

ECOTROC DD

Heatless-regenerated Desiccant Dryers



System solutions for compressed air and gas –
reliable and safe processing



Reliable and safe pressure dew points are guaranteed

Desiccant dryers are used in critical applications where pressure dew points of -40°F or better must be achieved. Dryers of the **ECOTROC** DD series are available in three versions: as a aluminum compact series (DDAP) for volume flows up to 130 cfm, with welded vessels (DDN) for volume flows up to 705 cfm as well as in the large version (DDF) up to 1,800 cfm*. Higher volume flows are available on request.

*based on standard conditions - higher capacities on request

ECOTROC DD PLUS-EFFECTS +++

- + two large dimensioned silencers
 - ▶ clogging with desiccant dust almost impossible
- + use of quality drying agents
 - ▶ more safety in performance
- + standard pre and post filtration (up to DDN 705)
 - ▶ system security
- + regeneration gas recirculation included as standard (up to DDN 705)
- + delivery of plug-and-play-systems
- + robust and modern design
- + DDAP6 to DDAP12 can optionally be supplied with wall mounting bracket

Models and capacity ranges



DDAP6 - 65

Volume flow: up to 65 cfm*

Pressure dew point: -40°F up to -94°F

*calculated at 14,5 psi (abs.) and 68°F at 101,5 psi working pressure



DDAP80 - 130

Volume flow: up to 130 cfm*

Pressure dew point: -40°F up to -94°F

*calculated at 14,5 psi (abs.) and 68°F at 101,5 psi working pressure



DDN200 - 705

Volume flow: up to 705 cfm*

Pressure dew point: -40°F up to -94°F

*calculated at 14,5 psi (abs.) and 68°F at 101,5 psi working pressure



DDF915 - 1800

Volume flow: up to 1,800 cfm*

Pressure dew point: -40°F up to -94°F

*calculated at 14,5 psi (abs.) and 68°F at 101,5 psi working pressure

Further versions and options at a glance:

- **ECOTROC CTAP, ECOTROC CTN** and **ECOTROC CTF**: system solution for oil-free compressed air (see additional separate product information)
- **ECOTROC** high pressure desiccant dryers for operating pressures up to 7,250 psi and volume flows up to 825 cfm
- further special versions on request
- standard controller included; the ETC 4.0 and ETP 4.0 pressure dew point controllers are available optionally

Consistently high compressed air quality

KSI provides outstanding solutions for compressed air and gas treatment. Dryers of the **ECOTROC** DD series are offered in three versions: as a compact series (DDAP) for volume flows up to 130 cfm, with welded vessels for volume flows up to 705 cfm and in the large version up to 1,800 cfm. Higher volume flows are available on request.

KSI produces **ECOTROC** DD desiccant dryers in high-end industrial quality using first-class materials. The use of quality desiccants in combination with intelligent control systems ensures constant compressed air or compressed gas quality and stable pressure dew points (from -40°F to -94°F). Flow-independent shuttle valves ensure reliable and risk-free operation. Standardized brand name blow-off valves guarantee operating life, minimize service times and significantly simplify maintenance and service.

The excellent price/performance ratio is complemented by economical operation and functionality. The intelligent 10-minute **ECOMATIC** cycle (control cycle for adsorption, regeneration and pressure build-up) requires less purge air

than dryers with shorter cycles and protects the adsorbents due to the lower number of load cycles. The possibility of individual time setting creates further savings potential. The standard integrated compressor synchronization circuit in the **ECOMATIC** controller enables further energy savings, as the **ECOTROC** DD deactivates the switch-over when the compressor is not running. This way, no purge air escapes during standstill periods. Highly efficient compressed air and gas flow profiles are achieved by design features such as consistently large inlet and outlet diameters, pipe dimensions as well as valves and silencers.

Integrated solutions such as **KSI ECOCLEAN** compressed air filters and **KONDRAIN** zero-loss condensate drains complement our product portfolio.

The functional principle

Pre-filtration

The flow-optimized **KSI ECOCLEAN** SMA pre-filter easily separates solid and liquid components down to 1 micron from the inlet flow. Condensate is reliably discharged by the optional zero-loss **KONDRAIN** condensate drain or the standard automatic drain.

Adsorption

Incoming compressed air is flowing through the desiccant bed from below in the so-called „wet zone“ for pre-drying. Then the actual adsorption process takes place by adsorbing water molecules on the large inner surface of the desiccant.

Post-filtration

Dry compressed air with the desired pressure dew point exits the desiccant bed at the upper end of the vessel and is guided by a flow optimizer and shuttle valve. Finally the **KSI ECOCLEAN** DMF filter removes any dust that might emerge from the drying process, producing compressed air with the highest purity.

Regeneration / Desorption

Parallel to the adsorption phase in the first vessel the desiccant in the second vessel is regenerated. For this purpose, a small part of the already dried compressed air is directed through the desiccant in the second vessel in countercurrent flow. By using the physical effect of pressure relief to atmospheric pressure, the purge air regenerates the moist desiccant effectively.

The moisture is released into the atmosphere via the blow-off valve and silencer.

Switching

When regeneration is complete, pressure build-up begins in the vessel. Once the operating pressure is reached, the system switches the flow from the adsorbing vessel to the regenerated vessel. Now the freshly regenerated vessel starts adsorption, while the other vessel starts its regeneration cycle.

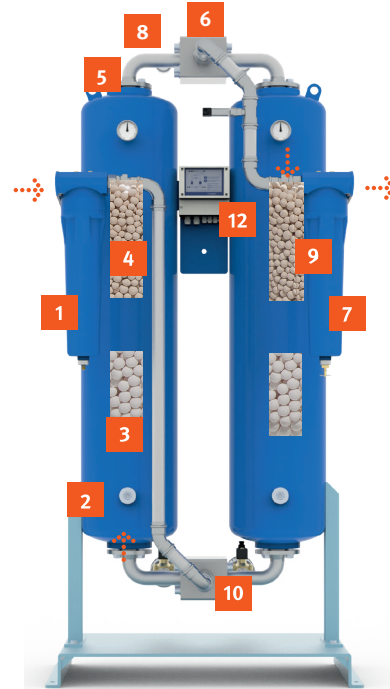
- 1 flow-optimized pre-filter **KSI ECOCLEAN SMA**
- 2 inlet diffuser
- 3 wet zone for pre-drying
- 4 desiccant vessel adsorption phase
- 5 outlet diffuser
- 6 shuttle valve
- 7 flow-optimized post-filter **KSI ECOCLEAN DMF**
- 8 purge air nozzle
- 9 desiccant vessel regeneration phase
- 10 blow-off valve
- 11 silencer
- 12 electronic control **ECOMATIC**



various desiccants



silencer,
blow-off valves



silencer

ECOTROC DD

Heatless-regenerated Desiccant Dryers – Compact Series up to 130 cfm



Compact design at the highest level

The solid and rugged construction of the DDAP series provides long uptime, high reliability and trouble-free installation. All sizes can be fixed to the floor.

An aluminum profile developed by KSI offers optimal flow conditions in the desiccant bed and ensures a stable pressure dew point. In the standard version, the DDAP units achieve a safe pressure dew point of -40°F. Special versions for pressure dew points of up to -94°F are available on request and offer maximum process reliability.

Simple and fast service

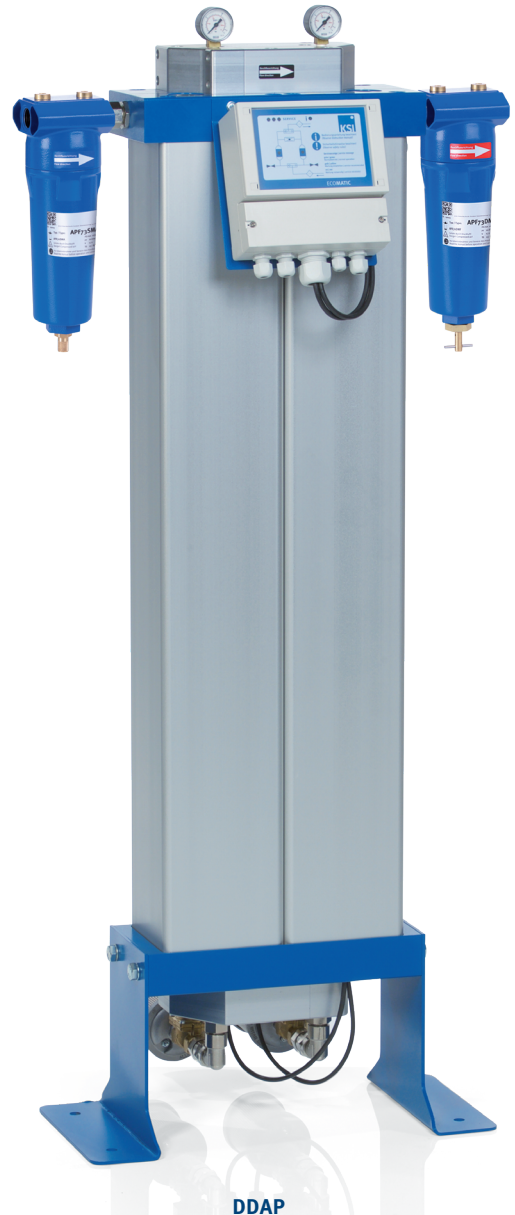
DDAP desiccant dryers offer great serviceability and maintenance features. Firstly, changing the desiccant is possible without the use of costly cartridge systems or dismantling top and bottom plates. The DDAP range offers generously dimensioned emptying openings in the lower plate and filling openings in the upper plate. The result: Fast and safe emptying and re-filling of the desiccant bed!

The two service blocks on the upper and lower plate contain all the parts required for service. After simple disassembly, all service work is carried out in a relaxed posture, eliminating the need for laborious work directly on the dryer. Important: The dryer remains installed in the overall installation.

Process reliability as a top priority

The DDAP series comes with two large silencers that offer more safety compared to dryers with only one or smaller sized silencers, both during expansion when switching the flow direction and during discharge of the regeneration air. KSI is convinced that this system offers more safety, as backflow into the dryer is hardly possible due to the large silencer surface.

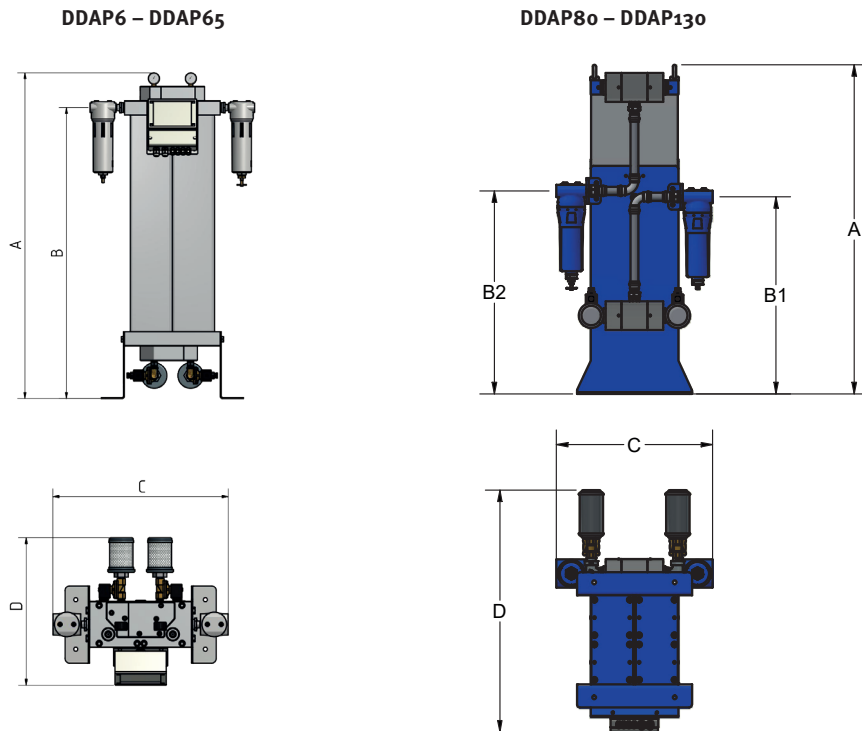
KSI pre- and post-filters **KSI ECOCLEAN** SMA and DMF are included in the standard scope of supply and offer an optimal pre-filtration of incoming particles and water and oil droplets. This significantly increases the operational reliability and service life of the DDAP units.



Performance data and dimensions

Type	Capacity cfm	Dimensions (inch)					Connection Inlet	Connection Outlet	Installed power HP	Electric voltage V	Frequency Hz
		A	B / B1	B2	C	D					
DDAP6	6	28.43	25.00	-	15.51	12.17	3/8"	3/8"	0.042	115	50 / 60
DDAP12	12	32.36	28.94	-	15.51	12.68	3/8"	3/8"	0.042	115	50 / 60
DDAP20	20	34.29	30.20	-	18.90	16.93	3/8"	3/8"	0.042	115	50 / 60
DDAP30	30	38.23	34.13	-	18.90	16.93	3/8"	3/8"	0.042	115	50 / 60
DDAP35	35	42.17	38.07	-	18.90	16.93	1/2"	1/2"	0.042	115	50 / 60
DDAP40	40	38.54	33.86	-	21.73	17.80	1/2"	1/2"	0.042	115	50 / 60
DDAP55	55	44.06	39.37	-	21.73	17.80	1/2"	1/2"	0.042	115	50 / 60
DDAP65	65	51.14	46.46	-	23.62	17.80	1/2"	1/2"	0.042	115	50 / 60
DDAP80	80	39.57	27.01	27.80	21.38	33.15	1"	1"	0.042	115	50 / 60
DDAP110	110	45.08	27.01	27.80	21.38	33.15	1"	1"	0.042	115	50 / 60
DDAP130	130	52.28	27.01	27.80	21.38	33.15	1"	1"	0.042	115	50 / 60

*calculated at 14.5 psi (abs.) and 68°F at 101.5 psi working pressure



Correction factors

Correction factors inlet temperature

°F	<77	77	86	95	100.4	104	113	118.4	122
F(t)	1.2	1.1	1.09	1	0.84	0.78	0.72	0.65	0.58

Correction factors operating pressure

psi	58	65	73	80	87	94	102	109	116	123	131	138	145	152	160	167	174	181	189	196	203	210	218	225	232
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

Multiply the capacity of the dryer by the correction factor in the table above and you will get the corrected capacity.
Higher inlet temperatures on request.

Range of application

installation site	inside non-aggressive atmosphere				
ambient humidity max.	25% r.h. at 104°F	37% r.h. at 95°F	50% r.h. at 86°F	70% r.h. at 77°F	90% r.h. at 68°F
ambient temperature max.	122°F				
ambient temperature min.	35.6°F				
operating pressure	58 up to 232 psi (DDAP65 & DDAP130: up to 195.75 psi)				
flow medium	compressed air and gases				
pressure dew point	-40°F* (-94°F available on request)				

*calculated at 14.5 psi (abs.) and 68°F at 101.5 psi working pressure

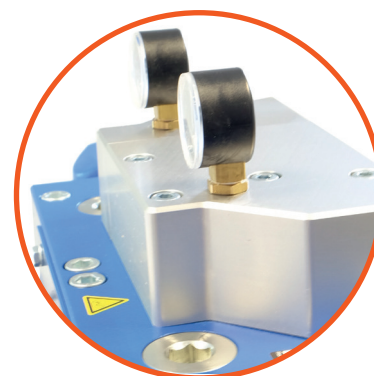
ECOTROC DDAP PLUS-EFFECTS +++

- + two large-dimensioned silencers ▶ risk of clogging with desiccant dust virtually eliminated
- + use of quality drying agents ▶ more safety in performance
- + standard pre and post filtration ▶ system safety
- + regeneration gas recirculation included as standard
- + delivery of ready-to-connect units
- + robust and solid construction
- + floor fixation possible
- + DDAP6 and DDAP12 can optionally be supplied with wall mounting bracket
- + modular approach



Service advantages: less effort, more time saved

- change of desiccant via filling and emptying openings
- filling nozzles eliminate the need for laborious removal of the plates
- simple and clear service packages
- easy to understand control unit, simple menu navigation (with ETC 4.0)
- two service blocks on the upper and lower plate contain all the parts in need of service



Upper service block with easily accessible filling nozzle

Technical features

- Regeneration by means of purge air in countercurrent flow
- Low purge air requirement thanks to shorter cycles and optimized flow diameters

Approvals for pressure equipment

EU	approval for fluid group 2 according to Pressure Equipment Directive 2014/68/EU
Classification acc.	DDAP6 to 12 paragraph 3 article 4
DGRL 2014/68/EU	DDAP20 to 130 category
Fluid group	2
Northern America	CRN (certificates on request), ASME B31.3;2020 ASME U/UM and NB

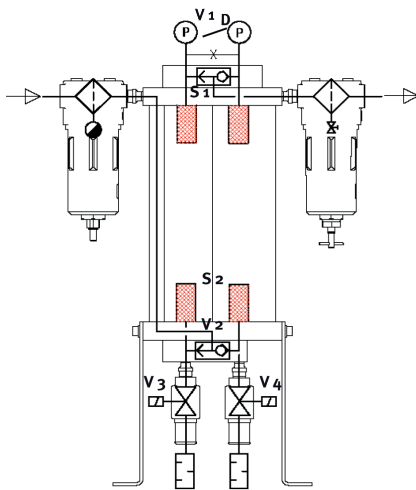
Quality assurance

Development/production	DIN EN ISO 9001
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Air purity class according to ISO 8573-1:2010

Solid particles	class 2 (by postfiltration, standard scope of supply)
Humidity (gaseous)	class 3 (PDP -4°F), class 2 (PDP -40°F), opt. class 1 (PDP -94°F)
Total oil	-

Flow scheme



P 1	pressure gauge vessel 1
P 2	pressure gauge vessel 2
V 1	upper shuttle valve
V 2	lower shuttle valve
S 1	upper diffuser
S 2	lower diffuser
V 3	blow-off valve vessel 1
V 4	blow-off valve vessel 2
D	nozzle

ECOTROC DD

Heatless-regenerated Desiccant Dryers – Series up to 1,800 cfm



Operational reliability and long service life

With the DD series, KSI offers heatless-regenerated desiccant dryers in connection sizes from 1 1/2" to 4" (flange) as well as volume flows from 200 - 1,800 cfm as a standard. Larger capacities are available upon request.

Best materials for a premium product

All vessels of the **ECOTROC** DDN series up to and including DDN705 are designed and manufactured for an operating pressure of up to 232 psi and in accordance with ASME and CRN regulations.

Equal to the **ECOTROC** DDA compact series, the KSI also offers a very robust design in the DD series, an easily accessible design for service and an oversized desiccant volume for safe pressure dew points.

Operational reliability and service benefits

The **ECOTROC** DD models (DDN = 2, DDF = 4) have large silencers on the downstream side which ensure safe and carefree operation, as the large silencer surface virtually eliminates the risk of clogging with desiccant dust and the associated backwater. Lifting lugs on the vessels, easily accessible emptying and filling nozzles on the vessels, easily dismantled pipe bridges at the top and bottom are just some of the many advantages.

KSI products: Service made easy and without potential risk for the compressed air specialist and end-user.

Valve controlled: full passage in the adsorption and expansion path

KSI desiccant dryers **ECOTROC** DDF915 and larger are characterized by the following features, which ensure optimal economic efficiency and operational safety in the range from 1,800 cfm:

- particularly large cross-sections in the main and expansion lines
- air distribution at the inlet via individually controlled shut-off valves
- optimized flow velocity and contact time of the air in the vessel
- check valves with enlarged inner diameter (compared to a standard valve) at the outlet
- expansion line via butterfly valves, therefore less back pressure than with a standard valve



DDN



DDF

Performance data and dimensions

Type	Capacity*		Dimensions (inch)				Connection	Connection	Weight lbs	Installed power HP	Electric voltage V	Frequency Hz
	cfm		A	B	C	D	Inlet	Outlet				
DDN200	200		61.85	41.29	39.96	29.74	1 1/2"	1 1/2"	669	0.042	115	50 / 60
DDN285	285		65.73	45.18	39.96	29.74	1 1/2"	1 1/2"	717	0.042	115	50 / 60
DDN350	350		83.84	63.29	39.96	29.74	1 1/2"	1 1/2"	939	0.042	115	50 / 60
DDN480	480		73.07	47.52	52.76	40.20	2"	2"	1630	0.042	115	50 / 60
DDN590	590		84.88	59.33	52.76	40.20	2"	2"	1902	0.042	115	50 / 60
DDN705	705		88.62	63.27	52.76	40.20	2"	2"	1997	0.042	115	50 / 60
DDF915	915		83.27	79.21	59.45	30.55	3" (flange)	3" (flange)	1819	0.042	115	50 / 60
DDF1090	1090		83.54	79.61	61.46	31.26	3" (flange)	3" (flange)	2050	0.042	115	50 / 60
DDF1210	1210		83.98	80.04	63.46	32.17	3" (flange)	3" (flange)	2315	0.042	115	50 / 60
DDF1445	1445		91.65	87.32	72.24	35.35	4" (flange)	4" (flange)	2778	0.042	115	50 / 60
DDF1800	1800		92.13	87.80	74.65	33.46	4" (flange)	4" (flange)	3219	0.042	115	50 / 60

*calculated at 14.5 psi (abs.) and 68°F at 101.5 psi working pressure

Correction factors

Correction factors inlet temperature

°F	<77	77	86	95	100.4	104	113	118.4	122
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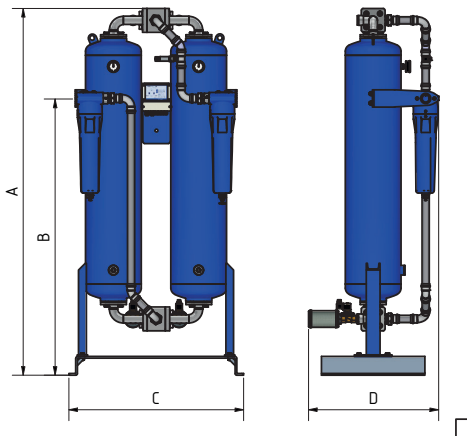
Correction factors operating pressure

psi	58	65	73	80	87	94	102	109	116	123	131	138	145	152	160	167	174	181	189	196	203	210	218	225	232
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

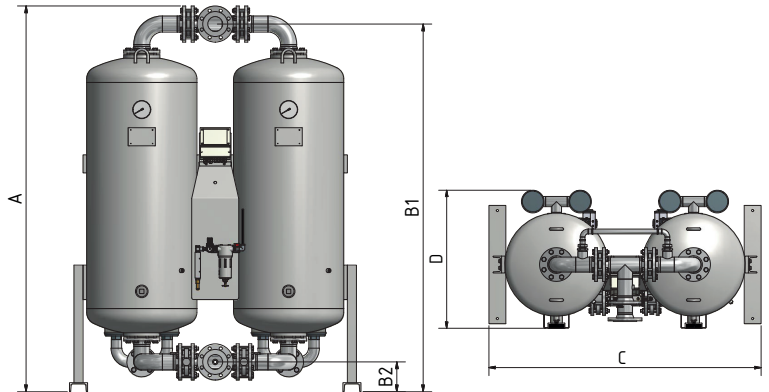
Multiply the capacity of the dryer by the correction factor in the table above and you will get the corrected capacity.

Higher inlet temperatures on request.

DDN200 - 705



DDF915 - 1800



Range of application

installation site	inside non-aggressive atmosphere				
ambient humidity max.	25% r.h. at 104°F	37% r.h. at 95°F	50% r.h. at 86°F	70% r.h. at 77°F	90% r.h. at 68°F
ambient temperature max.	122°F				
ambient temperature min.	35.6°F				
operating pressure	58 up to 232 psi				
flow medium	compressed air and gases				
pressure dew point	-40°F* (-94°F pressure dew points available on request)				

* related to 14.5 psi (abs.) and 68°F at 101.5 psi operating pressure

ECOTROC DD PLUS-EFFECTS +++

- + large-dimensioned silencers ▶ risk of clogging with desiccant dust virtually eliminated
- + use of quality drying agents ▶ more safety in performance
- + standard pre and post filtration ▶ system safety
- + regeneration gas recirculation included as standard
- + lifting lugs at all vessels make the installation into an existing system easier



Service advantages

- change of desiccant via filling and emptying openings
- disassembly of the complete pipe bridges by loosening just three screws ▶ comfortable and fast service work
- simple and clear service packages
- easy to understand control unit, simple menu navigation (with ETC 4.0)



Technical features

Regeneration by means of purge air in countercurrent flow.

Low purge air requirement thanks to shorter cycles and optimized compressed air or compressed gas ducts

Approvals for pressure equipment

EU approval for fluid group 2 according to Pressure Equipment Directive 2014/68/EU, module B+D (category IV)
Northern America CRN (certificates on request), ASME and NB

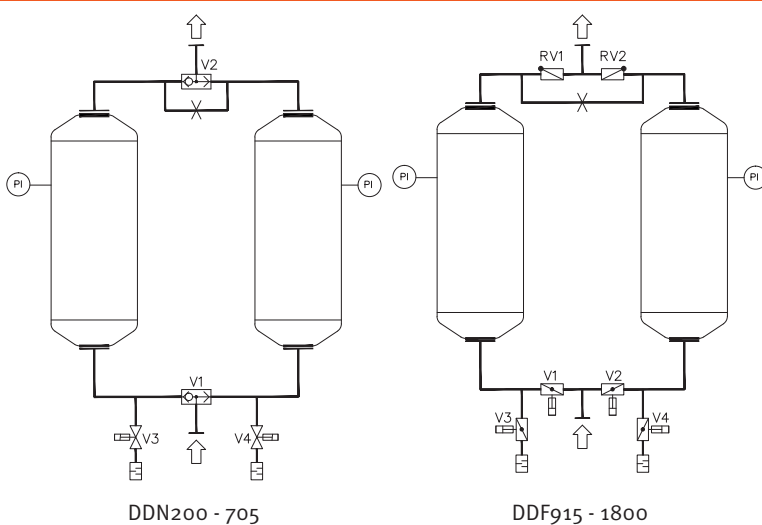
Quality assurance

Development/production **DIN EN ISO 9001**

Air purity class according to ISO 8573-1:2010

Solid particles class 2 (by postfiltration, standard up to DDN705)
Humidity (gaseous) class 3 (PDP -4°F), class 2 (PDP -40°F), opt. class 1 (PDP -94°F)
Total oil -

R&I scheme



DDN series

- PI 1** pressure gauge vessel 1
- PI 2** pressure gauge vessel 2
- V 1** shuttle valve inlet
- V 2** shuttle valve outlet
- V 3** blow-off valve vessel 1
- V 4** blow-off valve vessel 2

DDF series

- PI 1** Pressure gauge vessel 1
- PI 2** Pressure gauge vessel 2
- V 1** Control valve inlet 1
- V 2** Control valve inlet 2
- V 3** blow-off valve vessel 1
- V 4** blow-off valve vessel 2
- RV 1** non-return valve vessel 1
- RV 2** non-return valve vessel 2

ECOTROC DD

Heatless-regenerated Desiccant Dryers



Service instructions

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

daily	Pressure gauge + control unit:	visual and functional check
annually	Control box + silencer:	check cable and terminals for position, clean
	Pre-filter & final-filter element:	replace
2 years	Silencer:	replace
	Sieves/diffuser:	clean, replace if necessary
	O-rings of the filter housing:	replace
	Piston shuttle valves:	replace
	Solenoid valves:	replace
	pressure dew point sensor (opt.):	recalibrate
4 years	Desiccant:	replace

Controllers

Controller with fixed cycle times

ECOMATIC

Standard scope of supply in all **ECOTROC DD** dryer units

- display of adsorption/regeneration cycle
- microprocessor fully electronic
- energy saving compressor synchronization
- cycle times adjustable (selectable)
- status display and potential-free alarm signal for service
- 24 V optionally available
- can also be used for desiccant dryers of other manufacturers (after configuration by KSI)



NEW: Advanced dew point controller with intelligent functions (ETC 4.0 / ETP 4.0)

- wifi transmission / parameterization
- GSM module
- control as „master“ with touch display for connectable sensor boxes
- can be used as a master for internet-based monitoring and planning
- configurable inputs through selectable signal reception: potential-free or 4-20 mA (2-wire)
- control up to 5 valves

More information about the
online system monitoring
KSI ECOCONTROL at
www.ksi-technologies.com

ECOTROCONOMY-Comfort (ETC 4.0)

- available for the entire **ECOTROC** DD series
- sending of notification and alarm messages by email
- all **ECOTROC** DD dryers can easily be upgraded (even older models and models from other manufacturers)
- dew point measurement and display up to -148°F
- demand-oriented regeneration control by measuring the operational conditions
- integrated load change counter (makes vessel inspections at a later time possible)
- saves the operating parameters in combination with date and time (still available after power failure)
- password protection on all levels (can be modified)
- connection for optical and acoustic signals (flashing light, horn etc.)
- automatic service indicator
- service interval display, adjustable intervals
- potential-free alarm output
- external 4-20mA-signal to transfer the displayed dew point value, i.e. to a master display or control room



ETP 4.0 (Premium)

Functions like ETC 4.0, plus:

- pressure measurement at the dryer inlet and indication on the control display
- temperature measurement at the dryer inlet and indicator in the control display
- safety shutdown in case of divergence from specified values is possible

