BITEMAN TECHNOLOGY

Operation and Maintenance Manual



BITEMAN

Modular Units Desiccant Air Dryer



Carefully Read Before Operation

Shenzhen Biteman Technology Co., Ltd

BITEMAN Modular Units Desiccant Dryer

_____ Manual

Model : _____

Programme : _____

Note :

"B" stand for B-series ,Pressure Dewpoint -40℃ /-40 ℉

"C" stand for C-series, Pressure Dewpoint -20℃ /-4℉

About BITEMAN

Thank you for using BITEMAN innovative and patented Modular desiccant dryer

BITEMAN originally and exclusively employ Modular-Units concept and put it into practice,it helps to reduce purge and valuable downtime substantially,and get excellent performance.

It is compact and consists of certain number movable and replaceable desiccant units,thanks to manifold flow distribution and flow buffer cavity design to achieve excellent Pressure dewpoint and minimum purge losses.

Built-in self-designed PLC with 5inch LCD touch screen make the operation so easy and convenient,friendly User interface allows user to change all operation parameter to meet real working condition aim to save more purge while have needed dewpoint.

BITEMAN patents:US:US8,808,435 B2 ;PCT:WO2012/031532

China:ZL200620017361.8,ZL201020521796.2,and ZL201120150758.5

Filters:ZL200720171525.7,ZL201020514610.0

Filter integrated drainage system:ZL201020106389.5

Software copyright:2009SR054506,2010SR021054,2010SR021052 and 2010SR021050

In this manual, we will focus on running the operation of the device, use and maintenance, maintenance, and troubleshooting

Must follow the guild line before operation and maintenance

If you have questions or need assistance, please contact Biteman Technology or your local dealer.

This manual is written according to present products ,any change due to improvement is without further notice. Stay tuned for our followed products!

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Chapter One Safety

1.1 Overview

BITEMAN Products (Modular dryers, hereinafter referred to as a dryer) is the result of years of careful design and research, and have independent intellectual property rights of high-tech products, can work very safe and reliable . The following precautions should be followed carefully, it will reduce failure rate to a minimum within service life.

Only trained and authorized personnel to operate the dryer, the operator must read the manual carefully and fully understand before starting. It may lead to accidents if do not carefully follow the instructions ,work procedures and safety precautions. Before starting, we must ensure that the equipment is intact, otherwise it may lead to failure; Cut of power and mark in case of any wrong operation if device failure is confirmed .

Equipment operators need to carefully read the manual and keep it.

1.2 Prevention of electric shock



- Electrical wiring, maintenance must conform to local standard Criteria and provisions and handled by qualified technician
- Body, hands and other conductive material shall avoid touch exposed wire, must cut off power while maintenance and repair

- Prohibit non-professionals to operate

- Before complete the connection of electrical box, the operator may not leave the machine, or marks to prevent accidental start-up;
- Before starting, make sure that all the circuit in good condition.

1.3 Irritating substances



- BITEMAN unique movable and replaceable factory filled desiccant cartridge avoid to expose operator to absorbent directly and use high capacity customized Molecular Sieve as absorbent to make sure claimed Pressure dew point.

- Prohibit to touch desiccant and inhale desiccant dust, wear glove and respirator
- During the operation, if accidentally ingested adsorbent, should seek medical advice immediately; if come into the eyes, please flush with water
- If the adsorbent inadvertently scattered on the ground, please cleaned
- Note: The adsorbent is chemicals, the routine safety monitoring ,for the adsorbent herein have not indicated any hazardous material regulations.

1.4 Hot surfaces and sharp edges

- When engaged in maintenance work around the equipment, protective equipment should be worn, such as: gloves, helmets, etc;
- Heated dryer is built in heaters, Don't touch dryer top cap during operation
- Wear glove during maintenance in case of sharp edges

1.5 Transportation



Dryer is compact modular structure,much light weight and small dimension for easy transportation and lifting.

Dryer is packed in Plywood case, electrical panel, gauges and silencers are tightly wrapped with plastic film to prevent mechanical damage or moisture

Dryer must stand up during transportation, not violence loading and unloading;

• We recommend using a forklift, ensure that only for lifting equipment on the base or wood, beware of uneven load distribution; pipeline or any dryer component must not be used as load-bearing points, otherwise it will cause damage to the pipeline distortion, component damage

• Prohibit rain or wind during lifting;

• Ensure that all lifting and loading facilities can withstand the weight of the dryer;

• Before hoisting equipment, the operator should carefully check the connection bolts and nuts are firm, wooden packaging is solid

1.6 Maintenance and Repair

• Operators must be in strict compliance with the operating manual and safety regulations before installation, commissioning, operation, maintenance and repair ,and so on if you have any questions, please contact BITEMAN company or local distributor

• All operation must be handled by qualified technician

• Cut off power and shut down inlet and outlet valve and relieve pressure before maintenance and repair against accidental injury;

Please strictly keep in accordance with this manual to cut off power and relieve pressure

• has been designated for installation, maintenance and repair work, from my company (BITEMAN) responsible for implementing the service (contact details see last page);

• Maintenance of equipment failure in the state, please paste it in the fuselage above the nameplate, beware uninformed opened, causing personal injury;

• If the installation (maintenance) work in high places, should use appropriate safety scaffolding or other climbing equipment, for repair work above 1.8m, maintenance personnel must wear seatbelts.

1.7 Other Considerations

1.7.1 Responsibility

Personal injury or objects damage caused by one or more of the following Division BITEMAN assumes no responsibility for:

• Contrary to the provisions of the operating manual and other aspects of transportation, storage and installation;
• Due to improper startup/stop , operation and maintenance of equipment;
• Over pressure;
• When the operators have known defects, but still operate the equipment;
• Use of damaged or exceeded zero (with) member not be replaced;
• Use of non-original spare parts;
• Dismantle equipment without permission;

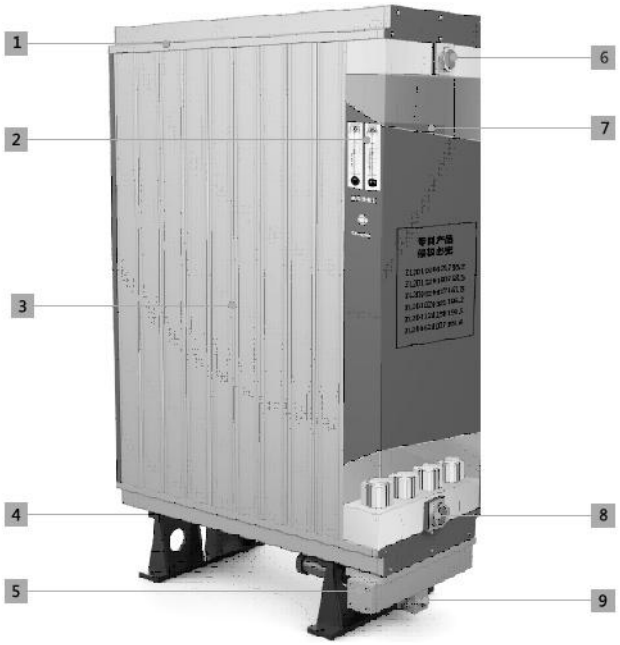
1.7.2 Requirements

• Use a suitable tool in perfect state;
• Follow safety provisions and regulations;
• Carefully read and master the operating manual.

Chapter Two Spare Parts and function

2.1 Components Name





1	Outlet Tube	2	Purge Rotameter
3	Body	4	Inlet Tube
5	Purge Valve Holder	6	Outlet
7	Electrical Box	8	Inlet
9	Integrated pre-filter drain valve		

2.2 Components

2.2.1 Inlet cavity

Flow is equally divided and distributed into each desiccant unit (cartridge)

2.2.2 Desiccant units (cartridges)

Factory-filled desiccant unit is a replaceable molecular sieve holder ,there are two groups of certain cartridges and flow alternatively pass through to be dried and desiccant regenerated

2.2.3 Outlet tube

Dried air is gathering and go downstream via non-return valve

2.2.4 Seal

2.2.5 Inlet valves (Diagram 1-1 and 1-2)
Control the changeover between A and B

2.2.6 Outlet one-way valve group (Diagram 2-1 and 2-2)
Connected to compress air system. Dried air is divided into three parts,
one is purge air to regenerate desiccant; Second flow into solenoid valves; Third output to air system

2.2.7 Silencer valve cavity (Diagram 3-1 and 3-2)
Assist the changeover between A and B group and control purge
air discharge

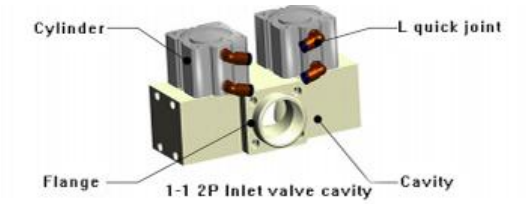
2.2.8 Dual silencer (Diagram 4-1 and 4-2)
Big flow capacity dryer employ Dual silencer to discharge purge air

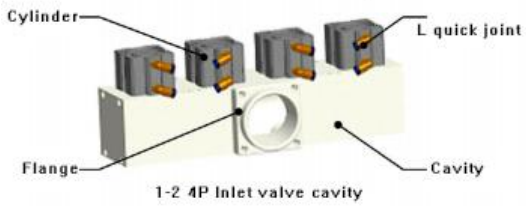
2.2.9 Pressure meter
A and B pressure display (approximate to outlet air pressure)

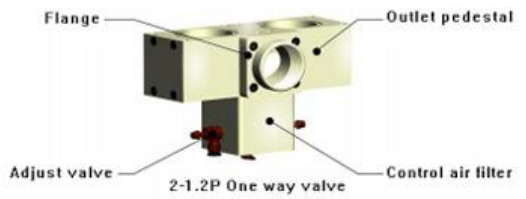
2.2.10 Electrical control
PLC module and microprocessor control system with touch panel control

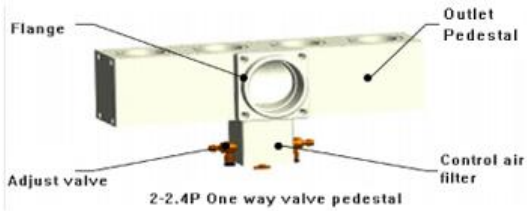
2.2.11 Collective drainage valve
Collect the water and condensate from before filters and dryer
then discharge regularly
Adjust the drainage screw to control the water drainage volume in
different season to save air

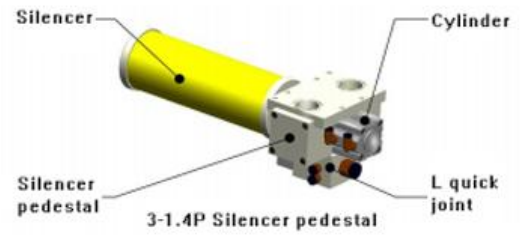
2.2.12 Electricity and Pneumatic component
Solenoid valve control

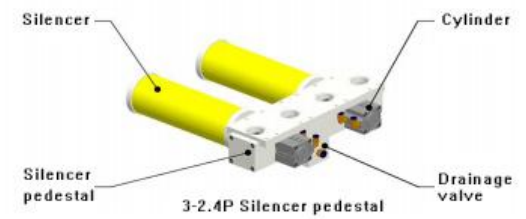
















Chapter Three Installation

3.1 Installation Notice

3.1.1 Install dryers strictly according to manual

3.1.2 Carefully clean upstream pipeline before connected to dryer

3.1.3 Install on firm concrete and smooth floor,secured by anchor bolts

3.1.4 Better keep a certain distance from other vibration equipments

3.1.5 Heaters are needed for the ambient temperature lower than -10℃

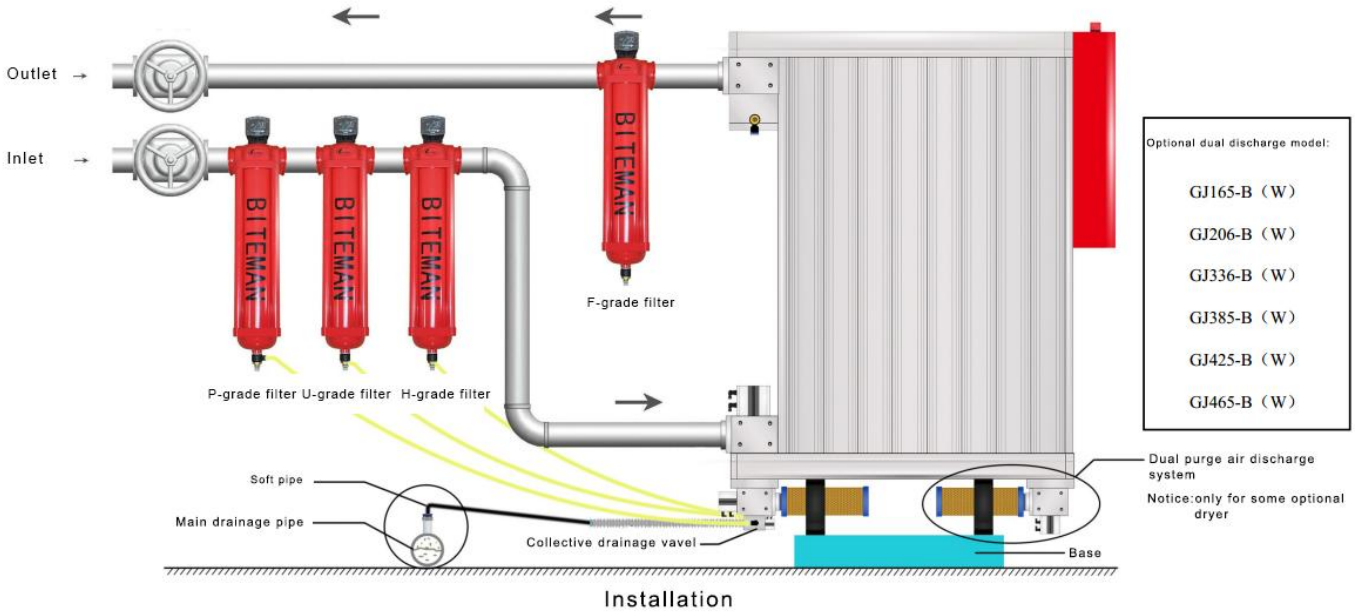
3.1.6 Keep good ventilation ,0.8m away from wall or other equipment ,1.5m from roof

3.1.7 By-pass valve is necessary for the air system without spare dryer ,in case of maintenance and repair without air supply

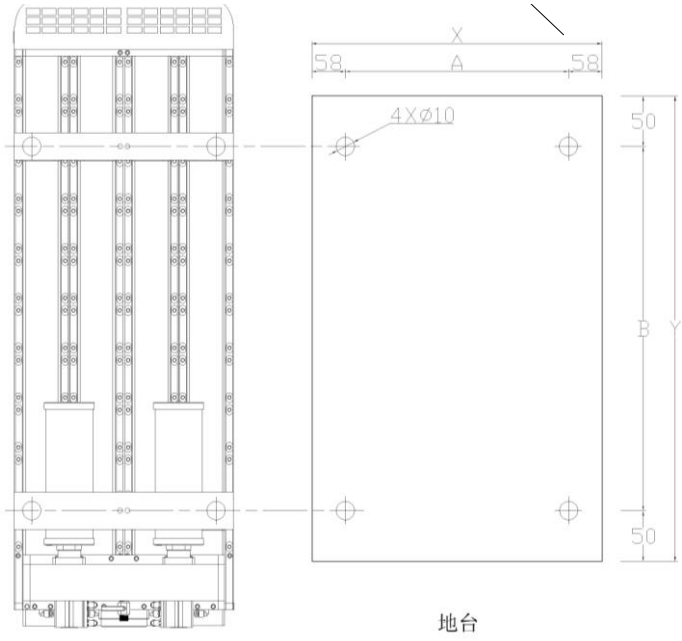
3.1.8 When two or more dryers share drainage pipe,must use 3inch or bigger pipe

3.1.9 Installation ground is recommended, dimension refer to below diagram

3.2 Installation diagram



Installation



Above is a standard installation,user could install according to surrounding condition

Diagram 6:Ground dimension
Height :100mm
X:width Y:length
A:horizon distance of two poles
B:Vertical distance of two poles
Anchor bolt is maximum diameter 10mm

Base dimension

Inlet & outlet height (-40℃PDP)			
Model	Outlet (B+C)	Inlet (C)	Connection (in)
GJ065-B（W）	1528	270	2
GJ085-B（W）			
GJ106-B（W）			
GJ146-B（W）			
GJ165-B（W）			
GJ206-B（W）			
GJ248-B（W）	1513	285	3
GJ295-B（W）			
GJ336-B（W）			
GJ385-B（W）			
GJ425-B（W）			
GJ465-B（W）	1513	285	4

Inlet & outlet height (-40℃PDP)			
Model	Dimension mm (±2mm)		
	Outlet (B+C)	Inlet (C)	Connection (in)
GJ026-C（W）	808	317	1
GJ038-C（W）			
GJ065-C（W）	1303	270	2
GJ085-C（W）			
GJ106-C（W）			
GJ146-C（W）			
GJ165-C（W）	1283	285	3
GJ206-C（W）			
GJ248-C（W）			
GJ295-C（W）			
GJ336-C（W）			
GJ385-C（W）			
GJ425-C（W）			
GJ465-C（W）	1283	285	4

1.Dryers can not share drainage pipe with compressors and receivers

2.Position of the connector of drainage main pipe and drainage hose should be maximum 30mm higher than that of drainage valve

3.3 Inlet and Outlet Connection Dimension



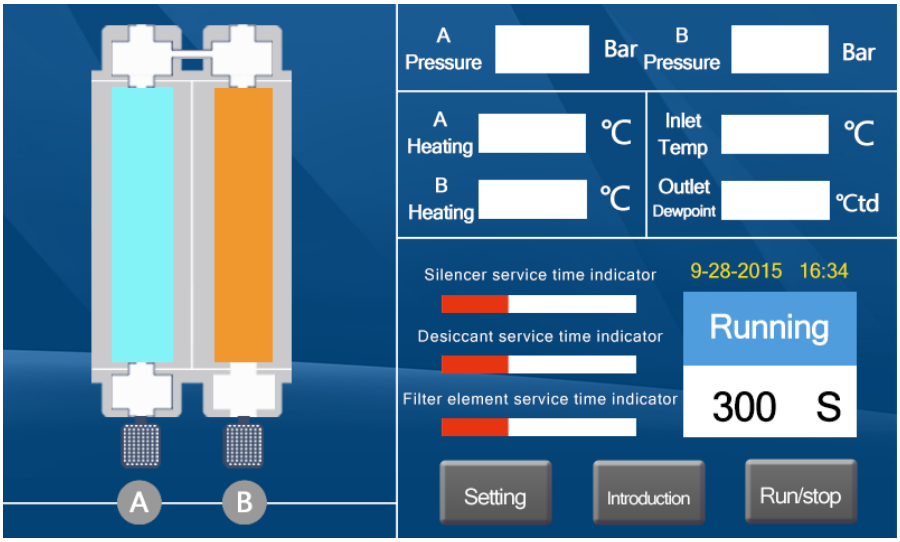
Chapter 4 User Interface and Parameter Setting

4.1.Power on ,show initial interface

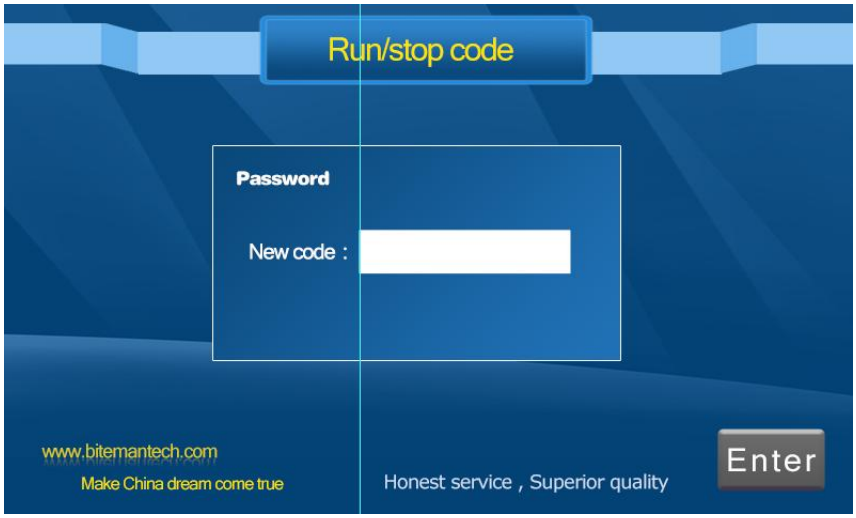


Click Enter to Operation Menu

4.2.Operation Menu shows all working parameter and indicator



4.3.Run/Stop:Click Run/stop to enter “Run/Stop Code” menu



Click white bar show the key-board and input “ 128 “ and “OK” to next page

“Start/Stop”

4.3.1 .In the "Start / Stop" screen There are three buttons , Start ,Stop and Auto

Click AUTO to switch MANUL to

Then Start and Stop button works , Click Start to manually Start the dryer or click Stop to shut down dryer

At Auto status ,dryer can automatically start while air pressure reach reach preset “start-up pressure”Bar (rang from 4bar to system normal pressure) or stop if pressure is lower than preset “shut-down pressure”,minimum 3bar





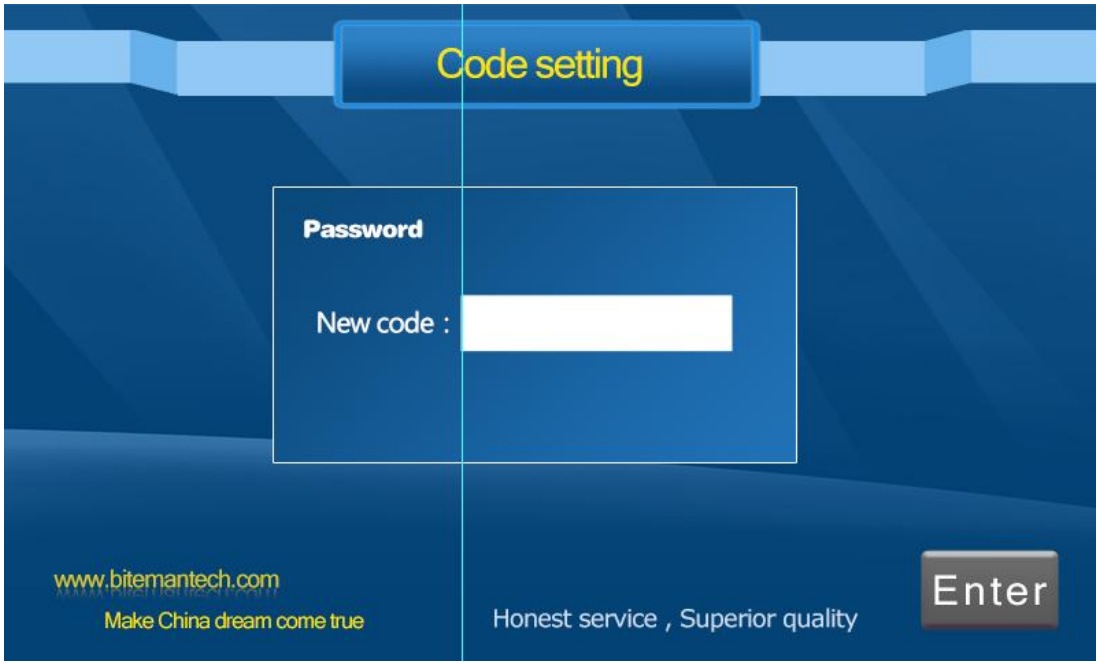
4.3.2.Click “Introduction”at main menu to enter “Company Profile”

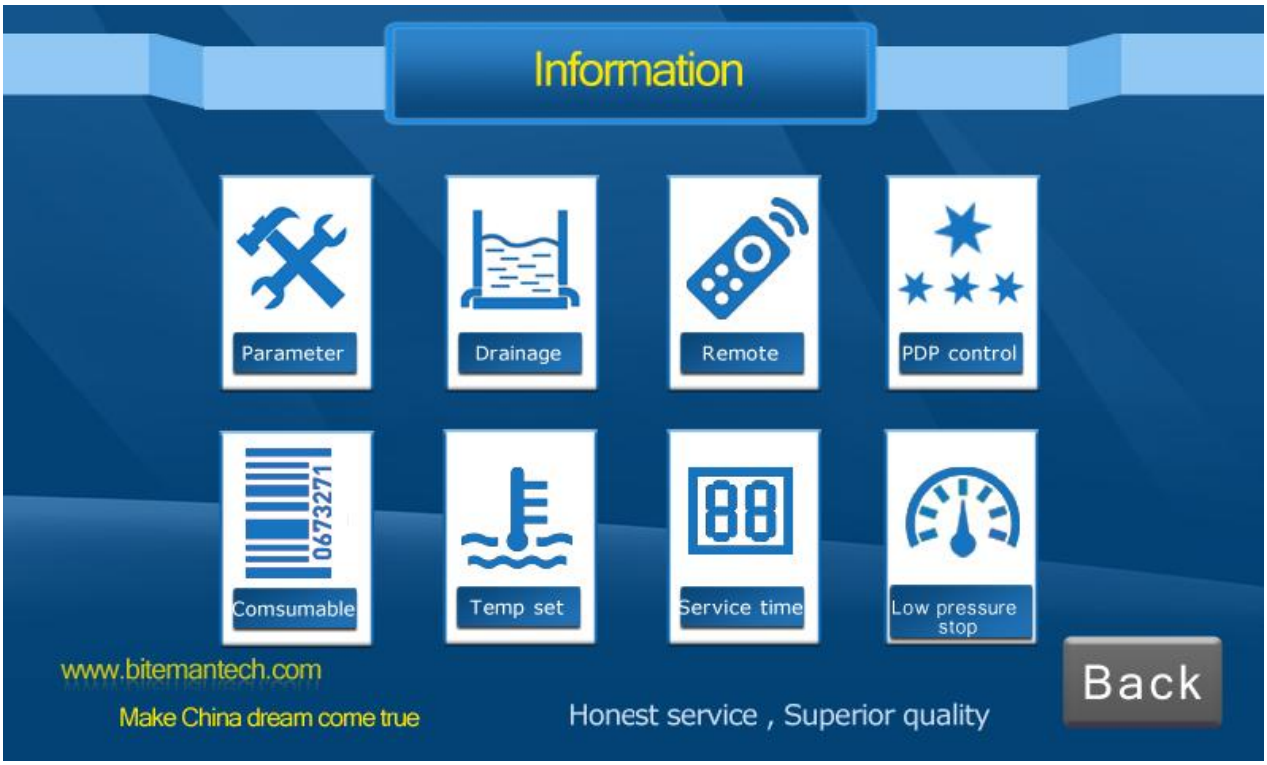


Three are five buttons show ‘About” “Products” “Alarm” “Touch Panel”and “Hotline”

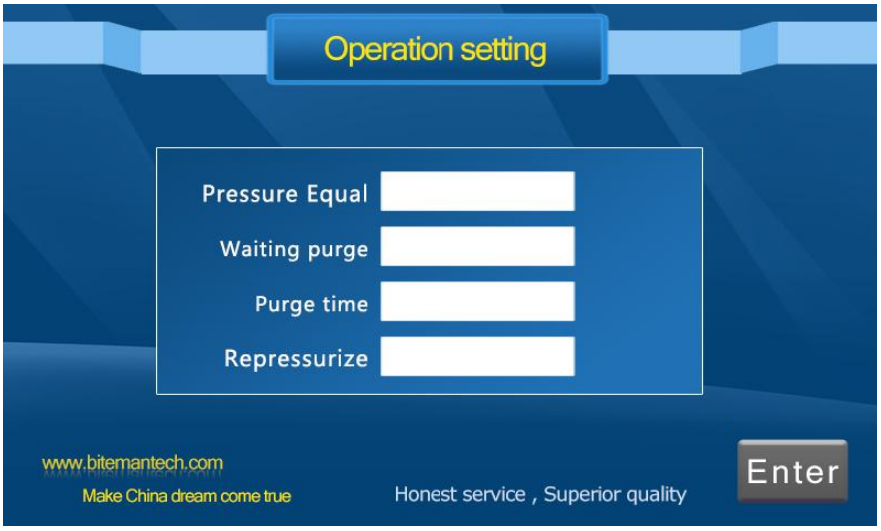
For OEM customers ,content is customized

4.3.3 .Click “Setting”button at Main menu to “code setting”page and input “159”to “Information” Page as below



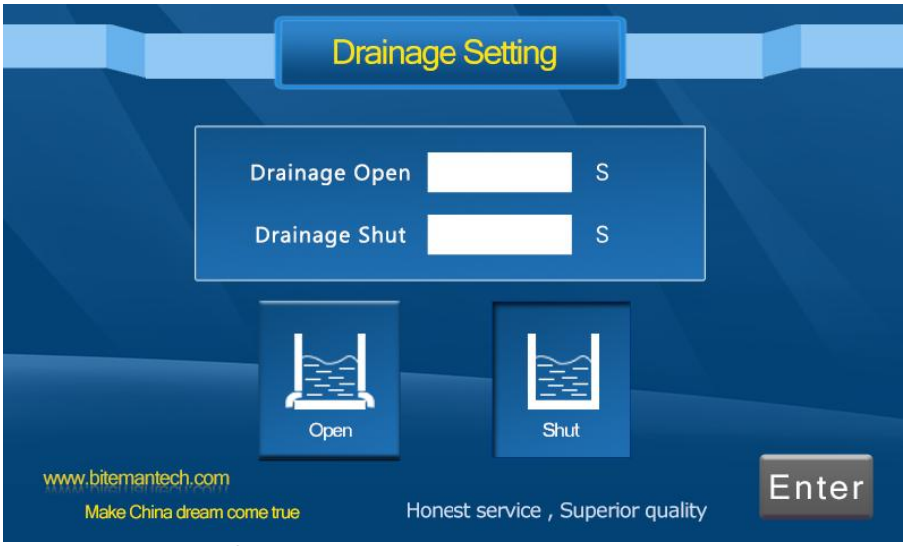


4.3.4. Click Parameter to

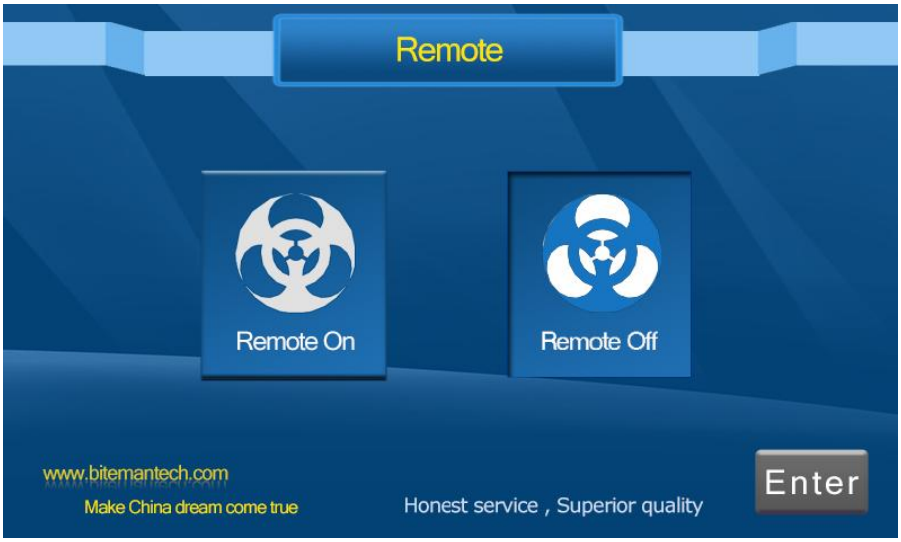


4.3.5 Click “Drainage” to

This function is only for choosing Biteman Filters ,filter drainage is controlled by dryer controller,automatically drain.



4.3.6 Remote feature is optional



4.3.7 PDP Control (pressure dewpoint control)

Purge time,minimum 10 S to detect live Pressure dew point

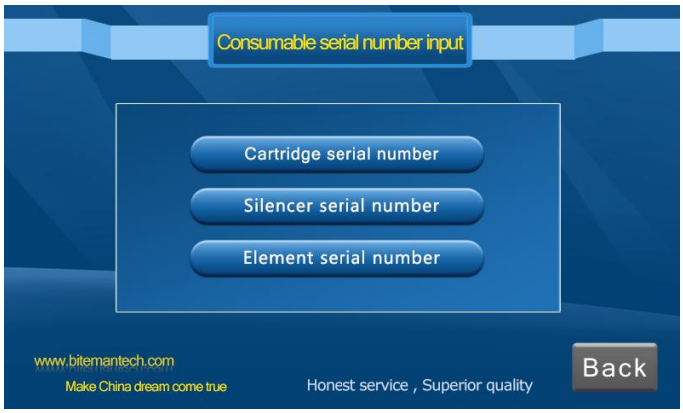
Max PDP :PDP to start purge control

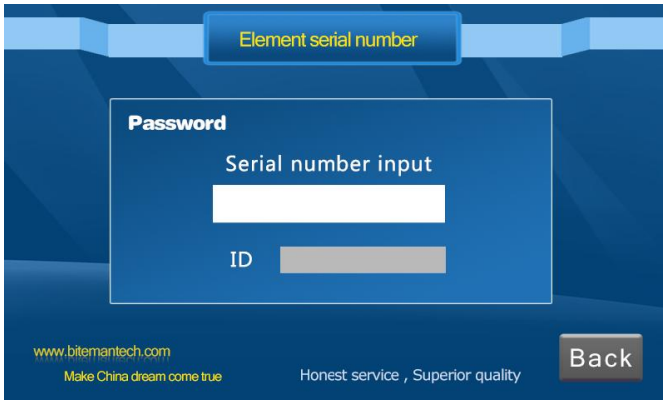
Min PDP:Stop PDP control



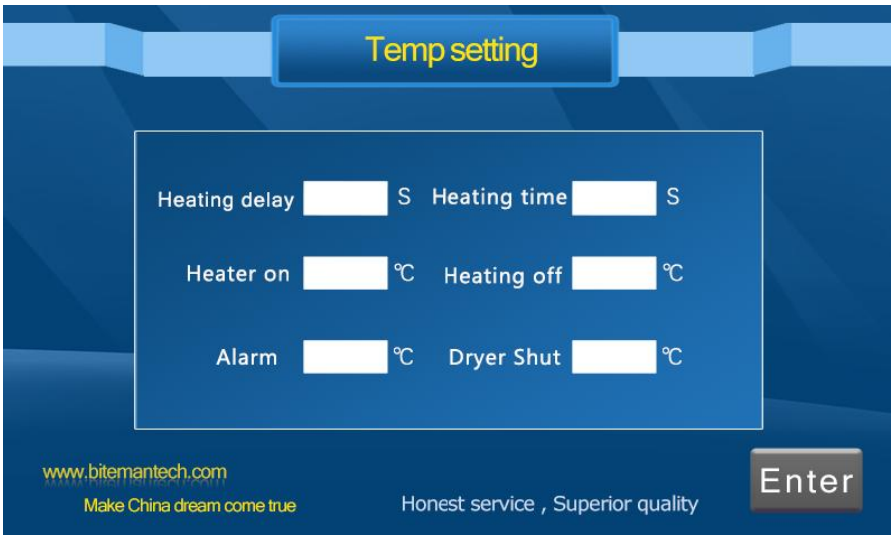
4.3.8 Consumable maintenance

Controller count consumable service life ,it will remind user to change if time is up ,user need to input new serial number from Biteman to renew

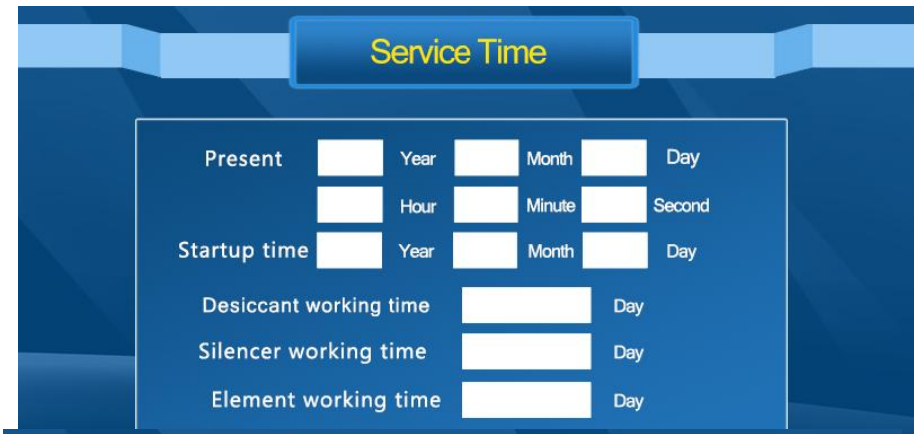




4.3.9 Temp set feature is for heated dryer



4.3.10 Service time



4.3.11 Low pressure Dryer Shutdown Low pressure point at



"**Manual"** or "**Auto**"

Restart Pressure: Dryer automatically restart if system pressure reach this point only for "**Auto**"

4.3.12 Replacement Prompt Menu

Filter element and silencer worklife is 5,000h,desiccant cartridge is of 20,000 hours when time is up,system remind to replace



How to get and input new serial number

When time is up,there is prompt menu to remind the replacement ,User need to provide original ID number to local distributor after purchasing new material,we will provide new ID number ,user input this number to start new time counter.

Chapter 5 Start and stop

Commissioning and operation should be operated by trained and qualified technician

5.1 Start operation procedure:

5.1.1 Switch off by-pass valve and outlet valve and then slowly turn on the inlet valve

5.1.2 After pressure stable,press the On button,power on dryer

5.1.3 Input start password and start the dryer

5.1.4 Turn on the inlet valve after 2 or 3 working cycle

5.2 Stop procedure

5.2.1 Orderly stop procedure

1.Close outlet valve and after purge air is discharged,and then close inlet valve

2.Input start/stop password and click stop key on screen

3.Press stop button to shut off power

Note: If dryer is stop over 24hours,need to release compressed air in dryer by open after-filter drainage

5.2.2 Disorderly or maintenance stop procedure

1.Open by-pass valve if necessary to supply compressed air for the application can not stop air for one dryer air system

2.Close outlet and inlet valve,make sure two desiccant unit finish regeneration process if dryer can work

3.Shut down power

4.Slowly open after filter drainage to release air

Notes:

1.Wearing earplug during above procedure

2.Keep away from released compressed air ,do not inhale it.

3.Make sure to close inlet and outlet valve after stop dryer,especially,long time stop to prevent desiccant from sink in wet air

Chapter 6 Maintenance

6.1 Overview

This chapter describe the method of replacement consumable and period of maintenance,such as ,desiccant chambers and filter elements ,silencer and so on.Strictly follow the regulation can ensure safety and have long work service of dryer;Must use BITEMAN spare parts,or else,Biteman won't take any responsibility for the lost.

6.2 Daily maintenance

Clean dryer,check all pneumatic components,meters and touch screen,ant the working

Item	Inspection instrument	Maintenance period	Inspection point	Notice
Pressure meter	Non	Daily	Pressure is in normal range	
Electric components &Pneumatic equipment	Non	Daily	If work properly	Sudden power off may cause component faulty
Dryer	Dew point meter	Daily	PDP	If PDP is higher,adjust purge air
Dryer		Monthly	Check all valves,solenoid	
Dryer	Soap bubble	Half year	Leakage check,check connection	If pressure drop reach to 0.3bar,there may be air leakage

parameter

6.3 Maintenance and repair

WARNING:

1.Do not maintenance or repair dryer while power on or high pressure situation,release pressure following instruction

2.Use BITEMAN components,spare parts and material ,following manual,otherwise,warranty is invalid

Notes:

1.BITEMAN dryer can constantly work two hours most after power off,otherwise ,it will cause permanent damage on desiccant

2.Following up Section 5 procedure if need to stop for long time.

3.If dryer stop more than one day,must follow stop instruction to protect desiccant from damage

6.3.1 Silencer maintenance

Must replace with new silencer every year,avoid tilt ,replacement procedure:

1.Stop dryer and release air to atmospheric pressure

2.Remove silencer

3.Clean valve pedestal carefully

4.Install new silencer

6.3.2 Desiccant maintenance

BITEMAN dryer is absolutely different at this process ,we simply replace with desiccant units (cartridges) in stead of replacing desiccant.

Normally,desiccant lifespan is three years .Under following circumstance,need to replace factory filled desiccant cartridge:

Replacement procedure:

1.Stop and release air

2.Dismantle all screws of UP-cavity and remove UP-cavity

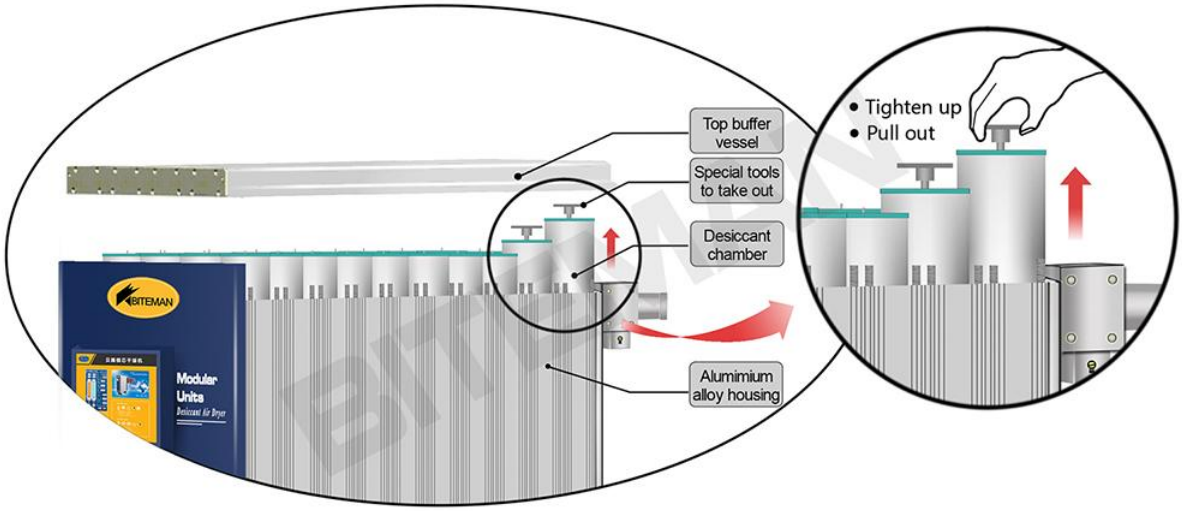
3.Remove UP-cavity

4.Take out all desiccant units (cartridges) by using provided tooling

5.Blow and clean dryer

6.Put BITEMAN brand new factory filled desiccant units with seals into dryer,the position of units is fixed,very easy to install

7.Mantle the UP-cavity and tighten the screws



6.3.3 Replace seal

Usually,seal's lifespan is one year,replace seals if it is broken or more than one year.

6.3.4 Replace controller filter's element

Open the filter's valve to clean element,replace element every year.Replacement procedure:

1.Stop and release air

2.Dismantle the bottom cover of filter and remove element

3.Clean the housing with cloth,do not blow it

4.Install new element

5.Fasten the screws of cover

6.3.5 Maintenance of solenoid valve and replacement

Every week,need to clean valve and muffler,maintenance every half year

Procedure:

1.Stop and release pressure

2.Remove solenoid valve,make a mark on each small air tube,in case mix up the tube when install them

3.Remove muffler and clean it,if found the muffler blocked,replace it immediately.

4.Install muffler and solenoid valve

6.3.6 Pre and post filters' maintenance and replacement

When the indicator of pressure meter is in red area or running time excess lifespan,need to replace element,pre-filter lifespan is one year,post filter lifespan is 6000 to 8000 hours

Replacement procedure:

1.Stop and release air

2.Remove bottom cover drainage tube for auto drain filter

3.Screw out and remove element

4.Clean internal housing

5.Install new element

6.Assemble bottom cover and connect tube

7.Ensure drainage valve is open

Notice:For manual drainage filters,open the valve to drain the condensate for 3 to 5 minutes every week.

Chapter 7 Alarm information and trouble shooting

7.1 Overview

Faults may be caused by various reasons,before repair and component replacement,should overall analysis,check follow items

1.Power supply is good,all electricity connection is good

2.External pipe is not broken and very valves are in right status

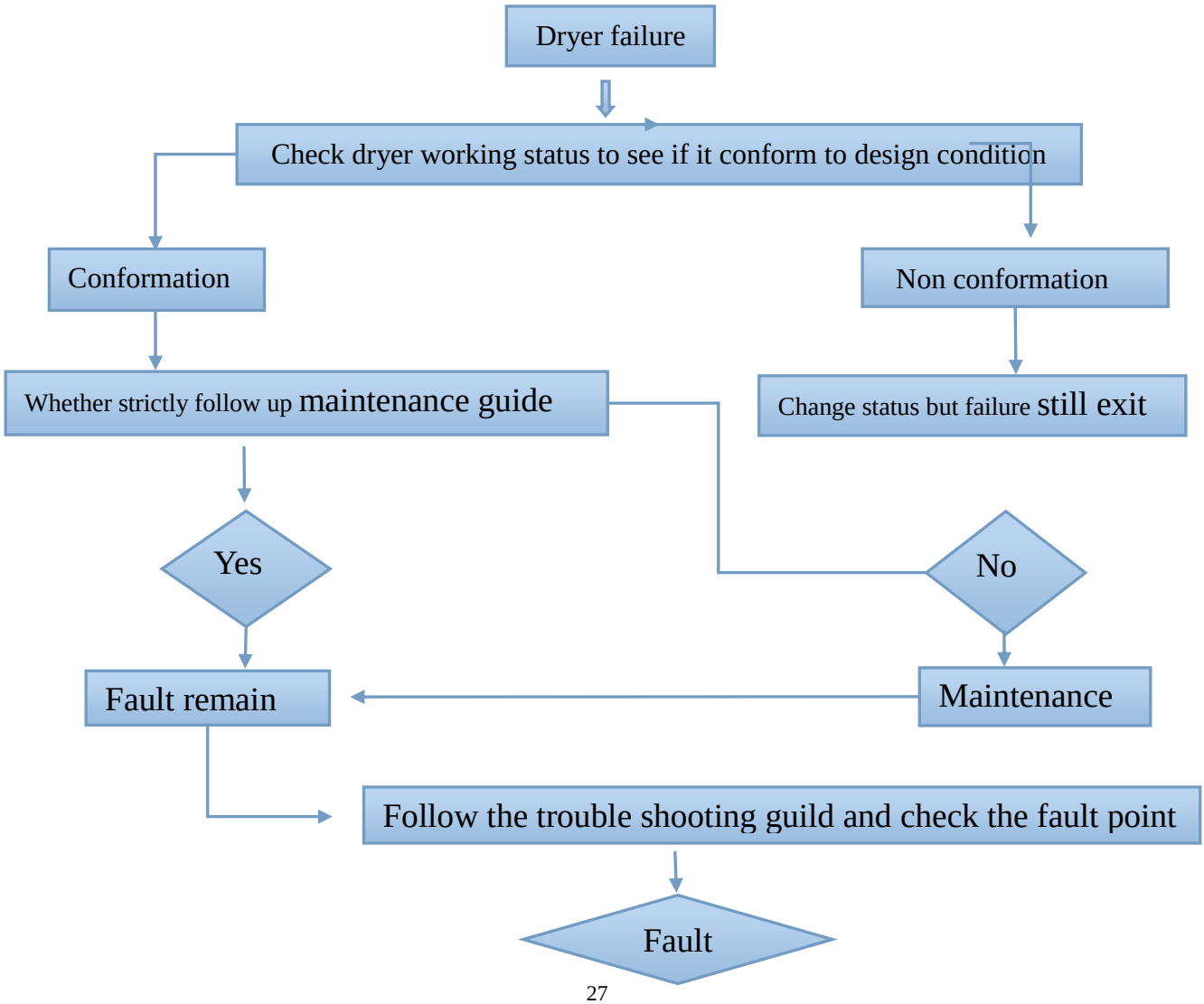
3.Inlet pressure and temperature is in request

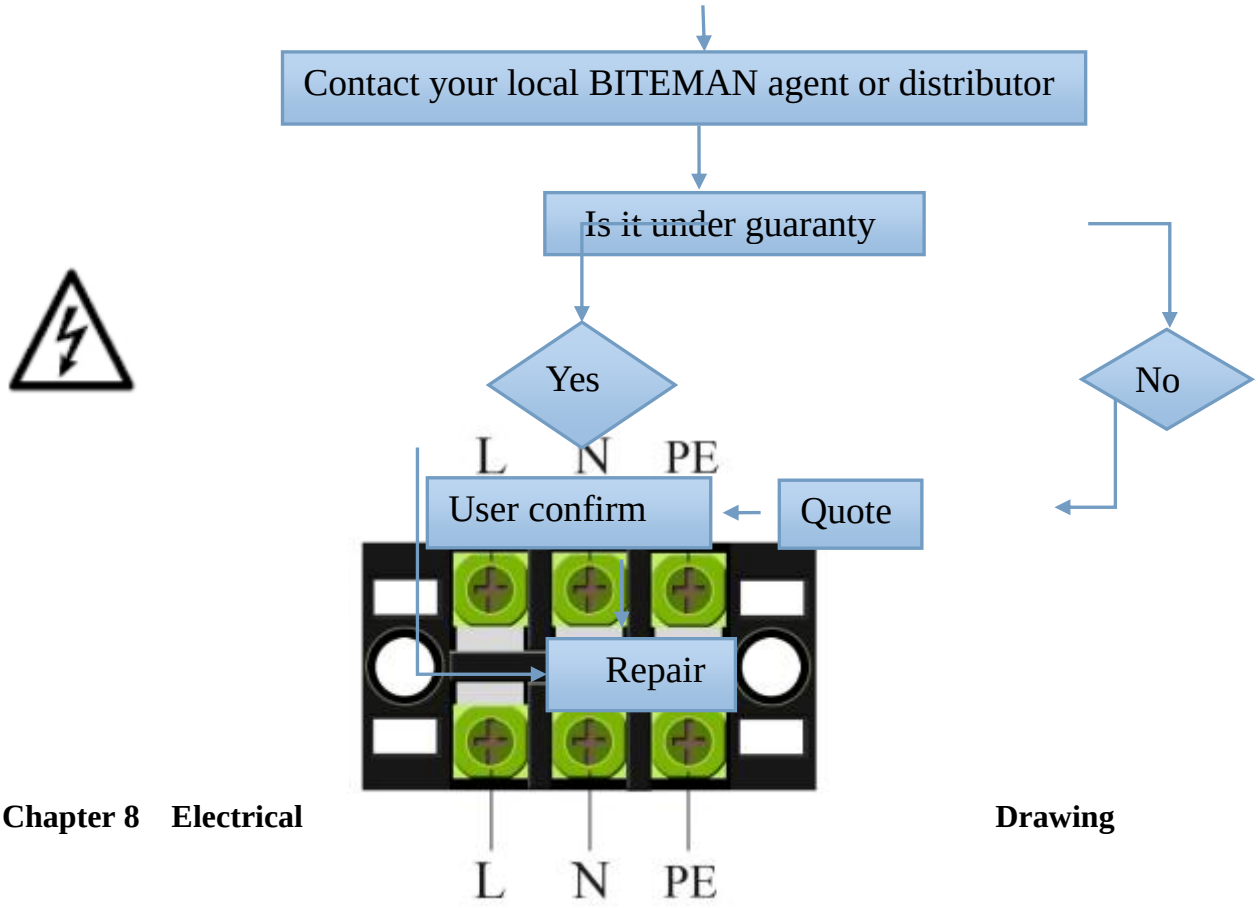
Problem	Probable cause	Measure
Pressure meter display ERROR,including under adsorption status,pressure display too high or too low and under regenerative status,meter does not show zero	Meter broken	Replace new meter
	Solenoid valve leak or clog	Clean valve and muffler,or replace
	Pipe broken or clog	Clean or replace
	Valve platen fall off or broken	Repair and replace
	Cylinder broken	Replace
	One way valve spring broken or invalid	Replace
	Muffler clog or broken	Clean ,replace

	Excessive purge air	Adjust valve to lower purge air
PLC program disorder	PLC broken	Restart or Replace
Hight pressure dew point	Flow rate higher than design condition	Check air flow rate
	Compressed air contains much rust to silt silencer	Clean receiver and pipe ,check pre filter,clean silencer and valve
	Inlet air temperature higher or pressure lower than design condition	Check pressure source
	Excessive water enters dryer	Check air/moisture separator and Pre filter
		Replace desiccant cartridge,if necessary
	Desiccant contaminated by oil	Install suitable pre filter or replace element
		Replace with desiccant units
	Low purge air	Adjust purge air flow
		Clean silencer and valves
Failure to shift from absorption to regenerating	Not electricity power	Check input power
	Control box fails	Check PLC working status
	Defective solenoid valve	Check input voltage to solenoid valve
		Check outlet air flow from solenoid valve
	No control air from control filter	Clean air-line ,replace if leakage or blockage
		Check to see if control air-line filter is clean. Replace element if needed

		Defective inlet valves	Check for control air to operate valve. Refer to steps above if no control air is detected
Dryer fails to pressurize		Faulty purge valve	Check purge valve and its solenoid valve. Refer to earlier steps if no control air is detected
			Check PLC timer setting
Dryer depressurizes too rapidly		Purge valve does not close; dryer depressurizing through purge valve	Check purge valve and its solenoid valve. Refer to earlier steps if no control air is detected
			Check depressurization time setting
Dryer fails to purge		Purge valve does not open; Purge valve stuck in closed position	Check solenoid valve. Repair and replace if necessary
			Check if there is power to solenoid valve
		Purge muffler is clogged	Clean muffler or replace if necessary
Accidental hutdown	Power shut down	Overload,short circuit	Check electric circuit,replace faulty component
	Low pressure stop	Low inlet air pressure	Increase inlet air pressure to design pressure
	High temp stop	Temperature control circuit fails	Repair or replace component if necessary

7.2 Troubleshooting guide(Whether follow the manual to start and stop dryers)





Chapter 8 Electrical Drawing

8.1 Electrical diagram

No other connections are required for factory installed units,only connection of AC power For field installation refer to applicable drawings and make required power and control corrections，handled by qualified technician.

Ground connection is must.

8.2 Electrical parameter

Power:AC220V/50HZ or 115V/60HZ

Power cable diameter:

Heatless dryer:2.5mm^2

2P Heated dryer:4mm^2

4P Heated dryer:6mm^2

Chapter 9 Technology introduction

9.1 Technical date

Media :Compressed air

Design pressure:Min 4.5bar ,Max 13bar

Inlet air temperature:-10℃ to 60℃

Optimum:7bar, inlet temp less than 35℃

Run：Cycle between dry and regeneration

Max pressure:13bar

Desiccant units pressure test:40bar

Design temp:-20℃ to 200℃

Outlet air

Air purified class as per ISO8573	Water contain (g/m^3)	Pressure dew point
3	0.1757	-20℃
2	0.029	-40℃
1	0.0027	-70

9.2 Low pressure inspection and alarm

When Inlet air pressure is lower than 4.5bar,dryer automatically shut down till pressure restore up to 4.5bar then it automatically start up,at the meantime,it alarm with sound.

Compressed air can pass through dryer continuously to maintain air supply.

noted that it can not last too long,no more than one to two hours, otherwise it will damage desiccant permanently,due to over adsorbing water can not be regenerated.

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