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SUBCONTRACTOR






MITSUBISHI HITACHI POWER SYSTEMS  
EUROPE

PTOLEMAIS UNIT V, 660 MW POWER PLANT

Contract DMKT : 11 09 50 52




DOC. TITLE			
<div>User Manual</div> <div>Belt conveyor</div>		<div>Subcontractor Document</div> <div>Number</div> <div>N-100170-M-O19-GM03-00001</div>	
Document Number	4311-M-O19-GM03-00001	Rev. --	Sheet 1 of 43

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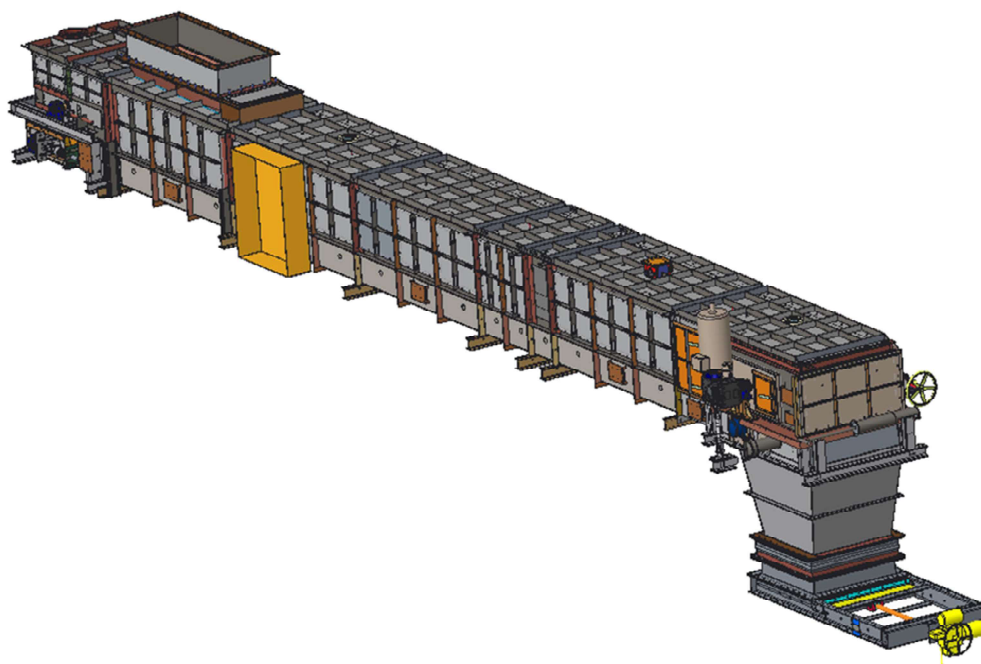
### REVISION SUMMARY SHEET

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		Comments			
		Internal Needs			
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# **User Manual** **Belt conveyor**






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## 1 Introduction

This document contains the plant specification, information on processes (for detailed information see operation manual N-100170-M-O19-GM02-00001) and specific descriptions of individual units and their maintenance.

The document does not claim to be complete in that it does not list all possible instructions and operations when operating the plant. It is not intended as a replacement for the essential training of operating personnel.

The manufacturer/supplier accepts no liability for damage caused by improper use, incorrect operation, deliberate damage, corrosion or erosion.

Correct use means that the plant is under constant expert supervision and rapid communication is possible between the control room and all the main local sections of the plant.

Safety norms or devices must never be fully or partially bypassed. In the event of such emergency operation, the supplier cannot assume responsibility for the resulting risks and consequences.

In addition to the operating instructions, the relevant national statutory and/or official requirements for operation of the plant apply.

The following regulations also apply to plants installed outside of Germany:

- The standard general national regulations for the operation of steam boilers
- The standard national regulations for the operation of firing systems
- The standard national accident prevention regulations

The supplier reserves the right to amend or supplement the document if new operational experience so requires.

It is in the interest of the operator to handle this document with care. In particular, it is important not to remove any individual pages.

The operator is requested to inform the supplier of important new performance data in order to ensure that the master document can be amended or corrected accordingly. The master document is located at:

Mitsubishi Hitachi Power Systems Europe GmbH




Department: Firing Components

Schifferstraße 80

47059 Duisburg

Tel.: +49 203 8038 0

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## 2 Identification

### 2.1 Type designation and marking of the machines

The Belt Conveyors, designed by Mitsubishi Hitachi Power Systems Europe GmbH (MHPSE), type GBF N80-xxxx, for the Mill Feeding System 07HFB of the Turow Power Plant (Com.-No.: N-100200-M-O19) have the following machine numbers:




KKS	Length [mm]	Φ-Φ	Weight [kg]	Machinery-no
5 0HFB10 AF001	33389	30079	22373	294
5 0HFB20 AF001	16074	12764	11988	295
5 0HFB30 AF001	16453	13143	12223	296
5 0HFB40 AF001	30663	27353	20737	297
5 0HFB50 AF001	30663	27353	20737	298
5 0HFB60 AF001	16453	13143	12223	299
5 0HFB70 AF001	16074	12764	11988	300
5 0HFB80 AF001	33389	30079	22373	301

### 2.2 Declaration of conformity

The Belt Conveyor has been designed and manufactured in compliance with the requirements of the EC machinery directive 2006/42/EC.

The declaration of conformity is specified in the Technical Documentation.

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### 3 Technical Data

#### BELT CONVEYOR

Belt Conveyor type	Belt Conveyor P800	
Number of Belt Conveyors	pc.	8
Belt width	mm	800
Drive pulley	mm	420
Adjusted Bed depth up to	mm	150
Belt velocity range	m/s	0,44...1,41

#### Coal feeder drive

5 0HFB10 AE001

5 0HFB40 AE001

5 0HFB50 AE001

5 0HFB80 AE001

Motor rating	kW	22 / 50Hz
Input speed	min-1	1480
Output speed (gear)	min-1	63,95...15,28

5 0HFB20 AE001




5 0HFB30 AE001

5 0HFB60 AE001

5 0HFB70 AE001

Motor rating	kW	18,5 / 50Hz
Input speed	min-1	1475
Output speed (gear)	min-1	63,95...15,28

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### Clean chain conveyor




Axle base [mm]

5 0HFB10 AT001	31376	
5 0HFB20 AT001	14061	
5 0HFB30 AT001	14440	
5 0HFB40 AT001	28650	
5 0HFB50 AT001	28650	
5 0HFB60 AT001	14440	
5 0HFB70 AT001	14061	
5 0HFB80 AT001	31376	
Scraper iron distance	mm	1000
Scraper iron width	mm	1000
Conveyor chain	mm	14x50

### Clean out conveyor drive

Motor rating	kW	3
Transmission ratio	-	95,09
Input speed	min-1	1455
Output speed	min-1	15,3

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## 4 General information on the operation, maintenance, inspection and repair of the Belt Conveyor

### 4.1 Symbols used



**Hazard**

The symbol indicates a potentially threatening hazard. Non-observance of this symbol may result in serious damage to health or even life-threatening injuries.



**Caution**

The symbol indicates a potentially hazardous situation. Non-observance of this symbol could result in less serious damage to health.



**Danger of falling objects**




The symbol indicates a potentially threatening hazard. Non-observance of the accident prevention regulations may result in serious damage to health or even life-threatening injuries.



**Keep hands clear**

The symbol indicates a potentially hazardous situation. Non-observance of this symbol could result in less serious damage to health. Warning of injury to hands

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## 4.2 General Instructions

To prevent hazards, the product standards that have been harmonized on the basis of the application, the specific EU directives, the user manual and all generally applicable standards apply for the operation, maintenance and repair of the Belt Conveyor. The Belt Conveyor must be operated and maintained only by reliable, professionally trained personnel who have been instructed accordingly.

It may only be used in perfect working order and for its designated use, having due regard for safety, an awareness of hazards and in due compliance with the following operating instructions. Faults that could compromise safety must be eliminated immediately.

The plant may only be operated for the designated use. The manufacturer accepts no liability for damage resulting from non-designated use.

Designated use includes observance of the respective operating instructions and compliance with the inspection and maintenance requirements. This includes the more detailed operating instructions for the individual units. This manufacturer documentation forms part of the overall documentation.

Modifications to the plant that might compromise safety must not be made without the manufacturer's approval; this includes the installation and adjustment of safety devices and valves, as well as welding on pressure parts or components subject to static and dynamic stress.

No additional welds may be carried out on the Belt Conveyor and its components without consultation with and the approval of MHPSE since the resulting heat could cause consequential damage. Warranty claims against MHPSE on this basis will be rejected.

Safety devices, such as electric interlock chains, must never be fully or partially bypassed. Work on electrical equipment must be carried out by a qualified electrician.

Modifications to programmable control systems are prohibited.




The location and use of fire extinguishers and the fire alarm and firefighting equipment should be noted.

The plant is built according to the state of the art and generally accepted safety rules.

Knowledge of the basic safety information and regulations is relevant to safe and smooth plant operation. All personnel working in this area must follow the safety instructions.

Personal protective equipment must be worn.

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### 4.3 Directives taken into consideration

The plant is built according to the state of the art and generally accepted safety rules.

With regard to safety, three specific EU directives were reviewed for their relevance to the Belt Conveyor:

- Pressure Equipment Directive (PED)
- Machinery Directive (MD 2006/42/EC) for mechanical hazards
- ATEX Directive for explosion hazards.

#### a) EU Pressure Equipment Directive (PED)

The PED is not relevant to the Belt Conveyor, because the criterion medium pressure  $p > 0.5$  bar is not met.

#### b) EU Explosion Protection Directive (ATEX, 94/4/EC)

This directive is relevant to the Drag-link Chain Conveyor, because the criteria “assembly of linked parts or components, at least one of which moves” and “joined together for a specific application” are relevant.




#### c) EU Machinery Directive (2006/42/EC)

This directive is relevant to the Belt Conveyor, because the criteria “assembly of linked parts or components, at least one of which moves” and “joined together for a specific application” are relevant.

#### d) Other important reference standards and documents:

- EN ISO 14121 and EN ISO 12100 Safety of Machinery
- EN 12952-9 Requirements for firing systems for pulverized solid fuels (Replaces TRD 413 and CEN/TC 266)
- EN 1011-1 to 8 Welding
- EN 13155 Cranes
- EN 50110-1 and 2 Operation of electrical installations
- DIN EN 50156-1 Electrical equipment for firing systems
- DIN 4420-1 to 4 Working and protective scaffolds
- DIN EN 12810-1 und 2 Working and protective scaffolds
- VGB M 213H Coal pulverizing plants

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- VGB R 200 Design and operation of power plant firing systems
- VGB M 112 und VGB R 112 Fire protection in power plants
- Federal Ministry of Justice accident prevention regulations §15
- Operator's accident prevention regulations

#### 4.4 Further information on operating the Belt Conveyor

Essential requirements for operating and maintaining plants/machines are listed below. Non-compliance may result in injury and damage.

- There are no metallic foreign bodies in the machine that could impair the function of the Belt Conveyor and cause damage
- The use of appropriate magnetic separators upstream of the coal bunker prevents metallic parts from entering the Belt Conveyor with the coal
- To prevent coal dust deposits and fire, there must be no foreign bodies, such as cotton waste, firing cables and welding wires, in the Belt Conveyor
- All access openings, doors and hand holes on the Belt Conveyor are closed.
- Before switching on/starting the plant, ensure that no-one is potentially at risk by the operation of the machine/plant.

Any changes, including changes to operating characteristics, must be reported to the responsible plant section without delay. If necessary, the plant must be shut down immediately. The on/off procedures and control indicators specified in the operating instructions must be observed.






#### Caution

Operation with bypassed/defective limit monitors is prohibited. The manufacturer assumes no liability for damage caused by exceeding the limit values.

All monitoring instruments, pipelines and bolt/screw connections must be checked both for correct and secure installation and for correct function according to the technical data and properly adjusted in accordance with the manufacturer's specifications.

During each start-up operation, monitor the power consumption of the Belt Conveyor motor. At a much higher consumption than usual, take the plant out of operation immediately, determine the cause of increased power consumption and

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eliminate it.

#### 4.5 Information on accessing the Belt Conveyor for maintenance and repair

Essential requirements for operating and maintaining plants/machines are listed below. Non-compliance may result in injury and damage.




- Only access in accordance with customer specifications and when the Belt Conveyor has been deactivated at the control desk.
- Only access the Belt Conveyor when personal protective equipment (PPE) is worn and with a fall protection system in place.
- Always access the Belt Conveyor with another person.
- Drive motors for the mill, Mill Feeding System and classifier cannot be switched on and have also been enabled.
- Only access when the hopper has run empty the bunker shut-off gates are locked and the coal downpipe are secured.
- Only access when the Belt Conveyor was cleaned before.
- When welding, ensure that the equipotential bonding is directly adjacent to the device protecting the roller bearings against current passage. Welding, torch cutting and grinding work to the plant may only be performed with express approval, e.g. there are no fire or explosion hazards. Before welding, torch cutting or grinding, remove dust and combustible materials from the plant and its surroundings and ensure adequate ventilation (explosion hazard).
- All work must be documented in accordance with customer specifications.
- The setting, maintenance and inspection work and dates specified in the operating instructions must be carried out on schedule by specialist personnel and documented.
- Machinery and equipment on which inspection, maintenance and repair work are carried out must be switched off – if specified. If work on live parts is necessary, a second person must be present to operate the emergency stop or mains switch with voltage tripping mechanism in an emergency. Working areas must be cordoned off with a red and white safety chain and a warning sign. Electrical work must be carried out with insulated tools.



#### Caution

Only lubricants may be used according to the specification from our lubricant list.

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## 5 System description

### 5.1 Belt Conveyor

The coal transferred from the drag-link chain conveyor passes over the chutes onto the belt. This will pull the coal towards the downspout. The respectively required fuel quantity is achieved via upstream chain conveyor. The Belt conveyors are designed in a dustproof execution.

If coal falls next to the belt, it is transported through a cleaning unit in the direction of discharge chute.




Depending on the location of the associated mill one or two belt conveyors are arranged downstream of the Belt conveyors. The last belt conveyor transports the coal via a gravity chute to the recirculation duct.



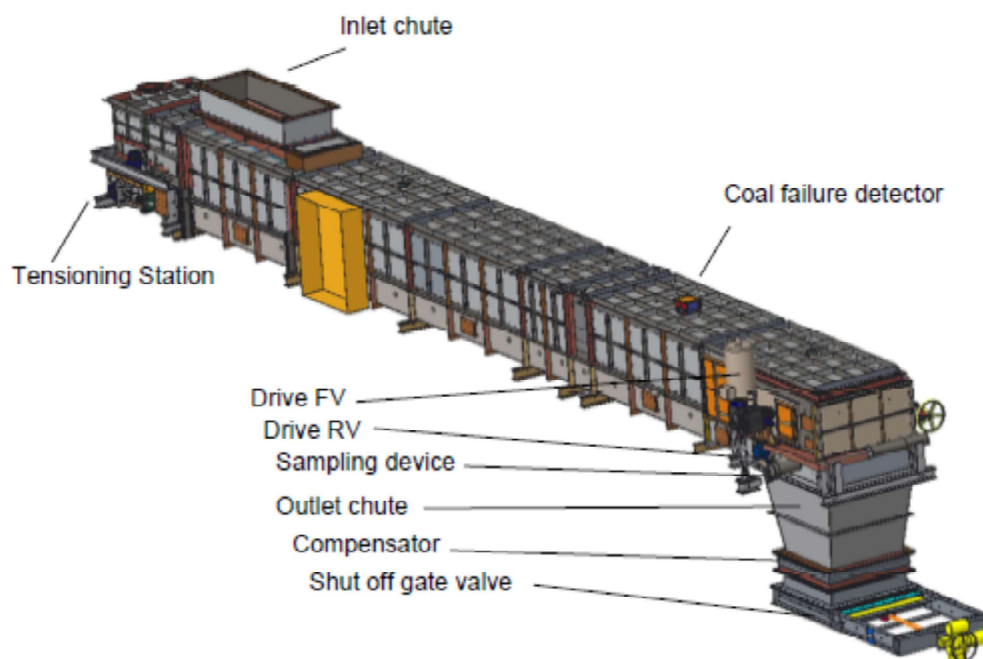
Caution!

- Starts without prior warning
- Vibrations may occur
- Area only accessible to authorized personnel
- Take heed of rotating parts
- Service, maintenance and repair work may only be carried out with a special permit
- Only with protective clothing
- Always access the Mill Feeding System with another person

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## 6 Description of deliverables



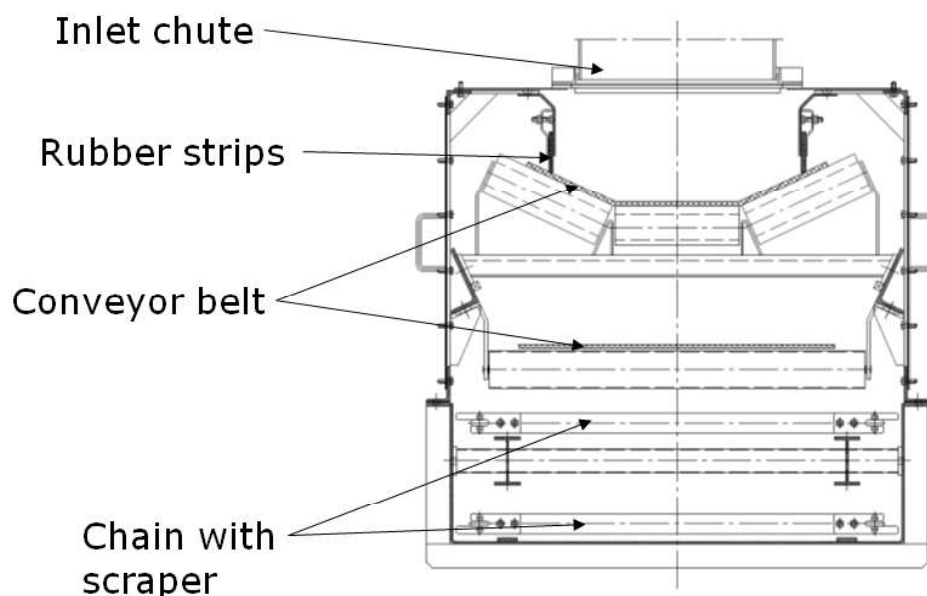
The Belt Conveyor 5 0HFB10-80 AF001 with its main components

- Housing / Inlet chute
- Drive station
- Tensioning station
- RV Drive - Chain with scraper
- Coal failure detector
- Sampling device
- Outlet Chute
- Compensator
- Shut off gate valve

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## 6.1 Housing / inlet chute






**Figure 1 - housing, inlet chute**

Housing of the entire belt conveyor in sheet metal construction, lateral housing removable, fastening with through bolts, cover in sheet metal construction; in the application area no housing joints, sealing between the housing parts and the cover by flat gaskets. Length of housing parts approx. 2.5 m (housing parts screwed together and sealed), stiffening of the enclosure between the supports, Hardox floor protection or similar material, inspection / inspection openings, extinguishing doors and vulcanization openings with asbestos-free sealing.

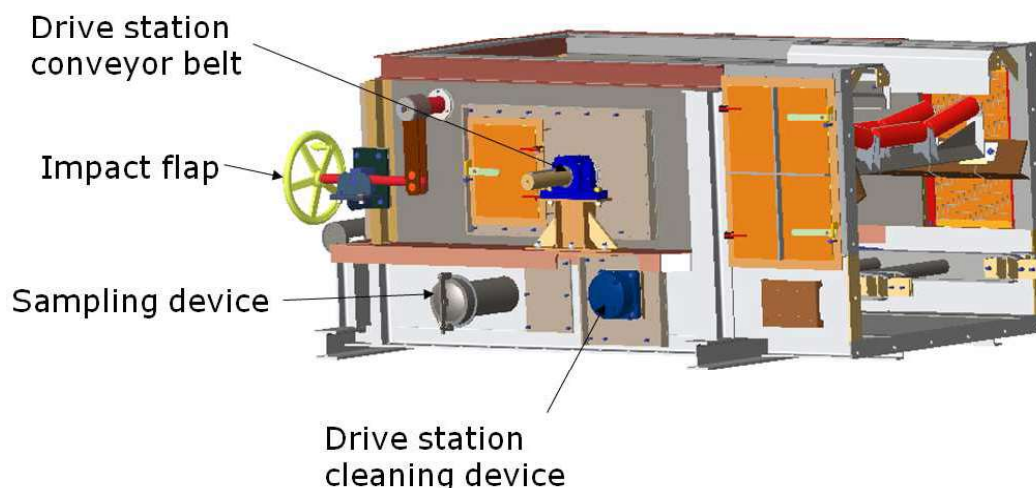
Gaskets to be operated with tools, gland seals at the shaft passages, gas tight, dust-free, encapsulated design for the design pressure 1.0 bar overpressure and - 20 mbar vacuum.

Material guidance about the whole length of the conveyor belt (from the inlet to the outlet) in a bolted and welded sheet metal design. Sealing between the conveyor belt and the inlet chute is realized by manual adjustable rubber strips.

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## 6.2 Drive station






Drive frame and bevel helical gear motor in a welded, partly screwed version. Cover with inspection glasses and asbestos-free seals.

Belt cleaning device executed as a spring disk cleaning device. Drive pulley with a diamond patterned rubber lining. The shaft of the pulley is running in pedestal bearing blocks, attached to the pulley via clamping set and sealed to the outside of the housing by gland packing.

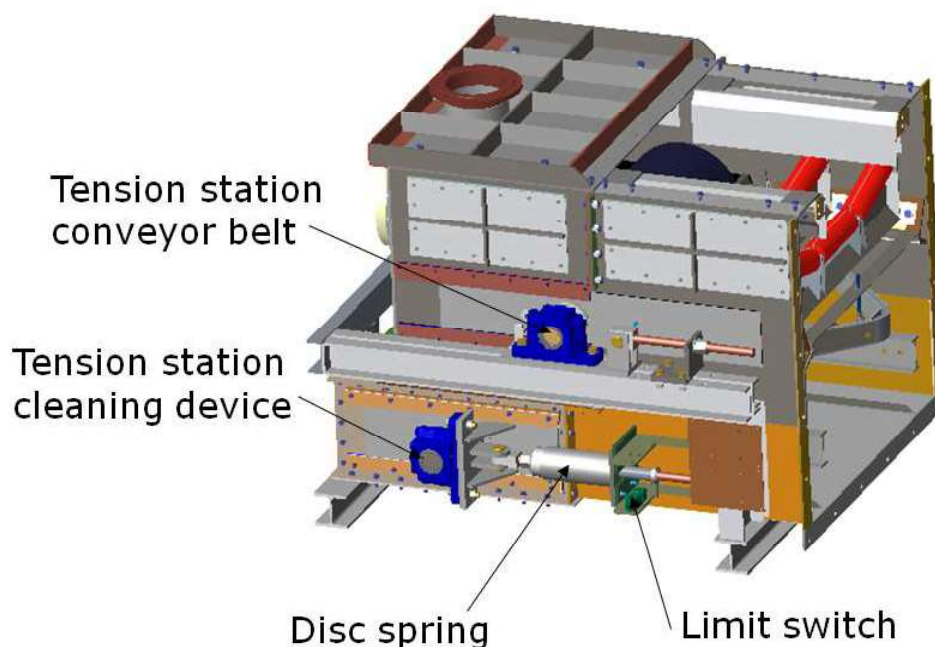
A screwed on stainless steel impact flap, which can be adjusted by hand wheel. The sampling device on one side of the housing can be used to take coal samples.

A slip-on gear mechanism drives the drive station of the cleaning device. The flange of the cleaning device drive station is bolted to the counter flange in the belt conveyor housing. The sprockets for chain motion are connected by feather key to the drive shaft of the cleaning device.

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### 6.3 Tensioning station






Scaffolding in a welded, partly screwed steel construction with two spindle tension stations for the conveyor belt and for the chain. Tension pulley with a diamond patterned rubber lining.

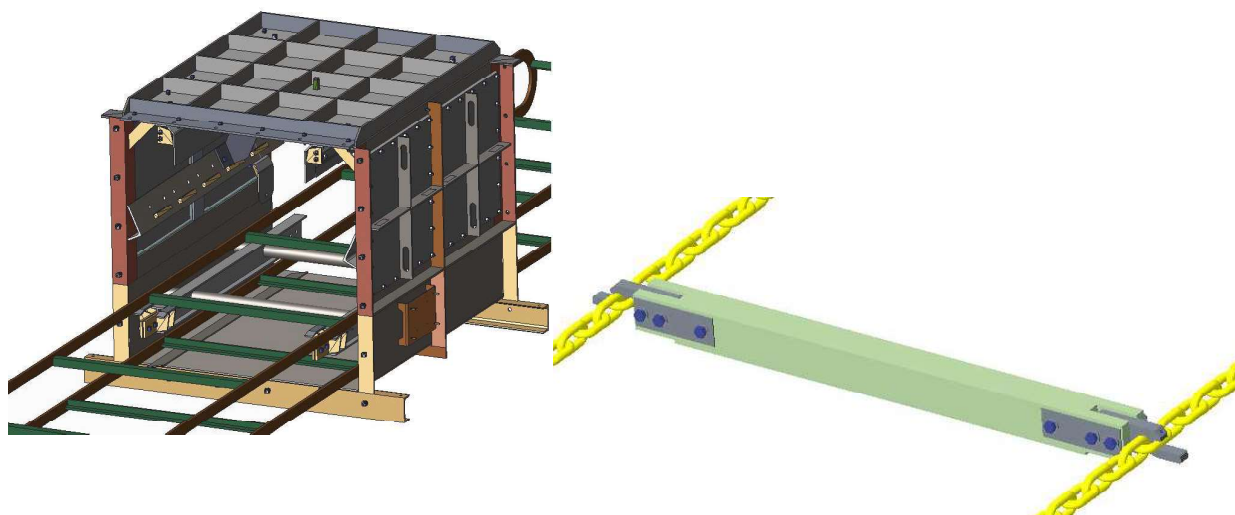
The shaft of the pulley is running in horizontally moveable pedestal bearing blocks, attached to the pulley via clamping set and sealed to the outside of the housing by moveable flat sealing.

The shaft of the cleaning device is carried out in a similar design, but the tension is made by spring-loaded clamping device and controlled via limit switches.

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## 6.1 Cleaning device



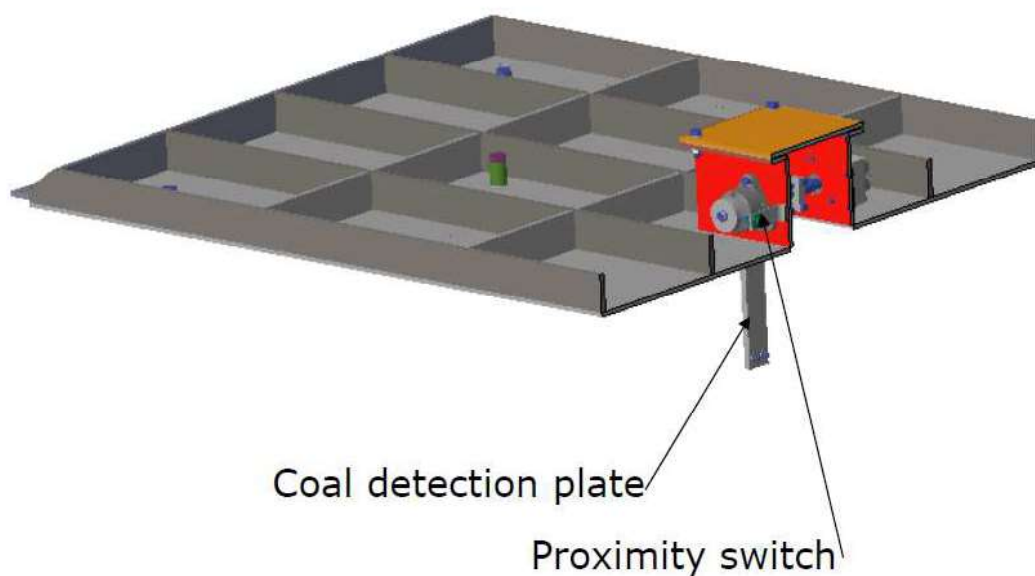
Among the belt conveyors, over the entire length, twine crane chain conveyors are used to clean up the spillage. Through the chain conveyor, the spillage is fed to the flow chute.

KKS	Chain Dimension
5 0HFB10 AF001	<b>14x50x 64000</b>
5 0HFB20 AF001	<b>14x50x 29000</b>
5 0HFB30 AF001	<b>14x50x 30000</b>
5 0HFB40 AF001	<b>14x50x 58000</b>
5 0HFB50 AF001	<b>14x50x 58000</b>
5 0HFB60 AF001	<b>14x50x 30000</b>
5 0HFB70 AF001	<b>14x50x 29000</b>
5 0HFB80 AF001	<b>14x50x 64000</b>

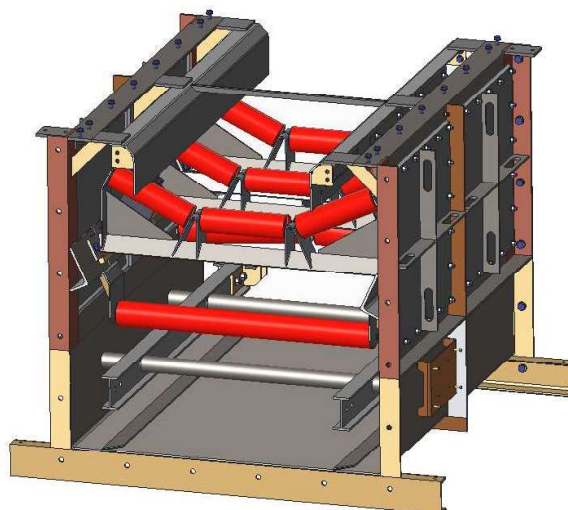
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## 6.2 Coal failure detector






## 6.3 Rolls



In order to give the belt better guidance and support during operation, rollers were mounted. Here three-piece domed idlers in the upper area and one-piece rigid idlers were used in the lower area.

The rollers can be mounted and dismantled through the top and side covers.

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### Carrying roller stations in the upper run

Three-piece domed carrying roller stations; permanently lubricated, as a rigid (displaced on support roller carrier) carried out carrying roller stations;

Trough angle		25 °
Diameter	mm	89
Track roller castors	mm	63/108
Roller distance on the track	mm	630
In the inlet areas	mm	250
Carrier with roof-shaped profile to prevent dust deposits.		

### Carrying roller stations in the lower run

One-piece rigid idler roller stations;




Diameter	mm	108
Carrier roll distance and return pulley station(s)	mm	2500

Assemble the rollers according to the drawings  
N-100170-M-O05-ID04-00001-00004

## 6.4 Belt cleaning devices

The belt cleaning is carried out by external and internal belt cleaner. To clean the carrying side of the belt, use spring lamella cleaners (main and pre-cleaner) and plow-shaped inner belt cleaners to clean the running side. The cleaners are located in the drive station, on the drive drum and in front of the tensioning drum.

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## 6.5 Belt

The dimensioning and selection of the respective belt takes place on the basis of the conditions of use and the corresponding calculation regulations (DIN 22100). The conveyor belts are of belt quality S, flame retardant, hot material quality 100 ° and antistatic.

KKS	Belt Dimension (endless length mm)
5 0HFB10 AF001	64000
5 0HFB20 AF001	29000
5 0HFB30 AF001	30000
5 0HFB40 AF001	58000
5 0HFB50 AF001	58000
5 0HFB60 AF001	30000
5 0HFB70 AF001	29000
5 0HFB80 AF001	64000

## 7 Maintenance and inspections

### 7.1 General




Mechanical conveyors require periodic maintenance and wearing part replacement. Scheduled, preventative maintenance and replacement will reduce operations and maintenance costs, decrease repair outage times, and increase boiler unit and conveyor availability.

Mitsubishi Hitachi Power Systems Europe GmbH recommends stocking items which are most often replaced, are critical to the operation of the Conveyor or require long lead time for delivery.

To achieve high operational safety and good availability, scheduled servicing of the Submerged Scraper Conveyor and its parts and scheduled maintenance involving the repair and/or replacement of parts should be carried out when the system has been shut down.

All inspection work must be documented in a work report.

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As a rule, it is therefore recommended that maintenance work involving the repair and replacement of parts is not left until it is absolutely necessary but that preventive maintenance is carried out on a continuous basis in order to prevent unplanned Belt Conveyor shutdowns.

Preventative maintenance and worn part replacement should be coordinated with scheduled outages.

Trouble-free operation is however only expected, if the plant has been properly installed and the operating instructions contained in this instruction manual are observed.

These operating instructions should be carefully read by the operating personnel before installation and start-up of the plant.

The complete maintenance work has to be performed by qualified maintenance personnel so that the operating reliability is always ensured. These maintenance personnel have to be instructed by the operator/owner and entrusted with the maintenance of the plant items.

Comprehensive knowledge of the complete operation and maintenance documentation is another requirement for the performance of maintenance work.



### Caution!

- Area only accessible for authorized personnel
- Works have to be carried out only by trained and skilled personnel
- Works have to be carried out with at least a second person
- Service, maintenance and repair work may only be carried out with special permit
- The indicated personal protection equipment has to be worn.
- When working on electrical components it has to be ensured that they are de-energized
- It is prohibited to fight fire at electrical installation with water




## 7.2 Work instruction for a Belt Conveyor inspection

The following is a list of what needs to be kept to for maintaining the operating and maintenance states of equipment/machinery.

**To avoid personal injuries or machine damages the following precautions have to be kept.**




- Ensure that the local control for the Belt Conveyor cannot be switched on and has also been enabled.

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- Only access in accordance with customer specifications and when the Belt Conveyor has been deactivated at the control desk.
- The indicated personal protection equipment including a fall protection mechanism has to be worn.
- Always access the Belt Conveyor with another person.
- Drive motors for the Belt Conveyor cannot be switched on and have also been enabled.
- Only access the Belt Conveyor when the hopper has run empty the bunker shut-off gates are locked and the coal downpipe are secured.
- Only access after the Belt Conveyor has been cleaned out.
- When welding, ensure that the equipotential bonding is directly adjacent to the device protecting the roller bearings against current passage. Welding, torch cutting and grinding work to the plant may only be performed with express approval, e.g. there are no fire or explosion hazards. Before welding, torch cutting or grinding, remove dust and combustible materials from the plant and its surroundings and ensure adequate ventilation (explosion hazard).
- All work must be documented in accordance with customer specifications.
- The setting, maintenance and inspection work and dates specified in the operating instructions must be carried out on schedule by specialist personnel and documented.
- Machinery and equipment on which inspection, maintenance and repair work are carried out must be switched off – if specified. If work on live parts is necessary, a second person must be present to operate the emergency stop or mains switch with voltage tripping mechanism in an emergency. Working areas must be cordoned off with a red and white safety chain and a warning sign. Electrical work must be carried out with insulated tools.
- Before starting work on the Belt Conveyor, all access openings have to be opened.
- It has to be ensured once the work is over that all components – and especially the protection guard – are properly fitted.
- It has to be ensured that all access openings of the Mill Feeding System became secured again against unintentional opening after maintenance and/or repair work.

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- With the work over, the component needs to be released for the operation – something which is to be logged. (Given that no further work is to be undertaken).

### 7.3 Preventative Maintenance

LUBRICATION - Important for a long availability is to follow the recommended lubrication interval. Refer to the lubrication schedule contained in this manual.

MECHANICAL EQUIPMENT – To maintain the operation of the system and its components the following general measures are required:

- Regular cleaning of the entire conveyor system
- Assessment of corrosion (paint, bare parts, fasteners, etc.) and repair or replacement
- regular control of the condition of the conveyor chain and the scrapers, the safety devices and the entire steel structure on wear, damage, deformation, cracks, etc. .
- All fasteners such as screws, nuts, bolts, etc. are to be checked for tightness after every 200 operating hours;
- Replacement of wear parts and removal of the deficits found during the checks, insofar as these do not assume the extent of a repair;
- Check the chain pre-tension

#### a) Maintenance of the electrical Equipment

Basically maintenance work only has to be performed by the authorized and instructed electrical specialist technicians.

Before maintenance work is carried out on electrical systems they have to be switched off and protected against erroneous or unauthorized switching on.

For fault location on the electrical system the circuit diagrams should be used.

#### b) Adjustment works




In addition to the information on the elimination of faults, the following remarks also contain supplementary statements about such operations to which increased safety requirements are made.

### 7.4 Chain

#### a) Replacement of conveyor chain

- Dismantle the rear wall of the tensioning station and the upper trough cover

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- Relax the conveyor chain tension
- Disconnect the old conveyor chain in the upper section, at an accessible point; i.e. knock pin lock and bolts out of the left and the right chain strand
- Fasten the new chain to the upper run, leading to the drive station
- By help of the Belt conveyor drive (select the smallest conveying speed), the new strap chain can be carefully pulled in; at the same time the old strap chain is pulled out at the tensioning station
- It should be checked by continuous visual inspection that the link chain does not jam
- After the entire strap chain is pulled into and the old strap chain has been removed, connect the chain ends with the bolts and hammer in the pin retainer (2 tension sleeves per bolt)
- then remove all fixtures and tools and pre-tension the conveyor chain with the necessary chain tension
- Check the free movement of the link chain
- Carry out test run without load and observe the running behavior of the chain
- The assembly takes place in reverse order
- The chain should be pretension so far that the running chain center behind the deflection roller sags approx. 15 - 25 mm. It must always be ensured that the deflection shaft is perpendicular to the conveyor in order to avoid tarnishing of the chain from the deflection roller.

b) Shorten the conveying chain




- If the tensioning travel is exhausted, the conveyor chain must be shortened by one chain element.
- For this, the conveyor chain is completely relax
- Remove the upper tray cover at the tensioning station
- Remove the bolt locks with two bolts from the left and right chain links with bolts, remove a chain link
- Reinstall the bolt and secure it properly.

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- Then tighten the conveyor chain again
- c) Change of the middle sprocket wheels on the drive sprockets
- Disassemble the drive housing
  - Relax the conveyor chain
  - Disconnect the conveyor chain (see Replacing the conveyor chain)
  - remove cotter pins from the castle nuts, loosen the crown nuts and remove the dowel screws with half the sprocket plate from the hub; then the other half of the sprocket disk has to be removed
  - When installing the new sprocket wheels, make sure that the rounded tooth flanks point in the direction of rotation
  - The assembly takes place in reverse order
- d) Change of the middle sprocket wheels on the deflection sprockets
- Remove the rear wall of the tensioning station and the upper drainage cover. Further procedure as described in the chapter before.
- e) Removal of the drive
- De-energize the drive
  - unscrew all wiring
  - Attach the drive unit to the hoist and relieve the drive shaft
  - Release the end cover and the torque arm and pull off the drive
  - The assembly takes place in reverse order
- f) Removal of the drive shaft
- Disassemble the drive
  - Remove drive housing
  - Relax and disconnect the conveyor chain
  - Attach the drive shaft to the hoist and relieve it

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- Loosen flanged bearing screws and pull out drive shaft
  - The installation of the drive shaft takes place in reverse order
- g) Removal of the tensioning shaft
- Remove the front wall and upper drain cover.
  - Relax and disconnect the conveyor chain
  - Loosen clamping spindles from plummer block housings
  - Clamping shaft can be removed by means of lifting gear to the rear
  - The clamping shaft is installed in the reverse order

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## 7.5 The conveyor belt

### a) Placing the conveyor belt

Before installing the conveyor belt, check that the idlers and drums are aligned and easy to turn. It should also be noted that drums and carrying rollers are free of grease, oil and dirt and, if possible, dry. During laying, attention must be paid to the marking of the running direction as well as to the carrying or running side. After vulcanization, the conveyor belt receives the required preload in order to be able to transmit the driving force without slip, d. H. The drive drum must not slip when starting under full load.

Overstretching the conveyor belt is to be avoided for reasons of belt life as well as the drum bearings. Operation of the conveyor is only possible with the belt in tension. A stop value for the correct belt tension is the passage of the belt in the lower strand:

Slack 1% of the carrying roller distance

Example: carrying roller distance 3,000 mm - passage 30 mm

### b) Tensioning Station

Uniform pretensioning on belt conveyor systems with clamping spindles must be ensured. Both spindles are to be tightened at the same time.

### c) Belt scraper

Scrapers are used to clean the conveyor belt. The standard version consists of:




Upper belt scraper for cleaning the upper side of the belt, installed in the lower run, directly behind the drive drum.

Internal belt scraper for cleaning the underside of the belt (tread) installed in the lower run, immediately before the entry into the turnaround and at weighting stations before entering the tensioning loop.

The scrapers have an adjustable stop. Adjust the stop so that the scraper frame does not touch the conveyor belt when the rubber lips are worn. Rubber overhangs min. 5 mm. If the rubber protrusion is lower, adjust or replace the rubber.

For other types of scrapers, the manufacturer's instructions must be followed. They can be found in the appendix.

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Inner belt and outer belt scraper must be checked during full load trial operation and readjusted if necessary.

The readjustment can be carried out if the adjustment of the scrapers takes place outside of the moving parts. If this is not possible, the scraper must be adjusted while the conveyor belt is at a standstill. When working on the conveyor, it must be secured against unauthorized or unintentional switching on. The conveyor may only be operated with all protection and safety devices. When setting it is important to ensure that there is no damage to the belt.

d) Replacement of belt

- Dismantle the cover hood A of the through in the middle of the conveyor housing
- Relax the conveyor belt tension
- In the area where the cover hood was removed, the belt has to be cut orthogonal to the rolling direction
- Installation of the special tool of the old and the new belt ends, to be able to pull the old belt out and the new in.
- By help of the Belt conveyor drive (select the smallest conveying speed), the new strap chain can be carefully pulled in; at the same time the old strap chain is pulled out at the tensioning station
- **For all further steps it is absolutely necessary that specialist handle the preparation for connection and vulcanization of the belt!!!**

e) Main rules for the regulation of the belt run

After installing the conveyor belt, the most important task is to be precise Regulation of the belt.

Method:




\* The conveyor belt must be properly tensioned.

- o Sag 1% of the idler roll distance at the lower strand
- o Example: idler rollers distance 2500mm – Sag 25mm

\* Check that the drive and tensioning drum are positioned at right angles to the system.

\* If necessary, the tensioning drum can now be adjusted slightly.

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**ATTENTION! Tilting the tensioning drum changes the sides of the belt.**

f) Main rules for tensioning the conveyor chain

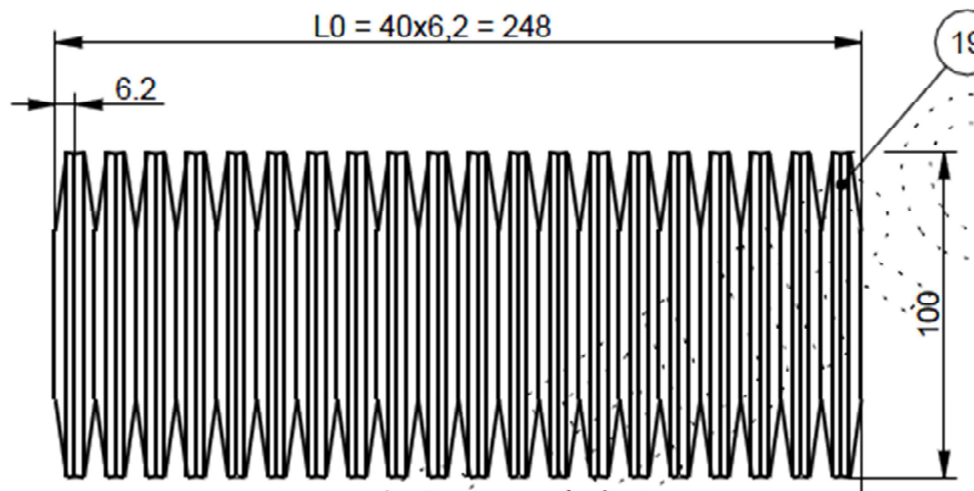
After mounting the conveyor chain, the most important task is to set the right tension on the chain.

\* The prestressing force of the conveyor chain is for all conveyors:




Max. Preload force  $2 \times 8,6 \text{ kN}$        $F = 17,2 \text{ kN}$

Min. Preload force  $2 \times 6 \text{ kN}$      $F = 12 \text{ kN}$

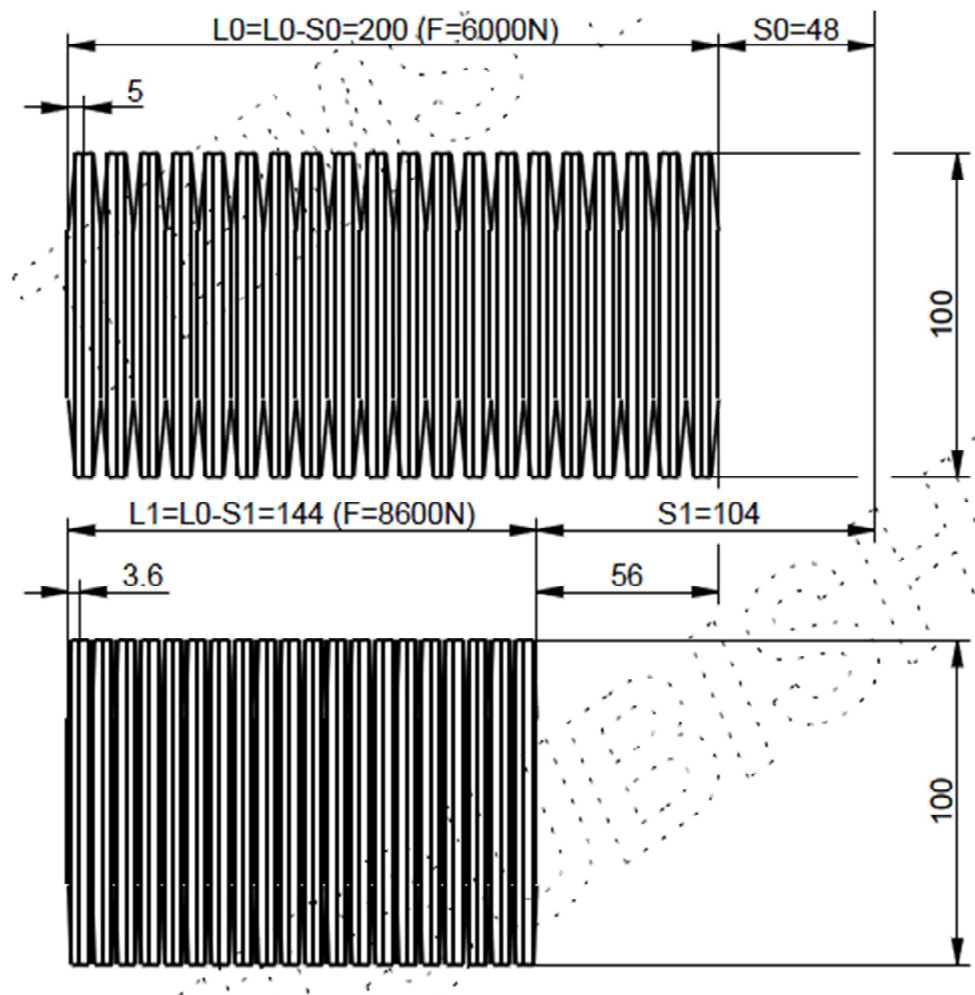
Disc spring package without preload



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### Disc spring package with preload



If the min. pretension force is reached, the spring assembly must be tightened.  
If an adjustment is no longer possible, the chain must be shortened.




Reaching the min. preload force is indicated by a limit switch query.

## 7.6 Return station

The deflection station consists of the tail pulley with the tensioning device, according to the disposition drawing. During assembly, the tail pulley is moved as far as possible to the drive station and fixed at this point. The final setup of the tail pulley is done after belt mounting.

Uniform pretensioning on belt conveyor systems with clamping spindles must be ensured. Both spindles are to be tightened at the same time; this influences the straight running of the system.

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All clamping spindles and clamping nuts must be greased and wrapped with grease flaps.

## 7.7 Drums

All drums must be aligned at right angles to the conveyor axis and parallel to each other. If necessary, the use of lining sheets is required. The drum surfaces must be free of dirt, oil or grease. All existing bearing screws must be tightened.

The grease filling of the bearings used must be checked immediately after assembly and, if necessary, completed in accordance with the operating instructions. For drive drums with arrow-shaped friction linings, pay attention to the installation direction (arrow in conveying direction). Mainly with ceramic friction linings.

## 7.8 Idlers

The idlers in the upper and lower run are always aligned at right angles to the belt axis and parallel to each other. If carrying idlers are used, choose the center mounting position of the fixing screws and make sure that the screws are tight.

A re-lubrication of the roller bearing is not possible, since only life lubricated bearings are used.

# 8 Lubricating Instruction

## 8.1 General Notes




Operating safety, reliability and economic efficiency of the plant items depend on the regular and correct lubrication of all areas of friction.

Decisive is the knowledge and observance of all rules and regulations in taking the below described measures. Of particular importance is observance of

- ⇒ cleanliness
- ⇒ checks
- ⇒ specified lubricant types and quantities
- ⇒ lubricating periods
- ⇒ lubricant change periods
- ⇒ proper lubricant supply

In order to ensure proper operation of the coal mills feed system of block no. 7 and to guarantee the durability of mechanical elements, as provided for in the design assumptions, periodic inspection, lubrication and maintenance should be carried out according to the recommendations given in the following table (Doc. No.: N-100170-M-O19-ID27-00001).

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#### a) Checks

Before first commissioning, after repairs and after longer downtimes it has to be checked whether the lubricant flow indicated in the lubricating plan is supplied to all areas of friction.

During the running-in period the bearings are to be checked for quiet running and normal heating and – if necessary – re-lubricating with the lubricant provided for this purpose.

#### b) Oil Level Check

The oil level of all machine elements and equipment lubricated with oil is to be checked during downtime according to the indications in the lubricating plan.

During operation no oil should be refilled.

#### c) Lubricant Change

During filling up and/or replacement of the lubricant great importance has to be attached to the fact that no foreign matter pass into the lubricant (as e.g. sand, dust, residues of cleaning wool or water). Adequate provisions have to be made for this purpose.

In case other lubricants than those indicated in the lubricating instruction for the attachment parts are used these lubricants should have the same quality as those indicated.

Different lubricants should not be mixed with each other. The check of the lubricants for compatibility is requirement for their use.

The indication of the oil flow in the tables is to be considered as approximate quantity only; the exact quantity is to be filled in according to the oil level marking and/or the data on the name plate.




## 9 Technical data for installation, operation and maintenance

1. Weights
2. Tightening torque

### 9.1 Weights

Please see chapter 14

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## 9.2 Tightening torques

Unless otherwise specified in drawings and/or charts, the pre-tensioning forces and tightening torque specified in the relevant literature apply.

Dimensions	Material	Tightening torque (Nm)
M 6	8.8	10
M 8	8.8	25
M 10	8.8	45
M 12	8.8	85
M 14	8.8	130
M 16	8.8	210
M 18	8.8	285
M 20	8.8	425
M 22	8.8	550
M 24	8.8	690

## 10 Operation




The Belt Conveyor has been designed to operate continuously with a minimum of operator intervention. Once operating, the equipment will continue to operate automatically depending on the generated ash amount under the full range of boiler operation, unless a shutdown is initiated by the system logic or manual by the operator.

If shutdown is processor generated, the fault will alarm at the belt conveyor control cabinet. The operator should visit the conveyor to understand the specific nature of the problem. The belt conveyor can either be operated from the local control panel or from the main control cubicle ash handling or from boiler control room. Normally the belt conveyor should be operated in the automatic mode from the boiler control room.

In general downstream equipment must be proven operating prior to starting upstream equipment. In automatic mode failures of downstream equipment should trip upstream equipment.

The different operation modes, all faults, alarms and suggested problem solutions are described in the operation manual N-100170-M-O19-GM02-00001.

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## 10.1 Commissioning (start-up requirements)

Prior to start-up, construction should be completed and the equipment must be inspected to ensure that all construction debris has been removed. All supporting plant utilities must be dismantled. All Plummer block bearings and overhung idler assemblies must be adequately lubricated per manufacturer's recommendations. Ensure that all field devices are secure and functional. The control system should be completely functional prior commissioning the conveyor. Refer to the various manufacturer pre-start-up/check-out instructions contained in the operation manual N-100170-M-O19-GM02-00001.

The following check list can be used as a guide:

- Ensure that all flights are installed and properly spaced and chain assembly is properly engaged on sprockets and idlers. Refer to Chain Installation Instructions contained in this technical documentation.
- Ensure that the chain is properly tensioned.

FOR DETAILED INFORMATION REFERING TO ANY COMPONENT OF THE BELT CONVEYOR PLEASE REFER TO THE DOCUMENTATION OF THE COMPONENTS.

As a guide to determine if the chain is too loose or too tight use the following hints:

Chain is too loose if:




- Visible chain sag between flights in lower chain strands is significant.
- Chains are derailing at the idlers.
- Flight bars do not stand-up straight as observed in lower horizontal trough.
- No rotation of lower trough idlers can be observed while moving chain.
- Excessive chain sag exists under drive sprocket such that flight bars have a tendency to hit leading edge of lower trough floor plate.
- No spring compression exists.

Chain is too tight if:

- Excessive creaking and snapping noises exist as chain is moved through conveyor.
- Visible deflection of tensioning frames occurs.

The conveyor must be operated for at least twelve hours (12) to determine proper initial

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chain tension. Once proper tension has been established the supplied proximity switches should be located and adjusted.

## 10.2 Checklist for commissioning

The following list was prepared to check the functioning of the system before commissioning:

- All foreign bodies must be removed from the Belt Conveyor.
- All measurement and control equipment must be ready for operation
- All lubrication points must be lubricated sufficiently with grease/oil according to the manufacturer's instructions. The oil level of the main drive must be checked.
- The correct conveying direction must be secured.
- The conveying chain including the scrapers must move smoothly without increased friction through the upper and the lower line.
- The belt conveyor must move smoothly without increased friction.
- It must be ensured, that the chain rests on the teeth of the drive sprockets and of the pulleys and they engage exactly in the chain.
- Monitoring of the warning signals during trial run of the plant.

Furthermore it must be ensured that all conditions or measurement signals listed in the table below are met before starting the Belt Conveyor.

## 10.3 Trial run

The test must be carried out on site during the test run. For long belt conveyors, which cannot be surveyed from one spot, place several people along the conveyor along the line of sight and on the road.

For the first start give only a short switching impulse, which lets the belt run about 10 to 50 m ahead? This puts the belt properly on the roller sets. Then let the belt conveyor start up several times under close observation.

If there are no faults, the belt conveyor can now run through.

A slight movement of the belt to just before the scaffolding construction is not a reason to cancel the test run.




Stop test run if the strap starts up so much at the side that there is a risk of edge damage.

## 10.4 Tensioning the chain

The chain is stretched with the help of the tensioning device at the reversal. The chain tension must be so great that the deflection shaft rotates properly.

If the chain is sufficiently tensioned, the alignment work is initially completed, and the

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conveyor should run for several days. As the chain becomes smoother during operation, it may be necessary to make further corrections to the chain tension.

## 10.5 Aligning the belt

Aligning long belt conveyors requires a systematic approach.

Before starting alignment work, the conveyor must be running (if possible several hours). The belt thus loses its rigidity and is then better managed by the rollers. The belt can only be aligned during the run as only during the run the effects of the corrections can be observed.

If the belt runs perfectly straight, the alignment work is initially completed, and the conveyor should run for several days. As the belt becomes smoother during operation, further straight-line correction may be required.

An unloaded belt conveyor may behave differently than when it is loaded. Be sure to check the directional stability of the loaded belt conveyor and correct if necessary.

According to DIN 22102 point 2.4, the belt may migrate laterally at maximum load by the following values:

Belt width up to 800 mm	= 40 mm
Belt width over 800 - 1,400 mm	= 5% of the belt width
Belt width over 1,400 mm	= 75 mm

It should be noted that the belt widths according to DIN can fluctuate by 10 mm.

## 10.6 Belt adjustment – possibilities

- a) The belt runs obliquely on the drive drum:

Adjust trough roller blocks in front of the drive drum, number of locks too adjusting roller blocks and degree of adjustment depend on the degree of skew.

Attention! Do not adjust the drive drum as it was aligned when setting up the conveyor.

- b) The belt runs obliquely on the reversing drum:

Adjust the idlers in the lower run in front of the reversing drum or constricting drum in front of the reversing drum. (Here good steering effects can be achieved, since the surface pressure between belt and drum is very high).

With a spindle-adjustable reversing drum (as a tensioning drum), the straight-line runout can be adjusted in particularly difficult exceptional cases by adjusting the clamping spindles.

Attention! Only use this method if all options are insufficient.




- c) Misalignment of the belt between stations:

Adjust the roller buckets before the misalignment. Number of too adjusting roller blocks and degree of adjustment depend on the degree of misalignment.

- d) misalignment in the lower strand:

Correct misalignment in the lower run according to the same scheme as in the upper run.

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However, because of the low contact forces between carrier roller and belt only small steering effects can be achieved. As far as troughs rolling blocks or rubberized support rollers are built, these should preferably be used for belt steering.

e) Misalignment of the material delivery:

The material task determines the directional stability of the belt quite considerably.

Chutes, baffles or similar must be set so that the conveyed material is fed in the center of the belt; In addition, the belt must run straight into the loading station.




## 10.7 Normal operation

The electrical control of the Belt Conveyor enables an automatic, torque-dependent, continuous adjustment of the conveying speed to the respectively resulting coal quantity.

a) General Measures in Case of Operating Faults

- Find out cause of failure.
- Check whether the failure can be eliminated at short notice during operation.
- In case that failure cannot be eliminated during operation, the boiler has to be stopped; the belt conveyor has to be disconnected from the stationary outdoor

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## 11 Functional tests, checks after successful installation, repairs, inspections and lengthy shutdowns

All settings and the notification of operational readiness must be documented!

## 12 Spares recommendations/spare parts

It is advisable to keep a stock of the main spare parts not available at short notice in suitable quantities, as shown on the spares list, or to order them early.




### Recommendation/information:

Please note that fitting spare parts that are not original MHPSE parts may affect the correct functioning and efficiency of the plant. They may also affect the scope of the contractual warranty.

Therefore we recommend that you only purchase original MHPSE parts in order to guarantee full functioning and efficiency.

- Plant : Ptolemais
- Com. no. : N-100170
- Machine no. : (as per nameplate)

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## 13 Drawings

<b>Electrical Location Plan</b>
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<b>Mounting drawing belt conveyor</b>
N-100170-M-O05-ID04-00001
N-100170-M-O05-ID04-00002
N-100170-M-O05-ID04-00003
N-100170-M-O05-ID04-00004
N-100170-M-O05-IM02-00001
N-100170-M-O05-IM02-00002
N-100170-M-O05-IM02-00003
N-100170-M-O05-IM02-00004
N-100170-M-O05-IM02-00005

## 14 Weights

<b>Weight table of main parts</b>		
	Description	[kg/pc.]
	<b>belt conveyor</b>	
	<i>driving station 800 ATEX</i>	2160,9
	<i>tension station 800 ATEX</i>	1919,3
	<i>feeder station A 800x2500 ATEX</i>	1307,5
	<i>feeder station D 800x2500 ATEX</i>	1190,2
	<i>adapter station A 800x655 ATEX</i>	366,8
	<i>cover E 800x2500</i>	366,8
	<i>cover A 800x750</i>	100,2
	<i>cover A 800x1000</i>	70,2
	<i>cover A 800x1500</i>	70,2
	<i>cover A 800x2500</i>	70,2
	<i>cover B 800x2500t</i>	346,6
	<i>cover C 800x2500t</i>	346,6
	<i>feeder station B 800x1500 ATEX</i>	1610,6
	<i>adapter station A 800x1000 ATEX</i>	574,6
	drive, FV 18,5 kW	204
	drive, FV 22 kW	204
	belt 5 OHFB10 AF001 DIN22102 - 800 x 64000 - EP400/3	529
	belt 5 OHFB20 AF001 DIN22102 - 800 x 29000 - EP400/3	240

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belt 5 0HFB30 AF001 DIN22102 - 800 x 30000 - EP400/3	247
belt 5 0HFB40 AF001 DIN22102 - 800 x 58000 - EP400/3	483
belt 5 0HFB50 AF001 DIN22102 - 800 x 58000 - EP400/3	483
belt 5 0HFB60 AF001 DIN22102 - 800 x 30000 - EP400/3	247
belt 5 0HFB70 AF001 DIN22102 - 800 x 29000 - EP400/3	240
belt 5 0HFB80 AF001 DIN22102 - 800 x 64000 - EP400/3	529
drive, RV 4kW	170
steel chain 5 0HFB10 AF001 / 14x50x 64000	254
steel chain 5 0HFB20 AF001 / 14x50x 29000	116
steel chain 5 0HFB30 AF001 / 14x50x 30000	119
steel chain 5 0HFB40 AF001 / 14x50x 58000	233
steel chain 5 0HFB50 AF001 / 14x50x 58000	233
steel chain 5 0HFB60 AF001 / 14x50x 30000	119
steel chain 5 0HFB70 AF001 / 14x50x 29000	116
steel chain 5 0HFB80 AF001 / 14x50x 64000	254

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