

## ECOTROC® ATK-BL

### heatless-regenerated adsorption dryer

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

Adsorption dryers **ECOTROC® ATK-BL** 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.



## Permanent high compressed air quality

KSI compressed air treatment systems provide customized solutions for specific purposes. **ECOTROC® ATK-BL** dryers are available in one version to improve competitiveness. With welded vessels for volume flows of up to 1200 m<sup>3</sup>/h in the standard version this line supplies the system with a constantly high compressed air quality.

Using first-class materials, KSI produces exceptional quality **ECOTROC® ATK-BL** 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-BL** 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 (optional) 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 (optional) through a flow optimizer and a shuttle valve for the final dust filtration. High purity compressed air is now available.

### Regeneration / Desorption

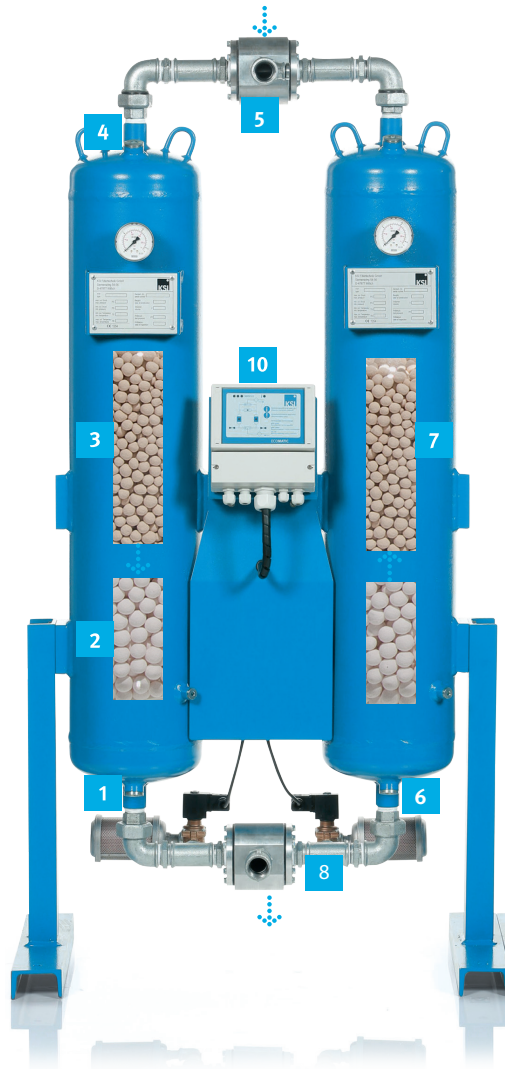
Simultaneously to the adsorption process in the first vessel the desiccant in the second vessel is regenerated. A part of the already treated compressed air from vessel one is channeled into vessel two through a purging air nozzle in counter flow. By using the physical effect of pressure release to atmospheric 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 inlet diffusor
- 2 wet zone for pre-drying
- 3 adsorption phase desiccant vessel
- 4 outlet diffusor
- 5 change-over valve
- 6 purging air nozzle
- 7 desiccant vessel regeneration phase
- 8 blow-down valve
- 9 silencer(s)
- 10 electronic control device **ECOMATIC**



**Fully-automatic heatless-regenerated adsorption dryer**

including:

- electronic control device **ECOMATIC**  
including compressor direct current switch

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

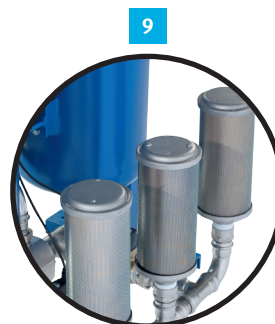
Capacity volume flow: up to 1200 m<sup>3</sup>/h\*

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

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



Desiccant



Silencers, blow-down valves ATK-BL

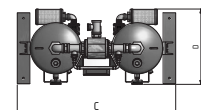
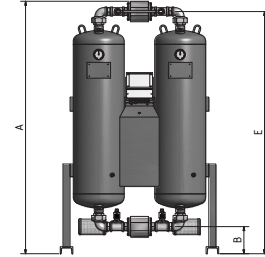


Various sorts of desiccant

## Capacities and dimensions

| Type       | Capacity* | Dimensions (mm)   |      |     | Connection |
|------------|-----------|-------------------|------|-----|------------|
|            |           | m <sup>3</sup> /h | H    | B   |            |
| ATK-BL 15  | 150       | 1178              | 797  | 376 | 1"         |
| ATK-BL 18  | 180       | 1338              | 797  | 380 | 1"         |
| ATK-BL 22  | 210       | 1458              | 797  | 400 | 1"         |
| ATK-BL 34  | 340       | 1453              | 1006 | 482 | 1 1/2"     |
| ATK-BL 45  | 480       | 1853              | 1006 | 482 | 1 1/2"     |
| ATK-BL 55  | 600       | 2013              | 1045 | 570 | 1 1/2"     |
| ATK-BL 75  | 820       | 1730              | 1252 | 644 | 2"         |
| ATK-BL 90  | 1000      | 2012              | 1403 | 681 | 2"         |
| ATK-BL 110 | 1200      | 2108              | 1496 | 701 | 2"         |

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



ATK-BL 15 - 110

## 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 temperatures

|      |     |     |      |    |      |      |      |      |      |
|------|-----|-----|------|----|------|------|------|------|------|
| °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.

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## Electrical data

| Type       | Installed power | Electrical voltage | Frequency |
|------------|-----------------|--------------------|-----------|
|            | W               | V                  | Hz        |
| ATK-BL 15  | 32              | 230                | 50-60     |
| ATK-BL 18  | 32              | 230                | 50-60     |
| ATK-BL 22  | 32              | 230                | 50-60     |
| ATK-BL 34  | 32              | 230                | 50-60     |
| ATK-BL 45  | 32              | 230                | 50-60     |
| ATK-BL 55  | 32              | 230                | 50-60     |
| ATK-BL 75  | 32              | 230                | 50-60     |
| ATK-BL 90  | 32              | 230                | 50-60     |
| ATK-BL 110 | 32              | 230                | 50-60     |



### 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<br>at 40°C                               | 37% r.H<br>at 35°C | 50% r.H<br>at 30°C | 70% r.H<br>at 25°C | 90% r.H<br>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

## 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 97/23/EWG on pressure equipment.

Dryers of KSI product line ECOTROC® ATK-BL 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), 97/23/EWG (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 97/23/EG, module B+D (categorie IV)  
**Other** ASME

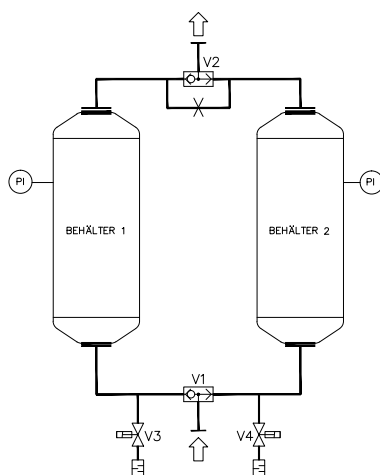
### Quality Management

**Development/Production** DIN EN ISO 9001

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

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

## R&I Scheme



ATK-BL 15 - 110

### ATK-BL 15 - 110

|             |                          |
|-------------|--------------------------|
| <b>PI 1</b> | Manometer vessel 1       |
| <b>PI 2</b> | Manometer vessel 2       |
| <b>V 1</b>  | Shuttle valve inlet      |
| <b>V 2</b>  | Shuttle valve outlet     |
| <b>V 3</b>  | Blow-down valve vessel 1 |
| <b>V 4</b>  | Blow-down valve vessel 2 |

## 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 +<br>Silencer(s):<br>Pre- & Final-filter<br>element (opt.):  | Check wires and clips, clean<br><br>Exchange  |
| <b>after 2 years</b> | Silencer(s):<br>Sieves/Diffusors:<br>O-rings of filter<br>housing (opt.):<br>Pistons shuttle valves:<br>Solenoid valves:<br>Pressure dew point<br>sensor (opt.): | Exchange<br>Clean, exchange if necessary<br><br>Exchange<br>Exchange<br>Exchange<br>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-BL 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-BL 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
- interface for data output to PC / software



## High-end control

### ECOTROCONOMY-Premium (ET-P)

effortless upgrade for all ECOTROC® ATK-BL 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-BL 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-BL for volume flows from 150 m<sup>3</sup>/h to 1200 m<sup>3</sup>/h
- standard control included, other control devices available separately

## The ECOTROC® ATK-BL Plus Effect +++

- + two large silencers => risk of clogging with desiccant dust virtually eliminated
- + use of quality desiccant => capacity is more reliable
- + optional pre- and final-filtration => safer operation
- + purging gas recirculation is standard scope of supply
- + lifting lugs on all vessels simplify the installation
- + robust and solid construction
- + fastening to floor is possible
- + very competitive adsorption dryer through a standardized and proved 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

