SIBRE

SIBRE – the world of industrial brakes

CRANE WHEELS

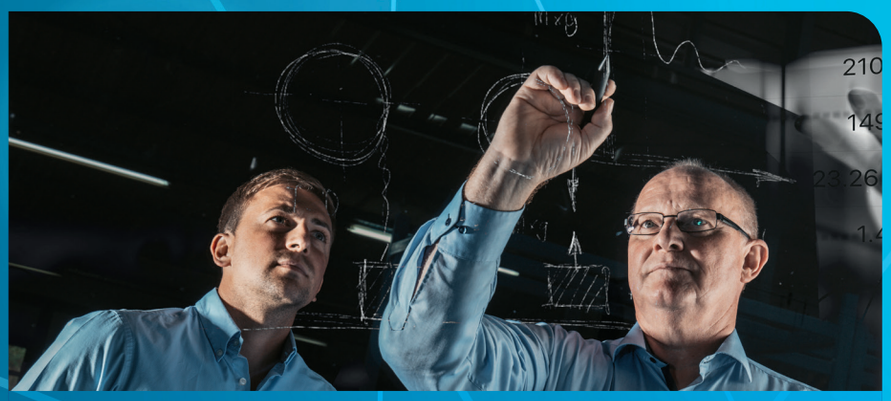
SIBRE -

The SIBRE Siegerland Bremsen GmbH is a worldwide operating, medium-sized company of traditions with meanwhile over 60 years of company history.

From the very first the company engages in the development and production of brake systems for the industry. Right from the start value was set on technical innovation, the most modern manufacturing technology and high customer use. Production procedures are continuously supervised by a quality management system.

The aim of the product development is an optimum combination of a top-quality product, the easiest use and market-driven price both for plant engineers and plant operators.

the world of industrial brakes



CONCEPTION

With a Team of experienced engineers and service technicians we have the knowledge to stand behind our slogan "Sure to be Safe". Through this knowledge and experience the SIBRE Team has a complete understanding of Braking System requirements, and the consequences of an inferior or flawed product. SIBRE has the flexibility to design, build, and test in our own facility, allowing free thinking ideas and concepts to be realized.

ENGINEERING

Based on the collective decades of experience, our engineers, technicians, and input from our customers, the SIBRE R & D department, can develop, manufacture and test products heavy industry can rely on. Using state of the art software and the latest innovative hardware, the SIBRE Team can achieve optimal products. From innovative concepts to detailed construction plans, our R & D department consistently develops reliable SIBRE Products.

PRODUCTION

With a well-trained, long-standing team, and a newly expanded modern production hall, SIBRE is producing quality. From individual components and parts to final assembly, SIBRE stands firm on sustainable product quality.

QUALITY

Being ISO 9001 certified, SIBRE is guaranteeing the highest quality of each individual part and the entire brake assembly. With the most currently available measuring and testing equipment, the SIBRE Team has the capability to check for raw material properties and dimensional accuracy, on each critical component. These capabilities ensure the functional reliability customers have come to depend on from SIBRE.

from **conception** to **high quality** brakes

INTERNATIONAL PRESENCE

With 11 offices strategically placed on all continents, SIBRE is truly a renowned Global Player.

We pride ourselves in being a reliable partner for safety relevant components. Through our well-established sales and service locations, we have created solid cooperation, that often exceed customer expectations. Among the industries we support, Container and Material Handling, Mining and Metals, Forestry, Oil and Gas, Wastewater Treatment, Movable Bridges, and Hydropower to name a few, SIBRE's well-situated locations allow for responsive action to serve our customers.

CONCEPTION & ENGINEERING

for **innovative** brake-systems

CONCEPTION

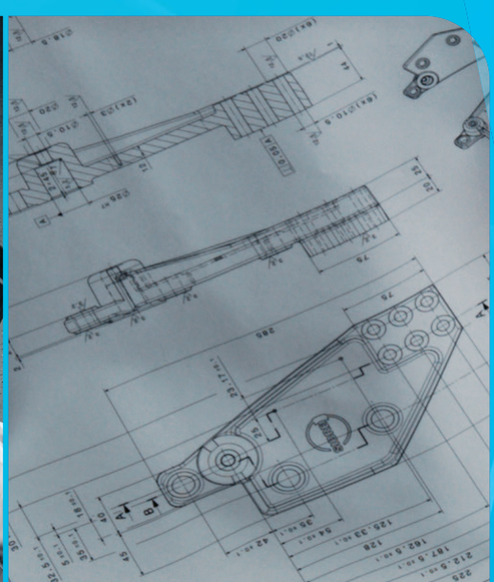
Sure to Be Safe. The SIBRE slogan and motto.

Realizing People's lives depend on the safest working environments, in some of the most inhospitable places, the SIBRE Team is consistently discussing, consulting, analyzing, and verifying ideas to create new components and systems.

Sure to Be Safe. The lives of real people depend on it.

This ever-flowing conversation is not just an internal practice; we actively seek input from industry. We engage industry leaders, engineering and consulting firms, and the all-important persons responsible for maintaining equipment.

These cooperative discussions create a true partnership between manufacturer and user. The ability of our product developers to engage dynamic thinkers allow the best possible solutions.



ENGINEERING

Implementing ideas and concepts belong to the dynamic engineering team at SIBRE.

This energizing team is always on the mission to safeguard people and equipment. The redesigning of our products is as important as bringing to life new concepts.

With the availability of the most modern hardware and software the engineering team has made the tried and true SIBRE range more efficient and maintenance friendly.

This dynamic group of engineers is an important part of SIBRE being a global supplier in the world of industrial brakes, couplings and crane wheels.

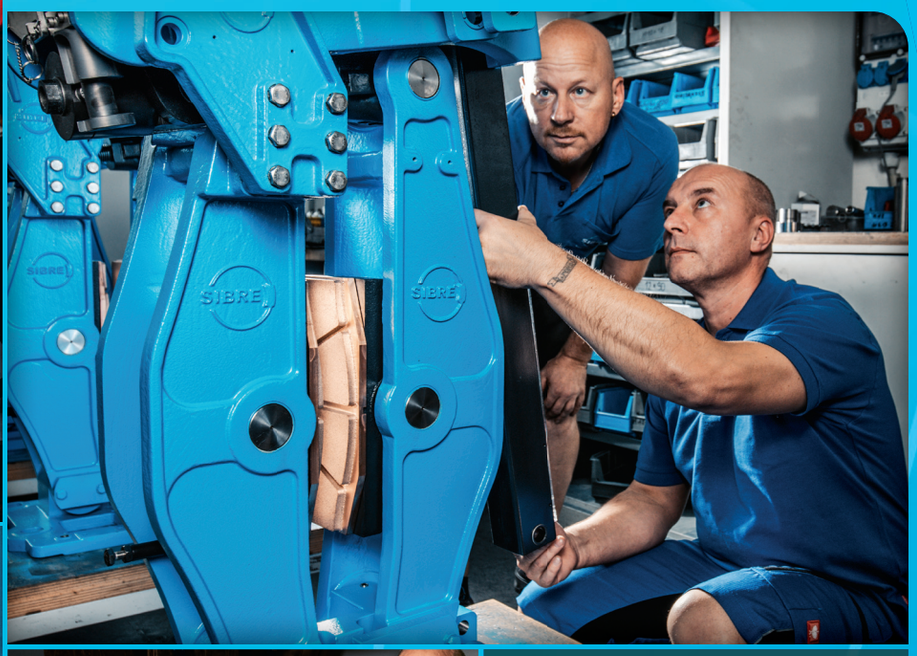
Made in Germany, standing behind the heritage of German Engineering.

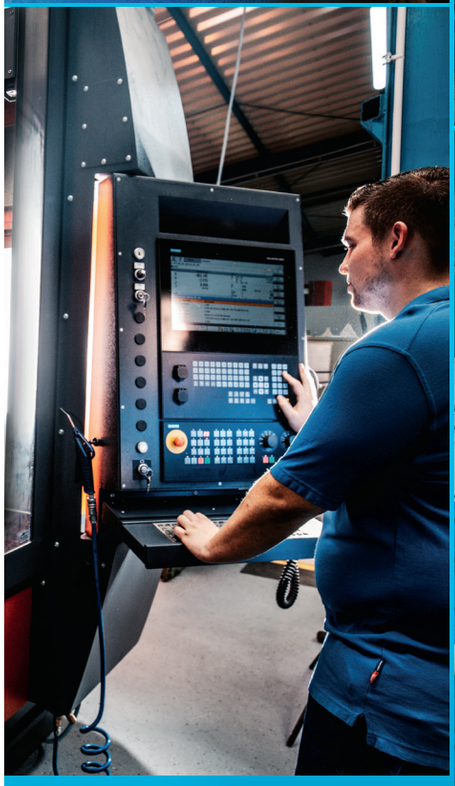
PRODUCTION & QUALITY

made in **Germany**

PRODUCTION

With a steadily expanding product offering, the extending global network of offices and activities, so to the SIBRE production facilities grow. Our machining facility in Haiger/Germany and our assembly plant, just up the road in Eschenburg/Germany, have also been growing. Both facilities have seen significant modernization and expansion to accommodate the demand for highly engineered integral products. Since 2018 several new lines have been installed. Our central production plant located in Haiger, Germany boasts several state-of-the-art CNC machines. These additions allow for tighter control of production and faster response times to customer requirements. This growth has afforded SIBRE the honor of being a good steward to our local communities, and continuing the solid reputation Made in Germany has been known for the world over for.





QUALITY

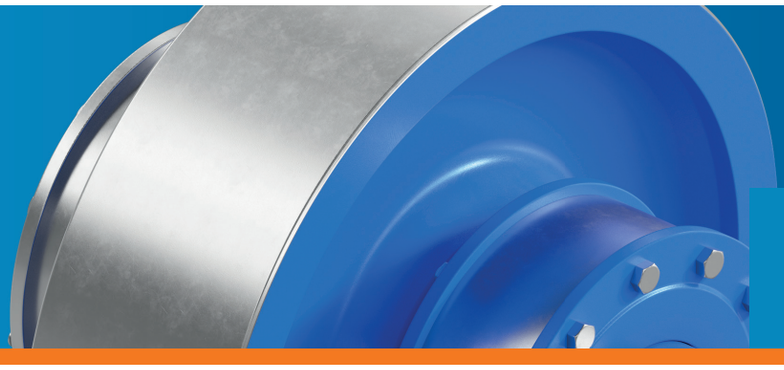
High-quality, reliable braking systems and drive components require a consistent quality standard.

With our internal development and simulation laboratory, both individual components and fully assembled systems are put through their paces.

In addition to function and load simulation, we also focus on checking, reaction times, material properties and dimensional accuracy.

SIBRE quality
– made in Germany

CRANE WHEEL SYSTEMS



CRANE WHEEL SYSTEMS

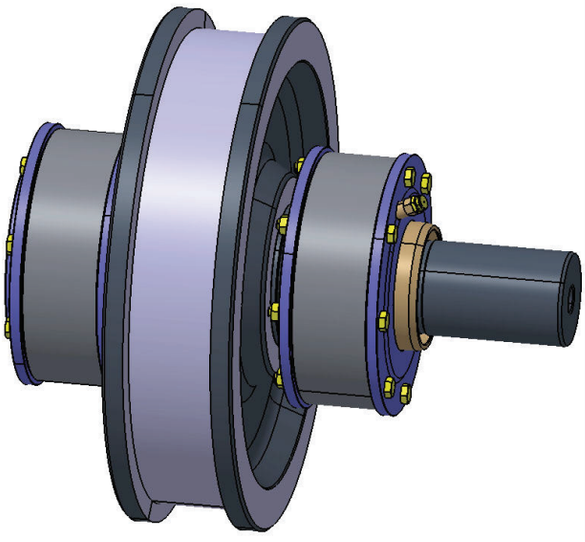
GENERAL

Wheels are machine-components with load bearing function.
When selecting wheels and their material quality, a broad variety of options is available.
Our production portfolio includes separate wheels of diameter 315 to 1000 mm as well as complete wheel assemblies similar to DIN, as per customer drawing or as design proposal approved by our customer.
SIBRE standard wheels are made of forged cylinders of material 42CrMo4V. For particularly high demands the wheels can be deep-hardened for reduced tread-wear.

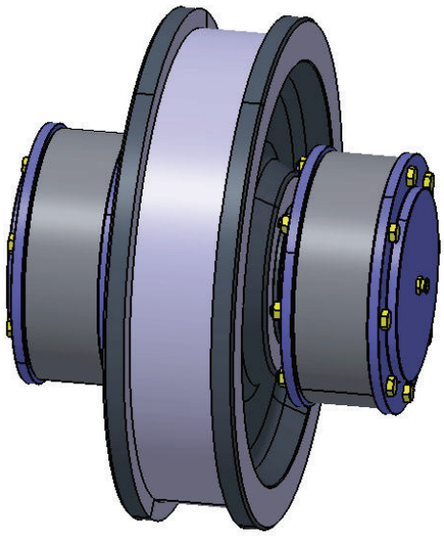
APPLICATIONS

- Gantry Travel Drives
- Trolley Travel Drives
- Slewing Drives
- etc.

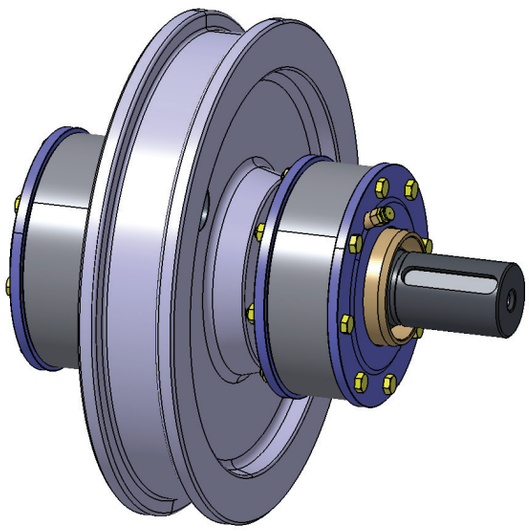
DRIVEN- AND NON-DRIVEN ASSEMBLIES WITH ROLLER BEARING SIMILAR TO DIN 15090



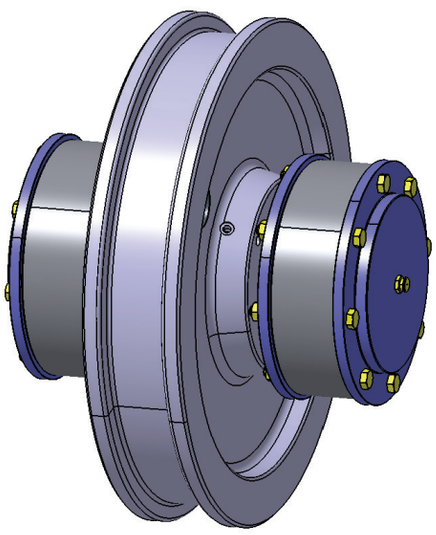
Driven Wheel Assembly:
T- BHKE 500x90 Z 100x152 – 222



Non-Driven Wheel Assembly:
M- BHKE 500x90 – 222



Driven Wheel Assembly:
T- SHKD 500x90 P 90x132



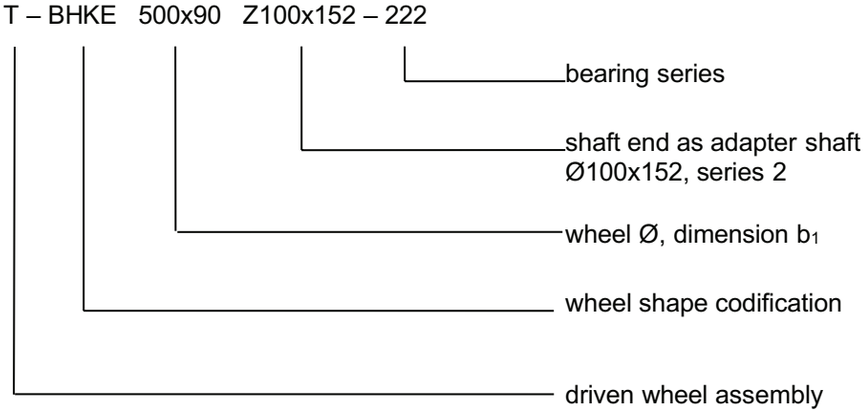
Non-Driven Wheel Assembly:
M- SHKD 500x90 – 222

WHEEL SHAPE CODIFICATION

Code	Meaning
S	narrow wheel
B	wide wheel
H	wheel with flanges
G	wheel without flanges
K	wheel without rim
D	with oil-pressure interference fit assembly
E	without oil-pressure interference fit assembly

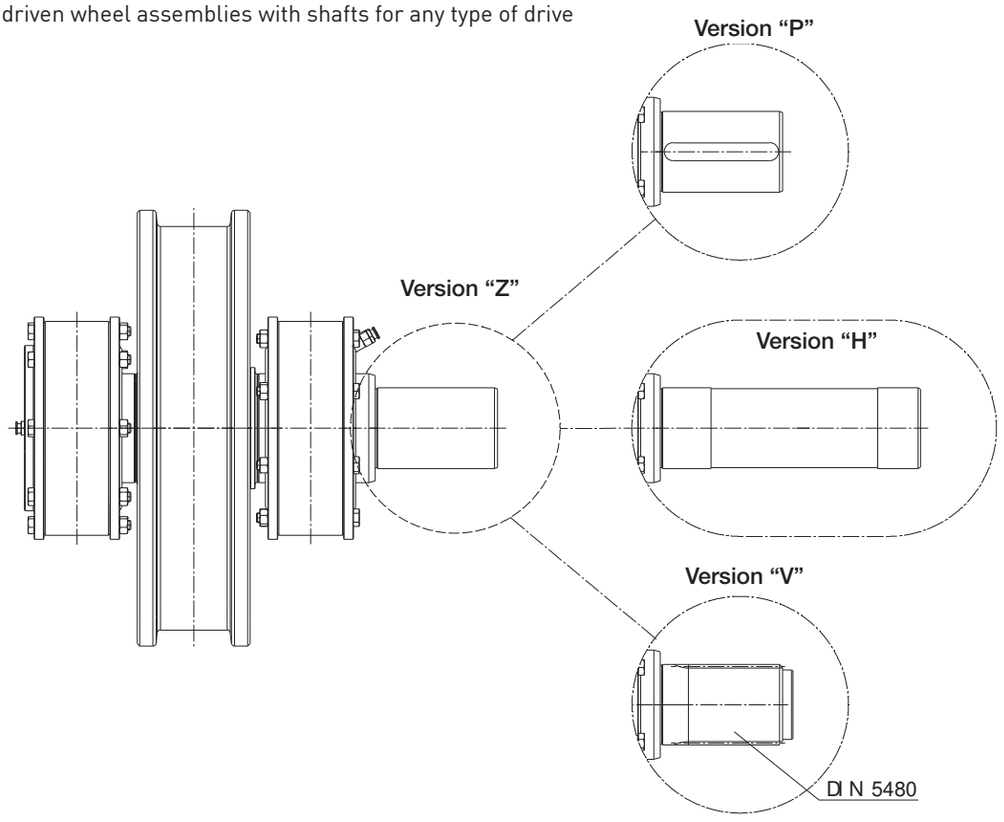
CODIFICATION OF WHEELS

T – BHKE 500x90 Z100x152 – 222



SHAFT TYPES OF DRIVEN WHEEL ASSEMBLIES

We supply driven wheel assemblies with shafts for any type of drive



pict. 5

• with connecting shaft resp. coupling hub	type Z
• with key-way acc. DIN 6885 T1	type P
• with gearing acc. DIN 5480	type V
• with extended shaft for slide on gear box with shrink disc	type H

SELECTION PARAMETER

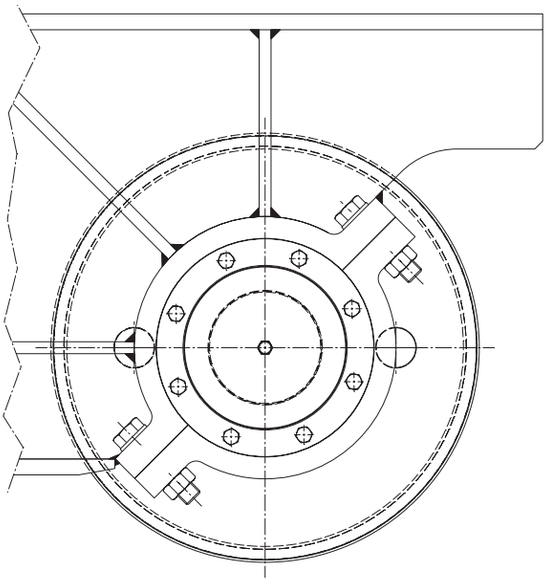
For an optimum selection, the folling parameter must be indicated by the customer

- wheel load
- rail profile and material
- travelling speed, rotation speed
- life expectiation
- ambient conditions
- available assembly dimensions
- wheel shape “B” (wide), “S” (narrow)
- type of shaft end for drive wheel assemblies

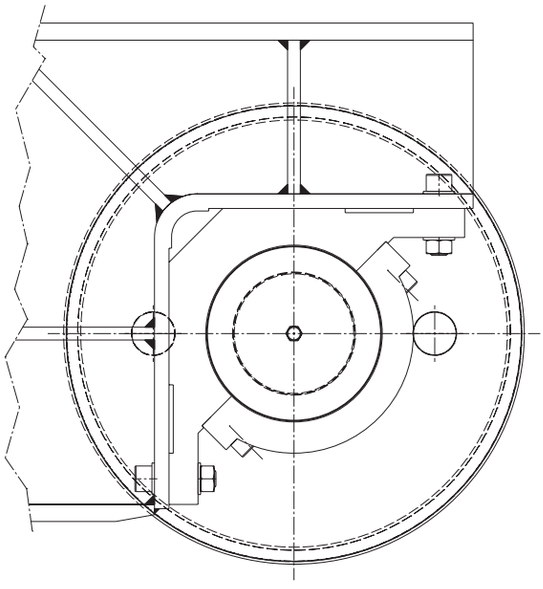
Wheel calculation is made acc. to DIN 15070 and the bearing calculation is made acc. to DIN 15071. Correlation of wheel profile and rail is selected acc. to DIN 15072.

SUPPORT OF WHEEL ASSEMBLIES

In parallel to the wheel assemblies with 45° split support (pict. 6), we can also supply driven- and non-driven wheel assemblies with rectangular split support (pict. 7) similar to TGL 34968.

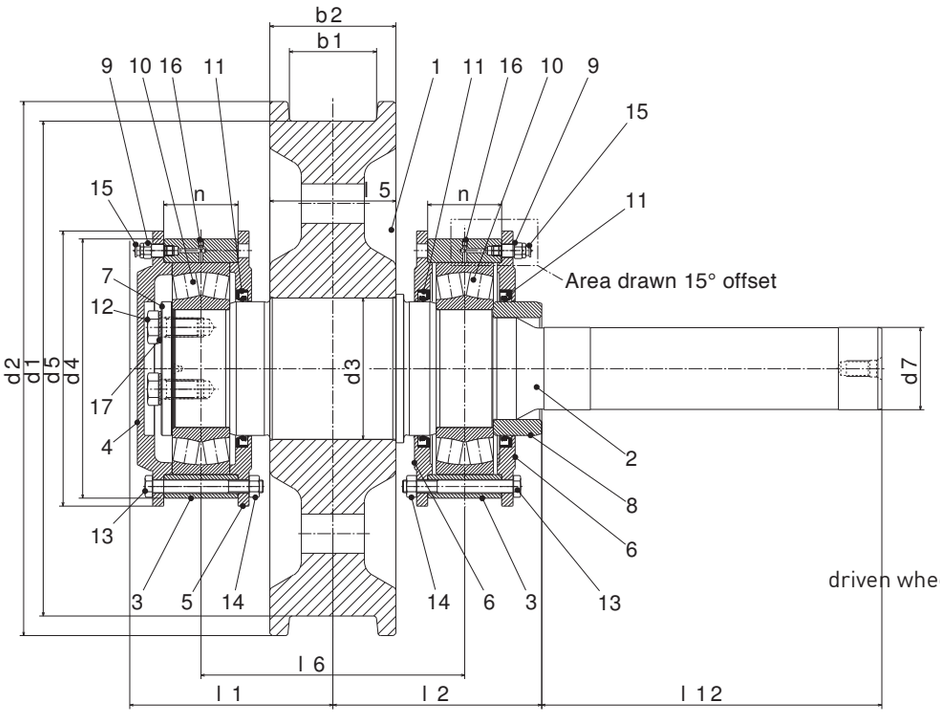


45° split support

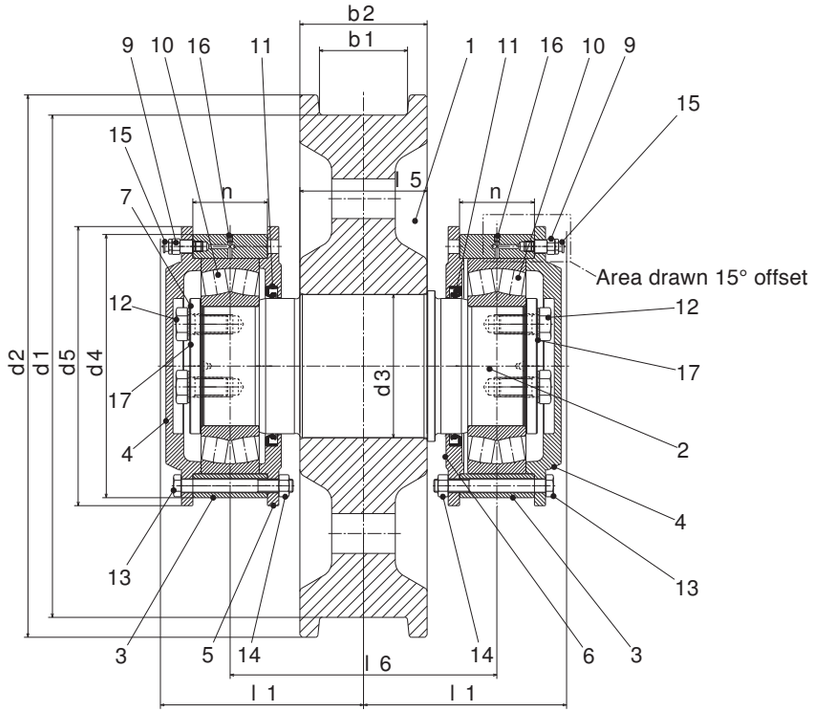


rectangular split support

DIMENSIONS AND NOMENCLATURE OF WHEEL ASSEMBLIES



driven wheel assembly type T-BHKE



non-driven wheel type M-BHKE

CRANE WHEEL SYSTEMS

DIMENSIONS AND NOMENCLATURE OF WHEEL ASSEMBLIES

d1 h9	dimensions and shape for wheels								l1 ≈	l6	n +0,15 +0,05	Roller bearings acc. DIN 635-2	dim´s. only for driven wheel assemblies				
	Form 1)	b12)	b26)	d2	d33)	d4 h7	d5	l56)					l2	d74)	l12	d74)	l12
														series1		series 25)	
315	S	45-55	90	350	110	210	220	110	171	235	62	222 18	185	-	-	70	105
	B	55-65	110		120	230	240		173			222 20	190	70	105	80	120
400	S	55-65	110	440	120	230	240	140	188	265	62	222 20	205	70	105	80	120
	B	70-90	140		130	250	260		202	280	72	222 22	215	80	120	90	132
500	S	55-65	110	540	130	250	260	140	202	280	72	222 22	215	80	120	90	132
	B	70-90	140		140	265	275		210	290	82	222 24	225			100	152
630	S	65-75	120	680	160	290	305	150	237	325	94	222 26	250	-	-	100	152
	B	80-110	160		180	330	345	160	245	335		222 30	265	100	152	110	
710	S	75-90	140	760	170	310	325	180	249	350	94	222 28	260	100	152	110	152
	B	95-160	210		190	350	365	210	278	395	104	222 32	300	110		130	172
800	S	75-90	140	850	180	330	345	180	255	355	94	222 30	275	110	152	120	172
	B	95-160	210		200	370	385	210	289	405	114	222 34	310	130	172	140	202
900	S	75-90	140	950	190	350	365	190	268	375	104	222 32	290	-	-	130	172
	B	95-160	210		230	420	435	210	315	430	134	222 40	335	140	202	160	202
1000	S	75-90	140	1050	200	370	385	190	279	385	114	222 34	300	-	-	140	202
	B	95-160	210		250	480	500	210	332	450	146	222 44	355	160	202	180	252

1) S = narrow wheel B = wide wheel
2) dimension for track gauge b1 when ordering please advise
3) interference fit of wheel and shaft; H7 / u6
4) tolerance for d7 acc. to DIN 15091.
5) series 2 is in accordance with cardan shaft classification acc. to DIN 15450.
6) for wheel shape S dimensions b2 and l5 are not identical

APPROX. WEIGHTS OF DRIVEN- & NON-DRIVEN WHEEL ASSEMBLIES

1) S = narrow wheel B = wide wheel.
2) weight calculation is based on series 2 of shaft ends, without connecting flange resp. coupling disc, referring to max. b1. Indicated weights are approx. figures and are supposed to provide an orientation.
   The actual weight depends on the selected version and the selected manufacturing process.
3) see codification

series 222

d1 h9	Wheel shape1)	weight2) = in kgs			
		driven3)		non-driven3)	
		HK	GK	HK	GK
315	S	100	-	95	-
	B	150	-	145	-
400	S	155	-	150	-
	B	230	220	220	210
500	S	215	-	205	-
	B	315	300	305	290
630	S	360	-	345	-
	B	560	530	540	515
710	S	475	-	460	-
	B	820	780	790	755
800	S	580	-	560	-
	B	1010	960	975	930
900	S	700	-	675	-
	B	1310	1240	1260	1220
1000	S	865	-	835	-
	B	1680	1590	1610	1570

PARTS LIST FOR DRIVEN-& NON-DRIVEN WHEEL ASSEMBLIES

Pos. No.	Nomenclature	quantities for wheel- Ød1																														material / DIN
		Driven Wheel ass'y																Non-driven wheel ass'y														
		315		400		500		630		710		800		900		1000		315		400		500		630		710		800		900		1000	
		S	B	S	B	S	B	S	B	S	B	S	B	S	B	S	B	S	B	S	B	S	B	S	B	S	B	S	B	S	B	
1	wheel	1																1														42CrMo4V
2	wheel shaft	1																1														42CrMo4V
3	bearing frame	2																1														St 52-3
4	cover	1																2														St 52-3
5	cover	1																2														St 52-3
6	cover	1																1														St 52-3
7	shaft washer	1																1														St 52-3
8	wheel bushing	1																□														C 45
9	nipple adapter	2																2														9SMn28K
10	spherical roller bearing	2																2														222 SNR premier
11	shaft sealing	3																2														NBR
12	hexagon screw	3																6														DIN 933-8.8 VZ
13	hexagon screw	16		16		16		16		24	16	24		24		24		16		16		16		16		24	16	24		24		24	DIN 931-8.8 VZ
14	hexagon nut	16		16		16		16		24	16	24		24		24		16		16		16		16		24	16	24		24		24	DIN 934-8 VZ
15	grease nipple	2																2														DIN 3404 A2
16	grub screw	2																2														DIN 913-45H VZ
17	lock washer	3																6														B 53070 VZ

BASICS OF WHEEL ASSEMBLY CALCULATION (EXTRACT OF DIN 15070)

Calculation of wheels:

The wheel force is calculated acc. following formula:

$$R \le p_{zul} \cdot c_2 \cdot c_3 \cdot d_1 \cdot (k - 2\,r_1) \qquad (1)$$

The result is the wheel diameter:

$$d_1 = \frac{R}{p_{zul} \cdot c_2 \cdot c_3 \cdot (k - 2\,r_1)} \qquad (2)$$

R = wheel force [N]
k-2r = ideal usable width of rail head [mm]
p_{zul} = allowed compression between wheel and rail [N/mm²]
d_1 = diameter of wheel [mm]
c_2 = rotation speed factor [chart mating of materials]
c_3 = operating time factor [chart mating of materials]

The characteristic wheel force R_0 is the result of equation (1) if:

p_{zul} = 5,6 N/mm²
c_2 = 1
c_3 = 1

inserted to:

$$R_0 = 5{,}6 \cdot d_1 \cdot (k - 2\,r_1) \qquad (3)$$

R_0 = characteristic wheel force

By usage of characteristic wheel force the allowed wheel force can be calculated simplified by following formula

$$R \le R_0 \cdot c_1 \cdot c_2 \cdot c_3 \qquad (4)$$

For crane wheels:

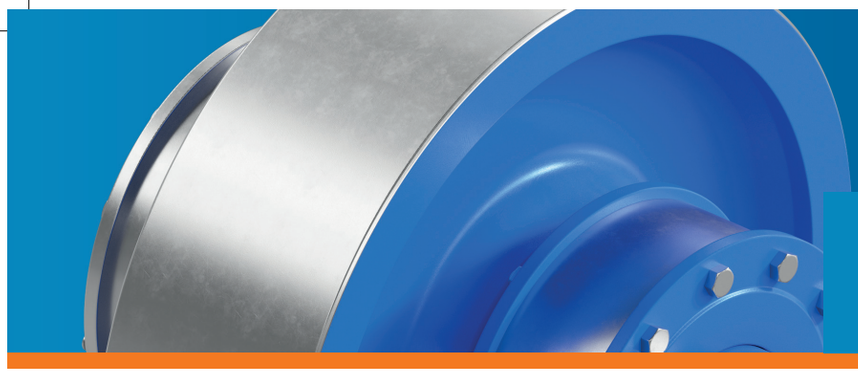
$$R = \frac{R_{min} + 2 \cdot R_{max}}{3} \qquad (5)$$

R_{max} = max wheel force [N]
R_{min} = min. wheel force [N]

For trolley wheels:

$$R = R_{max} \qquad (6)$$

R_{max} and R_{min} should be found by the frequent operating position of charged trolley.



MATING OF MATERIALS RAIL / WHEEL

allowed compression pzul and material- factor c1

material tensile strength at least N/mm²		pzul N/mm²	c1
rail	wheel		
590	330	2.8	0.5
	410	3.6	0.63
	490	4.5	0.8
	590	5.6	1.0
690	740	7.0	1.25
	800	7.2	1.29
	900	7.8	1.39
	1000	8.5	1.52

operating time- factor c3

Operating time of travel drive (referred to 1 hour)	ç
up to 16%	1.25
over 16 – 25%	1.12
over 25 – 40%	1
over 40 – 63%	0.9
over 65%	0.8

wheel - rotation speed - factor n, c2

n min-1	200	160	125	112	100	90	80	71	63	58	50	45	40	35.5	31.5
c2	0.66	0.7	0.77	0.79	0.82	0.84	0.87	0.89	0.91	0.92	0.94	0.96	0.97	0.99	1.0

wheel - rotation speed - factor n, c2

n min-1	28	25	22.4	20	18	16	14	12.5	11.2	10	8	6.3	5.6	5
c2	1.02	1.03	1.04	1.06	1.07	1.09	1.1	1.11	1.12	1.13	1.14	1.15	1.16	1.17

CHARACTERISTIC WHEEL FORCE R0

Chart I

wheel-diameter d1 [mm]	R0 in N narrow wheel				R0 in N wide wheel				
	for crane rail:				for crane rail:				
	A 45	A 55	A 65	A 75	A 55	A 65	A 75	A 100	A 120
315	65000	-	-	-	79000	-	-	-	-
400	83000	101000	-	-	-	119000	132000	-	-
500	104000	126000	-	-	-	148000	165000	-	-
630	-	159000	187000	-	-	-	208000	282000	-
710	-	-	211000	235000	-	-	-	318000	398000
800	-	-	-	264000	-	-	-	358000	448000
900	-	-	-	297000	-	-	-	403000	504000
1000	-	-	-	330000	-	-	-	448000	560000

RECTIFIED NOMINAL LIFE TIME OF BEARINGS L10H IN HOURS [H]

Nominal characteristic- life time of bearings LKenn in hours [h] (calculatet with characteristic wheel forces R0 and the factors c1 = c2 = c3 = 1,0) for spherical roller bearings, type 222, SNR premium.

Chart II

wheel-diameter d1 [mm]	narrow wheel				wide wheel				
	for crane rail:				for crane rail:				
	A 45	A 55	A 65	A 75	A 55	A 65	A 75	A 100	A 120
315	336000	-	-	-	355000	-	-	-	-
400	297000	154000	-	-	-	215000	152000	-	-
500	330000	174000	-	-	-	155000	108000	-	-
630	-	210000	122000	-	-	-	218000	79000	-
710	-	-	119000	83000	-	-	-	83000	39000
800	-	-	-	95000	-	-	-	91000	43000
900	-	-	-	100000	-	-	-	135000	64000
1000	-	-	-	114000	-	-	-	183000	87000

The figures for bearing lifetime L Kenn as mentioned in chart II are based on characteristic wheel force R0 with factors c1 = c2 = c3 = 1,0 according DIN 15070.

Differing wheel forces and factors can be calculated simplified as follows:

Nominal life time of bearings:

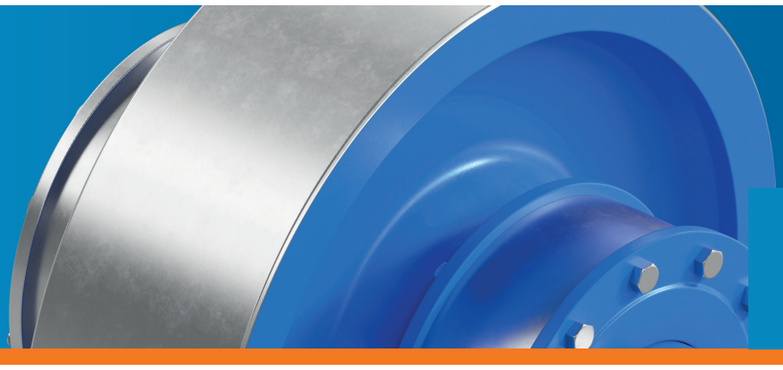
$$L_{10h} = L_{Kenn} \cdot \left(\frac{1}{c_{Ges}} \right)^{10/3} \cdot \frac{31{,}5}{n_{vorh}} \quad [h] \qquad (7)$$

L_{Kenn}: according Chart II [h]
n_{vorh}: existing rotation speed [min^{-1}]
C_{ges}: total factor

Based on given wheel force R and by usage of characteristic wheel force acc. DIN 15070, the total factor can be calculated simplified with following formula:

$$R \leq R_0 \cdot c_1 \cdot c_2 \cdot c_3 \leq R_0 \cdot c_{Ges} \qquad (8)$$

$$c_{Ges} = \frac{R}{R_0} \qquad (9)$$



EXAMPLE OF CALCULATION

- wheel diameter : d1 = 400 mm
- wheel type : B
- existing rail : A = 75
- average rotation speed : n vorh = 77 min-1
- max. wheel force : R max = 145 kN
- min. wheel force : R min = 45 kN

Wheel force:

$$R = \frac{R_{min} + 2 \cdot R_{max}}{3} \qquad (5)$$

$$R = \frac{45 + 2 \cdot 145}{3} = \underline{111{,}7 \text{ kW}}$$

Total factor:

$$c_{Ges} = \frac{R}{R_0} \qquad (6)$$

R_0 = 132 kN DIN 15070
wheel = Ø400 mm
crane rail = A 75

$$c_{Ges} = \frac{111{,}7}{132} = \underline{0{,}85}$$

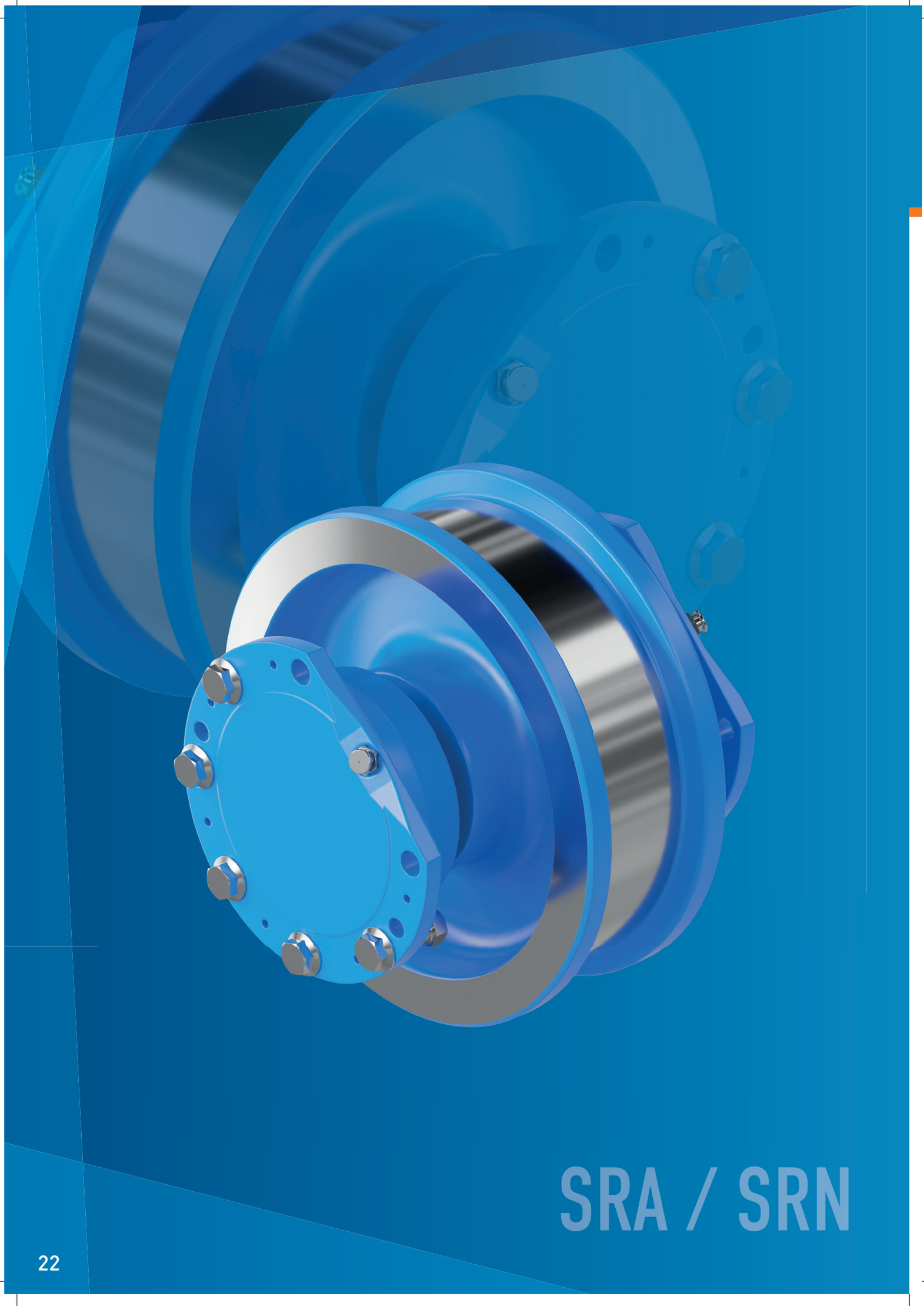
Nominal life time:

$$L_{10h} = L_{Kenn} \cdot \left(\frac{1}{c_{Ges}} \right)^{10/3} \cdot \frac{31{,}5}{n_{vorh}} \quad [h] \qquad (7)$$

L_{Kenn} = 152000 h [from chart II]

$$L_{10h} = 152000h \cdot \left(\frac{1}{0{,}85} \right)^{10/3} \cdot \frac{31{,}5}{77} =$$

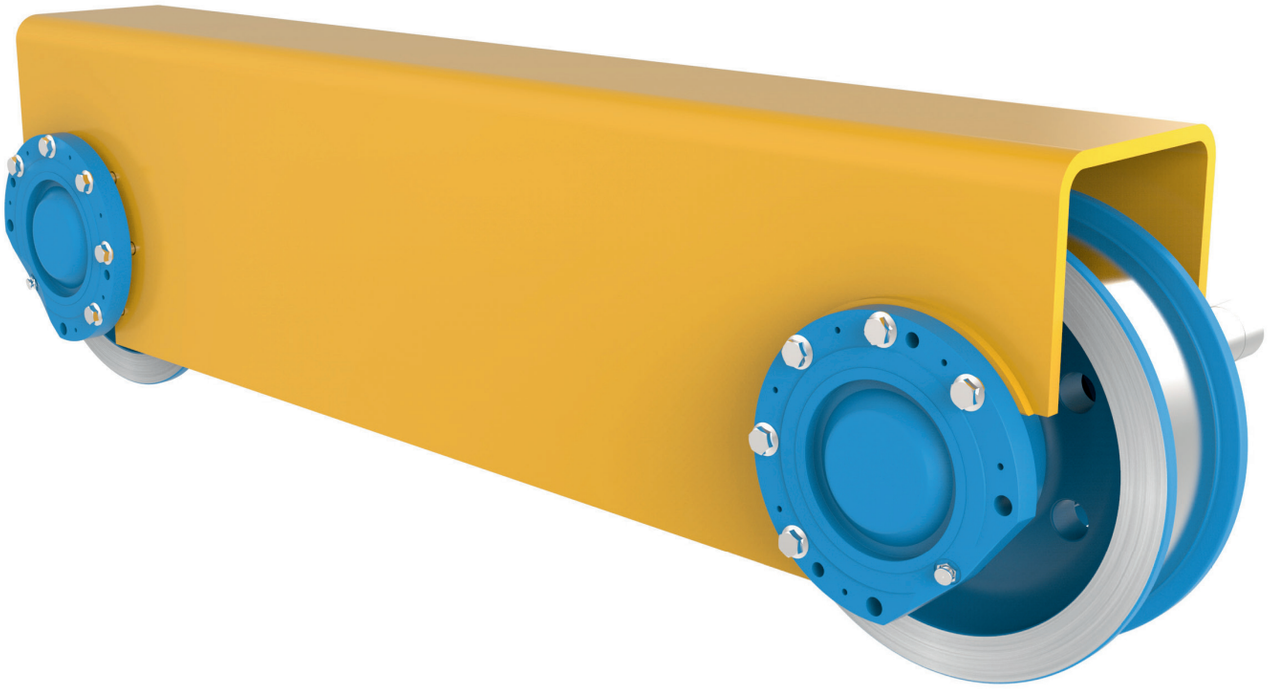
L_{10h} = 106800 h

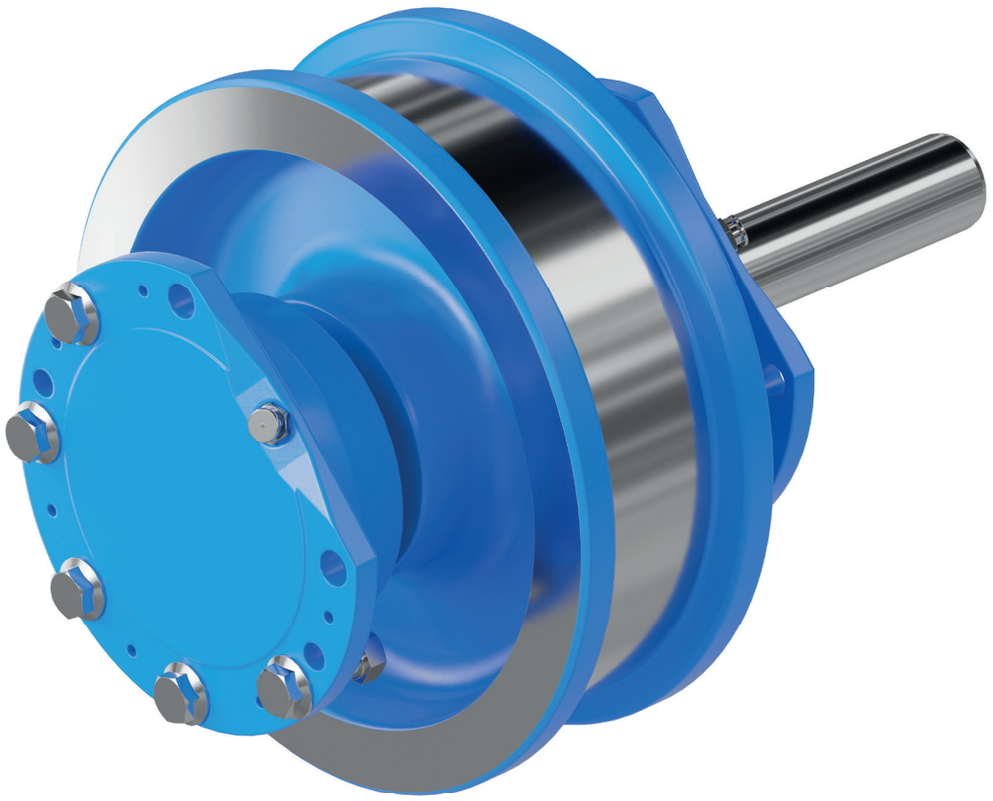


SRA / SRN

CRANE WHEEL SYSTEMS
SRA / SRN

M 1501 406 E-EN-2014-08





CRANE WHEEL SYSTEMS
SRA / SRN

M 1501 406 E-EN-2014-08

GENERAL

The crane wheel systems of the SRA / SRN series take over transport tasks in crane and chassis construction and can be used anywhere in track undercarriages in the materials handling. They are available as driven wheelsets SRA and non-driven wheelsets SRN.

CODIFICATION

SRAE 630 x 160 / 210 – 1 – FA 127 – H 105

SRNE 630 x 160 / 210 – 1

- End of drive shaft
  - W – Gear teeth DIN 5480
  - P – Feather key DIN 6885/1, Ø
  - H – Shrink disc, Ø
- Typ – Size of gearbox
- Mounting option (1, 2, 3, 4, 5)
- Width of wheel b2
- Cutout of wheel b1
- Size 315, 400, 500, 630
- SRAE SIBRE, wheelset, driven, corner hinge assembly
  SRAK SIBRE, wheelset, driven, box girder assembly
  SRAD SIBRE, wheelset, driven, direct mounting
  SRNE SIBRE, wheelset, non-driven, corner hinge assembly
  SRNK SIBRE, wheelset, non-driven, box girder assembly
  SRND SIBRE, Wheelset, Non-driven, Direkteinbau

DESIGN AND MOUNTING FEATURES

The wheelsets can be designed for corner hinge assembly, box girder assembly and direct mounting.
The type corner hinge assembly has proven advantageous by means of delivery of the fully assembled wheelset. The mounting and removal is carried out by directly removing the wheel / shaft unit in conjunction with a notched profil girder section at one corner.
This solution offers quick installation and removal of wheel sets and thus a highly available system. Wheelsets of type box girder assemly and direct mounting are delivered as single parts, thus the wheelset must not be dismantled for the mounting.
If the customer has profil girders with no possible machining of the bores of the flange bearing housing, it is possible to burn out the holes in the pofil girder. The centering of the flange bearing housings is taken by clamping pins DIN 1481. After the exact alignment of the wheelsets the holes for the clamping pins in the flange bearing housings and in the box girder are made jointly.
The flange connection thus can be released at any time and then be reassembled accurately.

TECHNICAL DETAILS

WHEELS

The wheels for the corner hinge assembly series are made out of nodular graphite cast iron GJS–700–2. The connection of wheel / impeller shaft is designed with a cylindrical interference fit assembly. The wheels for the box girder assembly respectively direct mounting are forged out of 42CrMo4QT. For size 315 the connection of wheel / impeller shaft is designed with a cylindrical feather key connection, sizes 400, 500 und 630 come along with a clamping set. If high wear is expected, for both materials the rolling surface and the wheel flange can be hardened. The hardening is used exclusively to minimize wear.

Roller bearing and temperature range

The wheelsets are float-mounted in the flange bearing housings respectively profil girders with spherical roller bearings. With additional shim rings per wheelset, the tolerance in the floating bearing can be adjusted from 0.1 up to 0.25 mm during assembly. By means of lubricating nipples in the flange bearing housings, the bearings can be lubricated. As lubricant a KP2K fat according to DIN 51502 or an equivalent quality lubricant has to be used. This standard lubricant is used in a temperature range of -20 C to +60 C.

Wheel shafts

The wheel shafts are made out of material 42CrM04QT. According to customer's specifications, the drive shafts can be designed with the
following alternative connections for shaft mounted gearboxes (all manufacturers) up to their max. allowed diameter:

- with feather key according to DIN 6885/1 (type P)
- for mountings with shrink discs (type H)
- with spline DIN 5480 (type W)
- extended with coupling and connecting shaft as central drive

Flange bearing housings

The flange bearings housings are made out of material GJS-500-7. In the standard version, the flange bearing housings will be bolted with locking bolts and screw nuts to the profil girder of the customer. If there are burnt out mounting holes, the flange bearings have to be additionally fixed with clamping pins during mounting. In this case, an exact alignment of the wheelsets is to make sure absolutely.

Compensation of span

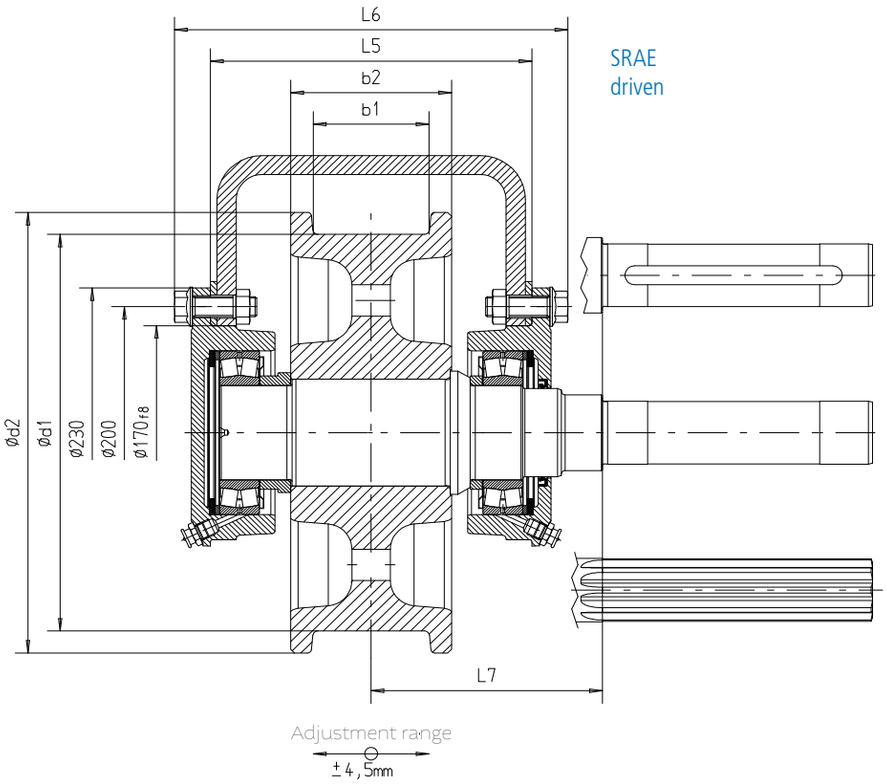
The span between the spherical roller bearings and locking rings in the flange bearing housings / girder construction can be modified by means of replaceable shim rings.

Wheelset SRA / SRN	Number and size of shim rings per wheelset	Max. adjustability
315	2 x 3,5 mm, 2 x 1,0 mm	± 4,5 mm
400	4 x 3,5 mm, 6 x 1,0 mm	± 10 mm
500	4 x 3,5 mm, 6 x 1,0 mm	± 10 mm
630	4 x 3,5 mm, 10 x 1,0 mm	± 12 mm

TYPES OF MOUNTING

Variation	Type of mounting	Centering of flange	Delivery of wheelset
1	corner hinge assembly	Machined	Complete
2	corner hinge assembly	Flame-cutted	Complete (with additional clamping pins for fixing)
3	box girder assembly (Hollow profile)	Machined	single parts
4	box girder assembly (Hollow profile)	Flame-cutted	single parts (with additional clamping pins for fixing)
5	Directly mounted in machined steel structure or flange bearing housing	-	single parts

WHEELSET SRAE / SRNE 315 (CORNER HINGE ASSEMBLY) OPTION 1 AND 2

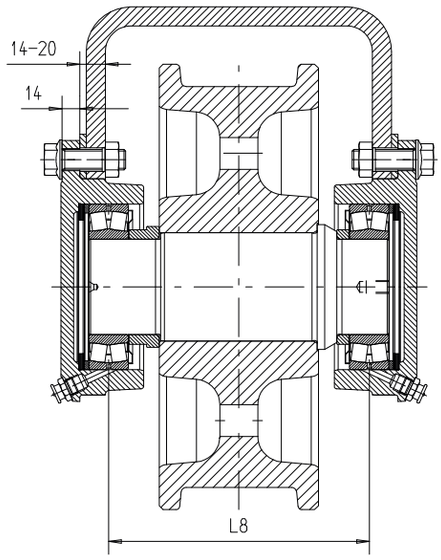


With key acc. DIN 6885/1
Design P Ø ...

For shrink disc
Design H Ø ...

With gear teeth acc. DIN 5480
Design W Ø ...

Specify manufacturer of gear and size when ordering!

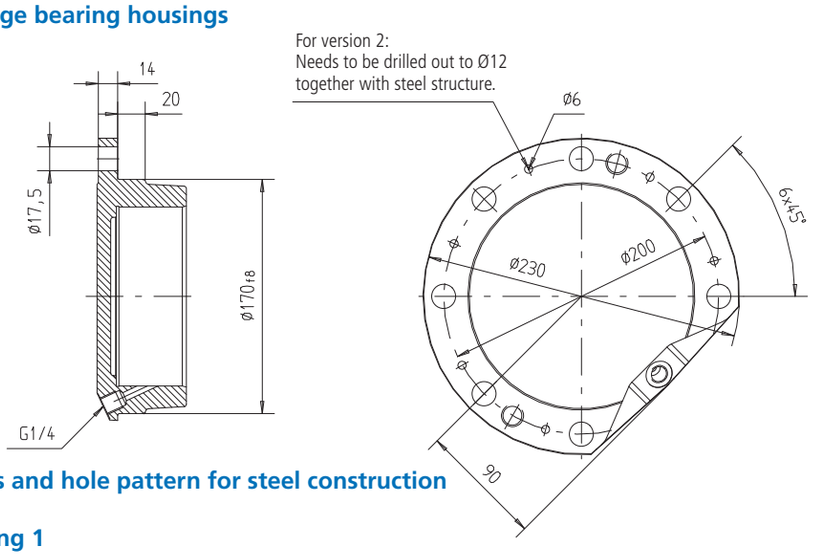


SRNE
non-driven

ø d1 h9	b1	b2	ø d2	L5	L6	L7[1] Standard	L8	Roller bearing	Drive shaft max. ø	Weight kg [2]	
										SRAE	SRNE
315	max. 90	125	350	250	306	180	205	22215	70	80	75

1) Other dimensions on request
2) Depending on type of wheel

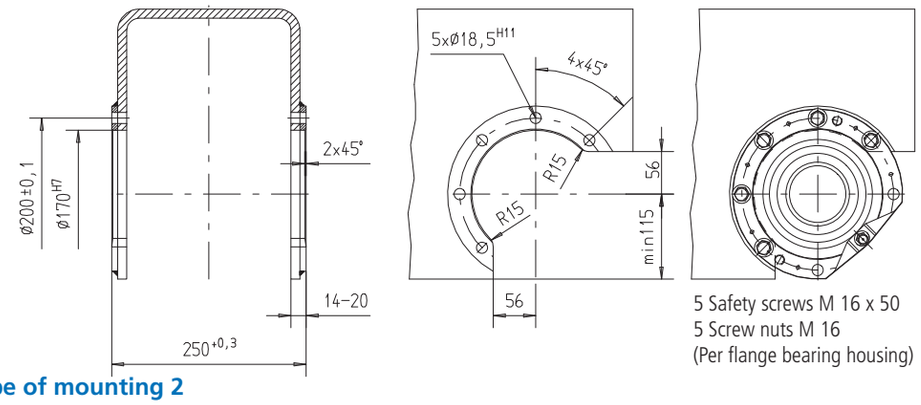
Design of the flange bearing housings



Fitting dimensions and hole pattern for steel construction

a) Type of mounting 1

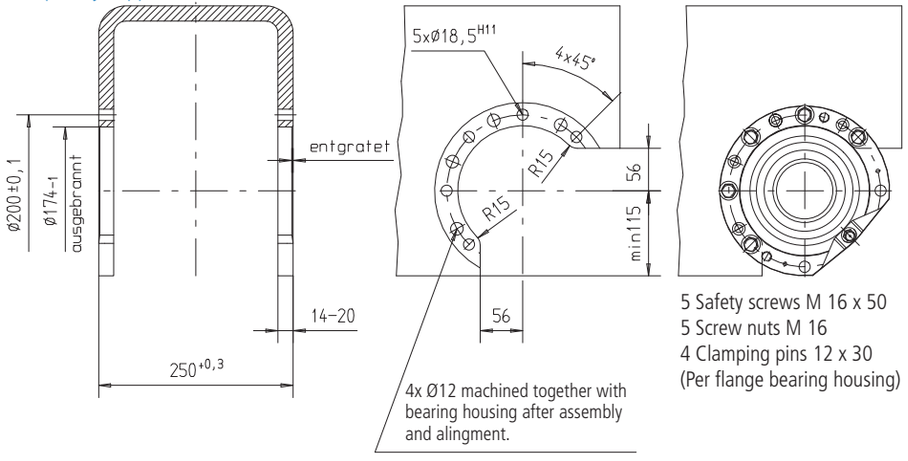
Corner hinge assembly
Machined centering of flange
Wheelset completely supplied



5 Safety screws M 16 x 50
5 Screw nuts M 16
(Per flange bearing housing)

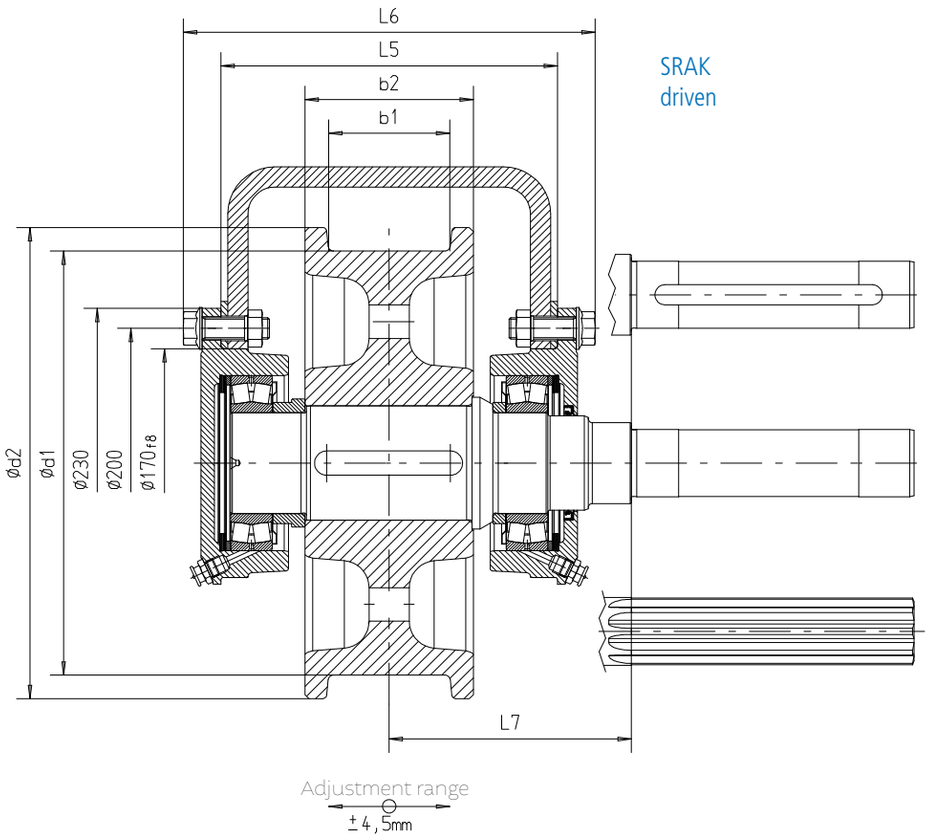
b) Type of mounting 2

Corner hinge assembly
Flame-cutted centering of flange
Wheelset completely supplied



5 Safety screws M 16 x 50
5 Screw nuts M 16
4 Clamping pins 12 x 30
(Per flange bearing housing)

WHEELSET SRAK / SRNK 315 (BOX GIRDER ASSEMBLY) OPTION 3 AND 4



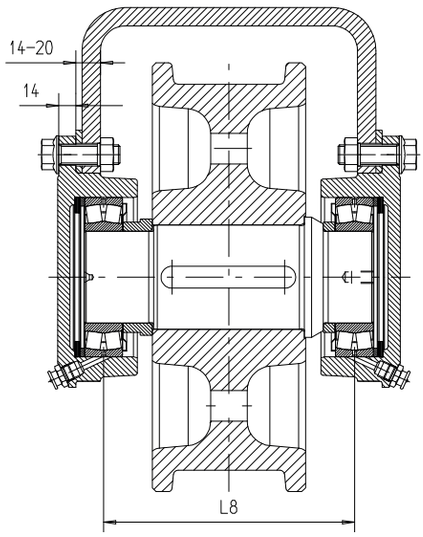
SRAK
driven

With feather key acc. DIN 6885/1
Design P Ø ...

For shrink disc
Design H Ø ...

With gear teeth acc. DIN 5480
Design W ...

Specify manufacturer of gear and size when ordering!

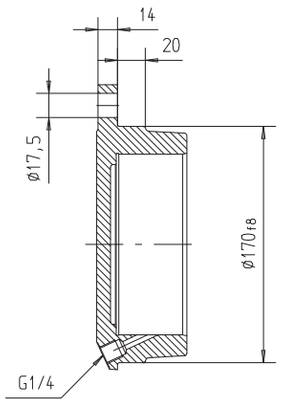


SRNK
non-driven

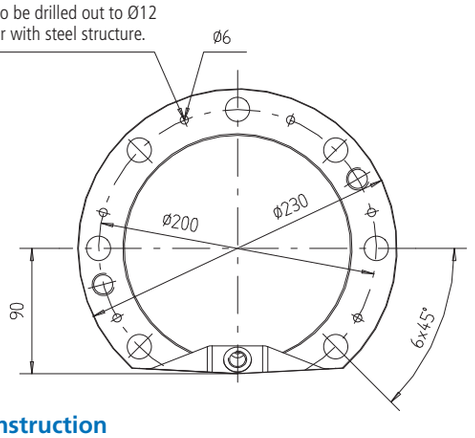
ø d1 h9	b1	b2	ø d2	L5	L6	L7[1] Standard	L8	Roller bearing	Drive shaft max. ø	Weight kg [2]	
										SRAK	SRNK
315	max. 90	125	350	250	306	180	205	22215	70	80	75

1) Other dimensions on request
2) Depending on type of wheel

Design of the flange bearing housings



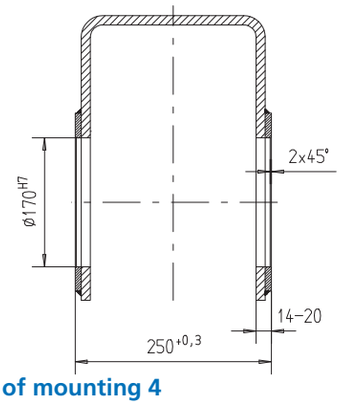
For version 2:
Needs to be drilled out to Ø12
together with steel structure.

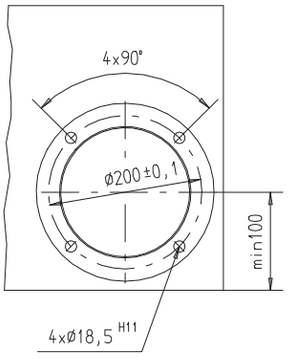


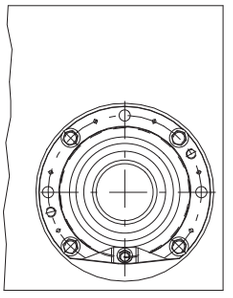
Fitting dimensions and hole pattern for steel construction

a) Type of mounting 3

Box girder assembly (Hohlprofil)
Machined centering of flange
Wheelset is delivered in single parts



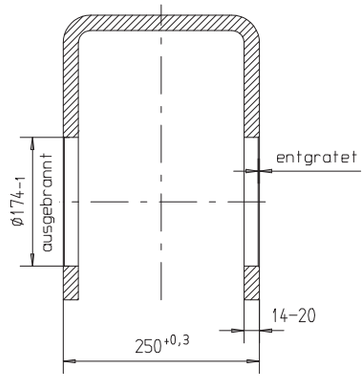


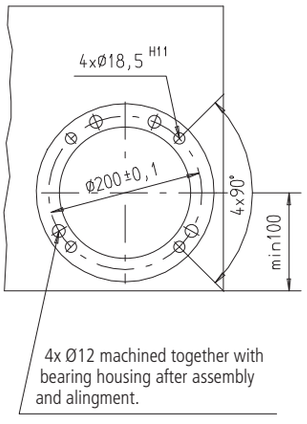


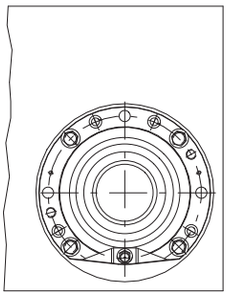
4 Safety screws M 16 x 50
4 Screw nuts M 16
(Per flange bearing housing)

b) Type of mounting 4

Box girder assembly (Hohlprofil)
Flame-cutted centering of flange
Wheelset is delivered in single parts

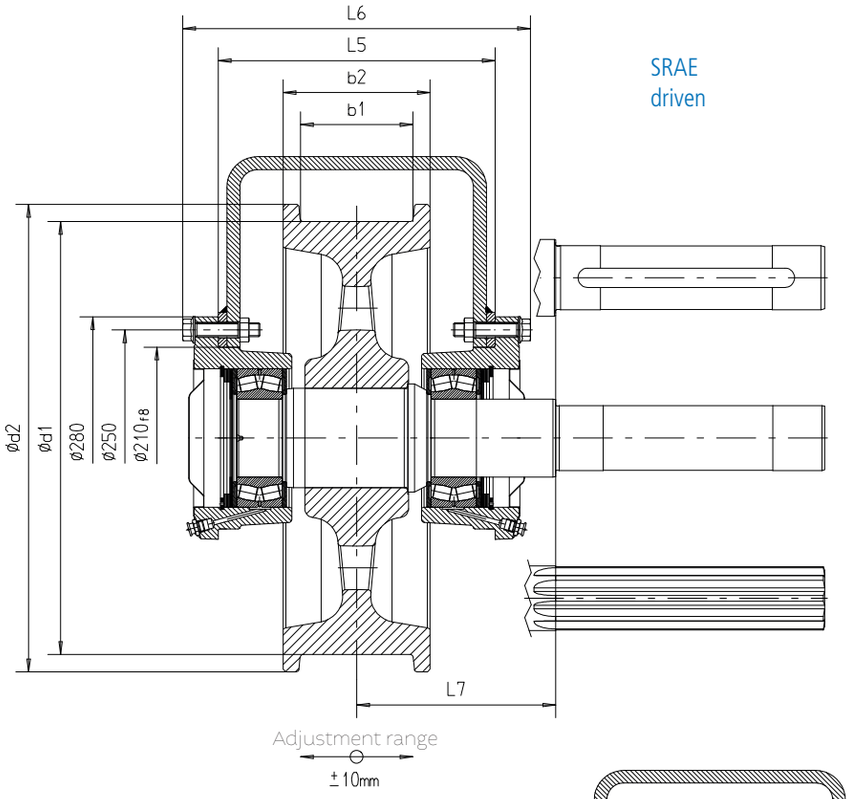






4 Safety screws M 16 x 50
4 Screw nuts M 16
4 Clamping pins 12 x 30
(Per flange bearing housing)

WHEELSET SRAE / SRNE 400 & 500 (CORNER HINGE ASSEMBLY) OPTION 1 AND 2

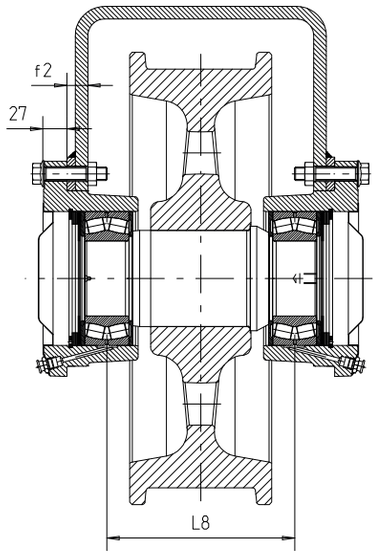


With feather key acc. DIN 6885/1
Design P Ø ...

For shrink disc
Design H Ø ...

With gear teeth acc. DIN 5480
Design W ...

Specify manufacturer of gear and size when ordering!

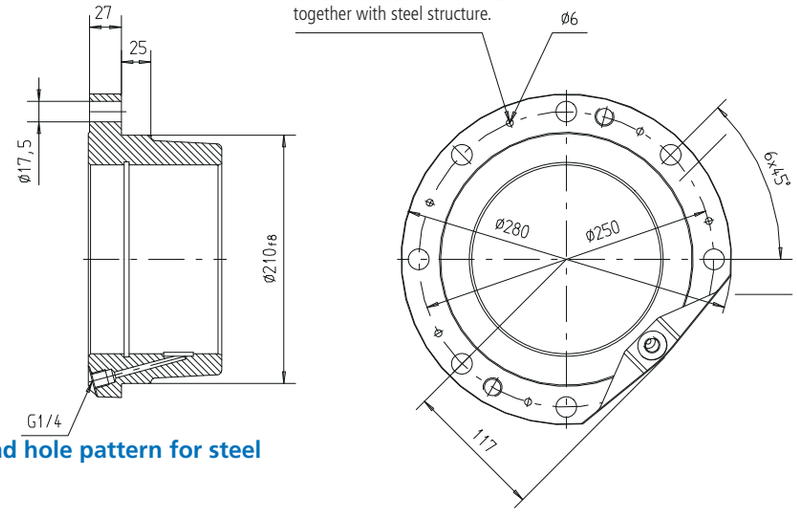


SRNE
non-driven

ø d1 h9	b1	b2	ø d2	f2	L5	L6	L7[1] Standard	L8	Roller bearing	Drive shaft max. ø	Weight kg[2]	
											SRAE	SRNE
400	60 - 90	125	440	15 - 32	280	362	210	182	22315	75	136	126
	85 - 105	140									142	132
500	60 - 100	140	540	20 - 32	320	402	230	224,6	23218	90	195	180
	95 - 130	170									209	193

1) Other dimensions on request
2) Depending on type of wheel

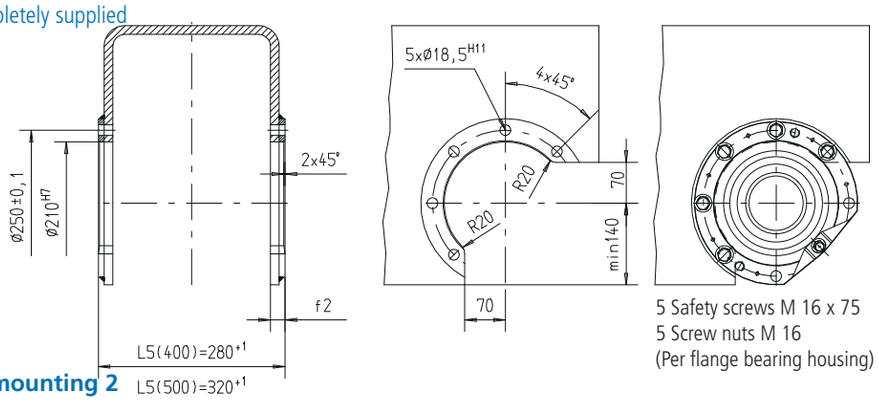
Design of the flange bearing housings



Fitting dimensions and hole pattern for steel construction

a) Type of mounting 1

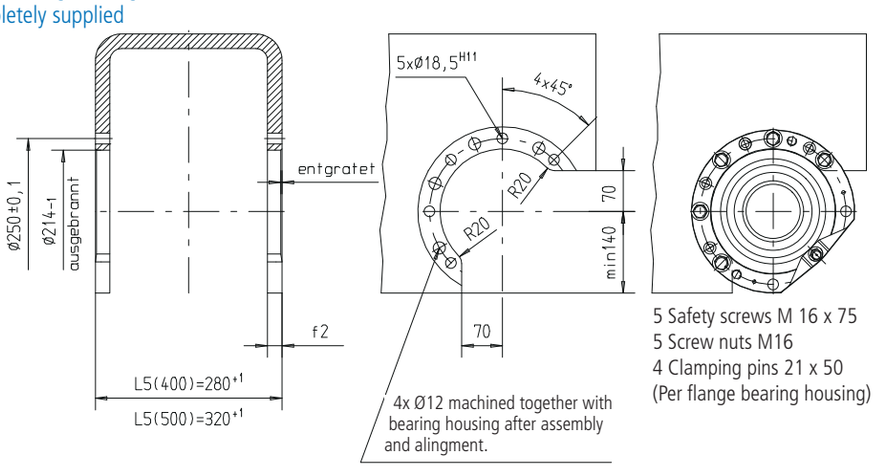
Corner hinge assembly
Machined centering of flange
Wheelset completely supplied



5 Safety screws M 16 x 75
5 Screw nuts M 16
(Per flange bearing housing)

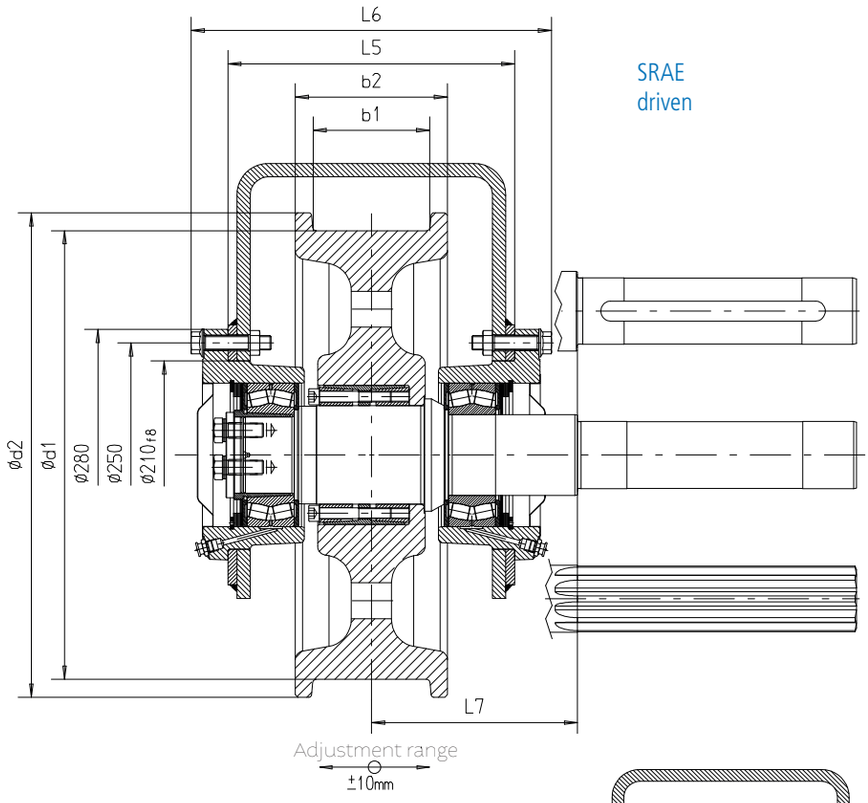
b) Type of mounting 2

Corner hinge assembly
Flame-cutted centering of flange
Wheelset completely supplied



5 Safety screws M 16 x 75
5 Screw nuts M16
4 Clamping pins 21 x 50
(Per flange bearing housing)

WHEELSET SRAK / SRNK 400 & 500 (BOX GIRDER ASSEMBLY) OPTION 3 AND 4

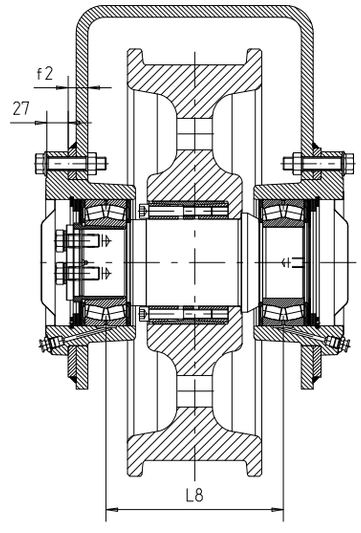


With feather key acc. DIN 6885/1
Design P Ø ...

For shrink disc
Design H Ø ...

With gear teeth acc. DIN 5480
Design W ...

Specify manufacturer of gear box and size when ordering!

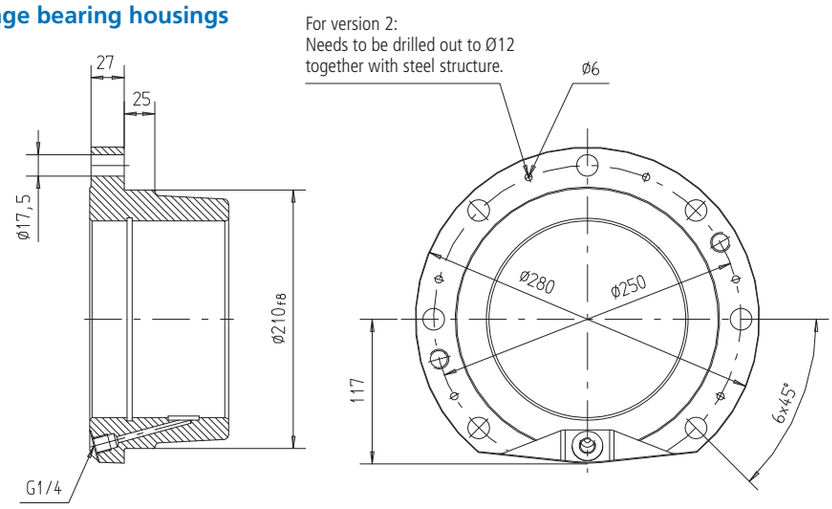


SRNE
non-driven

ø d1 h9	b1	b2	ø d2	f2	L5	L6	L7[1] Standard	L8	Roller bearing	Drive shaft max. ø	Weight kg[2]	
											SRAE	SRNE
400	60 - 90	125	440	15 - 32	280	362	210	182	22315	75	138	128
	85 - 105	140							22315 [3]		145	135
500	60 - 100	140	540	20 - 32	320	402	230	224,6	23218	90	210	196
	95 - 130	170							23218 [3]		224	208

1) Other dimensions on request
2) Depending on type of wheel
3) Spherical roller bearing with extractor sleeve. A special forcing nut is needed for dismounting of the wheelset.

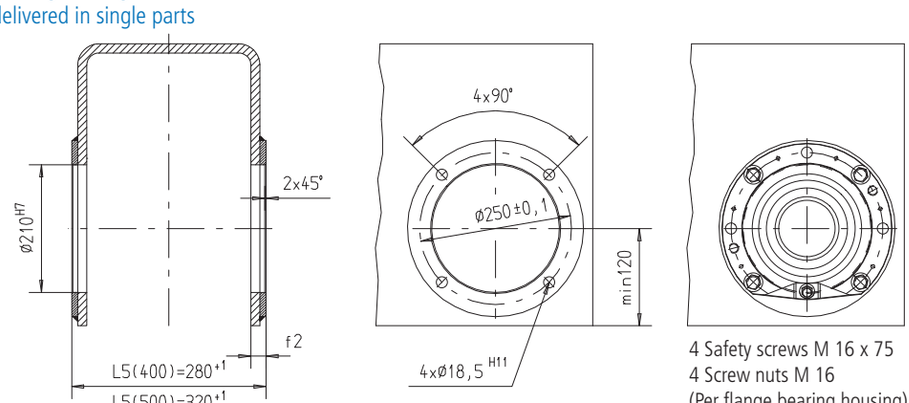
Design of the flange bearing housings



Fitting dimensions and hole pattern for steel construction

a) Type of mounting 3

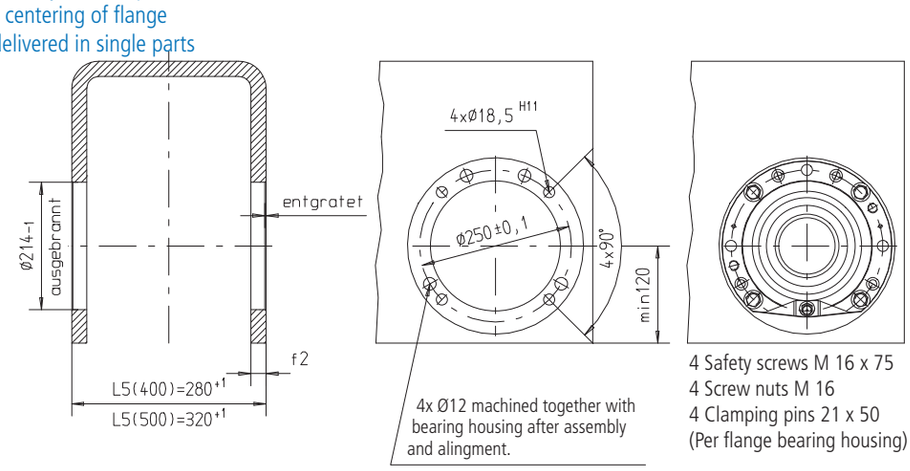
Box girder assembly (Hollow profile)
Machined centering of flange
Wheelset is delivered in single parts



4 Safety screws M 16 x 75
4 Screw nuts M 16
(Per flange bearing housing)

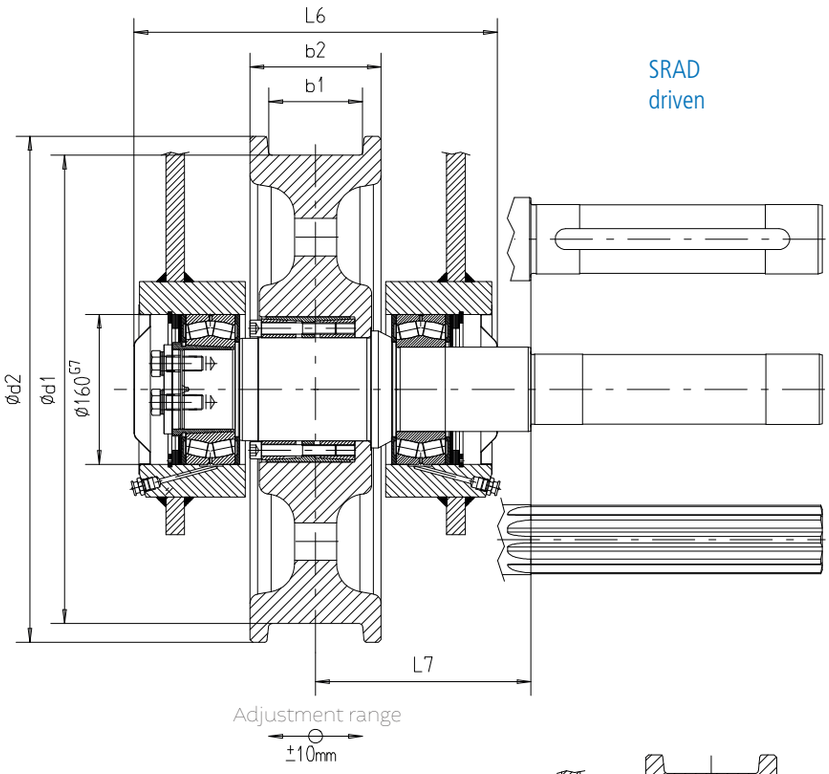
b) Type of mounting 4

Box girder assembly (Hollow profile)
Flame-cutted centering of flange
Wheelset is delivered in single parts



4 Safety screws M 16 x 75
4 Screw nuts M 16
4 Clamping pins 21 x 50
(Per flange bearing housing)

WHEELSET SRAD / SRND 500 (DIRECT MOUNTING) OPTION 5



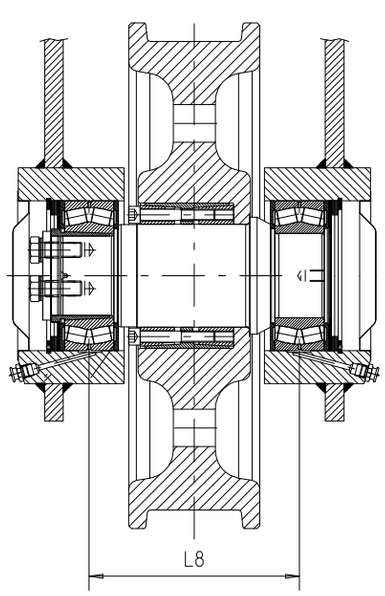
SRAD
driven

With feather key acc. DIN 6885/1
Design P Ø ...

For shrink disc
Design H Ø ...

With gear teeth acc. DIN 5480
Design W ...

Specify manufacturer of gear box
and size when ordering!



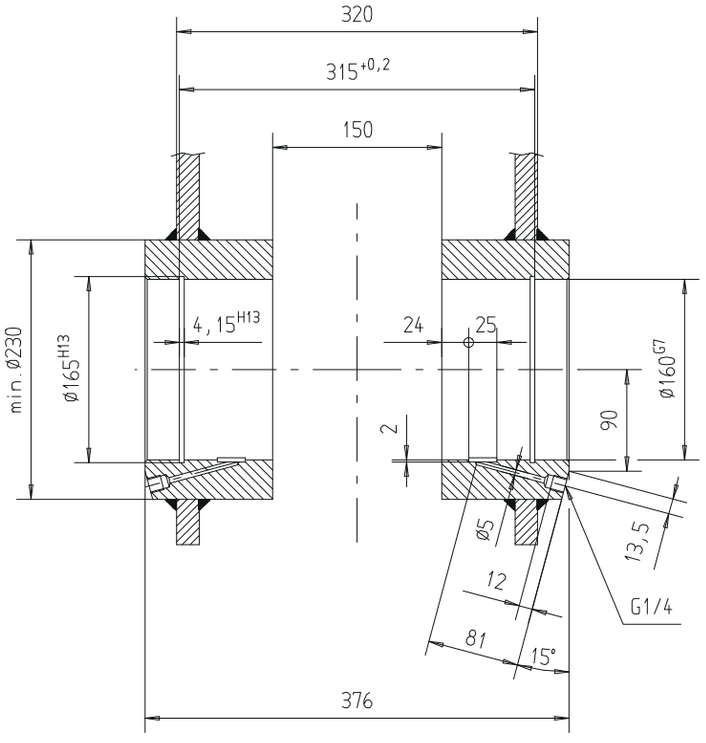
SRND
non-driven

ø d1 h9	b1	b2	ø d2	L6	L7[1] Standard	L8	Roller bearing	Drive shaft max. ø	Weight kg [2]	
									SRAD	SRND
500	60 - 100	140	540	388	230	224,6	23218	90	176	160
							23218 [3]			

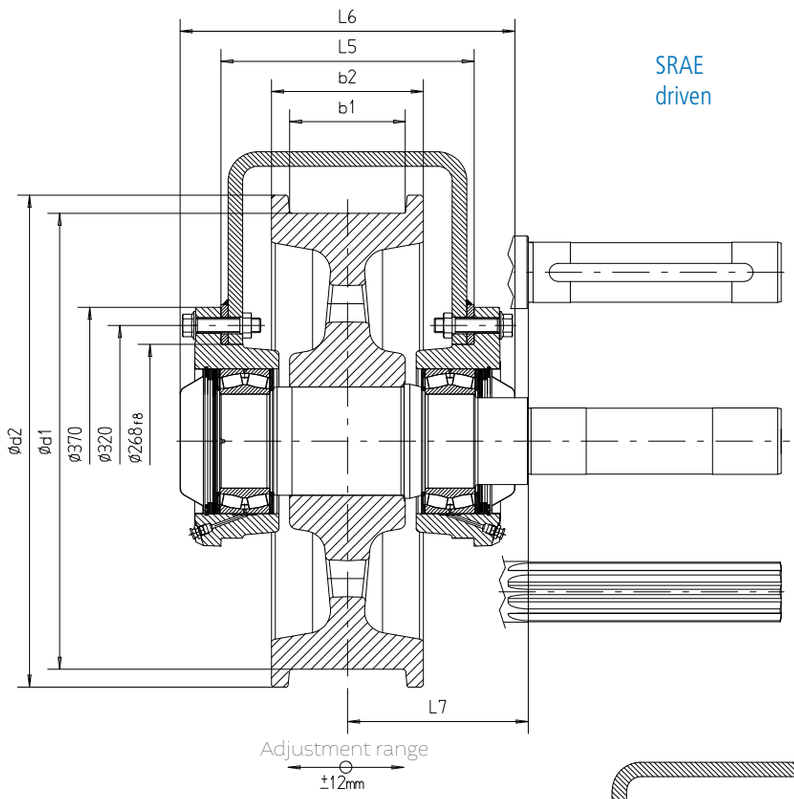
1) Other dimensions on request
2) Depending on type of wheel
3) Spherical roller bearing with extractor sleeve. A special forcing nut is needed for dismounting of the wheelset.

Fitting dimensions for the steel construction

Machined and welded bushings
Wheelset is delivered in single parts
(Incl. 2 locking rings J160 DIN 472)



WHEELSET SRAE / SRNE 630 (CORNER HINGE ASSEMBLY) OPTION 1 UND 2



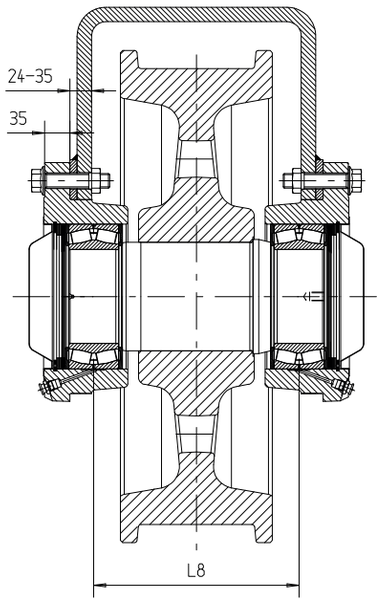
SRAE
driven

With feather key acc. DIN 6885/1
Design P Ø ...

For shrink disc
Design H Ø ...

With gear teeth acc. DIN 5480
Design W ...

Specify manufacturer of gear box and size when ordering!

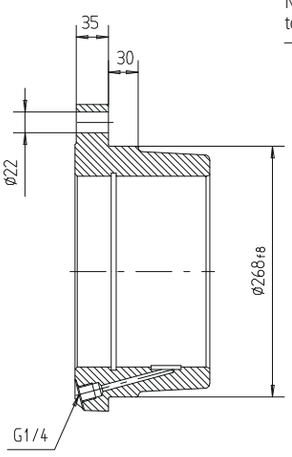


SRNE
non-driven

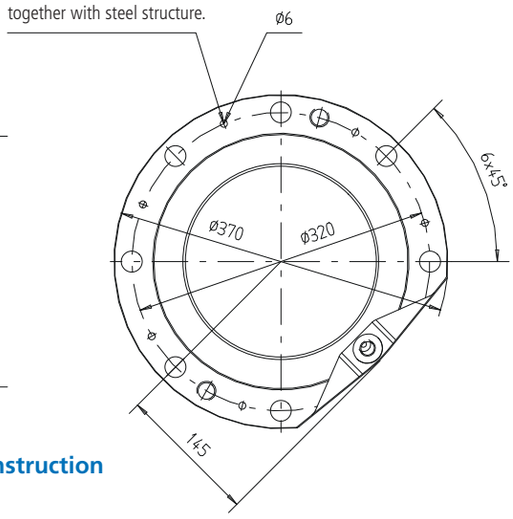
ø d1 h9	b1	b2	ø d2	L5	L6	L7[1] Standard	L8	Roller bearing	Drive shaft max. ø	Weight kg[2]	
										SRAE	SRNE
630	75 - 130	170	680	350	463	250	284	24026	130	385	345
	100 - 160	210								415	375

1) Other dimensions on request
2) Depending on type of wheel

Design of the flange bearing housings



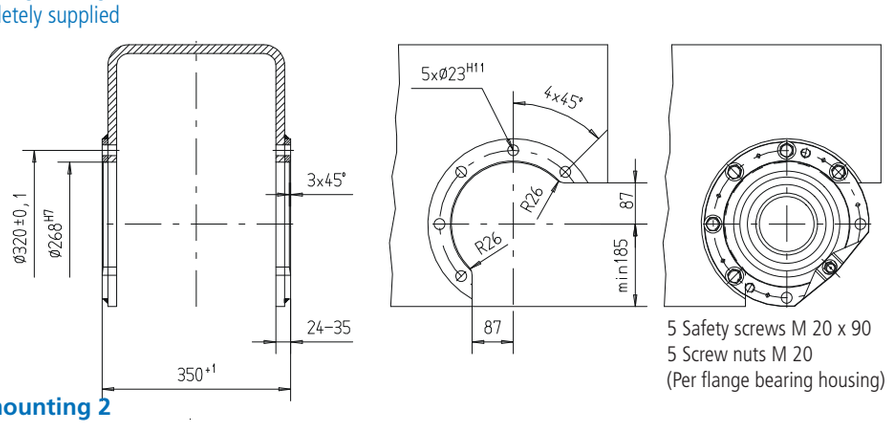
For version 2:
Needs to be drilled out to Ø12
together with steel structure.



Fitting dimensions and hole pattern for steel construction

a) Type of mounting 1

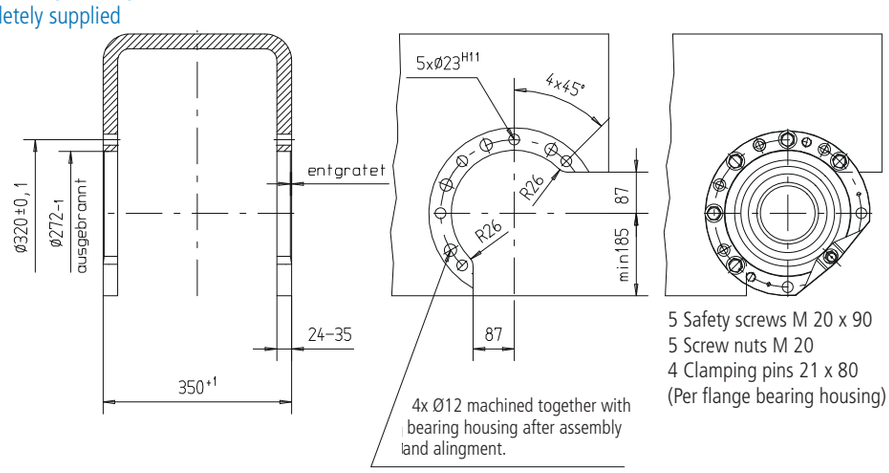
Corner hinge assembly
Machined centering of flange
Wheelset completely supplied



5 Safety screws M 20 x 90
5 Screw nuts M 20
(Per flange bearing housing)

b) Type of mounting 2

Corner hinge assembly
Flame-cutted centering of flange
Wheelset completely supplied



5 Safety screws M 20 x 90
5 Screw nuts M 20
4 Clamping pins 21 x 80
(Per flange bearing housing)

4x Ø12 machined together with bearing housing after assembly and alingment.

CRANE WHEEL SYSTEMS
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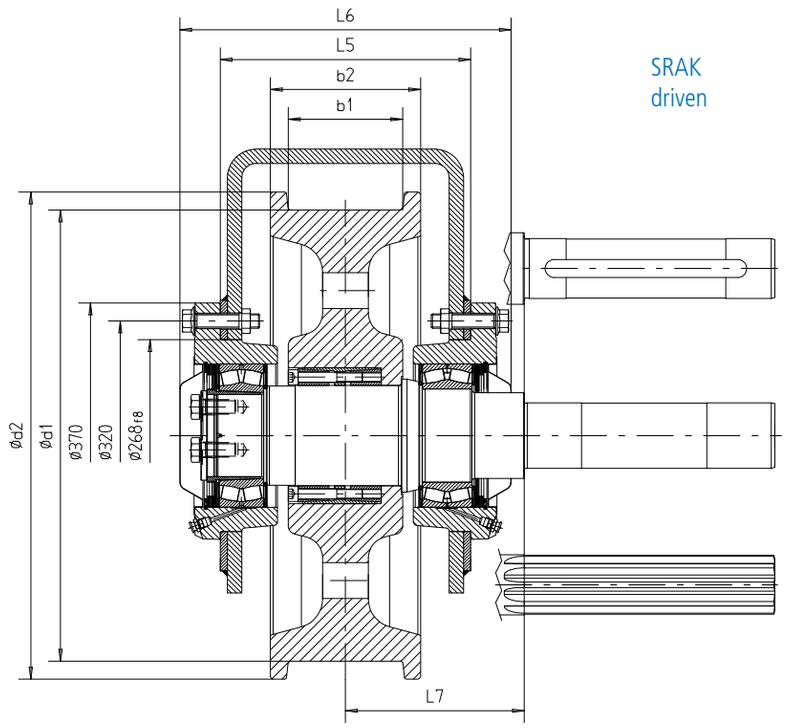
WHEELSET SRAK / SRNK 630 (BOX GIRDER ASSEMBLY) OPTION 3 AND 4



SRAK
driven

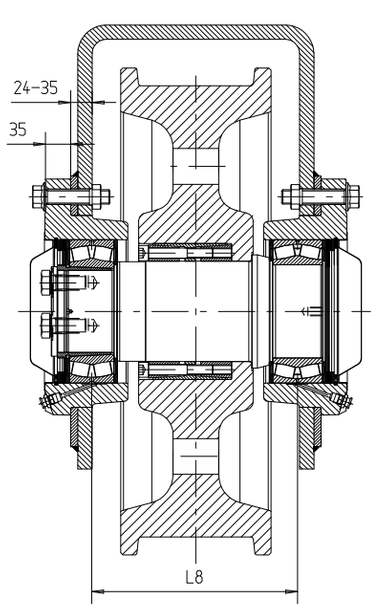
With feather key acc. DIN 6885/1
Design P Ø ...

For shrink disc
Design H Ø ...

With gear teeth acc. DIN 5480
Design W ...

Specify manufacturer of gear box and size when ordering!

Adjustment range
±12mm

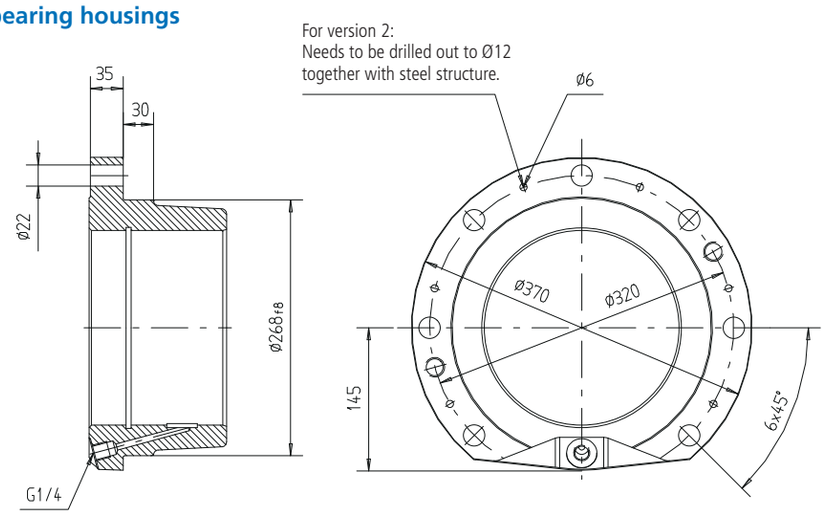


SRNK
non-driven

ø d1 h9	b1	b2	ø d2	L5	L6	L7[1] Standard	L8	Roller bearing	Drive shaft max. ø	Weight kg[2]	
										SRAK	SRNK
630	75 - 130	170	680	350	463	250	287,5	24026	130	430	390
	100 - 160	210						23124[3]		460	420

1) Other dimensions on request
2) Depending on type of wheel
3) Spherical roller bearing with extractor sleeve. A special forcing nut is needed for dismounting of the wheelset.

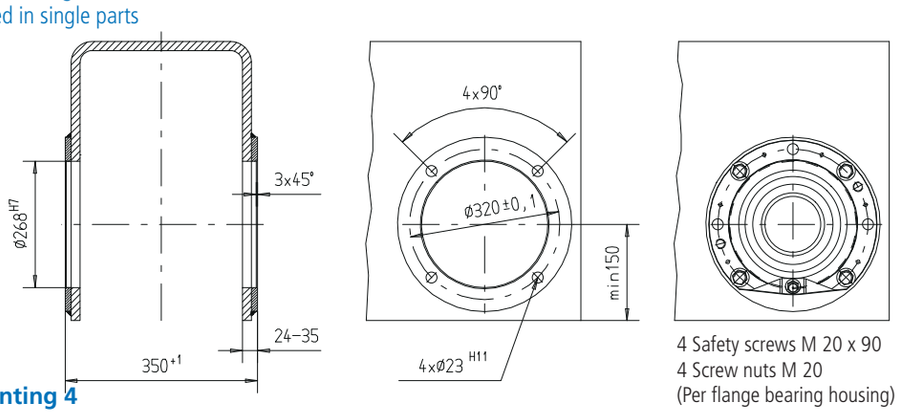
Design of the flange bearing housings



Fitting dimensions and hole pattern for steel construction

a) Type of mounting 3

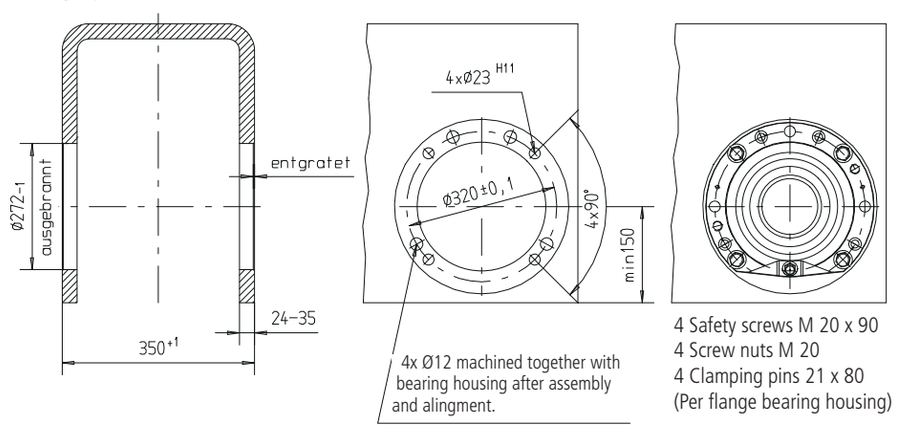
Box girder assembly (Hollow profile)
Machined centering of flange
Wheelset is delivered in single parts



4 Safety screws M 20 x 90
4 Screw nuts M 20
(Per flange bearing housing)

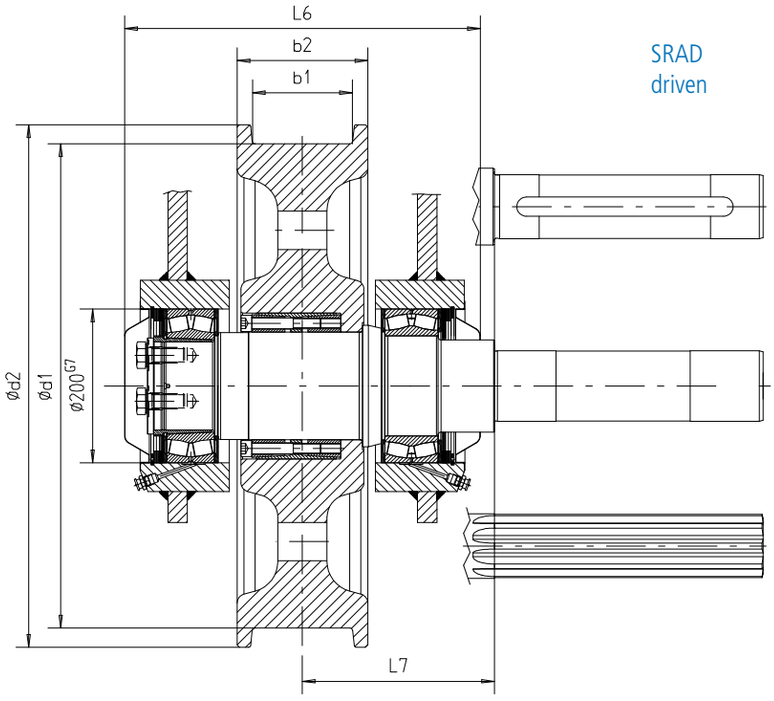
b) Type of mounting 4

Box girder assembly (Hollow profile)
Flame-cutted centering of flange
Wheelset is delivered in single parts



4 Safety screws M 20 x 90
4 Screw nuts M 20
4 Clamping pins 21 x 80
(Per flange bearing housing)

WHEELSET SRAD / SRND 630 (DIRECT MOUNTING) VARIANTE 5



SRAD
driven

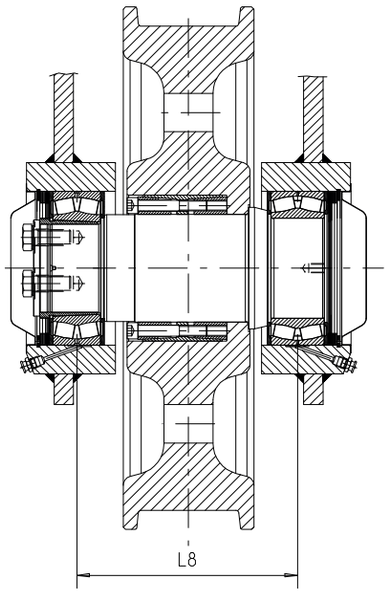
With feather key acc. DIN 6885/1
Design P Ø ...

For shrink disc
Design H Ø ...

With gear teeth acc. DIN 5480
Design W ...

Specify manufacturer of gear box and size when ordering!

Adjustment range
±12mm



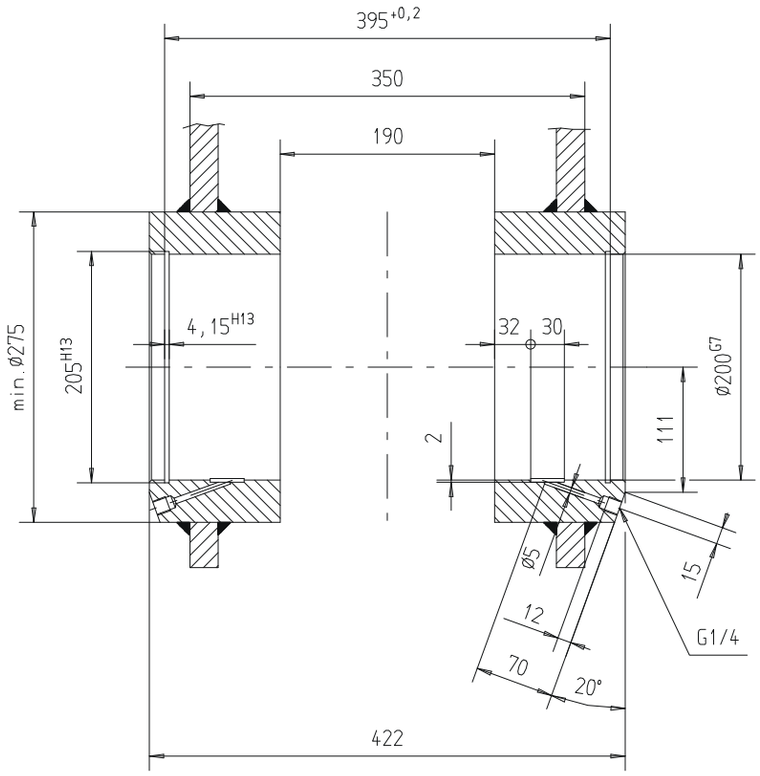
SRND
non-driven

ø d1 h9	b1	b2	ø d2	L6	L7[1] Standard	L8	Roller bearing	Drive shaft max. ø	Weight kg[2]	
									SRAD	SRND
630	75 - 130	170	680	463	250	287,5	24026	130	375	345
							23124[3]			

1) Other dimensions on request
2) Depending on type of wheel
3) Spherical roller bearing with extractor sleeve. A special forcing nut is needed for dismounting of the wheelset.

Fitting dimensions for the steel construction

Machined and welded bushings
Wheelset is delivered in single parts
(Incl. 2 locking rings J200 DIN 472)



LOADING CAPACITY OF THE WHEELSETS

The wheel loads $R_{max\ permissible}$ and $R_{id\ permissible}$ in the following tables are valid under the given conditions:

Material of rail:	St70-2 / E 360
Material of wheel:	EN-GJS 700 – 2, HB ≥ 240
Temperature range:	tu = -20o C up to +50o C
Max. allowed horizontal force:	10 % of existing wheel load
Contact wheel - rail:	Total line contact
Wheel / rail system requirements:	Tolerance acc. to ISO 12488 / tolerance class 2
Allowed wheel camber:	± 0,5 ‰

Selection guide
The largest existing wheel load must be less than the max. permissible wheel load according to the table:

$$R_{max} \leq R_{max\ permissible}$$

The existing ideal wheel load according to classification FEM (ISO) must not be greater than the allowable ideal wheel load according to
the table:

$$R_{id} \leq R_{id\ permissible}$$

Wheelset SRA / SRN 315							
Max. permissible wheel load	Classification FEM (ISO)	Real width rail head	Permissible ideal wheel load $R_{id\ perm.}$ [kg] at travel speed V [m / min]				
$R_{max\ perm.}$ [kg]		k_{eff} [mm]	16	25	40	63	100
22000	1 Bm M3	30	9550	9050	8500	8000	7200
		40	12750	12050	11350	10650	9600
		50	15950	15100	14200	13300	12000
		60	19150	18100	17000	15950	14400
		70	22000	21150	19900	18600	16800
	1 Am M4	30	8550	8100	7600	7150	6450
		40	11450	10800	10150	9550	8600
		50	14300	13500	12700	11950	10750
		60	17150	16200	15250	14300	12900
		70	20000	18900	17750	16150	14000
	2 m M5	30	7650	7200	6800	6400	5750
		40	10200	9650	9050	8500	7650
		50	12750	12050	11350	10650	9600
		60	15300	14450	13600	12750	11400
		70	17850	16850	15000	13100	11400
	3 m M6	30	6900	6500	6100	5750	5200
		40	9200	8650	8150	7650	6900
		50	11500	10850	10200	9600	8650
		60	13800	13000	12200	10650	9250
		70	16050	14050	12200	10650	9250
	4 m M7	30	6100	5800	5450	5100	4600
		40	8150	7700	7250	6800	6100
		50	10200	9650	9100	8500	7550
		60	12250	11450	9950	8700	7550
		70	13100	11450	9950	8700	7550
	5 m M8	30	5350	5050	4750	4450	4000
		40	7150	6750	6350	5950	5350
		50	8950	8450	7950	7050	6150
		60	10650	9350	8100	7050	6150
		70	10650	9350	8100	7050	6150

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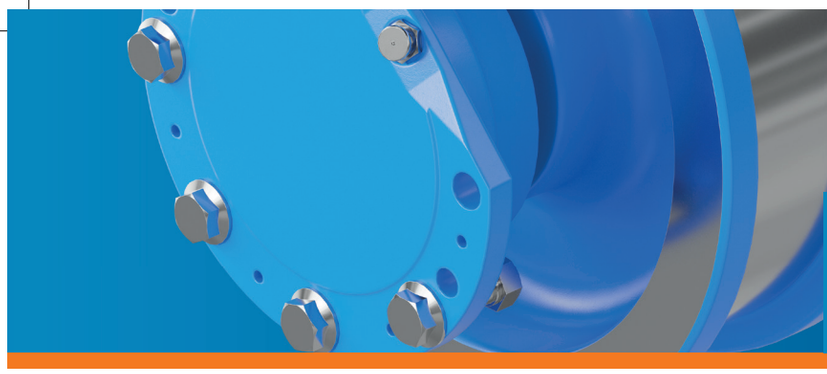
Wheelset SRA / SRN 400								
Max. permissible wheel load	Classification FEM (ISO)	Real width rail head	Permissible ideal wheel load $R_{id\ perm.}$ [kg] at travel speed V [m / min]					
$R_{max\ perm.}$ [kg]		k_{eft} [mm]	16	25	40	63	100	160
28000	1 Bm M3	40	16500	15750	14850	13950	12900	11400
		50	20600	19700	18550	17450	16150	14250
		60	24750	23650	22300	20950	19400	17150
		70	28000	27550	26000	24400	22600	20000
		80	28000	28000	28000	27900	25850	22850
	1 Am M4	40	14800	14100	13300	12500	11600	10250
		50	18500	17650	16650	15650	14500	12800
		60	22200	21200	20000	18800	17400	15400
		70	25900	24700	23300	21900	20300	17950
		80	28000	28000	26650	25050	23200	20500
	2 m M5	40	13200	12600	11900	11150	10300	9150
		50	16500	15750	14850	13950	12900	11450
		60	19800	18900	17850	16750	15500	13750
		70	23100	22050	20800	19500	18050	16000
		80	26400	25200	23800	22350	20650	18300
	3 m M6	40	11850	11300	10700	10050	9300	8200
		50	14800	14150	13350	12550	11600	10250
		60	17800	17000	16050	15100	13950	12350
		70	20750	19800	18700	17600	16250	14400
		80	23700	22650	21400	20100	18600	16450
	4 m M7	40	10550	10050	9500	8900	8250	7300
		50	13200	12550	11850	11150	10300	9150
		60	15850	15100	14250	13400	12400	11000
		70	18450	17600	16600	15600	14450	12800
		80	21100	20100	19000	17850	16500	14650
	5 m M8	40	9200	8800	8300	7800	7200	6400
		50	11500	11000	10400	9750	9000	8000
		60	13850	13250	12500	11750	10850	9600
		70	16150	15450	14550	13700	12650	11200
		80	18450	17650	16650	15650	14450	12800



Wheelset SRA / SRN 500								
Max. permissible wheel load	Classification FEM (ISO)	Real width rail head	Permissible ideal wheel load $R_{id\ perm.}$ [kg] at travel speed V [m / min]					
$R_{max\ perm.}$ [kg]		k_{eft} [mm]	16	25	40	63	100	160
40000	1 Bm M3	40	21000	20250	19150	18000	16900	15200
		50	26250	25300	23950	22500	21150	19050
		60	31500	30400	28750	27000	25400	22850
		70	36750	35450	33550	31500	29600	26650
		80	40000	40000	38300	36000	33850	30450
		>90	40000	40000	40000	40000	38100	34250
	1 Am M4	40	18800	18150	17150	16150	15200	13650
		50	23550	22700	21450	20200	18950	17050
		60	28250	27250	25750	24250	22750	20500
		70	32950	31800	30050	28300	26550	23900
		80	37650	36300	34300	32300	30300	27300
		>90	40000	40000	38600	36350	33250	28900
	2 m M5	40	16800	16200	15300	14400	13500	12200
		50	21000	20250	19150	18050	16900	15250
		60	25200	24300	23000	21650	20300	18300
		70	29400	28350	26800	25250	23650	21350
		80	33600	32400	30650	28850	27000	23450
		>90	37800	36450	34500	31000	27000	23450
	3 m M6	40	15100	14600	13800	13000	12150	11000
		50	18900	18250	17250	16250	15200	13700
		60	22700	21900	20700	19500	18250	16450
		70	26450	25550	24150	22750	21250	19000
		80	30250	29200	27600	25200	21950	19000
		>90	34050	32850	28900	25200	21950	19000
	4 m M7	40	13450	13000	12250	11500	10800	9750
		50	16800	16200	15300	14400	13500	12200
		60	20200	19450	18400	17300	16250	14650
		70	23550	22700	21450	20150	17900	15550
		80	26900	25900	23600	20500	17900	15550
		>90	30300	27150	23600	20500	17900	15550
	5 m M8	40	11750	11300	10700	10100	9450	8450
		50	14700	14150	13400	12600	10850	10500
		60	17650	17000	16100	15150	14200	12650
		70	20600	19800	18200	16750	14600	12650
		80	23500	22100	19200	16750	14600	12650
		>90	25250	22100	19200	16750	14600	12650

CRANE WHEEL SYSTEMS
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Wheelset SRA / SRN 630								
Max. permissible wheel load	Classification FEM (ISO)	Real width rail head	Permissible ideal wheel load $R_{id\ perm.}$ [kg] at travel speed V [m / min]					
$R_{max\ perm.}$ [kg]		k_{eft} [mm]	16	25	40	63	100	160
60000	1 Bm M3	50	33400	32500	31000	29250	27500	25450
		60	40050	39000	37250	35150	33000	30550
		70	46750	45500	43450	41000	38550	35650
		80	53400	52000	49650	46850	44050	40750
		90	60000	58500	55850	52700	49550	45800
		≥100	60000	60000	60000	58550	55050	50900
	1 Am M4	50	29900	29150	27800	26250	24650	22800
		60	35900	34950	33350	31500	29600	27350
		70	41900	40800	38950	36750	34550	31950
		80	47850	46600	44500	42000	39500	36500
		90	53850	52450	50050	47250	44400	41050
		≥100	59850	58250	55650	52500	49350	45650
	2 m M5	50	26700	26000	24800	23400	22000	20400
		60	32050	31200	29750	28100	26450	24450
		70	37400	36400	34750	32800	30850	28550
		80	42750	41600	39700	37450	35250	32600
		90	48050	46800	44650	42150	39650	36700
		≥100	53400	52000	49650	46850	44050	40750
	3 m M6	50	24000	23400	22350	21050	19800	18350
		60	28850	28050	26800	25250	23750	22000
		70	33650	32750	31300	29500	27750	25700
		80	38450	37400	35750	33700	31700	29350
		90	43250	42100	40250	37900	35650	32800
		≥100	48050	46750	44700	42150	37800	32800
	4 m M7	50	21350	20750	19850	18750	17600	16250
		60	25600	24950	23800	22500	21100	19550
		70	29900	29100	27800	26250	24650	22800
		80	34150	33250	31750	30000	28150	26050
		90	38450	37400	35750	33750	30850	26800
		≥100	42700	41550	39700	35400	30850	26800
	5 m M8	50	18650	18200	17400	16400	15400	14250
		60	22400	21850	20850	19650	18500	17100
		70	26150	25500	24350	22950	21600	19950
		80	29850	29100	27800	26200	24650	21800
		90	33600	32750	31300	28800	25100	21800
		≥100	37350	36400	33000	28800	25100	21800

LOAD CAPACITY AT DIVERGENT CONDITIONS

The wheel loads specified are reduced by:

- divergent material of rails
- divergent wheel camber
- Point contact, spherical shape of rail (Reduction on demand)

	Materials	Coefficient for reduced line contact
Rail	St 70 - 2 / E 360	1,0
	St 60 - 2 / E 335	0,95
	St 52 - 3 / 355 JSG 3	0,9

The values $R_{max\ perm.}$ and $R_{id\ perm.}$ specified in the tables must be reduced by 10%, if the wheel inclination is magnified by 2 times or the wheel camber to 1.25 times.

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