



Refrigerated Air Dryer Manual

———— V2.0 ————

Guangdong Baldor-tech Co.,Ltd

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Chapter One Foreword

(I) Foreword

Thank you for choosing this Refrigerated Air Dryer. This dryer has passed the strict test before leaving the factory. However you are still required to read this user manual carefully and thoroughly to ensure safe and reliable operation of the dryer.

We are continuously improving our product. If you have any quality problem or dissatisfaction when you use our machine, please put forward your suggestion for our improvement.

(II) General warning

Before operating the machine, user should check the **Installation Notice**(Chapter Two) first. This machine if not install and operate properly, may result in malfunction. Therefore, if any problem occurs, please check first if you have install and operate the equipment correctly, or check the overall condition of dryer carefully. If still cannot solve the problems by yourself, please contact us for the necessary service.

We will not be responsible for any failure due to improper installation, operation or maintenance.

Notice: Failure or accident could be prevented if you follow the user manual accordingly.

(III) Transportation and handling

1. Avoid throwing, impacting and vibrating violently when transport and handling the air dryer.
2. The dryer can be slanted to angle of below 45° for a short time transportation. If transport the dryer for long distance in large-angle position or in horizontal position, it is very likely to damage the refrigerant compressor of the dryer.
3. Use the forklift or elevator to transport an air dryer is permitted. However, please make sure not to damage the dryer.
4. In order to protect the components of the air dryer, please be careful when handling.
5. Drag the equipment by force is not allowed.
6. Use overhead crane, if required, to lift or lower a heavy dryer.
7. Wherever necessary, please use cushion pads to avoid damage the dryer.

Chapter Two Installation

(I) Installation Notice

1. Read and understand the **user manual** carefully, please note that accident may occur if the operator does not follow the operating procedure and caution as stated in the manual.
2. Operator must adhere to the proper operation and safety rule as per user manual during installation and use of the dryer. Only competent technician is allowed to maintain and repair the dryer, we suggest each factory to have a professional person to take care of the dryer.
3. Remove, change and reverse the warning and safety signs are not allowed.
4. During operation of the dryer, remove of any protection and safety equipments are strictly prohibited.
5. Before installation, open the case and inspect and tighten all fasteners and connector.
6. Keep your body, hand and other parts of body away from running fan and high temperature component.
7. Never start the air dryer in any unsafe condition. Do not operate the dryer if you suspect there is some fault.
8. Keep working pressure below the rated pressure of the dryer (please refer to the rated pressure indicator on the nameplate attached to the dryer).
9. Do not allow inflow of compressed air to the dryer when it is not in operation, otherwise the moisture will accumulate on the downstream of the air dryer, which will affect the quality of the compressed air. The best method is starting the air dryer first, wait for 3 minutes before allowing wet compressed air to go through the dryer.
10. Never operate a 3-phase air dryer when there is a phase failure (please check incoming power supply for proper voltage at all 3 phase) otherwise will occur serious accident.

Notice:

Do not operate the dryer if it is in improper condition!

Correct the fault by referring to the trouble shooting chart in this manual.

Please get the help of our distributor technician if you are not able to solve the problem.

Please keep the user manual properly.

(II) Installation Site

1. The site must be free from inflammable, explosive and volatile materials such as paint thinner, or it may cause fire or an explosion! The site shall be a dry and clean place with good ventilation.

2. The ambient temperature shall be no higher than 45°C and no lower than 2°C. (The dryer may not be damaged if operates occasionally at first, but it will affect the refrigerating capacity and the dewpoint. So we need to avoid running the dryer at higher than 45°C. The dryer will stop at ambient temperature higher than 45°C. The dryer will be damaged below 2°C. If we use the dryer below 0°C, the autodrain will be frozen and up the ambient environment when below 0°C.)

3. Surrounding the air dryer, a space of over 100 centimeters shall be reserved for maintenance.

4. Pay attention to the distance between dryers when you install 2 or more dryers side by side.

5. It is strongly recommended to install an air receiver before the air dryer. Direct blowing hot air from a compressor and other equipments must strictly prohibit! Failing to do so will result in overloading of air dryer resulting "auto-tripping" of the dryer.

(III) Basic Requirements

1. The vibration of an air dryer is very little, as a result, no need to install any anchor bolts. The only requirement is the floor must be level and hard with sufficient load-bearing capability. It is strongly recommended that the dryer be installed on a 2 inches height plinth above the floor level to avoid condensate wetting the floor according the dryer base.

2. Pay attention to the height of the drain system and confirm whether need to make the drain trench before installing the air dryer or not.



(IV) Pipeline

1. Please use flexible connecting to connect the air inlet and air outlet.
2. Please install a bypass pipeline. (We need to use the bypass pipeline during maintenance.)
3. Properly the pipeline must be used to avoid excessive pressure drop. Too small elbow or bend must be avoided.
4. The pipeline for the dryer cannot be too heavy.
5. Please clean the pipeline before connecting.
6. Please note that the resonance from the air compressor must be avoided.
7. The main line air filter should be installed in front of the air inlet of the dryer.

**(V) Installation of water-cooled dryer**

1. When the water flow is too high or the water temperature is too low, it may lead to the surface of evaporator frosting.
2. When the water flow is too low or the water temperature is too high, The dryer will stop when the pressure exceed 2.3MPa.
3. The dryer can not be installed in the outdoor without the cover.
4. Need to according to the following requires when install the dryers.
 - a. Must abide by the local government and relevant departments of the corresponding provisions.
 - b. When install the compressor system, the installation personal must be familiar with the local laws and regulations can be qualified.

(VI) Pipeline connecting for the water-cooled dryer

All the pipe systems should follow the local regulations. The design of the pipe must reduce the bend and high/low remove, which can save money and keep best function.

The correct installation is as follow:

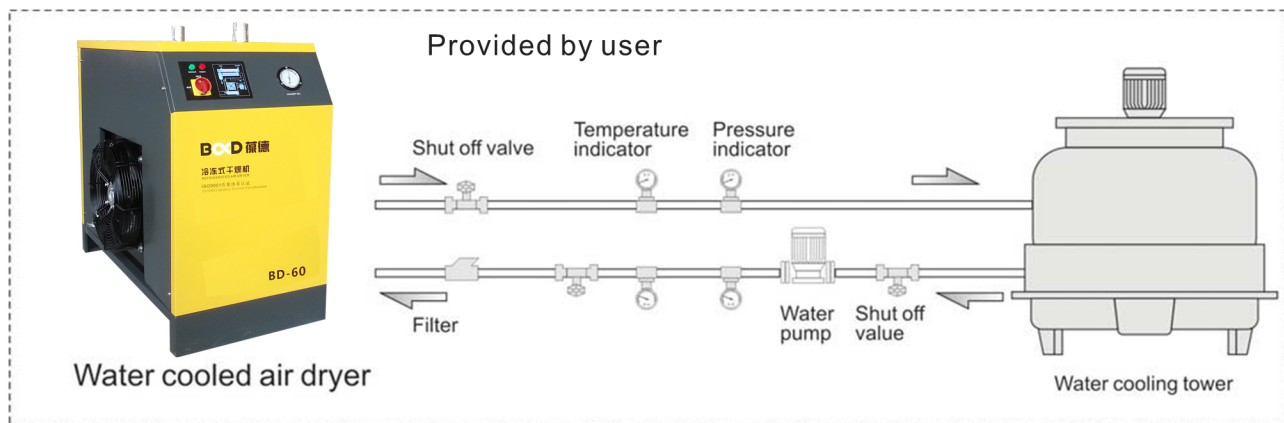
1. During maintain, close the ball valve to separate the dryer from the pipe system.
2. On the top of the pipe system, need to set the manual or automatic air outlet valve.
3. Keep sufficient water pressure in the system(such as control valve) , and the pressure of cooled water or the circulate cooled water must $\geq 0.15\text{Mpa}$, the water temperature $\leq 32^{\circ}\text{C}$ and go through softening.
4. In order to maintain or repair conveniently, should install the pressure indicator and temperature indicator.
5. Need to install the filter to clean the impurity of the water in front of the water pump .
6. The diameter of the pipe shall be configurated according to the distance and pressure of the machines.

(VII) Water Pipeline of the condenser

The pipeline of condenser has been equipped before out of the factory, the site pipe should be connected to the pipe on the equipment. The intake and outlet water pipe shall be connected with the marked pipe before out of the factory.

(VIII) Installation of the cooling pipe

Ensure the certain water pressure when connect the dryer with the cooling tower. The water capacity flowing through the cooling tower should be stable. Meanwhile, whatever the load and outside temperature change or not, the water capacity through the condenser can be adjusted, in order to keep a stable cooling pressure and make sure the thermostatic expansion valve and other elements can be running normally.

(IX) Installation of the cooling tower**(X) Power Supply**

1. Please adhere to local safety rules when using any electric power supply.
2. Please use the appropriate power outlet for AC220/380V.
3. Please ensure an approved earth leakage breaker is installed in your supply system.
4. Power supply should be AC210-230V, 50Hz for single phase, and AC360-400V, 50Hz for 3-phase.
5. Be sure to connect to the ground wire before using.

Notice: The electrical installation should be according to the relative electrical regulations. Any change of the basic connection diagram will not inform. The correct phase sequence in the electrical diagram must be observed absolutely.

(XI) Wind direction of fan

The wind of the fan should be come from the condenser.

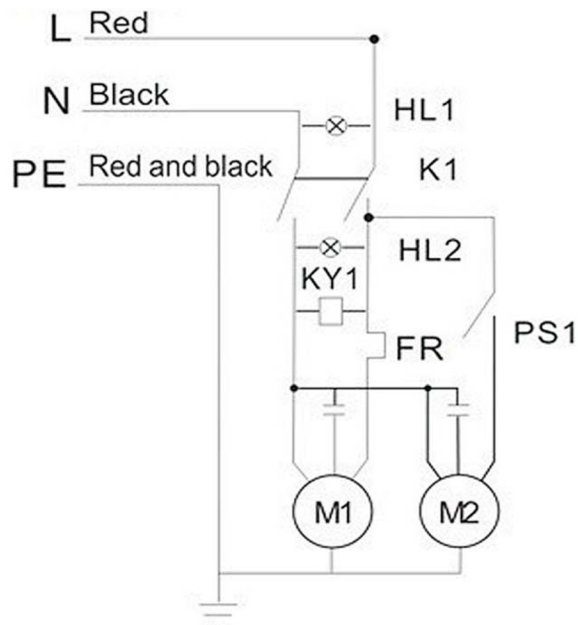
When the 3 phase power air dryer is starting, it should cut off the power and exchange the two wire in three when the compressor and the fan are not working. And then please power on the machine again. The control power wire and wiring of the single phase power air dryer has been equipped before leaving the factory. The user can operate the machine by offering the specified power of nameplate. Ensure the safety. The machine must be connected with the ground wire.



Chapter Three Circuit Diagram

Circuit Diagram(Model BD10-BD60)

Standard Power Supply: 220v/60hz/1ph

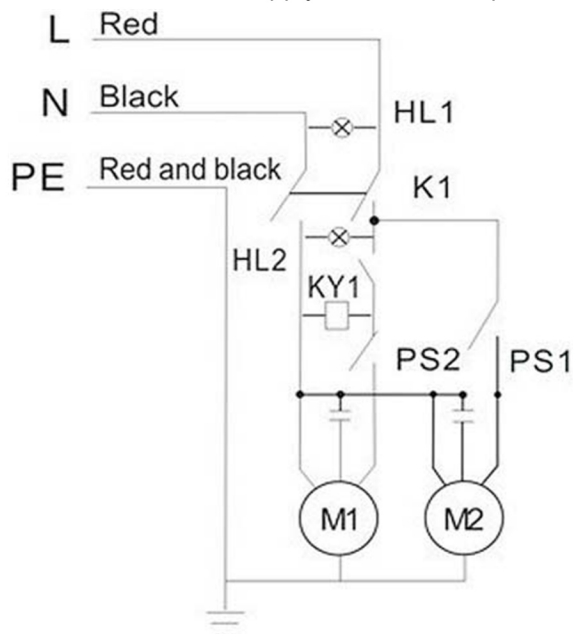


Remark:

L	Live wire
N	Neutral wire
PE	Earth wire
HL1	Power lamp
K1	Switch
KY1	Electric auto-drain
HL2	Running lamp
FR	Thermal relay
PS1	High pressure switch
M1	Refrigerant compressor
M2	Fan

Circuit Diagram(Model BD80-BD120)

Standard Power Supply: 220v/60hz/1ph

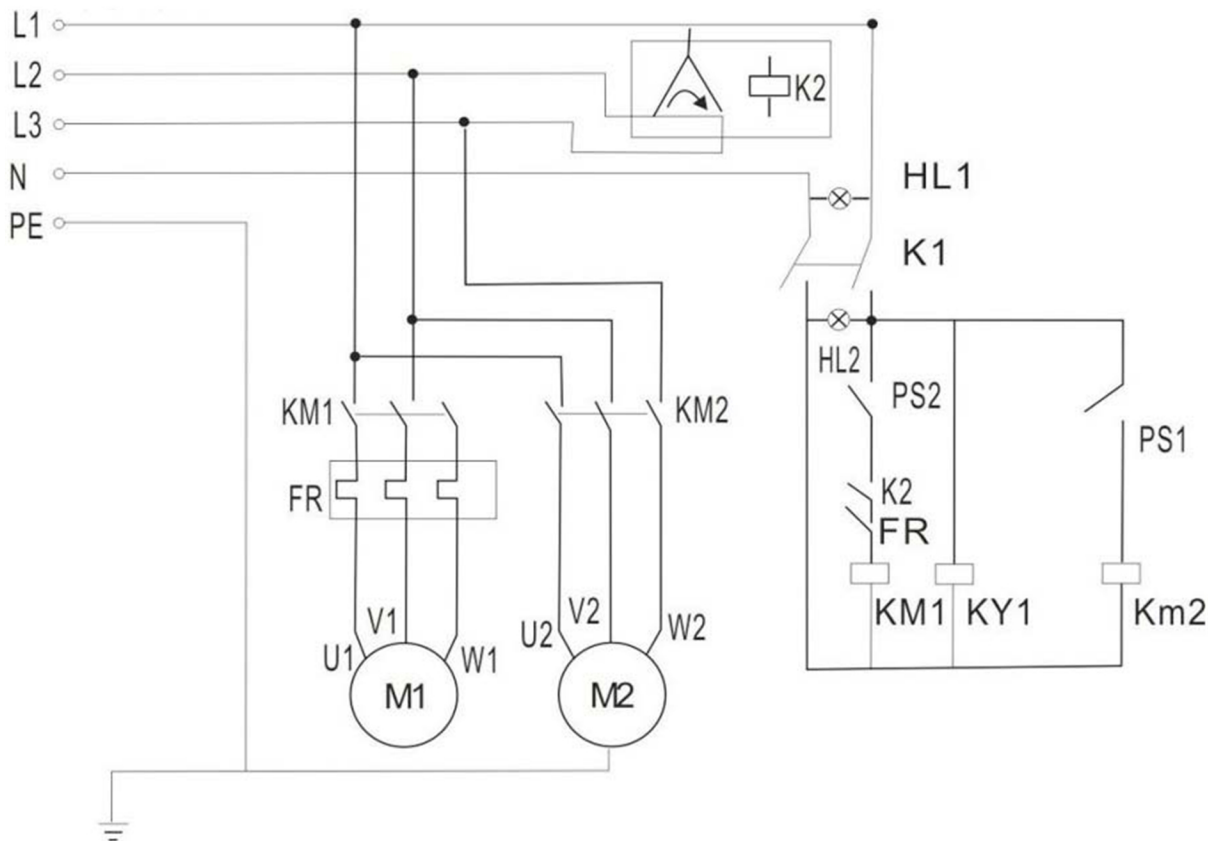


Remark:

L	Live wire
N	Neutral wire
PE	Earth wire
HL1	Power lamp
K1	Switch
KY1	Electric auto-drain
HL2	Running lamp
PS1	High pressure switch
PS2	High-low pressure switch
M1	Refrigerant compressor
M2	Fan

Circuit Diagram(Model BD150-BD800)

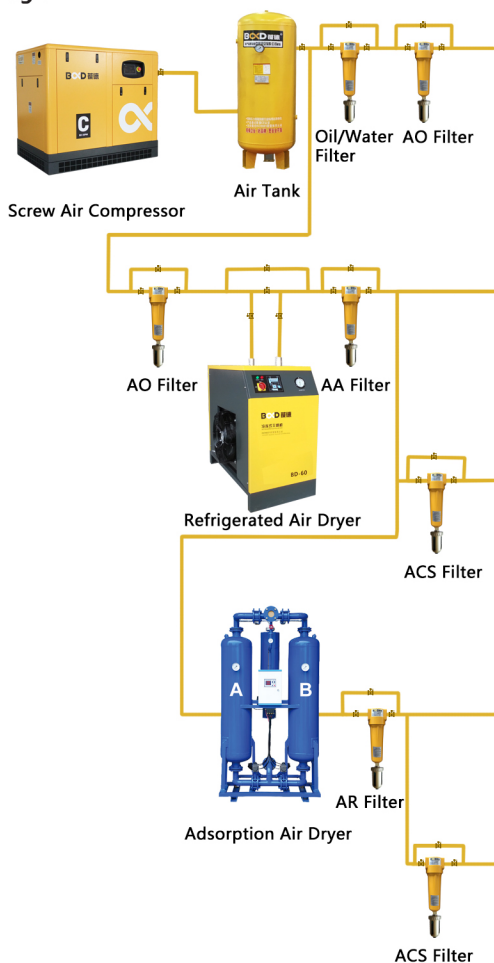
Standard Power Supply: 380v/60hz/3ph

**Remark:**

L	Live wire
N	Neutral wire
PE	Earth wire
HL1	Power lamp
K1	Switch
KY1	Electric auto-drain
HL2	Running lamp
FR	Thermal relay
PS1	High pressure switch
K2	Phase sequence protect
M1	Refrigerant compressor
M2	Fan
KM1/KM2	AC contactor
PS2	High-low pressure switch

Chapter Four Typical Compressor Layout

Program



Efficacy

Get rid of 99% moisture contents
Oil content:0.01ppm
Dust content:<14 m

Range of application

For swept,general cool and pack

Pressure dew point:2~10 °C
Oil content:0.01ppm
Dust content:<0.014m

For spray paint,pneumatic instrument,
pneumatic tool,sand blasting,air
move and mix,particles products
convey

Pressure dew point:2~10 °C
Oil content:0.003ppm
Dust content:<0.014m

For diving operation,breathing air,
food compound,dentistry,cosmetics,
hyperbaric oxygen chamber

Pressure dew point:-20~-70 °C
Oil content:0.01ppm
Dust content:<0.014m

For print,film industry,nuclear
industry,aerospace industry,precision
control instrument

Pressure dew point:-20~-70 °C
Oil content:0.003ppm
Dust content:<0.014m

For bioengineering,fermentating food

Component



Refrigerant compressor



Dry filter



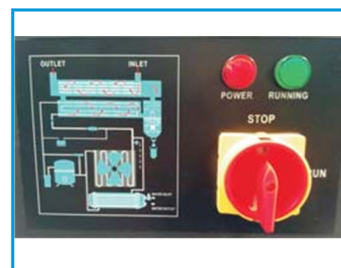
Refrigerant pressure indicator



High pressure switch High-low pressure switch



Electronic auto-drain



Control panel

Chapter Five Inspection and Maintenance

(I) Inspection before running the dryer

1. Check the power supply

(Model :BD10--BD120: Single Phase , AC220V±5%)

(Model: BD150--BD800: 3 Phase, AC380V±5%)

2. Check the cooling system

Inspect the high/ low pressure indicator. The two indicators are in a balanced value when in a certain pressure. This balanced value will be changed according to the ambient temperature. Usually, this balanced value is in 0.5MPa--1.2MPa.

3. Check the air pipe.

The pressure of the air inlet can not be higher than 1.0MPa. (except for the high pressure model)

Ensure the temperature of the air inlet can not be higher than the maximum temperature.

4. If you choose the water cooled dryer, please check the cooling water. The water pressure is in 0.15MPa-0.4MPa. The water temperature is not higher than 32 °C.

(II) Operate the dryer

1. Ensure the install site. Check the power connecting, the connecting between autodrain and the drain-tube.

2. Turn the BUTTON to run site.

3. The running lamp will be on a little later. The fan will work and it will blow the heat wind from the side net.

4. Check the compressed air and the ambient temperature, the motor of the fan will run and stop again and again. If the air dryer works continuously, the refrigerated low pressure indicator is higher than 0.6 MPa, it means the air dryer is in over load.

5. Condensate water will be drained automatically after the air dryer runs normally.

6. The refrigerator air dryer will be damaged by turning the "RUN"- "STOP" switch frequently.

(III) Stop the dryer

1. Turn the button to stop site.

2. The running lamp will be off. The compressor stops working.

(IV) Restart the dryer

Just can restart the dryer after stop the dryer 3 minutes.

(V) Daily inspection

1. Lamp — the lamp will be on when the button is turned to RUN site.

2. Auto-drain — please check whether the autodrain can drain off water regularly or not. You can press the "TEST" key to confirm it, open the manual drain valve often, and discharge inside impurity that can avoid auto-drainer blocking. If the drainer works not smoothly, please clean the auto-drain according to below item 2 in **(VIII) Operating instruction of auto-drain unit.**

3. Refrigerant pressure indicator — during running, it is the best working condition when the refrigerant low pressure indicator value is in the 0.3~0.6MPa.

4. Cooling water — please check whether the cooling water is in a normal condition during running. The water pressure should be in 2~4g/cm², the max. temperature of water can not exceed 35°C (this item suits for water cooled air dryer)

(VI) Monthly inspection

1. Clean the electronic auto-drain

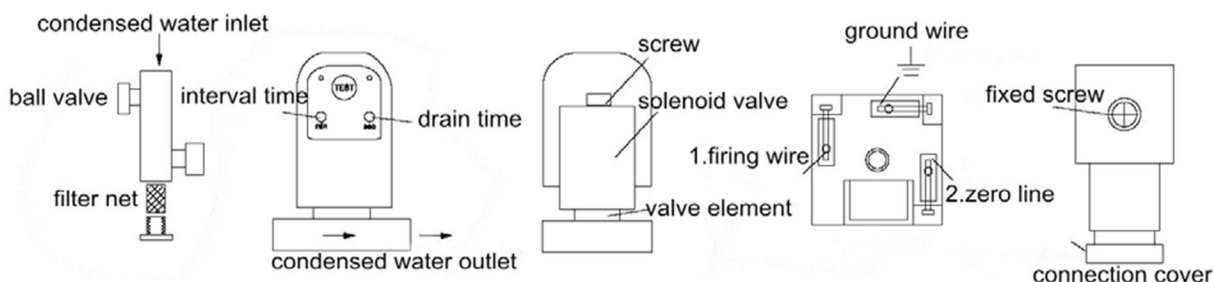
Need to clean the electronic auto-drain every month. It can avoid the error.

2. Clean the side net

Use the compressed air to blow the side net of an air dryer every week.

3. Clean the condenser

Due to condenser's structure, It can not manual cleaning, just for chemical cleaning.

(VII) Installation diagram of electronic auto-drain**(VIII) Operating instruction of auto-drain unit**

1. Please use three core circular cable as connection cable, make sure cable connect with ground reliably, also please check the power whether can meet the requirements or not.

2. Before installing the auto-drain, please clean the fouling, welding slag and rust in the compressed air system. For new machines, we suggest clean the drainer filter net weekly (turn off the ball valve), because condensed water is very dirty, particle will blocking the valve element. When occur this condition, you can solve the problems by following below methods:

* Press the "TEST" key again and again until solve the problem (this method is effective on valve element blocking)

* If press the "TEST" key repeatedly, drainer still not work, please take apart the solenoid valve and clean the valve element. Procedure as below:

(1)Turn off isolating valve, press the "TEST" key to exhaust air, ensure electronic drainer is separate with compressed system, it is mean that drainer under no pressure condition.

(2)Cut off the drainer's power.

(3)Take off the coil (before taking off it, please make sure the electronic drain had already without electricity, otherwise electrify coil will be burn up), take apart the solenoid valve, and take off the valve element and spring , and then wash the valve, valve element and spring by water, after that install them again, the trouble can be solved.

Notice:

While the Refrigerated air dryer is running, when the pressure indicator $\geq 0.6\text{MPa}$, it maybe in the overload state. Please check the below "overload state" condition:

(IX)Overloading of air dryer

The air dryer will be in overload(forced running)as the following state:

(1) The inlet temperature of compressed air is too high.

(2) The capacity of compressed air is too large.

(3) The ambient temperature is too high (above 45°C) (4) The power voltage is below 198v (220v standard) or below 340v (380v standard).

(5) The air inlet is blocked by wall or dust.

Chapter Six Troubleshooting

We can check the failure of the dryer when encountering the 6 problems as below

1. Air pressure drop is too large

Failure	Reason	Solution
Differential pressure is too big	Pipeline valve is not fully opened	Open the valve fully
	Pipeline diameter is too small	Enlarge the pipe diameter
	Pipeline is too long and with too many elbow, bend and connection	Design the pipeline system again
	Too many connection leakage	Check the leakage and repair
	Line air filter is blocked	Clean or replace the element
Not enough air supply	Capacity of air dryer exceeds the air flow rate of air compressor.	Replace a larger capacity air compressor
Evaporator frozen	Some problem in the temperature switch	Replace the temperature switch
	Solenoid valve failure	Replace the solenoid valve

2. Abnormal drainage

Failure	Reason	Solution
Compressed air with moisture at the downstream	Air bypass valve is not closed properly	Close the air bypass valve fully
	Compressed air does not pass through the refrigerated air dryer	Open air inlet & outlet valves of an air dryer fully
	Air flow too large and pressure drop is too big	Design the pipeline system again
	Autodrain not draining	Clean or replace autodrain
	Position of Drain-pipe is higher than the automatic drain	Re-position the drain pipeline
	Air flow rate of air compressor is much bigger than air capacity of refrigerated dryer.	Re-match a suited air dryer
	Compressed air inlet and compressed air outlet are in an opposite position.	Reposition
Abnormal value in the pressure indicator	Evaporation temperature is too high	Check the air compressor load
	Environment air is polluted and ventilation is abnormal	Select clean location and improve the ventilation
	Solenoid valve failure	Replace the solenoid valve
	Refrigerant leakage	Check and repair the leaks and re-fill refrigerant
	Instrument damaged	Replace instrument

3.Can not run

Failure	Reason	Solution
No power supply	Fuse broken or on-off switch tripping	Ensure if there is lack of phase or short circuit of power supply
	Circuit broken	Check the fuse or fuse switch
	Transformer failure	Replace the transformer
Power on but can not run	Voltage abnormal or power line is too small	Please select power according to the rated voltage on the nameplate
	Phase sequence protection	Replace any two of three line of power supply
	Contactor is damaged	Replace contactor
	Thermal overload relay is damaged	Replace the thermal overload relay
	Capacitor is abnormal	Replace capacitor
	High/low pressure switch is abnormal	Replace high/low pressure switch
	Temperature switch is abnormal	Replace temperature switch
	Refrigerant compressor is abnormal	Replace a new compressor
Switches are all normal but can not run	Time relay is abnormal	Repair or replace time relay
	High/low pressure switch tripped but not reset	Find the reason and reset
	Solenoid switch O.L not reset	Find the reason and reset
	High pressure switch not reset	
	Wrong setting of temperature switch	Re-set or replace a new temperature switch
	Compressor is abnormal	Replace refrigerant compressor
	Intermediately relay is abnormal	Repair or replace intermediary relay

4.Normal operation but poor effect (outlet air is not dry enough)

Failure	Reason	Solution
Too low evaporation temperature	Evaporation temperature indicator is abnormal(low pressure indicator)	Replace a new evaporation temperature indicator(low pressure indicator)
	Solenoid valve blocking	Replace solenoid valve
	Temperature switch or pressure switch setting too low	Re-set
	Refrigerant leaking	Check and repair the leaks and re-fill refrigerant
Too high evaporation temperature	Surrounding temperature is too high	Improve the surrounding temperature with good ventilation
	Failure in hot gas bypass valve	Adjust or replace a new hot gas bypass valve
	Condenser blocking	Cleaning with air duster
	Air capacity is too large	Re-design the matching
	The inlet/outlet valve-plates of refrigerant compressor are worn	Replace a new refrigerant compressor

5. Abnormally operation

Failure	Reason	
Unusual Voltage	Short circuit after running the dryer	Re-install the wire
Dryer tripped on high pressure, difficult to reset and start	Pressure switch abnormal	Change the pressure switch
	Fan abnormal	Change the motor of the fan
	Tripped by overload	Check and find the reason
	Dirty condenser	Clean the condenser
	Too much refrigerant	Reduce the refrigerant
	Too high ambient temperature	Improve the surrounding temperature with good ventilation
	Solenoid valve damaged	Change the solenoid valve
	Dry filter blocked	Change the filter
Dryer overload and relay tripped	Abnormal starting relay	Change the starting relay
	Abnormal capacitor	Replace a new capacitor
	Abnormal pressure switch	Change the pressure switch
	The compressor over load	Reduce the air capacity
	Ambient temperature too high	Improve the surrounding temperature with good ventilation
	Setting current value of relay is too low	Adjust the setting valve
	Poor connecting of relay	Tighten all connections
	Loss phase	Find the reason of loss phase
	Abnormal contactor or poor connecting	Clean or tighten the contactor

6. Auto-drain can not operate properly

Failure	Reason	
Poor drainage	Working pressure in 1.5 bar	The normal pressure should be 2-10 bar(standard pressure series)
	Drain valve damaged	Change the drain valve
	Tilted or broken auto-drain	Adjust the position or change a new one
	The blocking of filter of the auto drain	Clean the autodrain
	Working pressure is too high	Keep working pressure below the rated pressure of the auto-drain
	Drain valve blocked	Clean the drain valve
	Too much water in the system	Drained by manual drain

CERTIFICATE OF INSPECTION

Model:	
Air Inlet Temperature:	
Air Flow(Rates): M ³ /min	
Serial No.	
Manufacturing Date	
Inspector	
<p>This product is carried out by the standard : (JB/T 10526-2005--Normal Refrigerated Air Dryer) (GB/T10893-1989.Specifications and Testing of Compressed Air Dryers.) Now refrigerated air dryer is permit exit factory.</p>	

WARRANTY CARD

Customer:			
Date of Purchase:		Tel:	
Address of Installation:			
Model:		Serial No.:	
Failure Record:			

All Series of Compressed Air Equipments of Purging



Refrigerated Air Dryer

Model: BD10- BD500

Air Capacity: 0.8 - 55 m³/min

Pressure Dew Point: 2 - 10°C

Operating Principle : Physical Principles



Heatless Adsorption Air Dryer

Model : BH10- BH500

Air Capacity: 0.8 - 55 m³/min

Pressure Dew Point : -20 ~ -40°C

Operating Principle : Chemical Principles



Lowhot Adsorption Air Dryer

Model : BE20LH - BE500LH

Air Capacity: 2.8 - 55 m³/min

Pressure Dew Point : -20 ~ -40°C

Operating Principle : Chemical Principles



Combine Air Dryer

(Refrigerated Air dryer & Adsorption Air Dryer)

Model : BC10 - BC500

Air Capacity: 3.8 - 55 m³/min

Pressure Dew Point : -20 ~ -40°C



BD015-BD120



BD150-BD500

Line Air Filter

Model : BD015 - BD500

Air Capacity: 2.8 - 55 m³/min

Grade : AO, AA, AX, ACS, AR & AAR

** Please contact with us if you are interested in other compressed air equipments of purging **