

CSA Control drawing  
**FieldBarrier**  
**R4D0-FB-IA\***

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Table 1

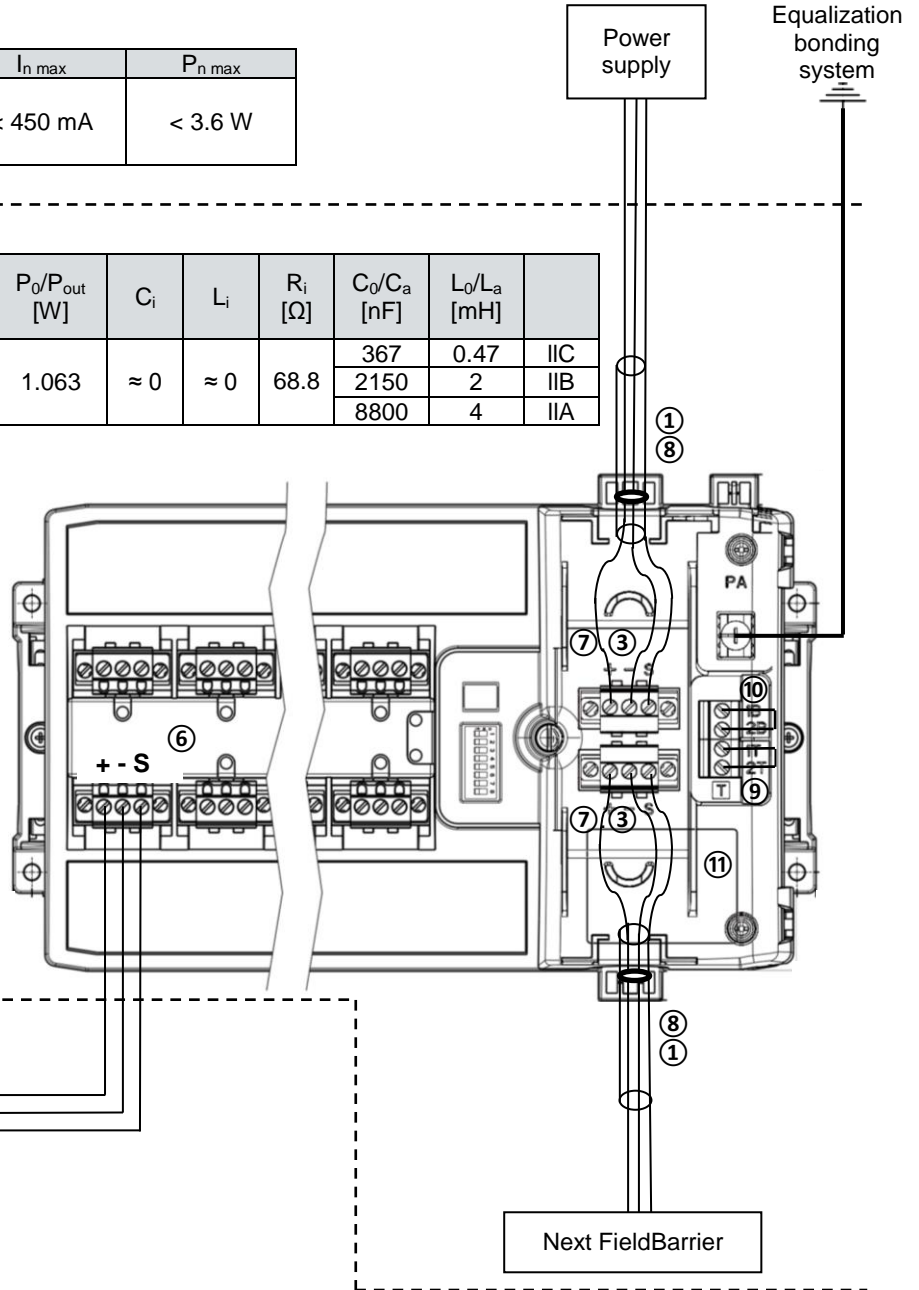
Model Number	$U_n$	$U_m$	$I_{n,max}$	$P_{n,max}$
R4D0-FB-IA12*	16...32 V	253V AC	< 450 mA	< 3.6 W
R4D0-FB-IA10*				
R4D0-FB-IA8*				

Table 2

Model Number	Number of outputs	$U_0/V_{oc}$ [V]	$I_0/I_{sc}$ [mA]	$P_0/P_{out}$ [W]	$C_i$	$L_i$	$R_i$ [ $\Omega$ ]	$C_0/C_a$ [nF]	$L_0/L_a$ [mH]	
R4D0-FB-IA12*	12	17.1	248.55	1.063	$\approx 0$	$\approx 0$	68.8	367	0.47	IIC
R4D0-FB-IA10*	10							2150	2	IIB
R4D0-FB-IA8*	8							8800	4	IIA

HAZARDOUS (CLASSIFIED) LOCATION  
 Class I, Zone 1, Groups IIC, IIB, IIA  
 Class I, Division 2, Groups A, B, C, D

⑫



HAZARDOUS (CLASSIFIED) LOCATION  
 Class I, Zone 0, Groups IIC, IIB, IIA  
 Class II, Zone 20, Groups IIIC, IIIB, IIIA

Class I, Division 1, Groups A, B, C, D  
 Class II, Division 1, Groups E, F, G  
 Class III, Division 1

Table 3

$U_i$ [V]	$I_i$ [mA]	$P_i$ [W]	$C_i$ [nF]	$L_i$ [mH]	
$\geq 17.1$	$\geq 248.55$	$\geq 1.063$	$\leq 367$	$\leq 0.47$	IIC
			$\leq 2150$	$\leq 2$	IIB
			$\leq 8800$	$\leq 4$	IIA

④

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- ① Intrinsically safe circuits must be suitable for the ambient temperature and be wired and separated in accordance with the wiring methods of National Electrical Code ANSI/NFPA 70, Canadian Electrical Code C22.1 or in accordance with the authority having jurisdiction.
- ② The output parameters are designed according to FISCO and Foundation Fieldbus Entity model. At each output field devices according to FISCO or Foundation Fieldbus Entity model may be connected.
- ③ The trunk is powered from a non-intrinsically safe power source. The trunk terminals are internally connected in parallel to be able to loop the supply power to the next unit. A maximum of 3 FieldBarriers may be connected to the trunk. The intrinsically safe spur outputs are safely isolated from the non-intrinsically safe trunk up to a peak-to-peak voltage of 375 V (safety maximum voltage ( $U_m$ ) of 253 Vac).
- ④ The Entity Concept allows interconnection of intrinsically safe apparatus with associated apparatus, not specifically examined in combination as a system, when the approved values of  $U_o$ ,  $I_o$  and  $P_o$  for the associated apparatus are less than or equal to  $U_i$ ,  $I_i$  and  $P_i$  for the intrinsically safe apparatus and the approved values of  $C_o$  and  $L_o$  for the associated apparatus are greater than  $C_i + C_{cable}$  and  $L_i + L_{cable}$ , respectively, for the intrinsically safe apparatus.

The parameters for  $L_o$  and  $C_o$  provided in table 3 apply when one of the two conditions below is met:

- the total  $L_i$  of the external circuit (excluding the cable) is  $\leq 1\%$  of the  $L_o$  value or
- the total  $C_i$  of the external circuit (excluding the cable) is  $\leq 1\%$  of the  $C_o$  value.

The parameters for  $L_o$  and  $C_o$  provided in table 3 are reduced to 50 % when both of the two conditions below are met:

- the total  $L_i$  of the external circuit (excluding the cable) is  $> 1\%$  of the  $L_o$  value and
- the total  $C_i$  of the external circuit (excluding the cable) is  $> 1\%$  of the  $C_o$  value.

Note: The reduced capacitance of the external circuit (including cable) shall not be greater than 1  $\mu$ F for C, D (IIA, IIB) and 600 nF for A, B (IIC).

- ⑤ Three different IS concepts are permitted for use on the intrinsically safe outputs: The FISCO concept, the Entity concept of Foundation Fieldbus or the standard Entity concept.

For use of the FieldBarrier in a fieldbus-system...

...in accordance with the FISCO concept of IEC 60079-25:

Up to 32 FISCO field devices can be connected to each output circuit. All field devices shall be passive (non-supplying).

For each field device:

Maximum internal capacitance:	$C_i$	$\leq 5$	nF
Maximum internal inductance:	$L_i$	$\leq 10$	$\mu$ H

The used fieldbus cable specification needs to fall within the following ranges:

Loop resistance:	$R_c$	15 ... 150	$\Omega$ /km
Loop inductance:	$L_c$	0.4 ... 1	mH/km
Capacitance:	$C_c$	45 ... 200	nF/km

On each intrinsically safe output circuit, a maximum cable length of 1 km in IIC and 5 km in I, IIB and IIIC may be connected. If more than one device is connected to this cable, the spur cable length to each device must be shorter than 60 m. The maximum cable length must include all cable lengths added together.

... in accordance with the Entity concept of the Foundation Fieldbus FF-816:

Up to 6 field devices of type 111, 112, 511 or 512 may be connected to each output. All field devices shall be passive (non-supplying).


For each field device:

Maximum internal capacitance:	$C_i$	$\leq 5$	nF
Maximum internal inductance:	$L_i$	$\leq 20$	$\mu$ H

The used fieldbus cable specification needs to fall within the following ranges:

Loop resistance:	$R_c$	15 ... 150	$\Omega$ /km
Loop inductance:	$L_c$	0.4 ... 1	mH/km
Capacitance:	$C_c$	45 ... 200	nF/km

On each intrinsically safe output circuit, a maximum cable length of 1 km in IIC and 1.9 km in I, IIB and IIIC may be connected. If more than one device is connected to this cable, the spur cable length to each device must be shorter than 60 m. The maximum cable length must include all cable lengths added together.

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... in accordance with the standard Entity concept:

When the standard Entity concept is used the values  $C_i$  and  $L_i$  given in table 3 may not be exceeded. Item ④ has to be taken in account.

- ⑥ Intrinsically safe outputs:  
Spur connectors are only allowed to be manipulated at ambient temperatures between  $-5\text{ °C}$  and  $+70\text{ °C}$ . The shield connection of the intrinsically safe outputs is connected to the PA terminal via a capacitance of  $\leq 4.4\text{ nF}$ .
- ⑦ Non-intrinsically safe inputs:  
Only the trunk terminals supplied with the FieldBarrier shall be used. Trunk connectors are only allowed to be manipulated at ambient temperatures between  $-5\text{ °C}$  and  $+70\text{ °C}$ .
- ⑧ The non-intrinsically safe cables and the cable to the equalization bonding system have to be fixed with adequate means, e.g. with cable ties at the intended fixtures.
- ⑨ With the terminal bridge 1T-2T an internal trunk terminator is switched on. With the jumper in its parked position, the trunk terminator is switched off. Only the supplied jumper shall be used.
- ⑩ With the terminal bridge 1B-2B the trunk shield connector is directly connected to the PA-terminal. With the jumper in its parked position, the trunk shield connector is connected to the PA-terminal via a capacitance of  $\leq 5.7\text{ nF}$ . Only the supplied jumper shall be used.
- ⑪ The non-intrinsically safe terminals are covered with a plastic cover so that a level of protection IP30 is reached. Between the non-intrinsically safe terminals and the intrinsically safe terminals a minimum distance of 50 mm is maintained when the cover is closed.  
**WARNING:** The plastic cover must not be opened while the device is energized. After de-energizing the device, wait at least 5 seconds, before opening the IP30 cover.  
**AVERTISSEMENT :** le capot en plastique ne doit pas être ouvert lorsque l'appareil est sous tension. Après avoir coupé l'alimentation de l'appareil, attendez au moins 5 secondes avant d'ouvrir le capot IP30.
- ⑫ Special Conditions of Safe Use as per CSA 14.70004139:
- I. Prevent any electrostatic charge that could result in electrostatic discharge while installing or operating the device.
  - II. This device is an OPEN type equipment that must be used within a suitable end-use system enclosure. The suitability of the enclosure is subject to investigation by the local authority having jurisdiction at the time of installation. The FieldBarrier has to be mounted in a suitable, separately certified enclosure. The temperature inside the enclosure shall not exceed the permissible ambient temperature of the FieldBarrier.
  - III. The FieldBarrier must be supplied by a Class 2 or limited-energy source in accordance with CSA 61010-1 3rd Edition.

#### Class I, Zone 1

The devices must be installed and operated only in surrounding enclosures that comply with the requirements for surrounding enclosures according to CAN/CSA-C22.2 No. 60079-0 or ANSI/UL 60079-0 and are rated with at least a degree of protection IP54 according to IEC 60529.

The external enclosure has to carry the warning "**WARNING - NON-INTRINSICALLY SAFE CIRCUIT PROTECTION BY INTERNAL IP 30 COVER**" in English and French.

Le boîtier externe doit porter le message d'avertissement « **AVERTISSEMENT - PROTECTION DU CIRCUIT SANS SÉCURITÉ INTRINSÈQUE PAR CAPOT INTERNE IP30** » en anglais et en français.


#### Class I, Zone 2

The devices must be installed and operated only in surrounding enclosures that comply with the requirements for surrounding enclosures according to CAN/CSA-C22.2 No 60079-0 or ANSI/UL 60079-0 and are rated with at least a degree of protection IP54 according to IEC 60529.

#### Class I, Division 2

The devices must be installed and operated only in surrounding enclosures that comply with the requirements as per local authority having jurisdiction.

**WARNING:** Substitution of components may impair intrinsic safety and suitability for hazardous (classified) locations.  
**AVERTISSEMENT :** le remplacement des composants peut altérer la sécurité intrinsèque et l'adéquation à une utilisation dans des zones dangereuses (classées).

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