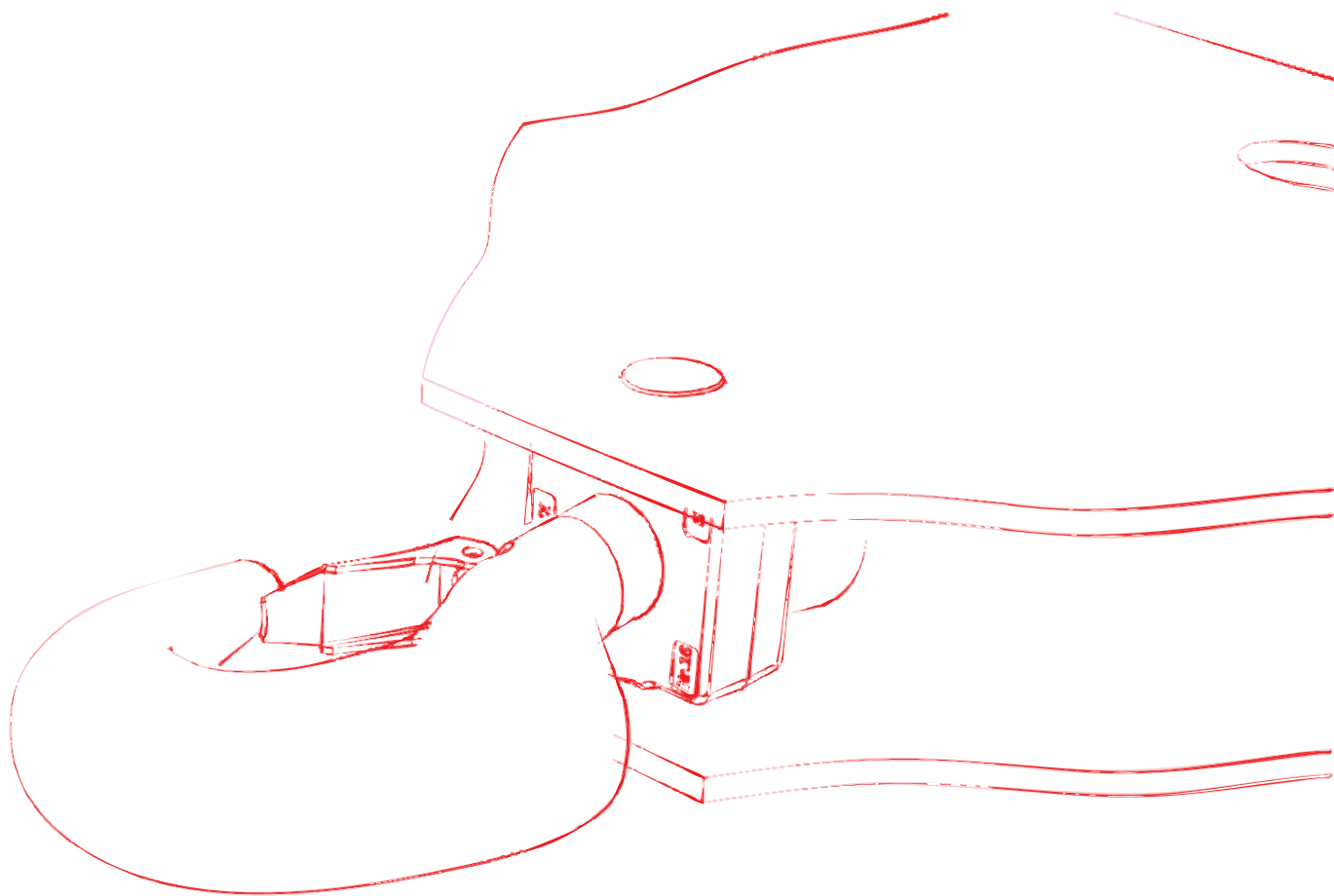


Slewing tower crane

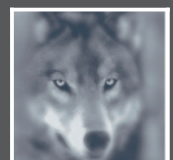
WOLFF 355 B

Technical data and site preparation



English

English



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Subject to change of design, error and typos.

Stand: 11/2014

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1 Using this documentation

1.1 General instructions on usage

This manual is focused on providing comprehensive information to the owner, to operations scheduling, to operators of the slewing tower crane, and to service personnel in terms of

- the function principle
- the operation
- and the safe handling

of the product.

	NOTICE These operating instructions do not constitute a substitution for comprehensive training on the live equipment and control system as provided by qualified and authorized personnel.
---	---

Technical documentation

The technical documentation for the crane comprises four chapters:

- 1 Safety Manual & general
- 2 Technical data & site preparation
- 3 Crane Operators' Manual
- 4 Service & assembly

Those four operating manuals are supplemented with the following documents. This documentation is an integral component of the operating instructions in accordance with Directive 98/37/EC.

- Electrical circuit diagrams
- Parts list
- Undercarriage documentation
- Cross frame documentation
- Cross frame element documentation
- Climbing frame documentation

	NOTICE Safety manual Read the safety manual before starting any type of work.
---	---

1 Using this documentation

1.2 Request to read

Read these instructions with meticulous care to make sure that you understand all aspects before using the product.

These instructions are aimed on familiarizing you with the basic tasks involved with the product.

These instructions provide vital information in terms of the safe and proper usage of the product.

Compliance with those instructions helps you to:

- Avoid hazards
- Reduce repair work and downtimes
- Increase reliability and the useful life of the unit.

Operators must strictly comply with valid country-specific regulations governing accident prevention and environment protection at locations where the product is put to operation, irrespective of specifications issued in these operating instructions.

- The operating instructions form part of the slewing tower crane or of a component.
 - Observe the operating instructions.
 - Always have the operating instructions at hand at the slewing tower crane.
 - Submit the operating instructions to successive users.

1.3 Layout of the operating instructions

Notations, signs and symbols used

The signs and symbols in these operating instructions are intended to help you use the operating instructions and the machine quickly, safely and efficiently.

Action sequence

The defined task sequence facilitates the proper and safe operation of the slewing tower crane.

The instructions are presented as follows:

- > The symbol draws your attention to conditions to be met in order to complete a specific task.
- 1) This is task 1.
- 2) This is task 2.
 - This symbol indicates an interim result. This improves orientation for more complex tasks.
- 3) This is task 3.
 - This symbol is used to indicate the result and successful completion of a task. This symbol is used to indicate the result and successful completion of a task.

Listing

- This list contains non-chronological items.

Cross-reference

Provides a cross-reference to additional information such as another operating manual.

NOTE

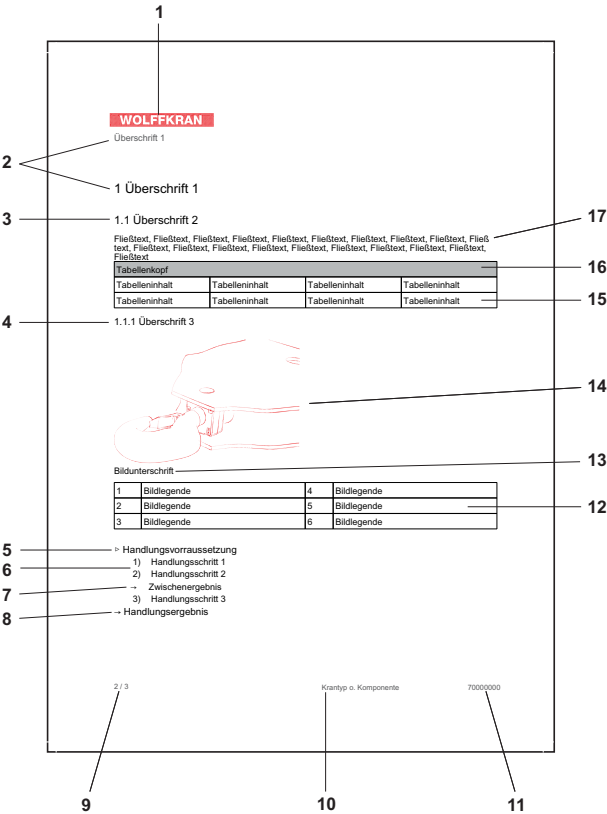
	NOTICE
	Note header Info text

Draws your attention to user tips and to other particularly useful information. It is not keyword which indicates dangerous or harmful situations. The note informs you of the most efficient or practical use of the slewing tower crane and of these instructions.

1 Using this documentation

1.4 Layout of a manual page

The diagram below shows an example of the page layout of this manual.



Page of the manual

1	WOLFFKRAN company logo	10	Crane type or component
2	Chapter (H 1)	11	Document number
3	Section (H 2)	12	Caption
4	Section (H 3)	13	Underline
5	Precondition for action	14	Diagram
6	Action sequence	15	Table contents
7	Intermediate result	16	Table header
8	Result of action	17	Running text
9	Page number: Page X of Y		

1.5 Use of pictograms

This safety sign is used to highlight sources of danger.

The safety signs deployed in the manuals conform to the harmonized standard EN 61310, Part 2: Safety of Machine Indication, Marking and Actuation, and/or EC Directive 92/58/EEC on Minimum Requirements for the provision of Safety and/or health Signs at Work.

Additional danger warnings were integrated in accordance with DIN ISO 3864-2 Graphic symbols - Safety colors and safety signs - Part 2: Design principles for product safety labels, for application on the products in order to substantiate specifications in the safety instructions.

	Warning of a general hazard This warning sign highlights tasks which are subject to several sources of risk.		Warning of dangerous electrical voltage This warning sign highlights tasks which pose the risk of fatal injury through electrical shock.
	Warning of falling objects This warning sign highlights tasks which are subject to the risk of fatal injury through falling objects.		Warning of rotary parts This warning sign highlights tasks which are subject to the risk of fatal injury through rotating machine parts.
	Warning of the risk of slipping This warning sign highlights tasks which are subject to the risk of fatal injury through slipping.		Warning of the risk of tripping This warning sign highlights tasks which are subject to the risk of fatal injury through tripping.
	Warning of the risk of falling This warning sign highlights tasks which are subject to the risk of fatal injury through falling.		Warning of the risk of contusion This warning sign highlights tasks which are subject to the risk of fatal injury through contusion.
	Warning of suspended loads		Prohibition sign

1 Using this documentation

1.6 Description of safety instructions

Safety instructions and warning keywords

The following safety instructions and warning keywords are used in the manuals:

Imminent risk of serious injury and death.

Death or serious injuries.

	 DANGER Type and source of hazards Consequences ▶ Accident prevention
---	--

Possible risk to the health and life of personnel.

Death or serious injuries.

	 WARNING Type and source of hazards Consequences ▶ Accident prevention
--	---

Risk of harm to the health of human beings.

Minor injuries.

	 CAUTION Type and source of hazards Consequences ▶ Accident prevention
---	---

Risk of damage to the product.

Material damage.

CAUTION Type and source of hazards Consequences ▶ Accident prevention	
--	--

The safety instructions comprise:

	 DANGER Type and source of hazards Consequences ► Accident prevention
---	--

Danger warnings are clearly identified in all of the technical documentation of the system. The danger areas of plants and/or machinery are clearly identified by means of warning signs, stickers and/or symbols (see the technical operating instructions of the corresponding manufacturer).

1 Using this documentation

1.7 Overview of the operating manual

Readership and contents of the manuals

This manual provides reference information to authorized individuals who work on and with the slewing tower crane.

- OPS: Operations scheduling
- CO: Crane operator
- S: Service personnel

Operating Manual			
1 SM (Safety manual & general instructions)	2 TDM Technical data and site preparation	3 COM (Crane Operator's Manual)	4 SAM (Service & and assembly)
WP, CO, S	OPS, S	CO, S	S
(General) ▪ General safety information ▪ Other general information	(crane-specific) ▪ Technical data	(General) ▪ All information required for operation. ▪ Load carrying capacity tables are not included in this manual and are posted separately in the operator cabin	(General) Essential maintenance and assembly information

Manual topics

To get you started quickly with all tasks involved with the operation of the slewing tower crane, the manual provide an in-depth table of contents.

1.8 Data required for slewing tower crane support

Identification plate



WOLFFKRAN

Turmdrehkran / Tower crane / Grue à tour

Typ:

Type:

Type:

Werk-Nr.:

Factory-No.:

N° de construction:

Baujahr:

Year of construction:

Année de construction:



WOLFFKRAN GmbH / Austraße 72 / D-74076 Heilbronn

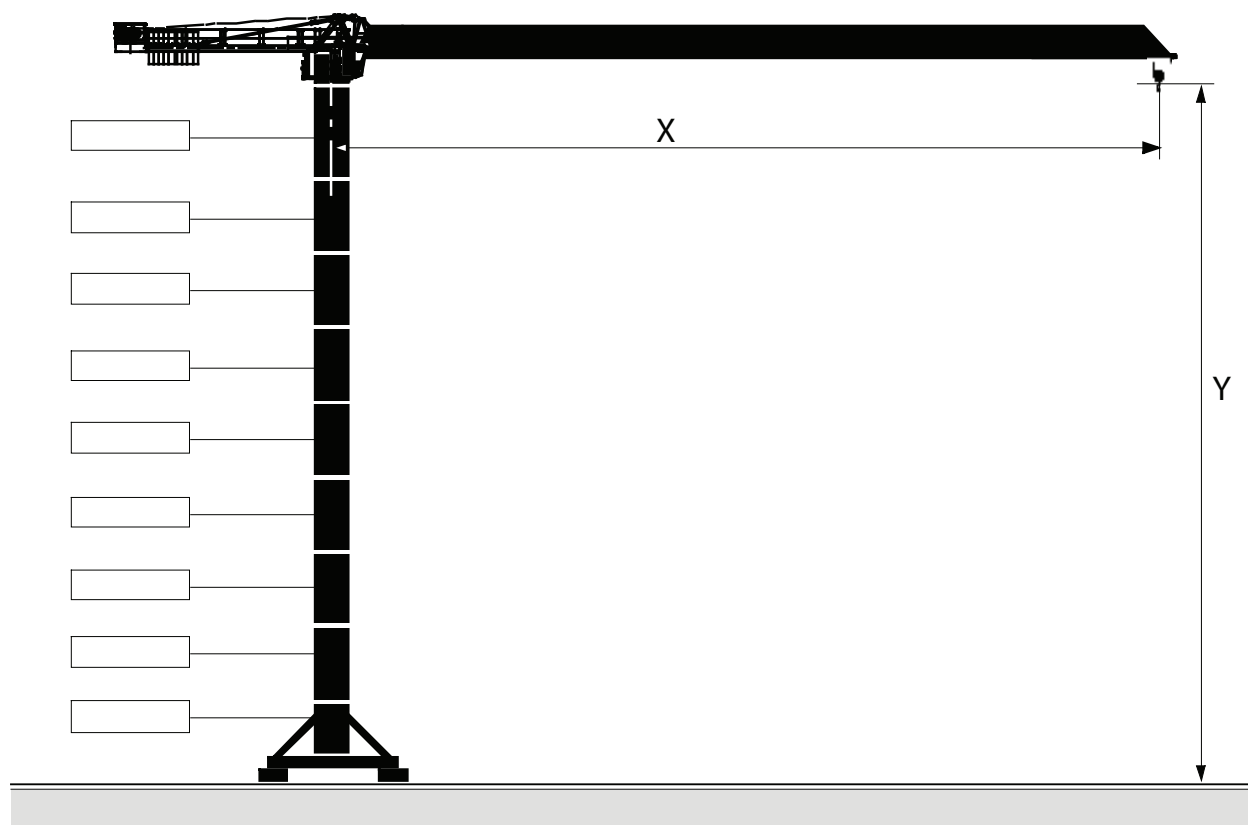
Telefon: +49 7131 9815-0 / Telefax: +49 7131 9815-355 / www.wolffkran.de

30049076

Identification plate

Item	Data
Crane model, series:	Slewing tower crane
Type:	WOLFF
Factory ID:	...
Serial no.:	...

1 Using this documentation



Tower configuration example

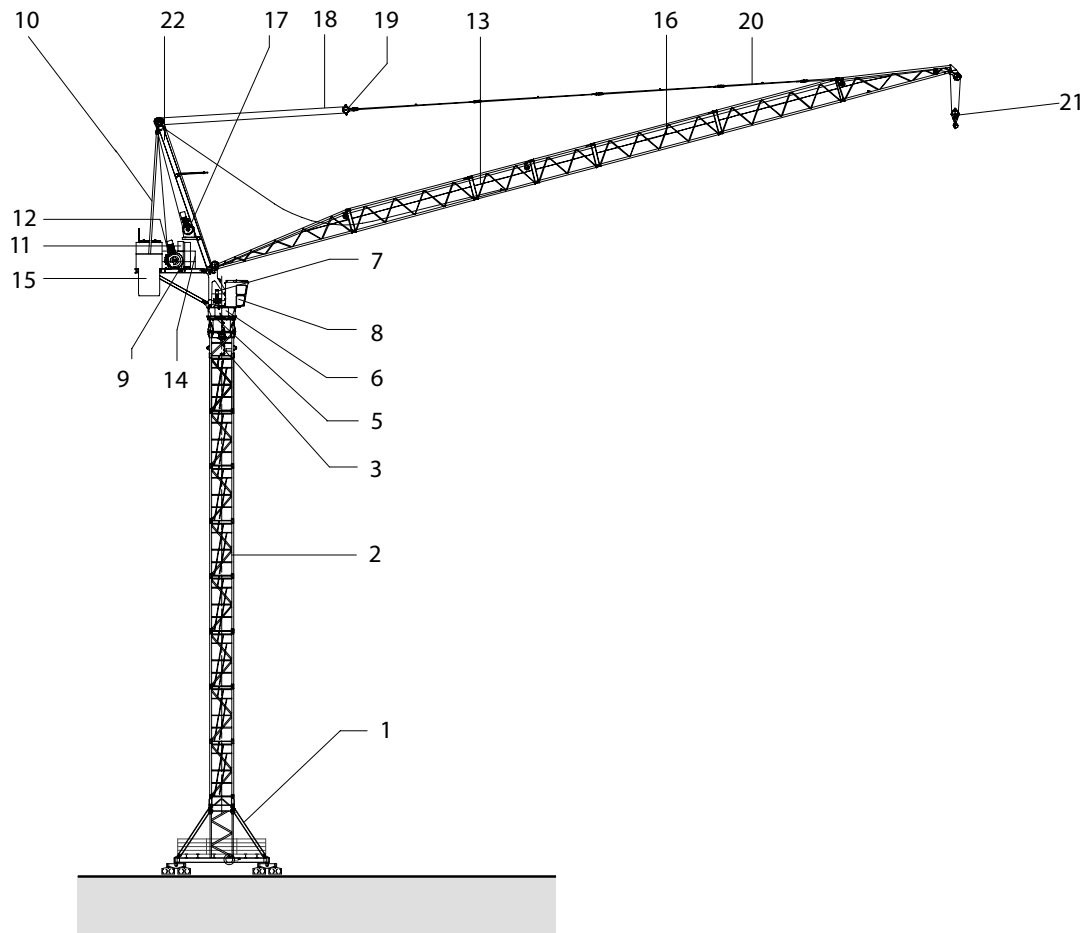
[X] Operating radius in ... m [Y] Hook height in ... m

	NOTICE
	Non-standard assembly Specify details of any non-standard tower assemblies.

2 Technical data

2 Technical data

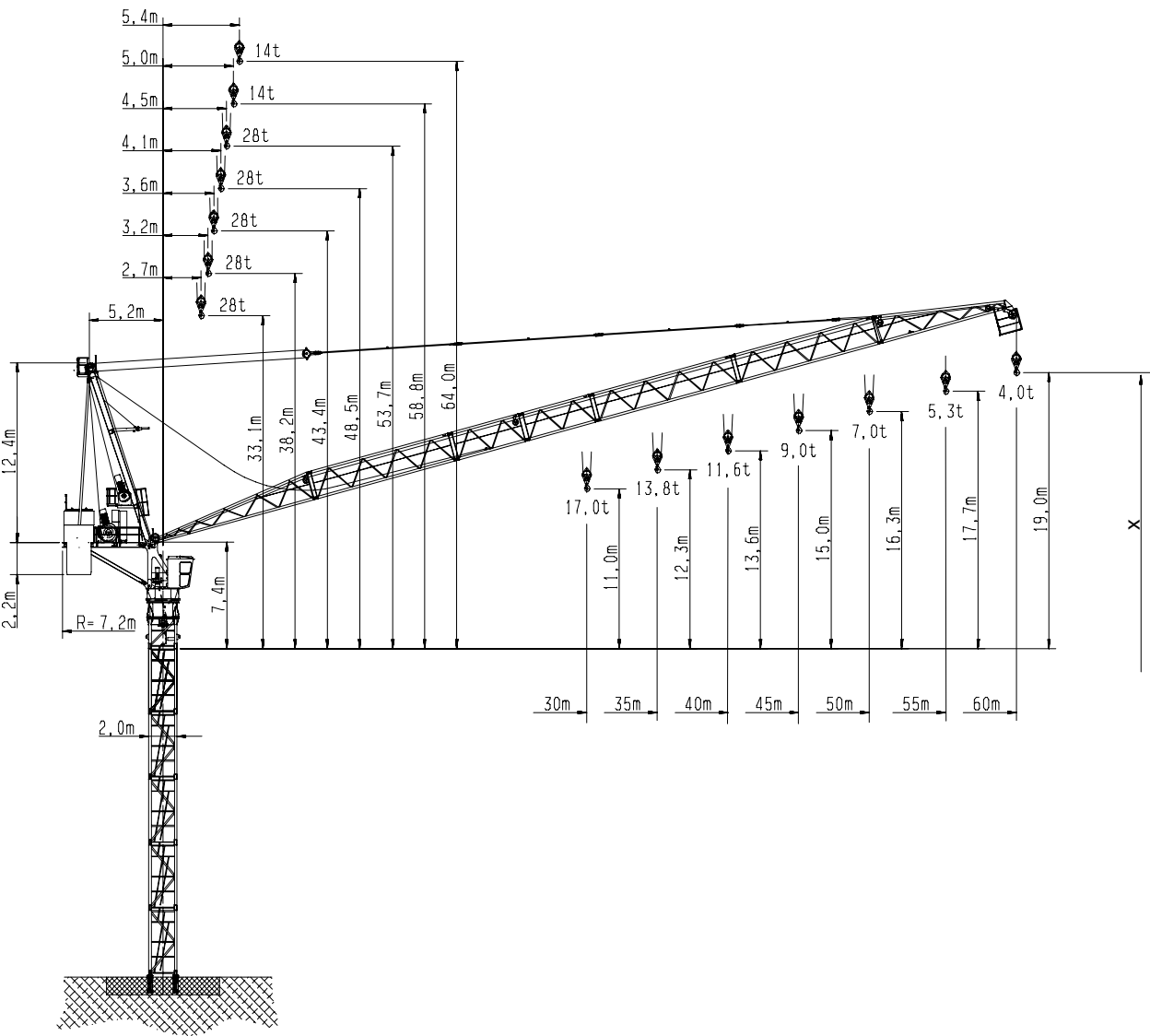
2.1 Designation of tower crane components



1	Crane base	11	Control cabinet
	– Foundation anchor	12	Hoisting gear
	– Cross frame	13	Hoisting rope
	– Cross frame element	14	Standard railings
	– Undercarriage	15	Counterweights
	- portal	16	Jib
2	Tower element	17	luffing gear
3	Tower head section lower part (SPUT)	18	Luffing rope
5	Ball race bearing	19	Pulley block
6	Slewing frame	20	Jib brace
7	Slewing gear	21	Snatch block
8	Driver's cab	22	Tower head section
9	Counterjib		
10	Counter jib brace		

2.2 Schedule drawing

2.2.1 Schedule drawing WOLFF 355 B



[X]	max. hook height above ground
-----	-------------------------------

Data WOLFF 355B

Item	Data
Crane type	BGL GROUP C.0.11.0355
Design	Overhead travelling crane with top slewing luffing jib, with climbing feature
Type of setup	Stationary or travelling
Basis of calculation	EN
Payload torque	max. 5100 kNm

2 Technical data

Item	Data
Hoist winch	Hw 28110FU / Hw 28132FU

2.3 Out of service positions

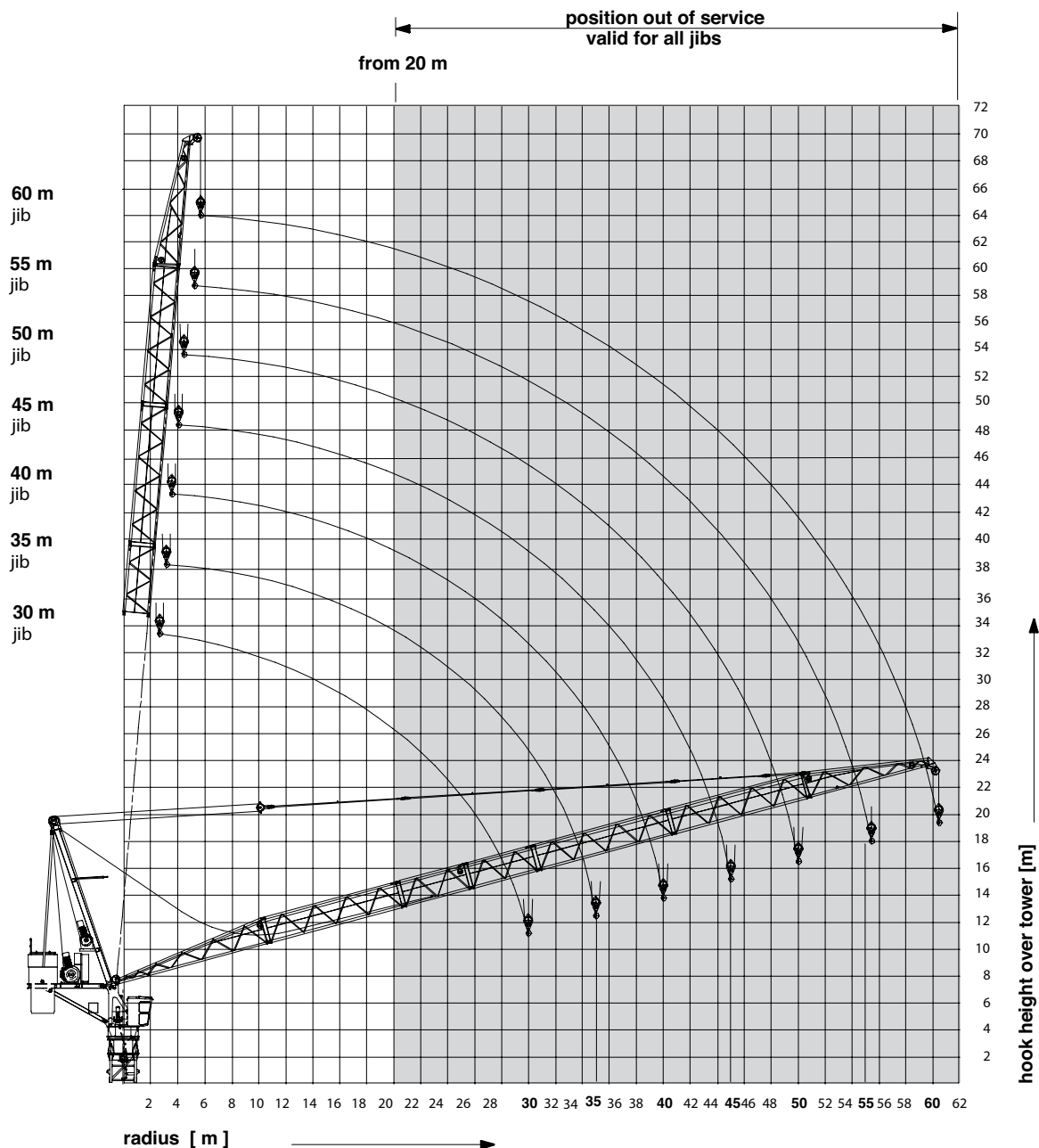


! WARNING

Parking the jib outside the area for the out of service position.

The slewing tower crane may overturn.

► Park the jib only in the grey shaded area for the out of service position.



2.4 Load carrying capacities

	NOTICE
	WOLFF-Boost With the WOLFF-Boost function, the load is allowed to exceed the load torque range specified for the lifting capacities by up to 10%. This is, however, subject to the restriction that hoisting gear and trolley drive (trolley crane) respectively hoisting gear and derricking gear (luffing crane) must only be moved alternately.

2.4.1 Table of load carrying capacity WOLFF 355 B (1 fall operation)

 14.0 t		Operating radius [m]		20.0	25.0	30.0	35.0	40.0	45.0	50.0	55.0	60.0	
JL [m]	60	5.4 - 27.0		14.0	14.0	12.2	9.8	8.1	6.7	5.6	4.7	4.0	LCC [t]
	55	5.0 - 28.0		14.0	14.0	12.8	10.5	8.7	7.3	6.2	5.3		
	50	4.5 - 29.5		14.0	14.0	13.7	11.3	9.5	8.1	7.0			
	45	4.1 - 31.0		14.0	14.0	14.0	12.2	10.4	9.0				
	40	3.6 - 33.5		14.0	14.0	14.0	13.4	11.6					
	35	3.2 - 34.5		14.0	14.0	14.0	13.8						
	30	2.7 - 30.0		14.0	14.0	14.0							
JL			Jib length										
LCC			Load carrying capacity										

The load carrying capacity is related to a tower height of 40.5 m. Tower heights greater than that reduce the maximum load carrying capacity by the weight of the additional hoisting ropes (one fall operation = 3.25 kg per meter of the hook range).

2 Technical data

2.4.2 Table of load carrying capacities (kg) in meter intervals, WOLFF 355 B (1 fall operation)

Operating radius	Jib length [m] 						
[m]	30	35	40	45	50	55	60
26	14000	14000	14000	14000	14000	14000	14000
27	14000	14000	14000	14000	14000	14000	14000
28	14000	14000	14000	14000	14000	14000	13350
29	14000	14000	14000	14000	14000	13390	12750
30	14000	14000	14000	14000	13700	12800	12200
31		14000	14000	14000	13170	12280	11650
32		14000	14000	13500	12670	11780	11160
33		14000	14000	13030	12190	11310	10690
34		14000	13780	12580	11740	10870	10260
35		13800	13400	12200	11300	10500	9800
36			12970	11770	10920	10060	9450
37			12600	11390	10540	9690	9090
38			12250	11040	10180	9340	8740
39			11920	10700	9840	9000	8410
40			11600	10400	9500	8700	8100
41				10080	9210	8380	7790
42				9790	8920	8090	7510
43				9510	8640	7820	7230
44				9250	8370	7560	6980
45				9000	8100	7300	6700
46					7880	7070	6490
47					7640	6840	6260
48					7420	6620	6050
49					7210	6400	5840
50					7000	6200	5600
51						6010	5440
52						5820	5260
53						5640	5080
54						5470	4910
55						5300	4700
56							4580
57							4430
58							4280
59							4140
60							4000

2.4.3 Table of load carrying capacity WOLFF 355 B (2 fall operation)

 28.0 t		Operating radius [m]		20.0	25.0	30.0	35.0	40.0	45.0	50.0	55.0	60.0	
JL [m]	60	-		-	-	-	-	-	-	-	-	-	LCC [t]
	55	-		-	-	-	-	-	-	-	-	-	
	50	4.5 - 16.0		21.7	16.7	13.4	11.0	9.2	7.8	6.7			
	45	4.1 - 16.5		22.7	17.6	14.3	11.9	10.1	8.7				
	40	3.6 - 17.0		23.6	18.7	15.4	13.1	11.3					
	35	3.2 - 17.5		24.4	19.3	15.9	13.5						
	30	2.7 - 18.0		25.3	20.3	17.0							
JL			Jib length										
LCC			Load carrying capacity										

The load carrying capacity is related to a tower height of 40.5 m. Tower heights greater than that reduce the maximum load carrying capacity by the weight of the additional hoisting ropes (2 fall operation = 6.5 kg per meter of the hook range).

2 Technical data

2.4.4 Table of load carrying capacities (kg) in meter intervals, WOLFF 355 B (2 fall operation)

Operating radius	Jib length [m]						
[m]	30	35	40	45	50	55	60
16	28000	28000	28000	28000	28000	-	-
17	28000	28000	28000	27100	26160	-	-
18	28000	27190	26390	25460	24520	-	-
19	26550	25710	24940	23990	23050	-	-
20	25300	24400	23600	22700	21700	-	-
21	24070	23170	22470	21470	20540	-	-
22	23000	22070	21400	20380	19460	-	-
23	22020	21070	20420	19390	18470	-	-
24	21130	20150	19530	18480	17560	-	-
25	20300	19300	18700	17600	16700	-	-
26	19540	18520	17950	16870	15950	-	-
27	18830	17800	17240	16150	15240	-	-
28	18180	17130	16590	15480	14580	-	-
29	17570	16500	15980	14860	13960	-	-
30	17000	15900	15400	14300	13400	-	-
31		15370	14880	13750	12840	-	-
32		14860	14390	13240	12340	-	-
33		14380	13920	12760	11860	-	-
34		13930	13480	12320	11420	-	-
35		13500	13100	11900	11000	-	-
36			12670	11490	10600	-	-
37			12300	11120	10220	-	-
38			11950	10760	9870	-	-
39			11620	10420	9530	-	-
40			11300	10100	9200	-	-
41				9790	8900	-	-
42				9500	8610	-	-
43				9220	8330	-	-
44				8950	8070	-	-
45				8700	7800	-	-
46					7570	-	-
47					7340	-	-
48					7120	-	-
49					6900	-	-
50					6700	-	-
51						-	-
52						-	-
53						-	-
54						-	-
55						-	-
56						-	-
57						-	-
58						-	-
59						-	-
60						-	-

2.4.5 Table of load carrying capacity WOLFF 355 B (1 fall operation, BOOST)

 14.0 t		Operating radius [m]		20.0	25.0	30.0	35.0	40.0	45.0	50.0	55.0	60.0	
JL [m]	60	5.4 – 29.0		14.0	14.0	13.4	10.8	8.9	7.4	6.2	5.2	4.4	LCC [t]
	55	5.0 – 30.2		14.0	14.0	14.0	11.5	9.6	8.0	6.8	5.8		
	50	4.5 – 31.9		14.0	14.0	14.0	12.5	10.5	8.9	7.7			
	45	4.1 – 33.7		14.0	14.0	14.0	13.4	11.4	9.9				
	40	3.6 – 36.7		14.0	14.0	14.0	14.0	12.8					
	35	3.2 – 35.0		14.0	14.0	14.0	14.0						
	30	2.7 - 30.0		14.0	14.0	14.0							
JL			Jib length										
LCC			Load carrying capacity										

The load carrying capacity is related to a tower height of 40.5 m. Tower heights greater than that reduce the maximum load carrying capacity by the weight of the additional hoisting ropes (one fall operation = 3.25 kg per meter of the hook range).

2 Technical data

2.4.6 Table of load carrying capacities (kg) in meter intervals, WOLFF 355 B (1 fall operation, BOOST)

Operating radius	Jib length [m] 						
[m]	30	35	40	45	50	55	60
26	14000	14000	14000	14000	14000	14000	14000
27	14000	14000	14000	14000	14000	14000	14000
28	14000	14000	14000	14000	14000	14000	14000
29	14000	14000	14000	14000	14000	14000	14000
30	14000	14000	14000	14000	14000	14000	13400
31		14000	14000	14000	14000	13510	12820
32		14000	14000	14000	13940	12960	12280
33		14000	14000	14000	13410	12440	11760
34		14000	14000	13840	12910	11960	11290
35		14000	14000	13380	12450	11510	10820
36			14000	12950	12010	11070	10400
37			13860	12530	11590	10660	10000
38			13480	12140	11200	10270	9610
39			13110	11770	10820	9900	9250
40			12760	11420	10470	9550	8900
41				11090	10130	9220	8570
42				10770	9810	8900	8260
43				10460	9500	8600	7950
44				10180	9210	8320	7680
45				9900	8930	8030	7400
46					8670	7780	7140
47					8400	7520	6890
48					8160	7280	6660
49					7930	7040	6420
50					7700	6820	6200
51						6610	5980
52						6400	5790
53						6200	5590
54						6020	5400
55						5830	5210
56							5040
57							4870
58							4710
59							4550
60							4400

2.4.7 Table of load carrying capacity WOLFF 355 B (2 fall operation, BOOST)

 28.0 t		Operating radius [m]		20.0	25.0	30.0	35.0	40.0	45.0	50.0	55.0	60.0	
JL [m]	60	-		-	-	-	-	-	-	-	-	-	LCC [t]
	55	-		-	-	-	-	-	-	-	-	-	
	50	4.5 – 17.4		23.9	18.4	14.7	12.1	10.1	8.6	7.4			
	45	4.1 – 18.0		24.9	19.4	15.7	13.1	11.1	9.6				
	40	3.6 – 18.6		26.0	20.6	17.0	14.4	12.4					
	35	3.2 – 19.2		26.8	21.2	17.5	14.9						
	30	2.7 – 19.8		27.8	22.3	18.7							
	JL			Jib length									
LCC			Load carrying capacity										

The load carrying capacity is related to a tower height of 40.5 m. Tower heights greater than that reduce the maximum load carrying capacity by the weight of the additional hoisting ropes (two fall operation = 6.5 kg per meter of the hook range).

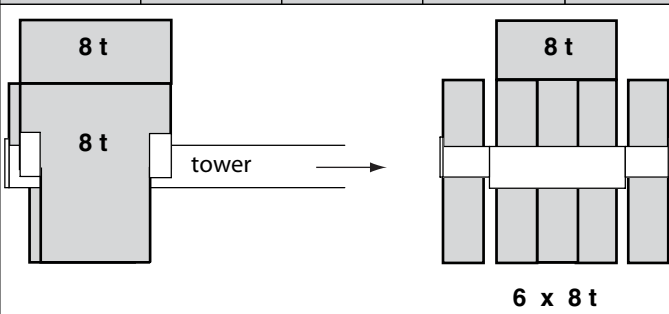
2 Technical data

2.4.8 Table of load carrying capacities (kg) in meter intervals, WOLFF 355 B (2 fall operation, BOOST)

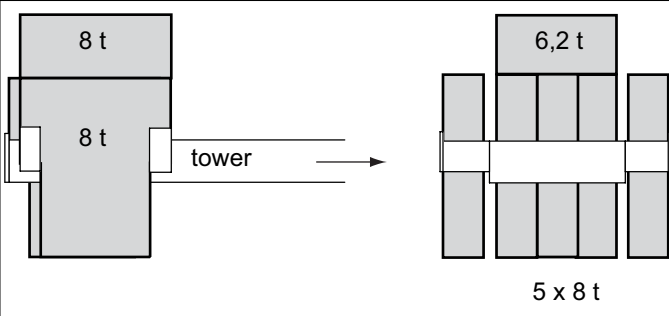
Operating radius	Jib length [m]						
[m]	30	35	40	45	50	55	60
16	28000	28000	28000	28000	28000	-	-
17	28000	28000	28000	28000	28000	-	-
18	28000	28000	28000	28000	26970	-	-
19	28000	28000	27430	26390	25360	-	-
20	27780	26820	26000	24940	23910	-	-
21	26480	25490	24720	23620	22590	-	-
22	25300	24280	23540	22420	21410	-	-
23	24220	23180	22460	21330	20320	-	-
24	23240	22170	21480	20330	19320	-	-
25	22330	21230	20580	19400	18390	-	-
26	21490	20370	19750	18560	17550	-	-
27	20710	19580	18960	17770	16760	-	-
28	20000	18840	18250	17030	16040	-	-
29	19330	18150	17580	16350	15360	-	-
30	18700	17510	16950	15720	14720	-	-
31		16910	16370	15130	14120	-	-
32		16350	15830	14560	13570	-	-
33		15820	15310	14040	13050	-	-
34		15320	14830	13550	12560	-	-
35		14850	14370	13080	12100	-	-
36			13940	12640	11660	-	-
37			13530	12230	11240	-	-
38			13150	11840	10860	-	-
39			12780	11460	10480	-	-
40			12430	11110	10130	-	-
41				10770	9790	-	-
42				10450	9470	-	-
43				10140	9160	-	-
44				9850	8880	-	-
45				9570	8590	-	-
46					8330	-	-
47					8070	-	-
48					7830	-	-
49					7590	-	-
50					7370	-	-
51						-	-
52						-	-
53						-	-
54						-	-
55						-	-
56						-	-
57						-	-
58						-	-
59						-	-
60						-	-

2.5 Arrangement of counterweight blocks

Arrangement of counterweight blocks Hw28110FU

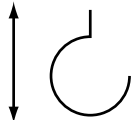
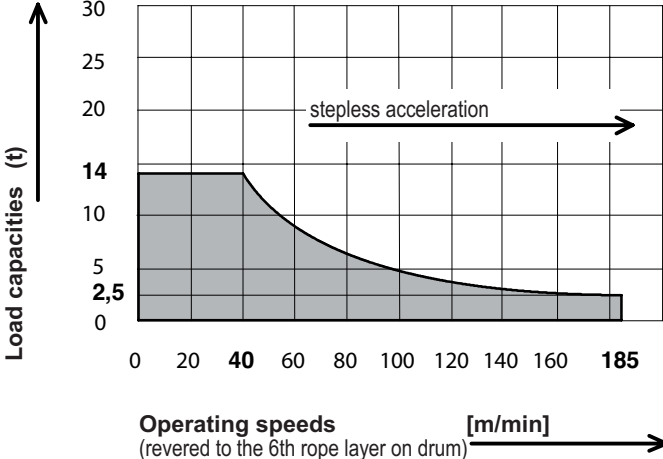
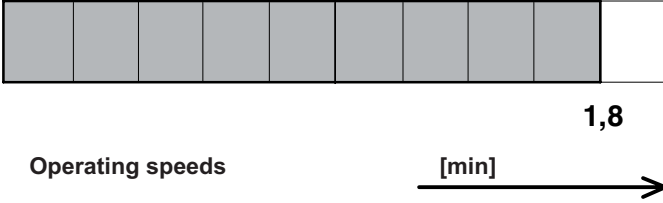
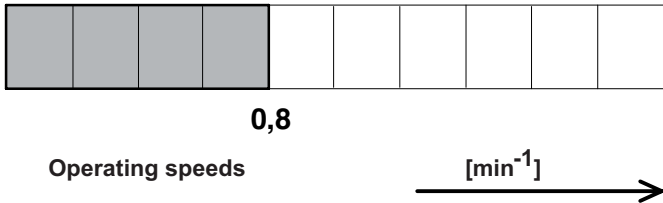
Jib length	60	55	50	45	40	35	30
Total weight 48 t	 6 x 8 t						
	5 x 8 tons suspended concrete weight						
	1 x 8 tons lying concrete weight						

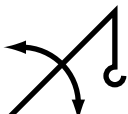
Arrangement of counterweight blocks Hw28132FU

Jib length	60	55	50	45	40	35	30
Total weight 46.2 t	 5 x 8 t						
	5 x 8 tons suspended concrete weight						
	1 x 6.2 tons lying concrete weight						

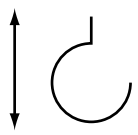
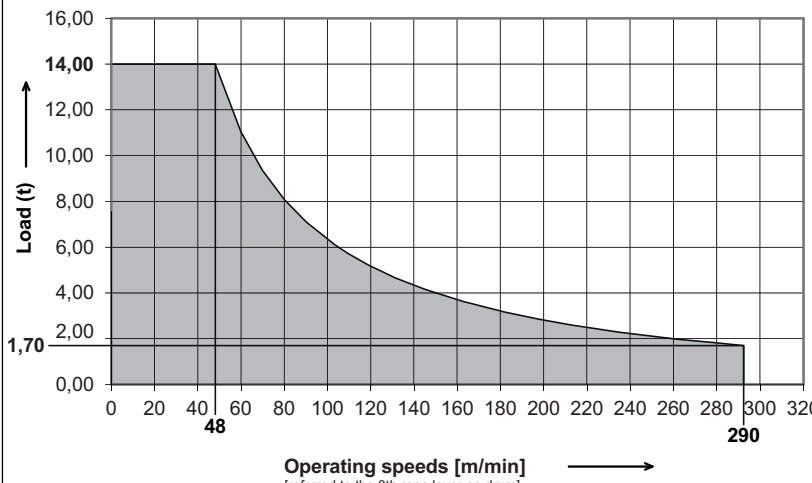
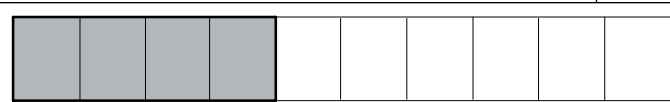
2 Technical data

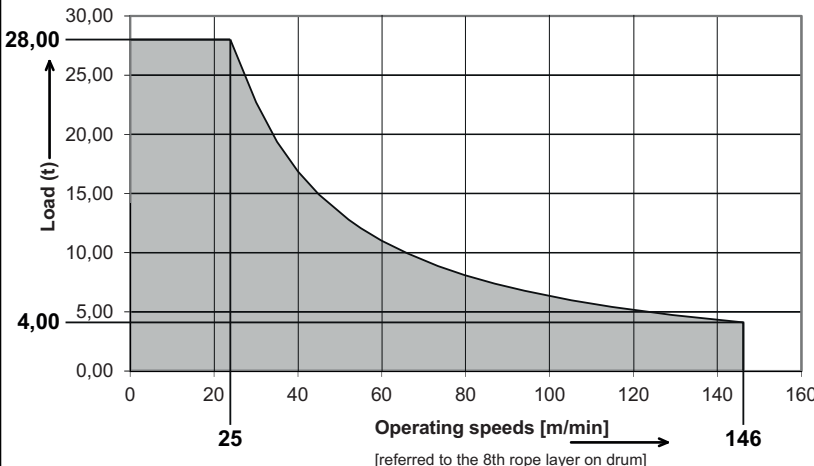
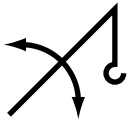
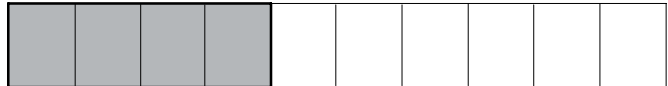
2.6 Operating speeds

Drive unit [type]	Operating speed Carrying load		Hook travel distance max. [m]	Power [kW]	Total connected load [kVA]
Hw 28110FU	Lifting		920	110	194.0 Total connected load at coincid- ence factor of 0.8
					
LG 1575FU	Jib up-down			75	
					
SG	Slewing			1 x 7.5	
					

Drive unit [type]	Operating speed Carrying load		Hook travel distance max. [m]	Power [kW]	Total connected wattage [kVA]
Hw 28110FU	Lifting		460	110	194.0 Total connected load at coincid- ence factor of 0.8
	Load capacities (t) 30 28 25 20 15 10 5,5 0 0 20 40 60 80 92 120 140 160 180 200 Operating speeds (reversed to the 6th rope layer on drum) [m/min] stepless acceleration				
LG 1575FU	Jib up-down			75	
	1,8 Operating speeds [min]				
SG	Slewing			1 x 7.5	
	0,8 Operating speeds [min⁻¹]				

2 Technical data

Drive unit [type]	Operating speed Carrying load		Hook travel distance max. [m]	Power [kW]	Total connected load [kVA]
Hw 28132FU	Lifting		920	132	205.0 Total connected load at coincid- ence factor of 0.8
	 Load (t) Operating speeds [m/min] [referred to the 8th rope layer on drum]				
LG 1575FU	Jib up-down		75		
	 1,8 Operating speeds [min]				
SG	Slewing		1 x 7.5		
	 0,8 Operating speeds [min⁻¹]				

Drive unit [type]	Operating speed Carrying load		Hook travel distance max. [m]	Power [kW]	Total connected wattage [kVA]
Hw 28132FU	Lifting		460	132	205.0 Total connected load at coincid- ence factor of 0.8
	 Load (t) Operating speeds [m/min] [referred to the 8th rope layer on drum]				
LG 1575FU	Jib up-down			75	
	 1,8 Operating speeds [min]				
SG	Slewing			1 x 7.5	
	 0,8 Operating speeds [min⁻¹]				

2.7 Tower combinations

	! DANGER Usage of incorrect tower combinations. The slewing tower crane may overturn. 1) Use the specified tower combinations. 2) If you need another tower combination that is not specified here, please contact WOLFFKRAN to get an approved alternative setup in writing.
	NOTICE All tower combinations apply to free standing slewing tower cranes without climbing gear.
	NOTICE For tower combination with tower element TV 25 and UV 25 please contact WOLFFKRAN.

2.7.1 Tower combinations on foundation (slewing section with TV 20 - connection)

Jib length		30 m – 40 m			
Elements					
1	4.5 m	TV 20.4			
2	9.0 m	TV 20.4			
3	13.5 m	TV 20.4			
4	18.0 m	TV 20.4			
5	22.5 m	TV 20.4			
6	27.0 m	TV 20.4			
7	31.5 m	TV 20.4			
8	36.0 m	TV 20.4			
9	40.5 m	TV 20.4			
Foundation anchors		FUA 140 / Type D-140			
Tower height [m]		40.5			
Wind category		C25			

2 Technical data

Jib length		30 m – 40 m			
Elements					
1	4.5 m	TV 20.4			
2	9.0 m	TV 20.4			
3	13.5 m	TV 20.4			
4	18.0 m	TV 20.4			
5	22.5 m	TV 20.4			
6	27.0 m	TV 20.4			
7	31.5 m	TV 20.4			
8	36.0 m	TV 20.4			
9	37.0 m	VR 2023			
10	41.5 m	TV 23			
11	46.0 m	TV 23			
12	50.5 m	TV 23			
13	55.0 m	TV 23			
Foundation anchors		FUA 140 type D-140			
Tower height [m]		55.0			
Wind category		C25			

Jib length		30 m – 40 m			
Elements					
1	4.5 m	TV 20.4			
2	9.0 m	TV 20.4			
3	13.5 m	TV 20.4			
4	18.0 m	TV 20.4			
5	22.5 m	TV 20.4			
6	27.0 m	TV 20.4			
7	31.5 m	TV 20.4			
8	32.5 m	VR 2023			
9	37.0 m	TV 23			
10	41.5 m	TV 23			
11	46.0 m	TV 23			
12	50.5 m	HTA 23			
13	55.0 m	HT 23			
14	59.5 m	HT 23			
15	64.0 m	HT 23			
16	68.5 m	HT 23			
Foundation anchors		FUA 160 G			
Tower height [m]		68.5			
Wind category		C25			

2 Technical data

Jib length		30 m – 40 m			
Elements					
1	4.5 m	TV 20.4			
2	9.0 m	TV 20.4			
3	13.5 m	TV 20.4			
4	18.0 m	TV 20.4			
5	22.5 m	TV 20.4			
6	27.0 m	TV 20.4			
7	31.5 m	TV 20.4			
8	32.5 m	VR 20.23			
9	37.0 m	TV 23			
10	41.5 m	TV 23			
11	46.0 m	HTA 23			
12	50.5 m	HT 23			
13	55.0 m	HT 23			
14	59.5 m	HT 23			
15	64.0 m	HT 23			
16	75.3 m	BT 23			
Foundation anchors		FUA 210 G			
Tower height [m]		75.3			
Wind category		C25			

Jib length		30 m – 40 m			
Elements					
1	4.5 m	TV 20.4			
2	9.0 m	TV 20.4			
3	13.5 m	TV 20.4			
4	18.0 m	TV 20.4			
5	22.5 m	TV 20.4			
6	27.0 m	TV 20.4			
7	28.0 m	VR 2023			
8	32.5 m	TV 23			
9	37.0 m	TV 23			
10	41.5 m	TV 23			
11	46.0 m	HTA 23			
12	50.5 m	HT 23			
13	55.0 m	HT 23			
14	59.5 m	HT 23			
15	64.0 m	HT 23			
16	65.2 m	VR 23/25-29			
17	69.7 m	UV 29			
18	74.2 m	UV 29			
19	84.2 m	BT 29			
Foundation anchors		FUA BT 29			
Tower height [m]		84.2			
Wind category		C25			

2 Technical data

Jib length		45 m – 50 m			
Elements					
1	4.5 m	TV 20.4			
2	9.0 m	TV 20.4			
3	13.5 m	TV 20.4			
4	18.0 m	TV 20.4			
5	22.5 m	TV 20.4			
6	27.0 m	TV 20.4			
7	31.5 m	TV 20.4			
8	36.0 m	TV 20.4			
9	40.5 m	TV 20.4			
Foundation anchors		FUA 140 / Type D-140			
Tower height [m]		40.5			
Wind category		C25			

Jib length		45 m – 50 m			
Elements					
1	4.5 m	TV 20.4			
2	9.0 m	TV 20.4			
3	13.5 m	TV 20.4			
4	18.0 m	TV 20.4			
5	22.5 m	TV 20.4			
6	27.0 m	TV 20.4			
7	31.5 m	TV 20.4			
8	36.0 m	TV 20.4			
9	37.0 m	VR 2023			
10	41.5 m	TV 23			
11	46.0 m	TV 23			
12	50.5 m	TV 23			
Foundation anchors		FUA 160 G			
Tower height [m]		50.5			
Wind category		C25			

2 Technical data

Jib length		45 m – 50 m			
Elements					
1	4.5 m	TV 20.4			
2	9.0 m	TV 20.4			
3	13.5 m	TV 20.4			
4	18.0 m	TV 20.4			
5	22.5 m	TV 20.4			
6	27.0 m	TV 20.4			
7	31.5 m	TV 20.4			
8	32.5 m	VR 20.23			
9	37.0 m	TV 23			
10	41.5 m	TV 23			
11	46.0 m	TV 23			
12	50.5 m	HTA 23			
13	55.0 m	HT 23			
14	59.5 m	HT 23			
15	64.0 m	HT 23			
Foundation anchors		FUA 160 G			
Tower height [m]		64.0			
Wind category		C25			

Jib length		45 m – 50 m			
Elements					
1	4.5 m	TV 20.4			
2	9.0 m	TV 20.4			
3	13.5 m	TV 20.4			
4	18.0 m	TV 20.4			
5	22.5 m	TV 20.4			
6	27.0 m	TV 20.4			
7	31.5 m	TV 20.4			
8	32.5 m	VR 2023			
9	37.0 m	TV 23			
10	41.5 m	TV 23			
11	46.0 m	HTA 23			
12	50.5 m	HT 23			
13	55.0 m	HT 23			
14	59.5 m	HT 23			
15	70.8 m	BT 23			
Foundation anchors		FUA 210 G			
Tower height [m]		70.8			
Wind category		C25			

2 Technical data

Jib length		45 m – 50 m			
Elements					
1	4.5 m	TV 20.4			
2	9.0 m	TV 20.4			
3	13.5 m	TV 20.4			
4	18.0 m	TV 20.4			
5	22.5 m	TV 20.4			
6	27.0 m	TV 20.4			
7	28.0 m	VR 2023			
8	32.5 m	TV 23			
9	37.0 m	TV 23			
10	41.5 m	TV 23			
11	46.0 m	HTA 23			
12	50.5 m	HT 23			
13	55.0 m	HT 23			
14	59.5 m	HT 23			
15	60.7 m	VR 23/25-29			
16	65.2 m	UV 29			
17	69.7 m	UV 29			
18	79.7 m	BT 29			
Foundation anchors		FUA BT 29			
Tower height [m]		79.7			
Wind category		C25			

Jib length		55 m – 60 m			
Elements					
1	4.5 m	TV 20.4			
2	9.0 m	TV 20.4			
3	13.5 m	TV 20.4			
4	18.0 m	TV 20.4			
5	22.5 m	TV 20.4			
6	27.0 m	TV 20.4			
7	31.5 m	TV 20.4			
8	36.0 m	TV 20.4			
9	40.5 m	TV 20.4			
Foundation anchors		FUA 140 / Type D-140			
Tower height [m]		40.5			
Wind category		C25			

2 Technical data

Jib length		55 m – 60 m			
Elements					
1	4.5 m	TV 20.4			
2	9.0 m	TV 20.4			
3	13.5 m	TV 20.4			
4	18.0 m	TV 20.4			
5	22.5 m	TV 20.4			
6	27.0 m	TV 20.4			
7	31.5 m	TV 20.4			
8	36.0 m	TV 20.4			
9	37.0 m	VR 2023			
10	41.5 m	TV 23			
11	46.0 m	TV 23			
12	50.5 m	TV 23			
Foundation anchors		FUA 160 G			
Tower height [m]		50.5			
Wind category		C25			

Jib length		55 m – 60 m			
Elements					
1	4.5 m	TV 20.4			
2	9.0 m	TV 20.4			
3	13.5 m	TV 20.4			
4	18.0 m	TV 20.4			
5	22.5 m	TV 20.4			
6	27.0 m	TV 20.4			
7	31.5 m	TV 20.4			
8	36.0 m	TV 20.4			
9	37.0 m	VR 2023			
10	41.5 m	TV 23			
11	46.0 m	TV 23			
12	50.5 m	HTA 23			
13	55.0 m	HT 23			
14	59.5 m	HT 23			
Foundation anchors		FUA 160 G			
Tower height [m]		59.5			
Wind category		C25			

2 Technical data

Jib length		55 m – 60 m			
Elements					
1	4.5 m	TV 20.4			
2	9.0 m	TV 20.4			
3	13.5 m	TV 20.4			
4	18.0 m	TV 20.4			
5	22.5 m	TV 20.4			
6	27.0 m	TV 20.4			
7	31.5 m	TV 20.4			
8	32.5 m	TV 20.4			
9	37.0 m	VR 2023			
10	41.5 m	TV 23			
11	46.0 m	TV 23			
12	50.5 m	HTA 23			
13	55.0 m	HT 23			
14	66.3 m	BT 23			
Foundation anchors		FUA 210 G			
Tower height [m]		66.3			
Wind category		C25			

Jib length		55 m – 60 m			
Elements					
1	4.5 m	TV 20.4			
2	9.0 m	TV 20.4			
3	13.5 m	TV 20.4			
4	18.0 m	TV 20.4			
5	22.5 m	TV 20.4			
6	27.0 m	TV 20.4			
7	31.5 m	TV 20.4			
8	36.0 m	TV 20.4			
9	37.0 m	VR 2023			
10	41.5 m	TV 23			
11	46.0 m	HTA 23			
12	50.5 m	HT 23			
13	55.0 m	HT 23			
14	56.2 m	VR 23/25-29			
15	60.7 m	UV 29			
16	65.2 m	UV 29			
17	75.2 m	BT 29			
Foundation anchors		FUA BT 29			
Tower height [m]		75.2			
Wind category		C25			

2 Technical data

2.7.2 Tower combinations on foundation (slewing section with HT 23 - connection)

Jib length		30 m – 40 m			
Elements					
1	4.5 m	HT 23			
2	9.0 m	HT 23			
3	13.5 m	HT 23			
4	18.0 m	HT 23			
5	22.5 m	HT 23			
6	27.0 m	HT 23			
7	31.5 m	HT 23			
8	36.0 m	HT 23			
9	40.5 m	HT 23			
10	45.0 m	HT 23			
11	49.5 m	HT 23			
12	54.0 m	HT 23			
13	58.5 m	HT 23			
14	63.0 m	HT 23			
15	67.5 m	HT 23			
Foundation anchors		FUA 160 G			
Tower height [m]		67.5			
Wind category		C25			

Jib length		30 m – 40 m			
Elements					
1	4.5 m	HT 23			
2	9.0 m	HT 23			
3	13.5 m	HT 23			
4	18.0 m	HT 23			
5	22.5 m	HT 23			
6	27.0 m	HT 23			
7	31.5 m	HT 23			
8	36.0 m	HT 23			
9	40.5 m	HT 23			
10	45.0 m	HT 23			
11	49.5 m	HT 23			
12	54.0 m	HT 23			
13	58.5 m	HT 23			
14	63.0 m	HT 23			
15	74.3 m	BT 23			
Foundation anchors		FUA 210 G			
Tower height [m]		74.3			
Wind category		C25			

2 Technical data

Jib length		30 m – 40 m			
Elements					
1	4.5 m	HT 23			
2	9.0 m	HT 23			
3	13.5 m	HT 23			
4	18.0 m	HT 23			
5	22.5 m	HT 23			
6	27.0 m	HT 23			
7	31.5 m	HT 23			
8	36.0 m	HT 23			
9	40.5 m	HT 23			
10	45.0 m	HT 23			
11	49.5 m	HT 23			
12	54.0 m	HT 23			
13	58.5 m	HT 23			
14	63.0 m	HT 23			
15	64.2 m	VR 23/25-29			
16	68.7 m	UV 29			
17	73.2 m	UV 29			
18	83.2 m	BT 29			
Foundation anchors		FUA BT 29			
Tower height [m]		83.2			
Wind category		C25			

Jib length		45 m – 50 m			
Elements					
1	4.5 m	HT 23			
2	9.0 m	HT 23			
3	13.5 m	HT 23			
4	18.0 m	HT 23			
5	22.5 m	HT 23			
6	27.0 m	HT 23			
7	31.5 m	HT 23			
8	36.0 m	HT 23			
9	40.5 m	HT 23			
10	45.0 m	HT 23			
11	49.5 m	HT 23			
12	54.0 m	HT 23			
13	58.5 m	HT 23			
14	63.0 m	HT 23			
Foundation anchors		FUA 160 G			
Tower height [m]		63.0			
Wind category		C25			

2 Technical data

Jib length		45 m – 50 m			
Elements					
1	4.5 m	HT 23			
2	9.0 m	HT 23			
3	13.5 m	HT 23			
4	18.0 m	HT 23			
5	22.5 m	HT 23			
6	27.0 m	HT 23			
7	31.5 m	HT 23			
8	36.0 m	HT 23			
9	40.5 m	HT 23			
10	45.0 m	HT 23			
11	49.5 m	HT 23			
12	54.0 m	HT 23			
13	58.5 m	HT 23			
14	69.8 m	BT 23			
Foundation anchors		FUA 210 G			
Tower height [m]		69.8			
Wind category		C25			

Jib length		45 m – 50 m			
Elements					
1	4.5 m	HT 23			
2	9.0 m	HT 23			
3	13.5 m	HT 23			
4	18.0 m	HT 23			
5	22.5 m	HT 23			
6	27.0 m	HT 23			
7	31.5 m	HT 23			
8	36.0 m	HT 23			
9	40.5 m	HT 23			
10	45.0 m	HT 23			
11	49.5 m	HT 23			
12	54.0 m	HT 23			
13	58.5 m	HT 23			
14	59.7 m	VR 23/25-29			
15	64.2 m	UV 29			
16	68.7 m	UV 29			
17	78.7 m	BT 29			
Foundation anchors		FUA BT 29			
Tower height [m]		78.7			
Wind category		C25			

2 Technical data

Jib length		55 m – 60 m			
Elements					
1	4.5 m	HT 23			
2	9.0 m	HT 23			
3	13.5 m	HT 23			
4	18.0 m	HT 23			
5	22.5 m	HT 23			
6	27.0 m	HT 23			
7	31.5 m	HT 23			
8	36.0 m	HT 23			
9	40.5 m	HT 23			
10	45.0 m	HT 23			
11	49.5 m	HT 23			
12	54.0 m	HT 23			
13	58.5 m	HT 23			
Foundation anchors		FUA 160 G			
Tower height [m]		58.5			
Wind category		C25			

Jib length		55 m – 60 m			
Elements					
1	4.5 m	HT 23			
2	9.0 m	HT 23			
3	13.5 m	HT 23			
4	18.0 m	HT 23			
5	22.5 m	HT 23			
6	27.0 m	HT 23			
7	31.5 m	HT 23			
8	36.0 m	HT 23			
9	40.5 m	HT 23			
10	45.0 m	HT 23			
11	49.5 m	HT 23			
12	54.0 m	HT 23			
13	65.3 m	BT 23			
Foundation anchors		FUA 210 G			
Tower height [m]		65.3			
Wind category		C25			

2 Technical data

Jib length		55 m – 60 m			
Elements					
1	4.5 m	HT 23			
2	9.0 m	HT 23			
3	13.5 m	HT 23			
4	18.0 m	HT 23			
5	22.5 m	HT 23			
6	27.0 m	HT 23			
7	31.5 m	HT 23			
8	36.0 m	HT 23			
9	40.5 m	HT 23			
10	45.0 m	HT 23			
11	49.5 m	HT 23			
12	54.0 m	HT 23			
13	55.2 m	VR 23/25-29			
14	59.7 m	UV 29			
15	64.2 m	UV 29			
16	74.2 m	BT 29			
Foundation anchors		FUA BT 29			
Tower height [m]		74.2			
Wind category		C25			

2.7.3 Tower combinations on cross frame (slewing section with TV 20 - connection)

Jib length		30 m – 40 m			
Elements					
1	4.5 m	TV 20.4	TV 20.4		
2	9.0 m	TV 20.4	TV 20.4		
3	13.5 m	TV 20.4	TV 20.4		
4	18.0 m	TV 20.4	TV 20.4		
5	22.5 m	TV 20.4	TV 20.4		
6	27.0 m	TV 20.4	TV 20.4		
7	31.5 m	TV 20.4	TV 20.4		
8	36.0 m	TV 20.4	TV 20.4		
9	40.5 m	TV 20.4	TV 20.4		
10	41.5 m		VR 2023		
11	46.0 m		TV 23		
Substructure		KRV 10-60	KRV 10-60		
Corner distance [m x m]		5.0 x 5.0 6.0 x 6.0	5.0 x 5.0		
Substructure height [m]		1.2	1.2		
Tower height [m]		41.7	47.2		
Wind category		C25			

2 Technical data

Jib length		30 m – 40 m			
Elements					
1	4.5 m	TV 20.4			
2	9.0 m	TV 20.4			
3	13.5 m	TV 20.4			
4	18.0 m	TV 20.4			
5	22.5 m	TV 20.4			
6	27.0 m	TV 20.4			
7	31.5 m	TV 20.4			
8	36.0 m	TV 20.4			
9	37.0 m	VR 2023			
10	41.5 m	TV 23			
11	46.0 m	TV 23			
12	50.5 m	TV 23			
Substructure		KRV 10-60			
Corner distance [m x m]		6.0 x 6.0			
Substructure height [m]		1.2			
Tower height [m]		51.7			
Wind category		C25			

Jib length		30 m – 40 m			
Elements					
1	4.5 m	TV 20.4	TV 20.4		
2	9.0 m	TV 20.4	TV 20.4		
3	13.5 m	TV 20.4	TV 20.4		
4	18.0 m	TV 20.4	TV 20.4		
5	22.5 m	TV 20.4	TV 20.4		
6	27.0 m	TV 20.4	TV 20.4		
7	31.5 m	TV 20.4	TV 20.4		
8	32.5 m	VR 2023	VR 2023		
9	37.0 m	TV 23	TV 23		
10	41.5 m	TV 23	TV 23		
11	46.0 m	TV 23	TV 23		
12	50.5 m	HTA 23	HTA 23		
13	55.0 m	HT 23	HT 23		
14	59.5 m	HT 23	HT 23		
15	64.0 m	HT 23	HT 23		
16	68.5 m	HT 23	HT 23		
Substructure		KR 12-60 KR 12-60/80	KR 16-80 KR 16-80/100		
Corner distance [m x m]		6.0 x 6.0 8.0 x 8.0	8.0 x 8.0 10.0 x 10.0		
Substructure height [m]		1.4	1.8		
Tower height [m]		69.9	70.3		
Wind category		C25			

2 Technical data

Jib length		30 m – 40 m			
Elements					
1	4.5 m	TV 20.4			
2	9.0 m	TV 20.4			
3	13.5 m	TV 20.4			
4	18.0 m	TV 20.4			
5	22.5 m	TV 20.4			
6	27.0 m	TV 20.4			
7	28.0 m	VR 2023			
8	32.5 m	TV 23			
9	37.0 m	TV 23			
10	41.5 m	TV 23			
11	46.0 m	HTA 23			
12	50.5 m	HT 23			
13	55.0 m	HT 23			
14	59.5 m	HT 23			
15	64.0 m	HT 23			
16	68.5 m	HT 23			
17	69.7 m	VR 23/25-29			
18	79.7 m	BT 29			
Substructure		KR 16-80 KR 16-80/100			
Corner distance [m x m]		8.0 x 8.0 10.0 x 10.0			
Substructure height [m]		1.8			
Tower height [m]		81.5			
Wind category		C25			

Jib length		45 m – 50 m			
Elements					
1	4.5 m	TV 20.4			
2	9.0 m	TV 20.4			
3	13.5 m	TV 20.4			
4	18.0 m	TV 20.4			
5	22.5 m	TV 20.4			
6	27.0 m	TV 20.4			
7	31.5 m	TV 20.4			
8	36.0 m	TV 20.4			
9	40.5 m	TV 20.4			
Substructure		KRV 10-60			
Corner distance [m x m]		5.0 x 5.0 6.0 x 6.0			
Substructure height [m]		1.2			
Tower height [m]		41.7			
Wind category		C25			

2 Technical data

Jib length		45 m – 50 m			
Elements					
1	4.5 m	TV 20.4			
2	9.0 m	TV 20.4			
3	13.5 m	TV 20.4			
4	18.0 m	TV 20.4			
5	22.5 m	TV 20.4			
6	27.0 m	TV 20.4			
7	31.5 m	TV 20.4			
8	36.0 m	TV 20.4			
9	37.0 m	VR 2023			
10	41.5 m	TV 23			
11	46.0 m	TV 23			
Substructure		KRV 10-60			
Corner distance [m x m]		5.0 x 5.0 6.0 x 6.0			
Substructure height [m]		1.2			
Tower height [m]		47.2			
Wind category		C25			

Jib length		45 m – 50 m			
Elements					
1	4.5 m	TV 20.4	TV 20.4		
2	9.0 m	TV 20.4	TV 20.4		
3	13.5 m	TV 20.4	TV 20.4		
4	18.0 m	TV 20.4	TV 20.4		
5	22.5 m	TV 20.4	TV 20.4		
6	27.0 m	TV 20.4	TV 20.4		
7	31.5 m	TV 20.4	TV 20.4		
8	32.5 m	VR 2023	VR 2023		
9	37.0 m	TV 23	TV 23		
10	41.5 m	TV 23	TV 23		
11	46.0 m	TV 23	TV 23		
12	50.5 m	HTA 23	HTA 23		
13	55.0 m	HT 23	HT 23		
14	59.5 m	HT 23	HT 23		
15	64.0 m	HT 23	HT 23		
Substructure		KR 12-60 KR 12-60/80	KR 16-80 KR 16-80/100		
Corner distance [m x m]		6.0 x 6.0 8.0 x 8.0	8.0 x 8.0 10.0 x 10.0		
Substructure height [m]		1.4	1.8		
Tower height [m]		65.4	65.8		
Wind category		C25			

2 Technical data

Jib length		45 m – 50 m			
Elements					
1	4.5 m	TV 20.4			
2	9.0 m	TV 20.4			
3	13.5 m	TV 20.4			
4	18.0 m	TV 20.4			
5	22.5 m	TV 20.4			
6	27.0 m	TV 20.4			
7	28.0 m	VR 2023			
8	32.5 m	TV 23			
9	37.0 m	TV 23			
10	41.5 m	TV 23			
11	46.0 m	HTA 23			
12	50.5 m	HT 23			
13	55.0 m	HT 23			
14	59.5 m	HT 23			
15	60.7 m	VR 23/25-29			
16	65.2 m	UV 29			
17	75.2 m	BT 29			
Substructure		KR 16-80 KR 16-80/100			
Corner distance [m x m]		8.0 x 8.0 10.0 x 10.0			
Substructure height [m]		1.8			
Tower height [m]		77.0			
Wind category		C25			

Jib length		55 m – 60 m			
Elements					
1	4.5 m	TV 20.4	TV 20.4		
2	9.0 m	TV 20.4	TV 20.4		
3	13.5 m	TV 20.4	TV 20.4		
4	18.0 m	TV 20.4	TV 20.4		
5	22.5 m	TV 20.4	TV 20.4		
6	27.0 m	TV 20.4	TV 20.4		
7	31.5 m	TV 20.4	TV 20.4		
8	36.0 m	TV 20.4	TV 20.4		
9	40.5 m	TV 20.4			
Substructure		KRV 10-60	KRV 10-60		
Corner distance [m x m]		5.0 x 5.0	6.0 x 6.0		
Substructure height [m]		1.2	1.2		
Tower height [m]		41.7	37.2		
Wind category		C25			

2 Technical data

Jib length		55 m – 60 m			
Elements					
1	4.5 m	TV 20.4	TV 20.4	TV 20.4	TV 20.4
2	9.0 m	TV 20.4	TV 20.4	TV 20.4	TV 20.4
3	13.5 m	TV 20.4	TV 20.4	TV 20.4	TV 20.4
4	18.0 m	TV 20.4	TV 20.4	TV 20.4	TV 20.4
5	22.5 m	TV 20.4	TV 20.4	TV 20.4	TV 20.4
6	27.0 m	TV 20.4	TV 20.4	TV 20.4	TV 20.4
7	31.5 m	TV 20.4	TV 20.4	TV 20.4	TV 20.4
8	36.0 m	TV 20.4	TV 20.4	TV 20.4	TV 20.4
9	37.0 m	VR 2023	VR 2023	VR 2023	VR 2023
10	41.5 m	TV 23	TV 23	TV 23	TV 23
11	46.0 m		TV 23	TV 23	TV 23
12	50.5 m		HTA 23	HTA 23	HTA 23
13	55.0 m		HT 23	HT 23	HT 23
14	59.5 m		HT 23		HT 23
Substructure		KRV 10-60	KR 12-60	KR 12-60/80	KR 16-80 KR 16-80/100
Corner distance [m x m]		6.0 x 6.0	6.0 x 6.0	8.0 x 8.0	8.0 x 8.0 10.0 x 10.0
Substructure height [m]		1.2	1.4	1.4	1.8
Tower height [m]		42.7	60.9	56.4	61.3
Wind category		C25			

Jib length		55 m – 60 m			
Elements					
1	4.5 m	TV 20.4			
2	9.0 m	TV 20.4			
3	13.5 m	TV 20.4			
4	18.0 m	TV 20.4			
5	22.5 m	TV 20.4			
6	27.0 m	TV 20.4			
7	31.5 m	TV 20.4			
8	32.5 m	VR 2023			
9	37.0 m	TV 23			
10	41.5 m	TV 23			
11	46.0 m	HTA 23			
12	50.5 m	HT 23			
13	55.0 m	HT 23			
14	56.2 m	VR 23/25-29			
15	60.7 m	UV 29			
16	70.7 m	BT 29			
Substructure		KR 16-80 KR 16-80/100			
Corner distance [m x m]		8.0 x 8.0 10.0 x 10.0			
Substructure height [m]		1.8			
Tower height [m]		72.5			
Wind category		C25			

2 Technical data

2.7.4 Tower combinations on cross frame element (slewing section with TV 20 - connection)

Jib length		30 m – 40 m			
Elements					
1	4.5 m	TV 20.4	TV 20.4		
2	9.0 m	TV 20.4	TV 20.4		
3	13.5 m	TV 20.4	TV 20.4		
4	18.0 m	TV 20.4	TV 20.4		
5	22.5 m	TV 20.4	TV 20.4		
6	27.0 m	TV 20.4	TV 20.4		
7	31.5 m		TV 20.4		
8	36.0 m		TVÜ 20.4		
9	40.5 m		TV 25		
10	45.0 m		TV 25		
11	49.5 m		TV 25		
12	54.0 m		UVA 25		
Substructure		KRE 260.2	KRE 480		
Corner distance [m x m]		6.0 x 6.0	8.0 x 8.0		
Substructure height [m]		4.0	4.0		
Tower height [m]		31.0	58.0		
Wind category		C25			

Jib length		45 m – 50 m			
Elements					
1	4.5 m	TV 20.4	TV 20.4		
2	9.0 m	TV 20.4	TV 20.4		
3	13.5 m	TV 20.4	TV 20.4		
4	18.0 m	TV 20.4	TV 20.4		
5	22.5 m	TV 20.4	TV 20.4		
6	27.0 m		TV 20.4		
7	31.5 m		TV 20.4		
8	36.0 m		TVÜ 20.4		
9	40.5 m		TV 25		
10	45.0 m		TV 25		
11	49.5 m		UVA 25		
Substructure		KRE 260.2	KRE 480		
Corner distance [m x m]		6.0 x 6.0	8.0 x 8.0		
Substructure height [m]		4.0	4.0		
Tower height [m]		26.5	53.5		
Wind category		C25			

2 Technical data

Jib length		55 m – 60 m			
Elements					
1	4.5 m	TV 20.4	TV 20.4		
2	9.0 m	TV 20.4	TV 20.4		
3	13.5 m	TV 20.4	TV 20.4		
4	18.0 m	TV 20.4	TV 20.4		
5	22.5 m		TV 20.4		
6	27.0 m		TV 20.4		
7	31.5 m		TV 20.4		
8	36.0 m		TVÜ 20.4		
9	40.5 m		TV 25		
10	45.0 m		UVA 25		
Substructure		KRE 260.2	KRE 480		
Corner distance [m x m]		6.0 x 6.0	8.0 x 8.0		
Substructure height [m]		4.0	4.0		
Tower height [m]		22.0	49.0		
Wind category		C25			

2.7.5 Tower combinations on mobile cross frame (slewing section with TV 20 - connection)

Jib length		30 m – 40 m			
Elements					
1	4.5 m	TV 20.4			
2	9.0 m	TV 20.4			
3	13.5 m	TV 20.4			
4	18.0 m	TV 20.4			
5	22.5 m	TV 20.4			
6	27.0 m	TV 20.4			
7	28.0 m	VR 2023			
8	32.5 m	TV 23			
9	37.0 m	TV 23			
10	41.5 m	TV 23			
11	46.0 m	HTA 23			
Substructure		KRF4 12-60/80			
Corner distance [m x m]		8.0 x 8.0			
Substructure height [m]		2.5			
Tower height [m]		48.5			
Wind category		C25			

2 Technical data

Jib length		30 m – 40 m			
Elements					
1	4.5 m	TV 20.4	TV 20.4		
2	9.0 m	TV 20.4	TV 20.4		
3	13.5 m	TV 20.4	TV 20.4		
4	18.0 m	TV 20.4	TV 20.4		
5	22.5 m	TV 20.4	TV 20.4		
6	23.5 m	VR 2023	VR 2023		
7	28.0 m	TV 23	TV 23		
8	32.5 m	TV 23	TV 23		
9	37.0 m	HTA 23	HTA 23		
10	41.5 m	HT 23	HT 23		
11	46.0 m	HT 23	HT 23		
12	50.5 m	HT 23	HT 23		
13	55.0 m	HT 23	HT 23		
14	59.5 m	HT 23	HT 23		
15	64.0 m	HT 23	HT 23		
Substructure		KRF6 12-60/80	KRF 16-80/100		
Corner distance [m x m]		8.0 x 8.0	10.0 x 10.0		
Substructure height [m]		2.9	3.3		
Tower height [m]		66.9	67.3		
Wind category		C25			

Jib length		30 m – 40 m			
Elements					
1	4.5 m	TV 20.4			
2	9.0 m	TV 20.4			
3	13.5 m	TV 20.4			
4	18.0 m	TV 20.4			
5	22.5 m	TV 20.4			
6	23.5 m	VR 2023			
7	28.0 m	TV 23			
8	32.5 m	TV 23			
9	37.0 m	HTA 23			
10	41.5 m	HT 23			
11	46.0 m	HT 23			
12	50.5 m	HT 23			
13	55.0 m	HT 23			
14	59.5 m	HT 23			
15	60.7 m	VR 23/25-29			
16	65.2 m	UV 29			
17	75.2 m	BT 29			
Substructure		KRF 16-80/100			
Corner distance [m x m]		10.0 x 10.0			
Substructure height [m]		3.3			
Tower height [m]		78.5			
Wind category		C25			

2 Technical data

Jib length		45 m – 50 m			
Elements					
1	4.5 m	TV 20.4			
2	9.0 m	TV 20.4			
3	13.5 m	TV 20.4			
4	18.0 m	TV 20.4			
5	22.5 m	TV 20.4			
6	27.0 m	TV 20.4			
7	28.0 m	VR 2023			
8	32.5 m	TV 23			
9	37.0 m	TV 23			
10	41.5 m	HTA 23			
11	46.0 m	HT 23			
Substructure		KRF4 12-60/80			
Corner distance [m x m]		8.0 x 8.0			
Substructure height [m]		2.5			
Tower height [m]		48.5			
Wind category		C25			

Jib length		45 m – 50 m			
Elements					
1	4.5 m	TV 20.4	TV 20.4		
2	9.0 m	TV 20.4	TV 20.4		
3	13.5 m	TV 20.4	TV 20.4		
4	18.0 m	TV 20.4	TV 20.4		
5	22.5 m	TV 20.4	TV 20.4		
6	23.5 m	VR 2023	VR 2023		
7	28.0 m	TV 23	TV 23		
8	32.5 m	TV 23	TV 23		
9	37.0 m	HTA 23	HTA 23		
10	41.5 m	HT 23	HT 23		
11	46.0 m	HT 23	HT 23		
12	50.5 m	HT 23	HT 23		
13	55.0 m	HT 23	HT 23		
14	59.5 m	HT 23	HT 23		
Substructure		KRF6 12-60/80	KRF 16-80/100		
Corner distance [m x m]		8.0 x 8.0	10.0 x 10.0		
Substructure height [m]		2.9	3.3		
Tower height [m]		62.4	62.8		
Wind category		C25			

2 Technical data

Jib length		45 m – 50 m			
Elements					
1	4.5 m	TV 20.4			
2	9.0 m	TV 20.4			
3	13.5 m	TV 20.4			
4	18.0 m	TV 20.4			
5	22.5 m	TV 20.4			
6	23.5 m	VR 2023			
7	28.0 m	TV 23			
8	32.5 m	HTA 23			
9	37.0 m	HT 23			
10	41.5 m	HT 23			
11	46.0 m	HT 23			
12	50.5 m	HT 23			
13	55.0 m	HT 23			
14	56.2 m	VR 23/25-29			
15	60.7 m	UV 29			
16	70.7 m	BT 29			
Substructure		KRF 16-80/100			
Corner distance [m x m]		10.0 x 10.0			
Substructure height [m]		3.3			
Tower height [m]		74.0			
Wind category		C25			

Jib length		55 m – 60 m			
Elements					
1	4.5 m	TV 20.4			
2	9.0 m	TV 20.4			
3	13.5 m	TV 20.4			
4	18.0 m	TV 20.4			
5	22.5 m	TV 20.4			
6	27.0 m	TV 20.4			
7	31.5 m	TV 20.4			
8	32.5 m	VR 2023			
9	37.0 m	TV 23			
10	41.5 m	TV 23			
Substructure		KRF4 12-60/80			
Corner distance [m x m]		8.0 x 8.0			
Substructure height [m]		2.5			
Tower height [m]		44.0			
Wind category		C25			

2 Technical data

Jib length		55 m – 60 m			
Elements					
1	4.5 m	TV 20.4			
2	9.0 m	TV 20.4			
3	13.5 m	TV 20.4			
4	18.0 m	TV 20.4			
5	22.5 m	TV 20.4			
6	27.0 m	TV 20.4			
7	28.0 m	VR 2023			
8	32.5 m	TV 23			
9	37.0 m	TV 23			
10	41.5 m	TV 23			
11	46.0 m	HTA 23			
12	50.5 m	HT 23			
13	55.0 m	HT 23			
Substructure		KRF6 12-60/80			
Corner distance [m x m]		8.0 x 8.0			
Substructure height [m]		2.9			
Tower height [m]		57.9			
Wind category		C25			

Jib length		55 m – 60 m			
Elements					
1	4.5 m	TV 20.4			
2	9.0 m	TV 20.4			
3	13.5 m	TV 20.4			
4	18.0 m	TV 20.4			
5	22.5 m	TV 20.4			
6	23.5 m	VR 2023			
7	28.0 m	TV 23			
8	32.5 m	TV 23			
9	37.0 m	HTA 23			
10	41.5 m	HT 23			
11	46.0 m	HT 23			
12	50.5 m	HT 23			
13	55.0 m	HT 23			
14	59.5 m	HT 23			
Substructure		KRF 16-80/100			
Corner distance [m x m]		10.0 x 10.0			
Substructure height [m]		3.3			
Tower height [m]		62.8			
Wind category		C25			

2 Technical data

Jib length		55 m – 60 m			
Elements					
1	4.5 m	TV 20.4			
2	9.0 m	TV 20.4			
3	13.5 m	TV 20.4			
4	18.0 m	TV 20.4			
5	22.5 m	TV 20.4			
6	23.5 m	VR 2023			
7	28.0 m	TV 23			
8	32.5 m	HTA 23			
9	37.0 m	HT 23			
10	41.5 m	HT 23			
11	46.0 m	HT 23			
12	50.5 m	HT 23			
13	55.0 m	HT 23			
14	56.2 m	VR 23/25-29			
15	60.7 m	UV 29			
16	70.7 m	BT 29			
Substructure		KRF 16-80/100			
Corner distance [m x m]		10.0 x 10.0			
Substructure height [m]		3.3			
Tower height [m]		74.0			
Wind category		C25			

2.7.6 Tower combinations on undercarriage (slewing section with TV 20 - connection)

Jib length		30 m – 40 m			
Elements					
1	4.5 m	TV 20.4	TV 20.4		
2	9.0 m	TV 20.4	TV 20.4		
3	13.5 m	TV 20.4	TV 20.4		
4	18.0 m	TV 20.4	TV 20.4		
5	22.5 m		TV 20.4		
6	27.0 m		TV 20.4		
7	31.5 m		TV 20.4		
8	36.0 m		TVÜ 20.4		
9	40.5 m		TV 25		
10	45.0 m		TV 25		
11	49.5 m		UVA 25		
Substructure		UW 260.3	UW 480		
Corner distance [m x m]		6.0 x 6.0	8.0 x 8.0		
Substructure height [m]		4.5	5.0		
Tower height [m]		22.5	54.5		
Wind category		C25			

2 Technical data

Jib length		45 m – 50 m			
Elements					
1	4.5 m	TV 20.4	TV 20.4		
2	9.0 m	TV 20.4	TV 20.4		
3	13.5 m	TV 20.4	TV 20.4		
4	18.0 m		TV 20.4		
5	22.5 m		TV 20.4		
6	27.0 m		TV 20.4		
7	31.5 m		TV 20.4		
8	36.0 m		TVÜ 20.4		
9	40.5 m		TV 25		
10	45.0 m		UVA 25		
Substructure		UW 260.3	UW 480		
Corner distance [m x m]		6.0 x 6.0	8.0 x 8.0		
Substructure height [m]		4.5	5.0		
Tower height [m]		18.0	50.0		
Wind category		C25			

Jib length		55 m – 60 m			
Elements					
1	4.5 m	TV 20.4	TV 20.4		
2	9.0 m	TV 20.4	TV 20.4		
3	13.5 m		TV 20.4		
4	18.0 m		TV 20.4		
5	22.5 m		TV 20.4		
6	27.0 m		TV 20.4		
7	31.5 m		TV 20.4		
8	36.0 m		TVÜ 20.4		
9	40.5 m		UVA 25		
Substructure		UW 260.3	UW 480		
Corner distance [m x m]		6.0 x 6.0	8.0 x 8.0		
Substructure height [m]		4.5	5.0		
Tower height [m]		13.5	45.5		
Wind category		C25			

2.8 Foundation loads / central ballast weights / corner loads in compliance with EN 14439 / EN 13001

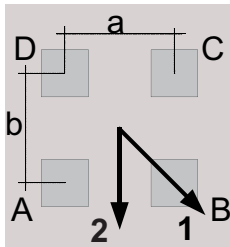
	! DANGER Usage of incorrect tower combinations. The slewing tower crane may overturn. 1) Use the specified tower combinations. 2) If you need another tower combination that is not specified here, please contact WOLFFKRAN to get an approved alternative setup in writing.
	NOTICE If you need foundation loads for tower combination with tower element TV 25 and UV 25, please contact WOLFFKRAN to get an approved alternative setup.

Jib positions

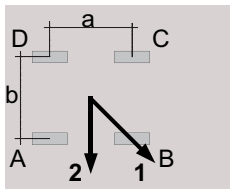
The corner loads are given for two jib positions with the maximum corner load resulting from jib position 1.

For square setup, the following equation is true: $a = b$

For rectangular setup, the following equation is true: $a > b$



Cross frame or cross frame element



Undercarriage

NOTICE! For undercarriage details, please refer to the relevant operating manual.

Wind load with crane out of operation

The stability for stormy weather is calculated on the basis of wind region C (EN 13001-2). The reference wind speed for zone C is 28 m/s (10 m above ground, averaged over 10 minutes). As a basis, a recurrence interval of 25 years is used. As a basis, a recurrence interval of 25 years is used.

Please contact WOLFFKRAN for stability calculations in other wind regions.

For information on the different substructures, refer to Section 5 of the Operating Manual.

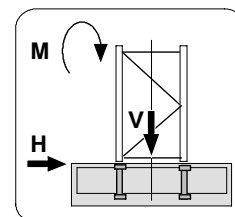
2 Technical data

2.8.1 Foundation loads slewing section with TV 20 connection (jib 30 m - 40 m)

Slewing section 355 B with TV 20 connection and 30 m – 40 m jib on foundation.
Slewing tower crane without climbing device.

Foundation load in compliance with EN 14439 / EN 13001 – typical loads

Includes all dynamical factors under consideration of second-order theory for stationary slewing tower cranes on concrete foundation in compliance with a tower combination without climbing device.



TH	Crane in service			Crane out of service			Assembly		
	Slewing torque: 340 kNm			Wind category C25					
	M	V	H	M	V	H	M	V	H
[m]	[kNm]	[kN]	[kN]	[kNm]	[kN]	[kN]	[kNm]	[kN]	[kN]
4.5	4070	992	25	3650	992	59	1660	512	9
9.0	4200	1020	27	3940	1020	65	1700	540	10
13.5	4350	1048	29	4270	1048	71	1750	568	11
18.0	4530	1077	31	4650	1077	77	1810	597	12
22.5	4730	1105	33	5070	1105	84	1880	625	13
27.0	4950	1133	35	5530	1133	90	1950	653	14
31.5	5200	1162	37	6050	1162	96	2040	682	15
36.0	5480	1190	39	6630	1190	102	2130	710	16
40.5	5800	1218	41	7270	1218	108	2240	738	17
41.5	5810	1245	42	7360	1245	112	2250	765	18
46.0	6130	1276	44	8040	1276	118	2360	796	19
50.5	6490	1306	46	8790	1306	125	2480	826	20
55.0	6880	1337	48	9620	1337	132	2610	857	22
59.5	7170	1401	51	10350	1401	140	2730	921	23
64.0	7590	1441	53	11280	1441	147	2870	961	24
68.5	8370	1784	63	12300	1480	154	3030	1000	26
70.8	8510	1828	64	12670	1524	160	3090	1044	26
75.3	9170	1867	67	13820	1564	167	3270	1084	28
Tower combination with base tower element BT 29									
79.7	9460	1930	69	14650	1625	258	3400	1145	29
84.2	10100	1975	72	16530	1671	272	3590	1191	31

Caption:

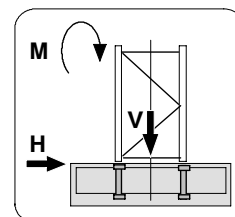
TH:	tower height	V:	Vertical load
H:	Horizontal load	M	Torque

2.8.2 Foundation loads slewing section with TV 20 connection (jib 45 m - 50 m)

Slewing section 355 B with TV 20 connection and 45 m – 50 m jib on foundation.
Slewing tower crane without climbing device.

Foundation load in compliance with EN 14439 / EN 13001 – typical loads

Includes all dynamical factors under consideration of second-order theory for stationary slewing tower cranes on concrete foundation in compliance with a tower combination without climbing device.



TH	Crane in service			Crane out of service			Assembly		
	Slewing torque: 340 kNm			Wind category C25					
	M	V	H	M	V	H	M	V	H
[m]	[kNm]	[kN]	[kN]	[kNm]	[kN]	[kN]	[kNm]	[kN]	[kN]
4.5	4140	1011	28	3840	1011	66	2720	531	9
9.0	4280	1040	30	4170	1040	72	2770	560	10
13.5	4450	1068	32	4530	1068	78	2820	588	11
18.0	4640	1096	34	4940	1096	84	2890	616	12
22.5	4850	1125	36	5400	1125	91	2970	645	13
27.0	5090	1153	38	5900	1153	97	3050	673	14
31.5	5360	1181	40	6460	1181	103	3150	701	16
36.0	5660	1209	42	7080	1209	109	3260	729	17
40.5	6000	1238	44	7770	1238	115	3380	758	18
41.5	6020	1265	45	7860	1265	119	3390	785	18
46.0	6360	1295	47	8590	1295	125	3510	815	20
50.5	6740	1326	49	9390	1326	132	3650	846	21
55.0	7050	1382	51	10140	1382	140	3770	902	22
59.5	7460	1421	54	11040	1421	147	3930	941	23
64.0	7910	1460	56	12020	1460	154	4090	980	25
66.3	8030	1504	58	12390	1504	160	4150	1024	25
70.8	8890	1847	67	13450	1544	243	4330	1064	27
Tower combination with base tower element BT 29									
75.2	9180	1909	70	14920	1605	258	4460	1125	28
79.7	9790	1955	73	16770	1652	272	4650	1172	30

Caption:

TH:	tower height	V:	Vertical load
H:	Horizontal load	M:	Torque

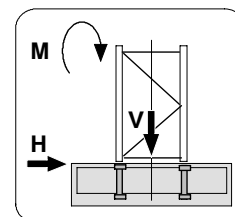
2 Technical data

2.8.3 Foundation loads slewing section with TV 20 connection (jib 55 m - 60 m)

Slewing section 355 B with TV 20 connection and 55 m – 60 m jib on foundation.
Slewing tower crane without climbing device.

Foundation load in compliance with EN 14439 / EN 13001 – typical loads

Includes all dynamical factors under consideration of second-order theory for stationary slewing tower cranes on concrete foundation in compliance with a tower combination without climbing device.



TH	Crane in service			Crane out of service			Assembly		
	Slewing torque: 340 kNm			Wind category C25					
	M	V	H	M	V	H	M	V	H
[m]	[kNm]	[kN]	[kN]	[kNm]	[kN]	[kN]	[kNm]	[kN]	[kN]
4.5	4290	1028	31	4170	1028	73	3800	548	9
9.0	4450	1056	33	4530	1056	79	3850	576	10
13.5	4630	1085	35	4920	1085	85	3910	605	11
18.0	4830	1113	37	5370	1113	91	3980	633	13
22.5	5060	1141	39	5860	1141	97	4070	661	14
27.0	5320	1170	41	6400	1170	104	4170	690	15
31.5	5610	1198	43	7010	1198	110	4280	718	16
36.0	5930	1226	45	7670	1226	116	4400	746	17
40.5	6290	1254	46	8410	1254	122	4540	774	18
41.5	6300	1282	48	8500	1282	126	4540	802	19
46.0	6660	1312	50	9280	1312	132	4690	832	20
50.5	7070	1342	52	10130	1342	139	4840	862	21
55.0	7420	1396	54	10950	1396	147	4990	916	22
59.5	7860	1436	56	11900	1436	154	5160	956	24
61.8	8010	1471	58	12300	1471	158	5220	991	24
66.3	8490	1510	60	13780	1510	242	5410	1030	26
Tower combination with base tower element BT 29									
70.7	8740	1579	63	15180	1579	257	5520	1099	27
75.2	9230	1625	66	16990	1625	271	5720	1145	29

Caption:

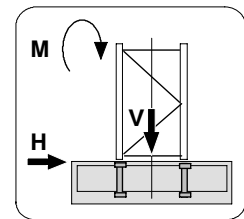
TH:	Tower heights	V:	Vertical load
H:	Horizontal load	M	Torque

2.8.4 Foundation loads slewing section with HT 23 connection (jib 30 m - 40 m)

Slewing section 355 B with HT 23 connection and 30 m – 40 m jib on foundation.
Slewing tower crane without climbing device.

Foundation load in compliance with EN 14439 / EN 13001 – typical loads

Includes all dynamical factors under consideration of second-order theory for stationary slewing tower cranes on concrete foundation in compliance with a tower combination without climbing device.



TH	Crane in service			Crane out of service			Assembly		
	Slewing torque: 340 kNm			Wind category C25					
	M	V	H	M	V	H	M	V	H
[m]	[kNm]	[kN]	[kN]	[kNm]	[kN]	[kN]	[kNm]	[kN]	[kN]
4.5	4070	1003	26	3650	1003	60	1660	523	9
9.0	4190	1042	28	3940	1042	67	1700	562	10
13.5	4340	1082	30	4270	1082	74	1750	602	11
18.0	4500	1121	32	4640	1121	81	1810	641	13
22.5	4680	1160	34	5060	1160	88	1880	680	14
27.0	4880	1200	37	5510	1200	95	1950	720	15
31.5	5100	1239	39	6020	1239	102	2030	759	16
36.0	5350	1278	41	6570	1278	109	2120	798	18
40.5	5610	1318	43	7170	1318	116	2220	838	19
45.0	5910	1357	45	7830	1357	123	2330	877	20
49.5	6230	1396	48	8560	1396	130	2440	916	21
54.0	6580	1436	50	9350	1436	137	2570	956	23
58.5	6970	1475	52	10210	1475	144	2710	995	24
63.0	7400	1515	54	11160	1515	152	2860	1035	25
67.5	7870	1554	56	12200	1554	159	3030	1074	26
69.8	8030	1590	58	12610	1589	163	3090	1109	27
74.3	8920	1932	68	13780	1628	170	3270	1148	28
Tower combination with base tower element BT 29									
78.7	9240	1991	71	14830	1688	263	3410	1208	30
83.2	9880	2037	73	16740	1734	277	3600	1254	31

Caption:

TH:	tower height	V:	Vertical load
H:	Horizontal load	M	Torque

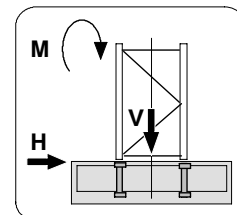
2 Technical data

2.8.5 Foundation loads slewing section with HT 23 connection (jib 45 m - 50 m)

Slewing section 355 B with HT 23 connection and 45 m – 50 m jib on foundation.
Slewing tower crane without climbing device.

Foundation load in compliance with EN 14439 / EN 13001 – typical loads

Includes all dynamical factors under consideration of second-order theory for stationary slewing tower cranes on concrete foundation in compliance with a tower combination without climbing device.



TH	Crane in service			Crane out of service			Assembly		
	Slewing torque: 340 kNm			Wind category C25					
	M	V	H	M	V	H	M	V	H
[m]	[kNm]	[kN]	[kN]	[kNm]	[kN]	[kN]	[kNm]	[kN]	[kN]
4.5	4140	1022	29	3840	1022	67	2720	542	9
9.0	4280	1062	31	4170	1062	74	2770	582	10
13.5	4440	1101	33	4530	1101	81	2820	621	12
18.0	4610	1141	35	4940	1141	88	2880	661	13
22.5	4810	1180	37	5380	1180	95	2950	700	14
27.0	5020	1219	40	5870	1219	102	3030	739	15
31.5	5260	1259	42	6410	1259	109	3120	779	17
36.0	5520	1298	44	7000	1298	116	3220	818	18
40.5	5800	1337	46	7650	1337	123	3330	857	19
45.0	6120	1377	48	8350	1377	130	3450	897	20
49.5	6460	1416	51	9120	1416	137	3580	936	22
54.0	6830	1455	53	9950	1455	144	3730	975	23
58.5	7240	1495	55	10870	1495	151	3880	1015	24
63.0	7690	1534	57	11870	1534	158	4060	1054	25
65.3	7850	1569	59	12280	1569	163	4120	1089	26
69.8	8620	1912	68	13530	1609	248	4310	1129	27
Tower combination with base tower element BT 29									
74.2	8950	1971	71	14990	1668	263	4450	1188	29
78.7	9560	2018	74	16870	1714	277	4640	1234	30

Caption:

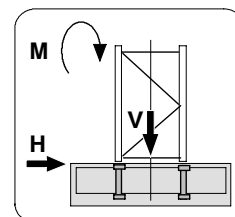
TH:	tower height	V:	Vertical load
H:	Horizontal load	M:	Torque

2.8.6 Foundation loads slewing section with HT 23 connection (jib 55 m - 60 m)

Slewing section 355 B with HT 23 connection and 55 m – 60 m jib on foundation.
Slewing tower crane without climbing device.

Foundation load in compliance with EN 14439 / EN 13001 – typical loads

Includes all dynamical factors under consideration of second-order theory for stationary slewing tower cranes on concrete foundation in compliance with a tower combination without climbing device.



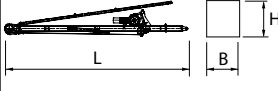
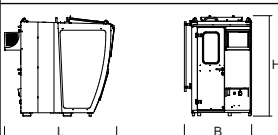
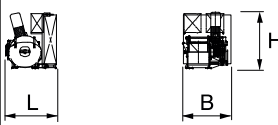
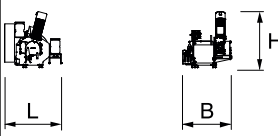
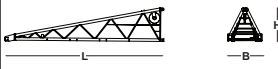
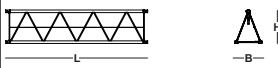
TH	Crane in service			Crane out of service			Assembly		
	Slewing torque: 340 kNm			Wind category C25					
	M	V	H	M	V	H	M	V	H
[m]	[kNm]	[kN]	[kN]	[kNm]	[kN]	[kN]	[kNm]	[kN]	[kN]
4.5	4290	1039	31	4170	1039	74	3800	559	9
9.0	4440	1079	34	4520	1079	81	3850	599	11
13.5	4610	1118	36	4920	1118	88	3910	638	12
18.0	4800	1157	38	5360	1157	95	3970	677	13
22.5	5010	1197	40	5840	1197	102	4050	717	14
27.0	5240	1236	42	6370	1236	109	4140	756	16
31.5	5500	1275	45	6940	1275	116	4230	795	17
36.0	5770	1315	47	7570	1315	123	4340	835	18
40.5	6070	1354	49	8260	1354	130	4460	874	19
45.0	6400	1393	51	9000	1393	137	4600	913	21
49.5	6760	1433	53	9820	1433	144	4740	953	22
54.0	7160	1472	56	10700	1472	151	4900	992	23
58.5	7590	1511	58	11670	1511	158	5080	1031	24
60.8	7750	1547	59	12050	1547	236	5150	1067	25
65.3	8240	1586	61	13730	1586	248	5340	1106	26
Tower combination with base tower element BT 29									
69.7	8530	1645	64	15190	1645	263	5470	1165	28
74.2	9020	1692	67	17040	1692	277	5670	1212	29

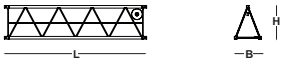
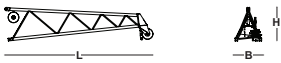
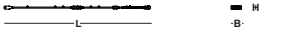
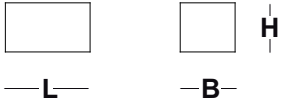
Caption:

TH:	Tower heights	V:	Vertical load
H:	Horizontal load	M	Torque

3 Package list 355 B

3 Package list 355 B

Quantity	Description	Package	L [m]	W [m]	H [m]	Weight [kg]	Volume [ft³]
1	Tower head section upper part including derricking winch, pulley block, platforms and struts		13.36	2.30	2.52	9800	77.40
1	Tower head section lower part		with TV 20 lower part of tower head section				
			5.63	2.30	2.53	11700	32.76
			with HT 23 lower part of tower head section				
			5.82	2.32	2.80	12995	37.81
1	Connecting block		3.77	2.14	2.53	3600	20.41
1	Driver's cab suspension		2.80	2.07	0.51	400	2.96
1	Driver's cab		2.26	1.45	2.30	940	7.54
1	Counterjib (including struts, platforms and standard railing)		6.58	2.30	0.93	5150	14.08
1	Machine platform Hw28110FU (incl. 920m Ø26 mm hoisting rope (3036 kg))		2.31	2.19	2.41	8200	12.12
1	Machine platform Hw28132FU (incl. 920m Ø26 mm hoisting rope (3036 kg) and 2nd brake)		2.98	2.56	2.81	11196	21.44
1	Rope slow-down device for Hw28132FU		2.71	1.39	0.52	215	1.96
1	Jib section 1 (including walkways)		11.92	2.22	2.00	2250	52.93
1	Jib section 2		10.56	1.71	1.96	1710	35.40
1	Jib section 3		5.39	1.71	1.96	960	18.07
1	Jib section 4		5.39	1.71	1.96	930	18.07

Quantity	Description	Package	L [m]	W [m]	H [m]	Weight [kg]	Volume [ft³]
2	Jib section 5		10.56	1.71	1.96	1630	35.40
1	Jib section 6 (including walkways)		10.16	1.71	1.99	2020	34.58
1	Snatch block		0.68	0.26	1.63	540	0.29
5	Stay rods for 60 m operating radius		10.51	0.24	0.61	1350	1.54
	Standard railings		2.60	1.10	0.65	300	1.86
1	Box (small parts)		0.63	0.50	0.38	100	1.12

4 Tower elements and joining frames

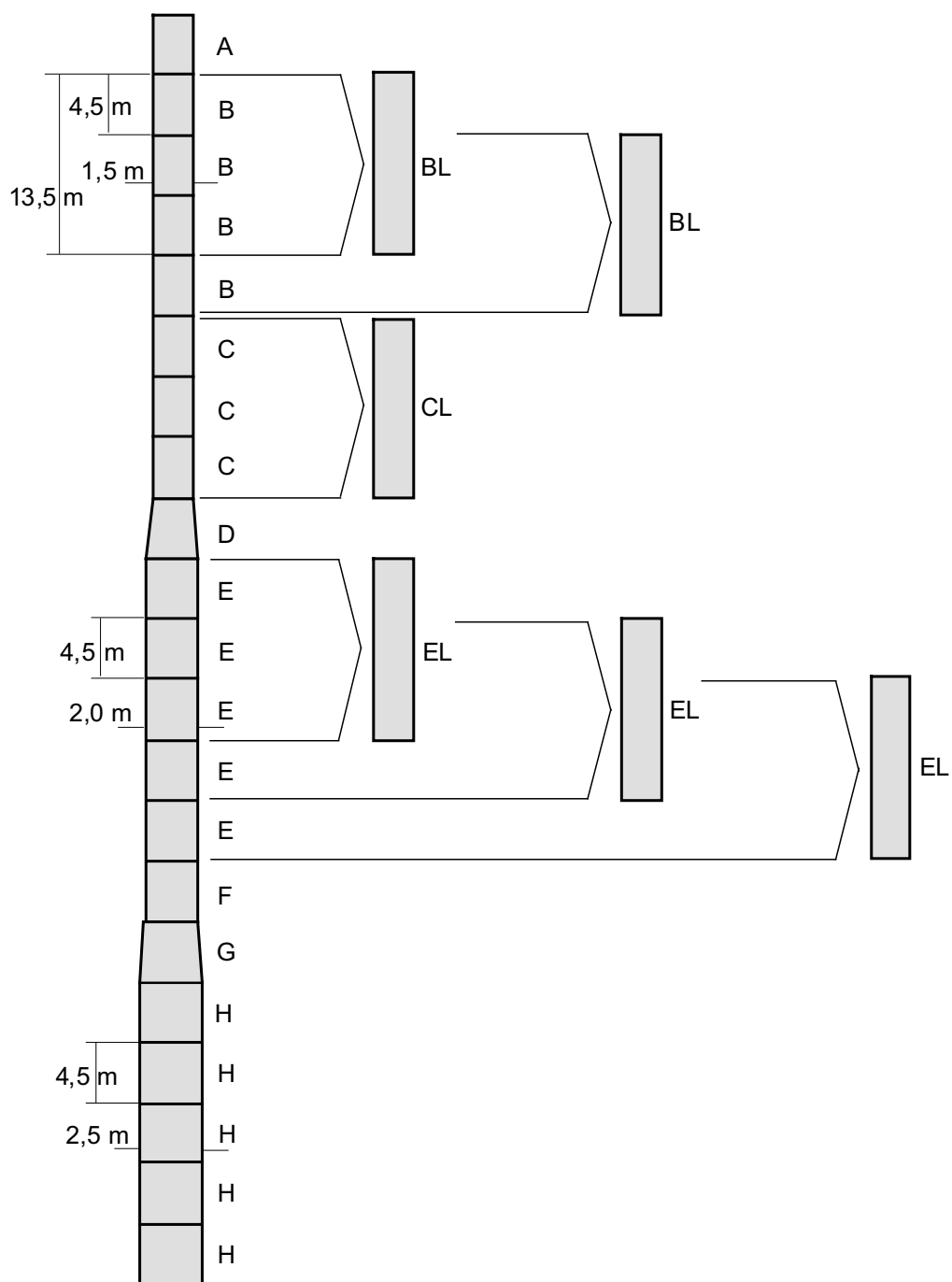
4 Tower elements and joining frames

4.1 Applications with long tower elements

	NOTICE Long tower elements are not available for all of the 4.5 m tower elements and cannot be replaced with these. However, have the option of using long tower elements of a higher grade (e.g. UT 20 replaced with UV 20.4 L). In this case, it is usually required to insert additional platforms.
---	---

The diagram below shows where you can install long tower elements.

	NOTICE The letters A to H are placeholders for any WOLFF tower element. The same letter means the same tower element.
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Applications with long tower elements

4 Tower elements and joining frames

4.2 Tower system 2.0m (TV 20.4 K)

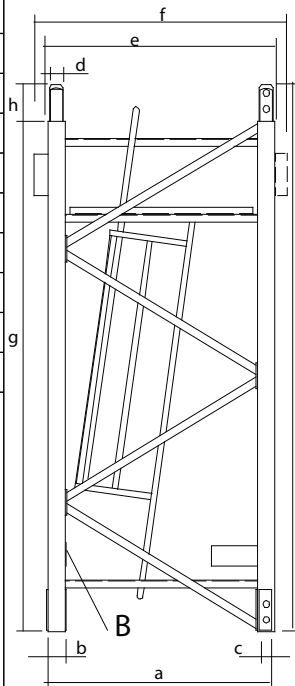
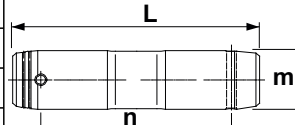
Tower element		TV 20.4 K			B = component identifier
Weight	kg	1866			
Dimensions					
a	mm	2030			
b	mm	182			
c	mm	140			
d	mm	147			
e	mm	1818			
f	mm	2590			
G*	mm	2240			
h	mm	350			
Ø1	mm	70			
Ø2	mm	70			
* System dimensions					
Knock-in bolts					
Order no.		30000001			
L	mm	295			
m	mm	70			
n	mm	228			
Quantity		8			
Spring retainers					
Order no.		10022204			
Ø	mm	10			
Quantity		16			

4.3 Tower system 2.0 m (TVA 20.4, TV 20.4)

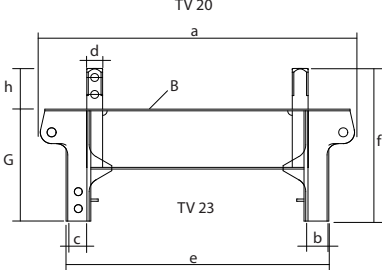
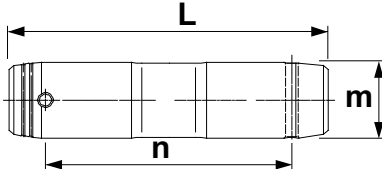
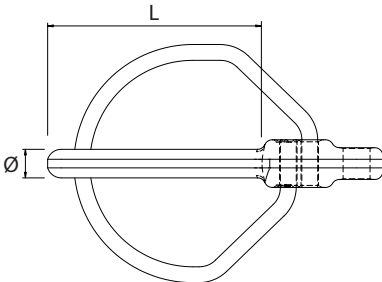
Tower element		TVA 20.4	TV 20.4		B = component identifier
Weight	kg	3080	2980		
Dimensions					
a	mm	2000	2000		
b	mm	182	182		
c	mm	147	147		
d	mm	118	140		
e	mm	2000	2000		
f	mm	2120	2120		
g*	mm	4500	4500		
h	mm	325	350		
i	mm	4815	4840		
* System dimensions					
Knock-in bolts					
Order no.		30 000 001	30 000 001		
L	mm	295	295		
m	mm	70	70		
n	mm	228	228		
Quantity		8	8		
Spring retainers					
Order no.		10 005 519	10 005 519		
Ø	mm	10	10		
Quantity		16	16		

4 Tower elements and joining frames

4.4 Transition tower system 2.0 m - 2.5 m (TVÜ 20.4)

Tower element		TVÜ 20.4			B = component identifier
Weight	kg	3440			
Dimensions					
a	mm	2500			
b	mm	182			
c	mm	147			
d	mm	140			
e	mm	2000			
f	mm	-			
g	mm	4500			
h	mm	350			
i	mm	4840			
Knock-in bolts					
Order no.		30 000 001			
L	mm	295			
m	mm	70			
n	mm	228			
Quantity		8			
Spring retainers					
Order no.		10 005 519			
Ø	mm	10			
Quantity		16			

4.5 Transition tower system 2.0 m - 2.3 m suitable for TV 20 and TV 23 tower elements (joining frame VR 2023)

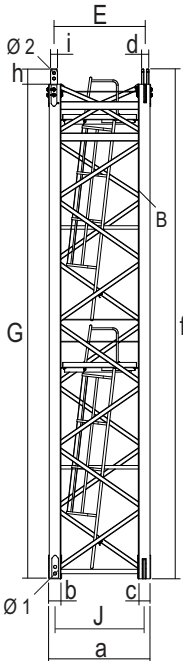
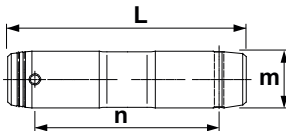
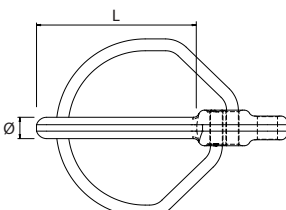
Joining frame		VR 2023	B = component identifier
Weight	kg	2417	
Dimensions			
a	mm	2780	
b	mm	219	
c	mm	140	
d	mm	140	
e	mm	2324	
f	mm	1350	
G*	mm	990	
h	mm	360	
* System dimensions			
Knock-in bolts			
Order no.		30051034	
L	mm	303	
m	mm	70	
n	mm	239	
Quantity		8	
Linch pin			
Order no.		10024804	
Ø	mm	10	
L	mm	100	
Quantity		16	

4 Tower elements and joining frames

4.6 Tower system 2.3 m (TV 23, HT 23, HTA 23)

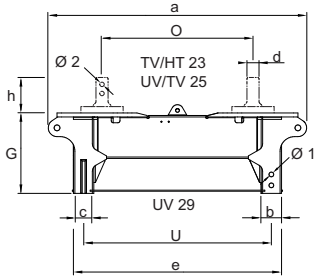
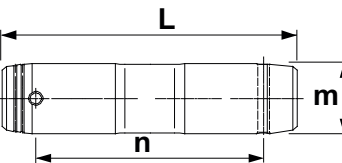
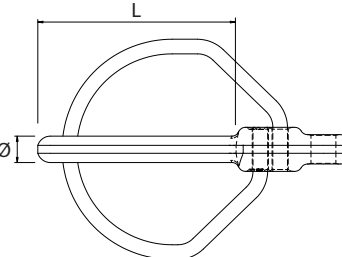
Tower element		TV 23	HT 23	HTA 23	B = component identifier
Weight	kg	3041	3936	4490	
Dimensions					
a	mm	2320	2320	2305	
b	mm	212	216	216	
c	mm	147	176	176	
d	mm	140	165	138	
e	mm	2108	2074	2074	
f	mm	4840	4840	4840	
G*	mm	4500	4500	4500	
h	mm	340	340	340	
Ø1	mm	70	60	70	
Ø2	mm	70	60	60	
* System dimensions					
Knock-in bolts					
Order no.		30050630	30050624	30050624	
L	mm	296	330	330	
m	mm	70	60	60	
n	mm	232	266	266	
Quantity		8	8	8	
Linch pin					
Order no.		10024804	10025012	10025012	
Ø	mm	10	10	10	
L	mm	100	75	75	
Quantity		16	16	16	

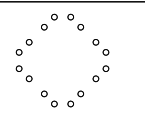
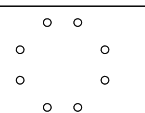
4.7 Tower system 2.3 m (BT 23)

Tower element		BT 23			B = component identifier
Weight	kg	11380			
Dimensions					
a	mm	2320			
b	mm	266			
c	mm	226			
d	mm	166			
E*	mm	2074			
f	mm	11590			
G*	mm	11250			
h	mm	350			
i	mm	160			
J*	mm	2024			
Ø1	mm	70			
Ø2	mm	60			
* System dimensions					
	Knock-in bolts, Ø 70 mm		Knock-in bolts, Ø 60 mm		
Order no.		10024746		10024744	
L	mm	380		365	
m	mm	70		60	
n	mm	320		305	
Quantity		8		8	
	Linch pin, Ø 70 mm bolts		Linch pin, Ø 60 mm bolts		
Order no.		10024804		10025012	
Ø	mm	10		10	
L	mm	100		75	
Quantity		16		16	

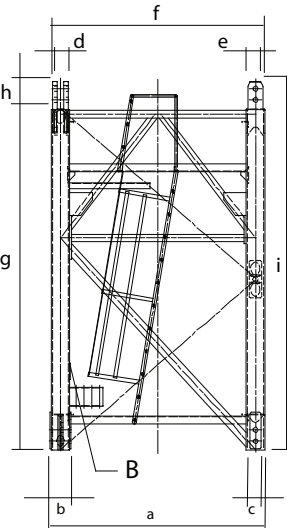
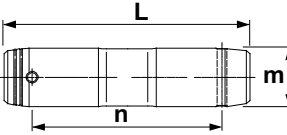
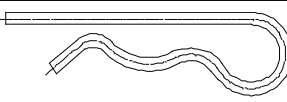
4 Tower elements and joining frames

4.8 Transition tower system 2.3 m / 2.5 m – 2.9 m suitable for UV 29 tower elements (joining frame VR 23/25-29)

Joining frame VR 23/25-29					B = component identifier
Weight [kg]		4275			
Dimension [mm]					
Tower system	TV 23	HT 23	TV 25	UV 25	
a	3550				
b	280				
c	220				
d*	140	160	140	156	
e	2860				
f	2940				
h*	452	487	452	462	
Ø 1	65				
Ø 2*	70	60	70	70	
System dimensions [mm]					
G	1200				
O*	2108	2074	2318	2298	
U	2580				
* varies depending on tower system					
Knock-in bolts					
Order no.		30038975			
L	mm	380			
m	mm	65			
n	mm	297			
Quantity		8			
Linch pin					
Order no.		10024804			
Ø	mm	10			
L	mm	100			
Quantity		16			

Accessories	VR 23/25-29		Hole pattern
Set of bolted spigots	Tower system	Order no.	
AZ 140 E 17	TV 23	30049645	
AZ 160 HT 23	HT 23	30049646	
AZ 140 E 10	TV 25	30049643	
AZ 156 M	UV 25	30049644	

4.9 Tower system 2.9 m (UV 29)

Tower element		UV 29			B = component identifier
Weight	kg	4550			
Dimensions					
a	mm	2830			
b	mm	250			
c	mm	218			
d	mm	208			
e	mm	200			
f	mm	2830			
g*	mm	4500			
h	mm	360			
i	mm	4850			
* System dimensions					
Knock-in bolts					
Order no.		30 038 975			
L	mm	380			
m	mm	65			
n	mm	297			
Quantity		8			
Spring retainers					
Order no.		10 022 204			
Ø	mm	10			
Quantity		16			

4 Tower elements and joining frames

4.10 Tower system 2.9 m (BT 29)

Tower element		BT 29			B = component identifier
Weight	kg	9205			
Dimensions					
a	mm	3010			
b Ø	mm	430			
c Ø	mm	360			
d	mm	208			
e	mm	200			
f	mm	2830			
g	mm	9980			
h	mm	370			
i	mm	10350			
System length	mm	10000			

5 Assembly weights

5.1 Counterweight blocks



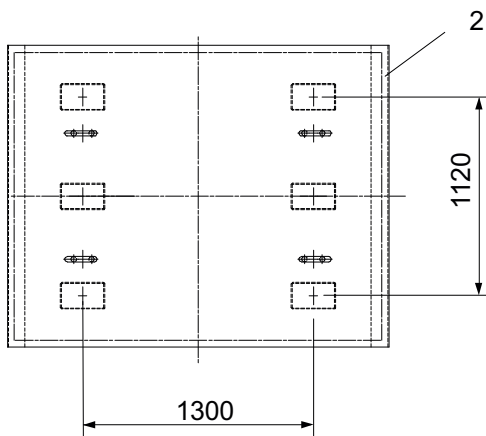
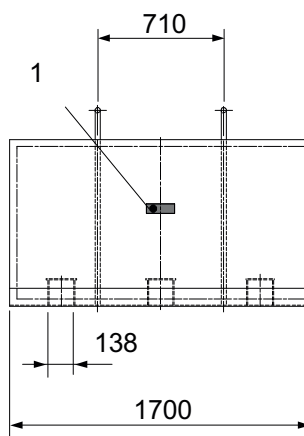
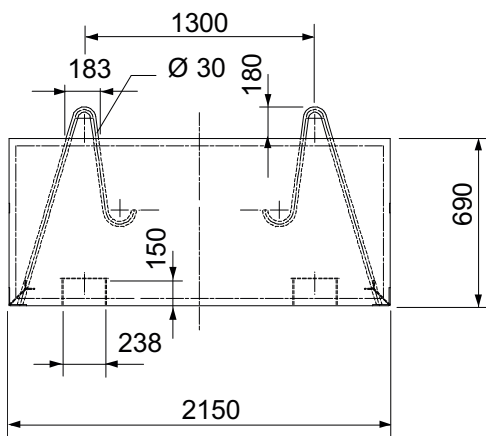
NOTICE

The described diagrams of the counterweights and central ballast blocks only show sketches. Have them issue the reinforcement charts by experts.

5 Assembly weights

5.1.1 Counterweight block, 6.2 t

	! DANGER
	Use of improper counterweight blocks may cause the slewing tower crane to overturn. The slewing tower crane may overturn, resulting in severe injury and death. ► Use of the horizontal counterweight block weighing 6.2 t is only permitted in connection with hoist winch Hw28132FU.



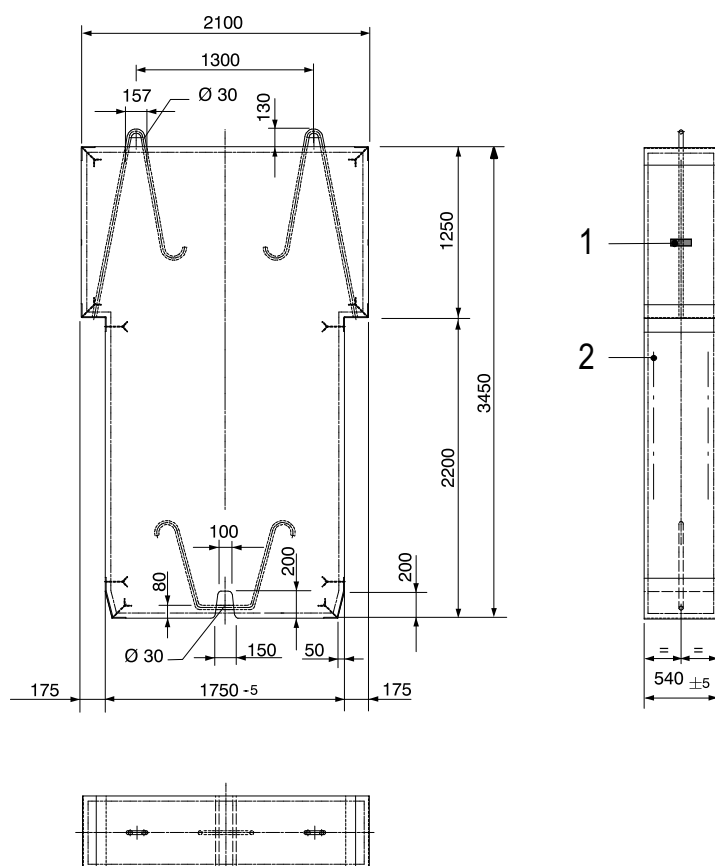
Data counterweight block 6.2 t, lying

Item	Data
Material	Concrete, min. C 20/25
Max. permitted weight tolerance	+/- 3 %
Order number	30055489
1	Component identifier

Item	Data
2	Structural steel reinforcement

5 Assembly weights

5.1.2 Counterweight block, 8.0 t



Data counterweight block 8.0 t

Item	Data
Material	Concrete, min. C 20/25
Max. permitted weight tolerance	+/- 3 %
Order number	30043944
1	Component identifier
2	Structural steel reinforcement

5.1.3 Counterweight block, 8.0 t

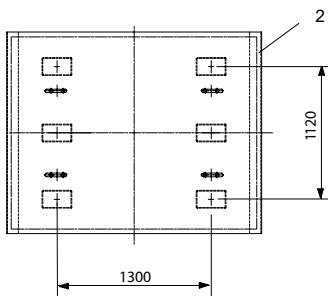
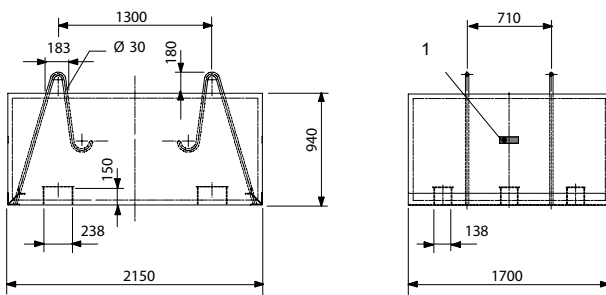


! DANGER

Use of improper counterweight blocks may cause the slewing tower crane to overturn.

The slewing tower crane may overturn, resulting in severe injury and death.

- Use of the horizontal counterweight block weighing 8.0 t is only permitted in connection with hoist winch Hw28110FU.



Data counterweight block 8.0 t, lying

Item	Data
Material	Concrete, min. C 20/25
Max. permitted weight tolerance	+/- 3 %
Order number	30043943
1	Component identifier
2	Structural steel reinforcement

5 Assembly weights

5.2 Total weight jib assembly

Complete jib: mechanical parts, brace plate, supports, assembly brace ropes, assembly rope guides, snatch block

Jib length [m]	Weight [kg] WOLFF 355 B
60.0	13330
55.0	12170
50.0	11270
45.0	10200
40.0	9300
35.0	8230
30.0	7070

5.3 Assembly weight slewing gear

Module	Crane parts	Weight [kg]	
Tower head section upper part (including luffing gear, pulley block, struts, platforms, standard railings, compensator)			9800
Tower head section lower part			15300
Driver's cab			1340
Counterjib (including struts, pedestals, standard railing, control cabinet, resistors, hoisting winch Hw28110FU, and hoisting rope (920 m))			13400
Counterjib (including struts, pedestals, standard railing, control cabinet, resistors, hoisting winch Hw28132FU, hoisting rope (920 m), 2nd brake and rope slowdown device)			15531

5 Assembly weights

5.4 Assembly weight cross frame

Module	crane part	Weight [kg]	
Cross frame KR 1000-8 (without accessories)			14000
(8 m x 8 m)	▪ 4 x bolted spigots AZ 140 E 10	630	
	▪ 4 bolted spigots AZ 156 M	686	
Cross frame KR 16 - 80 (without accessories)			21450
(8m x 8m)	▪ 4 bolted spigots AZ 140 E KR 16-80	620	
	▪ 4 bolted spigots AZ 156 M KR 16-80	680	
	▪ 4 bolted spigots AZ 156S M KR 16-80	675	
Cross frame KR 16 - 80/100 (without accessories)			25400
(10 m x 10 m)	▪ 4 bolted spigots AZ 140 E KR 16-80	620	
	▪ 4 bolted spigots AZ 156 M KR 16-80	680	
	▪ 4 bolted spigots AZ 156S M KR 16-80	675	

5.5 Assembly weights travelling cross frame

Module	Crane parts	Weight [kg]	
Mobile cross frame KRF4 12-60/80 complete			32300
(8.0 m x 8.0 m)	▪ Cross frame	14170	
	▪ Backing braces	2875	
	▪ Drive gear corners	4560	
	▪ Subframe	9380	
	▪ Platforms and ladders	255	
	▪ Control cabinet	130	
	▪ small items	930	
	▪ Set of bolted spigots AZR 140 M KR 12-60/80	790	
	▪ Set of bolted spigots AZ 120 E 15,5 KR 12-60/80	730	
	▪ Set of bolted spigots AZ 140 E 15,5 KR 12-60/80	875	
	▪ Set of bolted spigots AZR 160 M KR 12-60/80	905	
	▪ Set of bolted spigots AZ 140 E 10 KR 12-60/80	790	
	▪ Set of bolted spigots AZR 156 M KR 12-60/80	845	
Mobile cross frame KRF6 12-60/80 complete			41200
(8.0 m x 8.0 m)	▪ Cross frame	14170	
	▪ Backing braces	2875	
	▪ Drive gear corners	4560	
	▪ Subframe	18270	
	▪ Platforms and ladders	255	
	▪ Control cabinet	130	
	▪ small items	940	
	▪ Set of bolted spigots AZR 140 M KR 12-60/80	790	
	▪ Set of bolted spigots AZ 120 E 15,5 KR 12-60/80	730	
	▪ Set of bolted spigots AZ 140 E 15,5 KR 12-60/80	875	
	▪ Set of bolted spigots AZR 160 M KR 12-60/80	905	
	▪ Set of bolted spigots AZ 140 E 10 KR 12-60/80	790	
	▪ Set of bolted spigots AZR 156 M KR 12-60/80	845	

5 Assembly weights

5.6 Assembly weight cross frame elements

Module	crane part	Weight [kg]	
Cross frame element KRE 260.2, complete			10 900
	▪ Mast base with diagonal struts and tie rods	5 445	
	▪ Cross frame platform with jibs, corner plates and transport locks	5 455	
Cross frame element KRE 480 complete			24 250
	▪ Mast base	7 100	
	▪ Hinged sections with corner plates	6 250	
	▪ Diagonal struts and ballast carrier	9 260	
	▪ Assembly platform, ladder, and small parts	1 640	

5.7 Assembly weight undercarriage

Module	crane part	Weight [kg]	
Undercarriage UW 260.3, complete			17 100
	▪ Mast base with diagonal struts and tie rods	5 880	
	▪ Undercarriage platform with hinged sections, subframes and transport locks	11 220	
Undercarriage UW 480, complete			34 000
	▪ Mast base	7 100	
	▪ Hinged sections with mounting device and subframes	16 000	
	▪ Diagonal struts and ballast carrier	9 260	
	▪ Assembly platform, ladder, and small parts	1 640	

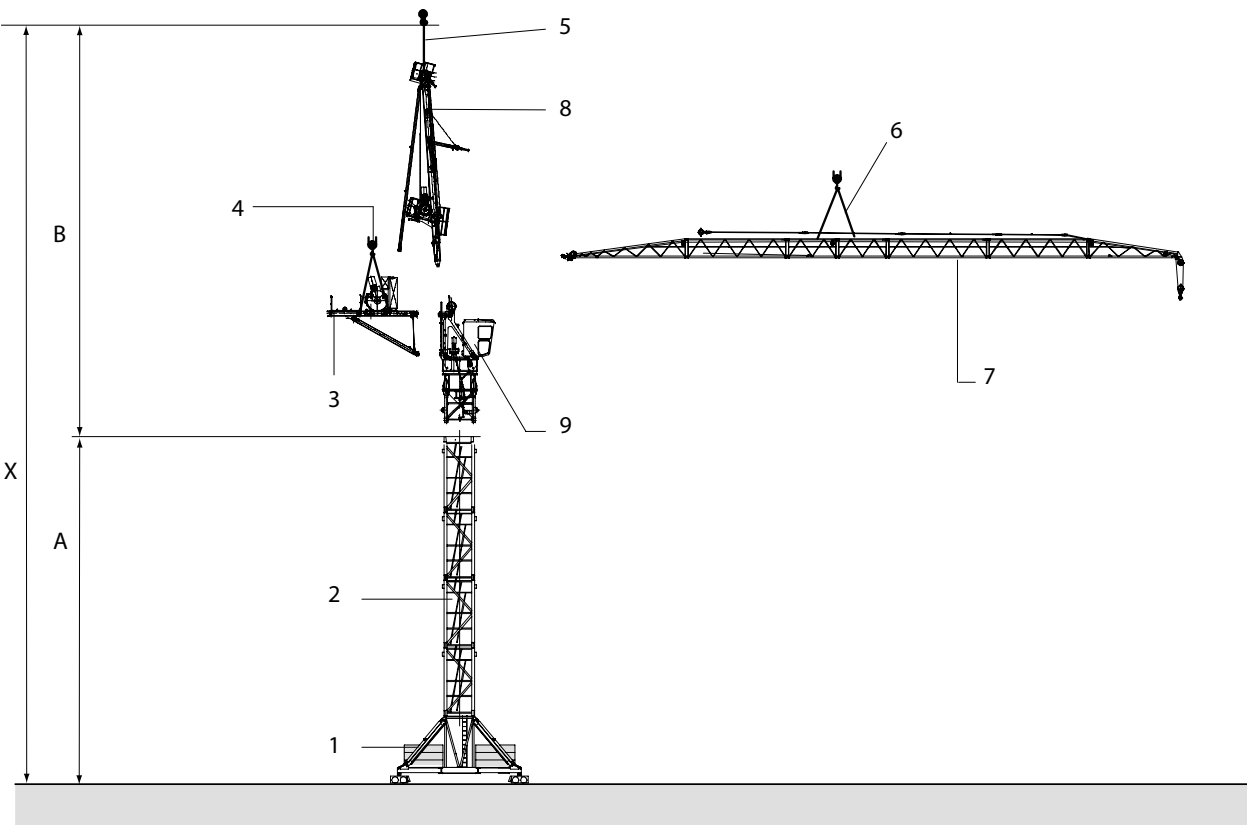
5 Assembly weights

5.8 Required hook height for vehicle cranes

For information about the height of the WOLFF slewing tower crane, refer to Tower combinations [36].

NOTICE! During assembly, allowances must be made for level differences (mobile crane to base of the slewing tower crane).

Hook height above ground required for mobile cranes (X) = height of the WOLFF slewing tower crane (A) + clearance of 24 (B).



Exemplary illustration

[A]	Height of the WOLFF slewing tower crane	[B]	Clearance 24 m
[X]	Hook height above ground required for the mobile crane		
1	Undercarriage	5	Two-point lifting tackle (3 m with shackle)
2	Tower element	6	Four-point lifting tackle (19' 8-1/2" (6 m) with shackle)
3	Counterjib, complete	7	Jib, complete
4	Four-point lifting tackle (with shackle)	8	Tower head section, complete

(see also):

- Tower combinations [36]

6 Assembly diagrams

6.1 Jib attachment diagram

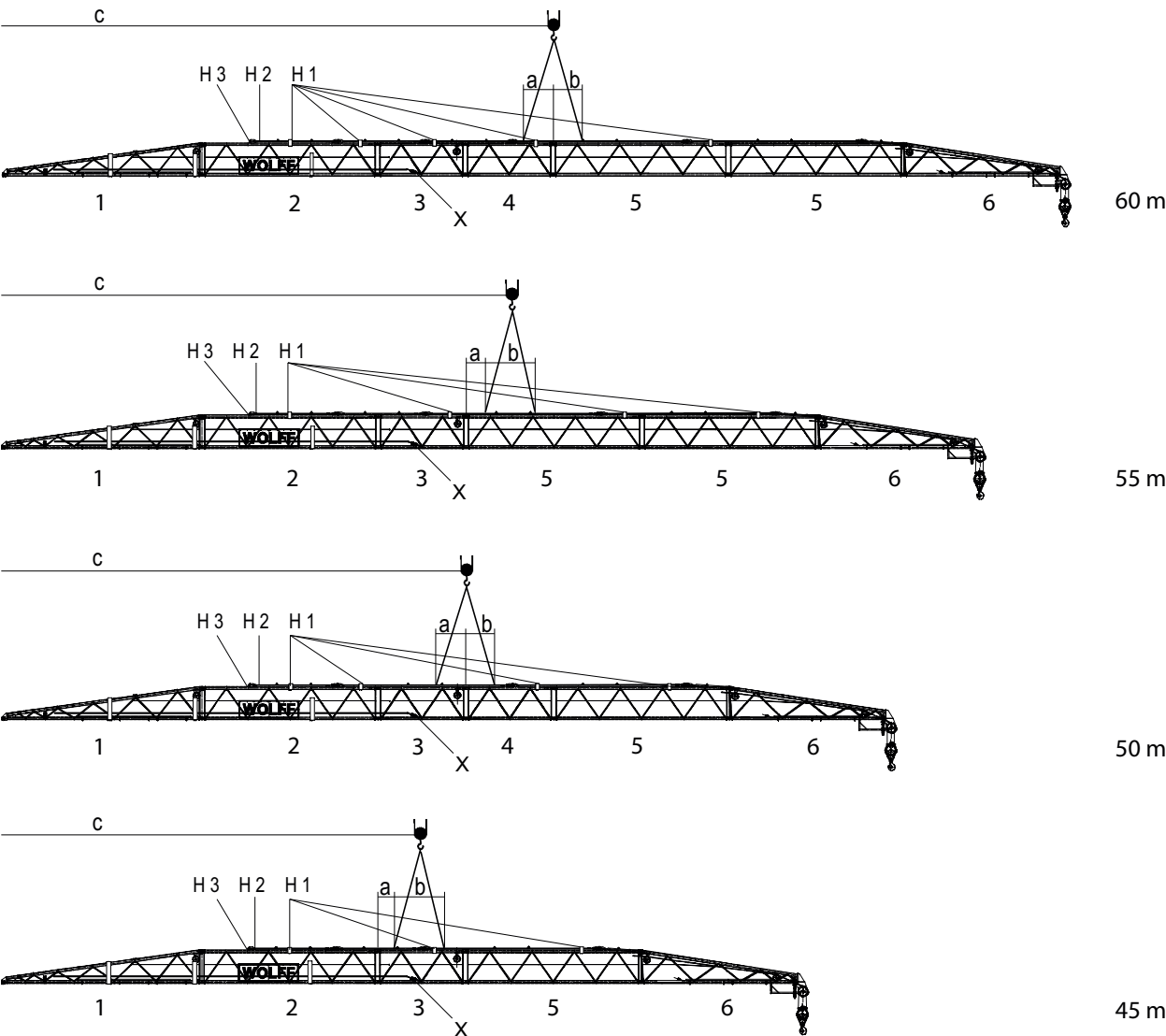
	NOTICE
	For jib assembly, use a Four-point lifting tackle (19' 8-1/2" (6 m) with shackle).

Length of jib elements

Item	Length [m]
Jib section 1, 2, 5, 6	10.0
Jib section 3, 4	5.0

6 Assembly diagrams

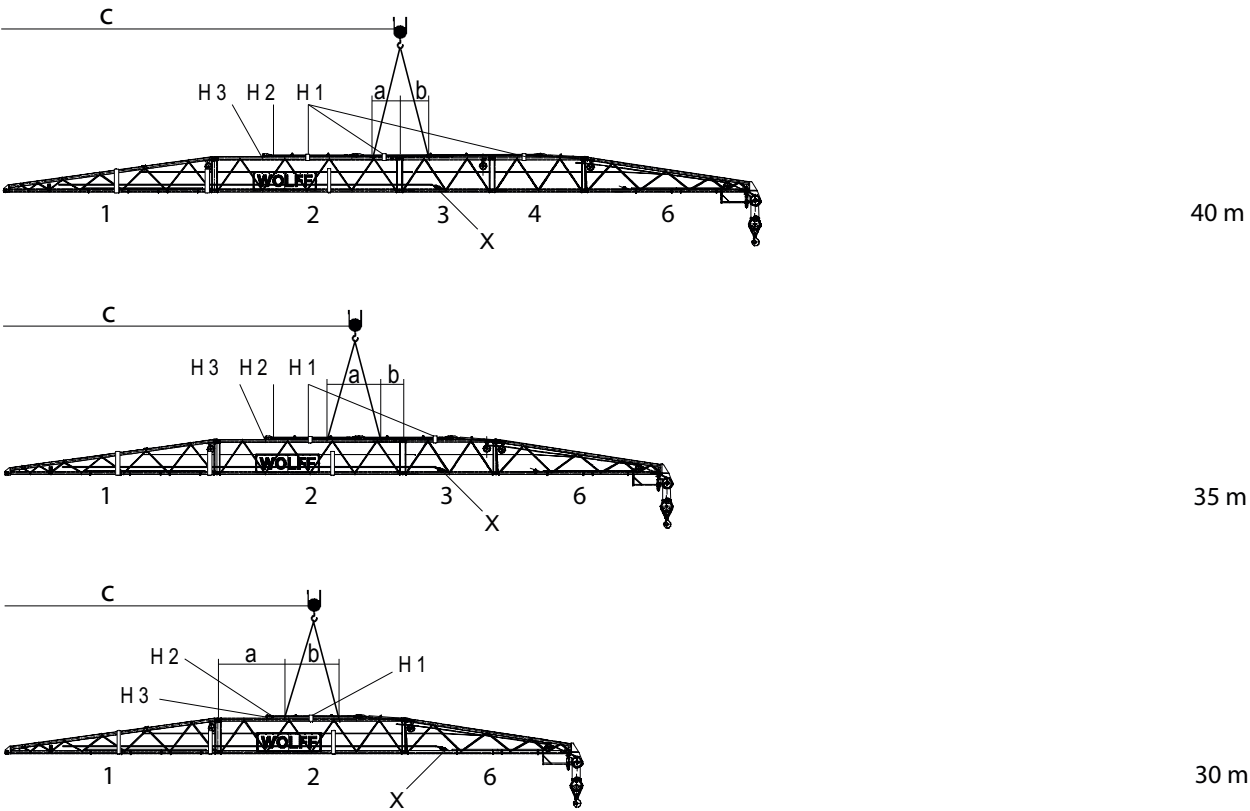
6.1.1 Jib attachment diagram 60 m to 45 m



Data	Jib length [m]			
	60	55	50	45
a [m]	1.53	1.24	1.53	1.24
b [m]	1.53	2.70	1.53	2.70
c [m]	32.70	30.10	27.60	25.00
Weight [kg]	13330	12170	11270	10200

Caption			
H 1 – H 2	Support blocks for jib brace	X	Fastening assembly brace ropes
H 3	Support block for pulley block		

6.1.2 Jib attachment diagram 40 m to 30 m



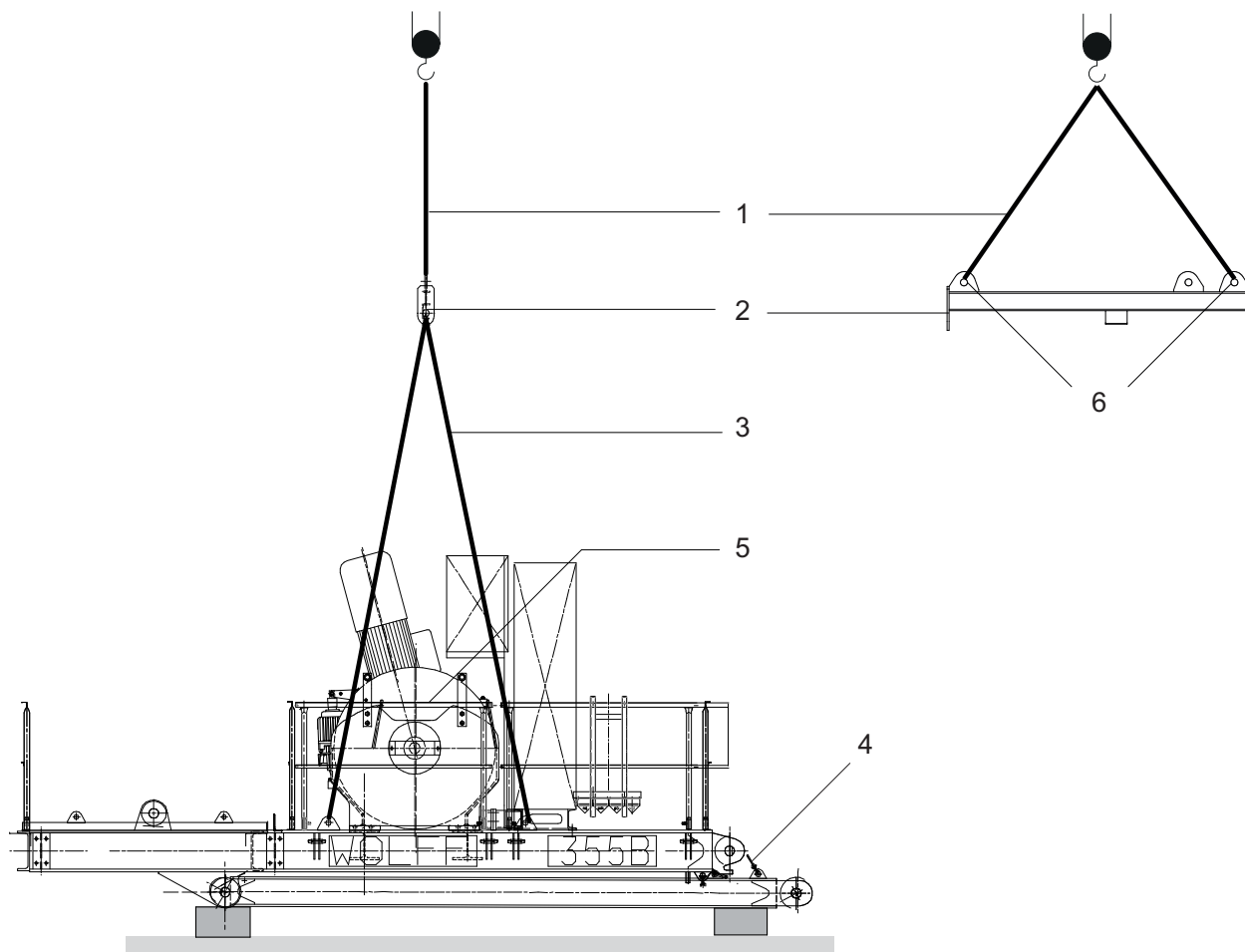
Data	Jib length [m]		
	40	35	30
a [m]	1.53	2.70	3.64
b [m]	1.53	1.24	2.70
c [m]	22.60	19.90	17.30
Weight [kg]	9300	8230	7070

Caption			
H 1 – H 2	Support blocks for jib brace	X	Fastening assembly brace ropes
H 3	Support block for pulley block		

6 Assembly diagrams

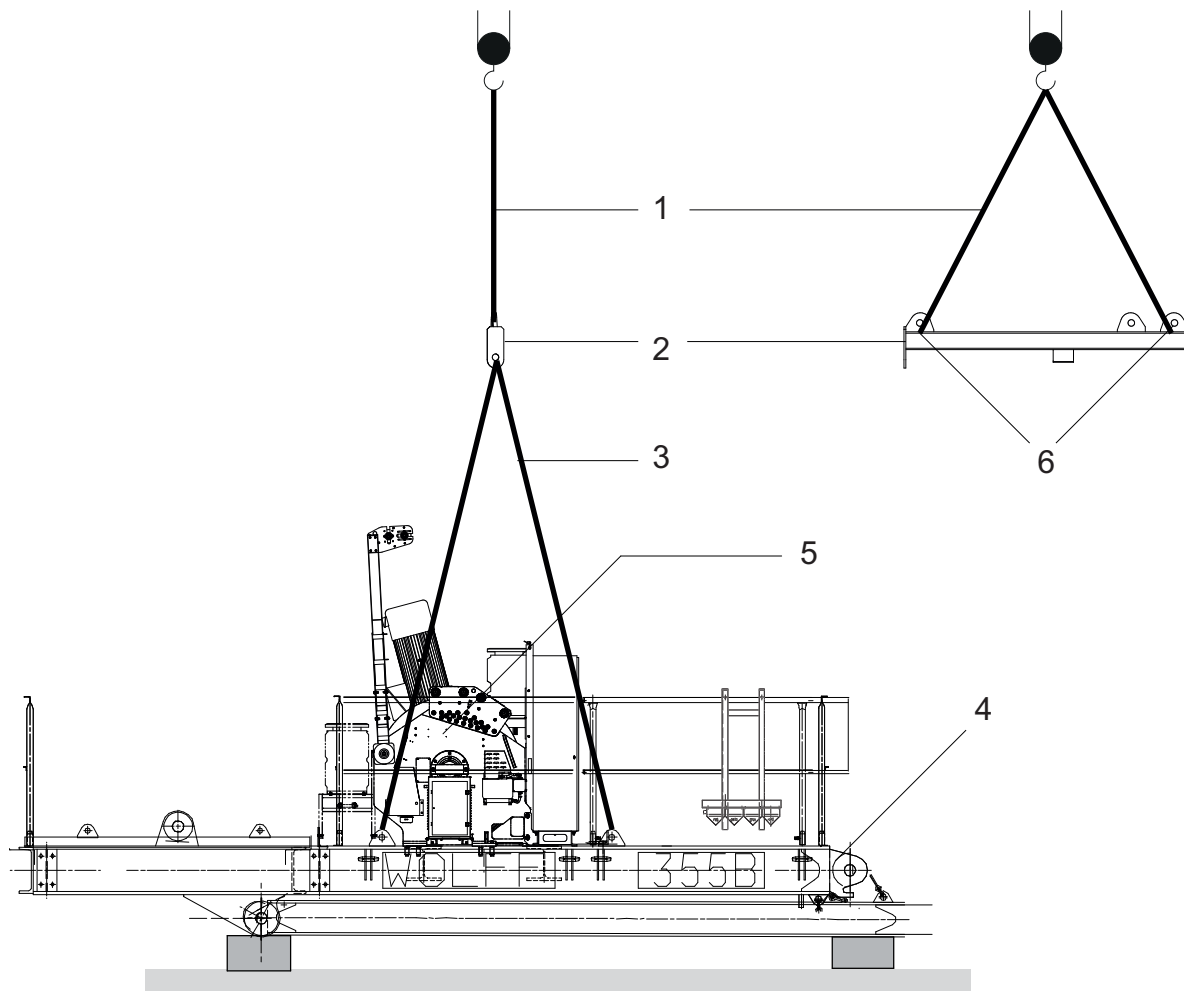
6.2 Counterjib lifting diagram

Counterjib with Hw28110FU



1	2-fall attachment	4	Counterjib
2	Mounting device	5	Hoist winch Hw28110FU
3	4 x attachment ropes (Ø 24 mm x 3 m) with shackles (D5650)	6	Lifting points of the mounting device

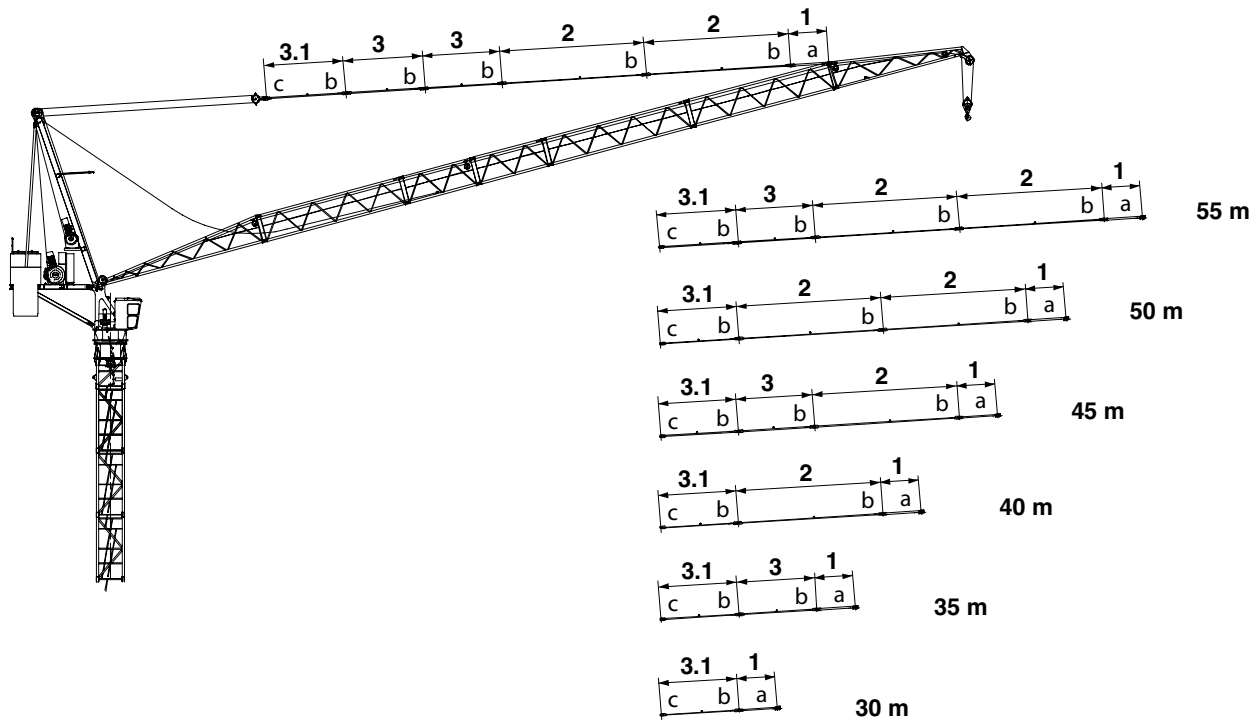
Counterjib with Hw28132FU



1	2-fall attachment	4	Counterjib
2	Mounting device	5	Hoist winch Hw28132FU
3	4 x attachment ropes (Ø 24 mm x 3 m) with shackles (D5650)	6	Lifting points of the mounting device

6 Assembly diagrams

6.3 Jib brace diagram



Brace table

Jib length	Lengths [m]								Total weight [t]
	Pulley block	Brace 3.1	Stay no. 3	Stay no. 3	Stay no. 2	Stay no. 2	Stay no. 1	Total length	
Jib – 60 m	0.50	5.15	5.15	5.15	10.30	10.30	2.48	39.03	1.4
Jib – 55 m	0.50	5.15	5.15		10.30	10.30	2.48	33.88	1.2
Jib – 50 m	0.50	5.15			10.30	10.30	2.48	28.73	1.0
Jib – 45 m	0.50	5.15	5.15			10.30	2.48	23.58	0.9
Jib – 40 m	0.50	5.15				10.30	2.48	18.43	0.7
Jib – 35 m	0.50	5.15	5.15				2.48	13.28	0.5
Jib – 30 m	0.50	5.15					2.48	8.13	0.3

Bolt table

Jib length	Brace	Bolts				Spring retainers	
			Qu- ant- ity	Dimension [mm]	Item no.	Dimension [mm]	Item no.
Jib – 60 m	1	a	1	Ø 95/80x285	30044028	10/60-80, galvan- ized, yellow	10022204
	2	b	2	Ø 80/70x180	30044034	10/60-80, galvan- ized, yellow	10022204
	3	b	2	Ø 80/70x180	30044034	10/60-80, galvan- ized, yellow	10022204
	3.1	c	1	Ø 80/70x305	30044035	10/60-80, galvan- ized, yellow	10022204
Jib – 55 m	1	a	1	Ø 95/80x285	30044028	10/60-80, galvan- ized, yellow	10022204
	2	b	2	Ø 80/70x180	30044034	10/60-80, galvan- ized, yellow	10022204
	3	b	1	Ø 80/70x180	30044034	10/60-80, galvan- ized, yellow	10022204
	3.1	c	1	Ø 80/70x305	30044035	10/60-80, galvan- ized, yellow	10022204
Jib – 50 m	1	a	1	Ø 95/80x285	30044028	10/60-80, galvan- ized, yellow	10022204
	2	b	2	Ø 80/70x180	30044034	10/60-80, galvan- ized, yellow	10022204
	3.1	c	1	Ø 80/70x305	30044035	10/60-80, galvan- ized, yellow	10022204
Jib – 45 m	1	a	1	Ø 95/80x285	30044028	10/60-80, galvan- ized, yellow	10022204
	2	b	1	Ø 80/70x180	30044034	10/60-80, galvan- ized, yellow	10022204
	3	b	1	Ø 80/70x180	30044034	10/60-80, galvan- ized, yellow	10022204
	3.1	c	1	Ø 80/70x305	30044035	10/60-80, galvan- ized, yellow	10022204
Jib – 40 m	1	a	1	Ø 95/80x285	30044028	10/60-80, galvan- ized, yellow	10022204
	2	b	1	Ø 80/70x180	30044034	10/60-80, galvan- ized, yellow	10022204
	3.1	c	1	Ø 80/70x305	30044035	10/60-80, galvan- ized, yellow	10022204
Jib – 35 m	1	a	1	Ø 95/80x285	30044028	10/60-80, galvan- ized, yellow	10022204
	3	b	1	Ø 80/70x180	30044034	10/60-80, galvan- ized, yellow	10022204
	3.1	c	1	Ø 80/70x305	30044035	10/60-80, galvan- ized, yellow	10022204

6 Assembly diagrams

Jib length	Brace	Bolts				Spring retainers	
			Qu- ant- ity	Dimension [mm]	Item no.	Dimension [mm]	Item no.
Jib – 30 m	1	a	1	Ø 95/80x285	30044028	10/60-80, galvan- ized, yellow	10022204
	3.1	c	1	Ø 80/70x305	30044035	10/60-80, galvan- ized, yellow	10022204

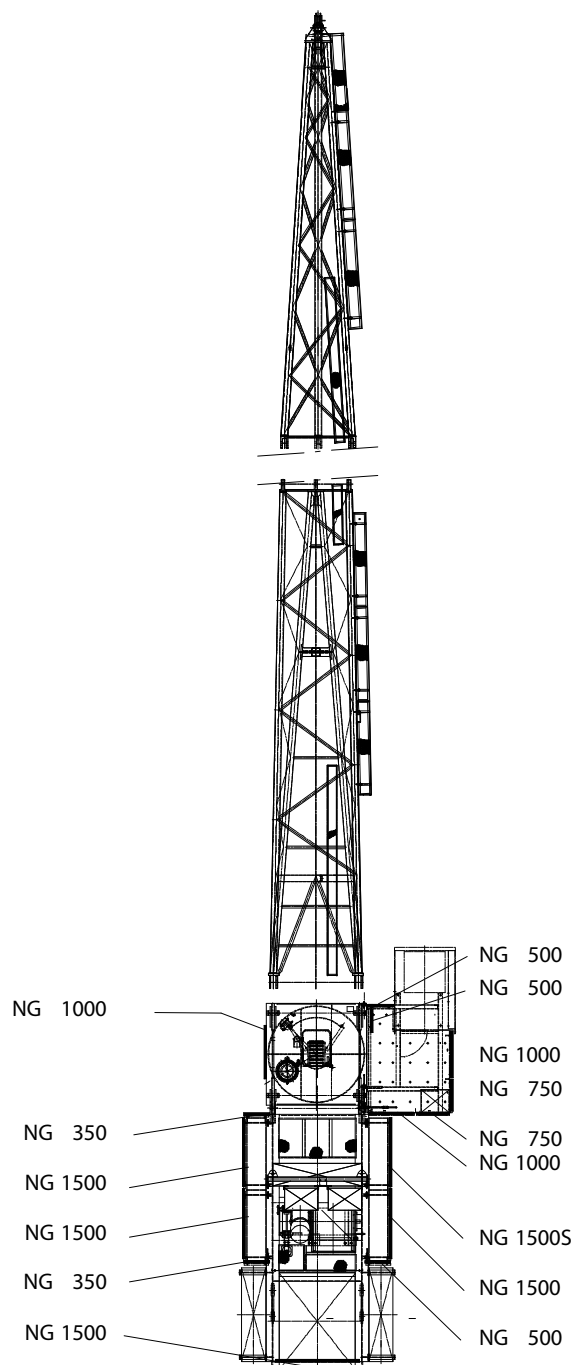
6.4 Arrangement of standard railings

6.4.1 Standard railings (NG) and accessories

Quantity *	Standard railings (NG)
1	Standard post (NP)
2	Standard railing350
8	NG 500
5	Standard railing750
3	Standard railing 1000
5	Standard railing1500
1	Standard railing 1500-S
1	Standard railing2000

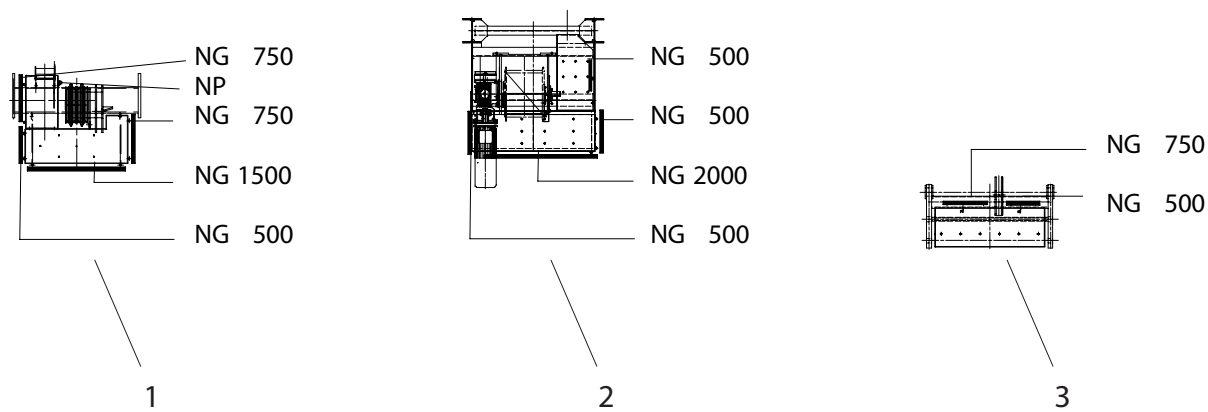
6 Assembly diagrams

6.4.2 Arrangement of standard railings



Arrangement of standard railings

6 Assembly diagrams

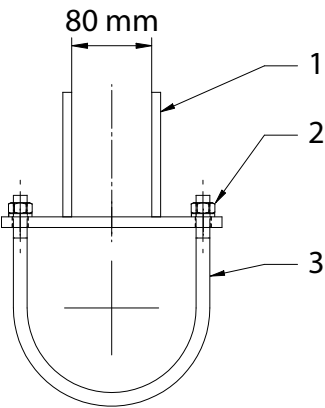


Arrangement of standard railings tower head section, luffing gear, connection block

1	Tower head section	3	Connecting block
2	luffing gear		

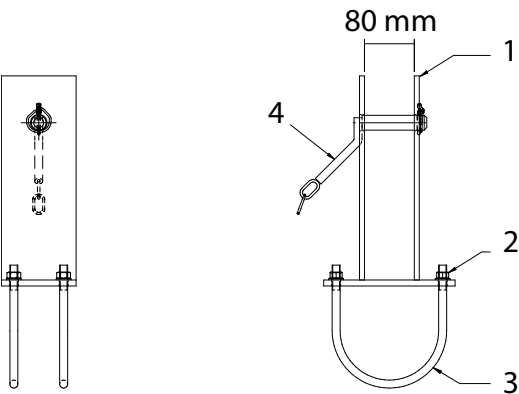
6 Assembly diagrams

6.5 Support blocks for brace



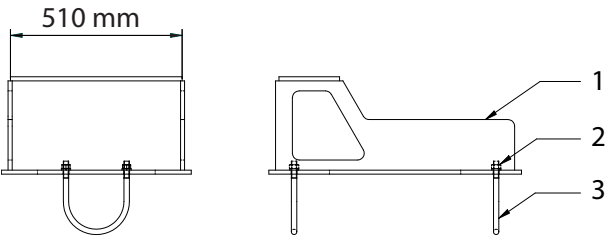
Support block H 1 for jib brace

1	Support block	3	Bracket
2	Nut and washer		



Support block H 2 for jib brace

1	Support block	3	Bracket
2	Nut and washer	4	Bolts with handle



Support block H 3 for pulley block

1	Support block	3	Bracket
---	---------------	---	---------

2	Nut and washer		
---	----------------	--	--

7 Suitable climbing devices

7 Suitable climbing devices

This section contains information on

- Outer climbing devices (KWH)
- Inner climbing devices (KSH)

	NOTICE Details for the climbing device. Refer to the details in the documentation of the climbing device.
	NOTICE The details obtain to jib lengths of 30 m - 50 m for the 2 fall snatch block at hook heights in height of the bottom edge of the tower head section lower part (hook height = tower height). The details obtain to jib lengths of 55 m - 60 m for the 1 fall snatch block at hook heights in height of the bottom edge of the tower head section lower part (hook height = tower height).
	NOTICE The operating radius specified is measured from the tower center and is to be considered a reference value. Exact balancing can be achieved by changing the operating radius with the tower elements or loads specified in the table.
	NOTICE If feasible, you should preferably operate your climbing device without balancing weight.

7.1 Outer climbing devices

	 DANGER Climbing device attached to the lower part of the tower head section lower part. Increased wind surface. The slewing tower crane may overturn. ► Dismantle the climbing device after the climbing procedure is finished or lower the climbing device down on the ground or lower the climbing device down to the uppermost tower brace.
	NOTICE Tower element on the transfer carriage The data on climbing balance was specified under the assumption that a tower element is on the transfer carriage.

7 Suitable climbing devices

7.1.1 Outer climbing device KWH 20.6 / KWH 20.6.1

Climbing radius [m] for the balancing weights

355 B	Jib length [m]						
	60	55	50	45	40	35	30
no weight	34.2	37.0	38.5	41.9	-	-	-
TV 20 = 2.98 t	-	-	-	-	28.8	30.5	-
Weight = 5.0 t	-	-	-	-	22.9	24.1	25.4

7.1.2 Outer climbing device KWH 23

Climbing radius [m] for the balancing weights

	Jib length [m]						
355 B	60	55	50	45	40	35	30
no weight	29.8	32.3	33.8	36.8	-	-	-
HT 23 = 3.94 t	18.6	19.7	20.3	21.4	22.3	23.6	25.1
Weight = 5.0 t	-	-	-	-	19.8	21.0	22.2

7 Suitable climbing devices

7.2 Inner climbing devices

	NOTICE The data required and the instructions for tower assemblies with inner climbing device is available in the separate description of the inner climbing device.
---	--

DANGER! Observe the special tower combination for the inner climbing device.

	NOTICE Clamping forces for the inner climbing device (KSH) are specified based on a building height of < 250m and wind category C 25.
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7.2.1 Inner climbing device KSH 20 SH

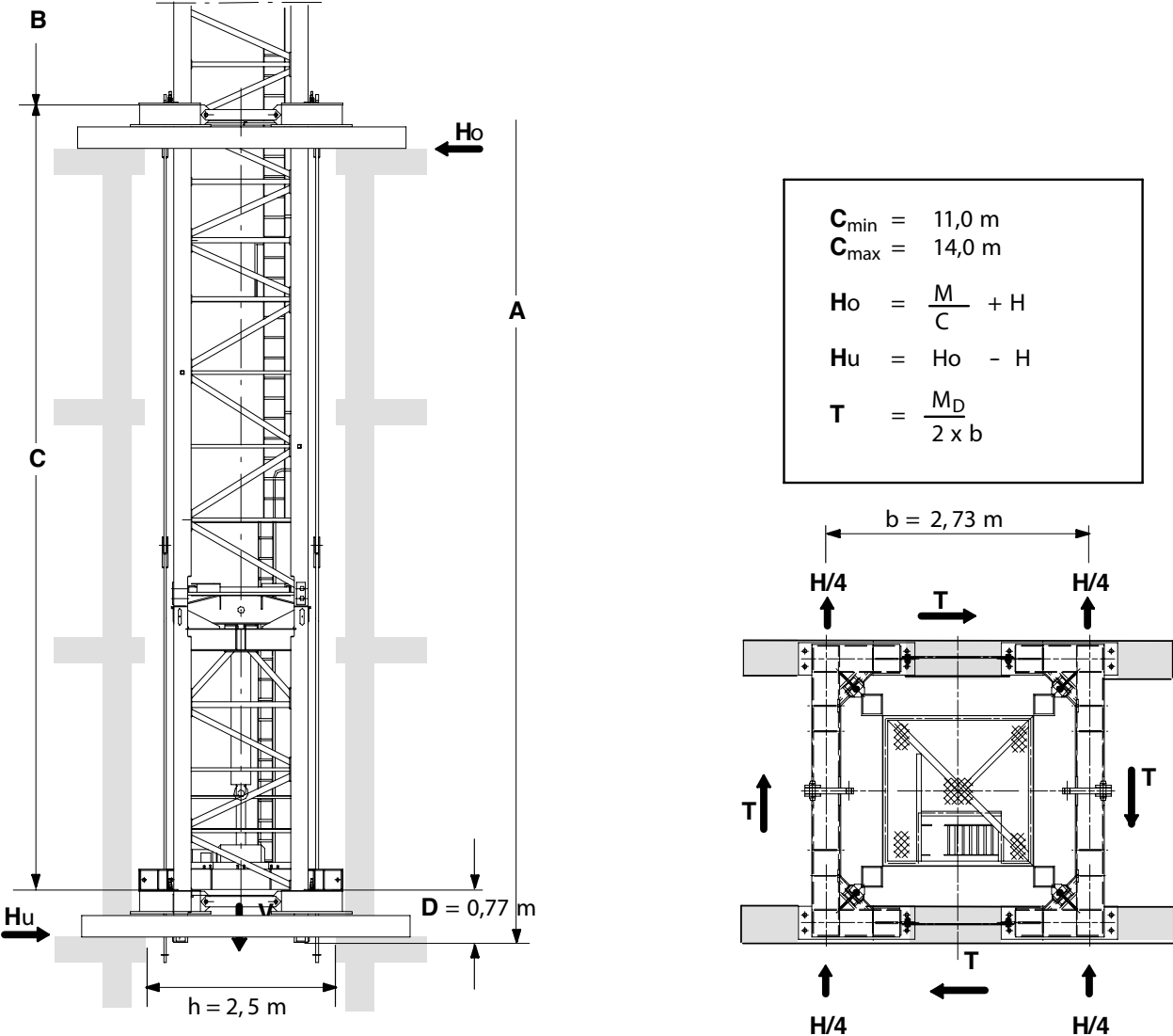
Tower combinations for slewing tower cranes with inner climbing device.

Item	Jib length 30 m - 60 m			
1	TV 20	TV 20		
2	TV 20	TV 20		
3	TV 20	TV 20		
4	TV 20	TV 20		
5	TV 20	TV 20		
6	TV 20			
inner climbing device	KSH 20 SH	KSH 20 SH		
Foundation anchors	FUA TYPE FS-156 / FUA 156S	FUA TYPE FS-156 / FUA 156S		
Tower height [m]	42.0	37.5		

Climbing radius [m] for the balancing weights

355 B	Jib length [m]						
	60	55	50	45	40	35	30
no weight	53.2	-	-	-	-	-	-
TV 20.4 = 2.98 t	38.0	39.9	41.0	43.2	-	-	-
Weight = 5.0 t	-	-	-	35.1	36.1	-	-
Weight = 7.5 t	-	-	-	-	29.3	30.4	-
Weight = 10.0 t	-	-	-	-	-	25.3	26.1

7 Suitable climbing devices



A	tower height	C	Distance between guide frames
B	A-C-D		

In service clamping forces

In service clamping forces [kN] inside a building								
A [m]	42.0				37.5			
C [m]	11	12	13	14	11	12	13	14
V	1519				1490			
Ho	550	510	470	440	530	490	450	420
Hu	500	460	420	390	480	440	400	370
T	60				60			

Out of service clamping forces

Out of service clamping forces [kN] inside a building								
A [m]	42.0				37.5			
C [m]	11	12	13	14	11	12	13	14
V	1364				1335			
Ho	930	860	790	730	810	750	690	640
Hu	650	570	500	450	540	470	420	370
T	0				0			

7.2.2 Inner climbing device KSH 23/ KSH E 23

	NOTICE
	Lower clamping length for the inner climbing device KSH 23 / KSH E 23. Subject to coordination with WOLFFKRAN, it is also possible to realize a clamping length of 10.0 to 15.5 m with a lower tower height. Contact WOLFFKRAN to discuss this issue.

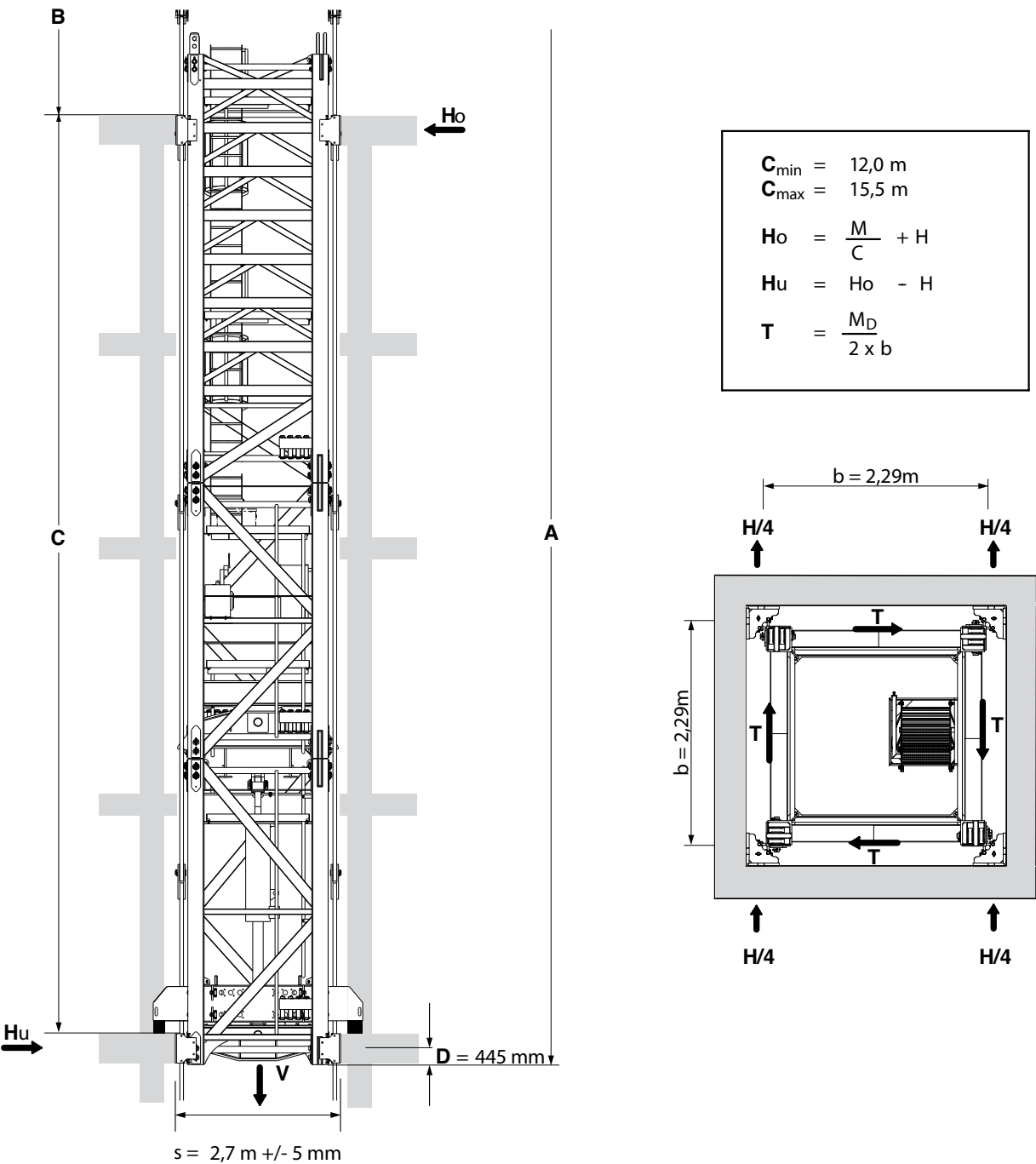
Tower combinations for slewing tower cranes with inner climbing device.

Item	Jib length 30 m - 60 m			
	HT 23	HT 23	HT 23	
1	HT 23	HT 23	HT 23	
2	HT 23	HT 23	HT 23	
3	HT 23	HT 23	HT 23	
4	HT 23	HT 23	HT 23	
5	HT 23	HT 23	HT 23	
6	HT 23	HT 23	HT 23	
7	HT 23	HT 23	HT 23	
8	HT 23	HT 23		
9	HT 23			
inner climbing device	KSH 23 / KSH E 23	KSH 23 / KSH E 23	KSH 23 / KSH E 23	
Foundation anchors	FUA 210 G	FUA 210 G	FUA 210 G	
Tower height [m]	57.0	52.5	48.0	

Climbing radius [m] for the balancing weights

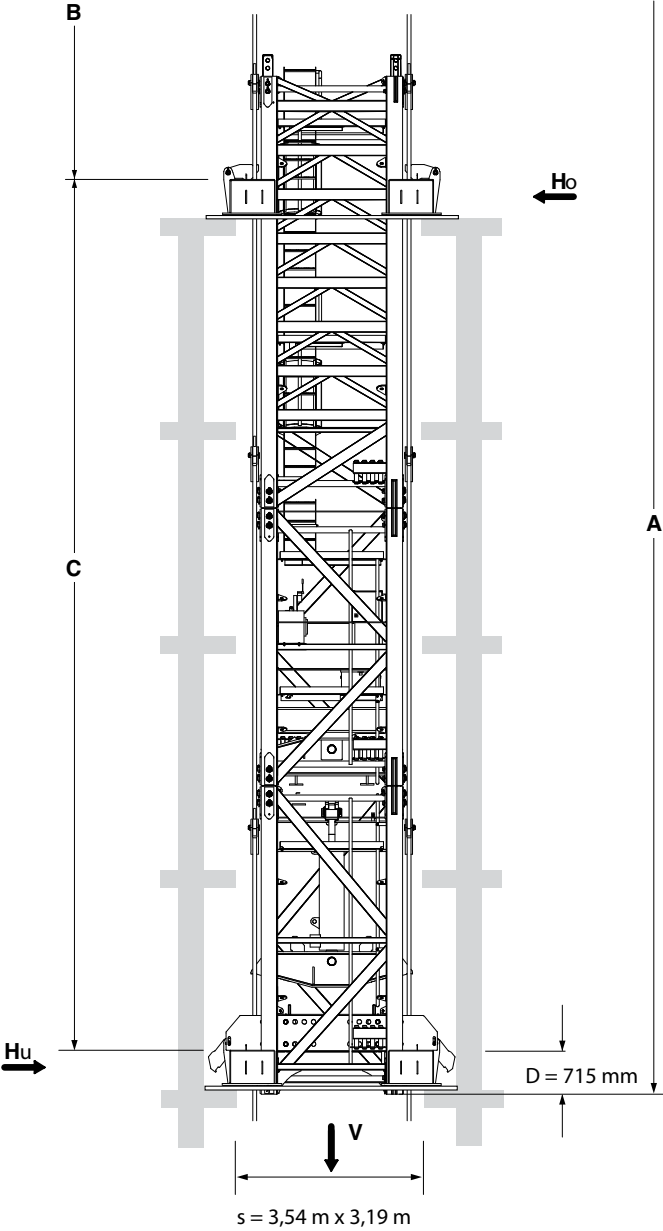
355 B	Jib length [m]						
	60	55	50	45	40	35	30
no weight	53.2	-	-	-	-	-	-
HT 23 = 3.94 t	34.6	36.2	37.1	38.9	-	-	-
Weight = 5.0 t	-	-	-	35.1	36.1	-	-
Weight = 7.5 t	-	-	-	-	29.3	30.4	-
Weight = 10.0 t	-	-	-	-	-	25.3	26.1

7 Suitable climbing devices

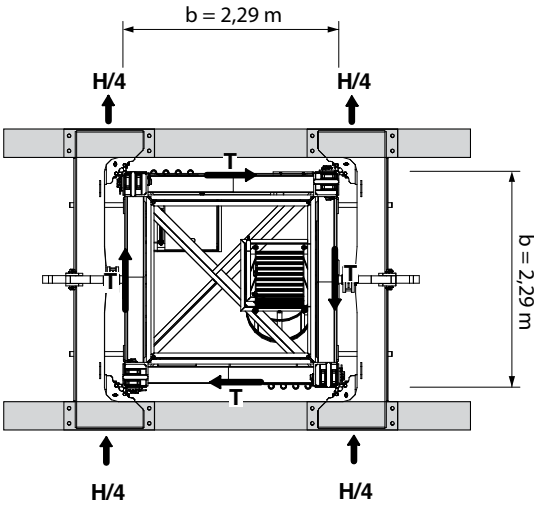


KSH E 23

A	= Tower height	C	= Distance between corner guides
B	= A-C-D		



$$C_{min} = 12,0\text{ m}$$
$$C_{max} = 15,5\text{ m}$$
$$H_o = \frac{M}{C} + H$$
$$H_u = H_o - H$$
$$T = \frac{M_D}{2 \times b}$$



KSH 23

A	= Tower height	C	= Distance between climbing frames
B	= A-C-D		

7 Suitable climbing devices

In service clamping forces

In service clamping forces [kN] inside a building															
A (m)	57.0					52.5					48.0				
C (m)	12.0	13.0	14.0	15.0	15.5	12.0	13.0	14.0	15.0	15.5	12.0	13.0	14.0	15.0	15.5
V (kN)	2044					2004					1965				
Ho (kN)	590	550	510	470	460	560	520	480	450	440	540	500	460	430	420
Hu (kN)	530	480	440	410	390	500	460	420	390	370	480	440	400	370	360
T (kN)	75					75					75				

Out of service clamping forces

Out of service clamping forces [kN] inside a building															
A (m)	57.0					52.5					48.0				
C (m)	12.0	13.0	14.0	15.0	15.5	12.0	13.0	14.0	15.0	15.5	12.0	13.0	14.0	15.0	15.5
V (kN)	1757					1718					1678				
Ho (kN)	1280	1190	1100	1030	1000	1150	1060	990	920	890	1020	940	880	820	790
Hu (kN)	930	830	740	670	640	810	720	640	580	550	700	620	550	490	470
T (kN)	-					-					-				

8 Foundations

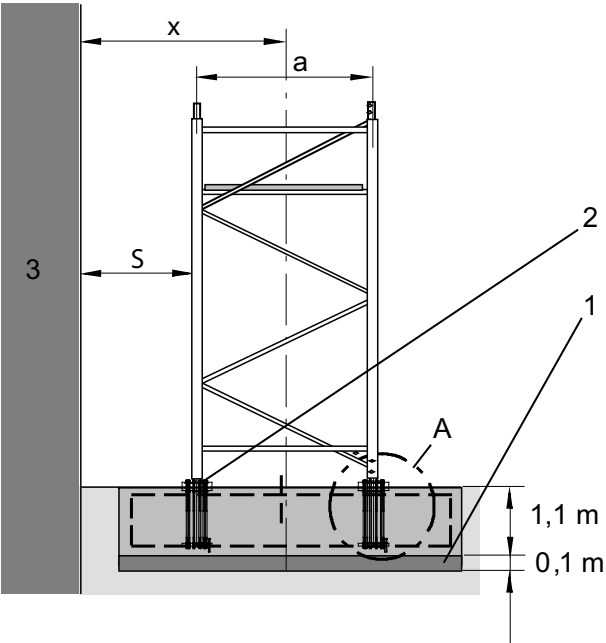
	 WARNING High voltage on electrically conductive parts. Risk of injury or death caused by electrical shock. 1) Request the applicable lightning protection regulations from local inspection authorities. 2) Conform to regional regulations governing the lightning protection of foundation structures.
	 CAUTION Inappropriate safety clearance between the slewing tower crane and buildings Collision of the crane with buildings or fixed objects. 1) Always maintain a minimum safety clearance of 1.5 m between the crane and buildings. 2) Always maintain a minimum safety clearance of 1.5 m between the crane and fixed objects.
	NOTICE Operators of the slewing tower crane are committed to proper calculation and construction of the foundation.
	NOTICE On climbing cranes, observe the position of the catch hook on the tower element in relation to the building. The climbing frame and tower elements must be mounted in parallel to the building. Notes on climbing units. [134]

8 Foundations

8.1 Foundation, general information

Dimensions of the fixing angles for the concrete base were calculated based on concrete strength B 25 to DIN 1045 for the foundations.

Dimensions of the concrete base at the construction site were calculated as a function of permissible foundation pressure and ground conditions.



1	Subbase	a	Länge (a x a)
2	Foundation anchors	s	min. safety clearance
3	Building	A	Detail A
x	min. clearance [154]		
Dimension a and position of the tie hooks			
Overview of the foundation anchors. [179]			

(see also):

- Overview of the foundation anchors. [154]
- Foundation anchors [179]

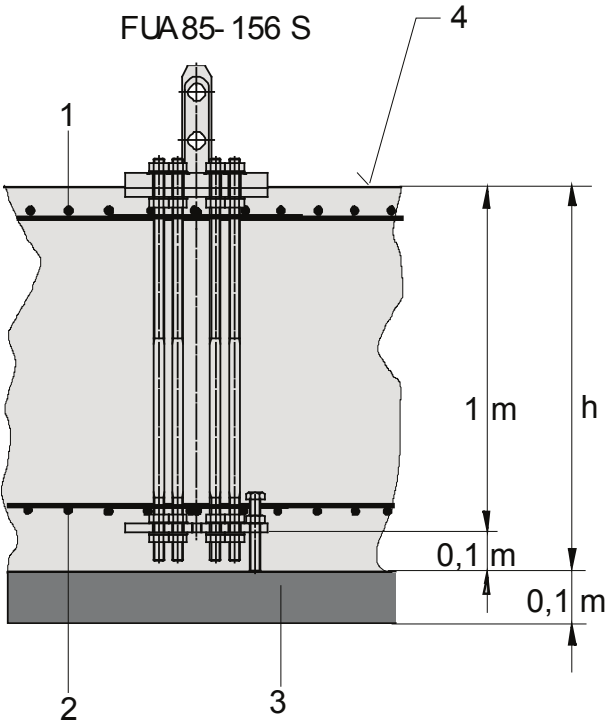
8.2 Foundation for FUA 85 - 156 S

NOTICE

All reinforcing rods must cover the entire length of the concrete base. Verify that the foundation anchors and reinforcements are secured against displacement before filling in the concrete.

NOTICE

The top edge of the foundation and the top edge of the foundation anchor slab must be brought to the same level. If the dimension "h" is greater than the length of the foundation anchors, a sufficiently solid base must be placed under the foundation anchors.

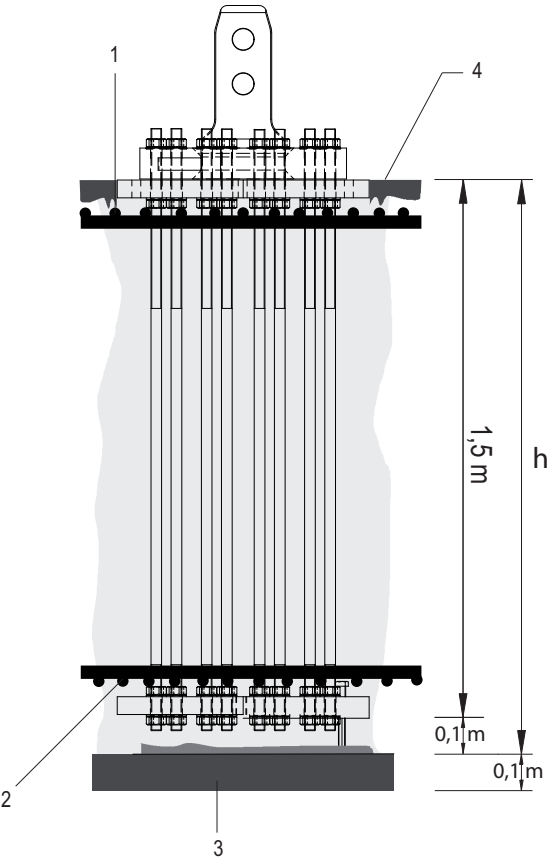


1	Upper reinforcement	3	Subbase
2	Lower reinforcement	4	Top of concrete and foundation anchor slab

8.3 Foundation for FUA 160 G

	NOTICE
	All reinforcing rods must cover the entire length of the concrete base. Verify that the foundation anchors and reinforcements are secured against displacement before filling in the concrete.
	NOTICE
	The top edge of the foundation and the top edge of the foundation anchor slab must be brought to the same level. If the dimension "h" is greater than the length of the foundation anchors, a sufficiently solid base must be placed under the foundation anchors.

FUA 160 G



1	Upper reinforcement	2	Lower reinforcement
3	Subbase	4	Top of concrete and foundation anchor slab

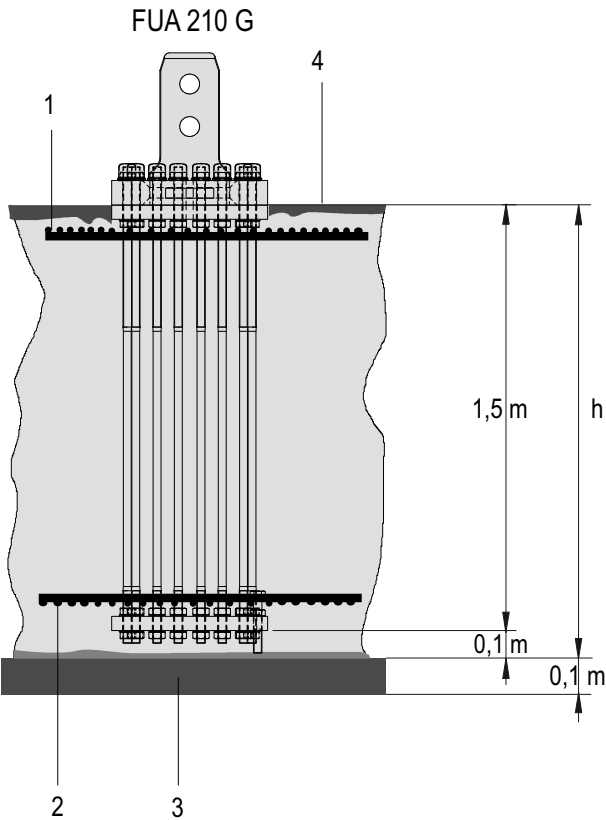
8.4 Foundation for FUA 210 G

NOTICE

All reinforcing rods must cover the entire length of the concrete base. Verify that the foundation anchors and reinforcements are secured against displacement before filling in the concrete.

NOTICE

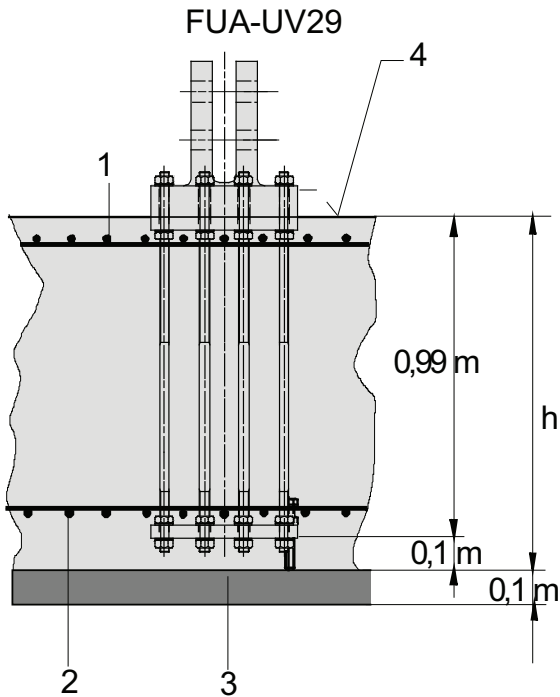
The top edge of the foundation and the top edge of the foundation anchor slab must be brought to the same level. If the dimension "h" is greater than the length of the foundation anchors, a sufficiently solid base must be placed under the foundation anchors.



1	Upper reinforcement	3	Subbase
2	Lower reinforcement	4	Top of concrete and foundation anchor slab

8.5 Foundation for FUA UV 29

	NOTICE
	All reinforcing rods must cover the entire length of the concrete base. Verify that the foundation anchors and reinforcements are secured against displacement before filling in the concrete.
	NOTICE
	The top edge of the foundation and the top edge of the foundation anchor slab must be brought to the same level. If the dimension "h" is greater than the length of the foundation anchors, a sufficiently solid base must be placed under the foundation anchors.



1	Upper reinforcement	3	Subbase
2	Lower reinforcement	4	Top of concrete and foundation anchor slab

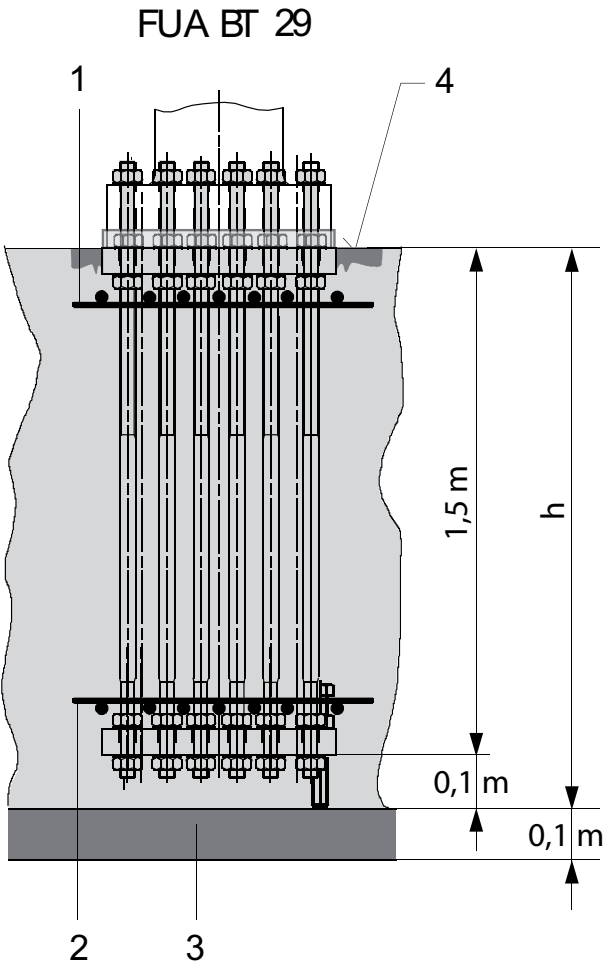
8.6 Foundation for FUA BT 29

NOTICE

All reinforcing rods must cover the entire length of the concrete base. Verify that the foundation anchors and reinforcements are secured against displacement before filling in the concrete.

NOTICE

The top edge of the foundation and the top edge of the foundation anchor slab must be brought to the same level. If the dimension "h" is greater than the length of the foundation anchors, a sufficiently solid base must be placed under the foundation anchors.



1	Upper reinforcement	3	Subbase
2	Lower reinforcement	4	Top of concrete and foundation anchor slab

8.7 Foundation for FUA G 33

NOTICE

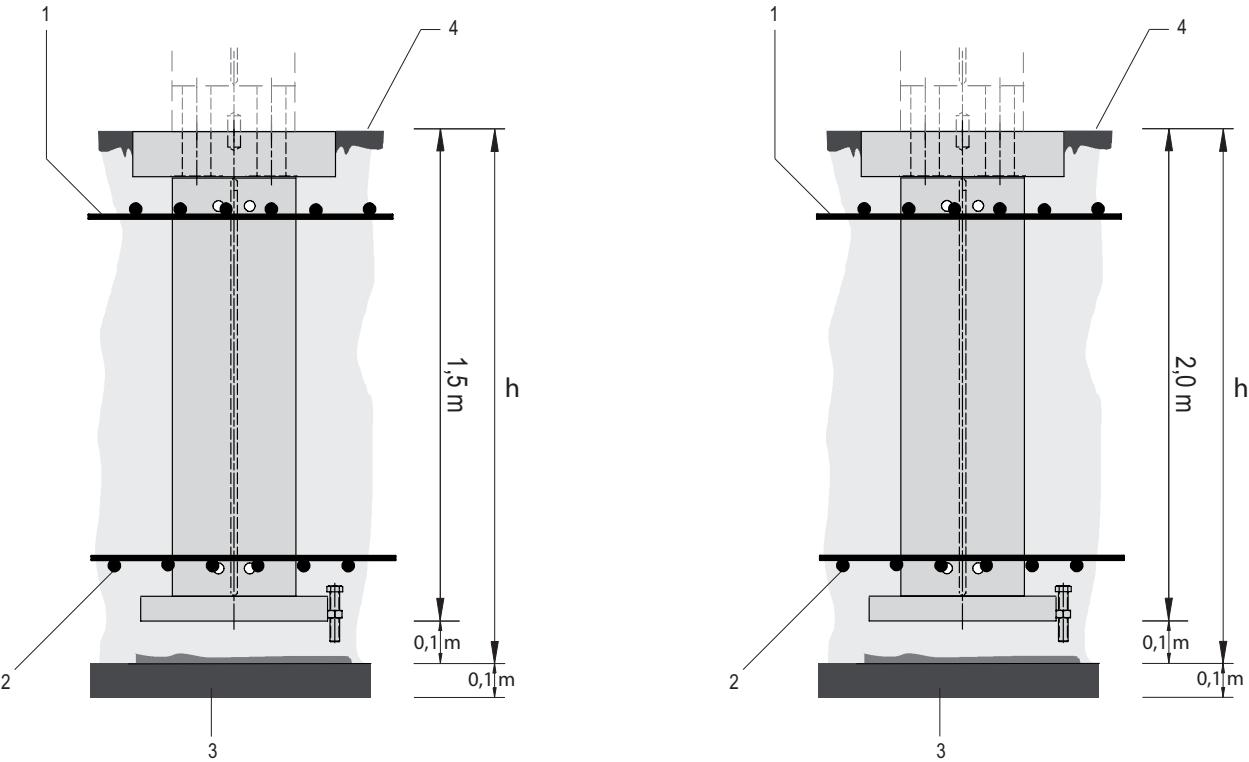
All reinforcing rods must cover the entire length of the concrete base. Verify that the foundation anchors and reinforcements are secured against displacement before filling in the concrete.

NOTICE

The top edge of the foundation and the top edge of the foundation anchor slab must be brought to the same level. If the dimension "h" is greater than the length of the foundation anchors, a sufficiently solid base must be placed under the foundation anchors.

FUA G 33-1500

FUA G 33-2000



1	Upper reinforcement	2	Lower reinforcement
3	Subbase	4	Top of concrete and foundation anchor slab

8.8 Installing and aligning the foundation anchors



! WARNING

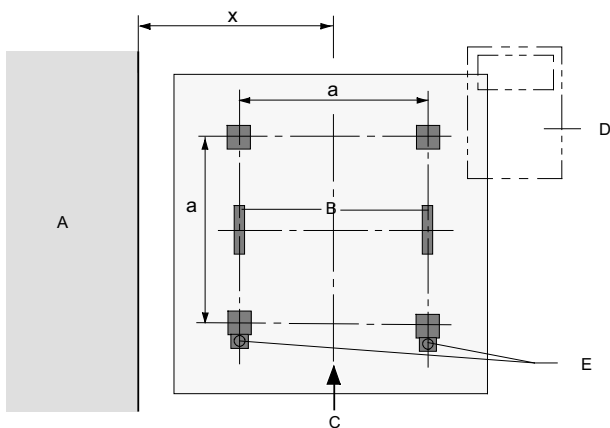
Incorrect vertical alignment.

The slewing tower crane may overturn.

1) Check the alignment of the tower sections.

→ The maximum offset at the tower may not exceed 1‰.
That is, at a measured length of 2 m the valid offset of 2 mm must not be exceeded.

2) Perform a differential leveling at two planes.



A	Building	E	Arrangement of the catch hooks at a 2.0 m tower
B	Arrangement of the catch hooks at 2.5 m	a	System dimensions (a x a)
C	Installation direction of the outer climbing frame	X	Min. clearance
D	Driver's cab		

> At the outset of assembly, verify that electrical power is available at the construction site and that the distribution, equipotential bonding circuits, fuses and safety equipment comply with local regulations. Verify sufficient dimensioning of the feed line.

- 1) Bolt the bottom tower element to the foundation anchors.
 - 2) Lower the tower element bolted to the foundation anchors onto the subbase of the foundation.
 - 3) For load distribution, place suitable steel plates under the set screws.
 - 4) Accurately align the tower element using a theodolite.
- You have successfully installed and aligned the foundation anchors.

8.9 Overview of the foundation anchors.

Tower element	Dimension a [m]	min. clearance X [m]	Foundation anchors	
			Type	Dogs [mm]
TFS 15.4	1.379	2.5	FUA 93	93
UVA 15.4	1.349		FUA 120	120
UV 15.4	1.349		FUA 120	120
UVÜ 15.4	1.849	3.0	FUA 120	120
UV 20	1.849	3.5	FUA 120	120
TVA 20	1.818		FUA 140	140
TV 20	1.818		FUA 140	140
TVÜ 20	2.318		FUA 140	140
TV 25	2.318		FUA 140	140
UVA 25	2.298		FUA 156	156
UV 25	2.298		FUA 156	156
UV 25s	2.298		FUA 156 S	156
TV 23	2.108		FUA 140	140
HT 23	2.074		FUA G 160	160 x 166
HTA 23	2.074		FUA G 160	160 x 166
BT 23	2.024		FUA 210 G	210
UV 29	2.58		FUA UV 29	208 x 200
TV 29	2.565		FUA 210 G	210
BT 29	2.58		FUA BT 29	-
TV 33	2.853 x 2.943		FUA G 33	-

9 Crane tracks

9.1 Crane tracks, general information

	 WARNING
	Incorrectly relayed crane tracks The slewing tower crane may overturn. 1) Always appoint professional personnel to relay the crane tracks. 2) Observe the ground conditions.

Crane tracks must be relayed on solid ground of appropriate load carrying capacity and be safely fastened to ensure stable operation of the slewing tower crane.

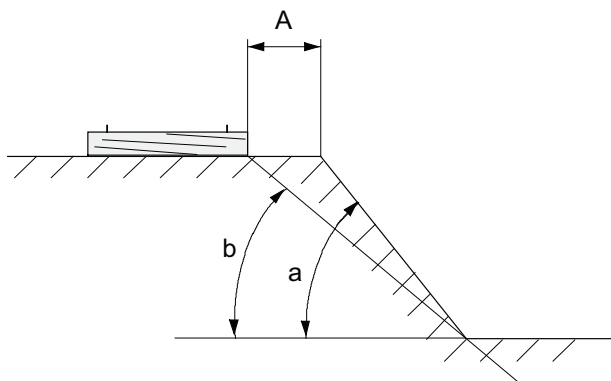
For information on crane track loads, refer to the central and corner load tables of the corresponding slewing tower crane.

Foundations are calculated based on the rules for reinforced concrete statics and on the mechanical values of the ground.

9 Crane tracks

9.2 Excavation slope

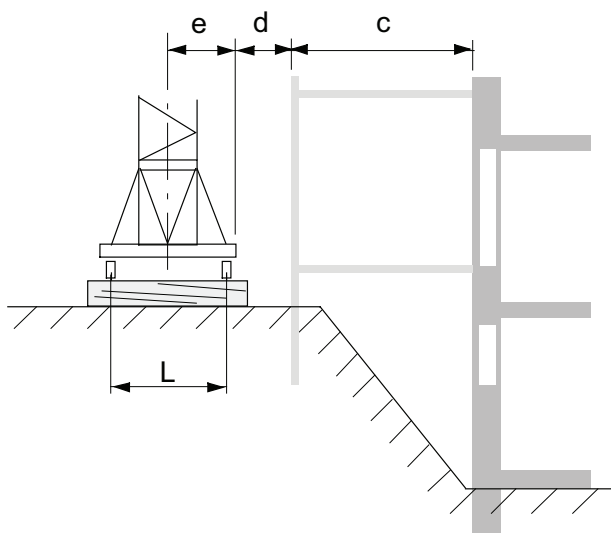
Rails systems in the area of excavations must be relayed so that the the excavation walls or slopes are safely protected against overload or caving in. The clearance between the tracks and the excavation is determined by the corner load of the slewing tower crane and ground properties (degree of saturation with water, frictional forces and shearing strength).



A	Safety strip	b	Slope angle as a function of additional load imposed by the slewing tower crane
a	Slope angle		

9.3 Safety clearance

A minimum safety clearance of 0.5 m must be maintained between buildings, railings, vehicle boundaries etc., and the maximum operating radius of any element of the slewing tower crane.



c	Scaffold width	e	Crane range
d	Safety clearance 0.5 m	L	Rail gauge

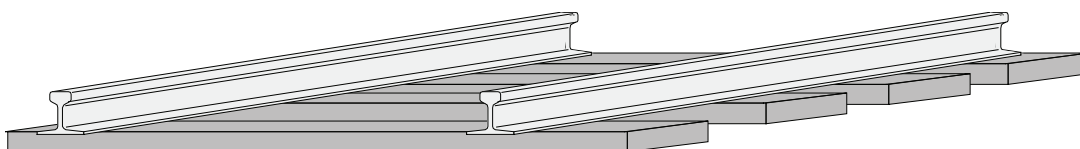
All foundations must be frost resistant if the crane is operated in the winter.

9 Crane tracks

9.4 Ground properties

The crane tracks must be relayed on solid, undisturbed ground. The ground can be leveled by filling and compacting sand and gravel.

It is advisable to commission an expert who is familiar with local ground conditions to verify permissible foundation loads.



9.5 Crane track design

Selecting the crane track

The design and selection of crane tracks is primarily determined by ground conditions.

Recommended type of rails

WOLFF recommends the installation of used railroad tracks to DIN 5902 with slight wear on their shoulder or head. However, the tracks must not show any signs of irregular wear or of damage. For information about rails sizes, refer to the documentation of the bogie truck.

Ensuring suitability of the rail gauge

The size of the rail gauge must be ensured by taking appropriate measures. You should always install spreaders at intervals of 1 x the rail gauge in order to maintain consistency of the gauge.

Using wooden crossties

Rails may only be mounted on wooden crossties using track bed plates. Always use bed plates which ensure a vertical position of the rails.

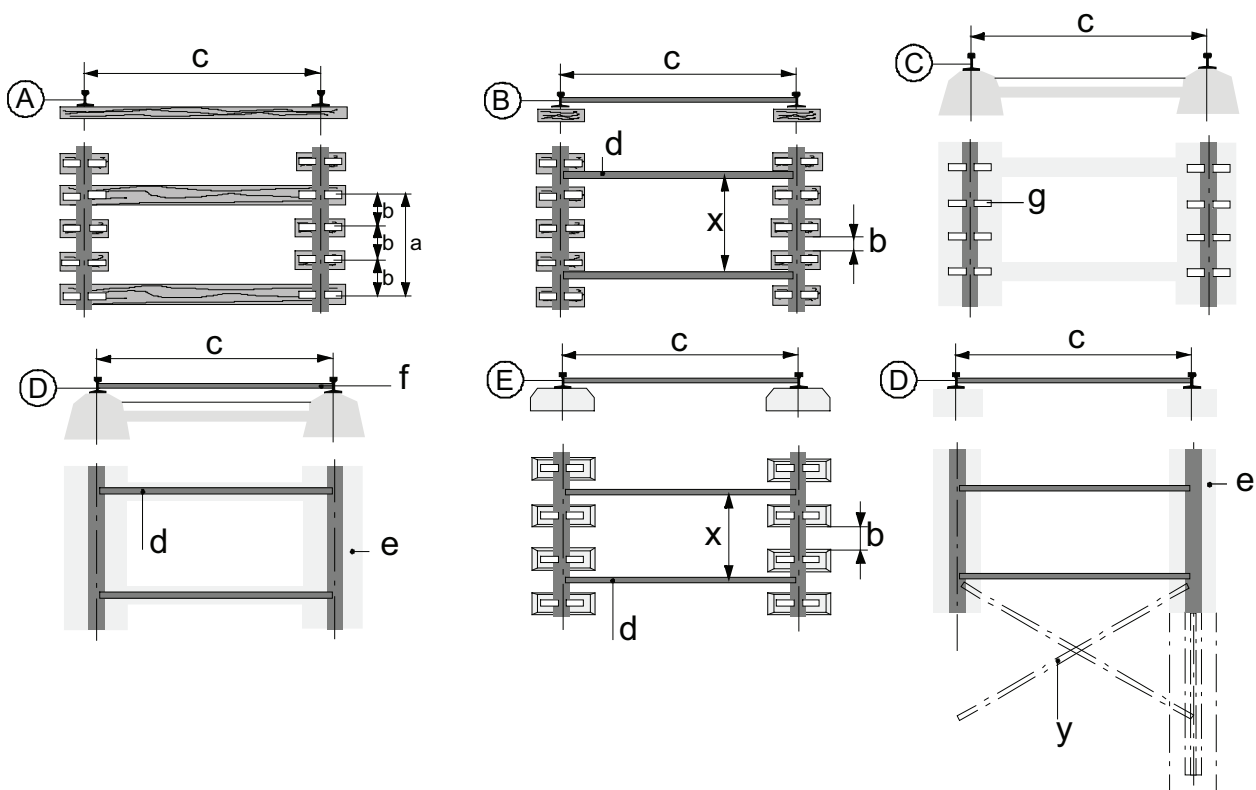
Strip foundation

Rails are mounted on a strip foundation by means of steel plates. The distance between each steel plate must not exceed 600 mm. The steel plate dimensions must be selected in accordance with the corner load

in order to prevent the rated compressive stress between the steel and concrete structure from being exceeded.

9.6 Example of crane tracks

	NOTICE
	The distances a and b and the carrier and crosstie dimensions must be defined as a function of corner load and ground properties.



A	Tracks on wooden crossties	a	Distance a
B	Tracks on I-beams	b	Distance b
C	Tracks on the foundation	c	Rail gauge
D	Rail on the I-beams and foundation	d	Spreaders
E	Tracks on an SRS system	e	Foundation
x	approx. 5.0 m	f	I-beams
y	Arrange the spreaders crosswise at the track ends.	g	Clamping plate

9.7 Tracks on crossties

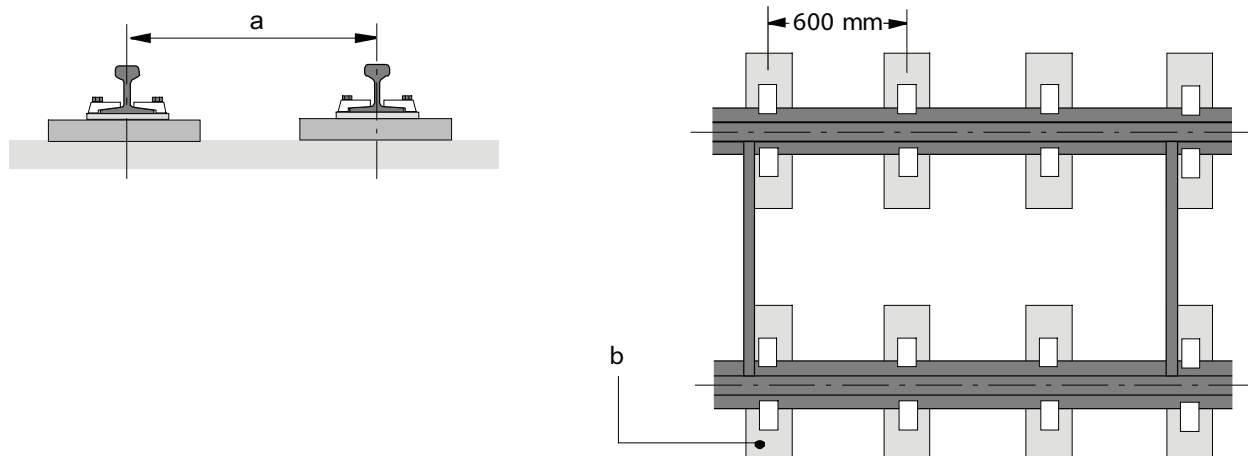


NOTICE

Wooden crossties can only support a maximum corner load of 200 kN.

Type of crosstie	Values
Approved bending stress of hardwood crossties	1,100 N/cm ²
Approved surface pressure: underneath the crossties	300 N/cm ²
Permissible bending stress for softwood crossties	1.000 N/cm ²
Approved surface pressure: underneath the crossties	200 N/cm ²

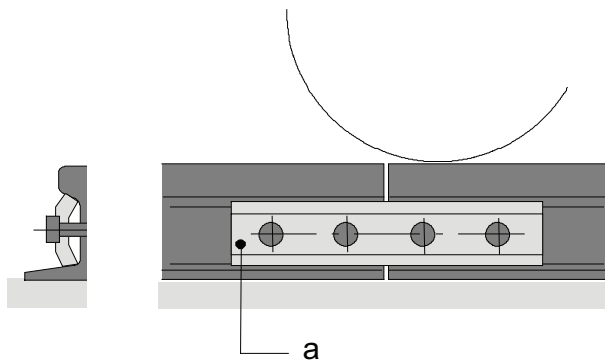
- Rails must be mounted on bed plates to ensure their vertical position.
- Only screwed bolts or joining materials of equivalent quality may be used to mount the rails.
- Concrete crossties must have a minimum cross-section of 16 x 24 cm to enable diversion of generated forces to the ground via the gravel ballast.
- The max. distance between the crossties must not exceed 600 mm. Crossties (crosstie partitions) which are not positioned underneath the rails may only be used as intermediate crossties underneath the outer rails of track bends and provided satisfactory proof of their load carrying capacity has been submitted.
- Measures must be taken to maintain an appropriate track gauge.
- It is not advisable to use concrete crossties in settling areas, or on frost-sensitive or resilient ground.



a	Rail gauge	b	Crosstie min. 16 x 24 cm
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9 Crane tracks

Rail joint

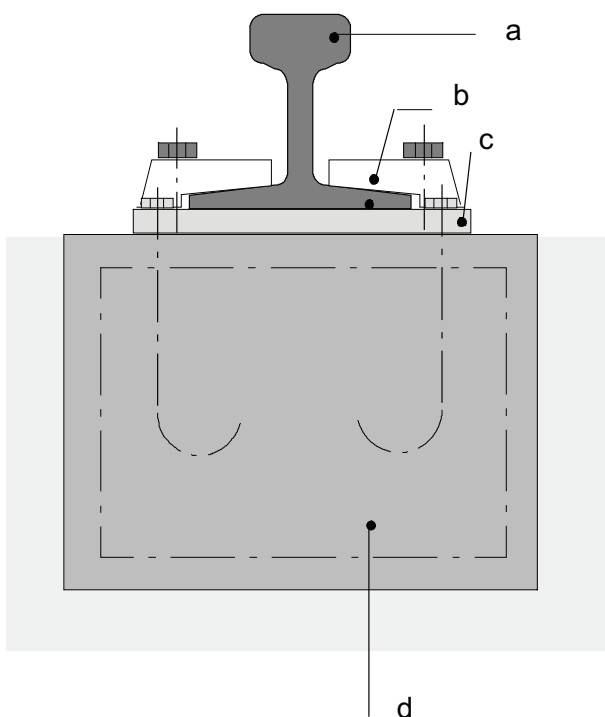


a	Shackle
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- Rail joints must not show any perceptible height transitions. Rail joints must be reinforced by means of shackles which are screw bolted between the rail flange and head.
- Rails showing irregular wear may not be used.

9.8 Tracks on the foundation

- The rails are mounted to the strip foundations by means of steel plates. The pitch between the steel plates must not exceed a length of 600 mm.
- The dimensions of the steel plates must be selected to suit the corner load in order to prevent the rated compressive stress between the steel and concrete structure from being exceeded..
- Mounting plates of the German Bundesbahn may not be used as foundation as those plates have an inclination of 4%. The rails would assume an oblique position on such rails and the running tread of the bogies would only contact one edge of the rail head. High wear and tear of the rails and bogies would be unavoidable.
- The strip foundations must be interconnected in order to maintain the rail gauge and prevent any displacement of a foundation on either one of the sides.

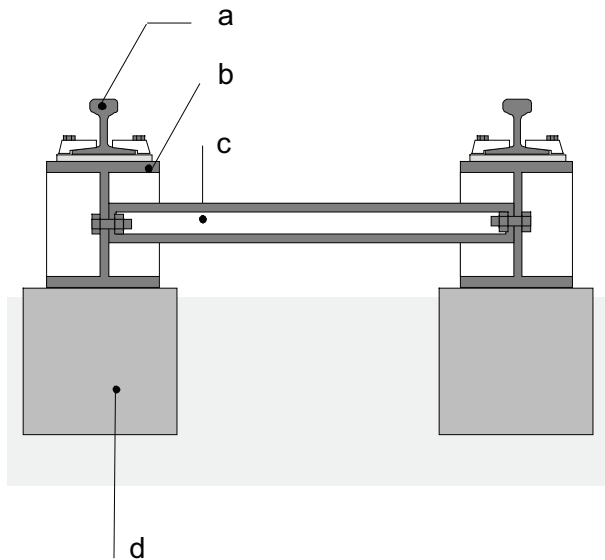


a	Rail	c	Steel plate
b	Clamping plate	d	Foundation

9 Crane tracks

9.9 Rail on the I-beams and foundation

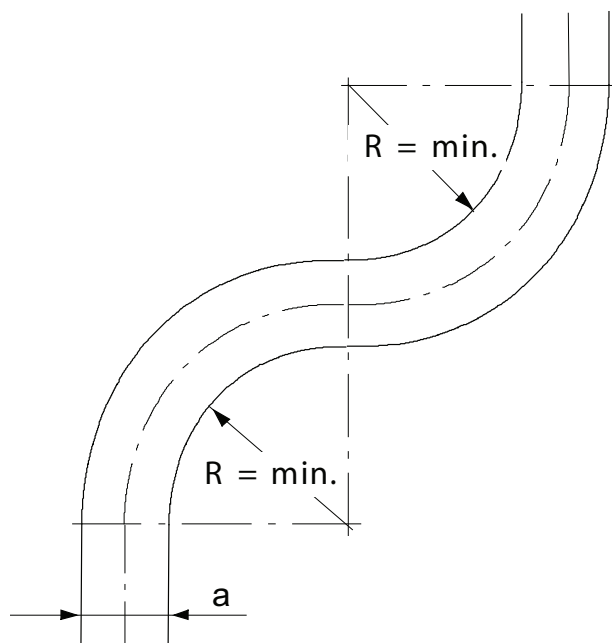
- The rails are relayed on wide-flange beams, secured against lateral displacement by welding on blocks and with clamping plates that prevent the tracks from raising.
- The wide-flange beams must interconnected in order to maintain the rail gauge.
- Select the substructure for the wide-flange beams according to ground conditions, corner loads and beam size. Feasible methods are gravel ballasts, single foundations, concrete slabs, or strip foundations.



a	Rail	c	Spreaders
b	Wide-flange beams	d	Foundation

9.10 Rail relaying in bends

- For information about the approved inner radius "R min", refer to the documents of the bogie truck to be used.
For additional information, refer to the bogie truck documentation.
- It is always possible, of course, to modify the inner radius "R min" to suit spatial requirements. A wider inner radius has a positive effect on traversing properties and on the bogies, i.e. wider inner radii proportionally reduce wear and tear on the bogies.

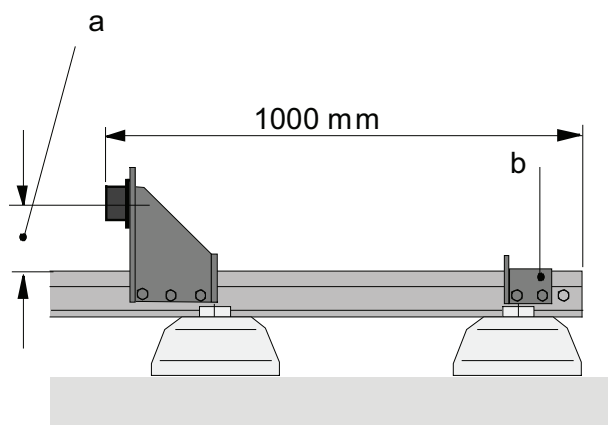


a	Rail gauge
	Dimensions are referenced to the center of the rail head

9 Crane tracks

9.11 Rail stops

- The rail ends must be equipped with fixed (bolted) rail stops (end-of-track safety feature), each one installed at the same distance to the rail bogies.
- The end-of-track safety devices can consist either of fixed stops, or of bumper stops. The end-of-track safety devices at both ends must be mounted upstream of the last crosstie at an appropriate distance to the track end.



a	Dimensions are derived from the bogie truck For additional information, refer to the bogie truck documentation.
b	Spreaders

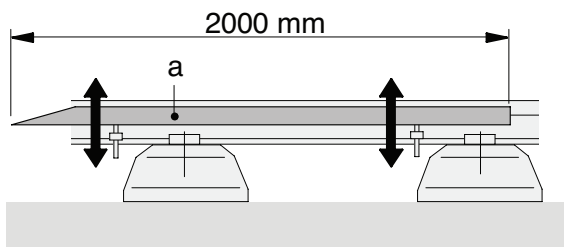
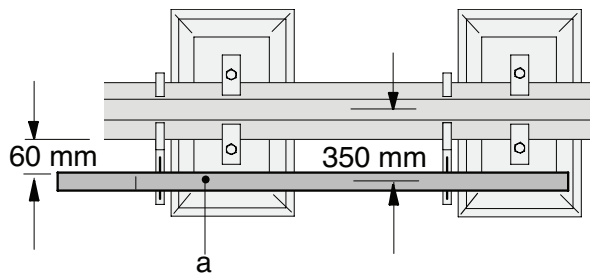
9.12 Travel limit switch ramp



NOTICE

Set up the travel limit switch ramp so that the slewing tower crane reaches a standstill approximately 1 m upstream of the end-of-track safety device after the limit switch was tripped. Secure the ramp by means of screw connection, or joining materials of equivalent quality, in order to prevent any displacement.

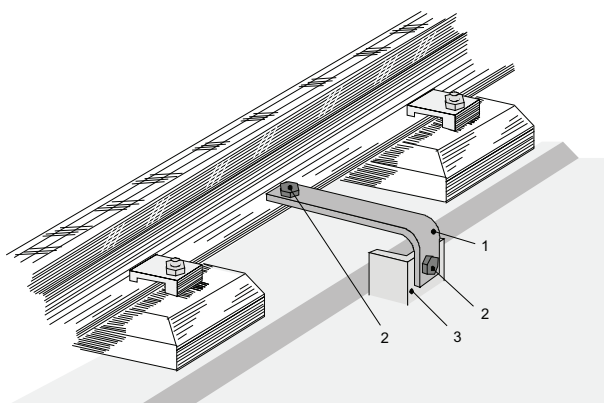
- The crane must be safely prevented from passing the limit switch ramp to a position where the limit switch is reactivated.
- The limit switch ramp must be installed at an inclination from 30° to 45°. Select a sufficient ramp width to prevent the actuating lever of the limit switch from slipping off.



a	Limit switch ramp
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9.13 Grounding of the crane track

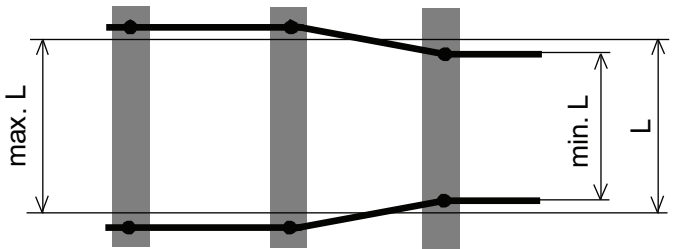
	! WARNING
	High voltage on electrically conductive parts. Risk of injury or death caused by electrical shock. 1) Request the applicable lightning protection regulations from local inspection authorities. 2) Conform to regional regulations governing the lightning protection of foundation structures.

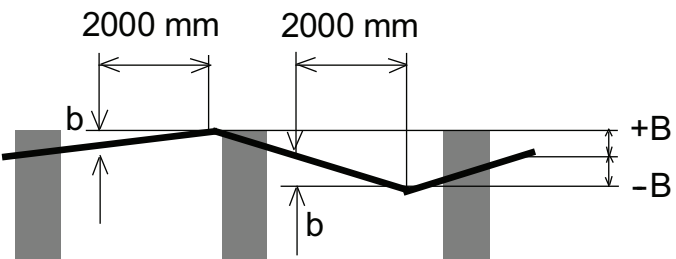


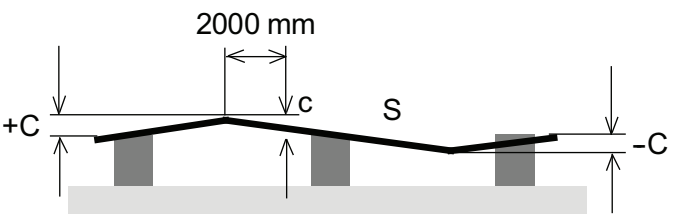
1	Galvanized steel strip 30 mm x 3.5 mm
2	M10 screw with toothed lock washer
3	Earthing rod with minimum submersion depth of 1.5 m

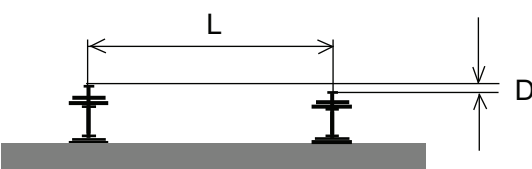
- Additional information is available in: DIN EN 62305-3 (2009).
- Both rails must be bonded to earth at each end; rails with a length greater than 20 m must be bonded to earth at intervals of 20 m length.
- An earthing rod with a minimum submersion depth of 1.5 m is sufficient if no other earth electrodes are available.
- Crane tracks with steel reinforced foundations must be provided an electrically conductive interconnection between the reinforcement and a rail.
- Any apparatus, machinery and metal tubing used within a 20-m radius around the crane track must be electrically bonded to the rails.
- Galvanized 30 mm x 3.5 mm strip steel is considered to be sufficient for use as feed line to the grounding rods and for interconnections. The connections must be established with an M 10 screw at either end. The connections must be secured to prevent them from getting loose (using toothed lock washers to DIN 6798, for example).
- Rail joints interconnected with steel shackles do not have to be bridged for the purpose of lightning protection.

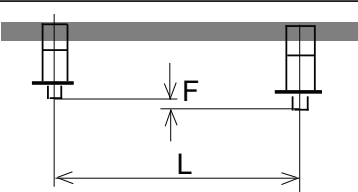
9.14 Crane track tolerances

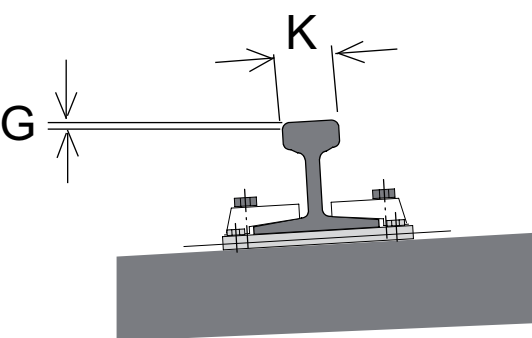
Rail gauge tolerance "A":		
A maximum tolerance "A" is approved for all rail gauges up to 15 m.		
$A = + / - 5 \text{ mm}$		
	$L = \text{Rail gauge average dimension}$	
	$\text{Max. } L = L + A$	$\text{Min. } L = L - A$

Lateral tolerance "B":	
Tolerance "B" as a function of the crane track length.	
$B = + / - 10 \text{ mm}$	
Tolerance "b" as a function of a gauge length of 2000 mm.	
$B = + / - 1 \text{ mm}$	

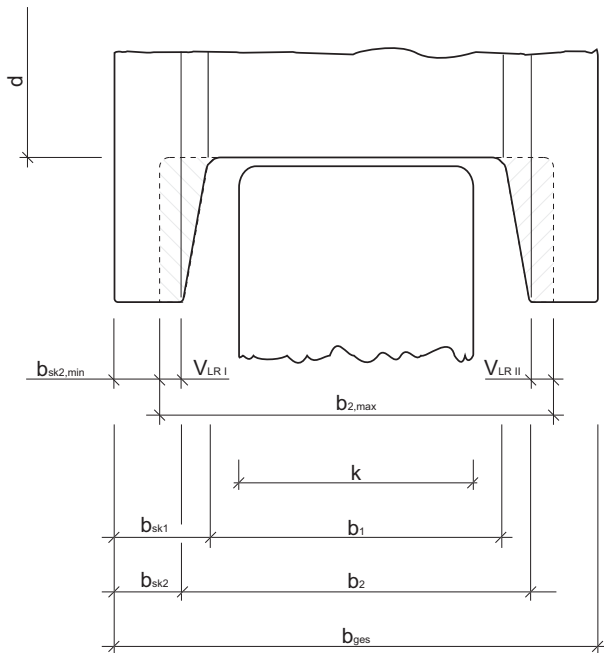
Height tolerance "C" (longitudinal gradient):	
Tolerance "C" as a function of the crane track length.	
$C = + / - 10 \text{ mm}$	
Tolerance "c" as a function of a gauge length of 2000 mm.	
$C = + / - 2 \text{ mm}$	

Height tolerance "D" (transverse gradient):	
Tolerance "D" between crane rails.	
$D = + / - 0.001 \times L \text{ (max. } 10 \text{ mm)}$	

Tolerance "F", rail stop, or end-of-track safety device:	
Tolerance "F" between end-of-track safety devices.	

Tolerance "G" of the rail head:	
Tolerance "G" of the rail head from crown level	 The diagram shows a cross-section of a rail head mounted on a base. A horizontal line represents the crown level. The distance from this line to the top of the rail head is labeled 'K'. The distance from the crown level to the top of the rail head is labeled 'G'. The rail head is shown with a running tread on top.
$G = + / - 0.008 \times K$ (with one running tread)	

9.15 Approved wear of the wheel flanges



d	Wheel diameter	$b_{SK2,min}$	wheel flange min. width (head)
k	Rail head width	b_{total}	Overall width
b_1	Width between wheel flanges at the base	$V_{LR I}$	Wear - wheel flange 1
b_2	Width between wheel flanges at the head	$V_{LR II}$	Wear - wheel flange 2
$b_{2,max}$	Max. width between wheel flanges at the head	S_{theo}	theoretical flange play without wear (with reference to the rail head)
b_{SK1}	Wheel flange width (base)	S_{max}	approved maximum flange play including wear (with reference to rail head)
b_{SK2}	Wheel flange width (head)		

Rail	d	b_{tot}	b_1	b_2	b_{SK1}	b_{SK2}	k
S64	630 mm	133.0 mm	90.6 mm	95.0 mm	21.2 mm	19.0 mm	74 mm
S49	400 mm	130.0 mm	86.5 mm	90.0 mm	21.8 mm	20.0 mm	67 mm

Rail	d	$V_{LR I}$	$V_{LR II}$	$b_{SK2,min}$	$b_{2,max}$	S_{zul}	
S64	630 mm	6.0 mm	4.0 mm	13.0 mm	105.0 mm	31.0 mm	
S49	400 mm	6.0 mm	4.0 mm	14.0 mm	100.0 mm	33.0 mm	

Two limits ($b_{SK2,min}/S_{zul}$) must be observed in terms of the wear of wheel flanges. The limits specify the wheel replacement schedule.

- The value may not be less than $b_{SK2,min}$.
- The value may not exceed S_{zul} .

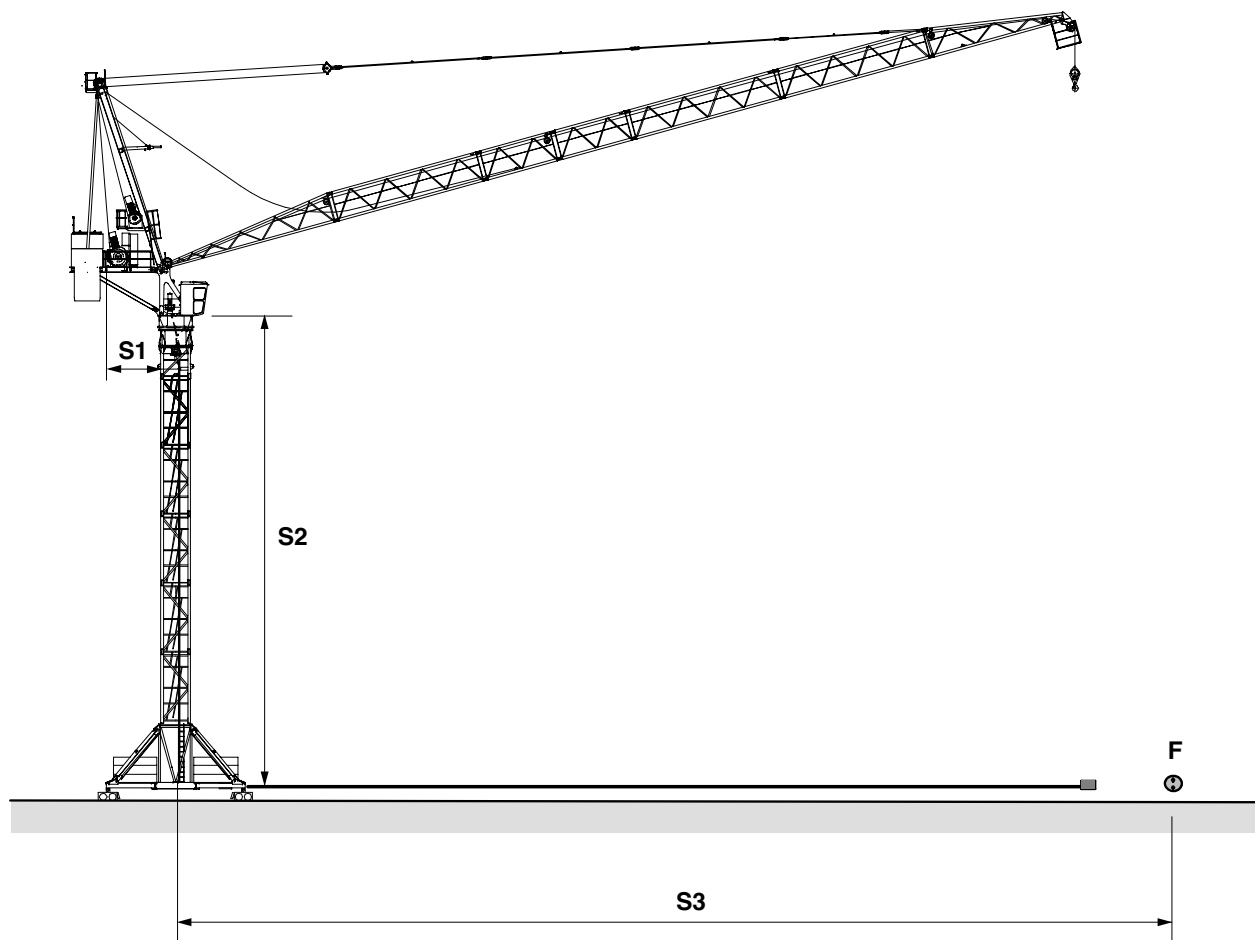
WARNING! The limits must be strictly observed. Values that are out of range of the high and low limits pose the risk of collapse of the slewing tower crane.

10 Preparing the construction site

10.1 Power supply

	 DANGER Live electrical equipment Risk of injury or death caused by electrical shock. 1) Always bond the slewing tower crane to ground. 2) Always use original fuses of the specified current rating. 3) Always allocate a skilled electrician to the work to be done. 4) Inspect the electrical equipment at cyclic intervals 5) Get appropriate First Aid instructions and information on precautions to be taken before starting work on live electrical equipment. 6) Disconnect the relevant unit components from the power supply. 7) Safeguard the work area against unintentional power on. 8) Connect the unit components to ground. 9) Fence off all adjacent live parts.
	NOTICE At the outset of assembly, verify that electrical power is available at the construction site and that all distributions, equipotential bonding circuits, fuses and safety equipment comply with local regulations. Verify sufficient dimensioning of the feed line. Here, voltage fluctuation must be limited to +/-10%.

10 Preparing the construction site



F	Fixed point connection
S1	The power cables are included in the scope of delivery of the slewing gear
S2	Never run any power cables down from the slewing element without appropriate attachment, i.e. provide cable tie fixtures (e.g. strain relief elements such as cable grips) on the tower elements at least at intervals of 25 m to 30 m
S2+ S3	The length of power cables is a decisive factor for calculating the conductor cross-sections.

10.2 Defining the dimensions of electrical feed lines

	NOTICE
Values for line fuses: to VDE 0100 part 430 for 3-phase power supply 380-460V, 50/60 Hz, for multicore copper stranded wire. Specification of the operating current is based on the theoretical assumption of a simultaneity factor 0.7.	

		WOLFF 320 BF WOLFF 355 B	
Item	Unit		
Hoisting gear			
Type		28110 FU	
Power	kW	110	
Current	A	220	
Luffing gear			
Type		1575 FU	
Power	kW	75	
Current	A	150	
Crane			
Operating current	A	280	
Peak current	A	337	
Supply cable			
Cross section	mm²	95	120
Back-up fuse In	A	200	200
Or setting circuit breaker	A	280 ¹	280 ¹
Max. length S2 + S3	m	208	263
Power input:	kVA	194	
min. required nominal generator power	kVA	485	

¹ Values for single conductors

10 Preparing the construction site

10.3 Note on connecting power to frequency controlled drives

Compensation systems can lead to excess harmonic voltages.

The free-running diode bridge at the power input of the frequency converter units generate harmonic voltages.

The resultant harmonics depend on mains conditions and must not exceed the locally defined limits at the mains junction.

Usually, compatibility levels are in compliance with IEC Publication 100-2-2 if the effective drive power is equivalent to max. 10% of the transformer power of the supply network.

Due to frequent operation of the drives in the jog and intermittent modes on slewing tower cranes, the mean value of harmonics usually equals one fifth of the maximum value at maximum drive power.

10.4 Connection to the building site mains cabinet

Building site mains cabinets must conform to currently valid local regulations such as: DIN EN 60439-4 (2004) Low-voltage and switchgear combinations, part 4: Special requirements of building site mains cabinets

The slewing tower crane is equipped with frequency controlled drives. In accordance with VDE 0160, the crane may not be connected to building site mains cabinets which contain safety equipment that is sensitive pulse-shaped current.

In the event of malfunctions, high-frequency residual currents or smoothed DC fault currents could block the protective equipment

The following types of connection are approved according to information from the Employer's Liability Insurance Association (BGI 608- Selection and operation of electrical systems and operating equipment at construction sites):

- The crane may be connected to a building site mains cabinet that is equipped with an AC/DC sensitive residual current operated device (type B ).
- A crane that is hooked up to mains by means of plug-in connector (rated power greater than 32 A to 63 A) must be operated in combination with an AC/DC-sensitive residual current circuit breaker (type B ) at a ground fault current less than/ equal to 500 mA, or in combination with an isolating transformer.
- A crane that is hooked up to mains by means of plug-in connector (rated power greater than 63 A) must be operated in combination with an AC/DC-sensitive residual current circuit breaker (type B ) or in combination with an isolating transformer.
- The crane can also be connected directly to power upstream of the fault current breaking device in the building site mains cabinet. In accordance with DIN VDE 0100- 410, such an application requires one or several protective measures to be taken.

Protective devices which are sensitive to pulse-shaped current must not be connected in series to AC/DC-sensitive residual current breaking devices.

The secondary coil of isolating transformers must be safely protected against indirect contact (insulation monitoring).

10 Preparing the construction site

10.5 Multiple voltage design

The electrical equipment is suitable for operation on mains voltages from 380 to 460 V (50 Hz/ 60 Hz).

A special transformer (OTS) is installed in the control cabinet to allow adaptation to the local voltage.

After having determined the local mains voltage, wire the power cable to the corresponding 380 V/ 400 V/ 420 V/ 460 V terminals on the primary side of the transformer.

Connections to local mains must be checked in preparation of crane assembly.

11 Foundation anchors

This section contains information on different foundation anchors.

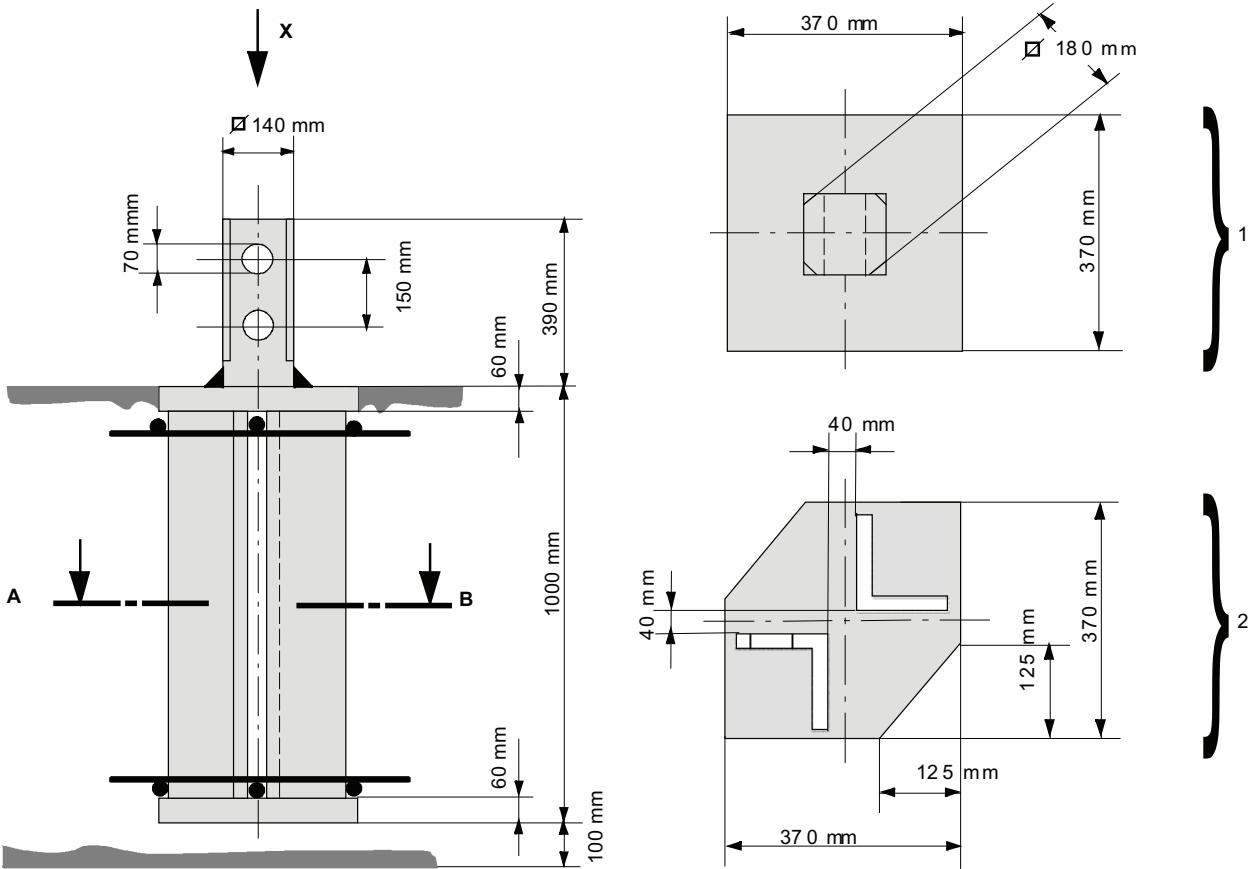
11 Foundation anchors

11.1 FUA D

- Spigots, 140 mm
- Tower element

TVA 20	TVA 20.3
TVÜ 20	TVA 20.4
TV 20	TV 20.4
TV 23	TV 25
TVÜ 20.4	TV 25.5

- Weight per item = 251 kg



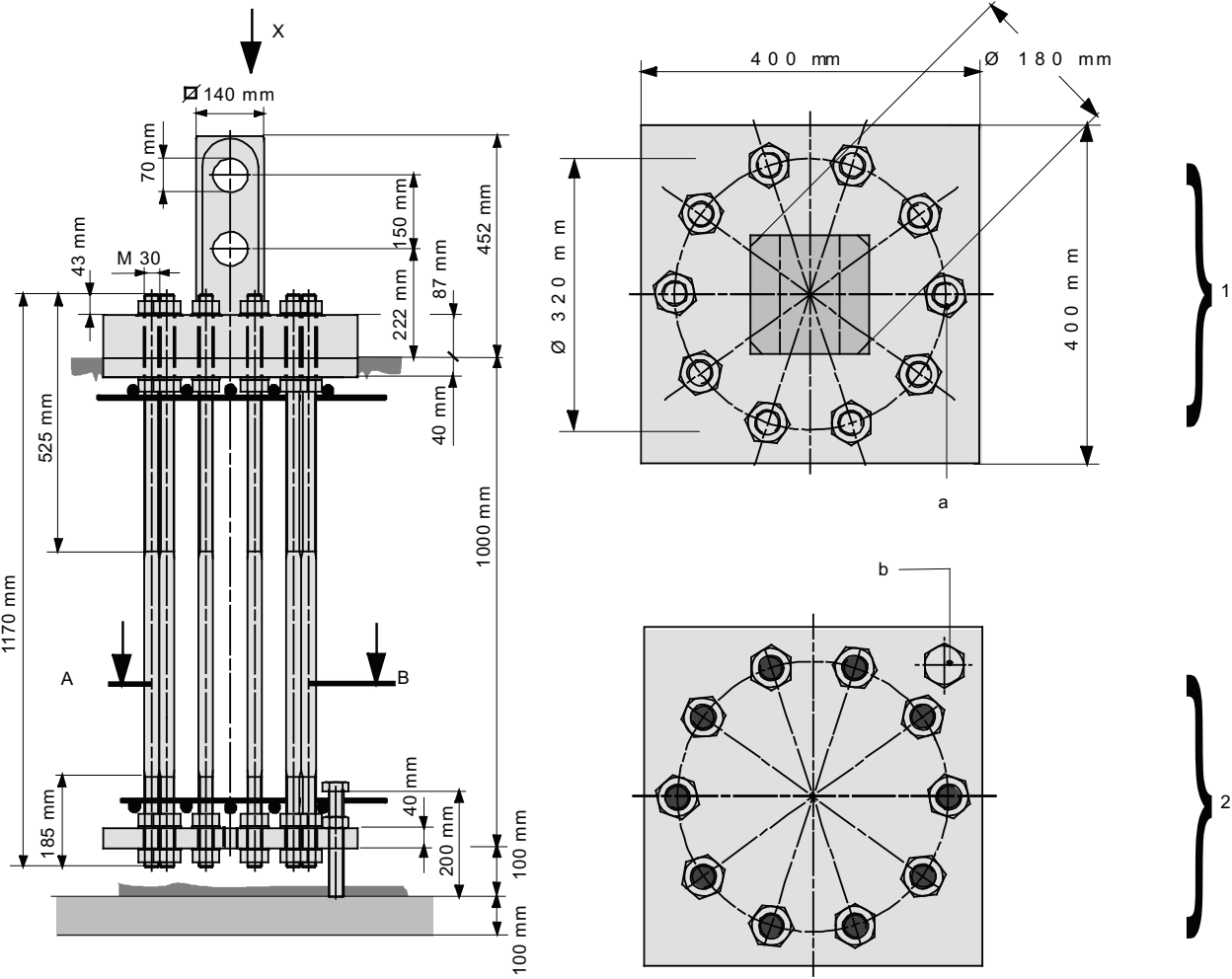
1	View X
2	Section A-B

11.2 FUA 140

- Spigots, 140 mm
- Tower element

TV 20.4	TV 23
TV 25	TV 25.5

- Weight per item = 337 kg



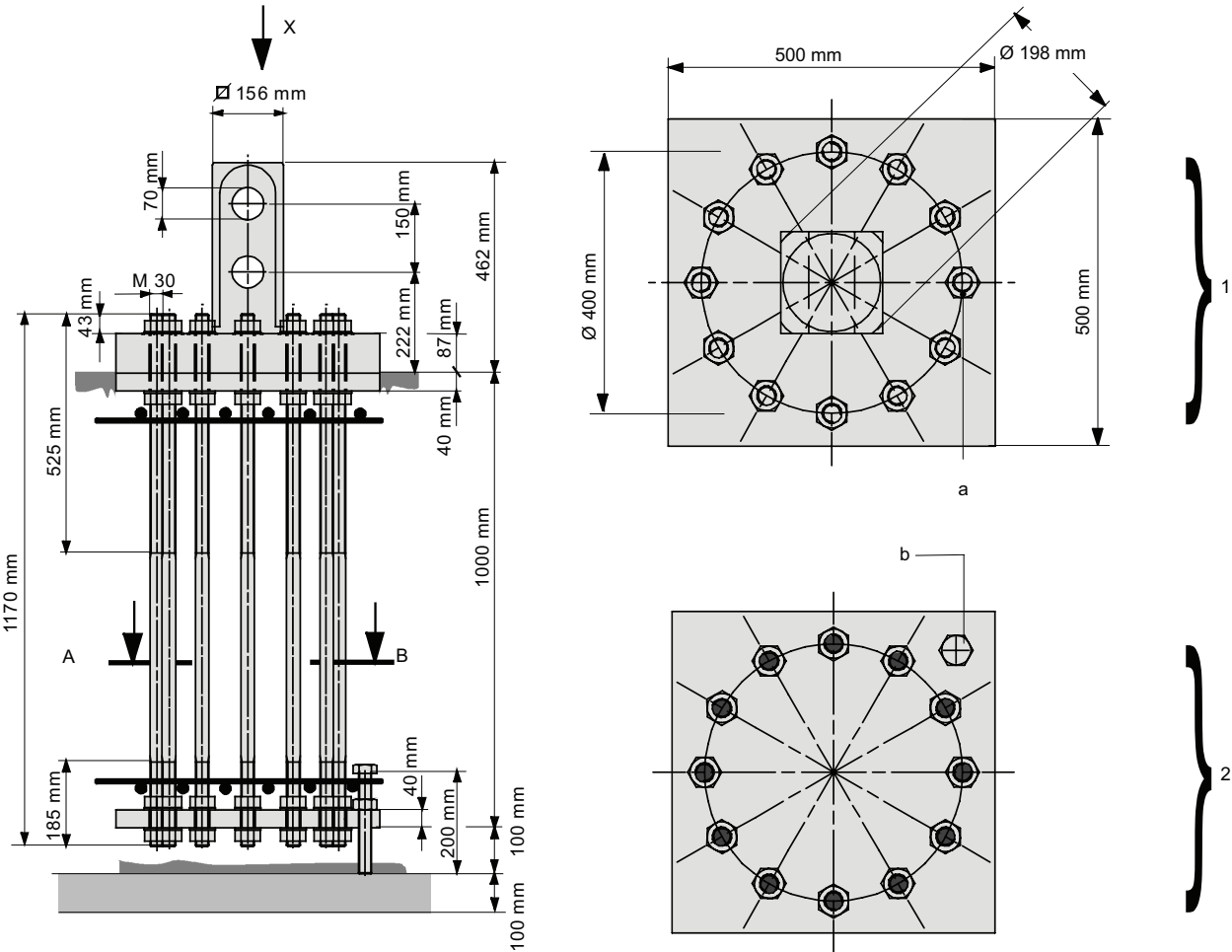
11 Foundation anchors

11.3 FUA 156

- Spigots, 156 mm
- Tower element

UV 25	UVA 25.5
UVA 25	

- Weight per item = 485 kg



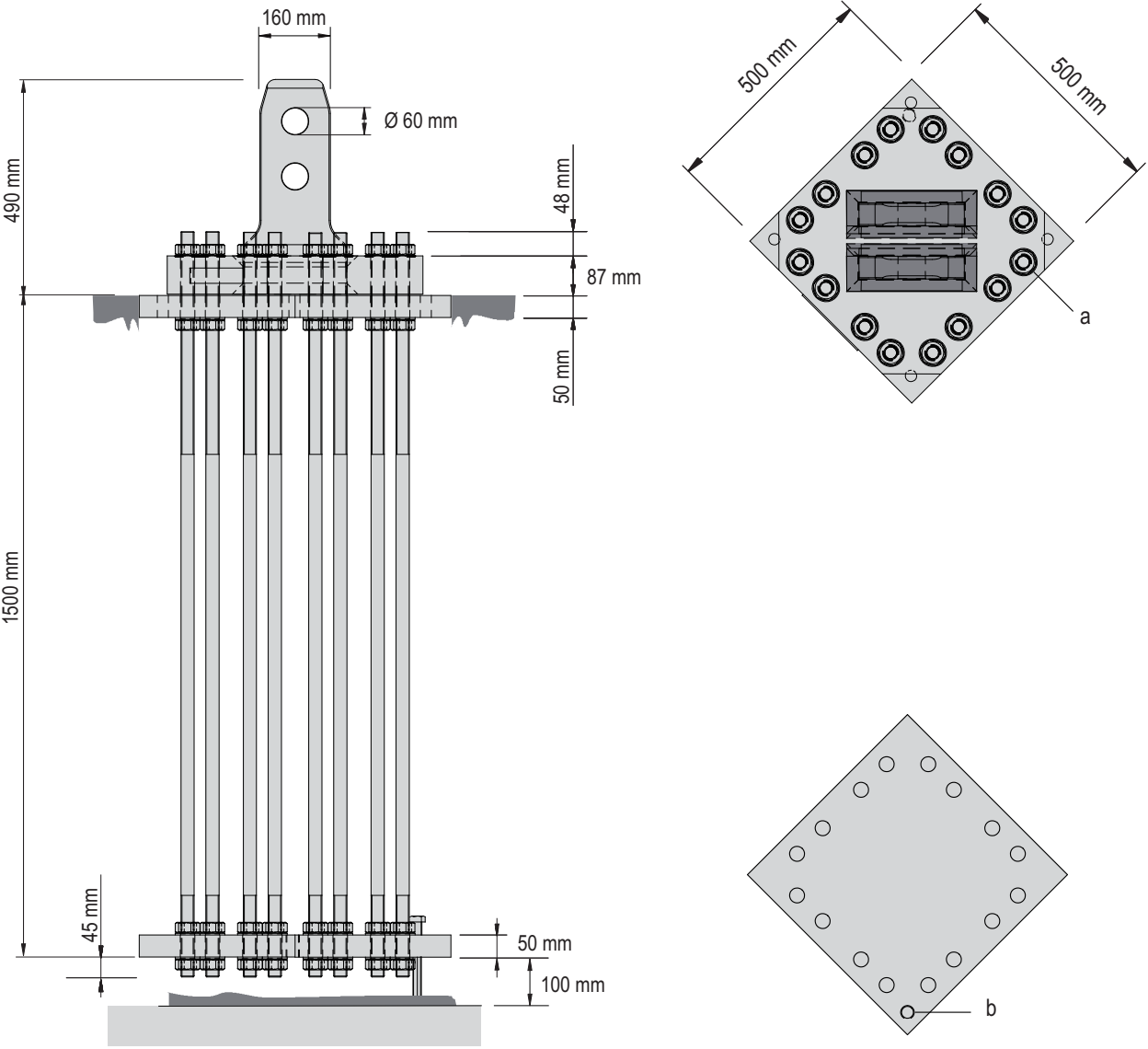
1 View X	2 Section A-B
a Tightening torque M30 - 10.9 = 1650 Nm MoS ₂	b Setscrew M30 x 200- 8.8

11.4 FUA G 160

- Tower element

HT 23	HTA 23
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- Weight per item = 564 kg



a	Tightening torque M30 - 10.9 = 1650 Nm MoS ₂	b	Setscrew M30 x 200- 8.8
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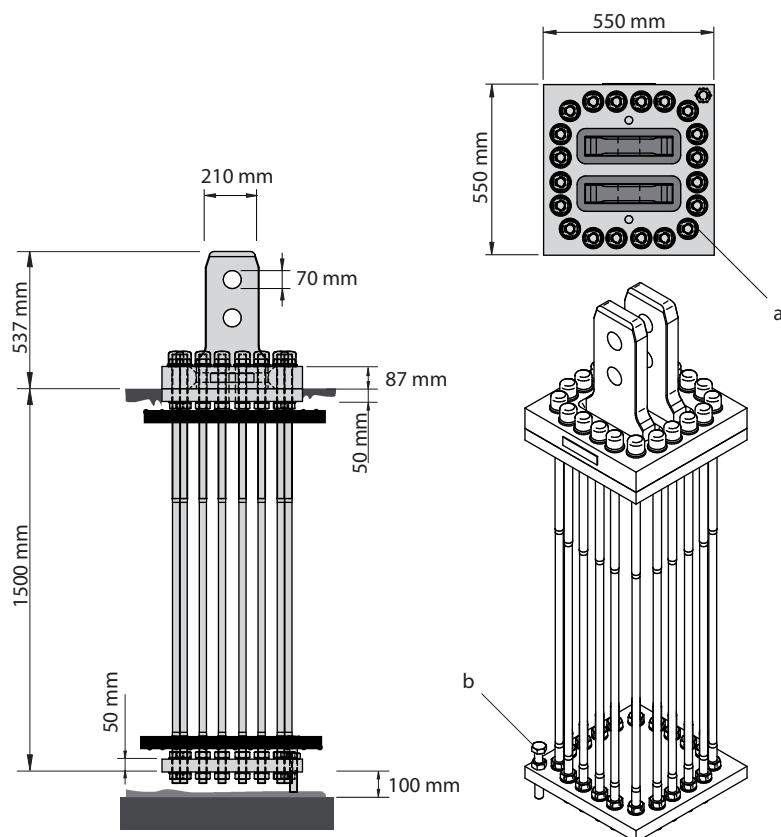
11 Foundation anchors

11.5 FUA G 210

- Tower element
- inner climbing device

BT 23	KSH 23 / KSH E 23
TV 29	

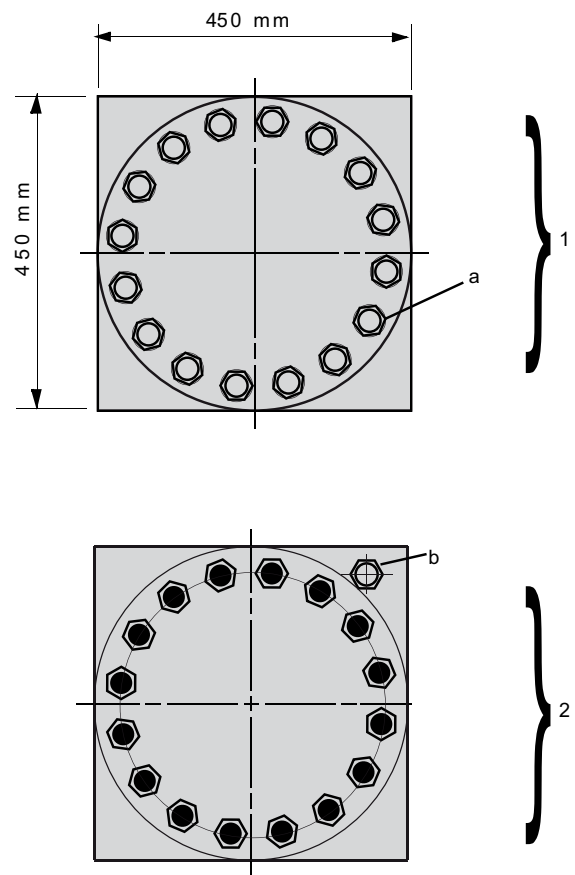
- Weight per item = 705 kg



a	Tightening torque M30 - 10.9 = 1650 Nm MoS ₂	b	Setscrew M30 x 200- 8.8
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- Tower element

- Weight per item = 327 kg



1	View X	2	Section A-B
a	Tightening torque M30 - 10.9 = 1650 Nm MoS ₂	b	Setscrew M30 x 200- 8.8

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