

# PRODUCTDATASHEET

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## 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 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.

# PRODUCT DATASHEET

## ECOTROC® KTN · Refrigeration Dryer

### Fully automated compressed air treatment system

including:

- time- controlled condensate drain

Capacity volume flow: up to 1.800 m<sup>3</sup>/h\*

Capacity pressure dew point: +3°C

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



## Capacities and Dimensions

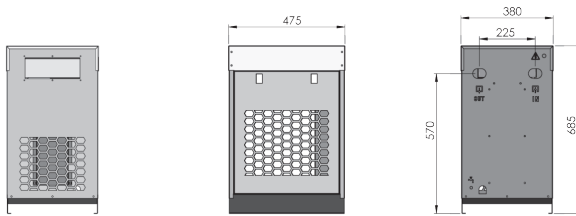
Type	Capacity*	Dimensions (mm)			Connection height	Weight	Connection	Heat exchangers
	m <sup>3</sup> /h	B	T	H	mm	kg	(male/female)	
KTN 54	54	380	475	685	570	30	1/2" female	1
KTN 72	72	380	475	685	570	30	1/2" female	1
KTN 108	110	380	475	685	570	32	3/4" female	1
KTN 132	132	380	475	685	570	32	3/4" female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

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

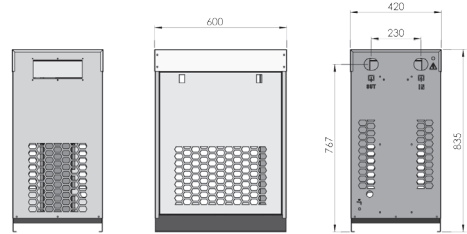
Higher volume flows / higher operating pressures on demand

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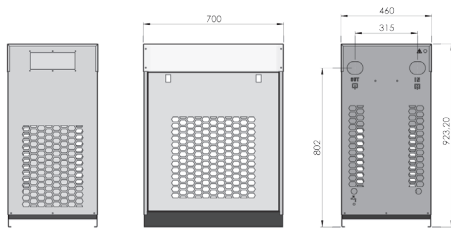
## ECOTROC® KTN - Refrigeration Dryer



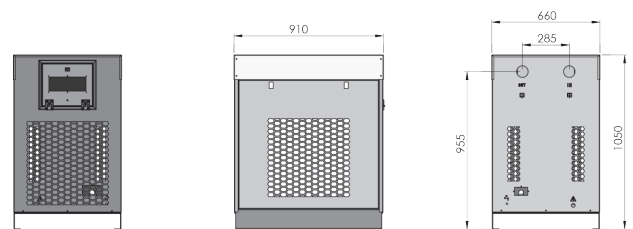
**KTN54 - KTN132**



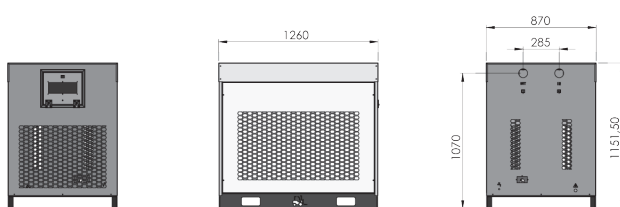
**KTN156 - KTN222**



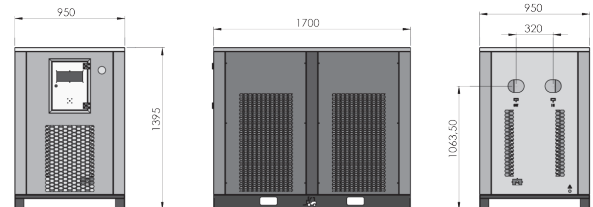
**KTN330 - KTN390**



**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 working pressure						
bar ü   g	4	6	7	8	9	10
F3	0,80	0,94	1	1,04	1,08	1,11

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

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)

# PRODUCT DATASHEET

ECOTROC® KTN · Refrigeration Dryer

## 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	230	1	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

<b>Installation site</b>	Installation inside in non-aggressive atmosphere
<b>Ambient temperature max.</b>	45°C
<b>Ambient temperature min.</b>	5°C
<b>Operating pressure</b>	4 to 16 bar ü
<b>Flow medium</b>	Compressed air and gases
<b>Pressure dew point*</b>	+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;  
97/23/EC Pressure Equipment Directive, CAT I, Module A; EN ISO 12100:2010; EN 60204-1:2006/AC:2010

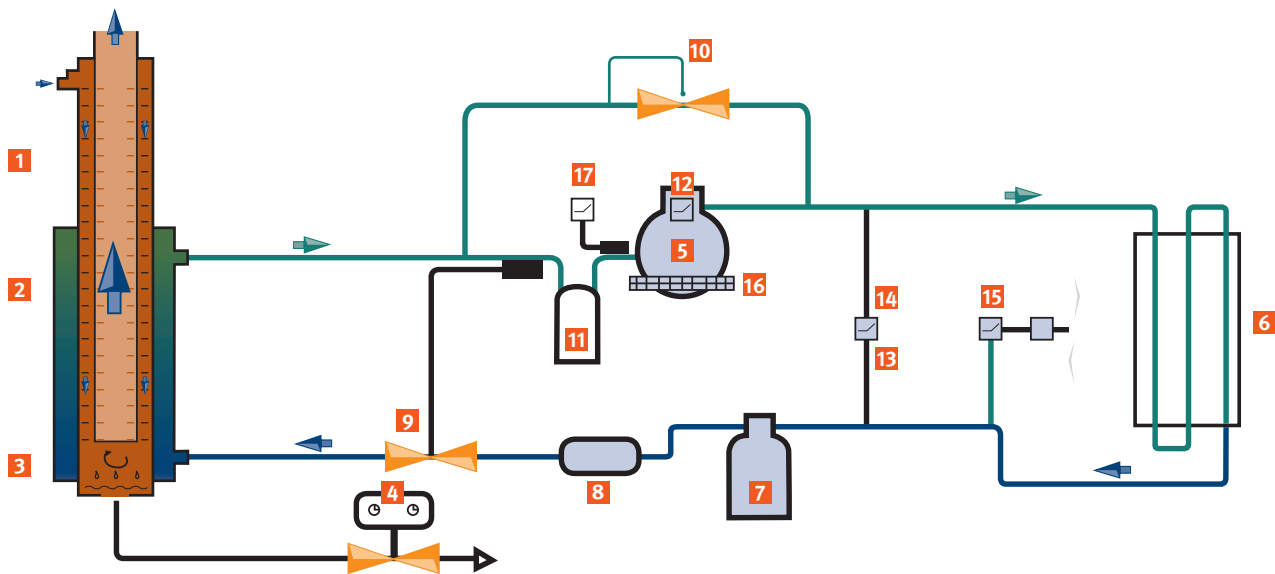
<b>Approvals for Pressure Equipment</b>	
EU	Approved for fluid group 2 according to Pressure Equipment Directive 97/23/EG, module B+D (categorie IV)
<b>Quality Management</b>	
Development/Production	DIN EN ISO 9001
<b>Air purity class according to ISO 8573-1:2010</b>	
Solid particles	-
Humidity (gaseous)	Class 4 (PDP +3°C); Class 5 (PDP +7°C); Class 6 (PDP +10°C)
Total oil	-

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ECOTROC® KTN · Refrigeration Dryer

## 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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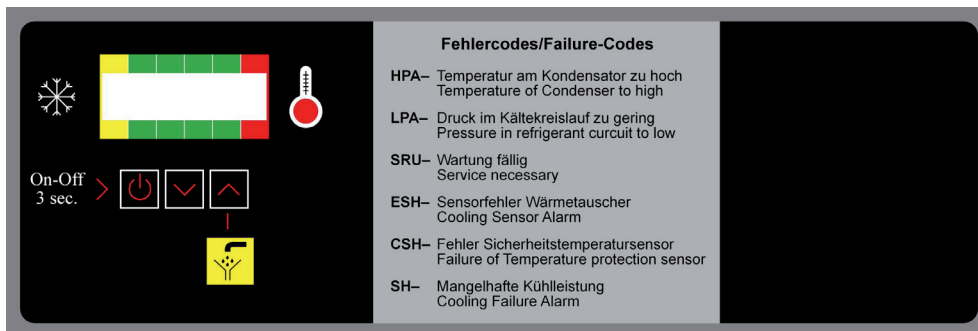
## Maintenance

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

<b>weekly</b>	Condenser:	Clean
<b>six-monthly</b>	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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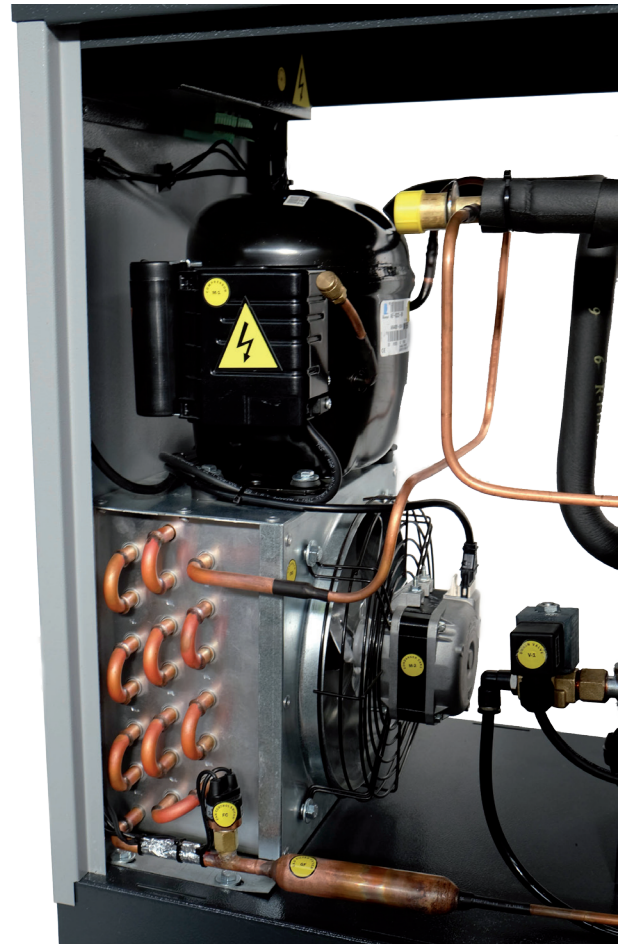
ECOTROC® KTN · Refrigeration Dryer

## 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 drain (KN1, Bekomat etc.) through connection on the back of the dryer



Easy access to the clear structured interior of the refrigerant dryer.



Clever clip-locks and easily removable side panels.