

# TS Non-Cycling REFRIGERATED AIR DRYERS

## 50Hz and 60Hz Design

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Revision 2

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### STRATEGIC WHITE PAPER

The new TS dryer has many attributes that are key to a remarkable, innovative dryer design. The Ingersoll Rand TS non-cycling refrigerated dryer has superior operating and performance characteristics.

Optimized connections and flow rates, to match IR rotary compressor loads, were the first steps in the TS design. Optimizing the connections avoids using adapters, which can result in increased pressure drop and air side leak paths. Optimizing the flow rates provides a custom IR solution to the end-user with minimum pressure drop and quality operation. Since we now have optimized flow rates, Ingersoll Rand has the ability to meet a customer's system requirements more precisely than the competition.

With a focus on increased reliability in refrigeration dryer design, IR will be the first to market with the Micro-Channel condenser. The condenser is already widely used in the automotive and home air conditioning industries for its superior efficiency and durability. Its design enables more efficient sub cooling in higher ambient environments, uses significantly less refrigerant, and lends itself to superb performance in all conditions.

Another attribute of the design is the lack of soldered U-joints found on the common tube-in-fin design. These joints tend to be the major leak path within a refrigeration circuit. They are often damaged in inbound manufacturing transportation and are susceptible to human error during the

manual soldering process. Micro-Channel condensers are batch dipped and processed and are less susceptible to variances in manufacturing practices or operator error.

When it comes to non-cycling technology, energy efficiency is achieved through reduction in pressure drop. The TS Refrigerated Dryer was subjected to lab testing to verify minimal pressure loss, which resulted from the 3-in-1 heat exchanger with integrated moisture separator. All the internal piping has been sized to avoid unnecessary pressure drop as well.

Further increases in energy efficiency in non-cycling technology can be achieved by limiting compressed air waste through the drain valve. To minimize air losses through the drain, IR is introducing the "Smart" drain. The ability of ambient air to hold moisture increases as its temperature increases. Therefore, dryers operating in higher ambient environments will produce more condensate. The "Smart" drain realizes that as ambient temperatures increase, the drain will need to open more often to discharge that condensate. If the dryer is ducted or is in a room with poor ventilation, it is also possible to manually set the "Smart" drain with the Intellisys™ controller.

Another way to increase energy efficiency and reduce run time is with the Efficiency Option. The Efficiency Option enables the dryer to cycle on and off, when it receives an "off" signal from a host compressor. When

the compressor goes off line, the dryer will maintain an evaporator core temperature between 35°F/1.7°C and 48°F/8.9°C.

PORO, Power Outage Restart Option, will automatically restart the dryer when an interruption in supply power occurs.

With industry leading 115°F/46°C maximum ambient and 140°F/60°C maximum inlet air temperatures, the TS is designed to perform in high temperature environments and avoid nuisance shutdowns associated with poor compressor room ventilation and fouled air compressor aftercoolers. At regular operating (100°F/38°C inlet air) conditions, the dryer is matched to the standard IR rotary flows at 125 Psig / 8.6 Barg.

R404A is the latest and most readily available refrigerant for lower temperature performance. It is Ozone friendly and is not on any list for global obsolescence.

The TS dryer is truly a remarkable and innovative design displaying improvements in reliability, energy efficiency and serviceability. When revisiting the performance characteristics, please note the superb re-rate capabilities. The operating and performance characteristics of Ingersoll Rand's TS dryer has the potential to raise the industry's average on non-cycling dryer performance.