

INTRINSIC SAFETY BARRIER  
FOR FIELDBUS



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www.smar.com

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Up-to-date address information is available on our website.

web: [www.smar.com/contactus.asp](http://www.smar.com/contactus.asp)

## AVOIDING ELECTROSTATIC DISCHARGES



### ATTENTION

Electrostatic discharges may damage semiconductor electronic components in printed circuit boards. They usually occur when touching components or connector pins from modules and racks, without wearing the appropriate equipment to prevent discharges. It is recommended to take the following precautions:

- Before handling modules and racks, remove the electrostatic charge from your body by wearing a proper wristband or touching grounded devices;
- Avoid touching electronic components or connector pins from racks and modules.

# DF47-12/DF47-17 – INTRINSIC SAFETY BARRIER FOR FIELDBUS

## Description

The Intrinsically Safe (I.S.) technology incorporated in the DF47-12 and DF 47-17 totally isolates the control network on the hazardous side of the barrier. The I.S. values of the power supply are designed for fieldbus devices, which are in compliance with the FISCO model.

The incorporation of a Fieldbus repeater in compliance with IEC 61158-2 (31.25 kbits/s) essentially filters and boosts the incoming communication signal transmitting it to hazardous environment. The networks of the hazardous and safe sides of the DF47-12 and DF47-17 are completely independent from one another.

In addition, the bus termination for the hazardous network is incorporated into the DF47-12 and DF47-17, which means that only a single far terminator is required.

### NOTES

If the terminator of the DF53 module is not being used, it is necessary to install another external terminator in the safe area.

The model DF47 was discontinued due to the new FISCO recommendations. The replacement by DF47-12 or DF47-17 models should be evaluated according to the current limits. The model DF47-17 supports up to 7 Smar's devices of the 302 series. If the replacement is using the DF47-12 model, it supports up to 5 Smar's devices of the 302 series.

- H1 isolated barrier and I.S. power supply in compliance with the FISCO model;
- H1 fieldbus signal repeater;
- In compliance with the IEC 61158-2, 31.25 kbits/s standard for Fieldbus. (FOUNDATION fieldbus and PROFIBUS PA);
- IEC, FM & CENELEC intrinsic safety standards certified;
- In compliance with IEC 60079-27, FISCO and FNICO power supply;
- Dual marking in compliance with IEC 60079-11 and IEC 60079-27;
- Bus termination on hazardous area.

## Installation

The selection and installation of the barrier should always be accomplished by competent technical personnel. Please contact Smar or our local representative if further information is required.

According to the hazardous standards the barrier DF47-12 or DF47-17 must be installed out of hazardous location. The inputs parameters for installation in hazardous location are in the Approvals for Hazardous Areas topic.

The barrier has to be installed on DF1A, DF93, or DF9 and fixed in a DIN rail. For further details see the section Installing.

### Installation Principles

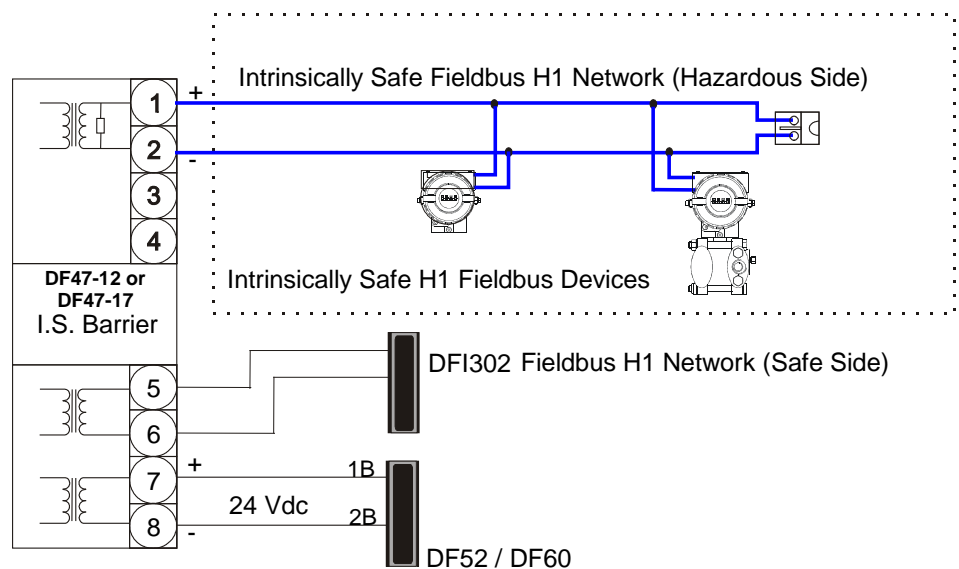
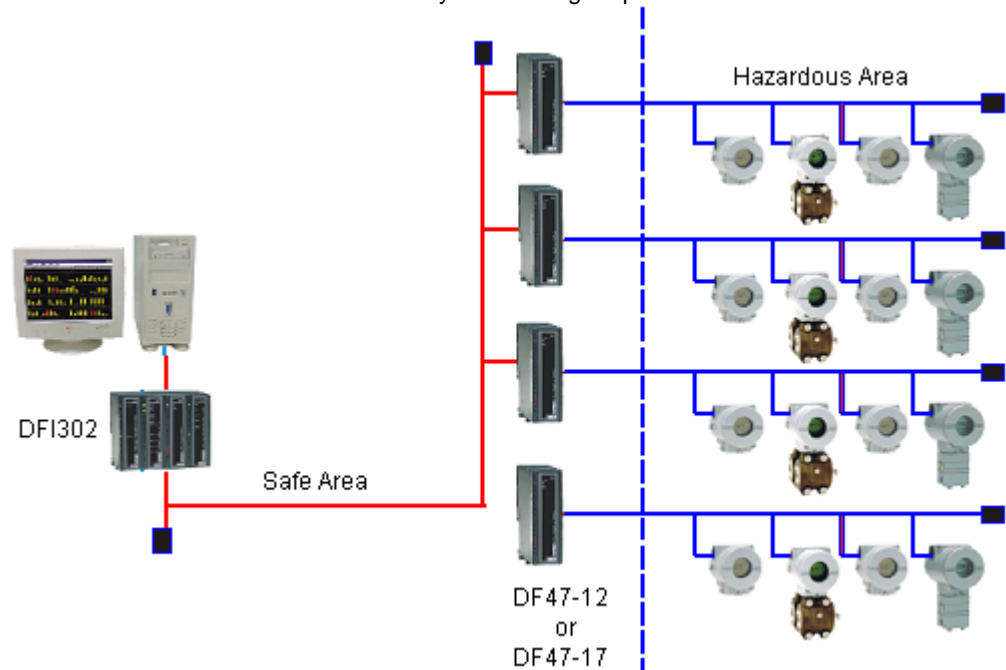
1. Ensure that there is an appropriate separation of intrinsically safe and non-intrinsically safe circuits (more than 50 mm or 1.97 inches), so the ignition energy from non-intrinsically safe circuit does not intrude into the intrinsically safe circuit.
2. Ensure that the limiting parameters of system design, total inductance and capacitance for example, upon which system approval is based are not exceeded.
3. Ensure that power system faults and ground potential differences do not generate system ignition.

### Location

The barrier is normally installed in a dust-free and moisture-free enclosure located in the non-hazardous area. The enclosure should be as close as possible to the hazardous area to reduce cable runs and increased capacitance. If the barrier is installed in a hazardous area, it must be in a proper enclosure suited for the intended area. The only intrinsically safe terminals are at the barrier output.

### Wiring

Intrinsically safe circuits may be wired in the same manner as conventional circuits installed for hazardous areas with two exceptions summarized as separation and identification. The intrinsically safe conductors must be separated from all other cables by placing them in separate conduits or by a separation of more than 50 mm or 1.97 inches of air. The raceways, cable trays, open wiring, and terminal boxes must be labeled “Intrinsically Safe Wiring” to prevent interference with other circuits.



## Technical Specifications

POWER	
Power Supply Input	Voltage: 24Vdc $\pm$ 5%
	Current (max.): 350mA @ 24Vdc

HAZARDOUS AREA	
Power Supply Output	Maximum voltage available at the barrier terminals: $U_s = 13.8$ Vdc.
	Maximum current in typical operation (considering $U_s = 13.8$ Vdc) DF47-12: $I_s = 65$ mA DF47-17: $I_s = 90$ mA
	Current limiting resistor (typical) DF47-12: $R_i \geq 247.5 \Omega$ DF47-17: $R_i \geq 176.22 \Omega$
	Maximum output power DF47-12: $P_o = 1.2$ W DF47-17: $P_o = 1.72$ W
Safety Parameters (Hazardous Area)	Refer to the item "Hazardous locations approvals.
Internal Dissipation	3 W maximum at 24 Vdc input, nominal conditions (for non intrinsically safe circuits).
Cable Length, Number of Devices	Maximum cables lengths are determined by IS requirements, and depend on both the number of devices attached and the maximum acceptable voltage drop along the cable. Use FISCO cable.
Digital Signal Transmission	Compatible with 31.25 kbps - Fieldbus systems.
Fuse	In order to guarantee the product safe, the internal fuse change must be executed only by the manufacturer.
Terminals	Accommodate conductors up to $2.5 \text{ mm}^2$ (22 AWG)
Isolation	2500 V galvanic isolation between input, output, and power supply terminals. Tested at 1500 Vrms minimum between hazardous and safe area terminals

PHYSICAL	
Ambient Temperature	0 to +60°C (operation)
	-30°C to 70°C (storage)
Humidity	-5% to 95% relative humidity

IMPORTANT	
By using active junction boxes you must consider their current consumption to calculate the total consumption of segment.	

## Certification Information

### Approved Manufacturing Locations

Smar Equipamentos Industriais Ltda – Sertãozinho, São Paulo, Brazil  
Smar Research Corporation – Ronkonkoma, New York, USA

### European Directive Information

This product complies with following European Directives:

#### **EMC Directive (2004/108/EC) - Electromagnetic Compatibility**

The equipment is in compliance with the directive and EMC test was performed according to IEC standards: IEC61326-1:2005 and IEC61326-2-3:2006. See table 2 from IEC61326-1:2005.

To comply with the EMC directive the installation must follow these special conditions:

- Use shielded, twisted-pair cable for powering the instrument and signal wiring.
- Keep the shield insulated at the instrument side, connecting the other one to the ground.

#### **ATEX Directive (94/9/EC) - Electrical equipment and protective system intended for use in potential explosive atmospheres**

The EC-Type Examination Certificate had been released by Nemko AS (CE0470) and/or DEKRA EXAM GmbH (CE0158), according to European Standards.

The certification body for Production Quality Assurance Notification (QAN) and IECEx Quality Assessment Report (QAR) is Nemko AS (CE0470).

Consult [www.smar.com](http://www.smar.com) for the EC declarations of conformity for all applicable European directives and certificates.

### Hazardous locations general information

#### **Ex Standards:**

IEC 60079-0 General Requirements

IEC 60079-11 Intrinsic Safety “i”

IEC 60079-27 Fieldbus intrinsically safe concept (FISCO)

#### **Customer responsibility:**

IEC 60079-10 Classification of Hazardous Areas

IEC 60079-14 Electrical installation design, selection and erection

IEC 60079-17 Electrical Installations, Inspections and Maintenance



#### **WARNING**

**Explosions can result in death or serious injury, besides financial damage.**

Installation of this instrument in an explosive environment must be in compliance with the national standards and according to the local environmental protection method. Before proceeding with the installation match the certificate parameters according to the environmental classification.

### General Notes

#### **Maintenance and Repair**

The instrument modification or replaced parts supplied by any other supplier than authorized representative of Smar Equipamentos Industriais Ltda is prohibited and will void the Certification.

#### **Marking Label**

Once a device labeled with multiple approval types is installed, do not reinstall it using any other approval types. Scratch off or mark unused approval types on the approval label.

#### **For Ex-i protection application**

- Connect the instrument to a proper intrinsically safe barrier.
- Check the intrinsically safe parameters involving the barrier, equipment including the cable and connections.
- Associated apparatus ground bus shall be insulated from panels and mounting enclosures.

- When using shielded cable, isolate the not grounded cable end.
- Cable capacitance and inductance plus  $C_i$  and  $L_i$  must be smaller than  $C_o$  and  $L_o$  of the Associated Apparatus.

**For FISCO System requirements (IEC 60079-27:2008)**

**FISCO Power Supplies**

General

The power supply shall be resistive limited or have trapezoidal output characteristic. The maximum output voltage,  $U_o$ , shall be not greater than 17.5V nor less than 14V under the conditions specified in IEC60079-11 for the respective level of protection.

The maximum unprotected internal capacitance  $C_i$  and inductance  $L_i$  shall be not greater than 5nF and 10 $\mu$ H, respectively.

The output of the power supply may be connected to earth.

No specification of the internal capacitance  $C_i$  and  $L_i$  or the maximum external parameters  $L_o$  and  $C_o$  is required on the certificate or label.

The determination of power supply output parameters shall into account the possible opening, shorting and grounding of field wiring connected to the field terminals of the apparatus.

Additional requirements of "ia" and "ib" FISCO power supplies

The maximum output current  $I_o$  for any "ia" or "ib" FISCO power supply shall be determined in accordance with IEC60079-11 but shall not exceed 380 mA.

Table 1 – Assessment of maximum output current for use with "ia" and "ib" FISCO power supplies

$U_o$	Permissible current , for IIC (includes 1.5 safety factor)	Permissible current , for IIB (includes 1.5 safety factor)
14V	183 mA	380 mA
15V	133 mA	354 mA
16V	103 mA	288 mA
17V	81 mA	240 mA
17,5V	75 mA	213 mA
Note: The two largest current values for IIB are derived from 5.32W.		

Additional requirements of "ic" FISCO power supplies

The maximum output current  $I_o$  for an "ic" FISCO power supply shall be determined in accordance with IEC60079-11.

Table 2 - Assessment of maximum output current for use with "ic" FISCO power supplies

$U_o$	Permissible current , for IIC (includes 1.5 safety factor)	Permissible current , for IIB (includes 1.5 safety factor)
14V	274 mA	570 mA
15V	199 mA	531 mA
16V	154 mA	432 mA
17V	121 mA	360 mA
17,5V	112 mA	319 mA



**GENERAL NOTES**

- The intrinsically safe conductors must be of blue colored, based in the IEC standards
- If one component of the intrinsically safe system is not FISCO comply, it is necessary to match all safety parameters among cable, device and barrier.
- Designated for connection to a Fieldbus system according FISCO Model with parameters as follows:
  - Intrinsically safe apparatus interconnected to the power supply circuit (Fieldbus) shall be passive current sink (not supplying) and effective internal inductance/capacitance shall be within the following maximum values:
 
$$L_i \leq 10 \mu\text{H}$$

$$C_i \leq 5 \text{ nF}$$
  - With regard to cable-length parameters of Fieldbus interconnection-cable shall be within the following ranges:

PARAMETER	VALUE
Resistance per Unit Length	$15 \Omega/\text{km} \leq R' \leq 150 \Omega/\text{km}$
Inductance per Unit Length	$0.4 \text{ mH}/\text{km} \leq L' \leq 1\text{mH}/\text{km}$
Capacitance per Unit Length (including shield)	$80 \text{ nF}/\text{km} \leq C' \leq 200 \text{ nF}/\text{km}$

Where:

$C' = C' \text{ wire/wire} + 0.5 \times C' \text{ wire/shield}$  when Fieldbus-circuit insulated.

$C' = C' \text{ wire/wire} + C' \text{ wire/shield}$  when shield is connected to the output of the Fieldbus power supply.

Maximum length of each spurs cable: 60m in IIC/IIB.

- A Fieldbus-data-signal terminator, providing a capacitance less than or equal to 1.1  $\mu\text{F}$  connected in series with a resistor greater than or equal to 100  $\Omega$ , is integrated in the Barrier DF47-12 and DF47-17; similar terminator may be connected to the other end of the Fieldbus circuit.
- When meeting the parameter mentioned above, maximum permissible Fieldbus-cable length including length of all spur cables for Group IIC is 1000 m.
- When meeting the parameter mentioned above, maximum permissible Fieldbus-cable length including length of all spur cables for Group IIB and Group I is 5000 m.

\* $C_i$  : Input's capacitance;  $L_i$  : Input's inductance;  $C_o$  : Output's capacitance;  $L_o$  : Output's inductance.

## Hazardous locations approvals

### FM Approvals (Factory Mutual)

#### DF47-12 FISCO Power Supply

##### Associated Intrinsic Safety (FM 3017363)

AIS Class I, Division 1, Groups A, B, C and D

AIS Class II, Division 1, Groups E, F and G

AIS Class III, Division 1

AIS Class I, Zone 0 [AEx ia], Group IIC

##### Special conditions for safe use:

Entity FISCO Trapezoidal Characteristic:

Terminals 1 and 2 Groups A/B IIC:

Voc (Uo)= 15.0 V, Isc (Io)= 140 mA, Iknee (Is)= 82 mA, Po= 1.2 W, Ca (Co)= 0.23  $\mu$ F, La (Lo)= 0.15 mH

Terminals 1 and 2 Groups C IIB

Voc (Uo)= 15.0 V, Isc (Io)= 140 mA, Iknee (Is)= 82 mA, Po= 1.2 W, Ca (Co)= 0.75  $\mu$ F, La (Lo)= 0.5 mH

Integral Terminator: R = 100  $\Omega$ , C = 1.0  $\mu$ F, Ci = 0, Li = 0

Note: The Fieldbus Isolated Barrier shall be installed in compliance with the enclosure, mounting, spacing and segregation requirements of the ultimate application, including a tool removable cover.

Ambient Temperature:  $-20^{\circ}\text{C} \leq T_a \leq +60^{\circ}\text{C}$

#### DF47-17 FISCO Power Supply

##### Associated Intrinsic Safety (FM 3017363)

AIS Class I, Division 1, Groups A, B, C and D

AIS Class II, Division 1, Groups E, F and G

AIS Class III, Division 1

AIS Class I, Zone 0 [AEx ia], Group IIC

##### Special conditions for safe use:

Entity FISCO Trapezoidal Characteristic:

Terminals 1 and 2 Groups A/B IIC:

Voc (Uo)= 15.0 V, Isc (Io)= 197 mA, Iknee (Is)= 115 mA, Po= 1.72 W, Ca (Co)= 0.21  $\mu$ F, La (Lo)= 0.15 mH

Terminals 1 and 2 Groups C IIB

Voc (Uo)= 15.0 V, Isc (Io)= 197 mA, Iknee (Is)= 115 mA, Po= 1.72 W, Ca (Co)= 0.7  $\mu$ F, La (Lo)= 0.5 mH

Integral Terminator: R = 100  $\Omega$ , C = 1.0  $\mu$ F, Ci = 0, Li = 0

Note: The Fieldbus Isolated Barrier shall be installed in compliance with the enclosure, mounting, spacing and segregation requirements of the ultimate application, including a tool removable cover.

Ambient Temperature:  $-20^{\circ}\text{C} \leq T_a \leq +60^{\circ}\text{C}$

### EXAM (BBG Prüf - und Zertifizier GmbH)

Non Intrinsically safe circuits Parameters:

Power Supply Un = 24 Vdc, Um = 250 Vac, Pn = 3 W

Fieldbus signal circuits Um = 250 Vac

#### DF47-12 FISCO Power Supply

##### Associated Intrinsic Safety (BVS 03ATEX E 411X)

Group II, Category (1) G, [Ex ia, EPL Ga], Groups IIB/ IIC FISCO Power Supply

Group I, Category (M2) [Ex ia, EPL Mb], Group I

Intrinsically safe fieldbus supply and signal circuit (FISCO-Model):

Safety parameters:

Uo = 15.0 Vdc, Io = 140.12 mA, Is = 80 mA, Po = 1200 mW, Ri  $\geq$  247.5  $\Omega$ ,

Characteristics trapezoidal

##### Special conditions for safe use

The Fieldbus-Isolated Barrier type DF47 -\*\* shall be installed outside the hazardous area.

Wiring in the terminal box must satisfy the conditions of clause 6.3.11 and clause 7.6.e of EN60079-11:2007

Terminals or connectors for the intrinsically safe fieldbus supply and signal circuit circuits shall be arranged according to clause 6.21 or 6.2.2 of EN 60079-11:2007 respectively.

Local installation rules to determine Lo and Co are replaced by apparatus- and cable-parameters in clause 15.3.2.

For Group I application interconnection of fieldbus-apparatus to an intrinsically safe electrical system shall be assessed in a System Certificate, if required in local installation rules.

Ambient Temperature:  $-20^{\circ}\text{C} \leq T_a \leq +60^{\circ}\text{C}$

**The Essential Health and Safety Requirements are assured by compliance with:**

EN 60079-0:2009 General Requirements

EN 60079-11:2007 Intrinsic Safety “i”

EN 60079-26:2007 Equipment with equipment protection level (EPL) Ga

EN 60079-27:2008 Fieldbus intrinsically safe concept (FISCO)

**DF47-17 FISCO Power Supply**

**Associated Intrinsic Safety (BVS 03ATEX E 411X)**

Group II, Category (1) G, [Ex ia, EPL Ga], Groups IIB/ IIC FISCO Power Supply

Group I, Category (M2) [Ex ia, EPL Mb] Group I

Intrinsically safe fieldbus supply and signal circuit (FISCO-Model):

Safety parameters:

$U_o = 15.0 \text{ Vdc}$ ,  $I_o = 197 \text{ mA}$ ,  $I_s = 115 \text{ mA}$ ,  $P_o = 1720 \text{ mW}$ ,  $R_i \geq 176.22 \Omega$ ,

Characteristics trapezoidal

**Special conditions for safe use**

The Fieldbus-Isolated Barrier type DF47 -\*\* shall be installed outside the hazardous area.

Wiring in the terminal box must satisfy the conditions of clause 6.3.11 and clause 7.6.e of EN60079-11:2007

Terminals or connectors for the intrinsically safe fieldbus supply and signal circuit circuits shall be arranged according to clause 6.21 or 6.2.2 of EN 60079-11:2007 respectively.

Local installation rules to determine Lo and Co are replaced by apparatus- and cable-parameters in clause 15.3.2.

For Group I application interconnection of fieldbus-apparatus to an intrinsically safe electrical system shall be assessed in a System Certificate, if required in local installation rules.

Ambient Temperature:  $-20^{\circ}\text{C} \leq T_a \leq +60^{\circ}\text{C}$

**The Essential Health and Safety Requirements are assured by compliance with:**

EN 60079-0:2009 General Requirements

EN 60079-11:2007 Intrinsic Safety “i”

EN 60079-26:2007 Equipment with equipment protection level (EPL) Ga

EN 60079-27:2008 Fieldbus intrinsically safe concept (FISCO)

**CEPEL (Centro de Pesquisa de Energia Elétrica)**

Non Intrinsically safe circuits parameters:

Power Supply  $U_n = 24 \text{ Vdc}$ ,  $P_n = 3 \text{ W}$

**DF47-12 FISCO Power Supply**

**Associated Intrinsic Safety (CEPEL 06.1095 X)**

[Ex ia, EPL Ga], Group IIB

Nominal values of the terminals Intrinsically safe (FISCO-Model):

$U_n = 14.0 \text{ V}$ ,  $I_n = 75 \text{ mA}$ ,  $P_n = 1200 \text{ mW}$

Safety parameters:

$U_m = 250 \text{ V}$ ,  $U_o = 15 \text{ V}$ ,  $I_o = 140.12 \text{ mA}$ ,  $I_s = 80 \text{ mA}$ ,  $P_o = 1200 \text{ mW}$ ,  $R_i \geq 247.5 \Omega$

Ambient Temperature:  $-20$  to  $60 \text{ }^{\circ}\text{C}$

**Special conditions for safe use**

The certificate number with “X” indicates that:

a) The equipment was projected to connect with a fieldbus system according to FISCO model, as IEC60079-27:2008. The Fieldbus intrinsic safety device connected to the fieldbus terminator must be current passive consumer (not generator) and must display  $C_i \leq 5 \text{ nF}$  and  $L_i \leq 10 \text{ } \mu\text{H}$ ;

b) Wiring in the terminal box must satisfy the conditions:

Resistance:  $15 \Omega/\text{km} \leq R_c \leq 1500/\text{km}$

Capacitance (including loop):  $45 \text{ nF/km} \leq C_c \leq 200 \text{ nF/km}$

Inductance:  $0,4 \text{ mH/km} \leq L_c \leq 1 \text{ mH/km}$

- c) The maximum length allowed for Fieldbus cables is 5000m for Group IIB.

**The Essential Health and Safety Requirements are assured by compliance with:**

ABNT NBR IEC 60079-0:2008 General Requirements

ABNT NBR IEC 60079-11:2009 Intrinsic Safety "i"

ABNT NBR IEC 60079-26:2008 Equipment with equipment protection level (EPL) Ga

IEC 60079-27:2008 Fieldbus intrinsically safe concept (FISCO)

**DF47-17 FISCO Power Supply**

**Associated Intrinsic Safety (CEPEL 06.1095 X)**

[Ex ia, EPL Ga], Group IIB

Nominal values of the terminals Intrinsically safe (FISCO-Model):

$U_n = 14.0 \text{ V}$ ,  $I_n = 110 \text{ mA}$ ,  $P_n = 1700 \text{ mW}$

Safety parameters:

$U_m = 250 \text{ V}$ ,  $U_o = 15 \text{ V}$ ,  $I_o = 197 \text{ mA}$ ,  $I_s = 115 \text{ mA}$ ,  $P_o = 1720 \text{ mW}$ ,  $R_i \geq 176,22 \Omega$

Ambient Temperature:  $-20$  to  $60 \text{ }^\circ\text{C}$

**Special conditions for safe use**

The certificate number with "X" indicates that:

- a) The equipment was projected to connect with a Fieldbus System according to FISCO model, as IEC60079-27:2008. The Fieldbus intrinsic safety device connected to the Fieldbus terminator must be current passive consumer (not generator) and must display  $C_i \leq 5 \text{ nF}$  and  $L_i \leq 10 \mu\text{H}$ ;
- b) Wiring in the terminal box must satisfy the conditions:  
Resistance:  $15 \Omega/\text{km} \leq R_c \leq 1500/\text{km}$   
Capacitance (including loop):  $45 \text{ nF/km} \leq C_c \leq 200 \text{ nF/km}$   
Inductance:  $0,4 \text{ mH/km} \leq L_c \leq 1 \text{ mH/km}$
- c) The maximum length allowed for Fieldbus cables is 1000 m for Group IIC and 5000m for Group IIB

**The Essential Health and Safety Requirements are assured by compliance with:**

ABNT NBR IEC 60079-0:2008 General Requirements

ABNT NBR IEC 60079-11:2009 Intrinsic Safety "i"



ABNT NBR IEC 60079-26:2008 Equipment with equipment protection level (EPL) Ga



IEC 60079-27:2008 Fieldbus intrinsically safe concept (FISCO)

## Identification labels and control drawings

### DF47-12 – Intrinsic Safety Barrier for Fieldbus

#### Labels




DF47-12 INTRINSIC SAFETY BARRIER FOR FIELDBUS																									
Safety Parameters:																									
	Intrinsically Safe Connections for, CL I, DIV1, GP ABCDEFG and CL I, ZONE 0, GP IIC [AEx ia] IIC "See Instalation drawing 102A0948 for FM FISCO parameters"																								
	BVS 03 ATEX E 411 X II (1)G [Ex ia Ga] IIB / IIC FISCO Power Supply I (M2) [Ex ia Mb] I																								
<b>Non Intrinsically Safe Fieldbus signal circuits.</b> Voltage $U_m$ AC 250 V - Max. Tamb. 60 °C																									
<b>Intrinsically Safe Fieldbus supply - and signal circuit (FISCO).</b> <table border="0"> <tr> <td>Voltage</td> <td>(Uo) Voc</td> <td>DC</td> <td>15.0 V</td> </tr> <tr> <td>Short circuit current</td> <td>(Io) Isc</td> <td></td> <td>140 mA</td> </tr> <tr> <td>Supply current at 15V</td> <td>(Is) Iknee</td> <td></td> <td>82 mA</td> </tr> <tr> <td>Power</td> <td>Po</td> <td></td> <td>1.2 W</td> </tr> <tr> <td>Current limiting resistor</td> <td>Ri</td> <td>≥</td> <td>247.5 ohm</td> </tr> <tr> <td>Characteristics</td> <td colspan="3">trapezoidal</td> </tr> </table>		Voltage	(Uo) Voc	DC	15.0 V	Short circuit current	(Io) Isc		140 mA	Supply current at 15V	(Is) Iknee		82 mA	Power	Po		1.2 W	Current limiting resistor	Ri	≥	247.5 ohm	Characteristics	trapezoidal		
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Current limiting resistor	Ri	≥	247.5 ohm																						
Characteristics	trapezoidal																								
<b>smar</b>																									

DF47-12 Barreira de Segurança Intrinseca Fieldbus											
<b>FISCO Power Supply</b> [Ex ia Ga] IIB CEPEL 06.1095 X $U_m = 250Vca$ $T_{amb}: -20^{\circ}C$ a $60^{\circ}C$											
  	<b>Valores Nominais [Ex ia Ga] IIB CEPEL 06.1095 X</b> <table border="0"> <tr> <td><math>U_N = 14Vcc</math></td> <td><math>U_o = 15V</math></td> </tr> <tr> <td><math>I_N = 75mA</math></td> <td><math>I_o = 140,12mA</math></td> </tr> <tr> <td><math>P_N = 1200mW</math></td> <td><math>P_o = 1200mW</math></td> </tr> <tr> <td></td> <td><math>I_s = 80mA</math></td> </tr> <tr> <td></td> <td><math>R_i \geq 247,5 \Omega</math></td> </tr> </table> $T_{amb}: -20^{\circ}C$ a $60^{\circ}C$	$U_N = 14Vcc$	$U_o = 15V$	$I_N = 75mA$	$I_o = 140,12mA$	$P_N = 1200mW$	$P_o = 1200mW$		$I_s = 80mA$		$R_i \geq 247,5 \Omega$
$U_N = 14Vcc$	$U_o = 15V$										
$I_N = 75mA$	$I_o = 140,12mA$										
$P_N = 1200mW$	$P_o = 1200mW$										
	$I_s = 80mA$										
	$R_i \geq 247,5 \Omega$										
<b>Circuito não Intrinsecamente Seguro</b> $U_m = 250Vca$ $U_N = 24Vcc$ $P_N = 3W$											
<b>smar</b>											






## DF47-17 – Intrinsic Safety Barrier for Fieldbus

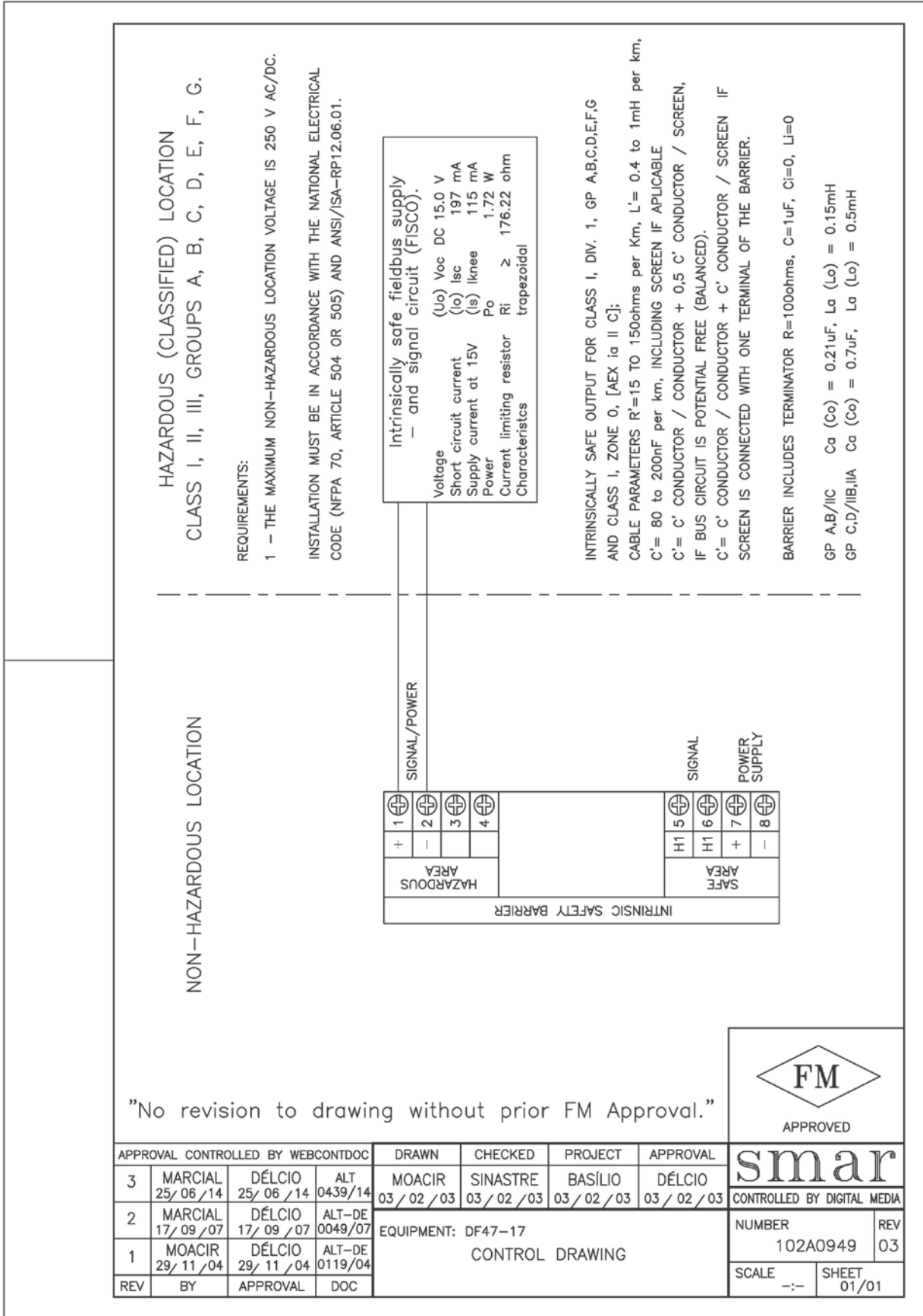
## Labels

DF47-17 INTRINSIC SAFETY BARRIER FOR FIELDBUS	
Safety Parameters:	
	Intrinsically Safe Connections for, CL I, DIV1, GP ABCDEFG and CL I, ZONE 0, GP IIC [AEx ia] IIC "See Instalation drawing 102A0949 for FM FISCO parameters"
	BVS 03 ATEX E 411 X II (1)G [Ex ia Ga] IIB / IIC FISCO Power Supply I (M2) [Ex ia Mb] I
	
<b>Non Intrinsically Safe Fieldbus signal circuits.</b>	
Voltage $U_m$ AC 250 V - Max. Tamb. 60 °C	
<b>Intrinsically Safe Fieldbus supply - and signal circuit (FISCO).</b>	
Voltage	( $U_o$ ) Voc DC 15.0 V
Short circuit current	( $I_o$ ) Isc 197 mA
Supply current at 15V	( $I_s$ ) Iknee 115 mA
Power	$P_o$ 1.72 W
Current limiting resistor	$R_i \geq 176.22 \text{ ohm}$
Characteristics	trapezoidal

**smar**

DF47-17 Barreira de Segurança Intrinseca Fieldbus	
FISCO Power Supply	
[Ex ia Ga] IIB CEPEL 06.1095 X	
$U_m = 250Vca$	$T_{amb}: -20^\circ C \text{ a } 60^\circ C$
	<b>Valores Nominais [Ex ia Ga] IIB CEPEL 06.1095 X</b>
$U_N = 14Vcc$	$U_o = 15V$
$I_N = 110mA$	$I_o = 197mA$
$P_N = 1700mW$	$P_o = 1720mW$
	$I_s = 115mA$
	$R_i \geq 176,22 \Omega$
	$T_{amb}: -20^\circ C \text{ a } 60^\circ C$
<b>Circuito não Intrinsecamente Seguro</b>	
$U_m = 250Vca$	$U_N = 24Vcc$ $P_N = 3W$
	

**smar**





# Appendix A

<b>smar</b>	<b>SRF – SERVICE REQUEST FORM</b>	
	DFI302 – Fieldbus Universal Bridge	Proposal Nº: _____
<b>COMPANY INFORMATION</b>		
Company: _____ Unit: _____ Invoice: _____		
<b>COMMERCIAL CONTACT</b>		
Full Name: _____ Phone: _____ Fax: _____ E-mail: _____		
<b>TECHNICAL CONTACT</b>		
Full Name: _____ Phone: _____ Extension: _____ E-mail: _____		
<b>EQUIPMENT DATA</b>		
Model: _____ Serial Number: _____		
<b>PROCESS DATA</b>		
Process Type (Ex. boiler control): _____ Operation Time: _____ Failure Date: _____		
<b>FAILURE DESCRIPTION</b>		
(Please, describe the failure. Can the error be reproduced? Is it repetitive?) _____ _____ _____ _____		
<b>OBSERVATIONS</b>		
_____ _____ _____		
<b>USER INFORMATION</b>		
Company: _____ Contact: _____ Section: _____ Title: _____ Signature: _____ Phone: _____ Extension: _____ E-mail: _____ Date: ____/____/____		
For warranty or non-warranty repair, please contact your representative. Further information about address and contacts can be found on <a href="http://www.smar.com/contactus.asp">www.smar.com/contactus.asp</a> .		

