

VAPOR BUS DOOR EQUIPMENT

The Next Generation

# CLASS<sup>®</sup> ULTRA

Advanced Contact-Less Acoustic Sensing System



Uniquely Intelligent, Multi-Functional and Reliable,  
the CLASS Ultrasonic Detection System Increases  
Passenger Protection and Optimizes Door Operation



**Vapor Bus International**

**Faiveley** ACCESS & MOBILITY

A Wabtec company

# Vapor CLASS<sup>®</sup> Ultra

## Contact-Less Acoustic Sensing System

### Solid State Ultrasonic Technology Improves Passenger Detection, Reduces Maintenance and Enhances Door System Functionality

#### The Advantages of Intelligent, Ultrasonic Door Actuation

Exclusive Vapor CLASS technology provides a door actuation and passenger detection system that is uniquely intelligent and completely reliable. Here are the advantages for your vehicles:

- **Reduces Maintenance Expenses** – Solid state CLASS sensors replace the expense and maintenance of mat switches, push buttons, tape switches, touch bars and light beams.
- **Reduces Dwell Time** – CLASS Ultra recognizes a stream of exiting passengers and holds the doors open to eliminate excessive time delays.
- **Robust Components** – Designed to resist dirt, humidity, temperature extremes and vandalism.
- **Minimizes Passenger Contact** – Safe, inaudible and invisible ultrasound sensor system minimizes passenger contact with the doors.
- **Reliable Performance** – Solid-state signal processing limits false activations.
- **Diverse Applications** – For new vehicles and retrofit installations.



#### A Multi-Function Exit Door Solution

- Door open activation device
- Increased passenger protection
- Advanced obstruction sensing
- Optimal door operation

#### The CLASS System Can Be Programmed to Provide Different Functions During Each Phase of the Bus Door Operation

- **Touch to Open** – The CLASS system functions as a touch bar or touch tape for passenger actuation when a door is enabled but is closed.
- **Hold Open** – Functioning like a treadle mat, the CLASS system detects a stream of exiting passengers and holds the door open, reducing dwell time.
- **Contact-Less Sensing** – Panel sensors enhance the function of sensitive edges. As the doors close, the CLASS system enables passengers to exit without contacting the doors.
- **Proximity Sensing** – While the bus is in motion, the CLASS system detects passengers standing too close to, or leaning against, the exit doors and activates a warning light, an alarm or a voice announcement system.



## CLASS® Ultra Detection Zones and Actuation Operation

Here is an example of the Vapor CLASS Ultra detection zones and actuation operation on a bus exit door. Other CLASS zone configurations may be used to optimize performance with specific vehicles and/or operating practices.

**Illustration A:** The bus has stopped and the operator has enabled the exit door. In response to the door enable signal, the CLASS signal-processing module has activated the two door-mounted sensors, which monitor two detection zones. The zones function similar to a touch bar or touch tape and extend, approximately, from 12" (30 cm) below the door header to 43" (110 cm) below the door header. When an exiting passenger places their hand within either detection zone, CLASS sensors detect that action and signal the door to open.

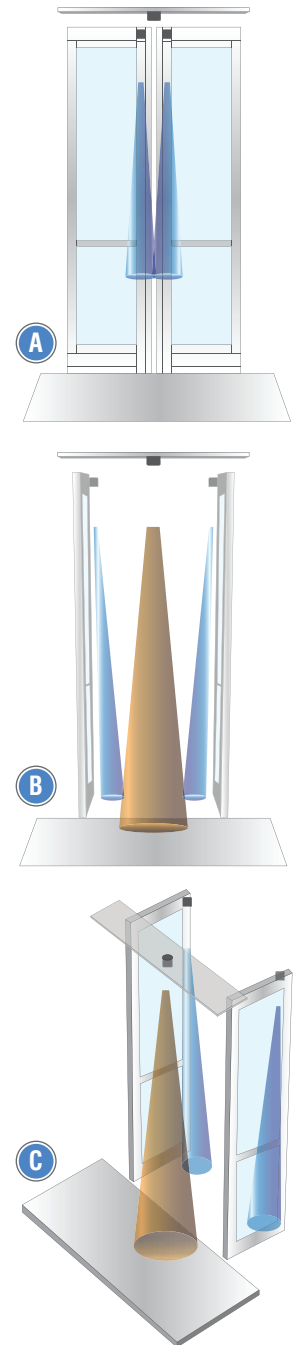
**Illustrations B:** When a position sensor on the door actuator indicates the doors are fully open, the signal-processing module automatically changes the detection zone configuration. The door-mounted sensor zones extend almost to floor level and the header-mounted center sensor is activated. In this mode, the CLASS system is now monitoring the entire exit door area.

**Illustration C:** The CLASS center sensor maintains the door in the open position for an exiting passenger stream, while the door-mounted sensors enhance the function of the sensitive edges with an expanded detection zone. This mode is maintained until the doors begin to close.

When the doors are nearly closed, and the door remains enabled, the detection zone returns as shown in illustration A.

### The CLASS Ultra Difference

- **Adaptive Threshold Sensing Technology** – Optimizes system sensitivity and enhances reliability.
- **Auto Learn** – Automatic target acquisition eliminates need for manual entry of fixed targets.
- **Coaxial Sensor Cables** – Detachable door panel sensor cables for easy installation and replacement.



## Digital Voice Messaging

The optional Vapor CLASS Voice Annunciator provides brief, digitally recorded audio messages, such as warnings, greetings or service announcements, for passengers in the exit door area. Activated in response to inputs from the CLASS controller, a set of standard messages in English and Spanish are available and may be expanded to include additional messages and languages.

This compact and rugged unit is easily installed in the door header space, or adjacent to the doorway, and is applicable to both new vehicles and as a retrofit to existing CLASS systems.



*Consult with your Vapor representative to review your specific applications.*

# CLASS<sup>®</sup> Ultra

## Vapor CLASS Ultra Contact-Less Acoustic Sensing System

### Specifications

#### Design Life

- 12 Years

#### Power Supply

- Operating Voltage: 12VDC or 24VDC nominal
- Minimum Operating Voltage: 10VDC
- Maximum Operating Voltage: 37VDC
- Maximum Surge Voltage (1 sec. max. duration): 40VDC
- Transient Voltage Spikes (1 msec. max. duration): +/- 250VDC
- Total System Power Consumption: 30W max.

#### Inputs

- Working voltage range is the same as the main power voltage specification. Inputs shall guarantee detection as ON when voltage is above 4V and guarantee detection as OFF when below 0.5V

#### Outputs

- Solid-state outputs capable of sinking or sourcing 500mA

#### Sensors

- Operating Frequency: 40 kHz to 125 kHz
- Robust coaxial cable, easy to install or replace
- Panel sensors equipped with replaceable cables

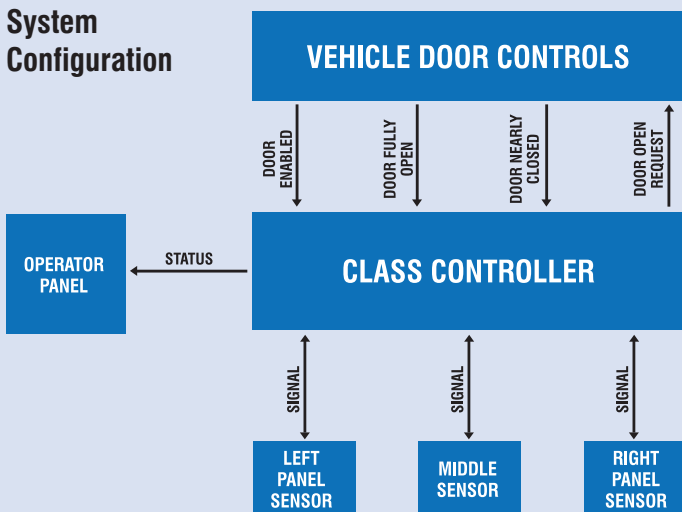
#### Computer Interface

- USB

#### Temperature Range

- -20° C to +60° C

### System Configuration



SYSTEM COMPARISON	CLASS	CLASS ULTRA
Minimizes Passenger Contact	√	√
Door Open Activation Device	√	√
Reduces Dwell Time	√	√
Improved Sensing Algorithms		√
Auto Learn for Simple Set Up		√
Coaxial Sensor Cables		√
USB for Diagnostics		√
J1939 Communication		√

*For more information on the CLASS Ultra system, and other Vapor products, contact your Vapor representative.*

**Call today: 847-777-6400**

**Or Visit VaporDoors.com**



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