

07/2012 – English



# PRODUCT INFO

## UNDER RUNNING CRANE END CARRIAGE

**DU**  
**DR**

## Table of Contents

1.	DU 08.....	4
1.1	DU 08 TECHNICAL SPECIFICATION .....	4
1.2	DU 08 END CARRIAGE SPECIFICATION .....	5
1.3	DU 08 END CARRIAGE PRODUCT CODES .....	6
1.4	DU08 END CARRIAGE PRODUCT FILE .....	7
1.5	DU 08 END CARRIAGE JOINT PLATE TYPES .....	8
1.6	DU 08 CRANE DRIVES SPECIFICATION.....	9
2.	DU 10.....	10
2.1	DU 10 TECHNICAL SPECIFICATION .....	10
2.2	DU 10 END CARRIAGE SPECIFICATION .....	11
2.3	DU 10 END CARRIAGE PRODUCT CODES .....	12
2.4	DU10 END CARRIAGE PRODUCT FILE .....	13
2.5	DU 10 END CARRIAGE CONNECTION TYPES.....	14
2.6	DU10 CRANE DRIVES SPECIFICATION.....	15
3.	DU 13.....	16
3.1	DU 13 TECHNICAL SPECIFICATION .....	16
3.2	DU13 END CARRIAGE SPECIFICATION .....	17
3.3	DU 13 END CARRIAGE PRODUCT CODES .....	18
3.4	DU13 END CARRIAGE PRODUCT FILE .....	19
3.5	DU 13 END CARRIAGE CONNECTION TYPES.....	20
3.6	DU 13 CRANE DRIVES SPECIFICATION.....	21
4.	DR 10.....	22
4.1	DR 10 TECHNICAL SPECIFICATION .....	22
4.2	DR 10 END CARRIAGE SPECIFICATION .....	23
4.3	DR 10 END CARRIAGE PRODUCT CODES .....	24
4.4	DR10 END CARRIAGE PRODUCT FILE .....	25
4.5	DR 10 END CARRIAGE CONNECTION TYPES.....	26
4.6	DR 10 CRANE DRIVES SPECIFICATION.....	27
5.	DR 13.....	28
5.1	DR13 TECHNICAL SPECIFICATION .....	28
5.2	DR13 END CARRIAGE SPECIFICATION .....	29
5.3	DR13 END CARRIAGE PRODUCT CODES .....	30
5.4	DR13 END CARRIAGE PRODUCT FILE DRAWING.....	31
5.5	DR13 END CARRIAGE CONNECTION TYPES.....	32
5.6	DR 13 CRANE DRIVES SPECIFICATION FOR DR13 END CARRIAGE.....	33

6.	DR20.....	34
6.1	DR20 TECHNICAL SPECIFICATION .....	34
6.2	DR20 END CARRIAGE SPECIFICATION .....	35
6.3	DR20 END CARRIAGE PRODUCT CODES .....	36
6.4	DR20 END CARRIAGE PRODUCT FILE DRAWING .....	37
6.5	DR20 END CARRIAGE CONNECTION TYPES .....	38
6.6	DR20 CRANE DRIVES.....	39
7.	TRAVELING MACHINERIES PRODUCT CODE.....	40

# 1. DU 08

## 1.1 DU 08 TECHNICAL SPECIFICATION

### General

The crane design is based on the standard crane components for single girder industrial cranes. Selection of components and crane engineering is accomplished with CraneMaster tools (Sales Configuration tools). The exact range for cranes is determined by the available components, steel materials and design parameters used in each market area. New underrunning end carriages serie DU will replace the old series UK and UD in the future. At the moment, calculations, design and testing for under running end carriage having 80 mm wheel diameter is ready. Factory name for this new end carriage is DU08. DU08 will replace old end carriage UK10 and it is covering partially corner loads of UK13, UD10 end carriages.

Some benefits for new DU08 under running end carriages are: pre-designed connection types, wheel anti-dropping device and finger protection device to meet latest European safety requirements. As an options vertical and horizontal support rollers, earth brushes, patent track wheels, assembly help tool.

### Specification for DU08

<b>Maximum crane load</b>	2 t, (3.2 t with short span)
<b>Number of hoists</b>	1 or 2 pcs; 2 hoists with equal capacity, single or tandem drive
<b>Type of hoist</b>	Low or normal headroom (NOVA-type), SK-chain hoist
<b>Maximum span</b>	abt. 19 m profile girder, abt. 22 m box girder <sup>(2)</sup> (depending the corner load) Hook approach up to runway line <sup>(1)</sup>
<b>Type of girder</b>	Standard profiles or welded box; flange width up to 300 mm
<b>Hoisting speeds and control</b>	Acc. to NOVA-hoists utilized; 2-speed or freq. Ctrl
<b>Traversing speeds and control</b>	Acc. to NOVA-hoists; 2 ramp-freq. Ctrl
<b>Travelling speeds and control</b>	Max speed 40 m/min freq. ctrl; 25 m/min 2-speed
<b>Classification</b>	Hoisting M4-M6 (1Am-3m) Traversing M5-M6 (2m-3m) Crane travelling M4-M6 (1Am-3m) Crane A3-A5
<b>Trolley power supply</b>	Festoon or energy chain (option)
<b>Crane control</b>	Pendant or radio controller
<b>Crane power supply</b>	Flat cable or CraneDuctor-type conductor bar, towing arm fixing to end carriage with brackets
<b>Runway</b>	Beam flange width 73 to 313 mm <sup>(1)</sup>
<b>Options</b>	All applicable standard single girder crane options

(1) Further range available upon request (SP13 cranes)

(2) Depending on design parameters

## 1.2 DU 08 END CARRIAGE SPECIFICATION

<b>Corner load</b>	max 25 kN dynamic corner load
<b>Classification</b>	Fem E2 for steel structures
<b>Wheel base</b>	up to 2800 mm <sup>(1)</sup>
<b>Wheels</b>	Gasted iron wheels, material GJS700-2, cambered running surface
<b>Nr. Of wheels</b>	(4+4) / end carriage
<b>Track width</b>	73 – 313 mm <sup>(1)</sup> (Patent Track wheel starting 63 mm...)
<b>Track type</b>	Flat flange, rolled profile, patent track (option)
<b>Construction</b>	Rigid frame, flexible (articulated) wheel suspension, so runway need not to be exact.
<b>Travelling machinery</b>	NOVA-types machinery, using GEK gear Driven wheels at one side as standard.
<b>Joints</b>	Bolted type with joint plate, bolted type without joint plate, welded joints <b>Type SA3:</b> Bolted type with SA3-joint plate. Standard, Medium and High connections; Trolley reaches runway line using Standard connection. <b>Type BA_:</b> Bolted type without joint plate. Only Standard connection is possible. Trolley reaches runway line using Standard connection. <b>Type WA_:</b> Main girder welded to end carriage. Only Standard connection is possible via CraneMaster/CADMAN/DAS, Medium connection as SP13 design; Trolley reaches runway line using Standard connection.  Single girder type possible as standard <sup>(1)</sup> Girder width up to 300 mm.
<b>Protections</b>	Derailment device, anti-dropping device, wheel anti-dropping device, finger protection
<b>Buffers</b>	Standard buffers from NOVA-series acc. to load
<b>Options</b>	Patent track wheels, support rollers in vertical and horizontal direction, earth brush, assembly help tool, wheel sets (driving + idle)
<b>Surface treatment</b>	Finishing paint EP120/2-FeSa2½-RAL1028 or primary paint only (RAL 1006).

(1) Further range available upon request (SP13 cranes)

(2) Depending on design parameters

## 1.3 DU 08 END CARRIAGE PRODUCT CODES

### Code example (DU)

<b>DU</b>	<b>08</b>	<b>-</b>	<b>23</b>	<b>080</b>	<b>-</b>	<b>SA3</b>	<b>0000</b>	<b>C</b>	<b>0000</b>	<b>-</b>	<b>N</b>
1,2	3,4	5	6,7	BT08 8,9,10	11	12,13,14	15-18	BT19 19	20-23	24	25

Pos.	Code	Feature code	Feature	Available properties		
1,2	<b>DU</b>		Short product name	DU	Factory code (End carriage)	
3,4	<b>08</b>		Wheel diameter	08	80 mm	
5	<b>-</b>		Description	-	Standard B Bogie C Asymmetrical joint with single girder	
6,7	<b>23</b>		Wheelbase	<u>Wheel base dimension</u> 12 1200 mm 14 1400 mm 18 1800 mm 23 2300 mm 28 2800 mm	<u>Applicable end carriage</u> DU08 DU08 DU08 DU08 DU08	
8-10	<b>080</b>		Flange width	73-313	<u>Applicable end carriage</u> DU08 (63...158 with patent track)	
11	<b>-</b>		Number of driving wheels	- D S D	One driving wheel/end carriage Two driving wheels/end carriage One driving wheel/travel bogie pair Two driving wheels/travel bogie pair	
12-14	<b>SA3</b>		Joint type	SA3	<u>Bolted joints with joint plate</u> 4-bolt connection (B<300mm)  <u>Straight bolted joints W/O joint plate</u> 4-bolt connection	<u>Applicable end carriage</u> DU08  <u>Applicable end carriage</u> DU08, x=1, 2, 3
15-18	<b>0000</b>		Bolt joint distance	####	Joint plates distance between alignment pin centers with double girder.	
19	<b>C</b>	BT19	Buffer type	DU08	A, B, C, K, G	
20-23	<b>0000</b>		Bogie inner wheel distance	0000	No bogie type end carriage	
24	<b>-</b>		Colour code	- K	Standard primary paint Standard finishing paint	
25	<b>N</b>		Special properties	N E	Standard Special	

# 1.4 DU08 END CARRIAGE PRODUCT FILE

UNDER RUNNING END CARRIAGE, DU08

a) with MF06 motor and GEK2 gear combination.

Suitable buffers		
Code	D1 [mm]	L1 [mm]
A	63	53
B	80	68
C	100	85
K	80	80
G	100	100
E	100	150
A, B, C: Rubber		
K, G, E: Polyurethane		

Possible B-dimensions						
Wheels	B [mm]	L2 [mm]	L3 [mm]	L4 [mm]	Width [mm]	
Normal	73...120	26	26	41	306	
Normal	121...168	26	26	41	354	
Normal	169...216	26	26	41	402	
Normal	217...264	26	26	41	450	
Normal	265...313	26	26	41	498	
Patent	63...110	21	31	46	306	
Patent	111...158	21	31	46	354	

WHEELBASE [mm]	Max dyn corner load [kN]	L [mm]	Weight [kg]
1200	25	1530	110
1400	25	1730	117
1800	25	2130	131
2300	23	2630	148
2800	20	3130	165

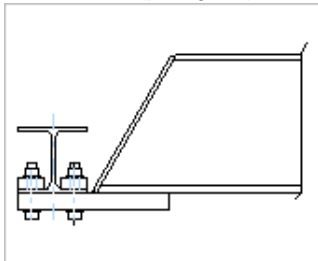
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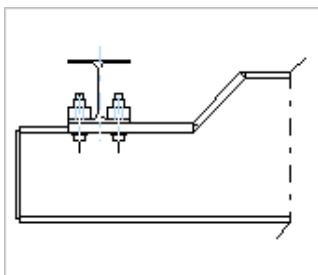
## 1.5 DU 08 END CARRIAGE JOINT PLATE TYPES

### Bolted connections with joint plate

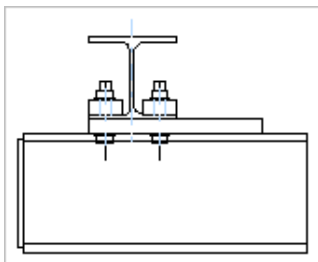
HIGH connection (profil girder)



MED connection (box and profil girder)

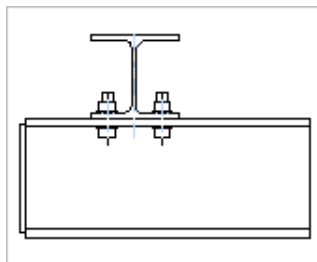


STD connection (box and profil girder)



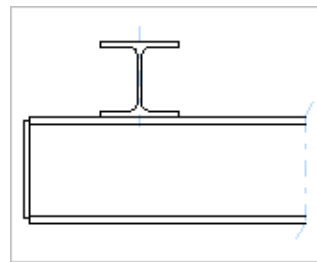
### Straightly bolted connections

STD connection (profil girder)



### Welded connections

STD connection (profil girder)





## 1.6 DU 08 CRANE DRIVES SPECIFICATION

<b>Nominal crane speeds, max</b>	20, 25, 32, 40 m/min
<b>Number of machinery / crane</b>	2 or 4
<b>Machinery type</b>	GEK2, (based on GEK1 gear, <u>but different outcoming axle to reach 40 m/min</u> )
<b>Motor types</b>	MF06LA-, MF06MA-
<b>Voltage</b>	All standard Q-travelling motor voltages
<b>Control method</b>	2-speed with frequency control, stepless frequency control
<b>Wheel diameters</b>	80 mm
<b>End truck types</b>	DU-underrunning end truck
<b>Reduction</b>	Open gear ratio included in drive train
<b>Cover for open gear ratio</b>	As standard
<b>Options</b>	All single girder top running crane options

## 2. DU 10

### 2.1 DU 10 TECHNICAL SPECIFICATION

#### General

The crane design is based on the standard crane components for single girder industrial cranes. Selection of components and crane engineering is accomplished with CraneMaster tools (Sales Configuration tools). The exact range for cranes is determined by the available components, steel materials and design parameters used in each market area. New underrunning end carriages serie DU will replace the old series UK and UD in the future. Design for under running end carriage having 100 mm wheel diameter is completed. Factory name for this new end carriage is DU10. DU10 will replace old end carriages UK13, UK16, UD10 and it is covering major part of the corner loads of the UD13 end carriages.

Some benefits for new DU10 under running end carriages are: pre-designed connection types, wheel anti-dropping device and finger protection device to meet latest European safety requirements. As an options vertical and horizontal support rollers, earth brushes, patent track wheels, assembly help tool and buffer extension.

#### Specification for DU10

<b>Maximum crane load</b>	5 t, (6.3 t with short span)
<b>Number of hoists</b>	1 or 2 pcs; 2 hoists with equal capacity, single or tandem drive
<b>Type of hoist</b>	Low or normal headroom (NOVA-type), SK-chain hoist
<b>Maximum span</b>	abt. 19 m profile girder, abt. 28 m box girder <sup>(2)</sup> (depending the corner load) Hook approach up to runway line <sup>(1)</sup>
<b>Type of girder</b>	Standard profiles or welded box; flange width up to 410 mm (450 mm)
<b>Hoisting speeds and control</b>	Acc. to NOVA-hoists utilized; 2-speed or freq. Ctrl
<b>Traversing speeds and control</b>	Acc. to NOVA-hoists; 2 ramp-freq. Ctrl
<b>Travelling speeds and control</b>	Max speed 40 m/min freq. ctrl; 25 m/min 2-speed
<b>Classification</b>	Hoisting M4-M6 (1Am-3m) Traversing M5-M6 (2m-3m) Crane travelling M4-M6 (1Am-3m) Crane A3-A5
<b>Trolley power supply</b>	Festoon or energy chain (option)
<b>Crane control</b>	Pendant or radio controller
<b>Crane power supply</b>	Flat cable or CraneDuctor-type conductor bar, towing arm fixing to end carriage with brackets
<b>Runway</b>	Beam flange width 82 to 322 mm <sup>(1)</sup>
<b>Options</b>	All applicable standard single girder crane options

(1) Further range available upon request (SP13 cranes)

(2) Depending on design parameters

## 2.2 DU 10 END CARRIAGE SPECIFICATION

<b>Corner load</b>	max 46 kN dynamic corner load
<b>Classification</b>	Fem E2 for steel structures
<b>Wheel base</b>	up to 3500 mm <sup>(1)</sup>
<b>Wheels</b>	Cast iron wheels, material GJS700-2, cambered running surface
<b>Nr. Of wheels</b>	(4+4) / end carriage
<b>Track width</b>	82 – 322 mm <sup>(1)</sup> (Patent Track wheel starting from width 61 mm...)
<b>Track type</b>	Flat flange, rolled profile, patent track (option)
<b>Construction</b>	Rigid frame, flexible (articulated) wheel suspension, so runway does not need to be exact.
<b>Travelling machinery</b>	NOVA-types machinery, using GEK gear Driven wheels at one side as standard.
<b>Joints</b>	Bolted type with joint plate, bolted type without joint plate, welded joints <b>Type SB4:</b> Bolted type with SB4-joint plate. Standard and Medium Connections; Hoist reaches runway line using Standard connection. <b>Type BB_:</b> Bolted type without joint plate. Only Standard connection is possible. Hoist reaches runway line using Standard connection. <b>Type WB_:</b> Main girder welded to end carriage. Only Standard connection is possible. via CraneMaster/CADMAN/DAS; Hoist reaches runway line using Standard connection.  Single girder type possible as standard <sup>(1)</sup> Girder width up to 410 mm (450 mm).
<b>Protections</b>	Derailment device, anti-dropping device, wheel anti-dropping device, finger protection
<b>Buffers</b>	Standard buffers from NOVA-series acc. to load
<b>Options</b>	Patent track wheels, support rollers in vertical and horizontal direction, earth brush, assembly help tool, buffer extension, wheel sets (driving + idle)
<b>Surface treatment</b>	Finishing paint EP120/2-FeSa2½-RAL1028 or primary paint only (RAL 7038, gray).
<b>(*)</b>	Current volume together with High type frame DU10H. In DU10H the frame is not an I-beam, but 2 pcs U-beams positioned to sides of runway beam to get main girder as up as possible

(1) Further range available upon request (SP13 cranes)

(2) Depending on design parameters

## 2.3 DU 10 END CARRIAGE PRODUCT CODES

### Code example (DU)

<b>DU</b>	<b>08</b>	<b>-</b>	<b>23</b>	<b>080</b>	<b>-</b>	<b>SA3</b>	<b>0000</b>	<b>C</b>	<b>0000</b>	<b>-</b>	<b>N</b>
1,2	3,4	5	6,7	BT08 8,9,10	11	12,13,14	15-18	BT19 19	20-23	24	25

Pos.	Code	Feature code	Feature	Available properties	
1,2	<b>DU</b>		Short product name	DU	Factory code (End carriage)
3,4	<b>08</b>		Wheel diameter	08 10	80 mm 100 mm
5	<b>-</b>		Description	- B C	Standard Bogie Asymmetrical joint with single girder
6,7	<b>23</b>		Wheelbase	<u>Wheel base dimension</u> 12 1200 mm 14 1400 mm 18 1800 mm 23 2300 mm 28 2800 mm 32 3200 mm 35 3500 mm	<u>Applicable end carriage</u> DU08, DU10 DU08, DU10 DU08, DU10 DU08, DU10 DU08, DU10 DU10 DU10
8-10	<b>080</b>		Flange width	73-313 82-322	<u>Applicable end carriage</u> DU08 (63...158 with patent track) DU10 (61...157 with patent track)
11	<b>-</b>		Number of driving wheels	- D S D	One driving wheel/end carriage Two driving wheels/end carriage One driving wheel/travel bogie pair Two driving wheels/travel bogie pair
12-14	<b>SA3</b>		Joint type	SA3 SB4	<u>Bolted joints with joint plate</u> 4-bolt connection (B<300 mm) 4-bolt connection (B<410 mm) <u>Applicable end carriage</u> DU08 DU10
				BAx BBx	<u>Straight bolted joints W/O joint plate</u> 4-bolt connection 4-bolt connection <u>Applicable end carriage</u> DU08, x=1, 2, 3 DU10, x=2, 3, 4, 5
15-18	<b>0000</b>		Bolt joint distance	####	Joint plates distance between alignment pin centers with double girder. 0000 With single girder, dimension from driving wheel to pin with asymmetrical joint.
19	<b>C</b>	BT19	Buffer type	DU08 DU10	A, B, C, K, G A, B, C, K, G A...C Rubber buffers K...G Polyurethane buffers 0 No buffer
20-23	<b>0000</b>		Bogie inner wheel distance	0000	No bogie type end carriage
24	<b>-</b>		Colour code	- K	Standard primary paint Standard finishing paint
25	<b>N</b>		Special properties	N E	Standard Special

## 2.4. DU10 END CARRIAGE PRODUCT FILE

UNDER RUNNING END CARRIAGE, DU10

a) with MF06 motor and GEK2 gear combination.

Code	D1 [mm]	L1 [mm]
A	63	53
B	80	68
C	100	85
K	80	80
G	100	100
E	100	150

A, B, C: Rubber  
K, G, E: Polyurethane

Wheels	B [mm]	L2 [mm]	L3 [mm]	L4 [mm]	Width [mm]
Normal	82...130	31.5	25.5	41.5	325
Normal	131...178	31.5	25.5	41.5	373
Normal	179...226	31.5	25.5	41.5	421
Normal	227...274	31.5	25.5	41.5	469
Normal	275...322	31.5	25.5	41.5	517
Patent	61...109	21	36	52	325
Patent	110...157	21	36	52	373

WHEELBASE [mm]	Max dyn corner load [kN]	L [mm]	Weight [kg]	H [mm]
1200	46	1590	161	180
1400	46	1790	171	180
1800	46	2190	191	180
2300	46	2690	217	180
2800	46	3190	275	200
3200	44	3590	299	200
3500	40	3890	318	200

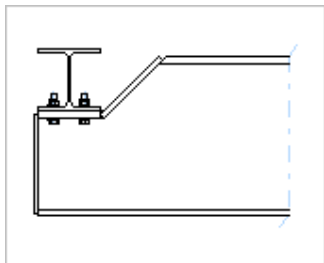
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## 2.5 DU 10 END CARRIAGE CONNECTION TYPES

### Bolted connections with joint plate

MED connection  
(box and profile girder)



### Straightly bolted connections

MED connection  
N/A

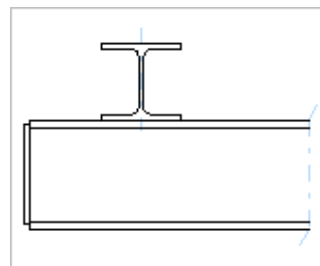
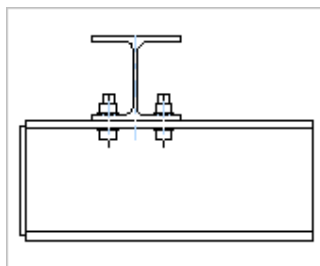
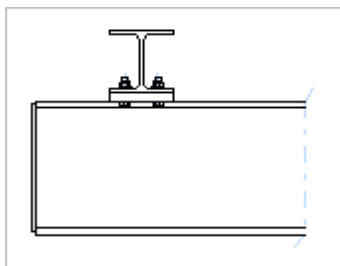
### Welded connections

MED connection  
N/A

STD connection  
(box and profile girder)

STD connection  
(profile girder)

STD connection  
(profile girder)



## 2.6 DU10 CRANE DRIVES SPECIFICATION

<b>Nominal crane speeds, max</b>	20, 25, 32, 40 m/min
<b>Number of machinery / crane</b>	2 or 4
<b>Machinery type</b>	GEK2, (based on GEK1 gear, <u>but different outcoming axle to reach 40 m/min</u> )
<b>Motor types</b>	MF06LA-, MF06MA-
<b>Voltage</b>	All standard NOVA-travelling motor voltages
<b>Control method</b>	2-speed with frequency control, stepless frequency control
<b>Wheel diameters</b>	100 mm
<b>End truck types</b>	DU-underrunning end truck
<b>Reduction</b>	Open gear ratio included in drive train
<b>Cover for open gear ratio</b>	As standard
<b>Options</b>	All single girder top running crane options

### 3. DU 13

#### 3.1 DU 13 TECHNICAL SPECIFICATION

##### General

The crane design is based on the standard crane components for single girder industrial cranes. Selection of components and crane engineering is accomplished with CraneMaster program. The exact range for cranes is determined by the available components, steel materials and design parameters used in each market area. New underrunning end carriages serie DU will replace the old series UK and UD in the future. Design for under running end carriage having 125 mm wheel diameter is completed. Factory name for this new end carriage is DU13. DU13 will replace rest of end carriage UD13 and it is covering the corner loads of the UD16 end carriages.

Some benefits for new DU13 under running end carriages are: pre-designed connection types, wheel anti-dropping device and finger protection device to meet latest European safety requirements. As an options vertical and horizontal support rollers, earth brushes, patent track wheels, assembly help tool and buffer extension. A bogie construction will also be available for bigger under running cranes.

##### Specification for DU13

<b>Maximum crane load</b>	10 t, (12.5 t with short span)
<b>Type of hoist</b>	Low or normal headroom (Nova-type), SK-chain hoist,
<b>Maximum span</b>	Abt. 19 m profile girder, abt. 28 m box girder <sup>(2)</sup> (depending the corner load) Hook approach up to runway line <sup>(1)</sup>
<b>Type of girder</b>	Standard profiles or welded box; flange width up to 510 mm
<b>Hoisting speeds and control</b>	Acc. to NOVA-hoists utilized; 2-speed or freq. Ctrl
<b>Traversing speeds and control</b>	Acc. to NOVA-hoists; 2 ramp-freq. Ctrl
<b>Travelling speeds and control</b>	Max speed 40 m/min freq. ctrl; 25 m/min 2-speed
<b>Classification</b>	Hoisting M4-M6 (1Am-3m) Traversing M5-M6 (2m-3m) Crane travelling M4-M6 (1Am-3m) Crane A3-A5
<b>Trolley power supply</b>	Festoon or energy chain (option)
<b>Crane control</b>	Pendant or radio controller
<b>Crane power supply</b>	Flat cable or CraneDuctor-type conductor bar, towing arm fixing to end carriage with brackets
<b>Runway</b>	Beam flange width 100 to 343 mm <sup>(1)</sup>
<b>Options</b>	All applicable standard single girder crane options

(1) Further range available upon request (SP13 cranes)

(2) Depending on design parameters



## 3.2 DU13 END CARRIAGE SPECIFICATION

<b>Corner load</b>	max 80.5 kN dynamic corner load
<b>Classification</b>	Fem E2 for steel structures
<b>Wheel base</b>	up to 3500 mm <sup>(1)</sup>
<b>Wheels</b>	Cast iron wheels, material GJS700-2, cambered running surface
<b>Nr. Of wheels</b>	(4+4) / end carriage
<b>Track width</b>	100 – 343 mm <sup>(1)</sup> (Patent Track wheel starting from width 64 mm...)
<b>Track type</b>	Flat flange, rolled profile, patent track (option)
<b>Construction</b>	Rigid frame, flexible (articulated) wheel suspension, runway does not need to be exact
<b>Travelling machinery</b>	Nova-types machinery, using GEK gear Driven wheels at one side as standard.
<b>Joints</b>	Bolted type with joint plate, bolted type without joint plate, welded joints <b>Type SC_:</b> Bolted type with SC_-joint plate. Standard and Medium Connections; Hoist reaches runway line using Standard connection. <b>Type BC_:</b> Bolted type without joint plate. Only Standard connection is possible. Hoist reaches runway line using Standard connection. <b>Type WC_:</b> Main girder welded to end carriage. Only Standard connection is possible. via CraneMaster/CADMAN/DAS; Hoist reaches runway line using Standard connection.
<b>Protections</b>	Single girder type possible as standard <sup>(1)</sup>
<b>Buffers</b>	Girder width up to 510 mm. Derailment device, anti-dropping device, wheel anti-dropping device, finger protection
<b>Options</b>	Standard buffers from Nova-series acc. to load Patent track wheels, support rollers in vertical and horizontal direction, earth brush, assembly help tool, buffer extension, wheel sets (driving + idle), bogie construction
<b>Surface treatment</b>	Finishing paint EP120/2-FeSa2½-RAL1028 or primary paint only (gray colour)
<b>Other</b>	Field assembly instructions to be created

(1) Further range available upon request (SP13 cranes)

(2) Depending on design parameters

### 3.3 DU 13 END CARRIAGE PRODUCT CODES

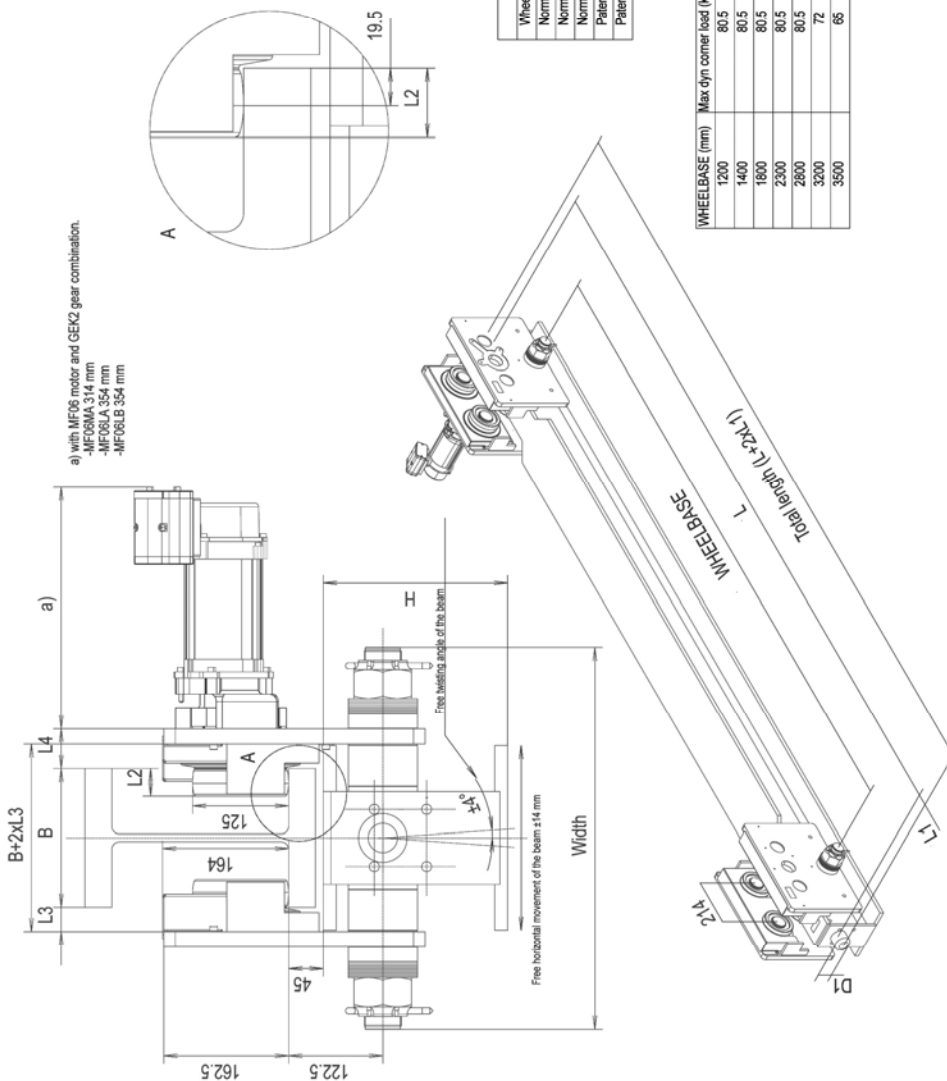
Code example (DU13)

Pos.	Code	Feature code	Feature	Available properties								
1,2	<b>DU</b>	GE19	Short product name	DU	Factory code (End carriage)							
3,4	<b>13</b>	WHE01	Wheel diameter	08	80 mm	DU08						
				10	100 mm	DU10						
				13	125 mm	DU13						
5	-		Description	-	Standard							
				B	Bogie							
				C	Asymmetrical joint with single girder							
6,7	<b>23</b>	WHE02	Wheelbase	<u>Wheel base dimension</u>				<u>Applicable end carriage</u>				
				12	1200 mm	DU08, DU10, DU13						
				14	1400 mm	DU08, DU10, DU13						
				18	1800 mm	DU08, DU10, DU13						
				23	2300 mm	DU08, DU10, DU13						
				28	2800 mm	DU08, DU10, DU13						
				32	3200 mm	DU10, DU13						
				35	3500 mm	DU10, DU13						
8-10	<b>100</b>	DIM09	Flange width	<u>Applicable end carriage</u>								
				73...313	DU08 (63...158 with patent track)							
				82...322	DU10 (61...157 with patent track)							
				100...343	DU13 (64...223 with patent track)							
11	-		Number of driving wheels	-	One driving wheel/end carriage							
				D	Two driving wheels/end carriage							
				S	One driving wheel/travel bogie pair							
				D	Two driving wheels/travel bogie pair							
12-14	<b>SC4</b>	DES08	Joint type	<u>Bolted joints with joint plate</u>				<u>Applicable end carriage</u>				
				SA3	4-bolt connection, M16-bolts, B<300 mm				DU08			
				SB4	4-bolt connection, M20-bolts, B<410 mm				DU10			
				SC3	8-bolt connection, M20-bolts, B<310 mm				DU13			
				SC4	8-bolt connection, M20-bolts, B<410 mm				DU13			
				SC5	8-bolt connection, M20-bolts, B<510 mm				DU13			
				<u>Straight bolted joints W/O joint plate</u>				<u>Applicable end carriage</u>				
				BA1	4-bolt connection, M16-bolts, B<203 mm				DU08, x=1			
				BA2	4-bolt connection, M16-bolts, B<253 mm				DU08, x=2			
				BA3	4-bolt connection, M16-bolts, B<320 mm				DU08, x=3			
				BB2	4-bolt connection, M20-bolts, B<265 mm				DU10, x=2			
				BB3	4-bolt connection, M20-bolts, B<315 mm				DU10, x=3			
				BB4	4-bolt connection, M20-bolts, B<415 mm				DU10, x=4			
				BB5	4-bolt connection, M20-bolts, B<450 mm				DU10, x=5			
				BC3	8-bolt connection, M20-bolts, B<315 mm				DU13, x=3			
BC4	8-bolt connection, M20-bolts, B<415 mm				DU13, x=4							
BC5	8-bolt connection, M20-bolts, B<450 mm				DU13, x=5							
<u>Welded joints W/O joint plate</u>				<u>Applicable end carriage</u>								
WA_				DU08								
WB_				DU10								
WC_				DU13								
15-18	<b>0000</b>		Bolt joint distance	####	Joint plates distance between alignment pin centers with double girder.		0000	With single girder, dimension from driving wheel to pin with asymmetrical joint.				
19	<b>C</b>	(DES09)	Buffer type	DU08	A, B, C, K, G, E		A, B, C, D	Rubber buffers				
				DU10	A, B, C, K, G, E		K, G, E, M, F	Polyurethane buffers				
				DU13	A, B, C, D, K, G, E, M, F		0	No buffer				
20-23	<b>0000</b>	DIM29	Bogie inner wheel distance	0000	No bogie type end carriage							
24	-		Colour code	-	Standard primary paint							
				K	Standard finishing paint							
25	<b>N</b>		Special properties	N	Standard							
				E	Special							

### 3.4 DU13 END CARRIAGE PRODUCT FILE



a) with MF06 motor and GEK2 gear combination.  
 -MF06MA 314 mm  
 -MF06LA 354 mm  
 -MF06LB 354 mm



Suitable buffers		
Code	D1 (mm)	L1 (mm)
A	63	53
B	80	68
C	100	85
D	125	105
K	80	80
G	100	100
E	100	150
M	125	125
F	125	190
A, B, C, D Rubber		
K, G, E, M, F Polyurethane		

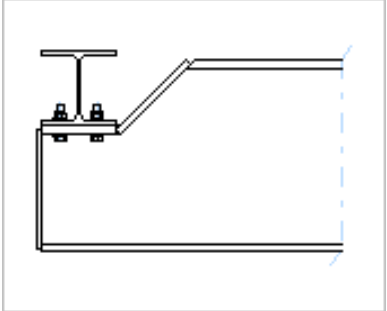
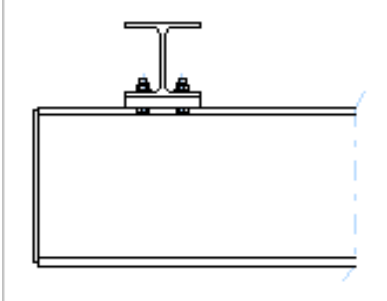
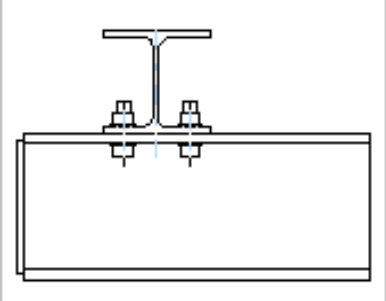
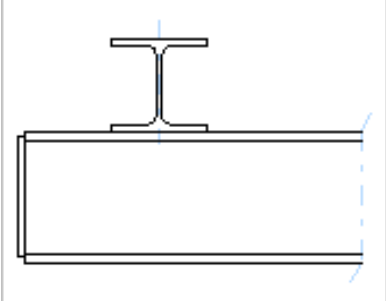
Wheels	Possible B-dimensions				Width (mm)
	B (mm)	L2 (mm)	L3 (mm)	L4 (mm)	
Normal	100...179	36	32	52	418
Normal	180...259	36	32	52	468
Normal	260...343	36	32	52	578
Patent	64...143	20	50	70	418
Patent	144...223	20	50	70	468

WHEELBASE (mm)	Max dyn corner load (kN)	L (mm)	Weight (kg)	H (mm)
1200	80.5	1680	300	220
1400	80.5	1860	314	220
1600	80.5	2290	343	220
2300	80.5	2790	378	220
2800	80.5	3290	453	240
3200	72	3680	468	240
3500	65	3690	511	240

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D103981-A 2008-10-10 DU13

### 3.5 DU 13 END CARRIAGE CONNECTION TYPES

Bolted connections with joint plate	Straight bolted connections	Welded connections
MED connection(box and profile girder) SC3, SC4, SC5 plates	MED connection N/A	MED connection N/A
	N/A	N/A
STD connection(box and profile girder) SC3, SC4, SC5 plates	STD connection(profile girder) BC3, BC4, BC5 joints	STD connection (profile girder)
		

### 3.6 DU 13 CRANE DRIVES SPECIFICATION

<b>Nominal crane speeds, max</b>	20, 25, 32, 40 m/min
<b>Number of machinery / crane</b>	2 or 4
<b>Machinery type</b>	GEK2, (based on GEK1 gear, <u>but different outcoming axle to reach 40 m/min</u> )
<b>Motor types</b>	MF06LA-, MF06MA-, MF06LB-
<b>Voltage</b>	All standard NOVA-travelling motor voltages
<b>Control method</b>	2-speed with frequency control, stepless frequency control
<b>Wheel diameters</b>	125 mm
<b>End truck types</b>	DU-underrunning end truck
<b>Reduction</b>	Open gear ratio included in drive train
<b>Cover for open gear ratio</b>	As standard
<b>Options</b>	All single girder top running crane options

## 4. DR 10

### 4.1 DR 10 TECHNICAL SPECIFICATION

#### General

The crane design is based on the standard crane components for single girder industrial cranes. Selection of components and crane engineering is accomplished with CraneMaster tools (Sales Configuration tools). The exact range for Q-cranes is determined by the available components, steel materials and design parameters used in each market area.

New underrunning end carriages serie DR (together with DU series) will replace the old series UK and UD in the future. Design, calculations and testing for under running end carriage having 100 mm wheel diameter is completed. Factory name for this new end carriage is DR10. DR10 will replace old end carriages UK13, UK16, UD10 and it is covering major part of the corner loads of the UD13 end carriages.

Some benefits for new DR10 under running end carriages are: pre-designed connection types, wheel anti-dropping device and finger protection device to meet latest European safety requirements. As an options vertical or horizontal support rollers, earth brushes, patent track wheels, assembly help tool and buffer extension. With DR design, crane can go as up as possible, i.e. as close to runway beam as possible.

#### Specification for DR10

<b>Maximum crane load</b>	5 t, (6.3 t with small spans)
<b>Number of hoists</b>	1 or 2 pcs; 2 hoists with equal capacity, single or tandem drive
<b>Type of hoist</b>	Low or normal headroom (NOVA-type), SK-chain hoist
<b>Maximum span</b>	abt. 19 m profile girder, abt. 22 m box girder <sup>(2)</sup> (depending on the corner load) Hook approach up to runway line <sup>(1)</sup>
<b>Type of girder</b>	Standard profiles or welded box; flange width up to 410 mm (450 mm)
<b>Hoisting speeds and control</b>	Acc. to NOVA-hoists utilized; 2-speed or freq. Ctrl
<b>Traversing speeds and control</b>	Acc. to NOVA-hoists; 2 ramp-freq. Ctrl
<b>Travelling speeds and control</b>	Max speed 40 m/min freq. ctrl; 25 m/min 2-speed
<b>Classification</b>	Hoisting M4-M6 (1Am-3m) Traversing M5-M6 (2m-3m) Crane travelling M4-M6 (1Am-3m) Crane A3-A5
<b>Trolley power supply</b>	Festoon or energy chain (option)
<b>Crane control</b>	Pendant or radio controller
<b>Crane power supply</b>	Flat cable or CraneDuctor-type conductor bar, towing arm fixing to end carriage with brackets
<b>Runway</b>	Beam flange width 82 to 322 mm <sup>(1)</sup>
<b>Options</b>	All applicable standard single girder crane options

(1) Further range available upon request (SP13 cranes)

(2) Depending on design parameters

## 4.2 DR 10 END CARRIAGE SPECIFICATION

<b>Corner load</b>	max 46 kN dynamic corner load
<b>Classification</b>	Fem E2 for steel structures
<b>Wheel base</b>	up to 2800 mm <sup>(1)</sup>
<b>Wheels</b>	Cast iron wheels, material GJS700-2, cambered running surface: contact point 17.5 mm from runway beam, so local stresses of bottom flange of the runway beam are smaller.
<b>Nr. Of wheels</b>	(4+4) / end carriage
<b>Track width</b>	82 – 322 mm <sup>(1)</sup> (Patent Track wheel starting 61 mm...)
<b>Track type</b>	Flat flange, rolled profile, patent track (option)
<b>Construction</b>	Rigid frame, flexible (articulated) wheel suspension, where end carriage beam can slide +/- 11 mm and rotate +/- 4 degrees, so runway need not to be so exact.
<b>Travelling machinery</b>	NOVA-types machinery, using GEK gear Driven wheels at one side as standard.
<b>Joints</b>	Bolted type with joint plate, bolted type without joint plate, welded joints
	<b>Type HB4:</b> Bolted type with HB4-joint plate. Standard and Medium Connections; Hoist reaches runway line using Standard connection.
	<b>Type KB2, KB3, KB4, KB5:</b> Bolted type without joint plate. Only Standard connection is possible. Hoist reaches runway line using Standard connection.
	Single girder type possible as standard <sup>(1)</sup> Girder width up to 410 mm (450 mm).
<b>Protections</b>	Derailment device, anti-dropping device, wheel anti-dropping device, finger protection
<b>Buffers</b>	Standard buffers from NOVA-series acc. to load
<b>Options</b>	Patent track wheels, support rollers in vertical and horizontal direction, earth brush, assembly help tool, buffer extension, wheel sets (driving + idle)
<b>Surface treatment</b>	Finishing paint EP120/2-FeSa2½-RAL1028 or primary paint only (RAL 7038, gray).
<b>(*)</b>	Current volume together with DU10 type. In DU10, the frame is an I-beam.

(1) Further range available upon request (SP13 cranes)

(2) Depending on design parameters

## 4.3 DR 10 END CARRIAGE PRODUCT CODES

### Code example (DR)

DR	10	-	23	082	-	KB3	0000	C	0000	-	N
1,2	3,4	5	6,7	BT08 8,9,10	11	12,13,14	15-18	BT19 19	20-23	24	25

Pos.	Code	Feature code	Feature	Available properties	
1,2	DR	GE19	Short product name	DR	Factory code (End carriage)
3,4	10		Wheel diameter	10	100 mm
5	-		Description	-	Standard B Bogie C Asymmetrical joint with single girder
6,7	23	WHE02	Wheelbase	<u>Wheel base dimension</u>	<u>Applicable end carriage</u>
				14	1400 mm DR10
				18	1800 mm DR10
				23	2300 mm DR10
				28	2800 mm DR10
8-10	082		Flange width	82-322	<u>Applicable end carriage</u> DU10 (61...157 with patent track)
11	-		Number of driving wheels	-	One driving wheel/end carriage D Two driving wheels/end carriage S One driving wheel/travel bogie pair D Two driving wheels/travel bogie pair
12-14	SA3		Joint type	<u>Bolted joints with joint plate</u>	<u>Applicable end carriage</u>
				HB4	4-bolt connection (B<410 mm) DR10
				<u>Straight bolted joints W/O joint plate</u>	<u>Applicable end carriage</u>
				KBx	4-bolt connection DR10, x=2, 3, 4, 5
15-18	0000		Bolt joint distance	####	Joint plates distance between alignment pin centers with double girder. 0000 With single girder, dimension from driving wheel to pin with asymmetrical joint.
19	C	BT19	Buffer type	DR10	A, B, C, K, G A...C Rubber buffers K...G Polyurethane buffers 0 No buffer
20-23	0000		Bogie inner wheel distance	0000	No bogie type end carriage
24	-		Colour code	-	Standard primary paint K Standard finishing paint
25	N		Special properties	N	Standard E Special



## 4.4 DR10 END CARRIAGE PRODUCT FILE

UNDER RUNNING END CARRIAGE, DR10

a) with MF06 motor and GEK2 gear combination.

Free twisting angle of the beam

< Free horizontal movement of the beam  $\pm 11$  mm >

Suitable buffers		
Code	D1 [mm]	L1 [mm]
A	63	53
B	80	68
C	100	85
K	80	80
G	100	100
E	100	150
A, B, C: Rubber K, G: Polyurethane		

Possible B-dimensions							
Wheels	B [mm]	L2 [mm]	L3 [mm]	L4 [mm]	Width [mm]	W1 [mm]	W2 [mm]
Normal	82...130	31.5	25.5	41.5	325	360	211
Normal	131...178	31.5	25.5	41.5	373	360	211
Normal	179...226	31.5	25.5	41.5	421	505	356
Normal	227...274	31.5	25.5	41.5	469	505	356
Normal	275...322	31.5	25.5	41.5	517	505	356
Patent	61...109	21	36	52	325	360	211
Patent	110...157	21	36	52	373	360	211

WHEELBASE [mm]	Max dyn corner load [kN]	L [mm]	L5 [mm]	Weight [kg]	H [mm]	H1 [mm]
1400	46	1790	440	285	180	180
1800	46	2190	840	305	180	180
2300	46	2690	1340	330	180	180
2800	46	3190	1840	370	180	200

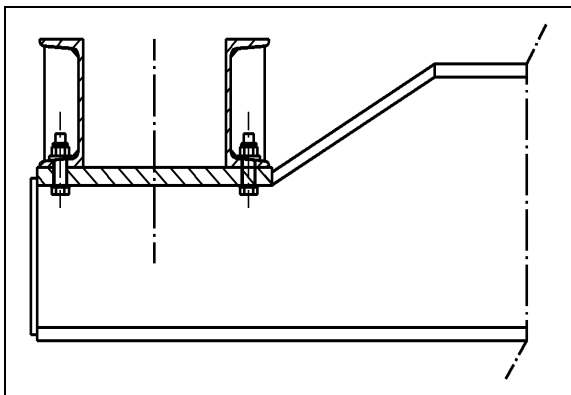
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D005016-A\_4 2008-06-05 UR10

## 4.5 DR 10 END CARRIAGE CONNECTION TYPES

### Bolted connections with joint plate type

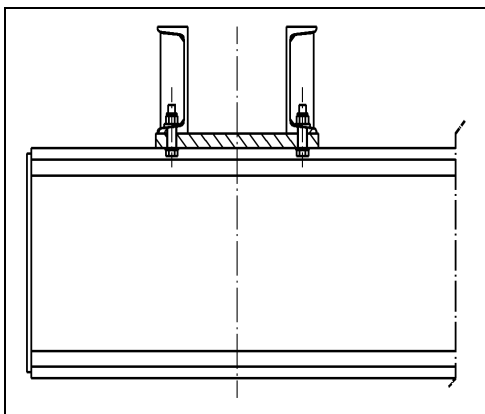
MED connection  
(box and profile girder), joint plate type HB4



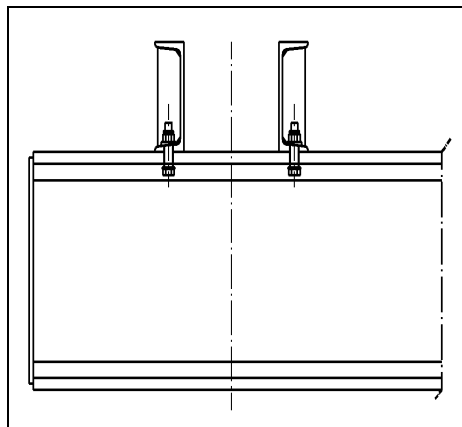
### Straightly bolted connections

MED connection  
N/A

STD connection  
(box and profile girder), joint plate type HB4  
KB5



STD connection  
(profile girder), joint plate type KB2, KB3, KB4,  
KB5



## 4.6. DR 10 CRANE DRIVES SPECIFICATION

<b>Nominal crane speeds, max</b>	20, 25, 32, 40 m/min
<b>Number of machinery / crane</b>	2 or 4
<b>Machinery type</b>	GEK2, (based on GEK1 gear, <u>but different outcoming axle to reach 40 m/min</u> )
<b>Motor types</b>	MF06LA-, MF06MA-
<b>Voltage</b>	All standard NOVA-travelling motor voltages
<b>Control method</b>	2-speed with frequency control, stepless frequency control
<b>Wheel diameters</b>	100 mm
<b>End truck types</b>	DR-underrunning end truck
<b>Reduction</b>	Open gear ratio included in drive train
<b>Cover for open gear ratio</b>	As standard
<b>Options</b>	All single girder top running crane options

## 5. DR 13

### 5.1 TECHNICAL SPECIFICATION

#### General

The crane design is based on the standard crane components for single girder industrial cranes. Selection of components and crane engineering is accomplished with CraneMaster tools (Sales Configuration tools). The exact range for cranes is determined by the available components, steel materials and design parameters used in each market area.

New under running end carriages series DR (together with DU series) replaces the old series UK and UD. Design, calculations and testing for under running end carriage having 125 mm wheel diameter is completed. Factory name for this new end carriage is DR13. **DR13** (together with DU13 end carriage) **are replacing old end carriages US16**.

Some **benefits** for new DR13 under running end carriages are:

- pre-designed connection types,
- wheel anti-dropping device and finger protection device to meet latest European safety requirements.
- As an options vertical or horizontal support rollers, earth brushes, patent track wheels, assembly help tool and buffer extension.
- With DR design, crane can go as up as possible, i.e. as close to runway beam as possible.

#### Specification for cranes with DR13 end carriage

<b>Maximum crane load</b>	10 t, (12.5 t with small spans)
<b>Type of hoist</b>	Low or normal headroom (NOVA-type), SK-chain hoist
<b>Maximum span</b>	abt. 19 m profile girder, abt. 28 m box girder <sup>(2)</sup> (depending on the corner load) Hook approach up to runway line <sup>(1)</sup>
<b>Type of girder</b>	Standard profiles or welded box; flange width up to 510 mm
<b>Hoisting speeds and control</b>	Acc. to NOVA-hoists utilized; 2-speed or frequency control
<b>Traversing speeds and control</b>	Acc. to NOVA-hoists; 2 ramp-frequency control
<b>Travelling speeds and control</b>	Max speed 40 m/min frequency control; 25 m/min 2-speed
<b>Classification</b>	Hoisting M4-M6 (1Am-3m) Traversing M5-M6 (2m-3m) Crane travelling M4-M6 (1Am-3m) Crane A3-A5
<b>Trolley power supply</b>	Festoon or energy chain (option)
<b>Crane control</b>	Pendant or radio controller
<b>Crane power supply</b>	Flat cable or CraneDuctor-type conductor bar, towing arm fixing to end carriage with brackets
<b>Runway</b>	Beam flange width 100 to 343 mm <sup>(1)</sup>
<b>Options</b>	All applicable standard single girder crane options

(1) Further range available upon request (SP13 cranes)

(2) Depending on design parameters

## 5.2 END CARRIAGE SPECIFICATION

<b>Corner load</b>	max 80.5 kN dynamic corner load
<b>Classification</b>	Fem E2 for steel structures, corner load decreased for higher groups
<b>Wheel base</b>	up to 3500 mm <sup>(1)</sup>
<b>Wheels</b>	Cast iron wheels, material GJS700-2, cambered running surface: <b>contact point 19.5 mm from runway beam</b> , local stresses of bottom flange of the runway beam are smaller.
<b>Nr. Of wheels</b>	(4+4) / end carriage
<b>Track width</b>	100 – 343 mm <sup>(1)</sup> (Patent Track wheel starting 64 mm...)
<b>Track type</b>	Flat flange, rolled profile, patent track (option)
<b>Construction</b>	Rigid frame, flexible (articulated) wheel suspension, where end carriage beam can slide +/- 14 mm and rotate +/- 4 degrees, so runway need not to be so exact.
<b>Travelling machinery</b>	NOVA-types machinery, using GEK gear Driven wheels at one side as standard.
<b>Joints</b>	Bolted type with joint plate, bolted type without joint plate <b>Type HC3, HC4, HC5:</b> Bolted type with HB_-joint plates. Standard and medium connections; Hoist reaches runway line using standard connection. <b>Type KC3, KC4, KC5:</b> Bolted type <b>without</b> joint plates. Only standard connection is possible. Hoist reaches runway line using standard connection. Single girder type possible as standard <sup>(1)</sup> Girder width up to 510 mm.
<b>Protections</b>	Derailement device, anti-dropping device, wheel anti-dropping device, finger protection
<b>Buffers</b>	Standard buffers from NOVA-series according to load
<b>Options</b>	Patent track wheels, support rollers in vertical and horizontal direction, earth brush, assembly help tool, buffer extension, wheel sets (driving + idle)
<b>Volumes</b>	Current volume abt. 400 pcs/a. <sup>(3)</sup>
<b>Surface treatment</b>	Finishing paint EP120/2-FeSa2½-RAL1028 or primary paint only (RAL 7038, gray).
<b>Other</b>	Field assembly instructions to be created

(1) Further range available upon request (SP13 cranes)

(2) Depending on design parameters

(3) Current volume together with DU13 type. In DU13, the frame is an I-beam.

## 5.3 END CARRIAGE PRODUCT CODES

### Factory code example (Factory: DR)

<b>DR</b> GE19 1,2	<b>13</b> WHE01 3,4	- 5	<b>23</b> WHE02 6,7	<b>125</b> DIM09 8,9,10	- 11	<b>KC3</b> DES08 12,13,14	<b>0000</b> 15-18	<b>C</b> (DES09) 19	<b>0000</b> DIM29 20-23	- 24	<b>N</b> 25
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Pos.	Code	Feature code	Feature	Available properties	
1,2	<b>DR</b>	GE19	Short product name	UR	Factory code (End carriage)
3,4	<b>13</b>	WHE01	Wheel diameter	10 13	100 mm 125 mm
5	-		Description	- B C	Standard Bogie Asymmetrical joint with single girder
6,7	<b>23</b>	WHE02	Wheelbase	<u>Wheel base dimension</u> 14 18 23 28 32 35	<u>Applicable end carriage</u> DR10, DR13 DR10, DR13 DR10, DR13 DR10, DR13 DR13 DR13
8-10	<b>125</b>	DIM09	Flange width	82...322 100...343	<u>Applicable end carriage</u> DR10 (61...157 with patent track) DR13 (64...223 with patent track)
11	-		Number of driving wheels	- D S D	One driving wheel/end carriage Two driving wheels/end carriage One driving wheel/travel bogie pair Two driving wheels/travel bogie pair
12-14	<b>KC3</b>	DES08	Joint type	<u>Bolted joints with joint plate</u> HB4 HC3 HC4 HC5 <u>Straight bolted joints without joint plate</u> KB2 KB3 KB4 KB5 KC3 KC4 KC5	<u>Applicable end carriage</u> DR10 DR13 DR13 DR13 <u>Applicable end carriage</u> DR10, x=2 DR10, x=3 DR10, x=4 DR10, x=5 DR13, x=3 DR13, x=4 DR13, x=5
15-18	<b>0000</b>		Bolt joint distance	####	Joint plates distance between alignment pin centers with double girder. 0000 With single girder, dimension from bogie shaft of the driving wheel set to closest joint bolt with asymmetrical joint.
19	<b>C</b>	(DES09)	Buffer type	DR10 DR13	A, B, C, K, G, E A, B, C, D, K, G, E, M, F A, B, C, D K, G, E, M, F 0 Rubber buffers Polyurethane buffers No buffer
20-23	<b>0000</b>	DIM29	Bogie inner shaft distance	0000	No bogie type end carriage
24	-		Colour code	- K	Standard primary paint Standard finishing paint
25	<b>N</b>		Special properties	N E	Standard Special

# 5.4 DR13 END CARRIAGE PRODUCT FILE DRAWING

12345678910111213

See drawing QINST-1-A for general manufacturing instructions combination.

xa) with MF06 motor and GEK2 gear combination.

- MF06MA 314 mm
- MF06LA 354 mm
- MF06LB 354 mm

Code	D1 (mm)	L1 (mm)
A	63	53
B	80	68
C	100	85
D	125	105
K	80	80
G	100	100
E	100	150
M	125	125
F	125	190

Suitable buffers  
A. B. C. D Rubber  
K. G. E. M. F Polyurethane

WHEELBASE (mm)	Max dyn corner load (kN)	L (mm)	L5 (mm)	Weight (kg)	H (mm)	H1 (mm)
1400	80.5	1690	370	450	24.0	25.0
1800	80.5	2290	770	480	24.0	25.0
2300	80.5	2790	1270	517	24.0	25.0
2800	80.5	3290	1770	595	24.0	30.0
3200	72	3690	2170	632	24.0	30.0
3500	65	3990	2470	659	24.0	30.0

Possible B-dimensions

Wheels	B (mm)	L2 (mm)	L3 (mm)	L4 (mm)	width (mm)	W1 (mm)	W2 (mm)
Normal 100	174	36	32	52	418	412	212
Normal 180	259	36	32	52	498	557	357
Normal 260	343	36	32	52	578	557	357
Patent 14.4	143	20	50	70	418	412	212
Patent 14.4	223	20	50	70	498	557	357

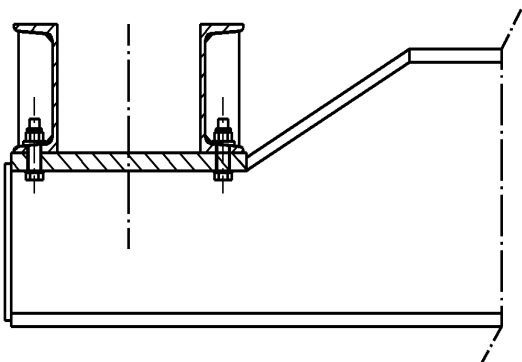
Design	Checked	Approved	Folder	Size
Jalli, A-r-i				A3
Date: 18-May-2010	END CARRIAGE			
Owner: Dep. Engineering	END CARRIAGE			
Drawing no. 53012463				Rev 2
Item no. 53012463				Weight kg -

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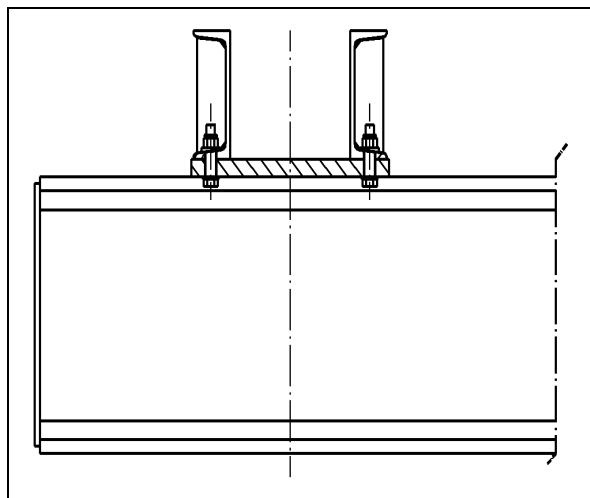
## 5.5 END CARRIAGE CONNECTION TYPES

### Bolted connections with joint plate type

MED connection, joint plates HC3, HC4, HC5  
(box and profile girder),



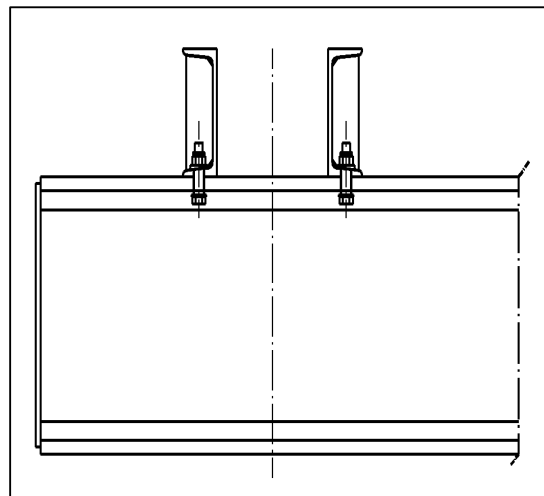
STD connection, joint plates HC3, HC4, HC5  
(box and profile girder)



### Straightly bolted connections

MED connection  
N/A

STD connection without joint plate,  
joint types KC3, KC4, KC5  
(profile girder)





## 5.6 CRANE DRIVES SPECIFICATION FOR DR13 END CARRIAGE

<b>Nominal crane speeds, max</b>	20, 25, 32, 40 m/min
<b>Number of machinery / crane</b>	2 or 4
<b>Machinery type</b>	GEK2, (based on GEK1 gear, <u>but different outcoming axle to reach 40 m/min</u> )
<b>Motor types</b>	MF06LA-, MF06MA-, MF06LB-
<b>Voltage</b>	All standard NOVA-travelling motor voltages
<b>Control method</b>	2-speed with frequency control, stepless frequency control
<b>Wheel diameters</b>	125 mm
<b>End truck types</b>	DR-underrunning end truck
<b>Reduction</b>	Open gear ratio included in drive train
<b>Cover for open gear ratio</b>	As standard
<b>Options</b>	All single girder top running crane options

## 6. DR20

### 6.1 TECHNICAL SPECIFICATION

#### General

The crane design is based on the standard crane components for single girder industrial cranes. Selection of components and crane engineering is accomplished with CRANEMASTER tools (Sales Configuration tools). The exact range for cranes is determined by the available components, steel materials and design parameters used in each market area.

New under running end carriages series DR (together with DU series) will replace the old series UL and US in the future. Design for under running end carriage having 200 mm wheel diameter is completed. Factory name for this new end carriage is DR20. DR20 (together with DU20 end carriage) will replace rest of end carriage UD16 and it is covering 80 % higher corner loads than UD16 end carriages.

Some benefits for new DR20 under running end carriages are: pre-designed connection types, wheel anti-dropping device and finger protection device to meet latest European safety requirements. As an options vertical and horizontal support rollers, earth brushes, assembly help tool and buffer extension. With DR design, crane can go as up as possible, i.e. as close to runway beam as possible.

#### Specification for cranes with DR20 end carriage

<b>Maximum crane load</b>	16 t, (20 t with small spans)
<b>Number of hoists</b>	1 or 2 pcs; 2 hoists with equal capacity, single or tandem drive
<b>Type of hoist</b>	Low or normal headroom (NOVA), Chain Hoist
<b>Maximum span</b>	abt. 19 m profile girder, abt. 32 m box girder <sup>(2)</sup> (depending on the corner load) Hook approach up to runway line <sup>(1)</sup>
<b>Type of girder</b>	Standard profiles or welded box; flange width up to 600 mm
<b>Hoisting speeds and control</b>	Acc. to NOVA-hoists utilized; 2-speed or freq. Ctrl
<b>Traversing speeds and control</b>	Acc. to NOVA-hoists; 2 ramp-freq. Ctrl
<b>Travelling speeds and control</b>	Max speed 40 m/min freq. ctrl; 25 m/min 2-speed
<b>Classification</b>	Hoisting M4-M6 (1Am-3m) Traversing M5-M6 (2m-3m) Crane travelling M4-M6 (1Am-3m) Crane A3-A5
<b>Trolley power supply</b>	Festoon or energy chain (option)
<b>Crane control</b>	Pendant or radio controller
<b>Crane power supply</b>	Flat cable or CRANEDUCTOR-type conductor bar, towing arm fixing to end carriage with brackets
<b>Runway</b>	Beam flange width 127 to 418 mm <sup>(1)</sup>
<b>Options</b>	All applicable standard single girder crane options

(1) Further range available upon request (SP13 cranes)

(2) Depending on design parameters

## 6.2 END CARRIAGE SPECIFICATION

<b>Corner load</b>	max 143.8 kN dynamic corner load
<b>Classification</b>	Fem E3 for steel structures, FEM 1Am (M4) for travelling machinery duty group. Higher duties by decreasing corner loads.
<b>Wheel base</b>	up to 4000 mm <sup>(1)</sup>
<b>Wheels</b>	Cast iron wheels, material GJS700-2, cambered running surface: contact point 23 mm from runway beam side, so local stresses of bottom flange of the runway beam are smaller.
<b>Nr. Of wheels</b>	(4+4) / end carriage
<b>Track width</b>	127 – 418 mm <sup>(1)</sup> (Patent Track wheels not available)
<b>Track type</b>	Flat flange, rolled profile,
<b>Construction</b>	Rigid frame, flexible (articulated) wheel suspension, where end carriage beam can slide +/- 14 mm and rotate +/- 2 degrees, so runway need not to be so exact.
<b>Travelling machinery</b>	NOVA-types machinery, using GES3 gear Driven wheels at one side as standard.
<b>Joints</b>	Bolted type with joint plate, bolted type without joint plate <b>Type HD3, HD4, HD5:</b> Bolted type with HD_-joint plates. Standard and Medium Connections; Hoist reaches runway line using Standard connection. <b>Type KD3, KD4, KD5:</b> Bolted type without joint plates. Only Standard connection is possible. Hoist reaches runway line using Standard connection.
	Single girder type possible as standard <sup>(1)</sup> Girder width up to 600 mm.
<b>Protections</b>	Derailment device, anti-dropping device, wheel anti-dropping device, finger protection
<b>Buffers</b>	Standard buffers from NOVA-series acc. to load
<b>Options</b>	Support rollers in vertical and horizontal direction, rail brush, assembly help tool, buffer extension, wheel sets (driving + idle), bogie construction
<b>Surface treatment</b>	Finishing paint EP120/2-FeSa2½-RAL1028 or primary paint only (RAL 7038, gray).
<b>Other</b>	Field assembly instructions to be created
<b>(*)</b>	Current volume together with DU20 type. In DU20, the frame is an I-beam.

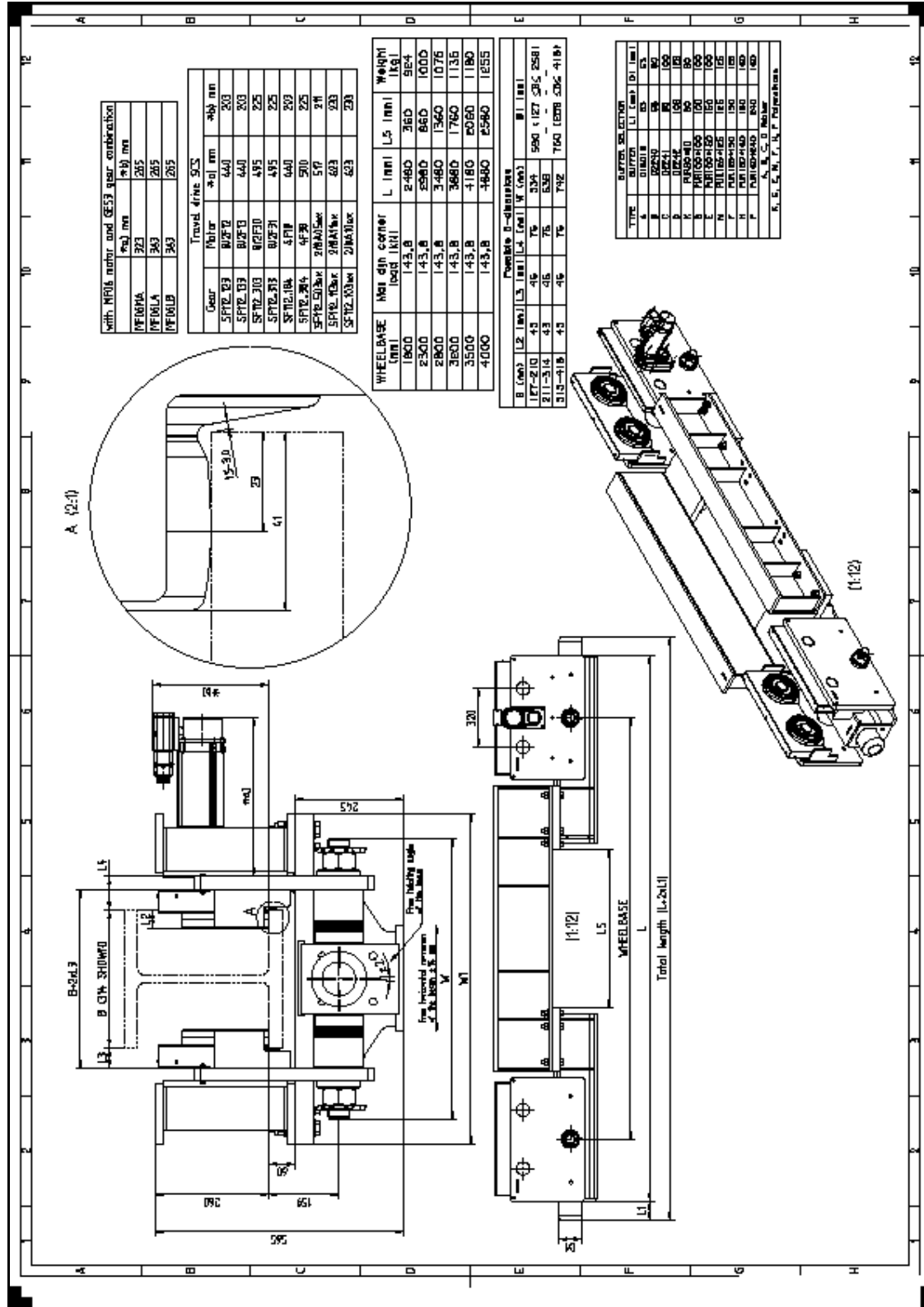
- (1) Further range available upon request (SP13 cranes)  
(2) Depending on design parameters

## 6.3 END CARRIAGE PRODUCT CODES

Factory code example (Factory: DR)

DR	20	-	23	200	-	KD3	0000	C	0000	-	N
GE19 1,2	WHE01 3,4	5	WHE02 6,7	DIM09 8,9,10	11	DES08 12,13,14	15-18	(DES09) 19	DIM29 20-23	24	25
Pos.	Code	Feature code	Feature	Available properties							
1,2	<b>DR</b>	GE19	Short product name	UR	Factory code (End carriage)						
3,4	<b>20</b>	WHE01	Wheel diameter	10	100 mm						
				13	125 mm						
				20	200 mm						
5	<b>-</b>		Description	-	Standard						
				B	Bogie						
				C	Asymmetrical joint with single girder						
6,7	<b>23</b>	WHE02	Wheelbase	<u>Wheel base dimension</u>				<u>Applicable end carriage</u>			
				14	1400 mm			DR10, DR13			
				18	1800 mm			DR10, DR13, DR20			
				23	2300 mm			DR10, DR13, DR20			
				28	2800 mm			DR10, DR13, DR20			
				32	3200 mm			DR13, DR20			
				35	3500 mm			DR13, DR20			
40	4000 mm			DR20							
8-10	<b>200</b>	DIM09	Flange width	<u>Applicable end carriage</u>							
				82...322	DR10 (61...157 with patent track)						
				100...343	DR13 (64...223 with patent track)						
				127...418	DR20						
11	<b>-</b>		Number of driving wheels	-	One driving wheel/end carriage						
				D	Two driving wheels/end carriage						
				S	One driving wheel/travel bogie pair						
				D	Two driving wheels/travel bogie pair						
12-14	<b>KD3</b>	DES08	Joint type	<u>Bolted joints with joint plate</u>				<u>Applicable end carriage</u>			
				HB4	4-bolt connection, M20-bolts, B<410 mm			DR10			
				HC3	8-bolt connection, M20-bolts, B<310 mm			DR13			
				HC4	8-bolt connection, M20-bolts, B<410 mm			DR13			
				HC5	8-bolt connection, M20-bolts, B<510 mm			DR13			
				HD3	16-bolt connection, M20-bolts, B<310 mm			DR20			
				HD4	16-bolt connection, M20-bolts, B<410 mm			DR20			
				HD5	16-bolt connection, M20 bolts, B<510 mm			DR20			
				<u>Straight bolted joints W/O joint plate</u>				<u>Applicable end carriage</u>			
				KB2	4-bolt connection, M20-bolts, B<265 mm			DR10, x=2			
				KB3	4-bolt connection, M20-bolts, B<315 mm			DR10, x=3			
				KB4	4-bolt connection, M20-bolts, B<415 mm			DR10, x=4			
				KB5	4-bolt connection, M20-bolts, B<450 mm			DR10, x=5			
				KC3	8-bolt connection, M20-bolts, B<347 mm			DR13, x=3			
				KC4	8-bolt connection, M20-bolts, B<447 mm			DR13, x=4			
				KC5	8-bolt connection, M20-bolts, B<500 mm			DR13, x=5			
				KD3	16-bolt connection, M20-bolts, B<400 mm			DR20, x=3			
KD4	16-bolt connection, M20-bolts, B<500 mm			DR20, x=4							
KD5	16-bolt connection, M20-bolts, B<600 mm			DR20, x=5							
15-18	<b>0000</b>		Bolt joint distance	####	Joint plates distance between alignment pin centers with double girder.			0000	With single girder, dimension from bogie shaft of the driving wheel set to closest joint bolt with asymmetrical joint.		
19	<b>C</b>	(DES09)	Buffer type	DR10	A, B, C, K, G, E			A, B, C, D	Rubber buffers		
				DR13	A, B, C, D, K, G, E, M, F			K, G, E, M, F	Polyurethane buffers		
				DR20	A, B, C, D, K, G, E, M, F, H, P			H, P	Polyurethane buffers		
								0	No buffer		
20-23	<b>0000</b>	DIM29	Bogie inner shaft distance	0000	No bogie type end carriage						
24	<b>-</b>	PAI05 PAI05 PAI04	Colour code	-	Standard primary paint (KC5, workshop primer paint)						
				S	Special primary paint (KC2)						
				K	Standard finishing paint (KC1, RAL 2018 yellow)						
25	<b>N</b>		Special properties	N	Standard						
				E	Special						

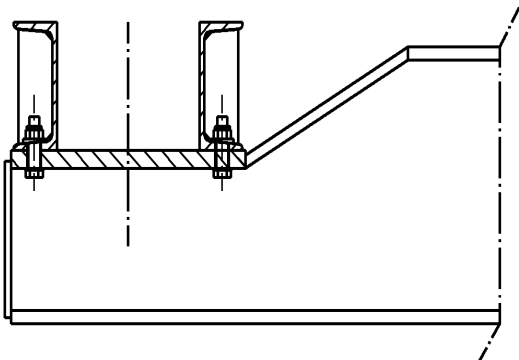
### 6.4 DR20 END CARRIAGE PRODUCT FILE DRAWING



## 6.5 END CARRIAGE CONNECTION TYPES

### Bolted connections with joint plate type

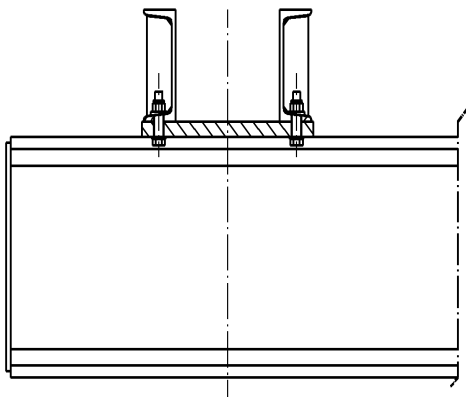
MED connection, joint plates HD3, HD4, HD5  
(box and profile girder),



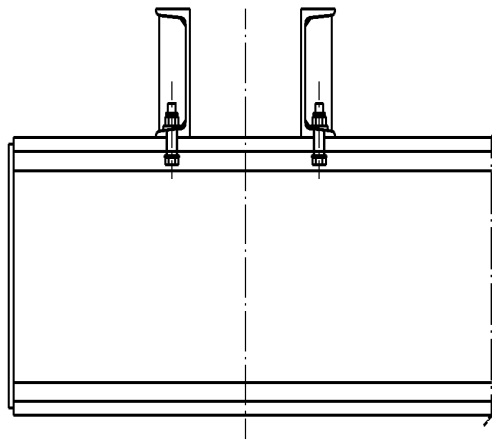
### Straightly bolted connections

MED connection  
N/A

STD connection, joint plates HD3, HD4, HD5  
(box and profile girder)



STD connection, joint types KD3, KD4, KD5  
(profile girder)



## 6.6 CRANE DRIVES

### CRANE DRIVES SPECIFICATION FOR DR20 END CARRIAGE

<b>Nominal crane speeds, max</b>	20, 25, 32, 40 m/min
<b>Number of machinery / crane</b>	2 or 4
<b>Machinery type</b>	GES3 with T3 secondary shaft,
<b>Motor types</b>	MF06LA-, MF06MA-, MF06LB-
<b>Voltage</b>	All standard NOVA-travelling motor voltages
<b>Control method</b>	2-speed with frequency control, stepless frequency control
<b>Wheel diameters</b>	200 mm
<b>End truck types</b>	DR-underrunning end truck
<b>Reduction</b>	Open gear ratio included in drive train, open gear ratio 5.588
<b>Cover for open gear ratio</b>	As standard
<b>Options</b>	All single girder top running crane options

## 7. TRAVELING MACHINERIES PRODUCT CODE

### Code example (GE)

<b>GE</b>	<b>K</b>	<b>1</b>	<b>06</b>	<b>P</b>	<b>T</b>	<b>1</b>	<b>B</b>	<b>O</b>	<b>F06MA</b>	<b>52273110</b>	<b>N</b>
1,2	3	4	5,6	7	TG05 8	TG06 9	10	11	12-16	17-24	25

Pos.	Code	Feature code	Feature	Available properties
1,2	<b>GE</b>		Gear	GE Factory code
3	<b>K</b>		Type	K Specific Trolley Drive (WRH) L Specific Trolley Drive (ECH) M Hollow shaft S Solid shaft T Reserved N Reserved
4	<b>1</b>		Machinery size (Torque Range)	1 0 Nm < T <sub>2</sub> < 50 Nm 2 16 Nm < T <sub>2</sub> < 125 Nm 3 40 Nm < T <sub>2</sub> < 320 Nm 4 100 Nm < T <sub>2</sub> < 800 Nm 5 250 Nm < T <sub>2</sub> < 2000 Nm 6 630 Nm < T <sub>2</sub> < 5000 Nm
5,6	<b>06</b>		Ratio code	01... 1 <sup>st</sup> mark: 0, 1, 2 ... 9, A (=10), B(=11),... ...99... 2 <sup>nd</sup> mark: 0, 1, 2 ... 9 ...H9 e.g. A0≐100, B0≐110, G5≐165, etc.
7	<b>P</b>		Options	P Standard, no options (plain) F Flywheel G Gantry type gear (GES4, GES5) V Stronger version (GES320V, GES316V, GES313V with MF06LB motor)
8	<b>T</b>	TG05	Secondary shaft type	T Driving Pinion K Keyway S Spline D Spline + Plain E Reserved (Special)
9	<b>1</b>	TG06	Version type	1...9 Versioning of machinery e.g. spline size, shaft size
10	<b>B</b>		Outlook	B B-Black (Dark grey)
11	<b>O</b>		Future reservation	O No feature
12-16	<b>F06MA</b>		Motor type and size	F Motor type code (B, F, T, etc.) 06 Frame size (e.g. 06, 07, ...) M Stator length (S, M, L, Z, E) A Power code (A, B, C, ...)
17-24	<b>52273110</b>		Motor ID-code	ID of the motor, if special then Winding data and Power supply data: 200-5400 (fourth mark, pos 20 "dash") 200 Number of HS- and LS-polepairs - Filling mark "dash" 5 Power Supply frequency: 5-50Hz, 6-60Hz 400 Power supply Voltage, e.g. 380, 400, ...
25	<b>N</b>		Order type	E Special Order, details defined with P.O. N Normal Order (e.g. Standard Motor)



