12HM and 14HM series

The Joy continuous miner product line has been developed to meet the high productivity requirements of today’s underground mining industry. It provides the ideal combination of cutting power, proven components and reliability for lower to mid-seam applications in a variety of materials. Built to withstand rigorous conditions, both the 12HM and 14HM continuous miners offer optimum service life and return on investment.

Wethead cutterhead systems

The Wethead continuous miner cutterhead from Komatsu incorporates a fine water spray behind each cutting bit on the cutter drums. Acting as both a cooling and wetting agent, the water reduces the potential for frictional ignitions and reduces respirable dust levels. The sprays also provide lubrication that substantially improves bit life. The Wethead cutterhead does all this while potentially consuming less water than the standard miner dust sprays. The heart of the system is a back-to-back carbon-face water seal designed to last from rebuild to rebuild before refurbishment is necessary.

Application specific cutting

A wide variety of cutting options...

The 12HM is available in solid head or Ripperveyor models and in drum diameters ranging from 51.5 to 58 in or 1200 to 1475 mm. With this availability, the cutting system can be sized to match seam conditions. Rated cutting power as high as 764 hp (570 kW) is available within this product line.
Haulage system compatibility

The 12HM series continuous miners can be designed to match mine specific haulage systems. Different conveyor lengths and conveyor chain speeds are available to optimize the haulage system performance, whether it is batch or continuous haulage. For continuous haulage capability the conveyor can also be supplied to match up with an attached haulage system.

Traction system

VFD traction system

The Optidrive system from Komatsu provides efficient speed control from zero to maximum speed. The variable speed control provides the operator the ability to smoothly and accurately move the machine short distances when maneuvering the machine during tramming in a typical room and pillar type mining lay-out.

The Optidrive system from Komatsu also provides increased traction torque, which delivers more power and control. In addition, the cutter motor feedback, linked with the Optidrive system results in increased sump performance no matter the underground mining conditions encountered.

Bolt-on traction reducer

The bolt-on traction reducer, exclusive to the South African market, provides a full bolt-on solution, which now includes the planetary as part of the assembly. The traction reducer and planetary are pre-assembled in a clean and controlled environment. This makes the bolt-on traction reducer more maintenance friendly in a demanding mining environment.

12HM and 14HM series

The basic elements of each continuous miner are similar in design, following field-proven philosophies perfected by Komatsu over the years. Each machine employs Komatsu’s multi-motor concept with outboard access to motors, gearcases, controllers and other major components. The philosophy calls for the isolation of major components for easier troubleshooting and maintenance. The continuous miners use individual motors with direct drive transmissions to power the cutter, traction, gathering and hydraulic systems. This permits service or repair quickly and easily, thus reducing downtime and maintenance costs.

Cutting system

As the 12HM continuous miners are the largest manufactured by Komatsu, the cutting systems have been designed to match the machine mass. This series of miners is available with a chainless cutter head with drum diameters from 1118mm to 1320mm. Depending on the cutter head design, the cutting horsepower can be as much as 520kW. Through Komatsu’s experience in this market, we also realize that all applications are different and therefore, we provide a number of different cutter bit spacing configurations.

Engineered for perfection

Why high voltage...

The potential for increased machine performance is due to the decrease in percent voltage drop for a given current occurring in a trailing cable when higher voltage is induced on that cable. Since motor torque varies with the speed of the voltage, any decrease in machine voltage has a drastic affect on machine performance.

Addressing corrosion

Pin and bushing design...

Through years of mine experience and in-house testing, Komatsu is able to provide a pin and bushing design that can withstand the often corrosive environments of industrial mineral applications. This significantly extends component life, making the machine more productive.
12HM and 14HM automation

The Faceboss control platform enables operators to consistently operate at the optimal balance of production rate and cost.

Competitive and market pressures require that Komatsu’s customers produce product at an ever increasing rate and at an ever decreasing cost per ton. These objectives are made all the more challenging by the worsening attributes of available reserves and the ever deteriorating operating conditions in which machinery must operate.

Using a combination of operator assistance tools, automated sequences, advanced diagnostics, machine performance monitoring and analysis tools, the Faceboss control platform enables operators to consistently operate their Komatsu underground machinery at the optimal balance of production rate and cost.

Product optimization

The Faceboss control platform can maximize continuous miner productivity in a variety of ways:

- **Optimized cutting**
  Rate of cutting is automatically maximized during sump and shear cycles by ensuring optimal cutter loading through the control of the traction motor speed and hydraulic shear rate respectively.

- **High availability feedback**
  Control loops protect all electric motors on the continuous miner from jam and thermal overloads, ultimately extending motor life and minimizing machine downtime.

- **Automated sequences**
  Consistent operation is now possible, even while changing operators or across multiple shifts. For example, one-touch-shear automatically controls the position of the cutter boom, which ensures the floor and roof levels are properly maintained while reducing operator fatigue.

- **Maximum flexibility**
  Different operating parameters for the typical cycle cutting requirements (e.g., full pass, half pass, cross cut, etc.) can be pre-defined, and are easily and quickly selected via the continuous miner remote station to prevent unnecessary delays.

Reliability through design

All Faceboss hardware has been designed and tested specifically for underground applications. Testing at extreme temperatures and vibration levels ensures that each component can stand up to harsh conditions. Further testing to destruction in a typical condition allows Komatsu engineers to better understand the failure modes of each component in order to improve the overall design and reliability.

User friendly interface

Graphical on-board interface with intuitive screens simplifies initial machine setup. These same screens make it easy to adapt to changing mining conditions without the need to open an XP enclosure. In addition, preset tram functions can be selected from the remote to allow the operator to make the fly cutter feedback adjustments as conditions dictate. The roof and floor cutting limits used with automation sequences are conveniently adjusted via the remote.

Outby communications

With the Joy continuous miner connected to a surface computer, the Faceboss control platform enables the real-time monitoring of the machine from remote locations (Remote Machine Monitoring - RMM).

In addition to RMM, the Faceboss control platform continuously buffers and streams operating data to the surface computer. The surface computer, installed with Joy Surface Reporting Software (USRPI), interprets this data and generates value-added production reports directly following each shift and emails the report to the appropriate mine/Komatsu individuals. This feedback mechanism allows management to intervene where required to make positive change. Similarly, monthly production and engineering reports are generated and communicated to provide a higher-level interpretation of the operation.

Advanced diagnostics

The Faceboss control platform includes an on-board graphical display which includes a log of events, messages and alarms. Machine operating parameters are continuously monitored and recorded during machine operation. By using the on-board trending and graphing capability on this stored information, the root cause of machine failure can be quickly and easily determined.

For quick and easy reference, on-board service manuals are accessible through the on-board display. Supplementary to the service manual are step-by-step instructions for regular maintenance operations and help text for systematic trouble shooting.
**General Specifications**

**Joy 12HM continuous miner**

<table>
<thead>
<tr>
<th>Model</th>
<th>Cutting rate (tonnes per minute)</th>
<th>Mass (estimated)</th>
<th>Ground pressure</th>
<th>Ground clearance</th>
<th>Cutter head diameter</th>
<th>Cutting width</th>
<th>Maximum cutting height</th>
<th>Maximum cutting height</th>
<th>Height over scrubber</th>
<th>Main frame height</th>
<th>Chassis depth</th>
<th>Sump range</th>
<th>Tram speed</th>
<th>Motors (water cooled)</th>
<th>Scrubber</th>
<th>Supply voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>12HM31 - AAA</td>
<td>up to 20</td>
<td>87 tonnes</td>
<td>205 kPa</td>
<td>250 mm</td>
<td>1118 mm (44&quot;)</td>
<td>3600 mm</td>
<td>3200 mm</td>
<td>2000 mm</td>
<td>305 mm</td>
<td>1450 mm</td>
<td>305 mm (12&quot;)</td>
<td>0-75 mm/sec</td>
<td>High</td>
<td>Cutter - 2</td>
<td>140 kW</td>
<td>N/A</td>
</tr>
<tr>
<td>12HM31 - B</td>
<td>up to 20</td>
<td>105 tonnes</td>
<td>200 kPa</td>
<td>285 mm</td>
<td>1178 mm (44&quot;)</td>
<td>3600 mm</td>
<td>4620 mm</td>
<td>2400 mm</td>
<td>406 mm</td>
<td>1420 mm</td>
<td>406 mm (16&quot;)</td>
<td>0-75 mm/sec</td>
<td>Intermediate</td>
<td>Pump - 1</td>
<td>85 kW</td>
<td>N/A</td>
</tr>
<tr>
<td>12HM31 - B</td>
<td>up to 20</td>
<td>110 tonnes</td>
<td>295 kPa</td>
<td>285 mm</td>
<td>1320 mm (52&quot;)</td>
<td>3600 mm</td>
<td>4800 mm</td>
<td>2300 mm</td>
<td>406 mm</td>
<td>1420 mm</td>
<td>406 mm (16&quot;)</td>
<td>0-75 mm/sec</td>
<td>High</td>
<td>Gathering head - 2</td>
<td>45 kW</td>
<td>N/A</td>
</tr>
<tr>
<td>12HM31 - B</td>
<td>up to 20</td>
<td>113 tonnes</td>
<td>304 kPa</td>
<td>285 mm</td>
<td>1118 mm (44&quot;)</td>
<td>3600 mm</td>
<td>4800 mm</td>
<td>2300 mm</td>
<td>406 mm</td>
<td>1420 mm</td>
<td>406 mm (16&quot;)</td>
<td>0-75 mm/sec</td>
<td>Intermediate</td>
<td>Conveyor - 1</td>
<td>37 kW</td>
<td>N/A</td>
</tr>
<tr>
<td>12HM37 - A</td>
<td>up to 30</td>
<td>90 tonnes</td>
<td>230 kPa</td>
<td>250 mm</td>
<td>1320 mm (52&quot;)</td>
<td>3600 mm</td>
<td>3800 mm</td>
<td>1600 mm</td>
<td>305 mm</td>
<td>1450 mm</td>
<td>305 mm (12&quot;)</td>
<td>0-75 mm/sec</td>
<td>High</td>
<td>Traction - 2</td>
<td>60 kW</td>
<td>N/A</td>
</tr>
<tr>
<td>12HM37 - B</td>
<td>up to 30</td>
<td>130 tonnes</td>
<td>270 kPa</td>
<td>350 mm</td>
<td>1320 mm (52&quot;)</td>
<td>3600 mm</td>
<td>4500 mm</td>
<td>2400 mm</td>
<td>406 mm</td>
<td>1420 mm</td>
<td>406 mm (16&quot;)</td>
<td>0-75 mm/sec</td>
<td>High</td>
<td>Total power (excl. scrubber)</td>
<td>612 kW</td>
<td>N/A</td>
</tr>
<tr>
<td>12HM37 - C</td>
<td>up to 30</td>
<td>132 tonnes</td>
<td>270 kPa</td>
<td>350 mm</td>
<td>1320 mm (52&quot;)</td>
<td>3600 mm</td>
<td>5100 mm</td>
<td>2900 mm</td>
<td>406 mm</td>
<td>1420 mm</td>
<td>406 mm (16&quot;)</td>
<td>0-75 mm/sec</td>
<td>High</td>
<td>Scrubber</td>
<td>37 kW / 45 kW</td>
<td>N/A</td>
</tr>
</tbody>
</table>

*In South African mining conditions*
Smart Solutions are integrations of smart connected Komatsu products and systems, advanced analytics and direct services customized to solve customers’ toughest challenges.

Smart Solutions at work:

Costs
- Lower cost per unit produced by reducing overall parts and consumables expenditures
- Optimize costs for power/fuel, labor and rebuilds

Safety
- Automate processes and controls
- Increase awareness through training and standard setting

Productivity
- Improve system availability, performance, utilization and consistency
- Leverage extensive Komatsu engineering knowledge to solve problems

Komatsu service facilities have given world-class service a new home. Smart Service Centers are strategically located around the world in order to conveniently serve our customers. With each new service center built, Komatsu products and people are becoming more connected, allowing for expanded benchmarking. Located strategically in zones of mining activity, each service center brings local support that is world-class. Services offered are structured to fulfill the lifecycle of mining equipment, optimizing equipment for productivity and safety.

Our commitment to world-class service is delivered through world-class processes and metrics. Our Joy OpEx processes bring operational excellence by prioritizing the elimination of waste, simplifying processes, automating and removing people from harm’s way. We leverage those principles throughout our network, with the ability to rapidly customize locally, helping customers work smarter, worldwide.