

**JOYGLOBAL**

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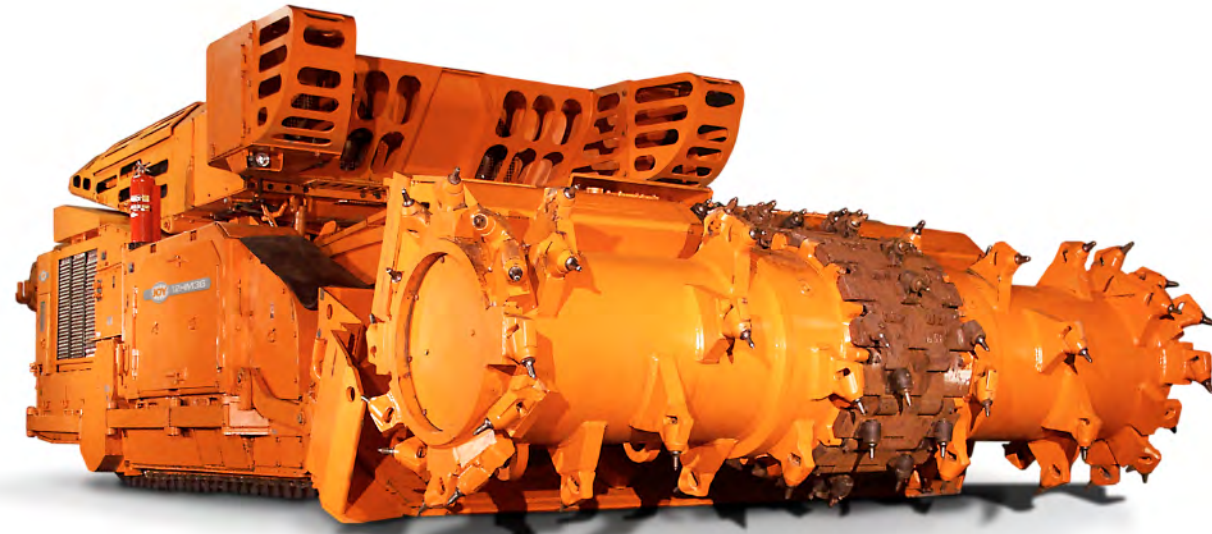


# 12HM Series

## Continuous Miner

### Product Overview





## 12HM Series

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 1/2 in (1310 mm) or 53 3/4 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 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.



### SMARTZONE PROXIMITY SYSTEM

The JOY SMARTZONE PROXIMITY SYSTEM is an integrated training device that helps teach personnel to operate a continuous miner from safe working zones, and to otherwise stay clear of danger zones. Its unique ability to track, recognize and log operator movement around the machine provides an additional layer of analysis for in depth training initiatives. The SMARTZONE PROXIMITY SYSTEM option is currently available on all continuous miner models.

### 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.

### Total Control

*The latest in VFD technology...*

Today's 12HM traction system builds on years of field-tested performance to offer even more durability and continuous miner maneuverability. Patented OPTIDRIVE AC electronics are coupled to a compact all-gear transmission to provide smooth and reliable performance. Cutter motor feedback control 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.



## Joy History

*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. Innovations such as air scrubbers, Wethead cutterhead drums, AC traction motors, noise reducing conveyor systems, and hydraulics manifolds are just a few examples. All are industry firsts from Joy Mining Machinery, the world leader in underground mining innovations.





## 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.

### 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 effect on motor performance.



### 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.



### Dual-Sprocket Chain Conveyor System

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.

### 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.

### Addressing Corrosion

*Pin and bushing design...*

Through years of mine experience and in-house testing, Joy 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 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.

### 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.

### Multilingual Display

On a Standard Control Platform...

The JOY FACEBOSS control platform can be configured to display a variety of languages. In combination with local field personnel, this multilingual control platform helps JOY equipment to achieve the goal of operating at the lowest cost per ton, regardless of where the equipment is located.

This platform is standard across all JOY equipment, reducing inventory to support a typical fleet. Common practices reduce training burdens and overall knowledge required for electrical maintenance personnel. This enables maintenance and trouble-shooting performance to rise to a more productive level.



### 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.

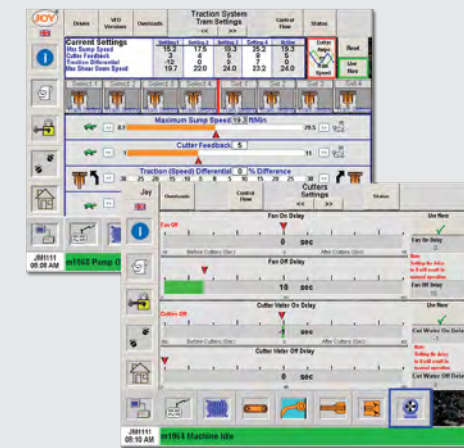
### Advanced Diagnostics

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.

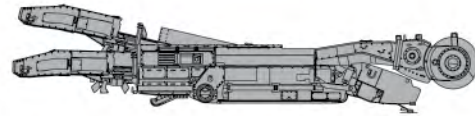
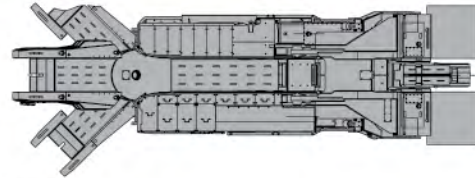
For quick and easy reference, on-board service manuals are accessible through the on-board display. Supplementary to the service manual are step-by-step instructions for regular maintenance operations and help text for systematic trouble shooting.

### User Friendly Interface Machine Setup/Configuration...

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 on the fly cutter feedback adjustments as conditions dictate. The roof and floor cutting limits used with automation sequences are conveniently adjusted via the remote.



# JOY 12HM Continuous Miner



		12HM27		12HM36	
Loading Rate		21-38 ton/min	19-35 tonne/min	21-38 ton/min	19-35 tonne/min
Cutter Head Diameter (Optional)		51 ½ in (53 ¾ in)	1310 mm (1367 mm)	58 in	1473 mm
Conveyor	Width	38 in	965 mm	38 in	965 mm
	Chassis Depth	16 in	406 mm	16 in	406 mm
	Chain Pitch	3 ¼ in	82 mm	3 ¼ in	82 mm
	Speed Options	402 fpm 480 fpm	123 m/min 147 m/min	402 fpm 480 fpm	123 m/min 147 m/min
Crawler Chain	Width	22 in	560 mm	22 in	560 mm
	Pitch	7 ¼ in	184 mm	7 ¼ in	184 mm
Cutter Drums	JOY Bit Blocks, Spacing	2 ¼ in	57 mm	2 ¼ in	57 mm
Cutting Width		13 ft 6 in	4115 mm	13 ft 6 in	4115 mm
Ground Pressure		27.5 psi	190 kPa	32.0 psi	220 kPa
Weight		180,000 lbs	82 kg	210,000 lbs	95 kg
Maximum Cutting Height		132 in	3350 mm	182 in	4615 mm
Minimum Cutting Height		62 in	1550 mm	82 in	2095 mm
Basic Chassis Height		51 in	1300 mm	60 in	1524 mm
Ground Clearance		12 in	305 mm	12 in	305 mm
Sump Range		0-25 fpm	0-7.5 m/min	0-25 fpm	0-7.6 m/min
Tram Speed	Slow	15 fpm	4.6 m/min	15 fpm	4.6 m/min
	Intermediate	30 fpm	9.1 m/min	30 fpm	9.1 m/min
	High	60 fpm	18.3 m/min	55 fpm	16.8 m/min
Gathering Arm Speed		45 or 54 rpm	45 or 54 rpm	45 or 54 rpm	45 or 54 rpm
Cutter Speed		39 fpm	39 m/min	42 fpm	42 m/min
Bit Tip Speed		481 fpm	146.4 m/min	626 fpm	190.8 m/min
Motors (Water Cooled)					
2300 Volt, 60 Hz					
Cutter - 2		328 hp	245 kW	335 hp	250 kW
Pump - 1		54 hp	40 kW	54 hp	40 kW
Conveyor - 2		54 hp (1)	40 kW (1)	54 hp	40 kW
Gathering Head - 2		67 hp	50 kW	67 hp	50 kW
Traction - 2		80 hp	60 kW	80 hp	60 kW
Total Power		1058 hp	790 kW	1126 hp	840 kW
3300/1050 Volt, 50 Hz					
Cutter - 2		349 hp	260 kW	382 hp	285 kW
Pump - 1		54 hp	40 kW	54 hp	40 kW
Conveyor - 2		50 hp (1)	37 kW (1)	50 hp	37 kW
Gathering Head - 2		60 hp	45 kW	60 hp	45 kW
Traction - 2		80 hp	60 kW	80 hp	60 kW
Total Power		1082 hp	807 kW	1198 hp	894 kW



## 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.

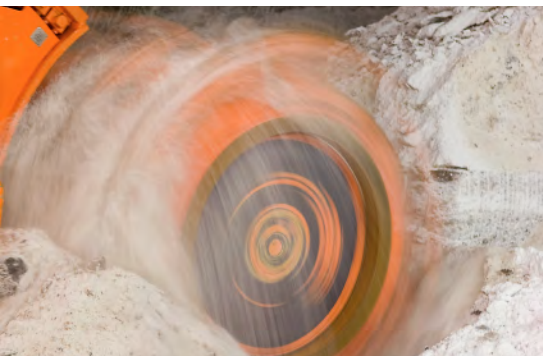
Careful attention is paid to even the finest nuances of bit positions and angles – and that attention pays off in smoother, faster cutting, longer lasting drums, and reduced dust and fines. Computer analysis of bit lacing patterns minimizes vibrations and optimizes cutting. We constantly monitor drums 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.

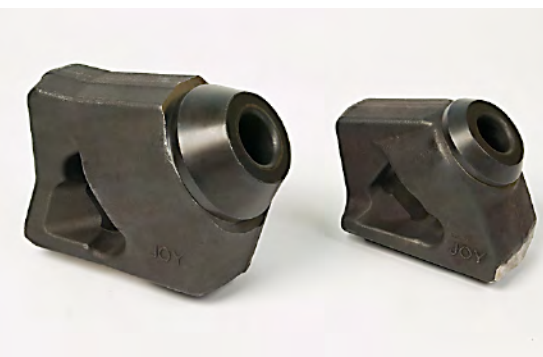
CNC burning equipment ensures close fit of pedestals to drum with no gaps. Careful control of welding sequence and preheat results in maximum weld quality and minimum distortion. Our in-house staff of metallurgists and welding engineers are constantly monitoring and improving the process.

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 equalled...*



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,

Joy Global service facilities have given world class service a new home.

prognostics, remote health monitoring, reliability and asset management, advanced training and integration of mining

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.



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.

- **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**



**JOYGLOBAL**



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