

Bruker BioSpin

AD-XT •

Air Drier
Technical Information Manual

Version 001

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This unit is not designed for any type of use which is not specifically described in this manual. Such use may be hazardous.

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General description

1

This document is the technical information for the AD-XT air drier.

General description

Overview

2

It is essential that the supply air for the BCU-Xtreme (BRUKER part number **W1212749**) is very dry to ensure its correct operation.

The air drier AD-XT was especially designed to be used with the BCU-Xtreme. It is designed to produce air with a very low dew point temperature.

Two versions of the drier AD-XT exist :

- Part number **W1213728**

AD-XT line voltage 230V / 50 Hz - 0,2 A delivered with a power cord L = 2 m (P/N:30240) and Europe plug 230V.

- Part number **W1213729**

AD-XT line voltage 115V / 60 Hz - 0,4 A delivered with a power cord L = 2 m (P/N 35929) and US plug 115V.

Technical specifications

3

Dew point

3.1

The pressure dew point is the temperature of a surface on which moisture condenses.

The adsorption dryer **AD-XT** adsorbs the moisture of the compressed air up to a pressure dew point of -70°C . Its dew point is much lower than standard commercial air dryers.

Compressed air supply

3.2

Supply air quality

3.2.1

The compressed air for the drier is provided by an autonomous air compressor delivering clean, dehumidified air (by an after cooler for example) without presence of oil or of dust.

Inlet pressure

3.2.2

Pressure range : 6 to 10 bar

Air inlet and outlet ports

3.2.3

8 mm quick couplings (Legris type)

Ambient conditions

3.3

- Maximum inlet air temperature : $+35^{\circ}\text{C}$ ($+95^{\circ}\text{F}$)
- Ambient temperature : $+1^{\circ}\text{C}$ to 35°C ($+95^{\circ}\text{F}$) max.

Air flow

3.4

The air flow should not exceed 50 l/min which is the maximum gas flow of the BCU-Xtreme.

Exceeding the highest flow rate may permanently damage the desiccant material of the drier.

Dew point meter

3.5

An electronic dew point meter with a display is located on the drier body. Its range is from -100 °C (-148°F) to 20 °C (+68°F).

Silencer

3.6

The exhaust is equipped with a silencer (it reduces the noise level by 40 dB). It is mounted in vertical position with a union elbow.

Inlet and outlet filters

3.7

Inlet air filter

3.7.1

BRUKER Part number : **W1213724**

The inlet air filter removes the residual dust and the oil droplets. It extends the lifespan of the drier desiccant material. The inlet filter holder is equipped with an automatic drain which evacuates the condensates.

Figure 3.1. Inlet filter P/N:W1213724



Outlet air filter

3.7.2

BRUKER Part number : **W1213725**

The outlet filter stops desiccant particles that may escape from the drier columns.

Mechanical dimensions

3.8

- Height : 580 mm
- Width : 400 mm
- Depth : 220 mm
- Weight : 13 kg approx.
- Color : Grey color RAL9002.

Dew point meter display

4

The digital dew point meter displays the dew point in degree °C or °F (for 110 Volt version). The range is from -100 °C (-148°F) and +20 °C (+68°F).

It measures the dew point under pressure (i.e. the inlet pressure of the drier).

Dew point meter messages

4.1

The dew point meter display shows the following messages in case of problem

Table 4.1. Dew point meter error messages

Display	Description
+20	Dew point is above high limit
999	Sensor failure
No display	Sensor failure or missing line voltage
-999	Sensor failure
Blinking display	Dew point alarm indication (if it is higher than -65°C/ -85°F)
SEr	When this message blinks a drier maintenance is required

Drier installation

5

A new drier is delivered assembled and is ready to be used. It must be firmly fixed on the ground or attached on a wall with its attachments and suitable screws.

The drier must be installed in a room whose temperature is always above +1°C (56°F) to avoid the internal icing. It must not be exposed to humidity coming from rain or other atmospheric influences.

Fixing on the ground

5.1

Fix the attachments with suitable screws on the ground.

Fixing on the wall

5.2

The attachments on both sides must be turned to permit the wall fixing. Follow the procedure below.

1. Remove the silencer with its elbow.
2. Detach the left and right attachments.
3. Turn on 90 degrees the attachments towards the wall and lock them.
4. Reinstall the silencer.
5. Fix the drier unit with suitable screws on wall.

The equipment must be accessible for its periodic maintenance (filter replacement, desiccant replacement, etc.). A one meter clearance above and all around the drier is required to facilitate the maintenance.

Dew point and pressure Information

6

The dew point at the drier's outlet depends also on the input air pressure, the higher the input pressure the lower the dew point.

The dew point meter measures the pressure dew point (at the inlet pressure).

The BCU-Xtreme uses air at a lower pressure than the pressure of the compressed air network, typically up to 3 barg according to the type of NMR probe.

For this reason the actual dew point is lower than indicated by the dew point meter.

The table **"Dew point of compressed air versus pressure at 25 °C"** gives the actual dew point temperature versus inlet pressure

The coldest internal parts of the BCU-Xtreme exchanger are typically at -83 °C +/-2 °C. The shaded cells of the table 6.1 are the cases where there is no frost or ice formation in the exchanger because the real dew point is below -83 °C.

Table 6.1. Dew point of compressed air versus pressure at 25 °C

Drier inlet pressure (barg ^a)	Dew point indicated by hygrometer (°C)	Real dew point at 0 barg ^a (°C)	Real dew point at 1 barg ^a (°C)	Real dew point at 2 barg ^a (°C)	Real dew point at 3 barg ^a (°C)
6	-70	-82,3	-77,7	-75,1	-73,3
	-75	-85,8	-82,3	-79,9	-78,1
	-80	-90,3	-87,0	-84,6	-83,0
8	-70	-83,7	-79,5	-76,9	-75,1
	-75	-88,1	-84,0	-81,6	-79,9
	-80	-92,5	-88,6	-86,3	-84,6
10	-70	-84,9	-80,8	-78,3	-76,5
	-75	-89,2	-85,3	-82,9	-81,2
	-80	-93,5	-89,8	-87,5	-85,9

a. 1 barg is about 2 bar absolute (atmospheric pressure + 1 bar).

Dew point and pressure Information

If the real dew point temperature is a slightly above $-83\text{ }^{\circ}\text{C}$, the BCU-Xtreme will function all the same a long time, because the air contains only a negligible quantity of moisture.

The AD-XT drier was largely dimensioned and one generally reaches a dew point lower than $-80\text{ }^{\circ}\text{C}$. It guarantees the correct operation of BCU-Xtreme under various operating conditions.

Hoses connections

6.1

Two fast union elbows for plastic hoses are screwed on the inlet and outlet filters holders

(Diameter 8 mm - threading 1/4" (LEGRIS code 3118 08 13) directed downwards. The inlet is located at the left side of the drier (see "**Drier front view**" on page **22**).

It is recommended to use polyethylene hoses High Density (HD) - external diameter 8 mm - to connect the drier outlet to the variable temperature unit BVT3000/BVT3200 and to the BCU-Xtreme.

This plastic material is impermeable to moisture and avoids the dew point degradation. One prevents thus a dysfunction or even a possible blockage of the BCU-Xtreme.

Electrical connections

6.2



Attention: Ensure that the line voltage is the same as the voltage marked on the drier unit.

Connect the power cord to a socket-outlet.

The ON/OFF switch of the hygrometer MULTITRONIC must be in

POSITION I (position FIX on label)

POSITION "0" the drier is OFF and the power supply is switched OFF

In **POSITION II**, the drier functions in variable mode (not to be used, this position is planned for other uses).

Noise

6.3

The drier periodically emits a brief noise when the expansion valve opens after a column switching. A damped explosion noise is emitted, attenuated by the silencer.

First startup

7

A very low dew point is obtained only after a several operating hours.

We recommend to operate a fresh drier unit for a certain time with air consumption to obtain a dew point of at least -70 °C (-94 °F) before connecting it on a BCU-Xtreme.

The air flow rate should not exceed 50 liter/min to avoid the damaging of the desiccant material.

The drier is delivered with a 8 mm plastic hose with a flow limiter factory preset to 50 liter/min. This hose is connected between the inlet and the outlet ports (see figure "**Drier with flow limiter**" on page 20). It is intended to be used only for the first startup.

First startup with the flow limiter

7.1

Connect the hose with the limiter to the outlet of the drier. The correct flow direction is indicated by an arrow on the flow limiter.

Supply the drier with compressed air. The air escapes freely into the atmosphere.

Switch on the drier unit.

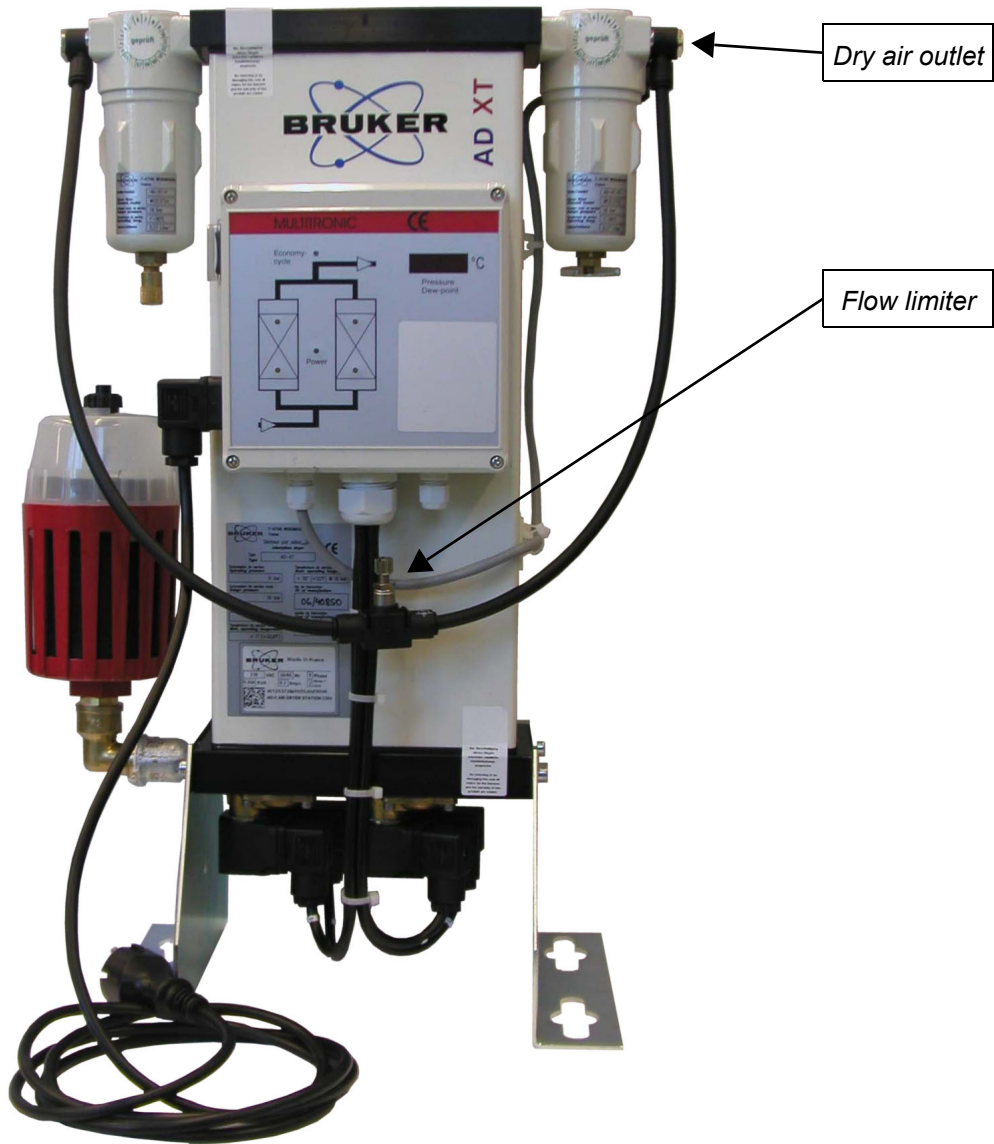
During the first startup phase, the dew point will decrease slowly and reach -70 °C after several hours.

The flow limiter is only necessary for the first startup phase; it limits simply the flow rate through the unit.

It must be removed when the drier is connected on the final equipment.

First startup

Figure 7.1. Drier with flow limiter



Periodic maintenance

8



Attention : The maintenance work must be made by qualified and authorized personnel.

The drier must not be under pressure and the line voltage must be removed before any intervention.

The drier unit needs some maintenance to keep its performances.

Every month

8.1

Check the correct operation of the drainer of the inlet filter. The drainer eliminates the condensates automatically as soon as the liquid level threshold is reached. One can check the correct operation of the drainer while turning the knurled screw located at the bottom of the filter holder (to be turned left). If it functions correctly, a little amount of condensates and air leave. If it does not function correctly, it can be either be blocked or possibly have also a permanent leak.

Every year

8.2

Both inlet and outlet filters should be replaced by new filters. The filter holder must be unscrewed to access the filter. Install a new filter and close the filter holder. A maintenance kit with Part Number 50467 is available.

Every 24 months

8.3

Replacement of valves and solenoid valves (contact BRUKER service). This kit has the Part Number 50468.

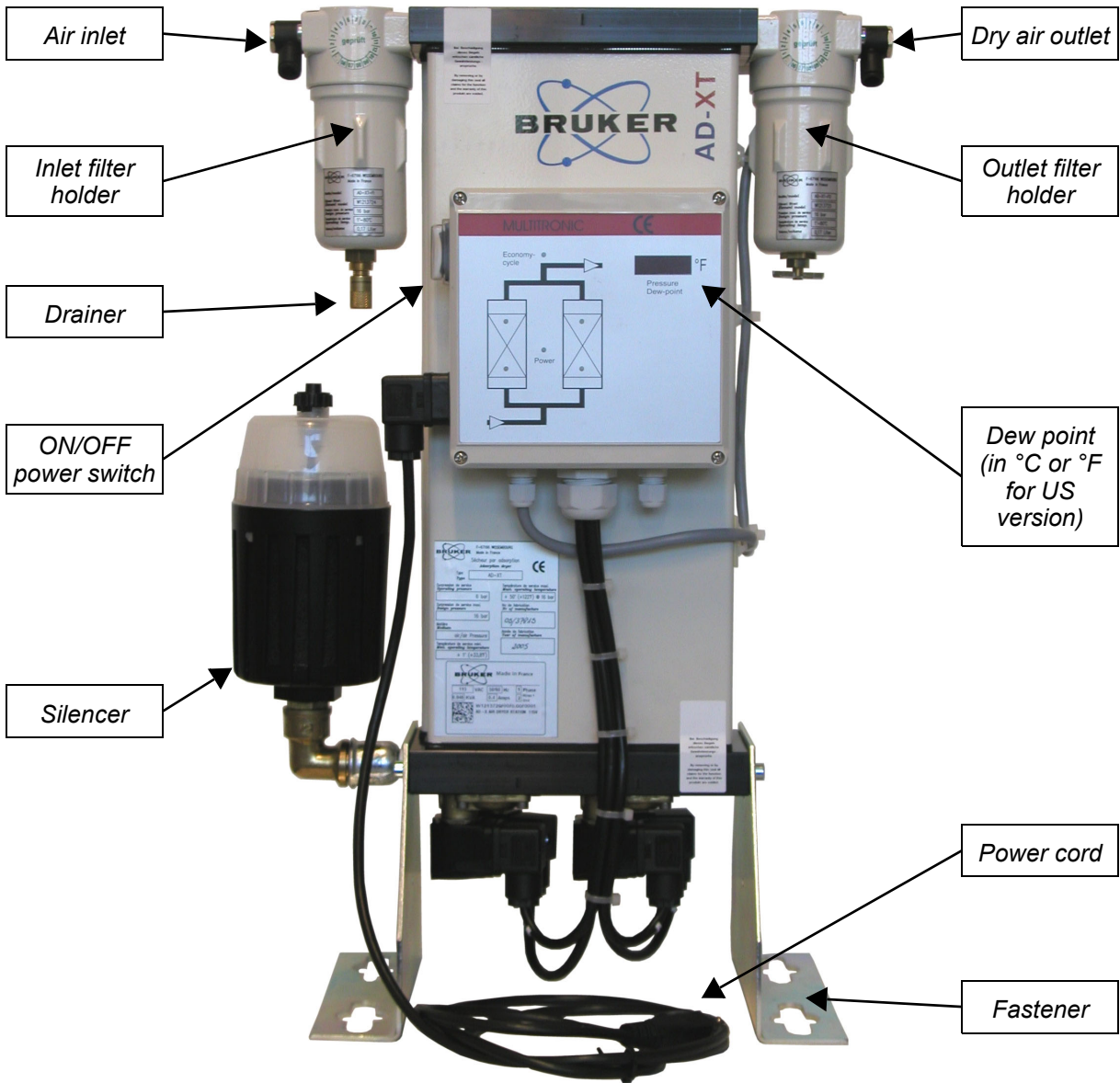
Every 48 months

8.4

Replacement of desiccant material (contact BRUKER service).

Periodic maintenance

Figure 8.1. Drier front view



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