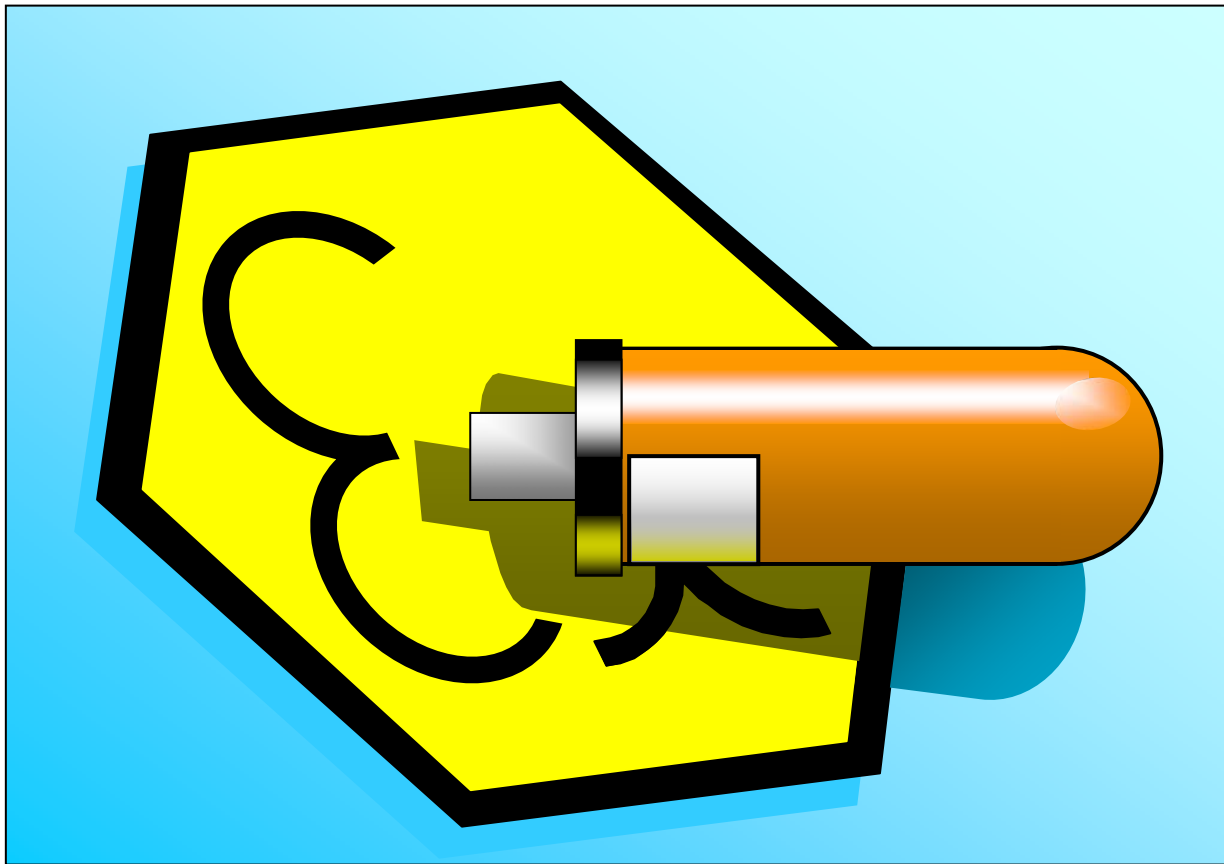


E.L.B. EX-GERÄTE



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Technical Documentation
FR-4..., FR5..., FR-6..., FR-7...

USB Devices



**Memory Sticks / Transceivers for
Keyboards, Scanners, Bluetooth**

24.09.2007

FR-4... FR-5... FR-6... FR-7...

Operating Instructions

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General Information

This manual mainly contains data concerning explosion protection. Operational data and instructions for operating with a PC are described more detailed in the manual for the Non-ex version and the DVD/papers enclosed with the device.

1 Functional Description

USB transceiver FR-4.../-6.../-7... and USB memory sticks FR-5... may operate inside of hazardous areas, zones 1 and 2 (gas atmosphere) and zones 21 and 22 (combustible dust atmosphere). They transmit data to a PC and install themselves there automatically.

The type numbers of devices, which are intrinsically safe, end with the letter "I" (FR-nnI). The type numbers of devices, which are protected by moulding, end with the letter "E" (FR-nnE). The meaning of the numbers "nn" is explained in the actual price list and partially in chapter 4 ("Type suffixes").

Intrinsically safe devices must be connected with intrinsically safe supplies with fitting electrical data, see chapter 4: "Limits for intrinsic safety". Moulded devices must be connected with supplies according to chapter 4: "Nominal values for moulded devices".

Most of the devices have flying leads for connection. Intrinsic safe devices in gas atmosphere may also be manufactured with USB plugs. Chapter 5 shows the possible combinations and gives hints for mounting.

2 Delivery Components

Delivery includes:

- USB device
- serial accessories if available
- Manual of the Ex version
- Manual of the Non-Ex version (on paper or DVD)

3 Operating

Please note the safety advices and the data for hazardous areas use !

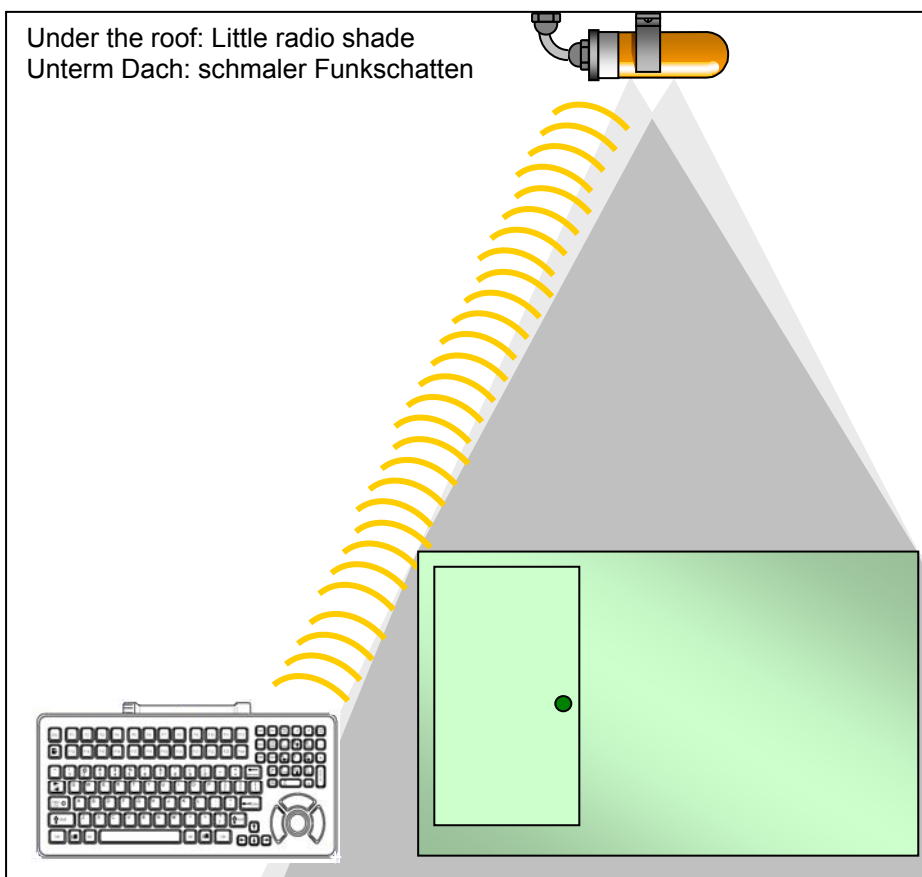
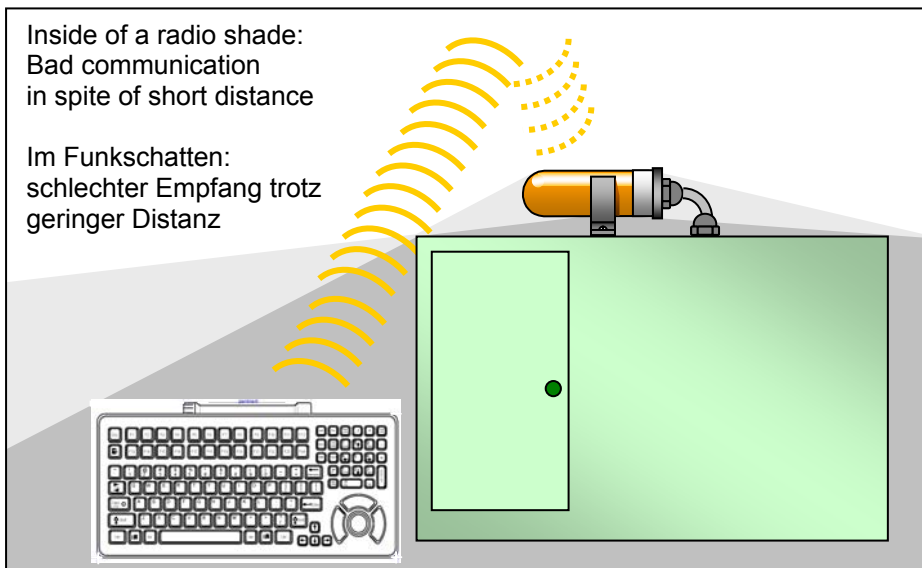
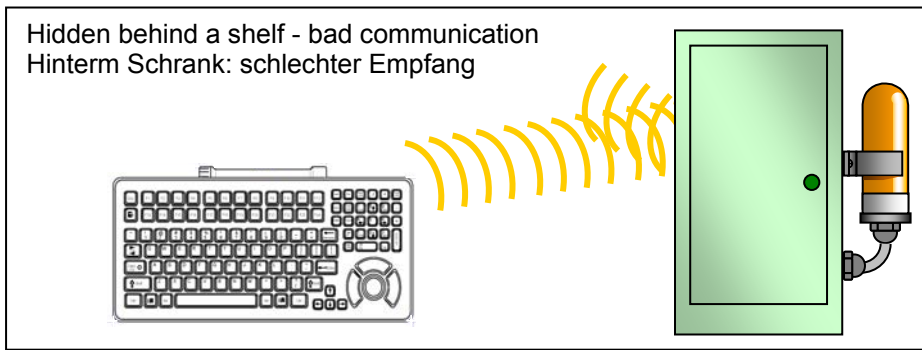
For additional information concerning operating data refer to the manual of the Non-Ex version enclosed with the USB device.

In order to avoid damage, please connect and disconnect USB devices for hazardous areas only with the PC switched off. This is also valid for intrinsically safe versions with USB plugs, if not the manual of the intrinsically safe supply allows plugging and unplugging during operation explicitly.

Intrinsically safe USB devices must only be powered by intrinsically safe supplies with appropriate electrical data.

USB devices install themselves automatically on your PC.

Hints for good radio transmission

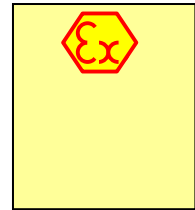
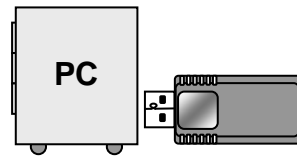


Some hints for the connection with a PC

(Models and connectors see chapter 4 and 6)

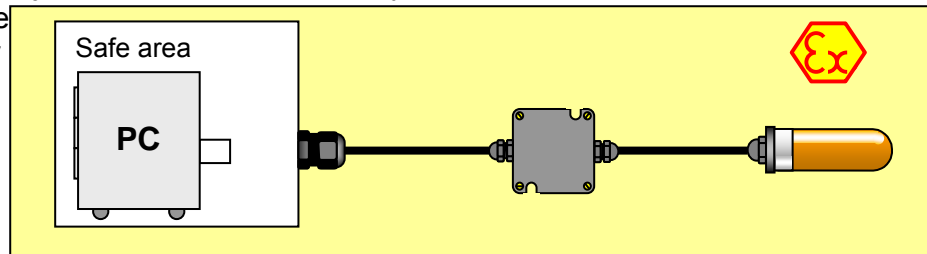
Outside of hazardous areas

Without explosive atmospheres the USB sticks can be used without protection.

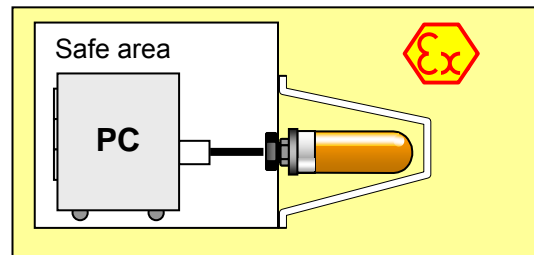


FR-xyE

Explosion protected USB sticks FR-xyE...A may be connected inside of hazardous areas in an Ex e junction box. The cable may leave the hazardous area via an ATEX approved cable gland and may be connected with a PC without interface.

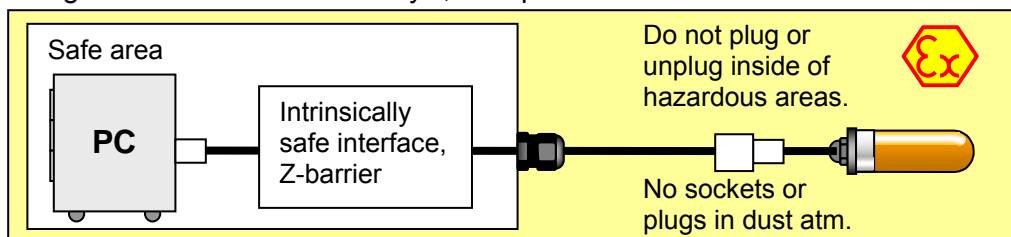


Additionally the models FR-xyE...G may be mounted using their own threads. However, the sticks must be protected against impact then. Please note the hints for good radio transmission, if the impact protection contains parts made of metal.



FR-xyI

Explosion protected USB sticks FR-xyI... need an intrinsically safe interface/supply according to the data in chapter 5. Please make sure, that this interface is able to transmit the USB data correctly. USB plugs and sockets may be used inside of the hazardous area because of the intrinsic safety, but not inside of dust atmospheres. Mounting is the same as with FR-xyE, except the interface in between.



4 Type Codes

FR-xy I nnn z

xy = (shaded: not yet available)
 40: Transceiver for USB keyboard FT-40
 50: USB memory
 5...: USB memory
 60: Bluetooth transceiver scanner SK400
 70E: Multi-purpose Bluetooth transceiver
 7...: Multi-purpose Bluetooth transceiver

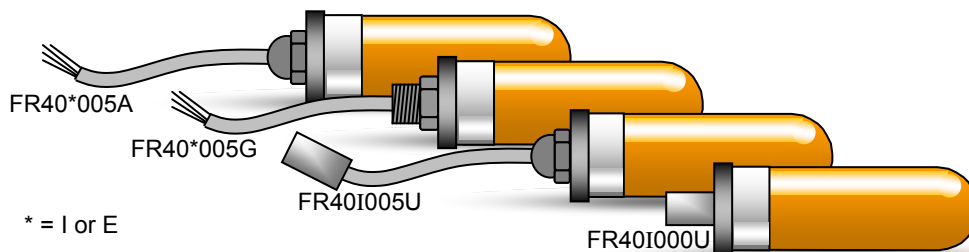
I = intrinsically safe, for connection with an intrinsically safe supply with corresponding el. Ex data

E = moulded, for connection with clamps and junction boxes of type of protection „increased safety“ („e“) or directly with a PC outside of hazardous areas

nnn = cable length in dm.
 standard length: 0.5 m = 005
 special length 25 m e.g. = 250

z = connection
 A = flying leads
 G = flying leads, thread outside for easy mounting
 U = USB plug, only for kind of protection „i“ (FR-xyI...)

Type code examples for transceiver of the cordless keyboard FT-40:



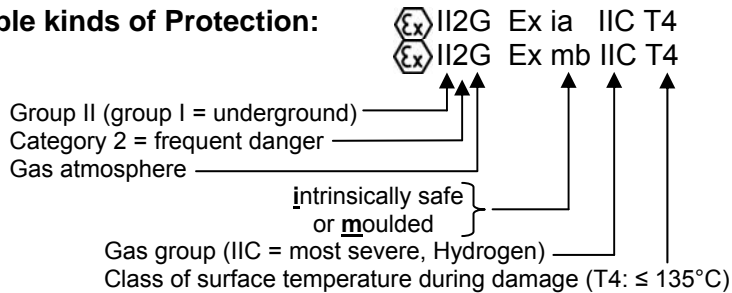
Technical Data

5 Electrical Data

Certificate no.:

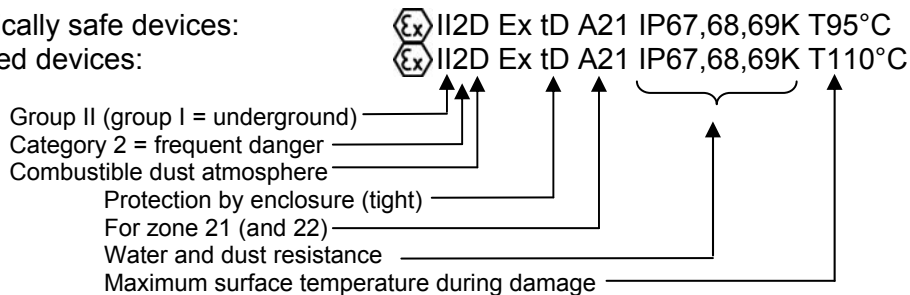
IBExU 07 ATEX 1012

Possible kinds of Protection:



Intrinsically safe devices:

Moulded devices:



Limits for intrinsic safety:

U_i	$\leq 5.9 \text{ V}$	C_i	$\leq 43 \mu\text{F}$
I_i	$\leq 1.1 \text{ A}$	L_i	$\leq 1 \mu\text{H}$
P_i	$\leq 6.1 \text{ W}$		

These values are valid for supply and data lines !

Explanation: The output values U_o , I_o and P_o of the intrinsically safe supply must not exceed the input values U_i , I_i and P_i of the USB devices. The input values C_i and L_i of the USB devices must not exceed the output C_o and L_o of the intrinsically safe supply.

Nominal values for encapsulation "m":

$U_N = 5 \text{ V}$ (nominal supply voltage)
 $I_N = 100 \text{ mA}$ (nominal current consumption)

Explanation: Supply voltages greater than $5 \text{ V} + 10\%$ may trigger protection circuits inside of the USB device. Maximum current consumption of the USB devices is 0.1 A .

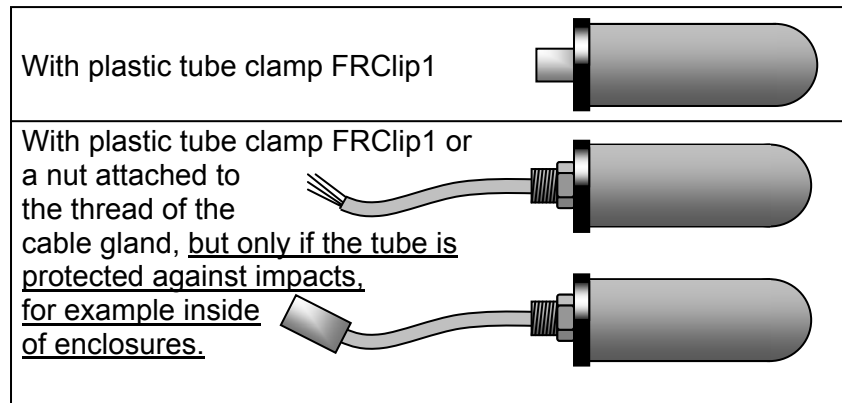
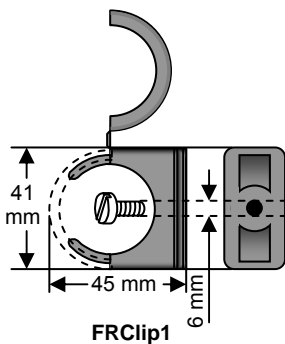
Ambient temperature:

$-20^\circ\text{C} \dots +60^\circ\text{C}$ for all protection standards

6 Mechanical Data

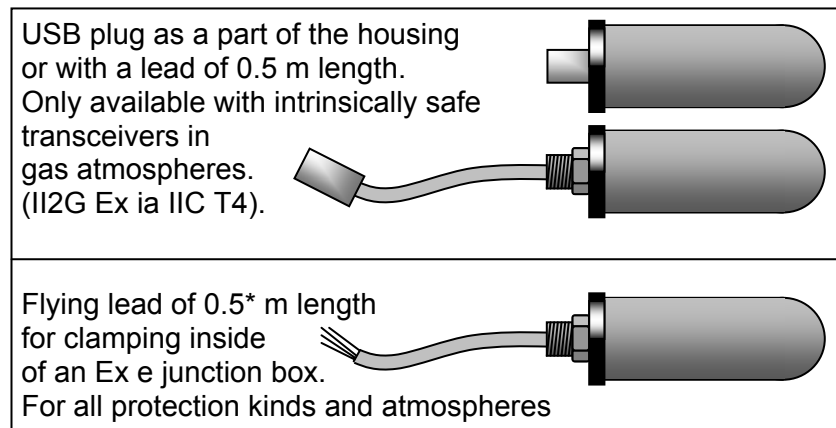
Enclosure:	Plastic tube
Diameter:	28.5 mm
Length:	90 ... 140 mm depending on the type, without plug or thread
Weight:	75 ... 116 g depending on the length
Material:	PP-H (high density polypropylene)
IP classes:	IP67 + IP68 + IP69K

Mounting:



Note: Due to moulding these sticks are heavier than standard USB sticks, so the ones without lead need an additional mechanical support, if they are plugged in a standard PC backplane. - Metal tube clamps may disturb the radio transmission.

Connectors:



*Optionally up to 20 m, if tested concerning correct data transmission.
Possible length of thin PS/2 cable: ca. 10 m for FR-nnE, 15 m for FR-nnl

Lead no.	1	2	3	4
Signal	VCC	D-	D+	GND
Colour	red	white	green	black

These assignments are part of the USB standard.
Other colours possible for cables longer than 0.5 m.

7 Cleaning

Clean with a soft dry cloth or brush. Do not clean in hazardous areas because of potential static charging of the cleaning tool.

8 Safety Advices

USB devices must not be plugged or unplugged inside of hazardous areas.

In order to prevent damage only connect or disconnect USB devices for hazardous areas, while the PC is switched off. This is also valid for intrinsically safe versions with an USB socket, if the manual of the intrinsically safe supply does not allow hot plugging and unplugging explicitly.

Intrinsically safe USB devices must only be connected with intrinsically safe supplies with fitting electrical values. The values listed in chapter 4 are limits as well for the supply as for each data line.

USB devices with damaged cases must not be used inside of hazardous areas!

Read the manual completely and carefully before operation. Only the latest documentation is valid.

Installation, maintenance and cleaning of the units must only be performed by persons trained and authorized for this purpose, insofar as they are familiar with the units.

If it can be assumed that safe operation is no longer possible, switch off the unit and secure it against being used again.

It is prohibited for the operator or his staff to open the units in a way that is not described in this manual. This may only be done by specifically authorized personnel of E.L.B. Ex-Geraete GmbH & Co. KG.

Modifications and conversions to the units are not permissible and will cause the Ex protection and the guarantee to become void.

E.L.B. Ex-Geraete GmbH & Co. KG is not liable for any consequential damage.

The technical data specified for hazardous areas comply with the values certified in the European ATEX approval. The user bears the sole responsibility of examining the equipment with regard to its suitability for the intended application and environmental conditions. E.L.B. Ex-Geraete GmbH & Co. KG accepts no liability for any lack of suitability.

For the installation, maintenance and cleaning of the units, it is absolutely necessary to observe the applicable ordinances and provisions concerned with explosion protection as well as the Accident Prevention Regulations and codes of practice in your region.

Appendix

9 Liability

The technical data specified for hazardous areas comply with the values certified in the European EEx approval. The user bears the sole responsibility of examining the equipment with regard to its suitability for the intended application and environmental conditions. E.L.B. Ex-Geraete GmbH & Co. KG accepts no liability for any lack of suitability.

10 EC Declaration of Conformity



We hereby confirm the conformity of the equipment listed below with the directives of the Council of the European Community. The safety and installation instructions of the product documentation must be observed.

Models: USB devices FR-4..., FR-5..., FR-6..., FR-7...

Directive: EMC Directive 98/336/EC

European Standards: EN 55022, class B
EN 55024

Directive: Low Voltage Directive 73/23/EC

European Standards: EN 60950

Directive: 94/9/EC

European Standards: EN 60079-0:2004
EN 60079-11:2006
EN 60079-18:2004
EN 61241-0:2002
EN 61241-1:2004

E.L.B. Ex-Geraete Bachmann GmbH & Co KG
Postal address: An der Hartbruecke 8, 64625 Bensheim, Germany
Tel.: ++49-6251-6 37 36, Fax: 06251-6 37 29



- [1] **EC-TYPE EXAMINATION CERTIFICATE**
according to Directive 94/9/EC, Annex III
(Translation)
- [2] Equipment and Protective Systems intended for use
in Potentially Explosive Atmospheres, Directive 94/9/EC
- [3] EC-Type Examination Certificate Number: **IBExU07ATEX1012**
- [4] **Equipment:** USB-radio transceiver FR-4..., FR-6... and FR-7...
USB-memory FR-5...
- [5] **Manufacturer:** E.L.B. Ex-Geräte Bachmann GmbH & Co. KG
- [6] **Address:** An der Hartbrücke 8
64625 Bensheim
Germany
- [7] The equipment mentioned under [4] and any acceptable variation there to are specified in the schedule to this EC-Type Examination Certificate.
- [8] IBExU Institut für Sicherheitstechnik GmbH, NOTIFIED BODY number 0637 in accordance with article 9 of the Council Directive 94/9/EC of 23rd March 1994, certifies that the under [4] mentioned equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of the equipment intended for use in potentially explosive atmospheres given in Annex II to the Directive.
The examination and test results are recorded in test report IB-06-3-135 of 29th January 2007.
- [9] Compliance with the Essential Health and Safety Requirements has been assured by compliance with EN 60079-0:2004, EN 60079-11:2006, EN 60079-18:2004, EN 61241-0:2006 and EN 61241-1:2004.
- [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 under [17] in the schedule to this EC-Type Examination Certificate.
- [11] This EC-Type Examination Certificate relates only to the design and construction of the specified equipment. If applicable, further requirements of this Directive apply to the manufacture and supply of this equipment.
- [12] The marking of the equipment mentioned under [4] shall include the following:

Intrinsically safetypes FR-...I

cable version additionally

II 2G Ex ia IIC T4

II 2D Ex tD A21 IP 6X T 95 °C

-20 °C ≤ T_a ≤ +60 °C

Encapsulated Types FR-...E

cable version additionally

II 2G Ex mb IIC T4

II 2D Ex tD A21 IP 6X T 110 °C

-20 °C ≤ T_a ≤ +60 °C

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Fuchsmühlenweg 7 - 09599 Freiberg, Germany
☎ +49 (0) 3731 3805-0 - ☎ +49 (0) 3731 23650

Authorised for certifications
- Explosion protection -

By order

(Dr. Lössch)

Schedule



- Seal -
(ID no. 0637)

Freiberg, 31st January 2007

Certificates without signature and seal are not valid.
Certificates may only be duplicated completely and unchanged.
In case of dispute, the German text shall prevail.

[13]

Schedule

[14]

to EC-TYPE EXAMINATION CERTIFICATE IBExU06ATEX1163

[15]

Description of the equipment

The USB-radio transceivers/memories are equipments protected by intrinsic safety respectively moulding equipment for use in hazardous areas. Electrical connection is possible with plugs or fixed cables connection. All equipment have moulded plastic enclosures of various dimensions and can contain a radio module.

Types:

FR-40y = USB transceiver for radio keyboard FT-40

FR-60y = USB Bluetooth transceiver for a bar code scanner

FR-70E = USB multiple purpose Bluetooth transceiver

FR-4xy, FR-6xy, FR-7xy = various USB radio transceivers; **x = 1 ... 9**

FR-5xy = various USB memories; **x = 0 ... 9**

The following options (y) are possible respectively:

y I = intrinsically safety; E = encapsulated

Ambient temperature range: -20 °C to +60 °C

Degree of protection of the enclosure: ≥ IP 67

Electrical data

FR-...I:

Power supply and Data circuit in type of protection Ex ia IIC

U_i	5.9 V
I_i	1.1 A
P_i	6.1 W
L_i	1 μ H
C_i	43 μ F

FR-...E:

Power supply circuit

rated voltage

5 V DC \pm 10 %

current input

100 mA

Max. r.m.s. a.c. or d.c. voltage U_m

253 V

[16]

Test report

The test results are detailed recorded in the test report IB-06-3-135. The test documents are part of the test report and listed there.

Summary of the test results:

The USB- radio transceivers/memories fulfil the requirements of explosion protection for the Equipment Group II and Category 2G respectively 2D in type of protection Intrinsic safety respectively encapsulation and protection by enclosure for gases of the Explosion Group IIC and Temperature Class T4 respectively with a maximum surface temperature of maximum 95 °C respectively 110 °C.

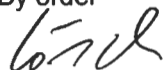
Safety instructions

In hazardous areas the USB devices must not be plugged or disconnected.

[17] **Special conditions**
none

[18] **Essential health and safety requirements**
Confirmed by compliance of standards (see [9]).

By order


(Dr. Lösch)

Freiberg, 31st January 2007



IBExU