EU-TYPE-EXAMINATION CERTIFICATE
(Translation)

(2) Equipment or Protective Systems Intended for Use in Potentially Explosive Atmospheres - Directive 2014/34/EU

(3) EU-Type Examination Certificate Number:

PTB 02 ATEX 2117 X

Issue: 1

(4) Product:
Vibration switches type series Optiswitch 5**0 C VF1*.C*****N/W*

(5) Manufacturer:
KROHNE S.A.S.

(6) Address:
2 allée des Ors, 26100 Romans sur Isère, Frankreich

(7) This product and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

(8) The Physikalisch-Technische Bundesanstalt, notified body No. 0102 in accordance with Article 17 of the Directive 2014/34/EU of the European Parliament and of the Council, dated 26 February 2014, certifies that this product has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of products intended for use in potentially explosive atmospheres, given in Annex II to the Directive.

The examination and test results are recorded in the confidential Test Report PTB Ex 17-26085.

(9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

(10) If the sign "X" is placed after the certificate number, it indicates that the product is subject to the Specific Conditions of Use specified in the schedule to this certificate.

(11) This EU-Type Examination Certificate relates only to the design and construction of the specified product in accordance to the Directive 2014/34/EU. Further requirements of the Directive apply to the manufacturing process and supply of this product. These are not covered by this certificate.

(12) The marking of the product shall include the following:

Ex II 1G, 1/2G, 2G Ex ia IIC T6...T1 Ga Ga/Gb Gb

Konformitätsbewertungsstelle, Sektor Explosionsschutz
Braunschweig, February 17, 2017
On behalf of PTB:

Dr.-Ing. F. Lieneck
Regierungsdirektor
(13) **SCHEDULE**

(14) **EU-Type Examination Certificate Number PTB 02 ATEX 2117 X, Issue: 1**

(15) **Description of Product**
The vibration switches type series Optiswitch 5**0 C VF1*.C******N/W*, are used for level monitoring or control in potentially explosive atmospheres. They consist of an electronics housing, the process connection element and the sensor. Locking screw connections, type series ARV52.2** reep. ARV52.3**, may alternatively be used as fixing elements.

Extract from the type key

\[
\begin{array}{cccccc}
\text{VF1*} & \text{ab} & \text{C}^* & \text{***} & \text{f} & \text{g} & \text{h} & \text{i} \\
\end{array}
\]

<table>
<thead>
<tr>
<th>ab: area of validity</th>
<th>ca:</th>
<th>cde: process connection / material</th>
</tr>
</thead>
<tbody>
<tr>
<td>CX = ATEX II 1G, 1/2G, 2G Ex ia IIC T6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CA = ATEX II 1G, 1/2G, 2G Ex ia IIC T6 + WHG</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CM = ATEX II 1G, 1/2G, 2G Ex ia IIC T6 + Schifzulassung</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>f: adapter / process temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>g: enclosure / protection / cable gland</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>h: electronics</th>
</tr>
</thead>
<tbody>
<tr>
<td>N = NAMUR-Signal</td>
</tr>
<tr>
<td>W = NAMUR-Signal (250ms)</td>
</tr>
</tbody>
</table>

| i: switch point |

The full type code can be found in the safety instructions.

**Operating as Category-1 apparatus**
The vibration limit switches are installed in potentially explosive atmospheres for category-1 apparatus.

**Sheet 2/6**

EU-Type Examination Certificates without signature and official stamp shall not be valid. The certificates may be circulated only without alteration. Extracts or alterations are subject to approval by the Physikalisch-Technische Bundesanstalt. In case of dispute, the German text shall prevail.
Operating as Category-1/2 apparatus
The electronics enclosure is installed in potentially explosive atmospheres requiring category 2 apparatus. The process connectors are installed in the partition separating areas requiring category-2 or category-1 apparatus. The measuring sensor is installed in potentially explosive areas requiring category-1 apparatus.

Operating as Category-2 apparatus
The vibration switches are installed in potentially explosive atmospheres for category-2 apparatus.

For the relationship between the temperature class and the maximum permissible temperature at the measuring sensor as well as the maximum permissible ambient temperature for the electronics, reference is made to the tables below.

### Category-1 equipment

<table>
<thead>
<tr>
<th>Temperature class</th>
<th>Temperature at the measuring sensor</th>
<th>Ambient temperature for the electronics</th>
</tr>
</thead>
<tbody>
<tr>
<td>T6</td>
<td>-20 ... +51 °C</td>
<td>-20 ... +51 °C</td>
</tr>
<tr>
<td>T5, T4, T3, T2, T1</td>
<td>-20 ... +60 °C</td>
<td>-20 ... +60 °C</td>
</tr>
</tbody>
</table>

Using the vibration switches, type series Optiswitch 5"U"0 C VF1."C******NW" resp. even at usage of type series Optiswitch 5"U"0 C VF1."C******NW" with locking screw connections, types ARV52.2** resp. ARV52.3**, the media process pressure for applications requiring category-1 equipment, has to be between 80 kPa (0.8 bar) ... 110 kPa (1.1 bar).

For the process conditions without explosive mixtures, reference is made to the specifications provided by the manufacturer.

### Category-1/2 equipment

<table>
<thead>
<tr>
<th>Temperature class</th>
<th>Temperature at the measuring sensor</th>
<th>Ambient temperature for the electronics</th>
</tr>
</thead>
<tbody>
<tr>
<td>T6</td>
<td>-20 ... +85 °C</td>
<td>-40 ... +67 °C</td>
</tr>
<tr>
<td>T5</td>
<td>-20 ... +100 °C</td>
<td>-40 ... +82 °C</td>
</tr>
<tr>
<td>T4</td>
<td>-20 ... +135 °C</td>
<td>-40 ... +90 °C</td>
</tr>
<tr>
<td><strong>T3</strong></td>
<td>-20 ... +200 °C</td>
<td>-40 ... +90 °C</td>
</tr>
<tr>
<td><strong>T2, T1</strong></td>
<td>-20 ... +250 °C</td>
<td>-40 ... +90 °C</td>
</tr>
</tbody>
</table>

** as from 150 °C with temperature adapter
Using the vibration limit switches, type series Optiswitch 5**0 C VF1*.C******N/W* resp. even at usage of type series Optiswitch 5**0 C VF1*.C******N/W* with locking screw connections, type ARV52.2** resp. ARV52.3***, the media process pressure for applications requiring category-1 equipment, has to be between 80 kPa (0.8 bar) ... 110 kPa (1.1 bar).

When the sensor elements of the vibration switches type series Optiswitch 5**0 C VF1*.C******N/W* are operated with higher temperatures than indicated in the table above, it shall be guaranteed by suitable measures that no ignition hazard is caused by such hot surfaces. In this case the temperature at the electronics/housing shall not exceed the respective values of the table above.

In the process it shall be considered that the measuring sensor (even in case of failure) does not show any self-heating and that the plant owner is responsible for the safe operation of the plant regarding the pressures/temperatures of the materials used.

For the process conditions without explosive mixtures, reference is made to the specifications provided by the manufacturer.

**Category-2 equipment**

<table>
<thead>
<tr>
<th>Temperature class</th>
<th>Temperature at the measuring sensor</th>
<th>Ambient temperature for the electronics</th>
</tr>
</thead>
<tbody>
<tr>
<td>T6</td>
<td>-40 ... +85 °C</td>
<td>-40 ... +67 °C</td>
</tr>
<tr>
<td>T5</td>
<td>-40 ... +100 °C</td>
<td>-40 ... +82 °C</td>
</tr>
<tr>
<td>T4</td>
<td>-40 ... +135 °C</td>
<td>-40 ... +90 °C</td>
</tr>
<tr>
<td><strong>T3</strong></td>
<td>-50 ... +200 °C</td>
<td>-40 ... +90 °C</td>
</tr>
<tr>
<td><strong>T2, T1</strong></td>
<td>-60 ... +250 °C</td>
<td>-40 ... +90 °C</td>
</tr>
</tbody>
</table>

**Temperature adapter as from measuring sensor temperatures ≥ 150 °C and/or ≤ -40 °C**

When the sensor elements of the vibration switches type series Optiswitch 5**0 C VF1*.C******N/W* are operated with higher temperatures than indicated in the table above, it shall be guaranteed by suitable measures that no ignition hazard is caused by such hot surfaces. In this case the temperature at the electronics/housing shall not exceed the respective values of the table above.

When using the vibration switches Optiswitch 5**0 C VF1*.C******N/W* with locking screw connections types ARV52.2** resp. ARV52.3*** during operation the conditions of use as well as the permissible temperatures and pressures specified by manufacturer can be found in the manufacturer's instructions.
Electrical data

Supply and signal circuit (terminals 1[+] & 2[-])

- type of protection Intrinsic Safety Ex ia IIC
- only for connection to a certified intrinsically safe circuit.

Maximum values:

- $U_i = 20 \text{ V}$
- $I_i = 103 \text{ mA}$
- $P_i = 516 \text{ mW}$
- $L_i$ negligibly low

For the version with fixed cable additionally

- $L'_i = 55 \mu\text{H/m}$ is to be considered.
- $C_i = 2.2 \text{ nF}$

For the version with fixed cable additionally

- $C_i^{core/core} = 58\text{pF/m}$ and $C_i^{core/screen} = 270\text{pF/m}$

is to be considered.

Modifications to the EC Type - Examination Certificate:
The modifications concern the application of the above standards as well as an adaptation of the type code.

(16) Test Report PTB Ex17-26085

(17) Specific conditions of use

1. The surfaces of the vibration switches type series Optiswitch 5**0 C VF1*.C*****N/W* resp. type series Optiswitch 5**0 C VF1*.C*****N/W* with locking screw connections, types ARV52.2** bzw. ARV52.3**, with plastic enclosure or metal enclosure with plastic parts and/or plastic-coated or enameled measuring sensors can be charged electrostatically. A warning label shall point to this danger.

2. When used as category-1 equipment, the vibration switches that include aluminium shall be installed in such a way that sparking as a result of impact or friction between aluminium and steel (with the exception of stainless steel if the presence of rust particles can be excluded) will positively be excluded.

3. When used as category-1 or category-1/2 equipment, the vibration switches shall be electrostatically (contact resistance $\leq 1\Omega$) connected to the equipotential bonding conductor (e.g. using the ground terminal).
4. Additional tests have shown that the vibration switches type series Optiswitch 5**0 C VF1*.C******N/W* resp. type series Optiswitch 5**0 C VF1*.C******N/W* with locking screw connections, types ARV52.2** bzw. ARV52.3**, may also be operated under the following conditions:

**Category-1/2 equipment**

<table>
<thead>
<tr>
<th>Temperature class</th>
<th>Temperature at the measuring sensor</th>
<th>Ambient temperature for the electronics</th>
</tr>
</thead>
<tbody>
<tr>
<td>T4, T3, T2, T1</td>
<td>-20 ... +60 °C</td>
<td>-40 ... +90 °C</td>
</tr>
</tbody>
</table>

For applications requiring category-1/2 equipment, the process pressure of the media has to range from 0 to 600 kPa (6 bar). Should the above mentioned conditions not be met at the measuring sensor, it shall be considered that the measuring sensor (even in case of failure) does not show any self-heating and that the plant owner is responsible for the safe operation of the plant regarding the pressures/temperatures of the materials used.

(18) **Essential health and safety requirements**

Met by compliance with the aforementioned standards.

According to Article 41 of Directive 2014/34/EU, EC-type examination certificates which have been issued according to Directive 94/9/EC prior to the date of coming into force of Directive 2014/34/EU (April 20, 2016) may be considered as if they were issued already in compliance with Directive 2014/34/EU. By permission of the European Commission supplements to such EC-type examination certificates and new issues of such certificates may continue to hold the original certificate number issued before April 20, 2016.

Konformitätsbewertungsstelle, Sektor Explosionsschutz
Braunschweig, February 17, 2017

On behalf of PTB:

[Signature]
Dr.-Ing. F. Linenschmidt
Regierungsdirektor