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RTN, RTL & RSN End Trucks
WB-R Wheel Blocks
Technical Guide
January 2012

RTN, RTL & RSN Top Running End Trucks



WB-R Wheel Blocks Technical Guide



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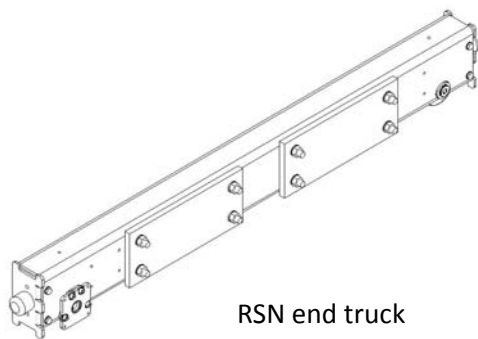


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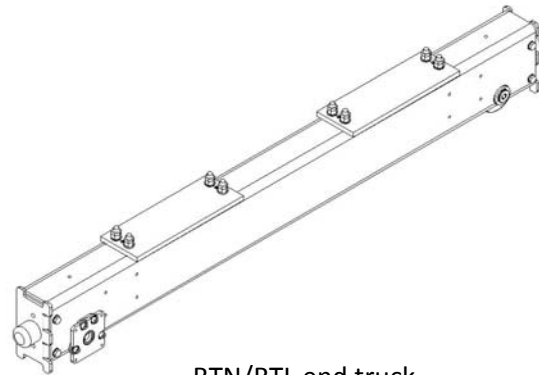
1 General

RSN and RTN are a new generation of top running end trucks, replacing the RS and RT end trucks. RTL is a light-duty truck.

The RSN and RTN end truck are similar in design except the location of the joint plate and the way the beam connects to the joint plate. The joint plate on the RSN end trucks mounts to the side of the end truck frame for a simple side joint. The joint plate on the RTN 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 end trucks. The RTL end truck with its smaller and lighter frame is similar to the RTN end truck and is equipped with a top joint plate.

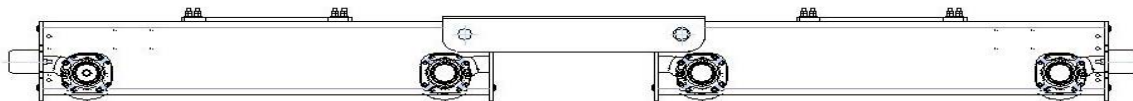


RSN end truck



RTN/RTL end truck

Some of the RTN end truck models (RTN20B, RTN25B, RTN32B, & RTN40B) can be used for a bogie configuration of which consists of two independent end trucks that are tied together with a connector bar. The connector bar fastens to each end truck through a pin connection that allows for a non-rigid joint in the vertical direction.



2 Selection Criteria

The maximum allowable wheel loads for the end trucks are determined by these criteria:

- 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, the following checks should be made:

- Wheel loading not to exceed allowed value
- Structure loading not to exceed allowed loading value
- Bridge girder connection

3 End Truck Drawings

End truck outline drawings in PDF are available on R&M's website (www.rmhoist.com) to download or to view.



4 Frame

The frames of the RSN, RTL, and RTN09 - RTN25 end trucks are made from rectangular structural steel tubing. The frame of the RTN32 and RTN40 end trucks is fabricated from plates and welded into a box construction, which include diaphragms for additional stiffness.

Each end of the end truck is equipped with end plates, which work as a guard and to prevent the end truck from dropping more than one inch [25 mm] in case of axle failure. The end plates project below the top of the rail.

5 Wheels & Axles

The RTN end trucks come in several different wheel diameters - 90, 110, 140, 160, 200, 250, 315, or 400 mm. The RSN end trucks have four different wheel diameters - 90, 110, 140, or 160 mm. The RTL end truck has just one wheel diameter - 90 mm.

The design of the standard wheel is double flanged and flat tread. The actual 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 listed 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-JS1070 (ductile iron) and the hardness is approximately 280 BHN.

The end truck is equipped with one drive wheel and one idler wheel as standard. The drive wheel receives the output shaft of the GES drive. A second GES drive can be added to most end trucks as an option. The idler wheel would be replaced with a drive wheel. For bogie end trucks a second GES drive normally mounts to the mating end truck. The RTN40 end truck has an option for a QM6 drive. The QM6 drive has a hollow bore and mounts to the output shaft on the wheel of the RTN40 end truck.

Axles and Bearings

End Truck	Drive wheel axle	Idler wheel axle	Wheel Bearing type
RTL09 / RTN09 / RSN09	Stationary	Stationary	Sealed
RTN11 / RSN11	Stationary	Stationary	Sealed
RTN14 / RSN14	Stationary	Stationary	Sealed
RTN16 / RSN16	Stationary	Stationary	Sealed
RTN20	Rotating	Rotating	Shielded – See Lubrication
RTN25	Rotating	Rotating	Shielded – See Lubrication
RTN32	Rotating	Rotating	Shielded – See Lubrication
RTN40	Rotating	Rotating	Shielded – See Lubrication

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

If the end truck is operated for long periods in extremely cold conditions where the ambient temperature is below 14 °F [-10 °C] or in extremely hot conditions where the ambient temperature is above 131 °F [55 °C], it is recommended to replace the normal lubricant with a synthetic lubricant.



6 Specifications

6.1 RTN and RTL End Trucks

Wheelbase range	<u>2-wheel</u>	<u>Wheelbase, mm</u>	<u>Bogie</u>	<u>Wheelbase, mm</u>
	RTL09	1250, 1600, 2000	RTN20B	1200, 1400, 1600, 1800, 2000
	RTN09	1250, 1600, 2000, 2500	RTN25B	1200, 1400, 1600, 1800, 2000, 2200, 2500
	RTN11	1600, 2000, 2500, 3150		
	RTN14	1600, 2000, 2500, 3150, 3500, 4000	RTN32B	1400, 1600, 1800, 2000
	RTN16	1600, 2000, 2500, 3150, 4000, 4500	RTN40B	1400, 1600, 1800, 2000, 2500
	RTN20	1600, 2000, 2500, 3150, 4000, 4500		
	RTN25	2000, 2500, 3150, 4000, 4500		
	RTN32	2500, 3150, 4000, 4500, 5000, 5500		
	RTN40	2500, 3150, 4000, 4500, 5000, 5500		
	Wheel diameter	<u>2-wheel</u>	<u>Wheel diameter</u>	<u>Bogie</u>
RTN/RTL09		90 mm	RTN20B	200 mm
RTN11		110 mm	RTN25B	250 mm
RTN14		140 mm	RTN32B	315 mm
RTN16		160 mm	RNT40B	400 mm
RTN20		200 mm		
RTN25		250 mm		
RTN32		315 mm		
RTN40		400 mm		
Groove width	<u>Model</u>	<u>Groove width range</u>	<u>Wheel groove widths - metric</u>	<u>Min. wheel groove - metric</u>
	RTN/RTL09	2" – 2 3/4"	50, 55, 60, 65, 70 mm	Rail head width + 10 mm
	RTN11	2 1/16" – 3 7/16"	52, 57, 62, 67, 72, 77, 84, 87 mm	Rail head width + 12 mm
	RTN14	2 1/8" – 3 5/16"	54, 59, 64, 69, 74, 79, 84 mm	Rail head width + 14 mm
	RTN16	2 1/8" – 3 5/16"	54, 59, 64, 69, 74, 79, 84 mm	Rail head width + 14 mm
	RTN20	2 1/8" – 3 3/4"	54, 59, 64, 69, 74, 79, 84, 89, 94 mm	Rail head width + 14 mm
	RTN25	2 1/8" – 3 1/2"	54, 59, 64, 69, 74, 79, 84, 89 mm	Rail head width + 14 mm
	RTN32	2 1/8" – 3 3/4"	54, 59, 64, 69, 74, 79, 84, 89, 94 mm	Rail head width + 14 mm
	RTN40	2 3/16" – 4 3/4"	55, 60, 65, 70, 75, 80, 85, 90, 95, 100, 105 mm	Rail head width + 15 mm
	Flangeless wheels and guide rollers are used for wider rails.			
Rail	ASCE			
	Flat Bar			
Truck frame construction	<u>Rectangular structural tubing</u>		<u>Welded box frame</u>	
	RTL09, RTN09, RTN11, RTN14, RTN16, RTN20, RTN25		RTN32, RTN40	
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)			
	GES gear & QM6 gear with inverter-duty motor for RTN40 end truck only			
	One wheel per end truck is driven as standard. Nominal VFD speeds: 65, 80, 100, 130 fpm [20, 25, 32, 40 m/min]			
Joint type	Joint plate is bolted to end truck; bridge girder is welded 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 end trucks			
Bumpers	Bumpers are standard and sized according to the load			
Options	Anti-jump catch device		Rail cleaning device	
	Bumper extension		Second drive wheel	
	Guide rollers (bolt on)			
Surface treatment	Primer only (RAL 7038 gray for frame)			



6.2 RSN End Trucks

Wheelbase range	<u>Model</u>	<u>Wheelbase, mm</u>		
	RSN09	1250, 1600, 2000, 2500		
	RSN11	1600, 2000, 2500, 3150		
	RSN14	1600, 2000, 2500, 3150, 3500, 4000		
	RSN16	1600, 2000, 2500, 3150, 4000, 4500		
Wheel diameter	<u>Model</u>	<u>Wheel diameter</u>		
	RSN09	90 mm		
	RSN11	110 mm		
	RSN14	140 mm		
	RSN16	160 mm		
Groove width	<u>Model</u>	<u>Groove width range</u>	<u>Wheel groove widths - metric</u>	<u>Min. wheel groove - metric</u>
	RSN09	2" – 2 3/4"	50, 55, 60, 65, 70 mm	Rail head width + 10 mm
	RSN11	2 1/16" – 3 7/16"	52, 57, 62, 67, 72, 87 mm	Rail head width + 12 mm
	RSN14	2 1/8" – 3 5/16"	54, 59, 64, 69, 74, 79, 84 mm	Rail head width + 14 mm
	RSN16	2 1/8" – 3 5/16"	54, 59, 64, 69, 74, 79, 84 mm	Rail head width + 14 mm
Flangeless wheels and guide rollers are used for wider rails.				
Rail	ASCE			
	Flat Bar			
Truck frame construction	Rectangular structural tubing		<u>Welded box frame</u>	
	RSN09, RSN11, RSN14, RSN16		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 wheel per end truck is driven as standard.			
	Nominal VFD speeds: 65, 80, 100, 130 fpm [20, 25, 32, 40 m/min]			
Joint type	Joint plate is bolted to end truck; bridge girder is welded to joint plate.			
	Single girder or double girder configurations			
	Uses EBN side joint plate See Possible Girder Connections for RSN end trucks			
Bumpers	Bumpers are standard and sized according to the load			
Options	Anti-jump catch device		Rail cleaning device	
	Bumper extension		Second drive wheel	
	Guide rollers (bolt on)			
Surface treatment	Primer only (RAL 7038 gray for frame)			



7 Possible Girder Connections

7.1 RTN and RTL End Trucks

The RTN and RTL end trucks are equipped a top joint plate as standard. The RTN20, RTN25, RTN32, and RTN40 end trucks have a side joint plate option. The joint plate bolts to the end truck.

7.1.1 Top Joint

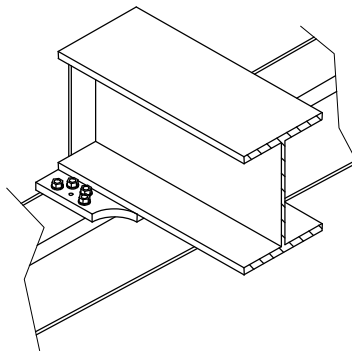
The top joint accepts a profile girder (commercial beam) or box girder that can be mounted in the STD or MED girder position. The connection between the girder and the joint plate is welded. R&M does not provide the additional plates that may be needed to reinforce the connection.

Joint plates for gantry cranes are not covered in this technical guide. For gantry cranes, contact R&M.

Girder Position	Joint Illustration		RTN/L09	RTN11/14	RTN16	RTN20	RTN25	RTN32	RTN40										
			Joint Plate Types (A3, A4, A6...)																
			Pr	Bo	Pr	Bo	Pr	Bo	Pr	Bo	Pr	Bo	Pr	Bo	Pr	Bo	Bo	Bo	
STD			A3	A3	A4	A4	B4	B4	L3	L3	H4	H4	K4	K4	K4	K4	J1	J6	
					A6	A6	B6	B6	L4	L4	H5	H5	K5	K5	K5	K5	J2	J7	
									L5	L5	H7	H7	K7	K7	K7	K7	J3	J8	
											L6		H9		K9		K9	J4	J9
																	K9	J5	J0
MED			A3	A3	A4	A4	B4	B4	L3	L3	H4	H4	K4	K4	K4	K4	J1	J6	
					A6	A6	B6	B6	L4	L4	H5	H5	K5	K5	K5	K5	J2	J7	
									L5	L5	H7	H7	K7	K7	K7	K7	J3	J8	
											L6		H9		K9		K9	J4	J9
																	K9	J5	J0

Suggested Connection Drawing

A drawing for the suggested connection between the end truck and bridge beam can be obtained by running the crane calculation through QuoteMaster®. The suggested connection will be specific to that calculation.



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



7.1.2 Side Joint

The side joint accepts a profile (commercial beam) or box girder that can be mounted in the STD, MED or LOW girder position as illustrated below. The connection between the girder and the joint plate is welded. R&M does not provide the additional plates that may be needed to reinforce the connection.

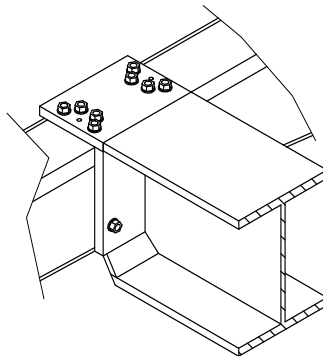
The side joint usually is specified for when better overhead crane clearance is needed.

Girder Position	Joint Illustration		RTN20	RTN25	RTN32	RTN40	Side Joint Plate Types (R3, R4, R5, F4, F5, F6, F7, Q...)			
			Profile	Box	Profile	Box	Profile	Box	Profile	Box
	Std. method	Alt. method								
STD			R3	R3	F4	F4	Q4	Q4	N.A.	S6
			R3r	R4	F5	F5	Q5	Q5		S7
			R4r	R5	F7	F7		Q6		S9
			R5r	R6	F8	F8		Q7		
								Q8		
						Q9				
						Q0				
MED			R3	R3	F4	F4	Q4	Q4	N.A.	N.A.
			R3r	R4	F5	F5	Q5	Q5		
			R4r	R5	F7	F7		Q6		
			R5r	R6	F8	F8		Q7		
								Q8		
						Q9				
						Q0				
LOW			R3	R3	F4	F4	Q4	Q4	N.A.	S6
			R3r	R4	F5	F5	Q5	Q5		S7
			R4r	R5	F7	F7		Q6		S9
			R5r	R6	F8	F8		Q7		
								Q8		
						Q9				
						Q0				

N.A. = Not available

Suggested Connection Drawing

A drawing for the suggested connection between the end truck and bridge beam can be obtained by running the crane calculation through QuoteMaster®. The suggested connection will be specific to that calculation.



Example of a girder connection (low position) for the RTN end truck with a side joint plate



7.2 RSN End Trucks

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

7.2.1 Side Joint

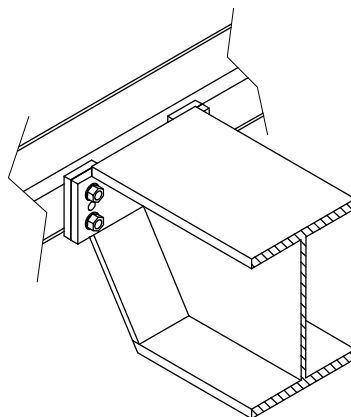
The side joint accepts a profile girder (commercial beam) or a box girder that can be mounted in the STD, MED or LOW girder position as illustrated below. The connection between the girder and the joint plate is welded. R&M does not provide the additional plates that may be needed to reinforce the connection.

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

Girder Position	Joint Illustration		Side Joint Plate Types							
			RSN09		RSN11		RSN14		RSN16	
	Standard method	Cut Corner method	Profile	Box	Profile	Box	Profile	Box	Profile	Box
STD			Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
MED			Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
LOW			Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Suggested Connection Drawing

A drawing for the suggested connection between the end truck and bridge beam can be obtained by running the crane calculation through QuoteMaster®. The suggested connection will be specific to that calculation.



Example of a girder connection (low position) for the RSN end truck with an EBN joint plate



8 Joint Plate Code Description - RTN and RTL End Trucks

The joint plate code is generated through QuoteMaster[®] 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 are bolted to the end plates on each end of the truck and are available in rubber or polyurethane.

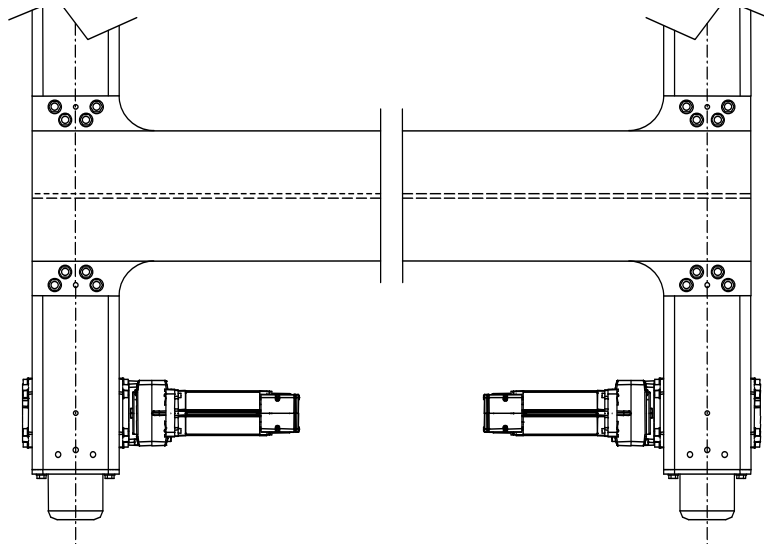
The bumper is sized and selected for each crane package through QuoteMaster[®]. Bumper and end truck compatibility must be verified if a different bumper size is needed. The bumper code is included in the end truck code.

CODE	Dia./mm	Length/mm	Material	End Truck
A	63	53	Rubber	RTN/RSN09, RTL09, RTN/RSN11, RTN/RSN14
B	80	68	Rubber	All RTN, RSN, RTL models
C	100	85	Rubber	RTN/RSN09, RTL09, RTN/RSN11, RTN/RSN14, RTN20-40
D	125	105	Rubber	RTN/RSN14, RTN/RSN16, RTN20, RTN25, RTN32, RTN40
E	100	150	Polyurethane	All RTN, RSN, RTL models
F	125	190	Polyurethane	RTN/RSN14, RTN/RSN16, RTN20, RTN25, RTN32, RTN40
G	100	100	Polyurethane	RTN/RSN09, RTL09, RTN/RSN11, RTN/RSN14, RTN/RSN16, RTN20
H	160	160	Polyurethane	RTN/RSN16, RTN20, RTN25, RTN32, RTN40
I	200	200	Polyurethane	RTN20, RTN25, RTN32, RTN40
K	80	80	Polyurethane	RTN/RSN09, RTL09, RTN/RSN11, RTN/RSN14, RTN/RSN16
M	125	125	Polyurethane	RTN/RSN14, RTN/RSN16, RTN20, RTN25, RTN32, RTN40
P	160	240	Polyurethane	RTN/RSN14, RTN/RSN16, RTN20, RTN25, RTN32, RTN40
S	200	300	Polyurethane	RTN20, RTN25, RTN32, RTN40
T	250	350	Polyurethane	RTN32, RTN40 – requires special adapter to mount to end plate
Y	250	475	Polyurethane	RTN32, RTN40 – requires special adapter to mount to end plate

10 GES Drive

The GES drives are mated with the RSN, RTL and RTN end trucks and mounted typically to the trucks on the inboard side of the crane as shown. The drive wheel receives the output shaft of the GES drive.

Motor driven cranes are equipped with 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.

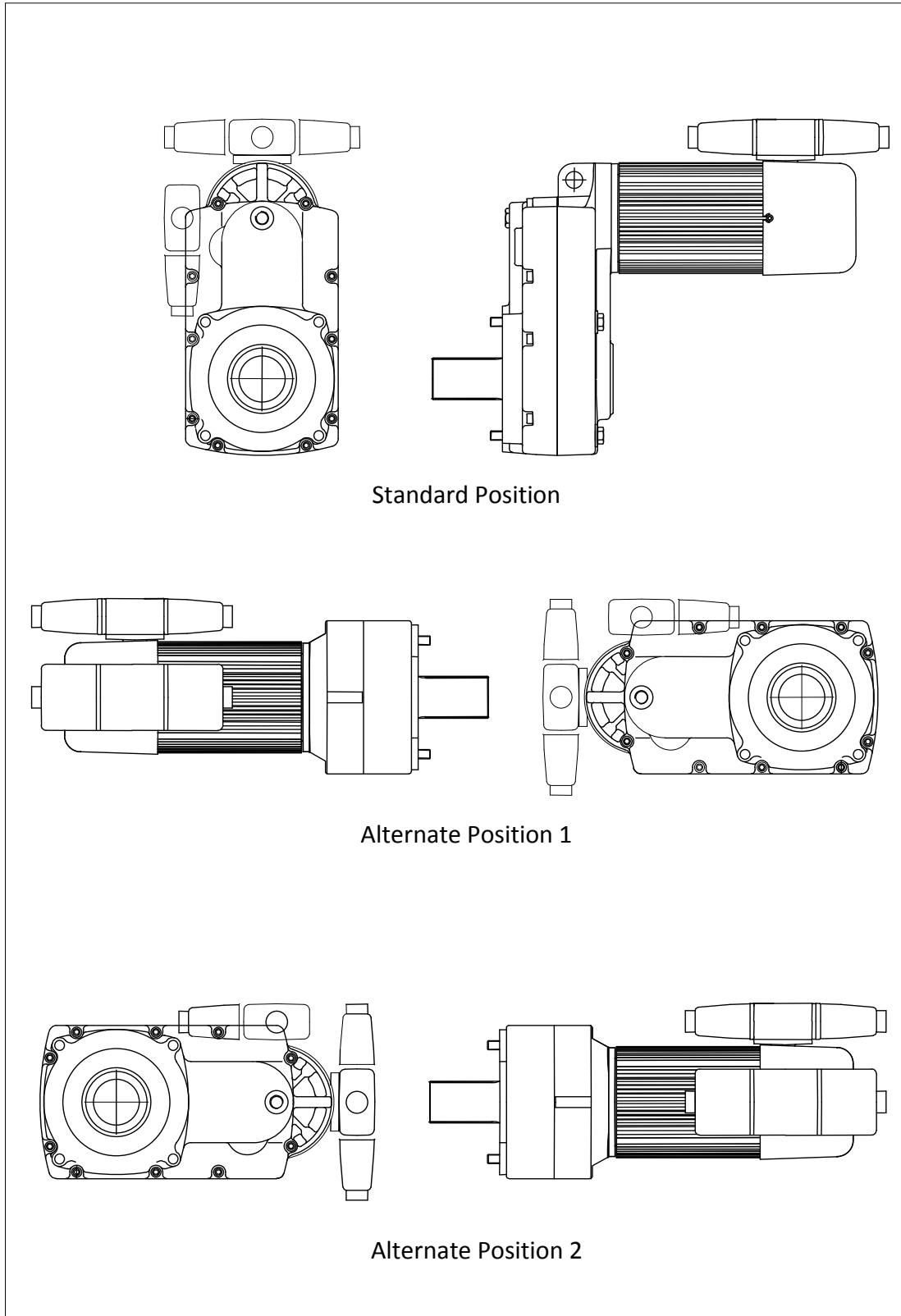


Location of the bridge drives

10.1 GES Drive to End Truck Compatibility

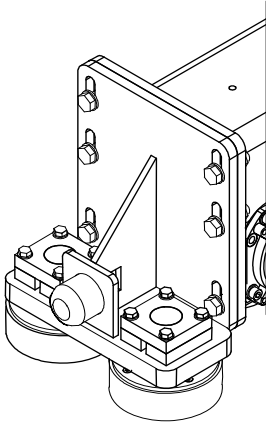
Drive size - Output shaft size	End Truck
GES3 – S4	RTN/RSN09, RTL09, RTN/RSN11
GES3 – S3	RTN/RSN16, RTN20
GES4 – S3	RTN/RSN16, RTN20
GES4 – S2	RTN25, RTN32
GES5 – S2	RTN25, RTN32, RTN40
GES5 – S1	RTN40
QM6	RTN40 with output shaft on drive wheel

10.2 GES Drive Mounting Positions



11 Additional Features

11.1 Guide Rollers



Standard guide roller assemblies are individually designed for each wheel size and to take the same horizontal forces as seen on the end truck. The guide roller assembly is bolted to the RTN20 end truck, and welded to the RTN25, and the RTN32 end truck. The rollers can be adjusted in the radial direction by $\pm 3/16''$ [5 mm]. Guide rollers are typically mounted to only one of the pair of end trucks.

The guide rollers can be used on a welded or clamped runway rail, but the space between the guide roller and the clamp or the weld must be verified case by case. The guide rollers must be mentioned separately on the end truck order. **Note:** Always mention the width and height of the rail used.

11.2 Polyurethane Flat Wheels

The RSN/RTN end trucks can be equipped with special wheels that have the running surfaces coated with polyurethane plastic. 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. The polyurethane flat wheels must be mentioned separately in the end truck order.

In general, polyurethane coating has following 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 found in the table below. The values are limited to following conditions:

- Thickness of coating according to the given figures
- Maximum travelling speed: 200 fpm or 63 m/min
- Material of the coating is Vulkollan®; the hardness is 95° Sha
- Operating temperature range is 14°F...86°F [-10°C...+30°C]
- Running surface can be of steel, concrete, or equivalent; surface should be smooth and free from loose particles
- If the wheel is under load and standing still for very long time, there may be small compression in surface, which will disappear during use.

Maximum wheel loads for Vulkollan® coated wheels:

End truck model	RSN/RTN16	RTN20	RTN25	RTN32
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]	26.8 [5.96]	39.9 [8.98]	45.1 [10.15]	65.4 [14.72]

Dynamic wheel load = 1.15 x static wheel load



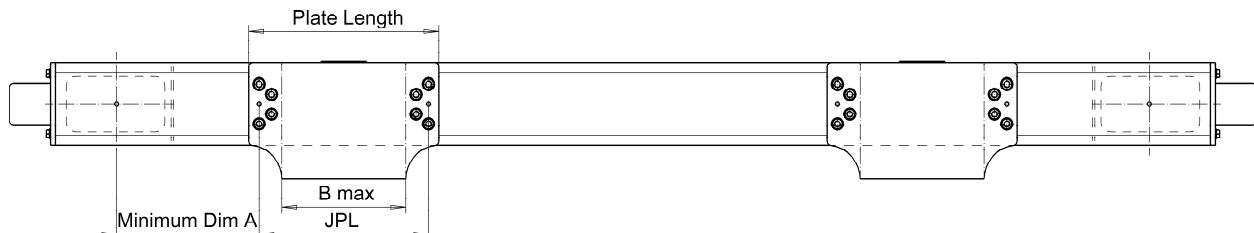
12 Joint Plate

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
RTN/RTL09	A3	Top joint	14.17	360	12.20	310	8.07	205	16.14	410
RSN09	EBN09-400	Side joint	15.75	400	15.75	400	10.43	265	19.29	490
RTN11	A4	Top joint	16.14	410	14.17	360	8.07	205	18.11	460
RTN11	A6	Top joint	23.62	600	21.65	550	8.07	205	25.59	650
RSN11	EBN11-400	Side joint	15.75	400	15.75	400	10.43	265	19.29	490
RTN14	A4	Top joint	16.14	410	14.17	360	8.07	205	18.11	460
RTN14	A6	Top joint	23.62	600	21.65	550	8.07	205	23.62	600
RSN14	EBN14-400	Side joint	15.75	400	15.75	400	10.43	265	19.29	490
RTN16	B4	Top joint	19.69	500	13.78	350	7.48	190	21.65	550
RTN16	B6	Top joint	27.56	700	21.65	550	7.48	190	29.53	750
RSN16	EBN16-350	Side joint	13.78	350	13.78	350	10.43	265	16.93	430
RSN16	EBN16-450	Side joint	17.72	450	17.72	450	10.43	265	25.59	650
RTN20	L3	Top joint	16.14	410	11.81	300	6.1	200	18.11	460
RTN20	L4	Top joint	20.47	520	16.14	410	6.1	200	22.44	570
RTN20	L5	Top joint	24.8	630	20.47	520	6.1	200	26.77	680
RTN20	L6	Top joint	29.13	740	24.80	630	6.1	200	31.10	790
RTN20	R3	Side joint	9.84	250	11.81	300	7.28	290	11.81	300
RTN20	R4	Side joint	14.17	360	16.14	410	7.28	290	16.14	410
RTN20	R5	Side joint	18.5	470	20.47	520	7.28	290	20.47	520
RTN20	R6	Side joint	22.83	580	24.80	630	7.28	290	24.80	630
RTN25	H4	Top joint	23.23	590	16.14	410	9.84	250	25.20	640
RTN25	H5	Top joint	27.56	700	20.47	520	9.84	250	29.53	750
RTN25	H7	Top joint	36.22	920	29.13	740	9.84	250	38.19	970
RTN25	H9	Top joint	46.06	1170	38.98	990	9.84	250	48.03	1220
RTN25	F4	Side joint	18.9	480	15.35	390	12.01	305	20.87	530
RTN25	F5	Side joint	25.98	660	20.47	520	12.01	305	28.74	730
RTN25	F7	Side joint	35.04	890	29.53	750	12.01	305	37.80	960
RTN25	F8	Side joint	40.55	1030	35.04	890	12.01	305	43.31	1100
RTN32	K4	Top joint	20.47	520	16.14	410	9.84	250	22.44	570
RTN32	K5	Top joint	24.8	630	20.47	520	9.84	250	26.77	680
RTN32	K7	Top joint	33.46	850	29.13	740	9.84	250	35.43	900
RTN32	K9	Top joint	43.31	1100	38.98	990	11.42	290	45.28	1150



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
RTN32	Q3	Side joint	20.47	520	16.14	410	12.2	310	22.44	570
RTN32	Q4	Side joint	20.47	520	16.14	410	13.78	350	22.44	570
RTN32	Q5	Side joint	24.8	630	20.47	520	12.2	310	26.77	680
RTN32	Q6	Side joint	24.8	630	20.47	520	13.78	350	26.77	680
RTN32	Q7	Side joint	33.46	850	29.13	740	12.2	310	35.43	900
RTN32	Q8	Side joint	33.46	850	29.13	740	13.78	350	35.43	900
RTN32	Q9	Side joint	43.31	1100	38.98	990	12.2	310	45.28	1150
RTN32	Q0	Side joint	43.31	1100	38.98	990	13.78	350	45.28	1150
RTN40	K4	Top joint	20.47	520	16.14	410	11.81	300	22.44	570
RTN40	K5	Top joint	24.8	630	20.47	520	11.81	300	26.77	680
RTN40	K7	Top joint	33.46	850	29.13	740	11.81	300	35.43	900
RTN40	K9	Top joint	43.31	1100	38.98	990	11.81	300	45.28	1150
RTN40	S6	Side joint	20.47	520	16.14	410	14.96	380	23.23	590
RTN40	S7	Side joint	28.74	730	24.41	620	14.96	380	31.50	800
RTN40	S9	Side joint	43.31	1100	38.98	990	14.96	380	46.06	1170
RTN40	J1	Top joint	37	940	15.35	390	19.69	500	38.58	980
RTN40	J2	Top joint	46.85	1190	25.39	645	19.69	500	48.43	1230
RTN40	J3	Top joint	60.63	1540	37.2	945	19.69	500	62.20	1580
RTN40	J4	Top joint	40.94	1040	15.35	390	19.69	500	42.52	1080
RTN40	J5	Top joint	49.61	1260	25.39	645	19.69	500	51.18	1300
RTN40	J6	Top joint	64.57	1640	37.2	945	19.69	500	66.14	1680
RTN40	J7	Top joint	41.73	1060	20.08	510	19.69	500	43.31	1100
RTN40	J8	Top joint	45.67	1160	20.08	510	19.69	500	47.24	1200
RTN40	J9	Top joint	51.57	1310	29.92	760	19.69	500	53.15	1350
RTN40	J0	Top joint	55.51	1410	29.92	760	19.69	500	57.09	1450

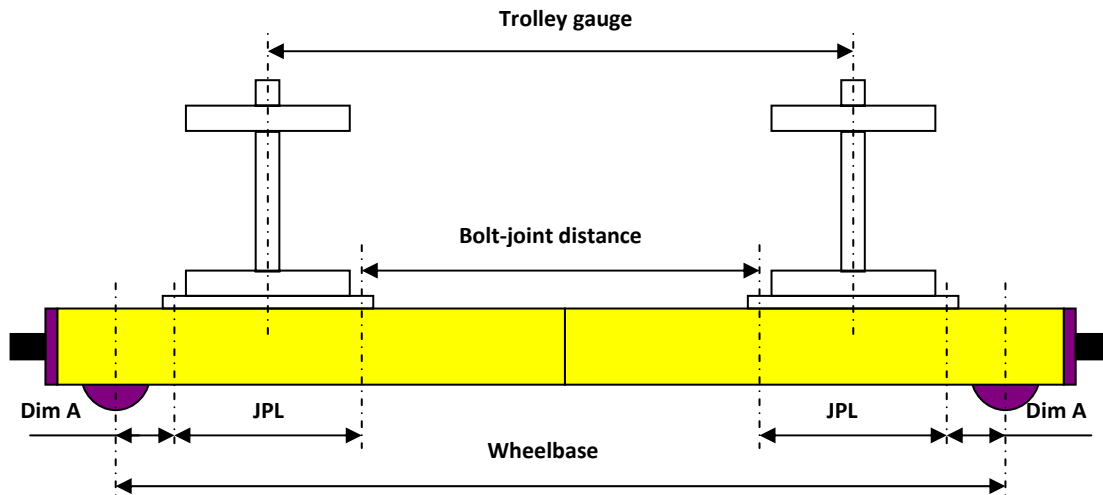


12.1.1 Joint Plate Length & Dimension A

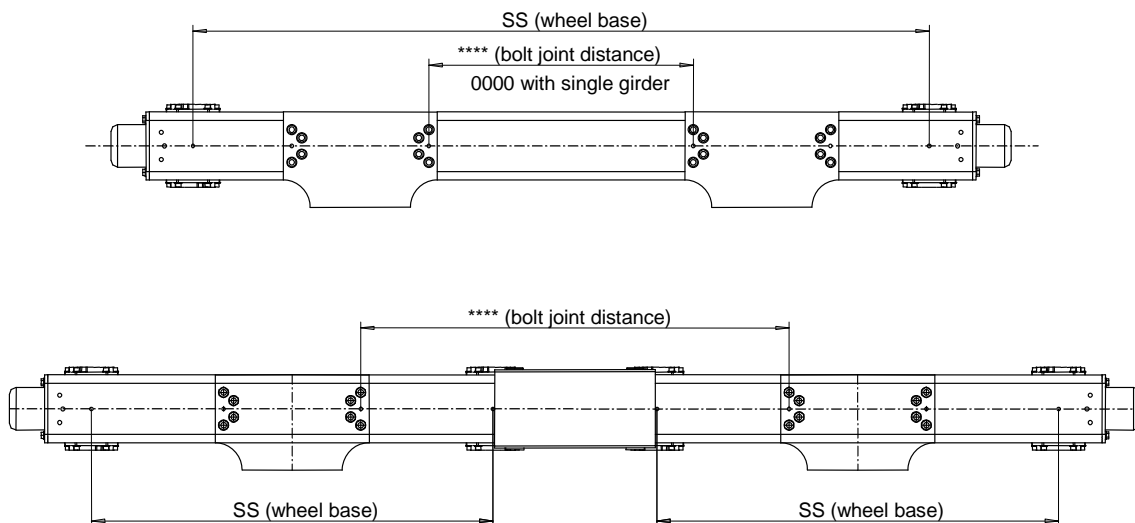
The joint plate length, JPL, is measured from the center of the alignment pin located at one end of the joint plate to the center of the other alignment pin located at the other end of the joint plate.

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

The minimum “A” dimension and the JPL are listed 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 measured from the innermost alignment pins in the joint plates.

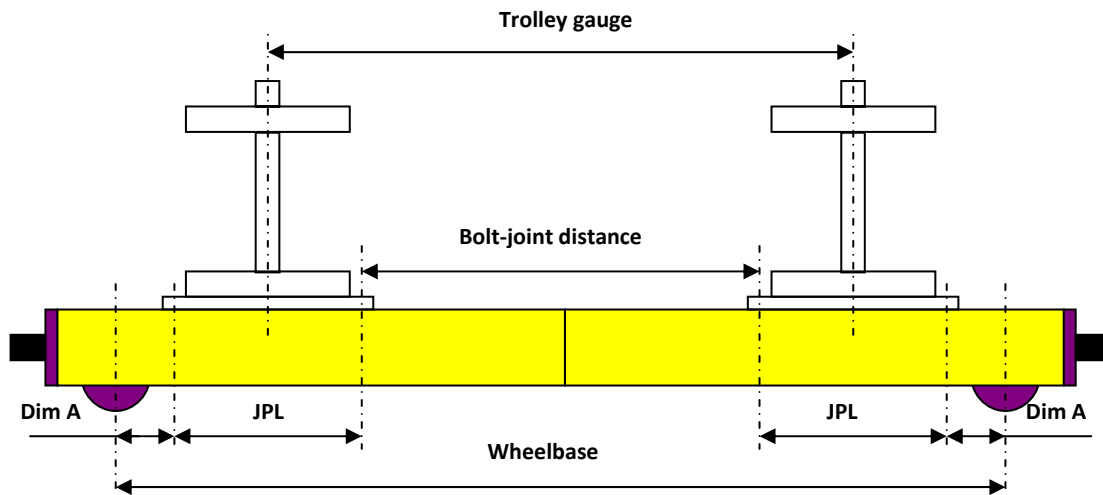
In addition the bolt joint distance can define the location of the joint plate on a single girder end truck if the joint plate is located off-center for a special application. In this case the bolt joint distance is measured from the center of the drive wheel to the closest alignment pin in the joint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

The bolt-joint distance (in millimeters) is defined in the product code of the end truck.

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 are used to determine the bolt-joint distance. The JPL is listed in the **Key Joint Plate Dimensions** found in this section. The actual bolt-joint distance (in millimeters) and the joint plate type are defined in the product code of the end truck.

$$\text{BOLT JOINT DISTANCE} = \text{TROLLEY GAUGE} - \text{JPL (of 1 plate)}$$

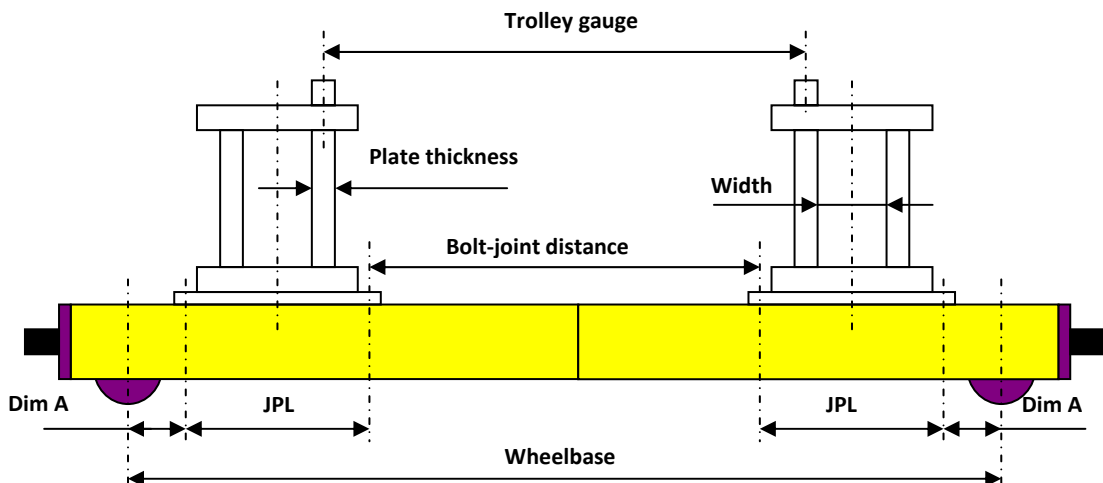


12.4 Joint Plate Location – Asymmetrical Rail Location

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 calculated from the trolley gauge, joint plate length (JPL), the width between the side plates, and the thickness of side plates. The JPL is listed in the **Key Joint Plate Dimensions** found in this section. The actual bolt-joint distance (in millimeters) and the joint plate type are defined in the product code for the end truck.

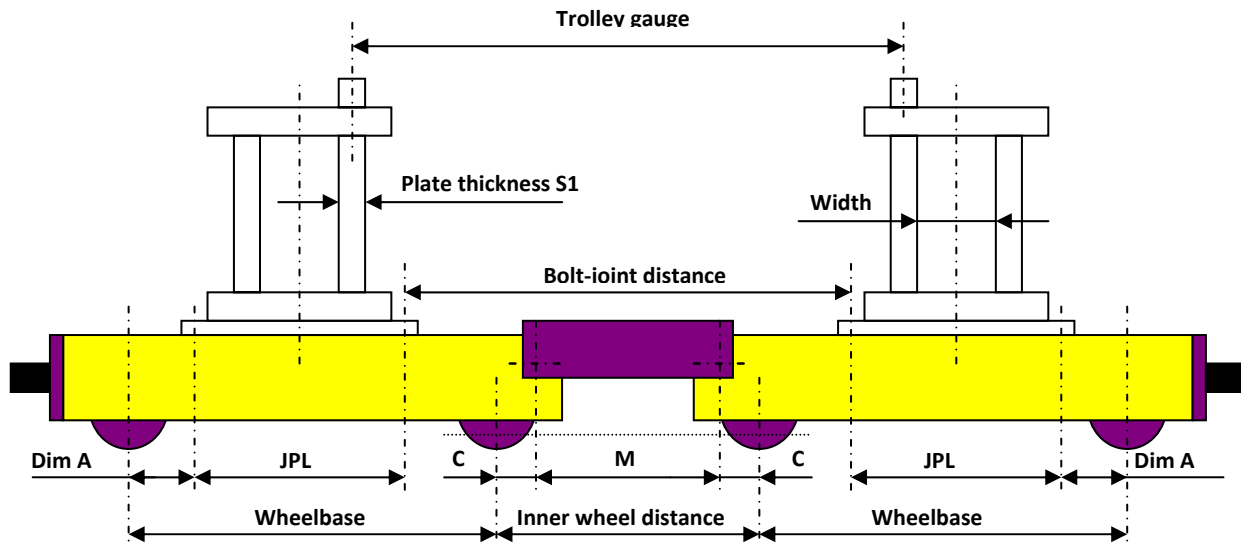
Note: For crane calculations with box girders, QuoteMaster[®] will always locate the joint plates on the end truck based on the asymmetrical rail location and the dimensions of the suggested box girder.

$$\text{BOLT JOINT DISTANCE} = \text{TROLLEY GAUGE} - \text{JPL (of 1 plate)} + (\text{Width} + \text{Plate thickness})$$



12.5 Bogie End Trucks - Inner Wheel Distance

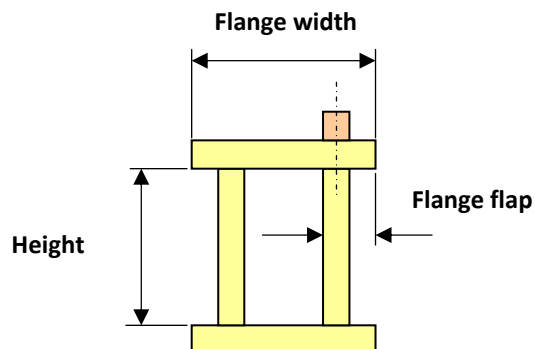
The inner wheel distance defines the distance between the bogie end trucks. The inner wheel distance is measured from the centers of the inner wheels. The actual inner wheel distance for bogie end trucks is determined case by case. The minimum inner wheel distance is the minimum clearance needed between 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.



End Truck	Minimum M		C		Min. Inner Wheel Distance	
	inch	mm	inch	mm	inch	mm
RTN20B	16.93"	430	5.56"	65	22.05"	560
RTN25B	18.9"	480	6.89"	175	32.68"	830
RTN32B	19.29"	490	6.69"	170	32.68"	830
RTN40B	24.41"	620	7.48"	190	39.38"	1000

12.6 Suggested Box Girder Dimensions

The box girder size suggested through QuoteMaster® will be identified by the flange width and the height of the box girder. The height of the box girder is measured between the top and bottom plates. The flange flap is measured from the edge of the flange to the inside of the side plate. The flange flap dimension is normally 2" [50 mm] for box girders suggested through QuoteMaster®.



13 Wheel Blocks

13.1 General

Wheel blocks can be used for bridge or trolley construction, or for nonstandard material handling applications. The wheel blocks, which are available in six different wheel diameters, incorporate a robust design, compact construction, low maintenance, and excellent reliability. The wheel blocks are enclosed on six sides ensuring frame stability and dimensional accuracy.

Mounting to the wheel blocks can be done through a variety of connection arrangements using welds, bolts, or pins. The standard wheel comes with flanges and the width of the groove cut into the wheel is to match the specified rail size or type. The wheel block comes with either a drive wheel or an idler wheel.

The GES series drive will be used to drive the wheel block. The motor can be either inverter-duty for inverter controls or two-speed motor for contactor controls. Motors are with plugs for cable connection.

Controls, bumpers, and other electrical or mechanical options are available.

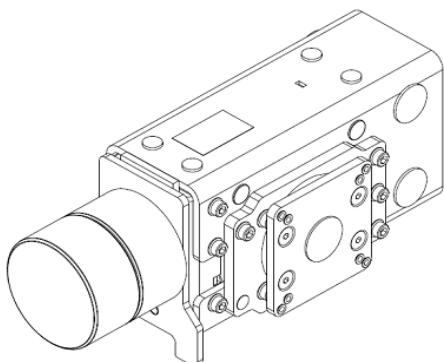
13.2 Wheels

The wheel blocks come in six different wheel diameters – 125, 160, 200, 250, 315, and 400 mm. The standard wheel has double flanges and a flat tread. The actual groove width cut into the wheel will depend on the actual rail size or type specified. The available groove widths for the various wheel diameters are listed in the **Specifications** section.

Adjustable guide rollers are available as an alternative to the standard wheel or for wider rails. Wheels are flangeless. The anti-derail devices for wheel blocks with guide rollers are different than the anti-derail devices for wheel blocks with standard wheels.

The material for the standard wheel is EN-GJS700 (ductile iron) with spheroidal graphite. The hardness of the wheel is 240-300 BHN. The self-lubricating characteristic of the wheel material ensures a long service life.

Wheel diameter (mm)	Drive wheel axle	Idler wheel axle	Wheel bearing type
125	Rotating	Rotating	Sealed
160	Rotating	Rotating	Sealed
200	Rotating	Rotating	Sealed
250	Rotating	Rotating	Sealed
315	Rotating	Rotating	Shielded – grease nipple
400	Rotating	Rotating	Shielded – grease nipple



Wheel block – with standard wheel, bumper, & anti-derail device



Wheel block – with drive wheel, anti-derail device, & provision for guide rollers.



13.3 Selection Criteria

The maximum allowable wheel loads for the wheel blocks are determined by these criteria:

- ❑ Permissible surface pressure between wheel and rail
- ❑ Maximum bearing capacity
- ❑ Service life of the bearing

When selecting the wheel block, the following things should be considered:

- ❑ Wheel loading not to exceed allowed value
- ❑ Connection type
- ❑ Rail size/groove width
- ❑ Bumper
- ❑ Anti-derail device
- ❑ Idler or drive wheel; left- or right-hand orientation for the drive wheel block

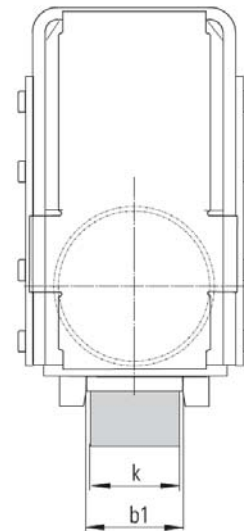
13.4 Wheel Block Drawing

Wheel block dimensional drawings in PDF are available on R&M’s website.

13.5 Wheel Grooves for Wheel Blocks

These wheel groove rules apply only to the wheel blocks and not to the end trucks.

Wheel dia.	Groove width b1	Metric rail width k	ASCE/BETH rail	Imperial rail width k
mm	mm	mm		
125	50	40	---	----
	60	50	ASCE30, 40	2"
160	52	40	---	----
	57	---	ASCE30	----
	62	50	ASCE40	2"
	72	60	ASCE60	----
200	54	40-45	---	----
	64	50-55	ASCE40	2"
	74	60-65	ASCE60	----
250	54	40-45	---	----
	64	50-55	ASCE40	2"
	74	60-65	ASCE60	----
	79	70-75	ASCE80, 85	2 ½"
	84	70-75	---	----
315	64	50-55	---	----
	74	60-65	ASCE60	----
	79	---	ASCE80, 85	2 ½"
	84	70-75	---	----
	94	80-85	---	----
	99	---	BETH135	3"
400	75	60-65	---	----
	80	70-75	ASCE60, 80, 85	2 ½"
	85	---	---	----
	95	80-85	---	3"
	105	---	BETH135	3 ½"
	115	100	---	----

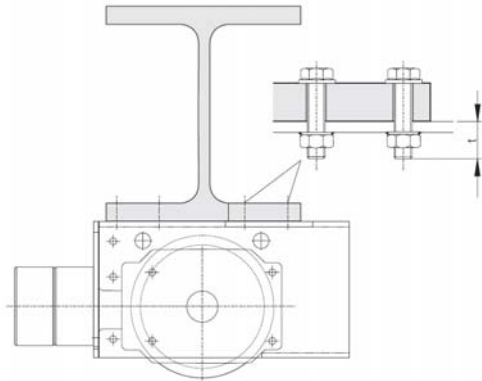


Guide rollers with flangeless wheels are available.

13.6 Connection Types

13.6.1 Head Connection - H

The steel structure can be bolted directly to the top of the wheel block. Bolts and hardware supplied by others.

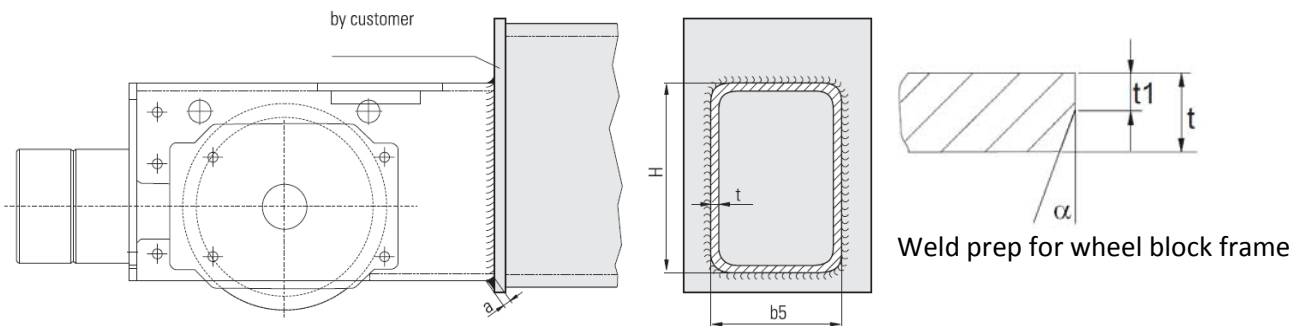


Wheel diameter	t max.	t min.	t max.	t min.	Bolt size / Qty
mm					
125	23	17	15/16"	11/16"	M12-8.8 / 4
160	38	24	1 1/2"	15/16"	M16-8.8 / 4
200	38	24	1 1/2"	15/16"	M16-8.8 / 8
250	40	15	1 9/16"	5/8"	M16-10.9 / 8
315	30	15	1 3/16"	5/8"	M16-10.9 / 8
400	43	36	1 11/16"	1 7/16"	M20-8.8 / 8

Bolt size	Tightening torque (Nm)	Tightening torque (ft-lb)
M12-8.8	87	64
M16-8.8	215	158
M16-10.9	310	228
M20-8.8	430	316

13.6.2 Welded Connection - W

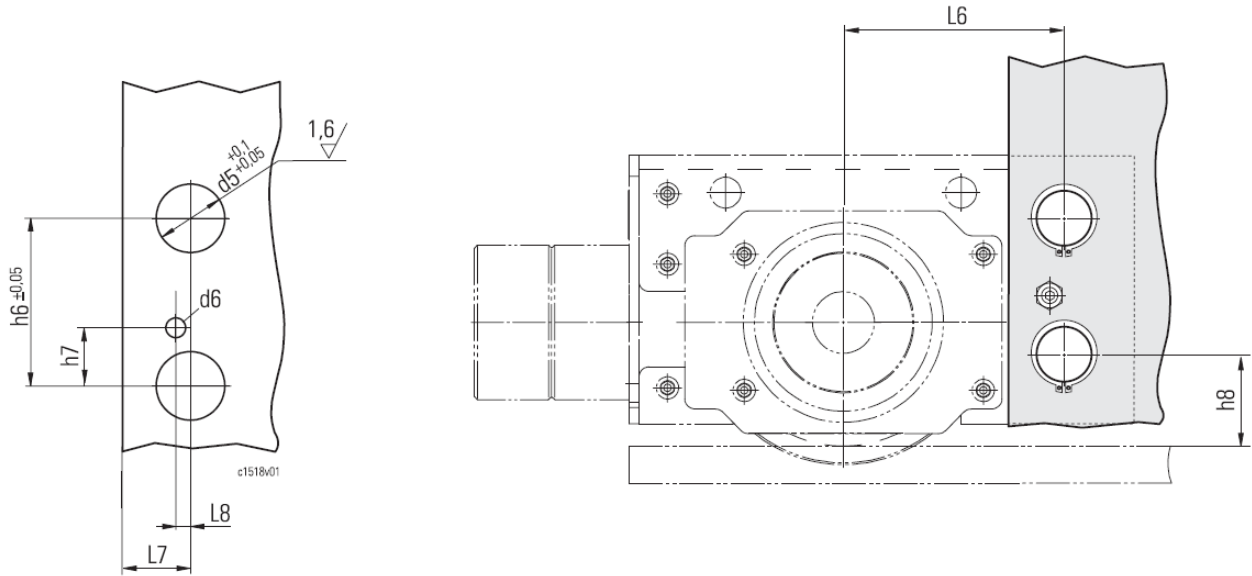
The end face of the wheel block can be welded to a flat surface. Material of the wheel block frame is S355MC.



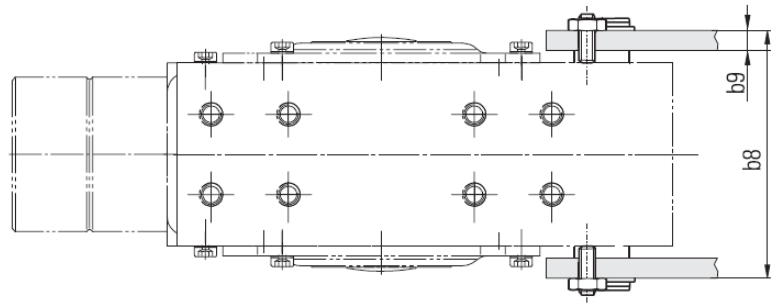
Wheel diameter	Wheel Block Frame - Key Dimensions				
	b5	t	t1	H	α
mm					
125	97	6	1	155	45°
160	128	8	1	178	45°
200	148	8	1	217	45°
250	160	12	2	283	60°
315	204	12	2	336	60°
400	258	15	3	415	60°

13.6.3 Inserted (Pinned) Connection - I

The wheel block can be inserted between two side plates. The plates are attached to the wheel block using two pins. The side plates can be adjusted by means of a bolt (d6). The mounting set for each wheel block includes two pins suitable for width b8, four retaining rings for the pins, and 2 bolts for the adjustment.



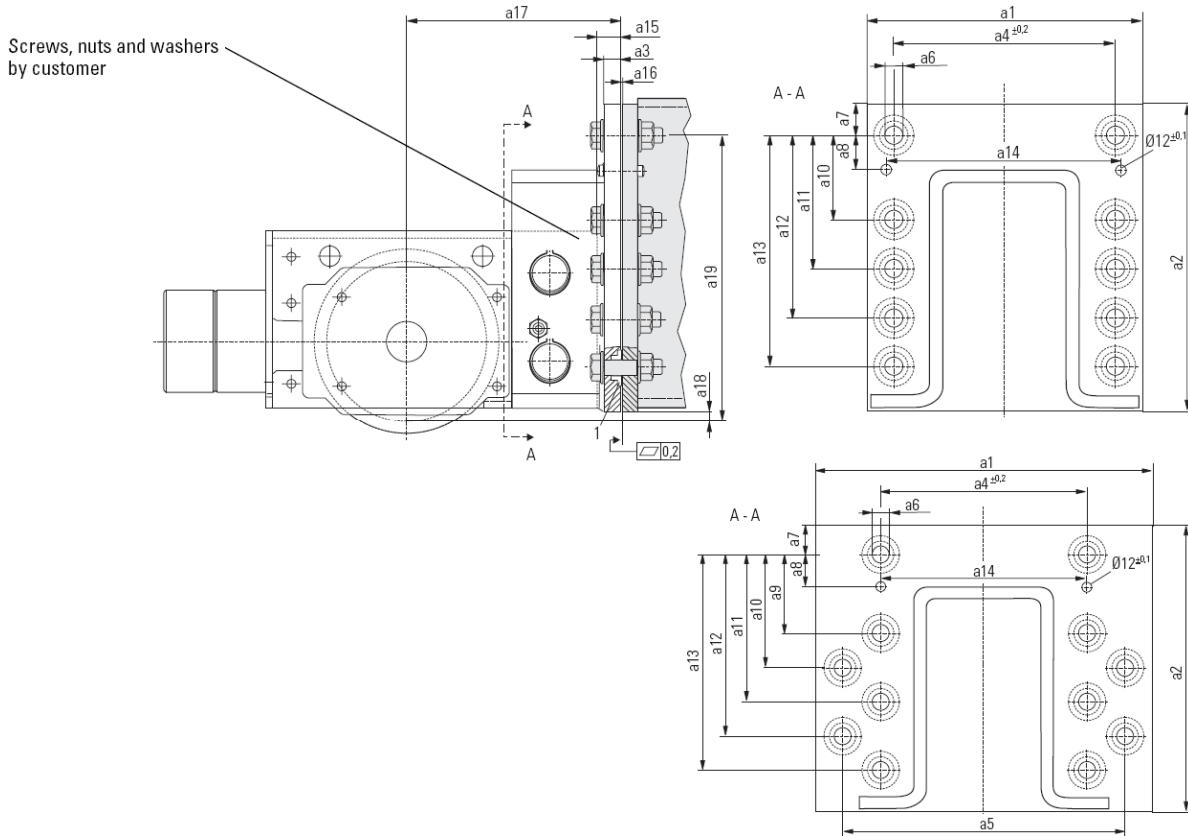
Side plate detail



Type	b8	b9 min. ..max.	d5	d6	h6	h7	h8	L6	L7 max.	L8	[kg]
	[mm]										[kg]
125	140	12..15	32	M12	95	38	42,5	125	33	10	3
160	200	14..30	40	M16	105	42	52	152	42	10	5
200	200	16..20	45	M20	135	44	64	178	48	15	6
250	200	12,5..15	50	M20	170	100	75	187	57	0	8
315	250	16..18	55	M20	195	125	95,5	205	55	0	11
400	300	16..20	65	M20	250	117,5	115	287	90	0	18

13.6.4 Bolted and Pinned Connection - S

The wheel block gets bolted to the structure through a connection flange. The connection flange is attached to the wheel block using two pins and the structure is bolted to the connection flange. The mounting set for each wheel block includes the connection flange, two pins, four retaining rings for the pins, and 2 bolts for side-to-side adjustment, special bushings (item 1), and two alignment pins. The bolts, nuts, and washers are supplied by others.

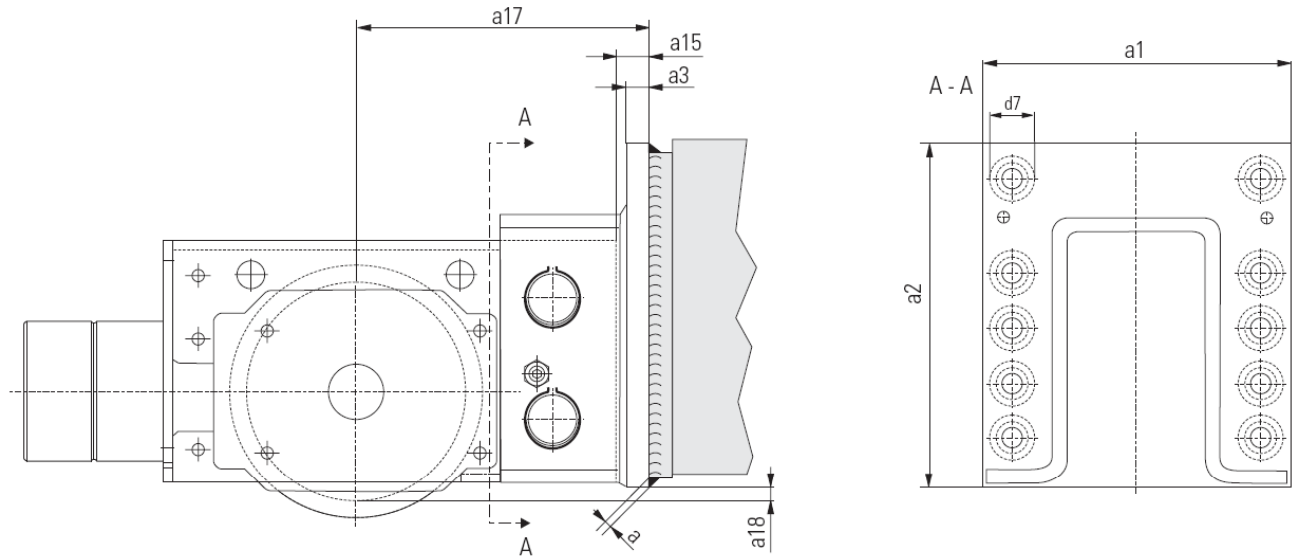


Type	a1	a2	a3	a4	a5	a6	a7	a8	a9	a10	a11	a12	a13	a14	a15	a16	a17	a18	a19	kg
	[mm]																			[kg]
125	300	270	20	240	-	23	40	35	-	-	-	-	190	240	38	5	198	10	240	21
160	350	315	20	290	-	23	40	35	-	-	-	175	235	290	37	5	237	10	285	30
200	340	325	20	280	-	23	40	35	-	-	125	185	245	280	41	5	278	10	295	33
250	350	400	25	280	-	27	50	47	-	-	150	225	300	280	50	5	295	12	362	45
315	430	463	30	360	-	27	50	47	-	125	200	275	350	375	50	5	320	12	425	74
400	590	550	30	410	516	27	53	50	213	266	319	372	425	410	39	5	407	20	517	120

Type	Screw	Nut	Washer	Bushing
125	4x M20 10.9 tZn DIN 6914	4x M20 10 fvz DIN 6915	8x 21 C45 tZn DIN 6916	2x 12x60 St ISO 8736
160	6x M20 10.9 tZn DIN 6914	6x M20 10 fvz DIN 6915	12x 21 C45 tZn DIN 6916	2x 12x60 St ISO 8736
200	8x M20 10.9 tZn DIN 6914	8x M20 10 fvz DIN 6915	16x 21 C45 tZn DIN 6916	2x 12x60 St ISO 8736
250	8x M24 10.9 tZn DIN 6914	8x M24 10 fvz DIN 6915	16x 25 C45 tZn DIN 6916	2x 12x80 St ISO 8736
315	10x M24 10.9 tZn DIN 6914	10x M24 10 fvz DIN 6915	20x 25 C45 tZn DIN 6916	2x 12x80 St ISO 8736
400	12x M24 10.9 tZn DIN 6914	12x M24 10 fvz DIN 6915	24x 25 C45 tZn DIN 6916	2x 12x80 St ISO 8736

13.6.5 Welded and Pinned Connection - A

The wheel block gets welded to the structure through a connection flange. The connection flange is attached to the wheel block using two pins and the structure is bolted to the connection flange. The mounting set for each wheel block includes the connection flange, two pins, four retaining rings for the pins, and 2 bolts for side-to-side adjustment, special bushings (item 1), and two alignment pins.



Typ Type	a1	a2	a3	a15	a17	a18	d7	[kg]
	[mm]							
SR-S 125	300	270	20	38	198	10	46	20
SR-S 160	350	315	20	37	237	10	46	30
SR-S 200	340	325	20	41	278	10	46	32
SR-. 250	350	400	25	50	295	12	57	44
SR-E 315	430	463	30	50	320	12	57	72
SR-E 400	590	550	30	39	407	20	57	118



13.7 Wheel Block Specifications

Wheel diameter and GES type	<u>Model</u>	<u>Wheel diameter</u>	<u>Specification</u>	<u>GES shaft specification</u>
	WB-R125	125 mm	GES3	S3
	WB-R160	160 mm	GES3, GES4	S3
	WB-R200	200 mm	GES3, GES4	S3
	WB-R250	250 mm	GES4, GES5	S2
	WB-R315	315 mm	GES4, GES5	S2
	WB-R400	400 mm	GES5	S1
Groove width	<u>Wheel dia.</u>	<u>Groove width</u>	<u>Wheel groove widths - metric</u>	<u>Min. wheel groove - metric</u>
	125 mm	50 - 60 mm	50, 55, 60 mm	Rail head width + 10 mm
	160 mm	52 - 72 mm	52, 57, 62, 67, 72 mm	Rail head width + 12 mm
	200 mm	54 - 74 mm	54, 59, 64, 69, 74 mm	Rail head width + 14 mm
	250 mm	54 - 84 mm	54, 59, 64, 69, 74, 79, 84 mm	Rail head width + 14 mm
	315 mm	64 - 94 mm	64, 69, 74, 79, 84, 89, 94 mm	Rail head width + 14 mm
	400 mm	75 - 115 mm	75, 80, 85, 90, 95, 100, 105, 110, 115 mm	Rail head width + 15 mm
Flangeless wheels and guide rollers are used for wider rails.				
Wheel	Idler wheel			
	Drive wheel			
Drive wheel orientation	Left hand			
	Right hand			
Rail	ASCE			
	Flat Bar			
	BETH			
GES drive	GES gear with inverter-duty motor			
	GES gear with two-speed, pole change motors; limited travelling speeds available with two-speed motors			
	One wheel per end truck is driven as standard.			
	Standard travel speeds with inverter control: 65, 80, 100, 130 fpm [20, 25, 32, 40 m/min] Standard travel speed with two-speed control: 80/20 fpm [25/6 m/min]			
Connection type	<u>Connection code</u>	<u>Specification</u>	<u>Models</u>	
	H	Head (bolted) connection	WB-R125 – WB-R400	
	W	Welded connection	WB-R125 – WB-R400	
	I	Inserted (pinned) connection	WB-R125 – WB-R400	
	S	Bolted & pinned connection	WB-R125 – WB-R400	
	A	Welded & pinned connection	WB-R200 – WB-R400	
Bumpers	<u>Bumper code</u>	<u>Specification</u>	<u>Wheel block wheel diameter</u>	
	G	PUR bumper D100 mm x 100 mm	125 mm	
	M	PUR bumper D125 mm x 125 mm	160 mm, 200 mm	
	H	PUR bumper D160 mm x 160 mm	250 mm, 315 mm	
	I	PUR bumper D200 mm x 200 mm	400 mm	
Bumpers must be added to wheel block separately.				
Options	Anti-derail device		Rail cleaning device	
	Bumper extension		Guide rollers (bolt on)	
Surface treatment	Primer only (RAL 7038 gray for frame)			



13.8 Permissible Wheel Loads

13.8.1 WB-R125

Pdynamic = 1.15 x Pstatic				Maximum permissible dynamic wheel load 125 mm diameter wheel					
FEM Duty	CMAA Duty	Speed	Due to bearing		ASCE 40	ASCE 30		50 mm or 2"	40 mm
2m	C	20 m/min 65 fpm	58 kN 13 kips		42.6 kN 9585 lbs	37 kN 8325 lbs		50 kN 11.3 kips	39 kN 8775 lbs
		25 m/min 80 fpm	58 kN 13 kips		41 kN 9225 lbs	36 kN 8100 lbs		49 kN 11 kips	38 kN 8550 lbs
		32 m/min 100 fpm	54 kN 12.2 kips		39.3 kN 8843 lbs	34 kN 7650 lbs		47 kN 10.6 kips	36 kN 8100 lbs
		40 m/min 130 fpm	50 kN 11.3 kips		37.5 kN 8438 lbs	32.8 kN 7380 lbs		44 kN 9900 lbs	34 kN 7650 lbs
		50 m/min 160 fpm	46 kN 10.4 kips		35.2 kN 7920 lbs	30.5 kN 6863 lbs		42 kN 9450 lbs	32 kN 7200 lbs
		63 m/min 200 fpm	43 kN 9.68 kips		32.9 kN 7403 lbs	28.8 kN 6480 lbs		39 kN 8775 lbs	30 kN 6750 lbs
3m	D	20 m/min 65 fpm	50 kN 11.3 kips		38 kN 8550 lbs	33.5 kN 7538 lbs		45 kN 10.1 kips	35 kN 7875 lbs
		25 m/min 80 fpm	46 kN 10.4 kips		37 kN 8325 lbs	32.3 kN 7268 lbs		44 kN 9900 lbs	34 kN 7650 lbs
		32 m/min 100 fpm	43 kN 9.68 kips		35.4 kN 7965 lbs	30.9 kN 6953 lbs		42 kN 9450 lbs	32 kN 7200 lbs
		40 m/min 130 fpm	40 kN 9 kips		33.8 kN 7605 lbs	29.4 kN 6615 lbs		40 kN 9000 lbs	31 kN 6975 lbs
		50 m/min 160 fpm	37 kN 8.32 kips		31.7 kN 7133 lbs	27.7 kN 6233 lbs		37 kN 8325 lbs	29 kN 6525 lbs
		63 m/min 200 fpm	34 kN 7.65 kips		29.7 kN 6683 lbs	25.9 kN 5828 lbs		34 kN 7650 lbs	27 kN 6075 lbs

Note 1: Maximum permissible dynamic wheel load listed is due to bearing.



13.8.2 WB-R160

Pdynamic = 1.15 x Pstatic				Maximum permissible dynamic wheel load 160 mm diameter wheel					
FEM Duty	CMAA Duty	Speed	Due to bearing	ASCE 40	ASCE 30	60 mm (Note 1)	50 mm or 2"	40 mm	
2m	C	20 m/min 65 fpm	81 kN 18.2 kips	56.8 kN 12.8 kips	49.6 kN 11.2 kips	81 kN 18.2 kips	67 kN 15.1 kips	52 kN 11.7 kips	
		25 m/min 80 fpm	81 kN 18.2 kips	55 kN 12.4 kips	48 kN 10.8 kips	81 kN 18.2 kips	65 kN 14.6 kips	50 kN 11.3 kips	
		32 m/min 100 fpm	75 kN 16.9 kips	52.8 kN 11.9 kips	46 kN 10.4 kips	75 kN 16.9 kips	62 kN 14 kips	48 kN 10.8 kips	
		40 m/min 130 fpm	70 kN 15.8 kips	50 kN 11.3 kips	43.9 kN 9878 lbs	70 kN 15.8 kips	60 kN 13.5 kips	46 kN 10.4 kips	
		50 m/min 160 fpm	65 kN 14.6 kips	48.1 kN 10.8 kips	42 kN 9450 lbs	65 kN 14.6 kips	57 kN 12.8 kips	44 kN 9900 lbs	
		63 m/min 200 fpm	60 kN 13.5 kips	45.7 kN 10.3 kips	39.9 kN 8978 lbs	60 kN 13.5 kips	54 kN 12.2 kips	42 kN 9450 lbs	
3m	D	20 m/min 65 fpm	70 kN 11.3 kips	51.2 kN 11.5 kips	44.5 kN 10 kips	70 kN 11.3 kips	61 kN 13.7 kips	47 kN 10.6 kips	
		25 m/min 80 fpm	65 kN 14.6 kips	49.5 kN 11.1 kips	43.2 kN 9720 lbs	65 kN 14.6 kips	58 kN 13.1 kips	45 kN 10.1 kips	
		32 m/min 100 fpm	60 kN 13.5 kips	47.5 kN 10.7 kips	41.4 kN 9315 lbs	60 kN 13.5 kips	56 kN 12.6 kips	43 kN 9675 lbs	
		40 m/min 130 fpm	55 kN 12.4 kips	45.3 kN 10.2 kips	39.6 kN 8910 lbs	55 kN 12.4 kips	54 kN 12.2 kips	42 kN 9450 lbs	
		50 m/min 160 fpm	51 kN 11.5 kips	43.2 kN 9720 lbs	37.7 kN 8483 lbs	51 kN 11.5 kips	51 kN 11.5 kips	40 kN 9000 lbs	
		63 m/min 200 fpm	48 kN 10.8 kips	41.1 kN 9248 lbs	35.9 kN 8078 lbs	48 kN 10.8 kips	48 kN 10.8 kips	37 kN 8325 lbs	

Note 1: Maximum permissible dynamic wheel load listed is due to bearing.



13.8.3 WB-R200

Pdynamic = 1.15 x Pstatic				Maximum permissible dynamic wheel load 200 mm diameter wheel					
FEM Duty	CMAA Duty	Speed	Due to bearing	ASCE 60	ASCE 40	60 mm	50 mm or 2"	40 mm	
2m	C	20 m/min 65 fpm	115 kN 25.9 kips	98.7 kN 22.2 kips	73 kN 16.4 kips	106 kN 23.9 kips	87 kN 19.6 kips	67 kN 15.1 kips	
		25 m/min 80 fpm	115 kN 25.9 kips	95.7 kN 21.5 kips	71.1 kN 16 kips	103 kN 23.2 kips	84 kN 18.9 kips	65 kN 14.6 kips	
		32 m/min 100 fpm	115 kN 25.9 kips	91.8 kN 20.7 kips	68.2 kN 15.3 kips	99 kN 22.3 kips	80 kN 18 kips	62 kN 14 kips	
		40 m/min 130 fpm	115 kN 25.9 kips	88.8 kN 20 kips	65.9 kN 14.8 kips	96 kN 21.6 kips	78 kN 17.6 kips	60 kN 13.5 kips	
		50 m/min 160 fpm	107 kN 24.1 kips	84.9 kN 19.1 kips	63 kN 14.2 kips	91 kN 20.5 kips	74 kN 16.7 kips	58 kN 13.1 kips	
		63 m/min 200 fpm	99 kN 22.3 kips	80.8 kN 18.2 kips	60 kN 13.5 kips	87 kN 19.6 kips	71 kN 16 kips	55 kN 13.4 kips	
3m	D	20 m/min 65 fpm	115 kN 25.9 kips	88.8 kN 20 kips	65.9 kN 14.8 kips	96 kN 21.6 kips	78 kN 17.6 kips	60 kN 13.5 kips	
		25 m/min 80 fpm	107 kN 24.1 kips	86 kN 19.4 kips	63.9 kN 14.4 kips	93 kN 20.9 kips	76 kN 17.1 kips	58 kN 13.1 kips	
		32 m/min 100 fpm	99 kN 22.3 kips	82.6 kN 18.6 kips	61.3 kN 13.8 kips	89 kN 20 kips	72 kN 16.2 kips	56 kN 12.6 kips	
		40 m/min 130 fpm	92 kN 20.7 kips	79.9 kN 18 kips	59.3 kN 13.3 kips	86 kN 19.4 kips	70 kN 15.8 kips	54 kN 12.2 kips	
		50 m/min 160 fpm	85 kN 19.1 kips	76.4 kN 17.2 kips	56.7 kN 12.8 kips	82 kN 18.5 kips	67 kN 15.1 kips	52 kN 11.7 kips	
		63 m/min 200 fpm	79 kN 17.8 kips	72.8 kN 16.4 kips	54.1 kN 12.2 kips	78 kN 17.6 kips	64 kN 14.4 kips	49 kN 11 kips	



13.8.4 WB-R250

Pdynamic = 1.15 x Pstatic				Maximum permissible dynamic wheel load 250 mm diameter wheel					
FEM Duty	CMAA Duty	Speed	Due to bearing	ASCE 80	ASCE 60	ASCE 40	2 ½" (Note 1)	60 mm	50 mm or 2"
2m	C	20 m/min 65 fpm	178 kN 40.1 kips	135.2 kN 30.4 kips	127.1 kN 28.6 kips	94.3 kN 21.2 kips	153.9 34.6 kips	137 kN 30.8 kips	111 kN 25 kips
		25 m/min 80 fpm	165 kN 37.1 kips	131.2 kN 29.5 kips	123.3 kN 27.7 kips	91.7 kN 20.6 kips	149.4 kN 33.6 kips	133 kN 29.9 kips	108 kN 24.3 kips
		32 m/min 100 fpm	152 kN 34.2 kips	127.3 kN 28.6 kips	119.6 kN 26.9 kips	88.9 kN 20 kips	144.9 kN 32.6 kips	129 kN 29 kips	105 kN 23.6 kips
		40 m/min 130 fpm	141 kN 31.7 kips	122 kN 27.5 kips	114.7 kN 25.8 kips	85.2 kN 19.2 kips	138.9 kN 31.3 kips	123 kN 27.7 kips	101 kN 22.7 kips
		50 m/min 160 fpm	131 kN 29.5 kips	118.1 kN 26.6 kips	110.3 kN 24.8 kips	82.5 kN 18.6 kips	131 kN 29.5 kips	120 kN 27 kips	97 kN 21.8 kips
		63 m/min 200 fpm	121 kN 27.2 kips	112.8 kN 25.4 kips	106 kN 23.9 kips	78.8 kN 17.7 kips	121 kN 27.2 kips	114 kN 25.7 kips	93 kN 20.9 kips
3m	D	20 m/min 65 fpm	141 kN 31.7 kips	121.7 kN 27.4 kips	114.3 kN 25.7 kips	84.9 kN 19.1 kips	138.5 kN 31.2 kips	123 kN 31.2 kips	100 kN 22.5 kips
		25 m/min 80 fpm	131 kN 29.5 kips	118.1 kN 26.6 kips	111 kN 25 kips	82.5 kN 18.6 kips	131 kN 29.5 kips	120 kN 27 kips	97 kN 21.8 kips
		32 m/min 100 fpm	121 kN 27.2 kips	114.5 kN 25.8 kips	107.6 kN 24.2 kips	79.9 kN 18 kips	121 kN 27.2 kips	116 kN 26.1 kips	94 kN 21.2 kips
		40 m/min 130 fpm	112 kN 25.2 kips	109.8 kN 24.7 kips	103.2 kN 23.2 kips	76.7 kN 17.3 kips	112 kN 25.2 kips	111 kN 25 kips	91 kN 20.5 kips
		50 m/min 160 fpm	104 kN 23.4 kips	106.3 kN 23.9 kips	99.8 kN 22.5 kips	74.2 kN 17 kips	104 kN 23.4 kips	104 kN 23.4 kips	88 kN 19.8 kips
		63 m/min 200 fpm	96 kN 21.6 kips	101.5 kN 22.8 kips	95.5 kN 21.5 kips	70.8 kN 15.9 kips	96 kN 21.6 kips	96 kN 21.6 kips	81 kN 18.3 kips

Note 1: Maximum permissible dynamic wheel load listed is due to bearing.



13.8.5 WB-R315

Pdynamic = 1.15 x Pstatic				Maximum permissible dynamic wheel load 315 mm diameter wheel					
FEM Duty	CMAA Duty	Speed	Due to bearing	BETH 135	ASCE 80	ASCE 60	80 mm	70 mm	60 mm
2m	C	20 m/min 65 fpm	253 kN 56.9 kips	239.8 kN 54 kips	175.3 kN 39.4 kips	164.7 kN 37.1 kips	243 kN 54.7 kips	210 kN 47.3 kips	177 kN 39.8 kips
		25 m/min 80 fpm	253 kN 56.9 kips	235.3 kN 53 kips	172 kN 38.7 kips	161.6 kN 36.4 kips	238 kN 53.6 kips	206 kN 46.4 kips	174 kN 39.2 kips
		32 m/min 100 fpm	253 kN 56.9 kips	226.2 kN 50.9 kips	165.4 kN 37.2 kips	155.4 kN 35 kips	229 kN 51.5 kips	198 kN 44.6 kips	167 kN 37.6 kips
		40 m/min 130 fpm	253 kN 56.9 kips	219.4 kN 49.4 kips	160.4 kN 36.1 kips	150.8 kN 33.9 kips	222 kN 50 kips	192 kN 43.2 kips	162 kN 36.5 kips
		50 m/min 160 fpm	253 kN 56.9 kips	212.6 kN 47.8 kips	155.5 kN 35 kips	146.1 kN 32.9 kips	216 kN 48.6 kips	186 kN 41.9 kips	157 kN 35.3 kips
		63 m/min 200 fpm	243 kN 54.7 kips	203.7 kN 45.8 kips	148.8 kN 34.5 kips	139.8 kN 31.5 kips	206 kN 43.4 kips	178 kN 40.1 kips	151 kN 44 kips
3m	D	20 m/min 65 fpm	253 kN 56.9 kips	215.9 kN 48.6 kips	157.8 kN 35.5 kips	148.2 kN 33.3 kips	219 kN 49.3 kips	189 kN 42.5 kips	160 kN 36 kips
		25 m/min 80 fpm	253 kN 56.9 kips	211.7 kN 47.6 kips	154.8 kN 34.8 kips	145.5 kN 32.7 kips	215 kN 48.3 kips	186 kN 41.9 kips	157 kN 35.3 kips
		32 m/min 100 fpm	242 kN 54.5 kips	203.7 kN 45.8 kips	148.8 kN 33.5 kips	139.8 kN 31.4 kips	206 kN 46.4 kips	178 kN 40.1 kips	151 kN 34 kips
		40 m/min 130 fpm	226 kN 50.9 kips	197.5 kN 44.4 kips	144.3 kN 32.5 kips	135.7 kN 30.5 kips	200 kN 45 kips	173 kN 38.9 kips	146 kN 32.9 kips
		50 m/min 160 fpm	212 kN 47.7 kips	191.4 kN 43.1 kips	140 kN 31.5 kips	131.4 kN 29.6 kips	194 kN 43.7 kips	168 kN 37.8 kips	142 kN 32 kips
		63 m/min 200 fpm	197 kN 44.3 kips	183.3 kN 41.2 kips	134 kN 30.2 kips	125.8 kN 28.3 kips	186 kN 41.9 kips	161 kN 36.2 kips	136 kN 30.6 kips



13.8.6 WB-R400

Pdynamic = 1.15 x Pstatic				Maximum permissible dynamic wheel load 400 mm diameter wheel					
FEM Duty	CMAA Duty	Speed	Due to bearing	BETH 135	ASCE 80	ASCE 60	100 mm (Note 1)	80 mm	60 mm
2m	C	20 m/min 65 fpm	345 kN 77.6 kips	313.1 kN 70.4 kips	229 kN 51.5 kips	215.1 kN 48.4 kips	345 kN 77.6 kips	317 kN 71.3 kips	232 kN 52.2 kips
		25 m/min 80 fpm	345 kN 77.6 kips	304.5 kN 68.5 kips	222.6 kN 50.1 kips	209.2 kN 47.1 kips	345 kN 77.6 kips	309 kN 69.5 kips	225 kN 50.6 kips
		32 m/min 100 fpm	345 kN 77.6 kips	295.9 kN 66.6 kips	216.3 kN 48.7 kips	203.3 kN 45.7 kips	345 kN 77.6 kips	300 kN 67.5 kips	219 kN 49.3 kips
		40 m/min 130 fpm	345 kN 77.6 kips	287.3 kN 64.6 kips	210 kN 47.3 kips	197.3 kN 44.4 kips	345 kN 77.6 kips	291 kN 65.5 kips	212 kN 47.7 kips
		50 m/min 160 fpm	345 kN 77.6 kips	278.6 kN 62.7 kips	203.8 kN 45.8 kips	191.5 kN 43.1 kips	345 kN 77.6 kips	282 kN 63.5 kips	206 kN 46.4 kips
		63 m/min 200 fpm	345 kN 77.6 kips	270 kN 60.8 kips	197.5 kN 44.4 kips	185.5 kN 41.7 kips	345 kN 77.6 kips	274 kN 61.7 kips	200 kN 45 kips
3m	D	20 m/min 65 fpm	345 kN 77.6 kips	281.9 kN 63.4 kips	206.1 kN 46.4 kips	193.5 kN 43.5 kips	345 kN 77.6 kips	286 kN 64.4 kips	208 kN 46.8 kips
		25 m/min 80 fpm	345 kN 77.6 kips	274 kN 61.6 kips	200.3 kN 45.1 kips	188.3 kN 42.4 kips	345 kN 77.6 kips	278 kN 62.6 kips	203 kN 45.7 kips
		32 m/min 100 fpm	345 kN 77.6 kips	266.3 kN 59.9 kips	194.7 kN 43.8 kips	183 kN 41.2 kips	343 kN 77.2 kips	270 kN 60.8 kips	197 kN 44.3 kips
		40 m/min 130 fpm	345 kN 77.6 kips	258.6 kN 58.2 kips	188.9 kN 42.5 kips	177.6 kN 40 kips	333 kN 74.9 kips	262 kN 59 kips	191 kN 43 kips
		50 m/min 160 fpm	345 kN 77.6 kips	250.8 kN 56.4 kips	183.2 kN 41.2 kips	172.3 kN 38.8 kips	323 kN 72.7 kips	254 kN 57.2 kips	185 kN 41.6 kips
		63 m/min 200 fpm	345 kN 77.6 kips	243.1 kN 54.7 kips	177.7 kN 40 kips	167 kN 37.6 kips	313 kN 70.4 kips	246 kN 55.4 kips	180 kN 40.5 kips

Note 1: Maximum permissible dynamic wheel load listed is due to bearing.

13.9 Wheel Block Electrics

13.9.1 Inverter Control

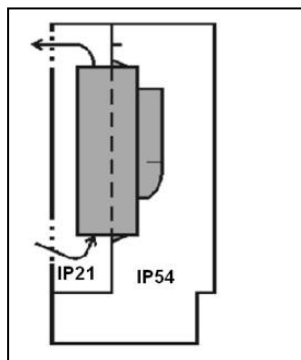
The WBE control panel for wheel blocks is supplied with the ControlMaster™ series inverter. The panel comes completely wired and includes terminals and the brake relay as needed. The control panel does not include plugs, manual disconnect switch, and mainline contactor. The control transformer is normally not included. But when specified, the control transformer can be supplied for the inverter sizes noted in the table.



A QX bridge panel can be substituted for the WBE control panel. The bridge panel will include a control transformer, mainline contactor, manual disconnect, and if applicable, plugs for cable connection.

Enclosure size (W x H x D)	Inverter type	Panel IP rating
400 mm x 400 mm x 250 mm	CMCX022, CMST003, CMST004, without control transformer	IP55
600 mm x 400 mm x 250 mm	CMCX022, CMST003, CMST004, with control transformer	IP55
1000 mm x 600 mm x 300 mm	CMST005 - CMST011 without transformer	IP54/IP21
1000 mm x 1000 mm x 320 mm	CMST015 without transformer	IP54/IP21

Example of IP54/IP21 panel



Through panel mounting: Cooling parts, fan, and braking resistor are in the ventilated section of panel (IP21)

Technical Information & Travel Speeds

The power supply voltage to the inverter must be 380-415V-3-50Hz or 440-480V-3-60Hz. An auto-transformer is required for all other power supply voltages. The auto-transformer is supplied by others.

The available control voltages are 48V or 115V 50/60Hz.

Infinitely variable (EP2) is the standard control method. Two-step (MS2) control method is an option.

Nominal travel speeds with inverter controls: 65, 80, 100, or 130 fpm [20, 25, 32, or 40 m/min]

Ambient temperature: 14°F – 104°F [-10°C – 40°C]

13.9.2 Two-speed Control

Two-speed contactor controls are supplied by others. Motor connection diagrams will be supplied.

Technical Information & Travel Speed

The standard motor voltages are 230V-3-60Hz, 460V-3-60Hz, 575V-3-60Hz, or 380V-3-50Hz.

Nominal travel speed with two-speed contactor controls is 80/20 fpm [25/6 m/min].

Ambient temperature: 14°F – 104°F [-10°C – 40°C]

For other voltages, environments, or speeds, contact R&M.



13.9.3 Optional Electrical Features

- Standby heating for motor – MOT17
- Standby heating for control enclosure – PAN08
- Over-temperature protection
- Motor cable with motor plugs
- Rain cover for motor – MOT18