Features

Safety
- Three independent braking systems.
- Emergency circuit isolator.
- Keyswitch.
- Fail-safe circuitry.
- Traction isolated by seatswitch and handbrake.
- Handbrake delay interlock allows gradient start without roll back.
- Electric horn.
- Electrical overload protection.
- Excellent stability.

Standard equipment
All items shown above.
- 48V circuit with 12V lighting via DC/DC converter.
- Three wheel configuration.
- Single pedal accelerator and direction lever.
- Fully adjustable, PVC-covered seat.
- Pneumatic tires.
- 3.2 kW drive motor.
- Digital microprocessor, high frequency controller.
- Combination instrument indicating parking brake applied/low brake fluid level, driver alert, brush wear warning, motor temperature warning, battery discharge and elapsed time (hour meter).
- Multi-position, rear towing coupling.
- Head, side, rear and brake lights.
- Standard color scheme – vermilion and charcoal gray.

Optional equipment
- 24 Volt power.
- Maximum travel speed inhibitor.
- Full cab with two lift-off, side glass doors and rear hatch, front and rear screen wipers, front screen washer and demister, interior light and mirror and two exterior mirrors.
- Cab with roll-up, fabric sides and lower rear panel including glass front and rear screens, front and rear wipers, interior light and mirror, and two exterior mirrors. Canopy with front screen, wiper and washer.
- Contoured solid (superelastic) tires – normal or non-marking.
- Fabric-covered seat –with or without heating.
- Seat backrest extension.
- Multi-position, front towing coupling.
- Road lighting – as standard, plus turn signal indicators, hazard warning, reversing light, license plate holder and reflectors.
- Audible warning on reverse.
- Alternative color schemes.

Check with dealer/factory for additional equipment availability.

Linde Material Handling North America Corporation
2450 West 5th North Street
Summerville, SC 29483
(843) 875-8000
E-mail: trucksales@lmh-na.com
Web Site: http://www.lmh-na.com

03/03/5M Graphic Revision: 061407

Electric Tow Tractor
13,000 lbs. Capacity

Introduction
The three-wheel electric tow tractor model P60Z, represents a significant advance in ergonomics and technology. Designed to ensure maximum operator comfort and minimum fatigue, as well as high productivity and lowest lifetime costs, it is particularly suited to a range of industrial environments including airports, railways, postal services, hospitals and the automotive industry. The P60Z has a nominal towing capacity of 13,000 lbs. and an unladen traction speed of 11.0 mph. An exclusive range of optional equipment ensures that this highly versatile tractor can be adapted for use in all types of applications.

Features
- Modern styling and powerful towing capability.
- Compact, rugged design for excellent maneuverability and versatility.
- Smooth, energy efficient, virtually noise free, digital traction control.
- Ergonomically-designed driver's compartment.
- Heavy duty, high performance design.
- Integral chassis suspension and low center of gravity provide both excellent anti-roll handling charateristics and superb stability.

Driver's compartment and controls
A low step facilitates access to the driver's compartment, which has a spacious, uncluttered floor plate covered with textured, non-slip rubber matting. The automotive layout of the pedals, direction lever, steering wheel and controls, enable safe, comfortable and efficient operation. A combination instrument indicates parking brake applied/low brake fluid level, driver alert, turnsignal indicator, direction of travel, drive motor brush wear warning and drive motor temperature warning combined with progressive traction slow down. The instrument also includes a battery discharge indicator and hour meter to enable planning of maintenance intervals and battery charging schedules for optimum performance and reliability. The driver's compartment also provides storage space for drink containers and a clipboard, plus a fully adjustable PVC-covered seat with document pouch.

Chassis
The chassis has been designed for maximum strength and stability using the latest finite element stress analysis techniques. The lower, pressed steel section provides excellent rigidity and rugged strength and protects all major components. The battery is located between the two axles for maximum stability. The top section is comprised of two robust, double-skinned, impact resistant, polyethylene moldings – the hood and seat pan. The latter of these can be tilted back to provide easy access for maintenance and battery changing. The modular design maximizes material utilization.

Transmission and suspension
A powerful 3.2 kW, separately excited (shunt wound) drive motor is mounted transversely on the drive axle. Power is transmitted to the rear wheels via a rugged drive axle and differential. Integral full chassis suspension ensures excellent ride characteristics.

Electrical system
The tractor is fitted with a microprocessor-based, digital, high frequency control system. In conjunction with the drive motor, it enables precise control of speed and acceleration for safe operation and high productivity. A high number of work cycles can be obtained from each battery charge due to the high efficiency of this system.

Steering
Manual steering is both light and responsive requiring minimum steering effort, thus ensuring high maneuverability with minimum operator fatigue.

Towing coupling and carrier
The tractor has a multi-position, rear towing coupling as standard equipment. The carrying compartment molded into the rear chassis has a load capacity of 330 lbs.

Lighting
The standard lighting package is comprised of two headlights protected by grills, side and rear lights and brake lights. A seven-pin trailer lighting socket is also fitted.

Braking
The tractor has three independent braking systems:
1. Hydraulic drum brakes on all three wheels.
2. Hand lever-operated parking brake mechanically connected to rear wheels.
3. Electrical regenerative braking occurs:
   - as accelerator pedal is released.
   - when opposite direction of travel is selected.
   - automatically on grades with release of the accelerator pedal.

Electrical energy is returned to the battery minimizing wear on the service brakes. On grades, speed is automatically reduced when the accelerator pedal is released to prevent overspeeding.

Manufacturer's Data and Design Characteristics

March 2003

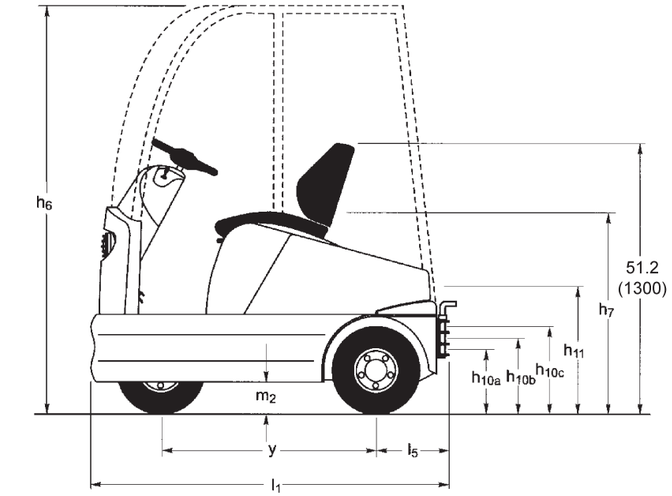
Characteristics	1.1	Manufacturer		Linde		Linde	
	1.2	Model designation		**P60Z** (48V)		**P60Z** (24V)	
	1.3	Power unit: Battery, Diesel, Gasoline, LP gas		Battery		Battery	
	1.4	Operation: manual, pedestrian, stand-on, seated, order picker		Seated		Seated	
	1.5	Towed load capacity	Q lbs (kg)	13,000[1] (6,000)[1]		13,000[1] (6,000)[1]	
	1.7	Rated drawbar pull	lbs (N)	270[1] (1,200)[1]		270[1] (1,200)[1]	
	1.9	Wheelbase	Y in (mm)	41 (1,040)		41 (1,040)	
Weight	2.1	Service weight	lbs (kg)	2,360 (1,070)		2,250 (1,020)	
	2.3	Axle load without load, front/rear	lbs (kg)	1,036 (470) 1,323 (600)		926 (420) 1,323 (600)	
Wheels and Tires	3.1	Tires, front/rear (SE= CS superelastic, P=pneumatic)		P/P[2]		P/P[2]	
	3.2	Tire size, front		4.00-8, 6 ply		4.00-8, 6 ply	
	3.3	Tire size, rear		4.00-8, 6 ply		4.00-8, 6 ply	
	3.5	Wheels, number front/rear (x = driven)		1/2x		1/2x	
	3.7	Track width, rear	b11 in (mm)	33.9 (860)		33.9 (860)	
Dimensions	4.7	Height of overhead guard (cabin)	h6 in (mm)	77.2 (1,960)		77.2 (1,960)	
	4.8	Height of seat/stand-on platform	h7 in (mm)	35.1 (890)		35.1 (890)	
	4.12	Towing coupling height	h10 in	a)11.4 b)13.6 c)15.8		a)11.4 b)13.6 c)15.8	
	4.13	Platform height without load	h11 in (mm)	24 (610)		24 (610)	
	4.16	Loading platform, length	l3 in (mm)	17.3 (440)		17.3 (440)	
	4.17	Rear overhang	l5 in (mm)	13.6 (345)		13.6 (345)	
	4.18	Loading platform, width	b9 in (mm)	32.7 (830)		32.7 (830)	
	4.19	Overall length	l1 in (mm)	68.1 (1,730)		68.1 (1,730)	
	4.21	Overall width	b1 in (mm)	39.2 (996)		39.2 (996)	
	4.32	Ground clearance, center of wheelbase	m2 in (mm)	4.5 (115)		4.5 (115)	
	4.35	Turning radius	Wa in (mm)	65 (1,650)		65 (1,650)	
	4.36	Minimum pivoting point distance	b13 in (mm)	23.6 (600)		23.6 (600)	
Performance	5.1	Travel speed with/without rated load	mph (km/h)	4.4 (7) 11 (17.6)		4.4 (7) 11 (17.6)	
	5.5	Drawbar pull at 60 minute rating	lbs. (N)	270 (1,200)		270 (1,200)	
	5.7	Maximum drawbar pull	lbs. (N)	1,010 (4,500)		1,010 (4,500)	
	5.7	Climbing ability	%	See graph		See graph	
	5.8	Maximum climbing ability	%	See graph		See graph	
	5.10	Service brake		Hydraulic/electric		Hydraulic/electric	
Elec. System	6.1	Drive motor, 60 minute rating	Hp (kW)	4.3 (3.2)		4.3 (3.2)	
	6.4	Battery voltage rating capacity (5h)	V/Ah	48 / 300		24 / 500	
	6.5	Battery weight (+_5%)	lbs./ Kg	1,190 (540)		980 (445)	
	6.6	Maximum battery tray dimensions	x/y/z in[4]	32.68/16.3/24.69[4]		32.68/12.87/24.69[4]	
Other	8.1	Type of drive control		Microprocessor/Transistor		Microprocessor/Transistor	
	8.4	Mean noise level at driver's ear	dB (A)	66		66	

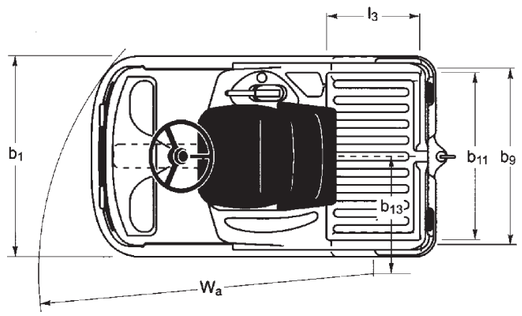
1) Based on level, dry surface with rolling resistance of 0.02 lbs./lbs. Refer to graph opposite for specific operating conditions.

2) CSE tires are available.

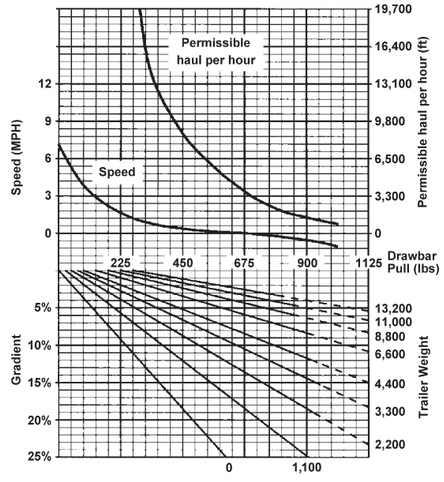
3) Refer to manufacturer for figures.

4) x = width, y = length, z = height.

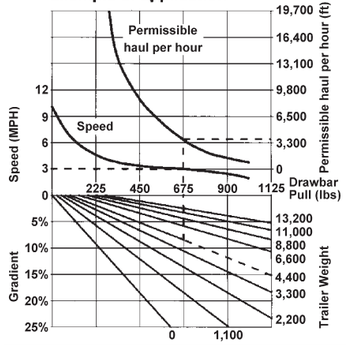




Performance Chart



Example of application



The example shown above illustrates

- a tractor towing a load of: 5,500 lbs.
- operating on a slope of: 8%
- maximum travelling speed obtainable: 3 mph
- permissible length of run per hour: 3,930 ft.

(Where the 8% slope is 197 ft. long, the complete cycle, including the return journey, can be performed 10 times per hour).

- Load/gradient combinations shown by full line can be restarted from stationary on the gradient.
- The permissible haul per hour is the total distance travelled, including the return journey and any downhill gradients.
- It is recommended that braked trailers are used for trailer loads exceeding 5,500 lbs. and for all trailer loads where a gradient is involved.