Depotlift WA - ManUp Turret

STEINBOCK BOSS

New Product Features

The Future of VNA Technology

WA 13 - 15

WA Series - Turret Truck

With the experience of over 3500 WA ManUp style Turret Trucks in the field, STEINBOCK BOSS has enhanced and developed a NEW vehicle that has revolutionized the Very Narrow Aisle World.

The "Hercules - Project"

Alone at its inception the new WA had to excel in all areas in order to maintain the market leadership position by example.

- **Ergonomic & Design**
- **Productivity**
- **Efficiency**
- **Service / Safety**

WA - Warehouse Technology

Basic Chassis

Model	Capacity	Length	Wheelbase	Battery
WA13R-17	2750 lbs	141.0 “	70.2 ”	72v 465 Ah
WA15R-19	3300 lbs	146.7 ”	75.8 “	72v 550 Ah
WA15R-22	3300 lbs	158.3 “	87.5 “	72v 1000 Ah

- The Steinbock-Boss WA series was designed and developed to meet the requirements of very narrow aisle front and lateral stacking and order picking.
- WA series models cover basic capacities of 2200 lbs, 2750 lbs and 3300 lbs.
- Lift heights and order picking heights are up to 46.9 ft. high, depending on weight and size of load.
- Aisle width (AST) is as small as 53.1”, dependent on size and weight of load, stacking/picking height requirement and type of guidance system.
- The WA can be supplied with inductive wire guidance or roller/rail guidance, to meet customer requirements.
- The WA is designed and built for high productivity, ease of operation, safety, reliability and durability, combined with ease of routine maintenance.

WA Warehouse Technology

Productivity

- Touch button control of the load handling functions with a feather light response for proportional speed control and ease of operation.
- The main mast is a Steinbock Boss proven space frame mast design with regenerative lowering for longer battery shift life. Options include Duplex and Triplex full free lift masts.
- Increased height of the forward positioned secondary mast with 68.9” of lift for higher lift heights, and easy order picking from each side of the aisle.
- Powered by 72/80 volt AC brushless motor technology, with 21 kW hydraulic and 7 kw traction motors, low energy consumption longer shift life.
- Automatically combined second and main mast lowering giving faster work cycles.
- Continuous numeric lift height display of the combined main and second mast on the operators console provides easier fork positioning, for faster work cycles.
- Synchronized rotating of the forks. Unladen and laden, (aisle width permitting) increases the load handling speed.
- Single piece battery roll out to each side of the vehicle for easy battery change, lift out batteries can be accommodated if required.

WA Series

Ergonomic - Design

- generous size operator entrance on both sides of the vehicle are fitted with 3 safety folding bars - (kick plate / mid high knee protection / top bar w. handle padded for comfort)

➔ comfortable entry and exit from flat surface reduces possibility of tripping

- inside clear cabin height 80.7”

➔ space availability for tall operators

- compact turret frame minimizes load center and overall vehicle length

➔ order picking without obstruction across the entire width of the compartment

Ergonomic - Design

- ergonomically designed cabin with generous operator work space

➔ generous leg room for freedom of movement and relaxed seating
➔ unobstructed work place optimizes order picking

- cushioned floor mat absorbs vibration decreasing operator fatigue

➔ adds to the overall well being of the operator by reducing stress

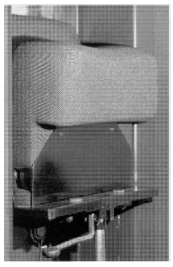
- large rear cabin window allows excellent visibility

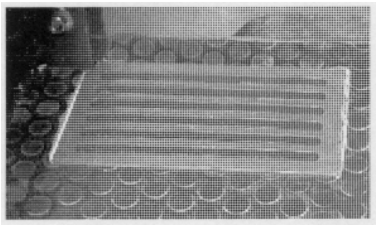
➔ good unobstructed view of the vehicle chassis and travel path

Ergonomic - Design

Ergonomics

- Greater operator comfort - cabin length increased to 22.0”
- Fully adjustable single piece operator console, only 20.5” x 5.9” x 2.4”
- Easy to operate thumb controls for drive and hydraulics using solid state technology incorporating TMC (Truck Management Control)
- Fully adjustable cushioned folding seat, cushioned non slip floor mat
- Easy truck access 24.4” wide with 3 bar cushioned lift up side gates
- Insulated front scuttle with toe hole for easy order picking
- Fully cushioned 39.4” high cabin rail for greater protection
- Twin, florescent lights for operator visibility incorporating escape harness, single fixing enclosure for easy access.
- Full range of operator compartment widths 48.8” to 68.5” giving a spacious cabin when order picking.
- Floor positioned cut outs on each side of the the cabin, for front guideroller vision when entering rail guided aisles.





PMH

WA Series

STEINBOCK BOSS 75

Ergonomic - Design

- compact, centrally located control console facing the load, for a forward unobstructed view of the travel path

➔ minimum panel width (6”) allows for the best possible unobstructed order picking operation

- control arrangement incl... all main operator functions in the operator handles (drive, main- and initial lift functions, combined lowering of main- and initial lift, sideshift, rotation and horn)

➔ control of main functions without releasing handles or reaching for levers ensures efficient, safe operation

- graphic display of all important vehicle data such as: battery capacity, steering - position of traction wheel (wire guidance - mode), hour meter, time, digital indication of overall lift height of forks (h10 - spec sheet) and vehicle status conditions

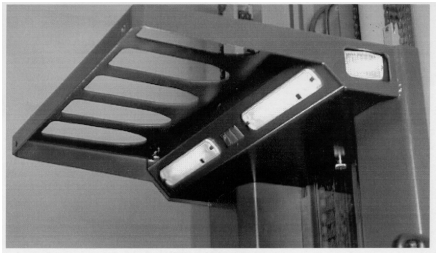
➔ the driver has all pertinent vehicle data at a glance

Ergonomic - Design

Driver Ergonomics

The driver operating cabin has been designed with great care, a deep spacious area with fully adjustable control console, a seat fully adjustable set deep within the wrap round mast sections ensures operators are safe, comfortable and productive. Motors are a powerful 'brush less' design for productive work cycles with low noise levels for operator comfort over long shifts.

Forward Facing Controls



The slim compact driver console positioned forward ensures safe forward facing driving and load handling, coupled with the spacious cabin area and forward positioned second mast gives easy access to each side and the front for productive order picking.
The slim traverse head design and toe well further enhances easy forward order picking functions.

Ergonomic & Productive

When using rail guided installations, pressing a button on the operator console, automatically centers and locks the steering. This not only makes straight line exit and re-entry into rail guidance faster and safer, but also prevents "weave" and minimizes guide rail side loading and damage.

Releasing the steering lock, automatically sets the steering wheel and the rear steered wheel in the straight ahead position.

Control Console

The single ergonomically designed driver console with easy to read display screen, incorporating steered wheel, position indicator and easy to read operating function symbols ensure the truck controls are easy to use. Two hand controls carefully positioned, with easy to operate drive control (right hand) and hydraulic control (left hand) ensure minimum fatigue over long shift operation.

The steering wheel is responsive and positive ensuring safe maneuvering in confined transfer aisles.

Each hydraulic, function is initiated by simple finger control and progressive hand control, the truck automatically applies the parking brake when a hydraulic function is selected ensuring safe truck operation.

Diagonal travel, when in the very narrow (lifting and traveling) aisle gives productive safe operation.

Ergonomic & Productive

Electronic Power Steering

When operating outside the aisle with roller/rail guidance, or off the wire guidance system safe finger tip control is ensured by the unique Steinbock Boss electronic integrated steering system.

The split field motor powering the rear steered wheel via a gear box and constant in mesh gears, gives positive responsive steering with system locking when driving in very narrow aisles. Safe productive operation when rail or wire guided.

The WA safely "free ranges" between rail guided aisles, to remote marshaling or P& D stations etc.

If in a wire guided installation/curve and remote position guidance has not been incorporated, then the same facility applies.

Automatic Height Indicator

While lifting or lowering the main or second mast the driver display constantly gives accurate fork height indication enabling faster work cycles and productive load handling.

Combined, Main and Second mast lowering improves operating efficiency for more productive work cycles.

Secondary Mast Position

The secondary free lift mast is positioned well forward of the control center. This ensures a full width picking aperture, making it easy to pick both long/large and small items. It also means that bin or stillage gates can be folded down without hitting the mast or other obstruction, enabling full access for picking.

Mast Design

Lift Chains

The Steinbock Boss WA is fitted with two lift chains, each rated at ten times the rated capacity of the truck. The WA fully meets BITA, FEM, DIN, HSE and ANSI requirements.

High Strength Main Mast

Duplex and Triplex masts are available to meet customers specific needs. Both types are multi-section "spaceframe" design - (three main plus two additional vertical sections.) This "triangulated" design gives not only immense strength but also ensures both forward/backward and lateral stability. This is critically important with elevating operator trucks, where the operator can be working at heights up to 13 meters. The design also resists and controls the lateral and torsional stresses created by traversing and rotating loads.

High Visibility Masts

Special Steinbock Boss designed rolled steel nesting mast sections, spaced widely apart, with twin lift cylinders each nested on the outside of the vertical mast sections, combine with carefully positioned wide spaced lift chains, to ensure a high degree of rearward visibility.

With the immensely strong but slim offset secondary mast, positioned well forward from the operator, forward and sideways visibility is excellent.

The mast sections themselves are rolled to special Steinbock Boss design and finally machined to ensure perfect tolerances and mast stability - Steinbock Boss investment results in accurate and fast load handling, operator comfort and safety.

Main mast damping when lowered and lifted is standard for operator comfort throughout the operating shift.

WA Series

Ergonomic - Design

- quick and easy height / tilt adjustment of the compact control panel.

➔ adjustment to individual operator preference
➔ optimum position for sitting or standing driver control

- two handed operation is accomplished via sensors in the control handles (even if the operator wears gloves)

➔ effortless activation without the inconvenience of separate deadman switches
➔ hand molded grip design supports the wrist and ensures comfortable, tireless control

- activation and release of the main functions via thumb movement

➔ sensitive infinite adjustment of the drive and hydraulic functions care for exact placement and protection of the load
➔ no unnatural hand movement reduces stress on wrist joints

Ergonomic Controls

Two Handed Control

All travel and operating functions require both hands to be in position on the controls.

a) Forward/reverse direction and acceleration/travel speed deceleration controlled by easy thumb movement operated by the right hand - the further knob is turned from the neutral position, the faster the truck will travel, up to its safe predetermined maximum. The knob is inter-connected with the left hand operated lift/lower control. Unless the operator's hands are on both and in the safety interlock mode, traction power is not available when in the very narrow aisle.

This safety feature ensures that the operator cannot drive "one handed" and risk trapping the other hand/arm in the racks or between the racks and truck.

One of the operating benefits of this two handed control, is diagonal drive lift or lower whilst traveling - without moving to other controls. Safety is enhanced and work cycle times reduced, increasing throughput.

b) Traverse, rotate or secondary mast lift/lower.

To perform any of these functions, the operator must move his right hand from the direction control (the load wheel brakes automatically come into operation) and operate the function, with the left hand being used to control the required operation. The two handed control again prevents any possibility of the operator trapping a hand/arm between load and rack, between load and control center etc.. The safety system prevents travel during traverse or rotation.

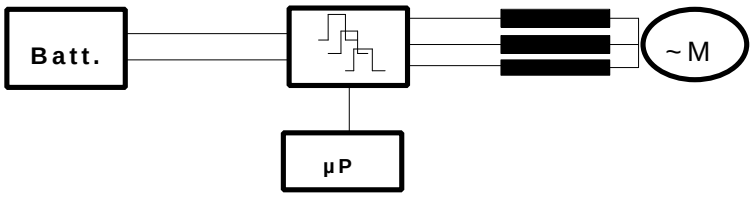
Ergonomic Controls

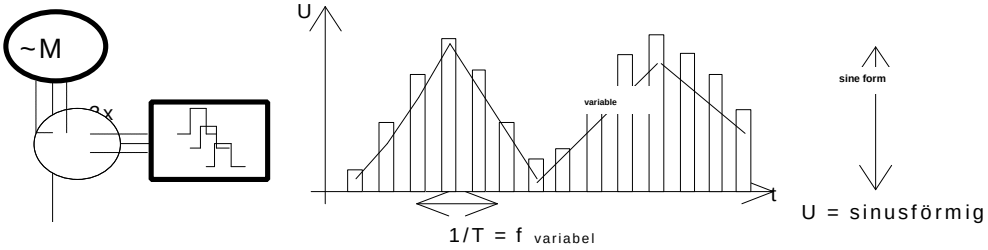
Electronic Power Steering

Whether wire guided, roller guided or free ranging, the WA standard electronic power steering utilizing a split field motor, ensures positive, precise and safe control. Controlled through the TMC, the steering responds quickly and precisely, within finely controlled limits - critically important for successful wire guidance. On rail guided installations, the automatic steering centering and locking, makes exit and re-entry of aisles quick and easy and prolongs guide rail life.

WA Series

Productivity





- use of modern Mos-fet AC technology for traction, hydraulic and steering systems

- 80/72 Volt power and MOS - FET AC pulse control (MOS - FET = Metal Oxide Semiconductor - Field Effect Transistor)

- simultaneous lowering of the main and initial lift masts

➔ fast travel - and lift speeds coupled with rapid acceleration increase productivity and throughput
➔ quiet operation - reduction of noise pollution

➔ higher component efficiency levels add to increased acceleration and obtainable speeds
➔ smooth initial movement of all function (jerk free)

➔ cycle time reduction

Quality & Reliability

Reliability (Truck Management Center)

- TMC is networked to remote individual micro controllers and control sensors using a CAN open field bus system. Four wires constitute the network. Truck cabling is reduced to a minimum, no complicated truck wiring making servicing fault finding easy.

- On board diagnostics via a graphical interface making servicing simple to complete, increasing 'truck uptime.'

- Full electric powered steering with gear drive to steered wheel. No drive chain or hydraulic pipes giving long reliable life.

- Minimum use of sensors for long term reliability

- Mos fet control of AC brushless motors, minimum components, maximum reliability.

- Simplified hydraulic system, no proportional valves, motor speed control provides the variable control of the oil flow for hydraulic services, easy to service and maintain

- The load handling 'head' position is continuously sensed using two solid state sensors, no switches, reduced servicing time.

- The console mounted TMC can be accessed via a telephone modem for service engineer technical back up when required, faster service fix more 'truck uptime.'

Quality & Reliability

Electrical System

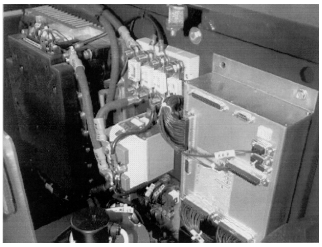
The WA has a powerful 80 volt system. This ensures that fast lift speeds, rapid acceleration and fast travel speeds are available, increasing productivity and throughput. The WA will give more work per battery charge than a similar kwh battery of lower voltage. The WA excels at one of the key requirements - more throughput per day.

Motor Control

Traction and hydraulic pump motors are controlled using the latest Mosfet A.C. technology. This system provides only the power that is required to achieve the desired operating or travel speed - battery power is not wasted. Also, contactors, resistors, etc are not required, resulting in maximum reliability.

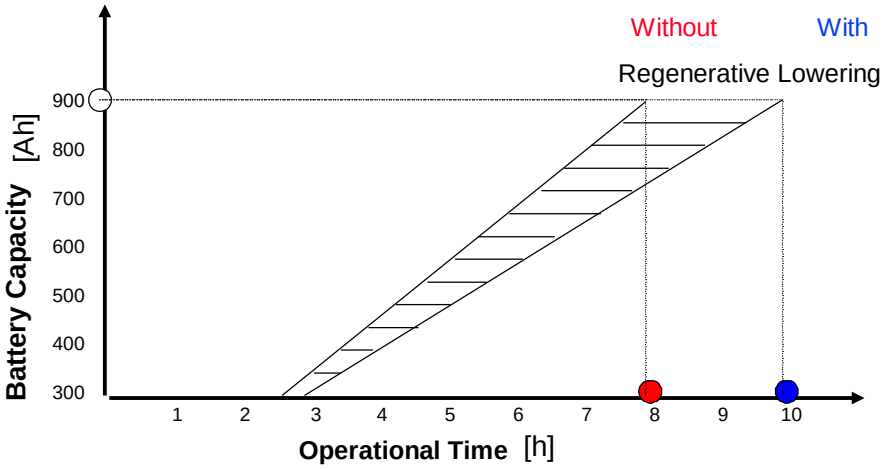
Precision Control

All truck functions - traction and hydraulic - are controlled by the T.M.C. which in turn authorizes SCR motor controls via the CAN open field bus system. This system ensures smooth precise control of all motors. The maximum rate of acceleration, deceleration, maximum travel speed under various conditions, etc. are governed by the TMC.



WA Series

Efficiency



- use of modern powerful AC systems for drive, hydraulic, and steering controls

➔ optimum use of available energy
➔ hydraulic system controlled via motor rpm - eliminates the need for proportional oil flow control valves and excess fluid returned to the hydraulic tank

- high degree of efficiency

➔ regenerative energy returned to the battery with high degree of efficiency using brushless motors
➔ no contactors / resistors / or motor brushes for the ultimate in service friendly equipment (cost reduction and maintenance effort)
➔ longer shift cycles with equal battery capacities
➔ increased pallet throughput

Features

Hydraulic System

The 'High Tech' simplified hydraulic system gives improved hydraulic efficiency and reliability levels, through a reduced number of components, proportional valves are eliminated. All hydraulic flows and speeds are smoothly and progressively controlled by the high specification 'brushless' motor, further enhancing reliability.

Regenerative Lowering

Main mast lowering is precise and controlled, the hydraulic circuit is designed to use the returning hydraulic oil flow energy and convert it to electrical energy and return it to the battery giving increasing battery shift life.

All Wheel Braking

The Steinbock Boss WA has braking on all wheels as standard. Electro-hydraulic drum brakes on each load (front) wheel, with regenerative "Retarder" and plug braking on the rear steer/drive wheel. The regenerative braking, combined with the large diameter load wheel brakes, ensure smooth and progressive "straight line" braking, even in an emergency.

Regenerative "Retarder" and Plug Braking

This simple to operate and reliable system, gives powerful, progressive braking (without use of drum or disc brakes), and change of travel direction, resulting in fast and smooth operating cycles. The regenerative braking also returns some power to the battery, effectively increasing the work per battery charge. The braking system requires minimal maintenance.

Features

Traction & Hydraulic Motors

A heavy duty 19 / 21 kW brushless pump motor is fitted as standard to the WA 1 3/15 trucks. Plenty of power for fast lift and operating cycles, with long term reliability and low noise levels.

The vertically fixed mounted brushless 7kW traction motor,(only the transmission and drive wheel turn) with down draught fan gives fast acceleration maximum reliability and productive operation.

Brushless AC motors (no brush commutator wear) for traction and hydraulics give high power output with low noise levels for long life operation and maximum truck reliability.

WA Series

Efficiency

- hydraulic system flow control via the pump motor rpm
- use of energy efficient (black / white) hydraulic valves
- higher lift speeds obtainable with lower hydraulic oil temperatures

➔ sensitive smooth acceleration control of the hydraulic

➔ greater overall vehicle efficiency and extended use of available battery capacity

➔ minimal simplified service with reduction of complex components

➔ no added heat buildup of the electrical components, a common cause of premature failure

Operation

Traverse, Rotate and Secondary Mast Unit

Designed and built by Steinbock Boss to the highest specification, the unit is hydrostatically powered, eliminating traverse cylinders, electric motors etc. Some of the benefits are,

a) Minimum lost "head width" means the Steinbock Boss WA works in the narrowest aisles, whilst retaining proper working clearances.

b) Slim traverse rack mounted directly onto the mast carriage gives rigidity and minimizes the operator distance from the load, a benefit when order picking,

c) Hydrostatic operation, ensures smooth controlled traverse and rotate. Automatic locks prevent dangerous "over-run." Cushioned start/stop of each function ensures load and operator safety.

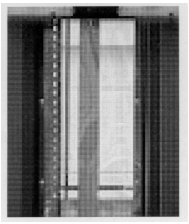
d) Large carefully positioned rollers unit, ensure load stability and safety.

e) Wide spaced large bearings on both traverse and rotate movements, ensure durability and reliability.

f) Hydrostatic powered traverse operates on twin machine cut gear racks with large tooth contact area, for precise control and durability. When eventually required, gear racks are easy to replace.

g) The secondary free lift mast, which traverses and rotates, is positioned sufficiently far forward to enable the forks to be equally spaced. This prevents unequal loading and stress, and ensures long reliable life.

Safety

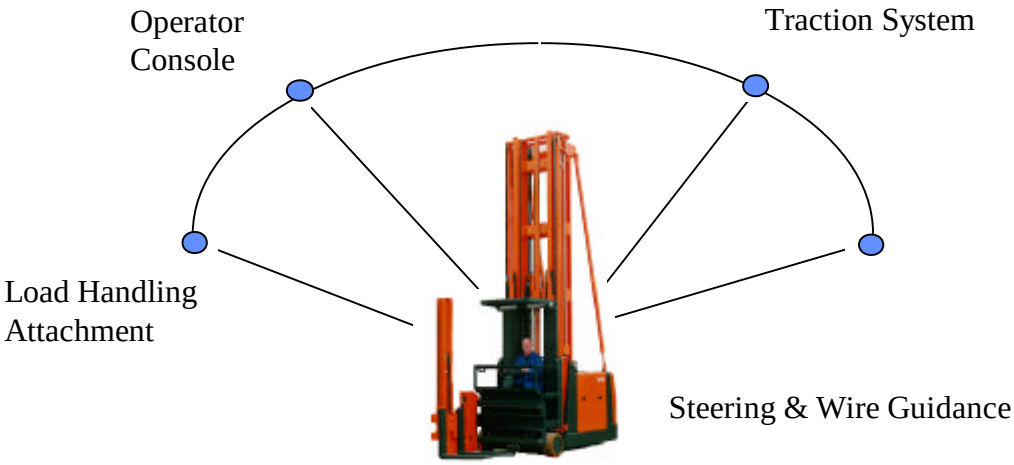


Slack Chain Device

Should a most unlikely situation arise - ' eg the operator accidentally catching the forks or pallet in the rack when lowering - the lift chains could become slack. If the operator continued lowering, then damage could be caused to the rack, load, etc - if he continued operating the lowering control and there was nothing to prevent it, then there could be so much slack in the lift chains and weight on the rack or other obstruction, that it could eventually cause an accelerated drop of the fork carriage and operator control center, resulting in a very serious situation. To eliminate this possibility, the Steinbock Boss WA is fitted with a "slack chain" device. Should the lift chains ever become slightly slack, for whatever reason, then a safety system immediately takes over and prevents further lowering until the hazard is eliminated.

WA Series

Service / Safety



- intelligent CAN - open field bus networked to remote industrial micro controllers and sensors
  - ➔ reduced wiring and connections enhance reliability and make fault finding easy
- data evaluation according to priorities
  - ➔ maximum safety ensuring immediate attention to signals with the highest priorities - this system has been extremely successful in the automotive industry
- service - interface
  - ➔ setup vehicle parameters with a simple - Laptop computer
  - ➔ read internal data buffers in order to analyze fault detection
  - ➔ analyze sensor values
  - ➔ debug and analyze programmed functions
  - ➔ additions and changes are minimized with program changes in place of wiring

Maintenance

Accessibility

Accessibility for routine service and maintenance is excellent. One cover lifts to give total access to battery. The battery is positioned low in the truck for best possible stability and mounted on rollers as standard, it can be rolled out to either side. The rear cover lifts off for total accessibility to all electronic components and motors.

Solid State Sensors

Minimum use is made of solid state sensors and only two mechanical switches. Hydraulic black/white valves instead of complex proportional flow control valves, coupled with the CAN open field bus system, reliability is further enhanced.

All truck components are positioned in the operators cabin or the truck rear with no components under the truck battery for easy service access.

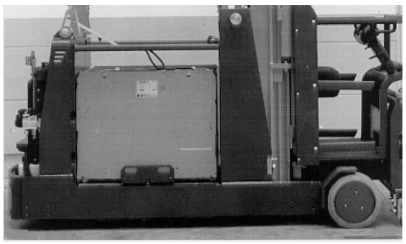
Maintenance

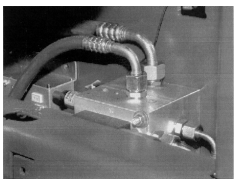
Service Access

- No electrical components under the battery. Access to all components without moving the battery, easy service access.
- 4 wire harness via open CAN field bus system for easy fault finding.
- On board diagnostics with display for easy service adjustments giving 'high truck uptime.'
- All electronic components in the OCC and the truck rear, for quick service access.
- Lift off rear cover for service access to the motors and control equipment, can be accessed even in the VNA.
- Drive motor is fixed. No moving cables for longer reliability.
- The main mast can be laid back on to the chassis for transport (dependent on lift height). No additional support bar required.

All load handling functions, traverse, rotate are controlled via the TMC with no micro switches, and two solid state sensors. Lifting and lowering of the main mast and second mast is controlled by a constant read out height detector, again minimum use of sensors, reliability is ensured, faults minimized.

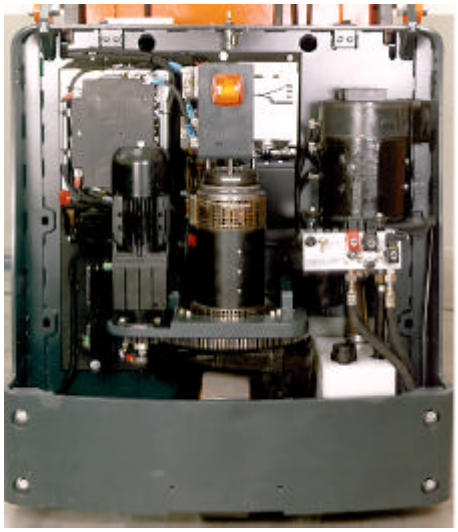
The Steinbock Boss WA truck, using the CAN open field bus system with minimum number of tamper proof sensors and a Truck Management Center ensures that all control information follows a correct pattern, incorrect or unsafe operation will be detected and safely shut down, the TMC will not reactivate until the operator resets the system, ensuring safe productive operation.





WA Series

Service / Safety



- use of AC brushless motors together with reliable basic hydraulic controls
  - ➔ reduction of programmed service and failures on motors without brushes and simple on / off hydraulic solenoids
- reduction in the number of building blocks or system components
  - ➔ minimal wear and tear
- all drive and hydraulic components are fitted under the rear cover for immediate easy service access
  - ➔ strong light weight cover is completely removable
  - ➔ unparalleled access for service and repair even within the narrow aisle
- phone modem connection to service center PC - provides high tech remote analyses and assistance
  - ➔ remote diagnostic help available

Reliability

RELIABILITY

CAN open field bus system with a minimum number of wires and connections ensures a reliable control system and maximum truck' uptime.'

A plug in service unit with diagnostic display allows the service engineer to integrate the whole truck control system quickly and simply making fault finding easy. The truck controls can be integrated via the service unit and a telephone modem, technical engineers based at regional service centers can support field engineers when fault finding ensuring "minimum downtime" even for the most complicated truck problems.

Controls - "Overmast" Electrical Controls

All controls from control center to "truck" and vice versa, are by the CAN open field bus system. The encoded signals are transmitted via four wires and reliable "overmast" cable. This ensures maximum reliability and should replacement eventually be required, it is quick and easy to do.

CAN OPEN FIELD BUS SYSTEM

Proven reliable automobile technology on fork lift trucks. The 'Truck Management Center' is networked to remote Industrial Micro Controllers and control sensors using a CAN open field bus system. Four wires constitute the network, cables are reduced to a minimum. This unique design ensures that a minimum number of electrical connections are required, (no complicated truck wiring loom or harness.) Minimum connections and reduced wiring enhances reliability making servicing and fault finding easy.

On board diagnostics via a graphical user interface makes servicing simple to complete increasing' truck uptime.' Minimum use of switches ensures long term reliability. Only two micro switches on the truck, these are for slack chain safety detection.

Safety

SAFETY

Truck Management Center (T.M.C.)

All operating functions are monitored, analyzed and authorized by the TMC. This also governs the parameters in which the traction control, hydraulic function control and braking systems operate - these parameters can be changed easily to suit customers specific operating requirements, by re-programming the TMC computer.

Features

- Vision main mast, and forward mounted second mast with lower front scuttle for all round visibility.
- 8 roller support of the operator cabin including side thrust rollers for improved operator safety.
- High visibility paint finish in alert orange with repositioned amber flashing beacon, the truck is easy to see.
- Reduced traverse rack depth for increased stability and higher rated capacities.
- Larger diameter load wheels and drive wheel for reduced floor loading and improved driver comfort.
- Wider load wheel track for increased truck stability.
- All welded chassis with clean outside lines for easy maneuvering and stability.

WA 13 / WA 15

Features

Standard Features:

Cabin

- ergonomic operator compartment includes - overhead guard, anti-fatigue and slip resistant floor mat, insulated front cabin wall
- spring mounted, height adjustable, folding cushioned operator seat
- height and tilt adjustable control panel with minimal dimensions
- integrated graphic display screen indicates vehicle status (battery, hour meter, constant combined digital lift readout, wheel position, and operator controls) & service requirements
- Emergency stop button integrated within the control console

Safety & Efficiency

- diagonal load movement with optimum velocity profiles for each travel direction
- integrated front / rear warning lights
- repelling system brackets (climbing rope not incl)

Steering

- electronic servo system

Guidance System

- rail guidance with polyurethane wheels, aisle detection via optical sensor
- automatic centering of the steered wheel via operator switch

Mast

- wide profile and deep box frame provide deflection stiffness

Attachment

- coordinated side shift and rotation movement
- initial lift mast of 68.9”

WA 13 / WA 15

Motors

- AC motor controls

Brakes

- two independent braking systems

Hydraulics

- end dampening of all functions
- start / stop acceleration ramps
- coordinated dampening of main mast collapse point
- unilateral lowering of main and initial mast

Electrical

- electronic drive system with plugging brake & energy return
- lift system energy return while lowering
- rpm regulation of hydraulic motor (in place of proportional valves)
- cabin power supply 24V 2 A for data communication