This PowerPoint presentation CD was produced specifically for Hyster Dealer Principals and Sales Managers only. This CD is intended to be used to help enhance the selling skills and product knowledge of the Hyster dealer sales force. <u>This presentation is not intended to be given to the end user</u>.

The Hyster W40 "Z" and W45 "Z" Series Motorized Hand Trucks are designed for maneuverability and value. All motorized hand truck components are engineered for outstanding performance and extended, low maintenance life. The easy-to-use handle, designed with advanced ergonomics, contributes to exceptional operator comfort and results in greater productivity. Hyster motorized hand trucks have engineered excellence and outstanding quality.

<u>NOTE</u>: BE SURE TO CHECK **NOTES PAGE** FOR EACH SLIDE . MANY OF THE SLIDES HAVE ADDITIONAL INFORMATION IN THE **NOTES PAGE** VIEW.

Introduction

The W40Z and W45Z utilize the latest technology for motorized hand trucks in today's marketplace.

W40Z

W45Z

Objectives:

- "Best-in-Class" Ergonomics
- State-of-the-Art Technology
- Low Maintenance Design

Presentation Overview

- Introduction
- Product Focus
- Application Information
- Tiller Handle Durability & Testing
- Standard Features & Ergonomics
- Options
- Competitive Review

Product Focus

Focus:

- **Reliability**
- **Ergonomics**
- **Competitive performance & styling**

These trucks meet or exceed the following codes and standards:

-OSHA, subpart N, Section 1910.178
-ASME B56.1-2000
-ISO 3691-0
-UL 583

Application/Duty Cycle & Environment

W40Z

Walkie Light Duty Application

4,000 Lbs. Capacity Walkie Pallet

3 to 5 hours use per day

Maximum annual usage of 750 hours

45 pallets per day

Maximum of 15 pallets per hour for 3 hours per day

W45Z

Walkie Light Duty Application

4,500 Lbs. Capacity Walkie Pallet

3 to 5 hours use per day

Maximum annual usage of 1250 hours

75 pallets per day

Maximum of 15 pallets per hour for 4 hours per day

This series of trucks was re-designed for specific product applications. These applications are segmented based upon duty cycle, or product utilization.

Walkie pallet trucks are predominately used for loading, unloading and transporting over short distances.

These trucks are designed to move palletized loads. These particular trucks are designed to move a single pallet load primarily for retail or wholesale distribution. The maximum single pallet load weight is 3,000 lbs. This weight is based upon the limits of the pallet. Most wooden pallets are designed to carry 2,800 lbs., uniformly distributed load. However, documented studies conducted by IFDA® (International Foodservice Distributors Association) suggest the average single pallet weight to be less than 1,800 lbs.

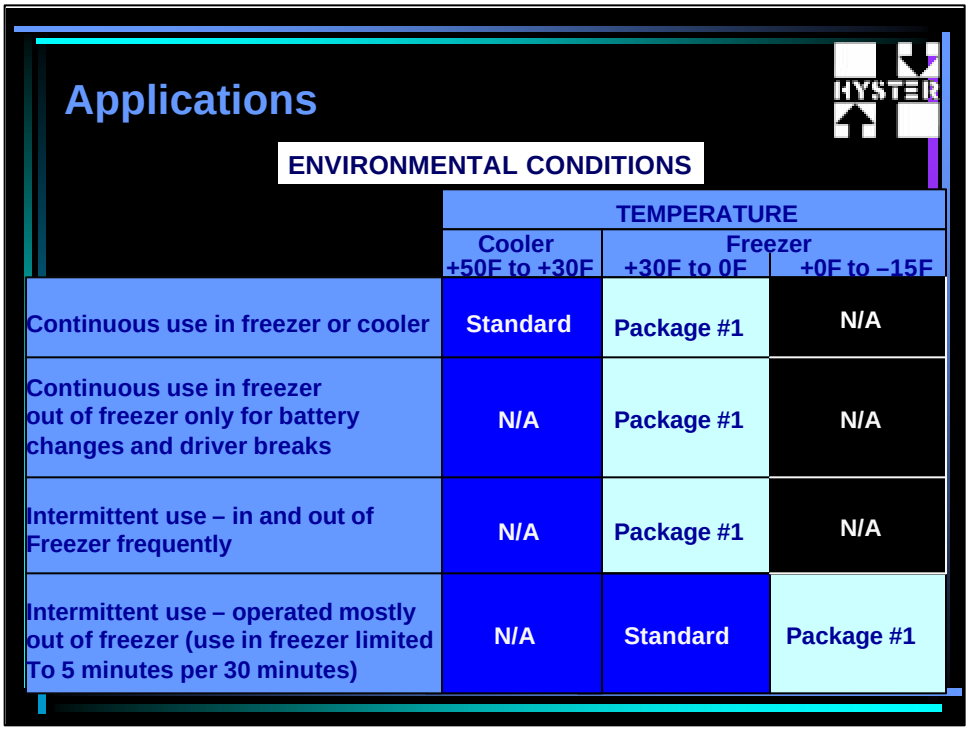
Applications

	DEFINITIONS
General Warehouse	Standard Equipment Non-perishable foods; durable goods
Cooler/Intermittent Freezer	Standard Equipment Produce, refrigerated perishable foods Cold rooms and/or refrigerated storage areas
Cold Storage / Freezer	Package #1 Perishable foods Frozen meat & dairy products

The W40Z and W45Z pallet trucks are not recommended for corrosive, food processing or food manufacturing applications. These trucks are not for use in operations requiring UL type “EE” classification.

W40Z and W45Z:

Severe Freezer / Corrosion	NOT AVAILABLE
EE Construction	NOT AVAILABLE



Definitions of environmental types:

General Warehouse - General warehousing and distribution; non-perishable foods; durable goods

Cooler / Intermittent Freezer - Produce; refrigerated perishable foods; cold rooms and/or refrigerated storage areas; intermittent use in freezers down to 0 degrees F (5 minutes or less in freezer)

Cold Storage / Freezer - Frozen meat and dairy products; frequently in and out of freezer, and/or temperatures to -15 degrees F

Severe Freezer / Corrosion / Meat Processing - Meat processing, pickling, tannery, exposure to corrosive environments such as brine.

UL EE Rating - Applications requiring UL type “EE” construction such as paints, chemicals, etc.

TRUCK SELECTION GUIDE

	W40Z	W45Z	W60Z	W65Z	W80Z	B60Z	B80Z
Environment (truck location)							
General Warehouse	Std	Std	Std	Std	Std	Std	Std
Cooler / Intermittent Freezer	Std	Std	Std	Std	Std	Std	Std
Cold Storage / Freezer	Opt	Opt	Opt	Opt	Opt	Opt	Opt
Severe Freezer Corrosion / Meat Processing	N/A	N/A	N/A	Opt	Opt	N/A	Opt
UL Type "EE" Rating	N/A	N/A	N/A	Opt	Opt	N/A	Opt
Typical Duty Cycle							
Pallets per Day	30-45	45-60	60-90	90-135	90-135	135-270	270-480
Typical Single Pallet Load Wt	2000#	2000#	3000#	3000#	3000#	3000#	3000#
Load Max	4000#	4500#	6000#	6500#	8000#	6000#	8000#
Approx. Run Length	<100 ft	<100 ft	100-500 ft	100-500 ft	100-500 ft	>500 ft	>500 ft
Shifts per Day	single	single	two	multi	multi	multi	multi
Operational Hours per Day	<5	6	9	9	12	12	12
Travel Speed - Empty / Loaded	3.7 / 3.2	3.7/3.0 (24V) 3.7/2.8 (12V)	3.7 / 2.6	3.7 / 2.6	3.7 / 2.6	8.2 / 5.6	8.2 / 5.6
Maximum Battery kWh	4.8	6	10	9	14	12	18
Maximum AH (6 hr rate)	200	255 /510	510	750	600	510	750
Voltage	24	24 /12	24	12	24	24	24
Pallet Fork Length (inches)							
Single Pallet	36,42,48	36,42,48,	36,42,48,	36,42,48,	36,42,48,	36,42,48,	36,42,48,
"		60	60	60	60	60	60
Double Pallet	---	---	---		---	---	84,93,96
Width across forks (outside to outside)	22, 27	22, 27	27	27	27	27	27 (28 dbl)

This truck selection guide illustrates the pallet truck models.

Product Configuration Summary

Low-Lift Walkie Pallet Truck

W40Z

4,000 lbs. Capacity

158 AH battery back with on-board 20A battery charger (120V, 50 to 60 Hz)

24 volt, UL type “E” SEM Traction System

5” max. lift
7” fork width
27” fork spread
48” fork length
Flush pallet stop
Pallet entry/exit skids; pallet exit rollers

Head length = 21.4”; max. OAW = 29.2”
9” x 4” molded-on rubber drive tire

3.25” diameter x 4.5” wide single poly load wheels
Knock-out load wheel axle

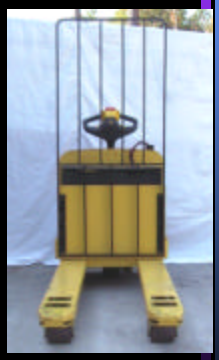
Product Configuration Summary

Low-Lift Walkie Pallet Truck

4,500 lbs. Capacity

W45Z

Configured for industrial flooded, lead-acid batteries up to 300 AH
510 AH (12V OPTIONAL)



9.1” x 28.0” battery compartment

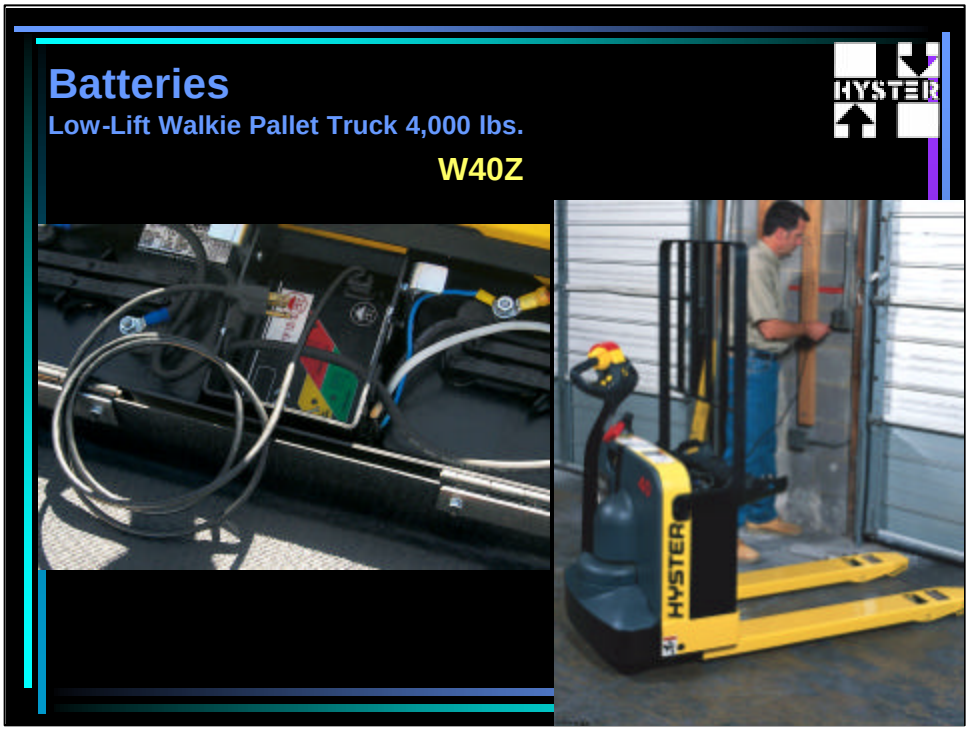
24, UL type “E” (12 Volt Optional)

5” max. lift
7” fork width
27” fork spread
48” fork length
Flush pallet stop
Pallet entry/exit skids; pallet exit rollers

Head length = 22.4”; max. OAW = 29.2”

9” x 5” press-on rubber

3.25” diameter x 4.5” wide single poly load wheels
Knock-out load wheel axle



The standard battery pack consists of four (4) deep-cycle batteries, a low-frequency battery charger, tray weldment and battery cover with hinged convenience tray. The four batteries are connected in series to provide a 24-volt system.

The batteries are 6 volt, deep-cycle flooded cell type delivering 158 AH (6 hour rate). As with any flooded cell battery, these batteries will require periodic inspection of water level and electrolytes.

The battery charger delivers 20 amps. The charger requires 110 VAC at 50 to 60 Hz. A detachable industrial AC power cord, and truck/charger inhibit circuit are included. The battery connector remains connected to the truck, unless the operator disconnects the battery in the event of an emergency. The charger will automatically inhibit the truck traction system drive circuit to prevent the truck from being driven while the batteries are being charged. Once the AC power cord is disconnected from the outlet, the truck may resume driving.

The charger is mounted in the battery compartment. This mounting location requires the user to open the battery compartment cover which enables natural air flow for charger cooling and to ventilate the battery gases which are produced during the charging cycle.

The tray weldment includes locking swing-out trays for the top two batteries to enable easy inspection and maintenance of the two lower batteries.

Note: The cord for the battery pack charger will come from the factory stored below the charger to prevent loss.

Batteries

Low-Lift Walkie Pallet Truck 4,000 lbs.

W40Z

No. of Cells	Cell Size	Plates per Cell	Capacity (6 hr rate) Amp-Hours	KWH	"X" Dim.	"Y" Dim.	"Z" Dim.	Max. Weight
Standard Battery Pack With 20A charger			158 (185 AH @ 20hr rate)	4.0	28.4"	7.9"	23.9"	310 lbs.
GNB PalletPro® Battery Pack with 25A Charger			195	4.4	27.3"	7.5"	26.4"	375 lbs.

A red SBX type battery connector is used with all battery packs. Following industry standard, the red connector identifies a 24-volt system. The SBX connector provides two auxiliary contacts that are used to connect the charger inhibit circuit with the traction controller.

The optional battery offering is the GNB PalletPro® Maintenance-Free pack with on-board charger. According to the manufacturer this offering is limited to 60% D.O.D. (depth of Discharge) and not recommended for use in cold storage and freezer applications. The Maintenance-Free battery technology is less tolerant to over discharge than traditional flooded-cell batteries and may result in irreparable damage. To minimize the potential of over discharge, the battery type is a selectable feature of the traction system.

Batteries

Low-Lift Walkie Pallet Truck
4,500 lbs.

W45Z

(24 VOLT)

No. of Cells	Cell Size	Plates per Cell	Capacity (6 hr rate) Amp-Hours	KWH	"X" Dim.	"Y" Dim.	"Z" Dim.	Max. Weight
GNB PalletPro® Battery Pack with Charger			195	4.4	27.3"	7.5"	26.4"	360 lbs.
12	75	5	150	3.5	25.3"	6.4"	23.3"	410 lbs.
12	85	5	170	3.9	25.3"	6.4"	23.3"	425 lbs.
12	100	5	200	4.6	25.3"	6.4"	26.3"	470 lbs.
12	75	7	225	5.2	25.7"	8.8"	23.3"	540 lbs.
12	85	7	255	6.0	25.7"	8.8"	23.3"	570 lbs.

Notes:

1) Steel tray with cover required for all batteries
2) Battery connector type is SB-175 Red (Gray optional)
3) Cable lead position "B"
4) 20" cable length
5) Maximum cable gauge of 1/0

The 4,500 lbs. truck is configured for flooded and low-maintenance batteries.

Batteries

Low-Lift Walkie Pallet Truck
4,500 lbs. Cont.

W45Z

12 VOLT (Optional)

No. of Cells	Cell Size	Plates per Cell	Capacity (6 hr rate) Amp-Hours	KWH	"X" Dim.	"Y" Dim.	"Z" Dim.	Max. Weight
6	85	11	425	5.0	26.1"	7.7"	23.3"	436 lbs.
6**	85	11	425	5.0	31.2"	7.8"	23.3"	512 lbs.
6	85	13	510	6.0	30.6"	7.7"	23.3"	510 lbs.

Notes:

1) Steel tray with cover required for all batteries
2) Battery connector type is SB-175 Yellow (Gray is optional)
3) Cable lead position "B"
4) 20" cable length
5) Maximum cable gauge of 1/0

*** -- With On-Board Power System*

Battery Mounted Convenience Tray W40Z (Standard on W40Z)

New Tiller Handles & Controls

***Why*?**

"Excellent Ergonomics"

The design of the new handle for the W40Z and W45Z Series trucks was primarily based on ergonomic principles.

DESIGN: Tiller Handle & Controls

❖**HYSTER DESIGN** ***provides total functional control when:***

- traveling
- lifting
- lowering
- braking

W40Z / W45Z

DURABILITY: Tiller Handle & Controls

The most significant attribute of the tiller handle other than ergonomics for a Walkie pallet truck is durability.

The tiller handle is the same as the handle on the W60Z and W80Z.

Materials: The handles are injection molded of a fiberglass impregnated composite material that gains strength from the hot injection molded process. There is no concern with durability in cold storage environments or from direct exposure to sunlight/UV.

W40Z / W45Z

Testing of Handle & Controls

W40Z / W45Z

User Research/Testing of Handle

- ✓ comfort
- ✓ access to buttons
- ✓ degree of movement in butterfly travel control
- ✓ responsiveness
- ✓ speed control
- ✓ horn
- ✓ operation of reversing switch

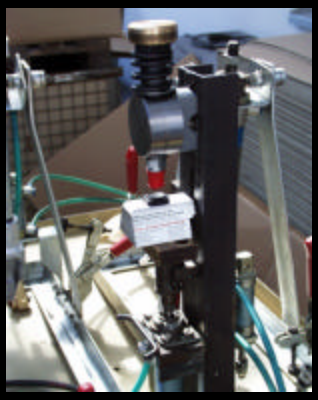
Testing of Handle & Controls

W40Z / W45Z

User Research/Testing Handle

- Users in:
  - USA
  - France
  - Italy
  - Germany
- 70+ user surveys were conducted

Testing of Handle & Controls



100,000 Cycle Push Button Test

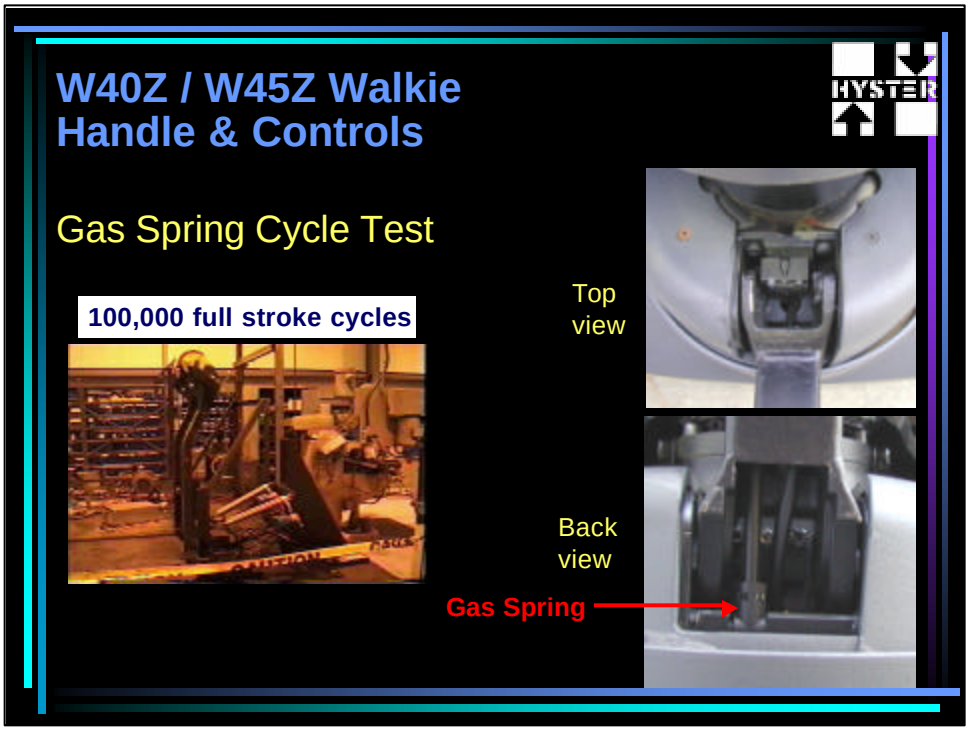
Bench testing program
Cycle testing on:

- butterfly travel control
- handle
- push buttons
- horn
- reversing switch

The is a photo of a durability test being performed on the lift and lower push button material. This shows the durability after 100,000 cycles of set pressures being applied.

Similar tests were performed on on all components such as butterfly travel control, handle, horn and reversing switch.

Results: Highly durable and reliable!



The gas spring cycle test verifies the ability of the gas spring to properly hold it's gas charge and provide adequate dampening of the handle as it approaches the vertical position.

This test is conducted under worst case conditions of full handle stroke on each end of the gas cylinder. The automated test stand is also checking the durability of the handle harness as it passes around the handle pivot joint. All wires in the harness are continually checked for continuity during the test to allow the test engineer to know if a wire should break due to the constant flexing of the harness during use.

The test also checks the durability of the handle control head to resist the shock of the handle returning to the vertical stop position under the full force of the gas spring.

W40Z / W45Z Walkie Handle & Controls

FEATURE

Direction/throttle control actuators (butterfly wings)

BENEFIT

30 degree rotation in either direction.

Provides thumb actuation in the forks trailing direction, and thumb and forefinger actuation in the forks leading direction.

Serviceability - Designed for minimal troubleshooting and repair time;

No special tools required to disassemble; only three mounting screws. All switches and actuators are sub-assembled as part of the top cover. All electronics are incorporated on one PC board in the handle. Switches for the lift and lower functions are identical which minimizes service parts.

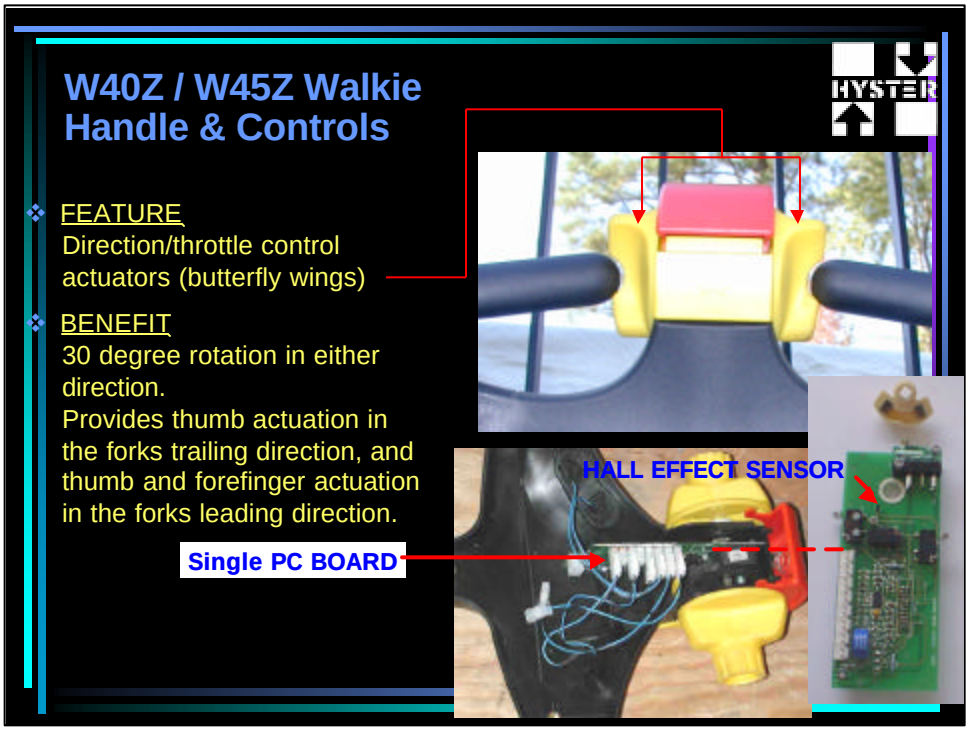
The Hall Effect Sensor is a non-contact device , therefore eliminating wear.

Materials - Injection moulded glass fiber impregnated composite material. This material gains strength from the hot injection moulded process.

No concern with durability in cold storage environments or from direct exposure to sunlight/UV.

The circuit board is sealed and located inside the tiller handle.

The Hall effect sensor measures the difference across a magnetic field to generate a proportional output – (travel direction and speed).



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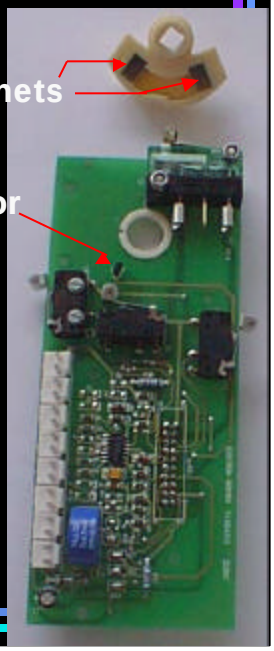
The circuit board is sealed and located inside the tiller handle.

The Hall effect sensor measures the difference across a magnetic field to generate a proportional output – (travel direction and speed).

W40Z / W45Z Walkie Handle & Controls

- Hall effect sensor:
  measures the difference across a magnetic field to generate a proportional output
  - travel direction
  - speed



The Hall effect sensor is a non-contact device and replaces traditionally used potentiometers.

W40Z / W45Z Walkie Handle & Controls

FEATURE

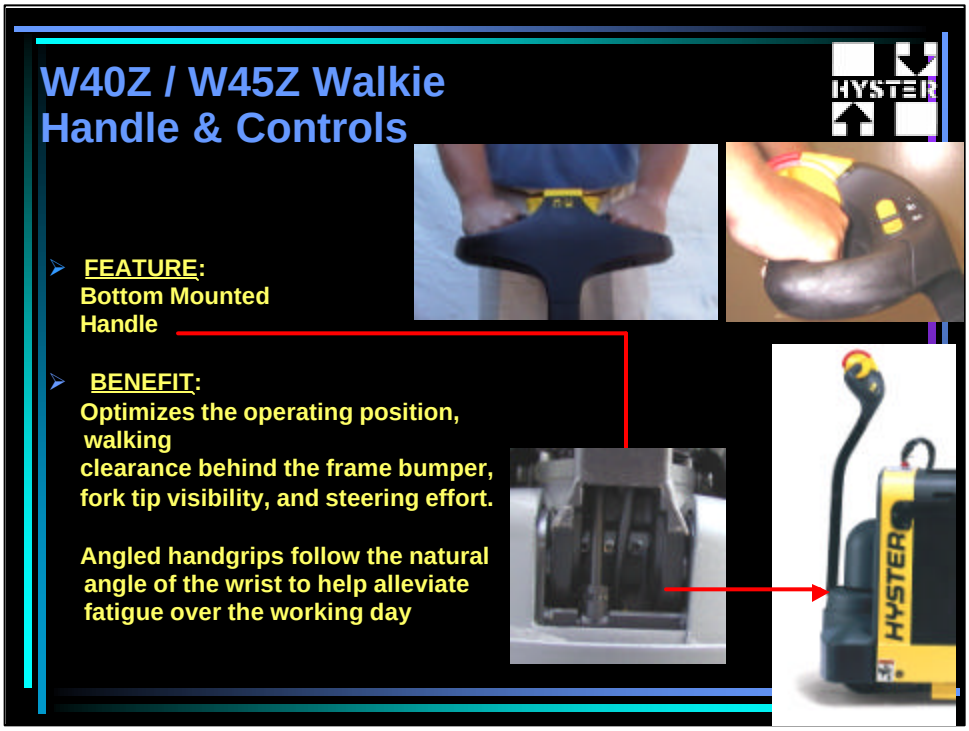
Hand protection

BENEFIT

The control handle is designed to keep an operator's hands within the interior perimeter of the handle. The raised center section provides protection for the top of the hand and the rear wrap-around arms protect the fingers and knuckles.

The angled handgrips follow the natural angle of the wrist to help alleviate fatigue over the working day.

The grips are 1.38 in. in diameter with an effective width of 6.0 in. each. The width is measured from the inside of the hand guard to the recess in the direction/throttle control actuator. The grips are inclined in both the vertical plane and horizontal plane. These angles are measured with the tiller 36.4 in. from the floor.



The angle of the handle tube was added to keep the handle within the truck's profile, in the neutral position provide a better range of operation, and improve the ergonomics of the truck.

The control handle return now uses a gas spring which replaces the torsion spring.

The gas spring provides for a much smoother and less aggressive return when it hits the stop.

W40Z / W45 Z Walkie Handle & Controls

- FEATURE
  Lift & lower controls
- BENEFIT
  The operator can control these functions without repositioning hands. Fingertip raised controls and concave switch actuators provide tactile and intuitive use.

W40Z / W45Z Walkie Handle & Controls

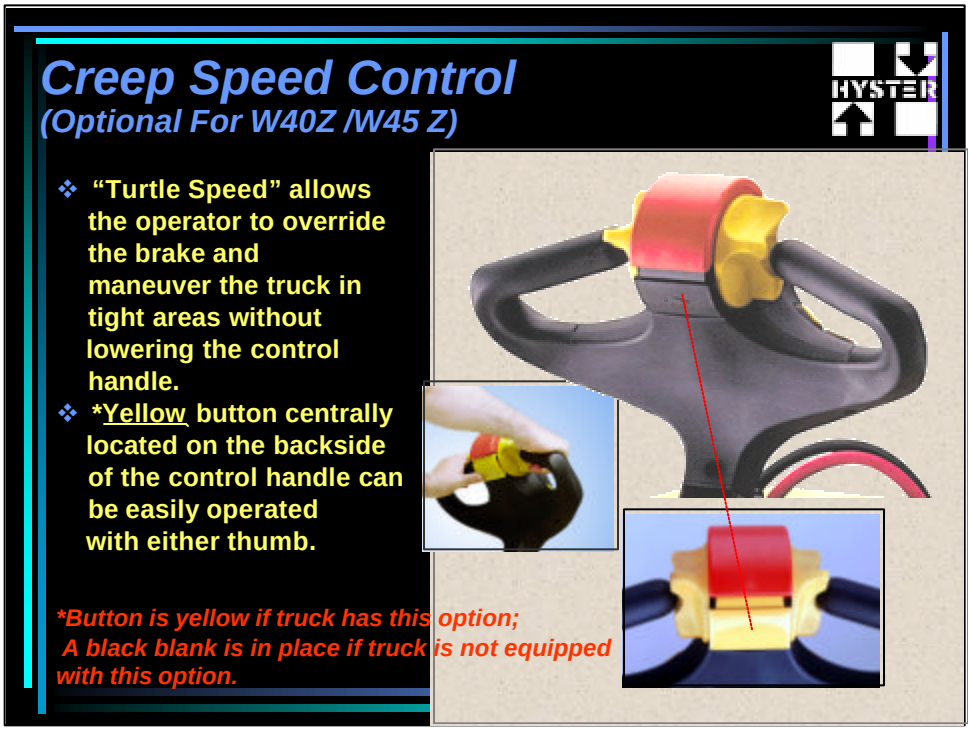
- FEATURE
  Wrap-around traction reversing actuator (belly switch)
- BENEFIT
  Provides a large area of contact for the operator. The actuator is at the leading edge of the handle assembly and can be actuated within the full range of the handle pivot. The horn beeps to make the operator and others around aware when it has actuated.

The auto reversing switch (belly switch) automatically reverses the truck's direction should the switch come in contact with the operator. After contact with the belly switch, the horn beeps to make the operator and others in the area aware. The traction motor will not re-engage until the operator cycles the butterfly to neutral. The handle does not need to be raised or lowered to the brake-on position in order to re-engage the traction motor.

W40Z / W45Z Walkie Handle & Controls

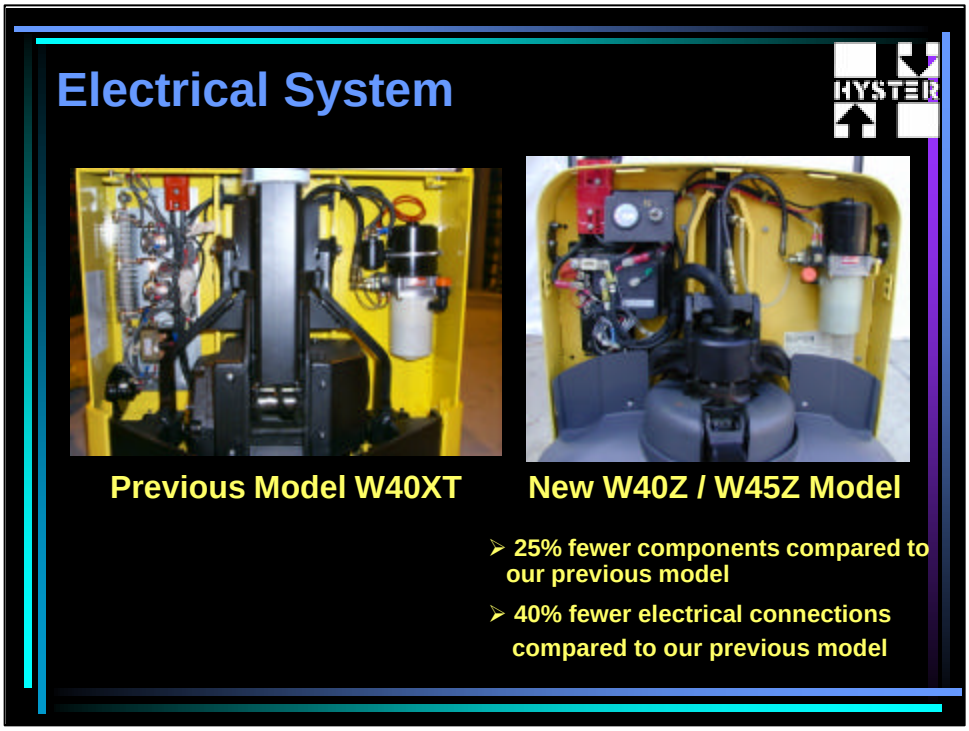
- **FEATURE**
  Horn actuator for electronic horn

- **BENEFIT**
  Centrally located on top of the handle.
  Sized to provide easy access with either hand.



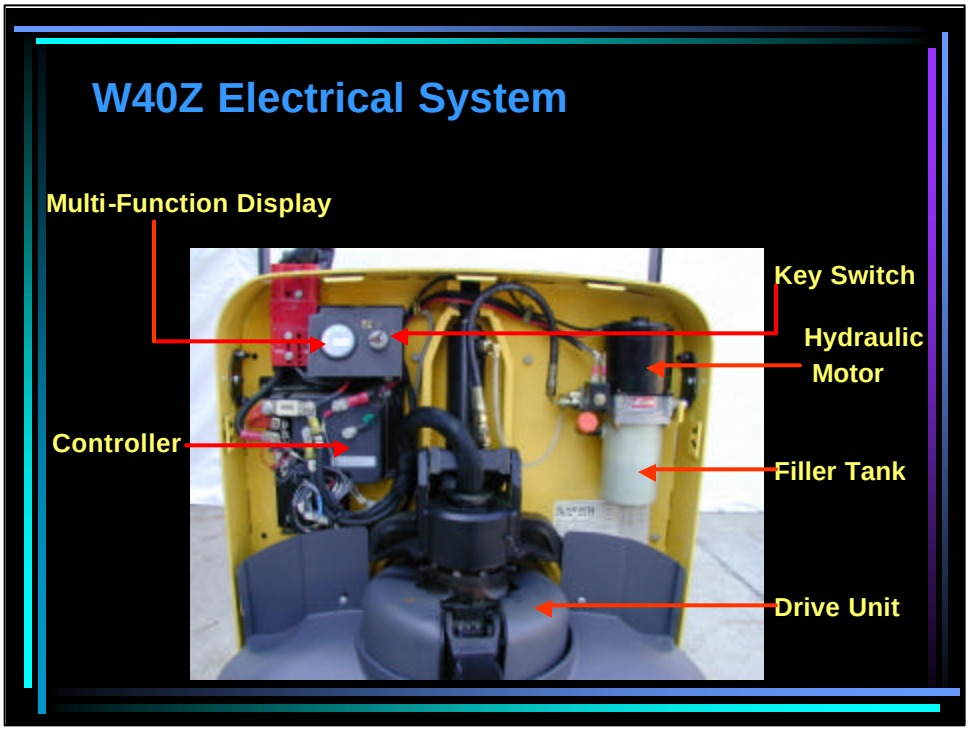
The optional creep speed control, also known as "Turtle" speed, has been introduced allowing an operator to maneuver the truck in tight areas without lowering the handle. The actuator is centrally located on the backside of the tiller handle where it can easily be operated with either thumb. The actuating force is 2.2 ft. pounds of pressure. The truck speed is variable up to approximately 1 MPH in both directions. The Creep Speed Control is active until the direction/throttle control is returned to the neutral position or the creep speed actuator is released. If the tiller bar is lowered to the driving position, or brake "OFF", while the creep speed actuator is depressed, the creep speed control will remain active. The truck will resume the normal driving mode once the creep speed actuator is released. The creep speed control cannot be re-activated until the handle is returned to the full upright position, or brake "ON".

The angle of the tiller handle tube provides a better operating position with the new handle improving the ergonomics of the truck.



The truck electrical system has been designed using SEM technology to enhance truck reliability and performance. Significant steps have been taken to design a transistor traction system with the same level of reliability as the former contactor control. The key advantages of this new design, as compared to the former models, are:

- **25% fewer components compared to previous model**
- **40% fewer electrical connections compared to previous model**
- Serial communication between tiller and controller → reduces wiring
- Fewer wires and smaller diameter traction motor field wires improves flexibility of wiring at king pin → improved reliability
- Proximity switch for tiller position rather than a roller switch activated by brake cam → eliminates adjustments
- Fused traction controller and motors → reduces risk of component damage.
- Solid-state pump control → extends life of pump motor by eliminating in-rush currents
- Integral battery state-of-charge and lift interrupt → protection for traction system and battery.



Electrical System Protection (Enclosure IP Ratings):

W40Z - rating - IP55

W45Z - rating - IP64

Ingress Protection (IP) Ratings indicate the degree of protection provided by enclosures for electrical equipment.

IP55 is: 1st **(5)** "Protection against entry of dust in sufficient quantity to interfere with satisfactory operation of equipment"; 2nd **(5)** "Protection against a low pressure jet of water from all practicable directions".

IP64 is: 1st number **(6)** "Complete protection against entry of dust"; 2nd number **(4)** Protection against splashing and spraying water from all practicable directions".

W45Z Electrical System

24V

Optional 12V

Traction Controller w/Integral Hoist Control

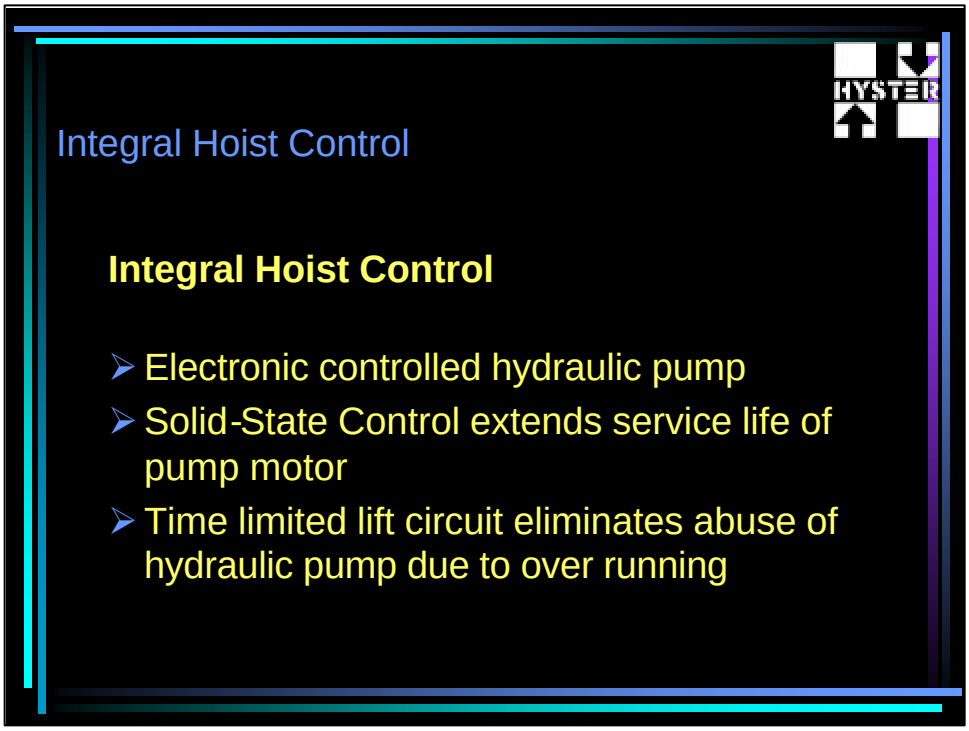
- **SEM Traction Control Technology**
  - Main or line contactor provides reverse battery polarity protection
  - Regenerative braking
  - Increases brush life
- **Integral Hoist Control**
  - Solid-state control
  - Extends service lift of pump motor
  - Standard lift interrupt

SEM Traction Control Technology

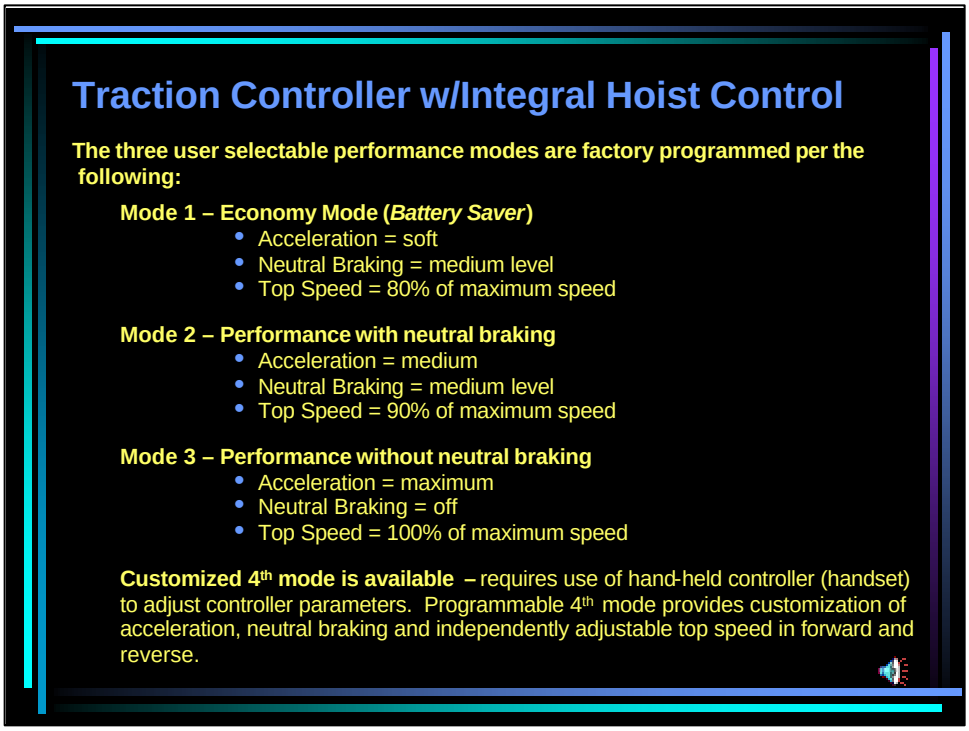
SEM Traction Control Technology

- Utilizes MOSFET Transistors
- Improved Productivity
- Regenerative Braking

SEM Traction Control Technology – SEM Traction Control Technology utilizes MOSFET transistors and provides separate control of the traction motor armature and field for optimum speed and torque performance, resulting in improved productivity. A main, or line contactor, is used to provide reverse polarity protection as well as to interrupt power to the traction motor in the event of a controller fault. The controller utilizes regenerative braking which significantly reduces the current through the traction motor brushes during "plugging" therefore increasing brush life.



Integral Hoist Control – The hydraulic pump motor is controlled electronically as opposed to traditional contactors that have historically been a high maintenance item. The solid-state control eliminates the high in-rush current associated with contactors and therefore extends the service life of the pump motor. The lift circuit is time limited to prevent running of the pump and motor against the pump relief setting, therefore limiting abuse to the hydraulic power pack.



User Selectable Performance Modes:

(Mode 3 is the default setting from the factory).
The user has a choice of three performance modes that are selectable through the tiller handle. The mode selection is made at start-up, or key "on". Performance parameters that vary are acceleration, deceleration (neutral braking), and top travel speed.

Note:
If the truck is programmed using the hand set for the customized 4th performance mode, the 3 user selectable modes will be disabled.

Traction Controller w/Integral Hoist Control

The three user selectable performance modes

(Mode 3 is the default setting from the factory).

1. The tiller handle must be in the full upright position, brake "ON"
2. Press and hold the horn button while turning the key switch to the "ON" position
3. The horn will sound, then release the horn button
4. Toggle through the modes by pressing the lift or lower buttons
5. The horn provides an audible indication as to the mode selected. One "beep" represents Mode 1, two beeps represents Mode 2 and three beeps represents Mode 3.

Traction Controller w/Integral Hoist Control

What is Neutral Braking?

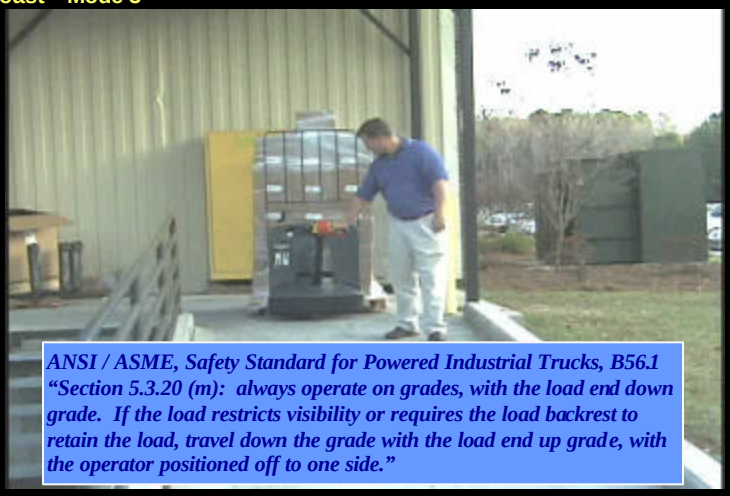
- Neutral braking is enabled while using performance modes 1 and 2.
- Neutral braking occurs when the Direction/throttle control actuators are released to neutral. The truck will "plug" to a stop automatically.

Benefits of Neutral Braking:

- Provides a smoother stop as compared to using the service brake (raising or lowering the tiller handle).
- Some operators prefer neutral braking while operating in tight areas because it provides automatic braking of the truck without raising or lowering the control handle to the brake position.

Traction Controller w/Integral Hoist Control

Neutral Braking - Modes 1 & 2
Coast – Mode 3



This demonstration video illustrates an 800 lb. Load on a 10% grade. The truck came to a complete stop in Mode 1 and in Mode 2 as the throttle was returned to the neutral position (neutral braking).

Neutral braking provides enhanced control while operating on ramps. While operating down a ramp, the truck will come to a stop without returning the control handle to the vertical position. Coasting is minimized.

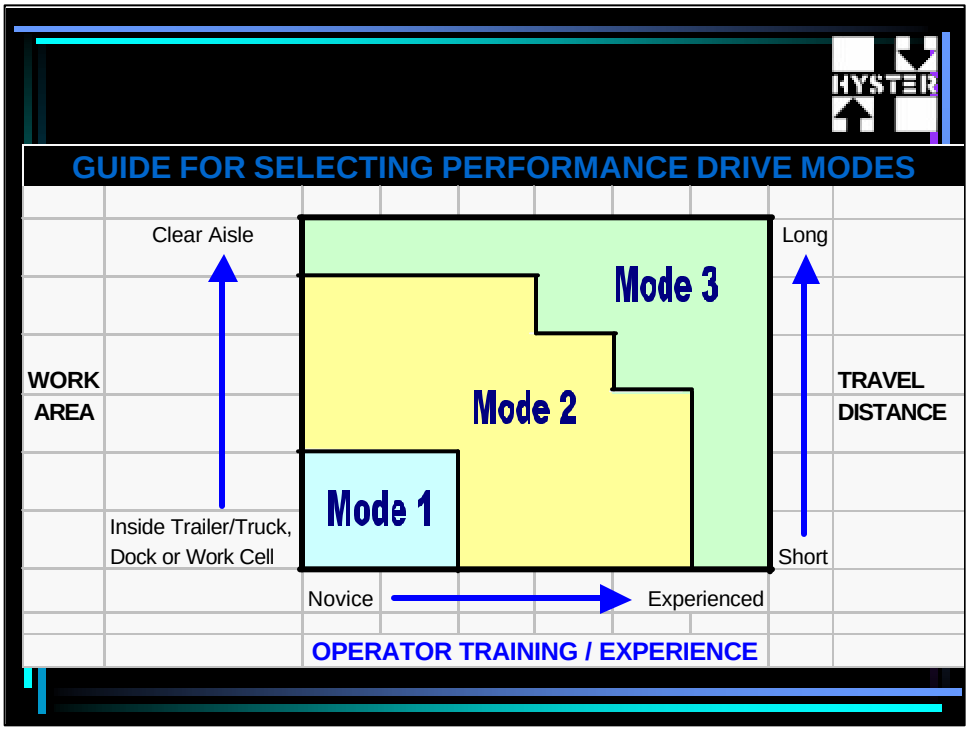
If the truck is set to Mode 3 the truck will continue to coast as long as the handle is in the drive position and the throttle in neutral.

The operator would then need to plug the truck to a stop or raise the tiller handle to the brake on position.

Mode 1 – Economy Mode (*Battery Saver*)
Neutral Braking = medium level
Truck comes to a stop

Mode 2 – Performance with neutral braking
Neutral Braking = medium level
Truck comes to a stop

Mode 3 – Performance without neutral braking
Neutral Braking = off
Truck will coast
Mode 3 is not recommended for ramp use.



Guide for selecting performance drive modes:

Mode 1 – new operator, inside trailer, short distances, or for improved battery life.

Mode 2 – operator with more experience, larger work area, medium runs

Mode 3 – experienced operator, large work area, longer travel distances

Note: Changing drive modes is easy to do. It is recommended that the operator be made aware of how to change and select modes. The operator should try each mode and select the one best suited for the operator, and the application.

Other Features and Benefits

- Lift Cutback at Low Battery
- Traction Cutback at Low Battery
- Power Fuse is Standard for Traction and Hoist
- Reverse Polarity Protection
- Protection for Logic Inputs

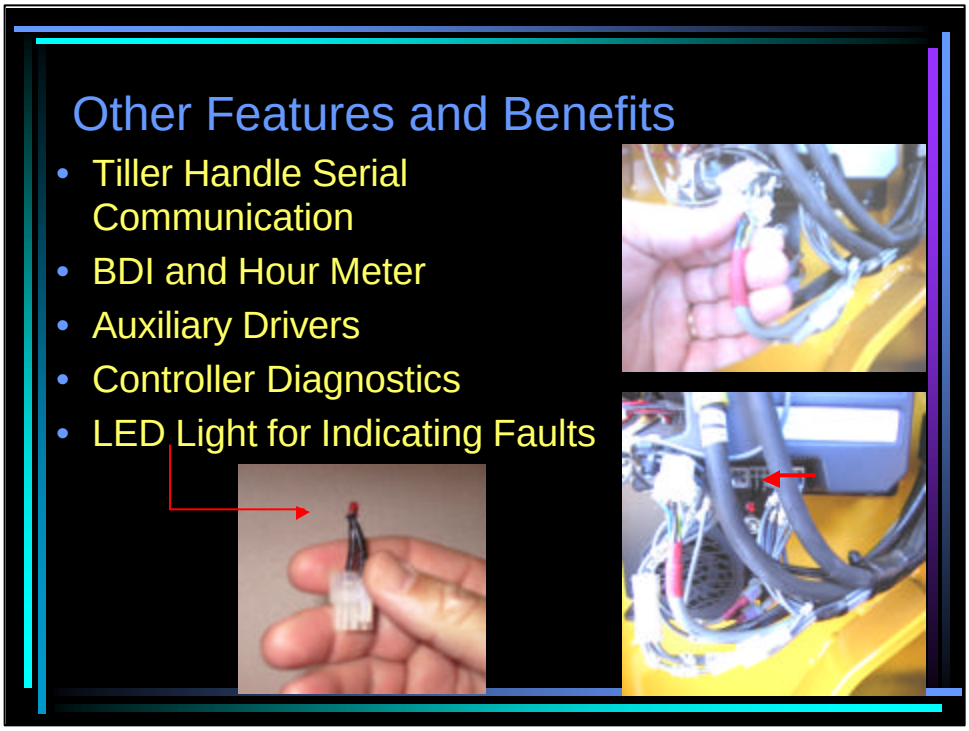
Lift Cutback at Low Battery – At 70% battery discharge the horn will sound twice indicating the battery is in need of charge. Lift lockout is invoked at 80% battery discharge.

Traction Cutback at Low Battery – Traction current is reduced in the event the battery is depleted beyond 80%. Maximum traction cutback is 50%.

A **Power Fuse is Standard** to protect the traction and lift pump motors.

Reverse Polarity Protection – The line contactor, driven by the controller, will protect against reverse battery protection.

Protection for Logic Inputs – All logic inputs are protected against BATTERY POSITIVE, BATTERY NEGATIVE and REVERSE POLARITY. Protection for over voltage and under voltage are also provided through the controller software.



Tiller Handle Serial Communication -- In an effort to reduce the number of wire conductors particularly at the tiller handle pivot and steering connection, serial communications has been utilized. The communication link between the tiller handle and the traction controller is a 6-wire jacketed and shielded cable.

BDI and Hour Meter – Both the battery discharge indicator and hour meter calculations are performed by the traction controller. The signal is transmitted to the gauge for display.

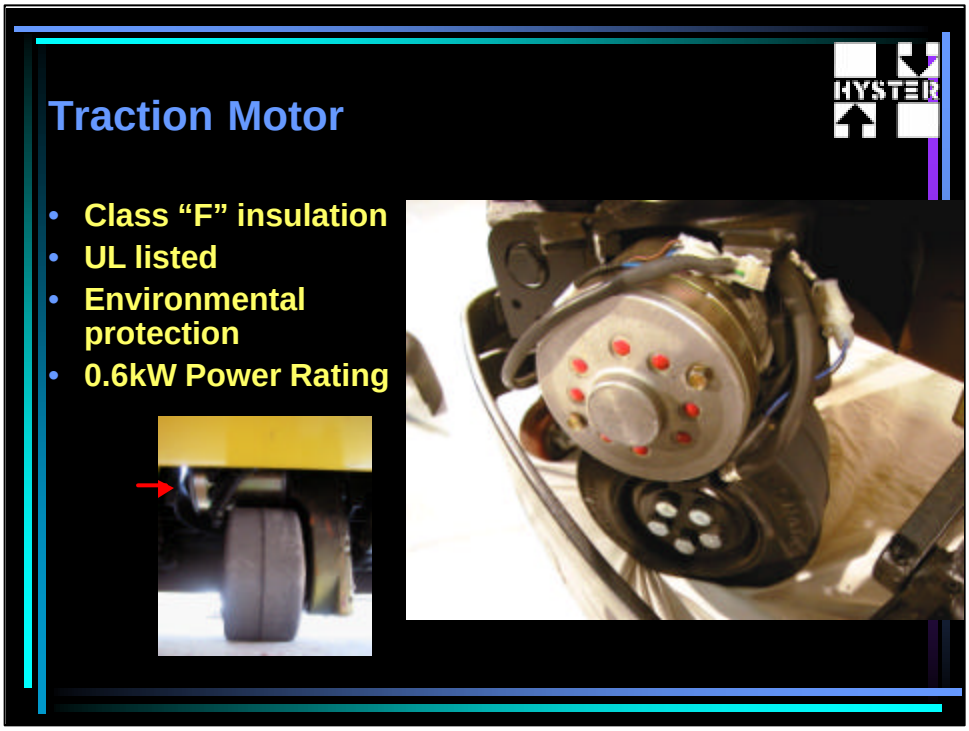
Auxiliary Drivers – Output drivers are included for the battery type selection, horn and electromagnetic brake.

Controller Diagnostics – Faults are displayed on the optional gauge in alpha-numeric characters "AL__XX" format. Fault history is stored in the controller memory.

LED Light - To determine a fault, the LED light will flash. The type of fault is determined by the number of times the LED light flashes. A list of alarm codes is shown in the service manual.

Display

- A single, multi function display is offered as an option. The digital display provides battery state-of-charge indication, truck hours, fault codes and lift interrupt warning. The battery state-of-charge is displayed by 4 high intensity LEDs.



This new series of trucks utilizes SEM technology for improved performance and productivity.

The traction motors have Class “F” insulation and are UL listed. A premium brush compound is used for increased brush and commutator life. The traction motor is shielded providing IP54 degree of environmental protection. Power rating (60 minute) is 0.6kW.

The Master Drive Unit (gearbox) is a proven design. The heat treated gears are enclosed in an oil bath. Installation has been designed for ease of maintenance. The steer bearing installation has been designed such that the steer bearings and bearing nut can be maintained and serviced without disassembling the Master Drive Unit (gearbox). A lubrication fitting has been added to grease the steer bearings.

Protection of the Master Drive Unit is provided by a rugged steel bumper.

The gear ratio is 42.2:1 for all models.

Hydraulic Power Unit Lift System

	1.8T (4,000 Lbs.)	2.0T (4,500 Lbs.) – 24V	2.0T (4,500 Lbs.) – 12V
Motor	1.0 kW	1.2 kW	1.2 kW
Pump Displacement	1.25 cc/rev	1.25cc/rev	1.25cc/rev
Hydraulic Relief Pressure	170 bar	180 bar	180 bar

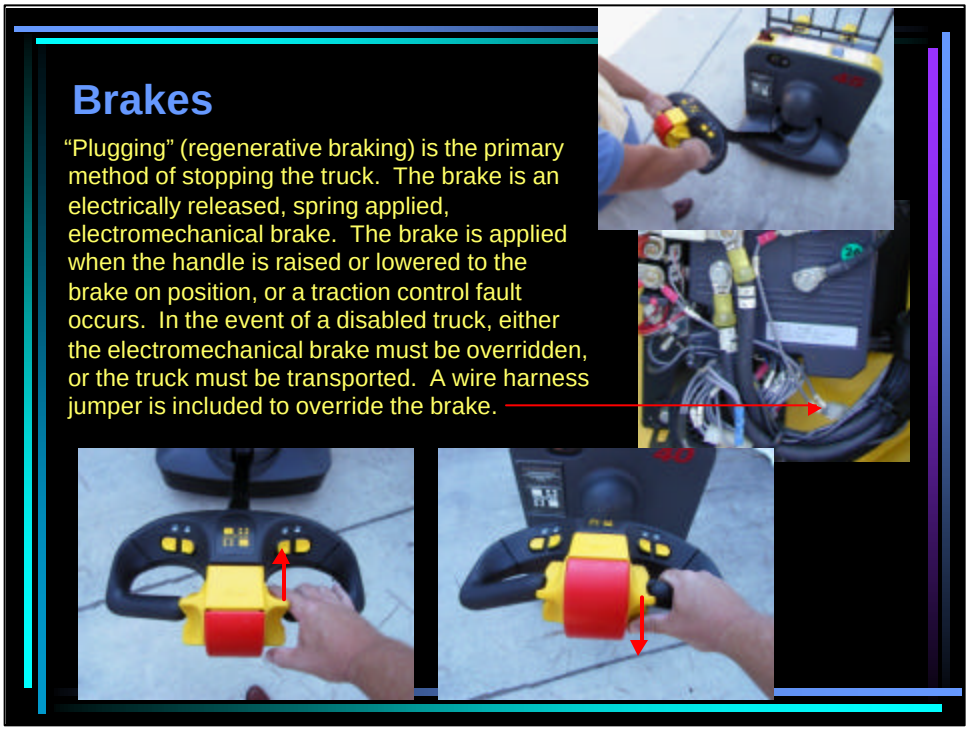
Lift Cylinder – Spherical bushings added; contains only 2 high-pressure connections.

The **Hydraulic Power Unit** utilizes a permanent magnet motor, pressure compensated pump and translucent reservoir. This is the same power unit used on the former 1.8T (4,000 Lbs.) capacity trucks. The change is the use of a solid-state circuit to control the pump motor as opposed to a start switch, or contactor. A review of the solid-state controller can be found in the Electrical System section. This higher efficiency system allows the pump and motor to operate at lower RPMs resulting in lower noise. The hydraulic reservoir is translucent with graduated fluid level marks for easy fluid level inspection. The power unit motor characteristics and pump displacement data is provided below.

The **Lift Cylinder** is a piston type and is fully serviceable. Spherical bushings have been added to the cylinder connections to compensate for any misalignment and improved life. The piston rod is chrome plated for corrosion protection.

The lift system contains only 2 high-pressure connections. Four additional low-pressure connections are required for lubrication of the piston rod end gland seals.

Lubrication fittings have been added to all lift linkage pivots. Electroless nickel-plated pins are standard for all models.



Braking for the 'E" Series of trucks:

Neutral braking and "plugging" (regenerative braking) are the primary method for stopping the truck. The traction motor will retard, or decelerate the truck when the throttle is returned to the neutral position. "Plugging" functions are similar to that of the former models.

The brake is an electrically released, spring applied, electromechanical brake. The brake is released by lowering the tiller handle and rotating the direction/speed control. The brake is applied when the handle is raised or lowered to the brake "ON" position, or a traction control fault occurs.

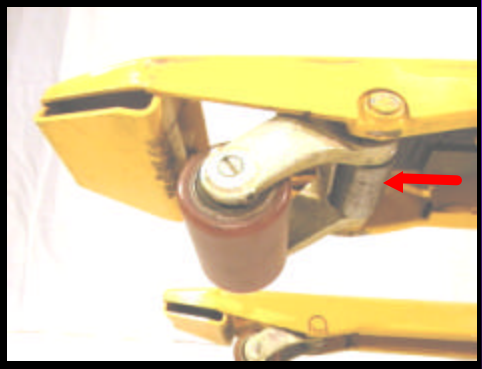
In the event the truck is disabled, either the electromechanical brake must be overridden, or the truck must be transported. An auxiliary wire harness, located near the traction controller, is included to override the brake allowing the truck to be towed. The truck will not drive with the auxiliary harness connected.

Forks and Frame

- The battery compartment/fork frame is robotically welded, steel construction.
- A flush pallet stop is standard on all fork frames.
- Additional fork section reinforcement is included in the (4,500 Lbs.) capacity fork frame.

Pallet Entry& Exit

- The pallet fork lifts up and over pallet bottom boards when exiting.



The pallet fork lifts up and over pallet bottom boards when exiting.

The fork profile has ***not*** been changed with these new models. Fork tip skid shoe and pallet entry/exit skids are welded to the fork. Pallet exit rollers are located on the load wheel links.

Load Wheels

- Single load wheel
- Two roller bearings
- “Knock-out” axle
- 92 durometer polyurethane
- 82mm (3.25”) diameter
- 114mm (4.5”) in length

Drive Unit Cover

- Extremely durable, produced from an engineered thermoplastic elastomer.
- Meets UL flammability requirements
- The operator's manual and storage tray are attached to the drive unit cover for all models.

W40Z / W45Z
DRIVE TIRES

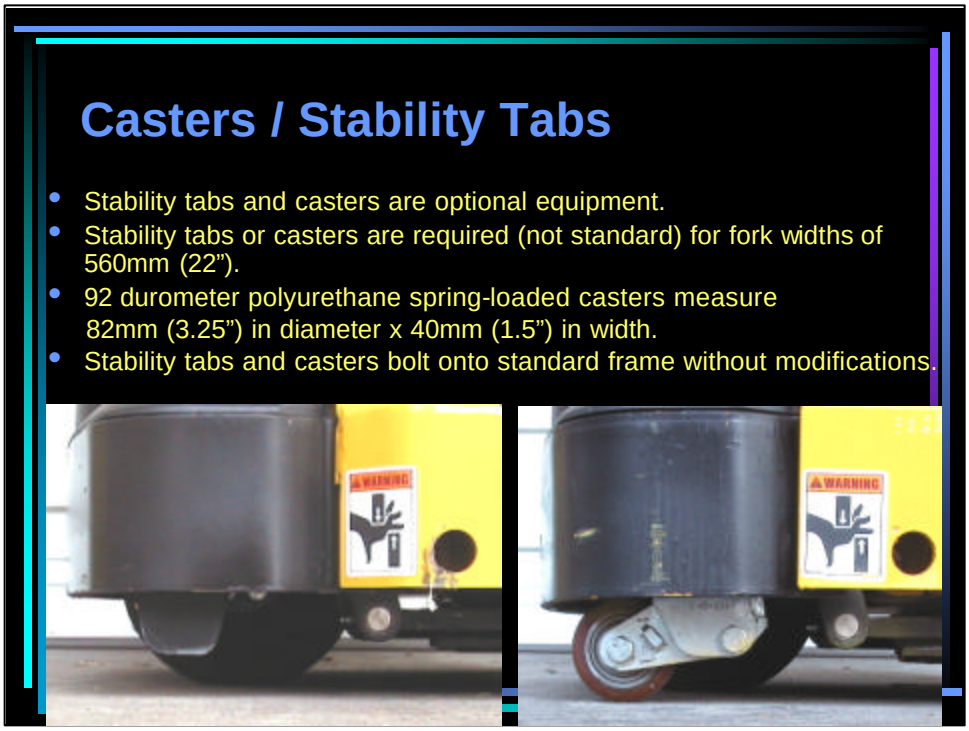
The drive tire is secured to the drive axle with 5 screws.
Dimensions by model are detailed below:

9" x 5" Press-On Rubber	OPT	**STD**
9" x 4" Molded-On Rubber Drive Tires	**STD**	OPT
9" x 4" Molded-on Polyurethane (Includes Static Strap)	OPT	OPT
9" x 5" Non-Marking Press-On Rubber (Includes Static Strap)	OPT	OPT
9" x 5" Press-On Micro-Siped Polyurethane (Includes Static Strap)	OPT	OPT
9" x 5" Press -On Polyurethane (Includes Static Strap)	OPT	OPT

STD (Standard) **OPT (Optional)**

Micro-Siped Polyurethane tire with static strip

- W40Z standard tire is now a molded on 9” x 4” rubber tire.
  - -increased grip without increasing steering effort.
- When replacing an older W40Z truck, it is recommended to specify the optional 9” x 5” press-on for continuity.



Use of stability tabs or casters are subject to application requirements. General guidelines for consideration are:

No casters or stability tabs – level ground with low load height, and a tightly stacked, banded or wrapped load.

Stability tabs – medium slope/grades with medium high load height and medium stacked, banded or wrapped load.

Casters – higher slope/grades with taller load height or loosely stacked or unstable loads.

Stability tabs and casters are easily installed and are interchangeable.

Note: Stability tabs can cause surface damage to floors. Stability tabs and casters may have a tendency to hang up on dock plates depending on the application and type of dock plates used. Casters do require additional maintenance.

Load Backrest

48” and 60” load backrests are available as options

48” and 60” load backrests are available as options. Load backrest bolt-on mounting is standard for the 1.8T (4,000 Lbs.) truck. The 2.0T (4,500 Lbs.) truck load backrest is also a bolt-on configuration, but requires a 50mm (2.0”) increase in fork length.

Standard Features and Options List

	Hyster W40Z	Hyster W45Z	Hyster W45Z*
Environmental Packages:			
Standard Construction	S	S	S
Cold Storage / Freezer Construction	O	O	O
Corrosion / Food Processing Construction	---	---	---
UL Type "EE" Construction	---	---	---
Electrical:			
12V SEPEX Traction Control	---	---	S
24V SEPEX Traction Control	S	S	---
Multi-function Display with Hour meter and BDI	O	O	O
"Creep Speed" tiller switch	O	O	O
Red SBX175 Battery Connector (24V)	S	---	---
Red SB175 Battery Connector (24V)	---	S	---
Yellow SB175 Battery Connector (12V)	---	---	S
Gray SB175 Battery Connector	---	O	O
Toggle Switch Ignition	O	O	O
Battery Compartment:			
8.1" x 28.5" x 23.0"	S	---	---
8.1" x 31.2" x open	---	---	S
9.1" x 28.0" x open	---	S	---
Batteries:			
158 AH Flooded Battery Pack with 20A Charger	S	---	---
195 AH GNB Pallet-Pro Pack with Charger	O	O	---
Lateral battery spacers	---	S	S
Fore/Aft battery spacers	---	S	---

*12V is Optional

Standard Features and Options List Cont.

	Hyster W40Z	Hyster W45Z	Hyster W45Z*
Pallet Forks:			
22" OAW x 36" L (stability tabs included)	O	O	O
22" OAW x 42" L (stability tabs included)	O	O	O
22" OAW x 48" L (stability tabs included)	O	O	O
27" OAW x 36" L	O	O	O
27" OAW x 42" L	O	O	O
27" OAW x 48" L	S	S	S
27" OAW x 60" L	O	O	O
Load Wheels:			
3.25" Dia. x 4.5" Single with 2 Bearings / Wheel	S	S	S
Drive Tires:			
9" x 4" Rubber - Moulded-on	S	O	O
9" x 4" Poly - Moulded-on	O	O	O
9" x 5" Rubber - Press-on	O	S	S
9" x 5" Poly - Press-on	O	O	O
9" x 5" Micro-Siped Poly - Press-on	O	O	O
9" x 5" Non-Marking - Press-on	O	O	O
Stability Casters / Tabs:			
3.25" Dia. x 1.5" wide poly wheel	O	O	O
Stability Tabs	O	O	O
Load Backrest:			
48" high Bolt-on	O	---	---
60" high Bolt-on	O	---	---
48" high Bolt-on (adds 2" to fork length)	---	O	O
60" high Bolt-on (adds 2" to fork length)	---	O	O
Battery Rollers:			
RH Extraction	---	O	O
Convenience Tray:			
Battery mounted with Standard Battery Pack	S	---	---

*12V is Optional

Competitive Product Comparison

Manufacturer		Hyster	Hyster	Barrett	Linde	BT/Prime Mover	Big Joe	Raymond	Crown	Crown	Crown
Model		W40Z	W45Z	WP-40	EGU20	PMX	PTW40	101T-F40L	WP2030-45	WP2035-45	WP2040-45
Capacity	lbs.	4000	4500	4000	4400	4500	4000	4000	4500	4500	4500
Voltage	volts	24	24	24	24	24	24	24	24	24	24
Fork Length	in.	48	48	48	47	48	47	48	47.6	45.5	47.6
Overall Width Across Forks	in.	27	27	27	26.5	27	27	27	26.4	26.4	26.4
Chassis Length	in.	21.4	22.4	22	26.1	26.1	26	23.2	23.2	24.4	24.6
Overall Length	in.	68.6	69.7	76.81	77.6	74.1	76.2	70.9	67.7	72	72.1
Chassis Width	in.	29.2	29.2	32.5	30	30	30	27.9	27.9	27.9	30.3
Turning Radius	in.	62.8	63.8	66.25		54.8	63.7				62.2
Right Angle Aisle, 40" x 48" Pallet	in.	78	79	74.5	73.5	73		73			
Gradability, loaded	%	10	10			10	10	5	10	10	10
Grade Clearance, Center with Load	%	25	25	30	25	38			38.7	31.6	37.8
Fork Lifting Height	in.	5	5	6	5.1	6	5.5	6.1	6	5.2	6
Battery Compartment	in.	28.7x7.8x24.3	28.5x9.1xopen	32x8.25x31	26x9x26	28.3x9x24	31x7xopen	28x8.7x26.5	25.8x7.9x24	25.8x7.9x24	25.8x7.9x24
Travel Speed, No Load	mph	3.7	3.7	3.2	3.4	3.7	3.4	3.7	3.7	3.7	3.7
Travel Speed, Rated Load	mph	3.2	3	2.1	2.7	3.3		2.4	3.4	3.4	3.4
Drive Tire Size	in.	9x4	9x5	10x5	9x3	10.5x5	10x4	10.5x5	10x4	10x4	10x4
Load Wheel Size	in.	3.25x4.5	3.25x4.5	3.25x6	3.3x4	3.3x5	3.3x4.5	3.3x5	3.5x4.5	3.5x4.5	3.5x4.5
Truck Weight, w/o Battery, No Load	lbs.	540	560	1000	640	830		830	712	712	712
Truck Weight, w/ Battery, No Load	lbs.	850	1130								
Raymond brands products for Caterpillar NPP40, Mitsubishi PMW20, Dockstocker DSW400, and Toyota 6HBW20											
BT/Prime Mover brands products for Kalmar WF40, Komatsu MWL22-1A and Clark WP40											

Summary

- Introduction
- Project Scope
- Application/Duty cycle & Environment
- Applications
- Configuration Summary
- Batteries
- Capacity
- Handle and Controls
- Creep Speed Control
- Electrical System
- Traction Controller
- Drive Unit
- Traction Motor
- Brakes