

# Feeding & Dosing Series

## Application Guide

Confidential

Date: April 2013

Version: V3.0 (EN)



Confidential

## Contents

<b>1. Preface .....</b>	<b>9</b>
<b>2. Relative information.....</b>	<b>10</b>
2.1 Introduction of pneumatic conveying.....	10
2.2 Introduction of mixing units of plastic .....	12
<b>3. Product Classification .....</b>	<b>15</b>
3.1 Product Category of Feeding & Conveying Series.....	15
3.2 Coding Principle.....	15
3.2.1 Coding Principle for SAL Series.....	15
3.2.2 Coding Principle for SAL-G Series .....	16
3.2.3 Coding Principle for SAL-U Series.....	16
3.2.4 Coding Principle for SAL-UG Series.....	16
3.2.5 Coding Principle for “1 to 4” SAL-UG Series .....	17
3.2.6 Coding Principle for “1 to 2” SAL-UG Series .....	17
3.2.7 Coding Principle for SAL-UGP Series .....	17
3.2.8 Coding Principle for SSC Series.....	18
3.2.9 Coding Principle for VL Series.....	18
3.3 Product Category of Dosing & Mixing Series .....	19
3.4 Coding Principle for Dosing & Mixing Series.....	19
3.4.1 Coding Principle for SPV Series.....	19
3.4.2 Coding Principle for SCM Series .....	19
3.4.3 Coding Principle for SGB Series.....	20
3.4.4 Coding Principle for SVM Series .....	20
3.4.5 Coding Principle for SVM-U Series.....	20
3.4.6 Coding Principle for SDS Series.....	20
3.4.7 Coding Principle for SMS Series .....	20
<b>4. Gravimetric Blenders SGB .....</b>	<b>21</b>
4.1 Application Fields.....	21
4.2 Application Cases .....	21
4.3 Model Selection .....	23
4.4 Q & A .....	26

<b>5. Volumetric Dosers SCM</b> .....	<b>30</b>
5.1 Application Fields.....	30
5.2 Application Cases .....	30
5.3 Model Selection .....	31
5.4 Q & A .....	31
<b>6. Vertical Mixers SVM / SVM-U</b> .....	<b>34</b>
6.1 Application Fields.....	34
6.2 Model Selection .....	34
6.3 Q & A .....	34
<b>7. Dust Separators SDS</b> .....	<b>37</b>
7.1 Application Fields.....	37
7.2 Application Cases .....	37
7.3 Model Selection .....	38
7.4 Q & A .....	39
<b>8. Metal Detecting Separators SMS</b> .....	<b>40</b>
8.1 Application Fields.....	40
8.2 Application Cases .....	40
8.3 Model Selection .....	41
8.4 Q & A .....	41
<b>9. Proportional Valves SPV-U</b> .....	<b>42</b>
9.1 Application Fields.....	42
9.2 Application Cases .....	42
9.3 Model Selection .....	43
9.4 Q & A .....	43
<b>10. System Configuration</b> .....	<b>44</b>
<b>11. “Standard” Self-contained Hopper Loaders SAL</b> .....	<b>47</b>
11.1 Application Fields.....	47
11.2 Application Cases .....	47
11.3 Model Selection .....	48
11.4 Q & A .....	48
<b>12. “Standard” Separate-vacuum Hopper Loaders SAL-G</b> .....	<b>50</b>
12.1 Application Fields.....	50

12.2 Application Cases .....	50
12.3 Model selection .....	51
12.4 Q & A .....	52
<b>13. Self-contained Hopper Loaders SAL-U .....</b>	<b>54</b>
13.1 Application Fields.....	54
13.2 Application Cases .....	54
13.3 Model Selection .....	55
13.4 Q & A .....	55
<b>14. Separate-vacuum Hopper Loaders SAL-UG .....</b>	<b>57</b>
14.1 Application Fields.....	57
14.2 Application Cases .....	57
14.3 Model Selection .....	58
14.4 Q & A .....	58
<b>15. “1 to 2” Separate-vacuum Hopper Loaders .....</b>	<b>60</b>
15.1 Application Fields.....	60
15.2 Application Cases .....	60
15.3 Model Selection .....	61
15.4 Q & A .....	62
<b>16. “1 to 4” Separate-vacuum Hopper Loaders .....</b>	<b>63</b>
16.1 Application Fields.....	63
16.2 Application Cases .....	63
16.3 Model Selection .....	64
16.4 Q & A .....	65
<b>17. Separate-vacuum Hopper Loaders SAL-UGP .....</b>	<b>67</b>
17.1 Application Fields.....	67
17.2 Application Cases .....	67
17.3 Model Selection .....	68
17.4 Q & A .....	69
<b>18. Flexible Screw Feeders SSC .....</b>	<b>70</b>
18.1 Application Fields.....	70
18.2 Application Cases .....	70
18.3 Model Selection .....	72

18.4 Q & A .....	72
<b>19. References .....</b>	<b>73</b>
19.1 Hopper Flange Specifications .....	73
<b>Version .....</b>	<b>77</b>

Confidential

## Table Index

Picture 13-4: Performance Curve of SAL-U (50Hz) .....	55
Picture 14-4: Performance Curve of SAL-UG (50Hz) .....	58
Picture 15-1: Performance Curve of SAL-UG122 (50Hz) .....	62
Picture 16-1: Performance Curve of SAL-UG124 (50Hz) .....	65
Table 17-1: Parameters of SAL-UGP (with filter bag 50Hz) .....	68
Table 17-2: Parameters of SAL-UGP (with filter plate 50Hz).....	68

## Picture Index

Picture 3-1: Product Category .....	15
Picture 3-2: Product Category .....	19
Picture 4-1: Gravimetric Blenders.....	21
Picture 4-2: Direct Installation.....	22
Picture 4-3: Floor Installation.....	23
Picture 5-1: Volumetric Dosers.....	30
Picture 5-2: Direct Installation.....	错误! 未定义书签。
Picture 5-3: Collocation with double color dosers.....	错误! 未定义书签。
Picture 5-4: Collocation with Drying Hopper.....	错误! 未定义书签。
Picture 6-1: Vertical Mixers.....	34
Picture 6-2: SVM Optimum Mixing Time Curve .....	35
Picture 7-1: Dust Separators .....	37
Picture 7-2: Installation of SDS-500.....	38
Picture 7-3: Installation of SDS-100/250.....	38
Picture 8-1: Metal Detecting Separators.....	40
Picture 8-2: Direct Installation.....	错误! 未定义书签。
Picture 8-3: Floor Installation.....	错误! 未定义书签。
Picture 9-1: Proportional Valves .....	42
Picture 9-2: SPV-U Application Chart.....	42
Picture 10-1: Main Parts of Conveying System .....	44
Picture 11-1: “Standard” Self-contained Hopper Loaders.....	47
Picture 11-2: Installation on the Drying Hopper .....	47
Picture 11-3: Floor Stand Installation.....	错误! 未定义书签。

Picture 11-4: Performance Curve of SAL series (50Hz) .....	48
Picture 12-1: “Standard” Separate-vacuum Hopper Loaders .....	50
Picture 12-2: Installation on the Drying Hopper .....	50
Picture 12-3: Direct Installation.....	51
Picture 12-4: Performance Curve of SAL-G (50Hz).....	52
Picture 13-1: Self-contained Hopper Loaders.....	54
Picture 13-2: With Drying Hopper .....	54
Picture 13-3: Independent Installation of SAL-U-E .....	错误! 未定义书签。
Picture 13-4: Performance Curve of SAL-U (50Hz).....	55
Picture 14-1: Separate-vacuum Hopper Loaders .....	57
Picture 14-2: Installing on the drying hopper .....	57
Picture 14-3: Working with molding machine.....	错误! 未定义书签。
Picture 14-4: Performance Curve of SAL-UG (50Hz).....	58
Picture 15-1: “1 to 2” Separate-vacuum Hopper Loaders.....	60
Picture 15-2: Collocation with Drying Hopper.....	61
Picture 15-3: Collocation with 2 Molding Machines .....	错误! 未定义书签。
Picture 16-1: “1 to 4” Separate-vacuum Hopper Loaders.....	63
Picture 16-2: Convey to Molding Machines.....	错误! 未定义书签。
Picture 16-3: Convey to Drying Tanks.....	错误! 未定义书签。
Picture 16-4: Collocation with SDB .....	64
Picture 17-1: Separate-vacuum Hopper Loaders .....	67
Picture 17-2: Direct Installation.....	67
Picture 18-1: Flexible Screw Feeders.....	70
Picture 18-2: Combination with Shredders .....	71
Picture 18-3: Combination with Blenders.....	71
Picture 18-4: Combination with Storage Tanks .....	71
Picture 19-1: Dimension Chart for Base Installation of SAL-330/360/430/460	73
Picture 19-2: Dimension Chart for Base Installation of SAL-330E/360E.....	73
Picture 19-3: Dimension Chart for Base Installation of SMH-6L/12L .....	74
Picture 19-4: Dimension Chart for Base Installation of SAL-6U/12U-E.....	74
Picture 19-5: Dimension Chart for Base Installation of SAL-3U and Above.....	74
Picture 19-6: Dimension Chart for Base Installation of SAL-1U.....	75
Picture 19-7: Dimension Chart for Base Installation of SAL-U-E (EA).....	75
Picture 19-8: Dimension Chart for Base Installation of SHR-U (E) .....	76



## 1. Preface

This guide is a model selection and application manual for Feeding & Dosing series which includes information of plastics feeding and dosing, selection and application of SHINI's Feeding & Dosing equipment.

### **Purpose**

In order to assist professionals or customer service staffs to pick out proper products for customers, this guide will help them better comprehend application fields of products and enhance their application proficiency.

### **Target Group**

This guide is applicable for professionals and customer service personnel who face the clients directly and need choose appropriate products as requested.

### **Related Information**

Specific models are subject to "Product Catalogue" during model selection for customers. Please refer to "Model Selection Questionnaire" when the customer's demand is not clear or for other reasons the service is unavailable.

### **Notice**

This guide is used for preliminary model selection of SHINI's Feeding & Dosing series products. It is recommended the client contact our customer service personnel before giving an order to ensure correct selection and avoid unwanted loss.

Referential texts and data in this guide do not represent SHINI's viewpoint.

If you need any further information of SHINI products, please contact us:

Dial direct China service hotline: +86 800-999-3222

Log on SHINI Group website: [www.shini.com](http://www.shini.com)

Send eMail to us: [shini@shini.com](mailto:shini@shini.com)

## 2. Relative information

### 2.1 Introduction of pneumatic conveying

There are many sorting techniques for pneumatic conveying such as based on mixing ratio or hydrodynamic characters of air and material or movement characters of air and material or features of conveying equipment etc. Commonly, it is followed following two sorting techniques: based on the conveying equipments, it refers to the air pressure state inside air conveying pipe; the another is based on the flow state of material in the conveying pipe, it refers to phase diagram, flow state of solid and air in the conveying pipe, conveying capacity per unit time and ratio of air and material.

- Based on the features of conveying device, the pneumatic conveying could be divided into three types: vacuums, pressure ones and mixing ones.

#### Conveying system with vacuum pressure

Conveying system with vacuum pressure uses the pressure difference between negative pressure, which was produced by the blower at the end point of system, and air pressure to conveying the material. Because of existing pressure difference, air can be sucked into pipe and simultaneously material follows into pipe along with air movement. Arrived at the end point, the material will be separated from the air and collected by any devices, but the air exhausts into atmosphere after being purified. This system is usually worked for centralized conveying system, that is to say, many points to one point, for example, dedusting for workshop or collect grain into storage etc. Its advantage is that it can collect the material effectively and the material can not enter into atmosphere, the latter is particularly advantageous for the poison material. In opposite word, the vacuum limits the conveying distance.

#### Conveying system with positive pressure

Conveying system with positive pressure is the earlier used conveying system, it also is the most elemental form of pneumatic conveying. It uses the pressure difference between start point and end point, which is produced by the blower at the start point of system, to convey the material.

In this system, the material enters into conveying system at the start point and is separated from air at the end point. Compared with vacuum system, this system can convey material in longer distance. It is suitable for distributed system, that is to say, one point to many points. The material can be separated from the air at will by gravity within conveying pipe.

Conveying system mixing above types

This system combines the positive pressure and vacuum into one conveying system. It features the above system advantages, so it can be used at complex conveying condition.

- Based on ratio of air and material, pneumatic conveying system can be divided into four types; dilute-phase pneumatic conveying, dense-phase pneumatic conveying, concentrated-phase pneumatic conveying with static pressure and conveying with barrel etc.

Dilute-phase pneumatic conveying system

The features of this system are that the air flow rate is quick and material is kept in state of suspension and voidage is big. The energy of conveying material mainly depends on energy of motion of air flow rate. The conveying speed for this system is commonly at 12~40m / s, mixing ratio is 1~5 which can not exceed 15.

Dense-phase pneumatic conveying with dynamic pressure

The air flow rate for this system is commonly within 8~15m / s. The material in this system is kept intensive state, the energy of conveying material depend on the dynamic energy of air. These types of conveying device have: high pressure conveying, suction with strong vacuum and conveying of fluidization. Range of variation of mixing ratio of this type of conveying technique is big, the mixing ratio of high pressure conveying and suction with strong vacuum is about 15~50, the flow state of material is kept at state of impulse. If the material is powder which is easily filled by air, the mixing ratio can reach up to 200 or more, the flow rate of material is kept at state of fluidization.

## Dense-phase pneumatic conveying system with static pressure

The material in this system embolizes the pipe because of dense material. The energy of conveying material depends on static pressure of compressed air. This conveying technique can be divided into plug flow and slug flow: the former means that dense material enters continuously into pipe to form material plug. Movement velocity of the material plug is low (about 0.2~2m/s), it is suitable for conveying material in short distance. The latter means that the material plug was cut manually into shorter sector by ones. The material and air plug are separated correspondingly when conveying them. This conveying technique is suitable for conveying material in long distance.

## Conveying with barrel

This conveying technique is to put the material into conveying barrel before conveying, using air pressure to make the barrel slide in the pipe. It is suitable for conveying the material which is difficult either to keep state of suspension or to keep state of plug, such as invoices in a train, files or mains etc.

## 2.2 Introduction of mixing units of plastic

The metering scale of masterbatch, additive and regrinding is important procedure during production in plastic molding industry. Due to intensification of market competition and material cost rising, all of the producers are focusing on improving the quality of products and reducing the cost of produce and consumption. Because of the above results, the metering devices begin to work at a essential actor during production. A set of excellent metering unit can improve the rate of finished products to save unnecessary cost and increase the benefit. At present, no matter which molding technology of plastic, most of domestic manufacturers still meter the material manually, and then mixing material by simply mixer. With increasingly perfect the product technology, the standard of product is also increasingly strict; people also understand the importance of metering units by degree.

The metering units on market basically are divided into two types:

volumetric metering and gravimetric metering. Common type of the former has screw type and wheel type and that of the latter has weight increasing type and weight loss type. It mainly is to select the suitable models according to technological requirements and product positioning in customer's site. Usually to speak, volumetric metering is suitable for adding additive or regrinding with lower precision, it must be needed to operation calibration manually before operating it or change new scale. Gravimetric metering whose metering scale is very accurate is suitable for adding additive and masterbatch or working at other accurate productive technology; it can operate calibration automatically, its controller could control metering scale automatically according to the customized scale. The weight increasing type is used in molding and extruding (film, sheet, pipe) technologies. Weight loss type is mainly used in continuous extruding technologies.

Volumetric and gravimetric metering device appear in most of mold technologies such as film, sheet, pipe and section bar etc. As a metering technology of recipe in real time, weight loss metering technology has been used in wide range of closed-loop control of flow in extruder in international market for last years. On the injection molding hand, the volumetric metering and gravimetric metering is commonly used. Now most of domestic manufacturers still use simply the volumetric metering.

At present, no matter which molding technology of plastic, most of domestic manufacturers still meter the material manually, and then mixing material by simply mixer. The causes are: technical level of products is lower; customers are too strange for the automatic metering device to having image; the one time investment of metering device is more than that of conventional technologies, in addition, the manufacturers of this device are a few, most of them mainly are oversea companies.

Metering devices are not same with other units, they mainly feature accurate controlling system to ensure steady quality of products. Their inner technical content is very high and relative technologies include industrial computer technologies, modern sensor technologies, accurate transmission technologies, automatic metering closed-loop control

technologies of mathematic mold and process technologies of plastic, these technologies just are industrial weak field in China, particularly it is needed to integrate perfectly these technologies as one. Therefore, there is still a long way to develop metering device of our country, especially improvement of experience and technologies.

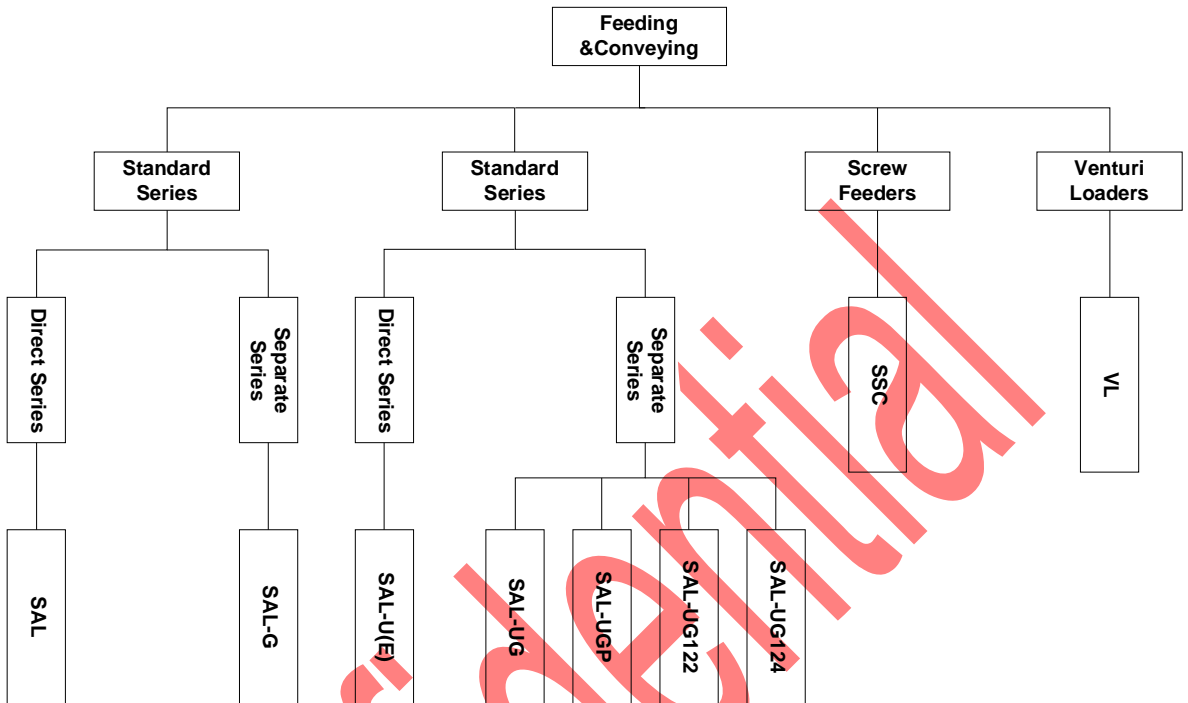
Volumetric metering and mixing system is the most advanced volumetric metering device, which features synchronized and numeric technologies to control accurately the adding scale of plastic/additive and make them enter into main unit of plastic molding such as injection mold machines, extruding molding machines and blowing molding machines.

Weight increasing metering and mixing system is the most advanced batch metering and mixing device in market. It is used to control the adding scale of pellet, powder or additive and is suitable for used in injection molding technologies, extruding molding technologies and blowing molding technologies. This metering system can ensure the accuracy of each batch up to 0.1% by using numeric technologies through weighting sensors and simultaneously saving the cost and improving quality of products. Optimal design of mixer makes the material get mixing completely.

With the development of science and technologies, application of the weight loss metering technology will be widely used further. This technology is not simply used in adding and mixing material, some of new weight loss metering devices was developed even to control the output of extruders in order to make the extruders keep steady and accurate output in a long time under customized setting. Its principle is: put the weighing hopper on the inlet of a extruder and take the extruder as the feeder of the weight loss metering device, its controller controls directly the rotating speed of screw of the extruder by detecting constantly the weight loss per unit time in order to make the output of the extruder being steady and accurate. This technology applies in auxiliary extruder of co-extrusion line, which can control accurately the thickness of each layer of film, to improve the quality of products.

### 3. Product Classification

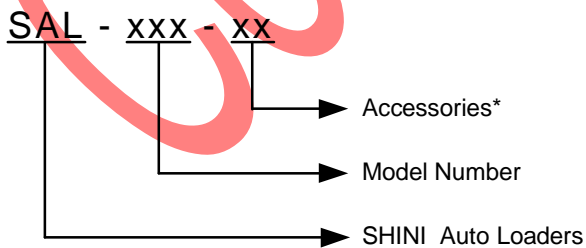
#### 3.1 Product Category of Feeding & Conveying Series



Picture 3-1: Product Category

#### 3.2 Coding Principle

##### 3.2.1 Coding Principle for SAL Series

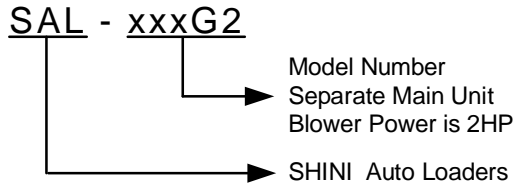


Note: \*

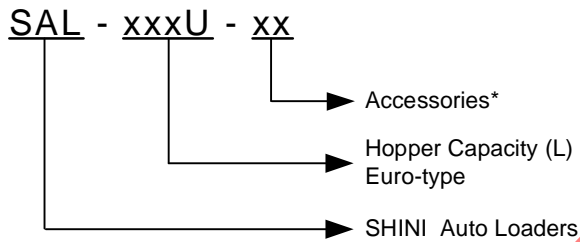
E=Photosensor A=Optional Accumulator (except for SAL-430/SAL-460)

P=Polishing Treatment

### 3.2.2 Coding Principle for SAL-G Series



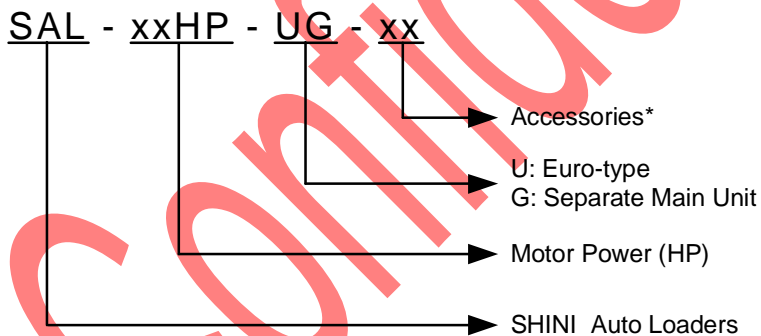
### 3.2.3 Coding Principle for SAL-U Series



Note: \*

A= Additional Accumulator E=Photosensor P=Polishing Treatment

### 3.2.4 Coding Principle for SAL-UG Series

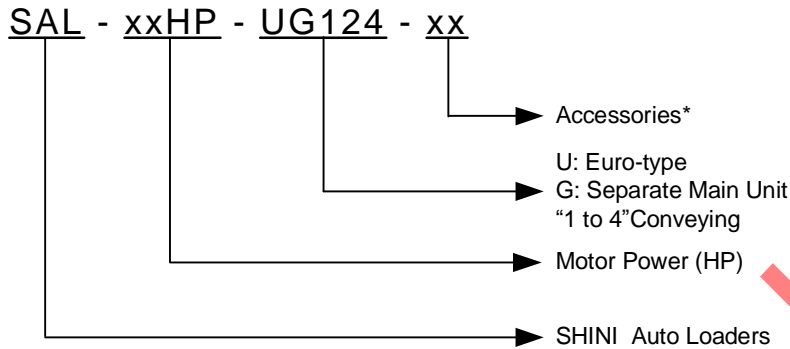


Note: \*

S=Standard Type D=Double-stage

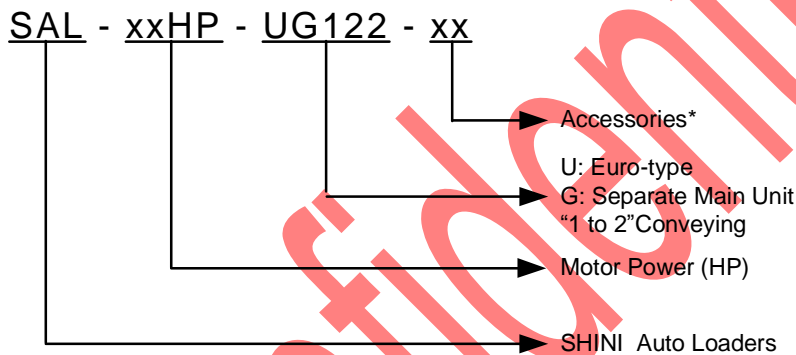


### 3.2.5 Coding Principle for “1 to 4” SAL-UG Series



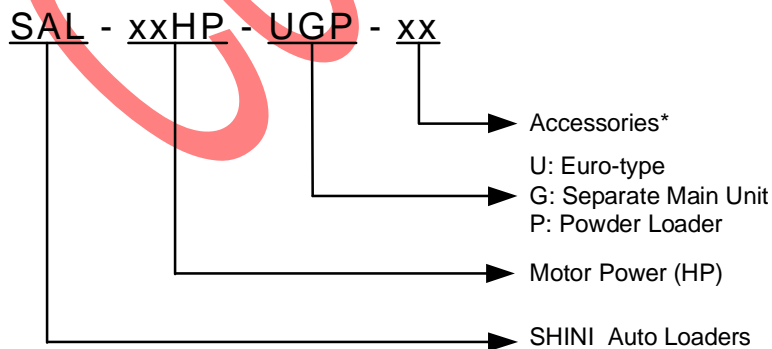
Note: \*  
D= Double-stage

### 3.2.6 Coding Principle for “1 to 2” SAL-UG Series



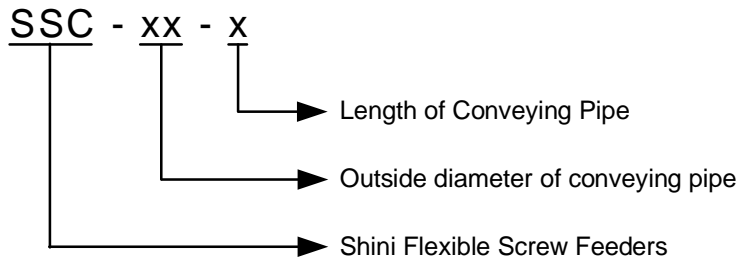
Note: \*  
D= Double-stage

### 3.2.7 Coding Principle for SAL-UGP Series

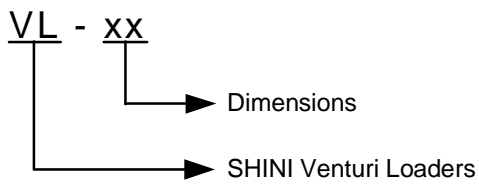


Note: \*  
D= Double-stage

### 3.2.8 Coding Principle for SSC Series

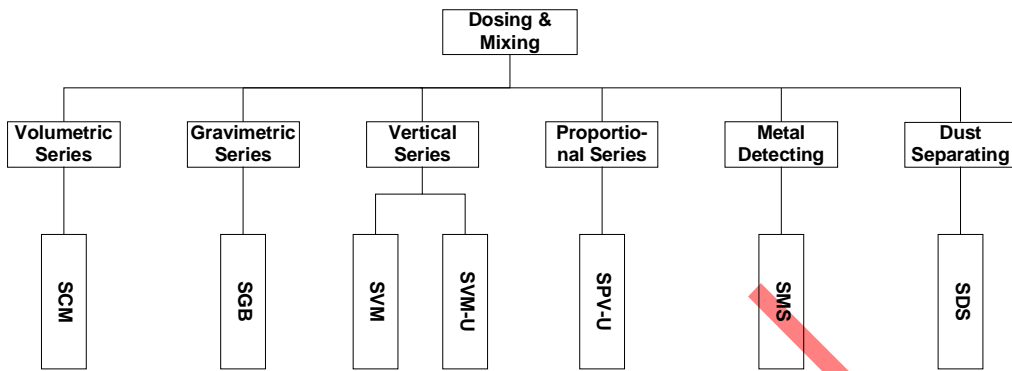


### 3.2.9 Coding Principle for VL Series



Confidential

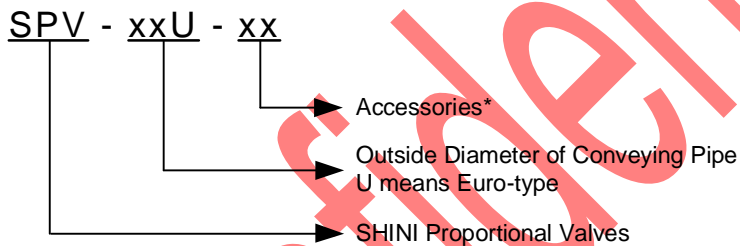
### 3.3 Product Category of Dosing & Mixing Series



Picture 3-2: Product Category

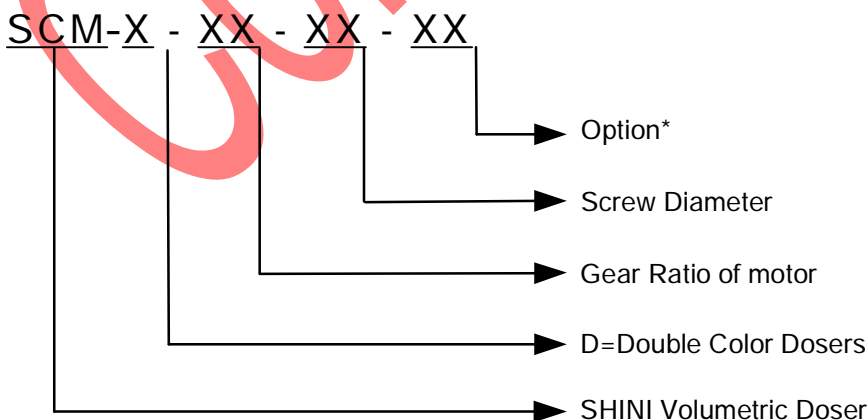
### 3.4 Coding Principle for Dosing & Mixing Series

#### 3.4.1 Coding Principle for SPV Series



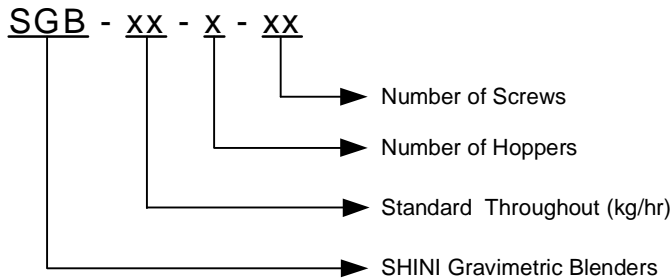
Note: \*  
C=Equipped with Control Cabinet

#### 3.4.2 Coding Principle for SCM Series

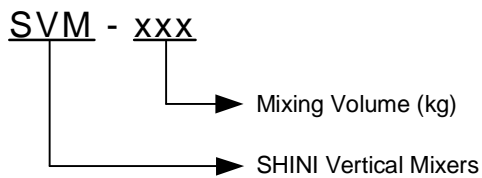


Note: \*  
MS=Equipped with mixer(Only applicable for single color doser)  
CE=CE Conformity(Not applicable for“Standard”model)

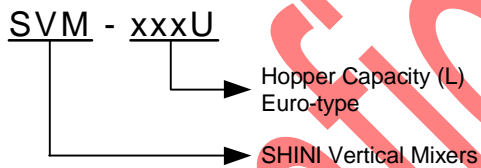
### 3.4.3 Coding Principle for SGB Series



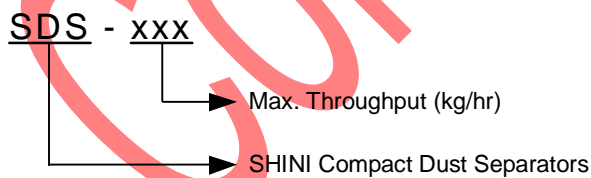
### 3.4.4 Coding Principle for SVM Series



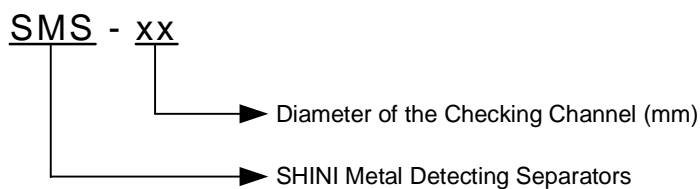
### 3.4.5 Coding Principle for SVM-U Series



### 3.4.6 Coding Principle for SDS Series



### 3.4.7 Coding Principle for SMS Series



## 4. Gravimetric Blenders SGB



Picture 4-1: Gravimetric Blenders

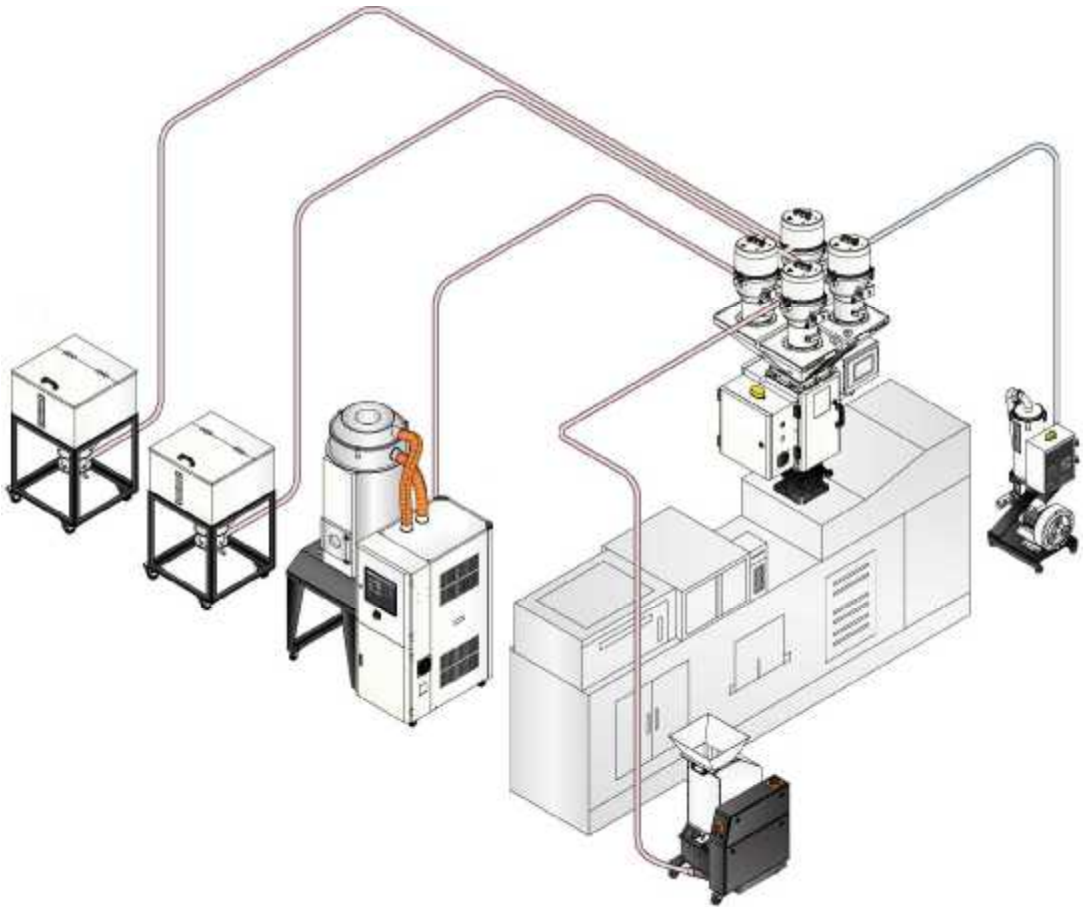
### 4.1 Application Fields

SGB is suitable for cases such as injection, extrusion or blow molding process in which varieties of materials blend precisely by weight ratio. The current SGB standard model can not be used dealing with plastic powder and all kinds of foods, chemicals, and inflammable, explosive and volatile materials. The standard model is also unavailable for processing optical products such as PC, PMMA and so on. The parts that contact materials should be specially treated as adopting food-grade materials and polishing treatment etc.

### 4.2 Application Cases

Generally, SGB installation can be divided into direct installation on the molding machine or installation on the ground when equipped with floor stands.

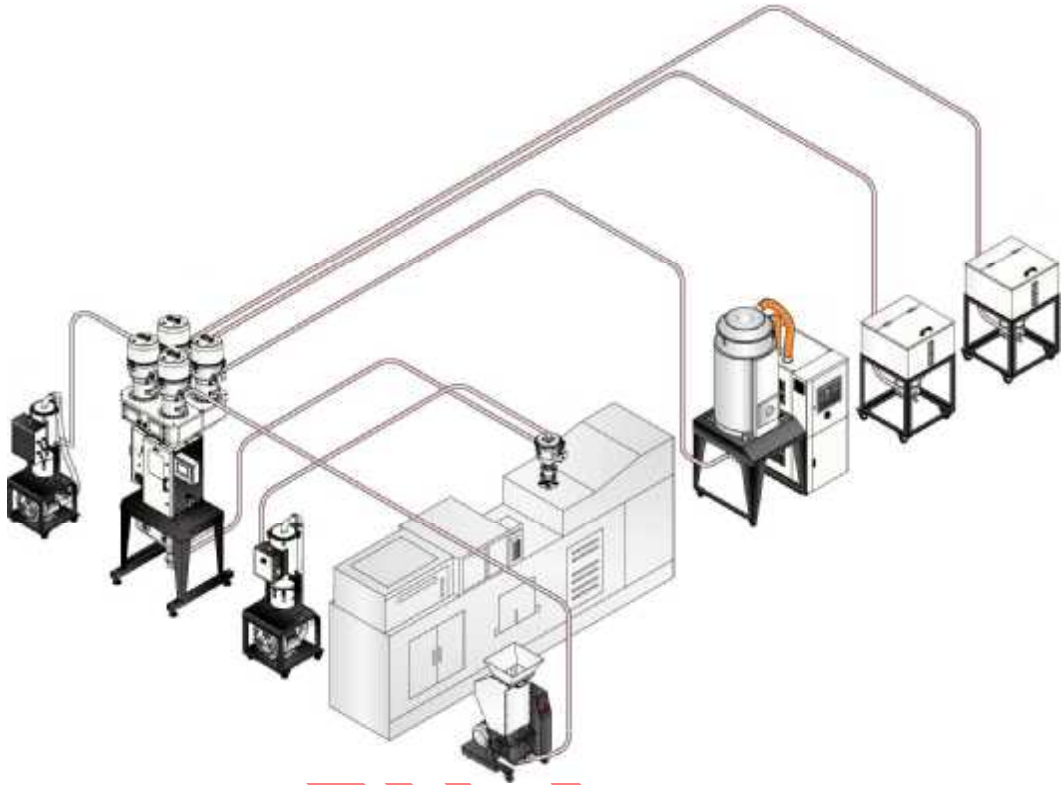
## Direct Installation



Picture 4-2: Direct Installation

When direct installation is applied, it is recommended to remove the touch-screen control box to ensure normal operation if the surrounding temperature is too high ( $\geq 45^{\circ}\text{C}$ ). To avoid effects of high temperature to the precision parts, direct installation is mainly employed when raw materials need not to be dried or the drying temperature is below  $120^{\circ}\text{C}$ .

## Floor Installation



Picture 4-3: Floor Installation

Floor installation is applied when the material should be dried with high temperature ( $> 120^{\circ}\text{C}$ ) or moisture content of materials is strictly requested (such as PET). In addition, separate SAL or the increased blower power for SAL series is recommended to use; SGB should be located beside the molding machine for fear that insufficient conveying capacity of the auto loader or different bulk densities of materials lead to material delaminating after blending.

### 4.3 Model Selection

The maximum throughput is based on bulk density of the material which is  $0.8\text{kg/L}$  when calculating. If bulk density of the material differs, the maximum throughput bears slight deviation.

## Examples

Q: If a customer provides the following parameters:

The throughput is 150kg/hr, material A accounts for 80%, material B 10%, material C 8% and material D 2%.

A: SGB-200-4 is suitable according to the data provided.

From the catalogue of the former page: when four kinds of materials mix and the required throughput is 150kg/hr, so SGB-200-4 is available.

Since the ratio of material D is 2%, a set of screw is requisite for conveying materials.

So the appropriate model is SGB-200-4-1R.

## Calculations for Proportion of Masterbatch and Addictive

- With Respect to Batch Weight

The proportion of masterbatch and addictive is calculated by batch weight.

For instance: Batch Weight=1000g, Hopper 1=Auto Calculation, Hopper 2=40%, Hopper 3=3%, Hopper 4=2%, then the real weight for each hopper is:

$$\text{Hopper 1 (raw material)} = 1000\text{g} \times (100\% - 40\% - 3\% - 2\%) = 550\text{g}$$

$$\text{Hopper 2 (recycling material)} = 1000\text{g} \times 40\% = 400\text{g}$$

$$\text{Hopper 3 (masterbatch)} = 1000\text{g} \times 3\% = 30\text{g}$$

$$\text{Hopper 4 (addictive)} = 1000\text{g} \times 2\% = 20\text{g}$$

In this mode, weight of masterbatch and addictive will not fluctuate with discharging volume of the main materials.



- With Respect to weight of materials

The proportion of masterbatch and additive is calculated by weight of materials in the two hoppers (Hopper 1 and Hopper 2).

For instance: Batch Weight=1000g, Hopper 1=Auto Calculation, Hopper 2=40%, Hopper 3=3%, Hopper 4=2%, then the real weight for each hopper is:

$$\text{Hopper 1 (raw material)}=1000\text{g}\times(100\%-40\%) = 600\text{g}$$

$$\text{Hopper 2 (recycling material)}=1000\text{g}\times 40\% = 400\text{g}$$

$$\text{Hopper 3 (masterbatch)}= ( 600\text{g} + 400\text{g} )\times 3\%= 30\text{g}$$

$$\text{Hopper 4 (additive)}=( 600\text{g} + 400\text{g} )\times 2\% = 20\text{g}$$

In this mode, weight of masterbatch and additive will fluctuate with discharging volume of the main materials.

- With respect to weight of materials in Hopper 1

The proportion of masterbatch and additive is calculated by weight of materials in Hopper 1.

For instance: Batch Weight=1000g, Hopper 1=Auto Calculation, Hopper 2=40%, Hopper 3=3%, Hopper 4=2%, then the real weight for each hopper is:

$$\text{Hopper 1 (raw material)}=1000\text{g}\times(100\%-40\%) = 600\text{g}$$

$$\text{Hopper 2 (recycling material)}=1000\text{g}\times 40\% = 400\text{g}$$

$$\text{Hopper 3 (masterbatch)}= 600\text{g}\times 3\% = 18\text{g}$$

$$\text{Hopper 4 (additive)}= 600\text{g}\times 2\% = 12\text{g}$$

In this mode, the additive quantity of masterbatch and additive will be adjusted automatically depending on availability of recycling materials. Take the above case as an example, as long as Hopper 2 loads recycling materials, quantity of masterbatch (Hopper 3) and additive (Hopper 4) will be 18g and 12g respectively; while Hopper 2

is short of materials, the ratio of recycling materials is replaced by raw materials (Hopper 1) and quantity of masterbatch and additive is:

$$\text{Hopper 3} = 1000\text{g} \times 3\% = 30\text{g}$$

$$\text{Hopper 4} = 1000\text{g} \times 2\% = 20\text{g}$$

In this mode, weight of masterbatch and additive will only fluctuate with discharging volume of the main materials as compensation value for color difference of the recycled material is set at 0%; it will not only fluctuate with discharging volume of the main materials but also that of recycling materials when compensation value for color difference of the recycled material is set above or below 0%.

#### 4.4 Q & A

Q: What should be noticed when plastics manufacturers select mixing equipment with automatic measurement?

A: Mixing equipment with automatic measurement is an indispensable configuration if the plastics manufacturer means to elevate the competition of its products and costs. Certain aspects should be paid attention to as following:

1) The mixing equipment with automatic measurement is determined by factors such as processing technics and properties of materials, accuracy of the prescription, temperature and environment. Volumetric and gravimetric models are suitable for general injection and extrusion process, while agravic models are available for granulation and fiber industry.

2) To avoid some false cognition such as gravimetric model has higher accuracy than volumetric model. During extrusion or injection molding technics, accuracy of the prescription refers to dynamic accuracy. With good material morphology and bulk density, volumetric metering and mixing is synchronous with the molding machine; while the gravimetric model adopts batch processing of material prescription, so gravimetric model does not have higher accuracy than volumetric model.

Another myth is confusion of dynamic accuracy and sensor accuracy. In gravimetric models, application of sensor accuracy alone is not enough. The uppermost is dynamic accuracy of equipment which includes sensor accuracy, dynamic metering accuracy (mainly rely on software design), and mixing precision (mainly rely on mechanical design).

The other misunderstanding is that the weight sensor has higher precision after being used repeatedly. In fact, it is not so. There is currently an important indicator of precision for weight sensors: resolution of the maximum surface in weighing response. Greater resolution brings higher precision and less sensors. More sensors will directly influence the accuracy of the software which indicates low accuracy and weak anti-jamming ability.

Q: What should be noticed when dealing with sheet materials by SGB?

A: What should be noticed are as follows:

Dimension of the sheet material should not be greater than 15~20mm;

Bulk density of the sheet material should be provided. As bulk density of general sheet material is about 0.2~0.4kg/L, the throughput will drop when introducing the standard formula;

To employ bridge-breaking devices ensuring smooth blanking;

It's better to supply samples of sheet material for test.

Q: A customer has one SGB for one bottle blowing machine, and an extruder besides the SGB. Will the extruder's changing position up and down influence weighing effect of SGB?

A: If SGB is at rest, the extruder's changing position will not affect weighing effect of SGB and there may not be strong shock.

Q: How does the photosensor of SGB look like which detects whether the hopper is fulfilled and where is it?

A: There is a switch detects the material level outside the mixing chamber of SGB which is of electrostatic capacitor. Suspending installation keeps

materials from falling between the switch and the mixing chamber. When employing the floor stand, this photosensor will be installed in the storage tank below the stand.

Q: With throughput of 35kg/hr, the extruder uses four kinds of materials in which one masterbatch should be less than 4%. Is the model of SGB 40-4-1R or SGB 80-4-1R suitable?

A: It is recommended to use SGB-80-4-1R. However, SGB deals with granular materials whose bulk density is more than 0.6kg/L.

Q: Parameters provided by the customer are as follows:

Material: PP

Proportion of additive: 10~20%

Proportion of masterbatch: 4~5%

Maximum throughput: 350kg/hr, please commend an appropriate model.

A: SGB-600-4-1R is suitable if powder is not adopted.

Q: Extrusion capacity of customer's bottle blowing machine is 200kg/hr.

Proportion of PE materials (colorless): 70%

Proportion of recycling materials (granules whose diameter varies 4-6mm): 27%

Proportion of masterbatch granules: 3%

Please commend an appropriate model for floor installation.

A: SGB-200-3-1R is suitable. Floor stand and storage tank are necessary regarding to floor installation.

Q: What should be noticed when customers use standard SGB model handling transparent materials such as PMMA, PC and so on?

A: Under this condition, the standard SGB model is not available. Parts that

contact materials should be specially treated such as using food-grade materials and polishing treatment etc. Specification should be given when ordering.

Q: How about operating temperature of the load cell of the standard SGB model?

A: Operating temperature of the load cell is  $-20^{\circ}\text{C}\sim 60^{\circ}\text{C}$

Confidential

## 5. Volumetric Dosers SCM



Picture 5-1: Volumetric Dosers

### 5.1 Application Fields

SCM is suitable for automatically proportionate blending of virgin materials, regrind materials, masterbatch and additive with an error within  $\pm 1\%$ . The current SCM standard model can not be used dealing with plastic powder of masterbatch and all kinds of foods, chemicals, and inflammable, explosive and volatile materials. The standard model is also unavailable for processing optical products such as PC, PMMA and so on. The parts that contact materials should be specially treated as adopting food-grade stuff and polishing treatment etc.

### 5.2 Application Cases

Generally, SCM is installed directly at feeding port of the molding machine. It is recommended to fix the control box with a bracket for fear that accessories of the control box get loose because of shakes of screws in the molding machine.

As the masterbatch need to be added during the molding process, SHD-450U and models below it can be installed on SCM with floor stand; SHD-120U and models below it also can be installed directly on SCM without the stand. Masterbatch will be added in term of the designed proportion based on quantity demanded.

### 5.3 Model Selection

Please pay attention to the bulk density and dimension of the masterbatch granules when selecting specific model of SCM to ensure the maximum throughput and control accuracy.

#### Examples

Q: Information provided by the customer is as follows:

Masterbatch	Form	Bulk Density (kg/L)	Dimensions(mm)	Even / Uneven	Proportion (%)
Black	Granules	1.0	Ø 2~ Ø 3	Even	4
Red	Granules	1.4	Ø 2~ Ø 3	Even	2

Injection volume of each mold is 2000g with molding cycle of 60s, and the melting time is 30s.

Please work out the hourly amount needed of masterbatch and select the suitable model of SCM.

A: The hourly quantity demanded of the black masterbatch is:  $2\text{kg} \times 0.04 \times (3600/30) = 9.6\text{kg/hr}$

The hourly quantity demanded of the red masterbatch is:  $2\text{kg} \times 0.02 \times (3600/30) = 4.8\text{kg/hr}$

The corresponding testing output is:

Black masterbatch:  $[(9.6\text{kg/hr})/1.0] \times 1.2 = 11.52\text{kg/hr}$

Red masterbatch:  $[(4.8\text{kg/hr})/1.4] \times 1.2 = 4.1\text{kg/hr}$

“1.2” stands for bulk density of testing material.

Both SCM-75-16 and SCM-38-14 are suitable.

### 5.4 Q & A

Q: Is it suitable if the customer uses standard SCM model to deal with masterbatch granules (whose diameter is about 0.2mm)?

A: The conveying accuracy is hard to control because the granule is too small and SCM is not suitable. It is recommended that the diameter of the masterbatch granule should be greater than 1.5mm.

Q: Is the maximum output of SCM-38 different from that of SCM-30?

A: The maximum output of SCM-38 is 20% lower than that of SCM-30. For example, the output of SCM-38-16 is 1.1~32kg/hr, but that of the SCM-30~16 is 1.1~36kg/hr.

Q: Is the monochromatic masterbatch machine equipped with mixing blade capable of dealing with glutinous materials? If so, will the output reach 500g/min when equipped with the biggest screw?

It relates to material liquidity and dimension of the granules, and it is recommended to provide samples for testing.

Several models can obtain an output of 500g/min, and the density of materials should be greater than 1.2kg/L. Bigger screws are essential when the testing output can not meet requirements.

Q: The output has reduced by 20% after SCM-30 is replaced by SCM-38 which can not reach the standard required?

A: Increase the dimension of the screw to  $\phi 30$ mm, and the efferent pipe to 1.5"PT pipe.

Q: How about the capacity of the optional hopper?

A: It has a capacity of 15L.

Q: How to add the mixing device while the client does not employ it initially?

A: There are currently reserved signal interface for the mixing motor in the standard masterbatch machine. It will be settled when making connection according to the circuit drawing after re-installing the mixing blade, the motor and some electrical components.

Q: What are the differences as the standard SCM model is used for



molding machine and extruder?

A: When used for molding machines, signal voltage of SCM is 24VDC, and both screws work synchronously. While used for extruders, signal voltage is 0~10VDC and both screws work continuously. SCM is set at molding mode when leaves factory. Control components should be modified according to the manual if extruding model is adopted. We can set the machine at extruding model as requested.

Confidential

## 6. Vertical Mixers SVM / SVM-U



Picture 6-1: Vertical Mixers

### 6.1 Application Fields

SVM is mainly used for mixing plastics as raw materials, masterbatch and recycled materials. SVM can not be used dealing with plastic powder and all kinds of foods, chemicals, and inflammable, explosive and volatile materials. Bulk density should be taken into account when the dimension of material is uneven or in other forms. When dealing with powder materials, it is recommended to select drum-type mixer.

### 6.2 Model Selection

Model selection of SVM (U) is based on capacity of the mixing hopper and throughput per unit time.

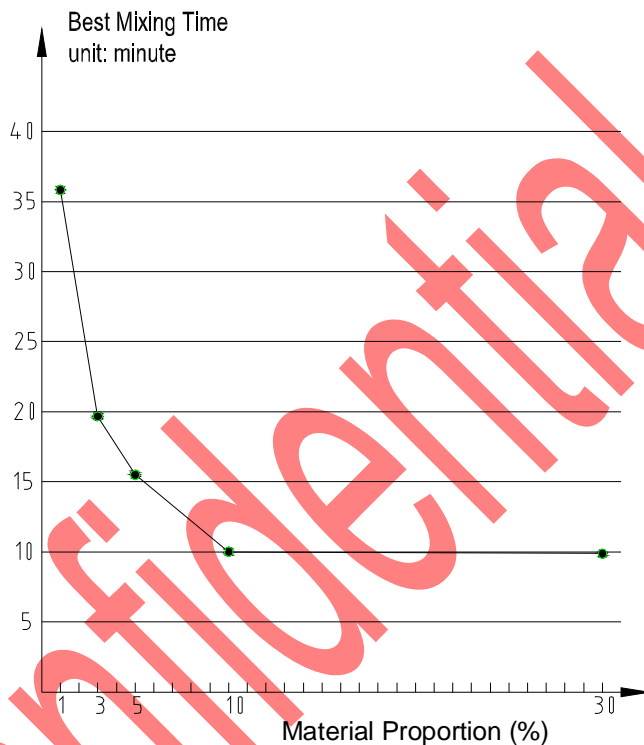
### 6.3 Q & A

Q: How is the average mixing error of SVM?

A: The maximum average mixing error is  $\pm 1\%$  (it is equal to the mixing ratio of inputs minus the ratio of random sampling after mixing).

Q: How about the best mixing time for SVM?

A: The graph below shows the relationship between mixing time and proportion of SVM-25, and graph of other models will be supplied after tests.



Picture 6-2: SVM Optimum Mixing Time Curve

For example, the best mixing time can be set to 10 minutes when the blending ratio is 10%; the time is 15 minutes as the blending ratio is 5%.

Q: What is the testing standard of SVM mixing effect?

A: Blending velocity test in *Powder Technical Manual* is the reference for mixing effect test. The maximum loading ratio of SVM is 50%, and 30% is a common value to avoid extravagancy. The variation coefficient (Cv) refers to our feed standard.

The variation coefficient, just being unevenness, is defined as level that a group of testing data deviates the average value.

Referring to the factor that the load ratio impact on the mixing process,. The material should be tumbled strongly in the mixing barrel. it is bad to perfectly mixing the material if the mixing barrel is filled by the material. The experiment has been shown, the load ratio should less than the 50% for vertical mixer.

Confidential

## 7. Dust Separators SDS



Picture 7-1: Dust Separators

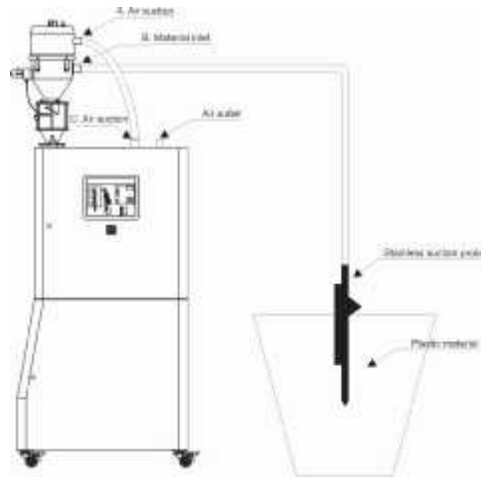
### 7.1 Application Fields

SDS is suitable for removing dust in plastic materials such as PET, PA, and PC etc. It is not used for dealing with recycled materials. Please inform us as the material need anomalous temperature or close-loop circulation after drying.

### 7.2 Application Cases

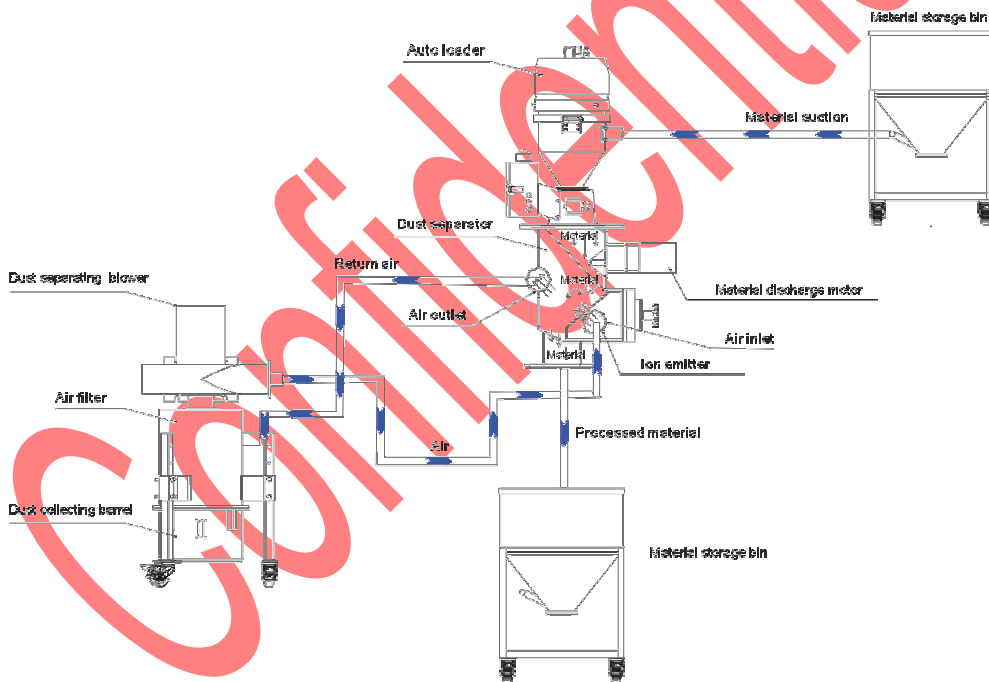
#### **Installation of SDS-500**

SDS-500 has SHR-12U-E as a standard configuration which can remove dust while conveying materials.



Picture 7-2: Installation of SDS-500

### Installation of SDS-100/250



Picture 7-3: Installation of SDS-100/250

Without function of conveying materials, SDS-100/250 should be equipped with vacuum auto loaders and material storage tanks.

### 7.3 Model Selection

Model selection of SDS is based on throughput per unit time which can refer to

product catalogue.

Model	Conveying Blower (kW) (50 / 60Hz)	Dust Separating Blower (kW) (50 / 60Hz)	Receiver	Max. Processing Capacity (kg / hr)	Suction Box	Material Storage Bin
SDS-100	N / A	0.55 / 0.66	N / A	100	N / A	N / A
SDS-250	N / A	0.55 / 0.66	N / A	250	N / A	N / A
SDS-500	1.5 / 1.8	2.2 / 2.6	SHR-12U-E	500	Standard	Standard

Notes: The data of maximum throughput above is calculated with bulk density of 0.65kg/L, granule diameter of 2~3mm with continuous operation.

#### 7.4 Q & A

- Q: In what condition does SDS-500 should be equipped with material storage tank?
- A: Optional storage tank and suction box can remove dust and convey the material to other places immediately (need to buy conveying devices).
- Q: How to meet the requirement of removing dust from the recycled materials?
- A: Generally speaking, SDS is suitable for processing raw materials. The throughput will reduce to 350kg/hr when processing recycled materials. The feed port should be enlarged to avoid block of materials. SDS-100/250 is not suitable for dealing with recycled materials.

## 8. Metal Detecting Separators SMS



Picture 8-1: Metal Detecting Separators

### 8.1 Application Fields

In plastics industry, SMS is mainly used for protecting machinery. It prevents shutdown caused by equipment failure and ensures continuity of production as well as enhances output.

### 8.2 Application Cases

Direct installation and floor installation are available for SMS according to actual conditions.

When direct installation is adopted, there should be a temporary material storage tank under SMS. The high-level meter installed at the tank can stop the loader SAL-U above SMS once fulfilling which ensures normal operation.



When floor installation is adopted, there should be a high-level meter installed at the temporary material storage tank which will stop the loader SAL-U above SMS once fulfilling and ensure normal operation.

### 8.3 Model Selection

The maximum output is based on continuous processing of granules with bulk density of 0.8kg/L and dimension of 2-3mm.

Model	SMS-35	SMS-50	SMS-70	SMS-100
Min. Volume of Metal Detected(mm)	0.5	0.6	1.0	1.3
Max. Throughput( L/hr)	600	1500	3000	6900
Pipe Aperture Detected(mm)	35	50	70	100

### 8.4 Q & A

Q: Is SMS capable of detecting copper in the material?

A: The detect accuracy varies with different sorts of materials. The accuracy of standard models is based on test of iron.

Q: Is it feasible to install SMS at the outlet of cyclone dust collector on SG-5090 for detecting metals?

A: No. The great air flow below the dust collector will cause high speed of material discharging that SMS can not work normally.

Q: How about the highest temperature when detecting devices of standard SMS checking the material?

A: The highest temperature is 100°C

## 9. Proportional Valves SPV-U

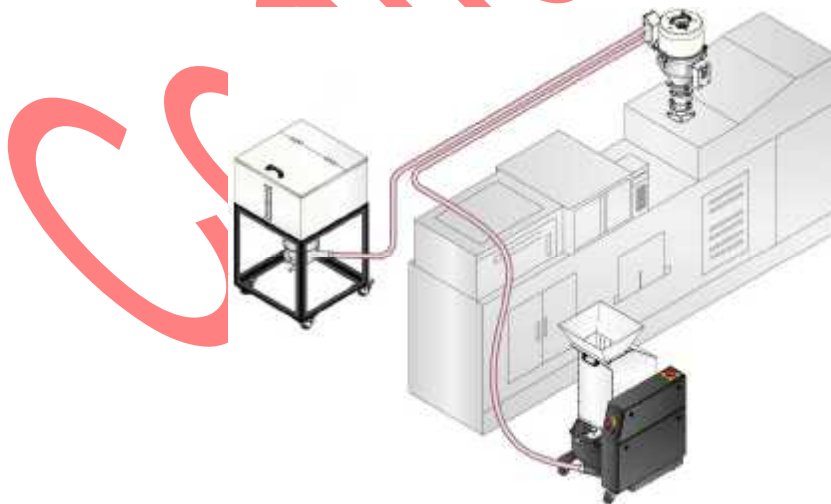


Picture 9-1: Proportional Valves

### 9.1 Application Fields

SPV-U can achieve proportional mixing and conveying as transmitting virgin materials and regrind materials by certain percentage. SPV-U can not be used dealing with all kinds of foods, chemicals, and inflammable, explosive and volatile materials. Fluidity should be taken into account when the dimension of material is uneven or in other forms.

### 9.2 Application Cases



Picture 9-2: SPV-U Application Chart

SPV-U is installed on the loader or pipeline and also can be equipped with Euro-loaders. The control box can be collocated in other conditions.

### 9.3 Model Selection

Model selection of SPV-U is based on weight of materials passing through its valve (kg/hr). The weight of materials is tested and calculated by materials with bulk density of 0.65kg/L and dimension of 3-5mm. The maximum throughput varies with different bulk density.

Model	Pressure of Air source	Max. Throughput	Piping Size	Dimensions HxWxD(mm)	Weight (kg)
SPV-38U	3kgf/cm <sup>2</sup>	350kg/hr	38mm	230x260x150	3.5
SPV-50U	3kgf/cm <sup>2</sup>	550kg/hr	50mm	230x260x150	5

### 9.4 Q & A

Q: How much does the control precision of mixing proportion reach for SPV-U?

A: Mixing proportion precision is directly related to value of the mixing ratio. Referring to test data of Shihi, PET and PC is blended by proportion of 70:30, and the control precision varies within 15%.

Q: Air pressure being 5kgf/cm<sup>2</sup>, how much is air consumption of SPV-U per unit time?

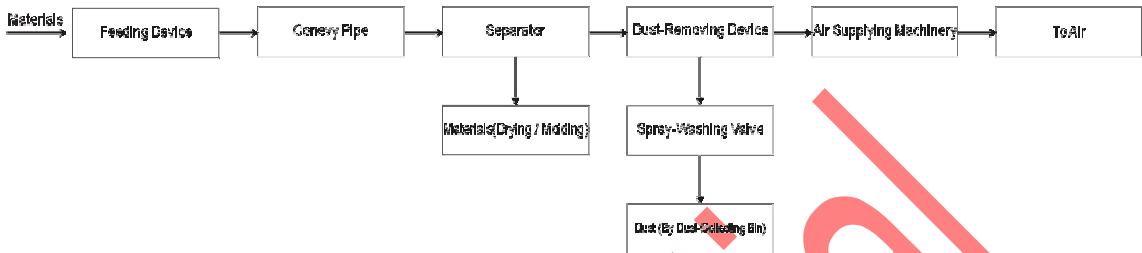
A: As switching every 30 seconds, the air consumption per unit time is 0.006m<sup>3</sup>/hr.

Q: Is standard model of SPV-U capable of processing materials of high temperature?

A: It is suggested that the temperature not be higher than 70°C.

## 10. System Configuration

Central conveying system consists of feeding device, convey pipeline, separator, dust-removing device, air supplying equipment, air pipeline and control parts. Working sequence is shown as follows:



Picture 10-1: Main Parts of Conveying System

### Feeding Device

Feeding device refers to components suck materials such as suction pipe, suction box (shut-off), which are basic parts of the feeding device. During long-distance (more than 30m) or secondary conveying (drying hopper→molding machine), shut-off suction box is necessary for fear that material choke the pipeline or moisture regain.

### Convey Pipeline

Central conveying system often uses steel-braid hose (PVC) or stainless steel (SUS201) during single material conveying. As for some particular industries such as food and medicine industry, stainless steel (SUS304) or glass tube is needed.

### Separator

Separator is a material-receiving hopper used to separate material from air, which can be divided into vacuum hopper and photosensor hopper. The vacuum hopper is usually launched on the drying hopper, and the photosensor hopper is often installed at the feeding port of the molding machine.

## Dust-removing Device

In central conveying system, dust in the material or carried during long-distance transportation gets into separator and then into dust-removing device. The dust-removing device employs cyclone dust-removing filter. Filter accuracy of SHINI's standard filter is 98 $\mu$ m. According to personal conditions, customers can choose filter of high accuracy.

## Air Supplying Equipment

As material conveying system adopts vacuum suction convey, the air supplying equipment employs high-pressure vacuum blower or Roots blower.

### High pressure blowers

Under designed condition, the blowers whose air pressure is within 30kPa ~200kPa or compressing ratio is worked in 1.3~3 belong to high pressure blower.

Features:

1. It can not only work at positive pressure place but also vacuum place.
2. Running without oil or little oil, so the air output is purified.
3. Its working pressure is much higher than that of a centrifugal blower or a middle pressure.
4. Its running noise is less than that of other blowers such as Roots blowers.
5. Maintenance-free. The easily damaged components are only two bearings, so it doesn't need to maintain during warranty period.
6. The mechanical dissipation is much lower because it has no contact surface except for two bearings.

## Roots blowers

They belong to rotary blower, which use two rotors with vane shape in relative movement to compress and convey the air. This type of blowers, which featured simple structure and easy manufacturing, are suitable for conveying and compressing air in low pressure place and also can be vacuum pump. Because of air impulse of air flow and pressure, the noise is higher. In addition, the gap between rotor and cylinder can result in air leakage and efficient decreasing.

### Features:

1. The deviation of air flow is much little when adjusting the air flow in using within acceptable range,
2. It can adjust air pressure within wide range and force to produce the compressed air.
3. Conveying air without oil.
4. Simple structure and easy maintenance and long life of use and lower vibration.

## 11. “Standard” Self-contained Hopper Loaders SAL



Picture 11-1: “Standard” Self-contained Hopper Loaders

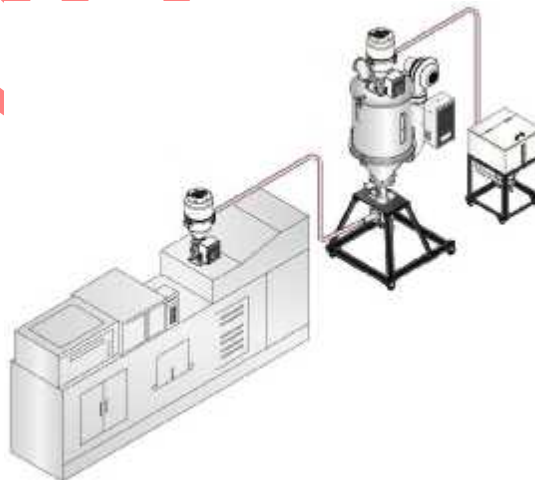
### 11.1 Application Fields

SAL series are mainly used for conveying plastic granules. Bulk density and fluidity of sheet materials should be taken into account when the dimension of material is uneven or in other forms (such as sheet material or that contains too much dust).

### 11.2 Application Cases

Generally speaking, SAL can be installed on the drying hopper (micro-switch) or directly on the molding machine (photo-sensor).

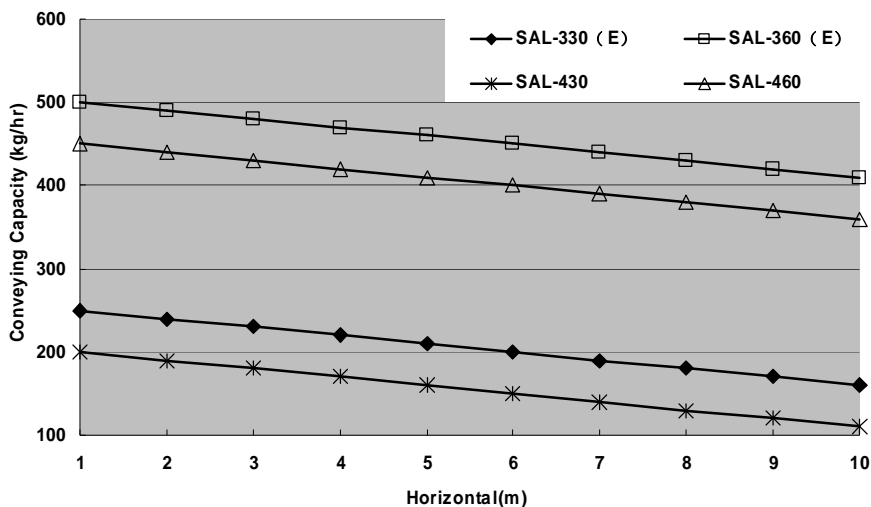
#### Installation on the Drying Hopper



Picture 11-2: Installation on the Drying Hopper

### 11.3 Model Selection

Products catalogue is referential for model selection of SAL. The maximum output recorded in the catalogue is determined with horizontal distance of 1m and vertical height of 4m. With different requirements, the performance curve of SAL series can be a reference (the measuring conditions are: new equipment, H=4m, bulk density of materials is 0.65kg/L, diameter is 2~3mm and at room temperature), the safety margin of 20% should be considered when selecting specific models. The conversion is that vertical height of 1m equals to horizontal distance of 2m, one 90-degree elbow equals to horizontal distance of 5m. Dimensions of material pipeline and vacuum pipeline are of standard model.



Picture 11-3: Performance Curve of SAL series (50Hz)

### 11.4 Q & A

Q: What is carbon brush motor?

A: Carbon brush, just as its name implies, is made of carbon (ie. graphite which is main component of pencil lead, and sometimes the carbon crush is made of alloys instead of graphite). It is a part that heads the phase switcher in the brush motor. Electric power is conveyed to the coil by the phase switcher when the motor rotates. As the main



component is carbon, it is likely to wear. So it is necessary to maintain and replace it regularly and clean up the deposit. The carbon brush is a device between the fixed part and rotating part of the motor which transmits energy or signal. It is a cube generally made of pure carbon and coagulant. The carbon brush sticks to metal holder and is pressed to the rotating shaft by springs. It is can not be reversed.

Q: How to achieve automatic spray washing?

A: The carbon brush equipped in SAL-330/360 (E) adopts compressed gas ( $4\sim 6\text{kgf/cm}^2$ ) to achieve this function. However, the induction motor equipped in SAL-430/460 uses reverse exhausting of the motor for spray washing.

Q: How to convey recycled flaky materials?

A: The standard model is sufficient for recycling flaky materials whose dimension is less than  $8\text{mm}\times 8\text{mm}$ . Material is likely to accumulate at the discharge port as the dimension is greater than  $8\text{mm}\times 8\text{mm}$ . A bridge-breaking device is essential under this condition.

## 12. “Standard” Separate-vacuum Hopper Loaders SAL-G



Picture 12-1: “Standard” Separate-vacuum Hopper Loaders

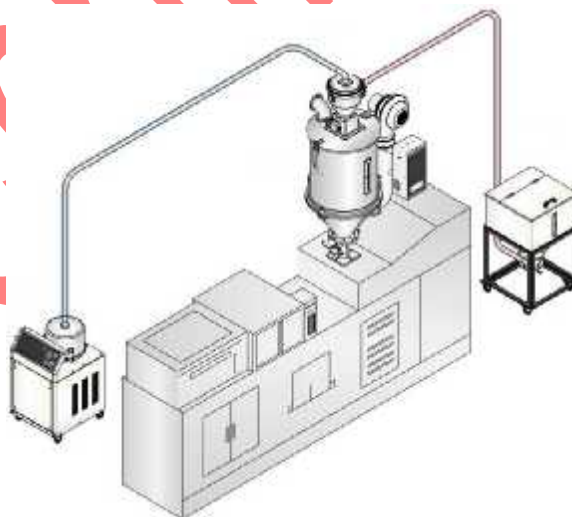
### 12.1 Application Fields

SAL-U series are mainly used for conveying plastic granules. Bulk density and fluidity of sheet materials should be taken into account when the dimension of material is uneven or in other forms (such as sheet material or that contains too much dust).

### 12.2 Application Cases

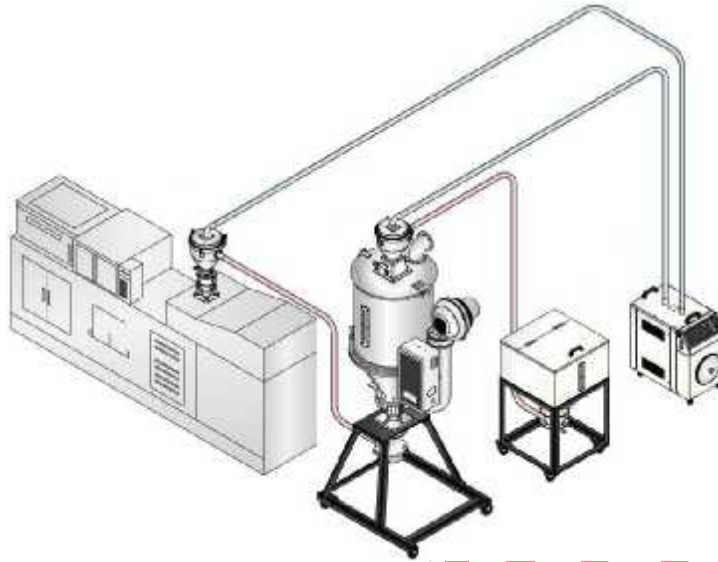
Generally speaking, SAL-G can be installed on the drying hopper (micro-switch) or directly on the molding machine (photo-sensor).

Conveying material with single stage



Picture 12-2: Conveying material with single stage

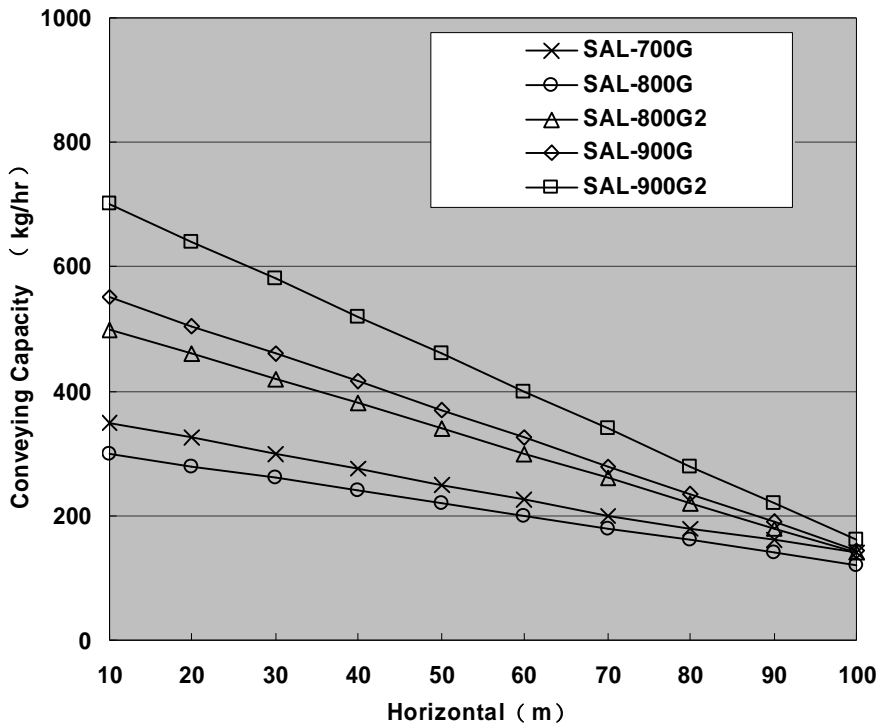
## Conveying material with double stage



Picture 12-3: Conveying material with double stage

### 12.3 Model selection

Products catalogue is referential for model selection of SAL-G. The maximum output recorded in the catalogue is determined with horizontal distance of 5m and vertical height of 4m. With different requirements, the performance curve of SAL-G series can be a reference (the measuring conditions are: new equipment,  $H=4\text{m}$ , bulk density of material is  $0.65\text{kg/L}$ , diameter is  $2\sim 3\text{mm}$  and at room temperature), the safety margin of 20% should be considered when selecting specific models. The conversion is that vertical height of 1m equals to horizontal distance of 2m, one 90-degree elbow equals to horizontal distance of 5m. Dimensions of material pipeline and vacuum pipeline are of standard model.



Picture 12-4: Performance Curve of SAL-G (50Hz)

## 12.4 Q & A

Q: How much is the filter accuracy of SAL-G series?

A: The filter accuracy of SAL-G series is 90 $\mu$ m.

Q: Under what condition will the optional ACF cyclone dust collector be equipped?

A: The main function of ACF is collecting dust. It can be equipped as long as there is much dust or wastes in the material to prevent dust from entering the filter of main unit.

Q: On which dryers does SAL-800G and SAL-900G can be installed? Does the hole of SMH hopper match that of the molding machine?

A: SAL-800G employs single-stage convey, and SAL-900G employs double-stage convey. They can be installed on full range of SHD and

SHD-U series. SMH is usually installed on the dryer, while SVH on the molding machine. The installation hole of SVH is a long hole. The customer can produce or order customized conversion flange.

Q: How many shut-off control points are there for SAL-700G/800G and SAL-900G as standard configuration?

A: There are no shut-off control point for SAL-700G/800G, but the client may order customized model (with additional time relay); one shut-off point is equipped for SAL-900G, and a time relay should be added if the client needs two.

Q: How to convey recycled flaky materials?

A: The standard model is sufficient for recycling flaky materials whose dimension is less than 8mm×8mm. Material is likely to accumulate at the discharge port as the dimension is greater than 8mm×8mm. A bridge-breaking device is essential under this condition.

Confidential

## 13. Self-contained Hopper Loaders SAL-U



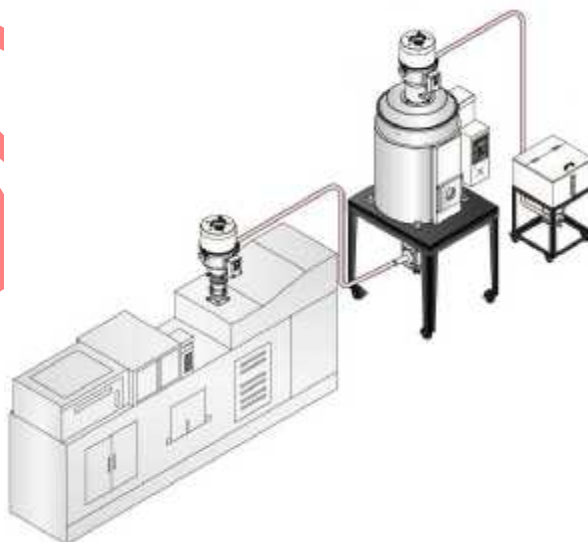
Picture 13-1: Self-contained Hopper Loaders

### 13.1 Application Fields

SAL-U series are mainly used for conveying plastic granules. Bulk density and fluidity of sheet materials should be taken into account when the dimension of material is uneven or in other forms (such as sheet material or that contains too much dust).

### 13.2 Application Cases

#### Combination with Drying Hopper



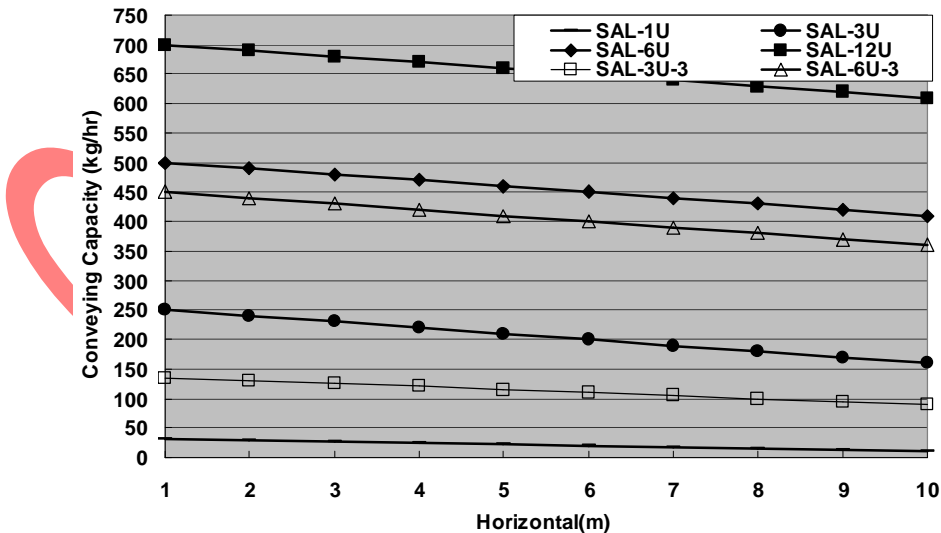
Picture 13-2: With Drying Hopper

This installation is adopted when materials need to be dried or there is unlimited space for installation. However, drying hopper of 300kg/450U or models under that is available.

Independent Installation is introduced as long as materials need not to be dried or central drying is adopted, or there is restricted space for installation. SAL-U-E series are directly mounted on the molding machine.

### 13.3 Model Selection

Products catalogue is referential for model selection of SAL-U. The maximum output recorded in the catalogue is determined with horizontal distance of 1m and vertical height of 4m. With different requirements, the performance curve of SAL-U series can be a reference (the measuring conditions are: new equipment, H=4m, bulk density of materials is 0.65kg/L, diameter is 2~3mm and at room temperature), the safety margin of 20% should be considered when selecting specific models. The conversion is that vertical height of 1m equals to horizontal distance of 2m, one 90-degree elbow equals to horizontal distance of 5m. Dimensions of material pipeline and vacuum pipeline are of standard model.



Picture 13-3: Performance Curve of SAL-U (50Hz)

### 13.4 Q & A

Q: Can the shut-off function be a customized order?

A: Yes. The mixing output control point can be replaced by shut-off output control point.

Q: How much compressed air is needed for cleaning 3 sets of SAL-3U and 4 sets SAL-3U-E within one cycle?

A: The test indicates that the compressed air requisite is 240L/min.

Q: How to convey recycled flaky materials?

A: The standard model is sufficient for recycling flaky materials whose dimension is less than 8mm×8mm. Material is likely to accumulate at the discharge port as the dimension is greater than 8mm×8mm. A bridge-breaking device is essential under this condition.

Confidential



## 14. Separate-vacuum Hopper Loaders SAL-UG



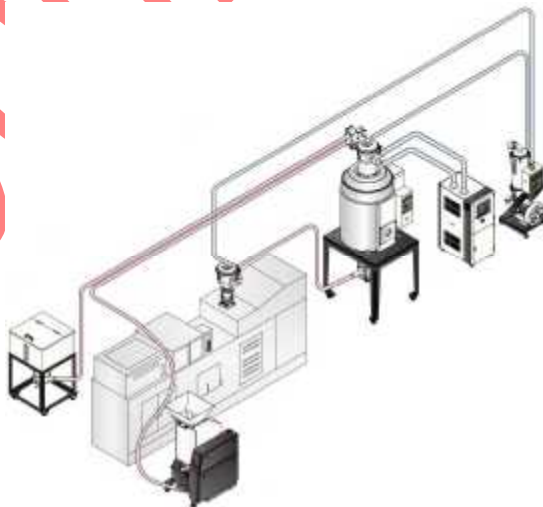
Picture 14-1: Separate-vacuum Hopper Loaders

### 14.1 Application Fields

SAL-UG series are mainly used for conveying plastic granules. Bulk density and fluidity of sheet materials should be taken into account when the dimension of material is uneven or in other forms (such as sheet material or that contains too much dust).

### 14.2 Application Cases

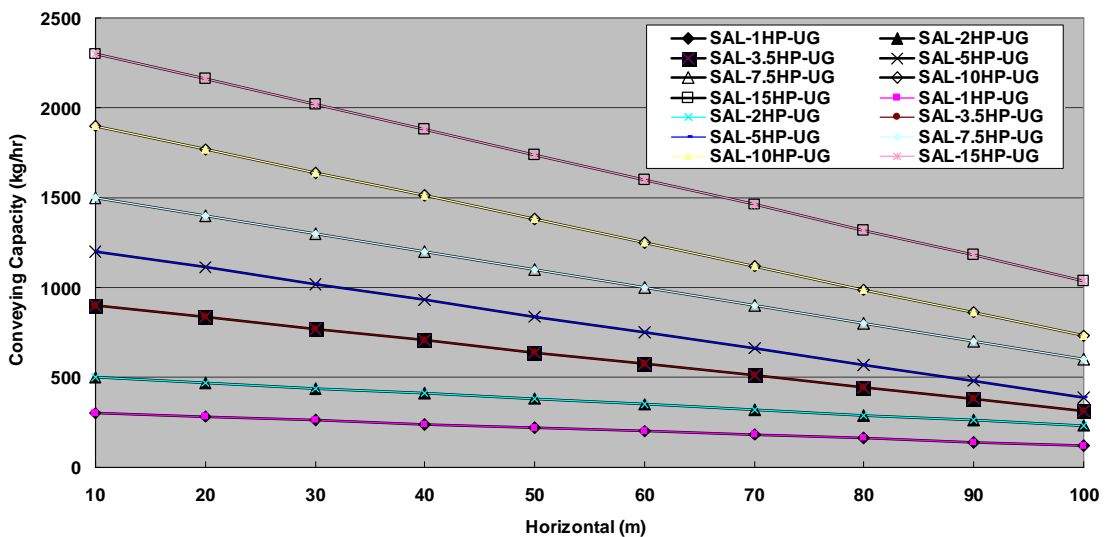
#### Installing sketch



Picture 14-2: Installing sketch

### 14.3 Model Selection

Products catalogue is referential for model selection of SAL-UG. The maximum output recorded in the catalogue is determined with horizontal distance of 5m and vertical height of 4m. With different requirements, the performance curve of SAL-UG series can be a reference (the measuring conditions are: new equipment, H=4m, bulk density of the material is 0.65kg/L, diameter is 2~3mm and at room temperature), the safety margin of 20% should be considered when selecting specific models. The conversion is that vertical height of 1m equals to horizontal distance of 2m, one 90-degree elbow equals to horizontal distance of 5m.



Picture 14-3: Performance Curve of SAL-UG (50Hz)

### 14.4 Q & A

Q: Is it possible to set the vacuum breaking function unavailable?

A: It is no need to set the parameters once the vacuum breaking function is not exquisite. To disconnect the power or air supply is enough. However, it will lead to decline of conveying capacity and shorten the span of life, in addition, it is necessary to set parameters of delay time (F-05) between the two conveys.

Q: The customer provides the following requirements: for conveying PE

materials, throughput of 200kg/hr, horizontal distance of 30m, vertical height of 4m with 4 elbows, equipped with SPV, horizontal distance between the recycling materials and the hopper as well as the height is 4m. Is SAL-3.5HP-UG capable of meeting the above demands?

A: SAL-3.5HP-UG+SHR-24U equipping with SPV-50U can achieve the goal.

Q: How to solve the problem that the voltage of SAL-5HP-UG can not reach rated value when it starts from standstill?

A: This is caused by soft launch of the motor. Set the "F19" on the control panel to "1" to disable this function if it is needless.

Q: How to convey recycled flaky materials?

A: The standard model is sufficient for recycling flaky materials whose dimension is less than 8mm×8mm. Material is likely to accumulate at the discharge port as the dimension is greater than 8mm×8mm. A bridge-breaking device is essential under this condition.

## 15. “1 to 2” Separate-vacuum Hopper Loaders



Picture 15-1: “1 to 2” Separate-vacuum Hopper Loaders

### 15.1 Application Fields

SAL-UG122 is suitable for conveying plastic granules from one to two delivery points. The “1 to 2” convey can save the cost significantly by transmitting materials from one vacuum blower to various molding machines or storage tanks. Bulk density and fluidity of materials should be taken into account when the dimension of material is uneven or in other forms (such as sheet material or that contains too much dust).

### 15.2 Application Cases

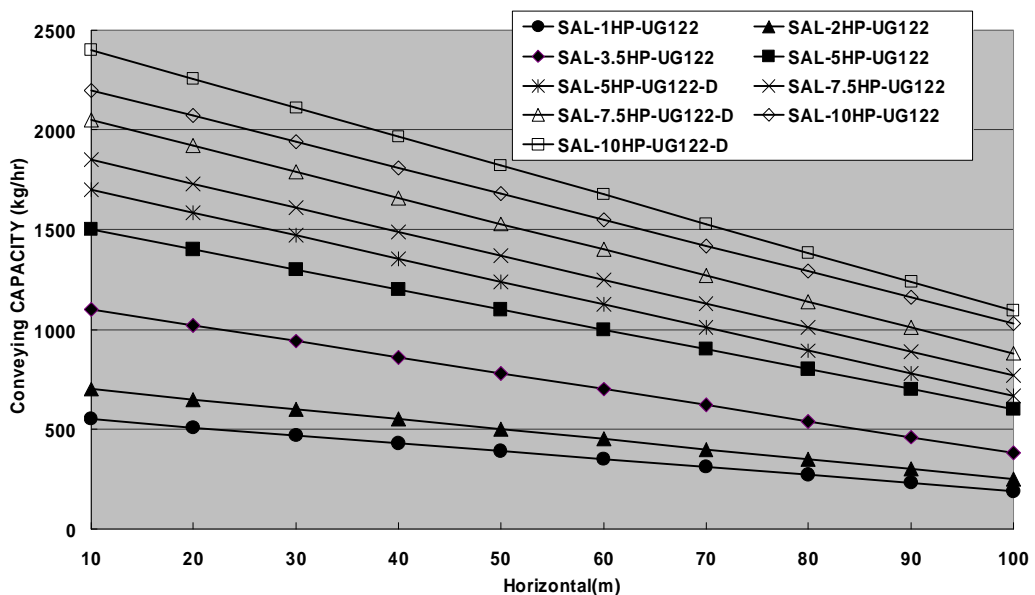
#### **Collocation with Drying Hopper**



Picture 15-2: Collocation with Drying Hopper

### 15.3 Model Selection

Products catalogue is referential for model selection of SAL-UG122. The maximum output recorded in the catalogue is determined with horizontal distance of 5m and vertical height of 4m. With different requirements, the performance curve of SAL-UG122 series can be a reference (the measuring conditions are: new equipment, H=4m, bulk density of the material is 0.65kg/L, diameter is 2~3mm and at room temperature), the safety margin of 20% should be considered when selecting specific models. The conversion is that vertical height of 1m equals to horizontal distance of 2m, one 90-degree elbow equals to horizontal distance of 5m. Dimensions of material pipeline and vacuum pipeline are of standard model.



Picture 15-1: Performance Curve of SAL-UG122 (50Hz)

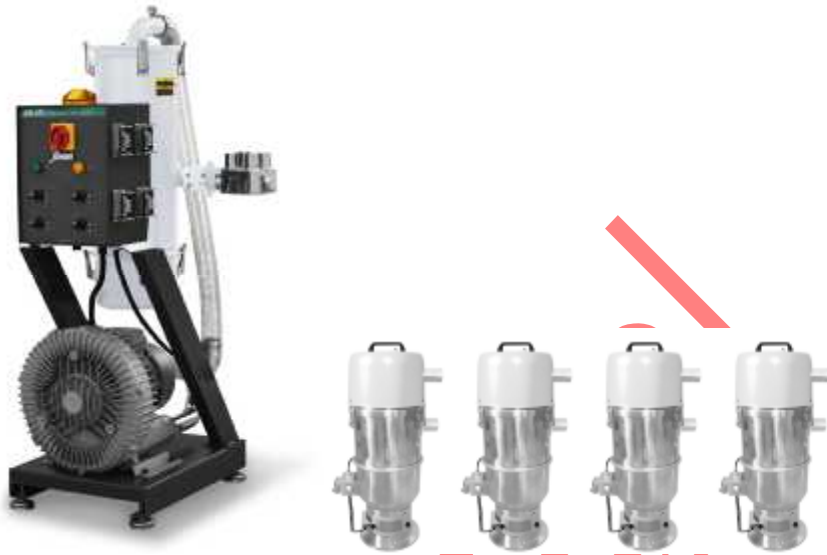
#### 15.4 Q & A

Q: How to manipulate the suction movement of SAL-UG122?

A: SAL-900G control circuit board is applied in SAL-UG122. The mode of control is similar to that of SAL-900G whose standard configuration includes a shut-off output control point.

Confidential

## 16. “1 to 4” Separate-vacuum Hopper Loaders



Picture 16-1: “1 to 4” Separate-vacuum Hopper Loaders

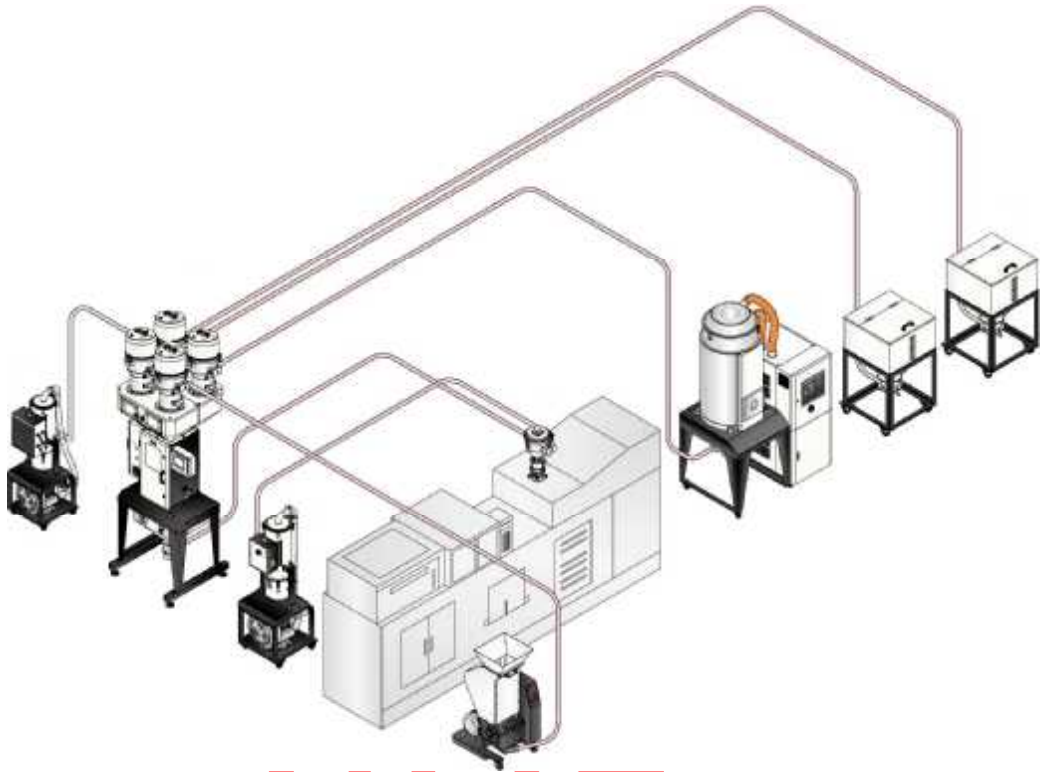
### 16.1 Application Fields

SAL-UG124 is suitable for conveying plastic granules from one to four delivery points. The “1 to 4” convey can save the cost significantly by transmitting materials from one vacuum blower to various molding machines or storage tanks which is equal to a small central feeding system. Bulk density and fluidity of materials should be taken into account when the dimension of material is uneven or in other forms (such as sheet material or that contains too much dust).

### 16.2 Application Cases

The material is transmitted to various molding machines or storage tanks by “1 to 4” convey of SAL-UG124 such as used for certain dehumidifiers and dryers (SDD) or combination with separate gravimetric blender (SGB).

## Collocation with SGB

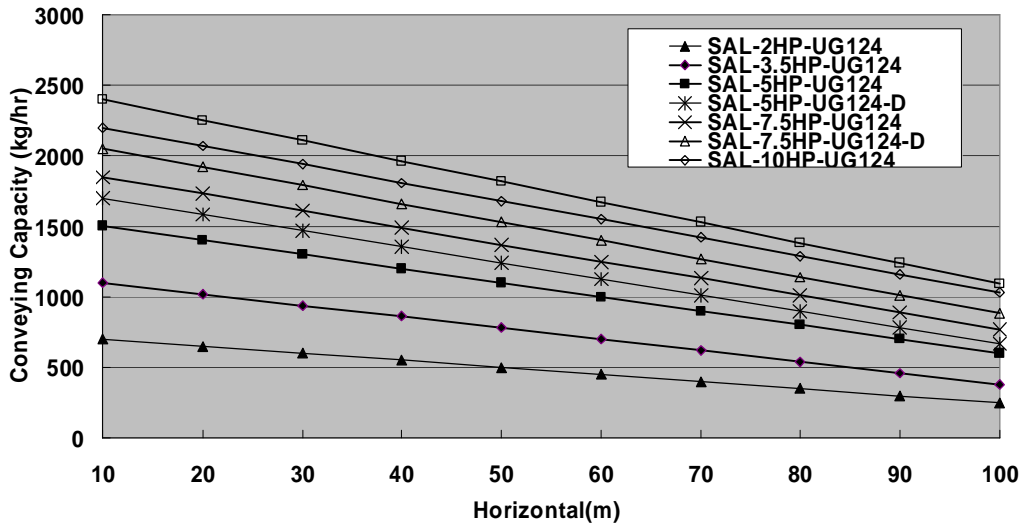


Picture 16-2: Collocation with SDB

### 16.3 Model Selection

Products catalogue is referential for model selection of SAL-UG124. The maximum output recorded in the catalogue is determined with horizontal distance of 5m and vertical height of 4m. With different requirements, the performance curve of SAL-UG124 series can be a reference (the measuring conditions are: new equipment,  $H=4\text{m}$ , bulk density of materials is  $0.65\text{kg/L}$ , diameter is 2~3mm at room temperature), the safety margin of 20% should be taken into account when selecting specific models. The conversion is that vertical height of 1m equals to horizontal distance of 2m, one 90-degree elbow equals to horizontal distance of 5m. Dimensions of material pipeline and vacuum pipeline are of standard model.





Picture 16-1: Performance Curve of SAL-UG124 (50Hz)

## 16.4 Q & A

Q: How does SAL-UG124 work?

A: If the four hoppers are at work after booting, they suction materials in turn. One hopper stops once being fulfilled and the others are still at work. The machine will stop after latency if all the four hoppers are full, and it will start again once receiving shortage signal of any of the four hoppers. In addition, there is only one hopper at work at one time. The serial number marked on the hopper is basis of working sequence when two shortage signals arriving simultaneously.

Q: Whether SAL-UG124 will work properly or not if the vacuum breaking valve does not connect with high-pressure air.

A: Frequent overload will occur to the motor which influences its operation and service life if the vacuum breaking valve does not connect with high-pressure air.

Q: With total output of 1000kg/hr, the customer selects initially SAL-7.5HP-UG124D. For conveying 5 kinds of materials, does the loader with 5 hoppers can be equipped?

A: At present, there is not loader with 5 hoppers. It is recommended to purchase one more auto loader based on the amount of materials to be loaded and conveying distance.

Confidential

## 17. Separate-vacuum Hopper Loaders SAL-UGP



Picture 17-1: Separate-vacuum Hopper Loaders

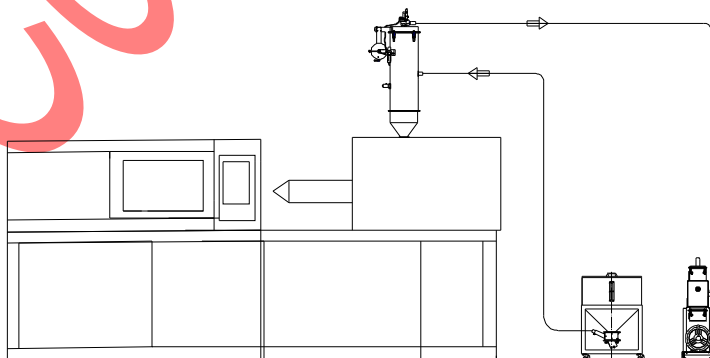
### 17.1 Application Fields

SAL-UGP series are mainly used for conveying plastic powder or mixture of plastic granules and powder. Bulk density and fluidity of sheet materials should be taken into account when the dimension of material is uneven or in other forms.

### 17.2 Application Cases

SAL-UGP is directly installed on the molding machine when combining with storage hopper to achieve molding operation.

#### Direct Installation



Picture 17-2: Direct Installation

### 17.3 Model Selection

Products catalogue is referential for model selection of SAL-UGP. The maximum output recorded in the catalogue is determined under the condition that horizontal distance is 5m; vertical height is 4m and bulk density of the dried and non-viscous powder is 0.6kg/L. The safety margin of 20% should be considered when selecting specific models.

Table 17-1: Parameters of SAL-UGP (with filter bag 50Hz)

Main Unit			Powder Receiver					Number of Bag Filters
Model	Motor Power (kW) (50/60Hz)	Specification	Model	Vacuum Line Dia.	Volume (L)	Diameter (mm)	Loading Capacity (kg / hr)	
SAL-1HP-UGP	0.75 / 0.85	3Φ	SHR-P-12U	1.5"	12L	Φ270	300	3
SAL-2HP-UGP	1.5 / 1.8	3Φ	SHR-P-30U		30L	Φ380	400	7
SAL-3.5HP-UGP	2.4 / 2.6	3Φ	SHR-P-60U	2"	60L	Φ440	800	10
SAL-5HP-UGP	3.7 / 4.2	3Φ					1200	
SAL-7.5HP-UGP	5.5 / 6.3	3Φ	SHR-P-90U	2.5"	90L	Φ550	1500	19
SAL-10HP-UGP	7.5 / 8.6	3Φ					2000	

Table 17-2: Parameters of SAL-UGP (with filter plate 50Hz)

Main Unit			Powder Receiver					Number of Bag Filters Model
Model	Motor Power (kW) (50/60Hz)	Specification	Model	Vacuum Line Dia.	Volume (L)	Diameter (mm)	Loading Capacity (kg / hr)	
SAL-1HP-UGP	0.75 / 0.85	3Φ	SHR-P-30U-1	1.5"	30L	Φ380	300	1
SAL-2HP-UGP	1.5 / 1.8	3Φ	SHR-P-30U-2				400	2
SAL-3.5HP-UGP	2.4 / 2.6	3Φ	SHR-P-60U-3	2"	60L	Φ440	800	3
SAL-5HP-UGP-D	3.7 / 4.2	3Φ					1200	
SAL-7.5HP-UGP-D	5.5 / 6.3	3Φ	SHR-P-90U-5	2.5"	90L	Φ550	1500	5
SAL-10HP-UGP-D	7.5 / 8.6	3Φ					2000	

## 17.4 Q & A

Q: Under what condition is the loader with filter plate applicable?

A: The loader with filter plate is suitable for conveying 100% of powder, while the filter bag for 30% of powder.

Q: What does the "3" in "SHR-P-60U-3" stand for?

A: It stands for that 3 plates are equipped in the hopper.

Q: How about the filter accuracy of the filter plate and the filter bag?

A: The filter accuracy of the filter plate and the filter bag is 1 $\mu$ m and 7 $\mu$ m respectively.

Confidential

## 18. Flexible Screw Feeders SSC



Picture 18-1: Flexible Screw Feeders

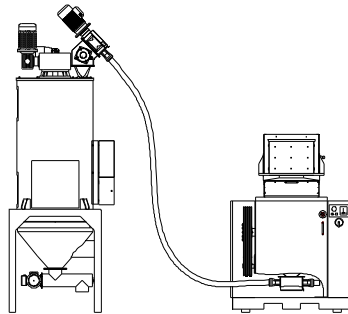
### 18.1 Application Fields

SSC series are mainly used for conveying plastic powder, plastic granules or sheet materials. Bulk density and fluidity of sheet materials should be taken into account when the dimension of material is uneven or in other forms.

### 18.2 Application Cases

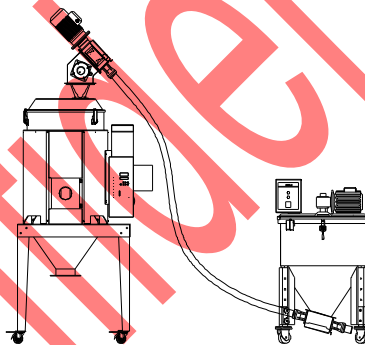
SSC series can be used together with other models such as shredders, blenders, storage tanks and so on. Special treatment of the connection parts should be put forward as doing so.

## Combination with Shredders



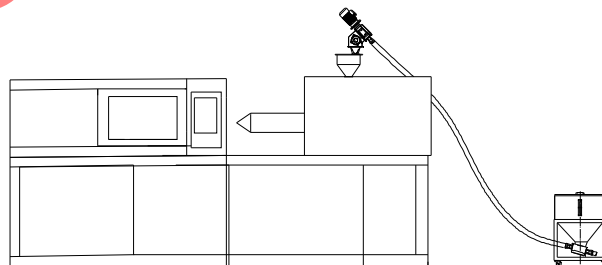
Picture 18-2: Combination with Shredders

## Combination with Blenders



Picture 18-3: Combination with Blenders

## Combination with Storage Tanks



Picture 18-4: Combination with Storage Tanks

### 18.3 Model Selection

Table 18-1: Reference Table of SSC Model Selection

Model	Pipeline Diameter (mm)	Type of Materials	Bulk Density (kg/L)	Throughput(kg/hr)		Radius of Curve r(mm)	Motor Speed (r.p.m)
				Tilt Angle=0°	Tilt Angle=45°		
SSC-40	Φ40	Granules	0.8	240	200	1000	910
		Powder	0.7	100	90	1000	910
		Sheet	0.3	90	70	1000	910
SSC-50	Φ50	Granules	0.7	800	700	1200	910
		Powder	0.6	450	350	1200	910
		Sheet	0.3	300	250	1200	910
SSC-65	Φ65	Granules	0.7	1900	1400	1400	910
		Powder	0.6	1000	800	1400	910
		Sheet	0.3	600	500	1400	910

Notes: 1) Special stainless steel storage tanks should be equipped with SCC series;

2) Motor power should be increased when the length of the pipeline is more than 8m;

3) To avoid material obstruction, the granule diameter for SSC-40/50 should be less than 4mm and that for SSC-65 should be less than 6mm. Edge length of sheet materials should be less than 15mm;

4) Safety margin of 20% should be taken into account when selecting specific model.

### 18.4 Q & A

Q: How is the highest temperature that the standard SSC models used for conveying materials?

A: The highest temperature is 100°C.

Q: What are the screw and screw sleeve made of?

A: They are made of 60Si2MnA, PA12 respectively.

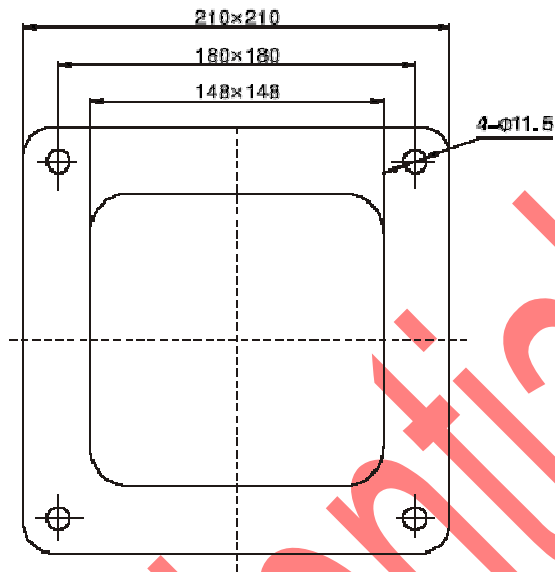
Q: Is SSC suitable for conveying SOP. Acid (which is a kind of corrosive plastics additive)?

A: No. The corrosive plastics additive will rust the spring during conveying process.

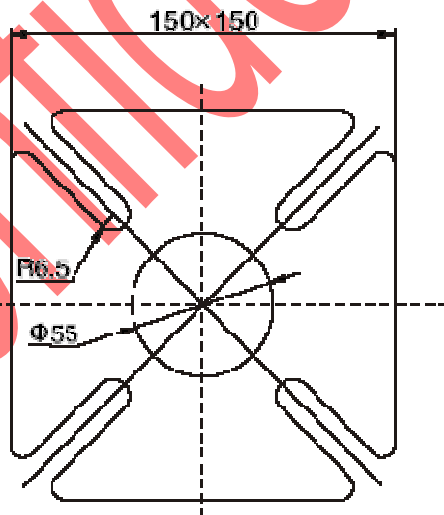


## 19. References

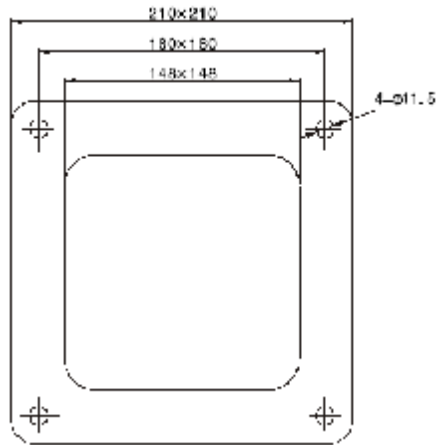
### 19.1 Hopper Flange Specifications



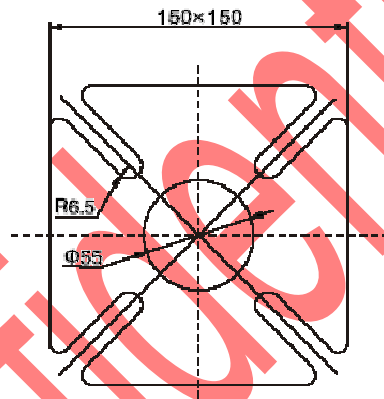
Picture 19-1: Dimension Chart for Base Installation of SAL-330/360/430/460



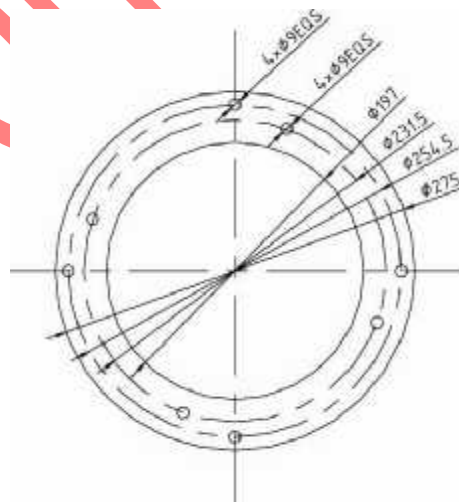
Picture 19-2: Dimension Chart for Base Installation of SAL-330E/360E



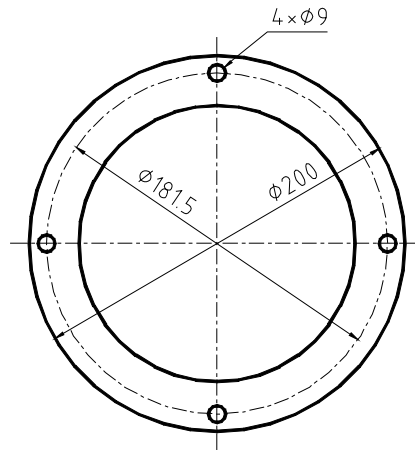
Picture 19-3: Dimension Chart for Base Installation of SMH-6L/12L



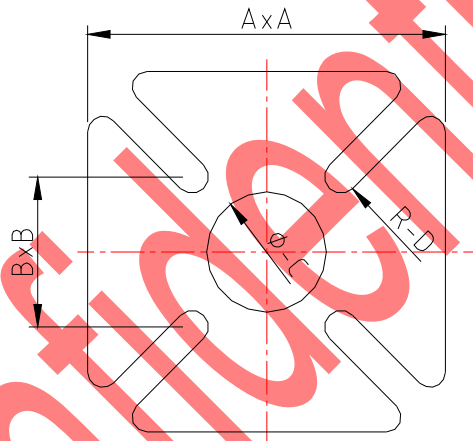
Picture 19-4: Dimension Chart for Base Installation of SAL-6U/12U-E



Picture 19-5: Dimension Chart for Base Installation of SAL-3U and Above

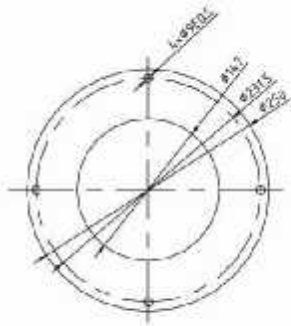


Picture 19-6: Dimension Chart for Base Installation of SAL-1U

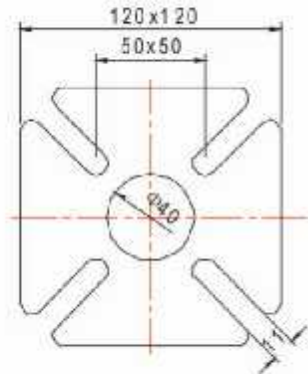


Model Parameters	Model			
	SAL-1.5U-E/EA	SAL-3U-E/EA	SAL-6U-E/EA	SAL-12U-E/EA
A	120	150	150	180
B	50	70	70	80
C	40	55	55	55
D	5.5	6.5	6.5	6.5

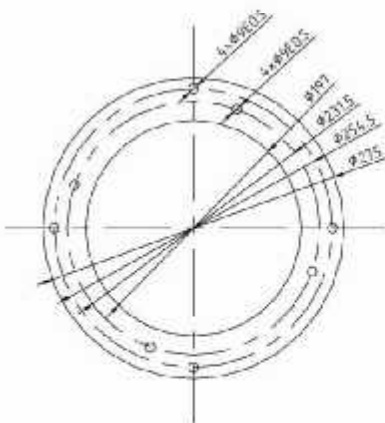
Picture 19-7: Dimension Chart for Base Installation of SAL-U-E (EA)



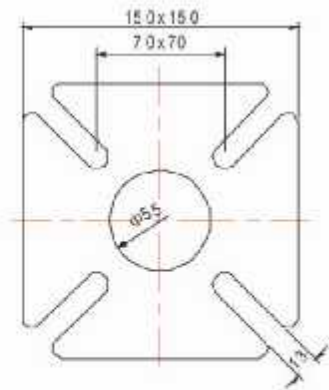
SHR-3U



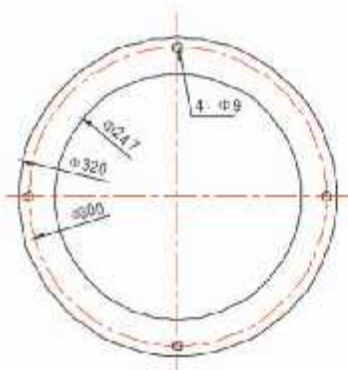
SHR-3U-E



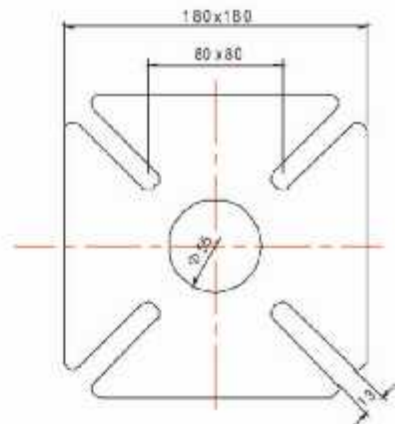
SHR-6U/12U/24U/36U



SHR-6U-E



SHR-48U / 96U



SHR-12U-E

Picture 19-8: Dimension Chart for Base Installation of SHR-U (E)

## Version

No.	Page (P) Chapter (C)	Description	Date Dep./Name
1		New Document	2010-04-01 TM/Henry Chang
2		Revising coding principle	2010-10-19
		Revising pictures	TM/Gavinbai
3		New brand image	2013-04-28
			TM/Gavinbai

Confidential

## Feedback Form

Thank you very much for taking time to read this application guide. We have been committed to assisting sales staffs to select proper products for customers and improve their application proficiency. Editors are eager for your precious opinions and suggestions to perfect the contents and forms of this application guide, which is also a spur for us.

---

1. Your general feeling about this manual:

- Perfect       Common       Not good

2. Your opinion about format and layout of this manual:

- Perfect       Common       Not good

3. Do you think this manual is helpful for model selection and application?

- Of great help       Not much       Not at all

4. Which content is of great help for you?

5. What should be added to this manual?

6. From what aspects does this journal need to be improved?

Your Name: \_\_\_\_\_ Contact Information: \_\_\_\_\_

---

Please fill out this form and send it back to us by:

Fax: +86-769-8111-6611