CHI-SHUN

BELT PRESS

OPERATION and MAINTENANCE MANUAL

Please read this manual carefully before operation

Contents of This INSTRUCTION

- **Chapter 1：Introduction**

  Introduces the features，procedures for treatment and construction of the Belt Press

- **Chapter 2 ： Preparation**

  Describes how to prepare before operation.

- **Chapter 3 ： Operation Procedure**

  Describes how to using the Belt Press.

- **Chapter 4 ：Maintaining the Belt Press**

  Describes routine cleaning of the Belt Press, how to replace a new filter cloth and maintenance.

- **Chapter 5 ： Troubleshooting**

  Explains in detail what to do when problems occur with the Belt Press. Refer to this section if you encounter a problem.

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  Please feel free to contact us if you need any help.

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1. Introduction

1.1 Introduction

The all new NBD Type high pressure and high performance Belt Press of CHI SHUN Machinery Plant Co., Ltd. with sludge mixing tank, and rotary dewater section. The belt press is suitable for dewatering of wide range of sludge in various municipal and industrial waste water. CHI SHUN Belt press has the widest application range compared with other dewatering equipment.

The CHI SHUN NBD Type Belt Press is a continuously operating unit, where sludge dewatering is carried out by utilizing gravitation and pressing the sludge in between upper and lower filter belts.

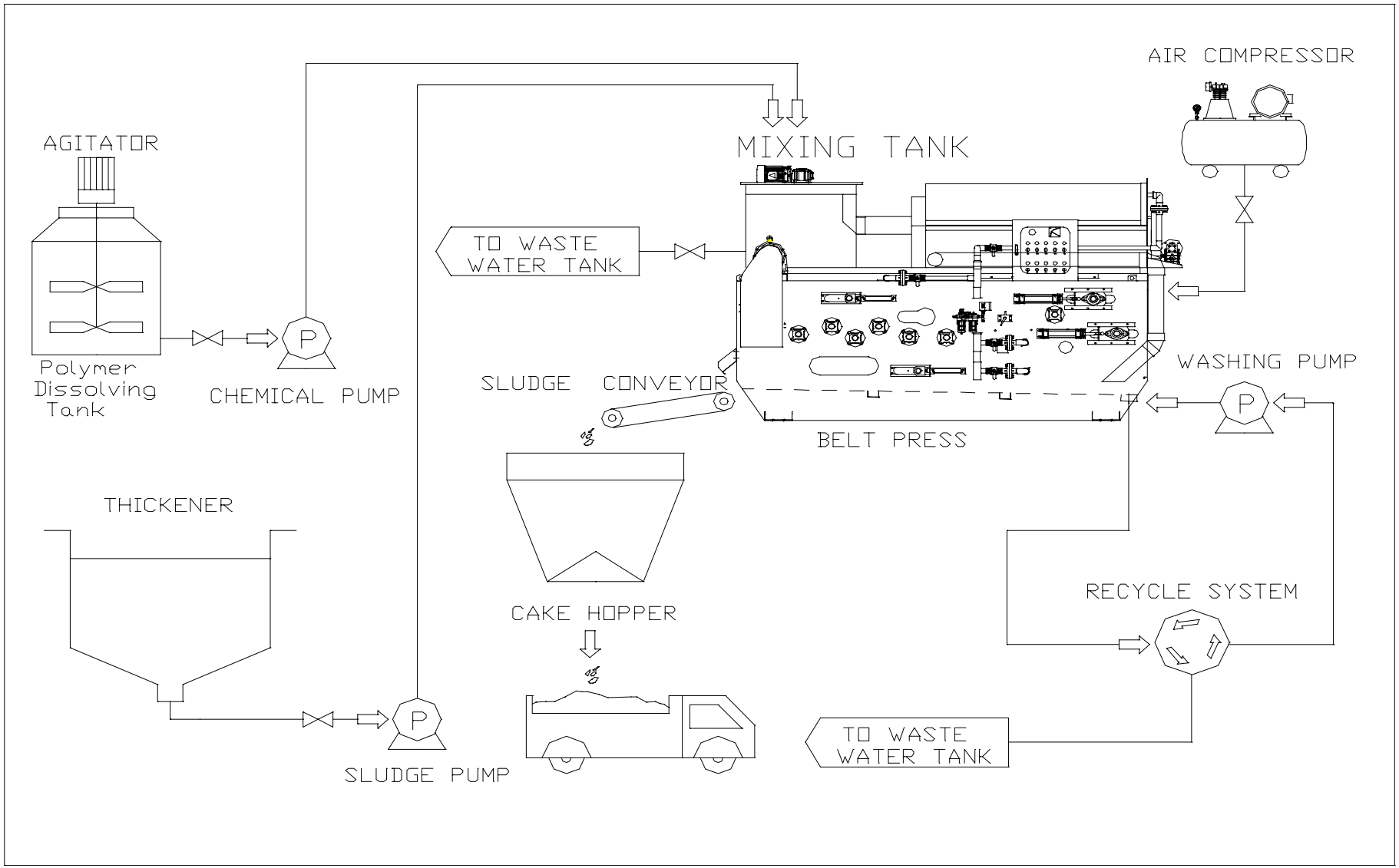
The operation of the CHI SHUN belt press can be divided into four zones, Rotary Dewatering Zone、Gravity Dewatering Zone、 Compression Dewatering Zone (low pressure)and pressure zone(high pressure).
After mix with polymer in the mixing tank, sludge flows into the Belt Press cause the force of gravity through the Rotary Dewatering Chamber, and subsequently goes through the lower-cloth Gravity Dewatering Chamber of force of gravity and enters the Compression Dewatering Chamber and the Shear Dewatering Chamber. This series of operations completes extracting water.

The CHI SHUN belt presses are designed to be as user friendly as possible, where maintenance requirements are diminished to minimum level by using high quality components and long term know-how on belt press operations. The CHI SHUN NBD Type belt presses are manufactured with high quality corrosion resistant materials.

The frame construction are made of stainless steel (SUS 304) and also other parts which are in touch which liquid are made on non corrosive materials such as PP, PES and SUS 304 material. The components which are supplied by sub suppliers are high standard and manufactured by well known manufactures.

In order to achieve the optimal performance of the NBD high-performance Belt Press, the instructions should be read carefully before operation, and the equipment should be operated and maintained according to the mechanical principles, operational procedure, maintenance requirements, and troubleshooting described in the manual of operation and maintenance.

1.2 Flow Sheet



1.3 Procedures for Treatment

There are five steps by which the NBD type high pressure and high performance Belt Press treatment：

Step one ➔ Sludge Mixing Section.

Step two ➔ Pre-Dewatering (Rotary Dewatering) Section.

Step three ➔ Gravity Dewatering Section.

Step four ➔ Compression (Low Pressure) Dewatering Section.

Step five ➔ High Pressure (Shear) Dewatering Section.

(A) Sludge Mixing Section

After the sludge is thickened and mixed with the polymer, the physical and chemical character of the sludge solid could be changed to reduce the affinity between the sludge and water and increase the agglomeration force of the sludge for improving the effect of dewatering.

(B) Pre-Dewatering (Rotary Dewatering) Section

After the sludge is thickened and conditioned，sludge enters the rotary screen filter and is completely tossed and agitated owing to spinning force. Due to rotation mixing, a lot of free sludge water would be separated from the gap water.

(C) Gravity Dewatering Section

The sludge going through the spinning screen filter drop on the wriggling roller. The load of the sludge causes low-frequency trembling which filters out sludge water, and the sludge drop on the filter cloth and enter the compression dewatering chamber

(D) Compression (Low Pressure) Dewatering Sectio..

After gravity dewatering section, the sludge is carried into compression dewatering section gradually and compressed wedge-shape. Then a certain thick sludge pass in the high pressure (shear) dewatering section.

(E) High Pressure Dewatering Section

When the sludge enters the high pressure dewatering section. There are a number of S type rollers to form the sludge cake by shear force. The sludge becomes sludge cakes because of the high-pressure shear force generated between the two cloths. The cakes contains very little moist.

1.4 Specification of Belt Press

(a.) NBD-E TYPE

Mode	Belt Width m/m	Belt Velocity HP	Drive Motor HP	Conditioning HP	Wash Water m3/hr	Dimension L*W*H mm
NBD-E 50	500	2-8	1/4	1/4	1.5	2000*970*1660
NBD-E 75	750	2-8	1/4	1/4	2.2	2000*1220*1660
NBD-E 100	1000	2-8	1/4	1/4	2.8	2170*1620*1660
NBD-E 125	1250	2-8	1/4	1/4	3.6	2170*1740*1660

(b.) NBD-M TYPE

Mode	Belt Width m/m	Belt Velocity HP	Drive Motor HP	Conditioning HP	Rotary Dewatering HP	Wash Water m3/hr	Dimension L * W * H mm
NBD-M 50	500	2-8	1/4	1/4	1/4	2.2	228 0*1040*1840
NBD-M 75	750	2-8	1/4	1/4	1/4	2.8	2280*1220*1840
NBD-M100	1000	2-8	1/4	1/4	1/4	3.9	2480*1490*1840
NBD-M 125	1250	2-8	1/4	1/4	1/4	4.6	2480*1740*1840

(c.) NBD-L TYPE

Mode	Belt Width m/m	Belt Velocity HP	Drive Motor HP	Conditioning HP	Rotary Dewatering HP	Wash Water m3/hr	Dimension L * W * H mm
NBD-L 125	1250	2-8	1/2	1/4	1/4	6.8	3320*1770*1990
NBD-L 150	1500	2-8	1/2	1/4	1/4	7.9	3320*2430*1990
NBD-L 175	1750	2-8	1	1/4	1/4	9.3	3350*2300*2040
NBD-L 200	2000	2-8	1	1/4	1/4	10.4	3350*2550*2090

(d.)NBD-H TYPE

Mode	Belt Width m/m	Belt Velocity HP	Drive Motor HP	Conditioning HP	Rotary Dewatering HP	Wash Water m3/hr	Dimension L * W * H mm
NBD-H 200	2000	2-8	2	1/2	1/2*2	12.2	4320*2820*2910
NBD- H250	2500	2-8	2	1/2	1/2*2	215.1	4400*3320*2920
NBD- H 300	3000	2-8	3	1	1/2*2	3.917.6	4620*3850*2940

1.5 Construction Diagram

2. Preparation

2.1 Preparation Check

Please read carefully this manual for operation and maintenance and understand operation procedure, mechanical maintenance and individual parts.

Follow these steps before operate CHI-SHUN Belt Press：

(a) Check if the Belt Press Machine and its parts are in perfect condition.

(b) Remove foreign objects from filter cloths , rollers , and the Belt Press Machine.

(c) Check if chemical liquid and the supply of liquid are in normal condition.

(d) Check the tension force and positions of filter cloths.

(e) Check the level of motor oil of the driver.

(f) Check if the scraper contact is normal

(g) Check the air compressor and air control unit.

(h) Check if the supply of washing water , polymer, sludge , and air are normal.

3. Operation Procedure

3.1 Operation Procedure

1. Open control panel and turn on all NFB switch in the control box, then close control panel. Turn the power switch to “on” position, the white indicator will light. At this time, the machine table is ready to operate.

2. For operation of the machine, the air compressor must be turned on first. The selection switch of the compressor should be turn to ON position. At this time, the compressor begins to send wind and increase pressure. Start the subsequent steps after a specific pressure is reached (about 5kg/cm2 ~ 6 kg/cm2) . For safety of the machine itself, the machine is designed to lock all subsequent operation if the compressor is not turned on or not reach require pressure.

3. Check volt meter is correct.

4. After completing the above procedures, you may start to operate the machine. Basically, this machine can be operated manually or automatically.

5. Turn hand control valve of filter cloths to tension cloths.
   (Omitted in the case of spiral rod tension)

【Under MANUAL mode】

1. Turn driving motor to manual position
   - Check the running condition of drive motor.
   - Check the speed and running condition of filter cloths.
   - Check filter cloths tracking system is normal.

2. Turn washing pump to manual position and let it run more than 5 minutes.
   - Check if the source of water is normal
   - Check if the water pressure from spray nozzle is normal.

3. Turn mixing tank and rotary switches to manual position.

4. Turn chemical pump and sludge pump to manual position.
   - Make sure chemical liquid and the supply of liquid are in normal condition.

【Under AUTO mode】

1. Under AUTO mode, the manual operation of each function should be tested first to make sure it can operate normally. During automatic operation, turn the selection switch to AUTO position. At this time, the machine is ready for sludge treatment. The water level controller will detect have volume of the sludge to see if it has reached the setting level. The water level can be set by three Water Level Controllers: E1, E2 and E3. If the sludge reaches the high level, the driving motor, rotary, washing pump, mixing tank, sludge pump, and polymer pump will start running. If the sludge reach the low level, the above machines will be disconnected automatically. The water level controller will not be started automatically until the sludge reaches the high level again next time.

3.2 Stop Procedure

(1) Turn the sludge pump and chemical pump to stop position.

1. Turn off the valve on pipe.
2. Make sure that there is no sludge in conditioning tank.
3. Check there is no sludge on the filter belt.

(2) Turn rotary dewatering and sludge conditioning switches to stop position.

1. After treated, please keep the machine's washing system running about 30 minutes. Then turn washing pump to stop.
2. Check pores of filter belt are cleaned.
3. Turn off the Drive Motor.

(3) Turn the filter cloths control hand valve to loose filter cloths. (excluding NBD-E Type.)

1. Make sure the filter cloths are loose.

(4) Turn off the air compressor or source of air.

(5) Turn off the main power.

(6) Clean the Belt Press mainframe and condition around the Belt Press.

(7) If the operator leave the spot or it is time to leave office, and it is not necessary to dispose the sludge, please make sure to turn off the power switch for safety purpose.

(8) During operation of the machine, if abnormal condition happened, turn the selection switch of the compressor to OFF. Then the machine will stop running, or you may press the EMERGENCY STOP SWITCH at the side of the machine to stop the machine forcedly. If you would like to re-start the machine, please rotate the switch by following the arrow direction to raise up the button, then the machine can start running again.

(9) If the control box must be opened for inspection, be sure to turn off the NFB in the main switch first and then turned it left to open the door of the control box in order to ensure the safety of all personnel. In case it is necessary to open the control box for inspection without turning off the power switch, please turn the RESET button at the lower right of the main switch right, the it is possible to open the door of the control box under a non-interruption status. However, it is suggested to conduct the inspection by a trained electrician for safety purpose.

3.3 Emergency Stop

(a) *Protective device for filter cloths*

The Belt Press are equipped with belt alignment systems (by mechanical valve and air cylinders) and belt protect device (by limit switch). The alignment system is easy to maintain and adjust. Oil consumption of air control unit is very low, thus the system has very low running costs.

The belt alignment system is consisting of belt edge location sensor. It's operated with individual alignment roller and air cylinder for each belt and this gives accuracy to correct belt positioning smoothly. If the belt alignment system was breakdown, the Belt Press will stop when belt touch the protect device.

(b) *Emergency stop button*

During operation of the machine, if abnormal condition happened, press the EMERGENCY STOP button on control panel or at side of the machine to stop the machine forcedly. If you would like to re-start the machine, please rotate the switch by following the arrow direction to raise up the button, then the machine can start running again.

4. Maintenance

4.1 Periodic Inspection

Your Belt Press requires routine maintenance to keep your Belt Press in good operating. Be careful when cleaning the Belt Press.

Inspection Item	Important Tasks	Period
Driver	Smooth Running	Daily
Roller	Cleaning	Daily
Bearing and slide rail	Oiling	Weekly
Rotary Dewatering section	Whether there is an obstruction. If yes, remove of obstruction.	Daily
Air compressor	Output pressure	Daily
Air Control Unit	Oil Injection	Daily
Limiting Switch	Cleaning and Test.	Daily
Tension Spiral Rod	Cleaning and Maintenance	Weekly
Sludge Scraper	Effectiveness in scraping sludge	Daily
Washing Pump	Output of pressure	Daily
Washing nozzle	Whether there is obstruction	Daily
Chemical Pump	Whether there is obstruction	Daily
Sludge Pump	Good running conditions	Daily
Sludge Stirrer Pump (sludge mixing tank)	Smooth running No abnormal noise	Daily
Machine Mainframe	Cleaning	Daily

4.2 Maintenance and Adjust

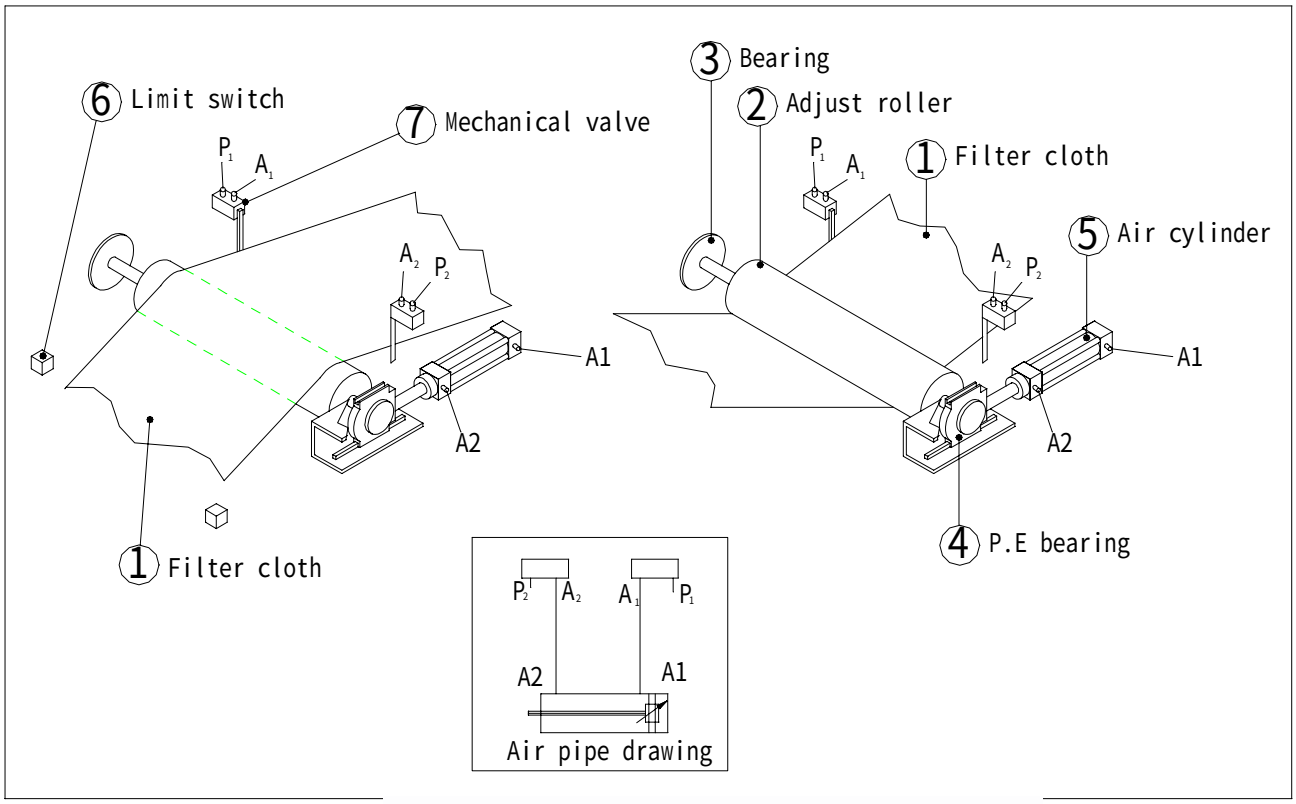
Item	Maintenance and Adjust
Drive Motor	＊ Ensure that the motor is sufficiently cooled with good ventilation from the fan side. ＊Check the oil level through the sight glass. Refill new oil if oil is low. ＊The unit should be put into service gradually ; do not apply the maximum load immediately.
Sludge Scraper	＊ Remove sludge that on the scraper after stop Belt Press. **Please replace a new scraper when it is broken.**
Filter cloth tension adjuster	Use screw or air cylinder to adjust the tension of filter cloth
Washing Pipe and Spray Nozzle	*Remove the washing pipe and spray nozzle. Clean the washing pipe and nozzle hole.
Air Control Unit	*Keep the lubricator in safe level to protect air cylinders, mechanical valve and limit switch.
Filter clothes are obstructed	＊ Please use high pressure spray to wash filter cloth when the washing system can not clean cloths. ＊ Replace a new filter cloth when high pressure spray can not clean the filter cloth.

5. Abnormal Remove

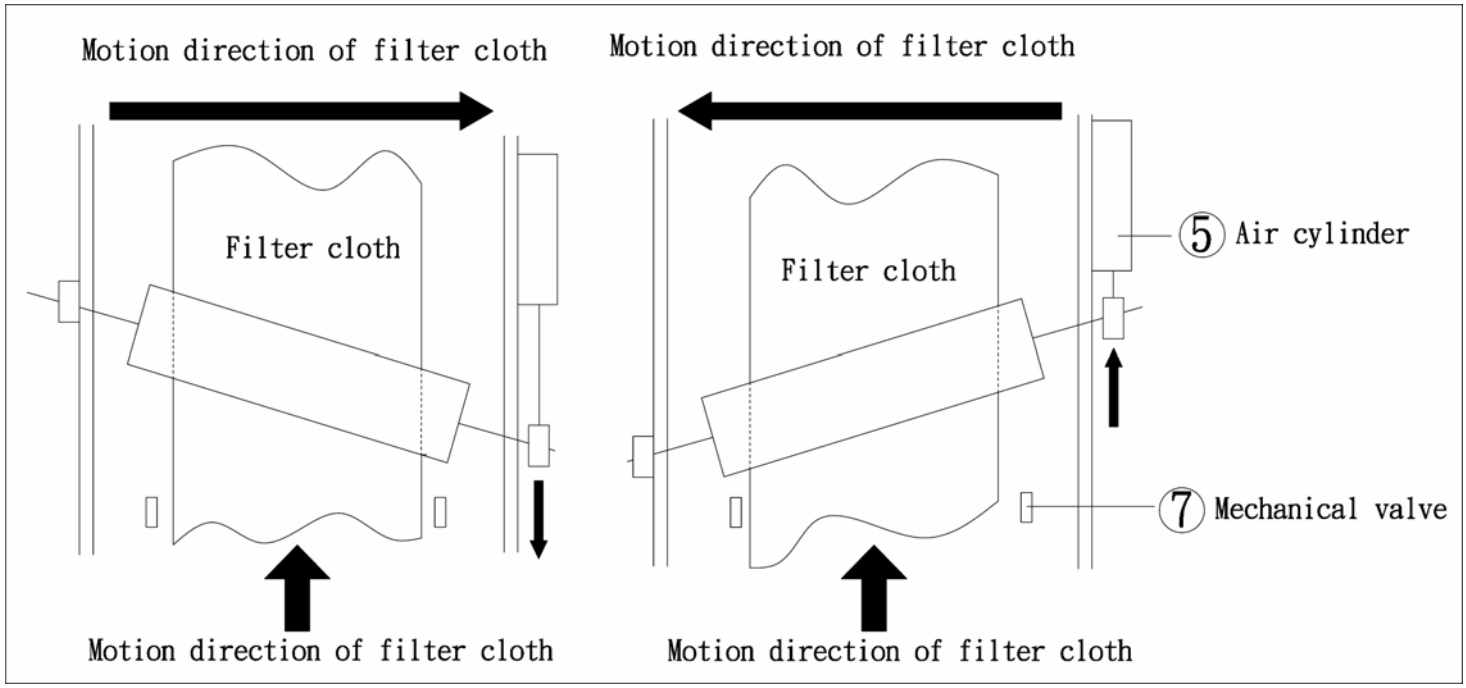
5.1 Adjust the filter cloths

The Belt Press will stop when belt run out and touch limit switch. In this time please turn system to MANUAL position. Check and make sure air source and pneumatic parts (Mechanical Valves, Air cylinders and Air control unit) are normal. Press yellow “RESET” button to coerce machine running. After machine alignment belt cloths to original position, release “RESET” button.

Drawing 1: The device for filter auto alignment system installed on the adjuster is composed of the following parts :



Drawing 2: Mechanical check the filter cloth is slanting.

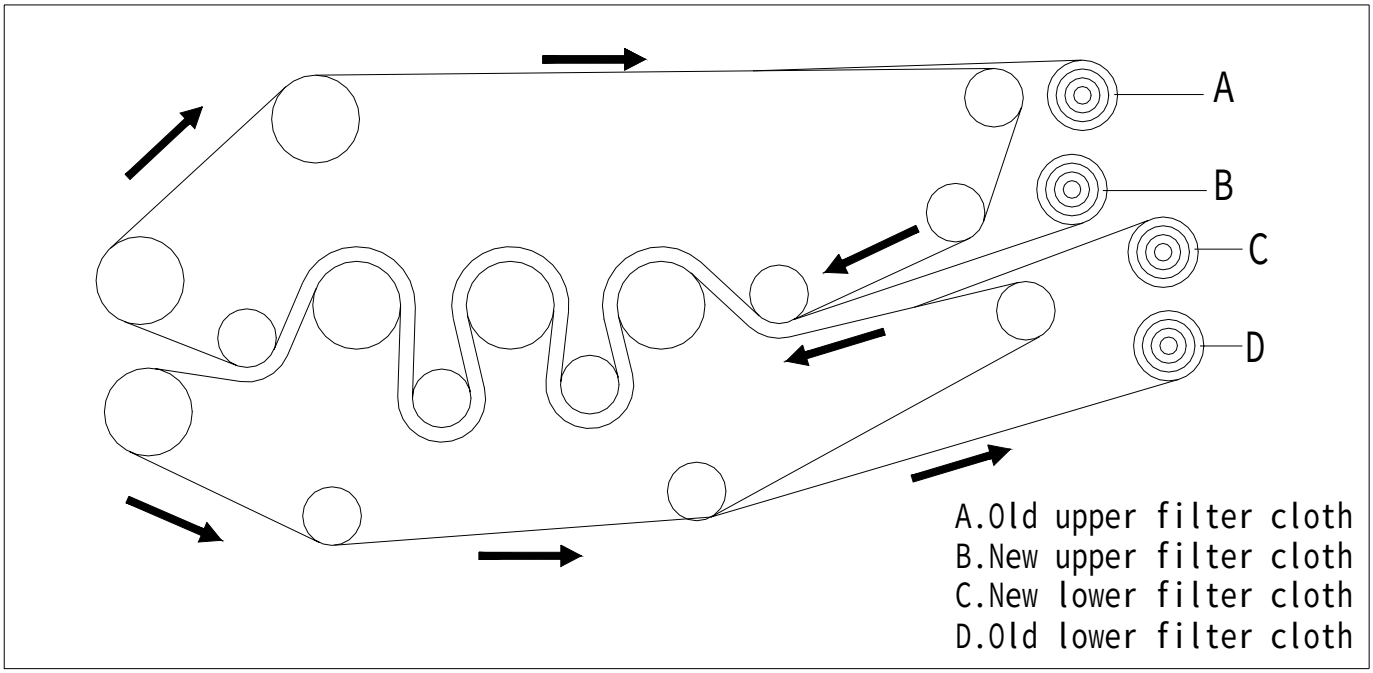


5.2 Replace the new filter cloths

Drawing 1. : In replacing filter clothes, the joints of the cloths should be placed at the sludge entrance side, and the new clothes should be run a cycle along with the old cloths while the old cloths are rolled up gradually. When the two joints of cloths meet at entrance of sludge, they are joined with thread passing through metal hook ring.

Attention: When replace upper cloth, put arrow side down.

When replace lower cloth, put arrow side up.



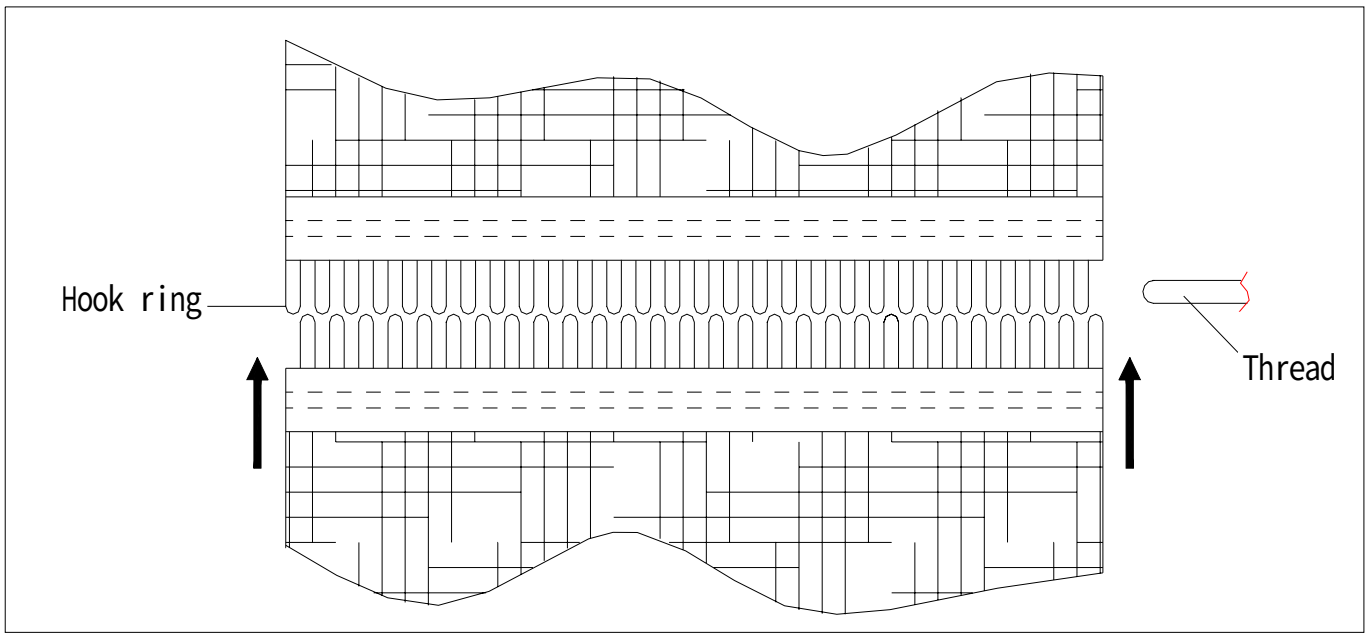
Drawing 2. : After new cloths are installed, the following things should be taken care:

(1) Inspect the match of joining marks.

(2) The joining is accomplished with thread passing through metal hook ring.

(3) The thread should extend about 20m/m at two ends of the cloths. If it is too long, the thread should be cut off and the two end should fold inward to prevent protruding.

(4) The joining points of the upper and the lower cloths should be kept away as possible.



5.3 Filter cloths are obstructed

(a) Check whether the pump for washing water is normal.

(b) Check whether the washing device is normal, whether there is obstruction.

(c) Check the condition of mixing tank. (Sludge and chemical liquid)

(d) Check the tension force and consumption of filter cloths.

5.4 Poor coming off of sludge cakes

(a) Check if the filter cloths were obstructed.

(b) Poor chemical feeding conditions, correct sludge and chemical liquid.

(c) Adjust the motion speed of filter cloths.

5.5 Flowing out of sludge from two side

(a) Check whether the supply of sludge is too much.

(b) Filter cloths were obstructed.

(c) Examine the chemical feeding, concentration and condensation of sludge.

(d) Adjust the tension force of filter cloths.

(e) Adjust the motion speed of filter cloths.

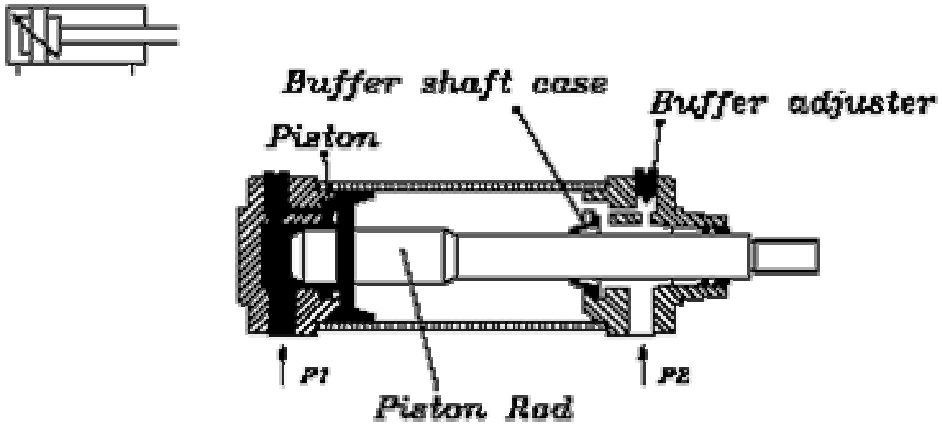
5.6 Air Cylinder

P1 is exhausting when air into P2.

P2 is exhausting when air into P1.

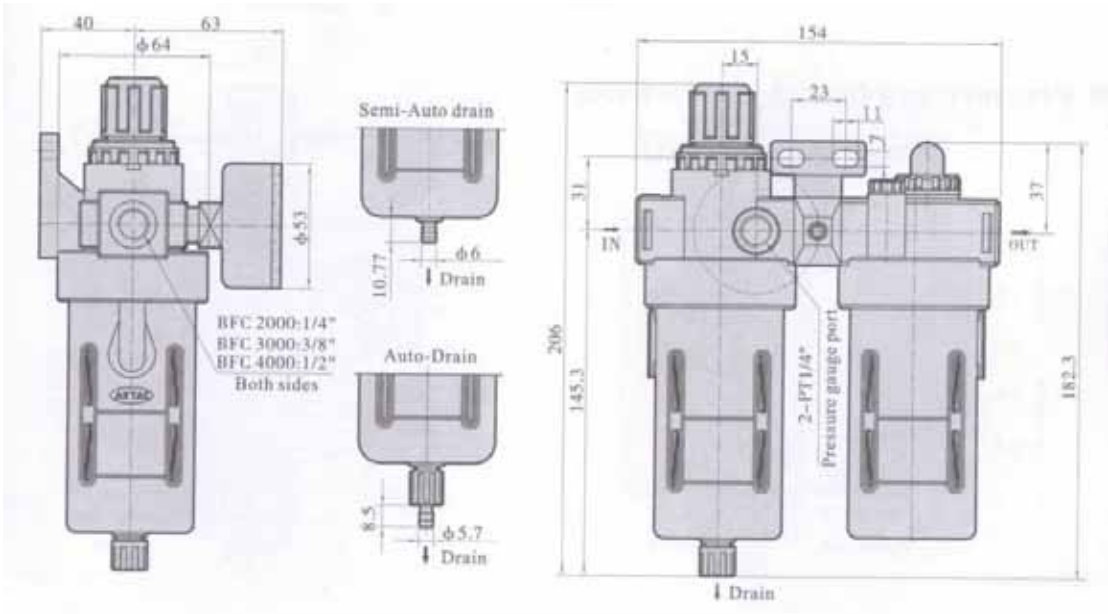
Adjustable buffer devices are attached so that the cylinder can decelerate when it moves to the front and rear end.

The buffer adjuster can adjust the buffer speed of piston rod.



5.7 Air control unit

1. An units as standard are self-relieving.
2. Spring-loaded piston-type units feature a balanced valve for superior regulation characteristics.
3. Turning adjusting knob clockwise to increase pressure and turn counter-clockwise to decrease pressure.
4. Contaminants collected in the bowl can then be easily drained through the standard semi-automatic drain.
5. Oil is injected into the mist generator by allowing some of the incoming air to pass through the bowl pressure control valve and down into the bowl where it forces oil up into the siphon tube. The oil then passes by the adjustment screw, which meters the amount of oil that can flow to the drip tube and down onto the mist generator.



6. Selection of Lubrication

6.1 Gear Reducer

Suitable gear lubrication oil will increase gear surface contact running and extension gears, bearings and other parts life. Please reference following table of lubrication gear oil for your reducers.

LOAD	AMBIENT	SHELL OIL	MOBIL OIL	ISO VG
NORMAL LOAD	-30℃~5℃	OMALA OIL 150	MOBIL GEAR 629	ISO VG EP150
	5℃~40℃	OMALA OIL 320	MOBIL GEAR 632	ISO VG EP320
	40℃~65℃	OMALA OIL 460	MOBIL GEAR 634	ISO VG EP460
HEAVY LOAD	-30℃~5℃	OMALA OIL 320	MOBIL GEAR 632	ISO VG EP320
	5℃~40℃	OMALA OIL 460	MOBIL GEAR 634	ISO VG EP460
	40℃~65℃	OMALA OIL 680	MOBIL GEAR 636	ISO VG EP680

Remark：

a. CHI SHUN gear reducer use （MOBIL OIL）MOBIL GEAR 632。

b. After initial 100 hours of use, the interior of the reducing gear should be cleaned up and refill new oil. And then, after every 2500 hours of usage replace new oil again.

c. Insufficient lubricant oil may lead to the rapid wears of worm gear and low efficiency.

d. Excessive of lubricant oil may lead to oil leakage.

e. Please fill in adequate lubricant oil to above half of the oil gauge. (See oil gauge).

6.2 Other Parts Lubrication

a. Air control unit ➔ Shell tellus 32

b. Bearing ➔ Shell Aeroshell 7 or Shell Alvania EP

7. Contact us

Please feel free to contact us if you need any help.

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