Technical Documentation

LAS 800 / LAS 800 Ex

Version 003

air quality

Contents

Annexes:

- XG30 interface diagram

Series description

Areas of application

Laser cutting| Laser engraving| Laser welding | Laser structuring | Laser marking

Application and use

The LAS 800 offers a high-performance filtration capacity for laser smoke – even in demanding laser applications – with low space requirements, due to its compact design.

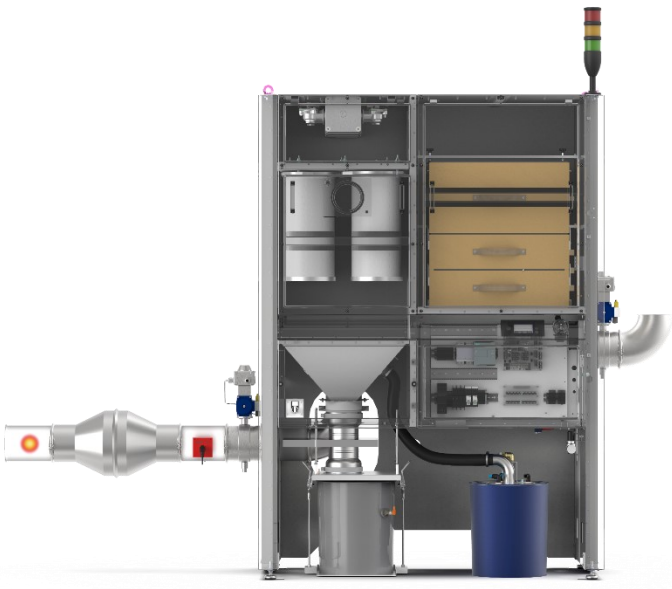
The versatile work processes in which lasers are used generate laser smoke. This toxic, corrosive mixture of aerosol, gas and nanoparticles poses a health hazard and adversely affects the product and process quality. Depending on the process, very different precipitating mixtures of substances can be created, which must be removed from the raw gas.

For these situations, the LAS 800 represents a complete cartridge filter solution. The basic version of the LAS 800 is suitable for collecting and filtering dry and non-flammable dust in non-explosive air mixtures produced during laser processing. A wide range of equipment options are available to meet many different filtration requirements for collecting the pollutants and gases generated.

In the LAS 800 Ex configuration, the extraction and filtration unit has an ignition source-free design and can also be used for the collection and filtration of combustible dusts with the following characteristics:

- Not self-igniting
- Minimum ignition energy >10 mJ
- Smoldering temperature >180 °C
- Ignition temperature >180 °C

The HEPA H14 particulate filter, which can otherwise be optionally used, is part of the LAS 800 Ex basic equipment and triggers an automatic shutdown in case of an increased dust load. Monitoring of the H14 safety filter prevents any carryover of critical dusts.



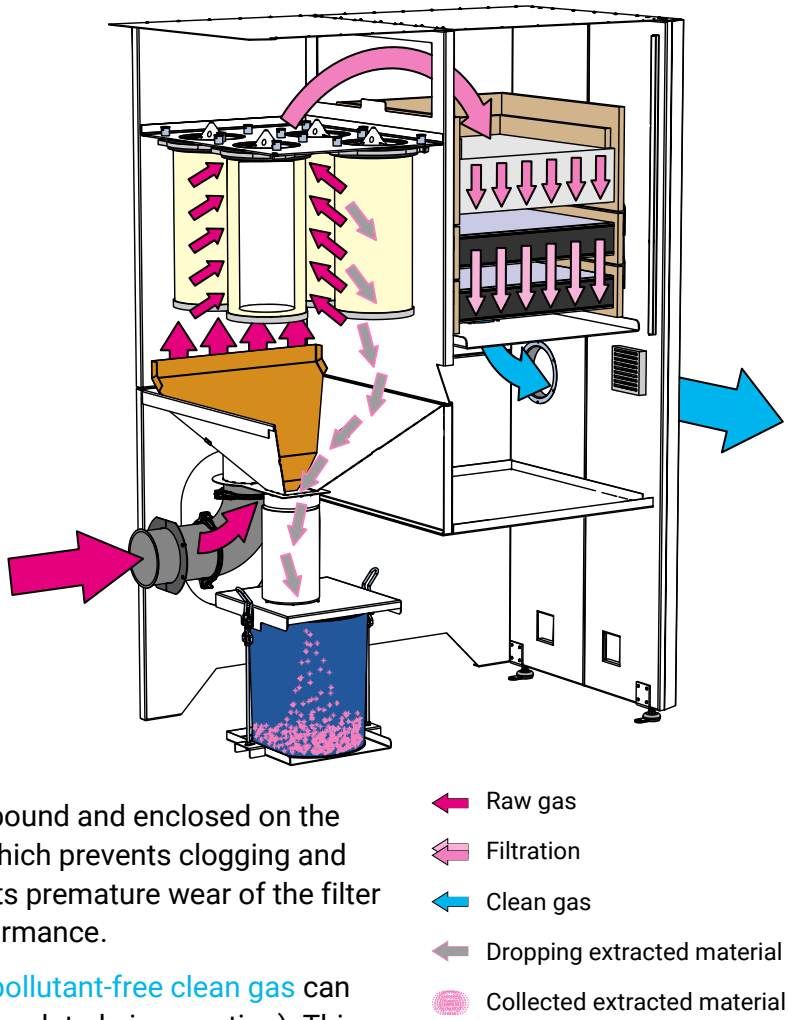
Functional principal

During the extraction process, a high-pressure blower with high pressure reserve on the clean gas side of the filter system generates a volumetric flow adapted to the application purpose. The volumetric flow can be controlled individually and infinitely variably. In this way, the pollutant-loaded raw gas is extracted reliably.

The raw gas extracted at the collection point is first transported via the air ducting system to the intake of the LAS 800 extraction and filtration system. There the raw gas is slowed down at a baffle plate and deflected. This slows down a large percentage of the particles transferred in the raw gas and holds them back so that they do not directly hit the filter elements. Inflow to the baffle plate takes place from below. It is made of copper, which enables effective cooling of warm particles and prevents the generation of impact sparks in the unit.

Finally, the raw gas reaches the surface of the cartridge filter elements (dust class M). There the dust particles are separated according to the surface filtration principle. The clogged filter cartridges are cleaned individually and automatically with the aid of the pulse-jet nozzles through the use of compressed air according to a counterflow principle. A compressed air connection (5 - 8 bar) is required for operation of the system. The removed particles drop into a 30 liter. disposable bin for removal and disposal of the extracted material with minimal contamination.

The cleaned air then enters the clean gas area and is discharged via an air vent. Prior to this, the air passes through a secondary filter stage, which can be equipped with an HEPA H14 filter and a combination of gas filters. The optional HEPA H14 particulate filter enables the precipitation of ultra-fine suspended matter and guarantees a precipitation rate of 99.995%. The gas filters enable the precipitation of gaseous and vaporous substances. Their operating principle is based on the adsorption or chemical conversion (chemisorption) of gaseous substances on the surface of the granulate in the filter.

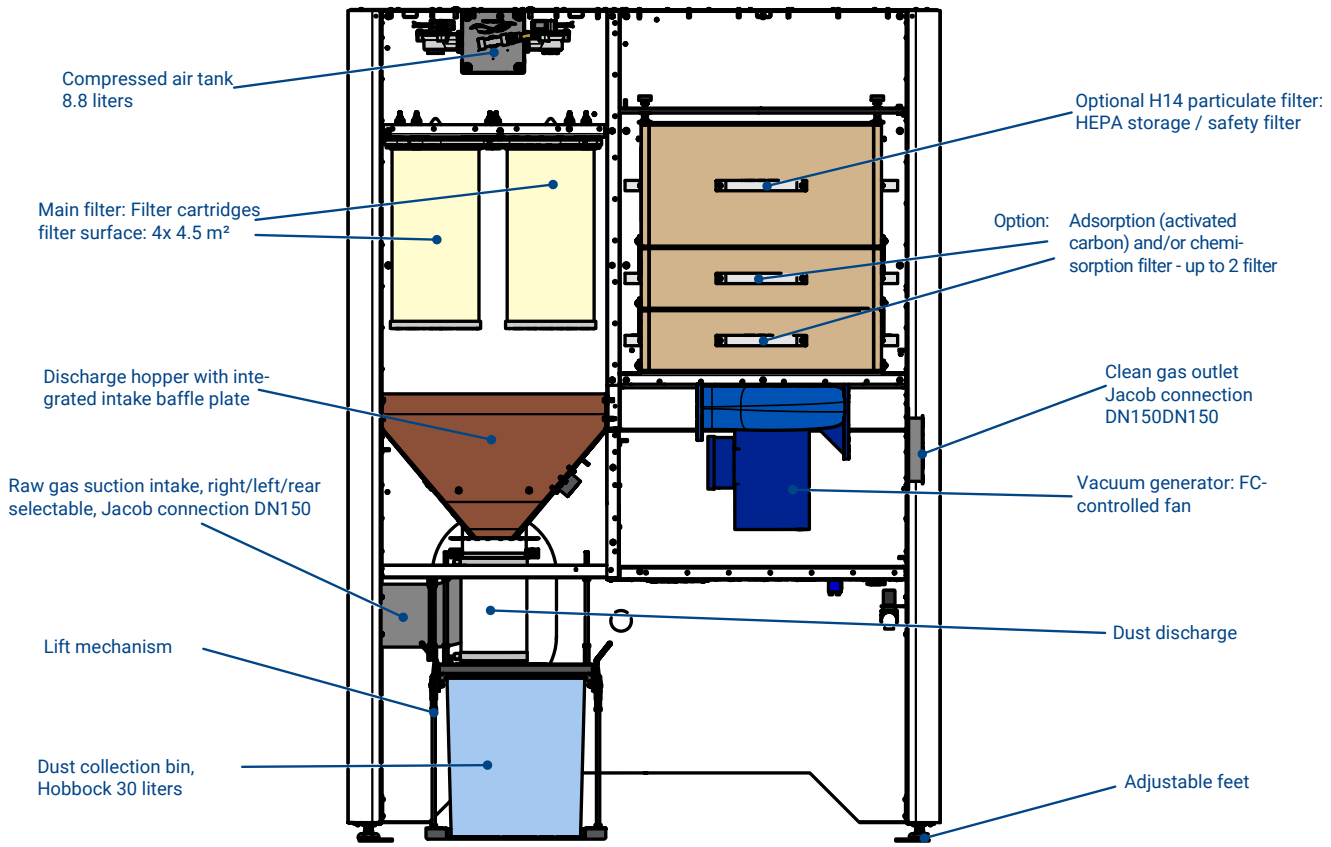


In order to better precipitate sticky and very fine dust, the LAS 800 can be equipped with an automatic filtration aid dosing system. It adds filtration aid to the raw gas. In this process, particles and aerosols contained in the laser smoke are bound and enclosed on the filter aid due to the agglomeration effect, which prevents clogging and sticking of the filter cartridges. This prevents premature wear of the filter elements and improves their cleaning performance.

Thanks to the high degree of cleaning, the pollutant-free clean gas can then be fed back into the working area (recirculated air operation). This avoids any loss of heat.

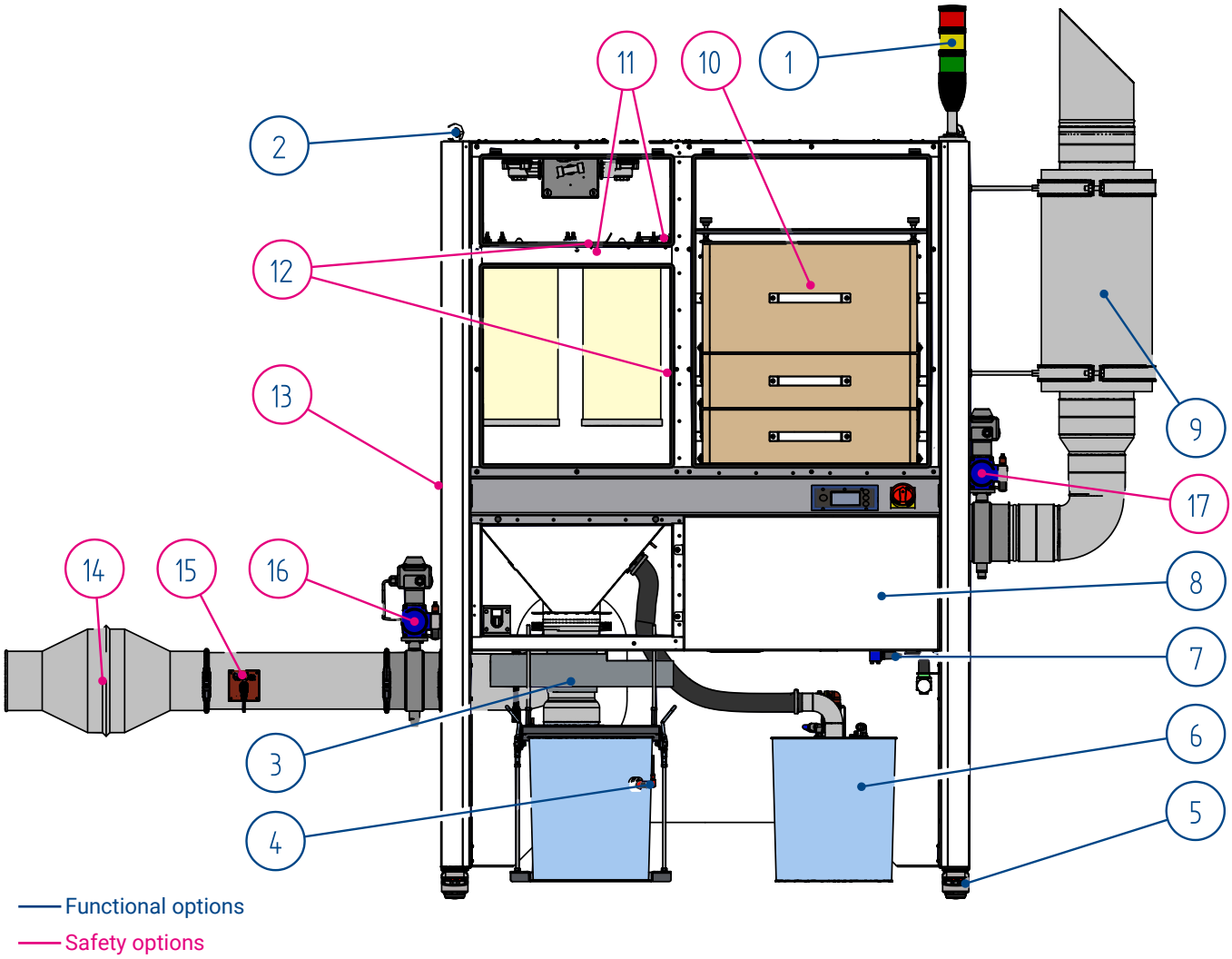
Recirculated air operation is not permitted for the suctioning and filtration of carcinogenic, mutagenic or reprotoxic substances. The filtered clean gas must then be routed through a connected pipeline into a central discharge air system.

Equipment



- Suction baffle plate – pre-separation of coarse particles, protection of the filter cartridges against premature wear
- Fire extinguishing opening in the maintenance cover to the raw gas chamber
- 30 ltr. Dust collection and disposal container, high capacity
- Control panel with display and the following basic functions:
  - Display of the filter status and device status
  - Adjustment of the fan output and different operating modes (air flow control / constant pressure)
  - Automatic filter cleaning - compressed air pulse jet; adjustable to manual operation or selection between different modes possible (differential pressure-dependent "Δp" or cleaning after fixed time interval)
  - Run-on cleaning of the filter cartridges can be activated
  - German, English or French language setting possible
- Display of alarms & error messages - via control interface & visually via control display (error code display)
- Analog control interface - terminal strip in the control cabinet for integration into the overall system and for external control of the unit (for assignment, see XG30 interface diagram in the appendix)
- All interfaces for all equipment options are already prepared – they can also be retrofitted

Equipment options



	Option	Option description	LAS 800	LAS 800 Ex
1	Signal lamp	Traffic light signal: A signal lamp mounted on the roof of the system indicates the operating status in the traffic light colors (red, yellow, green). The signal lamp results in an additional unit height of 370 mm.	■	■
2	Lifting eyes	4 attachment points on the roof of the unit facilitate installation.	■	■
3	Slide valve dust discharge	A pneumatically operated slide valve between the discharge hopper and the dust collection bin allows the container to be changed during operation.	■	■
4	Filling sensor	Enables a change indication for the dust collection bin in the unit control. Visual inspections of the filling level become superfluous.	■	■

	Option	Option description	LAS 800	LAS 800 Ex
5	Leveling casters	Unit casters with leveling feet that can be unscrewed enable easy transport of the equipment to the place of use. It is not possible to change the location during operation, as the unit is permanently piped during operation and requires a permanent electrical connection. The leveling casters result in an additional unit height of 40 mm.	■	■
6	Dosing unit for filter aid powder	Automatic filter aid addition: Additive admixture for improved precipitation of sticky and extra fine dust.	■	■
7	Compressed air monitor	A pressure sensor monitors the pressure accumulator and detects if compressed air is missing.	■	■
8	BUS communication PROFINET	Control interface: BUS communication via Profinet enables network integration of the unit.	■	■
9	Exhaust air silencer	Results in the reduction of the sound pressure level by up to 5 dB(A) in recirculation mode. The discharge direction is vertically upwards with silencer. Additional space required: ▪ upwards:360 mm ▪ side:360 mm or. ▪ 510 mm (with shut-off flap)	■	■
10	Automatic device shutdown for H14 HEPA filter	Automatic shutdown if the H14 secondary filter is clogged - increased safety level On the LAS 800 Ex, the H14 safety filter and automatic shutdown are part of the basic equipment.	■	
11	Temperature sensor	Temperature monitoring: Sensors in the filter chamber of the system detect a temperature increase in the process air and shut down the unit if the operating temperature is unacceptable.	■	
12	Fire detection through temperature monitoring	Unacceptable temperature increases in the filter chamber are indicated and the system is shut down to prevent a fire. An external fire alarm is triggered, and the compressed air tank is emptied to the outside.		■

Option		Optionsbeschreibung	LAS 800	LAS 800 Ex
13	Extinguishing system (incl. 2 shut-off dampers)	Extinguishing gas supply: Fires are suppressed using extinguishing gas (CO_2). The extinguishing gas is supplied through several nozzles into the raw and clean gas areas. During the extinguishing process, the system is shut down and the shut-off dampers at the inlet and outlet close. The system works autonomously even without line voltage. To use the extinguishing system, the option fire detection (12) is required. When using the extinguishing system in recirculation mode, a free floor space of 55 m² is required at the installation site of the unit.		■
14	Spark pre-separator	Spark trap in the suction pipe: Prevents sporadic sparks from being drawn into the system. Installation at a distance of at least 1.5 m from the system. For applications with explosion and/or fire hazards, further protective devices are necessary.	■	■
15	Spark detection (incl. shut-off damper air intake)	Spark detection: Detection of sparks in the suction pipe - enables the system to be shut down in combination with shut-off damper for fire prevention. Installation of spark detection in the pipeline at a distance of at least 10 m to the system and shut-off damper for safe operation.	■	■
16	Shut-off damper air intake	Pneumatically operated damper on the raw gas suction intake via the system control: enables immediate extraction stop. Prevents the ingress of impermissible substances or sparks. The shut-off damper results in an additional dimension of 150 mm.	■	■
17	Shut-off damper air outlet	Pneumatically operated damper on the clean gas outlet via system control: Prevents a fire spreading or dust discharge in the event of a broken filter. The shut-off damper results in an additional dimension of 150 mm.	■	■

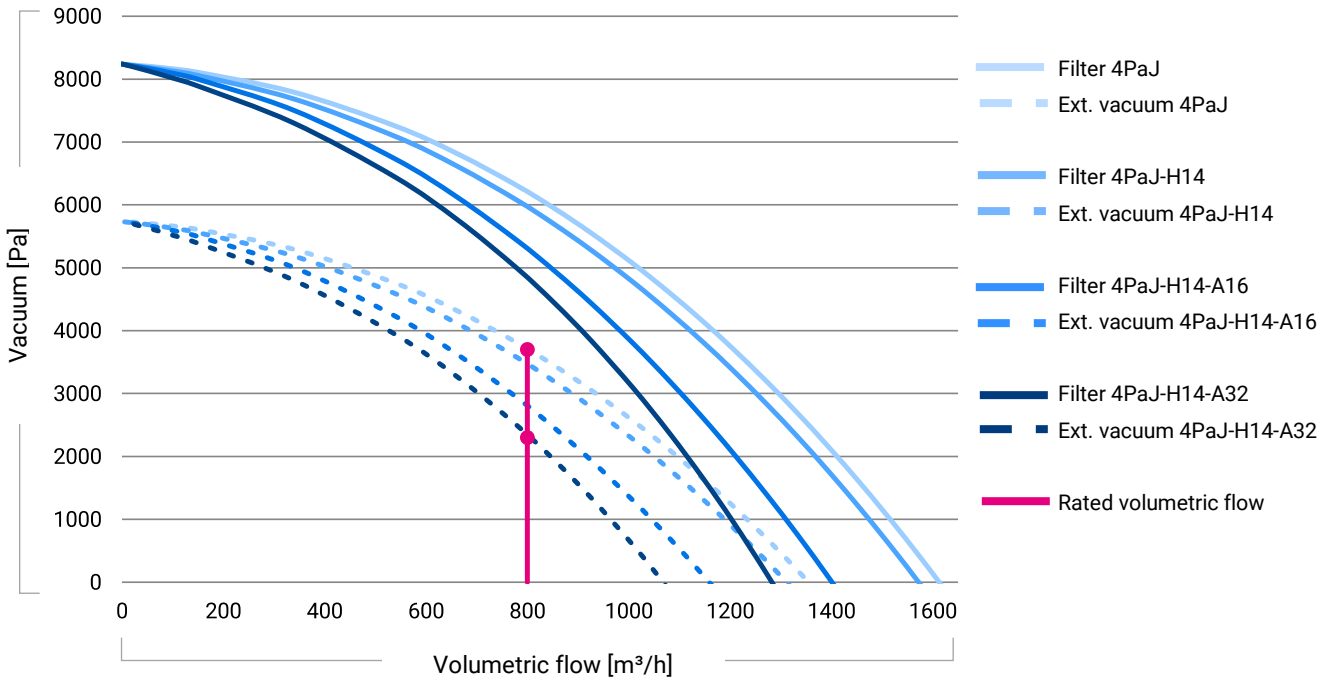
Technical Data

PARAMETER	UNIT	HD.60
Volumetric flow, max.	m³ / h	1.620
Vacuum max.	Pa	8.500
Nominal volumetric flow (blower curve)	m³/h @ Pa	800 @ 7.800
Externally available vacuum (at nominal flow rate)	Pa	2.300 – 3.700
Rated motor power	kW	3,0
Rated voltage	VAC	3~ 400
Rated current	A	6,3
Noise level (@ 100% air throughput)	dB(A)	< 68
Frequency	Hz	50/60 (upstream FC with control range of 0 – 105 Hz)
Vacuum generator type		Fan, three-phase motor, FU-controlled
Intake	Ø Position	1x Ø150 mm Jacob connection Position selectable: right, left, rear
Air outlet	Ø Position	1x Ø150 mm Jacob connection right; rear center
Dimensions (Width x Depth x Height)	mm	1.430 x 800 x 2.020 (without options)
Weight	kg	approx.. 350
Power line		attaches in control cabinet
Compressed air connection		NW8, 5 – 8 bar, 30 l/min
Housing		robust sheet metal, powder coated RAL7035 / 5010

Characteristic Curve

Continuous lines: **Unit characteristic curves with as-new filters without dust load**

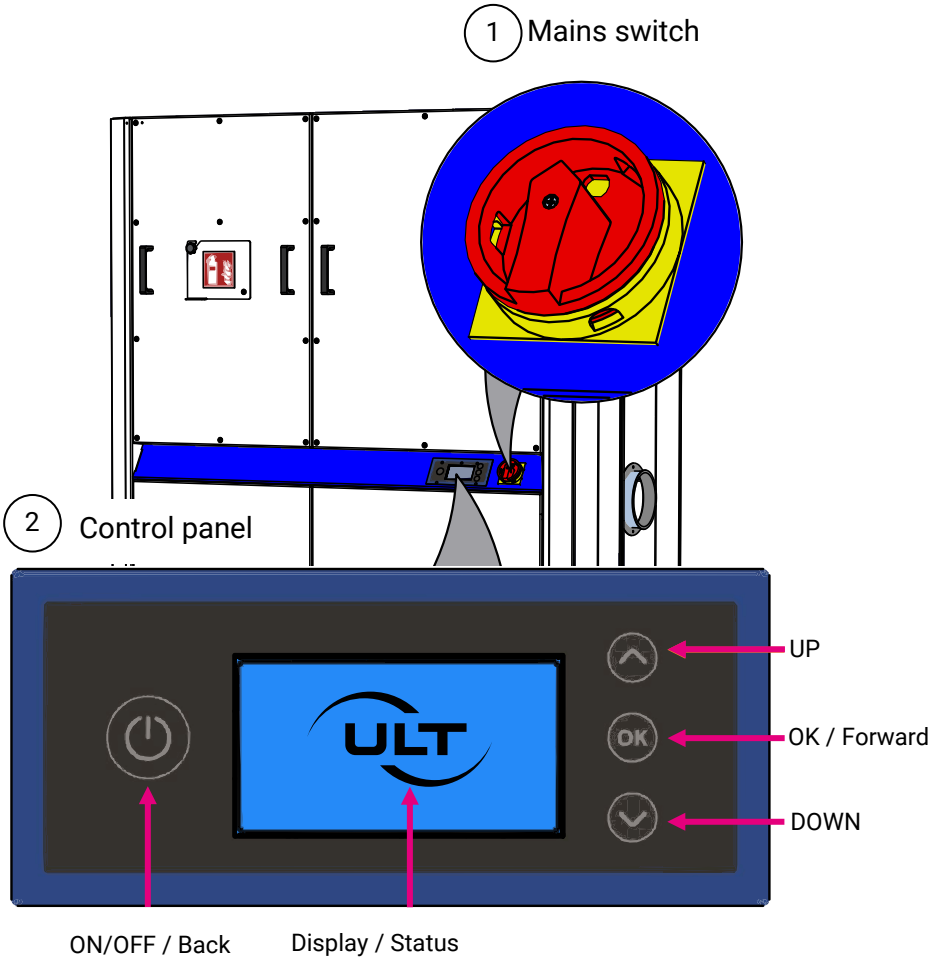
Dotted lines: **available external vacuum with maximum load on cartridge filters (2,500 Pa)**



Operation

The LAS 800 is operated via an easy-to-use, robust control panel using pushbuttons and a display screen. The current operating status and error states of the unit are indicated by different display illuminations.

To operate the LAS 800, the power supply must be switched on at the main switch (1). The control panel (2) indicates stand-by mode on the display after switching on the voltage.



The control of the unit and the indication of the current unit status are performed via the display and the buttons of the control panel.

Pressing and holding the <ON/OFF> button switches the unit on or off. The unit switches to the operating mode (green) after being switched on.

To control the unit and display information, the <UP> and <DOWN> buttons can be used to switch between the available functions within a menu level and parameter settings can be changed. The selected setting can be confirmed with <OK>. The button is also used to switch to a deeper menu navigation level. The <ON/OFF> button can be used to return to the menu level above or to cancel the confirmation of settings.

LAS 800 display control

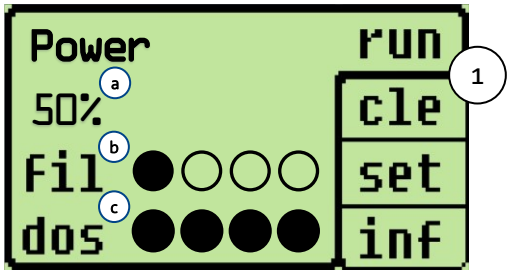
1 "run" menu - operation

Display and adjustment of the suction power, display of the filter cartridge load (main filter) and the filter aid powder level (option):

a ... Suction power [%]: Adjustable with <OK> and <UP>/<DOWN>

b ... Main filter clogging:0 points - empty; 4 points – full

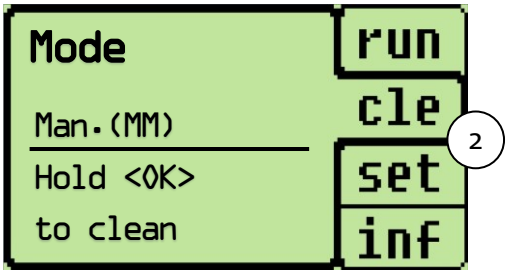
c.... Filter aid level:0 points - empty; 4 points - full



2 “cle" menu - cleaning filter cartridges

Display and selection of the mode for pneum. pulse-jet cleaning of the filter cartridges:

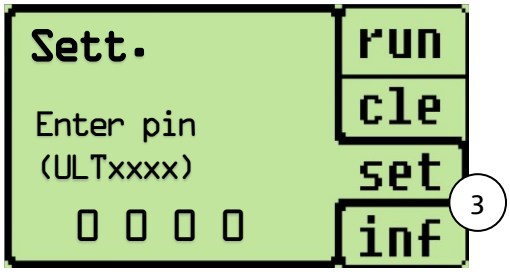
- Option of selecting different modes with differential pressure-dependent triggering, triggering after fixed time intervals or manual triggering by the user or a higher-level machine



3 "set” menu – parameter setting

Display and modification of more in-depth parameters for controlling the unit:

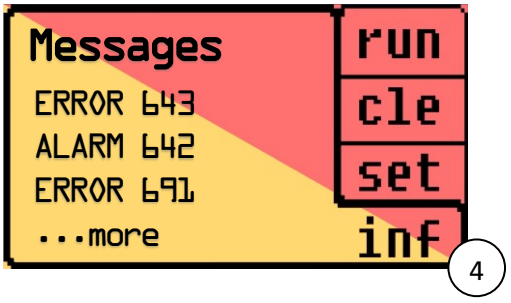
- Password-protected area
- Different user profiles from "read-only" to "admin" are available



4 "inf" menu - information

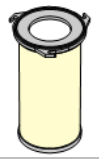
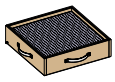
Display of information on the current operating status and on applicable error messages:

- Distinction between:
  - Alarm: Note, uncritical, display is illuminated yellow
  - Error: critical condition, unit can be further operated, display is illuminated red
  - Error with shutdown: critical condition, unit cannot be operated without danger, display is illuminated red



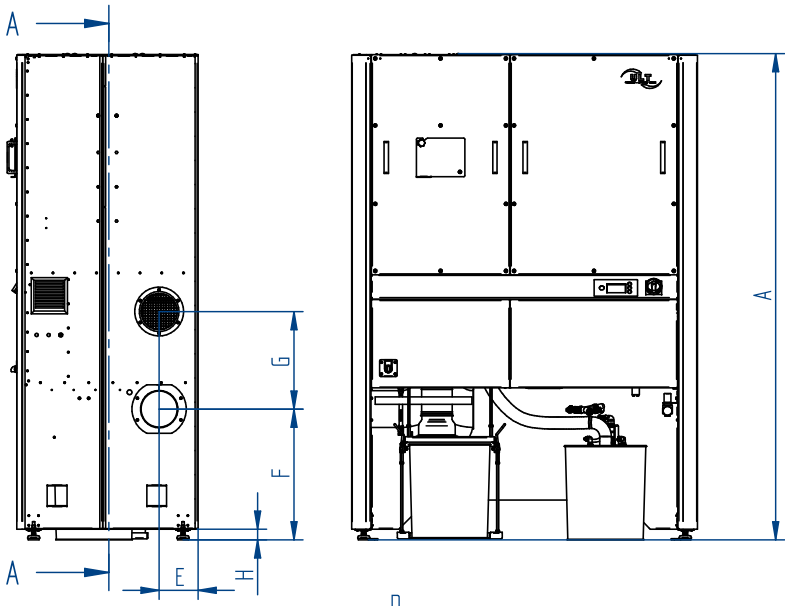
Filter system

The filter system of the LAS 800 consists of a main filter stage containing 4 filter cartridges and a variable post-filter stage that can be equipped with storage filter elements according to requirements. The filter cartridges of the main filter stage have a conductive design and, due to their Nano coating, are ideally suited for high dust volumes and regular pneumatic cleaning.
The post-filter stage can be optionally equipped with an H14 particulate filter and a gas filter stage. In the LAS 800 Ex unit configuration, a conductive H14 particulate filter with automatic shutdown is an integral part of the equipment.

		LAS 800	LAS 800 Ex
Main filter stage Filter system: Cartridge filter, automatic air pulse-jet cleaning			
Cartridge filter set, polyester fiber, Nano coating ▪ 4x filter cartridge 4.5 m² class M ▪ Cylindrical design ▪ Clean gas side assembly ▪ incl. dust mask, gloves, disposal bag	Art.-no.: 4-00631	■	■
Post filter stage Filter system: Storage filter for particles			
H14 suspended matter filter ▪ Filter class HEPA H14 according to DIN EN 1822 ▪ MDF filter shaft, clean gas side seal	Art.-no.: 4-00821	■	
H14 suspended matter filter, conductive ▪ Filter class HEPA H14 according to DIN EN 1822 ▪ MDF filter shaft, clean gas side seal	Art.-no.: 4-00820		■
Gas filter stage Filter system: Storage filter for gases and vapors			
Filter medium: Activated carbon 100% (16 kg)	Art.-no.: 4-00400	■	■
Filter medium: Activated carbon 100% (32 kg)	2x Art.-no.: 4-00400		
Filter medium: Activated carbon / chemisorption agent 50% (21 kg)	Art.-no.: 4-00415	■	■
Filter medium: Activated carbon / chemisorption agent 50% (42 kg) (42 kg)	2x Art.-no.: 4-00415		
Filter medium: Chemisorption agent 100% (26 kg)	Art.-no.: 4-00416	■	
Filter medium: Chemisorption agent 100% (52 kg)	2x Art.-no.: 4-00416		

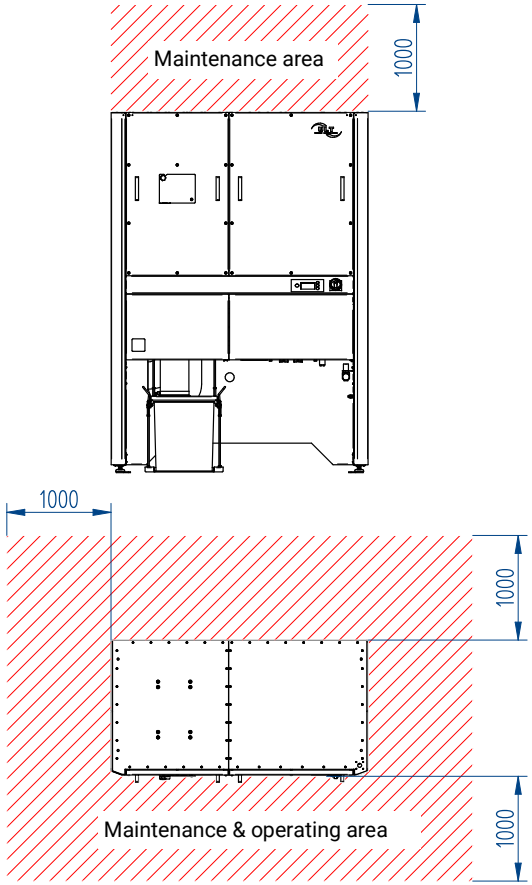
■ Basic equipment
■ Optional

Dimensions and distances

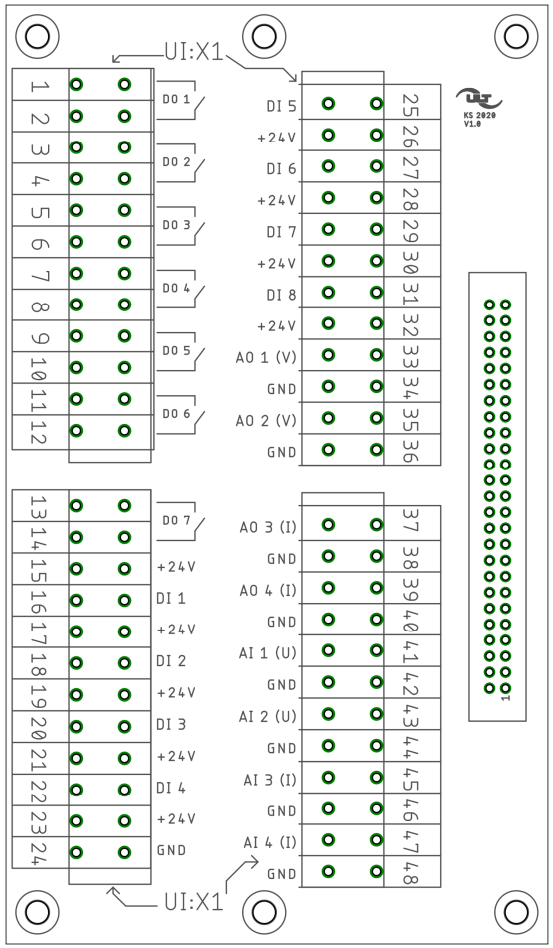


	Dimensions
	[mm]
A	2020
B	800
C	1430
D	354
E	161
F	544
G	400
H	44
I	40

Maintenance and operating intervals



Interface UF30:XG30 1-24



Device Tag		Type	Function	Potential	Rating	Status	Description
1-2	DO 1	Terminal Block	Operation message	Free	0.5A at 24V	Closed Open	Unit is in operation Unit is not in operation
3-4	DO 2	Terminal Block	Alarm message	Free	0.5A at 24V	Closed Open	No Alarm is active Alarm is active
5-6	DO 3	Terminal Block	Error message	Free	0.5A at 24V	Closed Open	No Error is active Error is active
7-8	DO 4	Terminal Block	Police filter	Free	0.5A at 24V	Closed Open	Police filter OK Police filter problem
9-10	DO 5	Terminal Block	Main filter alarm	Free	0.5A at 24V	Closed Open	Main filter - no alarms Main filter alarm
11-12	DO 6	Terminal Block	Main filter error	Free	0.5A at 24V	Closed Open	Main filter - no errors Main filter error
13-14	DO 7	Terminal Block	Cleaning required Only with dosing active!	Free	0.5A at 24V	Closed Open	Cleaning is neccessary but release (DI2) is not set. Cleaning not yet neccessary or release (DI2) is set
15		Terminal Block	Power supply	+24V	max 1W for all	-	-
16	DI1	Terminal Block	Remote on/off (*)	-	-	+24V 0V	Unit is started with remote control Unit is not started with remote control
17		Terminal Block	Power supply	+24V	max 1W for all	-	-
18	DI2	Terminal Block	Cleaning release (*)	-	-	+24V 0V	Cleaning is allowed Cleaning is not allowed
19		Terminal Block	Power supply	+24V	max 1W for all	-	-
20	DI3	Terminal Block	Cleaning trigger (*) Bridged before shipping.	-	-	+24V (rising edge) 0V	If in correct mode, start cleaning -
21		Terminal Block	Power supply	+24V	max 1W for all	-	-
22	DI4	Terminal Block	Dosing release (*) Bridged before shipping.	-	-	+24V 0V	Dosing is allowed Dosing is not allowed
23		Terminal Block	Power supply	+24V	max 1W for all	-	-
24		Terminal Block	Power supply	0V	max 1W for all	-	-

(*) - Signals functional only if not overwritten by signals on BUS

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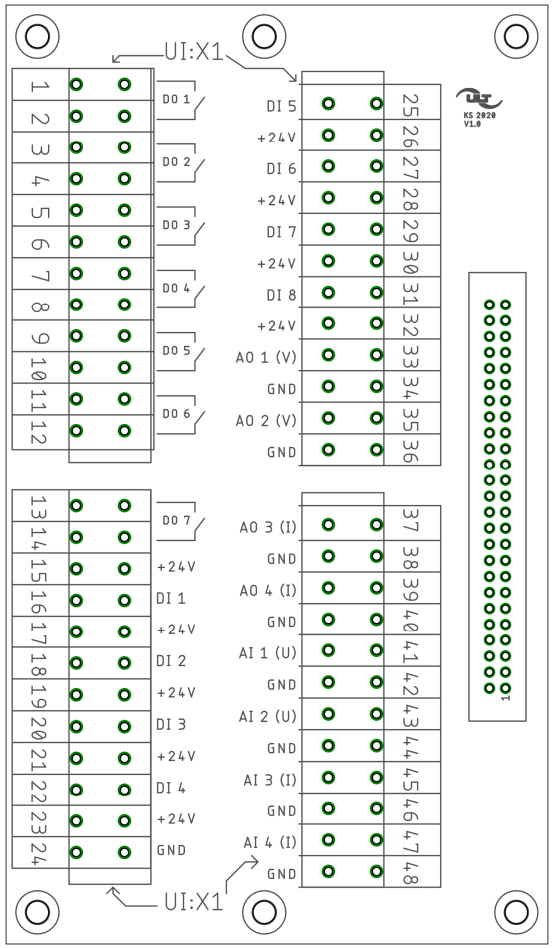
Interface UF30:XG30 25-48



Device Tag		Type	Function	Potential	Rating	Status	Description
25	DI5	Terminal Block	Dosing reset (*)	-	-	+24V (rising edge) 0V	Reset dosing material -
26		Terminal Block	Power supply	+24V	max 1W for all	-	-
27	DI6	Terminal Block	Dosing impuls (*) Only for Service! Dosing is automated.	-	-	+24V (rising edge) 0V	Dosing impuls -
28		Terminal Block	Power supply	+24V	max 1W for all	-	-
29	DI7	Terminal Block	No function	-	-	-	-
30		Terminal Block	Power supply	+24V	max 1W for all	-	-
31	DI8	Terminal Block	No function	-	-	-	-
32		Terminal Block	Power supply	+24V	max 1W for all	-	-
33	AO 1 (U)	Terminal Block	Filter pressure (V) (**)	0-10V	10mA/Output	0V 10V	Pressure main filter 0 Pa Pressure main filter 4000 Pa
34		Terminal Block	Power supply	0V	max 1W for all	-	-
35	AO 2 (U)	Terminal Block	Dosing mat. (V) (**)	0-10V	10mA/Output	0V 10V	Dosing material empty Dosing material full
36		Terminal Block	Power supply	0V	max 1W for all	-	-
37	AO 3 (I)	Terminal Block	Filter pressure (mA) (**)	4-20mA	-	4mA 20mA	Pressure main filter 0 Pa Pressure main filter 4000 Pa
38		Terminal Block	Power supply	0V	max 1W for all	-	-
39	AO 4 (I)	Terminal Block	Dosing mat. (mA) (**)	4-20mA	-	4mA 20mA	Dosing material empty Dosing material full
40		Terminal Block	Power supply	0V	max 1W for all	-	-
41	AI 1 (U)	Terminal Block	Ventilator setpoint (V)	0-10V	in 0-10V load max. 5mA	0V-1.9V 2V-10V	Input not active Ventilator setpoint control
42		Terminal Block	Power supply	0V	max 1W for all	-	-
43	AI 2 (U)	Terminal Block	No function	0-10V	in 0-10V load max. 5mA	-	-
44		Terminal Block	Power supply	0V	max 1W for all	-	-
45	AI 3 (I)	Terminal Block	Ventilator setpoint (mA)	0-20mA	-	0mA-3.9mA 4mA-20mA	Input not active Ventilator setpoint control
46		Terminal Block	Power supply	0V	max 1W for all	-	-
47	AI 4 (I)	Terminal Block	No function	0-20mA	-	-	-
48		Terminal Block	Power supply	0V	max 1W for all	-	-

(*) - Signals functional only if not overwritten by signals on BUS
(**) - Analog output can be set to show another variables, for more info contact ULT AG

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