E.L.B. EX-GERÄTE

BACHMANN GmbH & Co. KG

Technical Documentation
ELB*Scan*-300

- Scanner SK-30...
- Base Station BS-30..., BS-290
- Charging Unit LK-30...

EEx-i Radio Scanner

02.10.2007

ELB*Scan*-300

Instruction Manual ELB*Scan* 300

Contents

General Information

1 Brief Description

Radio Scanner SK-30... :

- No cable; radio distance: typically 20 m (max. 40 m) to the base station
- Great scan distance (20 cm ... 6 m); ideal for scanning from a fork truck
- Light weight (170 g)
- Wide scan field (up to 220 cm at 6 m scan distance; min. bar width is then 3 mm)
- High capacitance, safe NiMH battery
- More than 10,000 scan procedures before recharging
- Scan procedure released by button; automatic stand-by
- Automatic recognition of all standard bar codes
- Easy programming by scanning programming bar codes
- Standard accessory: carrying strap and holster

Base Station BS-30..

- Approved for operating inside of the Ex area
- Interface modes for order no. BS300: RS232 + RS-485 or PS/2
- Interface modes for order no. BS300USB: RS232 + RS-485 or USB
- Radio channel selection via bar codes; 10 channels about 433 MHz

2 Delivery Components

Delivery includes:

- Bar code radio scanner SK-30...
- Base station with terminals inside of an EEx e housing: BS-30...
- Charging device with wall cube: LK-300, 230 VAC, not allowed inside of Ex area
- Optionally: holster GK-300, universal charger LU-300 (100 ... 240 VAC)
- Instruction manual
- Programming guide

3 Start-up

1. Connect the terminals of the base station, see chapter 7
2. Register the scanner to the respective base station by scanning the bar code on the base station, see also chapter 4.3 of the "User Guide"
3. Select the desired interface mode, bar code types and radio channel, as explained in the folded sheet of the scanner and in chapter 5.2 of the "User Guide"

   For example: To achieve the simulation of a PS/2 device scan from the table "Keyboard Wedge Mode":

- Start of Configuration
- Keyboard Wedge Mode Activated
- 1-1 (= US keyboard ID code [2 numbers]) or 6-1-1 (= UK ID code)
- Return (for one "Carriage Return" after each scan)
- "lower case" ("upper case" = CAPS LOCK)
- End of Configuration

For the special USB version the ID code is 524 (US+UK)

For RS232 transmission please scan from the table "RS232 Mode" or the "Factory Settings" from page 5:

- Start of Configuration
- RS232 Mode Activated
- End of Configuration

This activates the default values shown in the left upper corner of the table (baud rate, number of data bits ...).

4. Scan one bar code and check its transmission to the PC. For the meaning of the tones and melodies please read chapter 4.4 of the "User Guide".

   Examples:
   - descending melody during scanning: Battery empty soon (after the next 2 scans).
   - Ascending melody connecting the scanner to the charger: Battery was flat, former registration to a base station lost, please register again.

Please note:

- The Ex-protected base station provides only the data terminals mentioned in chapter 7: "Terminals".
- If scanner and base station are configured to wait for an acknowledge signal from the PC, this will take several seconds for each scanning procedure. (See chapter 5 of the "User Guide".)
- In PS/2 mode the base station does not answer to the PC like a keyboard, in order not to disturb the communication between the PC and a keyboard in parallel to the base station. This might make the PC switch off the PS/2 lines. In this case please switch a keyboard or a PS/2 simulator in parallel inside of the safe area using our keyboard wedge KS-20 or modify the BIOS configuration ("Stand Alone PC" e.g.).
- After "misunderstandings" between scanner and PC in PS/2 mode please scan the "default settings" (barcode see folder), scan some product bar codes and go the PS/2 mode again. Sometimes even several scans of the code "end of configuration" may help.

Correct connections are not enough to ensure correct data transmission. Please see chapter 7 "Terminals" for data types and values. Configuration of the scanner is described in the "programming Guide" and the "User Guide". Factory settings see page 4 of the folder e.g.

Please note,

- that the antenna cannot be screwed off the base station !!
- that the long range version of the scanner needs at least 30 cm distance from a bar code, even for registration to the base station.
- that bar code labels may shine, even the one on the base station. In this case incline the laser beam.
- If scanners refuse registration to base stations: Charge the battery completely. If this does not help: scan "End of configuration" from any configuration procedure.

PS/2 Configuration: 611=UK; 11=US

START OF CONFIGURATION

KEYBOARD WEDGE MODE ACTIVATED

6

1

1

RETURN *

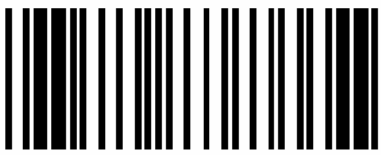
lower case

END OF CONFIGURATION

Default = RS-232

DEFAULT CONFIGURATION (factory settings)

USB Configuration, 524 = US; 525 = D



START OF CONFIGURATION

KEYBOARD WEDGE MODE ACTIVATED

5

2

4

RETURN *

lower case

END OF CONFIGURATION

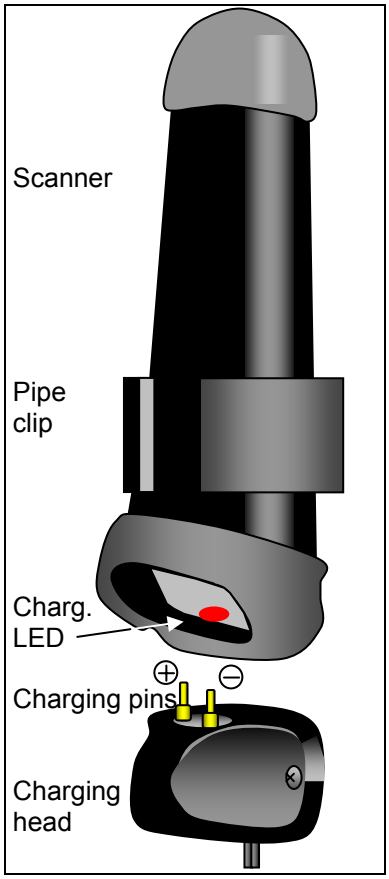
4 Charging of the built-in Battery

Charging only with the enclosed charging device and outside of the Ex area. The charger contains circuitry to protect Ex components inside of the scanner.

The charging head may be fixed to the wall like in the figure. It should then be mounted so high, that the charging LED is easily visible. Fix the scanner to the wall with a fitting pipe clip e.g.

Plug in the wall cube and connect the scanner with the charger head with the laser window (and the LED) away from the wall. The charging pins will now easily lock in the scanner contacts, which the scanner acknowledges with a beep (or an ascending melody, if the battery had been flat). The LED is continuously on.

The LED flashes at room temperature when the battery is charged about 70%. Do not leave the scanner in the charger eternally. Long time stand-by charging reduces the life time of the battery.

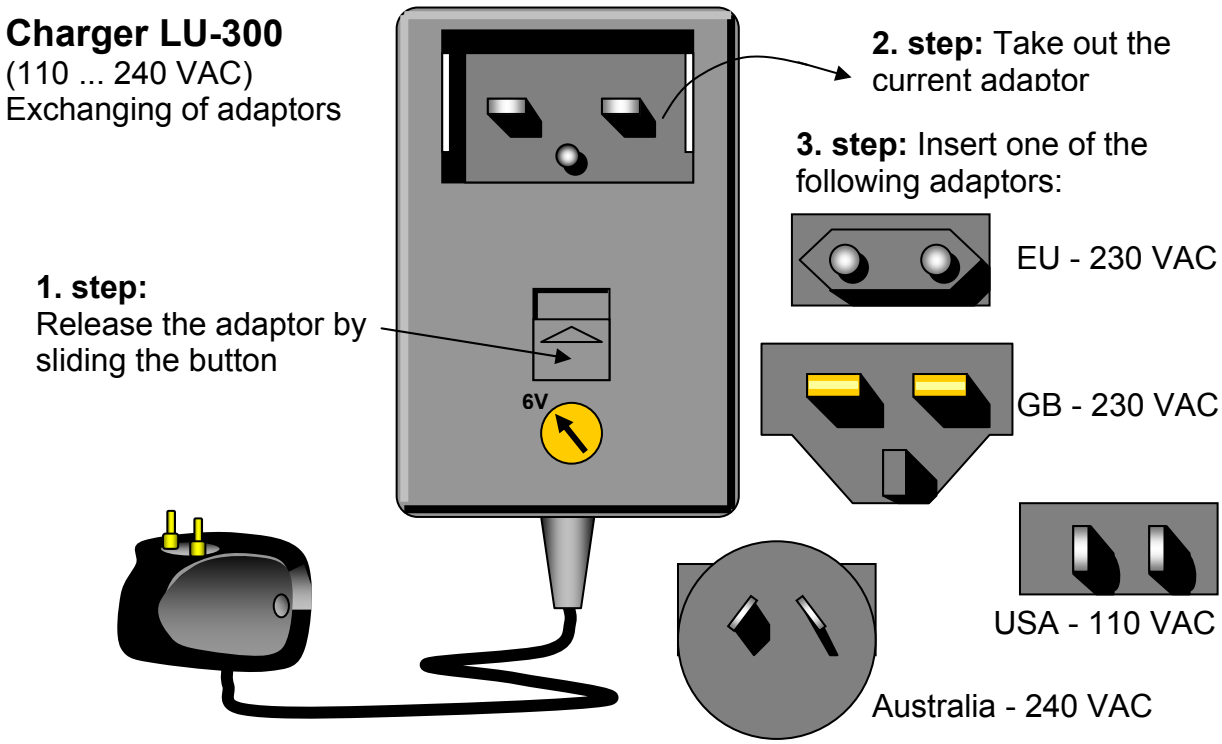


Approximate charging times at room temp.:

hours	1,3	4	8
charge [%]	25	50	100

Self-discharging:
ca. 40 % after one month at 20°C

Charger LU-300
(110 ... 240 VAC)
Exchanging of adaptors



5 Cleaning

You may clean the scanner and the base station lamp with a damp cloth or a brush. Clean the laser window of the scanner from time to time with a very soft cloth. No cleaning inside of the Ex area because of potential charging of the cleaning tool!

Technical Data

6 Operating data

Circuitry:

Available supply voltages (base station):	12 V DC		
	24 V DC		
	24 V AC	±10%	48 ... 62 Hz
	115 V AC	±10%	48 ... 62 Hz
	230 V AC	+8,5 / -10%	48 ... 62 Hz
	250 V AC	+5 / -15%	48 ... 62 Hz

Data lines:	RS232 (TxD to the PC, ca ±7 V) RS485 (A + B to the PC) PS/2 (for EEx i keyboard) (Transmission distances depending on the cable quality) On request: more data lines e. g. USB (order no. BS300USB); keyboard wedge
Battery charging:	see chapter 4
Radio transmission:	> 40 m in the open, >10 m inside of industry buildings

Dimensions:

Scanner dimensions:	192 x 56 x 49 mm
Scanner weight:	ca. 170 g
Base station dimensions:	220 x 125 x 92 mm
Base station weight:	ca. 3 kg

Laser:

Visible Red (650 nm)
1,35 mW
Class 3A (1 … 5 mW light power)

Bar codes:

Ames	Delta distance A	Standard 2 out of 5
BC-412 (on request)	EAN 128	TELEPEN
Codabar	IATA	UPC / EAN
Codablock A and F	Interleaved 2 out of 5	2/5 Matrix
Code 11	Label code 4/5	3W7
Code 39	MSI	
Code 93	PHARMA 32/39	
Code 128	Plessey	

Charging devices

Not allowed inside of the Ex area!
No different charging device allowed!
U = 230 VAC (LK300)
U = 110...240 VAC (LU290) with exchangeable plugs for EU, UK, USA, AUS

Ex protection:

Bar code laser scanner SK-30…

- TÜV 03 ATEX 2336
- II 2 G EEx ia IIC T4
- -30°C ≤ T_{amb} ≤ +50°C
- Charging only with the charger enclosed and outside of the Ex area

Base station BS-30…

- TÜV 03 ATEX 2337
- II 2 G EEx e m [ia] IIC T4 or
  II 2 D T60°C for all AC voltages
  II 2 D T70°C at 12 VDC
  II 2 D T95°C at 24 VDC respectively
- -30°C ≤ T_{amb} ≤ +50°C for II 2 G EEx e m [ia] IIC T4
- -30°C ≤ T_{amb} ≤ +40°C for II 2 D ...

Supply:	U_i = 12 VDC		
	24 VDC		
	24 VAC	±10%	48 ... 62 Hz
	115 VAC	±10%	48 ... 62 Hz
	230 VAC	+8,5 / -10%	48 ... 62 Hz
	250 VAC	+5 / -15%	48 ... 62 Hz

Data lines:	RS232 (TxD)	|U| < 10,5 V
	RS485 (A + B)	|U| < 5,35 V
	PS/2 and USB	(for EEx-i-keyboard; only from the keyboard to the PC) ΣP_o = 0,86 W ΣI_o = 250 mA $\Sigma(L_o,C_o)$: negligible U_o = 5,36 V
	On request:	other data lines e. g. USB; keyboard wedge

Please note, that the base station can be programmed either for PS/2 (USB) or RSXXX transmission, see "Programming Guide".

Type labels for SK-30...:

E.L.B. Ex-Geräte Bachmann GmbH & Co. KG
An der Hartbrücke 8, D-64625 Bensheim
System **ELB***Scan*-300
Type: **SK-30...** Serial no. XXX Date: XX.XX.XXXX
II 2 G EEx ia IIC T4
-30°C ≤ T_{amb} ≤ +50°C CE 0032
TÜV 03 ATEX 2336
Charging only outside of Ex area.
Technical data see documentation

Type labels for BS-30...:

E.L.B. Ex-Geräte Bachmann GmbH & Co. KG
An der Hartbrücke 8, D-64625 Bensheim
System **ELB***Scan*-300
Type: **BS-30...** Serial no. [ ] Date: [ ]
II 2 G EEx e m [ia] IIC T4
-30°C ≤ T_{amb} ≤ +50°C
TÜV 03 ATEX 2337
CE 0032

Type label for zone 1 and 2

E.L.B. Ex-Geräte Bachmann GmbH & Co. KG
An der Hartbrücke 8, D-64625 Bensheim
System **ELB***Scan*-300
Type: **BS-30...** Serial no. [ ] Date: [ ]
II 2 D T60°C IP66
-30°C ≤ T_{amb} ≤ +40°C
TÜV 03 ATEX 2337
CE 0032
[ ] VAC

Type label for zone 21 and 22 with AC supply

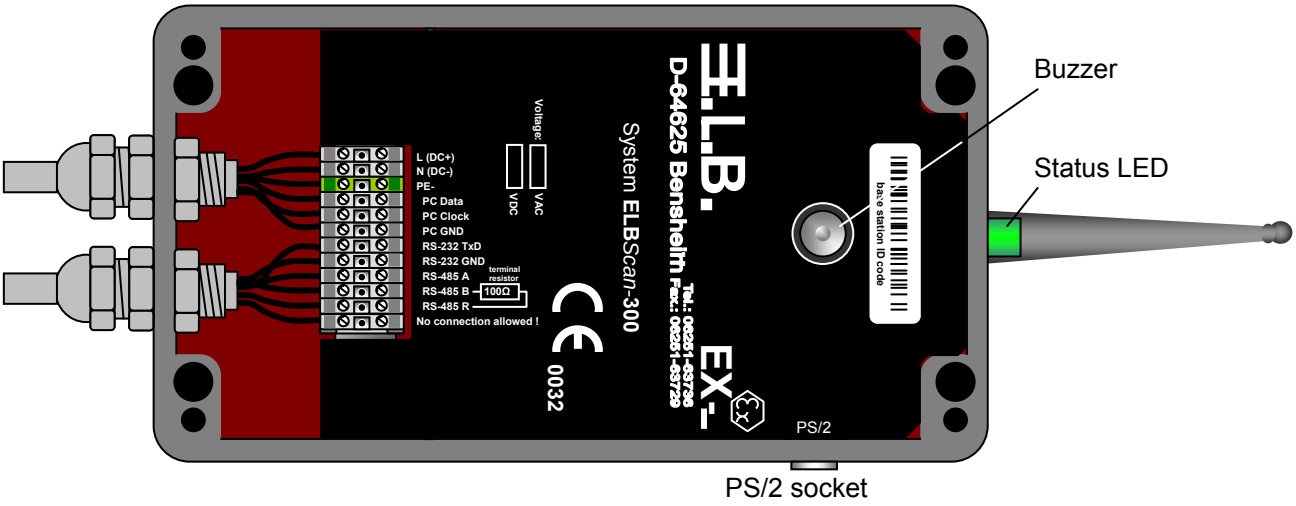
E.L.B. Ex-Geräte Bachmann GmbH & Co. KG
An der Hartbrücke 8, D-64625 Bensheim
System **ELB***Scan*-300
Type: **BS-30...** Serial no. [ ] Date: [ ]
II 2 D T70°C IP66
-30°C ≤ T_{amb} ≤ +40°C
TÜV 03 ATEX 2337
CE 0032
[12] VDC

Type label for zone 21 and 22 with 12 V DC supply

E.L.B. Ex-Geräte Bachmann GmbH & Co. KG
An der Hartbrücke 8, D-64625 Bensheim
System **ELB***Scan*-300
Type: **BS-30...** Serial no. [ ] Date: [ ]
II 2 D T95°C IP66
-30°C ≤ T_{amb} ≤ +40°C
TÜV 03 ATEX 2337
CE 0032
[24] VDC

Type label for zone 21 and 22 with 24 V DC supply

7 Terminals

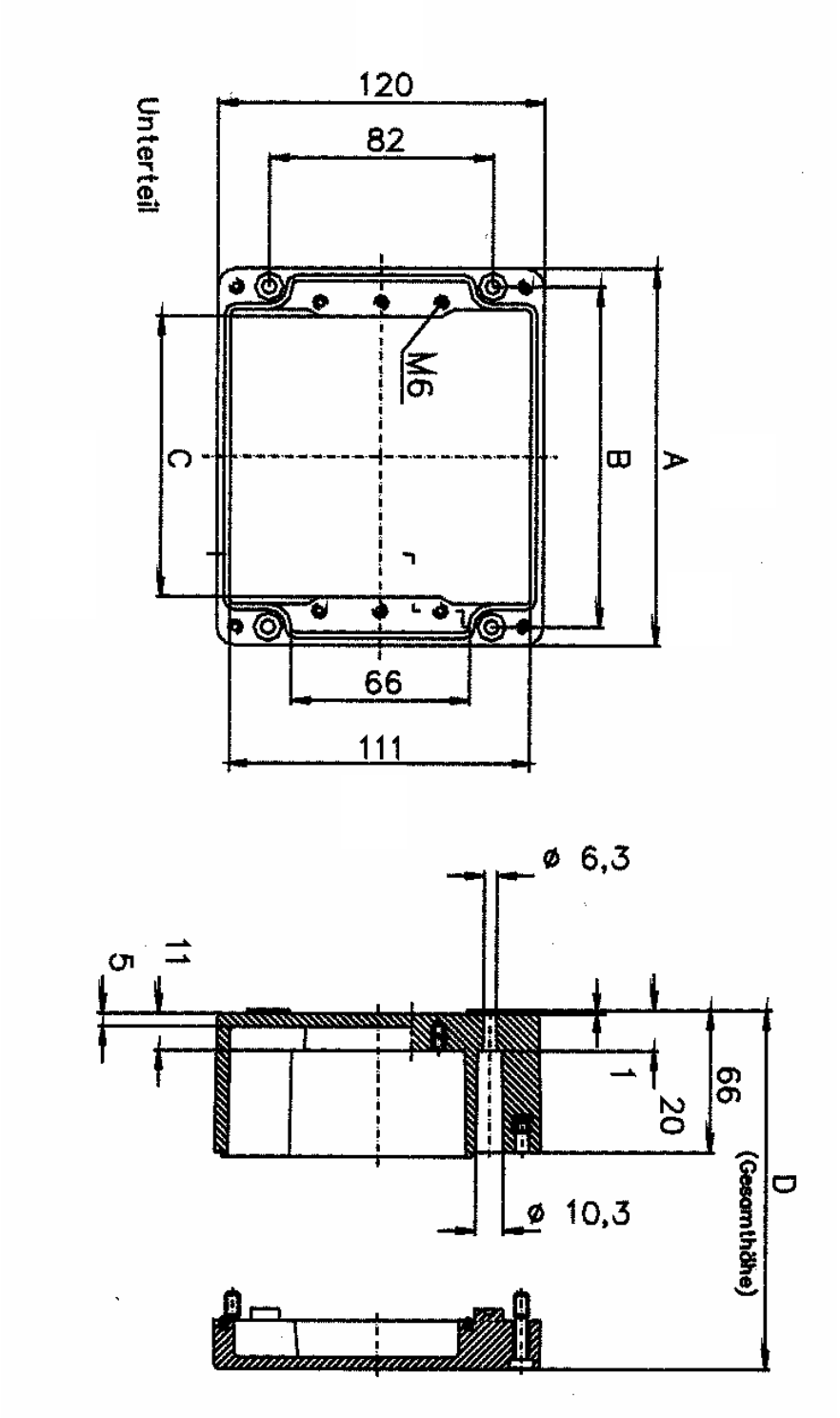


1	DC: +	AC: L
2	DC: -	AC: N
3	PE (protection earth)	
4	PS/2: Data (USB: D+, green)	
5	PS/2: Clock (USB: D-, white)	
6	PS/2: GND (USB: GND)	
7	RS232: TxD (from BS-30... to PC)	
8	RS232: GND	
9	RS485: A (A minus B ≥ 0,2 V = High; A minus B ≤ 0,2 V = Low)	
10	RS485: B and one pin of the terminating resistor	
11	RS485: terminating resistor, connect with terminal 9 if needed	
12	No connection allowed!	

PS/2 socket: On request. Wired in parallel with PS/2 terminal of BS-30... Only for intrinsically safe keyboards, approved values see chapter 6 "Circuitry" and "Ex protection".

Please note, that the base station can be programmed either for PS/2 (USB) or RSXXX transmission, see "Programming Guide".

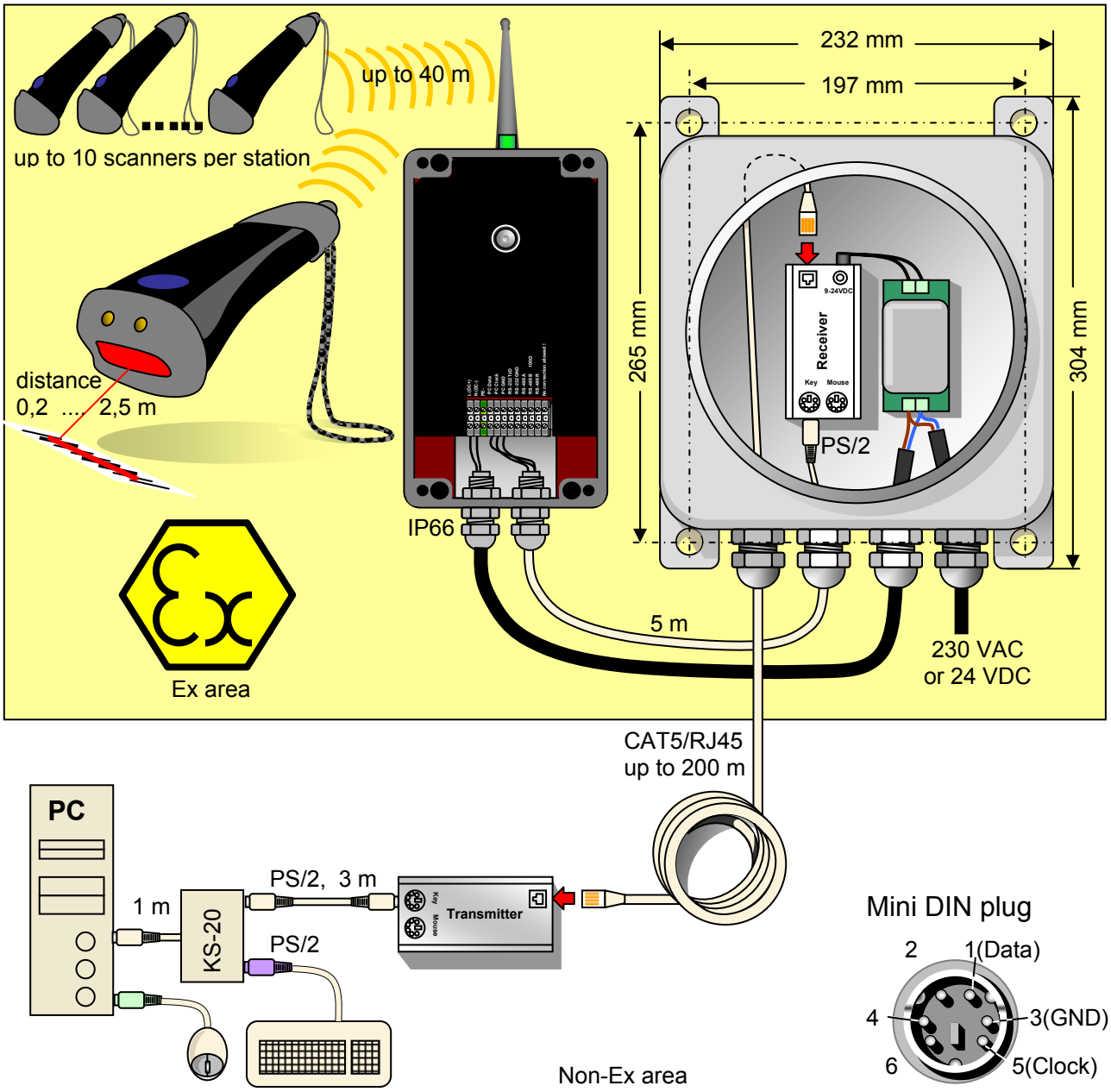
8 Base Station Dimensions (Drawings are not true to scale)



A	B	C	D
220	204	180	91

Length of the antenna: 91 mm

9 Option: CAT5 long distance transmitter (PS/2)

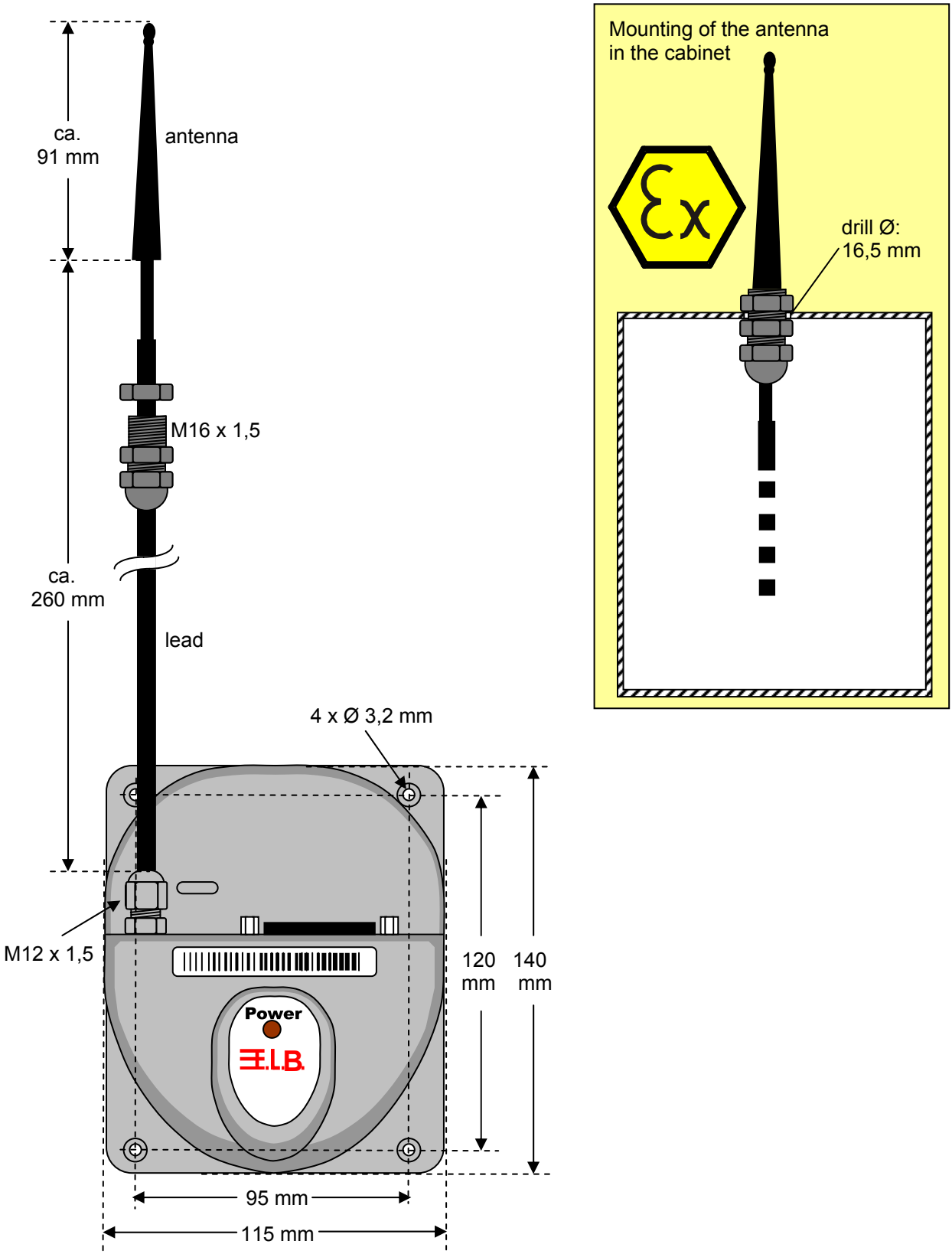


Order numbers:
BS300KVM1: 84-264 VAC
BS300KVM2: 24 VDC

Components included:
PS/2 transmitter
PS/2 receiver including power supply for 84 - 264 VAC or 24 VDC in EEx d enclosure
PS/2 cable 5 m with flying leads (from receiver to base station BS-300)
PS/2 cable 3 m (from transmitter to keyboard wedge KS-20)
keyboard wedge KS-20

Sending PS/2 data to a distant PC
Insert bar codes as PS/2 data from the Ex area into the safe area directly into your text application. SK-300 in the figure above works simply like a second keyboard.

10 Option: BS-290 for inside of cabinets

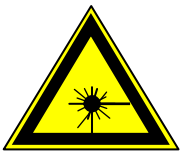


11 Use for the Intended purpose

System **ELB***Scan*-30... is only meant to serve for scanning bar codes and transmit data to a PC. Any other application is regarded to be against the intended use. Modifications and demounting is forbidden if not described in this manual.

12 Safety advice

Bar code scanner SK-30... must only be charged with the enclosed charging device and only outside of the Ex area. The charging device contains circuitry to protect Ex components inside of the scanner during charging.



Radiation from light emitting diodes.
Do not look into the beam.
Do not beam into eyes.

Light power ≤ 5 mW
Laser device class 3A

The scanner contains a NiMH battery. Battery and device must be disposed according to the respective ordinances.

The PS/2 socket must only be connected with intrinsically safe keyboards. Approved electrical values see chapter 6: "Electronic circuitry" and "Ex Protection".

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 renewed switching-on.

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.

Exchanging of batteries and opening of the battery box only outside of hazardous areas.

Only use battery cells type Duracell MN 1500 AA.

Light emitting diode radiation. Do not turn the light directly to the eyes of men or animals

E.L.B. Ex-Geräte GmbH & Co. KG 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 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 (VDE 0160, VDE 0165 or EN 60079-14, EN 50014 - 50039) as well as the Accident Prevention Regulations (UVV).

13 EC 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:	Radio laser scanner SK-30... Base station BS-30... Charging device LK-30..
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* EN 60825-1* (Laser)
Directive:	94/9/EC*)
European Standards:	EN 50014: 02/2000* EN 50019: 2000 EN 50020: 2002 EN 50028: 07/1988 EN 50281-1-1: 11/2003

*) including amendments

E.L.B. Ex-Geräte GmbH & Co. KG
An der Hartbrücke 8
D-64625 Bensheim
Int. + 49 - 6251 -63736 Tel.
Int. + 49 - 6251 -63729 Fax
elb@elb.de
www.elb.de

Translation

(1) # EC-TYPE EXAMINATION CERTIFICATE

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

(3) EC-Type Examination Certificate Number

TÜV 03 ATEX 2337

(4) Equipment: Basis station type BS-30...

(5) Manufacturer: E.L.B. Ex-GERÄTE Bachmann GmbH

(6) Address: An der Hartbrücke 8, D-64625 Bensheim

(7) This equipment or protective system and any acceptable variation thereto are 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° 03 YEX 551014-1.

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

EN 50014:1997 EN 50019:2000 EN 50020:2002 EN 50028:1987 EN 50281-1-1:1999

(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 em [ia] IIC T4 bzw. II 2 D T 95/70/60°C IP 66

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, 2003-12-19

Head of the
Certification Body

TÜV NORD CERT

(13) **SCHEDULE**

(14) EC-TYPE EXAMINATION CERTIFICATE N° TÜV 03 ATEX 2337

(15) Description of equipment

The basis station type BS-30.... may be operated in hazardous explosive areas that require apparatus of category 2 resp. 3.

The permissible ambient temperature range is–30°C to +50°C for the types intended for the use in explosive gas atmospheres and -30°C to 40°C for the types for the use in areas with the presence of combustible dust

The electronics is partly realized in encapsulation. Non-intrinsically safe circuits are connectable in Increased Safety.

Electrical Data

Supply (terminals 1 to 3)	U = 12 resp. 24 VDC, I = 100 mA or U = 24, 115, 230 resp. 250 VAC. depending on the type U_m = 253 V
RS-232 interface (terminals 7 and 8)	U = ±10 VDC U_m = 253 V
RS-485 interface (terminals 9 to 11)	U = 5 VDC U_m = 253 V
PS/2 interface from the PC (terminals 4 to 6)	U = 5 VDC U_m = 253 V
PS/2 interface to the keyboard (socket)	in type of protection Intrinsic Safety EEx ia IIC Maximum values: U_o = 5.36 V $\sum I_o$ = 250 mA $\sum P_o$ = 0.86 W max. permissible outer capacitance 65 µF max. permissible outer inductance 0.25 mH

Light-emitting diode and buzzer are operated via internal intrinsically safe circuits.

(16) Test documents are listed in the test report No.: 03 YEX 551014-1

(17) Special conditions for safe use

none

(18) Essential Health and Safety Requirements

no additional ones

Translation

(1) # EC-TYPE EXAMINATION CERTIFICATE

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

(3) EC-Type Examination Certificate Number

TÜV 03 ATEX 2336

(4) Equipment: Barcode hand scanner type SK-30...

(5) Manufacturer: E.L.B. Ex-GERÄTE Bachmann GmbH

(6) Address: An der Hartbrücke 8
D-64625 Bensheim

(7) This equipment or protective system and any acceptable variation thereto are 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° 03 YEX 551014.

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

EN 50014:1997 **EN 50020:2002**

(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:

Ex II 2 G EEx ia IIC T4

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, 2003-12-19

TÜV NORD CERT

Head of the
Certification Body

(13) **SCHEDULE**

(14) **EC-TYPE EXAMINATION CERTIFICATE N° TÜV 03 ATEX 2336**

(15) Description of equipment

The bar code hand scanner type SK-30 may be operated in hazardous explosive areas that require apparatus of category 2 resp. 3.

Replacement and charging of the accumulator has to be carried outside of the hazardous explosive area.

The data transmission is wireless.

The permissible ambient temperature range is -30°C to +50°C.

The HF power is 10 mW.

Electrical data

Supply (internal accumulator)	3 NiMH cells, type Twicell HR-AAAU, manufacturer Sanyo U = 4.2 V; 730 mAh
Charging contacts	only for the connection with the associated charger outside of hazardous areas

(16) Test documents are listed in the test report No.: 03 YEX 551014.

(17) Special conditions for safe use

none

(18) Essential Health and Safety Requirements

no additional ones