

EMPTY CONTAINER HANDLER 7 – 10 TONNE

TECHNICAL INFORMATION DCE70, DCD70, DCE80-100





Dedicated for empty container handling

Kalmar has for a long time been developing machines especially adapted to the handling of empty containers. Our empty container handlers are today operating all over the globe.

In order to get the optimum balance of economy, lifting height and performance for each client, Kalmar can offer a wide range of empty container handlers. Our range stretches from a capacity of 3 high up to 8+1 high.

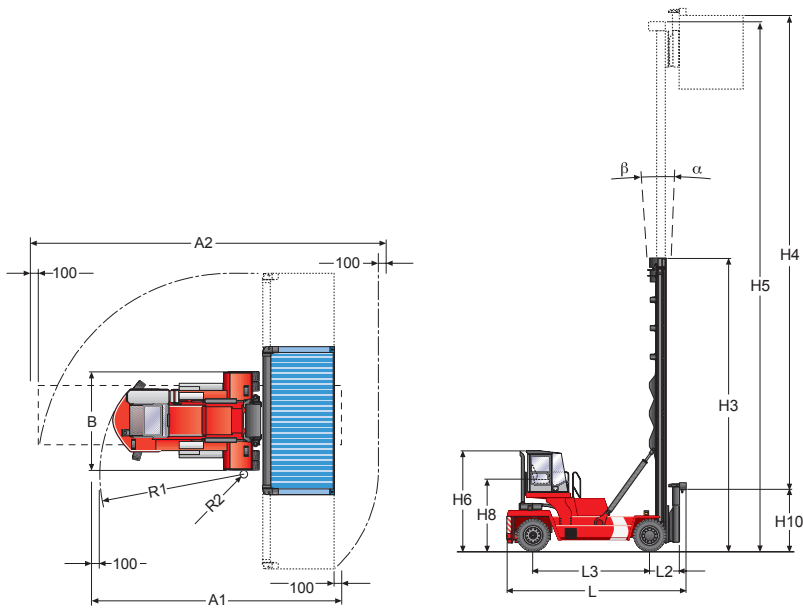
The containers must be moved and stacked fast, safely and efficiently independent of lifting height.

Beside from driving fast and safe, stacking is a time-consuming job that demands preciseness. This places heavy demands on the stability of the machine, mast and spreader together with user friendliness during handling. Another key factor is to create an unobstructed field of vision.

These characteristics combined allow the operator to focus on the task instead of the management of the machine.

Kalmar has developed empty container handling concepts for both single- and double stacking for different lifting heights. The decision on which concept is most suitable is depending on individual operational demands.

Capacity and dimensions					DCE 70-32/35, DCD 70-40			DCE 80-45				
					E3	E4	E5	E5	E6	E7	E8	
Lifting	Lift capacity	Rated	kg	7000	7000	7000	8000	8000	8000	8000		
		Load centre	L4	mm	1220	1220	1220	1220	1220	1220		
		Number of containers	8'6" container		3	4	5	5	6	7	8	
			9'6" container		3	4	5	5	6	7		
Dimensions	Truck	Truck length	L	mm	5595	5845	6355	6900	6900	6900	6900	
		Truck width	B	mm	2540	2900	3500	4000	4000	4000	4000	
		Truck height, basic machine	Spirit Delta	H6	mm	2920	2920	3840	3940	3940	3940	
		Seat height		H8	mm	1790	1790	2700	2800	2800	2800	
		Distance between centre of front axle - front edge of attachment		L2	mm	1265	1265	1275	1150	1150	1150	
		Wheelbase		L3	mm	3250	3500	4000	4550	4550	4550	
			Track (c-c)	front		mm	1855	2210	2800	3270	3270	3270
		rear			mm	1960	1960	1960	2250	2250	2250	
		Turning radius	outer	R1	mm	4360	4785	5400	6000	6000	6000	
				R2	mm	125	420	285	200	200	200	
			inner		mm	250	250	250	250	250	250	
		Ground clearance, min.			mm	250	250	250	250	250	250	
		Max height when tilting cab	Spirit Delta	T1	mm	3395	3395	-	-	-	-	
		Max width when tilting cab	Spirit Delta	T2	mm	3380	3380	-	-	-	-	
		Min, aisle width for 90° stacking with forks		8'6" container	A1	mm	8900	9200	9500	10000	10000	10000
				9'6" container	A1	mm	13800	13900	13950	14000	14000	14000
		Standard duplex mast	Lifting height		H4	mm	7000	10000	13000	13000	13000	13000
Mast height	min.			H3	mm	5195	7075	8540	8540	8540	8540	
	max			H5	mm	8695	12075	15040	15040	15040	15040	
Mast tilting, forwards - backwards	$\alpha - \beta$			°	3 - 5	3 - 5	3 - 5	3 - 3	3 - 3	3 - 3		
Attachment	Width	b	mm	6064	6064	-	-	-	-			
		Height under twistlock	H10	mm	2120	2120	2180	2180	2180	2180		
		Height under hooks	H10	mm	-	-	-	-	-	-		
		Sideshift \pm	V1	mm	140	140	600	600	600	600		
Weight	Service weight		kg	22900	23900	30900	33850	34350	35500	37050		
		Axle load front	Unloaded	kg	14700	15600	21100	21300	21800	22950	24500	
			At rated load	kg	27100	27600	32500	33450	33950	35100	36650	
		Axle load back	Unloaded	kg	8200	8300	9800	12550	12550	12550	12550	
At rated load	kg		2800	3300	5400	8400	8400	8400	8400			
Wheels, brakes, steering	Wheels/tyres	Type, front-rear			Pneumatic			Pneumatic				
		Dimensions, front-rear	inch		12,00 x 20/20PR			12,00 x 24 - 12,00 x 24				
		Number of wheels, front-rear (*driven)			4* - 2			4* - 2				
		Pressure	MPa		0,9	0,9	0,9	1,0	1,0	1,0	1,0	
Wheels, brakes, steering	Steering system	Type - manoeuvring			Hydraulic servo - Steering wheel			Hydraulic servo - Steering wheel				
		Service brake system	Type - affected wheels		Oil cooled disc brakes (Wet disc brakes - drive wheels)			Oil cooled disc brakes (Wet disc brakes - drive wheels)				
			Parking brake system	Type - affected wheels		Dry spring activated disc brake - drive wheels			Dry spring activated disc brake - drive wheels			
Misc.	Hydraulic pressure	Max	MPa	19,5	20	16,0	19,0	19,0	19,0	19,0		
		Hydraulic fluid volume		l	225	225	220	320	320	320	320	
			Fuel volume	l	200	200	205	380	380	380	380	
		Starting battery	Voltage - capacity	V-Ah	2 x 12 - 140			2 x 12 - 140				

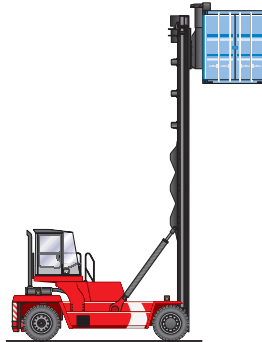


Model designation

eg. DCE80-45E8

- Diesel engine _____
- Counterweight truck _____
- Generation _____
- Lifting capacity, in decitonne _____
- Wheelbase, in decimetres _____
- Empty containers _____
- No. of containers when stacking _____

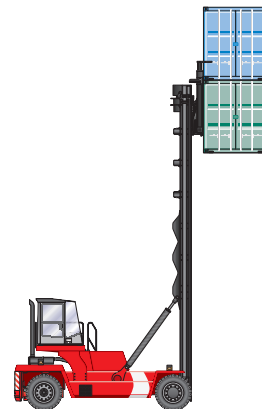
DCE 90-45				DCE 100-45	
E5	E6	E7	E8	E7	E8
9000	9000	9000	9000	10000	10000
1220	1220	1220	1220	1220	1220
5	6	7	8	7	8
5	5	6	7	6	7
6900	6900	6900	6900	6900	6900
4000	4000	4000	4000	4500	4500
4000	4000	4000	4000	4600	4600
2900	2900	2900	2900	3500	3500
1150	1150	1150	1150	1140	1200
4550	4550	4550	4550	4550	4550
3270	3270	3270	3270	3750	3750
2250	2250	2250	2250	2250	2250
6300	6300	6300	6300	6300	6300
200	200	200	200	200	200
300	300	300	300	300	300
-	-	-	-	-	-
-	-	-	-	-	-
10000	10000	10000	10000	10000	10000
14000	14000	14000	14000	14000	14000
13000	13000	13000	13000	16500	16500
8600	8600	8600	8600	10350	10350
16350	16350	16350	16350	19500	19500
3 - 3	3 - 3	3 - 3	3 - 3	3 - 3	3 - 3
-	-	-	-	-	-
2240	2240	2240	2240	2300	2300
-	-	-	-	-	-
600	600	600	600	600	600
34700	35200	36700	38200	40600	41900
21500	22000	23500	25000	21600	27400
35200	35700	37200	38700	41400	42700
13200	13200	13200	13200	14500	14500
8500	8500	8500	8500	9200	9200
Pneumatic				Pneumatic	
14,00 x 24 - 14,00 x 24				14,00 x 24 - 14,00 x 24	
4* - 2				4* - 2	
1,0	1,0	1,0	1,0	1,0	1,0
Hydraulic servo - Steering wheel				Hydraulic servo - Steering wheel	
Oil cooled disc brakes (Wet disc brakes - drive wheels)				Oil cooled disc brakes (Wet disc brakes - drive wheels)	
Dry spring activated disc brake - drive wheels				Dry spring activated disc brake - drive wheels	
20,0	20,0	20,0	20,0	22,5	22,5
320	320	320	320	320	320
380	380	380	380	380	380
2 x 12 - 140				2 x 12 - 140	



Single stacking

The single handling concept starts at 3 high stacking and up to 8 high. Characteristic for the machines dedicated for single stacking is flexibility, stability and high lifting speeds. Twistlock attachments are widely used on many Kalmar machines over the globe.

High demands on selectivity and limitations in ground space are the key factors when considering on single stacking equipment.



Double stacking

Double stacking of containers is an important step in increasing the productivity in the empty container handling business. Double stacking can be a very demanding application for the Empty Container Handler. The new DCE100 model from Kalmar fulfils these high requirements of stability and strength with margin.

Stacking two containers simultaneously is most of all a question of extreme demands of operational efficiency before demands on selectivity.



Performance

Performance is the result of how well the machine's functions work together.

The efficiency of the lifting equipment is determined by a combination of lifting speed, capacity, visibility and user-friendliness.

Lifting places heavy demands on the engine and working hydraulics, but lifting is only part of the operating cycle. Before the machine is in position to load or unload, the demands are instead on precise control with tight turning radius, effective brakes and high pulling power. And of course, all the functions must still perform optimally even after heavy use.



Engine

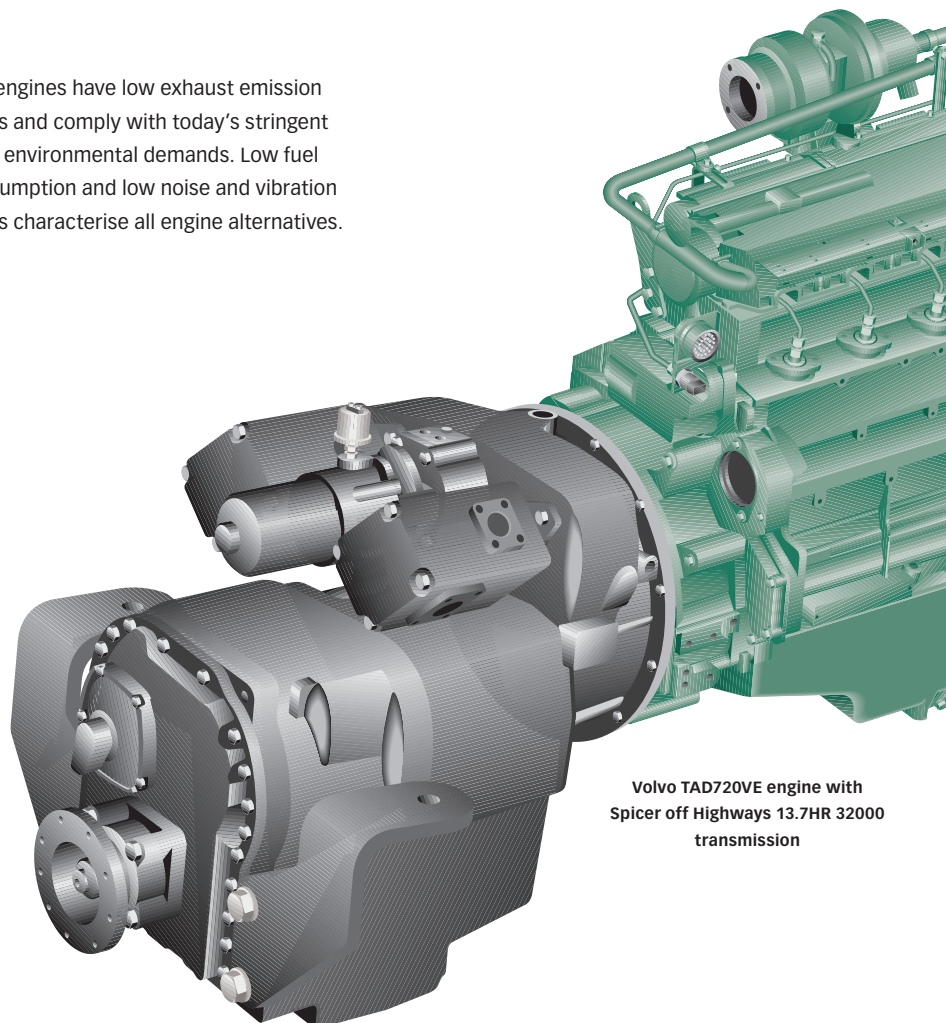
All empty container handlers are equipped with straight six cylinder turbo charged engines equipped with intercooler. The engines are adapted to the special working conditions of empty container handling, with high power and torque levels at low engine speeds.

The engines have low exhaust emission levels and comply with today's stringent legal environmental demands. Low fuel consumption and low noise and vibration levels characterise all engine alternatives.

Transmission

All trucks in the series are equipped with well proven hydrodynamic transmission systems.

The transmission has integrated gearbox and torque converter, for smooth, quick acceleration with a minimum of "clutch-slip". Gear changing is electrically achieved via solenoid valves with three reverse and three forward gears, controlled by means of an easily operated multifunction lever.

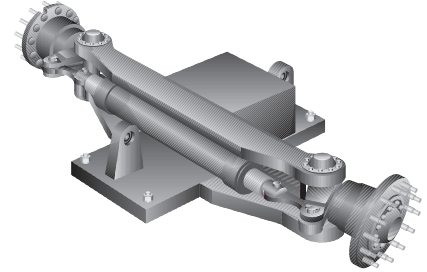


Volvo TAD720VE engine with Spicer off Highways 13.7HR 32000 transmission

Steering System

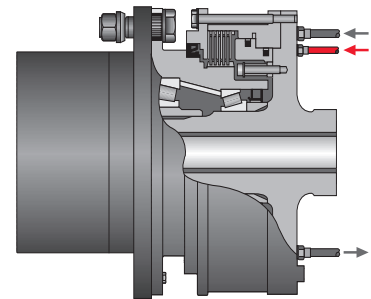
The steering system is completely hydraulic. The steering axle is a robust construction with double-acting cylinder. The pendulum suspension of the axle, over powerful spherical rubber bushings, has a long operative life span and is totally maintenance free.

The minimal number of parts ensures operational reliability, a minimum of service points and easy maintenance. The steering geometry allows a tight turning circle.

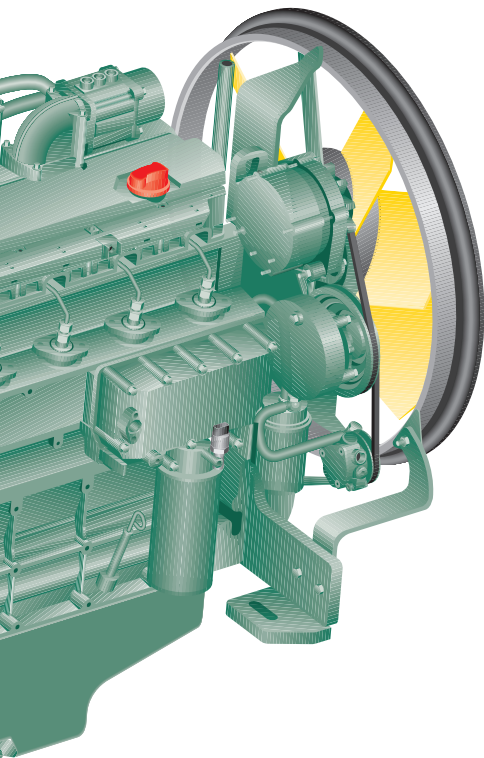


Service Brake System

All empty container handlers are equipped with Wet Disc Brakes with oil cooled discs that are alternately fixed to and rotating with the hub. When the brakes are applied, the discs are pressed together by hydraulic pressure from the brake pedal, which provides effective braking. The system is virtually maintenance free and can cope with heavy loads over an extended period of time, with no fade and without the need for brake adjustments.



Wet Disc Brakes

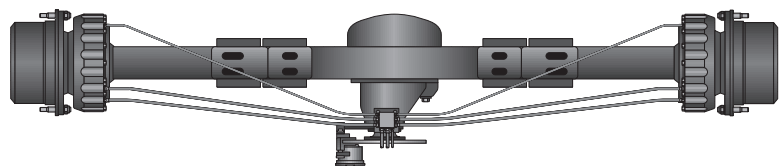


Drive axle

The drive axles are designed to cope with the tough working environments in ports and terminals. All axles has reduction in two stages - differential and hub reduction, which ensures a minimum of strain on the transmission system. The drive axles are fitted with a hydraulic braking system.

Parking Brake System

The parking brake system consists of a dry disc brake on the ingoing shaft of the drive axle. The disc brake is applied by means of a powerful spring in the parking brake cylinder and is released by means of hydraulic pressure from the parking brake valve.



Kessler D81 drive axle

Drive trains

DCE70-32/35, E3/E4

Drive train			Standard driveline	Cummins option driveline	
Drive train	Engine	Manufacturer - type designation		Volvo - TAD620VE	Cummins - 6B5,9e
		Fuel - type of engine		Diesel - 4 stroke	Diesel - 4 stroke
		Rating ISO 3046 - at revs	kW-rpm	145/197 - 2300	138/188 - 2200
		Peak torque ISO 3046 - at revs	Nm-rpm	700 - 1500	780 - 1400
		Number of cylinders - displacement	cm ³	6 - 5702	6 - 5900
		Fuel consumption, normal driving	l/h	8-11	8-11
	Transmission	Manufacturer - type designation		Dana - TE13000	Dana - TE13000
		Clutch, type		Torque converter	Torque converter
		Gearbox, type		Hydrodynamic Powershift	Hydrodynamic Powershift
		Numbers of gears, forward - reverse		3 - 3	3 - 3
Alternator	Type - power	W	AC - 1540	AC - 1540	
Driving axle	Type		Differential and hub reduction	Differential and hub reduction	

DCD70-40, E5

Drive train			Standard driveline	Optional driveline	
Drive train	Engine	Manufacturer - type designation		Volvo - TAD720VE	Volvo - TD640VE
		Fuel - type of engine		Diesel - 4 stroke	Diesel - 4 stroke
		Rating ISO 3046 - at revs	kW-rpm	174/236 - 2300	129 - 2400
		Peak torque ISO 3046 - at revs	Nm-rpm	864 - 1400	690 - 1400-1500
		Number of cylinders - displacement	cm ³	6 - 7145	6 - 5480
		Fuel consumption, normal driving	l/h	9-12	8-11
	Transmission	Manufacturer - type designation		Dana - 13,7HR32000	Dana - 13,7HR32000
		Clutch, type		Torque converter	Torque converter
		Gearbox, type		Hydrodynamic Powershift	Hydrodynamic Powershift
		Numbers of gears, forward - reverse		3 - 3	3 - 3
Alternator	Type - power	W	AC - 1540	AC - 1540	
Driving axle	Type		Differential and hub reduction	Differential and hub reduction	

DCE80-45/90-45/100-45, E5/E6/E7/E8

Drive train			Standard driveline	Optional driveline	Cummins option driveline	
Drive train	Engine	Manufacturer - type designation		Volvo - TAD720VE	Volvo - TWD731VE	Cummins QSB5.9
		Fuel - type of engine		Diesel - 4 stroke	Diesel - 4 stroke	Diesel - 4 stroke
		Rating ISO 3046 - at revs	kW-rpm	174 - 2300	167 - 2200	160 - 2200
		Peak torque ISO 3046 - at revs	Nm-rpm	854 - 1400	893 - 1300-1400	938 - 1400
		Number of cylinders - compression	cm ³	6-18,4:1	6-17,7:1	6-16.3:1
		Fuel consumption, normal driving	l/h	12 - 14	12 - 14	13 - 15
	Transmission	Manufacturer - type designation		Dana - 13,7HR32000	Dana - 13,7HR32000	Dana - 13,7HR32000
		Clutch, type		Torque converter	Torque converter	Torque converter
		Gearbox, type		Hydrodynamic Powershift	Hydrodynamic Powershift	Hydrodynamic Powershift
		Numbers of gears, forward - reverse		3 - 3	3 - 3	3 - 3
Alternator	Type - power	W	AC - 2240	AC - 2240	AC - 2240	
Driving axle	Type		Differential and hub reduction	Differential and hub reduction	Differential and hub reduction	

Performance

DCE70-32/35, E3/E4

Performance			Volvo - TAD620VE		Cummins - 6B5,9e			
			E3	E4	E3	E4		
Performance	Lifting speed	Unloaded	m/s	0,50	0,60	0,50	0,60	
		At rated load	m/s	0,45	0,55	0,45	0,55	
	Lowering speed	Unloaded	m/s	0,50	0,40	0,40	0,40	
		At rated load	m/s	0,50	0,40	0,40	0,40	
	Travelling speed, f/r	Unloaded	km/h	30	30	30	30	
		At rated load	km/h	30	30	30	30	
	Gradeability	Max	unloaded	%	48	46	50	47
			at rated load	%	35	33	36	34
		At 2 km/h	unloaded	%	35	33	36	34
			at rated load	%	26	25	26	25
Drawbar pull	Max	kN	103	103	105	105		

DCD70-40, E5

Performance			Volvo - TAD720VE		Volvo - TD640VE		
			E5	E5	E5	E5	
Performance	Lifting speed	Unloaded	m/s	0,45	0,45	0,45	
		At rated load	m/s	0,40	0,40	0,40	
	Lowering speed	Unloaded	m/s	0,60	0,60	0,60	
		At rated load	m/s	0,60	0,60	0,60	
	Travelling speed, f/r	Unloaded	km/h	26	26	26	
		At rated load	km/h	26	26	26	
	Gradeability	Max	unloaded	%	45	36	36
			at rated load	%	36	28	28
		At 2 km/h	unloaded	%	39	30	30
			at rated load	%	31	23	23
Drawbar pull	Max	kN	134	110	110		

DCE80-45/90-45/100-45, E5/E6/E7/E8

Performance			Volvo - TAD720VE			Volvo - TWD731VE			Cummins QSB5.9				
			DCE80-45	DCE90-45	DCE100-45	DCE80-45	DCE90-45	DCE100-45	DCE80-45	DCE90-45	DCE100-45		
Performance	Lifting speed	Unloaded	m/s	0,60	0,60	0,60	0,60	0,60	0,60	0,60	0,60		
		At rated load	m/s	0,55	0,55	0,55	0,55	0,55	0,55	0,55	0,55		
	Lowering speed	Unloaded	m/s	0,60	0,60	0,60	0,60	0,60	0,60	0,60	0,60		
		At rated load	m/s	0,60	0,60	0,60	0,60	0,60	0,60	0,60	0,60		
	Travelling speed, f/r	Unloaded	km/h	27/27	28/28	28/28	27/27	27/27	27/27	27/27	28/28	28/28	
		At rated load	km/h	25/25	26/26	26/26	25/25	25/25	25/25	25/25	27/27	27/27	
	Gradeability	Max	unloaded	%	36	31	31	28	28	28	36	31	31
			at rated load	%	29	24	23	25	22	22	29	25	25
		At 2 km/h	unloaded	%	31	27	27	24	24	24	31	27	27
			at rated load	%	25	21	20	22	19	19	25	21	21
Drawbar pull	Max	kN	127	114	114	105	105	105	127	115	115		



Chassis and lifting equipment

Chassis

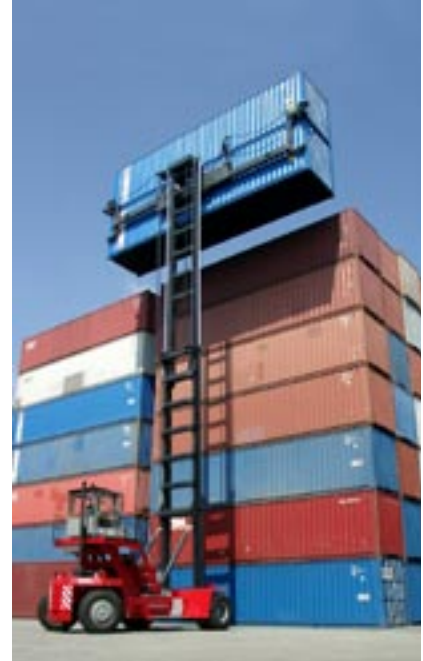
The chassis creates the base for the machine's external dimensions, stability and manoeuvre characteristics.

All chassis are built of fully welded steel profiles, which give a rigid construction with strong mounting points for the drive axle and lift equipment. Stress concentrations have been eliminated for optimum tensile strength.

Kalmar offers chassis in four different wheelbases corresponding to alternative capacities and lifting heights. The space at the rear of the chassis is used for counterweights. The number of counterweights depends on special operating requirements.

The chassis has a low profile for good visibility. The tanks are separately constructed and bolted to the chassis in a position that also contributes to good visibility.

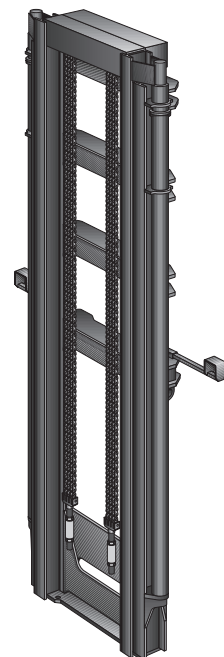
The cabin on each model is located for best visibility. The DCE80-100 series come in two different versions regarding the cabin position. Depending on market requirements the machines can be delivered with standard cabin height position or as an elevated version. This decision is depending on individual operational requirements.



Lift masts

All masts are constructed according to the free visibility principle. The mast profiles are made of high tensile steel, designed for minimal obstruction of the field of vision and long service life. All mast wheels for the bearing of longitudinal stress are fitted with high quality roller bearings. Lateral stresses are borne by plastic sliding plates.

The robust mast of the DCE100 has become even sturdier. All machines in the DCE80-100 series are equipped with the sturdy 10 tonne mast for best durability and strength.



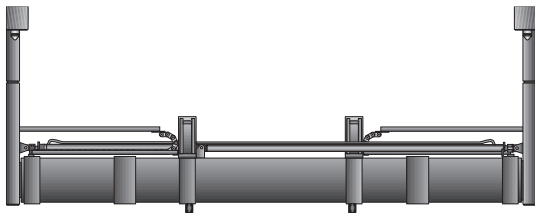
All masts from 3 to 8+1 high are designed according to the free visibility principle.

Attachments

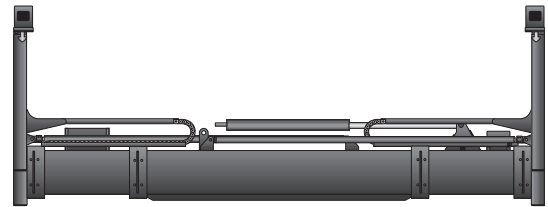
The 7 tonne DCE machines have twist-locks attachments with mechanical levelling, adjustment 20'-40' and with a sideshift of $\pm 140\text{mm}$.

The sidelif attachment has been designed for easy, safe and rapid handling, low weight and ease of maintenance.

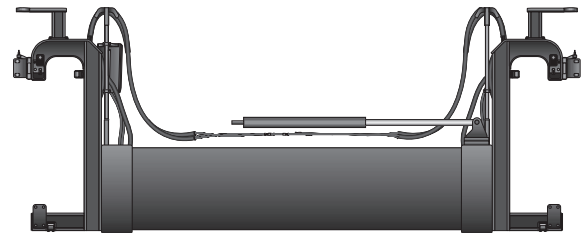
DCD 70 and DCE 80-100 are equipped with twistlock attachments. DCE 100 can be equipped with the newly developed hook attachment for double stacking. Both the hook and twistlock attachments have a hydraulic cylinder between the attachment and the carriage that allows $\pm 600\text{ mm}$ side-shift.



DCE 70 attachment with twistlocks, length adjustments 20-40'. Attachment with hook connection, side-shift $\pm 140\text{ mm}$. Mechanical levelling on each side.



DCD 70 and DCE 80, 90 and 100 attachment for single stacking with twistlocks.



DCE 100, attachment for double stacking with hooks.

Carriages

Three integrated carriages are available. Which one you choose depends on if the spreader is landing from above (twistlocks) or from the front side of the container (hooks). All carriages have support wheels to bear longitudinal stresses and sliding plates for lateral stresses.

Single stacking 7 tonne

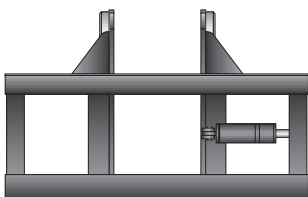
DCE 70 machines adapted for single stacking has a carriage for hook mounted attachment.

Single 8-9 tonne

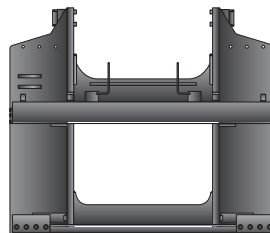
The fixed carriage for attachment with twist-locks has a mechanical levelling.

Double 10 tonne

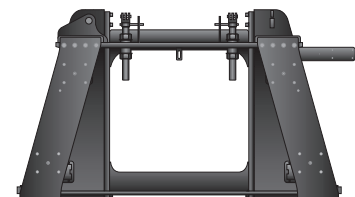
The hook attachment has mechanical levelling as standard and hydraulic as option.



DCE 70, carriage for hook mounted attachment side-shift $\pm 140\text{mm}$



DCD 70 and DCE 80, 90 and 100 carriage for single stacking



DCE 100, carriage for double stacking



Operator environment

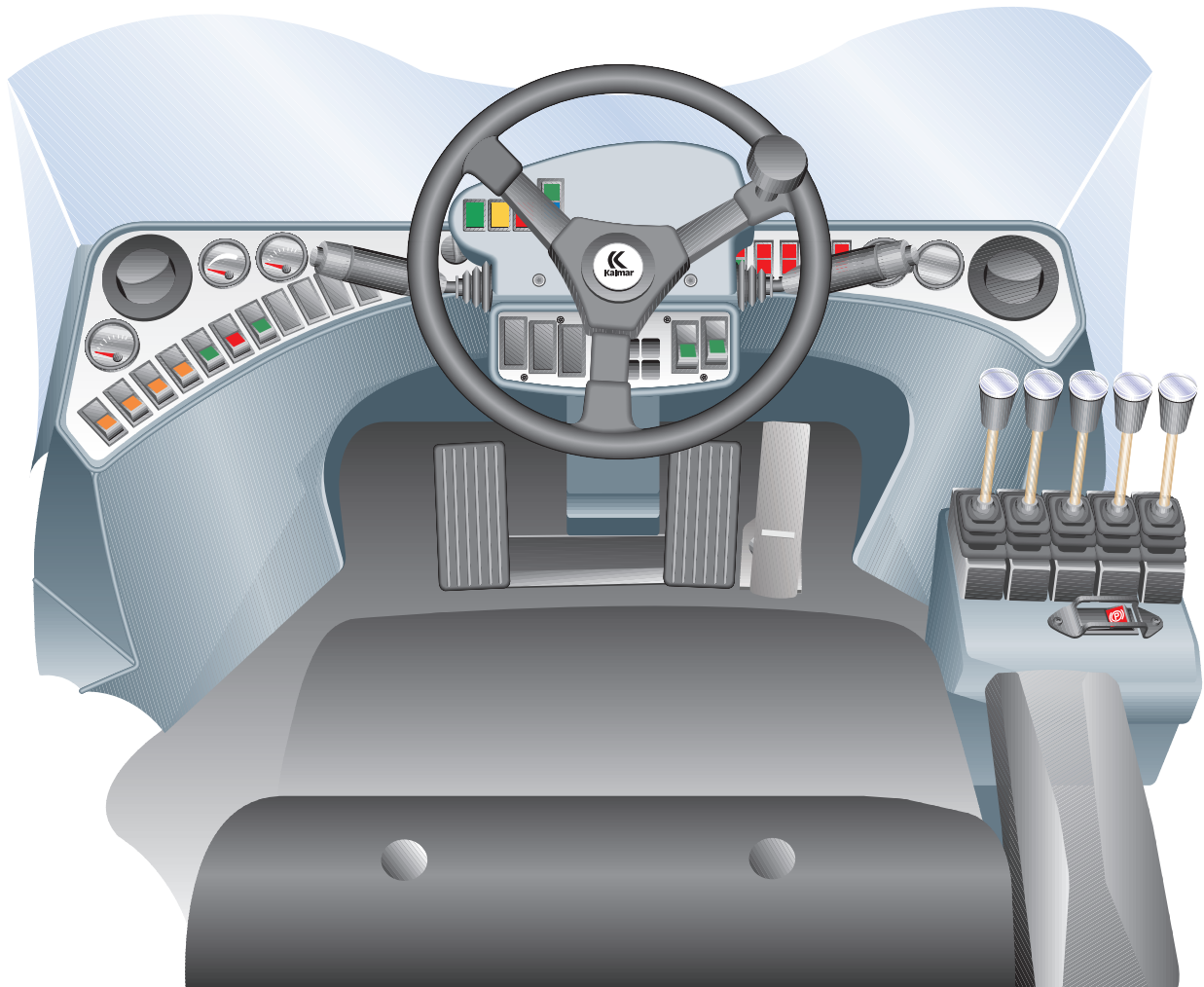
The Spirit Delta cab provides the operator with an efficient and safe place of work. The design of the cab is the result of a comprehensive analysis of operators' working conditions providing optimum visibility with large glass areas and no forward corner posts to obstruct the field of vision. The instrument panel is gently rounded and ergonomically designed with an unobstructed clear view of all essential information.

Noise and vibration levels are low thanks to the insulated mounting to the chassis. The operator's seat and hydraulic controls are all individually adjustable for optimum working position. The steering wheel and

related panel angle is adjustable. Two easily operated, ergonomically positioned multi-function levers are provided for gear changing, windscreen wipers, washers and horn.

A heating/ventilation unit ensures a comfortable cab temperature. An easily replaced fresh air filter cleans the incoming air, the unit slides out to give easy access for service. As standard, the equipment includes a powerful 3-speed fan for cooling, heating, defrosting and recirculation. Air conditioning can be fitted as optional extra.

The optional FlexCab can be fitted on the 7 tonne DCE machines. This cabin is a cost efficient solution with high flexibility for less requiring conditions.



Operators environment, Spirit Delta DCE 80-100

Instrumentation

The instrument panel in the Spirit Delta has logically grouped units, all within easy reach. Standard instrumentation includes warning lamps for battery charging, low engine and gearbox lubrication oil pressure, low brake pressure, high coolant temperature, high gearbox oil temperature and applied parking brake. In addition, gauges display values for gearbox oil pressure, engine coolant temperature, fuel quantity and operating time.

As option the 8-10 tonne trucks can be fitted with Electronic Control System (ECS) monitoring for easy supervision of the unit. All monitoring functions are then incorporated and handled by the ECS, which has a single warning lamp and full text display showing current values and any faults that occur.

A similar system can be fitted in the 7 tonne DCE machines named KCS – Kalmar Control System.

There are many options available in KCS with considerable opportunities for customising the truck's functions – everything from functions for improving productivity, such as pre-selected lifting height and automatic gearing, to ergonomics functions, such as joystick control and mini-steering wheel as well as further functions for improving safety, for example chain slack monitoring and prevention.



Reliability and service access

Reliability

The range is one of the most widely spread machines manufactured by Kalmar. This has created a great experience from the field of this machine type. The machine sub-systems all consist of well tested and field proven components.

Service Access

Routine daily service checks contribute to a safe work place and reduce the risk of breakdowns. All machines in the empty container handling range have built-in service access.

Daily service checks are made easier thanks to well thought out and grouped service points. The operator can reach all service points without having to climb up onto the truck. The cabin position facilitates easy access to the engine compartment.



Hydraulic components can be easily reached from above. This makes all vital components readily accessible for service.

Contact information:

Kalmar global partner

Local presence, globally

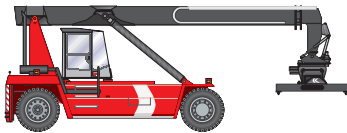
Kalmar is a global supplier of heavy materials handling equipment and services for ports, terminals, industry and intermodal handling.

Local presence means that we can support our customers throughout the product's life cycle, wherever they are.

Our products are manufactured in Sweden, Finland, the USA, the Netherlands, China and Malaysia.



Other empty container models



Empty Container Handler ContChamp

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