1 # EU - 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 Equipment and Protective Systems with respect to the risks of explosion**
Directive 2014/34/EU

3 EU - Type Examination Certificate Number: **BAS99ATEX7060X – Issue 20**

3.1 In accordance with Article 41 of Directive 2014/34/EU, EC-Type Examination Certificates referring to 94/9/EC that were in existence prior to the date of application of 2014/34/EU (20 April 2016) may be referenced as if they were issued in accordance with Directive 2014/34/EU. Supplementary Certificates to such EC-Type Examination Certificates, and new issues of such certificates, may continue to bear the original certificate number issued prior to 20 April 2016.

4 Product: **Smart Transmitter Isolator Type K*D2-STC(V)4-Ex1(.2O)(.P)**

5 Manufacturer: **Pepperl + Fuchs GmbH**

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

7 This re-issued certificate extends EC Type Examination Certificate No. BAS99ATEX7060 to apply to product designed and constructed in accordance with the specification set out in the Schedule of the said certificate but having any variations specified in the Schedule attached to this certificate and the documents therein referred to.

8 The original certificate was issued by The Electrical Equipment Certification Service, Notified Body Number 0600, which retains responsibility for its original documentation. SGS Baseefa, Notified Body Number 1180, in accordance with Article 17 of Directive 2014/34/EU of the European Parliament and of the Council, dated 26 February 2014, is responsible only for the additional work relating to this re-issued certificate and any other supplementary certificate it has issued.

The examination and test results are recorded in confidential Report No. See Certificate History

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

EN 60079-0:2012+A11:2013 **EN 60079-11:2012**

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 EU - TYPE EXAMINATION CERTIFICATE relates only to the design and construction of the specified product. Further requirements of the Directive 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 :

⟨Ex⟩ **II (1) G [Ex ia Ga] IIC (-20°C ≤ Ta ≤ +60°C)**

⟨Ex⟩ **II (1) D [Ex ia Da] IIIC (-20°C ≤ Ta ≤ +60°C)**

⟨Ex⟩ **I (M1) [Ex ia Ma] I (-20°C ≤ Ta ≤ +60°C)**

SGS Baseefa Customer Reference No. **0808** Project File No. **15/0954**

SGS Baseefa Limited
Rockhead Business Park, Staden Lane,
Buxton, Derbyshire SK17 9RZ
Telephone +44 (0) 1298 766600 Fax +44 (0) 1298 766601
e-mail baseefa@sgs.com web site www.sgs.co.uk/baseefa
Registered in England No. 4305578.
Registered address: Rossmore Business Park, Ellesmere Port, Cheshire, CH65 3EN

R S SINCLAIR
TECHNICAL MANAGER
On behalf of SGS Baseefa Limited

13 **Schedule**

14 **Certificate Number BAS99ATEX7060X – Issue 20**

15 **Description of Product**

The KFD2-STC(V)4-Ex1(.2O)... Smart Transmitter Isolator is designed to provide galvanic isolation between intrinsically safe circuits in a hazardous area and unspecified associated equipment in a non-hazardous area and limit the voltage and current into the hazardous area to intrinsically safe levels.

The device comprises a number of electrical components, including transformers, fuses, resistors and zener diodes, all mounted on a single printed circuit board and housed within a plastic enclosure fitted with terminals for external connections.

The use of 'C' or 'V' in the type description specifies Current source / sink or Voltage respectively.

Options following 'Ex1' in the type description are:

.2O	(Dual non-hazardous area output)
-Y...	(Current sink - used with 'C')
-1	(5 Volt - used with 'V')
-2	(10 Volt - used with 'V')

The device is designed to operate from a d.c. supply of up to 35V on terminals 7 to 12, 14 and 15, and power rail connector terminals 1 and 2. The segregation of the hazardous area circuits meets the requirements for 250V.

FOR VARIANTS TYPE KFD2-STC(V)4-Ex1. AND TYPE KFD2-STC(V)4-Ex1.2O

For terminals 7 to 12, 14 and 15, and power rail terminals 1 & 2:-

U_m = 250V

For Terminals 1 and 3:-

U_o = 25.4V I_o = 86.8mA P_o = 551mW C_i = 12nF L_i = 0

The capacitance and either the inductance or the inductance to resistance ratio (L/R) of the hazardous area load must not exceed the following values:

GROUP	CAPACITANCE in µF	INDUCTANCE in mH	OR L/R RATIO in µH/ Ω
IIC	0.093	4.6	62.5
IIB	0.798	18	243
IIA	2.808	36	486
I	4.3	29	833

For Terminals 3 and 2 (& 5):-

U_o = 3.5V I_o = 74mA P_o = 64mW U_i = 30V I_i = 115mA C_i = 0 L_i = 0

The capacitance and either the inductance or the inductance to resistance ratio (L/R) of the hazardous area load must not exceed the following values:

GROUP	CAPACITANCE in µF	INDUCTANCE in mH	OR	L/R RATIO in µH/ Ω
IIC	100	6.4		532
IIB	100	25		532
IIA	100	50		532
I	1000	42		7207

For Terminals 1, 2 (& 5) and 3:-

U_o = 25.4V I_o = 115mA P_o = 0.584W C_i = 12nF L_i = 0

The capacitance and either the inductance or the inductance to resistance ratio (L/R) of the hazardous area load must not exceed the following values:

GROUP	CAPACITANCE in µF	INDUCTANCE in mH	OR	L/R RATIO in µH/ Ω
IIC	0.093	2.7		62.5
IIB	0.798	11		243
IIA	2.808	22		486
I	4.3	17		639

For Terminals 6 and 5 (& 2):-

U_o = 8.7V I_o = 0 C_o = 5.9µF U_i = 30V I_i = 115mA C_i = 0 L_i = 0

The actual output voltage is 6.51V; the Applicant requested it to be shown as 8.7V.

FOR VARIANTS TYPE KFD2-STC4-EX1.H AND TYPE KFD2-STC4-EX1.2O.H

For terminals 7 to 12, 14 and 15, and power rail terminals 1 & 2:-

U_m = 250V

For Terminals 1 and 3:-

U_o = 27.2V I_o = 93mA P_o = 0.632W C_i = 12nF L_i = 0

The capacitance and either the inductance or the inductance to resistance ratio (L/R) of the hazardous area load must not exceed the following values:

GROUP	CAPACITANCE in µF	INDUCTANCE in mH	OR	L/R RATIO in µH/ Ω
IIC	0.077	4.2		57.7
IIB	0.678	17.7		216
IIA	2.288	36.0		456
I	4.0	51.9		687

For Terminals 3 and 2 (& 5):-

U_o = 3.5V I_o = 73mA P_o = 64mW U_i = 30V I_i = 117mA C_i = 0 L_i = 0

The capacitance and either the inductance or the inductance to resistance ratio (L/R) of the hazardous area load must not exceed the following values:

GROUP	CAPACITANCE in µF	INDUCTANCE in mH	OR	L/R RATIO in µH/ Ω
IIC	100	6.4		532
IIB	100	25		532
IIA	100	50		532
I	1000	42		7207

For Terminals 1, 2 (& 5) and 3:-

U_o = 27.2V I_o = 117mA P_o = 0.639W C_i = 12nF L_i = 0

The capacitance and either the inductance or the inductance to resistance ratio (L/R) of the hazardous area load must not exceed the following values:

GROUP	CAPACITANCE in µF	INDUCTANCE in mH	OR	L/R RATIO in µH/ Ω
IIC	0.077	2.2		34.1
IIB	0.678	10		136
IIA	2.288	20		272
I	4.0	30		409

For Terminals 6 and 5 (& 2):-

U_o = 8.7V I_o = 0 C_o = 5.9µF U_i = 30V I_i = 117mA C_i = 0 L_i = 0

The actual output voltage is 6.51V; the Applicant requested it to be shown as 8.7V.

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) ≥1% of the L_o value and
- the total C_i of the external circuit (excluding the cable) ≥1% of the C_o value.

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

16 Report Number

GB/BAS/ExTR16.0291/00

17 Specific Conditions of Use

1. The safety device must be installed in a controlled environment with suitably reduced pollution.

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:

Clause	Subject
1.2.7	LVD type requirements
1.2.8	Overloading of equipment (protection relays, etc.)
1.4.1	External effects

Clause	Subject
1.4.2	Aggressive substances, etc.

19 Drawings and Documents

New drawings submitted for this issue of certificate:

Number	Sheet	Issue	Date	Description
266-014BS-V	1 of 1	V	2016-Sep-15	Summary
266-014BS-01V	1 – 4	V	2015-Dec-10	Schematic
266-014BS-02V	1 – 2	V	2016-Sep-15	Components
266-014BS-03V	1 & 2	V	2016-Mar-23	Assembly
266-010BS-04F	1 – 15	F	2016-Mar-23	Mechanical Parts
266-014BS-05V	1 – 6	V	2016-Mar-23	Main Printed Circuit Board
266-014BS-06V	1 – 6	V	2016-Sep-15	Transformer Details for T101 & T201
266-014BS-10V	1 – 3	V	2015-Dec-10	Type Label

Current drawings which remain unaffected by this issue:

None. The above drawings replace previous drawings.

All drawings are common to, and held with, IECEx BAS 04.0016X.

20 Certificate History

Certificate No.	Date	Comments
BAS99ATEX7060	9 July 1999	The release of the prime certificate. The associated test and assessment is documented in Test Report 99(C)0087.
BAS99ATEX7060/1	18 August 1999	Minor electrical and mechanical changes.
BAS99ATEX7060/2	18 August 1999	Minor electrical and mechanical changes.
BAS99ATEX7060/3	20 June 2000	Addition of D in the apparatus marking ⟨Ex⟩II (1)GD.
BAS99ATEX7060/4	25 September 2000	Minor changes to non-critical components and non-critical areas of the PCB.
BAS99ATEX7060/5	14 February 2001	Minor changes to the PCB and an alternative toroidal core.
BAS99ATEX7060/6	12 December 2001	Alternative output CLR and change to output parameters. Addition of hazardous area terminals 5 & 6.
BAS99ATEX7060/7	1 August 2002	Minor drawing changes and alternative specified components.
BAS99ATEX7060/8	14 October 2002	Minor change to the zener diode selection range.
BAS99ATEX7060/9	5 March 2003	Minor change to circuit and PCB.
BAS99ATEX7060/10	9 December 2003	Alternative transformer design.
BAS99ATEX7060/11	26 February 2004	Changes to circuitry and component designations. The associated assessment is documented in Test Report 04(C)0079.
BAS99ATEX7060/12	8 June 2004	Minor electrical and mechanical changes.
BAS99ATEX7060/13	18 November 2005	Changes to PCB layout.

Certificate No.	Date	Comments
BAS99ATEX7060/14	4 September 2006	Introduction of variants KFD2-STC4-Ex1.H and KFD2-STC4-Ex1.2O.H. The associated assessment is documented in Test Report 06(C)0430.
BAS99ATEX7060/15	4 September 2007	Clarification of load parameters.
BAS99ATEX7060/16	15 January 2009	Confirmation that the current design meets the requirements of EN 60079-0:2006 and EN 60079-11:2007 for [Ex ia]IIC and has additionally been assessed for compliance with the requirements of Associated Apparatus to EN 61241-11: 2005 i.e. the addition of [Ex iaD].
BAS99ATEX7060 Issue 17	25 January 2011	This issue incorporates previously issued primary and supplementary certificates into one certificate and permits minor drawing changes.
BAS99ATEX7060 Issue 18	31 October 2014	To permit changes to the transformer and to confirm that the equipment covered by this certificate has been reviewed against the requirements of EN 60079-0:2012 and EN 60079-11:2012 in respect of the differences from EN 60079-0:2006 and EN 60079-11:2007 and that none of these differences, with the exception of marking, affect this equipment. The equipment is now marked: **⟨Ex⟩ II (1)G [Ex ia Ga] IIC** **⟨Ex⟩ II (1)D [Ex ia Da] IIIC** Test Report No. GB/BAS/ExTR14.0292/00 Project File No. 14/0400.
BAS99ATEX7060 Issue 19	16 October 2015	To permit the use of alternative fuses and to confirm that the equipment covered by this certificate has been reviewed against the requirements of EN 60079-0:2012+A11:2013 in respect of the differences from EN 60079-0:2012 and that none of the difference affected this equipment. Test Report No. GB/BAS/ExTR15.0306/00. Project File No. 15/0759.
BAS99ATEX7060X Issue 20	15 November 2016	To permit the use of an alternative circuit and PCB layout, replacing the original design; a specific condition of use has been added to refer to the requirement for installation in an environment with suitably reduced pollution levels. Test Report No. GB/BAS/ExTR16.0291/00. Project File No. 15/0954.
For drawings applicable to each issue, see original of that issue.		