

DRILL ASSIST ONBOARD TECHNOLOGY

TAKE YOUR DRILLING
TO THE NEXT LEVEL



An efficient mining value chain starts with cost-effective, high-precision drilling.

Cat® drills provide the quality, reliability and productivity you expect from Cat machines. And when you take advantage of automated features like Drill Assist, you can take that productivity even higher. Drill Assist helps automate the functions of a drill cycle, providing accuracy, consistency and hole quality on par with a skilled operator.

This onboard technology includes a wide variety of capabilities that enable your Cat drill to work even more accurately, safely and efficiently. All functions can be executed with a single button press.

Drill Assist capabilities include:

- **Auto Level** (and auto jack retract), which puts you into position quickly and accurately
- **Auto Mast** (raise/lower), which helps you reach the ideal mast angle for the given drill pattern
- **Auto Drill**, which helps ensure holes are drilled to the defined depth and are ready to load for blasting — with holes that stand straight, are stable and have limited to no fallback

THE JOURNEY TO AUTONOMOUS DRILLING

**FACTORY-
READY**
AUTO-LEVEL
AUTO-MAST
AUTO-DRILL

CAT® MINESTAR™ SOLUTIONS



TERRAIN
FOR
DRILLING



OPERATOR
MACHINE
ASSIST
SINGLE ROW



SEMI-
AUTONOMOUS
DRILLING
SINGLE ROW
MULTIPLE DRILLS

LINE-OF-
SIGHT

NON-LINE-
OF-SIGHT



FULL-
AUTONOMOUS
DRILLING
MULTIPLE DRILLS

LINE-OF-
SIGHT

NON-LINE-
OF-SIGHT

BENEFITS

- » Reduced drill cycle time and overall production costs
- » Improved hole consistency for better quality blasts and more productive downstream processes (loading, hauling and processing)
- » Decreased stress on the machine to reduce downtime and extend machine life
- » Enhanced operator comfort through technology-driven decision-making
- » Increased productivity for operators at any skill level
- » Optimized consumable wear and improved fuel consumption

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AUTO LEVEL (AND AUTO JACK RETRACT): QUICKLY PUTTING YOU INTO POSITION

The Auto Level functionality will automatically extend the jacks and level the drill platform before drilling a hole. When finished drilling, the operator can press a single button to retract the jacks for tramping to the next hole.

HOW IT WORKS

While leveling, Auto Level continuously monitors the angles of the drill platform, as well as jack stroke and jack cylinder pressures, to minimize deflection of the mainframe and help reduce torsional stress throughout the machine. If the system detects a fault (for example, if ground gives way under the jack pad while drilling), it will halt drilling functions to protect the drill string. The driller can simply activate the Auto Level function again to stabilize and re-level the machine to continue drilling.

Auto Level also provides varying jack height options. If ground conditions require additional clearance for the drill, operators can use the Auto Level button to increase the jack height and lift the rig higher.

Because it enables consistency in its leveling capabilities, sites utilizing the Auto Level functionality over several years can also expect to see longer life from their mast, mainframe and major structures.

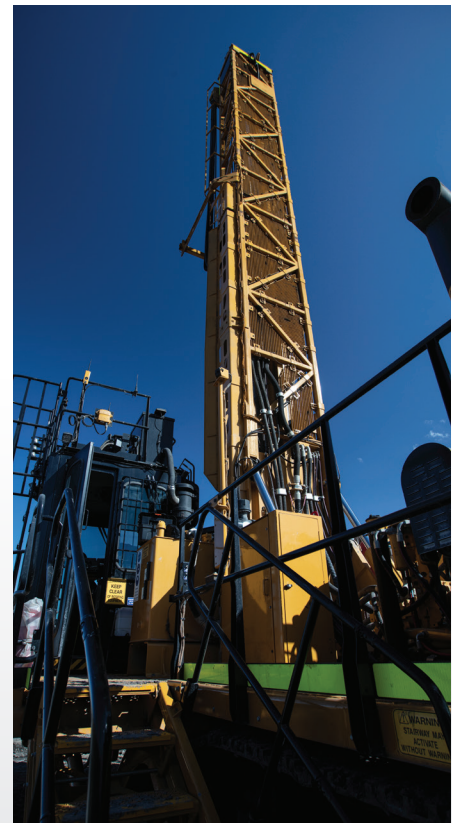
AUTO MAST (RAISE/LOWER): HELPING YOU REACH THE IDEAL ANGLE

After leveling the machine for drilling, the operator can enable the Auto Mast function, which will automatically raise the mast to a specified angle, out to 30 degrees (in 5-degree increments). The mast will lock into place; when the hole is finished, operators can enable Auto Mast to automatically unlock and lower the mast for tramping to the next hole or bench.

HOW IT WORKS

The Auto Mast feature enables fast and consistent operation for raising and lowering the mast. This includes a designed slow-down at the end of the mast movement to reduce stress and extend component life. The pins will automatically lock and unlock without requiring operator intervention.

The Auto Mast system easily handles drill patterns that require different angles for different holes. Operators can select and activate the appropriate angle at the push of a button. The machine has built-in interlocks to ensure the mast is locked in place for drilling or tramping functions, helping to protect components from accidental misuse.



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AUTO DRILL: IMPROVING DRILLING ACCURACY

The Auto Drill function enables down-the-hole (DTH) and rotary drilling without operator intervention under most geological conditions. Auto Drill improves drilling accuracy by directing the machine to drill to a specific depth and angle, helping to ensure it matches the plan. The system continuously monitors drill power to deliver the optimal penetration rate. Additionally, Auto Drill modulates through complicated ground and drilling conditions to optimize bit life and hole quality.

HOW IT WORKS

Auto Drill leverages user-defined inputs to automatically optimize and complete the drilling cycle. The functionality modulates the drill string's rotation, pulldown force and speed to adapt to ground conditions throughout the drilling cycle. Additional user-defined parameters are available to help sites further achieve their specific penetration rate, bit life, and other goals. Auto Drill can be used in single-pass or multi-pass applications.

KEY FUNCTIONALITIES

Jam Avoidance

Helps prevent the drill string from binding when the Auto Drill system detects a potential jam. If the conditions further degrade, the system will raise and lower the drill bit to clear the jam.

Vibration Compensation

Monitors the drill's vibration levels and automatically modulates the drilling cycle to maintain optimum performance or to stay within machine limits.

Water Injection Flow

Modulates the water injection flow for optimal dust control and/or hole quality. Water injection flow rates are configurable for both hole collaring and production drilling.

Automatic Collar

Helps maintain hole and wall stability when drilling through broken rock in both rotary and down-the-hole (DTH) drilling. The feature allows an operator to set a desired collaring depth; the drill string will then automatically ream the top of the hole (the collar) to minimize fallback.

Variable Air Volume Control

Allows operators to optimize drilling performance by adjusting the compressor's air output from inside the cab. This functionality optimizes consumable life while reducing fuel burn, for better total cost of ownership (TCO).

Pipe Count

Tracks the number of pipes connected to the rotary head. When multi-pass drilling, the system will automatically count pipes as they are added to the drill string, and reduce pipe count as they are re-racked in the carousel. This functionality helps Auto Drill ensure exact hole depth.

Hole Reaming

Leverages air, rotation and feed force to clear holes of any cuttings or fallback after the machine has drilled to target depth.

Automatic Hole Flooding

Helps ensure hole stability in fractured, dry ground. Sites can tailor the water flow to suit their ground conditions, configuring both:

- Flooding duration (in seconds), which sets the length of time that water will flow at the bottom of the hole after desired hole depth is reached.
- Height of flooding (in meters), which determines the height to hoist the bit while flooding before going back down to clear the hole.