

## ECOTROC® ATK

### Heatless-regenerated Adsorption Dryer

**Solutions for compressed air and gases – reliable and safe treatment**

Adsorption dryers **ECOTROC® ATK** are specially designed for use in systems where a required pressure dew point of  $-20^{\circ}\text{C}$  to  $-70^{\circ}\text{C}$  has to be ensured.



# PRODUCT DATASHEET

ECOTROC® ATK · Adsorption dryer systems · heatless-regenerated

## Permanent high compressed air quality

KSI compressed air treatment systems provide customized solutions for specific purposes. **ECOTROC® ATK** dryers are available in two options. The compact aluminium line (APN) for volume flows up to 110 m<sup>3</sup>/h and the standard line with welded vessels for volume flows up to 3050 m<sup>3</sup>/h. For further information about the aluminium line **ATK-APN** please consult the respective information material. Higher volume flows and operating pressures are available on demand. A constantly high compressed air quality is a feature of both product lines.

Using first-class materials, KSI produces exceptional quality **ECOTROC® ATK** industrial adsorption dryers. The use of quality desiccants in combination with intelligent controls assures consistent compressed air and compressed gas quality and stable dew points (from -20°C to -70°C). Non-electric change-over valves assure reliable and risk free operation. Standardized brand-name blow-down valves extend the operating life, minimise service times and simplify maintenance significantly. The cost effective operation and functionality

supplements the exceptional price-performance ratio. The intelligent 10 minute **ECOMATIC** cycle (control cycle for adsorption, regeneration and pressure build-up) requires less regeneration energy than dryers with shorter cycles and saves adsorbents due to the lower number of load changes. By configuring individual time intervals further energy saving is possible.

The compressor synchronizing circuit that is integrated in the **ECOMATIC** control as standard saves additional regeneration energy because the **ECOTROC® ATK** runs only when the compressor is working. Consequently no regeneration (purge) air is wasted during stand-by periods. Large cross sections at inlets and outlets, in internal and external pipe lines as well as valves and silencers ensure high flow capability. Integrated and coordinated solutions such as **ECOCLEAN®** compressed air filters and **KONDRAIN®** condensate drains enable further cost saving opportunities and improve operational reliability.

## Function

### Pre-filtration

The **ECOCLEAN®** SMA pre-filter simply removes any solid and liquid components from the saturated compressed air. Accumulated compressor condensate is ejected reliably and without pressure loss by the electronic level controlled **KONDRAIN®** N (optional).

### Adsorption

The pre-cleaned compressed air is distributed across the so-called wet-zone via the flow divider from the lower end of the adsorption vessel across the desiccant bed. The actual adsorption through agglomeration of the water molecules to the large internal surface of desiccant now begins.

### Final-filtration

After flowing through the whole desiccant bed the treated compressed air enters the final-filter **ECOCLEAN®** DMF through a flow optimizer and a shuttle valve for the final dust filtration. High purity compressed air is now available.

### Regeneration / Desorption

Simultaneously to the adsorption process in the first vessel the desiccant in the second vessel is regenerated. A part of the already treated compressed air from vessel one is channeled into vessel two through a purging air nozzle in counter flow. By using the physical effect of pressure release to atmospheric pressure the regeneration air dries the moist desiccant highly effectively. The moisture is exhausted via a blow-down valve and silencer.

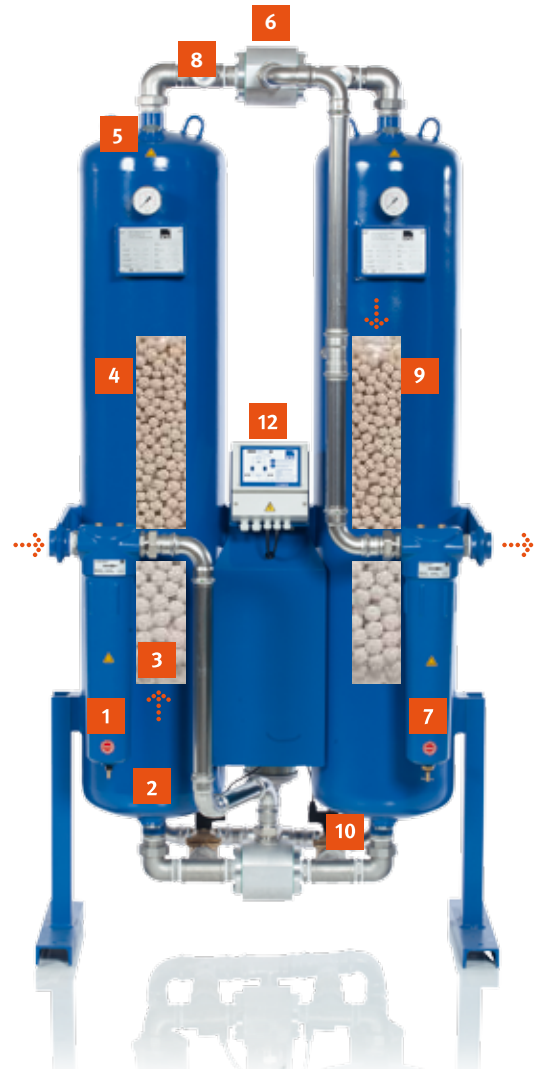
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## Switch-over

Once the regeneration process is done the pressure buildup in the vessel begins. After reaching the operating pressure the air flow is directed from the adsorbing vessel to the freshly regenerated vessel. Adsorption now commences in the freshly regenerated vessel, while the other vessel starts its regeneration cycle.

- 1 flow-optimised **ECOCLEAN® SMA** pre-filter
- 2 inlet diffusor
- 3 wet zone for pre-drying
- 4 adsorption phase desiccant vessel
- 5 outlet diffusor
- 6 change-over valve
- 7 flow-optimised **ECOCLEAN® DMF** final-filter
- 8 purging air nozzle
- 9 desiccant vessel regeneration phase
- 10 blow-down valve
- 11 silencer(s)
- 12 electronic control device **ECOMATIC**



## Fully-automatic heatless-regenerated adsorption dryer including:

- pre-filter **ECOCLEAN® SMA** (up to ATK 110)
- final-filter **ECOCLEAN® DMF** (up to ATK 110)
- electronic control device **ECOMATIC** including compressor direct current switch

Max. operating pressure **ATK**: 16 bar

Max. operating pressure **ATK-HP**: 500 bar

Capacity volume flow: up to 1200 m<sup>3</sup>/h\*

Capacity pressure dew point: -20°C to -70°C

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



Desiccants



Silencers, Blow-down valves ATK



Various sorts of desiccant

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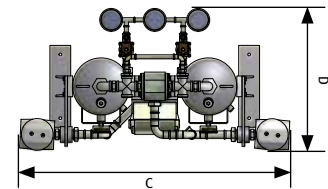
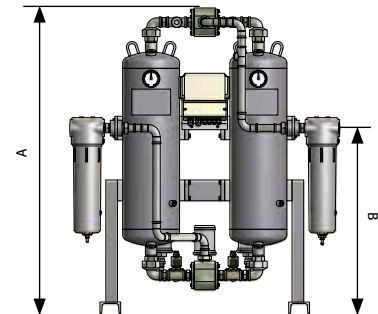
## Capacities and dimensions

Type	Capacity*		Dimensions (mm)					Connection
	m <sup>3</sup> /h	cfm	A	B <sub>1</sub>	B <sub>2</sub>	C	D	
ATK 15	150	88	1186	715	715	1036	546	1"
ATK 18	180	106	1346	715	715	1036	577	1"
ATK 22	210	124	1466	715	715	1036	577	1"
ATK 34	340	200	1461	950	950	1006	773	1 1/2"
ATK 45	480	282	1561	950	950	1006	773	1 1/2"
ATK 55	600	353	2021	950	950	1006	773	1 1/2"
ATK 75	820	482	1724	1155	1155	1272	954	2"
ATK 90	1000	588	2024	1155	1155	1272	1034	2"
ATK 110	1200	706	2124	1155	1155	1272	1034	2"
ATK 155	1550	912	2115	186	2012	1510	776	DN 80
ATK 185	1850	1088	2122	181	2022	1561	794	DN 80
ATK 205	2050	1206	2133	171	2033	1612	817	DN 80
ATK 245	2450	1442	2328	269	2218	1835	898	DN 100
ATK 305	3050	1795	2340	257	2230	1896	850	DN 100

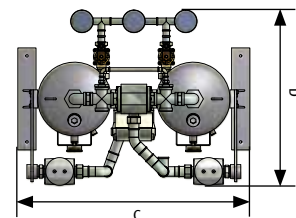
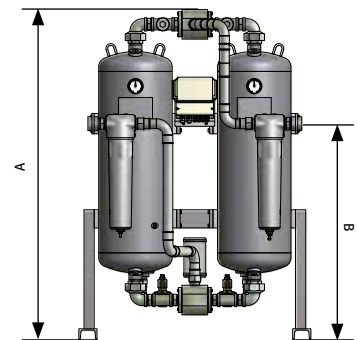
\*refer to 1 bar (abs.) 20°C at 7 bar g operating pressure, 35°C entry temperature

Higher volume flows / higher operating pressure on demand

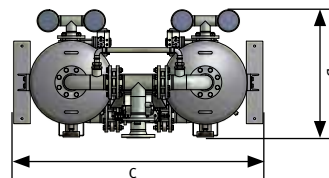
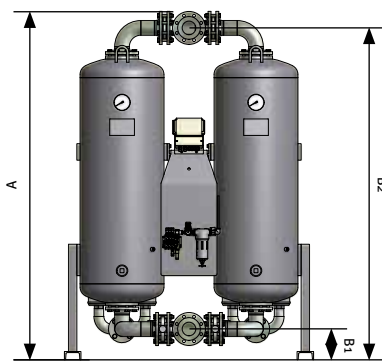
ATK 15 – ATK 22



ATK 34 – ATK 110



ATK 155 – ATK 305



## Correction factors

### Correction factors operating pressure

bar g	4	4,5	5	5,5	6	6,5	7	7,5	8	8,5	9	9,5	10	10,5	11	11,5	12	12,5	13	13,5	14	14,5	15	15,5	16
F(p)	0,6	0,7	0,74	0,82	0,89	0,97	1	1,08	1,11	1,16	1,22	1,29	1,36	1,42	1,5	1,57	1,63	1,69	1,75	1,83	1,9	1,96	2,03	2,1	2,14

### Correction factors inlet temperature

°C	<25	25	30	35	38	40	45	48	50
F(t)	1,2	1,1	1,09	1	0,84	0,78	0,72	0,65	0,58

Please multiply the dryer's capacity with the correction factors in the table above to get the correct capacity.

Higher inlet temperatures on demand

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## Electrical data

Type	Installed power	Electrical voltage	Frequency
	W	V	Hz
ATK 15	32	230	50-60
ATK 18	32	230	50-60
ATK 22	32	230	50-60
ATK 34	32	230	50-60
ATK 45	32	230	50-60
ATK 55	32	230	50-60
ATK 75	32	230	50-60
ATK 90	32	230	50-60
ATK 110	32	230	50-60
ATK 155	32	230	50-60
ATK 185	32	230	50-60
ATK 205	32	230	50-60
ATK 245	32	230	50-60
ATK 305	32	230	50-60



Pipings up to ATK 110 completely in stainless steel

### Further data

Protection class	IP 54
Purging air (average)	14 %*

\* at a pressure dew point of -40°C

## Field of application

Installation site	Installation inside in non-aggressive atmosphere				
Ambient humidity max.	25% r.h. at 40°C	37% r.h. at 35°C	50% r.h. at 30°C	70% r.h. at 25°C	90% r.h. at 20°C
Ambient temperature max.	50°C				
Ambient temperature min.	+2°C				
Operating pressure	4 to 16 bar g				
Medium	Compressed air and gases				
Pressure dew point	-40°C*				

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

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## Technical features

Regeneration by purging air in countercurrent to adsorption

Low purging air demand due to shorter cycles and optimized compressed air and gas pipings

According to Council directives 87/404/EWG on simple pressure vessels and the directive 2014/68/EU on pressure equipment. Dryers of KSI product line ECOTROC® ATK undergo a conformity assessment while construction according to annex III module B + D.

Following norms and manufacturing processes are basis for the production:

DIN EN ISO 12100, DIN EN 1050, DIN EN 50081, DIN EN 50082, DIN EN 60204, DIN EN ISO 9001:2008 (Total Quality Management), 87/404/EWG (Simple Pressure Vessels), 2014/68/EU (Pressure Equipment Directives), TR B'en (Technical Directives Pressure Vessels), GSG (Equipment Safety Act), 9. GSGV (9th Regulation for Equipment Safety), 2006/42/EG

### Approvals for Pressure Equipment

**EU** Approved for fluid group 2 according to Pressure Equipment Directive 2014/68/EU, module B+D (categorie IV)  
**Other** ASME

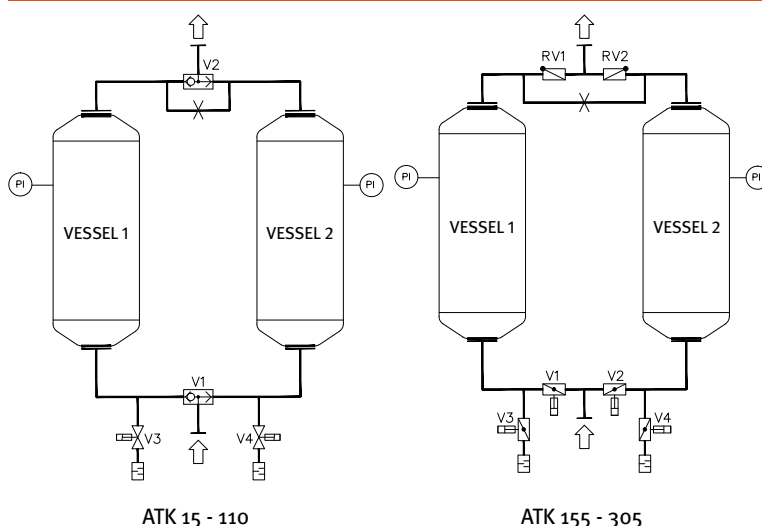
### Quality Management

**Development/Production** DIN EN ISO 9001

### Air purity class according to ISO 8573-1:2010

**Solid particles** Class 2 (through final-filtration, up to ATK 110 standard)  
**Humidity (gaseous)** Class 3 (PDP -20°C), Class 2 (PDP -40°C), opt. Class 1 (PDP -70°C)  
**Total oil** -

## R&I Scheme



### ATK 15 - 110

- PI 1** Manometer vessel 1
- PI 2** Manometer vessel 2
- V 1** Shuttle valve inlet
- V 2** Shuttle valve outlet
- V 3** Blow-down valve vessel 1
- V 4** Blow-down valve vessel 2

### ATK 155 - 305

- PI 1** Manometer vessel 1
- PI 2** Manometer vessel 2
- V 1** Control valve inlet 1
- V 2** Control valve inlet 2
- V 3** Blow-down valve vessel 1
- V 4** Blow-down valve vessel 2
- RV 1** Check valve vessel 1
- RV 2** Check valve vessel 2

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## Maintenance

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

<b>daily</b>	Manometer + Control:	Visual and function check
<b>annual</b>	Control box + Silencer(s): Pre- & Final-filterelement:	Check wires and clips, clean Exchange
<b>after 2 years</b>	Silencer(s): Sieves/Diffusors: O-rings of filter housing: Pistons shuttle valves: Solenoid valves: Pressure dew point sensor (opt.):	Exchange Clean, exchange if necessary Exchange Exchange Exchange Recalibrate
<b>after 4 years</b>	Desiccant:	Exchange

## Control devices

### Dew point controls with intelligent functions

#### Control with set cycle times

#### ECOMATIC

Standard scope of supply in all ECOTROC® ATK dryer units

- Display of adsorption/regeneration cycle
- Micro processor fully electronic
- Energy saving compressor direct current switch
- Cycle times configurable
- Status display and potential-free alarm signal for service
- 24 V optional on demand
- usable for adsorption dryers of other manufacturers as well (if configured by KSI staff)



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## Control on demand

### ECOTROCONOMY-Comfort (ET-C)

effortless upgrade for all ECOTROC® ATK adsorbers (older versions too)

- dew point measurement and display from +20°C up to -100°C
- demand based control of regeneration by measuring the operational conditions
- integrated load change counter => vessel inspections could be done later
- storage of operation parameters with time data => safety for power failures
- password protection on all levels (configurable)
- connection for optical and acustical signals
- automatical service display
- display of service intervals (adjustable)
- potential-free alarm output
- external 2-20mA-signal to transfer the displayed dew point value, i.e. to a master display or control room



## High-end control

### ECOTROCONOMY-Premium (ET-P)

effortless upgrade for all ECOTROC® ATK adsorbers (older versions too)

Functions like **ECOTROCONOMY-Comfort**, in addition:

- pressure measurement at dryer inlet and display on control monitor
- temperature measurement at dryer inlet and display on control monitor
- security shutdown for variation from set values possible (refers to pressure)
- alarm when leaving defined data intervals (refers to pressure and temperature)



### Dew point control saving potential (calculation based on ECOTROC® ATK 15)

Compressed air volume flow	150 m <sup>3</sup> /h	Purge air costs without control	0,30 €/h
Operating pressure in system	7 bar	Purge air costs with control	0,09 €/h
Energy demand air compressor	14,16 kW	<b>Costs for the dryer</b>	
Operating hours per year	7500 h	Purge air loss without control	2229,79 €
Energy cost per kWh	0,15 €/kWh	Purge air loss with control	668,94 €
Purge air share	14 %		
Stand by operation	70 %	<b>Savings through dew point control per year</b>	<b>1560,86 €</b>



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## Versions and options

- **ECOTROC® ATK** for volume flows from 150 m<sup>3</sup>/h to 3050 m<sup>3</sup>/h
- **ECOTROC® ATK-APN** for volume flows from 5 m<sup>3</sup>/h to 110 m<sup>3</sup>/h (information material available separately)
- **ECOTROC® ATO**, combines **ECOTROC® ATK** and **ECOTROC® ATC**, solution for oil-free compressed air
- **ECOTROC® ATK-HP** for operating pressures up to 500 bar and volume flows from 10 to 1000 m<sup>3</sup>/h
- customized dryers for special needs possible on demand
- higher volume flows possible
- higher operating pressures possible
- standard control included, other control devices available separately

## The ECOTROC® ATK Plus Effect +++

- + three large silencers ⇒ risk of clogging with desiccant dust virtually eliminated
- + use of quality desiccant ⇒ capacity is more reliable
- + standard pre- and final-filtration (up to **ATK 110**) ⇒ safer operation
- + purging gas recirculation is standard scope of supply (up to **ATK 110**)
- + design for special spaces possible due to symmetrical piping and components
- + delivery of ready-to-use units
- + lifting lugs on all vessels simplify the installation
- + internal pipework from **ATK 15** to **ATK 110** is entirely in stainless steel
- + robust and solid construction
- + fastening to floor is possible
- + custom built versions possible through modular concept



## Service advantages

- desiccant change is possible via filler and drain ports
- removal of the complete pipework by releasing 3 connections allows easy service access
- simple and clear service packages
- intelligent controller is easy to programme and operate