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IG4 Electric Ventura DCU

Commissioning Manual

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Revision history

Revision	Date	By	Description
2.1	2022-05-11	Prepared: <i>M.Stoelinga</i>	Preface adjusted. Added an external reference. Changed internal references. Minor text adjustments. Removed Appendix B
2.0	2020-10-05	Prepared: <i>M.Sandtmann</i>	Added multiple references Minor text improvements Replaced 'Manual' with 'Document' Added 'Remove blue foam' subchapter Added 'First installation kit' subchapter Added 'Brake cylinder' subchapter Added 'Final commissioning checks' subchapter Added appendix B 'Problem solving flowchart'
1.0	2019-06-24	Prepared: <i>M. Sandtmann</i>	Initial version.



Preface

The Quality System of Ventura Systems is accredited to IATF 16949:2016 and ISO 14001:2015.

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1 Introduction

1.1 Purpose

This commissioning manual describes commissioning procedures for the Ventura inward gliding door system electric with DCU. Together with the installation manual and system drawings makes a complete set of installation documentation. It is important to follow all instructions. All instructions must be conducted without air/electric power unless mentioned otherwise. When the instructions involve a door leaf, those 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 mechanics through the commissioning steps of the inward gliding door system.

1.3 Definitions

No definitions.

1.4 Acronyms and Abbreviations

Abbreviation	Description
ISO	International Standardization Organization
PSI	Pound-force per Square Inch
DCU	Door Control Unit
HQ	Headquarters
IATF	International Automotive Task Force
REG107	Regulation Number 107
TS155	Technical Specification
LED	Light emitting diode
GND	Ground

Table 1: Acronyms and abbreviations

1.5 References

1.5.1 External documents

Reference	Description	Date
IATF 16949:2016	Automotive quality management system standard	2016-10-01
ISO 14001:2015	Environmental management systems – Requirements with guidance for use	2015-10-01
ISO 9001:2015	ISO Standard for Quality Management Systems – Requirements.	2015-10-01
REG 107 Rev 08	Uniform provisions concerning the approval of category M2 or M3 vehicles with regard to their general construction (Incorporating all valid text up to: Supplement 1 to 08 series of amendments)	2020-11-02
TS 155 Rev 2	Bus door safety systems	2017-11-23

Table 2: External documents

1.5.2 Ventura Systems documents

Reference	Type	Description	Revision	Date
QM000001	DG	Documentation Guideline	4.1	2022-03-16

Table 3: Ventura Systems documents

1.6 Overview

The list below shows a brief overview of the contents each chapter:

1. gives an introduction, definitions and overview of this document.
2. contains the general door system safety instructions, safety symbols and disclaimer.
3. contains information about the general lay-out of the door mechanism.
4. contains general checks before commissioning the mechanism.
5. contains instructions for commissioning the mechanism.

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 document 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 document are based on the information that was available at the time this document was written and can change at any time without notice.

2.2 Disclaimer

The information contained in this document is based upon reliable technical data at the time the document was published. These instructions are intended for use by persons having the technical knowledge to install, maintain or repair this door system. The instructions are to be used at the 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 document provides basic instructions for handlings of the door system in a step-by-step sequence that will work in most situations. While effort has been made to ensure the information in this document is correct and complete, we would appreciate it if you would contact us in case of errors.

2.3 Safety alert symbols

This document contains safety messages which alert you to potential personal injury hazards. Obey all safety messages in this document 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 these safety messages. The NOTE message is used for additional information but these are not threatening for the mechanic, bystanders, nor the door system.



DANGER!

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.



WARNING!

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



CAUTION!

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

NOTICE

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

NOTE

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 Door mechanism description

3.1 Standard mechanism lay-out

Mechanism layout as standard for an electric mechanism with a Ventura DCU. This is not a representation of a specific mechanism but a general, indicative image.

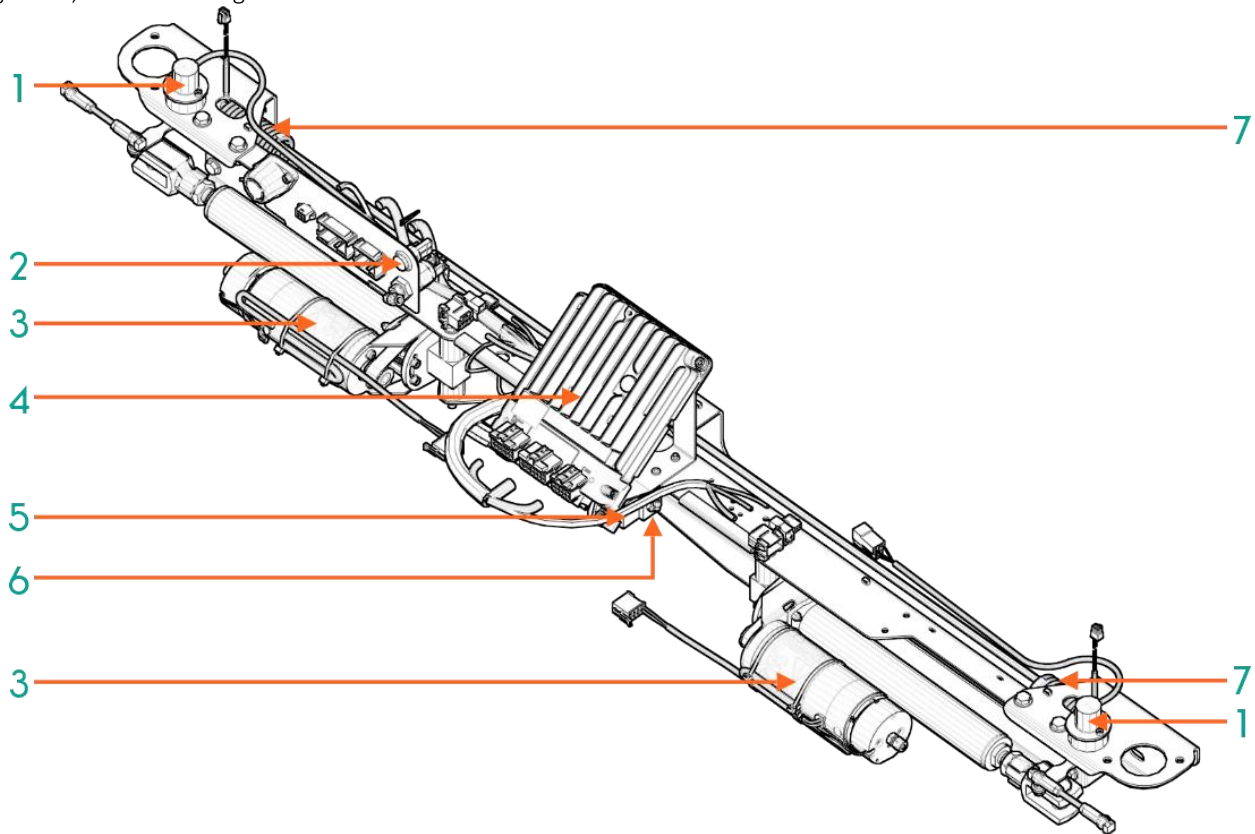


Figure 1: indication of parts

1. Potentiometer (If applicable)
2. Workshop button
3. Actuator
4. Ventura DCU
5. 5/2 Valve (If applicable)
6. emergency inhibit/reset valve (If applicable)
7. Spiral cable

NOTICE

The mechanism is one of Ventura's most comprehensive models. It is possible one or more options are not on the mechanism you use.

Left and right are defined looking from the inside of the vehicle.

Illustrations or images in the manual may differ from reality.

4 Commissioning checks

Before the final adjustments are made for commissioning the door system there are some safety checks which need to be done.

4.1 Check torque settings

Check if all door system torque settings are torqued to specification as described in the Installation Manual. This can be done by checking the torque marks applied with a torque marker.

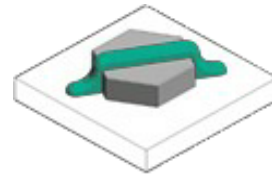


Figure 2: mark the fasteners with a torque marker.

4.2 Remove blue foam

Check if there is blue padding on parts of the door system. If there is, remove it. The padding can prevent the door mechanism from functioning properly.



Figure 3: Blue padding.

4.3 Remove white TieWraps

Check if there are tie wraps on the moving parts of the door system. If there are, remove the white tie wraps, they are mostly used to secure components during transportation. White tie wraps can prevent the door mechanism from functioning properly. Black tie wraps are used to secure parts onto the mechanism and are meant for permanent application.



Figure 4: black and white tie wraps.

4.4 Remove red plugs

When the system has pneumatics, all pneumatic components need to be connected following the pneumatic scheme. Check the pneumatic components and air tubes for red plugs. When there are red plugs in the tubes, remove them and connect the loose end to the right component. When there are red plugs in components, connect the right tube to the component.

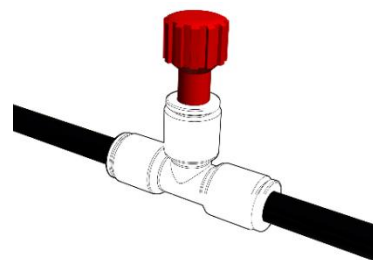


Figure 5: Red plugs in pneumatic component.

4.5 Door moving freely

Check manually if the door leaves are able to move freely from closed to fully open position (without pressure). The door should not collide into or slide over other surfaces while moving.

4.6 Connect buttons

- Make a cut-out in the side of the bus.
- (Emergency) buttons can be electric (1), pneumatic (2) or both. In case of pneumatics there is an air inlet (3) and outlet (4). Connect the pneumatics according to the pneumatic schematic.
- Screw the button in place.
- Put the cover in place if applicable.

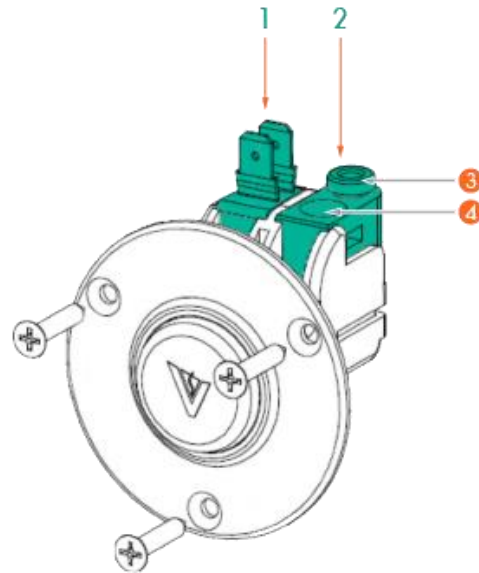


Figure 6: Connect the buttons

4.7 Connect pneumatics



WARNING!

Be sure all safety checks have been executed before applying power.

Connect the pneumatic tube from the vehicle's pneumatic system to the filter regulator to apply air pressure to the system. Be aware to connect the pneumatic tube with air pressure to the correct side of the filter regulator.

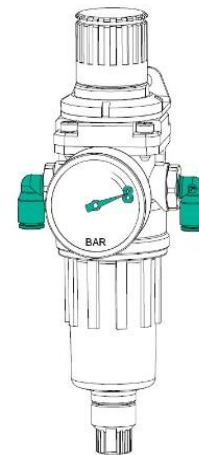


Figure 7: Filter regulator

4.8 Connect power



WARNING!

Be sure all safety checks have been executed before applying power.

Connect the cable loom of the door mechanism to the designated interface connector on the vehicle side. If necessary, look at the electrical schematic.

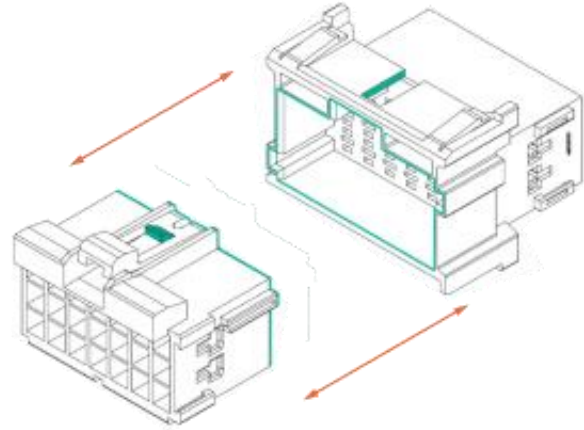


Figure 8: Connect power supply

5 Commissioning

5.1 First installation kit

After mechanical installation of the door system and in case the wiring in the vehicle is not yet completed, a “first installation kit” can be used to power up the door system. With this first installation kit you can check if the door is running properly or perform a door calibration. This “first installation kit” can be provided by Ventura.

The kit has a supply cable that needs be connected to a power source. (i.e. 24VDC for common systems). On the other side the kit connects to the Vehicle Interface (VI) connector of the mechanism. The connector that plugs into the Vehicle Interface connector also has a provision that puts the door system in to “service mode” which allows it to be opened and closed via the workshop button regardless of the state of the CAN communication. (or lack of CAN communication.)

There is also the possibility to reset the emergency valve of the system by using the reset button on the “first installation kit”. Contact Ventura systems for more details on the “first installation kit”.

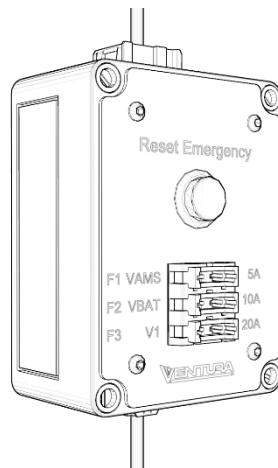


Figure 9: First installation kit



WARNING!

Be aware the door can move as soon as the 24 Volt is connected!

5.2 Ventura DCU Calibration

The calibration process is essential for the DCU to be able to control the door system. The calibration process is to define the positions of the door leaves in open and closed position.

These steps must be performed when:

- The door system is newly installed.
- After configuration of the door control movement (Reed switches, potentiometer or cams + sensors, whichever is applicable).
- Re-adjustment of door systems parts (door leaves, door shafts, guiding brackets or bottom supports).



CAUTION!

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

1. Push and hold the workshop button (1) regardless of the position of the door leaves. The Ventura DCU will now move the door to closed position.
2. When the door is already in closed position or has moved into closed position, a green light will flash only once on the Ventura DCU. Hold the workshop button.
3. The Ventura DCU will continue open the door slowly into open position. When the open position is reached, a green light will flash twice on the Ventura DCU.
4. Release the workshop button (1). The open and closed positions are now set.

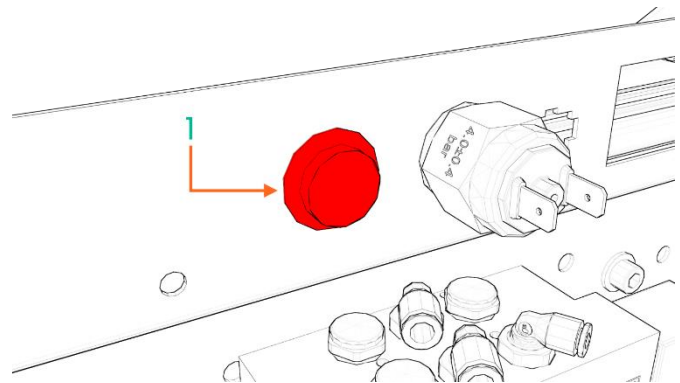


Figure 10: Workshop button

5.3 Configuring door leaf positions: Potentiometer Ventura DCU

This adjustment is only needed if the door leaves are not functioning properly. The power needs to be applied while doing these checks.



CAUTION!

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

Legend:

1. Cable to cable loom
2. Potentiometer
3. Adjustment bolts
4. Adjustment bush

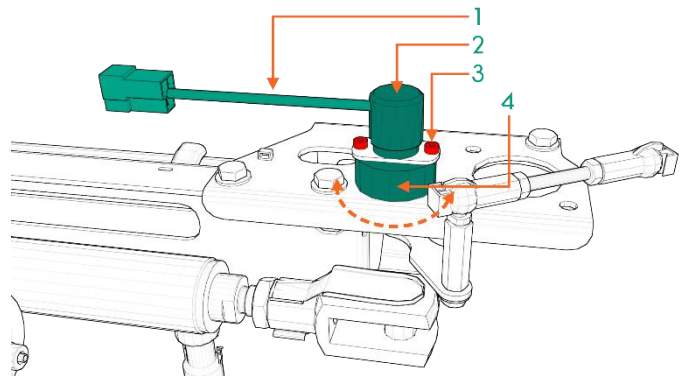


Figure 11: Potentiometer

Connect a PC with V-diag software to the DCU (Instructions are included in the connection kit). Check within V-diag the parametergroup "... potentiometer".

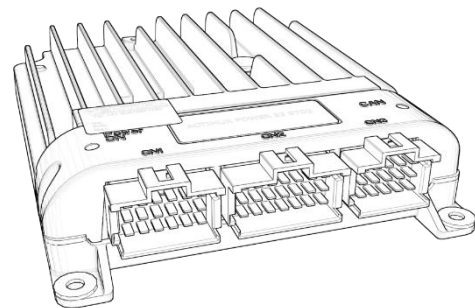


Figure 12: Ventura DCU

- For the closed position the measured voltage should be between 1.5V and 3.5V (see note).
- For the open position the measured voltage should be between 9.0V and 13.5V (see note).
- If the voltage is correct, but the door is not operating as it should. Then go to the calibration chapter.
- If the voltage is slightly off margin. Turn the adjustment bush (4) by loosening the fasteners (3) and move the bolts (3) through the slotted holes.
- Make sure all the fasteners are hand-tightened after adjustments and recalibrate the door using the calibration chapter.

If there is no PC with V-diag software available, use a multimeter set to $V \geq 15V$. Because of the difference between the left and the right side, it is best to measure the voltage from the 15 pin connector (5) connected to the DCU.

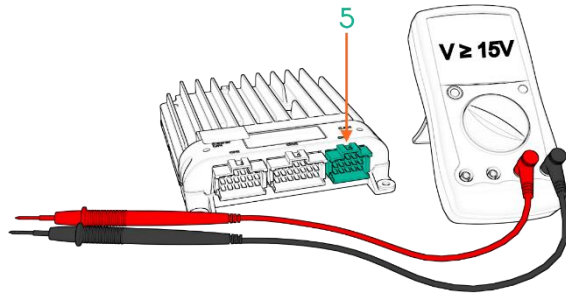


Figure 13: Multimeter Wabco DCU

15 - pin connector (5)

- Connect red to pin 6 for signal potentiometer right or to pin 9 for signal potentiometer left on the 15 pin connector.
- Connect black to GND on pin 3 or 21 on the 21-pin connector

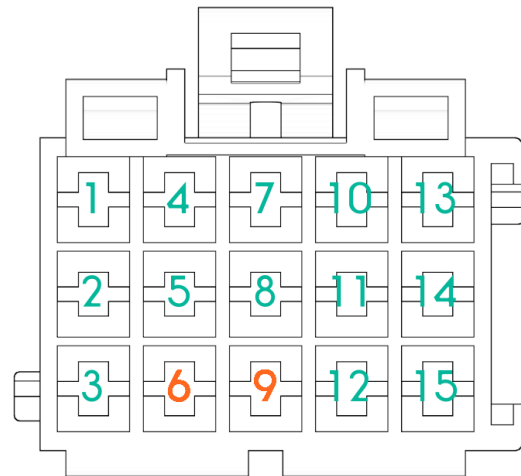


Figure 14: 15 pin connector

- For the closed position the measured voltage should be between 1.5V and 3.5V (see note).
- For the open position the measured voltage should be between 9.0V and 13.5V (see note).
- If the voltage is correct, but the door is not operating as it should. Then go to the calibration chapter.
- If the voltage is slightly off margin. Turn the adjustment bush (4) by loosening the fasteners (3) and move the bolts (3) through the slotted holes.
- Make sure all the fasteners are hand-tightened after adjustments and recalibrate the door using the calibration chapter.

NOTE

When adjusting the potentiometer make sure the measured voltage is between 1.8V and 3.2V at closed position and 9.3V and 13.2V at open position. Retaining a margin of 0.3V ensures there are no errors in the calibration of the potentiometer.



WARNING!

Remove the power and/or pressure from the system after executing these steps and before you continue.

5.4 Brake Cylinder

In this step the adjustment of the brake cylinder (1) is explained. If the cushioning of the door starts to early or to late it can be adjusted by either shortening or lengthening the distance (4) of the end stop.

1. Place the door in fully open position.
2. Shorten the end stop on the brake cylinder (1) so the cylinder will not be at the end of the stroke. Loosen the M6 nut (2) to adjust the length. The nominal length of the brake cylinder is 35mm (4).
3. Adjust the rubber end stop on the door shaft lever (if applicable) so the end stop touches the door leaf at the same time the end stop touches the bottom support.
4. Shorten the distance (4) of the end stop on the brake cylinder (1) if the cushioning starts to early.
5. Lengthen the distance (4) of the end stop on the brake cylinder (1) if the cushioning starts to late.

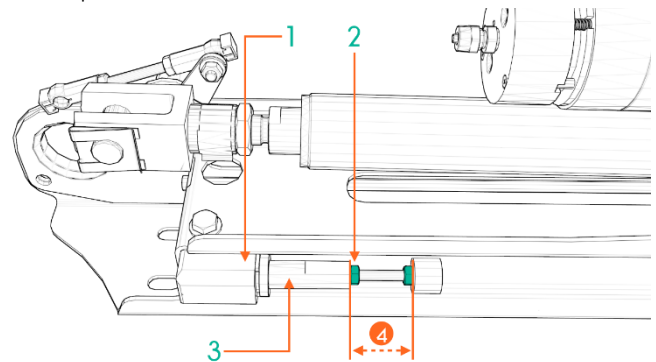


Figure 15: Brake Cylinder

NOTE

If the brake cylinder is making a squeaking noise, the piston (3) needs to be greased.

5.5 Sensitive edge

Sensitive edges are installed inside the seal of the leading edge of the door leaves. It provides line of touch sensing along surfaces when the door is in operation. The activation of the sensitive edge results in a signal being send to the control system. This signal stops and reverses the door movement. When one of the sensitive edges is not working correctly the following steps need to be checked.



CAUTION!

Dysfunctional sensitive edges have to be replaced immediately.

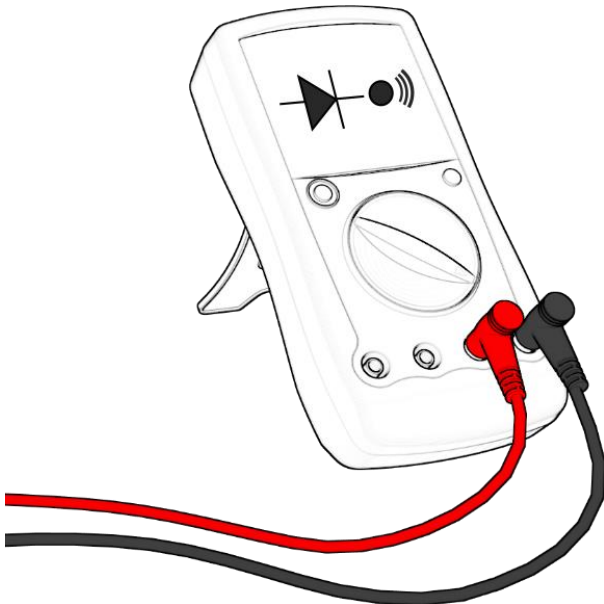


Figure 16: Multimeter on continuity mode

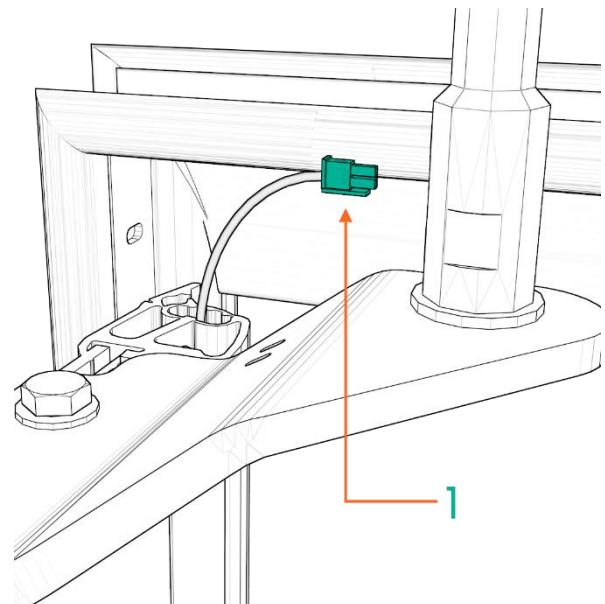


Figure 17: Sensitive edge connector

- Consult the electrical drawing to see which type of sensitive edge is used (with or without resistor).
- Remove the door leaf from the door arm and disconnect the sensitive edge from the spiral cable.
- Connect a multimeter on continuity mode to the connector of the sensitive edge (1)
 - Sensitive edge without resistor:
 - Sensitive edge not pressed = resistance infinite ($\infty \Omega$)
 - Sensitive edge pressed = $\sim 0 \Omega$
 - Sensitive edge with resistor:
 - Sensitive edge not pressed = 1200 or 8200 Ω
 - Sensitive edge pressed = $\sim 0 \Omega$
 - Sensitive edge malfunctioning = resistance infinite ($\infty \Omega$)

5.6 Emergency inhibit/reset valve

Depending on the applicable requirements the emergency inhibit/reset valve prevents operation of the emergency triggers while the vehicle is at speed.

This safety feature must be tested before delivery of the bus and during maintenance intervals. The emergency inhibit/reset valve is not adjustable.

If the safety feature is not working:

- Test if the control signal (1) is active when required.
- Test incoming pneumatic pressure (See pneumatic schematic).
- Test outgoing pneumatic pressure when the valve receives a control signal (1) and check the incoming pneumatic pressure. If the valve is not switching, replace the emergency inhibit/reset valve. See pneumatic schematic for the correct pressure.

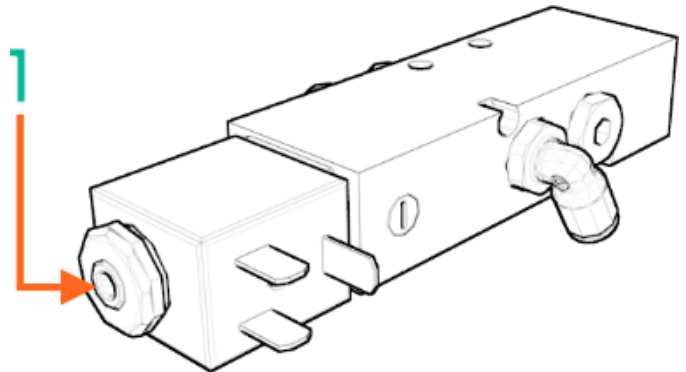


Figure 18: Emergency inhibit/reset valve

5.7 Detection beam

This paragraph explains how to test the detection beams. All types of detection beams have a LED indication light or emit light that should be visible when closely inspected.

NOTE

Infrared light is not visible with the naked eye. Use a camera or a smartphone camera to see if the light is emitting.

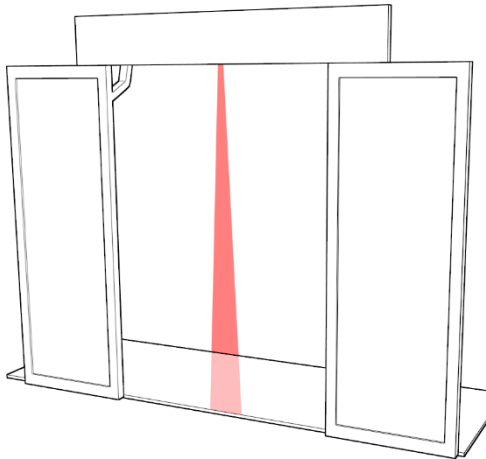


Figure 19: Cone beam top sensor

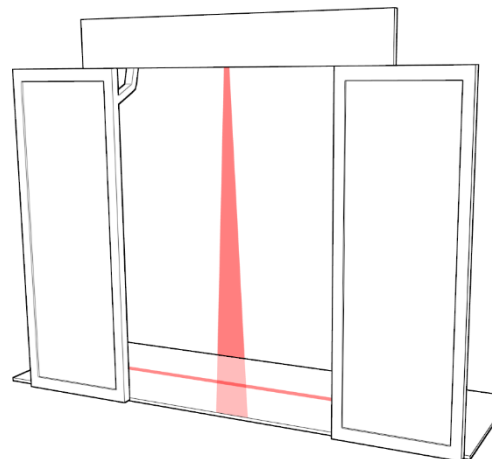


Figure 20: Cone beam top sensor and horizontal beam

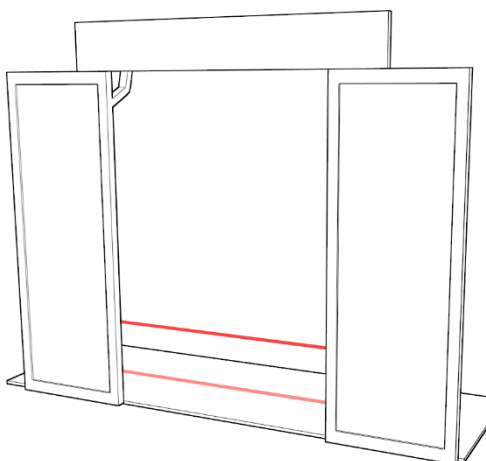


Figure 21: Double horizontal beam

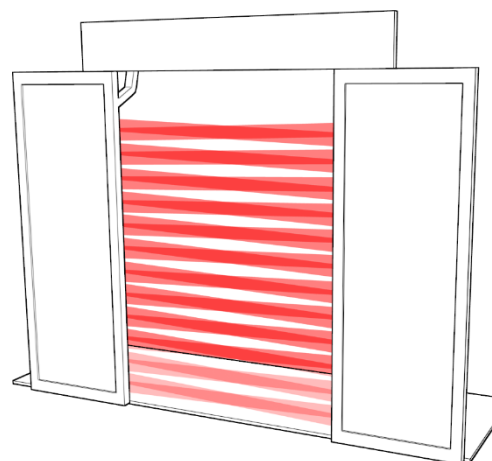


Figure 22: Light curtain



WARNING!

Do not place a person between the door leaves to test the detection beams while operating the door system!

- Check if the sensor is working by checking if the LED light is active or by trying to operate the door while blocking the beam with an object.
- If the sensor is not working but the LED light is active, then check the DCU settings with the DCU diagnostics software.
- If the sensor is not working and the LED light is not active, then check the wiring (see paragraph Electrical Scheme to see how the detection beam is connected to the cable loom).

5.8 Final checks

The following checks can be done after commissioning the mechanism to check if the door system works correctly.



CAUTION!

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

- Check fuse rating according to the system layout drawing.
- Check CAN termination.
 - Turn off the vehicle.
 - Connect a multimeter set to resistance on CAN H and CAN L.
 - the measured resistance should be 60 ohm +/- 10%.
- Check network configuration on door 1 (Only necessary if the DCU is variant 1, 3 or 6). This can be checked after calibrating door 1. If the number of detected DCUs does not correspond to the number of doors check if all DCUs are connected and powered and recalibrate door 1.
- Check parameter and software configurations.
 - Is the current software version of the DCU the same as the latest accepted software version.
 - Are customer specific settings, including but not limited to buzzer settings, button setting set to the requirements of the end user?
 - Check if DTC174 is not active. If this DTC is active refer to DTC info in v-diag manual.
- Check v-diag for other DTCs, if there are any active DTCs refer to DTC info in v-diag manual.

The following checks are not obligatory but are useful to find problems early on.

- Check if the door movement timing is correct. If the door movement is too fast or too slow first try recalibrating the door system. If you still encounter problems check the following parts.
 - Is the potentiometer or encoder calibrated correctly?
 - Is the sensitive edge connected and working correctly?
 - Check v-diag if there are any DTCs, if there are active DTCs refer to DTC info in v-diag manual.
- Check if sensitive edge and speed obstruction are working correctly.
- Check interlock systems, bus stop brake and standstill if necessary.
- Check emergency reporting to dashboard.
- Check emergency blocking while driving.

Appendix A - Contact

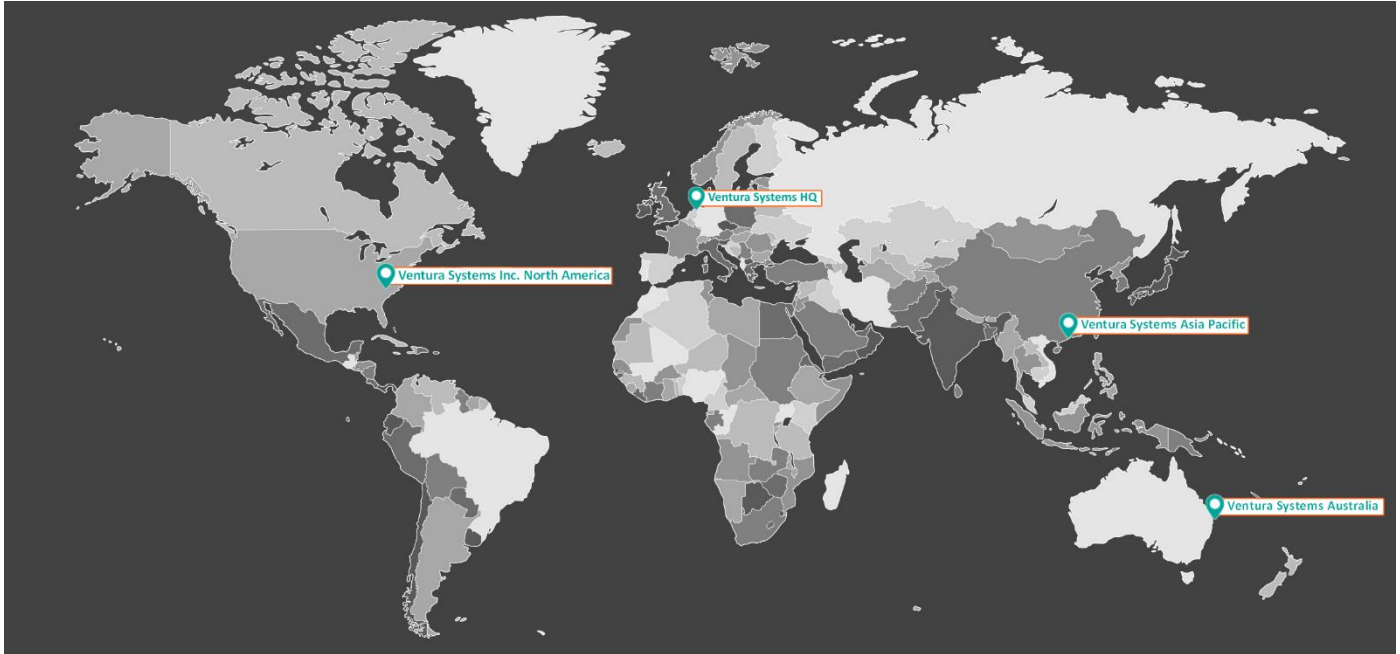


Figure 23: World map Ventura locations



Ventura Systems HQ	Ventura Systems Asia Pacific	Ventura Systems Australia	Ventura Systems Inc North America
 De Marne 216 8701MH Bolsward The Netherlands	Unit 10 on the 13/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
 +31 (0) 51 557 7750	+852 2712 6001		+1 704-691-0311
 +31 (0) 51 557 3410	+852 2512 2325		+1 704-691-0313
 support@venturasystems.com	info@venturasystems.hk	info@venturasystems.com.au	info@venturasystems.com
 www.venturasystems.com			

Table 4: General contact information



Ventura Systems HQ	Ventura Systems Asia Pacific	Ventura Systems Australia	Ventura Systems Inc North America
 parts@venturasystems.com	info@venturasystems.hk	info@venturasystems.com.au	info@venturasystems.com
 +31 (0) 515 577485			

Table 5: Parts contact information

Contact your local Agent for parts.