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Air Compressors for Kodak Output Devices

Annacis Island, Canada (21 February 2003)—Kodak output devices require clean, dry, compressed air. This paper offers general guidelines for achieving the specifications for air cleanliness, volume and pressure as outlined in the Site Preparation & Requirements document for each device.

Selecting a Compressor

The first step in meeting air quality requirements is to understand that Kodak output devices are high-quality industrial equipment, and must be matched with a high-quality industrial compressor. Such compressor units are not available at general hardware stores. It is important to contact a reputable dealer[1], and to consider consulting with an industrial compressor specialist before connecting a Kodak device to any air source.

Location

The compressor should be placed as close to the device as possible. It needs to be thoroughly sound-insulated and well-ventilated, as compressors can produce a lot of heat. Inlet air should be clean and can come from inside or outside the building. In cool climates, it is advantageous to draw outside air, as less energy is required to compress cooler air.

Capacity

The compressor unit must be able to meet the minimum specifications of the Site Preparation document throughout its service life. It is important to anticipate any additional loads on the compressor from other equipment than the Kodak device, in order to choose the appropriate size of compressor and its ancillary equipment. Deterioration of compressor performance with age should also be taken into account.

[1] An example of a dealer with a proven track record in compressor reliability is Atlas Copco Compressors.

Automatic Unloader Valve

It is strongly recommended to choose a compressor equipped with an automatic unloader valve. This will allow the electric drive motor to run continuously while still allowing the pump to cycle as needed. Advantages of a unit with an automatic unloader valve include the following:

- A much smaller accumulator can be used. Without an unloader valve, it is more difficult to calculate the correct tank size (accumulator).
- Reliability of the motor and motor starter is improved by having the unit run continuously
- Electricity consumption is reduced. Electricity accounts for 70% of the costs of running a compressor over its lifetime—including the initial purchase. Since motor start-up consumes many times more current than continuous running, it is more economical to run the motor continuously.

The disadvantage of equipping a unit with an automatic unloader valve is noise. However, the type of compressor selected can greatly reduce this drawback.

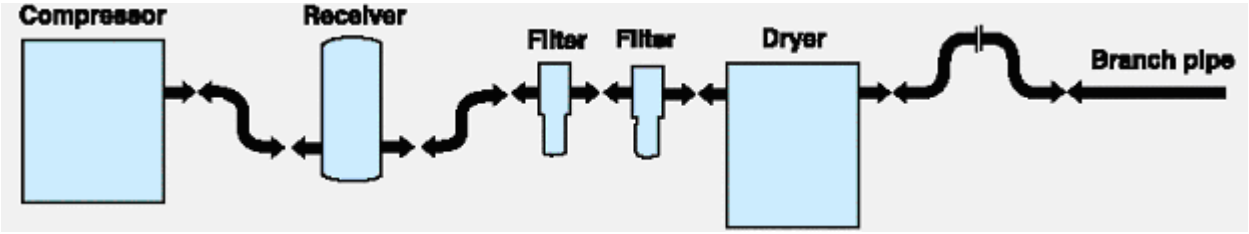
Type of Compressor

Screw- or scroll-type compressors are recommended, as they are quieter and more efficient than piston units. They also have a lower coefficient of wear. Scroll type compressors have an extra advantage over screw compressors, in that the scroll unit requires no lubrication. As long as an automatic tank drain is installed, there is virtually no maintenance needed for scroll compressors. There is also no possibility of compressor lubricant leaking into the air stream and contaminating the Kodak device.

Air Filtration

Filtration is essential to air quality. It prevents many downstream problems, including grit in the valves and cylinders, oil on the optic lenses, and corrosion and mildew from excessive moisture. Kodak products have filters built in at the factory, but these filters are the final safeguards to protect the equipment. The air should be clean and dry before it reaches the device.

This diagram shows a typical system for air filtration and drying.



A 5-micron particle filter, followed by a 0.01 micron combination coalescing/particle filter is the minimum acceptable to meet the requirements specified in the Site Preparation document. Both filters should be at least 99.7% efficient[2].

The filtration units must be sized so that air speed never exceeds 1800 m/min [5900 ft/min] at peak consumption. Simply ensure that the pipe ports on the filters are as large as the pipe sizes recommended in this document. Consider installing a unit that is one or two sizes larger, because the filtration is more efficient at slower air speeds, and the cartridges will need replacement less often.

As well as the particle filter and the coalescing/particle filters, an absorption filter can be added to remove the last remnants of oil. *Do not install an oiler on any line leading to a Kodak device.*

Drying

A refrigerant air dryer should be installed downstream of the filters, since moisture in the device can cause corrosion, mildew, component failure, and plate artifacts. By drying the air to a pressure dew point of approximately[3] ISO class 4 [+3ºC], there will be no water condensation as the compressed air expands and cools.

Dryers are sized by the flow rate at a given pressure dew point. The dryer should be sized for the peak capacity of the compressor, unless it is positioned on a branch line that feeds only the Kodak device.

Supply Line Pressure

The static line pressure should not exceed 830 kPa [120 psi], as the maximum inlet pressure for the internal regulator is only slightly higher. If the compressor is a continuously running unit, set the cutout pressure to 830 kPa [120 psi]. Kodak devices require 620 kPa [90 psi] dynamic at the final connection to the device, so a cut-in pressure of 690 kPa [100 psi] should be the minimum[4]. Alternatively, place a regulator in the line with the filters.

Pipe Sizes

To determine the size of supply line needed, measure the difference between the tube and the pipe. Inside diameter is the most common unit of measure when specifying compressed air supply lines. Tube sizes, which are normally measured by outside diameter, must be increased until the inside diameter corresponds to the inside diameter of the specified pipe, since flexible tube usually has much thicker walls (with a correspondingly smaller bore) than rigid tube.

[2] A 5-micron filter at 97% efficiency can be less efficient than a 10-micron filter at 99.7% efficiency.

[3] A pressure dewpoint of +5ºC is also acceptable.

[4] The Trendsetter® Autoloader requires a higher pressure.

Recommended pipe sizes are as follows:

0.22 m^3/min [8 $scfm^5$], use 10 mm [3/8"] pipe
0.42 m^3/min [15 scfm], use 15 mm [1/2"] pipe
0.57 m^3/min [20 scfm], use 20 mm [3/4"] pipe
0.99 m^3/min [35 scfm], use 25 mm [1"] pipe

For longer runs of supply line, increase by at least one size.

Disclaimer

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[5] Standard cubic feet per minute, or the volume of air at 14.7 psi.