

**CROWN**

**Specifications**

**TSP 6000 Series**

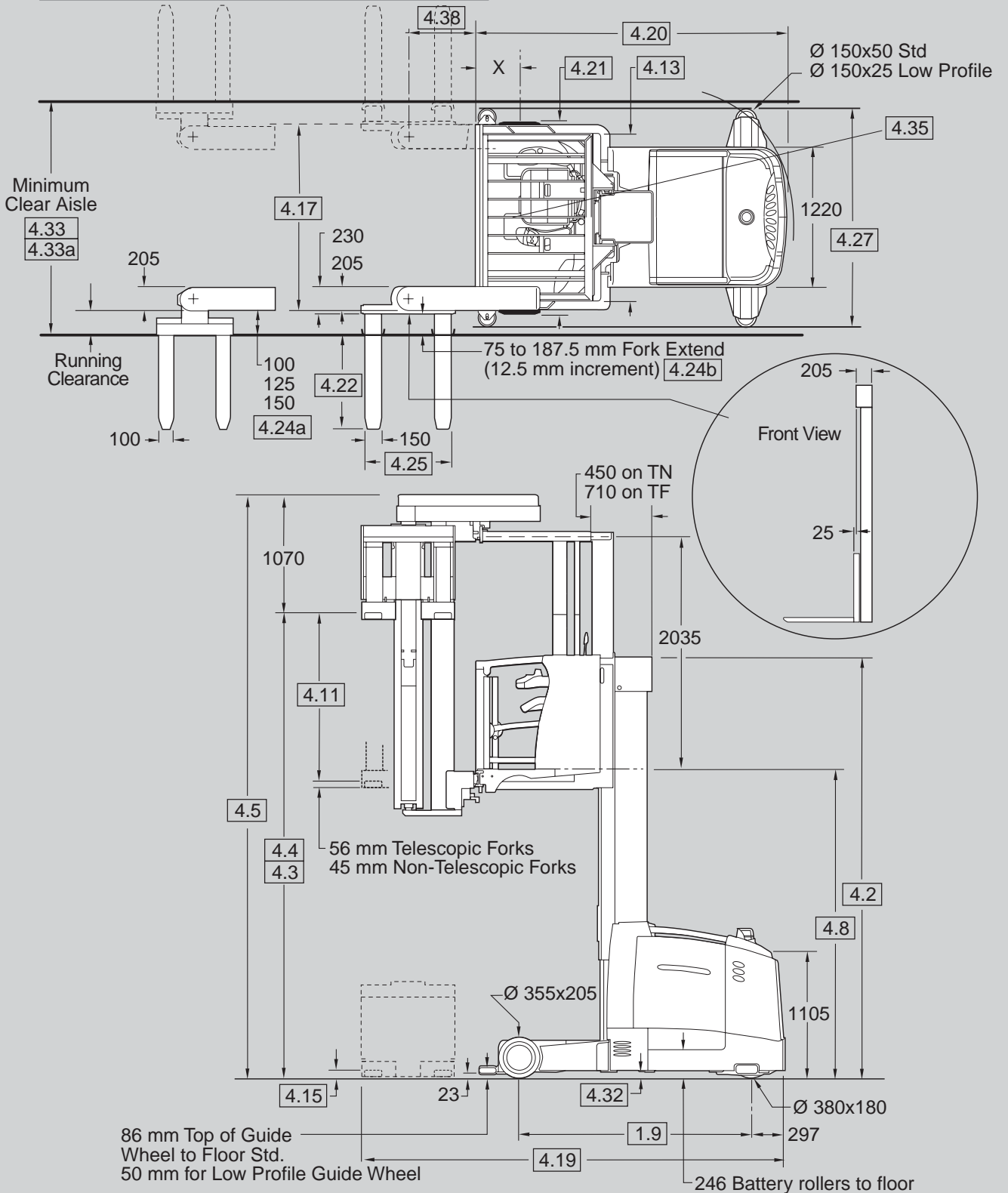
Turret Order Picker

# TSP 6000

# Series



	Non-Telescopic Forks	Telescopic Forks
Minimum Clear Aisle	4.33a Load Length + 205 + Fork Carriage Offset + Running Clearance + Running Clearance	4.33 Load Length + 230 + Running Clearance + Running Clearance
Running Clearance	Forks Carriage Offset	Fork Extend + 25



**TSP 6000 Series**

**Specifications**

General Information	1.	<b>Manufacturer</b>	Crown Equipment Corporation				
	1.2	<b>Model</b>			TSP 6000-1.0	TSP 6000-1.25	
	1.3	<b>Power</b>	electric		volt	48	
	1.4	<b>Operator Type</b>				standing /seated	
	1.5	<b>Load Capacity*</b>		Q	t	1.0	1.25
	1.6	<b>Load Centre</b>		c	mm	600	
	1.8	<b>Load Distance</b>		X	mm	386	
	1.9	<b>Wheel Base</b>		y	mm	see table 3	
	2.1	<b>Weight</b>	less battery		kg	see table 1	
Tyres	3.1	<b>Tyre Type</b>				polyurethane	
	3.2	<b>Tyres</b>	front		mm	Ø 355 x 205	
	3.3	<b>Tyres</b>	rear		mm	Ø 380 x 180	
	3.4	<b>Additional Wheels</b>	guide rollers, std / low profile		mm	Ø 150 x 50 / Ø 150 x 25	
	3.5	<b>Wheels</b>	number (x = driven) front / rear			2 / 1x	
	3.6	<b>Track Width</b>	front	b10	mm	1015 – 1625	
Dimensions	4.2	<b>Mast</b>	collapsed height	h1	mm	see table 1	
	4.3	<b>Free Lift</b>	TN-mast, TF-mast	h2	mm	see table 1	
	4.4	<b>Lift Height</b>	lift + auxiliary lift	h3	mm	see table 1	
	4.5	<b>Mast</b>	extended height	h4	mm	see table 1	
	4.8	<b>Operator Stand Height</b>	lowered / raised	h7	mm	460 / h4 - 2415	
	4.11	<b>Aux. Lift</b>		h9	mm	1750	
	4.13	<b>Cabin Width</b>			mm	1220 / 1320 / 1475	
	4.15	<b>Lowered Fork Height</b>		h13	mm	75	
	4.17	<b>Traverse Frame Width</b>			mm	see table 4	
	4.19	<b>Overall Length</b>		l1	mm	see table 3	
	4.20	<b>Head Length</b>		l2	mm	see table 3	
	4.21	<b>Overall Width</b>	front / rear	b1/b2	mm	1220 to 1830 / 1220	
	4.22	<b>Fork Dimensions</b>	non-telescopic	thxwxl	mm	45 x 100 x 760/915/950/1070/1150/1220	
	4.22		telescopic	thxwxl	mm	56 x 150 x 915/950/1070/1150/1220/1370	
	4.24a	<b>Fork Carriage Offset</b>	non-telescopic	b8	mm	100 / 125 / 150	
	4.24b	<b>Fork Extension</b>	telescopic	b8	mm	75 to 187.5 in 12.5 mm increments	
	4.25	<b>Outside Fork Spread</b>	(standard)	b5	mm	see table 4	
	4.27	<b>Width Across Guide Rollers</b>	optional available in 6.5 mm increments	b6	mm	32 to 222 wider than 4.21 load wheel OAW	
	4.32	<b>Ground Clearance</b>	centre wheelbase	m2	mm	46	
	4.33	<b>Clear Aisle Width</b>	telescopic forks	Ast	mm	see drawing	
4.33a	<b>Clear Aisle Width</b>	non telescopic forks	Ast	mm	see drawing		
4.34a	<b>Intersecting Aisle</b>			mm	see table 3		
4.35	<b>Turning Radius</b>		Wa	mm	see table 3		
4.38	<b>Load Handler Length</b>	standard	l8	mm	585 / 685		
4.38		optional available in 76 mm increments	l8	mm	762 to 1370		
Performance	5.1	<b>Travel Speed</b>	forks first - seat in any position	w. / w.o load	km/h	9.6 / 10.4	
			power unit first - seat forward facing	w. / w.o load	km/h	9.6 / 9.6	
			power unit first - side facing	w. / w.o load	km/h	11.2 / 12.0	
	5.2	<b>Lift Speed</b>	main mast - standard	w. / w.o load	m/s	0.28 / 0.33	
			main mast - high performance	w. / w.o load	m/s	0.36 / 0.41	
	5.2a	<b>Lift Speed Auxiliary Mast</b>	auxiliary mast	w. / w.o load	m/s	0.41 / 0.41	
	5.3	<b>Lower Speed</b>	main mast	w. / w.o load	m/s	0.41 / 0.41	
	5.3a	<b>Lower Speed</b>	auxiliary mast	w. / w.o load	m/s	0.41 / 0.33	
		<b>Pivot Speed</b>	180° rotation		sec	6 - 10	
		<b>Traverse Speed</b>			cm/s	10 - 30.5	
5.10	<b>Brake</b>				mechanically applied, electrically released		
Motors	6.1	<b>Traction Motor</b>	60 min. rating		kW	7.3	
	6.2	<b>Lift Motor</b>	30 % on time - standard		kW	16.2	
			30 % on time - high performance		kW	23	
	6.3	<b>Maximum Battery Size</b>			mm	see table 2	
	6.4	<b>Battery Voltage</b>	nominal capacity K5		V/Ah	48 / 700	48 / 840, 980, 1120
6.5	<b>Battery Weight</b>	minimum		kg	see table 2		
8.1	<b>Type of Controller</b>				AC traction and AC lift		

\* Capacity derating is dependant upon combination of load centre, overall width, 180° traverse/fork extend, battery compartment size, lift height, and travel speed.

Table 1 Lift Height

				TSP 6000-1.0 & TSP 6000-1.25											
4.2	Collapsed Height	h <sub>1</sub>	mm	3000	3175	3330	3480	3635	3785	3940	4090	4245	4395	4550	4700
4.3	Free Lift TN ◯	h <sub>2</sub>	mm	1830											
4.3	Free Lift TF ●	h <sub>2</sub>	mm	n/a	2105	2260	2415	2565	2720	2870	3025	3175	3325	3480	3630
4.4	Lift Height ●	h <sub>3</sub>	mm	4900	5255	5560	5865	6170	6475	6780	7085	7390	7695	8000	8305
4.5	Extended Height	h <sub>4</sub>	mm	5970	6325	6630	6935	7240	7545	7850	8155	8460	8765	9070	9375
2.1	Truck Weight ▲	TSP 6000-1.0 "AA" battery compt.	kg	5234 to 5681											
		TSP 6000-1.25 "A" battery compt.	kg	5260 to 5707											

				TSP 6000-1.0 & TSP 6000-1.25						TSP 6000-1.25				
4.2	Collapsed Height	h <sub>1</sub>	mm	4855	5005	5160	5310	5465	5615	5770	5920	6075	6225	6380
4.3	Free Lift TN ◯	h <sub>2</sub>	mm	1830						1830				
4.3	Free Lift TF ●	h <sub>2</sub>	mm	3785	3935	4090	4240	4395	4545	4700	4850	5005	5155	5310
4.4	Lift Height ●	h <sub>3</sub>	mm	8610	8915	9220	9525	9830	10135	10440	10745	11050	11350	11660
4.5	Extended Height	h <sub>4</sub>	mm	9680	9985	10290	10595	10900	11205	11510	11815	12120	12425	12730
2.1	Truck Weight ▲	TSP 6000-1.0 "AA" battery compt.	kg	5733 to 5842						n/a				
		TSP 6000-1.25 "A" battery compt.	kg	5747 to 6020						6108 to 6268				

◯ Auxiliary lift only

● Including auxiliary lift

▲ Truck weight less battery, TN-mast, min load wheel OAW, 585 mm load handler length, non-telescopic forks

Table 2 Battery

Batteries			TSP 6000-1.0		TSP 6000-1.25		
	compartment size		AA		A	B	C
	ampere hours	Ah	700		840	980	1120
	cells according to DIN 43531		5 PzS		6 PzS	7 PzS	8 PzS
6.3	Maximum Battery Size	length	mm	1133	1133	1133	1133
		width	mm	544	628	715	859
		height	mm	790	790	790	790
6.5	Battery Weight	minimum	kg	1065	1245	1425	1610

Table 3 Intersecting Aisle Dimension

			TSP 6000-1.0		TSP 6000-1.25			
6.3	Battery Compartment		AA	A	B	C		
1.9	Wheel Base		mm	1950	2034	2121	2265	
4.20	Head Length		mm	2634	2718	2805	2949	
4.35	Turning Radius	Wa	mm	2247	2331	2418	2562	
4.19	Overall Length		mm	3599	3683	3770	3914	585 mm Load Handler Length
4.34a	Intersecting Aisle*	without load	mm	3962	3988	4089	4216	
		800 mm load width / 1200 mm load length	mm	3988	4064	4166	4293	
4.19	Overall Length		mm	3699	3783	3870	4014	685 mm Load Handler Length
4.34a	Intersecting Aisle*	without load	mm	4013	4089	4166	4318	
		1200 mm load width / 1000 mm load length	mm	4242	4318	4420	4547	

\* Intersecting aisle dimensions include 200 mm safety distance according to VDI 2198

Table 4 Traverse Frame & Fork Spread

4.17	Traverse Frame Width	1220 Cab width	mm	1220	1245	1270	1295		
		1320 Cab width	mm	1320	1345	1370	1395	1420*	1445*
		1475 Cab width	mm	1475	1500	1525	1550	1575*	1600*
		1475 Cab width**	mm	1625	1650	1675	1700	1725	1750
4.25	Outside Fork Spread (Standard)	Load Handler Length		Carriage Width	Telescopic	Non-Telescopic			
		585 to 1370 Load Handler	mm	760	550 to 760	380 to 760			
		740 to 1370 Load Handler	mm	1065	850 to 1065	380 to 1065			
		890 to 1370 Load Handler	mm	1370	1155 to 1370	380 to 1370			

\* A 50 mm bolt-on platform extension will be added to both sides of the cab/platform

\*\* Actual cab is 1475 mm wide with a 75 mm platform extension welded to each side, resulting in a 1625 mm platform

**Capacity**

At a 600 mm load centre:  
TSP 6000-1.0 - 1000 kg  
TSP 6000-1.25 - 1250 kg

**Standard Equipment**

1. 48-volt fused electrical system
2. Virtually maintenance free AC lift and traction motors
3. Access 1 2 3® Integrated Control System
  - Fully interactive, four-line display
  - Battery discharge indicator with lift interrupt
  - Capacity monitor
  - Start-up and run time diagnostics
  - Diagnostic history storage
  - Hour meters include traction motor, hydraulic motor, steer motor and run time (increments if any of previous three are active)
  - Programmable speed curves and top travel speeds
  - Linear speed control for gradual reduction in speed as platform is raised
  - Programmable lift/lower cut-outs with over-rides
4. Intelligent Braking System combines the optimum amount of friction and motor braking
5. Intelligent Steering System slows the travel speed when in a turn and provides smooth, electronic steering
6. MoveControl™ Seat
  - Fully integrated right and left hand controls
  - Allows -20, 0, 60, and 90 degree operating positions
  - Independent seat swivel
  - Sit or stand operation
  - 190 mm height adjustment (seat and armrests)
  - Armrest position adjustments
  - Integrated hand sensors
7. Exclusive closed-section mast for superior rigidity at height
8. Heavy-duty power unit
  - Easily removable steel doors and covers
  - Top battery access
  - Flashing light
  - Removable steer tyre skirt for easy access
  - Manual lowering valve release located in power unit
  - Ø 70 mm diameter battery rollers
  - SBE 320 blue battery connector
  - Colour-coded wiring
9. Heavy-duty platform
  - Sturdy front rail and hinged side gates
  - Smooth and blended control of travel, main raise/lower, auxiliary raise/lower, traverse and pivot
  - MoveControl™ Seat
  - Premium floor mat
  - Operator fan
  - Dual overhead dome lights
  - Dual adjustable overhead work lights
  - Adjustable rear view mirror
  - Key switch
  - Horn
  - 12-volt accessory outlet
  - Multiple storage areas
  - Partial overhead Plexiglas shield
  - Operator egress system
10. InfoPoint® Quick Reference Maps
11. Battery Compartment
  - **TSP 6000-1.0** "AA" battery compartment
  - **TSP 6000-1.25** "A", "B" or "C" battery compartments

**Optional Equipment**

1. Wire guidance
  - 5.2 to 10kHz range
2. Rail guidance
  - Standard 100 mm rail height
  - Low profile 50 mm rail height
3. End-of-aisle control system
4. TF mast for extended free lift
5. Power unit / Main frame
  - Selectable Overall Width (OAW), in 25 mm increments
  - Non-marking drive tyre and load wheels
  - Various strobe lights
  - Battery retainer switch
6. High performance lift system
7. Platform
  - Extended load handler lengths and carriage widths
  - Telescopic or non-telescopic forks
  - Power source and mounting brackets for WMS terminal
  - Plexiglass rear windshields
  - Zone select key switch
8. Work Assist™ Accessories
  - Work lights
  - Clip pad and hook
  - Plate (for WMS terminal mount)
  - Adjustable swing arm (for WMS terminal)

**Optional Infrastructure Equipment**

1. Line driver
2. Guide wire
3. EAC magnets

**Electrical**

Heavy-duty 48-volt electrical power system. AC lift and traction motors provide excellent control at any speed. All truck functions are monitored and controlled through the Access 1 2 3 Control System. Each of the eight microprocessor controlled modules, located throughout the truck, are in constant communication with each other providing an unparalleled degree of control.

Long-life, solid-state encoders and hall-effect sensors are utilized where appropriate to sense operating parameters. Colour-coded wiring and Crown's exclusive InfoPoint System reduces downtime by providing clear direction for the service engineer.

**Operator Platform**

The MoveControl™ Seat rotates through 110° giving the operator a choice of seating and standing positions, the seat pad and backrest also swivel independently for an added degree of mobility. The seat pad can be folded up to provide a soft backrest for a standing operator. The seat and controls have 190 mm of height adjustability.

Controls for all operating functions are positioned smartly in the seat armrests. The controls are always positioned consistently for the operator, regardless of seat orientation. Armrests also pivot to permit free movement within the platform. Multi-task controls are arranged so that a wide array of blended functions can occur. The right hand controls travel, main raise/lower and traverse functions, while the left hand controls auxiliary lift/lower, pivot and steering. Hands are sensed using infrared light beams, while feet activate large, flat sensors in the floor.

The spacious floorboard is covered with an anti-fatigue floor mat for optimum comfort. Other operator comforts include a series of Work Assist Accessories such as a fan and two work lights that are located in the overhead guard.

Other accessories can also be mounted to the vertical Work Assist tube, or horizontal tubes in the overhead guard. Multiple storage compartments provide abundant room for personal items and tools.

The operator's feet and right hand must be in the proper operating position for the travel and main raise functions to work. For load handler functions, the left hand sensor must also be activated. The gates must be closed during any powered truck movement.

The truck can be stopped by activation of either of two foot-operated, positive action service brakes or by reversing the traction motor for smooth AC plugging.

**Display**

The four-line, alphanumeric display (Access 1) is conveniently mounted on the left upright for easy access. In addition to providing a full diagnostic and calibration interface, the display is capable of continuously displaying:

- Current event codes
- Battery discharge indication
- Steer wheel position
- On/off wire status
- Capacity Monitor
- Fork height
- Load weight
- Time of day and/or date

The interactive display can be used to interrogate the truck or adjust parameters without the need for a handset or laptop. State of the art diagnostics are standard equipment. Every sensor can be monitored in real time through the display and many of the output drivers can be tested as well.

**Power Unit**

The heavy-duty power unit was designed to evenly disperse load stresses during pallet retrieval and put away. Steel doors and covers protect the electrical and hydraulic system components from the operating environment and intrusion.

All covers can be easily removed with only a few tools. Sturdy skid bars are easily replaceable. Batteries are easily serviced through the top battery access panel, which lifts easily out of the way.

### Mast

Exclusive closed-section mast minimises deflection for the entire length of the mast. Rolled I-beams, continuously welded to a massive cross member, are capable of resisting front and side loading equally well. Lift cylinders, hoses, cable and chain within the mast are protected from the operating environment, but are readily accessible for service. Built-in sensors in the primary mast detect chain slack and shut down primary lower, auxiliary lower, pivot and traverse functions. A glass window in the rear of the platform provides additional visibility above staging.

### Access 1 2 3...™

The Comprehensive Access 1 2 3 System Control is a modular communications and control system. It monitors all on-board sensors, makes decisions based on the sensor readings, and subsequently, controls all system movements safely and smoothly.

All eight modules are in constant communications with each other via a CAN (Control Area Network) bus so that real time information is accessible to the system at all times.

- Access 1  
Interactive Display Module
- Access 2  
Hydraulic Control Module
- Access 3  
Traction Control Module
- Access 4  
Vehicle Control Module
- Access 5  
Steering Control Module
- Access 6  
Guidance Control Module
- Access 7  
Accessory Control Module
- Access 8  
Operator Control Module

### Simplified Hydraulic System

The hydraulic system has been designed to provide high performance with a simplified approach that incorporates fewer parts, fewer connections and fewer hoses.

The mast/outrigger assembly can be completely separated from the power unit without breaking any hydraulic connections. Not only is it easier to dismantle the truck for transport, but the hydraulic system is isolated from the electrical system so that oil and other contaminants will not affect operation. All hydraulic functions are controlled by two manifold blocks – one in the main frame, and one in the load handler.

A large AC motor provides the power for main lift, auxiliary lift, traverse, pivot and fork extension. The hydraulic and electrical systems work together to provide excellent control of the load handler for smooth and safe manipulation of loads. Acceleration rates and top functional speeds can be programmed to suit the application. A manual lowering valve, positioned in the power unit, will allow the platform to be lowered from the ground. Forks can be returned to the home position prior to lowering.

### Traction System

Massive AC traction motor provides powerful acceleration, fast travel speeds and the ability to creep the truck a few millimetres for precise pallet placement. The drive unit uses spiral bevel and helical gears from motor to drive axle. The drive motor does not rotate, minimizing wear on electrical cables. Acceleration and deceleration rates can be programmed to fit the application, while direction

reversals are smooth and immediate. Many performance profiles can be chosen to maximise safety and productivity. Many factors such as direction of travel, height of the platform, position of the forks, and whether operating in a guided mode will have a bearing on speed. Top speeds will be diminished gradually as the platform is raised.

### Intelligent Braking

The patented Intelligent Braking System combines variable motor braking with a three-step friction brake to optimise safety and comfort for the operator. Operating conditions such as speed of the truck, direction of travel, height and weight on the forks, and weight of the truck are taken into account when the brakes are applied. In addition, friction brake use is minimised, which prolongs brake life. Although the service brake is always available to the operator through two floor pedals, the operator can choose to bring the truck to a controlled stop by reversing the direction of travel (plugging).

### Intelligent Steering

Full electronic steering provides smooth and easy manoeuvring for the operator. Top travel speed of the truck is decreased when the steered tyre is turned more than ten degrees. Further speed reductions occur as the amount of steering is increased. This intelligent approach provides a maximum degree of safety and comfort for the operator.

### Load Handler

The fork carriage pivots (turrets) 180° permitting pallet handling on either side or front of the truck. Position of the forks is continually monitored to permit safe, smooth

and productive operation. Fork handling functions can be blended together for simultaneous operation which will greatly improve productivity. The Auto-Pivot feature will automatically traverse and pivot the forks, all while keeping the pallet centred in the aisle. Fork spread is incrementally adjustable while two choices of forks are available – telescopic or non-telescopic. Telescopic forks automatically extend during the traverse function or can be manually extended using the standard override button. Programmable height limits are also available for raise and lower. Lower and raise limits can be overridden by the operator, if desired. Lift cylinder, hydraulic hoses and electrical cables are protected within the profile of the structure or behind removable covers. Vertical side alignment of the auxiliary mast is maintained by rack and pinion gears.

### Wheels and Tyres

Large, high-load capacity polyurethane press-on tyres. Load wheels are Ø 355 x 205 mm wide, while the drive tyre is Ø 380 x 180 mm wide. Standard guide wheels for rail guidance are Ø 150 x 50 mm wide.

### Safety Regulations

Conforms to European safety standards. Dimensions and performance data given may vary due to manufacturing tolerances. Performance is based on an average size vehicle and is affected by weight, condition of truck, how it is equipped and the conditions of the operating area. Crown products and specifications are subject to change without notice.

