ROGERS KNW SERIES®

Heat of Compression Regenerative Air Dryers

Cost efficient solutions to your clean, dry air needs

Designed specifically for use with Kobelco® KNW Series oil-free compressors

www.knw-series.com

Introduction

The Rogers KNW Series® Heat of Compression Air Dryer is an energy efficient, zero purge, thermal swing adsorption dryer, which removes water vapor from compressed air. The dryer is designed to be used with oil free compressors.

Designed for long life, corrosion resistant, high tensile, seamless aluminum extrusions are manifolded together at the top and bottom into two columns. Each column is comprised of a number of chambers, each filled with a beaded desiccant material using a "snow storm" filling process to provide maximum packing density of the desiccant bed. Each chamber is spring loaded to prevent desiccant movement and related attrition.

During operation one column of the dryer is online, drying the compressed air, while the other column of the dryer is being thermally regenerated. The regeneration heat is a by-product of the compression process. The regeneration and drying column selection is reversed after a temperature probe has detected that regeneration is complete, or a maximum timed regeneration period has elapsed. Column selection is controlled by a single solenoid valve, operating four identical switching valves.

- *Air or Water-cooled design*
- *Interconnecting Piping and Insulation are Standard*
- *Optional Skid and Air Receiver shown*
- *Optional Outdoor Weather Protection shown*

Benefits

▲ Highest Quality Air
Clean, oil-free and dry compressed air.

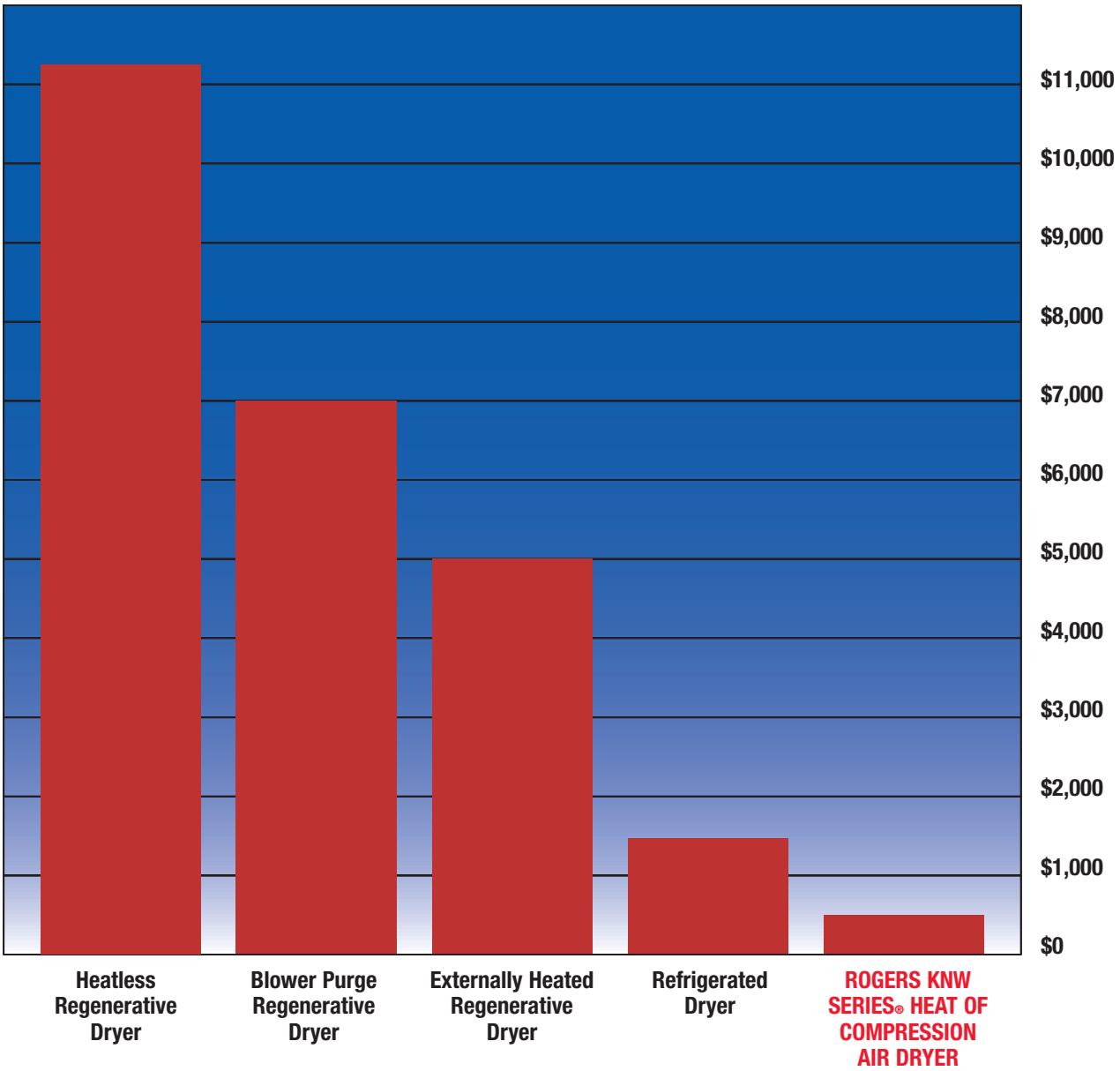
▲ High Dewpoint Suppression
Dry air assures maximum protection of all products and processes.

▲ Prevents System Corrosion
Prolongs life of compressed air system components.

▲ Compact Design
Saves valuable floor space.

Operating Costs Estimates

Annual energy costs based on the operation of 500 SCFM dryer



Energy cost based on 8760 hours per year @ $.07/kwh

The Advantages Are Obvious

- ▲ Up to 97% energy savings when compared to heatless dryers.
- ▲ No need to oversize compressor - 100% utilization of compressed air.
- ▲ Improved plant efficiency.
- ▲ Low cost installation, includes piping kit.
- ▲ Reduced life cycle cost.
- ▲ Environmental design; no freon or CFC.
- ▲ Fast return on investment.
- ▲ No purge air.
- ▲ Oil-free condensate.
- ▲ Proven design.

Regenerative Heating

Figure 1 shows the air flow path through the dryer with column A undergoing regeneration heating and column B drying the air. Hot unsaturated regeneration air flows into the dryer's hot inlet as selected by the inlet selector valve [V4]. The addition of cooled air, by the temp control solenoid, limits the temperature of regeneration air to a maximum of 350°F at T1 if necessary. The temp balance valve equalizes pressures of the hot air and the cooled air streams, controlling the regen temperature. The regen air enters the bottom manifold of the column undergoing regeneration via the column selection valve [V1]. The regeneration air then flows through the desiccant column, stripping the adsorbed moisture from the desiccant, and exits the column via the top manifold.

After exiting the top manifold at the outlet valve [V2], the regeneration air flows through the dryer aftercooler, which cools the regeneration air, causing most of the water vapor to condense. The condensed water is then removed from the compressed air by a high efficiency moisture separator and a zero air loss drain.

The compressed air, which is saturated, enters the bottom manifold of the column B via the inlet valve [V3]. The compressed air then flows upward through the column and the water vapor held within the compressed air is adsorbed by the desiccant. The now dried compressed air exits the column, via the top manifold, at the outlet valve [V4], passes through the afterfilter and enters the plant compressed air distribution system.

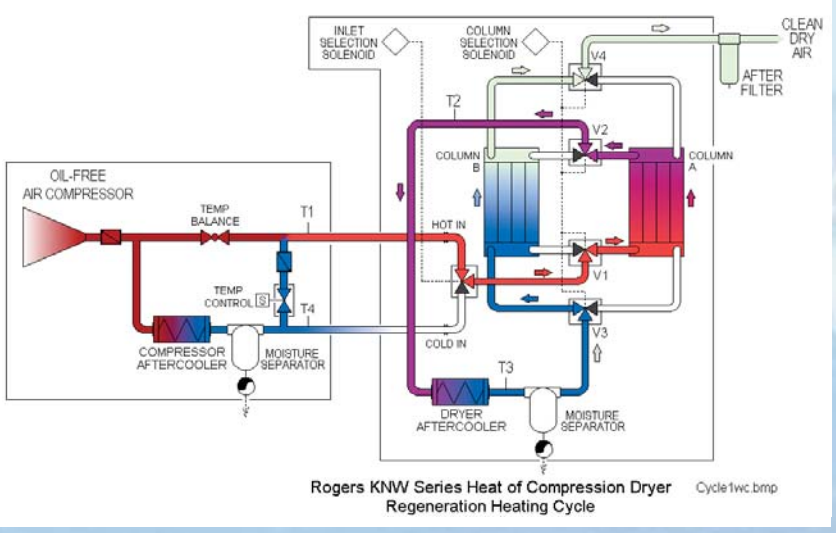


Figure 1

Regenerative Cooling

Figure 2 shows the air flow path through the dryer with column A undergoing regeneration cooling and column B drying the air. The cooling cycle prevents dewpoint spikes at column switchover. The compressor aftercooler cools the regeneration air at T1 to 15°F above cooling media temperature. This cool and saturated regeneration air flows into dryer's Cold Inlet as selected by the Hot/Cold inlet selector valve [V4].

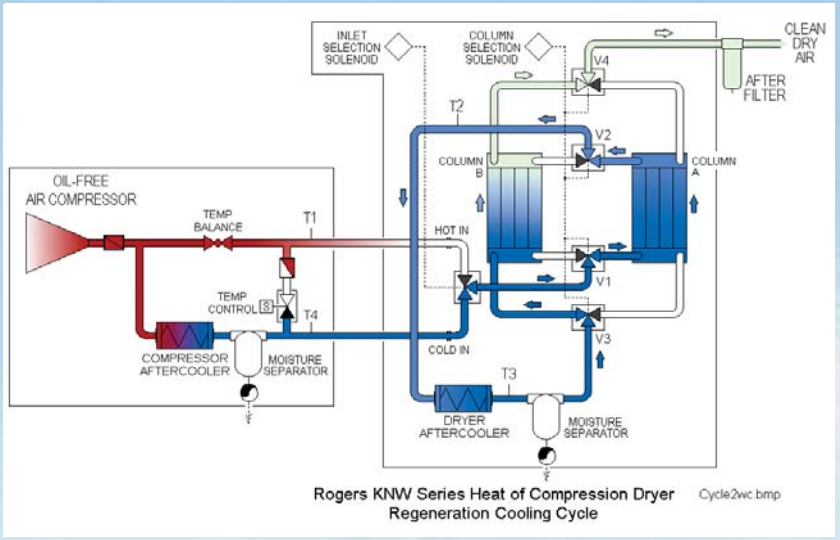


Figure 2

The cooled regen air then enters the bottom manifold of the column undergoing regeneration cooling via column selection valve [V1]. The regeneration air flows through the desiccant, stripping the heat from the desiccant and exits the column via the top manifold at the outlet valve [V2]. The water vapor is not adsorbed from the cool regeneration air as the desiccant is too hot to efficiently adsorb water vapor.

Once regeneration cooling is complete, the air flow path is reversed, with column B undergoing regeneration heating then cooling, and column A drying the compressed air.

Ease of Maintenance

Rogers KNW Series® dryers are easy to maintain. Column switching valves are easily accessible for inspection and desiccant replacement is accomplished in a short time. Just remove the top manifold, vacuum the desiccant from the chambers and refill using our unique snow storm filling process. Service kits are also available to facilitate routine maintenance.

Corrosion resistant, high tensile, seamless extruded aluminum column with twin chambers designed for long life are each filled with beaded desiccant material. Snow storm filling process provides maximum packing density of desiccant bed. Each chamber is spring loaded to prevent desiccant attrition.

Efficient Solution

Reduces cost of drying compressed air by up to 97% when compared to typical heatless desiccant dryers.

Rogers KNW Series® heat of compression dryers represent the most cost effective and energy efficient solution for the provision of clean, dry, oil-free air.

Traditional dryers need additional energy to regenerate the desiccant towers while heat of compression dryers utilize the heat generated by the compressor for regeneration.

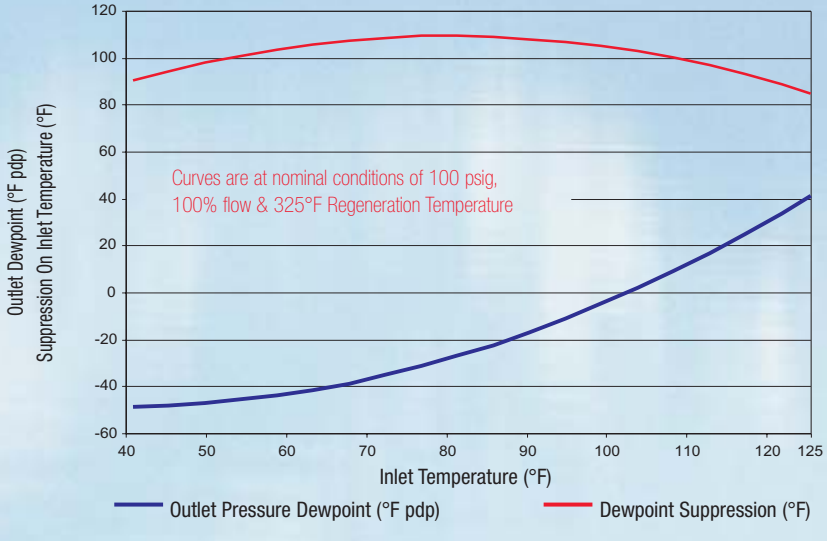
Using patented technology, Rogers KNW Series® heat of compression dryers provide the ultimate in uncompromising performance, security and reliability for your compressed air system.

Integrated Design

The Rogers KNW Series® heat of compression dryer and compressor is a simple compact package which requires minimal installation time and floor space. A prefilter is not required. The dryer has mounted high efficiency moisture separators to remove condensed water. A fixed cycle of drying, regeneration and cooling prior to column switchover insures constant dewpoint suppression. A minimum number of moving parts compliments this reliable, cost effective design. Each dryer includes four identical switching valves, controlled by one solenoid valve. The valves are the same size for all dryer models.

All piping and internal components are corrosion resistant to assure long life and prevent contamination of compressed air.

Graph of Outlet Dewpoint (°F pdp) and Suppression on Inlet Temperature (°F) against Inlet Temperature (°F) for Rogers KNW Series® Heat of Compression Air Dryer



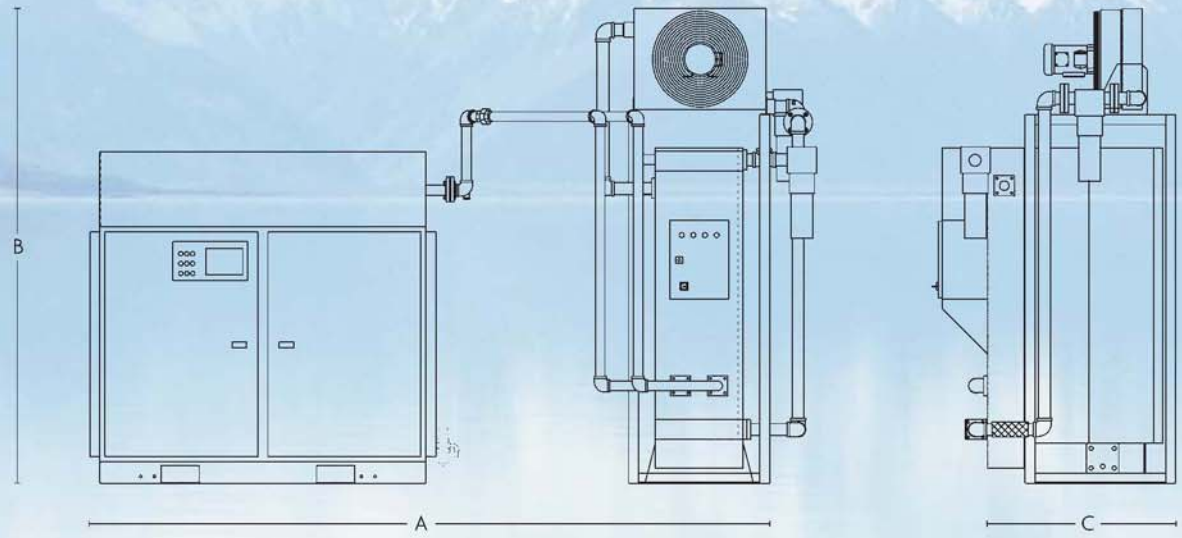
TECHNICAL SPECIFICATIONS

Dryer Models	Flow Rate acfm	Flow Rate Nm^3/min	Pipe Connection
KNW-102	175	4.6	2"
KNW-104	350	9.4	2"
KNW-106	525	14.2	2"
KNW-108	700	18.6	2½"
KNW-110	875	23.3	2½"

Parameter	Minimum	Normal	Maximum
Inlet Pressure	70psig / 5barg	100psig / 7barg	150psig / 10barg
Ambient Temperature	32°F / 0°C	80°F / 27°C	110°F / 43°C
Inlet Temperature	40°F / 5°C	82°F / 28°C	125°F / 52°C
Regeneration Temperature	266°F / 130°C	325°F / 163°C	356°F / 180°C

MODELS AND DIMENSIONS

Compressor Model Air or Water-cooled 60 Hz	Compressor Model Air or Water-cooled 50 Hz	Dryer Models	Dimensions (Inches) Water-cooled / Air-cooled / Dryer only			Weight (Pounds / kg)	
			"A"	"B"	"C"	Compressor and Dryer	Dryer only
KNW00 / A00 A,B,C,D	KNW00 / A00 B,D,E	KNW-102	132 / 132 / 22	67 / 67 / 61	40 / 40 / 34	2870 / 1305	477 / 217
KNW00 / A00 E		KNW-104	132 / 132 / 22	67 / 67 / 61	40 / 40 / 34	2870 / 1305	821 / 373
KNW0 / A0 A	KNW0 / A0 A	KNW-102	136 / 136 / 22	53 / 90 / 61	46 / 46 / 34	4730 / 2150	477 / 217
KNW0 / A0 B,C,D	KNW0 / A0 B,C,D	KNW-104	136 / 136 / 22	53 / 90 / 61	46 / 46 / 34	4730 / 2150	821 / 373
KNW1 / A1 A,B,C	KNW1 / A1 A,B,C,D	KNW-106	155 / 166 / 22	60 / 96 / 68	59 / 59 / 59	7130 / 3241	1159 / 527
KNW1 / A1 D,E	KNW1 / A1 E,F	KNW-108	155 / 166 / 22	60 / 96 / 68	72 / 72 / 72	7700 / 3500	1498 / 681
KNW1 / A1 F & G	KNW1 / A1 G	KNW-110	155 / 166 / 22	60 / 96 / 71	85 / 85 / 85	8300 / 3773	1839 / 836



Dimension "B" can be reduced by 24" for water-cooled model.
Air-cooled compressor model shown.

Dimensions and performance subject to change without notice.
Compressed air should not be used for breathing air, unless properly purified and monitored.
Compressor and dryer capacity should closely match system demand to assure published dewpoint performance.

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