



Formula Air

Supporting your performance



CCACF – Cartridge filter

Maintenance manual

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1. EC- declaration of incorporation

EC-Declaration of Incorporation for Partly Completed Machinery

Machinery Directive 2006/421EC Annex IIB

The undersigned manufacturer and authorized for the elaboration of technical documentation for partly completed machinery and by due request hand over the technical dossier to the national authorities :

Manufacturer: v.Aa.Gram A/S
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The undersigned hereby declare that:

Partly completed machinery: Cyclone filter
Name: Gram

Type:	CCACF 39 (04 033 750)	CCACF 104 H (04 034 500)	CCACF 234 D (04 052 000)
	CCACF 52 (04 034 000)	CCACF 117 (04 043 000)	CCACF 234 H (04 043 500)
	CCACF 52 H (04 032 500)	CCACF 130 D (04 046 000)	CCACF 260 DH (04 046 500)
	CCACF 65 (04 037 000)	CCACF 130 H (04 037 500)	CCACF 364 DH (04 049 500)
	CCACF 78 H (04 033 500)	CCACF 182 D (04 049 000)	CCACF 468 DH (04 052 500)
	CCACF 91 (04 040 000)	CCACF 182 H (04 040 500)	

Was manufactured in conformity with the following essential health and safety requirements in the Machinery Directive 2006/421EC Annex1:

The following harmonized standards were used:

ISO 14121
EN/I.S013857
EN60204

The partly completed machinery may not be put into service until the final machinery into which it is to be incorporated has been declared in conformity with all relevant health and safety requirements in the Machinery Directive 2006/42/EC and other relevant Directives

Position : XX
Name : XX

Company : V.Aa.Gram A/S

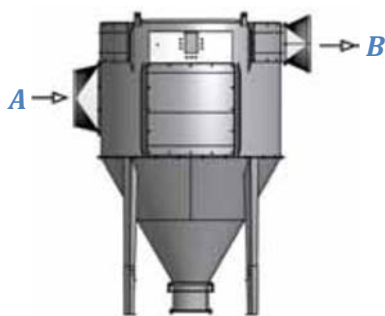
Date : XX.XX.XXXX

XXX
(Signature)

2. General description

The cyclo-filters type CACF are units used for the separation of dust from processed air.
Standard surface treatment in enameling and powder enameling for outdoor execution.
Only ATEX-Zone XX-marked unit may be used in explosion dangerous environments.

3. Functioning



Processed air is led in through the side in the lowest connection, where after the air passes in the pre-separator and filter elements. Air leaves unit on the other side in upper connection.

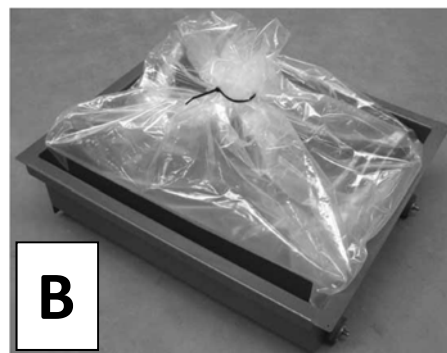
Filtered material is collected in an emptyable dust container.

3.1 Daily maintenance

Differential pressure (display) or watch is monitored daily. The pressure may not exceed 2,300 Pa. However, with filter elements G115A and G116A, this may be increased up to 3,000Pa.

Dust container is emptied according to need, but may never be filled more than max. 75% of its volume.

At work with dangerous dust a plastic bag is placed in the dust container. The surplus plastic bag is turned over the dust container (point A, page 3). When the bag must be removed, it is straightened out in its full length and is closed with 1 plastic strip, before it is taken out of the dust container to be destroyed according to governmental demands (point B, page 3). Sack must always be mounted, when a relief hose is mounted.



Repairs may only be carried out by professional trained personnel. Jet valves must be kept clean of dust.

4. Unit condition during operation

All filter doors must be closed and secured.

The dust container must be mounted and locked correctly during all steps of filter operation.

5. Intentional / unintentional application

Cyclone filter type CACF may only be used for dry dust without sparks. Filter unit may not be used for larger chips and the like. For this a cyclone type CY is used as a coarse separator.

In ATEX-zones only units may be used that are marked for the same zone. Filter units cannot be converted to another zone.

Repairs may only be performed with original spare parts.

6. Mounting

CACF 39 - CACF 324 H:

Cyclone filters CACF 38 - CACF 324 H are shipped lying on a pallet completely mounted with loose inlet.

Cyclone filters CACF 182 H and CACF 324 H are further shipped with loose dust container and leg extensions.

CACF 130 D - 480 DH:

Cyclone filters CACF 130 D - CACF 480 DH are shipped on two pallets.

Cyclone filters CACF 364DH and CACF 468 DH are further shipped with loose dust container and leg extensions.

CACF Cyclone filters are bolted to the pallet. When CACF cyclone filters must be mounted, transport fittings are removed.

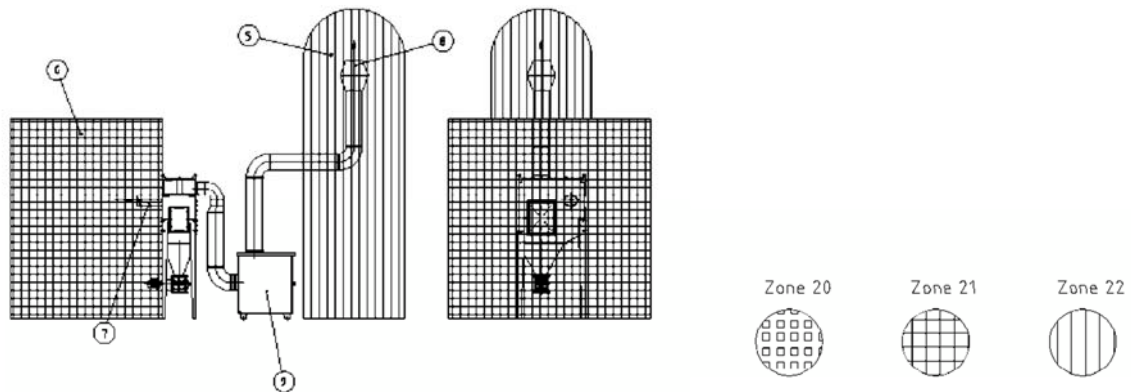
CACF Cyclone filters are raised by crane lifting points in the top. D-models are placed so the connection pieces are next to each other, where after inlet and outlet connections are mounted.

CACF Cyclone filters must be bolted to an even, horizontal and stable surface.

6.1 Filter placement

At cyclone filter placement the environment and fire demands must be considered.

At EX- unit mounting the danger zones must be taken into consideration



Note : Zone range 5 is intended as a guide, normal radius of 1000mm around the outlet.

Zone range 6 depends on the dust type and the concentration of it.

6.2 Electrical connections

Electrical connection for TEC-33-N or differential pressure control type BA are made in the control box, which is connected to 230V, 50Hz and earth.

DO NOT FORGET to close the control box firmly after mounting. Humidity can destroy the print.

Connection must be in accordance with the Power Code and must be breakable from supply.

Electrical connection must be active for so long after operation with BA-control as the after- cleaning takes. The control box diagram is enclosed.

For ATEX-units the special rules in the Power Code must be followed. And for ATEX-units all parts must be securely earthed. Where there is a dust container, this must also be earthed.

6.3 Compressed air connection

The compressed air connection must give min. 5.5 - max. 6.0 bar dry compressed air. The connection is made at the end of the header tank. A reduction valve and water separator ($\frac{1}{2}$ "") can be advantageous.

DO NOT FORGET compressed air at possible after-cleaning.

6.4 Ducting connection

The ducting connection must be made with approved ventilation pipes.

The ducting connection for D-models must be made in such a way that the dust is equally spread in the two units, e.g. vertically falling with 1 piece 90°-bend, or by sufficient long horizontal ducting.

For ATEX-units, it must be secured that piping cannot be blown away at a possible explosion.

6.5 Rotary valve (optional)

The rotary valve must be securely mounted on the unit and it must be airtight. It must be in operation at the start and during the running of the filter unit.

6.6 Adjustments

Every filter unit is dimensioned for a certain workload which may not be exceeded as it would result in an improper function of the unit or a premature lifespan.

The unit is dimensioned following the following criteria's :

_____ Maximum air volume
_____ Type of dusts

Type of fan :

Type of cartridges : cartridges G1xx / ø225x1000 mm Polyester

Total surface area: xx m²

6.7 Differential pressure control

Filter element cleaning takes place by differential pressure control type BA, which is programmed at the factory.

Control is automatically operational upon receipt. Display shows first differential pressure when it is at minimum 200Pa.

6.8 Alarm on EN 15012-1 units

When a differential pressure is created over the filter elements that is larger than allowable, a yellow flashing light (ø57mm) on the control box will light up.

If an alarm is requested at the affected work places, yellow flashing lights (order no. 09 403 500) can be connected parallel with the mounted light.

7. Noise damping

Average noise level excluding cleaning shot cycles : more or less 75 dB (A)

Average noise level including cleaning shot cycles : more or less 85 dB (A), this can be brought down to 75 dB (A) if an acoustic booth is placed on the header tank.

8. Maintenance

Filter unit must be maintained 1 to 2 times a year to work optimally.

Differential pressure settings are checked (see instructions for differential pressure control type BA/filter control type TEC33-N in the back of these instructions).

Differential pressure may not exceed 2,300Pa (3,000Pa with filter material G115A and G116A) at max. set operation point for air volume.

Check that all valves shoot correctly. If the valves are checked with open clean air chamber, you must use ear defenders for 95-110 dB(A) (SNR=35).

With electrical supply removed check the tightness of pipe connections, tank and valves. Tank is emptied for water through connection.

When compressed air is disconnected, check clean air chamber for possible dust.

If dust occurs, check filter sealing and filter elements for tightness between elements. Sealing at doors and dust container are checked for damages - possible defects are corrected, or if necessary seals are replaced.

At filter defects, tight filters that cannot be washed (G105 and G104A), or worn-out filters must be replaced. Use protective clothing, gloves, and respirator with filter adjusted according to work place dust type.

Filter cartridge durability is variable, depending on circumstances such as filter stress, dust type and volume. Filter cartridges get blocked with time due to very fine particles that attach themselves to the fibers.

Also be aware whether compressed air operates with defect pressure reducing valve with water separator. This means an internal dirtying of filter cartridges. Under normal circumstances there will be a certain dust layer on the outside of cartridge, even after compressed air cleaning.

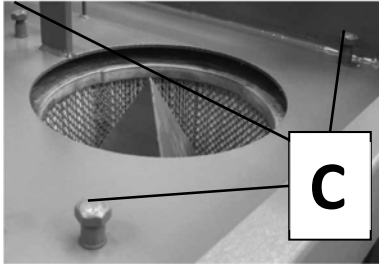
This layer increases the filtration capacity and the differential pressure.

If noticeable capacity reduction occurs, we recommend cartridge cleaning with high pressure cleaner (see point 8.2).

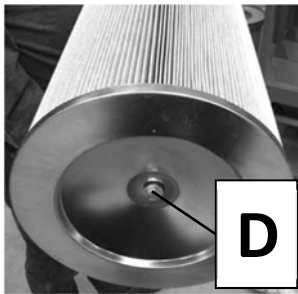
Every filter cartridge is mounted with bayonet grip attached with 3 bolts in filter mounting plate.

8.1. Cartridge replacement

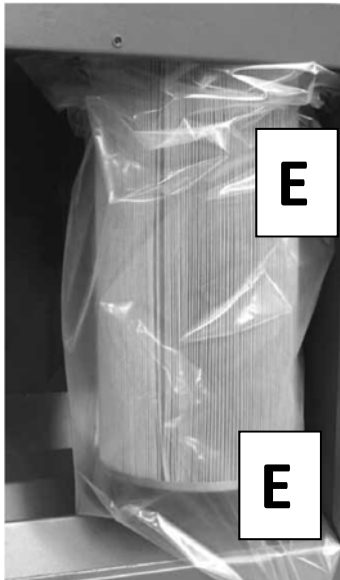
Every electric supply must be disconnected as well as pressure tank emptied for air before filter replacement from clean air side.



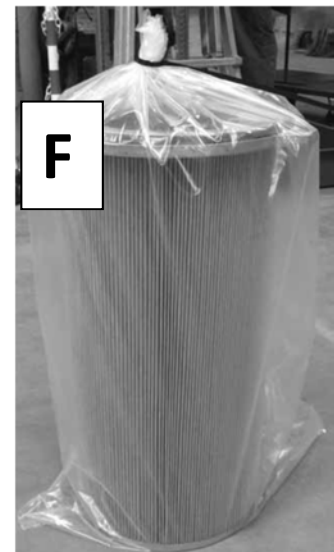
Side doors to clean air and row air chambers are dismantled. All filter bolts in clean air chamber are screwed completely down (point C, page 8).



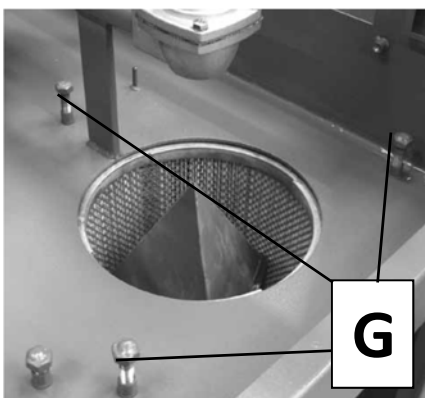
Bolts for filter cones are removed (point D, page 8). Now the filter cartridges can be removed.



This is done by guiding a plastic bag up around the filter cartridge from beneath (Point E, page 8), gripping the cartridge and turning it clockwise until it is released from the bolts.



Filter cartridges are removed from the filter units, filter cone is removed, and plastic bag is closed with 1 plastic strip (point F, page 8).



The new filter cartridges (check sealing) are hung on the filter bolts. They are fastened hereafter (point G, page 8). Doors are mounted.

Certificated units W2 and W3 must use plastic bag and strips at filter change. Used filter elements must be disposed of according to governmental demands.

8.2 Cartridge cleaning

The filter cartridge type G103 can be cleaned, after having been dismantled from the filter as described in the procedure point 8.1. These can be cleaned with a high

pressure cleaner with a maximum temperature of 50°C. Soap **WITHOUT** detergent can be used if needed.

The filter cartridges G104 and G105 **CANNOT** be cleaned.

Place the cleaner nozzle at a distance of 30 to 50 cm from the cartridge (on WIDE spread). Only clean the outside of the cartridge.

The cartridges must be completely dry before reinserting them in the filter unit.

New filter elements must in dimension be equal to original cartridge. Filter cloth quality must be according to filter job.

Original type of filter elements can be seen on machine marking.

8.3 Jet valve exchange / repair

Exchange may only take place, when supply and compressed air are not connected to unit, and compressed air tank is emptied by compressed air connection.

Coil, membrane and valve top are exchangeable by disconnecting electric plug, where after 4 pcs. M6-bolts are loosened and new coil and membrane are mounted.

9. After maintenance

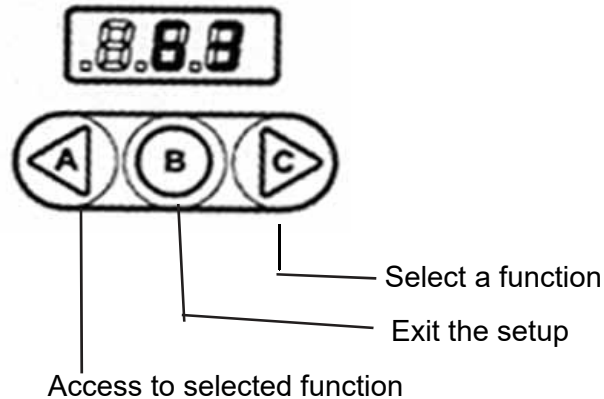
After the maintenance operations are completed, make sure that all electrical and pneumatic connections are established.

Test and control the filter unit before operation.

10. Differential pressure control - type BA

In operation mode :

Press «C » to Scroll through the functions.



Mount the differential pressure control in a suitable location.

Electrical connections :

See diagram furnished with the controller. Display will light up once connected.

DO NOT FORGET : clamp 14 & 15 must be short-circuited (jumper) for the activation of the dP program.

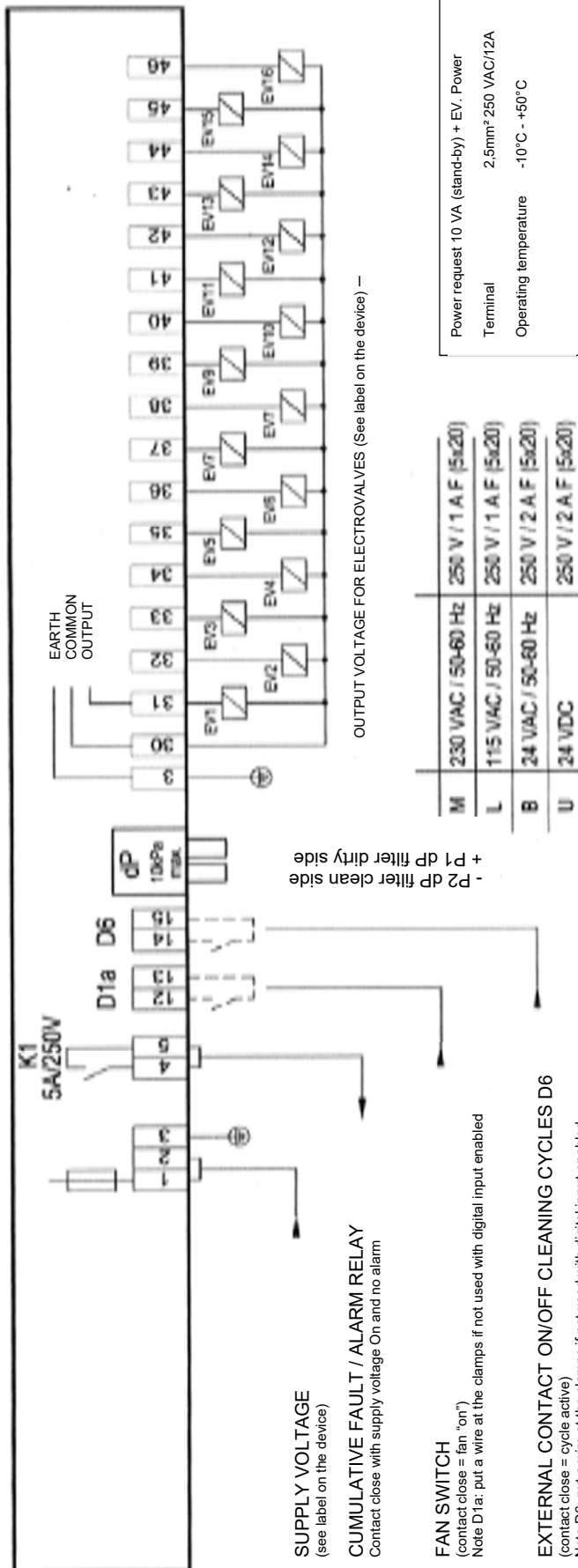
Setting operation data :

1. Press C to enter the menu. Function « F01 » is displayed on the screen.
2. Press A to enter in the function.
3. Press A or C to increase or decrease the value of the function.
4. Press B to go back to the functions menu.
5. Press C to move forward in the functions menu.
6. Repeat points 2 to 5 until function 13 is established.
7. Press B to leave the set-up menu.

Function	Description	Recommended value
F01	External start/stop - signal "0" / differential pressure control "1"	1
F02	Pulse time 0.05 - 5.00 seconds	0.24
F03	Pulse time 1 - 999 seconds	20 - 40
F04	Define number of valves (0 - 16)	See model
F05	Other cycles after fan stops (0 - 99)	15
F06	Manual activation of each valve. Press C selection; press A to activate	-
F07	Activation of dP program	1
F08	Output voltage	24V
F09	Zero adjustment "0.00" of the dP value at first unit start	0
F10	Set stop cycle cleaning in min. dP	0.60
F11	Set start cycle cleaning in max. dP	0.90
F12	3 rd threshold – alarm max. dP used with relay K1	2.3
F13	Fan control - "0" by switch / "1" by dP reading	1

Standard description

Code	Description
B1a	MANUAL SELECTION OF NUMBER OF OUTPUTS / ELECTRO-VALVES BY KEYBOARD Every EDABUS line can drive up to 32 RED modules. If over 32, the activation of the RED modules will automatically switch from one line to the next one.
B2x	SET ACTIVATION TIME FOR EACH OUTPUT FROM 0.05 TO 5.00 SEC.
B3x	SET INTERVAL TIME BETWEEN TWO ACTIVATIONS FROM 1 TO 999 SEC. If the pulse time is lower than 1 sec. it is possible to set any interval time value in the range indicated. If the activation time is higher than 1 sec. the minimum settable interval time is: Minimum interval time = 5 times pulse time (B2x)
B8a	SHORT CIRCUIT OUTPUT PROTECTION In case of short circuit, the output is automatically shipped, relay K1 - normally active - is deactivated and the terminal board contact opens. The display alternatively shows code E1 and the number of the faulty output. Press key B to reset the alarm.
B10	MANUAL ACTIVATION OF EVERY SINGLE OUTPUT From the keyboard you can manually and individually activate every single output for a operation test. Press key A to select the output you wish to activate. Press key C to activate the output.
C0	INPUTS ACTIVATION FROM KEYBOARD In Set up you can activate or deactivated the control of all the inputs of the device. If inputs are deactivated, they are considered as always closed and no jumper is required on the terminal board. Use a jumper for unused
C1d	DIFFERENTIAL PRESSURE DIGITAL CONTROL With dP control active (set F07), the cleaning cycle starts and stops according to the dP reading. With dP reading under the STOP threshold the cleaning cycle stops and the display shows dP reading and letter P alternatively. The cleaning cycle stop is at the end of the cycle. With dP reading over the START threshold the cleaning cycle is able to start.
C3	DIFFERENTIAL PRESSURE READING BY INTERNAL TRANSDUCER (max. 10 kPa)
C7d1	MAXIMUM dP ALARM WITH ALARMED OPEN CONTACT AND AUTOMATIC RESET If the dP readout is above the threshold in Set up, the maximum dP alarm is activated. The display shows the alarm condition code E7 (see the alarm description) or the dP readout and the letter H alternatively, according to model. The corresponding alarm relay will signal its condition. The alarm is automatically reset when the dP readout is below the alarm thresh- old again. The activation of this alarm is delayed by 20 seconds by default.
C8	ZERO dP READING AJDJUSTMENT In this Set up code it is possible to adjust the zero reading of differential pressure. In this function the display shows the dP reading and, with plant stop or air pipes not connected if the dP reading is not 0.00 kPa it is possible to adjust it by key A or C.
C13_10	dP READING FULL RANGE 10 kPa Maximum differential pressure measurable by the sequencer 10.00 kPa = 100.0 mbar = 1012 mmH2O With dP reading over 10 kPa the display shows "E" instead of the numeric value of dP.
D1ab1	ADDITIONAL POST-CLEANING CYCLES AFTER THE STOP OF THE FAN In Set up you can select the mode intended to manage the fan and the post-washing cycles: SET = 0 If you connect a voltage-free auxiliary contact of the circuit intended to drive the fan with the timer, you can add a pre-set number of washing cycles after the fan stop. Their number can be set from the keyboard from 0 to 99. Post-cleaning cycles can be also activated when the C6 contact is open. If the D1a contact is open, the display will show "-0-" and signal that the cycle is not working because the fan is off. The decimal points on the display will flash on and off during the cycles after the fan stop. NOTE D1a: Connect D1a by means of a jumper, if it is not used with active inputs (see F01). SET = 1 If the dP control is activated, you can add a pre-set number of washing cycles after the fan stop. Their number can be set from the key- board from 0 to 99. The timer will automatically recognize the fan state by comparing the dP readout with a 0.20 kPa fixed threshold: dP > 0.20 kPa = fan on, dP < 0.20 kPa = fan off. Post-cleaning cycles will be activated even if the dP readout = 0. If the fan is off, the display will show "-0-". The decimal points on the display will flash on and off during the additional cycles. Post-cleaning cycles will be activated only if the dP readout should reach the cycle STOP threshold value during the normal operation
D6	ON/OFF CLEANING CYCLE BY EXTERNAL VOLT FREE CONTACT If contact D6 is open, the cleaning cycle is not enabled and the display shows "OFF". By closing D6, the cleaning cycle can start from the first electro valve. NOTE D6: Use a jumper for D6 if it is not used with active inputs (see F01).
G1	MAXIMUM LOAD POWER FOR 25W OUTPUT FOR MAX. 5 SEC.
HV	INPUT AND OUTPUT VOLTAGE SELECTION BY JUMPER JP1, JP2, JP3 ON THE BOARD Use the jumpers on the board to select the supply voltage and the output voltage for the electro valves (see the plates on the sequencers). JP1: Supply voltage selection between 115VAC and 230VAC. JP2: Output voltage selection between 24, 115, 230V (Only with 115 VAC or 230 VAC power supply). JP3: Output voltage selection between AC and DC only with JP2 set to 24V. ATTENTION: Set F08 to the same output voltage that has been selected by means of the jumpers to adjust the short circuit trip thresh- old. Otherwise, this might cause any malfunction or damage to the sequencer.



PLEASE NOTE!

Turbo differential pressure control type BA is connected to constant current and is not cut off with fan or the like.

Operation

When power is on, cleaning cycle will start, if all necessary conditions for operation are present.

OFF Cycle stops for cleaning, consent is missing (D6 open).

-0- Cycle stops for fan OFF (D1a open).

1.00/P Cycle stops for low dP (display blinks).

A01 Number of activated electro valves.
... Cycles after fan stop active (blinking points).

1.23 Differential pressure reading (kPa).

E dP reading above 9.99 kPa.
Key B = Alarm reset
Key C = Access to set-up.

- P1 dP filter dirty side
- P2 dP filter clean side

SUPPLY VOLTAGE
(see label on the device)

CUMULATIVE FAULT / ALARM RELAY
Contact close with supply voltage On and no alarm

FAN SWITCH
(contact close = fan "on")
Note D1a: put a wire at the clamps if not used with digital input enabled

EXTERNAL CONTACT ON/OFF CLEANING CYCLES D6
(contact close = cycle active)
Note D6: put a wire at the clamps if not used with digital input enabled

11. Dismantling and recycling

When dismantling a unit, be sure to keep in mind the following important information:

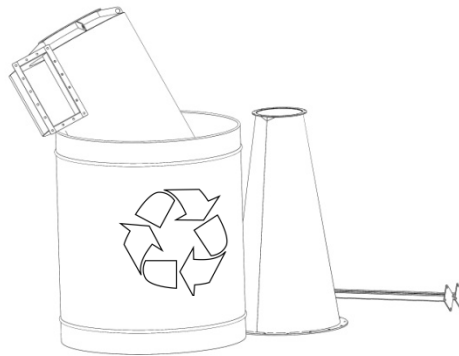
As the unit is dismantled, set aside all still functioning parts in order to re-use them on another unit.

You should always separate the different materials depending on their type : iron, rubber, oils, greases, etc...

Recyclable parts must be disposed of in the appropriate containers or brought to a local recycling company.

The rubbish must be collected in special containers with appropriate labels and disposed of in compliance with the national laws and/or local legislations in force.

CAUTION! It is strictly forbidden to dispose of toxic wastes in municipal sewerage and drain systems. This concerns all oils, greases, and other toxic materials in liquid or solid form.



12. Spare parts

For spare parts please contact Formula Air Group.

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The Netherlands
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