

JOYGLOBAL

P&H

1900AL

Electric Mining Shovel Product Overview





1900AL Shovel

Taking the Next Step: Building on Proven Success

When the P&H 1900AL was introduced in 1977, the result was one of the most rugged, reliable, easy to operate and easy to maintain electric mining shovels that has excelled, endured – and remained largely unchanged since that time.

P&H 1900ALs utilize friction-free P&H Magnetorque® electromagnetic power drive to develop exceptional bail pull in the hoist function when encountering extremely heavy digging. The result is smooth, rapid passage of the dipper through the bank for increased dipper fill factor without stalling.

Modern P&H 1900ALs now feature a solid-state Magnetorque-based control system to obtain fast dig cycle time, minimized electrical inertia and rapid motor response. Simple, straight-forward circuitry promotes fast, easy shovel maintenance and system diagnostics.



Proven Performance

P&H Shovels have been exceeding customer requirements and expectations since 1932.

- Lowest Total Cost of Ownership
- Highest productivity
- Superior machine reliability and durability

**We set the industry standard for
Electric Mining Shovels**

A Closer Look

Them 1900AL *utilizes proven components.*

- High-strength, low alloy steel structures
- Motors designed and manufactured by Joy Global specifically for Electric Mining Shovel

The Joy Global Performance Edge

Joy Global is the Worldwide Leader in Electric Mining Shovels. The P&H 1900AL sets the standard in performance and productivity.

- Designed for *severe-duty* digging and loading
- Years of experience in building rugged, reliable equipment

We are driven by achieving the lowest Total Cost of Ownership for our customers:

- Quality components
- Focus on machine availability and productivity
- Heavy-duty structures
- Joy Global field support

Attachment of choice for the world's toughest pits

- **Twin-leg dipper handle** – Stable dipper trajectory, faster cycle times, higher productivity
- **Rack and pinion crowd** – Less maintenance, all weather performer
- **P&H Dippers** – Designed and built for optimum digging and long service life



Solid-State, Magnetorque based control system

- **Fast cycle time**
- **Minimized electrical inertia**
- **Rapid motor response**
- **Simple, straight forward circuitry**

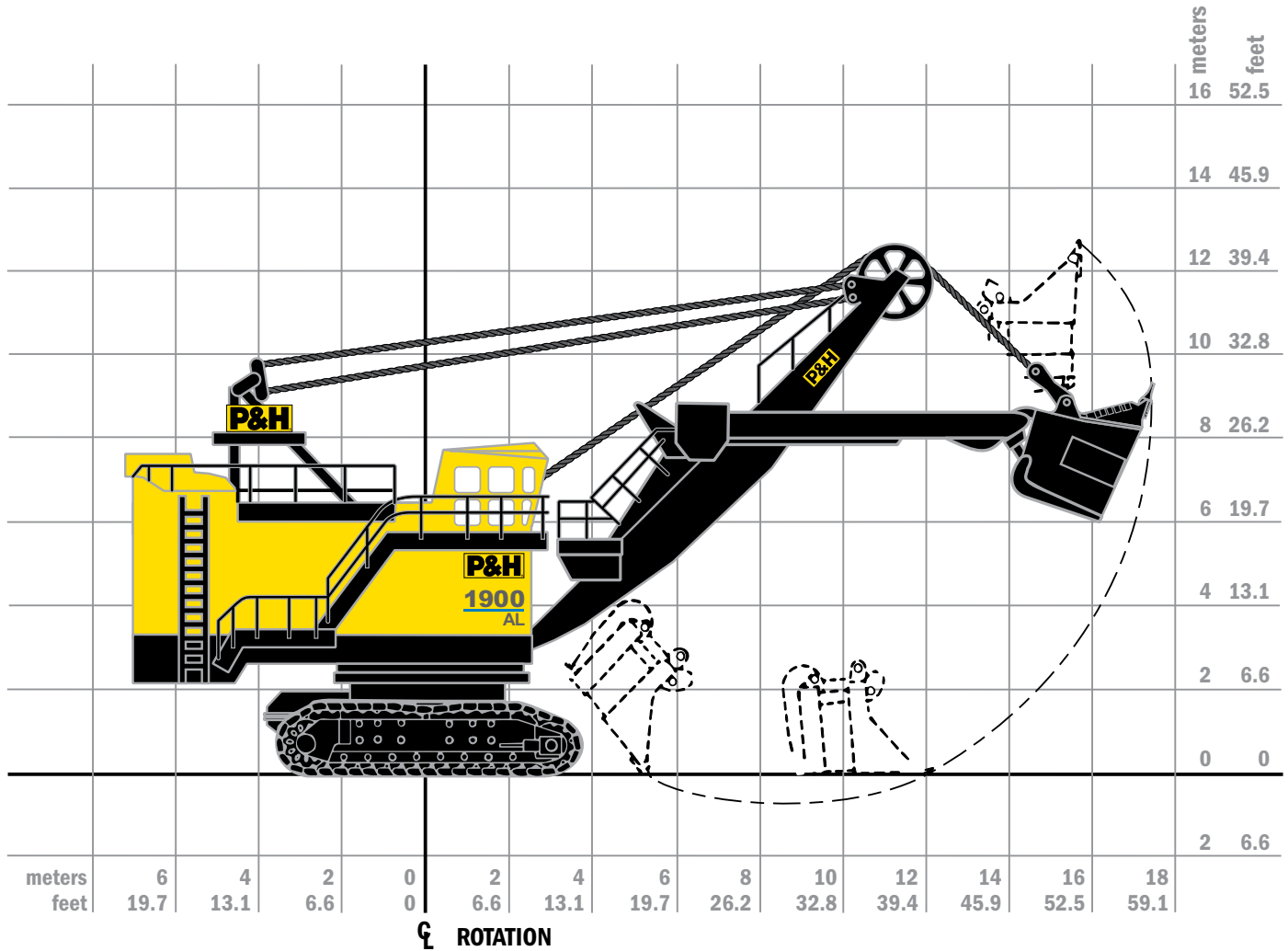
Joy Global Support

- **Reliability Centered Maintenance support**
- **Life Cycle Management programs**
- **Genuine OEM parts**
- **Component rebuild and exchange programs**



1900AL

Electric Mining Shovel



Working Ranges		
Height of Cut	13.0 m	42 ft. 6 in.
Radius of Cut	17.8 m	58 ft. 6 in.
Dumping Height* (Door Open)	8.2 m	27 ft. 0 in.
Floor Level Radius	11.6 m	38 ft. 0 in.
Tail Swing Radius	7.0 m	23 ft. 0 in.
Operator Eye Level	7.4 m	24 ft. 3 in.

*Height shown with bail-type dipper. Heights will be greater with bail-less or compact-bail dippers. Actual dumping height can be greater than door clearance height.

Capacity		
Nominal Payload*	18 mt	20 st
Nominal Dipper Capacity*	10.7 m ³	14 yd ³
Range Dipper Capacity	7.5-19.1 m ³	10-25 yd ³
Rated Suspended Load	37.2 mt	41 st

*Payload and dipper capacity are dependent on many factors. Contact Joy Global for an analysis of your specific application.

Electrical Control Systems

Main Machinery Motors P&H DC Mill Type Motors

Propel Motor	HP at 475 volts DC (one hour)	325
	HP peak	370
	Motor ventilation	Blown
Swing Motor (vertical - 2 used)	HP at 475 volts DC (continuous)	Total 355
	HP peak	325
	Motor ventilation	Blown
Crowd Motor	HP at 475 volts DC (continuous)	130
	HP peak	250
	Motor ventilation	Blown
Insulation		Class H
Bearings		Ball or roller
Bearing Lubrication		Grease

*Specifically designed for mining shovel service.

Auxiliary Motors*

	60 Hz	50 Hz
House Blower Motor HP (two)	Each 15	Each 15
Crowd Motor Blower HP	1.5	1.5
Swing Motor Blower HP (two)	Each 1.5	Each 1.5
Propel Motor Blower HP	2	1.6
Hoist Gearcase Pump Motor HP	1	1
Air Compressor Motor HP	10	10
Dipper Trip Motor HP	7.5	15

Power Requirements

Incoming Supply Requirements

Shovel Power	2400 / 4160V	3300 / 6600V	
	3 Phase, 60 Hz	3 Phase, 50 Hz	
Main AC Motor	HP continuous	750	750
	HP intermittent	1875	1875
	Speed - 50/60 cycle	590 rpm	590 rpm
Swing Generator	Output to meet swing motor capacity		
Crowd Generator	Output to meet crowd/propel motor capacity		
Hoist Magnetorque® HP	700	700	
Peak HP	725	725	
Voltage of AC Auxiliary Units	440	380/415	
High Voltage Collector		Dry type	
High Voltage Disconnect		Non-fused - air type	
High Voltage Motor Protection	Standard:	Thermal Overloads	
	Optional:	Electronic motor protection relay	
Main Transformer Protection		Primary fusing	
Low Voltage Protection		Circuit breakers	
Main Motor Starting	Across-the-line vacuum contactor		
Optional Main Motor Starting	65% voltage with Autotransformer & three vacuum contactors		

Transformer

Main/Lighting	100 kVA
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Note: Transformer capacities may vary depending on options.

Swing

Gear Case (Two Used)	Oil Tight	
Gear Case Bearings	Tapered Roller	
Swing Transmission (Two Used)	Spur Gears	
Swing Gear	External Cut Teeth	
Swing Gear Dia.	3.96 m	13 ft.
Swing Disc Brakes (Two Used)	Spring Set-Air Release	
Brake Location	Motor Shaft	
Type of Swing	Live Roller Circle	
Number of Rollers in Roller Circle	Sealed Tapered 40	
Tapered Roller Diameter	228.6 mm	9 in.
Roller Track Mean Diameter	3.66 m	12 ft.
Type of Fastening to Upper	Center Gudgeon	
Location of Gudgeon Adjusting Nut	On Upper	

Propel

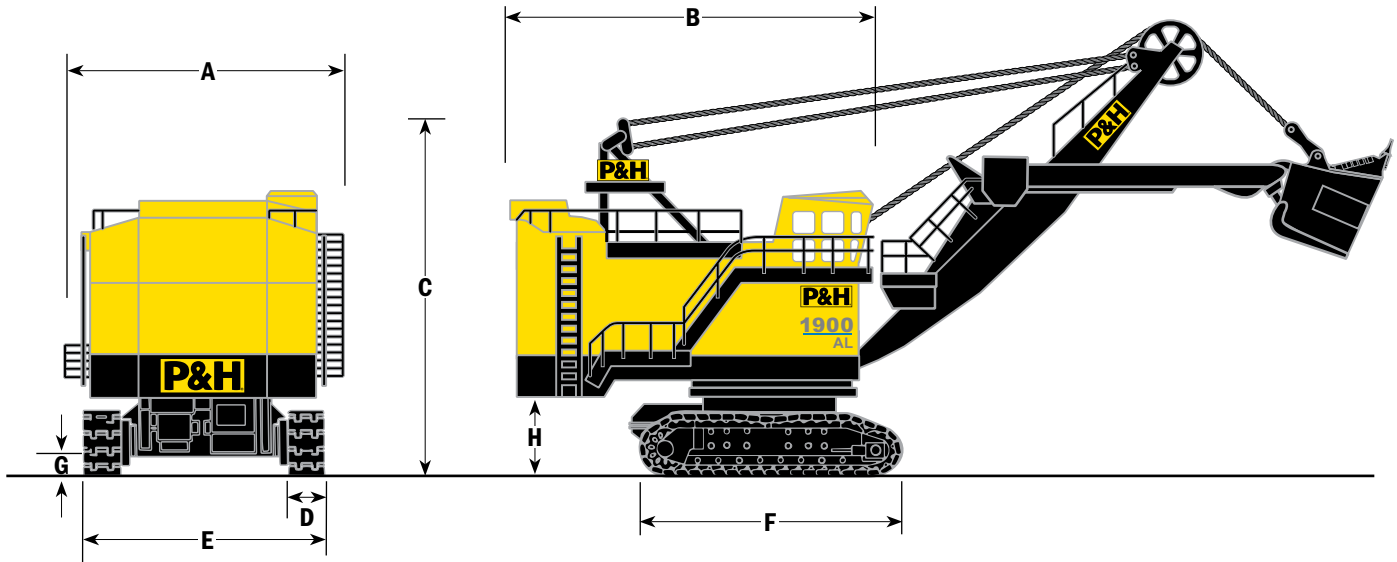
Front Idler Dia.	1092 mm	43 in.
Gear Case	Oil Tight	
Gear Case Bearing	Tapered Roller	
Propel Transmission	Spur Gears	
Propel Brakes (Two Used)	Spring Set-Air Release	
Brake Location	Final Reduction Pinion Shaft	
Center to Center of Sprockets	6.17 m	20 ft. 3 in.
Number of Lower Rollers, Each Crawler Frame	8	
Diameter of Lower Rollers	558 mm	22 in.
Width of Crawler Shoes (standard)	1066 mm	42 in.
Width of Crawler Shoes (optional)	1219mm	48 in.
Pitch of Crawler Shoes (42" & 48")	375 mm	14.75 in.
Number of Crawler Shoes (42" & 48") (Both Crawlers)	88	
Steering	Air, Dual from Either Crawler	
Steering Lock	V-Brake Type	
Propel Speed	1.63 kmph	1.01 mph

Crowd

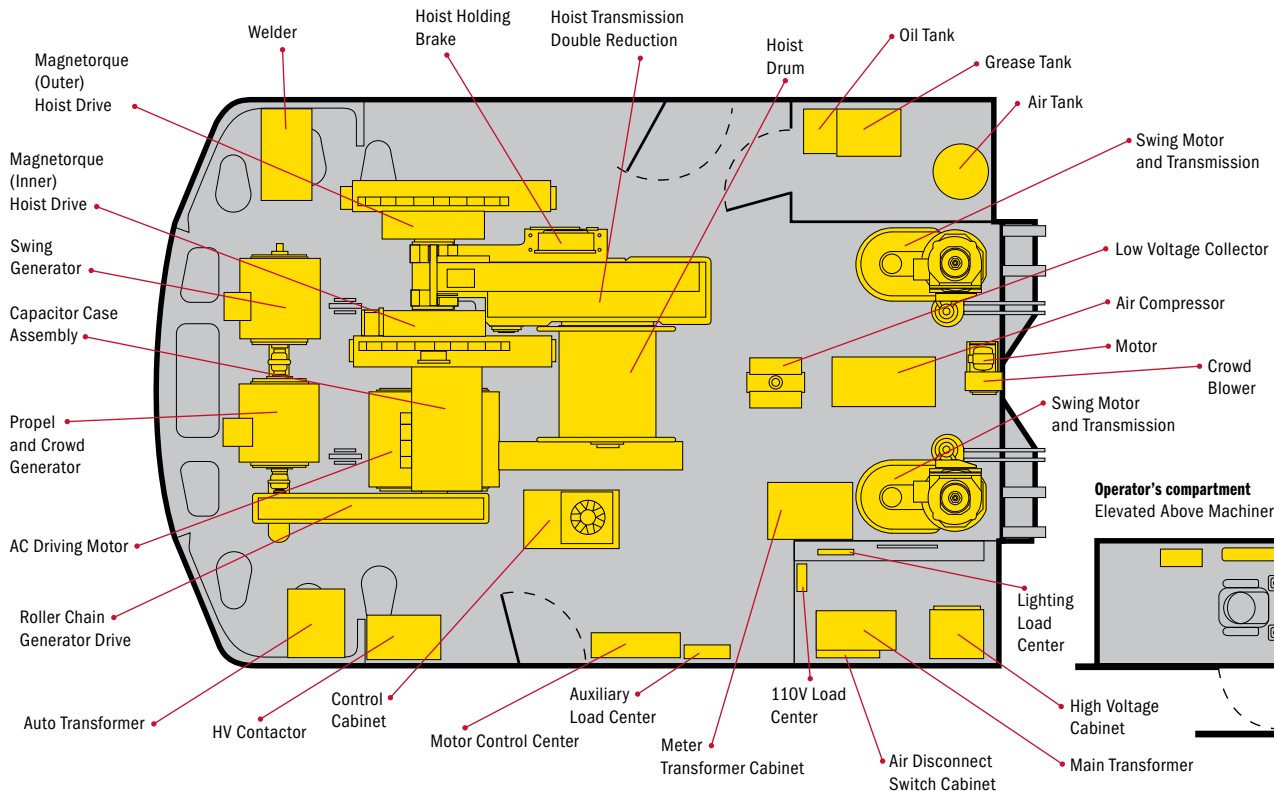
Gear Case	Oil Tight, Welded Integral with Boom	
First Reduction Gearing	Conical Worm	
Worm and Wheel Bearings	Tapered & Straight Roller	
Shipper Shaft Bearing Type	Sleeve	
Shipper Shaft Bearing Dia.	305 mm	12 in.
Shipper Pinion Pitch Dia.	387 mm	15.25 in.
Access to Crowd Machinery	Railed Platform	

Overall Dimensions

A	Width	8.05 m	26 ft. 5 in.
B	Length	10.36 m	34 ft. 0 in.
C	Height Over Gantry	10.11 m	33 ft. 2 in.
D	Width of Crawler Shoes	1066 mm	42 in.
		1219 mm	48 in.
E	Width of Crawlers (42")	6.71 m	22 ft. 0 in.
F	Length of Crawlers	7.62 m	25 ft. 0 in.
G	Ground Clearance	0.53 m	1 ft. 9 in.
H	Height – Ground to Bottom of Counterweight Slabs	2.24 m	7 ft. 4 in.



Machinery Deck Plan



Hoist

Gear Case	Oil Tight	
Drum Pitch dia.	997 mm	39¼ in.
Drum Length	1168 mm	46 in.
Drum Groove Arrangement	Single part quadruplex hoist cable	
Drum Shaft Bearings	Tapered roller	
Other Bearings	Tapered and straight roller	
First Reduction Gears	Modified helical	
Other Gears	Spur	
Hoist Break	Spring-set-air release	
Hoist Break Location	Outboard of hoist gear case	
Boom Point Sheaves Pitch Dia.	1676 mm	66 in.
Boom Point Bearing	Tapered Roller	
Maximum Dipper Bail Pull	92,998 kg	205,000 lbs.

Ground Pressure & Weight

Bearing Area – Ground Pressure

Standard:

Crawler Bearing Area 42" Shoes / 1066 mm	14.23 m ²	22,060 in ²
Crawler Ground Pressure 42" Shoes / 1066 mm	261.3 kPa	37.9 psi

Optional:

Crawler Bearing Area 48" Shoes / 1219 mm	16.27 m ²	25,210 in ²
Crawler Ground Pressure 48" Shoes / 1219 mm	230.3 kPa	33.4 psi

Weights – Approximate*

Working Weight (with Dipper, Approx. Wt.)

42" Shoes / 1066 mm	378,756 kg	835,000 lbs
48" Shoes / 1219 mm	381,931 kg	842,000 lbs
Counterweight (Punchings)**	54,43 kg	120,000 lbs

* All weights subject to 5% variation.

** To be furnished by customer.

Control System

Operating Motion Control	P&H solid state electronic
Propel Steering	From operator's station
Hoist Controller – horn & dipper trip	Joystick
Swing/Crowd/Propel Controller	Joystick
Static Exciter	7.5 KW
Crowd – propel transfer	Magnetic

Cable Data

	Type	Size	Length
Hoist (2 required)	14	38 mm 1.5 in.	73.15 m 240 ft.
Boom Suspension (4 required)	25	51 mm 2 in.	14.66 m 48 ft. 1 in.
Dipper Trip – Electric	12	13 mm .5 in.	15.24 m 50 ft.

*45° boom angle

Lubrication System

Type	Centralized, dual line with programmable logic controller
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