



JOYGLOBAL

P&H

P&H[®] Shovels

Integrated Information Technologies

Improve Control, Comfort and Consistency



Newly designed, tinted windows increase safety by providing greater visibility to the work area, including a more comprehensive view of the dipper and track in the tuck position.

Hour After Productive Hour, These P&H Shovels Were Inspired by You

You manage a large production landscape focused on the most efficient possible production of a valuable commodity like copper, coal, iron ore, petroleum or gold.

Your mine plan changes daily or perhaps hourly as complex factors interplay.

You require highly reliable and productive equipment to help ensure your ability to obtain sustained throughput rates – and optimized production costs.

You look across your production landscape and see that you have invested in the best available mix of capital equipment – including your P&H electric shovels – to help realize your operations management objectives.

You helped inspire Joy Global to design, build and support these exceptionally tough, smart loading machines. What follows is a summary of how Joy Global has transformed your ideas and your insights into best-in-class P&H electric mining shovels for the cost and safety-focused mining industry.

Take Control

Optimum Performance to Reduce Cycle Time

Your shovel operator is not just a “shovel operator.” He or she plays a pivotal role in managing a consistent, reliable flow of material within your mine operation. By investing in a P&H electric mining shovel, you effectively position your shovel operators to help you obtain the optimized material throughput rates and reliability you require in support of sustained efficiencies elsewhere in your operations.

Operator Comfort

Throughout a typical 12-hour shift, your shovel operator is seated in comfort within an ergonomically adjustable seat and with hands perfectly positioned to apply feather-touch, pistol-grip joystick controllers. What’s more, your shovel operator looks through large windows offering superb sight lines covering the loading operation and the shovel’s surroundings – all the while surrounded by clean, fresh air and even stereophonic sound to help maintain alertness through the end of the shift. Above all, your operator has at his or her fingertips a graphical user interface or portal into the shovel’s powerful P&H Centurion® electrical control systems performance and health monitoring system.

In effect, you have placed your shovel operator into the cockpit of the world’s most advanced, rugged, reliable and productive loading machine ever built – the P&H electric mining shovel.

Advanced Diagnostics to Reduce Downtime

Not only does Centurion electrical control system help optimize the health and performance of your P&H shovel, it is also the communication, command and control system that your shovel operator uses to help manage the loading process, optimize shovel set-ups, diagnose faults and help mine maintenance obtain increased control over how best to optimize shovel availability.

Remote Health Monitoring

Centurion electrical control system also serves as the foundation for the powerful P&H PreVail® remote health monitoring system. PreVail (RHM) combines advanced information management and wireless communication technology. This enables mine management and the Joy Global network to optimize shovel systems performance for lower-cost throughput – and increased return on your P&H shovel investment.

Expandable Platform

Centurion electrical control system’s architecture utilizes standard industry protocols that allow for virtually unlimited scalability and integration of new technologies for many years to come.

Joy Global Support

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



Productive Solutions for All Mines

The Power of Centurion Electrical Control System at All Payloads

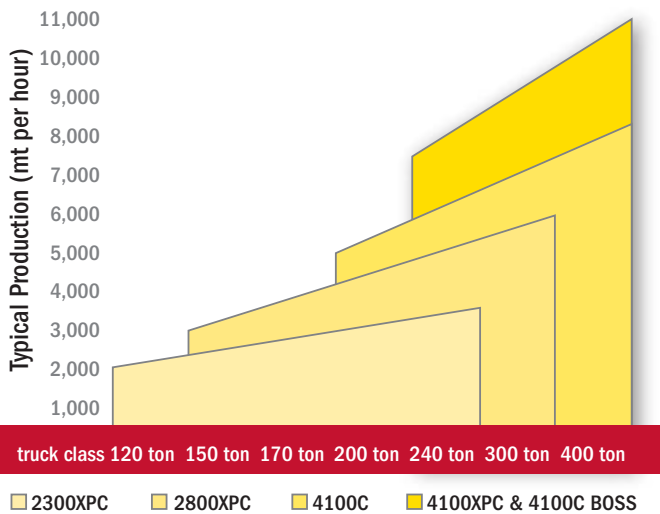
P&H® 2300XPC

The 2300XPC is a heavy duty electric mining shovel that provides a 50 ton (45.4 metric ton) nominal payload capacity specifically designed to operate in mines for high production loading of 120 ton to 240 ton (109 metric ton to 218 metric ton) and larger haul trucks. The 2300XPC is based upon the proven 2300 series of shovels which can be found digging in coal, copper, iron ore and gold mines around the world.



P&H® 2800XPC

The 2800XPC is a heavy duty electric mining shovel that provides a 65 ton (58.9 metric ton) nominal payload capacity specifically designed to operate in mines for high production loading of 190 ton to 330 ton (172 metric ton to 300 metric ton) haul trucks and larger. The industry's best-selling shovel model, P&H 2800 series shovels are recognized for their durability and versatility, with over 250 P&H 2800 series machines placed into service since they were first introduced in 1968 – most of which are still operating today.



Truck Class	4100XPC 4100C BOSS	4100C	2800XPC	2300XPC
400 ton	4 Pass	5 Pass	6 Pass	
330 ton	3 Pass	4 Pass	5 Pass	7 Pass
240 ton	2 Pass	3 Pass	4 Pass	5 Pass
200 ton		2 Pass	3 Pass	4 Pass
170 ton			3 Pass	4 Pass
150 ton			2 Pass	3 Pass
120 ton			2 Pass	3 Pass

Proven Productivity P&H shovels have achieved outstanding productivity in a wide range of applications and truck sizes. While actual production rates will vary depending on mine specific conditions, you can count on proven performance with the P&H shovels.

Fast Loading P&H Models 4100XPC and 4100C BOSS can four pass load the largest ultra-class 400 ton trucks. All models are designed to match up well with the most common haul truck sizes.

P&H® 4100XPC

The P&H 4100XPC is a heavy duty electric mining shovel that provides nominal 115 ton / 99.8 metric ton payload capacity (upgradable to 120 ton / 108.9 metric ton payload) for high production loading of haul trucks up to 400 tons / 363 metric tons capacity as well as in-pit crusher-conveyor systems. The 4100XPC stands alone as the preferred ultra-class shovel choice for high production mines around the world.



P&H® 4100C BOSS

The 4100C BOSS is a heavy duty electric mining shovel that provides a 100 ton (90.8 metric ton) nominal payload capacity specifically designed to operate in mines for high production loading of 240 ton to 400 ton (218 metric ton to 363 metric ton) and larger haul trucks. With its 138 inch (3505 mm) wide crawler shoes, the 4100C BOSS is specifically designed for oil sands and other operations that require low ground bearing pressure and high digging forces.



P&H® 4100C

The 4100C is a heavy duty electric mining shovel that provides a 90 ton (81.7 metric ton) nominal payload capacity specifically designed to operate in mines for high production loading of 190 ton to 400 ton (172 metric ton to 363 metric ton) haul trucks and larger. Introduced in 1990 to three pass load 240 ton trucks, with over 185 units currently in operation, the P&H 4100 Series shovels are the benchmark of reliability and high productivity.



	2300XPC	2800XPC	4100C	4100C BOSS	4100XPC
Nominal Pay Load	45.4 mt	59.0 mt	81.6 mt	90.7 mt	108.9 mt
	50 st	65.0 st	90 st	100 st	120 st
Nominal Dipper Capacity – SAE struck	18.3 - 25.5 m ³	26.8 - 33.6 m ³	42.8 - 47.7 m ³	44.3 m ³	52.8 - 61.2 m ³
	24.0 - 33.0 yd ³	35.0 - 44.0 yd ³	56.0 - 62.0 yd ³	58.0 yd ³	69.0 - 82.0 yd ³
Nominal Dipper Capacity – SAE 2:1	20.2 - 27.8 m ³	29.2 - 36.6 m ³	47.4 - 52.5 m ³	48.4 m ³	58.3 - 67.6 m ³
	26.7 - 36.7 yd ³	38.1 - 47.9 yd ³	62.0 - 68.6 yd ³	63.0 yd ³	74.4 - 88.4 yd ³

* All weights subject to 5% variation



Rugged Centurion-Based ABB Drive, P&H Motors

A rugged, Centurion-based ABB drive system provides exceptional mining shovel systems control and drive performance for optimized reliability and productivity. Centurion monitors and controls a neural network of over 500 Input/Output nodes through a fast, high-capacity Profibus fiber-optic cable network for optimized systems health monitoring and performance.

Centurion electrical control system is structured for robust OPC open connectivity via open standards industrial automation and control. Independent graphical user interfaces (GUIs) in the operator cab and machinery house are standard on shovels, enabling maintenance personnel to perform diagnostic and other procedures without interrupting the operator's work.

Compact-design ABB ACS800 MultiDrive provides highly precise Direct Torque Control. Rugged Joy Global designed and built motors for severe-duty mining undergo smooth ramp-up to sustained speed and smooth ramp-down with ABB patented motor control algorithms for best dynamic response.

P&H motors have excelled in heavy-duty and severe-duty industrial applications since 1893. They provide robust speed, lower inertia and peak HP thanks to rugged, mining-duty mechanical design, proven bearing technology, improved thermal design, premium insulation and many other features.

Powerful health monitoring tools are standard with the Centurion electrical control system, enabling maintenance technicians to achieve maximum up-time.

P&H shovels come standard with an array of control technologies, including:

- Temperature monitoring system
- Drive programming and analysis software
- Control logic software
- Input/Output (I/O) device monitoring and fault detection
- Remote Health Monitoring
- Extended speed range in hoist and crowd
- Automatic Boom Soft Setdown (ABSS) and Boom Profile Protection Envelope
- Anti-Swing-in-Bank system
- Hoist, crowd and retract limits
- Automatic lubrication and compressed air systems control



Rugged P&H Mechanical Systems

P&H shovels are ultimately the most rugged digging platforms available for the mining industry.

P&H shovel lower works feature a deep-section carbody housing a large, cast center gudgeon. Secure-mounted to the carbody are highly rugged crawler frames, belts, rollers, drive tumblers, P&H electric motors and genuine, modular P&H planetary transmissions designed and built for exceptional durability and ease of service.

P&H shovel revolving frames serve as the rugged platform for the dig attachment and the full array of power management, swing and hoist drive systems the comprise these best-in-class digging machines.

An above-deck high voltage collector system promotes ease of access and safe monitoring. Modular P&H motors, brakes, planetary swing transmissions, and a rugged hoist transmission gearcase designed with

maintenance-friendly inspection ports and lifting lugs all contribute to lower total cost of ownership.

P&H single-mast booms provide a rugged support and ideal fulcrum for the classic P&H twin-leg dipper handle that has stood the test of time – over a century now – by enabling P&H Optima dippers to effectively advance into and gather-up material with even force applied across the dipper lip. P&H crowd systems feature rack-and-pinion combined with proven PowerBand drive for reliable forward thrust. Centurion-controlled P&H OptiDig balances and optimizes hoist and crowd forces for efficient loading performance.

P&H booms and A-frame gantry structures are also outfitted with rugged, handrail-enclosed stairs and platforms to help increase maintenance efficiency and safety.

P&H shovels are also available with several kinds of P&H Optima dippers that have been optimized for productivity, reliability and ease of maintenance in various kinds of digging conditions.

At Joy Global, we believe the difference is in the details. From advanced structural designs to state-of-the-art Centurion electrical control systems, it all adds up to lowest cost-per-ton loading solutions for high performance mining operations.



Modular, highly efficient, long-lived and easily interchangeable, P&H planetary transmissions are built and tested to the highest standards.



P&H shovels are designed to the demands of their operating environments. And once our shovels are in the field, we regularly monitor their performance. It's all part of our ongoing commitment to continually enhance equipment performance and reduce your overall cost per ton.



World Class Support From Joy Global

P&H shovels are designed for the sole purpose of reducing your production cost per ton.

As part of our commitment to helping you optimize the life cycle management of your equipment, you can count on a comprehensive array of products, services, and expert technical support through Joy Global. You can also count on built-in parts commonality for simplified, cost-effective inventory management.

From fully-equipped parts and service centers worldwide to world class training for operators and maintenance personnel we're here to provide productive, profitable solutions for your mine, including:

- Reliability Centered Maintenance Support
- Life Cycle Management Programs
- Genuine OEM Parts
- Equipment Inspections
- Wire Rope Systems and Service
- Maintenance and Repair

- Component Rebuilds and Exchanges
- Lubrication Management
- Predictive Diagnostics
- Operator and Maintenance Training
- Remote Health Monitoring

No one understands your needs better than Joy Global. In fact, most of the improvements in P&H shovels came from mining professionals like you, and our 1,600 Joy Global support specialists in the field. Call us today.

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