

# KOMATSU



## Crushing and Conveying Systems Product Overview



**Who we are:**

Since 1921, Komatsu has stood for unrivaled quality and reliability. Our enduring global success stems from the principles of our founder, Meitaro Takeuchi, who envisioned a sustainable future built through globalization, quality first, technology innovation and talent development. These defining principles, along with an emphasis on safety and compliance, remain part of our Komatsu DNA. With each brand and company added to the Komatsu family, we expand our capabilities, leveraging our global teams to push beyond what can be done and create what can be imagined. We believe partnering directly with our stakeholders and being in the workplace (gemba) is the best way to gain insight into their challenges, win their trust and develop cutting-edge solutions.

**What we do:**

Komatsu is an indispensable partner to the mining, forestry, industrial and construction industries that maximizes value for customers through innovative solutions. With a full line of products supported by our advanced IoT technologies and global service network, we help customers safely and sustainably optimize their operations. Our **Komatsu, P&H, Joy** and **Montabert** equipment and services are used to extract fundamental minerals and develop modern infrastructure.

Single-source supply of crushing and conveying equipment from Komatsu provides an integrated system for maximum availability and productivity.

A material handling system, simple or complex, will perform only as well as its component parts, the engineering that went into its design, and its installation. At Komatsu, we strive to make sure that all of our products work together at the highest levels.



Our line of feeder-breakers, reclaim feeders and MVT-II models properly size and feed material as designed and are an integral part of your overall material handling system. Working in conjunction with the belt conveyor system design, we are able to provide efficient, flexible sizing and surge capability.

Komatsu can custom design and build a crushing and conveying system for your specific material handling requirements.



**Proven conveyor performance**

The drive section is one of the most important terminal components in a conveyor system. It should be carefully selected to ensure that the arrangement is suited to the application. There are three basic types: single pulley, adjustable boom and remote drive.

The single pulley type drive is available for low horsepower conveyors. The adjustable boom type drive is highly portable and can be furnished as a head drive or a tandem pulley skid configuration.

The remote drive is most frequently used on permanent installations. It is available with single, dual, triple, or quadruple drive trains. It is also available with tandem drive pulleys or with our four pulley arrangement.

Each specification is designed and furnished to your requirements utilizing the most modern and up-to-date methods available. We have been the leader in high tension conveyor terminals for many years and have designed conveyors with up to 10,000 connected horsepower.

Properly designed terminal equipment is at the heart of any conveyor system. The correct application is key to a conveyor's performance and productivity.

**Drive options**

Proper drive selection varies depending on many factors including the operating environment, maintenance expertise (hydraulic vs. electrical), overall horsepower requirements, and the investment required to make the system perform at the highest level. The goal when selecting a particular drive option is to provide a conveyor powering system that is controllable and friendly to the system from a starting and load sharing standpoint, thereby protecting the conveyor belt and the many components that make up the conveyor system. Too much stress on either can result in extended downtime and lost production. A system that allows a repeatable, linear time ramp during start-up and can balance load distribution during operation (regardless of load) offers the most protection for your conveyor system.

In today's market, four of these systems have emerged as the best available options: controlled clutch slip system, controlled fill fluid coupling, low-voltage VFD control system, and medium-voltage VFD control system. Each has its advantages and disadvantages. We can supply all of these systems in addition to other drive options. We continually work with our customers to determine which system best fits their particular requirements.

A Komatsu representative can assist you in determining the best technology for your application and provide unparalleled expertise in the selection of conveyor components or assist you with complete system design.



**Service and support**

At Komatsu, we strive to make sure that all of our products work together and perform at the highest levels. We are committed to supplying technologically advanced equipment backed by a dedication to service.



## Hydraulic take-ups

Any conveyor system is only as productive as its take-up. Joy hydraulic cylinder take-up sections are designed to pull slack out of the belt for a smooth conveyor start, regardless of the loading conditions. Our take-up sections are designed to withstand rigorous conditions with minimum downtime. Joy take-up sections are available in standard arrangements ranging from 10' to 40' of travel.



## Gravity take-ups

Gravity take-ups utilize a counter-weight to achieve proper belt tension. This type of take-up offers an economical, simple and predictable option for taking slack out of the belt and is a suitable option for many belt conveyor applications. Gravity take-ups are limited in their ability to achieve the desired belt tension in some complicated systems with dynamic starting/stopping and/or loading conditions. A representative can assist you in proper design for your specific application.



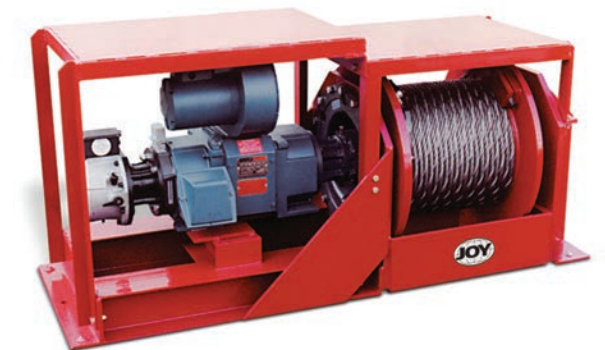
## All-electric constant tension winches

Constant tension winches are an alternative to the traditional sheaved cylinder take-up designs. Greater line pull and longer travel are the main advantages of the winch design. Our first generation constant tension winch employed a hydraulic power system. In the fall of 1995, we revolutionized the high-tension take-up market with the introduction of an All-Electric constant tension winch. This revolutionary technology enabled us to furnish a take-up system without sheaves and hydraulic systems. With line pull ranging from 25,000 lbf - 150,000 lbf, the Joy constant tension winch take-up is capable of providing belt tensioning requirements on lengthy, high-tension applications.



## All-electric Pony winch

The all-electric Pony winch is a compact version of the full-size winch noted above and is designed to maintain belt tension at a constant level. Pony winches allow digital control and are available in 30, 40 and 50 horsepower configurations that are designed for systems that do not require extremely high take-up tensions. Pony winches provide self control capabilities and easy-to-use screen-based data feedback.



## Belt turnovers

Belt turnovers are designed to minimize material buildup and spillage on the return side of your conveyor system. By turning your conveyor belt over and allowing the clean side of your belt to contact the return rolls, material clean-up on return rolls is minimized allowing for a more efficient operating conveyor system and environmentally friendly operation.



## Tripper booster drives



Tripper booster drives provide smooth start-up and shutdown operations with full tension control on extremely long single-flight conveyors. Tripper booster drive systems are able to respond to varying load conditions while maintaining a stable operating system.

These drives can have a significant impact on reducing downtime and improving productivity on many operating conveyor systems.

## Engineered transfer systems

Our engineered transfer systems include a discharge section, loading section and custom designed transfer chute that are all engineered and designed as one piece to help eliminate spillage problems at the point of transfer.



## Loading sections



Loading sections are designed to withstand the abusive conditions encountered in conveyor loading. Loading sections of varying heights are available to fit your particular requirements. Units are available with solid type pulley, lagged solid pulley, wing type pulley and spiral type self-cleaning pulley arrangements.

Loading sections are available with hinged deck plates to help maintain both skirt rubber and idlers. Designs incorporating either rubber disc impact idlers, steel roll idlers or impact beds are available.

## Hydraulic power units

The Joy hydraulic take-up power unit provides an accurate, reliable system for proper tensioning of your belt system. Improper tensions, whether high or low, are severely damaging to the belt and components such as pulleys, shafts and bearings. A system of pressure sensing switches provides constant monitoring of the hydraulic circuit. A low pressure switch starts the hydraulic pump when a minimum safe operating level is reached. A high pressure switch stops pump action when the maximum level is attained. This system provides an intermittent operating motor and pump as opposed to a continuous system, resulting in greatly reduced maintenance problems. All units are factory set and tested based on your tension requirements.



All hydraulic unit components, including the accumulator, are integrally mounted on a common welded steel kid type base. The unit is designed to be compatible with either water-in-oil type fire resistant fluids or standard hydraulic fluid. Immersion heating element and control circuits are available for cold climate operations in 25, 40, 60, 100, and 125 horsepower units.

## Controllers provided by Komatsu

Komatsu has long been the industry leader with its Smartveyor technology. This technology is possible through the use of our PLC control systems. With controllers for head and tripper drives, the overall conveyor control package is capable of handling the most complex conveyor systems. With tried and proven start packages, including DC, VFD, and active coupling, our systems are capable of giving start times in excess of 120 seconds and optimal load sharing between head and multiple tripper drives. Whether you have a short stacker belt or a long single-flight overland conveyor, we can provide a custom-designed control system to meet your conveying needs.



## Feeder-breakers

The feeder-breaker is an integral part of a material handling system providing efficient, flexible sizing and surge capability. An integrated crushing and conveying system allows equipment to operate at maximum efficiency and productivity.



### Summary

The Joy feeder-breaker is designed to reduce your operating costs and increase your productivity. Joy feeder-breakers can be designed for a variety of mining and industrial applications, including coal, phosphate, cement, limestone, petroleum coke and gypsum board, among other materials. By custom-designing and building the feeder-breaker for your specific haulage and conveyor systems, your operation will realize optimum availability and reliability.

When compared to conventional primary crushers, Joy feeder-breakers offer:

- Lower initial cost
- Easier installation because site excavation and concrete work are reduced or eliminated
- Higher throughput per horsepower
- Lower power consumption
- Fewer fines because the material is fractured rather than crushed
- Larger lumps of material handled routinely
- Lower profile:
  - Most haulage equipment can discharge directly into the feeder hopper
  - No need for ramps or costly elevating and discharge conveyors

The Joy feeder-breaker performs three important functions:

- **Surge capacity** – A surge hopper at the intake end of the feeder-breaker allows trucks or other haulage equipment to discharge material at the maximum rate
- **Size reduction** – A powerful rotary pick breaker reduces material to a consistent size easily handled by conveyor belts and secondary crushing operations
- **Rationing/feeding** – As the product moves through the feeder-breaker, the material flow is discharged onto the conveyor at a steady rate the belt can accept, virtually eliminating spillage, reducing wear and significantly increasing belt life



A powerful rotary pick breaker reduces material to a consistent size easily handled by conveyor belts and secondary crushing operations. The carbide-tipped picks on the breaker shafts are designed to interlace with solid steel alloy flights to maintain a consistent product size.

### Benefits

- Joy feeder-breakers feature a low, horizontal profile that operates without eccentric motion to provide the lowest height truck dump installation of any crusher arrangement available
- For maximum space efficiency, each feeder-breaker features an integral surge hopper, a flight conveyor, and a rotary pick breaker
- Specific material output size is achieved by breaker picks and a pick pattern designed to work with conveyor flights
- High-strength engineered conveyor chain, with hardened link pins, is specially manufactured for long life, low maintenance and superior dependability
- Breaker drives are electro-mechanically direct driven
- Optional crawler, wheel or skid mounting provides mobility to help reduce haulage cycle time and increase productivity



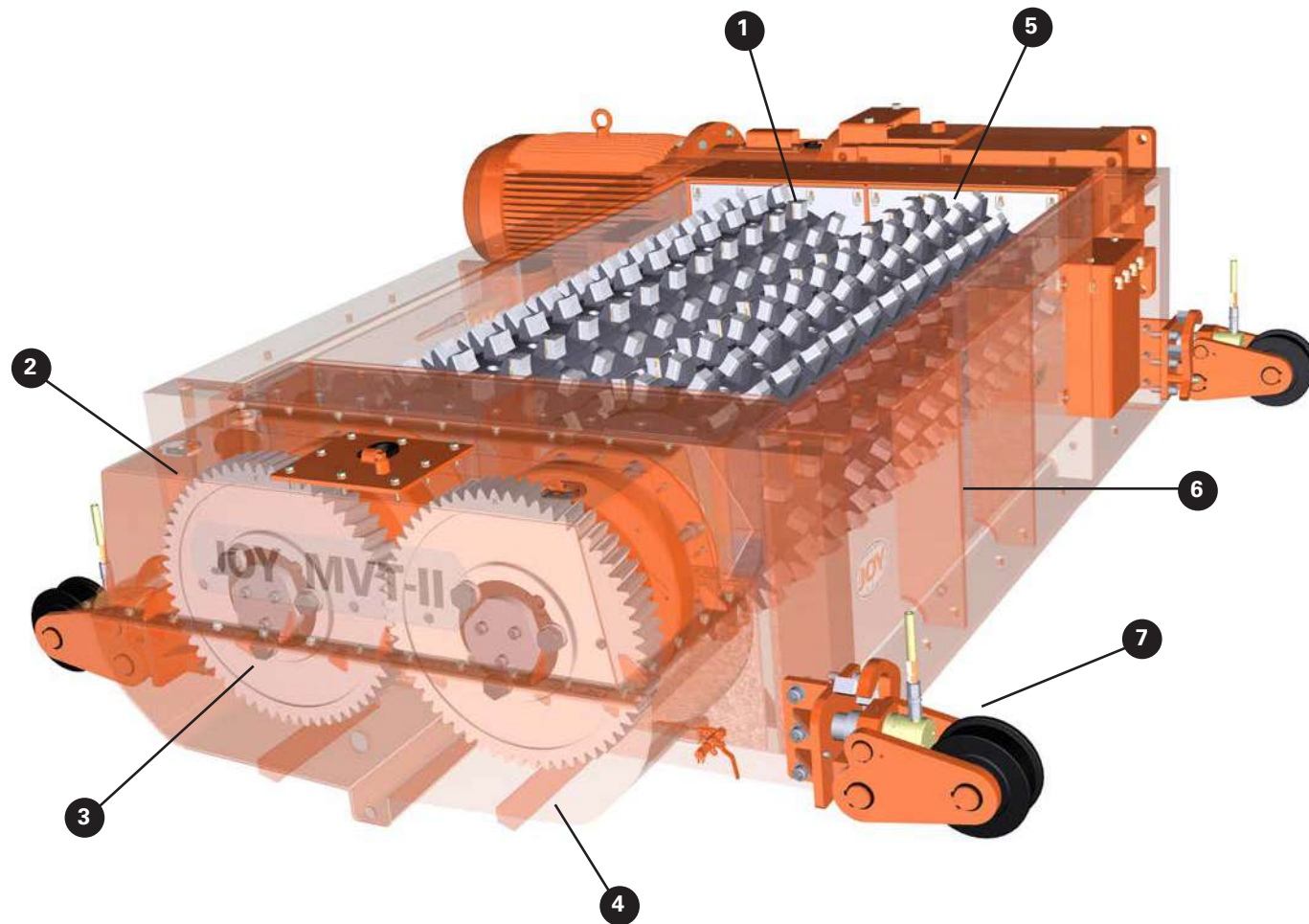
Crawler-mounted feeder-breakers provide mobility to help reduce haulage cycle time and increase productivity. Optional radio remote control operation allows increased visibility when tramping the machine into position.

## MVT-II sizer

### Features and benefits

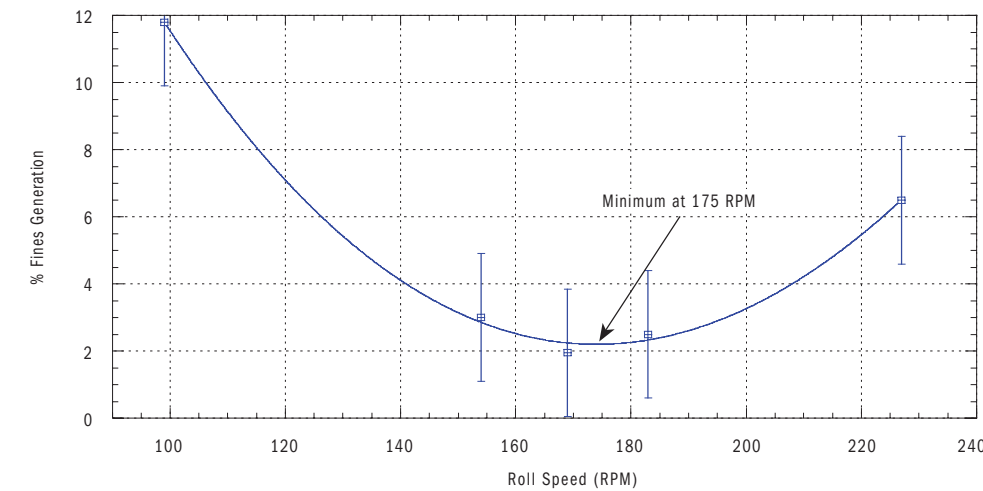
- Segmented roll design - only the worn segments need to be replaced
- Roll gap can be adjusted to optimize productivity
- Welded frame construction
- Self-cleaning, timed impact teeth optimize throughput by allowing sized material to pass through unimpeded

The MVT-II is a secondary and tertiary sizer that reduces fines generation through Matched Velocity Technology, while optimizing throughput capacity. Roll speeds are set to match the speed of incoming material, reducing excess fines created with other designs.



1. One piece solid roll shaft
2. All timing gears are oil lubricated
3. Helical gears for greater power transmission and quieter operation
4. Timing gears are totally enclosed and operate in a sealed lubricant bath
5. Replaceable bolt-on roll segments
6. Welded frame construction
7. Unit is wheel mounted utilizing hydraulic jacks to position sizer for maintenance. Upon disconnect from adjacent chutework, the MVT-II sizer can be raised and rolled into an easily accessible location.

Independent research indicated fines reduction using Matched Velocity Technology. For this test, fines were defined as a product size < 4 mm.



Roll speed, which varies for each application, is set to match the velocity of material falling through the sizer. Optimum roll speed for the research was 175 rpm. As the roll speeds decreased below or increased above the optimum application speed, fines generation rapidly increased.

### Assumptions

- Coal @ .9 tonne/m<sup>3</sup>
- 50 Hz, 1430 RPM motor
- 3:1 crushing ratio
- Coal, no impurities
- Expected nominal capacities shown

### MVT-II 600

Roll centers (mm)	600	Capacity MTPH	Roll length (mm)			
			1000	1500	2000	2500
Product Size -25	143 RPM	146	219	292	365	
	227 RPM	226	339	452	565	
Product Size -38	143 RPM	221	331	440	551	
	227 RPM	343	514	685	856	
Product Size -50	143 RPM	291	436	581	727	
	227 RPM	462	693	924	1155	
Product Size -65	143 RPM	378	567	756	945	
	227 RPM	600	900	1200	1500	

### MVT-II 800

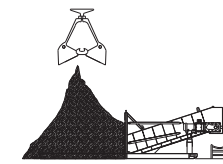
Roll centers (mm)	800	Capacity MTPH	Roll length (mm)			
			1500	2000	2500	3000
Product Size -50	143 RPM	582	776	970	1164	
	227 RPM	924	1232	1540	1848	
Product Size -65	143 RPM	756	1008	1260	1512	
	227 RPM	1201	1601	2001	2402	
Product Size -80	143 RPM	932	1242	1553	1864	
	227 RPM	1479	1972	2465	2958	
Product Size -100	143 RPM	1164	1552	1940	2328	
	227 RPM	1848	2464	3080	3696	

Contact your local Komatsu representative for assistance with equipment selection.

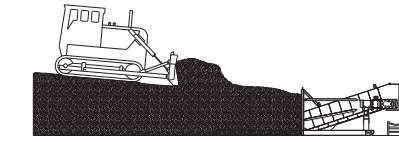
## Reclaim feeders



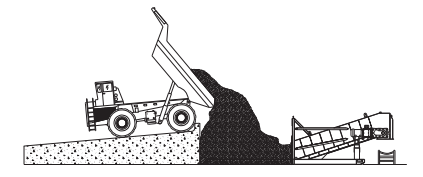
## A variety of loading options are available



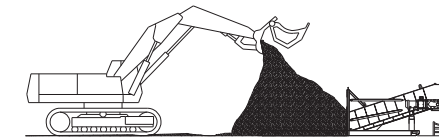
Clam shell bucket



Dozer



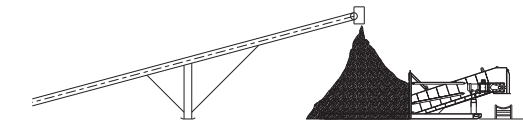
Dump truck



Excavator



Front end loader



Stacking conveyor



Multiple reclaim feeder units can feed a single conveyor allowing for material blending and increased tonnage.

The Joy reclaim feeder is an efficient and cost-effective mechanism for blending materials, reclaiming stockpiles and feeding material. Design features reduce or eliminate costly civil work and site preparation. Reclaim feeders currently operate in various applications including, synthetic fuel plants, power plant facilities, synthetic gypsum plants, truck load-out facilities, port load-out facilities, and coal mining operations.

Joy reclaim feeders are available with either electro-mechanical or hydraulic conveyor drives. Rotary pick breakers for stockpile applications requiring size reduction are available. Mobility options include skids, wheel or crawler mounting.

### Benefits

- In-ground hoppers, grids, tunnels and underground belt systems are no longer needed
- Requires only solid, level ground conditions for installation
- Material forms its own surge hopper, eliminating expensive fabricated upper hoppers and structures
- Hopperless design allows material to be pushed by dozers or vertically discharged from front-end loaders, trucks, clam shell buckets and excavators directly onto the integral drag conveyor
- Rugged machine frame design for dependable performance and availability
- Multiple stockpiles can be reclaimed and blended onto a central conveyor belt by utilizing several reclaim feeders feeding from these stockpiles at varying rates
- When utilizing an electro-mechanically driven conveyor powered by a variable frequency drive, a variable throughput unit can be supplied with no need for external power units or hydraulic piping
- Material size reduction and stockpile reclamation can be accomplished in a single unit



Working in combination, the Joy reclaim feeder, properly designed discharge chute and properly designed belt conveyor system work together as one unit.

## The advantages of properly designed Joy reclaim feeders and Joy conveyor equipment as an integrated system

- Ability to blend materials – Facilities that need to blend materials can benefit from the combination of reclaim feeders and conveyors. When properly designed, multiple reclaim feeders can feed a variety of materials to a single conveyor system.
- Multiple reclaim feeder units for maximum system capacity – Reclaim feeders are typically limited to around 4,000 tph. Multiple reclaim feeder units can feed a single conveyor to increase overall capacity.
- Broad range of total material handling system capacity – A single reclaim feeder can feed the belt conveyor. Additional units can be added to feed a single belt conveyor if the conveyor system design allows for additional capacity. Planning for the maximum capacity for a conveyor system is a key component to having flexibility in tonnage rates.

## HAC system High angle, high volume productivity

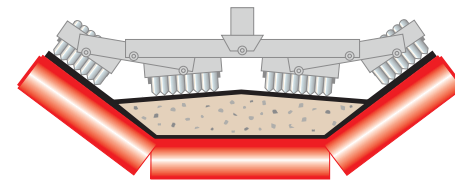
### Proven in a wide variety of applications

Since the early 1980's, the HAC system has proven itself to be a versatile and money saving method for elevating or lowering materials continuously from one level to another at extremely steep angles.

Over the years, the HAC system has been successfully used in a variety of commercial applications, conveying a wide range of materials. These have included coal, tunnel muck, gravel, wood chips, copper ore, gypsum, slag, excavated silts, sands, clay, grains, refuse and municipal sludge, among other materials.

The HAC system has taken the sandwich-belt concept, and turned it into a highly reliable materials handling workhorse – the result of specific engineering breakthroughs. One of the secrets to the high performance capabilities of the HAC system technology is its use of pressing components. The fully-equalized pressing mechanism secures material toward the center of the belt while gently, but effectively, sealing the belt edges together. The HAC system holds the conveyed material continually — eliminating relative movement between material and belts.

It does not confront materials, rather it conforms to surface shapes without incurring high local forces. Soft, gentle pressure results in the preservation of product quality and longer life for the equipment.



During operation conveyed material is sealed between the carrying and cover belts. This decreases the potential for spillage along the conveyor length.

### The advantage of standard conveyor idlers and rolls

The use of standard conveyor idlers and rolls in the HAC system means replacement of these components is quick and easy. HAC systems in place around the world have demonstrated high availability and low maintenance costs.

The HAC system is adaptable to multi-module sections using self-contained units, as well as single-run systems. In both cases the conveyor unit may be shortened or lengthened or the conveying angle may be altered according to the requirements of a new location. HAC systems may be mounted on rails, rubber tired or crawler type transporters.

Standard, smooth surface belts allow continuous cleaning by belt scrapers or plows. This is especially important in handling wet and sticky material.

### Versatile, adaptable and economical

The HAC system is a proven option for a variety of steep angle applications. Contact us for your specific application.



One of the secrets to the high performance capabilities of the HAC system technology is its use of pressing components.



The HAC system is a proven method for conveying materials vertically from tunnelling operations to the surface.



## Smart Material Handling

Smart Material Handling solutions are available for your specific application to increase truck utilization and efficiency, while maintaining material handling flexibility.

HAC systems accept properly sized material from primary crushers or feeder-breakers. Joy feeder-breakers offer improved mobility, increased flexibility and reduced material handling costs.

When compared to other crushing solutions, Joy feeder-breakers offer:

- Lower equipment cost
- Lower installation and relocation cost because the low profile and earthworks hoppers reduce or eliminate civil works
- Lower power consumption
- The ability to easily handle typical run-of-mine material
- Mobility options are available



Joy feeder-breakers and sizers are utilized to process material in the pit.

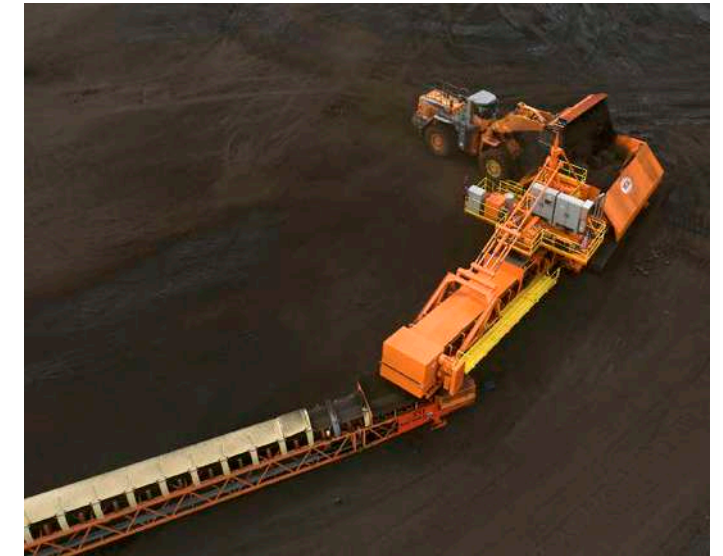


HAC systems elevate material from the pit on to overland conveyors for processing. A HAC system can convey material at very steep angles, high lifts and capacities over 8,000 MTPH, saving up to 50% in material handling costs.

In-pit mobile feeder-breakers allow the primary loading and sizing point to move as close as possible to the actual mining of material. This Smart Material Handling solution offers flexibility, improved production and lower material handling costs by reducing equipment travel time and distance.

Joy feeder-breakers form the essential connection between mobile equipment and belt conveyors: accepting material from the mobile haulage process at its maximum rate, feeding it into the breaker in a controlled manner and metering the material flow onto the belt conveyor at an optimal rate.

Smart Material Handling solutions are available for new as well as maturing mines where the mining process has moved farther away from the processing plant. Contact us today for your specific application.





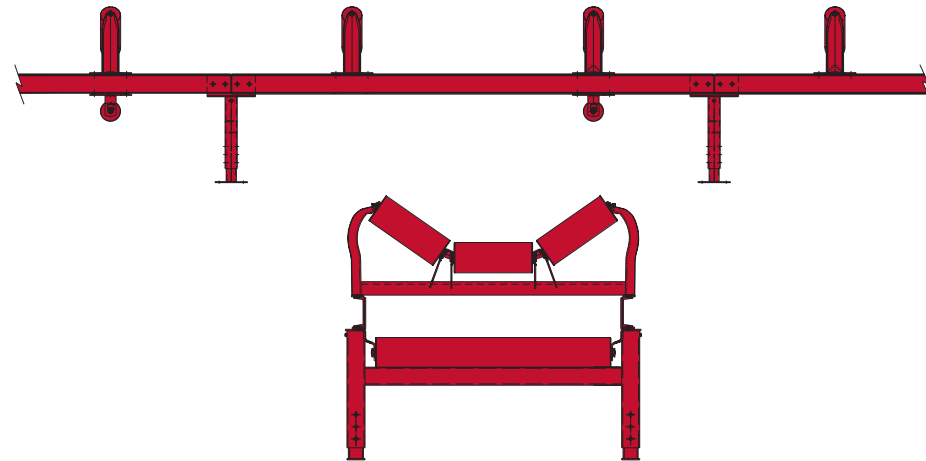
Komatsu offers a variety of idlers for CEMA C, D, E and F applications. Additional conveyor components are available to solve some of the industry's toughest material handling challenges.

## Typical structure arrangements

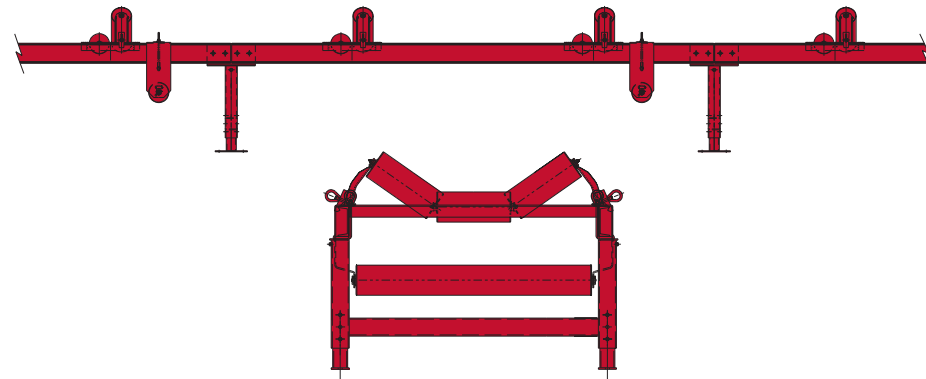
### Mine-duty rigid

Overland conveyor systems are utilized to economically move bulk materials over long distances. Today's overland systems are able to negotiate varied terrain and both horizontal and vertical curves. This makes them a viable option for many materials handling applications when compared to other methods.

Overland structure often provides significant economies in site preparation, costly supporting steel work and installation.



Mine-duty rigid structure with in-line idlers uses a bolted structural channel side-member support designed to withstand abusive environments encountered in many applications.

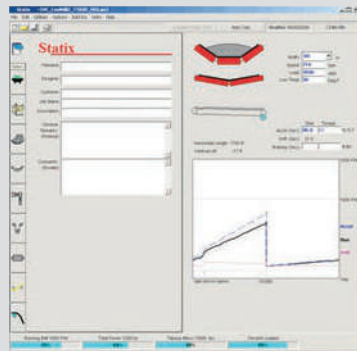


Mine-duty rigid structure with off-set idlers uses a boltless structural channel side-member support designed to withstand abusive environments encountered in many applications.

## Engineering expertise

### Conveyor system simulation software...

Successful conveyor system installations start with proper engineering. Komatsu utilizes proprietary conveyor simulation software to model system behavior under a wide range of loading conditions before your conveyor is installed.



Along with computer modeling, Komatsu draws on decades of design experience to provide highly efficient and reliable conveyor systems.

## Impact bed

The Joy impact bed assembly extends belt life and reduces downtime by supporting the conveyor belt and cushioning it against the shock of heavy loads and impact. Its modular design allows multiple units to be closely fitted to form the bed length needed.



Impact bed assembly with impact center roll



Impact bed assembly

## Slide Seal

The Joy slide seal assembly is a simple and cost effective way to provide continuous support of your conveyor belt against the skirting material, resulting in a positive seal. By utilizing two standard troughing idler frames with center rolls and UHMW/steel support bars with support mounting brackets, this unit will provide a positive seal in your loading area with reduced belt drag. For impact loading, refer to Impact Bed assembly.



Slide seal assembly

Contact your Komatsu Mining service representative for more information on Crushing and Conveying systems or visit [mining.komatsu](http://mining.komatsu)

## Komatsu Mining Corp. Group

<https://mining.komatsu>



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