

EL1000

LONGWALL SHEARER



**Seam Range
Installed Power**

1.6-3.9 m (63-156 in)
up to 1230 kW @ 50 Hz (up to 1,924 hp @ 60 Hz)

CAT®

TAKING THE SHEARER TO THE NEXT LEVEL

Your shearer is the most critical part of your longwall production process. That's why high-performance longwall operations demand shearers that deliver the highest productivity, availability and reliability to meet the demands of low to medium seam applications:

- + OPTIMIZED CUTTING AND HAULAGE POWER
- + HIGH RELIABILITY AND SAFETY
- + EASE OF MAINTENANCE AND OPERATOR ERGONOMICS
- + ADVANCED AUTOMATION

Cat® shearers were always designed to meet these demands. But Caterpillar has taken them to the next level.



THE NEW CAT® EL1000

Meeting Tomorrow's
Production Targets in
Low and Medium Seams

Coal panels and face lengths are increasing – the average seam height is not. Maximizing productivity levels as the seam height diminishes requires a robust and compact cutting machine design with optimal coal-loading performance – backed by advanced automation capabilities for visualization and control.

For low seam shearer applications, the most compact Cat solution yet will be there to deliver the results you expect: the new Cat EL1000. This latest addition to the successful range of Cat longwall shearers will cover seam heights from 1.6 to 3.9 meters (63 to 156 inches) with power for the toughest conditions to meet the production targets of tomorrow.



COMPACT POWERHOUSE

FOR LOW AND MEDIUM SEAM HEIGHTS

The Cat EL1000 features a robust, modular design, designed for top productivity, enhanced safety and the best reliability in the industry.

Using high cutting and haulage power, this compact powerhouse makes maximum impact in low and medium coal seams. Equipped with a state-of-the-art automation, it delivers efficient cycle times and cutting consistency with face alignment and horizon control.



ADVANCED AUTOMATION

The Cat PMC-S control system delivers efficient control of the shearer. The modular design allows individual configuration – from basic monitoring and protection to advanced automation and data transmission.



MAXIMUM POWER

High-powered ranging arms and haulage units ensure world-class production in the toughest mining conditions.



MODULARITY IS KEY

The mainframe not only offers maximum protection of major units – its fully modular construction means versatility in application as well as the option for targeted overhauls to manage your total costs of ownership (TCO).



MAXIMUM PRODUCTIVITY

WITH CAT® LONGWALL AUTOMATION



IMPROVED COAL OUTPUT UP TO 156%*

Production results recorded during automation implementation on a high-production Australian longwall illustrate the positive role that automation can play. In brief, weekly production improvements from 61,592 tonnes (67,894 short tons) cutting in manual mode to 118,094 tonnes (130,894 short tons) as automation evolved and then a step further to 158,000 tonnes (174,165 short tons) as automation utilization increased from 0 percent to 98 percent.

Production grew more than 156 percent as automation utilization increased, indicated by a reduction in shearer ranging arm override commands.

INCREASED SHEARER SPEED UP TO 30%*

In automated cutting mode, the average time taken per shearer pass dropped from 62 minutes to 44 minutes as automation was implemented. The quicker passes increased the average number of passes per week from 34 to 90.

In addition to increases in productivity, Cat longwall automation increased equipment availability and reduced in-panel parts usage, specifically replacement of conveyor flights, shear pins and conveyor connectors, also known as dog bones. Over three panels, longwall system availability increased from 91.0 percent to 96.5 percent.

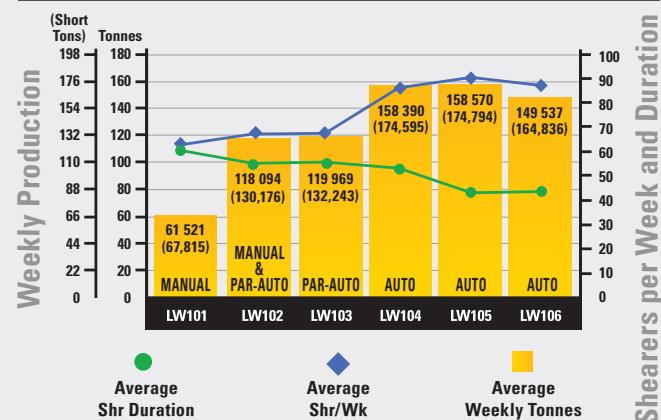


AUTOMATION IMPROVES COAL OUTPUT UP TO »

Production results recorded during automation implementation on a Australian longwall operation illustrate the positive role that automation can play.

156% *

AUTOMATION PRODUCTIVITY *



**AS AUTOMATION INCREASED
FROM 0% TO 98%,
WEEKLY PRODUCTION INCREASED
FROM 61 592 TONNES (67,894 SHORT TONS)
TO 158 000 TONNES (174,165 SHORT TONS).**



CAT SHEARER AUTOMATION

THE NEXT LEVEL OF SAFETY, PRODUCTIVITY AND AVAILABILITY.

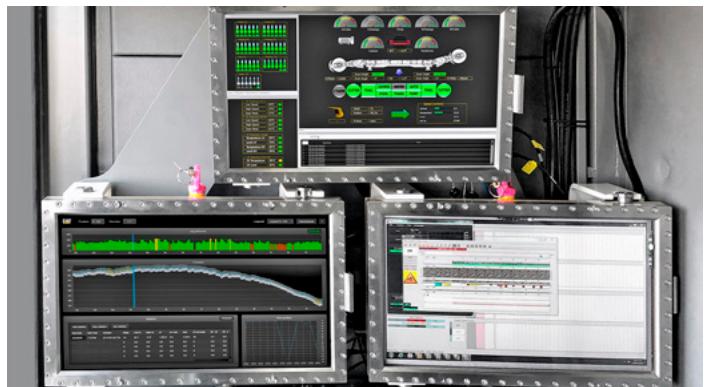


POWERFUL CONTROL SYSTEM

The EL1000 incorporates the extremely powerful, modular and Ethernet-based PMC-S control system that enables programming complex algorithms and functions. The system is designed with many intrinsically safe components, which makes it easy to maintain at the face without opening flameproof enclosures.

KEEPING OPERATORS AWAY FROM HAZARDOUS AREAS

In addition to longwall system automation driving production and improved mechanical availability, shearer automation reduces working time for operators near the cutting machine and at the face in general. In consistent geological conditions, the EL1000 can be operated in automated mode, keeping your personnel and productivity in the “safe zone”. The EL1000 shearer operation, production level and component condition can be monitored on site and from the surface.



COMMAND FOR LONGWALL



PUSHING THE LIMITS

Command for Longwall, a Cat MineStar™ technology capability set, delivers dramatic improvements in safety, productivity and availability at your longwall operation. It offers remote control, semi-autonomous and autonomous systems for your longwall shearer and provides the following operational benefits:

- + OPTIMIZATION OF LONGWALL MINING PRODUCTION CYCLES
- + LOWERING PRODUCTION COST
- + IMPROVED CONSISTENCY AND CONTINUITY OF THE CUTTING PROCESS
- + ENHANCED SHEARER PERFORMANCE
- + IMPROVED OPERATOR SAFETY AND HEALTH
- + EXTENDED SERVICE LIFE OF ALL LONGWALL SYSTEM COMPONENTS



IMPROVED SAFETY



MAXIMIZED UPTIME



INCREASED PRODUCTIVITY



OPTIMIZED COST

SELECT THE DEGREE OF AUTOMATION YOU NEED

SAFETY AND EFFICIENCY RIGHT FROM ENTRY LEVEL.

ADAPTABLE TO YOUR OPERATIONAL CHALLENGE.

When it comes to safe and efficient longwall mining operation, Command for Longwall offers the right level of automation for your shearer – from operator assistance to full autonomy:



STANDARD MACHINE CONTROL

- + REMOTE CONTROL MACHINE OPERATION
- + AUTOMATION LOGIC THAT CAN REDUCE OVERLOAD SITUATIONS
- + DIAGNOSTIC TOOLS FOR TROUBLESHOOTING AND PROBLEM-SOLVING



BASIC AUTOMATION

- + STANDARD MACHINE CONTROL FEATURES
- + EXTENDED GATE END COMMUNICATION (DATA EXCHANGE WITH OTHER LONGWALL COMPONENTS)
- + DRUM AUTOMATION FOR RANGING ARMS TO CUT A DEFINED SHAPE
- + COLLISION AVOIDANCE FUNCTION TO PREVENT COLLISION BETWEEN THE SHEARER AND THE SHIELDS

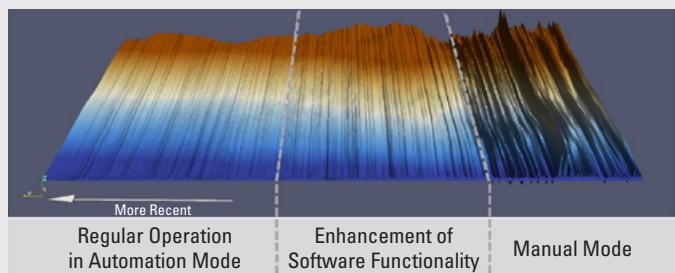


ADVANCED AUTOMATION

- + ADVANCED GEOMETRY AND TRIGONOMETRY CALCULATIONS FOR FULL 3D NAVIGATION
- + ADVANCED FLOOR PROFILE CALCULATION
- + HORIZON CONTROL, EXTRACTION CONTROL AND FACE ALIGNMENT

TAKE CONTROL WITH CAT SHEARER AUTOMATION

- + CHOOSE THE AUTOMATION CAPABILITIES THAT MAKE SENSE FOR YOUR LONGWALL OPERATION
- + ADAPT WHAT'S WORKING WELL IN OTHER MINES TO BOOST SAFETY, EFFICIENCY AND EQUIPMENT AVAILABILITY AT YOUR LONGWALL MINE
- + KEEP YOUR SHEARER OPERATORS IN CONTROL BUT OUT OF HARM'S WAY – THROUGH REMOTE-CONTROLLED OR SEMI-AUTONOMOUS COAL EXTRACTION
- + FINALLY, AUTOMATE YOUR SHEARER CUTTING CYCLES



MODULAR DOWNDRAVE DESIGN PROVIDES EASY ADAPTION TO CHANGING CONDITIONS

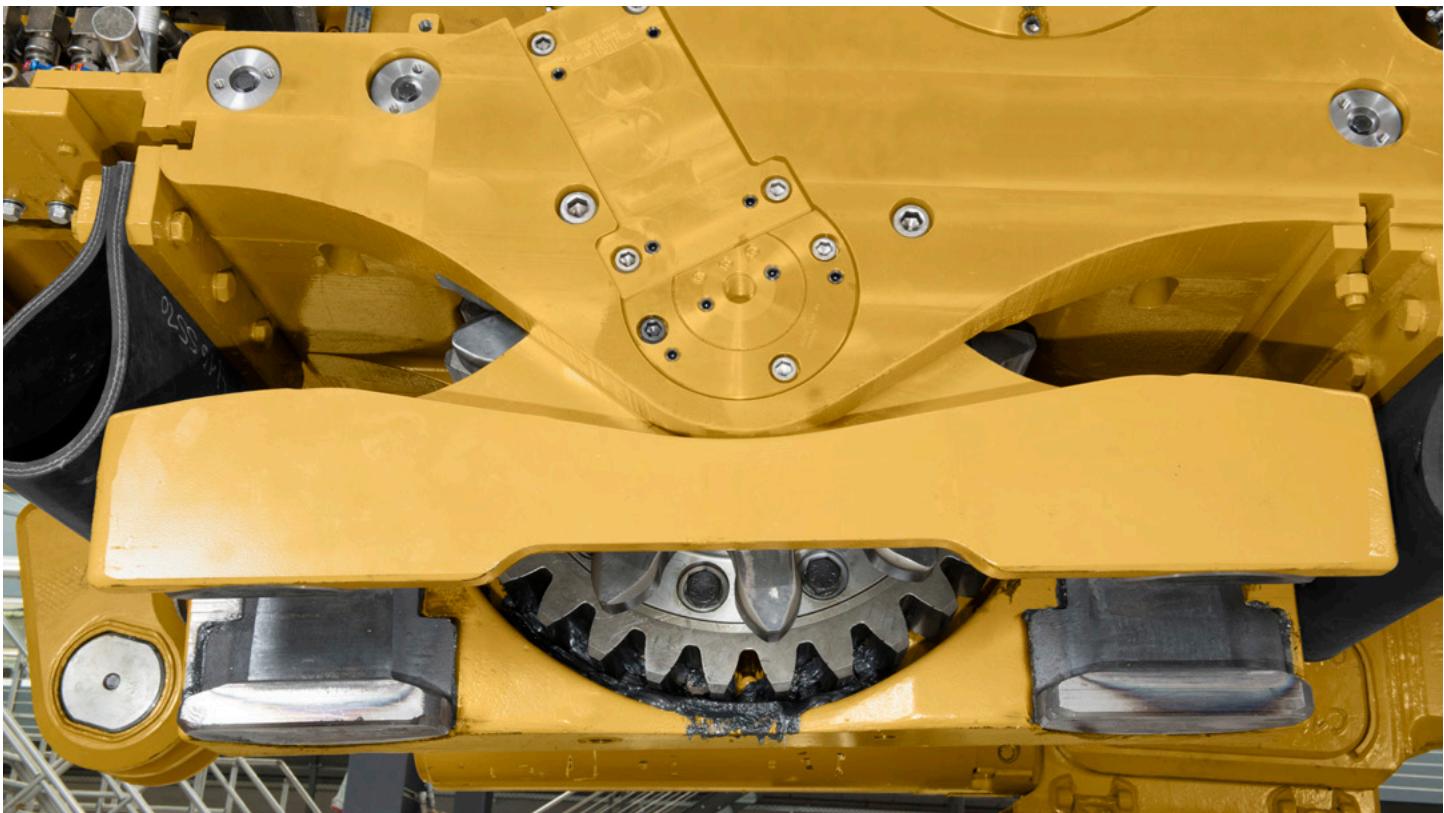


The innovative downdrive design results in longer bearing life, increased gear rating and greater modularity for simplified maintenance.

FULLY MODULAR DESIGN INCREASES VERSATILITY

Height adjustment of the shearer is relatively easy and is achieved with replacement of the downdrive and shoe post to allow adaption to changing AFC width and seam conditions. The EL1000 mainframe is designed to take different types of downdrive arrangements to fit a wide range of seam heights.





DIRECT DOWNDRAVE

The direct downdriven is designed to maximize tunnel clearance when the shearer is operating on a narrow AFC profile. Due to the geometrical design requirements, the direct drive profile does not allow the fitting of the trapping shoes with replaceable inserts.

The direct downdriven design includes:

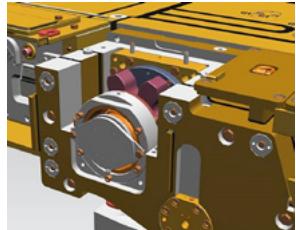
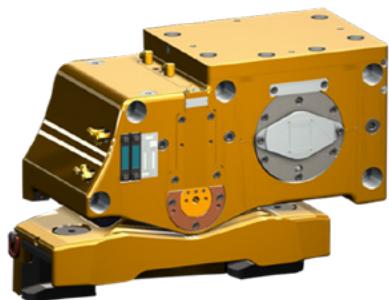
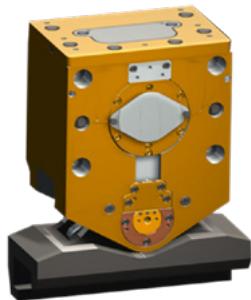
- + EASILY ACCESSED DRIVE SHAFT
- + UNIQUE TOP GEAR ASSEMBLY ACCESS AND EXCHANGE
- + DEDICATED BEARING GREASE PATHS ACCESSIBLE FROM WALKWAY SIDE
- + RUGGED ATTACHMENT TO MACHINE BODY USING SUPERBOLTS

INDIRECT DOWNDRAVE

The indirect downdriven has the sprocket driven by a gear arrangement which promotes improved gear and sprocket life. Indirect downdrives are also designed to accept trapping shoe insert technology. The inserts are the wear component and weigh less than 50 kg (110 lb) each, rather than replacing the complete trapping shoe.

The indirect downdriven includes:

- + FULL MODULAR DESIGN
- + SIMPLIFIED DESIGN FOR MAINTENANCE ACCESS
- + FULLY ARTICULATING SHOE WITH WEARING INSERTS
- + GREASE GALLERIES WITH TELLTALES TO LUBRICATE ALL BEARINGS
- + GREASE POINT ACCESS FROM THE WALKWAY SIDE
- + RUGGED ATTACHMENT TO MACHINE BODY USING SUPERBOLTS
- + TOP COVER FOR EASY ACCESS TO TOP GEAR FOR VISUAL INSPECTION AND REPAIR (YODE DESIGN)



Yoke design for quick and easy maintenance

The EL1000 mainframe is designed to fit the full range of downdriven arrangements suited to specific extraction ranges in various seam thicknesses.



MODULAR HAULAGE SYSTEM INCREASED SERVICE LIFE AND REDUCED COST

ACCURATE LOAD-SHARING FOR INCREASED SERVICE LIFE

Caterpillar has further developed its modular haulage concept with increased power rating, gear rating, bearing life and redundancy, leading to longer overhaul intervals based on typical usage.

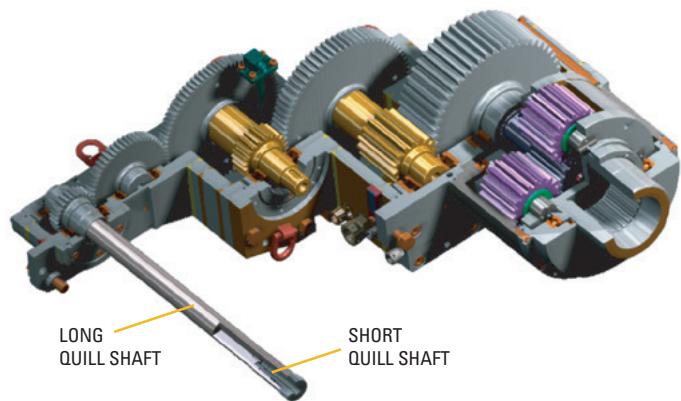
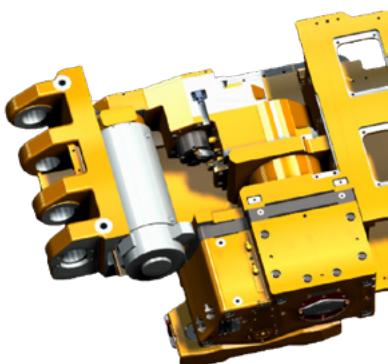
The haulage system is a simple design capable of achieving cutting speeds of up to 29.5 m/min (97 ft/min), with improved reliability and longer service life. The fully modular haulage gearbox is located in the shearer mainframe and does not form part of the shearer structure. The haulage system offers:

- + SIMPLE CONSTRUCTION FOR IMPROVED RELIABILITY AND LONGER SERVICE LIFE
- + FULLY PROVEN LOAD-SHARING SYSTEM
- + REDUCED COST

The fully modular haulage system features a separate gearbox and motor and is suitable for a parking brake attachment and absolute encoder for shearer position.

Features include:

- + CLOSED LOOP CONTROL, ACCURATE LOAD-SHARING AND INCREASED LIFE OF SPROCKET AND RACKBAR
- + SENSOR FOR OIL LEVEL AND TEMPERATURE
- + MOTORS IEEE RATED TO IP55
- + MECHANICAL PROTECTION WITH SHORT REPLACEABLE SHEAR PIN FOR SIMPLE EXCHANGE
- + ABSOLUTE ENCODER FOR ACCURATE MACHINE POSITION DETECTION (NO RESET DEVICES REQUIRED)





INNOVATIVE TRAPPING SHOE DESIGN GREATER SAFETY AND EASE OF HANDLING

Trapping shoes protect the haulage sprockets and form an area of interaction with the haulage rack system attached to the armored face conveyor, allowing the shearer to be hauled up and down the face. A new type of trapping shoe developed by Caterpillar offers numerous advantages over the original design:

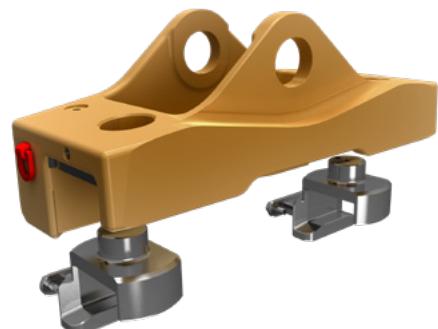
- + IMPROVED SAFETY AND EASE OF HANDLING DURING REPLACEMENT
- + GREATLY IMPROVED REPLACEMENT TIME OF THE WEAR COMPONENTS
- + INCREASED FLEXIBILITY
- + LOWER OPERATING COSTS

The innovative Cat trapping shoe Ix continues the principle of designing products with separate structural and wear parts to allow quick and easy replacement of surfaces subject to wear. The new design cuts the weight that must be handled during replacement from more than 500 kg (1,102 lb) to less than 50 kg (110 lb) per insert, and cuts the time required for exchange to a fraction of the previous time. Because the weight handled is so much lower, changeout can take place anywhere along the face – previously this work had to be done at the gate ends, where heavy lifting equipment was available.

EXTENDED SERVICE LIFE

The inserts have the same wear area as conventional shoes and are articulated. This articulation enables – better maneuverability going through snakes and the enlarge contact area leads to less contact to the edge and increased service life. This – combined with the fact that the shoe does not have to exert as much pressure, resulting in a lower point load – means less wear.

Field tests of the Trapping Shoe Ix showed its service life to be 50 percent longer than conventional trapping shoes.



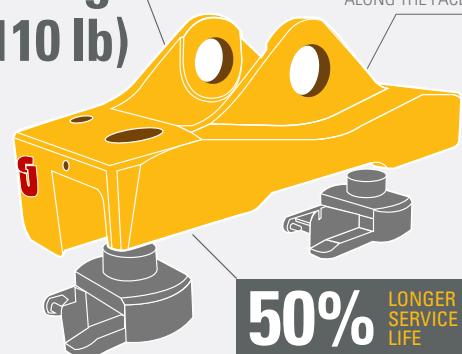
NEW CAT® TRAPPING SHOE LIGHTER WEIGHT FOR QUICKER EXCHANGE

OLD DESIGN 500 kg (1,102 lb)

NEW DESIGN

50 kg
(110 lb)

CHANGEOUT
CAN TAKE PLACE
ANYWHERE
ALONG THE FACE!



50%
LONGER
SERVICE
LIFE

REPLACEMENT EXCHANGE REDUCED BY 30%

INSERTS EXCHANGE VS. TRAPPING SHOE EXCHANGE

TRAPPING SHOE:	INSERTS:
FROM 8 TO 12 HOURS	2 TO 4 HOURS

HIGHEST EFFICIENCY

OPTIMIZED HYDRAULIC POWER SYSTEM

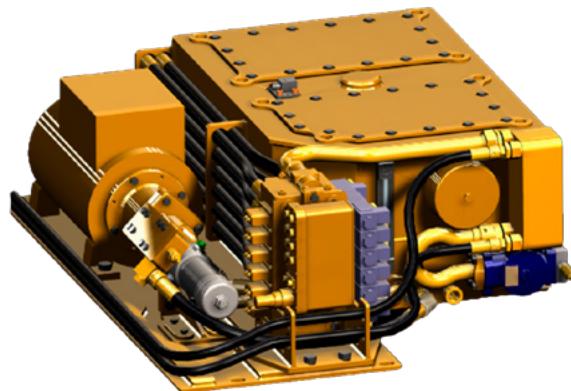


ONE SINGLE SOURCE

Caterpillar continues its single power pack philosophy with all hydraulic function from one single source. Featuring a single power pack instead of two means less parts to fail and less maintenance effort and time.

SIMPLIFIED LAYOUT

The power pack has been re-engineered to provide increased functionality, optimized performance and better access to filtration units using a simplified layout. Higher volume pump and boost valve optionally available for accelerated gate end operations.



HIGH PERFORMANCE

The Hydraulic Power Pack is designed to operate at the highest efficiency. It is driven by a single 30 kW (48 hp) low voltage (600V) electric motor.

POWER PACK FEATURES

- + LOW NOISE OPERATION
- + OPTIMIZED FLUID FLOW
- + EXTERNAL COOLING
- + ATTENTION TO HOSE MANAGEMENT AND COMPONENT LOCATION
- + EASY ACCESS RETURN FILTERS
- + OIL LEVEL AND TEMPERATURE MONITORING
- + BENCH BUILT AND TESTED SUB-COMPONENT
- + ALL CONNECTION POINTS POSITIONED AT READILY AVAILABLE LOCATIONS

ROBUST ONE-PIECE MAINFRAME

MORE THAN MAXIMUM PROTECTION



IMPROVED MAINTENANCE CONVENIENCE

The mainframe not only offers maximum protection of major units – its fully modular construction means cost-effective overhauls with independent replacement of units.

The mainframe is designed to house all major components and isolate them from cutting and haulage forces. This design is particularly effective in maintaining explosion-proof integrity, the enclosures are not subject to these forces as they do not form part of the mechanical structure of the shearer.

Manufactured from a blend of structural steel, high tensile steel and castings using the latest analysis techniques to ensure integrity and extended life, the mainframe is designed to allow multiple rebuilds during its service life. For operational and maintenance convenience, covers and access points are provided at key locations.

A split mainframe version is also available allowing the shearer to be transported in manageable pieces due to dimension and weight restrictions.

MAINFRAME BENEFITS:

- + LONG SERVICE LIFE OF THE STRUCTURE AND COMPONENTS WITHIN
- + HIGH STRUCTURAL INTEGRITY AND ABSORPTION OF CUTTING AND HAULAGE FORCES
- + EASY ACCESS FOR MAINTENANCE AND CREATION OF TARGETED COMPONENT OVERHAUL
- + INDEPENDENT COMPONENT EXCHANGE FOR SELECTIVE OVERHAUL SCHEDULES
- + ADDITIONAL WEIGHT TO COUNTERACT CHALLENGING MINING CONDITIONS





POWER FOR THE TOUGHEST MINING CONDITIONS

Based on proven Cat design concepts, the RA560 ranging arm delivers maximum cutting power in an application-focused profile. The EL1000 provides cutting power up to 2×500 kW using 3,300 V @ 50 Hz respectively 2×805 hp using 4,140 V @ 60 Hz.



OPTIMAL COOLING AND LUBRICATION

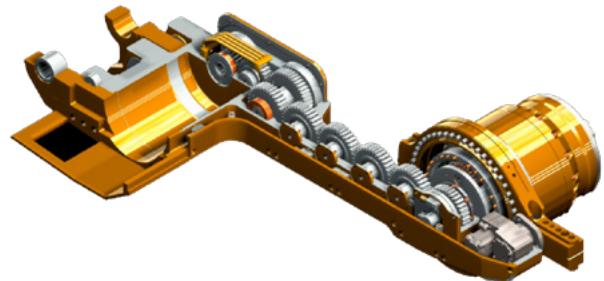
Enhancements generated over years of experience in operation include an independent epicyclic oil compartment for optimizing lubrication and cooling with a second layer of protection from debris ingress.

DESIGNED REDUNDANCY

With an available cutting power of 500 kW (805 hp) and high-speed gears and idlers rated for 560 kW at 50 Hz (900 hp at 60 Hz) and hub rated for 750 kW at 50 Hz (1,200 hp at 60 Hz), the EL1000 is designed for high machine reliability and increased service life.

The ranging arm high speed section has a mechanical rating 12% greater than input power with the slow speed section 50% greater, creating redundancy in the design.

The epicyclic and idler gears feature an advanced bearing design to take highest loads and consider torsion during operation – ensuring highest reliability and low rebuild costs.





POWERFUL RANGING ARM CYLINDER

225 mm (8.86 in) diameter cylinders provide all the power required to position and support the ranging arms during production. 140 mm (5.51 in) rods use the latest technology coatings to provide extended life in the most challenging conditions. The ranging arm cylinder is tested to 39 MPa (5,656 psi) with a complete range of safety systems for operation and maintenance.



RANGING ARM FEATURES:

- DESIGN REDUNDANCY: HIGH-SPEED GEARS AND IDLERS RATED FOR 560 KW AT 50 HZ (900 HP AT 60 HZ), HUB RATED FOR 750 KW AT 50 HZ (1,200 HP AT 60 HZ)
- SEPARATE OIL COMPARTMENTS FOR HIGH SPEED AND PLANETARY SECTION (OPTIMAL COOLING AND LUBRICATION)
- RECONFIGURABLE GEAR CASSETTES FOR ADAPTATION OF DRUM SPEEDS
- INTEGRAL MONITORING TRANSDUCERS
- QUILLSHAFT TRANSMISSION PROTECTION
- HIGH PERFORMANCE MECHANICAL SEALING – DESIGNED FOR MAXIMUM DURABILITY
- ROBUST COWL DRIVE MECHANISM (OPTIONAL)
- VIBRATION MONITORING (OPTIONAL)

The safety factor for the ranging arm has been further increased. Gear rating, bearing life and redundancy have also been improved, leading to an increase in overhaul intervals based on typical usage.

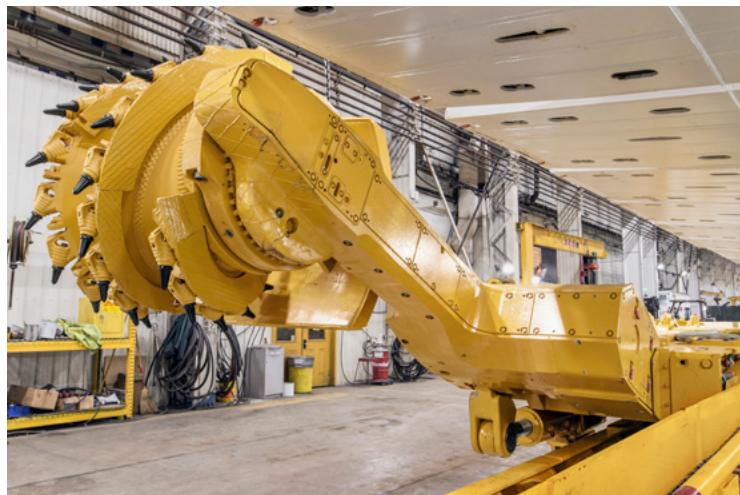
Optimized Cutting and Loading



CUTTING DRUMS

Cat shearers are supplied and fitted with approved manufacturer's cutting drums. The preferred cutting drum design can be chosen by the customer. If required, Caterpillar will provide consultancy on selecting the best suitable drum design to meet customer production requirements and machine reliability. Drums are designed to optimize cutting and loading to suit the specific application and seam conditions:

- + ENSURES YOU ACHIEVE THE REQUIRED HAULAGE SPEEDS
- + PRODUCES THE REQUIRED PRODUCT SIZE
- + MINIMIZES VIBRATIONS TO THE SHEARER TO INCREASE UPTIME
- + STAYS WITHIN CUTTING POWER AND HAULAGE POWER LIMITATIONS



CUTTER MOTOR

The 500 kW (805 hp) cutter motor is fitted as standard to the EL1000. Motors are FLP certified according to the mine requirements, IP56 rated, built and tested to IEEE standards and feature an easy access terminal chamber.



COWL SYSTEM

When required, a cowl system can be supplied with or retrofitted to the shearer. The cowl system utilizes a robust pin arrangement, driven by a single hydraulic motor through a reduction gearbox to deliver maximum performance, while maintaining a simple, low-maintenance design.

If damaged, each individual pin can be replaced without the need for removal of the cowl arm. The cowl system comes complete with water flushing and oil lubrication facility. The system is radio-controlled and additional cowl position control can be included with advanced shearer automation packages.

ELECTRICAL POWER/CONTROL SYSTEM

MODULAR DESIGN FOR EASY MAINTENANCE ACCESS

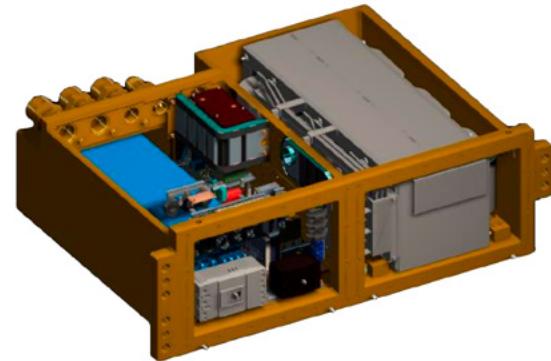


HAULAGE TRANSFORMER BOX

The haulage and transformer box is a self-contained enclosure containing the main shearer transformer and drive system components.

DESIGN FEATURES INCLUDE:

- + CIRCUIT BREAKER AND RESET
- + A SINGLE AC-INVERTER DRIVE FOR BOTH HAULAGE MOTORS
- + ABSOLUTE ENCODER FOR ACCURATE MACHINE POSITION DETECTION (NO NEED FOR RESET DEVICES AT GATE ENDS)
- + WATER-COOLED, MACHINED SURFACE BASEPLATE FOR IMPROVED EFFICIENCY AND PERFORMANCE
- + MINIMUM WIRING AND MAXIMUM USE OF CUSTOMIZED CONNECTING CABLES AND HIGH INTEGRITY PLUG AND SOCKETS
- + HIGHLY FLEXIBLE CABLE CONCEPT
- + VISIBLE DISCONNECT
- + CLOSED-LOOP CONTROL WITH MEASUREMENT OF MOTOR SPEED FOR ACCURATE LOAD SHARING AND INCREASED LIFE OF RACKBAR AND SPROCKET
- + TRANSFORMS TO 600V FOR HAULAGE AC-INVERTER DRIVE POWERING THE HAULAGE MOTORS
- + QUICK CONNECT PLUGS ON CABLES FOR REDUCED FIXED WIRING AND QUICK, CLEAR INSTALLATION
- + TEMPERATURE MONITORING AND WATER COOLING



ELECTRICAL CONTROL BOX

The explosion-proof enclosure contains most of the high-voltage and low-voltage electronics for the shearer. A separate compartment houses the shearer control system components. The control box features proven industry-standard electrical components, door-mounted operator controls, test points and reset functions. Moreover, it provides a special machine performance algorithm "Advanced Motor and Speed Control" for increased machine uptime, coal production and longer service life.

CONTROL BOX FEATURES:

- + PLUG AND PLAY
- + COMPONENTS MOUNTED ON DEDICATED REMOVABLE CHASSIS
- + EASY TO MAINTAIN
- + QUICK AND EASY TO TROUBLESHOOT
- + DOOR HANDLING KIT FOR LARGE FLAMEPROOF COVER



TESTED FOR RELIABILITY

ENSURING MAXIMUM RETURN OF INVESTMENT



Downtime is inconvenient and has the potential to become an enormous expense for operators. With an understanding of customer expectations each shearer design is subjected to rigorous in-house testing to maximize availability and reduce the required service time.

LUBRICATION VERIFICATION

Ranging arms and haulage units are subjected to an intense test regime to establish the optimum oil-level requirements to suit all mining conditions.

ENDURANCE BLOCK LOAD TESTING

This test applies loads far in excess of those encountered during normal mining operations, ensuring that the shearer can operate reliably at the installed power ratings. The endurance block load test imposes loads from 100 to 175% to ensure that the ranging arm design meets the requirements of the most demanding applications.

PRODUCTION LOAD TESTING

This test for ranging arms and haulage units gradually increases the load up to full load. All temperatures and vibration points are monitored during the test, and oil samples are again collected for analysis.



THE CAT EL1000

HIGH PRODUCTIVITY. LOW COSTS.

HIGHEST PERFORMANCE IN LOW COAL

EL1000 MAIN FEATURES:

- + MAINFRAME DESIGN FOR MAXIMUM PROTECTION OF ALL MAJOR UNITS
- + MODULAR DESIGN ALLOWS FOR SELECTIVE OVERHAULS WITH REDUCED TIME REQUIRED
- + MAINFRAME ADDS WEIGHT TO COPE WITH THE MOST CHALLENGING CUTTING CONDITIONS
- + DESIGNED REDUNDANCY IN THE RANGING ARM AND HAULAGE SYSTEM
- + DEDICATED OIL COMPARTMENTS IN THE RANGING ARM TO ENSURE OPTIMAL COOLING AND LUBRICATION AT ALL ARM ANGLES
- + CLOSED LOOP CONTROL FOR ACCURATE LOAD-SHARING WITH INCREASED RACK BAR AND SPROCKET LIFE
- + RECONFIGURABLE DOWNDRAVE AND SHOE POST FOR DIFFERENT PAN WIDTHS AND SEAM HEIGHT
- + WIDESPREAD USE OF INTRINSICALLY SAFE COMPONENTS FOR IMPROVED MAINTENANCE AND SERVICEABILITY
- + SINGLE POWER PACK WITH LESS PARTS TO FAIL AND LESS TASKS FOR QUICK AND EASY MAINTENANCE
- + ADVANCED MOTOR AND SPEED CONTROL FOR INCREASED MACHINE UPTIME AND COAL PRODUCTION



REDUCED TOTAL COST OF OWNERSHIP

SHEARER AUTOMATION BENEFITS

Cat shearers with advanced automation put you in the best place for achieving lowest total cost of ownership (TCO). Increased machine availability and lowered maintenance time and cost lead to significant TCO reductions.

COST ADVANTAGES SHEARER:

- + REDUCED CONSUMPTION OF IN PANEL PARTS (CONSUMABLE COSTS)
- + REDUCED DAMAGE TO THE SHEARER (REPAIR COSTS)
- + SELECTIVE OVERHAULS TO CONTROL REBUILD COSTS



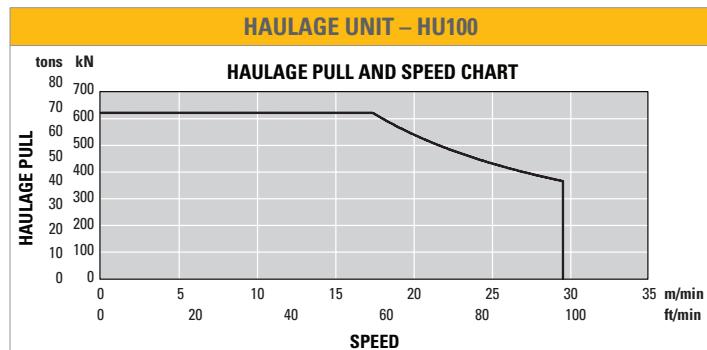
COST ADVANTAGES LONGWALL EQUIPMENT:

- + INCREASED CONVEYOR COMPONENT LIFE
- + REDUCED WEAR ON FLIGHTS
- + REDUCED WEAR IN SIGMA
- + REDUCED REPAIR COST/CONSUMABLE COST



TECHNICAL SPECIFICATIONS

SPECIFICATIONS		
	Machine @ 50 Hz	Machine @ 60 Hz
Seam Range	1.6-3.9 m	63-156 in
Typical Machine Length (drum centers)	13 780 mm	45.25 ft
Installed Power	1230 kW	1,924 hp
Available Cutting Power	2 x 500 kW	2 x 805 hp
Cutting Drum Diameter	1500 to 2000 mm	61 to 79 in
Cutting Drum Speed	33.5, 38.8 and 43.8 rpm	40.2, 46.6 and 52.5 rpm
Haulage Control	AC inverter drive	AC inverter drive
Haulage Power	2 x 100 kW	2 x 134 hp
Haulage Speed (max.)	Up to 29.5 m/min	Up to 97 ft/min
Haulage Pull (max.)	Up to 622.3 kN	Up to 70 tons
Pump Motor	30 kW	48 hp
Body Height	550 mm	21.6 in
Machine Weight (approximate, depending on configuration)	60 tonnes	66 tons
Operating Voltage	3,300V	4,160V
Minimum Pan Width	832 mm	32.7 in



- Fully removable, modular gearbox
- Closed loop control for accurate load-sharing and increased service life of rackbar and sprocket
- Transmission reduction of 132.6:1
- Absolute encoder for accurate machine position detection (no reset devices at gate ends needed)
- Fast oil drain functionality
- Haulage unit accepts hydraulic motor for installation and face recovery
- Oil temperature monitoring
- Quill shaft transmission protection
- Machine parking brake (optional)
- Vibration monitoring (optional)

RANGING ARM – RA560
<ul style="list-style-type: none"> • High-speed gears and idlers rated for 560 kW at 50 Hz (900 hp at 60 Hz), hub rated for 750 kW at 50 Hz (1,200 hp at 60 Hz) • Separate oil compartments for high speed and planetary section (optimal cooling and lubrication) • Reconfigurable gear cassettes for adaptation of drum speeds • Integral monitoring transducers • Quillshaft transmission protection • High performance mechanical sealing – designed for maximum durability • Robust cowl drive mechanism (optional) • Vibration monitoring (optional)

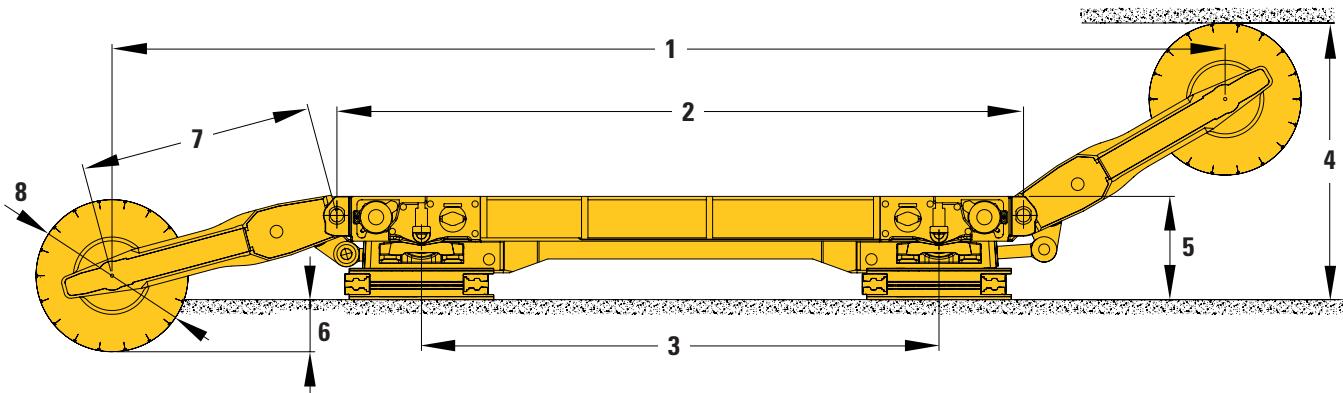
DOWNSHIFT – DS100
<ul style="list-style-type: none"> • Configurations for direct and indirect drives • Removable modular top drive wheel assembly (top cover allows easy and quick inspections) • Trapping shoe with replaceable wear inserts (for indirect drives) • Suitable for all rack type systems • Reconfigurable downshift and shoe posts for different pan widths or seam heights

POWERPACK – PP2			
<ul style="list-style-type: none"> • Single powerpack with less parts to fail and less tasks for quick and easy maintenance 			
<ul style="list-style-type: none"> • Fixed displacement pump with two options: 			
Capacity		Operating Pressure	
	at 50 Hz	at 60 Hz	
Standard	49 L/min (10.8 gal/min)	59 L/min (13 gal/min)	280 bar (4,060 psi)
Options	62 L/min (13.6 gal/min)	74 L/min (16.3 gal/min)	225 bar (3,260 psi)
<ul style="list-style-type: none"> • Robust hydraulic reservoir of 140 L (37 gal) capacity • Integral monitoring transducers (oil level and temperature) • For use with ISO 68 hydraulic oils • Available with 6 section valve bank • Reliable low-voltage pump motor rating of 30 kW @ 50 Hz (48 hp @ 60 Hz) • Optional boost valve for accelerated gate end operations (recommended for cowls) 			

TECHNICAL SPECIFICATIONS

<p>MAINFRAME – MF1</p> <ul style="list-style-type: none"> • High structural integrity and absorption of all cutting and haulage forces, providing maximum protection for all major units • Maximum protection of electrical boxes, providing the highest level of flameproof integrity, protects gearboxes against torsion • Split mainframe available in case of transportation limitations • Modular design enabling for selective overhauls with less time required and rebuild cost management • Spray boom retrofittable • Mainframe adds additional weight to cope with the most challenging cutting conditions 	<p>WATER CIRCUIT MATERIAL</p> <ul style="list-style-type: none"> • All Cat hose assemblies are designed according to ISO 6805 and proof tested according to EN ISO 1402 • The hoses are assembled to Hose Assembly Standard DIN 20066 • Hose selection and routing per industry standard best practices (including MDG41, ISO 17165-2 and SAE J1273) • Cat hoses are aligned with the standards of MSHA, DGMS and MA • Stainless steel fittings (optional) • Onboard water filtration (optional)
<p>ELECTRICAL CONTROL BOX – ECB2</p> <ul style="list-style-type: none"> • Flameproof module containing the majority of the electrical control and power distribution components • High current carrying capacity of 400 amps; accommodation of trailing cables up to 120 mm² (4/0 AWG) • Internal chassis can be 'bench built,' tested and stored • LV circuit breakers resettable through FLP cover (reduced downtime) • Powerful PMC Evo-S control system with state-of-the-art Ethernet communication • Containing cutter motor contactors, circuit breakers, control transformer, current monitoring, HV fuses, earth leakage and visible disconnect 	<p>DUST SUPPRESSION</p> <ul style="list-style-type: none"> • Wide range of dust suppression solutions available: <ul style="list-style-type: none"> – Body sprays – Spray booms – Sloughing plate sprays – Spray rings (in place of cowls) – Shearer clearers
<p>HAULAGE TRANSFORMER BOX – HTB2</p> <ul style="list-style-type: none"> • Flameproof module containing the main 253 kVA haulage transformer, power supplies, auxiliary transformer, drive system circuit breaker, hydraulic pump motor, and a 250 kW (335 hp) 600V AC inverter drive with integrated regenerative breaking. 	<p>HEALTH MONITORING</p> <ul style="list-style-type: none"> • A comprehensive health monitoring system is available, including oil levels and temperatures, flows, pressures and vibration analysis
<p>ELECTRICAL MATERIAL</p> <ul style="list-style-type: none"> • This model of shearer is available with headlights, cameras, methane monitoring, end displays and audible alarms. • All electrical material is designed and certified to IEC standards and also complies with other regional and national standards, such as MSHA, GOST, MA, ATEX and DGMS, as well as Australia's New South Wales and Queensland regulations. 	<p>MACHINE AUTOMATION AND COMMUNICATION</p> <ul style="list-style-type: none"> • Distributed, high-performance PMC-S control system for machine control, health monitoring, system protection and predictive maintenance • Modular design allows individual configuration (from basic monitoring and protection to advanced automation) to meet customer requirements • Fast Ethernet Broadband communication allows enhanced diagnostics and analysis • Control system architecture with backup functionality • Widespread use of intrinsically safe components for improved serviceability and maintenance • Machine performance algorithm "advanced motor and speed control" for increased machine uptime, coal production and longer service life • Shearer automation levels available: <ul style="list-style-type: none"> – Standard Machine Control – Basic Automation – Advanced Automation (with optional automatic face alignment and horizon control) • Pan Angle Measurement System (PAMS) enabling fully automated gate end cutting sequences without machine operator interactions (optional) • Horizon Control from PMC-R Controls to allow corrections to Floor and Roof drum cutting heights (optional) • Shearer Remote Operation to allow machine control from a safe remote location outside the face (optional)
<p>HYDRAULIC MATERIAL</p> <ul style="list-style-type: none"> • All Cat hose assemblies are designed according to ISO 6805 and proof tested according to EN ISO 1402 • The hoses are assembled to Hose Assembly Standard DIN 20066. • Hose selection and routing per industry standard best practices (including MDG41, ISO 17165-2 and SAE J1273) • Cat hoses are aligned with the standards of MSHA, DGMS and MA 	<p>REMOTE CONTROL</p> <ul style="list-style-type: none"> • Lightweight handheld device • Color graphic display • Tilt, drop and impact detection

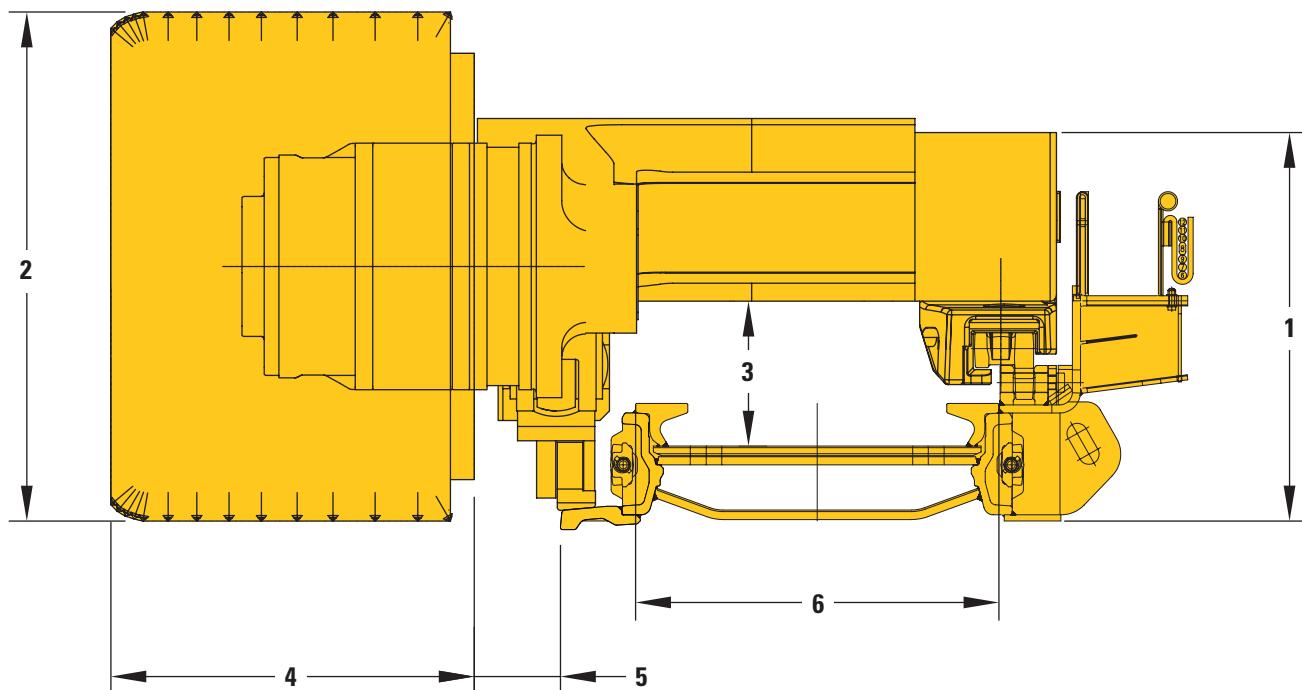
TECHNICAL SPECIFICATIONS



DIMENSIONS (All dimensions are approximate)											
	Low (DD)		Low (ID)		Mid-Low (ID)		High (DD)		High (ID)		
1 Distance between Drums with Arms Horizontal	13 780 mm	543 in	13 780 mm	543 in	13 780 mm	543 in	13 780 mm	543 in	13 780 mm	543 in	
2 Distance between Ranging Arm Hinge Points	8270 mm	326 in	8270 mm	326 in	8270 mm	326 in	8270 mm	326 in	8270 mm	326 in	
3 Distance between Trapping Shoe Centers	6123 mm	241 in	6199 mm	244 in	6022 mm	237 in	5530 mm	218 in	5530 mm	218 in	
4 Cutting Heights	Maximum	3580 mm	141 in	3540 mm	139 in	3785 mm	149 in	3955 mm	156 in	3965 mm	156 in
	Minimum	1600 mm	63 in	1600 mm	63 in	2000 mm	79 in	2200 mm	87 in	2200 mm	87 in
5 Height to Top of Machine Main Body	1220 mm	48.0 in	1180 mm	45.5 in	1300 mm	51.2 in	1400 mm	55.1 in	1410 mm	55.5 in	
6 Shearer Drum Undercut of Floor	995 mm	39 in	1035 mm	41 in	1040 mm	41 in	1030 mm	41 in	1030 mm	41 in	
7 Ranging Arm Length (hinge to drum)	2755 mm	108 in	2755 mm	108 in	2755 mm	108 in	2755 mm	108 in	2755 mm	108 in	
8 Diameter of Shearer Cutting Drum	1550 mm	61 in	1550 mm	61 in	1800 mm	71 in	2000 mm	79 in	2000 mm	79 in	

DD = Direct Drive
 ID = Indirect Drive
 NOTE: All illustrations and drawings are exemplary. Binding drawings are created for specific offers.

TECHNICAL SPECIFICATIONS



DIMENSIONS (All dimensions are approximate)

	Low (DD)	Low (ID)	Mid-Low (ID)	High (DD)	High (ID)
Haulage Drive Type	Direct Drive (DD)	In-Direct Drive (ID)	In-Direct Drive (ID)	Direct Drive (DD)	In-Direct Drive (ID)
1 Height to Top of Machine Main Body	1220 mm 48.0 in	1180 mm 45.5 in	1300 mm 51.2 in	1400 mm 55.1 in	1410 mm 55.5 in
2 Diameter of Shearer Cutting Drum	1550 mm 61 in	1550 mm 61 in	1800 mm 71 in	2000 mm 79 in	2000 mm 79 in
3 Vertical Tunnel Clearance	470 mm 18.5 in	430 mm 16.9 in	550 mm 21.7 in	650 mm 25.6 in	660 mm 26.0 in
4 Maximum Cutting Drum Overall Width	1150 mm 45 in	1150 mm 45 in	1150 mm 45 in	1150 mm 45 in	1150 mm 45 in
5 Clearance from Drum to AFC Toeplate	280 mm 11.0 in	280 mm 11.0 in	290 mm 11.4 in	290 mm 11.4 in	290 mm 11.4 in
6 AFC Pan Width	Maximum	1342 mm 53 in	1342 mm 53 in	1342 mm 53 in	1342 mm 53 in
	Minimum	832 mm 33 in	1032 mm 41 in	832 mm 33 in	1032 mm 41 in

DD = Direct Drive

ID = Indirect Drive

NOTE: All illustrations and drawings are exemplary. Binding drawings are created for specific offers.

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AEXQ3040
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