



(1) EC-TYPE-EXAMINATION CERTIFICATE (Translation)

(2) Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres - **Directive 94/9/EC**

(3) EC-type-examination Certificate Number:

PTB 05 ATEX 2011 X



(4) Equipment: Level limit switches, type series
OPTISWITCH 3*00 C VF3*4.C****Z**X

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

(6) Address: Les Ors, 26103 Romans Cedex, France

(7) This equipment and any acceptable variation thereto are 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 9 of the Council Directive 94/9/EC of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres, given in Annex II to the Directive.

The examination and test results are recorded in the confidential report PTB Ex 05-24402 .

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

EN 50014:1997 + A1 + A2

EN 50020:2002

EN 50284:1999

(10) If the sign "X" is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.

(11) This EC-type-examination Certificate relates only to the design, examination and tests of the specified equipment in accordance to the Directive 94/9/EC. Further requirements of the Directive apply to the manufacturing process and supply of this equipment. These are not covered by this certificate.

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

II 1 G or II 1/2 G or II 2 G EEx ia IIC T6

Zertifizierungsstelle Explosionsschutz

Braunschweig, February 02, 2005

By order:

(signature)

Dr.-Ing. U. Johannsmeyer
Regierungsdirektor

5 pages, correct and complete as regards content.

By order:

Dr.-Ing. Johannsmeyer, Braunschweig, September 20, 2007
Direktor und Professor

sheet 1/5

SCHEDULE

(13)

(14) **EC-TYPE-EXAMINATION CERTIFICATE PTB 05 ATEX 2011 X**

(15) Description of equipment

The level limit switches, type series OPTISWITCH 3*00 C VF3*4.C****Z**X are used for the level measurement and they are installed in hazardous areas requiring equipment of category 1 or 1/2 or 2.

They consist of an electronics enclosure with the associated analyzing electronic system, the process connection elements and the sensor.

Category-1-equipment

The level limit switches are installed in hazardous areas requiring category-1-equipment.

Category-1/2-equipment

The electronics enclosure is installed in hazardous areas requiring equipment of category 2. The process connection elements are mounted into the partition which separates areas from each other where equipment of category 2 or 1 is required. The sensor is installed in areas requiring equipment of category 1.

Category-2-equipment

The level limit switches are installed in hazardous areas requiring category-2-equipment.

For relationship between the temperature class, the maximum permissible temperature at the sensor and the maximum permissible ambient temperature in the area of the electronics, reference is made to the following table:

Category-1-equipment

Temperature class	Ambient temperature at the electronics	Temperature at the sensor
T6	-20 ... +48 °C	-20 ... +48 °C
T5, T4, T3, T2, T1	-20 ... +60 °C	-20 ... +60 °C

For applications requiring category-1 equipment, the media process pressure shall range from 0.8 bar to 1.1 bar. The specified permissible ambient temperatures are based on the 80% rule in section 6.4.2 of EN 1127-1. For the operating conditions without explosive mixtures, reference is made to the specifications provided by the manufacturer.

Category-1/2-equipment

Temperature class	Permissible ambient temperature at the electronics	Permissible ambient temperature at the sensor of the OPTISWITCH 3200 C VF324.C	Permissible ambient temperature at the sensor of the OPTISWITCH 3100 C VF314.C and 3300 C VF334.C	
			without temperature adaptor	with temperature adaptor
T6	-40 °C ... +64 °C	-20 °C ... +54 °C	-50 °C...+ 85 °C	-50 °C ...+ 85 °C
T5	-40 °C ... +79 °C	-20 °C ... +60 °C	-50 °C...+100 °C	-50 °C ...+100 °C
T4	-40 °C ... +80 °C	-20 °C ... +60 °C	-50 °C...+135 °C	-50 °C ...+135 °C
T3	-40 °C ... +80 °C	-20 °C ... +60 °C	-50 °C...+150 °C	-50 °C ...+200 °C
T2, T1	-40 °C ... +80 °C	-20 °C ... +60 °C	-50 °C...+150 °C	-50 °C ...+250 °C

When the level limit switches, type series OPTISWITCH 3200 C VF324.C****Z**X are applied as category-1 equipment, the media process pressure shall range from 0.8 bar to 1.1 bar. The permissible ambient temperatures specified for the type series OPTISWITCH 3200 C VF324.C****Z**X are based on the 80% rule in section 6.4.2 of EN 1127-1. For the permissible temperatures and pressures for the operation, reference is made to the specifications provided by the manufacturer.

For the permissible temperatures and pressures for the operation of the type series OPTISWITCH 3100 C VF314.C****Z**X and OPTISWITCH 3300 C VF334.C****Z**X, reference is made to the specifications provided by the manufacturer (cf. safety instructions for the application in hazardous areas).

Category-2-equipment

Temperature class	Permissible ambient temperature at the electronics	Permissible ambient temperature at the sensor of the OPTISWITCH 3200 C VF324.C	Permissible ambient temperature at the sensor of the OPTISWITCH 3100 C VF314.C and 3300 C VF334.C	
			without temperature adaptor	with temperature adaptor
T6	-40 °C ... +64 °C	-40 °C ... +70 °C	-50 °C... +85 °C	-50 °C ... +85 °C
T5	-40 °C ... +79 °C	-40 °C ... +80 °C	-50 °C...+100 °C	-50 °C ...+100 °C
T4	-40 °C ... +80 °C	-40 °C ... +80 °C	-50 °C...+135 °C	-50 °C ...+135 °C
T3	-40 °C ... +80 °C	-40 °C ... +80 °C	-50 °C...+150 °C	-50 °C ...+200 °C
T2, T1	-40 °C ... +80 °C	-40 °C ... +80 °C	-50 °C...+150 °C	-50 °C ...+250 °C

For the permissible temperatures and pressures for the operation, reference is made to the specifications provided by the manufacturer.

Electrical data

Supply and signal circuit
(terminals 1 [+], 2 [-] in the electronic
compartment, for the 2-chamber enclosure
variant in the terminal compartment

type of protection Intrinsic Safety EEx ia IIC/IIB
For connection to a certified intrinsically safe
circuit.

Maximum values:

$$U_i = 30 \text{ V}$$

$$I_i = 131 \text{ mA}$$

$$P_i = 983 \text{ mW}$$

L_i negligibly low

C_i negligibly low

The intrinsically safe supply and signal circuit is safely electrically isolated from parts which can be grounded.

The metallic parts of the OPTISWITCH level limit switches are electrically connected to the internal and external earth terminal clamp.

(16) Test report PTB Ex 05-24402

On the basis of further tests it was determined that the level limit switches, type series OPTISWITCH 3100 C VF314.C****Z**X and OPTISWITCH 3300 C VF334.C****Z**X may also be used as category-1/2 equipment in hazardous areas which deviate from the atmospheric conditions (0.8 up to 1.1 bar and -20 °C up to +60 °C). For the permissible temperatures and pressures for the operation, reference is made to the specifications provided by the manufacturer. It shall be considered here that the sensors do not show any self-heating (not even in case of a fault) and that the operating company is responsible for the safe operation of the system regarding the pressures/temperatures of the media used.

(17) Special conditions for safe use

1. When applied as category-1-equipment those variants of the level limit switches, type series OPTISWITCH 3*00 C VF3*4.C****Z**X, for which the material aluminium is used, shall be installed as such, that the generation of sparks due to impact or friction between aluminium and steel (with the exception of stainless steel if the existence of rust particles can be excluded) is impossible.
2. The level limit switches provide surfaces which can charge electrostatically when they are designed with a plastic enclosure or a metal enclosure with inspection window or plastic coated or enamelled measuring sensors, carrying cable or spacer tube. A warning label shall point to this risk.
3. When applied as category-1 or category-1/2 equipment the OPTISWITCH level limit switches shall be connected to the equipotential bonding system (contact resistance $\leq 1\text{M}\Omega$, e.g. via the earth terminal) to avoid the risk of electrostatic charge of metal parts.

4. The OPTISWITCH level limit switches shall be installed in such a way that buckling or swinging of the sensor can be excluded with sufficient safety considering the tank installations and the flow conditions inside the tank. This applies, in particular, to sensors which are more than 3 m long.

5. When applied as category-1 or category-1/2 equipment all parts of the OPTISWITCH level limit switches which contact the medium may be used only in such media which they are sufficiently resistant to.

(18) Essential health and safety requirements

met by compliance with the standards mentioned above

Zertifizierungsstelle Explosionsschutz
By order:

Braunschweig, February 02, 2005

(signature)

Dr.-Ing. U. Johannsmeyer
Regierungsdirektor

1. SUPPLEMENT

according to Directive 94/9/EC Annex III.6

to EC-TYPE-EXAMINATION CERTIFICATE PTB 05 ATEX 2011 X

(Translation)

Equipment: Level limit switch, type series OPTISWITCH 3*00 C VF3*4.C****Z**X

Marking:  II 1 G or II 1/2 G or II 2 G EEx ia IIC T6

Manufacturer: KROHNE S.A.S.

Address: Les Ors, 26103 Romans Cedex, France

Description of supplements and modifications

In the future the level limit switches of type series OPTISWITCH 3*00 C VF3*4.C****Z**X may also be manufactured and operated according to the test documents listed in the test report. The modifications concern the external construction (stainless steel forming housing and the use of a 2nd pressure compensation element), the application of the locking screw connection of type series ARV-VB63.2** or ARV-VB67.2**, the internal construction, a part of the electrical data as well as the adaption to the current state of the standards series EN 60079-et sqq. and, therefore, the marking of the equipment.

In the future this will read:  II 1 G or II 1/2 G or II 2 G Ex ia IIC T6

The following applies additionally to the operation as category 1/2-equipment or category 2-equipment:

When the sensors of the level limit switches of type series OPTISWITCH 3100 C VF314.C****Z**X and OPTISWITCH 3300 C VF334.C****Z**X are operated with higher temperatures than indicated in the respective tables of the EC-type examination certificate, it shall be guaranteed by suitable measures that no ignition hazard is caused by such hot surfaces. In this case the temperature at the housing shall not exceed the values of the table applicable for the respective category. 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 operating company is responsible for the safe operation of the system regarding the pressures / temperatures of the materials used.

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

1. SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 05 ATEX 2011 X

<u>Electrical data</u>	
Supply and signal circuit (terminals 1 [+], 2 [-] in the electronic compartment, for the 2-cell enclosure version in the terminal compartment)	type of protection Intrinsic Safety Ex ia IIC only for connection to a certified intrinsically safe circuit. Maximum values: $U_i = 30 \text{ V}$ $I_i = 131 \text{ mA}$ $P_i = 983 \text{ mW}$ C_i negligibly low or for the version with firmly connected cable $C_i'_{\text{Core/Core}} = 58 \text{ pF/m}$, $C_i'_{\text{Core/Screen}} = 270 \text{ pF/m}$ L_i negligibly low or for the version with firmly connected cable $L_i' = 55 \text{ }\mu\text{H/m}$

All other data and specifications of the EC-type examination certificate as well as the "Special Conditions" apply without changes also to this 1st supplement.

Applied standards

EN 60079-0:2006

EN 60079-11:2007

EN 60079-26:2007

Assessment and test report: PTB Ex 09-28269

Zertifizierungssektor Explosionsschutz
By order:

Braunschweig, January 26, 2009

Dr.-Ing. U. Johannsmeyer
Direktor und Professor

