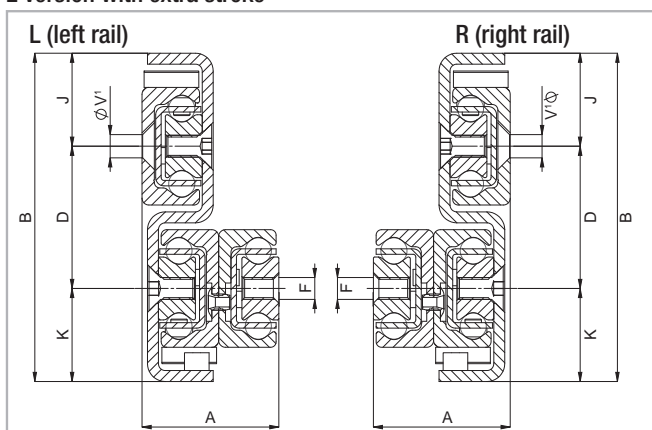
Type	Size	Length L [mm]	Stroke H [mm]	Load capacity* C _{Orad} [N]	No. of holes fixed part	No. of holes mobile part
DSE	63	610	999	2164	6 / 8	8
		690	1119	2630	8 / 9	9
		770	1239	3104	8 / 10	10
		850	1359	3582	9 / 11	11
		930	1479	4064	9 / 12	12
		1010	1599	4548	11 / 13	13
		1090	1719	5035	11 / 14	14
		1170	1839	5523	12 / 15	15
		1250	1959	5672	12 / 16	16
		1330	2079	5357	14 / 17	17
		1410	2199	2635	14 / 18	18
		1490	2319	4822	15 / 19	19
		1570	2439	4593	15 / 20	20
		1650	2559	4384	17 / 21	21
		1730	2679	4194	17 / 22	22
		1810	2799	4019	18 / 23	23
		1890	2919	3859	18 / 24	24
1970	3039	3710	20 / 25	25		

* The given load capacities and weights apply for a single extension

Tab. 21

> DSE

E version with extra stroke



¹ Fixing holes (V) for countersunk head screws according to DIN 7991
Please observe right or left installation for version DSE.

Fig. 22

Type	Size	Cross-section							Weight [kg/m]
		A [mm]	B [mm]	K [mm]	D [mm]	J [mm]	F	V'	
DSE	28	30	84	24,5	35	24,5	M5	M5	8,4
	35	39,5	104	30,5	43	30,5	M6	M6	13,2
	43	50	120	34	52	34	M8	M8	19,9
	63	69	208	64	80	64	M8	M10	42,9

Tab. 22

> DSC

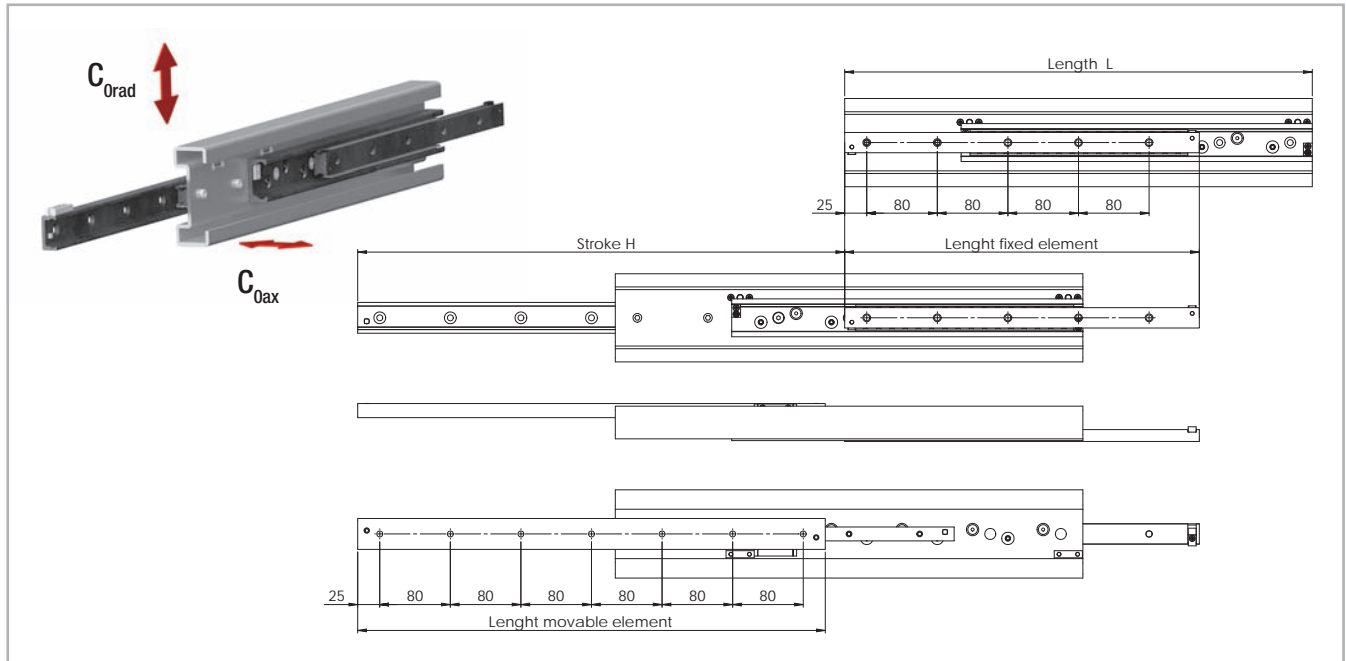


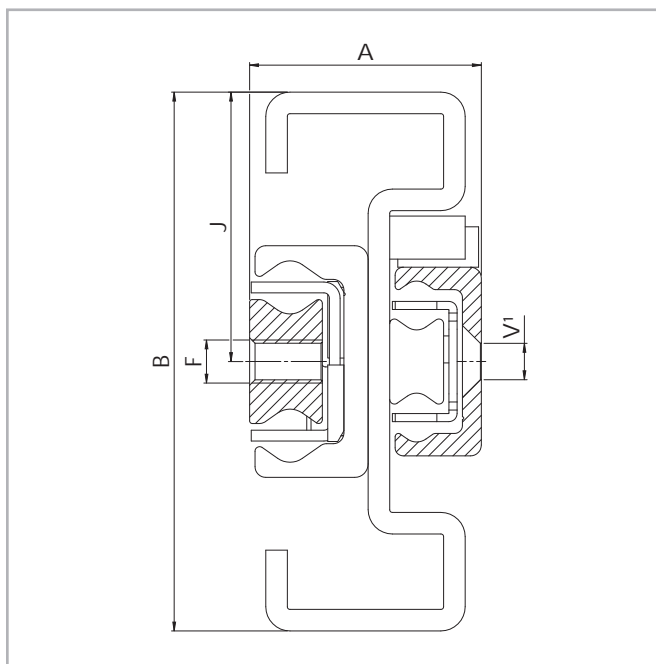
Fig. 23

Type	Size	Length L [mm]	Stroke H [mm]	Load capacities*		Fixed element		Movable element	
				C _{Orad} [N]	C _{Oax} [N]	Accessible holes / total	Length [mm]	Accessible holes / total	Length [mm]
DSC	43	530	552	2390	1673	5 / 5	402	6 / 7	530
		610	619	2964	2075	6 / 6	465	6 / 8	610
		690	725	3095	1920	6 / 6	520	8 / 9	690
		770	792	3666	1792	7 / 7	582	8 / 10	770
		850	859	4246	1681	8 / 8	644	9 / 11	850
		930	965	4369	1459	9 / 9	700	9 / 12	930
		1010	1029	5254	1392	10 / 10	770	11 / 13	1010
		1090	1099	5529	1317	10 / 10	825	11 / 14	1090
		1170	1202	5177	1182	11 / 11	887	12 / 15	1170
		1250	1272	4937	1127	12 / 12	942	12 / 16	1250
		1330	1375	4499	1027	13 / 13	1005	14 / 17	1330
		1410	1445	4317	986	14 / 14	1060	14 / 18	1410
		1490	1509	4181	955	14 / 14	1130	15 / 19	1490
		1570	1615	3849	879	15 / 15	1185	16 / 20	1570
		1650	1685	3714	848	15 / 15	1240	16 / 21	1650
		1730	1752	3601	822	16 / 16	1302	17 / 22	1730
		1810	1843	3406	778	17 / 17	1365	18 / 23	1810
1890	1922	3270	747	18 / 18	1427	19 / 24	1890		
1970	2028	3063	699	19 / 19	1482	20 / 25	1970		

* The given load capacities and weights apply for a single extension

Tab. 23

> DSC



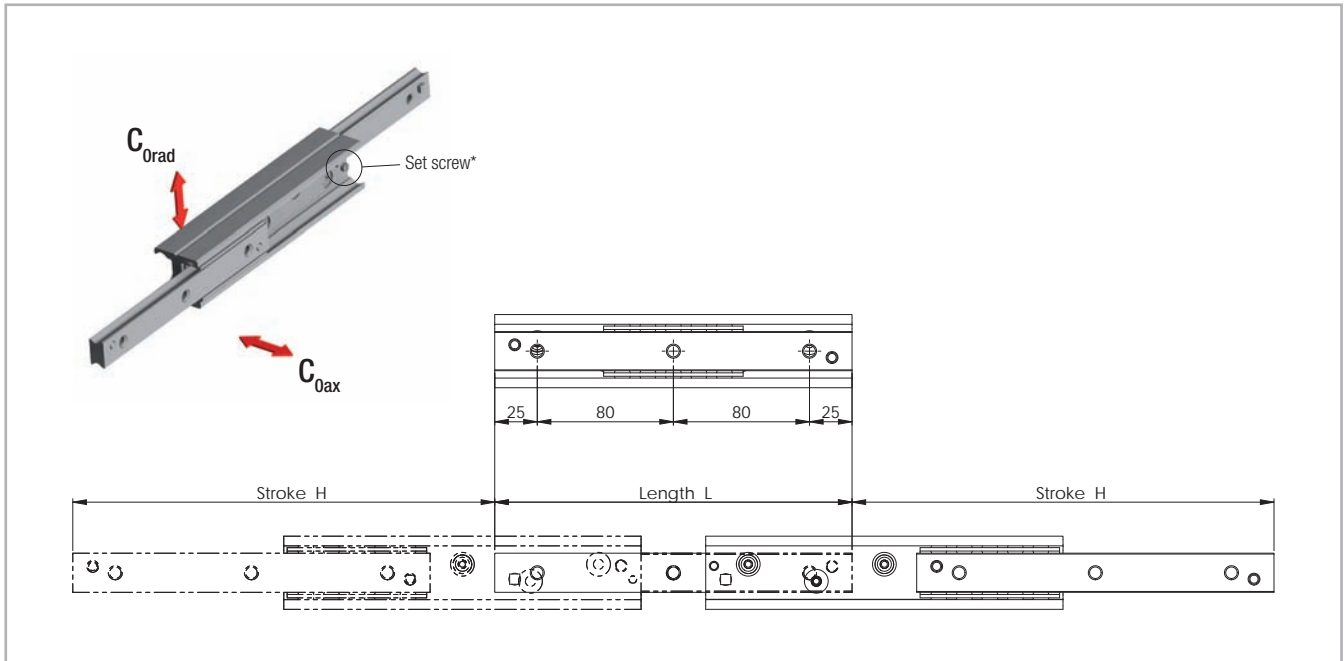
¹ Fixing holes (V) for countersunk head screws according to DIN 7991

Fig. 24

Type	Size	Cross-section					Weight [kg/m]
		A [mm]	B [mm]	J [mm]	F [mm]	V' [mm]	
DSC	43	43	100	50	M8	M6	13.4

Tab. 24

> DE



* Remove the set screw to reach all the fixing holes. See also assembly instructions on page TR-45f.

Fig. 25

Type	Size	Length L [mm]	Stroke H [mm]	Load capacities*		No. of holes
				C _{Orad} [N]	C _{Oax} [N]	
DEF DEV DEM	22	130	152	119	83	2
		210	222	281	196	3
		290	308	390	273	4
		370	392	501	263	5
		450	462	674	230	6
		530	548	571	193	7
		610	632	494	167	8
		690	702	453	153	9
		770	788	401	135	10

Tab. 25

* The given load capacities and weights apply for a single extension

Type	Size	Length L [mm]	Stroke H [mm]	Load capacities*		No. of holes
				C _{Orad} [N]	C _{Oax} [N]	
DEF DEV DEM	28	130	148	235	164	2
		210	232	432	302	3
		290	296	767	537	4
		370	380	968	471	5
		450	464	1169	385	6
		530	548	1107	325	7
		610	633	955	280	8
		690	717	842	247	9
		770	801	753	221	10
		850	866	710	208	11
		930	950	646	189	12
		1010	1034	592	174	13
		1090	1118	547	160	14
		1170	1202	508	149	15

* The given load capacities and weights apply for a single extension

Tab. 26

Type	Size	Length L [mm]	Stroke H [mm]	Load capacities*		No. of holes
				C _{0rad} [N]	C _{0ax} [N]	
DEF DEV DEM	35	210	254	402	281	3
		290	318	800	560	4
		370	406	1025	718	5
		450	494	1250	793	6
		530	558	1685	728	7
		610	646	1908	626	8
		690	734	1689	548	9
		770	798	1591	516	10
		850	886	1425	463	11
		930	974	1291	419	12
		1010	1038	1233	400	13
		1090	1126	1131	367	14
		1170	1214	1045	339	15
		1250	1278	1006	327	16
		1330	1366	937	304	17
		1410	1454	877	285	18
		1490	1518	850	276	19

* The given load capacities and weights apply for a single extension

Tab. 27

Type	Size	Length L [mm]	Stroke H [mm]	Load capacities*		No. of holes
				C _{0rad} [N]	C _{0ax} [N]	
DEF	63	610	666	4090	2863	8
		690	746	4859	3062	9
		770	826	5635	2784	10
		850	906	6415	2553	11
		930	986	7198	2357	12
		1010	1066	6885	2189	13
		1090	1146	6427	2043	14
		1170	1226	6026	1916	15
		1250	1306	5672	1803	16
		1330	1386	5357	1703	17
		1410	1466	5076	1614	18
		1490	1546	4822	1533	19
		1570	1626	4593	1460	20
		1650	1706	4384	1394	21
		1730	1786	4194	1333	22
		1810	1866	4019	1278	23
		1890	1946	3859	1227	24
		1970	2026	3710	1180	25

* The given load capacities and weights apply for a single extension

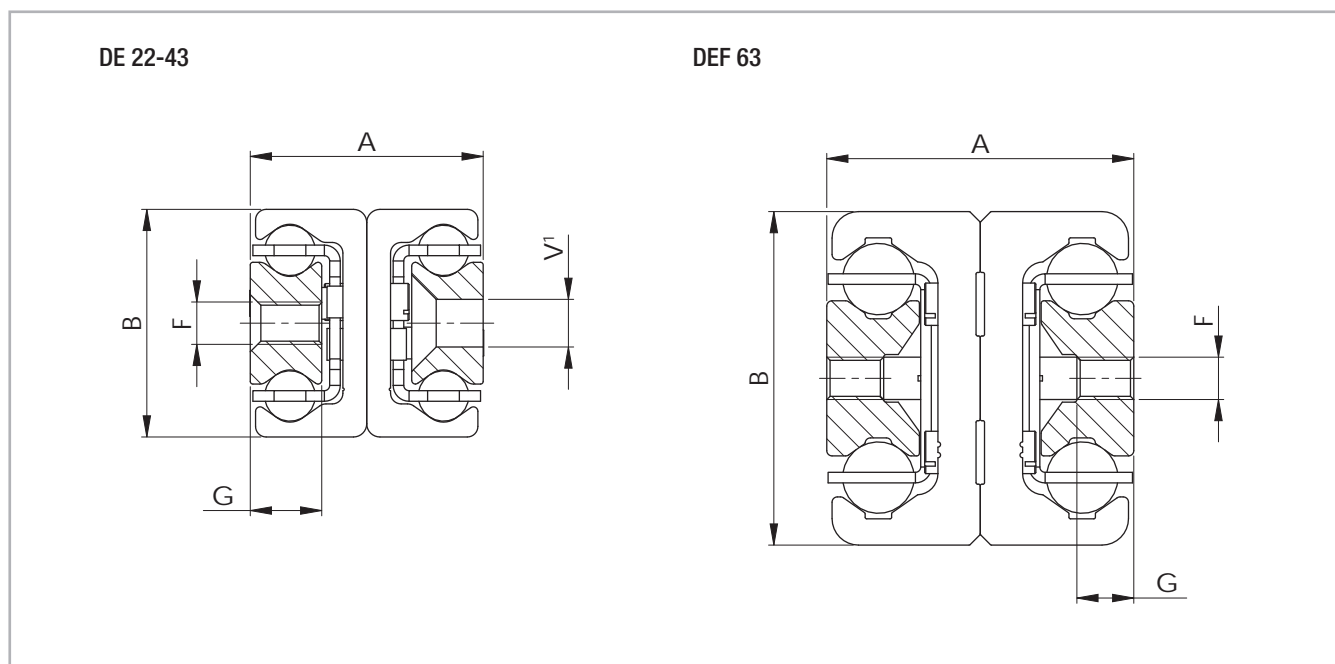
Tab. 29

Type	Size	Length L [mm]	Stroke H [mm]	Load capacities*		No. of holes
				C _{0rad} [N]	C _{0ax} [N]	
DEF DEV DEM	43	210	246	605	424	3
		290	316	1114	780	4
		370	416	1300	910	5
		450	486	1828	1279	6
		530	556	2375	1434	7
		610	626	2934	1300	8
		690	726	3091	1096	9
		770	796	3055	1016	10
		850	866	2847	946	11
		930	966	2506	833	12
		1010	1036	2364	786	13
		1090	1106	2238	744	14
		1170	1206	2022	672	15
		1250	1276	1928	641	16
		1330	1376	1766	587	17
		1410	1446	1694	563	18
		1490	1516	1628	541	19
		1570	1586	1567	521	20
		1650	1686	1458	485	21
		1730	1756	1409	468	22
		1810	1856	1320	439	23
		1890	1926	1280	425	24
		1970	2026	1206	401	25

* The given load capacities and weights apply for a single extension

Tab. 28

> DE



¹ Fixing holes (V) for countersunk head screws according to DIN 7991

Fig. 26

Type	Size	Cross-section					Weight [kg/m]
		A [mm]	B [mm]	G [mm]	F	V	
DEF DEV DEM	22	22	22	6.5	M4	M4	2.64
	28	26	28	7.5	M5	M5	4.04
	35	34	35	10	M6	M6	6.10
	43	44	43	13.5	M8	M8	10.50
	63	58	63	10.5	M8	-	20.60

Tab. 30

There are three options for mounting holes available for the DE series in sizes 22 to 43:

Version DEF with threaded holes,

Version DEV with counter-sunk holes,

Version DEM, both variants (mixed) (see fig. 26).

Size 63 is only available with threaded holes.

> DE...S

...S version with reinforced and damped stainless steel end stops

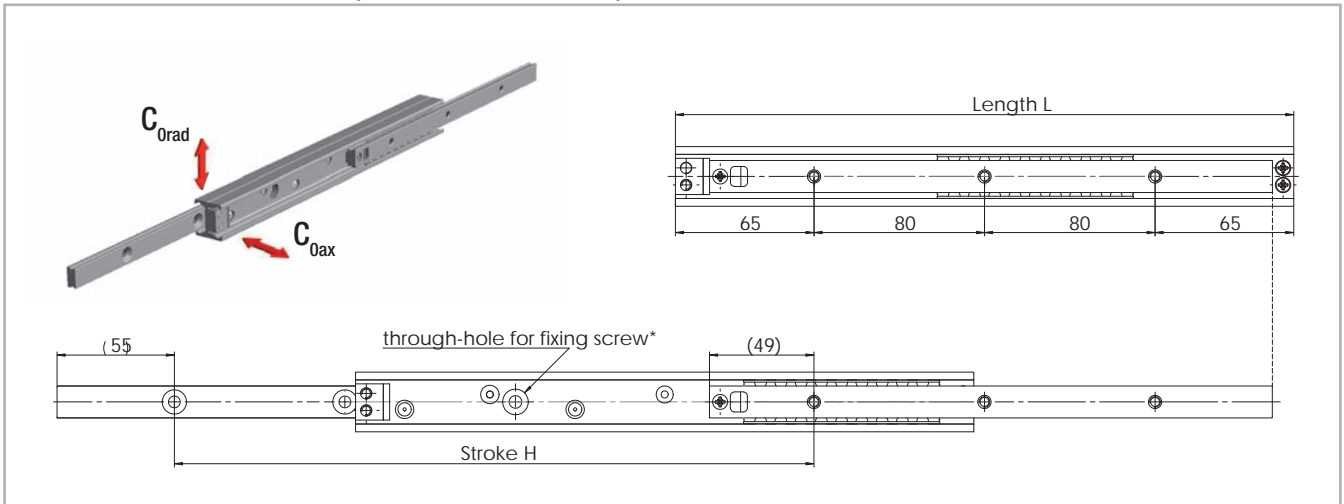


Fig. 27

Type	Size	Length L [mm]	Stroke H [mm]	Load capacities*		Slider [mm]	B [mm]	No of holes
				C _{Orad} [N]	C _{Oax} [N]			
DE...S	28	290	300	352	247	264	49	3
		370	384	542	379	344	49	4
		450	468	735	378	424	49	5
		530	533	1050	343	504	49	6
		610	636	946	278	584	49	7
		690	701	880	258	664	49	8
		770	804	747	219	744	49	9
		850	850	737	216	824	49	10
		930	953	642	188	904	49	11
		1010	1018	611	179	984	49	12
		1090	1102	562	165	1064	49	13
		1170	1186	521	153	1144	49	14

* The given load capacities and weights apply for a single extension

Tab. 31

Type	Size	Length L [mm]	Stroke H [mm]	Load capacities*		Slider [mm]	B [mm]	No of holes
				C _{Orad} [N]	C _{Oax} [N]			
DE...S	35	370	370	715	500	338	45	4
		450	464	894	626	418	45	5
		530	536	1238	787	498	45	6
		610	630	1416	656	578	45	7
		690	702	1770	597	658	45	8
		770	796	1599	519	738	45	9
		850	868	1483	481	818	45	10
		930	962	1322	429	898	45	11
		1010	1012	1296	421	978	45	12
		1090	1128	1127	366	1058	45	13
		1170	1178	1108	360	1138	45	14
		1250	1272	1015	330	1218	45	15
		1330	1344	968	314	1298	45	16
		1410	1438	896	291	1378	45	17
		1490	1510	859	279	1458	45	18

* The given load capacities and weights apply for a single extension

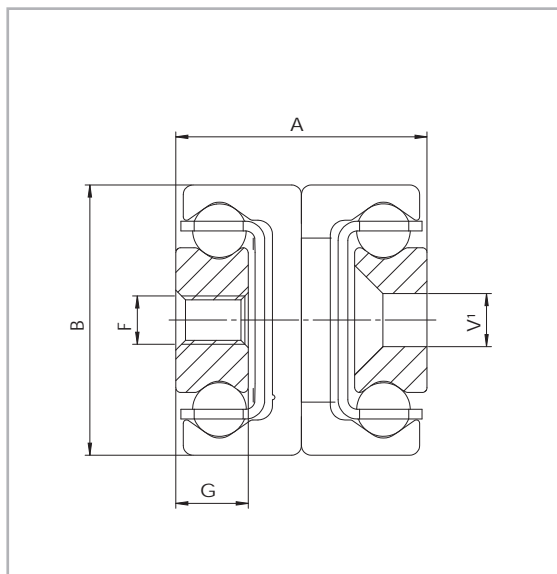
Tab. 32

Type	Size	Length L [mm]	Stroke H [mm]	Load capacities*		Slider [mm]	B [mm]	No of holes
				C _{Grad} [N]	C _{Oax} [N]			
DE...S	43	370	366	1007	705	338	45	4
		450	496	932	653	418	45	5
		530	536	1709	1197	498	45	6
		610	636	1898	1261	578	45	7
		690	706	2419	1156	658	45	8
		770	806	2603	991	738	45	9
		850	846	2982	991	818	45	10
		930	976	2457	817	898	45	11
		1010	1016	2457	817	978	45	12
		1090	1116	2199	731	1058	45	13
		1170	1186	2089	695	1138	45	14
		1250	1286	1899	631	1218	45	15
		1330	1326	1899	631	1298	45	16
		1410	1456	1672	556	1378	45	17
		1490	1496	1672	556	1458	45	18
		1570	1596	1548	515	1538	45	19
		1650	1666	1493	496	1618	45	20
		1730	1766	1393	463	1698	45	21
		1810	1806	1393	463	1778	45	22
		1890	1936	1267	421	1858	45	23
1970	2066	1161	386	1938	45	24		

Tab. 33

> DE...S

...S version with reinforced and damped stainless steel end stops



¹ Fixing holes (V) for countersunk head screws according to DIN 7991 Fig. 28

Type	Size	Cross-section					Weight [kg/m]
		A [mm]	B [mm]	G [mm]	F	V	
DE...S	28	26	28	7.5	M5	M5	4.04
	35	34	35	10	M6	M6	6.10
	43	44	43	13.5	M8	M8	10.50

Tab. 34

> DE...D

DED with double direction stroke (double stroke)

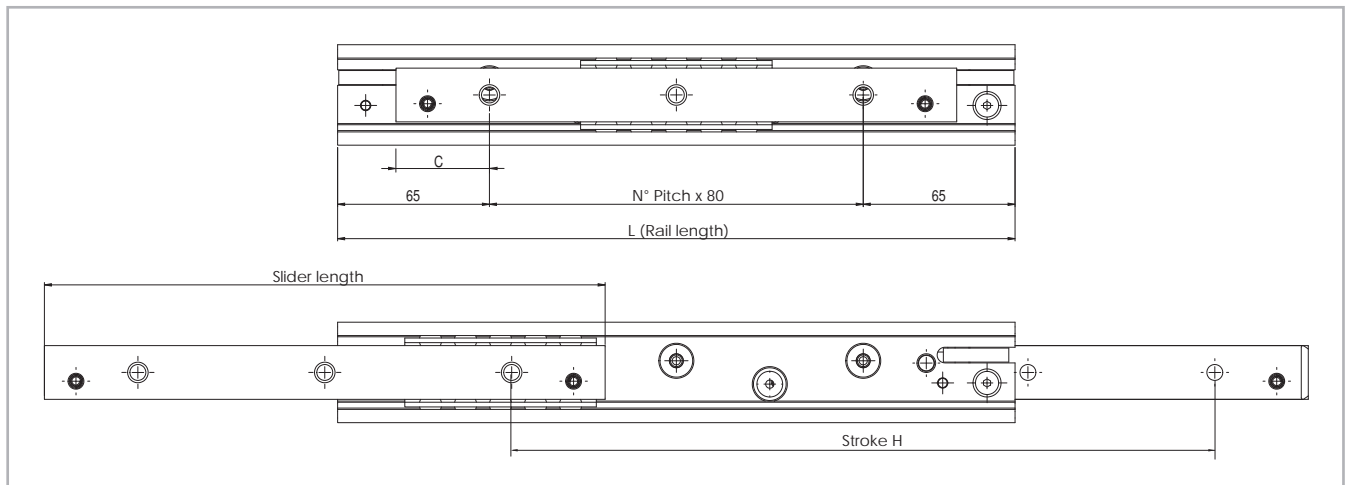


Fig. 29

D version (with a driving disc)

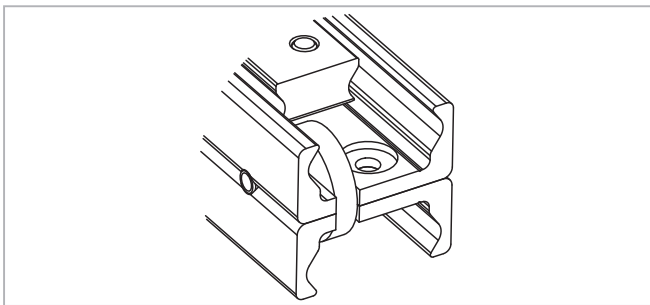


Fig. 30

The driving disc in the intermediate element in the DE...D versions acts to make sure that in bilateral strokes (double strokes) the intermediate element always returns to the correct position and does not remain in an undefined position. This design is available in sizes 28, 35, 43 and 63 with all three versions of the fixing holes. This version is based on the standard DE series version, but differs in the technical characteristics for the construction methods. Please contact our technical service department for more information.

Type	Size	Length L [mm]	Stroke H [mm]	Load capacities*		Slider [mm]	B [mm]	No. of holes
				C _{Orad} [N]	C _{Oax} [N]			
DEF...D DEV...D DEM...D	28	290	292	418	293	250	45	3
		370	376	612	428	330	45	4
		450	460	809	391	410	45	5
		530	544	1007	329	490	45	6
		610	628	970	285	570	45	7
		690	712	853	250	650	45	8
		770	796	762	224	730	45	9
		850	880	688	202	810	45	10
		930	964	628	184	890	45	11
		1010	1048	577	169	970	45	12
		1090	1132	534	157	1050	45	13
		1170	1216	496	146	1130	45	14

* The given load capacities and weights apply for a single extension

Tab. 35

Type	Size	Length L [mm]	Stroke H [mm]	Load capacities*		Slider [mm]	B [mm]	No. of holes
				C _{Orad} [N]	C _{Oax} [N]			
DEF...D DEV...D DEM...D	35	290	303	445	312	250	45	3
		370	391	661	463	330	45	4
		450	479	880	616	410	45	5
		530	543	1281	767	490	45	6
		610	631	1506	654	570	45	7
		690	719	1730	570	650	45	8
		770	783	1651	536	730	45	9
		850	871	1473	478	810	45	10
		930	959	1330	432	890	45	11
		1010	1023	1268	412	970	45	12
		1090	1111	1161	377	1050	45	13
		1170	1199	1070	347	1130	45	14
		1250	1263	1030	334	1210	45	15
		1330	1351	958	311	1290	45	16
		1410	1439	895	291	1370	45	17
		1490	1503	867	281	1450	45	18

* The given load capacities and weights apply for a single extension

Tab. 36

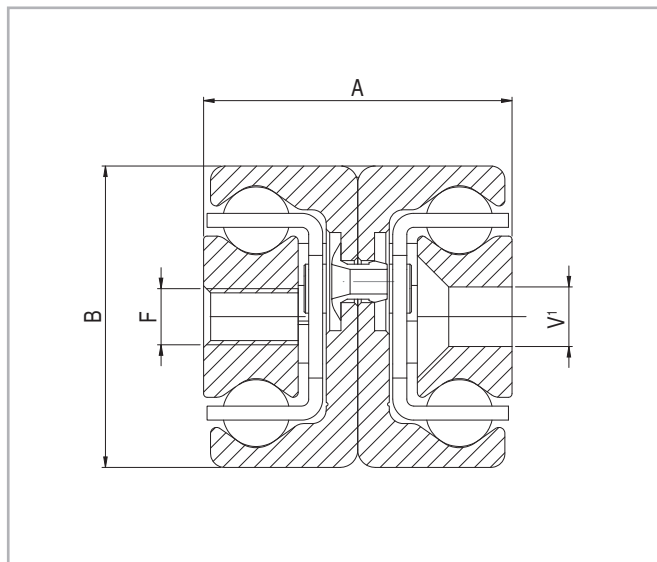
Type	Size	Length L [mm]	Stroke H [mm]	Load capacities*		Slider [mm]	B [mm]	No. of holes
				C _{0rad} [N]	C _{0ax} [N]			
DED...D DEV...D DEN...D	43	290	301	501	351	240	40	3
		370	401	700	490	320	40	4
		450	471	1159	811	400	40	5
		530	541	1656	1159	480	40	6
		610	641	1848	1242	560	40	7
		690	711	2362	1140	640	40	8
		770	781	2892	1054	720	40	9
		850	881	2753	915	800	40	10
		930	951	2583	859	880	40	11
		1010	1021	2433	809	960	40	12
		1090	1121	2180	725	1040	40	13
		1170	1191	2072	689	1120	40	14
		1250	1261	1974	656	1200	40	15
		1330	1361	1804	600	1280	40	16
		1410	1431	1729	575	1360	40	17
		1490	1501	1661	552	1440	40	18
		1570	1601	1538	512	1520	40	19
		1650	1671	1484	493	1600	40	20
		1730	1741	1433	476	1680	40	21
		1810	1841	1341	446	1760	40	22
1890	1911	1300	432	1840	40	23		
1970	2011	1224	407	1920	40	24		

* The given load capacities and weights apply for a single extension

Tab. 37

> DED version D

DED with double direction stroke (double stroke)



¹ Fixing holes (V) for countersunk head screws according to DIN 7991

Fig. 31

Type	Size	Length L [mm]	Stroke H [mm]	Load capacities*		Slider [mm]	B [mm]	No. of holes
				C _{0rad} [N]	C _{0ax} [N]			
DEF...D	63	610	602	3844	2691	558	39	7
		690	682	4618	3233	638	39	8
		770	762	5398	3257	718	39	9
		850	842	6181	2945	798	39	10
		930	922	6967	2687	878	39	11
		1010	1002	7756	2471	958	39	12
		1090	1082	7193	2287	1038	39	13
		1170	1162	6694	2128	1118	39	14
		1250	1242	6260	1990	1198	39	15
		1330	1322	5879	1869	1278	39	16
		1410	1402	5542	1762	1358	39	17
		1490	1482	5241	1666	1438	39	18
		1570	1562	4971	1580	1518	39	19
		1650	1642	4728	1503	1598	39	20
		1730	1722	4507	1433	1678	39	21
		1810	1802	4306	1369	1758	39	22
		1890	1882	4122	1310	1838	39	23
		1970	1962	3953	1257	1918	39	24

* The given load capacities and weights apply for a single extension

Tab. 38

Type	Size	Cross-section				Weight [kg/m]
		A [mm]	B [mm]	F	V ¹	
DE...D	28	26	28	M5	M5	4,04
	35	34	35	M6	M6	6,10
	43	44	43	M8	M8	10,50
	63	58	63	M8	-	20,60

Tab. 39

There are three options for mounting holes available for the

DE...D series in sizes 28 to 43:

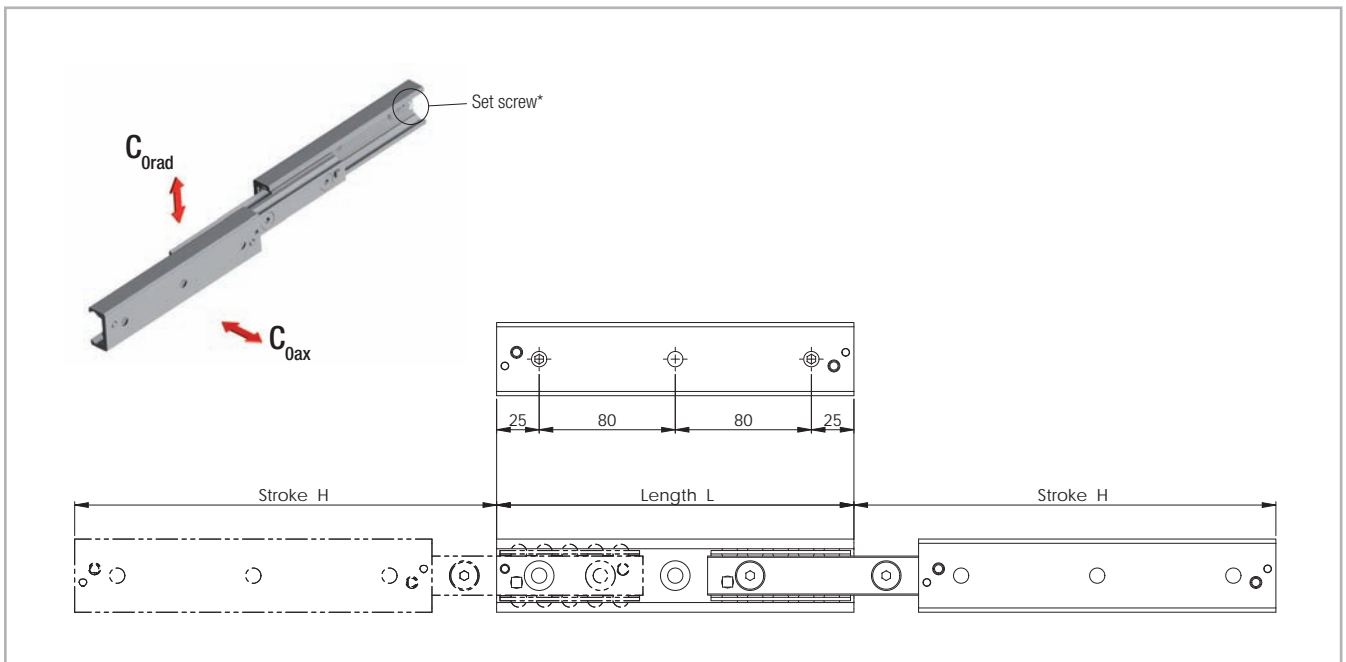
Version DEF with threaded holes,

Version DEV with counter-sunk holes,

Version DEM, both variants (mixed).

Size 63 is only available with threaded holes.

> DBN



* Remove the set screw to reach all the fixing holes. See also assembly instructions on page TR-45f.

Fig. 32

Type	Size	Length L [mm]	Stroke H [mm]	Load capacities*		No. of holes
				C _{Orad} [N]	C _{Oax} [N]	
DBN	22	130	152	119	83	2
		210	222	281	196	3
		290	308	236	236	4
		370	392	186	186	5
		450	462	162	162	6
		530	548	136	136	7
		610	632	117	117	8
		690	702	108	108	9
		770	788	95	95	10

Tab. 40

* The given load capacities and weights apply for a single extension

Type	Size	Length L [mm]	Stroke H [mm]	Load capacities*		No. of holes
				C _{Orad} [N]	C _{Oax} [N]	
DBN	28	130	148	235	164	2
		210	232	432	302	3
		290	296	622	537	4
		370	380	482	482	5
		450	464	393	393	6
		530	548	332	332	7
		610	633	286	286	8
		690	717	252	252	9
		770	801	226	226	10
		850	866	213	213	11
		930	950	194	194	12
		1010	1034	178	178	13
		1090	1118	164	164	14
		1170	1202	152	152	15

Tab. 41

* The given load capacities and weights apply for a single extension

3 Dimensions and load capacity

Type	Size	Length L [mm]	Stroke H [mm]	Load capacities*		No. of holes
				C _{Orad} [N]	C _{Oax} [N]	
DBN	35	210	254	402	281	3
		290	318	667	560	4
		370	406	522	522	5
		450	494	429	429	6
		530	558	394	394	7
		610	646	338	338	8
		690	734	297	297	9
		770	798	279	279	10
		850	886	250	250	11
		930	974	227	227	12
		1010	1038	217	217	13
		1090	1126	199	199	14
		1170	1214	183	183	15
		1250	1278	177	177	16
		1330	1366	165	165	17
		1410	1454	154	154	18
		1490	1518	149	149	19

* The given load capacities and weights apply for a single extension

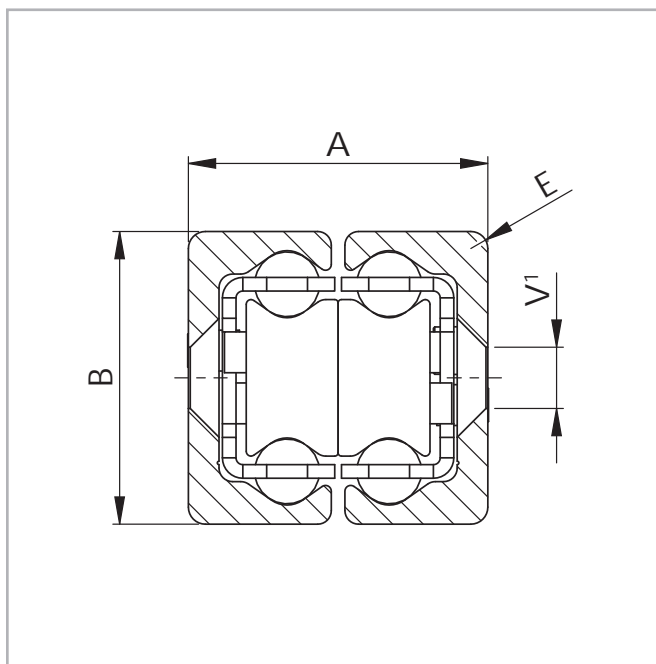
Tab. 42

Type	Size	Length L [mm]	Stroke H [mm]	Load capacities*		No. of holes
				C _{Orad} [N]	C _{Oax} [N]	
DBN	43	210	246	605	424	3
		290	316	1114	780	4
		370	416	1300	910	5
		450	486	1331	1279	6
		530	556	1193	1193	7
		610	626	1082	1082	8
		690	726	912	912	9
		770	796	845	845	10
		850	866	788	788	11
		930	966	693	693	12
		1010	1036	654	654	13
		1090	1106	619	619	14
		1170	1206	559	559	15
		1250	1276	533	533	16
		1330	1376	488	488	17
		1410	1446	469	469	18
		1490	1516	450	450	19
		1570	1586	434	434	20
		1650	1686	403	403	21
		1730	1756	390	390	22
		1810	1856	365	365	23
		1890	1926	354	354	24
		1970	2026	334	334	25

* The given load capacities and weights apply for a single extension

Tab. 43

> DBN



¹ Fixing holes (V) for countersunk head screws according to DIN 7991

Fig. 33

Type	Size	Cross-section				Weight [kg/m]
		A [mm]	B [mm]	E [mm]	V	
DBN	22	22	22	3	M4	2.64
	28	26	28	1	M5	4.04
	35	34	35	2	M6	6.10
	43	44	43	2.5	M8	10.50

Tab. 44

> DMS

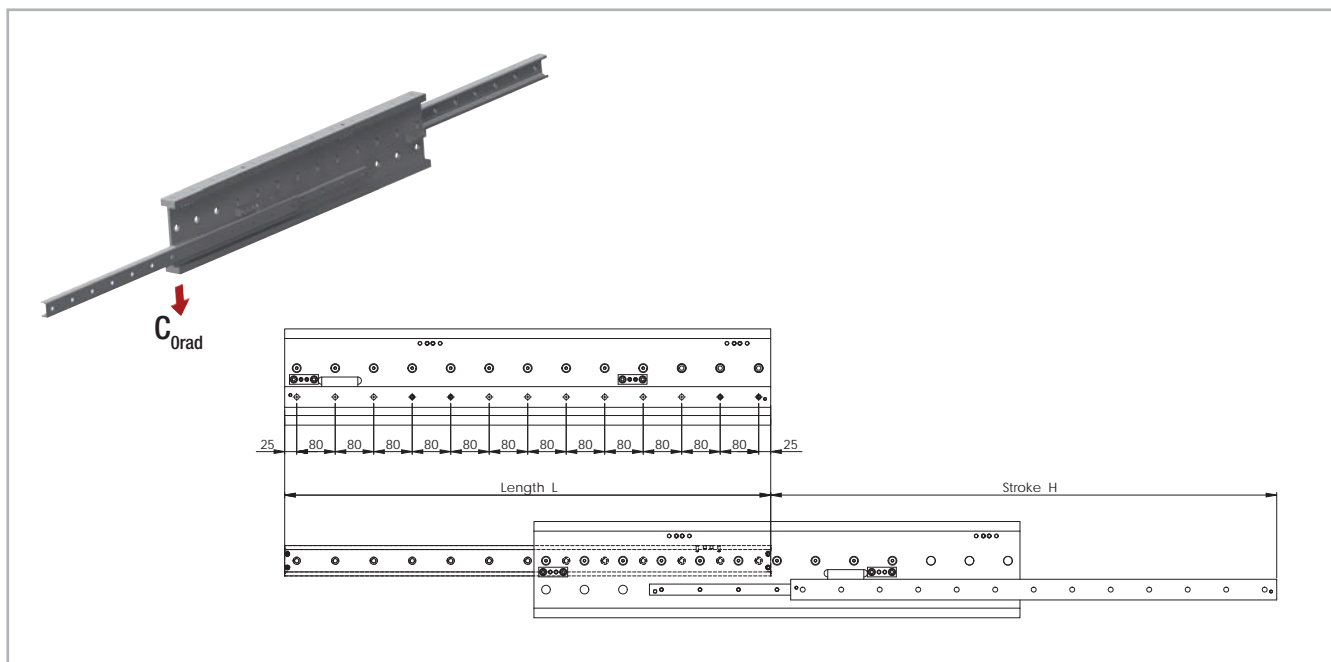


Fig. 34

Type	Size	Length L [mm]	Stroke H [mm]	Load capacity* C_{Orad} [N]	Fixed element Accessible holes / total	Movable element Accessible holes / total
DMS	63	1010	1051	8052	10 / 13	10 / 13
		1090	1141	8748	10 / 14	11 / 14
		1170	1216	9584	11 / 15	11 / 15
		1250	1291	10424	12 / 16	13 / 16
		1330	1381	11119	13 / 17	13 / 17
		1410	1456	11960	13 / 18	14 / 18
		1490	1531	12804	14 / 19	14 / 19
		1570	1621	13498	14 / 20	15 / 20
		1650	1696	14343	16 / 21	16 / 21
		1730	1771	15190	16 / 22	17 / 22
		1810	1861	15883	17 / 23	17 / 23
		1890	1936	16730	18 / 24	19 / 24
		1970	2026	17423	19 / 25	19 / 25
		2050	2101	18271	19 / 26	20 / 26
2130	2176	19120	20 / 27	20 / 27		
2210	2266	19812	21 / 28	22 / 28		

* The given load capacities and weights apply for a single extension

Tab. 45

> DMS

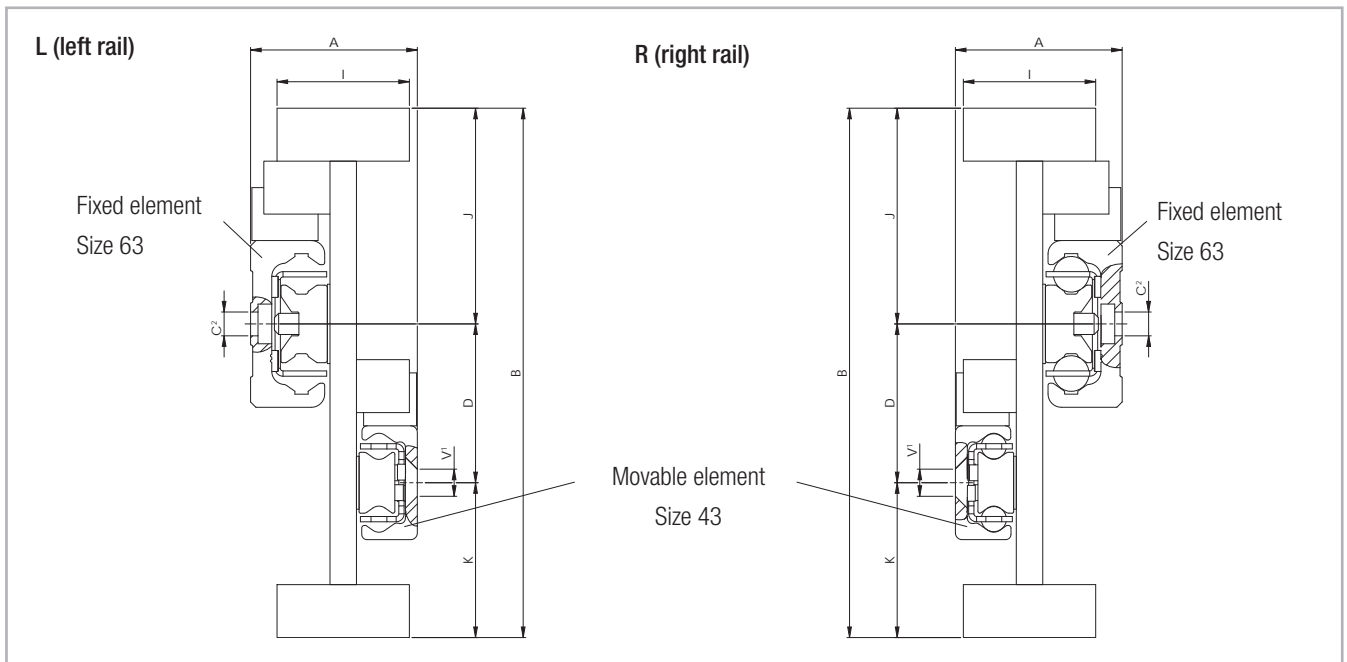


Fig. 35

¹ Fixing holes (V) for countersunk head screws according to DIN 7991

² Fixing holes (C) for socket cap screws according to DIN 7984. Alternative fixing with Torx® screws in special design with low head (on request)

Please observe right or left installation for version DMS.

Type	Size	Cross-section								Weight [kg/m]
		A [mm]	B [mm]	I [mm]	K [mm]	D [mm]	J [mm]	C	V	
DMS	63	63	200	50	58.5	60	81.5	M8	M8	43

Tab. 46

> DRT

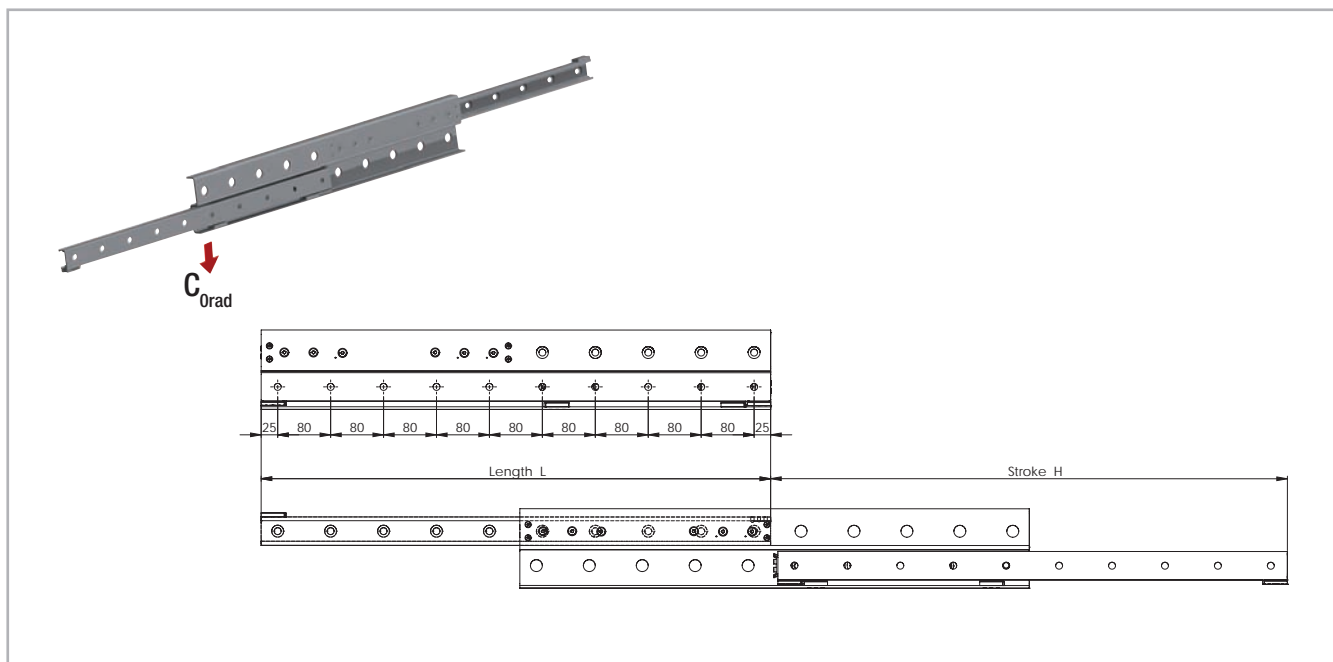


Fig. 36

Type	Size	Length L [mm]	Stroke H [mm]	Load capacity* C_{Orad} [N]	Accessible holes / total
DRT	43	770	780	2385	10 / 10
		850	860	2460	10 / 11
		930	940	2520	12 / 12
		1010	1020	2575	12 / 13
		1090	1100	2620	14 / 14
		1170	1180	2660	14 / 15
		1250	1260	2690	16 / 16
		1330	1340	2720	16 / 17
		1410	1420	2745	18 / 18
		1490	1500	2770	18 / 19
		1570	1580	2790	20 / 20
		1650	1660	2805	20 / 21
		1730	1740	2825	22 / 22
		1810	1820	2840	22 / 23
		1890	1900	2850	24 / 24
1970	1980	2860	24 / 25		

* The given load capacities and weights apply for a single extension

Tab. 47

> DRT

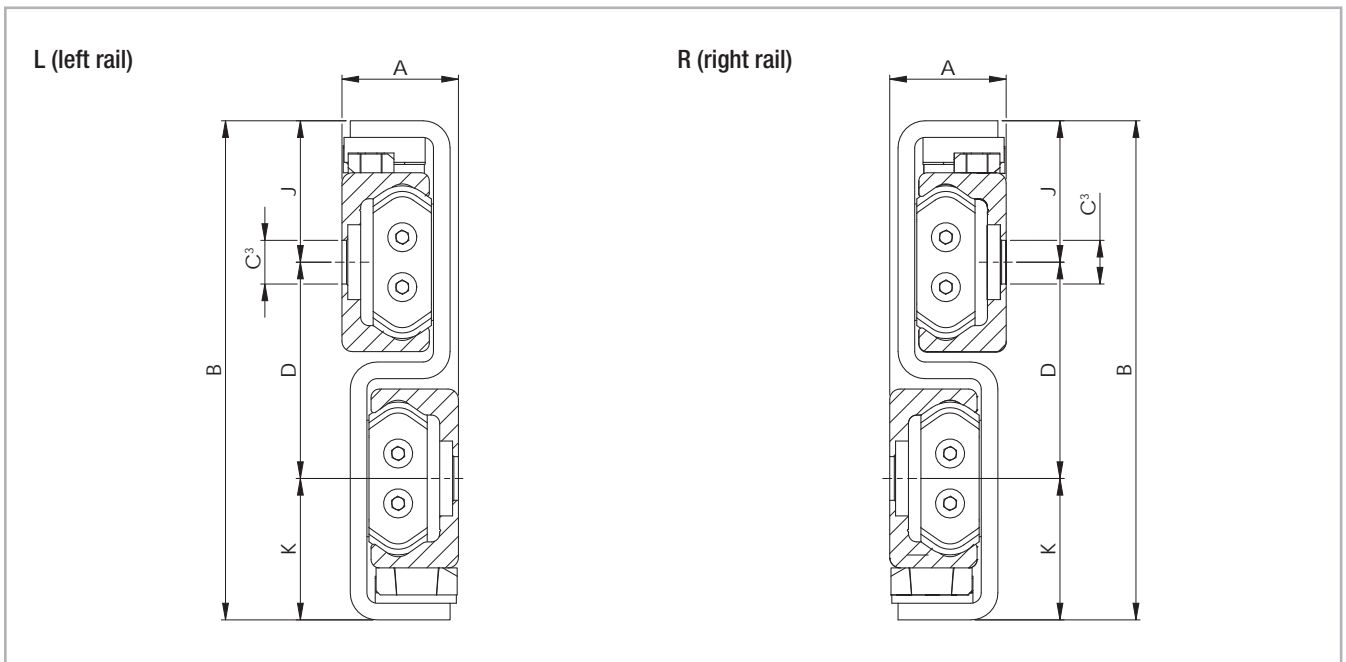


Fig. 37

³ Fixing holes for Torx® screws in custom design with load head (included in scope of supply)
Please observe right or left installation for version DRT.

Type	Size	Cross-section						Weight [kg/m]
		A [mm]	B [mm]	K [mm]	D [mm]	J [mm]	C	
DRT	43	29	120	34	52	34	M8	11.20

Tab. 48

Technical instructions



> 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 telescopic rail depends on two factors: the loading capacity of the ballcage and the rigidity of the intermediate element. For mainly short strokes the load capacity is determined by the load-bearing capacity of the ballcage; for average and long strokes it is determined by the rigidity of the intermediate element. Therefore series, which otherwise contain comparable components, are also suited for differing load capacities.

> Static load check

The values in the load capacity tables of the corresponding series (see Sect. 3, Product Dimensions, pg. TR-6ff) give the maximum permissible loading of a telescopic rail in the centre of the movable rail in the completely extended state.

All load capacity data is based on a telescopic rail.

Typically, a pair of rails is used and the loading acts in the centre on both rails (see fig. 39, P1).

In this case, the load capacity of a rail pair is:

$$P_1 = 2 \cdot C_{\text{Orad}}$$

Fig. 38

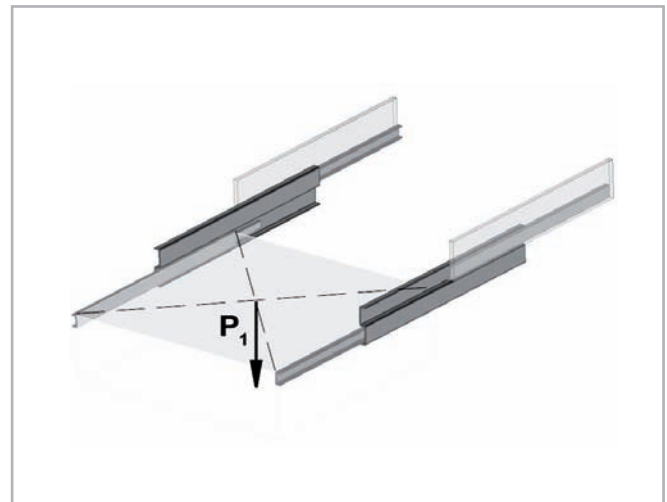


Fig. 39

> Deflection

If the load P acts vertically on the rail (see fig. 42), the expected elastic deflection of the individual telescopic rail in the extended state can be determined as follows:

$$f = \frac{q}{t} \cdot P \quad (\text{mm})$$

Fig. 40

Whereby:

f is the expected elastic deflection in mm

q is a stroke coefficient (see fig. 43)

t is a factor depending on the model of the telescopic rail (see fig. 41)

P is the actual load acting on the centre of a rail, in N

Also refer to page TR-38 for checking the static load

DS28	$t = 180$	DBN22	$t = 3$
DS35	$t = 470$	DBN28	$t = 8$
DS43	$t = 800$	DBN35	$t = 13$
DS63	$t = 4000$	DBN43	$t = 56$
DE22	$t = 8$	DMS63	$t = 3500$
DE28	$t = 17$	DRT43	$t = 800$
DE35	$t = 54$	DSC43	$t = 800$
DE43	$t = 120$		
DE63	$t = 540$		

Fig. 41

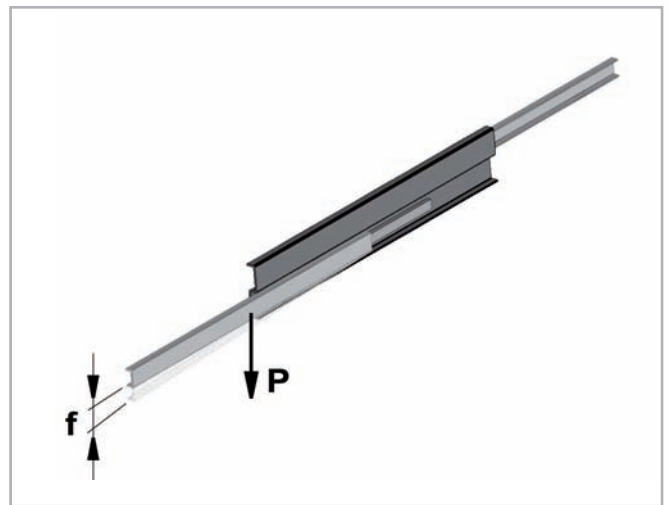


Fig. 42

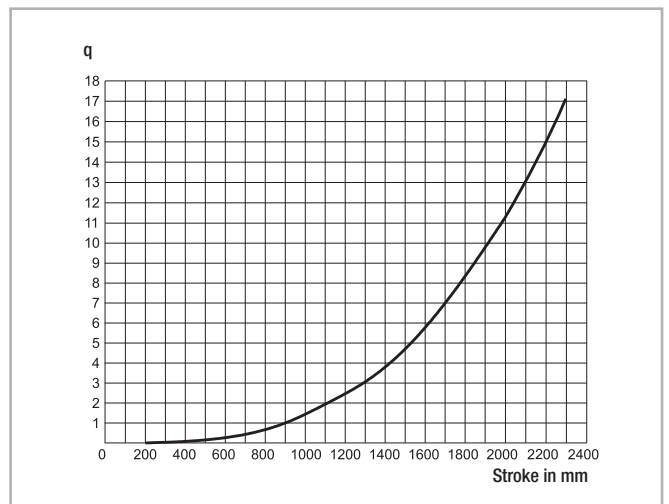


Fig. 43

Note: The above formula (see fig. 40) applies to a single rail. When using a rail pair, the load of the single rail is $P = P1/2$ (see pg. TR-36, fig. 39). This estimated value assumes an absolutely rigid adjacent construction. If this rigidity is not present, the actual deflection will deviate from the calculation.

Important:

With the partial extensions of the ASN series, the deflection is almost completely determined by the rigidity, i.e. by the moment of inertia of the adjacent construction.

For guides Series DSE please contact Rollon technical support.

> Static load

The telescopic extension of the various series allow different forces and moments (see Sect. 3, Product dimensions, pg. TR-6ff).

During the static tests the radial load capacity, C_{Orad} , the axial load capacity, C_{Oax} and moments M_x , M_y and M_z indicate the maximum permissible values of the loads; higher loads negatively effect the running properties

and the mechanical strength. A safety factor, S_0 , is used to check the static load, which takes into account the basic parameters of the application and is defined in more detail in the following table:

Safety factor S_0

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

Tab. 49

The ratio of the actual load to maximum permissible load may be as large as the reciprocal of the accepted safety factor, S_0 , at the most.

$\frac{P_{Orad}}{C_{Orad}} \leq \frac{1}{S_0}$	$\frac{P_{Oax}}{C_{Oax}} \leq \frac{1}{S_0}$	$\frac{M_1}{M_x} \leq \frac{1}{S_0}$	$\frac{M_2}{M_y} \leq \frac{1}{S_0}$	$\frac{M_3}{M_z} \leq \frac{1}{S_0}$
--	--	--------------------------------------	--------------------------------------	--------------------------------------

Fig. 44

The above formulas are valid for a single load case. If two or more of the described forces act simultaneously, the following check must be made:

$\frac{P_{Orad}}{C_{Orad}} + \frac{P_{Oax}}{C_{Oax}} + \frac{M_1}{M_x} + \frac{M_2}{M_y} + \frac{M_3}{M_z} \leq \frac{1}{S_0}$	<p>P_{Orad} = effective radial load C_{Orad} = permissible radial load P_{Oax} = effective axial load C_{Oax} = permissible axial load M_1 = effective moment in the x-direction M_x = permissible moment in the x-direction M_2 = effective moment in the y-direction M_y = permissible moment in the y-direction M_3 = effective moment in the z-direction M_z = permissible moment in the z-direction</p>
--	---

Fig. 45

> 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 rows of balls.

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 (f_i in the formula below), so the service life consists of:

$$L_{km} = 100 \cdot \left(\frac{\delta}{W} \cdot \frac{1}{f_i} \right)^3$$

L_{km} = calculated service life in km
 δ = load capacity factor in N
 W = equivalent load in N
 f_i = application coefficient

Fig. 46

Application coefficient f_i

	ASN, DS, DE, DBN, DRT, DSC
Neither shocks nor vibrations, smooth and low-frequency direction change, clean environment	1.3 - 1.8
Light vibrations and average direction change	1.8 - 2.3
Shocks and vibrations, high-frequency direction change, very dirty environment	2.3 - 3.5

Tab. 50

If the external load, P, is the same as the dynamic load capacity, C_{0rad} , (which of course must never be exceeded), the service life at ideal operating conditions ($f_i = 1$) amounts to 100 km.

Naturally, for a single load P, the following applies: $W = P$. If several external loads occur simultaneously, the equivalent load is calculated as follows:

$$W = P_{rad} + \left(\frac{P_{ax}}{C_{0ax}} + \frac{M_1}{M_x} + \frac{M_2}{M_y} + \frac{M_3}{M_z} \right) \cdot C_{0rad}$$

Fig. 47

Load capacity factor δ

Length [mm]	ASN				
	22	28	35	43	63
	δ [N]				
130	415	872			
210	932	1577	1533	2288	
290	1295	2692	2906	4055	
370	1665	3405	3721	4794	
450	2205	4119	4537	6602	
530	2567	4832	5990	8451	
610	2936	5557	6803	10325	15003
690	3480	6271	7617	11005	17708
770	3842	6984	9093	12877	20427
850		8111	9903	14762	23155
930		8811	10714	15429	25889
1010		9524	12201	17310	28629
1090		10237	13009	17981	31374
1170		10950	13818	19860	34121
1250			15311	21747	36871
1330			16118	22411	39623
1410			16925	24295	42377
1490			18423	26186	45133
1570				28083	47890
1650				28733	50648
1730				30626	53407
1810				31281	56166
1890				33172	58927
1970				33829	61688

Tab. 51

Length [mm]	DS...				DSE				DSC
	28	35	43	63	28	35	43	63	43
	δ [N]								
290	863				542				
370	1164				733				
450	1466	1892			924	1195			
530	1768	2540	3120		1116	1612	1988		3597
610	2078	2878	3929	5328	1310	1825	2509	3345	4451
690	2381	3217	4197	6459	1502	2040	2396	4063	4661
770	2684	3881	5010	7604	1694	2467	3194	4789	5511
850	3180	4218	5836	8759	2014	2679	3726	5523	6373
930	3474	4555	6090	9921	2203	2892	3879	6263	6572
1010	3778	5226	6916	11089	2396	3325	4410	7006	7880
1090	4081	5561	7750	12261	2706	3536	4948	7752	8296
1170	4384	5897	7646	13437	2781	3748	5095	8501	8934
1250	4896	6573	8829	14616		4184	5632	9252	9351
1330	5193	6907	9077	15798		4395	5781	10005	9990
1410	5496	7242	9909	16981		4606	6316	7957	10409
1490	5806	7920	10746	18166		5044	6855	11514	11728
1570		8253	10988	19353			7048	12270	11913
1650		8588	11825	20540			7539	13028	12330
1730		9268	12665	21729			8080	13786	13197
1810			12904	22919			8222	14544	13912
1890			13743	24109			8763	15303	14704
1970			13983	25301			8907	16063	14885

Tab. 52

Length [mm]	DRT	DMS
	43	63
	δ [N]	
770	5160	
850	5306	
930	5424	
1010	5522	12154
1090	5605	14987
1170	5675	14457
1250	5736	16486
1330	5789	16763
1410	5836	19842
1490	5878	19285
1570	5915	22158
1650	5948	21598
1730	5978	24707
1810	6005	23911
1890	6030	25963
1970	6053	26225
2050		29341
2130		28763
2210		30595

Tab. 53

Length [mm]	DE... / DBN				DE
	22	28	35	43	63
	δ [N]				
130	165	357			
210	386	655	614	923	
290	537	1153	1211	1687	
370	690	1456	1552	1974	
450	925	1759	1892	2764	
530	1075	2063	2540	3580	
610	1229	2372	2878	4414	6203
690	1467	2675	3217	4661	7361
770	1616	2979	3881	5493	8527
850		3487	4218	6335	9699
930		3783	4555	6572	10875
1010		4086	5226	7411	12055
1090		4388	5561	8257	13238
1170		4691	5897	8489	14423
1250			6573	9332	15610
1330			6907	9568	16798
1410			7242	10409	17987
1490			7920	11255	19178
1570				12105	20369
1650				12330	21561
1730				13178	22754
1810				13406	23948
1890				14252	25142
1970				14483	26336

Tab. 54

> Speed

The maximum operating speed is determined by the mass of the intermediate element, which moves with the movable rail. This reduces the maximum permissible operating speed with increasing length (see fig. 48).

Maximum acceleration: 1.2 m/s²

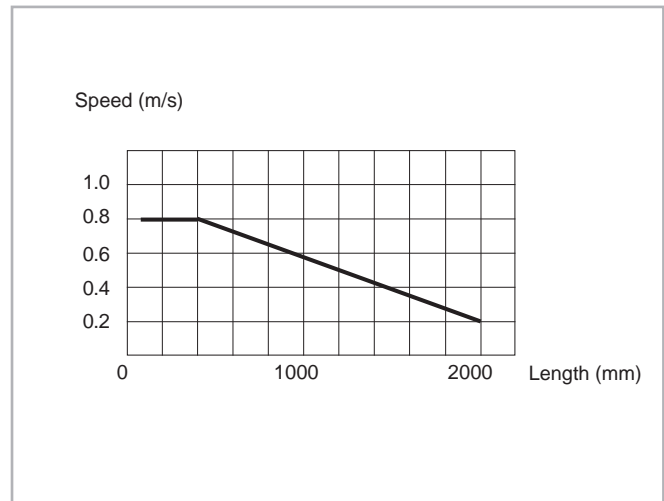


Fig. 48

> Opening and closing force

The required actuation forces of a telescopic rail depend on the acting load and the deflection in the extended state. The force required for opening is principally determined by the coefficient of friction of the linear bearing. With correct assembly and lubrication, this is 0.01. During the extension, the force is reduced with the elastic deflection of the loaded

telescopic rail. A higher force is required to close a telescopic extension, since, based on the elastic deflection, even if it is minimal, the movable rail must move against an inclined plane.

> Double-sided stroke

For all designs allowing double-sided stroke, it must be noted that the position of the intermediate element is defined only in the extended state. In the extended state, the intermediate element can protrude by half of its length on each side. Exception is the ASN series, which comes out as a partial extension without an intermediate element and the custom design of series DE with driving disc.

The double-sided stroke in the ASN, DE and DBN series is achieved by removing the set screw. For the DSD series, the double-sided stroke is implemented by design adaptation. Double-sided stroke for series DMS on request. The DSB and DRT series are not available with double-sided stroke.

> Temperature

- ASN, DE, DBN series can be used up to an ambient temperature of +170 °C (+338 °F). A lithium lubricant for high operating temperatures is recommended for temperatures above +130 °C (+266 °F). Minimum temperature with standard grease is -20 °C (-4 °F).
- The DS, DSC, and DRT series have a useable range of -20 °C to +110 °C (-4 °F to +230 °F) due to of the rubber stop.
- The DSS43S and DE...S series have a temperature range of application from -20 °C to + 50 °C (-4 °F to 122 °F), due to the bumpers in special resin.

> Anticorrosive protection

- All of our Telescopic Rail series have a standard anticorrosive protection by electrolytic galvanisation according to ISO 2081. If a higher resistance to corrosion is required, the guides are available with Rollon Alloy or chemical nickel treatment. For both versions stainless steel balls are provided.
- Numerous application-specific surface treatments are available upon request, e.g., FDA approved nickel plating for use in the food industry. For more information please contact Rollon technical support.

> Lubrication

Recommended lubrication intervals are heavily dependent upon the ambient conditions, speed and temperature. Under normal conditions, lubrication is recommended after 100 km operational performance or after an operating period of six months. In critical application cases the interval should be shorter. Please clean the raceways carefully before lubricating. Raceways and spaces of the ball cage are lubricated with a lithium lubricant of average consistency (roller bearing lubricant).

Different lubricants are available on request for special applications:

- FDA-approved lubricant for use in the food industry
- specific lubricant for clean rooms
- specific lubricant for the marine technology sector
- specific lubricant for high and low temperatures

For specific information, contact Rollon technical support.

> Clearance and preload

Telescopic Rail guides are mounted as standard with no play. For more information, please contact Rollon technical support.

Preload classes		
Increased clearance	No clearance	Increased preload
G ₁	Standard	K ₁

Tab. 55

* for higher preload, contact Rollon technical support.

> Fixing screws

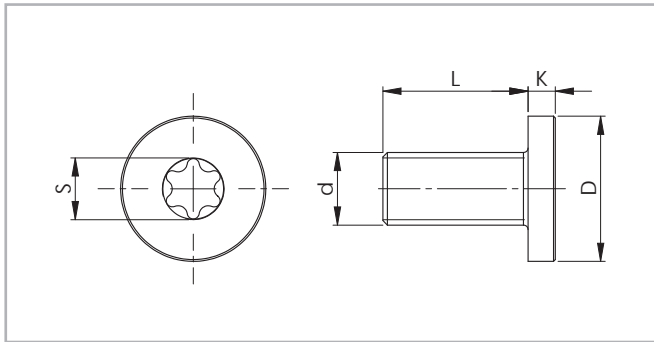


Fig. 49

The DRT 43 telescopic rail must be fixed with a custom designed Torx® screws with low cap head. The screws are included in the scope of supply. All other rails are fixed with counter-sunk or cap head screws as per DIN 7991 or 7984. In size 63 of the ASN and DMS series, Torx® screws with low head cap screws are available on request (see fig. 49).

Size	Screw type	d	D [mm]	L [mm]	K [mm]	S
63	M8 x 20	M8 x 1.25	13	20	5	T40
43	M8 x 16	M8 x 1.25	16	16	3	

Tab. 56

Recommended Standard fixing screw tightening torques

Property class	Size	Tightening torque [Nm]
10.9	22	3
	28	6
	35	10
	43	25
	63	30

Tab. 57

Prepare a sufficient bevel on the threaded fixing holes, according to the following table:

Size	Bevel (mm)
22	0,5 x 45°
28	1 x 45°
35	1 x 45°
43	1 x 45°
63	1 x 45°

Tab. 58

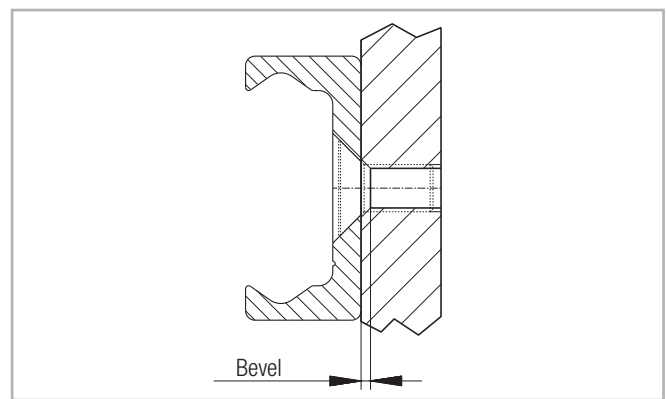
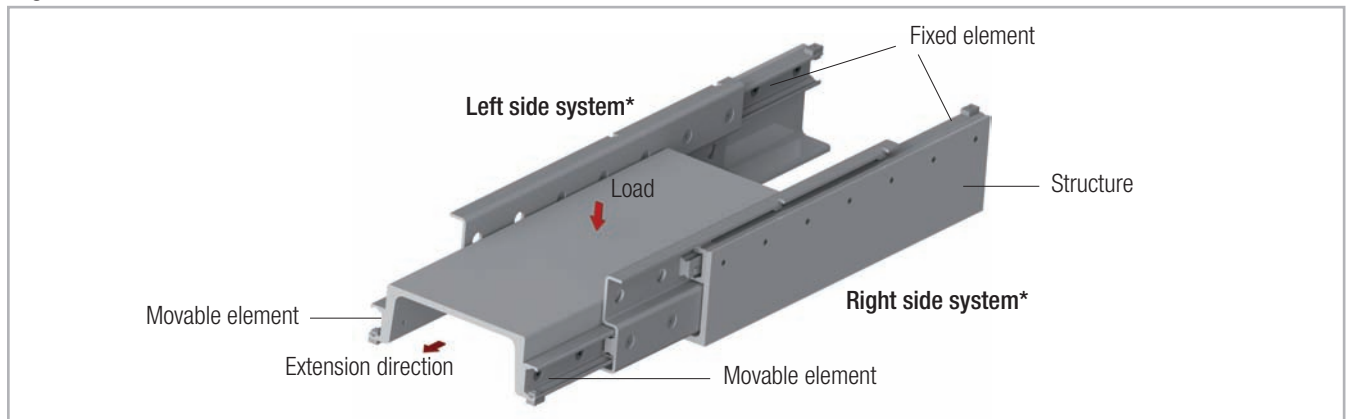


Fig. 50

> Installation instructions

In general and for ASN, DBN, DE, DMS, DRT, DSB, DSE



* For models DMS, DRT, DSB, and DSE, please observe right or left side use

Fig. 51

General

- Internal stops are used to stop the unloaded slider and the ball cage. Please use external stops as end stops for a loaded system.
- 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.
- In order to reach all mounting holes for the ASN, DEV, DEM and DBN series it is necessary to remove the locking screw in the rail during assembly and then to reinsert it afterwards.
- When using two telescopic rails, please observe the parallelism of the installation surfaces. The fixed and movable rails fit to the rigid assembly construction.
- Telescopic Rail guides are suitable for continuous use in automatic systems. For this, the stroke should remain constant in all moving cycles and the operating speed must be checked (see pg. TR-42, fig. 48). The movement of the telescopic rails is enabled by internal ballcages, which could experience an offset from the original position with differing strokes. This phase offset can have a negative effect on the running properties or limit the stroke. If differing strokes occur in an application, the drive force must be sufficiently dimensioned in order to appropriately synchronise the ballcage offset. Otherwise, an additional maximum stroke must be planned regularly to ensure the correct position of the ballcage.

ASN

- Series ASN accepts radial and axial loads and moments in all principle directions.
- Horizontal and vertical application is possible. Prior to vertical installation, we recommend contacting Rollon technical support.
- The installation of two partial extensions on a profile provides a load capable full extension. For individual solutions, please contact Rollon technical support.

DE / DBN

- Series DE and DBN accept radial and axial loads.
- Horizontal and vertical application is possible. Prior to vertical installation, we recommend you contact Rollon technical support.
- The functionality of custom design DE...D is only guaranteed if the stroke available is completely used.

DS / DSE / DMS / DRT

- Series DS, DES, DMS and DRT accept 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, we recommend you contact Rollon technical support.
- When installing make sure that the load is placed on the movable element (the lower rail) (see fig. 51).
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.

> Installation instructions

For DSC

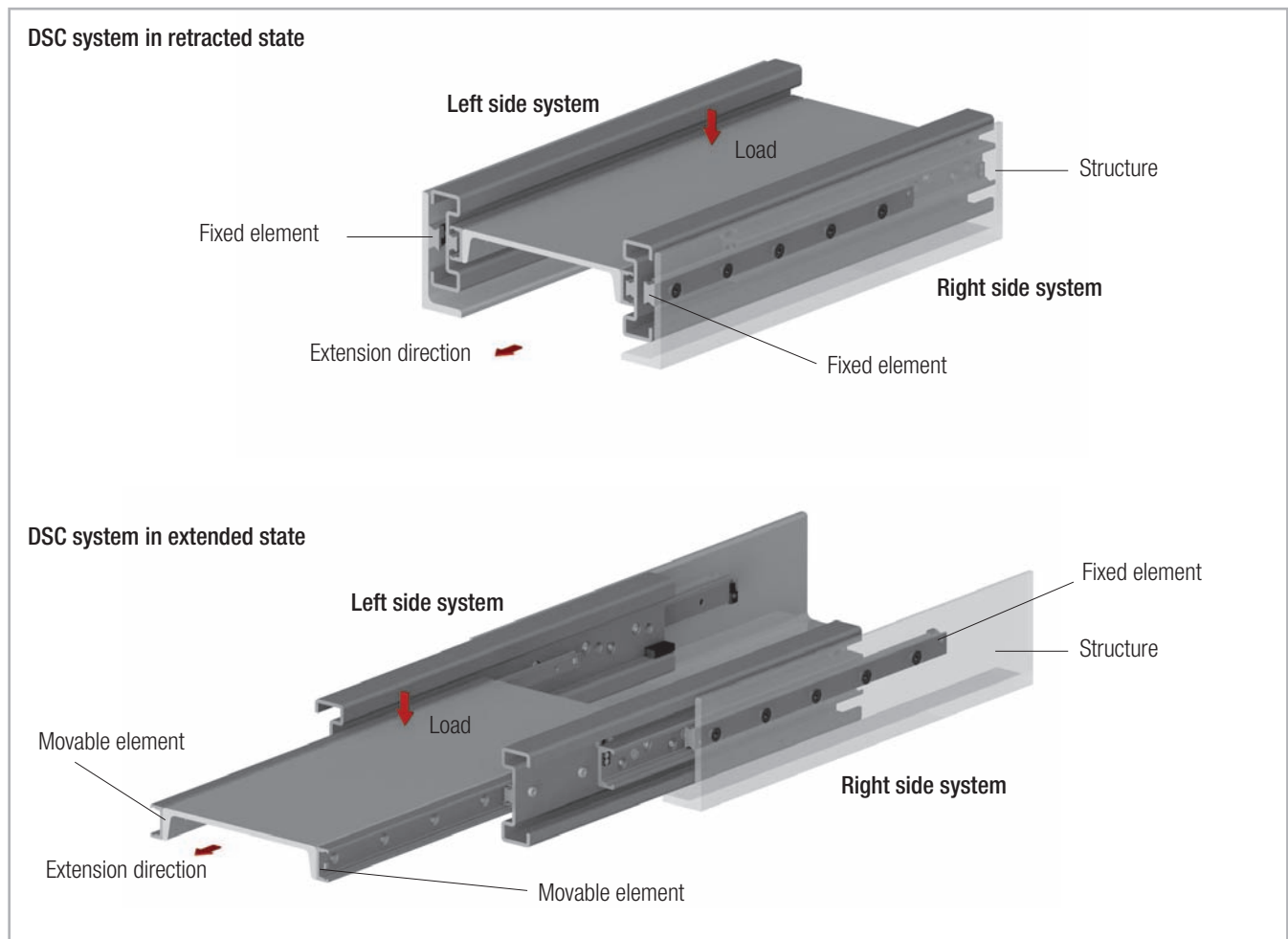


Fig. 52

DSC

- The DSC series absorbs radial and axial loads, in which case radial load directions are preferable.
- Horizontal and vertical use is possible. Prior to vertical installation we recommend inspection by the application engineers.
- During installation make sure that the load is mounted on the movable element (see Fig. 52). Reverse installation will impair proper functioning.
- The installation must be performed on a rigid structure, using all accessible mounting holes.
- Important: The length of the slider (fixed element) is different from the system length. See Table 23 on page TR-20 for DSC load ratings. The table also provides information on the accessible mounting holes.
- Important: The slide (fixed element) must be mounted in the front position when the system is retracted in order to achieve the entire stroke.
- If used in pairs, make sure the elements are aligned parallel during mounting.

Ordering key

> Telescopic rails

DSB	28	690	885	L	NIC
					Expanded surface protection is deviation from standard (ISO 2081) <i>see pg. TR-43, Anticorrosive protection</i>
					Right (R) or left (L) version (only for series DMS, DRT, DSB, DSE) <i>see pg. TR-5 Remarks</i>
					Stroke, if deviating from standard stroke (catalogue data) <i>see pg. TR-6ff Product dimensions and Ordering key for special strokes</i>
		Length			<i>see pg. TR-6ff Product dimensions</i>
	Size				<i>see pg. TR-6ff Product dimensions</i>
Product type					<i>see pg. TR-6ff Product dimensions</i>

Ordering example 1: ASN35-0770

Ordering example 2: DSB28-0690-0885-L-NIC

Ordering example 3 (rail DE...D): DEF28D-0690

Notes on ordering: Information for right and left side installation and for expanded surface protection is only necessary if required.

Rail lengths and stroke lengths are always stated with 4 digits. Please pad with zeroes to fill in for lengths with less than 4 digits, e.g. 515mm length is "0515"

> Special strokes

Special strokes are defined as deviations from standard stroke H. They are each available as multiples of the values in tab. 59 and 60.

These values are dependent on the spacing of the ballage.

Type	Size	Stroke modification [mm]
ASN	22	7.5
	28	9.5
	35	12
	43	15
	63	20

Tab. 59

Stroke modification of series DMS on request.

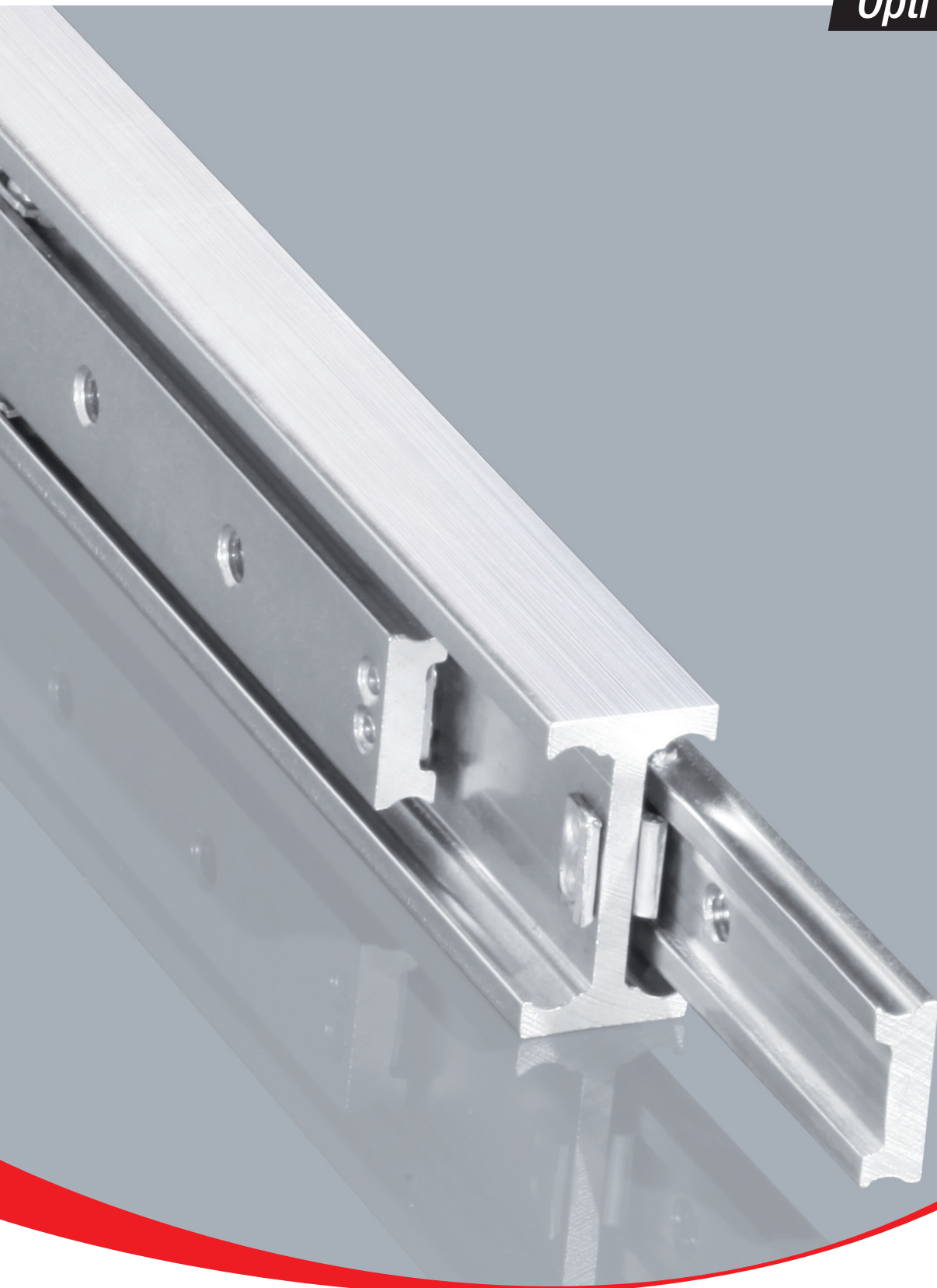
No stroke modification is possible for the DSD, DSC and DRT series. Each stroke modification influences the load capacities stated in the catalogue. It is possible that after a stroke modification important fastening holes might no longer be accessible. For more information please contact Rollon technical support.

Type	Size	Stroke modification [mm]
DSS DE DBN	22	15
	28	19
	35	24
	43	30
	63	40
DSE	28	28,5
	35	36
	43	45
	63	60

Tab. 60

ROLLON[®]
Linear Evolution

Opti Rail



Product explanation



> Fully extending telescopic rails for manual movement



Fig. 1

Range of fully extending telescopic rails, extremely compact and highly rigid, with reduced deflection even when the telescopic rail is fully extended. The steel ball bearings ensure a high load capacity.

The most important characteristics:

- Full extension
- Compact construction
- Quiet and smooth operation
- Long life
- Reliable operation
- 2 types of hole pitch

Preferred areas of application:

- Railway (e. g. maintenance and battery extensions)
- Special Vehicles (e.g. fireworks, ambulance, mobile shops)
- Professional furniture
- Special machines
- Industrial drawers

LTH

Fully extending telescopic rail made of cold drawn steel, consisting of two rails, one fixed and one moveable, and of a central I-beam profile element. This element has high inertia and a very rigid construction, while boasting a very compact design. This ensures a high load capacity and reduced deflection even when the telescopic rail is fully extended.

...S version available with reinforced and damped stainless steel end stops.



Fig. 2

LTF

Fully extending telescopic rail consisting of two guide rails as fixed and movable elements and an S-shaped intermediate element. This special shape allows an extremely slim and compact design for movements that are only occasionally executed.



Fig. 3

Technical data

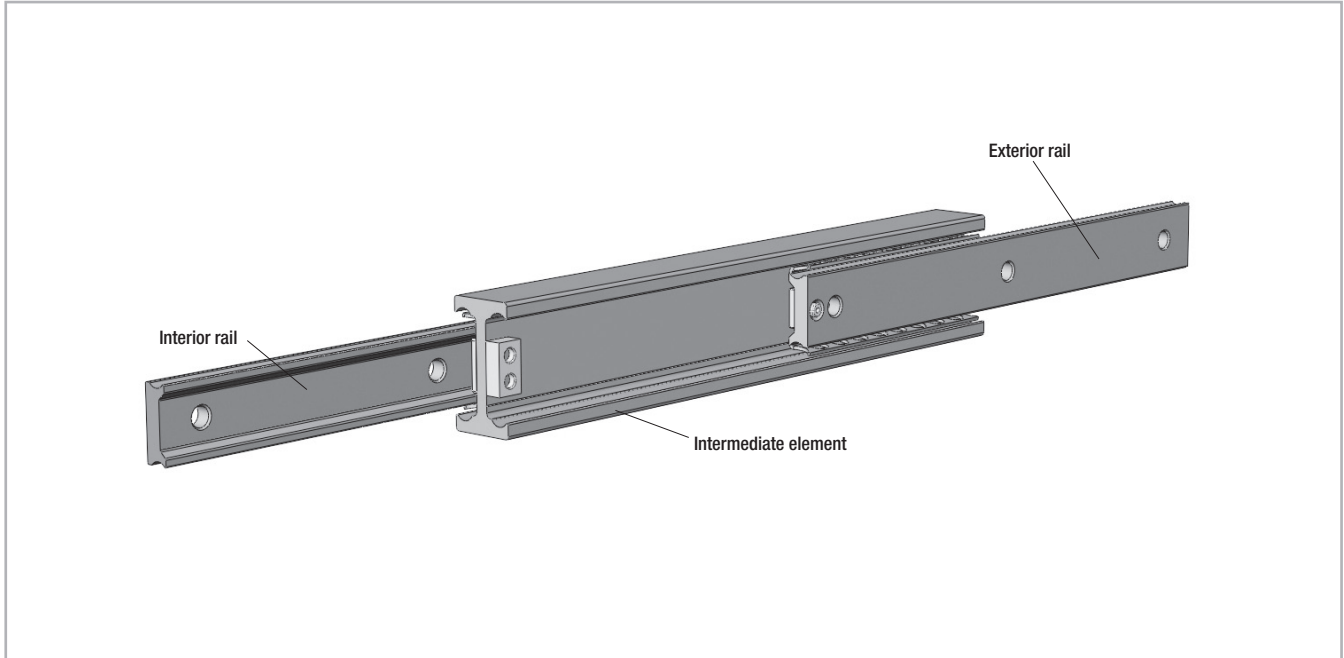


Fig. 4

Performance characteristics

- Temperature range: -20 °C to +170 °C (-4 °F to +338 °F)
- Max. operating speed: 0.3 m/s (depending on application)
- Available sizes LTH: 30 and 45
- Available sizes LTF: 44
- Sliders and LTH central element made of steel Cf53
- Sliders and LTF central element made of steel C43

Note:

- Horizontal movement installation is recommended
- Vertical movement installation on request
- Custom strokes on request
- All load capacity data are based on one telescopic rail
- Fixing screws of property class 10.9 must be used for all telescopic rails
- Internal stops are used to stop the unloaded slider and the ball cage.
Please use external stops as end stops for a loaded system.

Dimensions and load capacity

LTH30 RF

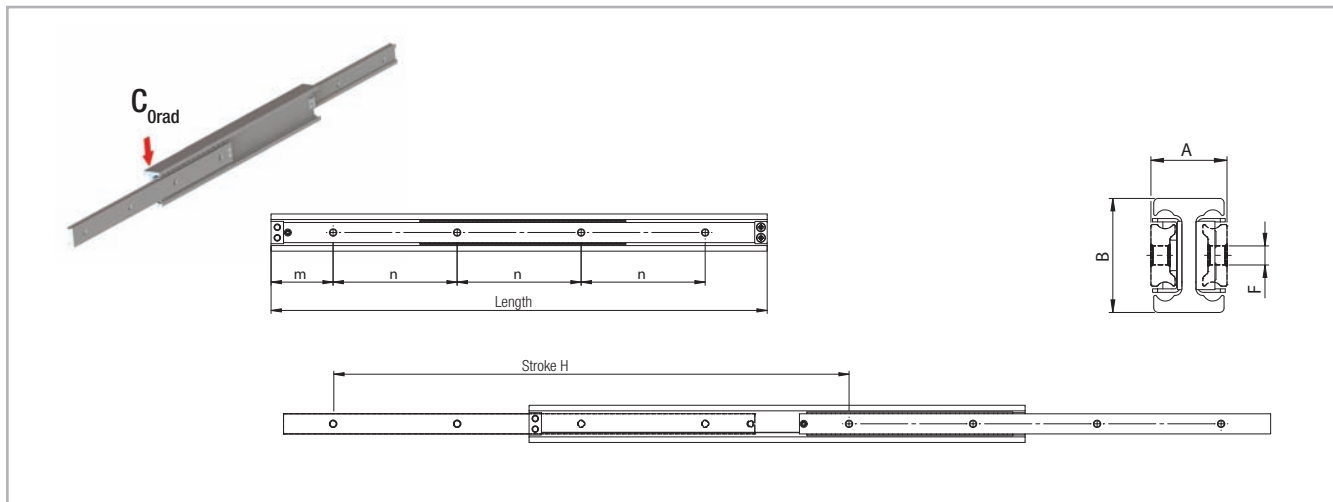


Fig. 5

Type	Size	Length	Stroke H	A	B	m	n	F	Load capacity*	No. of holes	Weight*
		[mm]	[mm]	[mm]	[mm]	[mm]	[mm]		C_{Orad} [N]		[kg]
LTH	30	250	285	20	30	25	100	M6	202	3	0.88
		300	323			50			504		1.05
		350	377			25			521	4	1.23
		400	416			50			568		1.40
		450	485			25			582	5	1.58
		500	523			50			735		1.75
		550	577			25			732	6	1.93
		600	615			50			701		2.10
		650	685			25			615	7	2.28
		700	723			50			593		2.45
		750	777			25			550	8	2.63
		800	815			50			533		2.80
		850	884			25			481	9	2.98
		900	923			50			468		3.15
		950	977			25			441	10	3.33
		1000	1015			50			429		3.50
1050	1084	25	396	11	3.68						
1100	1123	50	386		3.85						
1150	1176	25	368	12	4.03						
1200	1215	50	360		4.20						

* The given load capacities and weights apply for a single extension

Tab. 1

> LTH30 KF

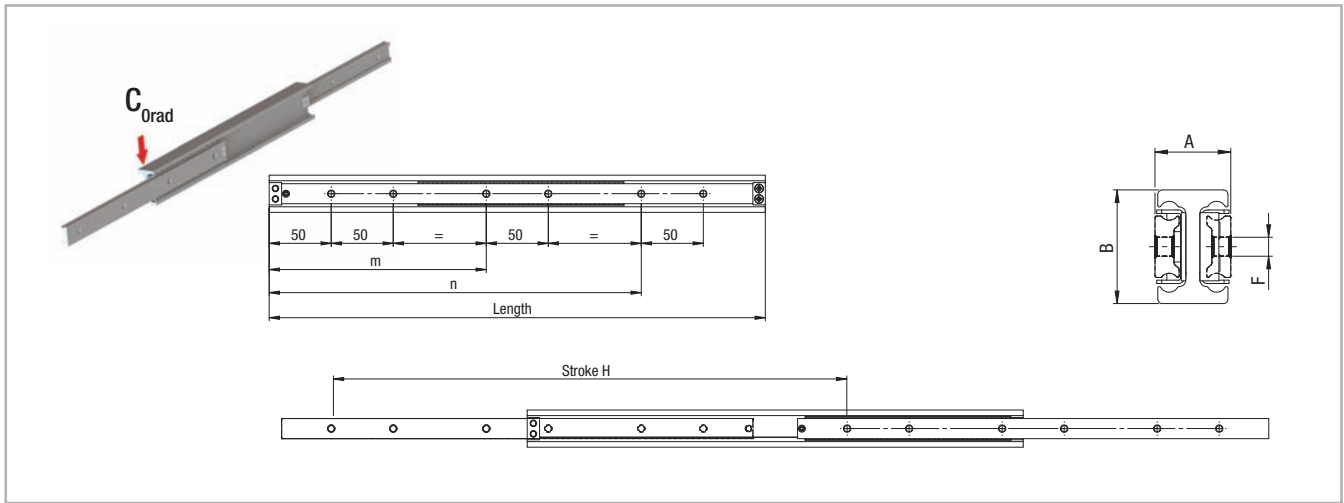


Fig. 6

Type	Size	Length	Stroke H	A	B	m	n	F	Load capacity*	No. of holes	Weight*
		[mm]	[mm]	[mm]	[mm]	[mm]	[mm]		C_{Orad} [N]		[kg]
LTH	30	250	285	20	30	-	150	M6	202	4	0.88
		300	323			-	200		504		1.05
		350	377			-	250		521		1.23
		400	416			175	300		568		1.40
		450	485			200	350		582	1.58	
		500	523			225	400		735	1.75	
		550	577			250	450		732	1.93	
		600	615			275	500		701	2.10	
		650	685			300	550		615	2.28	
		700	723			325	600		593	2.45	
		750	777			350	650		550	2.63	
		800	815			375	700		533	2.80	
		850	884			400	750		481	2.98	
		900	923			425	800		468	3.15	
		950	977			450	850		441	3.33	
		1000	1015			475	900		429	3.50	
1050	1084	500	950	396	3.68						
1100	1123	525	1000	386	3.85						
1150	1176	550	1050	368	4.03						
1200	1215	575	1100	360	4.20						

* The given load capacities and weights apply for a single extension

Tab. 2

> LTH30S

...S version with reinforced and damped stainless steel end stops

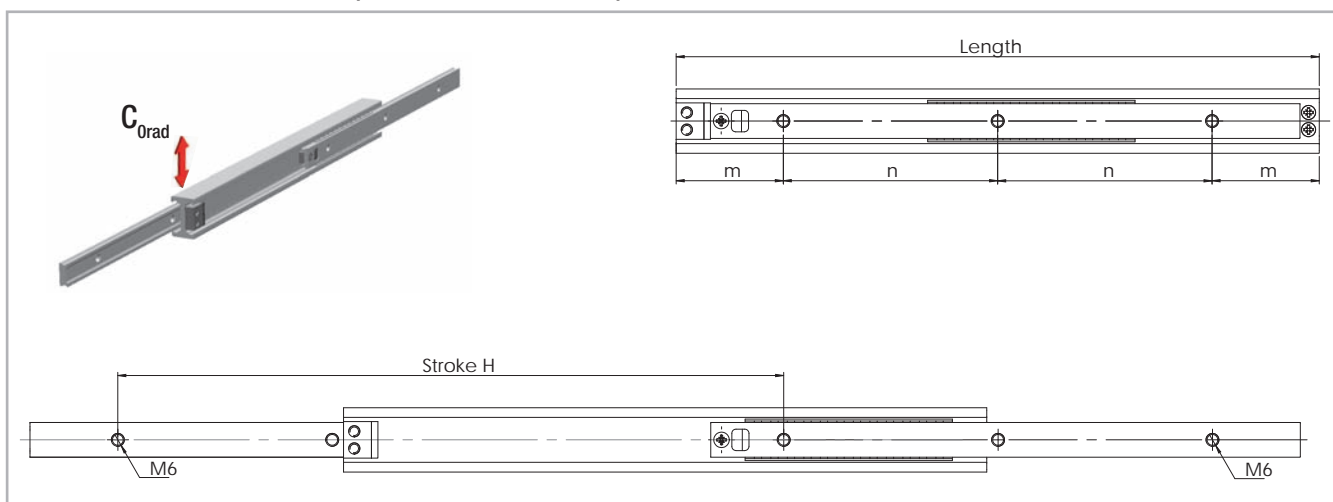


Fig. 7

Type	Size	Length [mm]	Stroke H [mm]	A [mm]	B [mm]	m [mm]	n [mm]	F	Load capacity* C _{Orad} [N]	No. of holes
LTH...S	30	300	310	20	30	50	100	M6	408	3
		350	364			75			440	
		400	402			50			497	4
		450	472			75			516	
		500	510			50			665	5
		550	564			75			749	
		600	618			50			696	6
		650	671			75			638	
		700	725			50			589	7
		750	764			75			569	
		800	817			50			530	8
		850	871			75			496	
		900	925			50			466	9
		950	979			75			439	
		1000	1017			50			428	10
1050	1071	75	405							
1100	1109	50	395	11						
1150	1179	75	366							
1200	1217	50	359	12						

* The given load capacities and weights apply for a single extension

Tab. 3

> LTH45 RF

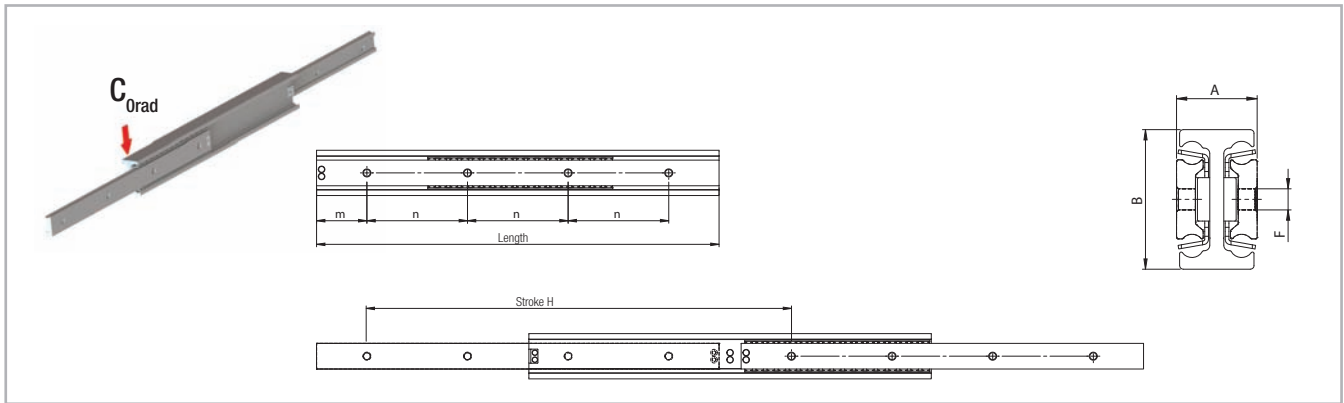


Fig. 8

Type	Size	Length	Stroke H	A	B	m	n	F	Load capacity*	No. of holes	Weight*
		[mm]	[mm]	[mm]	[mm]	[mm]	[mm]		C_{Orad} [N]		[kg]
LTH	45	250	276	26	45	25	100	M8	1305	3	1.50
		300	310			50			1412		
		350	388			25			1410	4	2.10
		400	422			50			1421		
		450	478			25			1432	5	2.70
		500	512			50			1450		
		550	590			25			1382	6	3.30
		600	624			50			1516		
		650	680			25			1626	7	3.90
		700	714			50			1673		
		750	770			25			1542	8	4.50
		800	826			50			1430		
		850	882			25			1333	9	5.10
		900	916			50			1307		
		950	972			25			1225	10	5.70
		1000	1028			50			1153		
		1050	1084			25			1089	11	6.30
		1100	1118			50			1072		
		1150	1174			25			1017	12	6.90
		1200	1230			50			967		
1250	1286	25	921	13	7.50						
1300	1320	50	909								
1350	1376	25	869	14	8.10						
1400	1410	50	858								
1450	1488	25	798	15	8.70						
1500	1522	50	789								

* The given load capacities and weights apply for a single extension

Tab. 4

> LTH45 KF

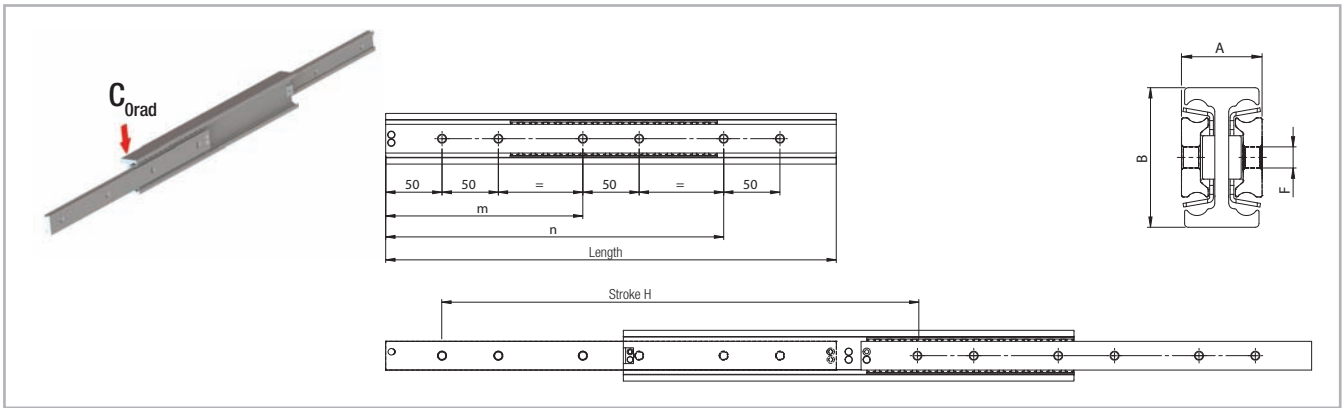


Fig. 9

Type	Size	Length [mm]	Stroke H [mm]	A [mm]	B [mm]	m [mm]	n [mm]	F	Load capacity* C_{Orad} [N]	No. of holes	Weight* [kg]
LTH	45	250	276	26	45	-	150	M8	1305	4	1.50
		300	310			-	200		1412		1.80
		350	388			-	250		1410		2.10
		400	422			175	300		1421		2.40
		450	478			200	350		1432	2.70	
		500	512			225	400		1450	3.00	
		550	590			250	450		1382	3.30	
		600	624			275	500		1516	3.60	
		650	680			300	550		1626	3.90	
		700	714			325	600		1673	4.20	
		750	770			350	650		1542	4.50	
		800	826			375	700		1430	4.80	
		850	882			400	750		1333	5.10	
		900	916			425	800		1307	5.40	
		950	972			450	850		1225	5.70	
		1000	1028			475	900		1153	6.00	
		1050	1084			500	950		1089	6.30	
		1100	1118			525	1000		1072	6.60	
		1150	1174			550	1050		1017	6.90	
		1200	1230			575	1100		967	7.20	
1250	1286	600	1150	921	7.50						
1300	1320	625	1200	909	7.80						
1350	1376	650	1250	869	8.10						
1400	1410	675	1300	858	8.40						
1450	1488	700	1350	798	8.70						
1500	1522	725	1400	789	9.00						

* The given load capacities and weights apply for a single extension

Tab. 5

> LTH45S

...S version with reinforced and damped stainless steel end stops

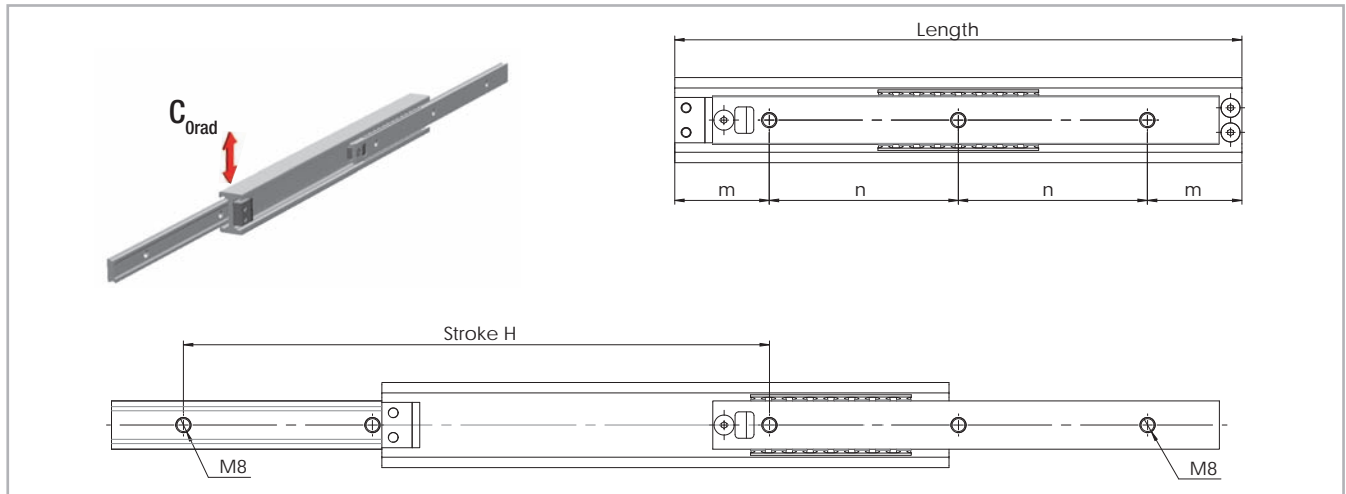


Fig. 10

Type	Size	Length [mm]	Stroke H [mm]	A [mm]	B [mm]	m [mm]	n [mm]	F	Load capacity* C_{Orad} [N]	No. of holes
LTH...S	45	300	310	26	45	50	100	M8	658	3
		350	366			75			916	
		400	422			50			833	4
		450	456			75			1077	
		500	512			50			986	5
		550	568			75			1100	
		600	624			50			1102	6
		650	680			75			1213	
		700	714			50			1471	7
		750	770			75			1542	
		800	826			50			1430	8
		850	882			75			1333	
		900	916			50			1307	9
		950	972			75			1225	
		1000	1028			50			1153	10
		1050	1084			75			1089	
		1100	1118			50			1072	11
		1150	1174			75			1017	
		1200	1230			50			967	12
		1250	1286			75			921	
1300	1320	50	909	13						
1350	1376	75	869							
1400	1410	50	858	14						
1450	1488	75	798							
1500	1522	50	789	15						

* The given load capacities and weights apply for a single extension

Tab. 6

> LTF44

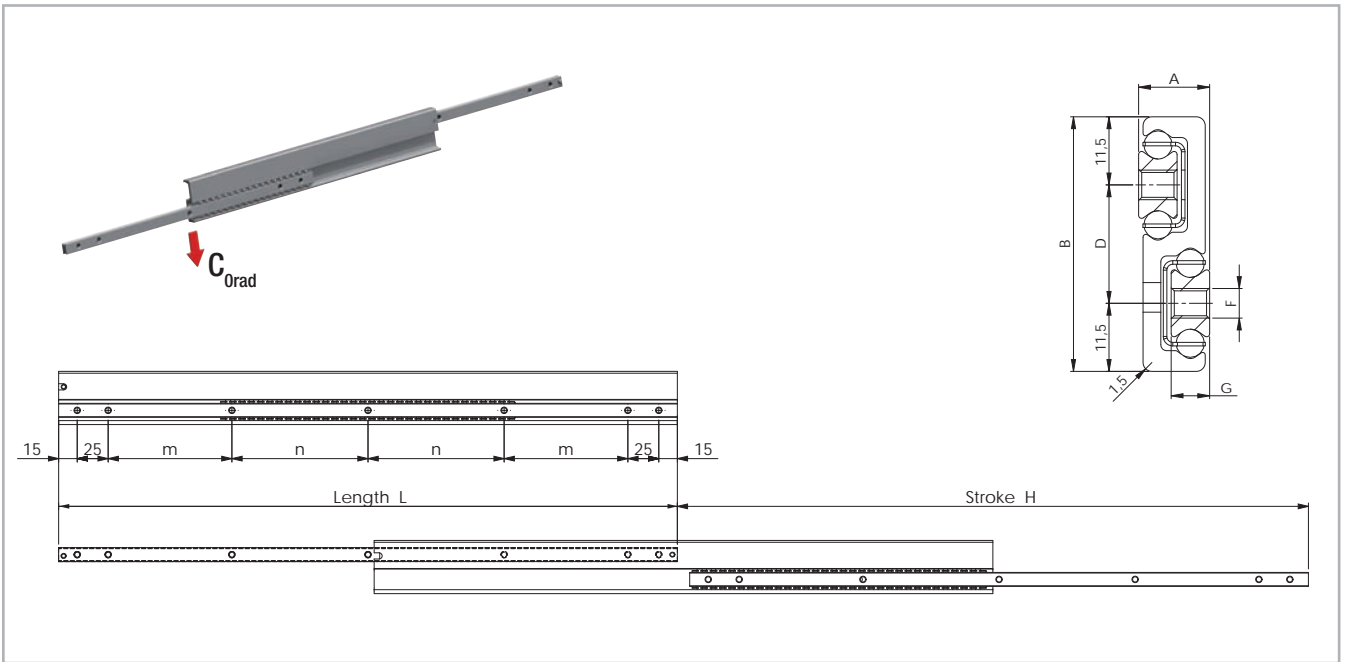


Fig. 11

Type	Size	Length L [mm]	Stroke H [mm]	Load capacity* C _{Orad} [N]	Cross-section					Fixed and movable rail			Weight [kg/m]
					A [mm]	B [mm]	D [mm]	G [mm]	F	m [mm]	n [mm]	No. of holes	
LTF	44	200	210	114	12	43	20	6,5	M5	60	0	5	2,70
		225	235	130						72,5			
		250	260	144						85			
		275	285	162						97,5			
		300	310	180						110			
		325	335	196						122,5			
		350	360	210						135			
		375	385	226						147,5			
		400	410	246						160			
		425	435	262						172,5			
		450	460	276						185			
		500	510	312						100	110		
		550	560	342							135		
		600	610	384							160		
		650	660	408							185		
		700	710	444							150	160	
		750	760	474								185	
		800	810	510								210	
		850	860	540								235	
		900	910	576						260			
950	960	612	285										
1000	1010	648	310										

Tab. 7

Technical instructions



> Load capacity

- The given load capacities are guidelines for one extension slide mounted vertically with uniform load distribution (area load) when using all mounting holes. The load values must be reduced in unfavorable conditions.

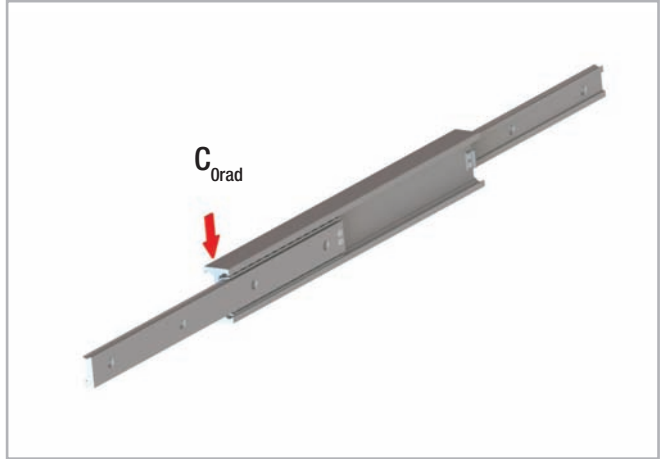


Fig. 12

> Opening and closing force

- The required actuation forces of a telescopic rail depend on the acting load and the deflection in the extended state. The force required for opening is principally determined by the coefficient of friction of the linear bearing. With correct assembly and lubrication, this is 0.01. During the extension, the force is reduced with the elastic deflection of the loaded telescopic rail. A higher force is required to close a telescopic extension, since, based on the elastic deflection, even if it is minimal, the movable rail must move against an inclined plane.

> Anticorrosive protection

- All of the OPTI RAIL series have a standard anticorrosive protection by electrolytic galvanisation according to ISO 2081. If a higher resistance to corrosion is required, the guides are available with Rollon Alloy or chemical nickel treatment. For both versions stainless steel balls are provided.
- Numerous application-specific surface treatments are available upon request, e.g., FDA approved nickel plating for use in the food industry. For more information please contact Rollon technical support.

> Temperature

- The OPTI RAIL series can be used up to an ambient temperature of +170 °C (+338 °F). A lithium lubricant for high operating temperatures is recommended for temperatures above +130 °C (+266 °F). Minimum temperature with standard grease is -20 °C (-4 °F). The LTH30S and LTH45S series have a temperature range of application from -20 °C to + 50 °C (-4 °F to 122 °F), due to the bumpers in special resin.

> Lubrication

Recommended lubrication intervals are heavily dependent upon the ambient conditions, speed and temperature. Under normal conditions, lubrication is recommended after 100 km operational performance or after an operating period of six months. In critical application cases the interval should be shorter. Please clean the raceways carefully before relubrication. Raceways and spaces of the ball cage are lubricated with a lithium lubricant of average consistency (roller bearing lubricant).

Different lubricants are available on request for special applications:

- FDA-approved lubricant for use in the food industry
- specific lubricant for clean rooms
- specific lubricant for the marine technology sector
- specific lubricant for high and low temperatures

For specific information, contact Rollon technical support.

> Installation instructions

- The internal stops are not designed to stop a moving load. They are only supposed to retain the ball-cage and prevent the internal parts from sliding out of the assembly. An external end-stop must always be installed to stop the moving load.
- To achieve optimum running properties, high service life and rigidity, it is necessary to fix the OPTI RAIL rails with all accessible holes on a rigid and level surface.
- Double-sided stroke available on request.
- When using an extension pair, please observe the parallelism of the installation surfaces. The fixed rail and the movable one will assume the rigidity of the mounting structure.
- The movement of the extensions is enabled by internal ball cages, which could experience an offset from the original position with differing strokes. This phase offset can have a negative effect on the running properties or limit the stroke. If differing strokes occur in an application, the drive force must be sufficiently dimensioned in order to appropriately synchronize the ball cage offset. As an alternative, an extra full stroke cycle can be performed after a number of cycles, in order to re-phase the ball cage in its correct position.

Ordering key OPTI RAIL



> LTH

LTH	45	850	904	KF	NIC	
						Expanded surface protection is deviation from standard (ISO 2081) <i>see pg. OR-13 Anticorrosive protection</i>
						Hole pattern <i>see pg. OR-5ff</i>
						Stroke, if deviating from standard stroke (catalogue data) <i>see pg. OR-5ff Product dimensions and Ordering key for special strokes</i>
						Length <i>see pg. OR-5ff Product dimensions</i>
						Size <i>see pg. OR-5ff Product dimensions</i>
						Product type <i>see pg. OR-5ff Product dimensions</i>

Ordering example 1: LTH45-0850-KF

Ordering example 2: LTH45-0850-0904-KF-NIC

Notes on ordering: Rail lengths and strokes are always stated with 4 digits. Please use zeroes to fill in for lengths with less than 4 digits

> LTH Special strokes

Special strokes are defined as deviations from standard stroke.

They are each available as multiples of the values in tab. 8.

These values are dependent on the spacing of the ballage.

Type	Size	Stroke modification [mm]
LTH	30	15,4
	45	22

Tab. 8

Each stroke modification influences the load capacities stated in the catalogue. For more information please contact Rollon technical support.

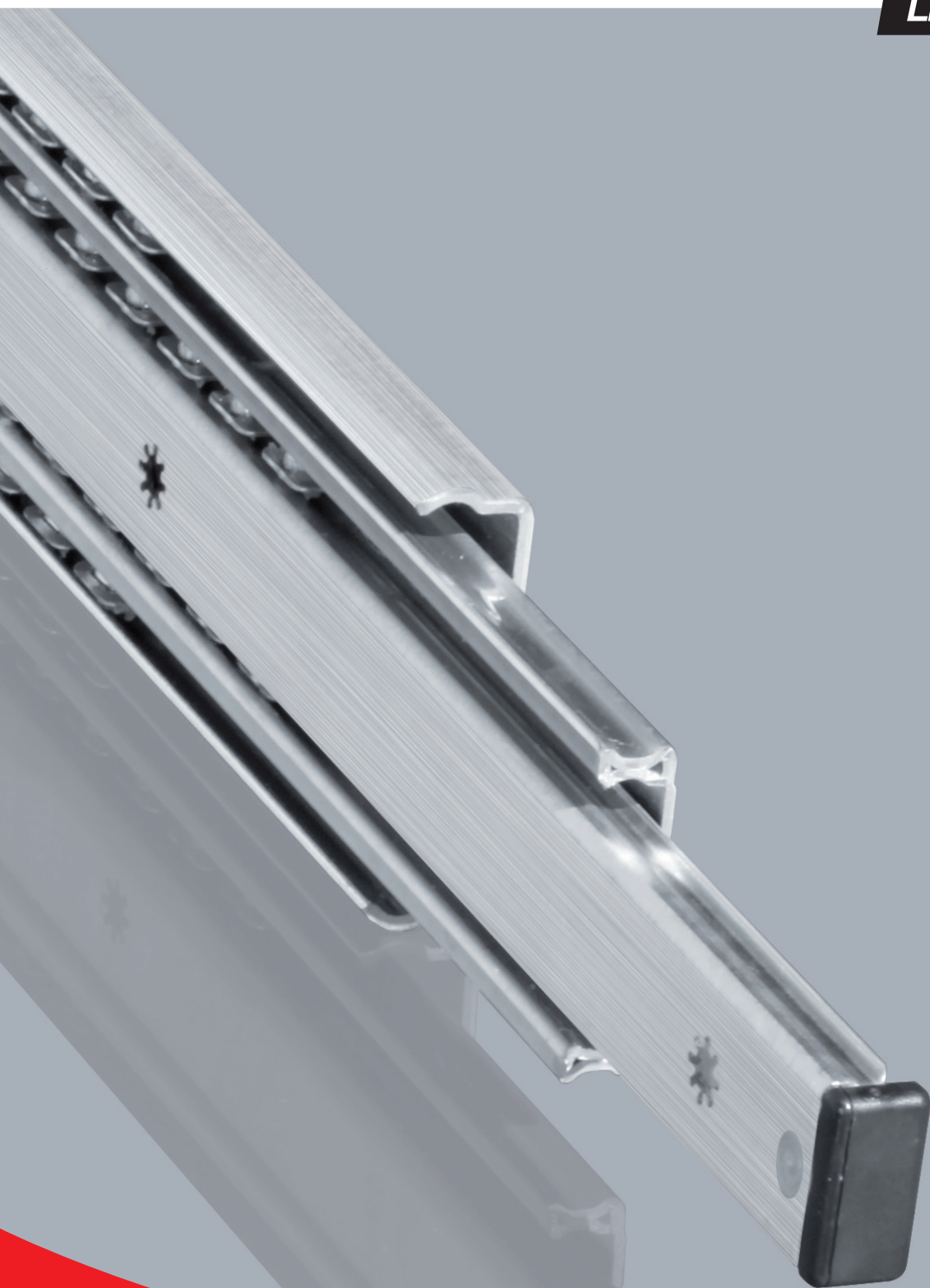
> LTF

LTF	44	690	NIC	
				Expanded surface protection is deviation from standard (ISO 2081) <i>see pg. OR-13 Anticorrosive protection</i>
				Length <i>see pg. OR-11ff</i>
				Size <i>see pg. OR-11ff</i>
				Product type <i>see pg. OR-11ff</i>

ROLLON[®]

Linear Evolution

Light Rail



Product explanation



> Light telescopic rails, with full or partial extension



Fig. 1

The Light Rail product family consists of five series with full and partial extensions in a lightweight design. It is ideal for applications in which the mass of the rail is just as important as the bending rigidity.

The most important characteristics:

- Light and quiet running with heavy loads
- Long service life without maintenance
- Effective self-cleaning of the ball track
- High functional reliability
- Structural elasticity capable of absorbing minor impacts and absence of permanent deformation
- Not sensitive to side impacts

Preferred areas of application:

- Beverage industry
- Automotive
- Construction and machine technology (e.g., housing)
- Packaging machines
- Railcars (e. g., maintenance and battery extensions)
- Special machines

LPS 38

Partial extension with rails made of hot-dipped galvanized steel and plastic ball cages.



Fig. 2

LFS 46

Detachable internal rail which can be released with a latch. Rails are made of bright chrome-plated steel, the ball cages of steel and plastic. Roll back protection in closed position.



Fig. 3

LFS 57

Full extension with rails made of hot-dipped galvanized steel and zinc-plated steel ball cages. Roll back protection in closed position.



Fig. 4

LFS 58 SC

Full extension with automatic retraction and damping. The automatic retraction system is assisted by a spring-loaded mechanism that allows the rail to get back to a complete retraction before reaching the closed position.



Fig. 5

LFS 70

Full extension with rails made of zinc-plated galvanized and blue passivated steel. The ball cages are made of zinc-plated steel. Heavy load end stop in opened and closed position. Roll back protection in closed position.



Fig. 6

LFX 27

The stainless steel full extension consists of two inner guide rails that, connected to a double-T profile, form the intermediate element and two outer rails that form the connection to the connecting construction as fixed and moving element. The square cross-section allows a compact design of high load ratings and low deflection.



Fig. 7

DRX-DRS

Roller type telescopic rail made of stainless or galvanized steel. Corrosion resistant even if scratched, exposed to solvents or to shocks.



Fig. 8

Technical data

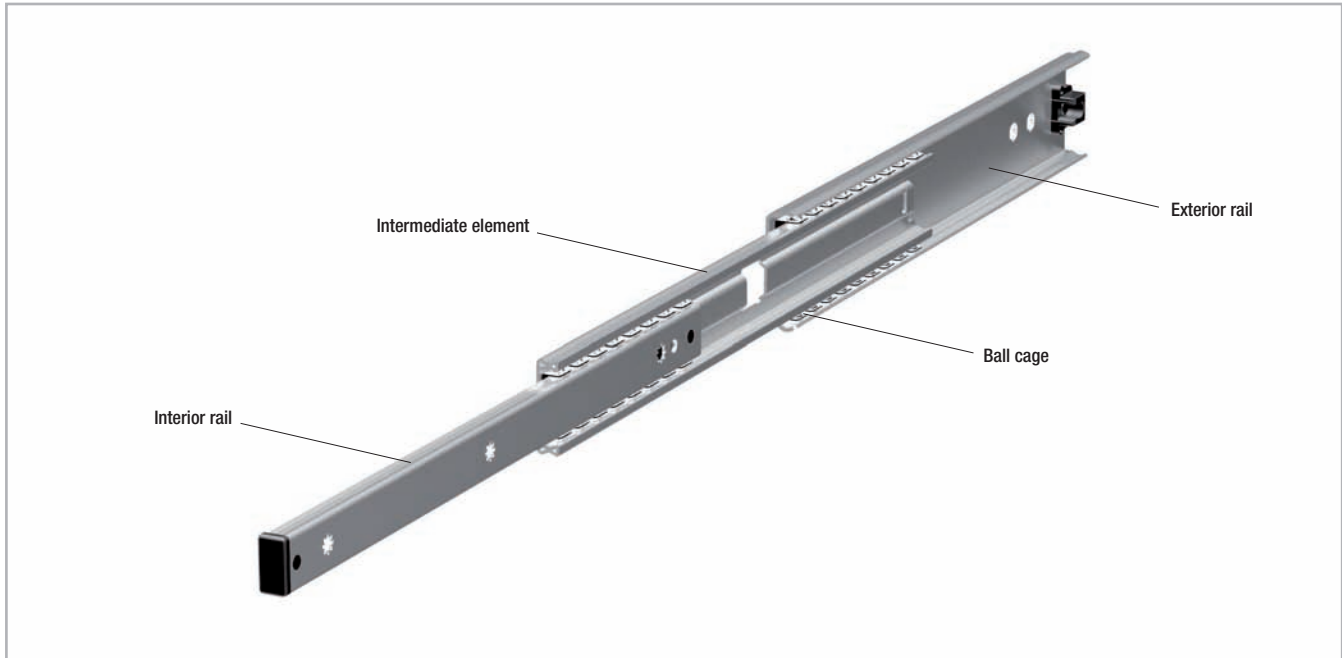


Fig. 9

Performance characteristics:

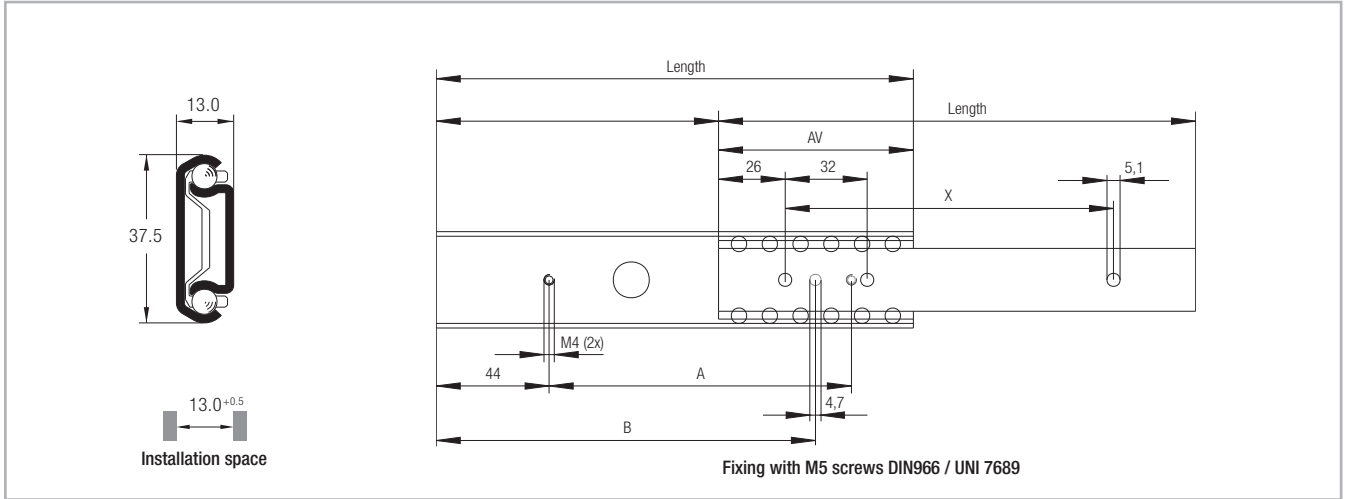
- Extension speed (depending on application):
 - Extension distance 100 - 500 mm: max. 0.5 m/s (19.69 in/s)
 - Extension distance 600 mm: max. 0.4 m/s (15.75 in/s)
 - Extension distance 700 mm: max. 0.3 m/s (11.81 in/s)
- LFS 58 SC series with automatic retraction
- Temperature range: from +10 °C to +40 °C, for DRX/DRS from -20° to + 100° C, for LFX from -30° to +200° C. Temporary storage and transport temperature: -20 °C to max. +80 °C (-4 °F to +176 °F)
- All systems are lubricated for life
- LFS/LPS rail material: hot galvanized or chromed steel
- LFS/LPS ball bearing cage material: galvanized steel or plastic
- LFS/LPS ball bearing material: hardened carbon steel
- LFX rail, balls and cage material: stainless steel 1.4301
- DRX rail material: stainless steel AISI 316L
- DRS rail material: galvanized steel ISO 2081 compliant

Remarks:

- Assembly in cross-sectional width, here a positive tolerance of +0.5 mm is recommended (mounted under tension). If the extensions are installed with too small a tolerance, the service life is decreased
- Load capacity is per single rail (not per pair)
- Cycle data applies to the use of an extension pair (recommended)
- Vertical use of extensions (radial load) is recommended
- If mounted in a horizontal position, the load capacity will be reduced (see p. LR-12)
- Cathodic edge protection, additional corrosion protection with powder coating on request
- Roll back protection in closed position is friction locked (except LPS 38)
- Not suitable for moments – must be used as extension pair

Dimensions and load capacity

> LPS 38



All dimensions given in mm

Fig. 10

Type	Size	Length [mm]	Extension loss AV [mm]	Stroke* [mm]	A [mm]	B [mm]	X [mm]	Load capacity** C _{0rad} [N]	Load capacity** C _{0ax} [N]	Weight** [kg]
LPS	38	242	88	154	166	202	192	175	50	0.30
		317		229	241	277	256			0.40
		398	100	298	322	358	352			0.50
		473		373	397	433	416			0.60

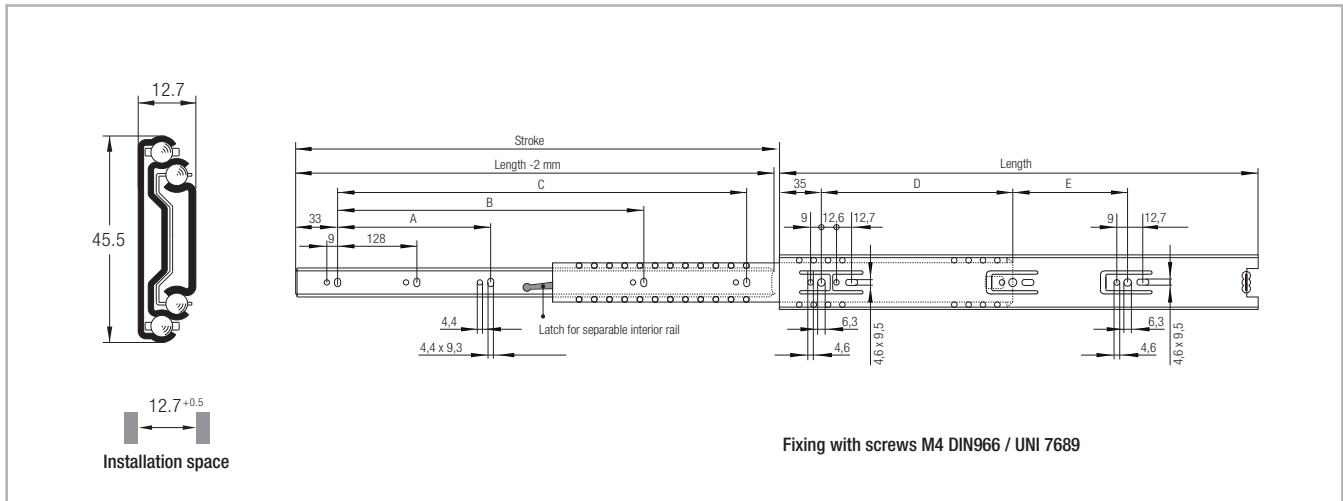
* The stroke is the difference of the length and the extension loss AV

** The given load capacities and weights apply for a single extension

Tab. 1

Note: The given load capacities are guidelines with 100,000 cycles and uniform load distribution (area load) when using all mounting holes. The load values must be reduced in unfavorable conditions.

> LFS 46



All dimensions given in mm

Fig. 11

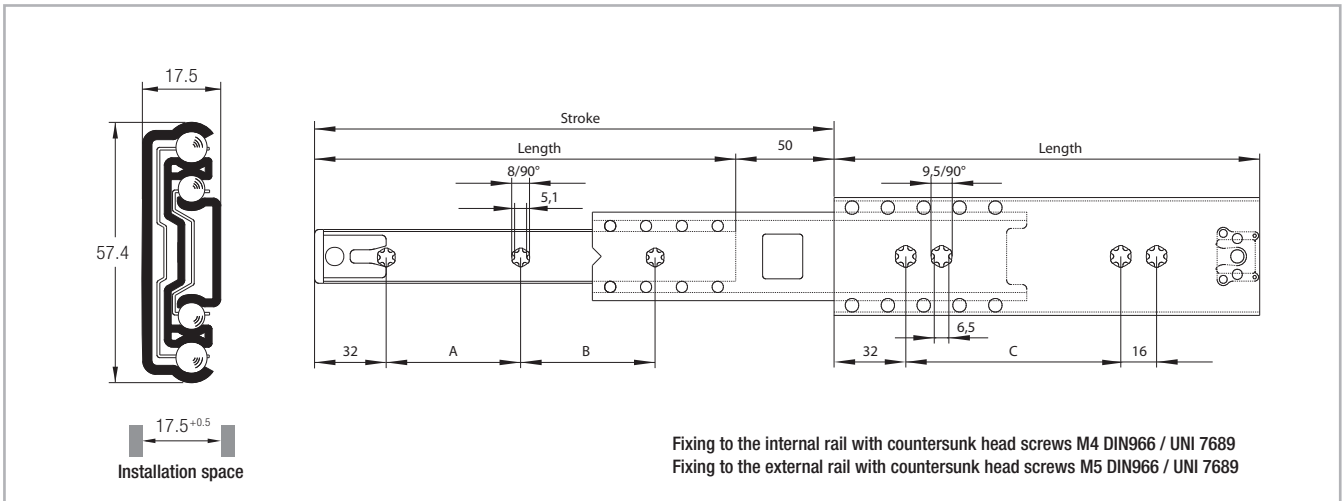
Type	Size	Length	Stroke	A	B	C	D	E	Load capacity*	Load capacity*	Weight*
		[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	C_{Grad} [N]	C_{Oax} [N]	
LFS	46	300	305	-	-	242	192	-	150	50	0,48
		350	356	-	-	292	256	-	150		0,505
		400	406	-	-	342	160	96	175		0,64
		450	457	-	256	392		160			175
		500	508	-	352	442	224	128	200		0,79
		550	559	224	416	492		192			0,88
		600	610			542		224			0,95

* The given load capacities and weights apply for a single extension

Tab. 2

Note: The given load capacities are guidelines with 50,000 cycles and uniform load distribution (area load) when using all mounting holes. The load values must be reduced in unfavorable conditions.

> LFS 57



All dimensions given in mm

Fig. 12

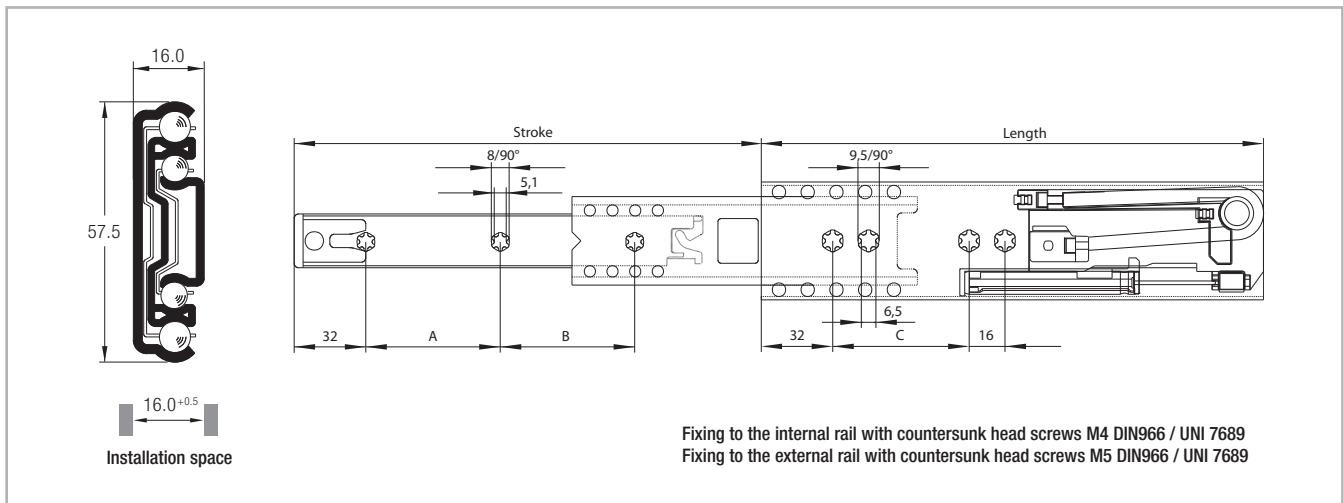
Type	Size	Length	Stroke*	A	B	C	Load capacity**		Weight**
		[mm]	[mm]	[mm]	[mm]	[mm]	C_{0rad} [N]	C_{0ax} [N]	
LFS	57	300	350	128	104	160	250	80	0.84
		350	400		152				0.98
		400	450	160	168	256	325	80	1.13
		450	500		224				1.27
		500	550	224	208	384	375	80	1.42
		550	600		256				1.57
		600	650	288	240	384	400	80	1.71
		650	700		288				1.86
		700	750	320	312	384	400	80	2.01
		750	800		360				2.16

* The stroke is the sum of the length and the over extension
 ** The given load capacities and weights apply for a single extension

Tab. 3

Note: The given load capacities are guidelines with 100,000 cycles and uniform load distribution (area load) when using all mounting holes. The load values must be reduced in unfavorable conditions.

> LFS 58 SC



All dimensions given in mm

Fig. 13

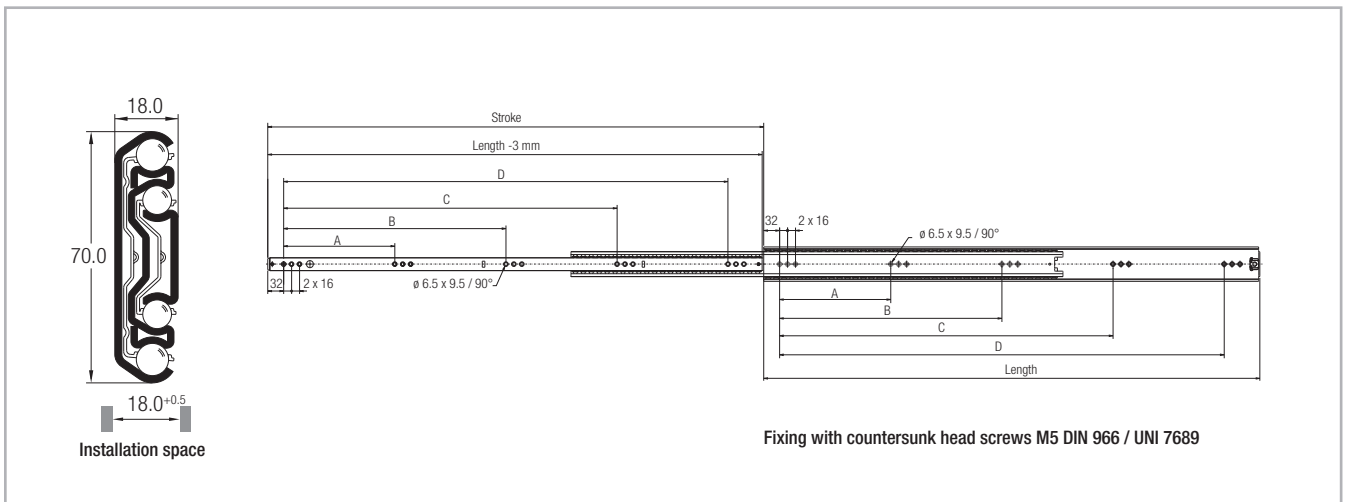
Type	Size	Length [mm]	Stroke [mm]	A [mm]	B [mm]	C [mm]	Load capacity* C_{Drad} [N]	Weight* [kg]
LFS	58	400	434	128	128	224	200	1.10
		450	484	160	160	256	250	1.25
		500	534				275	1.40
		550	584	192	320	300	1.55	

* The given load capacities and weights apply for a single extension

Tab. 4

Note: The given load capacities are guidelines with 100,000 cycles and uniform load distribution (area load) when using all mounting holes. The load values must be reduced in unfavorable conditions. Horizontal installation is not possible due to the damping system. The damping effect is reduced for loads of 450 N and higher per extension pair.

> LFS 70



All dimensions given in mm

Fig. 14

Type	Size	Length	Stroke	A	B	C	D	Load capacity*		Weight*	
		[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	C_{0rad} [N]	C_{0ax} [N]		
LFS	70	400	400	-	-	-	288	525	900**	150	1,55
		450	450	-	-	160	320	575	950**		1,74
		500	500	-	-	192	384	650	975**		1,94
		550	550	-	-	224	448		1000**		2,13
		600	600	-	-				975**		2,32
		700	700	-	192	384	576	875**	2,70		
		800	800	-	224	448	672	600	725**		3,10
		1100	1100	224	448	672	896	450	525**	100	4,25

* The given load capacities and weights apply for a single extension
 ** 10.000 cycles

Tab. 5

Note: The given load capacities are guidelines with 100.000 cycles and uniform load distribution (area load) when using all mounting holes. The load values must be reduced in unfavorable conditions.

> LFX 27

Stainless steel telescopic guide

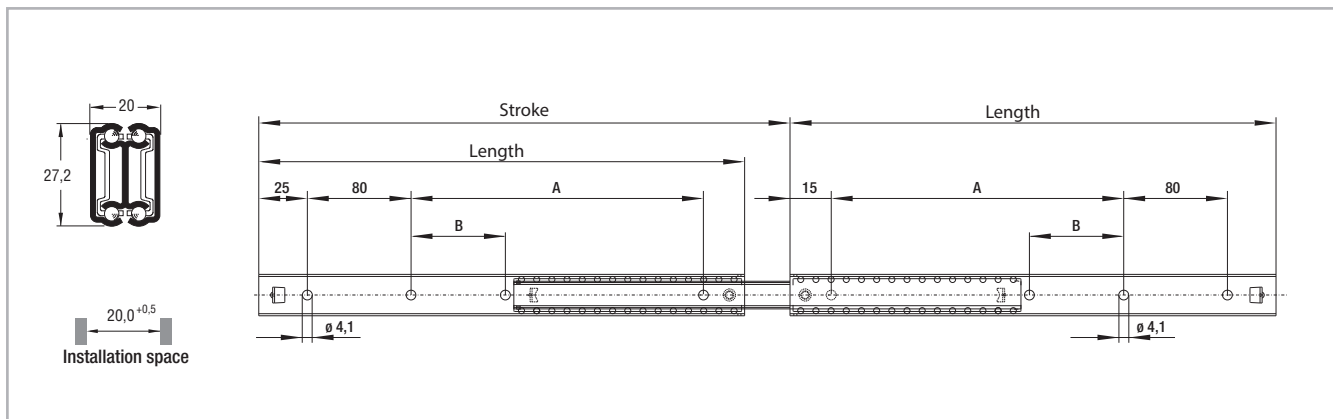


Fig. 15

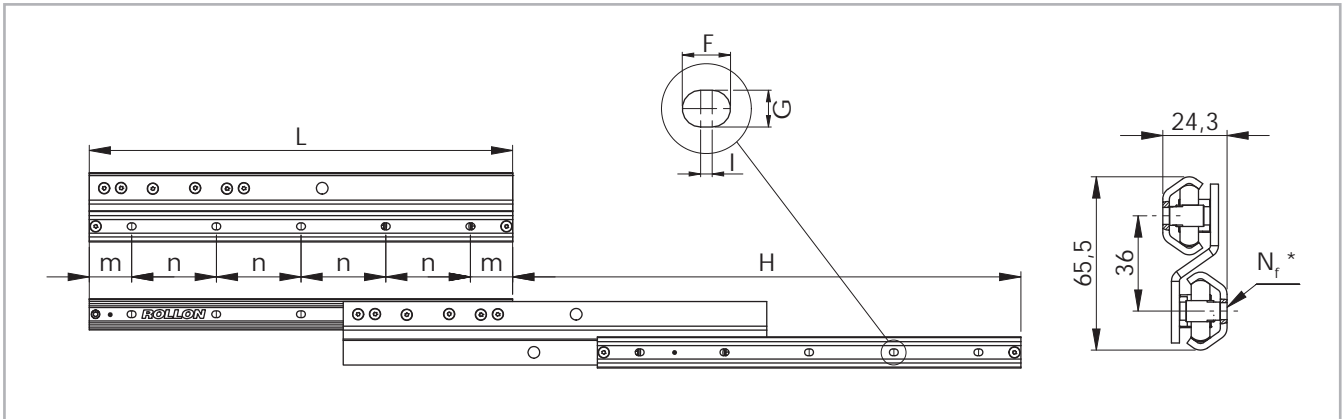
Type	Size	Length [mm]	Stroke [mm]	A [mm]	B [mm]	Load capacity* [N]				Weight* [kg]
						to 10.000 cycles		to 100.000 cycles		
						C_{0rad}	C_{0ax}	C_{0rad}	C_{0ax}	
LFX	27	300	326	180	-	175	25	125	25	0,43
		350	376	230	70					0,49
		400	426	280	100					0,57
		450	476	330	100					0,64
		500	526	380	140					0,72
		550	576	430	160					0,76

* The given load capacities and weights apply for a single extension

Tab. 6

> DRX/DRS

DRX version in stainless steel



* Number of mounting holes

Fig. 16

Type	Size	Length L [mm]	Stroke H [mm]	Load capacity* C _{0rad} [N]	Fixed and movable rail							
					m [mm]	n [mm]	N _f [2 rails]	Holes for screws	Weight [kg/m]	F [mm]	G [mm]	I [mm]
DRX DRS	30	400	480	150	40	80	10	M5	3.40	8,4	6,4	2
		480	560	200			12					
		560	640	240			14					
		640	720	280			16					
		720	800	320			18					
		800	880	360			20					
		880	960	350			22					
		960	1040	310			24					
		1040	1120	250			26					

* The given load capacities and weights apply for a single extension

Tab. 7

> Fixing screws

We recommend fixing screws according to ISO 7380 with low head height or TORX® screws (see fig. 17) on request.

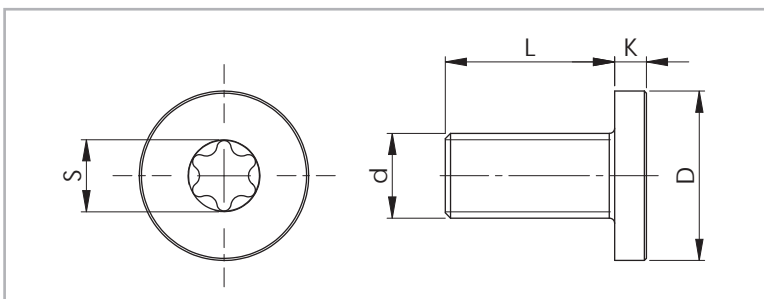


Fig. 17

Rail size	Screw type	d	D [mm]	L [mm]	K [mm]	S	Tightening torque [Nm]
30	M5 x 10	M5 x 0.8	10	10	2	T25	9

Tab. 8

Technical instructions



> Load capacities

Vertical installation (radial load)

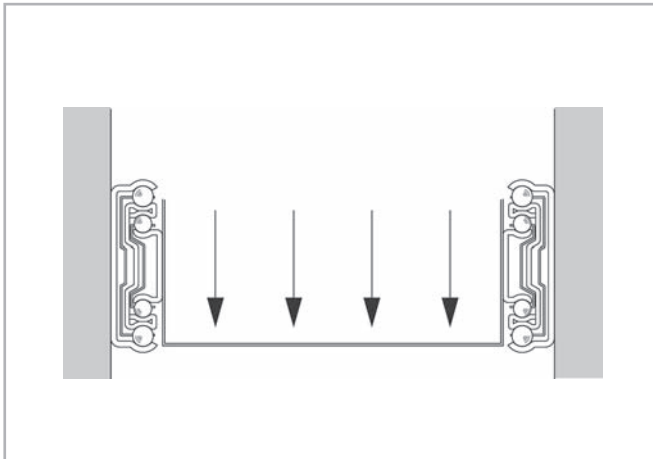


Fig. 18

The given loading capacities are guidelines for an extension rail vertically mounted with uniform load distribution using all mounting holes. The load values must be reduced in unfavorable conditions.

Horizontal installation (axial load)

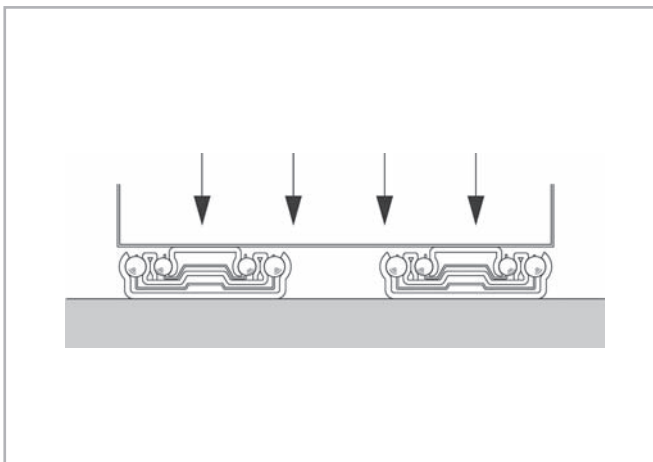


Fig. 19

For horizontal mounted extensions the load capacity is reduced (see pg. LR-5ff). The DRS/DRX series is not suitable for use on horizontal mounting (axial loads)

> Speed

The extension speed is determined by the size of the intermediate elements. Therefore, the maximum extension speed is inversely proportional to the overall extension of the rails (see fig. 20). The maximum extension speed is also directly related to the applied load and operating time. The indicated data refers to continuous operation at the maximum load capacity.

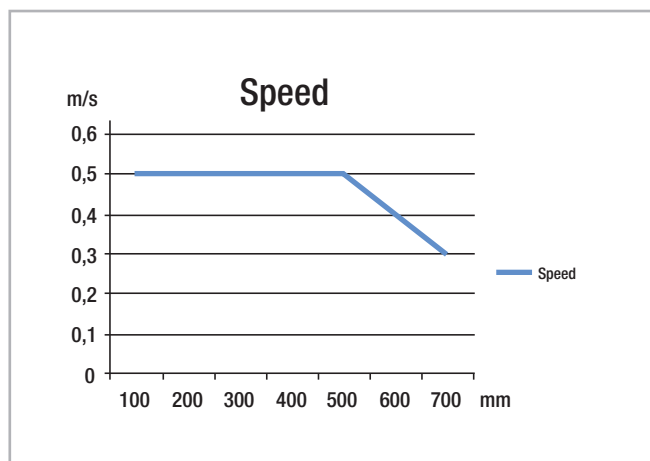


Fig. 20

> Temperature

Continual operating temperature of the Light Rail extensions is +10 °C to +40 °C. Temporary storage and transport temperature: -20 °C to max. +80 °C. The operating temperature for the DRX/DRS rails ranges from -20 °C to +100 °C. For more information please contact Rollon technical support.

> Lubrication

All extensions of the Light Rail product family are lubricated for life. Different lubricants for special applications are available upon request. Example: Lubricant with FDA approval for use in the food industry. For more information please contact Rollon technical support.

> Corrosion protection

Base material for the Light Rail product family is cold-rolled, hot-dipped galvanized steel. The cathodic edge protection offers a perfect combination of quality and cost-efficiency. The surface protection conforms to RoHS. The DRX/DRS series rails are also available in the stainless steel version for a high corrosion resistance. For more information please contact Rollon technical support.

> Installation instructions

- The existing internal stops are not designed to stop the moving load. They are only supposed to retain the ball-cage and prevent the internal parts to slide out of the assembly. An external end-stop must always be installed to stop the moving load.
- To achieve optimum running properties, high service life and rigidity, it is necessary to fix the Light Rail extensions with all accessible holes on a rigid and level surface. When using an extension pair, please observe the parallelism of the installation surfaces. The fixed and movable rails will assume the rigidity of the mounting structure.

Horizontally installed guides

Horizontally installed extensions can support tension or compression loads (see figs. 21 and 22).

For the horizontal mounting of extensions with compression loads, please take the following conditions into account: The Hertzian stress of the balls is no longer effective due to the expansion of the rail profile; the nominal tension tolerance of +0.5 mm is eliminated due to the installation confi-

guration. Both the above mentioned conditions contribute to a significant reduction of the axial load capacity.

Horizontally-mounted rails (axial load) also determine a considerably higher deflection of the extended tips if compared to traditionally vertically-mounted rails (radial load).

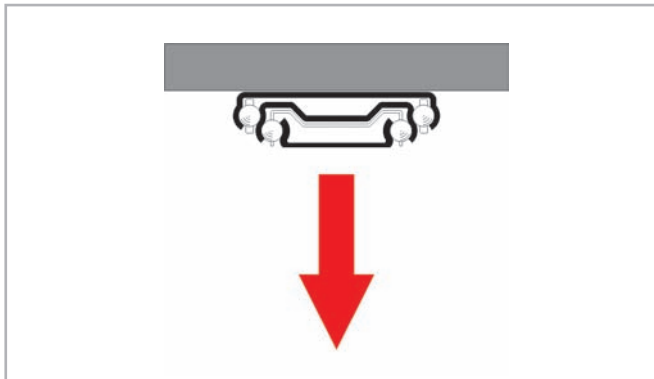


Fig. 21

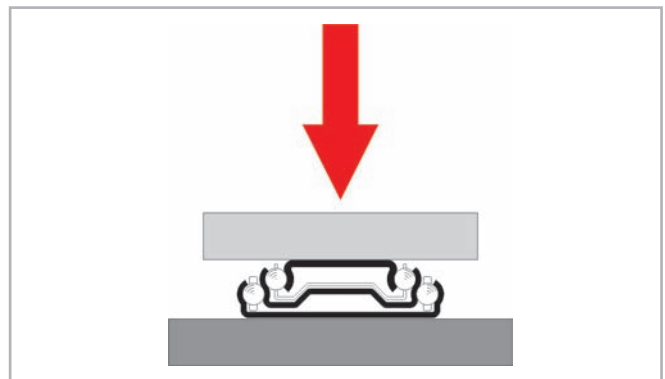


Fig. 22

> DRX/DRS installation

- During installation care must be taken that the movable elements are assembled as in the figure; i.e. as the lower rail. The opposite upside-down assembly negatively affects the function.
- Internal stops are used to stop the unloaded slider and the ball cage. Please use external stops as end stops for a loaded system.
- 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.
- When using two telescopic rails, please observe the parallelism of the installation surfaces. The fixed and movable rails fit to the rigid assembly construction.

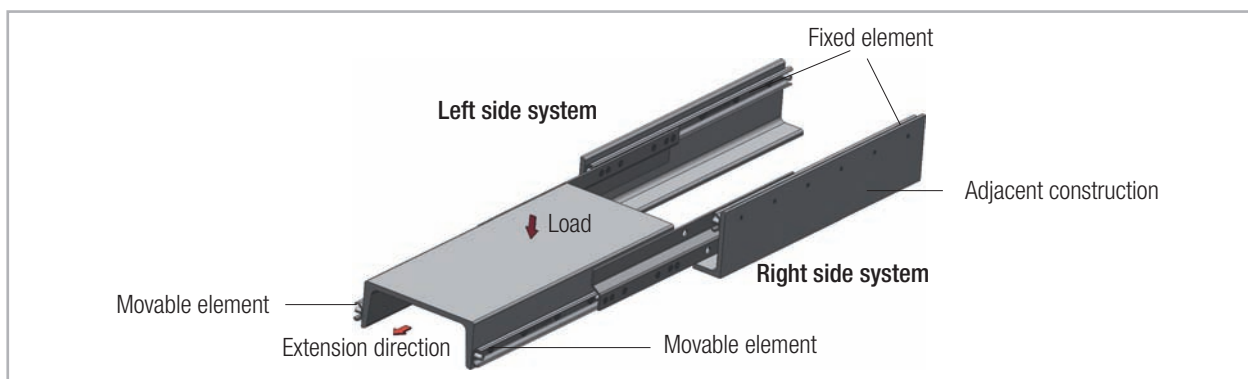


Fig. 23

Ordering key

> Light Rail

LFS	58-	400	SC	
			Automatic retraction only in LFS 58 SC	see pg. LR-8
		Rail length in mm		see pg. LR-5
	Size			see pg. LR-5
Rail type				see pg. LR-5

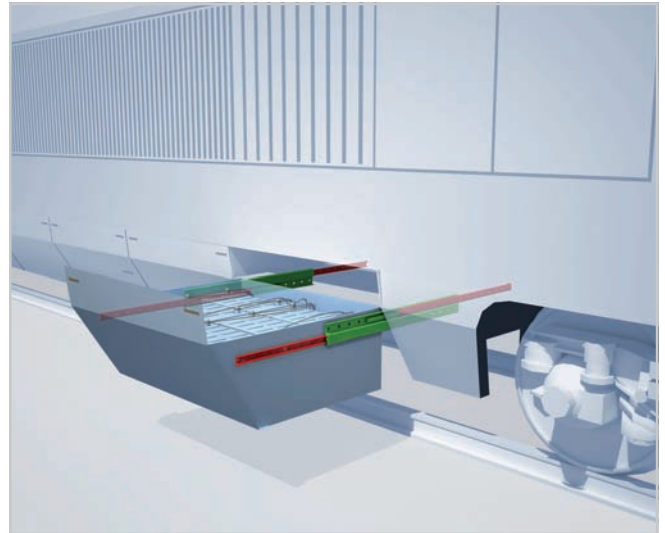
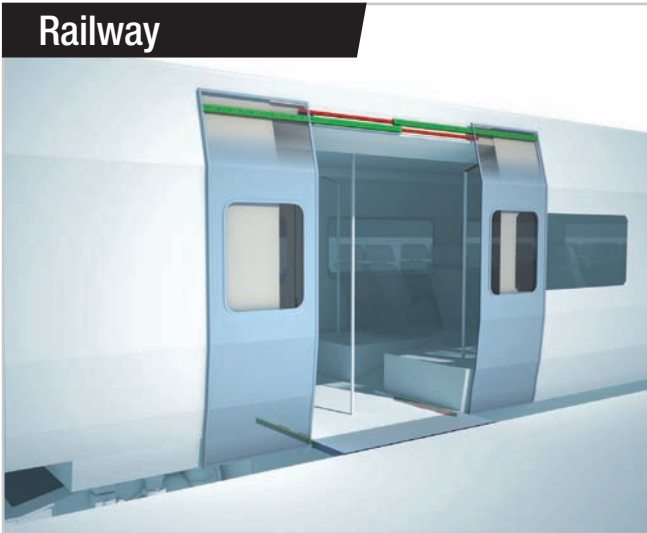
Ordering example: LFS58-0400SC

Notes on ordering: The rail lengths are always indicated as 4 digits with 0 prefixes

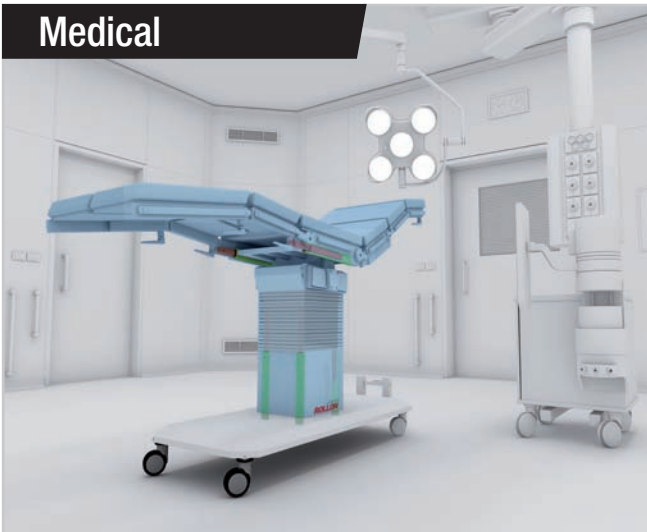
Guides suitable for all applications



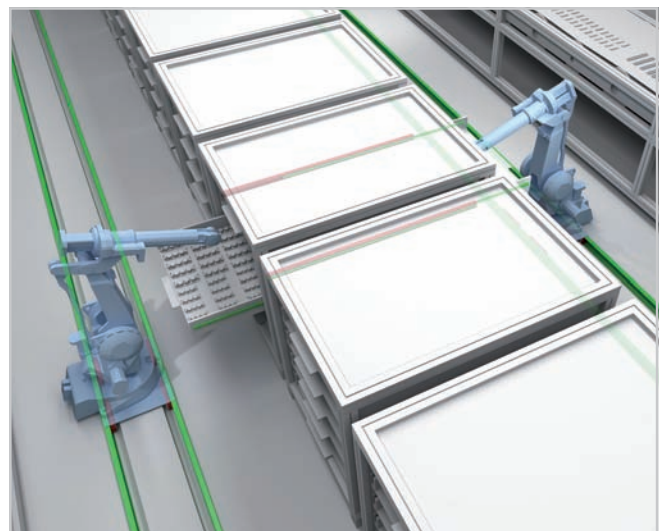
Railway



Medical



Logistics



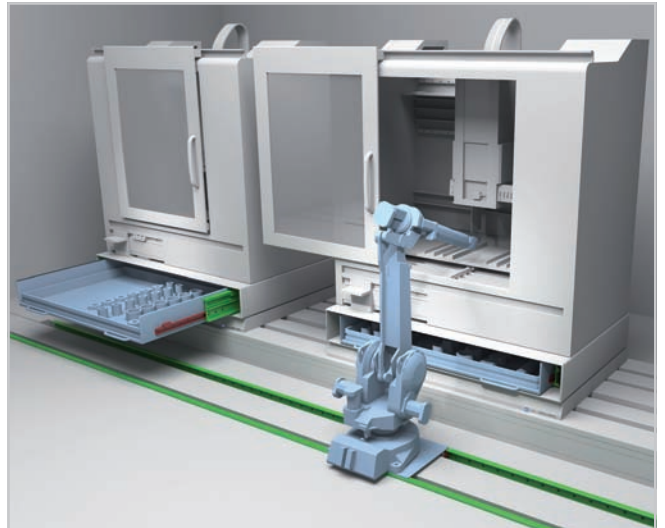
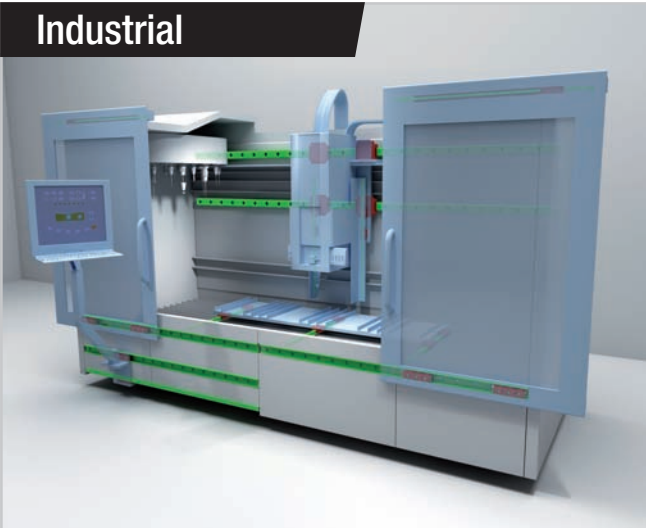
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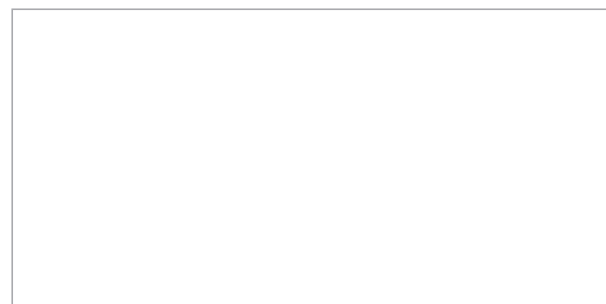
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