

Modular very narrow aisle (VNA) dual purpose combi-truck to 1500 kg capacity



K



011

Introduction

The new K range is a versatile dual-purpose rising cabin VNA system truck for efficient, high density storage and retrieval of unit loads as well as order picking in very narrow aisles. The unique modular design ensures the specification always matches the application precisely.

- Lift heights to 14585 mm
- Picking heights to 14940 mm
- Load capacity to 1500 kg
- Elevating operator's cab
- Rotating turret head or telescopic forks with supplementary lift
- Rail or inductive wire guidance options

Features

- Unique modular design enables bespoke specification to match application
- Linde System Control (LSC) ensures high productivity coupled with superb operator comfort
- Assured safety with power and speed profiles dynamically controlled by LSC
- Enhanced, precision load handling with new, low deflection mast
- High residual capacities through inherent structural stability and innovative design
- Up to 15% energy recovered when lowering main lift
- Rapid servicing via CAN bus

Operators cabin and controls

- Choice of three cab versions (Standard, universal and optimum),
- Wide and low cabin access
- Spacious operator's cabin
- Folding comfort seat with height adjustment
- Tilting control console, with digital display
- Superb visibility forward and rear
- Two travel speeds (9 km/h and 12 km/h)
- Batteries from 420 Ah to 840 Ah

- Linde System Control (LSC) 'smart' electronics, for faster simultaneous travel and lift
- Acceleration, top travel speed and deceleration automatically controlled relative to lift height for total safety

Chassis

The patented heavy duty and compact modular chassis utilises 50mm and 80mm thick sections and is designed to withstand high torsional stresses for optimum structural integrity and durability, as well as providing high residual capacities. A range of modular chassis configurations ensures total compatibility with each individual application. The unique design provides easy service access to key components and for battery checking and changing.

Drive and transmission

Encapsulated, maintenance-free AC drive motors provide the option of two maximum speeds, 9 km/h, and 12 km/h depending on the application demands. A choice of two gear ratios ensures the perfect interface with the motors for optimum operational performance with smooth, rapid acceleration.)

Electrical system

The Linde System Control (LSC) represents a significant advance in the 'smart' control of VNA system trucks. The LSC provides automatic control of traction and lift speeds during simultaneous lift and travel sequences within the aisle, as well as automatic slow down of lift, turret head rotation and traverse movements. The unique LSC controller enables smoother, faster work cycles with safe, precision load handling at all lift heights. An integrated CAN bus system continuously monitors all functions and retains diagnostic data through LSC for rapid fault finding and maximum uptime. All performance parameters are easily changed to suit customer and application issues.

Steering

Effortless electric power steering for rapid aisle transfer and guidance acquisition with a dual circuit fail-to-safe system.

The steered wheel centre position is shown on digital display.

The low maintenance brushless DC steering motor has an integrated speed sensor and straight travel reference switch. The steering angle is also continuously monitored.

Guidance

The truck can be guided using either inductive wire guidance or mechanical rail guidance systems. The trucks steering is automatically centred and locked when in the aisle leaving the operator free to concentrate on the allotted order picking and storage tasks.

Mast, hydraulics and turret head

New modular design for exceptionally stable low deflection characteristics with a range of telescopic and triplex masts for all headroom requirements. Smooth and highly responsive operation of all mast movements is ensured by the Linde System Control (LSC). Up to 15% energy is recovered as the mast is lowered.

- Modular rotating turret and traversing telescopic heads with a range of supplementary lift options
- Automatic soft-stop of lift, rotate and traverse movements
- Simultaneous lowering of main and auxiliary lift
- Choice of 20 kW or 24 kW maintenance-free AC lift motors to match individual application demands

LINDE

**Combination Order Picker
and High-Bay VNA Truck**

**Data sheet for
Industrial Trucks**

EKL

Symbol

June 2004

Designation to VDI 3586

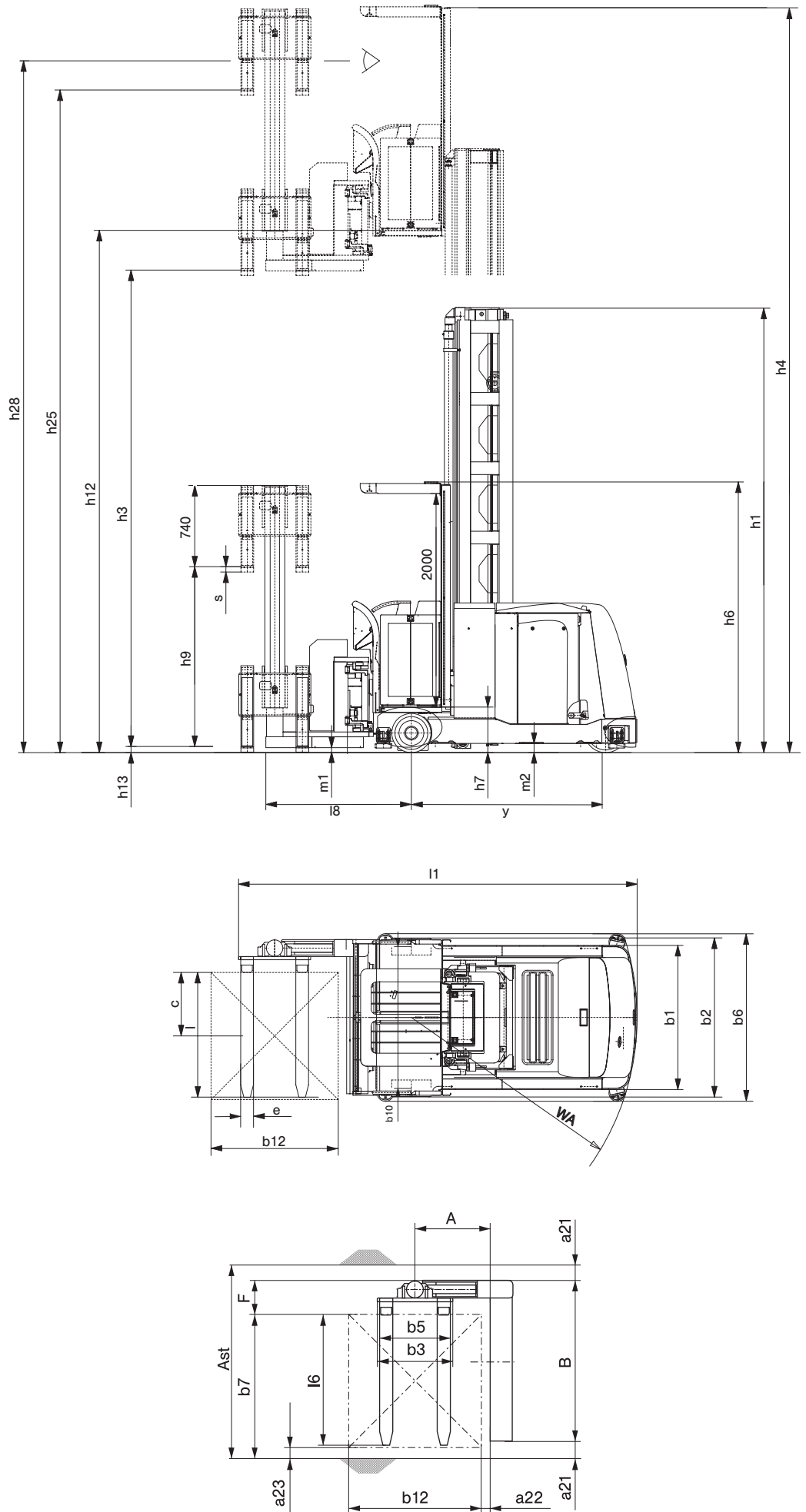
(Example configurations from a virtually infinite Modular System selection)

				Linde	Linde	Linde
Characteristics	1.1	Manufacturer		Linde	Linde	Linde
	1.2	Model designation		K	K	K
	1.3	Power type: Battery, diesel, gasoline, LPG, AC		Battery	Battery	Battery
	1.4	Control type: Manual, pedestrian, stand-on, seated, order picker		Stand-on/seated	Stand-on/seated	Stand-on/seated
	1.5	Load capacity	Q (kg)	700	900	1100
	1.6	Load center	c (mm)	600	600	600
Weight	1.9	Wheelbase	y (mm)	1586	1730	1964
	2.1	Dead weight (with battery)	kg	8163	8902	10275
	2.2	Axle load with load, drive side / load side	kg	2406 / 5757	2615 / 6287	3034 / 7241
Chassis	2.3	Axle load without load, drive side / load side	kg	2859 / 4604	3148 / 4854	3624 / 5551
	3.1	Tyres (Solid rubber, Vulkollan, pneumatic, polyurethane)		Vulkollan	Vulkollan	Vulkollan
	3.2	Tyre size, drive side	mm	ø 400 x 140	ø 400 x 140	ø 406 x 170
	3.3	Tyre size, load side	mm	ø 370 x 160	ø 370 x 160	ø 370 x 160
	3.5	Wheels, number drive side / load side (x = driven)		1x/2	1x/2	1x/2
	3.6	Track width, front	b ₁₀ (mm)	1290	1290	1290
Dimensions	3.7	Track width, rear	b ₁₁ (mm)	-	-	-
	4.2	Height of mast, lowered	h ₁ (mm)	3900	4400	5400
	4.4	Lift	h ₃ (mm)	5200	6200	8200
	4.5	Height of mast, extended	h ₄ (mm)	7755	8755	10755
	4.7	Height of overhead guard (cab)	h ₆ (mm)	2555	2555	2555
	4.8	Height of seat / platform	h ₇ (mm)	430	430	430
	4.11	Auxiliary lift	h ₉ (mm)	1675	1675	1675
	4.14	Platform height, raised	h ₁₂ (mm)	5630	6630	8630
	4.14.1	Pick height (h ₁₂ + 1600)	h ₂₈ (mm)	7230	8230	10230
	4.15	Lowered fork height	h ₁₃ (mm)	60	60	60
	4.19	Overall length (over forks)	l ₁ (mm)	3206	3350	3584
	4.21	Overall width of chassis / track wheel axle	b ₁ / b ₂ (mm)	1160 / 1500	1160 / 1500	1160 / 1500
	4.22	Fork dimensions	s / e / l (mm)	50 / 120 / 1200	50 / 120 / 1200	50 / 120 / 1200
	4.24	Fork carriage width	b ₃ (mm)	710	710	710
	4.25	Fork spread min.	b _{5 min} (mm)	470	470	470
	4.25	Fork spread max.	b _{5 max} (mm)	640	640	640
	4.27	Width over guide rollers	b ₆ (mm)	1615	1615	1615
	4.29	Traverse stroke	b ₇ (mm)	1280	1280	1320
	4.31	Ground clearance under mast, with load	m ₁ (mm)	40	40	40
	4.32	Ground clearance, center of wheelbase	m ₂ (mm)	87	87	87
	4.34	Aisle width	A _{st} (mm)	1620	1620	1680
	4.35	Turning radius	W _a (mm)	1852	1996	2230
	4.38	Fork pivot point	l ₈ (mm)	999	999	999
	4.39	Rotator length	A (mm)	480	480	480
4.40	Traverse frame width	B (mm)	1440	1440	1440	
4.41	Rotator width	F (mm)	250	250	240	
4.42	Transfer aisle width, min.	A _u (mm)	3628	3772	4003	
4.44	Cab entrance clear width	(mm)	495	495	495	
4.45	Cab clear height	(mm)	2000	2000	2000	
Performance	5.1	Travel speed, with / without load	km/h	9 / 9	9 / 9	12 / 12
	5.2	Lift speed, with / without load	m/s	0.47	0.47	0.46
	5.3	Lower speed, with / without load	m/s	0.45	0.45	0.45
	5.4	Traverse speed, with / without load	m/s	0.30	0.30	0.30
	5.9	Acceleration, with/without load (first 10 m)	s	7 / 7	7 / 7	9 / 8
	5.10	Service brake		Regenerative	Regenerative	Regenerative
Drive	6.1	Drive motor, 60 minute rating (S ₂)	kW	7	7	7
	6.2	Lift motor, 15% rating (S ₃)	kW	20	20	24
	6.3	Battery to IEC 254-2; A, B, C, No		IEC 254-2; A	IEC 254-2; A	IEC 254-2; A
	6.4	Battery type, voltage, rated capacity (K ₅)	V/Ah	PzV, 80 V, 360 Ah	PzV, 80 V, 480 Ah	PzV, 80 V, 700 Ah
	6.5	Battery weight ± 5% (varying with make)	kg	1314	1538	1863
Other	8.1	Drive controller		Microprozessor	Microprozessor	Microprozessor
	8.4	Noise level at operator's ear	dB(A)	68	68	68

VDI 2198

Linde	Linde
K	K
Battery	Battery
Stand-on/seated	Stand-on/seated
1300	1500
600	600
2108	2108
11362	11032
3358 / 8003	3087 / 7945
4008 / 6054	3836 / 5696
Vulkollan	Vulkollan
∅ 406 x 170	∅ 406 x 170
∅ 370 x 160	∅ 370 x 160
1x/2	1x/2
1290	1290
-	-
6400	5400
10000	8200
12555	10755
2555	2555
430	430
1675	1675
10430	8630
12030	10230
80	80
3728	3728
1160/1500	1160/1500
50/120/1200	50/120/1200
710	710
470	470
640	640
1715	1715
1330	1330
40	40
87	87
1720	1720
2374	2374
999	999
480	480
1440	1440
250	250
4150	4150
495	495
2000	2000
12/12	12/12
0.46	0.46
0.45	0.45
0.30	0.30
10/9	10/9
Regenerative	Regenerative
7	7
24	24
IEC 254-2; A	IEC 254-2; A
PzV, 80 V, 840 Ah	PzV, 80 V, 840 Ah
2178	2178
Microprozessor	Microprozessor
68	68

Turret head version



Features



Braking systems

Two independent braking systems:

- Electric regenerative braking actuated as the hand operated accelerator is released and or opposite direction of travel is selected
- Two-stage, electro-magnetic, sprung loaded parking and emergency brake operating on the drive motor shaft.

Servicing and maintenance

Overall low maintenance design and construction of the truck using thoroughly tested and proven components results in extended uptime and reduced service intervals. Easy service access to all key components. CAN bus technology integrated within the Linde System Control provides rapid diagnosis of the truck systems and intermittent faults are memorised. An optional modem link offers remote diagnostic facilities. All operational parameters are programmable to suit the customer.

Safety

- Two independent braking systems
- Deadman foot switch
- Automatic proportional speed control when travelling and lifting simultaneously
- Polycarbonate screen between operator and mast
- Two handed actuation of all operational controls
- Electric horn
- Overhead guard
- Electrical and hydraulic overload protection
- Emergency-escape rope and harness system
- Emergency circuit isolator
- Emergency lowering valve from ground level
- Slack chain interlock

Batteries

- To IEC 254-2A
- Capacities from 360 Ah to 840 Ah
- The battery is housed within the chassis and battery changing is either side lift out using a forklift or battery on rollers onto an auxiliary stand.

Optional equipment

- **NEW** – Modular solutions for increased residual capacity
- **NEW** – Alternative cabin widths and fittings
- **NEW** – Load sensors
- **NEW** – Weight sensors
- **NEW** – Load wheel brakes
- Cab and working lights
- Various operational interlocks
- Range of standard and triplex masts to 14585 mm
- Alternative turret and telescopic head configurations
- Synchronised rotation in the aisle
- Lift interrupts
- Writing surface
- Mechanical steering angle limiter

Other options available on request

Subject to modification in the interests of progress. Illustrations and technical details not binding for actual construction. All dimensions subject to usual tolerances.