

Spare parts  
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# Cooling Conveying System

## A:56207.00

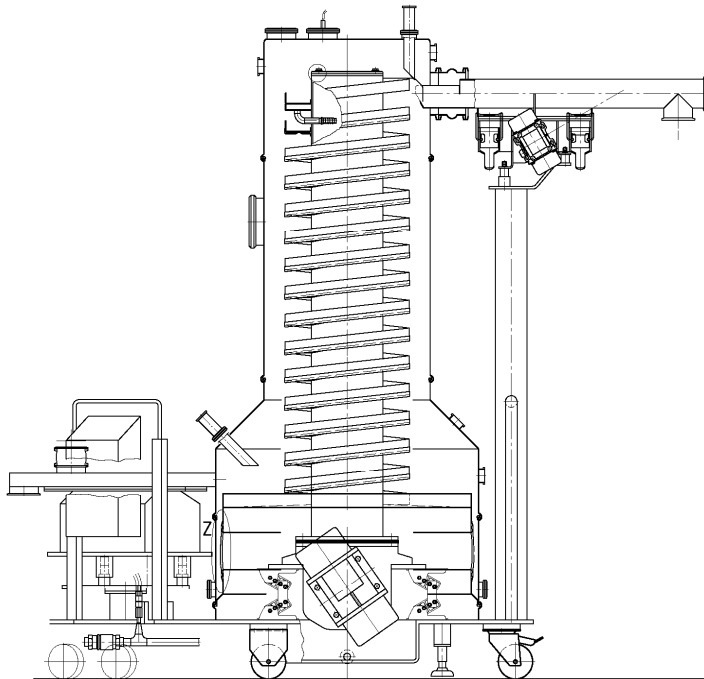
### Operating Instructions

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## 1 General Technical Information

The cooling and conveying system consists of the reversible vibrating through conveyor FRU 9/1-DV-R, the cooling spiral conveyor WFT 4.5/2.5-15-DV and the vibrating tube conveyor FRO 9.5/1-DV. The machines are built on a common support, which during the production placed and leveled on the machine bases and for cleaning procedures can be moved by means of the rollers.

The product space is completely encapsulated against the environment and can be opened for cleaning by removing of the covers and the housing.



Tasks of the components:

Through conveyor:	Conveying the start-up product in the reject bin Conveying the product in the cooling spiral conveyor
Cooling spiral conveyor:	Cooling of product and conveying the product to the top
Tube conveyor:	Conveying the product to the following equipment

## 2 Product and Process Data

Product:	Pharmaceutical product
Task:	Conveying and Cooling of about 80 kg/h

Product characteristics

Particle size:	about $\varnothing$ 5 mm, broken strands
Moisture:	dry
Bulk density:	300 - 500 kg/m <sup>3</sup>
Flow characteristics:	fluent good

Further design and process data are:

Specific heat cp:	1.6 kJ/(kg K) (assumption)
Thermal conduction k:	55 W/(m <sup>2</sup> K) (experimental results)
Temperature of product:	inlet about 190 °C inlet about < 40 °C

Temperature of water: inlet about 18 °C  
outlet about 25 °C  
Cooling water needed: about 1.3 m<sup>3</sup>/h (free of chloride)

Our design bases on calculations for which we had to fall on our assumptions and experiences. Please check these assumptions with the empirical values of the delivered machines.

**The use of dangerous product required activities by the customer. The system is designed for a non-ex use.**

### **3 Machine data**

#### **3.1 Technical data**

Principal dimensions: according to drawing No. S-21820 A1

##### **Through conveyor, Type FRU 9/1-DV-R – INLET**

Vibrating Trough Conveyor, reversible for transferring the product from the extruder into the spiral conveyor, with motor vibrators, the rectangular trough with bolted cover, sealing, the trough complete removable by means of the quick release fasteners, the connecting collar for flexible joint for flexible connection to the housing of the spiral conveyor.

Principal dimensions

Trough length: about 1200 mm  
Conveying length: 900 mm (middle inlet - middle outlet to WFT)  
200 mm (middle inlet - middle outlet to bin)  
Conveying cross area: 100 x 50 mm

##### **Cooling Spiral Conveyor, Type WFT 4.5/2.5-15-DV**

Cooling Spiral Conveyor with base mounted motor vibrator and the housing

Principal dimensions

Total height: about 2250 mm incl. housing  
Effective height: 1500 mm (height between inlet and outlet)  
Outer diameter: Ø 450 mm  
Feed level: Ø 900 mm  
Conveying cross area: 100 x 35 mm

##### **Tube Conveyor, Type FRO 9.5/1-DV - Outlet**

Vibrating Tube Conveyor with motor vibrators, for transferring the product to the following machine

Principal dimensions

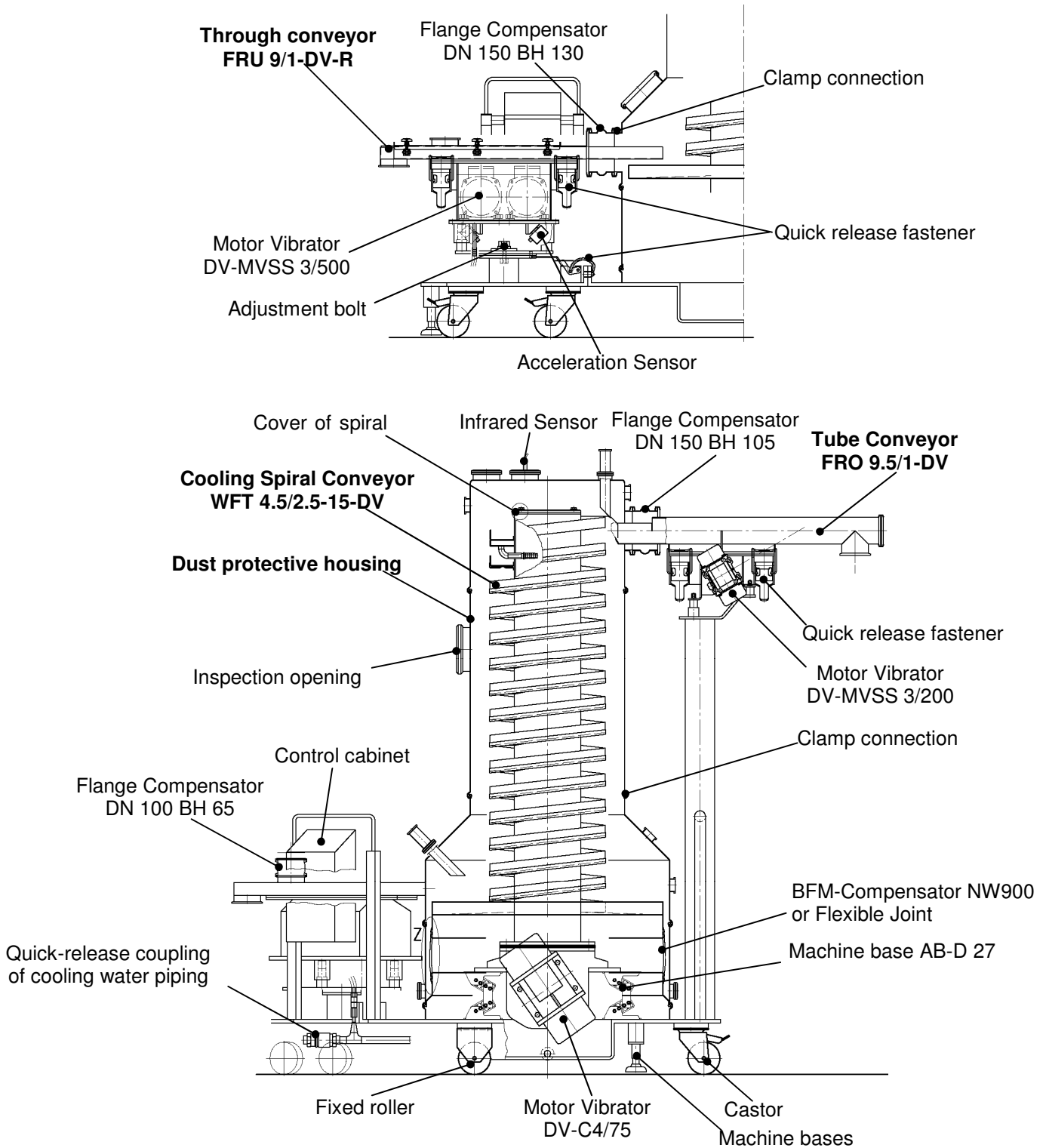
Total length: about 1060 mm  
Effective length: 950 mm (Inlet – Middle Outlet)  
Cross area diameter: Ø 100 mm

### **3.2 Other advices**

**The standard operation instructions of the installed components are to be followed.** During installation the distances between machine parts have to be observed.

Before a restart of the motors it has to be assured that the motors are not turning, as otherwise uncontrolled movements of the system can occur.

**4 Design of the Cooling Conveying System**



## 5 Cleaning and Maintenance

The cooling conveyor system must be disassembled accordingly before cleaning or maintenance.

Switch off the flow of material before dismounting, then discharge the machine, and make sure no explosive atmosphere is present.

Follow the procedure described in chapter 5.1, Dismounting for cleaning, or 5.3, Dismounting for maintenance, to remove the inlet through conveyor, the tube conveyor and the spiral conveyor with the housing.

After cleaning the cooling conveyor system, reinstall it in reverse order.

**Replace any defective seals immediately and make sure they are correctly fitted!**

**Tighten all connection elements and check that they are secure!**

**For operation re-establish all ground connections and check their ability to discharge static electricity!**

**Before restarting the machine, make sure all connection elements at the inlet and outlet are tight, and check the tightness of the unit!**

**There is a risk of pinching or crushing injuries by lifting of components during disassembly / assembly!  
The components must be secured during lifting against falling!**

### 5.1 Dismounting and mounting for cleaning

#### 5.1.1 Dismounting before cleaning

Order to follow:

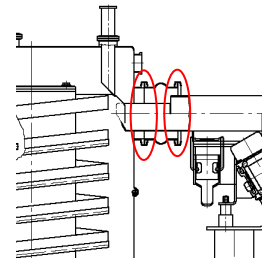
Switch off the flow of material

Discharge the conveying system

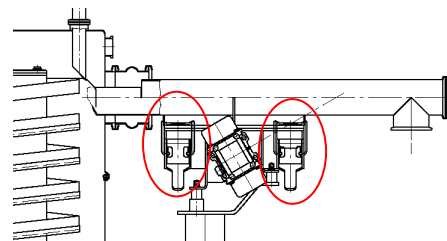
Switch off the power supply

Disconnect the cables and hoses

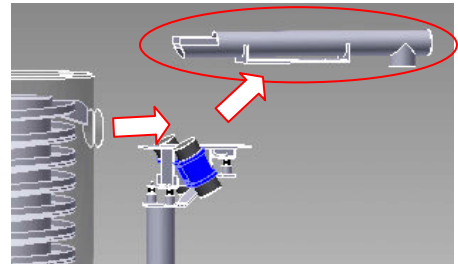
Release the clamping rings of the flexible joint (DN 150 BH 105) at the outlet of the spiral conveyor housing



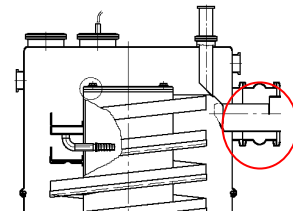
Release the quick release fasteners of the tube conveyor FRO 9,5/1-DV



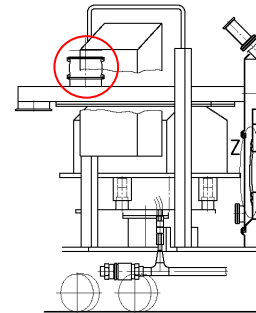
Take off the tube conveyor FRO 9.5/1-DV



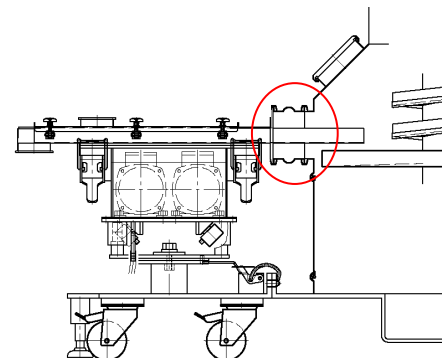
Take off the flexible joint (DN 150 BH 105) from the outlet of the spiral conveyor housing



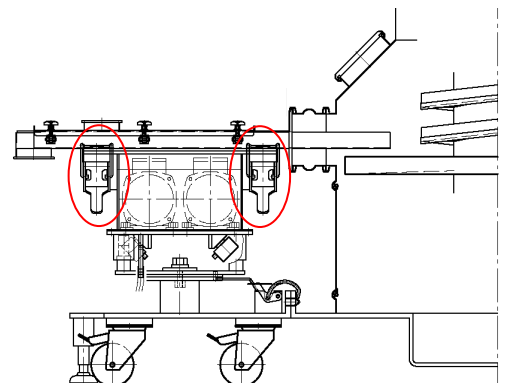
Release the clamping rings of the flexible joint (DN 100 BH 65) at inlet of through conveyor and remove it



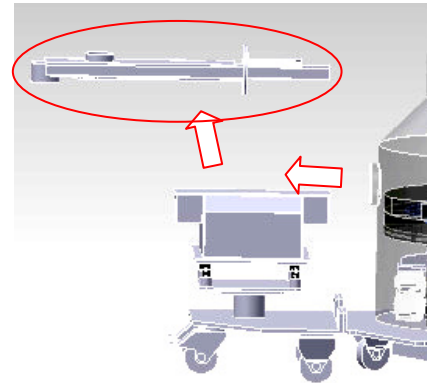
Release the clamping rings of the flexible joint (DN 150 BH 130) between through conveyor and housing



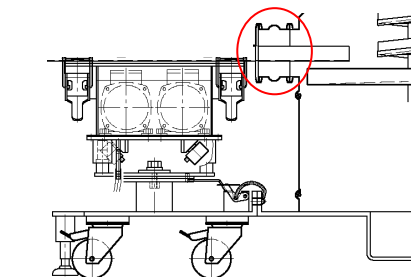
Release the quick release fasteners of the through conveyor FRU 9/1-DV-R



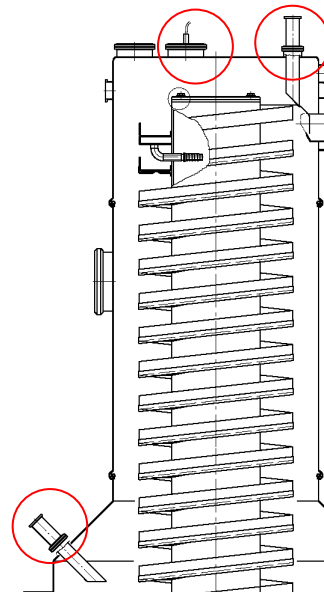
Take off the through of the conveyor FRU 9/1-DV-R



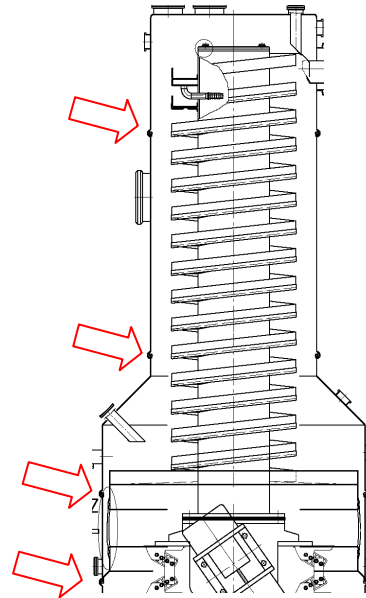
Take off the flexible joint (DN 150 BH 130) at the inlet of the housing



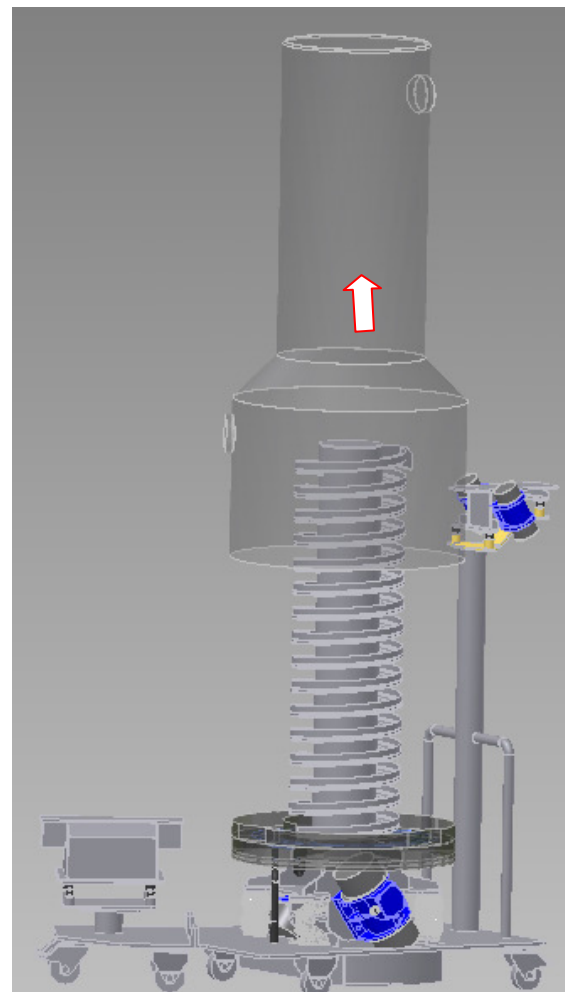
Release and remove the periphery of the spiral conveyor housing WFT 4.5/2.5-15-DV (the infrared sensor, the exhausting connection, etc.)



Release the clamping rings of the housing



Take off the housing segments sequentially from top to bottom



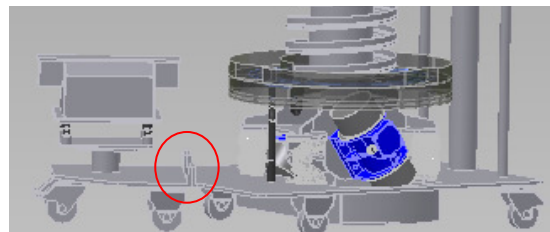
Cleaning



If necessary:

Lower the unit from the machine bases to castors

Disconnect the supports of the through conveyor and the spiral conveyor



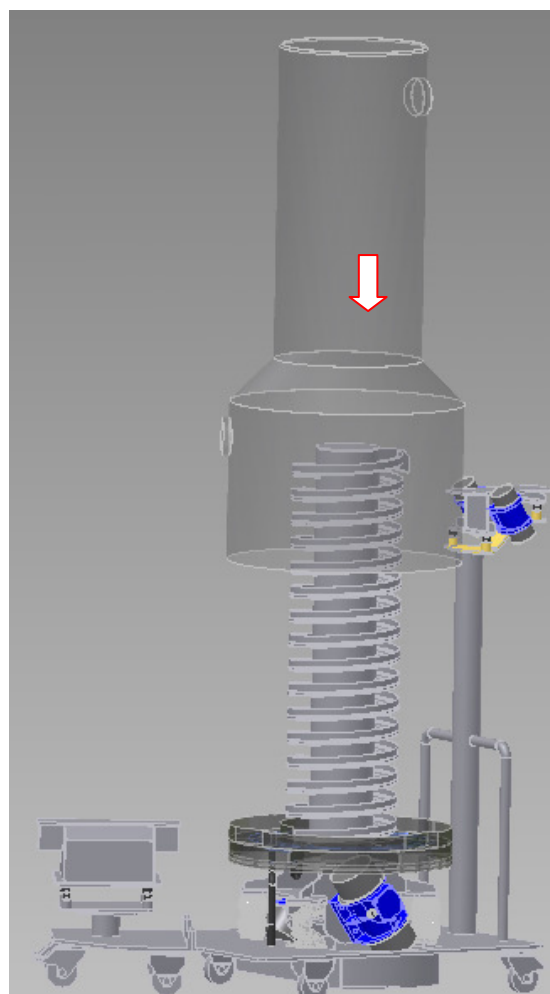
Transport the machine parts separately

### 5.1.2 Mounting and Positioning after Cleaning

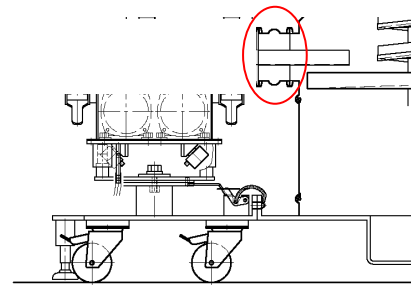
It is basically the reverse order of the dismounting to follow:

Mounting of equipment at the site

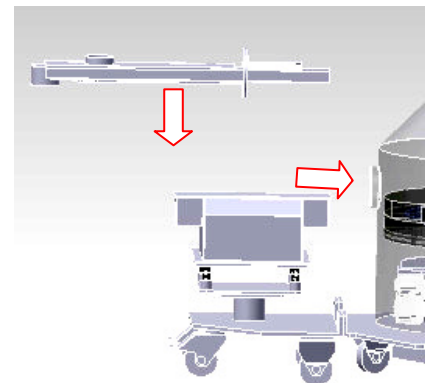
Mounting and positioning the housing segments of the spiral conveyor WFT 4.5/2.5-15-DV sequentially from bottom to top according to overview drawing



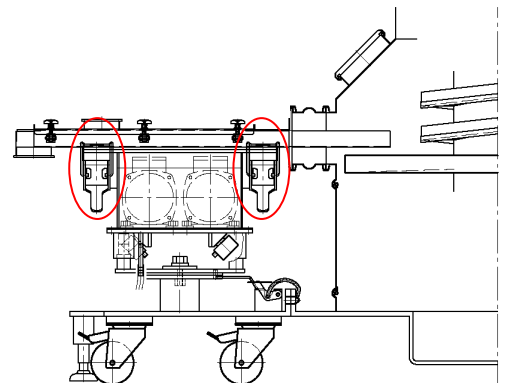
Mounting the flexible joint (DN 150 BH 130)  
at the inlet of the housing



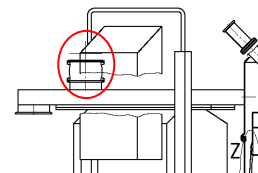
Mounting the through conveyor FRU 9/1-DV-R  
at the drive saddle



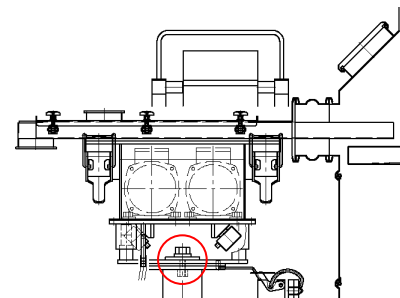
Fixing the through conveyor FRU 9/1-DV-R  
by means of quick release fasteners



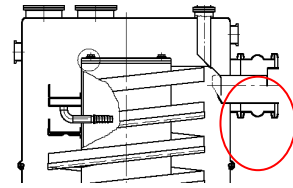
Mounting the flexible joint (DN 100 BH 65)  
at the trough's inlet



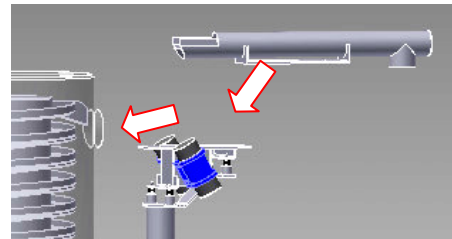
Alignment / positioning the through FRU 9/1-DV-R  
by means of the positioning screw  
at the support structure  
according to general drawing



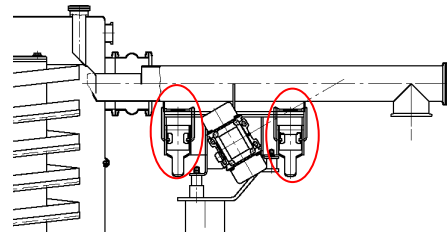
Mounting the flexible joint (DN 150 BH 105)  
at the outlet of the spiral conveyor housing



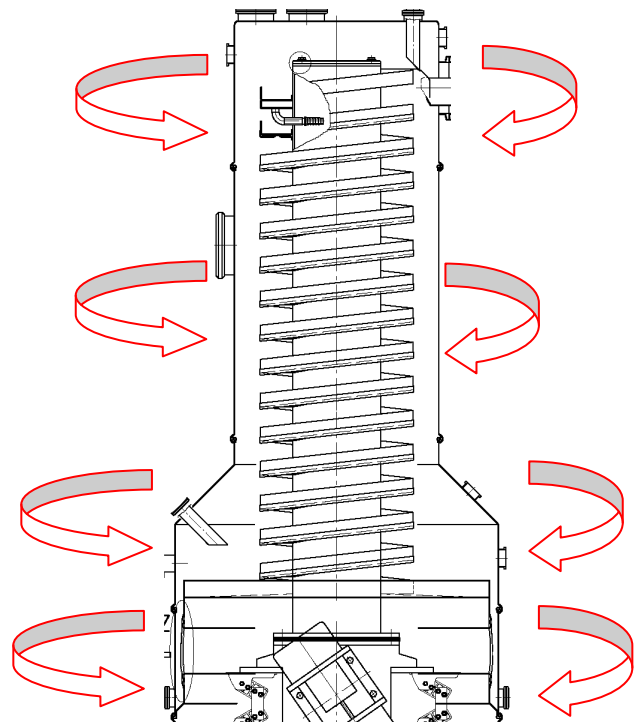
Mounting the tube conveyor FRO 9.5/1-DV  
at the drive saddle



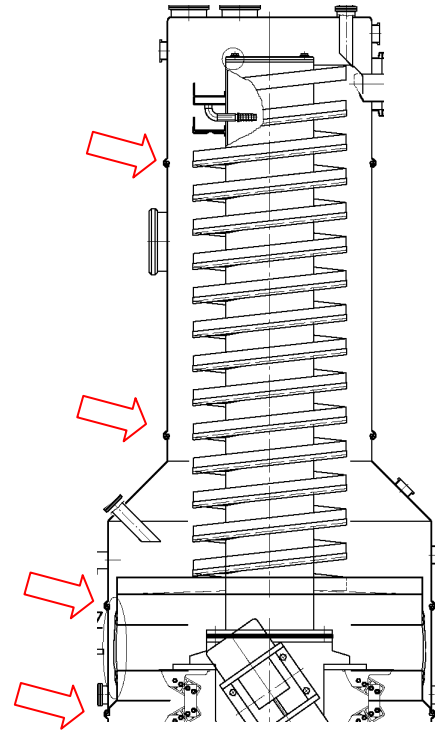
Fixing the tube conveyor FRO 9.5/1-DV  
by means of quick release fasteners



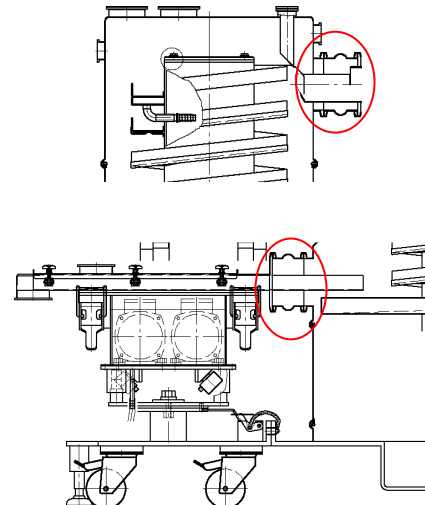
Align the spiral conveyor housing



Fixing the housing segments  
with the clamping rings



Fixing the flexible joints  
(DN 150 BH 130 and DN 150 BH 105)  
at the inlet and outlet of housing  
by means of clamping rings



Mounting and fixing the periphery of the spiral  
conveyor WFT 4.5/2.5-15-DV (the infrared sensor the  
exhausting connection etc.)

Connecting the cables and hoses

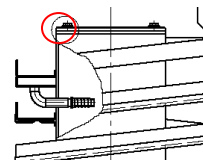
Check tightness of all fasteners / clamping rings

## 5.2 Dismounting for Maintenance

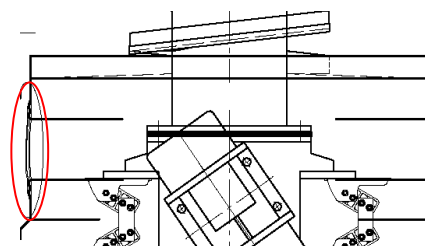
### 5.2.1 Dismounting before Maintenance

Order for dismounting for cleaning to follow then:

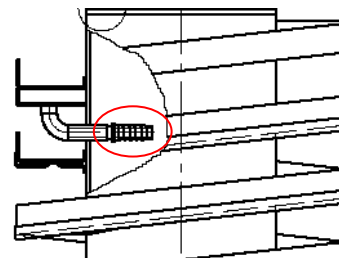
Release and remove the bolted cover at the top of the spiral conveyor



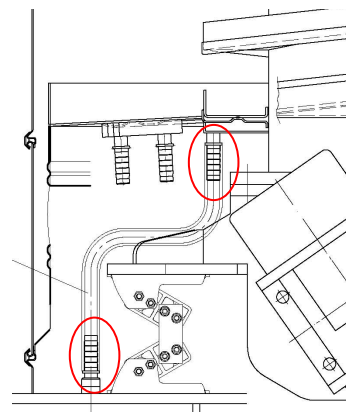
Release the clamping rings of BFM flexible joint (see installation manual for BFM fittings)



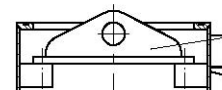
Release and take off the upper L-connection hose of the cooling water piping



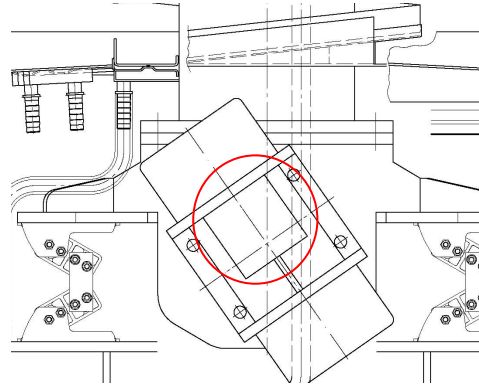
Release and take off the lower S-connection hose of the cooling water piping



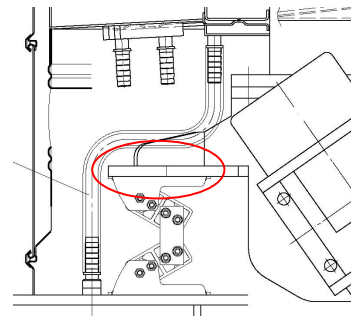
Mounting of the delivered installation help (the spiral tower cover with lifting eye) and fixing by means of bolts



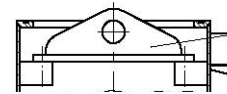
Disconnecting the wiring of motor vibrators  
(DV-C4/75)



Release the bolts of the oscillating mounting  
(AB-D 27) at the drive saddle



Lifting up and transport the spiral cover with drive  
saddle by taking at the lifting eye



Take off the BFM flexible joint

Maintenance

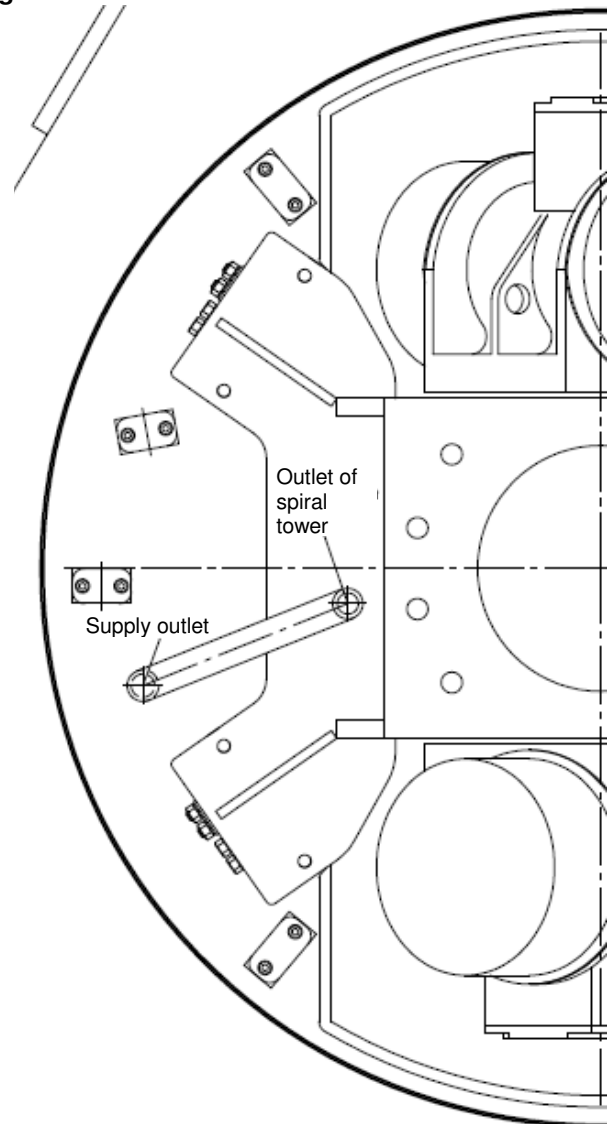
**5.2.2 Mounting after Maintenance**

It is basically the reverse order of dismantling for maintenance to follow.

During mounting of the spiral conveyor observe the positioning according to general drawing

**By mounting of the cooling spiral conveyor with cooling inlet area:**

If the inlet area should not be cooled, use only one **S-connection hose (Art. 140284)** for lower water supply and it must be connected with clamps directly to **water outlet connection of spiral tower** and **water supply connection** according to drawing **S-21821-277**.



If the inlet area should be cooled, use  
 2 pieces **S-connection hose** (Art. 204893447) (1)  
 1 piece **S-connection hose** (Art. 140284) (2)  
 and 1 piece **O-connection hose** (Art. 140871) (3)  
 with clamps and connect according to drawing  
**S-21821-275** as follow:

- to install the O-connection hose (3)
- to connect the **water outlet connection of spiral tower** and O-connection hose (3) by means of S-connection hose (2)
- to connect the **water inlet connection of inlet cooling desk** and connection piece for O-connection hose (3) by means of S-connection hose (1)
- to connect the **water outlet connection of inlet cooling desk** and **water supply connection** by means of S-connection hose (1).

