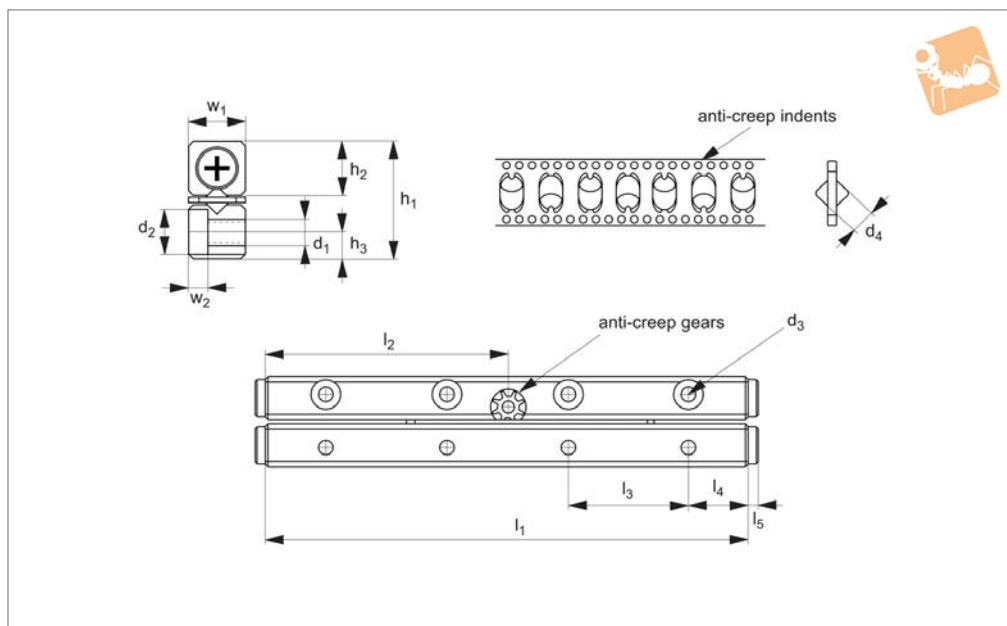




Anti-Creep Crossed Roller Rail Sets

corrosion resistant

Linear Rail Sets



L1003

LINEAR RAIL SETS

Material

Stainless steel rail and rollers (AISI 440C), Ni plated apart from V groove. Hardness 60 ± 2 HRC. Stainless steel rollers in brass retainer with special anti-creep mechanism (stainless 304).

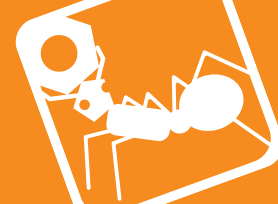
Technical Notes

Supplied in sets of 4 rails (with 2 roller cages and 8 end screws as standard). See table for number of rollers in each cage and technical pages for load calculations (based on number of rollers).

Tips

These rail sets are designed for high acceleration applications, or systems with significant moment loads.

Order No.	l_1	Stroke max.	h_1	w_1	l_2	l_3	h_2	h_3	w_2	d_1	d_2	d_3	d_4	l_4	l_5	No. of rollers	Weight kg
L1003.02-030	30	22	12	6	15	15	55	2.5	2	2.6	4.4	M3	Ø2	7.5	1.5	5	0.03
L1003.02-045	45	18	12	6	15	15	55	2.5	2	2.6	4.4	M3	Ø2	7.5	1.5	9	0.04
L1003.02-060	60	40	12	6	30	15	55	2.5	2	2.6	4.4	M3	Ø2	7.5	1.5	10	0.06
L1003.02-075	75	52	12	6	30	15	55	2.5	2	2.6	4.4	M3	Ø2	7.5	1.5	12	0.07
L1003.02-090	90	74	12	6	45	15	55	2.5	2	2.6	4.4	M3	Ø2	7.5	1.5	13	0.08
L1003.02-105	105	78	12	6	45	15	55	2.5	2	2.6	4.4	M3	Ø2	7.5	1.5	16	0.10
L1003.02-120	120	100	12	6	60	15	55	2.5	2	2.6	4.4	M3	Ø2	7.5	1.5	17	0.11
L1003.02-135	135	106	12	6	60	15	55	2.5	2	2.6	4.4	M3	Ø2	7.5	1.5	20	0.12
L1003.02-150	150	127	12	6	75	15	55	2.5	2	2.6	4.4	M3	Ø2	7.5	1.5	21	0.14
L1003.02-165	165	140	12	6	75	15	55	2.5	2	2.6	4.4	M3	Ø2	7.5	1.5	23	0.15
L1003.02-180	180	144	12	6	90	15	55	2.5	2	2.6	4.4	M3	Ø2	7.5	1.5	26	0.16
L1003.03-050	50	34	18	8	25	25	8.3	3.5	3.1	3.3	6	M4	Ø3	12.5	2	8	0.10
L1003.03-075	75	50	18	8	30	25	8.3	3.5	3.1	3.3	6	M4	Ø3	12.5	2	12	0.15
L1003.03-100	100	76	18	8	50	25	8.3	3.5	3.1	3.3	6	M4	Ø3	12.5	2	15	0.19
L1003.03-125	125	100	18	8	55	25	8.3	3.5	3.1	3.3	6	M4	Ø3	12.5	2	18	0.24
L1003.03-150	150	125	18	8	75	25	8.3	3.5	3.1	3.3	6	M4	Ø3	12.5	2	21	0.29
L1003.03-175	175	150	18	8	80	25	8.3	3.5	3.1	3.3	6	M4	Ø3	12.5	2	24	0.34
L1003.03-200	200	166	18	8	100	25	8.3	3.5	3.1	3.3	6	M4	Ø3	12.5	2	28	0.38
L1003.03-225	225	182	18	8	105	25	8.3	3.5	3.1	3.3	6	M4	Ø3	12.5	2	32	0.43
L1003.03-250	250	208	18	8	125	25	8.3	3.5	3.1	3.3	6	M4	Ø3	12.5	2	35	0.48
L1003.03-275	275	216	18	8	130	25	8.3	3.5	3.1	3.3	6	M4	Ø3	12.5	2	40	0.52
L1003.03-300	300	248	18	8	150	25	8.3	3.5	3.1	3.3	6	M4	Ø3	12.5	2	42	0.57
L1003.04-080	80	62	22	11	40	40	10	4.5	4.1	4.3	7.5	M5	Ø4	20	2	8	0.26
L1003.04-120	120	92	22	11	50	40	10	4.5	4.1	4.3	7.5	M5	Ø4	20	2	12	0.39
L1003.04-160	160	134	22	11	80	40	10	4.5	4.1	4.3	7.5	M5	Ø4	20	2	15	0.51
L1003.04-200	200	164	22	11	90	40	10	4.5	4.1	4.3	7.5	M5	Ø4	20	2	19	0.63
L1003.04-240	240	194	22	11	120	40	10	4.5	4.1	4.3	7.5	M5	Ø4	20	2	23	0.76
L1003.04-280	280	236	22	11	130	40	10	4.5	4.1	4.3	7.5	M5	Ø4	20	2	26	0.88
L1003.04-320	320	252	22	11	160	40	10	4.5	4.1	4.3	7.5	M5	Ø4	20	2	31	1.01
L1003.04-360	360	308	22	11	170	40	10	4.5	4.1	4.3	7.5	M5	Ø4	20	2	33	1.14
L1003.04-400	400	338	22	11	200	40	10	4.5	4.1	4.3	7.5	M5	Ø4	20	2	37	1.26
L1003.04-440	440	355	22	11	210	40	10	4.5	4.1	4.3	7.5	M5	Ø4	20	2	42	1.39

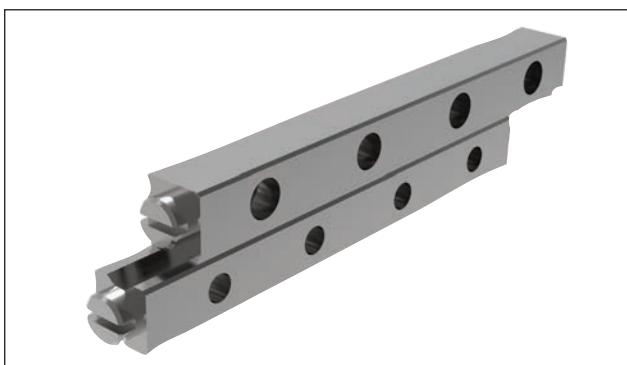


Order No.	l_1	Stroke max.	h_1	w_1	l_2	l_3	h_2	h_3	w_2	d_1	d_2	d_3	d_4	l_4	l_5	No. of rollers	Weight kg
L1003.04-480	480	396	22	11	240	40	10	4.5	4.1	4.3	7.5	M5	Ø4	20	2	45	1.51
L1003.06-100	10	86	31	14	50	50	14	6	5.2	5.3	9.5	M6	Ø6	25	2	7	0.62
L1003.06-150	150	118	31	14	65	50	14	6	5.2	5.3	9.5	M6	Ø6	25	2	11	0.93
L1003.06-200	200	168	31	14	80	50	14	6	5.2	5.3	9.5	M6	Ø6	25	2	14	1.24
L1003.06-250	250	212	31	14	115	50	14	6	5.2	5.3	9.5	M6	Ø6	25	2	17	1.55
L1003.06-300	300	260	31	14	120	50	14	6	5.2	5.3	9.5	M6	Ø6	25	2	20	1.85
L1003.06-350	350	292	31	14	165	50	14	6	5.2	5.3	9.5	M6	Ø6	25	2	24	2.17
L1003.06-400	400	340	31	14	160	50	14	6	5.2	5.3	9.5	M6	Ø6	25	2	27	2.46
L1003.06-450	450	388	31	14	215	50	14	6	5.2	5.3	9.5	M6	Ø6	25	2	30	2.77
L1003.06-500	500	436	31	14	200	50	14	6	5.2	5.3	9.5	M6	Ø6	25	2	33	3.08
L1003.06-550	550	484	31	14	265	50	14	6	5.2	5.3	9.5	M6	Ø6	25	2	36	3.38
L1003.06-600	600	516	31	14	300	50	14	6	5.2	5.3	9.5	M6	Ø6	25	2	40	3.69

Cage creep can occur due to especially high acceleration and deceleration forces, system vibration, uneven loading or with high moment loads. Our anti-creep rail sets have a special cage which is linked to an anti-creep gear which runs up and down in the mating indents on the roller cage system. It is a sturdy, all metal design, allowing accelerations up to 15G and is integrated into the rail system.

Rail size	Max. dynamic load/roller N	Max. static load/roller N	Max. allowable load/roller N
L1003.02	290	290	95
L1003.03	630	760	250
L1003.04	1230	1170	390
L1003.06	2550	2630	875

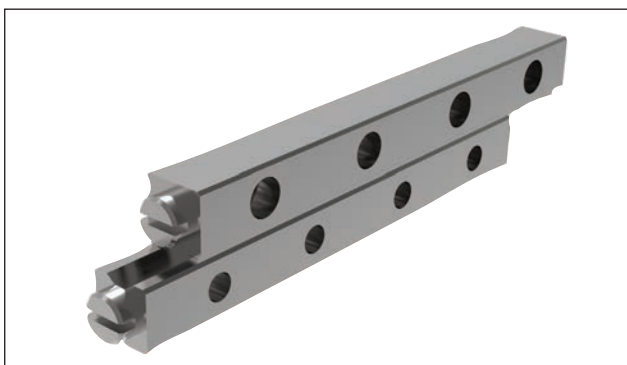
- Max. allowable load is 1/3 of max. static load to give a 3 x safety factor.



Standard cross roller rail sets

L1000 & L1001

- Seven rail profiles (Sizes 1-12)
- Lengths: 20mm to 1 metre
- L1000 standard rail set
- L1001 corrosion resistant rail sets



Deep groove and anti-creep rail sets

L1002 + L1003

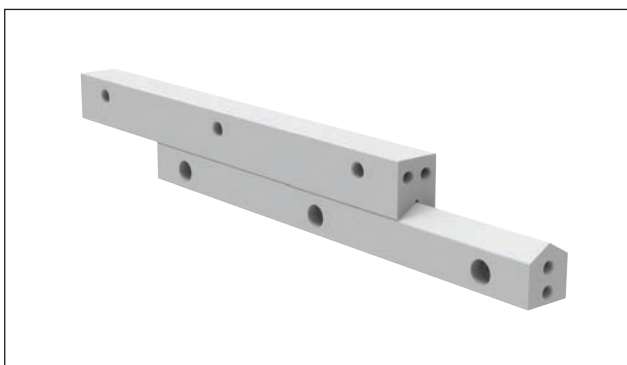
- 3 x load capacity of standard rail sets (due to deep V groove)
- Two rail profiles (Sizes 4 & 6)
- Lengths 50mm to 400mm
- Anti-creep versions for high acceleration applications



Needle roller rail sets

L1004

- Heavy load ratings and needle rollers are used
- Five rail profile size
- Lengths: 200mm to 1.2 metres



Anti-friction coated rail sets

L1005 & L1006

- Same profile as needle roller rails but contact face Teflon coated.
- Ideal for harsh, dirty conditions
- Vibration damping characteristics



Our cross roller rail sets are of the highest quality.

- Close tolerance $\pm 5\mu$
- Speeds up to 50 m/min
- Temperature range -40°C to $+80^{\circ}\text{C}$ up to $+250^{\circ}\text{C}$ if applying a temperature factor
- Through hardened to 60 ± 2 HRC
- Acceleration up to 50 m/sec^2
- Typical 0.003 coefficient of friction dependent on mounting surface accuracy

Expected life calculation:

$$\text{Life (Km)} L = (C/P)^{3.3} \times 1.15 \times 10^5 \text{m}$$

C = effective dynamic load (N)

P = equivalent load (N)

Working life calculation:

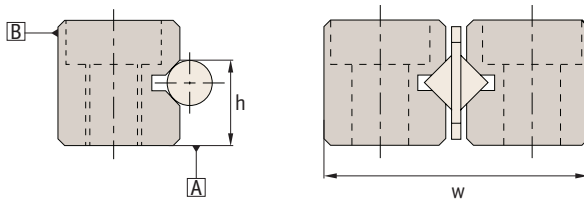
$$L_h \text{ (hours)} = \frac{L \times 10^6}{2 \times L_s \times n \times 60}$$

L = Life (Km), see above

L_s = Stroke Length (mm)

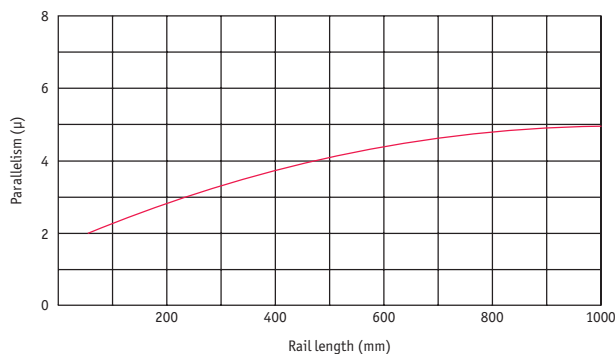
n = Number of operations/min

Accuracy Specification:



Accuracy level	
Parallelism of rolling plane A&B	graph below
Allowable height tolerance (h)	$\pm 0,02$
Paired mutual height tolerance (h)	0,01
Allowable width tolerance (w)	$+0, -0,02$

Parallelism



Lubrication:

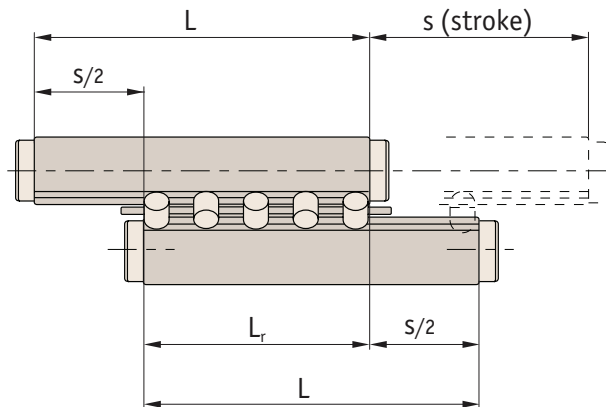
The units are lubricated with lithium soap lubricant. Relubricate if required.

Straightness		
Length (mm)		Straightness (μ)
Above	Below	
0	50	2,0
50	100	2,0
100	160	3,0
160	310	3,0
310	510	4,0
510	600	4,0

(Ra 0,2 μm)

Load capacity depends on:

- Rail size
- Number of rollers in cage
- Load rating = number of rollers x load rating/roller
- Number of rollers (N_r) = cage length (L_c) / pitch p
- Cage length affects the stroke and travel of the system



Load calculations

Calculations of retainer length and number of rollers:

$$L_r = L - \frac{S}{2}$$

L_r = distance between two rollers in ends of retainer (mm)

L = rail length (mm)

S = stroke length (mm)

Worked example:

Assume L1000.09-400 with a stroke of 250mm:

Cage length = $400 - (250/2) = 275\text{mm}$

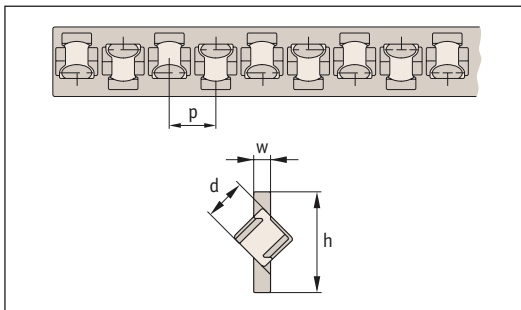
Roller $\varnothing = 9\text{mm}$ with a pitch (see table) of 18mm:

Number of rollers = $275/18 = 15$

Load rating of system = load/roller* x no. of rollers
(a pair of rollers) = $2420\text{N} \times 15$
= 36,300N

*See product table for allowable load per roller.

Allowable load rating with a 3x safety factor compared to static load.



Plastic cage



L1008.###-PR-xxx

Plastic cage with steel rollers,
for horizontal and vertical use.

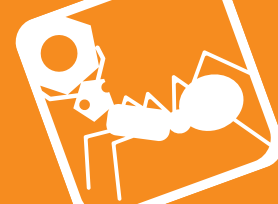
Steel cage



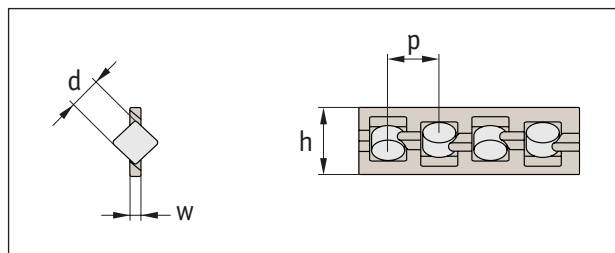
L1008.###-AA-xxx

Steel cage with steel rollers,
for horizontal use only.

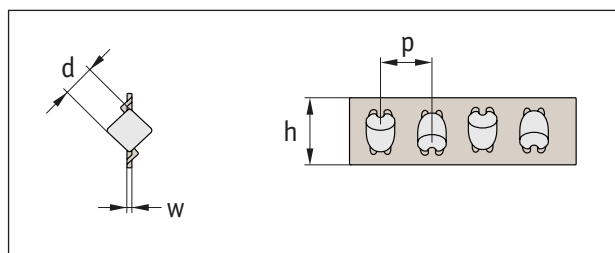
Order no.	d	p	h	w	Cage material
L1008.020-PR-xxx	2	3,9	5	0,75	Plastic - black
L1008.030-PR-xxx	3	5,0	7	1,00	Plastic - black
L1008.060-PR-xxx	6	8,5	14	2,00	Plastic - black
L1008.090-PR-xxx	9	14,0	20	3,00	Plastic - black
L1008.020-AA-xxx	2	4	5,5	0,80	Steel
L1008.030-AA-xxx	3	5	7,5	0,50	Steel
L1008.060-AA-xxx	6	12	14	0,80	Steel
L1008.090-AA-xxx	9	18	19,5	1,00	Steel
L1008.120-AA-xxx	12	22	25	1,20	Steel



Plastic cage (type PR)



Steel cage (type AA)



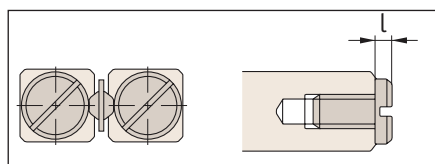
Roller load ratings (per roller)

Rail size	Max. dynamic load C_0 N	Max. static load C N	Allowable* load N
1	125	144	48
2	290	290	95
3	630	760	250
4	1230	1170	390
6	2570	2630	870
9	7190	7270	2420
12	14700	13100	4300

The more rollers the greater the load capacity

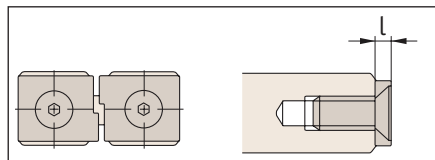
* Allowable load is 1/3 of max. static load/roller, to allow a safety factor in calculations of 3.

End pieces



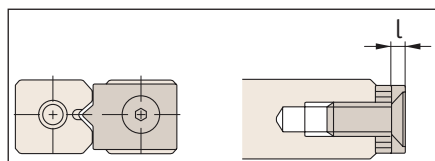
Type GA

- For horizontal applications, most used.



Type GB

- For horizontal or vertical applications.

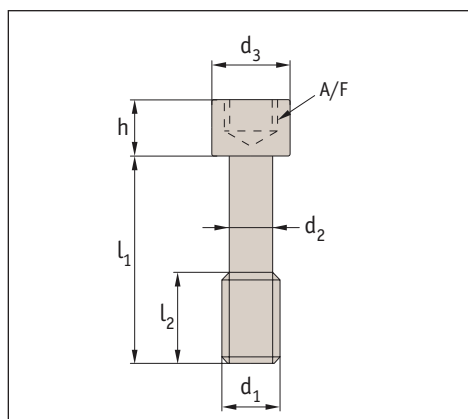


Type GC

- For horizontal or vertical applications.
- Mount on longer rail only.

Rail size	Type		
	GA l	GB l	GC l
1	1,5	-	-
2	2	3	-
3	2	2	3
6	3	3	5
9	3	4	6
12	3	5	8

End screws



Rail	h	d ₁	d ₂	d ₃	l ₁	l ₂	A/F
3	3	M3	2,3	5	12	5	2,5
6	5	M5	3,9	8	20	8	4
9	6	M6	4,6	8,5	30	12	5
12	8	M8	6,25	11,3	40	17	6