Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

(1) # EC-TYPE-EXAMINATION CERTIFICATE

(Translation)

(2) Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres - **Directive 94/9/EC**

(3) EC-type-examination Certificate Number:

PTB 00 ATEX 2080

(4) Equipment: Isolation Switching Amplifier type K*D*-SR*-Ex*.W.*

(5) Manufacturer: Pepperl + Fuchs GmbH

(6) Address: Königsberger Allee 87, D-68307 Mannheim

(7) This equipment and any acceptable variation thereto are specified in the schedule to this certificate and the documents therein referred to.

(8) The Physikalisch-Technische Bundesanstalt, notified body No. 0102 in accordance with Article 9 of the Council Directive 94/9/EC of 23 March 1994, certifies that this equipment 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 PTB Ex 00-20205.

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

EN 50014:1997 **EN 50020:1994**

(10) If the sign "X" is placed after the certificate number, it indicates that the equipment 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 and construction of the specified equipment in accordance with Directive 94/9/EC. Further requirements of this Directive apply to the manufacture and supply of this equipment.

(12) The marking of the equipment shall include the following:

II (1) G D [EEx ia] IIC

Zertifizierungsstelle Explosionsschutz
By order:

Braunschweig, July 20, 2000

In the absence of Dr.-Ing. U. Johannsmeyer
Regierungsdirektor

(13) # SCHEDULE

(14) ## EC-TYPE-EXAMINATION CERTIFICATE PTB 00 ATEX 2080

(15) Description of equipment

The isolation switching amplifier type K*D*-SR*-Ex*.W.* is used for the transmission of control commands from the hazardous area into the non-hazardous area as well as for the safe electrical isolation of intrinsically safe and nonintrinsically safe circuits.

The maximum permissible ambient temperature is 60°C.

Electrical data

Supply circuit (terminals 14 and 15 resp. powerrail contacts): direct voltage 20...30 V DC
maximum voltage: U_m = 253 V AC
U_m = 125 V DC

Output circuits (terminals 7, 8, 9 resp. 10, 11, 12): alternating current
$U \leq 253$ V
$I \leq 2$ A
$S \leq 500$ VA
$\cos\varphi \geq 0.7$

direct current
$U \leq 40$ V
$I \leq 2$ A
$P \leq 80$ W

$U \leq 130$ V
$I \leq 20$ mA

maximum voltage: U_m = 253 V AC

Input circuits (terminals 1, 2, 3 resp. 4, 5, 6): type of protection Intrinsic Safety EEx ia IIA/IIB/IIC resp. EEx ib IIA/IIB/IIC
maximum values per circuit:
U_o = 10.5 V
I_o = 13 mA
P_o = 34 mW
R_i = 807.7 Ω
linear characteristic
$C_i \approx 0$
$L_i \approx 0$

type of protection	EEx ia resp. ib		
	IIA	IIB	IIC
maximum permissible external inductance L_O	1 H	840 mH	210 mH
maximum permissible external capacitance C_O	75 µF	16.8 µF	2.41 µF

In the presence of concentrated capacitances and/or inductances in the intrinsically safe input circuit, the maximum permissible external capacitances and inductances for circuits of category „ia" are to be taken from the following table.

type of protection	EEx ia	
	IIB	IIC
maximum permissible external inductance L_O	7 mH	3 mH
maximum permissible external capacitance C_O	2.1 µF	620 nF

When both intrinsically safe input circuits are interconnected, the following maximum values result:
U_o = 10.5 V
I_o = 26 mA
P_o = 68 mW
R_i = 403.9 Ω
linear characteristic
$C_i \approx$ 0
$L_i \approx$ 0

type of protection	EEx ia resp. ib		
	IIA	IIB	IIC
maximum permissible external inductance L_O	420 mH	210 mH	52 mH
maximum permissible external capacitance C_O	75 µF	16.8 µF	2.41 µF

In the presence of concentrated capacitances and/or inductances in the interconnnected intrinsically safe input circuits, the maximum permissible external capacitances and inductances for circuits of category „ia" are to be taken from the following table.

type of protection	EEx ia	
	IIB	IIC
maximum permissible external inductance L_O	7 mH	3 mH
maximum permissible external capacitance C_O	2.1 µF	590 nF

The intrinsically safe input circuits are safely electrically isolated from all other circuits up to a peak value of the nominal voltage of 375 V.

(16) Test report PTB Ex 00-20205

(17) Special conditions for safe use

None

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

SCHEDULE TO EC-TYPE-EXAMINATION CERTIFICATE PTB 00 ATEX 2080

(18) Essential health and safety requirements

met by standards

Zertifizierungsstelle Explosionsschutz
By order:

Braunschweig, July 20, 2000

In the absence of Dr.-Ing. U. Johannsmeyer
Regierungsdirektor

Physikalisch-Technische Bundesanstalt
Braunschweig and Berlin

(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

PTB 00 ATEX 2080

(4) Equipment: Transformer Isolated Switching Amplifier Type K*D*-SR*-Ex*.W.*

(5) Manufacturer: Pepperl + Fuchs GmbH

(6) Address: Königsberger Allee 87, D-68307 Mannheim

(7) The design of this electrical apparatus as well as the different permissible versions are specified in the annex to this type examination certificate.

(8) Physikalisch-Technische Bundesanstalt being notified body number 0102 in accordance with Article 9 of the Council Directive of the European Communities of 23 March 1994 (94/9/EC) confirms the compliance 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 results of the examination are recorded in the confidential test report PTB Ex 00-20205.

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

EN 50014:1997 **EN 50020:1994**

(10) If the sign "**X**" is placed after the certificate number, it indicates that the equipment 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 and construction of the specified equipment in accordance with the Directive 94/9/EC. Further requirements of this Directive apply to the manufacture and supply of this equipment.

(12) The marking of the equipment shall include the following details:

Ex **II (1) G D** **[EEx ia] IIC**

Certification Body Explosion Protection
on behalf of

(signature)

Dr-Ing U. Johannsmeyer, in absence
Senior Government Official

Braunschweig, 20 July 2000

(13) **SCHEDULE**

(14) **EC-Type Examination Certificate PTB 00 ATEX 2080**

(15) Description of the Equipment

The Transformer Isolated Switching Amplifier Type K*D*-SR*-Ex*.W.* is designed for the transmission of control commands from the hazardous area to the non-hazardous area and for the galvanic isolation of intrinsically safe and non intrinsically safe circuits.

The max. permissible ambient temperature is 60°C.

Electrical parameters

Supply circuit (terminals 14 and 15 alt. power rail contacts): DC 20 ...30 V DC
safety relevant maximum voltage: V_m = 253V AC
V_m = 125V DC

Output circuits (terminals 7, 8, 9 alt. 10, 11, 12):

AC	DC	
$V \leq 253V$	$V \leq 40V$	$V \leq 130V$
$I \leq 2A$	$I \leq 2A$	$I \leq 20mA$
$P_a \leq 500VA$	$P \leq 80W$	
$pf \geq 0.7$		

safety relevant maximum voltage: V_m = 253V AC

Input circuits (terminals 1, 2, 3 alt. 4, 5, 6): for ignition protection intrinsic safety EEx ia IIA/IIB/IIC
alt. EEx ib IIA/IIB/IIC
maximum values for each circuit:
V_o = 10.5 V
I_o = 13 mA
P_o = 34 mW
R_i = 807.7 Ω
linear characteristic
$C_i \approx 0$
$L_i \approx 0$

type of protection	EEx ia alt. ib		
	IIA	IIB	IIC
max. permissible ext. inductance L_o	1 H	840 mH	210 mH
max. permissible ext. capacitance C_o	75 µF	16.8 µF	2.41 µF

Schedule to EC-Type Examination Certificate PTB 00 ATEX 2080

In the presence of concentrated capacitance and/or inductance in the intrinsically safe input circuit the maximum permissible external capacitance and inductance for the circuits of category "ia" are to be taken from the following table.

type of protection	EEx ia	
	IIB	IIC
max. permissible ext. inductance L_o	7 mH	3 mH
max. permissible ext. capacitance C_o	2.1 µF	620 nF

When interconnecting both intrinsically safe input circuits the following maximum values apply:
V_o = 10.5 V
I_o = 26 mA
P_o = 68 mW
R_i = 403.9 Ω
linear characteristic
$C_i \approx 0$
$L_i \approx 0$

type of protection	EEx ia alt ib		
	IIA	IIB	IIC
max. permissible ext. inductance L_o	420 mH	210 mH	52 mH
max. permissible ext. capacitance C_o	75 µF	16.8 µF	2.41 µF

In the presence of concentrated capacitance and/or inductance in the interconnected intrinsically safe input circuits the maximum permissible external capacitance and inductance for the circuits of category "ia" are to be taken from the following table.

type of protection	EEx ia	
	IIB	IIC
max. permissible ext. inductance L_o	7 mH	3 mH
max. permissible ext. capacitance C_o	2.1 µF	590 nF

The intrinsically safe input circuits are electrically safely isolated against all other electrical circuits up to the peak value of the nominal voltage of 375V.

(16) Test Report PTB Ex 00-20205

(17) Special Conditions

none

Physikalisch-Technische Bundesanstalt
Braunschweig and Berlin

Schedule to EC-Type Examination Certificate PTB 00 ATEX 2080

(18) Essential Health and Safety Requirements

covered by standards

Certification Body Explosion Protection
on behalf of

(signature)

Dr-Ing U. Johannsmeyer, in absence
Senior Government Official

Braunschweig, 20 July 2000

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

1st SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 00 ATEX 2080

Test report: PTB Ex 01-21062

Zertifizierungsstelle Explosionsschutz
By order:

Braunschweig, 13 September 2001

Dr.-Ing. U. Johannsmeyer
Regierungsdirektor

Physikalisch-Technische Bundesanstalt • Bundesallee 100 • D-38116 Braunschweig

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

2. SUPPLEMENT

according to Directive 94/9/EC Annex III.6

to EC-TYPE-EXAMINATION CERTIFICATE PTB 00 ATEX 2080

(Translation)

Equipment: Isolation switching amplifier, type K*D*-SR*-Ex*.W.*

Marking: Ⓔx **II (1) G D [EEx ia] IIC**

Manufacturer: Pepperl + Fuchs GmbH

Address: Königsberger Allee 87
68307 Mannheim, Germany

Description of supplements and modifications

The isolation switching amplifier, type K*D*-SR*-Ex*.W.* has been technically revised. In the future it may also be manufactured and operated in accordance with the test documents listed in the test report PTB Ex 04-24230. The modifications concern the internal construction.

The "Electrical data" as well as all other specifications apply without changes also for this 2nd supplement.

Test report: PTB Ex 04-24230

Zertifizierungsstelle Explosionsschutz
By order:

Dr.-Ing. U. Johannsmeyer
Regierungsdirektor

Braunschweig, November 18, 2004

PHYSIKALISCH-TECHNISCHE BUNDESANSTALT 24

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

3. S U P P L E M E N T

according to Directive 94/9/EC Annex III.6

to EC-TYPE-EXAMINATION CERTIFICATE PTB 00 ATEX 2080

(Translation)

Equipment: Isolation switching amplifier, type K*D*-SR*-Ex*.W.*

Marking: **II (1) G D [EEx ia] IIC**

Manufacturer: Pepperl + Fuchs GmbH

Address: Königsberger Allee 87, 68307 Mannheim, Germany

Description of supplements and modifications

The isolation switching amplifier, type K*D*-SR*-Ex*.W.* has been technically revised. In the future it may also be manufactured and operated in accordance with the test documents listed in test report PTB Ex 11-28333.

The modifications concern the address of the manufacturer, the standards applied, the marking, the internal construction as well as the enclosure.

The "Electrical data" as well as all other specifications apply without changes.

The manufacturer´s address changes as follows:

Manufacturer: Pepperl + Fuchs GmbH

Address: Lilienthalstrasse 200, 68307 Mannheim, Germany

In the future the marking of the isolation switching amplifier, type K*D*-SR*-Ex*.W.* will read:

II (1) G [Ex ia] IIC or II (1) D [Ex ia] IIIC

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Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

3. SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 00 ATEX 2080

Applied standards

EN 60079-0:2009, EN 60079-11:2007, EN 61241-11:2006

Assessment and test report: PTB Ex 11-28333

Zertifizierungssektor Explosionsschutz
On behalf of PTB:

Braunschweig, May 27, 2011

(signature)

Dr.-Ing. U. Johannsmeyer
Direktor und Professor

2 pages, correct and complete as regards content.
By order:

Dr.-Ing. T. Horn

Braunschweig, August 20, 2012

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

4. SUPPLEMENT

according to Directive 94/9/EC Annex III.6

to EC-TYPE-EXAMINATION CERTIFICATE PTB 00 ATEX 2080

(Translation)

Equipment: Isolation and switching amplifier, type K*D*-SR*-Ex*.W.*

Marking: **II (1) G [Ex ia] IIC or II (1) D [Ex ia] IIIC**

Manufacturer: Pepperl+Fuchs GmbH

Address: Lilienthalstraße 200, 68307 Mannheim, Germany

Description of supplements and modifications

The isolation and switching amplifier of type KFD*-SR*-Ex*.W.* was technically revised. In the future it can also be manufactured and operated according to the test documents listed in test report PTB Ex 14-24080 .

The modifications concern the applied standards, the marking, the extension of the "electrical data" by values for explosion groups I and IIIC as well as the internal construction. Iisolation and switching amplifiers of type KHD*-SR*-Ex*.W.* (KH = terminal housing, high) are no longer produced.
All other specifications apply without changes.

The new marking reads:

II (1) G [Ex ia Ga] IIC or II (1) D [Ex ia Da] IIIC or I (M1) [Ex ia Ma] I

Electrical data

Supply circuit ..... (terminals 14 and 15 or Powerrail contacts PR 1 and PR2)	Direct voltage 20 ... 30 V DC Safety-related maximum voltage: or	 U_m = 253 V AC U_m = 125 V DC
Fehlermeldeausgang ..... (Powerrail contact PR 4)	Safety-related maximum voltage:	U_m = 40 V DC

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Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

4. SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 00 ATEX 2080

Output circuits..... alternating current direct current
(terminals 7, 8, 9 bzw. 10, 11, 12)

$U \leq 253$ V	$U \leq 126{,}5$ V	$U \leq 40$ V	$U \leq 130$ V
$I \leq 2$ A	$I \leq 4$ A	$I \leq 2$ A	$I \leq 20$ mA
$S \leq 500$ VA		$P \leq 80$ W	
$\cos\varphi \geq 0.7$			

Safety-related maximum voltage: $U_m = 253$ V AC

Input circuits ..... type of protection Intrinsic Safety Ex ia I/IIA/IIB/IIC/IIIC
(terminals 1, 2, 3 or 4, 5, 6) or Ex ib I/IIA/IIB/IIC/IIIC

Maximum values per circuit:
U_o = 10.5 V
I_o = 13 mA
P_o = 34 mW
R_i = 807.7 Ω
linear characteristic
$C_i \approx 0$
$L_i \approx 0$

Type of protection	Ex ia or ib			
	I	IIA	IIB/IIIC	IIC
L_o	1 H	1 H	840 mH	210 mH
C_o	95 µF	75 µF	16.8 µF	2.41 µF

With the existence of concentrated capacitances and/or inductances in the interconnected intrinsically safe input circuits, the maximum permissible external capacitances and inductances for the circuits shall be taken from the following table.

Type of protection	Ex ia or ib			
	I	IIA	IIB/IIIC	IIC
L_o	20 mH	10 mH	7 mH	3 mH
C_o	5.3 µF	4.6 µF	2.1 µF	620 nF

The following values apply to the interconnection of both intrinsically safe input circuits:
U_o = 10.5 V
I_o = 26 mA
P_o = 68 mW
R_i = 403.9 Ω
linear characteristic
$C_i \approx 0$
$L_i \approx 0$

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

4. SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 00 ATEX 2080

Type of protection	Ex ia or ib			
	I	IIA	IIB/IIIC	IIC
L_o	500 mH	420 mH	210 mH	52 mH
C_o	95 µF	75 µF	16.8 µF	2.41 µF

With the existence of concentrated capacitances and/or inductances in the interconnected intrinsically safe input circuits, the maximum permissible external capacitances and inductances for the circuits shall be taken from the following table.

Type of protection	Ex ia or ib			
	I	IIA	IIB/IIIC	IIC
L_o	20 mH	10 mH	7 mH	3 mH
C_o	5.1 µF	4.4 µF	2.1 µF	590 nF

The intrinsically safe input circuits are safely electrically isolated from all other circuits up to a peak value of the nominal voltage of 375 V

Applied standards

EN 60079-0:2012, EN 60079-11:2012

Test report: PTB Ex 14-24080

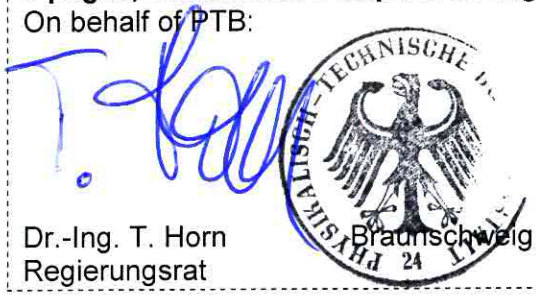
Zertifizierungssektor Explosionsschutz
On behalf of PTB:

Braunschweig, August 20, 2014

(signature)

Dr.-Ing. U. Johannsmeyer
Direktor und Professor

3 pages, correct and complete as regards content.
On behalf of PTB:



Dr.-Ing. T. Horn
Regierungsrat

Braunschweig, January 22, 2015