PNL-MS

Belt Conveyor with Metal Detector

Date: Apr, 2013

Version: Ver.B (English)

SHINI

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1. General Description

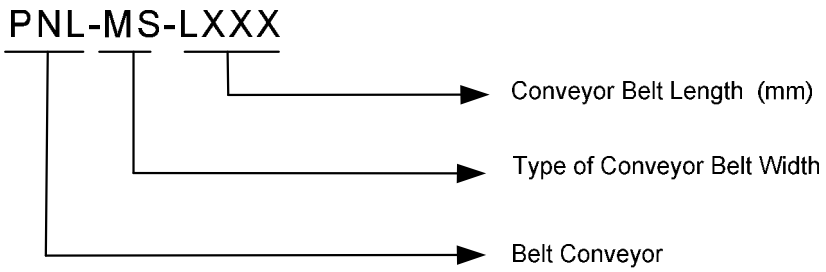
Please read this manual carefully before using this machine in order to operate correctly against any damage caused by improper operation.

Forbidden to process flammable or toxic material!

PNL-MS belt conveyor with metal detector is a device which can detect the metal contained in the material during conveying and simultaneously activate the alarm. It is suitable for not only working together with Shini's granulator, such as SG-36, SG-43, SG-50 and SGS series, but also working with other series of belt conveyors. PNL-MS series feature reliable performance, easy operation and convenient height adjustment upon customer's requirements.

Model: PNL-MS-L4500

1.1 Coding Principle



1.2 Features:

1) Equip with channel metal detector to detect effectively the metal in the channel.
2) PVC belt is adopted for smooth and efficient conveying.
3) Height of the floor stand is adjustable.
4) Sidewalls for PNL-MS series are 100 mm.
5) Conveying speed could be adjusted within 1.3~8 m/min by transducer which is standard configuration.
6) Power supply for PNL-MS series is 3Φ, 400V, 50/60Hz.

All service work should be carried out by a person with technical training or corresponding professional experience. The manual contains instructions for both handling and servicing. Chapter 6, which contains service instructions, is intended for service engineers. Other chapters contain instructions are for the daily operator.

Any modifications of the machine must be approved by SHINI in order to avoid personal injury and damage to machine. Warranty is inapplicable for any damage caused by unauthorized change of the machine.

Our company provides excellent after-sales service. Should you have any problem during using the machine, please contact the company or the local vendor.

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Technical Specifications

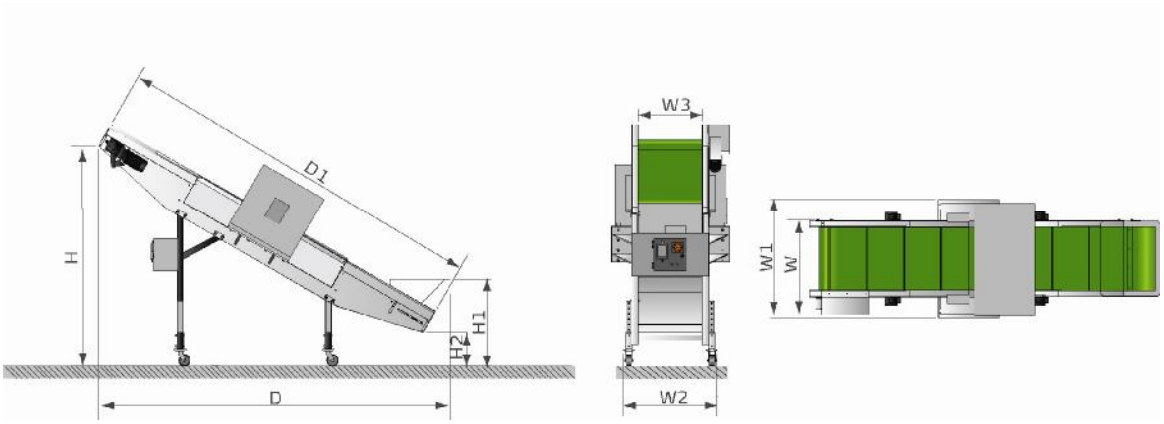
1.2.1 Specifications Table

Table 1-1: Specifications List

Models	PNL-MS-L3500	PNL-MS-L4500
Motor power (kW)	0.4	0.4
Speed range (m/min)	1.3~8	1.3~8
Dimension of channel W×H (mm)	580×380	980×580
Maximum conveying capacity (kg/min)	150	150
Minimum detectable diameter (metal ball SΦmm)	5	8.7

Notes: power supply is 3Φ，400V，50Hz.

1.2.2 Dimensions



Picture 1-1: Dimensions

Table 1-2: Dimensions List

Models	PNL-MS-L3500	PNL-MS-L4500
W (mm)	895	1295
W1 (mm)	1105	1505
W2 (mm)	880	1280
W3 (mm)	600	1000
D (mm)	3285	4150
D1 (mm)	3500	4500
H (mm)	2060	2560
H1 (mm)	805	805
H2 (mm)	310	310
Weight (kg)	****	****

We reserve the right to change specifications without prior notice.

1.3 Safety Regulations

To avoid any body injures and damages of the machine, please obey the regulations in this manual. When operating this machine, please comply with the regulations as follows.

1.3.1 Safety Signs and Labels

Electrical installation should be done by qualified electricians. Turn off the main switch and control switch before servicing and maintenance.

Warning!

The sound level produced by the machine is ⩽80dB at the position of the operator.

Notice:

Noise level test refers to the following conditions: 1m around the machine, 1.6m above the machine.

Warning!

1) Don't use the machine and don't try to repair it before carefully reading this manual and understanding all its parts completely.
2) In particular, it is important to adopt the precaution listed in the section 'safety instruction'.
3) It is forbidden to use the machine in any condition or for any use different from what is indicated in the manual. SHINI has no responsibility for breakdown, trouble, or injuries caused by improper operation.

Attention!

No need for regular inspection because all the electrical parts in the control unit are fixed tightly!

Attention!

The maximum weight of the pieces (average distribution) to be carried on the conveyor belt must not be over 150kg in total.

The conveyor belts are not suitable to transport loose material.

Attention!

These conveyor belts can be easily used by all of the personnel of the plant they are installed in, and they do not present any risk for the operator, if used properly.

Therefore, it is recommended to read the manual carefully before using the machine.

Attention!

SHINI claims no responsibility when:

1) Use of the conveyor belt is in any way openly opposed to what is indicated in the present instruction manual.
2) There are feeding defects.
3) There is a serious deficiency of the foreseen maintenance.
4) Non-authorized changes are adopted.
5) Spare parts that are non-authorized or not suitable for the actual model are used.
6) There are exceptional events.

Danger!

Risk of fire!

Risk of fire is present whenever the conditions of the conveyor belts are not suitable for the operation they are used for (in particular: temperature of the pieces carried). Adjust the condition of the conveyor belt according to the table shown here below.

Risks of high temperature:

These conveyor belts are designed for transporting molded parts, i.e. hot pieces. If you need to operate on the conveyor belt, use safety gloves. (In particular where the parts fall on the belt)

Type of belt	Max. temp. of parts
PVC	60℃

Attention!

The packing material must not be left around, and it must be disposed according to the regulations in force. It is possible to lift the conveyors with a fork lift.

Danger!

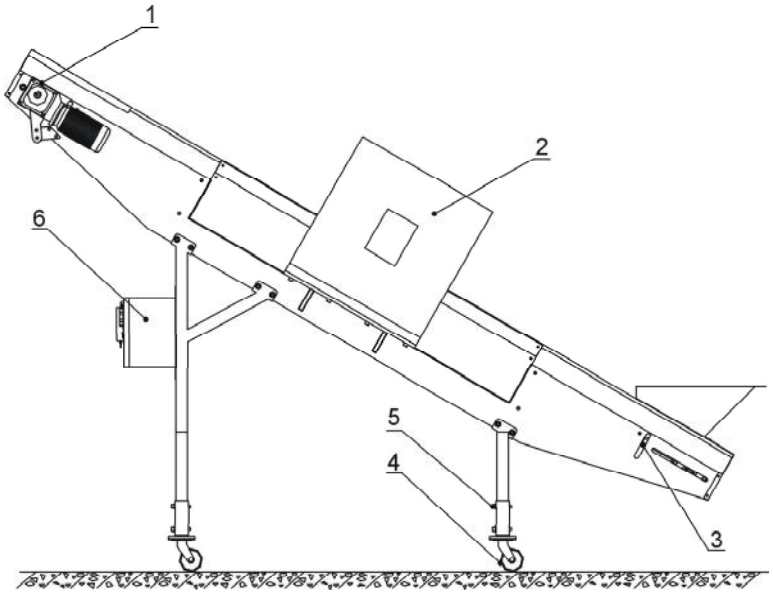
To protect the operator's safety, and the integrity of the machine, assure the stable lifting of the conveyor. Once the conveyor belt is running, it is necessary to fix the machine by locking the castors. Moreover, suitable slings or fixtures must be attached to keep it steady during transportation.

2. Structural Features and Working Principle

2.1 Function Description

PNL-MS horizontal belt conveyor with metal detector is a device which can detect the metal contained in the material during conveying and simultaneously activate the alarm. It is suitable for not only working together with Shini's granulator, such as SG-36, SG-43, SG-43, SG-50 and SGS series, but also working with other series of belt conveyors. PNL-MS series feature reliable performance, easy operation and convenient height adjustment upon customer's requirements.

2.1.1 Working Principle



Parts Name:

1. Gear motor 2. Metal detector 3. Adjusting nut 4. Castor

5. Adjusting bolt 6. Control box

Picture 2-1: Working Principle

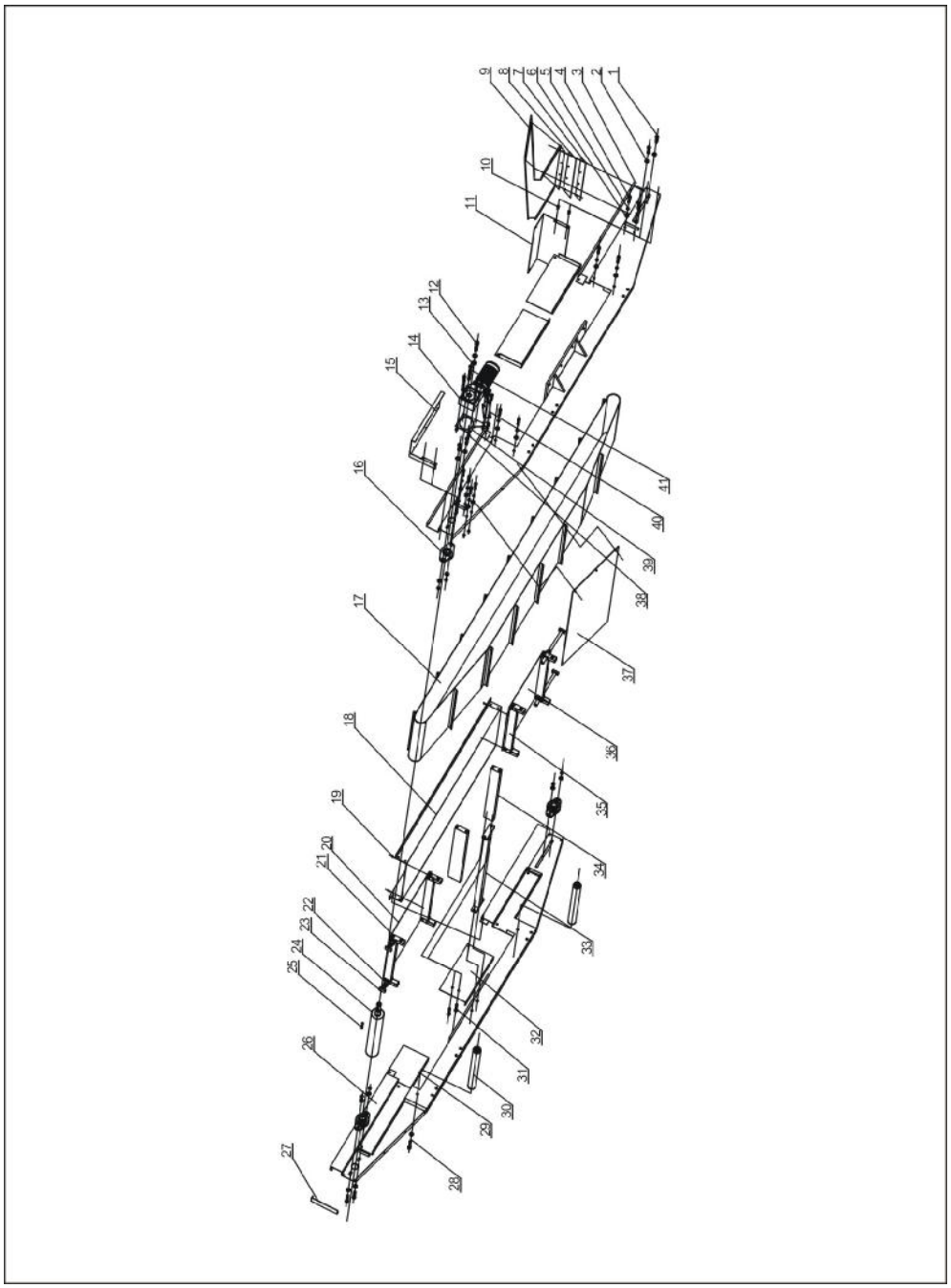
Working principle description:

Material is conveyed by the conveyor belt which is driven be the gear motor (1). The metal detector (2) stops the gear motor (1) and gives alarm by sending out a signal when material contains metals passing by the detector (2). The gear

motor restarts after removing the metals and pressing the reset switch on the control box (6). The adjusting nut is available for centralizing and tightening the conveyor belt. Customers also can adjust the height of the conveyor by adjusting bolt (3). Castors (4) make the conveyor easy to move.

2.2 Exploded View

2.2.1 Exploded View of Main Frame



Note: Please refer to 2.2.2 material list about the parts code.

Picture 2-2: Exploded View of Main Frame

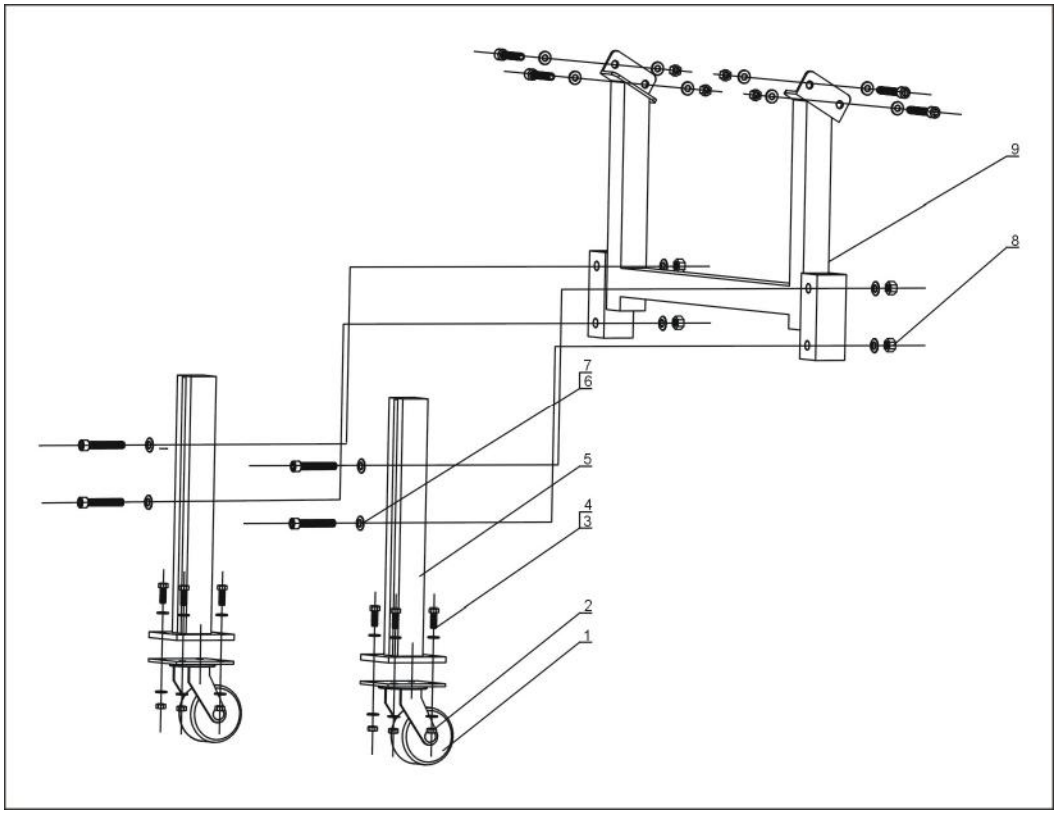
2.2.2 Parts List of Main Frame

Table 2-1: Parts List of Main Frame (PNL-MS-L3500/L4500)

No.	Name	**Part No.**	No.	Name	**Part No.**
1	Hexagon bolt	YW60144500000	22	Hexagon nut	YW64200200000
2	Flat washer	YW66142700000	23	Adjusting bolt	-
3	Left side plate	-	24	Driving shaft	-
4	Inner hexagon screw	YW61081600000	25	Flat key	-
5	Spring washer	YW65008000100	26	Right side plate	-
6	Flat washer	YW66082200100	27	Top right baffle-plate	-
7	Baffler pressing block	-	28	Inner-hexagon screw	YW61122500000
8	Baffle-leather	-	29	Side cover plate 2	-
9	Material collector	-	30	Driven shaft	-
10	Hexagon self-tapping screw	-	31	Plastic hexagon bolt	-
11	Lower baffle-plate	-	32	Side cover plate 1	-
12	Inner hexagon screw	YW61103000000	33	Bottom cross beam	-
13	Circlip for hole	YW69003000000	34	Flitch	-
14	Gear motor	-	35	Beam 1 Assembly	-
15	Top left baffle-plate	-	36	Lower bottom plate	-
16	Bearing base	-	37	Bottom baffle-plate	-
17	Conveying belt	-	38	Hexagon nut	YW64001000100
18	Middle bottom plate	-	39	Gear motor fixing plate 1	YW64200200000
19	Cross recessed tapping screw	-	40	Gear motor fixing plate 2	-
20	Top bottom plate	-	41	Hexagon nut	-
21	Beam 2 assembly	-			

* means possible broken parts. ** means easy broken parts, and spare backup is suggested. Please confirm the version of manual before placing the purchase order to guarantee that the item number of the spare part is in accordance with the real object.

2.2.3 Exploded View of Bottom Frame 1



Picture 2-3: Exploded View of Bottom Frame 1

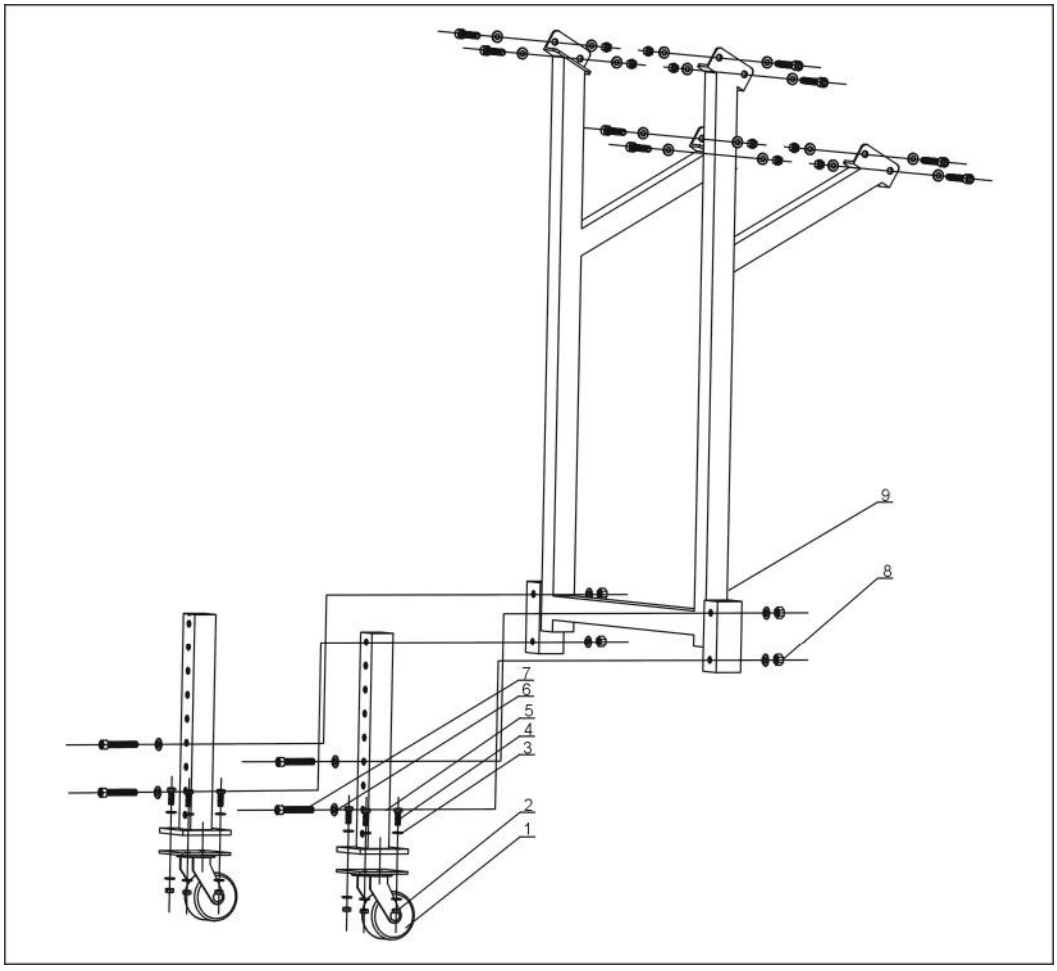
2.2.4 Parts List of Bottom Frame 1

Table 2-2: Parts List of Bottom Frame 1 (PNL-MS-L3500/L4500)

No.	Name	Part no.	No.	Name	Part no.
1	Flange type mounting castor with double brakes	YW03441090000	6	Flat washer	YW66142700000
2	Hexagon nut	YW64001000200	7	Inner hexagon bolt	YW61128000000
3	Flat washer	YW66181000000	8	Lock nut	YW64001200000
4	Hexagon bolt	YW60103000000	9	Top frame of bottom frame 1	-
5	Stand of bottom frame 1	YW03441090000			

* means possible broken parts. ** means easy broken parts, and spare backup is suggested. Please confirm the version of manual before placing the purchase order to guarantee that the item number of the spare part is in accordance with the real object.

2.2.5 Exploded View of Bottom Frame 2



Picture 2-3: Exploded View of Bottom Frame 2

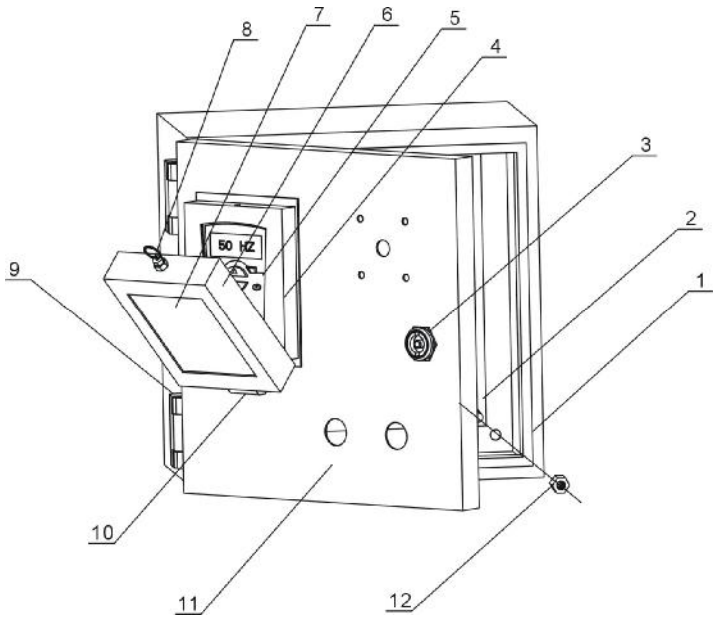
2.2.6 Parts List of Bottom Frame 2

Table 2-2: Parts List of Bottom Frame 2 (PNL-MS-L3500/L4500)

No.	Name	Part no.	No.	Name	Part no.
1	Flange type mounting castor with double brakes	-	6	Flat washer	YW66142700000
2	Hexagon nut	YW64001000200	7	Inner hexagon bolt	YW61128000000
3	Flat washer	YW66181000000	8	Lock nut	YW64001200000
4	Hexagon bolt	YW60103000000	9	Top frame of bottom frame 2	-
5	Stand of bottom frame 1	-			

* means possible broken parts. ** means easy broken part. and spare backup is suggested. Please confirm the version of manual before placing the purchase order to guarantee that the item number of the spare part is in accordance with the real object.

2.2.7 Exploded View of Main Control Box



Picture 2-5: Exploded View of Main Control Box

2.2.8 Parts List of Main Control Box

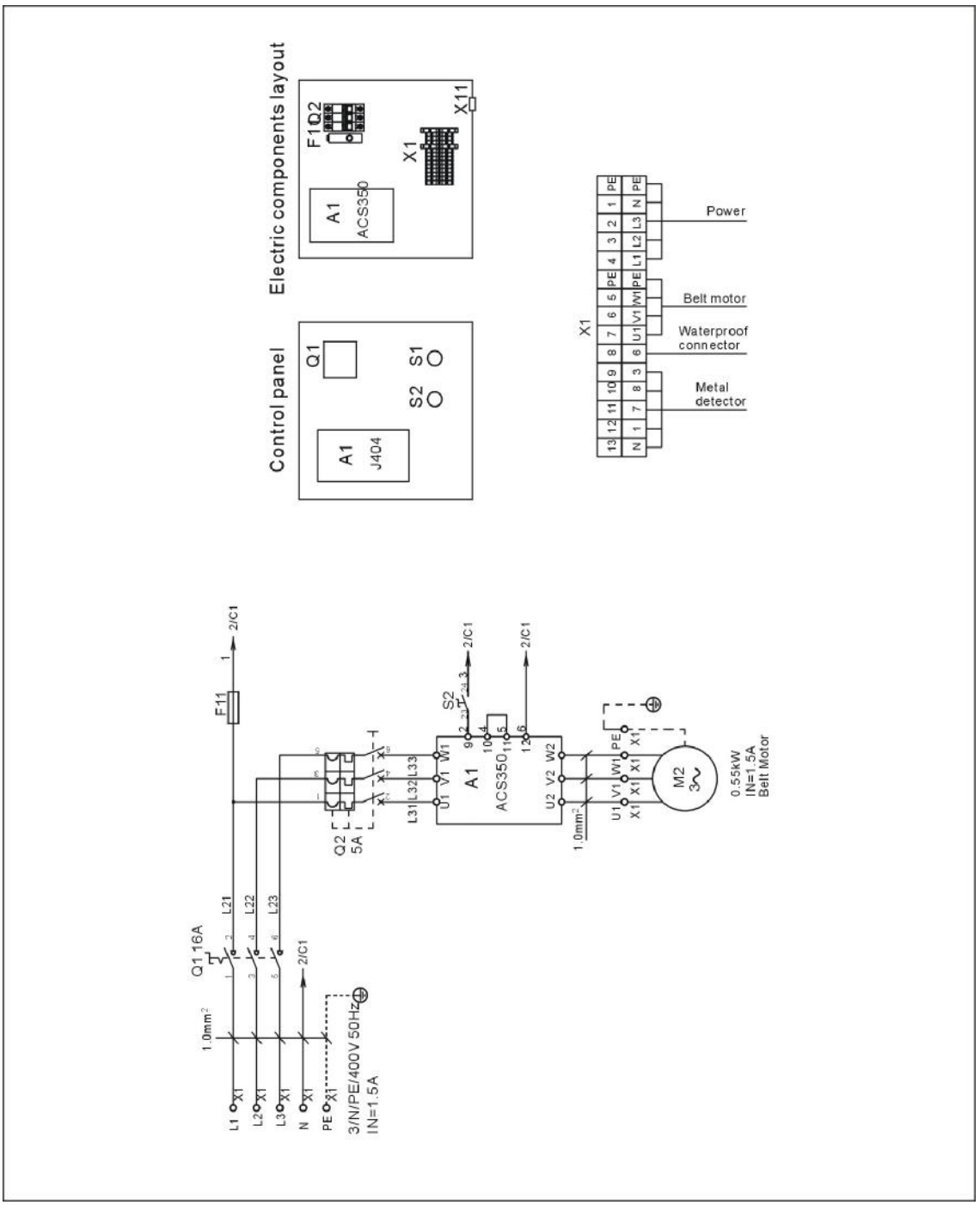
Table 2-3: Parts List of Main Control Box (PNL-MS-L3500/L4500)

No.	Name	Part no.	No.	Name	Part no.
1	Control box	-	7	Monitor plate	-
2	Electric components fixing plate	-	8	Located rod (without lock)	-
3	Door lock with long baffler	YW00000000100	9	Hinge with O-ring and zinc plating-white	-
4	Seal ring of small control box	-	10	Hinge with O-ring and zinc plating-white	-
5	Remote control panel	YE81040400000	11	Control box cover	-
6	Remote control panel cover	-	12	Hexagon nut M8	YW64000800200

* means possible broken parts. ** means easy broken part. and spare backup is suggested. Please confirm the version of manual before placing the purchase order to guarantee that the item number of the spare part is in accordance with the real object.

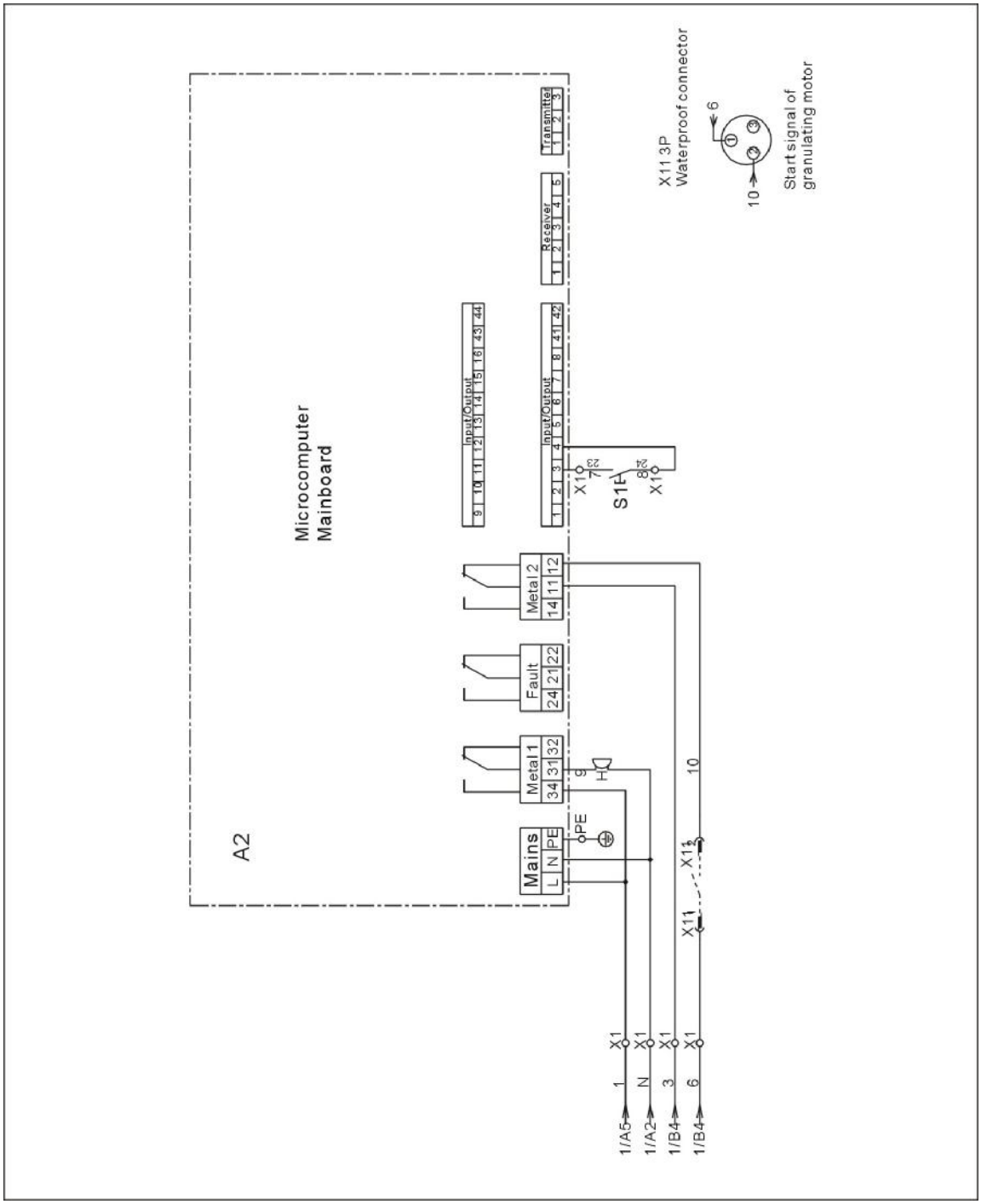
2.3 Electrical Circuit Diagram

2.3.1 Electrical Circuit Diagram



Picture 2-2: Electrical Circuit Diagram

2.3.2 Wiring Diagram



Picture 2-3: Wiring Diagram

2.3.3 Electric Parts List

Table 2-1: Electric Parts List

No.	Symbol	Name	Specification	Part No.
1	Q1	Main switch	16A	YE10200300000
2	Q2	Circuit breaker	5A	YE40603000000
3	A1	Transducer	400V 0.75W	YE75350300000
4		Control panel	-	YE81040400000
5	F11	Fuser	2A	YE41001000000
6	S1	Reset button	400VAC	YE11375800000
7	S2	Start switch	-	YE12210100000
8	H	Buzzer	230VAC 50/60Hz	YE84003500000
9	A2	Metal detector	-	M-04
10	X1	Terminal block	32A	YE61250040000
11		-	-	YE61253500000
12	X11	Waterproof joint	3P	YE62163000100 YE62163040000
13	M1	Motor	0.75kW	-

* means possible broken parts. ** means easy broken part. and spare backup is suggested. Please confirm the version of manual before placing the purchase order to guarantee that the item number of the spare part is in accordance with the real object.

3. Installation and Testing

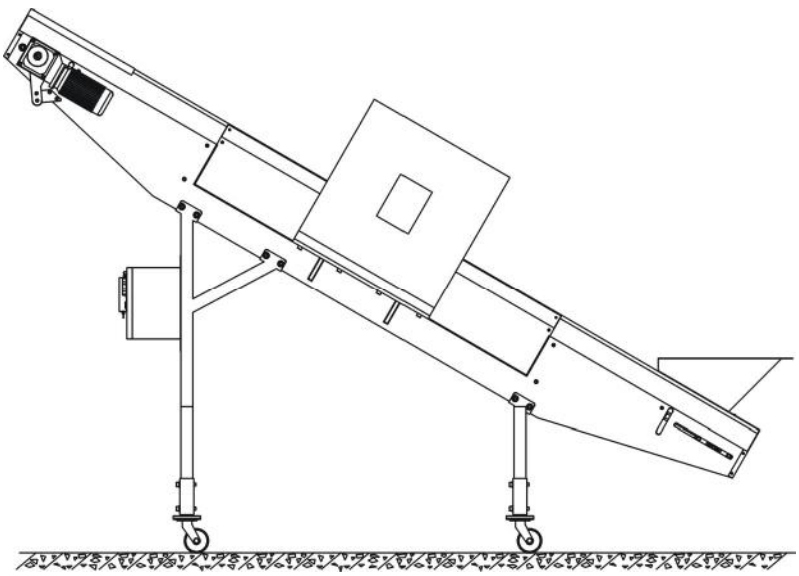
Read this chapter carefully before installation, Must observe the installation steps as follows!

The connection of the power supply should be done by qualified electricians only!

3.1 Attention

1) Verify that the power supply corresponds to the specifications of the plate near the controls of the conveyor.
2) Connect the power cable and the PE wire according to the local regulations.
3) Use independent power cable and switch, Make sure that the diameter of the cable is not smaller than the cable used in the control box.
4) The connection end of the power cable should be safely and tightly.
5) This series use the power with 3phase and 4wire, (L) connect to the live wire of the power, and the PE should be connected.
6) Power supply requirement:
   Main power voltage: ±10%
   Main power frequency: ±2%

3.2 Horizontal Installation



Picture 3-1: Horizontal Installation

Conveyors don't require any particular preliminary operation before starting-up. With reference to the layout of the cables, make sure that they are protected against damage and that they don't hamper the operators.

3.3 Power Connections

The wire of the horizontal belt conveyor, transducer and metal detector should be connected strictly comply with the wiring diagram.

Attention!

After the power connected, check the direction of the motor rotation, if the motor reverses, please turn off the power, change over the connecting wires of the L terminal.

Picture 3-2: Machine Installation Drawing

Attention!

Keep the machine away from the flammable object over 1m.

4. Operation

4.1 Operation guide

1) Switch on the main switch;

Picture 4-1: Main Switch

2) Tweak the start switch at the “start” position to start the conveyor;

Picture 4-2: Twist Switch

3) Press the up/down button on the remote control panel to change frequency in order to change conveying speed of belt;

Picture 4-3: Frequency Converter

4) Please take out them as the metal detector detects metal objects, and then

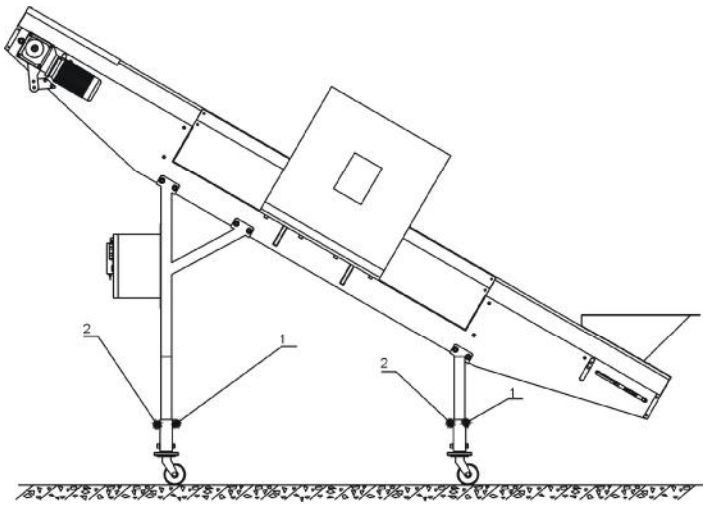
press down the reset switch to start the conveyor again;

5) Control parameters of metal detector, which have been adjusted at best mode before delivery, are better not to change it by customer in principle.

4.2 Height adjustment

Loosen the lock nut (1) and take out the inner hexagon bolt (2) (M12x75), and then adjust the height of conveyor at a suitable level. After finished adjustment, retighten the lock nut (1).

Please use auxiliary device to lift or support the conveyor when adjusting its height in case it falls abruptly to result in machine damage of personal injury.



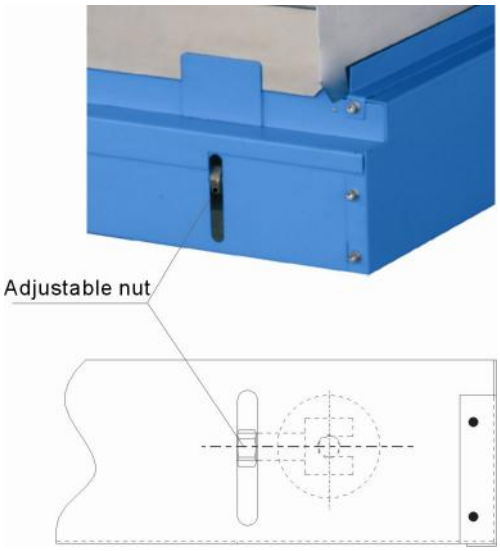
Picture 4-4: Height Adjustment

Attention!

The conveyor will loss the balance state if forget to tighten the lock nut after height adjustment!

4.3 Adjusting the Central Position of the PU Belt

Rotate this nut to adjust the central space of the PU Belt



Picture 4-5: PVC Adjusting Drawing

Danger!

It must be to check if the PVC belt is at the suitable position while the conveyor is running. However, the adjustment must be done when the machine is stopped, and then the belt must be made to run only for the time necessary to verify its proper centering.

Attention!

On a monthly basis verify that the external temperature of the motor and gearbox is not too high (it should be between 60 and 20℃). In case it is different, contact the technicians at SHINI directly.

Attention!

1) The maximum weight of the pieces to be carried on the conveyor belt must not be over 56kg in total(Conveying capacity is less than 56kg as the set value of the regulator is smaller than 4.5m/min)..

2) Not suitable to transport loose material.

3) The maximum resistant temperature of PVC belt is 60℃.

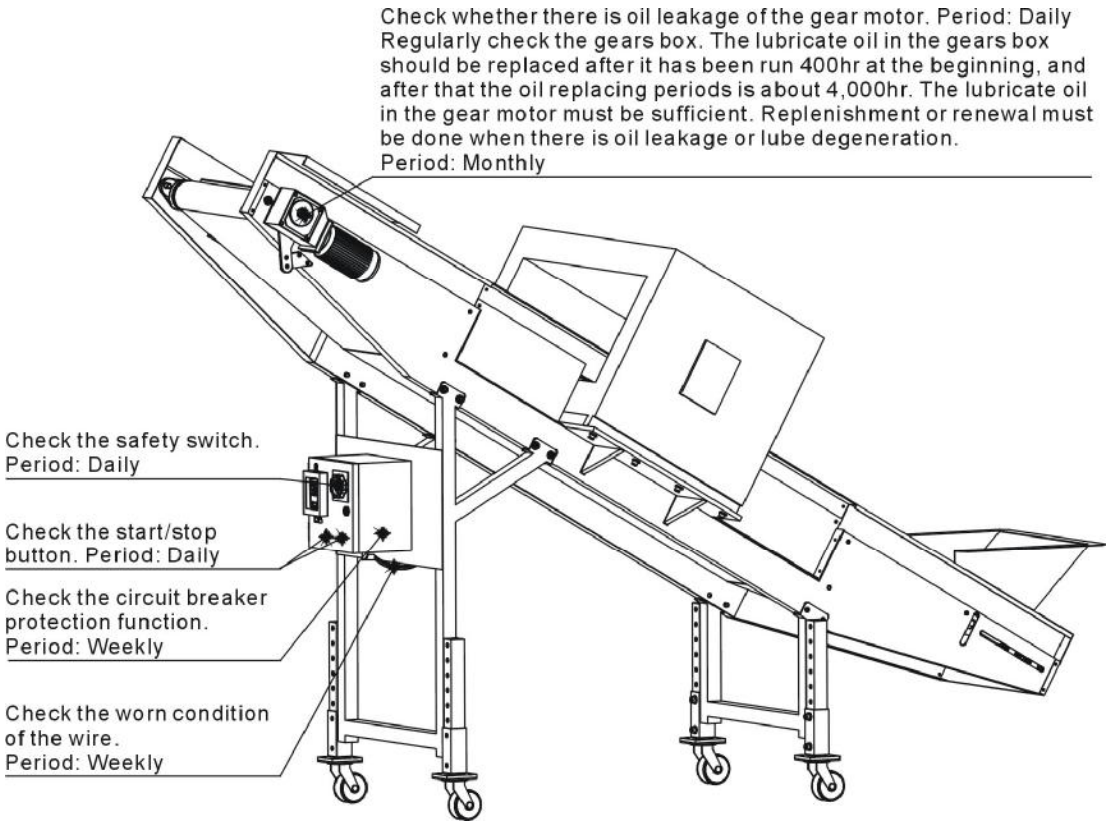
The operator, or the maintenance technician, must wear suitable work

clothes, without free parts. They must not wear chains, bracelets, or other objects which may be caught by mechanical parts in movement. In case of long hair, special hairnets must be used, to avoid the risk of being caught.

5. Trouble-shooting

Failures	Solutions
Connect the power, rotate the main switch and turn on the RUN / STOP switch, the motor doesn't run.	1. Check if the transducer show 0Hz，if yes, it is need to adjust the setting value by up button on control panel. 2. Check the circuit according to wiring diagram, the possible reasons can be as follows: a: The power is failure. b: The circuit is disconnected. c: The motor protector is damaged. d: The motor is failure.
The circuit breaker often trips off.	Check the circuit according to wiring diagram, the possible reasons can be as follows: a: Short circuit may exist. b: The motor protector is damaged. c: The motor is failure.

6. Service and Maintenance



6.1 Repair

To avoid any body injury and damage of the machine, all of the repair work should be done by professional person only.

It is the duty of the operator to keep the machine clean from foreign matter, such as deposits, oil, or other materials. So it is necessary to clean the machine at the end of every working shift. This must be performed when the machine is stopped, in stable starting of the machine.

6.2 Maintenance

6.2.1 Maintenance of the Gearbox

Check if the reduced gears box is oil leaking and it should be examined periodicity. When you find that the oil is reduced or the color of it changed dark and black, you must complement it or replace it immediately. Please be noticed that keep the surface of the gear motor cleaning. Move away the dust and the contamination in time so as to keep a good distribute of the heat.

Picture 6-1: Gear Motor

Attention!

The suitable temperature range of the motor and the gearbox is between 20℃-60℃.

6.2.2 Clearance of the Machine

Please keep the machine clean from foreign matter, such as deposits, oil, or other materials. Do the cleanly work everyday.

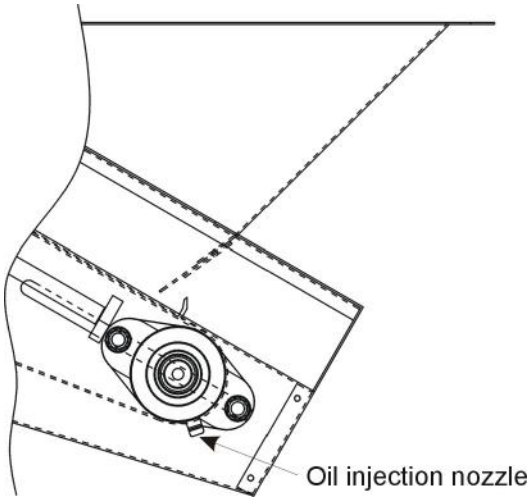
It is forbidden to use flammable liquids during the cleaning operation. Periodically check the status of the PVC belt, and replace it, if necessary. Once the machine has been cleaned, the operator must check for worn out or damaged parts (in which case, he must replace it immediately), or for parts which are not firmly fixed (in which case, he should fix them, if this is possible).

The machine protection and safety devices must not be removed, unless a specific repair and/or maintenance action is required. These protections must be put back as soon as the reason for their removal has disappeared, in any case, they must be installed before starting the machine.

If using compressed air, the operator must wear safety glasses, and make sure that nobody is near the machine, because they may be hit by materials and dust.

6.2.3 Lubricate the Bearing

An oil injection nozzle is attached with the bearing pedestal, and there is no need to add lubricant grease to it. Remove dusts and pollutants in time for heat dissipation as showing in the picture below:



Picture 6-2: Bearing Pedestal

Stop the machine and unplug the power supply before doing the repair or maintenance work.

6.3 Maintenance Schedule

6.3.1 About the Machine

Model _____ SN _____ Manufacture date _____

Voltage_____Φ_____V Frequency _____ Hz Power _____ kW

6.3.2 Check After Installation

☐Check if the body of the machine installated horizontal

☐Check for eventual leaks of lubricant from the reduction gear

☐Check the status about the PU belt

Electrical installation

☐Voltage _____ V _____ Hz

☐Check if the power connection of the control box is correctly

6.3.3 Daily Checking

☐Check the switches of the machine.

☐Check if the reduction gears is oil leaking leaking.

☐Check the function of the safety switch.

6.3.4 Weekly Checking

☐Check all the electrical wires.

☐Check the protection function of the breaker.