

Electric tow tractor 6.0 t

Linde



126

Introduction

The three wheel electric tow tractor model P60Z, which complies with EC directives, represents a significant advance in ergonomics and technology. Designed to ensure maximum operator comfort and minimum fatigue, with high productivity and lowest lifetime costs, it is particularly suited to a range of industrial applications including airports, railways, postal services, hospitals and the automotive industry. The P60Z has a nominal towing capacity of 6.0 tonne and an unladen traction speed of 17 km/h. An exclusive range of optional equipment ensures that this highly versatile tractor can be adapted for use in all types of industry.

Features

- Modern styling and powerful towing capability.
- Compact, rugged design for excellent manoeuvrability and versatility.
- Smooth, energy efficient, virtually noise free, digital control of traction.
- Ergonomically designed driver's compartment.
- Heavy duty, high performance.
- Integral chassis suspension and low centre of gravity provide both excellent anti-roll handling characteristics 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, plus a fully adjustable, PVC covered seat with document pouch, enable safe, comfortable and efficient operation. A combined instrument indicates parking brake applied/low brake

fluid level, driver alert, indicator repeater, trailer indicator repeater, direction of travel, motor brush wear warning and 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 drinks' containers and an A4 clipboard.

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 comprises two robust, double-skinned, impact resistant, polyethylene mouldings – the scuttle and seat pan – the latter for which can be tilted back to provide easy access for maintenance and battery changing. The modular design maximises material utilisation and the polyethylene is fully recyclable.

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 which, in conjunction with the motor, 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 efficiency of this system of energy control.

Steering

The manual steering is both light and responsive requiring minimum steering effort, thus ensuring high manoeuvrability with minimum operator fatigue.

Towing coupling and carrier

The tractor has a multi-position, rear towing coupling as standard. The carrying compartment moulded into the rear chassis has a load capacity of 150 kg (50 kg when cab or canopy is fitted).

Lighting

The standard lighting comprises two headlights protected by grilles, 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 gradients with accelerator pedal released.

Electrical energy is returned to the battery minimising wear on the service brakes. On gradients, speed is automatically reduced with the accelerator pedal released to prevent overspeeding.

LINDE

Tow tractor

Designation to VDI 3586

Data sheet for materials handling equipment

EFZ

Abbreviation to

April 1998

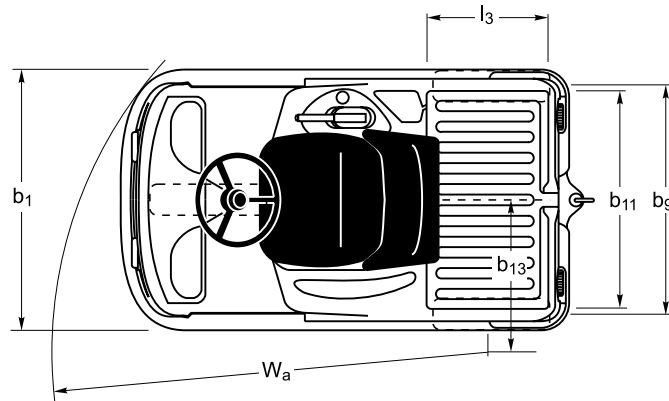
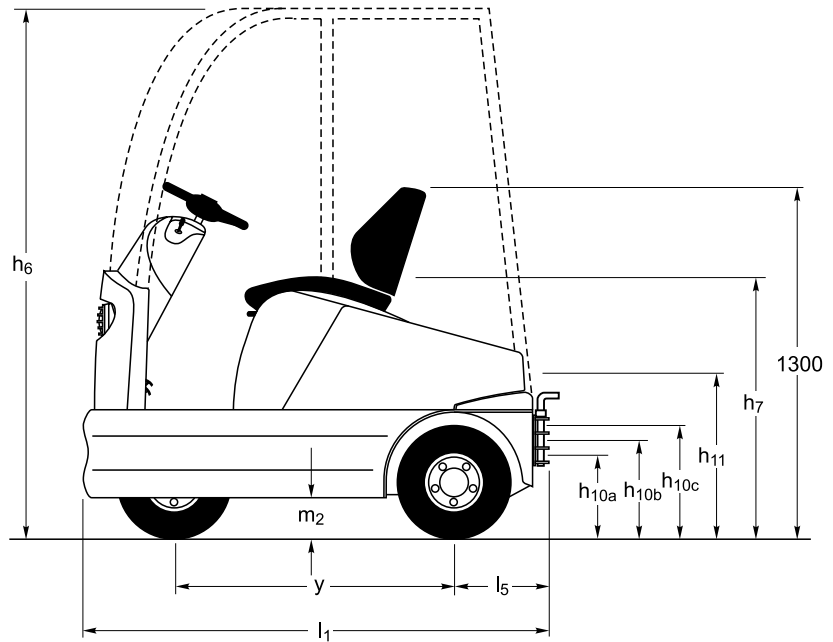
			Linde	Linde	
Characteristics	1.1	Manufacturer		Linde	Linde
	1.2	Model designation		P 60 Z (48 V)	P 60 Z (24 V)
	1.3	Power unit: battery, diesel, petrol, LP gas, mains power		Battery	Battery
	1.4	Operation: manual, pedestrian, stand-on, seated, order picker		Seated	Seated
	1.5	Load capacity	Q (t)	6.0 ¹⁾	6.0 ¹⁾
	1.7	Rated tractive force	F (N)	1200	1200
	1.9	Wheel-base	y (mm)	1040	1040
Weights	2.1	Service weight	kg	1070	1020
	2.3	Axle load without load, front/rear	kg	470/600	420/600
Wheels and tyres	3.1	Tyres, front/rear (SE = CS superelastic, P = pneumatic)		P ²⁾	P ²⁾
	3.2	Tyre size, front		4.00-8/6 PR	4.00-8/6 PR
	3.3	Tyre size, rear		4.00-8/6 PR	4.00-8/6 PR
	3.5	Wheels, number front/rear (x = driven)		1/2x	1/2x
	3.6	Track width, front	b ₁₀ (mm)	0	0
	3.7	Track width, rear	b ₁₁ (mm)	860	860
	Dimensions	4.7	Height of overhead guard (cabin)	h ₆ (mm)	1960
4.8		Height of seat/stand-on platform	h ₇ (mm)	890	890
4.12		Towing coupling height	h ₁₀ (mm)	a) 290 b) 345 c) 400	a) 290 b) 345 c) 400
4.13		Platform height, without load	h ₁₁ (mm)	610	610
4.16		Loading platform, length	l ₃ (mm)	440	440
4.17		Rear overhang	l ₅ (mm)	345	345
4.18		Loading platform, width	b ₉ (mm)	830	830
4.19		Overall length	l ₁ (mm)	1730	1730
4.21		Overall width	b ₁ (mm)	996	996
4.32		Ground clearance, centre of wheelbase	m ₂ (mm)	115	115
4.35		Turning radius	W _a (mm)	1650	1650
4.36		Minimum pivoting point distance	b ₁₃ (mm)	600	600
Performance	5.1	Travel speed, without load	km/h	7/17	7/17
	5.5	Tractive force, without load, 60 minute rating	N	1200	1200
	5.6	Maximum tractive force, without load, 5 minute rating	N	4 500	4 500
	5.7	Climbing ability, with/without load, 30 minute rating	%	see graph	see graph
	5.8	Maximum climbing ability, with/without load, 5 minute rating	%	see graph	see graph
	5.10	Service brake		Hydraulic/electric	Hydraulic/electric
Drive	6.1	Drive motor, 60 minute rating	kW	3.2	3.2
	6.3	Battery according to Euro norm		IEC 254-2	IEC 254-2
	6.4	Battery voltage/rated capacity (5 h)	V/Ah	48/330	24/550
	6.5	Battery weight (±5%)	kg	540	445
	6.6	Power consumption according to VDI cycle	kWh/h	3)	3)
	Other	8.1	Type of drive control		electronic/stepless
8.4		Noise level at operator's ear	dB (A)	66	66
8.5		Towing coupling, design/type, DIN		No	No

1) Based on level, dry surface with rolling resistance of 200 N/t. Refer to graph opposite for specific operating conditions

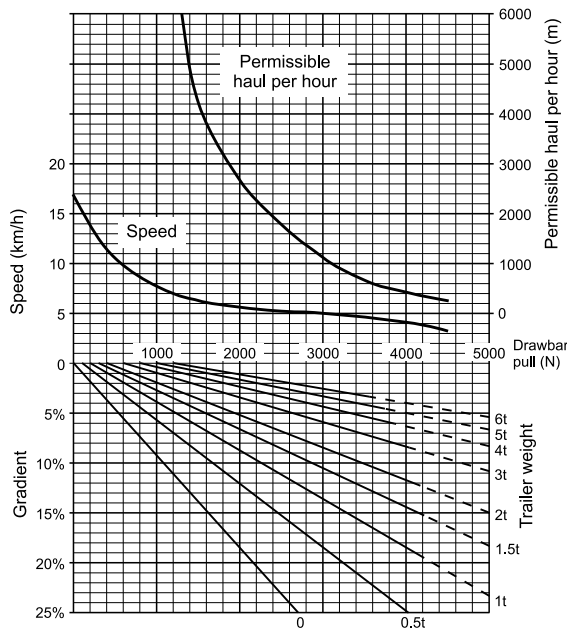
2) Based on starting resistance of 400 N/t. Refer to graph opposite for specific operating conditions.

3) Refer to manufacturer for figures.

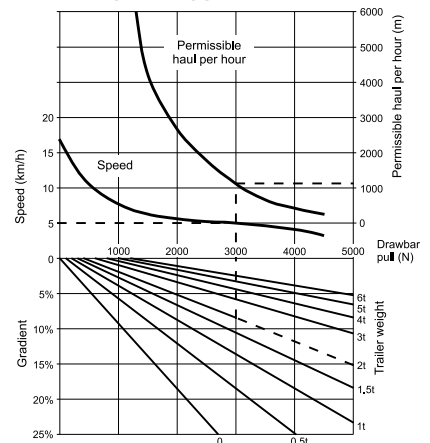
4) 72 V circuit is available. Traction speed is reduced by 10%.



Performance Chart



Example of application



The example shown above illustrates a tractor towing a 2 tonne load operating on a slope of 8% maximum travelling speed obtainable permissible length of run per hour (Where the 8% slope is 60m 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 2.5 tonne and for all trailer loads where a gradient is involved.

Features



Safety

- Three independent braking systems
- Emergency circuit isolator
- Keyswitch
- Fail-to-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 as shown under safety
- 48 V circuit with 12 V lighting via DC/DC converter
- Three wheel configuration
- Single pedal accelerator and direction lever
- Fully adjustable, PVC covered seat
- Pneumatic tyres
- 3.2 kW drive motor
- Microprocessor based, digital, high frequency control.

- Combined 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 colour scheme – vermilion and charcoal grey.

Batteries and chargers

- 48 V, 200 or 220 Ah
- 48 V, 300 or 330 Ah to DIN 43531 A
- 24 V, 500 or 550 Ah to DIN 43535 A
- A range of chargers is available to suit application and mains supply requirements.

Optional equipment

- 24 V circuit
- 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) tyres – normal or non-marking
- Fabric covered seat – with or without heating
- Seat backrest extension
- Multi-position, front towing coupling
- Automatic towing couplings (to DIN 15170-E2):
 - One rear
 - One front
 - One rear with extension
 - Two rear with extension
- Road lighting – as standard plus indicators, hazard warning, reversing, number plate and reflectors
- Audible warning on reverse
- Alternative colour schemes.

Other options available on request.

Subject to modification in the interests of progress. Illustrations and technical details not binding for actual construction. All dimensions subject to customary tolerances.