11. Activated Carbon Adsorbers

11.1 Function

11.2 Technical Specifications

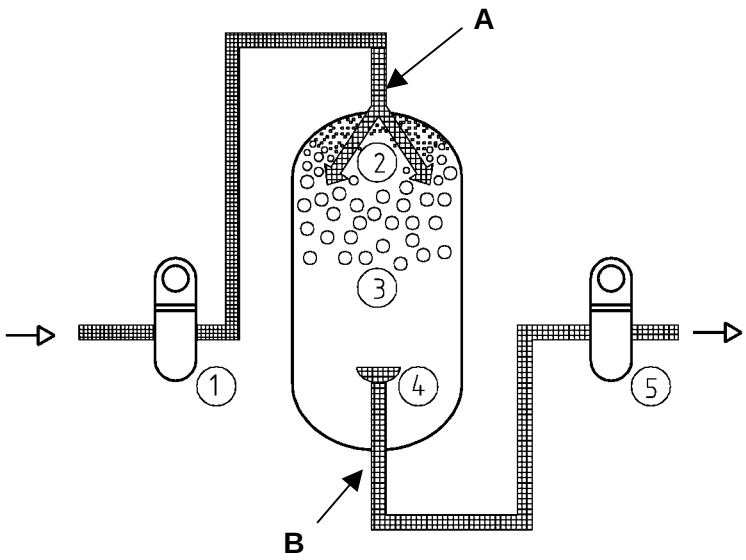
11.3 Dimensions

11.1 Function

The atmospheric air ingested by a compressor is generally known is a gas mixture containing nitrogen, oxygen, water vapour and foreign particle matter. Hydrocarbons in the exhausts of combustion plants and motor vehicles, as well as those produced in the compressor itself from its lubricating oils, find their way into the compressed air in unacceptably high concentrations, noticeable in smell and taste. These can exceed levels of 10 mg/m³. Every compressor, regardless of type, contributes aerosols from its cooling and lubricating oils to the compressed air produced. This applies to so-called „oil-free“ compressors as well as those using oil for lubricating and cooling. In fact, oil-injected screw compressors, thanks to their low operating temperatures and highly efficient oil separation and recovery systems, contribute very little oil carryover, in the region of 1 - 3 mg/m3.
There are many applications however, where even these levels of oil carryover are unacceptable. Such examples are in the food, chemical and pharmaceuticals industries, in hospitals and surface treatment plants (panting), where compressed must meet the standards of ISO 8573/1, class 1, which means an oil carryover less than 0.01 mg/m³.

When the application demands the removal from the air of not only oil vapours but all hydrocarbon aerosols, then conventional particle filters are inadequate. Such filters can remove the easily condensed oils used in compressor cooling but not the hydrocarbons already in the ambient air ingested by the compressor. In such cases, an activated carbon adsorber must be used.

11.1 Function



1 Microfilter FE (not included in the standard scope of supply)
2 Inlet diffuser
3 Adsorber bed
4 Outlet collector
5 Particulate filter FD (not included in the standard scope of supply)

A Necessary quality of in-flowing air:
Oil carryover < 0.01 mg/m³
Particles > 0.01 µm

B Quality of discharge air:
Oil carryover < 0.003 mg/m³

Adsorption
The previously dried compressed air passes through a microfilter (1) (to be installed by the user) which removes any remaining oil droplets and then into the adsorption chamber via the inlet diffuser (2). The diffuser ensures even distribution over the adsorber bed (3) which is of highly efficient, activated carbon granules. Maximum adsorption is achieved through long contact of the air with the bed, the correct air flow rate, choice of adsorbent and bed depth.
Air flow is downwards through the bed which improved the bed's absorbency and durability.
After passing through the mass transfer zone and reserve portion, the air leaves the chamber via the collector (4), passing finally through a particulate filter (5) (to be installed by the user) which retains any carbon dust resulting from attrition of the bed.

Assured air quality
A needle valve and integrated hydro carbon test indicator allows simple and reliable check of oil carryover to give assurance that the consumer is receiving the quality of compressed air needed.

Low energy consumption
Energy saving is a fundamental concept in the design of the Kaeser activated carbon adsorber. Large diameter pipe connections and the generously dimensioned chamber itself reduce flow rates, increase efficiency of adsorption and ensure minimum pressure loss over the unit (0.15 bar when new).

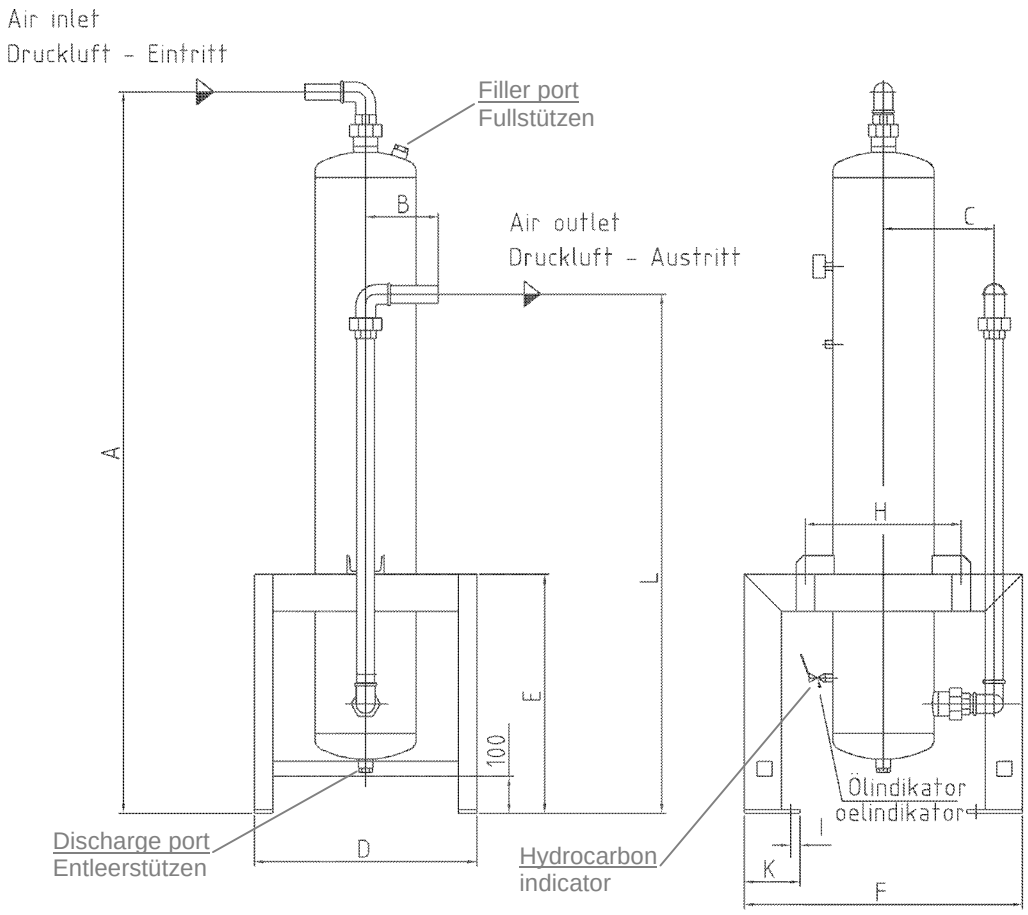
Minimum maintenance
A highly visible manometer shows the pressure in the adsorption chamber. The adsorbent charge volume is sufficient to give an operating life of 10,000 hours or more, and when changing is necessary the convenient ports provided and the accessibility of all parts makes emptying and filling easy.

Design Factors
The adsorber, together with its associated filters, must be designed for the maximum air flow rate, inlet temperature and pressure. A correctly designed unit should have a service life between adsorber changes of over 10,000 hours, but this can be reduced drastically if the inlet temperature correction factor is not used in design.

Decisive advantages
- Energy saving due to minimum pressure drop, thanks to large diameter in and outlet connections
- Long service life due to ideal air flow rate and efficient adsorbent
- Reliable monitoring by the integrated oil carryover indicator
- Easy adsorbent changing thanks to provided ports and accessibility of all components

11.3 Dimensions

ACT 11 – ACT 169

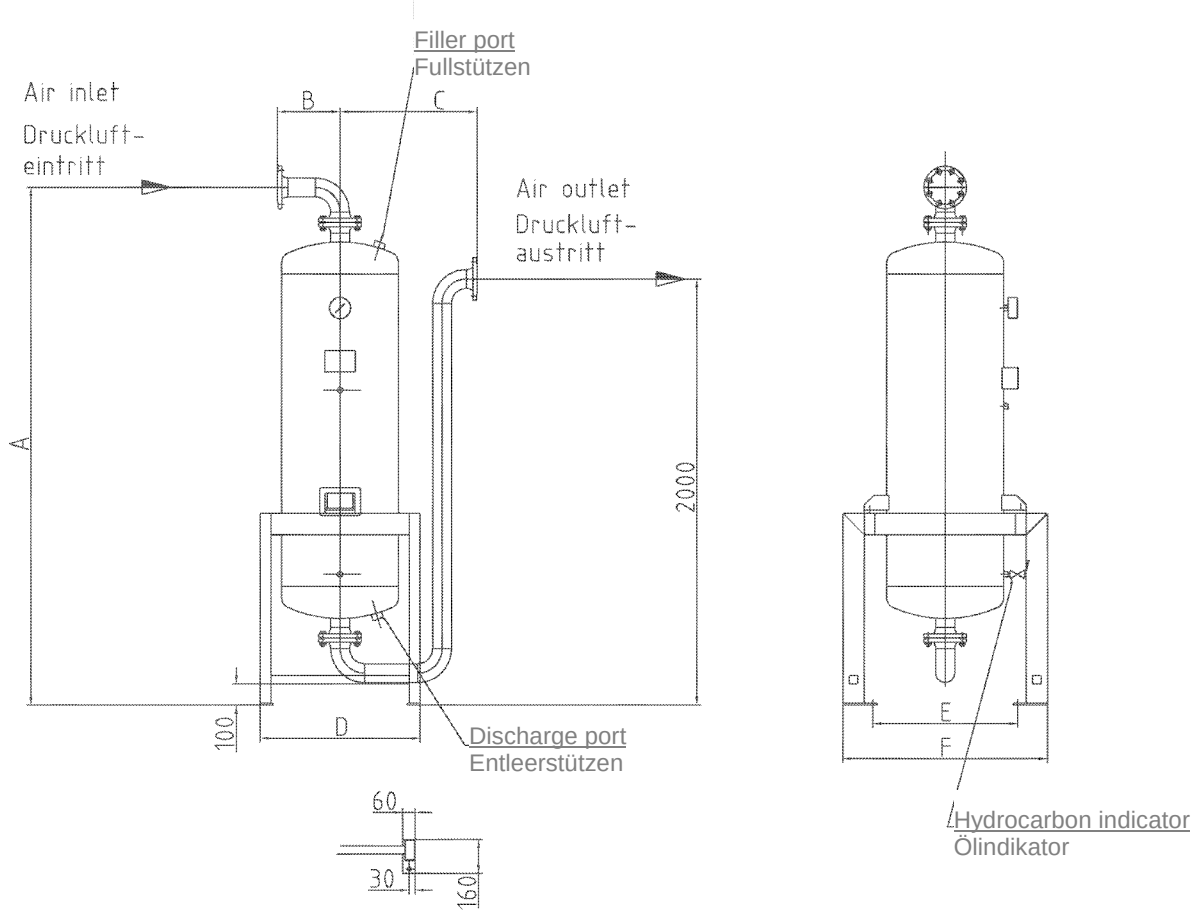


Filter **not** included in scope of delivery !!

	ACT 11	ACT 17	ACT 26	ACT 33	ACT 47	ACT 74	ACT 106	ACT 129	ACT 158	ACT 169
A	1865	1865	1870	1880	1880	1920	1925	1960	2000	2000
B	95	97	97	127	127	126	156	186	206	206
C	210	210	210	225	225	250	360	310	370	370
D	400	400	400	400	400	400	650	600	600	600
E	600	600	600	620	620	620	650	645	645	645
F	600	600	600	620	620	620	750	800	800	800
I	20	20	20	20	20	20	25	25	25	25
K	120	120	120	120	120	120	150	150	150	150
L	1400	1400	1400	1400	1400	1400	1400	1400	1700	1700
M*	R ½	R ¾	R ¾	R 1	R 1	R 1½	R 1½	R 2	R 2½	R 2½

M* = compressed air connections, in and out

ACT 215 – ACT 1545



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	ACT 215	ACT 266	ACT 323	ACT 386	ACT 444	ACT 601	ACT 859	ACT 1173	ACT 1545
A	2110	2400	2280	2280	2630	2720	2545	2807	3120
B	214	194	294	302	327	292	392	445	489
C	574	574	644	637	647	752	767	975	1089
D	650	650	750	750	750	900	960	1180	1380
E	520	520	680	730	730	830	900	1260	1230
F	800	800	960	1010	1010	1110	1250	1540	1580
M*	DN 80	DN 80	DN 80	DN 80	DN 80	DN 100	DN 100	DN 150	DN 150

M* = compressed air connections, in and out