

Technical Bulletin 105

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Understanding JT Series Refrigerated Compressed Air Dryers

by Brian S. Elliott

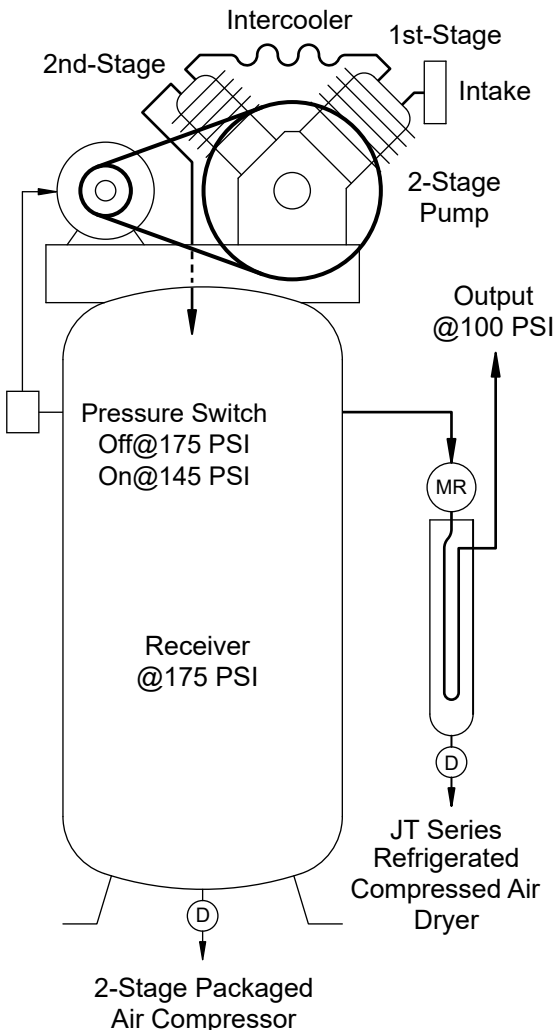
JT Series refrigerated compressed air dryers are specifically designed to complement the unique make-up and operating parameters of 2-stage reciprocating air compressors.

Two-stage air compressors are, by far, the most common type of compressors in the business community today. These compressors represent approximately 90% of all commercial and industrial compressors operating in North America. One might ask themselves, why? The short answer: “efficiency”

Two-Stage Reciprocating Air Compressors

Simply stated: 2 stage compressors produce more SCFM of compressed air per KWH used than do their single-stage counterparts. There are two key features that account for the efficiency of 2-stage air compressors, the intercooler and a high discharge pressure (175 PSI).

- The intercooler rejects the heat of compression from the first stage which, in turn, densifies the air being delivered to the second stage. This cooling and densification is important to the overall efficiency of the air compressor.
- To better utilize the cooler, densified air, the second stage subjects this flow to a 5:1 compression ratio which produces the high discharge pressure (175 PSI), further improving the efficiency of the system.
- The receiver is pumped up to 175 PSI and acts as a pressure buffer and an aftercooler.
- The only shortcoming to a 2-stage air compressor is its high discharge pressure. Because most pneumatic tools are rated at 90 PSI, the high discharge pressure of the compressor is grossly inappropriate for these tools. In most instances, the high pressure will dramatically reduce the life expectancy of the tool and force it to fail prematurely.
- In order to match the high discharge pressure to an appropriate distribution pressure, the output of all 2-stage air compressors should be equipped with a master regulator, however they rarely are. Most shop owners just turn down the cutoff pressure on the compressor to a tool friendly pressure, usually around 135 PSI. In doing so, they completely negate the efficiency that the compressor was designed to produce. This is the situation that Air Options has recognized as problematic through out the industry.



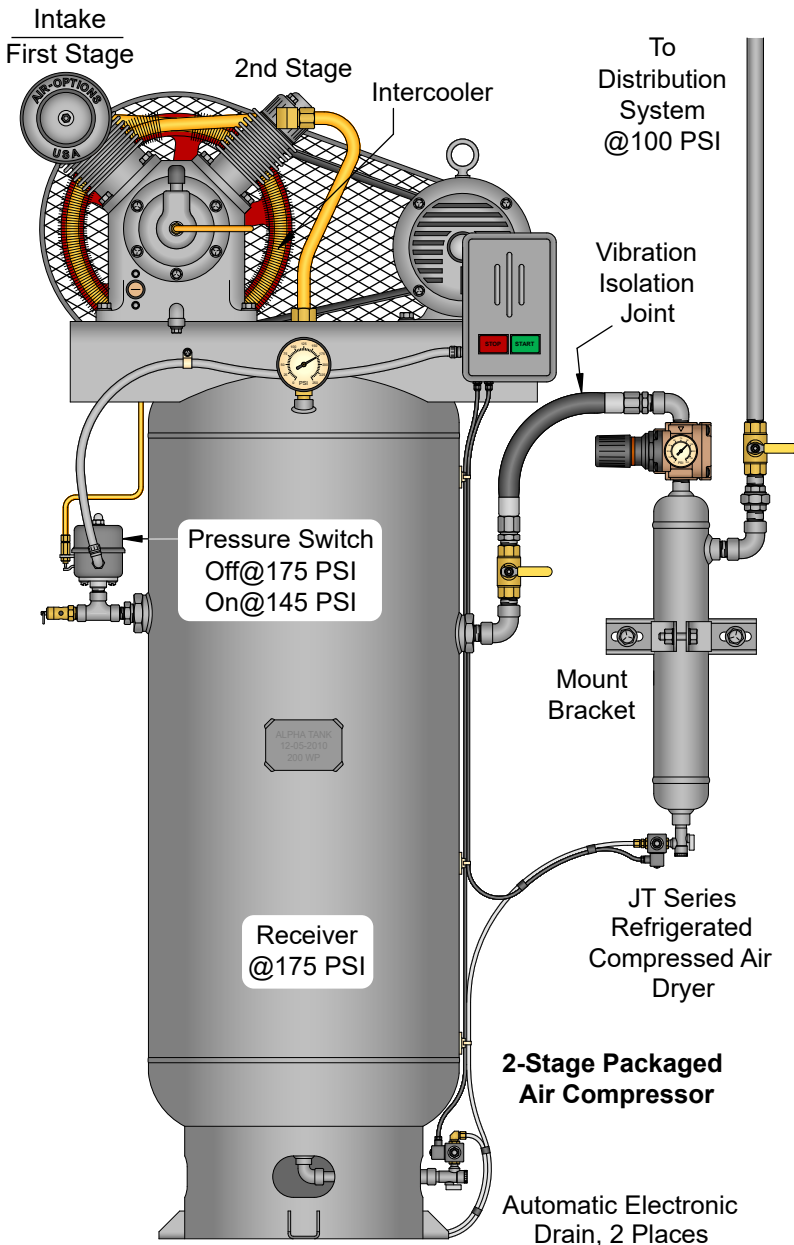
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Advanced Technologies for Compressed Air

The JT Series Refrigerated Compressed Air Dryer

The necessities of both a high discharge pressure and lower distribution pressure, coupled with the requirement for clean, dry air, is what makes JT Series dryers virtually ideal for 2-stage air compressors. The JT Dryers are supplied with an integral master regulator which is fed from the high pressure receiver. The master regulator's output is set to a suitable distribution pressure, usually 100 PSI. When the high pressure is reduced from 175 PSI to 100 PSI, the air expands dramatically and becomes ice cold. This expansive refrigeration is dictated by the Joule-Thomson effect. (Also see *Technical Bulletin Num.: 15, "The JT Refrigeration Process"*) When the air becomes cold, it loses its ability to retain moisture, which condenses out in the form of fog. The micro-droplets that make up the fog are separated from the air stream and the output of the JT Dryer now consists of clean, dry air at a consistent pressure.



The Benefits of using JT Series Refrigerated Compressed Air Dryers

- Clean, Dry Air (38°F dew point)
- Allows a 2-stage compressor to operate in its most efficient pressure range.
- Improves efficiency.
- 20~30 Year life expectancy.
- Approximately 1/3rd the cost of their Freon-based counterparts.
- Far more compact than a Freon dryer.
- A low cost, effective piece of equipment that is ideal for small shops.
- A common sense solution for drying compressed air that makes sense to small business owners.

The high cost and short life expectancy of Freon-based dryers is the very reason that most small business owners choose to operate without a dryer on their 2-stage compressors. They just can't afford such a high, repetitive expense.

JT Series Dryers have forever changed this dynamic.

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A complete bound copy of Air Options Technical Bulletins can be purchased on our web site at: JTDryers.com/jt-order-now



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