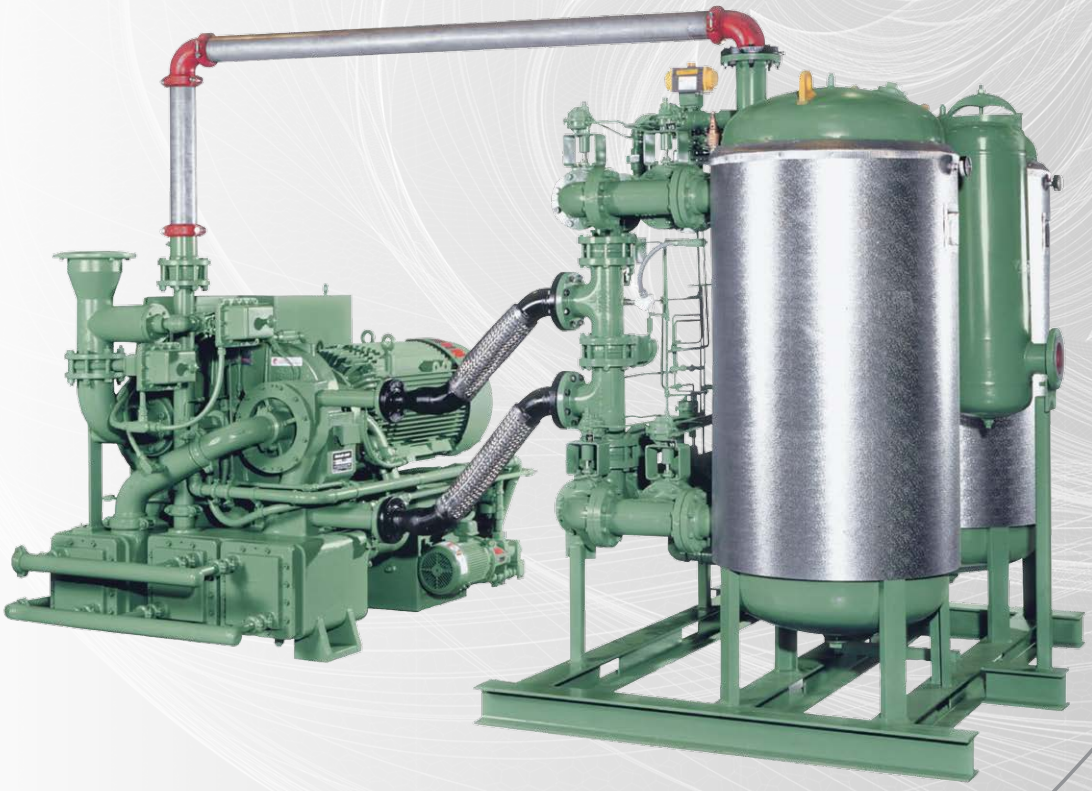
Ingersoll Rand®

TURBO DryPak™ Centrifugal Compressor and Heat-of-Compression Dryer

Patented Dryer and Compressor Package for Efficient, Dry, 100% oil-free air*

**Per ISO 8573-1 certification*



The TURBO DryPak™ (TDP) is designed to seamlessly blend the compressor and dryer into one integrated package by combining an efficient and reliable centrifugal compressor with a heat-of-compression (HOC) dryer. This elegant system combines the best features of both the compressor and dryer into a single, integrated module that delivers premium performance with impressive reliability.

When evaluating a compressed air system, it is important to consider the total life-cycle costs, including the initial investment, energy consumption and maintenance costs. Heat-of-compression technology coupled with the inherent efficiency and reliability of a MSG® TURBO-AIR® compressor allow the TDP to deliver premium performance at a low total cost of ownership for the complete compressor/dryer package.

TURBO DryPak

The TURBO DryPak is a pantented, unique compressor/air dryer package featuring adjustable dew point performance down to -40°C (-40°F).

Why TURBO DryPak?

- Low total costs of operation and ownership
- Minimal installation cost
- Provides dry, oil-free air as certified per ISO 8573-1
- Optional zero purge reduces operating costs
- Optional stripping and cooling cycle reduces dew point spikes
- Dryer controlled by compressor, no separate controller needed
- Complete package with minimum external connections
- No separate power requirements
- Does not require external heaters
- Does not require blower
- No dryer pre-filter is required because regenerating air is already filtered before entering the compressor
- After-filter is included in package to protect downstream process

Principle of TURBO DryPak

Physics tells us that as air is compressed it also rises in temperature. This rise in temperature (heat) allows this now warmer air to absorb additional moisture. The TURBO DryPak uses this available heat of compression to regenerate the desiccant beds that are primary to the function of the dryer.

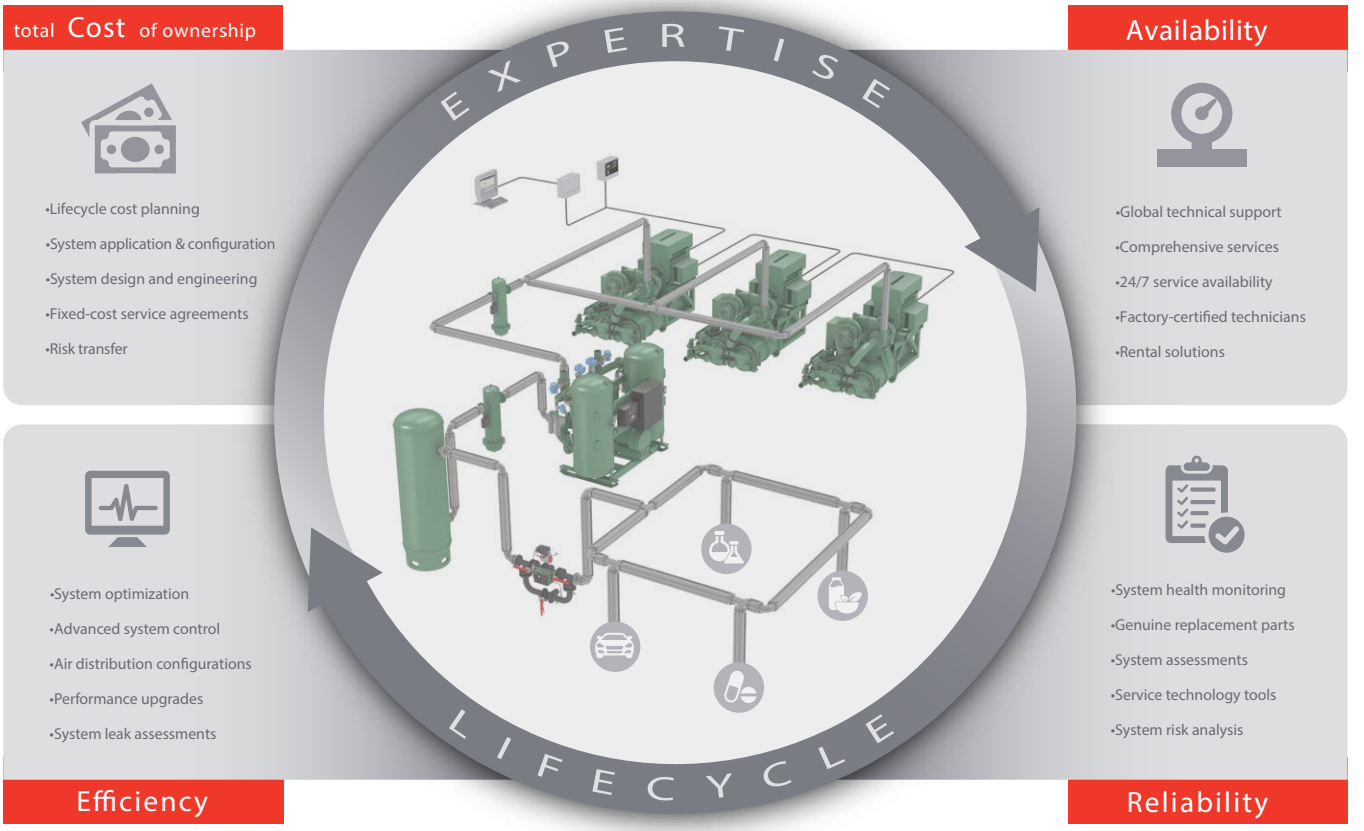
TURBO DryPak Advantages

- Minimizes costs by using the already available heat of compression for regeneration
- Regeneration with "free" heat that is already produced by your compressor
- Eliminates costly installation charges; components are pre-piped and pre-wired
- Minimizes potential for wear and mechanical failure
- Lower total cost of ownership than alternative regenerative dryer technology
- Accelerated return on investment (ROI) compared to alternative regenerative dryer technology
- TDP model design includes optional stripping and cooling cycle for optimum performance

Class 0
ISO 8573
Oil-Free Air

Your Trusted Partner in Compressed Air

Optimize your total **Cost** of ownership, while maximizing **Availability**, **Reliability** and **Efficiency** throughout the life of your compressed air system with our Lifecycle CARE services.



Design • Install • Commission • Operate • Maintain • Extend

PackageCARE™ *...eliminate the inconvenience*

No matter where your facility is located, Ingersoll Rand is committed to serving you 24 hours a day, seven days a week, and is available to support you with innovative, cost-effective service solutions that will keep you running at peak performance. Let Ingersoll Rand handle the pressures and responsibilities of owning a compressed air system with our signature service contract.

PackageCARE™

Annual Operating Cost Comparison

The TURBO DryPak provides protection for air lines, tools, and downstream instrumentation. Heat-of-compression dryer technology provides consistent pressure dew point performance at low annual operating costs.

DRYER	Purge Air**	Heater	Blower	Annual Operating Cost Per 1000 SCFM (1700 m^3/h)*
TURBO DryPak	½%	No	No	$600
Heatless	15%	No	No	$19,200
Exhaust Purge	2-7%	Yes	No	$11,200
Blower Purge	No***	Yes	Yes	$9,200

* Costs based on 1000 SCFM (1700 m^3/h)* dryer operating around the clock 365 days. Purge air at $.25/1000 SCFM electricity at $.05/kWh. Does not include maintenance costs.

** Average purge loss.

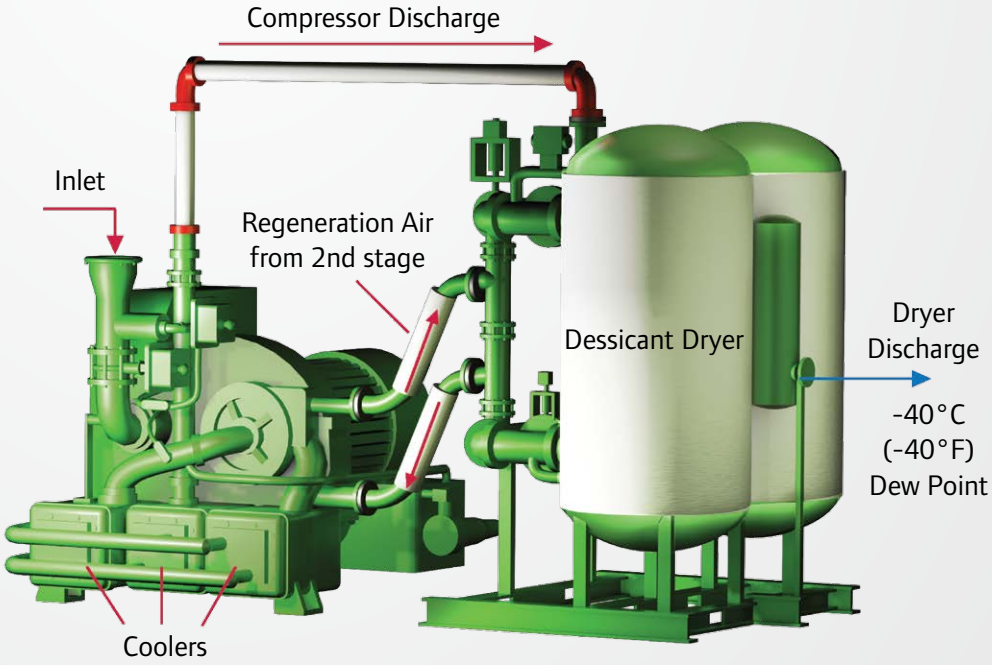
*** Can use up to 5% purge during cooling if exhaust purge cooling mode is selected.

TDP Arrangement... How it works

Hot air discharged from the second compression stage enters the dryer and is directed into the regenerating tower where it is used to remove moisture from the desiccant. This process is known as regeneration. After regeneration, this air next enters the second stage intercooler where it is cooled. During the cooling process excess moisture in the air condenses and is removed from the compressor via a condensate drainage system.

After the heating cycle is complete, the regenerating tower is de-pressurized. The now de-pressurized tower is fed a small stream of ambient air that is used to further cool the tower. This air is subsequently vented back to the atmosphere. An optional stripping cycle can also be executed to remove additional moisture from the desiccant to reduce moisture spikes upon tower switchover.

The next process is cooling. Cooling is used to allow the dryer to deliver consistently low dew points. By adequately cooling the bed before tower shift, dew-point spikes can be reduced. From the outlet, some of the dry, cool air is directed into the regenerating tower. It cools the bed and then rejoins the process air at the outlet, so there is no air lost during cooling.



The Right Air Dryer for Your Needs

TURBO DryPak Specifications

No matter your application, Ingersoll Rand can provide a heat-of-compression air dryer to meet your operating requirements. Ingersoll Rand offers a wide range of models whose specifications include:

Dryer Models	HCCI-1260	HCCI-1820	HCCI-3360	HCCI-4000
Flow Range @ 6.9 barg (100 psig) @ 29°C (85°F) CWT	1050 to 1545 m^3/h (620 to 910 SCFM)	1970 m^3/h (1160 SCFM)	2385 to 4950 m^3/h (1405 to 2915 SCFM)	5350 to 8410 m^3/h (3150 to 3515 SCFM)
kW energy savings compared to a bolt-on HOC w/ external heater Dryer inlet @ 93°C (200°F) CWT @ 29°C (85°F)	5.5 kW	8 kW	15 kW	17.5 kW
Overall energy savings on operational costs	Relevant to dryer type comparison (see table on previous page)	Relevant to dryer type comparison (see table on previous page)	Relevant to dryer type comparison (see table on previous page)	Relevant to dryer type comparison (see table on previous page)
Pressure drop across dryer	0.2 barg (3 psig)	0.2 barg (3 psig)	0.2 barg (3 psig)	0.2 barg (3 psig)
Amount of desiccant per tower	360 kg (800 lb)	520 kg (1145 lb)	995 kg (2110 lb)	1150 kg (2540 lb)
Connection sizes	DN 80 (3.0 FLG)	DN 100 (4.0 FLG)	DN 150 (6.0 FLG)	DN 150 (6.0 FLG)
Nominal amount of purge air	15 m^3/h (9 SCFM)	24 m^3/h (14 SCFM)	42 m^3/h (25 SCFM)	51 m^3/h (30 SCFM)

Ingersoll Rand provides complete system solutions including compressors, dryers, cooling systems, as well as extended warranty and preventative maintenance contracts.

The TURBO DryPak system, pictured to the left, supplies instrument air at -40°C (-40°F) dew point. It is located in an oil refinery and is relied on for control of critical process valves.

Ingersoll Rand (NYSE:IR) advances the quality of life by creating comfortable, sustainable and efficient environments. Our people and our family of brands—including Club Car®, Ingersoll Rand®, Thermo King® and Trane®—work together to enhance the quality and comfort of air in homes and buildings; transport and protect food and perishables; and increase industrial productivity and efficiency. We are a $13 billion global business committed to a world of sustainable progress and enduring results.

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