ALHP Series

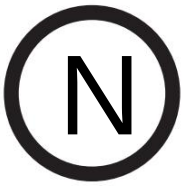
Enormous savings on operating costs!

Professional compressed air absorption dryer 16 bar -40 C° for laser equipment

Cutting with ultra-pure compressed air 16 Bar as an alternative to nit

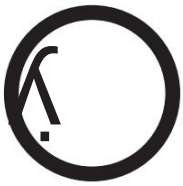
Laser cutting

With auxiliary gases:



Nitrogen

Oxygen



Compressed air

Usual gas	Nitrogen	Oxygen	Compressed air
function	**1.** Blows the molten metal way **2.** Accelerates cooling **3.** Seals air and prevents oxidation in the cut	**1.** Blows away the molten metal **2.** Generates a much hotter laser beam **3.** Gives off the heat if oxidized reaction with the metal, this in combination with laser energy provides sufficient heat for the cutting process	**1.** Blows away the molten metal **2.** Brings more heat into the laser beam **3.** Releases the heat by oxidation reaction with the metal **4.** Protects the surface of the workpiece **5.** Sometimes the use of air protects also the light beam
Benefit	The processed surface is smooth and clean	Low pressure and low process costs	The performance is between oxygen and nitrogen, high cutting speed, smooth processing surface, low cost and high efficiency
Disadvantage	High pressure, high gas costs	The work surface is black	Only perfect result provided our ALHP dryer

Effect of compressed air quality on laser equipment

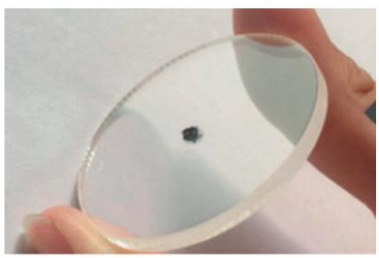
Possible causes of contaminated compressed air

» Air pollution
» Compressor lubricating oil

» Water vapor
» Condensation water

» Wear and rust of compressors
» Corrosion of piping system

» Atmospheric dust
» Rust
» Pipeline impurities

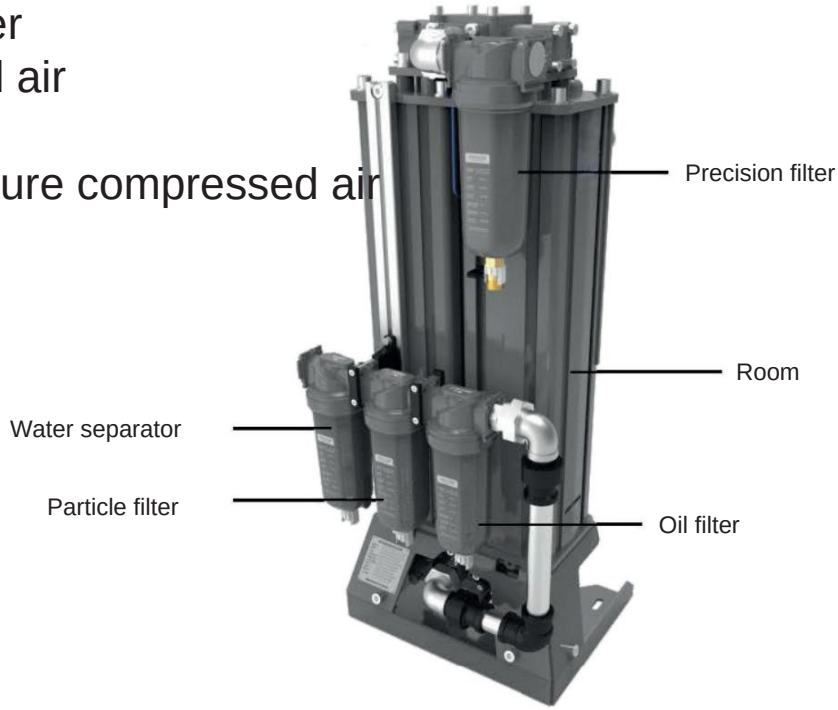


» Solvents
» Oil vapor

Possible consequences of contaminated compressed air

» Workpiece cannot be cut or slag hanging on the workpiece » Damaged optical lens, resulting in high replacement costs » Severe cases lead to beam pollution and shorten the life of laser equipment.

Absorption dryer, with an integrated and total filter system for compressed air with 16 bar working pressure, result: very pure compressed air



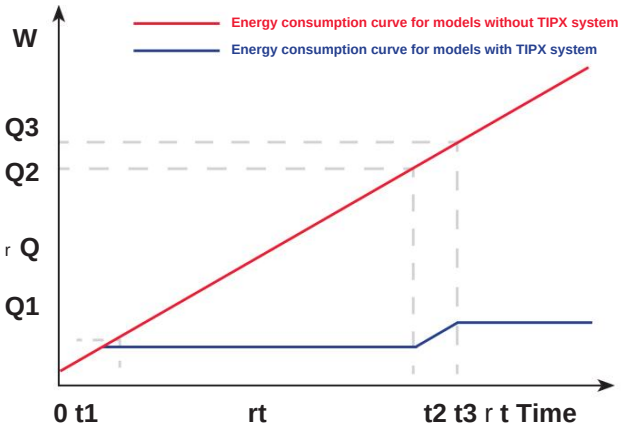
Filters are highly integrated and compact

» The filter system has a professional connection design to prevent leakage
» Easy to connect and easy to maintain

Interaction with compressor

The absorption dryer works synchronously with the compressor, when using the cold contact in port (V) the dryer will activate its memory function as soon as the compressed air supply stops. However, the dryer resumes its function at the same level as soon as the compressed air is activated again. This results in optimal operation and saves a lot on operating costs, both for the regeneration of the molecular absorption beads and for electricity, but also reduces service interventions.

TIPX control system



Q: *energy consumption unit*

The TIPX control system monitors the dew point in real time, and controls the operation of the dryer, significantly extending the absorption time and saving on the regeneration compressed air required to dry the molecular granules. As such, the patented TIPX control system saves up to 80% on the energy required compared to a conventional absorption dryer.
The combination with a 16 bar javac scroll compressor or a PM 16 bar screw compressor guarantees an energy-efficient but also more environmentally friendly compressed air installation

Theoretical parameters for laser
based on a 1200 watt reactor

material	Parameter laser cutting machine						
	thickness (mm)	auxiliary gas	focal length	speed (m/min)	nozzle diameter (mm)	cutting pressure (bar)	perforation pressure (bar
steel	1	compressed air	0	10	2	5	0.7
steel	1.5	compressed air	-1	6.5	2	8	0.5
steel	2	compressed air	-1	6	2	8.5	0.5
steel	3	compressed air	-2	4	2.5	12	0.8
steel	4	compressed air	-2.5	2	3	15	1
stainless steel	1	compressed air	-0.5	30	2	10	0.8
stainless steel	2	compressed air	-1.5	8	2	10	0.7
stainless steel	3	compressed air	-2	4	2	10	0.7
stainless steel	4	compressed air	-3	2	3	12	0.7
stainless steel	5	compressed air	-4	1.3	3	13.5	0.7
aluminium	1	compressed air	-0.5	10	1.5	8	0.7
aluminium	2	compressed air	-1	8	2	10	0.7
aluminium	3	compressed air	-1	4	2	12	0.8
aluminium	4	compressed air	-2	0.4	2	12	1

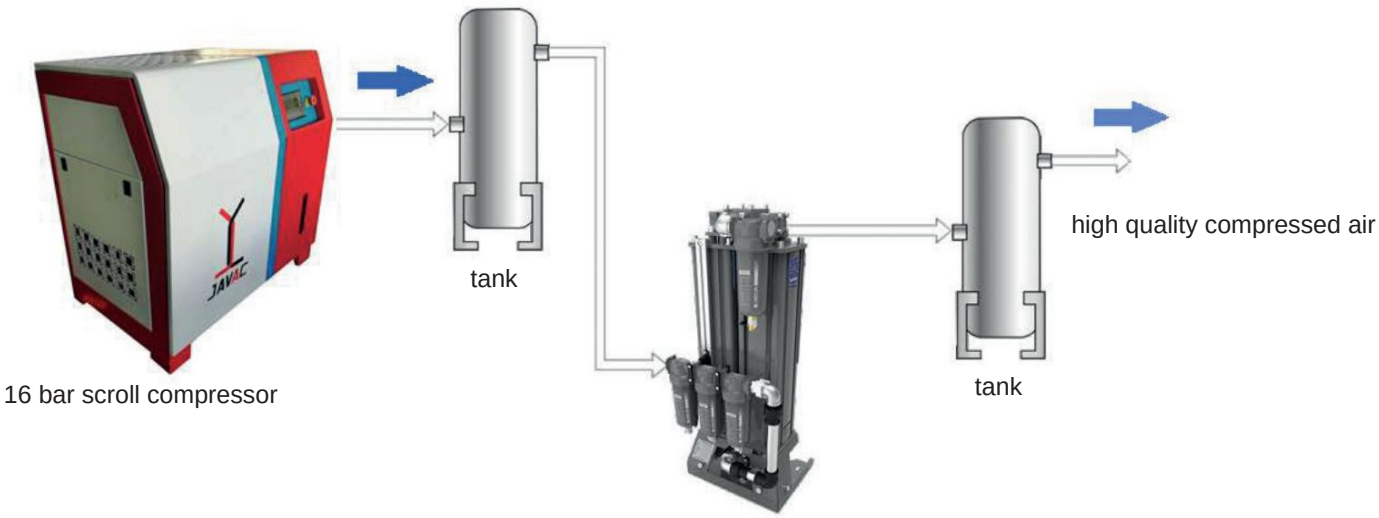
Note: The above data is based on using a 3 KW laser cutting machine

Selection table

On the right you see the selection table in function of the absorption dryer used, taking into account the regeneration process of the dryer, which amounts to a consumption of 20%, and this only during compressed air delivery thanks to the patented TIPX controller.

nozzle	net flow compressor output		suggested dryer	working pressure
ÿ2.6	1000 l/m	1,340 liters/minute	ALHP0115/HP	16 bars
ÿ3.2	1500 l/m	1,880 lit/minute	ALHP0115/HP	
ÿ3.4	1700 l/m	2,130 lit/minute	ALHP0165/HP	
ÿ3.7	2000 l/m	2,670 lit/minute	ALHP0165/HP	
ÿ3.9	2200 l/m	2,750 lit/minute	ALHP0165/HP	
ÿ4.3	2700 l/m	3,380 lit/minute	ALHP0200/HP	
ÿ4.5	2900 l/m	3,850 lit/minute	ALHP0230/HP	
ÿ4.7	3100 l/m	3,850 lit/minute	ALHP0230/HP	
ÿ5.0	3600 l/m	4,800 lit/minute	ALHP0330/HP	
ÿ5.1	3700 l/m	4,800 lit/minute	ALHP0330/HP	
ÿ5.5	4300 l/m	5,380 lit/minute	ALHP0330/HP	
ÿ5.6	4500 l/m	5,630 lit/minute	ALHP0330/HP	
ÿ6.1	5400 l/m	7,200 lit/minute	ALHP0400/HP	
ÿ6.4	5800 l/m	7,650 lit/minute	ALHP0510/HP	
ÿ6.6	6100 l/m	7,650 lit/minute	ALHP0510/HP	
ÿ7.0	7000 l/m	ÿ8,750 lit/minute	ALHP0510/HP	
ÿ7.3	7500 l/m	ÿ9,480 lit/minute	ALHP0680/HP	
ÿ8.1	9300 l/m	ÿ11,600 lit/minute	ALHP0680/HP	

Typical setup of a compressed air installation for laser cutting with compressed air



	Comparison between adsorption air dryer and conventional air dryer						
	power dew point	lens clear	frequency	change lens	cutting speed	cutting thickness	life of laser cutting machine
condenser dryer	300 watts	above 5°C	2 hours 1 month	half month 3 months	—	—	—
adsorption air dryer	50 watts	below -40°C	6 months	6 months 1 year	+ 20%	+ 20%	+ 30%

The above data comparison shows that the compressed air obtained by means of a -40°C ALHP absorption dryer generates an extremely pure compressed air. This increases the overall performance of the laser.

Cost reduction

It is believed that the investment in a nitrogen tank, or renting one, together with the significantly more expensive cost price of the nitrogen itself, prove to be an important cost factor in the cutting process. This is in contrast to a one-off investment of compressor and absorption dryer with a depreciation period depending on the degree of operation of 5 to 15 years. Furthermore, the limited maintenance costs of a javac installation.

The result can be as much as 90% savings in operation without making a remarkable compromise in the quality of the cut.

Even more, the use of compressed air will increase the cutting speed by 20% in stainless steel compared to nitrogen. The use of nitrogen will only be used for limited cutting jobs, where nitrogen is indicated.

Nitrogen vs Desiccant Dryer Treated Compressed Air

Steel

stainless steel

ALU

The moisture content of compressed air at dew point -40°C is 0.0950g/m³@16 bar

As you can see, the difference in quality of the cut is very fractional.

On the left you see the result with nitrogen and on the right you see the result with the compressed air treated by our absorption dryer.

For steel the difference is nil, for stainless steel there is a slight discoloration that can be stained if necessary, and for ALU there is no difference at all. What does make a difference is the speed of the cutting process. This is increased by a factor of 20% due to the presence of oxygen in the cutting gas

Standardization ISO8573-1:2010 of the purity level of compressed air

Polluting	solid particles			Water PDP°C	Oil (oil mist, oil drop and steam) mg/m³
ISO8573-1:2010	Maximum particle content/m³				
	0.1-0.5ÿm	0.5-1.0ÿm	1.0-5.0ÿm		
0	Recommended by equipment users or suppliers and more stringent than level 1				
1	ÿ20,000	ÿ400	ÿ10	ÿ-70	ÿ0.01
2	ÿ400,000	ÿ6,000	ÿ100	ÿ-40	ÿ0.1
3		ÿ90,000	ÿ1,000	ÿ-20	ÿ1
4			ÿ10,000	ÿ+3	ÿ5
5			ÿ100,000	ÿ+7	
6				ÿ+10	

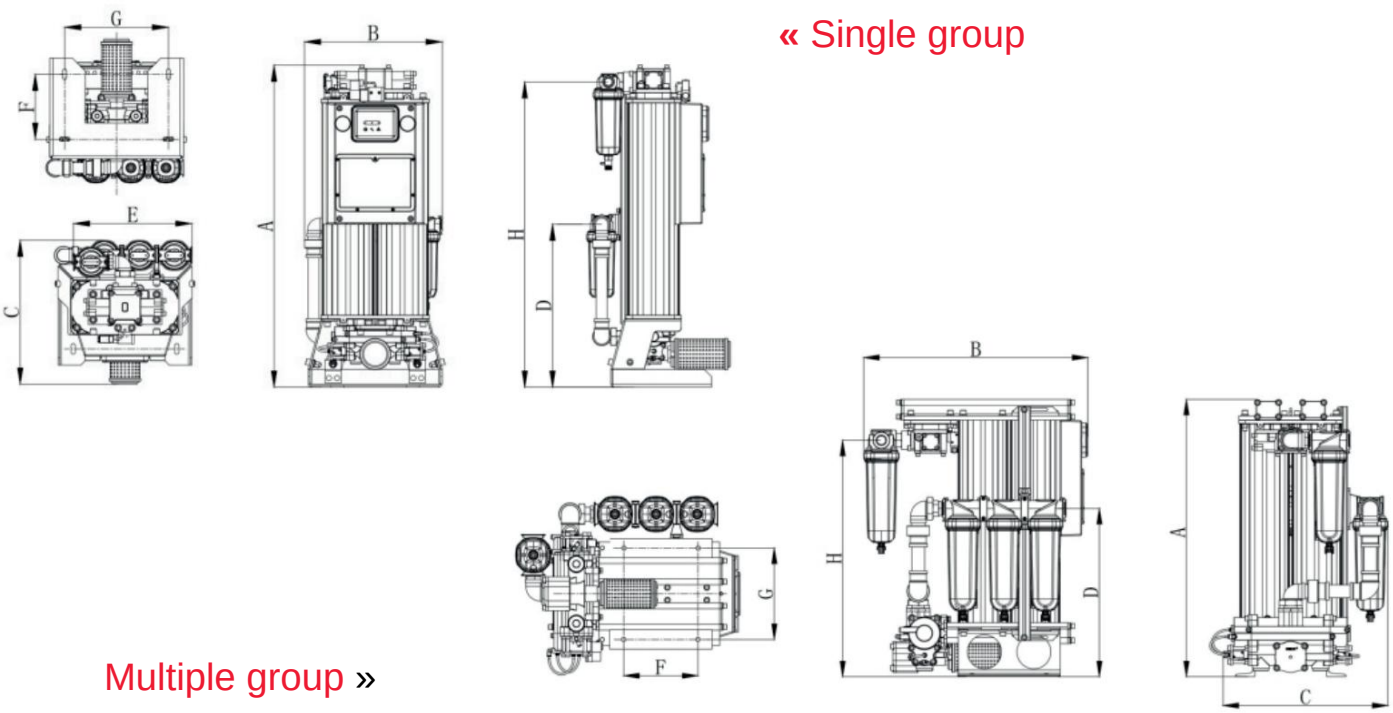
Remarks: The gas volume reference conditions are ambient temperature 20°C, absolute air pressure 100kPa, relative steam pressure 0.

Technical parameters and dimensions

max. Inlet temperature	50°C	Min Inlet Temp	2°C
Ambient temp.	2-45°C	Noise load	80 dBa
max. Workload	16 bars	Min. Workload	2 bars
Power supply	230 volts AC 50 Hz	Assets	50W
Pressure dew point	-40°C	Pressure drop	Drop 0.14bar (excluding filter)

Fashion model	Execution configuration dryer with the 4 filters											
	Processing capacity @ 16bar, 35°C ³m/min		Dimensions (mm)								Connection	Weight (kg)
	-40°C	-70°C	a	B	C	D	E	F	G	H		
ALHP0115/HP	2400 l/m		735	415	450	410	355	200	320	680	G3/4	56.40
ALHP0165/HP	3500 l/m		885	415	450	480	355	200	320	835	G3/4	63.20
ALHP0200/HP	4200 l/m		995	425	450	500	365	200	320	940	G1"	71.00
ALHP0230/HP	4800 l/m		1085 500		475	530	410	200	320 1030		G1"	76.50
ALHP0330/HP	7000 l/m	-	790	725	535	545	/	240	295 1030 G1 1/4"			116.00
ALHP0400/HP	8500 l/m		900	725	535	545	/	240	295	765	G1 1/4"	133.70
ALHP0510/HP 10800 l/m			790	910	535	650	/	400	295	680	G1 1/2"	157.10
ALHP0620/HP 13000 l/m			900	910	535	650	/	400	295	790	G1 1/2"	175.00
ALHP0680/HP 14400 l/m			985	910	535	650	/	400	295	850	G1 1/2"	203.70

« Single group



Multiple group »

Temperature Correction Factor (CFT)

max. Inlet temperature	°C	25	30	35	40	45	50
	CFT	1	1	1	0.97	0.88	0.73

Working pressure correction factor (CAD)

Minimum compressed air press	Bar	4	5	6	7	8	9	10	11	12	13	14	15	16
	CFP	0.30	0.36	0.42	0.47	0.54	0.59	0.65	0.71	0.77	0.83	0.88	0.94	1.00

Inlet Flow Rate: $\frac{\text{compressed air flow rate}}{\text{CFT}\times\text{CAD}}$ (capacity) = the minimum capacity below which the dryer must comply

An example makes this clearer: At a capacity of 2000 l/m with a CFT of 35°C, and CAD 14 bar, the ALHP0115 with a processing capacity of 2400 l/m according to this formula will suffice.
With a capacity of 2500 l/m with a CFT of 50°C, and CAD 16 bar, the ALHP0165 with a processing capacity of 3500 l/m according to this formula will suffice.

Model and configuration

Basic model	Execution configuration dryer with the 4 filters							
	Interactive signal		Dew point display	TIPX	water separator	Particle filter	Oil filter	Precision dust filter
	Direct entry	485 port						
ALHP0115HP	v	T	D	E	S(0015)	O(0015)	A(0015)	RA(0015)
ALHP0165HP	v	T	D	E	S(0020)	O(0020)	A(0020)	RA(0020)
ALHP0200HP	v	T	D	E	S(0028)	O(0028)	A(0028)	RA(0028)
ALHP0230HP	v	T	D	E	S(0028)	O(0028)	A(0028)	RA(0028)
ALHP0330HP	v	T	D	E	S(0036)	O(0036)	A(0036)	RA(0036)
ALHP0400HP	v	T	D	E	S(0048)	O(0048)	A(0048)	RA(0048)
ALHP0510HP	v	T	D	E	S(0075)	O(0075)	A(0075)	RA(0075)
ALHP0620HP	v	T	D	E	S(0075)	O(0075)	A(0075)	RA(0075)
ALHP0680HP	v	T	D	E	S(0075)	O(0075)	A(0075)	RA(0075)
GHSD0080HP	v	T	D	E	S(0015)	O(0015)	A(0015)	RA(0015)
GHSD0115HP	v	T	D	E	S(0020)	O(0020)	A(0020)	RA(0020)

Which absorption dryer to use?

Eg. The absorption dryer ALHP0115 HP has a processing capacity of 2400 litres/minute, at a dew point of -40 °C. There is a negligible pressure drop of 0.14 Bar. On the other hand, due to the interaction of the filters, the regeneration process (drying the sieve) consumes 20% of the compressed air power, which means that this version is good for a compressed air consumption on the laser of up to 1900 litres/minute. The final calculation of the required compressed air and ditto absorption dryer is part of a study per installation. The data in our tables are therefore only a theoretical approximation of the exact requirement.

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