

AIR/TAK

Compressed Air System Products Installation & Maintenance Instructions Refrigerated Air Dryers Models SD-5 thru SD-20

Specifications

Refrigerant: R-134a

Maximum Inlet Air Pressure:

250 psig (17.2 bar) with metal bowl on separator;

150 psig (10.3 bar) with polycarbonate bowl on separator

Maximum Inlet Air Temperature: 130°F (54°C) with metal bowl;

125°F (52°C) with polycarbonate bowl*

Minimum Ambient Temperature: 50°F (10°C)

Maximum Ambient Temperature: 110°F (43°C)

Weight: 5 & 10 scfm – 45 lb (20 kg) net, 50 lb (23 kg) shipping;

15 & 20 scfm – 48 lb (22 kg) net, 53 lb (24 kg) shipping

*Polycarbonate bowl not suitable for all applications. See Warning.

Air Flow Rating** scfm (dm³/s) at 100 psig (6.9 bar)

| Nominal Flow Capacity | Outlet Pressure Dewpoint °F (°C) | |
|-----------------------|----------------------------------|-------------|
| | 35°F to 42°F (2° to 5°C) | 50°F (10°C) |
| 5 scfm | 5 (2.4) | 10 (4.7) |
| 10 scfm | 10 (4.7) | 15 (7.1) |
| 15 scfm | 15 (7.1) | 19 (9.0) |
| 20 scfm | 20 (9.4) | 24 (11.3) |

**Air flow ratings are determined at the conditions listed below. The test procedures used for all dryers for 60 Hz service comply with ANSI/B93.45M.

| Condition | |
|--------------------|--------------------|
| Electrical Input | 60 Hz |
| Inlet Air Pressure | 100 psig (6.9 bar) |
| Inlet Air Temp. | 100°F (38°C) |
| Ambient Air Temp. | 100°F (38°C) |

For 50 Hz operation apply the following conditions to achieve the above stated Air Flow Ratings.

| Condition | |
|--------------------|--------------------|
| Electrical Input | 50 Hz |
| Inlet Air Pressure | 100 psig (6.9 bar) |
| Inlet Air Temp. | 90°F (32°C) |
| Ambient Air Temp. | 85°F (29°C) |

Operation

Under normal conditions, the air dryer will run continuously when power is on. The dryer will provide a specified pressure dew point for the compressed air system with little maintenance or adjustments required.

Moisture and condensation will be removed from the moisture separator automatically through the automatic drain.

Units are designed for inlet air temperature of 100°F. If the inlet air temperature exceeds 100°F, there is a possibility of overloading the refrigerant compressor.

The allowable range for ambient temperature is 50°F to 110°F. At ambient temperatures above 110°F, refrigeration capacity will decrease with a corresponding increase in pressure dew point. If the thermal overload switch trips out and stops the compressor, the unit will not restart until it has cooled.

Installation

Install the dryer in a well-ventilated area where the ambient temperature will be above 50°F and below 110°F. Indoor installation is recommended. Dryers installed outdoors must be well protected from precipitation, dust, dirt, debris, and animals.

Position the dryer to permit free circulation of cool air through the front and sides of the dryer. Mounting holes are located on the back and bottom of unit. Optional floor stands are also available.

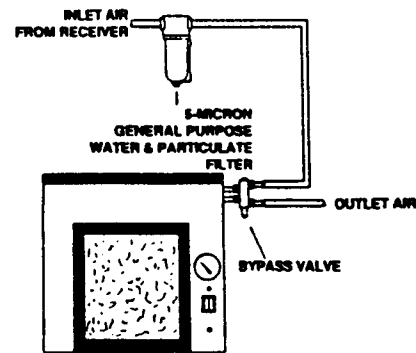
Dryer installation should follow the installation arrangements shown in Figure 1. An aftercooler and moisture separator with automatic drain are recommended to reduce the moisture removal and temperature variation demands on the refrigerated dryer. Between the compressed air receiver and dryer a general purpose filter with 5 micron filter and automatic drain is used to remove liquid water, liquid oil and solid particles from the airstream. Pre-filtering eases the load on the dryer and prevents an emulsion of water, oil, and particulates from forming. This emulsion can leave a deposit that reduces heat exchanger efficiency and clogs automatic drains.

For applications that require ultra-clean air, additional filtering may be required to remove the oil aerosols and vapors present in most systems. Oil coalescing filters remove oil in aerosol form. To remove oil vapor from the air stream use a filter fitted with an adsorbing activated carbon cartridge at the dryer outlet.

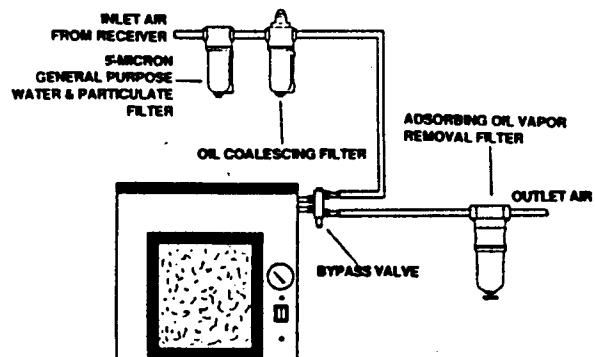
Note that the inlet and outlet ports of the air dryer are labeled. A dryer bypass valve should be installed for air dryer servicing. If aftercooler exit air temperature averages less than 100°F the dryer including prefilter and bypass system can be placed between the aftercooler separator and receiver.

Figure 1

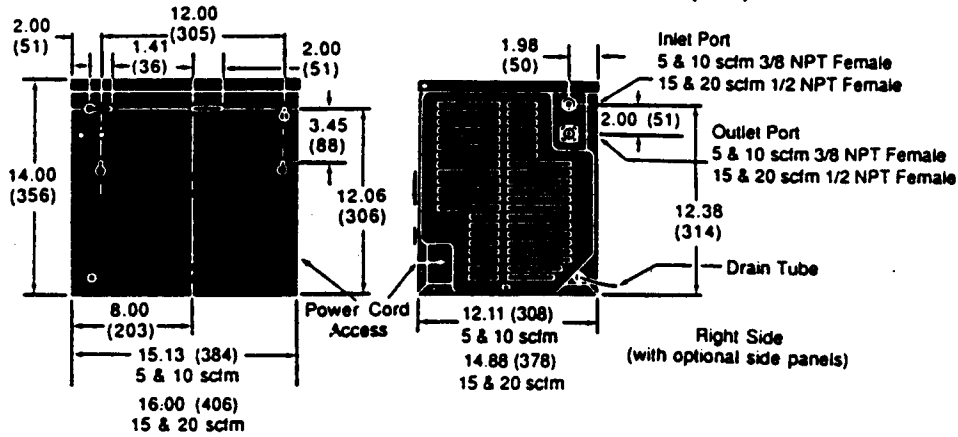
STANDARD INDUSTRIAL AIR APPLICATIONS



INSTRUMENTATION GRADE AIR



DIMENSIONS — ALL DIMENSIONS IN INCHES (MM)



Installation (continued)

If not already in place, connect condensate drain tube to the dryer's moisture separator drain trap. Position outlet of drain tube in such a manner that condensate will be drained away from dryer and other mechanical or electrical equipment.

Make sure when piping is in place that no undue stress is placed on dryer connections. Union joints or flexible connections are recommended to relieve stress.

Dryer is to be connected to an appropriate electrical power source based upon specifications shown on unit data label. Do not connect unit to a power source other than that called out on data label. Power source should incorporate a fused disconnect not to exceed 15 amps.

Air & Refrigerant Circuits

Air Circuit

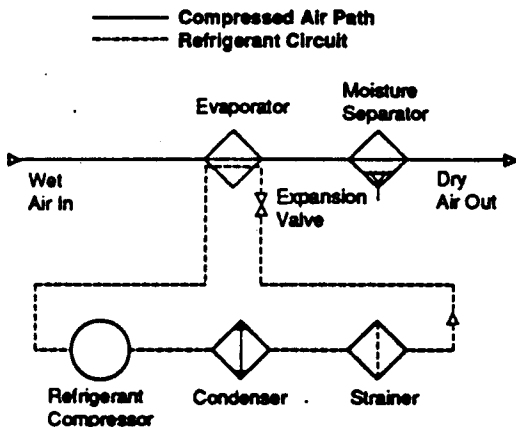
Warm wet compressed air enters the refrigerant dryer at the inlet port. It then enters the evaporator or refrigerant-to-air heat exchanger where its temperature is lowered. The condensate (water) generated by the cooling action is collected in the moisture separator and automatically removed. The dry air then leaves the filter and exits through outlet port.

Refrigerant Circuit

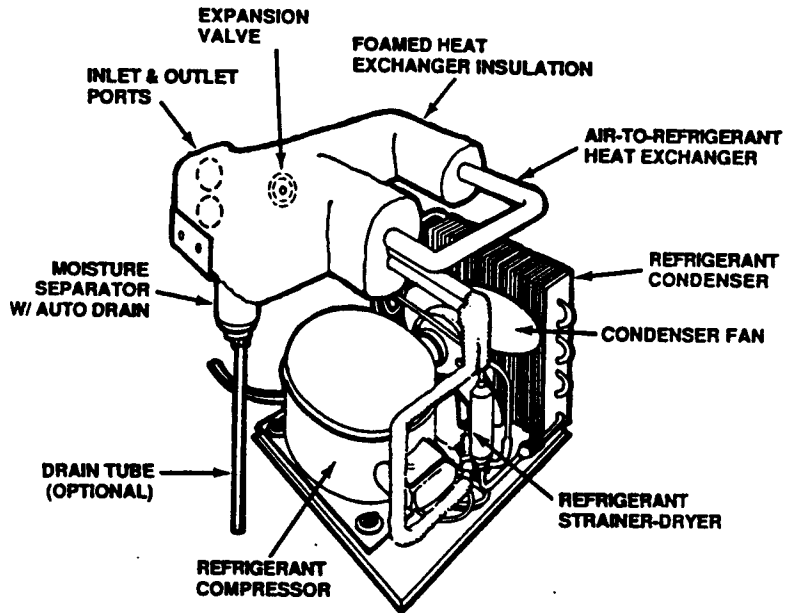
The refrigerant compressor compresses refrigerant vapor to a high pressure and temperature. It then flows through the condenser where it is cooled and forms a liquid. After this, it is filtered through the refrigerant strainer-dryer where any traces of moisture and contaminants are removed. The expansion valve lowers the pressure which in turn lowers the temperature of the liquid refrigerant to its preset level. It remains at this pressure and vaporizes as it flows through the evaporator/refrigerant-to-air heat exchanger absorbing heat from the air being dried. The refrigerant then flows back to the compressor and the cycle then repeats.

The refrigerant used is 134a. For units with a refrigerant suction pressure gauge, the refrigerant suction pressure gauge setting should read between 33 and 38 psig. If a lower pressure dew point is required, back off the adjustment screw on the expansion valve until gauge pressure reaches the desired level.

Air Dryer Circuit



Interior View



Accessory Kits

| | |
|---|----------|
| Side Panels 5 & 10 scfm | 71359-07 |
| Side Panels 15 & 20 scfm | 71359-12 |
| Ambient Filter | 71370-06 |
| On/Off Switch, Power On & "Hi-Temp" | |
| Indicator Lights 115 V | 71369-06 |
| On/Off Switch, Power On & "Hi-Temp" | |
| Indicator Lights 220 V | 71369-07 |
| 6-ft Power Cord, 115 V | 71366-06 |
| 6-ft Power Cord, 240 V | 71366-08 |
| 10-ft Power Cord, 115 V | 71366-07 |
| 10-ft Power Cord, 240 V | 71366-09 |

Panel Mounted Refrigerant Suction

| | |
|---------------------------------------|------------|
| Pressure Gauge | 72010-23 |
| Bypass Valve (with fitting kit) | 17-020-002 |
| Drain Tube Assembly | 71440-01 |
| Floor Stand (24-inch long legs) | 71439-01 |
| Gauge & Switch Hole Plugs | 71453-01 |
| Power-On Light | 71454-01 |

Repair Kits

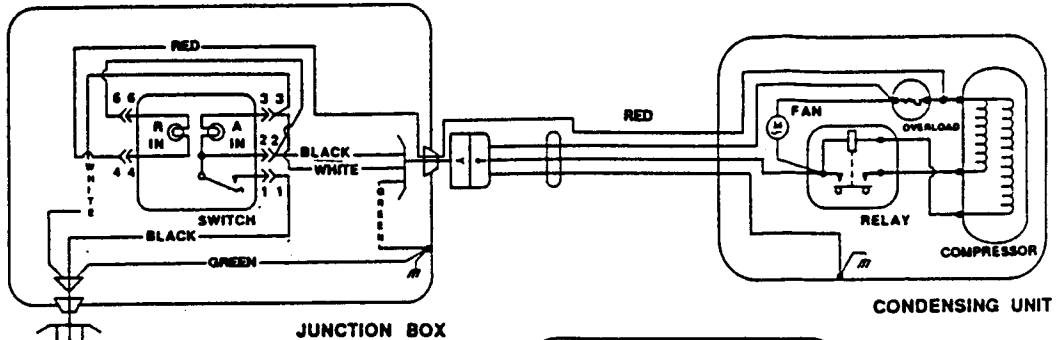
| | |
|--|----------|
| Automatic Drain Replacement 5 & 10 scfm | 71441-01 |
| Automatic Drain Replacement 15 & 20 scfm | 71441-02 |
| Ambient Filters (6) | 31370-12 |

Electrical Specifications – Refrigerant Compressor

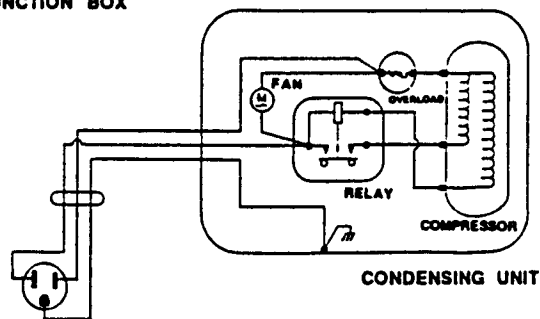
| Dryer Capacity | Compressor H.P. | Nominal Voltage | Permissible Voltage Range | Maximum Fuse Size | Rated Load Amperage | Locked Rotor Amperage 60 Hz | Watts At Rated Load |
|----------------|-----------------|-------------------|---------------------------|-------------------|---------------------|-----------------------------|---------------------|
| 5/10 scfm | 1/6 | 115-60-1/100-50-1 | 126.5-103.5/110-90 | 15 | 2.9 | 18.0 | 250 |
| 5/10 scfm | 1/6 | 240/220-50-1 | 264-198 | 15 | 1.4 | 8.7 | 208 |
| 5/10 scfm | 1/6 | 220-60-1/200-50-1 | 242-198/220-180 | 15 | 1.6 | 8.5 | 250 |
| 15/20 scfm | 1/5 | 115-60-1/100-50-1 | 126.5-103.5/110-90 | 15 | 4.4 | 24.0 | 415 |
| 15/20 scfm | 1/5 | 240/220-50-1 | 264-198 | 15 | 2.0 | 11.2 | 346 |

Electrical Schematics

ELECTRICAL SCHEMATIC
(FOR UNITS WITH SWITCH)



ELECTRICAL SCHEMATIC
(FOR UNITS WITHOUT SWITCH)



Trouble Shooting Guide

| Problem | Possible Cause | Repair | Comments |
|------------------|---|--|--|
| Water in System* | 1. Inlet and outlet connections are reversed. | Check inlet and outlet connections | This dryer is designed for air flow in one direction only. Inlet and outlet connections are identified on the dryer. |
| | 2. Drain trap is clogged or inoperative. | Restore a free flow of water | Trap is a float type. The bowl will normally contain some water and valves should be free and clean. Important: (1) the trap should be periodically checked and cleaned, (2) during initial 60 days following installation, the trap should be checked weekly for dirt, pipe scale, etc. |
| | *3. Bypass system is open. | Check the valves | Important: Bypass piping should be installed around the dryer so the dryer may be isolated for service without shutting down the air supply. During dryer operation valves must be set so all air goes through the dryer. |
| | *4. Free moisture remains in pipe lines. | Blow out the system | Before dryer is first started all free moisture should be blown out of the system. |
| | *5. Excessive air flow | Check actual (scfm) flow through the dryer. | This dryer is designed for a specified air flow. If air flow into the dryer exceeds specifications, water removal capacity may not be sufficient, resulting in liquid carry-over downstream. Check the flow of air system. |
| | 6. Excessive free moisture. | Check the separator and drip legs ahead of the dryer. | If this dryer is installed at an individual work station or in one portion only of the piping system, instead of near the compressor, there may be an accumulation of free moisture in the pipeline ahead of the dryer. If the moisture is pumped into the dryer intermittently, water removal capacity may not be sufficient. A separator or air line filter with an automatic trap should be installed ahead of the dryer. |
| | *7. High temperature inlet air. | Designed condition is 100°F. | The dryer is designed for inlet air temperature of 100°F. Temperatures above 100°F may cause water down stream and an overloading of the condensing unit. |
| | 8. Clogged condenser fins. | Clear fins of all obstructions | Clogged fins in the condenser coil will restrict air passage and reduce refrigeration capacity, causing water down stream. Fins should be periodically checked and cleaned. Install ambient air filter. |
| | 9. Shortage of refrigerant. | Fix the leak and add a charge of refrigerant. | Loss of refrigerant will cause improper functioning. A qualified refrigeration specialist should perform the necessary repairs, or factory should be contacted if the unit is in warranty. |
| | 10. Refrigeration system is not functioning. | Check to be certain refrigerant compressor is running. | It is possible for the fan to be operating but not the compressor. Compressor not running can be caused by several factors. A qualified refrigeration contractor should check refrigerant and electrical controls. |

*These items are typical problem areas on initial start up of refrigerated compressed air dryers.

Trouble Shooting Guide (continued)

| | | | |
|---|--|---|---|
| Water in System (continued) | 11. Excessive pressure dew point. | Readjust expansion valve. | The expansion valve operates like a pressure regulator. Loosen lock nut. Turning the adjustment screw on the expansion valve counterclockwise decreases refrigerant pressure and lowers refrigerant temperature. Adjust valve in 1/4 turn increments to allow 15 minutes for pressure stabilization with air flowing. |
| High pressure drop. | 1. Excessive air flow. | Check the air flow. | This dryer is designed for a specified air flow as indicated in the Specifications. If air flow into the dryer exceeds specifications, the water removal capacity may be insufficient resulting in a liquid carry-over downstream. Check the flow of the air system. |
| | 2. Freeze up. | Readjust refrigeration controls. | Frosting of the lines is an indication the controls are set too low. Controls may be adjusted in the field by means of the expansion valve adjustment screw. Loosen lock nut. Turn screw clockwise to increase refrigerant pressure setting which will increase refrigerant temperature. Turn screw in 1/4 turn increments until frost disappears. Allow 15 minutes for pressure stabilization with air flowing. |
| The unit will not run or cycles off and on. | 1. Line disconnect switch is open. Power-on light will be off. | Close the start or disconnect switch. | If the dryer is not operating check the disconnect switch or circuit breaker to be certain it is on. |
| | 2. Fuse or breaker is open. Power on light will be off. | Replace fuse or reset breaker. | The fuse to the power line should be checked. Maximum fuse or breaker size is 15 amps. |
| | 3. Faulty refrigerant compressor or controls. Power on light will be on. | Determine the cause and make corrections. | Failure of compressor to run may be due to several factors. A qualified refrigeration specialist should check all electrical and refrigerant controls, or factory should be contacted if unit is in warranty. |
| | 4. High temperature inlet air. Power-on light will be on. | Maximum rated temperature is 100°F. | The dryer is designed for inlet air of 100°F. Temperatures above 100°F, may cause poor performance and an overloading of the condensing units. |
| | 5. High ambient temperature. Power on light will be on. | Check the ventilation. Ambient temperature should not exceed 110°F. | Air circulation around the dryer should be adequate, and proper ventilation in the equipment room should guarantee a correct ambient temperature. |
| | 6. Clogged condenser fins. Power on light will be on. | Clear fins of all obstructions. | The clogged fins in the condenser coil will restrict air passage and reduce refrigeration capacity, causing unit to shut down due to overheating. Fins should be periodically checked and cleaned. Install ambient air filter. |
| | 7. Shortage of refrigerant. | Fix the leak and add a charge of refrigerant. | Loss of refrigerant will cause improper functioning. A qualified refrigeration specialist should perform the necessary repairs, or factory should be contacted if the unit is in warranty. |
| "Hi-Temp" Indicator light is on | 1. Excessive air flow, high-temperature inlet air, clogged condenser fins or high ambient temperature. | See solutions in this troubleshooting guide for the appropriate possible cause. | "Hi-Temp" Indicator Light is activated when a sensor (thermal/current overload) experiences excessive current draw to the compressor or the temperature of the compressor shell to which it is attached becomes excessive. Energization of the light indicates power to the compressor has been disrupted for one of the above reasons. This may be caused by excessive ambient or inlet air temperature but it is not directly indicative of either condition. |

Warning

These products are intended for use in industrial compressed air systems only. Do not use these products where pressures and temperatures can exceed those listed under Specifications.

These products are not designed for use with fluids other than those specified, nonindustrial applications, life-support systems, or other applications not within published specifications.

The polycarbonate plastic bowls used on some of these units can be damaged and possibly burst if exposed to such substances as certain solvents, strong alkalies, compressor oils containing aromatic hydrocarbons, or synthetic oils. Fumes of these substances in contact with the polycarbonate bowl, externally or internally, can also result in damage. Clean with warm water only.

Use metal bowl in applications where a plastic bowl might be exposed to substances that are incompatible with polycarbonate.

Through misuse, age, or malfunction, components used in fluid power systems can fail in various modes. The system designer is warned to consider the failure modes of all component parts used in a fluid power system and to provide adequate safeguards to prevent personal injury or damage to equipment in the event of such failure modes.

System designers must provide a warning to end users in the system instructional manual if protection against a failure mode cannot be adequately provided.

System designers and end users are cautioned to review specific warnings found in instruction sheets packed and shipped with these products.

AIR/TAK

Compressed Air System Products

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| |
|--|
| CHECKLIST FOR SD OR SRD REFRIGERATED AIR DRYERS |
|--|

| | OK | NOT OK |
|--|--------------------------|--------------------------|
| 1. Check dryer for damaged cabinetry. | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. Check the refrigerant analyzer gauge reading. It must be reading a positive pressure. It should be no lower than 100# on a 60°F day for R-22 refrigerant and 57# on a 60°F day for R-134a refrigerant. Please note that this gauge is a compound gauge. Be sure to read the PSIG scale. | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. Are the temperature gauge(s) registering a temperature? | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. Are the air pressure gauge(s) reading zero? | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. Does your plant voltage match the required voltage on the dryer data tag? | <input type="checkbox"/> | <input type="checkbox"/> |
| 6. Have you read the Operation Instruction Manual provided? | <input type="checkbox"/> | <input type="checkbox"/> |

DO NOT place the air dryer in service unless you are able to check OK for each of the above items.

Notify the freight carrier and Air/Tak immediately of any problems.