



# Plug Sliding Door System 2

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## Maintenance Manual

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## Revision history

Revision	Date	By	Description
0.4	2018-11-15	M.Stoelinga	Rephrased safety checks. Added "Only applicable for electric systems" to spindle nut. Changed reference from appendix to installation manual. Adjusted contact information.
0.3	2018-11-13	M.Stoelinga	Adjusted emergency release. Removed step 3. Added contact page. Added simple check, sensitive edge procedure. Small changes to introduction for safety parts and wear parts.
0.2	2018-11-02	M.Stoelinga	Maintenance frequencies changed.
0.1	2018-10-10	M.Stoelinga M.Delorme	Initial version



## Preface

The Quality System of Ventura Systems is accredited to EN ISO 9001:2015

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## Table of Contents

1 Introduction .....	6
1.1 Purpose .....	6
1.2 Scope .....	6
1.3 Definitions .....	6
1.4 Acronyms and Abbreviations .....	6
1.5 References .....	6
1.5.1 External documents .....	6
1.6 Overview .....	6
2 Door installation safety .....	7
2.1 General .....	7
2.2 Disclaimer .....	7
2.3 Safety alert symbols .....	8
2.4 Safety instructions .....	9
3 Maintenance .....	10
3.1 Safety parts .....	10
3.1.1 Lever block .....	10
3.1.2 Clamping force test .....	11
3.1.3 Emergency release .....	12
3.1.4 Sensitive edge .....	13
3.1.5 Obstruction detection unit .....	14
3.1.6 Micro switches (Switch & Cams) .....	15
3.2 Wear parts .....	16
3.2.1 Spindle Nut .....	16
3.2.2 Over center soft stopper .....	17
3.2.3 Cushioning rubber bearing house .....	18
3.2.4 Guide rollers .....	18
3.2.5 Catch block .....	19
3.2.6 Bottom stopper .....	20
3.3 Parts inspections .....	21
3.3.1 Door shafts .....	21
3.3.2 Filter regulator .....	22
3.3.3 Tension steel cables .....	23
3.3.4 Grease bearing house .....	23
3.3.5 Grease spiral cable guiding shaft .....	24
4 Operational checks .....	25
4.1 Operation and controls .....	25
4.2 Safety checks .....	25
5 Contact .....	26

## List of Figures

Figure 1: Lever block .....	10
Figure 2: Obstruction test setup .....	11
Figure 3: Dismount the door leaf .....	13
Figure 4: Disconnect the sensitive edge connectors .....	13



Figure 5: connect multimeter to the obstruction detection unit .....	14
Figure 6: Door open micro switch .....	15
Figure 7: Door closed micro switch .....	15
Figure 8: Spindle nut .....	16
Figure 9: Over-center electric with unlock cylinder .....	17
Figure 10: Over-center pneumatic with unlock cylinder.....	17
Figure 11: Pneumatic without over-center function.....	17
Figure 12: Rubber cushioning ring.....	18
Figure 13: Bottom guide roller .....	18
Figure 14: Distance between bottom lever and guiding rail.....	18
Figure 15: Catch wedge and catch block locations.....	19
Figure 16: Check catch wedge .....	19
Figure 17: Bottom stopper.....	20
Figure 18: Top bearing door shaft .....	21
Figure 19: Bottom bearing door shaft.....	21
Figure 20: Camozzi filter regulator .....	22
Figure 21: Tension meter .....	23
Figure 22: Spiral cable guiding shaft.....	24

### List of Tables

Table 1: Definitions .....	6
Table 2: Acronyms and abbreviations .....	6
Table 3: External documents .....	6
Table 4: Maintenance frequencies .....	10

# 1 Introduction

## 1.1 Purpose

This maintenance manual describes maintenance and small adjustment procedures for the Ventura plug slide door system. Together with the Installation manuals and system drawings makes a complete set of maintenance documentation. It is important to follow all instructions. All instructions must be conducted without air/electric power unless mentioned otherwise. The instructions should be executed for the left and right door leaf when the system contains two door leaves. A well-adjusted door system is less vulnerable to failure. The right maintenance is crucial for the durability of the door system.

## 1.2 Scope

The purpose of this document is to guide trained service mechanics through the maintenance steps of the plug slide door system. When repairs have to be made, the mechanic needs to use the repair manual, or the proper service instruction.

## 1.3 Definitions

Definition	Description
Wear part	Wear is progressive damage to a part caused by relative motion with respect to another substance or part.
Safety part	A safety part is a part, which is important to the overall safety of a system.

*Table 1: Definitions*

## 1.4 Acronyms and Abbreviations

Abbreviation	Description
ISO	International Standardization Organization
PSI	Pound-force per Square Inch
HQ	Headquarters

*Table 2: Acronyms and abbreviations*

## 1.5 References

### 1.5.1 External documents

Reference	Description	Date
ISO 9001:2015	ISO Standard for Quality Management Systems – Requirements.	2015-10-01
REG107	Regulation No 107 of the Economic Commission for Europe of the United Nations (UNECE) — Uniform provisions concerning the approval of category M2 or M3 vehicles with regard to their general construction	2015-06-15

*Table 3: External documents*

## 1.6 Overview

Section 1 gives an introduction, definitions and overview of this document.  
 Section 2 contains the general door system safety instructions, safety symbols and disclaimer.  
 Section 3 contains the maintenance instructions.

## 2 Door installation safety

### 2.1 General

Safety of the operator and bystanders is one of the main concerns in designing and developing a new piece of equipment. Ventura's door systems have the proper safety features for common use of the system. An accident can often be avoided by recognizing potentially hazardous situations before an accident occurs. As you install, operate, or maintain the door system, you must be alert to potential hazards. Make sure you have the necessary training, skills and tools to perform any assembly, or maintenance procedures. Improper operation and maintenance of this door system may result in a dangerous situation that may cause injury or death.

Ventura Systems cannot anticipate every possible circumstance that may involve a potential hazard. The warnings in this manual and on the product are not all-inclusive. If a method of installation or operation is used, which is not specifically recommended by Ventura Systems, you must satisfy yourself that it is safe for you and for others. You should also ensure that the door system will not be damaged or be made unsafe by the installation and/or operational methods you choose. The information, specifications and illustrations in this manual are based on the information that was available at the time this manual was written and can change at any time without notice.

### 2.2 Disclaimer

The information contained in this maintenance manual is based upon reliable technical data at the time the manual was published. These instructions are intended for use by persons having the technical knowledge to maintain this door system. The instructions are to be used at the maintenance mechanic's own discretion and risk. Ventura Systems assumes no responsibility for results obtained or damage incurred from the use of this material either in whole or in part by the installer. This manual provides basic instructions for the maintenance of the door system in a step-by-step sequence that will work in most types of maintenances. While effort has been made to ensure the information in this manual is correct and complete, we would appreciate it if you would contact us in case of errors.

## 2.3 Safety alert symbols

This manual contains safety messages which alert you to potential personal injury hazards. Obey all safety messages in this manual to avoid possible injury or death. The following key words and layouts calls for your attention: DANGER, WARNING, CAUTION and NOTICE. Below are examples of every safety message. The NOTE message is used for additional information but these are not threatening for the mechanic, bystanders, nor the door system.



Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury. This signal word is limited to the most extreme situations.



Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



Indicates a potentially hazardous situation which if not avoided, may result in minor or moderate injury.



Indicates that equipment or property damage can result if instructions are not followed.



Additional information important but not threatening for people or to the system.



## 2.4 Safety instructions



### WARNING!

This door system is designed for a specific application; **DO NOT modify or use this unit for any application other than for which it was designed.**

Door systems operated improperly or by untrained personnel is dangerous. Lack of operation knowledge may cause high risk.

Do not install this door system if it is damaged. If you are in doubt if the door system has a defect, immediately stop the installation and contact Ventura Systems.

Do not connect the door system to air or electric supply during the maintenance process. If the manual states otherwise, follow the manual.

Do not attempt to install the door system under influence of drugs or alcohol.

### NOTICE

Do not modify the door system or safety devices. Unauthorized modifications may impair its function and safety.

**If equipment has been altered in any way from the original design, Ventura Systems does not accept any liability for injury or warranty.**

If replacement of parts is necessary, genuine factory replacement parts must be used to restore the door system to its original specifications.

\*always disconnect the air and/or electric power while replacing parts. Safety features may not be active while replacing parts.

**Ventura Systems will not accept responsibility for damages as a result of the use of unapproved parts.**

While working on the Ventura door systems wear appropriate personal protective equipment. This list may include but is not limited to:

- Protective shoes with slip resistant soles
- Protective goggles, glasses or face shield
- A hard hat

Follow the regional and country laws and safety precautions.

## 3 Maintenance

Maintenance of a door system should only be performed when the bus is positioned on a flat surface to prevent distortion/twisting of the bus body, which can lead to inaccurate measurements of the portal.

Whenever the amount of cycles is past, we advise to execute the applicable maintenance.

Number of cycles	Applicable for
10.000	Safety parts Operational checks
50.000	Spare parts
100.000	Parts inspections

Table 4: Maintenance frequencies

### 3.1 Safety parts

The checks in this chapter are very important. If these parts are not installed correctly, it can have great consequences for the safety of the system. When the system has two door leaves, the checks must be executed for both sides.

Ventura Systems recommend to execute all safety checks every 10 000 cycles of the door system.

#### 3.1.1 Lever block

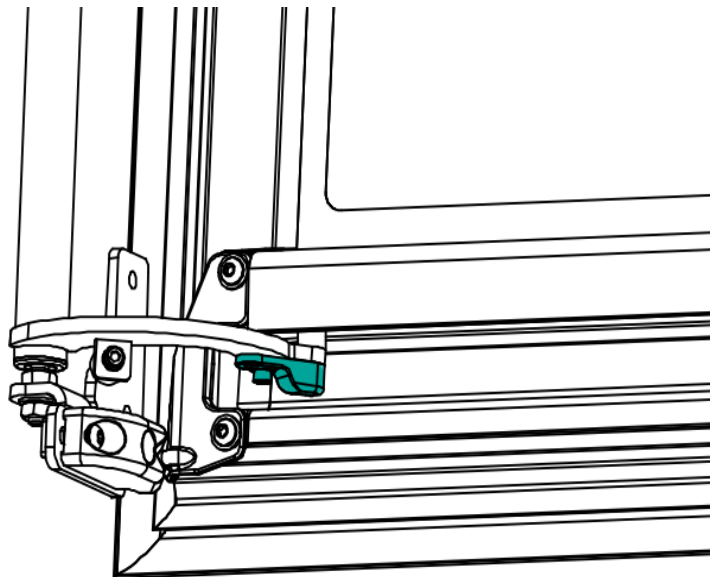


Figure 1: Lever block



### WARNING!

When the lever block is not in place, the door leaf could get off the guiding roller when twisted, leading to situations with a high risk of injury to persons. It is very important the lever block is in place.

1. Check if the lever block is present at the bottom of the lever.
2. Check if the lever block is in the right position. It has to be inside the rail of the door leaf.
3. Check if the bolt is on torque following the installation manual.

### 3.1.2 Clamping force test

Be assured all safety features of the system are active. Execute the obstruction test following REG107.

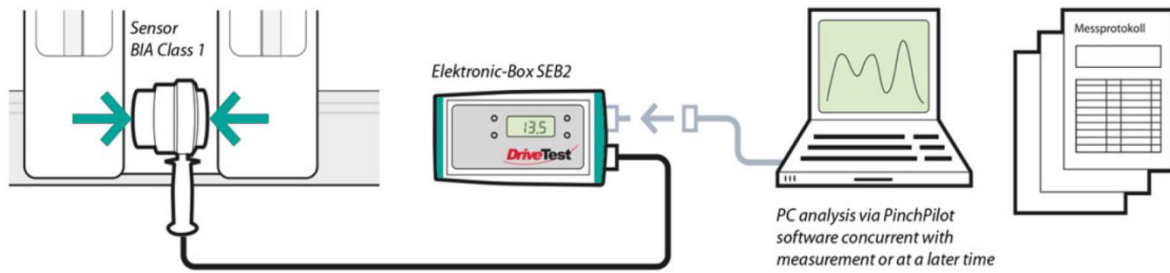


Figure 2: Obstruction test setup

1. Setup the measurement system following the user manual included with the measurement tool.
2. Apply power and/or pressure to the system.



## CAUTION!

Be aware the system could move when applying power and/or pressure to the system.

3. Put the doors in open position.
4. Execute the test recording REG107

When the test is not successful;

- Check the safety parts of system.
- Check adjustments following the installation manual.



## WARNING!

Remove the power and/or pressure from the system after executing this step and before you continue.

### 3.1.3 Emergency release

Apply power and/or pressure to the system and put the door(s) in closed position.



#### CAUTION!

Be aware the system could move when applying power and/or pressure to the system.

1. When the system is active, activate the emergency release.  
The following events should occur.
  2. The power/pressure is released from the system.
  3. The door(s) can be opened manually.
- Reset the emergency release.
  - Open and close the door(s) using the power source.



#### WARNING!

Remove the power and/or pressure from the system after executing this step and before you continue.

### 3.1.4 Sensitive edge

- Press against the right mid seal at a height of 1 meter or less. The doors go to open position.
- Press against the left mid seal at a height of 1 meter or less. The doors go to open position.

When the doors do open in both cases, continue to the next step.

When the door leaves do not open when pressing one of the mid seals perform the following checks. Disconnect the sensitive edge.

- Remove the bolts which connect the door leaf to the door arm.
- Disconnect the connector from the spiral cable
- **The full door leaf could be removed to continue or a second engineer needs to hold the door, while executing the checks.**
- Connect a multimeter to the connector of the sensitive edge.

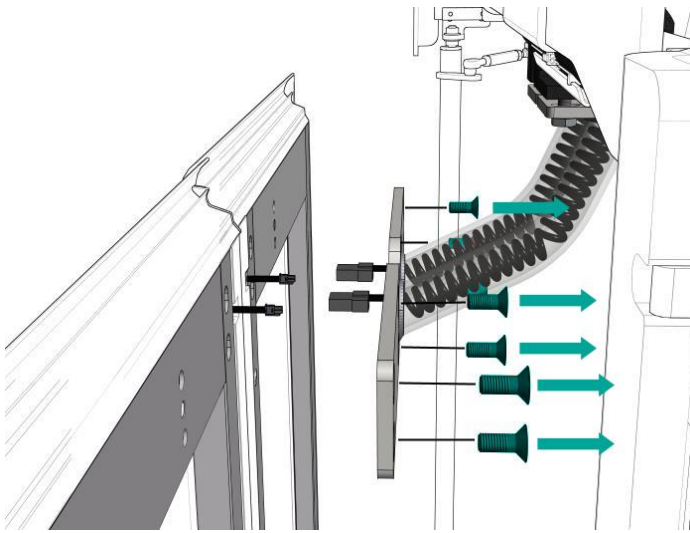


Figure 3: Dismount the door leaf

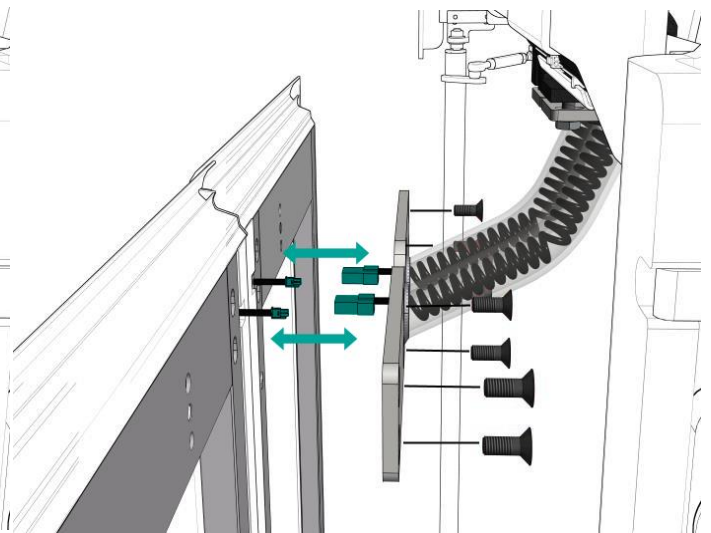


Figure 4: Disconnect the sensitive edge connectors

1. Be sure there is no force pressing the mid seal which can activate the sensitive edge. Resistance is 1200 or 8200  $\Omega$  depending on the resistor of the sensitive edge.
2. Apply force onto the mid seal of the door leaf. Resistance is approximately 0.  $\sim 0 \Omega$

In case all checks are approved, reinstall the door leaf.

Follow the adjustment steps in the installation manual. Redo the teach-in procedure described in the installation manual.

#### NOTE

The sensitive edge is malfunctioning when the resistance is infinite.  $\infty \Omega$ .

### 3.1.5 Obstruction detection unit

Apply power and/or pressure to the system and put the door(s) in closed position.



**CAUTION!**

Be aware the system could move when applying power and/or pressure to the system.

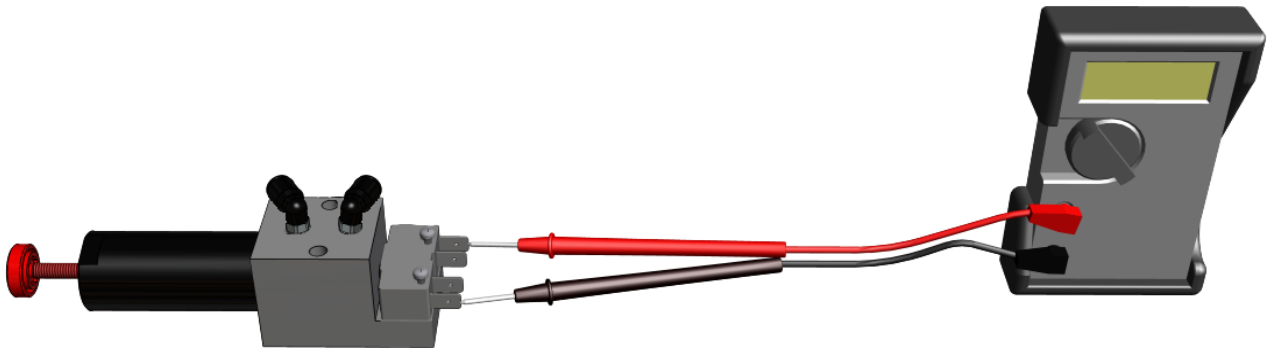


Figure 5: connect multimeter to the obstruction detection unit

1. If a signal is measured, the obstruction detection works properly.



**WARNING!**

Remove the power and/or pressure from the system after executing this step and before you continue.

### 3.1.6 Micro switches (Switch & Cams)

The micro switches are optional. When the door system has one or more micro switches do the following checks. When the door system has no micro switches, skip this step.

If the system has one or more micro switches, apply power and/or pressure to the system and put the door(s) in closed position.



#### CAUTION!

Be aware the system could move when applying power and/or pressure to the system.

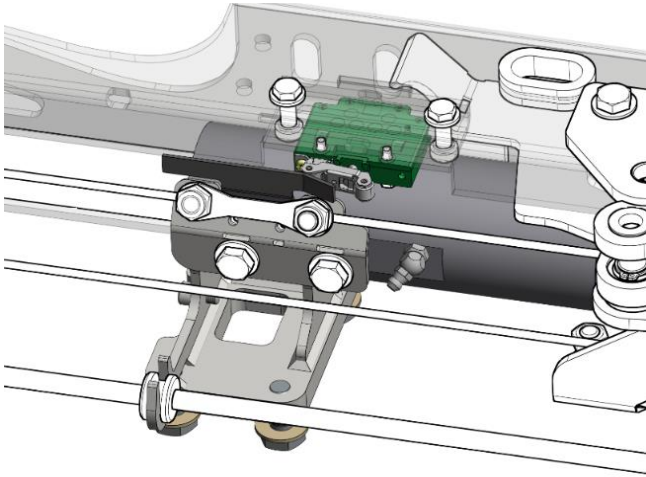


Figure 6: Door open micro switch

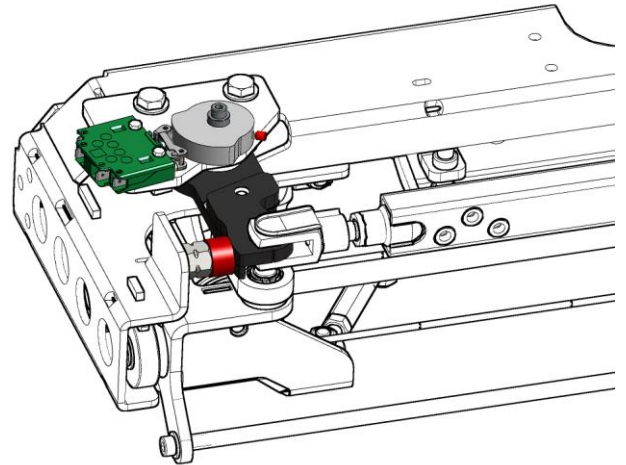


Figure 7: Door closed micro switch

1. When the door leaves are closed, and the top lever is ~2mm before hitting the end stop, the micro switch needs to be activated.
2. When the doors are in open position, the micro switch open has to be activated. This micro switch is not adjustable.

When the door closed micro switch is not activated when it is supposed to, readjust the cam following the installation manual.

## 3.2 Wear parts

These parts wear out and must be replaced when damaged, worn, after the prescribed cycles or after the prescribed time the parts are in usage. When a part has an amount of maximum cycles, it will be mentioned.

### 3.2.1 Spindle Nut

*This step is only applicable for electric systems.*

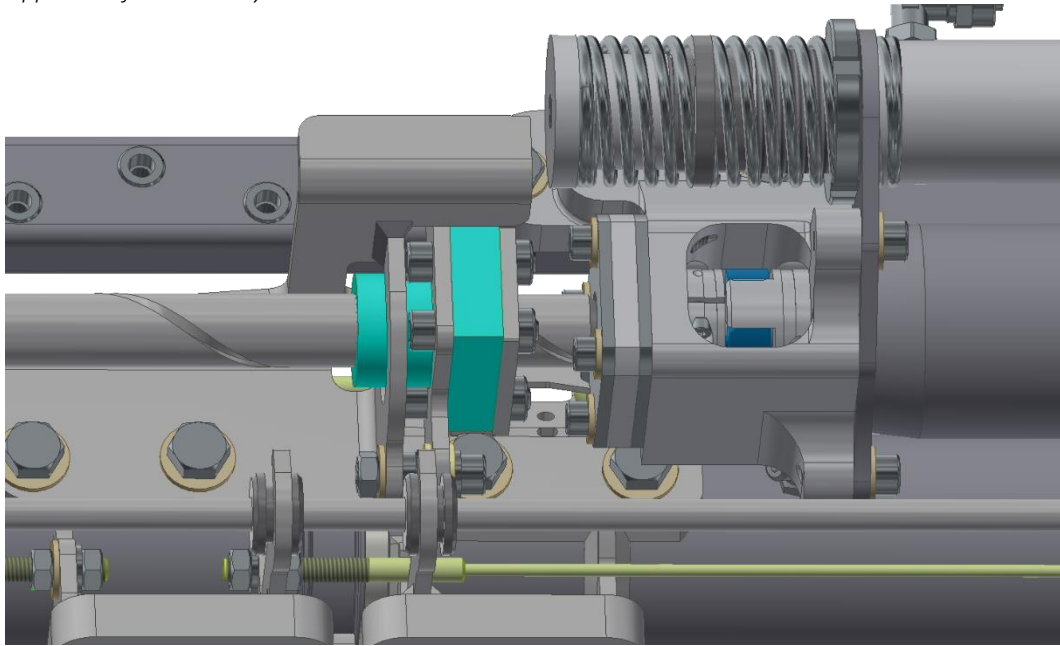


Figure 8: Spindle nut

1. There is no play between the spindle and spindle nut.  
To test this, manually twist the spindle.
2. There is no grease or dirt on the spindle, nor the spindle nut.

Replace every  
1 000 000  
cycles



### 3.2.2 Over center soft stopper

Apply power and/or pressure to the system and put the doors in closed position.



#### CAUTION!

Be aware the system could move when applying power and/or pressure to the system.

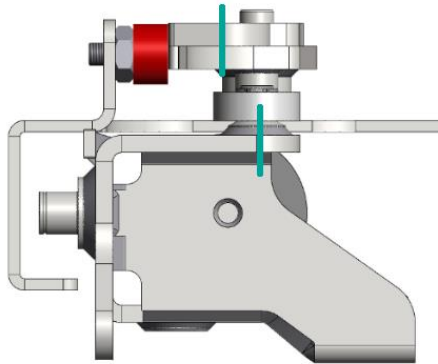


Figure 9: Over-center electric with unlock cylinder

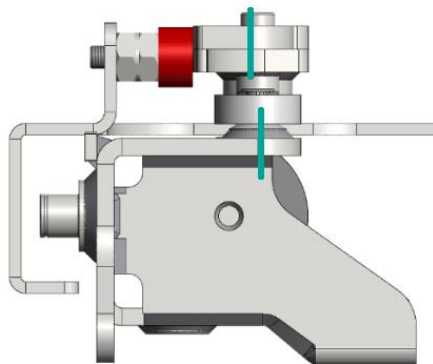


Figure 10: Over-center pneumatic with unlock cylinder

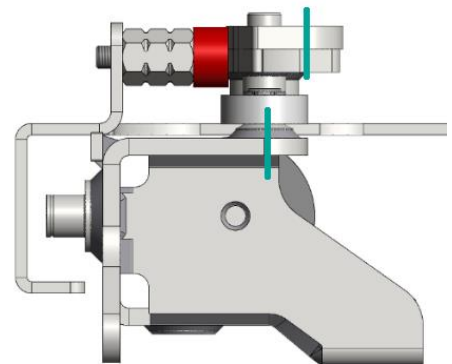


Figure 11: Pneumatic without over-center function

1. The lever touches the soft stopper in closed position, with power/pressure.
2. The rubber bush of the soft stopper is not worn. Inner dimension following system drawing.



#### WARNING!

Remove the power and/or pressure from the system after executing this step and before you continue.

### 3.2.3 Cushioning rubber bearing house

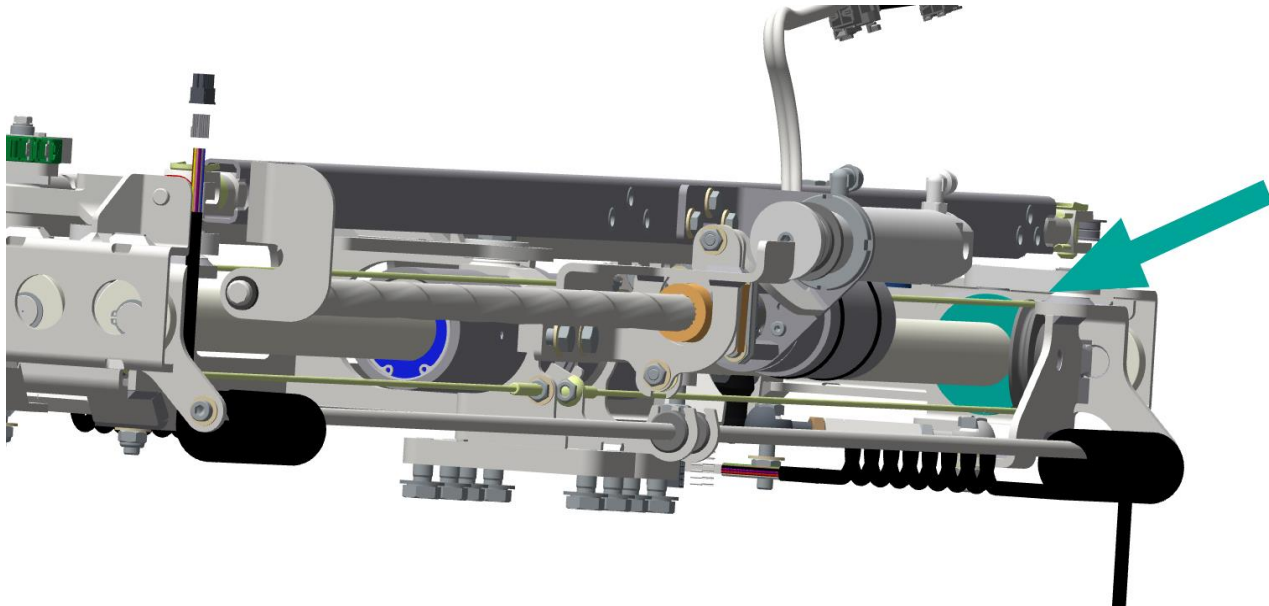


Figure 12: Rubber cushioning ring

1. The cushioning rubber is present at both sides of the mechanism.
2. There is no visible damage on the cushioning rubber.

### 3.2.4 Guide rollers

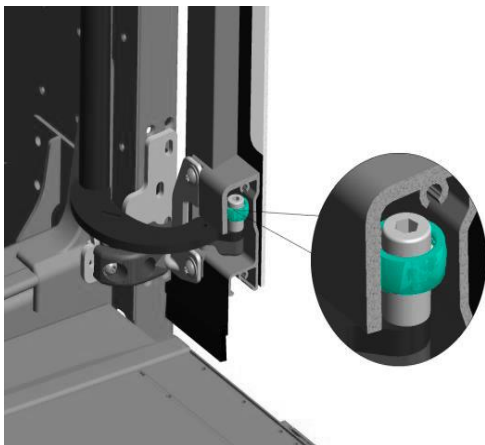


Figure 13: Bottom guide roller

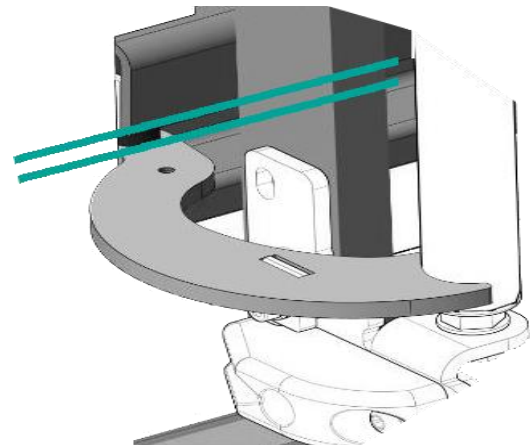


Figure 14: Distance between bottom lever and guiding rail

1. The guide rollers on the lever(s) are not worn or damaged in any way. Check for damage visually and feel if there are no worn places on the guide rollers. The guide rollers are located at the bottom lever. See image above.
2. The clearance between the bottom lever and the guiding rail is the same as described in the installation manual over the full length of the door movement. If the clearance is not the same, adjust the height of the door shaft following the installation manual.

**Replace every  
50 000  
cycles**

### 3.2.5 Catch block

Apply power and/or pressure to the system and put the door(s) in closed position.



#### CAUTION!

Be aware the system could move when applying power and/or pressure to the system.



Figure 15: Catch wedge and catch block locations



Figure 16: Check catch wedge

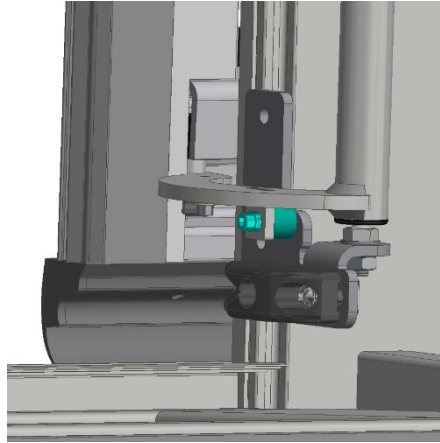
1. Check if the catch wedge is caught by the catch block when the door is closed.
2. The catch block or catch wedge is not worn or damaged.



#### WARNING!

Remove the power and/or pressure from the system after executing this step and before you continue.

### 3.2.6 Bottom stopper



*Figure 17: Bottom stopper*

1. Check if the bottom stopper is present.
2. The bottom stopper is not worn or damaged.

## 3.3 Parts inspections

These parts can get affected by usage and must be re-adjusted or cleaned when needed. Check the distance settings of the door system in open and closed position following the installation manual. Check the torque settings of the door system following the installation manual.

### 3.3.1 Door shafts

- Check if the door shaft is free from vertical play (up and downward movement).

If the door shaft is free from vertical play, continue without executing this step. If there is play, execute the following checks.

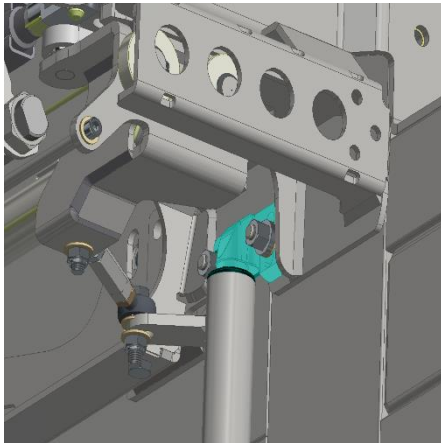


Figure 18: Top bearing door shaft

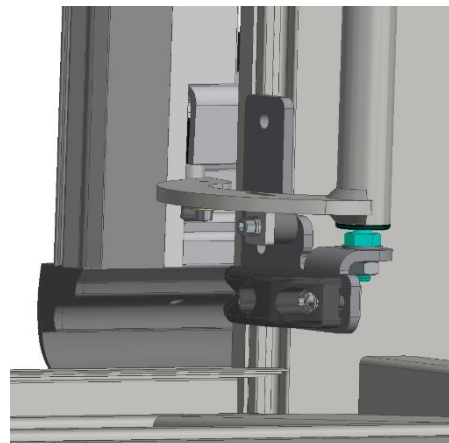


Figure 19: Bottom bearing door shaft

1. Check the settings following the installation manual.
2. The bearing bush and pivot point at the bottom of the door shaft are not worn or damaged.
3. The bearing bush and pivot point at the top of the door shaft is not worn or damaged.

### 3.3.2 Filter regulator

Check if the system is equipped with a filter regulator. If there is no filter regulator, skip this step.

1. The Camozzi filter regulator is semi-automatic, meaning the filter will drain itself when the pneumatic pressure drops below 0.3 bar (4.3 PSI) and the drain is open.
2. Check if the pressure of the pneumatic system is 8 bar.
3. Replace the filter when it is not clear white.

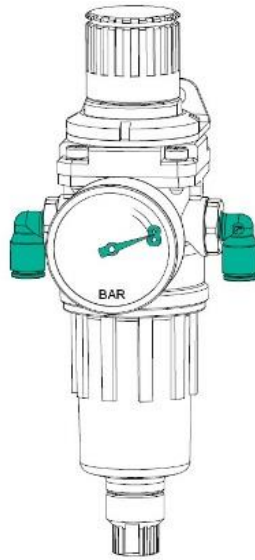


Figure 20: Camozzi filter regulator

Open drain by turning clockwise  
Close drain by turning counter clockwise

## NOTICE

Depending on the filter regulators location, it is advised to keep the drain closed so it will not spill dirt over vital parts of the bus.

### 3.3.3 Tension steel cables

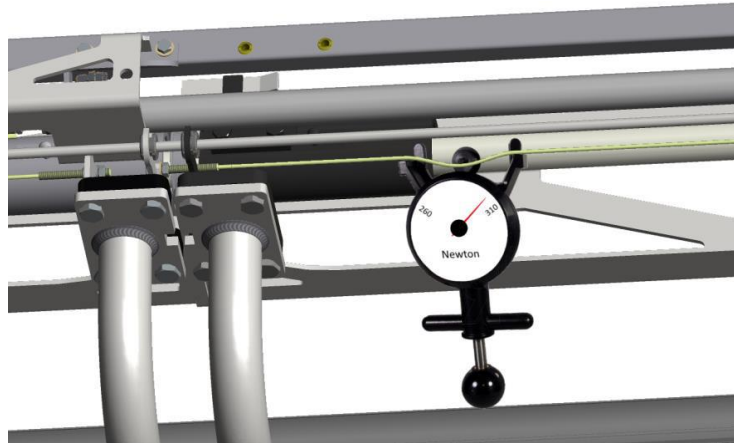


Figure 21: Tension meter

- Put the doors in open position.
  - Apply the tension meter as described by the manufacturer.
1. Check if the tension in the cable is 260-310 Newton.
  2. When using a sonic tension meter the tension has to be 33-39 hertz.

### 3.3.4 Grease bearing house

The bearing house is greased before delivery. In some cases the bearing house needs a refill.  
(Use "Arcanol MULTITOP" or a grease with similar specifications)

#### NOTICE

If a refill is needed with grease, do not use more as 20gr. When the bearing house has too much grease, the friction will hinder a smooth opening and closing of the door system.

1. The bearing houses run silent and smoothly over the guiding shaft.
2. If there is thin grease on the guiding shaft. The grease could be refilled.

### 3.3.5 Grease spiral cable guiding shaft

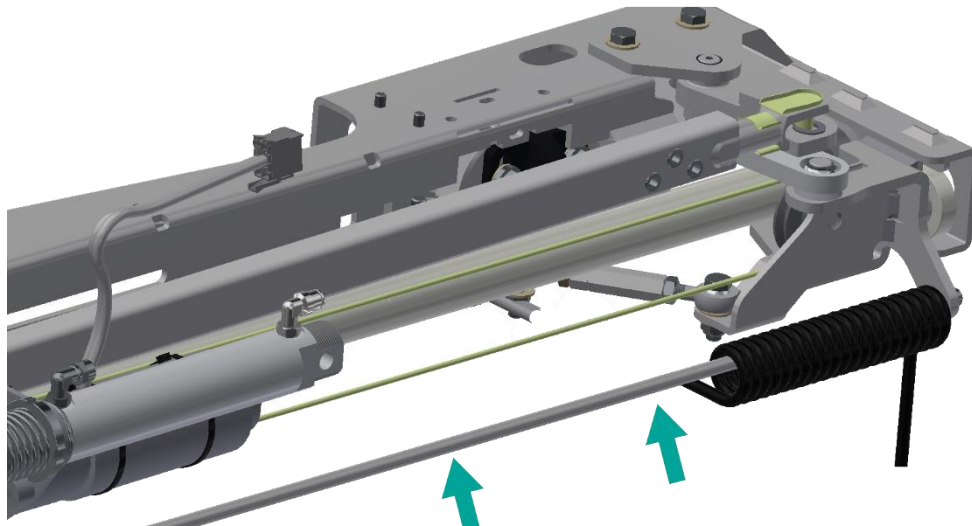


Figure 22: Spiral cable guiding shaft

- Put the doors in open position.
  1. The shaft is clean of dirt.
  2. There is a layer of grease on the guiding shaft which helps the spiral cable run smoothly over the shaft.

Apply grease when needed. (Use "Arcanol MULTITOP" or a grease with similar specifications)



## 4 Operational checks

Execute these checks before applying power.



### WARNING!

Applying power to an unchecked system may result in a potentially hazardous situation which, if not avoided, could result in death or serious injury.

No.	Check	Verified by	Approved
1.	Be assured all fasteners are on torque as described in the installation manual of this system.		
2.	Check if no cables/tubes are loose on the system.		
3.	Check if all parts are in place.		
4.	Manually check if the door leaf/leaves open and close without obstructions.		
5.	All safety parts are connected.		

After these checks, the power may be applied.

### 4.1 Operation and controls

These checks are all with power and/or pressure.

No.	Check	Verified by	Approved
1.	In case of Pneumatic parts: There is no leakage in the pneumatic system. There is no leakage while opening and closing the doors.		
2.	In case of electric parts: Check if the electric parts and wires have no short circuits or damages.		
3.	Check if all settings are conform installation manual.		
4.	The doors opens and closes fluently.		
5.	All buttons work. (if applicable)		

### 4.2 Safety checks

These checks are all with power and/or pressure.

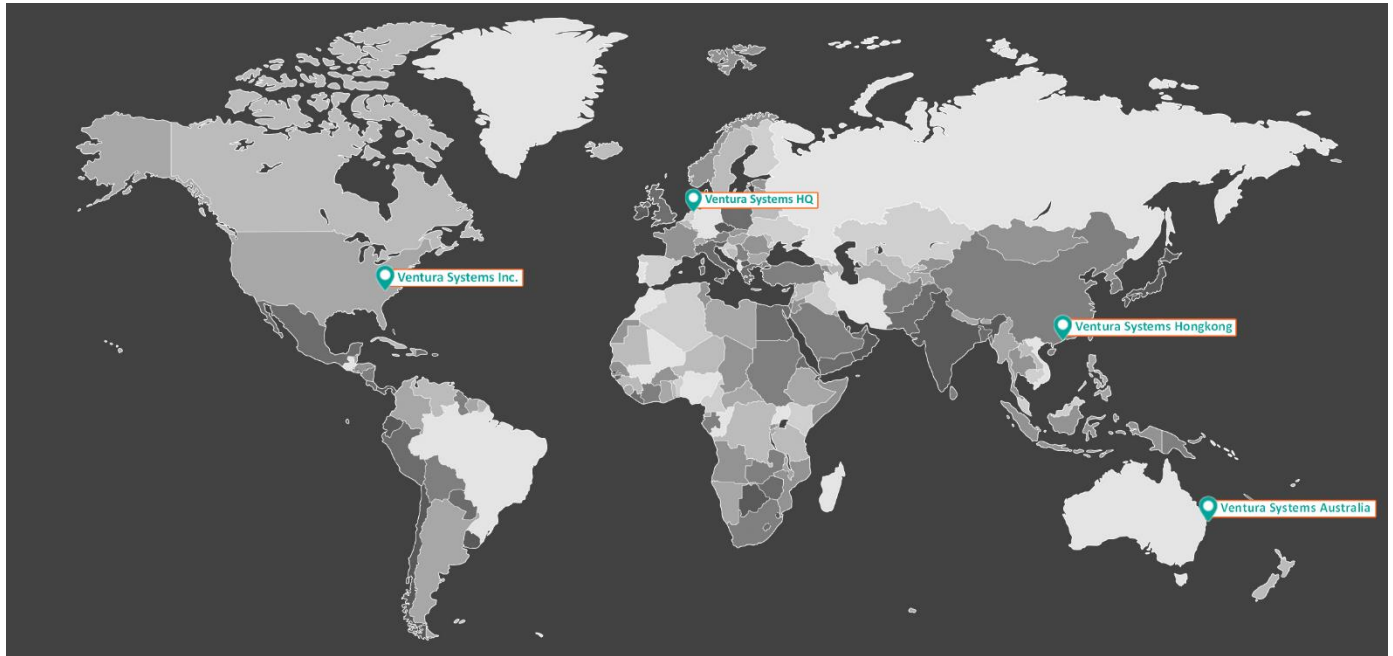
No.	Check	Verified by	Approved
1.	All emergency buttons are functioning.		
2.	Check pneumatic obstruction detections. (if applicable)		
3.	Apply an obstruction while closing. Doors open again. Test left and right separately. *CAUTION!		
4.	Apply an obstruction while opening. Doors go to half open position. Test left and right separately. (if applicable) *CAUTION!		
5.	Check if the mechanism goes over center in closed position. (if applicable)		



### CAUTION!

Do not use body parts to apply an obstruction.

## 5 Contact



### General contact information

	Ventura Systems HQ	Ventura Systems AP	Ventura systems Australia	Ventura systems Inc
	De Marne 216 8701MH Bolsward The Netherlands	Unit 02 on the 11/F Fotan Industrial Centre 26-28 Au Pui Wan Street Hong Kong	PO Box 284 Sanctuary Cove QLD 4212 Australia	160 Gibson Ct NC 28034 Dallas
	+3151 557 7750	+852 2712 6001		+1704-691-311
	+3151 557 3410	+852 2512 2325		+1704-691-313
	service@venturasystems.nl	info@venturasystems.hk	info@venturasystems.com.au	info@venturasystems.com
	www.venturasystems.nl			

### Parts contact information

	Ventura Systems HQ	Ventura Systems Asia Pacific	Ventura systems Australia	Ventura systems Inc
	parts@venturasystems.nl	info@venturasystems.hk	info@venturasystems.com.au	info@venturasystems.com
	+31 515 577750 (extension 485)			