SCAD-U Series

Compressed Air Dryer

Date: March, 2023

Version: Ver.B (English)

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1. General Description

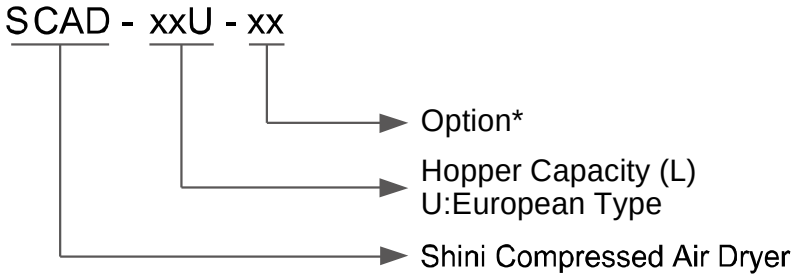
Read this manual carefully before operation to prevent damage of the machine or personal injuries.

Forbidden to process flammable or toxic material!

Applicable for the small batch drying of commonly-used engineering plastics such as ABS and PS, also suitable for the pre-heating treatment before plastics molding.

Picture 1-1：Compressed Air Dryer SCAD-12U

1.1 Coding Principle



1.2 Feature

1) P.I.D. temperature controller with LCD can reach an accuracy of ±1℃, and is easy to operate.
2) The weekly timer with an auto On/Off function.
3) The unit utilizes compressed air to dry plastic materials with a good and stable drying effect, and it is not influenced by ambient temperature and humidity.
4) Compressed air pressure detection lets the unit operate smoothly and safely.
5) Temperature control with an SSR relay can effectively prolong the unit's lifespan.
6) The controller has built-in overheat protection to avoid excessively high drying temperatures.
7) The unit has a built-in warning light that can visualize the status of the unit.
8) It has an RS485 communication interface to realize remote monitoring or automatic production.
9) The visualized drying hopper of SCAD -1~6U adopts a double-layer high-temperature-resistant tube.
10) SCAD-1~6U has an air discharge filter before the dry air is released outside.
11) The double-layer drying hopper of SCAD-12~40U is made of stainless steel to ensure no material contamination and prevent heat loss.
12) SCAD-12~40U has a pipe heater temperature protector to prevent the unit from overheating or dry burning.

1.3 Options

1) Entry-level dew point monitor, and add "Y.D." at the end of the model

code.

2) VAISALA dew point monitor, and add "D" at the end of the model code.
3) For the unit with a polished hopper inside (only for SCAD-12U and above), add "P" at the end of the model code.
4) Add "H.D." at the end of the model code for a heatless regenerative air dryer.

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.

Shini Hotline Service:

Headquarter and Taipei factory：

Tel: + 886 (0)2 2680 9119

Shini Plastics Technologies (Dongguan), Inc.：

Tel: +86 (0)769 8331 3588

Shini Plastics Technologies (Pinghu), Inc.：

Tel: +86 (0)573 8522 5288

Shinden Precision Machinery (Chongqing), Inc.:

+86 (0)23 6431 0898

1.4 Safety Regulations

Notice!

The electrical installation should be done by qualified electricians.
Before connect to power, make sure the specification of the power switch and rated current is proper and safe. Turn the switch into "OFF" position before power connection and also turn off both the power switch and auto running switch before maintaining.

1.4.1 Safety Signs and Labels

Hazard!

High voltage!

This label is attached to the housing of control box.

Caution!

Be careful when this label appears.

Warning!

Hot surface, easy to get hands burnt!

This label is attached at the housing of the electric heaters.

Attention!

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

1.4.2 Transportation and Storage of the Machine

Transportation

1) SCAD-U series 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) 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˚C to +55˚C for long distance transportation and for a short distance, it can be transported with temperature under +70˚C.

Storage

1) SCAD-U series should be stored indoors with temperature kept from 5˚Cto 40˚C 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˚Cand 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) At least a clearance of 1m surrounding the equipment is required during operation. Keep this equipment away from flammable sources at least two meters.
5) Avoid vibration, magnetic disturbance at the operation area.

Rejected parts disposal

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

Fire hazard

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

1.5 Exemption Clause

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

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

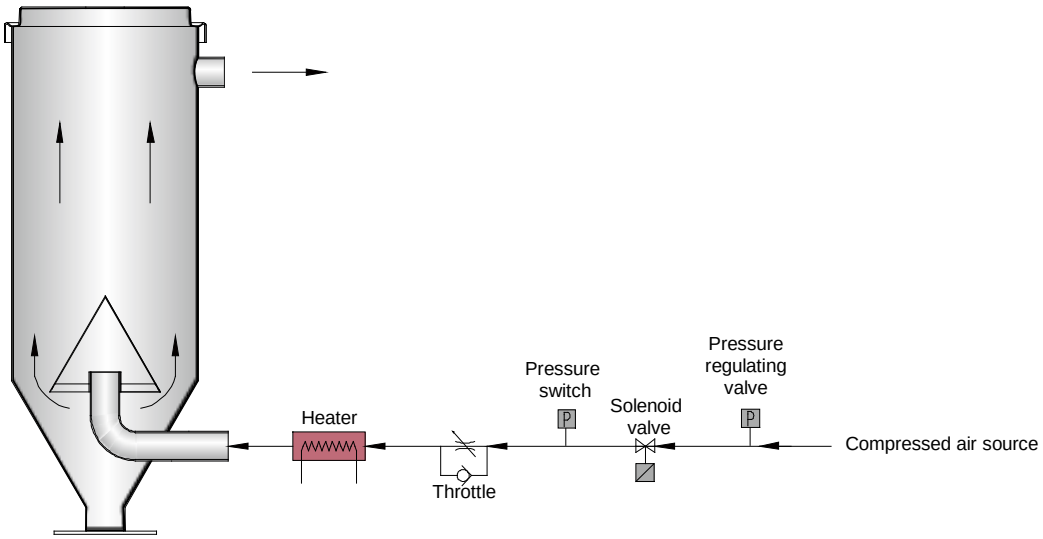
1) Any careless or man-made installations, operation and maintenances upon machines without referring to the Manual prior to machine using.
2) Any incidents beyond human reasonable controls, which include man-made vicious or deliberate damages or abnormal power, and machine faults caused by irresistible natural disasters including fire, flood, storm and earthquake.
3) Any operational actions that are not authorized by Shini upon machine, including adding or replacing accessories, dismantling, delivering or repairing.
4) Employing consumables or oil media that are not appointed by Shini.

2. Structure Characteristics and Working Principle

2.1 Main Functions

2.1.1 Working Principle Table (SCAD-U)

After startup, the system will immediately open the solenoid valve to make the machine's gas pipeline open. The compressed air generated by the compressor will pass through the filter & pressure regulating valve to change the pressure and filtrate the impurities. The adjusting range of the filter & pressure regulating valve is 0~1Mpa. The gas pressure entering the machine must ≥0.4Mpa, and the throttle valve controls the gas flow. The P.I.D high-precision heater can heat up the compressed air evenly, with accuracy of ±1℃; Finally, the high-temperature compressed air can be blown into the materials in the drying hopper through the air diffuser. The moisture in the materials is evaporated after being heated up, taken away by the compressed air, and discharged into the air, thus achieving the effect of drying materials.

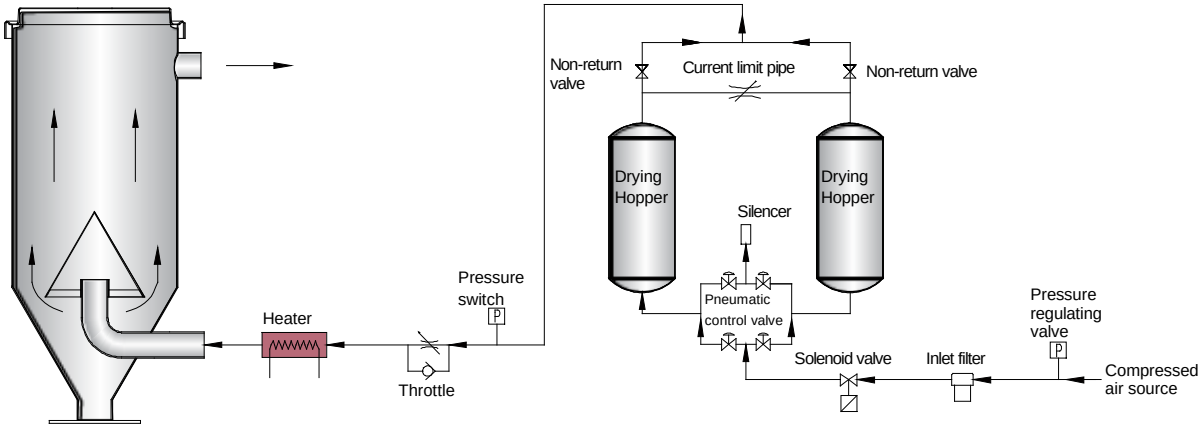


Picture 2-1：SCAD-U Working Principle

2.1.2 SCAD-U-HD Working Principle (Option)

After startup, the system will immediately open the solenoid valve to make the machine's gas pipeline open. The compressed air generated by the compressor will pass through the filter & pressure regulating valve and filter (include the oil mist filter and micro filter) at the inlet to change the pressure and filtrate the

impurities. The adjusting range of the filter & pressure regulating valve is 0~1Mpa.The gas pressure gets into the machine must ≥0.4Mpa, and the compressed air after pressure regulation and impurity removal will enter the heatless regenerative air dryer. The heatless regenerative air dryer works according to the pressure swing adsorption principle, and the desiccant absorbs moisture under pressure, which a releases moisture under reduced pressure to dehumidify the compressed air. The compressed-air dew point after dehumidifying can reach - 40 ℃, and the throttle valve controls the gas flow. The P.I.D high-precision heater can heat up the compressed air evenly, with accuracy of ±1℃; Finally, the high-temperature compressed air is blown evenly to the materials in the drying hopper through the air diffuser; The moisture in the materials is evaporated after being heated up, taken away by the compressed air, and discharged into the air, thus achieving the effect of drying materials.



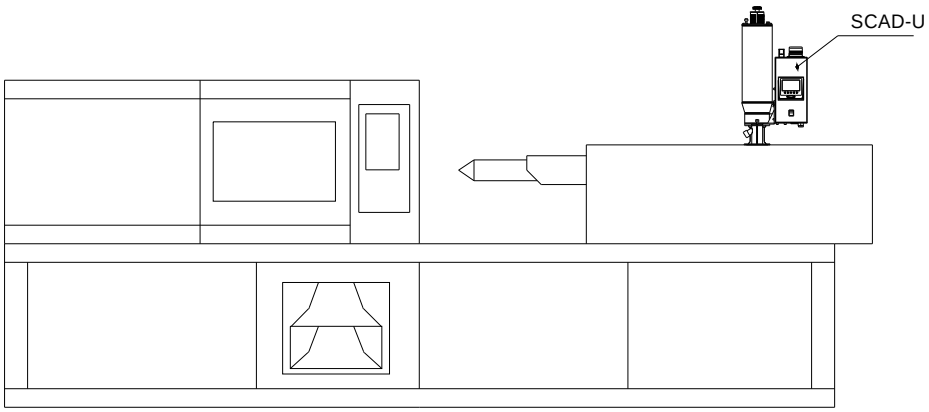
Picture 2-2：SCAD-U-HD Working Principle

3. Installation and Debugging

3.1 Attentions during Installation

1) Make sure that voltage of electricity matches with the nameplate.
2) Connect the electricity wire and earth wire according to local regulations.
3) Use independent electricity wire and power switch .The diameter of the wire should not be less than that of electric cabinet's wire.
4) The end of the electricity wire should be safe and firm.
5) This series of power supplies adopts a single-phase three wire system, and connect the power supply (L) to the live wire, (N) to the zero line and the ground wire (PE).
6) Electric Power distribution demand.
   Main power voltage：±5%
   Main power frequency：±2%
7) Install pipe work system according to scheme of wiring.

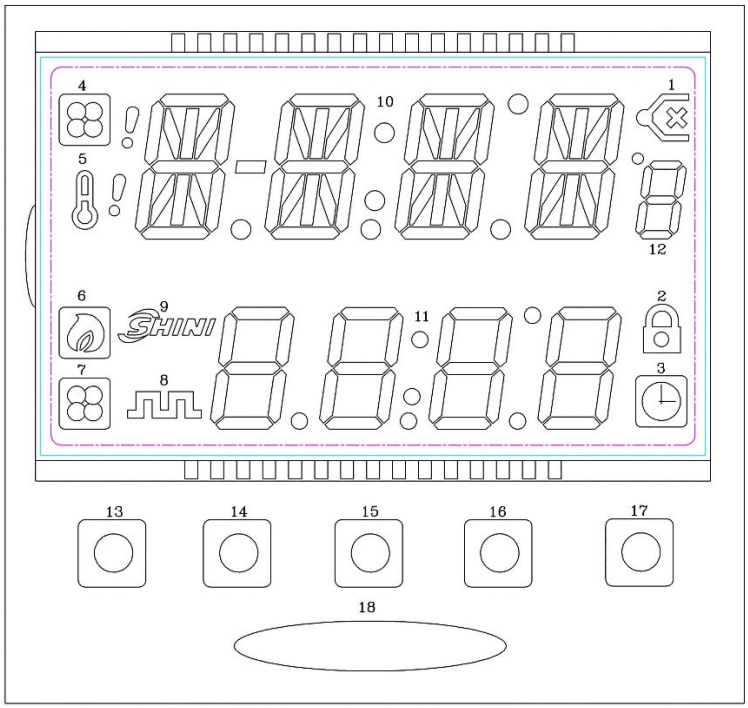
3.2 Installation Structure Demonstration



Picture 3-1：Installation Structure Demonstration

4. Application and Operation

4.1 Panel Description



Picture 4-1：Operation Panel

Table 4-1: Panel Description

No.	Description	No.	Description
1	K-Type wire broken indicator	10	4 bit PV display area +1 bit unit
2	SV Lock indicator	11	4 bit SV display area
3	Reserved timing indicator	12	Unit + weekday reservation (Mon. =1…Sun.=7)
4	Blower overload input indicator	13	On/Off button
5	Overheat indicator	14	Menu button
6	Heating indicator	15	Set button
7	Blower indicator	16	▽button
8	Intermittent running indication	17	△button
9	Logo	18	Status indicator signal

4.2 Operation Instruction

Table 4-2: Display Description

	PV	SV
Intermittent Operation	present temp. display	alternate display of countdown time and set temp. unit + weekday reservation = no display
Timing Startup	alternate display of present time and OFF	startup time display Unit + weekday reservation = display startup weekday
Timing Shutdown	alternate display of present time and temp. value	alternate display the unit of shutdown time and set value + weekday reservation = display shutdown weekday

4.2.1 Dew-point Monitor Setting

When setting the D-EN to yes, the dew-point value is on, and it can press the ▽ or △ button to switch current displaying screen (temp. value and dew-point value).

Picture 4-2：Dew-point Monitor Setting

When displaying the dew-point value, long press the Menu key 2S to enter the dew-point setting screen;

When displaying the temp. value, long press the Menu key for 2S to enter the basic setting screen.

Note: After the EGO error occurs, it must press the ON/OFF key to cancel the alarm.

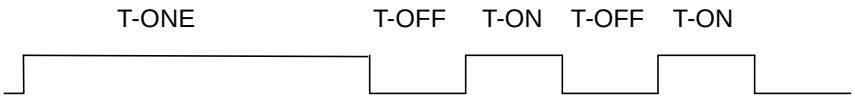
4.3 Intermittent Running Description

Set the initial intermittent running time (RONE) to 120, the intermittent running OFF time (ROFF) to 60, and the intermittent running ON time (R ON) to 180, which means that the first drying time after startup is two hours. The machine will stop one hour, and start three hours; and then stop one hour and start three hours, and so on.

T-ONE: Initial intermittent running time (RONE)

T-OFF: Intermittent running OFF time (ROFF)

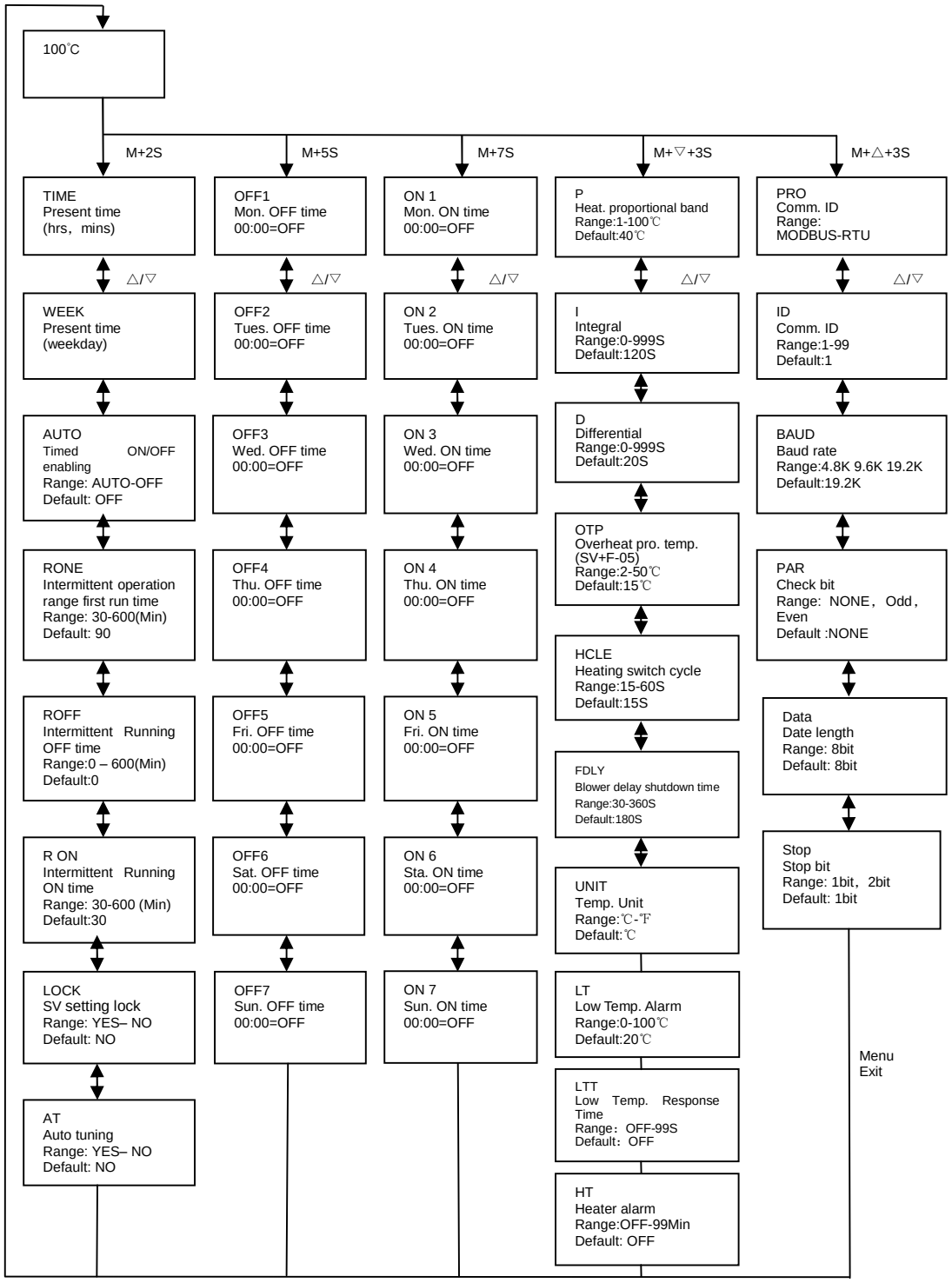
T-ON: Intermittent running ON time (R ON)



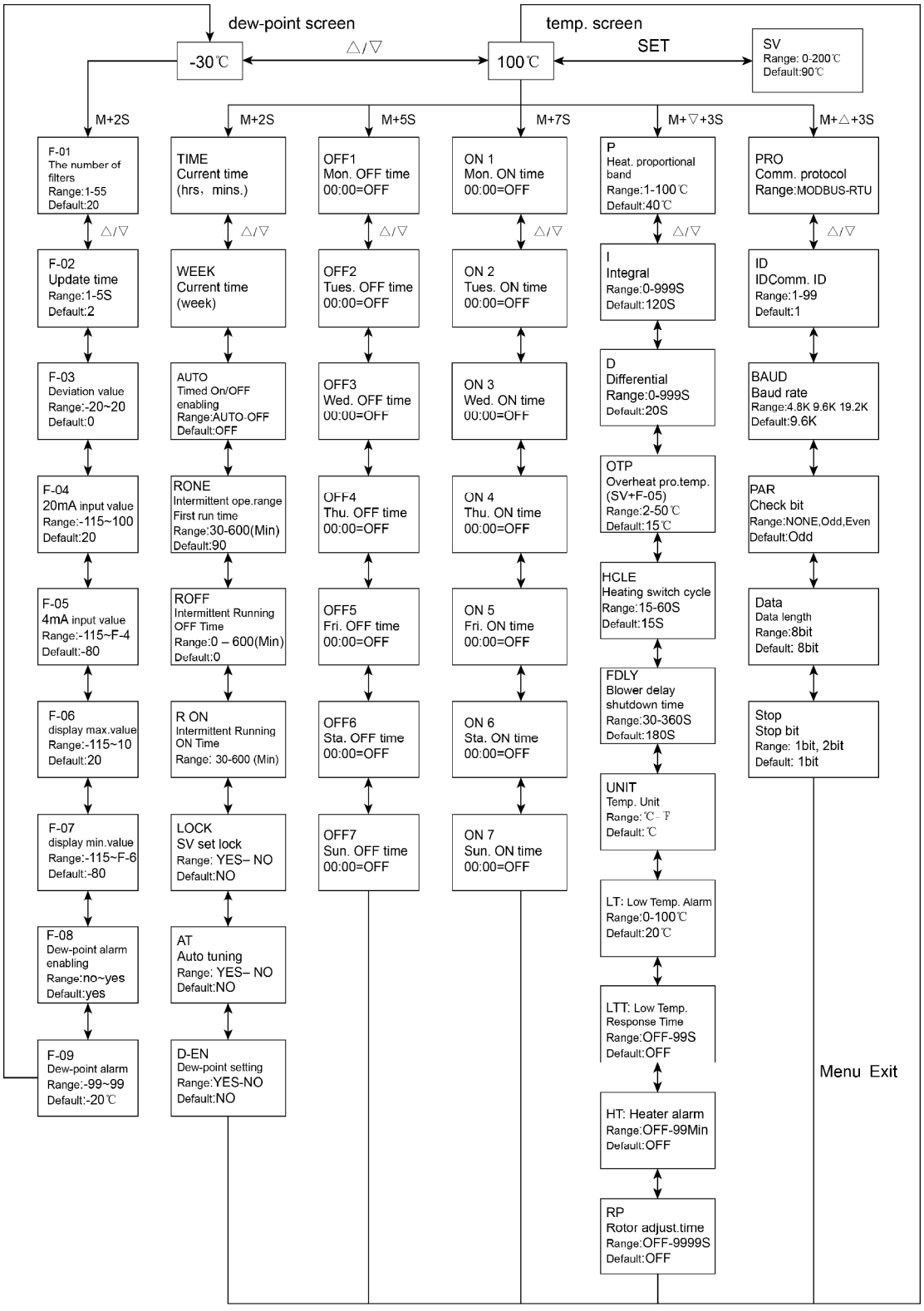
Picture 4-3： Intermittent Running Diagram

4.4 Operation Process

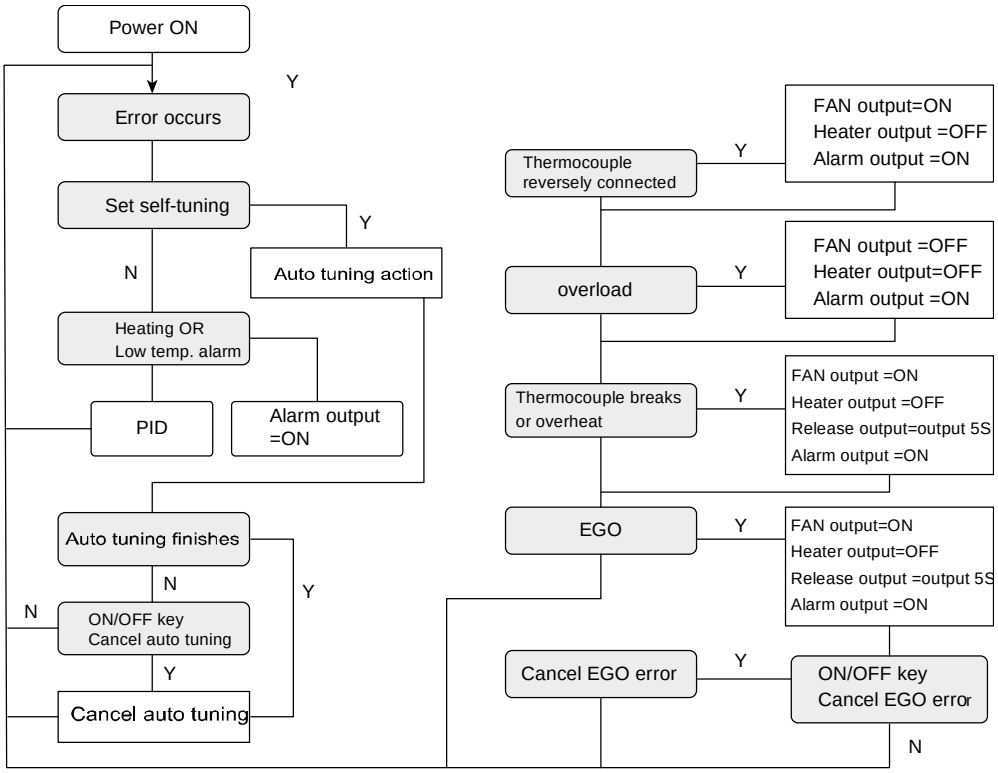
4.4.1 Parameter Button Menu of the Standard model (TS-02 controller)



4.4.2 Parameter Button Menu of the optional dew-point meter（TS-22 controller）



4.5 Operation Flow Chart

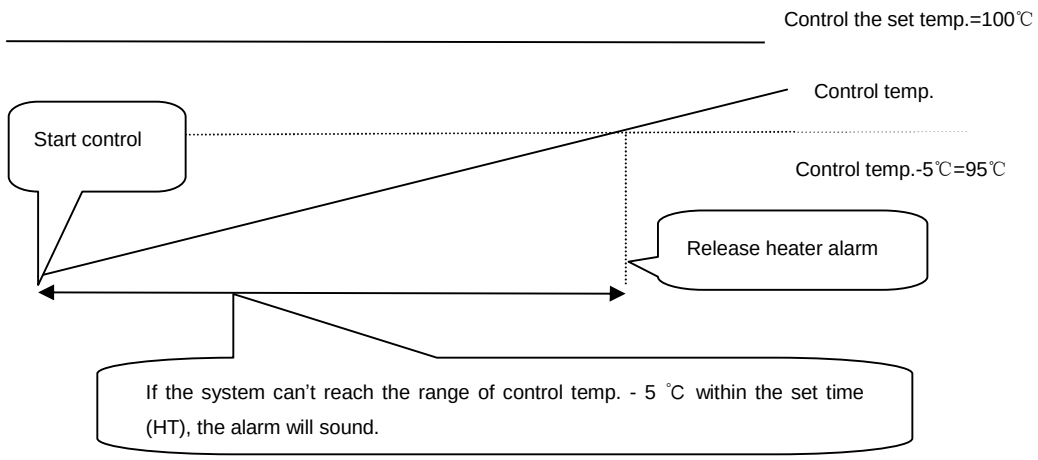


Picture 4-4： Process Flow Diagram

4.6 Alarm Description

4.6.1 Heater Alarm

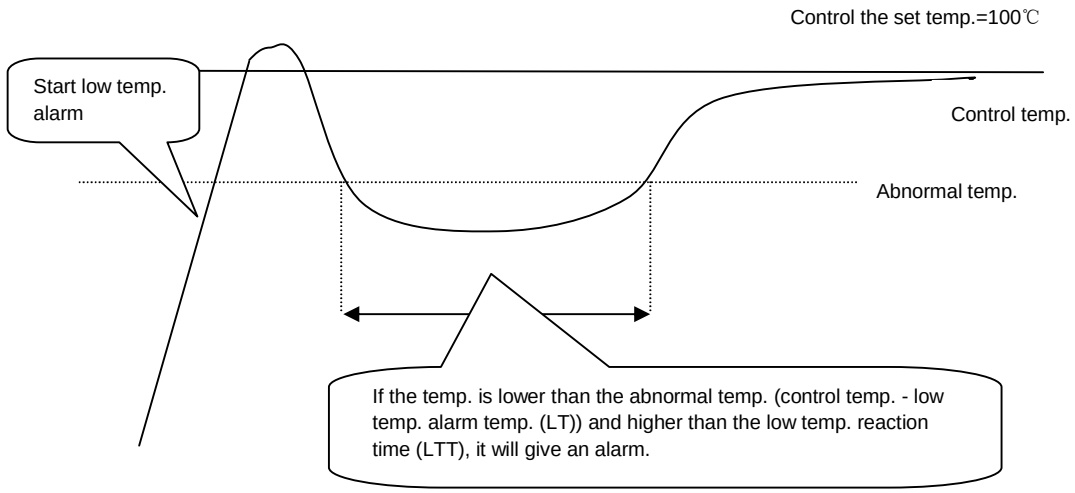
1) The heater will give alarm if the control temp. can't reach the value below set temp. -5 ℃ range within the heater alarm set time (HT).
2) The Heater alarm only works when the control board is OFF ->ON. Once it reaches the temp. range, the alarm will be cancelled.
3) The temperature control will not stop even it gives the alarm.



Picture 4-5：Heater Alarm Diagram

4.6.2 Low Temperature Alarm

1) After the system reaches the set temp., the low temp. alarm will be started.
2) When the control temp. is lower than the abnormal temp. (control temp. - low temp. alarm temp. (LT)) and greater than the low temp. reaction time, it will give an alarm.
3) The temperature control will not stop even it gives the alarm.



Picture 4-6：Low Temp. Alarm Diagarm

4.7 Error Code Description

Table 4-3: Error Code Description for Standard Model (TS-02)

Error Code	Possible Reasons	Solution
bR	Thermocouple breaks	Check whether the terminals of machine are loose or broken.
oH	Overheat	Check whether the setting of overheat deviation parameters is reasonable. If it is prohibited, set the deviation to 0 ℃.
REV	Thermocouple reversely connected	Replace the positive and negative poles of the thermocouple.
oL	Overload	Shut down and restart. In case of any problem, please check the machine.
bAT	Battery fault	Check whether the battery is installed correctly or replace the battery.
EGo	EGO overheat input	Detect the overheat setting of the parameter input EGO, and check whether the overheat signals of normal open and close are correct.
xATx	Auto- tuning error	Shut down and restart. In case of any problem, please check the machine.
LT	Low temp. alarm	Check whether the low temp. deviation signal is reasonable. If it is prohibited, set the deviation to 0 ℃
HT	Heater alarm	Check whether the heater works normally.

Table 4-4: Error Code Description for Optional Dew-point Meter (TS-22)

Error Code	Possible Reasons	Solution
bR	Thermocouple breaks	Check whether the terminals of machine are loose or broken.
oH	Overheat	Check whether the setting of overheat deviation parameters is reasonable. If it is prohibited, set the deviation to 0 ℃.
REV	Thermocouple reversely connected	Replace the positive and negative poles of the thermocouple.
oL	Overload	Shut down and restart. In case of any problem, please check the machine.
bAT	Battery fault	Check whether the battery is installed correctly or replace the battery.

EGo	EGO overheat input	Detect the overheat setting of the parameter input EGO, and check whether the overheat signals of normal open and close are correct.
xATx	Auto- tuning error	Shut down and restart. In case of any problem, please check the machine.
RP	Rotor switch input error	Set the parameter to OFF and close the rotor.
LT	Low temp. alarm	Check whether the low temp. deviation signal is reasonable. If it is prohibited, set the deviation to 0 ℃
HT	Heater alarm	Check whether the heater works normally.
d-SV	Dew point temp. > dew point alarm temp.	Check whether the dew-point meter is normal.
d-H	Input current>21mA	Check whether the power is normal.
d-L	Input current <4mA	Check whether the power is normal.

5. Trouble-shooting

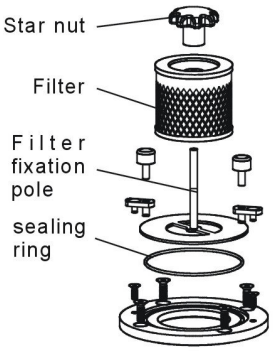
Fault	Possible reasons	Solution
Actual drying temp. can't reach the set value	1.Thermocouple fault	1. Replace thermocouple.
	2.Controller fault	2. Readjust the controller or replace the controller.
	3.Pipe heater fault	3. Replace the pipe heater.
System can't run	1. Power disconnected.	1. Connect to the power
	2. Circuit board damage.	2. Replace
	3. Power circuit fault.	3. Check the power circuit
	4.Control circuit fuse breaks	4. Replace the fuse
Pressure switch alarm	1.External air source disconnected	1. Turn on external air source.
	2.Solenoid valve fault.	2. Replace the solenoid valve.
	3.Pressure switch fault.	3. Replace the pressure switch.
	4. Controller fault.	4. Readjust the controller or replace the controller.
	5. Air pipe broken.	5. Replace the air pipe.
Actual drying temp. exceeds the set value	1. Thermocouple fault.	1. Replace the thermocouple.
	2. Controller fault.	2. Readjust the controller or replace the controller.
	3. Pipe heater fault.	3. Replace the pipe heater.
The indicator on the control panel of SCAD-20U-HD is OFF*.	1.Power cable breaks	1. Replace the power wire.
	2. Controller fault.	2. Readjust the controller or replace the controller.
The compressed air dryer SCAD-20U -HD doesn't switch the hopper*.	1.Controller fault.	1. Readjust the controller or replace the controller.
	2.Hole blocked.	2. Remove the discharge hole and blow it with the compressed air.
	3. Solenoid valve fault.	3.Replace the solenoid valve.
	4. Exhaust valve fault.	4.Replace the exhaust valve.
	5. Silencer blocked	5.Clean or replace silencer.

	6. Check valve fault.	6. Replace the check valve.
The adsorbent exchange indicator of the compressed air dryer SCAD-20U-HD is ON*	After running for 10,000 hrs.	Replace adsorbent and check valve.
The component exchange indicator of the compressed air dryer SCAD-20U-HD is ON*	After running for 5,000 hrs.	Replace the suction and discharge filter components and silencers.

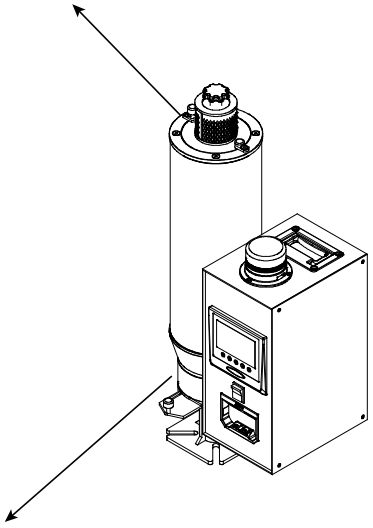
Note: * Stands for optional model - HD

6. Repair and Maintenance

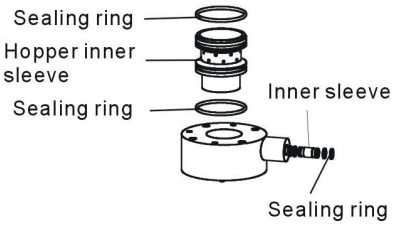
SCAD-6U and Models Below



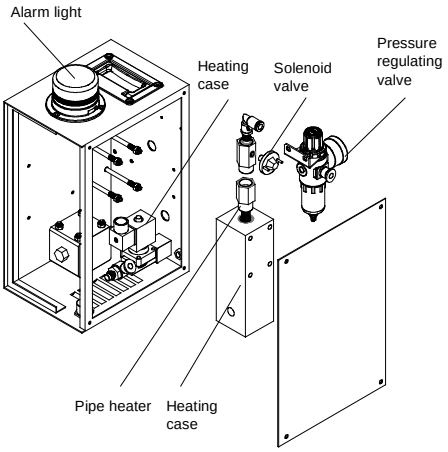
1. Filter cleaning.
   Period: Daily
   Method: unscrew the nuts and take out the filter, blow off the dust with compressed air.
   Lifetime: 6~12 months.
2. Check the sealing ring is damaged, or replaces a new one.
   Period: Monthly
   Check whether the screw bolt and the screws work normally.
   Period: Monthly



3. Check the sealing ring is damaged, or replaces a new one. Period: Monthly

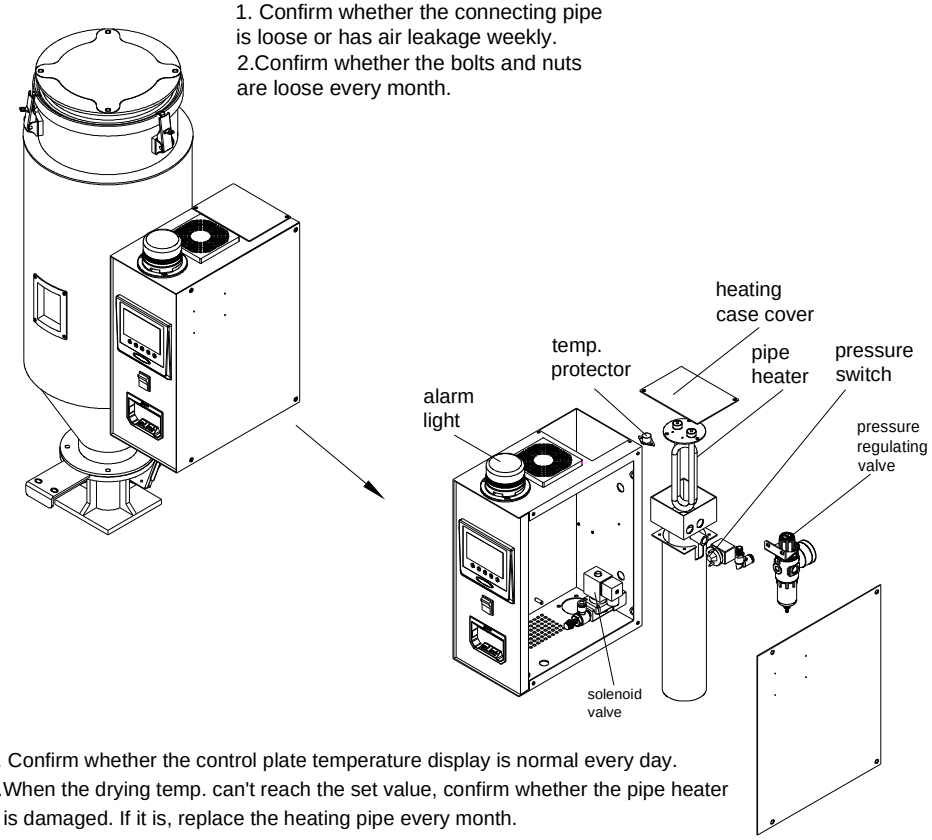


4. Check whether the pipe heaters are damaged when the drying temperature can not reach the set value; replace them if they are damaged. Period: Monthly
5. Confirm whether the pressure switch is normal every day .
6. Check whether the solenoid valve works normally. Period: Weekly
7. Check whether the filter & pressure regulating valve works normally.
   Period: Weekly



SCAD-12U and Models Above

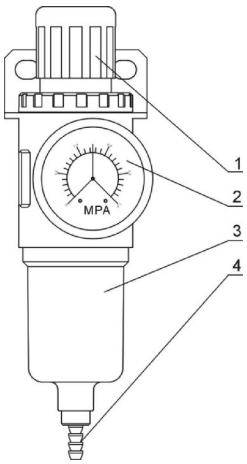
1. Confirm whether the connecting pipe is loose or has air leakage weekly.
2.Confirm whether the bolts and nuts are loose every month.



3. Confirm whether the control plate temperature display is normal every day.
4.When the drying temp. can't reach the set value, confirm whether the pipe heater is damaged. If it is, replace the heating pipe every month.
5.Confirm whether the the control panel temp. display is normal every day.
6.Confirm whether the temperature protector is normal every day.
7. Confirm whether the solenoid valve works normally every.
8. Confirm whether the filter & pressure regulating valve and pressure switch work normal, and conduct spot inspection every week.
9.Confirm whether the flow adjusting air pipe connector is normal, and the drying temperature can't reach the set value. The flow may be too large, the pipe heater is easy to be damaged, and the flow may be too small, check it every month.

6.1 Filter & Pressure Regulating Valve

6.1.1 Filter & Pressure Regulating Valve Drawing



Parts list:

1. Pressure adjusting knob 2. Pressure gauge 3. Cup 4. Water outlet

Picture 6-1：Filter & Pressure Regulating Valve Drawing

6.1.2 Filter & Pressure Regulating Valve Operation steps

1) Switch on the air source.
2) Pull the black pressure adjusting knob 1 upward and rotate it, observe the pressure gauge 2, generally a 0.5 Mpa pressure is advisable.
3) Push back the black knob 1.

6.2 Filter

Clean the filter periodically , usually one time for a week；

Steps：

1) Take out filter.
2) Use compressed air to clean the lid and filter.
3) Use cloth to wipe out the empty internal face of the filter.
4) Install in opposite order after cleaning.

Note: Do not let any scrap fall into the hopper when take the filter out.

6.3 Maintenance Schedule

6.3.1 About the Machine

Model _____ SN _____ Manufacture date _____

Voltage _____ Φ_____V Frequency _____ Hz Power _____ kW

6.3.2 Installation & Inspection

☐Check if the pipe are connected correctly

☐Check if the pipe has any leakage

☐Check if the sealed joint has any crack

Electrical Component Installation

☐Voltage: _____ V _____ Hz

☐Fuse melt current: 1 Phase _____ A 3 Phase _____ A

☐Power phase sequence check

6.3.3 Daily Checking

☐Check the function of switches.

☐Check all wires of the machine.

6.3.4 Weekly Check

☐Check if the joint point is loose.

6.3.5 Monthly Check

☐Check the function of timer.