03/2011 – English

PRODUCT INFO FOR TOP RUNNING CRANE END CARRIAGE

ETN
ESN
ETL

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1. ETN 09

1.1 ETN 09 TECHNICAL SPECIFICATION

General

The crane design is based on the standard crane components for single and double 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 top running end carriages serie ETN will replace the old series ET in the future. At the moment, calculations and design for end carriage having 90 mm wheel diameter is ready. Factory name for this new end carriage is ETN09. ETN09 will replace old end carriage ET09 and it is covering partially wheel loads of ET11 end carriage.

Some benefits of the new ETN09 end carriages are: better crane approaches due to shorter end carriages wheelbase in volume area of this size cranes. As an option new even afterwards boltable guiding rollers, new adjustable anti-jumping brackets, new rail sweeps and buffer extensions.

Specification for ETN09

Maximum crane load	2 t, major part of 3.2 t (4t and even 5 t with short span)
Number of hoists	1 or 2 pcs; 2 hoists with equal capacity, single or tandem drive
Type of hoist	Low, normal headroom or double girder (NOVA-type), SK-chain hoist
Maximum span	abt. 19 m profile girder, abt. 19 m box girder (2) (depending the corner load)
Type of girder	Standard profiles or welded box; flange width up to 300 mm
Hoisting speeds and control	Acc. to NOVA-hoists utilized; 2-speed or freq. Ctrl
Traversing speeds and control	Acc. to NOVA-hoists; 2 ramp-freq. Ctrl
Travelling speeds and control	Max speed 40 m/min freq. Ctrl or 2-speed
Classification	Hoisting M4-M6 (1Am-3m) Traversing M5-M6 (2m-3m) Crane travelling M4-M6 (1Am-3m) Crane A3-A6
Trolley power supply	Festoon or energy chain (option)
Crane control	Pendant or radio controller
Crane power supply	Flat cable or CraneDuctor -type conductor bar, towing arm fixing to end of end carriage
Runway rail	Rail width from 40 to 60 mm (1)
Options	All applicable standard single girder and double girder crane options

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

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1.2 ETN 09 END CARRIAGE SPECIFICATION

Corner load	max 28 kN dynamic wheel load in FEM 2m (M5)
Classification	FEM E2 for steel structures
Wheel base	up to 2500 mm (1)
Wheels	Gasted iron wheels, material GJS700-2
Nr. Of wheels	2 / end carriage (bogie type not available)
Groove width	50 to 70 mm, over 70 without flanges using guide rollers (1)
Construction	Rectangular tube frame, integrated wheel failure support
Travelling machinery	NOVA-types machinery, using GES3 gear
Joints	Joint plate bolted to top of end carriage, main girder welded to joint plate Single and double girder types possible as standard (1) Girder width up to 300 mm
Buffers	Standard buffers from NOVA-series acc. to load
Options	Bolted type guiding rollers (also possible to add afterwards), anti-jumping brackets, rail sweeps, buffer extensions
Surface treatment	Finishing paint EP120/2-FeSa2½-RAL1028 or primary paint only (RAL1006 maize yellow)
Other	Field assembly instructions to be created

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

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1.3 ETN 09 END CARRIAGE PRODUCT CODES

Code example

ETN	09	-	16	60 BT08	-	A3	0000	C BT19	0000	-	N
1-3	4,5	6	7,8	9,10	11	12,13	14-17	18	19-22	23	24

Pos.	Code	Feature code	Feature	Available properties			
1-3	**ETN**		Short product name	ETN	Factory code (End carriage)		
4,5	**09**		Wheel diameter	09	90 mm		
6	**-**		Description	-	Standard	C	Asymmetrical joint with single girder
7,8	**16**		Wheelbase	Wheel base dimension 13 16 20 25	Applicable end carriage 1250 mm ETN09 1600 mm ETN09 2000 mm ETN09 2500 mm ETN09		
9,10	**60**	BT08	Groove width	Applicable end carriage 50-70	ETN09		
11	**-**		Number of driving wheels	- D	One driving wheel/end carriage Two driving wheels/end carriage		
12,13	**A3**		Joint type	Top joints A3	4-bolt connection (B<300mm)	Applicable end carriage	ETN09
14-17	**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.
18	**C**	BT19	Buffer type	ETN09	A, B, C	A…C 0	Rubber buffers No buffer
19-22	**0000**		Bogie inner wheel distance	0000	No bogie type end carriage		
23	**-**		Colour code	-	Standard primary paint	K	Standard finishing paint
24	**N**		Special properties	N	Standard	E	Special

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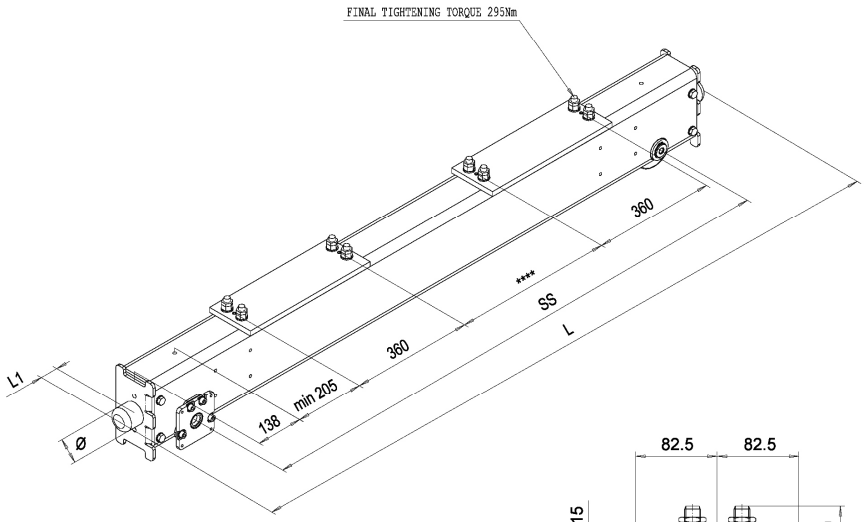
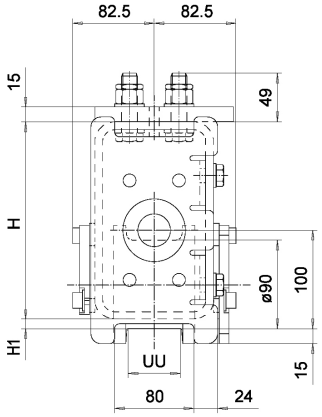
1.4 ETN09 END CARRIAGE PRODUCT FILE

END CARRIAGE, ETN09

For single and double girder cranes

SWF KRANTECHNIK





SS (mm)	H (mm)	H1 (mm)	SG Wgt (kg)	SG max Pdyn (kN)	DG Wgt (kg)	DG max Pdyn (kN)
1250	200	10	78	28*)	-	-
1600	200	10	98	28*)	100	28*)
2000	200	10	112	28	114	28
2500	200	10	131	28	133	28

*) 35 kN in FEM 1Am

L=SS+276+2*L1
Max. dynamic wheel load 28 kN.
Available only with ductile iron wheel.
UU=50...70

ETN09 end carriage can be equipped with 1 or 2 GES3 travelling unit

Buffer type	L1 (mm)	Ø (mm)
A	53	63
B	68	80
C	85	100
K	80	80
G	100	100
E	150	100
Material:	A,B,C rubber K,G,E polyurethane	

The maximum wheel load is only a guideline (calculated with double girder). The maximum value are based on assumption that the crane speed is 40m/min, the end carriage duty is Fem 2m and the runway rail width is 50mm.

If the crane speed is higher, end carriage duty group higher or used runway rail narrower the max. dynamical wheel load must be calculated separately case by case.

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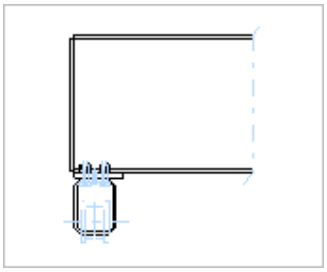
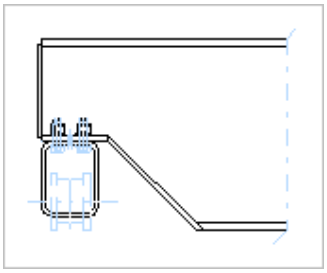
1.5 ETN 09 END CARRIAGE JOINT TYPES

Top Standard (box or profile girder)



Top Medium (box or profile girder)



Other types on request as SP13 case

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1.6. ETN 09 CRANE DRIVES

Nominal crane speeds, max	20, 25, 32, 40 m/min
Number of machinery / crane	2 or 4
Machinery type	GES3
Motor types	MF06LA-, MF06MA-
Voltage	All standard NOVA-travelling motor voltages
Control method	2-speed with frequency control, stepless frequency control
Wheel diameters	90 mm
End truck types	ETN-top running end truck
Options	All single girder top running crane options

1.7 TRAVELING MACHINERIES PRODUCT CODE

Code example

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

Pos.	Code	Feature code	Feature	Available properties			
1,2	**GE**		Gear	GE	Factory code		
3	**K**		Type	K L M	Specific Trolley Drive (WRH) Specific Trolley Drive (ECH) Hollow shaft	S T N	Solid shaft Reserved Reserved
4	**1**		Machinery size (Torque Range)	1 2 3	0 Nm < T_2 < 50 Nm 16 Nm < T_2 < 125 Nm 40 Nm < T_2 < 320 Nm	4 5 6	100 Nm < T_2 < 800 Nm 250 Nm < T_2 < 2000 Nm 630 Nm < T_2 < 5000 Nm
5,6	**06**		Ratio code	01… ...99… …H9	1st mark: 0, 1, 2 … 9, A (=10), B(=11),… 2nd mark: 0, 1, 2 … 9 e.g. A0≡100, B0≡110, G5≡165, etc.		
7	**P**		Options	P F	Standard, no options (plain) Flywheel	G V	Gantry type gear (GES4, GES5) Stronger version (GES320V, GES316V, GES313V with MF06LB motor)
8	**T**	TG05	Secondary shaft type	T K S	Driving Pinion Keyway Spline	D E	Spline + Plain Reserved (Special)
9	**1**	TG06	Version type	1…9	Versioning of machinery e.g. spline size, shaft size		
10	**B**		Outlook	B	B-Black (Dark grey)		
11	**O**		Future reservation	O	No feature		
12-16	**F06MA**		Motor type and size	F 06 M A	Motor type code (B, F, T, etc.) Frame size (e.g. 06, 07, …) Stator length (S, M, L, Z, E) Power code (A, B, C, …)		
17-24	**52273110**		Motor ID-code	 200 - 5 400	ID of the motor, if special then Winding data and Power supply data: 200-5400 (fourth mark, pos 20 “dash”) Number of HS- and LS-polepairs Filling mark “dash” Power Supply frequency: 5-50Hz, 6-60Hz Power supply Voltage, e.g. 380, 400, …		
25	**N**		Order type	E N	Special Order, details defined with P.O. Normal Order (e.g. Standard Motor)		

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2. ETN 11

2.1 ETN11 TECHNICAL SPERCIFICATION

General

The crane design is based on the standard crane components for single and double 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 top running end carriages serie ETN will replace the old series ET in the future. At the moment, design for end carriage having 110 mm wheel diameter is ready. Factory name for this new end carriage is ETN11. ETN11 will replace old end carriage ET11 and it is covering major part of wheel loads of ET14 end carriage.

Some benefits of the new ETN11 end carriages are: better crane approaches due to shorter end carriages wheel base in volume area of this size cranes, new even afterwards boltable guiding rollers, new adjustable anti-jumping brackets, new rail sweeps and buffer extensions.

Specification for ETN11

Maximum crane load	5 t (6.3 t with short span)
Number of hoists	1 or 2 pcs; 2 hoists with equal capacity, single or tandem drive
Type of hoist	Low, normal headroom or double girder (NOVA-type), SK-chain hoist,
Maximum span	abt. 19 m profile girder, abt. 23 m box girder (2) (depending the corner load)
Type of girder	Standard profiles or welded box; flange width up to 400 mm
Hoisting speeds and control	Acc. to NOVA-hoists utilized; 2-speed or freq. Ctrl
Traversing speeds and control	Acc. to NOVA-hoists; 2 ramp-freq. Ctrl
Travelling speeds and control	Max speed 40 m/min freq. Ctrl or 2-speed
Classification	Hoisting M4-M6 (1Am-3m) Traversing M5-M6 (2m-3m) Crane travelling M4-M6 (1Am-3m) Crane A3-A6
Trolley power supply	Festoon or energy chain (option)
Crane control	Pendant or radio controller
Crane power supply	Flat cable or CraneDuctor-type conductor bar, towing arm fixing to end of end carriage
Runway rail	Rail width from 40 to 75 mm (1)
Options	All applicable standard single girder and double girder crane options

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

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2.2 ETN 11 END CARRIAGE SPECIFICATION

Corner load	max 46 kN dynamic wheel load in FEM 2m (M5)
Classification	FEM E2 for steel structures
Wheel base	up to 3150 mm (1)
Wheels	Cast iron wheels, material GJS700-2
Nr. Of wheels	2 / end carriage (bogie type not available)
Groove width	52 to 87 mm, over 87 without flanges using quide rollers (1)
Construction	Rectangular tube frame, integrated wheel failure support
Travelling machinery	N-types machinery, using GES3 gear
Joints	Joint plate bolted to top of end carriage, main girder welded to joint plate Single and double girder types possible as standard (1) Girder width up to 400 mm
Buffers	Standard buffers from N-series acc. to load
Options	Bolted type guiding rollers (also possible to add afterwards), anti-jumping brackets, rail sweeps, buffer extensions
Surface treatment	Finishing paint EP120/2-FeSa2½-RAL1028 or primary paint only (RAL 7038 gray)
Other	Field assembly instructions to be created

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

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2.3 ETN 11 END CARRIAGE PRODUCT CODES

Code example (ETN11)

ETN	11	-	16	60 BT08	-	A3	0000	C BT19	0000	-	N
1-3	4,5	6	7,8	9,10	11	12,13	14-17	18	19-22	23	24

Pos.	Code	Feature code	Feature	Available properties			
1-3	**ETN**		Short product name	ETN	Factory code (ECN End carriage)		
4,5	**11**		Wheel diameter	09 110	90 mm 110 mm		
6	**-**		Description	-	Standard	C	Asymmetrical joint with single girder
7,8	**16**		Wheelbase	Wheel base dimension 13 16 20 25 32	Applicable end carriage 1250 mm 1600 mm 2000 mm 2500 mm 3150 mm	 ETN09 ETN09, ETN11 ETN09, ETN11 ETN09, ETN11 ETN11	
9,10	**60**	BT08	Groove width	Applicable end carriage 50-70 52-87	 ETN09 ETN11		
11	**-**		Number of driving wheels	- D	One driving wheel/end carriage Two driving wheels/end carriage		
12,13	**A3**		Joint type	Top joints A3 A4 A6	 4-bolt connection (B<300 mm) 4-bolt connection (B<400 mm) 4-bolt connection (B<400 mm)	Applicable end carriage ETN09 ETN11 ETN11	
14-17	**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.
18	**C**	BT19	Buffer type	ETN09 ETN11	A, B, C, K, F, E A, B, C, K, G, E	A…C K,G,E 0	Rubber buffers Polyurethane No buffer
19-22	**0000**		Bogie inner wheel distance	0000	No bogie type end carriage		
23	**-**		Colour code	-	Standard primary paint	K	Standard finishing paint
24	**N**		Special properties	N	Standard	E	Special

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2.4 ETN11 END CARRIAGE PRODUCT FILE

END CARRIAGE, ETN11

For single and double girder cranes

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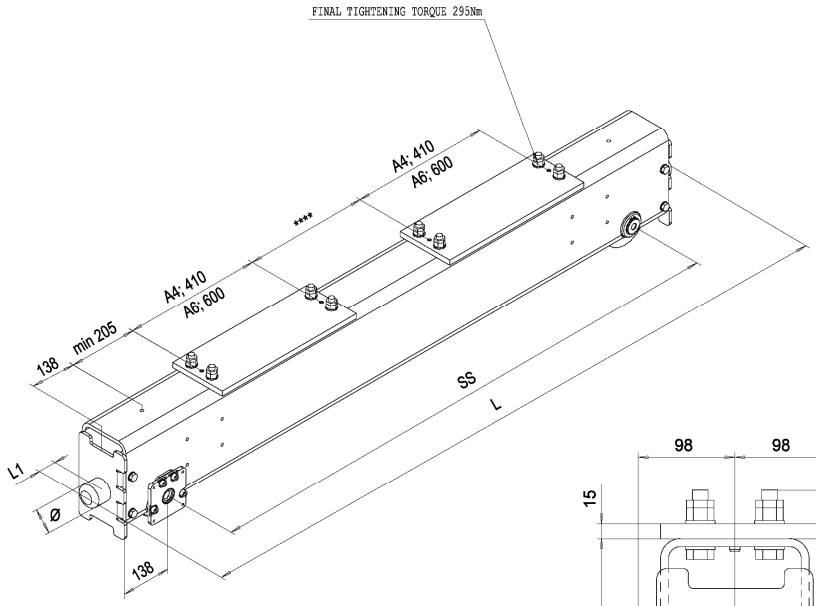

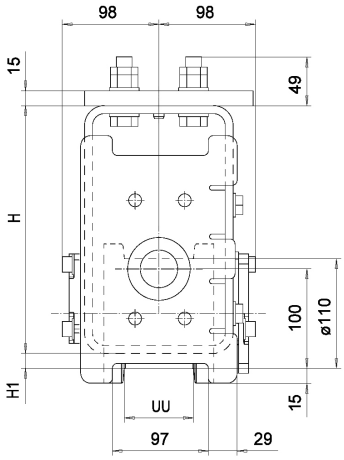

SS (mm)	H (mm)	H1 (mm)	SG Wgt (kg)	max Pdyn (kN)	DG Wgt (kg)	max Pdyn (kN)
1600	250	15	117	46*)	127	46*)
2000	250	15	136	46*)	146	46*)
2500	250	15	159	46*)	169	46*)
3150	250	15	189	46*)	199	46*)

*) 48 kN in FEM 1Am

L=SS+276+2*L1
Max. dynamic wheel load 48 kN.
Available only with ductile iron wheel.
UU=52...87

ETN11 end carriage can be equipped with 1 or 2 GES3 travelling unit

The maximum wheel load is only a guideline (calculated with double girder). The maximum value are based on assumption that the crane speed is 40m/min, the end carriage duty is Fem 2m and the runway rail width is 60mm.

If the crane speed is higher, end carriage duty group higher or used runway rail narrower the max. dynamical wheel load must be calculated separately case by case.

Buffer type	L1 (mm)	Ø (mm)
A	53	63
B	68	80
C	85	100
K	80	80
G	100	100
E	150	100
A,B,C rubber K,G,E polyurethane		

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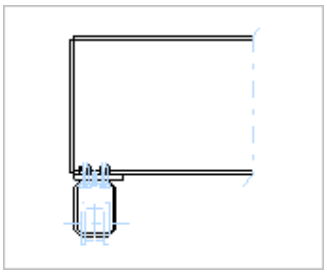
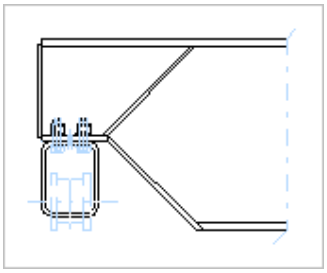
2.5 ETN 11 END CARRIAGE JOINT TYPES

Top Standard (box or profile girder)



Top Medium (box or profile girder)



Other types on request as SP13 case

2.6 ETN 11 CRANE DRIVES SPECIFICATION

Nominal crane speeds, max	20, 25, 32, 40 m/min
Number of machinery / crane	2 or 4
Machinery type	GES3
Motor types	MF06LA-, MF06MA-
Voltage	All standard NOVA-travelling motor voltages
Control method	2-speed with frequency control, stepless frequency control
Wheel diameters	110 mm
End truck types	ETN-top running end truck
Options	All single girder top running crane options

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3. ETN 14

3.1 ETN TECHNICAL SPECIFICATION

General

The crane design is based on the standard crane components for single and double 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 top running end carriages series ETN will replace the old series ET in the future. At the moment, design for end carriage having 140 mm wheel diameter is ready.
ETN14 will replace rest of old end carriage ET14 range and it is covering part of wheel loads of ETN16 end carriage.

Some benefits of the new ETN14 end carriages are: better crane approaches due to shorter end carriages wheel base in volume area of this size cranes, new even afterwards boltable guiding rollers, new adjustable anti-jumping brackets, new rail sweeps and buffer extensions.

Specification for ETN14

Maximum crane load	6.3 t (8 t with short span)
Number of hoists	1 or 2 pcs; 2 hoists with equal capacity, single or tandem drive
Type of hoist	Low, normal headroom or double girder (NOVA-type), SK-chain hoist
Maximum span	abt. 19 m profile girder, abt. 33 m box girder (2) (depending the corner load)
Type of girder	Standard profiles or welded box; flange width up to 550 mm
Hoisting speeds and control	Acc. to NOVA-hoists utilized; 2-speed or freq. Ctrl
Traversing speeds and control	Acc. to NOVA-hoists; 2 ramp-freq. Ctrl
Travelling speeds and control	Design speed 40 m/min freq. Ctrl or 2-speed
Classification	Hoisting M4-M6 (1Am-3m) Traversing M5-M6 (2m-3m) Crane travelling M4-M6 (1Am-3m) Crane A3-A6
Trolley power supply	Festoon or energy chain (option)
Crane control	Pendant or radio controller
Crane power supply	Flat cable or CraneDuctor-type conductor bar, towing arm fixing to end of end carriage
Runway rail	Rail width from 40 to 70 mm (1)
Options	All applicable standard single girder and double girder crane options

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

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3.2 ETN14 END CARRIAGE SPECIFICATION

Corner load	max 55 kN dynamic wheel load in FEM 2m (M5), max 69 kN dynamic wheel load in FEM 1Am (M4)
Classification	FEM E3 for steel structures
Wheel base	up to 4000 mm (1)
Wheels	Cast iron wheels, material GJS700-2
Nr. Of wheels	2 / end carriage (bogie type not available)
Groove width	54 to 84 mm, over 84 without flanges using quide rollers (1)
Construction	Rectangular tube frame, integrated wheel failure support
Travelling machinery	Q-types machinery, using GES3 gear
Joints	Joint plate bolted to top of end carriage, main girder welded to joint plate Single and double girder types possible as standard (1) Girder width up to 550 mm
Buffers	Standard buffers from NOVA-series acc. to load
Options	Bolted type guiding rollers (also possible to add afterwards), anti-jumping brackets, rail sweeps, buffer extensions
Surface treatment	Finishing paint EP120/2-FeSa2½-RAL1028 or primary paint only (RAL 7038 grey)
Other	Field assembly instructions to be created

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

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3.3 ETN14 END CARRIAGE PRODUCT CODES

Code example

ETN	14	-	20	74	-	A4	0000	C	0000	-	N
GE19	WHE01		WHE02	BT08		DES08		(DES09)	DIM29		
1-3	4,5	6	7,8	9,10	11	12,13	14-17	18	19-22	23	24

Pos.	Code	Feature code	Feature	Available properties			
1-3	**ETN**	GE19	Short product name	ECN	Factory code (End carriage)		
4,5	**14**	WHE01	Wheel diameter	09 11 14 16	90 mm 110 mm 140 mm 160 mm		
6	**-**		Description	- B	Standard Bogie (only ETN20 and bigger)	C	Asymmetrical joint with single girder
7,8	**20**	WHE02	Wheelbase	Wheel base dimension		Applicable end carriage	
				13	1250 mm	ETN09	
				16	1600 mm	ETN09, ETN11, ETN14, ETN16	
				20	2000 mm	ETN09, ETN11, ETN14, ETN16	
				25	2500 mm	ETN09, ETN11, ETN14, ETN16	
				32	3150 mm	ETN11, ETN14, ETN16	
				35	3500 mm	ETN14	
				40	4000 mm	ETN14, ETN16	
				45	4500 mm	ETN16	
9,10	**74**	BT08	Groove width		Applicable end carriage		
				50-70	ETN09 (rail head width + 10 mm)		
				52-87	ETN11 (rail head width + 12 mm)		
				54-84	ETN14 (rail head width + 14 mm)		
				54-84	ETN16 (rail head width + 14 mm)		
11	**-**		Number of driving wheels	- D	One driving wheel/end carriage Two driving wheels/end carriage		
12,13	**A4**	DES08	Joint type		Top joints		Applicable end carriage
				A3	4-bolt connection (B<310 mm)		ETN09
				A4	4-bolt connection (B<360 mm)		ETN11, ETN14
				A6	4-bolt connection (B<550 mm)		ETN11, ETN14
				B4	8-bolt connection (B<350 mm)		ETN16
				B6	8-bolt connection (B<550 mm)		ETN16
14-17	**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.
18	**C**	(DES09)	Buffer type	ETN09 ETN11 ETN14 ETN16	A, B, C, K, G, E A, B, C, K, G, E, A, B, C, D, K, G, E. M, F, H, P B, C, D, G, E, M, F, H, P	A, B, C, D K, G, E, M, F H, P 0	Rubber buffers PUR buffers PUR buffers No buffer
19-22	**0000**	DIM29	Bogie inner wheel distance	0000	No bogie type end carriage		
23	**-**		Colour code	-	Standard primary paint	K	Standard finishing paint
24	**N**		Special properties	N	Standard	E	Special

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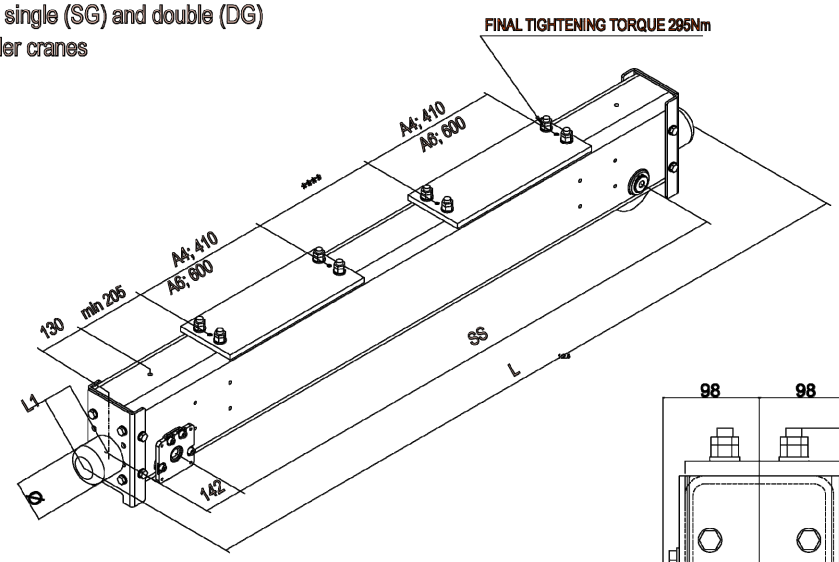
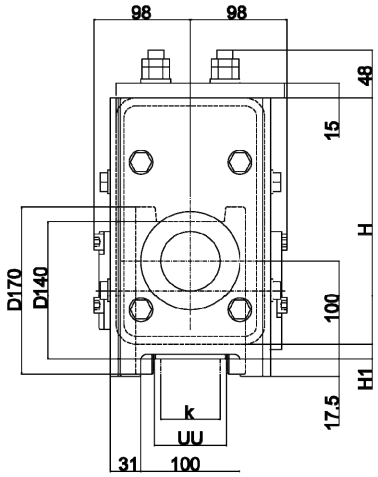
3.4 ETN14 END CARRIAGE PRODUCT FILE

SWF KRANTECHNIK

END CARRIAGE, ETN14

For single (SG) and double (DG) girder cranes





L=SS+284+2*L1
max. dynamic wheel load 55 kN.
Available only with ductile iron wheel.
UU=54...84

ETN14 end carriage can be equipped with 1 or 2 GES3 travelling unit

SS	H	H1	max Pdyn (kN)		Weight (kg/pcs)	
(mm)	(mm)	(mm)	SG	DG (R=1200)	SG	DG
1600	250	15	55 *)	55 *)	131	140
2000	250	15	55 *)	55 *)	150	159
2500	250	15	55 *)	55 *)	173	182
3150	250	15	55 **)	55 *)	203	212
3500	250	15	48	55	220	229
4000	250	15	32	37	243	252

*) 69 kN in FEM 1 Am
**) 58 kN in FEM 1 Am

Weight of one end carriage (kg/pcs) is calculated without buffers, when joint plate is A4 and when wheel groove is UU=74.

The maximum wheel load is only a guideline (calculated with double girder).
The maximum values are based on an assumption that the crane speed is 40 m/min, the duty class of the crane is 2m according to FEM and the width of the runway rail is 80mm.

If the speed of the crane is higher, the duty class of the end truck is higher or the runway rail used is narrower, the max. dynamic wheel load shall be calculated separately case by case.

Rail width	Note!
k (mm)	
40≤ k ≤70	With wheel grooves, U = 54...84
70< k ≤100	Use flangless wheels and guide rollers

Buffer type	L1 (mm)	Ø (mm)
A	53	63
B	68	80
C	85	100
D	105	125
K	80	80
G	100	100
E	150	100
F	190	125
M	125	125
H	160+100	160
P	240+100	160
A, B, C, D rubber		
K, G, E, F, M, H, P polyurethane		

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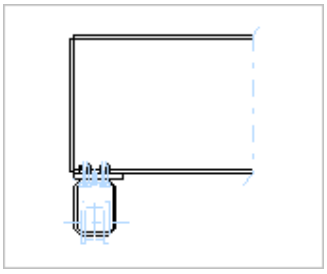
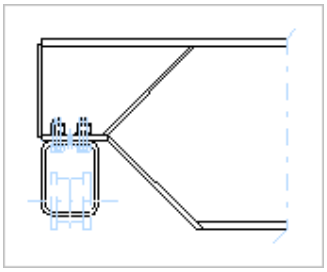
3.5 ETN14 END CARRIAGE JOINT TYPES

Top Standard (box or profile girder)



A4 and A6 joint plates

Top Medium (box or profile girder)



A4 and A6 joint plates

Other types on request as SP13 case

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3.6 ETN14 CRANE DRIVES

Nominal crane speeds, max	20, 25, 32, 40 m/min
Number of machinery / crane	2 or 4
Machinery type	GES3
Motor types	MF06LA-, MF06MA-
Voltage	All standard Q-travelling motor voltages
Control method	2-speed with frequency control, stepless frequency control
Wheel diameters	140 mm
End truck types	ETN-top running end truck
Options	All single girder top running crane options

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4. ETN 16

4.1 ETN 16 TECHNICAL SPECIFICATION

General

The crane design is based on the standard crane components for single and double 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 top running end carriages serie ETN will replace the old series ET in the future. At the moment, design for end carriage having 160 mm wheel diameter is ready. ETN16 will replace rest of old end carriage ET14 and it is covering part of wheel loads of ET20 end carriage.

Some benefits of the new ETN16 end carriages are: better crane approaches due to shorter end carriages wheel base in volume area of this size cranes, new even afterwards boltable guide rollers, new adjustable anti-jump brackets, new rail sweeps and buffer extensions.

Specification for ETN16

Maximum crane load	8 t (10 t with short span)
Number of hoists	1 or 2 pcs; 2 hoists with equal capacity, single or tandem drive
Type of hoist	Low, normal headroom or double girder (NOVA), SK-chain hoist
Maximum span	abt. 19 m profile girder, abt. 33 m box girder (2) (depending the corner load)
Type of girder	Standard profiles or welded box; flange width up to 550 mm
Hoisting speeds and control	Acc. to NOVA crane-hoists utilized; 2-speed or freq. Ctrl
Traversing speeds and control	Acc. to NOVA crane-hoists; 2 ramp-freq. Ctrl
Travelling speeds and control	Max speed 40 m/min freq. Ctrl or 2-speed
Classification	Hoisting M4-M6 (1Am-3m) Traversing M5-M6 (2m-3m) Crane travelling M4-M6 (1Am-3m) Crane H1/B2 – H3/B4 and A3-A6
Trolley power supply	Festoon or energy chain (option)
Crane control	Pendant or radio controller
Crane power supply	Flat cable or CraneDuctor-type conductor bar, towing arm fixing to end of end carriage
Runway rail	Rail width from 40 to 70 mm (1)
Options	All applicable standard single girder and double girder crane options

(1) Further range available upon request (Special)
(2) Depending on design parameters

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4.2 ETN16 END CARRIAGE SPECIFICATION

Corner load	max 69 kN dynamic wheel load in FEM 2m (M5)
Classification	FEM E3 for steel structures
Wheel base	up to 4500 mm (1)
Wheels	Cast iron wheels, material GJS700-2
Nr. Of wheels	2 / end carriage (bogie type not available)
Groove width	54 to 84 mm, over 84 without flanges using guide rollers (1)
Construction	Rectangular tube frame, integrated wheel failure support
Travelling machinery	NOVA-types machinery, using GES3/GES4 gear
Joints	Joint plate bolted to top of end carriage, main girder welded to joint plate Single and double girder types possible as standard (1) Girder width up to 550 mm
Buffers	Standard buffers from NOVA-series acc. to load
Options	Bolted type guiding rollers (also possible to add afterwards), anti-jumping brackets, rail sweeps, buffer extensions
Surface treatment	Finishing paint EP120/2-FeSa2½-RAL1028 or primary paint only (RAL 7038 grey)

(1) Further range available upon request (Special)
(2) Depending on design parameters

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4.3 ETN16 END CARRIAGE PRODUCT CODES

Code example (ETN16)

ETN	16	-	20	74	-	B4	0000	C	0000	-	N
GE19	WHE01		WHE02	BT08		DES08		(DES09)	DIM29		
1-3	4,5	6	7,8	9,10	11	12,13	14-17	18	19-22	23	24

Pos.	Code	Feature code	Feature	Available properties			
1-3	**ETN**	GE19	Short product name	ECN			
4,5	**16**	WHE01	Wheel diameter	09 11 16	90 mm 110 mm 160 mm		
6	**-**		Description	- B	Standard Bogie (only ETN20 and bigger)	C	Asymmetrical joint with single girder
7,8	**20**	WHE02	Wheelbase	Wheel base dimension 13 16 20 25 32 40 45	Applicable end carriage 1250 mm 1600 mm 2000 mm 2500 mm 3150 mm 4000 mm 4500 mm	 ETN09 ETN09, ETN11, ETN16 ETN09, ETN11, ETN16 ETN09, ETN11, ETN16 ETN11, ETN16 ETN16 ETN16	
9,10	**74**	BT08	Groove width	Applicable end carriage 50-70 52-87 54-84	 ETN09 (rail head width + 10 mm) ETN11 (rail head width + 12 mm) ETN16 (rail head width + 14 mm)		
11	**-**		Number of driving wheels	- D	One driving wheel/end carriage Two driving wheels/end carriage		
12,13	**B4**	DES08	Joint type	Top joints A3 A4 A6 B4 B6	 4-bolt connection (B<310 mm) 4-bolt connection (B<360 mm) 4-bolt connection (B<550 mm) 8-bolt connection (B<350 mm) 8-bolt connection (B<550 mm)	Applicable end carriage ETN09 ETN11 ETN11 ETN16 ETN16	
14-17	**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.
18	**C**	(DES09)	Buffer type	ETN09 ETN11 ETN16	A, B, C, K, G, E A, B, C, K, G, E, B, C, D, G, E, M, F, H, P	A, B, C, D K, G, E, M, F H, P 0	Rubber buffers PUR buffers PUR buffers No buffer
19-22	**0000**	DIM29	Bogie inner wheel distance	0000	No bogie type end carriage		
23	**-**		Colour code	-	Standard primary paint	K	Standard finishing paint
24	**N**		Special properties	N	Standard	E	Special

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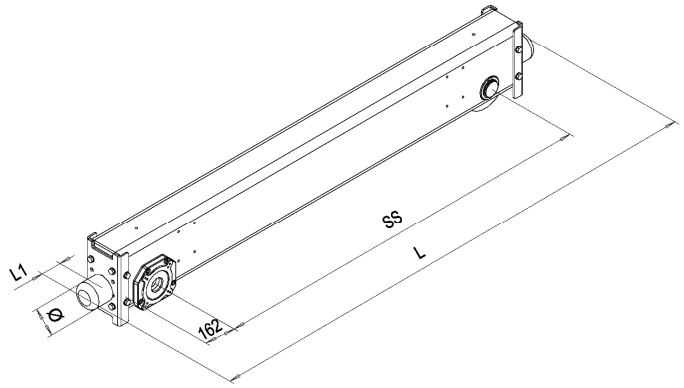
4.4. ETN16 END CARRIAGE PRODUCT FILE

SWF KRANTECHNIK

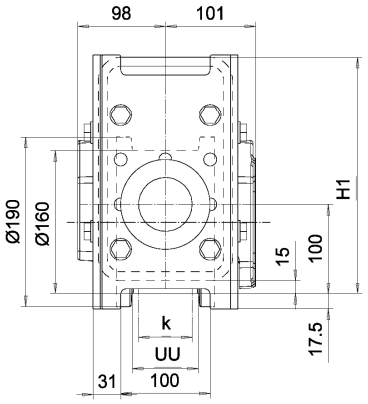
END CARRIAGE, ETN16

For single (SG) and double (DG) girder cranes



L=SS+324+2*L1
max. dynamic wheel load 69 kN.
Available only with nodular cast iron wheels.

ETN16 end carriage can be equipped with 1 or 2 GES3/GES4 travelling unit.



SS	SG/DG	H1	max Pdyn (kN)		Weight
(mm)		(mm)	SG	DG (R=1200)	(kg)
1600	SG/DG	265	69 *)	69 *)	197
2000	SG/DG	265	69 *)	69 *)	220
2500	SG/DG	265	69 *)	69 *)	248
3150	DG	265	-	69 *)	284
3150	SG	315	69 *)	-	312
4000	SG/DG	315	63	69	368
4500	SG/DG	315	44	48	400

*) 80.5 kN in FEM 1Am

Weight [kg] is calculated without buffers.

Buffer type	L1 (mm)	Ø (mm)
B	68	80
C	85	100
D	105	125
K	80	80
G	100	100
E	150	100
F	190	125
M	125	125
H	160+100	160
P	240+100	160
B, C, D rubber		
K, G, E, F, M, H, P polyurethane		

Rail width	Note!
k (mm)	
40≤ k ≤70	With wheel grooves, U = 54...84
70< k ≤100	Use flangless wheels and guide rollers

The maximum wheel load is only a guideline (calculated with double girder).
The maximum values are based on an assumption that the crane speed is 40 m/min, the duty class of the crane is 2m according to FEM and the width of the runway rail is 60mm.

If the speed of the crane is higher, the duty class of the end truck is higher or the runway rail used is narrower, the max. dynamic wheel load shall be calculated separately case by case.

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D005720-A_1 2008-10-30 ETN16

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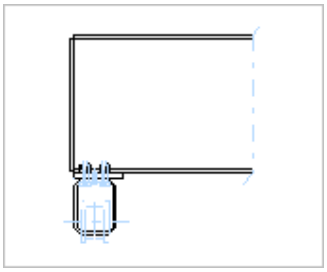
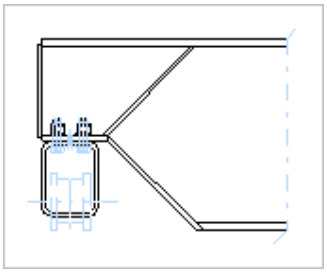
4.5 ETN 16 END CARRIAGE JOINT TYPES

Top Standard (box or profile girder)



B4 and B6 joint plates

Top Medium (box or profile girder)



B4 and B6 joint plates

Other types on request as SP13 case

4.6 ETN 16 CRANE DRIVES SPECIFICATION

Nominal crane speeds, max	20, 25, 32, 40 m/min
Number of machinery / crane	2 or 4
Machinery type	GES3, GES4
Motor types	MF06LA-, MF06MA-
Voltage	All standard NOVA-travelling motor voltages
Control method	2-speed with frequency control, stepless frequency control
Wheel diameters	160 mm
End truck types	ETN-top running end truck
Options	All single girder top running crane options

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5. ETN 20

5.1 ETN 20 TECHNICAL SPECIFICATION

General

The crane design is based on the standard crane components for single and double 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 top running end carriages serie ETN will replace the old series ET in the future. At the moment, design for end carriage having 200 mm wheel diameter is ready. ETN20 will replace old end carriage ET20 and it is covering part of wheel loads of ET25 end carriage.

Some benefits of the new ETN20 end carriages are: better crane approaches due to shorter end carriages wheel base in volume area of this size cranes, new even afterwards boltable guide rollers, new adjustable anti-jump brackets, new rail sweeps and buffer extensions.

Specification for ETN20

Maximum crane load	10 t (16 t with short span), 2 wheel end carriages 20 t (32 t with short span), bogie end carriages
Number of hoists	1 or 2 pcs; 2 hoists with equal capacity, single or tandem drive
Type of hoist	Low, normal headroom or double girder
Maximum span	abt. 19 m profile girder, abt. 33 m box girder (2) (depending the corner load)
Type of girder	Standard profiles or welded box; flange width up to 630 mm
Hoisting speeds and control	Acc. to NOVA hoists utilized; 2-speed or freq. Ctrl
Traversing speeds and control	Acc. to NOVA hoists; 2 ramp-freq. Ctrl
Travelling speeds and control	Max speed 40 m/min freq. Ctrl or 2-speed
Classification	Hoisting M4-M6 (1Am-3m) Traversing M5-M6 (2m-3m) Crane travelling M4-M6 (1Am-3m) Crane H1/B2 – H3/B4 and A3-A6
Trolley power supply	Festoon or energy chain (option)
Crane control	Pendant or radio controller
Crane power supply	Flat cable or CraneDuctor-type conductor bar, towing arm fixing to end of end carriage
Runway rail	Rail width from 40 to 80 mm (1)
Options	All applicable standard single girder and double girder crane options

(1) Further range available upon request (Special)
(2) Depending on design parameters

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5.2 ETN 20 END CARRIAGE SPECIFICATION

Corner load	max 120 kN dynamic wheel load in FEM 2m (M5)
Classification	FEM E3 for steel structures
Wheel base	up to 4500 mm (1)
Wheels	Cast iron wheels, material GJS700-2
Nr. of wheels	2 or 4 / end carriage
Groove width	54 to 94 mm, over 94 without flanges using guide rollers (1)
Construction	Rectangular tube frame, integrated wheel failure support
Travelling machinery	NOVA-types machinery, using GES3/GES4 gear
Joints	Joint plate bolted to top of end carriage, main girder welded to joint plate Single and double girder types possible as standard (1) Girder width up to 630 mm
Buffers	Standard buffers from Q-series acc. to load
Options	Bolted type guiding rollers (also possible to add afterwards), anti-jumping brackets, rail sweeps, buffer extensions
Surface treatment	Finishing paint EP120/2-FeSa2½-RAL1028 or primary paint only (RAL 7038 grey)

(1) Further range available upon request (Special)
(2) Depending on design parameters

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5.3 ETN 20 END CARRIAGE PRODUCT CODES

Code example (ETN20)

ETN	20	-	25	84	-	L4	0000	C	0000	-	N
GE19	WHE01		WHE02	BT08		DES08		(DES09)	DIM29		
1-3	4,5	6	7,8	9,10	11	12,13	14-17	18	19-22	23	24

Pos.	Code	Feature code	Feature	Available properties
1-3	**ETN**	GE19	Short product name	ECN
4,5	**20**	WHE01	Wheel diameter	09 90 mm 11 110 mm 16 160 mm 20 200 mm
6	**-**		Description	- Standard B Bogie (only ETN20 and bigger) C Asymmetrical joint with single girder
7,8	**25**	WHE02	Wheelbase	Wheel base dimension / Applicable end carriage 12 1200 mm ETN20 13 1250 mm ETN09 14 1400 mm ETN20 16 1600 mm ETN09, ETN11, ETN16, ETN20 18 1800 mm ETN20 20 2000 mm ETN09, ETN11, ETN16, ETN20 25 2500 mm ETN09, ETN11, ETN16, ETN20 32 3150 mm ETN11, ETN16, ETN20 40 4000 mm ETN16, ETN20 45 4500 mm ETN16, ETN20
9,10	**84**	BT08	Groove width	Applicable end carriage 50-70 ETN09 (rail head width + 10 mm) 52-87 ETN11 (rail head width + 12 mm) 54-84 ETN16 (rail head width + 14 mm) 54-94 ETN20 (rail head width + 14 mm)
11	**-**		Number of driving wheels	- One driving wheel/end carriage D Two driving wheels/end carriage
12,13	**L4**	DES08	Joint type	Top joints / Applicable end carriage A3 4-bolt connection (B<310 mm) ETN09 A4 4-bolt connection (B<360 mm) ETN11 A6 4-bolt connection (B<550 mm) ETN11 B4 8-bolt connection (B<350 mm) ETN16 B6 8-bolt connection (B<550 mm) ETN16 L3 8-bolt connection (B<300 mm) ETN20 L4 8-bolt connection (B<410 mm) ETN20 L5 8-bolt connection (B<520 mm) ETN20 L6 8-bolt connection (B<630 mm) ETN20 Side joints / Applicable end carriage R3 8 top bolts and 2 side bolts (B<300 mm) ETN20 R4 8 top bolts and 2 side bolts (B<410 mm) ETN20 R5 8 top bolts and 2 side bolts (B<520 mm) ETN20 R6 8 top bolts and 2 side bolts (B<630 mm) ETN20
14-17	**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.
18	**C**	(DES09)	Buffer type	ETN09 A, B, C, K, G, E — A, B, C, D Rubber buffers ETN11 A, B, C, K, G, E, — K, G, E, M, F PUR buffers ETN16 B, C, D, K, G, E, M, F, H, P — H, P, I, S, T, Y PUR buffers ETN20 B, C, D, K, G, E, M, F, H, P, I, S — 0 No buffer
19-22	**0000**	DIM29	Bogie inner wheel distance	0000 No bogie type end carriage
23	**-**		Colour code	- Standard primary paint K Standard finishing paint
24	**N**		Special properties	N Standard E Special

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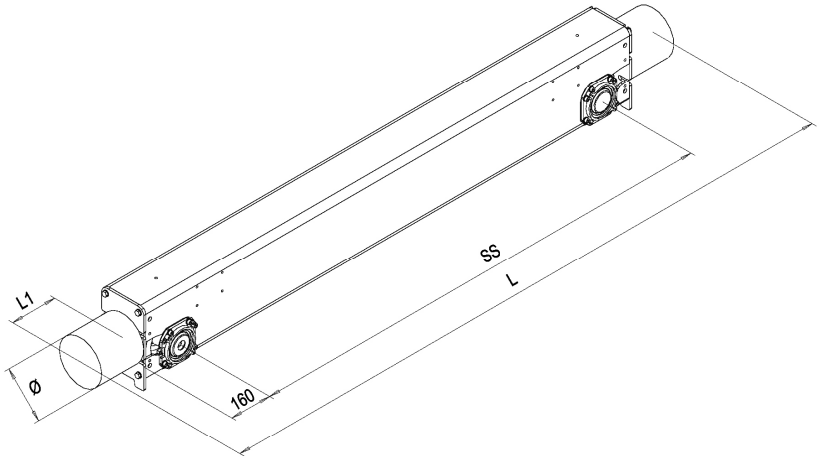
5.4 ETN20 END CARRIAGE PRODUCT FILE

SWF KRANTECHNIK

END CARRIAGE, ETN20

For single (SG) and double (DG) girder cranes



L=SS+320+2*L1
max. dynamic wheel load 120 kN.
Available only with nodular cast iron wheels.

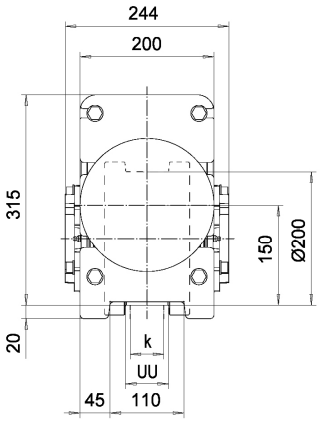
SS	max Pdyn (kN)		Weight
(mm)	SG	DG (R=1200)	(kg)
1600	120 *)	120 *)	199
2000	120 *)	120 *)	227
2500	120 *)	120 *)	265
3150	112	120 *)	311
4000	75	85	372
4500	53	59	409

*) 132 kN in FEM 1Am

Weight [kg] is calculated with buffer type 'B'.

ETN20 end carriage can be equipped with 1 or 2 GES3/GES4 travelling unit.

Buffer type	L1 (mm)	Ø (mm)
B	68	80
C	85	100
D	105	125
K	80	80
G	100	100
E	150	100
F	190	125
H	160	160
I	200	200
M	125	125
P	240	160
S	300	200
B, C, D rubber		
K, G, E, F, H, I, M, P, S polyurethane		



The maximum wheel load is only a guideline (calculated with double girder).
The maximum values are based on an assumption that the crane speed is 40 m/min, the duty class of the crane is 2m according to FEM and the width of the runway rail is 80mm.

If the speed of the crane is higher, the duty class of the end truck is higher or the runway rail used is narrower, the max. dynamic wheel load shall be calculated separately case by case.

Rail width	Note!
k (mm)	
40≤ k ≤80	With wheel grooves, U = 54...94
80< k ≤100	Use flangless wheels and guide rollers

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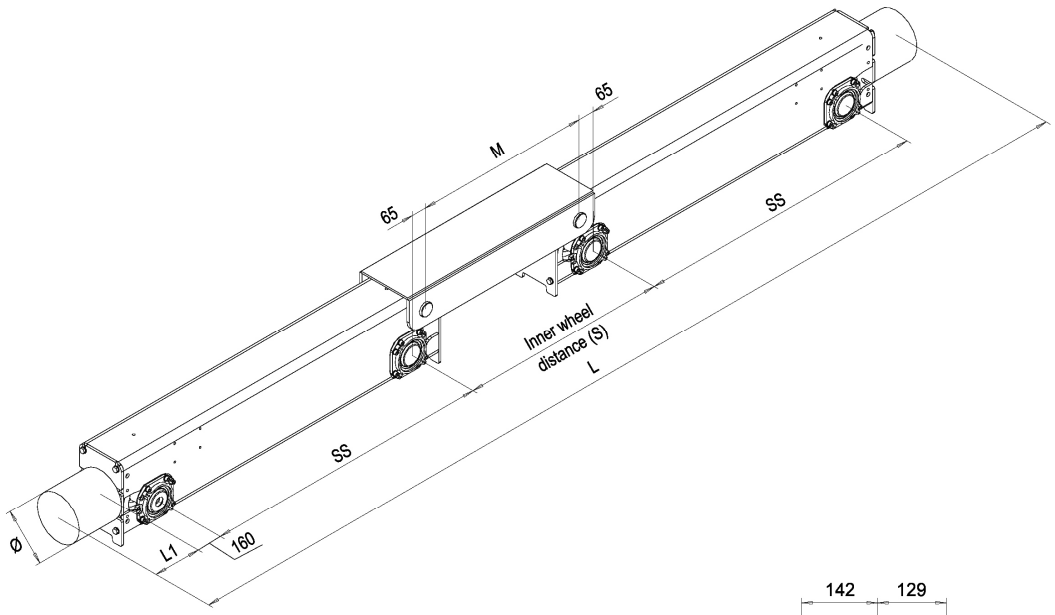
5.5 ETN20B END CARRIAGE PRODUCT FILE

SWF KRANTECHNIK

END CARRIAGE; BOGIE, ETN20B



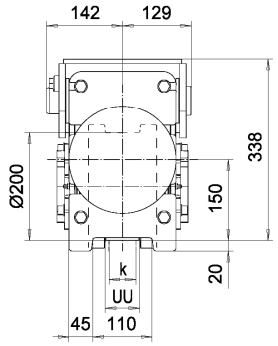
L = 2*(SS+160+L1) + S
max. dynamic wheel load 120 kN.
Available only with nodular cast iron wheels.

SS	Weight	Pdyn
(mm)	(kg)	(kN)
1200	344	120 *)
1400	373	120 *)
1600	402	120 *)
1800	431	120 *)
2000	460	120 *)
*) 132 kN in FEM 1Am		
Total weight (kg)		
Wgt = Weight(kg)+43(kg/m)*M(m)		

Weight (kg) calculated with B_buffer type.

ETN20-B end carriage can be equipped with 1 or 2 GES3/GES4 travelling unit.

Buffer type	L1 (mm)	Ø (mm)
B	68	80
C	85	100
D	105	125
K	80	80
G	100	100
E	150	100
F	190	125
H	160	160
I	200	200
M	125	125
P	240	160
S	300	200
B, C, D rubber		
K, G, E, F, H, I, M, P, S polyurethane		



Rail width	Note!
k (mm)	
40≤ k ≤80	With wheel grooves, U = 54...94
80< k ≤100	Use flangless wheels and guide rollers

M = S-130, Mmin = 430 mm for wheel change

The maximum wheel load is only a guideline (calculated with double girder).
The maximum values are based on an assumption that the crane speed is 40 m/min, the duty class of the crane is 2m according to FEM and the width of the runway rail is 80mm.

If the speed of the crane is higher, the duty class of the end truck is higher or the runway rail used is narrower, the max. dynamic wheel load shall be calculated separately case by case.

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D005575-A_1 2008-09-11 ETN20B

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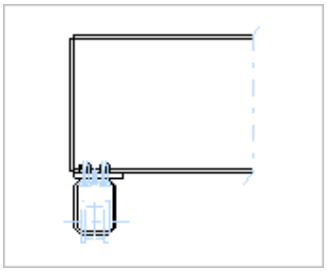
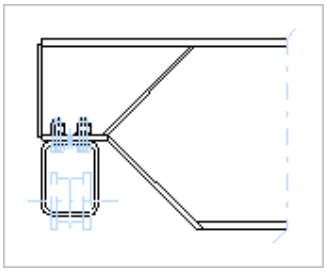
5.6 ETN 20 END CARRIAGE JOINT TYPES

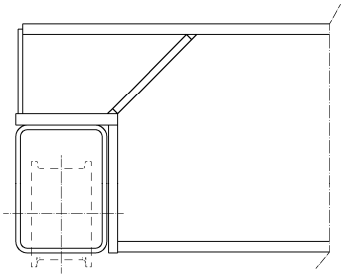
Top Standard (box or profile girder)
L3, L4, L5, L6 plates



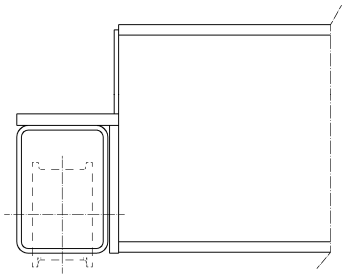
Top Medium (box or profile girder)
L3, L4, L5, L6 plates



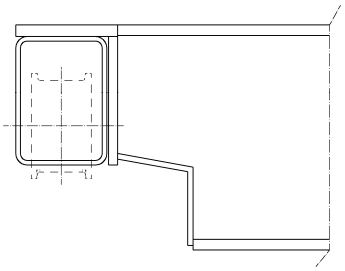
Side Standard Expanded (box or profile girder)
R3, R4, R5, R6 plates



Side standard (box or profile girder)
R3, R4, R5, R6 plates



Side Low (box or profile girder)
R3, R4, R5, R6 plates



Other types on request as SP13 case

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5.7 ETN 20 CRANE DRIVES SPECIFICATION

Nominal crane speeds, max	20, 25, 32, 40 m/min
Number of machinery / crane	2 or 4
Machinery type	GES3/GES4
Motor types	MF06LA-, MF06MA-, MF06LB
Voltage	All standard crane-travelling motor voltages
Control method	2-speed with frequency control, stepless frequency control
Wheel diameters	200 mm
End truck types	ETN-top running end truck
Options	All single girder top running crane options

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6. ETN 25

6.1 ETN 25 TECHNICAL SPECIFICATION

General

The crane design is based on the standard crane components for single and double 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 top running end carriages serie ETN will replace the old series ET in the future. At the moment, design for end carriage having 250 mm wheel diameter is ready. Factory name for this new end carriage is ETN25. ETN25 will replace old end carriage ET25.

Some benefits of the new ETN25 end carriages are: better crane approaches due to shorter end carriages wheel base in volume area of this size cranes, new even afterwards boltable guiding rollers, new adjustable anti-jumping brackets, new rail sweeps and buffer extensions.

Specification for ETN25

Maximum crane load	20 t (25 t with short span), 2 wheel end carriages 32 t (50 t with short span), bogie end carriages
Type of hoist	Low, normal headroom or double girder (NOVA-type), SK-chain hoist
Maximum span	abt. 19 m profile girder, abt. 40 m box girder [(2)] (depending the corner load)
Type of girder	Standard profiles or welded box; flange width up to 990 mm
Hoisting speeds and control	Acc. to NOVA-hoists utilized; 2-speed or freq. Ctrl
Traversing speeds and control	Acc. to NOVA-hoists; 2 ramp-freq. Ctrl
Travelling speeds and control	Design speed 40 m/min freq. Ctrl, max speed up to 80 m/min (100 m/min)
Classification	Hoisting M4-M6 (1Am-3m) Traversing M5-M6 (2m-3m) Crane travelling M4-M6 (1Am-3m) Crane A3-A6
Trolley power supply	Festoon or energy chain (option)
Crane control	Pendant or radio controller
Crane power supply	Flat cable or CraneDuctor-type conductor bar, towing arm fixing to end of end carriage
Runway rail	Rail width from 40 to 70 mm, over 70 mm with guiding rollers [(1)]
Options	All applicable standard single girder and double girder crane options

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

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6.2 ETN 25 END CARRIAGE SPECIFICATION

Corner load	max 185 kN dynamic wheel load in FEM 2m (M5)
Classification	FEM E3 for steel structures
Wheel base	up to 5500 mm (1)
Wheels	Cast iron wheels, material GJS700-2
Nr. of wheels	2 or 4 / end carriage
Groove width	54 to 84 mm, over 84mm without flanges using guide rollers (1)
Construction	Rectangular tube frame, integrated wheel failure support
Travelling machinery	Nova-types machinery, using GES4/GES5 gear
Joints	Joint plate bolted to end carriage, main girder welded to joint plate Single and double girder types possible as standard (1) Girder width up to 990 mm
Buffers	Standard buffers from NOVA-series acc. to load
Options	Bolted type guiding rollers (also possible to add afterwards), anti-jumping brackets, rail sweeps, buffer extensions
Surface treatment	Finishing paint EP120/2-FeSa2½-RAL1028 or primary paint only (gray colour)
Other	Field assembly instructions to be created

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

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6.3 ETN 25 END CARRIAGE PRODUCT CODES

ETN	25	-	32	84	-	H4	0000	C	0000	-	N
GE19	WHE01		WHE02	BT08		DES08		(DES09)	DIM29		
1-3	4,5	6	7,8	9,10	11	12,13	14-17	18	19-22	23	24

Pos.	Code	Feature code	Feature	Available properties
1-3	**ETN**	GE19	Short product name	ETN Factory code (End carriage)
4,5	**25**	WHE01	Wheel diameter	09 90 mm 11 110 mm 16 160 mm 20 200 mm 25 250 mm
6	**-**		Description	- Standard B Bogie (only ETN20 and bigger) C Asymmetrical joint with single girder
7,8	**32**	WHE02	Wheelbase	Wheel base dimension / Applicable end carriage 12 1200 mm ETN20 13 1250 mm ETN09 14 1400 mm ETN20, ETN25 16 1600 mm ETN09, ETN11, ETN16, ETN20, ETN25 18 1800 mm ETN20, ETN2 20 2000 mm ETN09, ETN11, ETN16, ETN20, ETN25 22 2200 mm ETN25 25 2500 mm ETN09, ETN11, ETN16, ETN20, ETN25 32 3150 mm ETN11, ETN16, ETN20, ETN25 40 4000 mm ETN16, ETN20, ETN25 45 4500 mm ETN16, ETN20, ETN25 50 5000 mm ETN25 55 5500 mm ETN25
9,10	**84**	BT08	Groove width	Applicable end carriage 50-70 ETN09 (rail head width + 10 mm) 52-87 ETN11 (rail head width + 12 mm) 54-84 ETN16 (rail head width + 14 mm) 54-94 ETN20 (rail head width + 14 mm) 54-84 ETN25 (rail head width + 14 mm)
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/driving bogie pair
12,13	**H4**	DES08	Joint type	Top joints / Applicable end carriage A3 4-bolt connection (B<310 mm) ETN09 A4 4-bolt connection (B<360 mm) ETN11 A6 4-bolt connection (B<550 mm) ETN11 B4 8-bolt connection (B<350 mm) ETN16 B6 8-bolt connection (B<550 mm) ETN16 L3 8-bolt connection (B<300 mm) ETN20 L4 8-bolt connection (B<410 mm) ETN20 L5 8-bolt connection (B<520 mm) ETN20 L6 8-bolt connection (B<630 mm) ETN20 H4 12-bolt connection (B<410 mm) ETN25 H5 12-bolt connection (B<520 mm) ETN25 H7 12-bolt connection (B<740 mm) ETN25 H9 12-bolt connection (B<990 mm) ETN25
s.	**Code**	**Feature code**	**Feature**	**Available properties**
				Side joints / Applicable end carriage R3 8 top bolts and 2 side bolts (B<300 mm) ETN20 R4 8 top bolts and 2 side bolts (B<410 mm) ETN20 R5 8 top bolts and 2 side bolts (B<520 mm) ETN20 R6 8 top bolts and 2 side bolts (B<630 mm) ETN20 F4 8 top bolts and 4 side bolts (B<410 mm) ETN25 F5 12 top bolts and 4 side bolts (B<520 mm) ETN25 F7 12 top bolts and 4 side bolts (B<750 mm) ETN25 F8 12 top bolts and 4 side bolts (B<890 mm) ETN25
14-17	**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.

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18	**C**	(DES09)	Buffer type	ETN09 A, B, C, K, G, E ETN11 A, B, C, K, G, E, ETN16 B, C, D, K, G, E, M, F, H, P ETN20 B, C, D, K, G, E, M, F, H, P, I, S ETN25 B, C, D, K, G, E, M, F, H, P, I, S		A, B, C, D K, G, E, M, F H, P, I, S, T, Y 0	Rubber buffers PUR buffers PUR buffers No buffer
19-22	**0000**	DIM29	Bogie inner wheel distance	0000	No bogie type end carriage		
23	**-**		Colour code	-	Standard primary paint	K	Standard finishing paint
24	**N**		Special properties	N	Standard	E	Special

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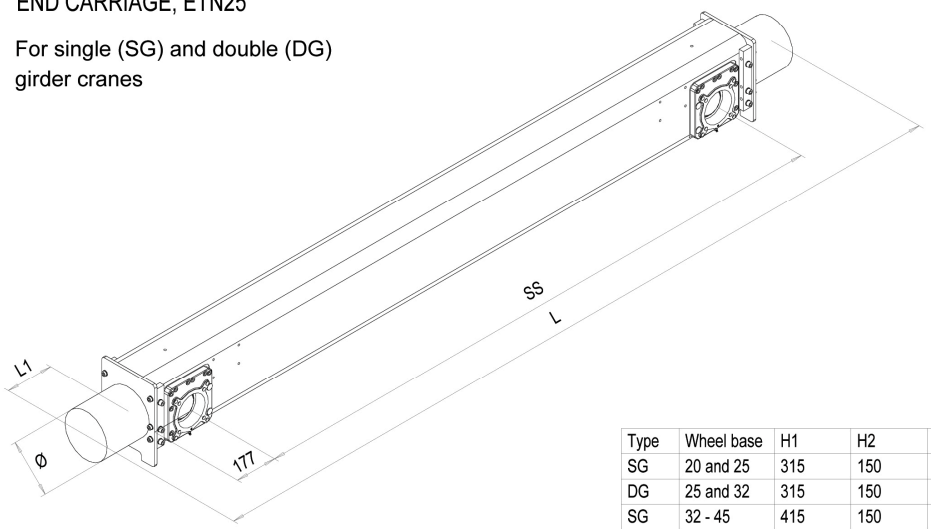
6.4 ETN25 END CARRIAGE PRODUCT FILE

SWF KRANTECHNIK

END CARRIAGE, ETN25

For single (SG) and double (DG) girder cranes



Type	Wheel base	H1	H2	H
SG	20 and 25	315	150	335
DG	25 and 32	315	150	335
SG	32 - 45	415	150	435
DG	40 and 45	415	150	435
SG	50 and 55	420	155	435
DG	50 and 55	420	155	435

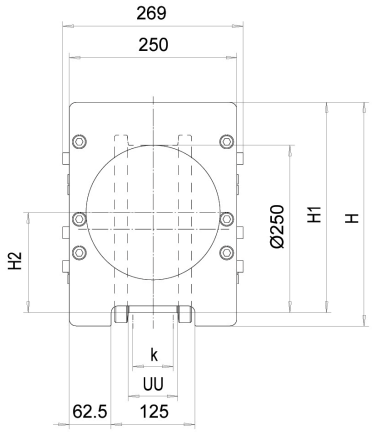
L=SS+354+2*L1
max. dynamic wheel load 185 kN.
Available only with nodular cast iron wheels.

SS	max Pdyn (kN)		Weight (kg)	
(mm)	SG	DG (R=1400)	SG	DG
2000	185	-	409	-
2500	171	185	453	453
3150	170	185	579	510
4000	158	185	671	671
4500	128	139	725	725
5000	138	182	938	938
5500	125	135	1007	1007

Weight [kg] is calculated with buffer type 'B'.

ETN25 end carriage can be equipped with 1 or 2 GES4/GES5 travelling unit.

Buffer type	L1 (mm)	Ø (mm)
B	68	80
C	85	100
D	105	125
K	80	80
G	100	100
E	150	100
F	190	125
H	160	160
I	200	200
M	125	125
P	240	160
S	300	200
B, C, D rubber		
K,G, E, F, H, I, M, P, S polyurethane		



The maximum wheel load is only a guideline (calculated with double girder).
The maximum values are based on an assumption that the crane speed is 40 m/min, the duty class of the crane is 2m according to FEM and the width of the runway rail is 80 mm.

If the speed of the crane is higher, the duty class of the end truck is higher or the runway rail used is narrower, the max. dynamic wheel load shall be calculated separately case by case.

Rail width	Note!
k (mm)	
40≤ k ≤70	With wheel grooves, U = 54...84
70< k ≤100	Use flangless wheels and guide rollers

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D005650-A_3 2009-01-15 ETN25

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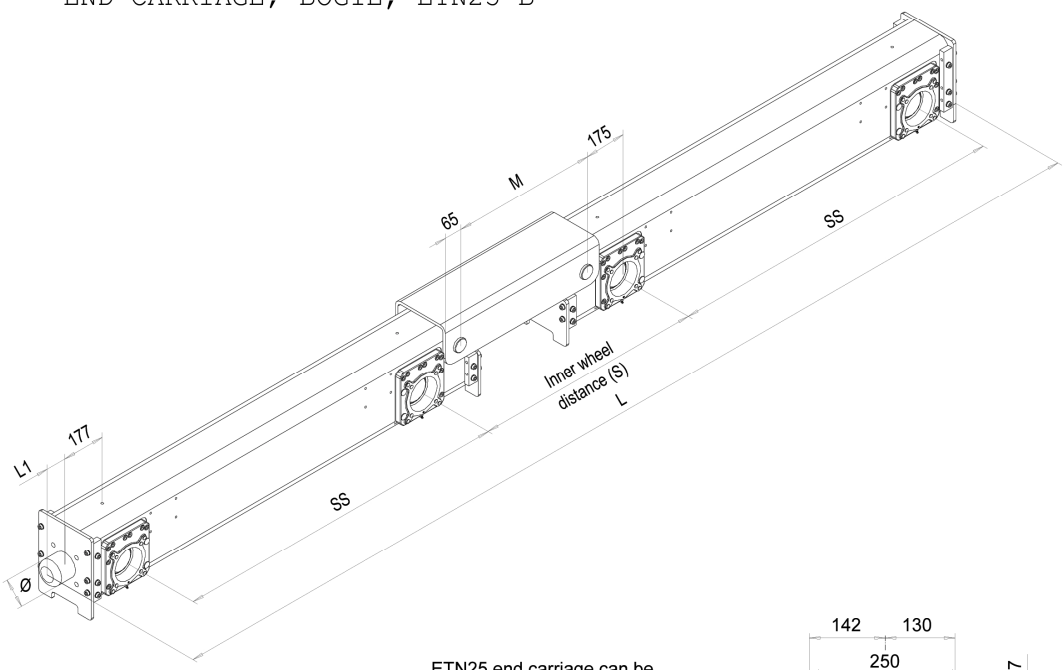
6.5 ETN25B END CARRIAGE PRODUCT FILE

SWF KRANTECHNIK

END CARRIAGE; BOGIE, ETN25-B



L = 2*(SS+177+L1) + S
max. dynamic wheel load 185 kN.
Available only with nodular cast iron wheels.

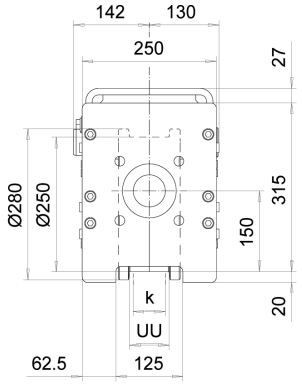
SS	Weight W_E	Pdyn
(mm)	(kg)	(kN)
1400	492	185
1600	528	185
1800	563	185
2000	598	185
2200	633	185
2500	686	171

Weight (W_E) calculated with B_buffer type and travel wheel (UU=79), but without intermediate beam (W_BB).

Total weight (Wgt) = W_E+W_BB (kg)

ETN25 end carriage can be equipped with 1 or 2 GES4/GES5 travelling unit.

Buffer type	L1 (mm)	Ø (mm)
B	68	80
C	85	100
D	105	125
K	80	80
G	100	100
E	150	100
F	190	125
H	160	160
I	200	200
M	125	125
P	240	160
S	300	200
B, C, D rubber		
K, G, E, F, H, I, M, P, S polyurethane		



Rail width	Note!
k (mm)	
40≤ k ≤70	With wheel grooves, U = 54...84
70< k ≤100	Use flangless wheels and guide rollers

INTERM. BEAM	W_BB
M=S-350 (mm)	(kg/pcs)
480*)...< 2000	43.2+(S-830)*0.05
≥ 2000...< 4000	122.0+(S-2350)*0.05
≥ 4000...5000	296.0+(S-4350)*0.07
*) Mmin = 480 mm for wheel change	

The maximum wheel load is only a guideline (calculated with double girder).
The maximum values are based on an assumption that the crane speed is 40 m/min, the duty class of the crane is 2m according to FEM and the width of the runway rail is 80 mm.

If the speed of the crane is higher, the duty class of the end truck is higher or the runway rail used is narrower, the max. dynamic wheel load shall be calculated separately case by case.

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D005892-A_1 2009-01-14 ETN25-B

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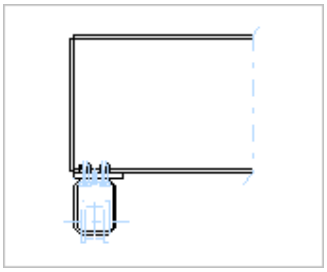
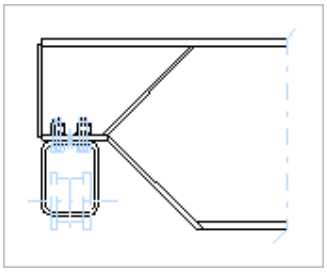
6.6 ETN25 END CARRIAGE JOINT TYPES

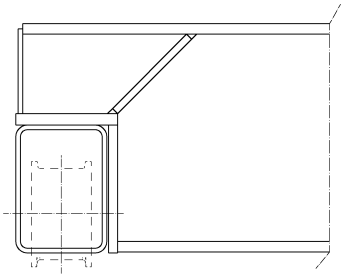
Top Standard (box or profile girder)
H4, H5, H7, H9 plates



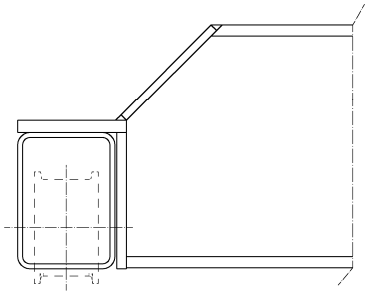
Top Medium (box or profile girder)
H4, H5, H7, H9 plates



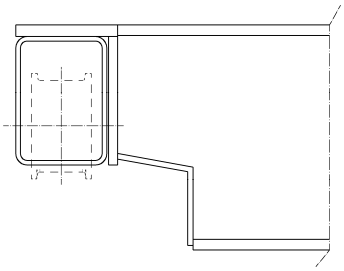
Side Standard Expanded (box or profile girder)
F4, F5, F7, F8 plates



Side standard cutted (box or profile girder)
F4, F5, F7, F8 plates



Side Low (box or profile girder)
F4, F5, F7, F8 plates



Other types on request as SP13 case

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6.7 ETN 25 CRANE DRIVES SPECIFICATION

Nominal crane speeds	20, 25, 32, 40, 50, 63, 80, (100) m/min
Number of machinery / crane	2 or 4
Machinery type	GES4/GES5
Motor types	MF06LA-, MF06LB-, MF07X_-
Voltage	All standard Q-travelling motor voltages
Control method	2-speed with frequency control, stepless frequency control
Wheel diameters	250 mm
End truck types	ETN-top running end truck
Options	All single girder top running crane options

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7. ETN 32

7.1 ETN 32 TECHNICAL SPECIFICATION

General

The crane design is based on the standard crane components for single and double 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 top running end carriages serie ETN will replace the old series ET in the future. At the moment, design for end carriage having 315 mm wheel diameter is ready. Factory name for this new end carriage is ETN32. ETN32 will replace old end carriage ET32 and will take part of volumes of old ET50.

Some benefits of the new ETN32 end carriages are: better crane approaches due to shorter end carriages wheel base in volume area of this size cranes, new even afterwards boltable guiding rollers, new adjustable anti-jumping brackets, new rail sweeps and buffer extensions.

Specification for ETN32

Maximum crane load	32 t (40 t with short span), 2 wheel end carriages 50 t (63 t with short span), bogie end carriages
Type of hoist	Low, normal headroom or double girder (NOVA-type), SK-chain hoist,
Maximum span	abt. 19 m profile girder, abt. 40 m box girder (2) (depending the corner load)
Type of girder	Standard profiles or welded box; flange width up to 990 mm
Hoisting speeds and control	Acc. to NOVA-hoists utilized; 2-speed or freq. Ctrl
Traversing speeds and control	Acc. to NOVA-hoists; 2 ramp-freq. Ctrl
Travelling speeds and control	Design speed 40 m/min freq. Ctrl, max speed up to 80 m/min (100 m/min)
Classification	Hoisting M4-M6 (1Am-3m) Traversing M5-M6 (2m-3m) Crane travelling M4-M6 (1Am-3m) Crane A3-A6
Trolley power supply	Festoon or energy chain (option)
Crane control	Pendant or radio controller
Crane power supply	Flat cable or CraneDuctor-type conductor bar, towing arm fixing to end of end carriage
Runway rail	Rail width from 50 to 80 mm, over 80 mm with guiding rollers (1)
Options	All applicable standard single girder and double girder crane options

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

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7.2 ETN 32 END CARRIAGE SPECIFICATION

Corner load	Max 225 kN dynamic wheel load in FEM 2m (M5)
Classification	FEM E3 for steel structures
Wheel base	up to 5500 mm (1)
Wheels	Cast iron wheels, material GJS700-2
Nr. of wheels	2 or 4 / end carriage
Groove width	64 to 94 mm, over 94 without flanges using guide rollers (1)
Construction	Rectangular tube frame, integrated wheel failure support
Travelling machinery	NOVA-types machinery, using GES4/GES5 gear
Joints	Joint plate bolted to end carriage, main girder welded to joint plate Single and double girder types possible as standard (1) Girder width up to 990 mm
Buffers	Standard buffers from NOVA-series acc. to load
Options	Bolted type guiding rollers (also possible to add afterwards), anti-jumping brackets, rail sweeps, buffer extensions
Surface treatment	Finishing paint EP120/2-FeSa2½-RAL1028 or primary paint only (gray colour)
Other	Field assembly instructions to be created

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

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7.3 ETN 32 END CARRIAGE PRODUCT CODES

Code example (ETN32)

ETN	32	-	40	84	-	K5	0000	C	0000	-	N
GE19	WHE01		WHE02	BT08		DES08		(DES09)	DIM29		
1-3	4,5	6	7,8	9,10	11	12,13	14-17	18	19-22	23	24

Pos.	Code	Feature code	Feature	Available properties
1-3	**ETN**	GE19	Short product name	ECN Factory code (End carriage)
4,5	**32**	WHE01	Wheel diameter	09 90 mm 11 110 mm 16 160 mm 20 200 mm 25 250 mm 32 315 mm
6	**-**		Description	- Standard B Bogie (only ETN20 and bigger) C Asymmetrical joint with single girder
7,8	**40**	WHE02	Wheelbase	Wheel base dimension / Applicable end carriage 12 1200 mm ETN20 13 1250 mm ETN09 14 1400 mm ETN20, ETN25, ETN32 16 1600 mm ETN09, ETN11, ETN16, ETN20, ETN25, ETN32 18 1800 mm ETN20, ETN25, ETN32 20 2000 mm ETN09, ETN11, ETN16, ETN20, ETN25, ETN32 22 2200 mm ETN25 25 2500 mm ETN09, ETN11, ETN16, ETN20, ETN25, ETN32 32 3150 mm ETN11, ETN16, ETN20, ETN25, ETN32 40 4000 mm ETN16, ETN20, ETN25, ETN32 45 4500 mm ETN16, ETN20, ETN25, ETN32 50 5000 mm ETN25, ETN32 55 5500 mm ETN25, ETN32
9,10	**84**	BT08	Groove width	Applicable end carriage 50-70 ETN09 (rail head width + 10 mm) 52-87 ETN11 (rail head width + 12 mm) 54-84 ETN16 (rail head width + 14 mm) 54-94 ETN20 (rail head width + 14 mm) 54-84 ETN25 (rail head width + 14 mm) 64-94 ETN32 (rail head width + 14 mm)
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/driving bogie pair
12,13	**K5**	DES08	Joint type	Top joints / Applicable end carriage A3 4-bolt connection (B<310 mm) ETN09 A4 4-bolt connection (B<360 mm) ETN11 A6 4-bolt connection (B<550 mm) ETN11 B4 8-bolt connection (B<350 mm) ETN16 B6 8-bolt connection (B<550 mm) ETN16 L3 8-bolt connection (B<300 mm) ETN20 L4 8-bolt connection (B<410 mm) ETN20 L5 8-bolt connection (B<520 mm) ETN20 L6 8-bolt connection (B<630 mm) ETN20 H4 12-bolt connection (B<410 mm) ETN25 H5 12-bolt connection (B<520 mm) ETN25 H7 12-bolt connection (B<740 mm) ETN25 H9 12-bolt connection (B<990 mm) ETN25 K4 12-bolt connection (B<410 mm) ETN32 K5 12-bolt connection (B<520 mm) ETN32 K7 12-bolt connection (B<740 mm) ETN32 K9 12-bolt connection (B<990 mm) ETN32

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Pos.	Code	Feature code	Feature	Available properties			
					Side joints		Applicable end carriage
				R3	8 top bolts and 2 side bolts (B<300 mm)		ETN20
				R4	8 top bolts and 2 side bolts (B<410 mm)		ETN20
				R5	8 top bolts and 2 side bolts (B<520 mm)		ETN20
				R6	8 top bolts and 2 side bolts (B<630 mm)		ETN20
				F4	8 top bolts and 4 side bolts (B<410 mm)		ETN25
				F5	12 top bolts and 4 side bolts (B<520 mm)		ETN25
				F7	12 top bolts and 4 side bolts (B<750 mm)		ETN25
				F8	12 top bolts and 4 side bolts (B<890 mm)		ETN25
				Q4	12 top bolts and 4 side bolts (B<410 mm)		ETN32
				Q5	12 top bolts and 4 side bolts (B<520 mm)		ETN32
				Q6	12 top bolts and 6 side bolts (B<520 mm)		ETN32
				Q7	12 top bolts and 4 side bolts (B<740 mm)		ETN32
				Q8	12 top bolts and 6 side bolts (B<740 mm)		ETN32
				Q9	12 top bolts and 4 side bolts (B<990 mm)		ETN32
				Q0	12 top bolts and 6 side bolts (B<990 mm)		ETN32
14-17	**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.
18	**C**	(DES09)	Buffer type	ETN09 ETN11 ETN16 ETN20 ETN25 ETN32	A, B, C, K, G, E A, B, C, K, G, E, B, C, D, K, G, E, M, F, H, P B, C, D, K, G, E, M, F, H, P, I, S B, C, D, K, G, E, M, F, H, P, I, S B, C, D, K, G, E, M, F, H, P, I, S, T, Y	A, B, C, D K, G, E, M, F H, P, I, S, T, Y 0	Rubber buffers PUR buffers PUR buffers No buffer
19-22	**0000**	DIM29	Bogie inner wheel distance	0000	No bogie type end carriage		
23	**-**		Colour code	-	Standard primary paint	K	Standard finishing paint
24	**N**		Special properties	N	Standard	E	Special

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7.4. ETN32 END CARRIAGE PRODUCT FILE

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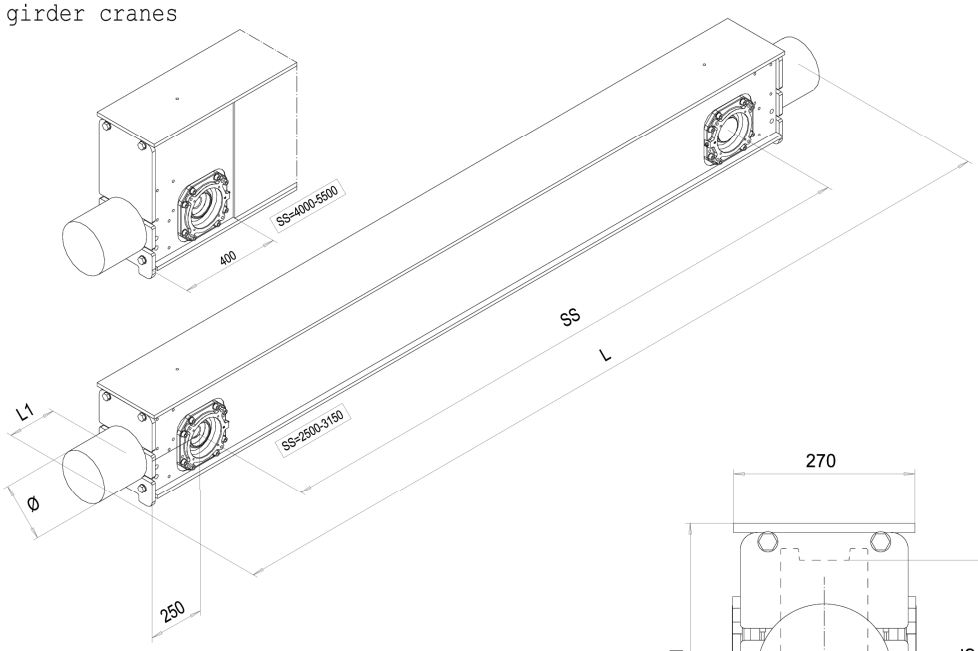
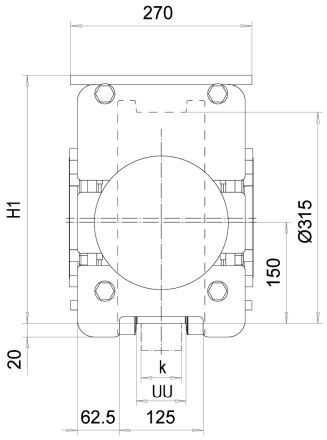
END CARRIAGE, ETN32

For single and double girder cranes





L=SS+500+2*L1

max. dynamic wheel load 253 kN.

Available only with ductile castiron wheel.

SS	H1	max Pdyn (kN)		Weight
(mm)	(mm)	SG	DG (R=1400)	(kg)
2500	370	225 *)	225 *)	538
3150	370	200	225 *)	623
4000	470	208	225 *)	716
4500	470	185	225 **)	772
5000	545	200	225 *)	895
5500	545	182	225	956

*) 253 kN in FEM 1Am; **) 243 kN in FEM 1Am

Weight [kg] is calculated with buffer type 'B', but without inner support plates of the end carriage.

ETN32 end carriage can be equipped with 1 or 2 GES4/GES5 travelling unit.

Buffer type	L1 (mm)	Ø (mm)
B	68	80
C	85	100
D	105	125
E	150	100
F	190	125
H	160	160
I	200	200
M	125	125
P	240	160
S	300	200
T	350	250
Y	475	250
B, C, D rubber		
E, F, H, I, M, P, S, T, Y polyurethane		

Rail width	Note!
k (mm)	
50...80	Ductile cast iron wheel (UU=64...94)
>80 ≤100	Use flangeless wheels and guide rollers

The maximum wheel load is only a guideline (calculated with double girder).
The maximum values are based on an assumption that the crane speed is 40 m/min, the duty class of the crane is 2m according to FEM and the width of the runway rail is 80mm.

If the speed of the crane is higher, the duty class of the end truck is higher or the runway rail used is narrower, the max. dynamic wheel load shall be calculated separately case by case.

SWF Krantechnik GmbH reserves the right to alter or amend the above information without notice

D005089-A_1 2007-09-10 ETN32

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7.5 ETN32B END CARRIAGE PRODUCT FILE

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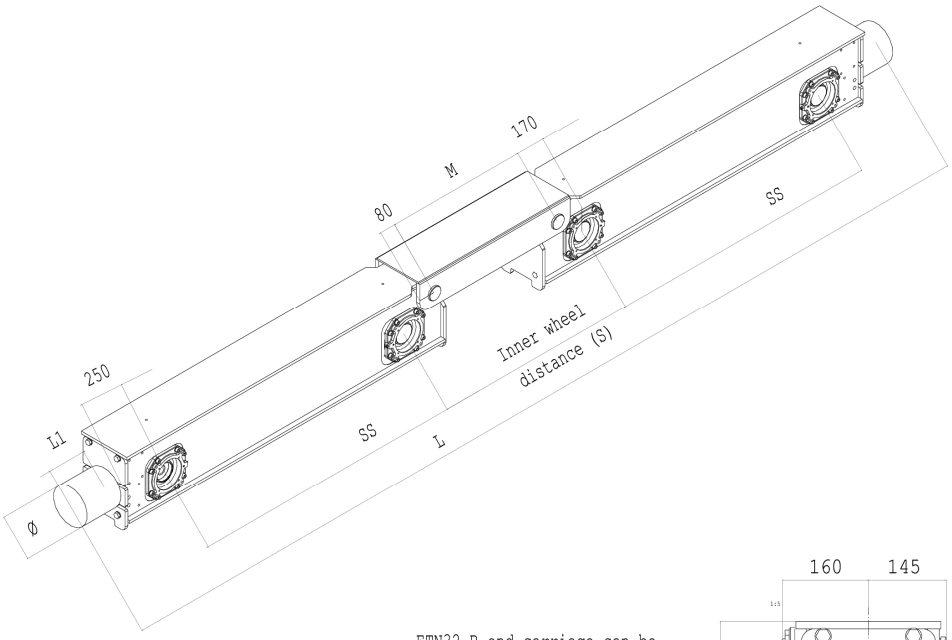
END CARRIAGE; BOGIE, ETN32-B

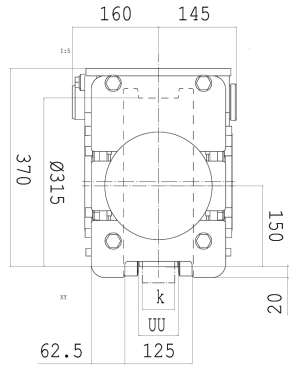


L = 2*(SS+250+L1) + S
max. dynamic wheel load 253 kN.
Available only with ductile castiron wheel.

SS	Weight	Pdyn
(mm)	(kg)	(kN)
1400	395	225 *)
1600	421	225 *)
1800	447	225 *)
2000	473	225 *)
*) 253 kN in FEM 1Am		
Total weight (kg)		
Wgt = Weight*2(kg)+16(kg)+64(kg/m)*M(m)		

ETN32-B end carriage can be equipped with 1 or 2 GES4/GES5 travelling unit.

Buffer type	L1 (mm)	Ø (mm)
B	68	80
C	85	100
D	105	125
E	150	100
F	190	125
H	160	160
I	200	200
M	125	125
P	240	160
S	300	200
T	350	250
Y	475	250
B, C, D rubber		
E, F, H, I, M, P, S, T, Y polyurethane		



Rail width	Note!
k (mm)	
50...80	Ductile cast iron wheel (UU=64...94)
>80 ≦100	Use flangeless wheels and guide rollers

Weight (kg) calculated with B_buffer type, but without inner support plates of end carriage.

The maximum wheel load is only a guideline (calculated with double girder).
The maximum values are based on an assumption that the crane speed is 40 m/min, the duty class of the crane is 2m according to FEM and the width of the runway rail is 80mm.

If the speed of the crane is higher, the duty class of the end truck is higher or the runway rail used is narrower, the max. dynamic wheel load shall be calculated separately case by case.

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D005298-A_2 2008-04-09 ETN32-B

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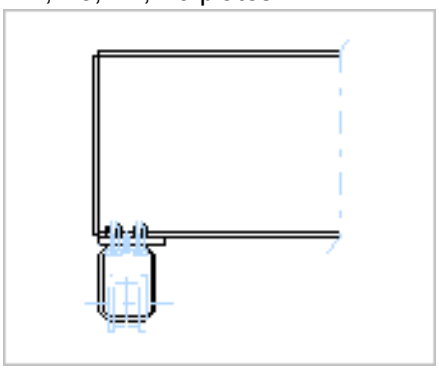
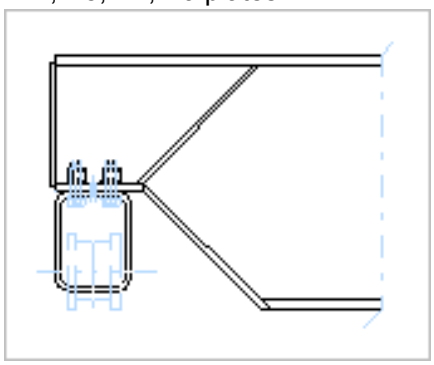
7.6 ETN 32 END CARRIAGE JOINT TYPES

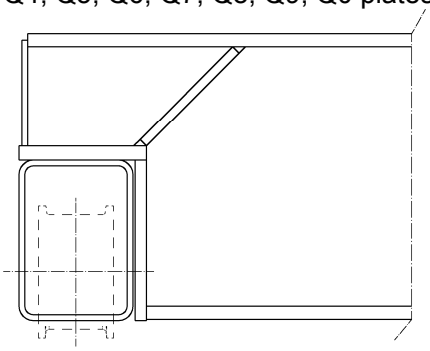
Top Standard (box or profile girder)
K4, K5, K7, K9 plates



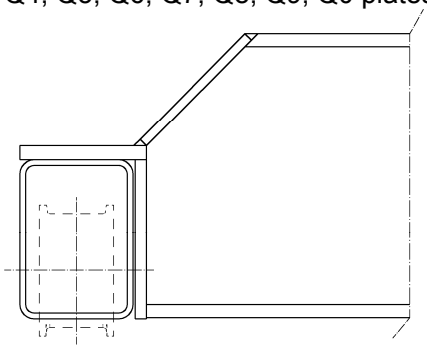
Top Medium (box or profile girder)
K4, K5, K7, K9 plates



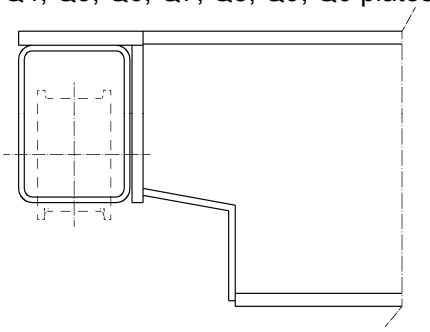
Side Standard Expanded (box or profile girder)
Q4, Q5, Q6, Q7, Q8, Q9, Q0 plates



Side standard cutted (box or profile girder)
Q4, Q5, Q6, Q7, Q8, Q9, Q0 plates



Side Low (box or profile girder)
Q4, Q5, Q6, Q7, Q8, Q9, Q0 plates



Other types on request as SP13 case

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7.7 ETN 32 CRANE DRIVES SPECIFICATION

Nominal crane speeds	20, 25, 32, 40, 50, 63, 80, (100) m/min
Number of machinery / crane	2 or 4
Machinery type	GES4/GES5
Motor types	MF06LA-, MF06LB-, MF07X_-
Voltage	All standard NOVA-travelling motor voltages
Control method	2-speed with frequency control, stepless frequency control
Wheel diameters	315 mm
End truck types	ETN-top running end truck
Options	All single girder top running crane options

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8. ETN 40

8.1 ETN40 TECHNICAL SPECIFICATION

General

The crane design is based on the standard crane components for single and double 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 top running end carriages series ETN will replace the old series ET. Now the design for end carriage having 400 mm wheel diameter is ready.
ETN40 will replace old end carriage ET50 (partly) and will take part of volumes of EHR40 end trucks.

Some benefits of the new ETN40 end carriages are: better crane approaches due to shorter end carriages wheel base in volume area of this size cranes, new even afterwards boltable guiding rollers, new anti-jumping brackets, new rail sweeps and buffer extensions.

Coming later: QM6 travelling machinery and EHR end trucks top joint plates. Can be used as options with new ETN40.

Specification for ETN40

Maximum crane load	40 t (50 t with short span), 2 wheel end carriages 80 t (100 t with short span), bogie end carriages
Number of hoists	1 or 2 pcs; 2 hoists with equal capacity, single or tandem drive
Type of hoist	Low, normal headroom or double girder
Maximum span	abt. 19 m profile girder, abt. 40 m box girder (2) (depending the corner load)
Type of girder	Standard profiles or welded box; flange width up to 990 mm
Hoisting speeds and control	Acc. to NOVA-hoists utilized; 2-speed or freq. Ctrl
Traversing speeds and control	Acc. to NOVA-hoists; 2 ramp-freq. Ctrl
Travelling speeds and control	Design speed 40 m/min freq. Ctrl, max speed up to 80 m/min (100 m/min)
Classification	Hoisting M4-M6 (1Am-3m) Traversing M5-M6 (2m-3m) Crane travelling M4-M6 (1Am-3m) Crane A3-A6
Trolley power supply	Festoon or energy chain (option)
Crane control	Pendant or radio controller
Crane power supply	Flat cable or CraneDuctor-type conductor bar, towing arm fixing to end of end carriage
Runway rail	Rail width from 40 to 120 mm, over 120 mm with guiding rollers (1)
Options	All applicable standard single girder and double girder crane options

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

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8.2 ETN40 END CARRIAGE SPECIFICATION

Corner load	max 350 kN dynamic wheel load in FEM 2m (M5), max 400 kN dynamic wheel load in FEM 1Am (M4)
Classification	FEM E3 for steel structures
Wheel base	up to 5500 mm (1)
Wheels	Cast iron wheels, material GJS700-2
Nr. of wheels	2 or 4 / end carriage
Groove width	55 to 120 mm, over 120 without flanges using quide rollers (1)
Construction	Welded box frame, integrated anti-derail-device
Travelling machinery	Q-types machinery, using GES5 gear. Option: QM6 machinery from EHR end trucks
Joints	Joint plate bolted to end carriage, main girder welded to joint plate Single and double girder types possible as standard (1) Girder width up to 990 mm Top connections: K-joint plates. Option: EHBJ joint plates from EHR end trucks Side connections: S-joint plates.
Buffers	Standard buffers from NOVA-series acc. to load
Options	Bolted type guiding rollers (also possible to add afterwards), anti-jumping brackets, rail sweeps, buffer extensions
Surface treatment	Finishing paint EP120/2-FeSa2½-RAL1028 or primary paint only
Other	Field assembly instructions

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

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8.3 ETN40 END CARRIAGE PRODUCT CODES

Code example

ETN	40	-	40	85	-	K5	0000	C	0000	-	N
GE19	WHE01		WHE02	BT08		DES08		(DES09)	DIM29		
1-3	4,5	6	7,8	9,10	11	12,13	14-17	18	19-22	23	24

Pos.	Code	Feature code	Feature	Available properties
1-3	**ETN**	GE19	Short product name	ECN Factory code (End carriage)
4,5	**40**	WHE01	Wheel diameter	09 90 mm 11 110 mm 14 140 mm 16 160 mm 20 200 mm 25 250 mm 32 315 mm 40 400 mm
6	**-**		Description	- Standard B Bogie (only ETN20 and bigger) C Asymmetrical joint with single girder
7,8	**40**	WHE02	Wheelbase	Wheel base dimension / Applicable end carriage 12 1200 mm ETN20 13 1250 mm ETN09 14 1400 mm ETN20, ETN25, ETN32 16 1600 mm ETN09,ETN11, ETN14,ETN16, ETN20, ETN25, ETN32, ETN40 18 1800 mm ETN20, ETN25, ETN32, ETN40 20 2000 mm ETN09,ETN11,ETN14,ETN16, ETN20, ETN25, ETN32, ETN40 22 2200 mm ETN25, ETN40 25 2500 mm ETN09,ETN11,ETN14,ETN16, ETN20, ETN25, ETN32, ETN40 32 3150 mm ETN11, ETN14, ETN16, ETN20, ETN25, ETN32, ETN40 35 3500 mm ETN14 40 4000 mm ETN14, ETN16, ETN20, ETN25, ETN32, ETN40 45 4500 mm ETN16, ETN20, ETN25, ETN32, ETN40 50 5000 mm ETN25, ETN32, ETN40 55 5500 mm ETN25, ETN32, ETN40
9,10	**85**	BT08	Groove width	Applicable end carriage 50-70 ETN09 (rail head width + 10 mm) 52-87 ETN11 (rail head width + 12 mm) 54-84 ETN14 (rail head width + 14 mm) 54-84 ETN16 (rail head width + 14 mm) 54-99 ETN20 (rail head width + 14 mm) 54-89 ETN25 (rail head width + 14 mm) 64-99 ETN32 (rail head width + 14 mm) 55-120 ETN40 (rail head width + 15 mm)
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/driving bogie pair

Continues on next page….

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12,13	**K5**	DES08	Joint type		Top joints		Applicable end carriage
				A3	4-bolt connection (B<310 mm)		ETN09
				A4	4-bolt connection (B<360 mm)		ETN11, ETN14
				A6	4-bolt connection (B<550 mm)		ETN11, ETN14
				B4	8-bolt connection (B<350 mm)		ETN16
				B6	8-bolt connection (B<550 mm)		ETN16
				L3	8-bolt connection (B<300 mm)		ETN20
				L4	8-bolt connection (B<410 mm)		ETN20
				L5	8-bolt connection (B<520 mm)		ETN20
				L6	8-bolt connection (B<630 mm)		ETN20
				H4	12-bolt connection (B<410 mm)		ETN25
				H5	12-bolt connection (B<520 mm)		ETN25
				H7	12-bolt connection (B<740 mm)		ETN25
				H9	12-bolt connection (B<990 mm)		ETN25
				K4	12-bolt connection (B<410 mm)		ETN32, ETN40
				K5	12-bolt connection (B<520 mm)		ETN32, ETN40
				K7	12-bolt connection (B<740 mm)		ETN32, ETN40
				K9	12-bolt connection (B<990 mm)		ETN32, ETN40
				J1	Shear ring connection		ETN40
				J2	Shear ring connection		ETN40
				J3	Shear ring connection		ETN40
				J4	Shear ring connection		ETN40
				J5	Shear ring connection		ETN40
				J6	Shear ring connection		ETN40
				J7	Shear ring connection		ETN40
				J8	Shear ring connection		ETN40
				J9	Shear ring connection		ETN40
				J0	Shear ring connection		ETN40
					Side joints		Applicable end carriage
				R3	8 top bolts and 2 side bolts (B<300 mm)		ETN20
				R4	8 top bolts and 2 side bolts (B<410 mm)		ETN20
				R5	8 top bolts and 2 side bolts (B<520 mm)		ETN20
				R6	8 top bolts and 2 side bolts (B<630 mm)		ETN20
				F4	8 top bolts and 4 side bolts (B<410 mm)		ETN25
				F5	12 top bolts and 4 side bolts (B<520 mm)		ETN25
				F7	12 top bolts and 4 side bolts (B<750 mm)		ETN25
				F8	12 top bolts and 4 side bolts (B<890 mm)		ETN25
				Q3	12 top bolts and 4 side bolts (B<410 mm)		ETN32
				Q4	12 top bolts and 6 side bolts (B<410 mm)		ETN32
				Q5	12 top bolts and 4 side bolts (B<520 mm)		ETN32
				Q6	12 top bolts and 6 side bolts (B<520 mm)		ETN32
				Q7	12 top bolts and 4 side bolts (B<740 mm)		ETN32
				Q8	12 top bolts and 6 side bolts (B<740 mm)		ETN32
				Q9	12 top bolts and 4 side bolts (B<990 mm)		ETN32
				Q0	12 top bolts and 6 side bolts (B<990 mm)		ETN32
				S6	12 top bolts and 6 side bolts (B<520 mm)		ETN40
				S7	12 top bolts and 6 side bolts (B<740 mm)		ETN40
				S9	12 top bolts and 6 side bolts (B<990 mm)		ETN40
14-17	**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.
18	**C**	(DES09)	Buffer type	ETN09	A, B, C, K, G, E	A, B, C, D	Rubber buffers
				ETN11	A, B, C, K, G, E,	K, G, E, M, F	PUR buffers
				ETN14	A, B, C, D, K, G. E, M, F, H, P	H, P, I, S, T, Y	PUR buffers
				ETN16	B, C, D, K, G, E, M, F, H, P	0	No buffer
				ETN20	B, C, D, K, G, E, M, F, H, P, I, S		
				ETN25	B, C, D, K, G, E, M, F, H, P, I, S		
				ETN32	B, C, D, K, G, E, M, F, H, P, I, S, T, Y		
				ETN40	B, C, D, K, G, E, M, F, H, P, I, S, T, Y		
19-22	**0000**	DIM29	Bogie inner wheel distance	0000	No bogie type end carriage		
23	**-**		Colour code	-	Standard primary paint	K	Standard finishing paint
24	**N**		Special properties	N	Standard	E	Special

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8.4 ETN40 END CARRIAGE PRODUCT FILE

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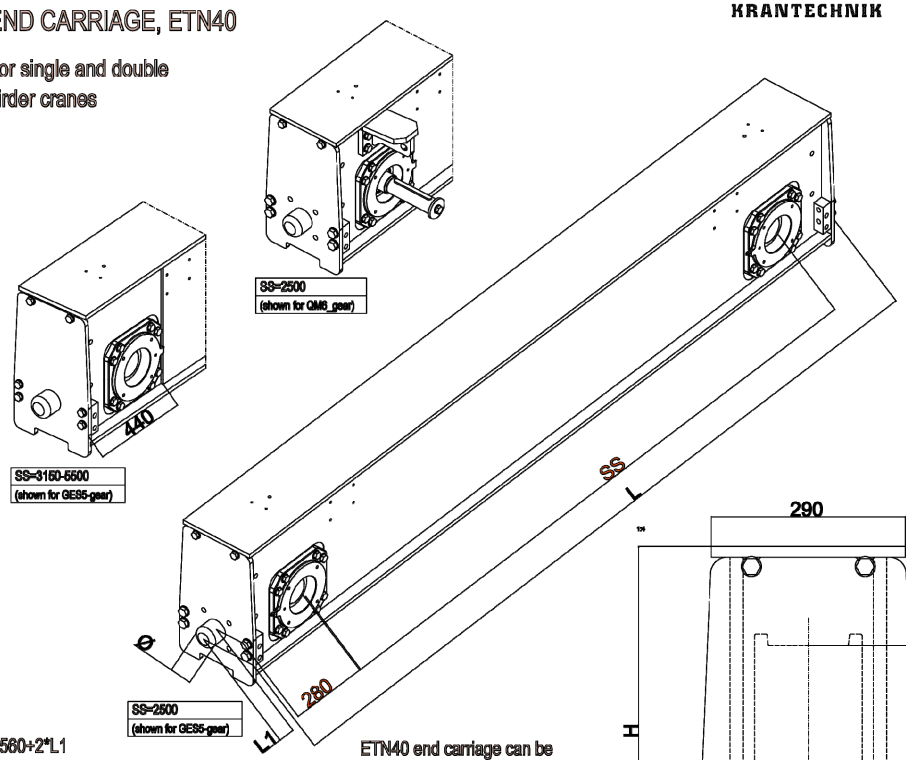
END CARRIAGE, ETN40

For single and double girder cranes



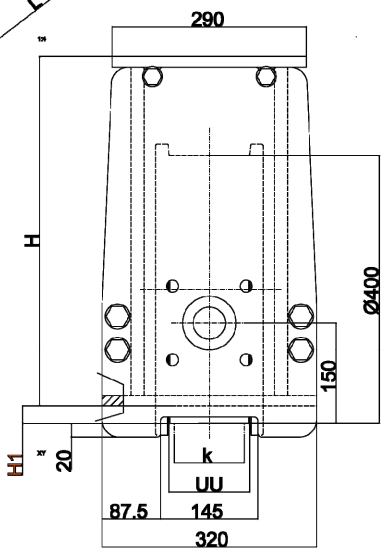
L=SS+560+2*L1
max. dynamic wheel load 400 kN.
Available only with ductile castiron wheel.

SS	H	H1	max Pdyn (kN)		Weight
(mm)	(mm)	(mm)	SG	DG (R=1400)	(kg)
2500	522	26	350 *)	350 *)	990
3150	522	26	350 *)	350 *)	953
4000	530	22	350 **)	350 *)	1173
4500	642	26	350	350 *)	1300
5000	650	22	350	350 *)	1487
5500	650	22	350	350 *)	1583

*) 400 kN in FEM 1Am; **) 360 kN in FEM 1Am

ETN40 end carriage can be equipped with 1 or 2 GES5/QM6 travelling unit.

Buffer type	L1 (mm)	Ø (mm)
B	68	80
C	85	100
D	105	125
E	150	100
F	190	125
H	180	160
I	200	200
M	125	125
P	240	160
S	300	200
T	350	250
Y	475	250
B, C, D rubber		
E, F, H, I, M, P, S, T, Y polyurethane		



Weight [kg] is calculated with buffer type 'B', but without inner support plates of the end carriage
Extra weight (33 kg/gear), when QM6-gear is used.

The maximum wheel load is only a guideline (calculated with double girder).
The maximum values are based on an assumption that the crane speed is 32 m/min, the duty class of the crane is 2m according to FEM and the width of the runway rail is 100 mm.

If the speed of the crane is higher, the duty class of the end truck is higher or the runway rail used is narrower, the max. dynamic wheel load shall be calculated separately case by case.

Rail width	Note!
k (mm)	
40...105	Ductile cast iron wheel (UU=55...120)
>105 ≤120	Use flangeless wheels and guide rollers

SWF Krantechnik GmbH reserves the right to alter or amend the above information without notice

D009915-A_1 2010-10-01 ECN40

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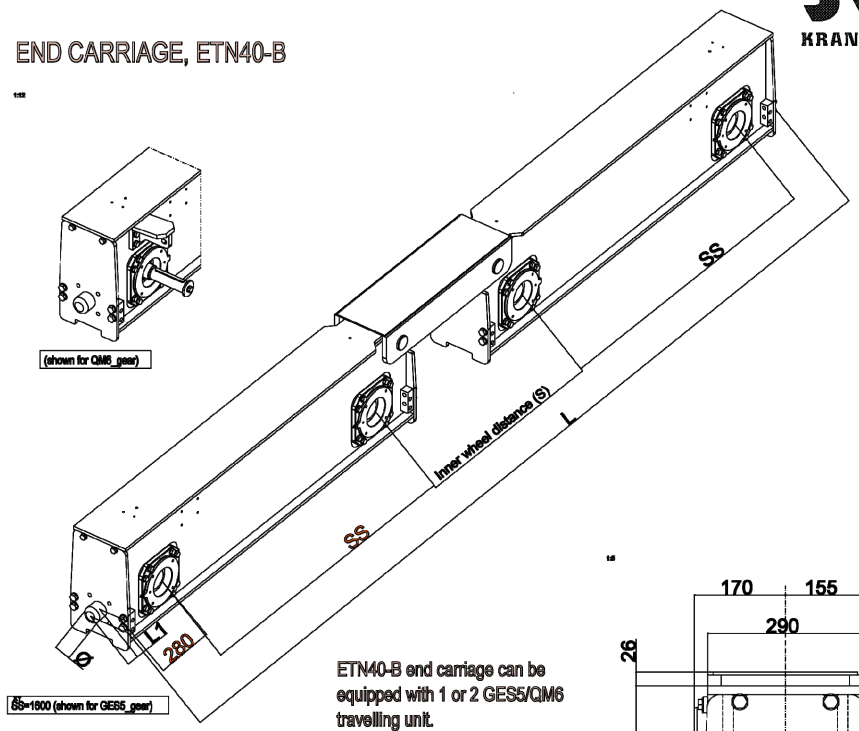
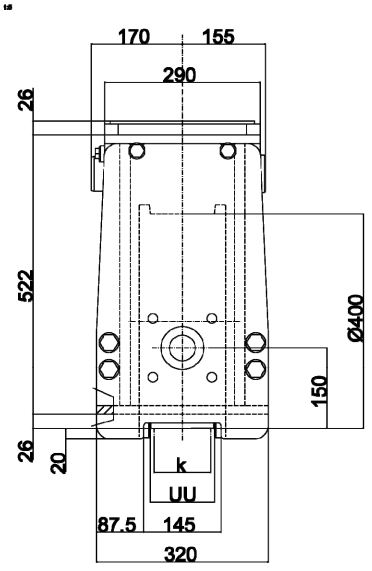
END CARRIAGE, ETN40-B





ETN40-B end carriage can be equipped with 1 or 2 GES5/QM6 travelling unit.

L = 2*(SS+280+L1) + S
Smin = 1000 mm for wheel change
max. dynamic wheel load 400 kN.
Available only with ductile cast iron wheel.

SS	Weight	Pdyn
(mm)	(kg)	(kN)
1600	642	350 *)
1800	688	350 *)
2000	735	350 *)
2200	781	350 *)
2500	850	350 *)
*) 400 kN in FEM 1Am		
Total weight (kg)		
Wgt = Weight*2(kg)+58(kg)+0.091kg/mm)*M(mm)		

Buffer type	L1 (mm)	Ø (mm)
B	68	80
C	85	100
D	105	125
E	150	100
F	190	125
H	160	160
I	200	200
M	125	125
P	240	160
S	300	200
T	350	250
Y	475	250
B, C, D rubber		
E, F, H, I, M, P, S, T, Y polyurethane		

Weight [kg] is calculated with buffer type 'B', but without inner support plates of the end carriage
Extra weight (33 kg/gear), when QM6-gear is used.

The maximum wheel load is only a guideline (calculated with double girder).
The maximum values are based on an assumption that the crane speed is 32 m/min, the duty class of the crane is 2m according to FEM and the width of the runway rail is 100 mm.

If the speed of the crane is higher, the duty class of the end truck is higher or the runway rail used is narrower, the max. dynamic wheel load shall be calculated separately case by case.

Rail width	Note!
k (mm)	
40...105	Ductile cast iron wheel (UU=55...120)
>105 ≤120	Use flangeless wheels and guide rollers

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D009922-A_1 2010-10-04 ECN40-B

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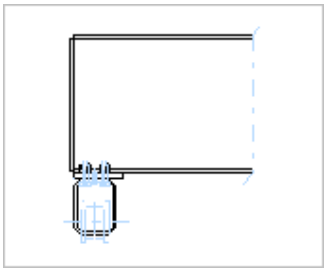
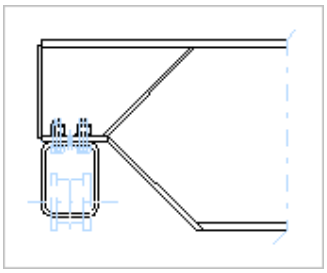
8.5 ETN40 END CARRIAGE JOINT TYPES

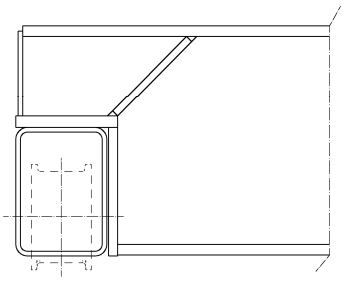
Top Standard
K4, K5, K7, K9 plates (box or profile girders)
J1...J0 plates (only box girders)



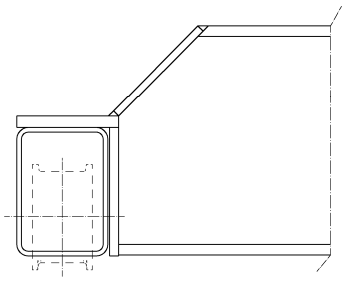
Top Medium
K4, K5, K7, K9 plates (box or profile girders)
J1...J0 plates (only box girders)



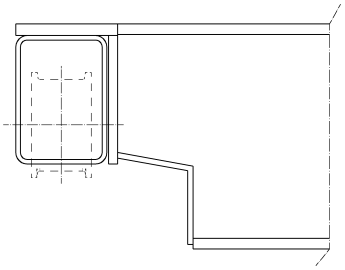
Side Standard Expanded (box girders)
Available later
S6, S7, S9 plates



Side standard cutted (box girders)
Available later
S6, S7, S9 plates



Side Low (box girders)
S6, S7, S9 plates



Other types on request as SP13 case

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8.6 ETN40 CRANE DRIVES

Nominal crane speeds	20, 25, 32, 40, 50, 63, 80, (100) m/min
Number of machinery / crane	2 or 4
Machinery type	GES5, option: QM6
Motor types	MF07X_-, option MF10 for QM6
Voltage	All standard Q-travelling motor voltages
Control method	2-speed with frequency control, stepless frequency control
Wheel diameters	400 mm
End truck types	ETN-top running end truck
Options	All single girder top running crane options

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8.7 ETN40 QM TRAVELING MACHINERIES PRODUCT CODE

QM travelling machinery code

QM **MACHINERY TYPE**

06 **SIZE OF THE GEAR**
06, 07, 09, 10

H **GEARBOX TYPE**
H = Helical gear
K = Bevel gear

045 **GEAR RATIO CODE**

QM06	022, 045, 090
QM07	028, 056, 112
QM09K	012, 014, 018, 022, 028, 036, 045, 056, 071, 080
QM10	014, 018, 022, 028, 036, 045, 056, 071, 090, 112, 140, 180, 230, 280
QM10K	018, 022, 028, 036, 045, 056, 071, 090, 112

NA **GEAR OPTIONS**
N_ = Standard _A = Shaft arrangement A
L_ = Foot-mounted _B = Shaft arrangement B

F **TYPE OF MOTOR**
F = Enclosed squirrel-cage motor equipped with brake

10 **SIZE OF MOTOR**
10, 11, 13

Z **LENGTH OF MOTOR FRAME**
M, Z, X

M **WINDING POWER VARIANT**
M, N

2 **NUMBER OF POLE PAIRS**

A **CODE OF WINDING**
A, P, Z

– **MOTOR OPTIONS**
– = Standard motor without options
S = Motor with options selected from options list
X = Motor with extra options

FREQUENCY OF SUPPLY NETWORK
5 = 50 Hz
6 = 60 Hz

VOLTAGE OF SUPPLY NETWORK [V]

WINDING CONNECTION
D = Inverter control Delta-connected
Y = Inverter control Star-connected

FREQUENCY OF MOTOR
A = 50 Hz E = 87 Hz
C = 60 Hz G = 100 Hz

QM	06	H	045	NA	F	10	Z	M	2	A	-	6	400	Y	C
												6			
													400		
														Y	
															C

For example:

- Helical QM10H056NAF13ZM2A–6400YC
- Bevel QM09K045NAF13ZM2A–5400DE

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9. ESN 09

9.1 ESN 09 TECHNICAL SPECIFICATION

General

The crane design is based on the standard crane components for single and double 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 top running end carriages serie ESN will replace the old series EB in the future. At the moment, calculations and design for end carriage having 90 mm wheel diameter is ready. Factory name for this new end carriage is ESN09. ESN09 will replace old end carriage ES11 and it is covering partially wheel loads of ES14 end carriage.

Some benefits of the new ESN09 end carriages are: better crane approaches due to shorter end carriages wheel base in volume area of this size cranes, simple side connection between end carriage and main girder. As an option new even afterwards boltable guiding rollers, new adjustable anti-jumping brackets, new rail sweeps and buffer extensions.

Specification for ESN09

Maximum crane load	2 t, major part of 3.2 t (4t and even 5 t with short span)
Number of hoists	1 or 2 pcs; 2 hoists with equal capacity, single or tandem drive
Type of hoist	Low, normal headroom or double girder (NOVA-type), SK-chain hoist
Maximum span	abt. 19 m profile girder, abt. 19 m box girder (2) (depending the corner load)
Type of girder	Standard profiles or welded box; flange width up to 400 mm
Hoisting speeds and control	Acc. to NOVA-hoists utilized; 2-speed or freq. Ctrl
Traversing speeds and control	Acc. to NOVA-hoists; 2 ramp-freq. Ctrl
Travelling speeds and control	Max speed 40 m/min freq. Ctrl or 2-speed
Classification	Hoisting M4-M6 (1Am-3m) Traversing M5-M6 (2m-3m) Crane travelling M4-M6 (1Am-3m) Crane A3-A6
Trolley power supply	Festoon or energy chain (option)
Crane control	Pendant or radio controller
Crane power supply	Flat cable or CraneDuctor-type conductor bar, towing arm fixing to end of end carriage
Runway rail	Rail width from 40 to 60 mm (1)
Options	All applicable standard single girder and double girder crane options

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

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9.2 ESN 09 END CARRIAGE SPECIFICATION

Corner load	max 28 kN dynamic wheel load in FEM 2m (M5)
Classification	FEM E2 for steel structures
Wheel base	up to 2500 mm (1)
Wheels	Gasted iron wheels, material GJS700-2
Nr. Of wheels	2 / end carriage (bogie type not available)
Groove width	50 to 70 mm, over 70 without flanges using guide rollers (1)
Construction	Rectangular tube frame, integrated wheel failure support
Travelling machinery	NOVA-types machinery, using GES3 gear
Joints	Joint plate bolted to side of end carriage, main girder welded to joint plate Single and double girder types possible as standard (1) Girder width up to 300 mm (400 mm).
Buffers	Standard buffers from Q-series acc. to load
Options	Bolted type guiding rollers (also possible to add afterwards), anti-jumping brackets, rail sweeps, buffer extensions
Surface treatment	Finishing paint EP120/2-FeSa2½-RAL1028 or primary paint only (RAL1006 maize yellow)

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

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9.3 ESN 09 END CARRIAGE PRODUCT CODES

Code example (ESN09)

ESN	09	-	16	65 BT08	-	400	200	C BT19	0000	-	N
1-3	4,5	6	7,8	9,10	11	12-14	15-17	18	19-22	23	24

Pos.	Code	Feature code	Feature	Available properties			
1-3	**ESN**		Short product name	ESN	Product code		
4,5	**09**		Wheel diameter	09	90 mm		
6	**-**		Description	-	Standard	C	Asymmetrical joint with single girder
7,8	**16**		Wheelbase (100 mm)	ESN09	12, 16, 20, 25		
9,10	**65**	BT08	Groove width	ESN09	50-70 mm		
11	**-**		Number of driving wheels	-	One driving wheel/end carriage	D	Two driving wheel/end carriage
12-14	**400**		Joint plate length (distance between bolts)	ESN09	400	Length 400 400	Description Profile girder, B = max 400 Box girder, B = max 400
15-17	**200**		Joint plate height	ESN09	200		
18	**C**	BT19	Buffer type	ESN09	A, B, C	A… C 0	Rubber buffer No buffer
19-22	**0000**		Bolt joint distance (mm)	####	Joint plate distance from pin centers with double girder.	0000	with single girder, dimension from driving wheel to pin with asymmetrical joint
23	**-**		Colour code	-	Standard primary paint	K	Standard finishing paint
24	**N**		Special properties	N	Standard	E	Special

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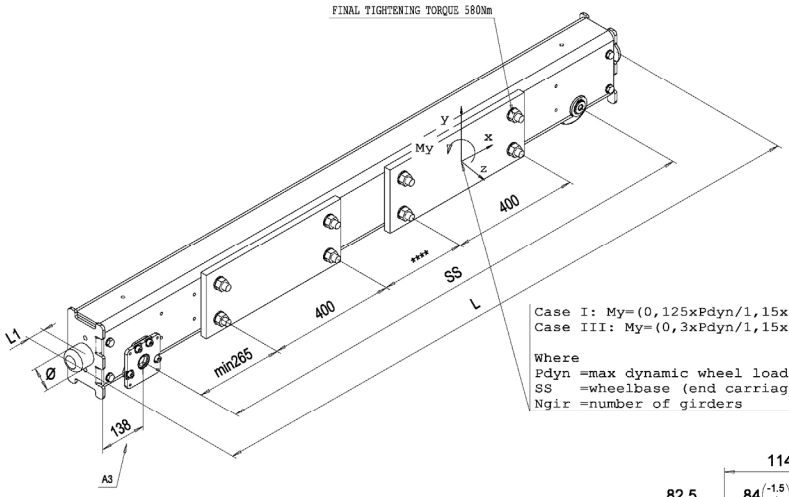
9.4 ESN09 END CARRIAGE PRODUCT FILE

END CARRIAGE, ESN09

For single and double girder cranes

SWF KRANTECHNIK

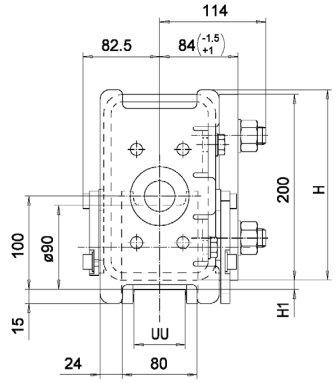


Case I: My=(0,125xPdyn/1,15xSS)/Ngir
Case III: My=(0,3xPdyn/1,15xSS)/Ngir A3

Where
Pdyn =max dynamic wheel load
SS =wheelbase (end carriage)
Ngir =number of girders

SS (mm)	H (mm)	H1 (mm)	SG Wgt (kg)	SG max Pdyn (kN)	DG Wgt (kg)	DG max Pdyn (kN)
1250	205	10	86	28*)	-	-
1600	205	10	99	28*)	116	28*)
2000	205	10	113	28	130	28
2500	205	10	132	28	149	28

*) 35 kN in FEM 1Am



L=SS+276+2*L1
Max My(I)= 9 kNm, My(III)= 21.6 kNm
Available only with ductile iron wheel.
UU=50...70

ESN09 end carriage can be equipped with 1 or 2 GES3 travelling unit

Buffer type	L1 (mm)	Ø (mm)
A	53	63
B	68	80
C	85	100
K	80	80
G	100	100
E	150	100
Material: A,B,C rubber K,G,E polyurethane		

The maximum wheel load is only a guideline (calculated with double girder). The maximum value are based on assumption that the crane speed is 40m/min, the end carriage duty is Fem 2m and the runway rail width is 50mm.

If the crane speed is higher, end carriage duty group higher or used runway rail narrower the max. dynamical wheel load must be calculated separately case by case.

D004769-A_4 2007-11-28 ESN09

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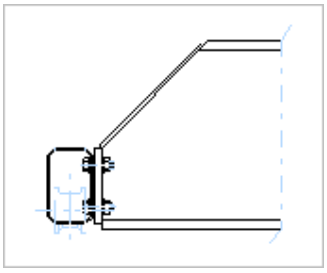
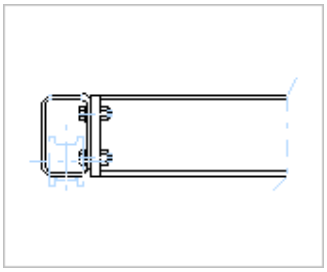
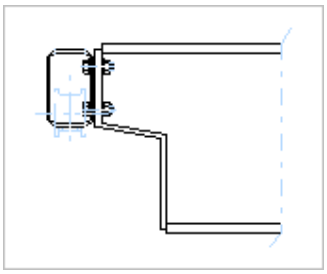
9.5 ESN09 END CARRIAGE JOINT TYPES



Side Standard (box or profile girder)



Side Standard Low (profile girder)



Side Low (box or profile girder)

Other types on request as SP13 case only

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9.6 ESN 09 CRANE DRIVES SPECIFICATION

Nominal crane speeds, max	20, 25, 32, 40 m/min
Number of machinery / crane	2 or 4
Machinery type	GES3
Motor types	MF06LA-, MF06MA-
Voltage	All standard travelling motor voltages
Control method	2-speed with frequency control, stepless frequency control
Wheel diameters	90 mm
End truck types	ESN-top running end truck
Options	All single girder top running crane options

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10. ESN 11

10.1 ESN 11 TECHNICAL SPECIFICATION

General

The crane design is based on the standard crane components for single and double 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 top running end carriages serie ESN will replace the old series ES in the future. Design for new end carriage having 110 mm wheel diameter is completed. Factory name for this new end carriage is ESN11. ESN11 will replace old end carriage ES14.

Some benefits of the new ESN11 end carriages are: better crane approaches due to shorter end carriages wheel base in volume area of this size cranes, simple side connection between end carriage and main girder, new even afterwards boltable guiding rollers, new adjustable anti-jumping brackets, new rail sweeps and buffer extensions.

Specification for ESN11

Maximum crane load	5 t (6.3t with short span)
Number of hoists	1 or 2 pcs; 2 hoists with equal capacity, single or tandem drive
Type of hoist	Low, normal headroom or double girder, SK-chain hoist
Maximum span	abt. 19 m profile girder, abt. 23 m box girder (2) (depending the corner load)
Type of girder	Standard profiles or welded box; flange width up to 400 mm
Hoisting speeds and control	Acc. to NOVA hoists utilized; 2-speed or freq. Ctrl
Traversing speeds and control	Acc. to NOVA hoists; 2 ramp-freq. Ctrl
Travelling speeds and control	Max speed 40 m/min freq. Ctrl or 2-speed
Classification	Hoisting M4-M6 (1Am-3m) Traversing M5-M6 (2m-3m) Crane travelling M4-M6 (1Am-3m) Crane A3-A6
Trolley power supply	Festoon or energy chain (option)
Crane control	Pendant or radio controller
Crane power supply	Flat cable or CraneDuctor-type conductor bar, towing arm fixing to end of end carriage
Runway rail	Rail width from 40 to 75 mm (1)
Options	All applicable standard single girder and double girder crane options

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

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10.2 ESN 11 END CARRIAGE SPECIFICATION

Corner load	max 46 kN dynamic wheel load in FEM 2m (M5)
Classification	FEM E2 for steel structures
Wheel base	up to 3150 mm (1)
Wheels	Cast iron wheels, material GJS700-2
Nr. Of wheels	2 / end carriage (bogie type not available)
Groove width	52 to 87 mm, over 87 without flanges using guide rollers (1)
Construction	Rectangular tube frame, integrated wheel failure support
Travelling machinery	GES3 gear
Joints	Joint plate bolted to side of end carriage, main girder welded to joint plate Single and double girder types possible as standard (1) Girder width up to 400 mm.
Buffers	Standard buffers acc. to load
Options	Bolted type guiding rollers (also possible to add afterwards), anti-jumping brackets, rail sweeps, buffer extensions
Surface treatment	Finishing paint EP120/2-FeSa2½-RAL1028 or primary paint only (RAL7038 gray)
Other	Field assembly instructions to be created

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

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10.3 ESN 11 END CARRIAGE PRODUCT CODES

Code example (ESN11)

ESN	11	-	16	65 BT08	-	400	200	C BT19	0000	-	N
1-3	4,5	6	7,8	9,10	11	12-14	15-17	18	19-22	23	24

Pos.	Code	Feature code	Feature	Available properties			
1-3	**ESN**		Short product name	ESN	Factory code		
4,5	**11**		Wheel diameter	09 11	90 mm 110 mm		
6	**-**		Description	-	Standard	C	Asymmetrical joint with single girder
7,8	**16**		Wheelbase (100 mm)	ESN09 ESN11	12, 16, 20, 25 16, 20, 25, 32	12 16 20 25 32	1250 mm 1600 mm 2000 mm 2500 mm 3150 mm
9,10	**65**	BT08	Groove width	ESN09 ESN11	50-70 mm 52-87 mm		
11	**-**		Number of driving wheels	-	One driving wheel/end carriage	D	Two driving wheel/end carriage
12-14	**400**		Joint plate length (distance between bolts)	ESN09 ESN11	400 mm 400 mm	Length 400 400	Description Profile girder, B = max 400 Box girder, B = max 400
15-17	**200**		Joint plate height	ESN09 ESN11	200, 215 255		
18	**C**	BT19	Buffer type	ESN09 ESN11	A, B, C, K, G, E A, B, C, K, G, E	A… C K,G,E 0	Rubber buffer Polyurethane No buffer
19-22	**0000**		Bolt joint distance (mm)	####	Joint plate distance from bolt centers with double girder.	0000	with single girder, dimension from driving wheel to bolt with asymmetrical joint
23	**-**		Colour code	-	Standard primary paint	K	Standard finishing paint
24	**N**		Special properties	N	Standard	E	Special

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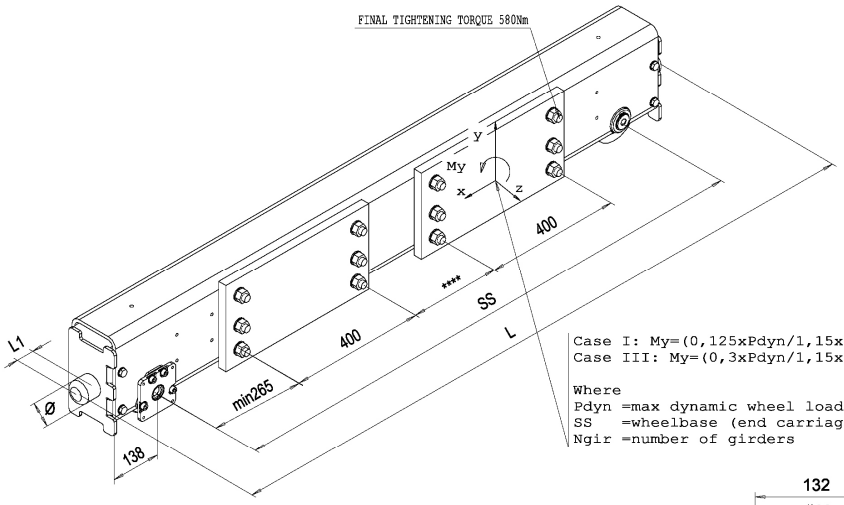
10.4 ESN11 END CARRIAGE PRODUCT FILE

END CARRIAGE, ESN11

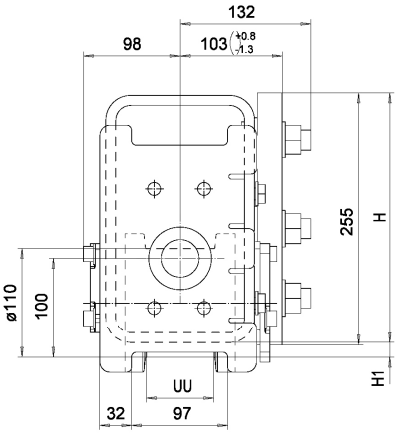
For single and double girder cranes

SWF KRANTECHNIK



Case I: My=(0,125xPdyn/1,15xSS)/Ngir
Case III: My=(0,3xPdyn/1,15xSS)/Ngir

Where
Pdyn =max dynamic wheel load
SS =wheelbase (end carriage)
Ngir =number of girders



SS (mm)	H (mm)	H1 (mm)	SG Wgt (kg)	max Pdyn (kN)	DG Wgt (kg)	max Pdyn (kN)
1600	253	15	153	46*)	179	46*)
2000	253	15	176	46*)	202	46*)
2500	253	15	204	46*)	230	46*)
3150	253	15	241	46*)	267	46*)

*) 48kN in FEM 1Am

L=SS+276+2*L1
Max My(I)= 19 kNm, My(III)= 45.7 kNm
Available only with ductile iron wheel.
UU=52...87
ESN11 end carriage can be equipped with 1 or 2 GES3 travelling unit

The maximum wheel load is only a guideline (calculated with double girder). The maximum value are based on assumption that the crane speed is 40m/min, the end carriage duty is Fem 2m and the runway rail width is 60mm.

If the crane speed is higher, end carriage duty group higher or used runway rail narrower the max. dynamical wheel load must be calculated separately case by case.

Buffer type	L1 (mm)	Ø (mm)
A	53	63
B	68	80
C	85	100
K	80	80
G	100	100
E	150	100

A,B,C rubber
K,G,E polyurethane

D004907-A_1 2007-03-27 ESN11

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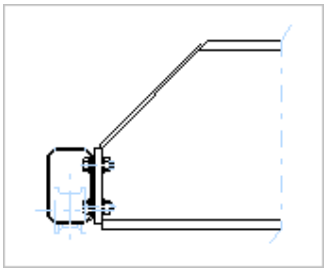
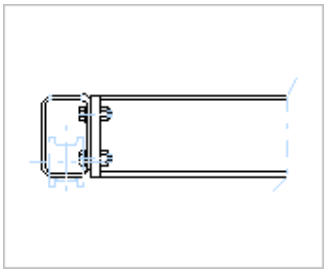
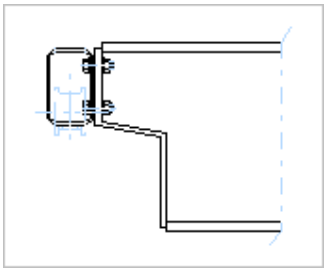
10.5 ESN11 END CARRIAGE JOINT TYPES



Side Standard (box or profile girder)



Side Standard Low (profile girder)



Side Low (box or profile girder)

Other types on request as SP13 case only

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10.6 ESN 11 CRANE DRIVES SPECIFICATION

Nominal crane speeds, max	20, 25, 32, 40 m/min
Number of machinery / crane	2 or 4
Machinery type	GES3
Motor types	MF06LA-, MF06MA-
Voltage	All standard Q-travelling motor voltages
Control method	2-speed with frequency control, stepless frequency control
Wheel diameters	110 mm
End truck types	ESN-top running end truck
Options	All single girder top running crane options

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11. ESN 14

11.1 ESN14 TECHNICAL SPECIFICATION

General

The crane design is based on the standard crane components for single and double 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 top running end carriages series ESN will replace the old series ES in the future. Design for new end carriage having 140 mm wheel diameter is completed.
ESN14 will replace rest of old end carriage ES14 and take part of ESN16.

Some benefits of the new ESN14 end carriages are: better crane approaches due to shorter end carriages wheel base in volume area of this size cranes, simple side connection between end carriage and main girder, new even afterwards boltable guiding rollers, new adjustable anti-jumping brackets, new rail sweeps and buffer extensions.

Specification for ESN14

Maximum crane load	6.3 t (8 t with short span)
Number of hoists	1 or 2 pcs; 2 hoists with equal capacity, single or tandem drive
Type of hoist	Low, normal headroom or double girder, SK-chain hoist
Maximum span	abt. 19 m profile girder, abt. 33 m box girder (2) (depending the corner load)
Type of girder	Standard profiles or welded box; flange width up to 400 mm
Hoisting speeds and control	Acc. to NOVA-hoists utilized; 2-speed or freq. Ctrl
Traversing speeds and control	Acc. to NOVA-hoists; 2 ramp-freq. Ctrl
Travelling speeds and control	Design speed 40 m/min freq. Ctrl or 2-speed
Classification	Hoisting M4-M6 (1Am-3m) Traversing M5-M6 (2m-3m) Crane travelling M4-M6 (1Am-3m) Crane A3-A6
Trolley power supply	Festoon or energy chain (option)
Crane control	Pendant or radio controller
Crane power supply	Flat cable or CraneDuctor-type conductor bar, towing arm fixing to end of end carriage
Runway rail	Rail width from 40 to 70 mm (1)
Options	All applicable standard single girder and double girder crane options

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

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11.2 ESN14 END CARRIAGE SPECIFICATION

Corner load	max 55 kN dynamic wheel load in FEM 2m (M5), max 69 kN dynamic wheel load in FEM 1Am (M4)
Classification	FEM E3 for steel structures
Wheel base	up to 4000 mm (1)
Wheels	Cast iron wheels, material GJS700-2
Nr. of wheels	2 / end carriage (bogie type not available)
Groove width	54 to 84 mm, over 84 without flanges using quiding rollers (1)
Construction	Rectangular tube frame, integrated wheel failure support
Travelling machinery	Q-types machinery, using GES3 gear
Joints	Joint plate bolted to side of end carriage, main girder welded to joint plate Single and double girder types possible as standard (1) Girder width up to 400 mm.
Buffers	Standard buffers from NOVA-series acc. to load
Options	Bolted type guiding rollers (also possible to add afterwards), anti-jumping brackets, rail sweeps, buffer extensions
Surface treatment	Finishing paint EP120/2-FeSa2½-RAL1028 or primary paint only (RAL7038 gray)
Other	Field assembly instructions to be created

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

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11.3 ESN14 END CARRIAGE PRODUCT CODES

Code example

ESN	14	-	20	74	-	400	255	C	0000	-	N
GE19	WHE01		WHE02	BT08				(DES09)			
1-3	4,5	6	7,8	9,10	11	12-14	15-17	18	19-22	23	24

Pos.	Code	Feature code	Feature	Available properties			
1-3	**ESN**	GE19	Short product name	EBN	Factory code		
4,5	**14**	AHE01	Wheel diameter	09 11 14 16	90 mm 110 mm 140 mm 160 mm		
6	**-**		Description	-	Standard	C	Asymmetrical joint with single girder
7,8	**20**	WHE02	Wheelbase (100 mm)	ESN09 ESN11 ESN14 ESN16	13, 16, 20, 25 16, 20, 25, 32 16, 20, 25, 32, 35, 40 16, 20, 25, 32, 40, 45	13 16 20 25 32 35 40 45	1250 mm 1600 mm 2000 mm 2500 mm 3150 mm 3500 mm 4000 mm 4500 mm
9,10	**74**	BT08	Groove width	ESN09 ESN11 ESN14 ESN16	50-70 mm (rail head width + 10 mm) 52-87 mm (rail head width + 12 mm) 54-84 mm (rail head width + 14 mm) 54-84 mm (rail head width + 14 mm)		
11	**-**		Number of driving wheels	-	One driving wheel/end carriage	D	Two driving wheels/end carriage
12-14	**400**		Joint plate length (distance between bolts)	ESN09 ESN11 ESN14 ESN16	400 mm 400 mm 400 mm 350 mm, 450 mm	Length 400 400 350 450	Description Profile girder, B = 400 Box girder, B = 400 Profile girder and box girder, B = 350 Box girder, B = 500
15-17	**255**		Joint plate height	ESN09 ESN11 ESN14 ESN16	200, 215 255 255 255, 305		
18	**C**	(DES09)	Buffer type	ESN09 ESN11 ESN14 ESN16	A, B, C, K, G, E A, B, C, K, G, E A, B, C, D, K, G, E, M, F, H, P B, C, D, K, G, E, M, F, H, P	A, B, C, D K, G, E M, F, H, P 0	Rubber buffer PUR buffer PUR buffer No buffer
19-22	**0000**		Bolt joint distance (mm)	####	Joint plate distance from bolt centers with double girder.	0000	with single girder, dimension from driving wheel to bolt with asymmetrical joint
23	**-**		Colour code	-	Standard primary paint	K	Standard finishing paint
24	**N**		Special properties	N	Standard	E	Special

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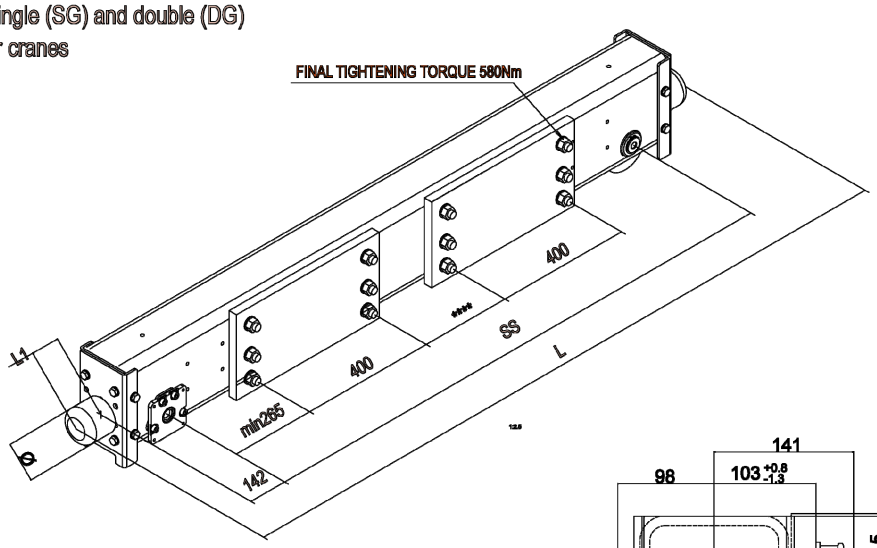
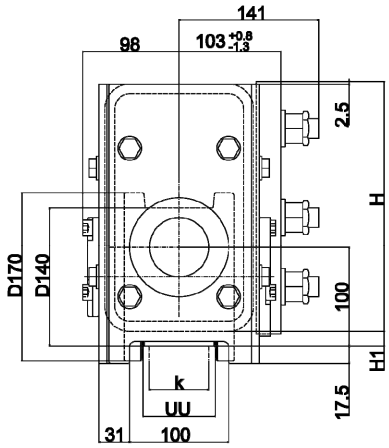
11.4 ESN14 END CARRIAGE PRODUCT FILE

SWF KRANTECHNIK

END CARRIAGE, ESN14

For single (SG) and double (DG) girder cranes





L=SS+284+2*L1
Max. dynamic wheel load 69 kN.
Available only with ductile iron wheel.
UU=54...84

ESN14 end carriage can be equipped with 1 or 2 GES3/GES4 travelling unit.

SS	H	H1	max Pdyn (kN)		Weight (kg/pcs)	
(mm)	(mm)	(mm)	SG	DG (R=1200)	SG	DG
1600	253	15	47 *)	55 **)	165	910
2000	253	15	47 *)	55 **)	188	213
2500	253	15	47 *)	55 **)	216	241
3150	253	15	47	55 **)	253	278
3500	253	15	40	55	273	298
4000	253	15	32	37	303	328

*) 52 kN in FEM 1 Am
**) 69 kN in FEM 1 Am

Weight of one end carriage (kg/pcs) is calculated without buffers, when wheel groove is UU=74.

The maximum wheel load is only a guideline (calculated with double girder).
The maximum values are based on an assumption that the crane speed is 40 m/min, the duty class of the crane is 2m according to FEM and the width of the runway rail is 60mm.

If the speed of the crane is higher, the duty class of the end truck is higher or the runway rail used is narrower, the max. dynamic wheel load shall be calculated separately case by case.

Buffer type	L1 (mm)	Ø (mm)
A	53	63
B	68	80
C	85	100
D	105	125
K	80	80
G	100	100
E	150	100
F	190	125
M	125	125
H	160+100	160
P	240+100	160

Rail width	Notel
k (mm)	
40≤ k ≤70	With wheel grooves, U = 54...84
70< k ≤100	Use flangless wheels and guide rollers

A, B, C, D rubber
K, G, E, F, M, H, P polyurethane

SWF Krantechnik GmbH reserves the right to alter or amend the above information without notice

D0006900-A_1 2010-09-08 ESN14

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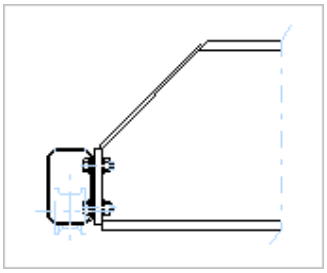
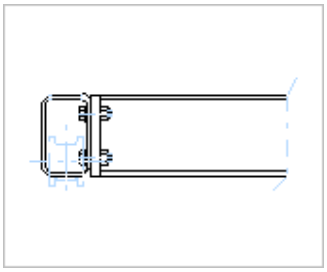
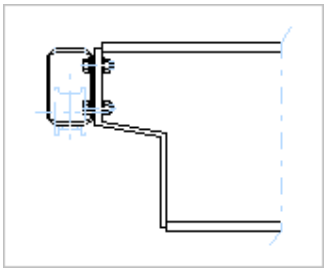
11.5 ESN14 END CARRIAGE JOINT TYPES



Side Standard (box or profile girder)
ESN14-400x255



Side Standard Low (profile girder)
ESN14-400x255



Side Low (box or profile girder)
ESN14-400x255

Other types on request as SP13 case only

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11.6 ESN14 CRANE DRIVES

Nominal crane speeds, max	20, 25, 32, 40 m/min
Number of machinery / crane	2 or 4
Machinery type	GES3
Motor types	MF06LA-, MF06MA-
Voltage	All standard Q-travelling motor voltages
Control method	2-speed with frequency control, stepless frequency control
Wheel diameters	140 mm
End truck types	ESN-top running end truck
Options	All single girder top running crane options

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12. ESN 16

12.1 ESN16 TECHNICAL SPECIFICATION

General

The crane design is based on the standard NOVA crane components for single and double girder industrial cranes. Selection of components and crane engineering is accomplished with CraneMaster program. The exact range for NOVA cranes is determined by the available components, steel materials and design parameters used in each market area. New top running end carriages serie ESN will replace the old series ES in the future. Design for new end carriage having 160 mm wheel diameter is completed. ESN16 will replace rest of old end carriage ES14 and take part of ET20 with side connection.

Some benefits of the new ESN16 end carriages are: better crane approaches due to shorter end carriages wheel base in volume area of this size cranes, simple side connection between end carriage and main girder, new even afterwards boltable guide rollers, new adjustable anti-jump brackets, new rail sweeps and buffer extensions.

Specification for ESN16

Maximum crane load	8 t (10 t with short span)
Number of hoists	1 or 2 pcs; 2 hoists with equal capacity, single or tandem drive
Type of hoist	Low, normal headroom or double girder (NOVA), SK-chain hoist
Maximum span	abt. 19 m profile girder, abt. 33 m box girder (2) (depending the corner load)
Type of girder	Standard profiles or welded box; flange width up to 500 mm
Hoisting speeds and control	Acc. to NOVA hoists utilized; 2-speed or freq. Ctrl
Traversing speeds and control	Acc. to NOVA hoists; 2 ramp-freq. Ctrl
Travelling speeds and control	Max speed 40 m/min freq. Ctrl or 2-speed
Classification	Hoisting M4-M6 (1Am-3m) Traversing M5-M6 (2m-3m) Crane travelling M4-M6 (1Am-3m) Crane H1/B2 – H3/B4 and A3-A6
Trolley power supply	Festoon or energy chain (option)
Crane control	Pendant or radio controller
Crane power supply	Flat cable or CraneDuctor conductor bar, towing arm fixing to end of end carriage
Runway rail	Rail width from 40 to 70 mm (1)
Options	All applicable standard single girder and double girder crane options

(1) Further range available upon request (Special)
(2) Depending on design parameters

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12.2 ESN 16 END CARRIAGE SPECIFICATION

Corner load	max 69 kN dynamic wheel load in FEM 2m (M5)
Classification	FEM E3 for steel structures
Wheel base	up to 4500 mm (1)
Wheels	Cast iron wheels, material GJS700-2
Nr. of wheels	2 / end carriage (bogie type not available)
Groove width	54 to 84 mm, over 84 without flanges using guide rollers (1)
Construction	Rectangular tube frame, integrated wheel failure support
Travelling machinery	NOVA-types machinery, using GES3/GES4 gear
Joints	Joint plate bolted to side of end carriage, main girder welded to joint plate Single and double girder types possible as standard (1) Girder width up to 500 mm.
Buffers	Standard buffers from NOVA-series acc. to load
Options	Bolted type guiding rollers (also possible to add afterwards), anti-jumping brackets, rail sweeps, buffer extensions
Surface treatment	Finishing paint EP120/2-FeSa2½-RAL1028 or primary paint only (RAL7038 grey)

(1) Further range available upon request (Special)
(2) Depending on design parameters

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12.3 ESN 16 END CARRIAGE PRODUCT CODES

Code example (ESN16)

ESN	16	-	20	74	-	350	255	C	0000	-	N
GE19	WHE01		WHE02	BT08				(DES09)			
1-3	4,5	6	7,8	9,10	11	12-14	15-17	18	19-22	23	24

Pos.	Code	Feature code	Feature	Available properties			
1-3	**ESN**	GE19	Short product name	EBN			
4,5	**16**	AHE01	Wheel diameter	09 90 mm 11 110 mm 16 160 mm			
6	**-**		Description	-	Standard	C	Asymmetrical joint with single girder
7,8	**20**	WHE02	Wheelbase (100 mm)	ESN09 13, 16, 20, 25 ESN11 16, 20, 25, 32 ESN16 16, 20, 25, 32, 40, 45		13 16 20 25 32 40 45	1250 mm 1600 mm 2000 mm 2500 mm 3150 mm 4000 mm 4500 mm
9,10	**74**	BT08	Groove width	ESN09 50-70 mm (rail head width + 10 mm) ESN11 52-87 mm (rail head width + 12 mm) ESN16 54-84 mm (rail head width + 14 mm)			
11	**-**		Number of driving wheels	-	One driving wheel/end carriage	D	Two driving wheels/end carriage
12-14	**350**		Joint plate length (distance between bolts)	ESN09 400 mm ESN11 400 mm ESN16 350 mm, 450 mm		Length 400 400 350 450	Description Profile girder, B = 400 Box girder, B = 400 Profile girder and box girder, B = 350 Box girder, B = 500
15-17	**255**		Joint plate height	ESN09 200 ESN11 255 ESN16 255, 305		200 255 305	SWF SWF SWF
18	**C**	(DES09)	Buffer type	ESN09 A, B, C, K, G, E ESN11 A, B, C, K, G, E ESN16 B, C, D, K, G, E, M, F, H, P		A, B, C, D K, G, E M, F, H, P 0	 Rubber buffer PUR buffer PUR buffer No buffer
19-22	**0000**		Bolt joint distance (mm)	####	Joint plate distance from bolt centers with double girder.	0000	with single girder, dimension from driving wheel to bolt with asymmetrical joint
23	**-**		Colour code	-	Standard primary paint	K	Standard finishing paint
24	**N**		Special properties	N	Standard	E	Special

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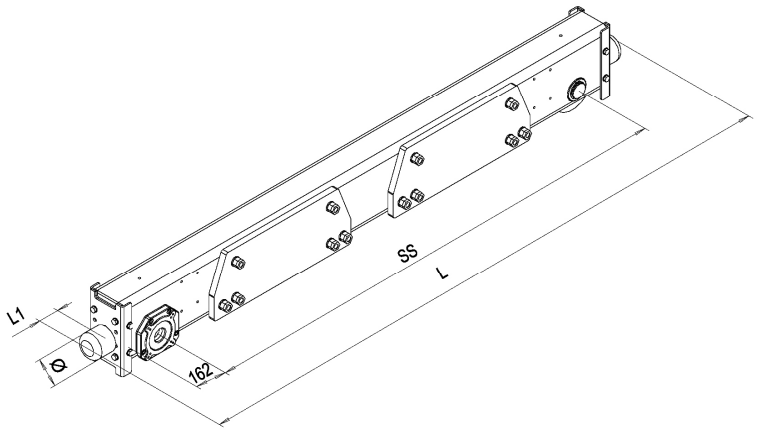
12.4 ESN16 END CARRIAGE PRODUCT FILE

SWF KRANTECHNIK

END CARRIAGE, ESN16

For single (SG) and double (DG) girder cranes



L=SS+324+2*L1
Max. dynamic wheel load 69 kN.
Available only with nodular cast iron wheels.

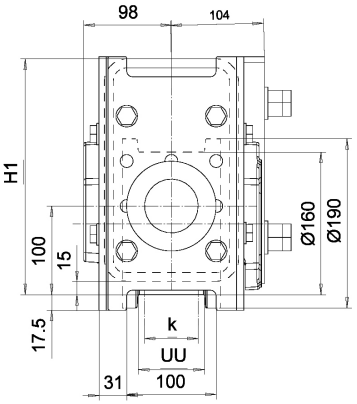
ESN16 end carriage can be equipped with 1 or 2 GES3/GES4 travelling unit.

SS (mm)	SG/DG	H1 (mm)	max Pdyn (kN) SG	max Pdyn (kN) DG (R=1200)	Weight (kg)
1600	SG/DG	265	69 *)	69 *)	197
2000	SG/DG	265	69 *)	69 *)	220
2500	SG/DG	265	69 *)	69 *)	248
3150	DG	265	-	69 *)	284
3150	SG	315	69 *)	-	312
4000	SG/DG	315	63	69	368
4500	SG/DG	315	44	48	400

*) 80.5 kN in FEM 1Am

Weight [kg] is calculated without buffers and joint plate.

Buffer type	L1 (mm)	Ø (mm)
B	68	80
C	85	100
D	105	125
K	80	80
G	100	100
E	150	100
F	190	125
M	125	125
H	160+100	160
P	240+100	160
B, C, D rubber		
K, G, E, F, M, H, P polyurethane		



Rail width	Note!
k (mm)	
40≤ k ≤70	With wheel grooves, U = 54...84
70< k ≤100	Use flangless wheels and guide rollers

The maximum wheel load is only a guideline (calculated with double girder).
The maximum values are based on an assumption that the crane speed is 40 m/min, the duty class of the crane is 2m according to FEM and the width of the runway rail is 60mm.

If the speed of the crane is higher, the duty class of the end truck is higher or the runway rail used is narrower, the max. dynamic wheel load shall be calculated separately case by case.

D005724-A_1 2008-10-31 ESN16

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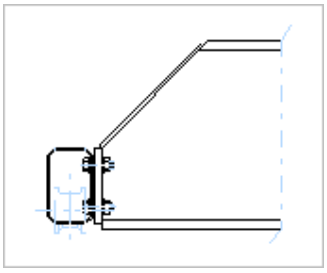
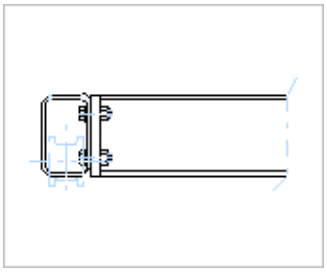
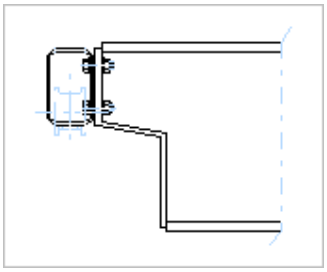
12.5 ESN 16 END CARRIAGE JOINT TYPES



Side Standard (box or profile girder)
ESN16-350x255
ESN16-450x305



Side Standard Low (profile girder)
ESN16-350x255
ESN16-450x305



Side Low (box or profile girder)
ESN16-350x255
ESN16-450x305

Other types on request as SP13 case only

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12.6 ESN 16 CRANE DRIVES SPECIFICATION

Nominal crane speeds, max	20, 25, 32, 40 m/min
Number of machinery / crane	2 or 4
Machinery type	GES3, GES4
Motor types	MF06LA-, MF06MA-, MF06LB-
Voltage	All standard travelling motor voltages
Control method	2-speed with frequency control, stepless frequency control
Wheel diameters	160 mm
End truck types	ESN-top running end truck
Options	All single girder top running crane options

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13. ETL 09

13.1 ETL 09 TECHNICAL SPECIFICATION

General

The crane design is based on the standard Crane components for single and double girder industrial cranes. Selection of components and crane engineering is accomplished with CraneMaster . The exact range for cranes is determined by the available components, steel materials and design parameters used in each market area. New top running end carriages series ETN and ETL09 will replace the old ET in the future. At the moment, calculations and design for light use end carriage having 90 mm wheel diameter is completed.
ETL09 will replace old end carriage ET09. As a matter of fact, ETL09 is same as ET09, but wheel bases changed to be acc. to ETN09. Also same options are possible than for ETN09, except guide rollers, which are not possible at all for ETL09

Some benefits of the new ETL09 end carriages compared to ET09 are: better crane approaches due to shorter end carriages wheel base in volume area of this size cranes, new adjustable anti-jumping brackets, new rail sweeps and buffer extensions.

Specification for ETL09

Maximum crane load	2 t, with smaller spans 3.2 t
Number of hoists	1 or 2 pcs; 2 hoists with equal capacity, single or tandem drive
Type of hoist	Low, normal headroom or double girder (NOVA-type), SK-chain hoist
Maximum span	abt. 14 m profile girder, abt. 14 m box girder (2) (depending on the corner load)
Type of girder	Standard profiles or welded box; flange width up to 300 mm
Hoisting speeds and control	Acc. to NOVA-hoists utilized; 2-speed or freq. Ctrl
Traversing speeds and control	Acc. to NOVA-hoists; 2 ramp-freq. Ctrl
Travelling speeds and control	Max speed 40 m/min freq. Ctrl or 2-speed
Classification	Hoisting M4-M6 (1Am-3m)
	Traversing M5-M6 (2m-3m)
	Crane travelling M4-M6 (1Am-3m)
	Crane A3-A6
Trolley power supply	Festoon or energy chain (option)
Crane control	Pendant or radio controller
Crane power supply	Flat cable or CraneDuctor-type conductor bar, towing arm fixing to end of end carriage
Runway rail	Rail width from 40 to 60 mm (1)
Options	All applicable standard single girder and double girder crane options

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

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13.2 ETL 09 END CARRIAGE SPECIFICATION

Corner load	max 28 kN dynamic wheel load in FEM 2m (M5)
Classification	FEM E2 for steel structures
Wheel base	up to 2000 mm (1)
Wheels	Cast iron wheels, material GJS700-2
Nr. Of wheels	2 / end carriage (bogie type not available)
Groove width	50 to 70 mm, over 70mm without flanges using guide rollers (1)
Construction	Rectangular tube frame, integrated wheel failure support
Travelling machinery	NOVA-types machinery, using GES3 gear
Joints	Joint plate A3 bolted to top of end carriage, main girder welded to joint plate
	Single and double girder types possible as standard (1) Girder width up to 300 mm
Buffers	Standard buffers from NOVA-series acc. to load
Options	Bolted type guiding rollers (also possible to add afterwards), anti-jumping brackets, rail sweeps, buffer extensions
Surface treatment	Finishing paint EP120/2-FeSa2½-RAL1028 or primary paint only (RAL7038 gray). End plates of end truck: galvanized/yellow passivated

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

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13.3 ETL 09 END CARRIAGE PRODUCT CODES

Code example (ETL09)

ETL	09	-	16	60	-	A3	0000	C	0000	-	N
GE19			WHE02	BT08				BT19			
1-3	4,5	6	7,8	9,10	11	12,13	14-17	18	19-22	23	24

Pos.	Code	Feature code	Feature	Available properties			
1-3	**ETL**	GE19	Short product name	ETL			
4,5	**09**		Wheel diameter	09	90 mm		
6	**-**		Description	-	Standard	C	Asymmetrical joint with single girder
7,8	**16**	WHE02	Wheelbase	Wheel base dimension		Applicable end carriage	
				13	1250 mm	ETL09	
				16	1600 mm	ETL09	
				20	2000 mm	ETL09	
9,10	**60**	BT08	Groove width		Applicable end carriage		
				50-70	ETL09		
11	**-**		Number of driving wheels	-	One driving wheel/end carriage		
				D	Two driving wheels/end carriage		
12,13	**A3**		Joint type		Top joints		Applicable end carriage
				A3	4-bolt connection (B<300mm)		ETL09
14-17	**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.
18	**C**	BT19	Buffer type	ETL09	A, B, C, K, G, E	A…C	Rubber buffers
						K,G,E	Polyurethane buffers
19-22	**0000**		Bogie inner wheel distance	0000	No bogie type end carriage		
23	**-**		Colour code	-	Standard primary paint	K	Standard finishing paint
24	**N**		Special properties	N	Standard	E	Special

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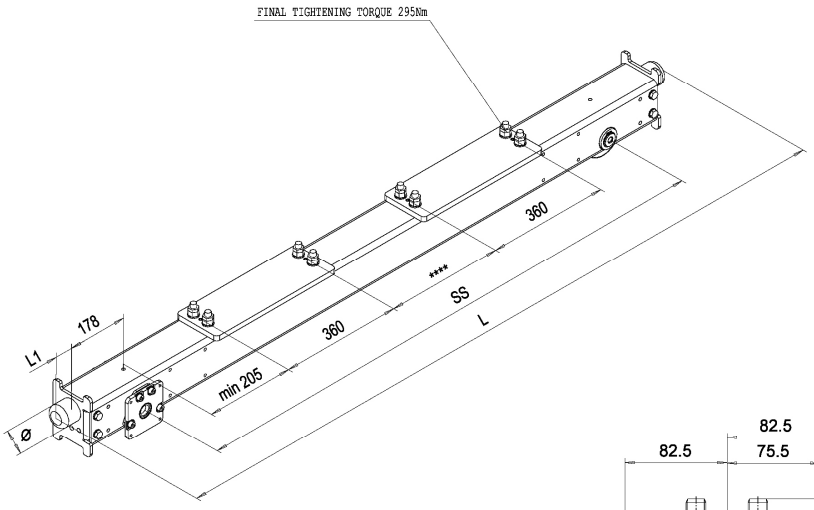
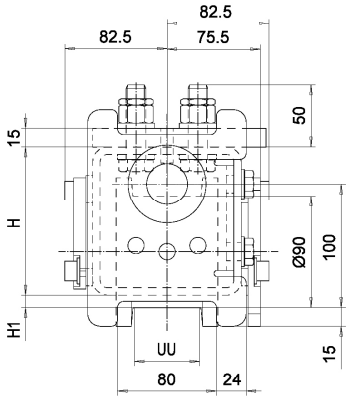
13.4 ETL09 END CARRIAGE PRODUCT FILE

END CARRIAGE, ETL09

For single and double girder cranes





SS (mm)	H (mm)	H1 (mm)	SG Wgt (kg)	max Pdyn (kN)	DG Wgt (kg)	max Pdyn (kN)
1250	120	10	53	28	–	–
1600	120	10	60	23	67	28
2000	120	10	69	18	75	28

L=SS+276+2*L1
Max. dynamic wheel load 28 kN.
Available only with ductile iron wheel.
UU=50...70

ETL09 end carriage can be equipped with 1 or 2 GES3 travelling unit

The maximum wheel load is only a guideline (calculated with double girder). The maximum value are based on assumption that the crane speed is 40m/min, the end carriage duty is Fem 2m and the runway rail width is 50mm.

If the crane speed is higher, end carriage duty group higher or used runway rail narrower the max. dynamical wheel load must be calculated separately case by case.

Buffer type	L1 (mm)	Ø (mm)
A	53	63
B	68	80
C	85	100
K	80	80
G	100	100
E	150	100
Material: A,B,C rubber K,G,E polyurethane		

D005064-B_1 2008-02-04 ETL09

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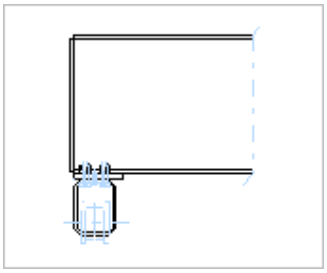
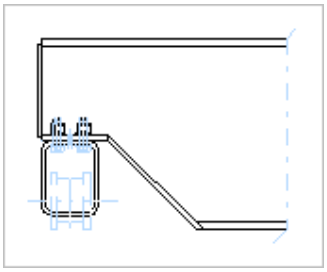
13.5 ETL 09 END CARRIAGE JOINT TYPES

Top Standard (box or profile girder), joint plate type A3



Top Medium (box or profile girder), joint plate type A3



Other types on request as SP13 case

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13.6 ETL09 CRANE DRIVES SPECIFICATION

Nominal crane speeds, max	20, 25, 32, 40 m/min
Number of machinery / crane	2 or 4
Machinery type	GES3
Motor types	MF06LA-, MF06MA-
Voltage	All standard NOVA-travelling motor voltages
Control method	2-speed with frequency control, stepless frequency control
Wheel diameters	90 mm
End truck types	ETL09 top running end truck
Options	All single girder top running crane options

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14. Traveling Maschinery Product Code

Code example (Factory: GE)

GE	K	1	06	P	T TG05	1 TG06	B	O	F06MA	200-5400	N
1,2	3	4	5,6	7	8	9	10	11	12-16	17-24	25

Pos.	Code	Feature code	Feature	Available properties			
1,2	**GE**		Gear	GE	Factory code		
3	**K**		Type	K L M	Specific Trolley Drive (WRH) Specific Trolley Drive (ECH) Hollow shaft	S T N	Solid shaft Reserved Reserved
4	**1**		Machinery size (Torque Range)	1 2 3	0 Nm < T_2 < 50 Nm 16 Nm < T_2 < 125 Nm 40 Nm < T_2 < 320 Nm	4 5 6	100 Nm < T_2 < 800 Nm 250 Nm < T_2 < 2000 Nm 630 Nm < T_2 < 5000 Nm
5,6	**06**		Ratio code	01… ...99… …H9	1st mark: 0, 1, 2 … 9, A (=10), B(=11),… 2nd mark: 0, 1, 2 … 9 e.g. A0≡100, B0≡110, G5≡165, etc.		
7	**P**		Options	P F	Standard, no options (plain) Flywheel	G V	Gantry type gear (GES4, GES5) Stronger version (GES320V, GES316V, GES313V with MF06LB motor)
8	**T**	TG05	Secondary shaft type	T K S	Driving Pinion Keyway Spline	D E	Spline + Plain Reserved (Special)
9	**1**	TG06	Version type	1…9	Versioning of machinery e.g. spline size, shaft size		
10	**B**		Outlook	B	B-Black (Dark grey)		
11	**O**		Future reservation	O	No feature		
12-16	**F06MA**		Motor type and size	F 06 M A	Motor type code (B, F, T, etc.) Frame size (e.g. 06, 07, …) Stator length (S, M, L, Z, E) Power code (A, B, C, …)		
17-24	**200-5400**		Motor ID-code	 200 - 5 400	ID of the motor, if special then Winding data and Power supply data: 200-5400 (fourth mark, pos 20 “dash”) Number of HS- and LS-polepairs Filling mark “dash” Power Supply frequency: 5-50Hz, 6-60Hz Power supply Voltage, e.g. 380, 400, …		
25	**N**		Order type	E N	Special Order, details defined with P.O. Normal Order (e.g. Standard Motor)		

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