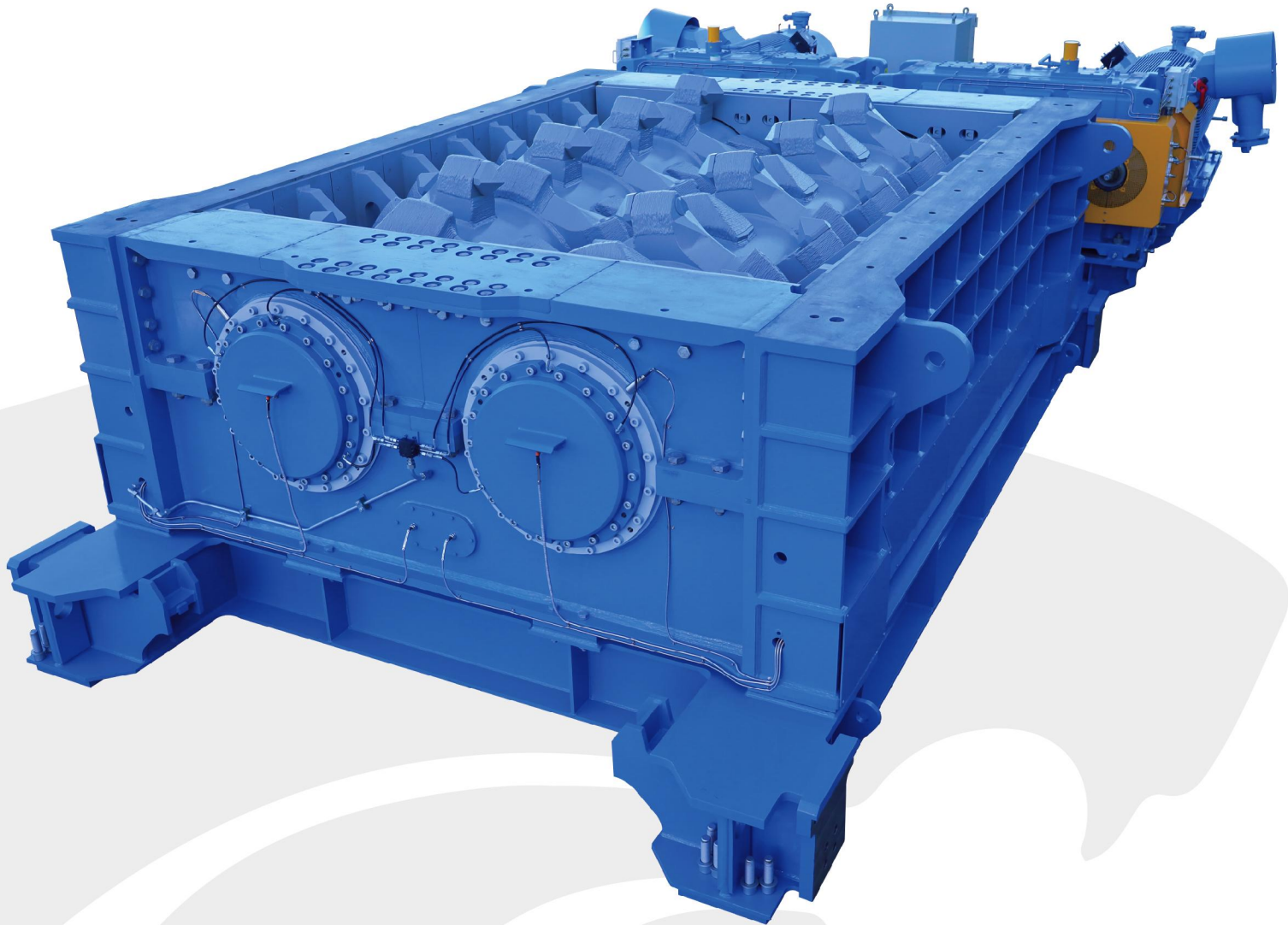




## Double Roll Crusher/Sizer Heavy-duty Apron Feeder

**Ideal choice for mineral crushing and conveying equipment**

HUACHUANG HEAVY INDUSTRY (DALIAN) CO., LTD.

## Company profile



Founded in 2012, Huachuang Heavy Industry (Dalian) Co., Ltd. (abbreviated as Huachuang Heavy Industry or TRSM), headquartered in the beautiful coastal city of Dalian, is primarily engaged in the design, manufacturing, and servicing of material crushing, conveying, and handling equipment systems. Adhering to the philosophy of "top-notch technology, quality and service", TRSM is guided by market demands and customer needs, integrating domestic and international advanced technologies for independent innovation. The company focuses on researching and developing internationally advanced technologies and products, steadily advancing towards high-quality technological development.

TRSM's main products include a series of complete equipment systems (solutions) and core equipment, mainly comprising semi-mobile crushing stations, fully-mobile crushing stations, heavy-duty apron feeders, double roll crusher/sizers, heavy-duty semi-mobile belt conveyors, portal scraper reclaimers, and relocatable steel structural bridge/culverts. These products and systems extensively serve industries such as mining (especially open-pit mining), thermal power, iron & steel, metallurgy, and ports.

The technical capabilities and quality levels of TRSM have gained widespread recognition from both domestic and international users. The company enjoys a higher reputation in high-altitude cold regions and was awarded the title of National "Specialized, Fined, Peculiar, and Innovative" Small Giant in 2021 and passed the review in 2024. Its 3000t/h class semi-mobile crushing station represents China proprietary "first set" world-class advanced technology modular, unmanned, rapidly relocatable primary crushing station running at large-scale open-pit coal mines with the continuous operation peak capacity reaching 3600t/h (raw coal crushing). The semi-mobile crushing station products and core technologies with processing capacities of 3000t/h and above are of the critical equipment and technological assets in China's open-pit mining industry sector, addressing key challenges and filling gaps to reach the world-class technological level for China.

TRSM insist in focusing R&D and innovation efforts on meeting target customers' needs and tackling their pain points. Concentrated on clients' core demands for "safety & reliability, environmental friendliness, efficiency & energy saving, and intelligent", TRMS continuously strengthen technological innovation and product development through independent research, international technical cooperation, and industry-academia collaboration. This long-standing approach provides customers with cost-effective "safe & reliable, environmentally friendly, efficient & energy-saving, and intelligent" products and solutions, assisting customers' transition towards high-quality development goals marked by "safety, environmental protection, energy conservation, and intelligence", thereby creating greater customer value.

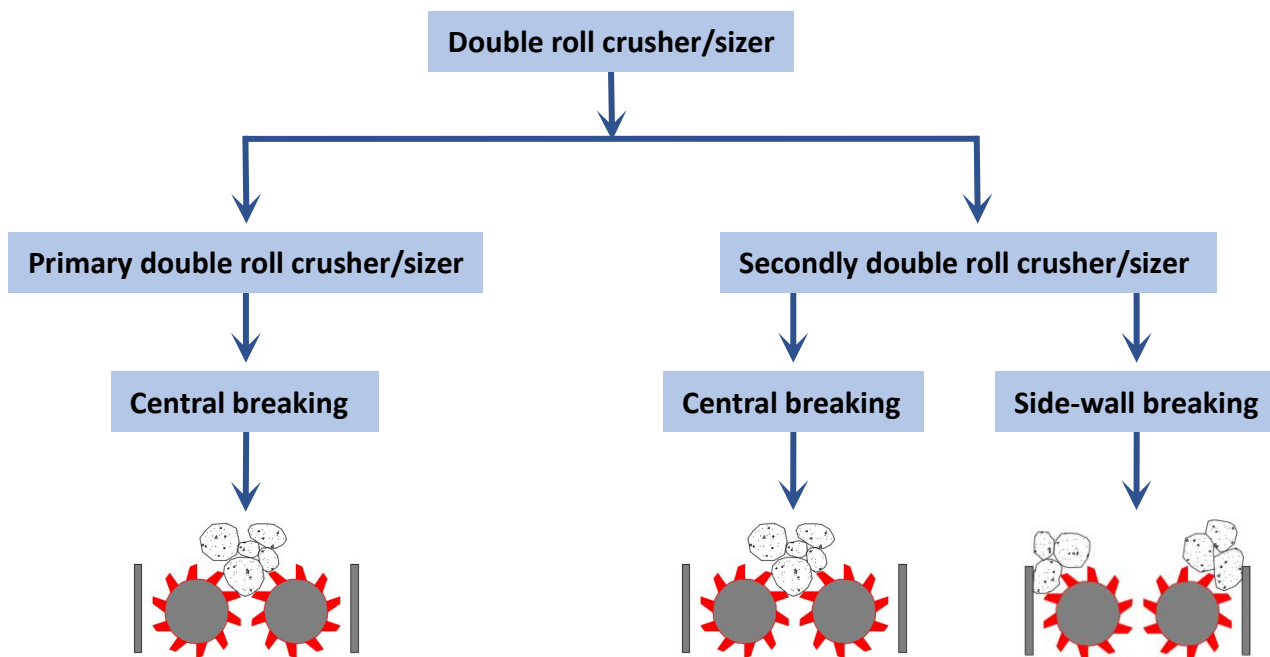


## Typical applications



# TRSM™ Double roll crusher/sizer

Ideal choice for mineral crushing equipment



## Double roll crusher/sizer

### Application areas and product features



TRSM™ double roll crusher/sizer series are suitable for crushing all kinds of coal, minerals and rock and soil (such as raw coal, iron ore, copper ore, limestone, oil shale, etc., and all kinds of surface rock and soil stripped from the surface of various open-pit mines).

In coal and metal mine application scenarios, its advanced and reliable design can provide users with strong crushing capacity, high reliability, long life, low powder rate and low maintenance costs.

TRSM™ double roll crusher/sizer is suitable for primary, secondary and tertiary crushing systems for dry hard, wet sticky and the mixed materials. The central breaking double roll crusher/sizer with mass flywheel accumulator has the outstanding advantage of high output when applied to the primary crushing of medium and high hard (120-200MPa) materials.

TRSM™ double roll crusher/sizer is low in height and can be easily integrated into most crushing plant designs for fully-mobile, semi-mobile or stationary crushing plant equipment systems.

TRSM™ double roll crusher/sizer series are designed with the maximum crushing capacity over 10,000 t/h ( depending on the characteristics of the material to be crushed, the size of the feed, and discharge particle size requirements ) and the maximum feed size up to 2000 mm.

#### Product features:

- Advanced and reliable design, robust and durable, large processing capacity;
- Flat and compact design;
- Integration of the screening and crushing functions, high processing capacity and low operating costs;
- Low over-crushing rate, reduced dust generation during crushing processing;
- Low or medium-low rotation speed design of the crushing rolls, high shear force and tensile force;
- Reduced equipment wear and extended service life by optimized crushing tooth shape, well-selected wear-resistant materials and heat treatment process based on adequate absorption of the industry's advanced and proven design concepts, experience, and practices.



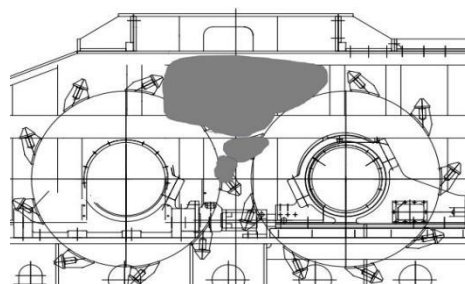
## Hybrid double roll sizer



In the Hybrid double roll sizer, the material is crushed between the crushing teeth in the middle of the crushing cavity.

### How it works

Toothed rolls with flywheel energy accumulators (TRSM's patented technology) deliver the super-high instantaneous torque and provide the super-high instantaneous shear and tensile forces required for crushing. The flywheel design effectively reduce the shock to the the drive train caused by the very unbalanced loads during crushing, making it possible for smooth operation during crushing. The tooth profile design of the multi-dimensional staggered arrangement ensures that the fine materials in the feed can flow freely in the continuously changing gaps between the toothed rollers rotating at a medium-low speed and are not crushed but directly screened, thereby effectively reducing the energy consumption, the abrasion and the over-crushing rate.

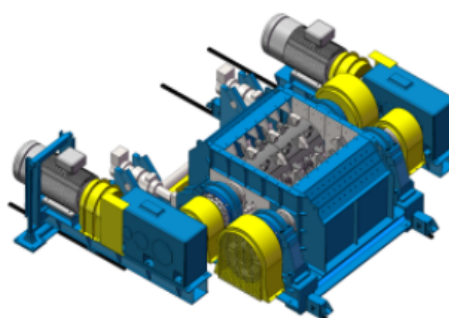
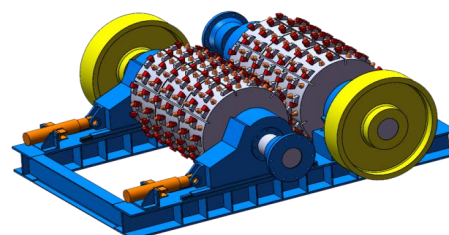


### Application in the primary crushing system

The crushing ratio of the central crushing crusher depends on the specific design and application, and can reach 5:1 to 7:1.

One end of the roll is fixed and the other end is a floating roll driven by a hydraulic cylinder, and the particle size of the output material is optimized by adjusting the gap between the two rolls. For large materials, a larger clamping gap can be obtained by adjusting the gap between the toothed rolls, and in addition, the hydraulic system features an automatic yield protection function against uncrushable objects.

Acc. to various application scenarios in the industry, we provide a variety of specifications and models of central breaking double roll crusher, with a maximum processing capacity of 12,000 t/h (reference feed size  $\leq 2000\text{mm}$ , discharge particle size  $\leq 400\text{mm}$  or  $300\text{mm}$ ).



### Drive system

The two crushing rolls of the central breaking double roll crusher are driven by two independent drive units. The drive units are arranged on both sides of the crushing cavity, and the non-driving end of the crushing roll is equipped with an additional mass flywheel energy accumulator, which effectively improves the moment of inertia and strengthens the crushing capacity.

Each drive unit comprises a motor, a fluid coupling, a reducer, a low speed coupling and a swing base.



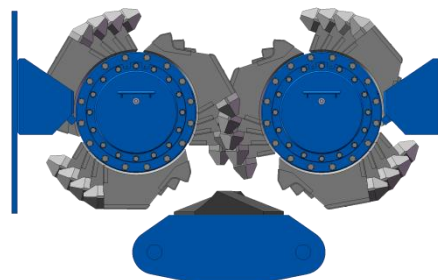
## Central breaking double roll sizer



In the central breaking type double roll sizer, the material is crushed between the crushing teeth in the middle of the crushing cavity.

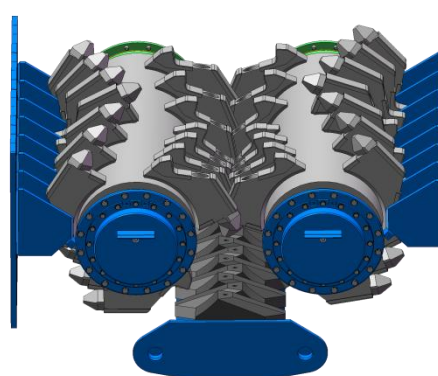
### How it works

The high transmission torque of the toothed roll due to low rotation speed design provides high shearing force and stretching force required for crushing. The tooth profile design of the multi-dimensional staggered arrangement enables the fine materials in the feeding to flow freely in the continuously changing gap between the toothed rollers rotating at a low or medium-low speed and to be directly screened without being crushed, thereby effectively reducing the energy consumption, the abrasion and the over-crushing rate.



### Application in primary and secondary crushing systems

The particle size of the crushed material can be determined by the position and geometric shape of the crushing beam teeth, and the discharge particle size can be flexibly adjusted by adjusting the gap between the crushing beam teeth and the crushing roll. Therefore, the central breaking double roll sizer can effectively ensure that the discharge particle size required by the customer is achieved.



The crushing ratio of the central breaking sizer depends on the specific design and application and can reach 3:1 to 6:1.

Acc. to various material crushing application scenarios in different industries, we provide a variety of specifications of central breaking roll sizers, with a maximum processing capacity of 12,000 t/h (reference feed size  $\leq 2000\text{mm}$ , discharge particle size  $\leq 400\text{mm}$  or  $300\text{mm}$ ).

### Drive system

The two crushing rolls of the central breaking roll sizer are driven by one synchronous drive unit or by two independent drive units which can be arranged on the same side or both sides of the crushing cavity.

The drive unit comprises of the motor, the fluid coupling, the reducer, the crown gear coupling and the swing base (same as the sizer base) or the hydraulic motor drive system.



## Crushing cavity and teeth



The crushing teeth of the central breaking sizer are optimized in the shape of tooth tips, which are arrow-shaped and spirally arranged in the length direction.

The spirally arranged tooth tips can push the material to disperse from the center to both ends, so that the whole length of the crushing roller can be evenly fed.

The crushing roll is equipped with a quick-change tooth tip, which can be quickly and conveniently replaced by inserting/pulling out the fixing pin.

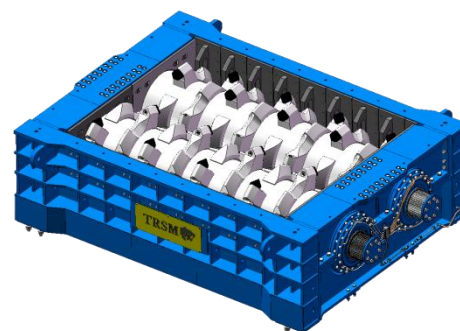
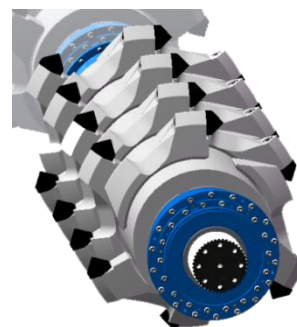
The crushing tooth tip is made of high-quality wear-resistant alloy steel, which can maintain excellent comprehensive performance in the crushing process, prevent the risk of hard and brittle fracture while ensuring high wear resistance, and has a long service life.

The side wall and end wall of the crushing cavity of the central breaking sizer are bolted and welded to install the bearing seat of the tooth roll bearing. The structure of the crushing cavity is adequately stable and sturdy, and the force generated during crushing will be offset inside the crushing cavity and will not be released to the external structure.

The inner wall of the crushing chamber is equipped with a high-performance wear-resistant lining plate (such as HARDOX400 or equivalent products).

A crushing beam is designed for the central breaking sizer and is installed on the crushing end walls on both sides. By adjusting the position of the crushing beam up and down, the crushing capacity and the particle size of the discharged material can be perfectly balanced.

- The larger the gap between the crushing beam and the tooth roll is, the larger the discharge particle size is, and the larger the capacity is;
- The smaller the clearance between the beam and the tooth roll is, the smaller the discharge particle size is, and the smaller the productivity.



## Side-wall breaking double roll sizer



In the side-wall breaking type double roll sizer, the material is crushed between the crushing teeth and the adjustable crushing comb teeth on both sides of the crushing cavity.

### How it works

Similar with the central breaking sizers, the tooth roll crushes material by shearing and stretching forces, and additionally by the cutting forces generated by the roll rotating at medium-low speed with high torque. The tooth profile design of the multi-dimensional staggered arrangement enables the fine materials in the feeding process to flow freely in the continuously changing gaps between the toothed rolls rotating at a medium-low speed and between the toothed roll and the side teeth, thus making them directly screened without being crushed, thereby effectively reducing the energy consumption, the abrasion and the over-crushing rate.



### Application in secondary and tertiary crushing systems

The particle size of the crushed material can be determined by the position and geometric shape of the crushing tooth comb, and the discharge particle size can be flexibly adjusted by adjusting the gap between the crushing tooth comb and the crushing tooth roll. Therefore, the side-wall breaking double roll sizer can effectively ensure that the discharge particle size specified by the customer ( e.g. 80~20mm ) is achieved.

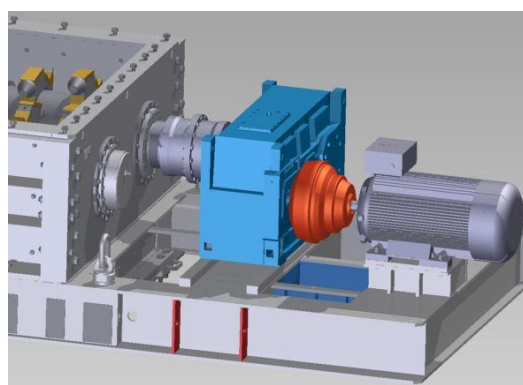


The crushing ratio of the side-wall crushing toothed roll screening crusher depends on the specific design and application, and can reach 3:1 to 6:1. We offer various types of side-wall breaking double roll sizers with capacity up to 3,000 t/h (raw coal, reference feed size  $\leq 300\text{mm}$ , discharge size  $\leq 50\text{mm}$ ).

### Drive system

The two crushing rolls of the side-wall breaking double roll sizer are driven by one synchronous drive unit or by two independent drive units which can be arranged on the same side or both sides of the crushing cavity.

The drive unit comprises of the motor, the fluid coupling, the reducer, the crown gear coupling and the swing base (same as the sizer base) or the hydraulic motor drive system.



## Accessories of crusher/sizer



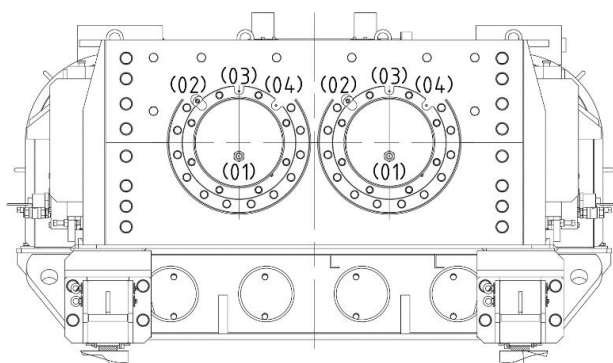
Double roll crusher/sizer is equipped with accessories delivering functions such as stall monitoring, temperature and vibration monitoring, automatic centralized lubrication for bearings and seals and etc.

### Monitoring device

| Number | Monitoring function            | Number of monitoring points |
|--------|--------------------------------|-----------------------------|
| 01     | Tooth roll stall monitoring    | 2                           |
| 02     | Bearing temperature monitoring | 4                           |

### Automatic centralize lubricating device

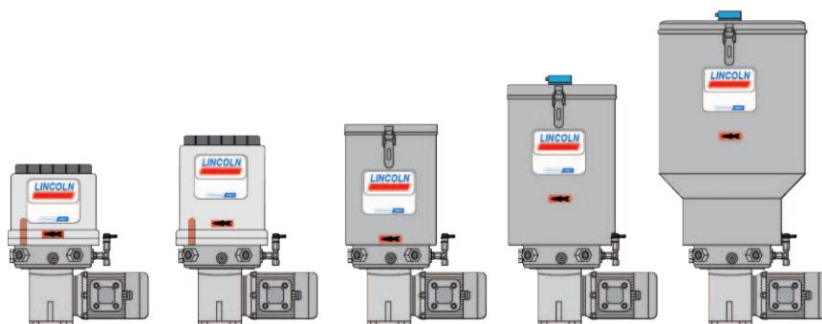
| Number | Lubrication position | Number of lubrication points |
|--------|----------------------|------------------------------|
| 03     | Bearing lubrication  | 4                            |
| 04     | Seal lubrication     | 4                            |



The automatic centralized lubrication system centralizes the lubrication points of bearings and seals for unified lubrication monitoring and management. By setting a series of alarm functions such as oil injection per unit time and pressure monitoring, the automatic lubrication function is realized.

The dynamic centralized lubrication system is to centralize the lubrication points of bearings and seals for unified lubrication monitoring and management. By setting a series of alarm functions such as oil injection per unit time and pressure monitoring, the automatic lubrication function is realized.

According to the different models of double roll crusher/sizers, to configure an automatic centralized lubrication system with the appropriate oil injection volume.

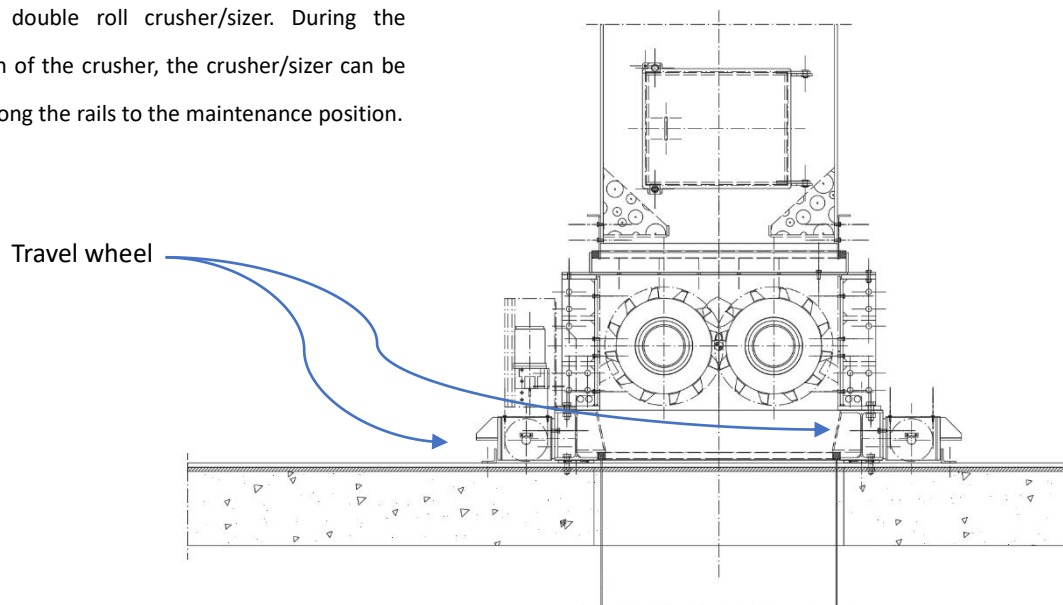


## Accessories of crusher/sizer

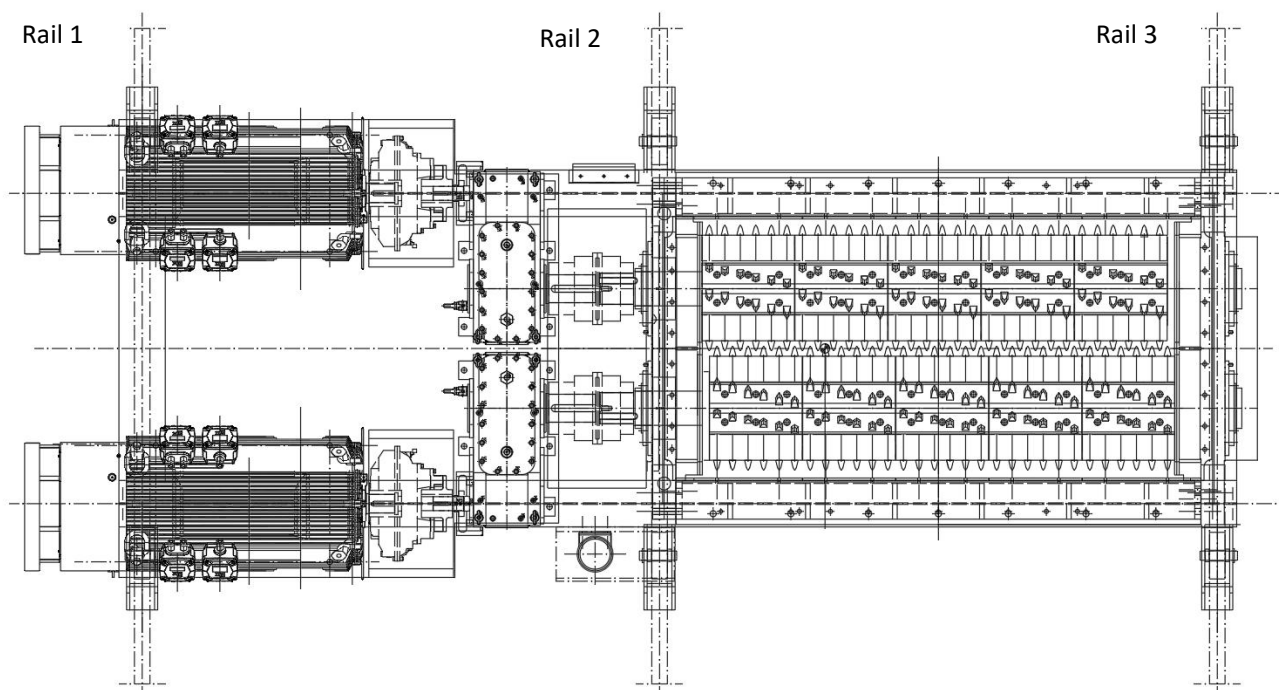


Double roll sizer is optionally equipped with the travel wheel assembly for easy maintenance purpose.

Temporary travel wheel assembly can be installed on both sides of the base of the double roll crusher/sizer. During the maintenance operation of the crusher, the crusher/sizer can be conveniently moved along the rails to the maintenance position.



According to the layout of different models, 2-3 flat steel rails are generally arranged under the base of the double-toothed roll crusher.



## Typical models and configurations



### 1、Central breaking type double roll crusher (for primary crushing)

| Models       | Rated capacity t/h | Type of material | Feed particle size mm | Discharge particle size mm | Roll center distance mm | Effective roll length mm | Total installed power kW |
|--------------|--------------------|------------------|-----------------------|----------------------------|-------------------------|--------------------------|--------------------------|
| DRC2000*2500 | 6000               | Rock & Soil      | 1500-2000             | 300-400                    | 2000                    | ~2500                    | 560-800                  |
| DRC2000*3700 | 9000               | Rock & Soil      | 1500-2000             | 300-400                    | 2000                    | ~3700                    | 710-900                  |
| DRC2000*4000 | 12000              | Rock & Soil      | 1500-2000             | 300-400                    | 2000                    | ~4000                    | 900-1120                 |

### 2、Central breaking type double roll sizer (for primary crushing)

| Models        | Rated capacity t/h | Type of material | Feed particle size mm | Discharge particle size mm | Roll center distance mm | Effective roll length mm | Total installed power kW |
|---------------|--------------------|------------------|-----------------------|----------------------------|-------------------------|--------------------------|--------------------------|
| DRS1000*3000C | 3000               | Raw coal         | 1500-1800             | 300-400                    | 1000                    | ~3000                    | 500-630                  |
| DRS1150*3000C | 3600               | Raw coal         | 1500-1800             | 300-400                    | 1150                    | ~3000                    | 630-710                  |
| DRS1300*3500C | 5000               | Raw coal         | 1500-1200             | 300-400                    | 1300                    | ~3600                    | 710-800                  |
|               | 7500               | Rock & Soil      |                       | 400-500                    |                         |                          |                          |
| DRS1600*4000C | 9000               | Raw coal         | 1500-2000             | 300-400                    | 1600                    | ~4000                    | 900-1120                 |
|               | 12000              | Rock & Soil      |                       | 400-500                    |                         |                          |                          |

### 3、Double roll sizer for secondary crushing (central breaking / side-wall breaking)

| Models          | Rated capacity t/h | Type of material | Feed particle size mm | Discharge particle size mm | Roll center distance mm | Effective roll length mm | Total installed power kW |
|-----------------|--------------------|------------------|-----------------------|----------------------------|-------------------------|--------------------------|--------------------------|
| DRS700*1500C/S  | 600                | Raw coal         | 300                   | 50-60                      | 700                     | ~1500                    | 150-220                  |
| DRS700*3000C/S  | 1000               | Raw coal         | 300                   | 50-60                      | 700                     | ~3000                    | 320-400                  |
| DRS800*3500C/S  | 1500               | Raw coal         | 300                   | 50-60                      | 800                     | ~3500                    | 400-500                  |
| DRS900*3700C/S  | 2300               | Raw coal         | 300                   | 50-60                      | 900                     | ~3700                    | 500-630                  |
| DRS1000*4200C/S | 3000               | Raw coal         | 300                   | 50-60                      | 1000                    | ~4200                    | 630-800                  |

# TRSM™ Heavy-duty apron feeder

Ideal choice for feeding and conveying equipment



# Heavy-duty apron feeder



## Application areas and product features

The heavy-duty apron feeder series of Huachuang Heavy Industry (Dalian) Co., Ltd. (TRSM) are suitable for conveying and transferring various minerals and rock & soil in big sizes (such as raw coal, iron ore, copper ore, limestone, oil shale and other minerals and various surface rock and soil stripping materials of open-pit mines).

TRSM's advanced design in non-coal mine application scenarios such as coal mine and metal mine. Rich experience in international cooperative manufacturing and reliable quality can provide users with strong Large conveying and feeding capacity, high reliability, long service life and low maintenance cost.

TRSM™ heavy-duty apron feeders can be used to feed large materials with the particle size of over 2.5 meters for all kinds of large primary crusher stations, and can also be used as feeders for conventional size materials under the high pressure working condition beneath silos.

TRSM™ heavy-duty apron feeder series have the maximum effective working width of over 3 meters and a length of up to 30 meters. The whole series of heavy-duty apron feeders are equipped with international high-quality brand drive system, bearing and D4-D11 standard series track chain drive system (segmented sprocket, lifelong lubrication-free chain, guide wheel, bearing wheel and return wheel, etc.) to ensure high reliability, long service life and maintainability of the product.

TRSM™ heavy-duty apron feeder series are designed with a rated capacity of over 12,000 t/h and are widely used as transfer conveyors at transfer points under the working conditions of high pressure beneath silos, or used in integrated equipment systems such as large fixed, semi-mobile and fully-mobile crushing stations as bulk material feeder at the front end of the primary crusher.

### Fields of applications

- Coal mines;
- Non-coal mines such as metal and non-metal mines.

### Product features

- Apron feeders can be installed horizontally or obliquely, with a maximum inclination of 26°;
- The design of large inclination angle can make the equipment more compact, so as to reduce the length of apron feeder and reduce the cost;
- Variable frequency motor drive to make the thickness of the material layer uniform, so as to ensure that the material flows evenly to the downstream equipment;
- Adoption of lifetime maintenance-free crawler chain system;
- Adoption of optimized design of H-shaped-section pans with fine-material-leak-proof and shock-resistant features;
- Pans with a feeding and anti-slip device are adopted to ensure that the material will not slide backwards under the condition of conveying angle and wet material.



## Head sprocket and tail wheel



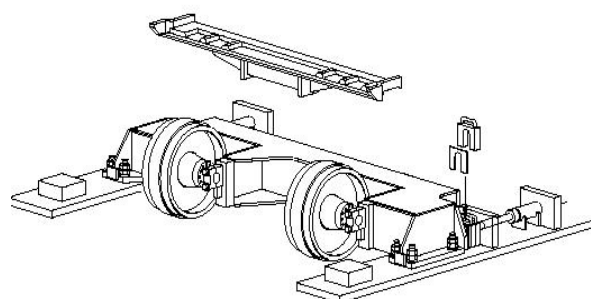
The drive shaft is fitted with the standard D4-D11 series segmented cast sprocket set, which is mounted to the hub with special bolts. No matter which segment of the sprocket set is worn seriously and can not be used, that segment of the sprocket set can be replaced independently without disassembling the chain.

The wheel hub and the driving shaft are installed in the form of an expansion sleeve, and the expansion sleeve not only effectively transmits heavy loads, but also has the characteristics of convenient installation, adjustment and disassembly.

Both sides of the drive shaft are equipped with heavy-duty split bearing housings, on which double-row spherical roller bearings, adapter sleeves and sealing components are integrated.

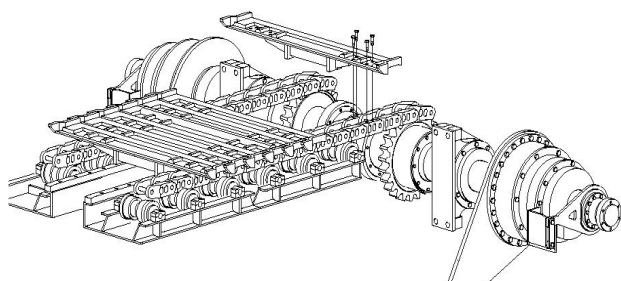
The tail wheels of apron feeder adopt the standard D4-D11 series toothless guide wheels, which help to offset the speed asynchronization of the two drive sprockets by slight slippage with the chain, and effectively compensate the distortion of the pans caused by uneven stress or asynchronous operation of the two chains.

The guide wheels are tensioned by a manual pump and a hydraulic cylinder, and after the tensioning is completed, gaskets with different thicknesses are inserted between the apron feeder frame and the guide wheel bracket to realize the accurate positioning and reliable locking of the guide wheels.



- The manual pump, hydraulic cylinder and pipeline accessories can be removed after each tensioning, and plugging protection measures shall be adopted for the permanent pipelines ;
- When inserting shims of different thickness, the thicker shims are to be used first.

## Drive system



The driving system of apron feeder consists of high-efficiency variable frequency motor, coupling (or torque-restricted high-speed-end coupling), hollow planetary reducer with hollow shaft shrink disc.

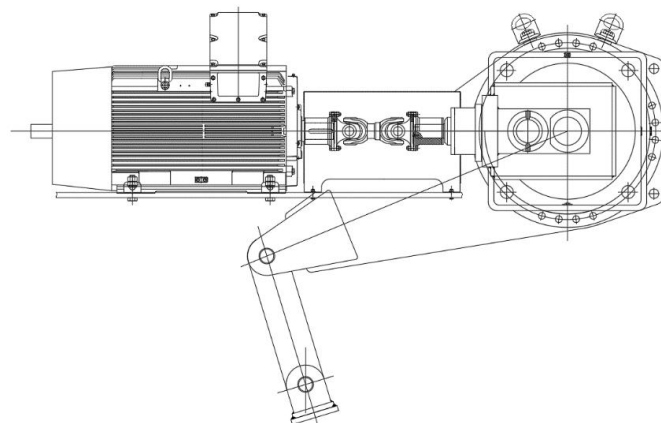
The rotating speed of the variable frequency motor is controlled by the frequency converter, so that the operating speed of the apron feeder is adjustable in a wide range, the pre-unification treatment of the materials required by various downstream crushers can be realized, and the stable material conveying capacity is provided.

Planetary reducer adopts the design of hollow shaft shrink disc, and is equipped with torque arm, which is reasonably arranged in a compact space.

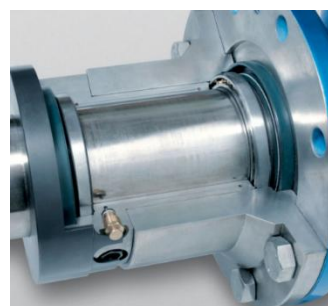
The selection of motor and planetary reducer takes into account the sufficient overload coefficient, which can meet the worst working conditions of start-up with the full max. load.

Cardan shaft + torque-restricted coupling can be configured between variable frequency motor and planetary reducer.

- The cardan shaft can effectively adjust the relative distance, misalignment and angle deviation between the motor output shaft and the high-speed shaft of the reducer.
- The torque-restricted coupling can set the input torque of the driving device, and automatically disengage under the working condition of exceeding the set input torque, so as to protect the motor and reducer.



cardan shaft



torque-restricted coupling

## Chain drive system



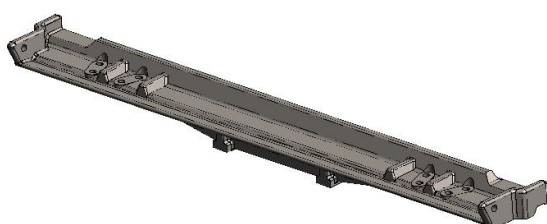
The D4-D11 standard series crawler chain track of the apron feeder has the characteristics of excellent load carrying capacity, fully sealed design and life-long maintenance-free, which greatly reduces the difficulty of maintenance.



The carrying idlers and return idlers of the apron feeder also adopt the D4-D11 standard series, and also have the characteristics of fully sealed design and life-long maintenance-free.



The welded pans, utilizing the specially optimized design of welded "H" section structure, effectively prevent deformation or damage risks caused by the impact of large materials and leak risks of fine materials. One pan in every five pans is designed with an anti-slip device to ensure that the apron feeder can maintain continuous and stable material conveying capacity under inclined conditions, especially during winter seasons when the material surface may be icy and slippery.



The one-piece casted pans also adopt the specially optimized design of "H" section structure with fine-material-leak-proof and shock-resistant features, and the material is cast manganese steel or high manganese steel, which is more suitable for highly abrasive materials (such as iron ore, copper ore, etc.).

## Slide rail system



The design of slide guide rails is also an important factor for contributing to the continuous and stable operation of the chain. The center distance is reasonably designed, so that the lower part of the pan is more firmly supported by adding 1-3 support points (depending on the width of the bearing plate) based on two support points from the carrying idlers.

The guide rail is made of ductile iron material, which has excellent mechanical properties and self-lubrication characteristics, making it suitable for applications with high load, complex force, and wear resistance.

### Optional kit

When the apron feeder is conveying materials, there will be a number of powder materials with high viscosity/water content adhering to the pans.

In order to prevent the sticky material from falling into the apron feeder during the return operation, the following design can be selected between the apron feeder and the downstream equipment (such as the discharge belt conveyor):

- Aggregate chutes
- Scrap scraper conveyor
- Scrap belt conveyor

Apron feeders can also be equipped with electric control and protection devices, such as:

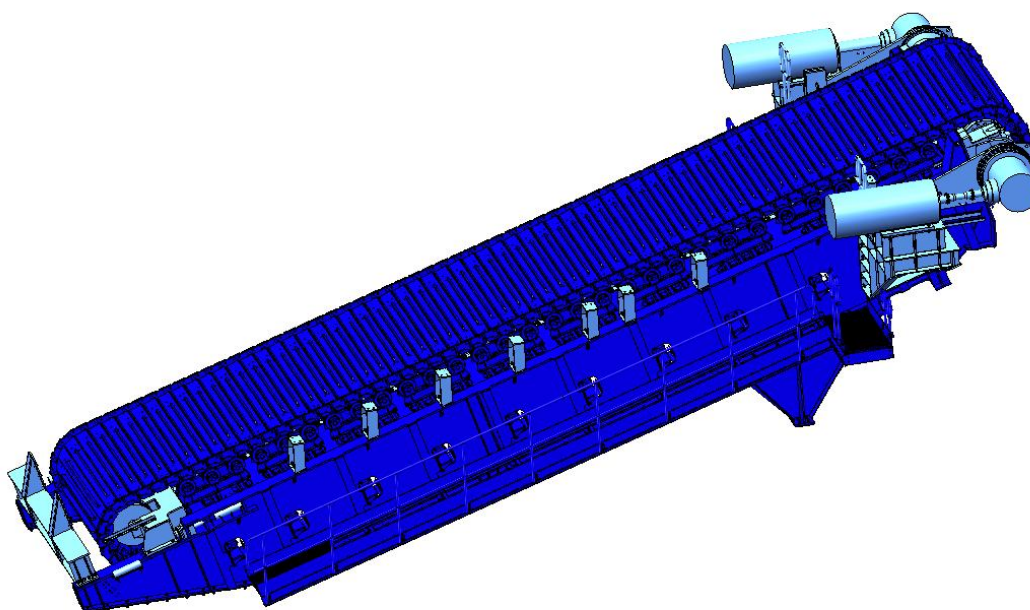
- Audible and visual alarms
- Speed sensors
- Broken chain protection sensors
- Pull cord protection switches
- Level sensors

## Typical models and configurations



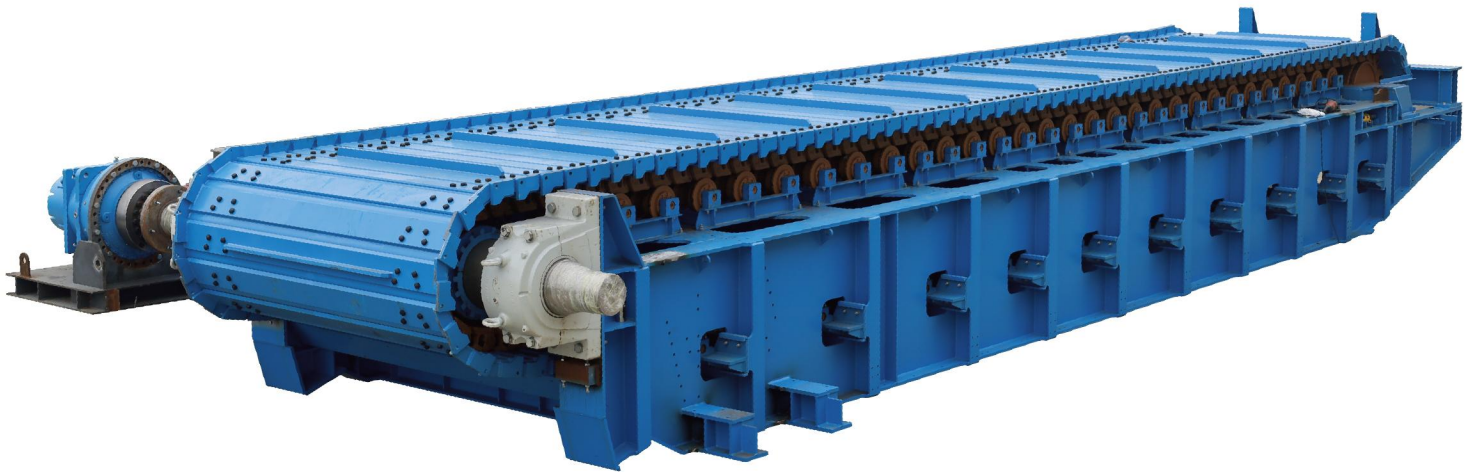
1. Apron feeders are used in equipment integration systems such as large fixed, semi-mobile and self-moving crushing stations.
2. The apron feeders are used as transfer conveyors under the working condition of high pressure beneath silos.

| Models | Rated capacity t/h | Type of material                                      | Effective pan width mm | Feeder Length mm | Speed m/s          | Elevation angle ° | Chain type | Total installed power kW |
|--------|--------------------|-------------------------------------------------------|------------------------|------------------|--------------------|-------------------|------------|--------------------------|
| AF1.6  | 1500               | Raw coal<br>Rock & soil<br>Metal minerals<br>and etc. | 1600                   | Customized       | 0.10~0.50<br>(VFD) | 0~26              | D5/D6      | 1x110<br>~<br>2x450      |
| AF2.0  | 2000               |                                                       | 2000                   |                  |                    |                   | D6/D7      |                          |
| AF2.4  | 3000               |                                                       | 2400                   |                  |                    |                   | D7/D8      |                          |
| AF2.6  | 5000               |                                                       | 2600                   |                  |                    |                   | D9/D10     |                          |
| AF3.0  | 9000               |                                                       | 3000                   |                  |                    |                   | D11        |                          |
| AF3.6  | 12000              |                                                       | 3600                   |                  |                    |                   | D11        |                          |



Your Reliable Partner in Mineral Crushing, Conveying and Handling Equipment and Systems!

Empowering the global heavy industry sector  
Creating the future of high-tech. equipment



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