

1 **UK-TYPE EXAMINATION CERTIFICATE**

2 **Safety Device, Controlling Device or Regulating Device intended for use outside a potentially
explosive atmosphere but required for or contributing to the safe functioning of Product and
Protective Systems with respect to the risks of explosion
UKSI 2016:1107 (as amended by UKSI 2019:696) – Schedule 3A, Part 1**

3 UK-Type Examination Certificate Number: **BAS21UKEX0011X**

4 Product: **Type KCD2-SR-Ex*.* Switch Amplifier**

5 Manufacturer: **Pepperl+Fuchs SE**

6 Address: **Lilienthalstrasse 200, 68307 Mannheim, Germany**

7 This product and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

8 SGS Baseefa, Approved Body number 1180, in accordance with Regulation 43 of the Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres Regulations 2016, UKSI 2016:1107 (as amended by UKSI 2019:696), certifies that this product has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of products intended for use in potentially explosive atmospheres given in Schedule 1 of the Regulations.

The examination and test results are recorded in confidential Report No. **GB/BAS/ExTR21.0032/00**

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

EN IEC 60079-0:2018 + AC2020 EN 60079-7:2015 + A1:2018 EN 60079-11:2012 EN IEC 60079-15:2019

except in respect of those requirements listed at item 18 of the Schedule.

10 If the sign “X” is placed after the certificate number, it indicates that the product is subject to the Specific Conditions of Use specified in the schedule to this certificate.

11 This UK-TYPE EXAMINATION CERTIFICATE relates only to the design and construction of the specified product. Further requirements of the Regulations apply to the manufacturing process and supply of this product. These are not covered by this certificate.

12 The marking of the product shall include the following:

See Schedule

SGS Baseefa Customer Reference No. **0808**

Project File No. **20/0416**

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R S SINCLAIR
TECHNICAL MANAGER

On behalf of SGS Baseefa Limited

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Schedule

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Certificate Number BAS21UKEX0011X

15 Description of Product

The Type KCD2-SR-Ex*.* Switch Amplifier is designed as associated apparatus and can be installed in the non-hazardous area or in a Zone 2 hazardous area. The Switch Amplifiers transfer digital signals from the hazardous area to unspecified apparatus located in the non-hazardous area or Zone 2 hazardous area. The voltage and current passed further to the hazardous area are limited to intrinsically safe levels and have linear characteristics. Up to two hazardous area channels fitted are galvanically isolated from the non-hazardous area (Zone 2) circuit using transformers.

The Type KCD2-SR-Ex*.* Switch Amplifier comprise a number of electronic components, including isolating transformers, fuses, zener diodes and resistors all mounted on a single printed circuit board and housed in a plastic enclosure with polarised plug-in screw or spring (denoted with an “.SP” suffix) terminals for hazardous and non-hazardous area connections. The non-hazardous area connections are via relay contacts with configuration switches allowing the setting of the direction of operation and lead monitoring. LED indication is provided for power-on and channel status.

There are three models of the Type KCD2-SR-Ex*.* Switch Amplifier:

- Type KCD2-SR-Ex2(.SP) Two Channel Switch Amplifier,
- Type KCD2-SR-Ex1(.SP) Single Channel Amplifier and
- Type KCD2-SR-Ex1.LB(.SP) Single Channel Switch Amplifier.

The Types KCD2-SR-Ex1(.SP) & KCD2-SR-Ex1.LB(.SP) are depopulated versions of the Type KCD2-SR-Ex2(.SP) with only one hazardous area channel. The type code of KCD2-SR-Ex*.* Switch Amplifier may be followed by additional alphanumeric signs (e.g. –Y1) to indicate special version. This does not affect the type of protection.

The Type KCD2-SR-Ex*.* Switch Amplifier is marked as follows:

⊕ II 3 (1) G	Ex ec nC [ia Ga] IIC T4 Gc	(-40°C ≤ Ta ≤ +70°C)
⊕ II (1) D	[Ex ia Da] IIIC	(-40°C ≤ Ta ≤ +70°C)
⊕ I (M1)	[Ex ia Ma] I	(-40°C ≤ Ta ≤ +70°C)

Input/Output Parameters

Non-Hazardous Area (Zone 2) Terminals 9 & 10 and Power Rail Connections PR1 & PR2

$U_m = 253V$ r.m.s.

The circuit connected to non-hazardous area (Zone 2) terminals 9 & 10 or Power Rail Connections PR1 & PR2 is designed to operate from a d.c. supply voltage of 19-30V.

Non-Hazardous Area (Zone 2) Terminals 5 & 6 and 7 & 8

$U_m = 253V$ r.m.s.

For installation in non-hazardous area:

Non-hazardous area terminals 5 & 6 (Channel 1) and 7 & 8 (Channel 2) are connected to relay contacts which can switch up to 253V r.m.s & 2A r.m.s, 126.5V r.m.s. & 4A r.m.s. or 30Vdc & 2A dc.

For installation in a Zone 2 hazardous area:

Non-hazardous area terminals 5 & 6 (Channel 1) and 7 & 8 (Channel 2) are connected to relay contacts which can switch up to 50V r.m.s & 2A r.m.s, or 30Vdc & 2A dc.

Power Rail Connections PR4 (Fault Bus)

$U_m = 40V$ d.c.

The circuit connected to Power Rail Connection PR4 is designed to operate from a d.c. supply voltage up to 30V.

Hazardous Area Terminals 1 w.r.t. 2 (Channel 1) or
Hazardous Area Terminals 3 w.r.t. 4 (Channel 2 – KCD2-SR-Ex2 model only)

$$\begin{aligned} U_o &= 10.5V \\ I_o &= 13mA^* \\ P_o &= 34mW^* \\ C_i &= 0 \\ L_i &= 0 \end{aligned}$$

* Note:

I_o and P_o are changed to lower values with this issue.

KCD2-SR-Ex2*: The intrinsically safe input circuits are not galvanically isolated from each other. The non-intrinsically safe circuits are galvanically isolated from the intrinsically safe circuits.

The capacitance and either the inductance or inductance to resistance ratio (L/R) of the load connected to output terminals of either channel must not exceed the following values:

GROUP	CAPACITANCE (μF)	INDUCTANCE (mH)	OR	L/R RATIO ($\mu H/ohm$)
IIC	2.41	210		1000
IIB/IIIC	16.8	840		4100
IIA	75	1,000		8200
I	95	1,000		13600

The above parameters apply when one of the two conditions below is given:

- the total L_i of the external circuit (excluding the cable) is < 1% of the L_o value or
- the total C_i of the external circuit (excluding the cable) is < 1% of the C_o value.

The above parameters are reduced to 50% when both of the two conditions below are given:

- the total L_i of the external circuit (excluding the cable) $\geq 1\%$ of the L_o value and
- the total C_i of the external circuit (excluding the cable) $\geq 1\%$ of the C_o value.

Note: the reduced capacitance of the external circuit (including cable) shall not be greater than 1 μF for Groups I, IIA & IIB/IIIC and 600nF for Group IIC.

Hazardous Area Terminals 1 & 3 w.r.t. 2 & 4 (Channel 1 and Channel 2)

$$\begin{aligned} U_o &= 10.5V \\ I_o &= 26mA \\ P_o &= 68mW \\ C_i &= 0 \\ L_i &= 0 \end{aligned}$$

The capacitance and either the inductance or inductance to resistance ratio (L/R) of the load connected to output terminals of either channel must not exceed the following values:

GROUP	CAPACITANCE (μF)	INDUCTANCE (mH)	OR	L/R RATIO ($\mu H/ohm$)
IIC	2.41	52		500
IIB/IIIC	16.8	210		2050
IIA	75	420		4100
I	95	500		6800

The above parameters apply when one of the two conditions below is given:

- the total L_i of the external circuit (excluding the cable) is < 1% of the L_o value or
- the total C_i of the external circuit (excluding the cable) is < 1% of the C_o value.

The above parameters are reduced to 50% when both of the two conditions below are given:

- the total L_i of the external circuit (excluding the cable) $\geq 1\%$ of the L_o value and
- the total C_i of the external circuit (excluding the cable) $\geq 1\%$ of the C_o value.

Note: the reduced capacitance of the external circuit (including cable) shall not be greater than $1\mu\text{F}$ for Groups I, IIA & IIB/IIIC and 600nF for Group IIC.

16 Report Number

GB/BAS/ExTR21.0032/00

17 Specific Conditions of Use

For installation in non-hazardous area:

The device must be installed and operated only in an environment of overvoltage category II (or better) according to IEC/EN 60664-1.

The device must be installed and operated only in a controlled environment that ensures a pollution degree 2 (or better) according to IEC/EN 60664-1.

For installation in zone 2 hazardous area:

The device must be installed and operated only in an environment of overvoltage category II (or better) according to IEC/EN 60664-1.

The device must be installed and operated only in a controlled environment that ensures a pollution degree 2 (or better) according to IEC/EN 60664-1.

The device must be installed and operated only in surrounding enclosures that:

- comply with the requirements for surrounding enclosures according to IEC/EN 60079-0,
- are rated with the degree of protection IP54 according to IEC/EN 60529

Connection or disconnection of energized non-intrinsically safe circuits is only permitted in the absence of a potentially explosive atmosphere.

Only use the DIP-switches when a potentially explosive atmosphere is not present.

18 Essential Health and Safety Requirements

In addition to the Essential Health and Safety Requirements (EHSRs) covered by the standards listed at item 9, the following are considered relevant to this product, and conformity is demonstrated in the report:

Clause	Subject	Compliance
1.2.7	LVD type requirements	Manufacturer responsibility
1.2.8	Overloading of equipment (protection relays, etc.)	User/Installer responsibility
1.4.1	External effects	User/Installer responsibility
1.4.2	Aggressive substances, etc.	User/Installer responsibility

19 Drawings and Documents

Number	Sheet	Issue	Date	Description
16-0533BS C	1 of 1	C	2021-Feb-03	Summary – KCD2-SR-Ex*
16-0533BS-00C	1 – 38	C	2020-Dec-18	Description – KCD2-SR-Ex*
16-0533BS-01C	1 & 2	C	2020-Jun-03	Schematic – KCD2-SR-(Ex)1(-)(Ex)2)(.LB)
16-0533BS-02C	1 & 2	C	2020-Dec-18	Bill of Materials – KCD2-SR-Ex*
16-0533BS-03C	1 of 1	C	2020-Jun-03	Assembly Drawing - KCD2-SR-((Ex)(1)(-)(Ex)2)(.LB)(-*)
16-0533BS-05C	1 – 4	C	2020-Jun-03	PCB Layout – KCD2-SR-((Ex)(1)(-)(Ex)2)(.LB)(-*)
16-0533BS-06C	1 – 3	C	2020-Jun-03	Transformer – KCD2-SR-Ex*
16-0533BS-09C	1 & 2	C	2020-Dec-18	Instructions – KCD2-SR-Ex*
16-0533BS-10C	1 of 1	C	2021-Feb-03	Type Label – KCD2-SR-Ex*

Number	Sheet	Issue	Date	Description
16-0533UL-04C	1 & 2	C	2020-Jun-03	Housing – KCD2-SR-Ex*

All drawings are common to Baseefa06ATEX0092X and held with IECEx BAS 06.0025X.