

ECOTROC® KTN

Compressed Air Refrigeration Dryer

Efficient compressed air treatment

Refrigeration dryers of the **ECOTROC® KTN** series provide high-quality compressed air constantly, safely and economically.



PRODUCT DATASHEET

ECOTROC® KTN · Refrigeration Dryer

The intelligent way treating compressed air safely

Due to physical conditions water is a part of the breathing air and every compressed air system. But water has to be separated from those systems in order to avoid corrosion and damages, operational problems and even breakdowns at pneumatic control devices and systems.

To extract humidity from the ambient air, refrigeration dryers use the simple physical fact that cold air can hold less humidity than warm air. When saturation is reached, humidity changes the aggregate stage from gas to liquid and can easily be separated. That's the functional principle of **ECOTROC® KTN** dryer series.

The installed microprocessor control monitors the relevant data constantly and precisely. In any case of critical divergence from the set parameters an alarm is triggered and the alarm mode of the dryer is working. Hereby the

device itself as well as the whole compressed air system is protected and the safety of the operation is improved.

KSI ECOTROC® KTN refrigeration dryers provide dry compressed air efficiently and effectively at minimum operating costs, ensuring operational security. This protects expensive systems, machines and devices worldwide and improves the operation security effectively.

KSI KTN series outstanding features are its very compact design, the high capacity and reliability. The compressed air treatment gets even more efficient and safer via the integrated control. High quality components, for example from Tecumseh, Elco, and Danfoss (s. page 9), guarantee the profitability and durability of the device.

The result:

a compact and powerful refrigeration dryer.

The operational principle

The **KTN** refrigeration dryer uses the physical principle that warm air can hold more humidity than cold air. The air at the inlet of the refrigeration dryer contains a significant amount of humidity, depending on the previous treatments and other influences. This air is cooled down by the refrigeration dryer to lower the saturation point. Water is discharged, and dry air is provided to the compressed air system.

The incoming air is pre-cooled in an air-to-air heat exchanger and afterwards treated in the air-refrigerant heat exchanger. In this part of the device the dryer cools down the air so a part of the humidity condensates and is collected in the bottom part of the heat exchanger by a cyclone separator. The collected condensate is discharged by the installed condensate drain either in adjusted time intervals or level controlled.

To ensure that the refrigerant is capable to cool down the air as much as needed a refrigerant circuit is integrated in the **KTN** refrigerant dryer.

The refrigerant is directed into the heat exchanger in liquid state. It evaporates partially because of the heat supply. A compressor densifies the gas after the remaining liquid parts were extracted. The compressed gas is liquified in an air-cooled compressor and stored in a special vessel. The accumulated refrigerant is then injected in the air-refrigerant heat exchanger again and the circuit starts from the beginning.

To improve the operational safety in the refrigerant circuit various protection features are part of the product. These are, for example, pressure switches and hotgas bypass lines.

The hotgas bypass is activated when the temperature in the refrigerant circuit drops to a critical level. It prevents the system from freezing in and maintains the functionality.

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ECOTROC® KTN · Refrigeration Dryer

Fully-automated compressed air treatment system

including:

- time- controlled condensate drain

Capacity volume flow: up to 1.800 m³/h*

Capacity pressure dew point: +3°C

* referring to 1 bar (abs.) at 7 bar g operating pressure



Capacities and Dimensions

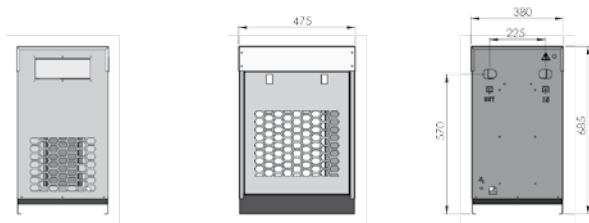
Type	Capacity*	Dimensions (mm)			Connection height	Weight	Connection	Heat exchangers
	m ³ /h	H	B	T	mm	kg	(male/female)	
KTN 54	54	685	380	475	570	30	½" female	1
KTN 72	72	685	380	475	570	30	½" female	1
KTN 108	110	685	380	475	570	32	¾" female	1
KTN 132	132	685	380	475	570	32	¾" female	1
KTN 156	156	835	420	600	767	46	1" female	1
KTN 186	186	835	420	600	767	46	1" female	1
KTN 222	222	835	420	600	767	47	1" female	1
KTN 330	330	923	460	700	802	64	1" female	2
KTN 390	390	923	460	700	802	64	1½" female	2
KTN 510	510	1050	660	910	955	86	2" male	2
KTN 660	660	1050	660	910	955	96	2" male	3
KTN 780	780	1050	660	910	955	114	2" male	3
KTN 1068	1068	1151	870	1260	1070	230	2" male	4
KTN 1200	1200	1151	870	1260	1070	245	2" male	5
KTN 1530	1530	1395	950	1700	1063	265	3" male	6
KTN 1800	1800	1395	950	1700	1063	290	3" male	7

*referring to 1 bar (abs.) and 20°C at 7 bar g operating pressure, 35°C inlet temperature

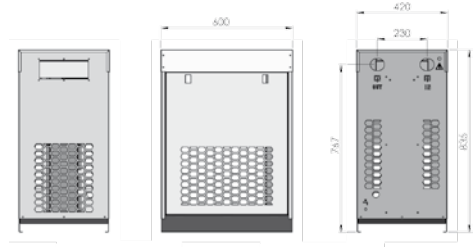
Higher volume flows / higher operating pressures on demand

PRODUCT DATASHEET

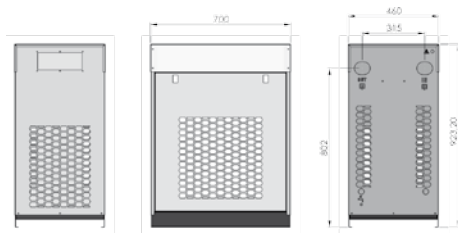
ECOTROC® KTN · Refrigeration Dryer



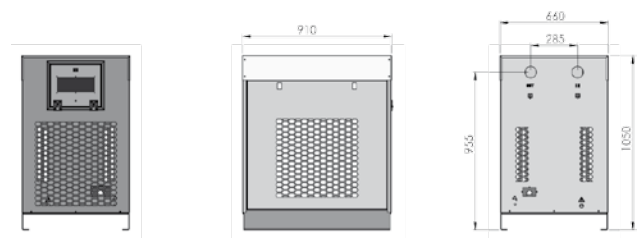
KTN54 - KTN 132



KTN156 - KTN222



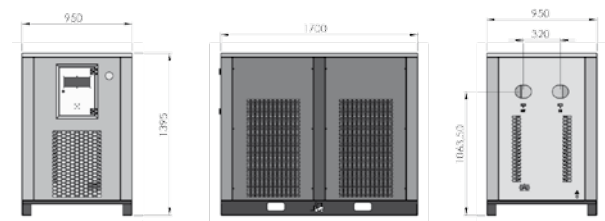
KTN330 - KTN390



KTN510 - KTN780



KTN1068 - KTN1200



KTN1520 - KTN1800

Correction Factors

Correction factors

Inlet temperature

°C	30	35	40	45	50	60
F1	1,28	1	0,92	0,78	0,65	0,45

Correction factors

Ambient temperature

°C	20	25	30	35	40	50
F2	1,05	1	0,98	0,93	0,84	0,70

Correction factors working pressure

bar ü g	4	6	7	8	9	10	11	12	13	14	15	16
F3	0,80	0,94	1	1,04	1,08	1,11	1,14	1,16	1,19	1,22	1,24	1,25

Pressure dew-point 3° C calculated to volume flow at a suction condition of 20°C and 1 bar (abs.)

Please multiply the capacity of KTN with the correction factors in the above table.

Example: Capacity KTN 390 at 8 bar g working pressure, 40°C inlet temperature and 30°C max. ambient temperature: • Capacity nom (390 m³/h) x F3 (1,04) x F1 (0,92) x F2 (0,98) = Capacity calculated (365,69 m³/h)

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Electric Data

Type	Installed power	electrical voltage	Phase	Frequency rate	min. protection
	kW	V		Hz	A
KTN 54	0,38	230	1	50	4
KTN 72	0,38	230	1	50	4
KTN 108	0,38	230	1	50	4
KTN 132	0,38	230	1	50	4
KTN 156	0,65	230	1	50	8
KTN 186	0,66	230	1	50	8
KTN 222	0,82	230	1	50	10
KTN 330	1,27	230	1	50	16
KTN 390	1,27	230	1	50	16
KTN 510	1,45	230	1	50	16
KTN 660	1,65	230	1	50	16
KTN 780	1,90	230	1	50	16
KTN 1068	2,10	400	3	50	3x16
KTN 1200	2,10	400	3	50	3x25
KTN 1530	3,14	400	3	50	3x25
KTN 1800	4,30	400	3	50	3x25

Further data

Safety class

IP 54

Refrigerant

KTN 54 - KTN 1800: R134a

Colour

Frontside for control panel and both sides powder coated in grey, RAL 7040;
bottom, back and top powder coated in RAL 7016

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ECOTROC® KTN · Druckluft-Kältetrockner

Field of Application

Installation site	Installation inside in non-aggressive atmosphere
Ambient temperature max.	45°C
Ambient temperature min.	5°C
Operating pressure	4 to 16 bar ü
Flow medium	Compressed air and gases
Pressure dew point*	+3°C

* refer to 1 bar (abs.), 20°C at 7 bar operating pressure

Technical Features

Microprocessor control guarantees a safe and efficient operation

Corresponds with standards based on Machinery Safety Directive 2006/42/EC.
ECOTROC® KTN refrigeration dryers undergo quality inspection at various stages of manufacture.

The following norms and manufacturing methods are the basis for production:
2006/42/EC Machinery Directive; 2006/95/EC Low Voltage Directive; 2004/108/EC Electro-magnetical Compatibility Directive;
2014/68/EU Pressure Equipment Directive, CAT I, Module A; EN ISO 12100:2010; EN 60204-1:2006/AC:2010

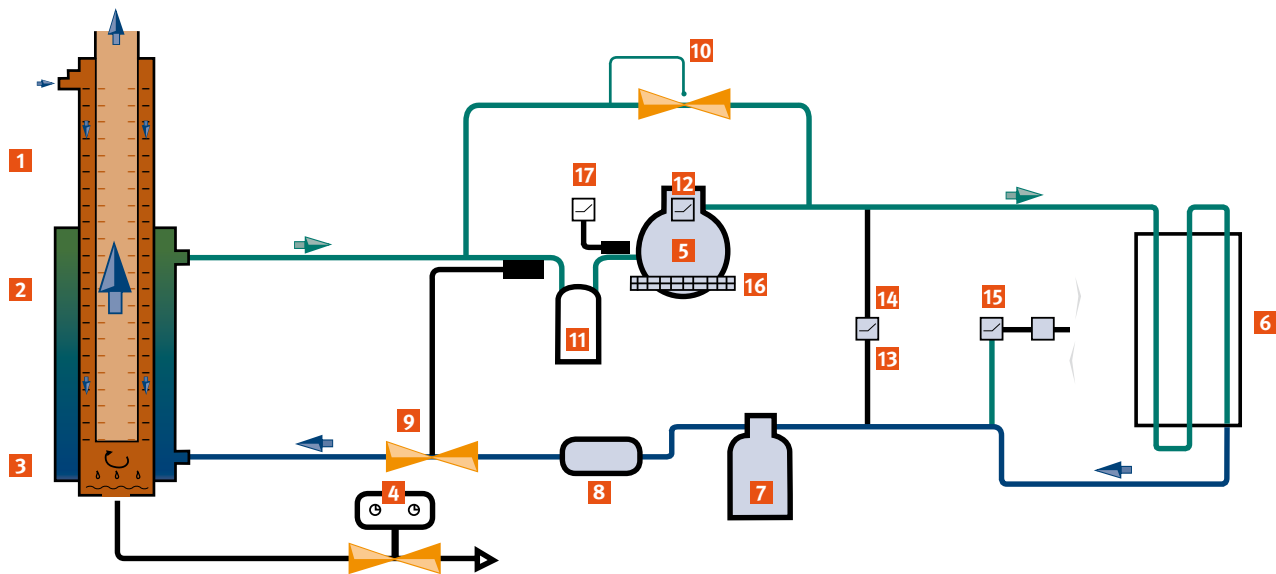
Approvals for Pressure Equipment	
EU	Approved for fluid group 2 according to Pressure Equipment Directive 2014/68/EU, module B+D (categorie IV)
Quality Management	
Development/Production	DIN EN ISO 9001
Air purity class according to ISO 8573-1:2010	
Solid particles	-
Humidity (gaseous)	Class 4 (PDP +3°C); Class 5 (PDP +7°C); Class 6 (PDP +10°C)
Total oil	-

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ECOTROC® KTN

The Functional Principle



- | | | | |
|---|-----------------------------------|----|--------------------------------|
| 1 | Air-to-Air heat exchanger | 10 | Hot-gas-bypass valve |
| 2 | Air-to-Refrigerant heat exchanger | 11 | Liquid separator |
| 3 | Cyclone separator | 12 | Thermal switch |
| 4 | Condensate drain | 13 | Low-pressure security switch |
| 5 | Compressor | 14 | High-pressure security switch |
| 6 | Air-cooled condenser | 15 | Fan pressure switch |
| 7 | Liquid receiver | 16 | Heater |
| 8 | Dehydrator | 17 | Refrigerant temperature switch |
| 9 | Vapour pressure regulator | | |

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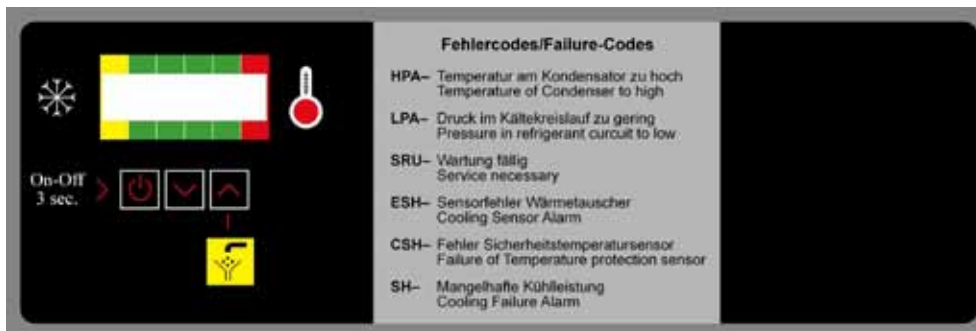
Maintenance

Following regulations for maintenance guarantee a secure and trouble-free use and should be obeyed by the customer.

weekly	Condenser:	Clean
six-monthly	Dust sieve:	Check, change if necessary

Control Device

Automatic operation control and monitoring



The microprocessor control device of the **ECOTROC® KTN** controls the operation of the refrigeration dryer fully automatic. Furthermore it monitors the current state of the process and enables a simple and fast diagnosis of failures.

- Display of pressure dew point through a clear scale
- Alarm output for problems in the compressed air refrigeration dryer
- Quick identification of the affected component
- Trouble-shooting overview in the manual enables a direct debugging in most cases
- Manual condensate discharge through pressing the „▲“ button.
- Signal output for external alarm integrated (12 V DC signal)

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The ECOTROC® KTN Plus Effect +++

- + safe operation through standard (KTN 330-1800) hotgas bypass guaranteed
- + microprocessor control monitors the most important components as well as the quality of the compressed air
- + simple and efficient installation due to same height of inlet and outlet
- + standard condensate drain can easily be exchanged by an alternative component
- + easy maintenance due to good accessibility of all components

Service Advantages

- Clever clip locks at the side panels; dismantling without any tools => easy access to the interior of the **KTN**
- clear arrangement of the components enables easy service and maintenance work
- simple installation of external condensate drains (e.g. **KONDRAIN® N1**) through connection on the back of the dryer

Optional versions

- Stages higher than 1800 m³/h
- High pressure version up to 350 bar
- Delivery with external mounted condensate drain **KONDRAIN® N1** | N5 | N10

High quality components:

- | | |
|----------------|-----------|
| • Compressor: | Tecumseh |
| • Fan motors: | Elco |
| | Rosenberg |
| • Control: | Danfoss |
| | Ranco |
| • Condensator: | Karyap |
| | Thermoway |
| • Valves: | Ceme |



Easy access to the clear structured interior



Clever clip-locks and easily removable side panels



with mounted **KONDRAIN® N5**



with mounted **KONDRAIN® N1**

KSI recommends pre and post filtration!