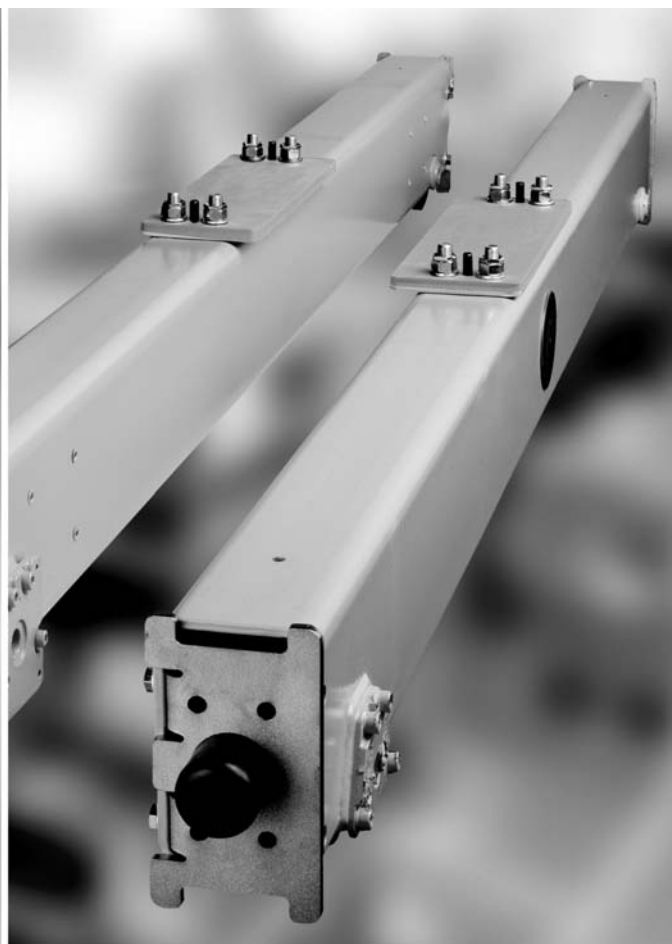
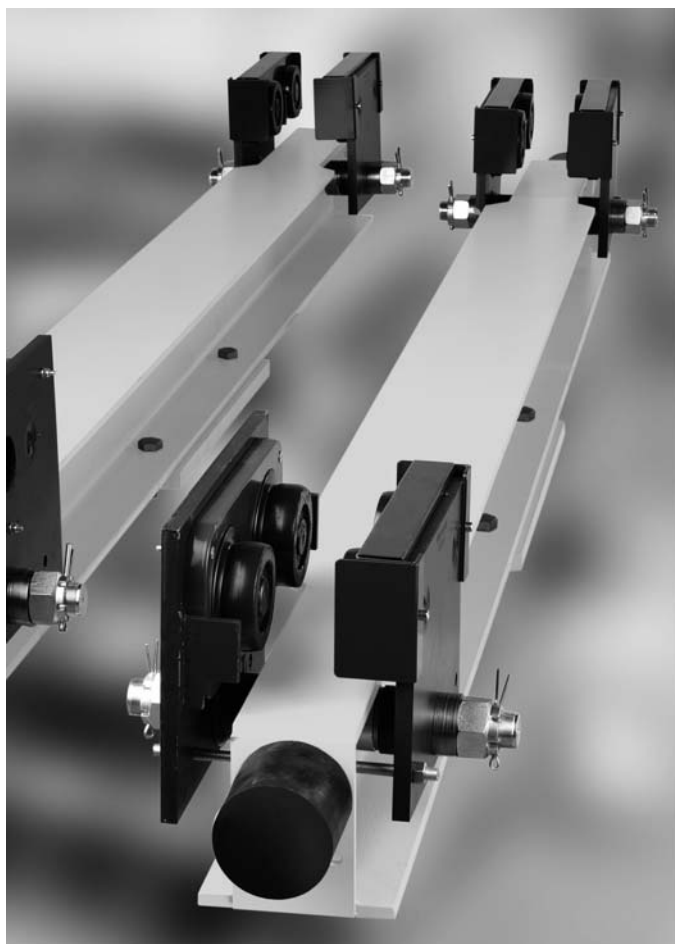


КранШталь



HL
HT



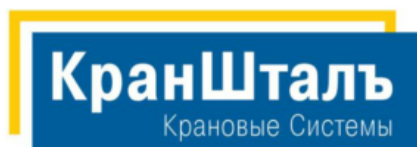
LS
LT

Endcarriages for Suspension and Overhead Travelling Cranes _

Product Information

» EN

02.2012



<http://kranstahl.ru>
info@kranstahl.ru

Partner of



+7 (495) 225-37-88

Validity

This latest edition of the Product Information brochure for Endcarriages for Suspension and Overhead Travelling Crane is valid from 02.2012 and supersedes all previous product information brochures.

With STAHL CraneSystems in particular, technical products are constantly subject to further development, improvement and innovation. We must therefore reserve the right to modify technical data, dimensions, weights, designs and availability.

The drawings serve to illustrate the products but are not binding.

Errors and printing errors are excepted.

Table of contents

Endcarriages for Suspension Cranes

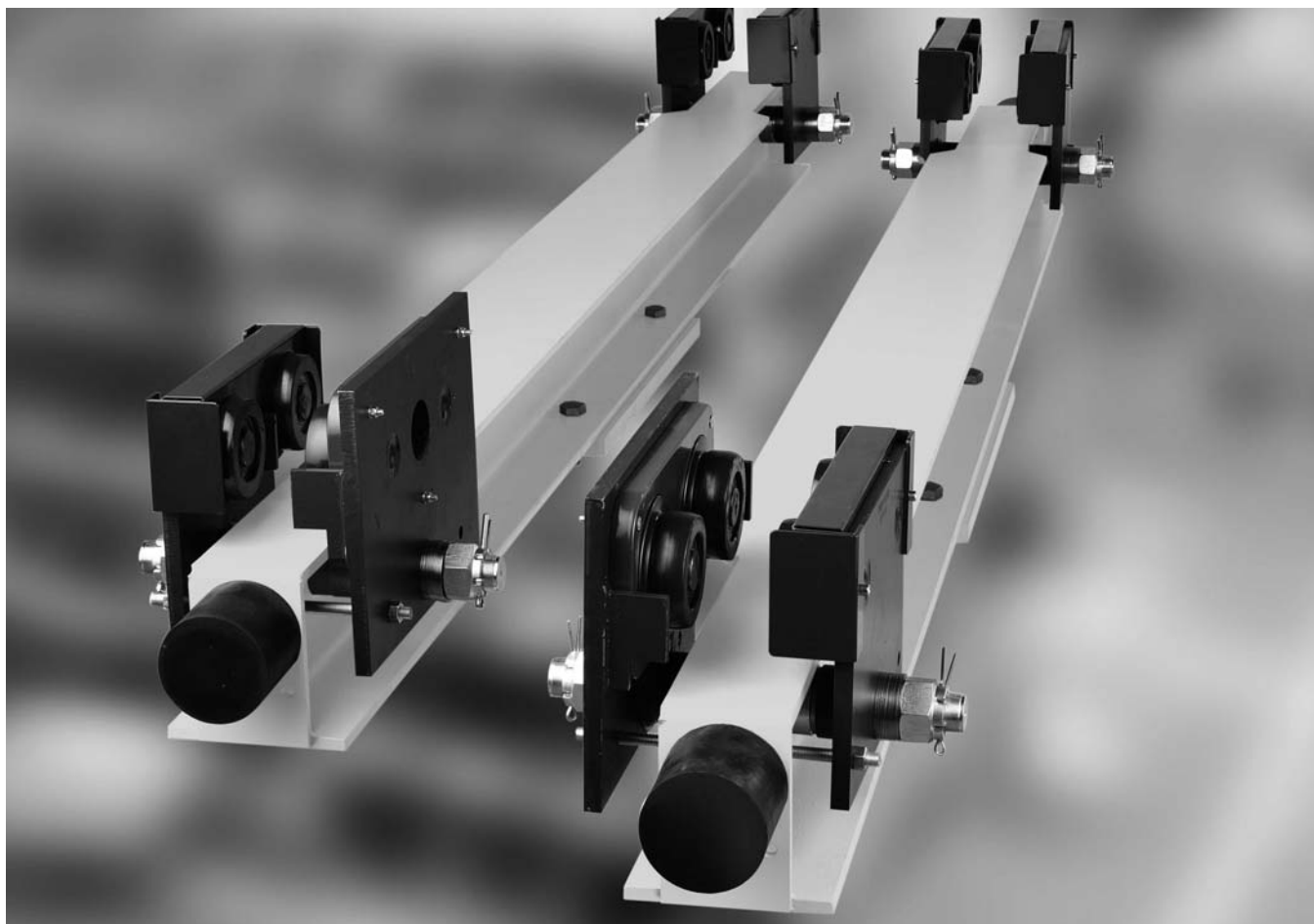


1

Endcarriages for O.H.T. Cranes



2



Endcarriages for Suspension Cranes _

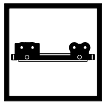
Product Information

➤ EN

Partner of Experts

STAHL
CraneSystems





1 Endcarriages for suspension cranes

HL

HT

Modern small-span suspension cranes up to a working load of 10,000 kg or 12,500 kg can be manufactured on the basis of HL/HT endcarriages for suspension cranes.

Make use of their sturdy design, compact construction, maintenance friendliness and reliability in conjunction with the economic advantages of series production for your crane manufacturing.

1.1 Explanation of symbols



Maximum working load [kg]



Weight [kg]



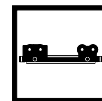
Travel speed [m/min]



Dimensions see page..



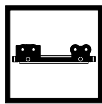
See page..



Contents

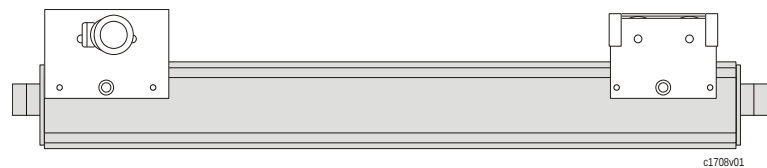
1	Endcarriages for suspension cranes	1-2
1.1	Explanation of symbols	1-2
1.2	Technical features at a glance	1-4
1.3	Type designation	1-5
1.4	Selection instructions	1-6
	1.4.1 Rough determination.....	1-6
	1.4.2 Determination of endcarriage size.....	1-6
	1.4.3 Determination of travel drive	1-6
	1.4.4 Determination of crane buffer	1-7
1.5	Endcarriages for single girder suspension cranes	1-8
	1.5.1 Dimensions.....	1-8
	1.5.1.1 HL08.....	1-8
	1.5.1.2 HL10.....	1-10
	1.5.1.3 HL13.....	1-12
	1.5.1.4 HT10.....	1-14
	1.5.1.5 HT13.....	1-16
1.6	Options.....	1-18
	1.6.1 Motor supply voltages	1-18
	1.6.2 Temperature control of motors	1-18
	1.6.3 IP 66 protection	1-18
	1.6.4 Off-standard ambient temperatures	1-18
	1.6.5 Paint/corrosion protection	1-18
	1.6.6 Paint/top coat	1-19
	1.6.7 Alternative travel speeds.....	1-19
	1.6.8 Buffer extension	1-19
	1.6.9 Horizontal guide rollers	1-20
	1.6.10 Vertical guide rollers.....	1-21
	1.6.11 Earth brush (rail sweep).....	1-22
	1.6.12 Assembly help tool	1-22
	1.6.13 Anti-skew support.....	1-23
1.7	Technical data.....	1-23
	1.7.1 Permissible ideal wheel loads calculated on the basis of bearing life	1-23
	1.7.1.1 HL08.....	1-23
	1.7.1.2 HL/HT10.....	1-23
	1.7.1.3 HL/HT13.....	1-23

Subject to alterations, errors and printing errors excepted.

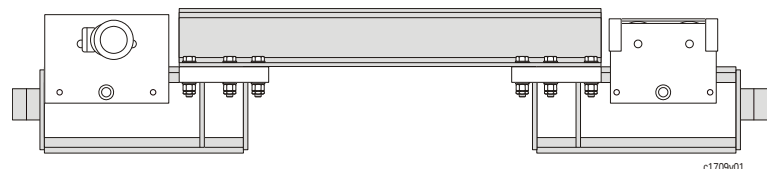


1.2 Technical features at a glance

HL



HT

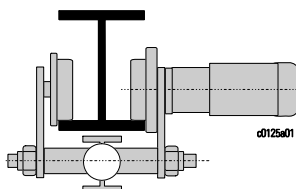
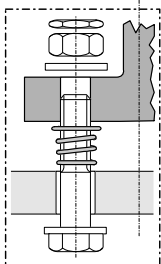
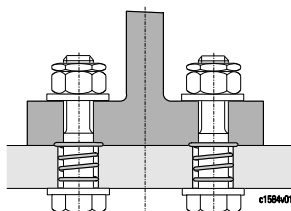


You can build modern suspension cranes simply and easily with the suspension crane endcarriages.

Modern manufacturing methods and our certified Quality Assurance System to DIN ISO 9001/EN 29001 guarantee consistent quality and dimensional accuracy.

Endcarriage

- Steel structure with a high degree of geometrical accuracy.
- Wheels of spheroidal graphite cast iron. The excellent self-lubricating properties of the wheel material EN-GJS-700-2 ensure a long service life of the wheel/runway system.
- Minimum load on crane runway beam. Only slight deflection of the bottom flange thanks to an optimized wheel profile, enabling the use of smaller crane runway beams.
- Simple adjustment to crane runway section using spacer parts.

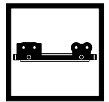


Crane connection

- High-tensile positive-locking connection between crane girder and endcarriages.

Travel drive

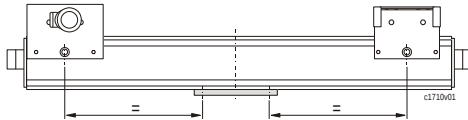
- Robust wheel drive with enclosed, grease-lubricated wheel gearing.
- Lifetime lubrication.
- Design acc. to FEM (ISO) 1Am (M4).
- Brake motor with disc brake and centrifugal mass. Smooth acceleration and braking characteristics for minimum load swing.
- Insulation class F to EN/IEC 60034.
- Motors are equipped with a plug connection (socket).
- Very little noise due to helical gearing of all gear steps.
- Travel speeds as desired with pole-changing motors at a ratio of 1:4 or with 4-pole motors and frequency inverter at a ratio of 1:10.



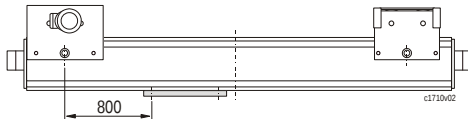
1.3 Type designation

H.	13	-	23	100	-	SC4	0000	C	0000	-	N
1,2	3,4	5	6,7	8-10	11	12-14	15-18	19	20-23	24	25

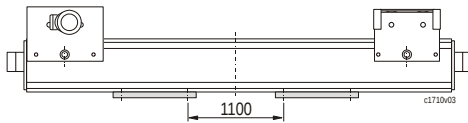
Single girder suspension crane, centre connection:
 HL13-23100-SC40000C0000-N



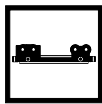
Single girder suspension crane, off-centre connection:
 HL13C23100-SC40800C0000-N



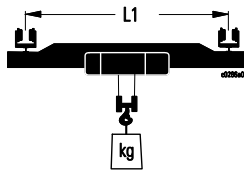
Double girder suspension crane:
 HL13-23100-SC41100C0000-N



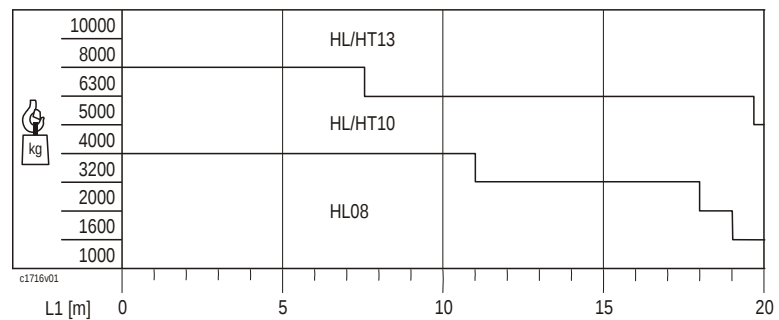
Pos.		Value	Description
1,2	Type of endcarriage	HL/HT	Endcarriage for suspension crane
3,4	Wheel diameter x 10	08 10 13	80 mm 100 mm 125 mm
5	Connection description	- B C	Centre (standard) Coupled endcarriages Off-centre (off-standard)
6,7	Wheelbase x 100	12 14 18 23 28 32 35	1200 mm 1400 mm 1800 mm 2300 mm 2800 mm 3200 mm 3500 mm
8-10	Flange width	073-313 082-322 100-343	HL08 HL/HT10 HL/HT13
11	Number of travel drives	- D	1 drive per endcarriage (standard) 2 drives per endcarriage
12-14	Joint (with / without joint plate)	SA3 / BA1-3 SB4 / BB2-5 SC3, SC4, SC5 / BC3-5 HB4 / KB2-5 HC3, HC4, HC5 / KC3-5	HL08 HL10 HL13 HT10 HT13
15-18	Joint plate spacing	0000 #### ####	Standard, centre connection Single girder suspension crane, off-centre connection (distance between suspension bolt and hole in joint plate) Double girder suspension crane (hole separation a between connections)
19	Buffer type	A, B, C, D K, G, E, M, F 0	Rubber buffers Polyurethane buffers Without buffers
20-23		0000 ####	On pair of endcarriages (standard) Distance between inside suspension bolts for coupled endcarriages
24	Paint	- K	Primer coat (standard) Top coat
25	Version	N E	Standard Off-standard



1.4 Selection instructions



1.4.1 Rough determination



1.4.2 Determination of endcarriage size

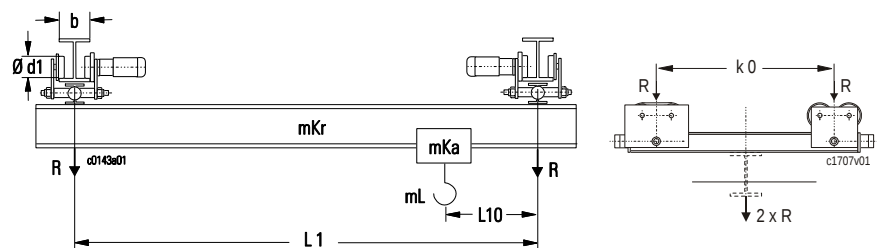
$$mKr = mT + mZ + mKo [kg]$$

$$R_{max} = \frac{mKr}{4 \times 100} + \frac{mL + mKa}{2 \times 100} \times \frac{(L1 - L10)}{L1} [kN]$$

$$R_{min} = \frac{mKr}{4 \times 100} + \frac{mL + mKa}{2 \times 100} \times \frac{L10}{L1} [kN]$$

Conditions:

- $R_{max} \leq R_{zul}$
- $actual\ L1 \leq L1_{zul}$



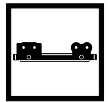
1.4.3 Determination of travel drive

$$mF_{max} = mKr + mKa + mL [kg]$$

Condition:

- $mF_{max} \leq mF_{zul}$

b	[mm]	Flange width
Ø d1	[mm]	Wheel diameter
L1	[m]	Crane span
L10	[m]	Hook approach trolley
mF	[kg]	Travel load/pair
mKa	[kg]	Weight of trolley/crab
mKo	[kg]	Weight of endcarriage + joint plate + drive
mKr	[kg]	Weight of crane
mL	[kg]	Working load
mT	[kg]	Weight of crane bridge(s)
mZ	[kg]	Weight of additional loads
R _{max}	[kN]	Max. actual wheel load (static)
R _{zul}	[kN]	Permissible wheel load (static)



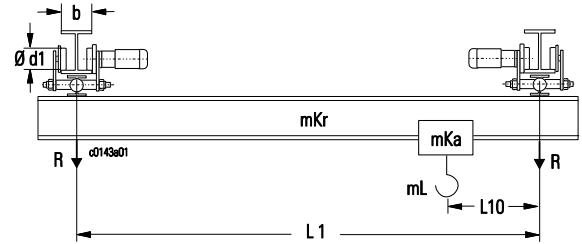
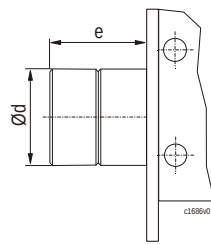
1.4.4 Determination of crane buffer

$$mpu_{vorh} = \frac{mKr}{2} + mKa \times \frac{L1-L10}{L1} [kg]^1$$

$$mpu_{zul} = \frac{2 \times E_{zul}}{vpu^2} [kg]$$

$$vpu = \frac{v \times kpu}{60} [m/s]$$

Formula for exact calculation of crane buffer.



Buffer selection table (rough calculation)

							max. travel speed v [m/min]									
Without limit switches			kpu = 0,85				10	12.5	16	20	25	32	40	50	63	80
With limit switch			kpu = 0,70				12.5	16	20	25	32	40	50	63	80	100
With pre- and final cut-off			kpu = 0,40				20	25	32	40	50	63	80	100	125	160
Type Code	Buffer	Mate- rial	Ød	e	Ezul		Permissible impact mass mpu in [kg] for max. impact speed vpu in [m/s]									
			[mm]	[mm]	[Nm]	vpu [m/s]	0.15	0.19	0.23	0.29	0.37	0.47	0.58	0.74	0.93	1.17
A	D1801	Rubber	63	53	250	mpu [kg]	23500	14300	9100	5800	3500	2200	1400	900	500	300
B	D2240		80	68	400		37600	22900	14600	9400	5700	3600	2300	1400	900	500
C	D2241		100	85	1000		94000	57300	36700	23500	14300	9100	5800	3700	2200	1400
D	D2242		125	105	1600		150400	91800	58700	37600	22900	14600	9400	5900	3600	2300
K	80x80	Polyurethane	80	80	400		37600	22900	14600	9400	5700	3600	2300	1400	900	500
G	100x100		100	100	800		75200	45900	29300	18800	11400	7300	4700	2900	1800	1100
E	100x150		100	150	1200		112800	68800	44000	28200	17200	11000	7000	4400	2700	1700
M	125x125		125	125	1550		145700	88900	56900	36400	22200	14200	9100	5700	3500	2200
F	125x190		125	190	2320		218100	133100	85200	54500	33200	21300	13600	8500	5300	3400

Max. permissible impact mass at standard travel speeds (20 or 40 m/min) and with limit switches

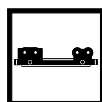
Runway end stops

The suspension crane endcarriages are fitted with buffers as standard. The stops required on the crane bridge must be supplied by the customer.

The size of the stops must be selected in accordance with the buffer forces (see chapter "Other components", Crane buffers). The dimensions must be selected so that the whole surface of the buffer strikes the stop.

E _{zul}	[Nm]	Permissible buffer energy
kpu		Reduction factor
L1	[m]	Crane span
L10	[m]	Hook approach trolley
mKa	[kg]	Weight of trolley/crab
mKr	[kg]	Weight of crane
mL	[kg]	Working load
mpu _{vorh}	[kg]	Actual impact mass
mpu _{zul}	[kg]	Permissible impact mass
Ø D	[mm]	Wheel diameter
v	[m/min]	Travel speed
vpu	[m/s]	Impact speed

¹ Not guided load



1.5 Endcarriages for single girder suspension cranes

1.5.1 Dimensions

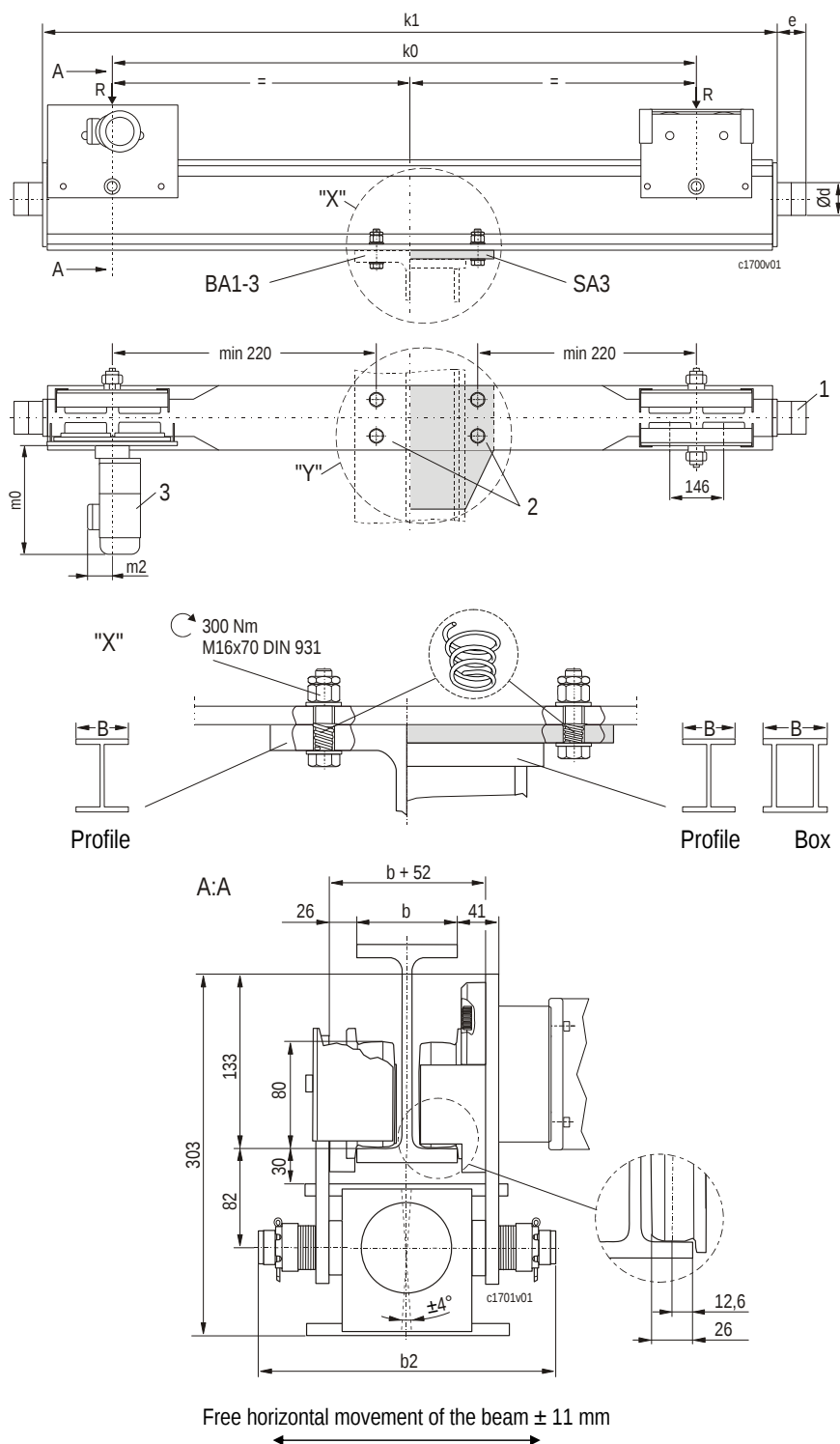
1.5.1.1 HL08

HL08

L1 _{zul} ² [m]	Type	k0 [mm]	k1 [mm]	Weight ³ [kg]
9	HL08-12	1200	1530	220
11	-14	1400	1730	234
14	-18	1800	2130	262
18	-23	2300	2630	296
21	-28	2800	3130	330

Type	R _{zul} [kN] ⁴			
	SA3	BA1	BA2	BA3
HL08-12	21.7	21.7	21.7	21.7
HL08-14	21.7	21.7	21.7	21.7
HL08-18	21.7	18.5	21.7	21.7
HL08-23	20.0	14.5	20.0	20.0
HL08-28	17.4	11.9	16.7	17.4

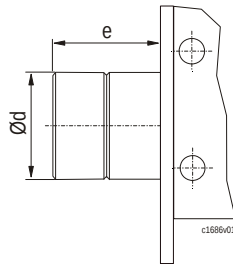
b [mm]	b2 [mm]
73-120	306
121-168	354
169-216	402
217-264	450
265-313	498



² Crane span
³ Weight per pair of endcarriages without joint plates
⁴ Max. permissible corner load (2 wheel pairs)

1 Buffer

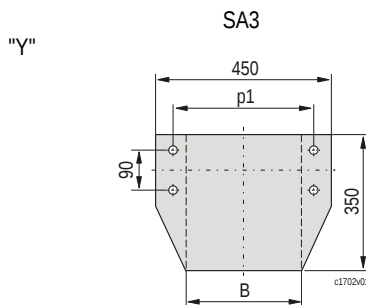
Calculation see buffer selection table page 1–7.



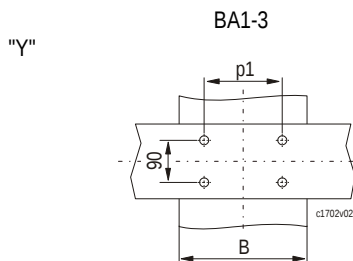
Type Code	Buffer	Material	Ød	e
A	D1801	Rubber	63	53
B	D2240		80	68
C	D2241		100	85
K	80x80	Polyurethane	80	80
G	100x100		100	100
E	100x150		100	150

2 Joint

With joint plate



	SA3
p1 [mm]	360
B _{min-max} [mm]	160-300
Weight [kg]	31



Without joint plate

	BA1	BA2	BA3
p1 [mm]	100	150	200
B _{min-max} [mm]	154-203	204-253	254-320

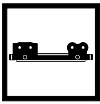
3 Travel drives

Ø d	50 Hz	60 Hz	50 Hz	60 Hz	mF _{zul} ⁵	Type	m0	m2	
	100 Hz ⁶		100 Hz ⁶						
[mm]	[m/min]		[kW] ⁷		[kg]		[mm]	[mm]	[kg] ⁵
100	5/20	6.3/25	2x0.09/0.37	2x0.11/0.44	11600	2x SDA208FT1BO8/2F12	437	89	36.4
	10/40	12.5/50	2x0.09/0.37	2x0.11/0.44	5800	2x SDA204FT1BO8/2F12			36.4
			2x0.13/0.55	2x0.16/0.66	8600	2x SDA204FT1BO8/2F13			40.8
	2.5...25		2x0.75		15200	2x SDA206PT1BO4F18			29.4
	4.0...40		2x0.75		10300	2x SDA204PT1BO4F18			29.4
	4.0...40		4x0.75		20600	4x SDA204PT1BO4F18			58.8

⁵ For 1 pair, design acc. to FEM (ISO) 1Am (M4)

⁶ With 4-pole travel motor for frequency inverter

⁷ Further travel speeds and motor data see Product information "Travel drives"



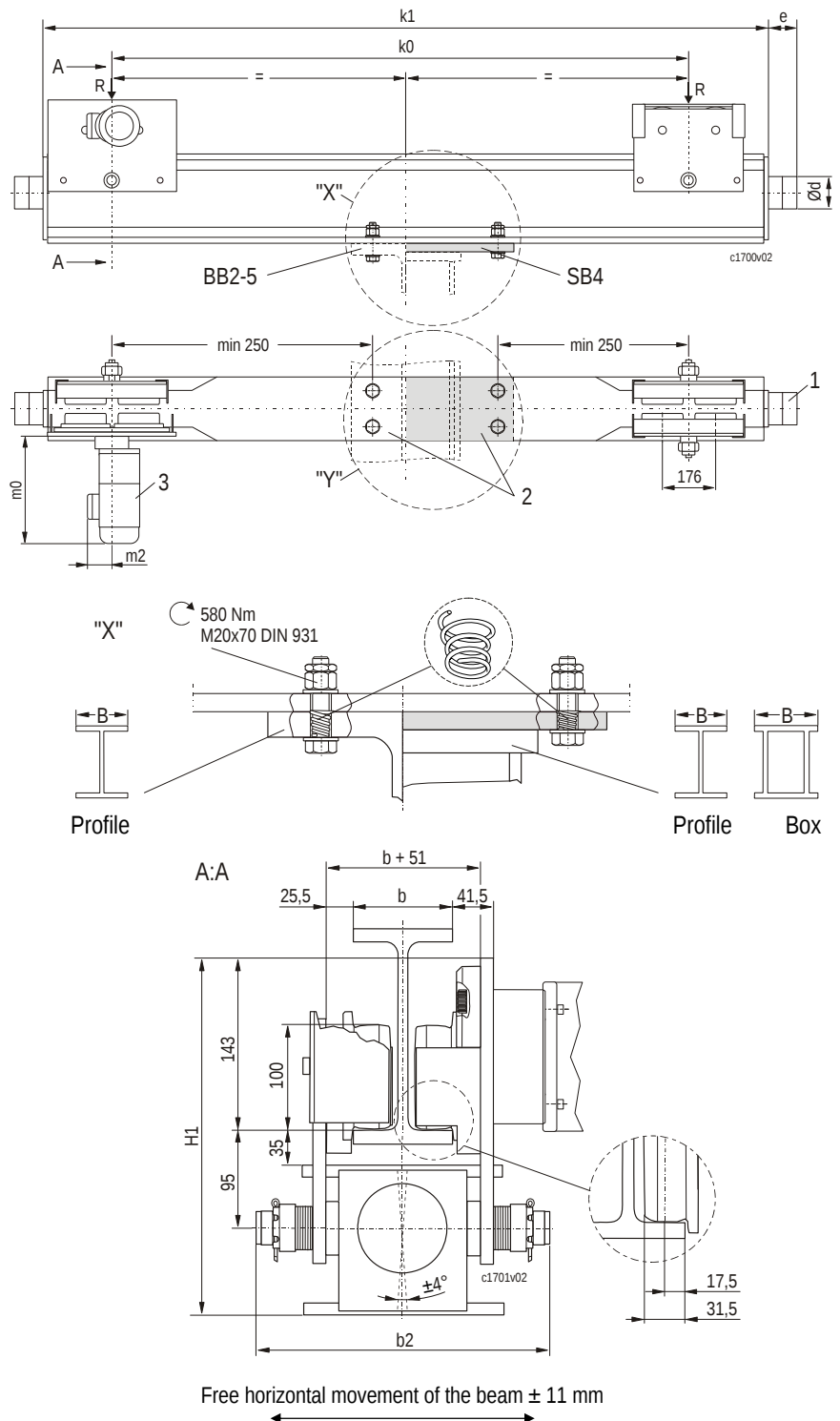
1.5.1.2 HL10

HL10

L _{1zul} ⁸	Type	k ₀	k ₁	H ₁	Weight ⁹
[m]	HL10	[mm]	[mm]	[mm]	[kg]
9	-12	1200	1590	358	322
11	-14	1400	1790		342
14	-18	1800	2190		382
18	-23	2300	2690		434
21	-28	2800	3190	378	550
24	-32	3200	3590		598
26	-35	3500	3890		636

Type	R _{zul} [kN] ¹⁰				
	SB4	BB2	BB3	BB4	BB5
HL10-12	40.0	40.0	40.0	40.0	40.0
HL10-14	40.0	40.0	40.0	40.0	40.0
HL10-18	40.0	38.9	40.0	40.0	40.0
HL10-23	40.0	30.4	39.1	40.0	40.0
HL10-28	40.0	25.0	32.1	39.3	40.0
HL10-32	38.3	21.9	28.1	34.4	38.3
HL10-35	34.8	20.0	25.7	31.4	34.8

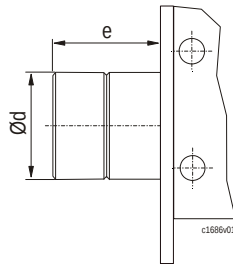
b	b ₂
[mm]	[mm]
82-130	325
131-178	373
179-226	421
227-274	469
275-322	517



⁸ Crane span
⁹ Weight per pair of endcarriages without joint plates
¹⁰ Max. permissible corner load (2 wheel pairs)

1 Buffer

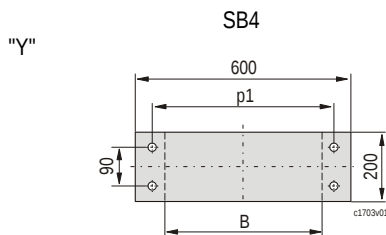
Calculation see buffer selection table page 1–7.



Type Code	Buffer	Material	Ød	e
A	D1801	Rubber	63	53
B	D2240		80	68
C	D2241		100	85
K	80x80	Polyurethane	80	80
G	100x100		100	100
E	100x150		100	150

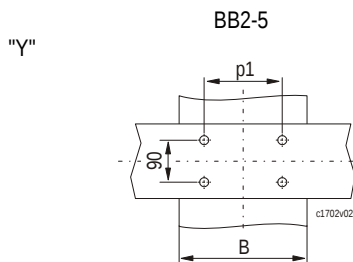
2 Joint

With joint plate



	SB4
p1 [mm]	500
B _{min-max} [mm]	200-410
Weight [kg]	24

Without joint plate



	BB2	BB3	BB4	BB5
p1 [mm]	150	200	250	350
B _{min-max} [mm]	216-265	266-315	316-415	416-450

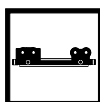
3 Travel drives

Ø d	50 Hz	60 Hz	50 Hz	60 Hz	mF _{zul} ¹¹	Type	m0	m2		
	100 Hz ¹²		100 Hz ¹²							
[mm]	[m/min]		[kW] ¹³		[kg]		[mm]	[mm]	[kg] ¹¹	
100	5/20	6.3/25	2x0.09/0.37	2x0.11/0.44	14100	2x SDA208FT1BO8/2F12	437.5	89	36.4	
	10/40	12.5/50	2x0.09/0.37	2x0.11/0.44	6900	2x SDA204FT1BO8/2F12			36.4	
			2x0.13/0.55	2x0.16/0.66	10500	2x SDA204FT1BO8/2F13			40.8	
	2.5...25		2x0.75		17100	2x SDA206PT1BO4F18			29.4	
	4.0...40		2x0.75		11400	2x SDA204PT1BO4F18			29.4	
	4.0...40		4x0.75		22800	4x SDA204PT1BO4F18			58.8	

¹¹ For 1 pair, design acc. to FEM (ISO) 1Am (M4)

¹² With 4-pole travel motor for frequency inverter

¹³ Further travel speeds and motor data see Product information "Travel drives"



1.5.1.3 HL13

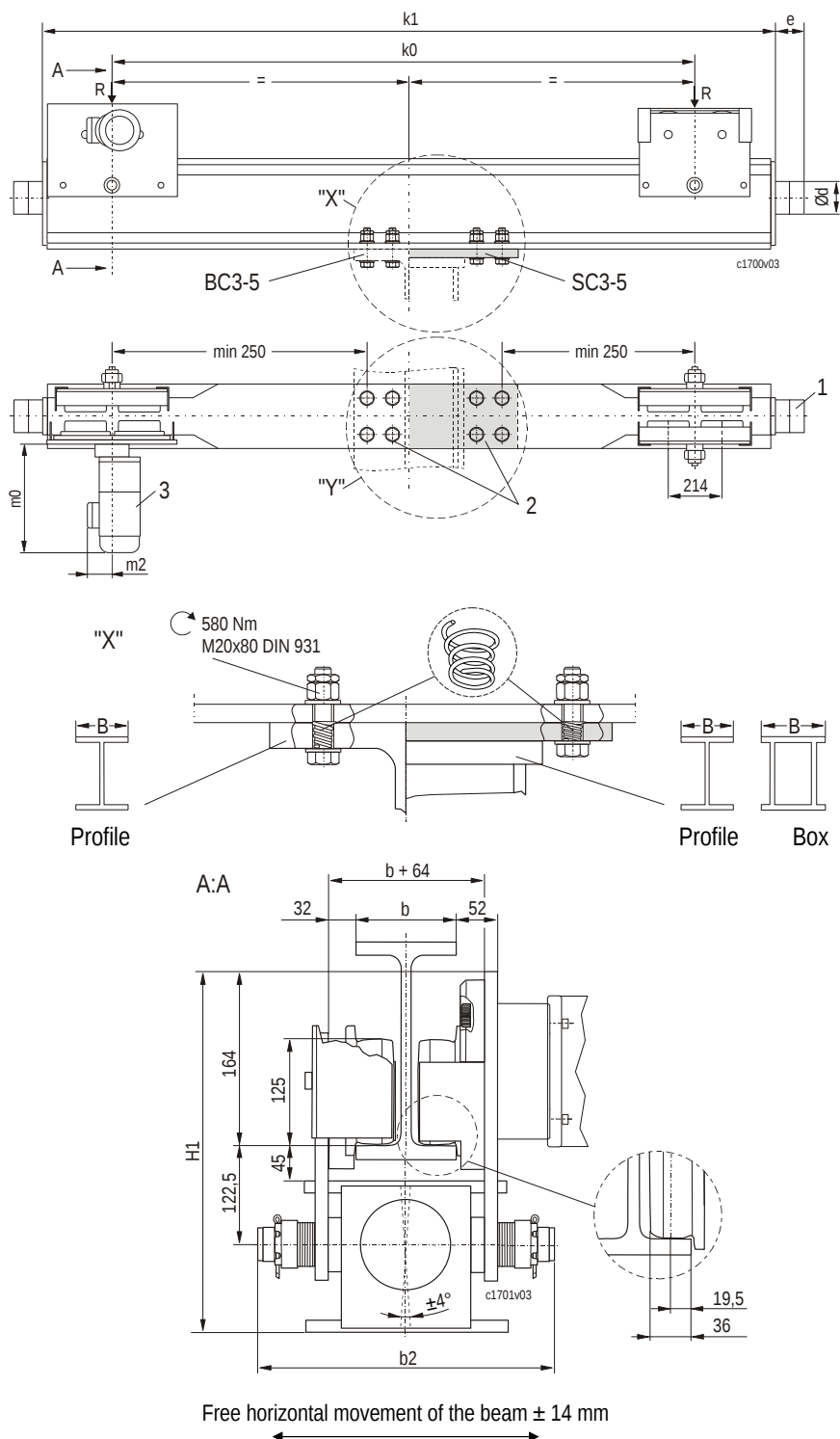
HL13

L _{1zul} ¹⁴	Type	k ₀	k ₁	H ₁	Weight ¹⁵
[m]	HL13	[mm]	[mm]	[mm]	[kg]
9	-12	1200	1690	428	600
11	-14	1400	1890		628
14	-18	1800	2290		686
18	-23	2300	2790		756
21	-28	2800	3290	448	906
24	-32	3200	3690		972
26	-35	3500	3990		1022

Type	R _{zul} [kN] ¹⁶		
	SC3	SC4	SC5
HL13-12	69.6	69.6	69.6
HL13-14	69.6	69.6	69.6
HL13-18	69.6	69.6	69.6
HL13-23	69.6	69.6	69.6
HL13-28	69.6	69.6	69.6
HL13-32	62.6	62.6	62.6
HL13-35	56.5	56.5	56.5

Type	R _{zul} [kN] ¹⁶		
	BC3	BC4	BC5
HL13-12	69.6	69.6	69.6
HL13-14	69.6	69.6	69.6
HL13-18	69.6	69.6	69.6
HL13-23	59.4	69.6	69.6
HL13-28	48.8	60.7	69.6
HL13-32	42.7	53.1	62.6
HL13-35	39.0	48.6	56.5

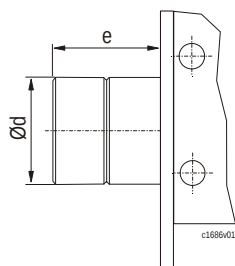
b	b ₂
[mm]	[mm]
100-179	418
180-259	498
260-343	578



¹⁴ Crane span
¹⁵ Weight per pair of endcarriages without joint plates
¹⁶ Max. permissible corner load (2 wheel pairs)

1 Buffer

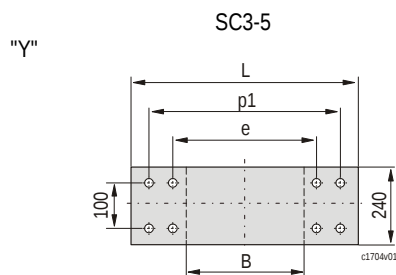
Calculation see buffer selection table page 1–7.



Type Code	Buffer	Material	Ød	e
A	D1801	Rubber	63	53
B	D2240		80	68
C	D2241		100	85
D	D2242		125	105
K	80x80	Polyurethane	80	80
G	100x100		100	100
E	100x150		100	150
M	125x125		125	125
F	125x190		125	190

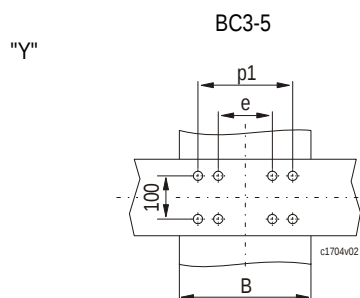
2 Joint

With joint plate



	SC3	SC4	SC5
p1 [mm]	460	560	660
e [mm]	360	460	560
L [mm]	550	650	750
B _{min-max} [mm]	200-310	300-410	400-510
Weight [kg]	25	30	35

Without joint plate



	BC3	BC4	BC5
p1 [mm]	200	250	350
e [mm]	100	150	250
B _{min-max} [mm]	266-315	316-415	416-450

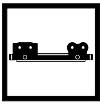
3 Travel drives

Ø d	50 Hz	60 Hz	50 Hz	60 Hz	mF _{zul} ¹⁷	Type	m0	m2	
	100 Hz ¹⁸		100 Hz ¹⁸						
[mm]	[m/min]		[kW] ¹⁹		[kg]		[mm]	[mm]	[kg] ¹⁷
125	5/20	6.3/25	2x0.09/0.37	2x0.11/0.44	16400	2x SDA208FT1BO8/2F12	448	89	36.4
	10/40	12.5/50	2x0.09/0.37	2x0.11/0.44	7600	2x SDA204FT1BO8/2F12			36.4
			2x0.13/0.55	2x0.16/0.66	11700	2x SDA204FT1BO8/2F13			40.8
	2.5...25		2x0.75		18900	2x SDA206PT1BO4F18			29.4
	4.0...40		2x0.75		12500	2x SDA204PT1BO4F18			29.4
	4.0...40		4x0.75		25000	4x SDA204PT1BO4F18			58.8

¹⁷ For 1 pair, design acc. to FEM (ISO) 1Am (M4)

¹⁸ With 4-pole travel motor for frequency inverter

¹⁹ Further travel speeds and motor data see Product information "Travel drives"



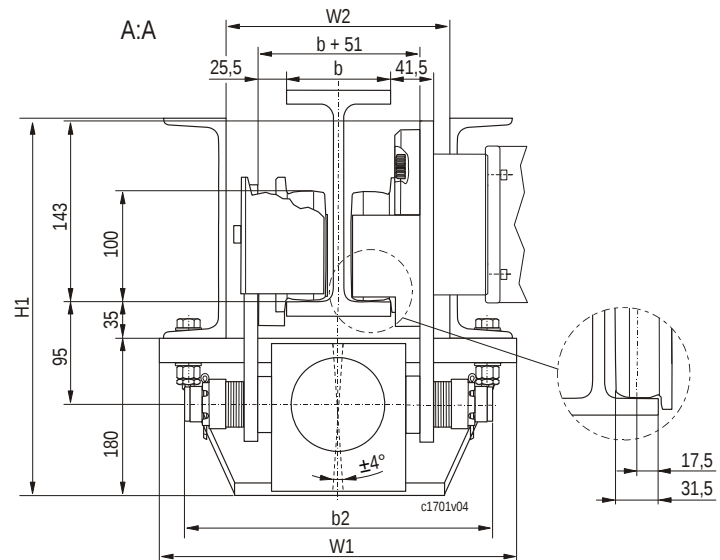
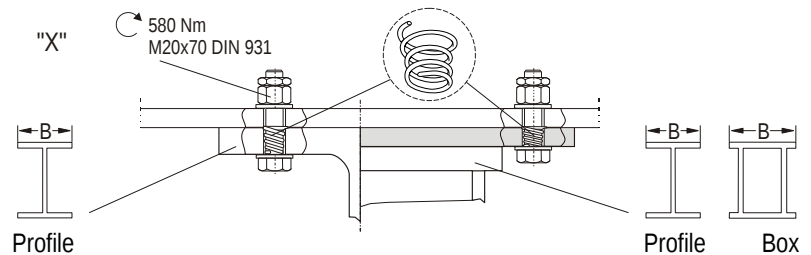
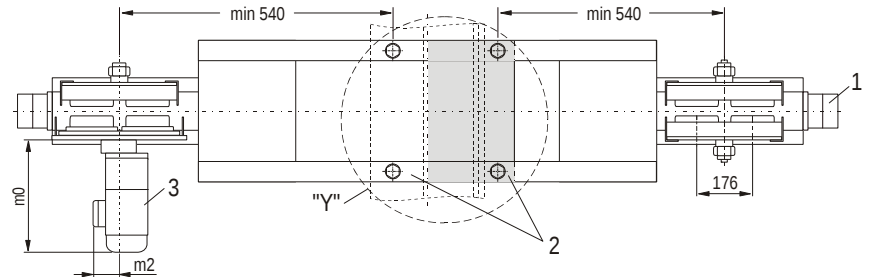
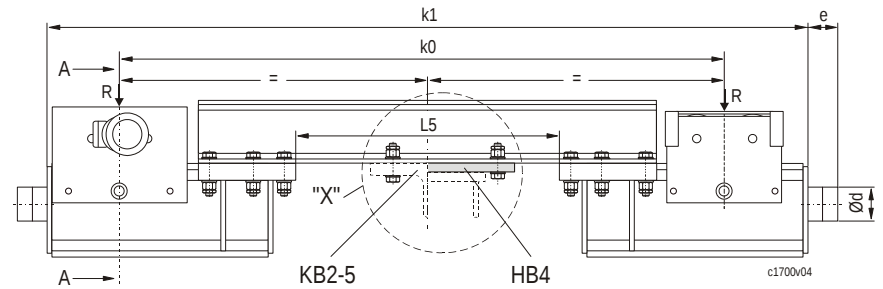
1.5.1.4 HT10

HT10

L1 _{zul} 20	Type	k0	k1	L5	H1	Weight 21
[m]	HT10	[mm]	[mm]	[mm]	[mm]	[kg]
11	-14	1400	1790	440	360	570
14	-18	1800	2190	840		610
18	-23	2300	2690	1340		660
21	-28	2800	3190	1840	380	740

Type	R _{zul} [kN] ²²				
	HB4	KB2	KB3	KB4	KB5
HT10-14	40.0	40.0	40.0	40.0	40.0
HT10-18	40.0	38.9	40.0	40.0	40.0
HT10-23	40.0	30.4	39.1	40.0	40.0
HT10-28	40.0	25.0	32.1	39.3	40.0

b	b2	W1	W2
[mm]	[mm]	[mm]	[mm]
82-130	325	360	211
131-178	373	360	211
179-226	421	505	356
227-274	469	505	356
275-322	517	505	356

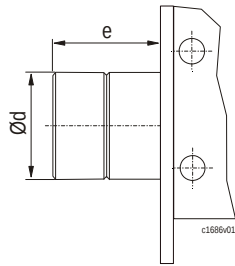


Free horizontal movement of the beam ± 11 mm

²⁰ Crane span
²¹ Weight per pair of endcarriages without joint plates
²² Max. permissible corner load (2 wheel pairs)

1 Buffer

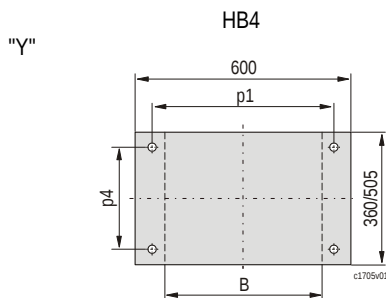
Calculation see buffer selection table page 1–7.



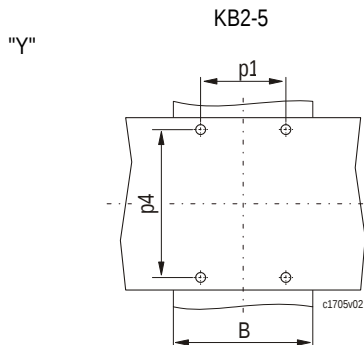
Type Code	Buffer	Material	Ød	e
A	D1801	Rubber	63	53
B	D2240		80	68
C	D2241		100	85
K	80x80	Polyurethane	80	80
G	100x100		100	100
E	100x150		100	150

2 Joint

With joint plate



	HB4	
p1 [mm]	500	
b _{min-max} [mm]	82-178	179-322
p4 [mm]	285	430
B _{min-max} [mm]	200-410	
Weight [kg]	42	59



Without joint plate

	KB2	KB3	KB4	KB5
p1 [mm]	150	200	250	350
b _{min-max} [mm]	82-178 / 179-322			
p4 [mm]	285 / 430			
B _{min-max} [mm]	216-265	266-315	316-415	416-450

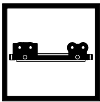
3 Travel drives

Ø d	50 Hz	60 Hz	50 Hz	60 Hz	mF _{Zul} ²³	Type	m0	m2	
	100 Hz ²⁴		100 Hz ²⁴						
[mm]	[m/min]		[kW] ²⁵		[kg]		[mm]	[mm]	[kg] ²³
100	5/20	6.3/25	2x0.09/0.37	2x0.11/0.44	14100	2x SDA208FT1BO8/2F12	437.5	89	36.4
	10/40	12.5/50	2x0.09/0.37	2x0.11/0.44	6900	2x SDA204FT1BO8/2F12			36.4
			2x0.13/0.55	2x0.16/0.66	10500	2x SDA204FT1BO8/2F13			40.8
	2.5...25		2x0.75		17100	2x SDA206PT1BO4F18			29.4
	4.0...40		2x0.75		11400	2x SDA204PT1BO4F18			29.4
	4.0...40		4x0.75		22800	4x SDA204PT1BO4F18			58.8

²³ For 1 pair, design acc. to FEM (ISO) 1Am (M4)

²⁴ With 4-pole travel motor for frequency inverter

²⁵ Further travel speeds and motor data see Product information "Travel drives"



1.5.1.5 HT13

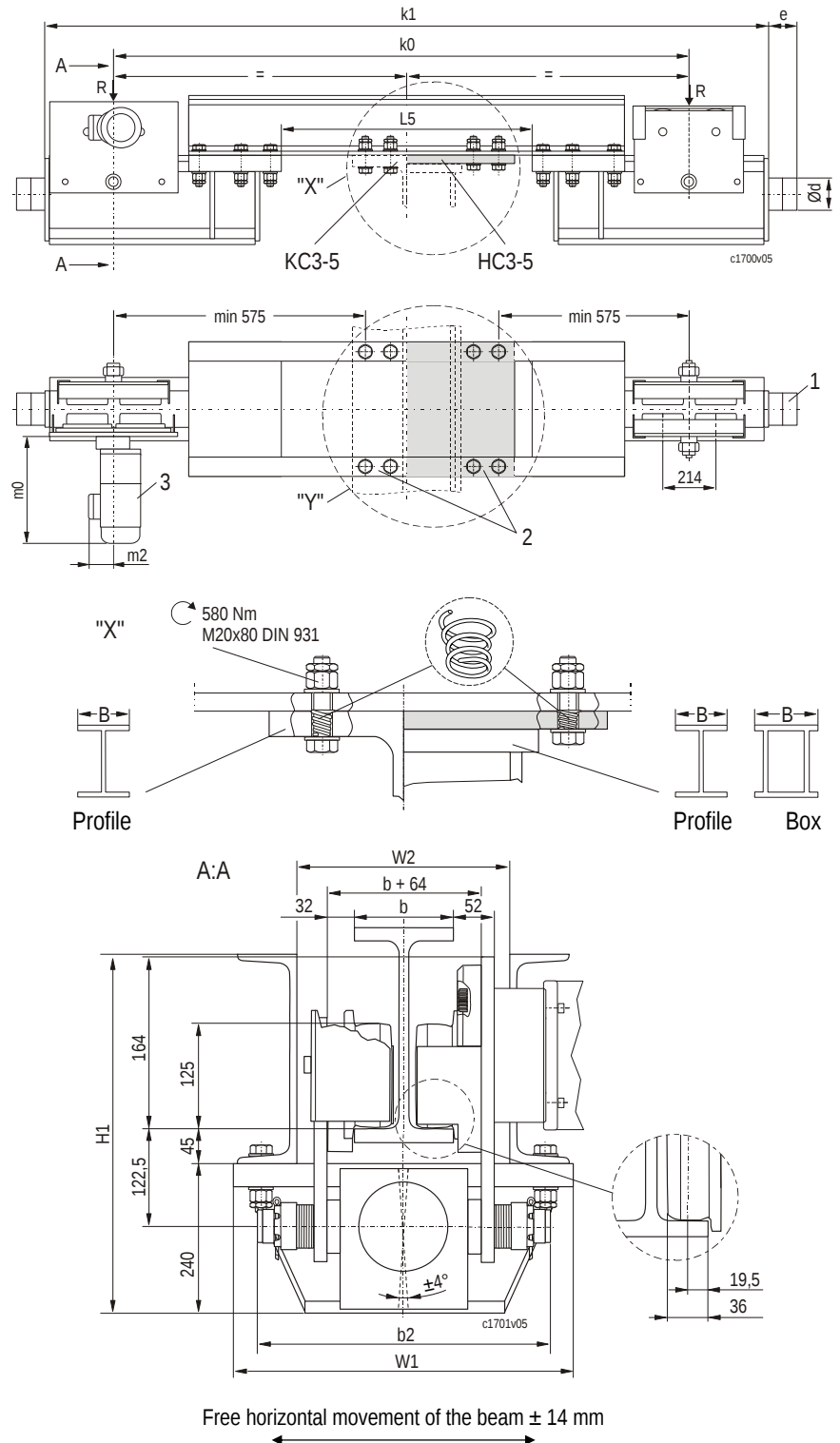
HT13

L1 _{zul} 26	Type	k0	k1	L5	H1	Weight 27
[m]	HT13	[mm]	[mm]	[mm]	[mm]	[kg]
11	-14	1400	1890	370	500	900
14	-18	1800	2290	770		960
18	-23	2300	2790	1270		1034
21	-28	2800	3290	1770	540	1190
24	-32	3200	3690	2170		1264
26	-35	3500	3990	2470		1318

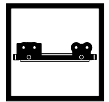
Type	R _{zul} [kN] ²⁸		
	HC3	HC4	HC5
HT13-14	70.0	70.0	70.0
HT13-18	70.0	70.0	70.0
HT13-23	70.0	70.0	70.0
HT13-28	70.0	70.0	70.0
HT13-32	62.6	62.6	62.6
HT13-35	56.5	56.5	56.5

Type	R _{zul} [kN] ²⁸		
	KC3	KC4	KC5
HT13-14	70.0	70.0	70.0
HT13-18	70.0	70.0	70.0
HT13-23	59.4	70.0	70.0
HT13-28	48.8	60.7	70.0
HT13-32	42.7	53.1	62.6
HT13-35	39.0	48.6	56.5

b	b2	W1	W2
[mm]	[mm]	[mm]	[mm]
100-179	418	412	212
180-259	498	412	212
260-343	578	557	357

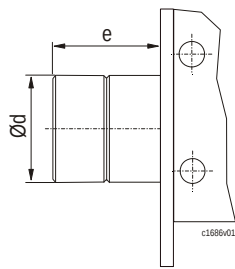


²⁶ Crane span
²⁷ Weight per pair of endcarriages without joint plates
²⁸ Max. permissible corner load (2 wheel pairs)



1 Buffer

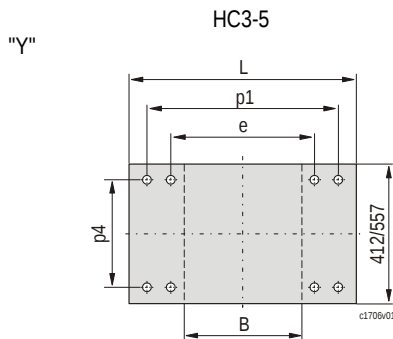
Calculation see buffer selection table page 1–7.



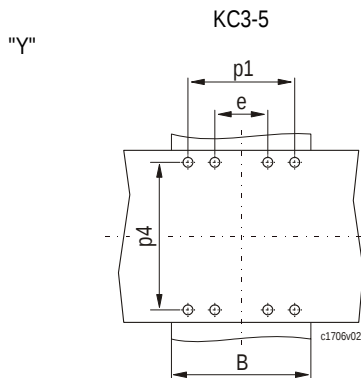
Type Code	Buffer	Material	Ød	e
A	D1801	Rubber	63	53
B	D2240		80	68
C	D2241		100	85
D	D2242		125	105
K	80x80	Polyurethane	80	80
G	100x100		100	100
E	100x150		100	150
M	125x125		125	125
F	125x190		125	190

2 Joint

With joint plate



	HC3		HC4		HC5	
p1 [mm]	560		660		760	
e [mm]	360		460		560	
L [mm]	660		760		860	
b _{min-max} [mm]	100-259	260-343	100-259	260-343	100-259	260-343
p4 [mm]	306	451	306	451	306	451
B _{min-max} [mm]	200-310		311-410		411-510	
Weight [kg]	53	72	61	83	69	94



Without joint plate

	KC3	KC4	KC5
p1 [mm]	240	282	382
e [mm]	108	150	250
b _{min-max} [mm]	100-259 / 260-343		
p4 [mm]	306 / 451		
B _{min-max} [mm]	306-347	348-447	448-500

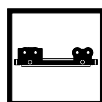
3 Travel drives

Ø d	50 Hz	60 Hz	50 Hz	60 Hz	mF _{Zul} ²⁹	Type	m0	m2	
	100 Hz ³⁰		100 Hz ³⁰						
[mm]	[m/min]		[kW] ³¹		[kg]		[mm]	[mm]	[kg] ²⁹
125	5/20	6.3/25	2x0.09/0.37	2x0.11/0.44	16400	2x SDA208FT1BO8/2F12	448	89	36.4
	10/40	12.5/50	2x0.09/0.37	2x0.11/0.44	7600	2x SDA204FT1BO8/2F12			36.4
			2x0.13/0.55	2x0.16/0.66	11700	2x SDA204FT1BO8/2F13			40.8
	2.5...25		2x0.75		18900	2x SDA206PT1BO4F18			29.4
	4.0...40		2x0.75		12500	2x SDA204PT1BO4F18			29.4
	4.0...40		4x0.75		25000	4x SDA204PT1BO4F18			58.8

²⁹ For 1 pair, design acc. to FEM (ISO) 1Am (M4)

³⁰ With 4-pole travel motor for frequency inverter

³¹ Further travel speeds and motor data see Product information "Travel drives"



1.6 Options

1.6.1 Motor supply voltages

The standard motor supply voltage is 380-415 V, 50 Hz or 440-480 V, 60 Hz. 4-pole motors for frequency inverter: 380...415 V/100 Hz. Other voltages are available.

	50 Hz	60 Hz	Dual-voltage motors
Supply voltages	220...240 V 380...415 V 420...460 V 480...525 V 575...630 V	190...240 V 220...240 V 380...415 V 440...480 V 550...600 V	50 Hz: 230/400 V 60 Hz: 230/400 V

1.6.2 Temperature control of motors (standard for 4-pole motors)

Temperature control of the travel motors (PTC thermistors) is available against a surcharge.

The necessary tripping device must be ordered separately, see also Product information "Crane electrics".

1.6.3 IP 66 protection (option)

IP 66 protection is required for outdoor use if the endcarriages are not protected by a roof, or are exposed to water jets. As a rule a space heater is also necessary. For frequency inverters, see Product information "Crane electrics".

1.6.4 Off-standard ambient temperatures

In standard design the endcarriages can be used in a temperature range from -20°C to +40°C.

On request, versions for other temperature ranges are available.

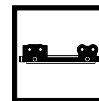
Frequency inverters can be used from -10°C to +50°C (non-dewing).

1.6.5 Paint/corrosion protection

Standard pre-treatment: Steel shot de-rusting grade SA2.5 in acc. with EN ISO 12944-4. Machined surfaces, aluminium and deep-drawn parts degreased.

Endcarriage: polyurethane-based primer, 60 µm. Colour agate grey (RAL 7038), cannot be welded (must be removed before welding).

Joint plate: epoxy resin-based primer (KorroE), approx. 20 µm. Colour oxide red (RAL 3009), can be welded.



1.6.6 Paint/top coat

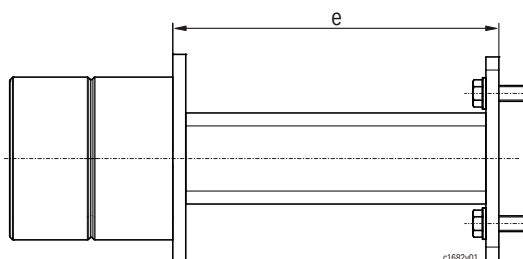
On request, all endcarriages can be supplied with polyurethane topcoat or epoxy resin-based top coat, colour as per RAL colour chart.

1.6.7 Alternative travel speeds

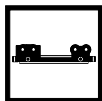
The standard travel speeds are 5/20 and 10/40 m/min (50 Hz) and 6.3/25 and 12.5/50 m/min (60 Hz), and 2.5...25 and 4...40 m/min for use with a frequency inverter. Other travel speeds available on request.

1.6.8 Buffer extension (option)

The buffers on the end faces of the endcarriages can be extended. Standard extensions are available from 100 - 500 mm (surcharge). Other extensions on request.



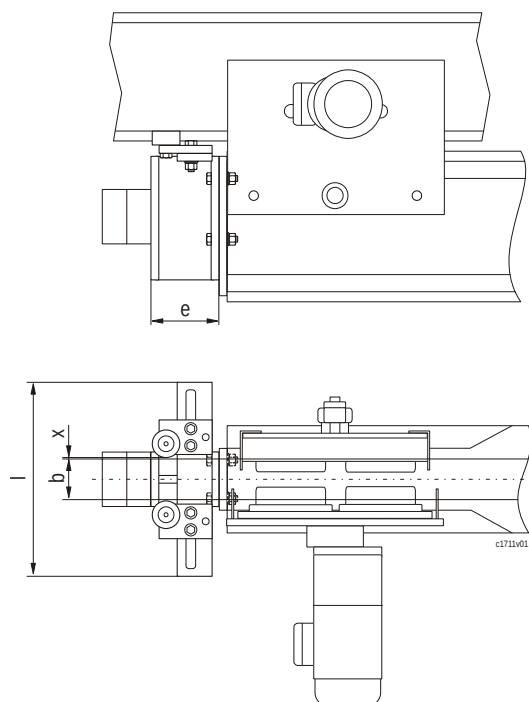
Endcarriage	Standard extension (without buffer)	Weight
	e [mm]	[kg]
HL08, HL/HT10	100	2
	250	3
	500	5
HL/HT13	120	4
	250	5
	500	7



1.6.9 Horizontal guide rollers (option)

Horizontal guide rollers can be used to counteract horizontal forces, e.g. from an uneven crane girder. They are bolted onto both ends of the endcarriage. The opposing endcarriage must be equipped with a corresponding buffer extension.

- The following information must be given when ordering:
- Flange width of crane runway
- On which side of crane it is to be mounted (left or right endcarriage)

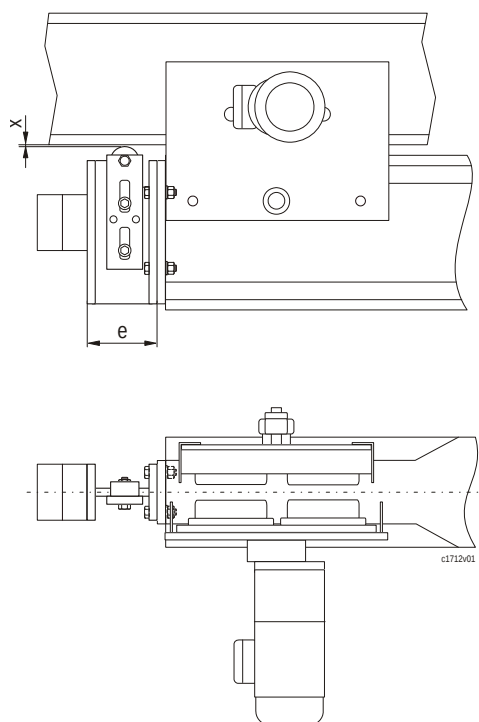


Endcarriage	b	l	x	e	Weight
	[mm]	[mm]	[mm]	[mm]	[kg]
HL08	73-195	335	1.5-5	100	8
	196-313	465			8.5
HL10	82-205	345	1.5-5	100	9
	206-322	345			10
HL13	100-220	386	1.5-5	120	13
	222-343	508			14

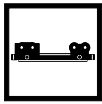
1.6.10 Vertical guide rollers (option)

These guide rollers prevent the endcarriage rising up, e.g. due to an uneven crane runway or lever action on cranes with lateral girder overhang (cantilever).

- The following information must be given when ordering:
- Flange width of crane runway
- On which side they are to be mounted (left, right or both endcarriages)

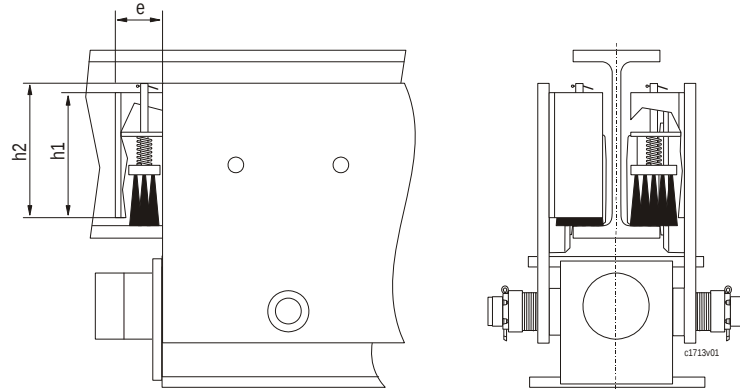


Endcarriage	x	e	Weight
	[mm]	[mm]	[kg]
HL08	2-5	100	5
HL10	2-5	100	6
HL13	2-5	120	9



1.6.11 Earth brush (rail sweep) (option)

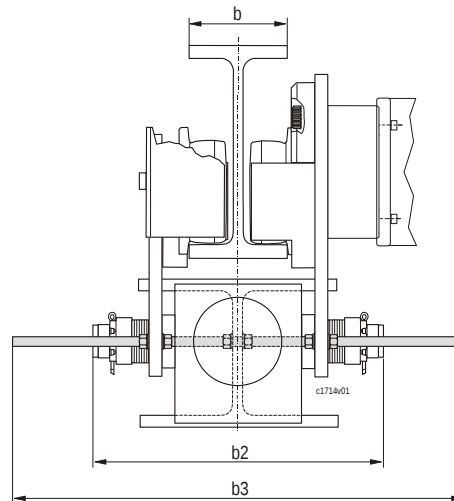
The brushes serve to earth the endcarriage on the crane runway and at the same time clean the running surfaces.



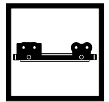
Endcarriage	e	h1	h2	Weight
	[mm]	[mm]	[mm]	[kg]
HL08	45	120	129	1.8
HL10	45	120	139	1.8
HL13	45	120	155	1.8

1.6.12 Assembly help tool (standard)

The assembly help tool locks the opposing carriage side cheeks and stops them turning during transport and assembly. The assembly help tool must be removed before commissioning the crane.

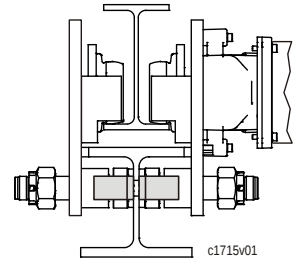
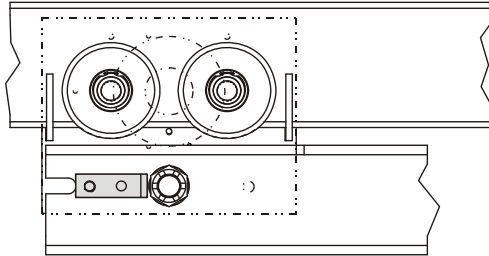


Endcarriage	b	b2	b3	Weight
	[mm]	[mm]	[mm]	[kg]
HL08	73-168	306-354	400	0.8
	169-313	402-498	600	1.2
HL10	82-178	325-373	400	0.8
	179-322	421-517	600	1.2
HL13	100-179	418	450	3.12
	180-259	498	550	3.12
	260-343	578	600	3.12



1.6.13 Anti-skew support (standard with pole-changing travel drives)

The anti-skew support prevents torsion in the carriage caused by the high starting and braking torques on pole-changing travel drives.



c1715v01

1

1.7 Technical data

1.7.1 Permissible ideal wheel loads calculated on the basis of bearing life

1.7.1.1 HL08

Classification to FEM (ISO)	Travel speed v in [m/min]			
	20	25	32	40
	[kN]			
1Am (M4)	21.7	21.7	21.7	21.7
2m (M5)	21.7	21.7	21.7	21.7
3m (M6)	21.7	21.7	20.9	19.1

1.7.1.2 HL/HT10

Classification to FEM (ISO)	Travel speed v in [m/min]			
	20	25	32	40
	[kN]			
1Am (M4)	40.0	40.0	40.0	40.0
2m (M5)	40.0	40.0	40.0	40.0
3m (M6)	40.0	40.0	37.4	34.8

1.7.1.3 HL/HT13

Classification to FEM (ISO)	Travel speed v in [m/min]			
	20	25	32	40
	[kN]			
1Am (M4)	70.0	70.0	70.0	70.0
2m (M5)	70.0	70.0	70.0	70.0
3m (M6)	70.0	70.0	66.1	60.9

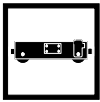


Endcarriages for Overhead Travelling Cranes _ ➤EN
Product Information

Partner of Experts

STAHL
CraneSystems







2 Endcarriages for overhead travelling cranes

LS

LT

This Product Information brochure permits the manual configuration of endcarriages for overhead travelling cranes. The results may differ from those provided by configuration programs.

On the basis of LS/LT endcarriages for overhead travelling cranes, modern single girder and double girder overhead travelling cranes up to a working load of 40,000 kg and a span of 41 m can be manufactured.

Make use of their sturdy design, compact construction, maintenance friendliness and reliability in conjunction with the economic advantages of series production for your crane manufacturing.

2

2.1 Explanations of symbols



Maximum working load [kg]



Weight [kg]



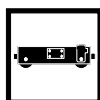
Travel speed [m/min]



Dimensions see page..



See page..



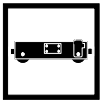
Contents

2	Endcarriages for overhead travelling cranes	2-3
2.1	Explanations of symbols	2-3
2.2	Technical features at a glance	2-6
2.3	Type designation	2-8
	2.3.1 Endcarriage LS	2-8
	2.3.2 Endcarriage LT	2-9
2.4	Selection instructions	2-10
	2.4.1 Rough determination	2-10
	2.4.2 Calculation of necessary classification	2-11
	2.4.3 Determination of endcarriage size	2-12
	2.4.4 Calculation of required rail width "k"	2-12
	2.4.5 Determining spacing a between joint plates (double girder o.h.t. crane)	2-13
	2.4.6 Determination of travel drive	2-13
	2.4.7 Determination of crane buffer	2-14
2.5	Endcarriages for single girder o.h.t. cranes	2-16
	2.5.1 Dimensions	2-16
	2.5.1.1 LS/LT-09	2-16
	2.5.1.2 LS/LT-11	2-18
	2.5.1.3 LS/LT-14	2-20
	2.5.1.4 LS/LT-16	2-22
	2.5.1.5 LT-20	2-24
	2.5.1.6 LT-25	2-26
	2.5.1.7 LT-32	2-28
	2.5.1.8 LT-40	2-30
2.6	Endcarriages for double girder o.h.t. cranes	2-32
	2.6.1 Dimensions	2-32
	2.6.1.1 LS/LT-09	2-32
	2.6.1.2 LS/LT-11	2-34
	2.6.1.3 LS/LT-14	2-36
	2.6.1.4 LS/LT-16	2-38
	2.6.1.5 LT-20	2-40
	2.6.1.6 LT-25	2-42
	2.6.1.7 LT-32	2-44
	2.6.1.8 LT-40	2-46
2.7	Options	2-48
	2.7.1 Motor supply voltages	2-48
	2.7.2 Temperature control of motors	2-48
	2.7.3 IP 66 protection	2-48
	2.7.4 Off-standard ambient temperatures	2-48
	2.7.5 Paint/corrosion protection	2-48
	2.7.6 Paint/top coat	2-49
	2.7.7 Alternative travel speeds	2-49
	2.7.8 Buffer extension	2-49
	2.7.9 Non-supply of joint plates	2-49
	2.7.10 Guide rollers	2-50
	2.7.11 Anti-jump catch	2-52
	2.7.12 Rail sweep	2-53
	2.7.13 Storm lock device	2-53



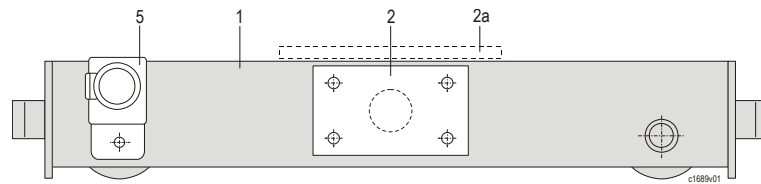
2.8	Technical data.....	2-54
2.8.1	Permissible ideal wheel loads.....	2-54
2.8.1.1	LS/LT-09.....	2-54
2.8.1.2	LS/LT-11.....	2-55
2.8.1.3	LS/LT-14.....	2-57
2.8.1.4	LS/LT-16.....	2-59
2.8.1.5	LT-20.....	2-60
2.8.1.6	LT-25.....	2-62
2.8.1.7	LT-32.....	2-64
2.8.1.8	LT-40.....	2-66

Subject to alterations, errors and printing errors excepted.

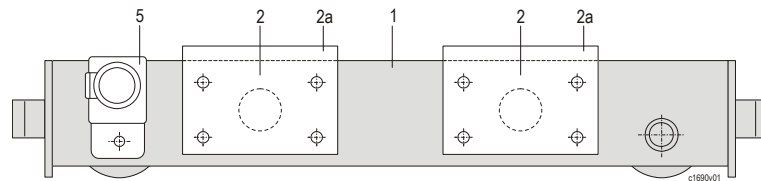


2.2 Technical features at a glance

Endcarriages for single girder overhead travelling cranes

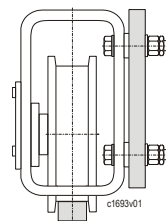


Endcarriages for double girder overhead travelling cranes



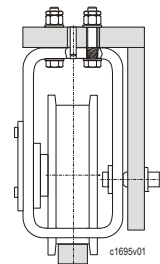
Connection variants

Side connection



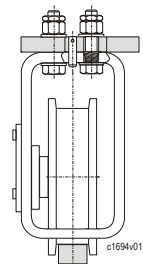
LS-09 / LS-11
LS-14 / LS-16

Side/top connection



LT-20 / LT-25
LT-32 / LT-40

Top connection



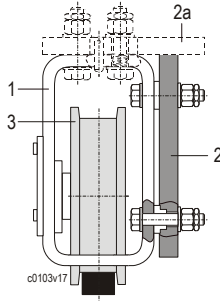
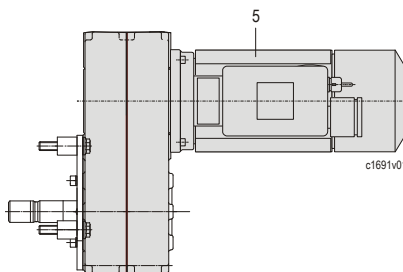
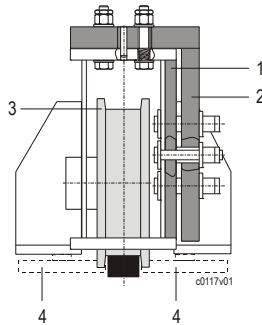
LT-09 / LT-11 / LT-14 / LT-16
LT-20 / LT-25 / LT-32 / LT-40

You can select the perfect endcarriages for your cranes from our finely-graduated programme.

Modern manufacturing methods and our certified Quality Assurance System to DIN ISO 9001/EN 29001 guarantee consistent quality and dimensional accuracy.

Our endcarriages are interchangeable.

The endcarriages are supplied with primer coat and are equipped as standard with buffers configured for the corresponding travel speed.


Ø90-250

Ø315-400

Endcarriage profile (1)

- Rectangular tube (Ø90-250) or welded structure (Ø315-400).
- Manufactured within narrow tolerances, endcarriages interchangeable.
- Design acc. to DIN 15018, classification H2/B3.

Crane girder connection (2)

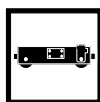
- High-tensile bolt connection between crane joint plate and endcarriage.
- Precisely defined introduction of forces between the joint plate (S355J2+N) and the endcarriage.
- All endcarriages are also available with "top" connection (2a).
- Joint plates are primed with a certified welding primer.

Wheel (3)

- Wheel with flanges (3).
- Guide rollers as option (4).
- High-quality spheroidal graphite cast iron EN-GJS-700-2, long life due to self-lubricating effect.
- Maintenance-free ball bearings for Ø90-160. Regreasable self-aligning roller bearings are used from Ø20.
- Design acc. to DIN 15070 or 15071.

Travel drive (5)

- Low-maintenance direct drive.
- Gear teeth and shafts in high-grade steels for high resistance to wear and breakage. Very low noise level due to helical gearing of all gear steps.
- Lifetime lubrication.
- Brake motor with disc brake and centrifugal mass. Smooth acceleration and braking characteristics.
- Travel speeds as desired with pole-changing motors in a ratio of 1:4 or with 4-pole motors and frequency inverter in a ratio of 1:10.
- Insulation class F to EN/IEC 60034.
- Motors are equipped with a plug connection (socket).
- Design acc. to FEM (ISO) 1Am (M4).



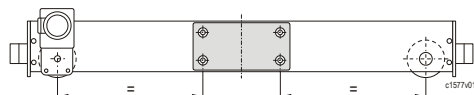
2.3 Type designation

2.3.1 Endcarriage LS

LS-	09	-	16	65	-	400	200	C	0000	-	N
1-3	4,5	6	7,8	9,10	11	12-14	15-17	18	19-22	23	24

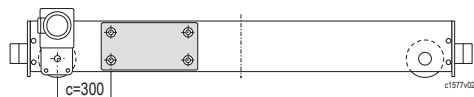
Single girder overhead travelling crane, centre connection:

LS-16-2564-350255B0000-N



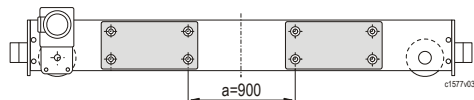
Single girder overhead travelling crane, off-centre connection:

LS-16C2564-350255B0300-N



Double girder overhead travelling crane:

LS-16-2564-350255B0900-N



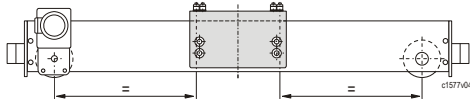
Pos.		Value	Description
1-3	Type of endcarriage	LS-	Endcarriage for overhead travelling crane, side connection
4,5	Wheel diameter x 10	09 11 14 16	90 mm 110 mm 140 mm 160 mm
6	Connection (see items 19-22)	- C	Centre (standard) Off-centre (single girder o.h.t. crane)
7,8	Wheelbase x 100	13 16 20 25 32 35 40	1250 mm 1600 mm 2000 mm 2500 mm 3150 mm 3500 mm 4000 mm
9,10	Wheel tread	50-87	Rail width + play
11	Number of travel drives	- D	1 drive per endcarriage (standard) 2 drives per endcarriage
12-14	Length of joint plate (hole separation)	400 350 450	400x200, 400x255 350x255 450x305
15-17	Height of joint plate	200 255 305	
18	Buffer type	A, B, C K, G, E 0	Rubber buffers Polyurethane buffers Without buffers
19-22	Spacing between joint plates (note item 6)	0000 #### ####	Single girder o.h.t. crane, centre connection Single girder o.h.t. crane, off-centre connection (dimension c, drive wheel to screw connection of joint plate) Double girder o.h.t. crane (hole separation a between joint plates)
23	Paint	- K	Primer coat (standard) Top coat
24	Version	N E	Standard Off-standard


2.3.2 Endcarriage LT

LT-	09	-	16	60	-	A3	0000	C	0000	-	N
1-3	4,5	6	7,8	9,10	11	12,13	14-17	18	19-22	23	24

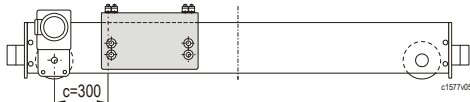
Single girder overhead travelling crane, centre connection:

LT-20-4084-L40000C0000-N



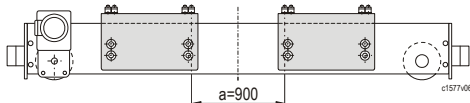
Single girder overhead travelling crane, centre connection:

LT-20C4084-L40300C0000-N

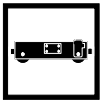


Double girder overhead travelling crane:

LT-20-4084-L40900C0000-N



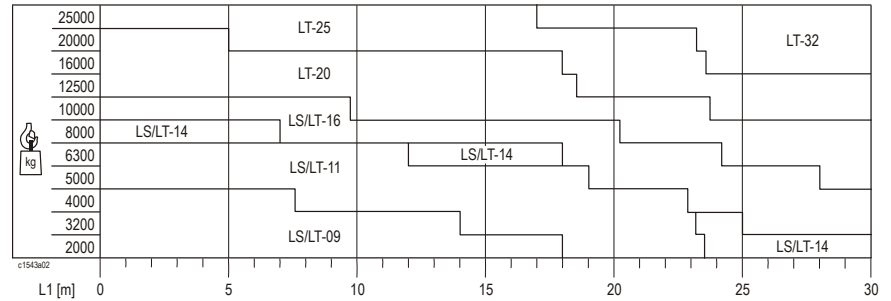
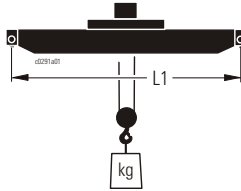
Pos.		Value	Description
1-3	Type of endcarriage	LT-	Endcarriage for overhead travelling crane, top and side connection
4,5	Wheel diameter x 10	09 11 14 16 20 25 32 40	90 mm 110 mm 140 mm 160 mm 200 mm 250 mm 315 mm 400 mm
6	Connection (see items 14-17)	- C	Centre (standard) Off-centre (single girder o.h.t. crane)
7,8	Wheelbase x 100	13 16 20 25 32 35 40 45 50 55	1250 mm 1600 mm 2000 mm 2500 mm 3150 mm 3500 mm 4000 mm 4500 mm 5000 mm 5500 mm
9,10	Wheel tread	50-99 (05-20) 00	Rail width + play (05-20=105-120mm) Wheel without flanges
11	Number of travel drives	- D	1 drive per endcarriage (standard) 2 drives per endcarriage
12,13	Joint plate	A3 A4, A6 B4, B6 L3, L4, L5, L6 H4, H5, H7, H9 K4, K5, K7, K9 K5, K7, K9 R3, R4, R5, R6 F4, F5, F7, F8 Q3, Q4, Q5, Q6, Q7, Q8, Q9, Q0 S6, S7, S9	LT-09 Top connection LT-11, LT-14 LT-16 LT-20 LT-25 LT-32 LT-40 LT-20 Side connection LT-25 LT-32 LT-40
14-17	Spacing between joint plates (note item 6)	0000 #### ####	Single girder o.h.t. crane, centre connection Single girder o.h.t. crane, off-centre connection (dimension c, drive wheel to fixing pin of joint plate) Double girder o.h.t. crane (hole separation a between joint plates)
18	Buffer type	A, B, C, D K, G, E, M, F, H, P, I, S, T, Y 0	Rubber buffers Polyurethane buffers Without buffers
19-22		0000	Endcarriages not coupled
23	Paint	- K	Primer coat (standard) Top coat
24	Version	N E	Standard Off-standard



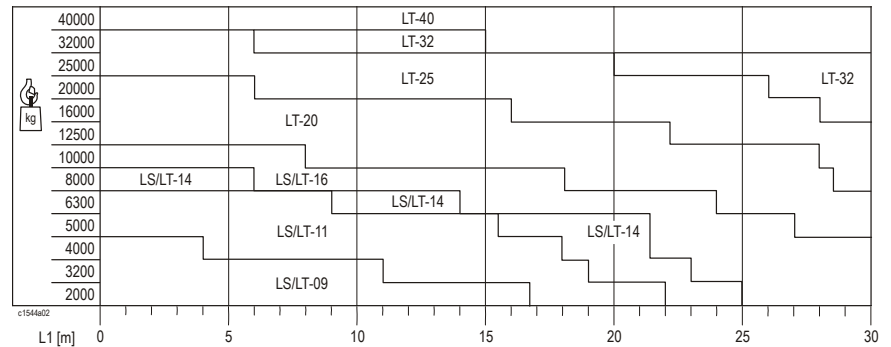
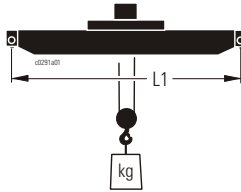
2.4 Selection instructions

2.4.1 Rough determination

Single girder overhead travelling cranes



Double girder overhead travelling cranes



L1 [m] Crane span



2.4.2 Calculation of necessary classification

The new optimised LS/LT endcarriages permit a high degree of material utilisation. This makes it essential to take into account the necessary classification for the application when selecting them.

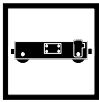
$$t = \frac{2 \times s \times SP \times T}{v \times 60} [h]$$

- Select the load spectrum suitable for the application from the table
- Determine the mean daily operating time t
- Determine the necessary FEM (ISO) classification from the table

Load spectrums		Mean daily operating time t in [h]								
		≤ 0.12	≤ 0.25	≤ 0.5	≤ 1	≤ 2	≤ 4	≤ 8	≤ 16	> 16
	light	-	-	1Dm (M1)	1Cm (M2)	1Bm (M3)	1Am (M4)	2m (M5)	3m (M6)	4m (M7)
	medium	-	1Dm (M1)	1Cm (M2)	1Bm (M3)	1Am (M4)	2m (M5)	3m (M6)	4m (M7)	5m (M8)
	heavy	1Dm (M1)	1Cm (M2)	1Bm (M3)	1Am (M4)	2m (M5)	3m (M6)	4m (M7)	5m (M8)	-
	very heavy	1Cm (M2)	1Bm (M3)	1Am (M4)	2m (M5)	3m (M6)	4m (M7)	5m (M8)	-	-

x = % of operating time
 y = % of maximum load

s [m] Average running distance
 SP [1/h] Cycles per hour
 T [h] Operating hours per day
 t [h] Mean daily operating time
 v [m/min] Travel speed



2.4.3 Determination of endcarriage size

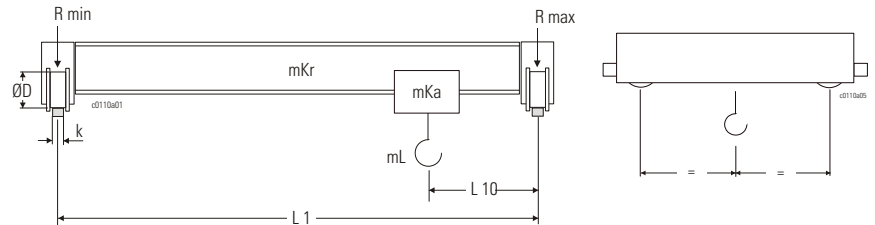
$$mKr = mT + mZ + mKo[kg]$$

$$R_{max} = \frac{mKr}{4 \times 100} + \frac{mL + mKa}{2 \times 100} \times \frac{(L1 - L10)}{L1} [kN]$$

$$R_{min} = \frac{mKr}{4 \times 100} + \frac{mL + mKa}{2 \times 100} \times \frac{L10}{L1} [kN]$$

Conditions:

- $R_{max} \leq R_{zul}$
- $actual\ L1 \leq L1_{zul}$



2.4.4 Calculation of required rail width "k"

$$R_{id} = \frac{2 \times R_{max} + R_{min}}{3} [kN]$$

Condition:

- $R_{id} \leq R_{id\ zul}$

Determine the rail width k necessary from tables section "2.8.1 Permissible ideal wheel loads".

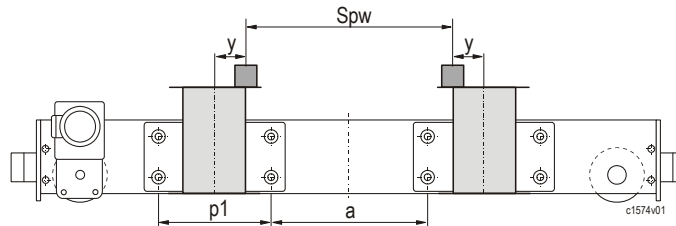
k	[mm]	Rail width
L1	[m]	Crane span
L10	[m]	Hook approach trolley
mKa	[kg]	Weight of trolley/crab
mKo	[kg]	Weight of endcarriage + joint plate + drive
mKr	[kg]	Weight of crane
mL	[kg]	Working load
mT	[kg]	Weight of crane bridge(s)
mZ	[kg]	Weight of additional loads
R _{id zul}	[kN]	Permissible ideal wheel load (static)
R _{id}	[kN]	Actual ideal wheel load (static)
R _{max}	[kN]	Max. actual wheel load (static)
R _{zul}	[kN]	Permissible wheel load (static)



2.4.5 Determining spacing a between joint plates (double girder o.h.t. crane)

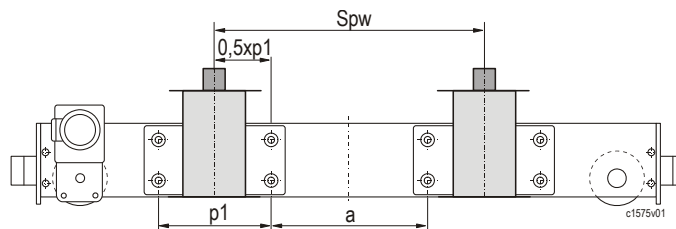
$$a = Spw - p1 + 2 \times y [mm]$$

Inside rail



$$a = Spw - p1 [mm]$$

Centre rail



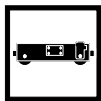
2.4.6 Determination of travel drive

$$mF_{max} = mKr + mKa + mL [kg]$$

Condition:

- $mF_{max} \leq mF_{zul}$

a	[mm]	Hole separation a between joint plates (double girder o.h.t. crane)
mF	[kg]	Travel load/pair
mKa	[kg]	Weight of trolley/crab
mKr	[kg]	Weight of crane
mL	[kg]	Working load
p1	[mm]	Hole separation of joint plate (see "2.5.1 Dimensions")
Spw	[mm]	Crab track gauge
y	[mm]	Spacing from centre crane girder to centre c.t. rail



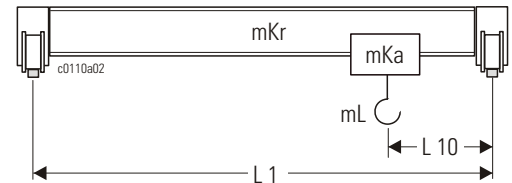
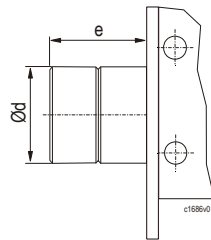
2.4.7 Determination of crane buffer

$$mpu_{vorh} = \frac{mKr}{2} + mKa \times \frac{L1-L10}{L1} [kg]^1$$

$$mpu_{zul} = \frac{2 \times E_{zul}}{vpu^2} [kg]$$

$$vpu = \frac{v \times kpu}{60} [m/s]$$

Formula for exact calculation of crane buffer.



Buffer selection table (rough calculation)

Example:

Crane with limit switches, crane travel speed 40 m/min, impact mass 25000 kg.
Buffer required: polyurethane buffer type H, 160x160 mm.

						max. travel speed v [m/min]										
Without limit switches				kpu = 0.85		10	12.5	16	20	25	32	40	50	63	80	
With limit switches				kpu = 0.70		12.5	16	20	25	32	40	50	63	80	100	
With pre- and final cut-off				kpu = 0.40		20	25	32	40	50	63	80	100	125	160	
Type Code	Buffer	Mate- rial	Ød	e	Ezul	vpu [m/s]	Permissible impact mass mpu in [kg] for max. impact speed vpu in [m/s]									
			[mm]	[mm]	[Nm]		0.15	0.19	0.23	0.29	0.37	0.47	0.58	0.74	0.93	1.17
A	D1801	Rubber	63	53	250	mpu [kg]	23500	14300	9100	5800	3500	2200	1400	900	500	300
B	D2240		80	68	400		37600	22900	14600	9400	5700	3600	2300	1400	900	500
C	D2241		100	85	1000		94000	57300	36700	23500	14300	9100	5800	3700	2200	1400
D	D2242		125	105	1600		150400	91800	58700	37600	22900	14600	9400	5900	3600	2300
K	80x80		80	80	400		37600	22900	14600	9400	5700	3600	2300	1400	900	500
G	100x100	Polyurethane	100	100	800		75200	45900	29300	18800	11400	7300	4700	2900	1800	1100
E	100x150		100	150	1200		112800	68800	44000	28200	17200	11000	7000	4400	2700	1700
M	125x125		125	125	1550		145700	88900	56900	36400	22200	14200	9100	5700	3500	2200
F	125x190		125	190	2320		218100	133100	85200	54500	33200	21300	13600	8500	5300	3400
H	160x160		160	160	3300		310300	189400	121200	77500	47300	30300	19300	12200	7500	4800
P	160x240		160	240	4950		465500	284100	181800	116300	71000	45400	29000	18300	11300	7200
I	200x200		200	200	6400		601800	367300	235100	150400	91800	58700	37600	23600	14600	9400
S	200x300		200	300	9600		902700	551000	352600	225600	137700	88100	56400	35500	22000	14100
T	250x250		250	250	12500		1175500	717400	459100	293800	179300	114700	73400	46200	28600	18300
Y	250x375		250	375	18750		1763200	1076200	688700	440800	269000	172100	110200	69400	43000	27500
Z	315x315		315	315	25000		2351000	1434900	918300	587700	358700	229500	146900	92500	57300	36700

Max. permissible impact mass at standard travel speeds (20 or 40 m/min) and with limit switches

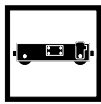
E _{zul}	[Nm]	Permissible buffer energy
kpu		Reduction factor
L1	[m]	Crane span
L10	[m]	Hook approach trolley
mKa	[kg]	Weight of trolley/crab
mKr	[kg]	Weight of crane
mL	[kg]	Working load
mpu _{vorh}	[kg]	Actual impact mass
mpu _{zul}	[kg]	Permissible impact mass
Ø D	[mm]	Wheel diameter
v	[m/min]	Travel speed
vpu	[m/s]	Impact speed

¹ Not guided load

**Runway end stops**

The overhead travelling crane endcarriages are fitted with buffers as standard. The stops required on the crane bridge must be supplied by the customer.

The size of the stops must be selected in accordance with the buffer forces (see chapter "Other components", Crane buffers). The dimensions must be selected so that the whole surface of the buffer strikes the stop.



2.5 Endcarriages for single girder o.h.t. cranes

2.5.1 Dimensions

2.5.1.1 LS/LT-09

LS/LT-09

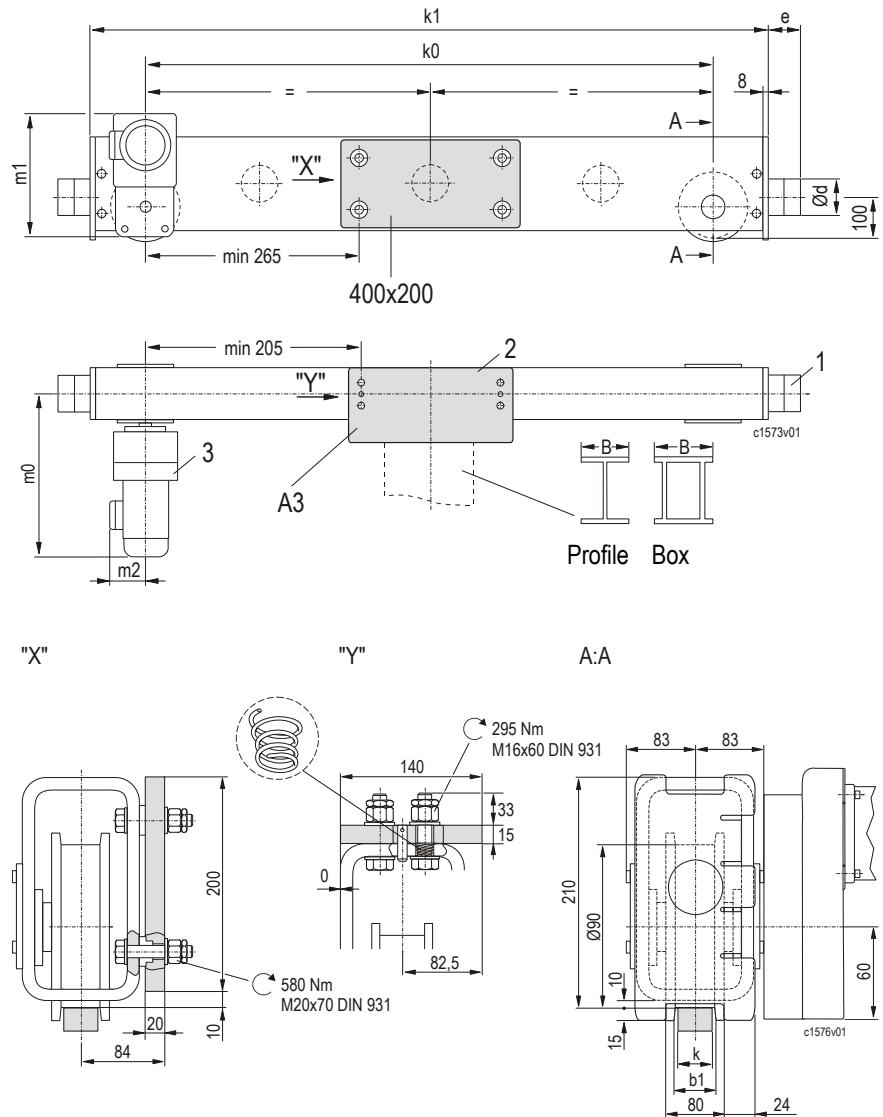
L1 _{zul} ² [m]	Type	k0 [mm]	k1 [mm]	Weight ³ [kg]
9.5	LS-09-13	1250	1526	144
12	LS-09-16	1600	1876	170
15	LS-09-20	2000	2276	198
18.5	LS-09-25	2500	2776	236
9.5	LT-09-13	1250	1526	144
12	LT-09-16	1600	1876	170
15	LT-09-20	2000	2276	198
18.5	LT-09-25	2500	2776	236

Side connection

Type	R _{zul} [kN] 400x200
LS-09-13	24.3
LS-09-16	24.3
LS-09-20	24.3
LS-09-25	24.3

Top connection

Type	R _{zul} [kN] A3
LT-09-13	24.3
LT-09-16	24.3
LT-09-20	24.3
LT-09-25	24.3



b1	50	55	60	65	70
k	40	45 (A45)	50	55 (A55)	60

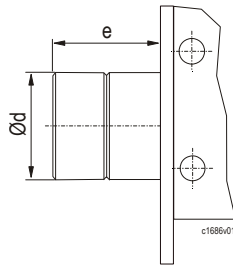
Calculation of required rail width "k" see page 2-12.

² Crane span

³ Weight per pair of endcarriages without joint plates

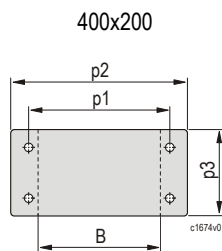
1 Buffer

Calculation see buffer selection table page 2-14.

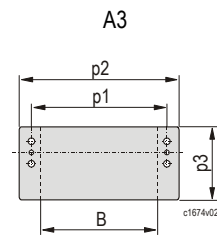


Type Code	Buffer	Material	Ød [mm]	e [mm]
A	D1801	Rubber	63	53
B	D2240		80	68
C	D2241		100	85
K	80x80	Polyurethane	80	80
G	100x100		100	100
E	100x150		100	150

2 Joint plates



	400x200
p1 [mm]	400
p2 [mm]	490
p3 [mm]	200
B _{min-max} [mm]	146-400
Weight per plate [kg]	17



	A3
p1 [mm]	360
p2 [mm]	410
p3 [mm]	140
B _{min-max} [mm]	90-310
Weight per plate [kg]	7

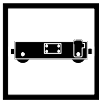
3 Travel drives

Ø D	50 Hz	60 Hz	50 Hz	60 Hz	mF _{zul} ⁴	Type	m0	m1	m2	
[mm]	100 Hz ⁵	100 Hz ⁵	100 Hz ⁵	100 Hz ⁵	[kg]		[mm]	[mm]	[mm]	[kg] ⁴
90	5/20	6.3/25	2x 0.09/0.37	2x 0.11/0.44	12800	2x SDB342FS4BO8/2F12	505	225	134	44.2
	10/40	12.5/50	2x 0.09/0.37	2x 0.11/0.44	6300	2x SDB320FS4BO8/2F12	505	225		44.2
			2x 0.13/0.55	2x 0.16/0.66	9500	2x SDB320FS4BO8/2F13	505	225		48.4
	2.5...25		2x 0.75		17900	2x SDB332PS4BO4F18	505	225	182	37.2
	4.0...40		2x 0.75		10400	2x SDB320PS4BO4F18	505	225		37.2
			4x 0.75		20800	4x SDB320PS4BO4F18	505	225		74.4

⁴ For 1 pair, design acc. to FEM (ISO) 1Am (M4)

⁵ With 4-pole travel motor for frequency inverter

⁶ Further travel speeds and motor data see Product information "Travel drives"



2.5.1.2 LS/LT-11

LS/LT-11

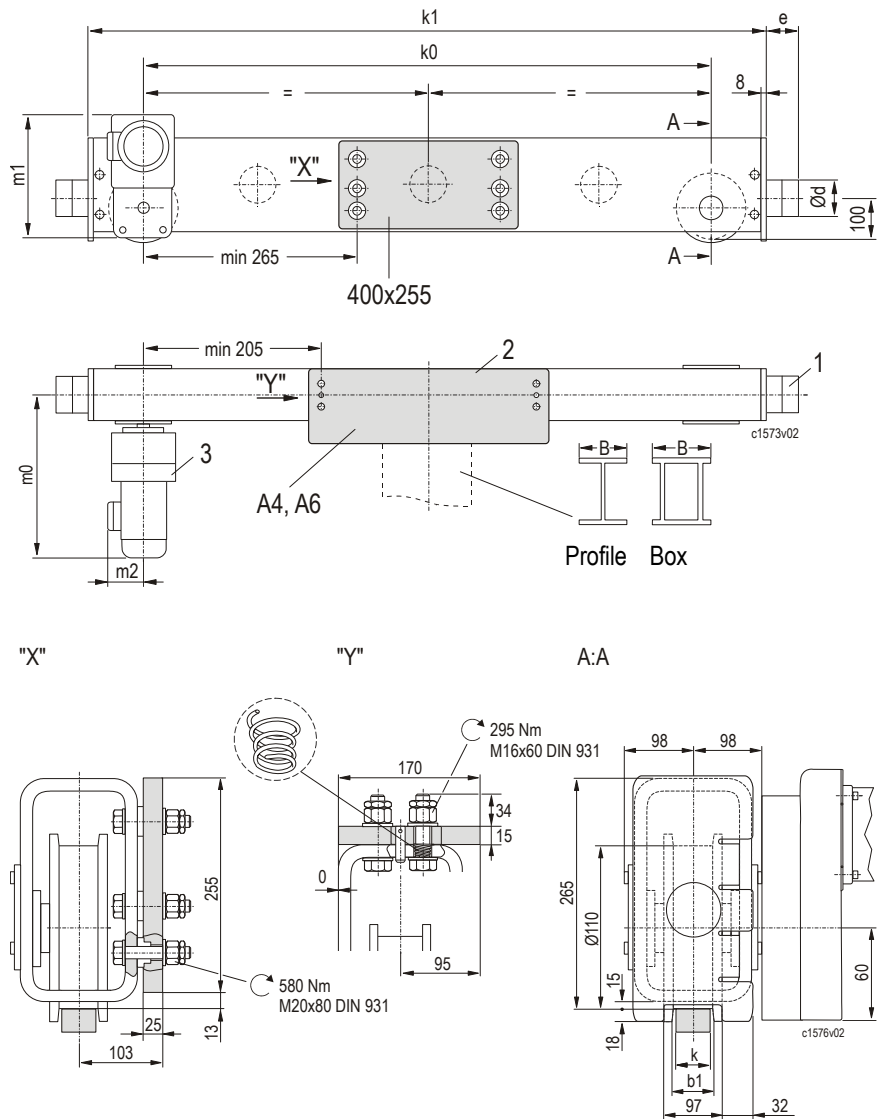
L1 _{zul} ⁷ [m]	Type	k0 [mm]	k1 [mm]	Weight ⁸ [kg]
12	LS-11-16	1600	1876	258
15	LS-11-20	2000	2276	304
18.5	LS-11-25	2500	2776	360
23.5	LS-11-32	3150	3426	434
12	LT-11-16	1600	1876	216
15	LT-11-20	2000	2276	254
18.5	LT-11-25	2500	2776	300
23.5	LT-11-32	3150	3426	360

Side connection

Type	R _{zul} [kN]
	400x255
LS-11-16	40.0
LS-11-20	40.0
LS-11-25	40.0
LS-11-32	40.0

Top connection

Type	A4	A6
LT-11-16	40.0	40.0
LT-11-20	40.0	40.0
LT-11-25	40.0	40.0
LT-11-32	37.0	40.0



	[mm]							
b1	52	57	62	67	72	77	82	87
k	40	45 (A45)	50	55 (A55)	60	65 (A65)	70	75 (A75)

L1	b1
[m]	[mm]
L1 < 20	+0
20 ≤ L1 < 30	+5

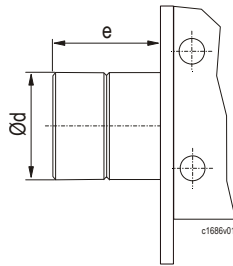
Calculation of required rail width "k" see page 2-12.

⁷ Crane span

⁸ Weight per pair of endcarriages without joint plates

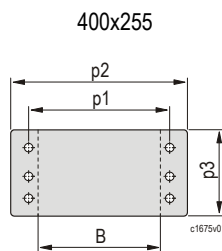
1 Buffer

Calculation see buffer selection table page 2-14.

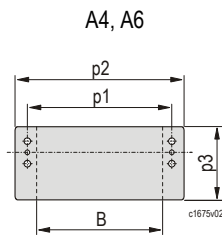


Type Code	Buffer	Material	Ød [mm]	e [mm]
A	D1801	Rubber	63	53
B	D2240		80	68
C	D2241		100	85
K	80x80	Polyurethane	80	80
G	100x100		100	100
E	100x150		100	150

2 Joint plates



	400x255
p1 [mm]	400
p2 [mm]	490
p3 [mm]	255
B _{min-max} [mm]	146-400
Weight per plate [kg]	24



	A4	A6
p1 [mm]	410	600
p2 [mm]	460	650
p3 [mm]	170	170
B _{min-max} [mm]	90-350	300-550
Weight per plate [kg]	9	13

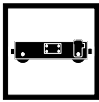
3 Travel drives

Ø D	50 Hz	60 Hz	50 Hz	60 Hz	mF _{zul} ⁹	Type	m0	m1	m2		
	100 Hz ¹⁰		100 Hz ¹⁰								
[mm]	[m/min]		[kW] ¹¹		[kg]		[mm]	[mm]	[mm]	[kg] ⁹	
110	5/20	6.3/25	2x 0.09/0.37	2x 0.11/0.44	14200	2x SDB350FS4BO8/2F12	522	235	134	44.2	
	10/40	12.5/50	2x 0.09/0.37	2x 0.11/0.44	7100	2x SDB325FS4BO8/2F12	522	235	134	44.2	
			2x 0.13/0.55	2x 0.16/0.66	10800	2x SDB325FS4BO8/2F13	522	235		48.4	
	2.5...25		2x 0.75		22000	2x SDB342PS4BO4F18	522	235		182	37.2
	4.0...40		2x 0.75		11600	2x SDB325PS4BO4F18	522	235	37.2		
			4x 0.75		23200	4x SDB325PS4BO4F18	522	235	74.4		

⁹ For 1 pair, design acc. to FEM (ISO) 1Am (M4)

¹⁰ With 4-pole travel motor for frequency inverter

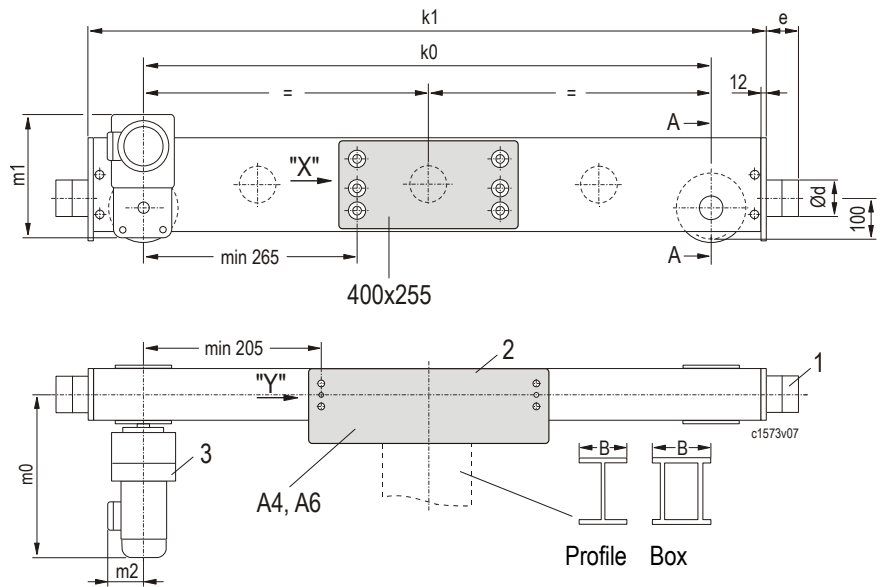
¹¹ Further travel speeds and motor data see Product information "Travel drives"



2.5.1.3 LS/LT-14

LS/LT-14

L1 _{zul} ¹²	Type	k0	k1	Weight ¹³
[m]		[mm]	[mm]	[kg]
12	LS-14-16	1600	1884	282
15	LS-14-20	2000	2284	328
18.5	LS-14-25	2500	2784	384
23.5	LS-14-32	3150	3434	458
26	LS-14-35	3500	3784	498
30	LS-14-40	4000	4284	558
12	LT-14-16	1600	1884	244
15	LT-14-20	2000	2284	282
18.5	LT-14-25	2500	2784	328
23.5	LT-14-32	3150	3434	388
26	LT-14-35	3500	3784	422
30	LT-14-40	4000	4284	468



Side connection

Type	R _{zul} [kN]
	400x255
LS-14-16	40.9
LS-14-20	40.9
LS-14-25	40.9
LS-14-32	40.9
LS-14-35	34.8
LS-14-40	27.8

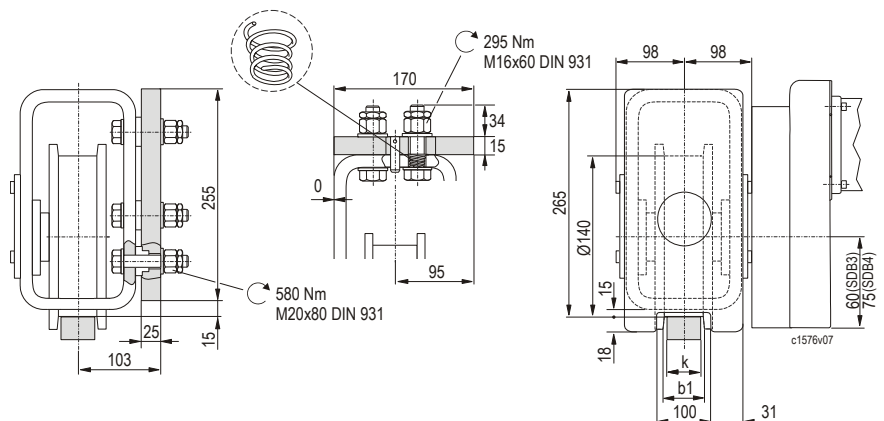
Top connection

Type	A4	A6
LT-14-16	47.8	47.8
LT-14-20	47.8	47.8
LT-14-25	46.7	47.8
LT-14-32	37.0	47.8
LT-14-35	33.3	41.7
LT-14-40	27.8	27.8

"X"

"Y"

A:A



	[mm]						
b1	54	59	64	69	74	79	84
k	40	45	50	55	60	65	70

L1	b1
[m]	[mm]
L1 < 20	+0
20 ≤ L1 < 30	+5
30 ≤ L1 < 35	+10

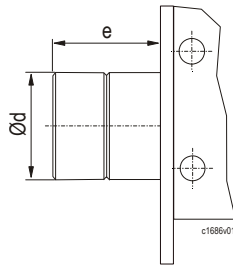
Calculation of required rail width "k" see page 2-12.

¹² Crane span

¹³ Weight per pair of endcarriages without joint plates

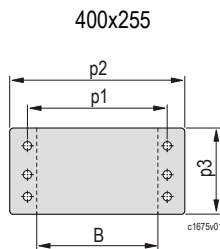
1 Buffer

Calculation see buffer selection table page 2–14.

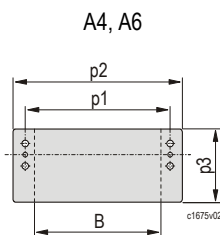


Type Code	Buffer	Material	Ød [mm]	e [mm]
A	D1801	Rubber	63	53
B	D2240		80	68
C	D2241		100	85
K	80x80	Polyurethane	80	80
G	100x100		100	100
E	100x150		100	150
M	125x125		125	125
F	125x190		125	190
H	160x160		160	160
P	160x240		160	240

2 Joint plates



	400x255
p1 [mm]	400
p2 [mm]	490
p3 [mm]	255
B _{min-max} [mm]	146-400
Weight per plate [kg]	24



	A4	A6
p1 [mm]	410	600
p2 [mm]	460	650
p3 [mm]	170	170
B _{min-max} [mm]	90-350	300-550
Weight per plate [kg]	9	13

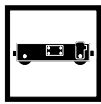
3 Travel drives

Ø D	50 Hz	60 Hz	50 Hz	60 Hz	mF _{zul} ¹⁴	Type	m0	m1	m2		
	100 Hz ¹⁵		100 Hz ¹⁵								
[mm]	[m/min]		[kW] ¹⁶		[kg]		[mm]	[mm]	[mm]	[kg] ¹⁴	
140	6.3/25	8/32	2x 0.09/0.37	2x 0.11/0.44	12500	2x SDB350FS3BO8/2F12	522	235	134	44.2	
	10/40	12.5/50	2x 0.09/0.37	2x 0.11/0.44	7600	2x SDB332FS3BO8/2F12	522	235		44.2	
			2x 0.13/0.55	2x 0.16/0.66	11700	2x SDB332FS3BO8/2F13	522	235		48.4	
	2.5...25		2x 0.75		21200	2x SDB350PS3BO4F18	522	235	182	37.2	
	4.0...40		2x 0.75		12300	2x SDB332PS3BO4F18	522	235		37.2	

¹⁴ For 1 pair, design acc. to FEM (ISO) 1Am (M4)

¹⁵ With 4-pole travel motor for frequency inverter

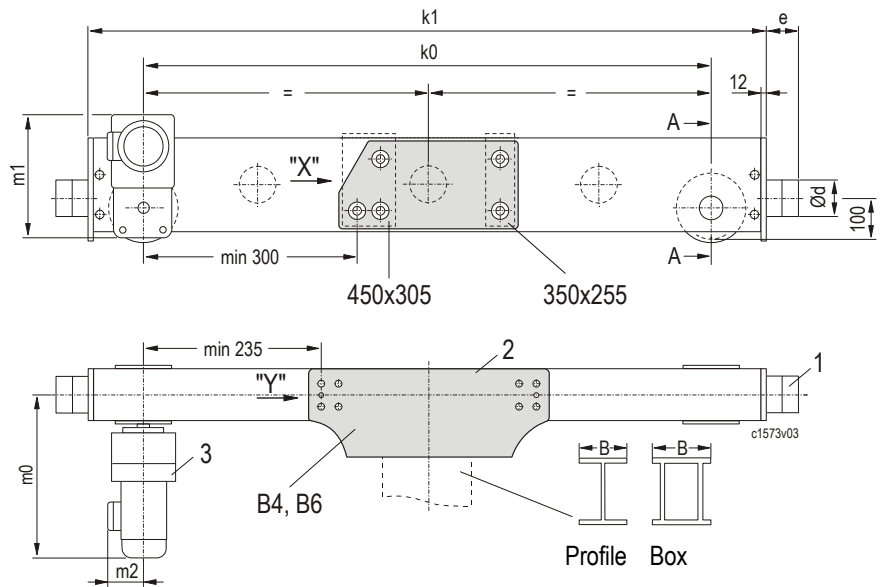
¹⁶ Further travel speeds and motor data see Product information "Travel drives"



2.5.1.4 LS/LT-16

LS/LT-16

L _{1zul} 17	Type	k ₀	H ₁	k ₁	Weight 18
[m]		[mm]	[mm]	[mm]	[kg]
12	LS-16-16	1600	268	1924	394
15	LS-16-20	2000		2324	440
18.5	LS-16-25	2500		2824	496
23.5	LS-16-32	3150	318	3474	624
30	LS-16-40	4000		4324	736
33.5	LS-16-45	4500		4824	800
12	LT-16-16	1600	265	1924	394
15	LT-16-20	2000		2324	440
18.5	LT-16-25	2500		2824	496
23.5	LT-16-32	3150	315	3474	624
30	LT-16-40	4000		4324	736
33.5	LT-16-45	4500		4824	800

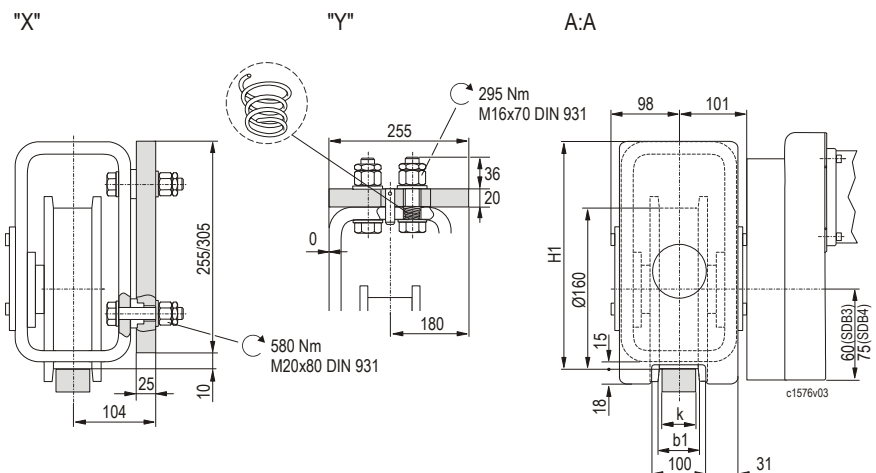


Side connection

Type	R _{zul} [kN]	
	350x255	450x305
LS-16-16	60.0	-
LS-16-20	60.0	-
LS-16-25	54.4	-
LS-16-32	-	60.0
LS-16-40	-	54.0
LS-16-45	-	38.3

Top connection

Type	R _{zul} [kN]	
	B4	B6
LT-16-16	60.0	60.0
LT-16-20	60.0	60.0
LT-16-25	60.0	60.0
LT-16-32	60.0	60.0
LT-16-40	54.8	54.8
LT-16-45	38.3	38.3



	[mm]						
b ₁	54	59	64	69	74	79	84
k	40	45	50	55	60	65	70
		(A45)		(A55)		(A65)	

L ₁	b ₁
[m]	[mm]
L ₁ < 20	+0
20 ≤ L ₁ < 30	+5
30 ≤ L ₁ < 35	+10

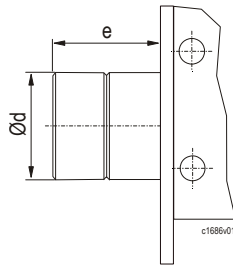
Calculation of required rail width "k" see page 2-12.

¹⁷ Crane span

¹⁸ Weight per pair of endcarriages without joint plates

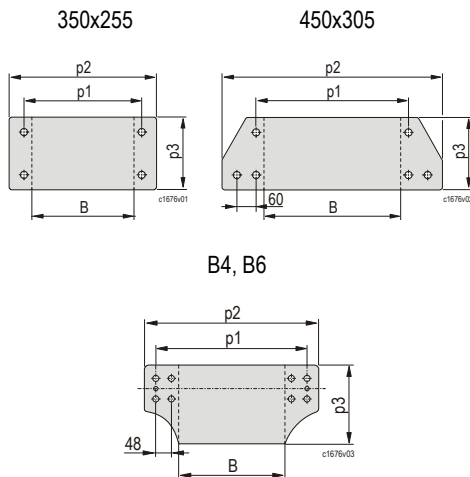
1 Buffer

Calculation see buffer selection table page 2–14.



Type Code	Buffer	Material	Ød [mm]	e [mm]
B	D2240	Rubber	80	68
C	D2241		100	85
D	D2242		125	105
K	80x80	Polyurethane	80	80
G	100x100		100	100
E	100x150		100	150
M	125x125		125	125
F	125x190		125	190
H	160x160		160	160
P	160x240		160	240

2 Joint plates



	350x255	450x305
p1 [mm]	350	450
p2 [mm]	430	650
p3 [mm]	255	305
B _{min-max} [mm]	146-370	300-470
Weight per plate [kg]	23	38

B4, B6

	B4	B6
p1 [mm]	500	700
p2 [mm]	550	750
p3 [mm]	255	255
B _{min-max} [mm]	200-350	350-550
Weight per plate [kg]	21	29

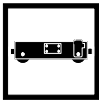
3 Travel drives

Ø D	50 Hz	60 Hz	50 Hz	60 Hz	mF _{zul} ¹⁹	Type	m0	m1	m2	
	100 Hz ²⁰		100 Hz ²⁰							
[mm]	[m/min]		[kW] ²¹		[kg]		[mm]	[mm]	[mm]	[kg] ¹⁹
160	5/20	6.3/25	2x 0.09/0.37	2x 0.11/0.44	18400	2x SDB472FS3BO8/2F12	533	291	134	55.2
			2x 0.13/0.55	2x 0.16/0.66	28200	2x SDB472FS3BO8/2F13	533	291		59.4
			2x 0.21/0.80	2x 0.25/0.96	43000	2x SDB472FS3BO8/2F30	590	291	154	80.4
	10/40	12.5/50	2x 0.13/0.55	2x 0.16/0.66	12400	2x SDB436FS3BO8/2F13	533	291	134	59.4
			2x 0.21/0.80	2x 0.25/0.96	18900	2x SDB436FS3BO8/2F30	590	291	154	80.4
			2x 0.32/1.25	2x 0.36/1.50	24100	2x SDB436FS3BO8/2F31	590	291		82.4
	2.5...25		2x 0.68		19500	2x SDB350PS3BO4F18	522	259	182	37.2
			2x 0.75		25500	2x SDB463PS3BO4F18	533	291		48.2
			2x 1.5		59500	2x SDB463PS3BO4F38	590	291	202	70.4
	4.0...40		2x 0.68		11300	2x SDB332PS3BO4F18	522	259	182	37.2
			2x 0.75		13000	2x SDB436PS3BO4F18	533	291		48.2
			2x 1.5		30700	2x SDB436PS3BO4F38	595	291	202	70.4

¹⁹ For 1 pair, design acc. to FEM (ISO) 1Am (M4)

²⁰ With 4-pole travel motor for frequency inverter

²¹ Further travel speeds and motor data see Product information "Travel drives"



2.5.1.5 LT-20

LT-20

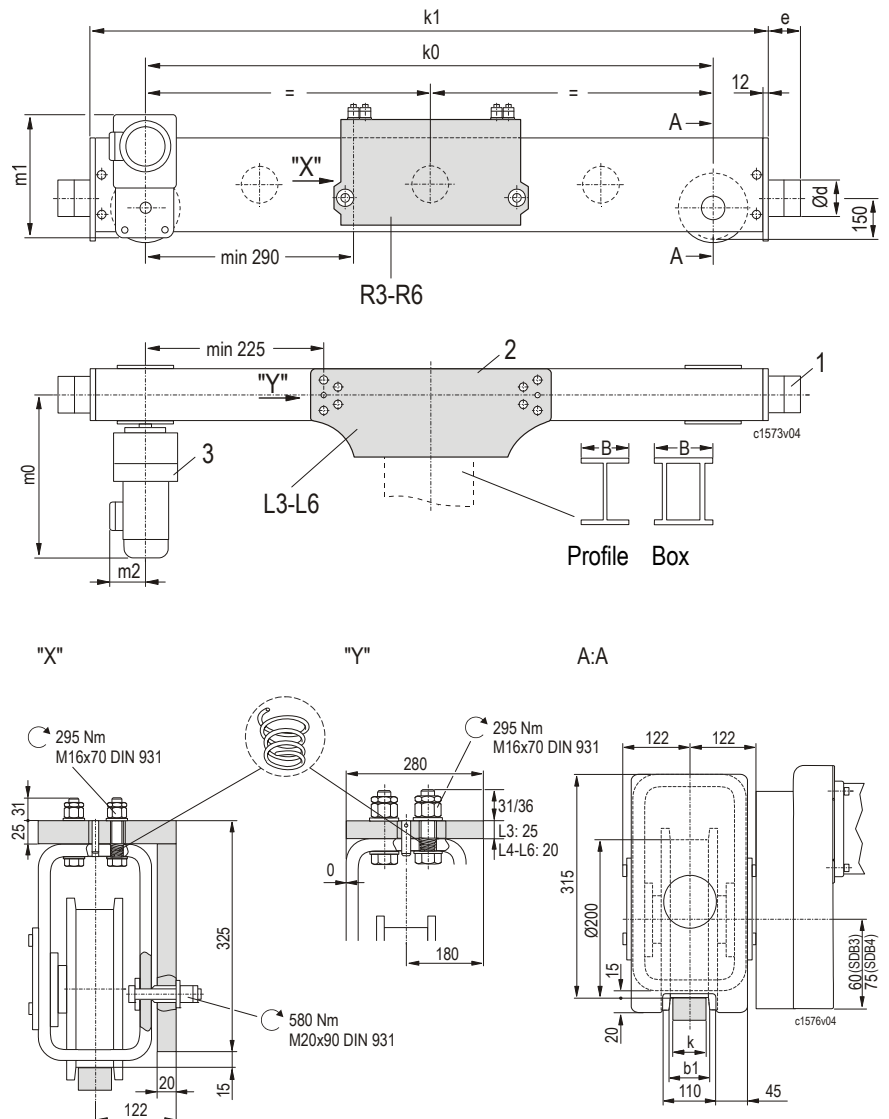
L1 _{zul} ²²	Type	k0	k1	Weight ₂₃
[m]		[mm]	[mm]	[kg]
12	LT-20-16	1600	1920	398
15	LT-20-20	2000	2320	454
18.5	LT-20-25	2500	2820	530
23.5	LT-20-32	3150	3470	622
30	LT-20-40	4000	4320	744
33.5	LT-20-45	4500	4820	818

Side/top connection

Type	R _{zul} [kN]				
	R3 Profile	R3 Box	R4	R5	R6
LT-20-16	75.0	104.3	104.3	104.3	104.3
LT-20-20	60.0	104.3	104.3	104.3	104.3
LT-20-25	48.0	89.6	104.3	104.3	104.3
LT-20-32	38.1	71.1	86.3	97.4	97.4
LT-20-40	30.0	56.0	65.2	65.2	65.2
LT-20-45	26.7	46.1	46.1	46.1	46.1

Top connection

Type	R _{zul} [kN]			
	L3	L4	L5	L6
LT-20-16	104.3	104.3	104.3	104.3
LT-20-20	104.3	104.3	104.3	104.3
LT-20-25	85.3	104.3	104.3	104.3
LT-20-32	67.7	84.7	97.4	97.4
LT-20-40	53.3	65.2	65.2	65.2
LT-20-45	46.1	46.1	46.1	46.1



	[mm]								
b1	54	59	64	69	74	79	84	89	94
k	40	45 (A45)	50	55 (A55)	60	65 (A65)	70	75 (A75)	80

L1	b1
[m]	[mm]
L1 < 20	+0
20 ≤ L1 < 30	+5
30 ≤ L1 < 35	+10

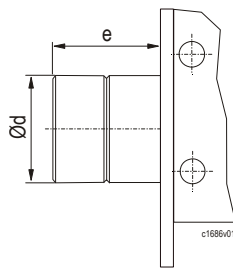
Calculation of required rail width "k" see page 2-12.

²² Crane span

²³ Weight per pair of endcarriages without joint plates

1 Buffer

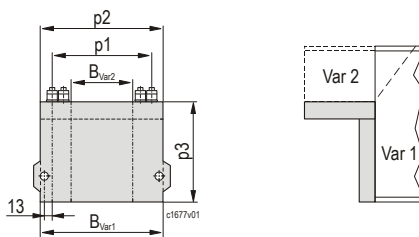
Calculation see buffer selection table page 2-14.



Type Code	Buffer	Material	Ød [mm]	e [mm]
B	D2240	Rubber	80	68
C	D2241		100	85
D	D2242		125	105
G	100x100	Polyurethane	100	100
E	100x150		100	150
M	125x125		125	125
F	125x190		125	190
H	160x160		160	160
P	160x240		160	240
I	200x200		200	200
S	200x300		200	300

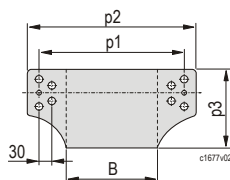
2 Joint plates

R3-R6



	R3	R4	R5	R6
p1 [mm]	250	360	470	580
p2 [mm]	300	410	520	630
p3 [mm]	325	325	325	325
Bmin-max profile [mm]	230-300	300-410	-	-
Bmin-max box Var 1 [mm]	230-300	300-410	410-520	520-630
B1min-max box Var 2 [mm]	-	300-320	321-430	431-540
Weight per plate [kg]	33	43	53	63

L3-L6



	L3	L4	L5	L6
p1 [mm]	410	520	630	740
p2 [mm]	460	570	680	790
p3 [mm]	280	280	280	280
Bmin-max [mm]	240-300	300-410	410-520	520-630
Weight per plate [kg]	24	25	29	34

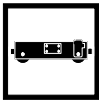
3 Travel drives

Ø D	50 Hz	60 Hz	50 Hz	60 Hz	mF _{zul} ²⁴	Type	m0	m1	m2	
	100 Hz ²⁵		100 Hz ²⁵							
[mm]	[m/min]		[kW] ²⁶		[kg]		[mm]	[mm]	[mm]	[kg] ²⁴
200	5/20	6.3/25	2x 0.09/0.37	2x 0.11/0.44	19800	2x SDB490FS3BO8/2F12	554	311	134	55.2
		6.3/25	2x 0.13/0.55	2x 0.16/0.66	30300	2x SDB490FS3BO8/2F13	554	311		59.4
	10/40	12.5/50	2x 0.13/0.55	2x 0.16/0.66	13500	2x SDB445FS3BO8/2F13	554	311		59.4
		12.5/50	2x 0.21/0.80	2x 0.25/0.96	20600	2x SDB445FS3BO8/2F30	611	311	154	80.4
		12.5/50	2x 0.32/1.25	2x 0.36/1.50	26200	2x SDB445FS3BO8/2F31	611	311		82.4
	2.5...25	2x 0.75			26700	2x SDB472PS3BO4F18	554	311	182	48.2
		2x 1.5			51300	2x SDB472PS3BO4F38	616	311	202	70.4
	4.0...40	2x 0.68			13200	2x SDB342PS3BO4F18	543	279	182	37.2
		2x 0.75			14000	2x SDB445PS3BO4F18	554	311		48.2
		2x 1.5			33200	2x SDB445PS3BO4F38	616	311	202	70.4
		2x 2.0			41700	2x SDB445PS3BO4F38	616	311		70.4

²⁴ For 1 pair, design acc. to FEM (ISO) 1Am (M4)

²⁵ With 4-pole travel motor for frequency inverter

²⁶ Further travel speeds and motor data see Product information "Travel drives"



2.5.1.6 LT-25

LT-25

L1 _{zul} 27	Type	k0	H1	k1	Weight 28
[m]		[mm]	[mm]	[mm]	[kg]
15	LT-25-20	2000	315	2330	818
18.5	LT-25-25	2500		2830	906
23.5	LT-25-32	3150	415	3480	1158
30	LT-25-40	4000		4330	1342
33.5	LT-25-45	4500		4830	1450

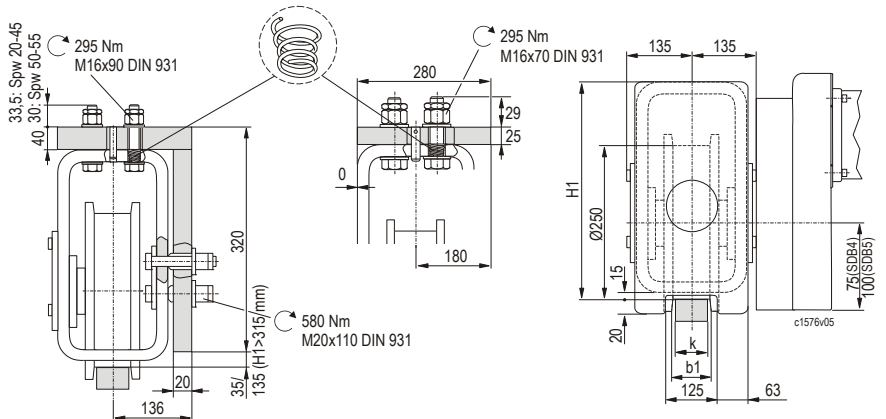
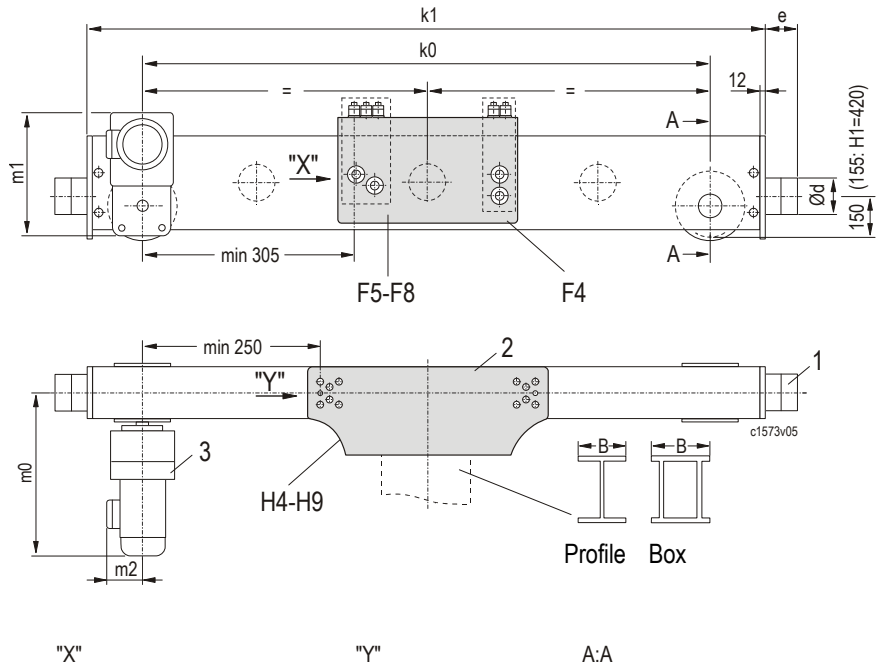
Side/top connection

Type	R _{zul} [kN]		
	F4 Profile	F4 Box	F5 Profile
LT-25-20	80.0	160.0	118.3
LT-25-25	64.0	128.0	94.7
LT-25-32	50.8	101.6	75.1
LT-25-40	40.0	80.0	59.2
LT-25-45	35.6	71.1	52.6

Type	R _{zul} [kN]		
	F5 Box	F7	F8
LT-25-20	160.9	160.9	160.9
LT-25-25	148.7	148.7	148.7
LT-25-32	147.8	147.8	147.8
LT-25-40	118.0	125.8	125.8
LT-25-45	104.9	111.3	111.3

Top connection

Type	R _{zul} [kN]			
	H4	H5	H7	H9
LT-25-20	160.9	160.9	160.9	160.9
LT-25-25	148.7	148.7	148.7	148.7
LT-25-32	127.0	147.8	147.8	147.8
LT-25-40	100.0	116.7	137.4	137.4
LT-25-45	88.9	103.7	111.3	111.3



	[mm]						
b1	54	59	64	69	74	79	84
k	40	45	50	55	60	65	70
		(A45)		(A55)		(A65)	

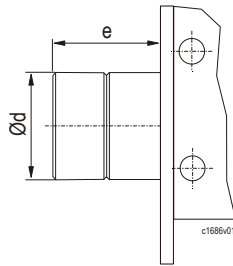
L1	b1
[m]	[mm]
L1 < 20	+0
20 ≤ L1 < 30	+5
30 ≤ L1 < 35	+10

Calculation of required rail width "k" see page 2-12.

27 Crane span
28 Weight per pair of endcarriages without joint plates

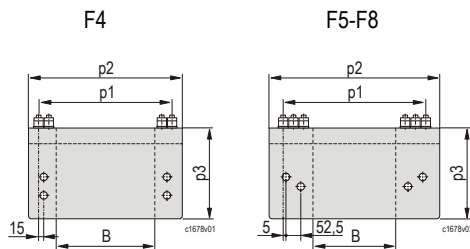
1 Buffer

Calculation see buffer selection table page 2-14.



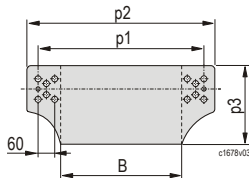
Type Code	Buffer	Material	Ød [mm]	e [mm]
B	D2240	Rubber	80	68
C	D2241		100	85
D	D2242		125	105
E	100x150	Polyurethane	100	150
M	125x125		125	125
F	125x190		125	190
H	160x160		160	160
P	160x240		160	240
I	200x200		200	200
S	200x300		200	300

2 Joint plates



	F4	F5	F7	F8
p1 [mm]	480	660	890	1030
p2 [mm]	530	730	960	1100
p3 [mm]	320	320	320	320
B _{min-max} profile [mm]	230-350	350-410	-	-
B _{min-max} box [mm]	300-410	410-520	520-750	750-890
Weight per plate [kg]	73	100	133	152

H4-H9



	H4	H5	H7	H9
p1 [mm]	590	700	920	1170
p2 [mm]	640	750	970	1220
p3 [mm]	280	280	280	280
B _{min-max} [mm]	90-410	90-520	520-740	740-990
Weight per plate [kg]	34	40	52	66

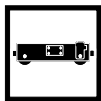
3 Travel drives

Ø D	50 Hz	60 Hz	50 Hz	60 Hz	mF _{zul} ²⁹	Type	m0	m1	m2	
	100 Hz ³⁰		100 Hz ³⁰							
[mm]	[m/min]		[kW] ³¹		[kg]		[mm]	[mm]	[mm]	[kg] ²⁹
250	5/20	6.3/25	2x 0.09/0.37	2x 0.11/0.44	21000	2x SDB4B0FS2BO8/2F12	561	336	134	55.2
			2x 0.13/0.55	2x 0.16/0.66	32200	2x SDB4B0FS2BO8/2F13	561	336		59.4
			2x 0.21/0.80	2x 0.25/0.96	51600	2x SDB5B5FS2BO8/2F30	655	425	154	107.4
			2x 0.32/1.25	2x 0.36/1.50	65700	2x SDB5B5FS2BO8/2F31	655	425		109.4
	10/40	12.5/50	2x 0.13/0.55	2x 0.16/0.66	15600	2x SDB463FS2BO8/2F13	561	336	134	59.4
			2x 0.21/0.80	2x 0.25/0.96	23700	2x SDB463FS2BO8/2F30	618	336	154	80.4
			2x 0.32/1.25	2x 0.36/1.50	30200	2x SDB463FS2BO8/2F31	618	336		82.4
			2x 0.50/2.00	2x 0.60/2.40	38300	2x SDB556FS2BO8/2F42	735	425		129.4
	2.5...25		2x 0.75		28100	2x SDB490PS2BO4F18	561	336	182	48.2
			2x 1.5		59400	2x SDB490PS2BO4F38	623	336	202	70.4
			2x 1.5		65000	2x SDB590PS2BO4F38	660	425	199	97.4
	4.0...40		2x 0.75		16200	2x SDB463PS2BO4F18	561	336	182	48.2
			2x 1.5		34200	2x SDB452PS2BO4F38	623	336	202	70.4
			2x 2.0		38200	2x SDB452PS2BO4F38	623	336		70.4
			2x 3.2		104700	2x SDB556PS2BO4F48	660	425	199	109.4

²⁹ For 1 pair, design acc. to FEM (ISO) 1Am (M4)

³⁰ With 4-pole travel motor for frequency inverter

³¹ Further travel speeds and motor data see Product information "Travel drives"



2.5.1.7 LT-32

LT-32

L _{1zul} 32	Type	k ₀	H ₁	k ₁	Weight 33
[m]		[mm]	[mm]	[mm]	[kg]
18.5	LT-32-25	2500	370	3000	1076
23.5	LT-32-32	3150		3650	1246
30	LT-32-40	4000	470	4500	1432
33.5	LT-32-45	4500		5000	1544
37.5	LT-32-50	5000	545	5500	1790
41	LT-32-55	5500		6000	1912

Side/top connection

Type	R _{zul} [kN]			
	Q3 Profile	Q3 Box	Q5 Profile	Q5 Box
LT-32-25	80.0	160.0	112.0	195.7
LT-32-32	63.5	127.0	88.9	173.9

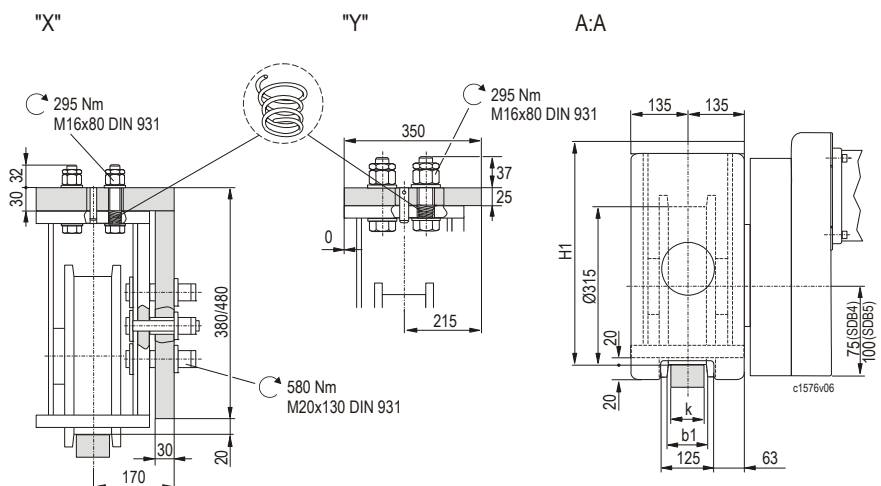
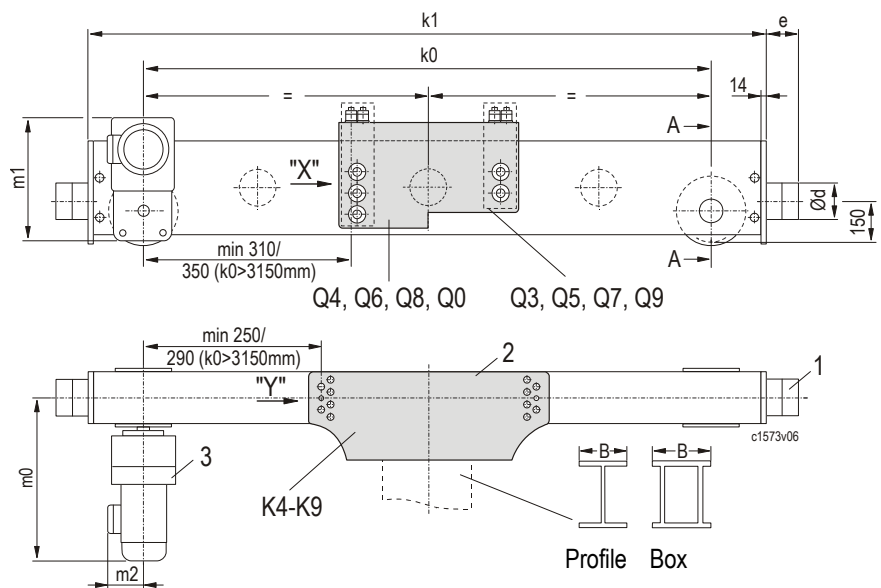
Type	R _{zul} [kN]	
	Q7	Q9
LT-32-25	195.7	-
LT-32-32	173.9	173.9

Type	R _{zul} [kN]			
	Q4 Profile	Q4 Box	Q6 Profile	Q6 Box
LT-32-40	58.3	116.7	79.2	158.3
LT-32-45	51.9	103.7	70.4	140.7
LT-32-50	46.7	93.3	63.3	126.7
LT-32-55	42.4	84.8	57.6	115.2

Type	R _{zul} [kN]	
	Q8	Q0
LT-32-40	180.9	180.9
LT-32-45	160.9	160.9
LT-32-50	173.3	173.9
LT-32-55	157.6	158.3

Top connection

Type	R _{zul} [kN]			
	K4	K5	K7	K9
LT-32-25	165.3	195.7	195.7	195.7
LT-32-32	131.2	156.6	173.9	173.9
LT-32-40	103.3	123.3	161.7	180.9
LT-32-45	91.9	109.6	143.7	160.9
LT-32-50	82.7	98.7	129.3	166.7
LT-32-55	75.2	89.7	117.6	151.5



	[mm]						
b1	64	69	74	79	84	89	94
k	50	55 (A55)	60	65 (A65)	70	75 (A75)	80

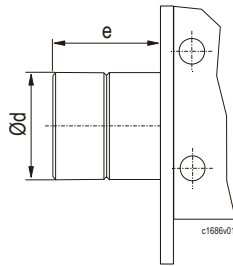
L ₁	b ₁
[m]	[mm]
L ₁ < 20	+0
20 ≤ L ₁ < 30	+5
30 ≤ L ₁ < 35	+10
L ₁ ≥ 35	+15

Calculation of required rail width "k" see page 2-12.

32 Crane span
33 Weight per pair of endcarriages without joint plates

1 Buffer

Calculation see buffer selection table page 2-14.

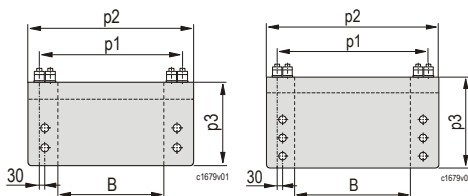


Type Code	Buffer	Material	Ød [mm]	e [mm]
B	D2240	Rubber	80	68
C	D2241		100	85
D	D2242		125	105
E	100x150	Polyurethane	100	150
M	125x125		125	125
F	125x190		125	190
H	160x160		160	160
P	160x240		160	240
I	200x200		200	200
S	200x300		200	300
T	250x250		250	250
Y	250x375		250	375

2 Joint plates

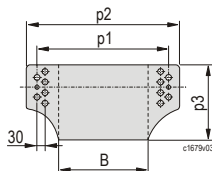
Q3, Q5, Q7, Q9

Q4, Q6, Q8, Q0



	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q0
p1 [mm]	520	520	630	630	850	850	1100	1100
p2 [mm]	570	570	680	680	900	900	1150	1150
p3 [mm]	380	480	380	480	380	480	380	480
B _{min-max} profile [mm]	300-420	300-420	-	-	-	-	-	-
B _{min-max} box [mm]	300-410	300-410	410-520	410-520	520-740	520-740	740-990	740-990
Weight per plate [kg]	94	110	111	126	144	165	183	209

K4-K9



	K4	K5	K7	K9
p1 [mm]	520	630	850	1100
p2 [mm]	570	680	900	1150
p3 [mm]	350	350	350	350
B _{min-max} [mm]	90-410	90-520	520-740	740-990
Weight per plate [kg]	39	46	61	78

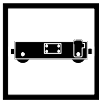
3 Travel drives

Ø D	50 Hz	60 Hz	50 Hz	60 Hz	mF _{zul} ³⁴	Type	m0	m1	m2	
	100 Hz ³⁵		100 Hz ³⁵							
[mm]	[m/min]		[kW] ³⁶		[kg]		[mm]	[mm]	[mm]	[kg] ³⁴
315	5/20	6.3/25	2x 0.21/0.80	2x 0.25/0.96	53700	2x SDB5E0FS2BO8/2F30	663	458	154	107.4
			2x 0.32/1.25	2x 0.36/1.50	68300	2x SDB5E0FS2BO8/2F31	663	458		109.4
			2x 0.32/1.25	2x 0.36/1.50	30000	2x SDB572FS2BO8/2F31	663	458		109.4
			2x 0.50/2.00	2x 0.60/2.40	41600	2x SDB572FS2BO8/2F42	743	458		129.4
	2.5...25		2x 0.75		28500	2x SDB4B0PS2BO4F18	569	367	182	48.2
			2x 1.5		52000	2x SDB4B0PS2BO4F38	631	367		70.4
			2x 1.5		70200	2x SDB5B5PS2BO4F38	668	458		97.4
			2x 1.5		36700	2x SDB472PS2BO4F38	631	367		70.4
	4.0...40		2x 1.5		36900	2x SDB572PS2BO4F38	668	458	199	97.4
			2x 2.0		46400	2x SDB572PS2BO4F38	668	458		97.4
			2x 3.2		92200	2x SDB572PS2BO4F48	668	458		109.4

³⁴ For 1 pair, design acc. to FEM (ISO) 1Am (M4)

³⁵ With 4-pole travel motor for frequency inverter

³⁶ Further travel speeds and motor data see Product information "Travel drives"



2.5.1.8 LT-40

LT-40

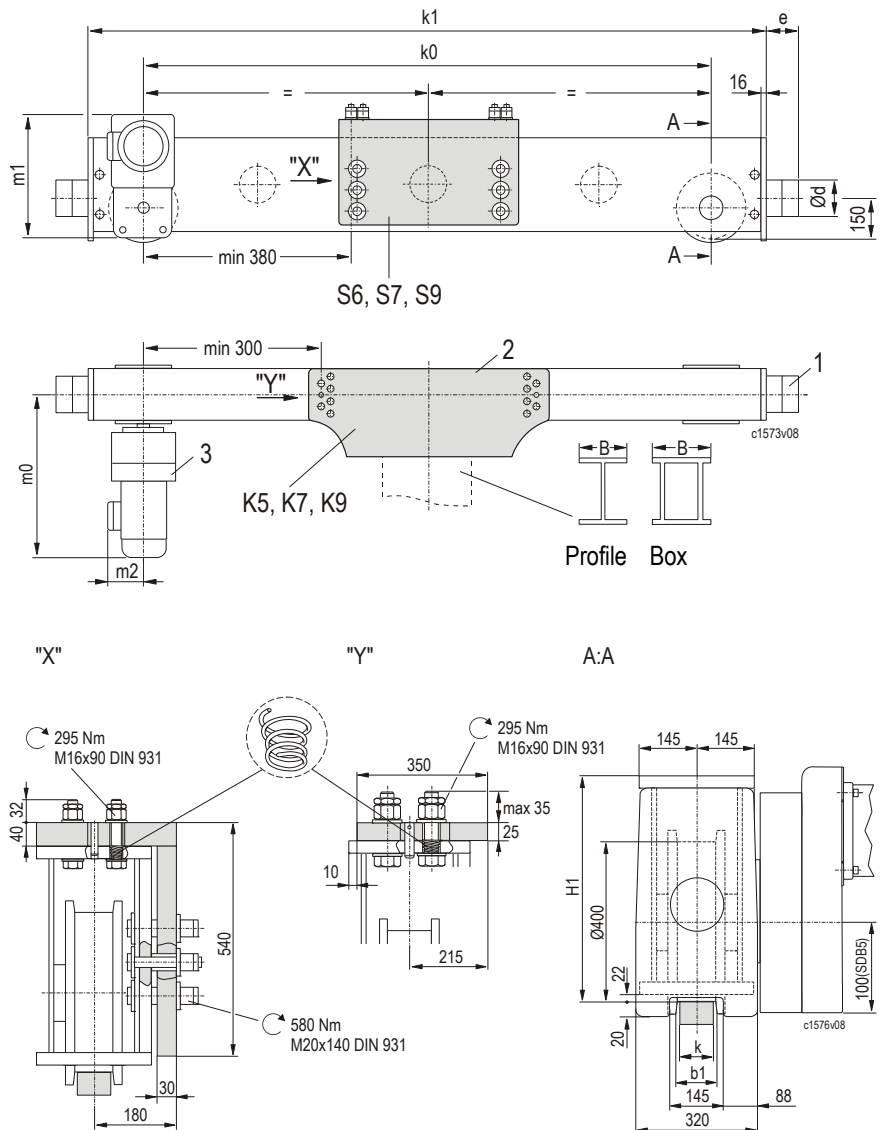
L ₁ ³⁷ [m]	Type	k ₀ [mm]	H ₁ [mm]	k ₁ [mm]	Weight ³⁸ [kg]
18.5	LT-40-25	2500	548	3060	1940
23.5	LT-40-32	3150		3710	1800
30	LT-40-40	4000	552	4560	2160
33.5	LT-40-45	4500	668	5060	2400
37.5	LT-40-50	5000	672	5560	2760
41	LT-40-55	5500		6060	3100

Side/top connection

Type	R _{zul} [kN]		
	S6	S7	S9
LT-40-25	304.3	304.3	304.3
LT-40-32	268.8	304.3	304.3
LT-40-40	211.7	304.3	304.3
LT-40-45	188.1	288.0	288.0
LT-40-50	169.3	259.2	259.2
LT-40-55	153.9	235.6	235.6

Top connection

Type	R _{zul} [kN]		
	K5	K7	K9
LT-40-25	197.3	258.7	304.3
LT-40-32	156.6	205.3	264.6
LT-40-40	123.3	161.7	208.3
LT-40-45	109.6	143.7	185.2
LT-40-50	98.7	129.3	166.7
LT-40-55	89.7	117.6	151.5



b1	55	60	65	70	75	80	85	90	95	100	105	110	115	120
k	40	45	50	55 (A55)	60	65 (A65)	70	75 (A75)	80	85 (A85)	90	95 (A95)	100	105 (A105)

L ₁ [m]	b ₁ [mm]
L ₁ < 20	+0
20 ≤ L ₁ < 30	+5
30 ≤ L ₁ < 35	+10
L ₁ ≥ 35	+15

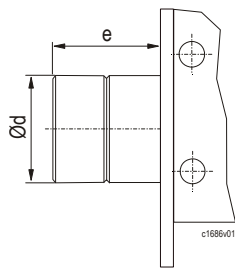
Calculation of required rail width "k" see page 2-12.

³⁷ Crane span

³⁸ Weight per pair of endcarriages without joint plates

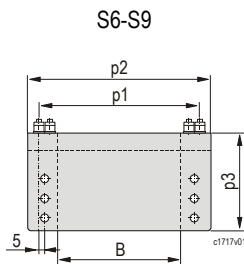
1 Buffer

Calculation see buffer selection table page 2–14.

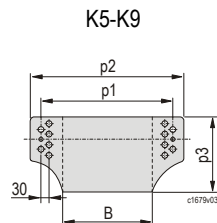


Type Code	Buffer	Material	Ød [mm]	e [mm]
B	D2240	Rubber	80	68
C	D2241		100	85
D	D2242		125	105
E	100x150	Polyurethane	100	150
M	125x125		125	125
F	125x190		125	190
H	160x160		160	160
P	160x240		160	240
I	200x200		200	200
S	200x300		200	300
T	250x250		250	250
Y	250x375		250	375

2 Joint plates



	S6	S7	S9
p1 [mm]	520	730	1100
p2 [mm]	590	800	1170
p3 [mm]	540	540	540
B _{min-max} [mm]	440-520	550-740	750-1100
Weight per plate [kg]	126	172	252



	K5	K7	K9
p1 [mm]	630	850	1100
p2 [mm]	680	900	1150
p3 [mm]	350	350	350
B _{min-max} [mm]	90-520	520-740	740-990
Weight per plate [kg]	46	61	78

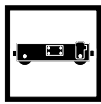
3 Travel drives

Ø D	50 Hz	60 Hz	50 Hz	60 Hz	mF _{zul} ³⁹	Type	m0	m1	m2	
	100 Hz ⁴⁰		100 Hz ⁴⁰							
[mm]	[m/min]		[kW] ⁴¹		[kg]		[mm]	[mm]	[mm]	[kg] ³⁹
400	5/20	6.3/25	2x 0.21/0.80	2x 0.25/0.96	45600	2x SDB5Z9FS1BO8/2F30	663	458	154	107.4
			2x 0.32/1.25	2x 0.36/1.50	59100	2x SDB5Z9FS1BO8/2F31	663	458		109.4
	10/40	12.5/50	2x 0.32/1.25	2x 0.36/1.50	29700	2x SDB590FS1BO8/2F31	663	458		109.4
			2x 0.50/2.00	2x 0.60/2.40	41200	2x SDB590FS1BO8/2F42	743	458		129.4
	2.5...25		2x 1.5		72400	2x SDB5E0PS1BO4F38	668	458	199	97.4
			2x 3.2		119000	2x SDB5E0PS1BO4F48	668	458		109.4
	4.0...40		2x 1.5		38100	2x SDB590PS1BO4F38	668	458		97.4
			2x 3.2		101700	2x SDB590PS1BO4F48	668	458	109.4	

³⁹ For 1 pair, design acc. to FEM (ISO) 1Am (M4)

⁴⁰ With 4-pole travel motor for frequency inverter

⁴¹ Further travel speeds and motor data see Product information "Travel drives"



2.6 Endcarriages for double girder o.h.t. cranes

2.6.1 Dimensions

2.6.1.1 LS/LT-09

LS/LT-09

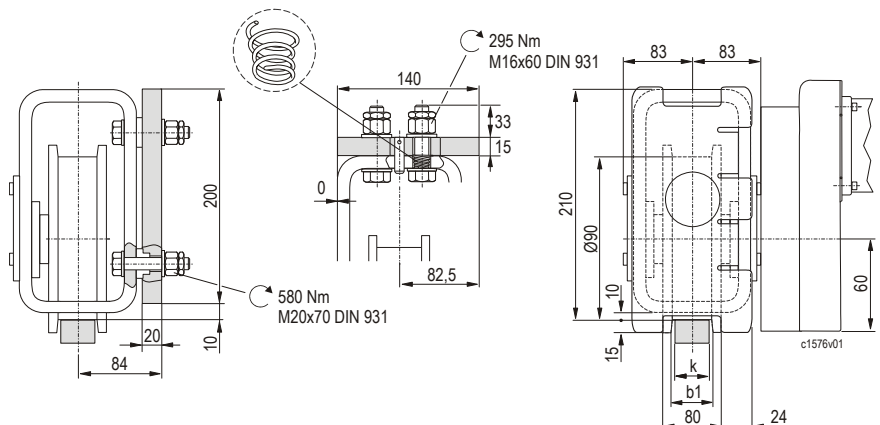
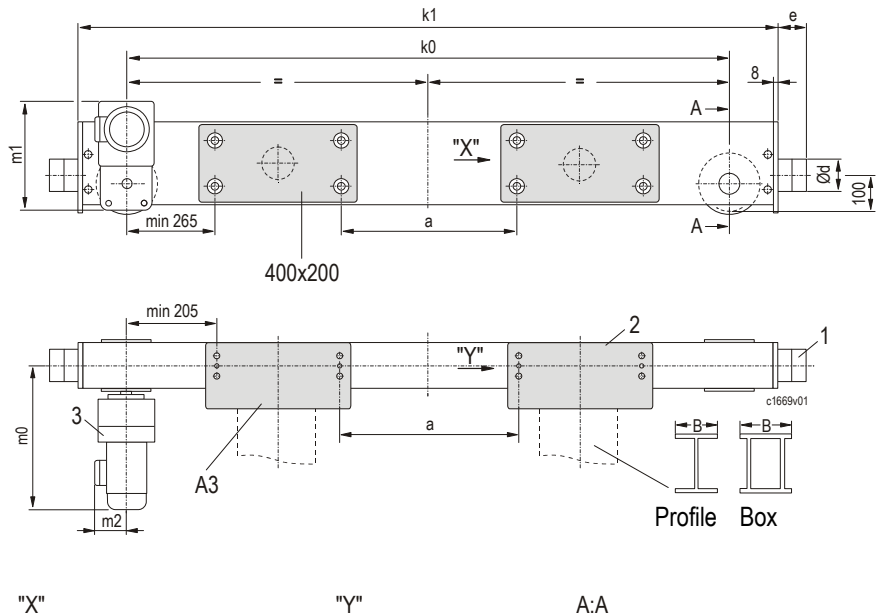
L1 _{zul} ⁴²	Type	k0	k1	Weight ₄₃
[m]		[mm]	[mm]	[kg]
12	LS-09-16	1600	1876	170
15	LS-09-20	2000	2276	198
18.5	LS-09-25	2500	2776	236
12	LT-09-16	1600	1876	170
15	LT-09-20	2000	2276	198
18.5	LT-09-25	2500	2776	236

Side connection

Type	R _{zul} [kN] ⁴⁴
	400x200
LS-09-16	24.3
LS-09-20	24.3
LS-09-25	24.3

Top connection

Type	R _{zul} [kN] ⁴⁴
	A3
LT-09-16	24.3
LT-09-20	24.3
LT-09-25	24.3



b1	50	55	60	65	70
k	40	45 (A45)	50	55 (A55)	60

Calculation of required rail width "k" see page 2-12.

Type	a max. [mm]	
	400x200	A3
L-09-16	270	470
L-09-20	670	870
L-09-25	1170	1370

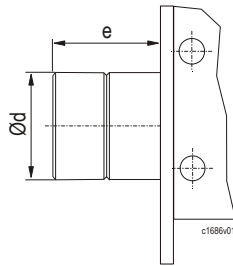
⁴² Crane span

⁴³ Weight per pair of endcarriages without joint plates

⁴⁴ R_{zul} with crab track gauge (Spw) ≥ 1200 mm

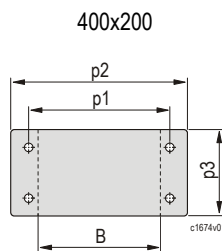
1 Buffer

Calculation see buffer selection table page 2–14.

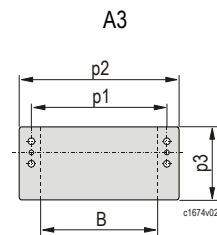


Type Code	Buffer	Material	Ød [mm]	e [mm]
A	D1801	Rubber	63	53
B	D2240		80	68
C	D2241		100	85
K	80x80	Polyurethane	80	80
G	100x100		100	100
E	100x150		100	150

2 Joint plates



	400x200
p1 [mm]	400
p2 [mm]	490
p3 [mm]	200
B _{min-max} [mm]	146-400
Weight per plate [kg]	17



	A3
p1 [mm]	360
p2 [mm]	410
p3 [mm]	140
B _{min-max} [mm]	90-310
Weight per plate [kg]	7

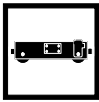
3 Travel drives

Ø D	50 Hz	60 Hz	50 Hz	60 Hz	mF _{zul} ⁴⁵	Type	m0	m1	m2		
	100 Hz ⁴⁶		100 Hz ⁴⁶								
[mm]	[m/min]		[kW] ⁴⁷		[kg]		[mm]	[mm]	[mm]	[kg] ⁴⁵	
90	5/20	6.3/25	2x 0.09/0.37	2x 0.11/0.44	12800	2x SDB342FS4BO8/2F12	505	225	134	44.2	
	10/40	12.5/50	2x 0.09/0.37	2x 0.11/0.44	6300	2x SDB320FS4BO8/2F12	505	225	134	44.2	
			2x 0.13/0.55	2x 0.16/0.66	9500	2x SDB320FS4BO8/2F13	505	225		48.4	
	2.5...25		2x 0.75		17900	2x SDB332PS4BO4F18	505	225		182	37.2
	4.0...40		2x 0.75		10400	2x SDB320PS4BO4F18	505	225	37.2		
			4x 0.75		20800	4x SDB320PS4BO4F18	505	225	74.4		

⁴⁵ For 1 pair, design acc. to FEM (ISO) 1Am (M4)

⁴⁶ With 4-pole travel motor for frequency inverter

⁴⁷ Further travel speeds and motor data see Product information "Travel drives"



2.6.1.2 LS/LT-11

LS/LT-11

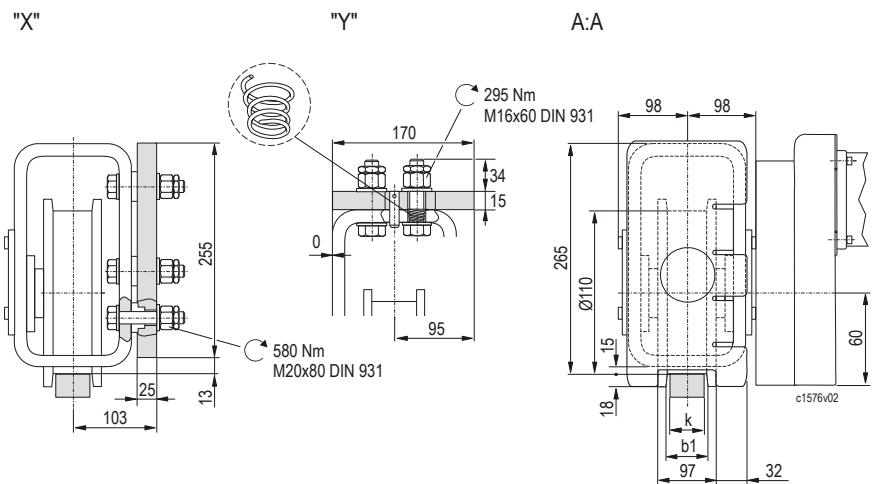
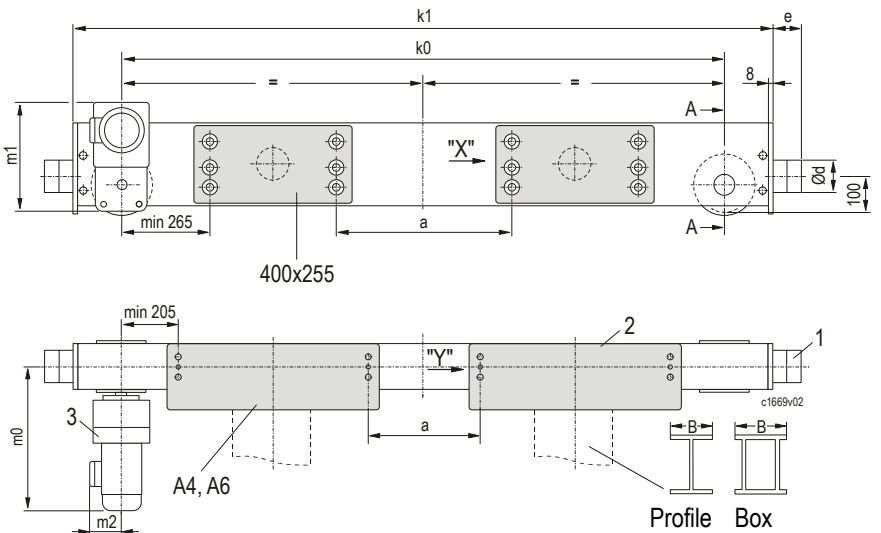
L1 _{zul} ⁴⁸	Type	k0	k1	Weight ⁴⁹
[m]		[mm]	[mm]	[kg]
12	LS-11-16	1600	1876	258
15	LS-11-20	2000	2276	304
18.5	LS-11-25	2500	2776	360
23.5	LS-11-32	3150	3426	434
12	LT-11-16	1600	1876	216
15	LT-11-20	2000	2276	254
18.5	LT-11-25	2500	2776	300
23.5	LT-11-32	3150	3426	360

Side connection

Type	R _{zul} [kN] ⁵⁰
	400x255
LS-11-16	40.0
LS-11-20	40.0
LS-11-25	40.0
LS-11-32	40.0

Top connection

Type	A4	A6
LT-11-16	40.0	-
LT-11-20	40.0	40.0
LT-11-25	40.0	40.0
LT-11-32	40.0	40.0



	[mm]						
b1	52	57	62	67	72	77	82
k	40	45 (A45)	50	55 (A55)	60	65 (A65)	70
						75 (A75)	

L1	b1
[m]	[mm]
L1 < 20	+0
20 ≤ L1 < 30	+5

Calculation of required rail width "k" see page 2-12.

Type	a max. [mm]		
	400x255	A4	A6
L-11-16	270	370	-
L-11-20	670	770	390
L-11-25	1170	1270	890
L-11-32	1820	1920	1540

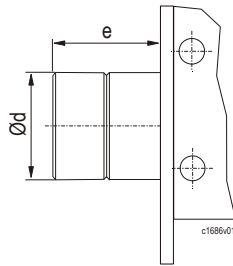
⁴⁸ Crane span

⁴⁹ Weight per pair of endcarriages without joint plates

⁵⁰ R_{zul} with crab track gauge (Spw) ≥ 1200 mm

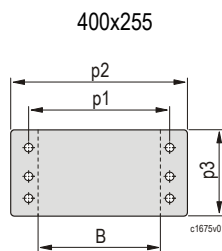
1 Buffer

Calculation see buffer selection table page 2–14.

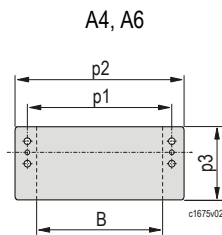


Type Code	Buffer	Material	Ød [mm]	e [mm]
A	D1801	Rubber	63	53
B	D2240		80	68
C	D2241		100	85
K	80x80	Polyurethane	80	80
G	100x100		100	100
E	100x150		100	150

2 Joint plates



	400x255
p1 [mm]	400
p2 [mm]	490
p3 [mm]	255
B _{min-max} [mm]	146-400
Weight per plate [kg]	24



	A4	A6
p1 [mm]	410	600
p2 [mm]	460	650
p3 [mm]	170	170
B _{min-max} [mm]	90-350	300-550
Weight per plate [kg]	9	13

3 Travel drives

Ø D	50 Hz	60 Hz	50 Hz	60 Hz	mF _{zul} ⁵¹	Type	m0	m1	m2	
	100 Hz ⁵²		100 Hz ⁵²							
[mm]	[m/min]		[kW] ⁵³		[kg]		[mm]	[mm]	[mm]	[kg] ⁵¹
110	5/20	6.3/25	2x 0.09/0.37	2x 0.11/0.44	14200	2x SDB350FS4BO8/2F12	522	235	134	44.2
	10/40	12.5/50	2x 0.09/0.37	2x 0.11/0.44	7100	2x SDB325FS4BO8/2F12	522	235		44.2
			2x 0.13/0.55	2x 0.16/0.66	10800	2x SDB325FS4BO8/2F13	522	235		48.4
	2.5...25		2x 0.75		22000	2x SDB342PS4BO4F18	522	235	182	37.2
	4.0...40		2x 0.75		11600	2x SDB325PS4BO4F18	522	235		37.2
			4x 0.75		23200	4x SDB325PS4BO4F18	522	235		74.4

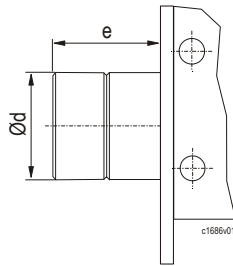
⁵¹ For 1 pair, design acc. to FEM (ISO) 1Am (M4)

⁵² With 4-pole travel motor for frequency inverter

⁵³ Further travel speeds and motor data see Product information "Travel drives"

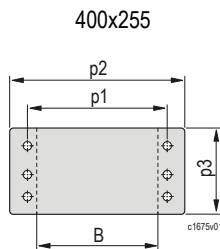
1 Puffer

Calculation see buffer selection table page 2–14.

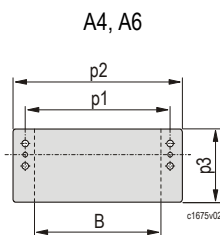


Type Code	Buffer	Material	Ød [mm]	e [mm]
A	D1801	Rubber	63	53
B	D2240		80	68
C	D2241		100	85
K	80x80	Polyurethane	80	80
G	100x100		100	100
E	100x150		100	150
M	125x125		125	125
F	125x190		125	190
H	160x160		160	160
P	160x240		160	240

2 Joint plates



	400x255
p1 [mm]	400
p2 [mm]	490
p3 [mm]	255
B _{min-max} [mm]	146-400
Weight per plate [kg]	24



	A4	A6
p1 [mm]	410	600
p2 [mm]	460	650
p3 [mm]	170	170
B _{min-max} [mm]	90-350	300-550
Weight per plate [kg]	9	13

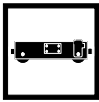
3 Travel drives

Ø D	50 Hz	60 Hz	50 Hz	60 Hz	mF _{zul} ⁵⁷	Type	m0	m1	m2	
	100 Hz ⁵⁸		100 Hz ⁵⁸							
[mm]	[m/min]		[kW] ⁵⁹		[kg]		[mm]	[mm]	[mm]	[kg] ⁵⁷
140	6.3/25	8/32	2x 0.09/0.37	2x 0.11/0.44	12500	2x SDB350FS3BO8/2F12	522	235	134	44.2
	10/40	12.5/50	2x 0.09/0.37	2x 0.11/0.44	7600	2x SDB332FS3BO8/2F12	522	235		44.2
			2x 0.13/0.55	2x 0.16/0.66	11700	2x SDB332FS3BO8/2F13	522	235		48.4
	2.5...25		2x 0.75		21200	2x SDB350PS3BO4F18	522	235	182	37.2
	4.0...40		2x 0.75		12300	2x SDB332PS3BO4F18	522	235		37.2

⁵⁷ For 1 pair, design acc. to FEM (ISO) 1Am (M4)

⁵⁸ With 4-pole travel motor for frequency inverter

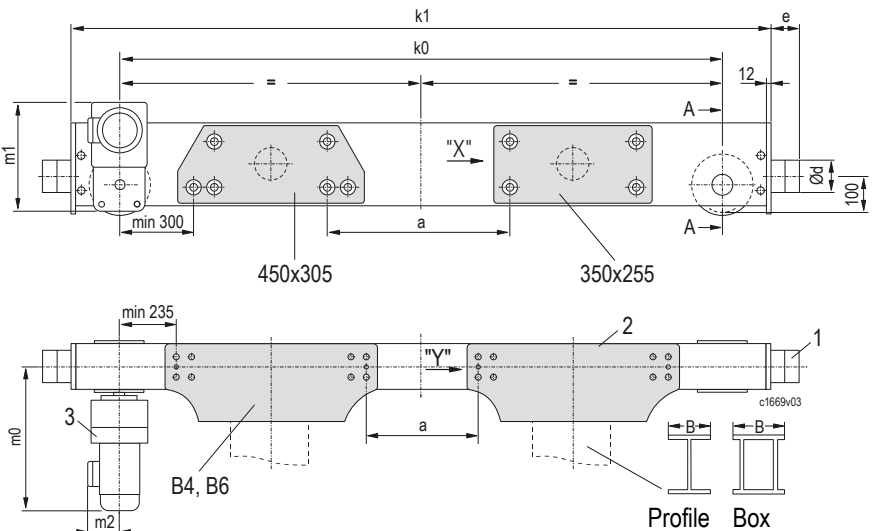
⁵⁹ Further travel speeds and motor data see Product information "Travel drives"



2.6.1.4 LS/LT-16

LS/LT-16

L ₁ ⁶⁰ [m]	Type	k ₀ [mm]	H ₁ [mm]	k ₁ [mm]	Weight ⁶¹ [kg]
12	LS-16-16	1600	268	1924	394
15	LS-16-20	2000		2324	440
18.5	LS-16-25	2500		2824	496
23.5	LS-16-32	3150		3474	568
30	LS-16-40	4000	318	4324	736
33.5	LS-16-45	4500		4824	800
12	LT-16-16	1600	265	1924	394
15	LT-16-20	2000		2324	440
18.5	LT-16-25	2500		2824	496
23.5	LT-16-32	3150		3474	568
30	LT-16-40	4000	315	4324	736
33.5	LT-16-45	4500		4824	800



Side connection

Type	R _{zul} [kN] ⁶²	
	350x255	450x305
LS-16-16	60.0	-
LS-16-20	60.0	-
LS-16-25	60.0	-
LS-16-32	-	60.0
LS-16-40	-	60.0
LS-16-45	-	41.7
Spw [mm] ⁶³	1400	43.3
	1800	47.6
	2240	54.6
	≥2500	60.0

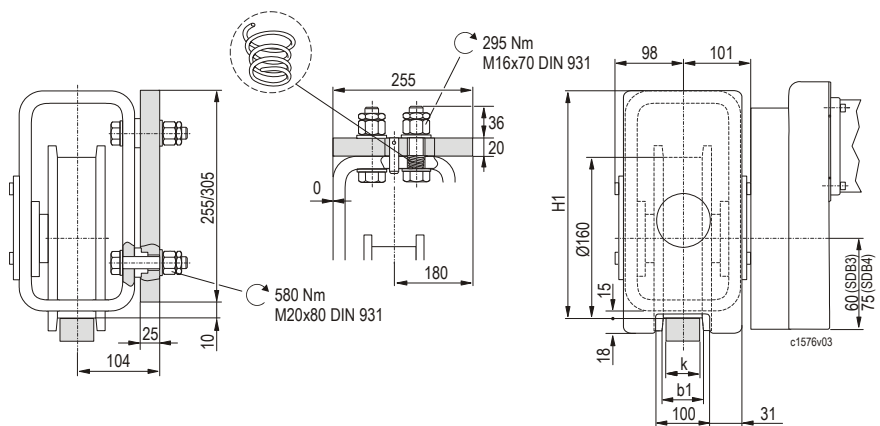
Top connection

Type	R _{zul} [kN] ⁶²	
	B4	B6
LT-16-16	60.0	-
LT-16-20	60.0	60.0
LT-16-25	60.0	60.0
LT-16-32	60.0	60.0
LT-16-40	60.0	60.0
LT-16-45	41.7	41.7
Spw [mm] ⁶³	1400	43.3
	1800	47.6
	2240	54.6
	≥2500	60.0

"X"

"Y"

A:A



	[mm]						
b1	54	59	64	69	74	79	84
k	40	45	50	55	60	65	70
		(A45)		(A55)		(A65)	

L ₁ [m]	b ₁ [mm]
L ₁ < 20	+0
20 ≤ L ₁ < 30	+5
30 ≤ L ₁ < 35	+10

Calculation of required rail width "k" see page 2–12.

Type	a max. [mm]			
	350x255	450x305	B4	B6
L-16-16	300	-	130	-
L-16-20	700	-	530	130
L-16-25	1200	-	1030	630
L-16-32	-	1530	1680	1280
L-16-40	-	2380	2530	2130
L-16-45	-	2880	3030	2630

⁶⁰ Crane span

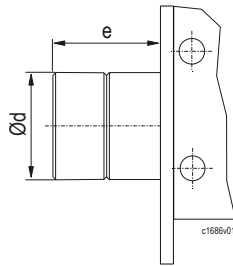
⁶¹ Weight per pair of endcarriages without joint plates

⁶² R_{zul} with crab track gauge (Spw) ≥ 1200 mm

⁶³ R_{zul} with specified crab track gauge (Spw)

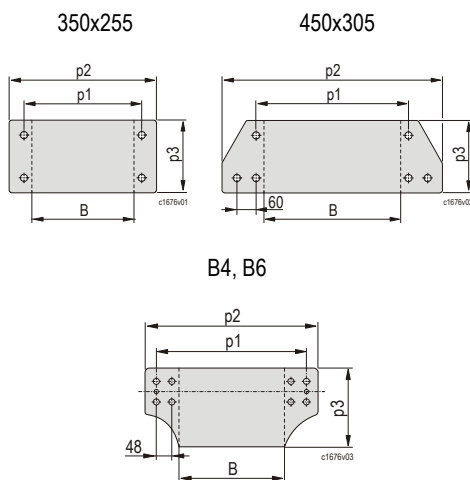
1 Buffer

Calculation see buffer selection table page 2–14.



Type Code	Buffer	Material	Ød [mm]	e [mm]
B	D2240	Rubber	80	68
C	D2241		100	85
D	D2242		125	105
K	80x80	Polyurethane	80	80
G	100x100		100	100
E	100x150		100	150
M	125x125		125	125
F	125x190		125	190
H	160x160		160	160
P	160x240		160	240

2 Joint plates



	350x255	450x305
p1 [mm]	350	450
p2 [mm]	430	650
p3 [mm]	255	305
B _{min-max} [mm]	146-370	300-470
Weight per plate [kg]	23	38

	B4	B6
p1 [mm]	500	700
p2 [mm]	550	750
p3 [mm]	255	255
B _{min-max} [mm]	200-350	350-550
Weight per plate [kg]	21	29

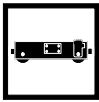
3 Travel drives

Ø D	50 Hz	60 Hz	50 Hz	60 Hz	mF _{zul} ⁶⁴	Type	m0	m1	m2	
	100 Hz ⁶⁵		100 Hz ⁶⁵							
[mm]	[m/min]		[kW] ⁶⁶		[kg]		[mm]	[mm]	[mm]	[kg] ⁶⁴
160	5/20	6.3/25	2x 0.09/0.37	2x 0.11/0.44	18400	2x SDB472FS3BO8/2F12	533	291	134	55.2
			2x 0.13/0.55	2x 0.16/0.66	28200	2x SDB472FS3BO8/2F13	533	291		59.4
			2x 0.21/0.80	2x 0.25/0.96	43000	2x SDB472FS3BO8/2F30	590	291	154	80.4
	10/40	12.5/50	2x 0.13/0.55	2x 0.16/0.66	12400	2x SDB436FS3BO8/2F13	533	291	134	59.4
			2x 0.21/0.80	2x 0.25/0.96	18900	2x SDB436FS3BO8/2F30	590	291	154	80.4
			2x 0.32/1.25	2x 0.36/1.50	24100	2x SDB436FS3BO8/2F31	590	291		82.4
	2.5...25		2x 0.68		19500	2x SDB350PS3BO4F18	522	259	182	37.2
			2x 0.75		25500	2x SDB463PS3BO4F18	533	291		48.2
			2x 1.5		59500	2x SDB463PS3BO4F38	590	291	202	70.4
	4.0...40		2x 0.68		11300	2x SDB332PS3BO4F18	522	259	182	37.2
			2x 0.75		13000	2x SDB436PS3BO4F18	533	291		48.2
			2x 1.5		30700	2x SDB436PS3BO4F38	595	291	202	70.4

⁶⁴ For 1 pair, design acc. to FEM (ISO) 1Am (M4)

⁶⁵ With 4-pole travel motor for frequency inverter

⁶⁶ Further travel speeds and motor data see Product information "Travel drives"



2.6.1.5 LT-20

LT-20

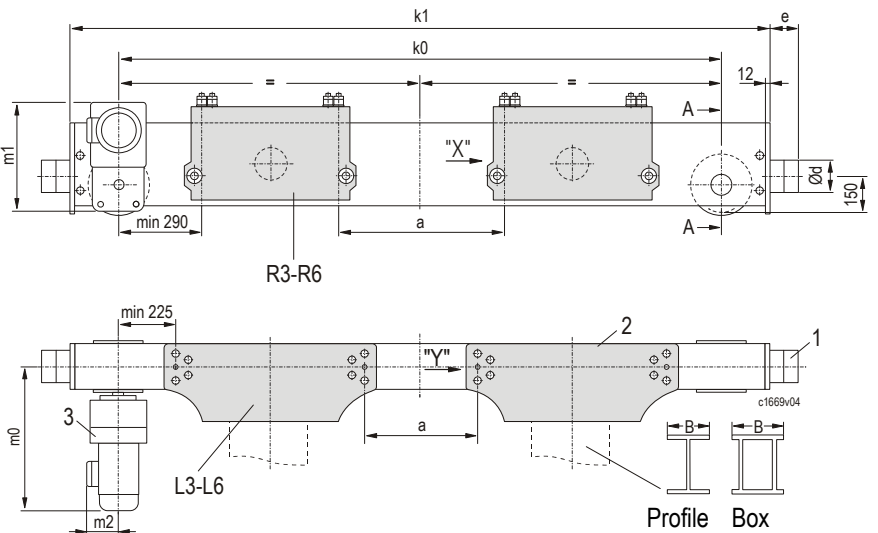
L1 _{zul} ⁶⁷	Type	k0	k1	Weight ⁶⁸
[m]		[mm]	[mm]	[kg]
12	LT-20-16	1600	1920	398
15	LT-20-20	2000	2320	454
18.5	LT-20-25	2500	2820	530
23.5	LT-20-32	3150	3470	622
30	LT-20-40	4000	4320	744
33.5	LT-20-45	4500	4820	818

Side/top connection

Type	R _{zul} [kN] ⁶⁹				
	R3 Profile	R3 Box	R4	R5	R6
LT-20-16	104.3	104.3	104.3	104.3	-
LT-20-20	104.3	104.3	104.3	104.3	104.3
LT-20-25	96.0	104.3	104.3	104.3	104.3
LT-20-32	76.2	104.3	104.3	104.3	104.3
LT-20-40	60.0	73.9	73.9	73.9	73.9
Spw [mm] ⁷⁰	1400	60.0	77.5	77.5	77.5
	1800	60.0	87.5	87.5	87.5
	≥2240	60.0	104.3	104.3	104.3
LT-20-45	51.3	51.3	51.3	51.3	51.3
Spw [mm] ⁷⁰	1400	53.2	53.2	53.2	53.2
	1800	53.3	58.5	58.5	58.5
	2240	53.3	67.1	67.1	67.1
	2500	53.3	74.4	74.4	74.4
	800	53.3	85.8	85.8	85.8
	3150	53.3	99.6	104.3	104.3

Top connection

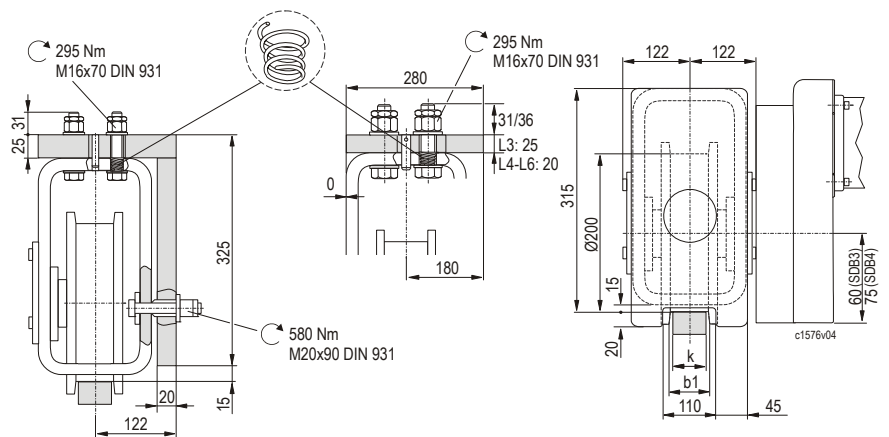
Type	R _{zul} [kN] ⁶⁹			
	L3	L4	L5	L6
LT-20-16	104.3	104.3	-	-
LT-20-20	104.3	104.3	104.3	104.3
LT-20-25	104.3	104.3	104.3	104.3
LT-20-32	104.3	104.3	104.3	104.3
LT-20-40	73.9	73.9	73.9	73.9
Spw [mm] ⁷⁰	1400	77.5	77.5	77.5
	1800	87.5	87.5	87.5
	≥2240	104.3	104.3	104.3
LT-20-45	51.3	51.3	51.3	51.3
Spw [mm] ⁷⁰	1400	53.2	53.2	53.2
	1800	58.5	58.5	58.5
	2240	67.1	67.1	67.1
	2500	74.4	74.4	74.4
	2800	85.8	85.8	85.8
	3150	94.8	104.3	104.3



"X"

"Y"

A:A



	[mm]								
b1	54	59	64	69	74	79	84	89	94
k	40	45 (A45)	50	55 (A55)	60	65 (A65)	70	75 (A75)	80

L1	b1
[m]	[mm]
L1 < 20	+0
20 ≤ L1 < 30	+5
30 ≤ L1 < 35	+10

Calculation of required rail width "k" see page 2-12.

Type	a max. [mm]							
	R3	R4	R5	R6	L3	L4	L5	L6
LT-20-16	520	300	80	-	330	110	-	-
LT-20-20	920	700	480	260	730	510	290	70
LT-20-25	1420	1200	980	760	1230	1010	790	570
LT-20-32	2070	1850	1630	1410	1880	1660	1440	1220
LT-20-40	2920	2700	2480	2260	2730	2510	2290	2070
LT-20-45	3420	3200	2980	2760	3230	3010	2790	2570

⁶⁷ Crane span

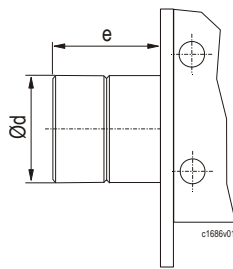
⁶⁸ Weight per pair of endcarriages without joint plates

⁶⁹ R_{zul} with crab track gauge (Spw) ≥ 1200 mm

⁷⁰ R_{zul} with specified crab track gauge (Spw)

1 Buffer

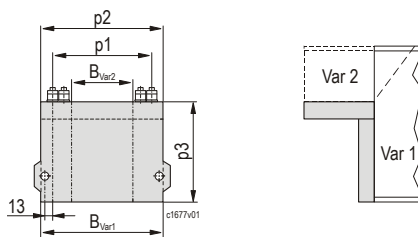
Calculation see buffer selection table page 2-14.



Type Code	Buffer	Material	Ød [mm]	e [mm]
B	D2240	Rubber	80	68
C	D2241		100	85
D	D2242		125	105
G	100x100	Polyurethane	100	100
E	100x150		100	150
M	125x125		125	125
F	125x190		125	190
H	160x160		160	160
P	160x240		160	240
I	200x200		200	200
S	200x300		200	300

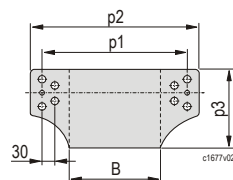
2 Joint plates

R3-R6



	R3	R4	R5	R6
p1 [mm]	250	360	470	580
p2 [mm]	300	410	520	630
p3 [mm]	325	325	325	325
Bmin-max profile [mm]	230-300	300-410	-	-
Bmin-max box Var 1 [mm]	230-300	300-410	410-520	520-630
Bmin-max box Var 2 [mm]	-	300-320	321-430	431-540
Weight per plate [kg]	33	43	53	63

L3-L6



	L3	L4	L5	L6
p1 [mm]	410	520	630	740
p2 [mm]	460	570	680	790
p3 [mm]	280	280	280	280
Bmin-max [mm]	240-300	300-410	410-520	520-630
Weight per plate [kg]	24	25	29	34

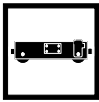
3 Travel drives

Ø D	50 Hz	60 Hz	50 Hz	60 Hz	mF _{zul} ⁷¹	Type	m0	m1	m2	
	100 Hz ⁷²		100 Hz ⁷²							
[mm]	[m/min]		[kW] ⁷³		[kg]		[mm]	[mm]	[mm]	[kg] ⁷¹
200	5/20	6.3/25	2x 0.09/0.37	2x 0.11/0.44	19800	2x SDB490FS3BO8/2F12	554	311	134	55.2
		6.3/25	2x 0.13/0.55	2x 0.16/0.66	30300	2x SDB490FS3BO8/2F13	554	311		59.4
	10/40	12.5/50	2x 0.13/0.55	2x 0.16/0.66	13500	2x SDB445FS3BO8/2F13	554	311		59.4
		12.5/50	2x 0.21/0.80	2x 0.25/0.96	20600	2x SDB445FS3BO8/2F30	611	311	154	80.4
		12.5/50	2x 0.32/1.25	2x 0.36/1.50	26200	2x SDB445FS3BO8/2F31	611	311		82.4
	2.5...25	2x 0.75			26700	2x SDB472PS3BO4F18	554	311	182	48.2
		2x 1.5			51300	2x SDB472PS3BO4F38	616	311	202	70.4
	4.0...40	2x 0.68			13200	2x SDB342PS3BO4F18	543	279	182	37.2
		2x 0.75			14000	2x SDB445PS3BO4F18	554	311		48.2
		2x 1.5			33200	2x SDB445PS3BO4F38	616	311	202	70.4
		2x 2.0			41700	2x SDB445PS3BO4F38	616	311		70.4

⁷¹ For 1 pair, design acc. to FEM (ISO) 1Am (M4)

⁷² With 4-pole travel motor for frequency inverter

⁷³ Further travel speeds and motor data see Product information "Travel drives"



2.6.1.6 LT-25

LT-25

L _{zul} 74	Type	k ₀	H ₁	k ₁	Weight 75
[m]		[mm]	[mm]	[mm]	[kg]
18.5	LT-25-25	2500	315	2830	906
23.5	LT-25-32	3150		3480	1020
30	LT-25-40	4000	415	4330	1342
33.5	LT-25-45	4500		4830	1450

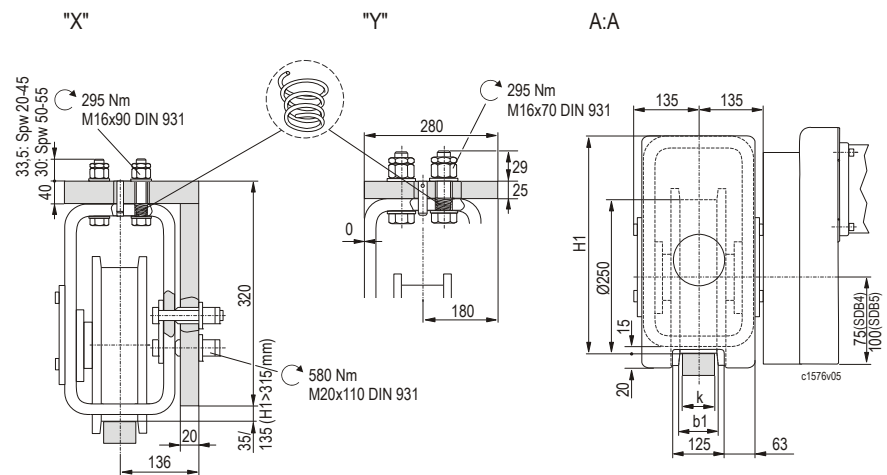
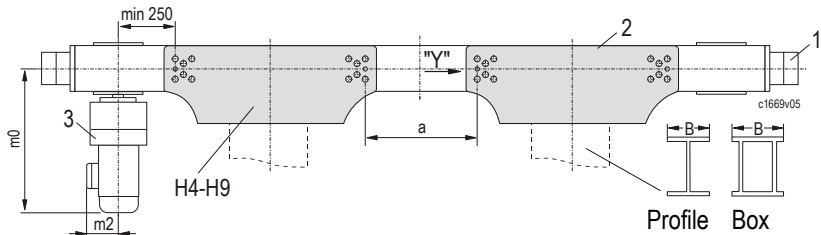
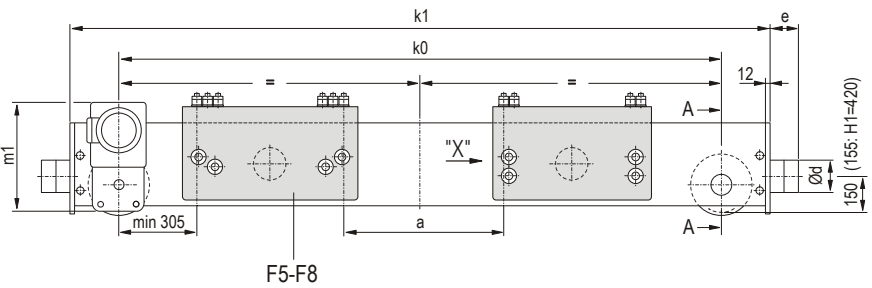
Side/top connection

Type	R _{zul} [kN] ⁷⁶		
	F4 Profile	F4 Box	F5 Profile
LT-25-25	128.0	160.9	160.9
LT-25-32	101.6	160.9	150.3
LT-25-40	80.0	160.0	118.3
LT-25-45	71.1	120.9	105.2
Spw [mm] ⁷⁷	1800	71.1	132.8
	2240	71.1	142.2
	≥2500	71.1	142.2

Type	R _{zul} [kN] ⁷⁶		
	F5 Box	F7	F8
LT-25-25	160.9	-	-
LT-25-32	160.9	160.9	160.9
LT-25-40	160.9	160.9	160.9
LT-25-45	120.9	120.9	120.9
Spw [mm] ⁷⁷	1800	132.8	132.8
	2240	152.4	152.4
	≥2500	160.9	160.9

Top connection

Type	R _{zul} [kN] ⁷⁶			
	H4	H5	H7	H9
LT-25-25	160.9	160.9	160.9	-
LT-25-32	160.9	160.9	160.9	160.9
LT-25-40	160.9	160.9	160.9	160.9
LT-25-45	120.9	120.9	120.9	120.9
Spw [mm] ⁷⁷	1800	132.8	132.8	132.8
	2240	152.4	152.4	152.4
	≥2500	160.9	160.9	160.9



	[mm]						
b1	54	59	64	69	74	79	84
k	40	45	50	55	60	65	70

L1	b1
[m]	[mm]
L1 < 20	+0
20 ≤ L1 < 30	+5
30 ≤ L1 < 35	+10

Calculation of required rail width "k" see page 2–12.

Type	a max. [mm]							
	F4	F5	F7	F8	H4	H5	H7	H9
LT-25-25	930	570	-	-	820	600	160	-
LT-25-32	1580	1220	760	480	1470	1250	810	310
LT-25-40	2430	2070	1610	1330	2320	2100	1660	1160
LT-25-45	2930	2570	2110	1830	2820	2600	2160	1660

⁷⁴ Crane span

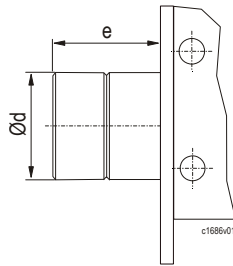
⁷⁵ Weight per pair of endcarriages without joint plates

⁷⁶ R_{zul} with crab track gauge (Spw) ≥ 1400 mm

⁷⁷ R_{zul} with specified crab track gauge (Spw)

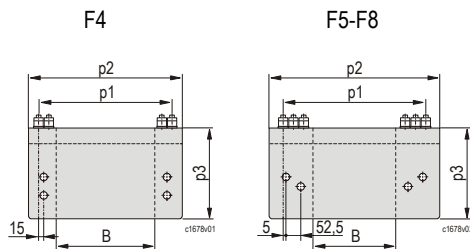
1 Buffer

Calculation see buffer selection table page 2-14.



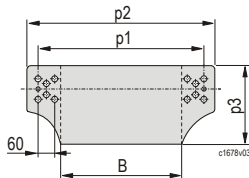
Type Code	Buffer	Material	Ød [mm]	e [mm]
B	D2240	Rubber	80	68
C	D2241		100	85
D	D2242		125	105
E	100x150	Polyurethane	100	150
M	125x125		125	125
F	125x190		125	190
H	160x160		160	160
P	160x240		160	240
I	200x200		200	200
S	200x300		200	300

2 Joint plates



	F4	F5	F7	F8
p1 [mm]	480	660	890	1030
p2 [mm]	530	730	960	1100
p3 [mm]	320	320	320	320
B _{min-max} profile [mm]	230-350	350-410	-	-
B _{min-max} box [mm]	300-410	410-520	520-750	750-890
Weight per plate [kg]	73	100	133	152

H4-H9



	H4	H5	H7	H9
p1 [mm]	590	700	920	1170
p2 [mm]	640	750	970	1220
p3 [mm]	280	280	280	280
B _{min-max} [mm]	90-410	90-520	520-740	740-990
Weight per plate [kg]	34	40	52	66

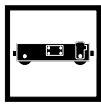
3 Travel drives

Ø D	50 Hz	60 Hz	50 Hz	60 Hz	mF _{zul} ⁷⁸	Type	m0	m1	m2	
	100 Hz ⁷⁹		100 Hz ⁷⁹							
[mm]	[m/min]		[kW] ⁸⁰		[kg]		[mm]	[mm]	[mm]	[kg] ⁷⁸
250	5/20	6.3/25	2x 0.09/0.37	2x 0.11/0.44	21000	2x SDB4B0FS2BO8/2F12	561	336	134	55.2
			2x 0.13/0.55	2x 0.16/0.66	32200	2x SDB4B0FS2BO8/2F13	561	336		59.4
			2x 0.21/0.80	2x 0.25/0.96	51600	2x SDB5B5FS2BO8/2F30	655	425	154	107.4
			2x 0.32/1.25	2x 0.36/1.50	65700	2x SDB5B5FS2BO8/2F31	655	425		109.4
	10/40	12.5/50	2x 0.13/0.55	2x 0.16/0.66	15600	2x SDB463FS2BO8/2F13	561	336	134	59.4
			2x 0.21/0.80	2x 0.25/0.96	23700	2x SDB463FS2BO8/2F30	618	336	154	80.4
			2x 0.32/1.25	2x 0.36/1.50	30200	2x SDB463FS2BO8/2F31	618	336		82.4
			2x 0.50/2.00	2x 0.60/2.40	38300	2x SDB556FS2BO8/2F42	735	425		129.4
	2.5...25		2x 0.75		28100	2x SDB490PS2BO4F18	561	336	182	48.2
			2x 1.5		59400	2x SDB490PS2BO4F38	623	336	202	70.4
			2x 1.5		65000	2x SDB590PS2BO4F38	660	425	199	97.4
	4.0...40		2x 0.75		16200	2x SDB463PS2BO4F18	561	336	182	48.2
			2x 1.5		34200	2x SDB452PS2BO4F38	623	336	202	70.4
			2x 2.0		38200	2x SDB452PS2BO4F38	623	336		70.4
			2x 3.2		104700	2x SDB556PS2BO4F48	660	425	199	109.4

⁷⁸ For 1 pair, design acc. to FEM (ISO) 1Am (M4)

⁷⁹ With 4-pole travel motor for frequency inverter

⁸⁰ Further travel speeds and motor data see Product information "Travel drives"



2.6.1.7 LT-32

LT-32

L _{1zul} 81	Type	k ₀	H ₁	k ₁	Weight 82
[m]		[mm]	[mm]	[mm]	[kg]
18.5	LT-32-25	2500	370	3000	1076
23.5	LT-32-32	3150		3650	1246
30	LT-32-40	4000	470	4500	1432
33.5	LT-32-45	4500		5000	1544
37.5	LT-32-50	5000	545	5500	1790
41	LT-32-55	5500		6000	1912

Side/top connection

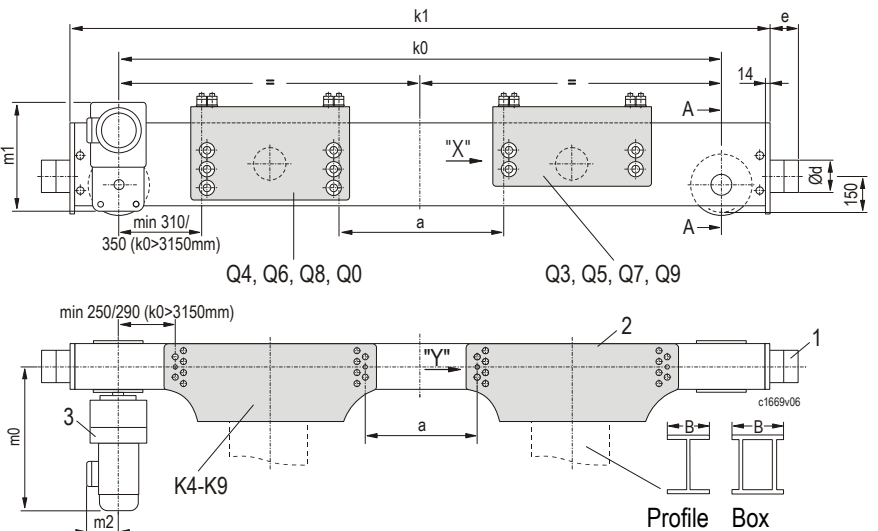
Type	R _{zul} [kN] ⁸³			
	Q3 Profile	Q3 Box	Q5 Profile	Q5 Box
LT-32-25	160.0	195.7	195.7	195.7
LT-32-32	127.0	195.7	177.8	195.7

Type	R _{zul} [kN] ⁸³	
	Q7	Q9
LT-32-25	195.7	-
LT-32-32	195.7	195.7

Type	R _{zul} [kN] ⁸³				
	Q4 Profile	Q4 Box	Q6 Profile	Q6 Box	Q8 Q0
LT-32-40	116.7	195.7	158.3	195.7	195.7
LT-32-45	103.7	195.7	140.7	195.7	195.7
LT-32-50	93.3	186.7	126.7	195.7	195.7
LT-32-55	84.8	169.7	115.2	195.7	195.7

Top connection

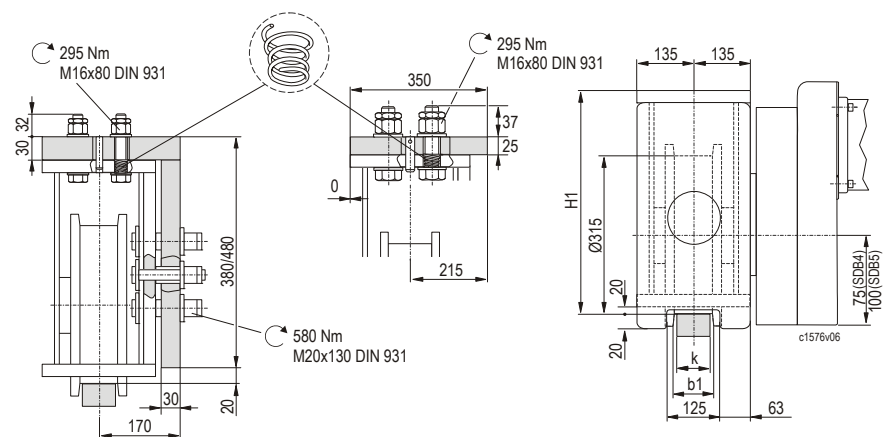
Type	R _{zul} [kN] ⁸³			
	K4	K5	K7	K9
LT-32-25	195.7	195.7	195.7	-
LT-32-32	195.7	195.7	195.7	195.7
LT-32-40	195.7	195.7	195.7	195.7
LT-32-45	183.7	195.7	195.7	195.7
LT-32-50	165.3	195.7	195.7	195.7
LT-32-55	150.3	179.4	195.7	195.7



"X"

"Y"

A:A



	[mm]							
b1	64	69	74	79	84	89	94	
k	50	55 (A55)	60	65 (A65)	70	75 (A75)	80	

L1	b1
[m]	[mm]
L1 < 20	+0
20 ≤ L1 < 30	+5
30 ≤ L1 < 35	+10
L1 ≥ 35	+15

Calculation of required rail width "k" see page 2-12.

Type	a max. [mm]											
	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q0	K4	K5	K7	K9
LT-32-25	840	-	620	-	180	-	-	-	960	740	300	-
LT-32-32	1490	-	1270	-	830	-	330	-	1610	1390	950	450
LT-32-40	-	2260	-	2040	-	1600	-	1100	2380	2160	1720	1220
LT-32-45	-	2760	-	2540	-	2100	-	1600	2880	2660	2220	1720
LT-32-50	-	3260	-	3040	-	2600	-	2100	3380	3160	2720	2220
LT-32-55	-	3760	-	3540	-	3100	-	2600	3880	3660	3220	2720

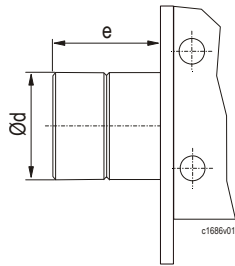
⁸¹ Crane span

⁸² Weight per pair of endcarriages without joint plates

⁸³ R_{zul} with crab track gauge (Spw) ≥ 1400 mm

1 Buffer

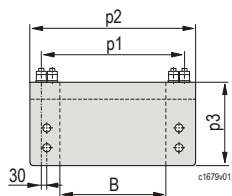
Calculation see buffer selection table page 2-14.



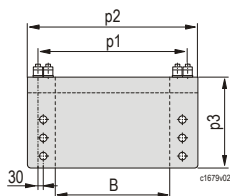
Type Code	Buffer	Material	Ød [mm]	e [mm]
B	D2240	Rubber	80	68
C	D2241		100	85
D	D2242		125	105
E	100x150	Polyurethane	100	150
M	125x125		125	125
F	125x190		125	190
H	160x160		160	160
P	160x240		160	240
I	200x200		200	200
S	200x300		200	300
T	250x250		250	250
Y	250x375		250	375

2 Joint plates

Q3, Q5, Q7, Q9

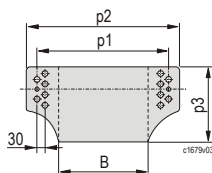


Q4, Q6, Q8, Q0



	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q0
p1 [mm]	520	520	630	630	850	850	1100	1100
p2 [mm]	570	570	680	680	900	900	1150	1150
p3 [mm]	380	480	380	480	380	480	380	480
B _{min-max} profile [mm]	300-420	300-420	-	-	-	-	-	-
B _{min-max} box [mm]	300-410	300-410	410-520	410-520	520-740	520-740	740-990	740-990
Weight per plate [kg]	94	110	111	126	144	165	183	209

K4-K9



	K4	K5	K7	K9
p1 [mm]	520	630	850	1100
p2 [mm]	570	680	900	1150
p3 [mm]	350	350	350	350
B _{min-max} [mm]	90-410	90-520	520-740	740-990
Weight per plate [kg]	39	46	61	78

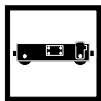
3 Travel drives

Ø D	50 Hz	60 Hz	50 Hz	60 Hz	mF _{zul} ⁸⁴	Type	m0	m1	m2	
	100 Hz ⁸⁵		100 Hz ⁸⁵							
[mm]	[m/min]		[kW] ⁸⁶		[kg]		[mm]	[mm]	[mm]	[kg] ⁸⁴
315	5/20	6.3/25	2x 0.21/0.80	2x 0.25/0.96	53700	2x SDB5E0FS2BO8/2F30	663	458	154	107.4
			2x 0.32/1.25	2x 0.36/1.50	68300	2x SDB5E0FS2BO8/2F31	663	458		109.4
			2x 0.32/1.25	2x 0.36/1.50	30000	2x SDB572FS2BO8/2F31	663	458		109.4
			2x 0.50/2.00	2x 0.60/2.40	41600	2x SDB572FS2BO8/2F42	743	458		129.4
	2.5...25		2x 0.75		28500	2x SDB4B0PS2BO4F18	569	367	182	48.2
			2x 1.5		52000	2x SDB4B0PS2BO4F38	631	367		70.4
			2x 1.5		70200	2x SDB5B5PS2BO4F38	668	458		97.4
	4.0...40		2x 1.5		36700	2x SDB472PS2BO4F38	631	367	202	70.4
			2x 1.5		36900	2x SDB572PS2BO4F38	668	458		97.4
			2x 2.0		46400	2x SDB572PS2BO4F38	668	458		97.4
			2x 3.2		92200	2x SDB572PS2BO4F48	668	458		109.4

⁸⁴ For 1 pair, design acc. to FEM (ISO) 1Am (M4)

⁸⁵ With 4-pole travel motor for frequency inverter

⁸⁶ Further travel speeds and motor data see Product information "Travel drives"



2.6.1.8 LT-40

LT-40

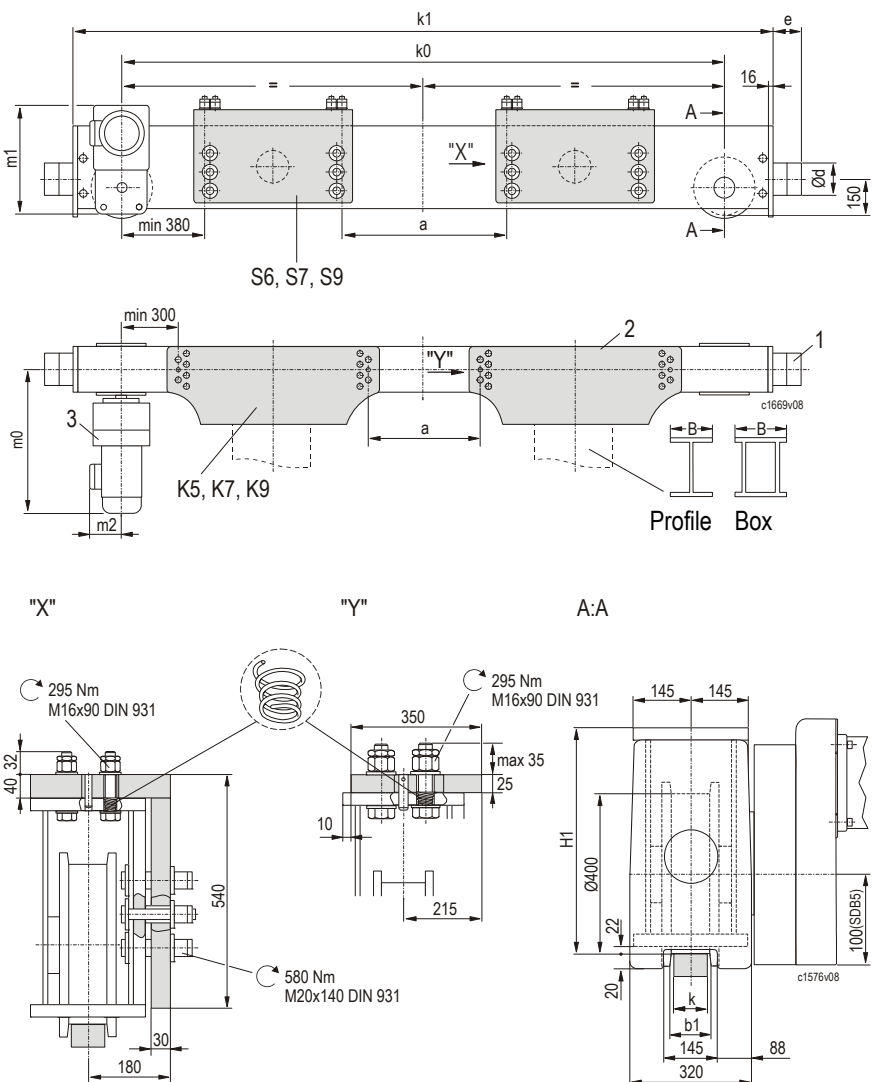
L1 _{zul} 87	Type	k0	H1	k1	Weight 88
[m]		[mm]	[mm]	[mm]	[kg]
18,5	LT-40-25	2500	548	3060	1940
23,5	LT-40-32	3150		3710	1800
30	LT-40-40	4000	552	4560	2160
33,5	LT-40-45	4500	668	5060	2400
37,5	LT-40-50	5000	672	5560	2760
41	LT-40-55	5500		6060	3100

Side/top connection

Type	R _{zul} [kN]		
	S6	S7	S9
LT-40-25	304,3	304,3	-
LT-40-32	304,3	304,3	304,3
LT-40-40	304,3	304,3	304,3
LT-40-45	304,3	304,3	304,3
LT-40-50	304,3	304,3	304,3
LT-40-55	304,3	304,3	304,3

Top connection

Type	R _{zul} [kN]		
	K5	K7	K9
LT-40-25	304,3	304,3	-
LT-40-32	304,3	304,3	304,3
LT-40-40	246,7	304,3	304,3
LT-40-45	219,3	287,4	304,3
LT-40-50	197,3	258,7	304,3
LT-40-55	179,4	235,2	303,0



b1	55	60	65	70	75	80	85	90	95	100	105	110	115	120
k	40	45	50	55	60	65	70	75	80	85	90	95	100	105
				(A55)		(A65)		(A75)		(A85)		(A95)		(A105)

L1	b1
[m]	[mm]
L1 < 20	+0
20 ≤ L1 < 30	+5
30 ≤ L1 < 35	+10
L1 ≥ 35	+15

Calculation of required rail width "k" see page 2-12.

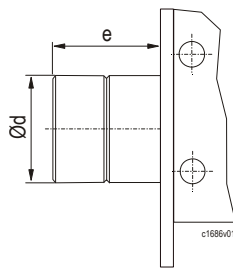
Type	a max. [mm]					
	S6	S7	S9	K5	K7	K9
LT-40-25	700	280	-	640	200	-
LT-40-32	1350	930	190	1290	850	350
LT-40-40	2200	1780	1040	2140	1700	1200
LT-40-45	2700	2280	1540	2640	2200	1700
LT-40-50	3200	2780	2040	3140	2700	2200
LT-40-55	3700	3280	2540	3640	3200	2700

87 Crane span

88 Weight per pair of endcarriages without joint plates

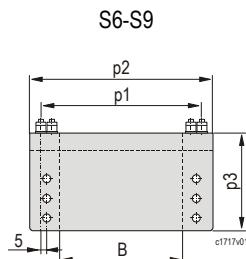
1 Buffer

Calculation see buffer selection table page 2-14.

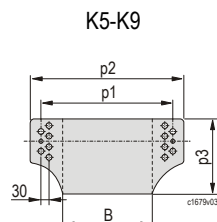


Type Code	Buffer	Material	Ød [mm]	e [mm]
B	D2240	Rubber	80	68
C	D2241		100	85
D	D2242		125	105
E	100x150	Polyurethane	100	150
M	125x125		125	125
F	125x190		125	190
H	160x160		160	160
P	160x240		160	240
I	200x200		200	200
S	200x300		200	300
T	250x250		250	250
Y	250x375		250	375

2 Joint plates



	S6	S7	S9
p1 [mm]	520	730	1100
p2 [mm]	590	800	1170
p3 [mm]	540	540	540
B _{min-max} [mm]	440-520	550-740	750-1100
Weight per plate [kg]	126	172	252



	K5	K7	K9
p1 [mm]	630	850	1100
p2 [mm]	680	900	1150
p3 [mm]	350	350	350
B _{min-max} [mm]	90-520	520-740	740-990
Weight per plate [kg]	46	61	78

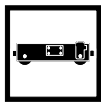
3 Travel drives

Ø D	50 Hz	60 Hz	50 Hz	60 Hz	mF _{zul} ⁸⁹	Type	m0	m1	m2	
	100 Hz ⁹⁰		100 Hz ⁹⁰							
[mm]	[m/min]		[kW] ⁹¹		[kg]		[mm]	[mm]	[mm]	[kg] ⁸⁹
400	5/20	6,3/25	2x 0,21/0,80	2x 0,25/0,96	45600	2x SDB5Z9FS1BO8/2F30	663	458	154	107,4
			2x 0,32/1,25	2x 0,36/1,50	59100	2x SDB5Z9FS1BO8/2F31	663	458		109,4
	10/40	12,5/50	2x 0,32/1,25	2x 0,36/1,50	29700	2x SDB590FS1BO8/2F31	663	458		109,4
			2x 0,50/2,00	2x 0,60/2,40	41200	2x SDB590FS1BO8/2F42	743	458		129,4
	2,5...25		2x 1,5		72400	2x SDB5E0PS1BO4F38	668	458	199	97,4
			2x 3,2		119000	2x SDB5E0PS1BO4F48	668	458		109,4
	4,0...40		2x 1,5		38100	2x SDB590PS1BO4F38	668	458		97,4
			2x 3,2		101700	2x SDB590PS1BO4F48	668	458		109,4

⁸⁹ For 1 pair, design acc. to FEM (ISO) 1Am (M4)

⁹⁰ With 4-pole travel motor for frequency inverter

⁹¹ Further travel speeds and motor data see Product information "Travel drives"



2.7 Options

2.7.1 Motor supply voltages

The standard motor supply voltage is 380-415 V, 50 Hz or 440-480 V, 60 Hz. 4-pole motors for frequency inverter: 380...415 V/100 Hz. Other voltages are available.

	50 Hz	60 Hz	Dual-voltage motors
Supply voltages	220...240 V 380...415 V 420...460 V 480...525 V 575...630 V	190...240 V 220...240 V 380...415 V 440...480 V 550...600 V	50 Hz: 230/400 V 60 Hz: 230/400 V

2.7.2 Temperature control of motors (standard for 4-pole motors)

Temperature control of the travel motors (PTC thermistors) is available against a surcharge.

The necessary tripping device must be ordered separately, see also Product information "Crane electrics".

2.7.3 IP 66 protection (option)

IP 66 protection is required for outdoor use if the endcarriages are not protected by a roof, or are exposed to water jets. As a rule a space heater is also necessary. For frequency inverters, see Product information "Crane electrics".

2.7.4 Off-standard ambient temperatures

In standard design the endcarriages can be used in a temperature range from -20°C to +40°C.

On request, versions for other temperature ranges are available.

Frequency inverters can be used from -10°C to +50°C (non-dewing).

2.7.5 Paint/corrosion protection

Standard pre-treatment: Steel shot de-rusting grade SA2.5 in acc. with EN ISO 12944-4. Machined surfaces, aluminium and deep-drawn parts degreased.

Standard primer coat:

All endcarriages and joint plates: epoxy resin-based two-component primer (KorroE), 20 µm. Colour oxide red (RAL 3009), can be welded.

Option:

Endcarriages (not joint plates): epoxy resin-based or polyurethane two-component primer, 60 µm. Colour agate grey (RAL 7038), cannot be welded (must be removed before welding).

2.7.6 Paint/top coat

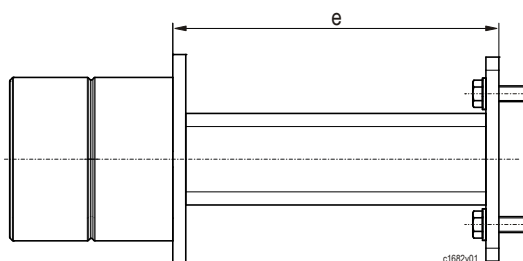
On request, all endcarriages can be supplied with polyurethane topcoat or epoxy resin-based top coat, colour as per RAL colour chart.

2.7.7 Alternative travel speeds

The standard travel speeds are 5/20 and 10/40 m/min (50 Hz) and 6.3/25 and 12.5/50 m/min (60 Hz), and 2.5...25 and 4...40 m/min for use with a frequency inverter. Other travel speeds available on request.

2.7.8 Buffer extension (option)

The buffers on the end faces of the endcarriages can be extended. Standard extensions are available from 100 - 1500 mm (surcharge). Other extensions on request.

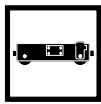


Endcarriage	Standard extension (without buffer)
	e [mm]
LS/LT-09	100, 250, 500, 1000, 1500
LS/LT-11	100, 250, 500, 1000, 1500
LS/LT-14	100, 148, 250, 500, 750, 1000, 1500
LS/LT-16	100, 148, 250, 500, 750, 1000, 1500
LT-20	100, 220, 250, 500, 750, 1000, 1500
LT-25	100, 220, 250, 500, 750, 1000, 1500
LT-32	100, 220, 250, 500, 750, 1000, 1500
LT-40	100, 220, 250, 500, 750, 1000, 1500

2.7.9 Non-supply of joint plates

In standard version, the endcarriages are supplied with joint plates bolted to the endcarriages.

On request, the endcarriages can be supplied without joint plates.



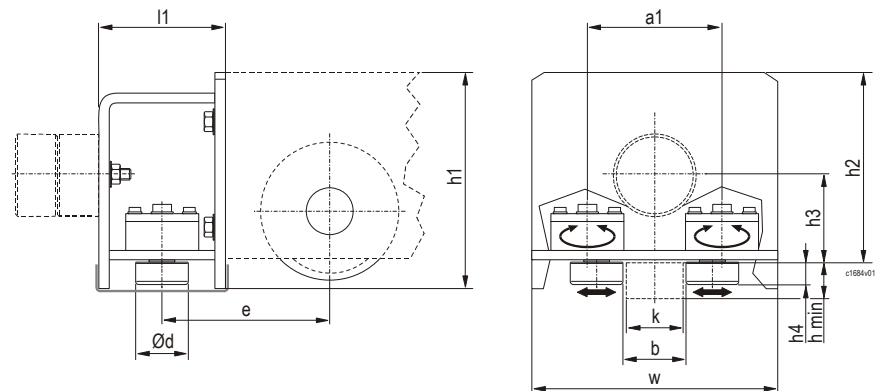
2.7.10 Guide rollers (option)

All overhead travelling crane endcarriages can be equipped with adjustable guide rollers. In this case the buffer plates fitted as standard and the wheel flanges are omitted. The guide rollers are dimensioned for 20% of the permissible wheel load of the wheel. The rollers can be adjusted laterally.

- L.-09/L.-11 by ± 10 mm
- from L.-14 by ± 15 mm

The following information must be given when ordering:

- Rail width (e.g. 60 mm)
- Side to which they are to be fitted (left or right endcarriage, the opposite side is equipped with a suitable buffer extension)



Endcarriage	k	h1	h2	h3	h4	h _{min}	b	w	a1	l1	Ød	e						
LS/LT-09	40	194	170	100	24	30	44	220	115	136	62	197-202						
	45						49											
	50						54											
	55						59											
	60						64											
	65						69		135									
	70						74											
	75						79											
	80						84											
LS/LT-11	40	204	180	100	24	30	44	250	115	136	62	197-202						
	45						49											
	50						54											
	55						59											
	60						64											
	65						69		135									
	70						74											
	75						79											
	80						84											
LS/LT-14	40	288	265	100	19	26	44	278	139	160	80	190-197						
	45	296					49		139									
	50						54											
	55	27				34	59											
	60						304						64					
	65												69					
	70				74													
	75	35			42	79	169											
	80					84												
	90					94												
	100					104												



Endcarriage	k	h1	h2	h3	h4	h _{min}	b	w	a1	l1	Ød	e
LS/LT-16	40	288	265	100	19	26	44	278	139	160	80	230-
	45						49					237,5
	50						54					
	55	296			27	34	59		139			
	60						64					
	65						69					
	70						74					
	75	304			35	42	79		169			
	80						84					
	90						94					
	100						104					
LT-20	40	340	315	150	17	24	44	373	184	180	125	238-
	45						49					245,5
	50						54					
	55	348			25	32	59		184			
	60						64					
	65						69					
	70						74					
	75	354			31	38	79		214			
	80						84					
	90						94					
	100						104					
LT-25	40	338 ⁹²	315 ⁹²	150	19	26	44	395	199	194	140	260-
	45	/438 ⁹³	/415 ⁹³				49					270,5
	50						54					
	55	346 ⁹²			27	34	59		199			
	60	/446 ⁹³					64					
	65						65					
	70						74					
	75	354 ⁹²			35	42	79		229			
	80	/454 ⁹³					84					
	90						94					
	100						104					
LT-32	45	481 ⁹⁴	356 ⁹⁴	150	20	27	49	490	240	236	180	350-
	50	/581 ⁹⁵	/456 ⁹⁵				55					357,5
	55	/656 ⁹⁶	/531 ⁹⁶				60					
	60	487 ⁹⁴			26	33	65		240			
	65	/587 ⁹⁵					70					
	70	/662 ⁹⁶					74					
	75	495 ⁹⁴			34	41	79		240			
	80	/595 ⁹⁵					85		270			
	90	/670 ⁹⁶					95					
	100						104					
LT-40	45	552 ⁹⁴	532 ⁹⁴	150	20	27	49	650	301	316	250	434-
	50	/672 ^{95,96}	/652 ^{95,96}				55					452
	55						60					
	60				28	35	65		323			
	65						70					
	70						75					
	75				40	47	80		345			
	80						84					
	90						95					
	100						105					
	120						124		367			

The dimensions vary dependent on wheelbase k0.

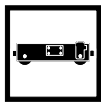
⁹² k0 = 2000-2500 mm (single girder o.h.t. crane) and 2000-3200 mm (double girder o.h.t. crane)

⁹³ k0 = 3200-4500 mm (single girder o.h.t. crane) and 4500-5500 mm (double girder o.h.t. crane)

⁹⁴ k0 = 2500-3200 mm

⁹⁵ k0 = 4000-4500 mm

⁹⁶ k0 = 5000-5500 mm



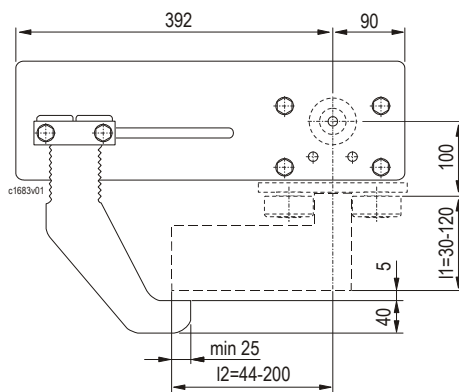
2.7.11 Anti-jump catch (option)

The endcarriages can be equipped with an anti-jump catch if required.

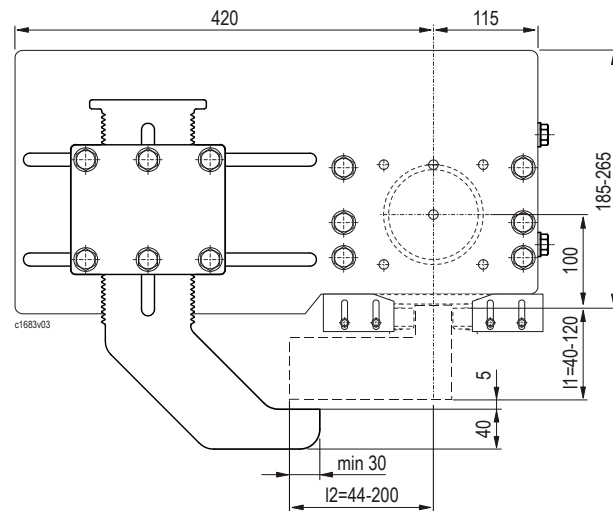
The following information must be given when ordering:

- Position (inside or outside)
- Dimensions l1 and l2 (also dc5 for LT-20...40)

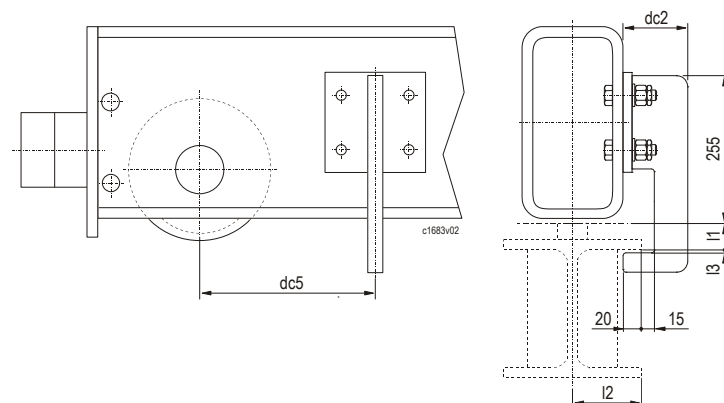
LS/LT-09 / -11



LS/LT-14 / -16



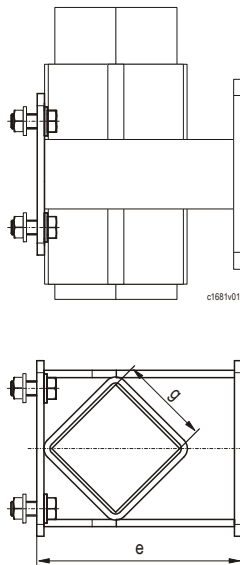
LT-20 / -25 / -32 / -40



Endcarriage	min. dc5	min. dc2	max. l3
	[mm]	[mm]	[mm]
LT-20	230	76	7,5
LT-25	205	76	7,5
LT-32 (k0 ≤ 3150)	290	108	10,0
LT-32 (k0 ≥ 4000)	290	108	10,0
LT-40 (k0 ≤ 2500)	330	158	10,0
LT-40 (k0 ≥ 3150)	355	148	10,0

2.7.12 Rail sweep (option)

Rail sweeps can be attached to the ends of the endcarriages to remove dirt from the crane rail.
 The sweep consists of a wooden block which pushes itself forward automatically when worn.



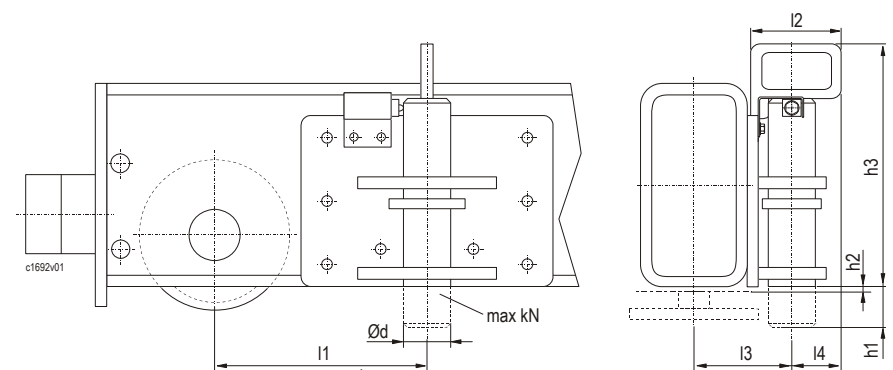
Endcarriage	e	g
	[mm]	[mm]
LS/LT-09	170	75
LS/LT-11	170	75
LS/LT-14	170	75
LS/LT-16	170	75
LT-20	250	100
LT-25	250	100
LT-32	250	100
LT-40	250	100

2.7.13 Storm lock device (option)

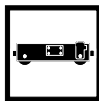
This mechanical lock can be used to prevent the crane moving of its own accord in high winds.

The following information must be given when ordering:

- Side to which it is to be fitted on the crane (left or right endcarriage)
- Side to which it is to be fitted on the endcarriage (left or right)
- Position (inside or outside)
- Dimension I1



Endcarriage	min. I1	I2	I3	I4	max. h1	h2	h3	Ød	max. kN
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[kN]
LS/LT-11	175	127	146	69	45	30	238	40	30
LS/LT-14	175		146			30			
LS/LT-16	232	150	151	74	65	10	340	70	180
LT-20	230		176			15			
LT-25	255		176			15			
LT-32 (k0 ≤ 3150)	315		218			20			
LT-32 (k0 ≥ 4000)	351		226			20			
LT-40 (k0 ≤ 2500)	455		243			20			
LT-40 (k0 ≥ 3150)	455		253			20			



2.8 Technical data

2.8.1 Permissible ideal wheel loads

2.8.1.1 LS/LT-09

Permissible wheel load (max.) ⁹⁷	Classification to FEM (ISO) ⁹⁸	Railhead width	Permissible ideal wheel loads R _{id zul} in [kN] at travel speed v in [m/min]														
			R _{zul}		k _{eff}	8	10	12.5	16	20	25	32	40	50	63	80	100
			[kN]		[mm]	[kN]											
30.4	1Bm (M3)	39.6 (A45)	27.3	26.5	25.6	24.6	23.6	22.6	21.4	20.0	18.4	16.8	15.6	11.0			
		40	27.6	26.7	25.8	24.8	23.8	22.8	21.6	20.2	18.6	16.9	15.8	11.1			
		48.3 (A55)	30.4	30.4	30.4	29.9	28.8	27.6	26.1	24.4	22.5	20.4	19.1	13.4			
		50	30.4	30.4	30.4	30.4	29.8	28.5	27.0	25.3	23.2	21.2	19.8	13.8			
		57 (A65)	30.4	30.4	30.4	30.4	30.4	30.4	30.4	28.8	26.5	24.1	22.5	15.8			
		60	30.4	30.4	30.4	30.4	30.4	30.4	30.4	30.3	27.9	25.4	23.7	16.6			
		70	30.4	30.4	30.4	30.4	30.4	30.4	30.4	30.4	30.3	28.0	25.9	19.4			
	1Am (M4)	39.6 (A45)	27.3	26.5	25.6	24.6	23.6	22.6	21.4	20.0	18.4	16.8	15.6	11.0			
		40	27.6	26.7	25.8	24.8	23.8	22.8	21.6	20.2	18.6	16.9	15.8	11.1			
		48.3 (A55)	30.4	30.4	30.4	29.9	28.8	27.6	26.1	24.4	22.5	20.4	19.1	13.4			
		50	30.4	30.4	30.4	30.4	29.8	28.5	27.0	25.3	23.2	21.2	19.8	13.8			
		57 (A65)	30.4	30.4	30.4	30.4	30.4	30.3	27.9	25.9	24.0	22.2	20.5	15.8			
		60	30.4	30.4	30.4	30.4	30.4	30.3	27.9	25.9	24.0	22.2	20.5	16.6			
		70	30.4	30.4	30.4	30.4	30.4	30.3	27.9	25.9	24.0	22.2	20.5	19.1			
24.3	2m (M5)	39.6 (A45)	24.3	23.6	22.8	21.9	21.1	20.2	19.1	17.9	16.4	15.0	14.0	9.8			
		40	24.3	23.9	23.1	22.1	21.3	20.4	19.3	18.1	16.6	15.1	14.1	9.9			
		48.3 (A55)	24.3	24.3	24.3	24.3	24.3	24.0	22.1	20.5	19.1	17.7	16.3	11.9			
		50	24.3	24.3	24.3	24.3	24.3	24.0	22.1	20.5	19.1	17.7	16.3	12.4			
		57 (A65)	24.3	24.3	24.3	24.3	24.3	24.0	22.1	20.5	19.1	17.7	16.3	14.1			
		60	24.3	24.3	24.3	24.3	24.3	24.0	22.1	20.5	19.1	17.7	16.3	14.8			
		70	24.3	24.3	24.3	24.3	24.3	24.0	22.1	20.5	19.1	17.7	16.3	15.1			
	3m (M6)	39.6 (A45)	21.9	21.3	20.6	19.7	19.0	18.2	17.2	16.1	14.8	13.5	12.6	8.8			
		40	22.2	21.5	20.8	19.9	19.2	18.3	17.4	16.3	14.9	13.6	12.7	8.9			
		48.3 (A55)	24.3	24.3	24.0	22.1	20.5	19.1	17.6	16.3	15.1	14.0	12.9	10.7			
		50	24.3	24.3	24.0	22.1	20.5	19.1	17.6	16.3	15.1	14.0	12.9	11.1			
		57 (A65)	24.3	24.3	24.0	22.1	20.5	19.1	17.6	16.3	15.1	14.0	12.9	12.0			
		60	24.3	24.3	24.0	22.1	20.5	19.1	17.6	16.3	15.1	14.0	12.9	12.0			
		70	24.3	24.3	24.0	22.1	20.5	19.1	17.6	16.3	15.1	14.0	12.9	12.0			
	4m (M7)	39.6 (A45)	19.5	18.9	18.3	17.5	16.4	15.2	14.0	13.0	12.1	11.2	10.3	7.8			
		40	19.7	19.1	18.5	17.7	16.4	15.2	14.0	13.0	12.1	11.2	10.3	7.9			
		48.3 (A55)	22.2	20.7	19.2	17.7	16.4	15.2	14.0	13.0	12.1	11.2	10.3	9.5			
		50	22.2	20.7	19.2	17.7	16.4	15.2	14.0	13.0	12.1	11.2	10.3	9.6			
		57 (A65)	22.2	20.7	19.2	17.7	16.4	15.2	14.0	13.0	12.1	11.2	10.3	9.6			
		60	22.2	20.7	19.2	17.7	16.4	15.2	14.0	13.0	12.1	11.2	10.3	9.6			
		70	22.2	20.7	19.2	17.7	16.4	15.2	14.0	13.0	12.1	11.2	10.3	9.6			
	5m (M8)	39.6 (A45)	17.1	16.4	15.3	14.1	13.0	12.1	11.2	10.4	9.6	8.9	8.2	6.8			
		40	17.2	16.4	15.3	14.1	13.0	12.1	11.2	10.4	9.6	8.9	8.2	6.9			
		48.3 (A55)	17.7	16.4	15.3	14.1	13.0	12.1	11.2	10.4	9.6	8.9	8.2	7.6			
		50	17.7	16.4	15.3	14.1	13.0	12.1	11.2	10.4	9.6	8.9	8.2	7.6			
		57 (A65)	17.7	16.4	15.3	14.1	13.0	12.1	11.2	10.4	9.6	8.9	8.2	7.6			
		60	17.7	16.4	15.3	14.1	13.0	12.1	11.2	10.4	9.6	8.9	8.2	7.6			
		70	17.7	16.4	15.3	14.1	13.0	12.1	11.2	10.4	9.6	8.9	8.2	7.6			

Maximum horizontal force: 20% of R_{zul}

⁹⁷ For classification H2/B3 to DIN 15018

⁹⁸ Rail material S355 (ST52) or better.

k_{eff} = effective rail width with line contact. Crowned rails on request.



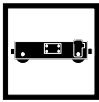
2.8.1.2 LS/LT-11

Permissible wheel load (max.) ⁹⁹	Classification to FEM (ISO) ¹⁰⁰	Railhead width	Permissible ideal wheel loads $R_{id\ zul}$ in [kN] at travel speed v in [m/min]												
			R_{zul}	k_{eff}	8	10	12.5	16	20	25	32	40	50	63	80
[kN]		[mm]	[kN]												
41.7	1Bm (M3)	39.6 (A45)	34.2	33.3	32.2	31.0	29.9	28.7	27.4	26.0	24.3	22.2	20.2	19.0	
		40	34.6	33.6	32.6	31.3	30.2	29.0	27.6	26.2	24.5	22.4	20.4	19.2	
		48.3 (A55)	41.7	40.6	39.3	37.9	36.5	35.0	33.4	31.7	29.6	27.1	24.7	23.1	
		50	41.7	41.7	40.7	39.2	37.7	36.3	34.5	32.8	30.7	28.1	25.5	24.0	
		57 (A65)	41.7	41.7	41.7	41.7	41.7	41.3	39.4	37.4	35.0	32.0	29.1	27.3	
		60	41.7	41.7	41.7	41.7	41.7	41.7	41.5	39.4	36.8	33.7	30.6	28.8	
		64.3 (A75)	41.7	41.7	41.7	41.7	41.7	41.7	41.7	41.7	39.5	36.1	32.8	30.8	
		70	41.7	41.7	41.7	41.7	41.7	41.7	41.7	41.7	41.7	39.3	35.7	33.5	
	1Am (M4)	39.6 (A45)	34.2	33.3	32.2	31.0	29.9	28.7	27.4	26.0	24.3	22.2	20.2	19.0	
		40	34.6	33.6	32.6	31.3	30.2	29.0	27.6	26.2	24.5	22.4	20.4	19.2	
		48.3 (A55)	41.7	40.6	39.3	37.9	36.5	35.0	33.4	31.7	29.6	27.1	24.7	23.1	
		50	41.7	41.7	40.7	39.2	37.7	36.3	34.5	32.8	30.7	28.1	25.5	24.0	
		57 (A65)	41.7	41.7	41.7	41.7	41.7	41.3	39.4	37.4	35.0	32.0	29.1	27.3	
		60	41.7	41.7	41.7	41.7	41.7	41.7	41.5	39.4	36.8	33.7	30.6	28.8	
		64.3 (A75)	41.7	41.7	41.7	41.7	41.7	41.7	41.7	41.7	39.5	36.1	32.8	30.8	
		70	41.7	41.7	41.7	41.7	41.7	41.7	41.7	41.7	41.4	38.3	35.4	32.8	
	41.7	2m (M5)	39.6 (A45)	30.5	29.7	28.8	27.7	26.7	25.6	24.4	23.2	21.7	19.8	18.0	16.9
			40	30.9	30.0	29.1	28.0	27.0	25.9	24.7	23.4	21.9	20.0	18.2	17.1
			48.3 (A55)	37.3	36.2	35.1	33.8	32.6	31.3	29.8	28.3	26.5	24.2	22.0	20.7
			50	38.6	37.5	36.4	35.0	33.7	32.4	30.8	29.3	27.4	25.0	22.8	21.4
57 (A65)			41.7	41.7	41.4	39.9	38.4	36.9	35.2	33.4	31.2	28.6	26.0	24.4	
60			41.7	41.7	41.7	41.7	40.4	38.9	37.0	35.1	32.8	30.1	27.3	25.7	
64.3 (A75)			41.7	41.7	41.7	41.7	41.7	41.4	38.1	35.4	32.8	30.4	28.1	26.1	
70			41.7	41.7	41.7	41.7	41.7	41.4	38.1	35.4	32.8	30.4	28.1	26.1	
3m (M6)		39.6 (A45)	27.5	26.7	25.9	24.9	24.0	23.1	22.0	20.9	19.5	17.9	16.2	15.2	
		40	27.8	27.0	26.2	25.2	24.3	23.3	22.2	21.1	19.7	18.0	16.4	15.4	
		48.3 (A55)	33.5	32.6	31.6	30.4	29.3	28.2	26.8	25.5	23.8	21.8	19.8	18.6	
		50	34.7	33.8	32.7	31.5	30.3	29.1	27.8	26.4	24.7	22.5	20.5	19.3	
		57 (A65)	39.6	38.5	37.3	35.9	34.6	32.8	30.2	28.1	26.1	24.1	22.3	20.7	
		60	41.7	40.5	39.3	37.8	35.4	32.8	30.2	28.1	26.1	24.1	22.3	20.7	
		64.3 (A75)	41.7	41.7	41.4	38.1	35.4	32.8	30.2	28.1	26.1	24.1	22.3	20.7	
		70	41.7	41.7	41.4	38.1	35.4	32.8	30.2	28.1	26.1	24.1	22.3	20.7	
4m (M7)		39.6 (A45)	24.4	23.8	23.0	22.2	21.4	20.5	19.5	18.6	17.4	15.9	14.4	13.6	
		40	24.7	24.0	23.3	22.4	21.6	20.7	19.7	18.7	17.5	16.0	14.6	13.7	
		48.3 (A55)	29.8	29.0	28.1	27.0	26.0	25.0	23.8	22.4	20.8	19.3	17.6	16.5	
		50	30.9	30.0	29.1	28.0	27.0	25.9	24.1	22.4	20.8	19.3	17.8	16.5	
	57 (A65)	35.2	34.2	33.0	30.4	28.2	26.2	24.1	22.4	20.8	19.3	17.8	16.5		
	60	37.0	35.6	33.0	30.4	28.2	26.2	24.1	22.4	20.8	19.3	17.8	16.5		
	64.3 (A75)	38.3	35.6	33.0	30.4	28.2	26.2	24.1	22.4	20.8	19.3	17.8	16.5		
	70	38.3	35.6	33.0	30.4	28.2	26.2	24.1	22.4	20.8	19.3	17.8	16.5		

⁹⁹ For classification H2/B3 to DIN 15018

¹⁰⁰ Rail material S355 (ST52) or better.

 k_{eff} = effective rail width with line contact. Crowned rails on request.



Permissible wheel load (max.) ⁹⁹	Classification to FEM (ISO) ¹⁰⁰	Railhead width	Permissible ideal wheel loads $R_{id\ zul}$ in [kN] at travel speed v in [m/min]											
			R_{zul}											
		k_{eff}	8	10	12.5	16	20	25	32	40	50	63	80	100
		[mm]	[kN]											
	5m (M8)	39.6 (A45)	21.4	20.8	20.2	19.4	18.7	18.0	17.1	16.2	15.2	13.9	12.6	11.9
		40	21.6	21.0	20.4	19.6	18.9	18.1	17.3	16.4	15.3	14.0	12.8	12.0
		48.3 (A55)	26.1	25.4	24.6	23.7	22.5	20.8	19.2	17.8	16.5	15.3	14.1	13.1
		50	27.0	26.3	25.4	24.2	22.5	20.8	19.2	17.8	16.5	15.3	14.1	13.1
		57 (A65)	30.5	28.3	26.3	24.2	22.5	20.8	19.2	17.8	16.5	15.3	14.1	13.1
		60	30.5	28.3	26.3	24.2	22.5	20.8	19.2	17.8	16.5	15.3	14.1	13.1
		64.3 (A75)	30.5	28.3	26.3	24.2	22.5	20.8	19.2	17.8	16.5	15.3	14.1	13.1
		70	30.5	28.3	26.3	24.2	22.5	20.8	19.2	17.8	16.5	15.3	14.1	13.1

Maximum horizontal force: 20% of R_{zul}



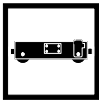
2.8.1.3 LS/LT-14

Permissible wheel load (max.) ¹⁰¹	Classification to FEM (ISO) ¹⁰²	Railhead width	Permissible ideal wheel loads R _{id zul} in [kN] at travel speed v in [m/min]											
R _{zul}		k _{eff}	8	10	12.5	16	20	25	32	40	50	63	80	100
[kN]		[mm]	[kN]											
60	1Bm (M3)	39.6 (A45)	44.7	43.6	42.5	41.0	39.6	38.2	36.5	35.0	33.2	31.0	28.3	25.9
		40	45.1	44.1	42.9	41.4	40.0	38.5	36.9	35.3	33.6	31.3	28.6	26.1
		48.3 (A55)	54.5	53.2	51.8	50.0	48.3	46.5	44.5	42.6	40.5	37.8	34.5	31.6
		50	56.4	55.1	53.6	51.8	50.0	48.2	46.1	44.1	41.9	39.2	35.7	32.7
		57 (A65)	60.0	60.0	60.0	59.0	57.0	54.9	52.6	50.3	47.8	44.7	40.7	37.3
		60	60.0	60.0	60.0	60.0	60.0	57.8	55.3	53.0	50.3	47.0	42.9	39.2
		64.3 (A75)	60.0	60.0	60.0	60.0	60.0	60.0	59.3	56.8	53.9	50.4	46.0	42.0
		70	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	58.7	54.8	50.0	45.7
		80	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	59.4	55.0	50.8	47.2
	1Am (M4)	39.6 (A45)	44.7	43.6	42.5	41.0	39.6	38.2	36.5	35.0	33.2	31.0	28.3	25.9
		40	45.1	44.1	42.9	41.4	40.0	38.5	36.9	35.3	33.6	31.3	28.6	26.1
		48.3 (A55)	54.5	53.2	51.8	50.0	48.3	46.5	44.5	42.6	40.5	37.8	34.5	31.6
		50	56.4	55.1	53.6	51.8	50.0	48.2	46.1	44.1	41.9	39.2	35.7	32.7
		57 (A65)	60.0	60.0	60.0	59.0	57.0	54.9	52.6	50.3	47.2	43.7	40.3	37.3
		60	60.0	60.0	60.0	60.0	60.0	57.8	54.7	50.8	47.2	43.7	40.3	37.4
		64.3 (A75)	60.0	60.0	60.0	60.0	60.0	59.4	54.7	50.8	47.2	43.7	40.3	37.4
		70	60.0	60.0	60.0	60.0	60.0	59.4	54.7	50.8	47.2	43.7	40.3	37.4
		80	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	59.4	55.0	50.8	47.2
47.8	2m (M5)	39.6 (A45)	39.9	39.0	37.9	36.6	35.4	34.1	32.6	31.2	29.7	27.7	25.3	23.1
		40	40.3	39.4	38.3	37.0	35.7	34.4	32.9	31.5	30.0	28.0	25.5	23.3
		48.3 (A55)	47.8	47.5	46.2	44.7	43.1	41.6	39.8	38.1	36.2	33.8	30.8	28.2
		50	47.8	47.8	47.8	46.2	44.7	43.0	41.2	39.4	37.4	34.7	31.9	29.2
		57 (A65)	47.8	47.8	47.8	47.8	47.8	47.2	43.4	40.3	37.4	34.7	32.0	29.7
		60	47.8	47.8	47.8	47.8	47.8	47.2	43.4	40.3	37.4	34.7	32.0	29.7
		64.3 (A75)	47.8	47.8	47.8	47.8	47.8	47.2	43.4	40.3	37.4	34.7	32.0	29.7
		70	47.8	47.8	47.8	47.8	47.8	47.2	43.4	40.3	37.4	34.7	32.0	29.7
		80	47.8	47.8	47.8	47.8	47.8	47.2	43.4	40.3	37.4	34.7	32.0	29.7
	3m (M6)	39.6 (A45)	35.9	35.1	34.1	33.0	31.8	30.7	29.3	28.1	26.7	24.9	22.7	20.8
		40	36.3	35.4	34.5	33.3	32.2	31.0	29.6	28.4	27.0	25.2	23.0	21.0
		48.3 (A55)	43.8	42.8	41.6	40.2	38.8	37.4	34.5	32.0	29.7	27.5	25.4	23.6
		50	45.3	44.3	43.1	41.6	40.2	37.4	34.5	32.0	29.7	27.5	25.4	23.6
		57 (A65)	47.8	47.8	47.2	43.4	40.3	37.4	34.5	32.0	29.7	27.5	25.4	23.6
		60	47.8	47.8	47.2	43.4	40.3	37.4	34.5	32.0	29.7	27.5	25.4	23.6
		64.3 (A75)	47.8	47.8	47.2	43.4	40.3	37.4	34.5	32.0	29.7	27.5	25.4	23.6
		70	47.8	47.8	47.2	43.4	40.3	37.4	34.5	32.0	29.7	27.5	25.4	23.6
		80	47.8	47.8	47.2	43.4	40.3	37.4	34.5	32.0	29.7	27.5	25.4	23.6
	4m (M7)	39.6 (A45)	31.9	31.2	30.3	29.3	28.3	27.3	26.1	25.0	23.7	21.9	20.2	18.5
		40	32.2	31.5	30.6	29.6	28.6	27.5	26.3	25.2	23.7	21.9	20.3	18.7
		48.3 (A55)	38.9	38.0	37.0	34.7	32.2	29.9	27.5	25.5	23.7	21.9	20.3	18.8
		50	40.3	39.4	37.6	34.7	32.2	29.9	27.5	25.5	23.7	21.9	20.3	18.8
		57 (A65)	43.7	40.5	37.6	34.7	32.2	29.9	27.5	25.5	23.7	21.9	20.3	18.8
		60	43.7	40.5	37.6	34.7	32.2	29.9	27.5	25.5	23.7	21.9	20.3	18.8
		64.3 (A75)	43.7	40.5	37.6	34.7	32.2	29.9	27.5	25.5	23.7	21.9	20.3	18.8
		70	43.7	40.5	37.6	34.7	32.2	29.9	27.5	25.5	23.7	21.9	20.3	18.8
		80	43.7	40.5	37.6	34.7	32.2	29.9	27.5	25.5	23.7	21.9	20.3	18.8

¹⁰¹ Für Einstufung H2/B3 nach DIN 15018

¹⁰² Schienenwerkstoff S355 (ST52) oder besser.

 k_{eff} = effektive Schienenbreite mit Linienberührung. Ballige Schienen auf Anfrage.



Permissible wheel load (max.) ¹⁰¹	Classification to FEM (ISO) ¹⁰²	Railhead width	Permissible ideal wheel loads $R_{id\ zul}$ in [kN] at travel speed v in [m/min]											
			R_{zul}											
		k_{eff}	8	10	12.5	16	20	25	32	40	50	63	80	100
		[mm]	[kN]											
	5m (M8)	39.6 (A45)	27.9	27.3	26.5	25.6	24.8	23.8	21.9	20.3	18.9	17.5	16.1	15.0
		40	28.2	27.5	26.8	25.9	25.0	23.8	21.9	20.3	18.9	17.5	16.1	15.0
		48.3 (A55)	34.1	32.3	29.9	27.6	25.6	23.8	21.9	20.3	18.9	17.5	16.1	15.0
		50	34.8	32.3	29.9	27.6	25.6	23.8	21.9	20.3	18.9	17.5	16.1	15.0
		57 (A65)	34.8	32.3	29.9	27.6	25.6	23.8	21.9	20.3	18.9	17.5	16.1	15.0
		60	34.8	32.3	29.9	27.6	25.6	23.8	21.9	20.3	18.9	17.5	16.1	15.0
		64.3 (A75)	34.8	32.3	29.9	27.6	25.6	23.8	21.9	20.3	18.9	17.5	16.1	15.0
		70	34.8	32.3	29.9	27.6	25.6	23.8	21.9	20.3	18.9	17.5	16.1	15.0
		80	34.8	32.3	29.9	27.6	25.6	23.8	21.9	20.3	18.9	17.5	16.1	15.0

Maximum horizontal force: 20% of R_{zul}



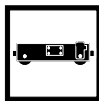
2.8.1.4 LS/LT-16

Permissible wheel load (max.) ¹⁰³	Classification to FEM (ISO) ¹⁰⁴	Railhead width	Permissible ideal wheel loads R _{id zul} in [kN] at travel speed v in [m/min]														
			R _{zul}		k _{eff}	8	10	12.5	16	20	25	32	40	50	63	80	100
			[kN]		[mm]	[kN]											
70	1Bm (M3)	39.6 (A45)	51.7	50.6	49.3	47.8	46.2	44.6	42.8	41.0	39.2	37.0	34.1	31.2			
		40	52.2	51.1	49.8	48.3	46.7	45.1	43.2	41.4	39.6	37.3	34.5	31.5			
		48.3 (A55)	63.1	61.7	60.2	58.3	56.4	54.4	52.2	50.0	47.8	45.1	41.6	38.0			
		50	65.3	63.9	62.3	60.3	58.4	56.3	54.0	51.8	49.5	46.7	43.1	39.3			
		57 (A65)	70.0	70.0	70.0	68.8	66.6	64.2	61.5	59.1	56.4	53.2	49.1	44.8			
		60	70.0	70.0	70.0	70.0	70.0	67.6	64.8	62.2	59.4	56.0	51.7	47.2			
		70	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	69.3	65.4	60.3	55.1			
	1Am (M4)	39.6 (A45)	51.7	50.6	49.3	47.8	46.2	44.6	42.8	41.0	39.2	37.0	34.1	31.2			
		40	52.2	51.1	49.8	48.3	46.7	45.1	43.2	41.4	39.6	37.3	34.5	31.5			
		48.3 (A55)	63.1	61.7	60.2	58.3	56.4	54.4	52.2	50.0	47.8	45.1	41.6	38.0			
		50	65.3	63.9	62.3	60.3	58.4	56.3	54.0	51.8	49.5	46.7	43.1	39.3			
		57 (A65)	70.0	70.0	70.0	68.8	66.6	64.2	61.5	59.1	56.4	53.2	49.1	44.8			
		60	70.0	70.0	70.0	70.0	70.0	67.6	64.8	62.2	59.4	56.0	51.7	47.2			
		70	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	69.3	65.4	60.3	55.1			
	60	2m (M5)	39.6 (A45)	46.2	45.2	44.1	42.7	41.3	39.8	38.2	36.6	35.0	33.0	30.5	27.8		
			40	46.6	45.6	44.5	43.1	41.7	40.2	38.6	37.0	35.3	33.3	30.8	28.1		
48.3 (A55)			56.3	55.1	53.7	52.0	50.4	48.6	46.6	44.7	42.7	40.3	37.2	33.9			
50			58.3	57.0	55.6	53.9	52.1	50.3	48.2	46.3	44.2	41.7	38.5	35.1			
57 (A65)			60.0	60.0	60.0	60.0	59.4	57.3	55.0	52.7	49.2	45.6	42.1	39.1			
60			60.0	60.0	60.0	60.0	60.0	60.0	57.1	53.0	49.2	45.6	42.1	39.1			
70			60.0	60.0	60.0	60.0	60.0	60.0	57.1	53.0	49.2	45.6	42.1	39.1			
3m (M6)		39.6 (A45)	41.6	40.7	39.6	38.4	37.2	35.8	34.4	33.0	31.5	29.7	27.4	25.0			
		40	42.0	41.1	40.0	38.8	37.5	36.2	34.7	33.3	31.8	30.0	27.7	25.3			
		48.3 (A55)	50.7	49.6	48.4	46.8	45.3	43.7	41.9	40.2	38.4	36.2	33.4	30.5			
		50	52.5	51.3	50.1	48.5	46.9	45.3	43.4	41.6	39.1	36.2	33.4	31.0			
		57 (A65)	59.8	58.5	57.1	55.3	53.0	49.2	45.3	42.1	39.1	36.2	33.4	31.0			
		60	60.0	60.0	60.0	57.1	53.0	49.2	45.3	42.1	39.1	36.2	33.4	31.0			
		70	60.0	60.0	60.0	57.1	53.0	49.2	45.3	42.1	39.1	36.2	33.4	31.0			
4m (M7)		39.6 (A45)	36.9	36.1	35.2	34.1	33.0	31.9	30.5	29.3	28.0	26.4	24.4	22.3			
		40	37.3	36.5	35.6	34.5	33.4	32.2	30.9	29.6	28.3	26.7	24.6	22.5			
		48.3 (A55)	45.1	44.1	43.0	41.6	40.3	38.9	36.2	33.6	31.2	28.9	26.6	24.7			
		50	46.6	45.6	44.5	43.1	41.7	39.3	36.2	33.6	31.2	28.9	26.6	24.7			
		57 (A65)	53.2	52.0	49.5	45.6	42.3	39.3	36.2	33.6	31.2	28.9	26.6	24.7			
		60	56.0	53.3	49.5	45.6	42.3	39.3	36.2	33.6	31.2	28.9	26.6	24.7			
		70	57.4	53.3	49.5	45.6	42.3	39.3	36.2	33.6	31.2	28.9	26.6	24.7			
5m (M8)		39.6 (A45)	32.3	31.6	30.8	29.9	28.9	27.9	26.7	25.6	24.5	23.0	21.2	19.5			
		40	32.6	31.9	31.1	30.2	29.2	28.2	27.0	25.9	24.7	23.0	21.2	19.7			
		48.3 (A55)	39.4	38.6	37.6	36.3	33.7	31.2	28.8	26.7	24.8	23.0	21.2	19.7			
		50	40.8	39.9	38.9	36.3	33.7	31.2	28.8	26.7	24.8	23.0	21.2	19.7			
		57 (A65)	45.7	42.4	39.4	36.3	33.7	31.2	28.8	26.7	24.8	23.0	21.2	19.7			
		60	45.7	42.4	39.4	36.3	33.7	31.2	28.8	26.7	24.8	23.0	21.2	19.7			
		70	45.7	42.4	39.4	36.3	33.7	31.2	28.8	26.7	24.8	23.0	21.2	19.7			

 Maximum horizontal force: 20% of R_{zul}
¹⁰³ For classification H2/B3 to DIN 15018

¹⁰⁴ Rail material S355 (ST52) or better.

 k_{eff} = effective rail width with line contact. Crowned rails on request.



2.8.1.5 LT-20

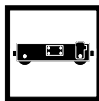
Permissible wheel load (max.) ¹⁰⁵	Classification to FEM (ISO) ¹⁰⁶	Railhead width	Permissible ideal wheel loads R _{id zul} in [kN] at travel speed v in [m/min]														
			R _{zul}		k _{eff}	8	10	12.5	16	20	25	32	40	50	63	80	100
			[kN]		[mm]	[kN]											
114.8	1Bm (M3)	39.7 (A45)	66.0	64.8	63.4	61.7	59.9	57.9	55.7	53.6	51.4	49.0	46.1	42.8			
		40	74.2	72.9	71.3	69.3	67.3	65.2	62.6	60.3	57.8	55.1	51.9	48.1			
		48.3 (A55)	89.6	88.0	86.1	83.7	81.3	78.7	75.6	72.8	69.8	66.6	62.6	58.1			
		50	92.8	91.1	89.1	86.7	84.2	81.4	78.3	75.3	72.3	68.9	64.8	60.1			
		57 (A65)	105.8	103.8	101.6	98.8	95.9	92.8	89.2	85.9	82.4	78.6	73.9	68.6			
		60	111.3	109.3	107.0	104.0	101.0	97.7	93.9	90.4	86.7	82.7	77.8	72.2			
		64.3 (A75)	114.8	114.8	114.6	111.4	108.2	104.7	100.7	96.9	92.9	88.6	83.4	77.3			
		70	114.8	114.8	114.8	114.8	114.8	114.0	109.6	105.4	101.2	96.5	90.8	84.2			
		80	114.8	114.8	114.8	114.8	114.8	114.8	114.8	114.8	114.8	110.2	103.7	96.2			
	1Am (M4)	39.7 (A45)	66.0	64.8	63.4	61.7	59.9	57.9	55.7	53.6	51.4	49.0	46.1	42.8			
		40	66.5	65.3	63.9	62.1	60.3	58.4	56.1	54.0	51.8	49.4	46.5	43.1			
		48.3 (A55)	80.3	78.8	77.2	75.0	72.8	70.5	67.7	65.2	62.6	59.6	56.1	52.0			
		50	83.1	81.6	79.9	77.6	75.4	73.0	70.1	67.5	64.8	61.7	58.1	53.9			
		57 (A65)	94.8	93.0	91.0	88.5	86.0	83.2	80.0	76.9	73.8	70.4	66.2	61.4			
		60	99.7	97.9	95.8	93.2	90.5	87.6	84.2	81.0	77.7	74.1	69.7	64.7			
		64.3 (A75)	106.9	105.0	102.7	99.9	97.0	93.8	90.2	86.8	83.3	79.4	74.7	69.3			
		70	114.8	114.3	111.8	108.7	105.6	102.2	98.2	94.5	90.7	86.4	81.3	75.4			
		80	114.8	114.8	114.8	114.8	114.8	114.8	112.2	108.0	103.6	98.8	92.9	86.2			
104.3	2m (M5)	39.7 (A45)	58.9	57.9	56.6	55.0	53.5	51.7	49.7	47.8	45.9	43.8	41.2	38.2			
		40	59.4	58.3	57.0	55.5	53.9	52.1	50.1	48.2	46.3	44.1	41.5	38.5			
		48.3 (A55)	71.7	70.4	68.9	67.0	65.0	62.9	60.5	58.2	55.9	53.2	50.1	46.5			
		50	74.2	72.9	71.3	69.3	67.3	65.2	62.6	60.3	57.8	55.1	51.9	48.1			
		57 (A65)	84.6	83.1	81.3	79.0	76.8	74.3	71.4	68.7	65.9	62.8	59.1	54.8			
		60	89.1	87.4	85.6	83.2	80.8	78.2	75.1	72.3	69.4	66.1	62.2	57.7			
		64.3 (A75)	95.4	93.7	91.7	89.2	86.6	83.8	80.5	77.5	74.4	70.9	66.7	61.9			
		70	103.9	102.0	99.8	97.1	94.3	91.2	87.7	84.4	81.0	77.2	72.6	67.4			
		80	104.3	104.3	104.3	104.3	104.3	104.2	100.2	96.4	92.5	88.2	83.0	77.0			
	3m (M6)	39.7 (A45)	53.0	52.1	51.0	49.5	48.1	46.6	44.7	43.1	41.3	39.4	37.1	34.4			
		40	53.4	52.5	51.3	49.9	48.5	46.9	45.1	43.4	41.6	39.7	37.3	34.6			
		48.3 (A55)	64.5	63.4	62.0	60.3	58.5	56.6	54.4	52.4	50.3	47.9	45.1	41.8			
		50	66.8	65.6	64.2	62.4	60.6	58.6	56.4	54.2	52.0	49.6	46.7	43.3			
		57 (A65)	76.1	74.8	73.2	71.1	69.1	66.8	64.2	61.8	59.3	56.6	53.2	49.4			
		60	80.2	78.7	77.0	74.9	72.7	70.4	67.6	65.1	62.4	59.5	56.0	52.0			
		64.3 (A75)	85.9	84.3	82.5	80.2	77.9	75.4	72.5	69.7	66.9	63.8	60.0	55.7			
		70	93.5	91.8	89.8	87.4	84.8	82.1	78.9	75.9	72.9	69.5	65.3	60.6			
		80	104.3	104.3	102.7	99.8	96.9	93.8	90.2	86.8	83.3	79.4	74.7	69.3			
	4m (M7)	39.7 (A45)	47.1	46.3	45.3	44.0	42.8	41.4	39.8	38.3	36.7	35.0	32.9	30.6			
		40	47.5	46.6	45.6	44.4	43.1	41.7	40.1	38.6	37.0	35.3	33.2	30.8			
		48.3 (A55)	57.4	56.3	55.1	53.6	52.0	50.4	48.4	46.6	44.7	42.6	40.1	37.2			
		50	59.4	58.3	57.0	55.5	53.9	52.1	50.1	48.2	46.3	44.1	41.5	38.5			
		57 (A65)	67.7	66.5	65.0	63.2	61.4	59.4	57.1	55.0	52.7	50.3	47.3	43.9			
		60	71.2	70.0	68.5	66.6	64.6	62.5	60.1	57.8	55.5	52.9	49.8	46.2			
		64.3 (A75)	76.4	75.0	73.4	71.3	69.3	67.0	64.4	62.0	59.5	56.7	53.4	49.5			
		70	83.1	81.6	79.9	77.6	75.4	73.0	70.1	67.5	64.8	61.7	58.1	53.9			
		80	95.0	93.3	91.3	88.7	86.2	83.4	80.2	77.1	74.0	70.6	65.7	61.5			

¹⁰⁵ For classification H2/B3 to DIN 15018¹⁰⁶ Rail material S355 (ST52) or better. k_{eff} = effective rail width with line contact. Crowned rails on request.



Permissible wheel load (max.) ¹⁰⁵	Classification to FEM (ISO) ¹⁰⁶	Railhead width	Permissible ideal wheel loads R _{id zul} in [kN] at travel speed v in [m/min]												
R _{zul}		k _{eff}	8	10	12.5	16	20	25	32	40	50	63	80	100	
[kN]		[mm]	[kN]												
	5m (M8)	39.7 (A45)	41.2	40.5	39.6	38.5	37.4	36.2	34.8	33.5	32.1	30.6	28.8	26.7	
		40	41.6	40.8	39.9	38.8	37.7	36.5	35.1	33.7	32.4	30.9	29.0	26.9	
		48.3 (A55)	50.2	49.3	48.2	46.9	45.5	44.1	42.3	40.7	39.1	37.3	35.1	32.5	
		50	52.0	51.0	49.9	48.5	47.1	45.6	43.8	42.2	40.5	38.6	36.3	33.7	
		57 (A65)	59.2	58.2	56.9	55.3	53.7	52.0	50.0	48.1	46.1	44.0	41.4	38.4	
		60	62.3	61.2	59.9	58.2	56.6	54.7	52.6	50.6	48.6	46.3	43.6	40.4	
		64.3 (A75)	66.8	65.6	64.2	62.4	60.6	58.7	56.4	54.2	52.1	49.6	46.7	43.3	
		70	72.7	71.4	69.9	67.9	66.0	63.9	61.4	59.0	56.7	54.0	50.8	47.1	
		80	83.1	81.6	79.9	77.6	75.4	73.0	70.1	65.9	61.6	57.5	53.5	50.0	

 Maximum horizontal force: 20% of R_{zul}



2.8.1.6 LT-25

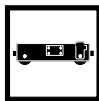
Permissible wheel load (max.) ¹⁰⁷	Classification to FEM (ISO) ¹⁰⁸	Railhead width	Permissible ideal wheel loads R _{id zul} in [kN] at travel speed v in [m/min]											
			8	10	12.5	16	20	25	32	40	50	63	80	100
[kN]		[mm]	[kN]											
160.9	1Bm (M3)	39.7 (A45)	83.8	82.5	81.0	79.1	77.1	74.8	72.2	69.6	67.0	64.2	61.1	57.6
		40	94.2	92.8	91.1	88.9	86.7	84.2	81.1	78.3	75.3	72.2	68.7	64.8
		48.3 (A55)	113.7	112.0	110.0	107.4	104.6	101.6	98.0	94.5	90.9	87.1	82.9	78.3
		50	117.7	116.0	113.9	111.1	108.3	105.2	101.4	97.8	94.1	90.2	85.8	81.0
		57 (A65)	134.2	132.2	129.8	126.7	123.5	119.9	115.6	111.5	107.3	102.8	97.8	92.4
		60	141.3	139.2	136.6	133.4	130.0	126.2	121.7	117.4	113.0	108.2	103.0	97.2
		64.3 (A75)	151.4	149.1	146.4	142.9	139.3	135.3	130.4	125.8	121.1	116.0	110.4	104.2
		70	160.9	160.9	159.4	155.6	151.7	147.3	142.0	137.0	131.8	126.3	120.2	113.4
		80	160.9	160.9	160.9	160.9	160.9	160.9	160.9	156.5	150.6	144.3	137.3	129.7
		90	160.9	160.9	160.9	160.9	160.9	160.9	160.9	160.9	160.9	160.9	154.5	145.9
	1Am (M4)	39.7 (A45)	83.8	82.5	81.0	79.1	77.1	74.8	72.2	69.6	67.0	64.2	61.1	57.6
		40	84.4	83.1	81.6	79.7	77.6	75.4	72.7	70.1	67.5	64.7	61.5	58.1
		48.3 (A55)	101.9	100.4	98.5	96.2	93.8	91.1	87.8	84.7	81.5	78.1	74.3	70.1
		50	105.5	103.9	102.0	99.6	97.1	94.3	90.9	87.7	84.4	80.8	76.9	72.6
		57 (A65)	120.3	118.4	116.3	113.5	110.6	107.5	103.6	99.9	96.2	92.1	87.7	82.8
		60	126.6	124.7	122.4	119.5	116.5	113.1	109.1	105.2	101.2	97.0	92.3	87.1
		64.3 (A75)	135.7	133.6	131.2	128.1	124.8	121.2	116.9	112.7	108.5	103.9	98.9	93.4
		70	147.7	145.5	142.8	139.4	135.9	132.0	127.2	122.7	118.1	113.2	107.7	101.6
		80	160.9	160.9	160.9	159.3	155.3	150.8	145.4	140.3	135.0	129.3	123.0	116.2
		90	160.9	160.9	160.9	160.9	160.9	160.9	160.9	157.8	151.8	145.5	138.4	130.7
	2m (M5)	39.7 (A45)	74.8	73.7	72.3	70.6	68.8	66.8	64.4	62.1	59.8	57.3	54.5	51.5
		40	75.4	74.2	72.9	71.1	69.3	67.3	64.9	62.6	60.3	57.7	54.9	51.9
		48.3 (A55)	91.0	89.6	88.0	85.9	83.7	81.3	78.4	75.6	72.8	69.7	66.3	62.6
		50	94.2	92.8	91.1	88.9	86.7	84.2	81.1	78.3	75.3	72.2	68.7	64.8
		57 (A65)	107.4	105.8	103.8	101.4	98.8	95.9	92.5	89.2	85.9	82.3	78.3	73.9
		60	113.0	111.3	109.3	106.7	104.0	101.0	97.4	93.9	90.4	86.6	82.4	77.8
		64.3 (A75)	121.1	119.3	117.1	114.3	111.4	108.2	104.4	100.7	96.9	92.8	88.3	83.4
		70	131.9	129.9	127.5	124.5	121.3	117.8	113.6	109.6	105.4	101.0	96.1	90.8
		80	150.7	148.4	145.7	142.3	138.7	134.7	129.8	125.2	120.5	115.5	109.9	103.7
		90	160.9	160.9	160.9	160.0	156.0	151.5	146.1	140.9	135.6	128.6	119.7	111.9
	3m (M6)	39.7 (A45)	67.3	66.3	65.1	63.5	61.9	60.1	58.0	55.9	53.8	51.6	49.1	46.3
		40	67.8	66.8	65.6	64.0	62.4	60.6	58.4	56.4	54.2	52.0	49.4	46.7
		48.3 (A55)	81.9	80.7	79.2	77.3	75.3	73.2	70.5	68.1	65.5	62.7	59.7	56.4
		50	84.8	83.5	82.0	80.0	78.0	75.7	73.0	70.4	67.8	64.9	61.8	58.3
		57 (A65)	96.6	95.2	93.5	91.2	88.9	86.3	83.3	80.3	77.3	74.0	70.4	66.5
		60	101.7	100.2	98.4	96.0	93.6	90.9	87.6	84.5	81.3	77.9	74.2	70.0
		64.3 (A75)	109.0	107.4	105.4	102.9	100.3	97.4	93.9	90.6	87.2	83.5	79.5	75.0
		70	118.7	116.9	114.8	112.0	109.2	106.0	102.2	98.6	94.9	90.9	86.5	81.7
		80	135.6	133.6	131.2	128.0	124.8	121.2	116.9	112.7	108.5	103.9	97.2	90.9
		90	152.6	150.3	147.6	144.0	140.4	136.3	128.0	119.7	111.9	104.4	97.2	90.9
	4m (M7)	39.7 (A45)	59.8	58.9	57.9	56.5	55.0	53.5	51.5	49.7	47.8	45.8	43.6	41.2
		40	60.3	59.4	58.3	56.9	55.5	53.9	51.9	50.1	48.2	46.2	43.9	41.5
		48.3 (A55)	72.8	71.7	70.4	68.7	67.0	65.0	62.7	60.5	58.2	55.8	53.1	50.1
		50	75.4	74.2	72.9	71.1	69.3	67.3	64.9	62.6	60.3	57.7	54.9	51.9
		57 (A65)	85.9	84.6	83.1	81.1	79.0	76.8	74.0	71.4	68.7	65.8	62.6	59.1
		60	90.4	89.1	87.4	85.4	83.2	80.8	77.9	75.1	72.3	69.3	65.9	62.2
		64.3 (A75)	96.9	95.4	93.7	91.5	89.2	86.6	83.5	80.5	77.5	74.2	70.6	66.7
		70	105.5	103.9	102.0	99.6	97.1	94.3	90.9	87.7	84.4	80.8	76.9	72.6
		80	120.6	118.7	116.6	113.8	110.9	107.7	103.9	97.7	91.3	85.2	79.3	74.2
		90	135.6	133.6	131.2	128.0	120.2	112.4	104.4	97.7	91.3	85.2	79.3	74.2

¹⁰⁷ For classification H2/B3 to DIN 15018¹⁰⁸ Rail material S355 (ST52) or better. k_{eff} = effective rail width with line contact. Crowned rails on request.



Permissible wheel load (max.) ¹⁰⁷	Classification to FEM (ISO) ¹⁰⁸	Railhead width	Permissible ideal wheel loads $R_{id\ zul}$ in [kN] at travel speed v in [m/min]											
			R_{zul}											
		k_{eff}	8	10	12.5	16	20	25	32	40	50	63	80	100
		[mm]	[kN]											
	5m (M8)	39.7 (A45)	52.4	51.6	50.6	49.4	48.2	46.8	45.1	43.5	41.9	40.1	38.2	36.0
		40	52.8	52.0	51.0	49.8	48.5	47.1	45.4	43.8	42.2	40.4	38.4	36.3
		48.3 (A55)	63.7	62.7	61.6	60.1	58.6	56.9	54.9	52.9	50.9	48.8	46.4	43.8
		50	65.9	64.9	63.8	62.2	60.7	58.9	56.8	54.8	52.7	50.5	48.1	45.4
		57 (A65)	75.2	74.0	72.7	71.0	69.2	67.2	64.8	62.5	60.1	57.6	54.8	51.7
		60	79.1	77.9	76.5	74.7	72.8	70.7	68.2	65.8	63.3	60.6	57.7	54.5
		64.3 (A75)	84.8	83.5	82.0	80.0	78.0	75.8	73.0	70.5	67.8	65.0	61.8	58.4
		70	92.3	90.9	89.3	87.1	84.9	82.5	79.5	76.7	73.8	69.4	64.6	60.4
		80	105.5	103.9	102.0	99.6	97.1	91.6	85.0	79.5	74.4	69.4	64.6	60.4
		90	118.7	116.9	112.7	104.7	97.9	91.6	85.0	79.5	74.4	69.4	64.6	60.4

 Maximum horizontal force: 20% of R_{zul}



2.8.1.7 LT-32

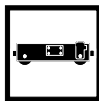
Permissible wheel load (max.) ¹⁰⁹	Classification to FEM (ISO) ¹¹⁰	Railhead width	Permissible ideal wheel loads $R_{id\ zul}$ in [kN] at travel speed v in [m/min]													
			R_{zul}	k_{eff}	8	10	12.5	16	20	25	32	40	50	63	80	100
[kN]		[mm]	[kN]													
220	1Bm (M3)	48.3 (A55)	130.1	128.5	126.5	124.0	121.3	118.3	114.5	110.8	106.8	102.7	98.2	93.8		
		50	150.3	148.4	146.2	143.3	140.2	136.6	132.3	128.0	123.4	118.6	113.5	108.3		
		57 (A65)	171.4	169.2	166.7	163.3	159.8	155.8	150.8	145.9	140.7	135.2	129.4	123.5		
		60	180.4	178.1	175.4	171.9	168.2	163.9	158.7	153.6	148.1	142.4	136.2	130.0		
		64.3 (A75)	193.3	190.9	188.0	184.2	180.2	175.7	170.1	164.6	158.8	152.6	145.9	139.3		
		70	210.4	207.8	204.7	200.6	196.2	191.3	185.2	179.1	172.8	166.1	158.9	151.7		
		80	220.0	220.0	220.0	220.0	220.0	218.6	211.6	204.7	197.5	189.8	181.6	173.3		
		86.6 (A100)	220.0	220.0	220.0	220.0	220.0	220.0	220.0	220.0	213.8	205.5	196.6	187.6		
		90 (F100)	220.0	220.0	220.0	220.0	220.0	220.0	220.0	220.0	220.0	213.5	204.3	195.0		
		100	220.0	220.0	220.0	220.0	220.0	220.0	220.0	220.0	220.0	220.0	220.0	216.7		
	1Am (M4)	48.3 (A55)	130.1	128.5	126.5	124.0	121.3	118.3	114.5	110.8	106.8	102.7	98.2	93.8		
		50	134.7	133.0	131.0	128.4	125.6	122.4	118.5	114.7	110.6	106.3	101.7	97.1		
		57 (A65)	153.5	151.6	149.3	146.3	143.2	139.6	135.1	130.7	126.1	121.2	115.9	110.7		
		60	161.6	159.6	157.2	154.0	150.7	146.9	142.2	137.6	132.7	127.5	122.0	116.5		
		64.3 (A75)	173.2	171.0	168.5	165.1	161.5	157.4	152.4	147.4	142.2	136.7	130.8	124.8		
		70	188.6	186.2	183.4	179.7	175.8	171.4	165.9	160.5	154.9	148.8	142.4	135.9		
		80	215.5	212.8	209.6	205.4	200.9	195.9	189.6	183.4	177.0	170.1	162.7	155.3		
		86.6 (A100)	220.0	220.0	220.0	220.0	217.5	212.0	205.2	198.6	191.6	184.1	176.1	168.1		
		90 (F100)	220.0	220.0	220.0	220.0	220.0	220.0	213.3	206.4	199.1	191.3	183.0	174.7		
		100	220.0	220.0	220.0	220.0	220.0	220.0	220.0	220.0	220.0	212.6	203.4	194.1		
195.6	2m (M5)	48.3 (A55)	116.2	114.7	113.0	110.7	108.3	105.6	102.2	98.9	95.4	91.7	87.7	83.7		
		50	120.2	118.7	117.0	114.6	112.1	109.3	105.8	102.4	98.8	94.9	90.8	86.7		
		57 (A65)	137.1	135.4	133.3	130.7	127.8	124.6	120.6	116.7	112.6	108.2	103.5	98.8		
		60	144.3	142.5	140.4	137.5	134.5	131.2	127.0	122.8	118.5	113.9	109.0	104.0		
		64.3 (A75)	154.6	152.7	150.4	147.4	144.2	140.6	136.1	131.6	127.0	122.0	116.8	111.5		
		70	168.3	166.2	163.7	160.5	157.0	153.0	148.1	143.3	138.3	132.9	127.1	121.3		
		80	192.4	190.0	187.1	183.4	179.4	174.9	169.3	163.8	158.0	151.8	145.3	138.7		
		86.6 (A100)	195.6	195.6	195.6	195.6	194.2	189.3	183.3	177.3	171.0	164.4	157.3	150.1		
		90 (F100)	195.6	195.6	195.6	195.6	195.6	195.6	190.4	184.3	177.8	170.8	163.4	156.0		
		100	195.6	195.6	195.6	195.6	195.6	195.6	195.6	195.6	195.6	189.8	181.6	173.3		
	3m (M6)	48.3 (A55)	104.5	103.2	101.7	99.6	97.5	95.0	92.0	89.0	85.9	82.5	78.9	75.3		
		50	108.2	106.9	105.3	103.1	100.9	98.4	95.2	92.1	88.9	85.4	81.7	78.0		
		57 (A65)	123.4	121.8	120.0	117.6	115.0	112.1	108.6	105.0	101.3	97.4	93.2	88.9		
		60	129.9	128.2	126.3	123.8	121.1	118.0	114.3	110.6	106.7	102.5	98.1	93.6		
		64.3 (A75)	139.2	137.4	135.4	132.6	129.8	126.5	122.5	118.5	114.3	109.8	105.1	100.3		
		70	151.5	149.6	147.4	144.4	141.3	137.7	133.3	129.0	124.4	119.6	114.4	109.2		
		80	173.2	171.0	168.4	165.0	161.5	157.4	152.4	147.4	142.2	136.7	130.7	124.8		
		86.6 (A100)	187.4	185.1	182.3	178.7	174.8	170.4	164.9	159.6	153.9	147.9	141.5	135.1		
		90 (F100)	194.8	192.4	189.5	185.7	181.6	177.1	171.4	165.8	160.0	153.7	147.1	140.4		
		100	195.6	195.6	195.6	195.6	195.6	195.6	190.4	184.3	174.8	163.1	151.8	142.0		
	4m (M7)	48.3 (A55)	92.9	91.8	90.4	88.6	86.6	84.5	81.8	79.1	76.3	73.3	70.2	67.0		
		50	96.2	95.0	93.6	91.7	89.7	87.4	84.6	81.9	79.0	75.9	72.6	69.3		
		57 (A65)	109.7	108.3	106.7	104.5	102.3	99.7	96.5	93.4	90.1	86.5	82.8	79.0		
		60	115.4	114.0	112.3	110.0	107.6	104.9	101.6	98.3	94.8	91.1	87.2	83.2		
		64.3 (A75)	123.7	122.2	120.3	117.9	115.4	112.4	108.9	105.3	101.6	97.6	93.4	89.2		
		70	134.7	133.0	131.0	128.4	125.6	122.4	118.5	114.7	110.6	106.3	101.7	97.1		
		80	153.9	152.0	149.7	146.7	143.5	139.9	135.4	131.0	126.4	121.5	116.2	110.9		
		86.6 (A100)	166.6	164.5	162.1	158.8	155.4	151.4	146.6	141.8	136.8	131.5	123.9	115.9		
		90 (F100)	173.2	171.0	168.4	165.0	161.5	157.4	152.4	147.4	142.2	133.1	123.9	115.9		
		100	192.4	190.0	187.1	183.4	179.4	174.9	163.1	152.6	142.7	133.1	123.9	115.9		

¹⁰⁹ For classification H2/B3 to DIN 15018¹¹⁰ Rail material S355 (ST52) or better. k_{eff} = effective rail width with line contact. Crowned rails on request.



Permissible wheel load (max.) ¹⁰⁹	Classification to FEM (ISO) ¹¹⁰	Railhead width	Permissible ideal wheel loads R _{id zul} in [kN] at travel speed v in [m/min]											
R _{zul}		k _{eff}	8	10	12.5	16	20	25	32	40	50	63	80	100
[kN]		[mm]	[kN]											
	5m (M8)	48.3 (A55)	81.3	80.3	79.1	77.5	75.8	73.9	71.5	69.2	66.8	64.2	61.4	58.6
		50	84.2	83.1	81.9	80.2	78.5	76.5	74.1	71.7	69.1	66.4	63.6	60.7
		57 (A65)	96.0	94.8	93.3	91.5	89.5	87.2	84.4	81.7	78.8	75.7	72.5	69.2
		60	101.0	99.7	98.2	96.3	94.2	91.8	88.9	86.0	83.0	79.7	76.3	72.8
		64.3 (A75)	108.2	106.9	105.3	103.2	100.9	98.4	95.2	92.2	88.9	85.4	81.7	78.0
		70	117.8	116.4	114.6	112.3	109.9	107.1	103.7	100.3	96.8	93.0	89.0	84.9
		80	134.7	133.0	131.0	128.4	125.6	122.4	118.5	114.7	110.6	106.3	100.9	94.4
		86.6 (A100)	145.8	144.0	141.8	139.0	135.9	132.5	128.3	124.1	116.2	108.4	100.9	94.4
		90 (F100)	151.5	149.6	147.4	144.4	141.3	137.7	132.8	124.2	116.2	108.4	100.9	94.4
		100	168.3	166.2	163.7	160.5	152.9	143.0	132.8	124.2	116.2	108.4	100.9	94.4

 Maximum horizontal force: 20% of R_{zul}



2.8.1.8 LT-40

Permissible wheel load (max.) ¹¹¹	Classification to FEM (ISO) ¹¹²	Railhead width	Permissible ideal wheel loads $R_{id\ zul}$ in [kN] at travel speed v in [m/min]														
			R_{zul}		k_{eff}	8	10	12.5	16	20	25	32	40	50	63	80	100
			[kN]		[mm]	[kN]											
347.8	1Bm (M3)	48.3 (A55)	167.0	165.3	163.3	160.6	157.7	154.3	150.0	145.7	141.0	135.9	130.4	125.1			
		50	193.0	191.0	188.7	185.5	182.2	178.3	173.3	168.3	162.9	157.0	150.6	144.6			
		57 (A65)	220.0	217.8	215.1	211.5	207.7	203.2	197.6	191.9	185.7	178.9	171.7	164.8			
		60	231.6	229.2	226.4	222.6	218.6	213.9	208.0	202.0	195.5	188.4	180.8	173.5			
		64.3 (A75)	248.2	245.7	242.6	238.6	234.3	229.3	222.9	216.5	209.5	201.9	193.7	185.9			
		70	270.2	267.4	264.1	259.8	255.0	249.6	242.6	235.6	228.0	219.7	210.9	202.4			
		80	334.2	330.9	326.8	321.4	291.5	285.2	277.3	269.3	260.6	251.1	241.0	231.3			
		86.6 (A100)	334.2	330.9	326.8	321.4	315.5	308.8	300.2	291.5	282.1	271.9	260.9	250.4			
		90 (F100)	308.8	305.6	301.9	296.9	327.9	320.9	312.0	303.0	293.2	282.5	271.1	260.2			
		100	347.8	347.8	347.8	347.8	347.8	347.8	346.6	336.6	325.8	313.9	301.3	289.1			
	1Am (M4)	48.3 (A55)	167.0	165.3	163.3	160.6	157.7	154.3	150.0	145.7	141.0	135.9	130.4	125.1			
		50	172.9	171.2	169.1	166.2	163.2	159.7	155.3	150.8	145.9	140.6	135.0	129.5			
		57 (A65)	197.1	195.1	192.7	189.5	186.1	182.1	177.0	171.9	166.4	160.3	153.9	147.7			
		60	207.5	205.4	202.9	199.5	195.9	191.7	186.4	181.0	175.1	168.8	162.0	155.4			
		64.3 (A75)	222.4	220.1	217.4	213.8	209.9	205.4	199.7	193.9	187.7	180.9	173.6	166.6			
		70	242.1	239.6	236.7	232.7	228.5	223.6	217.4	211.1	204.3	196.9	189.0	181.3			
		80	276.7	273.9	270.5	266.0	261.2	255.6	248.5	241.3	233.5	225.0	216.0	207.2			
		86.6 (A100)	299.5	296.4	292.8	287.9	282.7	276.7	269.0	261.2	252.8	243.6	233.8	224.3			
		90 (F100)	311.2	308.1	304.3	299.2	293.8	287.5	279.5	271.5	262.7	253.1	242.9	233.1			
		100	345.8	342.3	338.1	332.5	326.5	319.5	310.6	301.6	291.9	281.3	269.9	259.0			
304.3	2m (M5)	48.3 (A55)	149.1	147.6	145.8	143.4	140.8	137.8	133.9	130.1	125.9	121.3	116.4	111.7			
		50	154.4	152.8	150.9	148.4	145.7	142.6	138.7	134.7	130.3	125.6	120.5	115.6			
		57 (A65)	176.0	174.2	172.1	169.2	166.1	162.6	158.1	153.5	148.6	143.1	137.4	131.8			
		60	185.3	183.4	181.1	178.1	174.9	171.1	166.4	161.6	156.4	150.7	144.6	138.8			
		64.3 (A75)	198.5	196.5	194.1	190.9	187.4	183.4	178.3	173.2	167.6	161.5	155.0	148.7			
		70	216.1	213.9	211.3	207.8	204.0	199.7	194.1	188.5	182.4	175.8	168.7	161.9			
		80	247.0	244.5	241.5	237.5	233.2	228.2	221.8	215.4	208.5	200.9	192.8	185.0			
		86.6 (A100)	267.4	264.7	261.4	257.1	252.4	247.0	240.2	233.2	225.7	217.5	208.7	200.3			
		90 (F100)	277.9	275.1	271.7	267.2	262.3	256.7	249.6	242.4	234.6	226.0	216.9	208.2			
		100	304.3	304.3	301.9	296.9	291.5	285.2	277.3	269.3	260.6	251.1	241.0	229.5			
	3m (M6)	48.3 (A55)	134.2	132.9	131.2	129.0	126.7	124.0	120.5	117.1	113.3	109.2	104.8	100.5			
		50	138.9	137.5	135.8	133.6	131.2	128.4	124.8	121.2	117.3	113.0	108.5	104.1			
		57 (A65)	158.4	156.8	154.9	152.3	149.5	146.3	142.3	138.2	133.7	128.8	123.6	118.7			
		60	166.7	165.0	163.0	160.3	157.4	154.0	149.7	145.4	140.7	135.6	130.1	124.9			
		64.3 (A75)	178.7	176.9	174.7	171.8	168.7	165.1	160.5	155.8	150.8	145.3	139.5	133.8			
		70	194.5	192.6	190.2	187.0	183.6	179.7	174.7	169.7	164.2	158.2	151.8	145.7			
		80	222.3	220.1	217.4	213.7	209.9	205.4	199.7	193.9	187.6	180.8	173.5	166.5			
		86.6 (A100)	240.7	238.2	235.3	231.4	227.2	222.3	216.1	209.9	203.1	195.7	187.8	180.3			
		90 (F100)	250.1	247.6	244.5	240.5	236.1	231.0	224.6	218.1	211.1	203.4	195.2	186.4			
		100	277.9	275.1	271.7	267.2	262.3	256.7	249.6	242.4	229.5	214.1	199.3	186.4			
	4m (M7)	48.3 (A55)	119.3	118.1	116.6	114.7	112.6	110.2	107.2	104.1	100.7	97.0	93.1	89.4			
		50	123.5	122.3	120.8	118.7	116.6	114.1	110.9	107.7	104.2	100.5	96.4	92.5			
		57 (A65)	140.8	139.4	137.7	135.4	132.9	130.1	126.5	122.8	118.8	114.5	109.9	105.5			
		60	148.2	146.7	144.9	142.5	139.9	136.9	133.1	129.3	125.1	120.5	115.7	111.0			
		64.3 (A75)	158.8	157.2	155.3	152.7	149.9	146.7	142.6	138.5	134.1	129.2	124.0	119.0			
		70	172.9	171.2	169.1	166.2	163.2	159.7	155.3	150.8	145.9	140.6	135.0	129.5			
		80	197.6	195.6	193.2	190.0	186.5	182.5	177.5	172.4	166.8	160.7	154.3	148.0			
		86.6 (A100)	213.9	211.7	209.1	205.7	201.9	197.6	192.1	186.6	180.6	174.0	162.6	152.1			
		90 (F100)	222.3	220.1	217.4	213.7	209.9	205.4	199.7	193.9	187.3	174.7	162.6	152.1			
		100	247.0	244.5	241.5	237.5	233.2	228.2	214.1	200.2	187.3	174.7	162.6	152.1			

¹¹¹ For classification H2/B3 to DIN 15018¹¹² Rail material S355 (ST52) or better. k_{eff} = effective rail width with line contact. Crowned rails on request.



Permissible wheel load (max.) ¹¹¹	Classification to FEM (ISO) ¹¹²	Railhead width	Permissible ideal wheel loads R _{id zul} in [kN] at travel speed v in [m/min]											
R _{zul}		k _{eff}	8	10	12.5	16	20	25	32	40	50	63	80	100
[kN]		[mm]	[kN]											
	5m (M8)	48.3 (A55)	104.4	103.3	102.1	100.4	98.5	96.4	93.8	91.1	88.1	84.9	81.5	78.2
		50	108.1	107.0	105.7	103.9	102.0	99.8	97.1	94.3	91.2	87.9	84.4	81.0
		57 (A65)	123.2	121.9	120.4	118.4	116.3	113.8	110.6	107.5	104.0	100.2	96.2	92.3
		60	129.7	128.4	126.8	124.7	122.4	119.8	116.5	113.1	109.5	105.5	101.2	97.1
		64.3 (A75)	139.0	137.6	135.9	133.6	131.2	128.4	124.8	121.2	117.3	113.0	108.5	104.1
		70	151.3	149.8	147.9	145.5	142.8	139.8	135.9	132.0	127.7	123.1	118.1	113.3
		80	172.9	171.2	169.1	166.2	163.2	159.7	155.3	150.8	145.9	140.6	132.4	123.8
		86.6 (A100)	187.2	185.3	183.0	180.0	176.7	172.9	168.1	163.0	152.5	142.3	132.4	123.8
		90 (F100)	194.5	192.6	190.2	187.0	183.6	179.7	174.3	163.0	152.5	142.3	132.4	123.8
		100	216.1	213.9	211.3	207.8	200.7	187.7	174.3	163.0	152.5	142.3	132.4	123.8

 Maximum horizontal force: 20% of R_{zul}



○ Tochtergesellschaften/Subsidiaries

China Shanghai Tel +86 21 66083737 Fax +86 21 66083015 infochina@stahlcranes.com	India Chennai Tel +91 44 43523955 Fax +91 44 43523957 infoindia@stahlcranes.com	Singapore Singapore Tel +65 62712220 Fax +65 63771555 infosingapore@stahlcranes.com	United Arab Emirates Dubai Tel +971 4 8053700 Fax +971 4 8053701 infouae@stahlcranes.com
France Paris Tel +33 1 39985060 Fax +33 1 34111818 infofrance@stahlcranes.com	Italy S. Colombano Tel +39 0185 358391 Fax +39 0185 358219 infoitalia@stahlcranes.com	Spain Madrid Tel +34 91 4840865 Fax +34 91 4905143 infospain@stahlcranes.com	
Great Britain Birmingham Tel +44 121 7676400 Fax +44 121 7676485 infouk@stahlcranes.com	Portugal Lisbon Tel +351 21 4447160 Fax +351 21 4447169 ferrometal@stahlcranes.com	USA Charleston, SC Tel +1 843 7671951 Fax +1 843 7674366 infous@stahlcranes.com	

● Vertriebspartner/Sales partners

Die Adressen von über 100 Vertriebspartnern weltweit finden Sie im Internet auf www.stahlcranes.com unter Kontakt.
You will find the addresses of over 100 sales partners on the Internet at www.stahlcranes.com under contact.

Überreicht durch/Presented by



Россия ООО "КранШталь"
109451, г.Москва, ул. Верхние поля, д.28
тел./факс: +7 495 2253788
+7 495 9214517

info@stahlcranes.ru

➔ www.kranstahl.ru
➔ www.tali-market.ru
➔ www.servis-kran.ru
➔ www.stahlcranes.ru

STAHL
CraneSystems

