



Operations Manual:

# Vent Tube Detection System

REV 2-042417

## **DORCIA ENGINEERING - VENT TUBE DETECTION SYSTEM OPERATION MANUAL**

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## 2.0 FORWARD

This service manual is provided to serve as the installation, operation and maintenance guide for the equipment supplied by Dorcia Engineering. The contents should be read before attempting any phase of installation, operation and maintenance. The Dorcia Engineering Vent Tube Detection System (VTDS) requires installation by the customer or prearranged contractor. Unpack carefully and check all items received against the invoice.

The Dorcia Engineering Vent Tube Detection System has been tested and passed quality-control inspections in accordance with Dorcia Engineering standard procedures. However, the equipment as shipped may have been opened or disassembled for inspection, cleaning, etc., after testing. The customer should confirm that no nuts, bolts, flanges, enclosures or any other component have not become loose during shipment; these should be tightened wherever necessary.

An identification tag has been permanently attached to the equipment. When requesting information, service or spare parts, please be prepared to furnish the part number and serial number located on the identification tag. It is the user's responsibility to check actual operating conditions to ensure the vent tube detection system components, materials of construction, and sealing materials are compatible with the application and are within local safety codes.

Dorcia Engineering reserves the right to modify the contents of this service manual without notification.



## 3.0 SAFETY & GUARANTEE

### 3.1 General Safety Instructions

It is important that all personnel in charge of installing, setting-up, operating, maintaining or repairing the Vent Tube Detection System and its components read and understand this manual. Care must be taken when referring to this manual to ensure adherence to all warnings, cautions and important notes. These carry information related to the safety of personnel and the integrity and satisfactory operation of the equipment.

### 3.2 Uncrating and Inspection

Prior to uncrating the Vent Tube Detection System, inspect the exterior crating for obvious damage that may have occurred during shipment. All damage should be reported to both the freight carrier and Dorcia Engineering. Obtain the full part number and serial number from the identification tag then contact Dorcia's Technical Support Department at: [info@dorciaengineering.com](mailto:info@dorciaengineering.com)

While uncrating the VTDS, take care to avoid damaging the wiring of critical electrical and mechanical components. After removing the VTDS from its crate, carefully inspect the skid for damage that may not have been obvious during the initial inspection. It is good practice to ensure all fittings are tight and have not come loose during shipment.

### 3.3 Choosing the Installation Site

Prior to installing or operating the VTDS, consult your safety manager or plant manager regarding the possibility of physical damage or electrical interference.

Do not install or operate the VTDS in or near environments that contain large electromagnetic fields. Contact your local Dorcia Engineering representative for more details.

### 3.4 Safety of Personnel

Service and maintenance work for the VTDS should only be conducted by trained individuals who have read the operation manual. Contact your local Dorcia Engineering representative for more details.

### 3.5 Terms of Guarantee

The Vent Tube Detection System carries a warranty specified within the terms and conditions of the original sale (please refer to Dorcia Engineering's standard terms and conditions for exact details).

Dorcia Engineering is not liable for damage or poor performance resulting from:

- Improper use
- Failure to observe warnings and guidelines in this manual
- Purchase of complimentary/spare parts from parties other than Dorcia Engineering
- Employment of insufficiently qualified personnel
- Unauthorized modifications of the VTDS and its components

In these cases Dorcia Engineering's warranty/guarantee is rendered void





## 4 SPECIFICATIONS

### Materials of Construction :

VTDS Side Rails  
Sensor Detection Assembly Enclosures  
Electrical Connectors  
Indicators

Delrin®  
304 Stainless Steel, Nema 4X, IP68  
IP 68 rated gold plated contacts  
Allen Bradley 800FP Series

## 5 INSTALLATION

### 5.1 Installation Site Considerations

Before attempting to install the Vent Tube Detection System consider the following:

- Allow for 36 inches of clearance from all electromagnetic fields on all sides of the Vent Tube Detection System (VTDS)
- VTDS requires 24VDC supply voltage rated with max current consumption without outputs of <300mA @ 24VDC and earth ground
- VTDS electronics protected in IP 68 rated enclosure
- Please Review System Dimensions (see Figure 1 below) for proper drill and DO NOT drill mounting options
- VTDS is designed to be mounted in the ideal orientation (see Figure 2 mounting orientation below)

**Step 1** - Please refer to Figure 1 System Dimensions for proper drill and DO NOT drill areas shown below. If these areas are drilled into or modified in anyway the Sensor Detection Assembly (SDA) module will be damaged and the warranty of the system will be voided.

**Step 2** -Mount SDA's directly opposite each other with the side rail surfaces facing each as shown in ideal mounting orientation (Figure 2)

**Step 3** - The SDA's are designed to replace the existing side rails on the conveyor. If they do not directly replace the side rails, please contact Dorcia Engineering. DO NOT modify the side rails of the SDA's in anyway without written consent from Dorcia Engineering.

**Step 4** - Connect the flying leads of each of the SDA cables as shown below in section 5.2

**Step 5** - Connect the end of the cable with the pre-attached cord grip and interconnect to the appropriate user connection on the SDA's.

**Step 6** - Apply the correct voltage power to each SDA module.



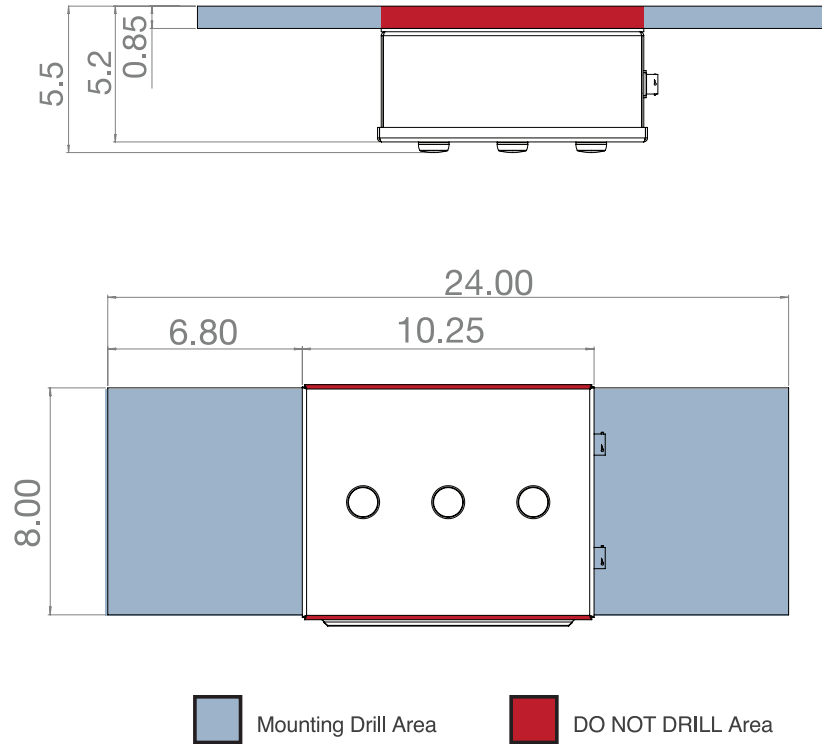
### **Step 7 - Start Up Sequence**

When power is initially connected to the unit each VTDS SDA will exhibit the following start-up sequence:

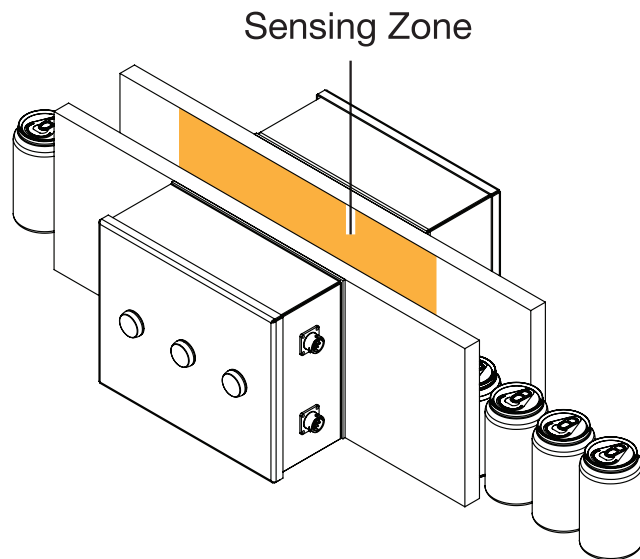
1. Green light illuminates (this indicates that the correct voltage is supplied to the unit and the unit is powered.
2. Yellow light will illuminate
3. Red light will illuminate
4. Yellow light will turn off
5. Red light will turn off
6. Both red and yellow light will flash on and then off quickly.
7. Green light should stay illuminated during and after the entire sequence



**Figure 1. System Dimensions (inches)**



**Figure 2. Ideal Mounting orientation**





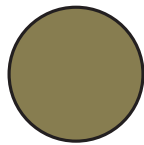
## 5.2 Wiring



### Wiring Color Description

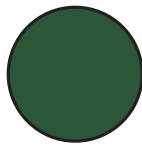
- 1. Black = (+V) 24 VDC Power
- 2. Yellow = Zero voltage (0V) 24 VDC Power
- 3. Blue = Earth GND
- 4. Orange = Detection (24V Output)
- 5. Red = Heartbeat (24V Output)

amber



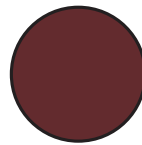
**N/A**

green



**OFF**

red



**N/A**





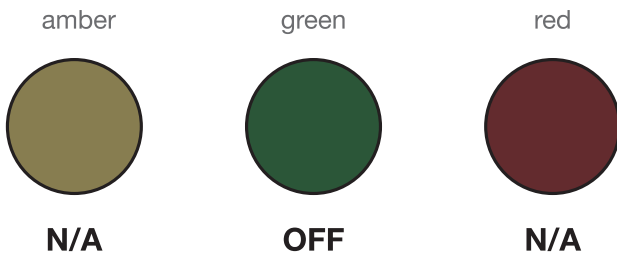


## 6 INDICATORS & OPERATOR INTERFACE

### 6.1 Indicators

Each Sensor Detection Assembly (SDA) of the Vent Tube Detection System (VTDS) has local indication of the overall system power, if service is required, and if a traceable vent tube has been detected.

There are (3) indicating lights on each face of the SDA's:



**Amber** = Vent Tube Detected - The amber light will illuminate when a traceable vent tube is located

**Green** = System Power - The green light will illuminate while there is 24VDC supplied to the VTDS

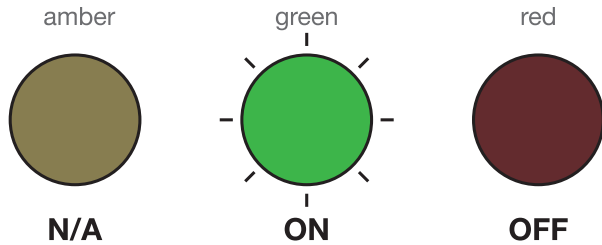
**Red** = Service Required- The red light will illuminate or flash when service is required

When the system is supplied power the system will go through a pre-set start up sequence. The green power light will illuminate, then shortly thereafter the amber light will illuminate and then finally the red light will illuminate. Upon successful completion of the start up sequence both the amber light and the red light will blink once and then remain off until their perspective action is required. If for any reason this sequence is not reproduced during start up please contact Dorcia Engineering for assistance.

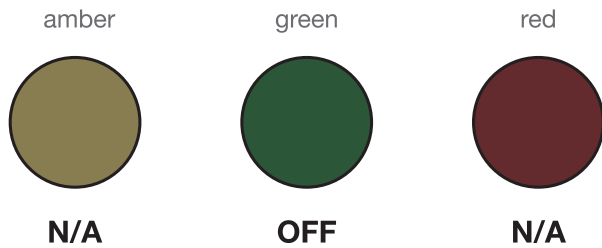


## 6.2 Operator Interface

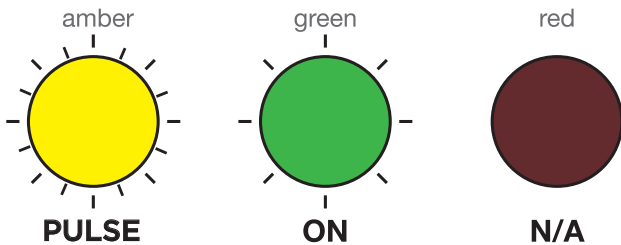
The following illustrate the possible visual indicators during normal operation:



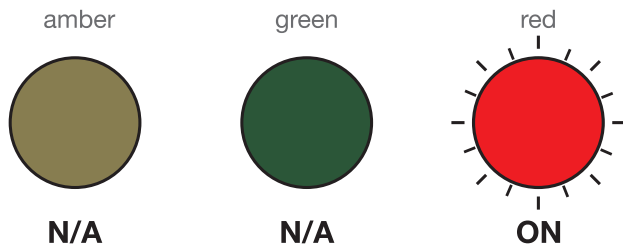
### Unit is "ON" & Operational



### Unit is "OFF"



### Traceable Vent Tube Detected

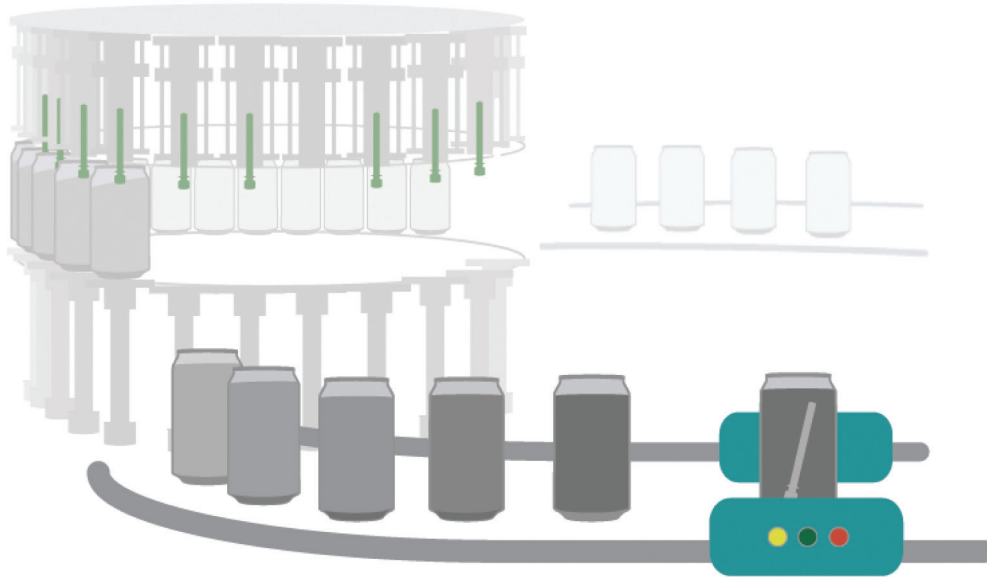


### Unit is sensing an Error

Contact Dorcia Engineering on the 24/7 service line (630) 632-0955

## 7 THEORY OF OPERATION & SYSTEM OUTPUTS

### 7.1 Theory of Operation



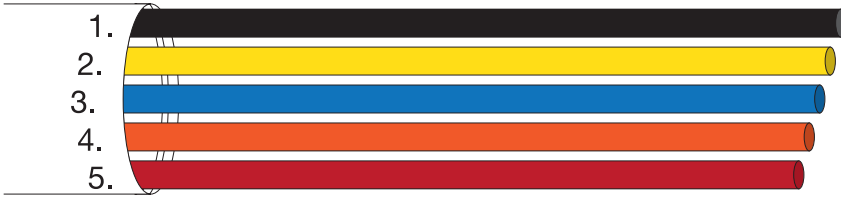
The VTDS uses patented state of the art technology to sense the presence of a traceable vent tube in a can. The standard Dorcia Engineering VTDS provides the filling machine owner / operator with both visual indications (as discussed above) as well as discrete 24VDC output signal whenever a vent tube malfunction occurs. The VTDS requires the use of Dorcia Engineering's patented Traceable Vent Tubes in order to reliably and accurately sense the presence of a traceable vent tube.

### 7.2 System Outputs

When a traceable vent tube moves within the sensing field of the VTDS the operator will receive a visual indication (see above) as well as a discrete 24VDC output.

Upon detection of a traceable vent tube, the standard VTDS configuration is to transmit a discrete 24VDC signal via the orange output wire (see below).



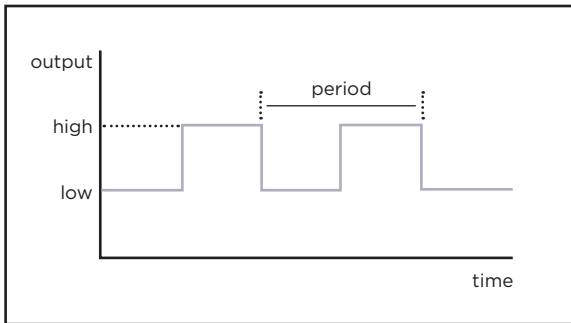


### Wiring Color Description

1. Black = (+V) 24 VDC Power
2. Yellow = Zero voltage (0V) 24 VDC Power
3. Blue = Earth GND
4. Orange = Detection (24V Output)
5. Red = Heartbeat (24V Output)

This configuration can be modified to a “fail safe” condition to where the 24VDC signal is generated until a traceable vent tube is detected.

The desired user output timing can be configured based on the customer’s specific programming needs (see below)



Please contact Dorcia Engineering for your specific ideal programming signal output conditions. Maintenance The heartbeat function of the VTDS provides the user a continual 24 VDC system health check. The duty cycle and frequency can be customized to the users specifications.



## 8 MAINTENANCE & SPARE PARTS

### 8.1 Maintenance

In order to give the owner / operator a real time indication of the VTDS system health, the standard VTDS comes with a constant electrical pulse heart beat signal as well as a locally mounted indicator light. Each Sensor Detection Assembly (SDA) performs its own system health check and informs the operator that the individual SDA the are functioning properly.

In the event that an error within the system occurs, the self-diagnostic software will cause the RED indicator to illuminate. Additionally ,if there is a complete system failure the heartbeat function will transmit an alarm signal via the 24VDC discrete heartbeat signal on the RED wire.

### 8.2 Spare parts

For any spare parts please contact your Dorcia Engineering's manufacture representative or Technical Support Department at 5 or email: [info@dorciaengineering.com](mailto:info@dorciaengineering.com)

## 9.0 AFTERWARD

The purpose of Dorica Engineering is to help our customers and the companies we work with to be the best they can be. We appreciate the opportunity to serve you and your organization.

For any additional information please contact Dorica Engineering or visit our website [www.DorciaEngineering.com](http://www.DorciaEngineering.com)

