**Diffuse Reflective Photoelectric Barrier**

**Time of Flight Barrier**

**VFT1**

Detection up to 10 m, on cold or hot objects

Without Reflector

Easy setup and installation

Design for steel industry conditions
**Description**

**Diffuse Reflective Barrier VFT1**

### Operating principle

The VFT1 is a LED based Time-of-Flight detector. With this technology DELTA introduces an innovative solution for the detection of product in the difficult environment of the **steel industry**. It works on very dark low reflecting targets, as well as high temperature targets, and has an extended operating temperature range compared to laser technology. Thanks to the Time-of-Flight technology the sensor is able to measure the position of the target, and can eliminate any background object.

### Features and benefits

- **Detection range:** from 0.8 m, up to 10 m on grey surface (18% remission) or 8 m on black surface (6% remission)
- **Target temperature:** from cold up to 1250 °C (2280 °F)
- **Response time:** from 2 ms on white matt surface at 2 m to 14 ms on black surface (6% remission) at 8 m
- **Choice for Product Presence output:** static (S & /S) or relay ; 1 output for Alarm
- **Easy sensor setup with detection range selection and sensitivity adjustment**
- **Visible laser pointer (class 2)**
- **Water cooling (model VFT1- J)* & air purging**
- **Optional heat shield for model VFT1 – J**
- **Choice for power supply:** 115/230 VAC or 24VDC

### Presentation

The VFT1 is an easy to use detector thanks to:
- 3 LED giving sensor status:
  - **P.P.** is green when detection output is activated (Product Presence)
  - **Ctrl** is orange when detection margin is not enough or saturated.
  - **Alarm** is red when alarm output is activated (internal T° too high, emitter or receiver out of function)
- The ‘**Sens./Laser**’ potentiometer to adjust sensitivity.
- The ‘**Dist.**’ potentiometer to setup the detection range by selecting the maximum distance (max. 10m). For example, potentiometer on position 2 will setup the detection range from 0.8 to 2 m.
- **A laser pointer** to make alignment of sensor. It is activated as soon as you turn the ‘Sens./Laser’ potentiometer (stays ON during 15 min, then automatically switches OFF).

### Typical applications

The **VFT1** can be used in many applications of detection, especially where it’s not easy or not possible to position a reflector for use of standard light barriers. Some examples below:

**Detection of hot or cold billets on cooling bed**

**Detection of hot or cold coils**

### Detection area

*Note:* if there is guide or plate between sensor and target, minimum aperture 100 x 70 mm or minimum diameter 100 mm.
## Technical Specifications

### Diffuse Reflective Barrier VFT1

#### Detection resolution

![Graph showing detection resolution with accuracy and inaccuracy]

- **d1** and **d2** (mm)

#### Technical characteristics

<table>
<thead>
<tr>
<th>Model</th>
<th>VFT1-<strong>S</strong></th>
<th>VFT1-<strong>R</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Detection range</strong></td>
<td>0.8 to 10 m</td>
<td>0.8 to 10 m on black surface (6% remission) / Max. 14 ms&lt;br&gt;0.8 to 10 m on grey surface (18% remission) / Max. 7 ms&lt;br&gt;0.8 to 10 m on white surface (80% remission) / Max. 3.5 ms</td>
</tr>
<tr>
<td><strong>Response Time (1)</strong></td>
<td>0.8 to 8 m on black surface (6% remission) / Max. 14 ms&lt;br&gt;0.8 to 10 m on grey surface (18% remission) / Max. 7 ms&lt;br&gt;0.8 to 10 m on white surface (80% remission) / Max. 3.5 ms</td>
<td>Relay: Single pole changeover&lt;br&gt;Switching capacity: 230 V a.c. – 2.5 A a.c.&lt;br&gt;Make time: 8 ms&lt;br&gt;Break time: 4 ms</td>
</tr>
<tr>
<td><strong>Detection resolution</strong></td>
<td>Standard target: 100 to 300 mm&lt;br&gt;Difficult target (black, high T°): 250 to 450 mm</td>
<td>IR 850 nm, non-visible working beam</td>
</tr>
<tr>
<td><strong>Maximum target temperature</strong></td>
<td>1250 °C (2280 °F)</td>
<td>≤ 1 mW class 2; Activated during 15 min as soon as a photometer is turned</td>
</tr>
<tr>
<td><strong>LED emitter</strong></td>
<td>IR 850 nm, non-visible working beam</td>
<td>Transistor: 2 PNP “High side” S &amp; /S 0/24V&lt;br&gt;complementary outputs; low impedance: 50 mA max.; protected against short circuit. Switching time: 0.2 ms</td>
</tr>
<tr>
<td><strong>Laser pointer (IEC 60825-1)</strong></td>
<td>≤ 1 mW class 2; Activated during 15 min as soon as a photometer is turned</td>
<td>Relay: Single pole changeover&lt;br&gt;Switching capacity: 230 V a.c. – 2.5 A a.c.&lt;br&gt;Make time: 8 ms&lt;br&gt;Break time: 4 ms</td>
</tr>
<tr>
<td><strong>Product Presence (P.P.)</strong></td>
<td>PNP “High side” 0/24V; low impedance: 50 mA; 24V when alarm activated (internal failure)</td>
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</tr>
<tr>
<td><strong>Display and setting</strong></td>
<td>3 status LED (P.P., Ctrl, Alarm)</td>
<td>2 PNP “High side” S &amp; /S 0/24V&lt;br&gt;complementary outputs; low impedance: 50 mA max.; protected against short circuit. Switching time: 0.2 ms</td>
</tr>
<tr>
<td><strong>Operating voltage / Power consumption</strong></td>
<td>VAC: 115 V (-15%) to 230 V (+10%) – 50/60 Hz / 5 VA&lt;br&gt;VDC: 12 to 28 VDC / &lt; 8 W</td>
<td>Relay: Single pole changeover&lt;br&gt;Switching capacity: 230 V a.c. – 2.5 A a.c.&lt;br&gt;Make time: 8 ms&lt;br&gt;Break time: 4 ms</td>
</tr>
<tr>
<td><strong>Cable (model VFT1-<strong>C</strong>)</strong></td>
<td>Connector fitted with silicone cable with protective steel braid&lt;br&gt;Standard length of 2 m (other length: 3, 5, 8 m)</td>
<td>2 PNP “High side” S &amp; /S 0/24V&lt;br&gt;complementary outputs; low impedance: 50 mA max.; protected against short circuit. Switching time: 0.2 ms</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>2.5 kg (VFT1-LB) - 3.0 kg (VFT1-JC)</td>
<td>Relay: Single pole changeover&lt;br&gt;Switching capacity: 230 V a.c. – 2.5 A a.c.&lt;br&gt;Make time: 8 ms&lt;br&gt;Break time: 4 ms</td>
</tr>
<tr>
<td><strong>Protection rating</strong></td>
<td>IP 66 (cast aluminium case)</td>
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</tr>
<tr>
<td><strong>Air Purging</strong></td>
<td>Protection of the optic with clean air: 50 to 200 g/cm², 4 to 16 l/min</td>
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<tr>
<td><strong>Operating temperature</strong></td>
<td>-20 °C to 60 °C (-4 °F to 140 °F) without cooling.&lt;br&gt;Up to 120 °C (250 °F) with water cooling: industrial quality water at about 25 °C, pressure 1-2 bar and flow 1-2 l/min</td>
<td>-20 °C to 60 °C (-4 °F to 140 °F) without cooling.&lt;br&gt;Up to 120 °C (250 °F) with water cooling: industrial quality water at about 25 °C, pressure 1-2 bar and flow 1-2 l/min</td>
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</tbody>
</table>

(1) Response time depends on remission of the surface, size of the receiver’s spot and distance. Values given for an area of detection filled at 100%.

#### Connection

- **VFT1-**B**-**S**
- **VFT1-**B**-**R**
- **VFT1-**C**-**S**
- **VFT1-**C**-**R**

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Technical Characteristics  Diffuse Reflective Barrier VFT1

Dimensions

VFT1-LB•  VFT1-JC•

1. Air supply Ø10  2. 2 cable glands (cable Ø from 7 to 10.5 mm)
2. Water supplies Ø10  3. Optical axis
3. Connector clearance 120 mm  4. Distance Reference
4. Mounting with screw Ø10  5. Receiver Ø30 mm
6. Water supplies Ø10  7. Emitter LED Ø30 mm
7. Connector clearance 120 mm  8. Laser Pointer Ø6 mm

Note: if there is guide or plate between sensor and target, minimum aperture 100 x 70 mm or minimum diameter 100 mm.

Reference for order

<table>
<thead>
<tr>
<th>Case</th>
<th>Mounting</th>
<th>Connection</th>
<th>Output</th>
<th>Supply Voltage</th>
<th>Cable length (VFT1--C--)</th>
</tr>
</thead>
<tbody>
<tr>
<td>L</td>
<td>Bracket</td>
<td>B</td>
<td>S</td>
<td>115-230VAC</td>
<td>L = 2: 2 m (1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Terminal Block</td>
<td>Push pull</td>
<td></td>
<td>3: 3 m</td>
</tr>
<tr>
<td>J</td>
<td>Mounting stand &amp; Cooling</td>
<td>C</td>
<td>R</td>
<td>24VDC</td>
<td>5: 5 m</td>
</tr>
<tr>
<td></td>
<td>jacket</td>
<td>Connector</td>
<td>Relay</td>
<td></td>
<td>8: 8 m</td>
</tr>
</tbody>
</table>

Example: VFT1-JC-S 24VDC L=2 or VFT1-LB-R 115-230VAC

Accessories

- Heat shield to protect from direct radiation, only for VFT1-J• models, Reference 7593826.

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