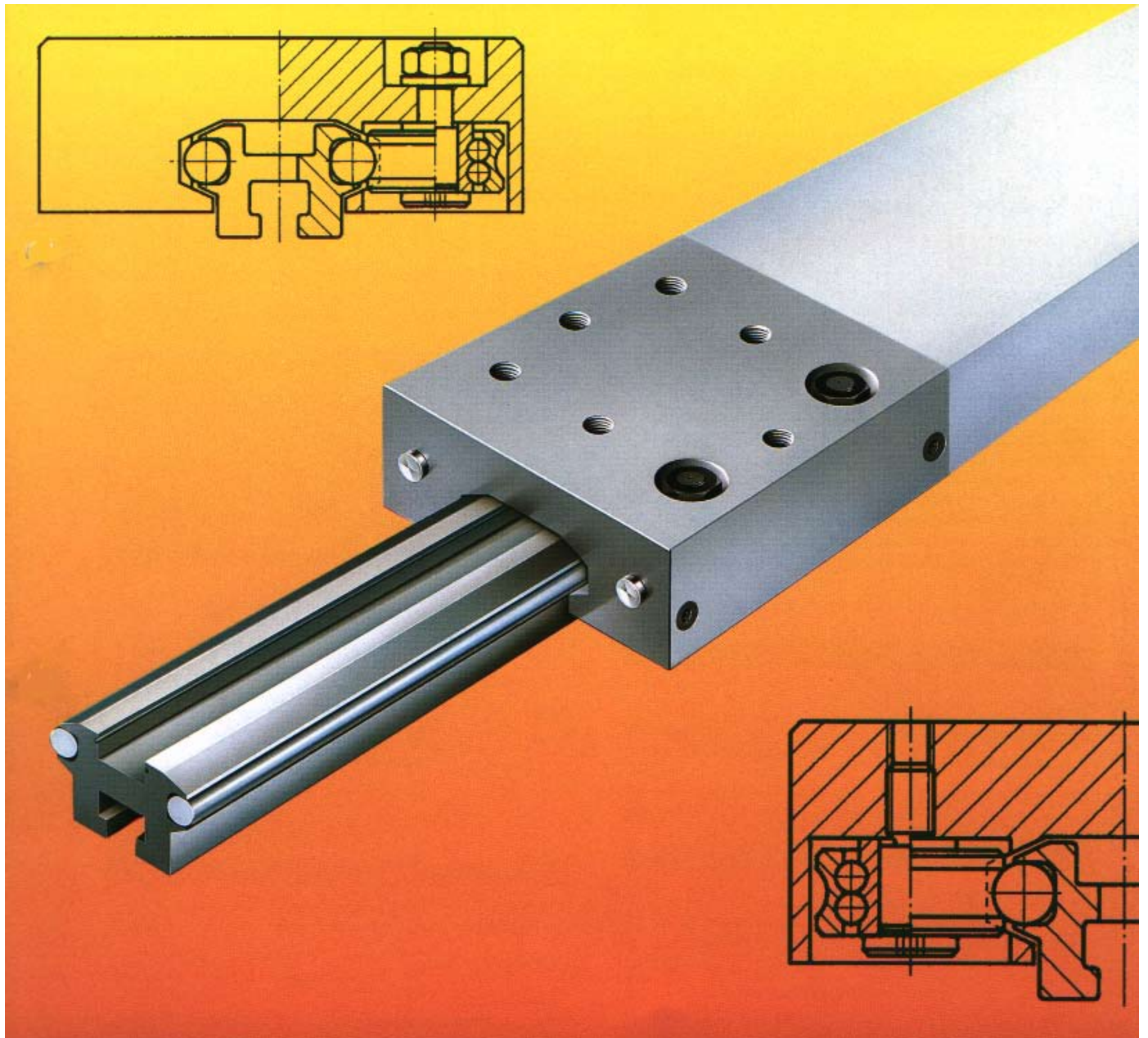


EURO-BEARINGS LTD

TRACK GUIDANCE SYSTEMS



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INTRODUCTION

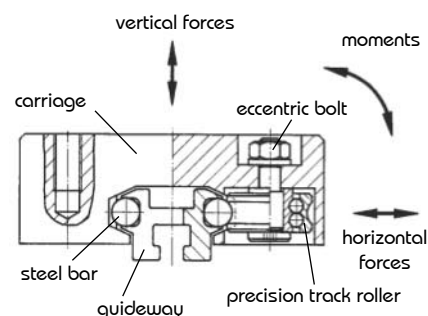
This linear guidance system consists of a carriage assembly complete with four precision track rollers running on an accurate guideway. The accuracy of the guideway unit is achieved by mounting precision hardened steel bars into a high quality aluminium support rail. This is done using our specially developed process.

The optimised double row angular contact ball bearings have outer rings with a precise profile ensuring accurate rolling combined with high radial and axial load capacities.

Two of the track rollers are fitted to the carriage using eccentric bolts, enabling adjustment for pre-loading the bearing onto the rail or setting for clearance free travel.

Advantages:

- High speeds and accelerations are possible due to the low mass and minimal friction
- Highly accurate guidance combined with smooth running
- High load carrying capacity allowing forces from all directions and moments about all axes.
- Extremely reliable operation even in contaminated environments
- The nearly unlimited stroke and mounting positions offer a variety of applications
- Very simple installation
- Long life
- Optional wiping and lubrication components available
- Integral length measuring available as option
- Corrosion resistant model available with same capacities



Application Range:

Velocity	v_{\max}	=	10 m/s
Acceleration	a_{\max}	=	50 m/s ²
Temperature	T	=	-20°C to +80°C

Accuracy:

The accuracy of this system has the following high precision characteristics:

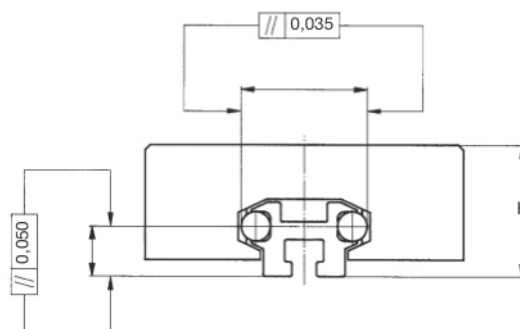
Guidance Accuracy 0.05mm/m

Assembly height (H) tolerances:

Dimensional tolerance $\pm 0.2\text{mm}$

Max Deviation of ONE guideway $\pm 0.1\text{mm}$

Higher accuracy units are available on request



PART NUMBERS EXPLAINED

1. Guideways	
TYPE	These consist of an anodised aluminium body with inlaid hardened and ground precision steel bars
S.-....	Designed for TEE SLOT Mounting
S.-B....	Supplied with additional mounting holes for THROUGH bolting
R.-....	CORROSION RESISTANT model for TEE SLOT mounting
R.-B....	CORROSION RESISTANT model for THROUGH bolting
SIZE	
S25-.... / S25 B-....	The number indicates the NOMINAL HEIGHT (H) of the system
S36-.... / S36 B-....	
S54-.... / S54 B-....	
LENGTH	
S.-	The last four digits indicate the LENGTH in mm. Maximum length is 3750mm.
2. Carriages	
LW25 - ..0	The carriage consists of an anodised aluminium body, fitted with maintenance free precision track rollers and gap sealed on the leading faces. They are paired with guideways S and S..B of corresponding size
LW36 - ..0	
LW54 - ..0	
LW.. _ 0.0	Carriage WITHOUT wiping and relubricating components
LW.. - 4.0	Carriage WITH wiping and relubricating components
LW.. -.10	Standard Type with anodised aluminium body and track rollers of bearing steel
LW.. -.50	Corrosion resistant type with surface coated track rollers and other components of stainless steel
3. Cover Strips	
A25 -	By using the simple snap in aluminium profiles the upper channel can be covered producing a flat top surface
A36 -	
A54 -	
	Guideways, carriages and cover strips to be ordered separately
	Example: 2 x S36-1250 + 2 x LW36-410 + A46 -1250
4. Track Rollers	
LR..-0..	Standard track roller
LR..-5..	Stainless steel track roller
5. Bolts (Bushes)	
B.-.M..	Concentric bolts
€.-.M..	Eccentric bolts

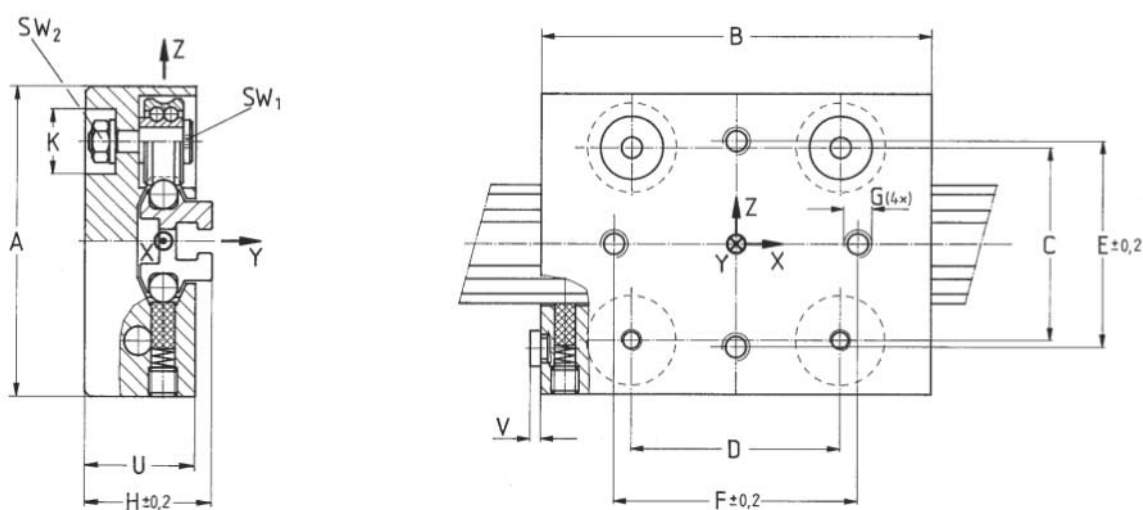
CARRIAGES

The carriages are characterised by their compact closed design, low mass and optimised precision track roller arrangement. The required light pre-load or clearance can be easily achieved by the adjustment of the eccentric bolts on one side of the carriage.

The aluminium body is completely anodised.

Type LW..4.0 includes shaft wiping and shaft relubrication components. The track rollers are pre-lubricated for life and are normally maintenance free.

When being used in a corrosive environment a special model is available.



With wiper	Without wiper	H	A	B	C	D	K	U	V	€	F	G	A/F1	A/F2	Weight (kg)
LW25-4.0	LW25-0.0	25.0	65	95	42	54	14	21	3	50	60	M5x9	3	7	0.26
LW36-4.0	LW36-0.0	35.5	86	112	55	62	18	31	3	59	70	M8x15	4	10	0.73
LW36-4.0	LW36-0.0	54.3	130	136	87	70	26	47	3	90	70	M10x21	4	17	1.85

	Maximum permissible loads (N)				Maximum permissible moments (Nm)					
	F _y	F _{oy}	F _z	F _{oz}	M _x	M _{ox}	M _y	M _{oy}	M _z	M _{oz}
LW25-10	400	650	700	700	4.4	7.2	19	19	11	18
LW36-10	850	1400	1400	1400	11	18	43*	43*	26	43
LW36-10	1500	2500	3500	3500	35	58	123*	123*	53	88

* If the actuals are more than 70% of these values, it is necessary to halve the distance between the guideway mounting bolt holes to t/2 (for 't' see page 5)

GUIDEWAYS

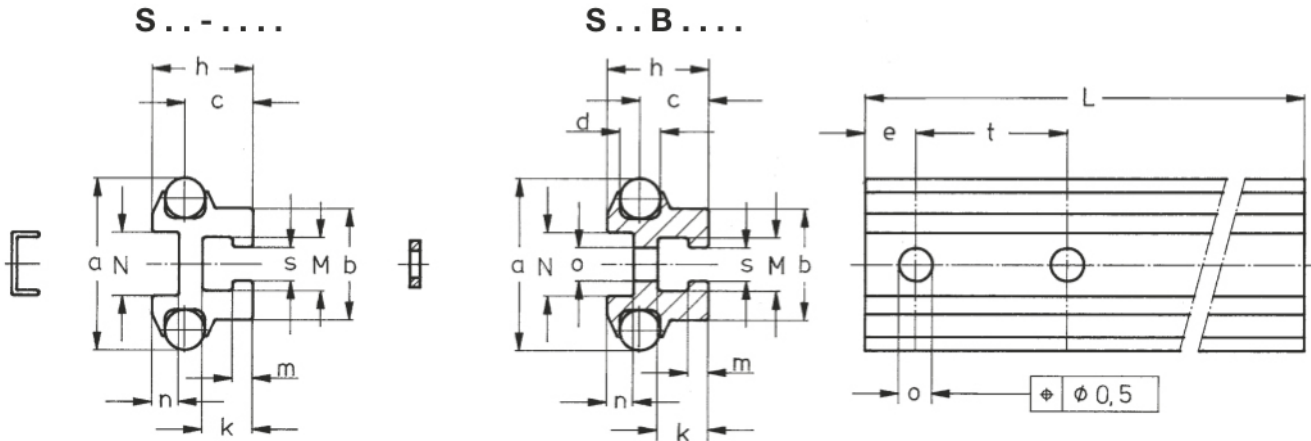
The design of the guideway combines the high accuracy and hardness of the round steel guide bars with the low weight of the aluminium supporting body.

There are 3 variants:

- Tee slot fixing type : using DIN 931/933 hex- headed bolts
- S...B... type for through bolting using cap head bolts (DIN 6912)
- Optional cover strip –in aluminum – to prevent particle build-up in the top channel



The aluminium supporting body is anodised as standard.
Corrosion resistant model is available on request.



Tee Slot	Thru Bolt	h	a	b	c	d	n	N	o & s	Bolt	t	m	k	M
S25-...	S25B-...	15.5	27	18	10.6	5	4.6	11	5.5	M5	62.5	3	8	8.2
S36-...	S36B-...	20	34	22	13.5	8	5.3	12.5	6.6	M6	125	4	10	10.5
S54-...	S54B-...	34	56	38	24.1	10	8	18.5	11	M10	250	6.4	15.4	18.5

... represents the length of rail required in millimetres

TRACK GUIDANCE SYSTEMS ARE ALSO AVAILABLE IN STAINLESS STEEL

Guideway length:

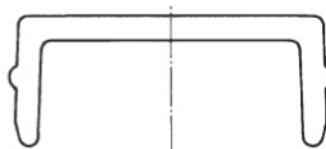
The standard maximum length is 3750mm but if required it is possible to exceed this.

Preferable length of S..B... is: $L = (\text{No. of fixing holes} + 1) \times t - 4 \text{ mm}$ and $e = t/2 - 2 \text{ mm}$

Cover Strips:

The wall thickness of the aluminium cover strip is 1mm and is a push fit into the top channel. They can be used for both types of guideway. When using the tee-slot type of guideway the top channel can be used for cables etc and protected with a cover strip.

A 25 -
A 36 -
A 54 -



INSTALLATION

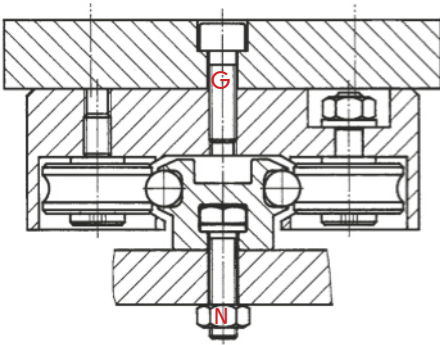
To ensure the accuracy of the guidance system it is essential that the surface to which the guideway is fixed is flat and distortion free.

Take care when handling the various components.

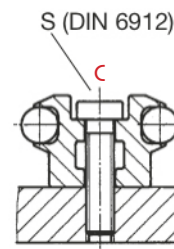
Guideway fixing bolts should initially be lightly tightened (whilst adjustments are made) and then finally tightened to the recommended torque value as per table "Torque M_o " on this page.

When using parallel guideways in one system it is necessary to ensure precise alignment of the guideways.

If a side load F_z is expected during operation, the carriage should be installed so that the load is acting on the CONCENTRIC bolt side of the carriage.



Left: Bolting the rail from below using the slot.
Right: Bolting the rail from above using a caphead



Torque M_o			
Carriage	LW25-..	LW36-..	LW54-..
Thread (G)	5.5 Nm	23 Nm	46 Nm
Eccentric Bolt	2.4 Nm	8 Nm	40 Nm
Concentric Bolt	2.4 Nm	8 Nm	40 Nm
Guideway	S25-....	S36-....	S54-....
Nut (N)	M5	M6	M10
Caphead (C)	6 Nm	10 Nm	46 Nm

Clearance Free Adjustment:

Use the eccentric bolts which are locked in position by lock nut. When correctly adjusted the carriage can be moved by hand with a very light force. Ensure all track rollers are rotating.

If pre-load is required this can be achieved. Remember that excessive pre-load reduces system life.

Lubrication:

To achieve a long operating life we recommend lubrication of the guideway surfaces.

The optional integral lubricating and wiping components are installed in the end faces of the carriage on LW..4.. type. Re-lubrication is carried out through the nipples. Use light oil (Viscosity: 300mm²/s at 40°C). Lubricate before use. Re-lube period depends on usage. Inspection of the shafts from time to time should show a light film of oil. If not, re-lube! The track rollers are pre-lubricated and sealed for life and therefore no further lubrication is necessary.

LOAD CALCULATIONS

The method is the theoretical calculation for ball bearing life.

When calculating load values take into account non-calculable peak loads in applications involving high speed, vibrations, shock loads etc.

For the value of f_B refer to the chart below.

The applied load must not exceed the maximum permissible loads for $F_{y,perm}$; $F_{z,perm}$; $M_{x,perm}$; $M_{y,perm}$ or $M_{z,perm}$. See table on page 4.

Life expectancy with force F_y or F_z :
$$L = \left(\frac{C_{y,z}}{F_{y,z} \cdot f_B} \right)^3 \cdot 10^5$$

Life expectancy with moment M_x , M_y or M_z :

$$L = \left(\frac{M_{dx,dy,dz}}{M_{x,y,z} \cdot f_B} \right)^3 \cdot 10^5$$

$$L_h = \frac{L}{120 \cdot s \cdot n}$$

Definition of Symbols:

- L = Nominal Life expectancy (m)
- L_h = Nominal Life expectancy (h)
- C_y, C_z = Dynamic load rating (N)
- F_y, F_z = Actual load (N)
- M_{dx}, M_{dy}, M_{dz} = Dynamic Moment rating (Nm)
- M_x, M_y, M_z = Actual Moment (Nm)
- s = Stroke length (m)
- n = Stroke Frequency (min⁻¹)

f_B	Operating conditions
1 to 1.2	Smooth running, insignificant vibrations or shocks
1.2 to 1.5	Small to medium vibrations or shocks
1.5 to 3.0	Strong vibrations and shocks

For load & moment ratings see page 8

Static Load Safety Factor:

Static load with force F_y or F_z :

$$S_o = \frac{C_{oy,oz}}{F_{y,z}}$$

Static load with moment M_x , M_y or M_z :

$$S_o = \frac{M_{ox,oy,oz}}{M_{x,y,z}}$$

Definition of Symbols

- S_o = Static load safety factor
- C_{oy}, C_{oz} = Static load rating (N) (see page 8)
- M_{ox}, M_{oy}, M_{oz} = Static moment rating (Nm) (see page 8)
- F_y, F_z = Actual load (N)
- M_x, M_y, M_z = Actual moment (Nm)

To prevent deformation of the guideways and track rollers the safety factor (S_o) should be ≥ 3 to ensure smooth running and good accuracy.

For some applications a lower safety factor might be acceptable.

The static loads must not exceed $F_{oy,perm}$; $F_{oz,perm}$; $M_{ox,perm}$; $M_{oz,perm}$. See page 4.

Coordinate System for Calculations:

The basis of all calculated values given is the coordinate system shown on page 8, where loads and moments are indicated. The formulae given are only valid for centralised forces F_y or F_z and single moments in the directions M_x , M_y or M_z .

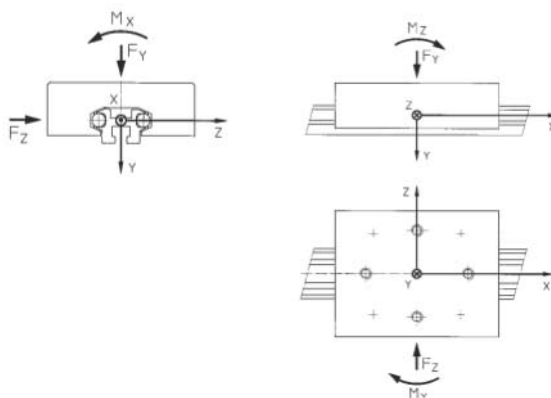
LOAD RATINGS

Load Ratings - use these to calculate life expectancy & safety factors only (see page 7):

	Load Rating (N)				Moment Rating (Nm)					
	C_y	C_{oy}	C_z	C_{oz}	M_{dx}	M_{ox}	M_{dy}	M_{oy}	M_{dz}	M_{oz}
LW25-10	1500	870	2600	1800	16.5	9.5	69	49	41	24
LW36-10	4250	2100	7000	4300	55	27	217	133	132	65
LW36-10	10300	4900	17000	10200	237	113	595	357	360	172

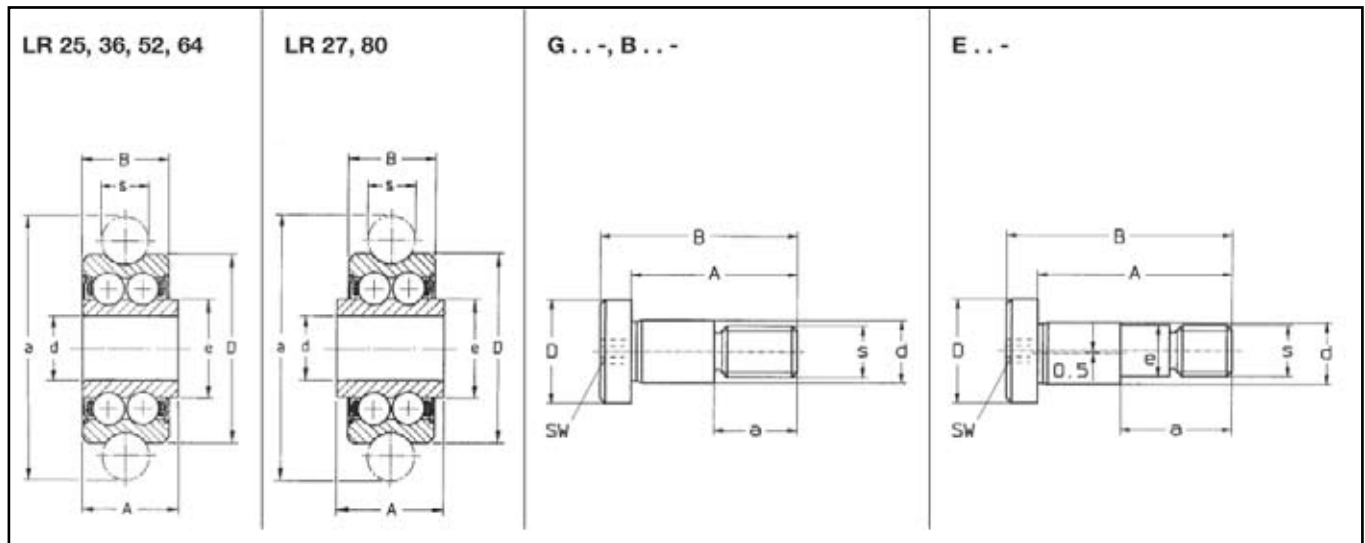
**** For maximum permissible loads see page 4 ****

The co-ordinate system used to define forces & moments are as follows:



BEARINGS & SPIGOTS

The standard track bearings are made from 100 Cr 6. If corrosion resistance is required, the bolts & bearings can be supplied in stainless steel. This is indicated with a 5 in the part number - eg LR36-508 & B36-5M06



	d	D	B	A	a	s	e	SW	C (N)	Co (N)
LR25-.05	5	17	7	8.5	25	5	6.9		1200	800
LR27-.05	5	17	7	8	27	6			1270	890
LR36-.08	8	24	11	12.5	37	8	11.5		330	2100
LR52-.10	10.5	35	15.9	21.9	51.3	10	20		8600	5150
LR52-.12	12	35	15.9	15.9	51.3	10			8600	5150
LR64-.12	12.5	47	19	24.5	63.3	10	24		14000	7700
LR64-015	15	47	19	19	63.3	10			14000	7700
LR64-.20	20	52	20.6	22.6	79	16	27		15600	9100
B25-_M04	5	9	17	14.5	7	M4		3		
B36-_M06	8	12	24.5	22	10.5	M6		5		
B54-_M10	12	20	38	32	15.5	M10		8		
€25-_M04	5	9	19	16.5	9	M4X5		3		
€36-_M06	8	12	29	26.5	15	M6X8		5		
€54-_M10	12	20	43.5	37.5	21	M10X12		8		

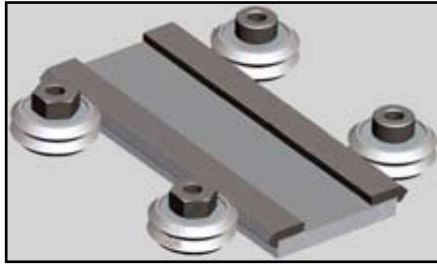
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TOLERANCE RINGS



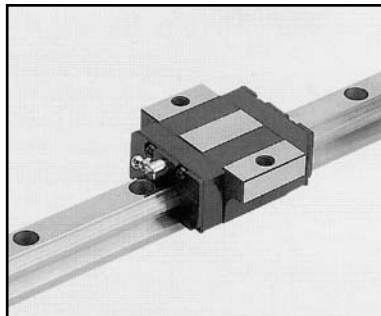
LINEAR BEARINGS



VEE BEARINGS



COMBINED ROLLER
BEARINGS



MOTION GUIDANCE
SYSTEMS

NEED TECHNICAL ADVICE?

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