Smart Modular Dehumidifying Dryer

Date: Oct., 2021

Version: Ver.A (English)

SHINI

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1. General Description

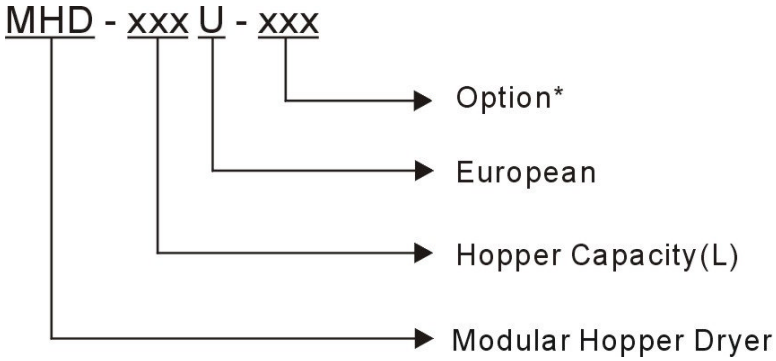
Please read through this operation manual before using the machine to prevent damages of the machine or personal injuries.

Smart modular dehumidifying dryer adopts modular structure, detachable floor stand for instant movement and installation. It can collocate with one dehumifier to several hopper dryers in processing. It mainly used to dehumidify one or several types of high hygroscopic engineering plastics with high efficiency.

Model: Smart Modular Dehumidifying Dryer

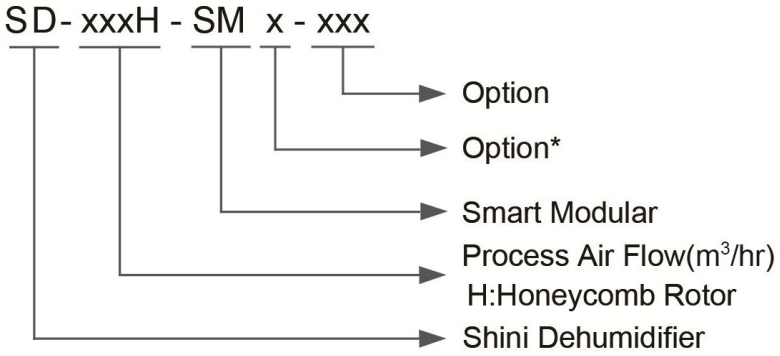
1.1 Coding Principle

SSMD-U is composed by MHD-U and SD-H-SM.



Notes:

P=For polished hopper inside



Notes*

SM4= Max. optional with 4 MHD-U

SM8= Max. optional with 8 MHD-U

SM12= Max. optional with 12 MHD-U

1.2 Feature

- With auto detecting and adjustment of air flow, it can save energy.
- With inverter blower control, it can offer required air flow timely to realize rational use of energy.
- Special air flow processing management can realize high efficient drying operation.
- Adopt PLC and HMI control system for central monitor and operation.
- Modularized assembly way is convenient for installation of modular hopper dryer.
- It's of simple operation management system.

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

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.

Headquarter and Taipei factory：

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1.3 Safety Regulations

Note!

Electrical installation of the machine should be done by qualified electricians.

Before connect through power supply, make sure that power switch specifications and security ratings are suitable and reliable, and also the main switch is turned to OFF. Turn off main switch and auto-start switch before service and maintenance.

1.3.1 Safety Signs and Labels

Danger!

High voltage danger!

This label is stuck on the electrical boxes.

Attention!

This label means that this area should be taken care!

Warning!

High temperature, take care of hands!

This label should be stick to the shell of heater.

Attention!

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

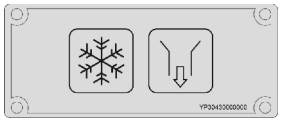
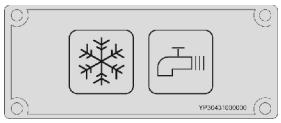
Note!

No need of adjustment of EGO because the default has been set !

Attention!

The hot-air pipeline must be well connected before machine start !

1.3.2 Signs and Labels

	Push switch of shut-off plate: I: Pull O: Push
	Water outlet: drainage outlet.
	Water inlet: inlet for replenishing water and cooling water.

1.3.3 Transportation and Storage of the Machine

Transportation

1) SSMD-U series smart modular dryers are separately packed in SD-H-SM and MHD-U by crates or plywood cases with wooden pallet at the bottom, suitable for quick positioning by fork lift.
2) After unpacked, castors equipped on the machine can be used for ease of movement.
3) Do not rotate the machine and avoid collision with other objects during transportation to prevent improper functioning.
4) 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.
5) 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) SSMD-U series smart modular dryer 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

Indoors in a dry environment with max. temperature +45℃ and humidity no more than 80%.

Don’t 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.

1.3.4 Safety Regulations for the Blowers

1) Under normal operation, the blowers will generate high temperature. Do not touch blower's case to avoid any physical injury.
2) Under normal operation, the blower motor's current loading will increase or reduce according to air pressure's change accordingly. While installation, an adequate motor overload protection switch should be installed with full loading test, to ensure operating safely under full-loading to avoid motor's damage.
3) To avoid any block materials, dust, powder, fiber particles and water drops entering the blower, and hence cause the deficiency of its performance.

This machine is well designed with air filters, so please clean up the filter with any foreign particles (recommended to clean up this filter weekly).

4) Clean the blowers both internal and external parts (especially for the fan cooling path), and remove surface dust if necessary. If more dusts are accumulated, it will cause deficiency for ventilation, temperature rising, vacuum power reduced, vibration increased and so it will cause machine broke down.
5) Ball bearing, oil seal and soundproof are belonging to consumable parts and so it has a life period and requires regular replacement. Meanwhile, blade, external case, and metallic screen etc. should be replaced regularly for best performance.
6) Under normal operation, if the blowers are not running smoothly or abnormal noise appeared. Please immediately shut down the machine for repair.

Picture 1-2: Blower

1.4 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.

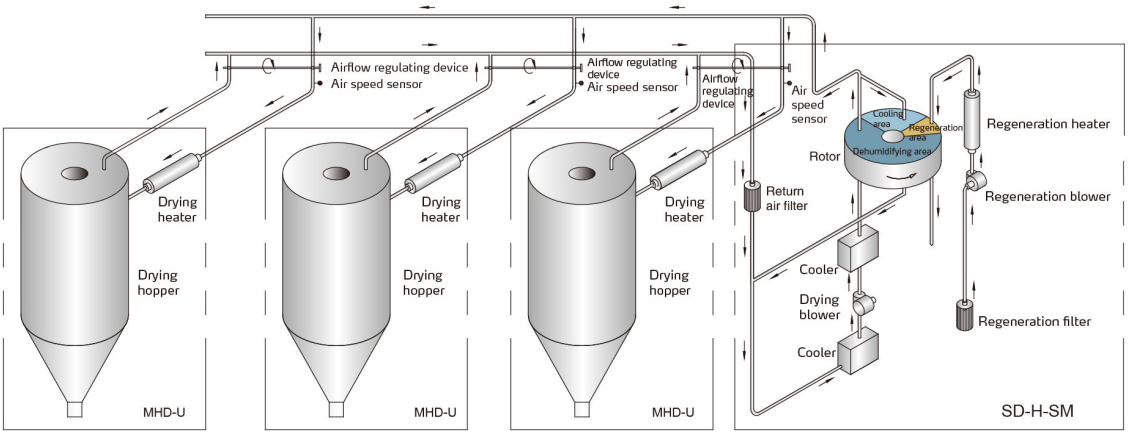
2. Structure Characteristics and Working Principle

2.1 Relative Humidity and Dew-point

Relative humidity: Relative air humidity means real vapor content to saturated vapor at the same temperature in percentage.

Dew point: it means that temperature when the saturation vapor begins to dew. When the relative humidity is 100%, the ambient temperature is the dew point temperature. The more lower of dew point temperature (than the ambient temperature) is, the more less possible to dew, that also means the more drier the air is. The dew point will not be influenced by temperature, but influenced by pressure.

2.2 Working Principle



Picture 2-1: Working Principle Illustration

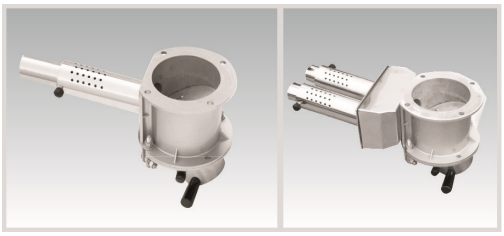
After dry-hot air from drying hopper gets through return-air filter, it enters the cooler for cooling then blew into the honeycomb rotor. The moisture in ambient air was absorbed by rotor, then absorbed by regenerative heating air. The two streams of air worked on the rotor at the same time and rotate with the rotor, which makes the moisture in ambient air constantly absorbed and exhausted by regenerative air, therefore, it forms the low dew-point air. Air-speed sensor at inlet of each drying hopper can detect the actual drying air flow in the pipe, and the hopper required drying air can be auto adjusted by air-flow auto regulator. By

heating to plastic drying temperature, the air was blown into the drying hopper which forms the hermetic circulation to dry the materials.

2.3 Accessory Option

2.3.1 Material Suction Box

European style in appearance design, work with dryer that has a floor stand and vacuum loader, suitable for material sunction and discharging.



Picture 2-2: Material Suction Box

Table 2-1: Specifications of Material Suction Box

Applied to / Model	MHD-20U~120U	MHD-160U and above
SBU	-20-38S	-160-38S
SBU	-20-50S	-160-50S
SBU	-20-38D	-160-38D
SBU	-20-50D	-160-50D

Notes：1) Install pneumatic shut off valve (add ”V” at the end of model code).
2) Change into stainless steel material (add “S” at the end of model code).
3) Stainless steel polishing (add “P” at the end of the model code).
4) “S” stands for single tube suction box and “D” stands for double tubes suction box.

2.3.2 Dew-point Monitor

Portable

Display	**Digital and Real-time Curve Display supports English\Chinese\Japanese\Korean version.**	
Range	-50.....+50℃ td	
	Pressure	-0.1.....1.5MPa td
	Temperature	-30.....+50℃
Accuracy	Dew point	±2℃ td@-50℃ td
	Pressure	±0.005MPa
	Temperature	±0.3℃
	Condition	temp.:23℃±3℃ Humidity:<90% no condensation
Other Units	g/m3,mg/m3,ppmv,g/kg	
Data Record	Memory space	4G, data can be exported by memory card
	Number of files	≤512 files
	Medium	SD card

Picture 2-3: Portable Dew-point Monitor

3. Installation and Debugging

 Read this chapter carefully before installation. Install the machine by following steps.

Power supply of the machine should be handled by qualified electricians!

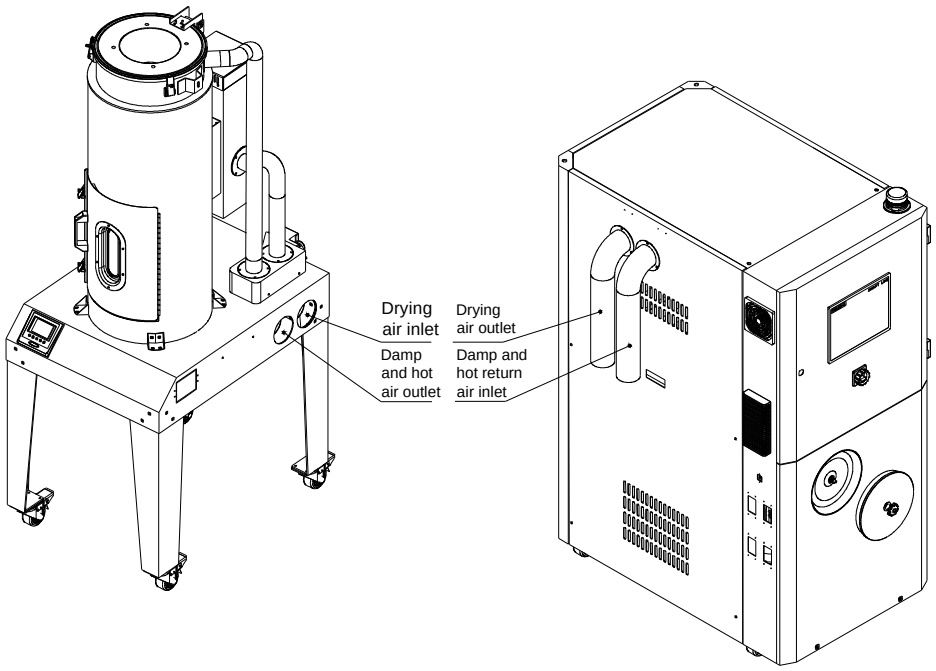
 Notes!

Keep the machine 2m from the combustible distance.

3.1 Machine Installation

A. Smart modular dehumidifying dryer consists of two parts, including MHD-U modular hopper dryer and SD-H-SM smart modular dehumidifier. During the shipping, it divided into two parts for package. After unpack the machine, the two parts should be connected together than can be in use, which including pipeline and wiring connection.

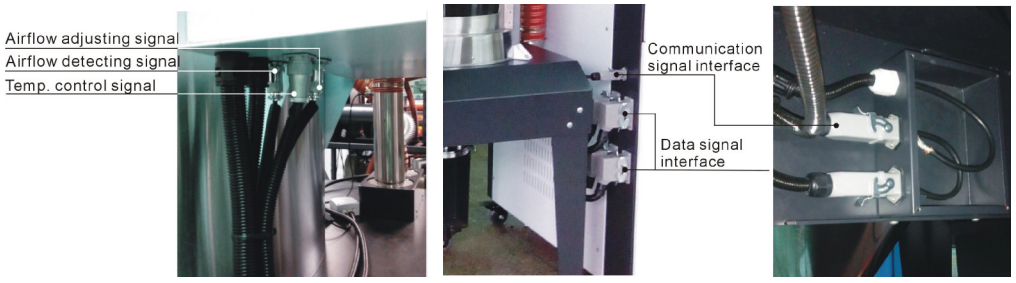
B. Pipeline connection: It has two pipelines, one is drying-air pipeline and another is hot-air pipeline. At first, connect drying-air outlet of SD-H-SM and drying-air inlet of MHD-U (as installation diagram). And then connect hot-air return inlet of SD-H-S and hot-air outlet of MHD-U (as installation diagram). Standard pipeline is heat-resistant air pipe with stainless steel clamp, which prohibits air leakage.



Picture 3-1: Installation Diagram

C. Cable connection: when packaging MHD-230U and above models, it should separate the hopper and floor stand. During connection, airflow detecting signal, airflow adjusting signal and temperature control signal require metal connectors. See below wiring diagram (1) MHD-U and SD-H-SM are jointed by 2 groups of cables, and among which one group is hopper's data cable jointed by 10PIN heavy-duty connector separately, and the other group is communication cable connected by 4PIN heavy-duty connector. Make sure that the connectors are connected as below wiring diagram (2).

Each hopper has communication box in connection with 4PIN heavy-duty connectors between adjacent hoppers. See below wiring diagram (3).



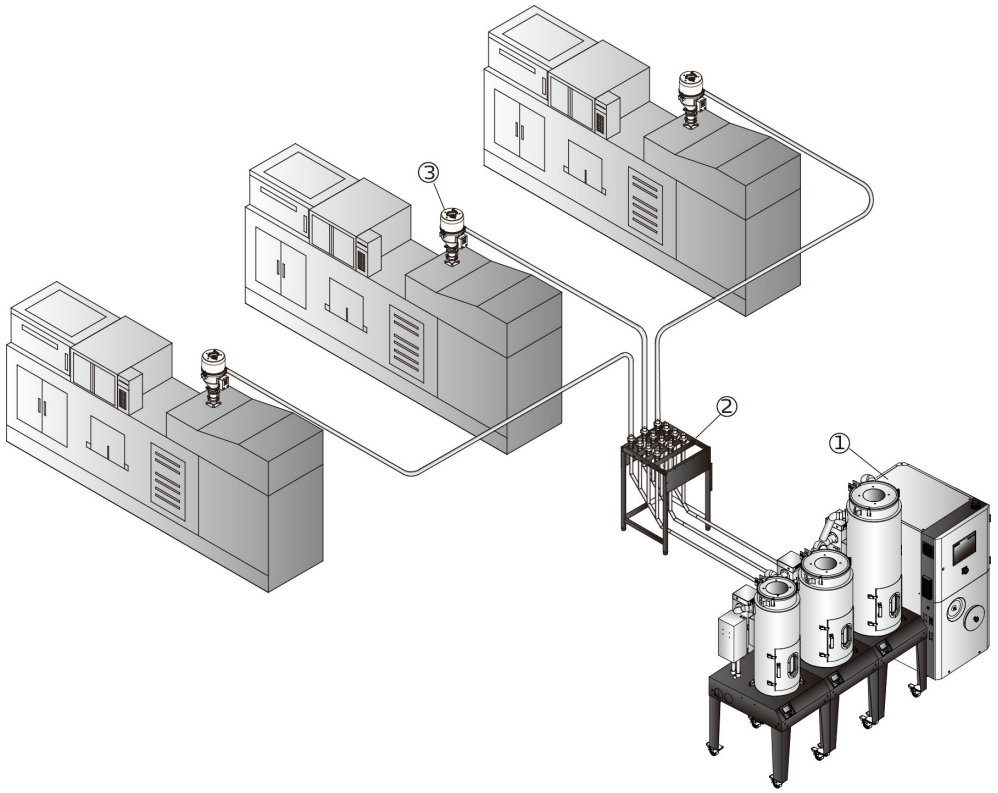
(1) (2) (3)

Picture 3-2: Wiring Diagram

3.2 Power Connectors

1) Make sure voltage and frequency of the power source comply with those indicated on the manufacturer nameplate, which is attached to the machine.
2) Power cable and earth connections should conform to your local regulations.
3) Use independent electrical wires and power switch. Diameter of the wire should not smaller than those used in the control box.
4) The electrical wire connection terminals should be tightened securely.
5) The machine requires a 3-phase 4-wire power source, connect the power lead (L1, L2, L3) to the live wires, and the earth (PE) to the ground.
6) Power supply requirements:
   Main power voltage: ±5%
   Main power frequency: ±2%
7) Specific power supply specifications please refer to the schematic model.

3.3 Application



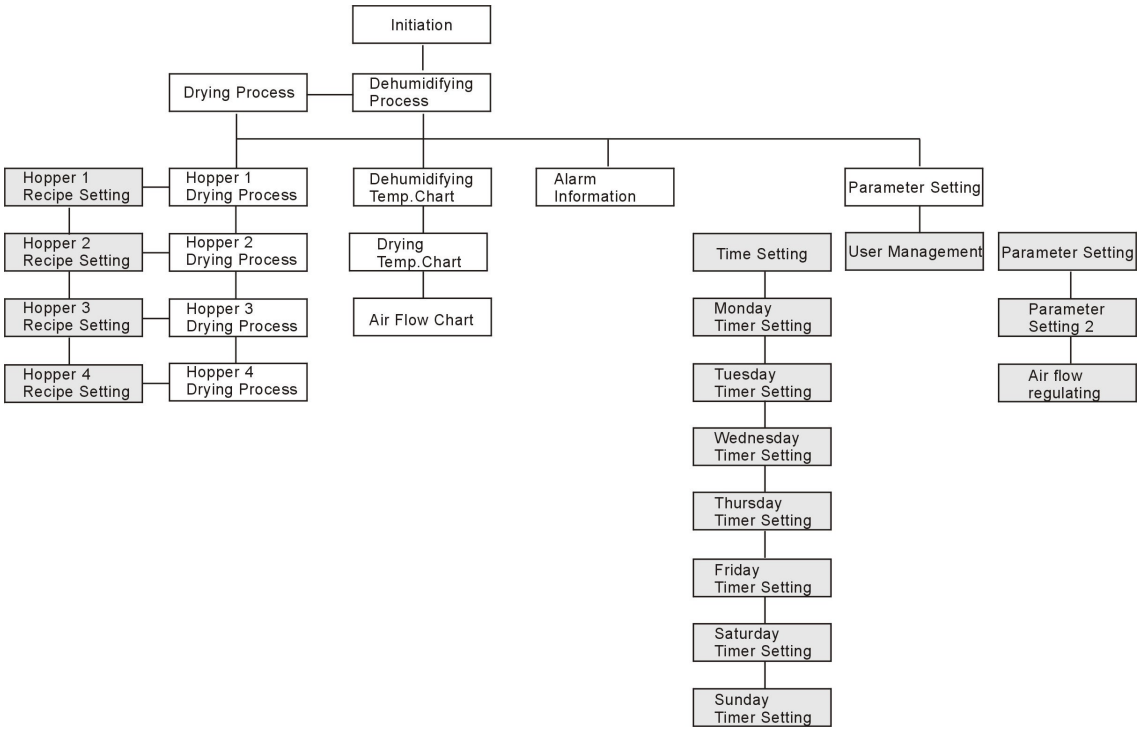
1. Smart modular dehumidifying and drying
2. Central material distribution station
3. “Standard” self-contained hopper loader

Picture 3-3：Smart Modular Dehumidifier Installation Diagram

4. Operation

4.1 Steps

The panel mainly includes four menus, which are dehumidifying process, drying process, alarming information and parameter setting. The panel steps are as following:



Notes: the gray indicated steps require correct username and password;

Common load: username: shini password: 3588

Picture 4-1: System Operation Diagram

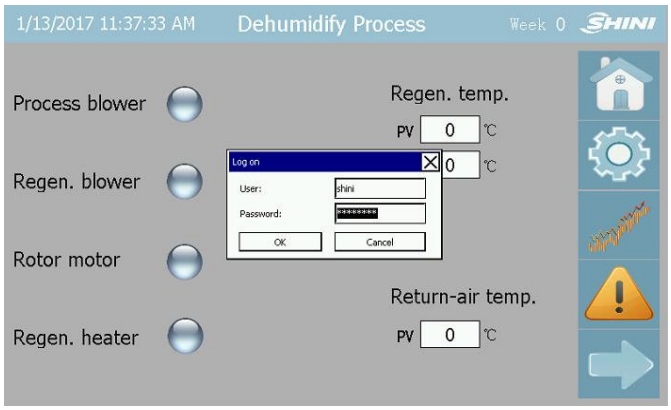
4.2 Panel Description

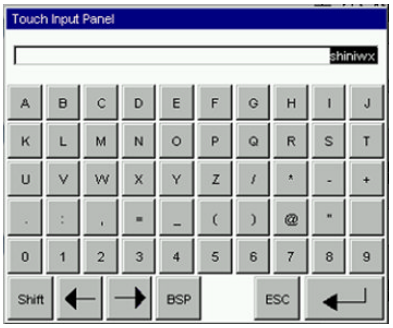
4.2.1 Initial Menu

Please refer to the following initial menu. Press “English” or “Chinese” to select a language. Then enter drying process menu.

4.2.2 Password

When entering the “parameter setting” or “recipe setting” screen, it should input the correct “username” and “password”.



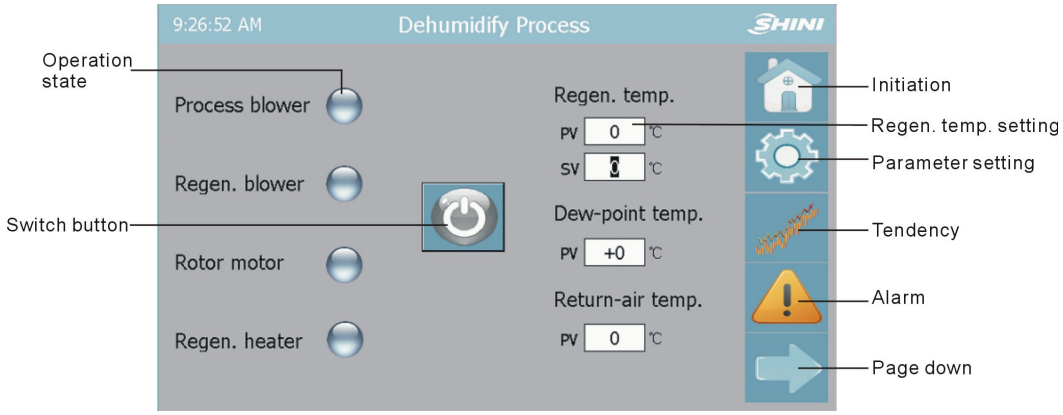


Input Password

Default username and password； shini 3588 (common use)

4.2.3 Dehumidifying process menu

Dehumidifying process menu as shown below:



When it doesn't start dewpoint monitor in parameter setting, this area is concealed.

A. System power on/off

System power on：

Touch panel switch to ON state, the system starts operation.

System power off：

Touch panel switch again to OFF state, the system stops. (Notice: To improve the life service of honeycomb, it requires 3 minutes suspension for machine's cooling down after the system stoped.)

B. Regeneration temperature setting

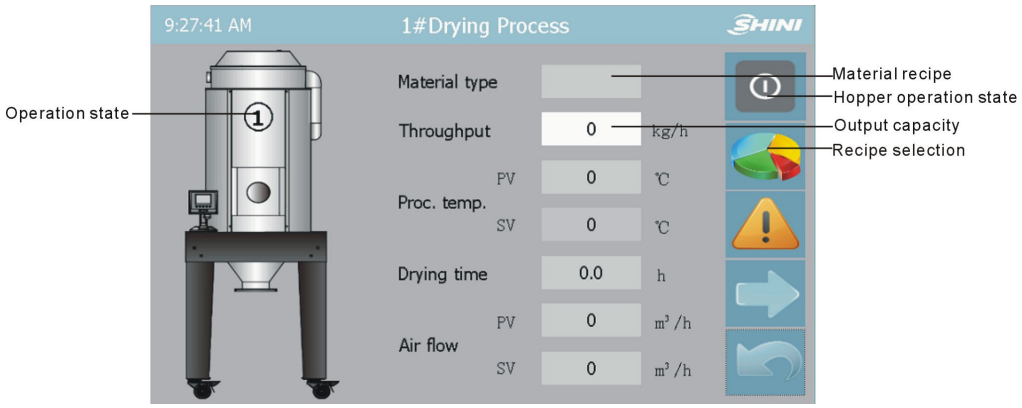
Touch the regeneration temperature SV, and input temperature in the shown keyboard with confirmation, than the temperature value is valid.

Notes!

Regeneration temperature is directly influence the dehumidifying of honeycomb rotor. Regenerating temperature range is 130℃~180℃, and default value is 180℃. No need of reset except for special situation.

4.2.4 Drying process menu

1. Touch the hopper on panel, entering the setting of material type and output:



A. According to “material”, use the corresponding parameters in “material recipe” automatically. Such as: drying temp., drying time, material “max. output capacity” and “ airflow”.

B. According to actual hopper capacity and parameters in “material recipe” to set the max. output capacity:

Max. output capacity (kg/h)=hopper capacity (L) *bulk density (kg/L) / drying time(h)

(Notes: To prevent material blockage due to small airflow, the min. value is also set in the program. That is when input value is larger than the max. output, it takes the max. output value for replacement; When the input value is smaller than the min. output, it takes the min. output value for replacement.)

C. Customer according to material actual dosage in production for “output” input. Machine according to airflow in “material recipe”, figures out and takes the required airflow automatically. (Notes: under the same output condition, by changing of “airflow” changes the output airflow.)

Formula: drying airflow (m^3/h) = output capacity (kg/h) * airflow (m^3/kg)

E.g. hopper capacity : 600L material : PC

According to recipe parameters of PC material

Drying temperature=120(˚C)

Drying time =3(h)

Bulk density=0.7(kg/L)

Airflow =1.8(m^3/kg)

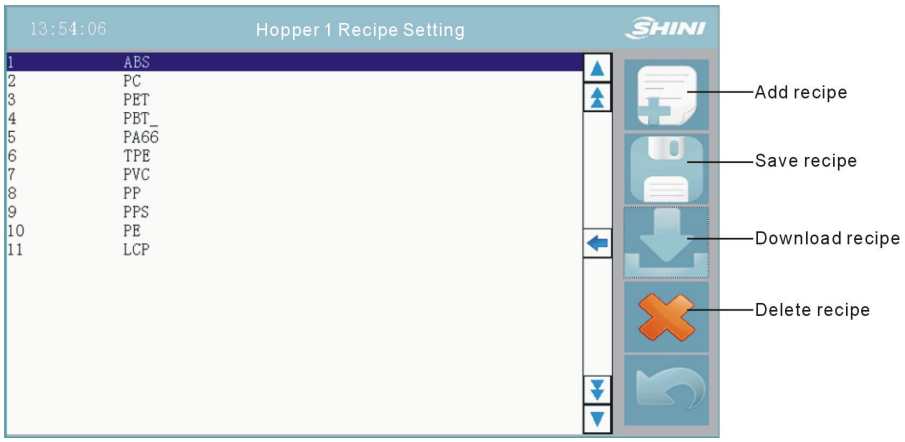
Max. output capacity =600*0.7 / 3=140(kg/h)

Take output amout 140, the caculated air quantity =140*1.8=252(m^3/h)

D. Hopper Switch

Click “hopper switch”, the hopper starts drying, the “operation state” turns green; Then click “hopper switch” again, the hopper stops drying, the “operation state” turns gray.

Touch recipe selection on each hopper’s drying monitoring screen on the right to start recipe operations for current hopper.

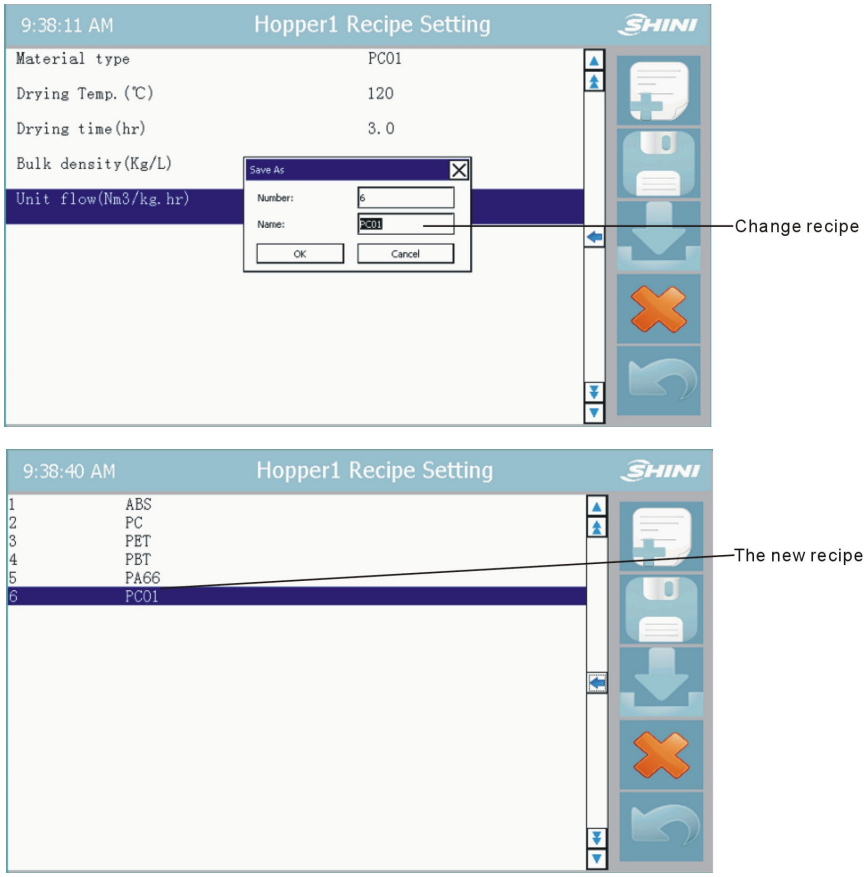


A. Add recipe

Add a new recipe, please according to material supplier provided parameters for setting.

B. Save recipe

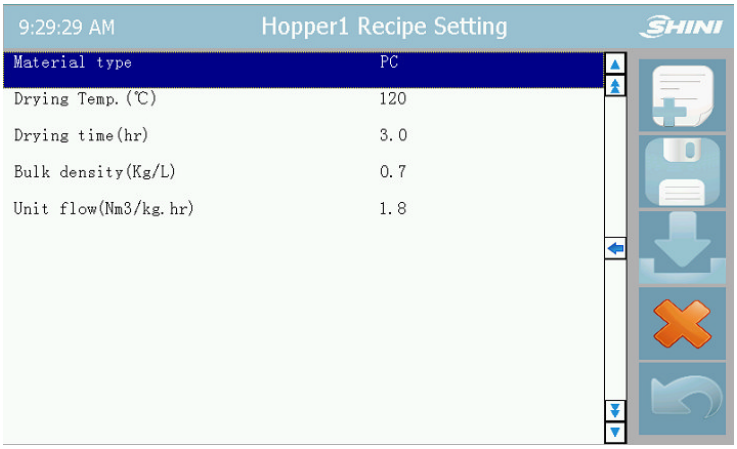
After the edit of recipe parameter or add the new recipe, click save recipe button. Confrim the name, system will save the edited recipe values forever.



C. Download recipe

Select one recipe and click download-recipe button, then it can download the selected recipe into PLC.

D. Double click the material, it enters material parameter setting:



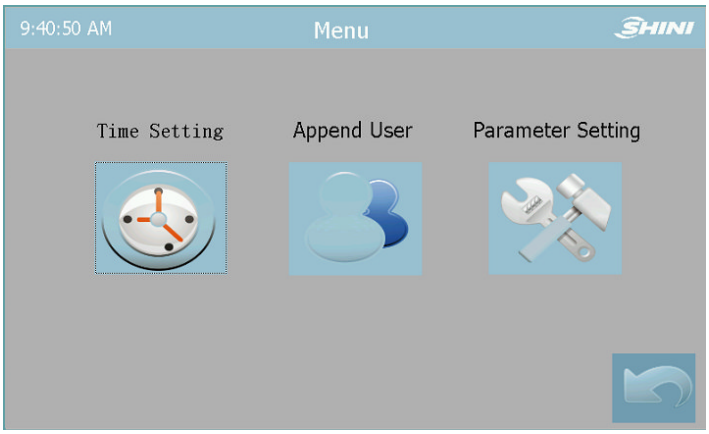
Notes: Material recipe parameter will directly influence the drying effect, please take material supplier provided parameter as standard.
Attached: Material Performance Table.

Table 4-1: Material Performance

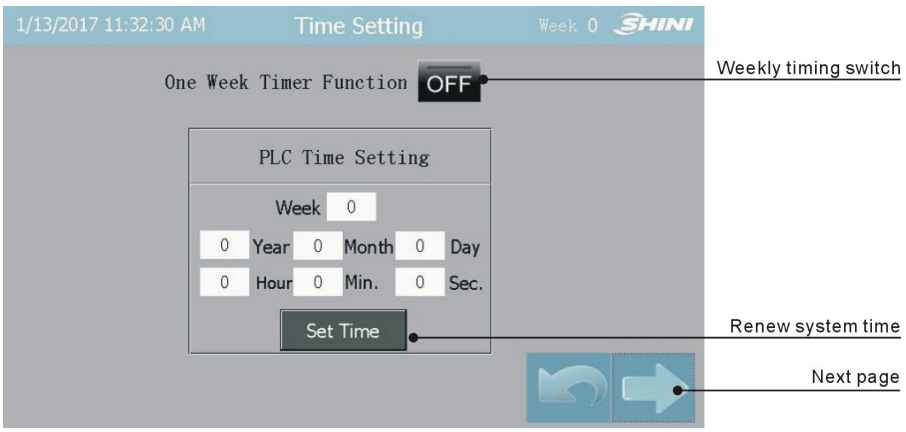
Material	Drying Temp. (℃)	Bulk Density (kg/L)	Drying Time (hr)	Moisture Content before Drying (%)	Moisture Content after Drying (%)	Airflow (Nm3/kg.hr)
ABS	80	0.6	2~3	0.3	0.02	1.8~2.4
CA	75	0.5	2~3	1.0	0.02	2.5~3.5
CAB	75	0.5	2~3	0.8	0.02	3.0~3.5
CP	75	0.6	2~3	1.0	0.02	2.9~3.5
LCP	150	0.6	4	0.04	0.02	1.8
PA	70~80	0.65	3~6	1.0	0.05	2.4~3.0
PBT	120~140	0.7	4	0.2	0.02	1.8~2.4
PC	120	0.7	2~3	0.3	0.01	1.8
PE	90	0.6	1	0.01	‹0.01	1.8~2.4
PEEK	150	0.6	3~4	0.4	0.02	1.8
PEI	150	0.6	3~4	0.25	0.02	1.8
PEN	170	0.85	5	0.1	0.05	2.4~3.5
PES	150~180	0.7	4	0.8	0.02	1.56~2.4
PET	160~180	0.85	4~6	0.2	0.02	2.4~3.5
PETG	60~70	0.6	4~6	0.5	0.02	2.4
PI	120~140	0.6	3	0.4	0.02	1.5~1.8
PMMA	70~100	0.65	3	0.5	0.02	2.0~2.4
POM	95~110	0.6	3	0.2	0.02	1.7~2.4

PP	90	0.5	1	0.1	0.02	1.8~2.4
PPO	110~125	0.5	2	0.1	0.04	1.8~2.1
PPS	140~150	0.6	3~4	0.1	0.02	1.8
PS	80	0.5	1	0.1	0.02	1.5~1.8
PSU	120~170	0.65	4	0.3	0.02	1.8~2.0
PUR	80~90	0.7	3	0.2	0.02	2.5~2.8
PVC	70	0.5	1	0.1	0.02	1.7~2.1
SAN	80	0.5	2~3	0.1	0.05	1.7~2.1
SB	80	0.6	2	0.2	0.05	1.7~2.1
TPE	105	0.7	3	0.1	0.02	2.9

4.2.5 Parameter Menu



1. Time Setting

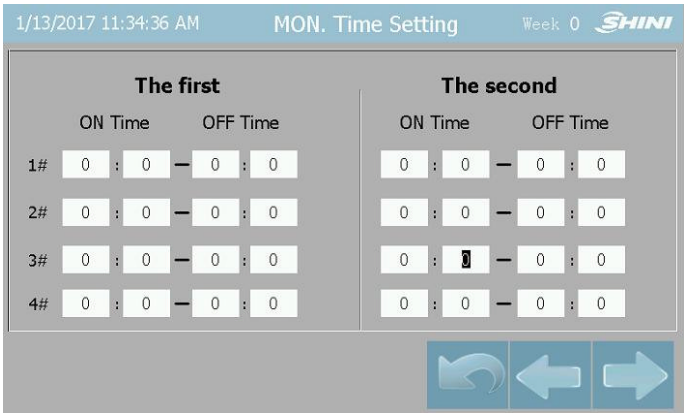


A. weekly timing

Start: set “set-up time” and “shut-down time” separately, then click “weekly timing switch” to “ON” state, it starts timing function. “dehumidifying process menu” as below picture:

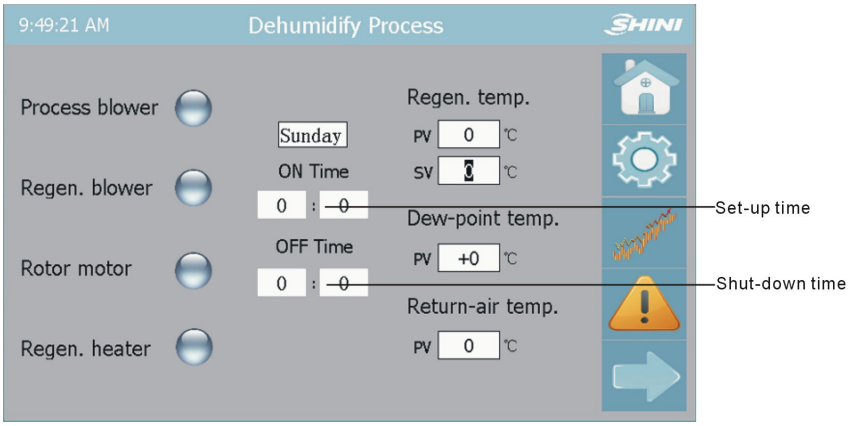
Under main power ON state, the machine will auto set up and shut down within the set time.

Stop: click “weekly timing switch” to “OFF” state, it stops auto set-up and shut-down function.



(Start: weekly timing)

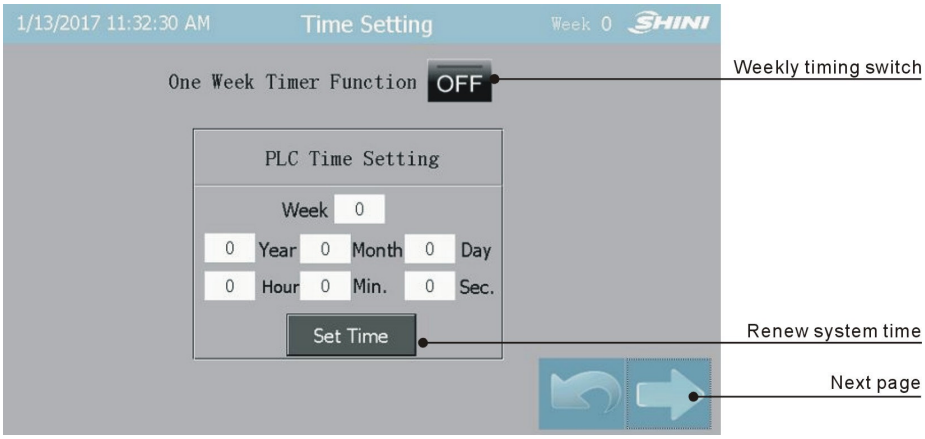
E.g. As above settings, hopper 1 will automatically start from 8:00 till 12:00 and re-start from 14:00 till 20:00 on Monday. Other week day settings are the same.



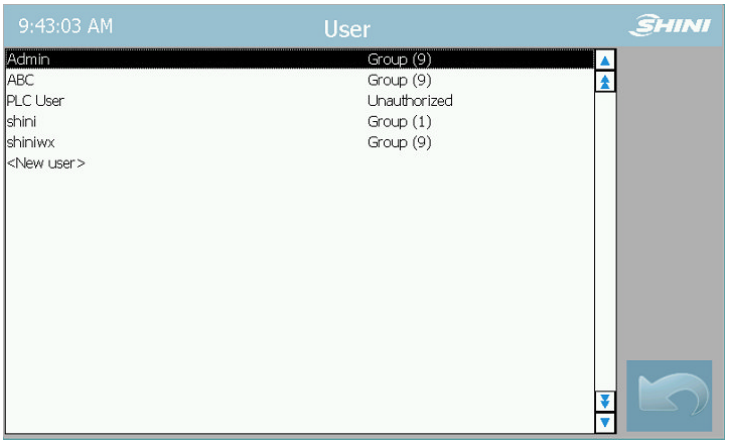
(After start the weekly timing, monitor of dehumidifying varies)

B. Setting system time

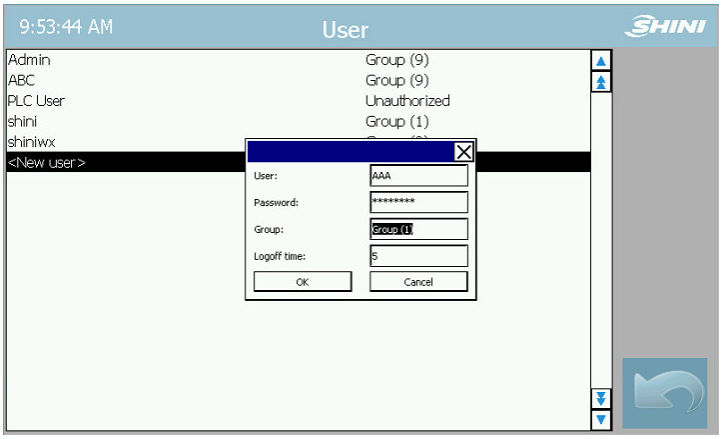
If system time and current time are not the same, input the right time and click “load time” button to adjust system time.



2. User management



A. Click <new user > to create new user



Note: 1) different groups represent different privileges. Group (9) is administrator privilege; Group (1) is common privilege.

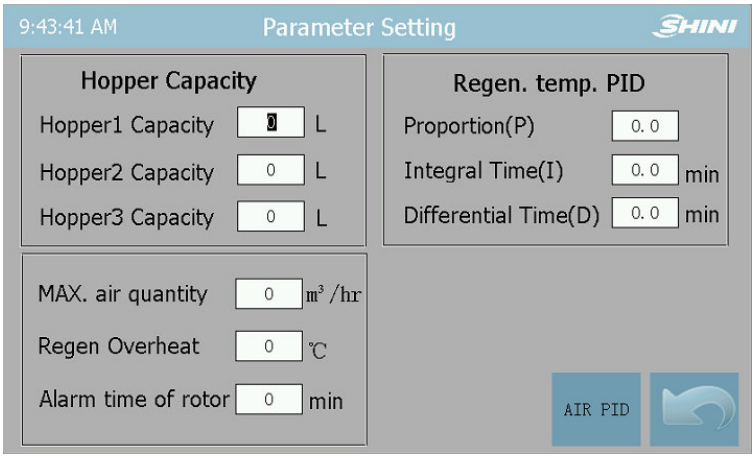
2) Log-off time (minute): when the no-operation screen exceeds the set time, log off the loading.

B. Click the user, it can change the username and password.

Notes：system has set three default users: Admin/Shiniwx/shini

3. Parameter Setting

A. Paramete Setting 1



Hopper 1/2/3 capacity: according to actual hopper capacity; (Default value has been set in factory)

As above picture, when it only starts hopper 1/2, and the ON/OFF at the back of hopper 3 and 4 should be turned off.

When it starts hopper 1/2/3, turn on ON/OFF at the back of hopper 3.

When it starts hopper 1/2/3/4, turn on ON/OFF at the back of hopper 3/4.

Above hopper activation won't be effective unless it pressing ON/OFF of the machine. Otherwise, the communication won't be connected through.

Activate or idle the dew-point monitor according to machine configuration.

Max. dehumidifying airflow: according to max. airflow of drying blower; (Already been set before delivery)

Regeneration over-temp. alarm: when regeneration temperature is larger than (set value+ regeneration over-temp value), it alarms.

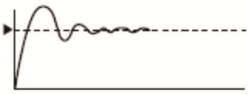
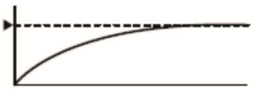
Rotor alarm time: monitoring time of rotor rotates a cycle. When there's no cycle rotary exceeds the time, it alarms.

P.I.D control: when temperature control is incorrect, it can adjust the P.I.D temperature-control parameter manually to reach the max. control effect.

Notes: Regeneration temp. PID value determines the effect of regenerative temperature control, please be careful to set the value.

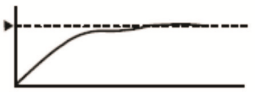
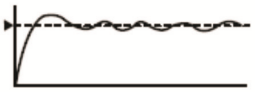
When adjusting the proportion (P):

Table 4-2: Adjustment of Proportion (P)

P increases		After the oscillation, the curve will be settled and back to setup point.
P decrease		The curve increases gradually in order to maintain a long reliable period against over oscillation.

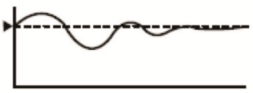
When adjusting integral time (I)

Table 4-3: Adjustment of Integral Time (I)

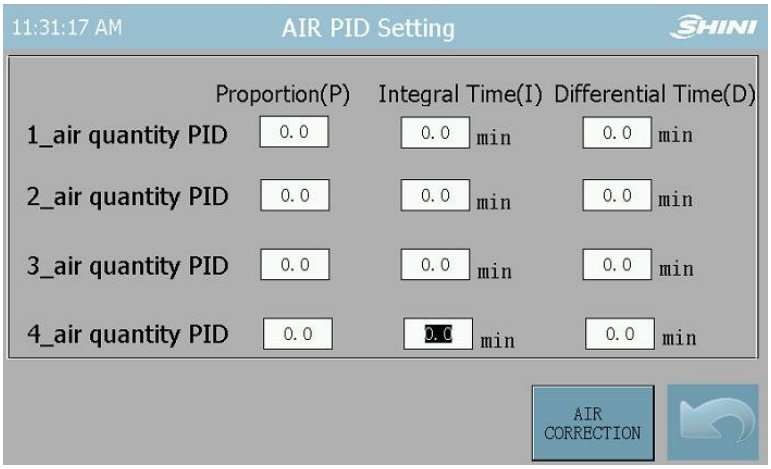
I increases		For default value requires a longer time for steady status. But, it still has over pulse/under pulse and oscillation occurs.
I decrease		After the occurrence of over pulse/under pulse and oscillation, but the curve tends to rise rapidly.

When adjusting differential time (D)

Table 4-4: Adjustment of Different Time (I)

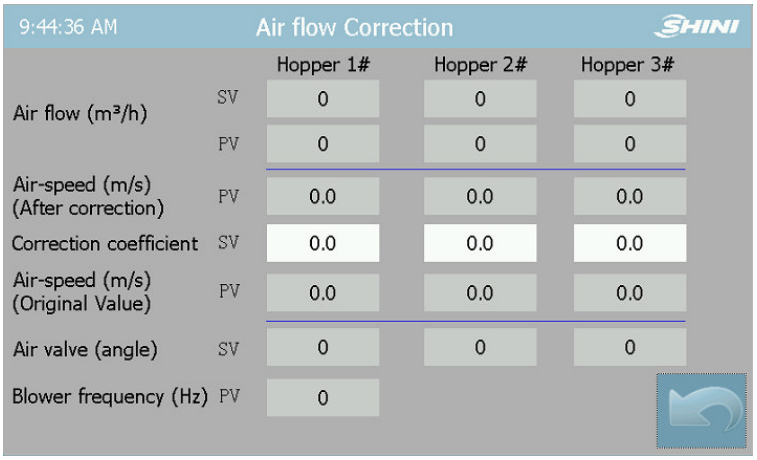
D increases		Over pulse/under pulse and steady time become less, but the curve has small oscillation.
D decrease		Over pulse/under pulse increases, the duration for setup value requires certain time.

B. Parameter setting 2



Notes: Airflow PID value determines the effect of airflow adjustment, please be careful to set the value!

4. Airflow Adjustment



Notes:

It is set before machine delivery, unprofessional adjustment is forbidden!

Air quantity calibration method:

1) After entering the air quantity caliberation interface, it can use the third-party testing instrument to test whether the air speed is correct.
2) Calculation of air speed caliberation value.

Assume that the “original value of air speed（m/s）" is "4", the value detected by the third-party testing instrument is "4", and input "1" for the "correction coefficient".

Assume that the “original value of air speed（m/s）" is "4", the value detected by the third-party testing instrument is "2", and input "0.5" for the "correction coefficient".

Assume that the “original value of air speed（m/s）" is "4", the value detected by the third-party testing instrument is "3.5", and input "0.9" for the "correction coefficient".

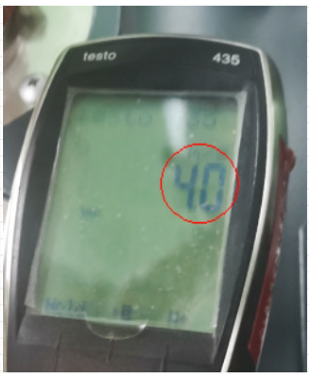
Calculation formula: X / Y = Z (Z reserves one decimal fraction, for example: 3.5 / 4 = 0.875, and take it as 0.9);

(Note: X: the value detected by the third-party testing instrument Y: air speed (m/s) original value Z: correction coefficient);

3) Air speed calibration of each hopper, and so on;

1. Insert the anemometer into the hot air resistant pipe at the MHD air inlet (try to place it parallel to the machine’s original anemometer);

2. Probe Position Placement Diagram
There’s a scale on the probe to ensure the detection position in front of the probe is in the middle of the pipe’s cross section after the extends into the pipe;



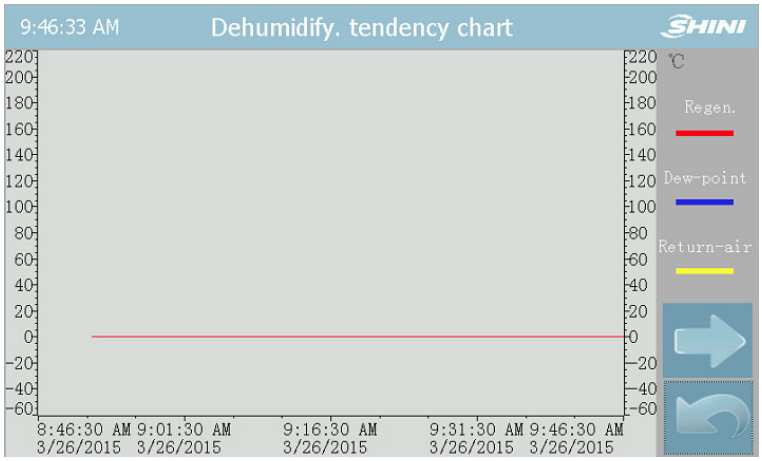
3. The air quantity’s value detected by the third-party

Picture 4-2： Air Quantity Caliberation Diagram

4.2.6 Tendency Chart

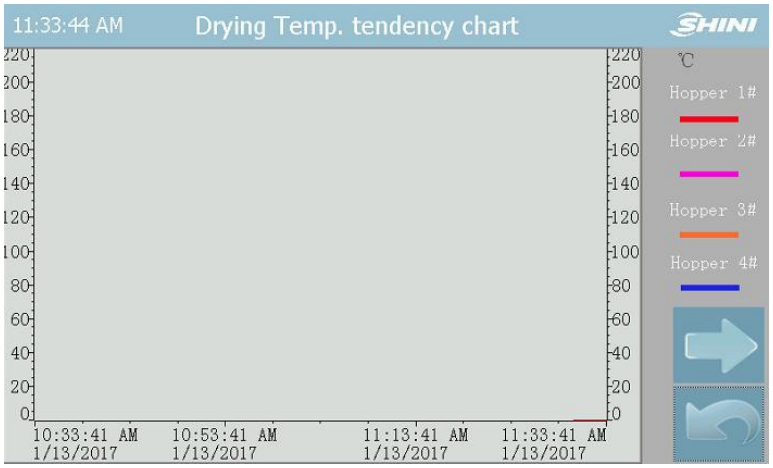
1. Dehumidifying temperature tendency

Record the “regeneration temp.” “dew-point temp.” “return temp.” variation in the last 1 hour.



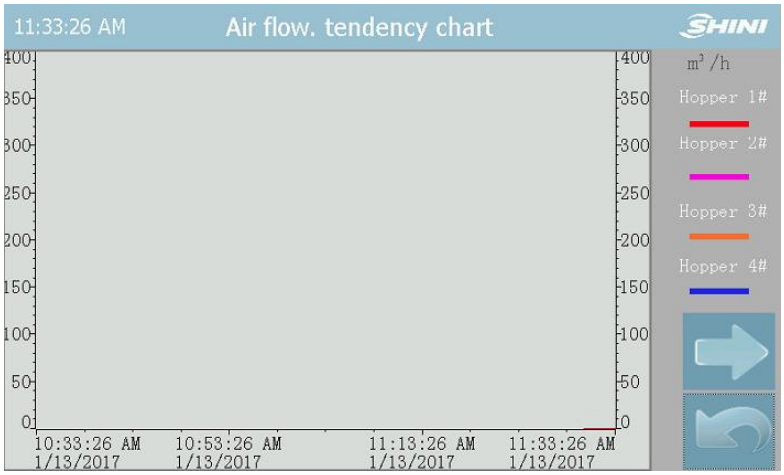
2. Drying temperature tendency chart

Record the “hopper 1 temp.” “hopper 2 temp.” “hopper 3 temp.” variation in the last 1 hour.

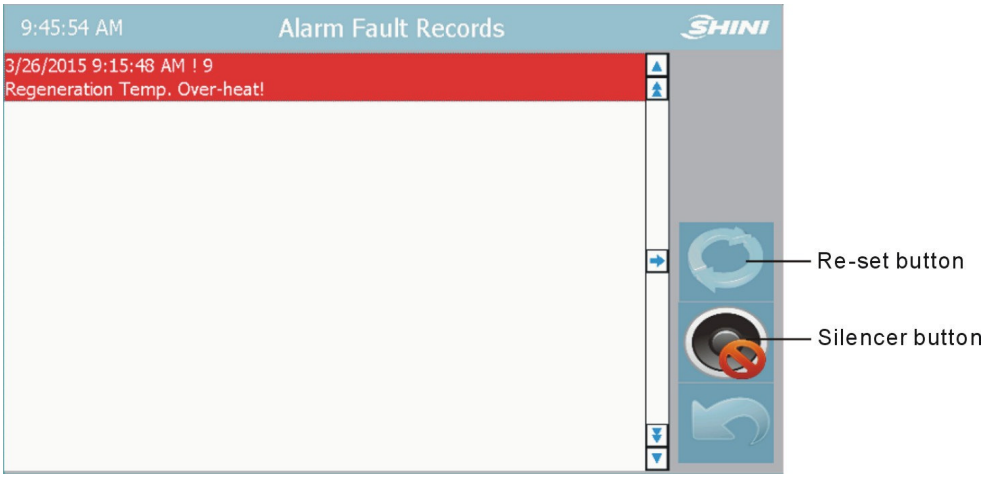


3. Airflow Tendency Chart

Record the “hopper 1 airflow” “hopper 2 airflow” “hopper 3 airflow” variation in the last 1 hour.



4.2.7 Alarm



4.2.8 ABB Inverter Parameter Setup Steps

Table 4-5：Select a parameter and change its value

Step	Action	Display
1	If it is in the output mode, press the key to enter the main menu. Otherwise, press the key till the displayer bottom shows the MENU.	LOC rEF MENU FWD

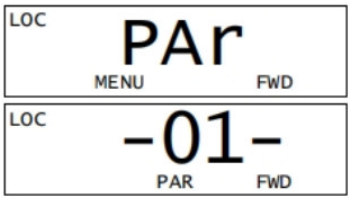
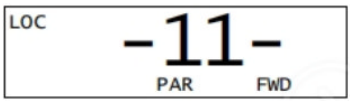
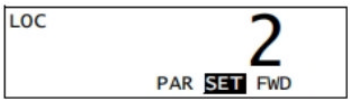
2	If the control panel is not in parameter mode (If no “PAr” displayed on the panel, press the ▲ or ▼ key till the panel displays the “PAr”. Then, press the ◥ key. The panel will show the the number of a parameter group.	
3	Press the ▲ or ▼ key to find out the target parameter group.	
4	Press the ◥ key. The panel will display a parameter in the selected parameter group.	
5	Press the ▲ or ▼ key to find out the target parameter group.	
6	Hold on the ◥ key for two secs. till the bottom panel of parameter value displays the SET. It means this parameter value can be changed. Note: When it displays the SET, press the ▲ or ▼ key to modify the value displayed on the panel to the parameter’s default value.	
7	Press the ▲ or ▼ key to select the parameter’s value. After it modifies the parameter’s value, the SET starts to flicker. ● To save the parameter value displayed, press the ◥ key. ● To cancel the new value and maintain the initial value, press the ◥ key.	 

Table 4-6：SD-200H-SM4 Factory Parameter Setting

No.	Parameter Code	Factory Settings	Parameter Meanings	Remarks
1	1001	1	Control the start and stop by entering the value of digital input DI1	DI1
2	1003	1	Fixed motor rotating is forward direction	Fixed forward direction
3	1103	1	External given signal source is analog input AI1	AI1
4	1104	30Hz	External given minimum value (Hz)	0Hz
5	1105	50Hz	External given maximum value (Hz)	50Hz
6	1401	3	Relay releases when the inverter fails(fault reversed）	FAULT(-1)
7	2003	3.8A	Max. output current	（motor nameplate）
8	2007	30Hz	Inverter min. output frequency (amplitude limit)	
9	2008	50Hz	Inverter max. output frequency (amplitude limit)	50/60Hz
10	2202	10	Acceleration time (secs.)	
11	2203	10	Deceleration time (secs.)	
12	9905	400V	Motor rated voltage	（motor nameplate）
13	9906	3.8A	Motor rated current	（motor nameplate）
14	9907	50Hz	Motor rated frequency	（motor nameplate）
15	9908	2880 rpm	Rated motor speed	（motor nameplate）
16	9909	1.5 kW	Rated motor power	（motor nameplate）

Note: These parameters are applicable to the parameter setting of ABB ACS 355 inverter. It's prohibited to use these parameters in other versions or models!

Table 4-7: System Slarm Information

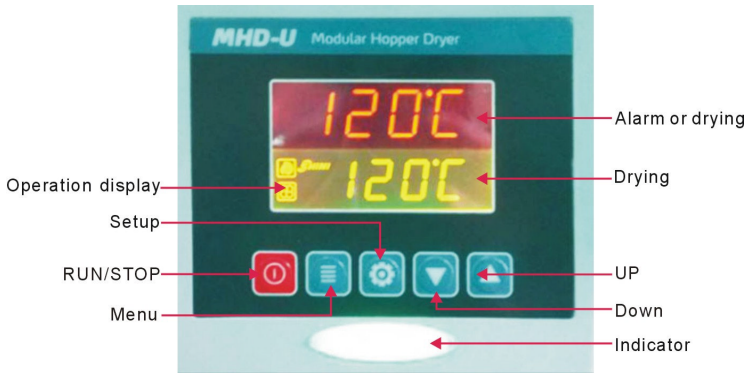
Faults	Results	Possible Reasons	Trouble-shooting
Wrong phase	System can't start, buzzer sounds, alarm flickers	Low voltage, phase shortage, wrong phase	Randomly exchange one of two power cables.
Rotor failure	System stops, buzzer sounds, alarm flickers	Motor stucked or damaged.	Check and replace the motor.
		Belt broken	Check and replace.
		Rotor wrong parameter setting	Check parameter setting of rotor.
Regention Over-temp.	System stops, buzzer sounds, alarm flickers	Woring temp.-control parameter setting	Check re-set parameters.
		Contactor conglutinated.	Check and replace.
		Regenerative thermocoupler failure	Check and replace.
Regeneration EGO over-temp.	System stops, buzzer sounds, alarm flickers	Contactor conglutinated.	Check and replace.
		EGO(over-temp. protector） Wrong setup or failure	Check regulator button or replace.
Regenerative thermocoupler circuit break	System stops, buzzer sounds, alarm flickers	Thermocoupler disconnected or poor connected. Thermocoupler reverse electrode.	Check repair or replace.
Regenerative blower Overload	System stops, buzzer sounds, alarm flickers	Low voltage.	Check and replace.
		Blower failure.	Check and replace.
		Wrong current setup of over-temp relay	Check and replace.
Retur air thermocoupler circuit break	System stops, buzzer sounds, alarm flickers	Thermocoupler disconnected or poor connected./Thermocoupler reverse electrode.	Check repair or replace.
Dew-point monitor circuit break	System stops, buzzer sounds, alarm flickers	Dew-point monitor disconnected or poor connected. /Wrong wiring.	Check repair or replace.
Inverter failure	System stops, buzzer sounds, alarm flickers	Low voltage.	Check and replace.
		Drying blower overload	Check re-set or replace.
		Inverter failure	Check and replace.
hopper*(1/2/3/4) EGO Over-temp	Hopper* (1/2/3/4) stop,buzzer sounds, alarm flickers	Contactor conglutinated.	Check and replace.
		EGO(over-temp. protector) Wrong setup or failure	Check regulator button or replace.
hopper*(1/2/3/4) Over-temp	Hopper* (1/2/3/4) stop, buzzer sounds, alarm flickers	Wrong setup of PID temp.-control parameter.	Check re-set parameters.
		Contactor conglutinated.	Check and replace.
		Regenerative thermocoupler failure.	Check and replace.
hoppe*(1/2/3/4) thermocoupler circuit break	Hopper* (1/2/3/4) stop, buzzer sounds, alarm flickers	Thermocoupler disconnected or poor connected. Thermocoupler reverse electrode.	Check repair or replace.
hoppe *(1/2/3/4) communication failure	Hopper* (1/2/3/4) stop, buzzer sounds, alarm flickers	Communication cable break line, communication Connector poor connected.	Check repair or replace.
Set airflow exceeds blower max. airflow	Buzzer sounds, alarm flickers	Wrong setup of airflow and system airflow.	Check re-set parameters of airflow and system airflow.

Notes: 1) Reset overload alarm: open the control box, press down "Reset" button of related thermo-relay.

2) Reset rotor failure alarm: switch off the drying, then switch on, the reset is available.

3) Reset over-temp.alarm: switch off the drying, then switch on it after the cooling, the reset is available.

4.3 Control Panel



4.4 Panel Operation

1) Turn on main power switch of control box.

2) Press “RUN/STOP”  key, it starts drying process, indicator turns green;

3) Press “RUN/STOP”  key again, it stops drying process, indicator turns yellow

4.5 Temperature Setting

1) The setup number will flicker after pressing "  " key, add or decrease temperature by pressing  or  key.

2) Press "  " key again to confirm the input value.

4.6 Lock Setup

1) Press “menu  ” key for 2 seconds, it displays “TIME”.

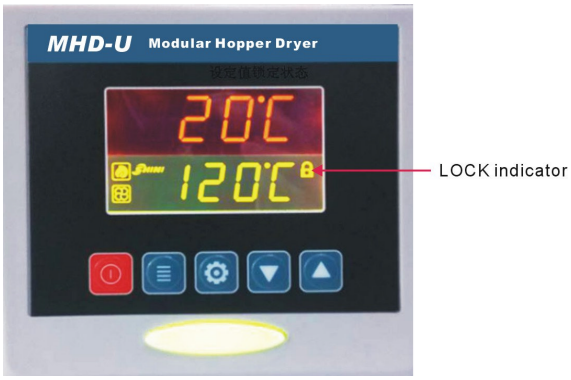
2) Press “page up  ” repeatly, till it display “LOCK”;

3) Press “  ” key, the set value flickers, press  or  key to select “YES”(lock temperature setting) and “NO” (don’t lock).

4) Press “  ” key to confirm the input value.

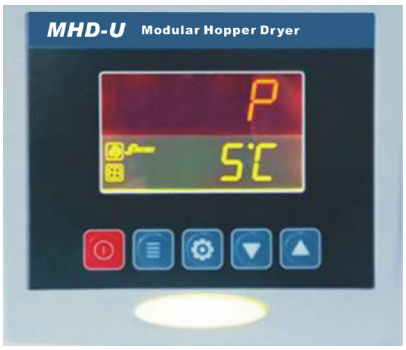
5) Press “menu  ” key to return operation menu.

Notes: When “LOCK” is set as “YES, temperature setting value will be locked which not accessible to change.



4.7 PID Setting

1) Press both  and  keys for 3 seconds, it shows “P” (proportion) setting;



2) Press “  ” key, the set value flickers, then press  or  key to add or decrease the value.

3) Press “  ” key to confirm the input value.

4) Press “page up  ” key again and again, it displays “I” (integral time) and “D” (differential time) setting accordingly.

5) Repeat above step2 and step 3, input and confirm related parameters.

6) Press “  ” key, it returns operation menu.

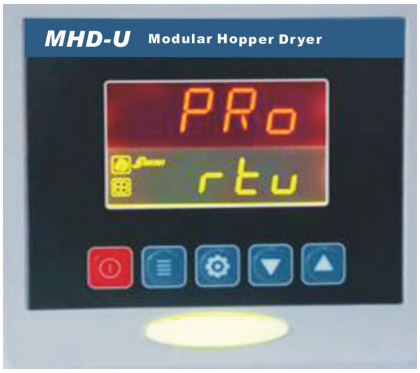
Notes: The PID parameter will directly influence the effect of temperature control, please be careful to set the value.

Parameters	Codes	Factory Default
Proportion	P	5
Integral time	I	200
Differential time	D	30
Over-temp alarm	OTP	15℃
Control cycle	HCLE	15
Blower delay	FDLY	180
Temp. unit	UNIT	℃

4.8 Communication Setting

1) Press both  and  for 3 seconds, it displays “PRO”(communication protocol) setting.

Notes: communication protocol is fixed to Modbus RTU protocol—“RTU”.



2) Press “page up  ” key to enter “ID” (communication address) setting;

Notes: The communication address of every controller in the same system must be the only one, no repeat use. In principle: communication address of hopper 1 is 1, communication address of hopper 1 is 2, and so on.)

3) Press “  key”, the set value flickers, then press  or  key to add or decrease the value.

4) Press “  ” key to confirm the input value;

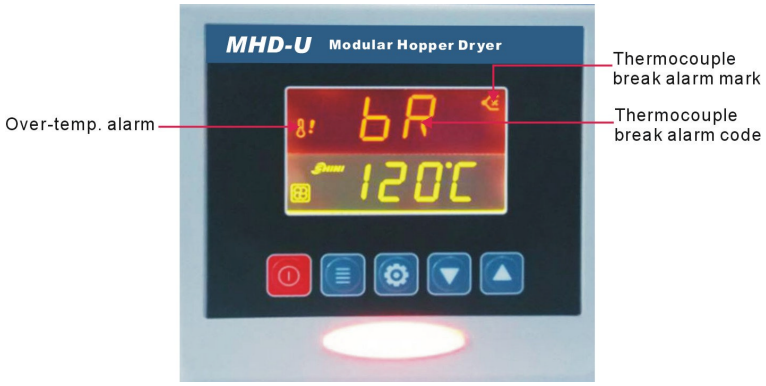
5) Press “page up  ” key again and again, it displays “Baud” and “PAR” settings, (as below)

6) Repeat step 3 and step 4, then confirm the related input parameters.

7) Press “menu  ” key to return operation menu.

Communication Parameters	Communication Codes	Factory Default
Communication Protocol	PRO	RTU
Communication Address	Id	1(current address)
Baud Rate	Baud	19.2K
PAR	PAR	none
Data Length	Data	8
Stop Bit	Stop	1

4.9 Wrong Codes Remark



Wrong Codes	Remark
bR	Thermocouple break alarm
oH	Over-temp alarm
oL	Overload alarm
EGO	EGO Over-temp heater cable cut off

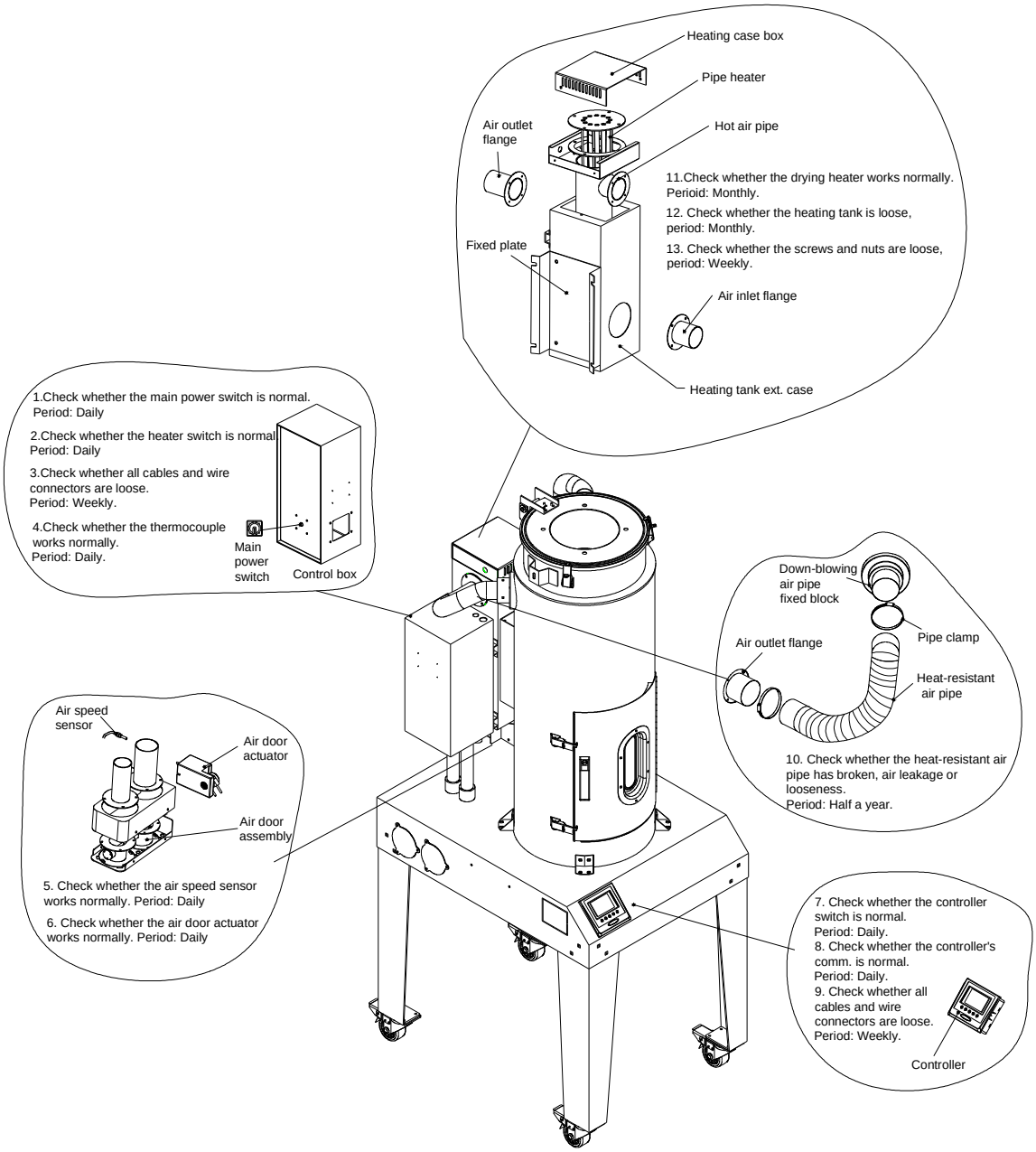
5. Trouble-shooting

Troubles	Possible Reasons	Solutions
Blower direction is reversed as the arrow.	1. Blower connection reversed.	1. Randomly exchange any of the two blower cables.
Blower doesn't work.	1. Motor failure	1. Check and replace.
	2. Solenoid switch contact break.	2. Check replacement or repair.
Blower neither working nor heating.	1. Overload tripping.	1. Check and replace.
	2. Transformer fault.	2. Check and replace.
	3. Fuse burnt.	3. Check and replace.
	4. Power fault.	4. Check the phase.
Blower works but without temperature.	1. Heating pipe connected lead sheet circuit break.	1. Check and replace.
	2. Solenoid switch fault.	2. Check replacement or repair.
	3. Heating pipe fault.	3. Check and replace.
	4. Temp. controller has no output.	4. Change temperature controller.
	5. Thermocoupler failure.	5. Replace thermocouple.
Blower works but temperature is not enough.	1. Heating pipe or lead sheet defect.	1. Check and replace.
	2. Over-temp. protector circuit break or tripping,	2. Check or reselt.
	3. Solenoid switch lacks of phase.	3. Check and replace.
	4. Controller damaged or large deviation.	4. Change temperature controller.
Blower works but over temperature.	1. Hot air pipe blocked.	1. Clear.
	2. Controller fault or large deviation.	2. Change temperature controller or adjust inching switch.
	3. Solenoid switch contacts conglutinated.	3. Replace.

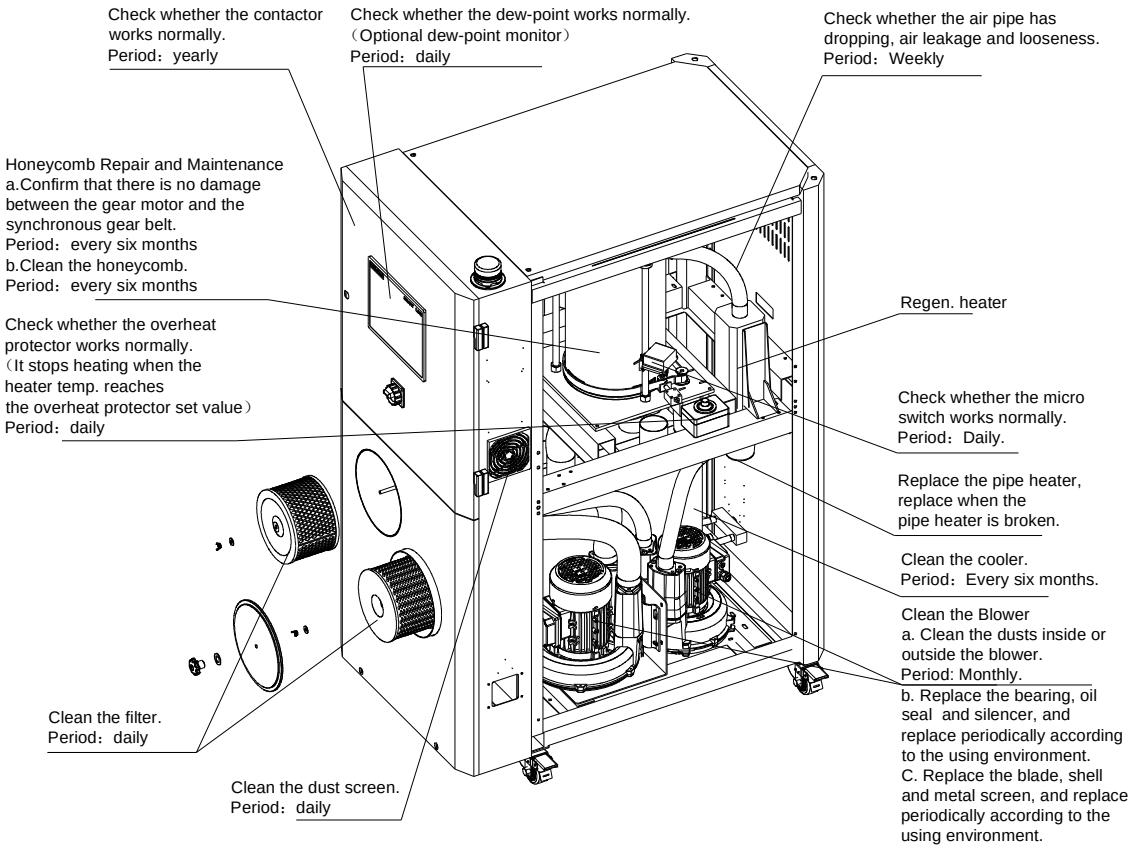
Note: When checking or replacing the components, make sure main power switch is at "OFF" state!

6. Maintenance and Repair

MHD-20U~300U



SD-H-SM



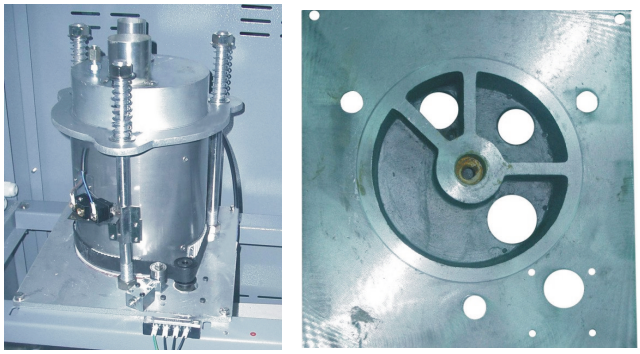
Attention !

1) Turn off the main switch and control switch and unplug the cord from power supply before service and maintenance.
2) Be sure not to modify electrical wiring or reassemble the electrical components inside of the control box.
3) Always refer to the electrical diagram of this manual to check and maintain the electrical wiring problems.
4) Service and maintenance of the electrical parts should only be carried out by qualified electricians.

6.1 Honeycomb-rotor

6.1.1 What is “honeycomb-rotor”?

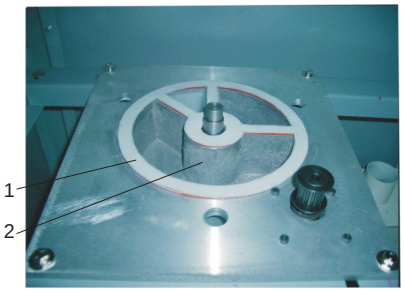
The main body of the honeycomb-rotor is a honeycomb, made by ceramic fibre and organic additives, sintered under high temperature with molecular sieve and silica gel, to be strongly bonded together and form a solid and hard surface. Not like common molecular sieve, which will produce dusts and fines to pollute raw materials when aging or become saturated requiring regular replacement, honeycomb-rotor offer unlimited long life and can be cleaned when it is polluted. The moisture of return air is quickly absorbed by numerous tunnels before coming out of the rotor to form low dew-point air. At the same time, regenerating blower takes dry air into the honeycomb-rotor from an opposite direction to regenerate the rotor.



Picture 6-1: Honeycomb Rotor

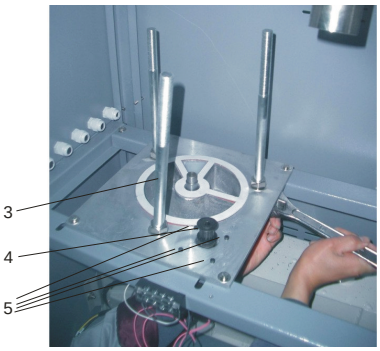
6.1.2 Installation of the Rotor (SD-120H~700H-SM)

1) The upper and lower lid of honey-comb should install Teflon gasket (Fig. 1). Use 4 screws to fix the rotor base on the machine frame firmly, and then install the shaft accordingly (Fig. 2).



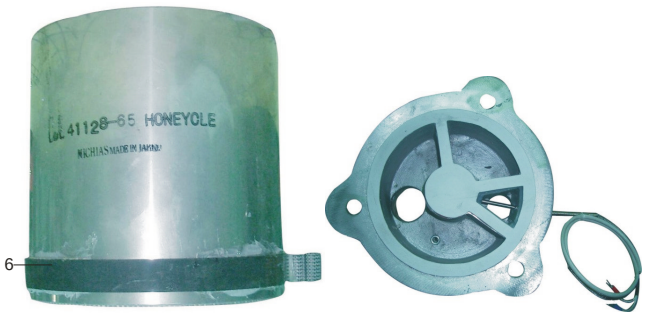
Picture 6-2: Honeycomb-rotor Installation 1

2) Install the gearmotor (the 4 screws as “5” in picture) and transmission gear (Fig. 4). Install and fix the main support screws (Fig. 3).



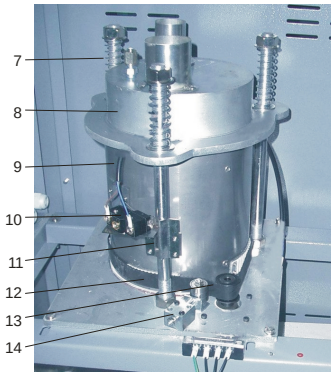
Picture 6-3: Honeycomb-rotor Installation 2

3) Fit the transmission belt in proper position (Fig. 6).



Picture 6-4: Honeycomb-rotor Installation 3

4) Install the honeycomb-rotor (Fig. 9) and transmission belt (Fig. 12). Fix the rotor top cover (Fig. 8). Fit all springs and tighten the screws (Fig. 7). Install both the transmission belt (Fig. 13) and belt tension regulator (Fig. 14). Install micro-switch and fixed board firmly (Fig. 10).



Picture 6-5: Honeycomb-rotor Installation 4

Honeycomb Rotor Cleaning Steps:

1) Use a vacuum-cleaner with brush to suck up the dust on rotor surface.
2) Blow off the dust in the rotor channels with compressed air.
3) If there is dirt sticking to the channel walls inside the rotor, cleaning steps as follows:

a. Saturate the rotor by blowing humid air (higher than 60%RH) through the rotor without having regeneration circuit on. This can be done by just turning the regeneration heater off and still have the process blower running if process air has high humidity. If the process air is too dry try to put a humidifier in the air stream. Do this for one hour.
b. Depending on the character of the dirt, sink the rotor into water with cleaning agent in it (PH value 3~2 liquid is applied to silica gel, PH value 7~10 applied to molecular valve). Greasy dirt should be put into a detergent solution with xylene. 15 minutes cleaning is suggested.
c. Take the rotor out of the liquid and let it rest with the channels vertically for 5 minutes so the liquid can run out.
d. Blow off the residual liquid in the channels with compressed air.
e. Put the rotor back into the dehumidifier and run the unit with regeneration circuit (the regeneration temperature between 50˚C and 60˚C) on for at least one hour.

 Note! :

1. Note that in the dry air and wet air outlets, there will be high concentrations liquid out for some time. If a solvent has been used, there will be a residual smell for several days.
2. For some dirt which is greasy and sticky in the rotor, 100% elimination is impossible. The only one thing you can do is to replace the rotor for the cleaned rotor performance can only be recovered partly.

6.2 EGO

Attention!

The EGO value has been setting before out factory, Don't modify it.

	Default Value
Drying	200˚C
Regenerating	200˚C

Picture 6-6: EGO

6.3 Filter

Please periodically clean the dust on the air filters, once per week.

Cleaning steps：

1) Take out the air filter carefully.
2) Blow off the dust on the air filter screen and the cover with pressure air.
3) Wipe off the barrel wall of air filter with dishcloth.
4) After cleaning, place all parts in reversed order carefully.

Picture 6-7: Filter Cleanig

Note: Do not let any impurities fall into the filter container.

The service life of filter is 6 months, the maximum is 1 year.

6.4 Cooler

Clean the cooler and eliminate the leakage regularly.

1) When use chilled water for cooling, do clean the cooler once every month.
2) When use normal temperature water for cooling, do clean the cooler once every quarter.

Cooler Clean Steps:

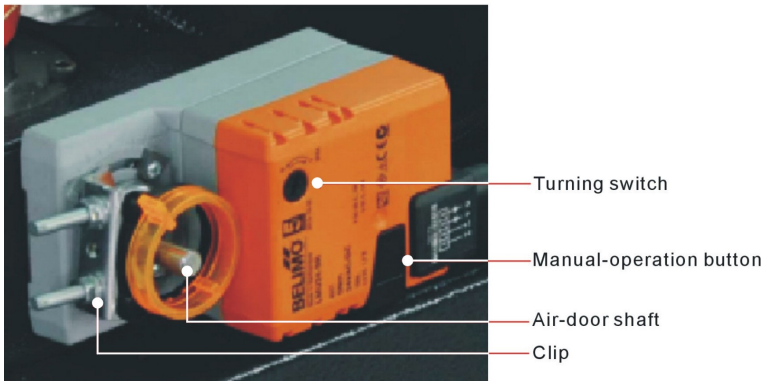
1) Disassemble the cooler's pipe and screw, and remove the cooler out of the chiller.
2) Release the fixed screw on the upper and lower cover of cooler and disassemble the cover.
3) Use brush, compressed air or low pressure water to clean the dust and sundries on the cooler fan and copper pipe.

Notes: water residue on the cooler fan and copper pipe should be dried with compressed air.

4) Make the cooler's upper and lower cover junction clean enough and smear t he silica gel then fixed the covers with screws.
5) Put the cooler on the air at least 4 hours to make the silica gel drying enough then fix the cooler on the chiller and connect all pipes.

6.5 Operation and Debugging of Air-door Actuator

1) The turning switch is used to select the rotary direction of air door. It has been set in factory according to its structure.
2) Air door actuator can operate automatically or manually, it has been set as automatically in factory.
3) Press manual-operation button (as below picture), gear of the actuator would be unlocked. Then, manually rotate the clip (as below picture) and air-door shaft (as below picture); Loose the button, gear would be combined, the actuator would operate automatically.



Picture 6-8: Air-door Actuator

6.6 Maintenance Schedule

6.6.1 Machine Information

Model _____ SN _____ Manufacture date _____

Voltage_____Φ_____V Frequency _____ Hz Power _____ kW

6.6.2 Check After Installation

☐Check that pipe connections are firmed locked by clips.

☐Check the drying hopper cleaning door is sealed.

☐Check that the piping system is correct.

☐Check if the honeycomb-rotor is damaged or not.

Electrical Installation

☐Voltage: _____ V _____ Hz

☐Fuse melt current：1 Phase_____ A 3 Phases _____ A

☐Check phase sequence of the power supply.

☐Check the rotating direction of blower fans.

6.6.3 Daily Checking

☐Check the start/stop function.

☐Check the set-up timing function.

☐Check whether air-door actuator is normal.

☐Check whether airflow detector is normal.

☐Check whether controller is normal.

☐Check power supply wires.

☐Check temperature controller.

☐Check and clean the air filter.

☐Check whether overheat protection is normal.

☐Check whether dew-point is normal.

☐Check whether cooling water circulation is normal.

6.6.4 Weekly Checking

☐Check all power cables.

☐Check if there are loose connections of electrical components.

- ☐ Check and clean air filter.
- ☐ Check the function of solenoid valve.
- ☐ Check motor overload relay and anti-phase function.
- ☐ Check whether air pipe is shed, leaked and loose.

6.6.5 Monthly Checking

- ☐ Check whether the pipe heater is normal.
- ☐ Check the working condition of electrical components.
- ☐ Check if the transmission belt is loose or not.
- ☐ Check the performance of gear motor.
- ☐ Check if there are leakages in honeycomb-rotor.

6.6.6 Half-yearly Checking

- ☐ Check if there are damages of heat-resistant hoses.
- ☐ Check the drying heaters.
- ☐ Check regen./process blower and blower fans.
- ☐ Check whether honey-comb rotor belt is damaged.
- ☐ Clean the cooler.

6.6.7 Yearly Checking

- ☐ Check whether the contactor is normal [1].

6.6.8 3 year Checking

- ☐ PC board renewal.
- ☐ No fuse breaker renewal.

Notes: [1] Manufacturer laboratory data for AC contactor is two million times in life. we suggest service life for one million four hundred thousand times, if work eight hours per day, recommended replacing frequency is 1.5 years, if work day and night, replacement is suggested to be done every six months.