August 2024

R&M's RTN, RTL & RSN
Demag's DFO, DFU & DFM

Top Running End Truck
Technical Guide

Table of Contents

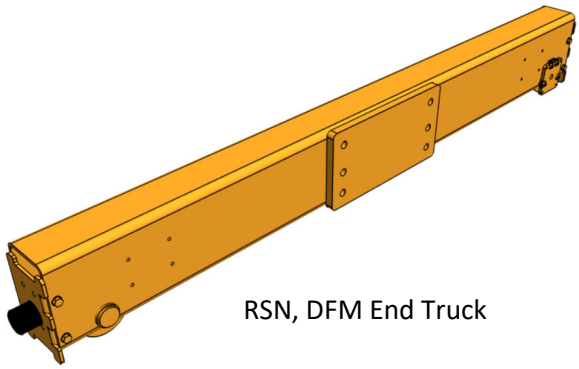
1 General

The RSN, DFM and RTN, DFO end trucks are a new generation, replacing the RS and RT end trucks. The RTL, DFU model is a light-duty truck.

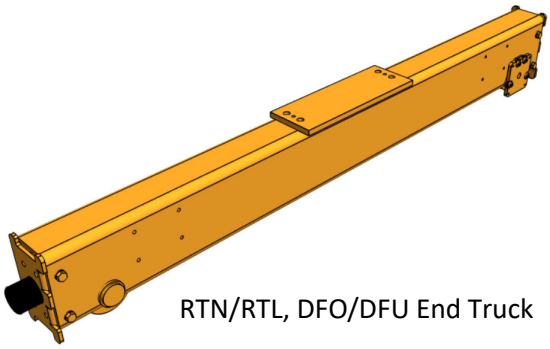
Model comparison between R&M and Demag

R&M	Demag
RTN	DFO
RSN	DFM
RTL	DFU

The joint plate on the RSN, DFM end trucks mounts to the side of the end truck frame for a simple side joint. The joint plate on the RTN, DFO end trucks mounts on the top of the end truck frame for a top joint. A side joint plate is available as an option on the bigger RTN, DFO end trucks. The RTL, DFU end truck with its smaller and lighter frame is like the RTN, DFO end truck and it has with a top joint plate.



RSN, DFM End Truck



RTN/RTL, DFO/DFU End Truck

RTN, DFO end truck models (RTN20B - RTN50B, DFO20B - DFO50B) are available in a bogie configuration that consists of two independent end trucks with pins that allow for a non-rigid joint in the vertical direction.

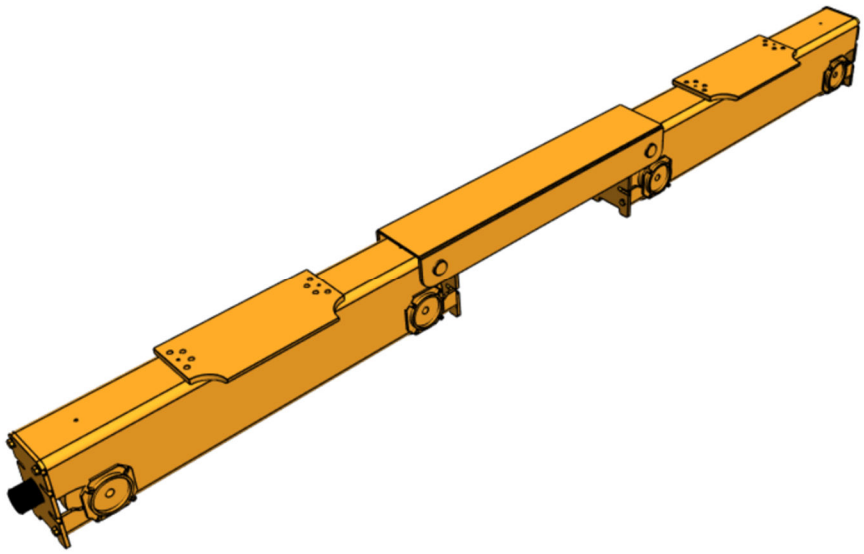


Illustration of a RTN20B, DFO20B Bogie End Truck

Warning: Do not weld to the end truck frame because it can potentially create distortions to the steel structure of the end truck and the distortions can lead to misalignment of the wheels.

2 Selection Criteria

These criteria determine the maximum allowable wheel loads for the wheel blocks:

- Properties of the truck structure or frame
- Permissible surface pressure between wheel and rail
- Maximum bearing capacity
- Service life of the bearings

When selecting the end trucks for the crane application, use the following checks:

- Wheel loading not to exceed allowed value.
- Structure loading not to exceed allowed loading value.
- Bridge girder connection
- Rail size does not exceed maximum wheel groove.

3 End Truck Drawings

Dimensional drawings as PDF are available on R&M's website (www.rmhoist.com) to download or to view. In addition, QuoteMaster® or Demag CraneExpert can generate end truck drawings in many different drawing file formats such as DWG or STP.

4 Frame

The construction of the frames for the RSN, DFM, RTL, DFU, and RTN09 - RTN25, DFO09 - DFO25 end trucks is rectangular structural steel tubing. The frames of the RTN32, DFO32, RTN40, DFO40, and RTN50, DFO50 end trucks are plates welded into a box construction, which include diaphragms for additional stiffness.

Warning: Do not weld to the end truck frame because it can potentially create distortions to the structure or frame of the end truck and the distortions directly affect the alignment of the wheels.

Each end of the end truck has end plates, which work as a guard and prevent the end truck from dropping more than one inch [25 mm] in case of axle failure. Part of the end plate projects below the top of the rail for derailment protection.

5 Wheels & Axles

The RTN, DFO end trucks come in nine different wheel diameters- 90, 110, 140, 160, 200, 250, 315, 400, 500 mm. The RSN, DFM end trucks have four different wheel diameters- 90, 110, 140, 160 mm. The RTL, DFU end truck has just one wheel diameter of 90 mm.

The design of the standard wheel is double flanged and flat tread. The groove width cut into the wheel will depend on the actual rail used for the crane. The minimum and maximum groove widths for the various wheel diameters are in the **Specifications** in the next section. Flangeless wheels with guide rollers are also available to adapt to wider rails that would exceed the maximum allowable groove width of the standard wheel.

The material for the standard wheel is GJS700-2 / EN 1563 (ductile iron) and the initial hardness is approximately 280 BHN. Ductile iron is graphite rich. Graphite is a dry lubricant that helps reduce wear of the wheel and the rail. In addition, as the ductile iron wheel travels on the steel rail, the ductile iron is being cold worked which improves the tensile strength and hardness.

The end truck typically has one drive wheel and one idler wheel as standard. Additional GES drives are available for most two-wheel end trucks as a factory option. For bogie end trucks, any additional GES drives normally mount to the mating bogey end truck. The drive wheel is driven directly by an output shaft from the GES gearbox. The output shaft on the GES drive fits into the drive wheel.

In addition to the GES drives, the RTN40, RTN50, DFO40, DFO50 end trucks have an option for a QM drive with larger motor power for faster speeds or heavier loads. The drive wheel is driven directly by an output shaft mounted to the wheel. The QM drive has a hollow bore, and it mounts to the output shaft attached to the drive wheel.

Axles and Bearings

End Truck	Drive wheel axle	Idler wheel axle	Wheel Bearing type
RTL09, DFU09	Stationary	Stationary	Sealed
RTN09, RSN09, DFO09, DFM09	Stationary	Stationary	Sealed
RTN11, RSN11, DFO11, DFM11	Stationary	Stationary	Sealed
RTN14, RSN14, DFO14, DFM14	Stationary	Stationary	Sealed
RTN16, RSN16, DFO16, DFM16	Stationary	Stationary	Sealed
RTN20, DFO20	Rotating	Rotating	Shielded (Note 1)
RTN25, DFO25	Rotating	Rotating	Shielded (Note 1)
RTN32, DFO32	Rotating	Rotating	Shielded (Note 1)
RTN40, DFO40	Rotating	Rotating	Shielded (Note 1)
RTN50, DFO50	Rotating	Rotating	Shielded (Note 1)

Note 1: Lubrication

Trade name and number	Operating temperature °C	Operating temperature °F
Mobil grease XHP 222	-25 to +150	-13 to +302
Mobilith SHC 460 (Synthetic)	-40 to +180	-40 to +356

6 Specifications

6.1 RTN and RTL or DFO and DFU End Trucks

Wheelbase range

2-wheel	Wheelbase, mm	Bogie	Wheelbase, mm
RTL09, DFU09	1250, 1600, 2000	RTN20B, DFO20B	1200, 1400, 1600, 1800, 2000
RTN09, DFO09	1250, 1600, 2000, 2500	RTN25B, DFO25B	1200, 1400, 1600, 1800, 2000, 2200, 2500
RTN11, DFO11	1600, 2000, 2500, 3150		
RTN14, DFO14	1600, 2000, 2500, 3150, 3500, 4000	RTN32B, DFO32B	1400, 1600, 1800, 2000
RTN16, DFO16	1600, 2000, 2500, 3150, 4000, 4500	RTN40B, DFO40B	1400, 1600, 1800, 2000, 2500
RTN20, DFO20	1600, 2000, 2500, 3150, 4000, 4500	RTN50B, DFO50B	1600, 1800, 2000. 2200, 2500
RTN25, DFO25	2000, 2500, 3150, 4000, 4500		
RTN32, DFO32	2500, 3150, 4000, 4500, 5000, 5500		
RTN40, DFO40	2500, 3150, 4000, 4500, 5000, 5500		
RTN50, DFO50	3150, 4000, 4500, 5000, 5500, 6500, 7500		

Wheel diameter

2-wheel	Wheel diameter	2-wheel	Wheel diameter	Bogie	Wheel diameter
RTL09, DFU09	90 mm	RTN20, DF20	200 mm	RTN20B, DFO20B	200 mm
RTN09, DFO09	90 mm	RTN25, DFO25	250 mm	RTN25B, DFO25B	250 mm
RTN11, DFO11	110 mm	RTN32, DFO32	315 mm	RTN32B, DFO32B	315 mm
RTN14, DFO14	140 mm	RTN40, DFO40	400 mm	RTN40B, DFO40B	400 mm
RTN16, DFO16	160 mm	RTN50, DFO50	500 mm	RTN50B, DFO50B	500 mm

Groove width

Model	Groove width range	Wheel groove increments - mm	Minimum rail clearance
RTL09, DFM09	2" – 2 3/4"	50, 55, 60, 65, 70	See Wheel Groove Rules
RTN09, DFO09	2" – 2 3/4"	50, 55, 60, 65, 70	
RTN11, DFO11	2 1/16" – 3 1/4"	52, 57, 62, 67, 72, 77, 82	
RTN14, DFO14	2 1/8" – 3 5/16"	54, 59, 64, 69, 74, 79, 84	
RTN16, DFO16	2 1/8" – 3 5/16"	54, 59, 64, 69, 74, 79, 84	
RTN20, DF020	2 1/8" – 3 ¾"	54, 59, 64, 69, 74, 79, 84, 89, 94	
RTN25, DFO25	2 1/8" – 3 1/2"	54, 59, 64, 69, 74, 79, 84, 89, 94, 99	
RTN32, DFO32	2 1/8" – 3 ¾"	54, 59, 64, 69, 74, 79, 84, 89, 94	
RTN40, DFO40	2 3/16" – 4 3/4"	55, 60, 65, 70, 75, 80, 85, 90, 95, 100, 105, 110, 115, 120	
RTN50, DFO50	2 3/16" – 5 1/8"	55, 60, 65, 70, 75, 80, 85, 90, 95, 100, 105, 110, 115, 120, 125, 130	

Use flangeless wheels and guide rollers for wider rails.
See Wheel Groove Rules to determine the wheel groove width.

Rail

ASCE
Flat Bar

Truck frame construction

Rectangular structural tubing	Welded box frame
RTL09, RTN09, RTN11, RTN14, RTN16, RTN20, RTN25	RTN32, RTN40, RTN50
DFM09, DFO09, DFO11, DFO14, DFO16, DFO20, DFO25	DFO32, DFO40, DFO50

Integrated wheel axle failure support
Bolt-on end plates/rail sweep

Bridge Drive

GES gear and inverter-duty motor (available with two-speed pole-change motors but limited bridge speeds)
QM6 or QM7 gears with inverter-duty motor for RTN40, DFO40 or RTN50, DFO50 end trucks only.
One drive wheel per end truck is standard.
Nominal VFD speeds: 65, 80, 100, 130 fpm [20, 25, 32, 40 m/min]; faster speeds up to 63 m/min available

Joint type

A bolted connection fastens joint plate to end truck; a welded connection fastens bridge girder to joint plate.
Single girder or double girder configurations
See ***Key Joint Plate Dimensions*** for acceptable beam widths for the various joint plate sizes.
See ***Possible Girder Connections*** for RTN and RTL or DFO and DFM end trucks

Bumpers

Bumpers are a standard feature and sized per the load

Options

Anti-jump catches	Rail cleaning device
Bumper extension	Second drive wheel
Guide rollers (bolt on)	

Surface treatment

Primer only

6.2 RSN or DFM End Trucks

Wheelbase range

Model	Wheelbase, mm
RSN09, DFM09	1250, 1600, 2000, 2500
RSN11, DFM11	1600, 2000, 2500, 3150
RSN14, DFM14	1600, 2000, 2500, 3150, 3500, 4000
RSN16, DFM16	1600, 2000, 2500, 3150, 4000, 4500

Wheel diameter

Model	Wheel diameter	Model	Wheel diameter
RSN09, DFM09	90 mm	RSN14, DFM14	140 mm
RSN11, DFM09	110 mm	RSN16, DFM16	160 mm

Groove width

Model	Groove width range	Wheel groove increments - mm	Minimum rail clearance
RSN09, DFM09	2” – 2 3/4”	50, 55, 60, 65, 70 mm	See Wheel Groove Rules
RSN11, DFM11	2 1/16” – 3 1/4”	52, 57, 62, 67, 72, 77, 82 mm	
RSN14, DFM14	2 1/8” – 3 5/16”	54, 59, 64, 69, 74, 79, 84 mm	
RSN16, DFM16	2 1/8” – 3 5/16”	54, 59, 64, 69, 74, 79, 84 mm	

Use flangeless wheels and guide rollers for wider rails.

See Wheel Groove Rules to determine the wheel groove width.

Rail

ASCE

Flat Bar

Truck frame construction

Rectangular structural tubing	Welded box frame
RSN09, RSN11, RSN14, RSN16 or DFM09, DFM11, DFM14, DFM16	None

Integrated wheel axle failure support
Bolt-on end plates/rail sweep

Bridge Drive

GES gear and inverter-duty motor (limited two-speed pole change motors and bridge speeds)

One drive wheel per end truck is the standard.

Nominal VFD speeds: 65, 80, 100, 130 fpm [20, 25, 32, 40 m/min]

Joint type

A bolted connection fastens joint plate to end truck; a welded connection fastens bridge girder to joint plate.
Single girder or double girder configurations
EBN side joint plate
See ***Possible Girder Connections*** for RSN or DFM end trucks

Bumpers

Bumpers are a standard feature and sized per the load

Options

Anti-jump catches	Rail cleaning device
Bumper extension	Second drive wheel
Guide rollers (bolt on)	

Surface treatment

Primer only

6.3 Wheel Groove Rules

	Span ≤ 20 m	Span > 20 m and ≤ 30 m	Span > 30 m and ≤ 35 m	Span > 35 m
End Truck	**Min. wheel groove**	**Min. wheel groove**	**Min. wheel groove**	**Min. wheel groove**
RTN09, RTL09 DFO09, DFU09	Rail head width + 10 mm	Rail head width + 15 mm	Rail head width + 20 mm	Rail head width + 25 mm
RTN11, RSN11 DFO11, DFM11	Rail head width + 12 mm	Rail head width + 17 mm	Rail head width + 22 mm	Rail head width + 27 mm
RTN14, RSN14 DFO14, DFM14	Rail head width + 14 mm	Rail head width + 19 mm	Rail head width + 24 mm	Rail head width + 29 mm
RTN16, RSN16 DFO16, DFM16	Rail head width + 14 mm	Rail head width + 19 mm	Rail head width + 24 mm	Rail head width + 29 mm
RTN20, DFO20	Rail head width + 14 mm	Rail head width + 19 mm	Rail head width + 24 mm	Rail head width + 29 mm
RTN25, DFO25	Rail head width + 14 mm	Rail head width + 19 mm	Rail head width + 24 mm	Rail head width + 29 mm
RTN32, DFO32	Rail head width + 14 mm	Rail head width + 19 mm	Rail head width + 24 mm	Rail head width + 29 mm
RTN40, DFO40	Rail head width + 15 mm	Rail head width + 20 mm	Rail head width + 25 mm	Rail head width + 30 mm
RTN50, DFO50	Rail head width + 15 mm	Rail head width + 20 mm	Rail head width + 25 mm	Rail head width + 30 mm

To determine the wheel groove width, use the formula: Rail head width + minimum clearance between wheel flange and rail for the specified span and the selected end truck.

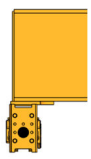
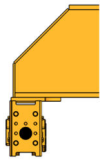
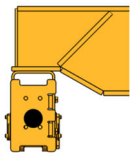
7 Possible Girder Connections

7.1 RTN and RTL or DFO and DFU End Trucks

The RTN, DFO, RTL, DFU end trucks have a top joint plate as standard. But the RTN20, DFO20, RTN25, DFO25, RTN32, DFO32, RTN40, DFO40 and RTN50, DFO50 end trucks have an option for side joint plate. (See RSN, DFM end trucks for side joint plate on smaller end trucks.) The joint plate bolts to the end truck.

7.1.1 Top Joint Plate

The top joint plate accepts a profile girder (commercial beam) or box girder that can mount in the STD or MED girder position. The girder connects to the joint plate through a welded connection. R&M does not provide any additional plates if needed to reinforce the connection.

			RTN09 RTL09 DFO09 DFU09		**RTN11 RTN14 DFO11 DFO14**		**RTN16 DFO16**		**RTN20 DFO20**		**RTN25 DFO25**		**RTN32 RTN40 DFO32 DFO40**		**RTN40 RTN50 DFO40 DFO50**	
Girder Position	**Joint Illustration**		Joint Plate Type Codes (A3, A4, A6…)													
	Standard method		**Pr**	**Bo**	**Pr**	**Bo**	**Pr**	**Bo**	**Pr**	**Bo**	**Pr**	**Bo**	**Pr**	**Bo**	**Bo**	**Bo**
STD			A3	A3	A4 A6	A4 A6	B4 B6	B4 B6	L3 L4 L5	L3 L4 L5 L6	H4 H5	H4 H5 H7 H9	K4 K5 K7	K4 K5 K7 K9	J1 J2 J3 J4 J5	J6 J7 J8 J9 J0
MED			A3	A3	A4 A6	A4 A6	B4 B6	B4 B6	L3 L4 L5	L3 L4 L5 L6	H4 H5	H4 H5 H7 H9	K4 K5 K7	K4 K5 K7 K9	J1 J2 J3 J4 J5	J6 J7 J8 J9 J0

Pr = Profile girder; Bo = Box girder

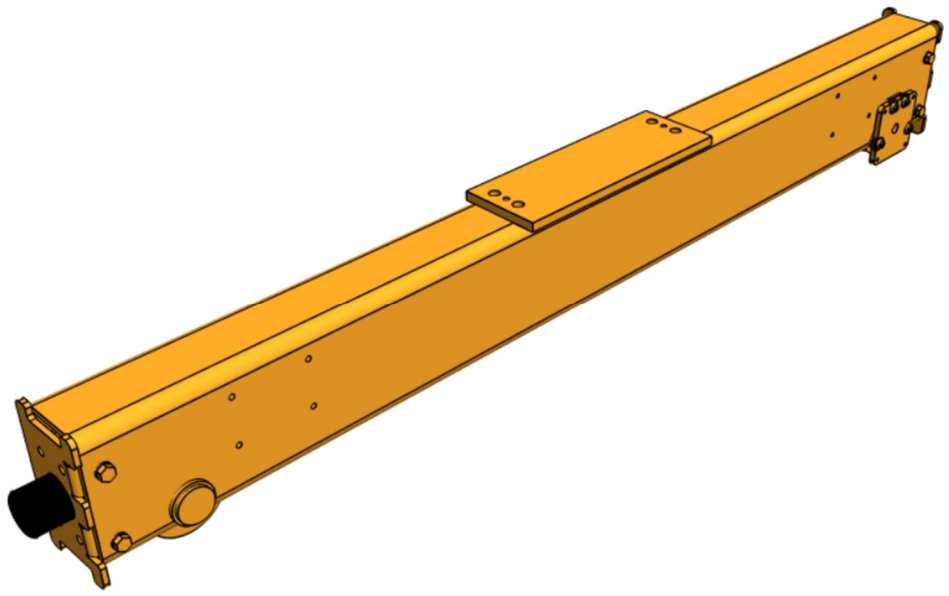
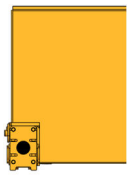
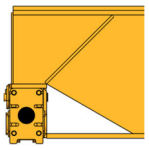
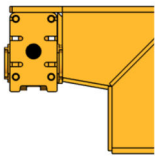
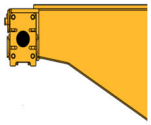


Illustration of a top joint plate for a Standard or Medium Girder Connection

7.1.2 Side Joint Plate

The side joint plate accepts a profile (commercial beam) or box girder that can mount in the STD or LOW girder position as illustrated below. The girder connects to the joint plate through a welded connection. R&M does not provide any additional plates if needed to reinforce the connection.

The side joint usually offers a lower overhead crane clearance.

			RTN20 DFO20		RTN25 DFO25		RTN32 DFO32		RTN40/RTN50 DFO40/DFO50	
Girder Position	**Joint Illustration**		Side Joint Plate Type Codes (R3, R4, R5, F4, F5, F6, F7, Q…)							
	Std. method	Alt. method	**Profile**	**Box**	**Profile**	**Box**	**Profile**	**Box**	**Profile**	**Box**
STD			R3 R3r R4r R5r	R3 R4 R5 R6	F4 F5 F7 F8	F4 F5 F7 F8	Q4 Q5	Q4 Q8 Q5 Q9 Q6 Q0 Q7	N.A.	S6 S7 S9
LOW			R3 R3r R4r R5r	R3 R4 R5 R6	F4 F5 F7 F8	F4 F5 F7 F8	Q4 Q5	Q4 Q8 Q5 Q9 Q6 Q0 Q7	N.A.	S6 S7 S9

N.A. = Not available

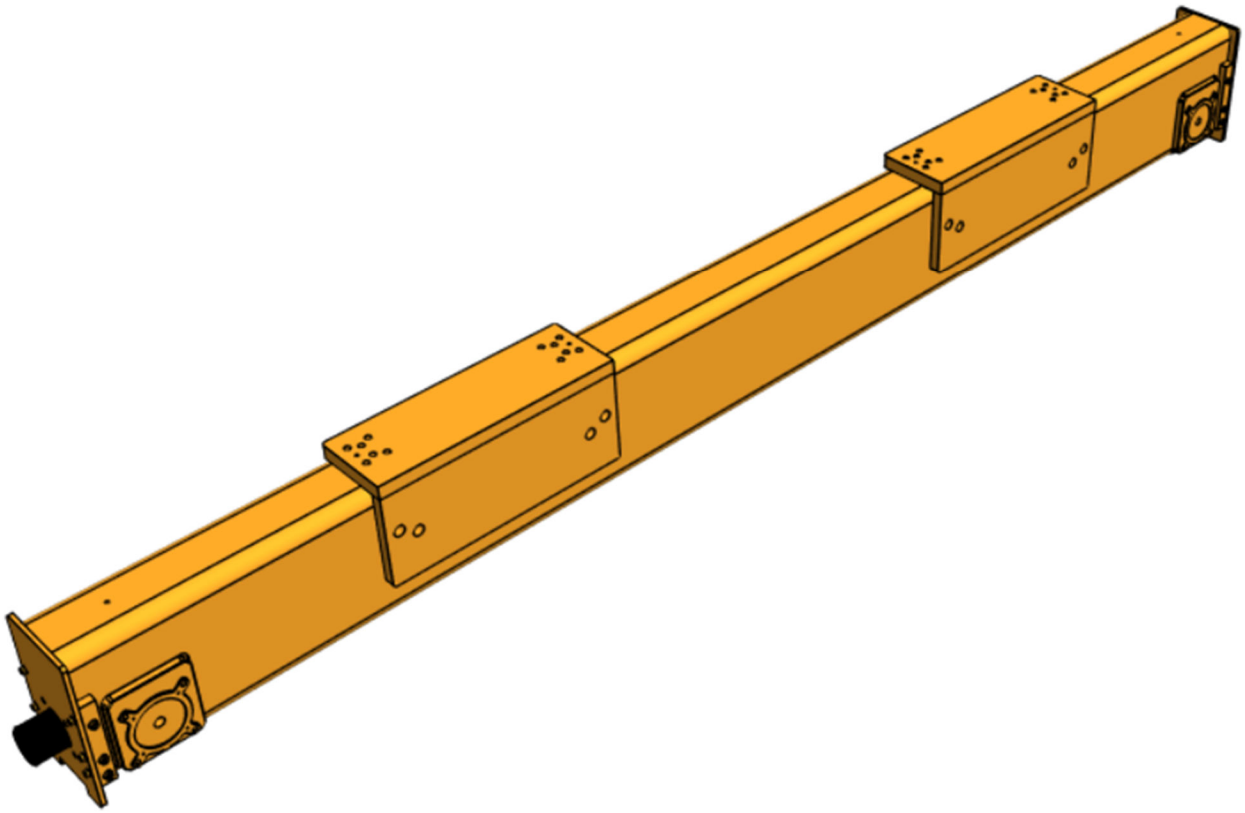


Illustration of a side joint plate for a Low Girder Connection
(RTN20 - RTN40, RTN50B, DFO20 - DFO40, DFO50B)

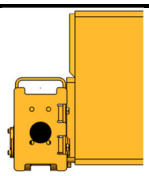
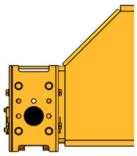
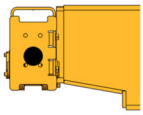
7.2 RSN or DFM End Trucks

The RSN, DFM end trucks have with a simple side joint plate as standard. The RSN, DFM end truck is an alternative to the RTN, DFO end trucks that do not have a side joint option. The joint plate bolts to the end truck.

7.2.1 Side Joint Plate

The side joint accepts a profile girder (commercial beam) or a box girder that can mount in the STD, MED or LOW girder position as illustrated in the table below. The girder connects to the joint plate through a welded connection. R&M does not provide any additional plates if needed to reinforce the connection.

Note: Some smaller profile girders with narrower flange widths might be inadequate for the EBN side joint while some bigger profile girders may need additional plates to reinforce the joint.

			RSN09 DFM09		**RSN11 DFM11**		**RSN14 DFM14**		**RSN16 DFM16**	
Girder Position	**Joint Illustration**		Side Joint Plate Type Codes							
	Std. method	Alt. method	**Profile**	**Box**	**Profile**	**Box**	**Profile**	**Box**	**Profile**	**Box**
STD			EBN09-400		EBN11-400		EBN14-400		EBN16-350 EBN16-450	
LOW			EBN09-400		EBN11-400		EBN14-400		EBN16-350 EBN16-450	

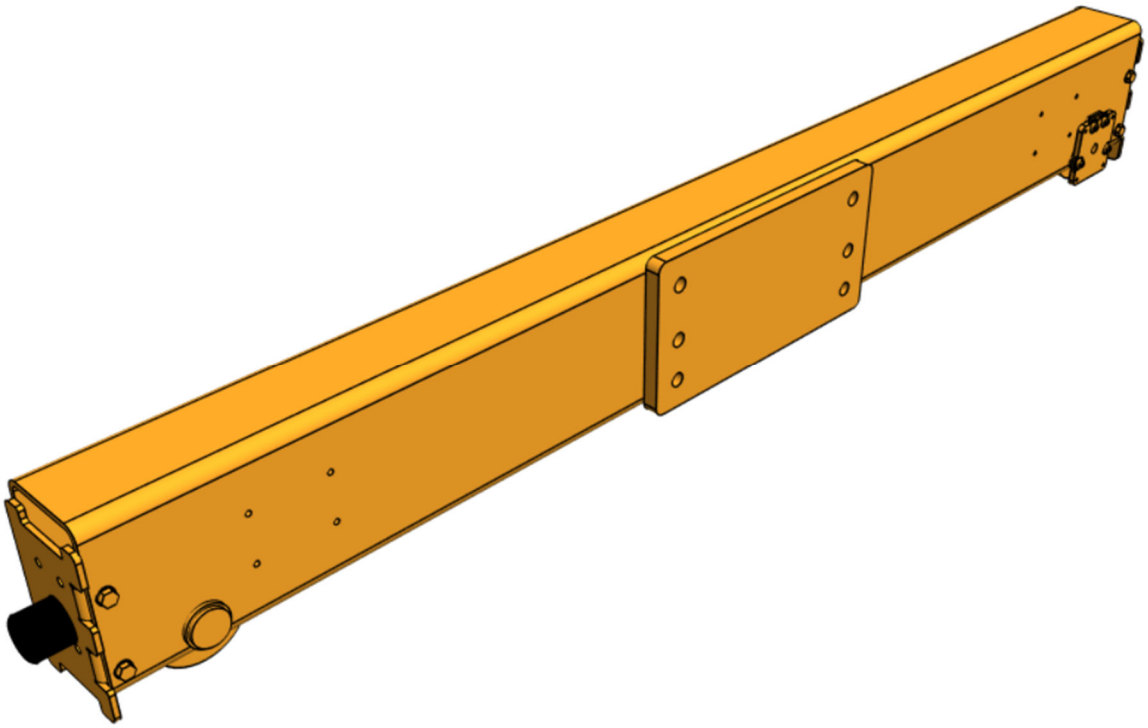


Illustration of a side joint plate (RSN09 - RSN16 or DFM09 - DFM16)

8 Joint Plate Code Description - RTN and RTL or DFO and DFU End Trucks

QuoteMaster® or Demag CraneExpert will generate the joint plate code for the selected end trucks.

1	2	3 4 5	6	7 8	9	10 11 12	13	14
P	**-**	**TOP**	**-**	**A4**	**-**	**STD**	**-**	**S**

1	**P** = Profile (commercial I-beam) **B** = Box
2	**-**
3-5	**TOP** = TOP joint plate **SID** = Side joint plate
6	**-** = Not a reinforced connection
7-8	Top joint plate types: **A_** for A3, A4, A6; **B_** for B4, B6; **L_** for L3, L4, L5, L6; **K_** for K4, K5, K7, K9 Side joint plate types: **R_** for R3, R4, R5, R6; **Q_** for Q4, Q5, Q6, Q7, Q8, Q9, Q0; **S_** for S6, S7, S9
9	**-** = Standard bottom flange **R** = Reinforced bottom flange **S** = Single girder type bottom flange **D** = Double girder type bottom flange
10-12	**STD** = Standard bridge girder position **MED** = Coped bridge girder position **LOW** = Low bridge girder position (only with side joint plate)
13	**-** = Normal bottom flange positioning **H** = High bottom flange positioning (for side connection joint) **L** = Low bottom flange positioning (for side connection joint)
14	**S** = Top flange Straight **C** = Top Flange Cut

9 Bumpers (Buffers)

The bumpers bolt on to the end plates on each end of the truck and are available in rubber or polyurethane.

QuoteMaster® or Demag CraneExpert will select the size of the bumper case by case for each crane package. If changing to a different bumper, you should verify the compatibility of the bumper size and end truck. The bumper size code is in the end truck product code.

CODE	Dia./mm	Length/mm	Material	End Truck
A	63	53	Rubber	RTN09 – RTN25, RSN09 - RSN16, RTL09, DFO09 - DFO25, DFM09 - DFM16, DFU09
B	80	68	Rubber	All RTN, RSN, RTL, DFO, DFM, DFU models
C	100	85	Rubber	All RTN, RSN, RTL, DFO, DFM, DFU models
D	125	105	Rubber	RSN14, RSN16, RTN14 - RTN50, DFM14, DFM16, DFO14 - DFO50
E	100	150	Polyurethane	All RTN, RSN, RTL, DFO, DFM, DFU models
F	125	190	Polyurethane	RSN14, RSN16, RTN14 - RTN50, DFM14, DFM16, DFO14 - DFO50
G	100	100	Polyurethane	All RTN, RSN, RTL, DFO, DFM, DFU models
H [1)]	160	160	Polyurethane	RSN16, RTN16 - RTN50, DFM16, DFO16 - DFO50
I	200	200	Polyurethane	RTN20, RTN25, RTN32, RTN40
K	80	80	Polyurethane	All RTN, RSN, RTL, DFO, DFM, DFU models
M	125	125	Polyurethane	RSN14, RSN16, RTN14 - RTN50, DFM14, DFM16, DFO14 - DFO50
P [1)]	160	240	Polyurethane	RSN14, RSN16, RTN14 - RTN50, DFM14, DFM16, DFO14 - DFO50
S	200	300	Polyurethane	RTN20, RTN25, RTN32, RTN40, RTN50, DFO20, DFO32, DFO40, DFO50
T [2)]	250	350	Polyurethane	RTN32, RTN40, RTN50, DFO32, DFO40, DFO50
Y [2)]	250	475	Polyurethane	RTN32, RTN40, RTN50, DFO32, DFO40, DFO50

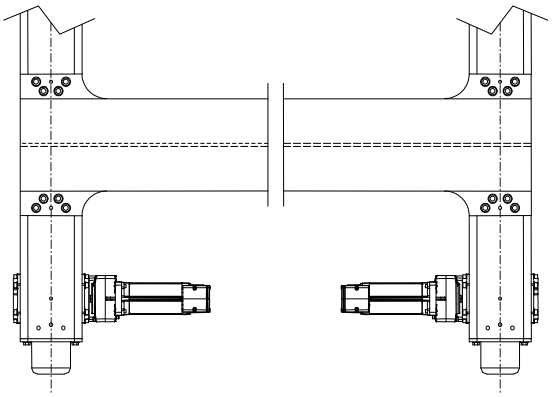
Note 1) Requires special adapter to mount the bumper to RTN/RSN14 and RTN/RSN16. Adapter length is 4" [100 mm].
Note 2) Requires special adapter to mount the bumper to end truck. Adapter length is 4" [100 mm].

10 GES and QM Drives

The GES drives mate to the RSN, DFM, RTL, DFU and RTN, DFO end trucks and mount typically to the trucks on the inboard side of the crane as shown. The drive wheel receives the output shaft of the GES drive.

In addition to the GES drives, the QM drives are available for the RTN40, DFO40 and RTN50, DFO50 end trucks. The QM drive has a keyed hollow bore, and the drive wheel requires an axle with an extended shaft. A torque arm fastened to the end truck clamps to the drive.

Motor driven cranes have at least two bridge drives. The number of bridge drive combinations for cranes using two-wheeled end trucks is two or four. The number of bridge drive combinations for cranes using bogie end trucks is two, four, six, or eight.



Location of the bridge drives

10.1 GES Drive and QM Drive End Truck Compatibility

Drive size - Output shaft size	End Truck
GES3 – S4	RTN09, RSN09, RTL09, RTN11, RSN11, DFO09, DFM09, DFU09, DFO11, DFM11
GES3 – S3	RTN14, RTN16, RSN16, RTN20, DFO14, DFO16, DFM16, DFO20
GES4 – S3	RTN16, RSN16, RTN20, DFO16, DFM16, DFO20
GES4 – S2	RTN25, RTN32, DFO25, DFO32
GES5 – S2	RTN25, RTN32, RTN40, DFO25, DFO32, DFO40
GES5 – S1	RTN40, RTN50, DFO40, DFO50
QM6 – keyed, hollow bore	RTN40, RTN50, DFO40, DFO50, with output shaft on drive wheel
QM7 – keyed, hollow bore	RTN50, DFO50, with output shaft on drive wheel

10.2 GES Drive and QM Drive Gears and Lubrication

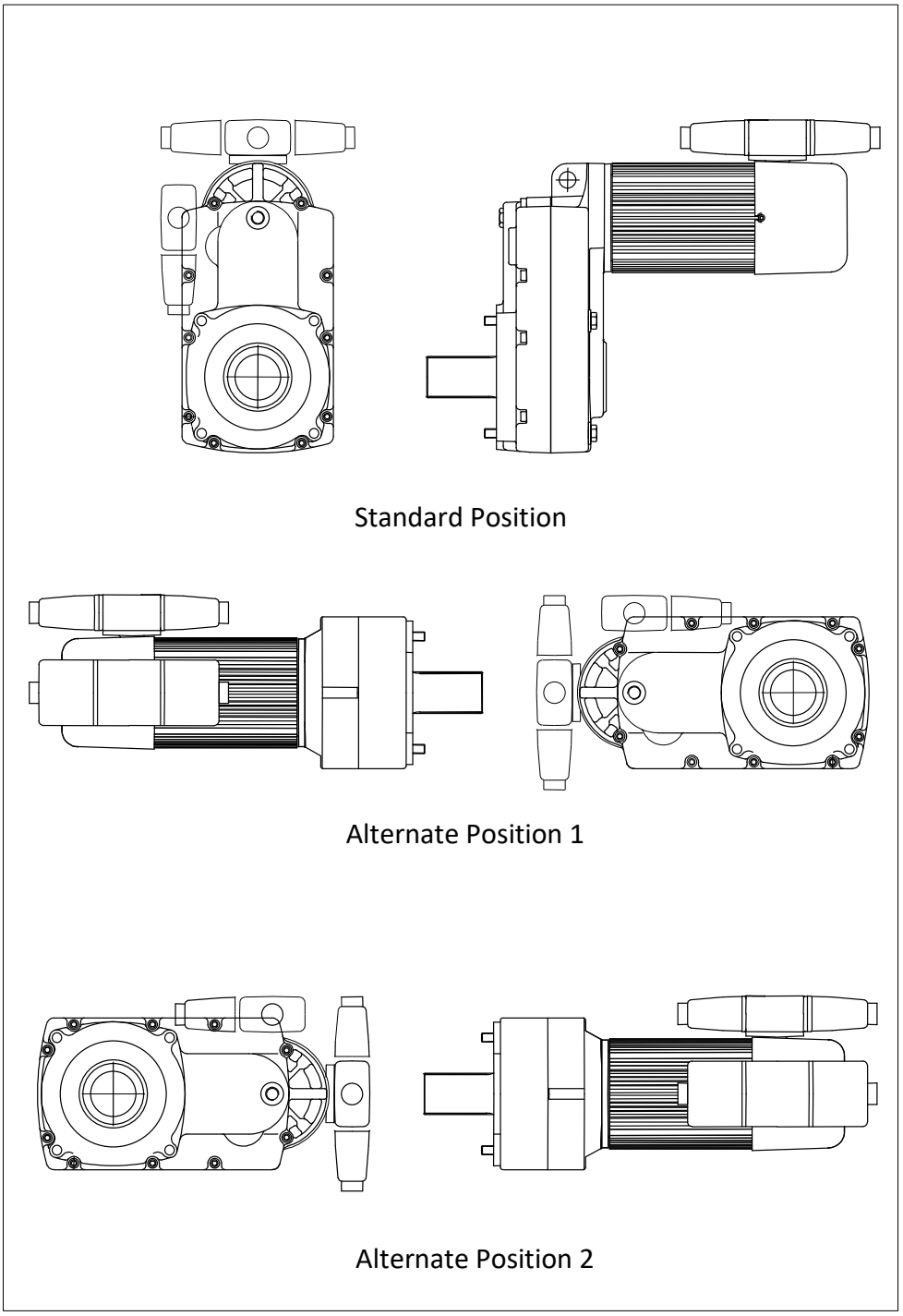
The GES and QM gearboxes are a multistage gear transmission. The gear quality class meets AGMA class 10 (per AGMA 2000-A88) and ISO/DIN class 8. The gear type is helical. Frictionless bearings support the gears.

Gear Lubrication

The lubricant for the GES gears is a semi-fluid grease. The lubricant for the QM gears is oil.

	Operating temperature above 14°F [-10°C]	Operating temperature below 14°F [-10°C]
GES Gear	Mobilux™ EP 004 or equivalent	Mobilith SHC 007 synthetic lubricant
QM Gear	Teboil Pressure oil 220	Teboil Pressure oil 150

10.3 GES Drive Mounting Positions



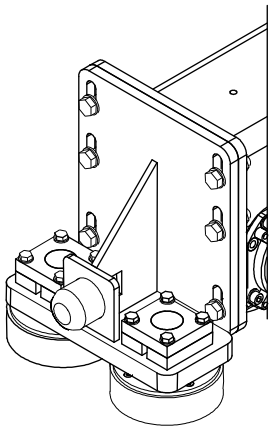
Standard Position

Alternate Position 1

Alternate Position 2

11 Additional Features

11.1 Guide Rollers



The design of the standard guide roller is specific to each wheel size. The guide roller can take the same horizontal forces as seen on the end truck. The rollers are adjustable in the radial direction by ± 3/16" [5 mm]. Guide rollers mount to only one end truck of the pair needed for the crane.

The guide rollers are available for a welded or clamped runway rail, but you must verify case by case the space between the guide roller and the clamp or the weld. You must mention the guide rollers separately in the end truck order. **Note:** Always mention the width and height of the rail used.

Guide roller option is available in QuoteMaster or Demag CraneExpert.

11.2 Polyurethane Flat Tread Wheels

The RSN, RTN, DFM, DFO end trucks can have special wheels that have the running surfaces coated with polyurethane. Polyurethane coated wheels are available for wheel diameters that range from 160 mm to 315 mm. Both the idler and drive wheels are available as flangeless. The wheel body has equal outer dimension and markings as the standard wheel. You must mention the polyurethane wheels separately in the end truck order.

Polyurethane coating has following typical characteristics:

- Ensure quiet, smooth running and lower surface pressure under wheel.
- Increased friction between rail and wheel
- Rolling resistance is about 1.5-2 times more than the steel wheel.
- High resistance to wearing and tearing, and good resistance to mineral oils and greases.

Maximum wheel loads with coated wheels are in the table below. The values conform to the following conditions:

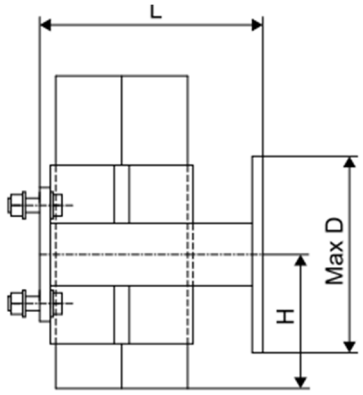
- Thickness of coating per the given figures
- Maximum travelling speed: 200 fpm or 63 m/min
- Material of the coating is Vulkollan®; Hardness Shore A (DIN 53505) is 90 ± 5 S.H.A.
- Operating temperature range is 14°F…104°F [-10°C…+40°C]
- Running surface can be of steel, concrete, or equivalent; surface should be smooth and free from loose particles, and dry. Do not use polyurethane wheels consistently wet floors.
- If the wheel is under load and standing still for exceptionally long time, there may be small compression in surface, which will disappear during use.
- Indoor use

Maximum wheel loads for Vulkollan® coated wheels:

End truck model	RTN16 DFO16	RTN20 DFO20	RTN25 DFO25	RTN32 DFO32
Wheel diameter, mm	160	200	250	315
Maximum thickness, mm	15	20	25	32.5
Maximum width of flangeless wheel, mm	110	127	115	130
Maximum dynamic wheel load, kN [kip]	39 [8.775]	62 [13.95]	78 [17.55]	100 [22.5]

11.3 Rail Sweep - Wood

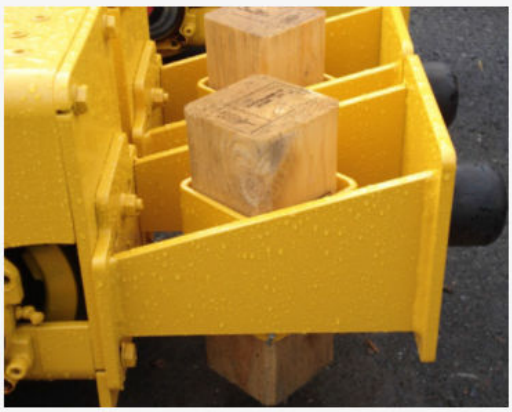
A rail sweep is available to mount the end plate on each end of the end truck. The block of wood, which loosely fits into a rectangle holding tube, rubs the rail to clean the rail of any debris that might accumulate. The addition of the rail sweep will increase the overall length of the end truck. The bumper mounts to the rail sweep frame.



End truck	L	H	Max D [1)]	Weight [kg]
RTN09, RSN09, DFO09, DFM09	170	100	160	7
RTN11, RSN11, DFO11, DFM11	170	100	160	7
RTN14, RSN14, DFO14, DFM14	170	100	160	7
RTN16, RSN16, DFO16, DFM16	170	100	160	7
RTN20, DFO20	250	150	220	18
RTN25, DFO25	250	150	220	18
RTN32, DFO32	250	150	220 / 250	18
RTN40, DFO40	250	150	220 / 250	18
RTN50, DFO50	250	150	220 / 250	18

All dimensions in mm

1) With bumper size code T and Y, Max D is 250 mm. Otherwise Max D is 220 mm with all other bumper sizes.



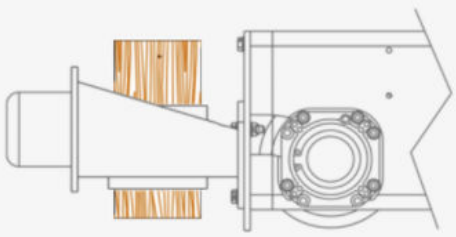


Illustration of rail sweep using wood

11.4 Storm Locks

The storm lock includes a lockout switch that disables the crane controls when the storm lock is engaged. The storm lock can be engaged by hand or by a motor. A button on the pendant allows the operator to control the storm lock actuation motor.

The storm lock is usually located on the span side of the crane and gets mounted on the end truck at each end of the crane.

The pin of the storm lock gets engaged between two steel blocks (not provided), which the crane builder welds to the flange of the runway beam.

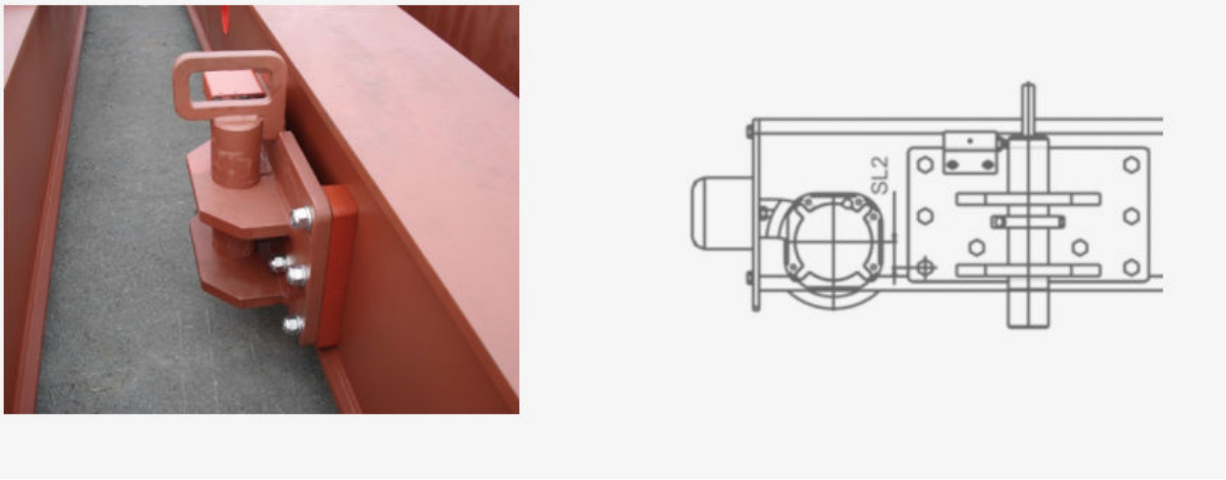


Illustration of a storm lock device with manual engagement and a lockout switch

11.5 Spark Resistant Wheel

For use in a classified hazardous location, a solid brass wheel that matches the profile of the standard wheel is available as an option.

Alloy CuZn25Al5Mn4Fe3 has exceptional strength, good wearing properties and good ductility. It has reasonable corrosion resistance but may be susceptible to dezincification under certain conditions. Material hardness is 210-310 HB.

11.6 Cambered Tread Wheel

A cambered wheel is for a semi-gantry crane when there is no guiding rail for the lower end truck. The flangeless, cambered wheel must ride on a steel plate or I-beam embedded into the concrete floor which has the top flange is level with the floor surface.

The camber radius of the wheel tread is 600 mm. The material of the wheel is ductile iron EN 1563 GJS-700-2 with a hardness of 265 HB.

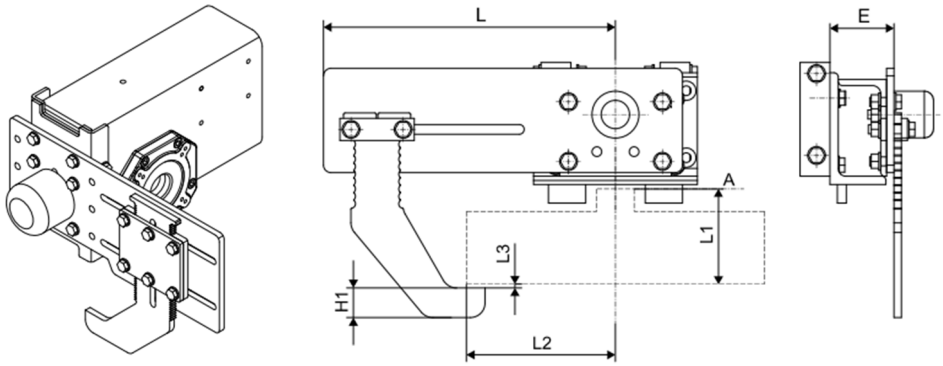
End truck model	**RTN16 DFO16**	**RTN20 DFO20**	**RTN25 DFO25**	**RTN32 DFO32**	**RTN40 DFO40**	**RTN50 DFO50**
Wheel tread diameter [mm]	160	200	250	315	400	500
Tread width [mm]	110	130	132	134	161	175
Gap between running surface and bolt-on end plate [mm]	5	10	10	10	10	10

All dimensions are in millimeters.

11.7 Jump Catches – OTH24

Jump catches are available to add to the RSN, DFM and RTN, DFO end trucks as an option. There are two jump catch designs depending on the end truck model.

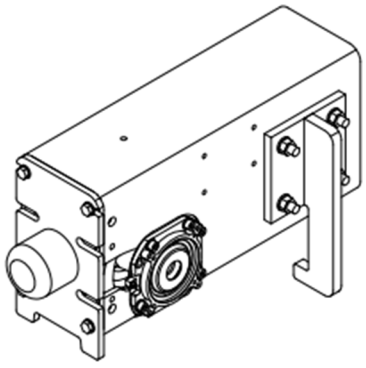
Jump catch A design is for RTN09, DFO09, RTN11, DFO11, RTN14, DFO14, RTN16, DFO16 end trucks and for RSN11, DFM11, RSN14, DFM14, RSN16, DFM16 end trucks, and the jump catch mounts to each end of the end truck between the bumper and the end plate and is field adjustable to match most runway flange designs and rail heights.



Jump Catch A for RTN16, DFO16

Model	Max. holding force	L	L1 min.-max.	L2 min.-max.	L3 Max	H1	E
	[kN]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
RTN09, RSN09, DFO09, DFM09	10.5	392	30 - 120	44 - 200	5	40	74
RTN11, RSN11, DFO11, DFM11	14.4	392	30 - 120	44 - 200	7.5	40	74
RTN14, RSN14, DFO14, DFM14	24	420	40 - 120	44 - 200	7.5	40	12
RTN16, RSN16, DFO16, DFM16	24	420	40 - 120	44 - 200	7.5	40	12

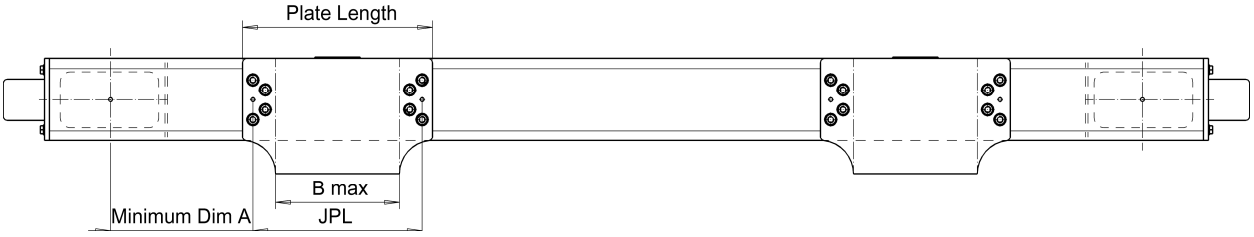
Jump catch B design is for RTN20, DFO20, RTN25, DFO25, RTN32, DFO32, RTN40, DFO40, RTN50, DFO50 end trucks, and the jump catch mounts to the side of end truck near the wheels and is not field adjustable to match the various runway designs and rail heights.



Jump Catch B Design – RTN20, DFO20 end truck shown.

12 Joint Plate

12.1 Key Joint Plate Dimensions



End Truck	Joint Plate Code	Joint Type	JPL (Joint Plate Length)		B max Maximum Flange Width		Minimum Dim "A"		Plate Length	
			inch	mm	inch	mm	inch	mm	inch	mm
RTL09, DFU09	A3	Top joint	14.17	360	12.20	310	8.07	205	16.14	410
RTN09, DFO09	A3	Top joint	14.17	360	12.20	310	8.07	205	16.14	410
RSN09, DFM09	EBN09-400	Side joint	15.75	400	15.75	400	11.03	280	19.29	490
RTN11, DFO11	A4	Top joint	16.14	410	14.17	360	9.06	230	18.11	460
	A6	Top joint	23.62	600	21.65	550	9.06	230	25.59	650
RSN11, DFM11	EBN11-400	Side joint	15.75	400	15.75	400	11.03	280	19.29	490
RTN14, DFO14	A4	Top joint	16.14	410	14.17	360	9.06	230	18.11	460
	A6	Top joint	23.62	600	21.65	550	9.06	230	23.62	600
RSN14, DFM14	EBN14-400	Side joint	15.75	400	15.75	400	11.03	280	19.29	490
RTN16, DFO16	B4	Top joint	19.69	500	13.78	350	10.63	270	21.65	550
	B6	Top joint	27.56	700	21.65	550	10.63	270	29.53	750
RSN16, DFM16	EBN16-350	Side joint	13.78	350	13.78	350	12.2	310	16.93	430
	EBN16-450	Side joint	17.72	450	17.72	450	14.57	370	25.59	650
RTN20, DFO20	L3	Top joint	16.14	410	11.81	300	10.04	255	18.11	460
	L4	Top joint	20.47	520	16.14	410	10.04	255	22.44	570
	L5	Top joint	24.8	630	20.47	520	10.04	255	26.77	680
	L6	Top joint	29.13	740	24.80	630	10.04	255	31.10	790
RTN20, DFO20	R3	Side joint	9.84	250	11.81	300	11.42	290	11.81	300
	R4	Side joint	14.17	360	16.14	410	11.42	290	16.14	410
	R5	Side joint	18.5	470	20.47	520	11.42	290	20.47	520
	R6	Side joint	22.83	580	24.80	630	11.42	290	24.80	630
RTN25, DFO25	H4	Top joint	23.23	590	16.14	410	9.84	250	25.20	640
	H5	Top joint	27.56	700	20.47	520	9.84	250	29.53	750
	H7	Top joint	36.22	920	29.13	740	9.84	250	38.19	970
	H9	Top joint	46.06	1170	38.98	990	9.84	250	48.03	1220

End Truck	Joint Plate Code	Joint Type	JPL (Joint Plate Length)		B max Maximum Flange Width		Minimum Dim "A"		Plate Length	
			inch	mm	inch	mm	inch	mm	inch	mm
RTN25, DFO25	F4	Side joint	18.9	480	15.35	390	12.01	305	20.87	530
	F5	Side joint	25.98	660	20.47	520	12.01	305	28.74	730
	F7	Side joint	35.04	890	29.53	750	12.01	305	37.80	960
	F8	Side joint	40.55	1030	35.04	890	12.01	305	43.31	1100
RTN32, DFO32	K4	Top joint	20.47	520	16.14	410	11.03	280	22.44	570
	K5	Top joint	24.8	630	20.47	520	11.03	280	26.77	680
	K7	Top joint	33.46	850	29.13	740	11.03	280	35.43	900
	K9 [1]	Top joint	43.31	1100	38.98	990	12.6	320	45.28	1150
RTN32, DFO32	Q3	Side joint	20.47	520	16.14	410	12.2	310	22.44	570
	Q4	Side joint	20.47	520	16.14	410	13.78	350	22.44	570
	Q5	Side joint	24.8	630	20.47	520	12.2	310	26.77	680
	Q6	Side joint	24.8	630	20.47	520	13.78	350	26.77	680
	Q7	Side joint	33.46	850	29.13	740	12.2	310	35.43	900
	Q8	Side joint	33.46	850	29.13	740	13.78	350	35.43	900
	Q9	Side joint	43.31	1100	38.98	990	12.2	310	45.28	1150
	Q0	Side joint	43.31	1100	38.98	990	13.78	350	45.28	1150
RTN40, DFO40	K4	Top joint	20.47	520	16.14	410	13	330	22.44	570
	K5	Top joint	24.8	630	20.47	520	13	330	26.77	680
	K7	Top joint	33.46	850	29.13	740	13	330	35.43	900
	K9	Top joint	43.31	1100	38.98	990	13	330	45.28	1150
RTN40, DFO40	S6	Side joint	20.47	520	16.14	410	14.96	380	23.23	590
	S7	Side joint	28.74	730	24.41	620	14.96	380	31.50	800
	S9	Side joint	43.31	1100	38.98	990	14.96	380	46.06	1170
RTN50B, DFO50B [2]	S6	Side joint	20.47	520	16.14	410	14.96	380	23.23	590
	S7	Side joint	28.74	730	24.41	620	14.96	380	31.50	800
	S9	Side joint	43.31	1100	38.98	990	14.96	380	46.06	1170
RTN40/50, DFO40/50	J1	Top joint	37	940	15.35	390	3.15	80	38.58	980
	J2	Top joint	46.85	1190	25.39	645	3.15	80	48.43	1230
	J3	Top joint	60.63	1540	37.2	945	3.15	80	62.20	1580
	J4	Top joint	40.94	1040	15.35	390	3.15	80	42.52	1080
	J5	Top joint	49.61	1260	25.39	645	3.15	80	51.18	1300
	J6	Top joint	64.57	1640	37.2	945	3.15	80	66.14	1680
	J7	Top joint	41.73	1060	20.08	510	3.15	80	43.31	1100
	J8	Top joint	45.67	1160	20.08	510	3.15	80	47.24	1200
	J9	Top joint	51.57	1310	29.92	760	3.15	80	53.15	1350
	J0	Top joint	55.51	1410	29.92	760	3.15	80	57.09	1450

Use metric dimensions for best accuracy.

[1] K9 joint plate fits wheelbase 4000 mm, 4500 mm, 5000 mm, or 5500 mm

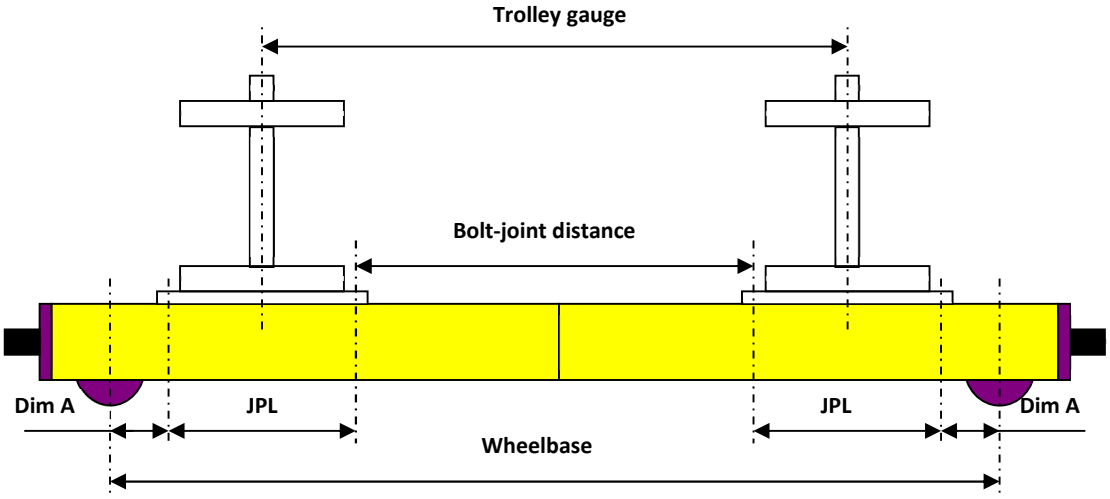
[2] Side joint plates are not available for RTN50, DFO50 two-wheel end truck, but are available for RTN50B, DFO50B bogey style end trucks.

12.1.1 Joint Plate Length & Dimension A

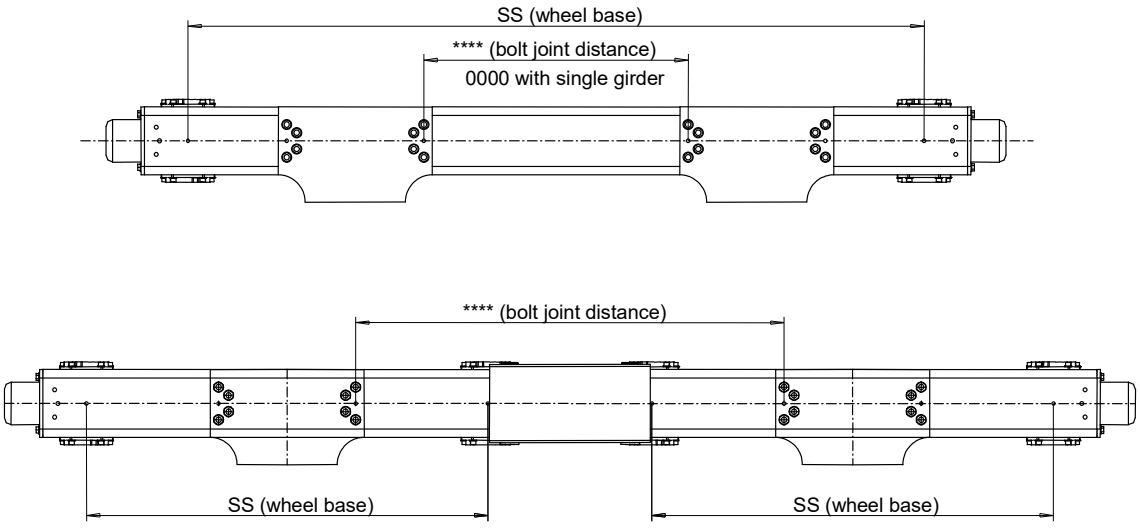
The joint plate length, JPL, is the measurement from the center of the alignment pin located at one end of the joint plate to the center of the other alignment pin located at the other end of the joint plate.

Dimension “A” indicates the distance between the joint plate and the end truck wheel. The distance is from the outermost alignment pin in the joint plate to the center of the wheel axle.

The minimum “A” dimension and the JPL are in the ***Key Joint Plate Dimensions*** found in this section.



12.2 Bolt Joint Distance



The bolt joint distance defines the distance between the joint plates on a double girder end truck. The bolt joint distance is from the innermost alignment pin on each of the joint plates.

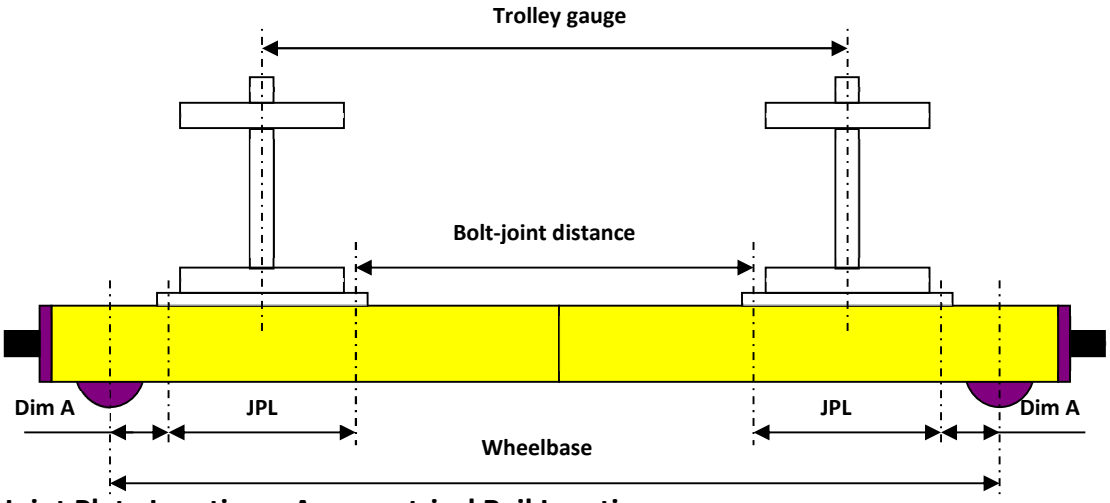
In addition, the bolt joint distance can define the location of the joint plate on a single girder end truck if the joint plate is located off-center for a special application. In this case, the bolt joint distance is the distance from the center of the drive wheel to the closest alignment pin in the joint plate.

The product code includes the bolt-joint distance (in millimeters).

12.3 Joint Plate Location – Symmetrical Rail Location

With symmetrical rail location, the distance between joint plates on the end truck depends primarily on the trolley gauge. The trolley gauge and the JPL determine the bolt-joint distance. The minimum "A" dimension and the JPL are in the ***Key Joint Plate Dimensions*** found in this section. The actual bolt-joint distance (in millimeters), wheelbase, and the joint plate type are part of the end-truck product code.

BOLT JOINT DISTANCE = TROLLEY GAUGE - JPL (of 1 plate)

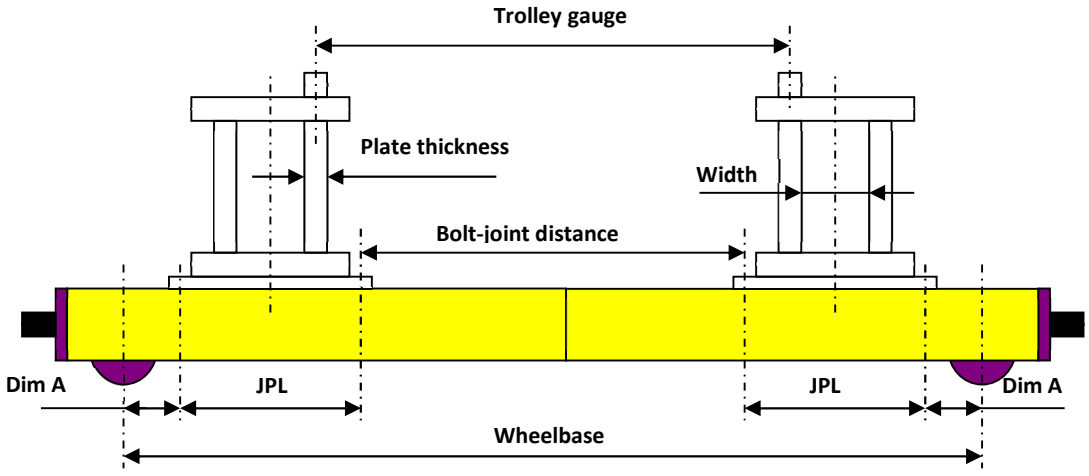


12.4 Joint Plate Location – Asymmetrical Rail Location

With asymmetrical rail location, the distance between joint plates on the end truck depends primarily on the trolley gauge and the width of the box girder. The bolt-joint distance is from the trolley gauge, joint plate length (JPL), and from the box girder, the width between the side plates, and the thickness of the side plates. The minimum "A" dimension and the JPL are in the ***Key Joint Plate Dimensions*** found in this section. The actual bolt-joint distance (in millimeters), wheelbase, and the joint plate type are part of the end-truck product code.

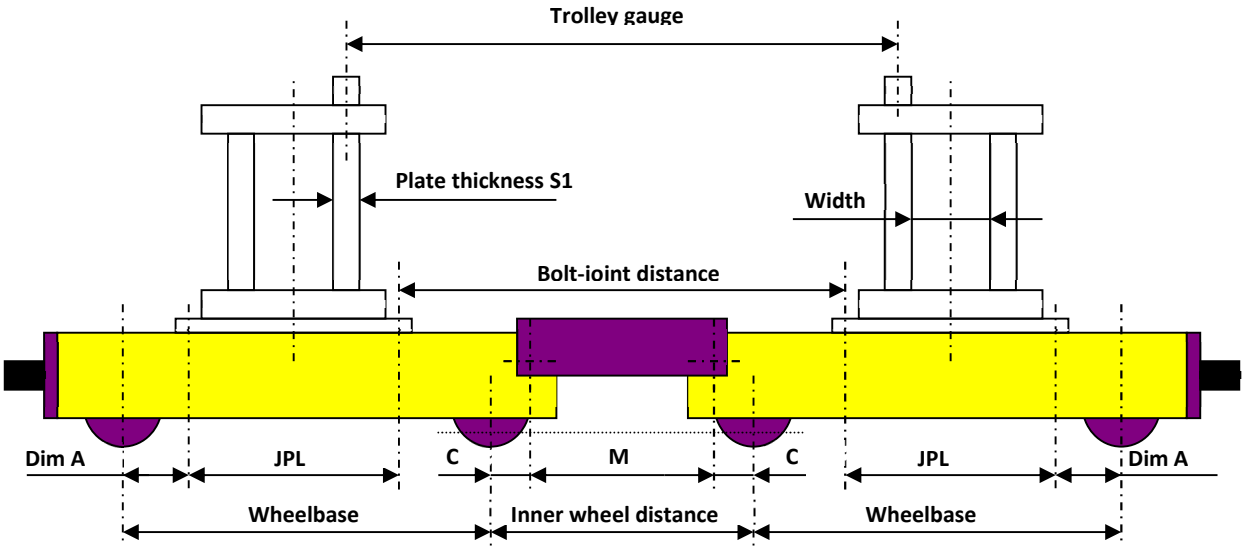
Note: For crane calculations with box girders, QuoteMaster® or Demag CraneExpert will always locate the joint plates on the end truck based on the asymmetrical rail location and the dimensions of the suggested box girder.

BOLT JOINT DISTANCE = TROLLEY GAUGE – JPL (of 1 plate) + (Width + Plate thickness)



12.5 Bogie End Trucks - Inner Wheel Distance

The inner wheel distance defines the distance between the bogie end trucks. The inner wheel distance is the measurement from the centers of the inner wheels. The actual inner wheel distance for bogie end trucks is determined case by case. The minimum inner wheel distance is the minimum clearance needed between the end trucks to remove the wheels. Dimension M is the distance between the two connection pins for the connector bar. Dimension C is the distance from the wheel center to the center of the pin. The minimum "A" dimension and the JPL are in the ***Key Joint Plate Dimensions*** found in this section. The actual bolt-joint distance (in millimeters), wheelbase, and the joint plate type are part of the end-truck product code.



End Truck	Minimum M		C		Min. Inner Wheel Distance	
	inch	mm	inch	mm	inch	mm
RTN20B, DFO20B	16.93	430	5.56	65	22.05	560
RTN25B, DFO25B	18.9	480	7.874	200	34.65	880
RTN32B, DFO32B	19.29	490	6.69	170	32.68	830
RTN40B, DFO40B	24.41	620	7.48	190	39.38	1000
RTN50B, DFO50B	33.86	860	10.63	270	55.12	1400

The end truck model code includes key dimensions for the end trucks and bogey connection.

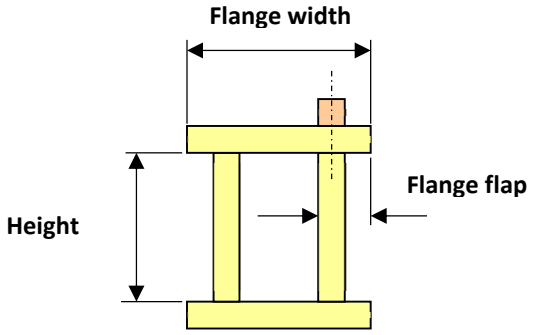
Model Description

RTN	40	B	16	75	-	S6	2108	C	1100	-	N
1	2	3	4	5	6	7	8	9	10	11	12

Pos.	Description		Pos.	Description
1	End truck type (RTN, DFO)		7	Joint plate size code
2	Wheel diameter code (code x 10 = WD, mm)		8	Bolt joint distance dimension, mm
3	Defines bogey or 2-wheel style		9	Bumper code
4	Wheel base code (code x 100 = WB, mm)		10	Inner wheel distance dimension, mm
5	Wheel groove dimension, mm		11	Color code
6	Number of drive wheels per truck or bogey truck		12	Special properties

12.6 Suggested Box Girder Dimensions

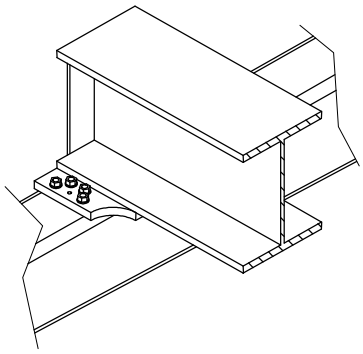
QuoteMaster® or Demag CraneExpert uses the *flange width* and the *height* of the box girder to describe box girder size. The height of the box girder is the distance between the top and bottom plates. The *flange flap* is the distance from the edge of the flange to the inside of the side plate. The flange flap dimension for a double girder crane is normally 2" [50 mm] for box girders suggested through QuoteMaster®.



13 Suggested Girder Connection Drawing

QuoteMaster® or Demag CraneExpert can generate a suggested girder connection drawing for the bridge girder. The information in the drawing will be specific to the joint type and the components configured in the calculation, and it will include dimensions for any plates needed to stiffen the connection and for the location of the holes for bolts and will include weld callouts for the girder and plates.

A suggested girder connection drawing would not be available for any special joint design.



Example of a girder connection (STD position) for the RTN or DFO end truck with a top joint plate.

14 Surface Treatment

The factory delivers the end trucks with primer paint: red epoxy RAL 3009, with a coat thickness of twenty (20) microns. Final painting is then conducted when painting the steel structure of the crane. Surface prep before primer painting is a shot blast to a near white metal (grade SA2 $^{1/2}$).

15 Gantry Crane End Trucks

End trucks for gantry cranes are from the RTN, DFO end truck series and come with joint plates, specifically designed for gantry cranes. The G-series joint plates are for the legs of a gantry crane. In a single-leg gantry crane, the upper end truck that rides on the runway uses a different joint plate specifically designed to support the bridge beam and the higher torsional loading.

15.1 Leg Plates for Gantry Legs

The size of the leg plate depends on the leg dimensions. Typically, the size of the legs are smaller for a hinged connection than a rigid connection. It is possible that each end truck for a full gantry crane could have different joint plate sizes for the different leg sizes. Each leg uses two plates where the top plate gets welded to the leg, and the bottom plate gets welded to the end truck. The leg plates bolt together.

	Leg Plate Code					
End truck	**G1**	**G2**	**G3**	**G4**	**G5**	**G6**
RTN16, DFO16	yes	no	yes	no	yes	no
RTN20, DFO16	yes	no	yes	no	yes	no
RTN25, DFO16	yes	no	yes	no	yes	no
RTN32, DFO32	no	yes	no	yes	no	yes
RTN40, DFO40	no	yes	no	yes	no	yes
RTN50, DFO50	no	yes	no	yes	no	yes

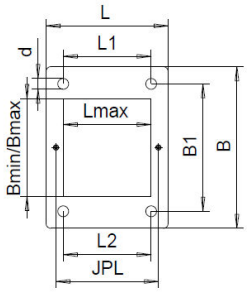
15.1.1 G-series Joint Plate Dimensions

Plate Code	L	L1	JPL	L2	B	B1	d	Bolt no.	S	Bmin	Bmax	Lmax
G1	9.84	7.09	8.27	7.09	13	10.24	22	4	1	5.91	7.87	7.09
G2	9.84	7.09	8.27	7.09	16.93	14.18	22	4	1	7.87	11.82	7.09
G3	16.93	14.18	15.35	3.54	13	10.24	22	10	1	5.91	7.87	14.18
G4	16.93	14.18	15.35	3.54	16.93	14.18	22	10	1	7.87	11.82	14.18
G5	26.77	23.62	25.2	3.94	14.18	11.02	26	14	1	5.91	7.87	23.62
G6	26.77	23.62	25.2	3.94	18.1	14.96	26	14	1	7.87	11.82	23.62

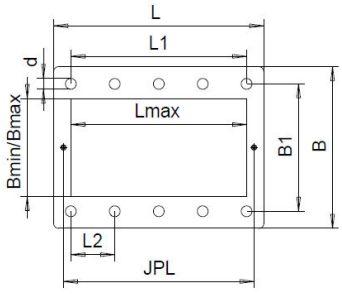
Dimensions are in inches. Use dimensions in millimeters for accuracy. S = plate thickness

Plate Code	L	L1	JPL	L2	B	B1	d	Bolt no.	S	Bmin	Bmax	Lmax
G1	250	180	210	180	330	260	22	4	25	150	200	180
G2	250	180	210	180	430	360	22	4	25	200	300	180
G3	430	360	390	90	330	260	22	10	25	150	200	360
G4	430	360	390	90	430	360	22	10	25	200	300	360
G5	680	600	640	100	360	280	26	14	25	150	200	600
G6	680	600	640	100	460	380	26	14	25	200	300	600

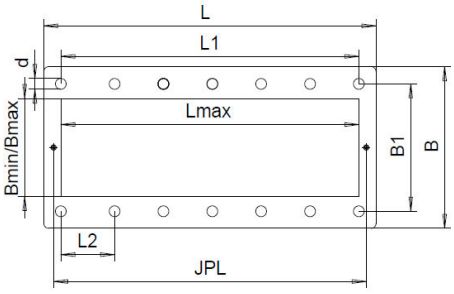
Dimensions are in millimeters. S = plate thickness



G1 & G2 PLATES

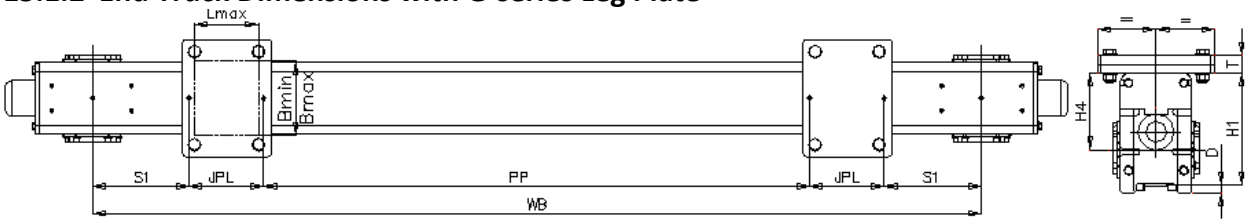


G3 & G4 PLATES



G5 & G6 PLATES

15.1.2 End Truck Dimensions with G-series Leg Plate



See G-series Joint Plate Dimensions for JPL, Bmin/Bmax, and Lmax dimensions. Joint plates in illustration are for two legs on end truck.
Dimension D is distance from the wheel tread to the bottom edge of the end plate. Dimension H4 is distance from center of wheel to frame.

			Max. PP if S1=225 mm							
End truck	**WB**	**Wheel Ø**	**G1**	**G3**	**G5**	**S1 min**	**H1**	**H4**	**D**	**T**
RTN16-16, DFO16-16	1600	160	730	----	----	225	265	185	18	50
RTN16-20, DFO16-20	2000	160	1130	770	----	225	265	185	18	50
RTN16-25, DFO16-25	2500	160	1630	1270	770	225	265	185	18	50
RTN16-32, DFO16-32	3150	160	2280	1920	1420	225	265	185	18	50
RTN16-40, DFO16-40	4000	160	3130	2770	2270	225	315	235	18	50
RTN16-45, DFO16-45	4500	160	3630	3270	2770	225	315	235	18	50

			Max. PP if S1=260 mm							
End truck	**WB**	**Wheel Ø**	**G1**	**G3**	**G5**	**S1 min**	**H1**	**H4**	**D**	**T**
RTN20-25, DFO20-25	2500	200	1560	1200	700	260	315	215	20	50
RTN20-32, DFO20-32	3150	200	2210	1850	1350	260	315	215	20	50
RTN20-40, DFO20-40	4000	200	3060	2700	2200	260	315	215	20	50
RTN20-45, DFO20-45	4500	200	3560	3200	2700	260	315	215	20	50

			Max. PP if S1=260 mm							
End truck	**WB**	**Wheel Ø**	**G1**	**G3**	**G5**	**S1 min**	**H1**	**H4**	**D**	**T**
RTN25-25, DFO25-25	2500	250	1560	1200	700	260	315	190	20	50
RTN25-32, DFO25-32	3150	250	2210	1850	1350	260	315	190	20	50
RTN25-40, DFO25-40	4000	250	3060	2700	2200	260	415	290	20	50
RTN25-45, DFO25-45	4500	250	3560	3200	2700	260	415	290	20	50

			Max. PP if S1=260 mm							
End truck	**WB**	**Wheel Ø**	**G2**	**G4**	**G6**	**S1 min**	**H1**	**H4**	**D**	**T**
RTN32-25, DFO32-25	2500	315	1560	1200	700	260	370	212.5	20	50
RTN32-32, DFO32-32	3150	315	2210	1850	1350	260	370	212.5	20	50
RTN32-40, DFO32-40	4000	315	3060	2700	2200	260	470	312.5	20	50
RTN32-45, DFO32-45	4500	315	3560	3200	2700	260	470	312.5	20	50
RTN32-50, DFO32-50	5000	315	4060	3700	3200	260	545	387.5	20	50
RTN32-55, DFO32-55	5500	315	4560	4200	3700	260	545	387.5	20	50

			Max. PP if S1=260 mm							
End truck (1)	**WB**	**Wheel Ø**	**G2**	**G4**	**G6**	**S1 min**	**H1(1)**	**H4(1)**	**D**	**T**
RTN40-25, DFO40-25	2500	400	1560	1200	700	260	548	348	20	50
RTN40-32, DFO40-32	3150	400	2210	1850	1350	260	548	348	20	50
RTN40-40, DFO40-40	4000	400	3060	2700	2200	260	552	352	20	50
RTN40G-45, DFO40G-45	4500	400	3560	3200	2700	260	552	352	20	50
RTN40G-50, DFO40G-50	5000	400	4060	3700	3200	260	552	352	20	50
RTN40G-55, DFO40G-55	5500	400	4560	4200	3700	260	552	352	20	50

Dimensions are in millimeters.
(1) In order to fit the gantry style gear, the three RTN40G, DFO40G models have a special, lower frame profile than the standard RTN40, DFO40 end truck.

15.2 Joint Plates for Gantry Girder (Semi-gantry)

These joint plates are for the bridge girder that mounts directly to the end truck that rides on the elevated runway for a semi-gantry crane.

	Joint Plate Code								
End truck	**D6**	**E5**	**E6**	**M5**	**M7**	**M9**	**N5**	**N7**	**N9**
RTN16, DFO16	yes	no	no	no	no	no	no	no	no
RTN20, DFO20	no	yes	yes	no	no	no	no	no	no
RTN25, DFO25	no	no	no	yes	yes	yes	no	no	no
RTN32, DFO32	no	no	no	no	no	no	yes	yes	yes
RTN40, DFO40	no	no	no	no	no	no	yes	yes	yes

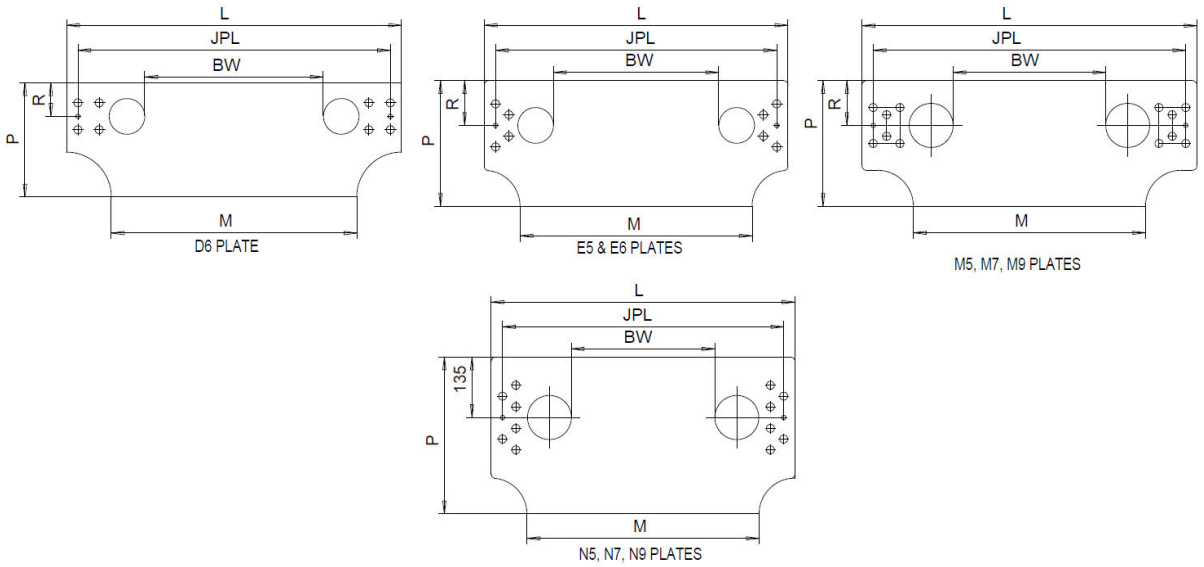
15.2.1 Girder Joint Plate Dimensions

Plate	L	JPL	BW	P	R	M	S	B min	B max
D6	29.53	27.56	15.75	10.04	2.95	21.65	25/32		14.56
E5	26.77	24.8	14.57	11	3.94	21.65	25/32		13.38
E6	31.1	29.13	18.9	11	3.94	24.8	25/32	13.38	17.72
M5	29.53	14.96	13.39	11	3.94	21.65	1		12.2
M7	38.19	36.22	22.05	11	3.94	29.13	1	12.2	20.87
M9	48.03	46.06	31.89	11	3.94	46.06	1	20.87	30.71
N5	26.77	24.8	12.6	13.78	5.31	21.65	1		11.42
N7	35.43	33.46	21.26	13.78	5.31	29.13	1	11.42	20.08
N9	45.28	43.31	31.1	13.78	5.31	38.98	1	20.08	29.92

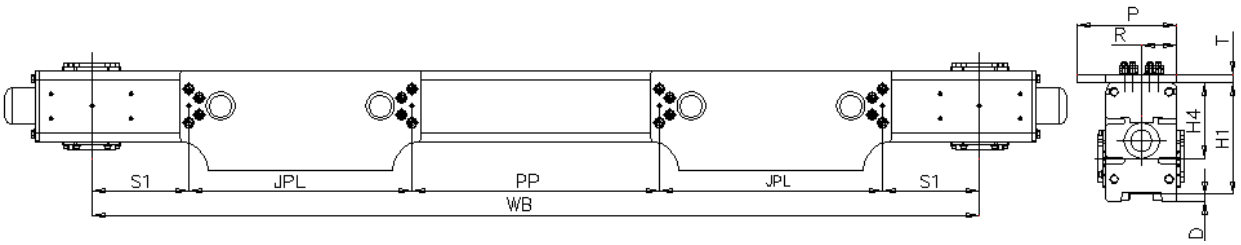
Dimensions are in inches. Use dimensions in millimeters for accuracy. S = plate thickness, B = flange width of girder

Plate	L	JPL	BW	P	R	M	S	B min	B max
D6	750	700	400	255	75	550	20		370
E5	680	630	370	280	100	520	20		340
E6	790	740	480	280	100	630	20	340	450
M5	750	380	340	280	100	520	25		310
M7	970	920	560	280	100	740	25	310	530
M9	1220	1170	810	280	100	1170	25	530	780
N5	680	630	320	350	135	520	25		290
N7	900	850	540	350	135	740	25	290	510
N9	1150	1100	790	350	135	990	25	510	760

Dimensions are in millimeters. S = plate thickness, B = flange width of girder



15.2.2 End Truck Dimensions with a Girder Joint Plate



Joint plates shown for double girder (DG) semi-gantry crane. See Girder Joint Plate Dimensions for JPL, P, and R dimensions. Dimension D is distance from the wheel tread to the bottom edge of the end plate. Dimension H4 is distance from center of wheel to frame.

			Max. PP if S1=225 mm							
End truck	**WB**	**Wheel Ø**	**D6**			**S1 min**	**H1**	**H4**	**D**	**T**
RTN16-16, DFO16-16	1600	160	---			225	265	185	18	20
RTN16-20, DFO16-20	2000	160	---			225	265	185	18	20
RTN16-25, DFO16-25	2500	160	650			225	265	185	18	20
RTN16-32, DFO16-32 (DG)	3150	160	1300			225	265	185	18	20
RTN16-32, DFO16-32 (SG)	3150	160	---			---	315	235	18	20
RTN16-40, DFO16-40	4000	160	2150			225	315	235	18	20
RTN16-45, DFO16-45	4500	160	2650			225	315	235	18	20

			Max. PP if S1=260 mm						
End truck	**WB**	**Wheel Ø**	**E5**	**E6**		**S1 min**	**H1**	**H4**	**D**	**T**
RTN20-25, DFO20-25	2500	200	720	500		260	315	215	20	20
RTN20-32, DFO20-32	3150	200	1370	1150		260	315	215	20	20
RTN20-40, DFO20-40	4000	200	2220	2000		260	315	215	20	20
RTN20-45, DFO20-45	4500	200	2720	2500		260	315	215	20	20

			Max. PP if S1=260 mm							
End truck	**WB**	**Wheel Ø**	**M5**	**M7**	**M9**	**S1 min**	**H1**	**H4**	**D**	**T**
RTN25-25	2500	250	1220	860	---	260	315	190	20	25
RTN25-32, DFO25-32 (DG)	3150	250	1870	1510	1010	260	315	190	20	25
RTN25-32, DFO25-32 (SG)	3150	250	---	---	---	---	415	290	20	25
RTN25-40, DFO25-40	4000	250	2720	2360	1860	260	415	290	20	25
RTN25-45, DFO25-45	4500	250	3220	2360	2360	260	415	290	20	25

			Max. PP if S1=260 mm							
End truck	**WB**	**Wheel Ø**	**N5**	**N7**	**N9**	**S1 min**	**H1**	**H4**	**D**	**T**
RTN32-25, DFO32-25	2500	315	720	---	---	260	370	212.5	20	25
RTN32-32, DFO32-32	3150	315	1370	930	---	260	370	212.5	20	25
RTN32-40, DFO32-40	4000	315	2220	1780	1280	260	470	312.5	20	25
RTN32-45, DFO32-45	4500	315	2720	2280	1780	260	470	312.5	20	25
RTN32-50, DFO32-50	5000	315	3220	2780	2280	260	545	387.5	20	25
RTN32-55, DFO32-55	5500	315	3720	3280	2780	260	545	387.5	20	25

			Max. PP if S1=260 mm							
End truck (1)	**WB**	**Wheel Ø**	**N5**	**N7**	**N9**	**S1 min**	**H1(1)**	**H4**	**D**	**T**
RTN40-25, DFO40-25	2500	400	---	---	---	260	548	348	20	25
RTN40-32, DFO40-32	3150	400	1370	930	---	260	548	348	20	25
RTN40-40, DFO40-40	4000	400	2220	1780	1280	260	552	352	20	25
RTN40-45, DFO40-45	4500	400	2720	2280	1780	260	668	468	20	25
RTN40-50, DFO40-50	5000	400	3220	2780	2280	260	672	472	20	25
RTN40-55, DFO40-55	5500	400	3720	3280	2780	260	672	472	20	25

Dimensions are in millimeters.

(1) Special low profile RTN40, DFO40 end truck is not available with the N-series plates. Dimensions H1 & H4 listed is for the standard end truck.

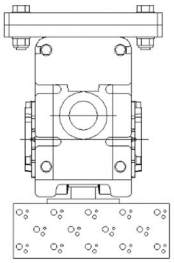
15.3 Gantry Floor Rail Design

End truck	Wheel Ø	Flange Ø	Truck clearance TC	Wheel width W	Plate width TW
RTN16, DFO16	160	190	15	110	162
RTN20, DFO20	200	230	15	127	200
RTN25, DFO25	250	280	15	115	250
RTN32, DFO32	315	350	20	130	250
RTN40, DFO40	400	435	26	161	320

Dimensions are in millimeters.

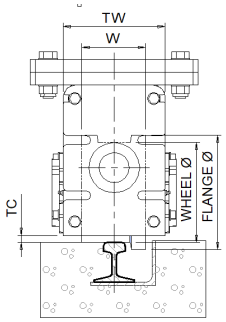
Truck clearance TC: distance between the top of rail and the bottom of the end truck frame at no load
Wheel width W: width of the wheel, as measured near the tread
Plate width TW: width of the end truck / end plate

15.3.1 Above the Floor Rail



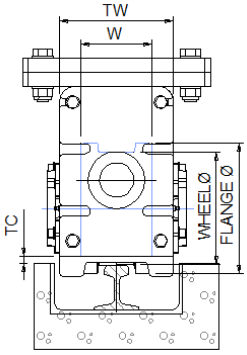
No alterations to the end truck wheel or end plates when using an above the floor rail for the gantry crane. Mounting hardware to fasten the rail must clear wheel flanges and end plates.

15.3.2 Single Channel Rail



Using a single channel rail embedded in the concrete floor requires a single-flanged wheel and end plates trimmed up to the bottom of the end truck frame.

15.3.3 Double Channel Floor Rail



Width of the channel opening can be the total width of the end truck (TW) or the width of the wheel (W). If the channel opening is to the width of the wheel, end plates must be trimmed up to the bottom of the end truck.

To avoid any potential inference with the end truck or bridge drives, the top of the rail must be firmly level with or even slightly above the building floor.

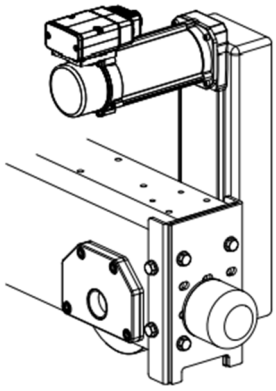
15.3.4 No Rail on Floor – Cambered Tread Wheel or Polyurethane Wheel

The end truck that would ride on the floor without rail or plate requires polyurethane tread wheels. See Polyurethane Flat Wheels section for specifications, wheel loadings, and wheel widths. The end truck that would ride on the floor without rail but on a flat plate requires a flangeless, cambered tread (steel) wheel. The radius of the camber is 600 mm. A polyurethane wheel or a flangeless cambered tread wheel arrangement is for a semi-gantry crane only.

NOTE: Without a guiding rail, the connection of the legs to the bridge girder must be a rigid design, never use a hinged connection.

15.4 Gantry Gears

As an option a gantry style gear is available to add to the floor-level RTN end truck of a semi-gantry or full gantry crane. The gantry gear locates the motor over the end truck for better space savings.



15.4.1 Gantry Gear and End Truck Compatibility

End truck	Wheelbase	H4	Gear & Motor Types			
			GES4G & MF06	GES4G & MF07 (2)	GES5G & MF06	GES5G & MF07
RTN16-16, DFO16-16	1600		Ok	OK	Not available	Not available
RTN16-20, DFO16-20	2000		OK	OK	Not available	Not available
RTN16-25, DFO16-25	2500		OK	OK	Not available	Not available
RTN16-32, DFO16-32	3150		OK	OK	Not available	Not available
RTN16-40, DFO16-40	4000		OK	OK	Not available	Not available
RTN16-45, DFO16-45	4500		OK	OK	Not available	Not available
RTN20-25, DFO20-25	2500		OK	OK	Not available	Not available
RTN20-32, DFO20-32	3150		OK	OK	Not available	Not available
RTN20-40, DFO20-40	4000		OK	OK	Not available	Not available
RTN20-45, DFO20-45	4500		OK	OK	Not available	Not available
RTN25-25, DFO25-25	2500		OK	OK	OK	OK
RTN25-32, DFO25-32	3150		OK	OK	OK	OK
RTN25-40, DFO25-40	4000		OK	OK	OK	OK
RTN25-45, DFO25-45	4500		OK	OK	OK	OK
RTN32-25, DFO32-25	2500		OK	OK	OK	OK
RTN32-32, DFO32-32	3150		OK	OK	OK	OK
RTN32-40, DFO32-40	4000		OK	No (3)	OK	OK
RTN32-45, DFO32-45	4500		OK	No (3)	OK	OK
RTN32-50, DFO32-50	5000		No (3)	No (3)	OK	OK
RTN32-55, DFO32-55	5500		No (3)	No (3)	OK	OK
RTN40-25, DFO40-25	2500		Not available	Not available	OK	OK
RTN40-32, DFO40-32	3150		Not available	Not available	OK	OK
RTN40-40, DFO40-40	4000		Not available	Not available	OK	OK
RTN40G-45, DFO40G-45	4500	352	Not available	Not available	OK (1)	OK (1)
RTN40G-50, DFO40G-50	5000	352	Not available	Not available	OK (1)	OK (1)
RTN32G-55, DFO40G-55	5500	352	Not available	Not available	OK (1)	OK (1)

Dimensions are in millimeters.

(1) In order to fit the gantry style gear, the three **RTN40G, DFO40G** models have a special, lower frame profile than standard RTN40, DFO40 end truck. Dimension H4 is the distance from the center of the wheel to the top of the low-profile end truck frame.

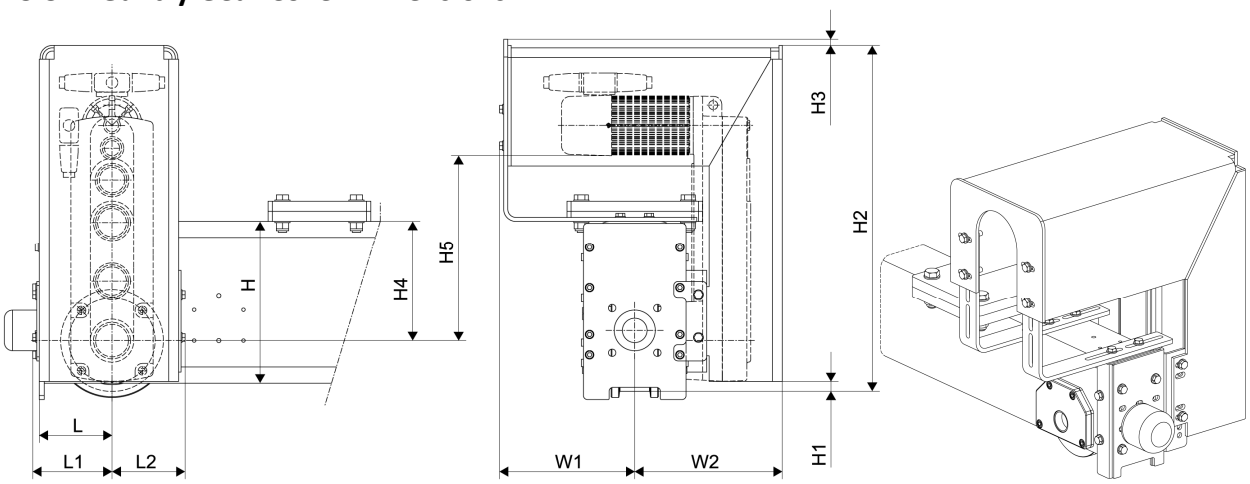
(2) Only GES474G and GES463G gear ratios are available for GES4G gantry gear with a two-speed, MF07 motor.

(3) Restricted due to height limitations. Ok to use standard GES4 traveling gear but not a GES4G gantry style gear.

15.5 Gantry Gear Cover

A cover can is available to protect the gantry gear. Gantry gear is an optional feature for floor-level end trucks.

15.5.1 Gantry Gear Cover Dimensions



Gear Size: GES4G

End truck	H	H1	H2	H3	H4	H5 (1)	H5 (2)	L	L1	L2	W1	W2
RTN16, DFO16	250	10	670	-	185	336	320	162	180	185	310	320
RTN16, DFO16	300	10	670	-	235	336	320	162	180	185	310	320
RTN20, DFO20	300	25	680	-	215	336	320	160	170	195	290	340
RTN25, DFO25	300	50	705	-	190	336	320	177	193	178	270	360
RTN25, DFO25	400	50	705	15	290	336	320	177	193	178	270	360
RTN32, DFO32	350	80	735	-	212.5	336	320	250	185	185	270	360

Gear Size: GES5G

End truck	H	H1	H2	H3	H4	H5 (1)	H5 (2)	L	L1	L2	W1	W2
RTN25, DFO25	300	25	855	-	190	473	457	177	193	178	330	360
RTN25, DFO25	400	25	855	-	190	473	457	177	193	178	330	360
RTN32, DFO32	350	55	885	-	212.5	473	457	250	185	185	330	360
RTN32, DFO32	450	55	885	-	312.5	473	457	250	185	185	330	360
RTN32, DFO32	525	55	885	-	387.5	473	457	250	185	185	330	360
RTN40, DFO40	522	100	930	-	348	473	457	280	185	185	340	350
RTN40G, DFO40G (3)	530	100	930	-	352	473	457	280	185	185	340	350

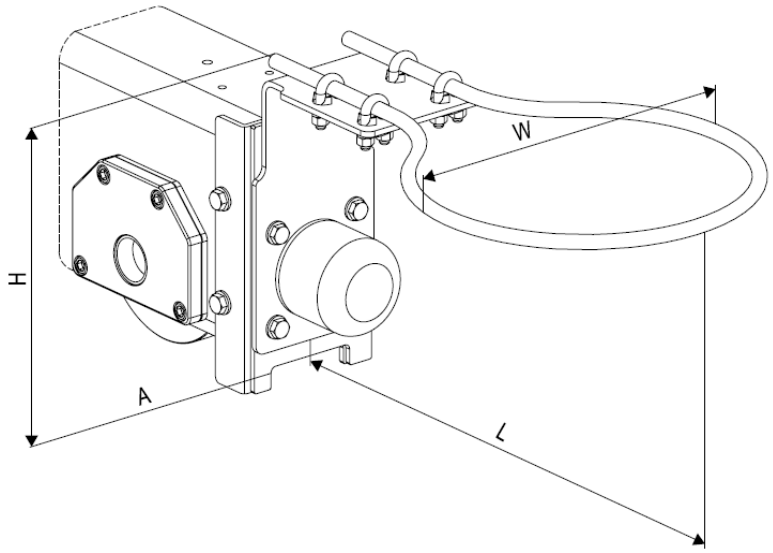
All dimensions are in millimeters.

(1) for MF06 motor
(2) for MF07 motor
(3) In order to fit the gantry style gear, **RTN40G, DFO40G** model with a wheelbase over 4 meters has a special, lower frame profile than the standard RTN40, DFO40 end truck, and dimensions H and H4 listed is for the special, low-profile frame.

15.6 Safety Wire

15.6.1 Mechanical Safety Wire

Safety wire that mounts to the ends of the end truck is to protect people from potentially dangerous contact with a gantry crane. The mechanical safety wire does not use any electrical switches.



A = Top of rail

End Truck	L	W	H	Weight
RTN16, DFO16	610	360	345	4.1
RTN20, DFO20	620	360	395	4.4
RTN25, DFO25	620	360	395	4.4
RTN32, DFO32	620	360	395	4.4
RTN40, DFO40	620	360	395	4.4
RTN50, DFO50	620	360	395	4.4