



# Mining And Surface Certification (Pty) Ltd

2015/021934/07



**Certificate Number:** MASC MS/17-0868  
**Issue:** 5 August 2021  
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## IA – CERTIFICATE

(Supplement 2: Reviewed by MASC as per ARP 0108)

IN TERMS OF REGULATION 21.17.2 OF THE MINERALS ACT (INCORPORATION THE MINE HEALTH AND SAFETY ACT) AND REGULATION 9 (1) OF THE ELECTRICAL MACHINERY REGULATIONS OF THE OCCUPATIONAL HEALTH AND SAFETY ACT

Ex – Type Examination

Certificate number:

Equipment:

Serial No:

**MASC MS/17-0868**

Type KFD0-SD2-Ex Series Transformer Isolated Solenoid Drivers  
(See “Conditions of Certification”)

Requested by:

Address:

Pepperl+Fuchs (Pty) Ltd

1st fl Zerwick Forum

8 Glen Eagle Office Park

Cnr Monument Rd and Braambos St

Glen Erasmia, Kempton Park 1619

South Africa

Manufacturer:

Address:

Pepperl+Fuchs SE

Lilienthalstrasse 200

68307 Mannheim

Germany

### DESCRIPTION:

The Type KFD0-SD2-Ex Series Transformer Isolated Solenoid Drivers are designed to transfer current from unspecified apparatus located in the non-hazardous area to the hazardous area. The voltage and current passed to the hazardous area are limited to intrinsically safe levels and have linear characteristics. The hazardous area circuit is galvanically isolated from the non-hazardous area circuit using transformers.

The Type KFD0-SD2-Ex Series Transformer Isolated Solenoid Drivers comprise a number of electronic components, including isolating transformers, fuses, zener diodes and resistors all mounted on printed circuit boards and housed in a plastic enclosure with polarized plug-in terminals for hazardous and non-hazardous area connections. LED indication is provided for channel status.

There are single and dual channel models of the apparatus. The dual channel versions have two printed circuit boards fitted and are denoted by ‘2’ after ‘Ex’ in the model number. The digits at the end of the model number denote the voltage and current limit of the apparatus. The following models are in the range:

KFD0-SD2-Ex1.1045

KFD0-SD2-Ex1.1245

KFD0-SD2-Ex1.1065

KFD0-SD2-Ex1.10100

KFD0-SD2-Ex2.1045

KFD0-SD2-Ex2.1245

KFD0-SD2-Ex2.1065

KFD0-SD2-Ex1.1180 ([Ex ia Ga] IIB only)

*/I. Type...*

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Mining And Surface Certification (Pty) Ltd Reg No: 2015/021934/07

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Type KFD0-SD2-Ex Series Transformer Isolated Solenoid Drivers  
Non-Hazardous Area Terminals 7 to 9

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

The circuit connected to non-hazardous area terminals 7 to 9 are designed to operate from a d.c. supply up to 35V.

Hazardous Area Terminals 1 w.r.t. 2 & 3 (Channel 1) OR Hazardous Area Terminals 4 w.r.t. 5 & 6 (Channel 2)

Model No.	$U_o$ (V)	$I_o$ (mA)	$P_o$ (W)	$C_i$ ( $\mu F$ )	$L_i$ (mH)
KFD0-SD2-Ex*.1045	25.2	93	0.586	0	0
KFD0-SD2-Ex*.1245	25.2	110	0.693	0	0
KFD0-SD2-Ex*.1065	17.22	220	0.947	0	0
KFD0-SD2-Ex1.1180	25.2	184	1.159	0	0
KFD0-SD2-Ex1.10100	17	271	1.152	0	0

NOTE: \* in model number denotes the number of channels. '1' denotes a single channel version and '2' a dual channel version. Hazardous Area Terminals 4 to 6 are only fitted on dual channel models.

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

GROUP	CAPACITANCE in $\mu F$	INDUCTANCE in mH	OR	L/R RATIO in $\mu H/\Omega$
Type KFD0-SD2-Ex*.1045				
IIC	0.107	4.11		60
IIB	0.82	16.44		242
IIA	2.90	32.88		485
I	4.15	53.95		796
Type KFD0-SD2-Ex*.1245				
IIC	0.107	2.93		51
IIB	0.82	11.75		205
IIA	2.90	23.50		410
I	4.15	38.56		673
Type KFD0-SD2-Ex*.1065				
IIC	0.353	0.73		37
IIB	2.06	2.93		150
IIA	8.50	5.87		300
I	10.60	9.64		492
Type KFD0-SD2-Ex1.10100				
IIC	0.375	0.48		30
IIB	2.20	1.93		123
IIA	9.00	3.87		246
I	11.00	6.35		405
Type KFD0-SD2-Ex1.1180 ([Ex ia] IIB only)				
IIB	0.82	4.20		122
IIA	2.90	8.40		245
I	4.15	13.78		402

**/i. Note...**

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Note: The above load parameters apply where:

1. The external circuit contains no combined lumped inductance  $L_i$  and capacitance greater than 1% of the above values.

Or 2. The inductance and capacitance are distributed as in a cable.

Or 3. The external circuit contains either only lumped inductance or lumped capacitance in combination with a cable.

In all other situations e.g. the external circuit contains combined lumped inductance and capacitance, up to 50% of each of the L and C values is allowed.

**MARKING:**

SGS marking remains applicable. The following MASC Certificate number (IA number) must be additionally applied to the equipment.

IA No: MASC MS/17-0868

**COMPLIANCE:**

The equipment as described above and in MASC letter 17-0868 is hereby certified "Explosion Protected" [Ex ia Ga] IIC/IIB, [Ex ia Da] IIIC, [Ex ia Ma] I  $-20^{\circ}\text{C} \leq T_a \leq +60^{\circ}\text{C}$  and is suitable for use in hazardous locations as stated below and as tested, assessed and inspected in accordance with the relevant requirements of SANS / IEC Standards:

The evaluation was conducted according to the requirements of:

- i) SANS (IEC) 60079-0 : 2019 "Explosive atmospheres – Part 0: Equipment — General requirements"
- ii) SANS (IEC) 60079-11 : 2012 "Explosive atmospheres – Part 11: Equipment protection by intrinsic safety "i"

Location	Zone *0, 1 & 2 Zone *20, 21 & 22	Gas Surface / Mining Dust
Hazard Frequency	---	Continuous as could occur under normal operating conditions in hazardous area (*Outputs only)
Environment	Group I Group IIC/IIB Group IIIC	Methane and Coal dust Propane to Hydrogen/Acetylene / Ethylene Dust (Metallic & non-metallic)
Service/Ambient Temperature	$-20^{\circ}\text{C}$ to $+60^{\circ}\text{C}$	

**/ The use...**

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**The use of apparatus in hazardous locations is subject to the following provisions as applicable, which shall be adhered to:**

- i. SANS 10086 requirements;
- ii. Any conditions mentioned in the above document;
- iii. Codes of Practice enforced in terms of Regulations 21.17.2 of Minerals Act, by Chief Inspector of Mines;
- iv. Any restrictions and conditions enforced by Chief Inspectors of Mines, Principal Inspector (Group I equipment) of Chief Inspector of Factories (Group II equipment);
- v. Any relevant requirements of the MHS Act or the OHS Act.

**CONDITIONS OF MANUFACTURE:**

- None

**SPECIAL CONDITIONS OF USE (X):**

- None

**CONDITIONS OF CERTIFICATION:**

1. This Certificate remains valid based on a three yearly review covered by an official MASC letter.
2. The apparatus must be additionally marked with the MASC marking details above.
3. This approval only covers the equipment as certified above and does not include any scheduled additions or variations / amendments / new issues to the certificate(s), made after the above date.
4. The equipment does not need to be re-tested when used on the conditions and with such restrictions as prescribed by SGS and in this approval.
5. The SGS certification must remain valid.
6. The extent of the requirements in the ARP 0108 (or regulations) and SANS 10108 on the certification of the equipment must remain unchanged.
7. The Ex quality assurance notification/report for the equipment must remain valid.



**D.P Visser**  
**TECHNICAL SPECIALIST**



**N Viljoen**  
**TECHNICAL SPECIALIST**

**Mining And Surface Certification**

*This document is issued based on Mining And Surface Certification's Standard Contract terms and conditions available on request.*

*While every endeavour is made to ensure that a test / assessment is representative and accurately performed, and that a report is accurate in the quoted results and conclusions drawn from the test / assessment, MASC or its members/employees shall in no way be liable for any error made in carrying out the test / assessment or for any erroneous statement, whether in fact or in opinion, contained in a report issued pursuant to a test / assessment.*

*MASC takes no responsibility for any non-conformances, exclusions or any results / assessments not in compliance with the standards. By marking the equipment in accordance with the documentation / standard, the manufacturer attests on his own responsibility that the equipment has been constructed in accordance with the applicable requirements of the relevant standards and that the routine verifications and routine tests have been successfully completed and the product complies with the documentation and standard(s).*

*This document is only for use and application in South Africa. It is issued based on National interpretations and accepted practises.*

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