REFRIGERATED AIR DRYER
(SDL Model)
OPERATION MANUAL

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1、Introduction

SDL Refrigerated Air dryer is a new type Plate Heat Exchanger that will cool and dry compressed air, which protects downstream components from damage caused by traces of moisture in the air supply. High quality copper tube with pure aluminum fin or stainless steel plate heat exchanger is selected for SDL heat exchanger and air condenser. The heat exchange is more efficient comparing with a conventional shell and tube type heat exchanger.

The dryer's dew-point can reach the pressure dew point of 35.6° F -50° F (0.7Mpa), which is equivalent to the normal dew point of – 9.4° F to 1.4 ° F. The dewatering rate can reach 93% and the oil content will not exceed 5PPM. If the company's high-precision compressed air filter is used, the solid impurities and 99.99% oil can be filtered out (see the manual of compressed air precision filter). Thus, the high-purity compressed air without water, oil and dust can be obtained to meet the requirements of pneumatic control transmission. Compressed air cleanliness requirements for dynamic, precision instruments, plastic spraying, food and medicine, electronic parts, metallurgical ships, diving breathing and other industries.

The SDL series of dryers produced by our company is an energy-saving type of air-drying machine. The pre-cooler adopts aluminum plate-exchange heat exchanger, and the main heat exchanger parts adopt stainless steel plate heat exchanger，which will be the evaporator and the pre-cooling regenerator and the gas-water separator are integrated into one.

At the same time, combined with advanced processing technology, the heat exchange effect is increased by 30% compared with the current shell-and-tube heat exchanger, thereby using less energy to reach the pressure dew point 35.6° F -50° F of gas quality.

The aluminum plate type front and stainless steel plate heat exchanger is a new type of high efficiency heat exchanger which is assembled by a series of aluminum plates with a certain corrugated shape and stainless steel plates. A thin rectangular channel is formed between the various sheets, and heat is exchanged through the sheets. Compared with the conventional shell-and-tube heat exchanger, the heat transfer coefficient is much higher under the same flow resistance and pump power consumption, and there is a tendency to replace the shell-and-tube heat exchanger within the applicable range.

SDL series of air dryers are non-basic installation equipment, small size, exquisite shape, low operating cost and low energy consumption. It is an ideal equipment for compressed air purification treatment in various industries.

Features:

a. High heat transfer coefficient

b. Large logarithmic average temperature difference, small temperature difference at end

c. Small footprint

d. Easy to change heat exchange area or process combination

e. Light weight

Small heat loss, small capacity

2、Refrigerated Compressed Air Dryer working principle & system Flow

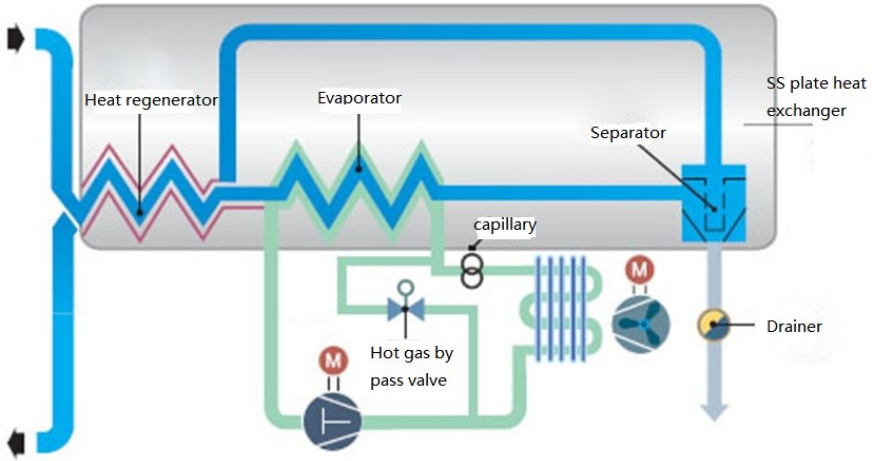
2.1 Working principle:

According to the principle of air freeze-drying, the refrigerating compressed air dryer uses the refrigeration system that to cool the compressed air to a certain dew point temperature ,and then deposits the corresponding water, and discharges it through the drain valve, thereby will be the compressed air obtains the required drying dew point.

2.2 Working process:

The refrigeration system of our SDL dryer is a compression refrigeration system consisting of four basic components: refrigeration compressor, condenser, heat exchanger and throttling capillary. They are connected in series by pipes to form a closed system. The refrigerant continuously circulates and flow in the system; changes state and exchanges heat with compressed air and cooling medium. The refrigeration compressor draws the low-pressure (low-temperature) refrigerant in the heat exchanger into the cylinder of the compressor, and the refrigerant vapor is compressed, and the pressure and temperature are simultaneously raised. The high-pressure high-temperature refrigerant vapor is pressed to the condenser. In the condenser, the higher-temperature refrigerant vapor exchanges heat with the relatively low-temperature ambient air, and the heat of the refrigerant is taken away by the ambient air to be condensed and turned into liquid. This part of liquid is then sent to the expansion valve, which is throttled into a low-temperature and low-pressure liquid through the expansion valve and enters the heat exchanger; the low-temperature and low-pressure refrigerant in the heat exchanger absorbs the heat of the high-temperature and

high-pressure compressed air and gasifies. When the compressed air is kept the pressure constant, the temperature is forcibly lowered, thereby generating a large amount of supersaturated water vapor. The refrigerant vapor in the heat exchanger is sucked away by the refrigeration compressor, so that the refrigerant undergoes four processes of compression, condensation, throttling, and evaporation in the system, thereby completing



a cycle.

3、Technical data

3.1.Processing capacity 17 ～ 28 CFM

3.2.Working pressure 0.4~1.6MPa

3.3.Ambient temperature ≤104° F

3.4.Import temperature Normal temperature type（SDL）≤113° F

3.5.Dew point temperature 35.6 -50° F

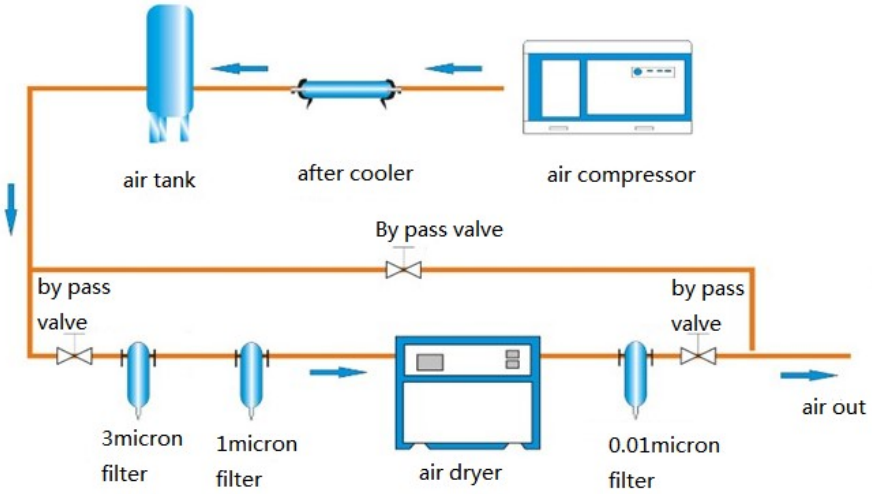
3.6. Refrigerant R22 environmentally friendly refrigerant

3.7. Power supply 220V/1P/50HZ

4、Compressor system

Advised to configure the device is as shown in picture 1-2. If there is a higher requirement for compressed air, please configure the adsorption dryer after the Class A filter.

After the air dryer, the A, F, and H filters can be selected according to the process requirements. If you have any questions, please consult our technical staff.



Picture 1-2

5. Installation and operation requirement

5.1 Dryer installation requirements: SDL refrigerated dryers do not require the installation of anchor bolts, but require a basic level of solidity, taking into account the height of the drainage system and the installation of drainage drains.

5.2 The air dryer is refrigeration equipment which should avoid strong

vibration and large angle inclination when loading, unloading, and handling and installation, so as to avoid damage to components such as refrigeration pipelines and compressors.

5.3 Avoid placing it outside the house to avoid direct sunlight, rain, high temperature, poor ventilation and dusty places.

5.4 It is recommended to install the air dryer between the surrounding environment or the surrounding wall environment. The distance should be maintained for easy operation and maintenance.

5.5 When installing, try to avoid using too long pipes and excessive bending angles to avoid pressure loss.

5.6 It is recommended to install the repair bypass valve as shown in Figure 1-2 on the inlet and outlet pipes before and after the dryer or filter. In order to easy to repair and perform maintenance.

5.7 It is recommended to install C-class and T-class main line filters at the inlet of the air dryer to prevent the heat exchange micro channels of the dryer from being contaminated by ≥1μm solid impurities and oil mist, which directly affects the heat exchange performance of the air dryer.

5.8 The pipeline from the outlet of the air compressor to the inlet of the dryer should do the processing of rust-proofed, and there should be no bending of the water storage pipeline.

5.9 It is recommended that the air dryer be installed after the rear cooler and the air tank to reduce the inlet temperature of the compressed air at the air dryer to improve the performance and life of the equipment.

Special attention should be paid to the electrical installation of the dryer:

1、The rated voltage of the equipment is within ±5%.

2、The wire diameter of the power supply line depends on the current and the length of the line.

Install a set of electrical appliances on the power supply side: such as magnetic starters, air switches (or knives), fuses, etc.!

Please ground properly!

6. Operations and precautions

1、Commissioning of the air dryer

The company's dryers are commissioned run before leaving the factory. Under normal circumstances, the user can directly use the device according to the instructions for installation and operation. The operator of the air dryer should attend the operation training organized by our company beforehand.

If you find an abnormal situation during the use process, you should contact the company. Under the guidance of the company's personnel, some valve parts should be adjusted, and blind operation should be avoided to avoid damage to the machine parts.

Only the professional technicians or authorized personnel designated by the company may be allowed to perform the debugging operation of this equipment.

2、Check before starting:

1) Check whether the conditions in the attached table 1-1 meet the requirements for use.

2)Check the power supply: Whether the voltage and phase are in compliance with the regulations, and whether the electrical wiring is correct.

Air-cooled: Whether the condenser air duct is unblocked.

3) Whether the filter configured before and after the dryer is installed correctly.

4) Check if the inlet bypass valve is closed and the outlet service valve is opened.

5) Check if the automatic drain ball valve is opened.

6) Whether the air remaining in the pipeline is discharged.

After the above checks are correct, the refrigerant compressor air dryer can be started.

 Only qualified personnel are allowed to operate the air dryer. (Qualified personnel are those who have a detailed understanding of the characteristics of this equipment or have been trained and authorized by the company)

3、Precautions after starting the air dryer

1）After the start of the air dryer, pay attention to listening to whether the compressor is running smoothly and without noise.

2）After the air dryer starts running for a while, then starts the air compressor.

3）When the gas tank pressure indication reaches 0.7MPa (depending on the on-site gas and equipment rated pressure value), the cold dry machine inlet repair valve can be slowly opened to gradually increase the compressed air flow and pressure into the lyophilized machine. It is strictly

forbidden to open the inlet repair valve violently, so as to avoid airflow shock waves in the dryer and damage the heat exchanger and other components.

4）Shutdown sequence: first turn off the air compressor and the inlet repair valve, then turn off the air dryer.

4、air dryer machine fan

The air dryer can control the start and stop by the temperature controller and the pressure controller to prevent the air dryer freezed.

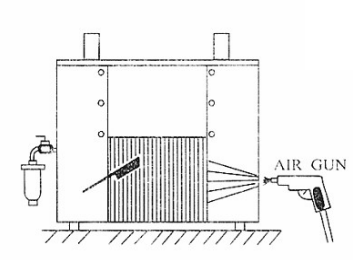
When the evaporating temperature reaches 0 ° C or the condensing pressure reaches 10 kg, the fan stops; when the evaporating temperature rises to 41 ° F and the condensing pressure drops to 8 kg, the fan rotates, otherwise it will not rotate.

 It is forbidden to frequently open and close the refrigerant compressor to avoid damage to the refrigeration compressor!

 It is strictly forbidden that the power supply of the air dryer does not match. Otherwise, the air dryer may not operate, or even directly cause the refrigeration compressor to be damaged!

7.Daily Maintenance and Maintenance

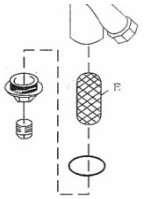
1、Air-cooled condenser should often clean dust and sundries, so as to avoid blockage affecting heat transfer effect.（Picture 1-5）



Picture 1-5

2、Picture1-6 is electrical drainer, should be check once a week. If it is found that the draining is not smooth, please check whether the coil is burnt out, or whether the filter is dirty blocked. If it is dirty blocked, please dismantle the involved cleaning according to Picture 1-7 in time

Picture1-6



Picture1-7

3、If there is no automatic drain (or the drain is damaged), manual drainage can be used. It must be drained in time to avoid air carrying water.

4、Picture 1-8is the hot gas by pass valve. When the equipment loading is smaller (compressed air flow capacity is less than air dryer's capacity) then system easy to freezing. open the red cap at the upper end and rotate clockwise with a screwdriver (open bypass) to raise the evaporation temperature; when the equipment loading becomes larger (right capacity matching for compressor ,under the right operating status, but bad dew-point), rotate counterclockwise (close bypass), pay attention to

adjustment, observe for a while after rotation, not enough to rotate again.

Picture1-8

6、Pay attention to whether the compressor is running smoothly and without noise;

7、Pay attention to the temperature difference between the air inlet and outlet. (Normally, the temperature difference should be about 5-15 degrees Celsius).

8、The ambient temperature should not be lower than 5 C, so as to avoid refrigerating oil condensation replenishment and compressor oil shortage burning out.

9、External boards should be often clean to avoid dust accumulation.

8. Common failures and Solutions

Refrigerated air dryer with 6 main common failures and please see the below solutions.

8.1、Large pressure drop

Status	Reason	Troubleshooting
Pipe connectio wrong	Pipe valve not open fully	Open the valve fully
	Small pipe size	Use bigger pipe size
	Longer pipe , or more elbows & connection on pipe	Design and use the new pipe
	Two or more compressors in parallel use, then pipe of flow rate asymmetry	Design a better pipe connection
	Blocking	Clean the pipe o change the new filter
	leaking	Check the elbow o conection
Overloading	Air dryer's capacity is less than compressor 's capacity	Use a bigger air dryer
		Reduce the air flow
Freezing Inside of condenser	temperature switch or pressure switch broken	Change the new parts or check the pipe no blocking
	Hot gas by pass valve broken	Change the new parts or check the pipe no blocking
	Air dryer's capacity more than air compressor's capacity	Clockwise one round the hot gas by pass valve or add the inlet compressed air flow

		rate

8.2、Draining not good

Status	Reason	Troubleshooting
Pipe connection wrong	By pass valve not closed fully	Closed the by-pass valve
	No air into the compressor	Check the air inlet connection and open the inlet valve on pipe
	No air tank or the air tank installation after air dryer	Installation the air tank and add filter between dryer & tank
	dryer not put in flat	In flat
	Drainer not flat	Make the drainer in flat
	Water out pipe higher than drainer	Put drown the water out pipe
Large pressure drop	Large air flow rate	Choose the right capacity compressor /dryer
Draining system wrong	Drainer broken	Clean or change a new one
	Valve which before the drainer is closed	Open the valve
Freon gas evaporated temperature wrong	Dew-point not good	Adjust the hot gas by pass valve
	Ambient temperature/ inlet temperature low	No impact can be used normally.
	Inlet temperature high	Add cooler for temp. down

	The ambient air is poorly ventilated	Choose a more appropriate location or improve ventilation
	Refrigerant leakage and low refrigeration efficiency	Filling Leakage and Adding Freon gas

8.3、Stop running

Status	Reason	Troubleshooting
Power on	Fuse or Fuse-free Switch Jump	Confirm whether the power supply has under-phase short circuit and grounding phenomenon, and check whether the fuse-free switch is damaged.
	Break line	Find out where the broken line is and overhaul it.
Power on but can not running	Wrong voltage	Rated voltage +-5%,pls check the nameplate
	Switch broken	Change a new one
	Pressure switch broken	Change a new one
	Reply broken	Change a new one
	Capacitor broken	Change a new one
	Temperature switch broken	Change a new one
	Compressor broken	Change a new one
Electrical part	Compressor broken	Change a new one

all wrong but cannot running	Wiring not good connection	Connection the wiring

8.4、Startup is broken

Status	Reason	Troubleshooting
Voltage wrong	Shortly after startup, the wires are short-circuited to produce a burning smell.	Reconfiguration of lines and switches to find out the causes of abnormal voltage
Refrigeration compressor can not start even it is returned after self-protection	Pressure switch / temperature switch broken, fan stop working	Change the new switch
	Fan broken	Change a new fan
	Condenser blocking	Clean the condenser

8.5、Normal operation, but ineffective

Status	Reason	Troubleshooting
Refrigerant evaporation temperature Indication is low.	Evaporator gauge broken	Change a new one
	Hot gas by pass valve broken	Change a new one
	Freon gas low	Filling Freon gas
	Freon gas blocking	Replacement of Freon gas, re-vacuuming and filling of refrigerant

	Pressure switch broken, make the fan always running status	Change the pressure switch
Refrigerant evaporation temperature Indication is high	Inlet temperature high	Add the cooler before the dryer or change a bigger air dryer on system
	Ambient temperature high	Adding ventilation equipment
	Hot gas by pass valve broken	Change a new one
	Condenser blocking	Clean or change a better ventilation equipment
	Air flow large but low pressure	Add one more air dryer or choose a bigger air dryer
	Inlet/discharge valve of refrigerated compressor broken	Change a new one
Over-loading	Inlet temperature high	Add cooler for temperature down
	Air flow large but low pressure	Add one more air dryer or choose bigger capacity dryer

	Freon gas leaking	Find the leaking place and mend it, filling new Freon gas.

8.6、Auto drainer not working fine

Reason	Troubleshooting
Connection blocking	Clean it
Drain valve broken or not oper fully	Change a new one or open the valve
Tilt or damage of drain valve	Fixed or renewed corrections
Filtering part blocking	cleaning
High working pressure	No more than 14bar
Drainer pipe blocking	Cleaning it