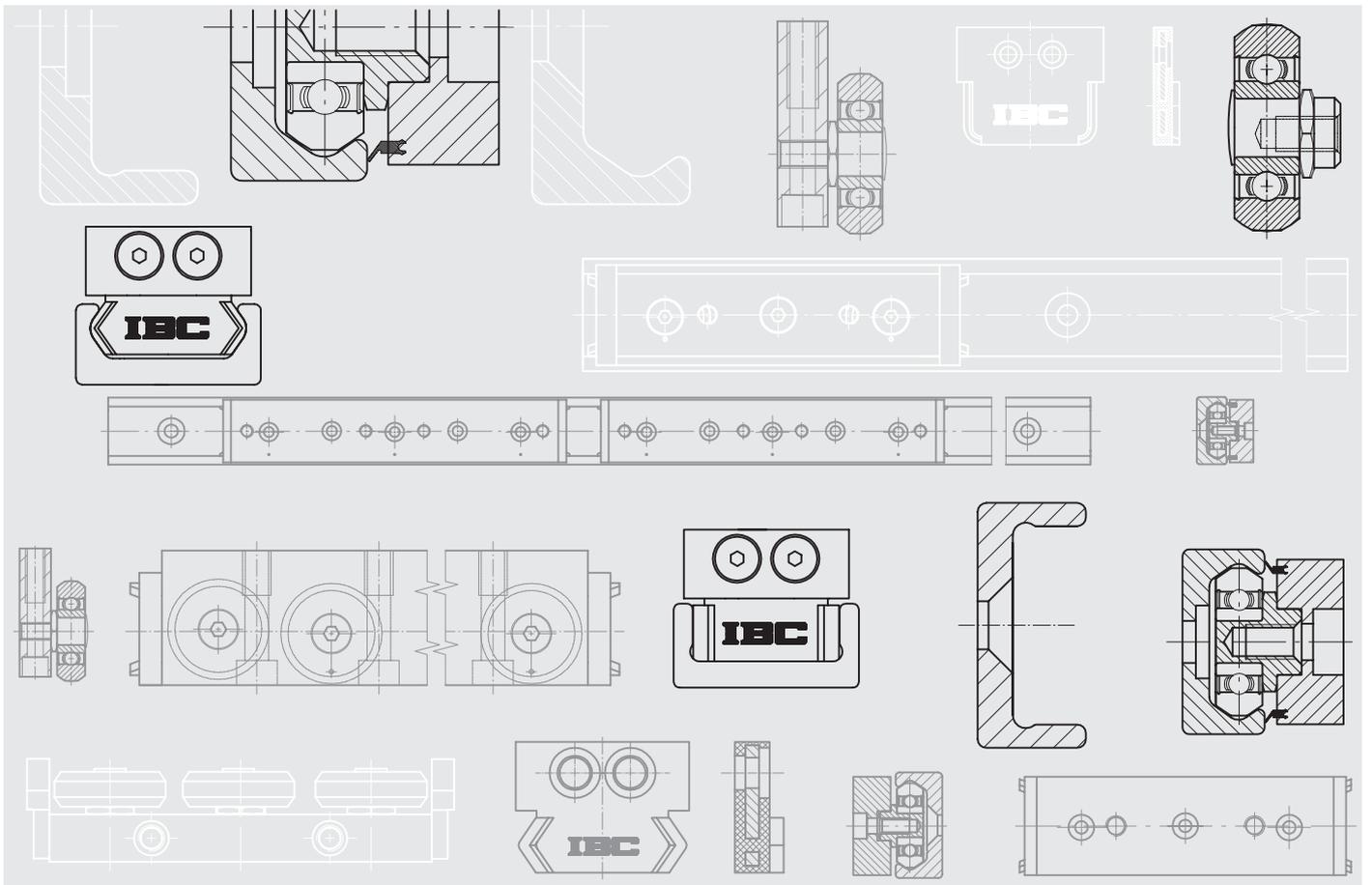# IBC

Linear motion bearings

TI-I-7001.3 / E

Headquarter of the IBC Wälzlager GmbH at the industrial area of Solms-Oberbiel

IBC Historical Location

The headquarters, with the plants Solms-Oberbiel and Asslar are conveniently situated in the centre of Germany. The immediate connection to major north/south routes as well as to the main routes leading east and west not only forms a central position in Germany, but also within entire Europe. The near airport of Frankfurt a. M. connects us worldwide.

Precise logistics secure a maximum in worldwide reliability of delivery

IBC Flexible and reliable

The central computer controlled high shelf warehouse, built in 1996, with more than 2000 pallet parking bays stores semi-manufactured and finished products as well as large bearings. It complements the previous 2-storied computerised service storage, also with more than 2500 storage places. Both storage systems, together with our despatch centre, secure a maximum in precise logistics and in worldwide reliability of delivery.

The central computer controlled high shelf warehouse

New Plant in Asslar

IBC Precision with future, remains without alternative.

We are future-oriented.
We have the creativity and
vision to perform and provide.
**This is our exact presentation
to solutions with precision.**

IBC Linear motion bearings

Beside the well known and proven, rotative bearing product range IBC also offers linear motion bearings as a C shaped profile with tracks on the inner side. This results in a very compact and space-saving system which can still be used when outside-guiding systems require too much space. In general, there are the following two designs: Linear motion bearing-carriage systems and Telescope linear motion bearings.

IBC linear motion bearings are not only used in machine tools and in robots, but are also found more and more in the automotive and carriage building sector as well as in medical technology, like in X-ray machines and in the electrical industry. Requirements on linear motion bearings are just as various as the different kinds of application are within these sectors. When it comes to handling and automation or to transport systems the most important aspect is speed, which also means productiveness and at the same time low power demand. In the machine tool sector the most important aspects are stiffness and easy running. The choice of the correct type of guidance depends on conditions like load, speed, stroke and acceleration as well as on influential factors such as temperature, lubrication, vibration, servicing and installation.

Constant quality controls that are integrated within the manufacturing process ensure the consistently high quality level of all our products. Our efficient quality management system is implemented and certificated for the design, development, manufacturing and distribution of rolling bearings and linear guides according to DIN EN ISO 9001:2000.

Detailed information on different bearing designs as well as on the choice of the correct bearing type and its safe integration into individual constructions are listed in our corresponding product catalogues. For a complete overview of these catalogues please review the last page of this brochure.

Due to our extensive product range and to the worldwide support of our customers on site by our service and technical departments we are able to create specific and economic rolling bearing solutions, in cooperation with our customers, for their individual bearing applications.

Areas of application:

- Machine tool industry
- Printing machine industry
- Automotive suppliers
- Mechanical engineering and plant construction
- Packaging machine industry
- Aerospace industry
- Paper machine industry
- Medical technology
- Railway supply industry

72-001

72-002

72-003

IBC Linear motion rolling bearing-carriage systems

IBC linear motion rolling bearing-carriage systems enable the reliable and economic linear movement of machine parts. Their specific characteristics are long-term and maintenance-free operation, long service life as well as dynamic and quiet running behaviour, resulting in a low noise level at the workplace. These qualities make IBC linear guides an essential component for highly efficient, maintenance-free and safe machines with a low power demand.

IBC produces compact linear guides on roller basis, with guiding and supporting rails in an expanded construction kit system in many different sizes and in several designs.

Two different ways of attaching the rail systems are available. Cylindrical countersinks enable precise positioning of the track system. Conical countersinks are used where the precision requirements are low and where a quick assembly is of greater importance.

By using locating bearings and loose fit bearings a not so exact machining of surrounding parts and a high degree of occurring nonconformities of parallelism in connecting constructions can widely be compensated so that preliminary works are reduced to a great extent.

The profiled rails of linear guides are made of high-quality heat treatable steel and are protected against corrosion. The balls used are made of bearing steel 100Cr6.

The tracks of the series 18, 28H and 43 are hardened inductively, which leads to a high fatigue life, even with great loads. The inductive hardening process preserves the toughness of the core material. The profile 28H shows advancement towards the previous profile 28; the stiffness has been improved and an increase of load ratings has been achieved by reinforcement of the flanks. On customer request, the tracks can also be delivered with a ground finish design.

All these issues are indicators for an economic, reliable and productive product.
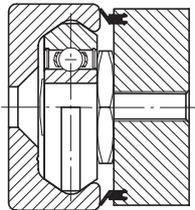
Technical specification:

Dimensions: from 18 x 15 to 43 x 37.5 mm
Load ratings: from 820 N to 9065 N

Shifting speed: up to 7 m/sec
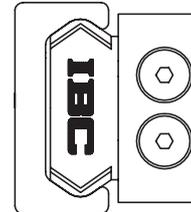**Rail lenghts:** from 160 mm to 3600 mm

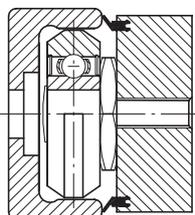**Locating bearing system LCX28H-1120.V/1/CN-21.2RS.AX**
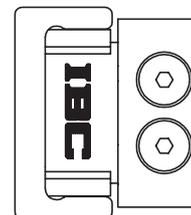
70-001

71-001

70-003

Loose fit bearing system LCU28H-1120.C/1/CN-21.2RS.AU
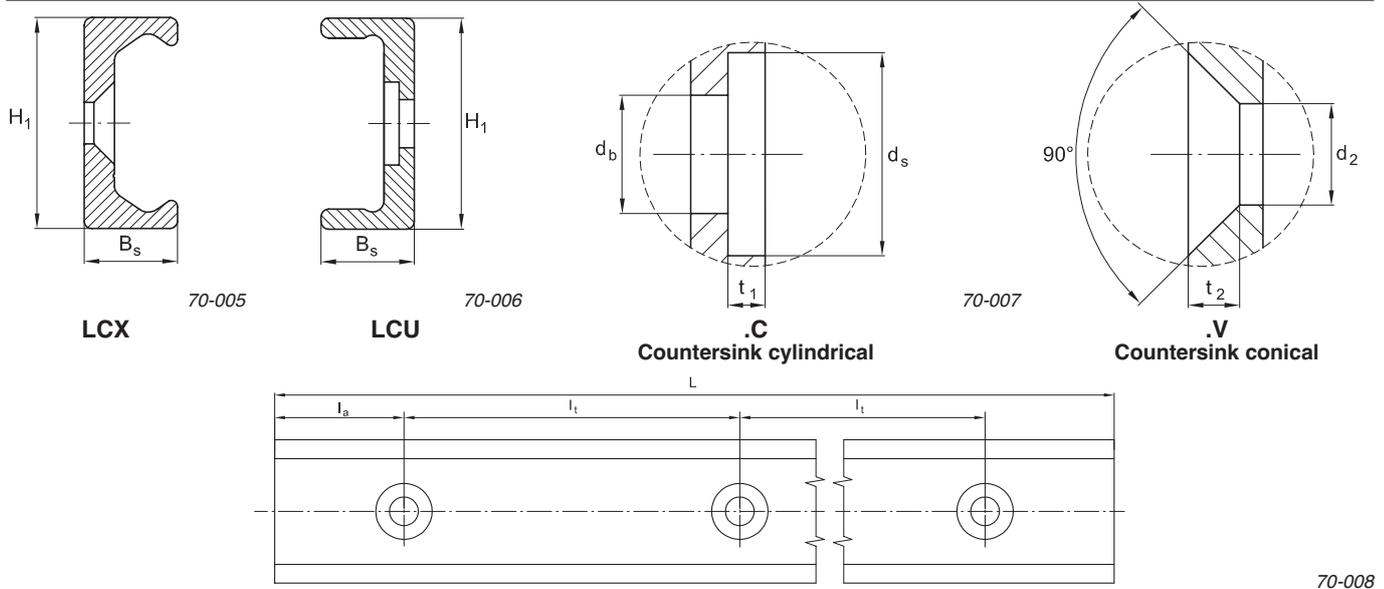
70-002

71-002

70-004

Linear guides of the size 28H.
Rail length 1120 mm.
Carriage of the sealed version CN.

Rollers with 2RS-sealing are lubricated for life.
A wiper system protects the track against chips and dirt.

IBC WÄLZLAGER GMBH

IBC

1. Locating bearing and loose fit bearing rails LCX and LCU

70-005
LCX

70-006
LCU

70-007
.C
Countersink cylindrical

.V
Countersink conical

70-008

LCX / LCU 18					LCX / LCU 28H					LCX / LCU 43				
L [mm]	l_a [mm]	l_t [mm]	n	Weight [kg]	L [mm]	l_a [mm]	l_t [mm]	n	Weight [kg]	L [mm]	l_a [mm]	l_t [mm]	n	Weight [kg]
160	40	80	2	0.09										
240			3	0.13	240	40	80	3	0.26					
320			4	0.18	320			4	0.35					
400			5	0.22	400			5	0.44	400	40	80	5	1.08
480			6	0.26	480			6	0.53	480			6	1.30
560			7	0.31	560			7	0.62	560			7	1.52
640			8	0.35	640			8	0.70	640			8	1.73
720			9	0.40	720			9	0.79	720			9	1.95
800			10	0.44	800			10	0.88	800			10	2.17
880			11	0.48	880			11	0.97	880			11	2.38
960			12	0.53	960			12	1.06	960			12	2.60
1040			13	0.57	1040			13	1.14	1040			13	2.82
1120			14	0.62	1120			14	1.23	1120			14	3.04
1200			15	0.66	1200			15	1.32	1200			15	3.25
1280			16	0.70	1280			16	1.41	1280			16	3.47
1360			17	0.75	1360			17	1.50	1360			17	3.69
1440			18	0.79	1440			18	1.58	1440			18	3.90
1520			19	0.84	1520			19	1.67	1520			19	4.12
1600			20	0.88	1600			20	1.76	1600			20	4.34
1680			21	0.92	1680			21	1.85	1680			21	4.55
1760			22	0.97	1760			22	1.94	1760			22	4.77
1840			23	1.01	1840			23	2.02	1840			23	4.99
1920			24	1.06	1920			24	2.11	1920			24	5.20
2000			25	1.10	2000			25	2.20	2000			25	5.42
					2080			26	2.29	2080			26	5.64
					2160			27	2.38	2160			27	5.85
					2240			28	2.46	2240			28	6.07
					2320			29	2.55	2320			29	6.29
					2400			30	2.64	2400			30	6.50
					2480			31	2.73	2480			31	6.72
					2560			32	2.82	2560			32	6.94
					2640			33	2.90	2640			33	7.15
					2720			34	2.99	2720			34	7.37
					2800			35	3.08	2800			35	7.59
					2880			36	3.17	2880			36	7.80
					2960			37	3.26	2960			37	8.02
					3040			38	3.34	3040			38	8.24
					3120			39	3.43	3120			39	8.46
					3200			40	3.52	3200			40	8.67
										3280			41	8.89
										3360			42	9.11
										3440			43	9.32
										3520			44	9.54
										3600			45	9.76

74-001

Designation	H_1	B_S	conical V	d_2	t_2	cylindrical C	d_b	d_S	t_1
Profile 18	18	8.25	M4 DIN 7991	5	2.6	M4 TORX	5.0	9.5	2.0
Profile 28H	28	12.30	M5 DIN 7991	6	2.8	M5 TORX	6.4	11.0	
Profile 43	43	21.00	M8 DIN 7991	9	4.3	M8 TORX	10.5	18.0	3.1

74-002

2. Profiled rollers

70-009

CBRY..

70-010

CBRS..

70-011
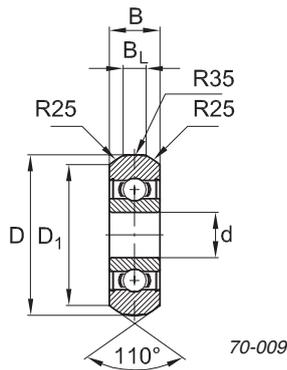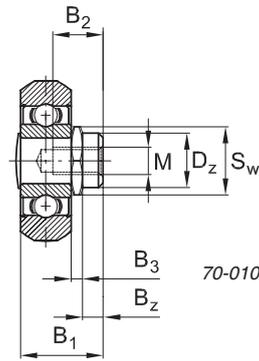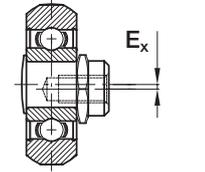
CBRE..

Rollers are available with 2Z- and with 2RS-sealing.

Designation	Dimensions [mm]								
	D	D_1	d	D_Z	B	B_1	B_L	B_2	B_3
CBRY 14-18	14.0	12.4	5.0	–	4.0	–	1.6	–	–
CBRS 14-18			–	6.0		7.3		5.0	1.5
CBRE 14-18			–						
CBRY 23-28H	22.4	19.2	7.0	–	7.0	–	2.4	–	–
CBRS 23-28H			–	10.0		13.0		8.0	2.2
CBRE 23-28H			–						
CBRY 35-43	35.0	30.8	10.0	–	11.0	–	5.0	–	–
CBRS 35-43			–	12.0		18.0		11.0	2.5
CBRE 35-43			–						

74-003

Designation	Dimensions [mm]				Load rating [N]		Weight [g]	Mounting-key
	B_Z	S_W	M	E_X	C	C_0		
CBRY 14-18	–	–	–	–	790	410	2.8	–
CBRS 14-18	1.8	8.0	M4	–			4.2	CK 18
CBRE 14-18				0.4				
CBRY 23-28H	–	–	–	–	2500	1100	13.0	–
CBRS 23-28H	3.8	13.0	M5	–			20.0	CK 28
CBRE 23-28H				0.5				
CBRY 35-43	–	–	–	–	6000	2700	40.0	–
CBRS 35-43	4.3	15.0	M6	–			65.0	CK 43
CBRE 35-43				0.8				

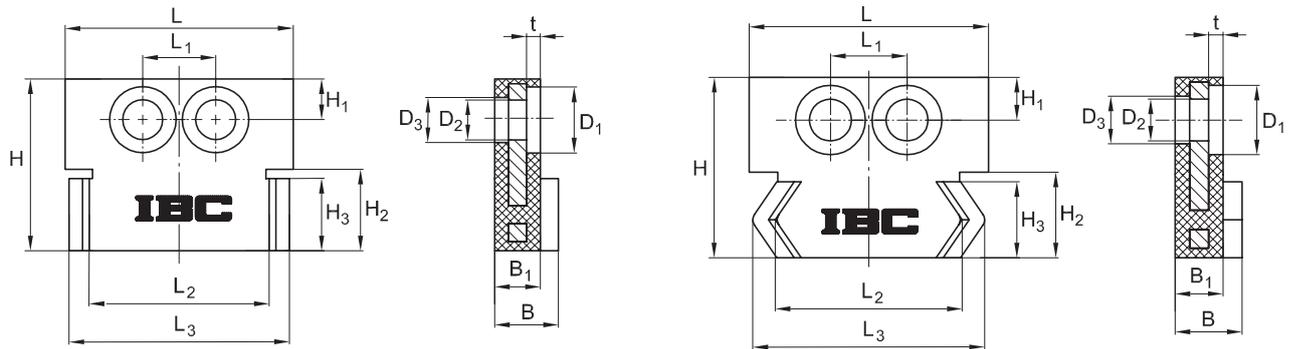*Rollers*   74-004

The CBRY is a roller without stud. Like the rollers with stud, the CBRY can be fixed to external constructions.

The CBRS is a roller with a concentric roller stud.

The CBRE roller with eccentric roller stud is designed for adjusting the preload.

All three roller types are suitable for application in LCX- and LCU-rails.

3. Wipers

| ABS U... | ABS X... | 70-012 |

Size	Dimensions [mm]													
	H	H$_1$	H$_2$	H$_3$	L	L$_1$	L$_2$	L$_3$	D$_1$	D$_2$	D$_3$	B	B$_1$	t
ABS X18	12.6	3.5	7.0	6.0	17.0	*	11.0	16.0	6.0	3.0	3.5	7.0	5.0	1.5
ABS U18						*								
ABS X28H	19.0	4.5	9.0	8.0	25.0	8.0	19.0	24.2	7.3	4.4	5.0			
ABS U28H														
ABS X43	32.2	7.5	17.2	15.9	40.0	12.0	31.1	38.0	7.5	4.5				
ABS U43														

Wiper   *74-005*

* Wipers of the size 18 are fixed concentric with a socket
  head cap screw.

The wiper protects the carriage and therefore the rollers from coarse dirt.

The wipers are easy mountable with two cylinder head bolts and are quickly replaceable when worn.

3.1 Sealing strip in carriage CN and CU

The carriage types CN and CU come as a standard with two sealing strips.

These help avoid dirt penetration from the side.

3.2 Optional sealing strips in CL-carriage

The carriage type CL is available with or without a sealing strip.

The suffix for CL carriages in locating bearing rails with wipers and sealing strips is AXS; it is AUS for loose fit bearing rails.

4. Carriages CR and CL

CR 18
CR 28H
CR 43

CL 18
CL 28H
CL 43

70-013

Carriage type and main load direction		Rollers	Dimensions [mm]															
▼	▲	n	H	H_1	B	B_S	B_l	d	d_1	h_2	C	C_w	C_a	C_t	d_2	b_1	H_2	h_1
CR 18-21	CR 18-12	3	22.0	18.0	17.4	8.3	8.0	4.2	7.5	8.0	60.0	74.0	20.0	20.0	M5*	4.0	9.0	3.0
CR 18-22/A		4									80.0	94.0		40.0				
CR 18-22/B																		
CR 18-32	CR 18-23	5									100.0	114.0		20.0				
CR 18-33/A		6									120.0	134.0		40.0				
CR 18-33/B																		
CR 28H-21	CR 28H-12	3	32.0	28.0	24.1	12.3	10.0	5.2	9.0	10.0	80.0	94.0	22.0	36.0	M6*	5.0	14.0	5.5
CR 28H-22/A		4									100.0	114.0		28.0				
CR 28H-22/B																		
CR 28H-32	CR 28H-23	5									125.0	139.0		27.0				
CR 28H-33/A		6									150.0	164.0						
CR 28H-33/B																		
CR 43-21	CR 43-12	3	47.0	43.0	37.5	21.0	15.0	6.7	11.0	16.0	120.0	134.0	32.0	56.0	M8*	7.5	21.5	6.5
CR 43-22/A		4									150.0	164.0		86.0				
CR 43-22/B																		
CR 43-32	CR 43-23	5									190.0	204.0		42.0				
CR 43-33/A		6									230.0	244.0		83.0				
CR 43-33/B																		
CL 18-21	**	3	–	18.0	15.0	8.3	5.7	–	–	–	60.0	74.0	20.0	20.0	M5	–	9.0	–
CL 18-22/A		4	–					–	–	–	80.0	94.0		40.0		–		–
CL 18-22/B			–					–	–	–						–		–
CL 18-32	**	5	–					–	–	–	100.0	114.0		20.0		–		–
CL 18-33/A		6	–					–	–	–	120.0	134.0		40.0		–		–
CL 18-33/B			–					–	–	–						–		–
CL 28H-21	**	3	–	28.0	24.1	12.3	10.0	–	–	–	80.0	94.0	22.5	35.0	M5	–	14.0	–
CL 28H-22/A		4	–					–	–	–	100.0	114.0	25.0	50,0		–		–
CL 28H-22/B			–					–	–	–						–		–
CL 28H-32	**	5	–					–	–	–	125.0	139.0		25.0		–		–
CL 28H-33/A		6	–					–	–	–	150.0	164.0		50.0		–		–
CL 28H-33/B			–					–	–	–						–		–
CL 43-21	**	3	–	43.0	37.5	21.0	15.0	–	–	–	120.0	134.0	32.5	55.0	M8	–	21.5	–
CL 43-22/A		4	–					–	–	–	150.0	164.0	35.0	80.0		–		–
CL 43-22/B			–					–	–	–						–		–
CL 43-32	**	5	–					–	–	–	190.0	204.0		40.0		–		–
CL 43-33/A		6	–					–	–	–	230.0	244.0		80.0		–		–
CL 43-33/B			–					–	–	–						–		–

Carriage type dimensions

74-006

* CR-carriage mounting:

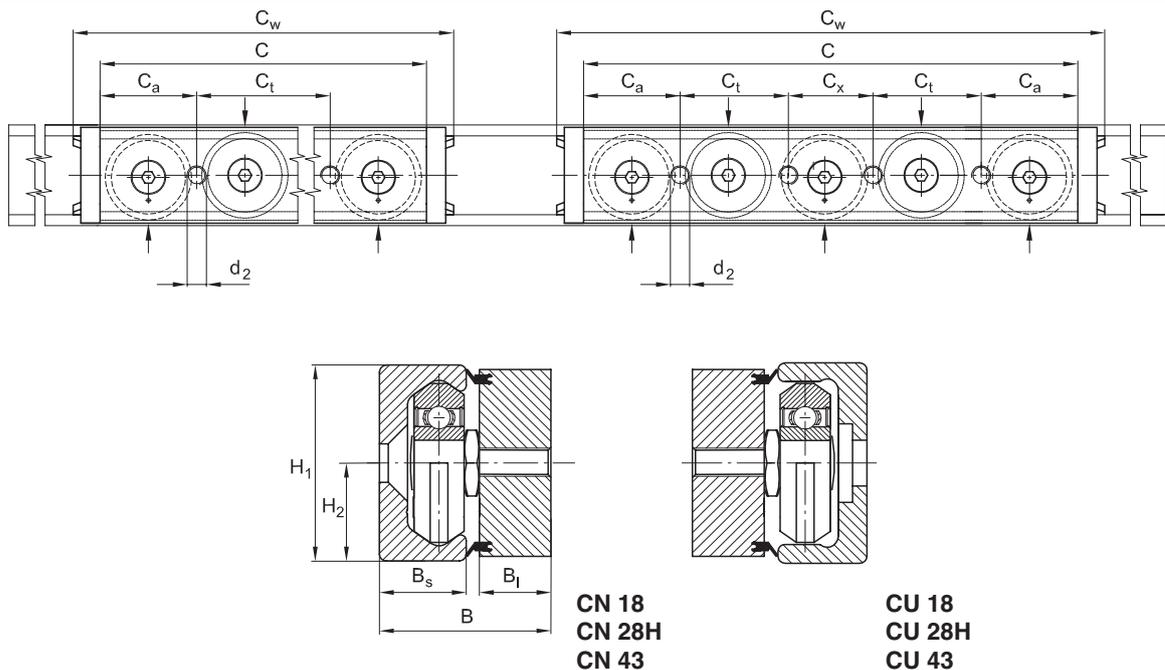| Slide	From above thread d_2	From below screw acc. to DIN 912
CR 18	M5	M4
CR 28H	M6	M5
CR 43	M8	M6

74-007

** The CL-carriage can also be placed into rails when turned 180°.

For arrangement of the rollers see page 11 and 13

Version A: First roller carrying load (standard)
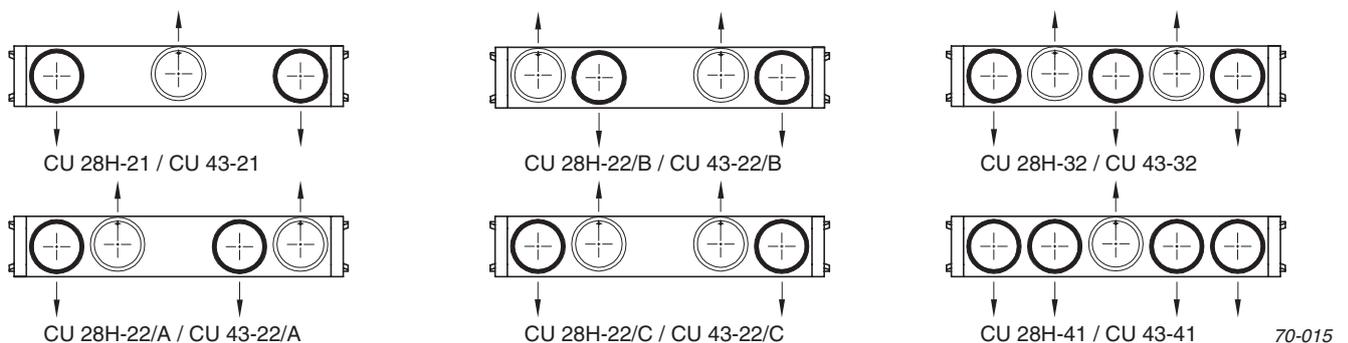Version B: Second roller carrying load.

5. Carriages CN and CU

CN 18
CN 28H
CN 43

CU 18
CU 28H
CU 43

70-014

Carriage type and main load direction		Rollers	Dimensions [mm]															
▼	▲	n	H	H₁	B	Bs	Bl	d	d₁	h₂	C	Cw	Cx	Ca	Ct	d₂	H₂
CN 18-21	**	3	–	18.0	16.5	8.3	7.2	-	-	-	80.0	94.0	-	14.0	52.0	M5	9.0
CN 28H-21	**		–	28.0	24.1	12.3	10.0	-	-	-	102.0	116.0	-	12.0	78.0		14.0
CN 43-21	**		–	43.0	37.5	21.0	15.0	-	-	-	134.0	148.0	-	10.0	114.0	M8	21.5
CU 28H-21	**	3	–	28.0	24.1	12.3	10.0	-	-	-	160.0	174.0	26.0	15.0	52.0	M5	14.0
CU 28H-22/A		4	–					-	-	-							
CU 28H-22/B			–					-	-	-							
CU 28H-22/C			–					-	-	-							
CU 28H-32	**	5	–					-	-	-							
CU 28H-41	**		–					-	-	-							
CU 43-21	**	3	–	43.0	37.5	21.0	15.0	-	-	-	218.0	232.0	37.0	15.0	75.5	M8	21.5
CU 43-22/A		4	–					-	-	-							
CU 43-22/B			–					-	-	-							
CU 43-22/C			–					-	-	-							
CU 43-32	**	5	–					-	-	-							
CU 43-41	**		–					-	-	-							

Carriage type dimensions   *74-008*

** The carriage can also be placed into rails when
   turned around 180°.

CU 28H-21 / CU 43-21

CU 28H-22/B / CU 43-22/B

CU 28H-32 / CU 43-32

CU 28H-22/A / CU 43-22/A

CU 28H-22/C / CU 43-22/C

CU 28H-41 / CU 43-41

70-015

CU type carriages are produced in one general length and are mounted with CBRE ex-centre rollers. According to the application case and as shown in the table above, different configurations can be achieved. For further information please contact our technical department.

Version A: First bottom roller load carrying (standard).
Version B: Second roller carries load at bottom.
Version C: Carriage type CU on request.

6. Load ratings and moments

Z
M_z
X
M_x
Co_{rad}
M_{yd}
Y
Co_{ax}
M_{ys}
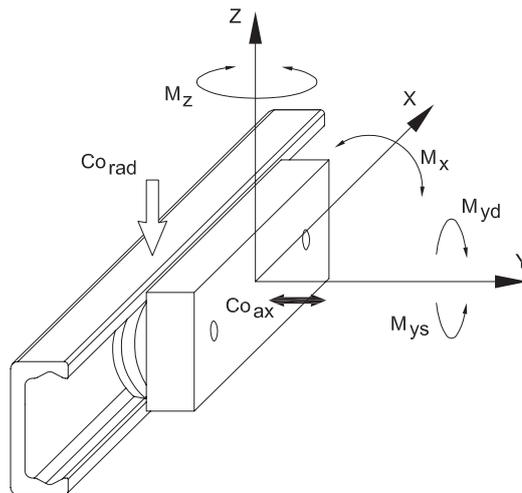
71-003

Main load directions of the carriages				Load ratings in main load directions [N]			Tolerable moments of load [Nm]				
CR ▼	CR ▲	CL ▼▲	CN ▼▲	C	$C_{0\,rad}$	$C_{0\,ax}$	M_x	M_z	M_{yd}	M_y	M_{ys}
CR 18-21	CR 18-12	CL 18-21	CN 18-21	1540	825	262	1.6	4.8		8.3	
CR 18-22/A		CL 18-22/A				310	2.9	7.1	8.3		24.9
CR 18-22/B		CL 18-22/B							24.9		8.3
CR 18-32	CR 18-23	CL 18-32		1832	978	365		9.5		24.9	
CR 18-33/A		CL 18-33/A				442	3.4	11.9	24.9		41.2
CR 18-33/B		CL 18-33/B							41.2		24.9
CR 28H-21	CR 28H-12	CL 28H-21	CN 28H-21	4345	2213	652	6.4	16.4		28.0	
CR 28H-22/A		CL 28H-22/A				765	11.8	22.3	28.0		84.1
CR 28H-22/B		CL 28H-22/B							84.1		28.0
CR 28H-32	CR 28H-23	CL 28H-32		5160	2630	919		30.0		84.1	
CR 28H-33/A		CL 28H-33/A				1102	14.1	37.3	84.1		140.0
CR 28H-33/B		CL 28H-33/B							140.0		84.1
CR 43-21	CR 43-12	CL 43-21	CN 43-21	12300	5520	1580	23.7	60.1		104,7	
CR 43-22/A		CL 43-22/A				1890	43.7	81.6	104.7		313.8
CR 43-22/B		CL 43-22/B							313.8		104.7
CR 43-32	CR 43-23	CL 43-32		14680	6560	2220		108.7		313.8	
CR 43-33/A		CL 43-33/A				2650	52.5	136.0	313.8		523.0
CR 43-33/B		CL 43-33/B							523.0		313.8

Load ratings and tolerated moments　　　　*74-009*

Main load directions of the carriages	Load ratings in main load directions [N]			Tolerable moments of load [Nm]				
CU ▼	C	$C_{0\,rad}$	$C_{0\,ax}$	M_x	M_z	M_{yd}	M_y	M_{ys}
CU 28H-21	4345	2213	652	6.4	29.9		56.1	
CU 28H-22/A			765			111.8		56.1
CU 28H-22/B						56.1		111.8
CU 28H-22/C							84.2	
CU 28H-32	5218	2660	928					
CU 28H-41	7020	3580	660				56.1	
CU 43-21	12300	5520	1580	23.7	108.7		210.0	
CU 43-22/A			1860	43.7		210.0		419.0
CU 43-22/B						419.0		210.0
CU 43-22/C							313.8	
CU 43-32	14680	6545	2218					
CU 43-41	20240	9065	1620	23.7			210.0	

Load ratings and tolerated moments　　　　*74-010*

For load ratings of single rollers see page 8.

7. Choice of the roller arrangement, depending on the direction of moments

7.1 Application with one carriage
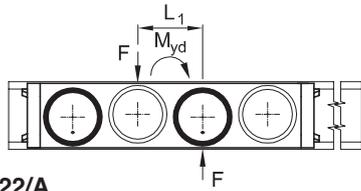
Type CL 28H-22/A
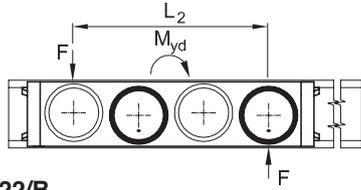
Type CL 28H-22/B
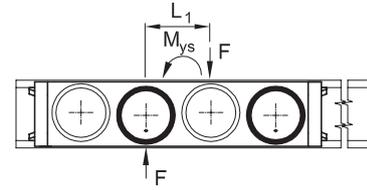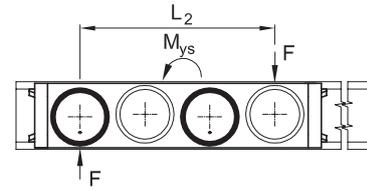
70-016

70-017

When a overhang load F_K is applied to an application with a carriage this generates a moment of load M_y. An IBC slide with four or six rollers in the configurations A and B is able to take on this moment of load M_y. The carriages admission of the moment varies with its sense of rotation.

The correct combination of the carriage configurations A and B is of large relevance for the utilisation of the carriages maximum load rating.
The illustration above shows the concept of the configuration A and B for carriages with four (or six) rollers.

7.2 Application with several carriages

If the moment load M_y is too large for one carriage, it should be considered to use two carriages.

In this case however the rollers of both carriages must support in opposite directions.
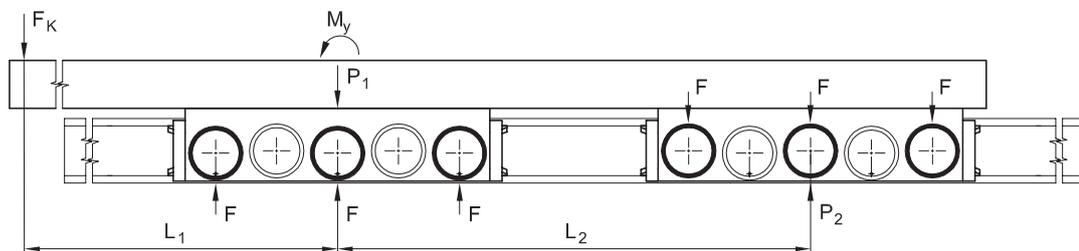
Type   **CR..-32**   **CR..-23**   70-018

When a projecting load is brought onto an application with two carriages this also generates a moment of load M_y. In this case it is possible to achieve maximum load ratings by appropriately chosen carriage configuration.

This means that carriage types CL, CN and CU with three or five rollers can be installed with front carriage and rear carriage in opposite main load direction.

Carriages with a symmetrical construction, for example with four or six rollers, have no effect here. The carriage types CR with mounting possibility from above cannot be installed offset because of the array of their mounting bores.

These are available as a configuration A and B.

8. Fatigue life calculation
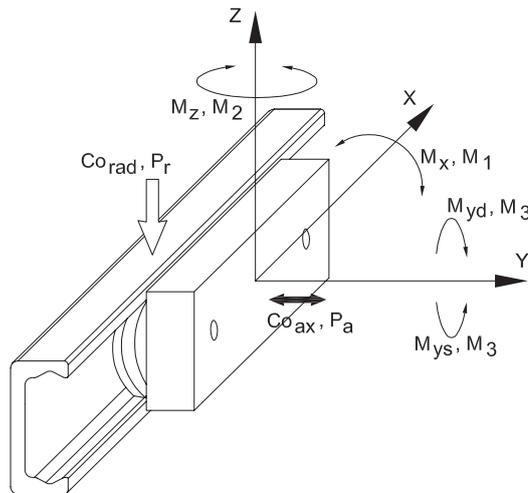
71-004

The dynamic load rating C of the carriages is the basis for the calculation of the fatigue life of a linear motion bearing-carriage system. It corresponds to a nominal fatigue life of 100 km. The fatigue life can be calculated by applying the equations listed below.

The equivalent dynamic bearing load adds up to the sum of forces and moments that, at the same time, have an impact on a carriage.

$$L_{km} = 100 \bullet \left(\frac{C}{P} \bullet \frac{K_1}{K_2} \bullet K_3 \right)^3 \qquad [1.0]$$

$$P = P_r + \left(\frac{P_a}{C_{0ax}} + \frac{M_1}{M_x} + \frac{M_2}{M_y} + \frac{M_3}{M_z} \right) \bullet C_{0rad} \qquad [1.1]$$

C: Dynamic load rating	[N]
C_{0rad}: Load ratings of the carriages	[N]
C_{0ax}: (see page 10 table 74-009/010)	[N]
K_1: Contact coefficient	
K_2: Use coefficient	
K_3: Stroke coefficient	
L_{km}: Nominal fatigue life	[km]
M_x: Tolerable moments of load	[Nm]
M_y: (see page 10)	[Nm]
M_z: (see page 10 table 74-009/010)	[Nm]
M_1: External moments see sketch	[Nm]
M_2: External moments see sketch	[Nm]
M_3: External moments see sketch	[Nm]
P: Equivalent dynamic bearing load	[N]
P_a: Axially resultant external forces	[N]
P_r: Radial resultant external forces	[N]

Amount of slides	K_1
1	**1**
2	**0.8**
3	**0.7**
4	**0.6**

Contact coefficient K_1   *74-011*

Ambient conditions	K_2
Low shifting speeds (< 1 m/s), clean ambient conditions; low-frequency and soft changes of direction; no vibrations or impacts	**1–1.5**
Average shifting speeds (1–3 m/s); mid-frequency changes of direction; slight vibrations and impacts	**1.5–2**
High shifting speeds (> 3 m/s); high-frequency changes of direction; high dirt impact; vibrations and impacts	**2–3.5**

Use coefficient K_2   *74-012*

Stroke coefficient K_3   *73-001*

9. Linear accuracy

9.1 Tolerances of mounted linear motion rolling bearing carriage systems [mm]

Referential mark   Referential surface

70-019
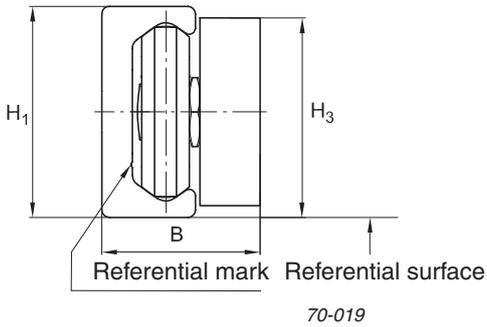
		18	28H	43
H_1		+0.25		+0.36
		−0.10		−0.10
H_3		+0.25	+0.15	+0.20
		−0.25	−0.35	−0.35
B		+0.15	+0.25	
		−0.15	−0.10	

74-013

9.2 Linear guidance accuracy L

70-020
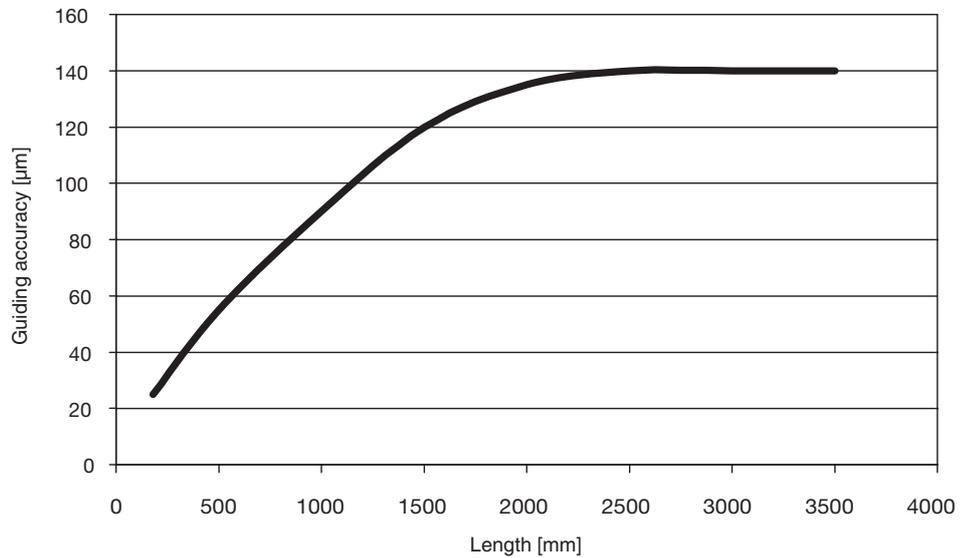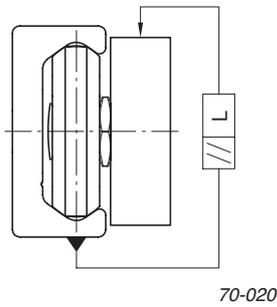
Guiding accuracy L

73-002

9.3 Guiding accuracy S

70-021
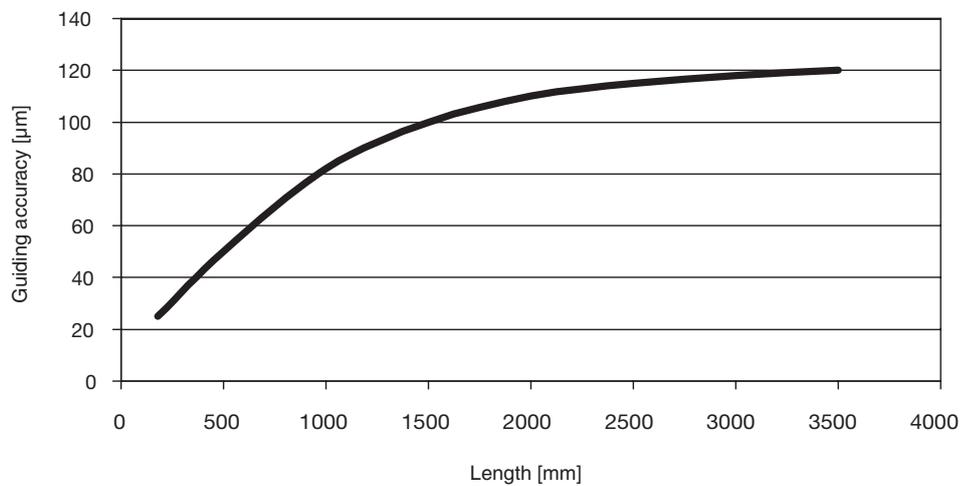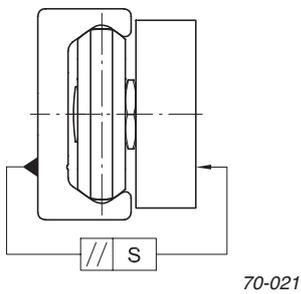
Guiding accuracy S

73-003

10. Angle compensation and lateral offset by locating bearing and loose fit bearing
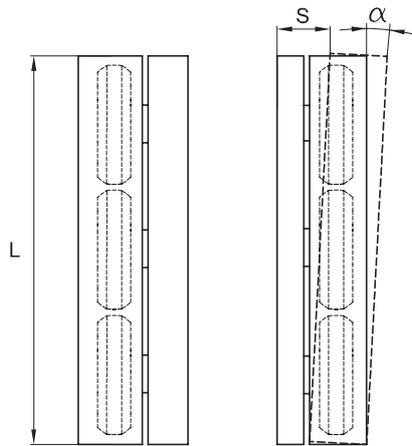
70-022
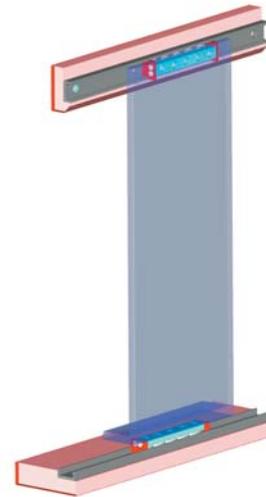
71-005

The locating bearing and loose fit bearing system enables the compensation of possible angle nonconformities or offset of mounting surfaces.

10.1 Angle compensation

The max tolerated angle α can be calculated by using following equation:

$$\alpha = \arctan \frac{S}{L} \qquad [1.2]$$

The total offset S consists of the single offsets W and Z referring to the nominal track centre B_m of a LCU loose fit bearing rail.

The maximum values for angle nonconformity and offset are as follows:

α:	Angle nonconformity	[°]
S:	Offset	[mm]
L:	Rail length	[mm]

Size	L [mm]	S [mm]	α [°]
18	2000	1.4	0.040
28H	3200	2.0	0.035
43	3600	4.0	0.063

Angle nonconformity and skewing   74-014

10.2 Lateral offset
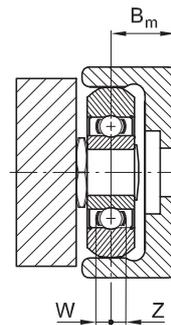
70-023

The displacement of rollers and carriages within the U rail referring to the nominal track centre B_m are listed as W and Z.

Size	Dimensions		
	B_m [mm]	W [mm]	Z [mm]
18	6.3	1.1	0.3
28H	8.6	1.3	0.7
43	14.5	2.5	1.5

Lateral offset   74-015

11. Assembly notes

11.1 Abutment and fillet dimensions, support widths

In order to guarantee a correct run, linear motion rolling bearing-carriage systems require the compliancy to external abutment and fillet dimensions.
Any rail support shouldn't fall short of the width A.
When external forces are implied to the carriage arranged on the outer side, the minimum supporting width B must be ensured.

70-024

Size	A [mm]	B [mm]
18	5	4
28H	8	4
43	14	5

Rail support 74-016
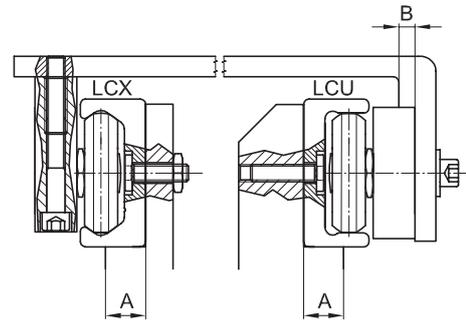
11.2 Chamfers and tightening torques

When cylindrical countersunk drill holes are applied please ensure that the mounting bores of the fixing surface are carried out sufficiently and according to following table. The tightening torques listed should be maintained.

Countersink

70-025

Size	Chamfer [mm]	Screw	Tightening torque [Nm]
18	0.5 x 45°	M4 TORX	3
28H	0.6 x 45°	M5 TORX	9
43	1.0 x 45°	M8 TORX	22

Chamfer of the countersink 74-017
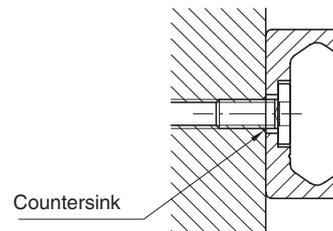
11.3 Tolerable offset in height

The locating bearing and loose fit bearing principle enables compensation of misalignments of the substructure. Nevertheless, the max. tolerable values shouldn't be exceeded when using LCX and LCU rails. The following table shows the max. tolerated height offset values for the locating bearing and loose fit bearing rails. Please note that reaching the listed values results in a reduction of the load rating of about **30%**.

70-026

Size	Angle α [°]
18	0.057
28H	0.143
43	0.171

Height compensation 74-018
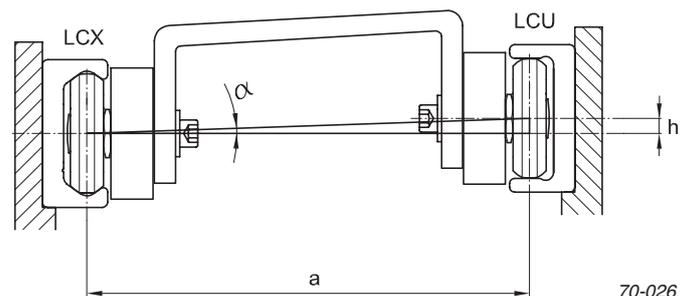
$$h = a \cdot \tan\alpha \qquad\qquad [1.3]$$

Example: Size 43 a = 650 mm
h = a • tanα = 1.94 mm

12. Application range of linear motion rolling bearing-carriage systems

For a better overview only two examples from a large variety of possibilities are introduced in the following:

1. Example

IBC Linear motion rolling bearing-carriage systems enable economic solutions in machine tool doors because of their proven locating bearing and loose fit bearing system.

The newly developed carriage with sealing results in a sealed off system.
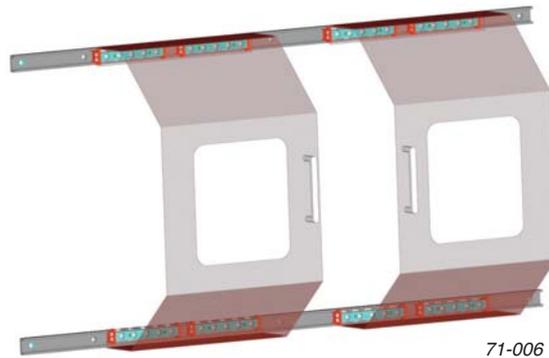
71-006

Linear Bearings:

Locating bearing guidance: **LCX28H-2000.V/2/CN-21.2RS.AX**
Loose fit bearing guidance: **LCU28H-2000.V/2/CN-21.2RS.AU**

2. Example

Furthermore our carriage systems are used in medical technology. X-ray machines and diagnosis apparatuses require easy, maintenance-free as well as noiseless run behaviour that is low in friction.

In these cases our carriage systems are applied for shifting the tables. The system can, by means of proven cylindrical countersunk drill holes, be exactly aligned to a referential surface and is therefore able to compensate appearing substructural inaccuracies.
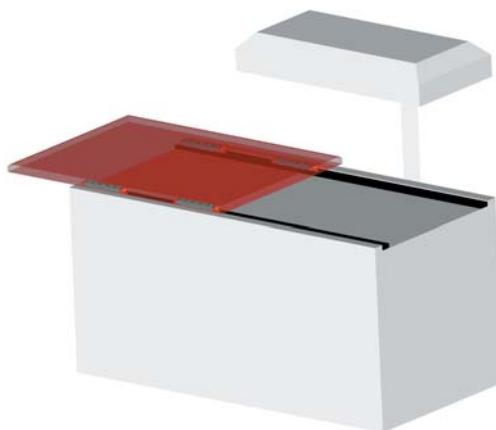
71-007

Linear Bearings:

Locating bearing guidance: **LCX43-2320.C/2/CL-22/A.2RS.AXS**
Loose fit bearing guidance: **LCU43-2320.C/2/CL-22/A.2RS.AUS**

13. Designation IBC linear motion bearings

13.1 Locating and loose fit rails

```
LCU    43-    0480.    C
LCX    28H-   1040.    V
```

Profile type	
LCX	Locating rail
LCU	Loose fit rail

Series
18
28H
43

Countersink	
V	conical DIN 7991
C	cylindrical TORX

Length in mm

13.2 Rollers

```
CBRE    23-    28H.    2RS
CBRS    35-    43.     2RS
CBRY    23-    28H.    2Z
```

Rollers	
CBRY	Roller
CBRS	Roller with concentric stud
CBRE	Roller with eccentric stud

Diameter roller
14
23
35

Seal	
2RS	2 Seals made of synth. caoutchouc
2Z	2 Shields made of metal sheet

Series
18
18H
43

13.3 Carriages with rollers

```
CR    28H-   21   2Z.    AX
CU    43-    32   2RS.   AU
CL    28H-   21   2RS.   AXS
```

Carriage on roller basis
C

Attachment type	
R	radial
L, N, U	axial

Series
18
28H
43

Seal on the carriage	
AX	Wiper for locating rail
AU	Wiper for loose fit rail
..S	With sealing strip carriage CL

Seal roller	
2RS	2 Seals made of synth. caoutchouc
2Z	2 Shields made of metal sheet

Arrangement	
1. Figure	Amount of carrying rollers (concentrical)
2. Figure	Amount of opposite rollers (eccentrical)

13.4 Wiper

```
ABS    X    43
ABS    U    18
```

Wiper

Profile type	
X	for locating rail
U	for loose fit rail

Series
18
28H
43

13.5 Rail with carriage

```
LCX 28H-1280.V   /2/   CL-21.2RS.AX
```

See illustration 13.1

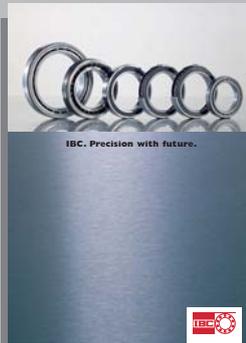| See illustration 13.3 |
|---|

Number of carriages

14. Product note

Beside their proven Linear motion rolling bearing carriage system, IBC also offers ball-guided telescope bearings up to the extension length of 1970 mm. The compact design favours the application in narrow construction spaces. Please check our technical catalogue for more detailed information TI-1-7005.1/E.

Series

LCE

70-027

71-008

Series

LCAE

70-028

71-009

Series

LCAD

70-029

71-010

Series

LCAH

70-030

71-011

Series

LCAZ

70-031

71-012

Series

LCAS

70-032

71-013

IBC WÄLZLAGER GMBH

More of IBC . . .

Company Profile

**Product Range
Super Precision Bearings**
T1-I-5000.0 / D (German)
T1-I-5000.0 / E (English)
T1-I-5000.0 / I (Italian)

**Product Range
Price List**
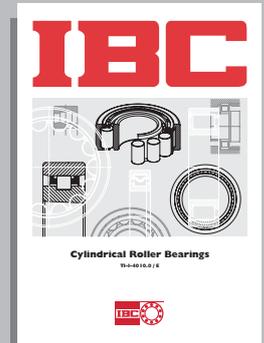
**Cylindrical Roller
Bearings**
T1-I-4010.0 / D (German)
T1-I-4010.0 / E (English)
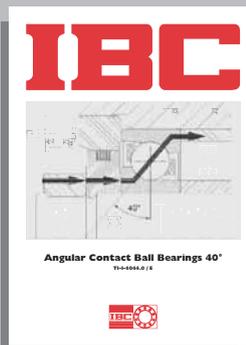
**Angular Contact Ball
Bearings 40°**
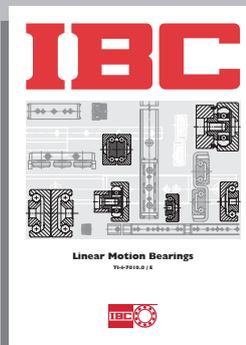T1-I-4044.0 / D (German)
T1-I-4044.0 / E (English)
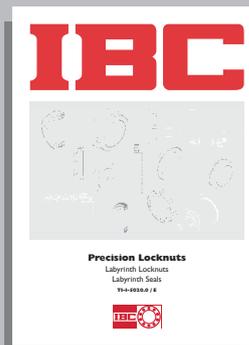
Precision Locknuts

T1-I-5020.0 / D (German)
T1-I-5020.0 / E (English)
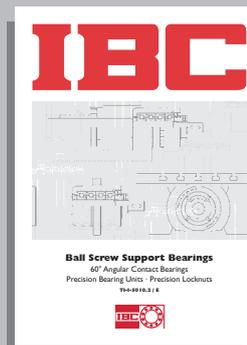
**Ball Screw Support
Bearings**
T1-I-5010.2 / D (German)
T1-I-5010.2 / E (English)

**Super Precision Bearings
Service Catalog**
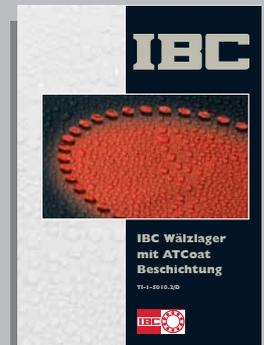T1-I-5003.1 / D (German)
T1-I-5003.2 / E (English)

**Product Range
Linear Motion Bearings**
T1-I-7010.0 / D (German)
T1-I-7010.0 / E (English)

Telescopic-Rails

T1-I-7005.1 / D (German)

Linear Motion Bearings

TI-I-7001.3 / D (German)
TI-I-7001.3 / E (English)

ATCoated Bearings

TI-I-5010.2 / D (German)

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