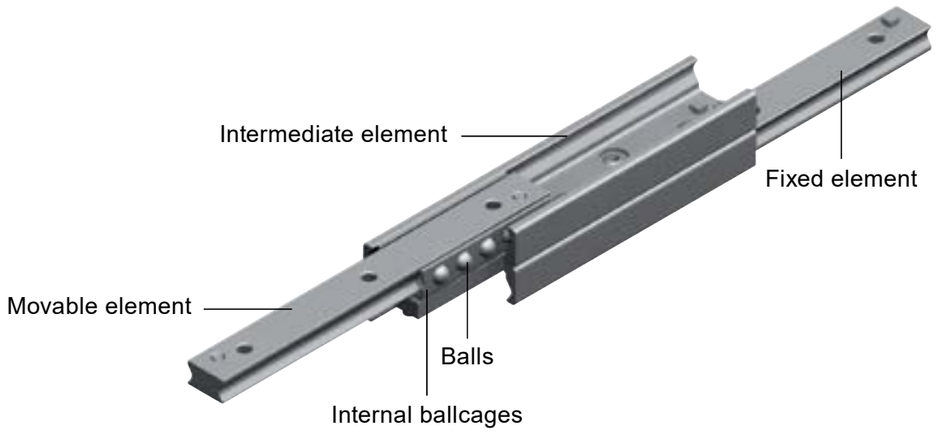
TELESCOPIC RAIL HEAVY

ROLLCO

SPECIALIZED
ON LINEAR MOTION

Index

Product Overview



The Telescopic Rail Heavy range consists of versions with full and partial extension and various cross-sections and intermediate elements in S-shape, double-T or square. High loads in combination with cost-efficiency and free movement have long been the outstanding properties of the telescopic rail product line.

Performance Characteristics

- High load with low deflection.
- Rigid intermediate elements.
- Standardised gauge for holes.
- Zero-play running even with maximum load.
- Space saving design.
- High reliability.

Technical Data

- Available sizes:
  ASN / DE: 22, 28, 35, 43, 63
  DS: 28, 43
  DBN: 22, 28, 35, 43
- Rails and sliders made of cold-drawn bearing steel.
- Induction hardened raceways.
- Balls made of hardened bearing steel.
- Max. operating speed: 0.8 m/s (depending on application).
- Electrolytic galvanised as per ISO 2081 for increased anticorrosion protection (option).
- Temperature range:
  ASN / DE / DBN: -30 °C to +170 °C (-22 °F to +338 °F)
  DS: -30 °C to +110 °C (-22 °F to +230 °F)

Application Areas

- 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.

Rail Types

ASN series

Partial extension consisting of a guide rail and a slider. This compact size and simple design allow very high load capacities. The high system rigidity is formed in connection with the adjacent construction.

DS series

Full extension consisting of two guide rails made of fixed and movable elements and an S-shaped intermediate element. This has a high moment of inertia and high rigidity with 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: Version S with one-sided extension, Version B with locking in the extracted state for one-sided extension (DSB) and Version D with double-sided extension (DSD).

DE series

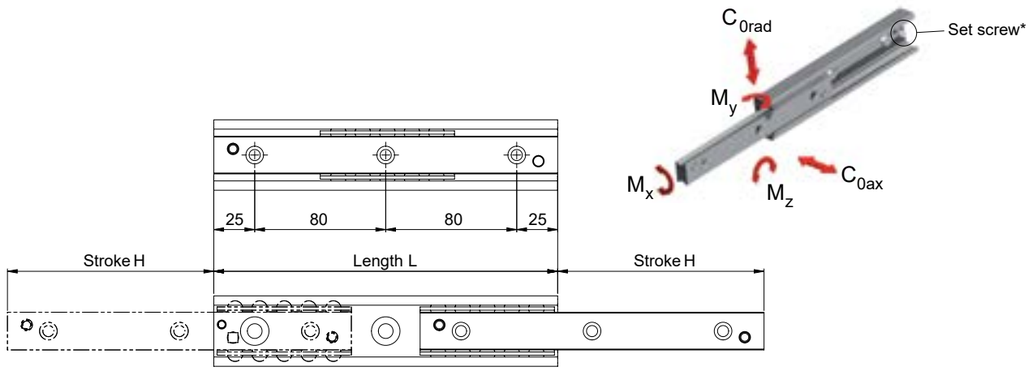
Full extension consisting of two guide rails, combined as double-T profile, form the intermediate element, and two sliders, which as fixed and movable element form the connection to the adjacent construction. The square cross-section allows a compact size with high load capacities and low deflexion, especially with radial loading. A custom design is available for extensions with double-sided strokes. The simultaneous movement of the intermediate element is implemented with a driving disc.

DBN series

Full extension consisting of two guide rails, both fixed and movable, and two sliders which together form the intermediate element. The size is similar to the DE series and offers good protection from dirt of the open ballcage.

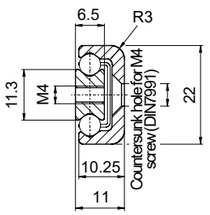
ASN SERIES

ASN series

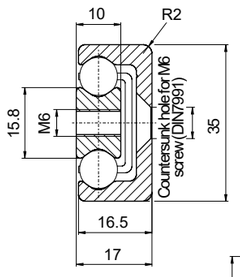


* Remove the set screw to reach all the fixing holes and for double stroke.

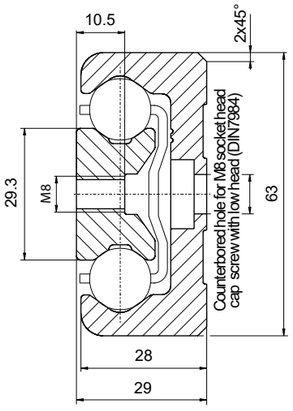
ASN22

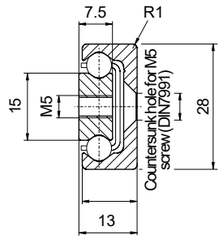


ASN35

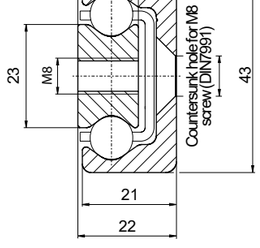


ASN63





ASN28



ASN43

Type	Length L	Stroke H	No. of holes	Load capacities and moments				
				C_{0rad}	C_{0rax}	M_x	M_y	M_z
	mm	mm		N	N	Nm	Nm	Nm
ASN22-130	130	76	2	313	219	5,7	10	15
ASN22-210	210	111	3	715	501	10,7	36	51
ASN22-290	290	154	4	994	696	14,9	69	99
ASN22-370	370	196	5	1278	895	19	113	162
ASN22-450	450	231	6	1701	1190	24	180	258
ASN22-530	530	274	7	1979	1385	28,2	248	355
ASN22-610	610	316	8	2262	1584	32,3	327	467
ASN22-690	690	351	9	2689	1882	37,3	436	623
ASN22-770	770	394	10	2967	2077	41,5	539	769

Type	Length L	Stroke H	No. of holes	Load capacities and moments				
				C_{0rad}	C_{0rax}	M_x	M_y	M_z
	mm	mm		N	N	Nm	Nm	Nm
ASN28-130	130	74	2	613	429	15,3	20	28
ASN28-210	210	116	3	1116	781	26,1	57	82
ASN28-290	290	148	4	1934	1354	39,6	132	188
ASN28-370	370	190	5	2445	1711	50,4	213	305
ASN28-450	450	232	6	2955	2069	61,2	314	449
ASN28-530	530	274	7	3466	2426	72	435	621
ASN28-610	610	316	8	3976	2783	82,8	575	821
ASN28-690	690	358	9	4487	3141	93,6	735	1050
ASN28-770	770	400	10	4997	3498	104,4	914	1306
ASN28-850	850	433	11	5828	4080	117,9	1165	1665
ASN28-930	930	475	12	6338	4436	128,7	1389	1984
ASN28-1010	1010	517	13	6848	4793	139,5	1613	2330
ASN28-1090	1090	559	14	7358	5150	150,3	1894	2705
ASN28-1170	1170	601	15	7868	5507	161,1	2175	3108
ASN35-210	210	127	3	1065	746	29,4	57	82
ASN35-290	290	159	4	2060	1442	46,9	146	208
ASN35-370	370	203	5	2638	1847	59,9	238	340
ASN35-450	450	247	6	3217	2252	73	354	505
ASN35-530	530	279	7	4282	2997	90,4	543	775
ASN35-610	610	323	8	4858	3401	103,5	711	1015
ASN35-690	690	367	9	5435	3804	116,6	902	1288
ASN35-770	770	399	10	6521	4565	134	1191	1702
ASN35-850	850	443	11	7095	4966	147,1	1435	2050
ASN35-930	930	487	12	7669	5368	160,2	1702	2431
ASN35-1010	1010	519	13	8765	6136	177,6	2092	2989
ASN35-1090	1090	563	14	9337	6536	190,7	2412	3445
ASN35-1170	1170	607	15	9909	6937	203,8	2754	3934
ASN35-1250	1250	639	16	11012	7708	221,2	3245	4636
ASN35-1330	1330	683	17	11582	8107	234,3	3640	5200
ASN35-1410	1410	727	18	12153	8507	247,4	4058	5797
ASN35-1490	1490	759	19	13260	9282	264,8	4650	6643
ASN43-210	210	123	3	1595	1117	60,6	84	120
ASN43-290	290	158	4	2872	2010	93,8	201	288
ASN43-370	370	208	5	3377	2364	115,9	308	440
ASN43-450	450	243	6	4690	3283	149,2	509	728
ASN43-530	530	278	7	6039	4227	182,4	762	1088
ASN43-610	610	313	8	7411	5188	251,6	1064	1521
ASN43-690	690	363	9	7863	5504	237,8	1294	1849
ASN43-770	770	398	10	9232	6463	271	1681	2402
ASN43-850	850	433	11	10615	7431	304,2	2119	3027
ASN43-930	930	483	12	11054	7738	326,4	2439	3484
ASN43-1010	1010	518	13	12434	8704	359,6	2961	4230
ASN43-1090	1090	568	14	12877	9014	381,8	3337	4767

Type	Length L mm	Stroke H mm	No. of holes	Load capacities and moments C_{0rad} N	C_{0rax} N	M_x Nm	M_y Nm	M_z Nm
ASN43-1170	1170	603	15	14254	9978	415	3943	5633
ASN43-1250	1250	638	16	15638	10947	448,2	4599	6571
ASN43-1330	1330	688	17	16075	11252	470,4	5065	7236
ASN43-1410	1410	723	18	17456	12219	503,6	5806	8295
ASN43-1490	1490	758	19	18845	13191	536,8	6598	9425
ASN43-1570	1570	793	20	20238	14167	570,1	7440	10628
ASN43-1650	1650	843	21	20661	14463	592,2	8029	11470
ASN43-1730	1730	878	22	22052	15436	625,5	8956	12794
ASN43-1810	1810	928	23	22479	15736	647,6	9601	13716
ASN43-1890	1890	963	24	23867	16707	680,8	10612	15160
ASN43-1970	1970	1013	25	24298	17009	703	11314	16162
ASN63-610	610	333	8	10591	7414	474	1553	2219
ASN63-690	690	373	9	12534	8774	547,5	2072	2960
ASN63-770	770	413	10	14489	10142	621	2666	3808
ASN63-850	850	453	11	16452	11516	694,5	3334	4763
ASN63-930	930	493	12	18421	12895	768	4077	5824
ASN63-1010	1010	533	13	20395	14277	841,4	4894	6992
ASN63-1090	1090	573	14	22373	15661	914,9	5787	8267
ASN63-1170	1170	613	15	24354	17048	988,4	6754	9648
ASN63-1250	1250	653	16	26337	18436	1061,9	7795	11136
ASN63-1330	1330	693	17	28322	19825	1135,4	8912	12731
ASN63-1410	1410	733	18	30309	21216	1208,9	10102	14432
ASN63-1490	1490	773	19	32297	22608	1282,4	11368	16240
ASN63-1570	1570	813	20	34287	24001	1355,9	12708	18155
ASN63-1650	1650	853	21	36277	25394	1429,4	14123	20176
ASN63-1730	1730	893	22	38268	26788	1502,8	15613	22304
ASN63-1810	1810	933	23	40261	28182	1576,3	17177	24539
ASN63-1890	1890	973	24	42253	29577	1649,8	18816	26880
ASN63-1970	1970	1013	25	44247	30973	1723,3	20530	29328

Weight

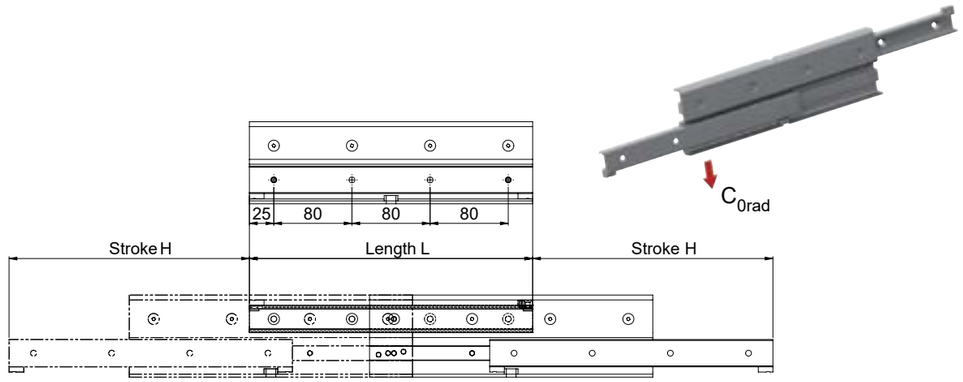
Type	Weight (kg/m)
ASN22	1,32
ASN28	2,02
ASN35	3,05
ASN43	5,25
ASN63	10,3

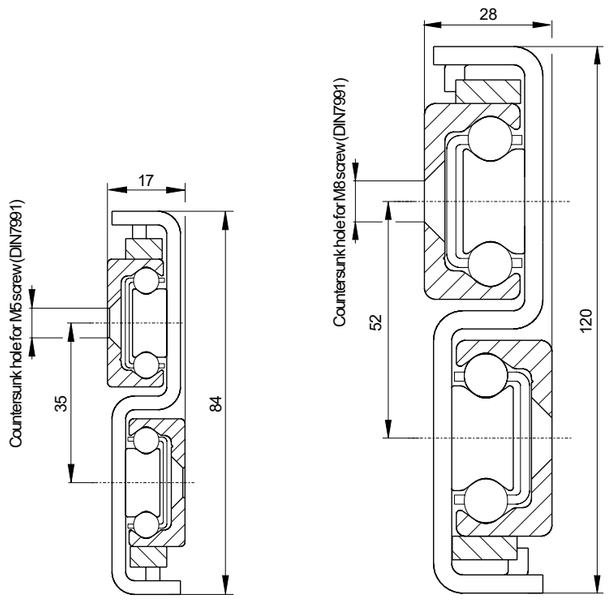
Special Strokes

Special strokes are defined as deviations from standard stroke H. They are each available as multiples of the values in the table below. These values are dependent on the spacing of the ballcage.

Type	Stroke modification (mm)
ASN22	7,5
ASN28	9,5
ASN35	12
ASN43	15
ASN63	20

DSS Series (single stroke)
DSD Series (double stroke)





DS..28 DS..43

DSS Series (single stroke)

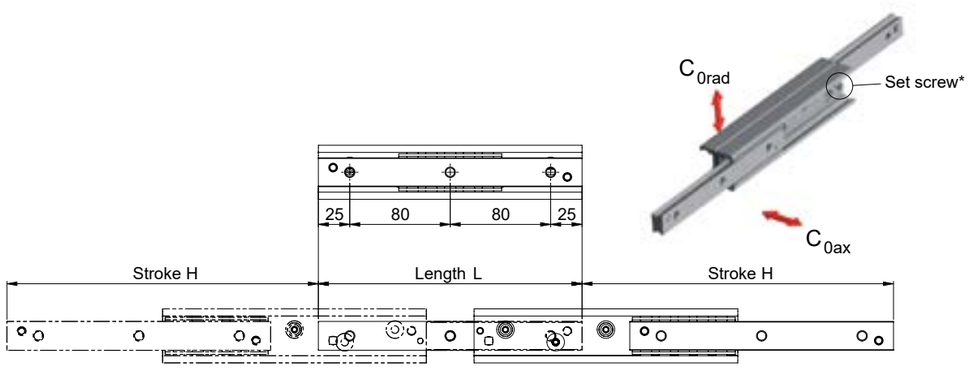
Type	Length L mm	Stroke H mm	Accessible holes/total	Load capacity C_{0rad} N
DSS28-290	290	296	3/4	570
DSS28-370	370	380	4/5	769
DSS28-450	450	464	4/6	969
DSS28-530	530	548	6/7	1170
DSS28-610	610	630	6/8	1376
DSS28-690	690	714	7/9	1577
DSS28-770	770	798	7/10	1778
DSS28-850	850	864	9/11	2111
DSS28-930	930	950	9/12	2240
DSS28-1010	1010	1034	10/13	2054
DSS28-1090	1090	1118	10/14	1896
DSS28-1170	1170	1202	12/15	1761
DSS28-1250	1250	1266	12/16	1695
DSS28-1330	1330	1350	13/17	1586
DSS28-1410	1410	1434	13/18	1490
DSS28-1490	1490	1518	15/19	1405
DSS43-530	530	556	6/7	2061
DSS43-610	610	626	6/8	2603
DSS43-690	690	726	7/9	2775
DSS43-770	770	796	7/10	3319
DSS43-850	850	866	9/11	3873
DSS43-930	930	966	9/12	4036
DSS43-1010	1010	1036	10/13	4590
DSS43-1090	1090	1106	11/14	4908
DSS43-1170	1170	1206	12/15	4610
DSS43-1250	1250	1276	12/16	4398
DSS43-1330	1330	1376	13/17	4027
DSS43-1410	1410	1446	13/18	3864
DSS43-1490	1490	1516	15/19	3713
DSS43-1570	1570	1616	15/20	3445
DSS43-1650	1650	1686	16/21	3325
DSS43-1730	1730	1756	16/22	3213
DSS43-1810	1810	1856	18/23	3011
DSS43-1890	1890	1926	18/24	2919
DSS43-1970	1970	2026	19/25	2750

DSD Series (double stroke)

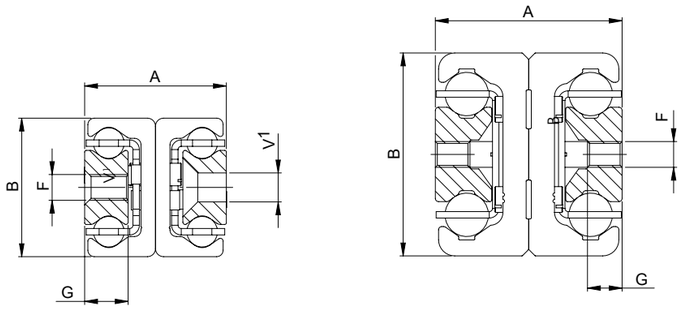
Type	Length L mm	Stroke H mm	Accessible holes/total	Load capacity C_{0rad} N
DSD28-290	290	246	4/4	895
DSD28-370	370	326	4/5	1105
DSD28-450	450	406	6/6	1317
DSD28-530	530	486	6/7	1626
DSD28-610	610	566	8/8	1837
DSD28-690	690	646	8/9	2050
DSD28-770	770	726	10/10	2262
DSD28-850	850	806	10/11	2475
DSD28-930	930	886	12/12	2581
DSD28-1010	1010	966	12/13	2357
DSD28-1090	1090	1046	14/14	2168
DSD28-1170	1170	1126	14/15	2008
DSD28-1250	1250	1206	16/16	1870
DSD28-1330	1330	1286	16/17	1749
DSD28-1410	1410	1366	18/18	1644
DSD28-1490	1490	1446	18/19	1550
DSD43-530	530	476	6/7	3018
DSD43-610	610	556	8/8	3265
DSD43-690	690	636	8/9	3781
DSD43-770	770	716	10/10	4297
DSD43-850	850	796	10/11	4547
DSD43-930	930	876	12/12	5063
DSD43-1010	1010	956	12/13	5578
DSD43-1090	1090	1036	14/14	5830
DSD43-1170	1170	1116	14/15	5392
DSD43-1250	1250	1196	16/16	5014
DSD43-1330	1330	1276	16/17	4686
DSD43-1410	1410	1356	18/18	4398
DSD43-1490	1490	1436	18/19	4143
DSD43-1570	1570	1516	20/20	3917
DSD43-1650	1650	1596	20/21	3713
DSD43-1730	1730	1676	22/22	3530
DSD43-1810	1810	1756	22/23	3364
DSD43-1890	1890	1836	24/24	3213
DSD43-1970	1970	1916	24/25	3075

DE SERIES

DE Series



* Remove the set screw to reach all the fixing holes



DE22 - 43

DEF63

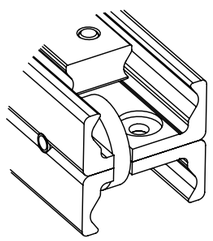
There are three versions of fixing holes available for the DE series in sizes 22 to 43:

- Version DEF with threaded holes.
- Version DEV with counter-sunk holes.
- Version DEM, both variants (mixed).
- Size 63 is always with threaded holes.

Type	A	B	F	G	V	Weight
	mm					kg/m
DE..22	22	22	M4	6,5	M4	2,64
DE..28	26	28	M5	7,5	M5	4,04
DE..35	34	35	M6	10	M6	6,1
DE..43	44	43	M8	13,5	M8	10,5
DE..63	58	63	M8	10,5	-	20,6

Custom Design DE Version D

The excentrically located driving disc on both ends of the DE...D ensures that the intermediate element is carried along and does not remain standing at an undefined location during double-sided strokes. This custom design is available in sizes 22, 28, 35 and 43 with all three versions of the fixing holes. It is built on the standard design of the DE series, however deviates in the technical data based on the model. For CAD-files or more information please contact Rollco.



Type	Length L	Stroke H	No. of holes	Load capacity	
	mm	mm		C_{0rad}	C_{0ax}
				N	
DE..22-130	130	152	2	119	83
DE..22-210	210	222	3	281	196
DE..22-290	290	308	4	390	273
DE..22-370	370	392	5	501	263
DE..22-450	450	462	6	674	230
DE..22-530	530	548	7	571	193
DE..22-610	610	632	8	494	167
DE..22-690	690	702	9	453	153
DE..22-770	770	788	10	401	135
DE..28-130	130	148	2	235	164
DE..28-210	210	232	3	432	302
DE..28-290	290	296	4	767	537
DE..28-370	370	380	5	968	471
DE..28-450	450	464	6	1169	385
DE..28-530	530	548	7	1107	325
DE..28-610	610	633	8	955	280
DE..28-690	690	717	9	842	247
DE..28-770	770	801	10	753	221
DE..28-850	850	866	11	710	208
DE..28-930	930	950	12	646	189
DE..28-1010	1010	1034	13	592	174
DE..28-1090	1090	1118	14	547	160
DE..28-1170	1170	1202	15	508	149
DE..35-210	210	254	3	402	281
DE..35-290	290	318	4	800	560
DE..35-370	370	406	5	1025	718
DE..35-450	450	494	6	1250	793
DE..35-530	530	558	7	1685	728
DE..35-610	610	646	8	1908	626
DE..35-690	690	734	9	1689	548
DE..35-770	770	798	10	1591	516
DE..35-850	850	886	11	1425	463
DE..35-930	930	974	12	1291	419
DE..35-1010	1010	1038	13	1233	400
DE..35-1090	1090	1126	14	1131	367
DE..35-1170	1170	1214	15	1045	339
DE..35-1250	1250	1278	16	1006	327
DE..35-1330	1330	1366	17	937	304
DE..35-1410	1410	1454	18	877	285
DE..35-1490	1490	1518	19	850	276
DE..43-210	210	246	3	605	424
DE..43-290	290	316	4	1114	780
DE..43-370	370	416	5	1300	910
DE..43-450	450	486	6	1828	1279
DE..43-530	530	556	7	2375	1434
DE..43-610	610	626	8	2934	1300
DE..43-690	690	726	9	3091	1096

Type	Length L	Stroke H	No. of holes	Load capacity	
				C_{0rad}	C_{0ax}
	mm	mm		N	
DE..43-770	770	796	10	3055	1016
DE..43-850	850	866	11	2847	946
DE..43-930	930	966	12	2506	833
DE..43-1010	1010	1036	13	2364	786
DE..43-1090	1090	1106	14	2238	744
DE..43-1170	1170	1206	15	2022	672
DE..43-1250	1250	1276	16	1928	641
DE..43-1330	1330	1376	17	1766	587
DE..43-1410	1410	1446	18	1694	563
DE..43-1490	1490	1516	19	1628	541
DE..43-1570	1570	1586	20	1567	521
DE..43-1650	1650	1686	21	1458	485
DE..43-1730	1730	1756	22	1409	468
DE..43-1810	1810	1856	23	1320	439
DE..43-1890	1890	1936	24	1280	425
DE..43-1970	1970	2026	25	1206	401
DEF63-610	610	666	8	4090	2863
DEF63-690	690	746	9	4859	3062
DEF63-770	770	826	10	5635	2784
DEF63-850	850	906	11	6415	2553
DEF63-930	930	986	12	7198	2357
DEF63-1010	1010	1066	13	6885	2189
DEF63-1090	1090	1146	14	6427	2043
DEF63-1170	1170	1226	15	6026	1916
DEF63-1250	1250	1306	16	5672	1803
DEF63-1330	1330	1386	17	5357	1703
DEF63-1410	1410	1466	18	5076	1614
DEF63-1490	1490	1546	19	4822	1533
DEF63-1570	1570	1626	20	4593	1460
DEF63-1650	1650	1706	21	4384	1394
DEF63-1730	1730	1786	22	4194	1333
DEF63-1810	1810	1866	23	4019	1278
DEF63-1890	1890	1946	24	3859	1227
DEF63-1970	1970	2026	25	3710	1180

Weight

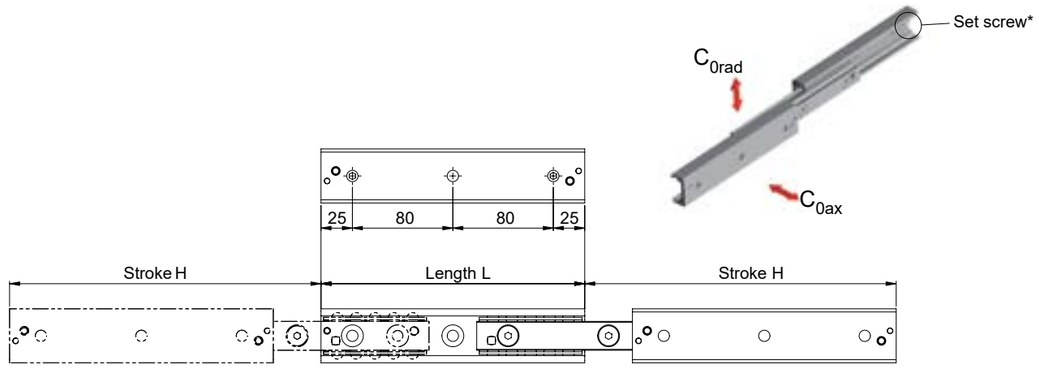
Type	Weight (kg/m)
DE22	2,64
DE28	4,04
DE35	6,1
DE43	10,5
DE63	20,6

Special Strokes

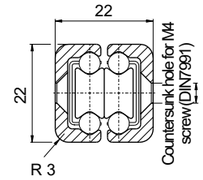
Special strokes are defined as deviations from standard stroke H. They are each available as multiples of the values in the table below. These values are dependent on the spacing of the ballcage.

Type	Stroke modification (mm)
DE22	15
DE28	19
DE35	24
DE43	30
DE63	40

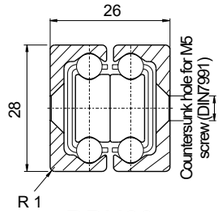
DBN Series



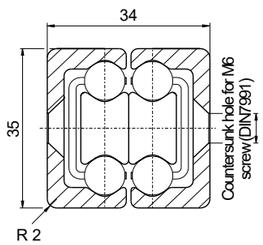
* Remove the set screw to reach all the fixing holes.



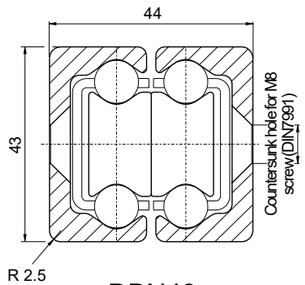
DBN22



DBN28



DBN35



DBN43

Type	Length L	Stroke H	No. of holes	Load capacity	
	mm	mm		C_{0rad}	C_{0ax}
				N	
DBN22-130	130	152	2	119	83
DBN22-210	210	222	3	281	196
DBN22-290	290	308	4	236	236
DBN22-370	370	392	5	186	186
DBN22-450	450	462	6	162	162
DBN22-530	530	548	7	136	136
DBN22-610	610	632	8	117	117
DBN22-690	690	702	9	108	108
DBN22-770	770	788	10	95	95
DBN28-130	130	148	2	235	164
DBN28-210	210	232	3	432	302
DBN28-290	290	296	4	622	537
DBN28-370	370	380	5	482	482
DBN28-450	450	464	6	393	393
DBN28-530	530	548	7	332	332
DBN28-610	610	633	8	286	286
DBN28-690	690	717	9	252	252
DBN28-770	770	801	10	226	226
DBN28-850	850	866	11	213	213
DBN28-930	930	950	12	194	194
DBN28-1010	1010	1034	13	178	178
DBN28-1090	1090	1118	14	164	164
DBN28-1170	1170	1202	15	152	152
DBN35-210	210	254	3	402	281
DBN35-290	290	318	4	667	560
DBN35-370	370	406	5	522	522
DBN35-450	450	494	6	429	429
DBN35-530	530	558	7	394	394
DBN35-610	610	646	8	338	338
DBN35-690	690	734	9	297	297
DBN35-770	770	798	10	279	279
DBN35-850	850	886	11	250	250
DBN35-930	930	974	12	227	227
DBN35-1010	1010	1038	13	217	217
DBN35-1090	1090	1126	14	199	199
DBN35-1170	1170	1214	15	183	183
DBN35-1250	1250	1278	16	177	177
DBN35-1330	1330	1366	17	165	165
DBN35-1410	1410	1454	18	154	154
DBN35-1490	1490	1518	19	149	149

Type	Length L	Stroke H	No. of holes	Load capacity	
	mm	mm		C_{0rad}	C_{0ax}
				N	
DBN43-210	210	246	3	605	424
DBN43-290	290	316	4	1114	780
DBN43-370	370	416	5	1300	910
DBN43-450	450	486	6	1331	1279
DBN43-530	530	556	7	1193	1193
DBN43-610	610	626	8	1082	1082
DBN43-690	690	726	9	912	912
DBN43-770	770	796	10	845	845
DBN43-850	850	866	11	788	788
DBN43-930	930	966	12	693	693
DBN43-1010	1010	1036	13	654	654
DBN43-1090	1090	1106	14	619	619
DBN43-1170	1170	1206	15	559	559
DBN43-1250	1250	1276	16	533	533
DBN43-1330	1330	1376	17	488	488
DBN43-1410	1410	1446	18	469	469
DBN43-1490	1490	1516	19	450	450
DBN43-1570	1570	1586	20	434	434
DBN43-1650	1650	1686	21	403	403
DBN43-1730	1730	1756	22	390	390
DBN43-1810	1810	1856	23	365	365
DBN43-1890	1890	1936	24	354	354
DBN43-1970	1970	2026	25	334	334

Weight

Type	Weight (kg/m)
DBN22	2,64
DBN28	4,04
DBN35	6,1
DBN43	10,5

Special Strokes

Special strokes are defined as deviations from standard stroke H. They are each available as multiples of the values in the table below. These values are dependent on the spacing of the ballcage.

Type	Stroke modification (mm)
DBN22	15
DBN28	19
DBN35	24
DBN43	30

ASN, DSS, DSD & DBN Series

ASN - 63 - 770 - 433

Series
(ASN, DSS, DSD, DBN)

Height of slide*
(22, 28, 35, 43, 63)

Length of fixed member

Stroke example, if deviating from standard stroke

*DSS and DSD are only available in size 28 and 43.

DE Series

DE - F - 35 - 690 - 806

Series
(DE)

Type of hole:
F: threaded
V: countersunk
M: both variants (mixed)
(size 63 only F)

Height of intermediate member
(22, 28, 35, 43, 63)

Length of fixed member

Stroke example, if deviating from standard stroke

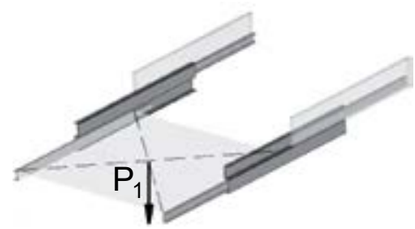
Technical Information

Selection of Telescopic Rail

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 different load capacities.

Load Capacities

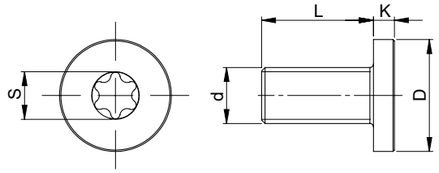
The values in the load capacity tables of the corresponding series give the maximum permissible loading of a telescopic rail in the centre of the movable rail in the completely extended state. All load capacity data is based on one telescopic rail. Typically, a pair of rails is used and the loading acts in the centre on both rails.
In this case, the load capacity of a rail pair is:



$$P_1 = 2 \cdot C_{0rad}$$

Fixing Screws

The fixings crews are not included in the scope of supply.
All rails are fixed with counter-sunk or cap head screws as per DIN 7991 or 7984. In size 63 of the ASN series, Torx® screws with low head cap screws are available on request.



Size	Screw type	d	D	L	K	S
			mm			
43	M8 x 16	M8 x 1,25	16	16	3	T40
63	M8 x 20	M8 x 1,25	13	20	5	T40

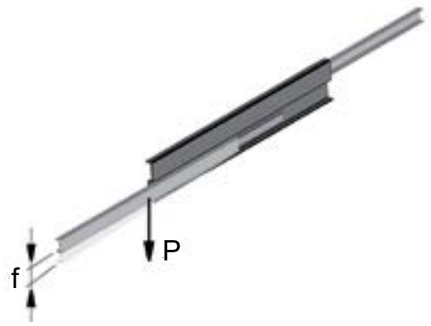
Tightening torques of the standard fixing screws to be used

Property Class	Size	Tightening torque
		Nm
10,9	22	4,3
	28	8,5
	35	14,6
	43	34,7
	63	34,7

Deflection

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

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



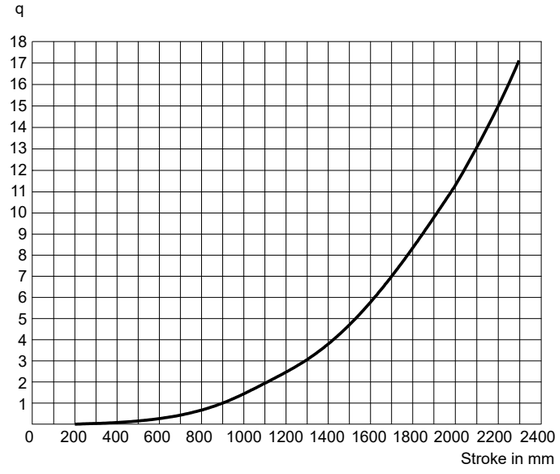
Whereby:

f is the expected elastic deflection in mm
q is a stroke coefficient
t is a factor depending on the model of the telescopic rail
P is the actual load acting on the centre of a rail, in N

DS28 **t = 180**
DS43 **t = 800**
DE22 **t = 8**
DE28 **t = 17**
DE35 **t = 54**
DE43 **t = 120**
DE63 **t = 540**
DBN22 **t = 3**
DBN28 **t = 8**
DBN35 **t = 13**
DBN43 **t = 56**

Note! The above formula applies to a single rail. When using a rail pair, the load of the single rail is P = P1/2. 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.



Static Load

The telescopic extension of the various series accept different forces and moments. During the static tests the radial load capacity, C_{0rad}, the axial load capacity, C_{0ax}, 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, z, 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 z

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

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

$$\frac{P_{0rad}}{C_{0rad}} \leq \frac{1}{z} \qquad \frac{P_{0ax}}{C_{0ax}} \leq \frac{1}{z} \qquad \frac{M_1}{M_x} \leq \frac{1}{z} \qquad \frac{M_2}{M_y} \leq \frac{1}{z} \qquad \frac{M_3}{M_z} \leq \frac{1}{z}$$

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:

$$\frac{P_{0rad}}{C_{0rad}} + \frac{P_{0ax}}{C_{0ax}} + \frac{M_1}{M_x} + \frac{M_2}{M_y} + \frac{M_3}{M_z} \leq \frac{1}{z}$$

P_{0rad} = effective radial load
C_{0rad} = permissible radial load
P_{0ax} = effective axial load
C_{0ax} = 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

Service Life

The service life is defined as the time span between commissioning and the first 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

Application coefficient f_i

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

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:

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

Load Capacity Factor δ

Length	ASN					DS		DE.../DBN				
	22	28	35	43	63	28	43	22	28	35	43	63
	δ (N)											
130	415	872						165	357			
210	932	1577	1533	2288				386	655	614	923	
290	1295	2692	2906	4055		863		537	1153	1211	1687	
370	1665	3405	3721	4794		1164		690	1456	1552	1974	
450	2205	4119	4537	6602		1466		925	1759	1892	2764	
530	2567	4832	5990	8451		1768	3120	1075	2063	2540	3580	
610	2936	5557	6803	10325	15003	2078	3929	1229	2372	2878	4414	6203
690	3480	6271	7617	11005	17708	2381	4197	1467	2675	3217	4661	7361
770	3842	6984	9093	12877	20427	2684	5010	1616	2979	3881	5493	8527
850		8111	9903	14762	23155	3180	5836		3487	4218	6335	9699
930		8811	10714	15429	25889	3474	6090		3783	4555	6572	10875
1010		9524	12201	17310	28629	3778	6916		4086	5226	7411	12055
1090		10237	13009	17981	31374	4081	7750		4388	5561	8257	13238
1170		10950	13818	19860	34121	4384	7646		4691	5897	8489	14423
1250		15311	21747	36871		4896	8829		6573	9332		15610
1330		16118	22411	39623		5193	9077		6907	9568		16798
1410		16925	24295	42377		5496	9909		7242	10409		17987
1490		18423	26186	45133		5806	10746		7920	11255		19178
1570			28083	47890			10988			12105		20369
1650			28733	50648			11825			12330		21561
1730			30626	53407			12665			13178		22754
1810			31281	56166			12904			13406		23948
1890			33172	58927			13743			14252		25142
1970			33829	61688			13983			14483		26336

Extension and Extraction 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.

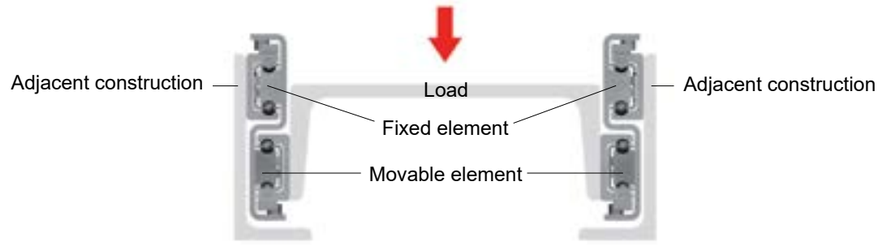
Double-sided Stroke

For all designs allowing double-sided stroke, it must be observed that the position of the intermediate element is defined only in the extended state. In the extracted 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 series ASN, DE and DBN is achieved by removing the set screw. For series DS version D, the double-sided stroke is implemented by design adaptation.

Remarks

- Horizontal installation is recommended.
- Vertical installation on request, please contact Rollco.
- External end stops are recommended.
- Double-sided stroke.
- Custom strokes on request.
- All load capacity data are based on one telescopic rail.
- All load capacity data are based on continuous operation.
- Calculation of the service life is based exclusively on the loaded rows of balls.
- ASN 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.

Installation Instructions



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. 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. 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. If vertical installation, please contact Rollco.
- The installation of two partial extensions on a profile provides a load capable full extension. For individual solutions, please contact Rollco.

DE/DBN

- Series DE and DBN accept radial and axial loads.
- Horizontal and vertical application is possible. Prior to vertical installation, we recommend a check by application technology.
- The functionality of custom design DE...D is only guaranteed if the stroke available is completely used.

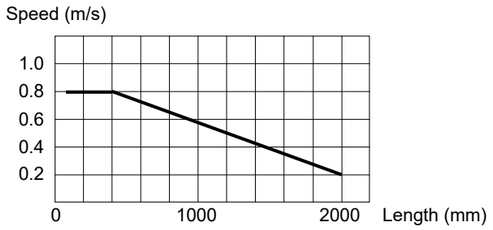
DS

- Series DS 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 a check by application technology.
- When installing make sure that the load is placed on the movable element (the lower rail). The opposite assembly negatively affects the function.
- Installation must be done on a rigid adjacent construction using all accessible fixing holes.
- Pay attention to the parallel alignment during assembly with paired application.

Operating Conditions

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.



Temperature

- Series ASN, DE and DBN 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).
- Series DS have a useable range of -30°C to+110°C (-22°F to +230°F) due to rubber stop.

Anticorrosive Protection

- All of the Telescopic Rail product series have a standard anticorrosive protection by electrolytic galvanisation according to ISO 2081. If increased anticorrosive protection is required, the rails are available chemically nickel plated and with corrosion resistant steel balls.
- Numerous application-specific surface treatments are available upon request, e.g., as a nickel-plated design with FDA approval for use in the food industry. For more information please contact Rollco.

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 lubrication. Raceways and spaces of the ball cage are lubricated with a lithium lubricant of average consistency (roller bearing lubricant).
- 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 Rollco.

Rollco Products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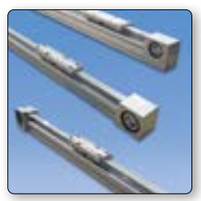
LINEAR UNIT E-SMART


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