MDD

Mini Dehumidifying Dryer

Date: Oct., 2023

Version: Ver. A

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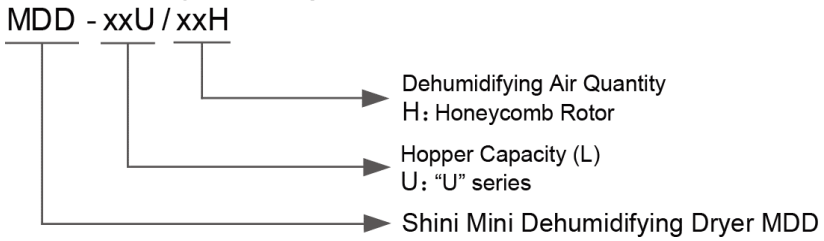
1. General Description

Read this manual carefully before operation to prevent machine damage or personal injuries.

MDD dehumidifying dryers integrate dehumidifying and drying into a single unit.It is widely applicable to various plastic materials, especially for hydroscopic engineering plastics,such as PC and PBT. Besides, the honeycomb rotor can reach the dew point below -40 ℃ under ideal conditions (closed-loop conditions).

Picture 1-1: Mini Dehumidifying Dryer MDD-40U/20H

1.1 Coding Principle



1.2 Features

1) Adopt molecular sieve structure honeycomb rotor, which provides low dew-point dry air that can reach -40℃ under ideal conditions(close-loop conditions).
2) Dehumidifying and drying functions are integrated into a single unit
3) The standard microprocessor controller with a temperature-control precision of + 1℃
4) It is equipped with a weekly timer to achieve auto operation
5) Equipped with RS485 communication screen
6) Adopt a 4.3" touch panel for an intuitive display and easy operation
7) USB screen can record the data and back up local data in real-time
8) New special gear transmission can eliminate the honeycomb errors to avoid slipping and tough installation caused by conventional belt drives.
9) When using optional dew point meter, the dew point temp. control can control the regeneration temp. heating based on the set dew point, so as to save the energy.

1.3 Options

1) Entry-level dew point monitor, and add "YD" at the end of the model code.
2) VAISALA dew point monitor, and add "D" at the end of the model code.

All machine service should be performed by professional technicians. This manual is applicable to the operator and maintenance personnel on the field. The service instruction of Chapter 6 is intended for service engineers, and other chapters are for the operator.

Any modifications of the machine must be approved by SHINI in order to avoid personal injury and machine damage. We shall not be liable for any damage caused by unauthorized change of the machine.

Our company provides excellent after-sales service. If there’s any problem during the application, please contact the company or local vendor.

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Headquarter and Taipei factory:
Tel:+886 (0)2 2680 9119
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Tel: +86 (0)769 8331 3588
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Shinden Precision Machinery (Chongqing), Inc.:
+86 (0)23 6431 0898

1.4 Safety Regulations

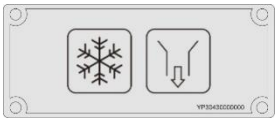
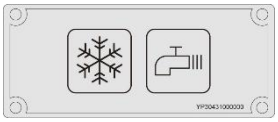
Note:

Electrical installation should be done by qualified electrician only.

Before connecting to AC Power Source, turn power switch to OFF position. While AC power source is connected, make sure specifications and overload protection rating of the power switch are suitable and reliable. When the machine is under care or maintenance, turn off both power switch and automatic operation switch.

1.4.1 Sign and Labels

Table 1-1: Label Description

Label	Description
	Warning! High temperature surface may burn hands! It is attached on the cover of pipe heater.
	Cooling water outlet
	Cooling water inlet
	Push-and-pull switch for shut-off plate: I: Means "Pull" O: Means "Push"

1.4.2 Transportation and Storage of the Machine

1.4.2.1 Transportation

1) MDD series Mini Dehumidifying Dryer are packed in 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) Don't 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℃.

1.4.2.2 Storage

1) SCD series "All-in-One" compact 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.

1.4.3 Working environment

1) Indoor, in dry environment with max. temperature +45℃ and humidity no more than 80%.

Do not use the machine:

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

1.4.4 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.

1.4.5 Fire hazard.

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

1.5 Exemption Clause

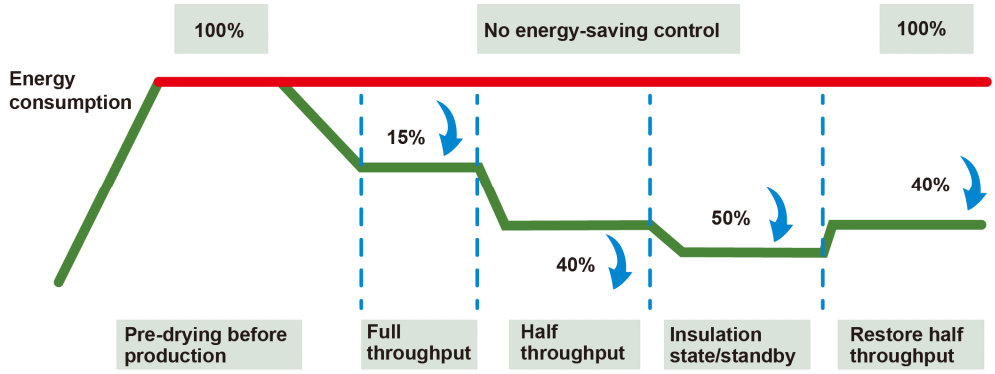
The following statements clarify the responsibilities and regulations born by any buyer or user who purchases products and accessories from Shini (including employees and agents).

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

1) Any careless or man-made installations, operation and maintenance 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

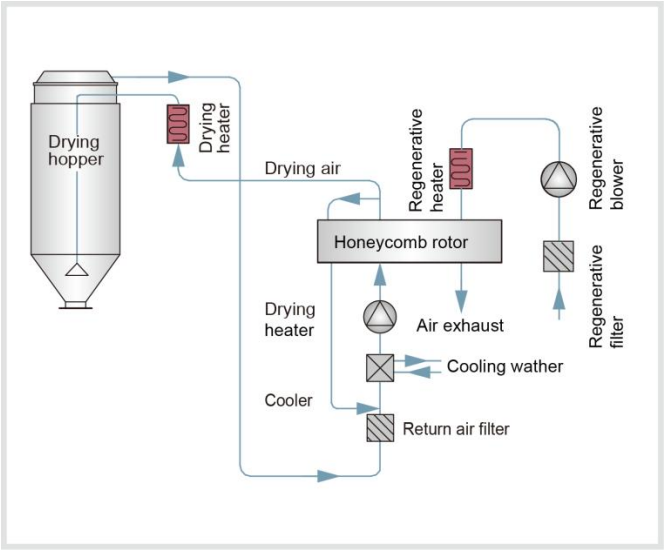
2.1 Energy-saving Control Principle



Picture 2-1: Energy Consumption Chart

The built-in adaptive energy-saving drying function can adjust the drying airflow and temp. according to different materials and outputs, thus achieving the purpose of energy-saving and preventing material from excessive drying;

2.2 Working Principle



Picture 2-2: Working Principle

The moisture in the air is adsorbed by the rotor and then desorbed by the regenerative heating air, and two air streams flow into the blower simultaneously. As the rotor rotates, the moisture in the air is continuously adsorbed and then desorbed by the regenerated air, thus generating a stable low dew point air. It will

be heated up to the drying temperature of the plastics, and blown into the drying hopper to form a closed cycle and drying the plastic materials.

2.3 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 lower of dew point temperature (than the ambient temperature) is, the 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.

2.4 Why Choose MDD?

The series of MDD-40U/20H are used for dehumidifying and drying hygroscopic plastics to reduce the rejects. Meanwhile, it features the convenience of hopper dryer and the low-dew point of dehumidifying dryers. For these quality deficiencies as bubble, crazing, cracking, poor transparency are due to insufficient drying of plastic materials before moulding, and the engineering plastics such as: PC, PBT, etc. cannot be dried effectively by conventional hot air drying systems because the moisture enters inside the particles. According to suggestion of the manufacturer, the plastic materials can be completely dried by drying air with dew-point temperature ≤-20℃.However, the SCD sufficiently dehumidifies and dries the air inside the closed-loop system, and the dry air eliminates the moisture fast and completely as to reach the drying and dehumidifying effect.

2.5 Partial Plastics That Can Precipitate Crystals during Pre-cooling

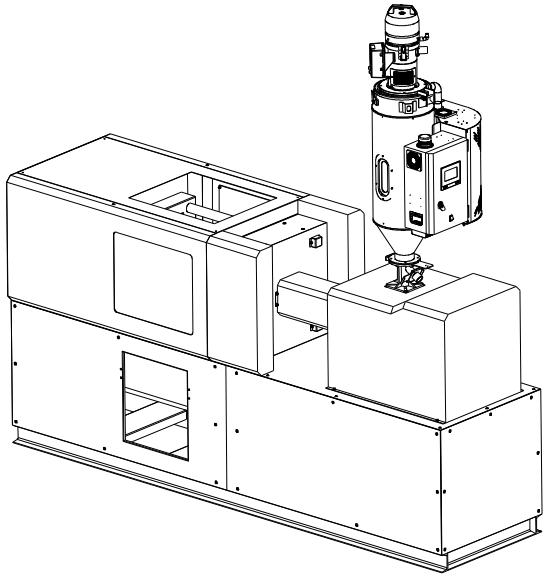
MDD-40U/20H dehumidifying dryers are not suitable for drying some special plastics, such as (PA series) , due to the small fin clearance between the coolers. After the dry air blows through the PA materials, it will precipitate white crystals when it cools down, resulting in cooler blocked. Therefore, for some materials with oil content and also be used in this machine, it’s necessary to choose an oil filter, or directly remove the return air pipe to prevent the return air from entering the cooler and avoid precipitated crystal .This optional oil filter has no effect on the dew point. Remove the return air pipe will decrease the dew point, but there’s no risk of pipe blockage.

Picture 2-1: Return Air Pipe

3. Installation and Debugging

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

3.1 Installation



Note: The model of top loader is: SAL-1U（It is a separate purchase）

Picture 3-1: Direct Installation

3.2 Power Connection

1) Make sure the voltage and frequency of the power source comply with those indicated on the manufacturer nameplate that attached to the machine.
2) Power cable and earth connection should conform to your local regulations.
3) Use independent electrical wires and power switch. Diameter of electrical wire should not be less than those used in the control box.
4) The power cable connection terminals should be tightened securely.
5) This series of power cables adopts unidirectional, with the power supply (L) connected to the live wire and the grounding wire (PE).
6) Power supply requirements:

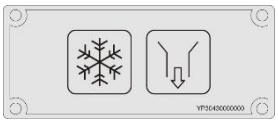
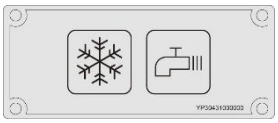
Main power voltage: +/- 5%

Main power frequency: +/- 2%

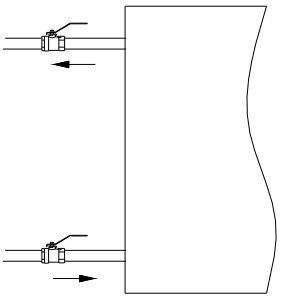
7) Please refer to electrical drawing of each model to get the detailed power supply specifications

3.3 Cooling Water Connection

The cooling water pressure is 3-5 kgf/cm^2, the cooling water temp. is 10-30 ℃, and the cooling water flow is 4L/min.

	Cooling water outlet
	Cooling water inlet

Cooling water needs to be connected the before operation. The water port is at the back of the machine.



Picture 3-2: Cooling Water Connection

3.3.1 Cooling Water Connection

Connect through the cooling water before machine operation. For the efficiency, please follow below suggestions:

1) For easy maintenance and safety, install the ball valve at cooling water inlet and outlet.
2) Water pipe diameter should not less than the diameter of cooling water inlet and outlet.
3) For water quality, it needs to sediment or filter the water before it gets into the pipe, to prevent the deposits accumulated on pipeline of cooler and performance degradation.

4. Application and Operation

4.1 Operation Procedure for HMI

Picture 4-1: Description of Touch Panel

Operation Notice:

1) Avoid violent collision of the touch screen when operating it.
2) In dry environment, static electricity may be produced on the touch screen, so a metal wire is needed to discharge it before operating.
3) Use alcohol or eleoptene to clean the touch screen, because other solvents may fade it.
4) Do not tear down the touch screen or take away any PCB from it. Otherwise, the component will be damaged.

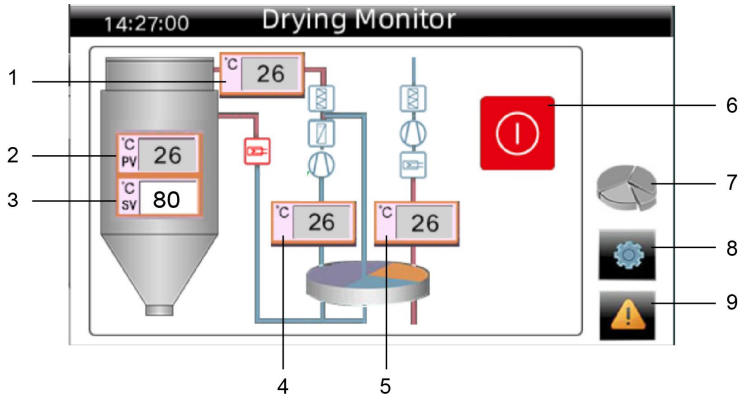
4.2 Initial Page of the System

After the system is powered on, the touch penal displays initial page. As below figure:

Picture 4-2: System Initialization Page

4.3 Dehumidifying and Drying Monitor Page

After a few seconds of countdown, the system initialization screen will enter the dehumidifying and drying monitoring screen, as below figure:



Picture 4-3: Dehumidifying and Drying Monitor Screen（standard mode）

Table 4-1: Dehumidifying & Drying Monitor Screen Press Key Description

No.	Name	Functional Type	Description
1	Return air temp. PV	Only display	
2	Drying temp. PV	Only display	
3	Drying temp. SV	Press key	Click to set the temp.
4	Cooling temp. PV	Only display	
5	Regen. temp. PV	Press key	Click to set the temp.
6	Switch button	Press key	Running switch
7	Recipe	Press key	The color means the recipe function has been enabled; Click to enter the recipe screen
8	Menu	Press key	Click to enter the menu screen.
9	Alarm	Press key	Click to enter the alarm screen.

4.3.1 Drying and Regenerating Temperature Change

It can directly click the <Drying Temp. SV>, it pops up a digital input screen, input the required temp., and click the <ENTER>to confirm the temp. change. Directly click on the <Regen. Temp. PV >, it pops up a digital input screen. Enter the

demanded temp., click<ENTER>to confirm, and finally enter the password 3588 to complete temperature change.

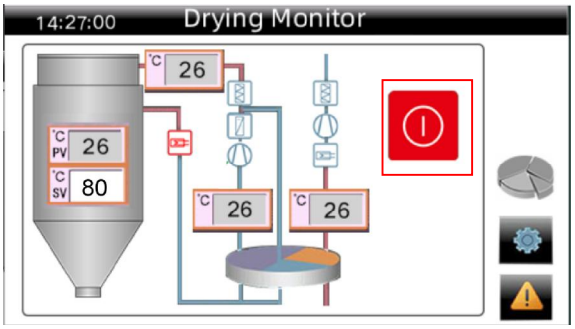
Picture 4-4: Temperature Setting Screen

Important: Both drying and regenerating temperature values have max. and min. settings. The regeneration temperature has been set to 180 ℃ at the factory. Please do not reset it without permission!

4.4 Switch On/Off

Click the <On / Off > button, it turns green, and the system will start automatically. Click the <On/Off button> again, it displays red, and the heater will stop immediately. The blower will stop running after the delay of 3 mins.

Important: To improve the honeycomb's service life, it is not allowed to shut down the main power switch directly. Instead, click the<On/Off >button to stop the machine. The latter operation can ensure that the honeycomb rotor continues to run for a delayed shutdown cooling time to extend its service life, which is generally set at 3 mins. After the delay time has reached, the main power switch can be turned off.

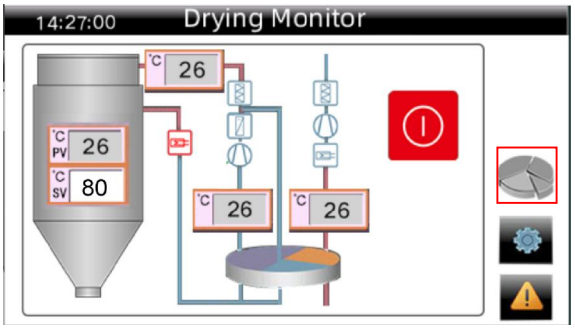


Picture 4-5: Dehumidifying & Drying Monitor Screen

4.5 Energy Saving Function

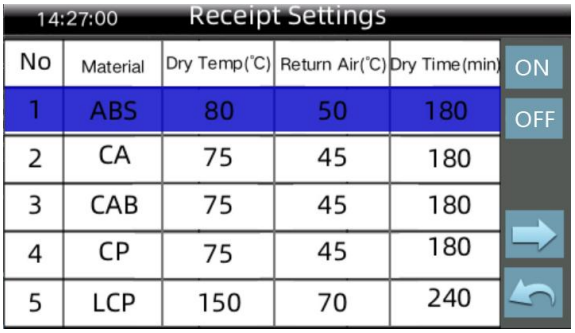
4.5.1 Recipe energy-saving mode

1) Click on the<Recipe>icon in the dehumidifying and drying monitor screen (the system defaults to using the recipe energy-saving function).



Picture 4-6: Step 1 of entering the recipe energy-saving mode

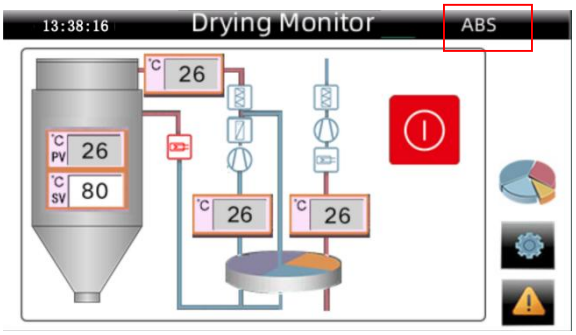
2) Enter the recipe setting screen, click the <group number>to select the required recipe for production, and click the <start> button in the upper right corner of the screen .



Picture 4-7: Step 2 of entering the recipe energy-saving mode

3) It will jump to the dehumidifying and drying monitor screen , and the recipe name will be displayed in the upper right corner, indicating that the recipe

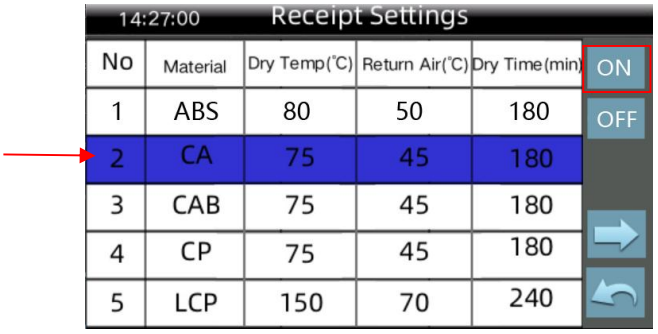
has been successfully selected. (The following figure shows ABS, which represents it selected the ABS recipe).



Picture 4-8: Step 3 of entering the recipe energy-saving mode

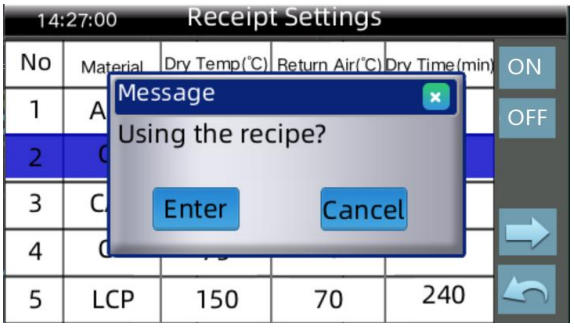
4.5.1.1 Change the recipe

1) Enter the recipe setting screen again, select the<group number>of the corresponding recipe, and click the<start>button.



Picture 4-9: Recipe Setting Step 1

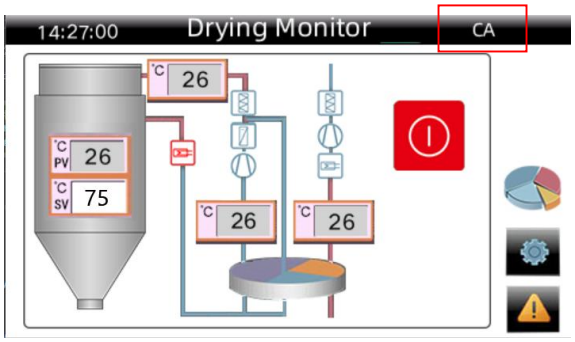
2) The system will prompt "Please confirm whether to enable this recipe"



Picture 4-10: Recipe Setting Step 2

3) Click the <Confirm> to complete the recipe switching (Otherwise, clicking "Cancel" will not modify the existing recipe. When starting the machine,

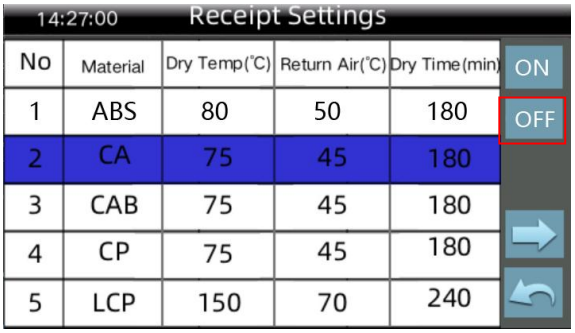
the controller will use parameters of the recipe to control the machine operation).



Picture 4-11: Recipe Setting Step 3

4.5.1.2 Turn off the recipe function

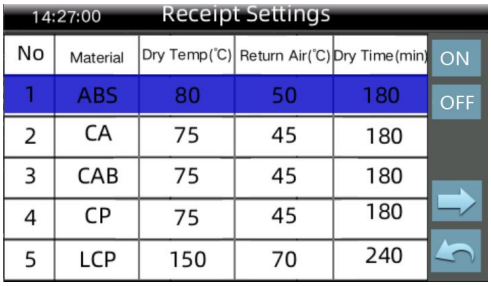
When the recipe mode is enabled, click on the <Off> button in the upper right corner of the recipe setting screen, the system will turn off the recipe function.

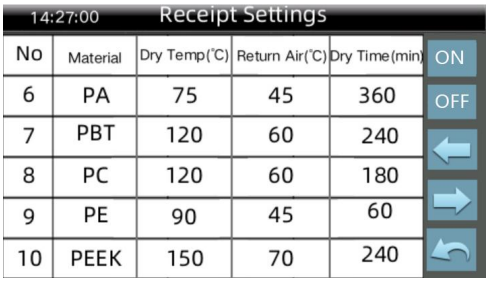


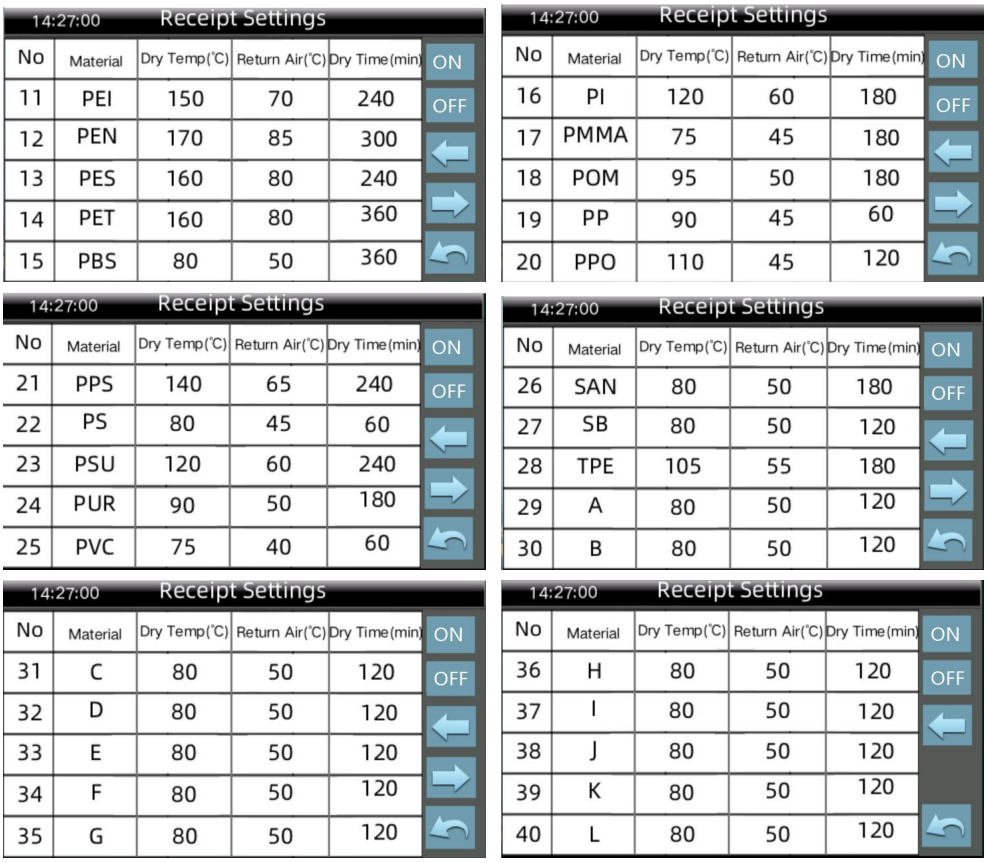
Picture 4-12: Turn off the recipe function

4.5.1.3 Recipe Data

The system supports 40 sets of recipe data, and users can choose their own recipe.







14:27:00 Receipt Settings

No	Material	Dry Temp(℃)	Return Air(℃)	Dry Time(min)
11	PEI	150	70	240
12	PEN	170	85	300
13	PES	160	80	240
14	PET	160	80	360
15	PBS	80	50	360

14:27:00 Receipt Settings

No	Material	Dry Temp(℃)	Return Air(℃)	Dry Time(min)
16	PI	120	60	180
17	PMMA	75	45	180
18	POM	95	50	180
19	PP	90	45	60
20	PPO	110	45	120

14:27:00 Receipt Settings

No	Material	Dry Temp(℃)	Return Air(℃)	Dry Time(min)
21	PPS	140	65	240
22	PS	80	45	60
23	PSU	120	60	240
24	PUR	90	50	180
25	PVC	75	40	60

14:27:00 Receipt Settings

No	Material	Dry Temp(℃)	Return Air(℃)	Dry Time(min)
26	SAN	80	50	180
27	SB	80	50	120
28	TPE	105	55	180
29	A	80	50	120
30	B	80	50	120

14:27:00 Receipt Settings

No	Material	Dry Temp(℃)	Return Air(℃)	Dry Time(min)
31	C	80	50	120
32	D	80	50	120
33	E	80	50	120
34	F	80	50	120
35	G	80	50	120

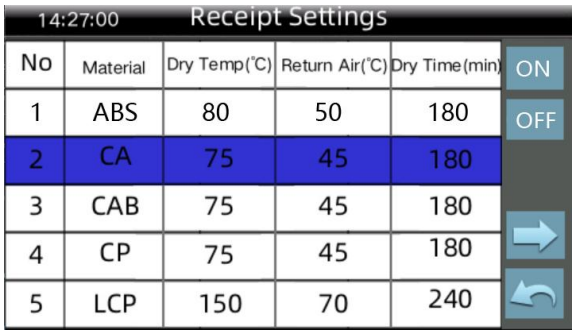
14:27:00 Receipt Settings

No	Material	Dry Temp(℃)	Return Air(℃)	Dry Time(min)
36	H	80	50	120
37	I	80	50	120
38	J	80	50	120
39	K	80	50	120
40	L	80	50	120

Picture 4-13: Recipe

4.5.1.4 Material Selection

In the recipe setting screen, click the < Material Name>, and users can select commonly used material names.



14:27:00 Receipt Settings

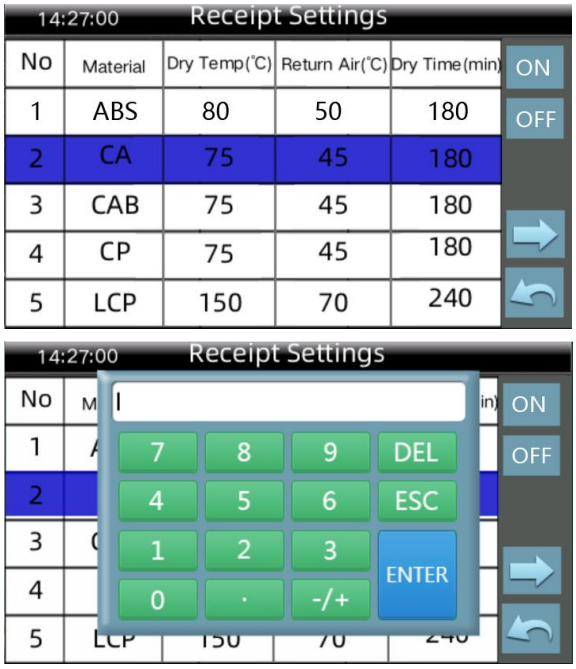
No	Material	Dry Temp(℃)	Return Air(℃)	Dry Time(min)
1	ABS	80	50	180
2	CA	75	45	180
3	CAB	75	45	180
4	CP	75	45	180
5	LCP	150	70	240

Picture 4-14: Material Name Selection

Picture 4-15: Material Selection

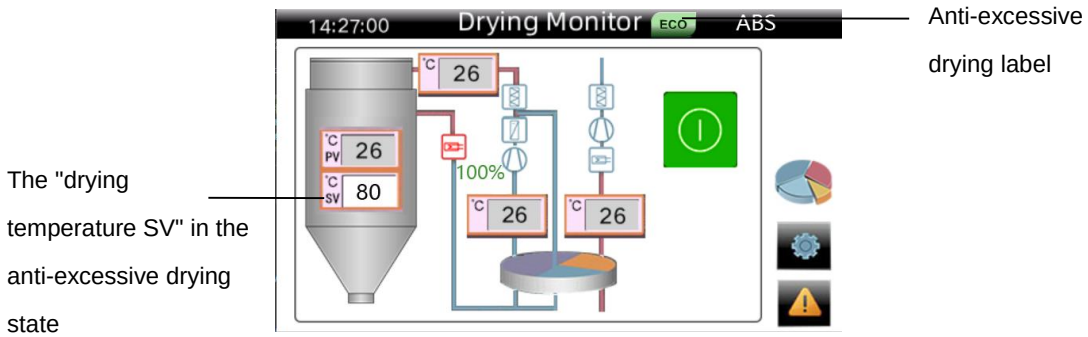
4.5.1.5 In the A~L recipe list, users can customize the recipe based on their own demands.

The "drying temp. (℃)", "exhaust temp. (℃)", and "drying time (mins.)" can all be set by the user in the recipe setting screen by the user according to actual production demands. If you don't remember the original parameters after modifying the recipe, you can refer to Figure 4-13 to modify the recipe, or click< Material Name>and select the material again to restore the original parameters.



Picture 4-16: Recipe Setting

Attention: In the dehumidifying and drying monitoring screen, the "drying temperature (℃)" and "exhaust temperature (℃)" of the recipe can also be modified. After modification, the "drying temperature (℃)" and "exhaust temperature (℃)" in the recipe setting screen will be updated at the same time.



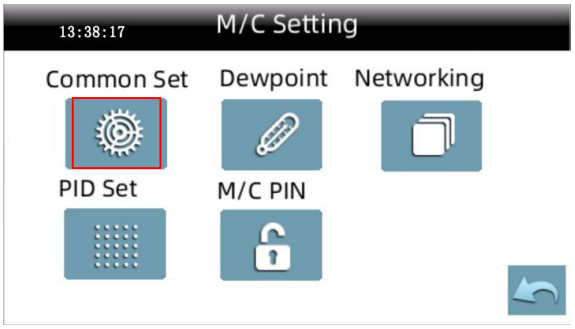
Picture 4-17: Dehumidifying and Drying Monitoring Screen
（anti-excessive drying state in recipe mode）

After starting the recipe, if the running time exceeds the drying time set by the recipe and the airflow continues to remain at 60%, the system will enter the anti-excessive drying function. The ECO state will be displayed in the upper right corner, and the drying temp. will decrease by 20 ℃. The system will be in a thermal insulation state, and it will restore the original set drying temperature after exiting the anti-excessive drying mode.

Note: When the system enters the anti-excessive drying energy-saving function, the "drying temp. SV" is subject to the "min. insulation temp.". If the "min. insulation temperature" is set to 70 ℃, and after the machine enters the anti excessive drying energy-saving function, the min. drying temp. SV can only be reduced to 70 ℃ (For example, the "drying temp. SV" 80 ℃; After the system enters the anti-excessive drying energy-saving function, theoretically it should be 80 ℃ -20 ℃=60 ℃. However, due to the setting of "min. insulation temp." of 70 ℃, the final set insulation temp. for the "drying temp. SV of " 80 ℃ can only be 70 ℃).

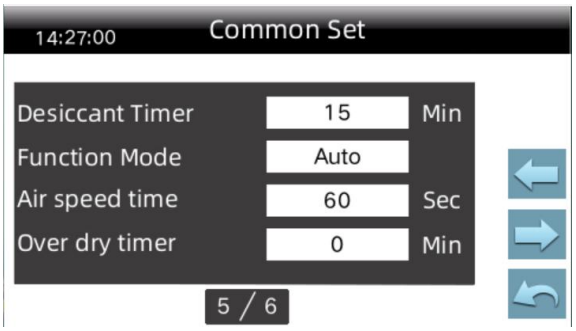
4.5.2 Adaptive Energy-saving Mode

Click on the upper left corner in the drying monitoring screen three times continuously, and it pops up the password input box. Enter the correct password (project parameter password: 3588) to enter the project settings screen.



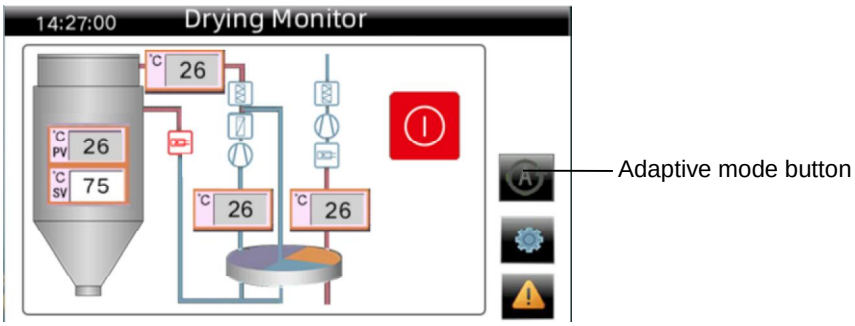
Picture 4-18: Project Settings Screen

1) In the project settings screen, enter the "General Settings" parameter, find "Function Mode", and select "Adaptive Mode".



Picture 4-19: Adaptive Mode Step 1

2) Return to the dehumidifying and drying monitoring screen

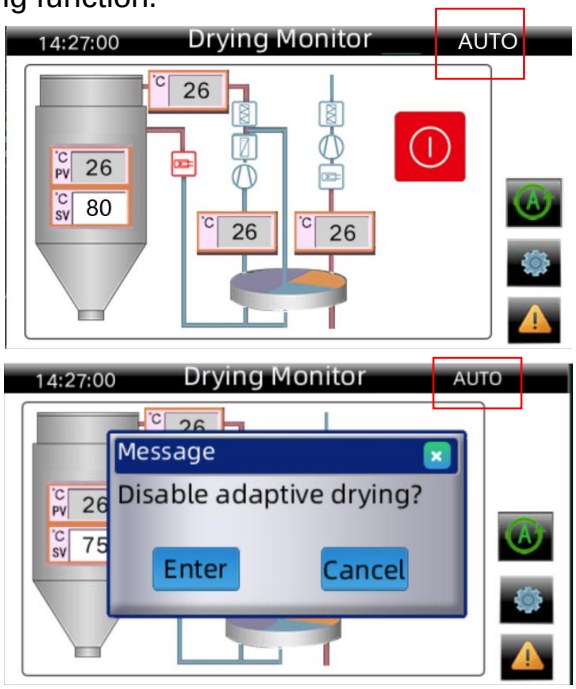


Picture 4-20: Adaptive Mode Step 2

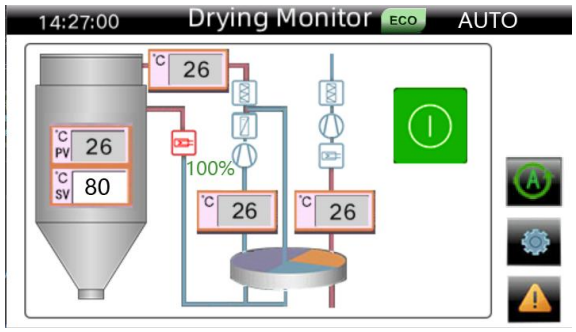
3) Click the "Adaptive Mode" button on the screen right side, and it will pop up a prompt box: "Are you sure to use the adaptive energy-saving drying?" Click "OK" to enable the adaptive energy-saving function. (Otherwise, click the “cancel”, it can’t enable the adaptive energy-saving function.) The display of AUTO in the upper right corner indicates the function is enabled.

Picture 4-21: Adaptive Mode Step 3

4) When enabling the adaptive mode, click the "Adaptive" button on the "Dehumidifying and Drying Monitoring" screen to turn off the "Adaptive" energy-saving function.



Picture 4-22: Turn off the adaptive mode



Picture 4-23: Dehumidifying and Drying Monitoring Screen

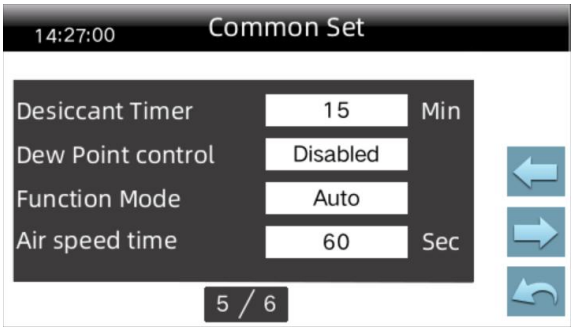
（Anti-excessive drying state in adaptive mode）

After starting the adaptive mode, if the running time exceeds the built-in drying time and the airflow continues to remain at 60%, the system will enter the anti-excessive drying function at the time. After entering the anti-excessive drying, the ECO state will be displayed in the upper right corner, and the drying temp. will decrease by 20 ℃. The system will be in a thermal insulation state, and it will restore the original set drying temperature after exiting the anti-excessive drying mode.

Note: When the system enters the anti-excessive drying energy-saving function, the "drying temp. SV" is subject to the "min. insulation temp.". If the "min. insulation temperature" is set to 70 ℃, and after the machine enters the anti-excessive drying energy-saving function, the min. drying temp. SV can only be reduced to 70 ℃ (For example, the "drying temp. SV" 80 ℃; After the system enters the anti-excessive drying energy-saving function, theoretically it should be 80 ℃ -20 ℃=60 ℃. However, due to the setting of "min. insulation temp." of 70 ℃, the final set insulation temp. for the "drying temp. SV of " 80 ℃ can only be 70 ℃).

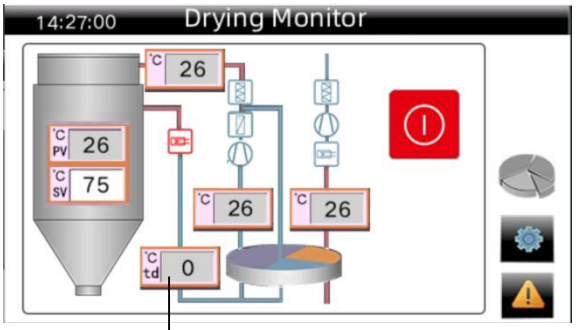
4.5.3 Dew-point Energy-saving Mode（Optional）

1) After the dew point display enabled, enter the "General Settings" parameter, find "Dew-Point Temperature Control", and select "Enable".



Picture 4-24: Enable the dew-point temp. control

2) Return to the dehumidifying and drying monitoring interface, click on "Dew point temp. PV", and the system will pop up the "dew-point temp. SV " setting box. Users can set the required "dew-point temp. SV" according to production demands.



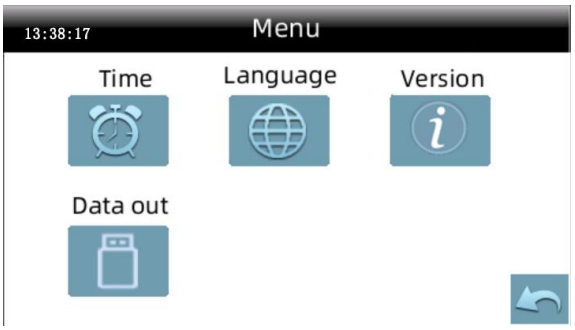
Picture 4-25: Dew-point Temp. SV

3) Modify the "Dew-Point Temp. SV" password: 3588

Picture 4-26: Modify the "Dew-Point Temp. SV" password

4.6 Menu Screen

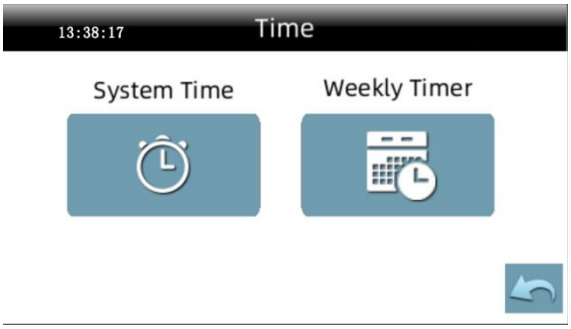
Click the < Menu Button > in the dehumidification and drying monitoring screen to enter the menu screen, which contains four function options: time setting, version information, data export and language selection.



Picture 4-27: Menu Screen

4.6.1 Timer Setting

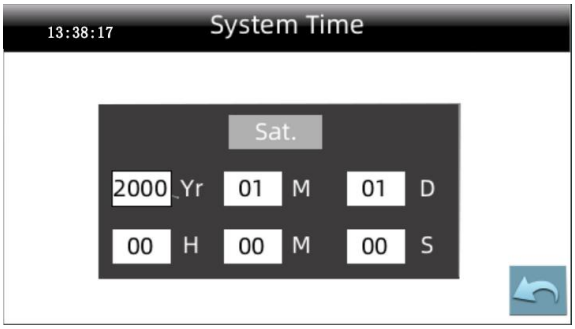
Click < Time Setting >in the menu screen to enter the time setting screen, where can set the system time and one-week timing function.



Picture 4-28: Time Setting Screen

4.6.1.1 System Time Setting

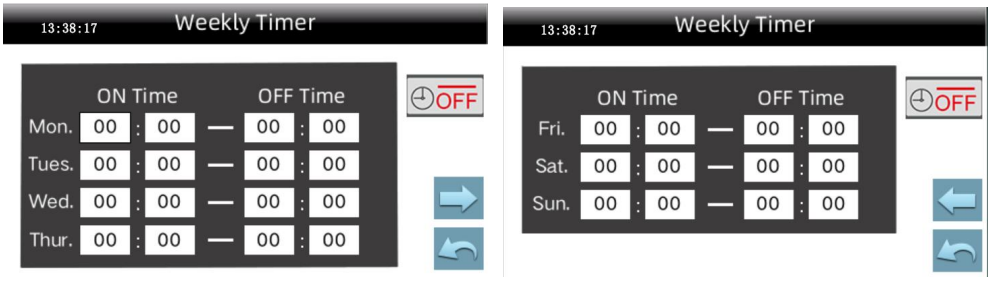
Enter timer screen by pressing <Time Set> on this screen, which can set current date and system time.



Picture 4-29: System Time Setting

4.6.1.2 Weekly Timer Setting

Click on the< WSET > button in the time setting screen to enter the setting screen of one-week timer function. After setting the one week timing, click<OFF>to activate weekly timing function, and the machine will run as per the set time.



Picture 4-30: One-week Timing Setting Screen

Note: As to ensure normal working for weekly timing function, it

is necessary to set the current time and date of system correctly before activating the weekly timing function.

4.6.2 Multilingual Setting

Chinese and English can be switched at any time.

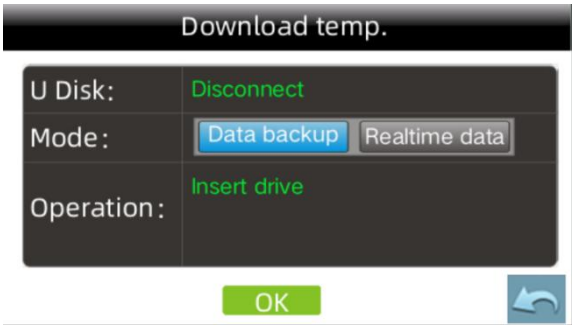
Picture 4-31: Multilingual Setting Screen

4.6.3 Data Download

When downloading data, please use the U flash drive format: FAT32. It's recommended that the U flash drive capacity of 16GB or less then it. In the user settings screen, click the<Data Download>button to enter the following screen:

Picture 4-32: Data Download Screen

4.6.3.1 Temperature Data Download



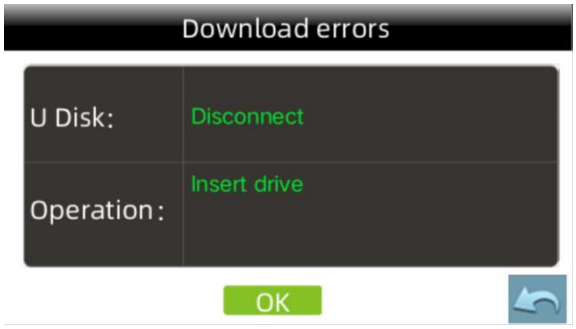
Picture 4-33: Temp. Data Download Screen

Local data backup: Copy the temperature stored on the display board to a U flash drive (the data can be stored for up to 48 hrs. on the display board). Insert the U flash drive, wait for the "U flash drive" to display "connected", and then follow the prompts. No other operations are allowed during the download. Real time data recording: After inserting the U flash drive and activating the real-time data recording, the temperature data will be updated in real time and stored in the U flash drive automatically. After removing the U flash drive, the recording will be interrupted. During the recording, other screen s can be operated.

Notice!

After exporting the data, create a folder/SF51XXX in the root directory of the U flash drive, and the data will be saved in an Excel table.

4.6.3.2 Alarm Record Download

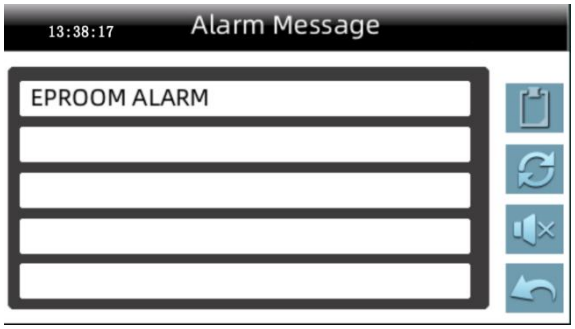


Picture 4-34: Alarm Record Download Screen

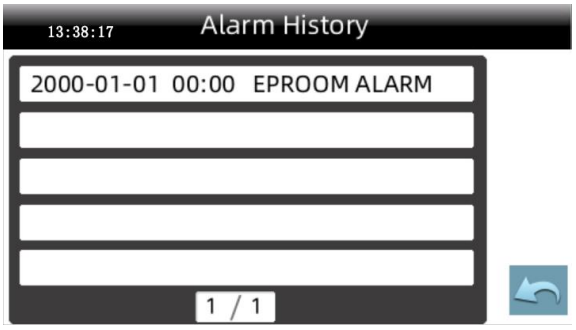
4.7 Alarm Message Checking

Enter into this page by pressing <Button of Error Searching> once on Drying

Monitoring Screen or Conveying Monitoring Screen. It's possible to check alarm history, reset alarm or mute alarm.



Picture 4-35: Alarm Message Screen



Picture 4-36: Alarm History Screen

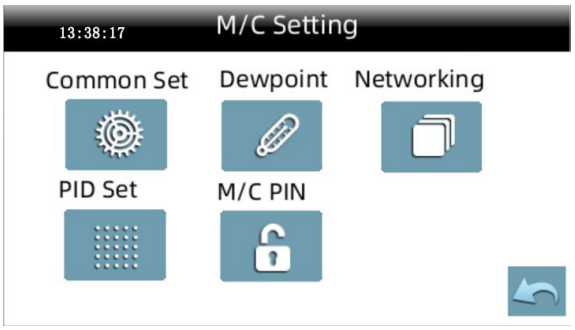
4.8 Project Setting

Click the left upper corner on the drying monitoring screen three times continuously, and it pops up the password input box. Input correct password (project parameter password: 3588) to enter the project setting screen, which includes four options: general setup, dew-point setup, PID setting and project password.

Picture 4-37: Project Password Setting Screen

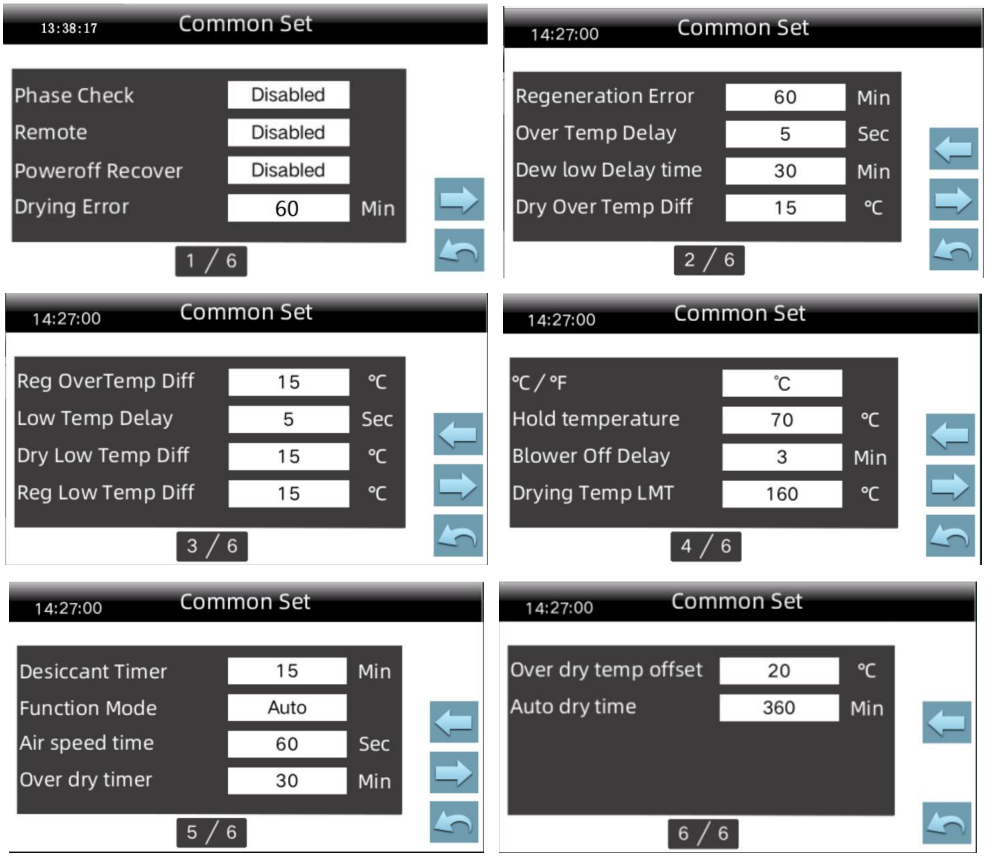
Note: Please keep this password securely and safely. If the

password is missing, then the operator won't be able to log into this page. It is better to let this password known only by system administrator or senior operator!

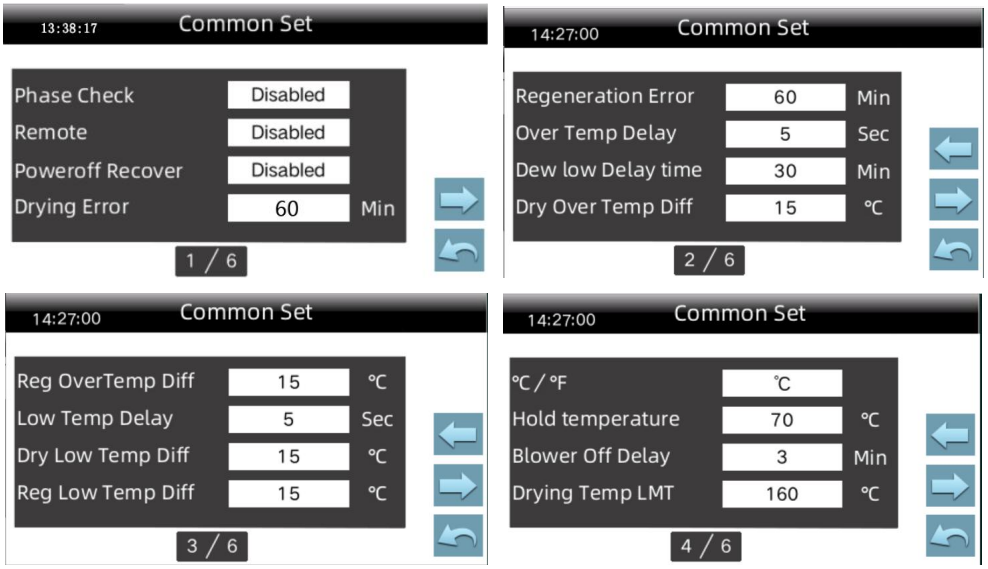


Picture 4-38: Project Setting Screen

Picture 4-39: Project Setting - Comm. Setting Screen（Recipe mode）

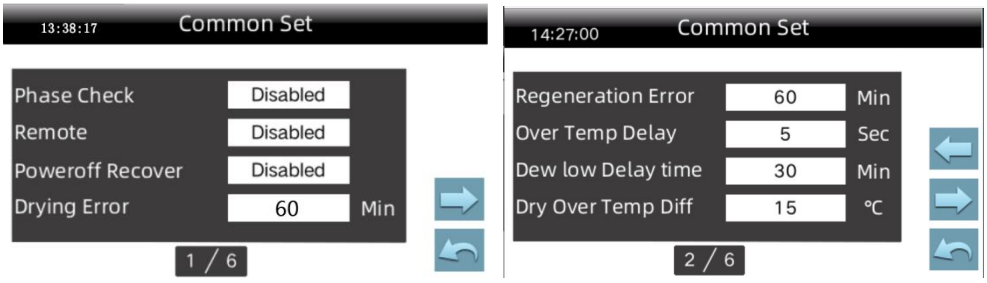


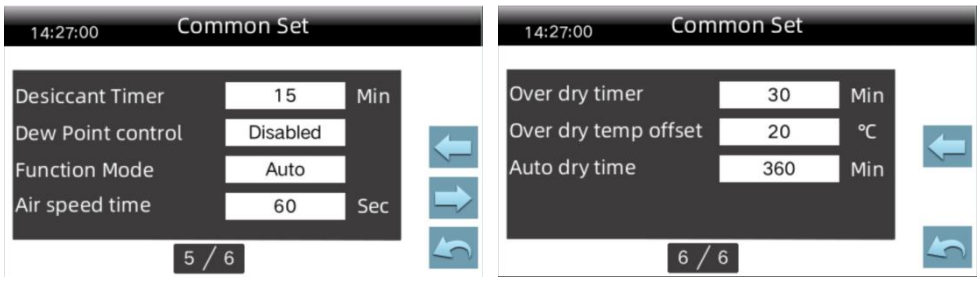
Picture 4-40: Project Setting - Comm. Setting Screen（Adaptive mode）



Picture 4-41: Project Setting - Comm. Setting Screen

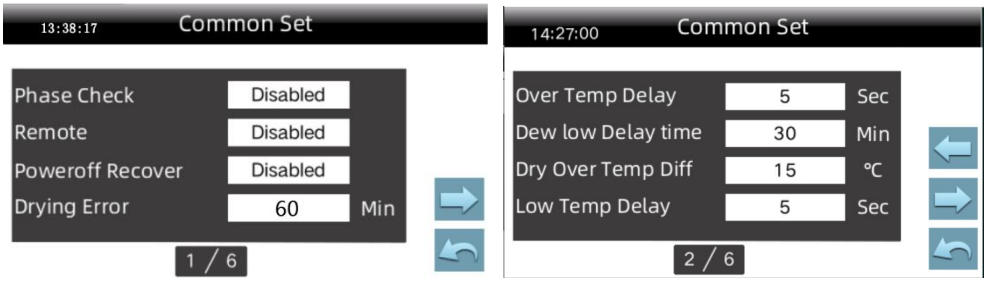
（Recipe mode with optional dew-point）

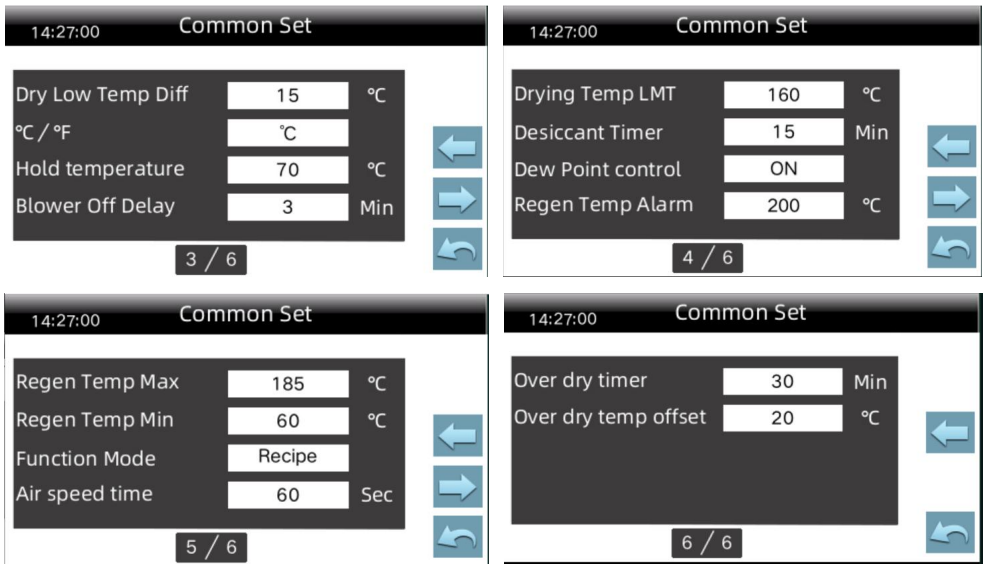




Picture 4-42: Project Setting - Comm. Setting Screen

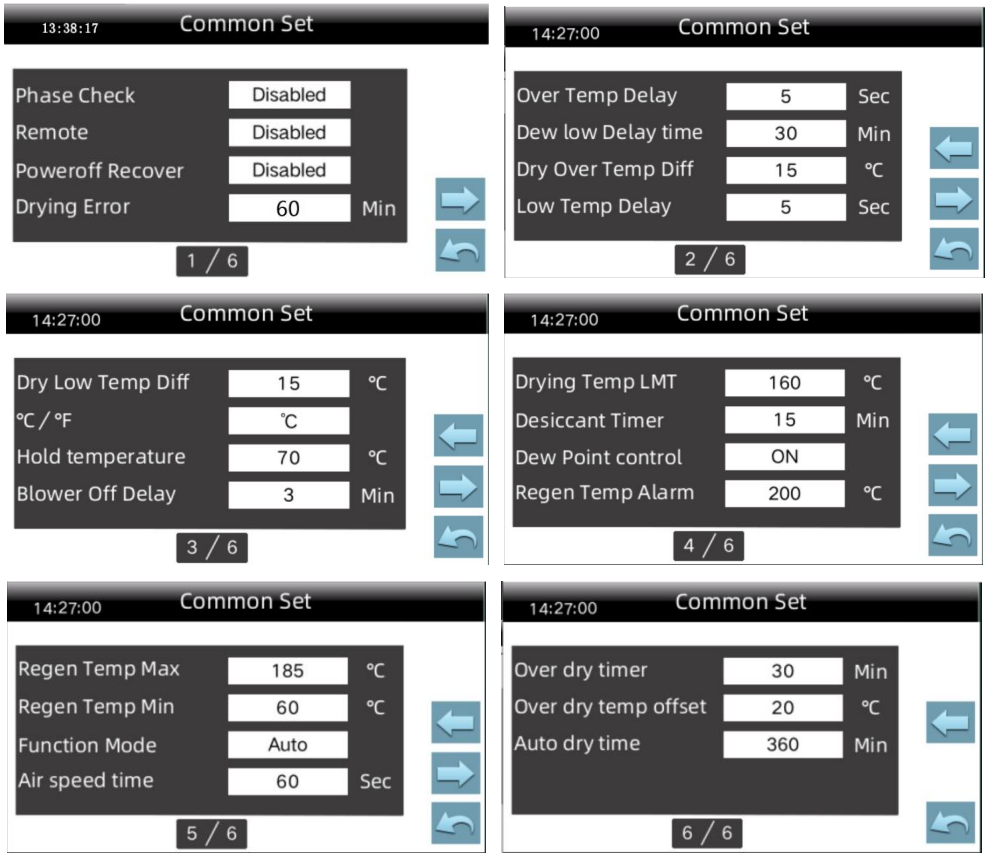
（Adaptive mode with optional dew-point）





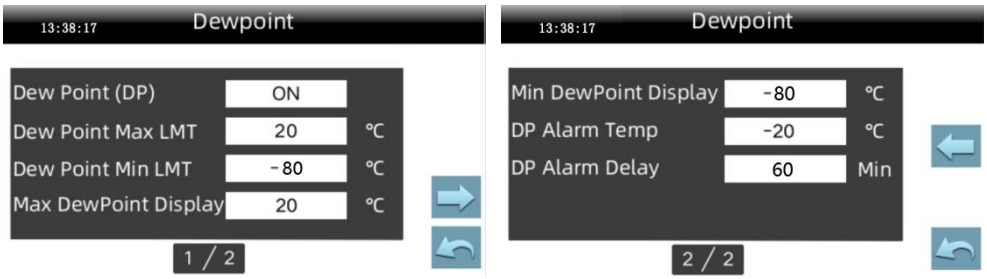
Picture 4-43: Project Setting - Comm. Setting Screen

（Recipe mode with optional dew-point temp. control）

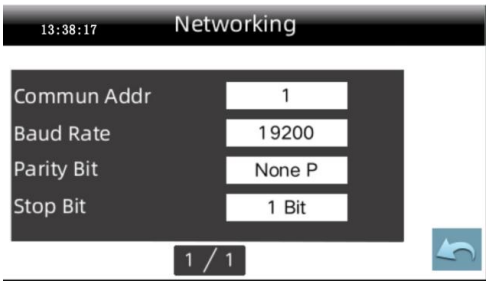


Picture 4-44: Project Setting-Comm. Setting Screen

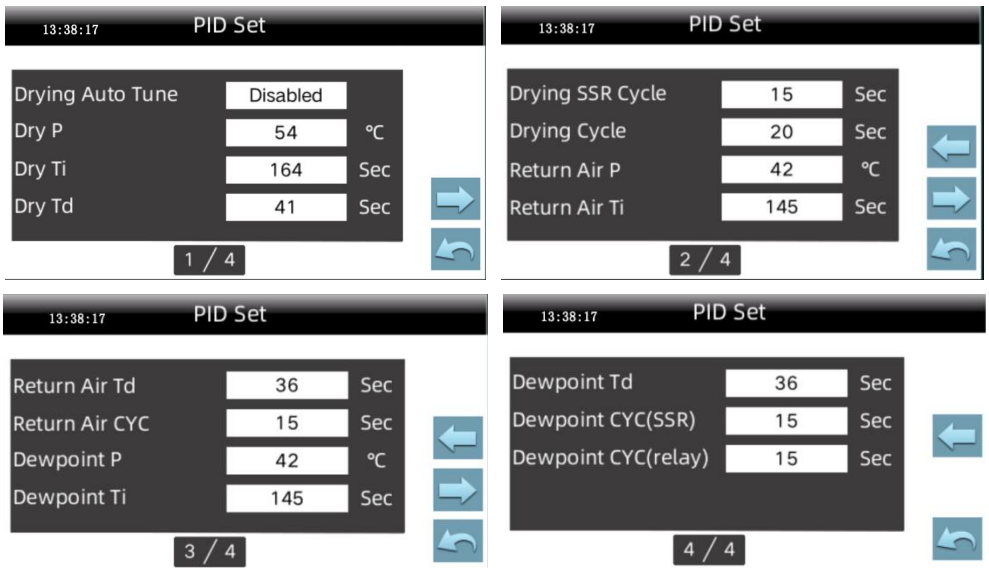
（Adaptive mode with optional dew-point temp. control）



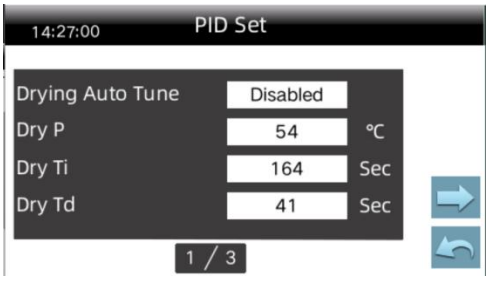
Picture 4-45: Project Setting Dew-point Setting Screen

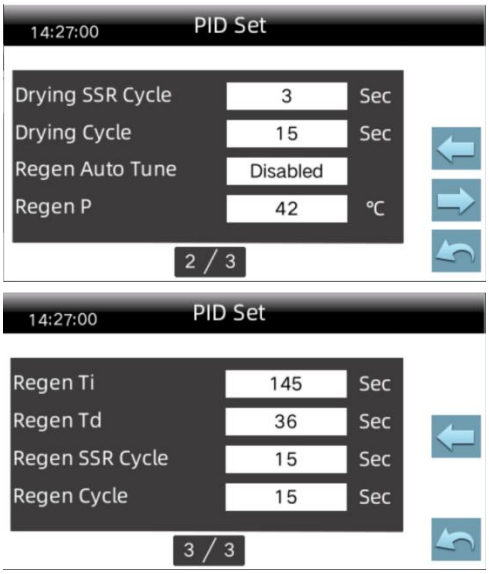


Picture 4-46: Project Setting-Comm. Setting Screen

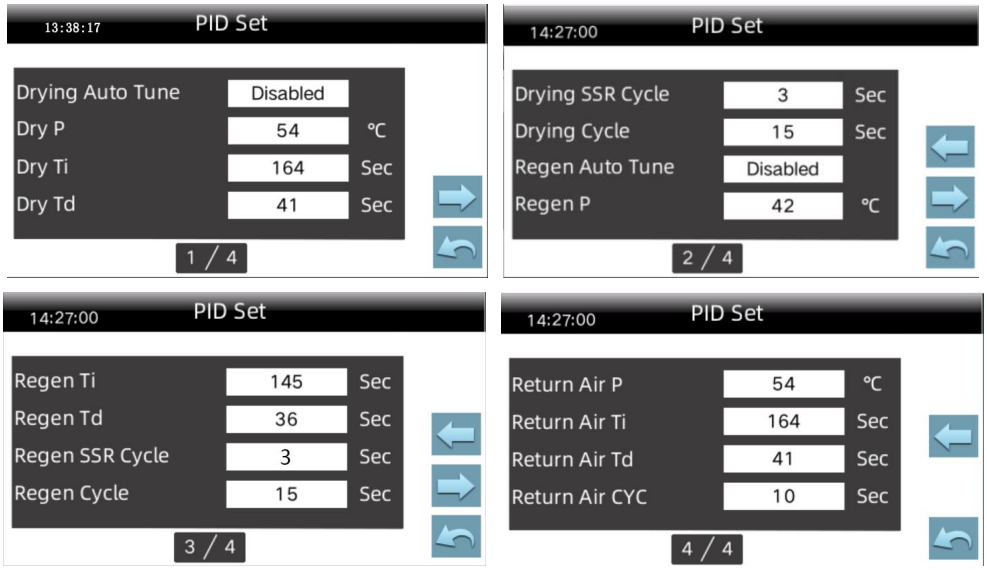


Picture 4-47: Project Setting PID Setting Screen
(Recipe/Adaptive Mode + Dew-point Mode)

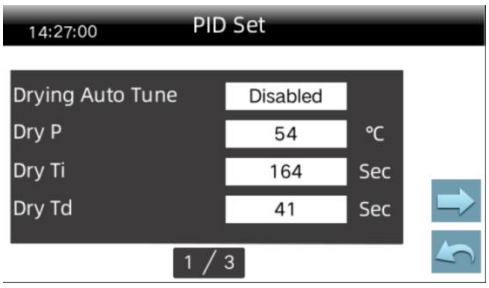


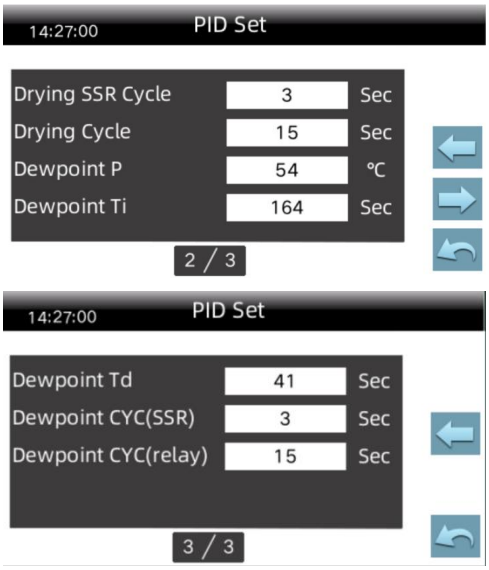


Picture 4-48: Project Setting PID Setting Screen (Standard)

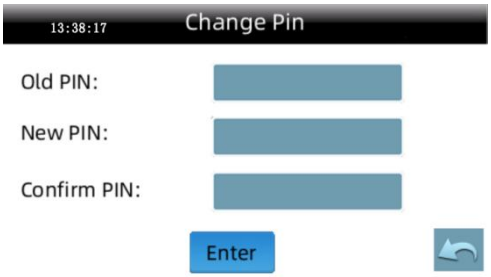


Picture 4-49: Project Setting PID Setting Screen（Recipe/Adaptive Mode）





Picture 4-50: Project Setting-PID Setting Screen (dew-point mode)



Picture 4-51: Project Setting -Project Password Modification Screen

4.8.1 Project Setting Parameters

Table 4-2: Project Setting Parameters

Parameter Type	Parameter Name	Setting Range	Remarks
General Setting	3-phase power detection	Disable (use - disable)	Open or close the onboard 3-phase power detection
	External startup	Disable (use - disable)	Use: Start the dehumidification and drying system when the external start switch input is closed. Disable: External start switch input point is invalid.

	Shutdown restart	Disable (use - disable)	Choose whether to use shutdown restart or not.
	Drying and heating abnormal monitoring	60 min.（0-999 mins.）	Drying heater breaks
	Regenerative heating abnormal monitoring	60 min.（0-999 mins.）	Regen. heater breaks
	Overheat alarm delay	5 secs.（0 ~ 999 secs.）	Overheat alarm delay time
	Drying overheat deviation	15.0℃（0.0 ~ 60.0℃）	Drying and overheat deviation
		27℉（0 ~ 108℉）	
	Regenerative overheat deviation	15℃（0 ~ 60℃）	Regen. overheat deviation
		27℉（0 ~ 108℉）	
	Low-temp. alarm delay	5 secs.（0 ~ 999 secs.）	Low temp. alarm delay time
	Drying low-temp. deviation	15℃（0 ~ 60℃）	Low drying temp. deviation
		27℉（0 ~ 108℉）	
	Regenerative low-temp. deviation	15℃（0 ~ 60℃）	Low regen. temp. deviation
		27℉（0 ~ 108℉）	
	℃／℉ switching	℃（℉ ~ ℃）	Temp. unit conversion
	Min. insulation temp.	70℃（0 ~ 200 ℃）	Min. insulation temp. to prevent excessive drying
		158℉（32 ~ 360℉）	
	Blower shutdown delay	3 secs.（0 ~ 999 secs.）	Turn off the machine, the blower stop delays after the drying heating and regeneration heating stop.
	Drying temp. setting upper limit	160℃（0 ~ 400℃）	Users can set the max. drying temperature.
		320℉（32 ~ 750℉）	
	Rotor monitoring time	15 mins.（0~250 mins.）	Rotor abnormal monitoring cycle; When set it to 0, don’t use the rotor anomaly detection.
	Dew-point control temp.	Disable (disable - enable)	Whether to use the dew-point temp. control for regenerative heating
	Regen. temp. alarm value	200℃（0 ~ 400℃）	When the dew-point temp. control is enabled, if the regen .temp. is higher than this value, it gives alarm
		392℉（32 ~ 752℉）	

			for regen. temp. overheat fault. Note: Only when the【dew-point temp. control】is enable, this parameter can be displayed.
	Dew-point mode regen. temp. upper limit	185℃（0 ~ 400℃）	When the dew-point temp. control is enabled, if the regen .temp. is higher than this value, the regen. heating is not allowed. Note: Only when the【dew-point temp. control】is enable, this parameter can be displayed.
		365℉（32 ~ 752℉）	
	Dew-point mode regen. temp. lower limit	60℃（0 ~ 400℃）	When the dew-point temp. control is enabled, if the regen. temp. is lower than [the lower limit of the dew-point mode regen. temp.] after running over 30 mins., it gives low regen. temp. alarm. Note: Only when the【dew-point temp. control】is enable, this parameter can be displayed.
		140℉（32 ~ 752℉）	
	Function mode	Recipe function (recipe function ~ adaptive function)	Energy-saving function selection
	Airflow acceleration and deceleration time	60（0 ~ 6000 secs.）	The time it takes for the airflow increases from 60% to 100%, or decreases from 100% to 60%.
	Anti-excessive drying judgment time	30（0 ~ 990 mins.）	After it meets the anti-excessive drying time, it will enter the anti-excessive drying mode.
	Anti-excessive drying cooling deviation	20℃（0 ~ 100℃）	When entering the anti-excessive drying process, subtract the [anti-excessive drying cooling deviation]
		36℉（32 ~ 180℉）	

			from the set drying temp. as the drying set temp.
	Adaptive drying time	360（0 ~ 999 mins.）	Enable adaptive mode to display this parameter
Dew-point setting	Dew-point meter	Disable (disable - enable)	Whether the dew-point meter is enabled.
	Dew-point meter upper limit temp.	20℃（0 ~ 100℃）	Upper testing temp. of the dew-point monitor.
		68℉（32 ~ 212℉）	
	Dew-point meter upper limit temp.	-80℃（-100 ~ 0℃）	Lower testing temp. of the dew-point monitor
		-112℉（-148 ~ 32℉）	
	Dew-point meter display upper limit	20℃（-20 ~ 50℃）	Dew-point meter display upper limit, and if the present dew-point is higher than this value, it will display this value.
		68℉（32 ~ 212℉）	
	Dew-point meter display lower limit	-80℃（-100 ~ 0℃）	Dew-point meter display lower limit, and if the present dew-point is lower than this value, it will display this value.
		-112℉（-148 ~ 32℉）	
	High dew-point alarm temp.	-20℃（-30 ~ 20℃）	Dew-point alarm temp., set it to 0 to disable this function.
		-4℉（-22 ~ 68℉）	
	High dew-point alarm delay	60 mins.（0 ~ 360 mins.）	Dew-point alarm monitoring delay
Comm. setting	Comm. address	1（0 ~ 32）	Comm. parameter
	Baud rate	19200（4800/9600/19200）	
	Check bit	No parity (No parity, odd parity check, even parity)	
	Stop bit	One stop bit (one stop bit, two stop bits)	
PID settings	Start drying auto- tuning	Disable (disable - enable)	Whether to start drying auto-tuning.

	Drying proportional band P	54℃（0 ~ 200）℃	
		129℉（0 ~ 360℉）	
	Drying integration time Ti	164 secs.（0-999 secs.）	
	Drying derivative time Td	41 secs.（0 ~ 3600 secs.）	
	Drying SSR cycle T	3 secs.（1 ~ 120 secs.）	Drying heating SSR output cycle.
	Drying and heating cycle T	15 secs.（1 ~ 120 secs.）	Drying and heating relay output cycle
	Start regen. auto-tuning	Disable (disable - enable)	When in standard mode, it displays this parameter.
	Regen. proportional band P	42℃（0 ~ 200）℃	
		107℉（0 ~ 360℉）	
	Regen. integration time Ti	145（0 ~ 999 secs.）	
	Regen. derivative time Td	36（0 ~ 999 secs.）	
	Regen. SSR cycle T	3 秒（1 ~ 120 secs.）	
	Regen. heating cycle T	15 秒（1 ~ 120 secs.）	
	Return air proportional band P	54℃（0 ~ 200℃）	When in recipe and adaptive mode, it displays this parameter.
		129℉（32 ~ 360℉）	
	Return air integration time Ti	164 secs.（0 ~ 999 secs.）	
	Return air derivative time Td	41 secs.（0 ~ 999 secs.）	
	Return air control	10 secs.（1 ~ 120 secs.）	

	cycle T		
	Dew-point proportional band P	54℃（0 ~ 200℃）	When in dew-point control mode, it displays this parameter.
		129℉（32 ~ 392℉）	
	Dew-point integration time Ti	164 secs.（0 ~ 999 secs.）	
	Dew-point derivative time Td	41 secs.（0 ~ 999 secs.）	
	Dew-point cycle (SSR)	3 secs.（1 ~ 120 secs.）	
	Dew-point cycle (relay)	15 secs.（1 ~ 120 secs.）	

5. Trouble-shooting

Faults	Possible Reasons	Troubleshooting
EPROM error	1. Controller failure	1. Replace controller.
Regen. blower overload	1. Blower blocked. 2. Regen. filter blocked. 3.Driver board wiring error.	1. Check whether the blower is blocked, and clean the blower. 2. Check whether the regen. filter is blocked, and clean the filter. 3.Check whether the interface between the driver and the blower works normally. If there's blackening or poor contact phenomena, replace or repair when necessary.
Drying blower overload	1. Blower blocked. 2. Drying filter blocked. 3. Cooling water disconnected. 4.Plate heat exchanger blocked. 5.Driver board wiring error.	1. Check whether the blower is blocked, and clean the blower. 2. Check whether the drying filer is blocked, and clean the filter. 3. Connect to the cooling water. 4. Use a normal blower to blow air into the plate heat exchanger directly. If there's no air blown out at the other end or if the airflow is too low, it may block the plate heat exchanger, and it's necessary to clean or replace the heat exchanger. 5.Check whether the interface between the driver and the blower works normally. If there's blackening or poor contact phenomena, replace or repair when necessary.
Regen. EGO overheat	1. Regen. blower error or blocked 2. Regen. thermocouple error 3.Drying temp. parameter setting error	1. Replace or clean the blower. 2. Check whether the regenerative thermocouple is damaged, and replace the thermocouple. 3. Check whether the value complies with the Program Parameter Table.
Drying EGO overheat	1. Drying blower error 2. Drying thermocouple error 3. Drying temp. parameter setting error. 4.Contactor stuck	1. Replace the blower. 2. Check whether the thermocouple is damaged, and replace the thermocouple. 3. Check whether the value complies with the Program Parameter Table. 4. Replace the contactor.
Rotor failure	1. Gears not matched correctly. 2. Micro-switch not contacted or damaged. 3. Gearbox doesn't work.	1. Check whether the screws on the gear are loose, which will cause the gear falling and unmatched. 2. Check whether the honeycomb rotates in contact with the micro-switch, and replace if damaged.

	4. One weaker run time of the honeycomb is set too short.	3. Replace the gear box. 4. Whether the value complies with the Program Parameter Table.
Regen. pipe heater breaks	1. Set heating time is unreasonable 2. Contactor damaged. 3. The wiring is loose. 4. Pipe heater fault.	1. Whether the value complies with the Program Parameter Table. 2. Replace the contactor. 3. Check whether the wiring is loose and tighten it again if it is loose. 4. Replace the pipe heater.
Drying pipe heater breaks	1. Set heating time is unreasonable. 2.Contactor damaged. 3. The wiring is loose. 4. Pipe heater fault.	1. Whether the value complies with the Program Parameter Table. 2. Replace the contactor. 3. Check whether the wiring is loose and tighten it again if it is loose. 4.Replace the pipe heater.
Regen. probe fault	1.Regen. probe damaged. 2.The wiring is loose. 3. Circuit board failure	1. Replace the .regen. probe. 2. Check the wiring. 3. Replace the circuit board.
Drying probe fault	1. Drying probe damaged. 2. The wiring is loose. 3. Circuit board failure	1. Replace the drying probe. 2. Check the wiring. 3. Replace the circuit board.
Return air probe fault	1. Return air probe damaged. 2. The wiring is loose. 3. Circuit board failure	1. Replace the return air probe. 2. Check the wiring. 3. Check the circuit board.
Cooling probe fault	1. Cooling probe damaged. 2. The wiring is loose. 3. Circuit board failure	1. Replace the cooling probe. 2. Check the wiring. 3. Replace the circuit board.
Regen. temp. overheat	1. Regen. blower error 2. Regen, temperature deviation set error. 3. Regen, thermocouple error. 4. Contactor damaged.	1. Replace the regen. blower. 2. Whether the value complies with the Program Parameter Table. 3. Replace the regen. thermocouple. 4. Replace the contactor.
Regen. temp. is too low	1. Regen. heater, blower error 2. Regen. heater contactor not closed. 3. Set dew-point mode regeneration temp. lower limit is improper. 4. Regeneration temp. deviation set error.	1. Check whether the regeneration temp. of the controller has changed, and whether the blower works, replace it if it is damaged. 2. Check whether the regeneration heater contactor is correctly closed. 3. Whether the value complies with the Program Parameter Table. 4. Whether the value complies with the Program Parameter Table.
Drying temp.	1. Set drying overheat deviation is	1. Whether the value complies with the Program

overheat	improper. 2. Drying blower error. 3. Drying thermocouple error.	Parameter Table. 2. Replace the drying blower. 3. Replace the thermocouple.
Drying temp. is too low	1. Drying heater, blower error 2. Drying heater contactor not closed. 3. Set drying temp. deviation error.	1. Check whether the drying temp. of the controller has changed, and whether the blower works, replace it if it is damaged. 2. Check whether the drying heater contactor is correctly closed. 3. Whether the value complies with the Program Parameter Table.
Dew-point monitor fault (option)	1. Wiring fault or loose. 2. Dew-point monitor damaged.	1. Please check whether the wiring of dew-point transmitter is correct and whether the range is within 4-20Ma. 2. Replace the dew-point monitor.
Dew-point temp. is too high	1. Honeycomb blocked. 2. Dehumidifying ability is not enough. 3. Return air temp. is too high. 4. Filter blocked. 5. Heat-resistant air pipe leakage. 6. Rotor doesn't run. 7. Honeycomb upper and lower air leaked. 8. Startup time is less than 30 mins. 9. Honeycomb run reversely 10. Regen. temp. set improperly.	1. Clean or replace honeycomb. 2. Reduce the output. 3. Detect the cooling water temp.（below 40℃）. 4. Clean or replace. 5. Detect the air pipe and connector. 6. Check whether the motor and micro-switch are damaged and whether the gears are properly matched. 7. Repair or replace the sealing parts. 8. Wait for 30mins. to run before confirming. 9. Check whether it runs reversely. 10.Reset the regeneration temp. (Default is180℃).

6. Maintenance and Repair

6.1 The Useful Life of the Key Parts of the Product

Table 6-1: The useful life of the key parts of the product

Name of the Parts	Useful Life
Blower	Above 1.5 years
Drying heater	Above 1 years
Regen. heater	Above 1 years
Contactor	Above 2000,000 act
Honeycomb	5 years
Filter	1 year

6.2 Plate Heat Exchanger

Please clean the plate heat exchanger regularly, and it's recommended to clean it monthly.

Cleaning steps:

1) Remove the plate heat exchanger.
2) Pour boiling water into the two ports shown in the picture, then pour it out and repeat several times.
3) Use compressed air to clean residual moisture inside.
4) Wipe the filter wall with a cloth.
5) After cleaning, install it in reverse order.

Picture 6-1: Plate Heat Exchanger

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.
5) Please ensue that the filter is well seal with metal frame.

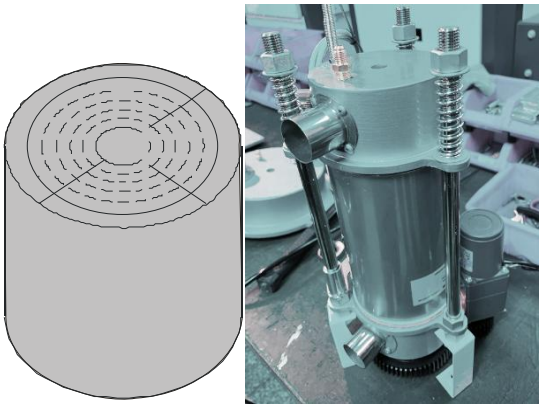
Picture 6-1: Filter

Note: Don't let foreign object enter into the barrel, when taking out the air filter.

6.4 Honeycomb-rotor

6.4.1 What is Honeycomb-rotor

The main body of honeycomb-rotor is a honeycomb, made by ceramic fiber and organic additives, sinterred under high temperature with molecular sieve and silica gel, to be strongly bonded together and form a solid and hard surface. Not like common hopper or rotary molecular sieve, which will produce dusts and fines to pollute materials due to aging or become saturated requiring regular replacement. When the moisture return air passes through the numerous small holes of honeycomb rotor, the moisture will be quickly absorbed by the molecular sieve. Therefore, when it goes out of the honeycomb, it has been completely dehumidified and becomes the dry air with very low dew-point temp. The working principle of regeneration and dehumidification is similar, and they work simultaneously, but the regeneration airflow is opposite.



Picture 6-2: Honeycomb Rotor

6.4.2 Honeycomb Rotor Cleaning Steps

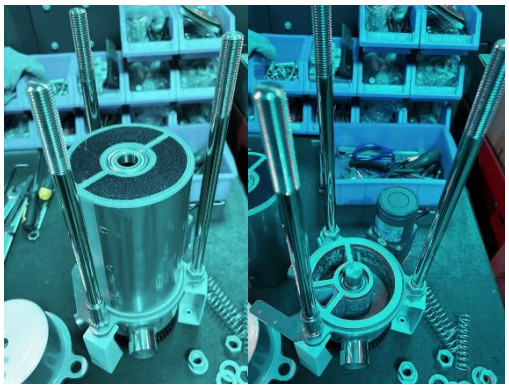
1) Unscrew three nuts on the honeycomb cover and remove the honeycomb cover.
2) Remove the honeycomb.
3) If there's dusts on the rotor surface, use the vacuum cleaner with a brush to remove the dusts.
4) There's dust in internal tunnel of rotor, and use the compressed air to blow away the dust.
5) When there's the sticky dirt adheres to the inner wall of the runner tunnel, it must take the following steps to clean it:
   a) Turn off the regeneration heater and allow the moisture processing air (with a relative humidity exceeding 60%) to continue passing through the rotor, gradually reaching a saturated humidity state with rotor continuous running; If the air is too dry, it needs to be humidified, which will take over an hour.
   b) Depending on different properties of the dirt, place the rotor in water with the cleaning agent. For silicone rotors, the solution PH is 2~3, and for the molecular sieve rotor, the PH is 7~10; If it is an oily pollutant, it should be placed in an aqueous solution of xylene. Shake the rotor up and down in the solution for about 15 mins. before removing it.
   c) Remove the rotor from the solution and place it vertically for 5 mins. to help the solution to flow out.

d) Blow out the solution left in medium pores with the high-pressure air.

e) Install the rotor back into the dehumidifier and start the regeneration action of the machine (at a temp. of 50-60 ℃) for at least one hour.

Important: At the beginning of operation, there will be highly concentrated moisture discharged from the dry and wet air outlets; If using the solvent, there will be residual odor in the airflow for a period of time.

Important: For some oil stains or heavily sticky pollutants, it's almost impossible to clean them out of the rotor, and it has to replace the rotor. The property of clean rotor can be partially restored, but it can't be fully restored.



Picture 6-3: Honeycomb Rotor Dismantling Diagram

6.5 Blower Description

Precautions for blower use:

1) After machine starts, the blower will make a loud sound. If the blower sound is incorrect, please turn off the power. Then, check whether the blower works normally and whether the connection between the blower and the driver is correct.
2) Blowers can generate high temperatures during operation, and it should avoid touching the cover to avoid burns.
3) The motor load current will vary with the air pressure used by the blower. When wiring, it should install suitable overload protection switch of the mould, and use it at the rated full load current to avoid motor burnout.
4) To prevent hard objects, dust, powder particles, fibers, and water droplets from entering the blower with the inlet air, thus affecting the blower

efficiency. This machine has the design of an air filter, please clean the debris in the air filter regularly (once a week is recommended).

5) Clean the blower inside and outside regularly (especially the air passage of the cooling blower) to remove dust on the surface. If a large amount of dust is accumulated, poor heat dissipation will make the temp. rise, airflow reduce, and vibration increase, resulting in mechanical failure.
6) If the machine doesn't run smoothly or makes abnormal noise during use, please turn off the power for maintenance.
7) After the dryer works, there is only residual heat in the materials. Don't discharge the material or open the cleaning door before cooling.

6.5.1 Blower Product Parameters

1) Motor type: 3-phase DC brushless
2) Insulation grade: Class F
3) Protection grade: IP54
4) Use environment: -20℃~+60℃
5) Service life（Rated load run in at ambient temp. of 25 ℃）: 15000 hrs.

Picture 6-4: Blower

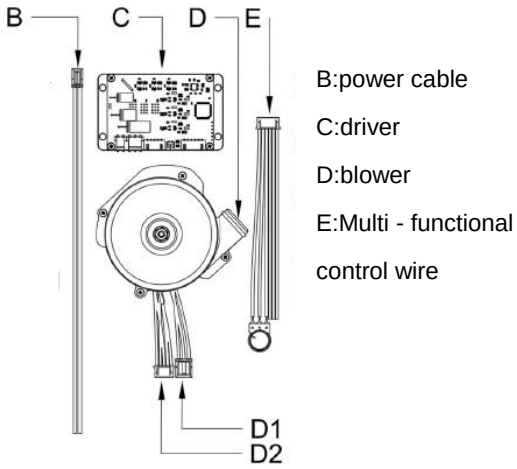
6.5.2 Common Fault Screening（LED1and LED2 are displayed on the driver board）

1) The LED1 ON indicates normal power supply; it flashes twice and pauses indicates the low voltage; it flashes three times and pauses indicates the high voltage; it turns OFF indicates driver damage, and power or power cable errors.
2) LED2 flickers -the motor is at the standby mode
3) LED2 is Off – the motor is at running state
4) LED2 and LED1are On at the same time - driver board overheat protection

LED2 slowly flashes twice and then pause - the power voltage is too high or too low

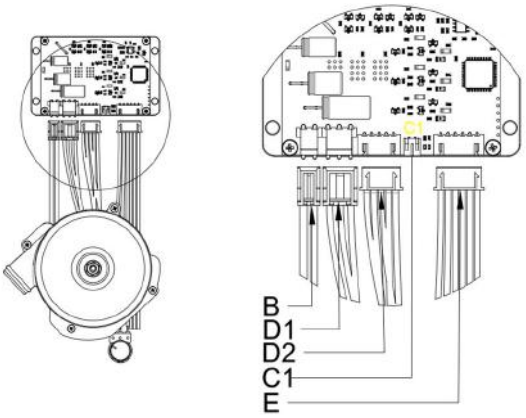
5) LED2 slowly flashes three times and then pause - LM358 current sampling error
6) LED2 slowly flashes four times and then pause - blower stuck or blocked
7) LED2 slowly flashes five times and then pause - motor phase shortage
8) LED2 slowly flashes six times and then pause - motor hall error
9) LED2 quickly flashes once - upper bridge arm error
10) LED2 quickly flashes twice - lower bridge arm error
11) LED2 quickly flashes three times - motor phase short circuit
12) LED2 quickly flashes four times- motor over-current protection

6.5.3 All Parts Name of the Blower



Picture 6-5: Blower Parts

6.5.4 Connection Method



Picture 6-6: Blower Connection Method

6.6 Maintenance Schedule

6.6.1 General Machine Information

Model _____ SN _____ Manufacture date _____

Voltage_____Φ_____V Frequency _____ Hz Power _____ kW

6.6.2 Installation & Inspection

☐Check whether the connection pipe is locked tightly.

☐Check whether the cleaning door of drying hopper is sealed.

☐Check whether the pipe connection is correct.

☐Check whether the honeycomb has damaged.

Electrical installation

☐Voltage _____V _____ Hz

☐Fuse spe.: 1 phase _____ A 3 phase _____ A

6.6.3 Daily Check

☐Check whether the blower is working normally.

6.6.4 Weekly Check

☐Check and clean the air filter.

6.6.5 Monthly Check

☐ Check whether the plate heat exchanger is blocked.

6.6.6 Half-year Check

☐ Check whether heat-resistant air pipe has damaged.

☐ Check and clean the dust from the regenerative blower /drying blower.

6.6.7 Yearly Check

☐ Check whether the contactor works normally[1].

☐ Check whether the KSD301 temperature protector works normally[2].

6.6.8 Triennial Check

☐ Replace the PC board.

☐ Replace the circuit breaker.

☐ Replace the drying blower.

Note: 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.

2. Use the multimeter KSD301 to measure the two connectors, and they are normally connected.