



Mining And Surface Certification (Pty) Ltd

2015/021934/07



Certificate Number: MASC MS/17-0868
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IA – CERTIFICATE

(Supplement 1 – Supplemented for revision 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 AG
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-Ex2.1045
KFD0-SD2-Ex1.1245	KFD0-SD2-Ex2.1245
KFD0-SD2-Ex1.1065	KFD0-SD2-Ex2.1065
KFD0-SD2-Ex1.10100	KFD0-SD2-Ex1.1180 ([Ex ia Ga] IIB only)

/i. Type...

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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 (μF)	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 μF	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.

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COMPLIANCE:

The equipment as described above and in MASC letter 17-0868 – R1 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 : 2012 “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°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 of the QAR/QAN and no more than 3 years.
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.



M. I. Gumede
TECHNICAL OFFICER



D. P. Visser
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.

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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).

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