EUCHNER

Operating Instructions

Key Adapter

CKS-K-AS2A-U-C20-PC (Unicode)

EN

Contents

1. About this document

1.1. Scope

These operating instructions are valid for all CKS-K-AS2A-U-C20-PC. These operating instructions, the document “Safety information and maintenance” and any enclosed data sheet form the complete user information for your device.

1.2. Target group

Design engineers and installation planners for safety devices on machines, as well as setup and servicing staff possessing special expertise in handling safety components.

1.3. Key to symbols

Symbol/depiction	Significance
	Printed document
	Document is available for download at www.euchner.de
	Document on CD
 **DANGER** **WARNING** **CAUTION**	Safety precautions **Danger** of death or severe injuries **Warning** about possible injuries **Caution** minor injuries possible
 **NOTICE** **Important!**	**Notice** about possible device damage **Important** information
Tip	Tip/useful information

1.4. Supplementary documents

The overall documentation for this device consists of the following documents:

Document title (document number)	Contents	
Safety information and maintenance CKS-AS-C20 (123913)	Basic information on safe setup and service	
Operating instructions (123914)	(this document)	
Possibly enclosed data sheet	Item-specific information about deviations or additions	

Important!

Always read all documents to gain a complete overview of safe installation, setup and use of the device. The documents can be downloaded from www.euchner.de. For this purpose enter the doc. no. in the search box.

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2. Correct use

EUCHNER key adapters series CKS-K-AS are operated as a slave on the safety bus AS-Interface Safety at Work

This safety component allows dangerous machine movements to be undertaken as long as a valid key is inserted. A stop command is triggered if the key is removed during the dangerous machine function.

Before use, a risk assessment must be performed on the machine, e.g. in accordance with:

- EN ISO 13849-1, Safety of machinery. Safety related parts of control systems. General principles for design
- EN ISO 12100, Safety of machinery - General principles for design - Risk assessment and risk reduction
- IEC 62061, Safety of machinery - Functional safety of safety-related electrical, electronic and programmable electronic control systems.

Correct use includes compliance with the relevant requirements for installation and operation, for example

- EN ISO 13849-1, Safety of machinery. Safety related parts of control systems. General principles for design
- EN 60204-1, Safety of machinery. Electrical equipment of machines. General requirements

The key adapter must be used only in conjunction with the designated CKS keys from EUCHNER. On the use of different keys, EUCHNER provides no warranty for safe function.

Important!

- The user is responsible for the proper integration of the device into a safe overall system. For this purpose, the overall system must be validated, e.g. in accordance with EN ISO 13849-2.
- In the estimation of the PL for the overall system, a maximum value of 100 years can be assumed for the $MTTF_d$ according to the limit value in EN ISO 13849-1:2008, section 4.5.2. This corresponds to a minimum value for the PFH_d of $2.47x10^{-8}$/h.
- Correct use requires observing the permissible operating parameters (see Technical data).
- If a product data sheet is included with the product, the information on the data sheet applies in case of discrepancies with the operating instructions.
- It is only allowed to use components that are permissible in accordance with the table below.

Table 1: Possible combinations for CES components

Key adapter	Key
	CKS-A-BK1-RD-113461
CKS-K-AS2A-U-C20-PC	●

Key to symbols	●	Combination possible

3. Description of the safety function

The safety function is defined by the related application.

- Device safety function:
  - The zero sequence is sent if the key is removed (see chapter *6.1. Switching states on page 6*).
- Safety characteristics: category, Performance Level, PFH_d (see chapter *11. Technical data on page 13*).

4. Exclusion of liability and warranty

In case of failure to comply with the conditions for correct use stated above, or if the safety instructions are not followed, or if any servicing is not performed as required, liability will be excluded and the warranty void.

5. General safety instructions

Safety components fulfill personal protection functions. Incorrect installation or tampering can lead to fatal injuries to personnel.

Check the safe function of the safety guard particularly

- after any setup work
- after the replacement of a system component
- after an extended period without use
- after every fault

Independent of these checks, the safe function of the safety guard should be checked at suitable intervals as part of the maintenance schedule.

⚠	**WARNING**
	
	Danger to life due to improper installation or due to bypassing (tampering). Safety components perform a personal protection function.
	- The switching operation may be triggered only by keys specially designated for this purpose.
	- The key must be completely pulled out of the key adapter in order to switch the safety circuit off safely.
	- Mounting, electrical connection and setup only by authorized personnel possessing the following knowledge:
	  - specialist knowledge in handling safety components
	  - knowledge about the applicable EMC regulations
	  - knowledge about the applicable regulations on occupational safety and accident prevention.

ⓘ	**Important!** Prior to use, read the operating instructions and keep these in a safe place. Ensure the operating instructions are always available during mounting, setup and servicing. EUCHNER cannot provide any warranty in relation to the readability of the CD for the storage period required. For this reason you should archive a printed copy of the operating instructions. You can download the operating instructions from www.euchner.de.

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6. Function

The key adapter CKS can, e. g., be used as a lockout mechanism. As soon as the key is in the key adapter, this is reported via the AS-Interface bus. Each delivered key possesses a unique electronic coding and so is a unique element in the system used.

The code of a key cannot be reprogrammed.

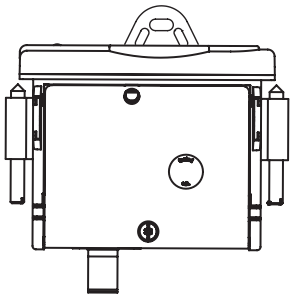
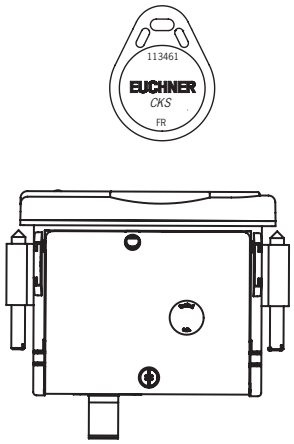
If a permissible code is detected, a bit sequence is sent via the AS-Interface bus to signal that the key is inserted.

The zero sequence is sent via the AS-Interface bus when the key is removed from the key adapter. The machine cannot be started.

If there is a fault in the key adapter, the zero sequence is sent and the LED illuminates.

6.1. Switching states

The detailed switching states for your key adapter can be found in the system status table. All indicator LEDs are described there.

	Key inserted	**Key removed**
		
LED indicator	Green	Yellow
DO, D1, D2, D3	Code sequence	Zero sequence

7. Mounting

NOTICE

Risk of damage to equipment and malfunctions as a result of incorrect installation.

- To achieve the degree of protection IP 67, it is necessary to install the key adapter in a clean, flat metal plate at least 2 mm thick and to tighten the screws with a tightening torque of 0.25 ... 0.35 Nm.
- The device may be damaged if the tightening torque applied exceeds 0.35 Nm.
- A suitable strain relief must be provided for the connection cables in order to avoid damage to the connection sockets or malfunctions.

The key adapter is intended for mounting in control panels with a cut-out measuring 33 mm x 68 mm according to DIN 43700. The device is fastened using screw clamp elements from the rear side of the panel.

1. Insert the key adapter, with seal already bonded in place, into the mounting cut-out from the front.
2. Insert screw clamp elements in the housing of the key adapter from the side up to the end stop and tighten with 0.25 ... 0.35 Nm.
3. After mounting, again check the key adapter for firm seating and correct sealing of the front panel.

8. Electrical connection

CAUTION

Risk of damage to equipment or malfunctions as a result of incorrect connection.

- Power devices which are a powerful source of interference must be installed in a separate location away from the input and output circuits for signal processing. The cable routing for safety circuits should be as far away as possible from the cables of the power circuits.
- In order to avoid EMC interference, the physical environmental and operating conditions at the installation site of the device must comply with the requirements according to the standard EN 60204-1:2006, section 4.4.2 (EMC).
- Please pay attention to any interference fields in case of devices such as frequency converters or induction heating systems. Observe the EMC instructions in the manuals from the respective manufacturer.

Important!

If the device does not appear to function when the operating voltage is applied (e.g. green LED does not flash), the key adapter must be returned unopened to the manufacturer.

8.1. Notes about cULus

Important!

- For use and operation as per the cULus requirements, a power supply with the feature "for use in class 2 circuits" must be used.
  Alternative solutions must comply with the following requirements:
  a) Electrically isolated power supply unit with a max. open-circuit voltage of 30 V/DC and a limited current of max. 8 A.
  b) Electrically isolated power supply unit in combination with fuse as per UL248. This fuse should be designed for max. 3.3 A and should be integrated into the 30 V DC voltage section.

8.2. Setting the AS-Interface address

The address can be set prior to or after assembly.

The AS-Interface address of the key adapter is set using an AS-Interface programming device. Addresses 1 to 31 are valid.

The unit is programmed by connecting the programming device to the ASi connection on the key adapter using a programming cable.

The AS-Interface address can also be set directly on the AS-Interface bus with a master.

The default setting for the address on delivery is 0.

8.3. Configuration in the AS-Interface safety monitor

(see operating instructions for the AS-Interface safety monitor)

8.3.1. Dual-channel positively driven

The key adapter is configured in the AS-Interface safety monitor with the AS-Interface address set as follows:

- Dual-channel positively driven
- With or without start-up test

8.4. Pin assignment key adapter CKS-K-AS2A-U-C20-PC

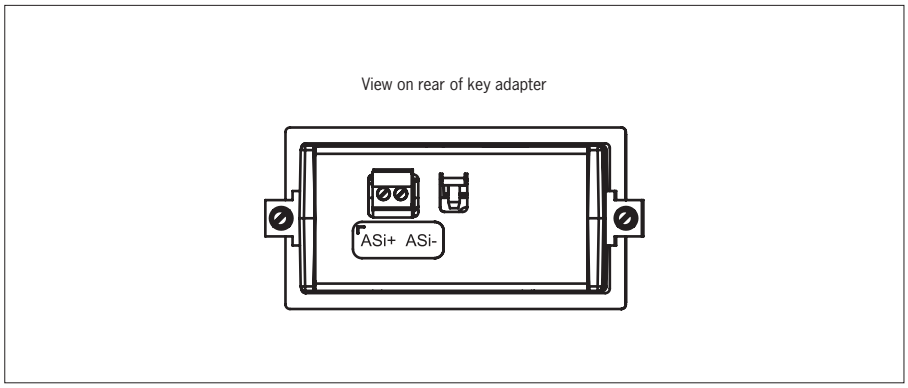


Figure 1: Terminal assignment, AS-Interface connection terminal

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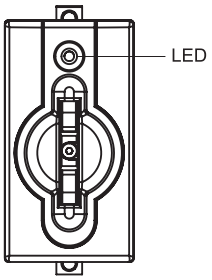
9. Setup

9.1. LED indicator

You will find a detailed description of the signal functions in chapter *10. System status table on page 12*.

LED color	Significance
Green	Key inserted
Yellow	Readiness for operation
Red	Fault



9.2. Teach-in function for key

The key must be allocated to the key adapter using a teach-in function before the system forms a functional unit.

The zero sequence is sent during the teach-in operation.

Important!

- The teach-in operation may be performed only if the device functions flawlessly. The red LED must not be illuminated.
- The key adapter disables the code of the previous key if teach-in is carried out for a new key. Teach-in is not possible again immediately for this actuator if a new teach-in operation is carried out. The disabled code is released again in the key adapter only after a third code has been taught-in.
- The key adapter can only be operated with the last key taught-in.
- If the key adapter detects the key that was most recently taught-in when in the teach-in standby state, this state is ended immediately and the key adapter changes to normal operation.
- If the key to be taught-in is within the operating distance for less than 60 s, it will not be activated and the most recently taught-in key will remain saved.

9.2.1. Preparing device for teach-in operation and teaching-in key

1. Insert new key
2. Connect AS-Interface bus to the key adapter.

➡ Teach-in operation starts, the LED flashes green (approx. 1 Hz). During the teach-in operation, the key adapter checks whether the key is a disabled key. Provided this is not the case, the teach-in operation is completed after approx. 60 seconds, and the green LED goes out. The new code has now been stored, and the old code is disabled.

3. To activate the new key code from the teach-in operation in the key adapter, the key adapter must then be disconnected from the AS-Interface bus for min. 3 seconds.

9.3. Functional check

⚠	**WARNING** Danger of fatal injury as a result of faults in installation and functional check. ‣ Before carrying out the functional check, make sure that there are no persons in the danger area. ‣ Observe the valid accident prevention regulations.

9.3.1. Electrical function test

After installation and any fault, the safety function must be fully checked. Proceed as follows:

1. Switch on operating voltage.

➡ The machine must not start automatically.

➡ The key adapter carries out a self-test. The LED then flashes green (3 min).

2. Insert key.

➡ The LED illuminates green.

3. Enable operation in the control system.
4. Remove key.

‣ The machine must switch off and it must not be possible to start it as long as a key is not inserted.
‣ The LED illuminates yellow.

Repeat steps 2 … 4 for each key adapter.

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10. System status table

Operating mode	Key inserted	CKS LED indicator: Green	CKS LED indicator: Yellow	CKS LED indicator: Red	State
Normal operation	Yes	☀		○	Normal operation, key inserted
	No	☀ 1 x		○	Normal operation, no key taught-in
	No	○	☀	○	Normal operation, no key inserted AS-i bus connected and in operation
	Yes	○	☀ 1 Hz	○	Normal operation, key inserted but not taught-in, AS-i bus connected and in operation
Teach-in standby	No	☀ 3 x		○	Device is ready for teach-in of another key (only short time after power-up)
Setup	Yes	☀ 1 Hz		○	Teach-in operation
	X	○		○	Positive acknowledgment after completion of teach-in operation or device not connected
Fault display	Yes	☀ 3 x		☀	Defective key (e.g. fault in code or code cannot be read)
	X	○		☀	Internal fault (e.g. component faulty, data error)
	X	☀ 4 x	○	☀	Error: AS bus connected, no communication with the master

Key to symbols	
○	LED not illuminated
☀	LED illuminated
☀ 10 Hz (8 s)	LED flashes for 8 seconds at 10 Hz
☀ 3 x	LED flashes three times, and this is then repeated
X	Any state

After the cause has been remedied, faults can generally be reset by removing and inserting again the key. If the fault is still displayed afterward, briefly interrupt the power supply. Please contact the manufacturer if the fault could not be reset after restarting.

Important!

If you do not find the displayed device status in the System status table, this indicates an internal device fault. In this case, you should contact the manufacturer.

11. Technical data

NOTICE

If a product data sheet is included with the product, the information on the data sheet applies.

11.1. Technical data, key adapter CKS-K-AS2A-U-C20-PC

Parameter	Value			Unit
	min.	typ.	max.	
Housing material	Plastic PA6-GF30 black			
Fixing screw tightening torque	-	-	0.35	Nm
Dimensions	75 x 40 x 73			mm
Weight (without connection cable)	0.13			kg
Ambient temperature at U_B = DC 30 V	-10	-	+65	°C
Degree of protection	IP 67 in mounted condition (only access side)			
Safety class	III			
Degree of contamination	2			
Installation position	On the front			
Mounting cut-out according to DIN 43700	33 x 68			mm
Connection	Screw terminal 2-pole			
For the approval according to UL the following applies	Operation with UL-class 2 power supply only			
Rated insulation voltage U_i	-	-	300	V
Rated impulse withstand voltage U_{imp}	-	-	1.5	kV
Resilience to vibration	In acc. with EN IEC 60947-5-2			
Ready delay	-	0.5	-	s
Risk time	-	-	260	ms
Switch-on time	-	-	300	
AS-Interface data	EA code: 0		ID code: B	
AS-i operating voltage	19	-	31.6	DC V
Total current consumption	-	-	50	mA
Valid AS-Interface addresses	1 - 31			
AS-Interface inputs	Acc. to AS-Interface Safety at Work			
Influenced by key	D0 - D3			
Reliability values according to EN ISO 13849-1				
Category	4			
Performance Level	PL e			
PFH_d	4.5×10^{-9} / h			
Mission time	20			years

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11.1.1. Typical system times

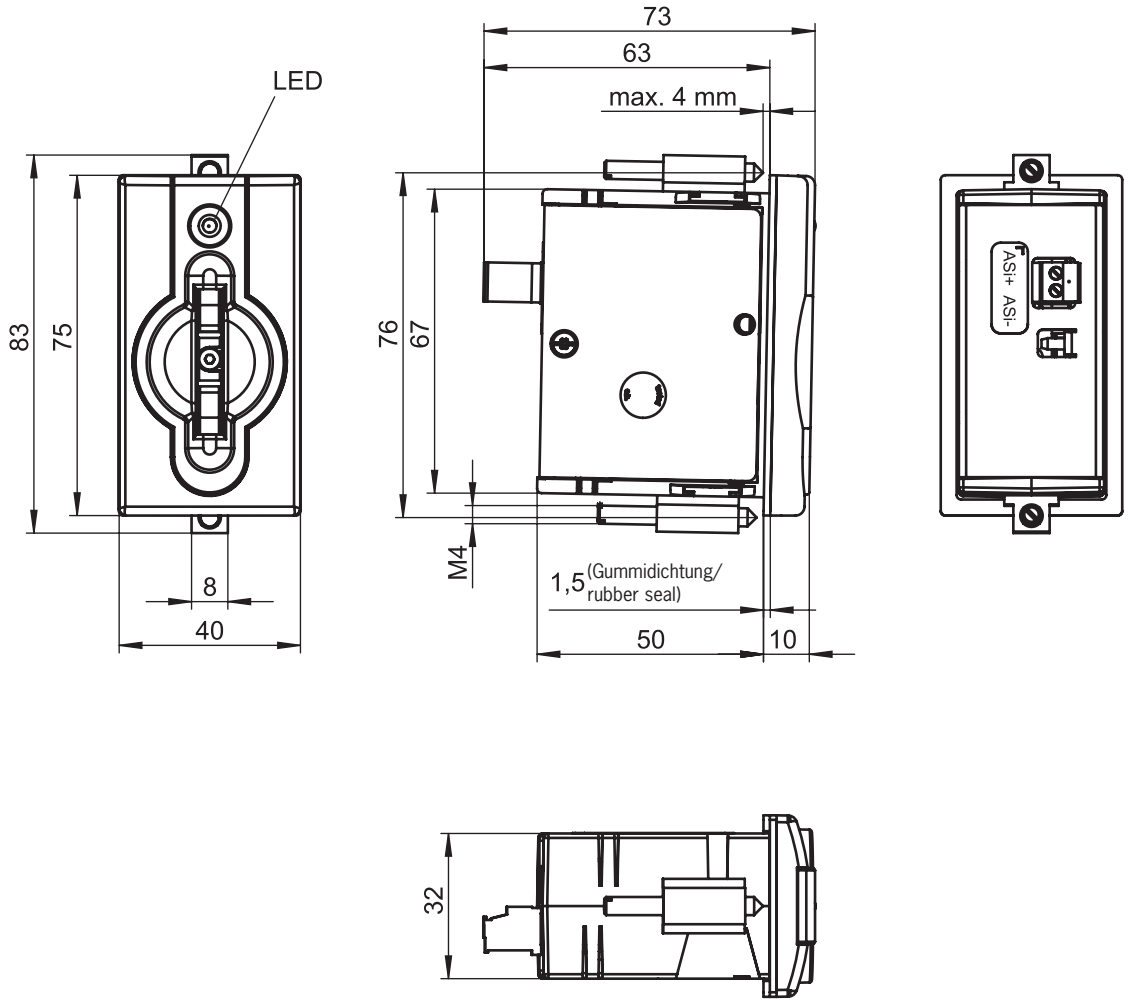
Please refer to the technical data for the exact values.

Ready delay: After switching on, the unit carries out a self-test. The system is ready for operation only after this time.

Risk time according to EN 60947-5-3: If a key moves outside the operating distance, the zero sequence is sent via the AS-Interface bus.

Switch-on time: The max. reaction time t_{on} is the time from the moment when the key is in the operating distance to sending the code sequence.

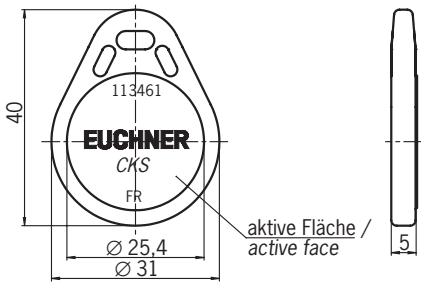
11.1.2. Dimension drawing of key adapter CKS-K-AS2A-U-C20-PC



11.2. Technical data, key CKS-A-BK1-RD-113461

Parameter	Value min.	Value typ.	Value max.	Unit
Housing material		Plastic PC		
Dimensions		42 x 25 x 18		mm
Weight		0.004		kg
Ambient temperature	- 20	-	+ 70	°C
Degree of protection		IP67		
Power supply		Inductive via key adapter		

11.2.1. Dimension drawing



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12. Inspection and service

⚠	**WARNING** Loss of the safety function because of damage to the system. ‣ In case of damage, the entire device must be replaced. ‣ Only accessories or spare parts that can be ordered from EUCHNER may be replaced.

Regular inspection of the following is necessary to ensure trouble-free long-term operation:
- ‣ Check the switching function (see chapter *9.3. Functional check on page 11*)
- ‣ Check the secure fastening of the devices and the connections
- ‣ Check for soiling

No servicing is required. Repairs to the device are only allowed to be made by the manufacturer.

ⓘ	**NOTICE** The year of manufacture can be seen in the lower right corner of the rating plate. The current version number in the format (VX.X.X) can also be found on the device.

13. Service

If service support is required, please contact:

EUCHNER GmbH + Co. KG

Kohlhammerstraße 16

D-70771 Leinfelden-Echterdingen

Service telephone:

+49 711 7597-500

E-mail:

support@euchner.de

Internet:

www.euchner.de

14. Declaration of conformity

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EUCHNER GmbH + Co. KG
Kohlhammerstraße 16
70771 Leinfelden-Echterdingen
Germany

EG-Konformitätserklärung
EC-Declaration of Conformity
CE-Déclaration de Conformité
CE-Dichiarazione di conformità
CE-Declaración de Conformidad

Original DE
Translation EN
Traduction FR
Traduzione IT
Traducción ES

077154-30-04/15

Die nachfolgend aufgeführten Produkte sind konform mit den Anforderungen der folgenden Richtlinien (falls zutreffend):
The beneath listed products are in conformity with the requirements of the following directives (if applicable):
Les produits mentionnés ci-dessous sont conformes aux exigences imposées par les directives suivantes (si valable)
I prodotti sotto elencati sono conformi alle direttive sotto riportate (dove applicabili):
Los productos listados a continuación son conforme a los requisitos de las siguientes directivas (si fueran aplicables):

I:	2006/42/EG	Maschinenrichtlinie
	2006/42/EC	*Machinery directive*
	2006/42/CE	*Directive Machines*
	2006/42/CE	*Direttiva Macchine*
	2006/42/CE	*Directiva de máquinas*
II:	2004/108/EG	EMV Richtlinie
	2004/108/EC	*EMC Directive*
	2004/108/CE	*Directive de Compatibilité électromagnétique*
	2004/108/CE	*Direttiva EMV*
	2004/108/CE	*Directiva CEM*

Die Schutzziele der Niederspannungsrichtlinie wurden gemäß Anhang I, Nr. 1.5.1 der Maschinenrichtlinie eingehalten.
The safety objectives of the Low-Voltage Directive comply with Annex I, No. 1.5.1 of the Machinery Directive.
Les objectifs de sécurité de la Directive Basse Tension sont conformes à l'annexe I, No. 1.5.1 de la Directive Machines
Gli obiettivi di sicurezza della Direttiva Bassa Tensione sono conformi a quanto riportato all'allegato I, No. 1.5.1 della Direttiva Macchine.
Los objetivos de seguridad de la Directiva de Bajo Voltaje cumplen con el Anexo I, No. 1.5.1 de la Directiva de Máquinas

Folgende Normen sind angewandt:	a:	EN 60947-5-3:1999 + A1:2005
Following standards are used:	b:	EN 1088: 1995+A2:2008 till 2015-04-30 / EN ISO 14119:2013 from 2015-05-01
Les normes suivantes sont appliquées:	c:	EN 62026-2:2013 (ASi)
Vengono applicate le seguenti norme:	d:	EN ISO 13849-1:2008
Se utilizan los siguientes estándares:	e:	EN ISO 13849-2:2012
	f:	EN 60947-5-2:2007
	g:	EN 61326-3-1: 2008
	h:	EN 61131-6: 2012

13.04.2015 - NG - AL - Blatt/*Sheet/ Page/Pagina/ Página* 1
EUCHNER GmbH + Co. KG Kohlhammerstraße 16 70771 Leinfelden-Echterdingen Tel. +49/711/7597-0 Fax +49/711/753316 www.euchner.de info@euchner.de

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Bezeichnung der Sicherheitsbauteile *Description of safety components* *Description des composants sécurité* *Descrizione dei componenti di sicurezza* *Descripción de componentes de seguridad*	**Type** *Type* *Type* *Tipo* *Typo*	**Richtlinie** *Directives* *Directive* *Direttiva* *Directivas*	**Normen** *Standards* *Normes* *Norme* *Estándares*	**Zertifikats-Nr.** *No. of certificate* *Numéro du certificat* *Numero del certificato* *Número del certificado*	
Auswertegerät *Safety Unit* *Analyseur* *Centralina* *Unidad de evaluación*	CES-A-ABA-01 CES-A-UBA-01 CES-A-ABA-01B CES-A-UBA-01B	I, II	a, b, d, e	ET 10126	(1)
	CES-A-AEA-02B CES-A-AEA-04B CES-A-UEA-02B CES-A-UEA-04B	I, II	a, b, d, e	ET 10124	(1)
	CES-AZ-ABS-01B CES-AZ-UBS-01B	I, II	a, b, d, e	ET 10126	(1)
	CES-AZ-AES-01B CES-AZ-AES-02B CES-AZ-AES-04B CES-AZ-UES-01B CES-AZ-UES-02B CES-AZ-UES-04B	I, II	a, b, d, e	ET 10147	(1)
	CES-CB-AC-C-A1	I, II	a, b, d, e, g, h	01/205/5375.00/14	(2)
Lesekopf *Read head* *Tête de lecture* *Testina di lettura* *Cabeza lectora*	CES-A-LMN-SC CES-A-LNA-SC CES-A-LNA-xxx CES-A-LCA-xxx CES-A-LQA-SC CES-A-LNN-SC CES-A-LNN-..V-...	I, II	a, b, d, e	ET 10126 ET 10124 ET 10147	(1)
	CES-A-LSP-SB CES-A-LSP-..V-...	I, II	a, b, d, e	ET 10147	(1)
	CEM-A-LE05K-S2 CEM-A-LE05R-S2 CEM-A-LH10K-S3 CEM-A-LH10R-S3 CEM-A-LE05K-S1-10V CEM-A-LH10K-S2-10V	I, II	a, b, d, e	ET 10126 ET 10124 ET 10147	(1)
	CET.-AX-L...	I, II	a, b, d, e	ET 13050	(1)
Betätiger *Actuator* *Actionneur* *Azionatore* *Actuador*	CES-A-BBA CES-A-BCA CES-A-BDA CES-A-BMB CES-A-BQA	I, II	a, b, d, e	ET 10126 ET 10124 ET 10147	(1)
	CES-A-BSP CES-A-BBN	I, I	a, b, d, e	ET 10147	(1)
	CEM-A-BE05 CEM-A-BH10	I, II	a, b, d, e	ET 10126 ET 10124 ET 10147	(1)
	CET-A-BWK-50X	I, II	a, b, d, e	ET 13050	(1)

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More than safety.

Bezeichnung der Sicherheitsbauteile *Description of safety components* *Description des composants sécurité* *Descrizione dei componenti di sicurezza* *Descripción de componentes de seguridad*	**Type** *Type* *Type* *Tipo* *Typo*	**Richtlinie** *Directives* *Directive* *Direttiva* *Directivas*	**Normen** *Standards* *Normes* *Norma* *Estándares*	**Zertifikats-Nr.** *No. of certificate* *Numéro du certificat* *Numero del certificato* *Número del certificado*
Auswertegerät *Safety Unit* *Analyseur*	CES-A-F1B-01B-AS1 CES-A-V1B-01B-AS1	I, II	a, b, c, d, e	Euchner QS PB 62/2005 TÜV 4478008554376-006
Tête de lecture *Testina di lettura* *Cabeza lectora*	CEM-A-ME05K-S1 CEM-A-LE05H-S2 CEM-RIBI…	I, II	a, b, d, e	Euchner QS PB 22/2005 Euchner QS PB 132/2010 Euchner QS PB 126/2013
	CET1-AX-L… CET2-AX-L…	I, II	a, b, d, e	Euchner QS PB 17/2008 Euchner QS PB 23/2008 Euchner QS PB 116/2009 Euchner QS PB 115/2009
Betätiger *Actuator* *Actionneur* *Azionatore* *Actuador*	CES-A-BLN…	I, II	a, b, d, e	Euchner QS PB 45/2008
Zubehör *Accessory* *Accessoire* *Accessorio* *Accesorio*	PM-SCL-096945	II	f	Euchner QS PB 14 /2006
Schlüsselaufnahme *Key Adapter* *Serrure* *Sedi per la chiave* *Módulo adaptador*	CKS-A-L1B-SC	I, II	a, d, e	UQS 114539 (2)
	CKS-K-AS2A-U-C20-PC	I, II	a, c, d, e	UQS 123720 (2)
Schlüssel *Key* *Clé* *Chiave* *llave*	CKS-A-BK1-RD	I, II	a, d, e	UQS 114539 (2)

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Sede indicata
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