

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 9th 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

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
Manager, Electrical Systems

17 April 2017

Date

To verify the availability of the Approved product, please refer to 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 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 manufacturer's control drawings.

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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/**-**-**

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

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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. 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 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

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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 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

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

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

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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

9162/13-11-14, 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-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

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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

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, 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

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US Certificate Of Conformity No: FM16US0122X

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 (V)	Vt (V)	Isc (mA)	It (mA)	Po (mW)	Ca (μF)	La (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 (V)	Vt (V)	Isc (mA)	It (mA)	Po (mW)	Ca (μF)	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

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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 (μF)	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 μF, 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

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US Certificate Of Conformity No: FM16US0122X

9172/a2-11-00, 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 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

Max Entity Parameters for Division 1 and Zone 0 (ia)								
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

Max Entity Parameters for Zone 1 (ib)								
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

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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.

Max Entity Parameters for Division 1 and Zone 0 (ia)								
Models	Terminals	Voc (V)	Vt (V)	Isc (mA)	It (mA)	Po (mW)	Ca (μ F)	La (mH)
9175/20-16-1f	10-14 (+), 11-15 (-)	-	27.6	-	220	1520	665	1.8
Max Entity Parameters for Zone 1 (ib)								
Models	Terminals	Voc (V)	Vt (V)	Isc (mA)	It (mA)	Po (mW)	Ca (μ F)	La (mH)
9175/20-16-1f	10-14 (+), 11-15 (-)	-	27.6	-	100	1520	665	1.8

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US Certificate Of Conformity No: FM16US0122X

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

Max Entity Parameters for Division 1 and Zone 0 (ia)								
Models	Terminals	Voc (V)	Vt (V)	Isc (mA)	It (mA)	Po (mW)	Ca (μF)	La (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

Max Entity Parameters for Zone 1 (ib)								
Models	Terminals	Voc (V)	Vt (V)	Isc (mA)	It (mA)	Po (mW)	Ca (μF)	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

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US Certificate Of Conformity No: FM16US0122X

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.

Max Entity Parameters for Division 1 and Zone 0 (ia)								
Models	Terminals	Voc (V)	Vt (V)	Isc (mA)	It (mA)	Po (mW)	Ca (μ 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

Max Entity Parameters for Zone 1 (ib)								
Models	Terminals	Voc (V)	Vt (V)	Isc (mA)	It (mA)	Po (mW)	Ca (μ 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

Max Output Entity Parameters						
Models	Terminals	Voc	Isc	Po	Ca	La
		(V)	(mA)	(mW)	(μ F)	(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

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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

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

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

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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 = 100 μ F, L_o = 1.3mH,
 U_i (Vmax) $\pm$ 4.2VDC, C_i = 0, L_i = 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(+) and 4(-): U_i = 30 V DC, I_i = 150 mA, P_i = 1 W, L_i = 0 mH, C_i = 0 nF
Output Terminals 1(+) and 2(-): U_i = 30 V DC, I_i = 150 mA, P_i = 1 W, L_i = 0 mH, C_i = 0 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)	(μ 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

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.

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US Certificate Of Conformity No: FM16US0122X

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 th April 2004	Original Issue Project 3017145.
25 th August 2016	<u>Supplement 21:</u> Report Reference: – 3057591 dated 25 th August 2016 Description of the Change: Addition of Type 9164, converted certificate to new format.
26 th October 2016	<u>Supplement 22:</u> Report Reference: – RR206832 dated 26 th October 2016 Description of the Change: 1) Minor circuit changes. 2) Correction of typographical errors and updates to label markings section.
17 th April 2017	<u>Supplement 23:</u> Report Reference: – RR209141 dated 17 th April 2017 Description of the Change: Minor typographical errors corrected.

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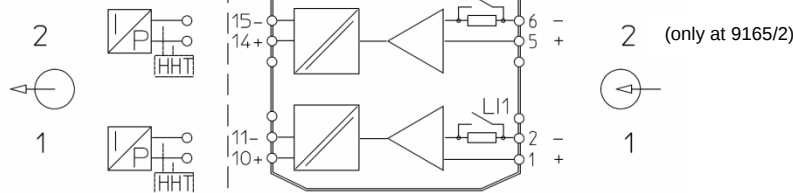
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Type 9165/**-11-1*

Hazardous area

Safe area



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 Isolating Repeater Type 9165/**-11-1* is an associated apparatus as well as a nonincendive apparatus for installation in non-hazardous or Class I, Division 2 or Zone 2 Hazardous (Classified) Locations and provides 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.

Isolating Repeater Type 9165/ab-11-1f

a = numeral 1 or 2 for number of channels
b = numeral 1 or 6 for signal (without / with HART)
f = numeral 1 or 0 for special inputs (open- / short-circuit detection)

Entity parameters for wiring configurations are as follows:

	V_{OC} [V]	I_{SC} [mA]	P_O [mW]	L_O CL I, DIV 1, A, B / Zone 0, GP IIC	L_O CL I, DIV 1, C-G / Zone 0, GP IIB	C_O CL I, DIV 1, A, B / Zone 0, GP IIC	C_O CL I, DIV 1, C-G / Zone 0, GP IIB	V_{max}	I_{max}
Type 9165/**-11-1*	25.6	96	605	1.9 mH	11 mH	103 nF	800 nF	-	-

Notes:

- For Connections refer to chapter Commissioning of Operating Instruction Id-No. 91 656 12 31 0.
- 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_i or $V_{OC} \leq V_{max}$ $C_O, C_a \geq C_i + C_{leads}$ $P_O \geq P_i$
 I_i 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_{max}).
- 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 I.S. 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.

			2007	Date	Name	Certification drawing	Scale
			drawn	04.05.	Einsiedler		none
			checked		Kaiser		Sheet
						Isolating Repeater Type 9165/**-11-1*	1 of 1
02	22.10.12	Reistle					Agency
01	15.04.11	Reistle					FM
Version	Date	Name				Ers. f.	A4

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 21st 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
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
Manager, Electrical Systems

17 April 2017

Date

To verify the availability of the Approved product, please refer to www.approvalguide.com

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Canadian Certificate Of Conformity No: FM16CA0067X

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.

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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 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.

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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/**_**-**

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

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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. 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 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

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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

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

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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

9162/13-11-14, 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-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

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9165/ab-11-1f, Isolating Repeater

a = Number of Channels: 1 or 2

b = Signal: 1 or 6

f = Special Input: 0 or 1

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, 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

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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 (V)	Vt (V)	Isc (mA)	It (mA)	Po (mW)	Ca (μF)	La (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 (V)	Vt (V)	Isc (mA)	It (mA)	Po (mW)	Ca (μF)	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

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SCHEDULE

Canadian Certificate Of Conformity No: FM16CA0067X

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 (μF)	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 μF, 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

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9172/a2-11-00, 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 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

Max Entity Parameters for Division 1 and Zone 0 (ia)								
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

Max Entity Parameters for Zone 1 (ib)								
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

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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>								
<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)	(μ 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>								
<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)	(μ F)	(mH)
9175/20-16-1f	10-14 (+), 11-15 (-)	-	27.6	-	100	1520	665	1.8

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

a = Number of Channels: 1 or 2

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

Max Entity Parameters for Division 1 and Zone 0 (ia)								
Models	Terminals	Voc (V)	Vt (V)	Isc (mA)	It (mA)	Po (mW)	Ca (μF)	La (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

Max Entity Parameters for Zone 1 (ib)								
Models	Terminals	Voc (V)	Vt (V)	Isc (mA)	It (mA)	Po (mW)	Ca (μF)	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

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SCHEDULE



Canadian Certificate Of Conformity No: FM16CA0067X

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>								
<i>Models</i>	<i>Terminals</i>	<i>Voc</i> (V)	<i>Vt</i> (V)	<i>Isc</i> (mA)	<i>It</i> (mA)	<i>Po</i> (mW)	<i>Ca</i> (μF)	<i>La</i> (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>								
<i>Models</i>	<i>Terminals</i>	<i>Voc</i> (V)	<i>Vt</i> (V)	<i>Isc</i> (mA)	<i>It</i> (mA)	<i>Po</i> (mW)	<i>Ca</i> (μF)	<i>La</i> (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>						
<i>Models</i>	<i>Terminals</i>	<i>Voc</i> (V)	<i>Isc</i> (mA)	<i>Po</i> (mW)	<i>Ca</i> (μF)	<i>La</i> (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

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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

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

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

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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 (V_{max}) = 24VDC, I_i (I_{max}) = 600mA, C_i = 0, L_i = 0
IS Bus Interface U_o (V_o) = 3.7VDC, I_o (I_{sc}) = 148mA, P_o = 137mW, C_o = 100 μ F, L_o = 1.3mH,
 U_i (V_{max}) $\pm$ 4.2VDC, C_i = 0, L_i = 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(-): U_i = 30Vdc, I_i = 150mA, P_i = 1W, L_i = 0mH, C_i = 0nF

Output Terminals 1(+), 2(-): U_i = 30Vdc, I_i = 150mA, P_i = 1W, L_i = 0mH, C_i = 0nF

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	V_o	I_{sc}	P_o	C_a	L_a	V_{max}
		(V)	(mA)	(mW)	(μ 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

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.

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Canadian Certificate Of Conformity No: FM16CA0067X

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

Details of the supplements to this certificate are described below:

Date	Description
21 st September 2006	Original Issue 3027620C.
25 th August 2016	<u>Supplement 15:</u> Report Reference: – 3057591 dated 25 th August 2016 Description of the Change: Addition of Type 9164, converted certificate to new format.
26 th October 2016	<u>Supplement 16:</u> Report Reference: – RR206832 dated 26 th October 2016 Description of the Change: 1) Minor circuit changes. 2) Correction of typographical errors and updates to label markings section.
17 th April 2017	<u>Supplement 17:</u> Report Reference: – RR209141 dated 17 th April 2017 Description of the Change: Minor typographical errors corrected.

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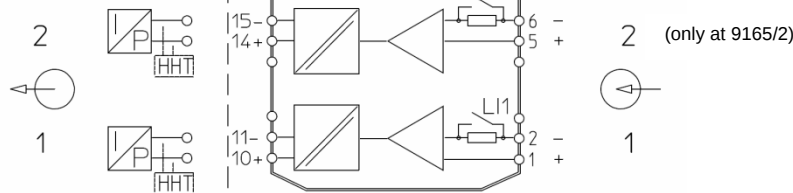
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Type 9165/**-11-1*

Hazardous area

Safe area



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 Isolating Repeater Type 9165/**-11-1* is an associated apparatus as well as a nonincendive apparatus for installation in non-hazardous or Class I, Division 2 or Zone 2 Hazardous (Classified) Locations and provides 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.

Isolating Repeater Type 9165/ab-11-1f

a = numeral 1 or 2 for number of channels
b = numeral 1 or 6 for signal (without / with HART)
f = numeral 1 or 0 for special inputs (open- / short-circuit detection)

Entity parameters for wiring configurations are as follows:

	V_{OC} [V]	I_{SC} [mA]	P_O [mW]	L_O CL I, DIV 1, A, B / Zone 0, GP IIC	L_O CL I, DIV 1, C-G / Zone 0, GP IIB	C_O CL I, DIV 1, A, B / Zone 0, GP IIC	C_O CL I, DIV 1, C-G / Zone 0, GP IIB	V_{max}	I_{max}
Type 9165/**-11-1*	25.6	96	605	1.9 mH	11 mH	103 nF	800 nF	-	-

Notes:

- For Connections refer to chapter Commissioning of Operating Instruction Id-No. 91 656 12 31 0.
- 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_i or $V_{OC} \leq V_{max}$ $C_O, C_a \geq C_i + C_{leads}$ $P_O \geq P_i$
 I_i 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_{max}).
- 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 I.S. 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.

			2007	Date	Name	Certification drawing	Scale
			drawn	04.05.	Einsiedler		none
			checked		Kaiser		Sheet
						Isolating Repeater Type 9165/**-11-1*	1 of 1
02	22.10.12	Reistle					Agency
01	15.04.11	Reistle					FM
Version	Date	Name				Ers. f.	A4