

Maximum Performance in Large-Scale Opencast Mining

# **SURFACE MINER 4200 SM (i)**





# MAXIMUM PERFORMANCE IN LARGE-SCALE OPENCAST MINING



Surface miner with highest extraction rates when it comes to selective mining of hard or soft rock.

The 4.2 m cutting drum unit with a cutting depth of up to 830 mm is tailored precisely to the specific application and achieves maximum cutting rates with minimum tool wear.

Trucks with a load capacity of between 120 and 220 tons can be loaded using the powerful height-adjustable and slewable rear-loading conveyor.

With an annual production capacity of up to 12 million tons in soft rock, the miner is ideal for large-scale open-cast mining operations.

The operator's cabin with all-round glazing features heating, air-conditioning, and soundproofing, and is anti-vibration mounted to ensure low operator-fatigue and high productivity.



## WIRTGEN SURFACE MINER

### 60-TON CLASS

- > Cutting width up to 3,800 mm
- > Cutting depth up to 350 mm

### 120-TON CLASS

- > Cutting width up to 2,750 mm
- > Cutting depth up to 650 mm

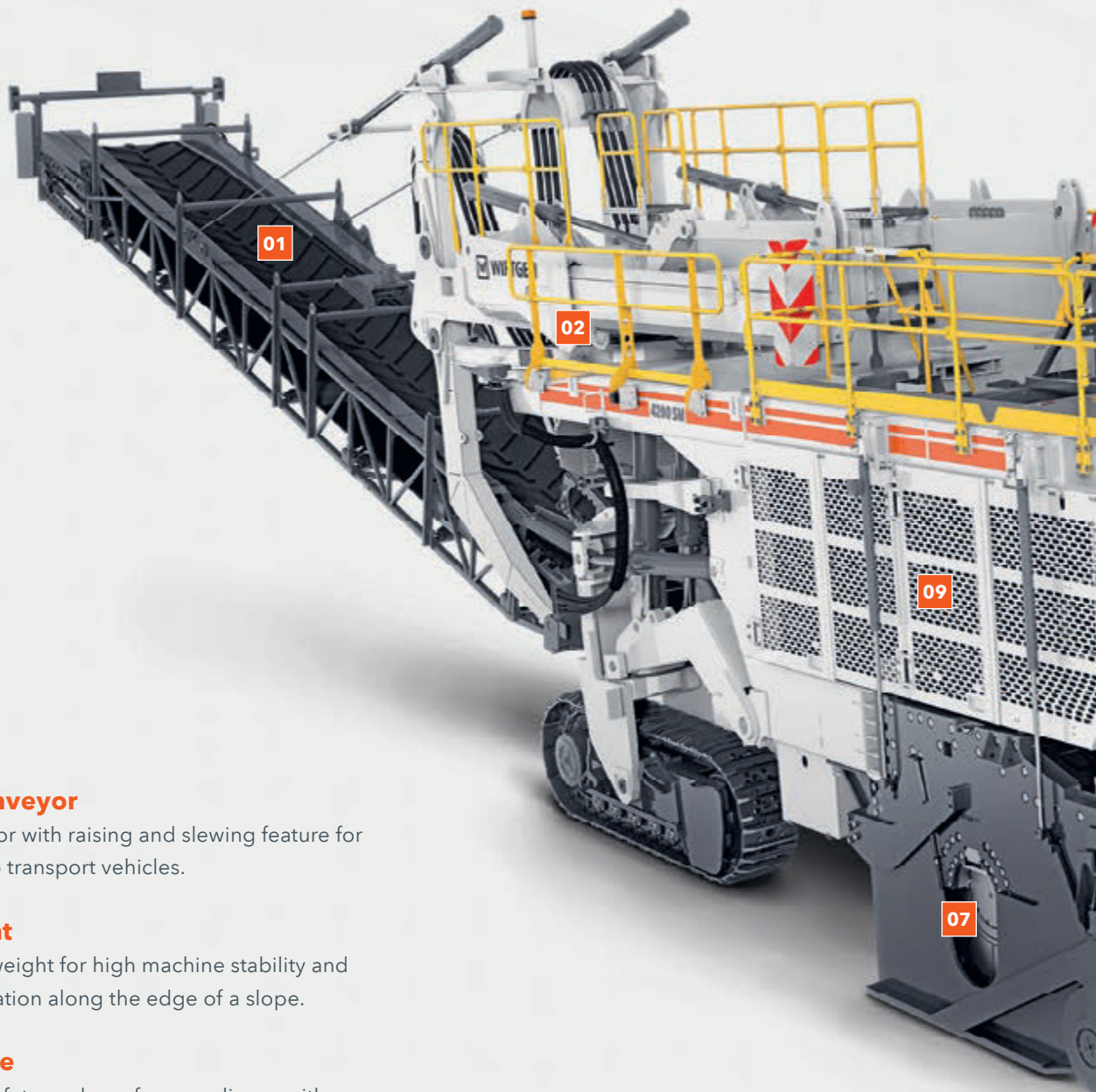
### 200-TON CLASS

- > Cutting width up to 4,200 mm
- > Cutting depth up to 830 mm



# OVERVIEW OF HIGHLIGHTS

Perfectly Equipped



**01 Discharge Conveyor**

Discharge conveyor with raising and slewing feature for direct loading into transport vehicles.

**02 Counterweight**

Movable counterweight for high machine stability and undisturbed operation along the edge of a slope.

**03 Safety Package**

Comprehensive safety package for compliance with international mining regulations.

**04 Operator's Cabin**

Fully glazed, sound-insulated, swivelling comfort cabin for productive operation.

09

07



**05 Access Ladder**

Wide, hydraulically adjustable access ladder for easy access to the machine.

**06 Track Units**

Separately height-adjustable and steerable track units for excellent manoeuvrability and precise adjustment of the cutting depth in off-road operation.

**07 Cutting Drum**

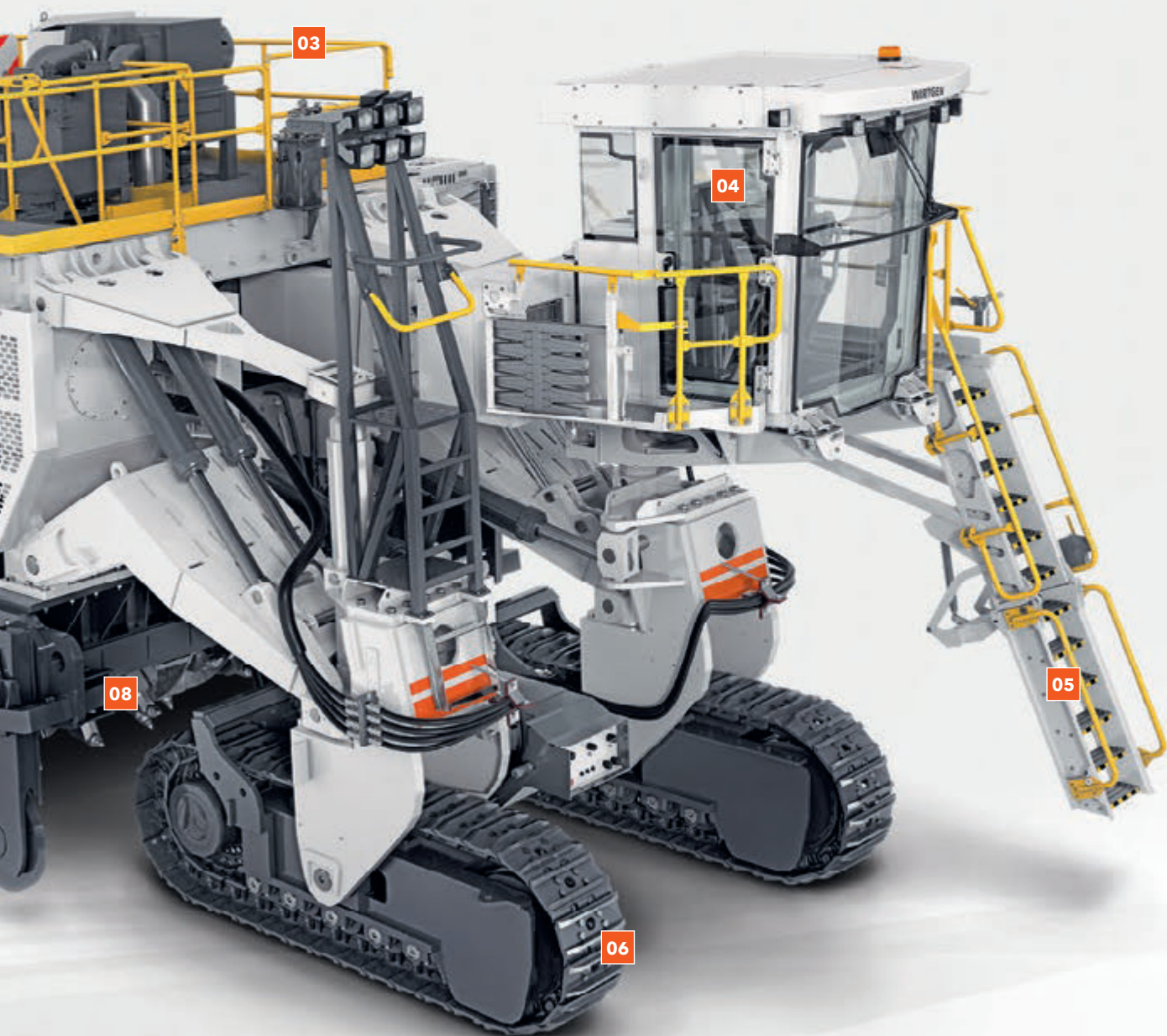
Mechanically driven, wear-resistant cutting drum rotating in up-cut mode for efficient operation.

**08 Drum Tooling**

Extremely durable mining picks arranged in a helical pattern for high cutting performance, minimized wear and extended pick life.

**09 Power Unit With Diesel Engine**

High-powered, fuel-efficient diesel engine paired with a heavy-duty mechanical belt drive for high cutting performance.





# SCALING NEW HEIGHTS WITH THE 4200 SM (i)

## Annual Mining Capacity of up to 12 Million Tonnes

The 4200 SM(i) is the ideal candidate for mining hard or soft rock on a truly grand scale. The miner's hallmarks include tremendous mining capacity, unmatched economic efficiency and flexible adjustment to field operating conditions and mining regulations. In contrast to conventional mining methods, which require four separate steps, up to 3,000 tonnes per hour can be mined in a single operation, with a single machine and a single operator. The high-performance machine is the prime choice for mine operators in large-scale opencast mining striving to achieve an annual mining capacity in soft rock of up to 12 million tonnes with a single machine.

Two different models are on offer: in soft-rock design, the high-performance machine is capable of mining rock with an unconfined compressive strength of up to 50 MPa at a cutting depth of up to 830 mm. In hard-rock design, materials with an unconfined compressive strength of up to 80 MPa can be mined at a working depth of up to 650 mm.

01



**Up to 12 Million Tons p.a.**

Enormous annual mined material output with a single machine

**No Drilling or Blasting**

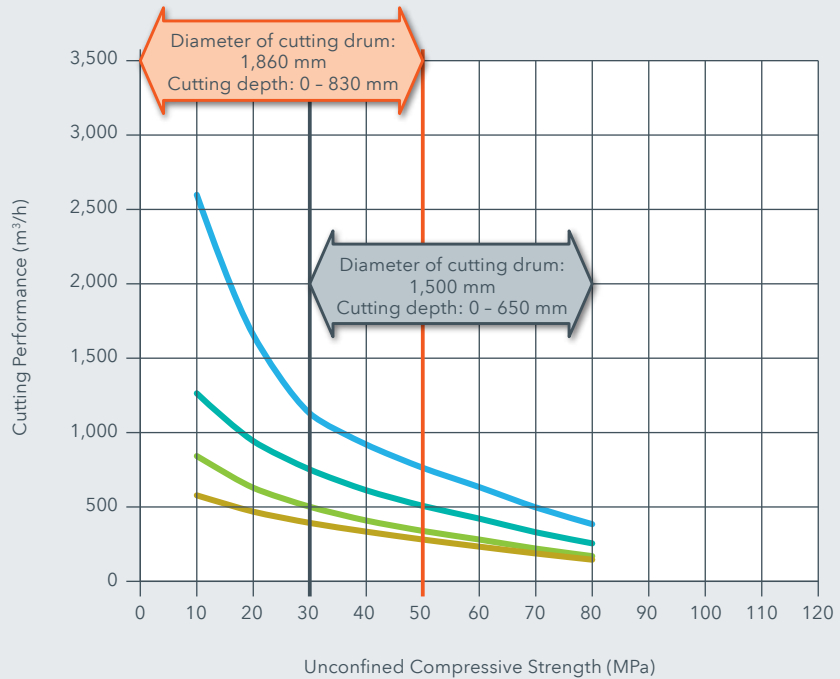
Only one process, instead of four



**01** High cutting performance and economic efficiency are hallmarks of the 4200 SM(i).

**02** A single operation instead of four separate steps - with the WIRTGEN 4200 SM(i) surface miner.

### Cutting Performance of the WIRTGEN 4200 SM(i) Surface Miner



**02**





# CUTTING DRUM DESIGN IN LINE WITH PERFORMANCE REQUIREMENTS

## Application-Specific Design

The cutting drums for the WIRTGEN 4200 SM(i) are made-to-measure products: they are fully tailored to the hardness of the material to be mined and to additional customer-specific requirements. The application-specific design of the cutting drum - including the use of a wide variety of different hard-wearing mining picks and toolholder systems - is based on unmatched expertise gained in several decades of experience in cutting technology. The cutting drum for mining soft rock has a large cutting diameter, for example, permitting the

throughput of large amounts of material. The cutting drum for mining hard rock has a smaller diameter, generating high cutting forces which permit the miner to be used in opencast mining as well as in rock and trench construction.

In addition, the cutting drum operates in up-cut mode: the more favorable pressure angle produces a comma chip which separates from the bottom up. This reduces energy consumption, minimizes vibrations and improves the overall efficiency of the machine.

01



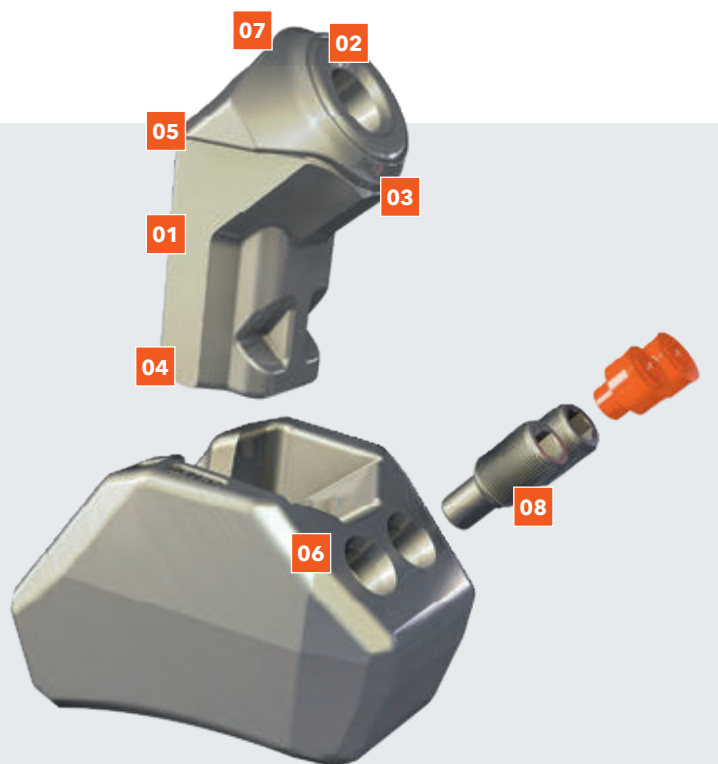
**Optimum Exploitation of Mineral Deposits**

Customer-specific cutting drums

**Reliable Continuous Operation**

HT15 toolholder system

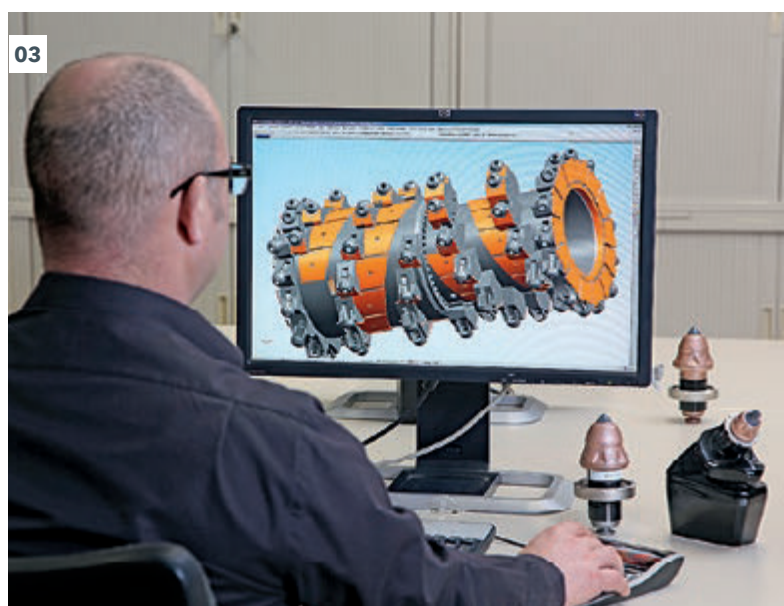




### HT15 Quick-Change Toolholder System

The innovative HT15 quick-change toolholder system maximizes pick utilization while minimizing breaks in operation.

- 01** Holder shank heat-treated in a special process for increased strength
- 02** Heavy-duty shank mounting for the use of WIRTGEN picks
- 03** Precise contact surfaces between upper part and bottom part for deflecting the cutting forces
- 04** Double prism for optimum fit and support of the upper part in the bottom part
- 05** Material deflectors for protecting the bottom part against abrasive wear
- 06** Pronounced recesses in the bottom part for preventing damage to the internal threads and bolts
- 07** Large opening on upper part for optimum access during pick replacement
- 08** Solid mounting bolts and flexible silicone plugs for protecting the fine-pitch thread from moisture and dirt



- 01** The cutting drum is tailored to application requirements to enable maximum cutting performance.
- 02** The HT15 quick-change toolholder system with replaceable upper toolholder part reduces the time required to replace a single toolholder from approx. 90 min to no more than 15 min compared to the fully welded HT14 toolholder system.
- 03** Every single cutting drum is designed in line with the specific application requirements.



# LOADING HUGE DUMP TRUCKS IN RECORD TIME

## Exceptional Performance

Maximum loading capacity

## Built-in Flexibility

Flexibly adjustable discharge conveyor

01





- 01** The high-capacity discharge conveyor permits direct loading into trucks or dumpers.
- 02** Slewing angles of up to 90° to the left and right allow full adjustment to conditions in the mine.
- 03** The mining material can also be simply discharged to the side of the miner.
- 04** The movable counterweight provides stability and can be easily retracted when working along steep high slopes.

### Flexibility is Standard

Optimum loading of the mining material is essential for the efficient mining of large mineral deposits. The conveyor system of the 4200 SM(i) impressively meets this requirement with high conveying capacity and outstanding flexibility: a tremendous slewing angle of 180°, height adjustment feature and continuously variable belt speed cater to the smooth and easy loading of large transport trucks even in restricted space conditions. The two-stage conveyor system replaces the usual loading equipment - a single device meets the requirements.

The primary conveyor transfers the material to the discharge conveyor which is available in two different lengths to ensure optimum loading of different truck sizes in opencast mining. Heavy-duty 220-t haul trucks can be loaded quickly and efficiently. The combination of steep-incline belt with rugged cleat profile and conveyor drive with tremendous power reserves ensures consistently high conveying performance even when mining ores of high density.





# NO COMPROMISE ON OPERATOR COMFORT

## The Operator is in Full Control

Keeping the productivity of the 4200 SM(i) at consistently high levels requires the operator to fully focus on his work throughout his shift. We have therefore made every effort to ensure that he feels safe and well. The operator's cabin is equipped with air-conditioning and heating systems. The soundproof, vibration-isolated cabin is mounted above the front left track unit, on the side facing away from the slope, far from the cutting drum and engine.

Four cameras plus screen provide the operator with a full view of important areas of the operation. The miner's field lighting system with 50 LED working lights ensures non-tiring and safe operation even in darkness. Both the cabin and the individually adjustable, air-sprung driver's seat can be rotated about large angles to either side, providing perfect visibility for loading heavy-duty haul trucks and for steering the track units. All controls, including the two multifunctional joysticks, are integrated into the seat's armrests in line with ergonomic principles. They include all the functions required for the mining operation, giving the operator full control of the process at all times.



**Everything under Control**

Intuitive, ergonomic operating concept



**01** A wide, hydraulically adjustable access ladder with separate, battery-operated pump offers convenient access to the machine.

**02** The panorama cabin can be rotated about 45° and the driver's seat about 135° to either side to provide even better visibility.



**Stress-Free Workplace**  
For maximum productivity





# MANEUVERABILITY - A KEY EFFICIENCY DRIVER

## Excellent Maneuverability

Hydraulic all-track steering

## Short Idle Times

Four steering modes

01



### Moving into Position without Losing Time

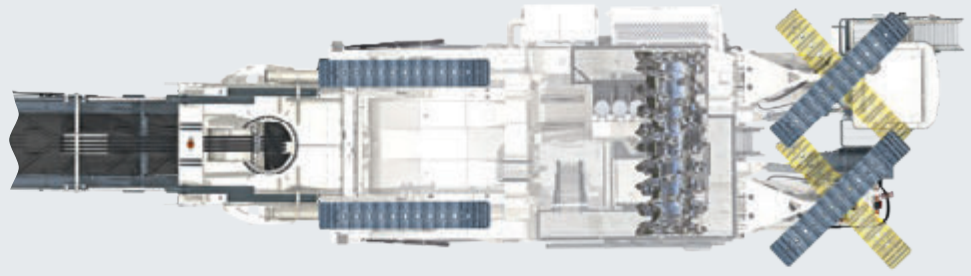
All-track steering makes the 4200 SM(i) surface miner extremely maneuverable despite being a huge machine. The smooth hydraulic steering system allows the four track units to be steered at large steering angles. Two selectable flow dividers additionally act as differential lock, ensuring uniform traction even in extremely difficult ground conditions. Three different steering modes can be selected: the front and rear track units are steered in opposite directions for positioning, the

front track units are steered to produce long, straight cuts, and all four track units are steered in the same direction in crab mode to enable lateral repositioning of the miner.

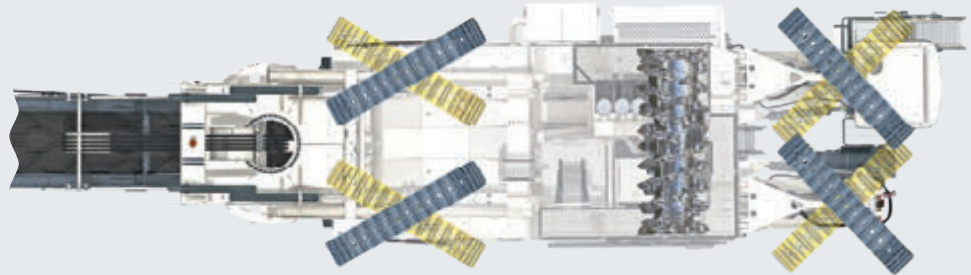
Effortless turning maneuvers requiring only little space keep non-productive times short, which increases the machine's overall productivity. This is promoted further by the miner's continuously adjustable advance speed.



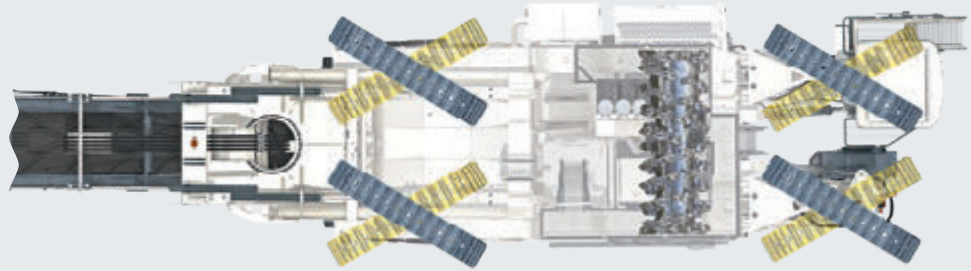
### Three Steering Modes



Steering the front track units



All-track steering



Crab steering



01 A small turning radius is achieved by steering the front and rear track units in opposite directions.



02 - 03 All four track units can be adjusted in height separately via hydraulic cylinders.

# CUT COSTS WITH MINIMUM MAINTENANCE REQUIREMENTS

## Maximum Machine Availability

The 4200 SM(i) requires maintenance after every 500 operating hours only. In addition, extra-large fuel and water tanks ensure extended productive uptimes. The miner's mechanical cutting drum drive via high-power V-belts impresses with high efficiency and ease of maintenance in tough opencast mining operations. The fluid coupling installed upstream of the drive system absorbs vibrations, is wear-free and requires little maintenance. All maintenance points are accessible safely and easily via

wide-opening service panels and wide, illuminated access ladders and walkways. The engine compartment inside the machine offers ample room to move during maintenance procedures.

Reliable support on site and the supply of spare parts and wearing parts are guaranteed: the operational availability of the 4200 SM(i) on an everyday basis is ensured by our network of around 55 sales and service companies around the globe.

**01** WIRTGEN service experts provide local "just-in-time" support around the globe.



01

## Minimal Lost Time

Fast servicing



# NO COMPROMISES ON SAFETY

## Strict Mining Regulations in Focus

WIRTGEN is first and foremost concerned with the safety of operators and maintenance staff: the miner's grated walkways and access ladders are fully illuminated, as are all of the service points, to comply with specific mining regulations. Grated catwalks and railings complying with applicable standards are provided wherever regular inspections and service work need to be carried out on machine components. The battery master switch prevents the machine from being started up inadvertently during maintenance procedures.

Lights on the track units, cutting drum and discharge conveyor permit safe operation of the surface miner in darkness. The camera system provides the operator with information on the areas outside his direct view at the rear and sides of the machine, as well as on the point of discharge of the mining material into the heavy-duty haul trucks.

The cabin is mounted at a large distance from the outer edge of the machine on the right, which offers additional safety when operating close to steep slopes. Further safety features include numerous emergency stop switches, FOPS and ROPS cabin, a second emergency exit as well as covers on all rotating parts. Emergency stop switches at the front left, front right, rear left and rear right of the 4200 SM(i), in the engine compartment, on the electrical cabinet and in the operator's cabin provide quick and easy access. Fireproof walls separate the engine from the hydraulic unit and drum drive clutch.

**01** Central logout station: inadvertent start-up of the machine is prevented from the ground by means of a mechanical lock.



## Safety First!

Safety for operating and maintenance personnel

# RECURRING WORK COMPLETED IN NO TIME AT ALL

## Save Valuable Time, Increase Productivity

Hydraulic cutting drum rotation device and hydraulically-powered pick ejector

### Time Savers that Pay off Quickly

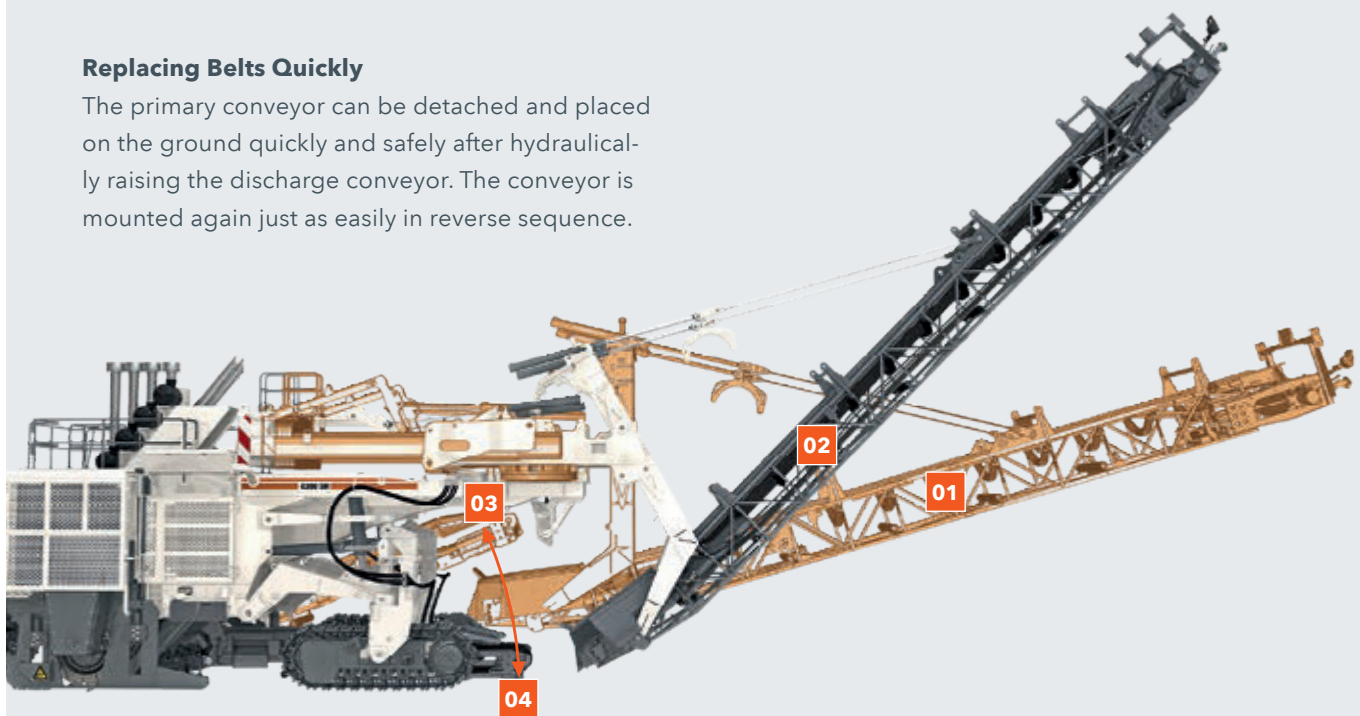
It has been one of our priorities in the development of the 4200 SM(i) to ensure that recurring procedures can be completed quickly and easily during operation. High-quality components and design improvements such as a larger oil sump have enabled the miner's maintenance intervals to be extended from 250 to 500 hours. After opening the service panel on the side of the miner, operating materials and consumables can be refilled easily via

a filling station. The length of stroke of the front height adjustment unit offers convenient, spacious access to the cutting drum for pick replacement. Quick positioning with the drum rotation device and the use of a hydraulic pick extractor optimize the process.

Particularly effective: quick and easy detachment of the primary conveyor allows the belt to be replaced in no time at all.

### Replacing Belts Quickly

The primary conveyor can be detached and placed on the ground quickly and safely after hydraulically raising the discharge conveyor. The conveyor is mounted again just as easily in reverse sequence.



**01** Discharge conveyor in operating position



**02** Position of discharge conveyor for detachment of primary conveyor



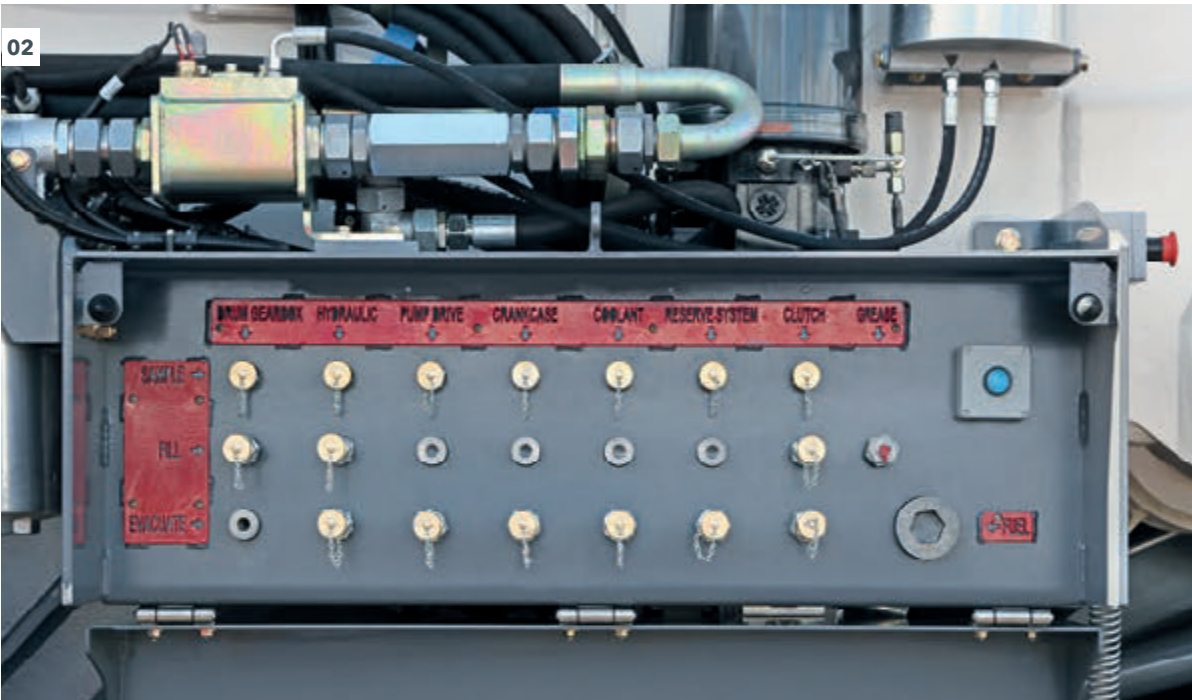
**03** Primary conveyor in operating position



**04** Position of primary conveyor after detachment







**01** Hydraulically operated pick extractors and the battery-operated cutting drum rotation device increase productivity.

**02** The filling station can be accessed quickly and easily from the ground.

The 4.2 m cutting drum unit with a cutting depth of up to 830 mm is tailored precisely to the specific application and achieves maximum cutting rates with minimum tool wear. Trucks with a load capacity of between 120 and 220 tons can be loaded using the powerful height-adjustable and slewable rear-loading conveyor. With an annual production capacity of up to 12 million tons in soft rock, the miner is ideal for large-scale open-cast mining operations.



TECHNICAL SPECIFICATIONS	4200 SM for Hard Rock	4200 SM for Soft Rock	4200 SM i for Hard Rock	4200 SM i for Soft Rock
<b>Cutting Drum</b>				
Cutting width max.	4,200 mm			
Cutting depth <sup>1)</sup>	0 - 650 mm	0 - 830 mm	0 - 650 mm	0 - 830 mm
Cutting diameter	1,500 mm	1,860 mm	1,500 mm	1,860 mm
Number of picks	depending on operating conditions			
<b>Engine</b>				
Exhaust emission standards	no EU regulation / US EPA Tier 2		no EU regulation / US EPA Tier 4f	
Manufacturer	CUMMINS		CUMMINS	
Type	QSK 50		QSK 50	
Number of cylinders	16		16	
Power	1,194 KW / 1,600 HP / 1,623 PS			
Fuel consumption, full load	289 l/h		308 l/h	
Fuel consumption, field operation	145 l/h		154 l/h	
<b>Electrical System</b>				
Voltage supply	24 V			
<b>Filling Capacities</b>				
Fuel			2,900 l	
Adblue <sup>®</sup> / DEF <sup>2)</sup>	—		300 l	
Hydraulic oil	800 l			
Water	10,000 l			
<b>Driving Performance</b>				
Operating speed (no EU regulation / US EPA Tier 2)	0 to 27 m/min			
Travel speed	0 to 2.5 km/h			
Theoretical gradeability	20%			
Max. cross slope	8%			



TECHNICAL SPECIFICATIONS	4200 SM for Hard Rock	4200 SM for Soft Rock	4200 SM i for Hard Rock	4200 SM i for Soft Rock
<b>Track Units</b>				
Dimensions (L x W x H)	3,912 x 600 x 1,271 mm			
<b>Conveyor System</b>				
Belt width of primary conveyor	1,800 mm			
Length of primary conveyor	7,000 mm			
Belt width of discharge conveyor	1,800 mm			
Length of discharge conveyor	16,000 mm			
<b>Shipping Dimensions</b>				
Basic machine dismantled for transport (L x W x H)	17,140 x 5,430 x 4,100 mm			
Discharge conveyor (L x W x H)	17,650 x 3,080 x 2,020 mm			
Cutting drum unit with cutting drum cutting diameter 1,500 mm (L x W x H)	5,550 x 3,300 x 2,400 mm			
Cutting drum unit with cutting drum cutting diameter 1,860 mm (L x W x H)	5,550 x 3,300 x 2,580 mm			
Conveyor slewing device including counterweight	5,700 x 3,550 x 2,100 mm			
Open-top shipping container 40' (L x W x H)	12,190 x 2,430 x 2,590 mm			
<b>Machine Weights</b>				
Empty weight	195,000 kg	198,000 kg	195,000 kg	198,000 kg
Operating weight, CE <sup>3)</sup>	201,300 kg	204,300 kg	201,300 kg	204,300 kg
Maximum operating weight, full tanks	208,300 kg	211,300 kg	208,300 kg	211,300 kg
<b>Transport Weights of Single Components</b>				
Basic machine dismantled for transport	142,000 kg			
Cutting drum unit with cutting drum cutting diameter 1,500 mm	approx. 34,000 kg <sup>4)</sup>			
Cutting drum unit with cutting drum cutting diameter 1,860 mm	approx. 32,800 kg <sup>4)</sup>			
Discharge conveyor, 16,000 mm long	9,600 kg			
Conveyor slewing device including counterweight	26,300 kg			
Two containers 20'	depending on scope of delivery			
<b>Weights of Operating Materials</b>				
Water	10,000 kg			
Fuel (0.83 kg/l)	2,400 kg			
AdBlue® / DEF <sup>2)</sup> (1.1 kg/l)	—		330 kg	
<b>Additional Add-On Weights</b>				
<b>Machine operator and tools</b>				
> Machine operator	75 kg			
> On-board tools	30 kg			

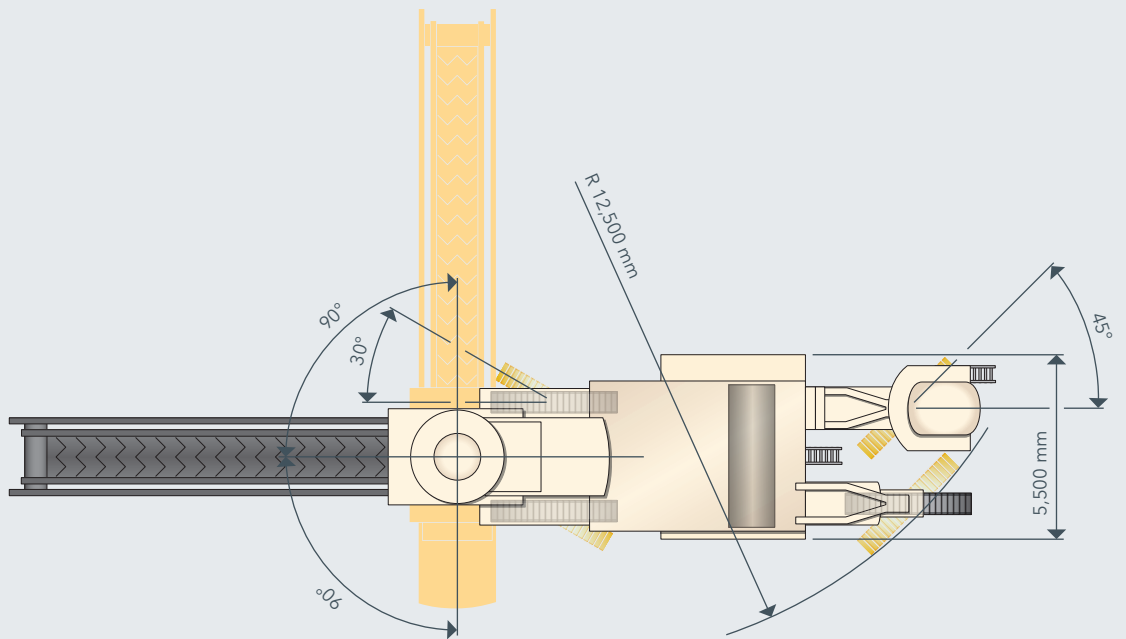
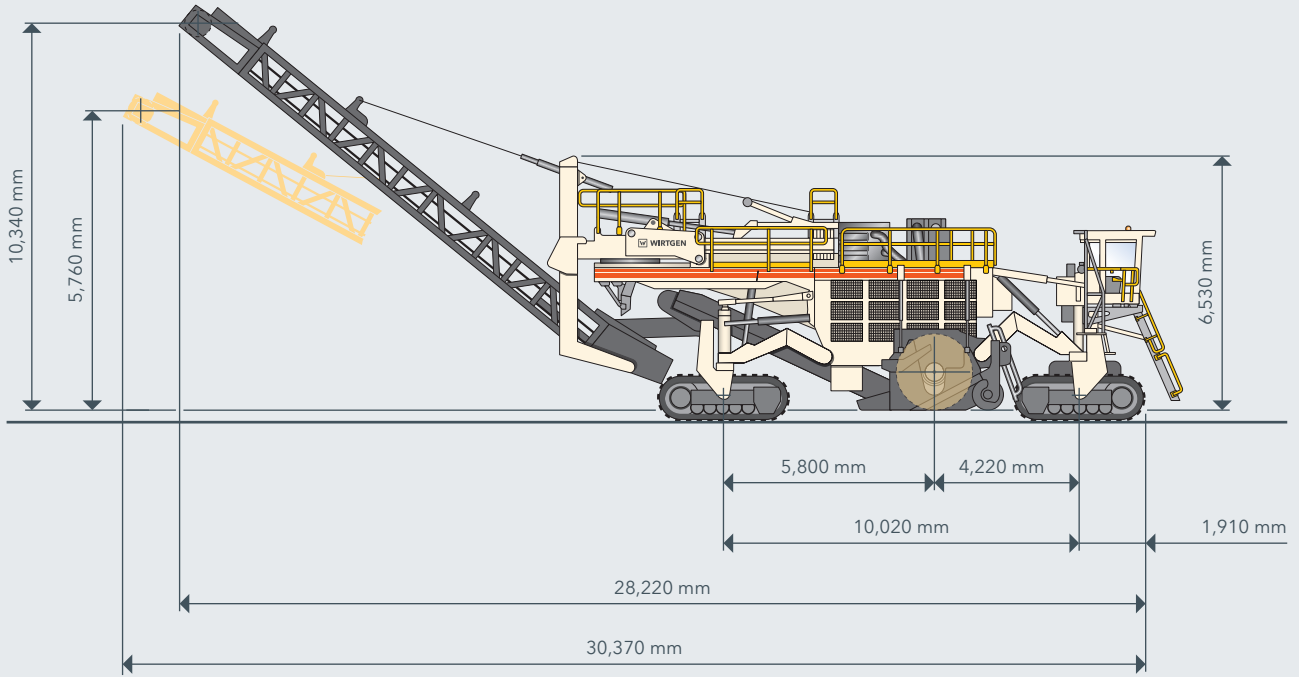
<sup>1)</sup> The maximum cutting depth may deviate from the value indicated due to tolerances and wear

<sup>2)</sup> AdBlue® is a registered trademark of the Association of the Automotive Industry (Verband der Automobilindustrie e. V.; VDA)

<sup>3)</sup> Weight of machine, half weight of all operating materials, on-board tools, machine operator, no optional equipment features

<sup>4)</sup> Weights depend on the type of cutting drum

SIDE VIEW / TOP VIEW 4200 SM (i)

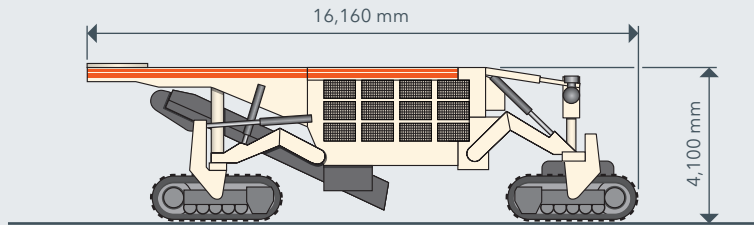




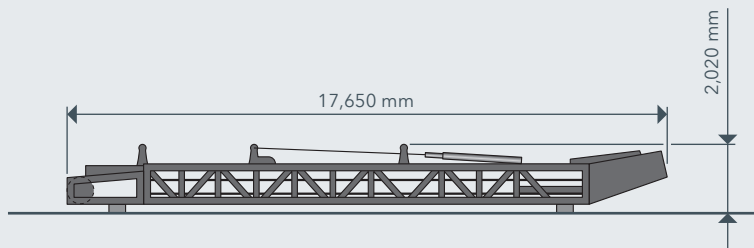
## TRANSPORT UNITS OF THE 4200 SM(i) FOR SEA TRANSPORT

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### Basic Machine



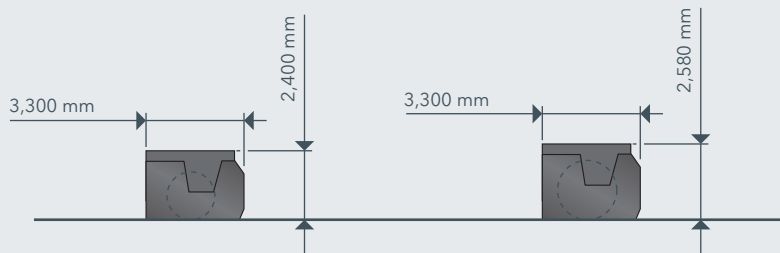
### Discharge Conveyor



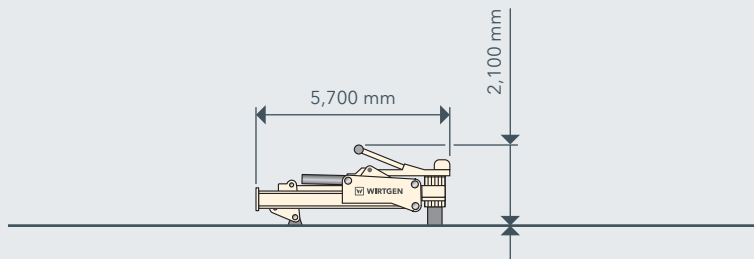
### Cutting Drum Unit

Cutting diameter  
1,500 mm

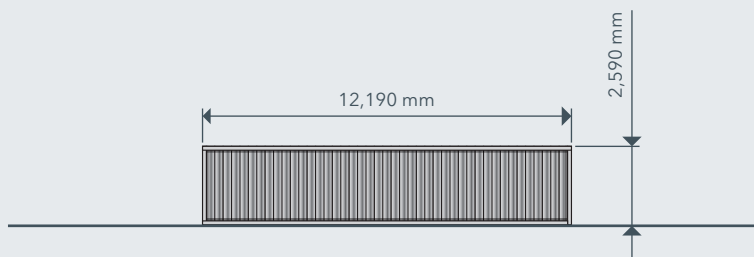
Cutting diameter  
1,860 mm



### Conveyor Slewing Device including Counterweight



### Shipping Containe



STANDARD EQUIPMENT	4200 SM	4200 SM(i)
<b>Basic Machine</b>		
> Base machine with engine	■	■
> Lubrication points with high-pressure hoses grouped together at easily accessible points	■	■
> Mechanical cutting drum drive via high-power V-belts	■	■
> Separate battery master switch for disconnecting the starter	■	■
<b>Cutting Drum Unit</b>		
> Cutting drum housing FB4200 SK1500 for hard rock	□	□
> Cutting drum housing FB4200 SK1860 for soft rock	□	□
<b>Cutting Drums</b>		
> Cutting drum FB4200 HT14 LA50 SK1500 in armored design with 104 picks for hard rock	□	□
> Cutting drum FB4200 HT14 LA90 SK1860 with 62 picks for soft rock	□	□
<b>Loading of the Mining Material</b>		
> Two-part discharge conveyor, 16,000 mm long, 1,800 mm wide SK1500	□	□
> Two-part discharge conveyor, 16,000 mm long, 1,800 mm wide SK1860	□	□
<b>Operator's Cabin</b>		
> Fully glazed, anti-vibration mounted, high-quality comfort cabin	■	■
> Equipped with rotating driver's seat and all important controls integrated into the seat's armrests	■	■
> Powerful air-conditioning system and separate heating system with automatic temperature control	■	■
> Cabin with rollover protection system (ROPS) and falling object protection system (FOPS)	■	■
> Emergency exit with ladder	■	■
> Pre-fitting for radio installation including aerial and speakers	■	■
<b>Chassis and Height Adjustment</b>		
> Track units with exceptionally sturdy double-grouser track pads in heavy-duty design for mining applications	■	■
> Continuously adjustable, hydraulic four-track drive with two speed ranges	■	■
> The following steering modes can be pre-selected: crab steering and all-track steering, as well as straight-ahead travel for the rear track units	■	■
<b>Miscellaneous</b>		
> Electrohydraulically driven cutting drum rotation device for quick and safe pick replacement; an electrohydraulic unit permits operation with the diesel engine switched off	■	■
> Water spray bar on the cutting drum unit	■	■
> Water spray system on the conveyor and material transfer systems	■	■
> High-pressure water cleaner (40 bar and a large quantity of water) with washing lance for cleaning the machine	■	■
> LED working lights, 24 V, with magnetic base	■	■
> EMERGENCY STOP switches in appropriate positions on the machine	■	■
> Lockable toolbox with toolkit for maintenance and servicing	■	■
> Pre-fitting for installing the WITOS FleetView control unit	■	■
> Standard painting in RAL 9001 (cream)	□	□
> WITOS - professional telematics solution for machine operation and service optimization	□	□
> Manual lubrication system	□	□



OPTIONAL EQUIPMENT	4200 SM	4200 SM (i)
<b>Operator's Cabin</b>		
> Second air-conditioning system for operator's cabin	<input type="checkbox"/>	<input type="checkbox"/>
> CD radio with Bluetooth hands-free system	<input type="checkbox"/>	<input type="checkbox"/>
> Monitor system including four cameras and 12" monitor for maneuvering assistance	<input type="checkbox"/>	<input type="checkbox"/>
> Monitor system displaying the separating layers behind the scraper	<input type="checkbox"/>	<input type="checkbox"/>
<b>Miscellaneous</b>		
> Painting in one special color (RAL)	<input type="checkbox"/>	<input type="checkbox"/>
> Model without WITOS	<input type="checkbox"/>	<input type="checkbox"/>
> Central lubrication system (Conveyor system)	<input type="checkbox"/>	<input type="checkbox"/>
> Hydraulic pick ejector	<input type="checkbox"/>	<input type="checkbox"/>
> Wiggins fast-fill system for diesel refueling	<input type="checkbox"/>	<input type="checkbox"/>
> Wiggins fast-fill system for AdBlue® refilling	-	<input type="checkbox"/>
> Field lighting system, 24 V, including 50 LED working lights	<input type="checkbox"/>	<input type="checkbox"/>
> Workshop container 20' including workshop equipment	<input type="checkbox"/>	<input type="checkbox"/>
> Workshop equipment - tools	<input type="checkbox"/>	<input type="checkbox"/>
> Workshop equipment - auxiliary equipment and consumables	<input type="checkbox"/>	<input type="checkbox"/>
> Workshop equipment - metric fastening elements	<input type="checkbox"/>	<input type="checkbox"/>
> Workshop equipment - electrical repairs	<input type="checkbox"/>	<input type="checkbox"/>
> Workshop equipment - hydraulic components	<input type="checkbox"/>	<input type="checkbox"/>
> Workshop equipment - hydraulic press	<input type="checkbox"/>	<input type="checkbox"/>
> Workshop equipment - hoses for emergency repairs	<input type="checkbox"/>	<input type="checkbox"/>

■ = Standard equipment

■ = Standard equipment, can be replaced with optional equipment if desired

□ = Optional equipment

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