

Pit Viper 231

Rotary blasthole drill rigs

Available with diesel or electric power options
Hole diameter: 6 to 9 7/8 inches (152 to 250 mm)



A mighty performer



Epiroc's Pit Viper 231 is a flexible workhorse that can be configured in many different ways for a wide range of rotary and DTH drilling operations. A proven staple in the Pit Viper range, this model is extremely fuel efficient - which can add up to significant savings. With both high and low pressure airends to choose from and Epiroc's Rig Control System (RCS) standard, the PV-231 delivers a full range of options to meet your needs, now and in the future.

The Pit Viper 231 builds upon the innovation and proven success of the PV-235, which is operating in over 20 major mine sites, while maintaining the highest levels of productivity and reliability.

One customer base specifically looking to get as much value out of a single pass surface drill is the gold market. Epiroc has worked together with many gold mining companies to make the drilling process more productive and efficient with the PV-231.

⊕ Key benefits

Variety of applications

The Pit Viper 231 is a crawler-mounted, hydraulic tophead-drive rig that's suitable for a variety of multi-pass rotary and DTH drilling applications. It provides blasthole drilling to a maximum hole depth of 123 ft (37.5 m).

Powerful performance

The PV-231 delivers a hole diameter of 6 in - 9-7/8 in (152 mm - 251 mm). In addition, the 53 ft tower is capable of single-pass depth of 53 ft (16.1 m) clean hole with the drill bit above the table, which is ideal for 15 m bench heights.

Options to suit your needs

Choose from a variety of low- and high-pressure compressors and a single- or two-speed rotary head.

Robust, double-cut structural tower lacing offers strength without the added weight of less efficient designs and is designed for long life in the toughest mining conditions.

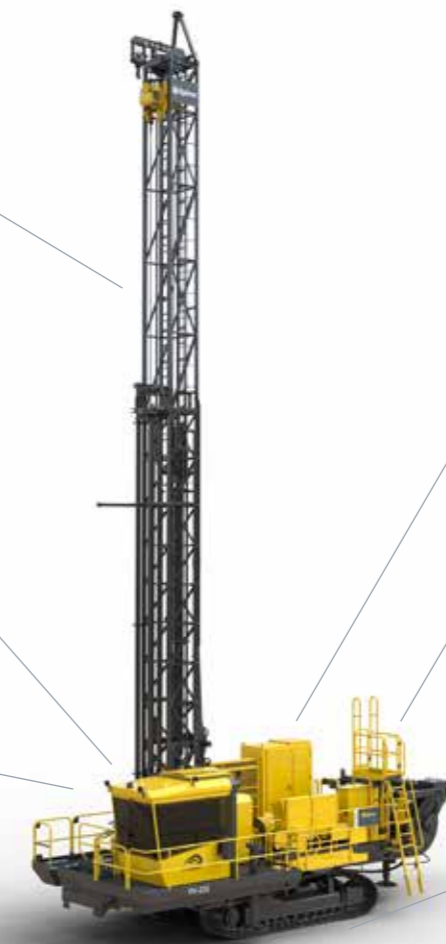
Spacious one-piece FOPS (Falling Object Protective Structure) rated cab designed for visibility and operator comfort.

Live work elimination solutions designed to eliminate reliance on live or pressurized systems, minimizing hands-on intervention and reducing exposure to hazardous tasks.

Electronic Air Regulation System (EARS) allows you to easily adjust your compressor to save horsepower and fuel consumption for a lower total cost of ownership (TCO).

Patented hydraulic wet clutch removes the load on the compressor during non-drilling functions, increasing engine and compressor life (diesel only).

"Walking beam" oscillation yoke allows the rig to travel over uneven ground while reducing torsional stresses on the main frame.



Pit Viper 231 — designed for maximum productivity and value



Enhanced safety

The Pit Viper 231 is equipped with numerous features to help keep operators safe on the job. Features include a FOPS cab with double safety glass and remote hydraulic tower pinning, as well as safety interlocks through RCS and safety shutdowns for temperature, low level, and pressure. Other features include spring-applied, hydraulic-released brakes on the tramming system, and automation options to further increase safety.



Operator comfort

The Pit Viper 231 features an insulated, pressurized cab with an air-ride operator seat, providing high suspension comfort with excellent visibility. The large cab is equipped with our Rig Control System (RCS), providing onboard automation capabilities as part of the standard drill package for added safety and productivity.



Ease of maintenance

The deck layout on the Pit Viper series offers easy access to all major service components. Valve and filter racks are standard, and optional ground-level fast fuel fill connections and live sampling are available.



Power meets sustainability

Epiroc's new electric-powered Pit Viper 231 E embraces safer, cleaner, and more sustainable operations without compromising on the productivity and reliability that the Pit Viper line is acclaimed for. With a lower carbon footprint, zero fuel costs, and superior automation, the Pit Viper 231 E contributes to stable drilling operations with more predictable drilling outcomes, improved accuracy, and optimized recovery.

Flexibility for the future



Epiroc's Rig Control System (RCS) is based on proven CAN-bus technology, and comes standard on the Pit Viper 231. RCS provides a number of safety and interlock features, as well as a foundation to add new functionality/options later without a major rebuild of the machine. With RCS, you can run your PV-231 with an operator on board using options such as Autodrive and Autolevel - or you can run with the operator off the drill with the optional Common Automation Panel (CAP). With CAP, the operator can be nearby the site, or right across the country. You can even implement autonomous drilling with almost no human interaction with the drill.

Add-on features:

AutoDrill 2

Executes fast, safe, and efficient drilling processes in a consistent way.

AutoLevel

Closes the gap between less experienced and expert operators.

Wireless remote tramming

Allows the operator to tram a Pit Viper from the bench within a 32.8 - 65.6 ft (10 - 20 m) distance.

Remote operations

Epiroc has remote solutions which allows safe, productive, and effective single- or multi-drill remote operations (control room and drill solutions sold separately).

High-precision GPS hole navigation system

Imports drill plans to RCS and ensures that each blasthole is precisely positioned with accuracies of up to ±3.9 in (±10 cm), depending on installation and the number of satellites.

Office pack

Includes:

- **Common Communications Interface (CCI)**
Allows data transfer to and from RCS.
- **Surface Manager**
Provides production reporting.
- **Rig Remote Access (RRA)**
Wirelessly sends files to and from the drill rigs.
- **Desktop Viewer**
Allows remote access to the drill's operational screens.

Tower, carousel and drill rod handling

Tower		
Tower construction	Fully welded four main member with open front ASTM A500 Grade B rectangular tubing	
Tower raising	Two hydraulic cylinders; live tower (raise and lower with full carousel and rotary head at top of tower)	
Rod support	Hydraulic cylinder actuation to center drill rod	
Rated capacity		
Single pass depth (clean hole with drill bit above the table)	57 ft (17.4 m)	
Single pass depth with ABC option	59 ft (18 m)	
Maximum hole depth with manual bit breaking basket	107 ft (32.6 m)	
Maximum hole depth with ABC option	109 ft (33.2 m)	
Carousel (carousel internal to the tower with key-lock retention)		
Rod length	35 ft (10.7 m)	
Capacity	Two pieces of 4-1/2 in, 5 in, 5-1/2 in, 6-1/4 in or 7 in, 7-5/8 in (114 mm, 127 mm, 140 mm, 159 mm or 178 mm)	
Actuation	Two hydraulic cylinders	
Safety	<ul style="list-style-type: none"> • Drill pipe is held securely in carousel by "key lock design" mechanism • No bump system to prevent damage if carousel not stowed 	
Drill rods		
Drill pipe diameter	Thread	Suggested bit diameter
4-1/2 in (114 mm)	3 in BECO or 3-1/2 in API	6 in - 6-3/4 in (152 mm - 171 mm)
5 in (127 mm)	3-1/2 in BECO	6-3/4 in - 7-3/8 in (171 mm - 187 mm)
5-1/2 in (140 mm)	3-1/2 in BECO	6-3/4 in - 7-7/8 in (171 mm - 200 mm)
6-1/4 in (159 mm)	4 in BECO	7-7/8 in - 9 in (200 mm - 229 mm)
7 in (178 mm)	4-1/2 in BECO	9 in (229 mm)
7-5/8 in (194 mm)	5-1/4 in BECO	9-7/8 in (251 mm)
Rotary head		
Speed range	Variable: 0 - 190 RPM	
Torque	Variable: 0 - 8,200 lbf-ft (0 - 11,118 Nm)	
Number of motors	Two	
Type of motor	One variable displacement axial piston and one fixed	
Reduction	15:1	
Travel length	59 ft (18 m)	
Feed system		
Pulldown capacity	Up to 60,000 lbf (0 - 267 kN)	
Pullback capacity	0 - 27,000 lbf (0 - 120 kN)	
Weight on bit	Variable: 0 - 64,200 lb (0 - 29,120 kg)	
Mechanism type	One hydraulic cylinder and feed cables	
Number of cables - diameter	Two pulldown - 1 in (25.4 mm), Two pullback - 7/8 in (22.2 mm)	
Number of sheaves - outside diameter	Eight - 24.5 in (622 mm)	
Feed speed	137 ft/min (41.7 m/min)	
Retract speed	157 ft/min (47.8 m/min)	

Power package

Electronic Air Regulation System (EARS)		Airends	
<ul style="list-style-type: none"> • Standard on the Pit Viper 231/231 E • Deliver variable air volume control (within system capacity), while still maintaining constant air pressure • Reduced wear on drill string components 		Diesel engine rig	1 900 cfm / 110 psi (45.3 m ³ /min / 7.6 bar) 1 300 cfm / 435 psi (36.8 m ³ /min / 30 bar) 1 530 cfm / 350 psi (43.3 m ³ /min / 24 bar)
Diesel engine / electric motor		Electric rig - 50 Hz	1 580 cfm / 110 psi (44.7 m ³ /min / 7.6 bar) 1 080 cfm / 435 psi (30.6 m ³ /min / 30 bar) 1 250 cfm / 350 psi (35.4 m ³ /min / 24 bar)
Diesel engine - non Tier 4	CAT C27 T2 - 800 HP (597 kW)		
Diesel engine - Tier 4 Final	CAT C27 T4 - 800 HP (597 kW)	Electric rig - 60 Hz	1 900 cfm / 110 psi (45.3 m ³ /min / 7.6 bar) 1 300 cfm / 435 psi (36.8 m ³ /min / 30 bar) 1 500 cfm / 350 psi (42.5 m ³ /min / 24 bar)
Electric motor 50/60 Hz	WEG - 800 HP (597 kW)		

Technical specifications

Substructure

Mainframe		Undercarriage and tramming system	
<ul style="list-style-type: none"> • Weld fabricated reinforced rectangular steel frame with steel plate for both main rails and crossbeams. • Designed by Epiroc, and weld fabricated by certified welders. • Designed with the latest FEA technology and verified by dynamic strain gauging. 		Make	Caterpillar 330EL
<h3>Leveling jack</h3>		Total length	210 in (5.33 m)
Type	Hydraulic cylinder with lock check	Ground contact	171 in (4.34 m)
Quantity	Four jacks	Take-up adjustment	Grease slack adjustment; spring recoil
Position indication	"Jack up" indicator lights on console or RCS screen	Rollers	11 lower / 2 upper
Capacities		Location	Equally spaced between idler and sprocket
Fuel tank	450 gal (1,703 L) or 650 gal (2,460 L)	Roller bearings	Sealed for life
Water tank (diesel rig)	600 gal (2,271 L) or 1,000 gal (3,785 L)	Track pads	Type: Triple bar grouser - for increased grip and reduced ground pressure Width: 33.5 in (851 mm)
Water tank (electric rig)	600 gal (2,271 L) or 1,000 gal (3,785 L)	Drive	Hydraulic motors through planetary reduction
Hydraulic tank	80 gal (303 L)	Propel motors	Two - Hydraulic, axial piston, fixed displacement rating (each): 205 HP (152.9 kW)
		Propel speed range	0 - 2.5 mph (0 - 4 km/h)

Cab and controls

Cab

- Quiet, single piece design with no seams or leaks (tested at less than 80 dBA)
- Insulated, pressurized with heater and under cab mounted air conditioning
- Falling object protective structure (FOPS) certified
- Ergonomically designed control system and excellent visibility (with unobstructed view to drill table)

Controls (Standard Rig Control System – RCS)

RCS	<p>Integrated control touchscreen (penetration rate, rotation torque, rotation pressure, pulldown force, pulldown pressure, hole depth indicator, etc.)</p> <p>Two joy sticks (attached to the operator's seat) and push buttons on the operator panel controls (propel and leveling jack, pulldown feed control, holdback feed control)</p> <p>Standard interlocks/features</p>
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Hydraulic system

- Pumps mounted on a single three-hole gearbox, and driven off the engine through a drive shaft
- Main pumps work through diverter valves to control feed/rotation and propel
- Hydraulic oil cooler provided standard: assures proper oil temperature (improve system efficiency and increase component life)
- Easy servicing with ease of access to pumps, filters, and valve bay area and simplified tracing of hosing

Dimensions

Shipping dimensions and weight (standard machine)

Tower	
Length	74 ft 10 in (22.8 m)
Width	6 ft 3 in (1.9 m)
Height	11 ft 10 in (3.6 m)
Gross weight	40,000 lb (18.1 tonnes)

Main frame (stripped)

Length	Short deck: 35 ft 10.9 in (10.95 m) Long deck: 39 ft 9.5 in (12.13 m)
Width	Short deck: 17 ft 4.1 in (5.29 m) Long deck: 18 ft 8.5 in (5.7 m)
Height	9 ft (2.75 m)
Gross weight	110,000 lb (49.9 tonnes)

Operating weight

Estimated weight	128,000 - 145,000 lb (58 - 65.8 tonnes)
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Optional equipment

Following are some examples of available options.
For a comprehensive list, please contact your local Epiroc Customer Center.

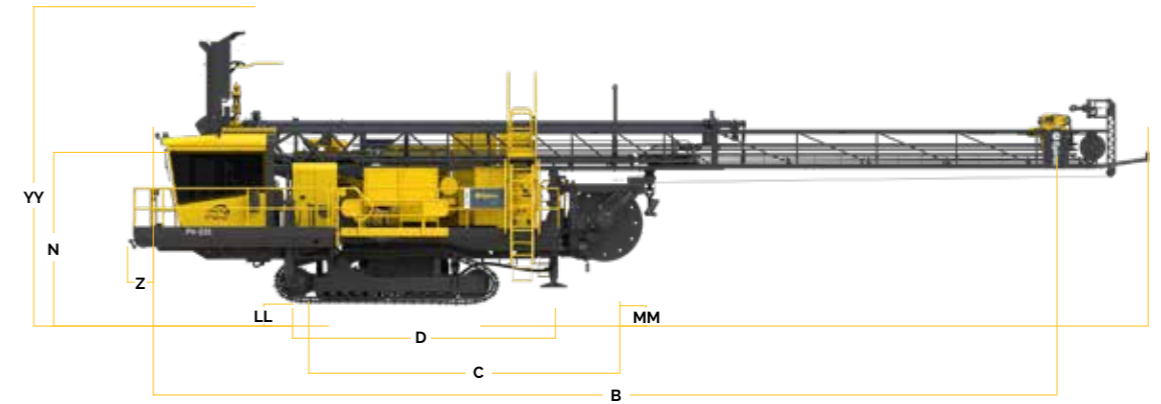
- Cold-weather options for drill operation in extremely cold ambient conditions (-450 C)
- Hydraulic retractable stairs
- Water injection system
- Angle drilling package
- Auxiliary crane
- Video camera
- Dust collector
- Live work elimination pressure washer
- Live work elimination automatic oil sampling
- Spool valve guards
- Drill deck guarding system
- Hydraulic filter handles
- Hydraulically operated automatic wet clutch between airend and engine
- Wrap-around decking for access around cab



Discover more about the Common Automation Panel (CAP) remote solution

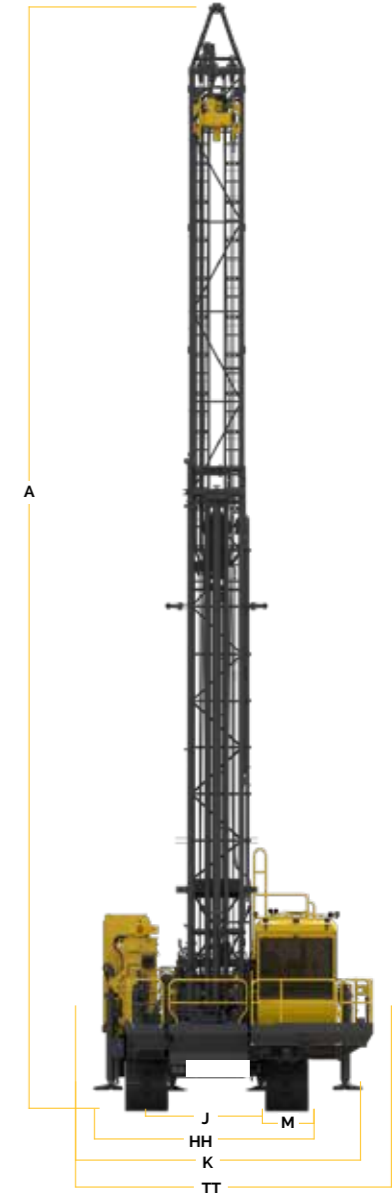


Discover more about Pit Viper 231



Operating dimensions

	Description	Dimensions ft (m)
A	Height - tower up	76' 6.4" (23.32)
B	Length - tower down	77' 6.2" (23.63)
C	Length - jack center to jack center	20' 8" (6.3)
D	Length - undercarriage	17' 5.3" (5.32)
J	Width - track inside to track inside	6' 11" (2.1)
K	Width - jack center to jack center	16' 3" (4.95)
L	Width - overall with dust collector overhang	17' 9.7" (5.44)
M	Width - track	2' 10" (0.85)
N	Height - ground to cab top	13' 4" (4.06)
P	Width - cab	5' 7" (1.7)
U	Width - cab to dust collector	15' 3.8" (4.7)
Z	Length - decking edge to cab edge	2' 1" (0.64)
HH	Width - undercarriage assembly	12' 6" (3.81)
TT	Jack to cab deck	18' 9" (5.7)
YY	Height - ground to dust hood	21' 0.3" (6.41)



Service and support

Epiroc offers several types of service agreements to meet your operational requirements and maximize your productivity:

Variable-price repairs
Service when you need it.

Fixed-price repairs
Service with controlled costs.

Equipment audit
Scheduled equipment quality control.

Preventive maintenance programs
Peace of mind so you can focus on your core business.

