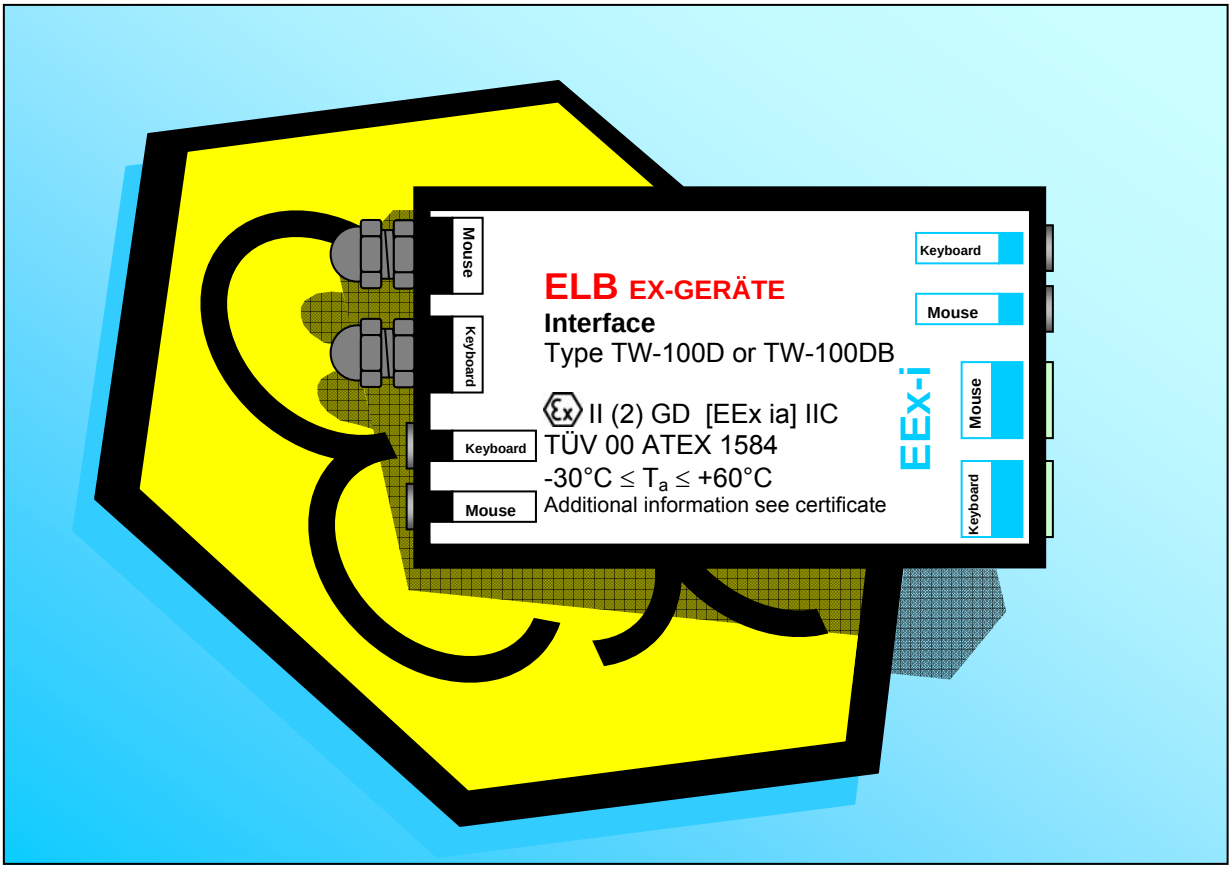
E.L.B. EX-GERÄTE
Bachmann GmbH



Technical Documentation

EEx-i Interface

TW-100D / TW-100DB

TW-100Dm / TW-100DBm

TW-115B

25.9.2007

TW-100D(B)
TW-100D(B)m
TW-115B

Operating Instructions
TW-100D(B), TW-100D(B)m, TW-115B

Contents

General Information

		Page
1	Functional Description	3
2	Delivery components	3
3	Start of Operation	4
4	Operating Hints	4

Technical Data

5	Electrical data	6
6	Safety advices	7
7	Dimensions and Terminals	8

Appendix

8	Liability	11
9	Declaration of Conformity	11
10	Connection examples	12
10.1	... for TW-100D(B)	13
	Standard PS/2	13
	Keyboard Wedge	15
	RS-232, RS-485	17
10.2	TW-200	19
10.3	TW-115B	19
10.4	TW-100D(B)m	20
Certificates		22

General Information

1 Functional Description

The interface series TW-100D... and TW-115B isolates a PC in the safe area electrically from a keyboard, a mouse or other PS/2 or RS232/RS485-devices in the Ex area. This separation concerns the signal lines as well as the power lines. Therefore these devices do not need to be connected to ground. TW-100D or TW-100DB and TW-115B are mounted in the safe area, while TW-100D**m** or TW-100DB**m** may be mounted inside of the Ex area as well.

The connected devices inside of the Ex area have to be approved for intrinsic safety and match the data for intrinsically safe circuits in chapter 5. There are two versions concerning this electrical data (type name with or without "B"), see table below.

RS232 data can be translated and sent to the safe area as RS485 data to the safe area in order to increase transfer range. This is not possible for the opposite direction. The transfer range is significantly depending on the cable type, the baud rate and the electrical distortions.

TW-100D... and TW-115B have a built-in keyboard wedge with one keyboard and one mouse socket, which makes communication with the PC possible even from the safe area. Chapter 10 shows sensible connection examples.

TW-1... and the connected PS/2 devices are supplied by the PC. In case of RS232 or RS485 transmission exclusively the interface can by supplied with an external plug-in supply, for details see chapter 10.

	Safe Area	Ex Area
0,7 W / 135 mA / 1,6 mH	TW-100D	TW-100Dm
1,2 W / 250 mA / 0,27 mH	TW-100DB TW-115B	TW-100DBm

TW-100D is the standard version.

TW-115B is TW-100DB for group I (mining), see also chapter 5.

2 Delivery Components

Delivery includes:

- TW-100D or TW-100DB respectively, TW-100Dm, TW-100DBm, TW-115B, configuration according to order no. or your special order
- Operating manual
- 5V wall plug-in power supply if necessary (for exclusive RS232 or RS-485 transmission)

3 Start of Operation

Observe the safety advices!

- Switch off the PC.
- Connect the cable from TW-1... with the PC (safe area)
- Connect the EEx i keyboard and EEx i mouse or other approved intrinsically safe devices with the terminals on the EEx i side of TW-1...
- Connect further devices with the safe side terminals of TW-1... if applicable
- Connect the external plug-in supply with the TW-1... (only for exclusive RS232 or RS485 transmission)
- Make sure, that the electrical data of connected devices correspond to the data of the terminals. (E.g. do not connect RS232 devices with PS/2 terminals !)
- Power the PC up and wait for the end of the booting procedure. Configuration of the PC during booting is only possible from one side of the interface TW-1... if the keyboard wedge is active, see chapter 10.

4 Operating Hints

- Some PCs can be restarted by pressing a key on the keyboard. In this case all PS/2 terminals of the PC are supplied even if the PC has been switched off. Therefore TW-1... and all connected devices are still active with the PC switched off !
- Do not mix up the mouse and keyboard channels, they are not quite identical.
- Standard PS/2 leads should not exceed 3 m of length, particularly if there are electrical distortions. If you need longer cables: more copper and isolation mean less resistance and capacitance.
- TW-1... sinks about ca. 350 mA from your PC. Devices connected with the safe side even increase the power consumption. Some laptops cannot supply TW-1... with sufficient current.
- Power on the EEx i side of the interface is limited. This limits the amount and the power consumption of the connected devices.
- A PS/2 scanner transmits PS/2 data, but might not answer to a booting PC like a PS/2 device. If your PC expects a keyboard (BIOS settings) it will switch off the keyboard clock line, if there is no keyboard to be found. You may then for example switch a keyboard in parallel to the base station over an external (KS-20) keyboard wedge or switch the base station over to the "keyboard wedge mode".
- A keyboard in parallel to a scanner cannot distinguish between the sources of PS/2 signals and might look at scanner data as PC

instructions. In this case switch scanner and keyboard in parallel over an external keyboard wedge (KS-20).

- RS-232 and RS-485 data may only be sent from the Ex-protected base station to the PC, not in the opposite direction. Transmission of RS-XXX data from the PC to the terminals of the Ex approved base station are not allowed and may additionally destroy components.
- Mixing-up of signal types (RS-232 into PS/2 terminals e.g.) or terminals may destroy internal components. Repair is hardly possible because of the moulding.
- TW-1... probably contains the only PS/2 wedge, which works even with mice. Please keep in mind, that swapping different devices connected to the internal TW-1... wedge causes the same PC reactions like swapping by hand. Some hints:
    - Let your PC boot completely before any action.
    - After switching on the PC only one side (selectable) of the keyboard wedge is connected to the PC for 30 seconds. The PC boots with the devices of this side. Mouse and keyboard of the other side are electronically disconnected meanwhile. They will be connected automatically afterwards and introduce themselves to the PC.
    - The PC boots with the devices connected to the side of TW-1..., which you selected for this purpose. If devices are missing there the PC switches all PS/2 lines dead.
    - The keyboard wedge switches over automatically, which you will not notice while swapping keyboards. Swapping mice may last up to 3 seconds, depending on the PC and the mice. Rapid mouse actions do not accelerate anything.
    - Some PCs answer to a new mouse like clicking the right mouse button: a window is opened. Please press "Esc" or "Alt" or click on an empty area on the screen with the left mouse button to close the window.
    - Frequent or rapid swapping does not affect TW-1... at all - but maybe your PC application. (If data strings are interrupted e.g.) Please keep in mind, that vibrations may move a mouse in industrial sites.
- Tip: Intrinsically safe circuits are electrically separated from other circuits up to a peak value of 375 V. Thus intrinsically safe devices connected there need not be grounded.

Technical Data

5 Electrical Data

Certificate no.: TÜV 00 ATEX 1584 resp. IBExU 02 ATEX 1155

Protection type:

TW-100D(B):	⟨Ex⟩ II (2) GD [EEx ia] IIC
TW-100D(B)m:	⟨Ex⟩ II 2 G EEx m [ia] IIC T4
	⟨Ex⟩ II 2 D T75°C IP67
TW-115B:	⟨Ex⟩ I (M1) [EEx ia] I

Non intrinsically safe circuits (from the computer):

U = 5 VDC, current consumption ca. 350 mA only TW-1...
U_m = 253 VAC

Intrinsically safe circuits (from the keyboard):
in type of protection Intrinsic Safety EEx ia IIC, peak values:

	TW-100D(m)	TW-100DB(m), TW-115B
U_o =	5,4V	
ΣI_o =	135 mA	250 mA
ΣP_o =	0,7 W	1,2 W
Characteristic:	trapezoidal	
ΣL_o =	1,6 mH	0,27 mH
ΣC_o =	65 µF	
$\lvert \pm U_i \rvert$ (RS-232) =	15 V	

Enclosure:

IP protection:	TW-100D, TW-100DB, TW-115B: IP20; TW-100...m: IP67	
Material:	aluminium profile case	
Mounting:	see chapter 7	
Dimensions:	44 x 105 x 166 mm	
Weights:	TW-100D.., TW-115B:	ca. 250 g (incl. 2 fixed leads)
	TW-100D(B)m:	ca. 1600 g (incl. 2 fixed leads)

Surface temperature:
max. 75°C (only TW-100...m)

Environmental conditions during operation:

Temperature:	-30°C ... +60°C
Humidity:	max. 75%, non-condensing, 72h test

Environmental conditions during storage:
Temperature: -30°C ... +70°C

6 Safety advice

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

Before setting the units to work, read the technical documentation carefully.
Important

The latest version of the technical documentation or the corresponding technical supplements is valid in each case.

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 renewed switching-on.

The units comply with the state of the art and must only be connected to systems which have been approved for this purpose by E.L.B. Ex-Geräte Bachmann GmbH.

It is prohibited for the operator or his staff to open the units. This may only be done by specifically authorized personnel of E.L.B. Ex-Geräte Bachmann GmbH.

When used in pressurized apparatus the inner volume of the interfaces must be purged. For this purpose the side covers of the interfaces can be provided with orifices on request.

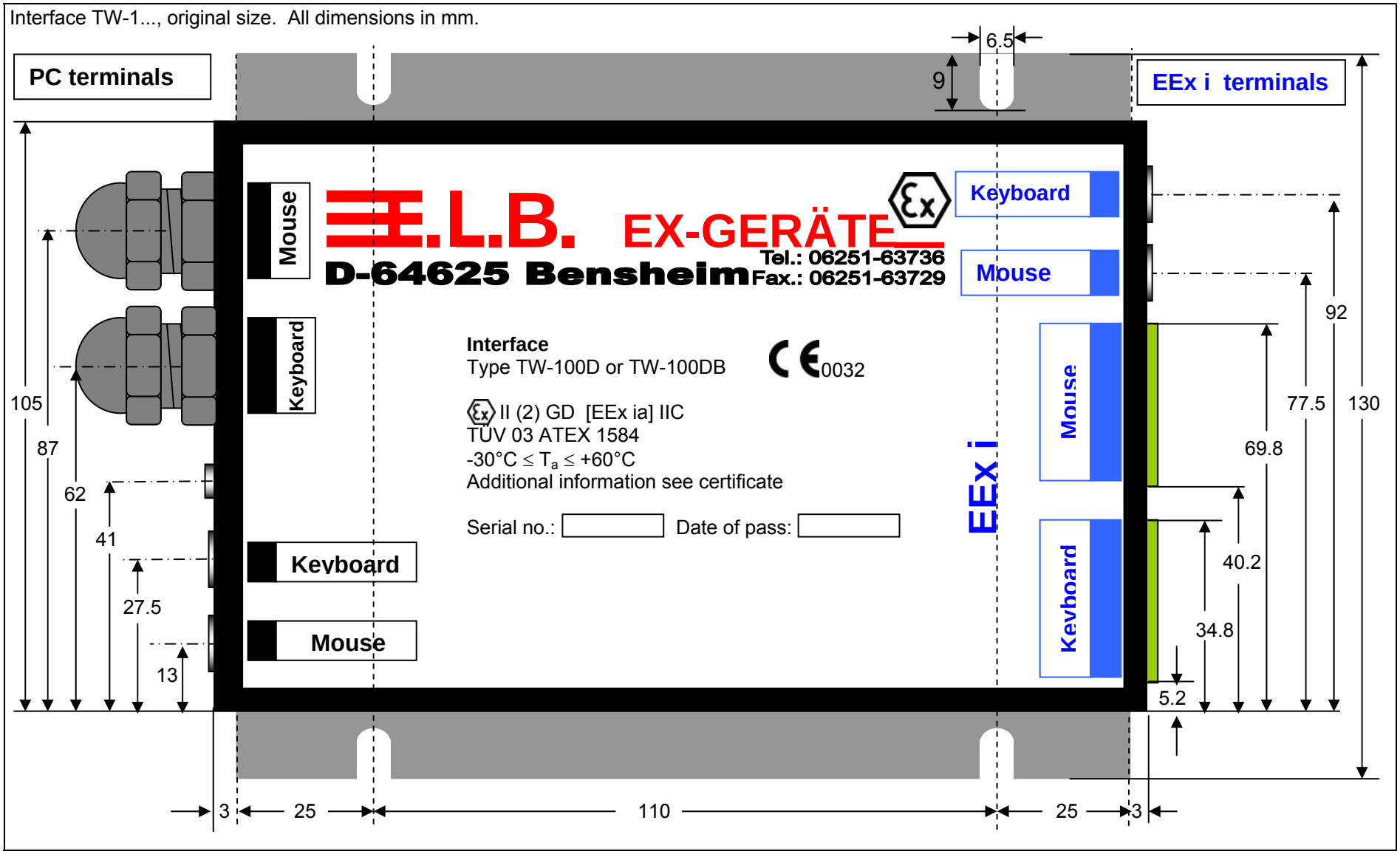
Modifications and conversions to the units are not permissible and will cause the Ex protection and the guarantee to become void.

E.L.B. Ex-Geräte Bachmann GmbH is not liable for any subsequent damage.

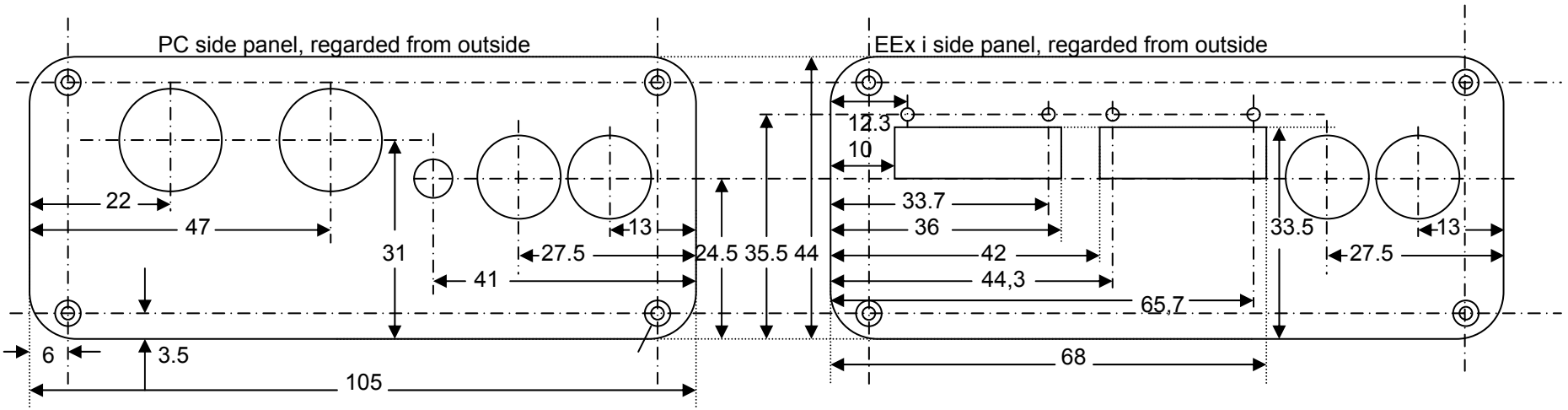
The technical data specified for the hazardous area comply with the values certified in the European EEx approval. The user bears the sole responsibility of examining the equipment with regard to its suitability for the intended application and environmental conditions. E.L.B. Ex-Geräte Bachmann GmbH 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 (VDE 0160, VDE 0165 or EN 60079-14, EN 50014 - 50039) as well as the Accident Prevention Regulations (UVV).

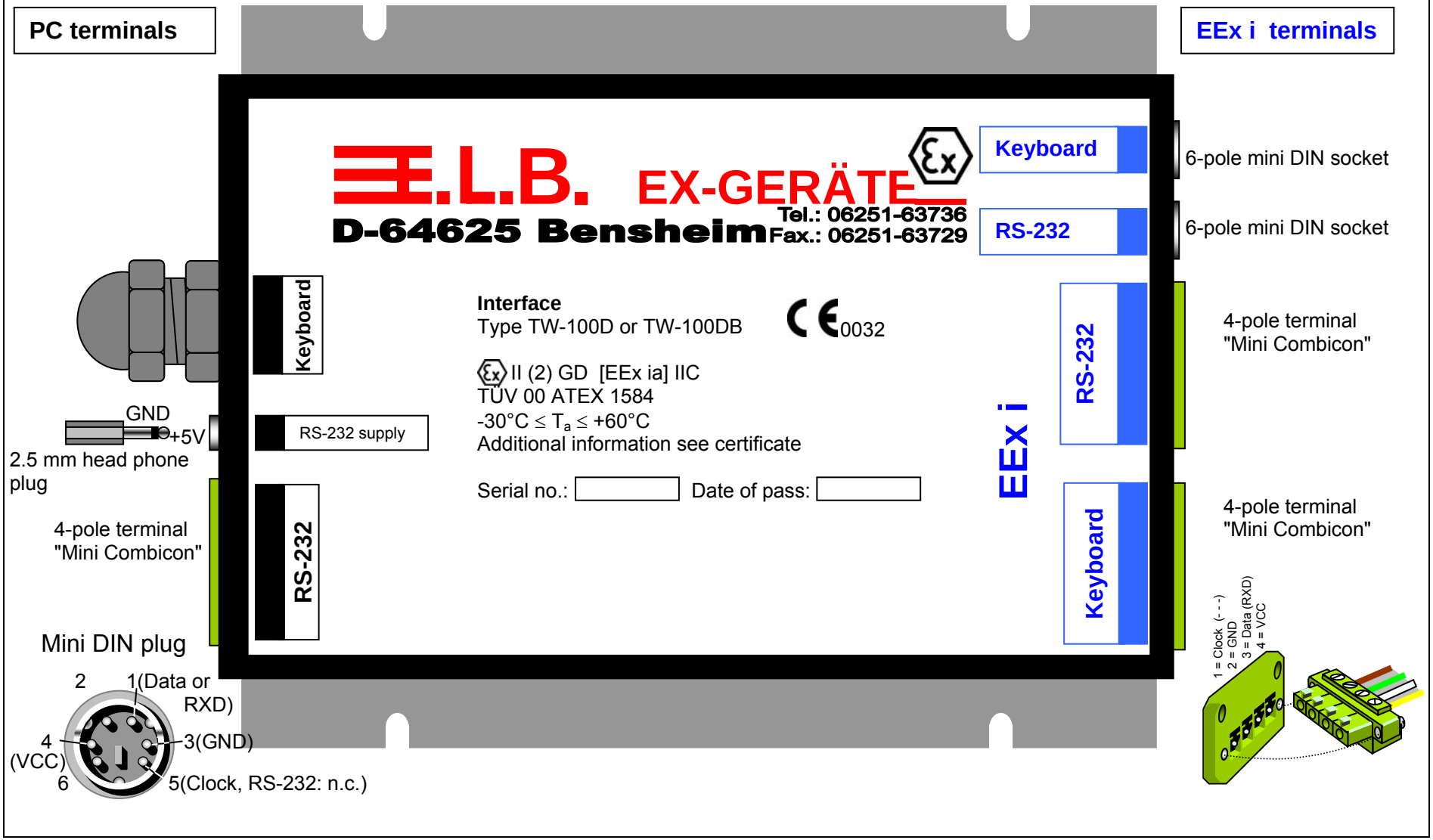
7 Dimensions and Terminals



Interface TW-1..., original size. All dimensions in mm.



Interface TW-1..., RS-232 version, original size, with terminal designs



8 Liability

The technical data specified for the hazardous area 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 accepts no liability for any lack of suitability.

9 Declaration of Conformity

EG Declaration of Conformity

CE

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:	Interface TW-100D or TW-100DB respectively
Directive:	EMC Directive 98/336/EWG)*
European Standard:	EN 50081-1, 3/93*) EN 50081-2, 3/93*) EN 50082-1, 2/96*) EN 50082-2, 2/96*)
Directive:	Low voltage Directive 73/23/EC*)
European Standard:	EN 61010-1, 3/94*)
Directive:	94/9 EC
European Standard:	EN 50014: February 2000*) EN 50020: 1994*)

*) including amendments

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10 Connection Examples

TW-100D... und TW-115B in standard version usually connect one keyboard and one mouse on the EEx i side to a PC on the non-Ex side. TW-100D(B) and TW-115B must stay in the non-Ex area, TW-100D(B)m may be used inside of the Ex area.

Other than the standard versions may be connected to further keyboards, scanners with PS/2 or RS-232 outputs and more, and on the non-Ex side data may be transmitted according to RS-232 or RS-485 standards. Any possible version must be switched internally by solder bridges.

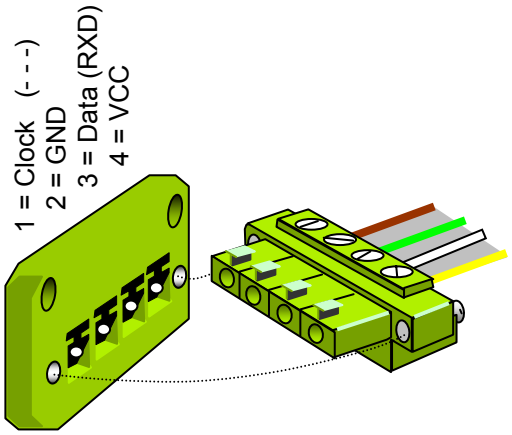
The following drawings show reasonable connection examples and their respective ID numbers. If your order does not mention a special ordering number, we supply you with the standard version. If you are not sure about the correct order number, please just describe your application and the kinds of plugs you desire.

Inside of Ex-p systems

When used in pressurized apparatus the inner volume of the interfaces must be purged. For this purpose the side covers of the interfaces can be provided with orifices on request.

Please note:
Terminals and PS/2 plugs on the Ex side are switched in parallel. So you may connect your devices with their original PS/2 terminals ***or*** a screw terminal to TW-100D..., see also chapter 7: "Dimensions and Terminals". The following drawings mostly only show the PS/2 plugs.

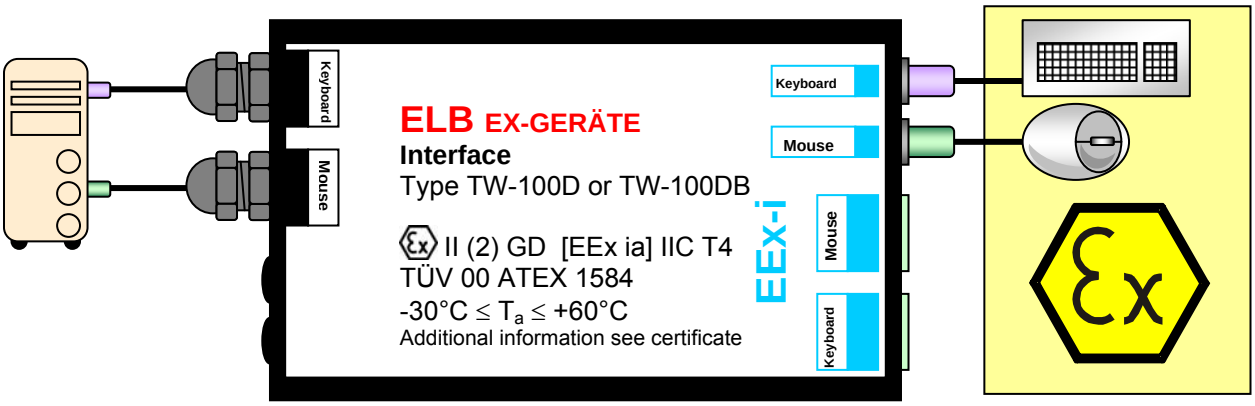
Figure of the screw terminals:
Phoenix Contact, type "Mini-Combicon"



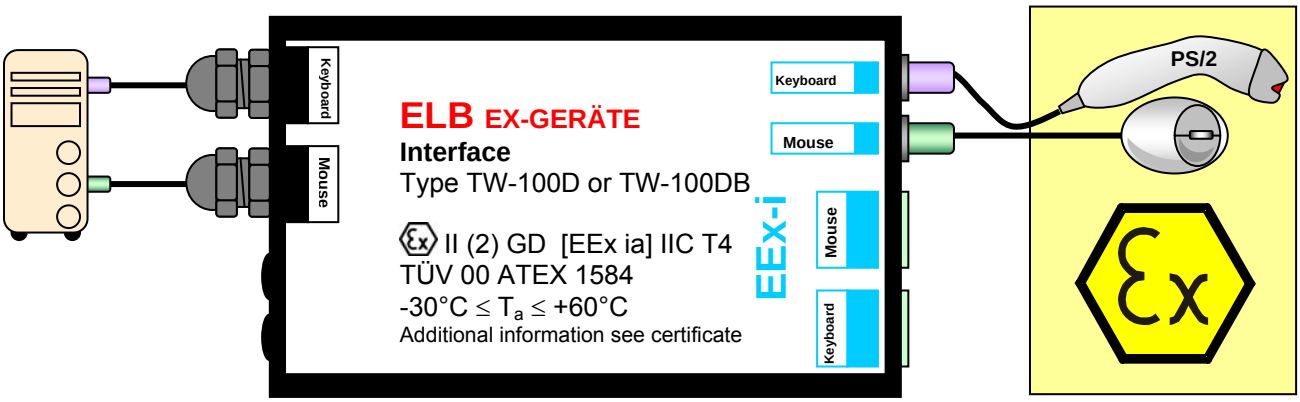
10.1 TW-100D(B)

ID no.:
TW-100D-KM000-KMMK **= standard version**

Connection examples:

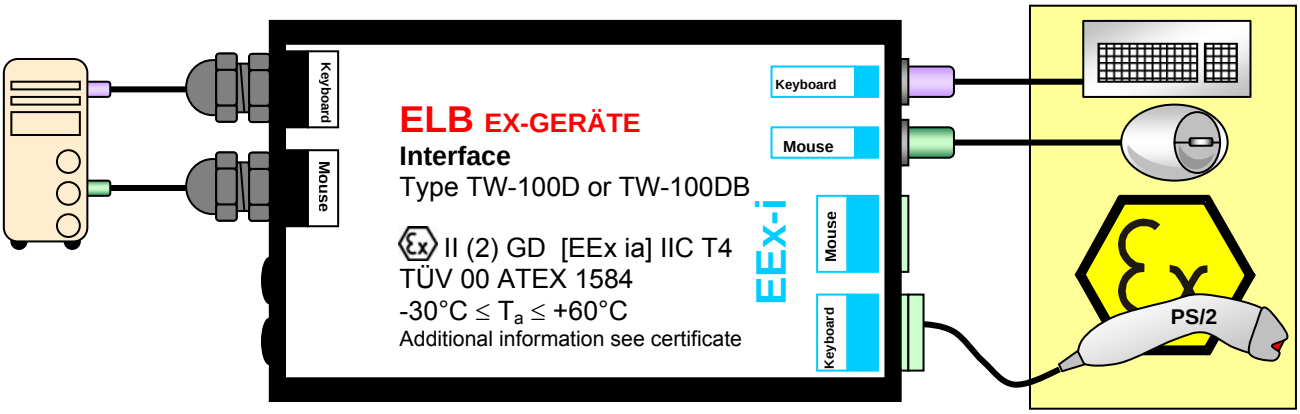


Standard connection, one keyboard and one mouse or only one of both on the Ex side. (Shown with PS/2 terminals here, the Combicon screw terminals are internally switched in parallel.) Cable glands and PS/2 plugs on the non-Ex side.

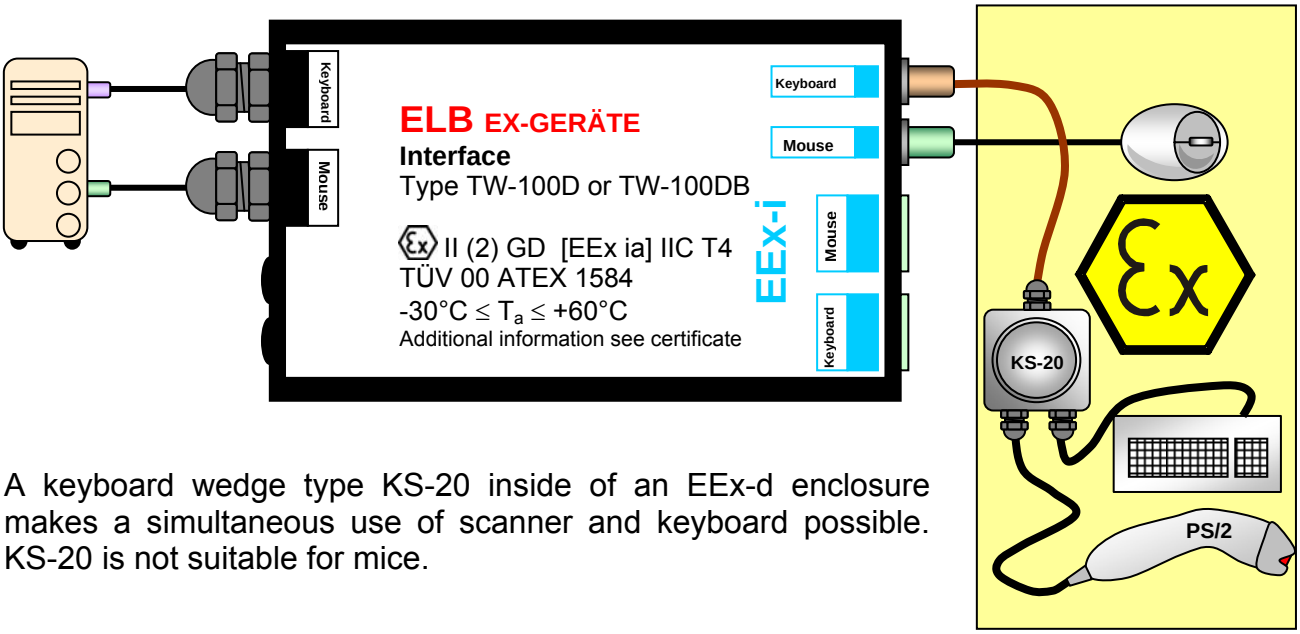


One mouse and one PS/2 scanner type SK-200 or only one of both on the Ex side. The scanner transmits data like a PS/2 keyboard therefore the ID number is the same as in the example above.

Please note: In the BIOS of your PC the keyboard test procedure must be switched off, otherwise the PC will switch off the PS/2 line, because the scanner does not send an ID code to the PC during booting. Instead of this you may switch a keyboard in parallel to the scanner over a keyboard wedge type KS-20.



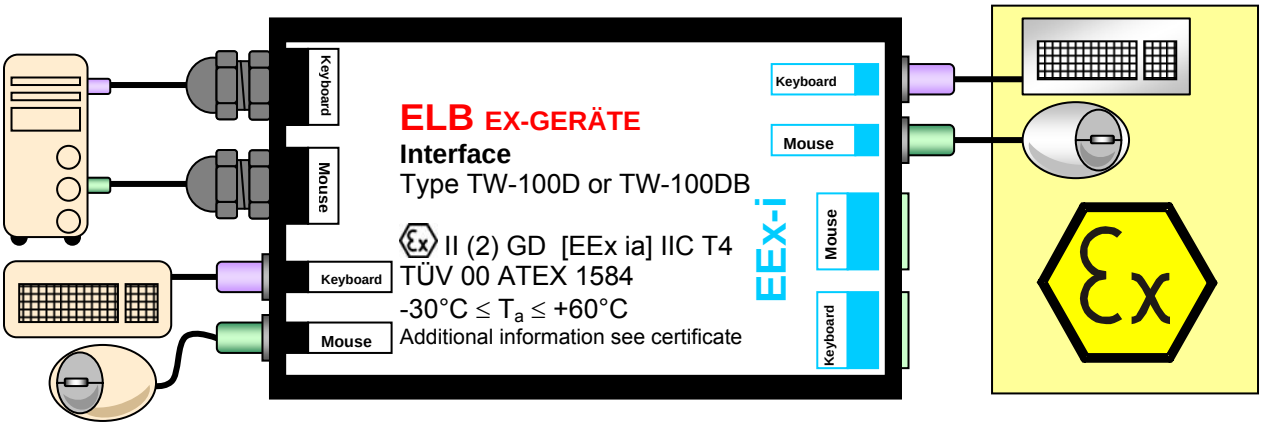
PS/2 scanner and keyboard are switched in parallel here over the internal connection between PS/2 and screw terminal, which only works with AT- or XT-keyboards and the BIOS set to "stand alone keyboard". Modern keyboards will look at data from the scanner as PC instructions and "answer unasked".



A keyboard wedge type KS-20 inside of an EEx-d enclosure makes a simultaneous use of scanner and keyboard possible. KS-20 is not suitable for mice.

ID no.:
TW-100D-KM0KM-KMMK-NE or
TW-100D-KM0KM-KMMK-EX

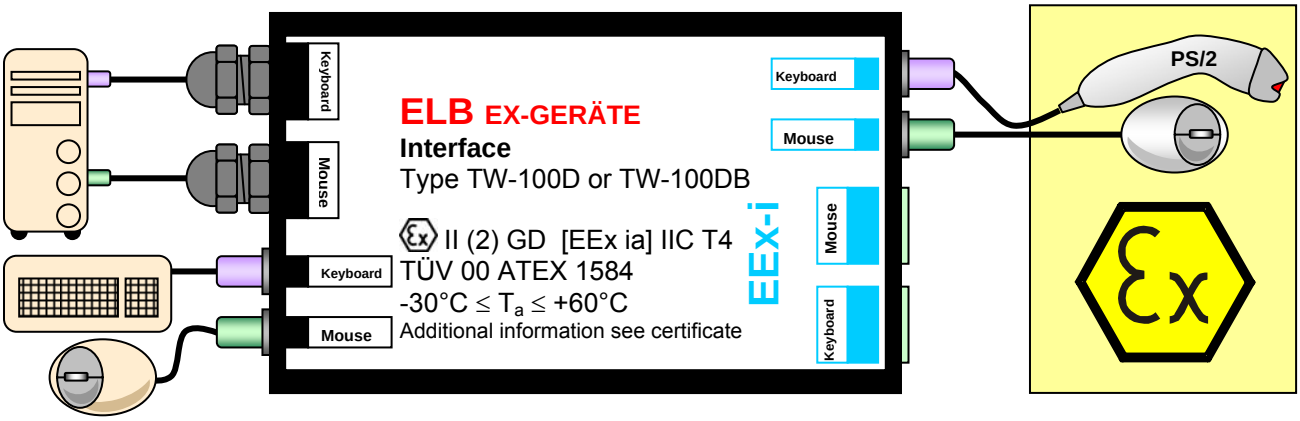
Connection examples:



Keyboard wedge version. Keyboard and mouse or only one of both on both sides. Please refer to the hints of chapter 4.

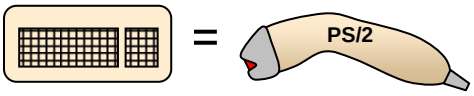
Only one side is active during booting, the ID number says, which one:

ID number, non-Ex side active during booting: ...NE
Ex side active during booting: ...EX



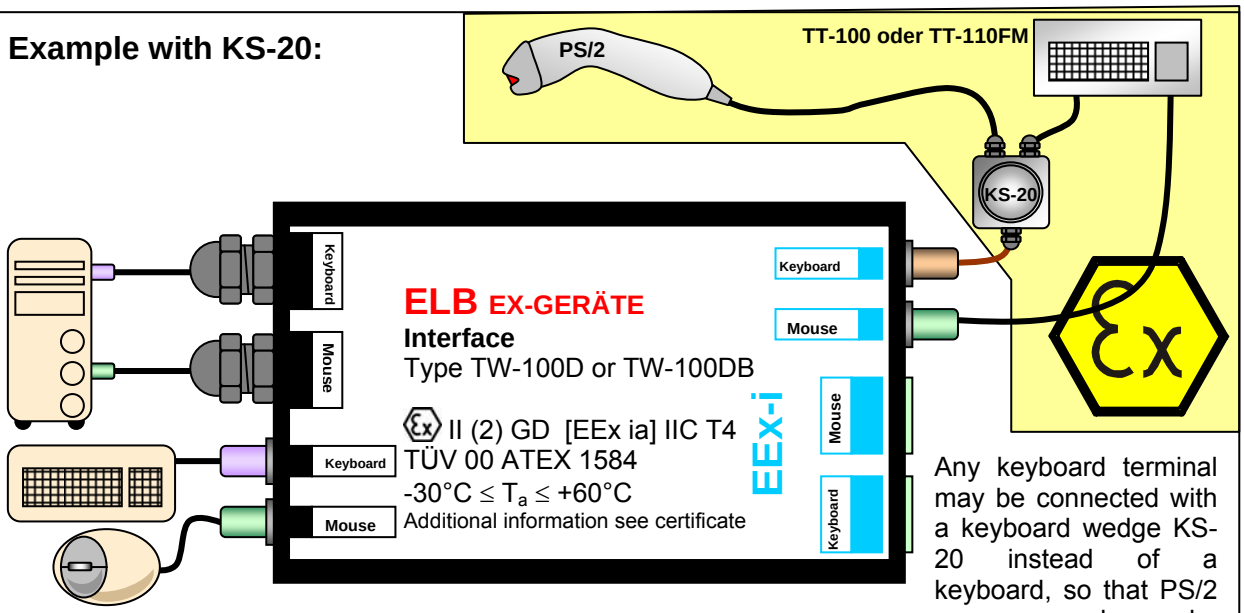
Like above, but with a EEx-i PS/2 scanner on the Ex side.

Please note: In the BIOS of your PC the keyboard test procedure must be switched off, otherwise the PC will switch off the PS/2 line, because the scanner does not send an ID code to the PC during booting. Instead of this you may switch a keyboard in parallel to the scanner over a keyboard wedge type KS-20.



The keyboard on the non-Ex side may also be substituted by a scanner.

Example with KS-20:

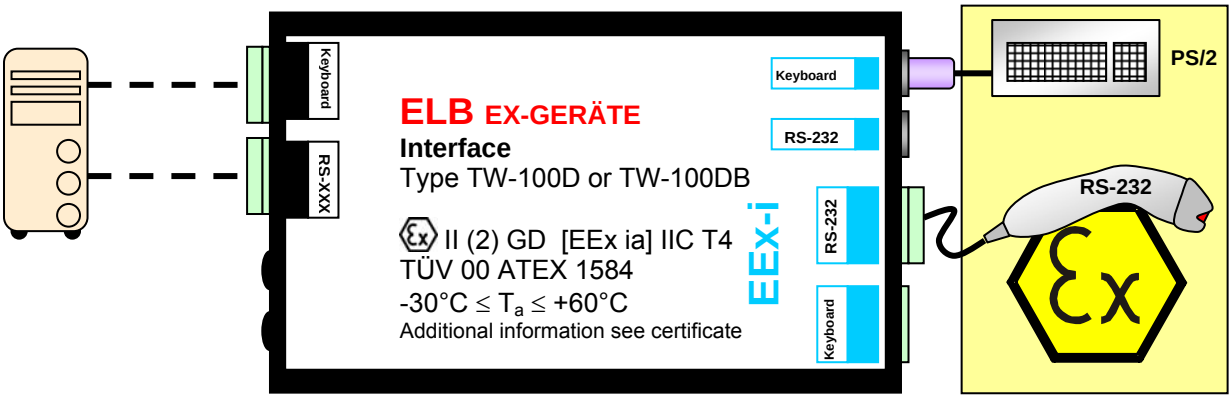


Any keyboard terminal may be connected with a keyboard wedge KS-20 instead of a keyboard, so that PS/2 scanners can be used there in parallel to a keyboard. Mice are always connected to the mouse terminals, the drawing shows the integrated mouse (or touchpad or touchpoint) inside of ELB's keyboard TT-100 or TT-110FM. KS-20 is not suitable for mice.

External devices must not consume more power than TW-100D... or your PC can provide. A separate power supply on the PC side is possible via a head phone plug, see RS-232 versions.

ID number:
TW-100D-K200-K22K or
TW-100D-K400-K22K

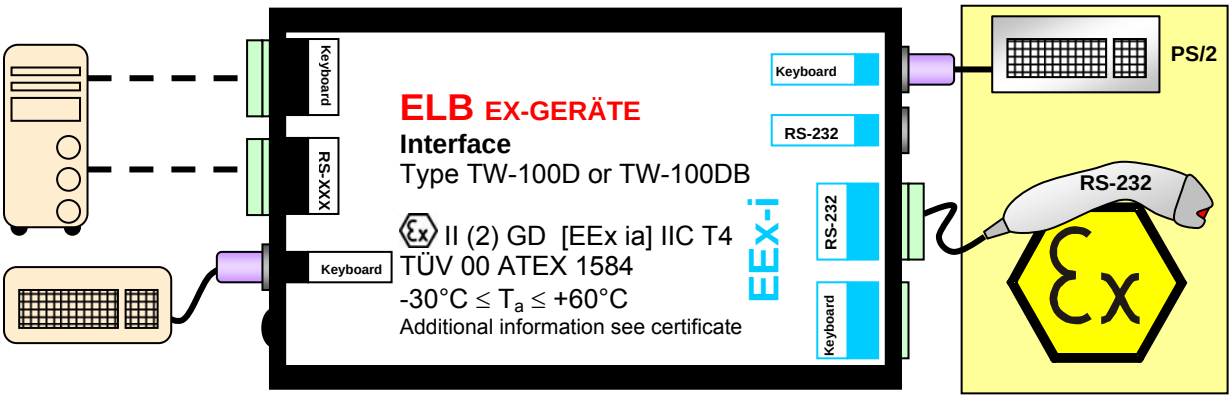
Connection example:



One keyboard and one RS-232 scanner type SK-200 on the Ex side. RS-232 data is transmitted via the mouse channel. RS-232/485 data from the PC to the scanner are not possible and prohibited. The keyboard terminal of the PC supplies both TW-100D and the scanner. RS-232 data can be translated internally to RS-485 levels. The non-Ex side is equipped with Combicon plugs and screw terminals, but no leads.
ID number with RS-232 transmission: TW-100D-K200-K22K
ID number with RS-485 transmission: TW-100D-K400-K22K

ID number:
TW-100D-K2K0-K22K-NE or TW-100D-K2K0-K22K-EX
TW-100D-K4K0-K22K-NE or TW-100D-K4K0-K22K-EX

Connection example:

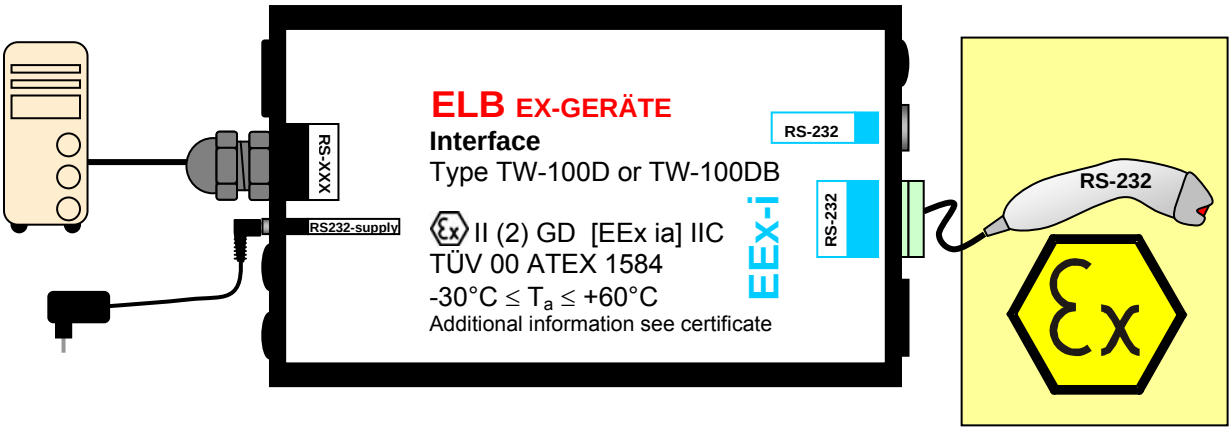


Same as above but one keyboard on the non-Ex side connected to the internal keyboard wedge. A mouse is not applicable, because the mouse channel is used for RS-232 transmission. Only one side is active during booting, the ID number says, which one:

RS-232,	**Non-Ex side active during booting:**	**TW-100D-K20K0-K22K-NE**
	Ex side active during booting:	**TW-100D-K20K0-K22K-EX**
RS-485,	**Non-Ex side active during booting:**	**TW-100D-K40K0-K22K-NE**
	Ex side active during booting:	**TW-100D-K40K0-K22K-EX**

ID number:
TW-100D-02500-0220 or TW-100D-04500-0220

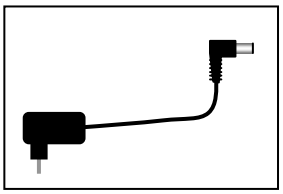
Connection example:



Only RS-232 or RS-485 transmission respectively. The PC cannot supply the TW-100D now, because the PS/2 connection is missing. A separate power supply is necessary, which must be ordered separately. Cable to the PC on request.

ID number with RS-232 transmission: **TW-100D-02500-0220**
ID number with RS-485 transmission: **TW-100D-04500-0220**

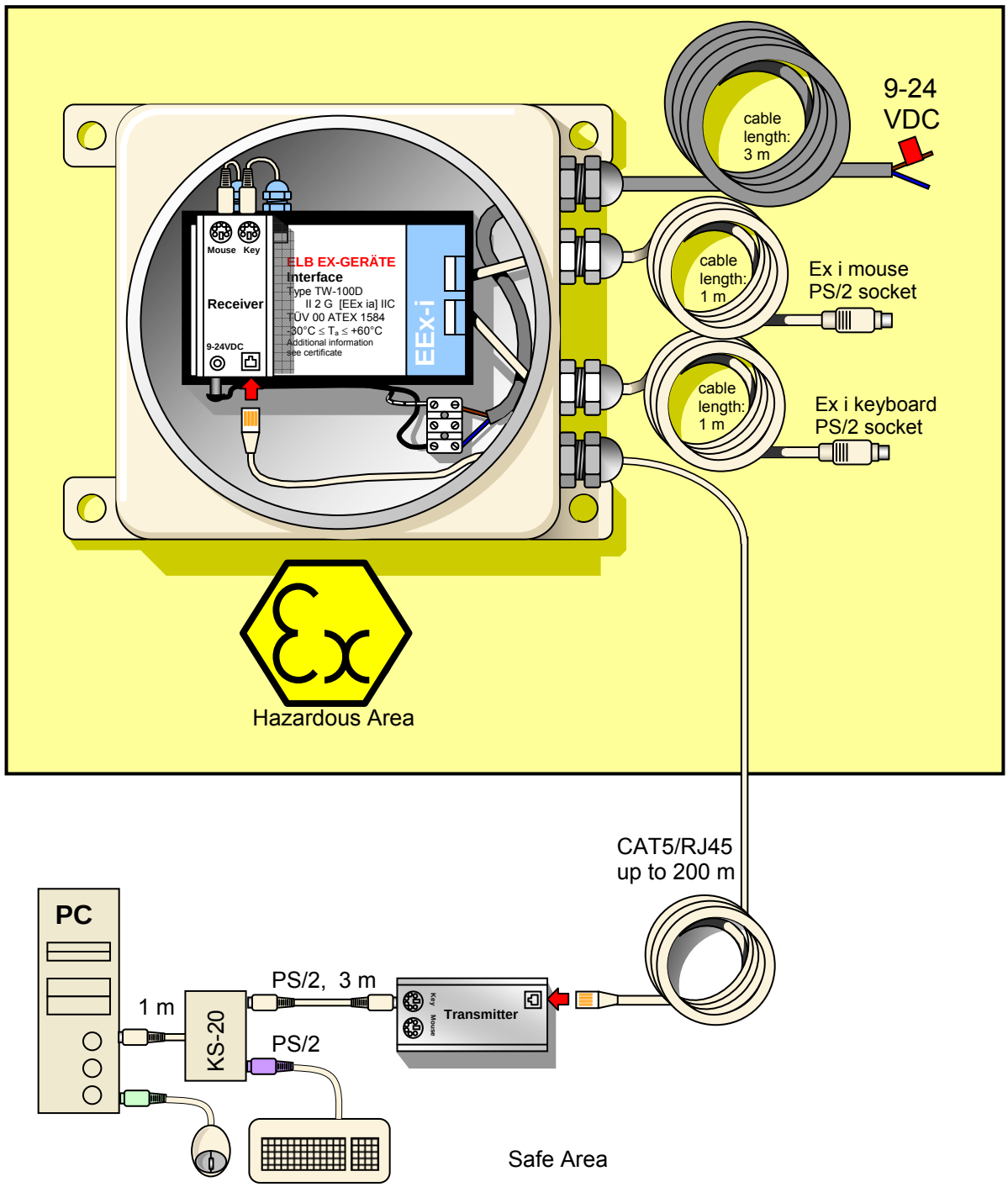
Suitable wall plug supply



Wall plug supply 230 VAC, Central European plug:
Order number **NE100**

Wall plug supply for 100 ... 240 VAC, exchangeable plugs for AUS, GER, GB, USA
Order number **NU100**

10.3 TW-100DD



10.3 TW-115B

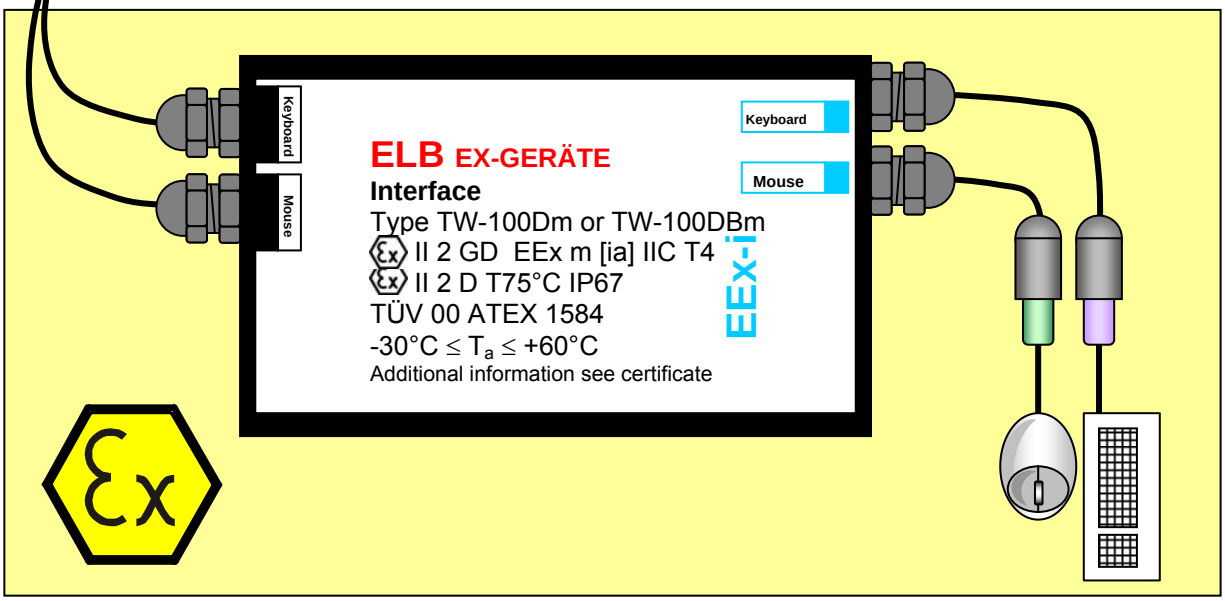
Electrical data of TW-115B are the same as for TW-100DB, see chapter 5, but it is certified for group I (mining). There is however no version TW-115...m for operation inside of the Ex area. TW-100D versions for operation inside of Ex areas see chapter 10.4.

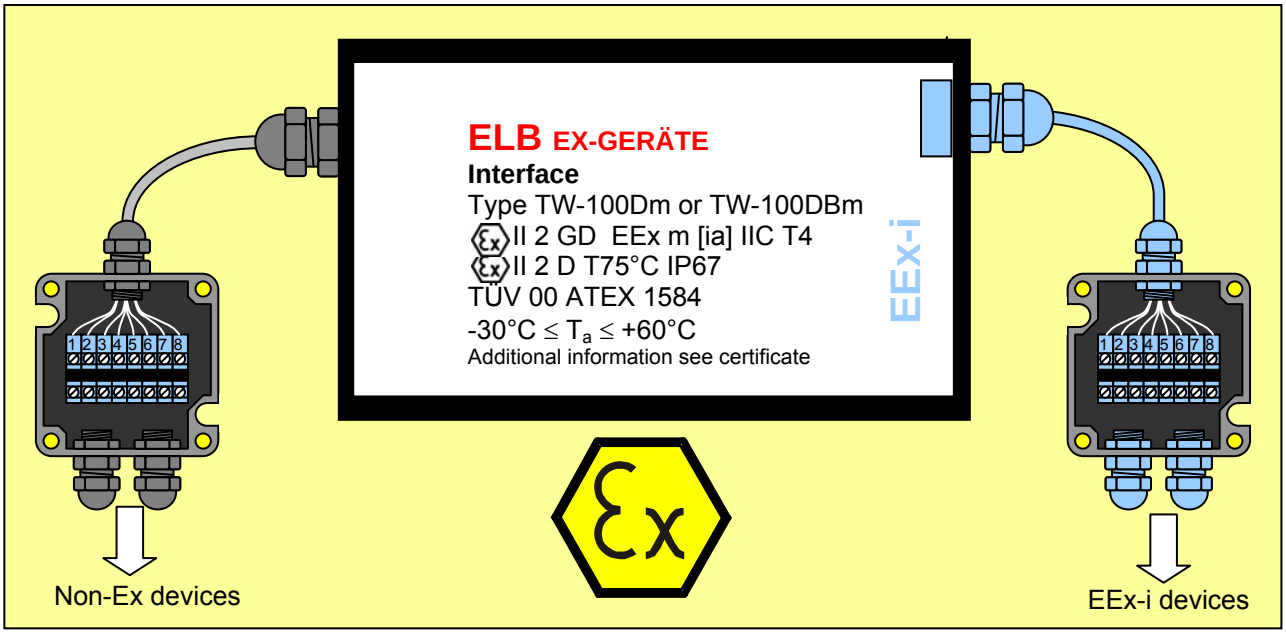
10.4 TW-100D(B) m (Certified to operate inside of Ex areas)

ID number: TW-100D-KM000-00MK-m

Standard version, one keyboard and one mouse or only one of both on the Ex side.

Further connection examples see chapter 10.1. Please talk to us about your application. Connections are usually made inside of an EEx-e type enclosure. PS/2 plugs as shown in the upper drawing would have to be certified for dust protection.

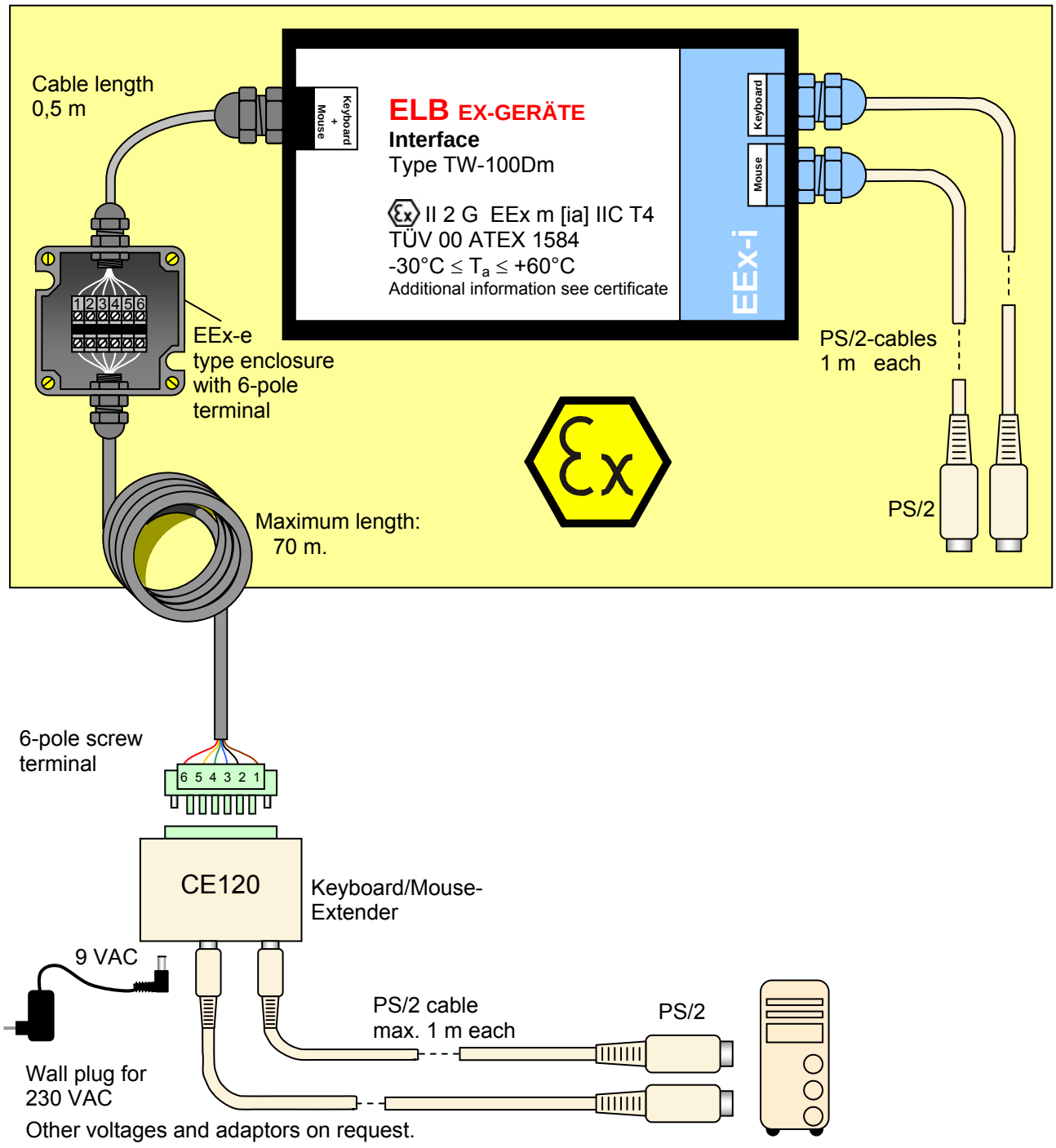




Non-Ex side:	
1	+5V
2	M-Data
3	GND
4	M-Clock
5	+5V
6	K-Data
7	GND
8	K-Clock

EEx-i side:	
1	+5V
2	M-Data
3	GND
4	M-Clock
5	+5V
6	K-Data
7	GND
8	K-Clock

Please keep in mind, that PS/2 data transmission on leads longer than 10 m (3 m for standard PS/2 leads) may fail. In these cases the PS/2 amplifier in the drawing below may help. (Connection example.)



Please note: For suitability in areas with combustible dust there must be an EEx-d type enclosure around the PS/2 plugs on the Ex side.

Translation

(1) # EC TYPE-EXAMINATION CERTIFICATE

(2) Equipment or protective system intended for use in potentially explosive atmospheres - **Directive 94/9/EC**

(3) EC-Type Examination Certificate Number

TÜV 00 ATEX 1584

(4) Equipment: Interface type TW-100..

(5) Manufacturer: E.L.B. EX-Geräte Bachmann GmbH

(6) Address: 64625 Bensheim

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

(8) The TÜV NORD CERT GmbH & Co. KG, TÜV CERT-Certification Body, notified body number N° 0032 in accordance with Article 9 of the Council Directive of the EC of March 23, 1994 (94/9/EC), certifies that this equipment or protective system 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 N° 00 PX12300.

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

EN 50 014: 1997 **EN 50 020: 1994**

(10) If the sign "X" is placed after the certificate number, it indicates that the equipment or protective system 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 or protective system must include the following:

II (2) G [EEx ib] IIC

TÜV NORD CERT GmbH & Co. KG
TÜV CERT-Certification Body
Am TÜV 1
D-30519 Hannover
Tel.: 0511 986-1470
Fax: 0511 986-2555

Head of the Certification Body

TÜV NORD CERT

Hanover, 2002-06-25

TÜV NORD CERT GmbH & Co. KG
legal successor of the notified body of
TÜV Hannover/Sachsen-Anhalt e.V.
German original certificate
issued on 2000-06-15

(13) **SCHEDULE**

(14) EC-TYPE EXAMINATION CERTIFICATE N° TÜV 00 ATEX 1584

(15) Description of equipment

The interface type TW-100.. enables a galvanically separated and intrinsically safe data transmission between computers and connected peripheral devices.

The permissible ambient temperature is –30°C to +60°C.

Electrical data

Non intrinsically safe circuits (from the computer)	$U = 5$ V d.c. $U_m = 253$ V a.c.
Intrinsically safe circuits (from the keyboard)	in type of protection „Intrinsic Safety" EEx ia IIC Maximum values: $U_o = 5.4$ V $\Sigma I_o = 135$ mA $\Sigma P_o = 0.7$ W Characteristic line: trapezoidal max. permissible outer inductance 1.6 mH max. permissible outer capacitance 65 µF

The intrinsically safe circuits are safely galvanically separated from the non intrinsically safe circuits up to up to a peak crest value of the voltage of 375 V.

(16) Test documents are listed in the test report No.: 00 PX 12300.

(17) Special conditions for safe use

none

(18) Essential Health and Safety Requirements

no additional ones

Translation

1. SUPPLEMENT to

EC TYPE-EXAMINATION CERTIFICATE No. TÜV 00 ATEX 1584

of the company: E.L.B. EX-Geräte Bachmann GmbH
D-64625 Bensheim, An der Hartbrücke 8

In the future, the interface type TW-100 may also be manufactured according to the test documents listed in the test report as type TW-100B. The amendments concern the internal design and the marking of all types.

The markings are: for type TW-100B **II (1) G D [EEx ia] IIC** and
for type TW-100.. **II (2) G D [EEx ib] IIC**

Electrical data

Type TW-100B

Non intrinsically safe circuits (from the computer)	U = 5 V d.c. U_m = 253 V a.c.
Intrinsically safe circuits (from the keyboard)	in type of protection „Intrinsic Safety" EEx ia IIC Maximum values: U_o = 5.4 V ΣI_o = 250 mA ΣP_o = 1.2 W Characteristic line: trapezoidal max. permissible outer inductance 0.27 mH max. permissible outer capacitance 65 µF

Type TW-100..

Non intrinsically safe circuits (from the computer)	U = 5 V d.c. U_m = 253 V a.c.
Intrinsically safe circuits (from the keyboard)	in type of protection „Intrinsic Safety" EEx ib IIC Maximum values: U_o = 5.4 V ΣI_o = 135 mA ΣP_o = 0.7 W Characteristic line: trapezoidal max. permissible outer inductance 1.6 mH max. permissible outer capacitance 65 µF

The intrinsically safe circuits are safely galvanically separated from the non intrinsically safe circuits up to up to a peak crest value of the voltage of 375 V.

BA 02 03.02

1. Supplement to EC Type-Examination Certificate No. TÜV 00 ATEX 1584

All other data apply unchanged for this supplement.

Test documents are listed in the test report N° 02 YEX 164542.

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TÜV CERT-Certification Body
Am TÜV 1
D-30519 Hannover
Tel.: 0511 986-1470
Fax: 0511 986-2555

Hannover, 2002-06-17

Head of the
Certification Body

Translation

2 SUPPLEMENT to

EC TYPE-EXAMINATION CERTIFICATE No. TÜV 00 ATEX 1584

of the company: E.L.B. EX-Geräte Bachmann GmbH
D-64625 Bensheim, An der Hartbrücke 8

The interface type TW-100... can also be manufactured according to the test documents listed in the test report with the type designation TW-100D resp. TW-100DB. The amendments concern the internal design and the marking.

In the future, the marking reads as follows: **II (2) G D [EEx ia] IIC**

Electrical data

Non-intrinsically safe circuits (from the computer)
U = 5 V DC
U_m = 253 V AC

Intrinsically safe circuits (keyboard and mouse)
in type of protection Intrinsic Safety EEx ia IIC
Maximum values see table:

Type	U_o	ΣI_o	ΣP_o	C_o	L_o
TW-100D	5,4 V	135 mA	0,7 W	65 µF	1,6 mH
TW-100DB	5,4 V	250 mA	1,2 W	65 µF	0,27 mH

Characteristic line: trapezoidal

RS232 interface
in type of protection Intrinsic Safety EEx ia IIC
only for the connection of certified intrinsically safe circuits with the following maximum value:
U_i = ±15 V
The effective internal capacitance and inductance are negligibly small.

The intrinsically safe circuits are safely galvanically separated from all non-intrinsically safe circuits up to the peak value of the nominal voltage of 375 V.

All further data apply unchanged for this supplement.

Test documents are listed in the test report N° 04 YEX 551396.

TÜV NORD CERT GmbH & Co. KG
TÜV CERT-Certification Body
Am TÜV 1
D-30519 Hannover
Tel.: 0511 986-1470
Fax: 0511 986-2555

Hanover, 2004-04-23

Head of the Certification Body

BA 02 11.03

Translation

3. SUPPLEMENT to

EC TYPE-EXAMINATION CERTIFICATE No. TÜV 00 ATEX 1584

of the company: E.L.B. EX-Geräte Bachmann GmbH
An der Hartbrücke 8
D-64625 Bensheim,

The interface type TW-100... can also be manufactured according to the test documents listed in the test report with the type designation TW-100Dm resp. TW-100DBm. The amendments concern the internal design, the additional moulding and the marking, which reads as follows:
II 2 G EEx m [ia] IIC T4 resp. II 2 D T75°C IP67

Electrical data

Non-intrinsically safe circuits (flying lead)
U = 5 V DC
U_m = 253 V AC

Intrinsically safe circuits (flying lead)
in type of protection Intrinsic Safety EEx ia IIC
Maximum values see table:

Type	U_o	ΣI_o	ΣP_o	C_o	L_o
TW-100Dm	5,4 V	135 mA	0,7 W	65 µF	1,6 mH
TW-100DBm	5,4 V	250 mA	1,2 W	65 µF	0,27 mH

Characteristic line: trapezoidal

RS232 interface (flying lead)
in type of protection Intrinsic Safety EEx ia IIC
only for the connection to intrinsically safe circuits with the maximum value:
U_i = ±15 V
The effective internal capacitance and inductance are negligibly small.

The intrinsically safe circuits are safely galvanically separated from all non-intrinsically safe circuits up to the peak value of the nominal voltage of 375 V.

All further data apply unchanged for this supplement.

Test documents are listed in the test report N° 04 YEX 551485.

TÜV NORD CERT GmbH & Co. KG
TÜV CERT-Certification Body
Am TÜV 1
D-30519 Hannover
Tel.: 0511 986-1470
Fax: 0511 986-2555

Hanover, 2004-06-09

Head of the Certification Body

BA 02 11.03

IBExU Institut für Sicherheitstechnik GmbH
An-Institut der TU Bergakademie Freiberg

[1] EG-BAUMUSTERPRÜFBESCHEINIGUNG

[2] Geräte und Schutzsysteme zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen, **Richtlinie 94/9/EG**

[3] EG-Baumusterprüfbescheinigungsnummer **IBExU02ATEX1155**

[4] Gerät oder Schutzsystem: Interface Typ TW-115B

[5] Hersteller: E.L.B. EX-Geräte Bachmann GmbH

[6] Anschrift: An der Hartbrücke 8
D-64625 Bensheim

[7] Die Bauart dieses Gerätes oder Schutzsystems sowie die verschiedenen zulässigen Ausführungen sind in der Anlage zu dieser EG-Baumusterprüfbescheinigung festgelegt.

[8] IBExU Institut für Sicherheitstechnik GmbH, BENANNTE STELLE Nr. 0637 nach Artikel 9 der Richtlinie 94/9/EG des Europäischen Parlaments und des Rates vom 23. März 1994, bescheinigt, daß dieses Gerät oder Schutzsystem die in Anhang II der Richtlinie festgelegten grundlegenden Sicherheits- und Gesundheitsanforderungen für die Konzeption und den Bau des Gerätes oder des Schutzsystems zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen erfüllt.
Die Prüfergebnisse sind in dem vertraulichen Prüfbericht IB-02-3-705 vom 04.12.2002 festgehalten.

[9] Die grundlegenden Sicherheits- und Gesundheitsanforderungen werden erfüllt durch Übereinstimmung mit EN 50014:1997+A1+A2 und EN 50020:1994.

[10] Falls das Zeichen „X" hinter der Bescheinigungsnummer steht, wird auf besondere Bedingungen für die sichere Anwendung des Gerätes oder Schutzsystems in der Anlage zu dieser EG-Baumusterprüfbescheinigung unter [17] hingewiesen.

[11] Diese EG-Baumusterprüfbescheinigung bezieht sich nur auf die Konzeption und den Bau des festgelegten Gerätes oder Schutzsystems. Weitere Anforderungen dieser Richtlinie gelten für die Herstellung und das Inverkehrbringen dieses Gerätes oder Schutzsystems.

[12] Die Kennzeichnung des Gerätes oder Schutzsystems muß die folgenden Angaben enthalten:

Ex I (M1) [EEx ia] I
$-30\ °C \leq T_a \leq +60\ °C$

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Tel.: 03731 3805-0 - Fax: 03731 23650

Zertifizierungsstelle Explosionsschutz
Im Auftrag

(Dr. Lösch)

Zertifizierungsstelle Explosionsschutz * IBExU Institut für Sicherheitstechnik GmbH * Kenn-Nr. 0637 *

- Siegel -
(Kenn-Nr. 0637)

Freiberg, 04.12.2002

Bescheinigungen ohne Unterschrift und ohne Siegel haben keine Gültigkeit. Bescheinigungen dürfen nur unverändert weiterverbreitet werden.

Anlage

[13] **Anlage**

[14] **zur EG-BAUMUSTERPRÜFBESCHEINIGUNG IBExU02ATEX1155**

[15] **Beschreibung des Gerätes oder Schutzsystems**
Das Interface Typ TW-115B ist ein zugehöriges eigensicheres Betriebsmittel. Es dient der galvanischen Trennung von Versorgungs- und Datenstromkreisen zwischen Computern und eigensicheren Peripheriegeräten.

Technische Daten

Umgebungstemperaturbereich	-30 °C bis + 60 °C
Bemessungsspannung	U_M = 253 VAC
Versorgungs- und Datenstromkreise	in Zündschutzart Eigensicherheit EEx ia I U_O = 5,4 V ΣI_O = 250 mA ΣP_O = 1,2 W Kennlinien: trapezförmig
höchstzulässige äußere Induktivität höchstzulässige äußere Kapazität	L_O = 6 mH C_O = 5000 µF
IP-Schutzgrad	≥ IP 54

Die eigensicheren Stromkreise sind von den nichteigensicheren Stromkreisen bis zu einem Scheitelwert der Nennspannung von 375 V sicher galvanisch getrennt.

Sicherheitstechnische Hinweise
Das Interface TW-115B muß außerhalb der von Grubengas gefährdeten Bereiche aufgestellt oder in ein gesondert bescheinigtes Gehäuse eingebaut werden, welches einer genormten Zündschutzart nach EN 50014:1994, Abschnitt 1.2 entspricht (z.B. Ex-d Gehäuse).

[16] **Prüfbericht**
Der Nachweis des Explosionsschutzes ist im Detail im vertraulichen Prüfbericht IB-02-3-705 vom 04.12.2002 dargelegt.

[17] **Besondere Bedingungen**
keine

[18] **Grundlegende Sicherheits- und Gesundheitsanforderungen**
Erfüllt durch Einhaltung von Normen (siehe [9])

Im Auftrag

Freiberg, 04.12.2002

(Dr. Lösch)

Anhang

Anhang

zur EG-BAUMUSTERPRÜFBESCHEINIGUNG IBExU02ATEX1155

Prüfunterlagen

Lfd. Nr.	unterschrieben am:
(1) Technische Dokumentation (9 Blatt)	05.05.02
(2) Zeichnung des Typenschildes	24.10.02
(3) Betriebsanleitung	