



Operating instructions

KBDi-USB-* keyboards

KBDi-USB-TB50-*

KBDi-USB-M-*

KBDi-USB-P-*

KBDi-USB-J-*

R. STAHL HMI Systems GmbH
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Specific markings

The markings in these operating instructions refer to specific features that must be noted.

In detail, these are:








 DANGER	This sign alerts users to hazards that will result in death or serious injury if ignored !
 WARNING	This sign alerts users to hazards that may result in death or serious injury if ignored !
 CAUTION	This sign alerts users to hazards that may damage machinery or equipment or result in injury if ignored !
 ATTENTION	Information highlighted by this symbol indicates measures for the prevention of damage to machinery or equipment !
 NOTICE	Information highlighted by this symbol indicates important information of which particular note should be taken !
 DOCUMENTATION	Information highlighted by this symbol refers to a different chapter or section in this manual or other documentation or a web-page !


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1 Preface

These Operating Instructions contain all aspects relevant to explosion protection for the KBDi-USB-* keyboards devices. They also contain information on the connection and installation (etc.) of these devices.

 NOTICE	All data relevant to explosion protection from the EC-type examination certificate were copied into these operating instructions.
	For the correct operation of all associated components please note, in addition to these operating instructions, all other operating instructions enclosed in this delivery as well as the operating instructions of the additional equipment to be connected !

 DOCUMENTATION	<p>Please note that all certificates of the KBDi-USB-* keyboards can be found in a separate document (CE_ET-xx7).</p> <p>You can find this document in the internet at www.stahl-hmi.de or request it from R. STAHL HMI Systems GmbH.</p>
	For more information on the HMIs please also refer to the Manual (available as online manual on www.stahl-hmi.de).

2 Keyboard function

The type KBDi-USB-* keyboards are used to enter data, commands etc. on PCs and similar devices in hazardous areas. In particular, they were designed for connection to HMI devices of the device platform MANTA ET-/MT-xx7.

The type KBDi-USB-* keyboards are explosion-protected equipment for installation in hazardous areas of zones 0 and 20. The devices may be connected to intrinsically safe USB interfaces. Power supply and data communication takes place via the USB interface. The keyboards are connected with a fixed cable.

Various keyboard versions are available that differ in their layout (German, US English, French, etc.) and in their design (PC keyboard with mouse, trackball, touchpad or with joystick).

The touchpad uses resistive technology and can therefore be operated with a touch pen or with gloved fingers.

The keyboards can be mounted inside a front panel or a desktop housing.

3 Type allocation

Since the beginning of 2013, the T-series devices have been allocated new type names according to the following pattern:

To avoid having to re-write certifications, the names in the certificates remain the same, but the devices receive new names.

In the interest of a clear link between device type and certificate, both device names are listed on the type plate from 01.04.2013 onwards.

3.1 Type marking

Old (certificate)	New
T-Ex*-KB-TB*	KBDi-USB-TB50*
T-Ex*-KB-M*	KBDi-USB-M*
T-Ex*-KB-P*	KBDi-USB-P*
T-Ex*-KB-J*	KBDi-USB-J*

* = alphanumeric or symbolic characters without relevance to explosion protection.



For the exact new device name and model please refer to the type code.

4 Technical Data

Function / Equipment	KBDi-USB-*
Power supply	via USB interface
MTBF	typically 50,000 h at 20°C
Interfaces	1x USB for keyboard (Ex ia) 1x USB for mouse, touch pad, trackball, joystick (Ex ia)
Cable type	standard USB, open cable end
Cable lengths	usually 1.8 m
Enclosure	Steel / aluminium, installation enclosure
Enclosure protection type	
Front	IP66 according to DIN EN 60529
Front with trackball module	statically IP66, dynamically IP54
Back	IP20 according to EN / IEC 60079-0
Keyboard foil	Polyester
Operating temperature range	
Operation	-30°C ... +60°C
Storage temperature range	-30°C ... +70°C
Relative humidity	10 to 90% at +40°C, non-condensing
Dimensions [mm] (W x H x D)	581 x 186 x 50
Weight [kg]	3.0

5 Conformity to standards

The KBDi-USB-* keyboards comply with the following standards and directives:

Standard		Classification
2. Supplement		
ATEX directive		
until 19.04.2016	from 20.04.2016	
94/9/EG	2014/34/EU	
EN 60079-0 : 2009		General requirements
EN 60079-5 : 2007		Powder filling "q"
EN 60079-7 : 2007		Increased safety "e"
EN 60079-11 : 2007		Intrinsic safety "i"
EN 60079-26 : 2007		Device protection (EPL) "Ga"
EN 60079-28 : 2004		Optical radiation
EN 60079-31 : 2009		Protected by enclosures "tD" (dust)
EN 61241-11 : 2006		Intrinsic safety "iD" (dust)
The product corresponds to requirements from:		
EN 60079-0 : 2012		General requirements
EN 60079-11 : 2012		Intrinsic safety "i"
EN 60079-31 : 2014		Protected by enclosures "tD" (dust)
Electromagnetic compatibility		
EMV directive		
until 19.04.2016	from 20.04.2016	Classification
94/9/EG	2014/34/EU	
EN 61000-6-2 : 2006		Interference resistance
EN 61000-6-4 : 2007		Interference emission
Low voltage directive		
Directive 2006/95/EC		
EN 50178 : 1997		Fitting power plants with electronic equipment
EN 61010-1 : 2001+		General requirements
RoHS directive		
2011/65/EU		Classification
EN 50581 : 2012		Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances

5.1 CEC / NEC / CSA

Standard	Classification
CAN/CSA-C22.2 No. 0-10 August 2011	General requirements Canadian Electrical Code, Part II
CAN/CSA-C22.2 No. 61010-1-12	Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use - Part 1: General Requirements (Third Edition)
CAN/CSA-C22.2 No. 60079-0 : 11 (December 2011)	Explosive atmospheres – Part 0: Equipment General requirements
CAN/CSA-C22.2 No. 60079-5 : 11 (December 2011)	Explosive atmospheres – Part 5: Equipment protection by powder filling “q”
CAN/CSA-C22.2 No. 60079-7 : 12 (February 2012)	Explosive atmospheres – Part 7: Equipment protection by increased safety “e”
CAN/CSA-C22.2 No. 60079-11 : 11 (December 2011)	Explosive atmospheres – Part 11: Equipment protection by intrinsic safety “i”
CAN/CSA-C22.2 No. 60529:05 (Reaffirmed 2010)	Degrees of protection provided by enclosures (IP Code)
ANSI/UL 61010-1 (2012)	Electrical Equipment for Measurement, Control, and Laboratory Use - Part 1: General Requirements (Third Edition)
ANSI/UL 60079-0 (sixth edition July 2013)	Explosive atmospheres – Part 0: Equipment – General requirements
ANSI/UL 60079-5 (third edition November 2013)	Explosive atmospheres – Part 5: Equipment protection by powder filling “q”
ANSI/UL 60079-7 (fourth edition May 2013)	Explosive atmospheres – Part 7: Equipment protection by increased safety “e”
ANSI/UL 60079-11 (sixth edition March 2014)	Explosive atmospheres – Part 11: Equipment protection by intrinsic safety “i”
ANSI/IEC 60529-2004	Degrees of protection provided by enclosures (IP code)

6 Certificates

The KBDi-USB-* keyboards are certified for installation in the following areas:

Europe:

according to ATEX Directive

International / Australia:

IECEX (International Electrotechnical Commission System for Certification to Standards for Electrical Equipment for Explosive Atmospheres)

USA:

according to NEC
for installation in
Class I, Zone 1

carried out by:

CSA (Canadian Standard Association)

Canada:

according to CEC
for installation in
Class I, Division 2

carried out by:
CSA (Canadian Standard Association)

Russia / Kazakhstan / Belarus:

TR (Technical Regulation of the Eurasian Customs Union (EAC))

Korea

KGS (Korea Gas Safety Corporation)

6.1 ATEX


The ATEX certification is listed under the following certificate number:

Certificate number: BVS 11 ATEX E 102 X

6.2 IECEX

The IECEX certification is listed under the following certificate number:

Certificate number: IECEX TUR 11.0075X

 DOCUMENTATION	You can access all IECEX certificates on the official website of the IEC under their certificate number. http://iecex.iec.ch/iecex/iecexweb.nsf/welcome?openform .
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6.3 NEC / CSA


The NEC / CSA certification is listed under the following certificate number:

Certificate number: 70011698

6.4 CEC / CSA

The CEC / CSA certification is listed under the following certificate number:

Certificate number: 70011698

 NOTICE	Note: The HMIs are certified according to Ex e q [ia] IIC T4 Gb. According to the CEC Part 1 each device with these protection types may be operated in Class I, Division 2 areas. For more details on this, please refer to the CEC.
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6.5 TR

The TR certificate is listed under the following certificate number:

Certificate number: TC RU C-DE.ГБ04.В00478


6.6 KGS

The KGS certification of the KBDi-USB-* keyboards ist included in the KGS certificate of the ET-xx7 HMI devices.


The KGS certificate of the ET-xx7 HMI devices is listed under the following certification number:

Certificate number:

12-GA4BO-0617X

 NOTICE	<p>In order to be able to operate these HMI devices in Korea, each device type additionally requires a KCC certificate. Actually the following devices has such a certificate: T-Ex-22 (ET-x67), T-Ex-22-DVI3 (ET-667-DVI3), T-Ex-24T (ET-x77 with touch screen (membrane))</p>
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7 Marking

Manufacturer	R. STAHL HMI Systems GmbH	
Type code	KBDi-USB-TB50* / KBDi-USB-M* / KBDi-USB-P* / KBDi-USB-J*	
CE classification:	CE 0158	
Testing authority and certificate number:	BVS 11 ATEX E 102 X	
Ex classification:		
ATEX guideline 94/9/EC		II 1 G Ex ia IIC T4 Ga II 1 D Ex ia IIIB T110°C Da
IECEX		Ex ia IIC T4 Ga Ex ia IIIB T110°C Da
NEC / CEC		Ex ia IIC T4 Ga Ex ia IIIB T110°C Da Class I, Zone 0 AEx ia IIC T4 Ga Zone 20 AEx ia IIIB T110°C Da
TR		0Ex ia IIC T4 Ga X Ex ia IIIB T110°C Da

8 Permitted maximum values

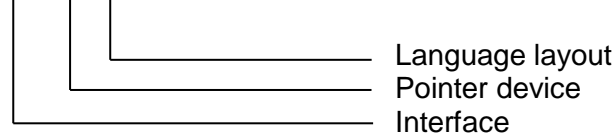
U_i	=	5.5	VDC	U_o	=	5.5	VDC
I_i	=	1	A	I_o	=	I_i	
P_i	=	650	mW	P_o	=	P_i	
C_i	=	20	μ F	C_o	=	30	μ F
L_i	=	negligible		L_o	=	5	μ H

For the joystick module, the following values apply:

C_i	=	40	μ F	C_o	=	10	μ F
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9 Type code


KBDi-USB-aa-bb




Product type:

Product key structure	Description
	Version
KBDi-USB- TB50 -bb	Keyboard with integrated trackball
KBDi-USB- TB50-VA -bb	Keyboard with integrated stainless steel trackball
KBDi-USB- M -bb	Keyboard with integrated mouse
KBDi-USB- P -bb	Keyboard with integrated touch pad
KBDi-USB- J -bb	Keyboard with integrated joystick
KBDi-USB-aa- DE	Language: German (QWERTZ)
KBDi-USB-aa- US	Language: American (QWERTY)
KBDi-USB-aa- FR	Language: French (AZERTY)
KBDi-USB-aa- FR-BE	Language: French, Belgian version (AZERTY)
KBDi-USB-aa- CH	Language: German, Swiss layout
KBDi-USB-aa- ES	Language: Spanish

10 Safety information


 NOTICE	<p>This chapter is a summary of the key safety measures. The summary is supplementary to existing rules which staff also have to study.</p>
	<p>The safety of persons and equipment in hazardous areas depends on compliance with all relevant safety regulations. Thus, the installation and maintenance staff carry a particular responsibility, requiring precise knowledge of the applicable regulations and conditions.</p>

 CAUTION	<p>The notes listed below in section 10 must be heeded to avoid injury and damage to equipment !</p>
--	--

10.1 General Safety Information

- All relevant accident prevention regulations and the rules for electric installations have to be observed during installation, maintenance and operations. All persons involved in installation, commission, maintenance and repairs of this device and its accessories must be qualified accordingly and must have familiarised themselves with this manual and any associated documentation.
- In case of non-compliance or contravention of the above explosion-protection is no longer guaranteed and all warranty claims shall be null and void.
- National safety and accident prevention rules apply.
- Use the device for its intended purpose only.
- No changes to the device are permitted. The enclosure may only be opened by R. STAHL HMI Systems GmbH.
- The first four digits of the serial number on the type plate stand for the year of manufacture.

10.2 Cautionary note

 ATTENTION	<p>This is an EN 55022 Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.</p>
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10.3 Installation safety information

- The national assembly and installation rules and the generally accepted technical rules must be observed. The device and its accessories must be connected and operated according to applicable standards, directives and installation guidelines. Only qualified personnel or personnel that has been instructed accordingly are allowed to install the device.
- Only appropriate tools must be used for the installation.
- The keyboards must be earthed via the bolt at the back of the device.
- We recommend you use screened cables with the keyboards. Routing of the cable may reduce performance.
- Before operating the keyboard you must ensure that it has been installed according to regulations and that its cables are undamaged.

10.4 Safety information for operation

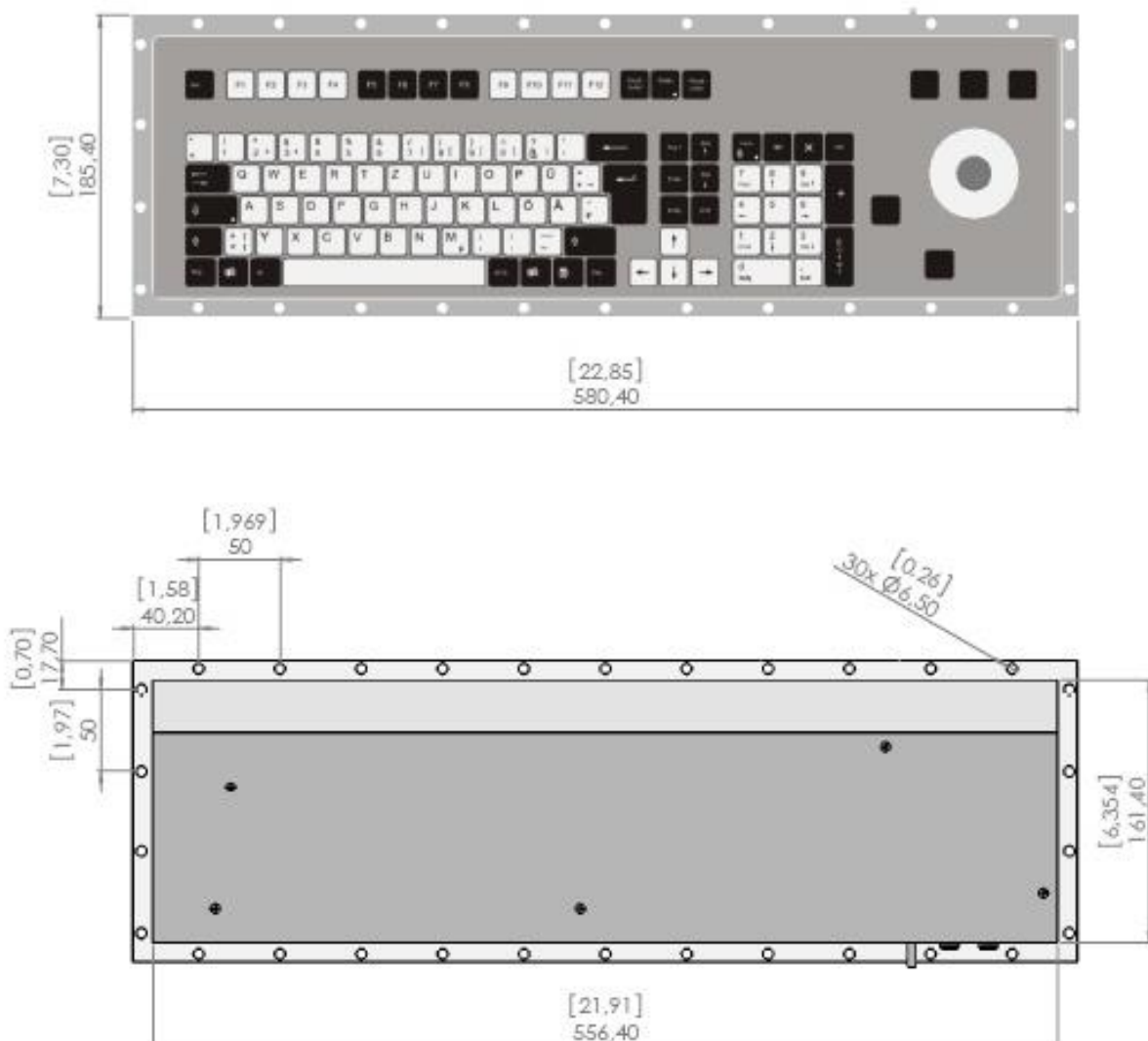
- Operate the keyboard only if it is clean and undamaged. If the keyboard is in any way damaged, do not touch it to avoid injury. In the case of any damage that may compromise ingress protection (e.g. cracks, holes or broken components) the keyboard must be taken out of commission immediately. Before the device is recommissioned the damaged components must be replaced.
- If you want to use the device in category 1D/2D/3D or EPL Da/Db/Dc, dust deposits of a thickness exceeding 5 mm must be removed and you have to ensure that no high-energy loading mechanisms at the operating surface of the keyboard (e.g. pneumatic particle transport) occur during operation. The keyboard may not be used in environments where propagating brush discharges may occur.
- In case of non-compliance or contravention of the above explosion-protection is no longer guaranteed and all warranty claims shall be null and void.

10.5 Special conditions

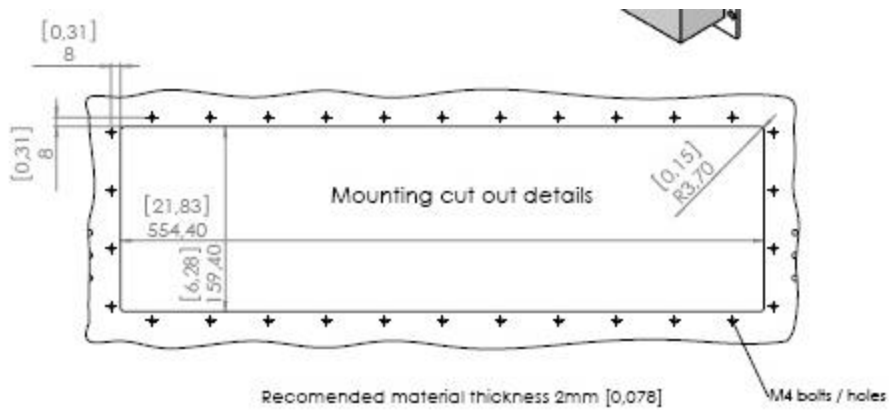
Equipotential bonding must be established for the external intrinsically safe circuits of the accessories to be connected, e.g. display, keyboard or pointer device.

11 Mechanical dimensions

Dimensions in mm, [inch]



11.1 Cut-out



12 Connections

Keyboard X72

Cable	Colour	Signal name	Definition
1	Red	+ UB	Power supply +UB
2	White	D-	Data cable D-
3	Green	D+	Data cable D+
4	Black	GND	Power supply GND

Trackball X73, mouse X94, touchpad X95, joystick X96:

Cable	Colour	Signal name	Definition
1	Red	+ UB	Power supply +UB
2	White	D-	Data cable D-
3	Green	D+	Data cable D+
4	Black	GND	Power supply GND

13 Maintenance



Associated equipment is subject to maintenance, service and testing according to guidelines 1999/92/EC, IEC/EN 60079-14, -17, -19 and BetrSichVer (Betriebssicherheitsverordnung - Ordinance on Industrial Safety and Health) !

Because the transmission of the keyboards remains reliable and stable over long periods of time, regular adjustments are not required.

System maintenance should focus on the following:

- a. Housing damage
- b. Front membrane damage
- c. All cables and lines are properly connected and undamaged

14 Troubleshooting



Devices operated in hazardous areas must not be modified. Repairs may only be carried out by qualified, authorized staff specially trained for this purpose.

Repairs may only be carried out by specially trained staff who are familiar with all basic conditions of the applicable user regulations and – if requested – have been authorized by the manufacturer.

14.1 Repairs / hazardous substances

An error description must be enclosed with any units returned to R. STAHL HMI Systems GmbH for repairs.

Remove all material residues. Please pay particular attention to the seal grooves and slits where material residues may be lodged. We have to ask you not to return a unit if you are unable to completely remove any hazardous substances. We shall bill you for any costs arising from insufficiently cleaned keyboards, such as disposal or damage to persons (chemical burns, etc.).

15 Disposal

Disposal of packaging and used parts is subject to regulations valid in whichever country the device has been installed.

The disposal of devices sold after August 13th, 2005, and installed in countries under the jurisdiction of the EU is governed by directive (amendment) 2012/19/EU on waste electrical and electronic equipment (WEEE). Under this directive, HMI devices are listed in category 9 (monitoring and control instruments).


We shall take back our devices according to our General Terms and Conditions.

15.1 RoHS directive 2011/65/EC

The revised version of the RoHS (restriction of hazardous substances) 2002/95/EC directive, directive 2011/65/EC, extends its area of application to all electric and electronic products.

In the case of the keyboards (category 9 – monitoring and controlling devices) a transitional period applies until 22.07.2017, after which the banned substances listed in RoHS 2011/65/EC directive apply to all devices newly put on the market.


16 Front panel resistance

 NOTICE	This section contains information on the resistance of the keyboards to various environmental factors. These have an impact on the mechanical, thermal and chemical stability of the operator interfaces.
	The keyboard was tested for chemical resistance according to DIN 42115. At room temperature and with a duration of exposure of 2 hours, the keyboard was shown to be resistant to the listed chemicals without any visible changes.

16.1 Materials

Application	Material
Keyboard plate	Aluminum
Keyboard foil	Polyester
Housing	Steel
Seal	Polyurethane

16.2 Material properties

 NOTICE	The selection of chemicals listed here is not exhaustive.
	Because of the numerous chemical substances available on the market, these lists can only represent a selection.

16.2.1 Keyboard foil (Polyester)

Property	Chemical material class / group	Chemical substances	Test method
Chemical • Chemical resistance	Alcohols	Ethanol Isopropyl alcohol Methanol	DIN 42115 DIN 53778/B1
	Aromatic hydrocarbons	Benzene Toluene Xylene	
	Ketones	Acetone Methyl ethyl ketone	
	Diluted acids	Formic acid <85% Phosphoric acid <75% Hydrochloric acid <10% Nitric acid <52%	
	Household chemicals	Pril <1%	
	Oils	Petrol 60/95 Turpentine	
	No specific material class	Chloroform Water-based felt marker Coffee Ketchup Ballpen Lip stick Methylene chloride Nail polish (with actone) Mustard Tea Ink Water Hydrogen peroxid <10%	

Property	Resistance	Test method
Mechanic (keyboard) <ul style="list-style-type: none">• Service life after imprint• Operating force• folding resistance	>1 Mio touches max. 50 N > 14000 folding operations	
Thermal <ul style="list-style-type: none">• Shrinkage	$\leq 0,5\%$ TD $\leq 1,0\%$ MD	130°C/30 min

17 Declaration of EC conformity

EG/EU-Konformitätserklärung
EC/EU Declaration of Conformity
Déclaration de Conformité CE/UE



R. STAHL HMI Systems GmbH • Adolf-Grimme-Allee 8 • 50829 Köln, Germany

erklärt in alleiniger Verantwortung, *declares in its sole responsibility, déclare sous sa seule responsabilité,*

dass das Produkt:

that the product:

que le produit:

Bedien- und Beobachtungsgeräte

Operating and Monitoring Devices

Consoles de commande et de visualisation

Typ(en), *type(s), type(s):*

Display Unit T-EX-##*-CAT7*

Display Unit T-EX-##*-MM*

Display Unit T-EX-##*-SM*

Keyboard Trackball Unit T-EX*-KB-TB*

Keyboard Mouse Unit T-EX*-KB-M*

Keyboard Pad Unit T-EX*-KB-P*

Keyboard Joystick Unit T-EX*-KB-J*

Transmission Unit T-EX-KVM*-CAT7*

Transmission Unit T-EX-KVM*-MM*

Transmission Unit T-EX-KVM*-SM*

*=any alphanumeric or symbolic character, without relevance for explosion protection

#=one numeric character, without relevance for explosion protection

mit den Anforderungen der folgenden Richtlinien und Normen übereinstimmt.

is in conformity with the requirements of the following directives and standards.

est conforme aux exigences des directives et des normes suivantes.

Richtlinie(n) / Directive(s) / Directive(s)			Norm(en) / Standard(s) / Norme(s)	
Bis/Until/Jusque'au 2016-04-19:		Ab/From/De 2016-04-20:	EN 60079-0: 2009 EN 60079-5: 2007 EN 60079-7: 2007 EN 60079-11: 2007 EN 60079-26: 2007 EN 60079-28: 2004 EN 60079-31: 2009 EN 61241-11: 2006	Das Produkt entspricht Anforderungen aus: <i>Product corresponds to requirements from:</i> <i>Produit correspond aux exigences:</i>
94/9/EG	ATEX-Richtlinie	2014/34/EU		EN 60079-0: 2012, EN 60079-11: 2012, EN 60079-31: 2014
94/9/EC	ATEX Directive	2014/34/EU		
94/9/CE	Directive ATEX	2014/34/UE		

Kennzeichnung, *marking, marquage:*

Display Unit:

II 2(1) G Ex e q [ia op is Ga] IIC T4 Gb

II 2(1) D Ex tb IIIC [ia op is Da] IP64 T110°C Db

Keyboard Trackball Unit, for Keyboard Mouse Unit, for Keyboard Pad Unit, for Keyboard Joystick Unit:

II 1 G Ex ia IIC T4 Ga

II 1 D Ex ia IIIB T110°C Da

Transmission Unit:

II (1) G [Ex op is Ga] IIC

II (1) D [Ex op is Da] IIIB



CE 0158

EG/EU-Baumusterprüfbescheinigung:

EC/EU Type Examination Certificate:

Attestation d'examen CE/UE de type:

BVS 12 ATEX E 033 X

DEKRA EXAM GmbH (NB 0158)

Dinnendahlstraße 9, 44809 Bochum, Germany

EG/EU-Konformitätserklärung
EC/EU Declaration of Conformity
Déclaration de Conformité CE/UE



Bis/Until/Jusque'au 2016-04-19:	Ab/From/De 2016-04-20:	EN 61000-6-2: 2006 EN 61000-6-4: 2007
2004/108/EG 2004/108/EC 2004/108/CE	EMV-Richtlinie <i>EMC Directive</i> <i>Directive CEM</i>	2014/30/EU 2014/30/EU 2014/30/UE
Produktnormen nach Niederspannungsrichtlinie: <i>Product standards according to Low Voltage Directive:</i> <i>Normes des produit pour la Directive Basse Tension:</i>		EN 50178: 1997 EN 61010-1: 2001+ Corrigendum / Errata
Produktnormen nach RoHS-Richtlinie (2011/65/EU): <i>Product standards according to RoHS Directive:</i> <i>Normes des produit pour la Directive RoHS:</i>		EN 50581:2012

Köln, 2015-12-11

Ort und Datum
Place and date
Lieu et date

i.V. 
J. Düren
 Technical Director

i.V. 
W. Bertges
 Quality Manager

18 Release Notes

The chapter entitled "Release Notes" contains all the changes made in every version of the operating instructions.

Version 01.00.00

- Original version of the operating instructions

Version 01.00.01

- Renew Disclaimer
- Changing address and telephone numbers
- Inclusion of chapter "specific markings"
- Changing of all markings according to the new definition
- Changing of content "Preface"
- Changing of content "Device function"
- Renew "Conformity to standards"
- Addition of certifications according to NEC and CEC
- Changing of certification from GOST-R into TR
- Changing of section "Marking"
- Adaptation section "Disposal" according to the newest WEEE and RoHS directive
- Renew Declaration of EC conformity
- Text-, layout- and formal corrections

Version 01.00.02

- Addition of standards according to IP protection in "Technical Data"

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