

# ECOTROC®

## Compressed Air Refrigeration Dryer

For the economical, safe and constant supply of dried compressed air



### More compact, more power: ECOTROC® KTD-BN

The new KTD-BN refrigeration dryer series impresses with its extremely compact design, high performance and reliability. The new integrated control system makes compressed air preparation even more efficient and safe. The use of high-quality components and a new type of heat exchanger ensures the economic efficiency and durability of the units.

### The branded components

- Refrigeration compr.: Tecumseh / Danfoss
- Fan motors: Elco / ebm-pabst / Rosenberg
- Pressure switch: Danfoss / Ranco / WILSPEC
- Condenser: GEMAK
- Magent valves: tork
- Controls: DigiPro (EVCO)  
ESD3 (Elimko)

### The ECOTROC® KTD-BN Plus-Effects +++

- + microprocessor control monitors the most important components as well as the quality of the compressed air
- + simple and efficient installation
- + easy maintenance due to good accessibility of all components
- + energy saving through ESD (Energy Saving Device) in dryers with DigiPro control system
- + discharge time of the time-controlled arrester is freely programmable

### The maintenance advantages

- + practical clip fasteners allow the side panels to be removed without tools; this ensures easy access to the interior of the KTD-BN
- + clear arrangement of components allows for easy repair and maintenance work

## Compressed Air Refrigeration Dryer

### The clever way to process compressed air safely and energy-saving way

Physically, water is unavoidably present in every compressed air system. In summer much more than in winter because warm air can absorb more moisture than cold air. The refrigeration dryer uses this physical principle to separate water. To avoid damage (corrosion), functional problems or even loss of production on pneumatic controls and systems, it is essential to separate water from compressed air systems. The **ECOTROC® KTD-BN** series treats compressed air in a solution-oriented manner.

KSI refrigeration dryers provide long-term dry compressed air at minimal operating costs. This protects expensive systems, machines and equipment worldwide and effectively increases operational safety.



### The functional principle

The **KTD-BN** refrigeration dryer works with the physical fact that warm air can absorb more moisture than cold air. The warm air entering the refrigeration dryer contains a not inconsiderable amount of moisture, depending on previous treatment and other influences. To remove this moisture from the air, it is cooled in the refrigeration dryer and can thus absorb less moisture. The excess condensate is removed so that dry compressed air is now fed into the further compressed air system.

The incoming air is first pre-cooled in an air-to-air heat exchanger before it flows into the air-to-refrigerant heat exchanger. There, so much heat is now extracted from it that some of the moisture condenses and is collected by a cyclone separator at the lower end of the heat exchanger. The condensate collected there is now discharged by a connected condensate drain either at certain time intervals or level-controlled.

A complex refrigerant circuit is integrated in the **KTD-BN** refrigeration dryer so that the refrigerant can cool the air flowing through it to such an extent.

The refrigerant is fed as a liquid into the heat exchanger. There it partially evaporates due to the heat input from the incoming warm air. A compressor compresses the resulting gas, from which the liquid component has previously been removed. This compressed gas is then liquefied again by an air-cooled condenser and stored in a tank. The refrigerant stored there is now fed back into the air-refrigerant heat exchanger and the cycle begins again.

To increase the operational safety in the refrigerant circuit, various safety precautions such as overpressure switches are installed.

A hot gas bypass, which is activated when the temperature in the refrigerant circuit drops too low, protects the system from freezing and maintains both the function and keeps wear to a minimum.

# Compressed Air Refrigeration Dryer

## The control

### Automatic operation control and monitoring

The microprocessor control of the **ECOTROC® KTD-BN** controls the operation of the refrigeration dryer fully automatically. In addition, it provides information about the current status of the process and, in the event of problems or errors, allows the problem to be easily diagnosed.

- display of the pressure dew point using a meaningful scale
- alarm output in the event of a problem in the compressed-air refrigeration dryer
- quick identification of the affected component
- troubleshooting list in the manual often enables direct troubleshooting
- manual condensate drain possible via button on the control unit
- signal output for external alarm indication available (potential-free)



Example: from KTD-BN 1380 ESD3 control is an option

## Optional versions

- capacity levels up to 12,500 m³/h
- high pressure version up to 45 bar
- thermal mass
- 60 Hz on request

### We recommend pre- and afterfiltration!



practical lock



easy access to clear structured interior

# Compressed Air Refrigeration Dryer

Fully automatic compressed air preparation system

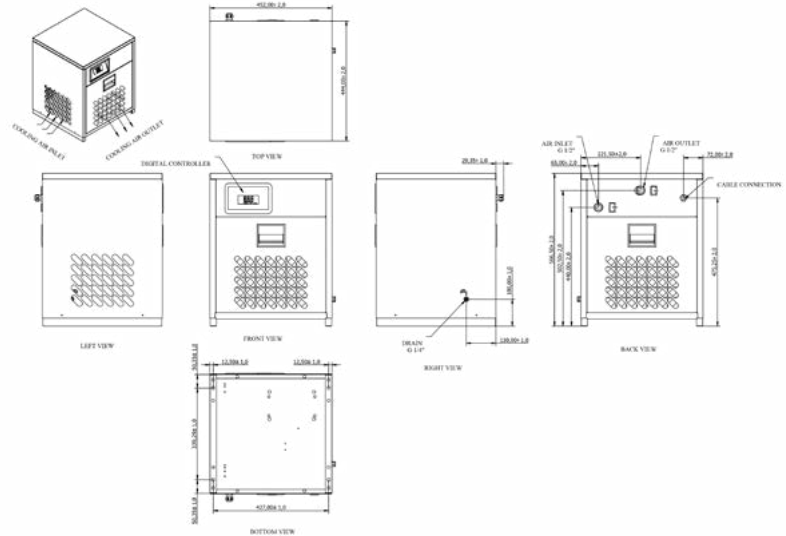
including:

- tiome-controlled condensate drain

Capacity Volume flow: up to 1800 m<sup>3</sup>/h\*

Pressure dew point: +3°C

\* based on 1 bar (abs.) at 7 bar g operating pressure



## Models

Type	Leistung*		Abmessungen (mm)			Anschluss	Gewicht	Anzahl Wärmetauscher
Type	Capacity*		Dimensions (mm)			Connection	Weight	Quantity heat exchanger
	m <sup>3</sup> /h	cfm	H	B	T		kg	
KTD-BN23	23	14	706	369	372	1/2" IG   female	32	1
KTD-BN38	38	22	706	369	372	1/2" IG   female	32	1
KTD-BN53	53	31	706	369	372	1/2" IG   female	32	1
KTD-BN70	70	41	706	369	372	1/2" IG   female	32	1
KTD-BN100	100	59	832	473	453	3/4" IG   female	51	1
KTD-BN155	155	91	832	473	453	3/4" IG   female	53	1
KTD-BN190	190	112	832	473	453	3/4" IG   female	55	1
KTD-BN210	210	124	875	556	506	1" IG   female	78	1
KTD-BN305	305	180	875	556	506	1 1/2" IG   female	83	1
KTD-BN375	375	221	875	556	506	1 1/2" IG   female	86	1
KTD-BN495	495	291	1157	678	648	2" IG   female	160	1
KTD-BN623	623	367	1157	678	648	2" IG   female	165	1
KTD-BN930	930	547	1369	727	947	2" IG   female	220	1
KTD-BN1200	1200	706	1369	727	947	2" IG   female	230	1
KTD-BN1388	1388	817	1459	798	948	3" IG   female	270	1
KTD-BN1800	1800	1060	1459	798	948	3" IG   female	285	1

Höhere Volumenströme / höherer Betriebsdruck auf Anfrage  
 Higher volume flows / higher operating pressure on request

# Compressed Air Refrigeration Dryer

## Correction factors

Korrekturfaktoren   Correction factors							Korrekturfaktoren   Correction factors						
Eintrittstemperatur   Inlet temperature							Umgebungstemperatur   Ambient temperature						
°C	30	35	40	45	50	60	°C	20	25	30	35	40	50
F1	1,29	1	0,92	0,78	0,65	0,45	F2	1,05	1	0,98	0,93	0,84	0,70

Korrekturfaktoren Arbeitsdruck   Correction factors working pressure										
bar ü   g	4	6	7	8	10	11	12	14	16	
F3	0,80	0,94	1	1,04	1,11	1,14	1,16	1,22	1,25	

Drucktaupunkt 3° C bezogen auf Volumenstrom bei einem Ansaugzustand von 20°C und 1 bar (abs.)  
 Pressure dew-point 3° C calculated to volume flow at a suction condition of 20°C and 1 bar (abs.)

Dividieren Sie bitte den maximal zu erwartenden Volumenstrom durch die Korrekturfaktoren in den oberen Tabellen.  
**Beispiel:** 200 m³/h maximales Volumen, bei 6 bar, 40°C Eintritts- und 30°C Umgebungstemperatur: ▶ Leistung nom (200 m³/h) / F3 (0,94) / F1 (0,92) / F2 (0,98) = Leistung korrigiert (236 m³/h)  
 ▶ Sie müssen den Trockner auswählen, der zumindest für 236 m³/h bei Normbedingungen ausreichend groß ist.

Please divide the maximum volume flow to be expected by the correction factors in the tables above.  
**Example:** 200 m³/h maximum volume, at 6 bar, 40°C inlet and 30°C ambient temperature: ▶ Capacity nom (200 m³/h) / F3 (0,94) / F1 (0,92) / F2 (0,98) = Capacity calculated (236 m³/h)  
 ▶ You have to choose the dryer that is big enough for at least 236 m³/h under normal conditions.

## Electrical data

Type	Installed power	Operating voltage	Min. fuse
	kW	V / Ph / Hz	
KTD-BN23	0,34	230 /1/ 50	1/2 IG
KTD-BN38	0,34	230 /1/ 50	1/2 IG
KTD-BN53	0,37	230 /1/ 50	1/2 IG
KTD-BN70	0,38	230 /1/ 50	1/2 IG
KTD-BN100	0,39	230 /1/ 50	3/4 IG
KTD-BN155	0,59	230 /1/ 50	3/4 IG
KTD-BN190	0,68	230 /1/ 50	3/4 IG
KTD-BN210	0,82	230 /1/ 50	1 1/2 IG
KTD-BN305	1,07	230 /1/ 50	1 1/2 IG
KTD-BN375	1,19	230 /1/ 50	1 1/2 IG
KTD-BN495	1,23	230 /1/ 50	2 AG
KTD-BN623	1,32	230 /1/ 50	2 AG
KTD-BN930	2,01	230 /1/ 50	2 AG
KTD-BN1200	2,59	230 /1/ 50	2 AG
KTD-BN1388	2,80	400 /3/ 50	3 AG
KTD-BN1800	3,21	400 /3/ 50	3 AG

# Compressed Air Refrigeration Dryer

## Specifications

Spezifikationen		Specifications
Drucktaupunkt	+3°C	Pressure dew-point
Medium	Druckluft und Gase   Compressed air and gases	Medium
min. Betriebsdruck	4 bar ü   g	Min. working pressure
max. Betriebsdruck	16 bar ü   g	Max. working pressure
Umgebungstemperatur max.	50°C	Ambient temperature max.
Umgebungstemperatur min.	4°C	Ambient temperature min.
Eintrittstemperatur max.	60°C	Inlet temperature max.
Spannungsversorgung	1 Ph / 230 V / 50 Hz (KTD-BN 23 – KTD-BN 1200) 3 Ph / 400 V / 50 Hz (KTD-BN 1388 – KTD-BN 1800)	Voltage
Kältemittel	R134a	Refrigerant
Farbausführung	pulverbeschichtet RAL 7012 powder coated RAL 7012	Colour

## Technical features

Microprocessor control ensures safe and efficient operation.

Complies with the following standards based on the Machinery Safety Directives 2006/42/EC.

The ECOTROC® KTD-BN series refrigeration dryers have been subjected to internal quality tests and a final assembly inspection.

The following standards and manufacturing procedures were used as a basis for production:

2006/42/EC Machinery Directives; 2006/95/EC Low Voltage Directives; 2004/108/EC Electromagnetic Compatibility Directives; 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 Approval for fluid group 2 according to Pressure Equipment Directive 2014/68/EU, module B+D (category IV)

### Quality assurance

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)

Residual oil -

## Maintenance instructions

The following maintenance rules ensure safe and trouble-free operation. These should be observed by the operator.

weekly	Condensor:	Clean
semi-annual	Strainer:	Check, clean if necessary