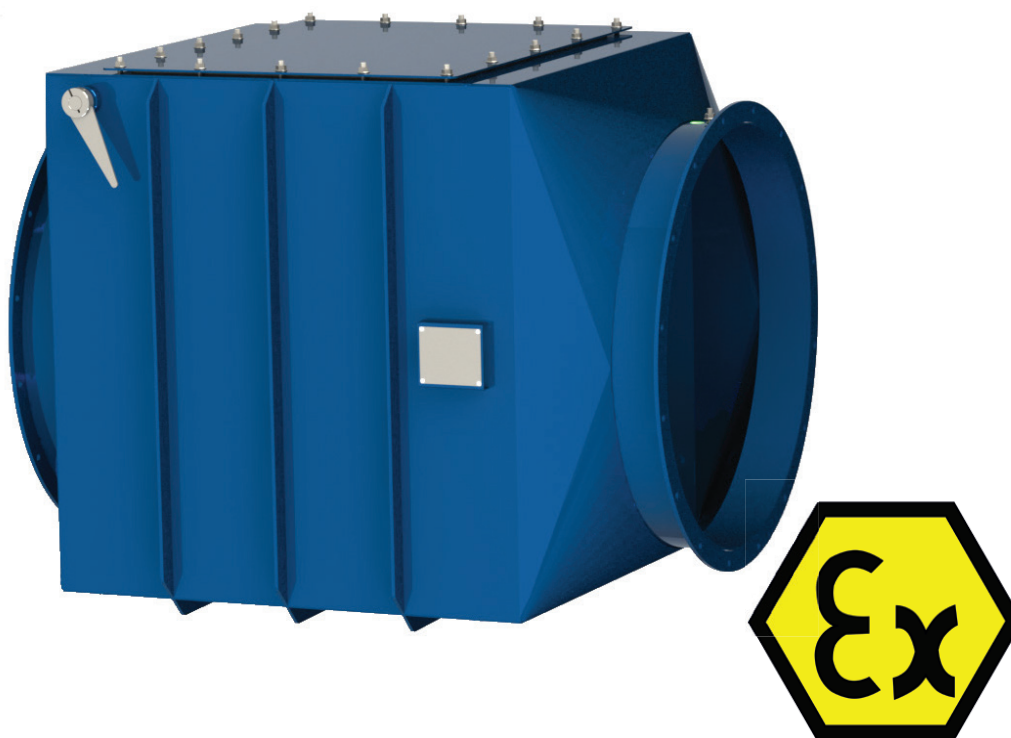




**GEOVENT**

## INSTRUCTION MANUAL



# EXPLOSION RETENSION VALVE-ATEX

Non-Return Valve



## Contents

General safety precautions	3
1. PRODUCT DESCRIPTION	3
How it works	3
1.1 Overall dimensions	4
1.2 Technical datasheet	4
1.2.1 Push flow situation	5
1.2.2 Pull flow situation	5
1.3 Special conditions for safe use	5
2. INSTALLATION	5
2.1 Valve installation direction	6
2.2 Connecting the non-return valve	6
2.3 Precautions for a proper use	7
3. MAINTENANCE AND TROUBLESHOOTING	7
3.1 Maintenance	7
3.1.1 Cleaning and checking the inside of the non-return valve	7
4. DISMANTLING and RECLYING	7
5. ATEX CERTIFICATION	8
5.1 Potentially explosive atmosphere	8
5.1.1 Dangerous areas classification	8
5.1.2 Protective system's selection criteria	8
5.2 ATEX code description	8
5.3 Product identification	9
6. USEFUL INFO RELATED TO THIS MANUAL	9
7. SPARE PARTS	9

## General safety precautions

**IMPORTANT** – Please study all the instructions before mounting and commissioning.

Please keep these instructions in a safe place and instruct all users in the function and operation of the product.

Exchange of filter/maintenance should only be implemented after studying section 4 thoroughly.

Avoid the dismantling of any factory-mounted parts, since it impedes the commissioning of the equipment.

All electrical installations must be carried out by an authorised electrician.

## 1. Product description

The non-return valves are ATEX certificated protective systems which prevent a dust explosion propagation from a filter (or storage) towards the rest of the installation. 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 housing of non-return valves is made of 2 or 3 mm thick 16mo3 steel powder coated RAL 5010 and the flap of HB400 (Hardox).

The Geovent ATEX non-return valves are certified according to EN 16447.

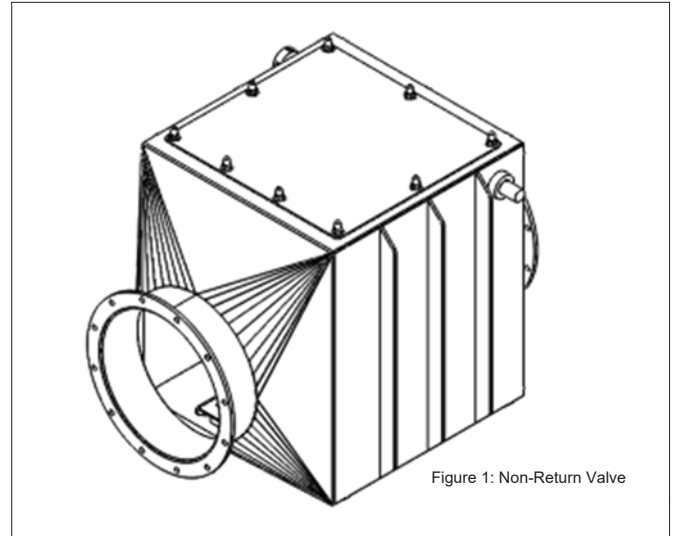


Figure 1: Non-Return Valve

## 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.

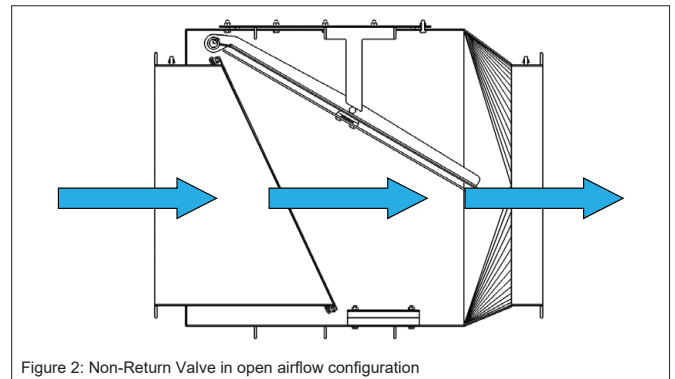


Figure 2: Non-Return Valve in open airflow configuration

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).

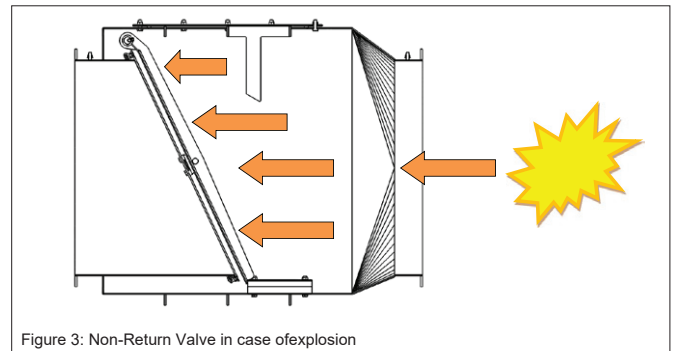
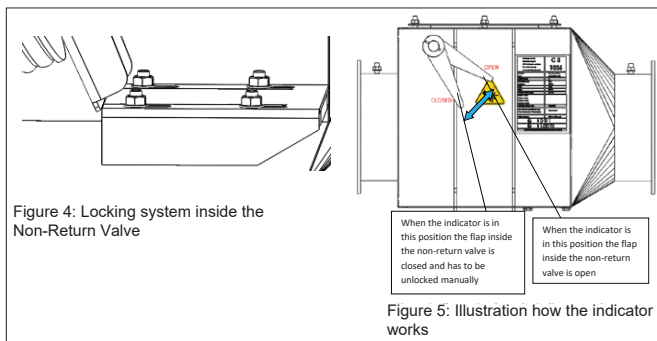
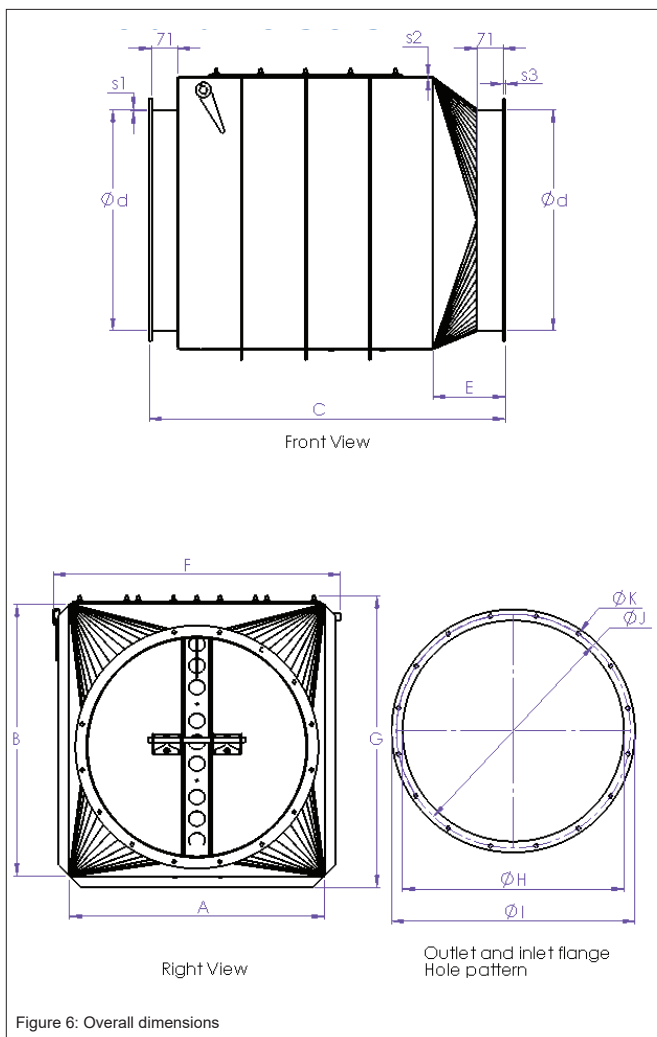


Figure 3: Non-Return Valve in case of explosion

After an explosion, the valve could re-open due to pressure oscillations. 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 has to be unblocked manually. The indicator on the outside of the non-return valve shows the current position of the flap. Therefore, it can be easily seen if the flap is closed and locked (see Figure 5).



## 1.1 Overall dimensions



Type	Ø d (mm)	A (mm)	B (mm)	C (mm)	E (mm)	F (mm)	G (mm)	Mass (kg)
Explosion retention valve ø200 - ATEX	204	334	344	569	85	436	397	25
Explosion retention valve ø250 - ATEX	254	406	466	645	90	500	518	47
Explosion retention valve ø300 - ATEX	304	406	466	645	90	500	518	49
Explosion retention valve ø350 - ATEX	354	506	566	750	93	600	618	68
Explosion retention valve ø400 - ATEX	404	506	566	750	93	600	618	70
Explosion retention valve ø450 - ATEX	454	606	666	857	102	700	718	91
Explosion retention valve ø500 - ATEX	504	606	666	857	102	700	718	94
Explosion retention valve ø550 - ATEX	554	697	746	972	122	785	798	115
Explosion retention valve ø600 - ATEX	604	697	746	972	122	785	798	117

Type	Ø H (mm)	Ø I (mm)	Ø J (mm)	Ø K (mm)	Qty. Flange holes	s1 (mm)	s2 (mm)	s3 (mm)
Explosion retention valve ø200 - ATEX	205	255	235	9	12	2	2	5
Explosion retention valve ø250 - ATEX	255	305	285	9	12	3	3	5
Explosion retention valve ø300 - ATEX	305	355	336	9	12	3	3	5
Explosion retention valve ø350 - ATEX	355	415	389	11	12	3	3	6
Explosion retention valve ø400 - ATEX	405	465	439	11	16	3	3	6
Explosion retention valve ø450 - ATEX	455	515	489	11	16	3	3	6
Explosion retention valve ø500 - ATEX	505	565	540	11	16	3	3	6
Explosion retention valve ø550 - ATEX	555	615	590	11	16	3	3	6
Explosion retention valve ø600 - ATEX	605	665	640	11	16	3	3	6

## 1.2 Technical datasheet

Characteristics of dust in relation with the ATEX non-return valve:

Type	Zone
Explosion retention valve ø200 mm	Internal: 20-21-22 External: 21-22
Explosion retention valve ø250 mm	Internal: 20-21-22 External: 21-22
Explosion retention valve ø300 mm	Internal: 20-21-22 External: 21-22
Explosion retention valve ø350 mm	Internal: 20-21-22 External: 21-22
Explosion retention valve ø400 mm	Internal: 20-21-22 External: 21-22
Explosion retention valve ø450 mm	Internal: 20-21-22 External: 21-22
Explosion retention valve ø500 mm	Internal: 20-21-22 External: 21-22
Explosion retention valve ø550 mm	Internal: 20-21-22 External: 21-22
Explosion retention valve ø600 mm	Internal: 20-21-22 External: 21-22

### 1.2.1 Push flow situation

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

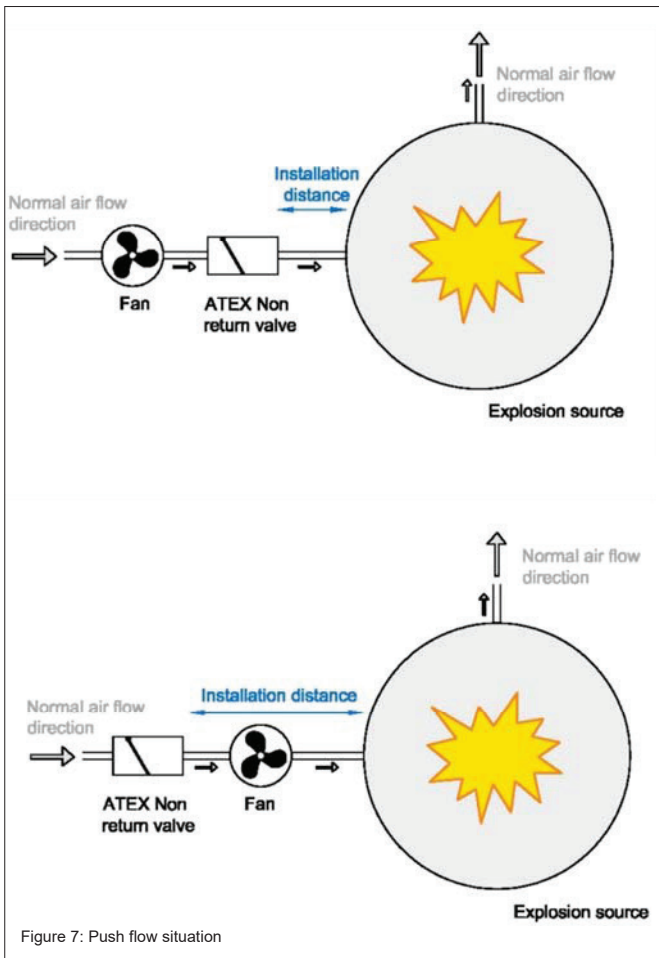


Figure 7: Push flow situation

### 1.2.2 Pull flow situation

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

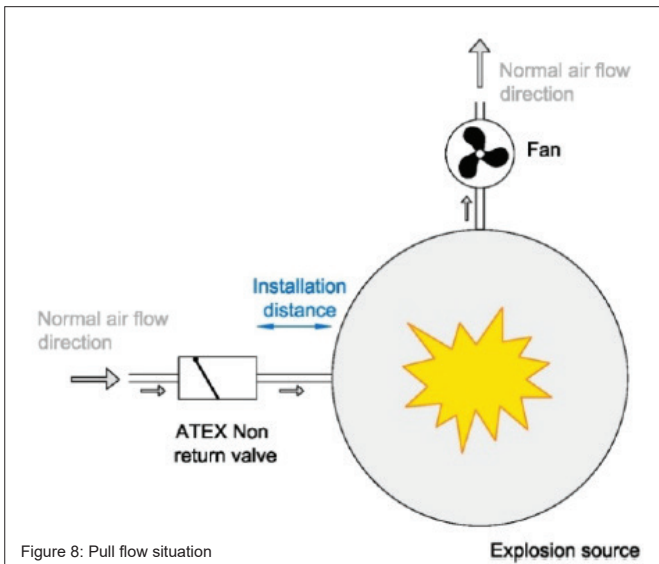


Figure 8: Pull flow situation

### 1.3 Special conditions for safe use

#### Installation:

- The valve should only be exposed to organic or non-metallic dust.
- Ambient temperature from -20 °C to 60 °C.
- Dust parameters: Kst, max - 20 MPa.ms<sup>-1</sup>, MESG - 2 mm
- DN 200 – 400: Pull and push, straight pipes between the protected vessel and the flap.
- DN 450 – 600: Pull flow situation, straight pipes between the protected vessel and the flap and venting on the protective vessel only non-reclosing vent devices (this excludes e.g. suppression and venting with reclosing vent devices).
- The maximum allowable opening angle of the blade is 60° to the vertical.
- The maximum flow velocity is: 25 m/s.
- Flap position is horizontal.

#### Parameters dependent on the size of the flap:

Parameters of flap (unit):	Sizes DN (mm):		
	200	250 - 400	450-600
pred, max (bar)	0,50		
pmax (bar) design pressure- EN 14460	1		
minimal vessel volume (m <sup>3</sup> )	0,4	0,9	6
minimal installation distance (m)	2	2	3
maximal installation distance (m)	7		
inclination of flap valve	Horizontal		
maximal speed flow (m.s <sup>-1</sup> )	25		
max. dust concentration in duct where device will be installed	Without limits		

### 2. Installation

**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 clothing, and do not work alone.



## 2.1 Valve installation direction

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

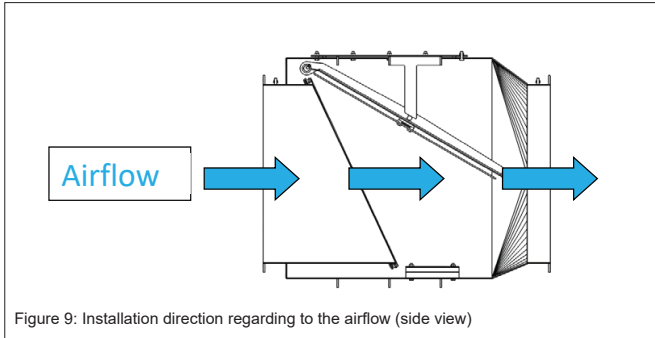


Figure 9: Installation direction regarding to the airflow (side view)

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

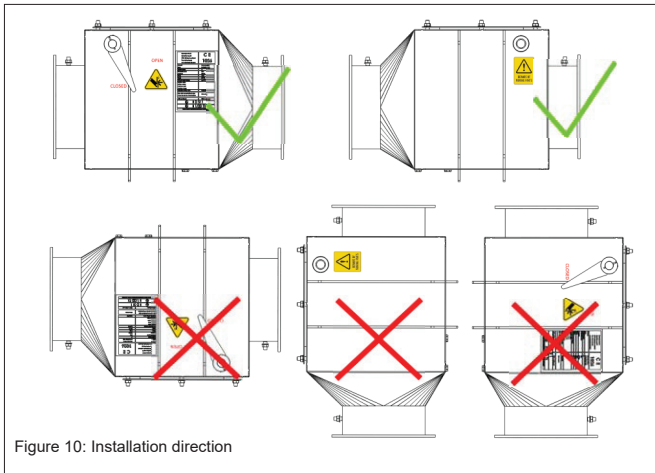


Figure 10: Installation direction

## 2.2 Connecting the non-return valve

For the best isolation effectiveness, the non-return valve needs to be installed in proximity of the risk zone which it is wanted to be isolated.

Step 1: Connect the inlet and outlet to the duct system with the correct fasteners (Figure 11). Use non-electrostatic sealing to make it airtight.

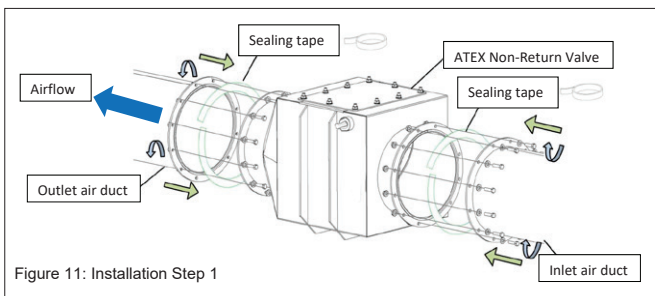


Figure 11: Installation Step 1

Step 2: Make sure that the indicator is in the correct position (Figure 12).

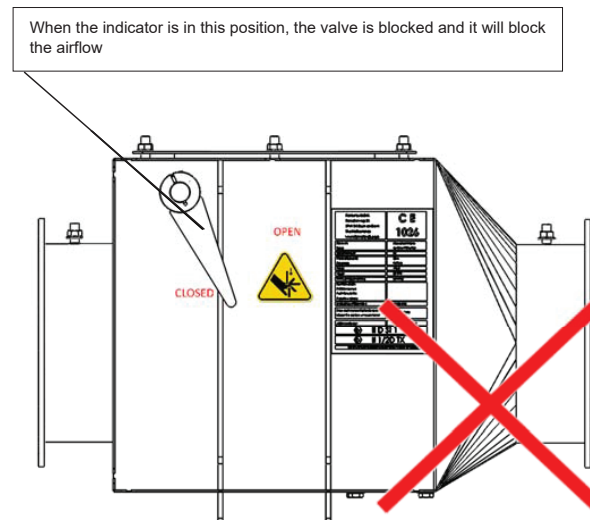
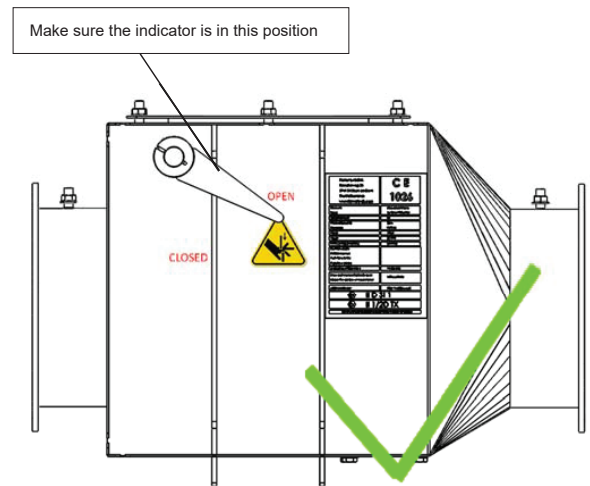


Figure 12: Indicator Position

Step 3: Connect inlet, outlet and inspection cover grounding points marked  $\oplus$  to the ductwork (Figure 13). Use at least 4 mm<sup>2</sup> cables.

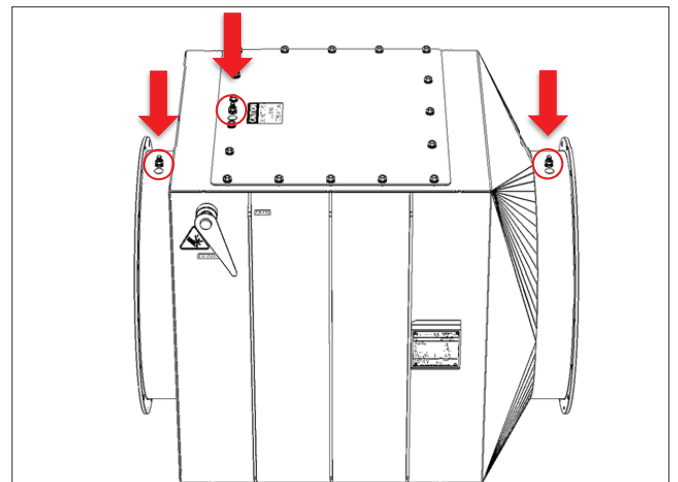


Figure 13: Grounding points



**CAUTION!** If grounding cables were disconnected during maintenance, they must be properly reconnected before restarting the system.

## 2.3 Precautions for a proper use

### CAUTION!

- It is strictly forbidden to open the inspection panel while the air flow is running through the duct.
- 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 nonreturn 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. If any part got damaged, replace it!

### 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:



- The non-return valve is allowed to be used in places where the risk of igniting the explosive atmosphere can't be brought to the minimum tolerable.



- Tools or operations which can produce sparks, which can cause gas ignition, or flammable vapors, 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 free flames near the explosion risk area is strictly forbidden.



- The use of electric material that is not marked II of the Directive 99/92/CE is not allowed.

## 3. Maintenance and troubleshooting

**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,

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!!

## 3.1 Maintenance

Clean and check the performance of the non-return valve regularly. Checking is suggested every two months and after any incident that can block or damage the non-return valve. It is strictly forbidden to open the inspection panel while the air flow is running through the duct. During maintenance keep the system disconnected and all the electrical equipment turned off.

### 3.1.1 Cleaning and checking the inside of the non-return valve

Step 1: Open the inspection panel as shown in Figure 14.

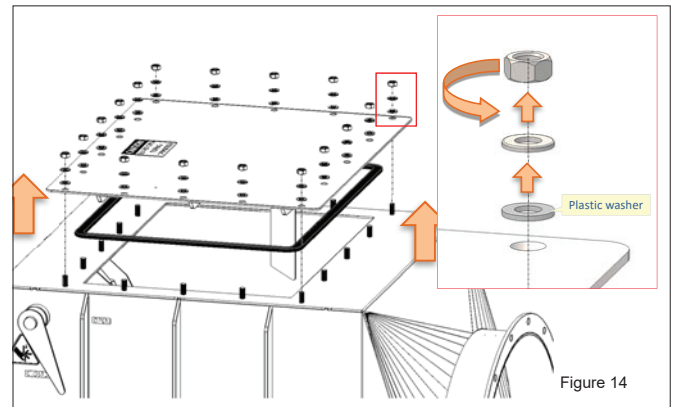


Figure 14

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

Step 3: Close the inspection as shown in Figure 15. If necessary, renew the sealing tape to make sure it remains airtight.

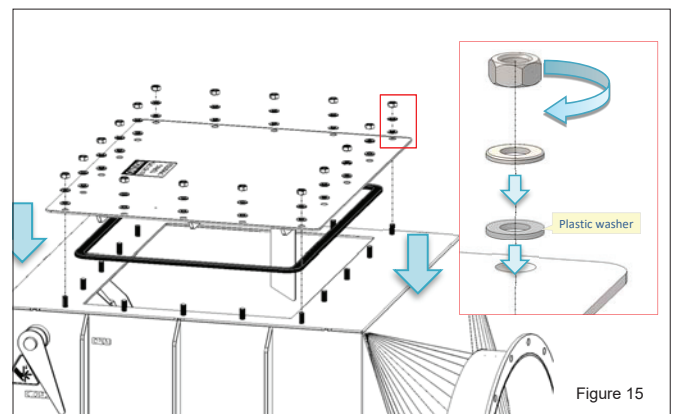


Figure 15

## 4. Dismantling and reclying

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

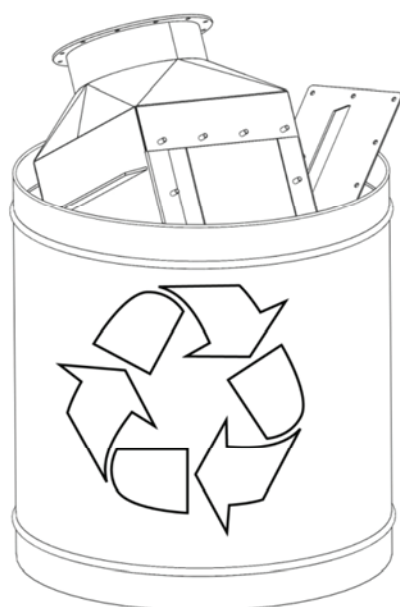
**CAUTION!** Make sure there is no remaining any explosion potential dust of similar before dismantling.

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.



## 5. ATEX CERTIFICATION

### EXPLOSIVE ATMOSPHERE DANGER

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

Every information attended by this symbol must be executed by highly qualified personnel, competent in safety environments regarding to places characterized by the presence of 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, vapors, 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.

### 5.1.1 Protective system's selection criteria

The ATEX 2014/34/EC 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	Mine	Above ground	
	Category	Gas	Dust
		Category	Category
Very High	M1	1G (zone 0)	1D (zone 20)
High	M2	2G (zone 1)	2D (zone 21)
Normal	-	3G (zone 2)	3D (zone 22)

### 5.2 ATEX code description

(1) (2) (3) (4) (5) (6) (7) (8)  
**CE**  **II 1/2 D Ex IIIC TX**

- (1) CE mark
- (2) Explosive atmosphere danger symbol (ATEX)
- (3) Equipment group (II = above ground)
- (4) Equipment category (1 = zones 20, 21, 22 inside; 2 = zones 21, 22 outside)
- (5) Explosive atmosphere caused by the presence of dust (D)
- (6) Protection group (Ex = explosion proof)
- (7) Dust group (III = dust, C = category C)
- (8) Temperature class (X = special case specified within this manual)

### 5.3 Product identification

The identification of Geovent 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 anti-return valve (Figure 16).



<div> <div>1</div>  </div>	
2	Product
3	Type
4	Serial number
5	Production year
6	Max. explosion reduced pressure, $P_{red, max}$
7	Explosion resistance pressure, $P_{max}$
8	Max. flow velocity, $V_{max}$
9	Ambient temperature, $T_{amb}$
10	Minimal vessel volume
11	Inclination of flap valve
12	Max. dust concentration
13	ATEX certificate number
14	Number of standard
15	<div> <div>CE</div> <div>1026</div> <div> <div>Ex</div> <div>II 1/2 D TX</div> </div> <div> <div>Ex</div> <div>St1</div> </div> </div>
16	Flow 
17	
Please refer to user manual before installation	

Figure 16: Example of name label used for every ATEX Non-Return Valve



**Explanation of the label (Figure 16):**

1. Name and address of the manufacturer
2. Designation of series
3. Designation of type
4. Product serial number
5. Year of manufacturing
6. Maximum reduced explosion pressure\*\*
7. Maximum explosion resistance pressure\*\*
8. Maximum flow speed
9. Ambient temperature range
10. Minimum volume of the vessel (filter)
11. Mounting position
12. Maximum dust concentration in the duct at installation location
13. The certification reference
14. Standard according to product was certified
15. CE marking and notified body identification number
16. Marking based on product certification\*. St1 – marking of protective system.
17. Normal flow direction

\* According to ATEX 2014/34/EU minimum info and certificate requirements.

\*\* According to EN 16447.

**6. USEFUL INFO RELATED TO THIS MANUAL**

This manual is compiled in accordance with the Directive ATEX 2014/34/EU.

Every step of the non-return valve all along its life cycle has been deeply analyzed by Geovent in the expected area during the design, construction and maintenance manual creation. However, it is understood that nothing can replace the experience, training and good sense of those professionals who work with the device.

Ignoring the cautions and warning from the present manual, using improperly parts or the whole device supplied, using unauthorized spare parts, handling of the device by non-qualified personnel, violation of any safety norm regarding design, construction and use expected by the supply, release Geovent from every responsibility in case of damages to people or properties.

Converting or modifying the non-return valve is prohibited and annuls the ATEX certification properties as we cannot insure the proper functioning

Geovent does not take any responsibility for the non-observance of the user with regard to the preventive safety measures presented in this manual.

**Warranty:**

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

**7. SPARE PARTS**

Contact Geovent for further information



## 8.0 Declaration of conformity



HOVEDGADEN 86 • DK-8831 LØGSTRUP  
(+45) 8664 2211 • salg@geovent.dk

The manufacturer: GEOVENT A/S  
HOVEDGADEN 86  
DK-8831 LØGSTRUP

Hereby declares that:

The product: Atex  
Model: Explosion retension valve

has been manufactured in compliance with the following directives and standards:

European Parliament and Council Directive 2006/42/EC of 17 May 2006 on machinery, and amendments to Directive 95/16/EC.

The following harmonized standards have been applied:

- |                    |  |
|--------------------|--|
| EN ISO 12100:2011  | Safety of machinery – General principles for design – Risk assessment and risk reduction             |
| EN ISO 1127-1:2011 | Explosive atmospheres - Explosion prevention and protection - Part 1: Basic concepts and methodology |
| DS/EN 14986:2017   | Design of fans working in potentially explosive atmospheres  |

Authorized to collect the technical file:

Lise Cramer

Date: 16.12.2019

Position: Director  
Name: Thomas Molsen

Signature:





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