Pit Viper 231 E

Electric blasthole drill rigs

Hole diameter: 152 mm - 250 mm (6 in - 9-7/8")

Epiroc

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.

Main benefits

Lower carbon footprint
Zero-emissions for a cleaner and more sustainable operation.

Zero fuel costs
Experience a drastic reduction in operational costs.

Superior automation
Packed with smart features that make your operation safer and more productive.

Designed for maximum productivity and value

+ Operator comfort

The Pit Viper 231 E features an insulated, pressurized cab with an air-ride operator seat — providing high suspension comfort with excellent visibility. The large cab is equipped with Rig Control System (RCS) controls, 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. With no fuel consumption and fewer moving parts, less maintenance requirements result in a decrease in downtime and maintenance costs.

+ Electric-driven

The electric Pit Vipers deliver robust performance with zero emissions, creating a cleaner and safer work environment. The Pit Viper 231 E contributes to stable drilling operations with more predictable drilling outcomes, improved accuracy, and optimized recovery.

+ Enhanced safety

The Pit Viper 231 E is equipped with a number of 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 the RCS system and safety shutdowns for temperature, low level, and pressure.

Service and support

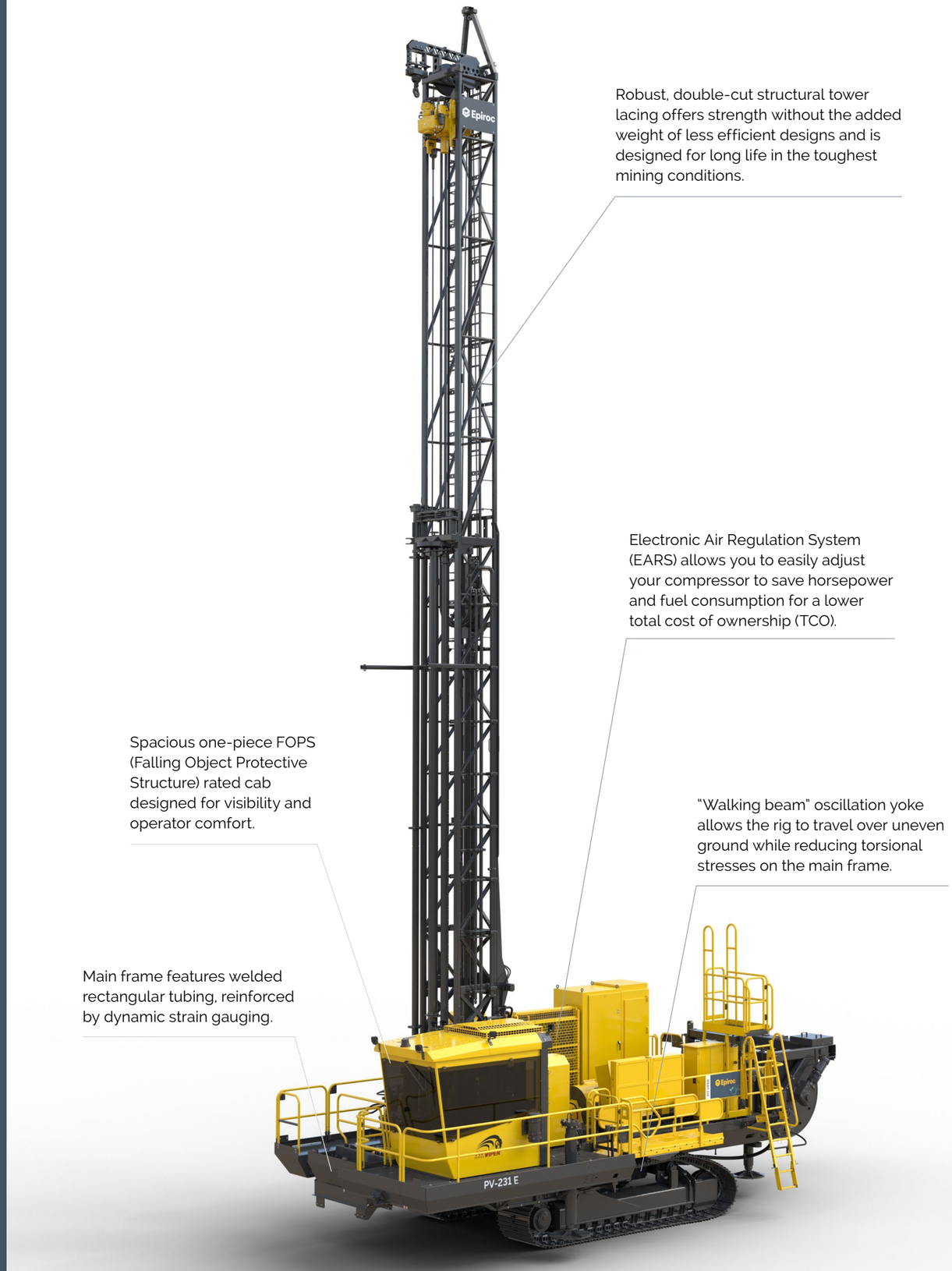
Epiroc offers several types of service agreements to meet your operational requirements and maximize your productivity:

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.



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.

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).

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

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

Main frame features welded rectangular tubing, reinforced by dynamic strain gauging.

Rig Control System

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 E. 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 Pit Viper 231 E with an operator on board using options such as Autodrill and Autolevel — or you can run with the operator off the drill with the optional BenchREMOTE package, allowing one operator to run one or multiple units. You can even implement autonomous drilling with almost no human interaction with the drill.

Add-on features:

Autodrill
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.

Teleremote
Allows safe, productive and effective single- or multi-drill remote operations (control room and drill solutions sold separately).

Automatic Bit Changer
Enables hands-free bit changes so operators can effortlessly switch rotary tricone bits with a simple touch of a button, reducing downtime and boosting efficiency.

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 the RCS system.
- **Rig Remote Access (RRA)**
  Wirelessly sends files to and from the drill rigs.
- **Desktop Viewer**
  Allows remote access to the drill's operational screens.

Technical specifications

Substructure

Mainframe	
• 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	
Leveling Jack	
Type	Hydraulic cylinder with lock check
Quantity	Four jacks
Position indication	"Jack up" indicator lights on console or RCS screen
Capacities	
Water tank	600 gal (2,271 L) or 1,000 gal (3,785 L)
Hydraulic tank	80 gal (303 L)
Undercarriage and propel system	
Make	Caterpillar 330EL
Total length	210 in (5.33 m)
Ground contact	171 in (4.34 m)
Take-up adjustment	Grease slack adjustment; spring recoil
Rollers	11 lower / 2 upper
Location	Equally spaced between idler and sprocket
Roller bearings	Sealed for life
Track pads	Type: Triple bar grouser — for increased grip and reduced ground pressure Width: 33.5 in (851 mm)
Drive	Hydraulic motors through planetary reduction
Propel motors	Two - Hydraulic, axial piston, fixed displacement rating (each): 205 HP (152.9 kW)
Propel speed range	Epiroc: 0 – 2.5 mph (0 – 4 km/h)

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	53 ft (16.1 m)	
Maximum hole depth	123 ft (37.5 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	• Drill pipe is held securely in carousel by "key lock design" mechanism • No bump system to prevent damage if carousel not stowed	
Drill rods (35 ft (10.7 m)		
Drill pipe diameter	**Thread**	**Suggested bit diameter**
4-1/2 in (114 mm)	3-in BECO or 3-1/2 API	6 in - 6-3/4 in (152 mm - 171 mm)
5 in (127 mm)	3-1/2 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 m), Two pullback – 7/8 in (22.2 mm)	
Number of sheeves - 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)	

Cab and controls

Cab

- Quiet, single piece design with no seams or leaks (tested @ 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 Control	**Integrated control touchscreen** (penetration rate, rotation torque, rotation pressure, pulldown force, pulldown pressure, hole depth indicator, etc.) **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) **Standard interlocks/features**

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 the pumps, filters and valve bay area and simplified tracing of hosing

Power package

Electronic Air Regulation System (EARS)

- Standard on the Pit Viper 231 E
- Deliver variable air volume control (within system capacity), while still maintaining constant air pressure
- Reduced wear on drill string components

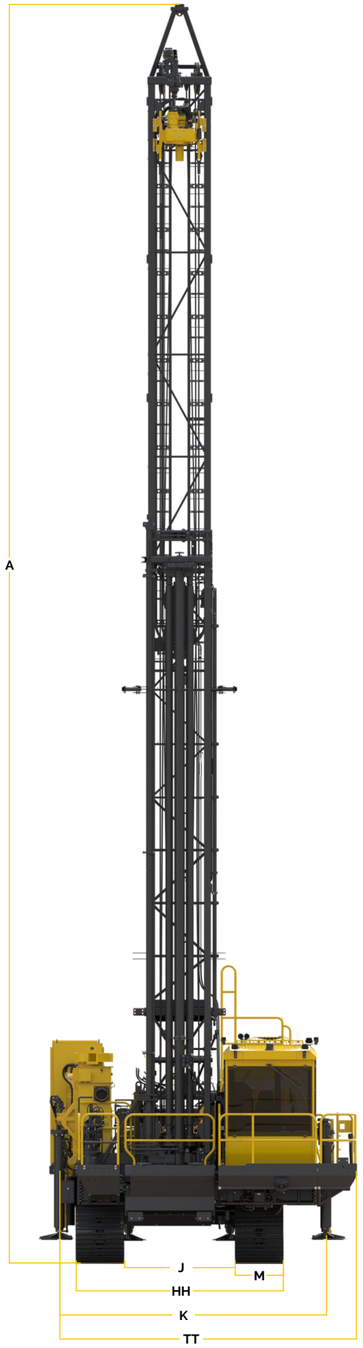
Electric motors	**50 hz or 60 hz**	
	WEG - 800 HP (597 KW)	
Airends	**50 hz or 60 hz**	
High Pressure	1500 CFM 350 PSI 42.5 m3/min 24 bar	1250 CFM 350 PSI 35.4 m3/min 24 bar
	1300 CFM 435 PSI 36.8 m3/min 30 bar	1080 CFM 435 PSI 30.6 m3/min 30 bar
Low Pressure	1900 CFM 110 PSI 53.8 m3/min 7.6 bar	1580 CFM 110 PSI 44.74 m3/min 7.4 bar
	1900 CFM 110 PSI 53.8 m3/min 7.6 bar	1580 CFM 110 PSI 44.74 m3/min 7.4 bar

Shipping dimensions and weight (standard machine)*

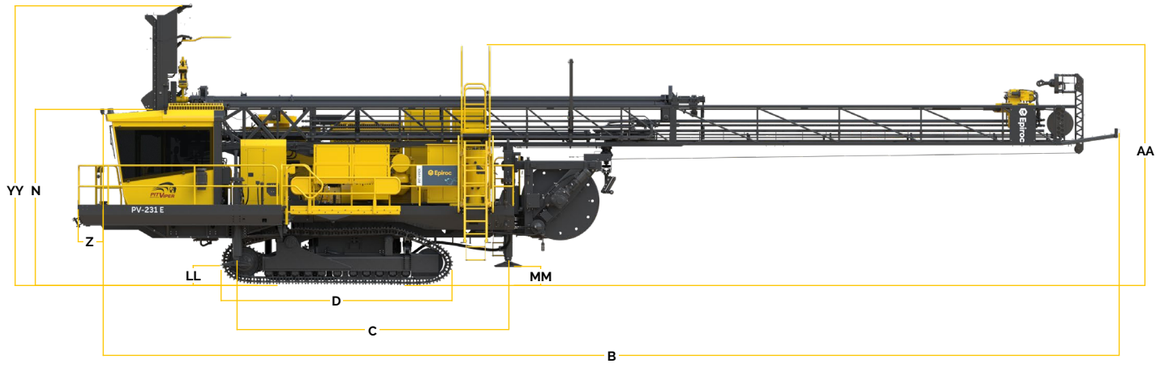
Tower	
Length	74 ft 10 in (22.8 m)
Width	6 ft 3 in (1.9 m)
Height	11 ft 10 in (3.6 m)
Gross weight	40,000 lb (18.1 tonnes)
Main frame (stripped)**	
Length	Short deck: 35 ft 10.9 in (10.95 m) Long deck: 39 ft 9.5 in (12.13 m)
Width	Short deck: 17 ft 4.1 in (5.29 m) Long deck: 18 ft 8.5 in (5.7 m)
Height	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)

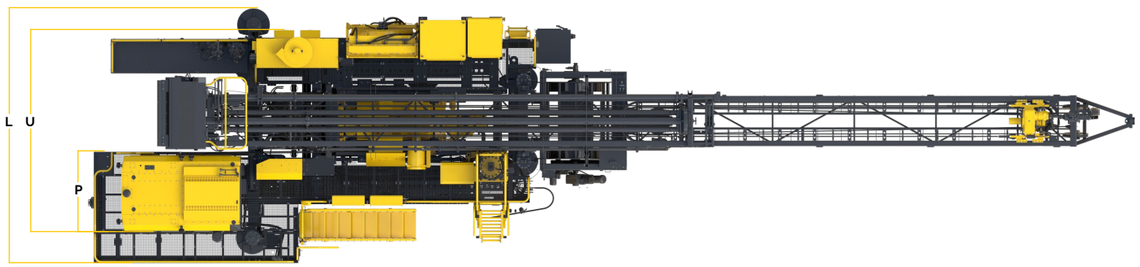
Operating dimensions
(For Pit Viper 231 E, dimensions may vary by machine and options)

	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)
AA	Height – ground to tower access ladder	18' 1.5" (5.52)
HH	Width - undercarriage assembly	12' 6" (3.81)
LL	Height - drill end jack edge to ground	0.92' (0.28)
MM	Height - non drill end jack edge to ground	0.92' (0.28)
TT	Jack to cab deck	18 ' 9" (5.7 m)
YY	Height - ground to dust hood	21' 0.3" (6.41)
ZZ	Width - drill end (short cab deck)	14' 7" (4.45)



Technical specifications





Optional equipment

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

- Hydraulically operated automatic wet clutch between airend and engine
- Wrap-around decking for 360° access around cab
- Cold-weather options for drill operation in extremely cold ambient conditions (-45° C)
- Automatic thread lubrication
- Hydraulic retractable stair
- Water injection system
- Angle drilling package
- Fast service options
- Auxiliary crane
- Video camera
- Dust collector

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