12HM Series
Continuous Miner
Product Overview
For the industrial minerals market, Joy offers the 12HM (Heavy-duty miner) series continuous miner. Within this series is the 12HM36, the largest and most powerful drum type continuous miner manufactured. Utilizing common continuous miner components, but designed to meet specific applications, 12HM continuous miners are successfully operating in trona, gypsum, potash and salt mines around the world.

The basic elements of each continuous miner are similar in design, following field proven philosophies perfected by Joy over the years. Each machine employs Joy’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 Joy, the cutting systems have been designed to match the machine mass. This series of miners is available either with chainless 51 ½ in (1310 mm) or 53 ¾ in (1367 mm) cutter head drum diameter or with Ripperveyor cutter head drum diameter of 58 in (1475 mm). Depending on the cutter head design, the cutting horsepower can be as much as 764 HP (570 kW). Through Joy’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.

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 53.5 to 58 in or 1350 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.

Bolted Construction

Due to shaft restrictions at many industrial mineral mines, access is often limited. With this in mind, the 12HM series has been designed in several bolted configurations to allow for such restrictions. After complete assembly and testing at a Joy facility, the machine is disassembled to the required size, shipped to the mine and reassembled with technical assistance from Joy. The machines are designed to be reassembled without, or with limited, welding of components.

High Capacity Conveying System

The conveying system on the 12HM features a 38 in (965 mm) conveyor for increased production capability. In addition to the dual gathering head system, the machine is equipped with single rear conveyor drive or optional dual rear conveyor chain drive. A cam style take-up automatically provides proper conveyor chain adjustment as the conveyor swings.

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.

JOY 12HM Series Continuous Miner Product Overview

Tradition in Quality & Pride...

With over 6,000 continuous miners shipped since 1948, Joy leads the mining industry with innovations that increase productivity and improve operator safety. Patented V-FORCE™ technology is coupled to a compact all-gear transmission to provide smooth and reliable performance. Cutter motor control feedback loops and an electronic traction motor differential optimize sump performance in even the most demanding of applications. Various track frame widths are available to suit specific floor conditions and entry widths.

Total Control

The latest in VFD technology...
Technological Features

Joy continuous miners are operated via radio remote control. The ergonomically designed control station is powered from an internal battery to provide ease of use for the operator. For places where multiple machines will operate in close proximity to one another, different frequencies are available.

High Voltage Operation

The relationship between machine input voltage and mining rate has long been recognized. For this reason, the 12HM series machines have been designed to operate at 2300 volt, 60 Hz (3300 volt, 50 Hz). In addition to the potential for increased performance, high voltage operation also provides lower costs associated with component failures and the potential to use a trailing cable with a smaller conductor size as compared to a medium voltage machine.

Engineered for Perfection

Why high voltage...

Addressing Corrosion

Pin and bushing design...

The dual-sprocket chain is 50% stronger in tension than conventional chains.

All 12HM continuous miners are available with the patented JOY dual-sprocket continuous miner conveyor chain. The dual-sprocket chain is 50% stronger in tension than conventional chains and is driven by two parallel 8-tooth sprockets which provide better torsional rigidity. Combined, these features reduce the probability of abrupt chain breakage. Increased contact area between the chain and sprocket significantly decreases the amount of wear, increasing the working life of both components. The dual-sprocket conveyor chain has an even pitch and travels smoothly around the sprocket and return-roller, reducing the noise generated by up to three decibels and consequently reducing the exposure level of the typically located continuous miner operator.

Dual-Sprocket Chain Conveyor System

Dust Collector Systems

Building on years of experience on continuous miners operating in coal mines, Joy now offers flooded bed dust collector systems for use in industrial mineral applications. As industrial mineral applications typically have larger entry sizes, these dust collector systems are designed with larger airflow options. Maintenance of the system is kept to a minimum by offering large access doors and water spray flushing systems.

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12HM 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 Joy’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 JOY FACEBOSS control platform enables operators to consistently operate their JOY machinery at the optimal balance of production rate and cost.

Product Optimization

The JOY 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.

- **Maximum Flexibility** Different operating requirements (e.g., full pass, half pass, cross cut, etc.) can be pre-defined, and are easily and quickly selected via the remote.

- **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.

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 (JSRP), interprets this data and generates value-added production reports directly following each shift and emails the report to the appropriate mine/Joy 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.

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 atypical conditions allows Joy engineers to better understand the failure modes of each component in order to improve the overall design and reliability.

Advanced Diagnostics

The JOY FACEBOSS control platform includes an on-board graphical display which includes a log of events, messages and alarms. All key 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.
## JOY 12HM Continuous Miner

### General Specifications

#### JOY 12HM Series Continuous Miner Product Overview

<table>
<thead>
<tr>
<th>Specification</th>
<th>12HM27</th>
<th>12HM36</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Loading Rate</strong></td>
<td>21-38 ton/min</td>
<td>19-35 tonne/min</td>
</tr>
<tr>
<td><strong>Cutter Head Diameter (Optional)</strong></td>
<td>51 ½ in (53 ¾ in)</td>
<td>1310 mm (1367 mm)</td>
</tr>
<tr>
<td><strong>Conveyor Width</strong></td>
<td>38 in</td>
<td>965 mm</td>
</tr>
<tr>
<td><strong>Chassis Depth</strong></td>
<td>16 in</td>
<td>406 mm</td>
</tr>
<tr>
<td><strong>Chain Pitch</strong></td>
<td>3 ¾ in</td>
<td>82 mm</td>
</tr>
<tr>
<td><strong>Speed Options</strong></td>
<td>482 fpm</td>
<td>123 m/min</td>
</tr>
<tr>
<td><strong>Crawler Chain Width</strong></td>
<td>22 in</td>
<td>560 mm</td>
</tr>
<tr>
<td><strong>Cutter Drums</strong></td>
<td>2 ¼ in</td>
<td>57 mm</td>
</tr>
<tr>
<td><strong>Cutting Width</strong></td>
<td>402 fpm</td>
<td>123 m/min</td>
</tr>
<tr>
<td><strong>Ground Pressure Weight</strong></td>
<td>27.5 psi</td>
<td>190 kPa</td>
</tr>
<tr>
<td><strong>Maximum Cutting Height</strong></td>
<td>132 in</td>
<td>3350 mm</td>
</tr>
<tr>
<td><strong>Minimum Cutting Height</strong></td>
<td>62 in</td>
<td>1550 mm</td>
</tr>
<tr>
<td><strong>Basic Chassis Height</strong></td>
<td>51 in</td>
<td>1300 mm</td>
</tr>
<tr>
<td><strong>Ground Clearance</strong></td>
<td>12 in</td>
<td>305 mm</td>
</tr>
<tr>
<td><strong>Sump Range</strong></td>
<td>0-25 fpm</td>
<td>0-7.5 m/min</td>
</tr>
<tr>
<td><strong>Tram Speed</strong></td>
<td>15 fpm</td>
<td>4.6 m/min</td>
</tr>
<tr>
<td><strong>Intermediate</strong></td>
<td>30 fpm</td>
<td>9.1 m/min</td>
</tr>
<tr>
<td><strong>High</strong></td>
<td>60 fpm</td>
<td>18.3 m/min</td>
</tr>
<tr>
<td><strong>Gathering Arm Speed</strong></td>
<td>45 or 54 rpm</td>
<td>45 or 54 rpm</td>
</tr>
<tr>
<td><strong>Cutter Speed</strong></td>
<td>39 fpm</td>
<td>39 m/min</td>
</tr>
<tr>
<td><strong>Bit Tip Speed</strong></td>
<td>481 fpm</td>
<td>146.4 m/min</td>
</tr>
<tr>
<td><strong>Motors (Water Cooled)</strong></td>
<td>328 hp</td>
<td>245 kW</td>
</tr>
<tr>
<td><strong>2300 Volt, 60 Hz</strong></td>
<td>54 hp</td>
<td>40 kW</td>
</tr>
<tr>
<td><strong>Cutters - 2</strong></td>
<td>54 hp (1)</td>
<td>40 kW (1)</td>
</tr>
<tr>
<td><strong>Conveyor - 2</strong></td>
<td>67 hp</td>
<td>50 kW</td>
</tr>
<tr>
<td><strong>Gathering Head - 2</strong></td>
<td>80 hp</td>
<td>60 kW</td>
</tr>
<tr>
<td><strong>Traction - 2</strong></td>
<td>1058 hp</td>
<td>790 kW</td>
</tr>
<tr>
<td><strong>Total Power</strong></td>
<td>3300/1050 Volt, 50 Hz</td>
<td></td>
</tr>
<tr>
<td><strong>Cutters - 2</strong></td>
<td>349 hp</td>
<td>260 kW</td>
</tr>
<tr>
<td><strong>Conveyor - 2</strong></td>
<td>54 hp</td>
<td>40 kW</td>
</tr>
<tr>
<td><strong>Gathering Head - 2</strong></td>
<td>50 hp (1)</td>
<td>37 kW (1)</td>
</tr>
<tr>
<td><strong>Traction - 2</strong></td>
<td>80 hp</td>
<td>60 kW</td>
</tr>
<tr>
<td><strong>Total Power</strong></td>
<td>1082 hp</td>
<td>807 kW</td>
</tr>
</tbody>
</table>
Bit Lacing

With JOY drums, you are getting more than quality and workmanship. You are also getting expertise. Our cutting specialists have many years of experience. We apply that experience to be sure you get the best drum, bit holders, and bit lacing for your specific application. If the optimum bit lacing does not already exist, it will be designed – even for one machine.

Careful attention is paid to even the finest nuances of bit positions and angles – and that attention pays off in smoother, faster cutting, longer lasting drums, and reduced dust and fines. Computer analysis of bit lacing patterns minimizes vibrations and optimizes cutting. We constantly monitor drums returned for rebuilding, looking at wear patterns and determining what we can improve. Our specialists make frequent underground visits to fully understand customers’ requirements. We provide a rock testing service to further determine the best lacing for the customers’ needs.

Engineered for Optimal Performance

At Joy, we know that the performance of our continuous miners and longwall shearers depends on the drums. JOY drums are manufactured using our own patented design three-axis digital lacing machine to ensure precise bit locations and angles. The bit positions for each drum are digitally recorded for traceability.

CNC burning equipment ensures close fit of pedestals to drum with no gaps. Careful control of welding sequence and preheat results in maximum weld quality and minimum distortion. Our in-house staff of metallurgists and welding engineers are constantly monitoring and improving the process.

Final machining of drum bores is accomplished with state-of-the-art CNC turning centers to ensure a precise fit to your JOY continuous miner.

Proven JOY bit holders

Much imitated but never equaled...

For 12HM miners, Joy offers a choice of two bit holders. Both are made of high-alloy steel forgings, machined and heat treated in our ISO 9001 facility. The bores of both the bit holder and the replaceable sleeve are induction hardened for maximum life. The patented stepped-press-fit design provides reliable sleeve retention, and tools are available for sleeve changing.

Smart Services

JOY Smart Services combines all of JOY’s value-added offerings into one package, under one roof as an integrated solution to our customers. The facilities and services feature technological advancements in processes/system optimization with 24-hour support.*

Our service strategies are delivering responsive and competitive service solutions, meeting the needs of our customers and driving unprecedented value in our customers’ operations. At the core of JOY’s Smart Services vision is our Performance Life Cycle Management (PLCM) strategy, which brings together all of the innovative people, services and products that Joy has to offer.*

Performance Life Cycle Management focuses these services, to align with our customers’ needs, cultivating a zero harm mentality and delivering the highest productivity at the lowest cost per ton, from the time you receive your new equipment for the entire life cycle of the equipment.

• Application Optimization
• 24/7 Product Support
• Health Management
• Performance Life Cycle Management
• Advanced Technical Training
• Technology Products
• Genuine Service Products
• Reliability
• Asset Revitalization & Rebuilds
• 24/7 Parts & Logistics
• Interactive Information Delivery

Health Management - State of the art predictive software analyzes the data streamed from your machines. The software predicts malfunctions, failures or process gaps at the earliest instance.

*All services are not yet available in all regions of the world.
All Joy Global products and services are sold subject to Joy's standard terms and conditions of sale, including its limited warranty. These will be furnished upon request. The company reserves the right to alter or improve the design or construction of its machinery as described herein and to furnish it, when so altered, without reference to the illustrations or descriptions in this bulletin.

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