NADELLA

HARDENED TELESCOPIC RAILS

NADELLA GROUP

SUMMARY

NADELLA / nadella.com
DURBAL / durbal.com
CHIAVETTE UNIFICATE / chiavette.com
IPIRANGA / ipirangahusillos.com
SHUTON / shuton.com

THE SPECIALIST FOR MOTION TECHNOLOGY

Nadella Group is an expert system partner for all areas of motion technology, with specialized manufacturer companies and a worldwide sales network.

Wherever innovative ideas, customized solutions, precision and reliability are required, developers and design engineers rely on products and solutions from the Nadella Group.

COMPANIES, BRANDS AND PRODUCTS OVERVIEW

NADELLA

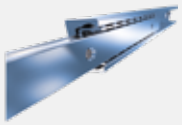

Linear Guide Systems


Linear Modules


Complete Systems


Bearings and Cam Followers


Adjusting Nuts & Rings


Telescopic Rails

durbal
chiavette unificate
TESCUBAL


Rod Ends and Spherical Plain Bearings


Clevises and Ball/Axial Joints

SHUTON
IPIRANGA


Precision Ball Screws


Rolled Ball Screws

MILESTONES

1930
NADELLA foundation in France

1958
Founding of NADELLA GMBH in Germany

1963
Founding of NADELLA S.P.A. in Italy

1984
Start of development and sale of Nadella Linear

2012
New Nadella subsidiaries in China and USA

2014
Acquisition of DURBAL

2018
Acquisition of CHIAVETTE UNIFICATE

2019
Founding of Nadella Motion Technology Changxing Co. Ltd.

2020
New Nadella subsidiaries in France and Spain
Acquisition of SHUTON and IPIRANGA

KEY NUMBERS

1 Group

7 manufacturing plants

13 main locations
Italy, Germany, France, United Kingdom, Spain, United States, China

leading the way in the international markets
in over **60** countries

for **90** years

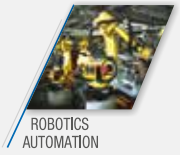
APPLICATION SECTORS


RAILWAY TECHNOLOGY

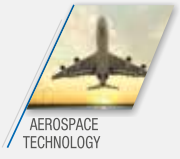

WAREHOUSE & LOGISTICS


MEDICAL ENGINEERING


FOUNDRY & IRONWORKS


ROBOTICS AUTOMATION


PACKAGING INDUSTRY


AEROSPACE TECHNOLOGY


PHARMACEUTICAL PRODUCTION


CUTTING & WELDING


HI-TECH PRODUCTION

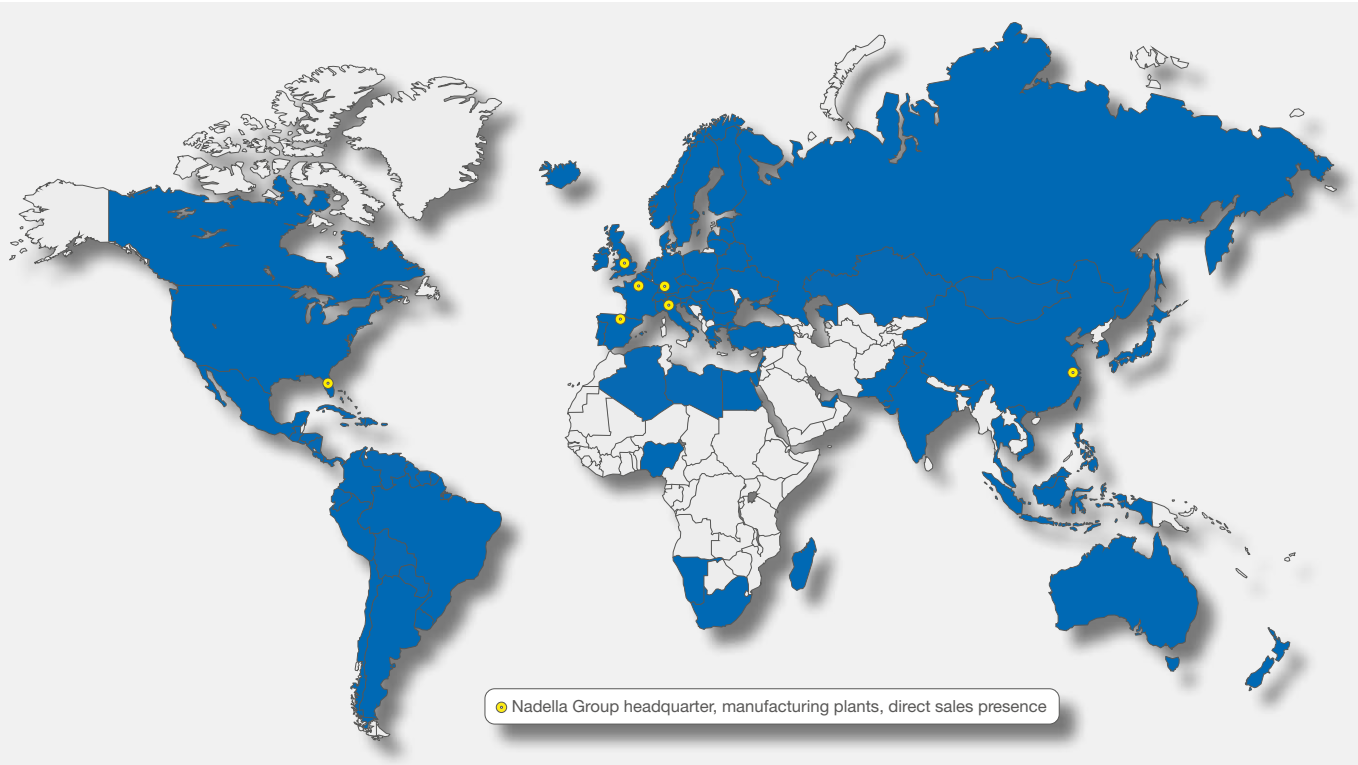
NADELLA / nadella.com
DURBAL / durbal.com
CHIAVETTE UNIFICATE / chiavette.com
IPIRANGA / ipirangahusillos.com
SHUTON / shuton.com

THE SPECIALIST FOR MOTION TECHNOLOGY

Our customers' satisfaction is the basis for our success and growth.
That is why we are at your service around the world and always keep your requirements as a priority.

We have a worldwide network of sales engineers and distributors in Europe, Asia and the USA.
This allows us to ensure customer-oriented solutions and best in class delivery and service.

WORLDWIDE NETWORK



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DISTRIBUTORS COVERAGE

Austria	China	France	India	Korea	Portugal	Slovakia	Switzerland
Belgium	Czech Republic	Germany	Ireland	Netherlands	Romania	Slovenia	Taiwan
Brazil	Denmark	Great Britain	Israel	Norway	Russia	Spain	Turkey
Canada	Finland	Hungary	Italy	Poland	Singapore	Sweden	United States

PRODUCT OVERVIEW
HARDENED TELESCOPIC LINE

2.0

The Hardened Telescopic Line of Nadella is the ideal solution for those applications requiring high duty cycles, heavy loads and continuous processes. Made entirely of steel, with cold drawn profiles and induction hardened raceways, it enables you to move heavy loads with a smooth rolling and reduced clearance thanks to the new optimized shape.

Each product is composed of:

- Linear guide made of cold drawn steel, to ensure a high load capacity and low deflection.
- Internal raceways composed of the new engineered shape to reduce friction and clearance, induction hardened for a high wear resistance and durability.
- New designed ball-cage made of steel, to allow a smoother sliding of the elements, controlled clearance and very high load capacity.

The hardened telescopic line includes:

- Part extension telescopic rails NTA-H, with a stroke equal to 50%-70% of the installation length

- Full extension telescopic rails NTS-H, with a stroke equal to 100% of the installation length

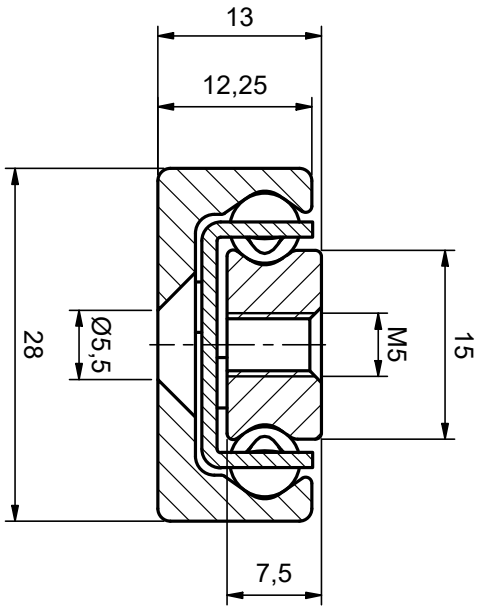
- NTSF Linear guides rails, with one or more recirculation sliders running inside a fixed length

Nadella telescopic rails are currently available in three sizes 28, 33, 43 (63 coming soon) and can be supplied in standard length and holes pitch as per our catalogue specifications or in several different configurations according to customer needs.

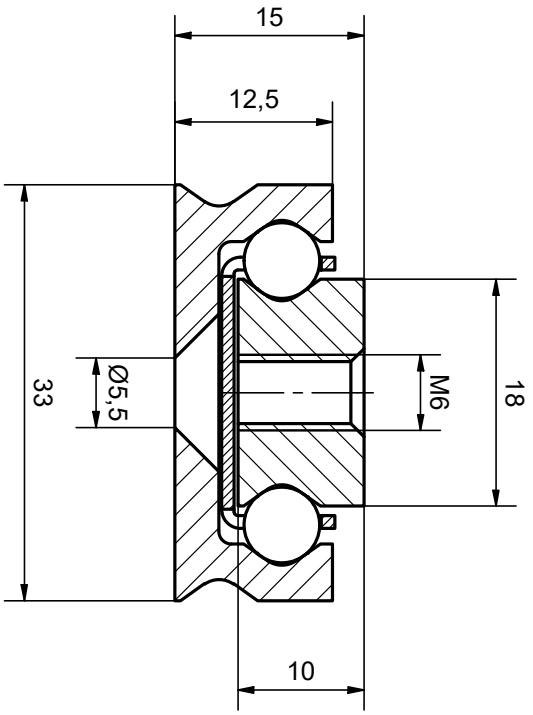
See technical specifications for more information regarding available solutions and options.

PRODUCT OVERVIEW
TELESCOPIC LINE - PART EXTENSION

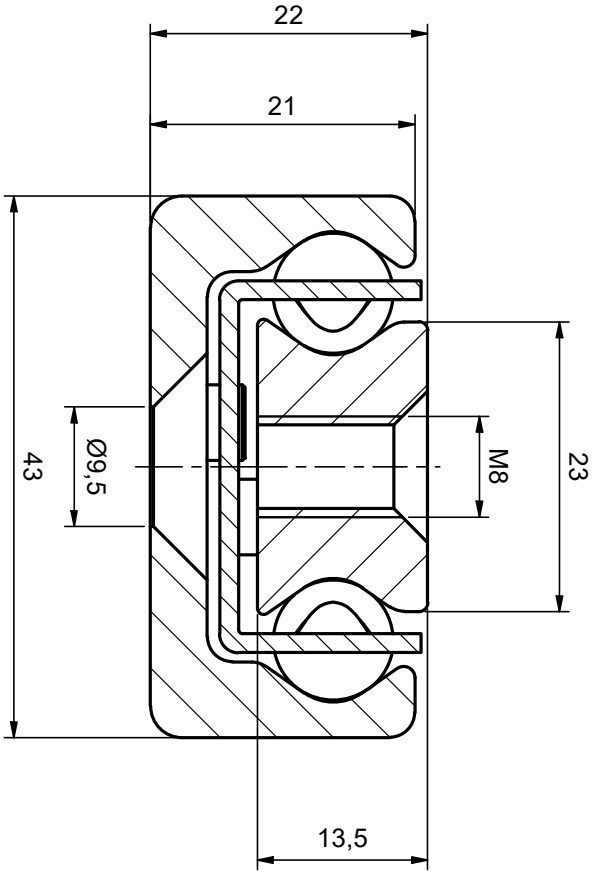
NTA28-13H



NTA33-15H

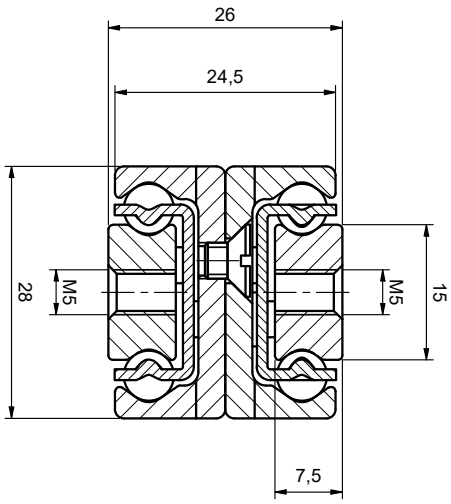


NTA43-22H

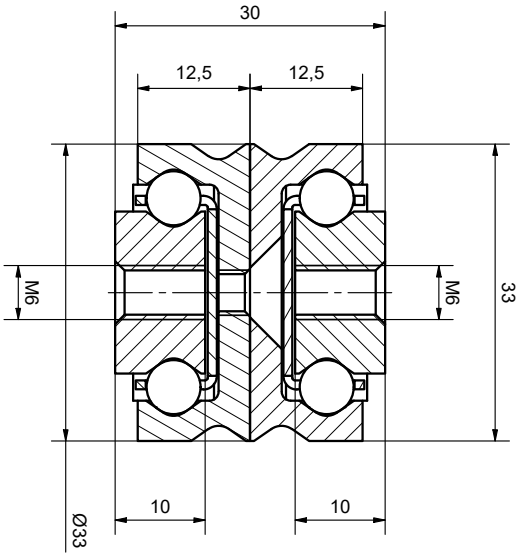


PRODUCT OVERVIEW
TELESCOPIC LINE - FULL EXTENSION

NTS28-26H



NTS33-30H



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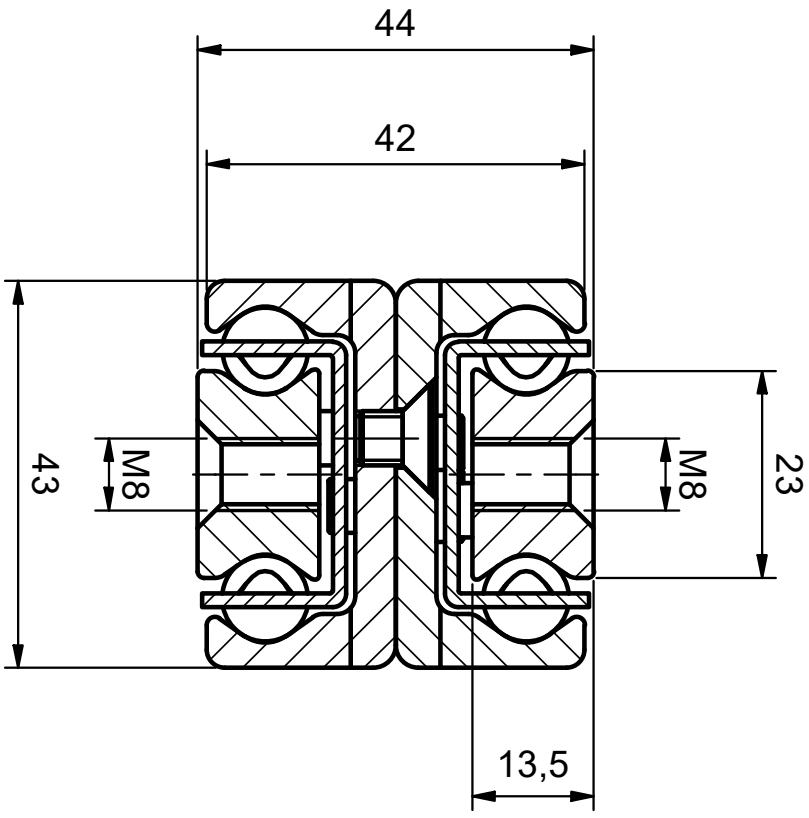
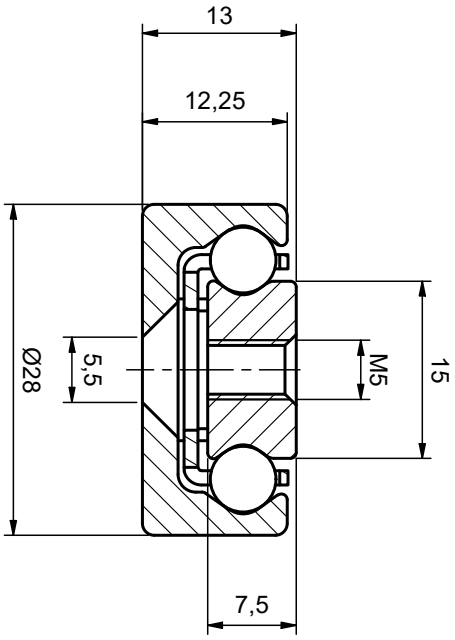
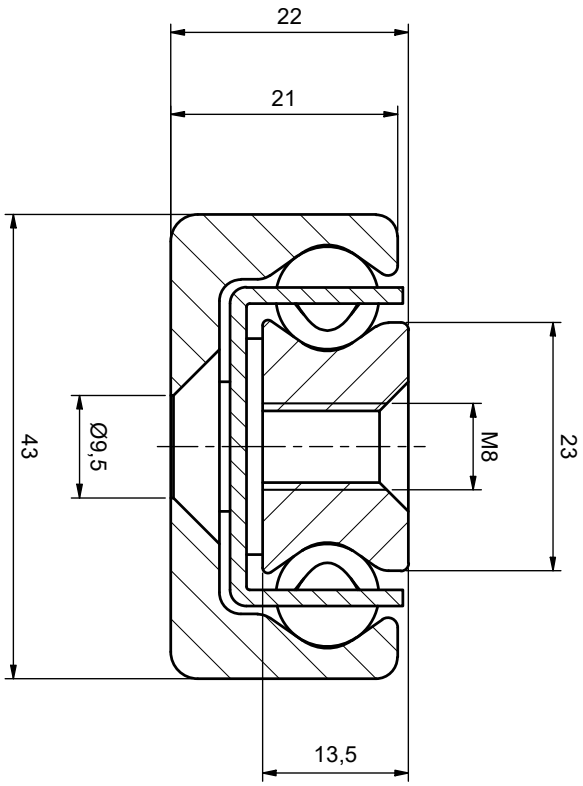


PRODUCT OVERVIEW
TELESCOPIC LINE - LINEAR GUIDES

NTSF28H



NTSF43H



PRODUCT DETAILS

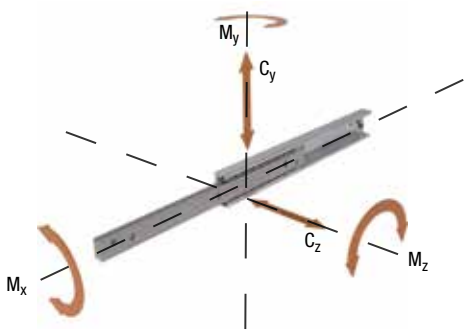
3

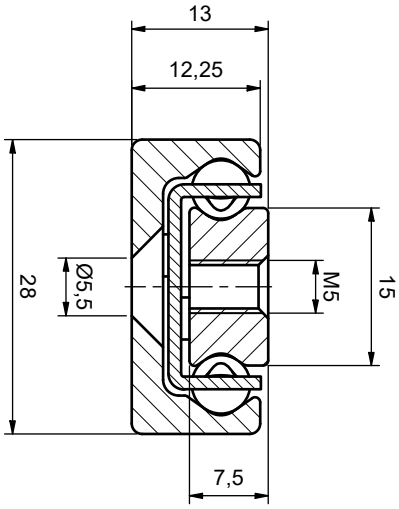
PART EXTENSION
NTA28-13H

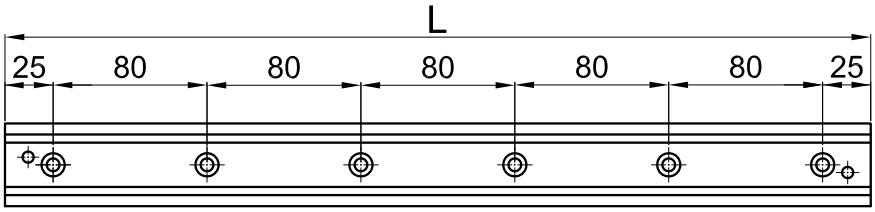
MATERIAL
Zinc-plated steel

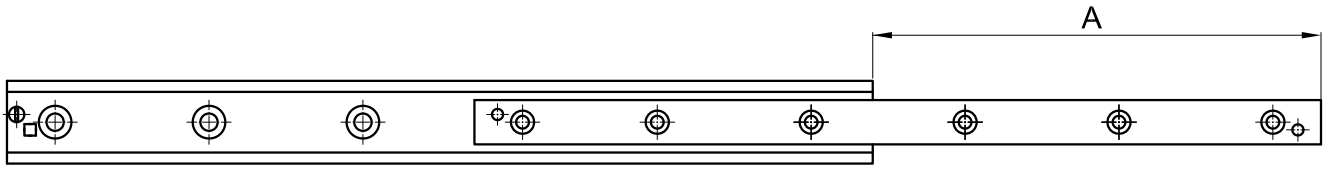
NC4 VR

Lmin130 Lmax1170









Order Number	Installation Length L	Extension Length A	Cy [1]	Cz [1]	Mx	My	Mz	Cdyn [2]	Net Weight
	[mm]		[N]		[Nm]			[N]	[kg]
NTA28-13H-130	130	73	726	506	15	20	29	4226	0.28
NTA28-13H-210	210	113	1302	914	27	61	86	6459	0.45
NTA28-13H-290	290	153	1878	1316	39	122	175	8366	0.62
NTA28-13H-370	370	193	2452	1723	52	206	293	10069	0.80
NTA28-13H-450	450	233	3028	2125	64	311	438	11650	0.97
NTA28-13H-530	530	273	3582	2524	76	437	607	13051	1.14
NTA28-13H-610	610	323	4008	2820	85	544	750	13935	1.31
NTA28-13H-690	690	363	4518	3216	97	701	943	15076	1.49
NTA28-13H-770	770	43	5016	3600	109	872	1144	16137	1.66
NTA28-13H-850	850	433	5616	4078	124	1110	1374	17481	1.84
NTA28-13H-930	930	473	5988	4488	137	1292	1543	18089	2.01
NTA28-13H-1010	1010	523	6284	4735	146	1445	1650	18469	2.18
NTA28-13H-1090	1090	563	6569	5080	158	1638	1757	18820	2.36
NTA28-13H-1170	1170	603	6794	5416	170	1834	1847	19013	2.53

1) Cy and Cz = load capacities for single rail
2) Cdyn is used for lifetime calculation

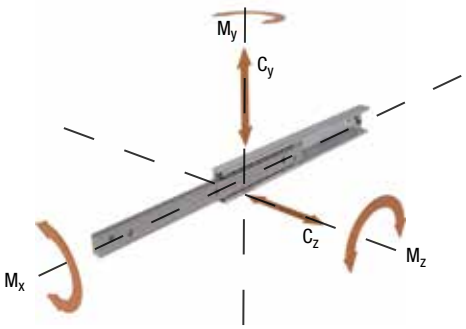
- If you are planning to combine several options, please contact our application engineering division.
- For technical information see pages 26-29.
- **Double stroke (option VR):** In order to obtain the double stroke and allow the slider to extend in both directions, please remove the screws at the edge of the rail or order with VR suffix.

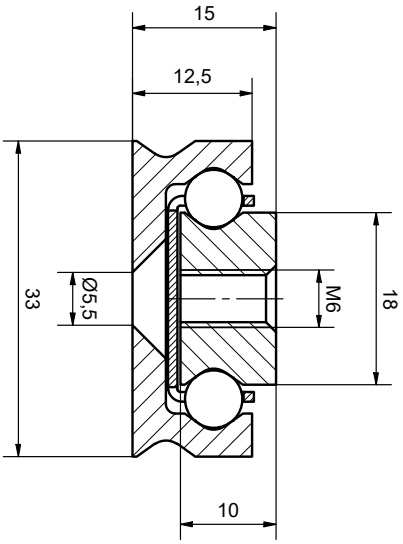
PART EXTENSION
NTA33-15H

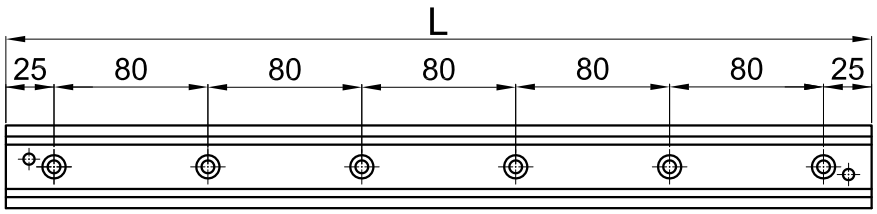
MATERIAL
Zinc-plated steel

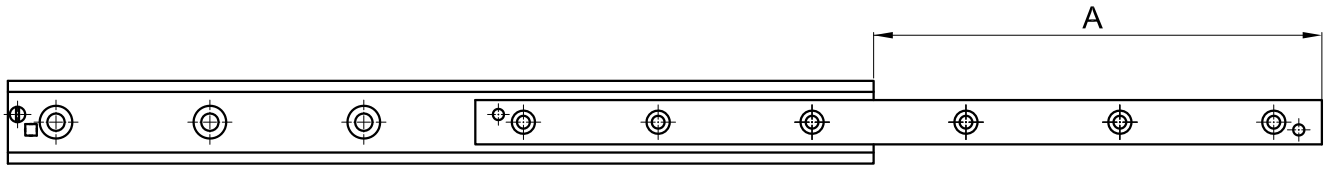
NC4 VR

Lmin130 Lmax1170









Order Number	Installation Length L	Extension Length A	Cy [1]	Cz [1]	Mx	My	Mz	Cdyn [2]	Net Weight
	[mm]		[N]		[Nm]			[N]	[kg]
NTA33-15H-130	130	73	665	467	13	19	26	3903	0.37
NTA33-15H-210	210	113	1012	709	21	48	68	5061	0.60
NTA33-15H-290	290	153	1356	952	30	90	128	6092	0.82
NTA33-15H-370	370	193	1702	1194	38	144	205	7049	1.06
NTA33-15H-450	450	233	2035	1432	46	211	300	7898	1.29
NTA33-15H-530	530	273	2387	1673	55	290	410	8771	1.52
NTA33-15H-610	610	323	2419	1706	59	335	472	8483	1.74
NTA33-15H-690	690	363	2732	1933	67	432	598	9196	1.98
NTA33-15H-770	770	43	3047	2176	76	541	736	9885	2.21
NTA33-15H-850	850	433	3619	2617	89	719	942	11362	2.45
NTA33-15H-930	930	473	3913	2844	97	845	1072	11922	2.67
NTA33-15H-1010	1010	523	3918	2864	101	914	1132	11613	2.90
NTA33-15H-1090	1090	563	4140	3080	110	1048	1246	11963	3.14
NTA33-15H-1170	1170	603	4354	3290	118	1183	1338	12287	3.36

1) Cy and Cz = load capacities for single rail
2) Cdyn is used for lifetime calculation

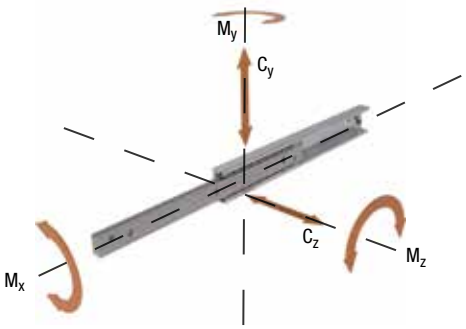
- If you are planning to combine several options, please contact our application engineering division.
- For technical information see pages 26-29.
- **Double stroke (option VR):** In order to obtain the double stroke and allow the slider to extend in both directions, please remove the screws at the edge of the rail or order with VR suffix.

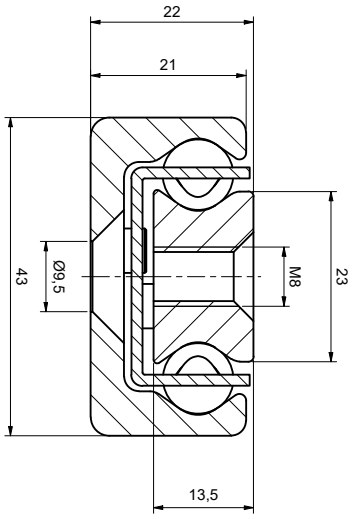
PART EXTENSION
NTA43-22H

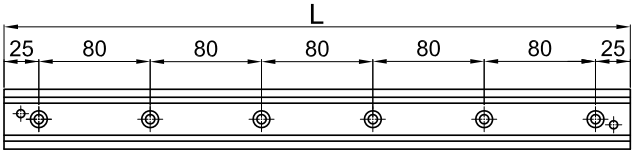
MATERIAL
Zinc-plated steel

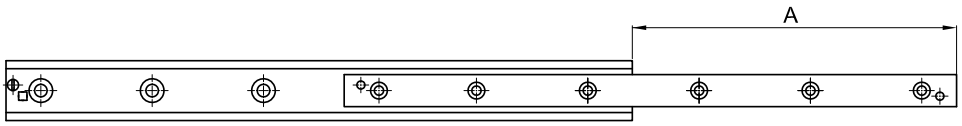
NC4 VR

Lmin210 Lmax1970









Order Number	Installation Length L	Extension Length A	Cy [1]	Cz [1]	Mx	My	Mz	Cdyn [2]	Net Weight
	[mm]		[N]		[Nm]			[N]	[kg]
NTA43-22H-210	210	123	2730	1516	66	91	131	11447	1.10
NTA43-22H-290	290	158	3458	2425	106	218	312	16278	1.53
NTA43-22H-370	370	208	4328	3031	132	334	475	18784	1.95
NTA43-22H-450	450	243	5604	3940	172	551	782	22783	2.39
NTA43-22H-530	530	278	6836	4844	211	822	1156	26318	2.82
NTA43-22H-610	610	313	8036	5752	251	1141	1584	29522	3.26
NTA43-22H-690	690	363	8928	6332	277	1379	1886	31477	3.67
NTA43-22H-770	770	398	10062	7229	317	1772	2352	34201	4.11
NTA43-22H-850	850	433	11154	8083	357	2198	2804	36684	4.54
NTA43-22H-930	930	483	11802	8654	383	2496	3082	37669	4.96
NTA43-22H-1010	1010	518	12638	9348	423	2950	3449	39244	5.40
NTA43-22H-1090	1090	568	13172	10007	449	3262	3652	39876	5.82
NTA43-22H-1170	1170	603	13788	10752	489	3708	3889	40766	6.25
NTA43-22H-1250	1250	638	14274	11480	529	4135	4061	41282	6.68
NTA43-22H-1330	1330	688	14551	11885	555	4393	4141	41223	7.10
NTA43-22H-1410	1410	723	14826	12508	595	4746	4216	41191	7.54
NTA43-22H-1490	1490	758	15014	13032	634	5047	4266	40954	7.97
NTA43-22H-1570	1570	793	15120	13526	674	5304	4278	40530	8.41
NTA43-22H-1650	1650	843	15210	13780	700	5442	4282	40101	8.82
NTA43-22H-1730	1730	878	15235	14112	740	5611	4284	39539	9.26
NTA43-22H-1810	1810	928	15254	14324	766	5699	4285	38996	9.68
NTA43-22H-1890	1890	963	15305	14575	806	5834	4286	38565	10.11
NTA43-22H-1970	1970	1013	15308	14692	832	5844	4286	38045	10.53

1) Cy and Cz = load capacities for single rail
2) Cdyn is used for lifetime calculation

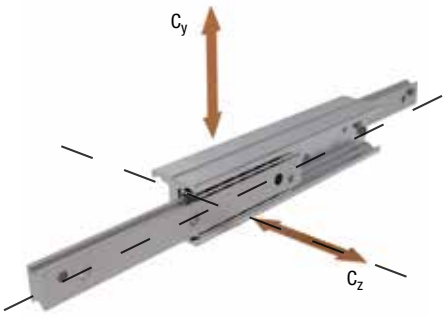
- If you are planning to combine several options, please contact our application engineering division.
- For technical information see pages 26-29.
- **Double stroke (option VR):** In order to obtain the double stroke and allow the slider to extend in both directions, please remove the screw at the edge of the rail or order with VR suffix.

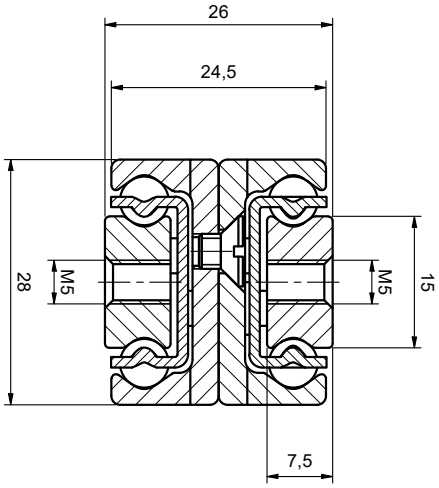
FULL EXTENSION
NTS28-26H

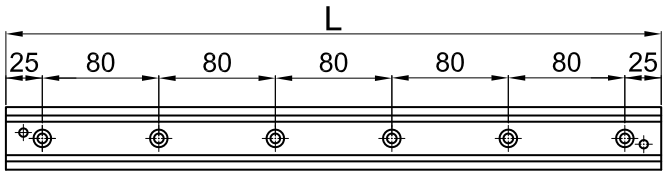
MATERIAL
Zinc-plated steel

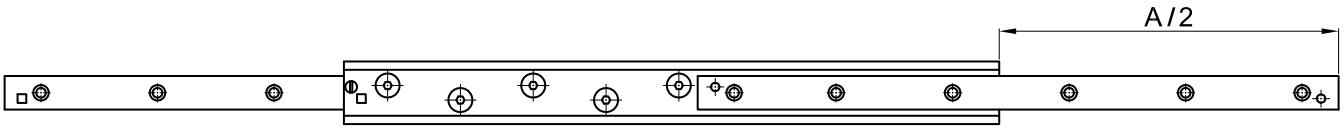
NC4 VR VRM

Lmin130 Lmax1170









Order Number	Installation Length L	Extension Length A	Cy [1]	Cz [1]	Cdyn [2]	Deflection	Net Weight
	[mm]		[N]			[mm]	[kg]
NTS28-26H-130	130	146	268	177	1872	1	0.55
NTS28-26H-210	210	226	630	308	2679	3	0.90
NTS28-26H-290	290	306	952	415	3181	4	1.25
NTS28-26H-370	370	386	1122	470	3253	6	1.60
NTS28-26H-450	450	466	1088	454	2955	7	1.94
NTS28-26H-530	530	546	995	420	2558	9	2.29
NTS28-26H-610	610	646	891	380	2186	11	2.63
NTS28-26H-690	690	726	797	344	1878	12	2.98
NTS28-26H-770	770	806	731	315	1660	14	3.32
NTS28-26H-850	850	866	675	290	1483	14	3.68
NTS28-26H-930	930	946	626	268	1334	15	4.02
NTS28-26H-1010	1010	1046	585	251	1213	18	4.36
NTS28-26H-1090	1090	1126	549	234	1111	19	4.71
NTS28-26H-1170	1170	1206	513	221	1014	21	5.06

1) Cy and Cz = load capacities for single rail
2) Cdyn is used for lifetime calculation

- If you are planning to combine several options, please contact our application engineering division.
- For technical information see pages 26-29.
- **Double stroke (option VR, VRM):** In order to obtain the double stroke and allow the slider to extend in both directions, please remove the screws at the edge of the rail or order with VR, VRM suffix.

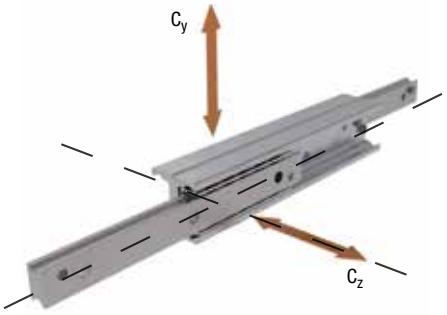
FULL EXTENSION
NTS33-30H

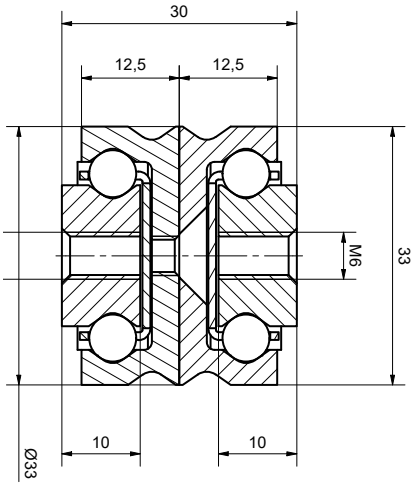
3.2

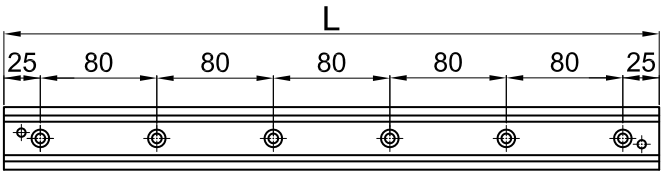
MATERIAL
Zinc-plated steel

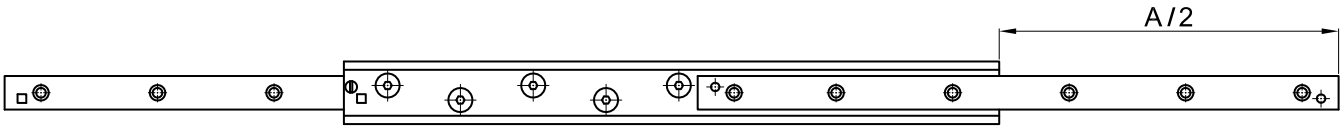
NC4 VR VRM

Lmin130 Lmax1170









Order Number	Installation Length L	Extension Length A	Cy [1]	Cz [1]	Cdyn [2]	Deflection	Net Weight
	[mm]		[N]			[mm]	[kg]
NTS33-30H-130	130	146	202	139	1423	1	0.73
NTS33-30H-210	210	226	471	220	1885	3	1.20
NTS33-30H-290	290	306	707	290	2243	4	1.66
NTS33-30H-370	370	386	831	341	2431	6	2.13
NTS33-30H-450	450	466	887	359	2431	7	2.58
NTS33-30H-530	530	546	874	351	2267	9	3.05
NTS33-30H-610	610	646	779	314	1927	11	3.50
NTS33-30H-690	690	726	731	292	1737	12	3.96
NTS33-30H-770	770	806	677	270	1550	14	4.42
NTS33-30H-850	850	866	655	261	1450	14	4.89
NTS33-30H-930	930	946	610	243	1312	15	5.35
NTS33-30H-1010	1010	1046	556	220	1163	18	5.80
NTS33-30H-1090	1090	1126	522	209	1065	19	6.26
NTS33-30H-1170	1170	1206	495	197	986	21	6.73

1) Cy and Cz = load capacities for single rail
2) Cdyn is used for lifetime calculation

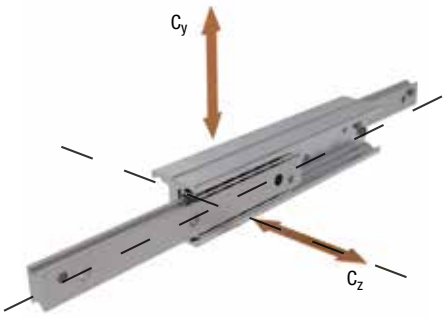
- If you are planning to combine several options, please contact our application engineering division.
- For technical information see pages 26-29.
- **Double stroke (option VR, VRM):** In order to obtain the double stroke and allow the slider to extend in both directions, please remove the screws at the edge of the rail or order with VR, VRM suffix.

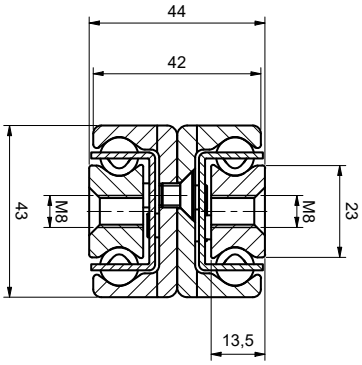
FULL EXTENSION
NTS43-44H

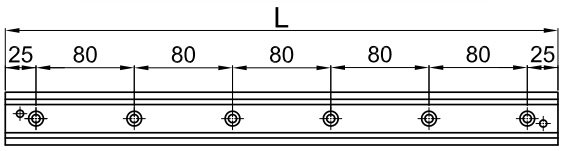
MATERIAL
Zinc-plated steel

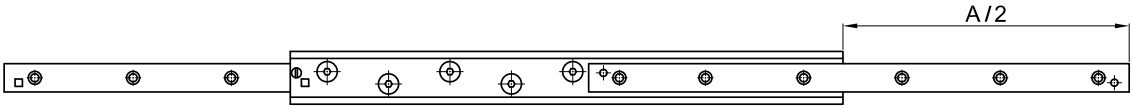
NC4 VR VRM

Lmin210 Lmax1970









Order Number	Installation Length L	Extension Length A	Cy [1]	Cz [1]	Cdyn [2]	Deflection	Net Weight
	[mm]		[N]			[mm]	[kg]
NTS43-44H-210	210	246	719	504	4522	3	2.20
NTS43-44H-290	290	316	1743	815	6563	5	3.07
NTS43-44H-370	370	416	2332	956	7145	6	3.90
NTS43-44H-450	450	486	2812	1183	8069	7	4.77
NTS43-44H-530	530	556	2994	1306	8135	9	5.64
NTS43-44H-610	610	626	2933	1322	7604	11	6.51
NTS43-44H-690	690	726	2703	1254	6727	12	7.35
NTS43-44H-770	770	796	2511	1181	6024	14	8.22
NTS43-44H-850	850	866	2329	1100	5407	16	9.10
NTS43-44H-930	930	966	2168	1026	4883	18	9.92
NTS43-44H-1010	1010	1036	2033	960	4457	20	10.80
NTS43-44H-1090	1090	1136	1911	902	4083	21	11.63
NTS43-44H-1170	1170	1206	1802	854	3761	24	12.50
NTS43-44H-1250	1250	1276	1700	808	3471	25	13.37
NTS43-44H-1330	1330	1376	1617	768	3233	28	14.20
NTS43-44H-1410	1410	1446	1533	730	3007	29	15.07
NTS43-44H-1490	1490	1516	1464	697	2818	29	15.90
NTS43-44H-1570	1570	1586	1399	668	2647	30	16.81
NTS43-44H-1650	1650	1686	1338	638	2490	33	17.65
NTS43-44H-1730	1730	1756	1285	613	2354	33	18.52
NTS43-44H-1810	1810	1856	1234	589	2227	36	19.36
NTS43-44H-1890	1890	1926	1187	567	2111	37	20.22
NTS43-44H-1970	1970	2026	1136	546	1992	40	21.06

1) Cy and Cz = load capacities for single rail
2) Cdyn is used for lifetime calculation

- If you are planning to combine several options, please contact our application engineering division.
- For technical information see pages 26-29.
- **Double stroke (option VR, VRM):** In order to obtain the double stroke and allow the slider to extend in both directions, please remove the screws at the edge of the rail or order with VR, VRM suffix.

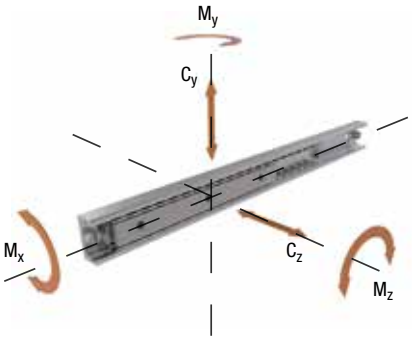
3.2

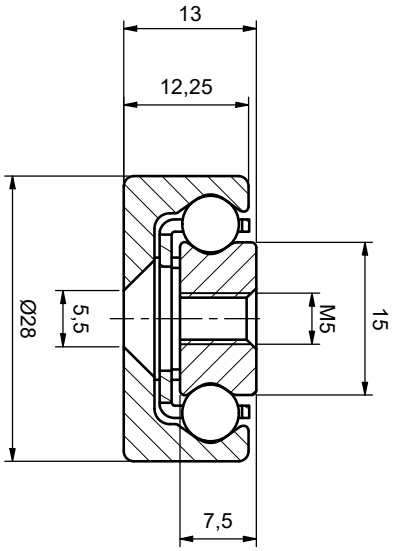
LINEAR GUIDES
NTSF28H

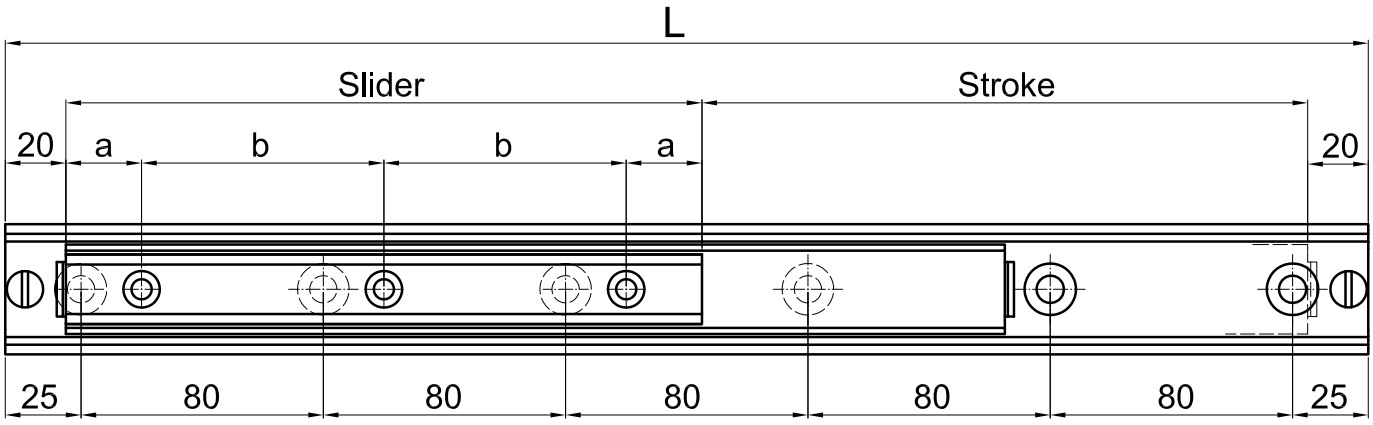
MATERIAL
Zinc-plated steel

NC4

$L_{min}150$ $L_{max}1650$







Slider	a	b	Cy [1]	Cz [1]	Mx	My	Mz	C_{100} [2]
[mm]			[N]		[Nm]			[N]
60	10	20	2409	1687	15	16	24	4473
80	10	60	3372	2361	21	32	44	5674
130	25	80	5780	4048	36	88	126	8294
210	25	80	9634	6746	61	236	336	11873
290	25	80	13488	9444	85	456	652	15034
370	25	80	17341	12143	109	749	1069	17930
450	25	80	21195	14841	134	1113	1590	20638

1) Cy and Cz = load capacities for single rail
2) C_{100} is used for lifetime calculation

- If you are planning to combine several options, please contact our application engineering division.
- For technical information see pages 26-29.

- **L = Available lengths [mm]:** 150, 210, 290, 370, 450, 530, 610, 690, 770, 850, 930, 1010, 1170, 1330, 1490, 1650. Other lengths are available on request up to a maximum length of 2000 mm.

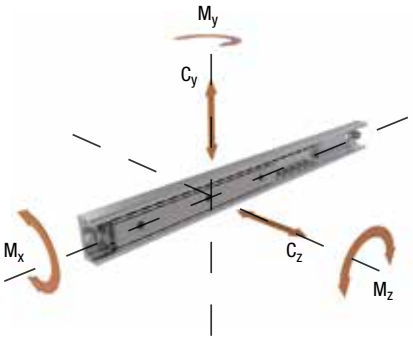
Code example: **NTSF28H 690 360**
Rail NTSF28G: length 690 mm, stroke 360 mm
(slider length = 290 mm = 690 - 360 mm – stop length 2 x 20)

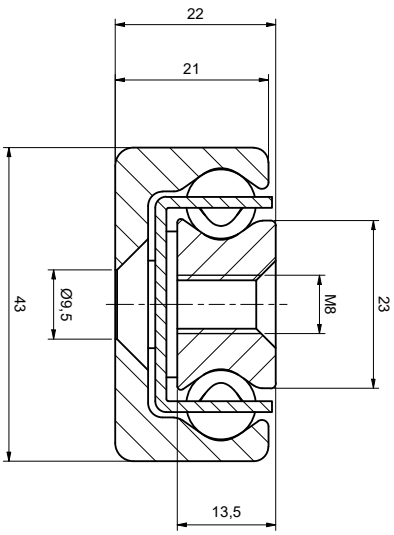
LINEAR GUIDES
NTSF43H

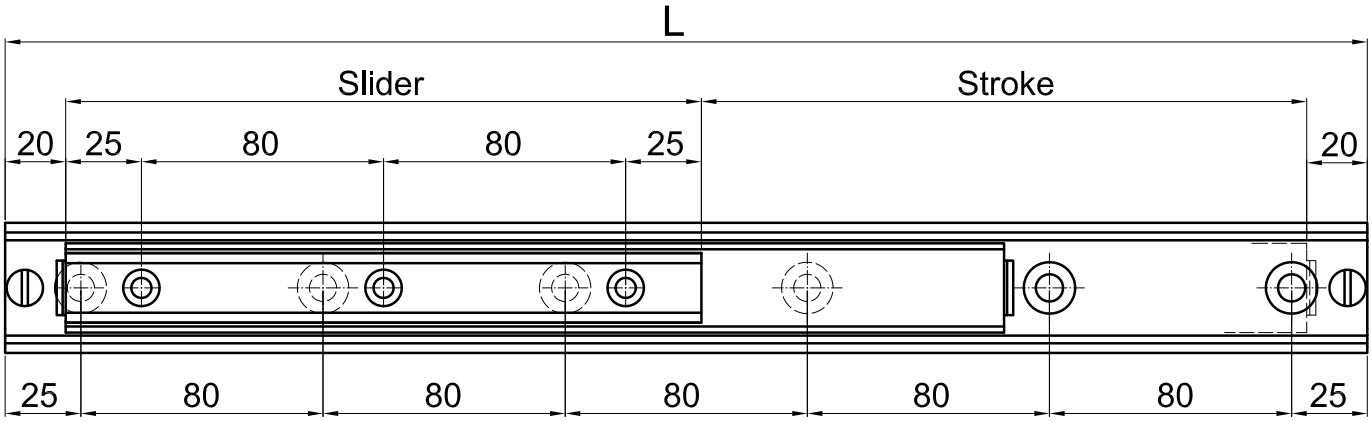
MATERIAL
Zinc-plated steel

NC4

Lmin290 **Lmax1970**







Slider	Cy [1]	Cz [1]	Mx	My	Mz	C_{100} [2]
[mm]	[N]		[Nm]			[N]
130	11546	8085	106	121	173	20001
210	18763	13138	172	307	438	28147
290	27423	19201	251	640	914	36743
370	34639	24254	317	1011	1443	43287
450	41856	29307	383	1465	2093	49431
530	50516	35371	462	2122	3031	56397
610	57732	40424	529	2762	3945	61930

1) Cy and Cz = load capacities for single rail
2) C_{100} is used for lifetime calculation

- If you are planning to combine several options, please contact our application engineering division.
- For technical information see pages 26-29.

- **L = Available lengths [mm]:** 290, 370, 450, 530, 610, 690, 770, 850, 930, 1010, 1170, 1330, 1490, 1650, 1810, 1970. Other lengths are available on request up to a maximum length of 2000 mm.

Code example: **NTSF43H 690 520**
Rail NTSF43G: length 690 mm, stroke 520 mm
(slider length = 130 mm = 690 - 520 mm – stop length 2 x 20)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MarCator
810 S

TECHNICAL SPECIFICATIONS

4

TECHNICAL SPECIFICATIONS
NTA-H, NTS-H, NTSF-H

Telescopic rails are ball guided slides used when reduced encumberances are required. Hardened telescopic line is the range of Nadella rails developed for those applications requiring high loads, heavy duty cycles and smooth running.

Thanks to the cold drawn profiles and induction hardened raceways, now re-designed with a new optimized shape to better control the clearance and minimize the sliding force, Nadella Hardened Telescopic Line allows a smoother sliding and a low deflection also for the most exigent applications.

Nadella telescopic rails NTA-H and NTS-H are available respectively available with ~60% and 100% extension, according to customer needs.

Linear guides NTSF-H, using the same optimised profile with Hardened raceways, plus an inner slider running inside the rail, provides a linear motion solution for applications demanding compact dimensions and heavy duty dynamics.

Our rails are available in size 28, 33, 43 - and 63 coming soon.

SURFACE TREATMENT

NTA-H, NTS-H and NTSF-H are supplied as standard in steel with zinc-plating surface.
Other treatments are available upon request and already included in the catalogue such as NC4 zinc-nickel alloy coating, or can be required as special execution (Black phosphate, etc.).

LUBRICATION AND TEMPERATURE

To guarantee a proper exercise and to ensure an adequate lifetime, a lubricant layer must always be provided in the contact area between the balls and the raceways. The guides are provided with raceways lubricated with a bearing grease with a Barium soap, which allows to work in a temperature range between -20°C and +120°C. Please contact our technical support if you plan application with higher temperatures.

We recomend to lubricate the raceways at least every 50 000 cycles. For extreme working temperature, please contact our technical support.

The maximum working temperature is 170°C, for higher temperature ranges, take into account a considerable reduction of the load capacity (at high temperatures the hardened raceways undergo a tempering process, reducing the surface hardness of the elements).

The recommended speed is lower than 0,5 m/s in order to have a correct functioning (for rails NTS-H maximum speed 0,3 m/s).

These products are suggested for applications with small inversion frequencies and accelerations (please, consult the following «Suggestions for a correct mounting» paragraph).

LOAD CAPACITIES

Guide rails with ball cage have preferential load capacity with the mounting on the side (major axis).
The correct assembly consists in mounting the guides in parallel with each other and having a uniform distribution of the load. When fastening the rail to the support structure and the load to the sliders, it is always recommended to use all available holes on the elements.

Ideal mounting configuration with two parallel guides, load in preferential direction applied in the middle of the sliders.

Load capacities are expressed in N (Newton), torque load capacities are expressed in Nm, referred to the Cartesian axes with origin in the centre of the slider.

Tables of load capacities in the following pages refer to a single slider and are to be intended as maximum static admissible loads for a smooth operation.

In order to choose the correct guide rail we suggest to use the product with the appropriate load capacity by calculating the safety factor S_F.

With more loads and torques acting simultaneously in different directions the check of the loads shouldn't be on the single component, but the contemporary action of all the components should be considered (P_{eq}).

OPERATING CONDITIONS	f_s
For high stiffness, low dynamics, low contaminations	1.5
Normal conditions	1.5 - 2
For low stiffness, heavy duty cicle	2 - 3

$$S_F = \left(\frac{C_y}{P_{eq}} \right) > f_s$$

$$P_{eq} = P_1 + \left(\frac{P_2}{C_z} + \frac{M_1}{M_x} + \frac{M_2}{M_y} + \frac{M_3}{M_z} \right) \times C_y$$

with:

P_{eq}	equivalent load in Y direction resulting from the combination of all the loads and torques acting contemporary on the slider
P_1	load applied in the middle of the slider in Y direction
P_2	load applied in the middle of the slider in Z direction
M_1	torque applied in the middle of the slider around X axis
M_2	torque applied in the middle of the slider around Y axis
M_3	torque applied in the middle of the slider around Z axis
C_y	maximum admissible static load capacity in Y direction
C_z	maximum admissible static load capacity in Z direction
M_x	maximum admissible static torque load capacity around X axis
M_y	maximum admissible static torque load capacity around Y axis
M_z	maximum admissible static torque load capacity around Z axis
f_s	static factor

LIFETIME

The lifetime of the guide rail is the maximum stroke (in km for rails NTSFH) or maximum number of cycles (for rails NTA-H and NTS-H), that the guide rail will be able to reach before the plastic deformation on the raceways occurs.

For rails NTSFH

$$L_{km} = 100 \times \left(\frac{C_{100}}{P_{eq}} \times \frac{1}{f_d} \right)^3$$

For rails NTAH and NTSH

$$L_{cycles} = 100000 \times \left(\frac{C_{dyn}}{P_{eq}} \times \frac{1}{f_d} \right)^3$$

with:

- C_{100} dynamic load in Y direction [N], valued according to standard ISO 14728-2 for the calculation of the lifetime in km (rails NTSFH)
- C_{dyn} dynamic load in Y direction [N], valued according to standard ISO 14728-2 for calculation of the lifetime in cycles (rails NTAH and NTSH)
- P_{eq} equivalent load in Y direction resulting from the combination of all the loads and torques acting contemporary on the slider (see formula above)
- f_d dynamic factor

OPERATING CONDITIONS	f_d
Smooth operation at low speed at constant load without shocks	1 - 1.2
Smooth operation with load variation	1.2 - 1.5
Operation with small shocks and vibrations	1.5 - 2
High accelerations, shocks and vibrations	2 - 4

DEFLECTION

The deflection is the elastic deformation you can experience at the edge of the opened rail when a load is applied.

With semi-telescopic rails NTA-H, that can partially exit from the rail, the deflection will depend almost exclusively on the rigidity of the structures connected to the guide elements.

For telescopic rails NTS-H, refer to the values of deflection written in the tables of the load capacities and which refer to the maximum load (C_y) applied in the middle of the opened slider. For applied loads inferior to the maximum load capacity, reduce the deflection proportionally

SUGGESTIONS FOR A CORRECT MOUNTING

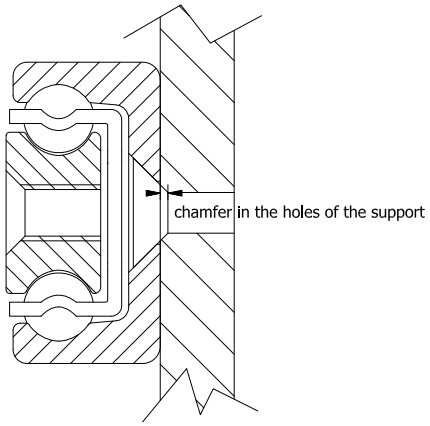
In guide systems based on ball-cage, the sliding occurs thanks to the simultaneous movement of the slider and of the ball-cage: the slider, moved by a drive system or manually, sets in motion the ball-cage, which will cover half of the stroke done by the slider, until reaching the end-stop.

During operation, with the succession of working cycles and consequent motion reversals, imperceptible displacements of the ball-cage, in relation to the position of the slider, occur.
This process, that is defined displacement and leads to a gradual reduction of the stroke and consequent dragging of the ball-cage on the raceways, can be slowed down using the race for the entire stroke and limiting speed and acceleration.

The restoration of the proper functioning must be done by setting a forced cycle up to the end stop: when the movement of the slider is commanded by a drive system, we recommend to provide a peak motor torque 10 times higher (friction coefficient in normal condition is 0,01).

Guide systems based on ball-cages are mostly recommended for horizontal movements. Vertical installation is not recommended because the ball-cage tends to fall by gravity, accelerating the process of displacement.

Providing an external end stop is highly recommended in order not to discharge on the screw of the internal stop the arrest of the machine.



Size	Chamfer (mm)
NTSF28H, NTA33	1 x 45°
NTSF43H, NTA43	1.5 x 45°

TECHNICAL SPECIFICATIONS
NTA-H, NTS-H, NTSF-H

FRICTION COEFFICIENT
The friction coefficient in normal condition is equal to 0,01.

When the movement of the slider is commanded by a drive system, we recommend to provide a peak motor torque 10 times higher than the standard required due to the process of displacement (see the "Suggestion for a correct mounting" paragraph).

For telescopic rails NTS-H the force necessary for closing the rails and let the slider return to the central position is increased from the deflection due to the extraction of the moving elements.

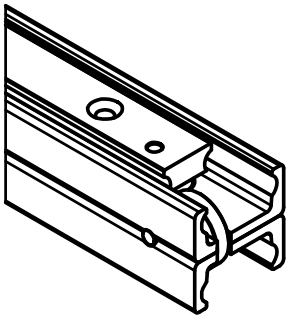
OPTIONS

Double stroke (VR, VRM)
Nadella telescopic rails NTA-H and NTS-H can be delivered with forward and backward extension (or with Double Stroke).
For Part-Extension NTA-H it can be made by the customer on a standard execution, simply removing the end screw at the edge of the rail or can be ordered directlv with -VR suffix.

Remove the screw at the edge of the rail for double stroke.

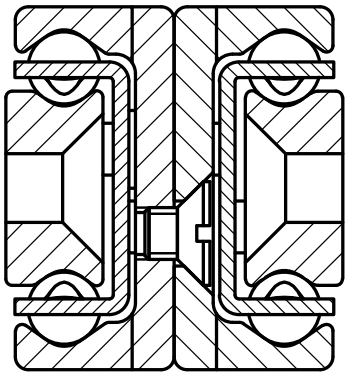
For Full-Extension NTS-H, removing the end stop screws may cause the unintentional shifting of the middle beam while moving from backward to forward direction.
To prevent this and ensure a synchronized movement of the three elements for double-stroke extensions, please add the -VRM suffix in the ordering code.
Note that VRM option, due to shortened cage, will have slightly lowered stroke and load capacity compared to the declared values.
Please contact our Technical Dept. for more info or for support on dimensioning and lifetime calculations.

Remove the screws at the edge of the rail for double stroke.



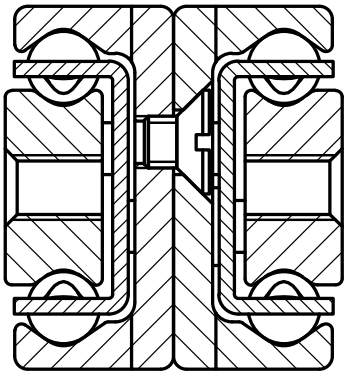
VRM option

Available hole configurations
NTS-H full extensions are available with countersunk holes (suffix SS) and threaded holes, or in the mixed version (suffix GS), with one slider with countersunk holes and one slider with threaded holes.



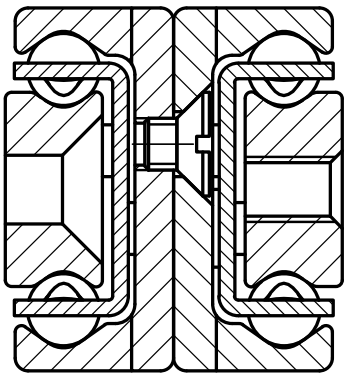
NTS28-26H-...SS
NTS43-44H-...SS

Code example: NTS28-26H-450 SS, full extension NTS-H size 28, closed length 450 mm, countersunk holes in both sliders.



NTS28-26H-...
NTS43-44H-...

Code example: NTS43-44H-770 , full extension NTS-H size 43, closed length 770 mm, threaded holes in both sliders.



NTS28-26H-...GS
NTS43-44H-...GS

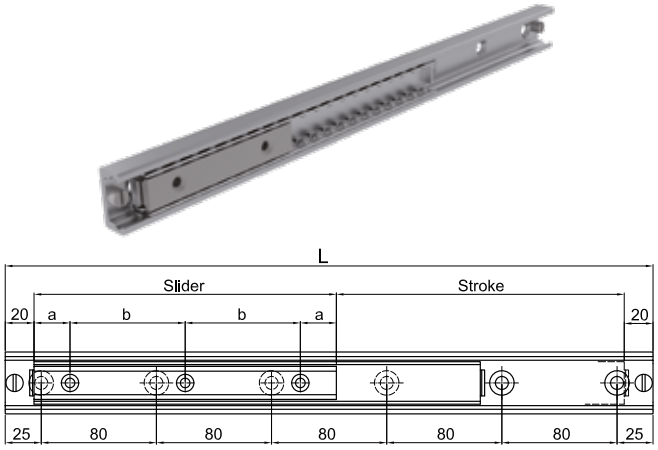
Code example: NTS43-44H-1170 GS, full extension NTS-H size 43, closed length 1170 mm, threaded holes on one slider and countersunk holes in the opposite one.

TECHNICAL SPECIFICATIONS
NTA-H, NTS-H, NTSF-H

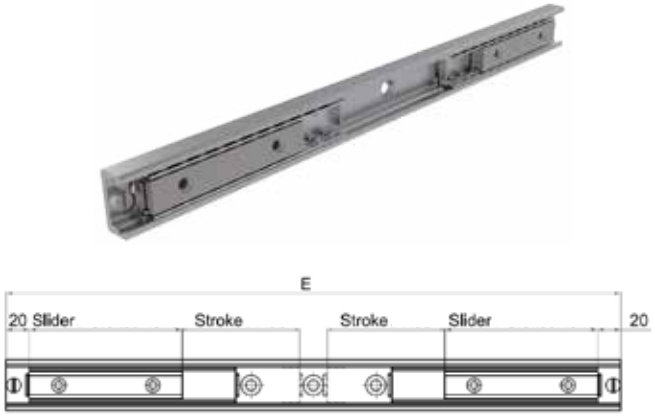
4.1

NTSF-H
With NTSF-H linear guides the movement is achieved through one or more sliders which run inside the guide rail. Several different combinations are possible and the final product can be configured out according to the application requests.

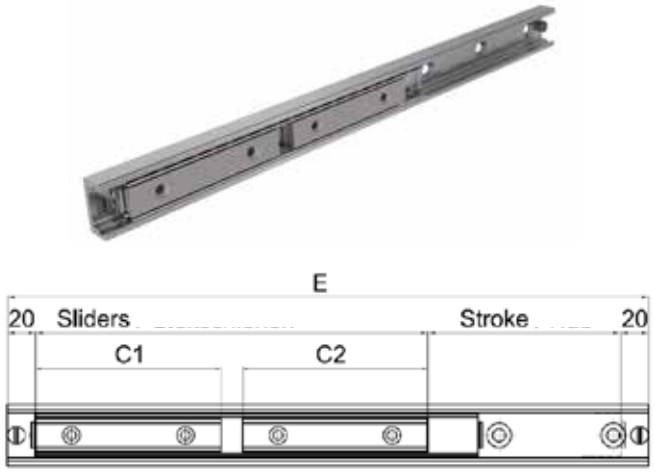
NTSF-H with single slider
In the standard configuration the final product is composed by the guide rail inside which run a single ball-cage and a single slider.



NTSF with two independent sliders
This configuration allows the movement, inside the guide rail, of two ball-cages, inside each ball-cage one or more sliders. The two ball-cages can run in opposing directions.

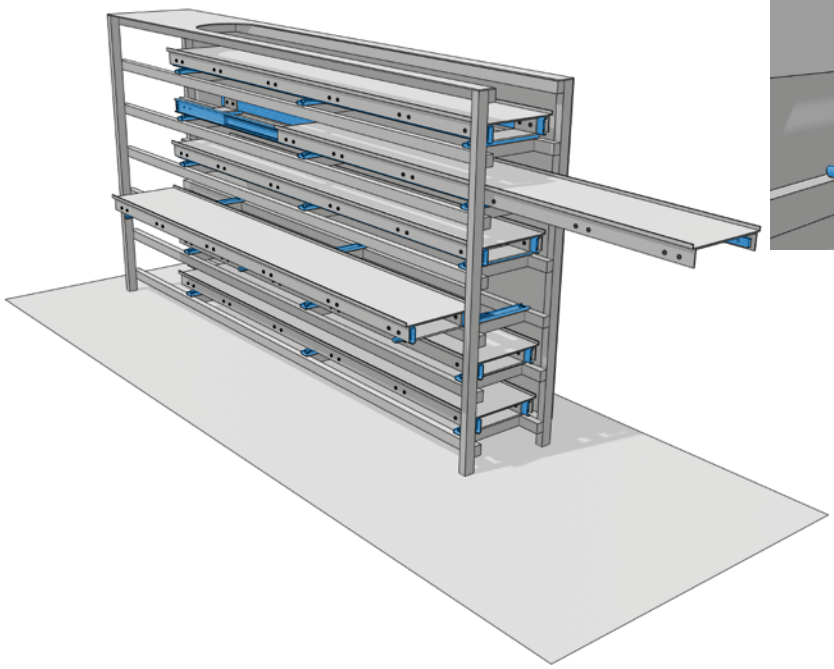


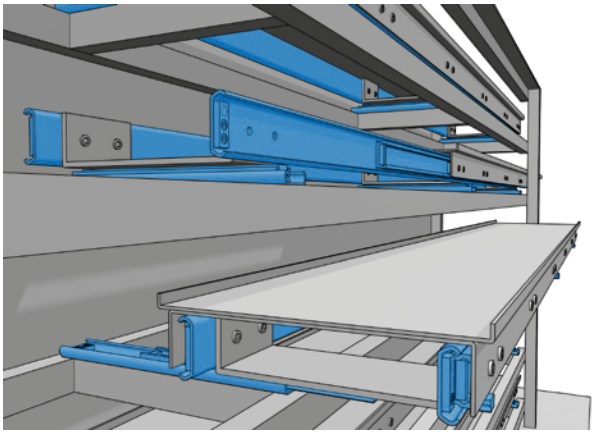
NTSF with two synchronized sliders
This configuration allows two syncronized sliders to move inside the ball-cage.



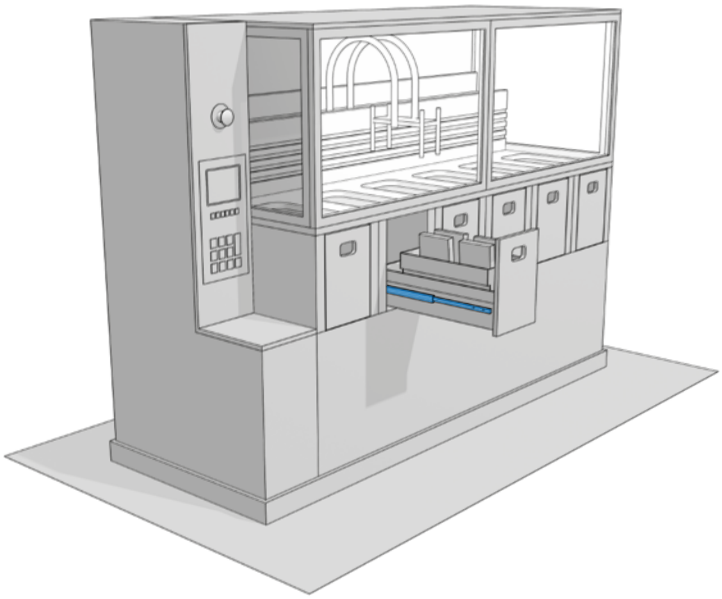
TECHNICAL SPECIFICATIONS
APPLICATION CASES

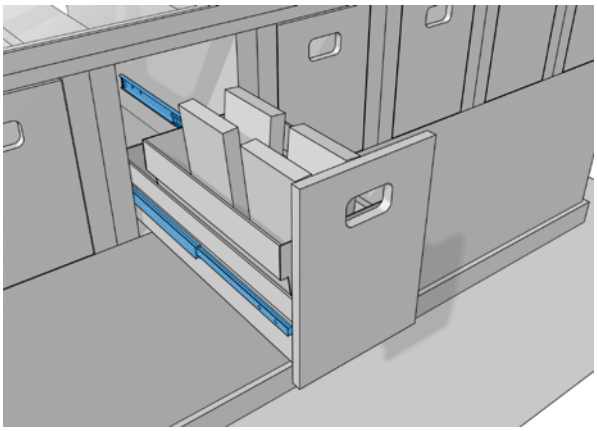
Application	Component magazine
Industry	Warehouse and logistics
Products	Part-extension (NTA)



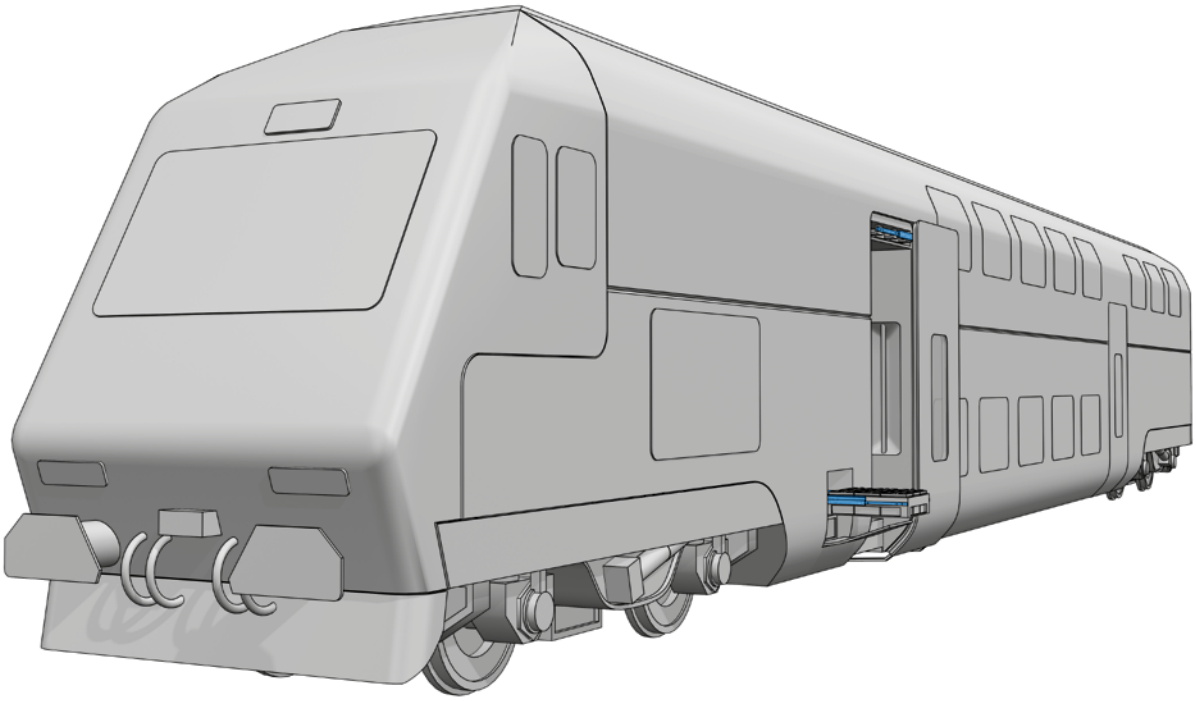


Application	Product supply
Industry	Medical technology
Products	Part-extension (NTA)

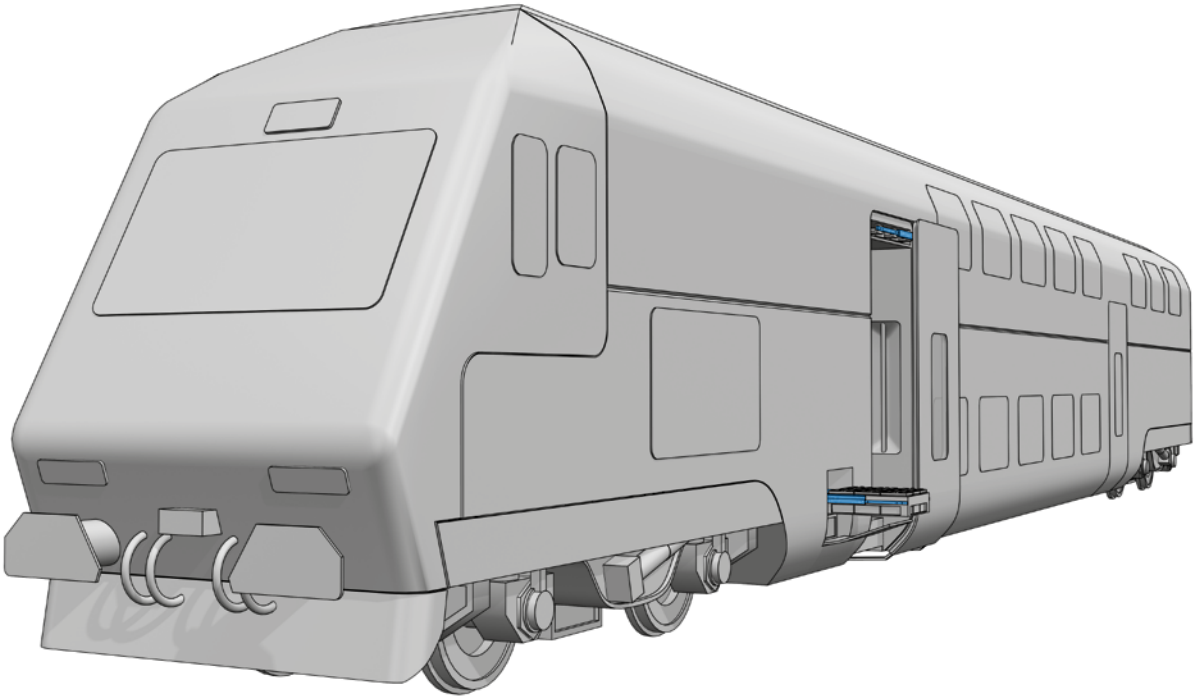




Application	Door rail guide
Industry	Railway technology
Products	Full Extension (NTS)



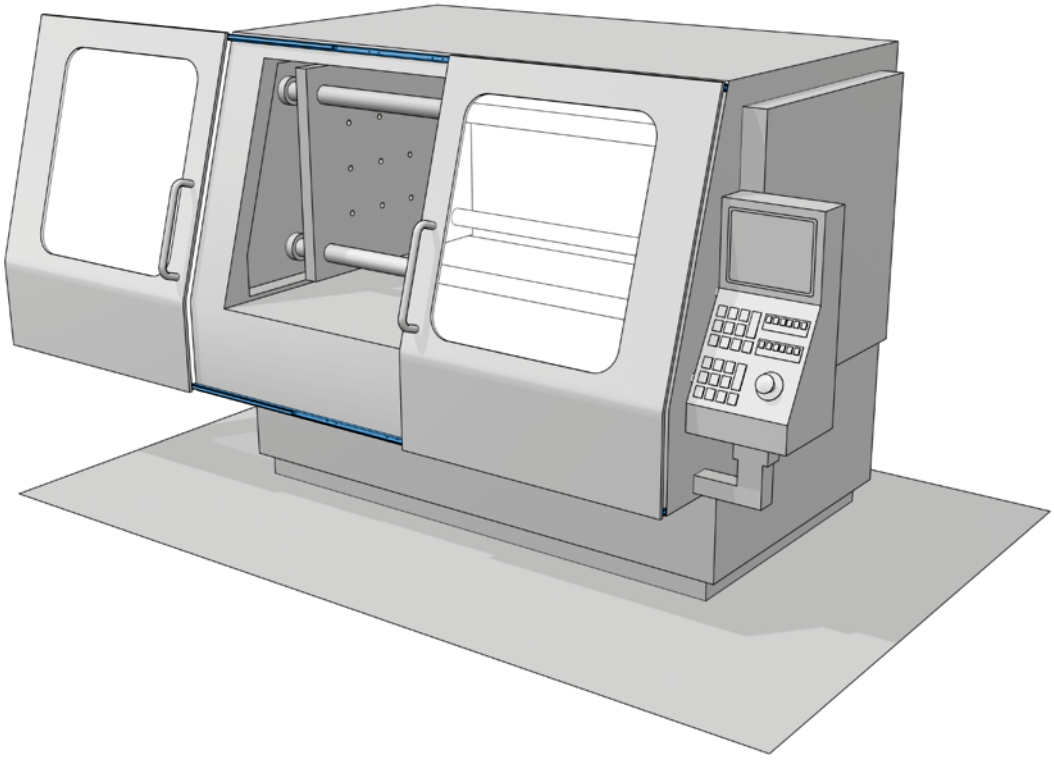
Application	Battery pack drawer
Industry	Railway technology
Products	Full Extension (NTS)

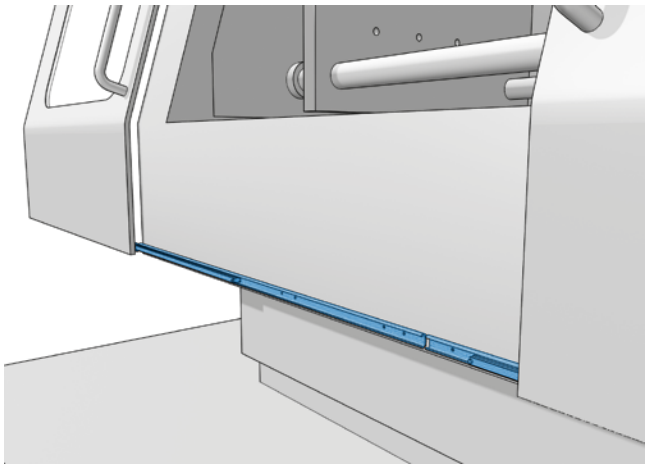


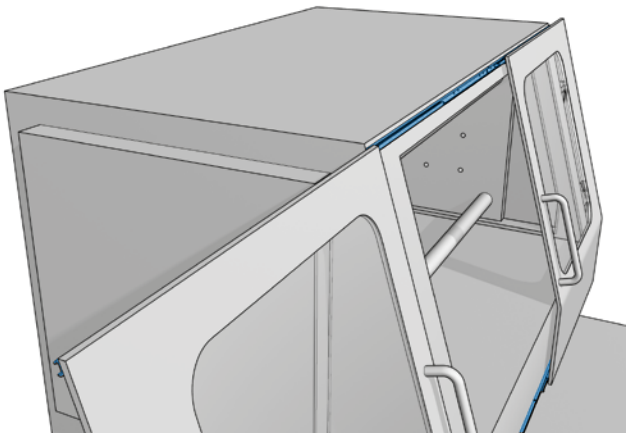
TECHNICAL SPECIFICATIONS
APPLICATION CASES

4.2

Application	Protective equipment
Industry	Rubber and plastics machines Machine tools
Products	Part-extension (NTA)







TECHNICAL SPECIFICATIONS
PRODUCT MATRIX

4.3

		Technical Manual			Material						
Product group	Designation	L from	L to	Extension length	ST	KK	NC4	VR	VRM	GS	SS
Part Extension	NTA28-13H	130	1170	~ 60%	x		x	x		x	x
	NTA33-15H	130	1170	~ 60%	x		x	x		x	x
	NTA43-22H	210	1970	~ 60%	x		x	x		x	x
Full Extension	NTS28-26H	130	1170	~100%	x	x	x	x	x	x	x
	NTS33-30H	130	1170	~100%	x	x	x	x	x	x	x
	NTS43-44H	210	1970	~100%	x	x	x	x	x	x	x
Linear Guides	NTSF28H	150	1650	x	x		x			x	x
	NTSF43H	290	1970	x	x		x			x	x

Legend

L	Installation length
ST	Standard steel with Zinc-Plating
KK	Stainless steel balls and cage
NC4	Zinc-Nickel Plated
VR	Double stroke extension
VRM	Double stroke extension with synchronization of inner rail
LL	Smooth-running, for temperature up to 200°C or vertical installation
LS	Increasing clearance, for temperature > 200°C
GS	Counterbores instead of threaded holes on one side
SS	Counterbores instead of threaded holes on both sides
NZ	Special according to drawing
AZ	"Special extension length (not necessary for standard version) i.e. NTS43-44H-1010-AZ1100 = Extension Length 1100 mm"

TECHNICAL SPECIFICATIONS
ORDER CODE

4.4

NTA 28-13-H - 1000 - XX

RAIL TYPE
NTA
NTS

INSTALLATION SIZE

H = HARDENED

INSTALLATION LENGTH

OPTIONS
NZ = Design according to drawing (e.g: customised hole pattern)
NC4 = Zinc-Nickel Plated
NC5 = Standard Steel without Coating
VR = Forward and backward extension
VRM = Forward and backward extension including carrier for inner rail
AZ = Special extension length (not necessary for standard version)
I.e.: NTA28-13H-1010-AZ600 = Extension Length 600mm
LL = Smooth-running, for temperature up to 200°C or vertical installation
LS = Increasing clearance, for temperature > 200°C
GS = Threaded/Countersunk holes
SS = Countersunk holes on both sides

ORDER CODE LINEAR GUIDE SYSTEM

NTSF 28-H - 2 - 210 - 930

RAIL TYPE

INSTALLATION SIZE

NUMBER OF CARRIAGES
Standard = 1 carriage (not necessary for standard version)

CARRIAGE LENGTH

RAIL LENGTH

NADELLA / nadella.com
DURBAL / durbal.com
CHIAVETTE UNIFICATE / chiavette.com
IPIRANGA / ipirangahusillos.com
SHUTON / shuton.com

THE SPECIALIST FOR MOTION TECHNOLOGY

HT211EN

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