Kalmar DCE70-90
Empty container handlers 7 – 9 tonnes

Technical Information

Introduction

Dedicated for empty container handling

Kalmar machines especially adapted to handle empty containers has been developed for a long time. 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, we can offer a wide range of Kalmar empty container handlers. Our range stretches from a capacity of 3 high up to 8 high.

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

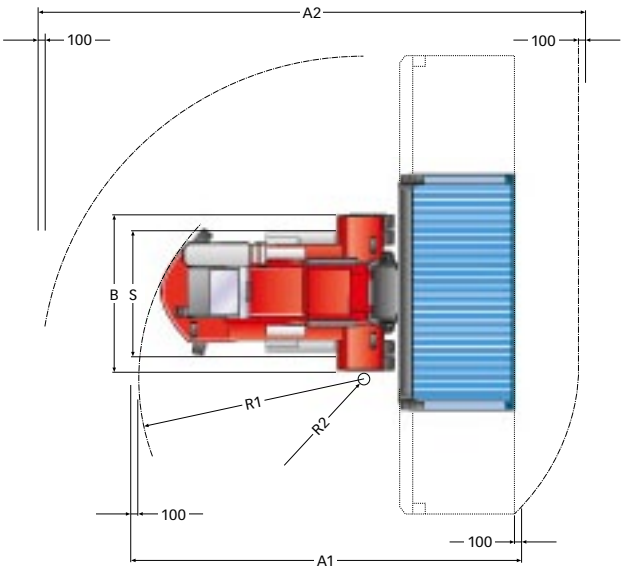
Beside from driving fast and safe, stacking is a time-consuming job that demands preciseness. This places heavy demands on the stability of the machine, mast and spreader together with user friendliness during handling. Another key factor is to create an unobstructed field of vision.

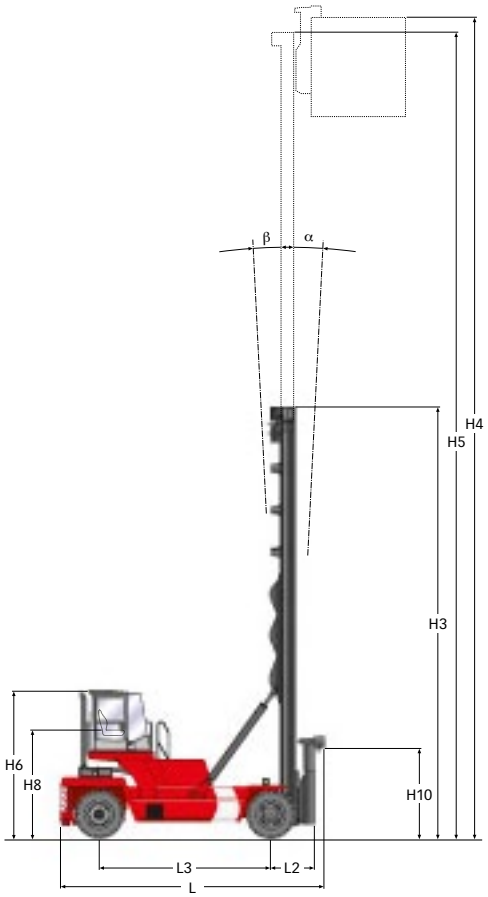
These characteristics combined allow the operator to focus on the task instead of the managment of the machine.

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.

Capacity and Dimensions					**DCE70-32/35, DCD 70-40**		
					E3	**E4**	**E5**
Lifting	Lift capacity	Rated		kg	7000	7000	7000
		Load centre	L4	mm	1220	1220	1220
		Number of containers – 8'6" container			3	4	5
		Number of containers – 9'6" container			3	4	5
Dimensions	Truck	Length of truck	L	mm	5595	5845	6355
		Width	B	mm	2540	2900	3500
		Height, basic machine	H6	mm	2920	2920	3840
		Seat height	H8	mm	1790	1790	2700
		Distance between centre of front axle – front face of attachment	L2	mm	1265	1265	1275
		Wheelbase	L3	mm	3250	3500	4000
		Track (c-c), front – rear	S	mm	1855 – 1960	2210 – 1960	2800 – 1960
		Turning radius, outer	R1	mm	4360	4785	5400
		Turning radius, inner	R2	mm	125	420	285
		Ground clearance, min.		mm	250	250	250
		Max height when tilting cab	T1	mm	3395	3395	-
		Max width when tilting cab	T2	mm	3380	3380	-
		Min, aisle width for 90° stacking with attachment – 20' container	A1	mm	8900	9200	9500
		Min, aisle width for 90° stacking with attachment – 40' container	A1	mm	13800	13900	13950
	Standard duplex mast	Lifting height	H4	mm	9120	12120	15180
		Mast height, min.	H3	mm	5195	7075	8540
		Mast height, max.	H5	mm	8695	12075	15040
		Mast tilting, forwards – backwards	α - ß	°	3 - 5	3 - 5	3 - 5
	Attachment	Width	b	mm	6064	6064	-
		Height under twistlock	H10	mm	2120	2120	2180
		Sideshift ±	V1	mm	140	140	600
Weight	Service weight			kg	22900	23900	30900
	Axle load front	Unloaded		kg	14700	15600	21100
		At rated load		kg	27100	27600	32500
	Axle load back	Unloaded		kg	8200	8300	9800
		At rated load		kg	2800	3300	5400
Wheels, brakes, steering	Wheels/tyres	Type			Pneumatic		
		Dimensions, front – rear		inch	12,00 x 20/20PR		
		Number of wheels, front – rear (*driven)			4* - 2		
		Pressure		MPa	0,9	0,9	0,9
	Steering system	Type – manoeuvring			Hydraulic servo - Steering wheel		
	Service brake system	Type – affected wheels			Oil cooled disc brakes (Wet disc brakes - drive wheels)		
	Parking brake system	Type – affected wheels			Dry spring activated disc brake - drive wheels		
Misc.	Hydraulic pressure	Max.		MPa	19,5	20	16,0
	Hydraulic fluid volume			l	225	225	220
	Fuel volume			l	200	200	205





	DCE80-45				DCE90-45			
	E5	E6	E7	E8	E5	E6	E7	E8
	8000	8000	8000	8000	9000	9000	9000	9000
	1220	1220	1220	1220	1220	1220	1220	1220
	5	6	7	8	5	6	7	8
	5	5	6	7	5	5	6	7
	6900	6900	6900	6900	6900	6900	6900	6900
	4000	4000	4000	4000	4000	4000	4000	4000
	3940	3940	3940	3940	4000	4000	4000	4000
	2840	2840	2840	2840	2900	2900	2900	2900
	1150	1150	1150	1150	1150	1150	1150	1150
	4550	4550	4550	4550	4550	4550	4550	4550
	3270 – 2250	3270 – 2250	3270 – 2250	3270 – 2250	3270 – 2250	3270 – 2250	3270 – 2250	3270 – 2250
	6000	6000	6000	6000	6300	6300	6300	6300
	200	200	200	200	200	200	200	200
	250	250	250	250	300	300	300	300
	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
	10000	10000	10000	10000	10000	10000	10000	10000
	14000	14000	14000	14000	14000	14000	14000	14000
	15180	16180	18680	21180	15240	16240	18240	21240
	8540	9040	10290	11540	8600	9100	10350	11600
	15040	16040	18540	21040	15100	16100	18600	21100
	3 - 3	3 - 3	3 - 3	3 - 3	3 - 3	3 - 3	3 - 3	3 - 3
	-	-	-	-	-	-	-	-
	2180	2180	2180	2180	2240	2240	2240	2240
	600	600	600	600	600	600	600	600
	35650	36300	37925	39550	36500	37150	38775	40400
	23100	23750	25375	27000	23300	23950	25575	27200
	35250	35900	37525	39150	37000	37650	39275	40900
	12550	12550	12550	12550	13200	13200	13200	13200
	8400	8400	8400	8400	8500	8500	8500	8500
	Pneumatic				Pneumatic			
	12,00 x 24 - 12,00 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	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			
	19,0	19,0	19,0	19,0	21,0	21,0	21,0	21,0
	320	320	320	320	320	320	320	320
	380	380	380	380	380	380	380	380

Model designation

DCE80-45E8

- Diesel engine
- Counterweight truck
- Generation
- Lifting capacity, in decitonne
- Wheelbase, in decimetres
- Empty containers
- Number of containers when stacking

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

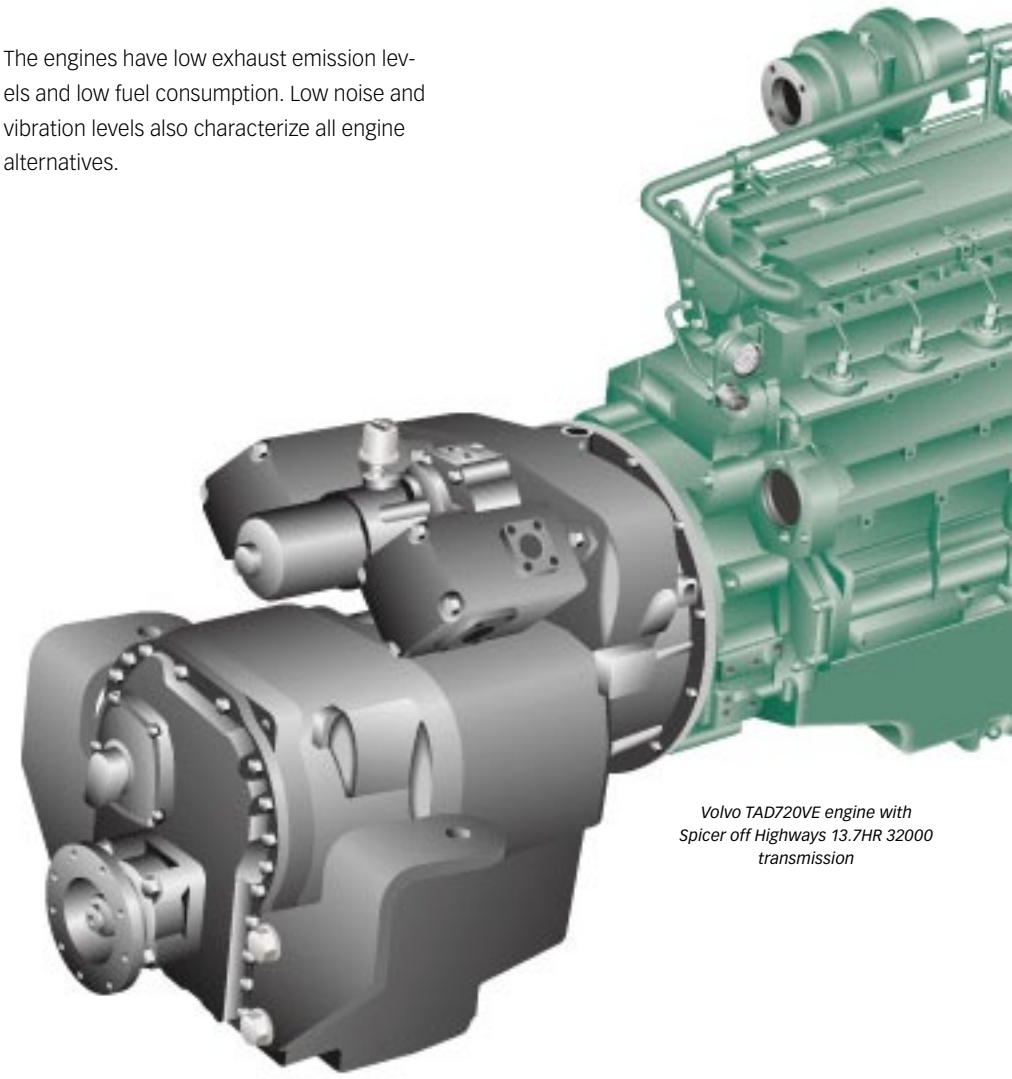
All empty container handlers are equipped with straight six cylinder turbo charged engines equipped with intercooler. The engines are adapted to the special working conditions of empty container handling, with high power and torque levels at low engine speed.

The engines have low exhaust emission levels and low fuel consumption. Low noise and vibration levels also characterize 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.

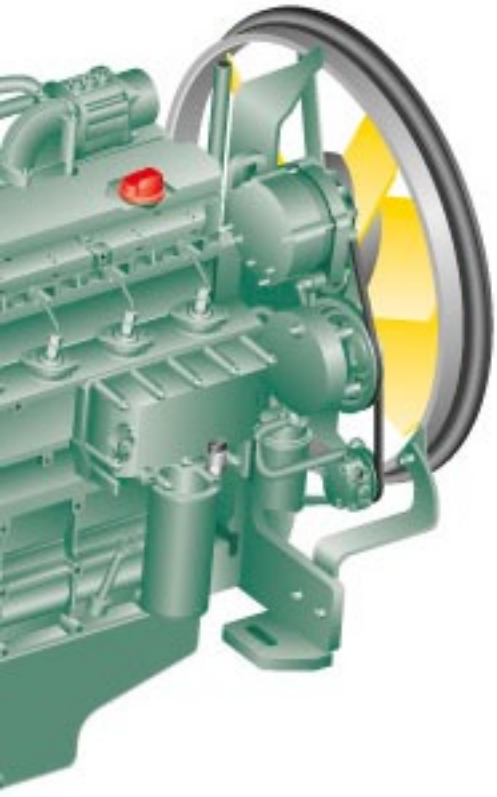


Volvo TAD720VE engine with Spicer off Highways 13.7HR 32000 transmission

Steering System

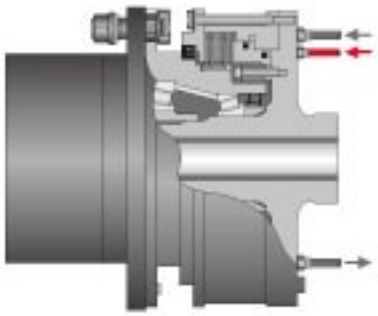
The steering system is completely hydraulic. The steering axle is a robust construction with double-acting cylinder. The pendulum suspension of the axle, over powerful spherical rubber bushings, has a long operative life span and is totally maintenance free.

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 and performance

Drive trains – DCE70-32/35, E3/E4					Standard	Option	Option
					Volvo TAD650VE with Dana TE13000	**Volvo - TAD750VE Dana TE17000**	**Cummins QSB6,7 with Dana TE17000**
Drive train	Engine	Manufacturer – type designation			Volvo – TAD650VE (Turbo Intercooler)	Volvo – TAD750VE (Turbo Intercooler)	Cummins – QSB6,7 (Turbo Intercooler)
		Fuel – type of engine			Diesel – 4 stroke	Diesel - 4 stroke	Diesel – 4 stroke
		Rating ISO 3046 – at revs	kW/rpm		147/200 – 2300	181/246 – 2300	164/223 – 2200
		Peak torque ISO 3046 – at revs	Nm – rpm		750 – 1600	1050 – 1500	949 – 1500
		Number of cylinders – displacement		cm^3	6 – 6057	6 – 7145	6 – 6702
		Fuel consumption, normal driving		l/h	8-11	8-11	8-11
	Gearbox	Manufacturer – type designation			Dana – TE13000	Dana - TE17000	Dana – TE17000
		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 – 1960
	Starting battery	Voltage – capacity		V – Ah	2×12 – 140	2×12 – 140	2×12 – 140
	Driving axle	Manufacturer – type			Kessler D81 – Differential and hub reduction	Kessler D81 – Differential and hub reduction	Kessler D81 – Differential and hub reduction
	Noise level	LpAZ (inside*) Sprit Delta		dB(A)	73	74	74
		LwA (outside**)		dB(A)	108	110	111

Drive trains – DCD70-40, E5					Standard
					Volvo TAD720VE with Dana 13,7HR32000
Drive train	Engine	Manufacturer – type designation			Volvo – TAD720VE (Turbo Intercooler)
		Fuel – type of engine			Diesel – 4 stroke
		Rating ISO 3046 – at revs	kW/rpm		174/236 – 2300
		Peak torque ISO 3046 – at revs	Nm – rpm		864 – 1400
		Number of cylinders – displacement		cm^3	6 – 7145
		Fuel consumption, normal driving		l/h	9-12
	Gearbox	Manufacturer – type designation			Dana – 13,7HR32000
		Clutch, type			Torque converter
		Gearbox, type			Hydrodynamic Powershift
		Numbers of gears, forward – reverse			3 – 3
	Alternator	Type – power		W	AC – 1540
	Starting battery	Voltage – capacity		V – Ah	2×12 – 140
	Driving axle	Manufacturer – type			Differential and hub reduction
	Noise level	LpAZ (inside*) Sprit Delta		dB(A)	–
		LwA (outside**)		dB(A)	–

Drive trains – DCE80-45/90-45, E5/E6/E7/E8					Standard
					Volvo TAD720VE with Dana 13,7HR32000
Drive train	Engine	Manufacturer – type designation			Volvo – TAD720VE (Turbo Intercooler)
		Fuel – type of engine			Diesel – 4 stroke
		Rating ISO 3046 – at revs	kW/rpm		174 – 2300
		Peak torque ISO 3046 – at revs	Nm – rpm		854 – 1400
		Number of cylinders – displacement		cm^3	6-18,4:1
		Fuel consumption, normal driving		l/h	12-14
	Gearbox	Manufacturer – type designation			Dana – 13,7HR32000
		Clutch, type			Torque converter
		Gearbox, type			Hydrodynamic Powershift
		Numbers of gears, forward – reverse			3 – 3
	Alternator	Type – power		W	AC – 2240
	Starting battery	Voltage – capacity		V – Ah	2×12 – 140
	Driving axle	Manufacturer – type			Differential and hub reduction
	Noise level	LpAZ (inside*) Sprit Delta		dB(A)	–
		LwA (outside**)		dB(A)	–

Performance – DCE70-32/35, E3/E4					Volvo TAD650VE		Volvo TAD750VE		Cummins QSB6,7	
					E3	E4	E3	E4	E3	E4
Performance	Lifting speed	unloaded		m/s	0,50	0,60	0,50	0,60	0,50	0,60
		at 70% of rated load		m/s	0,45	0,55	0,45	0,55	0,45	0,55
	Lowering speed	unloaded		m/s	0,40	0,40	0,40	0,40	0,40	0,40
		at rated load		m/s	0,40	0,40	0,40	0,40	0,40	0,40
	Travelling speed, forward – reverse	unloaded		km/h	29	29	29	29	32	32
		at rated load		km/h	28	28	29	29	32	32
	Gradeability	Max.	unloaded	%	57	54	74	69	70	66
			at rated load	%	41	39	51	48	48	46
		At 2 km/h	unloaded	%	41	39	55	52	52	50
			at rated load	%	30	29	39	38	38	36
	Drawbar pull	Max.		kN	116	116	138	138	133	133

Performance – DCD70-40, E5					Volvo TAD720VE
					E5
Performance	Lifting speed	unloaded		m/s	0,50
		at 70% of rated load		m/s	0,45
	Lowering speed	unloaded		m/s	0,40
		at rated load		m/s	0,40
	Travelling speed, forward – reverse	unloaded		km/h	29
		at rated load		km/h	29
	Gradeability	Max.	unloaded	%	74
			at rated load	%	51
		At 2 km/h	unloaded	%	55
			at rated load	%	39
	Drawbar pull	Max.		kN	138

Performance – DCE80-45/90-45, E5/E6/E7/E8					Volvo TAD720VE	
					DCE80-45	DCE90-45
Performance	Lifting speed	unloaded		m/s	0,60	0,60
		at 70% of rated load		m/s	0,55	0,55
	Lowering speed	unloaded		m/s	0,60	0,60
		at rated load		m/s	0,60	0,60
	Travelling speed, forward – reverse	unloaded		km/h	27/27	28/28
		at rated load		km/h	25/25	26/26
	Gradeability	Max.	unloaded	%	36	31
			at rated load	%	29	24
		At 2 km/h	unloaded	%	31	27
			at rated load	%	25	21
	Drawbar pull	Max.		kN	127	114

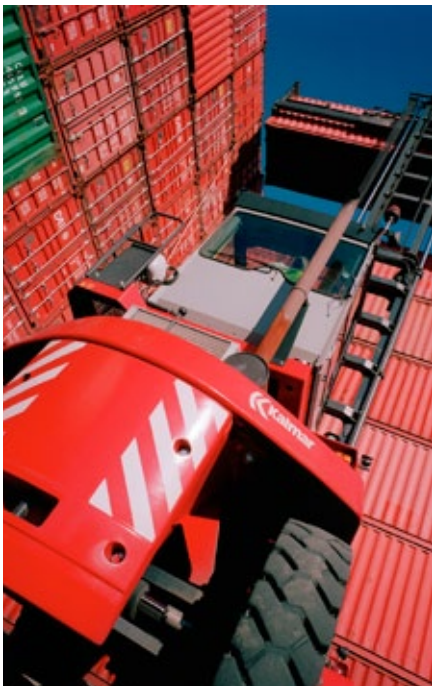
Chassis and lifting equipment

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.

We offer 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 DCE80-90 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.

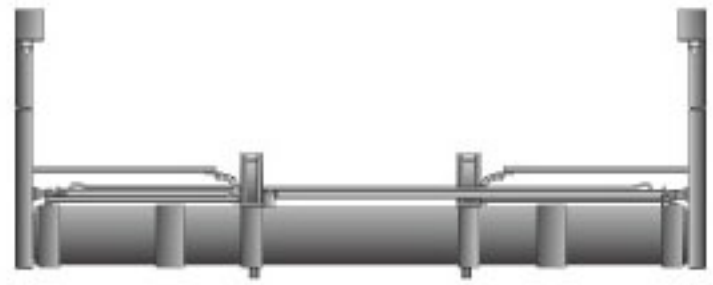
All masts from 3 to 8 high are designed according to the free visibility principle.

Attachments

The 7 tonne DCE machines have a twistlock attachment with mechanical levelling, adjustment 20'-40' and with a sideshift of ±140mm.

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

DCD70 and DCE80-90 are equipped with twistlock attachment and has a hydraulic cylinder between the attachment and the carriage that allows ±600 mm side-shift.



DCE70 twistlock attachment with hook connection and mechanical levelling on each side.

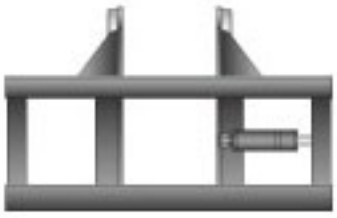
DCD70 and DCE80-90 twistlock attachment

Carriages

All carriages have support wheels to bear longitudinal stresses and sliding plates for lateral stresses.

Single stacking 7 tonne

DCE70 machines adapted for single stacking has a carriage for hook mounted attachment.



DCE70, carriage for hook mounted attachment side-shift ±140mm.

Single 8 – 9 tonne

The fixed carriage for attachment with twistlocks has a mechanical levelling.

DCD70 and DCE80-90 carriage for single stacking.

Ergonomics

Operator environment

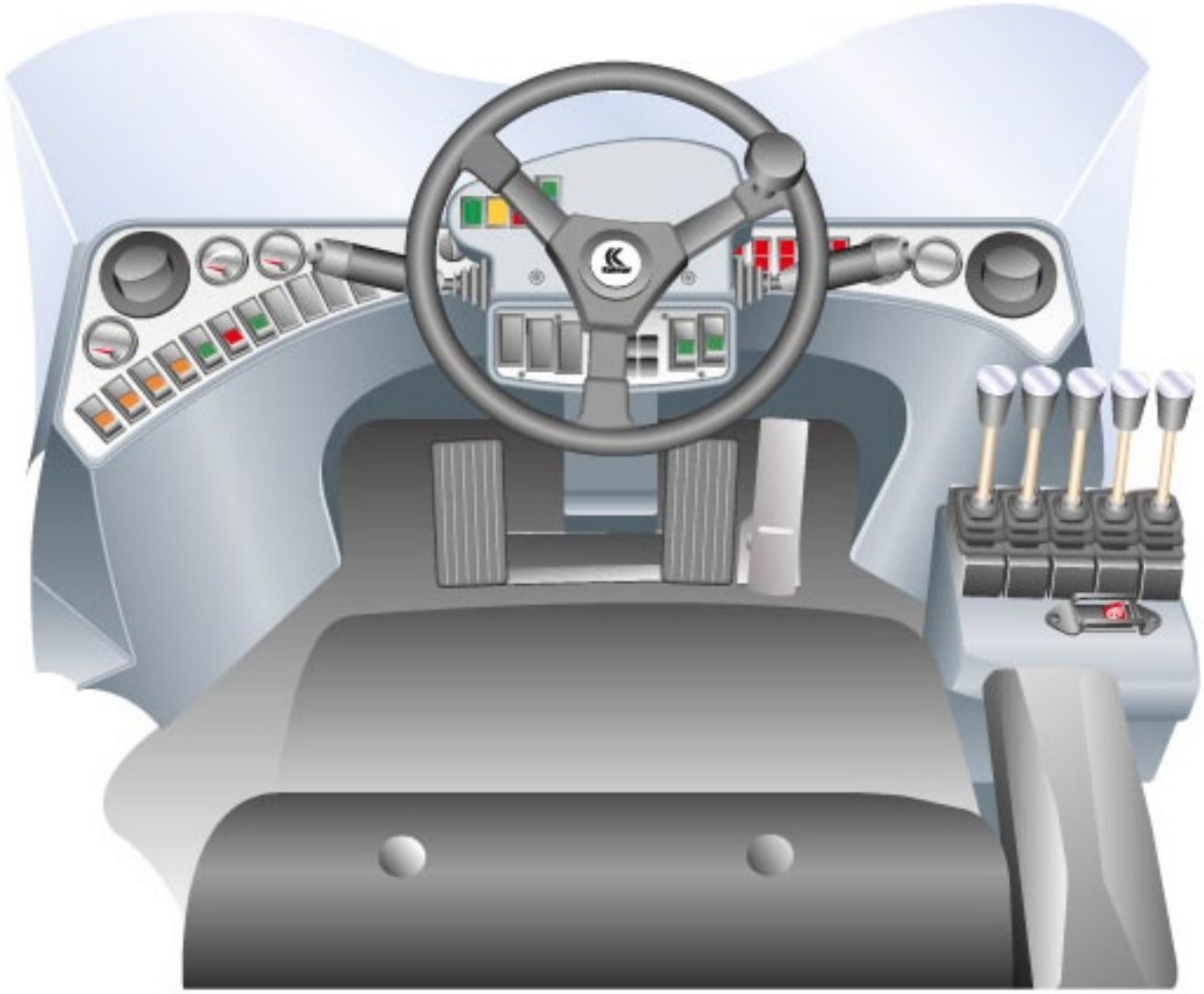
The Spirit Delta cab provides the operator with an efficient and safe place of work. The design of the cab is the result of a comprehensive analysis of operators' working conditions providing optimum visibility with large glass areas and no forward corner posts to obstruct the field of vision. The instrument 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.



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 – 9 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 DCE empty container handler is a well-known and a widely spread Kalmar machine. It has given us great experience from the empty container handling business. The machine's 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.

Global presence and local service bring our products and solutions closer to our customer.

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TI-EC9-EN-NCE / 2009.11.15