

Technical Documentation

TT-108

Silicone Keyboard Ex i



TT-108

Operating Instructions

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General Information

1 In short

Advantages of keyboard TT-108:

- Suitable for hazardous areas zone 1 and 2
- Well palpable keys, easy to find even with gloves
- Switch point easy to feel
- Case without gaps and edges, easy to clean
- Case, lead and plug material (silicone) resistant against most chemical fluids
- Dust and water proof, e.g. IP 68 (immersion)
- Suitable intrinsically safe interface and supply available (TW-100D)

2 Delivery components

Delivery includes:

- Keyboard TT-108
- Manual

Technical Data

3 Data for Hazardous Areas:

- Type: TT-108
- II 2 G EEx ia IIC T4
- II 2 D T79°C IP68
- $-20^{\circ}\text{C} \leq T_{\text{amb}} \leq +50^{\circ}\text{C}$
- IBExU 05 ATEX 1084 X
- $U_i \leq 5,4 \text{ V}$
- $I_i \leq 250 \text{ mA}$
- $P_i \leq 1,2 \text{ W}$
- $\Sigma C_i \leq 13 \mu\text{F}$
- $\Sigma L_i \leq \text{negligible}$

Meaning of the Marking for Hazardous Areas:

II	2	G	Ex ia	IIC	T4	II	2	D	T79°C	IP68	IBExU	05	ATEX	1084	X
Group II = all areas without mining	Category 2 = zone 1 (frequent or long lasting explosive atmosphere)	Gas atmosphere	i = intrinsically safe a = two-failure safety	Hydrogen (the most ignitable gas)	Surface temperature less than 135°C	Group II = all areas without mining	Category 2 = zone 1 (frequent or long lasting explosive atmosphere)	Conductive / explosive dust	Maximum possible surface temperature	Dust and water proof, see below.	Marking of the test board	Year of approval	Tested according to ATEX	Certificate number	Special conditions (see next page)

IP codes

The marking may be IP66, IP68 and IP69k simultaneously, see certificate sections (12) and (15), which means, that there are no different keyboard versions for special IP codes. Meanings of the codes:

IP6...: Dust proof, complete contact protection

IP...6: Tall seas / strong water beam

IP...8: Total immersion, for TT-108: 1 hour at 1 m below water surface

IP...9k: Water beam from 4 directions with >80 bar und 80°C

Wall thickness is generally more than 5 mm, but much less around the keys and the lamps. Even hardly visible damages may decrease the IP protection here and make the dust protection become invalid. Please watch these areas.

Feet for grounding

The metal bottom of the case must be grounded to avoid "isolated capacities" to be charged. Therefore the two feet of the case close to the cable outlet are electrically connected with the metal bottom of the case, which must have a conductive connection with the desktop. The user is responsible for the sufficient ground connection of the desktop.

Special Conditions ("X"):**Intrinsically Safe Supply and Data Transmission**

TT-108 must be supplied by an Ex i interface with isolated (from the mains) power and data lines, according to the above mentioned data for hazardous areas. We recommend TW-100D for interface installation in the safe area or TW-100Dm for installation inside of hazardous areas.

No plugging and unplugging inside of hazardous areas

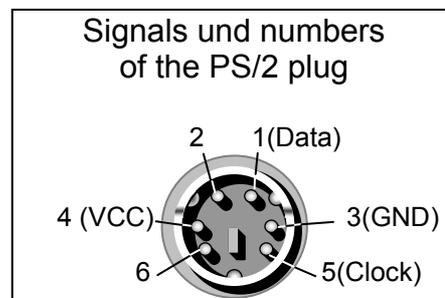
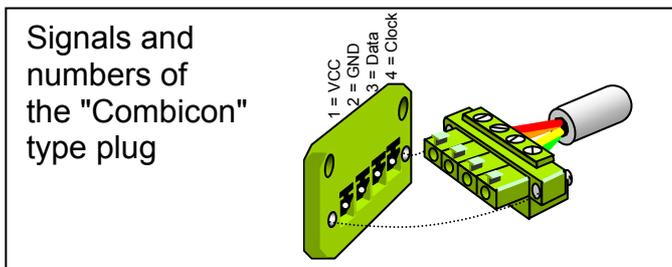
because of possible discharging of hidden capacities.

Cleaning

Please clean the keyboard with a damp cloth or a soft brush. Cleaning only outside of hazardous areas because of possible charging of the cleaning tool !

4 Electrical and Mechanical Data

- Dimensions: 390 x 151 x 22 mm
- Weight: 1280 g

**Appendix****5 Safety Advices**

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-Geräte 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-Geräte 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 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-Geräte 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.

Further advices see chapter 3.

6 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-Geräte GmbH & Co. KG accepts no liability for any lack of suitability.

7 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.

Model: Ex i silicone keyboard TT-108

Directive: EMC Directive 98/336/EC

European Standards: EN 55022: 1998, class B
EN 55024: May 1999

Directive: Low Voltage Directive 73/23/EC

European Standards: EN 60950

Directive: 94/9/EC

European Standards: EN 61010-1, 3/94
EN 50014: February 1997
EN 50020: 2002

E.L.B. Ex-Geräte Bachmann GmbH & Co KG,
Postal address: An der Hartbrücke 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: **IBExU05ATEX1084 X**

[4] Equipment: Keyboard
type TT-108

[5] Manufacturer: E.L.B. Ex-Geräte Bachmann GmbH & Co. KG

[6] Address: An der Hartbrücke 8
64625 Bensheim, Germany

[7] The equipment mentioned in [4] and any acceptable variation thereto 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 this 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 the test report IB-05-3-051 of 1st June 2005.

[9] Compliance with the Essential Health and Safety Requirements has been assured by compliance with EN 50014:1997+A1 +A2 and EN 50020:2002 and EN 500281-1-1:1998 +A1.

[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 in [4] shall include the following:

II 2G EEx ia IIC T4
 II 2D T 79 °C IP 68
-20 °C ≤ Ta ≤ +50 °C

IBExU Institut für Sicherheitstechnik GmbH
Fuchsmühlenweg 7 - D-09599 Freiberg
Tel.: 00493731 3805-0 - Fax: 00493731 23650

Authorised for certifications Explosion protection
By order

(Dr. Lösch)

Schedule



- Seal-
(ID no. 0637)

Freiberg, 6th June 2005

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 the EC-TYPE EXAMINATION CERTIFICATE IBExU04ATEX1084 X**

[15] **Description of the equipment**

The keyboard is an intrinsically safe apparatus and serves for the control of a PC in explosive areas. It consists of a silicon housing with aluminium-base plate, keys and 3 LED. The keyboard is intrinsically safe provided by associated apparatus.

Electrical data

Ambient temperature range: up -20 °C to +50 °C
Degree of protection: IP 66, IP 68 and IP 69k

Intrinsically safe input electric circuit:

$U_i \leq 5.4 \text{ V}$
 $I_i \leq 250 \text{ mA}$
 $P_i \leq 1.2 \text{ W}$
 $C_i = 13 \mu\text{F}$
 L_i negligible

[16] **Test report**

The test results are recorded in the test report IB-05-3-051 of 1st June 2005. The test documents are component of the test report and listed there.

Summary of the Test Result:

The keyboard type TT-108 fulfils the requirements of the Type of protection Intrinsic Safety for an explosion-proof electrical apparatus for Equipment Group II , Category 2G (Explosion Group of IIC, Temperature Class T4) as well as the regulations for protection of dust explosion of the Category 2D.

Safety instruction

In the operator's manual for the handling are instructions to be followed.

[17] **Special conditions**

The keyboard is not allowed to clean dry or plugged on in the explosive areas or explosive atmospheres.

For connection only galvanically isolated 'ia'- current sources are allowed.

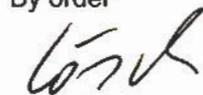
The plug connection of the keyboard TT-108 must be outside of explosive dust areas or according to IP 6X.

[18] **Essential Health and Safety Requirements**

Confirmed by norms (see [9]).

By order

Freiberg, 6th June 2005



(Dr. Lösch)