

2300XPC

Electric Mining Shovel - DC Drive Product Overview





2300XPC DC Shovel Taking the Next Step: Building on Proven Success

Mine operations and maintenance managers demand the best from their loading tools. For this reason, Joy Global has been the Electric Mining Shovel market share leader and preferred equipment supplier to the world's toughest mining environments for over **100 years**.

Joy Global is proud to offer the P&H® 2300XPC DC Electric Mining Shovel. The P&H shovel line is combining its solid reputation of reliability with the proven Centurion® Electrical Control System, time-tested DC systems, rugged structures and the industry's only OEM owned field service and support network to set the industry standard for Electric Mining Shovels.

Proven availability and productivity ultimately lead to the lowest cost per ton and the most efficient ultra-class loading tool available in the industry today. P&H shovels dig deeper into the realms of productivity safety, and reliability with greater control, comfort, and consistency.



Proven Performance

P&H DC-Drive 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

The 2300XPC DC *utilizes proven components.*

- Structures developed with advanced design software and field data collection
- Motors designed and manufactured by Joy Global specifically for Electric Mining Shovels



The Joy Global Performance Edge

Joy Global is the Worldwide Leader in Electric Mining Shovels. The P&H 2300XPC DC sets the standard in performance and productivity.

- Designed for *severe-duty* digging and loading
- Years of experience in building rugged, reliable equipment
- **Extensive collaboration** with customers and our partner ABB during development

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
- **OPTIMA® Dippers** – Mine-matched dippers with adjustable pitch braces for precise rake angles



Rugged Components

- **Dual Hoist Motors** – Balanced and evenly distributed load
- **DELTA™ Drive** – Improved shoe-to-tumbler engagement
- **Planetary Transmissions** – Proven long life on swing and propel with over 20 million hours logged

Technology

- **Centurion Electrical Control System** – Superior performance, monitoring and data integration capabilities
- **Universal Shovel Interface** – Send and receive data with any mine management system
- **PreVail® Remote Health Management** – Real time machine health and performance management

World-class Cab / Loading Control Center

Performance and comfort have been optimized with:

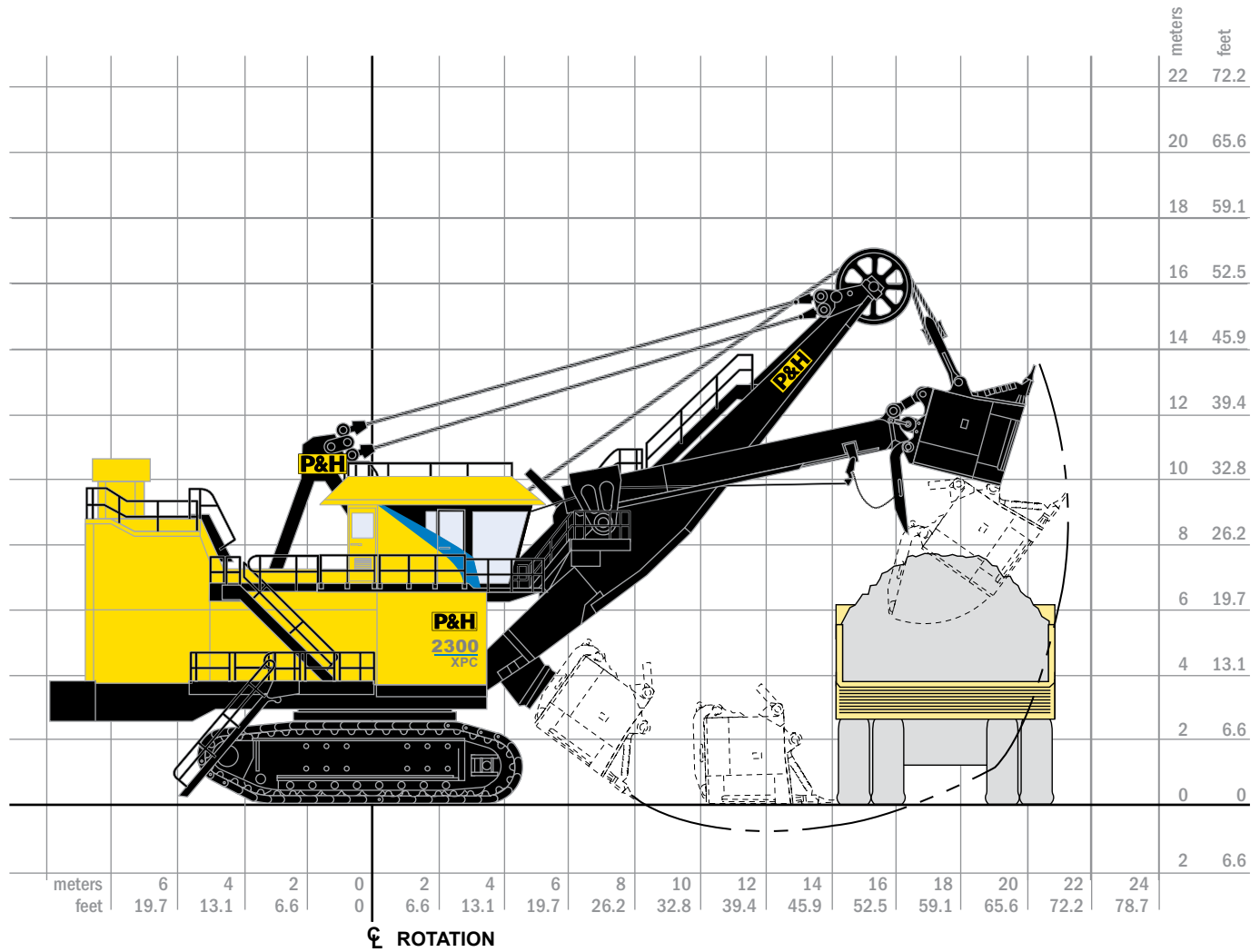
- Smart ergonomics
- Clear sight lines
- Easy access to command and control functions
- Access to key data on machine health and performance provided by Centurion Electrical Control System

Joy Global Support

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

2300XPC

DC Drive Electric Mining Shovel



Working Ranges		
Height of Cut	13.5 m	44 ft. 3 in.
Radius of Cut	21.3 m	70 ft. 0 in.
Dumping Height* (Door Open)	8.5 m	28 ft. 0 in.
Floor Level Radius	14.2 m	46 ft. 7 in.
Tail Swing Radius	10.1 m	33 ft. 0 in.
Operator Eye Level	7.9 m	26 ft. 0 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*	45.4 mt	50 st
Nominal Dipper Capacity		
SAE struck	18.3-25.5 m ³	24.0-33.0 yd ³
SAE 2:1	20.2-27.8 m ³	26.7-36.7 yd ³
Rated Suspended Load	90.7 mt	100 st
Optimum Truck Size (200 st truck shown)	109-218 mt	120-240 st

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

Electrical Control

P&H Centurion® Supervisory Controller provides direct integrated communication with motor drives giving precise motor control and fast cycle times. Real-time multi-tasking capability allows for optimal machine logic sequencing, monitoring and control.

Centurion I/O System uses 'Profibus' communication protocol for seamless integration of all shovel subsystems and future expandability. Low-voltage 24V DC I/O drop points feature open and short circuit detection for improved diagnostics and troubleshooting.

Centurion Information System's enhanced Graphical User Interface (GUI) features intuitive, icon-based screens to display vital information such as shovel status, troubleshooting information, and optional production monitoring data and operator feedback

P&H Digital DC Drive provides precise, reliable, solid state power to the main motion motors.

Electrical Control Systems

P&H Digital DC Static DC Power Conversion and Reactive Power Compensation

	Hoist**/Propel	Swing	Crowd/Propel
Continuous Armature Converter KW Rating @ 600 VDC*	2x1860 kW	1860 kW	1860 kW
15 Sec. Armature Converter Current Rating*	3700 amp.	3700 amp.	3700 amp.
Continuous Field Converter Rating*	150 amp.	150 amp.	150 amp.

* Rated at 600 V and based on outside ambient temperature of 50°C or 122°F.
** Cascaded hoist converters.

P&H Digital DC Automatic Reactive Power Compensation*

	60 Hz (7 step)	50 Hz (8 step)
Switched Steps	+4725 kVAR Total	+4500 kVAR Total

* Nominal rating at rated capacitor voltage (600 VAC)
* Rated at 600 V and based on outside ambient temperature of 50°C or 122°F.

P&H DC Fast Response Main Machinery Motors

Hoist Motor (Two used)	Continuous rating @ 600 volts Peak developed power	Total 1074kW / 1440hp 1442kW / 1933hp
Swing Motor (Two used)	Continuous rating @ 550 volts Peak developed power	Total 306kW / 410hp 748kW / 1002hp
Crowd Motor (One used)	Continuous rating @ 550 volts Peak developed power	Total 395kW / 530hp 441kW / 591hp
Propel Motor (Two used)	Continuous rating @ 550 volts Peak developed power	Total 612kW / 820hp 943kW / 1264hp

Power Requirements

Supply Voltage*	4160 or 7200V 3 Phase, 60 Hz	3300, 5000, 6000 or 6600 3 Phase, 50 Hz
Supply Transformer	(Minimum) 2000 kVA	
Minimum Short Circuit VA Available at Shovel	16 MVA	

*Voltage per customer requirements

Dipper & Dipper Trip

P&H Optima® dippers combine consistent productivity with high durability and maintainability. Dippers are configured to mine specific conditions and capacity requirements from a variety of combinations of body and lip designs, as well as other unique Joy Global technologies. Specific wear packages and GET styles can be cooperatively specified.

Adjustable-torque electric motor with geared drive unit for reliable trip and slack take-up operation

Swing

Two modular P&H planetary gear cases of proven design and a single piece forged swing gear transmit torque for fast cycle times.

Spring-set air release disc brakes – one per motor.

Splash lube filtration system.

Propel

Two rugged P&H planetary gear cases of proven design independently transmit torque to the drive sprockets, producing the tractive effort required for fast, efficient propel and positioning operations.

P&H drive system with heavy duty cast crawler shoes.

Spring-set air release disc brakes – one per motor.

Crowd

Powerband V-belt drive between motor and gear case absorbs shock loads.

First and second reduction gearing in enclosed gear case for reliable splash lubrication, ease of maintenance, and extended component life.

Twin-leg dipper handle with torsion box and rack and pinion drive has inherent stability in the bank for optimal digging.

Spring-set air release disc brake.

Hoist

All gearing housed in single enclosed gear case with filtered and cooled oil fed to all bearings in addition to splash lubrication for reliable operation and ease of maintenance.

Large 56" diameter hoist drum for extended rope bending life. Ferrule becket system and dual electric tuggers are standard for efficient rope change.

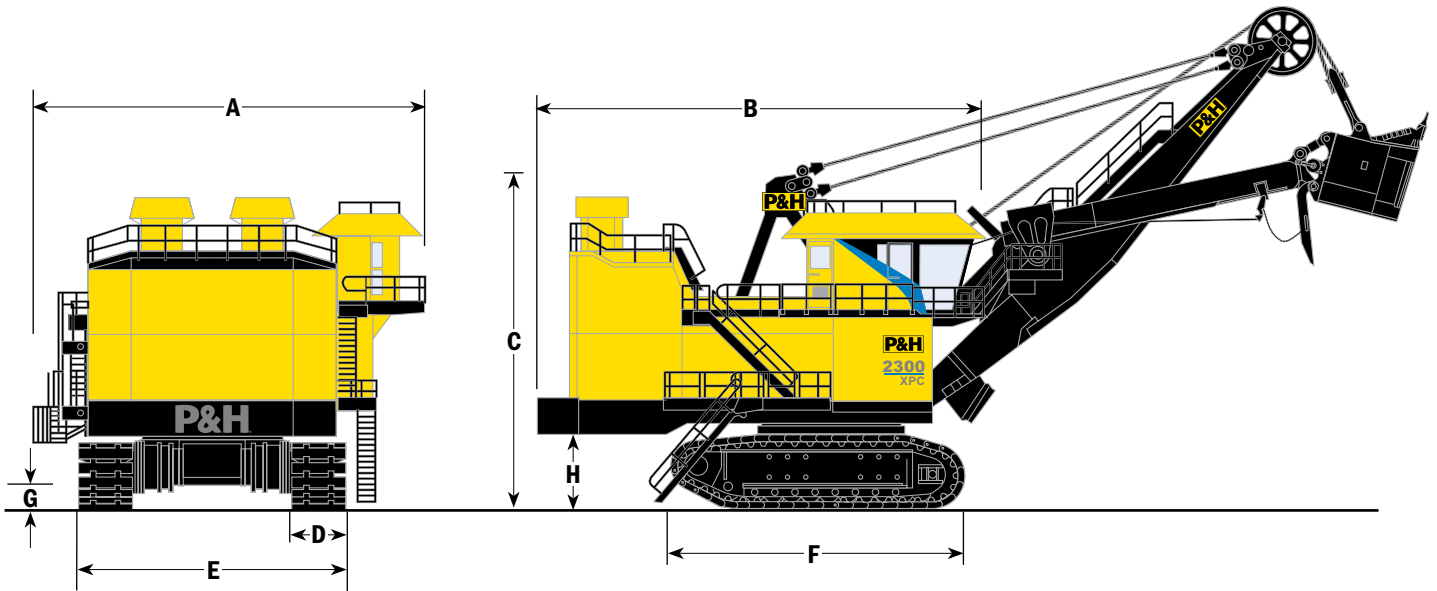
Spring-set air release disc brakes – one per motor.

Cable Data

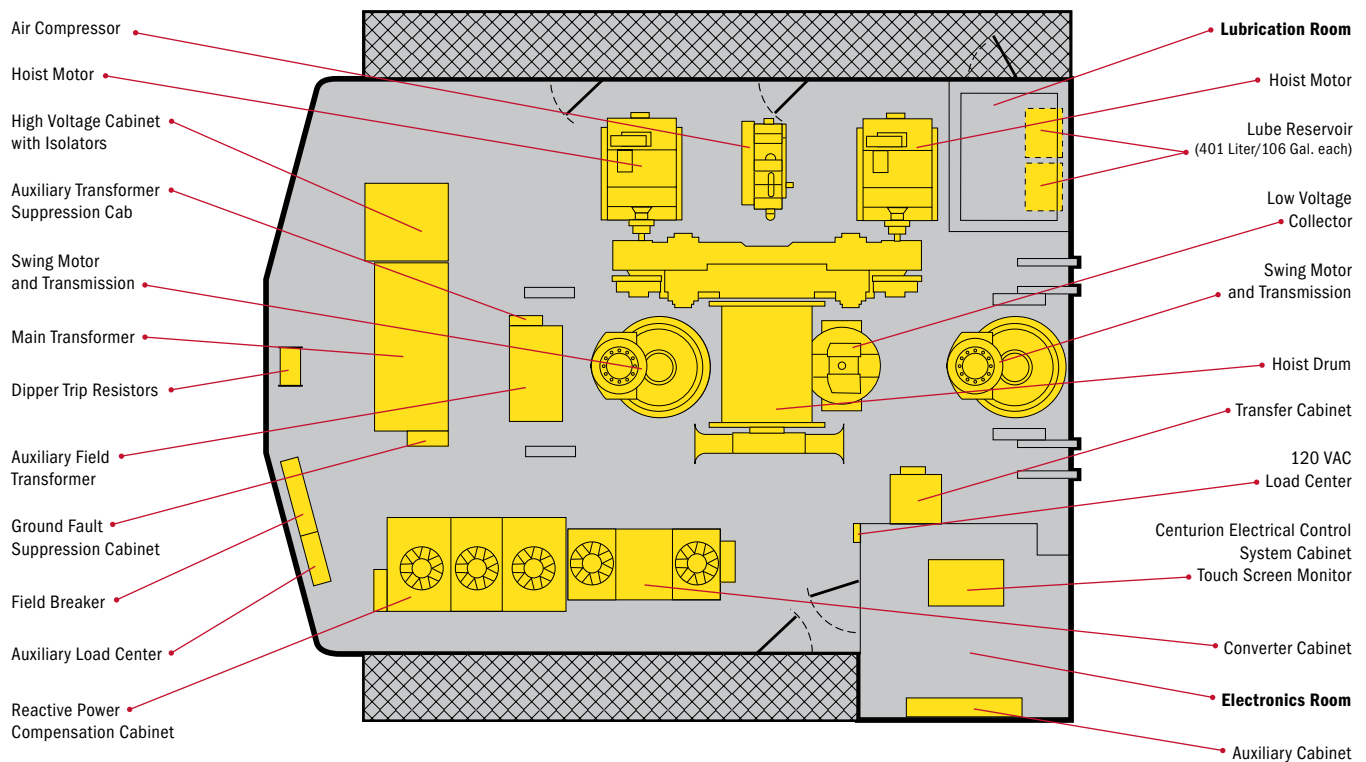
Hoist (wire rope)	57 mm	2.25 in. dia.
Suspension (bridge strand)	83 mm	3.25 in. dia.
Dipper Trip (wire rope)	13 mm	0.50 in. dia.

Overall Dimensions

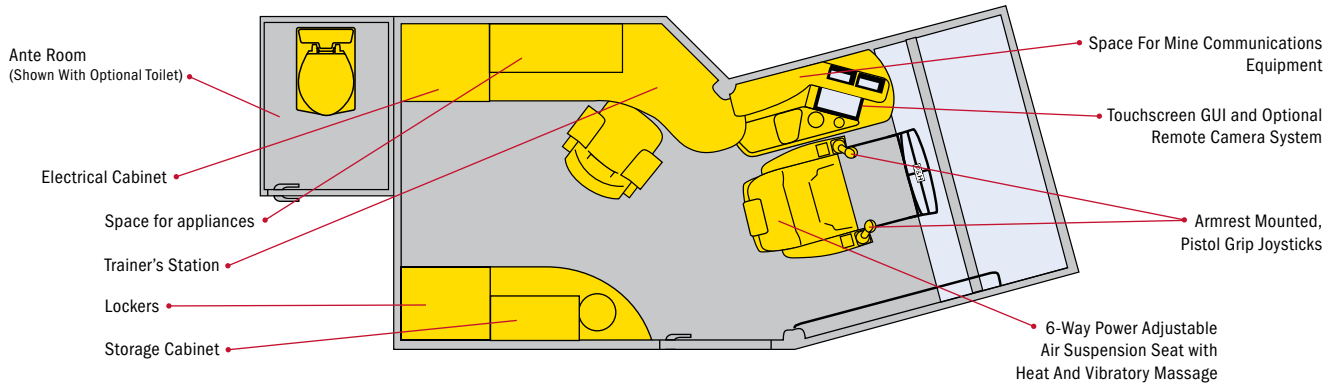
A	Width	12.5 m	40 ft. 10 in.
B	Length	15.0 m	49 ft. 4 in.
C	Height Over Gantry	11.6 m	38 ft. 0 in.
D	Width of Crawler Shoes	1321 mm	52 in.
		1778 mm	70 in.
E	Width of Crawlers (52")	8.7 m	28 ft. 5 in.
F	Length of Crawlers	9.9 m	35 ft. 4 in.
G	Ground Clearance	0.9 m	3 ft. 0 in.
H	Height – Ground to Bottom of Counterweight Slabs	2.6 m	8 ft. 5 in.



Machinery Deck Plan



Loading Control Center



Ground Pressure & Weight

Bearing Area – Ground Pressure

Standard:

Crawler Bearing Area 52" Shoes / 1321 mm	19.92 m ²	30,880 in ²
Crawler Ground Pressure 52" Shoes / 1321 mm	381 kPa	55.3 psi

Optional:

Crawler Bearing Area 70" Shoes / 1778 mm	26.82 m ²	41,570 in ²
Crawler Ground Pressure 70" Shoes / 1778 mm	288 kPa	41.8 psi

Weights – Approximate*

Working Weight (with Dipper, Approx. Wt.)

52" Shoes / 1321 mm	774,800 kg	1,708,000 lbs
70" Shoes / 1778 mm	787,500 kg	1,736,000 lbs
Counterweight (Punchings)**	136,100 kg	300,000 lbs

* All weights subject to 5% variation.

** To be furnished by customer.

Features And Customization

The 2300XPC is built with several features to enhance safety, reliability, and productivity over the lifecycle of the operation.

- Automatic Lubrication and Compressed Air Systems with advanced diagnostic and control
- Temperature Monitoring System for all DC motors, drum shaft bearings and shipper shaft bearings
- Automatic Boom Soft Setdown System (ABSS) and Boom Profile Protection Envelope to help prevent excessive loading to the attachment during operation
- Anti-Swing-in-Bank system to reduce excessive side loading on handle and attachment
- Remote hoist control pendant and hoist rope winch to assist in safe and efficient rope changeouts
- House Pressurization System to provide filtered air for cooling and dust repression

The shovel has multiple options for local and minesite specific conditions in the following areas:

- Climate Control
- Technology and Software
- Maintenance Systems





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