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BT vector

1.0 – 1.5 tons

Very Narrow Aisle Trucks

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A-series

R-series

R-series

C-series

A-series

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BT Vector – the *complete* range of very narrow aisle trucks

Productivity – Driveability – Safety – Durability

Companies that opt for very narrow aisle operation are committed to maximising the use of storage space. Toyota Material Handing Europe's range of VNA trucks has been developed with a series of unique features that are designed to minimise the space occupied by the truck, and to vastly improve speed and efficiency in operation. Like all BT warehouse trucks, BT Vector trucks are designed to work effectively in chilled environments, where the space-saving benefits of VNA storage are particularly beneficial.

For man-down work, the all-new BT Vector **R-series** is based on the class-leading BT Reflex reach truck. It is available with turret-head fork design and also shuttle forks, which require a lesser aisle-width and allow high-speed lateral pallet handling.

For man-up applications Toyota Material Handling offers a range of advanced combi trucks. Capable of both order picking and full-pallet handling at height in very narrow aisles, BT Vector combi trucks boast a range of advanced features.

All-new BT Vector **C-series** models bring full VNA functionality in a compact footprint. A choice of chassis and cab widths mean that the BT Vector C-series is suited to most existing VNA operations, offering class-leading performance and energy efficiency. The truck is also designed for fast and easy transportation and installation.

TMHE uniquely offers *Advanced VNA* solutions based on the BT Vector **A-series**, which has unique space-saving and productivity enhancing features. For example, its articulated chassis provides excellent stability and minimises the space required for aisle to aisle transfer, allowing more warehouse space to be used for storage. The A-series' BT Advanced Lifting System significantly reduces the amount of battery energy required to lift the cab and load, allowing two-shift operation on a single charge. Productivity levels are exceptional, allowing outstanding work-rates.

The strength of the BT Vector range means that any VNA operation can benefit from TMHE design and thinking – all of which is intended to allow operators to drive down costs.

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BT Vector R-series
productivity and driveability

The all-new BT Vector R-series is designed for handling full pallets in very narrow aisles. Developed on the advanced and highly successful BT Reflex reach truck platform, BT Vector R-series boasts many class-leading driveability and productivity features. VRE125 and VRE150 models offer turret-head operation for greater flexibility, while the VRE125SF has shuttle forks, allowing the narrowest aisles for maximum use of space.

Efficient performance
BT Vector R-series has a high maximum travel speed of 14 km/h, excellent acceleration, and a lift speed some 35% greater than the model it replaces. Maximum lift height is 11 metres. All this is achieved with reduced energy consumption thanks in part to the AC power system's regeneration of energy under braking or lowering.

Transitional Lift Control
A key element in achieving the R-series' high lift and lower speeds is the advanced Transitional Lift Control (TLC) system. This ensures that even at maximum speed the lift and lower movements are completely smooth, even in the transitions between mast stages – eliminating shocks to protect the load and assure safety in operation. This can also lead to a reduction in risk of load damage and associated costs.

Traversing and rotating movements can also be combined, once again improving work-cycle rates. The optional autorotation feature further helps in this respect – the operator can both rotate and traverse the forks with one control, and the movement is automatically optimised for smoothness and to take the minimum amount of space in the aisle.

BT Optipace
The BT Vector R-series is designed to perform in narrow aisles, with either rail or wire guidance. In this situation the operator is concerned with moving between pallet positions as quickly and smoothly as possible. BT Vector R-series excels at 'diagonal' driving, where the truck is both driving and lifting or lowering at the same time. BT Optipace automatically optimises both drive and lift speed height and load weight. All of this makes for confident operation, maximising productivity.

Flexible battery options
An optional built-in rollerbed facilitates fast sideways battery change. An alternative option is a battery casing with fork pockets, to allow extraction and replacement using another forklift truck. A range of different battery capacities is available to suit each application.

The new load camera option supports faster load handling by giving the operator a clear view of the load from above. A fork-level camera is also available

The VRE125SF's shuttle forks allow the narrowest aisles, for maximum use of space

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BT Vector R-series
works safely...

BT Vector R-series features a host of active safety features to make handling loads at up to 11 metres a safe, everyday procedure. The cab is designed around the operator to allow him to concentrate on the job.

Built-in security
BT Vector R-series is safe from operation by untrained personnel. Only a correct PIN-code or the optional ID key or card will start the truck. It will also automatically engage the appropriate performance settings for that operator.

The pedals are laid out as in a car, for safe, intuitive driving and the parking brake is automatic, applying whenever the truck comes to a halt. An easy-to-reach emergency stop button is standard.

Totalview means safety and productivity
Once seated in the cab, the operator will notice the view. BT's Totalview concept means a low sloping console to give good driving visibility, and an excellent view through the overhead guard and mast. All-round driving vision is maximised with a slim guard support and rear visibility window, together with a wide-angle rearview mirror.

The shape of the cab and overhead guard are optimised to protect the driver. An optional hip guard, which provides extra support for the driver, improves comfort and reduces fatigue.

In operation, new features include automatic centring of the drive wheel on start-up, and a load information display, indicating load weight and fork height in one easy-to-read location. The standard drive-wheel direction indicator is always active, in case the operator needs to confirm direction of travel.

Autorotation (option) allows the operator to rotate and traverse the forks simultaneously with one lever. The action is automatically configured to take the minimum space possible

The optional aisle camera provides the operator with a clear view of any obstructions in the aisle that may not be visible from the cab

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… with proven durability

Utilising many parts from the proven BT Reflex reach truck, and built according to the renowned Toyota Production System, the BT Vector R-series is designed to work day in, day out, with minimal need for servicing.

The Toyota Production System ensures the highest possible build quality, with subsequent benefits for reliability. The heavy-duty drive unit and gearbox are designed for a long working life; indeed, the gearbox oil should never need to be replaced. The AC motors are brushless and the oil filter only needs to be changed after 3000 working hours.

Fault indication and easy diagnostics keeps downtime to a minimum. The electronic cards are mounted in sealed boxes with Gore-Tex filters, protecting them from dust and moisture.

The size of the drive-wheel on the BT Vector R-series has been substantially increased, reducing wear and improving the ride quality

The AC motors are brushless, reducing maintenance requirements

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BT Vector C-series
easy-fit with power and performance

Very narrow aisle 'combi' trucks – combining full pallet handling and order picking – are amongst the most advanced forklift trucks in use today. The BT Vector C-series range offers state-of-the-art solutions to the most demanding warehousing operations, in which high productivity is a constant requirement. The BT Vector C-series has an industry-standard chassis configuration which means that it can be specified to work in most existing VNA applications.

There are three models in the BT Vector C-series, with capacities of 1000 kg (VCE100), 1200 kg (VCE120) and 1350 kg (VCE135). Maximum lift heights are from 9.5 m up to 13.6 m, ensuring the range can meet the requirements of all types of application.

Easy-fit from the start

The BT Vector C-series is designed to easily fit into VNA sites. Not only does the extent of the range ensure the optmum application fit, but even delivery and installation is simple, straightforward and fast.

Most VNA trucks require on-site assembly with requirements for heavy lifting to build the mast assembly. The BT Vector C-series has a swing-down mast design, which means it can be shipped on a standard road vehicle and towed into position, with mast repositioning and final commissioning taking less than half a day, driving down installation costs.

Class-leading productivity

With travel speeds of up to 12 km/h the BT Vector C-series outperforms comparable 3-wheel combi trucks. The BT Optipace system optimises travel speed according lift height allowing high speed elevated travel without compromising safety.

Simultaneous lifting and lowering of cab and fork unit is also possible allowing the operator to move between pick positions quickly and accurately, again adding to productivity.

The design of the hydraulic system on BT Vector C-series trucks has also been optimised not only for high lift/lower performance, but also to conserve energy. The result is long operating shifts before battery recharging is required thanks also to the high capacity batteries and regenerative braking and lowering.

Designed for excellent driveability

All aspects of the cab are adjustable to suit the driver. This includes the height of the twin control panels, which are designed to allow a fast change of driver position according to direction of travel.

BT Vector C-sereis trucks are designed to operate with either wire or rail guidance systems so that the operator does not need to steer the truck in-aisle

The twin control panels allow easy access to the forks for order picking

All truck movements are fingertip-controlled – light, responsive and effortless. This allows for fast and accurate handling

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BT Vector C-series
a focus on safety

Safety is essential in all working situations, but particularly so in man-up applications. The BT Vector C-series is designed and built with safety in mind.

The cab is built to protect the driver, with sturdy contruction and effective gate design.

Double safety handgrips ensure the operator is always operating the truck in a safe driving position, and the BT Optipace system ensures that travel speed is always adapted to lift height.

All controls have been carefully developed ensure logic in operation, and the driver is fully informed about all aspects of the truck's operation via a clear information display that also alerts the driver to any detected faults or errors.

Another important factor is visibility. The BT Vector C-series provides a clear view for drving and load handling based on the BT Totalview concept.

The mast allows a clear view, making rearward driving easier and safer

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durability for maximum uptime

Like all trucks from Toyota Material Handlig Europe, the BT Vector C-series rage is built to ensure maximum availability – or uptime – recognising the vital role that these machines play in handling processes.

The BT Vector range has a proven record of reliability and this is further enhanced in the design of the latest C-series models.

Many performance-related features also provide durability benefits. For example the regenerative braking and lowering systems also reduce component wear and heat that would otherwise be generated. This translates to greater durability and longer service intervals.

The high power lift motors are also designed to run cooler, further enhancing truck reliability.

Other design features include a well-designed hydraulic system, with fewer components and without the need for hoses to be connected through the mast structure.

The high power lift motors run cooler, enhancing reliability

The result is more dependable operation, and maximum uptime.

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BT Vector A-series
Advanced VNA

BT Vector A-series is the ultimate VNA truck, offering the greatest productivity, the highest energy efficiency and the most effective use of space, setting a completely new standard when it comes to driving down costs. We call it Advanced VNA – and these are the headlines:

Advanced use of space
The BT Vector A-series' unique articulated chassis allows it to drive between aisles using a transfer aisle up to one metre narrower than that required by a non-articulated truck. This means that typically an extra four pallet positions can be provided on each level within an aisle, and with lift heights to well over 14 metres it can result in up to 60 extra pallet positions per aisle. This gives substantial cost savings in terms of space, but not at the cost of productivity – aisle transfer typically takes less than 10 seconds.

Advanced stability
The BT Vector A-series model features four front wheels in an offset configuration. This brings two key benefits. Firstly, stability is improved, allowing class-leading lift capacities. Secondly, using four wheels reduces effective floor loading by 25% compared to a conventional three-wheeled truck. Ride is also smoother, and the wheel assembly's bolt-on design allows the truck's overall chassis width to be easily changed.

Advanced performance
The four-wheel chassis also allows a low overall weight as there is a reduced requirement for counterweight stability. Combine this with its two powerful drive motors and the result is exceptional performance and reduced work-cycle times.

Advanced Lifting System and energy efficiency
Another unique feature on the BT Vector A-series is the BT Advanced Lifting System (see overleaf). This dramatically reduces energy required for lifting, and combines with the low overall truck weight and regenerative braking and lowering to create a machine that can comfortably perform two full working shifts on just one battery charge.

Advanced belt drive
Belt drive for the traverse movement of the fork unit also saves weight over conventional designs, and offers the benefits of smoother operation, fast fork traverse times of 0.4m/s (automatically adapted to the load weight), reduced lubrication requirements, and a clearer view from the cab.

The VCE150A's unique articulated chassis requires a transfer aisle up to one metre narrower than that required by a non-articulated truck

The use of aluminium parts in the turret head reduces its weight, thereby saving energy and reducing lift times

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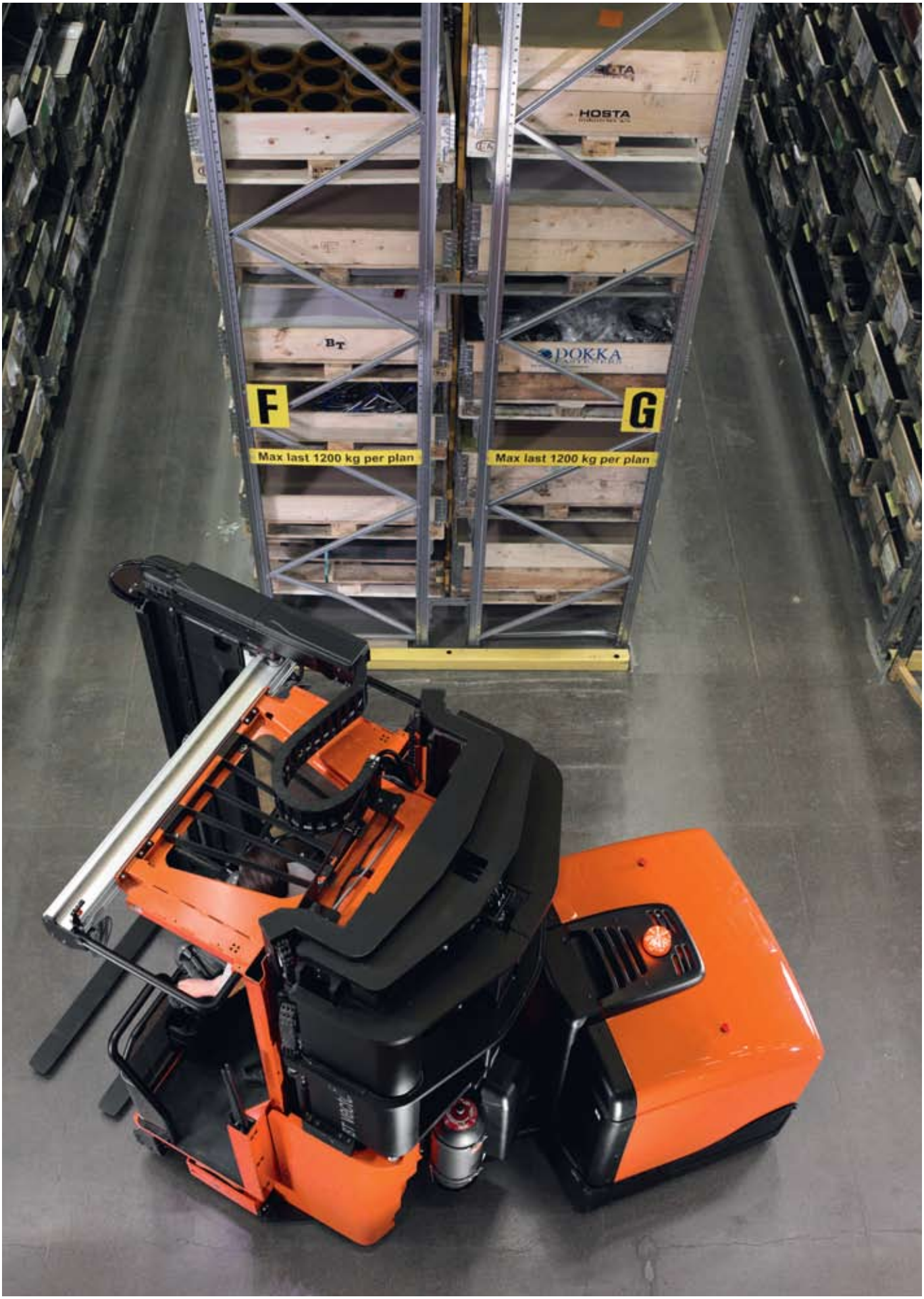

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BT Vector A-series
lifting efficiency

The BT Vector A-series is designed for the most demanding applications, in which safe and effortless productivity are essential. Its remarkable energy efficiency allows it to operate a full double shift on one charge.

The A-series' unique articulated chassis provides excellent stability and minimises the space required for aisle-to-aisle transfer, allowing more warehouse space to be used for storage. All models feature triplex masts with low collapsed heights, and three-way forks. A shuttle fork version (VCE125ASF) is also available, for even faster lateral performance.

BT Advanced Lifting System

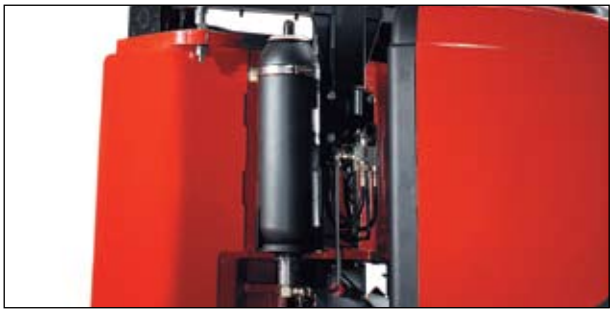
Energy required to lift the cab and load is significantly reduced by the BT Advanced Lifting System. It is a fully integrated combination of hydraulic and gas-pressure lifting, using precise electronic control for seamless and smooth operation. Inert nitrogen is compressed in a sealed system as the cab is lowered. The stored energy is then used to aid the next lifting movement. The force delivered by the system is equivalent to a major part of the mast, cab and fork unit weight, meaning that the lift motor is working to lift little more than the load. Energy and time savings are considerable. A lift speed of 0.4 m/s is obtainable with a full 1500 kg load. Separate motors for the main and auxiliary lift mean a combined speed of 0.7 m/s is possible with load. Practically, this allows the fork position to be adjusted while using the main lift.

The triplex mast is compact, sturdy, and smooth in use. Its open frame design is not cluttered by cables or hoses, leading to excellent visibility though to the rear.

Regenerative braking and lowering

Drive and lift energy regeneration means more work per battery charge. On the BT Vector A-series, up to 30% of the energy required to lift a load is regenerated during lowering.

BT Vector A-series is also easy to drive in 'free-ranging' conditions when it is not being guided in a narrow aisle, with front and rear wheels following the same path. This includes reversing – all of which means less time is spent manoeuvring and more time spent in the aisles working.



The BT Advanced Lifting System means that that the lift motor works to lift little more than the load itself

BT Vector A-series is also easy to drive in 'free-ranging' conditions, with front and rear wheels following the same path

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BT Vector A-series
safety for operator and load

With BT Vector A-series efficiency extends beyond space utilisation and performance. Safety and ergonomy are also given the highest priority.

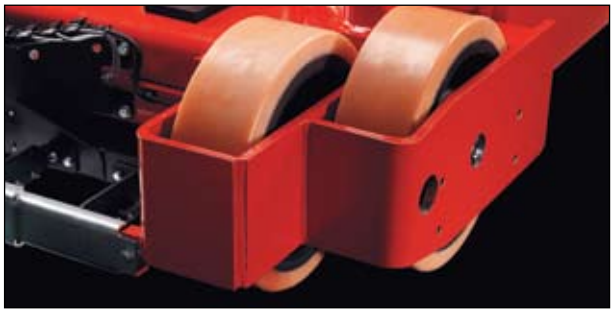
All hydraulic functions are operated by electronic controls for precision and ease-of-use. The electronic control of hydraulic functions is optimised for energy efficiency and smooth operation.

Integrated Control Panel
The BT Vector A-series has an integrated control panel featuring a large, easy-to-read, display. All truck functions are accessed electronically at this terminal. The truck's operating controls are integrated into the unit, which is fully adjustable to suit the operator's position.

Clear-view cab
All BT Vector models are designed to offer the clearest possible view in all directions.

Support arm brakes
These allow more of the truck's power to be used, increasing its safe travel speed. Most braking is achieved by the drive motors, with the support arm brakes being applied only to bring the truck to a full stop, or in emergencies.

The A-series' integrated control panel provides electonic access to all truck functions



The VCE150A's staggered front wheels increase stability and reduce floor loading

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advanced durability

As you would expect from such an advanced machine, the quality and durability of the BT Vector A-series is exceptional.

Like all BT warehouse trucks the BT Vector A-series is manufactured to demanding Toyota Production System standards, assuring the highest build quality. However the fundamental design of the truck further increases its durability in operation.

The articulated chassis design not only saves space but also reduces wear, as the wheel loadings are reduced by 25%. Add to this the quadset wheel design which provides smoother travel conditions and the result is a significant saving in wheel wear.

Heavy-duty motors combined with lower weight components and the Advanced Lifting System results in a truck that is working at optimum efficiency, reducing motor wear.

The electronic system is CAN-bus controlled, providing full data logging and diagnostics. This means fast and effective fault-finding and rectification. All key electrical components are safely encapsulated in sealed compartments for extra protection.

The result is a machine that provides the additional benefits of Advanced VNA thinking but also with the assurance of advanced durability.

Cold store cab option

The space-saving benefits of Advanced VNA are particularly relevant in cold store environments. The BT Vector A-series is available with full cold store protection and a heated drivers cab.

AC motors mean less maintenance and fewer components

The VCE150A with fully enclosed cab for cold store use

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Materials handling for Europe

Toyota Material Handling Europe (TMHE) has a strong European presence with its Toyota and BT brands, establishing close geographic links with its customers in order to better respond to their needs. TMHE has operations in more than 30 countries, and production centres in Ancenis (France), Bologna (Italy) and Mjölby (Sweden).

Toyota Production System
The Toyota Production System (TPS) empowers team members to optimize quality by constantly improving processes and eliminating unnecessary waste of resources. TPS includes a common set of knowledge, values and procedures, entrusts employees with well-defined responsibilities in each production step, and encourages each staff member to strive for overall improvement. Today, TPS is the acknowledged reference among automotive manufacturers and related industries. Our methods enable businesses to achieve sustained gains in productivity while satisfying customer expectations for quality and reliability.

Research & Development
Toyota Material Handling Europe benefits from Toyota's vast experience in the automotive industry, especially in engine development. By taking full advantage of the group's massive R&D facilities and engineering expertise, Toyota has developed a number of world-class technologies. Intelligent use of electronic and computer controlled devices has also made a significant contribution to creating more ergonomic and user-friendly operator environments, contributing to safety in the workplace.

Empowering your business
Our services and solutions are designed to provide different levels and types of support in response to individual customer's needs. This approach gives our customers the power to focus on their core business.

Our commitment to the environment
TMHE believes that getting the job done should never be at the expense of our environment. Our long-term commitment is to develop and deliver environmentally friendly and economically viable materials handling solutions that respect present and future energy needs. TMHE strives to reduce environmental impact throughout the product life cycle, from design, manufacturing and operation through to recycling at end-of-life. TMHE's production centres are all ISO 14001 certified. A declaration of the emissions and waste during the manufacturing process and typical life cycle is available on request.

With its emphasis on eliminating waste, TPS also helps to reduce the environmental impact of our manufacturing activities. CO_2 emissions, water consumption, waste-water generation and landfill quantities have all been reduced, while recycling levels for packaging, water and scrap have been raised. Hazardous substances and air pollutants have also been reduced. Moving towards the creation of a recycling-oriented society, TMHE seeks to continuously improve the recyclability levels of its products.

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Choose the features that suit your needs

● standard ○ option	BT Vector VRE125	BT Vector VRE125SF	BT Vector VRE150	BT Vector VCE100	BT Vector VCE120	BT Vector VCE135	BT Vector VCE125ASF	BT Vector VCE150A
Truck features								
Adjustable width over forks	●	●	●	●	●	●	●	●
Articulated chassis							●	●
BT Advanced Lifting System (ALS)							●	●
Choice of cab widths				●	●	●	●	
Choice of chassis widths	●	●	●	●	●	●	●	●
Elevating platform				●	●	●	●	●
Fork spreader	○	○	○	○	○	○		○
Shuttle forks		●		○	○	○	●	
Sideshift				○	○	○		○
Tilting forks	○	○	○	○	○	○		○
Wire/rail guidance	○	○	○	○	○	○	○	○
Driving features								
360° progressive steering	●	●	●					
Automatic deceleration	●	●	●	●	●	●	●	●
Electronic braking system	●	●	●	●	●	●	●	●
Electronic regenerative brakes (motor)	●	●	●	●	●	●	●	●
Electronic speed control	●	●	●	●	●	●	●	●
Controls and instruments								
Adjustable BT Control console	●	●	●	●	●	●	●	●
Auto-rotation	○	○	○	○	○	○		○
Drive motor temperature warning	●	●	●				●	●
Electronic controller temperature warning	●	●	●				●	●
Electronic height indicator	●	●	●	●	●	●	●	●
Electronic fingertip controls	●	●	●	●	●	●	●	●
Height pre-selector	○	○	○	○	○	○	○	○
Hour meter (working hours)	●	●	●	●	●	●	●	●
Information display	●	●	●	●	●	●	●	●
Load information display	○	○	○					
Mini-joystick electronic controls	●	●	●					
Multifunction control	○	○	○					
Power/Electronic steering	●	●	●	●	●	●	●	●
Split control panel	●	●	●	●	●	●		
Steering direction indicator	●	●	●	●	●	●	●	●
Camera/monitor system	○	○	○				○	○
Weight indicator	●	●	●	○	○	○	●	●
Safety features								
Automatic parking brake	●	●	●	●	●	●	●	●
BT Access Control	●	●	●					
BT Optipace System	●	●	●	●	●	●	●	●
Clear-view mast	●	●	●	●	●	●	●	●
Clear-view overhead guard	●	●	●	●	●	●	●	●
Driver detection system	●	●	●	●	●	●	●	●
Electronic support arm brakes	●	●	●	○	○	●	○	○
Emergency cut-off	●	●	●	●	●	●	●	●
Parking brake	●	●	●	●	●	●	●	●
Pedals as in a car	●	●	●					
Programmable gate security							●	●
Programmable performance	●	●	●	●	●	●	●	●
Warning beacon	○	○	○	●	●	●	●	●
Working lights	○	○	○	○	○	○	○	○
Operator features								
Adjustable seat with safety belt	○	○	○					
Adjustable seat	●	●	●	●	●	●	●	●
Adjustable steering wheel	●	●	●	●	●	●	●	●
E-bar	●	●	●					
Enclosed cab	○	○	○				○	○
Folding seat				●	●	●	●	●
Heated seat	○	○	○				○	○
Low step-in	●	●	●	●	●	●	●	●
On-board data terminal mount	○	○	○					
Storage compartments	●	●	●					
Writing table	○	○	○	○	○	○	○	○
Maintenance features								
Easy access for maintenance	●	●	●	●	●	●	●	●
Fault diagnosis facility	●	●	●	●	●	●	●	●
Historic fault log	●	●	●				●	●
Lubrication points				●	●	●	●	●
Battery management features								
Battery change facility	●	●	●	●	●	●	●	●
Battery status indicator	●	●	●	●	●	●	●	●
Battery discharge prevention system	●	●	●	●	●	●	●	●
Heavy-duty battery compartments	●	●	●					
Regenerative lowering	●	●	●	●	●	●	●	●
Sideways battery change	●	●	●	●	●	●	●	●
Special applications								
Coldstore version	○	○	○				○	○
EEx version (ATEX)	○	○	○					

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MATERIAL HANDLING

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TOYOTA INDUSTRIAL EQUIPMENT

TOYOTA MATERIAL HANDLING EUROPE, MANAGING THE TOYOTA AND BT MATERIALS HANDLING BRANDS IN EUROPE