

Desiccant Dryers DC Series

(Heatless regenerated) – Air flow rates 0.15 to 154.53 m³/min



Why is it necessary to dry compressed air?

The atmospheric air drawn into a compressor is a mixture of gases that always contains water vapour. However, the amount of water vapour that air can carry depends on the temperature. As air temperature rises – which happens during compression – the air's ability to hold moisture increases also. When the air is cooled, its capacity to retain moisture reduces which causes the water vapour to condense. This condensate is then removed in the centrifugal separator, or the air receiver, downstream from the compressor. Even then, the air can still be completely saturated with water vapour. This is why, as the air cools further, significant amounts of condensate can accumulate in the air distribution piping and at take-off points. Therefore, additional drying is essential to avoid production downtime and interruptions, as well as reduce costly maintenance and repair work.

How it works

The pre-filter removes solid particles (up to 0.01 µm) and oil residue from the air that is to be dried. The air then flows through the inlet valve and lower diffuser into one of the two desiccant tanks. The desiccant traps the moisture, leaving the dried compressed air to exit the desiccant tank via the upper diffuser. It then passes through a check valve, a particulate filter and out into the air network. A small portion of the dried compressed air is drawn off as purge air via a control valve and alternately regenerates the desiccant in whichever tank is not in use.

Seamless integration with exceptional results

As a leading compressed air systems provider, KAESER understands that each component plays an integral role in efficient production of clean, quality compressed air.

Therefore, all DC Series desiccant refrigeration dryers are manufactured to ensure the very highest standards in system reliability and performance. With KAESER knowledge and expertise, these units can then be seamlessly integrated into carefully designed compressed air systems to provide outstanding drying results.



DC – Dependable and efficient
Low pressure dew points to meet every need

SIGMA-Dry

Made from activated aluminium oxide, the desiccant has an exceptionally high adsorption capacity and its regeneration capability provides sustained low pressure dew point performance with minimal pressure loss. The desiccant is also waterproof and mechanically stable, which makes it particularly suitable for long periods of operation. Furthermore, specific pellet sizes are available to ensure optimal performance of flow diffusers and sieve plates.



- 1 Prefilter
- 2 Inlet valve
- 3 Desiccant tank
- 4 Desiccant
- 5 Check valve, regulating valve (not visible)
- 6 Desiccant tank
- 7 Particulate filter



Small models
DC 1.5 to 7.5

The ten-minute treatment cycle ensures low-pressure dew points to -40 °C, even with low compressed air demand, and provides maximum system reliability. The space-saving, installation-friendly design with protective enclosure is ideally suited to decentralised applications.



Compact models
DC 12 to 133

Minimum pressure drop across the dryer and low regenerating air requirement reduce service and operating costs, as well as the volume of desiccant needed and the size of filters to be installed. Intelligent controllers (the ECO Control basic, fitted as standard, or the optional ECO Control) economically match machine capacity to air demand. The dryers can be equipped with enclosures and soundproofing and in versions for outdoor installation.



Large models
DC 169 to 1545

With an open design and suited for pressures up to 10 bar_(g), or optionally up to 16 bar_(g), these large desiccant dryers provide the same reliability and efficiency as their smaller counterparts. Their modular construction enables easy transportation and installation, whilst excellent component accessibility greatly simplifies maintenance and service work.



Combination with activated carbon adsorber

Available in sizes from DC 12 upwards, DC dryers are equipped with an ACT activated-carbon adsorber that is precisely matched to meet dryer capacity. This consequently enables production of compressed air to the very highest standards (remaining oil content < 0.003 mg/m³). Connection of the

ACT activated carbon adsorber is made simple by the frame construction of compact desiccant dryers up to size DC 133.

Dependable drying power to -70 °C

Meticulous design and quality ensure that KAESER DC series desiccant dryers operate efficiently to provide dependable low pressure dew point performance at continuous load, even under the toughest of conditions. The impressive drying results are aided by generous quantities of KAESER's high quality 'SIGMA Dry' desiccant, as only a fraction of the material's initial load is used. Consequently, this means that minimal quantities of purge air are required for desiccant regeneration, even after longer than average periods of operation. In addition, long cycle periods reduce the number of flow optimised components required for reliable, integrated performance, such as KAESER's pre- and particulate filters.

Small – yet powerful!

DC 1.5 to 7.5 Compact and reliable

With space saving design and easy installation, small DC desiccant dryers from KAESER provide outstanding performance and efficiency. They are constructed of high quality components and reliably maintain a low pressure dew point even in continuous operation. As with all KAESER desiccant dryers, small DC units operate in long, energy-saving cycles that are gentle on components and consequently require minimal maintenance. Furthermore, their high efficiency design ensures minimal purge air is required for desiccant regeneration.

Compact DC desiccant dryers are ideal for decentralised air treatment applications where space is at a premium, as they can be simply mounted on the wall. They also provide the perfect solution for achieving the very low-pressure dew points required by the packaging and pharmaceutical industries for example, as well as for installations in containers and production of instrument air.



Desiccant tank

Application-specific design enables a million load cycles at 10 bar_(g). Performance meets all requirements as per Pressure Equipment Regulation 97/23/EC. Continuous operation of at least ten years is possible.



Quality components

Proven valve technology guarantees trouble-free operation. Operational status can be viewed at a glance via the manometer which is fitted to each tank. All DC compact desiccant dryers are equipped as standard with easily accessible pre- and particulate filters from KAESER KOMPRESSOREN.



Cycle control

The user-friendly cycle control system from KAESER enables quick and clear pressure dew point selection of -40 °C and -70 °C.



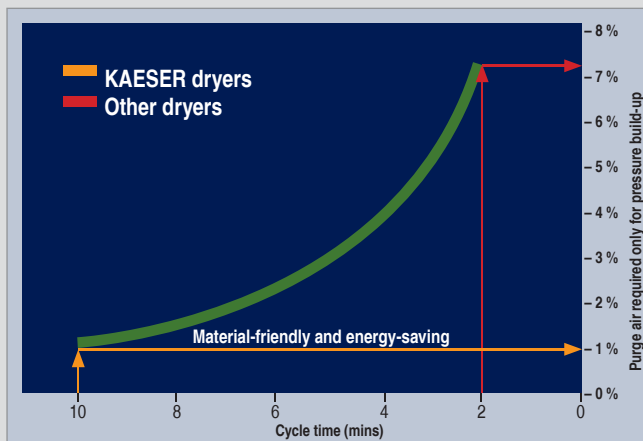
E-Pack (optional for all sizes)

In this version, the upstream desiccant dryer pre-filter is equipped with an ECO-Drain electronic condensate drain to provide highly effective condensate removal without compressed air loss.



Intermittent operation

An on/off controller can help save energy in systems with frequently interrupted cycle phases. "Reverse regeneration" (where the regeneration cycle uses air from the downstream air receiver) is particularly reliable, as a completely regenerated desiccant tank is always available each time the drying cycle restarts. This technique eliminates the possibility of extreme pressure dew point values from occurring at the outlet as a result of excessive loading of the desiccant.



Reliable drying results with material-friendly ten minute cycles

Small DC desiccant dryers also operate in ten-minute cycles to achieve pressure dew points to -40 °C. By reducing the number of switching sequences between the tanks, this method significantly reduces the load on valve components and the SIGMA Dry desiccant. Moreover, long cycle times reduce the amount of compressed air required to restore pressure following the desiccant regeneration phase. For example, 7.6 % of the compressed air has to be diverted for a two-minute cycle. However, this proportion drops to 1.3 % for a ten-minute cycle with a small DC dryer from KAESER KOMPRESSOREN. This reduction saves energy and extends desiccant service life. The outstanding reliability and efficiency of DC dryers is further aided by the flow-optimised round interior of the desiccant tank and by streaming of air through the specially designed screen filters.

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DC series – Powerful, compact and reliable



DC 12 to 1545 Minimal operating and service costs

As with the smaller DC desiccant dryers from KAESER KOMPRESSOREN, compact and large desiccant dryer models alike are also easy to transport, simple to install and provide outstanding performance. Meticulous design and high quality durable components ensure minimal operating and service costs. This is largely due to the very low purge air requirement of 13.5 % that can be attributed to the generous fill volume of KAESER's high-quality **SIGMA Dry** desiccant.

Efficient operation is monitored and managed with the multi-function ECO CONTROL or ECO CONTROL basic control systems.

The dryer system achieves maximum reliability through installation of KAESER pre- and particulate filters.



Desiccant tank

Application-specific design for a million load cycles in accordance with AD2000. Performance meets all requirements as per Pressure Equipment Regulation 97/23/EC. Continuous operation of at least ten years is possible.



Maximum reliability

High quality changeover switches ensure minimal pressure drop and gentle pressure build-up to reduce pressure fluctuations in the air network. Pressure is also monitored during the individual cycle phases. The volume of required purge air is precisely adjusted to meet demand via valve and pressure gauge, whilst operational status can be viewed at a glance via a moisture indicator.



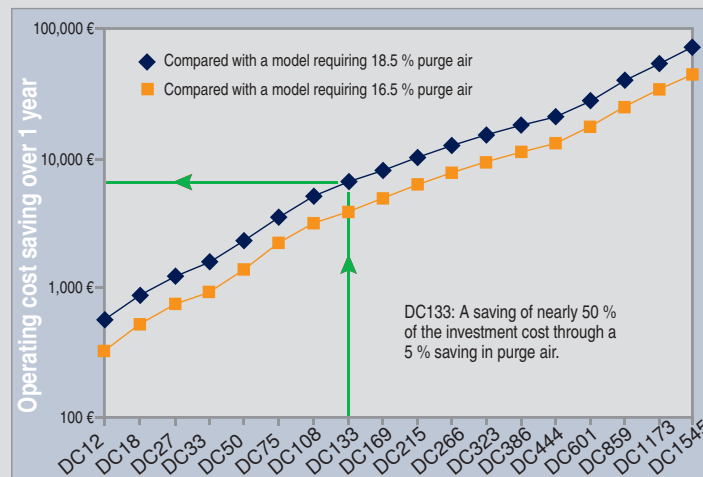
Service-friendly design

The radial layout of the desiccant tank's inlets and outlets enables the desiccant to be easily changed using large connectors on the highest or lowest point of the tank. Furthermore, the connectors are easily accessible for tank inspections and the filter housings are also within easy reach; in addition the silencers are easily dismantled for cleaning. These features therefore contribute to significantly reduced servicing and maintenance costs.



Quiet operation

With at least two highly effective silencers (depending on model size), even standard DC series dryer models operate extremely quietly. Special soundproofing is also available for certain models to provide additional sound reduction. For example, depending on the dryer, the optional soundproofing can reduce operating sound levels to 80 dB(A).



Reliable and efficient pressure dew point performance to -70 °C

Low-pressure dew point performance can also be achieved & sustained with continuous system operation, even at full load and with high inlet temperatures. With a purge air requirement of only 13.5 % (determined over one cycle under reference conditions), the amortisation period for these highly efficient dryers is far shorter than for comparable conventional systems (see graph). High performance is

Assuming: Perfect operation under reference conditions (purge air requirement 13.5%), PDP -40 °C, ten-minute cycle time (5 min adsorption, 4 min desorption, 1 min pressure build-up), running time 8000 operating hours/yr., compressed air generating costs 2 Euro cent/per m³, current DC list price.

achieved using large dryer tanks filled with generous volumes of KAESER's quality **SIGMA Dry** desiccant to ensure sufficient drying capacity even under extreme load conditions. Stainless steel diffusers provide optimal airflow over the desiccant to ensure an even drying load. Purge air requirement is further reduced, as the heat gathered during adsorption is temporarily stored in the desiccant and can be used for regeneration. The drying process is carried out in long energy-saving cycles that are kind to components due to the minimal number of switching and pressure build-up phases.

ECO CONTROL ECO CONTROL basic

Intelligent control for maximum savings

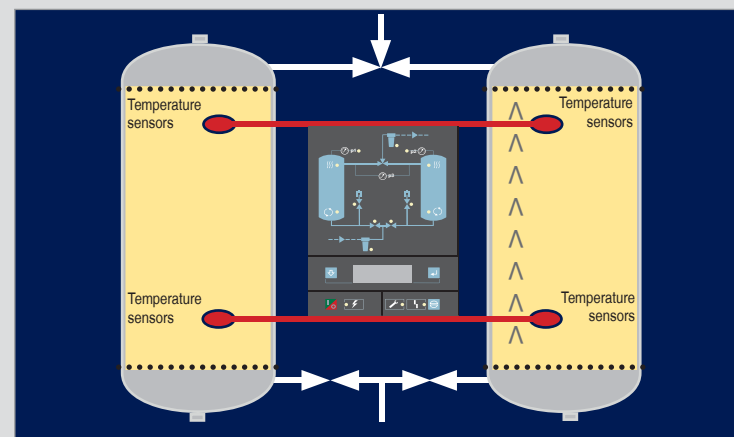
Efficient – Service-friendly – Versatile

A choice of two demand-oriented, energy-saving control systems is available for DC 12 dryer models upwards. As you might expect from KAESER products, each features a user-friendly control panel that combines comprehensive functionality with ease of use.

Standard DC models are equipped with the efficient **ECO CONTROL basic** system which features a highly effective purge air save mode.

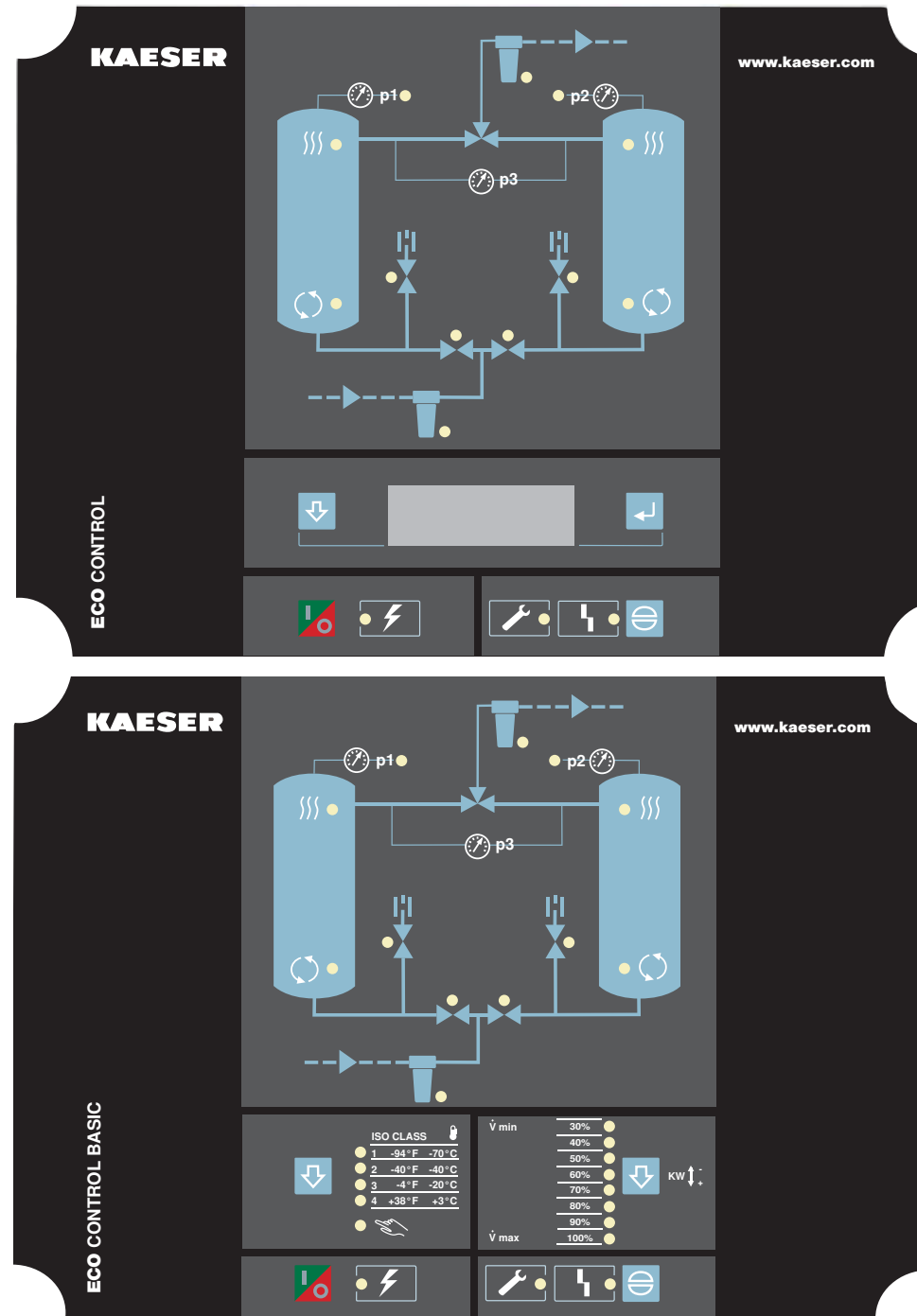
For maximum energy savings, the load dependent **ECO CONTROL** in “E-Pack” models uses a patented and ultra-reliable **pressure dew point trend recognition** system.

Enabling intermittent operation and system connectivity, both systems are particularly service-friendly thanks to their comprehensive status & maintenance displays.

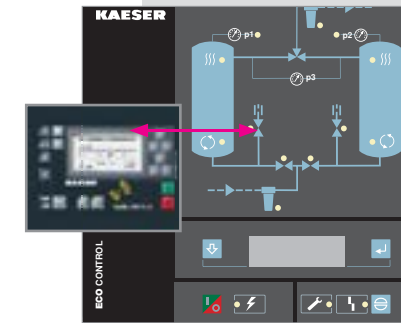


Eco Control: Pressure dew point trend recognition control

ECO CONTROL significantly reduces energy consumption through variable flow volume, pressure and temperature parameters. The pressure dew point **trend recognition** control is more cost-effective and reliable than conventional systems, as it reacts instantly to temperature differences in the desiccant and not to increases in pressure dew point at the dryer outlet. New measurements and relative temperature difference comparisons are carried out

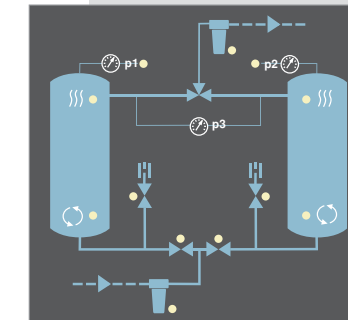


**KAESER
COMPRESSORS**



User-friendly

User-friendly control panel developed and constructed to KAESER's exacting design standards. Simple pressure dew point adjustment in accordance with ISO classification. Load-dependent control with easy-to-read display and five language options.



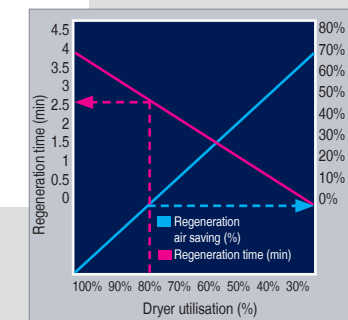
Service-friendly

Units feature an easy-to-read display panel with visual system overview and LEDs on the pressure switch, valve, and tank icons to provide clear, precise information regarding operational and servicing status. The exact valve switching sequence can be checked in the manual test mode.



Networking with SIGMA AIR MANAGER

Both ECO CONTROL versions are equipped as standard with a remote on/off and floating contact that can be monitored for alarm situations. With the ECO CONTROL system it is possible to connect and display data from a pressure dew point measuring device via an analogue input.



ECO CONTROL basic: Significant purge air savings

With Eco Control basic, the dryer is able to reduce its regeneration cycle to a value below the set rated flow value. For example, if the dryer is purchased with future compressed air system expansion in mind and is operating at only 80 % capacity, its regeneration time can be reduced from 4 minutes to 3.2 minutes – a purge air saving of 20 %. This feature allows drying capacity in the compressed air system to be varied according to actual demand.

for each new cycle. As tank switch-over occurs only after the desiccant has been used to its full potential, each drying phase can be extended by up to 30 minutes, allowing significant savings in purge air consumption.

- No need for a costly pressure dew point measuring device.
- The associated regular calibration and maintenance costs are also eliminated.
- A further advantage over a pressure dew point measuring device is that **temperature sensor** operation can be easily checked via reliable open circuit monitoring.

Equipment – DC

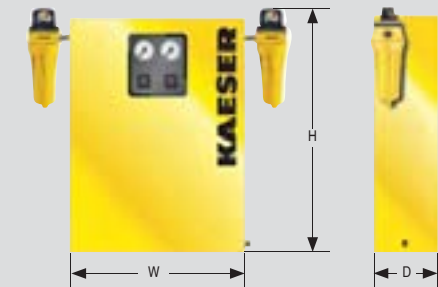
		DC 1.5 – 7.5		DC 12 – 133		DC 169 – 1545	
		Standard version	E-Pack	Standard version	E-Pack	Standard version	E-Pack
Enclosure	Open design	–	–	●	●	●	●
	Steel enclosure	●	●	○	○	–	–
Controller	ECO CONTROL, dew point control, incl. ECO DRAIN with alarm contact on pre-filter	–	–	–	●	○	●
	ECO CONTROL BASIC, with purge air saving mode	–	–	●	–	●	–
	KAESER time controller	●	●	–	–	–	–
	Intermittent operation (remote contact)	●	●	●	●	●	●
Filtration	Pre- and particulate filter, incl. mechan. differential pressure gauge, included	●	●	●	●	●	●
Drain	Float drain in pre-filter	●	–	●	–	●	–
	ECO DRAIN with alarm contact installed and pre-wired on pre-filter	–	●	–	●	–	●
Frost protection	Steel enclosure for indoor installation with resistance heating for Ta to -20°C	–	–	○	○	–	–
Sound insulation	Sound insulation Basic <= 80 dB(A) (only in combination with steel enclosure option)	–	○	–	○	○	○
	Sound insulation Plus <= 85 dB(A)	–	–	–	–	○	○
Pressure relief valves	Pressure relief valve per tank	–	–	○	○	○	○
Working pressure	Maximum working pressure 10 bar	●	●	–	–	●	●
	Maximum working pressure 16 bar	–	–	●	●	○	○
Process design	Two desiccant tanks with changeover regulated as per demand	●	●	●	●	●	●
	Simple filling and discharge at tank ends	●	●	●	●	●	●
	High quality individual components	–	–	●	●	●	●
	Complete desiccant filling of SIGMA DRY	●	●	●	●	●	●
	Optical humidity indicator	–	–	●	●	●	●
	Control air filter	–	–	●	●	●	●

Silicone-free version as per VW test standard PV 3.10.7

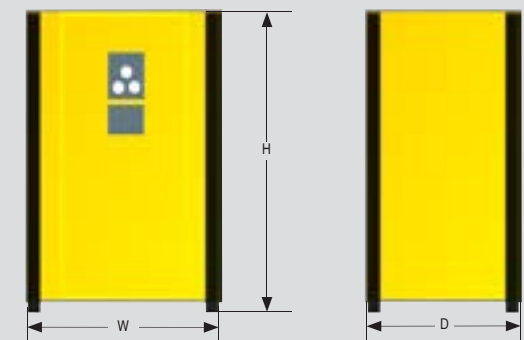
● Standard ○ Option – Not available

Dimensions

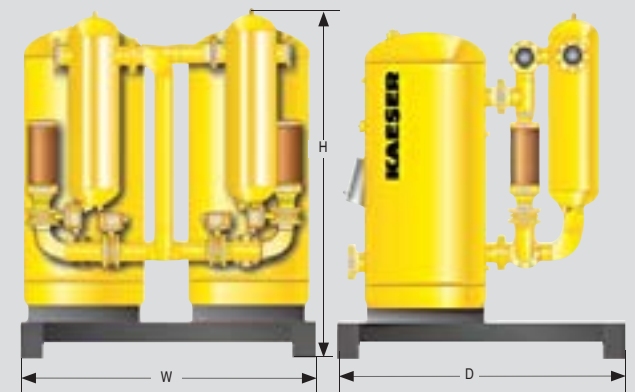
Models DC 1.5 to DC 7.5 E



Models DC 12 to DC 133 E



Models DC 169 to DC 1545



Technical specifications

Flow rate *)	Connection	Standard version				E-Pack version			
		Model	Design	Dimensions H x W x D mm	Weight kg	Model	Design	Dimensions H x W x D mm	Weight kg
0.15	G	DC 1.5	Enclosed	775 x 778 x 170	37	DC 1.5 E	Enclosed	775 x 778 x 170	37
0.28	G	DC 2.8	Enclosed	775 x 778 x 170	54	DC 2.8 E	Enclosed	775 x 778 x 170	54
0.42	G	DC 4.2	Enclosed	775 x 778 x 170	62	DC 4.2 E	Enclosed	775 x 778 x 170	62
0.58	G	DC 5.8	Enclosed	775 x 930 x 217	78	DC 5.8 E	Enclosed	775 x 930 x 217	78
0.75	G	DC 7.5	Enclosed	775 x 930 x 217	89	DC 7.5 E	Enclosed	775 x 930 x 217	89
1.17	R 3/4	DC 12	Open	1950 x 750 x 750	165	DC 12 E	Open	1950 x 750 x 750	181
1.83	R 3/4	DC 18	Open	1950 x 750 x 750	210	DC 18 E	Open	1950 x 750 x 750	220
2.67	G	DC 27	Open	1970 x 750 x 750	260	DC 27 E	Open	1950 x 750 x 750	308
3.33	G 1 1/4	DC 33	Open	1980 x 1150 x 750	310	DC 33 E	Open	1980 x 1150 x 750	398
5.00	G 1 1/4	DC 50	Open	1980 x 1150 x 750	310	DC 50 E	Open	1990 x 1150 x 750	398
7.50	G	DC 75	Open	1990 x 1150 x 750	460	DC 75 E	Open	1990 x 1150 x 750	531
10.83	G 2	DC 108	Open	1990 x 1150 x 750	550	DC 108 E	Open	1990 x 1150 x 750	650
13.33	G	DC 133	Open	2000 x 1150 x 750	615	DC 133 E	Open	1990 x 1150 x 750	815
16.88	DN 80	DC 169	Open	1930 x 1500 x 1300	1000	DC 169 E	Open	1930 x 1500 x 1300	1000
21.47	DN 80	DC 215	Open	1950 x 1500 x 1400	1225	DC 215 E	Open	1950 x 1500 x 1400	1225
26.62	DN 80	DC 266	Open	2106 x 1500 x 1450	1475	DC 266 E	Open	2106 x 1500 x 1450	1475
32.33	DN 80	DC 323	Open	2105 x 1500 x 1500	1700	DC 323 E	Open	2105 x 1500 x 1500	1700
38.63	DN 100	DC 386	Open	2190 x 1500 x 1700	1930	DC 386 E	Open	2190 x 1500 x 1700	1930
44.35	DN 100	DC 444	Open	2283 x 1700 x 1750	2180	DC 444 E	Open	2283 x 1700 x 1750	2180
60.10	DN 100	DC 601	Open	2242 x 1950 x 1900	2315	DC 601 E	Open	2242 x 1950 x 1900	2315
85.85	DN 100	DC 859	Open	2439 x 2400 x 2120	3860	DC 859 E	Open	2439 x 2400 x 2120	3860
117.33	DN 150	DC 1173	Open	2709 x 2690 x 2300	4500	DC 1173 E	Open	2709 x 2690 x 2300	4500
154.53	DN 150	DC 1545	Open	2568 x 2820 x 2560	5445	DC 1545 E	Open	2568 x 2820 x 2560	5445

*) Equivalent to ISO 7153, Option A1: Reference point 1 bar(abs), 20 °C, inlet pressure 7 bar(a), inlet temperature +35 °C, ambient temperature 20 °C

Note: Electrical supply: 95 - 240 V / 1 Ph / 50-60 Hz

Correction factors: DC(E) Nominal flow rate

DC 1.5 - 7.5

Inlet temperature	Working pressure					
	5bar	6bar	7bar	8bar	9bar	10bar
25 - 39 °C	0.56	0.77	1.00	1.13	1.25	1.38
40 °C	0.55	0.75	0.98	1.10	1.23	1.35
45 °C	0.53	0.72	0.94	1.06	1.18	1.29
50 °C	0.50	0.67	0.88	0.99	1.10	1.21

DC 12 - 1545

Inlet temperature	Working pressure					
	5bar	7bar	9bar	11bar	13bar	15bar
35 °C	0.75	1.00	1.12	1.22	1.32	1.41
37 °C	0.74	0.99	1.11	1.21	1.31	1.40
39 °C	0.74	0.98	1.10	1.20	1.30	1.39
41 °C	0.73	0.97	1.08	1.19	1.28	1.37
43 °C	0.71	0.95	1.06	1.16	1.26	1.34
45 °C	0.71	0.94	1.05	1.15	1.24	1.33
47 °C	0.69	0.92	1.03	1.13	1.22	1.30
49 °C	0.68	0.90	1.01	1.10	1.19	1.27

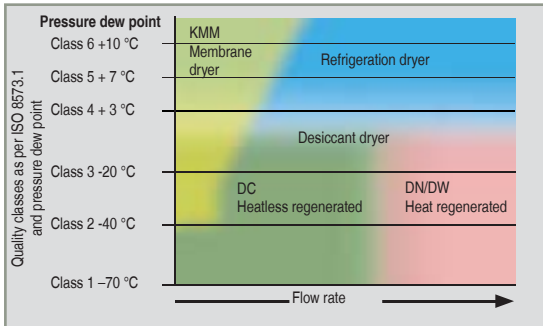
Example:

Specified:
Flow_{rate} = 5 m³/min
Inlet_{temp} = 47 °C
p = 7 bar(a)

Intention: Corrected flow rate
Result:
Factor = 0.92
Flow_{corr.} = 0.92 x 5 m³/min
= 4.60 m³/min

Easy to transport, easy to connect

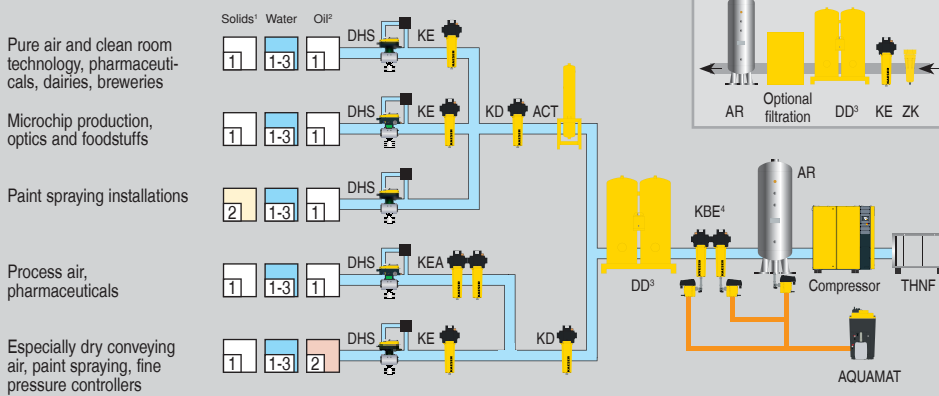
With a maximum height of only 2000 mm the desiccant dryer compact models can be transported on a standard euro-palette. The horizontally and vertically offset inlet and outlet ports provide the user with a convenient choice of connecting pipeline layouts. The air outlet from compact models can be controlled by a changeover valve that eliminates the need for a return air line for the intermittent operation mode.



Fields of use for desiccant dryers

Pressure dew points of up to -70 °C are required for compressed air supplies in numerous industries such as the electronics, pharmaceutical and food industries. They are also necessary for production of process air and for air applications susceptible to frost. DC desiccant dryers from KAESER KOMPRESSOREN combine outstanding reliability, efficiency and ease of maintenance to ensure the necessary low-pressure dew point performance required to meet even the most demanding compressed air needs.

Compressed air treatment with desiccant dryer



¹⁾ Achievable particle class with expert-implemented pipework and commissioning.
²⁾ Achievable total oil content with use of recommended compressor oils and unloaded intake air.
³⁾ High temperature filters and possibly an aftercooler are required downstream from heat-regenerated desiccant dryers.
⁴⁾ The use of an 'Extra Combination' (a filter combination comprising a KB and downstream KE filter) is recommended for critical applications requiring exceptionally high compressed air purity (e.g. in the electronics and optics sectors).

Explanation	
ACT	Activated carbon adsorber
AQUAMAT	AQUAMAT
AT	Desiccant dryer
DHS	Air-main charging system
DLB	Air receiver
ECD	ECO DRAIN
KA	Activated carbon filter, adsorption
KB	Coalescence filter, Basic
KBE	Extra combination
KD	Dust filter
KE	Coalescence filter, Extra
KEA	Carbon combination
T	Refrigeration dryer
THNF	Bag filter
ZK	Centrifugal separator

Compressed air quality classes to ISO 8573-1(2010):

Solid particles / dust

Class	Max. particle count per m ³ of a particle size with d [µm]*		
	0.1 ≤ d ≤ 0.5	0.5 ≤ d ≤ 1.0	1.0 ≤ d ≤ 5.0
0	e.g. Consult KAESER regarding pure air and cleanroom technology		
1	≤ 20,000	≤ 400	≤ 10
2	≤ 400,000	≤ 6,000	≤ 100
3	not defined	≤ 90,000	≤ 1,000
4	not defined	not defined	≤ 10,000
5	not defined	not defined	≤ 100,000
Class	Particle concentration C _p [mg/m ³]*		
6	0 < C _p ≤ 5		
7	5 < C _p ≤ 10		
X	C _p > 10		

Water

Class	Pressure dew point [°C]
0	e.g. Consult KAESER regarding pure air and cleanroom technology
1	≤ -70 °C
2	≤ -40 °C
3	≤ -20 °C
4	≤ +3 °C
5	≤ +7 °C
6	≤ +10 °C
Class	Concentration of liquid water C _w [g/m ³]*
7	C _w ≤ 0.5
8	0.5 < C _w ≤ 5
9	5 < C _w ≤ 10
X	C _w ≤ 10

Oil

Class	Total oil concentration (fluid, aerosol + gaseous) [mg/m ³]*
0	e.g. Consult KAESER regarding pure air and cleanroom technology
1	≤ 0.01
2	≤ 0.1
3	≤ 1.0
4	≤ 5.0
X	> 5.0

*) At reference conditions 20 °C, 1 bar(a), 0% humidity