SAL-430/460

Self-contained Hopper Loader

Date: Mar., 2022

Version: Ver.B

SHINI

Content

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1. General Description

📖 Please read through this operation manual before using and installation to avoid damage of the machine and personal injuries.

The SAL-430 / 460 series use a high voltage inductive motor with low noise level and long life. It also has an automatic reversal dust cleaning device.

1.1 Coding Principle

SAL - xxx - xx

- ⟶ Options
- ⟶ Model No.
- ⟶ Shini Hopper Loader
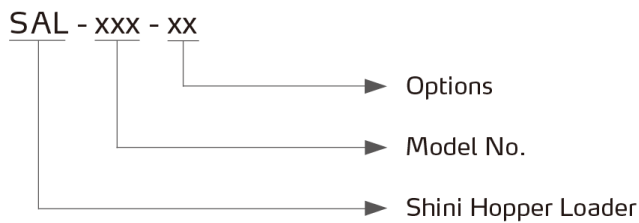
1.2 Main Features

- Stainless steel hopper, motor overload protective device.
- When it is installed in the feeder of the molding machine, it shall be used with the collection hopper SCH-U or SICH-U.
- Standard cloth mesh filter and motor reverse cleaning function.
- Sal-430 / 460 is equipped with RS485 communication function
- This series is equipped with manual control switch for easy power switching when the machine is installed at a high place.

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.

Any modifications of the machine must be approved by SHINI in order to avoid personal injury and damage to machine. We shall not be liable 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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1.3 Technical Specifications

1.3.1 Outer Dimensions
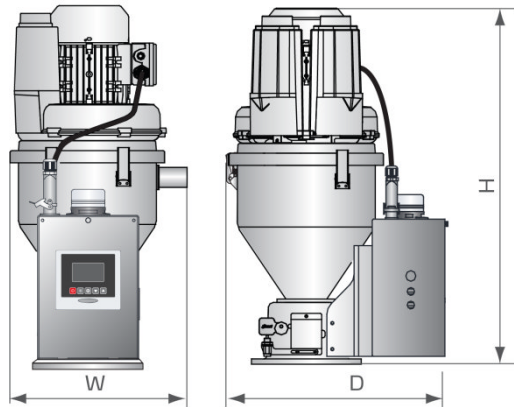
Picture 1-1: Outer Dimensions

Table 1-1:Specifications

Model	SAL-430	SAL-460
Ver.	B	B
Type	Inductive	
Blower power (kW) (50/60Hz)	0.37	0.75
Conveying pipe dia(Inch)	1.25	1.5
*Conveying capacity(kg/hr, 50Hz/60Hz)	200/220	300/330
Hopper capacity (L)	3	6
Input voltage	3Φ,400VAC,50Hz	
Material level control	Microswitch	
Cloth filter	Standard	
Auto-cleaning	Standard	
Dimensions		
H(mm)	660	735
W(mm)	310	350
D(mm)	430	455
Weight (kg)	23	26

Note：1) For hopper inside polished ones, add "P" at model behind.

2)Test condition of conveying capacity: Plastic material of bulk density 0.65kg/L, dia. 3~5 mm, vertical conveying height: 4m,   horizontal conveying distance: 1m.V.

1.3.2 Loading Capacity
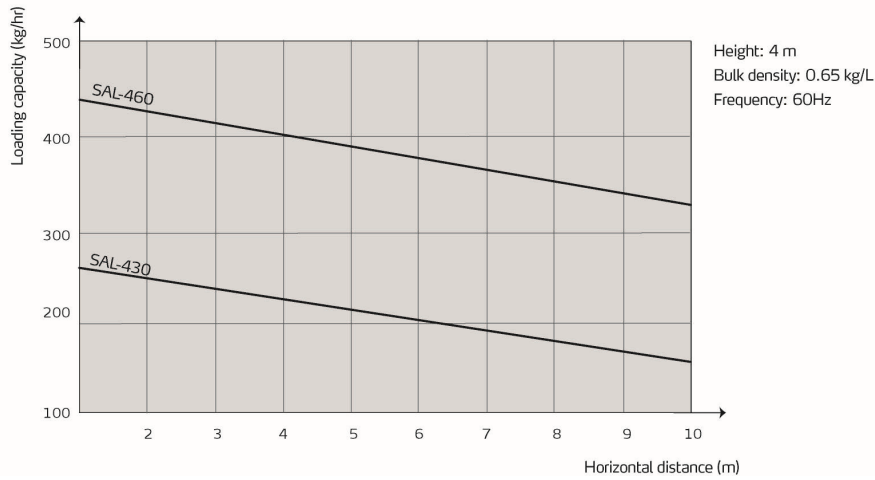
Picture 1-2: Loading Capacity

1.4 Safety Regulations

Please abide by the safety guide when you operate the machine so as to prevent damage of the machine and personal injuries.

⚠ All electrical components should be installed by qualified electricians.

Turn off main switch and control switch during repair and maintenance.

⚠ Warning! High voltage!
This mark is attached on the cover of the control box.

⚠ Warning! Be careful!
Be more careful when this mark appears.

Transportation

1) SAL series hopper loader are packed in paper cartons. Handle with care when to move the machine by hands.

2) Do not rotate the machine and avoid collision with other objects during transportation to prevent improper functioning.

3) The structure of the machine is well-balanced, although it should also be handled with care when lifting the machine for fear of falling down.

4) The machine and its attached parts can be kept at a temperature from -25℃ to +55℃ for long distance transportation and for a short distance, it can be transported with temperature under +70℃.

Storage

1) SAL series hopper loader should be stored indoors with temperature kept from 5℃ to 40℃ and humidity below 80%.

2) Disconnect all power supply and turn off main switch and control switch.

3) Keep the whole machine, especially the electrical components away from water to avoid potential troubles caused by the water.

4) Plastic film should be used to protect the machine from dust and rains.

Working Environment
The machine should be operated:

Indoors in a dry environment with max. temperature +45℃ and humidity nomore than 80%.

Do not use the machine

1) If it is with a damaged cord.
2) On a wet floor or when it is exposed to rain to avoid electrical shock.
3) If it has been dropped or damaged until it is checked or fixed by a qualified serviceman.
4) This equipment works normally in the environment with altitude within 3000m.
5) At least a clearance of 1m surrounding the equipment is required during operation. Keep this equipment away from flammable sources at least two meters.
6) Avoid vibration, magnetic disturbance at the operation area.

Rejected Parts Disposal

When the equipment has run out its life time and can not be used any more, unplug the power supply and dispose of it properly according to local code.

Fire hazard

⚠ In case of fire, CO_2 dry powder fire extinguisher should be applied.

1.5 Exemption Clause

The following statements clarify the responsibilities and regulations born by any buyer or user who purchases products and accessories from Shini (including employees and agents).

Shini is exempted from liability for any costs, fees, claims and losses caused by reasons below:

1. Any careless or man-made installations, operation and maintenances upon machines without referring to the manual prior to machine using.
2. Any incidents beyond human reasonable controls, which include man-made vicious or deliberate damages or abnormal power, and machine faults caused by irresistible natural disasters including fire, flood, storm and earthquake.
3. Any operational actions that are not authorized by Shini upon machine,

including adding or replacing accessories, dismantling, delivering or repairing.

4. Employing consumables or oil media that are not appointed by Shini.

2. Structure Characteristics and Working Principle

SAL-430 / 460 series are suitable for conveying plastic granules. The blower makes vacuum of material hopper by drawing the air out. Materials will then be sent into material hopper.
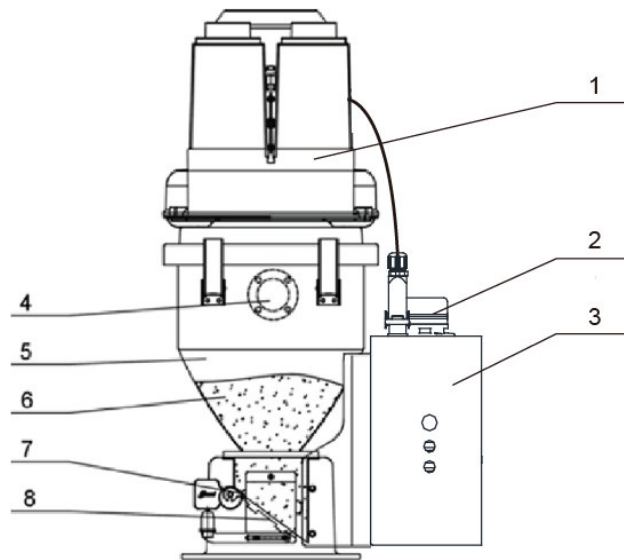
Picture 2-1: Working Principle

1. Blower	2. Alarm light
3. Control box	4. Material inlet pipe
5. Storage hopper	6. Materials
7. Microswitch	8. Discharging plate

After starting the machine, blower(1) works, it makes the storage hopper(5) generate the vacuum, discharging plate(8) closed, materials in the silo enter into the storage hopper(5) through material inlet pipe (4) by air pressure difference. When loading is finished, blower(1) stops rotating, materials(6) drop off by gravity, when microswitch(7) detected there's no material in the hopper, blower(1) will start again. When material can't be sucked or lack of material, alarm light (2) on control box (3) will flicker for indication.

2.1 Main Electrical Components Description

2.1.1 Microswitch

It is used to give control signals to make the motor start working after discharge of the material.
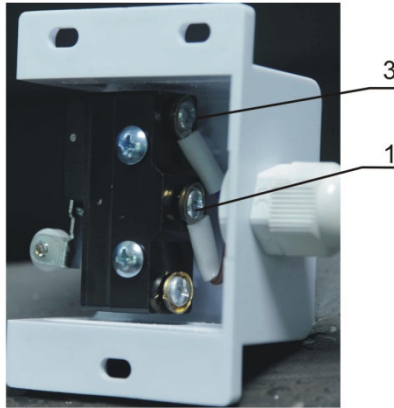
Picture 2-2: Photoelectrical Sensor

1. 3: To be connected with signal wires

3. Installation and Debugging

This series of models only could be applied in working environment with good ventilation.

Make a careful study of this chapter before installation. The machine must be installed according to the steps below.

Power supply should be connected by qualified electricians.

3.1 Installation of SAL-430 / 460
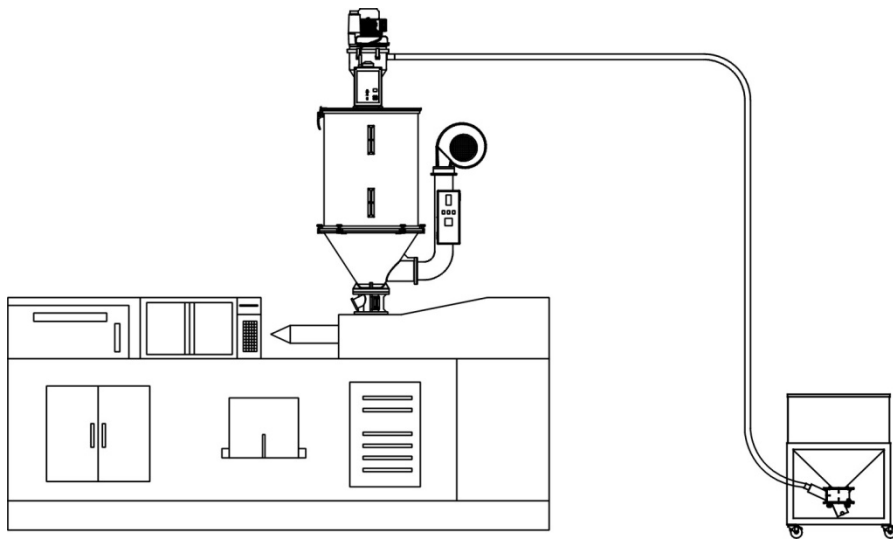
Picture 3-1: Installation Methods (SAL-430/460)

1. Notes for Installation and Positioning

  1) Machine just can be mounted in vertical position. Make sure there's no pipe, fixed structure or other objects above the installing location and around the machine which may block machine's installation, hit objects or injure human person.

  2) For easy maintenance, it's suggested to leave 1m space around the machine.

  3) Machine should be placed on water-level surface. If it needs to be mounted on a higher surface (e.g. the scaffold or the interlayer), should ensure its structure and size could bear the weight and size of the machine.

2. Pipe connection

As picture, mount the loader onto the hopper dryer and lock with screws. Connect one end of the material pipe to   inlet of loader and insert another side to the storage tank.

3. Electrical Circuit Connection of SAL-430 / 460

Please connect   SAL-430 / 460 series 230V model of machines with AC 3Φ, 230V 50Hz power supply and earth wire, and for SAL-430 / 460 series 400V model, please connect it with AC 3Φ, 400V 50Hz power supply and earth wire.

> *Please make sure that the main power is shut off when you connect the machine with power supply!*

3.2 Installation Space

During installation of the machine, keep at least 1m installation space around the machine as shown by the picture.

Do not install the machine in a position crowded with other objects. This would cause inconvenience to operation, maintenance and repair.

Do not sit on the machine.

Keep away flammable and explosive goods.

Picture 3-2: Installation Space

4. Application and Operation

4.1 Control panel description
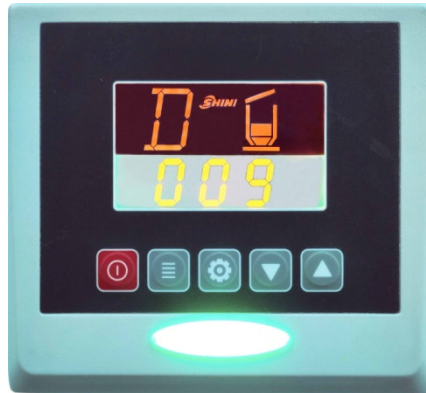
Pic.4-1：Description of operation panel keys

NO.	Symbol	Name	Description
1		ON/OFF	Start/stop the machine
2		MENU	Enter or exit parameter setting
3		SET	Modify or confirm machine parameters
4		DOWN	Move the menus down, and reduce the value
5		UP	Move the menbus up, and increase the value
6		FULL MAT.LIGHT	It means full materials in the hopper
7		BLENDING	It means the machine is mixing the materials in the hopper
8		MAT.SHUT-OFF	It means the machine is shutting off the materials
9		SHORTAGE ALARM	It means machine alarm for no materials during suction
10		COMMUNICATION	It means the communication is connecting through
11		FILTER MESH CLEAN	It means filter auto cleaning function
12		OVERLOAD ALARM	It means motor overload error
13		SCREEN BLOCKING	Prompt to clean or replace the filter screen

4.2 Parameter Setting

In OFF mode，Press ▤ , and enter parameter setting.

Press ▽ or △ to select parameter，press ⚙ enter setting.

Press ▽ or △ modify parameters，press ⚙ Confirm revision.

E.g：set"Suction time setting" 15S

In OFF mode，Press ▤ and enter parameter setting.

Press ▽ or △ key to select the function code F.01, and press ⚙ key to enter.

Press ▽ or △ key to change it to parameter 15, and press ⚙ key to confirm after modification.
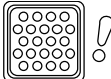
Code	Status	Parameters	
		Preset value	Range
F.01	Suction action time Motor suction time when there's a shortage of materials, which is also the vacuum breaking valve's working time. Corresponding action: **D**	15 secs.	5-127 secs.
F.02	Shut-off action time Start with the suction action at the same time, and set the shut-off time. The time can't be set exceed the suction action time, and set it to 0 as not start.	0	0-127 secs.
F.03	Mixing proportion Start at the same time with the suction action, and set the mixing proportion. Time calculation method: suction time * [F.03]% Set 0 as not start.	0% Not start	0-100%

F.04	Mixing mode The number of layers of mixing action when it starts mixing. For example: the suction time is 20sec, the mixing proportion is 10%, the number of layers is 2, and then the mixing action is 9s—1s ----9s---1s Set single layer's working, and the suction time range is 5-99 secs. Set double layers' working, and the suction time range is 17-99 secs. Set three layers' working, and the suction time range is 32-99 secs. Set four layers' working, and the suction time range is 46-99 secs. If the suction time changes, the min. action time is less than 1 sec. after calculation, and the program will force to change the action time to 1 sec.	1	1-4times
F.05	Mixing action count cycle start setting Count from the first start-up, and start once mixing action after several times of repeated suction startings. Set 1 as mixing materials every time. Set [F.03] to 0 without mixing.	once	1-9 times
F.06	Setting time of cleaning before suction Set 0 as the no screen cleaning before suction. Corresponding action: R01	0 secs.	0-99 secs.
F.07	Setting time of screen cleaning after suction Set 0 as no screen cleaning after suction. Corresponding action: R11	5 secs.	0-99 secs.
F.08	Screen cleaning cycle It starts once [F.06] or [F.07] cleaning action only after several times of repeated suction actions. Set 1 as cleaning the screen cleaning at every suction.	10 times	1-99 times
F.09	Circulating suction waiting time Waiting time before a new suction action starts after each suction action. Set 0 as not waiting. Waiting time before a new suction action starts Corresponding action: N03	0 (Unit 10 secs.)	0-9990
F.10	Shortage metering alarm Set the number of times that the material doesn't fall into the hopper, and it should alarm after several times of this error occurs. Alarm cleaning mode: 1.The alarm will dismiss when it feeds the materials again. 2. Ent key on the panel can be cancelled. 3.Turn on the power again. Set 9 as cancelling this function. Corresponding action: A.01	3	1-9 times

F.11	Shutdown alarm for the times of material shortage Set the number of times that no material falling into the hopper. The times of material shortage that it should alarm. 1.ENT key on the panel can be cancelled. 2.Turn on/off the power again. Corresponding action: A.04	3	[F.10]-99
F.12	The time waiting for motor stoppage (suitable for sal-430 / 460) . After motor starts, it only takes next action after the time countdown is finished.	20 secs.	0-99 secs.
F.13	Buzzer alarm type 0: Lasting alarm 1: Slow and interrupted alarm 2:Fast and interrupted alarm	0	0-2
F.14	Motor delay stop time After [F.01] suction time is ended, the delay time before motor stop.	0 secs.	0~999 secs.
F.15	Motor working time Check motor working time and clear the time. The method to clear the motor working time: Set the setting value as 0, and press ENT key to cancel.	0 (unit: 10 hrs.)	0-999 Only 0 means clearing the time.

4.3 Alarm Program

Description of blender controller, alarm status and solution method

Panel Code	Alarm Causes	Solution Method
	Shortage alarm [F.10] 1. The set suction time is too short. 2. The materials can't be absorbed. 3. Suction pipeline is blocked. 4. Pipeline suction is too small.	1) Add materials 2) Increase suction time 3) Shut down and check the pipe line. When it sucks the materials again, the alarm will dismiss or the ENT key on the panel can also be cancelled or turn on the power again.
	Filter warning Filter screen blocking	1) Shut down and clean the filter screen or replace filter screen. The alarm will dismiss when it turns on/off the power again or it can be cancelled by clicking the ENT key on the panel.

	Motor overload alarm When an overload alarm occurs, it alarms for shutdown.	1) If the motor is damaged, replace the motor. 2) The setting of thermal overload is wrong, adjust the setting value again. Check the cause of motor overload and turn on the power again;

4.4 Parameter Setting

Press ☰ key and ▲ key together for 3 secs. to enter parameter setting screen.

Code	Functional Description	Parameters	
		Preset value	Range
F.30	Comm. address	1	1-99
F.31	Baud rate 0---19200 1---9600 2---4800	1	0-2
F.32	Odd-even check 0---No test 1--- Odd parity 2--- Even parity	0	0-2

4.5 Operaton Procedure Description
4.5.1 Operation Procedure

Panel Code	Action Description	Corresponding Parameter	Parameters	
			Factory Setting	Range
R01	Filter screen cleaning	F.06	3 secs.	0-99 secs.
R02	Waiting for motor stop	F.12	3 secs.	0-99 secs.
D	Absoring the materials (vacuum breaking valve action)	F.01	15 secs.	5-127 secs.
	Absoring masterbatch material (Close the vacuum breaking valve after the action is stopped)	F.03	0%	0-100%
		F.05	3	1-9 次
N01	Waiting time	F.12	3 secs.	0-99 secs.

R11	Cleaning filter screen The materials start to discharge to the hopper	F.07	0 secs.	0-99 secs.
R12	Waiting motor stop	F.12	3 secs.	0-99 secs.
N02	Waiting materials completely discharge to the hopper	F.20	10 secs.	5-99 secs.
N03	Waiting for material circulating suction	F.09	0 secs.	0-9990 secs.
P	Waiting for suction confirmation			

4.5.2 Data Resetting

1) Turn off the machine plate power
2) Short circuit the two terminals of J2
3) Turn on the machine plate power
4) Remove the short circuit of J2's two terminals after three secs.
5) Completed

> ***Notes: All parameter settings will be reset to factory settings. Please use this function carefully.***

4.6 Communication Address（protocol modbus-RTU）

Address (keeping deposit zone） (decimal)	Parameters	Reading R/ Writing W	Default Parameter	Min. Value	Max. Value	Unit
0	Current action	R	/			/
	bit 0 shutdown			0	1	
	bit 1 standby			0	1	
	bit 2 absorb materials			0	1	
	bit 3 wait for material discharge			0	1	
	bit 4 cleaning the screen			0	1	
	bit 5 wait for motor stopping			0	1	
	bit 6 screen blockage alarm			0	1	
	bit 7 shortage alarm			0	1	
	Bit 8~bit 16 undefined					
1	Real-time info.	R	/			/
3	Suction action time	R/W	15	5	127	S
4	Screen cleaning action cycle	R/W	10	1	99	次
6	Screen cleaning setting time	R/W		0	99	S
7	Discharge checking time	R/W	10	5	99	S
8	Standby time after motor running	R/W	0	0	99	S
9	Screen cleaning setting time after suction	R/W	5	0	99	S
10	Waiting time for circulating suction	R/W	0	0	9990	10S
13	Input and output status	R	/			/
	bit 0 shortage input signal			0 full mat.	1 mat. shortage	
	bit 1 filter screen blockage input signal			0 no blockage	1 blockage	
	bit 4 suction output			0 no output	1 output	
	bit 5 spraying valve output			0 no output	1 output	
	bit 6 alarm output			0 no output	1 output	
	bit7~bit15 undefined					
14	Current action	R	/			/
	bit 0 shutdown			0	1	

		R/W	Default	Min	Max	Unit
	bit 1 standby			0	1	
	bit 2 absorbing materials			0	1	
	bit 3 waiting for material discharge			0	1	
	bit 4 clean the filter screen			0	1	
	bit 5 wait for motor stop			0	1	
	bit 6 filter blockage alarm			0	1	
	bit 7 shortage alarm			0	1	
	bit8~bit15 undefined					
15	Startup & shutdown control	W	/	0 startup	1 shutdown	/
16	Suction action time	R/W	15	5	127	S
17	Mixing proportion	R/W	0	0	100	%
18	Circulating startup setting of mixing action counting	R/W	1	1	9	times
19	Filter screen action cycle	R/W	3	1	99	times
20	Circulating suction waiting time	R/W	0	0	9990	10S
21	Screen cleaning setting time before suction	R/W	0	0	99	S
22	Screen cleaning setting time after suction	R/W	5	0	99	S
23	Discharge checking time	R/W	10	5	99	S
24	Material shortage counting alarm	R/W	3	1	9	times
25	Material shortage counting stop alarm	R/W	3	Mat. shortage counting alarm	99	times
26	Standby time after motor running	R/W	20	0	99	S
27	Buzzer alarm type	R/W	1	0	2	/
29	Motor working time record	R/W	0	0	999	10h
30	Full mat. detecting time	R/W	3	1	9	S
31	Mat. shortage detecting time	R/W	3	1	9	S
32	Mat. shut-off time	R/W	0	0	100	S
34	Motor delay stop time	R/W	0	0	999	S
35	Accumulating times of mixing actions	R	0	0	0x03 set value	times
36	Accumulating times of screen cleaning actions	R	0	0	0x04 set value	times
37	Accumulating times of material shortage alarm	R	0	0	99	times
38	Startup & shutdown control	W		0 startup	1 shutdown	/
39	Current action	R	/			/
	bit 0 startup			0	1	

	bit 1 standby			0	1	
	bit 2 cleaning the filter screen			0	1	
	bit 3 wait for motor stopping			0	1	
	bit 4 absorb the material			0	1	
	bit 5 absorb the masterbatch material (mixing)			0	1	
	bit 6 wait for material discharge			0	1	
	bit 7 wait for circulating suction			0	1	
	Bit 8 ~bit 15 undefined					
40	real-time information	R	/			/
41	Input and output state	R	/			/
	bit 0 shortage input signal			0 full mat.	1 mat. shortage	
	bit 1 filter blockage input signal			0 no blocking	1 blocking	
	bit 2 suction output			0 no output	1 output	
	bit 3 vacuum breaking output			0 no output	1 output	
	bit 4 mixing output			0 no output	1 output	
	bit 5 spraying valve output			0 no output	1 output	
	bit 6 alarm output			0 no output	1 output	
	bit7~bit15 undefined					
42	alarm state	R	/			/
	bit 0 shortage alarm			0	1	
	bit 1 mat. shortage stop alarm			0	1	
	bit 2 filter blockage alarm			0	1	
	bit 3~bit 15 undefined					
45	The number of mixing layers	R/W	1	1	4	layer
46	Action mode (only can be set in shutdown)	R/W	5	1	5	/

Notes：R means only reading

    W means only writing

    R/W means writing and reading

Note: The password is not set in factory, which can be set by users. In case of loss, please contact us.

5. Trouble-shooting

Failures	Possible Causes	Solutions
Motor does not work long after material discharged.	Motor and electnomagnetic contactor failure.	Repair or replace.
	Poor contact of microswitch.	Adjust or replace
	Signal wire broken.	Replace the signal wire.
Motor keep on working after loading time is running out.	Contactor malfunctions.	Repair or replace contactor
	PCB is broken	Replace
Can not full-load the material for several times or alarm indicating material shortage.	Material is used up.	Add material to storage bin.
	Leakage in conveying hose.	Lock up or replace conveying hose
	Filter is blocked.	Clear up filter screen
Motor does not work.	Short of phase or motor failures.	Repair or replace
Fuse melt after startup of the machine.	Short circuit or motor failures.	Check electrical circuit
The alarm indicating motor overload	Filter screen is blocked	After cleaning of filter screen,press Reset on the overload relay.
	Phase shortage	After fixed the circuit, press Reset on the overload relay.
Poor material liquidityin the pipe	Over or lack of air quantity	Adjust air inlet location of the suction box. Avoid small bending of the elbow.

6. Maintenance and Repair

All repair work should be done by professionals to prevent personal injuries and damages of the machine.

6.1 Filter Bag

For SAL-430/460 series, filter bag are fitted. They need to be cleaned periodically or at the time when conveying capacity of the machine decreases. Firstly, disconnect the 4P heavy-duty connector which connected the blower to control box,then loosen the snap hook of the hoop cover, take down the hopper cover, take out the filter bag. Remove all the dusts and sundries collected on the filter screen to ensure stable airflow passed through it which to improve the suction ability of the machine. For what should be paid special attention is that before taking off the blower, it must loosen the 4P heavy-duty connector firstly. When install the after cleaning, don't put your hands below the hopper cover to avoid hands nipping by the cover.
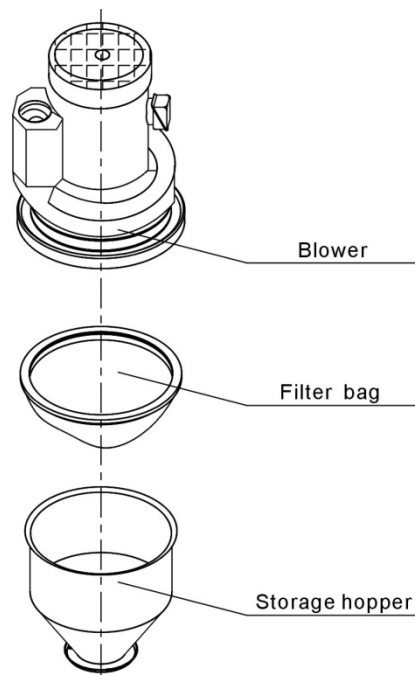
Picture 6-1: Filter Screen

1) Clear the blower from inside out regularly. If there are too much dirts accumulated on the blower, the function of the blower will be affected,

such as temperature rising, reduced air volume and higher noise level and vibration. All the above factors are liable to cause mechanical problems.

2) Check the status of blower perfomance. If the blower can not start or makes loud noises, repair or replace the motor.

3) The bearing, seal ring and silencer are consumable parts. They should be replaced after a period of time. The fans, covers, and metal screen also need to be replaced when necessary.

Note: Cut off main power when checking the electrical wire.

6.2 Storage Hopper

1) Loose the snap hook, and take out hopper cover.
2) Use high pressure air to blow away all the material remains.
3) Re-fix the hopper cover and fasten the snap hook.

Note: please make sure that the main switch is shut off before cleaning.

6.3 Service Life of Product Key Part

Name of the Parts	Service Life
Motor	Above 5 years
Circuit breaker	Above 100,000 act

6.4 Maintenance Schedule

6.4.1 About the Machine

Model: _____ SN: _____ Manufacturing date: _____

Voltage: _____ Φ_____ V Frequency: _____Hz   Total power: _____kW

6.4.2 Check after Installation

☐ Check that the conveying hose is correctly connected.
☐ Check that the conveying hose is tightly connected.
☐ Check that the mounting base is tightly fixed.

Electrical Specifications

☐ Voltage:_____ V _____ Hz
☐ Fuse burnt current: One phase _____ A Three-phase_____ A
☐ Check phase sequence of power supply

6.4.3 Daily Checking

☐ Check main power switch
☐ Check filter screen
☐ Check motor performance

6.4.4 Weekly Checking

☐ Check if there are damaged electrical wires
☐ Check if there are loose connections of electrical components
☐ Check if the screws of flange at material inlet are loose or not

6.4.5 Monthly Check

☐ Check the spring lock on the hopper cover is loosed or not.
☐ Check the non-return valve is deformed or not.
☐ Check the performance of magnetic proximity switch/photoelectrical sensor.