



(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 01 ATEX 2206 X

(4) Equipment: Temperature sensors, types TFE

(5) Manufacturer: Albert Balzer AG Rotax

(6) Address: 4143 Dornach, Switzerland

(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 01-21121.

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

EN 50014:1997 + A1 + A2

EN 50020:1994

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 EEx ia IIC T1 ... T6

Zertifizierungsstelle Explosionsschutz

Braunschweig, January 30, 2002

By order:

(signature)

In the absence of Dr.-Ing. U. Johannsmeyer
Regierungsdirektor

(13)

SCHEDULE

(14)

EC-TYPE-EXAMINATION CERTIFICATE PTB 01 ATEX 2206 X

(15) Description of equipment

The temperature sensors, types TFE are used for the determination of a medium temperature. Resistance thermometers or thermo-couples are employed as measuring elements. The temperature sensors are applied as category-1 or category-2 equipment.

For relationship between maximum permissible medium temperature, temperature class, sensor type and supplied power for application as category-1 or category-2 equipment, reference is made to the table given in the operating instructions.

Electrical data

Resistance thermometer

Sensor circuit type of protection Intrinsic Safety EEx ia IIC
only for connection to a certified intrinsically safe circuit

Maximum values:

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

$$I_i = 100 \text{ mA}$$

$$P_i = 0.1 \dots 0.75 \text{ W according to table (cf. operating instructions)}$$

Reactances per unit length of the incoming line:

$$L_i = 15 \text{ } \mu\text{H/m}$$

$$C_i = 280 \text{ pF/m}$$

Thermo-couple

Sensor circuit type of protection Intrinsic Safety EEx ia IIC

Maximum values:

$$U_o = 0.1 \text{ V DC}$$

$$I_o = 24 \text{ mA}$$

L_i negligibly low

C_i negligibly low

When the thermo-couple is connected to an active intrinsically safe circuit, the rules for the interconnection of intrinsically safe circuits are to be considered:

$$P_i = 1 \text{ W}$$

(16) Test report PTB Ex 01-21121

(17) Special conditions for safe use

1. For the application as category-1 equipment the temperature sensors, types TFE of such designs 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 not possible.
2. For the application as category-1 or -1/2 equipment the temperature sensors, types TFE shall be connected electrostatically (contact resistance $\leq 1M\Omega$) to the equipotential bonding system (e.g. using the ground terminal clamp).
3. For relationship between maximum permissible medium temperature, temperature class, sensor type and supplied power for application as category-1 or category-2 equipment, reference is made to the table given in the operating instructions.

(18) Essential health and safety requirements

met by compliance with the standards mentioned above

Zertifizierungsstelle Explosionsschutz
By order:

Braunschweig, January 30, 2002

(signature)

In the absence of Dr.-Ing. U. Johannsmeyer
Regierungsdirektor

3 pages, correct and complete as regards content.

By order:



Dr.-Ing. U. Gerlach
Oberregierungsrat

Braunschweig, August 03, 2006



sheet 3/3

1. SUPPLEMENT

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

to EC-TYPE-EXAMINATION CERTIFICATE PTB 01 ATEX 2206 X

(Translation)

Equipment: Temperature sensors, types TFE

Marking:  II 1 G EEx ia IIC T1 ... T6

Manufacturer: Albert Balzer AG Rotax

Address: 4143 Dornach, Switzerland

Description of supplements and modifications

In the future the temperature sensors, types TFE may also be manufactured and operated according to the test documents listed in the test report. The modifications concern specifications given in the documentation.

All specifications of the EC-type examination certificate apply without changes.

Test report: PTB Ex 02-22311

Zertifizierungsstelle Explosionsschutz
By order:

Braunschweig, October 15, 2002

(signature)

In the absence of
Dr.-Ing. U. Johannsmeyer
Regierungsdirektor

1 page, correct and complete as regards content.

By order:


Dr.-Ing. U. Gerlach, Braunschweig, August 03, 2006
Oberregierungsrat



Sheet 1/1

EC-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.

2. SUPPLEMENT

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

to EC-TYPE-EXAMINATION CERTIFICATE PTB 01 ATEX 2206 X

(Translation)

Equipment: Temperature sensors, types TFE

Marking:  II 1 G EEx ia IIC T1 ... T6

Manufacturer: Albert Balzer AG Rotax

Address: 4143 Dornach, Switzerland

Description of supplements and modifications

In the future the temperature sensors, types TFE may also be manufactured and operated according to the test documents listed in the test report. The modifications concern specifications given in the documentation and the operating instructions as well as the "Special conditions". These are extended as follows:

Special conditions

4. Incoming lines to the sensor or the measuring element having a length in excess of 3 m shall be secured against swinging and impact onto the tank's wall.

All further special conditions and specifications of the EC-type examination certificate apply without changes.

Test report: PTB Ex 04-23504

Zertifizierungsstelle Explosionsschutz

Braunschweig, May 06, 2004

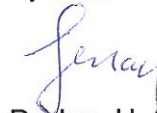
By order:

(signature)

In the absence of
Dr.-Ing. U. Johannsmeyer
Regierungsdirektor

1 page, correct and complete as regards content.

By order:



Dr.-Ing. U. Gerlach
Oberregierungsrat



Braunschweig, August 03, 2006

Sheet 1/1

3. SUPPLEMENT

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

to EC-TYPE-EXAMINATION CERTIFICATE PTB 01 ATEX 2206 X

(Translation)

Equipment: Temperature sensors, types TFE

Marking:  II 1 G EEx ia IIC T1 ... T6

Manufacturer: Albert Balzer AG Rotax

Address: 4143 Dornach, Switzerland

Description of supplements and modifications

In the future the temperature sensors, types TFE may also be manufactured and operated according to the test documents listed in the test report. The modifications concern the application of the temperature sensors in hazardous areas due to combustible dust/air-mixtures and which require equipment of category 1, 2 or 3. Therefore the marking of the equipment changes as follows:

 II 1 D T *** °C IP65 or II 2 D T *** °C IP65 or II 3 D T *** °C IP54

The appropriate temperature according to the following table shall be pasted at the place marked with ***:

power	≤ 0,1 W	0,1 W	0,25 W	0,5 W	0,75 W
sensor type	marking temperature				
Ø 3 mm, Pt100	*)	56	79	111	139
Ø 6 mm, Pt100	*)	47	56	72	86
Ø 6 mm, 2 x Pt100	*)	55	75	104	131
Ø 3 mm, thermo-couple	*)	42	43	47	50
Ø 6 mm, thermo-couple	*)	41	42	44	48

*) to be determined by extrapolation using the values of the columns for 0,1 W and 0,25 W

The "Special conditions" are supplemented by clause 5.

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3. SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 01 ATEX 2206 X

Special conditions:

5. For the application in hazardous areas due to combustible dust the marking shall include the appropriate temperature according to the table given in the operating instructions.

All further special conditions and specifications of the EC-type examination certificate as well as the 1st and 2nd supplement apply without changes.

Test report: PTB Ex 04-24263

Zertifizierungsstelle Explosionsschutz
By order:

Braunschweig, October 15, 2004



Dr.-Ing. U. Gerlach
Regierungsrat



4. SUPPLEMENT

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

to EC-TYPE-EXAMINATION CERTIFICATE PTB 01 ATEX 2206 X

(Translation)

Equipment: Temperature sensors, types TFE

Marking:  II 1 G EEx ia IIC T1 ... T6

Manufacturer: Albert Balzer AG Rotax

Address: 4143 Dornach, Switzerland

Description of supplements and modifications

In the future the temperature sensors, types TFE may also be manufactured and operated according to the test documents listed in the test report. The protective tube of the resistance thermometers may in future also be manufactured from the material titanium. Therefore the "Special condition" No. 1 is supplemented as follows:

Special conditions

1. For the application as category-1 equipment the temperature sensors, types TFE of such designs for which the material aluminium or titanium is used, shall be installed as such that the generation of sparks due to impact or friction between aluminium or titanium and steel (with the exception of stainless steel if the existence of rust particles can be excluded) is not possible.

All further special conditions and specifications of the EC-type examination certificate as well as supplements 1 through 3, apply without changes.

Test report: PTB Ex 06-26009

Zertifizierungsstelle Explosionsschutz

By order:

(signature)

In the absence of Dr.-Ing. U. Johannsmeyer
Regierungsdirektor

Braunschweig, January 19, 2006

1 page, correct and complete as regards content.

By order:


Dr.-Ing. U. Gerlach
Oberregierungsrat



Braunschweig, August 03, 2006

Sheet 1/1

5. SUPPLEMENT

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

to EC-TYPE-EXAMINATION CERTIFICATE PTB 01 ATEX 2206 X

(Translation)

Equipment: Temperature sensors, types TFE

Marking:  II 1 G EEx ia IIC T1 ... T6





Manufacturer: Albert Balzer AG Rotax

Address: Werbhollenstr. 52
4143 Dornach 2, Switzerland

Description of supplements and modifications

In the future the temperature sensors, types TFE may also be manufactured and operated according to the test documents listed in the test report. The modifications concern the temperature specifications for the operation in temperature class T4 (application of clause 5.6.2, EN 60079-11), the introduction of new materials for the protective tube and the connection head, the adaption to the current state of standard series EN 60079- et seq. and EN 61241- et seq. and, therefore, the marking of the equipment.

Depending on the field of application this reads in future:

 II 1 G Ex ia IIC T1 ... T6 or  II 1 G Ex ia IIC T4 or
 II 1 D Ex iaD 20 T...°C IP6* or  II 3 D Ex tD A22 T...°C IP5*

For the application in temperature class T4 the maximum permissible medium temperatures depend on the size of the sensor and the supplied power as specified in the following table (also see table 2a in the operating instructions manual).

Total surface area with the exception of connecting wires	Maximum surface temperature in °C	Maximum medium temperature in °C									
		for dissipation power of ... mW for sensors with a diameter of Ø 3 / 6 mm (equates to surface temperature – self-heating)									
		≤10 mW		≤100mW		≤250 mW		≤500 mW		≤750 mW	
		Ø 3	Ø 6	Ø 3	Ø 6	Ø 3	Ø 6	Ø 3	Ø 6	Ø 3	Ø 6
< 20 mm ²	275	273	274	259	268	236	259	204	243	176	229
≥20 mm ² and < 10 cm ²	200	198	199	184	193	161	184	129	168	101	154
> 10 cm ²	135	133	134	119	146	96	119	-	103	-	89

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

5. SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 01 ATEX 2206 X

The "Special Conditions" and specifications stated in the EC-type examination certificate as well as the supplements 1 through 4 apply without changes.

Applied standards

EN 60079-0:2006

EN 60079-11:2007

EN 60079-26:2004

EN 61241-0:2006

EN 61241-1:2004

EN 61241-11:2006

Assessment and test report: PTB Ex 09-29016

Zertifizierungssektor Explosionsschutz
On behalf of PTB:

Braunschweig, May 7, 2009

(signature)

Dr.-Ing. U. Johannsmeyer
Direktor und Professor

2 page, correct and complete as regards content.

By order:

Dr.-Ing. Johannsmeyer
Direktor und Professor



Braunschweig, September 19, 2011

6. SUPPLEMENT

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

to EC-TYPE-EXAMINATION CERTIFICATE PTB 01 ATEX 2206 X (Translation)

Equipment: Temperature sensors, types TFE

Marking:  II 1 G Ex ia IIC T1 ... T6 or
II 1 G Ex ia IIC T4 or
II 1 D Ex iaD 20 T...°C IP6* or
II 3 D Ex tD A22 T...°C IP5*

Manufacturer: Albert Balzer AG Rotax

Address: Werbhollenstr. 52
4143 Dornach 2, Switzerland

Description of supplements and modifications

In the future the temperature sensors of types TFE may also be manufactured and operated according to the test documents listed in the test report. The modifications concern the adaption to the current state of the standard series EN 60079-et seq. and hence the marking and the specifications on the type label of the equipment. The test documents have been revised correspondingly. Constructive modifications which are relevant for explosion protection have not been made.

Depending on the field of application the marking will read in future:

 II 1 G Ex ia IIC T1 ... T6 or  II 1 G Ex ia IIC T4 or
 II 1 D Ex ia IIIC T...°C or  II 3 D Ex tc IIIC T...°C

The "Special conditions" and all other specifications of the EC-type examination certificate as well as supplements 1. through 5. apply without changes also to this 6th supplement.

Applied standards

EN 60079-0:2012 + A11:2013
EN 60079-31:2014

EN 60079-11:2012

EN 60079-26:2015

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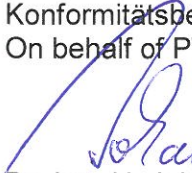


6. SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 01 ATEX 2206 X

Test report: PTB Ex 15-25200

Konformitätsbewertungsstelle, Sektor Explosionsschutz
On behalf of PTB:

Braunschweig, November 24, 2015


Dr.-Ing. U. Johannsmeyer
Direktor und Professor

