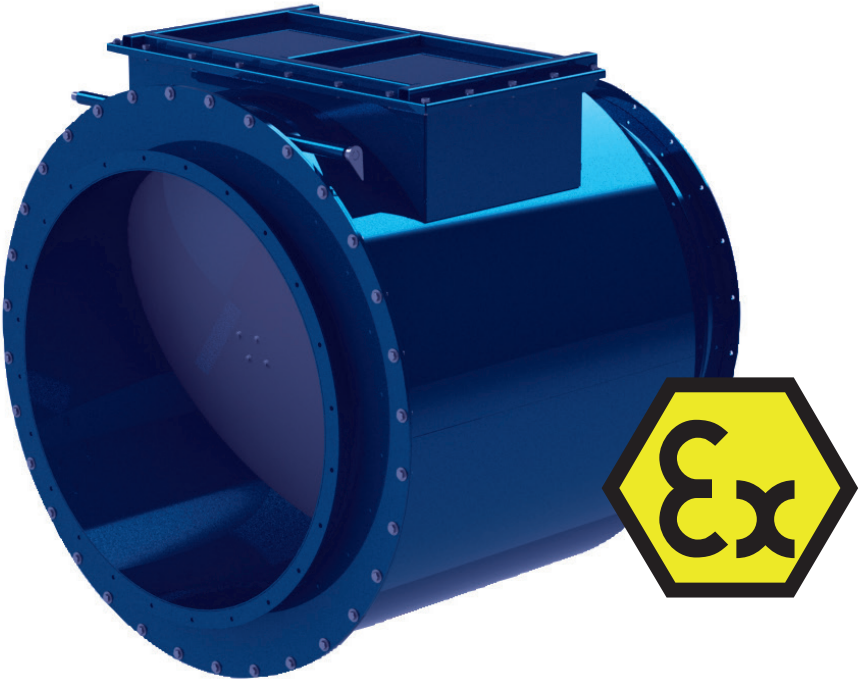
Formula Air
Supporting your performance



BADA ATEX NON-RETURN VALVE

Manual (EN)

Content

ENGLISH

1. Introduction

ENGLISH

This document contains information regarding the full installation of the non-return valve, the position sensor, and the dust level sensor. This includes the quality check procedure.

Every step of the non-return valves life cycle has been deeply analysed by Formula Air Group in the expected area during the design, construction, and creation of this manual.

Ignoring the cautions and warnings from the present manual, using improper parts or the whole device supplied, using unauthorized spare parts, manipulation of the device by non-qualified personnel, violation of any safety norm regarding design, construction, and use expected by the supplier, releases Formula Air Group from every responsibility in case of any damage to people or properties.

Formula Air Group does not take any responsibility for non-observance by the user of any of the preventive safety measures presented in this manual.

The utilization implies compliance and knowledge of the ATEX Directive 2014/34/EU. For use in potentially explosive areas, the installation rules stipulated by the technical rules of the area for which the indicator is designed must be observed.

Failure to comply with the requirements of the operating manual or incorrect use of the indicator during operation can lead to the damage to the indicator and the loss of the safety function performed by the indicator itself. This will result in termination of the warranty on the item and will release the manufacturer from any liability.

Warranty

Regarding the device's warranty, see the sales general condition in the contractual center.

Attention

Before proceeding with the installation of the indicator, ensure that the markings on the product are compatible with the ATEX rating of the site of use. Failure to comply with this prescription can cause serious injury to persons including death and/or serious damage to property.

NOTE: All drawings and references contained within this manual are non-contractual and are subject to change without prior notice at the discretion of the Formula Air Group and its partners.

The non-return valves are ATEX certified protective systems which are used to prevent a dust explosion from a vessel to propegate through the ductwork into other areas. The non-return valve cannot isolate a dust explosion when it propagates through the normal air flow direction.

The non-return valves are not designed to prevent the transmission of fire or burning powder transported by the normal process flow.

The non-return valves are built in 3 mm thick 16mo3 steel, powder coated RAL 5010 and the flap of HB400 (Hardox).

Formula Air Non-return valves fulfil all relevant requirement to be used safely in an explosion hazardous environment. To accomplish this, several instructions are described in this manual and shall be following prior to and during operation.

The following harmonized standards have been applied:

EN-ISO80079-36:2016
Explosive atmospheres – Part 36: Non-electrical equipment for explosive atmospheres – Basic method and requirement

EN 16447:2014
Explosion isolation flap valves

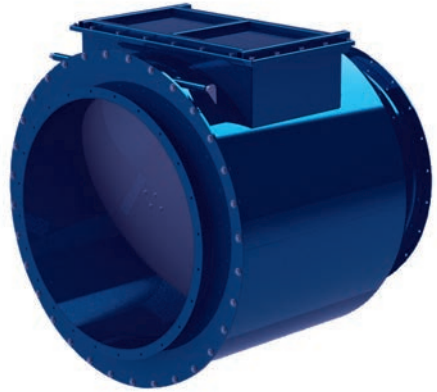


Figure 1. Formula Air Non-return Valve

2.1 How it works

During the normal process, the non-return valve's flap remains opened due to the airflow (Figure: 2). At deadlock, the valve closes due to the flap's own weight.

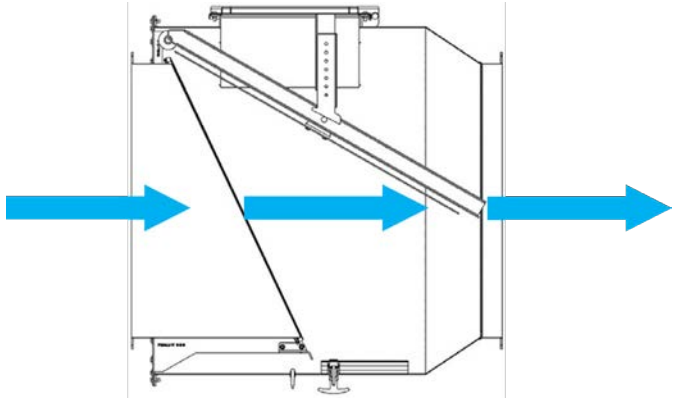


Figure 2. Non-Return Valve in open airflow configuration

When an explosion takes place, the ATEX certified non-return valve blocks the expansion of the explosion due to the front spreading pressure along the ductwork (Figure 3).

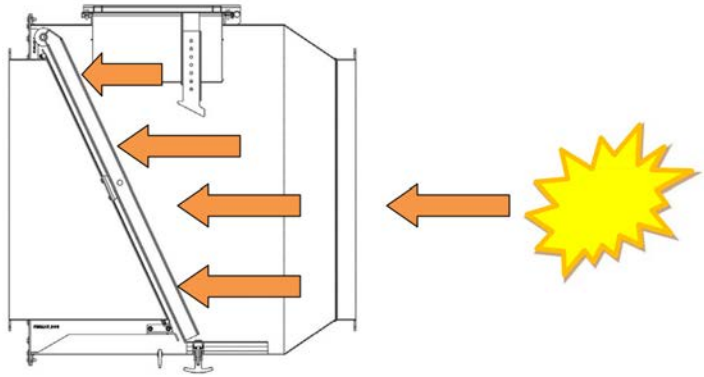


Figure 3. Non-Return Valve in closed configuration

After an explosion and due to pressure oscillations, the valve could re-open. To avoid the re-opening, a safety lock system keeps the valve closed long enough to avoid the propagation of flames during the explosion event, as can be seen in Figure 4. The locking system consists of a spring metal that allows it to bend easily. Therefore, if the flap closes the arm hits the locking system and the top of the locking system will give in. This way, the flap gets locked beneath the top plate of the locking system.

Once the explosion is completely over, the lock must be unlocked manually. Before unlocking the valve flap, the complete valve should be checked after an explosion has occurred for possible damage which could hinder the proper functioning.

Note that the inner flap can also lock itself due to reverse current cleaning of the filter. If this is the case, the installation distance and reverse flow pressure should be checked to reduce the effect on the non-return valve.

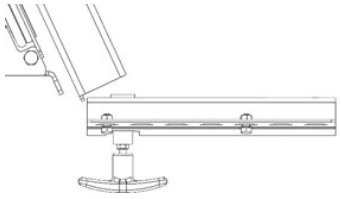
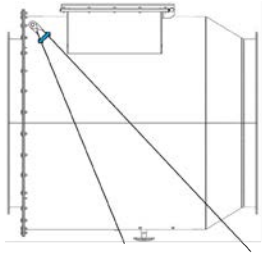


Figure 4. Locking system inside the Non-Return Valve



When the indicator is in this position the flap inside the non-return valve is closed and must be unlocked manually.

When the indicator is this position the flap inside the non-return valve is open.

Figure 5. Illustration how the indicator works when there is an active air current

2.2 Overall dimensions

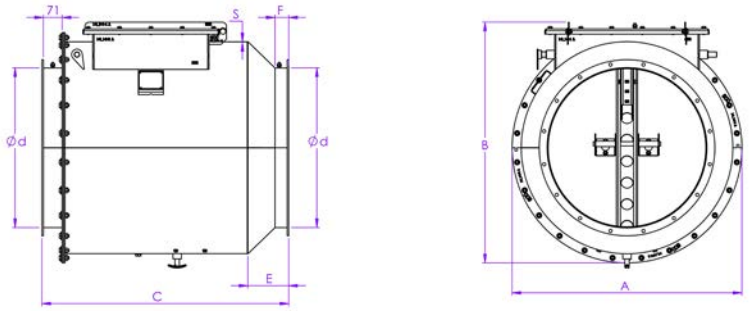


Figure 6. Overall dimensions

Type	Ø d (mm)	A (mm)	B (mm)	C (mm)	E (mm)	F (mm)	S (mm)	Mass (kg)
BADA000018	204	470	510	590	137	52	3	45
BADA000019	254	520	555	620	137	52	3	52
BADA000020	304	570	610	640	137	52	3	60
BADA000021	354	620	660	670	137	52	3	70
BADA000022	404	670	710	735	157	52	3	83
BADA000023	454	720	760	785	157	52	3	94
BADA000024	504	770	810	835	157	52	3	106
BADA000025	554	820	860	885	157	52	3	118
BADA000026	604	870	910	935	157	52	3	130
BADA000010	653	985	1021	+/- 1090	247	71	3	169
BADA000011	703	1035	1072	+/- 1120	247	71	3	185
BADA000012	753	1085	1127	+/- 1150	247	71	3	199
BADA000013	803	1152	1213	+/- 1220	277	71	3	229
BADA000014	853	1202	1263	+/- 1340	277	71	3	241
BADA000015	903	1252	1313	+/- 1340	277	71	3	268
BADA000016	953	1302	1363	+/- 1340	277	71	3	281
BADA000017	1003	1352	1413	+/- 1340	277	71	3	294

2.3 Technical datasheet

2.3.1 Push flow situation

Considering the normal process flow direction, the situation where the fan is located upstream of the explosion source (Figure 7).

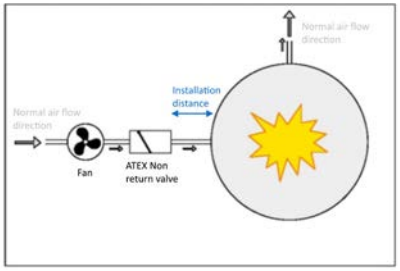


Figure 7. Push flow situation

2.3.2 Pull flow situation

Considering the normal process flow direction, the situation where the fan is located downstream of the explosion source (Figure 8).

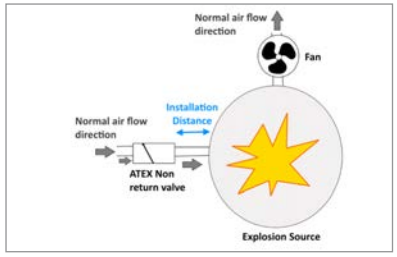


Figure 8. Pull flow situation

2.3.3 Special conditions for safe use

Installation:

- Installation, operation, maintenance and repair in areas with danger of explosions may only be carried out by qualified personnel.
- Ensure that no tools, nuts, bolts, or assembly parts remain in the machine during assembly or maintenance.
- Selection and installation of the electrical parts within hazardous areas shall be carried out according to EN60079-14 and the installation instructions of the specific equipment.
- No potential difference between all metal parts within the non-return valve, or between non-return valve and earth may exist. Therefor earthing resistance between all metal parts and earth shall be measured before operation and shall be maximum 1 MΩ between individual items and to earth and the connected process structure. An earthing resistance higher than 10Ω may indicate bad earth connections.
- An earth connection is provided externally on both sides and a lid of the valve. The external earth connections shall be used to bond other process parts with a equipotential bonding conductor of at least 4 mm^2.
- The valve should only be exposed to organic or non-metallic dust.
- Ambient temperature range: from -20 °C to +60 °C.
- Parameters of the dust: organic non-metal dust, Kst max =200 bar*m/s, Kst min=50 bar*m/s MIE=13 mJ, MIT=430 °C.
- DN 200 – 400: Pull and Push, straight pipes or 2x90° bends (1,5mm full welded) are allowed between the protected vessel and the flap.
- DN 450 – 1000: Pull flow situation, only straight pipes are allowed between non-return valve and vessel equipped with non-reclosing venting elements . This excludes e.g. suppression and venting with reclosing vent devices.
- The maximum air flow speed is 25 m/s;
- The maximum dust concentration in the ducting is without limit.
- The product has to be installed so that the propagating brush discharges on the external surface of the device are avoided.
- The electrical devices installed together with the back-pressure flap must have the type of protection corresponding with the defined explosive zone.
- Non-return valve position is horizontal.

Parameters dependent on the size of the flap:

Parameters of flap (unit):	Sizes DN (mm)			
	200	250-400	450-600	650-1000
$p_{red,\ max}$ (bar)	0,50			
p_{max} (bar) design pressure - EN 14460	1	1	0,8	0,70
minimal vessel volume (m^3)	0,46	0,96	6	6
minimal installation distance (m)	2,2	3,1	4	4
maximal installation distance (m)	7,2	7,2	7,2	7
maximum allowable opening angle of the blade to the vertical	60°	60°	60°	50°
inclination of flap valve	horizontal			
maximum air speed (m/s)	25			
max. dust concentration in duct where device will be installed	no limit			

CAUTION!

The non-return valve installation, connection, start-up and maintenance has to be performed in absence of potentially explosive atmosphere through the process interruption.

CAUTION!

The installation, connection, start-up and maintenance of the non-return valves have to be performed by qualified personnel. Use the right equipment and costumes, and do not work alone.

3.1 Valve installation direction

For a correct installation, the air flow direction in normal working conditions must be the same as indicated by the arrows on Figure 9.

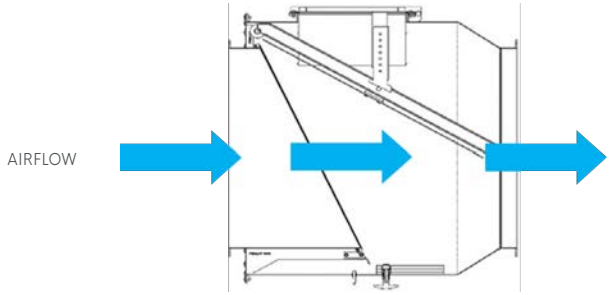


Figure 9. Installation direction regarding to the Air flow

The non-return valve needs to be installed horizontally. The inspection panel must always be set upwards, see Figure 10.

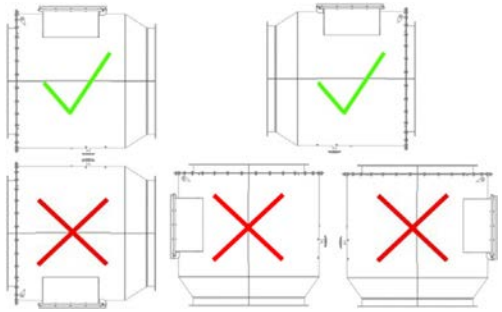


Figure 10. Installation direction

3.2 Connecting the non-return valve

The non-return valve should be placed in proximity of the risk zone for optimal performance.

Step 1: Connect the inlet and outlet to the duct system with the correct fasteners.

Step 2: Make sure that the indicator is in the correct position (Figure 11).

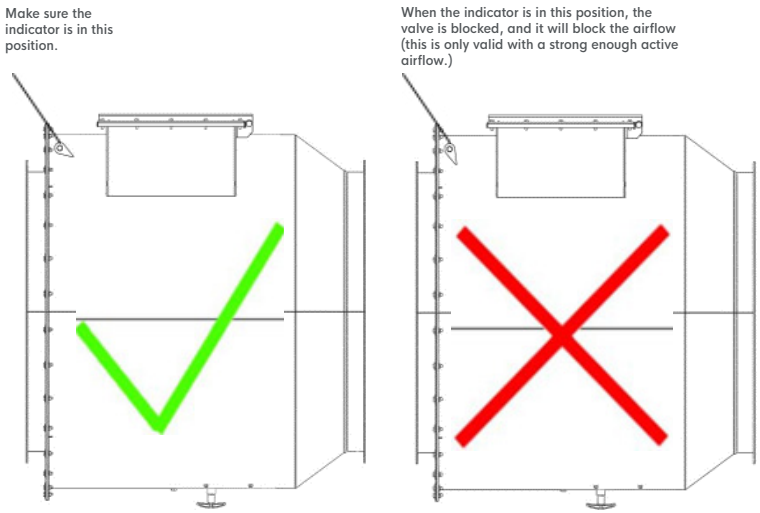


Figure 11. Indicator position

3.3 Precautions for a proper use

CAUTION!

- It is strictly forbidden to open the inspection panel while the installation is running.
- During maintenance keep the system disconnected and all the electrical equipment turned off.
- The valve should not be placed in an environment that could create a vibration in the non-return valve.
- After the event of an explosion, do not unblock or manipulate the non-return valve until the explosion is completely extinguished. Check if the non-return valve and its parts are working properly. Clean the valve. Replace any parts that are damaged!

CAUTION!

Be aware of hot particles remaining inside the valve, even if the explosion is over. While opening the inspection panel, parts can fall off from the inside, damaging the operator or goods.

Every time there is a potentially explosive atmosphere danger, special safety steps must be taken, as the following:

- Tools or operations which can produce sparks, which can cause gas ignition, or flammable vapours, are not allowed to be used in any procedure that takes place in any area classified as explosion risk.
- Avoid dust removal by blowing while cleaning.
- The use of open flames near the explosion risk area is strictly forbidden.

CAUTION!
The non-return valve installation, connection, start-up and maintenance must be performed in absence of potentially explosive atmosphere through the process interruption.

CAUTION!
The installation, connection, start-up and maintenance of the non-return valves must be performed by qualified personnel. Use the right equipment, clothing and individual protection devices according to the situation, and do not work alone.

CAUTION!
Any modifications done by the user on the non-return valve are prohibited.

Replacement parts must be purchased from original manufacturer to guarantee explosion protection.

CAUTION!
Internal parts of the non-return valve need to be inspected every two months for signs of wear. Especially the EPDM valve seal should be intact and in place. If the EPDM valve seal is worn or not fitted correctly, it must be replaced to guarantee explosion safe functioning.

Clean and check the performance of the non-return valve regularly. It is strictly forbidden to open the inspection panel while air is flowing through the non-return valve.

During maintenance keep the system disconnected and all the electrical equipment turned off.

Cleaning and checking the inside of the non-return valve

Step 1: Open the inspection panel as shown in Figure 12.

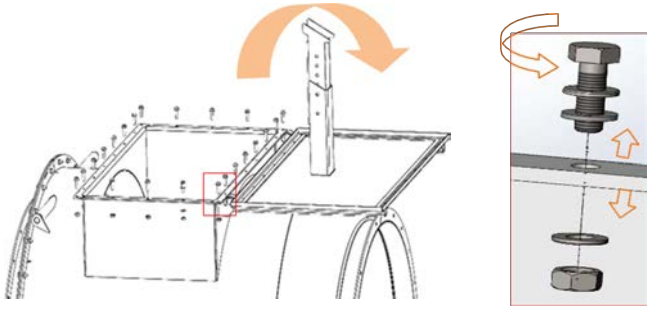


Figure 12. Opening inspection panel

Step 2: Clean the inside of the valve and check the condition of every part.

Step 3: Close the inspection as shown in Figure 13. If necessary, renew the sealing tape to make sure it remains airtight.

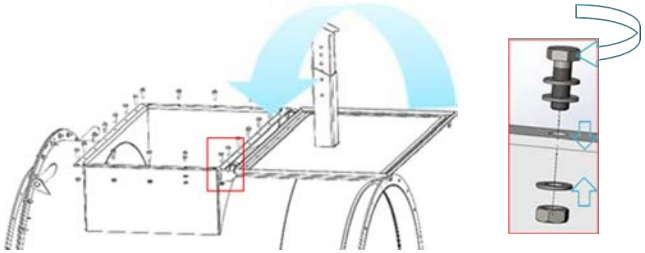


Figure 13. Closing inspection panel

EXPLOSIVE ATMOSPHERE DANGER

This symbol indicates information concerning the directive ATEX 2014/34/EU.

All information attended by this symbol must be executed by highly qualified personnel, competent in safety environments regarding potentially explosive atmospheres.

5.1 Potentially explosive atmosphere

An explosive atmosphere for the purpose of Directive 2014/34/EU is defined as a mixture with air, under atmospheric condition, of flammable substances in the form of gases, vapours, mists or dusts in which, after ignition has occurred, combustion spreads to the entire unburned mixture.

A potentially explosive atmosphere is an atmosphere which could become explosive due to local and operational conditions.

In carrying out the obligations laid down in Directive 99/92/EC, hazardous places are classified in terms of zones based on the frequency and duration of the occurrence of an explosive atmosphere.

Dangerous areas classification

- **Zone 0**: A place in which an explosive atmosphere consisting of a mixture with air of flammable substances in the form of gas, vapor or mist is present continuously, frequently, or for long periods.
- **Zone 1**: A place in which an explosive atmosphere consisting of a mixture with air of flammable substances in the form of gas, vapor or mist is likely to occur occasionally in normal operation.
- **Zone 2**: A place in which an explosive atmosphere consisting of a mixture with air of flammable substances in the form of gas, vapor or mist is not likely to occur in normal operation but, if it does occur, will persist for a short period only.
- **Zone 20**: A place in which an explosive atmosphere in the form of a cloud of combustible dust in air is present continuously, frequently, or for long periods.
- **Zone 21**: A place in which an explosive atmosphere in the form of a cloud of combustible dust in air is likely to occur occasionally in normal operation.
- **Zone 22**: A place in which an explosive atmosphere in the form of a cloud of combustible dust in air is not likely to occur in normal operation but, if it does occur, will persist for a short period only.

The ATEX 2014/34/EU Directive classifies the protection system (in this case the non-return valve) into 3 categories, with different protection levels, guaranteed to the related protection.

Protection Level	Plant
	Dust category
Very High	1D (zone 20)
High	2D (zone 21)
Normal	3D (zone 22)

Figure 14. ATEX classification

5.2 ATEX code description

The non-return valve is marked according the European Directive 2014/34/EU:

II 1D/2D Ex h IIIB T85°C Da/Db
II D St 1
Ta= -20°C to +60°C

In which:

CE:	CE-marking and number of the noticed (monitoring) body (1026) (not for equipment category 3)
Ex:	Explosive protection symbol (ATEX)
II:	Equipment group II for use above ground
1:	Equipment category (Category 2)
2:	Equipment category (Category 2)
D:	Explosive atmosphere (dust)
Ex:	Explosive protection marking
h:	Type of protection
IIIB:	Equipment group (Electrical apparatus group III, subgroup IIIB (non-conductive dust), intended for use in areas where an explosive dust atmosphere is to be expected, other than mines susceptible to firedamp)
T85°:	Surface temperature
Da:	Equipment Protection Level (EPL Da; equipment with very high protection level)
St 1:	Suitable as explosion isolation flap valve for dust explosion class St 1
Ta:	Allowed ambient temperature range

5.3 Production identification

The identification of Formula Air Group as manufacturer of the non-return valve is due to the conformity with the current legislation by means of the following:

- Declaration of conformity according to Directive ATEX 2014/34/EU
- Maintenance manual
- Marking plate ATEX of explosion containment device BADA 200-1000 Figure 15.

	Formula Air Supporting your performance	2 CE 1826 1 P. Motiekaičio g. 3 LT-77104 Šiauliai Lithuania
	Product:	Non-Return Valve
3	Type:	BADA XXXX FF20-ATEX
4	Serial Number:	XXXXXXXXXX
5	Production year:	20XX
6	$P_{Red, max}$	X.X bar
	P_{max}	X.X bar
7	V_{max}	XX m/s
8	T_{amb}	-20°C to +60°C
9	Minimal vessel volume	X m3
10	Inclination of flap valve	Horizontal
11	Max. dust concentration	Without limits
12	ATEX certificate:	FTZÚ 18 ATEX 0141X
13	II D St 1 EN 16447:2014	14 II 1D/2D Ex h IIIB T85°C Da/Db
	Please refer to user manual before installation	

Figure 15. Product name label

Explanation of the label Figure 15:

1) Name and address of the manufacturer
2) CE marking
3) Designation of series of type
4) Serial number
5) Year of construction
6) Explosion resistance pressure or explosion shock resistance pressure for the non-valve*
7) Maximum airspeed
8) Allowed ambient temperature range
9) The volume of equipment where the explosion can occur
10) Positioning of the Non-Return Valve
11) Maximum concentration of dust in duct at install location
12) The certification references
13) The numbers of standard that are used
14) For equipment-group II, G (Gas) and/or D (Dust)**

* According to EN 16447:14.
** According to II ATEX 2014/34/EU minimum info (some other manuals have more info);

Failure	Possible causes	Proposed solutions
Flap locks due too much pressure in the filter during the bags/ cartridge cleaning process. Cleaning process can be made with pressurized air or with regeneration fans!	• Cleaning pressure not set properly – pressure too high for cleaning • Bag, cartridge, or filter media damaged • Installation distance between BADA ATEX valve and filter is not respected • Wrong BADA ATEX valve used (a size too big or too small was selected)	• Check the filter cleaning system pressure and correct it accordingly • Check the bags, cartridges, or filter media for damage • Installation distance between BADA ATEX valve and filter needs to be corrected according to BADA requirements • Change the BADA ATEX valve size for the installation • Unlock BADA closing mechanism
Flap locks or makes noise due to : too high vibrations in the filter/ installation	• Fixing/support points for the ductwork weak or not present • Assembly components are not tight, broken or loosened • Feeding of transported material is not done properly – high-low feeding of the transported material • Inconsistent airflow feeding: airflow is disturbed by regulating valves, machinery, or other devices • Fan not working normally – variation in the working speed (damaged fan blade, variations in the electrical current, irregular working of the inverter) • No vibrations dampers or flexible connections are foreseen between fan/ filter and installation – vibrations from the fan/filter are transmitted to the installation ductwork • Wrong installing position for the BADA ATEX valve • Wrong BADA ATEX valve used (too small or too big size was selected) • Transported material accumulation in the BADA ATEX valve	• Check if there are enough fixing points present and if they are fixed properly • Tighten, check all assembly components • Check if the transported material is feed properly • Check the overall suction balance of the installation and adjust or remove the components that create powerful turbulences • Check if the fan is working properly and if the blade is not damaged or electrical part is not damaged – check also the electrical current flow, check working of the inverter • Check the installation for vibration dampers or flexible connections (if permitted) if they are present and installed properly • Check if the BADA ATEX valve was installed properly • Reconsider the BADA ATEX valve size for the installation • Check and clean the BADA ATEX valve for any transported material accumulation that might block the free movement of the flap • Unlock BADA closing mechanism

6. Troubleshooting

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Failure	Possible causes	Proposed solutions
Flap locking due to, too much pressure in the filter – issue occurring on installations where multiple fans are installed before the filter (positive filtration or push flow situations)	• One-way valves missing, damaged or not working/ installed properly • Distance between BADA ATEX valve and filter is not respected • Wrong BADA ATEX valve used (too small or too big size was selected)	• Check if there are any one-way valves present if they were installed correctly and if they work properly • Installation distance between filter and BADA valve needs to be reviewed according to BADA requirements • Reconsider the BADA ATEX valve size for the installation • Unlock BADA closing mechanism
Flap locking due to, sudden pressure drops in the installation. Some installations are provided with Dampers that can suddenly block the airflow through the installation or that the installation is overloaded, and the installation gets chocked with transported material. NOTE: an emergency shutdown of an installation always requires an in-depth inspection of the whole installation to ensure no fire/damage has occurred.	• Emergency shutdown of the installation due to a fire or explosion that closes the fire dampers and other air inlets. • Fan installed with a brake-motor. • Dampers closing times not adjusted correctly • Transported material chocked the installation due to sudden installation overloading • Wrong setting for fan start /stop sequence • Wrong installing position for the BADA ATEX valve • Wrong BADA ATEX valve used (too small or too big size was selected)	• An in-depth inspection needs to be done of the whole installation to ensure no fire/damage has occurred • Replace the brake motor with an asynchronous motor if the installation permits it. • Check if there are any closing dampers present, if they were installed correctly and if they work properly and closing times are considered and synchronized with the rest of the equipment • Check if there has been a sudden installation overload with transported material • Check the fan start stop sequence • Check if the BADA ATEX valve was installed properly • Reconsider the BADA ATEX valve size for the installation • Unlock BADA closing mechanism

Formula Air
Supporting your performance

7.1 Position sensor

7.1.1 Markings

The sensor is indelibly marked on the outside in a visible way. Marking includes:

- Producer trademark
- Product code
- Batch number and date of manufacture. Example: A17 FD1-411. The batch's first letter refers to the month of manufacture (A=January, B=February, etc.). The second and third letters refer to the year of manufacture (16 =2016, 17=2017, etc...).
- Symbol II 3D Ex tc IIIC T80°C Dc or II 3G Ex nC IIC T6 Gc
- Ambient temperature
- Information regarding voltage and current

7.1.2 Tools

- Hex key 4 mm
- Hex key 5 mm
- Wrench 7 mm
- Wrench 13 mm
- Wrench 17 mm

7.1.3 Fasteners

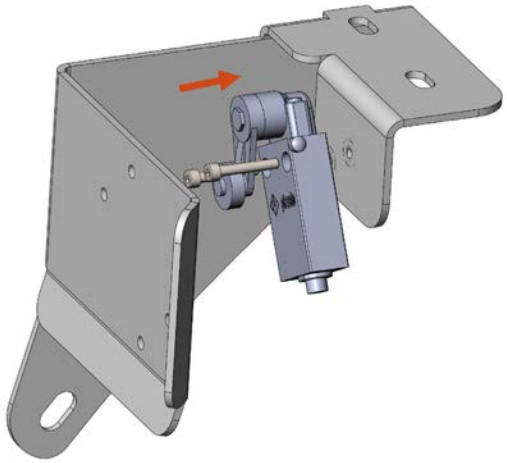
Washer M10 A2	2
Bolt M8x40 A2	2
Nut M8 A2	2
Washer M8 A2	4
Allen screw M4x25 A2	2
Flat Washer M4 A2 (s=1.0mm)	2
Nut M4 A2	2
Allen screw M5x40 A2	4
Flat Washer M5 A2 (s=1.0mm)	4
Nut M5 A2	4

7.1.4 Storage

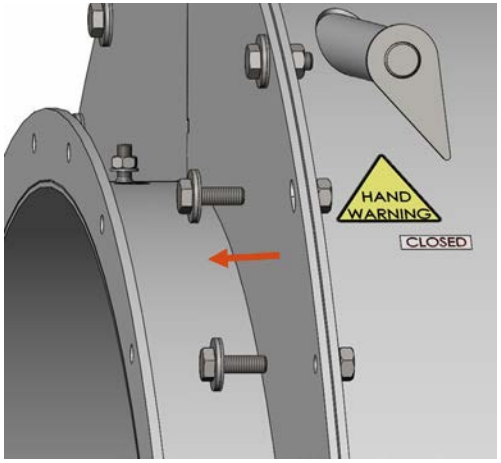
Store the products in their original packaging, in a dry place with temperature ranging between -40°C and +70°C.

7.1.5 Installing the position sensor for ATEX Zone 22

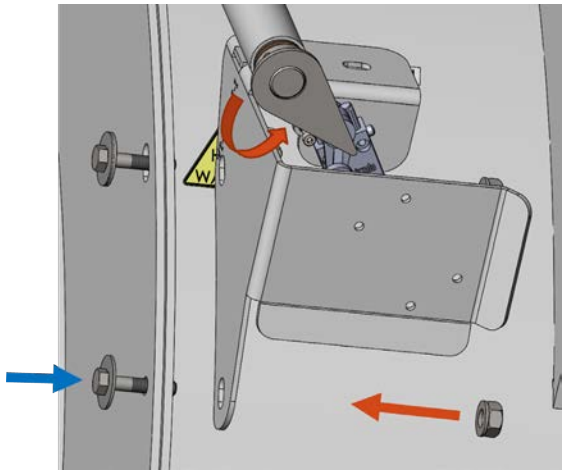
Step 1. Mount the position sensor on the holder:



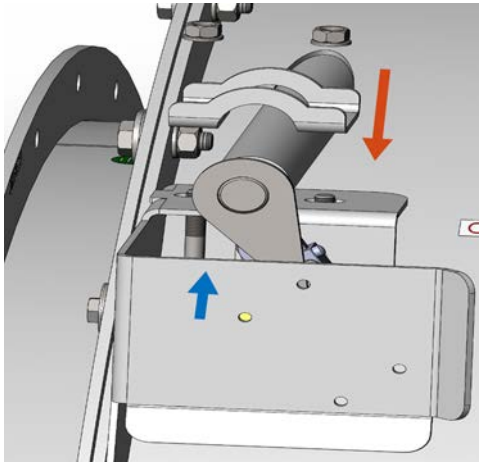
Step 2. Unscrew the screw indicated in the image below:



Step 3. Rotate the indicator slightly counter-clockwise and position the position sensor with the holder at the flange and screw it (loosely) into place:



Step 4. Place the bracket on top of the tube and connect the position holder:



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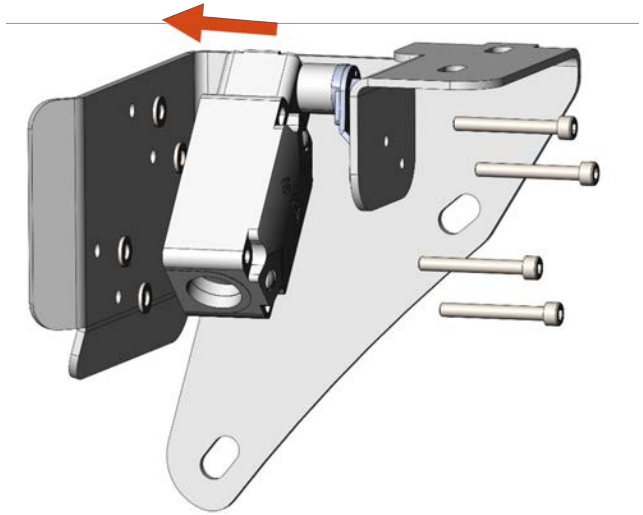
Step 5. Lift the blade and drop it, so it closes but does not get locked. If the sensor is triggered (rotate the rotating rod clockwise and check if you hear a click), readjust the indicator so that it does not trigger the sensor. **You can adjust the indicator by unscrewing the Allen screw (m4) and rotate the indicator.**

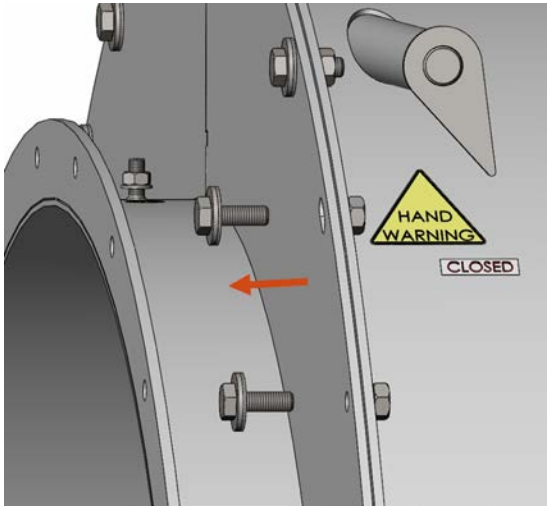
Step 6. Lift the blade and throw it downwards, so it gets locked. If the sensor does not get triggered, rotate the rotating rod clockwise and check if you hear a click), readjust the indicator so that it does trigger the sensor. If you had to readjust it go back to step 5.

7.1.6 Installing the position sensor for ATEX Zone 21

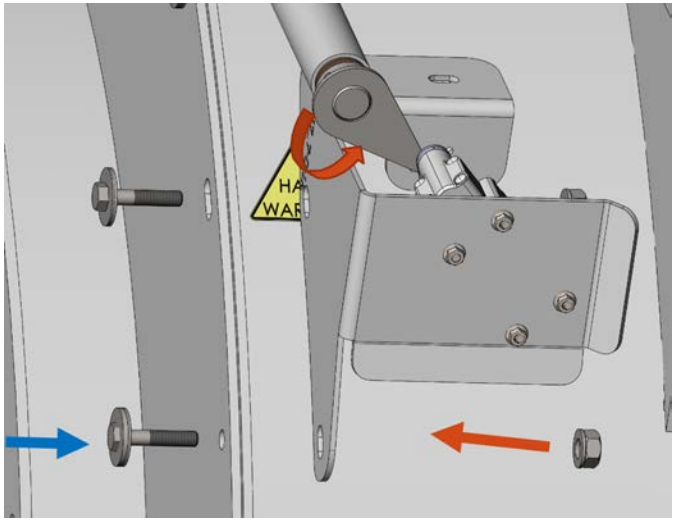
Step 1. Screw the position sensor on the holder:



Step 2. Unscrew the screw indicated in the image below:



Step 3. Rotate the indicator slightly counter clockwise and position the position sensor with the holder at the flange and screw it (loosely) into place:



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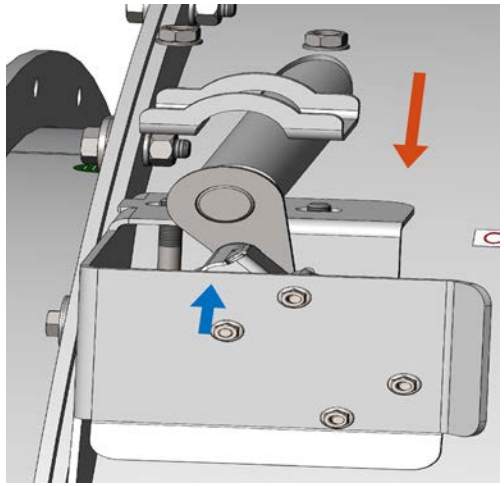
Step 4. Place the bracket on top of the tube and connect the position holder:



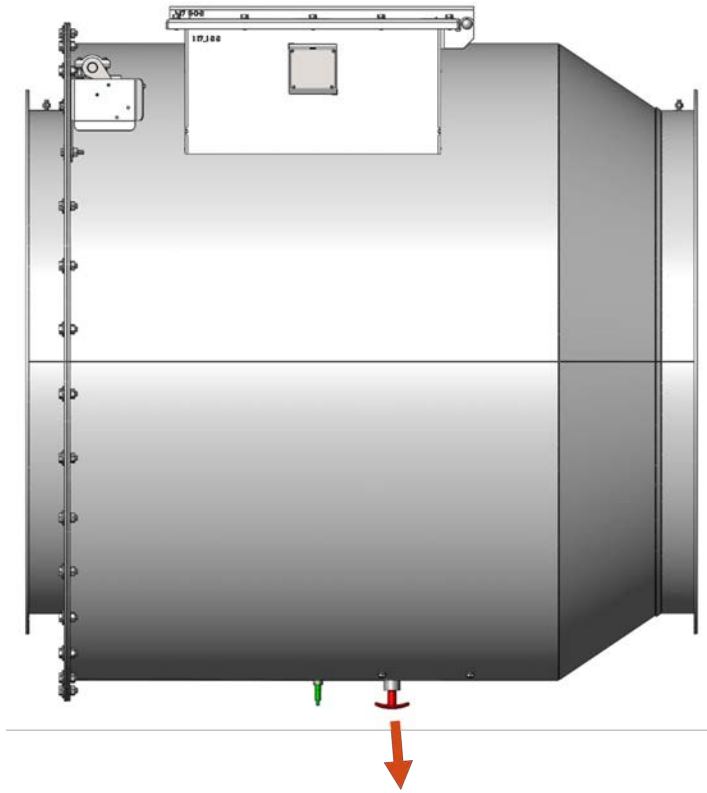
Step 5. Lift the blade and drop it, so it closes but does not get locked. If the sensor is triggered (rotate the rotating rod clockwise and check if you hear a click), readjust the indicator so that it does not trigger the sensor. **You can adjust the indicator by unscrewing the Allen screw (m4) and rotate the indicator.**

Step 6. Lift the blade and throw it downwards, so it gets locked. If the sensor does not get triggered (rotate the rotating rod clockwise and check if you hear a click), **readjust the indicator so that it does trigger the sensor. If you had to readjust it go back to step 5.**

7.1.7 Resetting of the sensor

When an explosion occurs, or the sensor is triggered due to high-pressure cleaning use this document to reset the sensor.

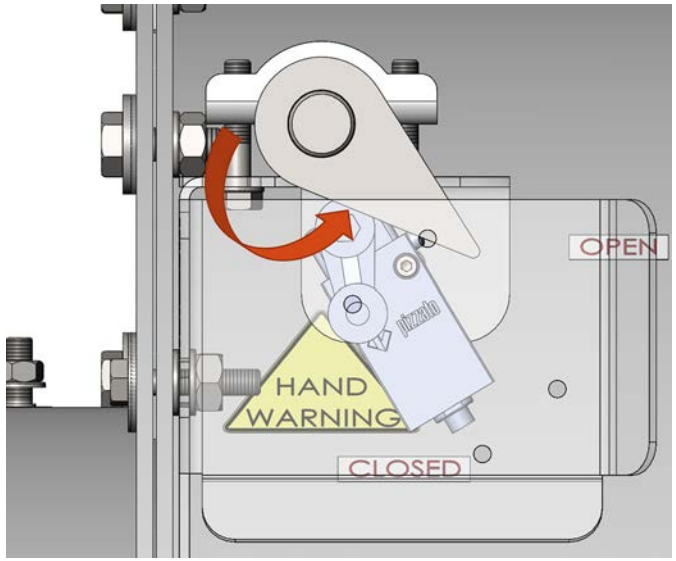
Step 1. Unlock the system by pulling the handle on the bottom of the valve:



Attention: Before unlocking the valve flap, the complete valve should be checked after an explosion has occurred for possible damage which could hinder the proper functioning.

Note that the inner flap can also lock itself due to reverse current cleaning of the filter. If this is the case, the installation distance and reverse flow pressure should be checked to reduce the effect on the non-return valve.

Step 2. Tilt the blade upwards until the sensor resets:



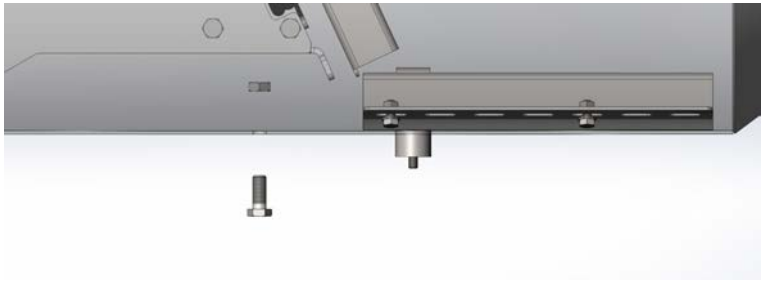
7.2 Dust level sensor

7.2.1 Tools

Wrench 17 mm
2x Nut M10 A2

7.2.2 Installing the dust level sensor

Step 1. Un-screw and remove the bolt and nut in the bottom of the valve:



Step 2. Put the bottom screw on the dust level sensor and insert it in the hole at the bottom of the valve:

7. Position and dust level sensors

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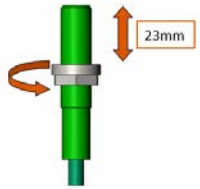
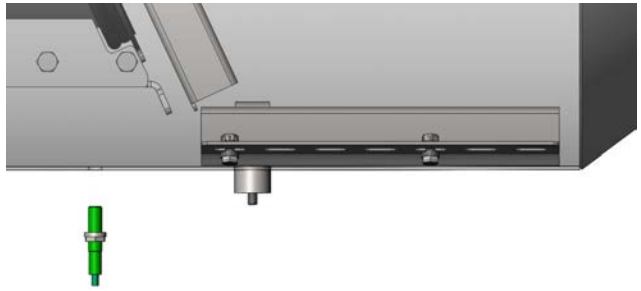
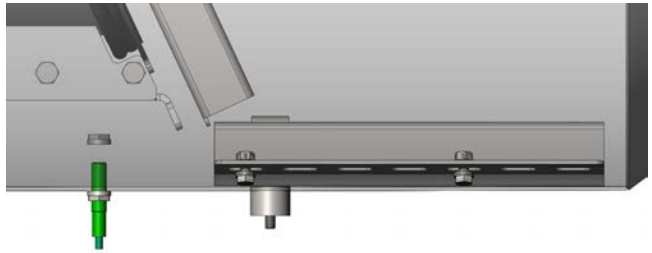
Step 3. Put the bottom screw on the dust level sensor and make sure the nut is positioned 23mm from the top:



Step 4. Insert the dust level sensor in the hole at the bottom of the valve till the nut touches the valve:



Step 5. Place the second nut on the onside on the dust level sensor and tighten it:



7.3. Specifications

7.3.1 Electrical connection

Attention:
The electrical parameters are indicated on the product and in the catalogue and must be strictly observed.

Keep the charge within the values specified in the electrical operation categories.

Always connect the protection fuse (or equivalent device) in series to the NC safety electrical contacts.

Attention:
Do not open the device if voltage is present.

7.3.2 Maintenance and functional tests

Attention:
Do not disassemble or try to repair the device. In case of any malfunction or failure, replace the entire device.

Attention:
In case of damages or wear it is necessary to change the whole device. Correct operation cannot be guaranteed when the device is deformed or damaged.

The device installer is responsible for establishing the sequence of functional tests to which the device is to be subjected before the machine is started up and during maintenance intervals.

The sequence of the functional tests can vary depending on the machine complexity and circuit diagram, therefore the functional test sequence detailed below is to be considered as minimal and not exhaustive.

Perform the following sequence of checks before the machine is commissioned and at least once a year (or after a prolonged shutdown):

1. Switch on the device and verify that the machine behaves as expected.
2. Turn off the device and verify that the machine behaves as expected.
3. Clean the device and avoid the formation of dust layers on the device itself.
4. All external parts must be undamaged.
5. If the device is damaged, replace it completely.
6. The device has been created for applications in dangerous environments, therefore it has a limited service life. Although still functioning, after 20 years from the date of manufacture the device must be replaced completely. The date of manufacture is placed next to the product code.

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7.3.3 Restrictions

- Do not modify the device for any reason.
- If the device performs an operator protection function in accordance with EN ISO 14119, improper installation or tampering can cause serious injury to persons and even death.
- These devices must not be bypassed, removed, turned or disabled in any other way.
- If the machine where the device is installed is used for a purpose other than that specified, the device may not provide the operator with efficient protection.
- The safety category of the system according to EN ISO 13849-1, including the safety device, also depends on the external components connected to it and their type.
- Before installation, make sure the device is not damaged in any part.
- Before installation, ensure that the connection cables are not powered.
- Avoid excessive bending of connection cables to prevent any short circuits or power failures.
- Do not paint or varnish the device.
- Do not drill in the device.
- Do not use the device as a support or rest for other structures.
- Before commissioning, make sure that the entire machine (or system) complies with all applicable standards and EMC directive requirements.
- The switch fitting surface must always be smooth and clean.
- The documents necessary for a correct installation and maintenance are always available in the multiple languages.
- These operating instructions must be kept available for consultation at any time and for the whole period of use of the device.

Do NOT use the device in the following situations:

- In environments where continual changes in temperature cause the formation of condensation inside the device.
- In environments where the application causes collisions, impacts or strong vibrations to the device.
- In environments where ice can form on the device.
- In environments containing strongly aggressive chemicals, where the products used is in contact with the device may impair its physical or functional integrity.
- In environments where dust and dirt accumulate on the device and stop its proper functioning.

8. Dismantling and recycling

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

CAUTION!
Make sure there is no remaining any explosion potential dust of similar before dismantling. As the unit is dismantled, set aside all still functioning parts to re-use them on another unit. You should always separate the different materials depending on their type: steel, stainless steel, rubber, foams, etc...

Recyclable parts must be disposed in the appropriate containers or brought to a local recycling company. The rubbish must be collected in special containers with appropriate labels and disposed in compliance with the nation laws and/or local legislations if force.

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

9. Maintenance / Onderhoud / Wartung

date/datum	description/beschrijving/beschreibung

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Supporting your performance

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