

# CERTIFICATE OF CONFORMITY



1. **HAZARDOUS (CLASSIFIED) LOCATION ELECTRICAL EQUIPMENT PER US REQUIREMENTS**

2. **Certificate No:** FM16US0122X  
3. **Equipment:** ISpac System Modules  
(Type Reference and Name)

4. **Name of Listing Company:** R. STAHL Schaltgeraete GmbH

5. **Address of Listing Company:** Am Bahnhof 30  
D-74638 Waldenburg (Wuertt)  
Germany

6. The examination and test results are recorded in confidential report number:

3017145 dated 9<sup>th</sup> April 2004

7. FM Approvals LLC, certifies that the equipment described has been found to comply with the following Approval standards and other documents:

FM Class 3600:2011, FM Class 3610:2015, FM Class 3611:2004, FM Class 3810:2005,  
ANSI/ISA 60079-0:2013, ANSI/ISA 60079-7:2008, ANSI/ISA 60079-11:2013, ANSI/ISA 60079-15:2009,  
ANSI/ISA 60079-18:2012, ANSI/ISA 60079-28:2013, ANSI/ISA-TR 12.21.01:2004

For 9193/21-11-11, 9294/31-12 and 9194/50-01 ( see standards listed below)

FM Class 3600:2022, FM Class 3611:2021, FM Class 3810:2021,  
ANSI/ISA 60079-0:2020, ANSI/ISA 60079-7:2017, ANSI/ISA 60079-15:2013  
ANSI/ISA No. 61010.1: 2012

8. If the sign 'X' is placed after the certificate number, it indicates that the equipment is subject to specific conditions of use specified in the schedule to this certificate.

9. This certificate relates to the design, examination and testing of the products specified herein. The FM Approvals surveillance audit program has further determined that the manufacturing processes and quality control procedures in place are satisfactory to manufacture the product as examined, tested and Approved.

**Certificate issued by:**

J.E. Marquedant  
VP, Manager - Electrical Systems

13 January 2023

Date

To verify the availability of the Approved product, please refer to [www.approvalguide.com](http://www.approvalguide.com)

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# SCHEDULE



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10. Equipment Ratings:

**Group I: In type of protection Nonincendive with alternate Zone 2 markings.**

Nonincendive for Class I, Division 2, Groups A, B, C, D. Hazardous (Classified) Locations. Class I, Zone 2, Group IIC Hazardous (Classified) Locations.

**Group II: In type of protection Nonincendive and Non-Sparking for Zone 2 markings and Intrinsically Safe output.**

Nonincendive for Class I, Division 2, Groups A, B, C, D. Hazardous (Classified) Locations. Class I, Zone 2, non-sparking, protected contacts for Group IIC Hazardous (Classified) Locations when installed per manufacturer's control drawings. Associated Apparatus with intrinsically safe connections for Class I, II and III, Division 1, Groups A, B, C, D, E, F and G Hazardous (Classified) Locations when installed per manufacturer's control drawings. Class I, Zone 0, Associated Apparatus with intrinsically safe connections for Group IIC Hazardous (Classified) Locations when installed per manufacturer's control drawings.

**Group III: In type of protection Nonincendive and Non-Sparking for Zone 2 markings.**

Nonincendive for Class I, Division 2, Groups A, B, C, D. Hazardous (Classified) Locations. Class I, Zone 2, non-sparking, protected contacts for Group IIC Hazardous (Classified) Locations when installed per manufacturer's control drawings.

**Group IV: In type of protection Nonincendive with alternate Zone 2 markings and Intrinsically Safe outputs.**

Nonincendive for Class I, Division 2, Groups A, B, C, D. Hazardous (Classified) Locations. Class I, Zone 2, Group IIC Hazardous (Classified) Locations. Associated Apparatus with intrinsically safe connections for Class I, II and III, Division 1, Groups A, B, C, D, E, F and G Hazardous (Classified) Locations when installed per manufacturer's control drawings. Class I, Zone 0, Associated Apparatus with intrinsically safe connections for Group IIC Hazardous (Classified) Locations when installed per manufacturer's control drawings.

**Group V: In type of protection Associated Apparatus with Intrinsically Safe outputs.**

Associated Apparatus with intrinsically safe connections for Class I, II and III, Division 1, Groups A, B, C, D, E, F and G Hazardous (Classified) Locations when installed per manufacturer's control drawings. Class I, Zone 0, Associated Apparatus with intrinsically safe connections for Group IIC Hazardous (Classified) Locations when installed per manufacturer's control drawings.

**Group VI: In type of protection Nonincendive and Increased Safety, Encapsulation and Intrinsic Safety with Intrinsically Safe and Ex op is outputs.**

Increased safety, encapsulated, intrinsically safe and fiber optical interfaces protected Ex op is for use in Class I, Zone 1, Group IIC with intrinsically safe outputs for connections to Class I, Zone 0, Group IIC Hazardous (Classified) Locations when installed per manufacturer's control drawings.

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**Group VII: In type of protection Intrinsic Safety for Division 1 and Zone 0 with Intrinsically Safe outputs**

Intrinsically Safe for Class I, II, III, Division 1, Groups A, B, C, D, E, F, and G Hazardous (classified) Locations in accordance with Intrinsically Safe connections to Class I, II, III, Division 1, Groups A, B, C, D, E, F, and G Hazardous (classified) Locations when installed per manufacturer's control drawings.  
Intrinsically Safe for Class I, Zone 1, Group IIC Hazardous (classified) Locations in accordance with Intrinsically Safe connections to Class I, Zone 0, Group IIC Hazardous (classified) Locations when installed per manufacturer's control drawings.

**Group VIII: In type of protection Nonincendive and Non-Sparking for Zone 2 markings and Intrinsically Safe output.**

Nonincendive for Class I, Division 2, Groups A, B, C, D. Hazardous (Classified) Locations. Class I, Zone 2, non-sparking, protected contacts for Group IIC Hazardous (Classified) Locations when installed per manufacturer's control drawings. Associated Apparatus with intrinsically safe connections for Class I, II and III, Division 1, Groups A, B, C, D, E, F and G Hazardous (Classified) Locations when installed per manufacturer's control drawings. Class I, Zone 1, Associated Apparatus with intrinsically safe connections for Group IIC Hazardous (Classified) Locations when installed per manufacture's control drawings.

**Group VIII: In type of protection Nonincendive and Increased Safety for Zone 2 markings:**

Nonincendive for Class I, Division 2, Groups A, B, C, D. Hazardous (Classified) Locations. Class I, Zone 2, Increased safety AEx ec for Group IIC Hazardous (Classified) Locations.

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11. The marking of the equipment shall include:

**Group I: In type of protection Nonincendive with alternate Zone 2 markings, the equipment is labelled with the following marking(s).**

Type 9146/\*\*-\*\*-6\*  
CL I, DIV 2, GP A,B,C,D; CL I, ZONE 2, GP IIC; T4 at Ta = 70°C; SEE DOC. 9146 6 031 002 1

Type 9164/13-20-55  
CL I, DIV 2, GP A,B,C,D; CL I, ZONE 2, GP IIC; T4; SEE DOC. 91 646 01 31 1

Type 9167/\*\*-\*\*-5\*  
CL I, DIV 2, GP A,B,C,D; CL I, ZONE 2, GP IIC; T4 at Ta = 70°C; SEE DOC. 91 676 02 31 1

Type 9170/\*\*-\*\*-6\*  
CL I, DIV 2, GP A,B,C,D; CL I, ZONE 2, GP IIC; T4 at Ta = 70°C; SEE DOC. 91 706 03 31 1

Type 9182/\*\*-\*\*-6\*  
CL I, DIV 2, GP A,B,C,D; CL I, ZONE 2, GP IIC; T4 at Ta = 70°C; SEE DOC. 91 826 02 31 1

Type 9191/20-00-50  
CL I, DIV 2, GP A,B,C,D; CL I, ZONE 2, GP IIC; T4 at Ta = 70°C; SEE DOC. 91 916 01 31 1

Type 9192/\*\*-\*\*-\*\* and Type 9196/\*\*-\*\*-\*\*  
CL I, DIV 2, GP A,B,C,D; CL I, ZONE 2, GP IIC; T4 at Ta = 70°C; SEE DOC. 91 926 01 31 1

Type 9193/\*0-\*\*-\*\*  
CL I, DIV 2, GP A,B,C,D; CL I, ZONE 2, GP IIC; T4 at Ta = 70°C; SEE DOC. 91 936 01 31 1

Type 9194/31-\*\* and Type 9195/\*\*-\*\*-\*\*  
CL I, DIV 2, GP A,B,C,D; CL I, ZONE 2, GP IIC; T4 at Ta = 70°C; SEE DOC. 91 956 01 31 1

**Group II: In type of protection Nonincendive and Non-Sparking for Zone 2 markings and Intrinsically Safe output, the equipment is labelled with the following marking(s).**

Type 9146/\*\*-\*\*-1\*  
CL I, DIV 2, GP A,B,C,D; CL I, ZONE 2, AEx/Ex nA nC GP IIC; AIS CL I,II,III, DIV 1, GP A,B,C,D,E,F,G;  
CL I, ZONE 0, [AEx/Ex ia] IIC T4 at Ta = 70°C; SEE DOC. 9146 6 031 001 1

Type 9147/\*\*-\*\*-\*\*  
CL I, DIV 2, GP A,B,C,D; CL I, ZONE 2, AEx/Ex nA GP IIC; AIS CL I,II,III, DIV 1, GP A,B,C,D,E,F,G; CL I,  
ZONE 0, [AEx/Ex ia] IIC T4 at Ta = 70°C; SEE DOC. 9147 6 031 001 1

Type 9160/\*\*-\*\*-10 and Type 9163/\*\*-\*\*-10  
CL I, DIV 2, GP A,B,C,D; CL I, ZONE 2, AEx/Ex nA GP IIC; AIS CL I,II,III, DIV 1, GP A,B,C,D,E,F,G; CL I,  
ZONE 0, [AEx/Ex ia] IIC T4 MOUNTING VERTICAL Ta = 70°C or HORIZONTAL Ta = 60°C; SEE DOC.  
91 606 01 31 1

Type 9160/\*\*-\*\*-1f (f= 1 or 3) and Type 9163/\*\*-\*\*-1f (f= 1 or 3)

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CL I, DIV 2, GP A,B,C,D; CL I, ZONE 2, AEx/Ex nA nC GP IIC; AIS CL I,II,III, DIV 1, GP A,B,C,D,E,F,G; CL I, ZONE 0, [AEx/Ex ia] IIC T4 MOUNTING VERTICAL Ta = 70°C or HORIZONTAL Ta = 60°C; SEE DOC. 91 606 01 31 1

Type 9162/\*\*-\*\*-1\*

CL I, DIV 2, GP A,B,C,D; CL I, ZONE 2, AEx/Ex nA nC GP IIC; AIS CL I,II,III, DIV 1, GP A,B,C,D,E,F,G; CL I, ZONE 0, [AEx/Ex ia] IIC T4 at Ta = 70°C; SEE DOC. 9162 6 031 001 1

Type 9165/\*\*-\*\*-1\*

CL I, DIV 2, GP A,B,C,D; CL I, ZONE 2, AEx/Ex nA nC GP IIC; AIS CL I,II,III, DIV 1, GP A,B,C,D,E,F,G; CL I, ZONE 0, [AEx/Ex ia] IIC T4 at Ta = 70°C; SEE DOC. 91 656 01 31 1

Type 9180/\*\*-\*\*-1\*

CL I, DIV 2, GP A,B,C,D; CL I, ZONE 2, AEx/Ex nA nC GP IIC; AIS CL I,II,III, DIV 1, GP A,B,C,D,E,F,G; CL I, ZONE 0, [AEx/Ex ia] IIC T4 at Ta = 70°C; SEE DOC. 9180 6 031 001 1

**Group III: In type of protection Nonincendive and Non-Sparking for Zone 2 markings, the equipment is labelled with the following marking(s).**

Type 9160/\*\*-\*\*-6f, (f= 1 or 3)

CL I, DIV 2, GP A,B,C,D; CL I, ZONE 2, AEx/Ex nA nC IIC; T4 MOUNTING VERTICAL Ta = 70°C or HORIZONTAL Ta = 60°C; SEE DOC. 91 606 02 31 1

Type 9160/\*\*-\*\*-60

CL I, DIV 2, GP A,B,C,D; CL I, ZONE 2, AEx/Ex nA IIC; T4 MOUNTING VERTICAL Ta = 70°C or HORIZONTAL Ta = 60°C; SEE DOC. 91 606 02 31 1

Type 9162/\*\*-\*\*-6\*

CL I, DIV 2, GP A,B,C,D; CL I, ZONE 2, AEx/Ex nA nC IIC; T4 at Ta = 70°C; SEE DOC. 9162 6 031 002 1

Type 9165/\*\*-\*\*-6\*

CL I, DIV 2, GP A,B,C,D; CL I, ZONE 2, AEx/Ex nA IIC; T4 at Ta = 70°C; SEE DOC. 91 656 02 31 1

Type 9185/\*2-\*\*-\*\*

CL I, DIV. 2, GP. A,B,C,D; CL I, ZONE 2, AEx/Ex nA nC IIC; T4 at Ta = 70°C; SEE DOC. 91 856 01 31 1

**Group IV: In type of protection Nonincendive with alternate Zone 2 markings and Intrinsically Safe outputs, the equipment is labelled with the following marking(s).**

Type 9167/\*\*-\*\*-0\*

CL I, DIV 2, GP A,B,C,D; CL I, ZONE 2, GP IIC; AIS CL I,II,III, DIV 1, GP A,B,C,D,E,F,G; CL I, ZONE 0, [AEx/Ex ia] IIC T4 at Ta = 70°C; SEE DOC. 91 676 01 31 1

Type 9170/\*0-\*d-1\* (d= 0, 1 or 4)

CL I, DIV 2, GP A,B,C,D; CL I, ZONE 2, GP IIC; AIS CL I,II,III, DIV 1, GP A,B,C,D,E,F,G; CL I, ZONE 0, [AEx/Ex ia] IIC T4 at Ta = 70°C; SEE DOC. 91 706 01 31 1

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Type 9170/\*1-\*d-1\* (d= 0, 1 or 4)

CL I, DIV 2, GP A,B,C,D; CL I, ZONE 2, GP IIC; AIS CL I,II,III, DIV 1, GP A,B,C,D,E,F,G; CL I, ZONE 0, [AEx/Ex ia] IIC T4 at Ta = 70°C; SEE DOC. 91 706 02 31 1

Type 9172/\*\*-\*\*-0\*

CL I, DIV 2, GP A,B,C,D; CL I, ZONE 2, GP IIC; AIS CL I,II,III, DIV 1, GP A,B,C,D,E,F,G; CL I, ZONE 0, [AEx/Ex ia] IIC T4 at Ta = 70°C; SEE DOC. 91 726 01 31 1

Type 9175/\*\*-\*\*-1\*

CL I, DIV 2, GP A,B,C,D; CL I, ZONE 2, GP IIC; AIS CL I,II,III, DIV 1, GP A,B,C,D,E,F,G; CL I, ZONE 0, [AEx/Ex ia] IIC T4 MOUNTING VERTICAL Ta = 70°C or HORIZONTAL Ta = 60°C; SEE DOC. 91 756 01 31 1

Type 9176/\*\*-\*\*-0\*

CL I, DIV 2, GP A,B,C,D; CL I, ZONE 2, GP IIC; AIS CL I,II,III, DIV 1, GP A,B,C,D,E,F,G; CL I, ZONE 0, [AEx/Ex ia] IIC T4 MOUNTING VERTICAL Ta = 70°C or HORIZONTAL Ta = 60°C; SEE DOC. 91 766 01 31 1

Type 9182/\*\*-\*\*-1\*

CL I, DIV 2, GP A,B,C,D; CL I, ZONE 2, GP IIC; AIS CL I,II,III, DIV 1, GP A,B,C,D,E,F,G; CL I, ZONE 0, [AEx/Ex ia] IIC T4 at Ta = 70°C; SEE DOC. 91 826 01 31 1

**Group V: In type of protection Associated Apparatus with Intrinsically Safe outputs, the equipment is labelled with the following marking(s).**

Type 9170/\*0-\*d-1\* (d= 2 or 3) and Type 9170/\*0-\*\*-2\*

AIS CL I,II,III, DIV 1, GP A,B,C,D,E,F,G; CL I, ZONE 0, [AEx/Ex ia] IIC T4 at Ta = 70°C; SEE DOC. 91 706 01 31 1

Type 9170/\*1-\*d-1\* (d= 2 or 3) and Type 9170/\*1-\*\*-2\*

AIS CL I,II,III, DIV 1, GP A,B,C,D,E,F,G; CL I, ZONE 0, [AEx/Ex ia] IIC T4 at Ta = 70°C; SEE DOC. 91 706 02 31 1

**Group VI: In type of protection Nonincendive and Increased Safety, Encapsulation and Intrinsic Safety with Intrinsically Safe and Ex op is outputs, the equipment is labelled with the following marking(s).**

Type 9186/12-11-1\*

CL I, Zone 1, AEx/Ex e mb ib, GP IIC; CL I, DIV 2, GP A,B,C,D; T4 Ta=65°C; AIS CL I, Zone 0, [AEx/Ex ia, op is] IIC; CL I, II, III, DIV 1, GP A – G; SEE DOC. 9186 6 031 001 1

**Group VII: In type of protection Intrinsic Safety for Division 1 and Zone 0 with Intrinsically Safe outputs, the equipment is labelled with the following marking(s).**

Type 9164/13-20-08

IS FOR CL I,II,III, DIV 1, GP A-G, T4; CL I, ZONE 0, AEx/Ex ia IIC T4; WITH CONNECTIONS FOR CL I,II,III, DIV 1, GP A-G; CL I, ZONE 0, AEx/Ex [ia] IIC; SEE DOC. 91 646 01 31 1

**Group VIII: In type of protection Nonincendive and Non-Sparking for Zone 2 markings and**  
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**Intrinsically Safe output, the equipment is labelled with the following marking(s).**

Type 9185/\*1-\*\*-\*\*

CL I, DIV 2, GP A,B,C,D; CL I, ZONE 2, AEx/Ex nA GP IIC; AIS CL I,II,III, DIV 1, GP A,B,C,D,E,F,G; CL I, ZONE 1, [AEx/Ex ib] IIC T4 at Ta = 70°C; SEE DOC. 91 856 01 31 1

**Group VIII: In type of protection Nonincendive and Increased Safety, the equipment is labelled with the following marking(s).**

Type 9193/21-11-11

CL I, DIV. 2, GP. A,B,C,D; CL I, ZONE 2, AEx/Ex ec nC IIC; T4 at Ta = 70°C; SEE DOC. 91 936 02 31 1

Type 9294/31-12

CL I, DIV. 2, GP. A,B,C,D; CL I, ZONE 2, AEx/Ex ec IIC; T4 at Ta = 70°C; SEE DOC. 91 956 01 31 1

Type 9194/50-01

CL I, DIV. 2, GP. A,B,C,D; CL I, ZONE 2, AEx/Ex ec IIC; T4 at Ta = 70°C; SEE DOC. 91 956 01 31 1

## 12. **Description of Equipment:**

**General** - The ISpac System is used for isolation between control equipment and field measuring devices. The product features basic units of the ISpac system used to interconnect between the individual isolators of the ISpac modules series to form a system. Digital communications options include HART and 4 to 20 mA current signal.

**Construction** - The ISpac System consists modules that can be mounted on a DIN rail or on pac-Carrier Model type 9195. The electronics housing is non-metallic and the ISpac System modules must be installed within a suitable enclosure for the ultimate application.

**Ratings** - The ISpac System modules operate at various DC and AC voltages. The modules are rated for use in an enlarged ambient temperature range. Refer to Control Drawings.

**Group I: In type of protection Nonincendive with alternate Zone 2 markings.**

### **9146/a0-1d-6f, Frequency Transmitter**

a = Number of Channels: 1 or 2

d = Analog / Digital Output: 0, 1, 5 or 9

f = Contact Limits: 1 or 2

### **9164/13-20-55, mA-Isolating Repeater**

### **9167/ab-11-50, Isolating Repeater Loop Powered**

a = Number of Channels: 1 or 2

b = Output Signal: 1, 3 or 4

### **9170/a1-cd-6f, Switching Repeater**

a = Number of Channels: 1 or 2

c = Input Stage: 1, 2, 3, 4, 5 or 6

d = Output Stage: 0, 1 or 4

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f = Line Fault Detection: 0, 1, 2 or 3

**9182/a0-5d-6f, Temperature Transmitter**

a = Number of Channels: 1 or 2  
d = Output: 0, 1, 3 or 9  
f = Limit Contact and SIL Option: 1, 2, 3 or 4

**9191/20-00-50, Termination Module**

**9192/32-10-10, HART-Multiplexer**

**9193/a0-11-1f, Supply Module**

a = Power Inputs: 1 or 2  
f = Error Message: 0 or 1

**9194/31-cd, pac-Bus**

cd = Grid Size: 17 or 22

**9195/abc-def-ghij, pac-Carrier**

ab = Slots: 08, 16, or 24, alternative a = numeral 1 to 9 for slots and b = numeral 1 or 2 for used channels per slot  
c = Model: A, H, M, N, P, S or T  
de = Any two digit alpha-numeric character representing the Manufacturer of the Automation system  
f = Any one digit numeric character representing the Automation System  
gh = Any two digit numeric character representing the type of I/O module  
ij = Any one digit alpha-numeric character followed by any one digit numeric character representing the type of connector

**9196/16H-def-ghi, Connecting Board**

def = Any three digit alpha-numeric or numeric character that represents the Automation system  
gh = Any two digit numeric character representing the type of I/O module  
i = Any one digit alpha-numeric character representing the type of terminals

**Group II: In type of protection Nonincendive and Non-Sparking for Zone 2 markings and Intrinsically Safe output.**

**9146/a0-1d-1f, Frequency Transmitter**

a = Number of Channels: 1 or 2  
d = Analog / Digital Output: 0, 1, 5 or 9  
f = Contact Limits: 1 or 2  
Entity Parameters:  
Voc = 10.5VDC, Isc = 23.4mA, Po = 61.4mW Ca = 2.41µF, La = 63mH

**9147/a0-99-10, Vibration Transducer Supply Unit**

a = Number of Channels: 1 or 2

Entity Parameters:

type	Voc [Vdc]	Isc [mA]	Po [mW]	La [mA]	Ca [nF]
9147/*0-99-10	26.3	88.3	579	2.2	97

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## 9160/ab-cd-1f, Transmitter Supply Unit

- a = Number of Channels: 1 or 2
- b = Design: 1, 3, 4 or 9
- c = Input: 1 or 8
- d = Output: 0 or 1
- f = Line fault detection: 0, 1 or 3

<i>Max Entity Parameters</i>					
<i>Terminals</i>	<i>Voc</i>	<i>Isc</i>	<i>Po</i>	<i>Ca</i>	<i>La</i>
	(V)	(mA)	(mW)	(nF)	(mH)
12(+), 10(-)	27.0	87.9	574	90	2.3
13(+), 14(-)*	27.0	87.9	574	90	2.3
12(+), 10 (signal), 11(-)	27.0	88.3	574	90	2.3
13(+), 14 (signal), 15(-) )*	27.0	88.3	574	90	2.3
10 (signal), 11(-)	4.1	≈0	≈0	100000	1000
14 (signal), 15(-)*	4.1	≈0	≈0	100000	1000

\* = Only for Model type 9160/2b-cd-1f

## 9162/13-11-12, Transmitter Supply Unit with Limit values

Entity Parameters:

2-wire Transmitter (Pins 11, 12) ; Voc = 27VDC, Isc = 87.9mA, Po = 574mW, Ca = 90nF, La = 2.3mH,  
3-wire Transmitter (Pins 10, 11, 12); Voc = 27VDC, Isc = 88.3mA, Po = 574mW, Ca = 90nF, La = 2.3mH,  
Active Current Source (Pins 10, 11); Voc = 4.1VDC, Isc ≈ 0mA, Po ≈ 0mW, Ca = 100µF, La = 1H

## 9163/ab-cd-1f, Isolating Repeater Input

- a = Number of Channels: 1 or 2
- b = Design: 1, 3, 4 or 9
- c = Input: 1 or 8
- d = Output Signal: 0 or 1
- f = Special Function: 0, 1 or 3

Entity Parameter only for type 9163/\*\*-1\*-1\*:

Terminals 10 (+), 11 (-) or 14 (+), 15 (-)\*;  
Vmax = 30 V, Imax = 150 mA, Pi = 1 W, Ci = 0 µF, Li = 0 mH  
Voc = 0 V, Isc = 0 mA, Po = 0 mW, Ca = -, La -

\* Only for Model type 9163/2b-1d-1f

Entity Parameter only for type 9163/\*\*-8\*-1\*:

Terminals 10/12 (+), 11 (-) or 13/14 (+), 15 (-)\*;  
Vmax = 30 V, Imax = 150 mA, Pi = 1 W, Ci = 0 µF, Li = 0 mH  
Voc = 4.1 V, Isc = 0 mA, Po = 0 mW, Ca = -, La -

\* Only for Model type 9163/2b-8d-1f

## 9165/ab-11-1f, Isolating Repeater

- a = Number of Channels: 1 or 2
- b = Signal: 1 or 6
- f = Special Input: 0 or 1

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Max Entity Parameters					
Terminals	Voc	Isc	Po	Ca	La
	(V)	(mA)	(mW)	(nF)	(mH)
10(+), 11(-)	25.6	96	605	103	1.9
14(+), 15(-)*	25.6	96	605	103	1.9

\* = Only for Model type 9165/2b-11-1f

**9180/ab-77-11, Resistance Isolator**

a = Number of Channels: 1 or 2

b = Measuring Range: 0 or 1

Entity Parameters:

Voc = 6.5VDC, Isc = 16.5mA, Po = 27mW Ca = 25µF, La = 120mH

**Group III: In type of protection Nonincendive and Non-Sparking for Zone 2 markings.**

**9160/ab-cd-6f, Transmitter Supply Unit**

a = Number of Channels: 1 or 2

b = Design: 1, 3, or 9

c = Input: 1 or 8

d = Output: 0 or 1

f = Line fault detection: 0, 1 or 3

**9162/13-11-64, Transmitter Supply Unit with Limit values**

**9165/ab-11-6f, Isolating Repeater**

a = Number of Channels: 1 or 2

b = Signal: 1 or 6

f = Special Input: 0 or 1

**9185/12-4d-10, Fieldbus Isolating Repeater**

d = Functionality: 5 or 6

**Group IV: In type of protection Nonincendive with alternate Zone 2 markings and Intrinsically Safe outputs.**

**9167/ab-11-00, Isolating Repeater Loop Powered**

a = Number of Channels: 1 or 2

b = Output Signal: 1, 3 or 4

Max Entity Parameters								
Models	Terminals	Voc	Vt	Isc	It	Po	Ca	La
		(V)	(V)	(mA)	(mA)	(mW)	(µF)	(mH)
9167/a1-11-00	10 (+), 11 (-) or 14 (+), 15 (-)*	15.7	-	60.0	-	233	0.48 7	10
9167/a3-11-00	10 (+), 11 (-) or 14 (+), 15 (-)*	25.0	-	99	-	613	0.11	2.5

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T: +1 (1) 781 762 4300 F: +1 (1) 781 762 9375 E-mail: [information@fmaprovals.com](mailto:information@fmaprovals.com) [www.fmaprovals.com](http://www.fmaprovals.com)

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9167/a4-11-00	10 (+), 11 (-) or 14 (+), 15 (-)*	18.8	-	107	-	503	0.26 6	3
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\* Only for Model type 9167/2b-11-00

### 9170/a0-cd-11, Switching Repeater

a = Number of Channels: 1 or 2

c = Input Stage: 1, 2, 3, 4, or 5

d = Output Stage: 0, 1 or 4

Max Entity Parameters								
Models	Terminals	Voc (V)	Vt (V)	Isc (mA)	It (mA)	Po (mW)	Ca ( $\mu$ F)	La (mH)
9170/a0-cd-11 c = 1, 3, 4, 5	10(+),11(-) or 14(+), 15(-)*	10.6	-	24	-	64	2.32	63
	10-14 (+), 11-15 (-)*	-	10.6	-	48	128	2.32	16
9170/a0-2d-11	10 (+),11(-) or 14(+), 15(-)*	10.6	-	1.1	-	2.9	2.32	1000
	10-14 (+), 11-15 (-)*	-	10.6	-	2.2	5.8	2.32	1000

\* = Only for Model type 9170/20-cd-11

### 9170/a1-cd-1f, Switching Repeater

a = Number of Channels: 1 or 2

c = Input Stage: 1, 2, 3, 4, 5 or 6

d = Output Stage: 0, 1 or 4

f = Line Fault Detection: 0, 1, 2 or 3

Max Entity Parameters								
Models	Terminals	Voc (V)	Vt (V)	Isc (mA)	It (mA)	Po (mW)	Ca ( $\mu$ F)	La (mH)
9170/a1-cd-1f c = 1, 3, 4, 5, 6	10(+),11(-) or 14(+), 15(-)*	9.6	-	10	-	24	3.6	350
	10-14 (+), 11-15 (-)*	-	9.6	-	20	48	3.6	90
9170/a1-2d-1f	10 (+),11(-) or 14(+), 15(-)*	9.6	-	0.61	-	1.5	3.6	1000
	10-14 (+), 11-15 (-)*	-	9.6	-	1.22	3	3.6	1000

\* = Only for Model type 9170/21-cd-1f

### 9172/a0-11-00, IS Relay Module

a = Number of Channels: 1 or 2

Entity Parameter:      Terminals 10 (+), 11 (-) or 14 (+), 15 (-)\*;  
                                  Vmax = 30 V, Imax = 150 mA, Pi = 1.3 W, Ci = 0  $\mu$ F, Li = 0 mH.  
                                  Voc = 0 V, Isc = 0 mA, Po = 0 mW, Ca = - , La -  
                                  \* Only for Model type 9172/20-11-00

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**9172/a1-11-00, IS Relay Module**

a = Number of Channels: 1 or 2

Models	Terminals	Vmax	I <sub>max</sub>	P <sub>i</sub>	C <sub>i</sub>	L <sub>i</sub>
9172/a1-11-00	10 (NO), 11 (C) 12 (NC) or 13 (NC) 14 (NO), 15 (C) *	125 Vac	4 A	-	0	0
		125 Vdc	0.25 A	-	0	0
		60 Vdc	0.3 A	-	0	0
		30 Vdc	4 A	-	0	0

\* Only for Model type 9172/21-11-00

**9172/a2-11-00, IS Relay Module**

a = Number of Channels: 1 or 2

Entity Parameter: Terminals 10 (+), 11 (-) or 14 (+), 15 (-)\*;  
 V<sub>max</sub> = 30 V, I<sub>max</sub> = 150 mA, P<sub>i</sub> = 1.3 W, C<sub>i</sub> = 0 μF, L<sub>i</sub> = 0 mH.  
 V<sub>oc</sub> = 0 V, I<sub>sc</sub> = 0 mA, P<sub>o</sub> = 0 mW, C<sub>a</sub> = -, L<sub>a</sub> -  
 \* Only for Model type 9172/22-11-00

Models	Terminals	Vmax	I <sub>max</sub>	P <sub>i</sub>	C <sub>i</sub>	L <sub>i</sub>
9172/a2-11-00	1 (NO), 2 (C) 3 (NC) or 4 (NC) 5 (NO), 6 (C) *	125 Vac	4 A	-	0	0
		125 Vdc	0.25 A	-	0	0
		60 Vdc	0.3 A	-	0	0
		30 Vdc	4 A	-	0	0

\* Only for Model type 9172/22-11-00

**9175/a0-1d-1f, Digital Output**

a = Number of Channels: 1 or 2

d = Output: 2, 4 or 6

f = line fault option: 0, 1 or 2

<i>Max Entity Parameters for Division 1 and Zone 0 (ia)</i>								
Models	Terminals	V <sub>oc</sub> (V)	V <sub>t</sub> (V)	I <sub>sc</sub> (mA)	I <sub>t</sub> (mA)	P <sub>o</sub> (mW)	C <sub>a</sub> (μF)	L <sub>a</sub> (mH)
9175/a0-12-1f	10(+),11(-) or 14(+), 15(-)*	11.3	-	75	-	210	1.79	6.3
	10-14 (+), 11-15 (-)*	-	11.3	-	150	420	1.79	1.5
9175/a0-14-1f	10 (+),11(-) or 14(+), 15(-)*	19.6	-	150	-	732	0.235	1.5
	10-14 (+), 11-15 (-)*	-	19.6	-	300	1464	0.235	0.3
9175/a0-16-1f	10 (+),11(-) or 14(+), 15(-)*	27.6	-	110	-	760	0.085	1.2

\* = Only for Model type 9175/20-1d-1f

<i>Max Entity Parameters for Zone 1 (ib)</i>								
Models	Terminals	V <sub>oc</sub>	V <sub>t</sub>	I <sub>sc</sub>	I <sub>t</sub>	P <sub>o</sub>	C <sub>a</sub>	L <sub>a</sub>

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		(V)	(V)	(mA)	(mA)	(mW)	( $\mu$ F)	(mH)
9175/a0-14-1f	10 (+),11(-) or 14(+), 15(-)*	19.6	-	60	-	732	0.235	1.5
	10-14 (+), 11-15 (-)*	-	19.6	-	120	1464	0.235	0.3
9175/a0-16-1f	10 (+),11(-) or 14(+), 15(-)*	27.6	-	50	-	760	0.085	1.2

\* = Only for Model type 9175/20-1d-1f

### 9175/20-16-1f, Digital Output

f = line fault option: 0, 1 or 2

When channel 1 and channel 2 are connected in parallel, the device may only be used for Group C-G / IIB.

<i>Max Entity Parameters for Division 1 and Zone 0 (ia)</i>								
Models	Terminals	Voc	Vt	Isc	It	Po	Ca	La
		(V)	(V)	(mA)	(mA)	(mW)	( $\mu$ F)	(mH)
9175/20-16-1f	10-14 (+), 11-15 (-)	-	27.6	-	220	1520	665	1.8

<i>Max Entity Parameters for Zone 1 (ib)</i>								
Models	Terminals	Voc	Vt	Isc	It	Po	Ca	La
		(V)	(V)	(mA)	(mA)	(mW)	( $\mu$ F)	(mH)
9175/20-16-1f	10-14 (+), 11-15 (-)	-	27.6	-	100	1520	665	1.8

### Type 9176/a0-1d-00, Digital Output Loop Powered

a = Number of Channels: 1 or 2

d = Output Signal: 2, 4, 5, 6 or 7

<i>Max Entity Parameters for Division 1 and Zone 0 (ia)</i>								
Models	Terminals	Voc	Vt	Isc	It	Po	Ca	La
		(V)	(V)	(mA)	(mA)	(mW)	( $\mu$ F)	(mH)
9176/a0-12-00	10(+),11(-) or 14(+), 15(-)*	11.3	-	75	-	210	1.79	6.3
	10-14 (+), 11-15 (-)*	-	11.3	-	150	420	1.79	1.5
9176/a0-14-00	10(+),11(-) or 14(+), 15(-)*	19.6	-	150	-	732	0.235	1.5
	10-14 (+), 11-15 (-)*	-	19.6	-	300	1464	0.235	0.3
9176/a0-15-00	10(+),11(-) or 14(+), 15(-)*	27.6	-	86.5	-	596	0.085	1.8
9176/a0-16-00	10(+),11(-) or 14(+), 15(-)*	27.6	-	110	-	760	0.085	1.2
9176/a0-17-00	10(+),11(-) or 14(+), 15(-)*	27.6	-	60	-	415	0.085	6.6

\* Only for Model type 9176/20-1d-00

<i>Max Entity Parameters for Zone 1 (ib)</i>								
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T: +1 (1) 781 762 4300 F: +1 (1) 781 762 9375 E-mail: [information@fmapprovals.com](mailto:information@fmapprovals.com) [www.fmapprovals.com](http://www.fmapprovals.com)

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Models	Terminals	Voc (V)	Vt (V)	Isc (mA)	It (mA)	Po (mW)	Ca ( $\mu$ F)	La (mH)
9176/a0-14-00	10(+),11(-) or 14(+), 15(-)*	19.6	-	60	-	732	0.23 5	1.5
	10-14 (+), 11-15 (-)*	-	19.6	-	120	1464	0.23 5	0.3
9176/a0-15-00	10 (+),11(-) or 14(+), 15(-)*	27.6	-	44	-	596	0.08 5	1.8
9176/a0-16-00	10 (+),11(-) or 14(+), 15(-)*	27.6	-	50	-	760	0.08 5	1.2

\* = Only for Model type 9176/20-1d-00

### 9176/20-1d-00, Digital Output Loop Powered

d = Output Signal: 5, 6 or 7

When channel 1 and channel 2 are connected in parallel, the device may only be used for Group C-G / IIB.

<i>Max Entity Parameters for Division 1 and Zone 0 (ia)</i>								
Models	Terminals	Voc (V)	Vt (V)	Isc (mA)	It (mA)	Po (mW)	Ca ( $\mu$ F)	La (mH)
9176/20-15-00	10-14 (+), 11-15 (-)	-	27.6	-	173	1192	0.66 5	2.5
9176/20-16-00	10-14 (+), 11-15 (-)	-	27.6	-	220	1520	0.66 5	1.8
9176/20-17-00	10(+),11(-) 14(+), 15(-)*	-	27.6	-	120	830	0.66 5	7.5

<i>Max Entity Parameters for Zone 1 (ib)</i>								
Models	Terminals	Voc (V)	Vt (V)	Isc (mA)	It (mA)	Po (mW)	Ca ( $\mu$ F)	La (mH)
9176/20-15-00	10-14 (+), 11-15 (-)	-	27.6	-	88	1192	0.66 5	2.5
9176/20-16-00	10-14 (+), 11-15 (-)	-	27.6	-	100	1520	0.66 5	1.8

### 9182/a0-5d-1f, Temperature Transmitter

a = Number of Channels: 1 or 2

d = Output: 0, 1, 3 or 9

f = Limit Contact and SIL option: 1, 2, 3 or 4

<i>Max Output Entity Parameters</i>							
Models	Terminals	Voc (V)	Isc (mA)	Po (mW)	Ca ( $\mu$ F)	La (mH)	
9182/a0-5d-1f	11,12 or 10,11,12 and/or 13, 15 or 13, 14, 15	6.5	19.7	32	25	90	

**Group V: In type of protection Associated Apparatus with Intrinsically Safe outputs.**

### 9170/a0-cd-e1, Switching Repeater

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T: +1 (1) 781 762 4300 F: +1 (1) 781 762 9375 E-mail: [information@fmaprovals.com](mailto:information@fmaprovals.com) [www.fmaprovals.com](http://www.fmaprovals.com)

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- a = Number of Channels: 1 or 2
- c = Input Stage: 1, 2, 3, 4 or 5
- d = Output Stage: 2 or 3
- e = Auxiliary Power: 1 or 2

<i>Max Entity Parameters</i>								
<i>Models</i>	<i>Terminals</i>	<i>Voc</i>	<i>Vt</i>	<i>Isc</i>	<i>It</i>	<i>Po</i>	<i>Ca</i>	<i>La</i>
		(V)	(V)	(mA)	(mA)	(mW)	(μF)	(mH)
9170/a0-cd-e1 b = 1, 3, 4, or 5	10(+),11(-) or 14(+), 15(-)*	10.6	-	24	-	64	2.32	63
	10-14 (+), 11-15 (-)*	-	10.6	-	48	128	2.32	16
9170/a0-2d-e1	10 (+),11(-) or 14(+), 15(-)*	10.6	-	1.1	-	2.9	2.32	1000
	10-14 (+), 11-15 (-)*	-	10.6	-	2.2	5.8	2.32	1000

\* = Only for Model type 9170/20-cd-e1

### 9170/a1-cd-ef, Switching Repeater

- a = Number of Channels: 1 or 2
- c = Input Stage: 1, 2, 3, 4, 5 or 6
- d = Output Stage: 2 or 3
- e = Auxiliary Supply: 1 or 2
- f = Line Fault Detection: 0, 1, 2, or 3

<i>Max Entity Parameters</i>								
<i>Models</i>	<i>Terminals</i>	<i>Voc</i>	<i>Vt</i>	<i>Isc</i>	<i>It</i>	<i>Po</i>	<i>Ca</i>	<i>La</i>
		(V)	(V)	(mA)	(mA)	(mW)	(μF)	(mH)
9170/a1-cd-ef c = 1, 3, 4, 5, 6	10(+),11(-) or 14(+), 15(-)*	9.6	-	10	-	24	3.6	350
	10-14 (+), 11-15 (-)*	-	9.6	-	20	48	3.6	90
9170/a1-2d-ef	10 (+),11(-) or 14(+), 15(-)*	9.6	-	0.61	-	1.5	3.6	1000
	10-14 (+), 11-15 (-)*	-	9.6	-	1.22	3	3.6	1000

\* = Only for Model type 9170/21-cd-ef

**Group VI: In type of protection Nonincendive and Increased Safety, Encapsulation and Intrinsic Safety with Intrinsically Safe and Ex op is outputs.**

### 9186/12-11-1f, Fiber Optic Isolating Repeater

f = Fault Monitoring: 0 or 1.

Entity Parameters:

Fault Monitoring Circuit;  $U_i$  (Vmax) = 24VDC,  $I_i$  (Imax) = 600mA,  $C_i$  = 0,  $L_i$  = 0  
 IS Bus Interface  $U_o$  (Voc) = 3.7VDC,  $I_o$  (Isc) = 148mA,  $P_o$  = 137mW,  $C_o$  = 100μF,  $L_o$  = 1.3mH,  
 $U_i$  (Vmax) ±4.2VDC,  $C_i$  = 0,  $L_i$  = 0

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**Group VII: In type of protection Intrinsic Safety for Division 1 and Zone 0 with Intrinsically Safe outputs.**

**9164/13-20-08, mA-Isolating Repeater**

Entity Parameters:

Input Terminals 3(+) and 4(-):  $U_i = 30\text{ V DC}$ ,  $I_i = 150\text{ mA}$ ,  $P_i = 1\text{ W}$ ,  $L_i = 0\text{ mH}$ ,  $C_i = 0\text{ nF}$

Output Terminals 1(+) and 2(-):  $U_i = 30\text{ V DC}$ ,  $I_i = 150\text{ mA}$ ,  $P_i = 1\text{ W}$ ,  $L_i = 0\text{ mH}$ ,  $C_i = 0\text{ nF}$

**Group VIII: In type of protection Nonincendive and Non-Sparking for Zone 2 markings and Intrinsically Safe output.**

**9185/11-cd-10, Fieldbus Isolating Repeater**

c = Field side interface: 3 or 4

d = Functionality: 5 or 6

Max Output Entity Parameters							
Models	Terminals	Voc	Isc	Po	Ca	La	Vmax
		(V)	(mA)	(mW)	( $\mu\text{F}$ )	(mH)	(V)
9185/11-35-10	3, 5, 6, and 8	3.73	149	139	100	1.3	$\pm 4.2$
9185/11-4b-10	3, 4, 8 and 9	5.88	50	73.3	43	15	$\pm 5.88$

**Group VIII: In type of protection Nonincendive and Increased Safety.**

**9193/21-11-11, Supply Module**

**9294/31-12, pac-Bus**

**9194/50-01, Terminal Set**

**13. Specific Conditions of Use:**

**All Modules**

1. Shall be installed in compliance with the enclosure, mounting, spacing and segregation requirements of the ultimate application including access only by the use of a tool.

**9186/12-11-1f, Fiber Optic Isolating Repeater**

1. The Fiber Optic Isolating Repeater shall be installed in compliance with the enclosure, mounting, spacing and segregation requirements of the ultimate application.
2. For Zone 1 installations the enclosure shall maintain mechanical retention for the power supply cable.

**9193/21-11-11, Supply Module (Group VIII)**

**9294/31-12, Pac-Bus and 9194/50-01, Terminal Set (Group VIII)**

1. Equipment shall be installed in an enclosure with the minimum degree of protection IP54 and providing at

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least pollution degree 2, according to ANSI/UL 60079-0, ANSI/UL 60079-7 and ANSI/UL 60664-1.

**14. Test and Assessment Procedure and Conditions:**

This Certificate has been issued in accordance with FM Approvals US Certification Requirements.

**15. Schedule Drawings**

A copy of the technical documentation has been kept by FM Approvals.

**16. Certificate History**

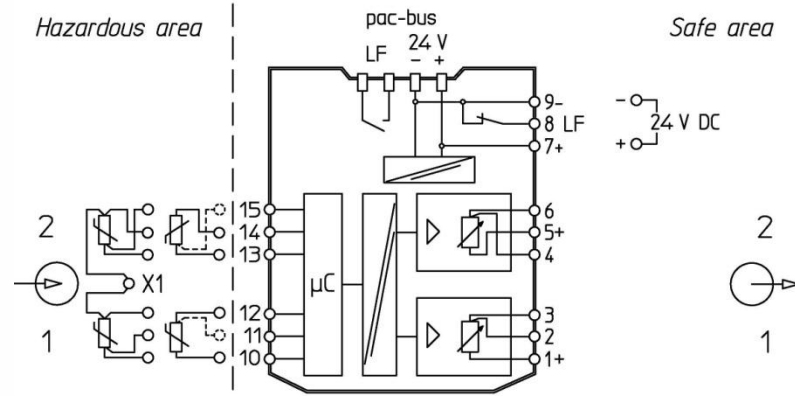
Details of the supplements to this certificate are described below:

Date	Description
9 <sup>th</sup> April 2004	Original Issue Project 3017145.
25 <sup>th</sup> August 2016	<u>Supplement 21:</u> Report Reference: – 3057591 dated 25 <sup>th</sup> August 2016. Description of the Change: Addition of Type 9164, converted certificate to new format.
26 <sup>th</sup> October 2016	<u>Supplement 22:</u> Report Reference: – RR206832 dated 26 <sup>th</sup> October 2016. Description of the Change: 1) Minor circuit changes. 2) Correction of typographical errors and updates to label markings section.
17 <sup>th</sup> April 2017	<u>Supplement 23:</u> Report Reference: – RR209196 dated 17 <sup>th</sup> April 2017. Description of the Change: Minor typographical errors corrected.
13 <sup>th</sup> January 2023	<u>Supplement 24:</u> Report Reference: – PR462553 dated 13 <sup>th</sup> January 2023. Description of the Change: The System has been modified in the following manner: <ol style="list-style-type: none"><li>1. New PCB Construction for Type 9193/21-11-11 for Zone 2 /Div. 2 locations.</li><li>2. New 9294/31-12 Pac-Bus.</li><li>3. List terminal set for pac-Bus Type 9194/50-01.</li><li>4. Corrections to certificate Various typographical errors and clarify Type 9193/** numbering.</li></ol>

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Type 9180/\*\*-77-11



Hazardous area: Class I, II, III; DIV 1; Group A-G or Class I; Zone 0; Group IIC/IIB Hazardous Locations  
 Safe area: Non-Hazardous; Division 2 or Zone 2 Hazardous (Classified) Locations

The Resistance Isolator Type 9180 is an associated apparatus as well as a nonincendive apparatus providing intrinsically safe connections for one (or two) field devices located in Class I, II, III, Division 1, Group A-G or Class I, Zone 0 [AEx ia] Group IIC, Hazardous Locations according to NEC Article 504/505 as listed below.

Resistance Isolator Type 9180/ab-77-11  
 a = numeral 1 or 2 for number of channels  
 b = numeral 0 or 1 for measuring range

Entity parameters for wiring configurations are as follows:

Terminal	V <sub>OC</sub> [V]	I <sub>SC</sub> [mA]	P <sub>O</sub> [mW]	L <sub>o</sub> CL I, DIV 1, A,B / Zone 0, GP IIC	L <sub>o</sub> CL I, DIV 1, C-G/ Zone 0, GP IIB	C <sub>o</sub> CL I, DIV 1, A,B / Zone 0, GP IIC	C <sub>o</sub> CL I, DIV 1, C-G/ Zone 0, GP IIB	V <sub>max</sub>	I <sub>max</sub>
10 - 15	6,5	16,5	27	120 mH	450 mH	25 µF	570 µF	-	-

Notes:

- Intrinsically safe apparatus may be switches, thermocouples, LEDs, RTDs or an FM Approved System or Entity device connected in accordance with the manufacturer's installation instructions.
- For Entity concept use the appropriate parameters to ensure the following:  
 $V_t \text{ or } V_{OC} \leq V_{max}$        $C_o, C_a \geq C_i + C_{leads}$        $P_o \leq P_i$   
 $I_t \text{ or } I_{SC} \leq I_{max}$        $L_o, L_a \geq L_i + L_{leads}$
- Electrical apparatus connected to an intrinsically safe system should not use or generate voltages > 250 V (U<sub>max</sub>).
- Installation should be in accordance with Article 504/505 of the National Electrical Code, ANSI/NFPA 70 and ANSI/ISA RP 12.06.01.
- Installation in Canada should be in accordance with the Canadian Electrical Code, CSA C22.1, Part 1, Appendix F.
- Use a general purpose enclosure meeting the requirements of IEC 61010-1 for use in Non-Hazardous or Class I, Division 2, Hazardous (Classified) Locations.
- Use an FM Approved Dust-ignition proof enclosure appropriate for environmental protection in Class II, Division 1, Groups E, F and G; and Class III, Hazardous (Classified) Locations.
- These modules are to be mounted on DIN rail, DIN rail with pac-Bus (type 9194) or pac-Carrier (type 9195). The field wiring in any case is connected to the ISpac device terminals.
- Ambient temperature: -20°C ... +70°C (any mounting position)

WARNING: Do not disconnect equipment when a flammable or combustible atmosphere is present.  
 AVERTISSEMENT: Ne pas débrancher l'équipement en présence d'atmosphère inflammable ou combustible.

The safety relevant statements of this document may be transferred into the operating instructions. Transferring the text, editorial changes of equivalent meaning are allowed.

			2006	Date	Name	Certification drawing	Scale
			drawn	24.05.	Einsiedler		none
			checked		Kaiser		Sheet 1 of 1
03	22.10.12	Reistle				Resistance Isolator Type 9180/**-77-11	Agency FM
02	24.08.11	Reistle					
01	19.09.06	Einsiedler					
Version	Date	Name	Ers. f.			Ers. d.	A4

Weitergabe sowie Vervielfältigung dieser Unterlage, Verwertung und Mitteilung ihres Inhalts nicht gestattet, soweit nicht ausdrücklich zugestanden. Zuwiderhandlungen verpflichten zu Schadenersatz. Alle Rechte für den Fall der Patenterteilung oder GH-Eintragung vorbehalten.

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# CERTIFICATE OF CONFORMITY



1. **HAZARDOUS LOCATION ELECTRICAL EQUIPMENT PER CANADIAN REQUIREMENTS**
2. **Certificate No:** FM16CA0067X
3. **Equipment:** ISpac System Modules  
**(Type Reference and Name)**
4. **Name of Listing Company:** R. STAHL Schaltgeraete GmbH
5. **Address of Listing Company:** Am Bahnhof 30  
D-74638 Waldenburg (Wuertt)  
Germany
6. The examination and test results are recorded in confidential report number:  
3027620C dated 21<sup>st</sup> September 2006
7. FM Approvals LLC, certifies that the equipment described has been found to comply with the following Approval standards and other documents:  
CSA-C22.2 No. 213-M1987:R2012, CSA-C22.2 No. 157-92:R2012, CSA-C22.2 No. 1010.1:2004, CAN/CSA-C22.2 No. 60079-0:2014, CAN/CSA-C22.2 No. 60079-7:2012, CAN/CSA-C22.2 No. 60079-11:2013, CAN/CSA-C22.2 No. 60079-15:2012, CAN/CSA-C22.2 No. 60079-18:2012, ANSI/ISA-TR 12.21.01:2004  
For 9193/21-11-11, 9294/31-12 and 9194/50-01 ( see standards listed below)  
CSA-C22.2 No. 213-M1987:R2016, CSA-C22.2 No. 1010.1:2012, CAN/CSA-C22.2 No. 60079-0:2019, CAN/CSA-C22.2 No. 60079-7:2016, CAN/CSA-C22.2 No. 60079-15:2015,
8. If the sign 'X' is placed after the certificate number, it indicates that the equipment is subject to specific conditions of use specified in the schedule to this certificate.
9. This certificate relates to the design, examination and testing of the products specified herein. The FM Approvals surveillance audit program has further determined that the manufacturing processes and quality control procedures in place are satisfactory to manufacture the product as examined, tested and Approved.

**Certificate issued by:**

J. E. Marquedant  
VP, Manager - Electrical Systems

13 January 2023  
Date

To verify the availability of the Approved product, please refer to [www.approvalguide.com](http://www.approvalguide.com)

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10. Equipment Ratings:

**Group I: In type of protection Nonincendive with alternate Zone 2 markings.**

Nonincendive for Class I, Division 2, Groups A, B, C, D. Hazardous (Classified) Locations.  
Class I, Zone 2, Group IIC Hazardous (Classified) Locations.

**Group II: In type of protection Nonincendive and Non-Sparking for Zone 2 markings and Intrinsically Safe output.**

Nonincendive for Class I, Division 2, Groups A, B, C, D. Hazardous (Classified) Locations. Class I, Zone 2, non-sparking, protected contacts for Group IIC Hazardous (Classified) Locations when installed per manufacturer's control drawings. Associated Apparatus with intrinsically safe connections for Class I, II and III, Division 1, Groups A, B, C, D, E, F and G Hazardous (Classified) Locations when installed per manufacturer's control drawings. Class I, Zone 0, Associated Apparatus with intrinsically safe connections for Group IIC Hazardous (Classified) Locations when installed per manufacturer's control drawings.

**Group III: In type of protection Nonincendive and Non-Sparking for Zone 2 markings.**

Nonincendive for Class I, Division 2, Groups A, B, C, D. Hazardous (Classified) Locations. Class I, Zone 2, non-sparking, protected contacts for Group IIC Hazardous (Classified) Locations when installed per manufacturer's control drawings.

**Group IV: In type of protection Nonincendive with alternate Zone 2 markings and Intrinsically Safe outputs.**

Nonincendive for Class I, Division 2, Groups A, B, C, D. Hazardous (Classified) Locations. Class I, Zone 2, Group IIC Hazardous (Classified) Locations. Associated Apparatus with intrinsically safe connections for Class I, II and III, Division 1, Groups A, B, C, D, E, F and G Hazardous (Classified) Locations when installed per manufacturer's control drawings. Class I, Zone 0, Associated Apparatus with intrinsically safe connections for Group IIC Hazardous (Classified) Locations when installed per manufacturer's control drawings.

**Group V: In type of protection Associated Apparatus with Intrinsically Safe outputs.**

Associated Apparatus with intrinsically safe connections for Class I, II and III, Division 1, Groups A, B, C, D, E, F and G Hazardous (Classified) Locations when installed per manufacturer's control drawings. Class I, Zone 0, Associated Apparatus with intrinsically safe connections for Group IIC Hazardous (Classified) Locations when installed per manufacturer's control drawings.

**Group VI: In type of protection Nonincendive and Increased Safety, Encapsulation and Intrinsic Safety with Intrinsically Safe outputs.**

Increased safety, encapsulated and intrinsically safe for use in Class I, Zone 1, and Group IIC with intrinsically safe outputs for connections to Class I, Zone 0, Group IIC Hazardous (Classified) Locations when installed per manufacturer's control drawings.

**Group VII: In type of protection Intrinsic Safety for Division 1 and Zone 0 with Intrinsically Safe**

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## **outputs.**

Intrinsically Safe for Class I, II, III, Division 1, Groups A, B, C, D, E, F, and G Hazardous (classified) Locations in accordance with Intrinsically Safe connections to Class I, II, III, Division 1, Groups A, B, C, D, E, F, and G Hazardous (classified) Locations when installed per manufacturer's control drawings.  
Intrinsically Safe for Class I, Zone 1, Group IIC Hazardous (classified) Locations in accordance with Intrinsically Safe connections to Class I, Zone 0, Group IIC Hazardous (classified) Locations when installed per manufacturer's control drawings.

## **Group VIII: In type of protection Nonincendive and Non-Sparking for Zone 2 markings and Intrinsically Safe output.**

Nonincendive for Class I, Division 2, Groups A, B, C, D. Hazardous Locations. Class I, Zone 2, non-sparking, protected contacts for Group IIC Hazardous Locations when installed per manufacturer's control drawings. Associated Apparatus with intrinsically safe connections for Class I, II and III, Division 1, Groups A, B, C, D, E, F and G Hazardous Locations when installed per manufacturer's control drawings. Class I, Zone 1, Associated Apparatus with intrinsically safe connections for Group IIC Hazardous Locations when installed per manufacturer's control drawings.

## **Group VIII: In type of protection Nonincendive and Increased safety for Zone 2 markings.**

Nonincendive for Class I, Division 2, Groups A, B, C, D. Hazardous Locations. Class I, Zone 2, increased safety for Group IIC Hazardous Locations .

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11. The marking of the equipment shall include:

**Group I: In type of protection Nonincendive, the equipment is labelled with the following marking(s).**

Type 9146/\*\*-\*\*-6\*

CL I, DIV 2, GP A,B,C,D; CL I, ZONE 2, GP IIC; T4 at Ta = 70°C; SEE DOC. 9146 6 031 002 1

Type 9164/13-20-55

CL I, DIV 2, GP A,B,C,D; CL I, ZONE 2, GP IIC; T4; SEE DOC. 91 646 01 31 1

Type 9167/\*\*-\*\*-5\*

CL I, DIV 2, GP A,B,C,D; CL I, ZONE 2, GP IIC; T4 at Ta = 70°C; SEE DOC. 91 676 02 31 1

Type 9170/\*\*-\*\*-6\*

CL I, DIV 2, GP A,B,C,D; CL I, ZONE 2, GP IIC; T4 at Ta = 70°C; SEE DOC. 91 706 03 31 1

Type 9182/\*\*-\*\*-6\*

CL I, DIV 2, GP A,B,C,D; CL I, ZONE 2, GP IIC; T4 at Ta = 70°C; SEE DOC. 91 826 02 31 1

Type 9191/20-00-50

CL I, DIV 2, GP A,B,C,D; CL I, ZONE 2, GP IIC; T4 at Ta = 70°C; SEE DOC. 91 916 01 31 1

Type 9192/\*\*-\*\*-\*\* and Type 9196/\*\*-\*\*-\*\* \*\*

CL I, DIV 2, GP A,B,C,D; CL I, ZONE 2, GP IIC; T4 at Ta = 70°C; SEE DOC. 91 926 01 31 1

Type 9193/\*0-\*\*-\*\*

CL I, DIV 2, GP A,B,C,D; CL I, ZONE 2, GP IIC; T4 at Ta = 70°C; SEE DOC. 91 936 01 31 1

Type 9194/31-\*\* and Type 9195/\*\*-\*\*-\*\* \*\*

CL I, DIV 2, GP A,B,C,D; CL I, ZONE 2, GP IIC; T4 at Ta = 70°C; SEE DOC. 91 956 01 31 1

**Group II: In type of protection Nonincendive and Non-Sparking for Zone 2 markings and Intrinsically Safe output.**

Type 9146/\*\*-\*\*-1\*

CL I, DIV 2, GP A,B,C,D; CL I, ZONE 2, AEx/Ex nA nC GP IIC; AIS CL I,II,III, DIV 1, GP A,B,C,D,E,F,G; CL I, ZONE 0, [AEx/Ex ia] IIC T4 at Ta = 70°C; SEE DOC. 9146 6 031 001 1

Type 9147/\*\*-\*\*-\*\*

CL I, DIV 2, GP A,B,C,D; CL I, ZONE 2, AEx/Ex nA GP IIC; AIS CL I,II,III, DIV 1, GP A,B,C,D,E,F,G; CL I, ZONE 0, [AEx/Ex ia] IIC T4 at Ta = 70°C; SEE DOC. 9147 6 031 001 1

Type 9160/\*\*-\*\*-10 and Type 9163/\*\*-\*\*-10

CL I, DIV 2, GP A,B,C,D; CL I, ZONE 2, AEx/Ex nA GP IIC; AIS CL I,II,III, DIV 1, GP A,B,C,D,E,F,G; CL I, ZONE 0, [AEx/Ex ia] IIC T4 MOUNTING VERTICAL Ta = 70°C or HORIZONTAL Ta = 60°C; SEE DOC. 91 606 01 31 1

Type 9160/\*\*-\*\*-1F (f= 1 or 3) and Type 9163/\*\*-\*\*-1f (f= 1 or 3)

CL I, DIV 2, GP A,B,C,D; CL I, ZONE 2, AEx/Ex nA nC GP IIC; AIS CL I,II,III, DIV 1, GP A,B,C,D,E,F,G; CL I, ZONE 0, [AEx/Ex ia] IIC T4 MOUNTING VERTICAL Ta = 70°C or HORIZONTAL Ta = 60°C; SEE DOC.

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91 606 01 31 1

Type 9162/\*\*-\*\*-1\*

CL I, DIV 2, GP A,B,C,D; CL I, ZONE 2, AEx/Ex nA nC GP IIC; AIS CL I,II,III, DIV 1, GP A,B,C,D,E,F,G; CL I, ZONE 0, [AEx/Ex ia] IIC T4 at Ta = 70°C; SEE DOC. 9162 6 031 001 1

Type 9165/\*\*-\*\*-1\*

CL I, DIV 2, GP A,B,C,D; CL I, ZONE 2, AEx/Ex nA nC GP IIC; AIS CL I,II,III, DIV 1, GP A,B,C,D,E,F,G; CL I, ZONE 0, [AEx/Ex ia] IIC T4 at Ta = 70°C; SEE DOC. 91 656 01 31 1

Type 9180/\*\*-\*\*-1\*

CL I, DIV 2, GP A,B,C,D; CL I, ZONE 2, AEx/Ex nA nC GP IIC; AIS CL I,II,III, DIV 1, GP A,B,C,D,E,F,G; CL I, ZONE 0, [AEx/Ex ia] IIC T4 at Ta = 70°C; SEE DOC. 9180 6 031 001 1

### **Group III: In type of protection Nonincendive and Non-Sparking for Zone 2 markings.**

Type 9160/\*\*-\*\*-6f, (f= 1 or 3)

CL I, DIV 2, GP A,B,C,D; CL I, ZONE 2, AEx/Ex nA nC IIC; T4 MOUNTING VERTICAL Ta = 70°C or HORIZONTAL Ta = 60°C; SEE DOC. 91 606 02 31 1

Type 9160/\*\*-\*\*-60

CL I, DIV 2, GP A,B,C,D; CL I, ZONE 2, AEx/Ex nA IIC; T4 MOUNTING VERTICAL Ta = 70°C or HORIZONTAL Ta = 60°C; SEE DOC. 91 606 02 31 1

Type 9162/\*\*-\*\*-6\*

CL I, DIV 2, GP A,B,C,D; CL I, ZONE 2, AEx/Ex nA nC IIC; T4 at Ta = 70°C; SEE DOC. 9162 6 031 002 1

Type 9165/\*\*-\*\*-6\*

CL I, DIV 2, GP A,B,C,D; CL I, ZONE 2, AEx/Ex nA IIC; T4 at Ta = 70°C; SEE DOC. 91 656 02 31 1

Type 9185/\*2-\*\*-\*\*

CL I, DIV 2, GP A,B,C,D; CL I, ZONE 2, AEx/Ex nA IIC; T4 at Ta = 70°C; SEE DOC. 91 856 01 31 1

### **Group IV: In type of protection Nonincendive with alternate Zone 2 markings and Intrinsically Safe outputs.**

Type 9167/\*\*-\*\*-0\*

CL I, DIV 2, GP A,B,C,D; CL I, ZONE 2, GP IIC; AIS CL I,II,III, DIV 1, GP A,B,C,D,E,F,G; CL I, ZONE 0, [AEx/Ex ia] IIC T4 at Ta = 70°C; SEE DOC. 91 676 01 31 1

Type 9170/\*0-\*d-1\* (d= 0, 1 or 4)

CL I, DIV 2, GP A,B,C,D; CL I, ZONE 2, GP IIC; AIS CL I,II,III, DIV 1, GP A,B,C,D,E,F,G; CL I, ZONE 0, [AEx/Ex ia] IIC T4 at Ta = 70°C; SEE DOC. 91 706 01 31 1

Type 9170/\*1-\*d-1\* (d= 0, 1 or 4)

CL I, DIV 2, GP A,B,C,D; CL I, ZONE 2, GP IIC; AIS CL I,II,III, DIV 1, GP A,B,C,D,E,F,G; CL I, ZONE 0, [AEx/Ex ia] IIC T4 at Ta = 70°C; SEE DOC. 91 706 02 31 1

Type 9172/\*\*-\*\*-0\*

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CL I, DIV 2, GP A,B,C,D; CL I, ZONE 2, GP IIC; AIS CL I,II,III, DIV 1, GP A,B,C,D,E,F,G; CL I, ZONE 0, [AEx/Ex ia] IIC T4 at Ta = 70°C; SEE DOC. 91 726 01 31 1

Type 9175/\*\*-\*\*-1\*

CL I, DIV 2, GP A,B,C,D; CL I, ZONE 2, GP IIC; AIS CL I,II,III, DIV 1, GP A,B,C,D,E,F,G; CL I, ZONE 0, [AEx/Ex ia] IIC T4 MOUNTING VERTICAL Ta = 70°C or HORIZONTAL Ta = 60°C; SEE DOC. 91 756 01 31 1

Type 9176/\*\*-\*\*-0\*

CL I, DIV 2, GP A,B,C,D; CL I, ZONE 2, GP IIC; AIS CL I,II,III, DIV 1, GP A,B,C,D,E,F,G; CL I, ZONE 0, [AEx/Ex ia] IIC T4 MOUNTING VERTICAL Ta = 70°C or HORIZONTAL Ta = 60°C; SEE DOC. 91 766 01 31 1

Type 9182/\*\*-\*\*-1\*

CL I, DIV 2, GP A,B,C,D; CL I, ZONE 2, GP IIC; AIS CL I,II,III, DIV 1, GP A,B,C,D,E,F,G; CL I, ZONE 0, [AEx/Ex ia] IIC T4 at Ta = 70°C; SEE DOC. 91 826 01 31 1

## **Group V: In type of protection Associated Apparatus with Intrinsically Safe outputs.**

Type 9170/\*0-\*d-1\* (d= 2 or 3) and Type 9170/\*0-\*\*-2\*

AIS CL I,II,III, DIV 1, GP A,B,C,D,E,F,G; CL I, ZONE 0, [AEx/Ex ia] IIC T4 at Ta = 70°C; SEE DOC. 91 706 01 31 1

Type 9170/\*1-\*d-1\* (d= 2 or 3) and Type 9170/\*1-\*\*-2\*

AIS CL I,II,III, DIV 1, GP A,B,C,D,E,F,G; CL I, ZONE 0, [AEx/Ex ia] IIC T4 at Ta = 70°C; SEE DOC. 91 706 02 31 1

## **Group VI: In type of protection Nonincendive and Increased Safety, Encapsulation and Intrinsic Safety with Intrinsically Safe and Ex op is outputs.**

Type 9186/12-11-1\*

CL I, Zone 1, AEx/Ex e mb ib, GP IIC; CL I, DIV 2, GP A,B,C,D; T4 Ta=65°C; AIS CL I, Zone 0, [AEx/Ex ia, op is] IIC; CL I, II, III, DIV 1, GP A – G; SEE DOC. 9186 6 031 001 1

## **Group VII: In type of protection Intrinsic Safety for Division 1 and Zone 0 with Intrinsically Safe outputs.**

Type 9164/13-20-08

IS FOR CL I,II,III, DIV 1, GP A-G, T4; CL I, ZONE 0, AEx/Ex ia IIC T4; WITH CONNECTIONS FOR CL I,II,III, DIV 1, GP A-G; CL I, ZONE 0, AEx/Ex [ia] IIC; SEE DOC. 91 646 01 31 1

## **Group VIII: In type of protection Nonincendive and Non-Sparking for Zone 2 markings and Intrinsically Safe output, the equipment is labelled with the following marking(s).**

Type 9185/\*1-\*\*-\*\*

CL I, DIV 2, GP A,B,C,D; CL I, ZONE 2, AEx/Ex nA GP IIC; AIS CL I,II,III, DIV 1, GP A,B,C,D,E,F,G; CL I, ZONE 1, [AEx/Ex ib] IIC T4 at Ta = 70°C; SEE DOC. 91 856 01 31 1

## **Group VIII: In type of protection Nonincendive and Increased Safety, the equipment is labelled with the following marking(s).**

Type 9193/21-11-11

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CL I, DIV. 2, GP. A,B,C,D; CL I, ZONE 2, Ex ec nC IIC; T4 at Ta = 70°C Gc; SEE DOC. 91 936 02 31 1

Type 9294/31-12

CL I, DIV. 2, GP. A,B,C,D; CL I, ZONE 2, Ex ec IIC; T4 at Ta = 70°C Gc; SEE DOC. 91 956 01 31 1

Type 9194/50-01

CL I, DIV. 2, GP. A,B,C,D; CL I, ZONE 2, Ex ec IIC; T4 at Ta = 70°C Gc; SEE DOC. 91 956 01 31 1

## 12. Description of Equipment:

**General** - The ISpac System is used for isolation between control equipment and field measuring devices. The product features basic units of the ISpac system used to interconnect between the individual isolators of the ISpac modules series to form a system. Digital communications options include HART and 4 to 20 mA current signal.

**Construction** - The ISpac System consists modules that can be mounted on a DIN rail or on pac Carrier Model type 9195. The electronics housing is non-metallic and the ISpac System modules must be installed within a suitable enclosure for the ultimate application.

**Ratings** - The ISpac System modules operate at various DC and AC voltages. The modules are rated for use in an enlarged ambient temperature range. Refer to Control Drawings.

### Group I: In type of protection Nonincendive.

#### 9146/a0-1d-6f, Frequency Transmitter

a = Number of Channels: 1 or 2

d = Analog / Digital Output: 0, 1, 5 or 9

f = Contact Limits: 1 or 2

#### 9164/13-20-55, mA-Isolating Repeater

#### 9167/ab-11-50, Isolating Repeater Loop Powered

a = Number of Channels: 1 or 2

b = Output Signal: 1, 3 or 4

#### 9170/a1-cd-6f, Switching Repeater

a = Number of Channels: 1 or 2

c = Input Stage: 1, 2, 3, 4, 5 or 6

d = Output Stage: 0, 1 or 4

f = Line Fault Detection: 0, 1, 2 or 3

#### 9182/a0-5d-6f, Temperature Transmitter

a = Number of Channels: 1 or 2

d = Output: 0, 1, 3 or 9

f = Limit Contact and SIL Option: 1, 2, 3 or 4

#### 9191/20-00-50, Termination Module

#### 9192/32-10-10, HART-Multiplexer

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### 9193/a0-11-1f, Supply Module

a = Power Inputs: 1 or 2  
f = Error Message: 0 or 1

### 9194/31-cd, pac-Bus

cd = Grid Size: 17 or 22

### 9195/abc-def-ghij, pac-Carrier

ab = Slots: 08, 16, or 24, alternative a = numeral 1 to 9 for slots and b = numeral 1 or 2 for used channels per slot  
c = Model: A, H, M, N, P, S or T  
de = Any two digit alpha-numeric character representing the Manufacturer of the Automation system  
f = Any one digit numeric character representing the Automation System  
gh = Any two digit numeric character representing the type of I/O module  
ij = Any one digit alpha-numeric character followed by any one digit numeric character representing the type of connector

### 9196/16H-def-ghi, Connecting Board

def = Any three digit alpha-numeric or numeric character that represents the Automation system  
gh = Any two digit numeric character representing the type of I/O module  
i = Any one digit alpha-numeric character representing the type of terminals

**Group II: In type of protection Nonincendive and Non-Sparking for Zone 2 markings and Intrinsically Safe output.**

### 9146/a0-1d-1f, Frequency Transmitter

a = Number of Channels: 1 or 2  
d = Analog / Digital Output: 0, 1, 5 or 9  
f = Contact Limits: 1 or 2  
Entity Parameters:  
Voc = 10.5VDC, Isc = 23.4mA, Po = 61.4mW Ca = 2.41µF, La = 63mH

### 9147/a0-99-10 Vibration Transducer Supply Unit

a = Number of Channels: 1 or 2

Entity Parameters:

type	Voc [Vdc]	Isc [mA]	Po [mW]	Lo [mH]	Co [nF]
9147/*0-99-10	26.3	88.3	579	2.2	97

### 9160/ab-cd-1f, Transmitter Supply Unit

a = Number of Channels: 1 or 2  
b = Design: 1, 3, 4 or 9  
c = Input: 1 or 8  
d = Output: 0 or 1  
f = Line fault detection: 0, 1 or 3

Max Entity Parameters					
Terminals	Voc	Isc	Po	Ca	La
	(V)	(mA)	(mW)	(nF)	(mH)

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12(+), 10(-)	27.0	87.9	574	90	2.3
13(+), 14(-)*	27.0	87.9	574	90	2.3
12(+), 10 (signal), 11(-)	27.0	88.3	574	90	2.3
13(+), 14 (signal), 15(-) )*	27.0	88.3	574	90	2.3
10 (signal), 11(-)	4.1	≈0	≈0	100000	1000
14 (signal), 15(-)*	4.1	≈0	≈0	100000	1000

\* = Only for Model type 9160/2b-1d-1f

### 9162/13-11-14, Transmitter Supply Unit with Limit values

Entity Parameters:

2-wire Transmitter (Pins 11, 12) ; Voc = 27VDC, Isc = 87.9mA, Po = 574mW, Ca = 90nF, La = 2.3mH,  
 3-wire Transmitter (Pins 10, 11, 12); Voc = 27VDC, Isc = 88.3mA, Po = 574mW, Ca = 90nF, La = 2.3mH,  
 Active Current Source (Pins 10, 11); Voc = 4.1VDC, Isc ≈ 0mA, Po ≈ 0mW, Ca = 100μF, La = 1H

### 9163/ab-cd-1f, Isolating Repeater Input

- a = Number of Channels: 1 or 2
- b = Design: 1, 3, 4 or 9
- c = Input: 1 or 8
- d = Output Signal: 0 or 1
- f = Special Function: 0, 1 or 3

Entity Parameter only for type 9163/\*\*-1\*-1\*:

Terminals 10 (+), 11 (-) or 14 (+), 15 (-)\*;  
 Vmax = 30 V, Imax = 150 mA, Pi = 1 W, Ci = 0 μF, Li = 0 mH  
 Voc = 0 V, Isc = 0 mA, Po = 0 mW, Ca = - , La -

\* Only for Model type 9163/2b-8d-1f

Entity Parameter only for type 9163/\*\*-8\*-1\*:

Terminals 10/12 (+), 11 (-) or 13/14 (+), 15 (-)\*;  
 Vmax = 30 V, Imax = 150 mA, Pi = 1 W, Ci = 0 μF, Li = 0 mH  
 Voc = 4.1 V, Isc = 0 mA, Po = 0 mW, Ca = - , La -

\* Only for Model type 9163/2b-8d-1f

### 9165/ab-11-1f, Isolating Repeater

- a = Number of Channels: 1 or 2
- b = Signal: 1 or 6
- f = Special Input: 0 or 1

<i>Max Entity Parameters</i>					
<i>Terminals</i>	<i>Voc</i>	<i>Isc</i>	<i>Po</i>	<i>Ca</i>	<i>La</i>
	<i>(V)</i>	<i>(mA)</i>	<i>(mW)</i>	<i>(nF)</i>	<i>(mH)</i>
10(+), 11(-)	25.6	96	605	103	1.9
14(+), 15(-)*	25.6	96	605	103	1.9

\* = Only for Model type 9165/2b-11-1f

### 9180/ab-77-11, Resistance Isolator

- a = Number of Channels: 1 or 2
- b = Measuring Range: 0 or 1

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Entity Parameters:

Voc = 6.5VDC, I<sub>sc</sub> = 16.5mA, P<sub>o</sub> = 27mW Ca = 25μF, La = 120mH

**Group III: In type of protection Nonincendive and Non-Sparking for Zone 2 markings.**

**9160/ab-cd-6f, Transmitter Supply Unit**

- a = Number of Channels: 1 or 2
- b = Design: 1, 3, 4 or 9
- c = Input: 1 or 8
- d = Output: 0 or 1
- f = Line fault detection: 0, 1 or 3

**9162/13-11-64, Transmitter Supply Unit with Limit values**

**9165/ab-11-6f, Isolating Repeater**

- a = Number of Channels: 1 or 2
- b = Signal: 1 or 6
- f = Special Input: 0 or 1

**9185/12-4d-10, Fieldbus Isolating Repeater**

- d = Functionality: 5 or 6

**Group IV: In type of protection Nonincendive and Intrinsically Safe outputs.**

**Type 9167/ab-11-00, Isolating Repeater Loop Powered**

- a = Number of Channels: 1 or 2
- b = Output Signal: 1, 3 or 4

Max Entity Parameters								
Models	Terminals	Voc	Vt	Isc	It	Po	Ca	La
		(V)	(V)	(mA)	(mA)	(mW)	(μF)	(mH)
9167/a1-11-00	10 (+), 11 (-) or 14 (+), 15 (-)*	15.7	-	60.0	-	233	0.48 7	10
9167/a3-11-00	10 (+), 11 (-) or 14 (+), 15 (-)*	25.0	-	99	-	613	0.11	2.5
9167/a4-11-00	10 (+), 11 (-) or 14 (+), 15 (-)*	18.8	-	107	-	503	0.26 6	3

\* Only for Model type 9167/2b-11-00

**9170/a0-cd-11, Switching Repeater**

- a = Number of Channels: 1 or 2
- c = Input Stage: 1, 2, 3, 4, or 5
- d = Output Stage: 0, 1 or 4

Max Entity Parameters								
Models	Terminals	Voc	Vt	Isc	It	Po	Ca	La
		(V)	(V)	(mA)	(mA)	(mW)	(μF)	(mH)

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9170/a0-cd-11 c =1, 3, 4, 5	10(+),11(-) or 14(+), 15(-)*	10.6	-	24	-	64	2.32	63
	10-14 (+), 11-15 (-)*	-	10.6	-	48	128	2.32	16
9170/a0-2d-11	10 (+),11(-) or 14(+), 15(-)*	10.6	-	1.1	-	2.9	2.32	1000
	10-14 (+), 11-15 (-)*	-	10.6	-	2.2	5.8	2.32	1000

\* = Only for Model type 9170/20-cd-11

### 9170/a1-cd-1f, Switching Repeater

a = Number of Channels: 1 or 2  
 c = Input Stage: 1, 2, 3, 4, 5 or 6  
 d = Output Stage: 0, 1 or 4  
 f = Line Fault Detection: 0, 1, 2 or 3

Max Entity Parameters								
Models	Terminals	Voc	Vt	Isc	It	Po	Ca	La
		(V)	(V)	(mA)	(mA)	(mW)	( $\mu$ F)	(mH)
9170/a1-cd-1f c =1, 3, 4, 5, 6	10(+),11(-) or 14(+), 15(-)*	9.6	-	10	-	24	3.6	350
	10-14 (+), 11-15 (-)*	-	9.6	-	20	48	3.6	90
9170/a1-2d-1f	10 (+),11(-) or 14(+), 15(-)*	9.6	-	0.61	-	1.5	3.6	1000
	10-14 (+), 11-15 (-)*	-	9.6	-	1.22	3	3.6	1000

\* = Only for Model type 9170/21-cd-1f

### 9172/a0-11-00, IS Relay Module

a = Number of Channels: 1 or 2

Entity Parameter: Terminals 10 (+), 11 (-) or 14 (+), 15 (-)\*;  
 Vmax = 30 V, Imax = 150 mA, Pi = 1.3 W, Ci = 0  $\mu$ F, Li = 0 mH.  
 Voc = 0 V, Isc = 0 mA, Po = 0 mW, Ca = - , La -  
 \* Only for Model type 9172/20-11-00

### 9172/a1-11-00, IS Relay Module

a = Number of Channels: 1 or 2

Models	Terminals	Vmax	Imax	Pi	Ci	Li
9172/a1-11-00	10 (NO), 11 (C) 12 (NC) or 13 (NC) 14 (NO), 15 (C) *	125 Vac	4 A	-	0	0
		125 Vdc	0.25 A	-	0	0
		60 Vdc	0.3 A	-	0	0
		30 Vdc	4 A	-	0	0

\* Only for Model type 9172/21-11-00

### 9172/a2-11-00, IS Relay Module

a = Number of Channels: 1 or 2

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Entity Parameter: Terminals 10 (+), 11 (-) or 14 (+), 15 (-)\*;  
 Vmax = 30 V, Imax = 150 mA, Pi = 1.3 W, Ci = 0 μF, Li = 0 mH.  
 Voc = 0 V, Isc = 0 mA, Po = 0 mW, Ca = - , La -  
 \* Only for Model type 9172/22-11-00

Models	Terminals	Vmax	Imax	Pi	Ci	Li
9172/a2-11-00	1 (NO), 2 (C) 3 (NC) or 4 (NC) 5 (NO), 6 (C) *	125 Vac	4 A	-	0	0
		125 Vdc	0.25 A	-	0	0
		60 Vdc	0.3 A	-	0	0
		30 Vdc	4 A	-	0	0

\* Only for Model type 9172/22-11-00

### 9175/a0-1d-1f, Digital Output

a = Number of Channels: 1 or 2  
 d = Output: 2, 4 or 6  
 f = line fault option: 0, 1 or 2

<i>Max Entity Parameters for Division 1 and Zone 0 (ia)</i>								
Models	Terminals	Voc (V)	Vt (V)	Isc (mA)	It (mA)	Po (mW)	Ca (μF)	La (mH)
9175/a0-12-1f	10(+),11(-) or 14(+), 15(-)*	11.3	-	75	-	210	1.79	6.3
	10-14 (+), 11-15 (-)*	-	11.3	-	150	420	1.79	1.5
9175/a0-14-1f	10 (+),11(-) or 14(+), 15(-)*	19.6	-	150	-	732	0.235	1.5
	10-14 (+), 11-15 (-)*	-	19.6	-	300	1464	0.235	0.3
9175/a0-16-1f	10 (+),11(-) or 14(+), 15(-)*	27.6	-	110	-	760	0.085	1.2

\* = Only for Model type 9175/20-1d-1f

<i>Max Entity Parameters for Zone 1 (ib)</i>								
Models	Terminals	Voc (V)	Vt (V)	Isc (mA)	It (mA)	Po (mW)	Ca (μF)	La (mH)
9175/a0-14-1f	10 (+),11(-) or 14(+), 15(-)*	19.6	-	60	-	732	0.235	1.5
	10-14 (+), 11-15 (-)*	-	19.6	-	120	1464	0.235	0.3
9175/a0-16-1f	10 (+),11(-) or 14(+), 15(-)*	27.6	-	50	-	760	0.085	1.2

\* = Only for Model type 9175/20-1d-1f

### 9175/20-16-1f, Digital Output

f = line fault option: 0, 1 or 2

When channel 1 and channel 2 are connected in parallel, the device may only be used for Group C-G / IIB.

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<i>Max Enty Parameters for Division 1 and Zone 0 (ia)</i>								
Models	Terminals	Voc	Vt	Isc	It	Po	Ca	La
		(V)	(V)	(mA)	(mA)	(mW)	( $\mu$ F)	(mH)
9175/20-16-1f	10-14 (+), 11-15 (-)	-	27.6	-	220	1520	665	1.8

<i>Max Enty Parameters for Zone 1 (ib)</i>								
Models	Terminals	Voc	Vt	Isc	It	Po	Ca	La
		(V)	(V)	(mA)	(mA)	(mW)	( $\mu$ F)	(mH)
9175/20-16-1f	10-14 (+), 11-15 (-)	-	27.6	-	100	1520	665	1.8

**9176/a0-1d-00, Digital Output Loop Powered**

a = Number of Channels: 1 or 2  
d = Output Signal: 2, 4, 5, 6 or 7

<i>Max Enty Parameters for Division 1 and Zone 0 (ia)</i>								
Models	Terminals	Voc	Vt	Isc	It	Po	Ca	La
		(V)	(V)	(mA)	(mA)	(mW)	( $\mu$ F)	(mH)
9176/a0-12-00	10(+),11(-) or 14(+), 15(-)*	11.3	-	75	-	210	1.79	6.3
	10-14 (+), 11-15 (-)*	-	11.3	-	150	420	1.79	1.5
9176/a0-14-00	10(+),11(-) or 14(+), 15(-)*	19.6	-	150	-	732	0.23 5	1.5
	10-14 (+), 11-15 (-)*	-	19.6	-	300	1464	0.23 5	0.3
9176/a0-15-00	10(+),11(-) or 14(+), 15(-)*	27.6	-	86.5	-	596	0.08 5	1.8
9176/a0-16-00	10(+),11(-) or 14(+), 15(-)*	27.6	-	110	-	760	0.08 5	1.2
9176/a0-17-00	10(+),11(-) or 14(+), 15(-)*	27.6	-	60	-	415	0.08 5	6.6

\* Only for Model type 9176/20-1d-00

<i>Max Enty Parameters for Zone 1 (ib)</i>								
Models	Terminals	Voc	Vt	Isc	It	Po	Ca	La
		(V)	(V)	(mA)	(mA)	(mW)	( $\mu$ F)	(mH)
9176/a0-14-00	10(+),11(-) or 14(+), 15(-)*	19.6	-	60	-	732	0.23 5	1.5
	10-14 (+), 11-15 (-)*	-	19.6	-	120	1464	0.23 5	0.3
9176/a0-15-00	10 (+),11(-) or 14(+), 15(-)*	27.6	-	44	-	596	0.08 5	1.8
9176/a0-16-00	10 (+),11(-) or 14(+), 15(-)*	27.6	-	50	-	760	0.08 5	1.2

\* = Only for Model type 9176/20-1d-00

**9176/20-1d-00, Digital Output Loop Powered**

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d = Output Signal: 5, 6 or 7

When channel 1 and channel 2 are connected in parallel, the device may only be used for Group C-G / IIB.

<i>Max Entity Parameters for Division 1 and Zone 0 (ia)</i>								
<i>Models</i>	<i>Terminals</i>	<i>Voc</i>	<i>Vt</i>	<i>Isc</i>	<i>It</i>	<i>Po</i>	<i>Ca</i>	<i>La</i>
		<i>(V)</i>	<i>(V)</i>	<i>(mA)</i>	<i>(mA)</i>	<i>(mW)</i>	<i>(μF)</i>	<i>(mH)</i>
9176/20-15-00	10-14 (+), 11-15 (-)	-	27.6	-	173	1192	0.66 5	2.5
9176/20-16-00	10-14 (+), 11-15 (-)	-	27.6	-	220	1520	0.66 5	1.8
9176/20-17-00	10(+),11(-) 14(+), 15(-)*	-	27.6	-	120	830	0.66 5	7.5

<i>Max Entity Parameters for Zone 1 (ib)</i>								
<i>Models</i>	<i>Terminals</i>	<i>Voc</i>	<i>Vt</i>	<i>Isc</i>	<i>It</i>	<i>Po</i>	<i>Ca</i>	<i>La</i>
		<i>(V)</i>	<i>(V)</i>	<i>(mA)</i>	<i>(mA)</i>	<i>(mW)</i>	<i>(μF)</i>	<i>(mH)</i>
9176/20-15-00	10-14 (+), 11-15 (-)	-	27.6	-	88	1192	0.66 5	2.5
9176/20-16-00	10-14 (+), 11-15 (-)	-	27.6	-	100	1520	0.66 5	1.8

**9182/a0-5d-1f, Temperature Transmitter**

a = Number of Channels: 1 or 2

d = Output: 0, 1, 3 or 9

f = Limit Contact and SIL option: 1, 2, 3 or 4

<i>Max Output Entity Parameters</i>						
<i>Models</i>	<i>Terminals</i>	<i>Voc</i>	<i>Isc</i>	<i>Po</i>	<i>Ca</i>	<i>La</i>
		<i>(V)</i>	<i>(mA)</i>	<i>(mW)</i>	<i>(μF)</i>	<i>(mH)</i>
9182/a0-5d-1f	11,12 or 10,11,12 and/or 13, 15 or 13, 14, 15	6.5	19.7	32	25	90

**Group V: In type of protection Associated Apparatus with Intrinsically Safe outputs.**

**9170/a0-cd-e1, Switching Repeater**

a = Number of Channels: 1 or 2

c = Input Stage: 1, 2, 3, 4 or 5

d = Output Stage: 2 or 3

e = Auxiliary Power: 1 or 2

<i>Max Entity Parameters</i>								
<i>Models</i>	<i>Terminals</i>	<i>Voc</i>	<i>Vt</i>	<i>Isc</i>	<i>It</i>	<i>Po</i>	<i>Ca</i>	<i>La</i>
		<i>(V)</i>	<i>(V)</i>	<i>(mA)</i>	<i>(mA)</i>	<i>(mW)</i>	<i>(μF)</i>	<i>(mH)</i>
9170/a0-cd-e1 b = 1, 3, 4, or 5	10(+),11(-) or 14(+), 15(-)*	10.6	-	24	-	64	2.32	63
	10-14 (+), 11-15 (-)*	-	10.6	-	48	128	2.32	16

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9170/a0-2d-e1	10 (+),11(-) or 14(+), 15(-)*	10.6	-	1.1	-	2.9	2.32	1000
	10-14 (+), 11-15 (-)*	-	10.6	-	2.2	5.8	2.32	1000

\* = Only for Model type 9170/20-cd-e1

### 9170/a1-cd-ef, Switching Repeater

a = Number of Channels: 1 or 2  
 c = Input Stage: 1, 2, 3, 4, 5 or 6  
 d = Output Stage: 2 or 3  
 e = Auxiliary Supply: 1 or 2  
 f = Line Fault Detection: 0, 1, 2, or 3

Max Entity Parameters								
Models	Terminals	Voc (V)	Vt (V)	Isc (mA)	It (mA)	Po (mW)	Ca (μF)	La (mH)
9170/a1-cd-ef c =1, 3, 4, 5, 6	10(+),11(-) or 14(+), 15(-)*	9.6	-	10	-	24	3.6	350
	10-14 (+), 11-15 (-)*	-	9.6	-	20	48	3.6	90
9170/a1-2d-ef	10 (+),11(-) or 14(+), 15(-)*	9.6	-	0.61	-	1.5	3.6	1000
	10-14 (+), 11-15 (-)*	-	9.6	-	1.22	3	3.6	1000

\* = Only for Model type 9170/21-cd-ef

**Group VI: In type of protection Nonincendive and Increased Safety, Encapsulation and Intrinsic Safety with Intrinsically Safe and Ex op is outputs.**

### 9186/12-11-1f, Fiber Optic Isolating Repeater

f = Fault Monitoring: 0 or 1.

Entity Parameters:

Fault Monitoring Circuit; Ui (Vmax) = 24VDC, Ii (Imax) = 600mA, Ci = 0, Li = 0  
 IS Bus Interface Uo (Voc) = 3.7VDC, Io (Isc) = 148mA, Po = 137mW, Co = 100μF, Lo = 1.3mH,  
 Ui (Vmax) ±4.2VDC, Ci = 0, Li = 0

**Group VII: In type of protection Intrinsic Safety for Division 1 and Zone 0 with Intrinsically Safe outputs.**

### 9164/13-20-08, mA-Isolating Repeater

Entity Parameters:

Input Terminals 3(+), 4(-): Ui = 30Vdc, Ii = 150mA, Pi = 1W, Li = 0mH, Ci = 0nF  
 Output Terminals 1(+), 2(-): Ui = 30Vdc, Ii = 150mA, Pi = 1W, Li = 0mH, Ci = 0nF

**Group VIII: In type of protection Nonincendive and Non-Sparking for Zone 2 markings and Intrinsically Safe output.**

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## **9185/11-cd-10, Fieldbus Isolating Repeater**

c = Field side interface: 3 or 4

d = Functionality: 5 or 6

<i>Max Output Entity Parameters</i>							
<i>Models</i>	<i>Terminals</i>	<i>Voc</i>	<i>Isc</i>	<i>Po</i>	<i>Ca</i>	<i>La</i>	<i>Vmax</i>
		<i>(V)</i>	<i>(mA)</i>	<i>(mW)</i>	<i>(<math>\mu</math>F)</i>	<i>(mH)</i>	<i>(V)</i>
9185/11-35-10	3, 5, 6, and 8	3.73	149	139	100	1.3	$\pm$ 4.2
9185/11-4b-10	3, 4, 8 and 9	5.88	50	73.3	43	15	$\pm$ 5.88

**Group VIII: In type of protection Nonincendive and Increased Safety.**

**Type 9193/21-11-11, Supply Module**

**Type 9294/31-12, pac-Bus**

**Type 9194/50-01, Terminal Set**

### 13. **Specific Conditions of Use:**

#### **All Modules**

1. Shall be installed in compliance with the enclosure, mounting, spacing and segregation requirements of the ultimate application including access only by the use of a tool.

#### **9186/12-11-1f, Fiber Optic Isolating Repeater**

1. The Fiber Optic Isolating Repeater shall be installed in compliance with the enclosure, mounting, spacing and segregation requirements of the ultimate application.
2. For Zone 1 installations the enclosure shall maintain mechanical retention for the power supply cable.

#### **9193/21-11-11, Supply Module (Group VIII)**

#### **9294/31-12, Pac-Bus and 9194/50-01, Terminal Set (Group VIII)**

1. Equipment shall be installed in an enclosure with the minimum degree of protection IP54 and providing at least pollution degree 2, according to CSA C22.2No. 60079-0, CSA C22.2No.60079-7 and CSA C22.2 No. 60664-1.

### 14. **Test and Assessment Procedure and Conditions:**

This Certificate has been issued in accordance with FM Approvals Canadian Certification Scheme.

### 15. **Schedule Drawings**

A copy of the technical documentation has been kept by FM Approvals.

### 16. **Certificate History**

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Canadian Certificate Of Conformity No: FM16CA0067X

Details of the supplements to this certificate are described below:

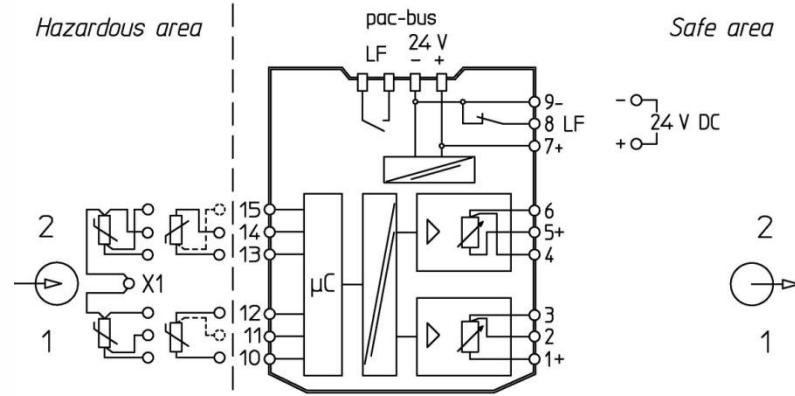
Date	Description
21 <sup>st</sup> September 2006	Original Issue 3027620C.
25 <sup>th</sup> August 2016	<u>Supplement 15:</u> Report Reference: – 3057591 dated 25 <sup>th</sup> August 2016. Description of the Change: Addition of Type 9164, converted certificate to new format.
26 <sup>th</sup> October 2016	<u>Supplement 16:</u> Report Reference: – RR206832 dated 26 <sup>th</sup> October 2016. Description of the Change: 1) Minor circuit changes. 2) Correction of typographical errors and updates to label markings section.
17 <sup>th</sup> April 2017	<u>Supplement 17:</u> Report Reference: – RR209196 dated 17 <sup>th</sup> April 2017. Description of the Change: Minor typographical errors corrected.
13 <sup>th</sup> January 2023	<u>Supplement 18:</u> Report Reference: – PR462553 dated 13 <sup>th</sup> January 2023. Description of the Change: The System has been modified in the following manner: <ol style="list-style-type: none"><li>1. New PCB Construction for Type 9193/21-11-11 for Zone 2 /Div. 2 locations.</li><li>2. New 9294/31-12 Pac-Bus .</li><li>3. List terminal set for pac-Bus Type 9194/50-01.</li><li>4. Corrections to certificate Various typographical errors and clarify Type 9193/** numbering</li></ol>

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Type 9180/\*\*-77-11



Hazardous area: Class I, II, III; DIV 1; Group A-G or Class I; Zone 0; Group IIC/IIB Hazardous Locations  
 Safe area: Non-Hazardous; Division 2 or Zone 2 Hazardous (Classified) Locations

The Resistance Isolator Type 9180 is an associated apparatus as well as a nonincendive apparatus providing intrinsically safe connections for one (or two) field devices located in Class I, II, III, Division 1, Group A-G or Class I, Zone 0 [AEx ia] Group IIC, Hazardous Locations according to NEC Article 504/505 as listed below.

Resistance Isolator Type 9180/ab-77-11  
 a = numeral 1 or 2 for number of channels  
 b = numeral 0 or 1 for measuring range

Entity parameters for wiring configurations are as follows:

Terminal	V <sub>OC</sub> [V]	I <sub>SC</sub> [mA]	P <sub>O</sub> [mW]	L <sub>O</sub> CL I, DIV 1, A,B / Zone 0, GP IIC	L <sub>O</sub> CL I, DIV 1, C-G/ Zone 0, GP IIB	C <sub>O</sub> CL I, DIV 1, A,B / Zone 0, GP IIC	C <sub>O</sub> CL I, DIV 1, C-G/ Zone 0, GP IIB	V <sub>max</sub>	I <sub>max</sub>
10 - 15	6,5	16,5	27	120 mH	450 mH	25 µF	570 µF	-	-

Notes:

- Intrinsically safe apparatus may be switches, thermocouples, LEDs, RTDs or an FM Approved System or Entity device connected in accordance with the manufacturer's installation instructions.
- For Entity concept use the appropriate parameters to ensure the following:  
 $V_t \text{ or } V_{OC} \leq V_{max}$        $C_o, C_a \geq C_i + C_{leads}$        $P_o \leq P_i$   
 $I_t \text{ or } I_{SC} \leq I_{max}$        $L_o, L_a \geq L_i + L_{leads}$
- Electrical apparatus connected to an intrinsically safe system should not use or generate voltages > 250 V (U<sub>max</sub>).
- Installation should be in accordance with Article 504/505 of the National Electrical Code, ANSI/NFPA 70 and ANSI/ISA RP 12.06.01.
- Installation in Canada should be in accordance with the Canadian Electrical Code, CSA C22.1, Part 1, Appendix F.
- Use a general purpose enclosure meeting the requirements of IEC 61010-1 for use in Non-Hazardous or Class I, Division 2, Hazardous (Classified) Locations.
- Use an FM Approved Dust-ignition proof enclosure appropriate for environmental protection in Class II, Division 1, Groups E, F and G; and Class III, Hazardous (Classified) Locations.
- These modules are to be mounted on DIN rail, DIN rail with pac-Bus (type 9194) or pac-Carrier (type 9195). The field wiring in any case is connected to the ISpac device terminals.
- Ambient temperature: -20°C ... +70°C (any mounting position)

WARNING: Do not disconnect equipment when a flammable or combustible atmosphere is present.  
 AVERTISSEMENT: Ne pas débrancher l'équipement en présence d'atmosphère inflammable ou combustible.

The safety relevant statements of this document may be transferred into the operating instructions. Transferring the text, editorial changes of equivalent meaning are allowed.

			2006	Date	Name	Certification drawing	Scale
			drawn	24.05.	Einsiedler		none
			checked		Kaiser		Sheet 1 of 1
03	22.10.12	Reistle	<b>STAHL</b>			Resistance Isolator Type 9180/**-77-11	Agency FM
02	24.08.11	Reistle					
01	19.09.06	Einsiedler					
Version	Date	Name	Ers. f.			Ers. d.	A4

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