Selection Guide

Interfaces – galvanic insulation

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1. Principle of a galvanic insulation and notions of intrinsic safety

1. Principle of a galvanic insulation

A galvanic insulation barrier is an associated equipment that is generally installed in the safe area.

Its main function in safety terms is to limit the level of energy that may appear in an electric circuit routed through a hazardous area, whatever the connection established upstream of this barrier. A galvanic insulation barrier comprises:

- safety transformers
- opto-isolators
- intrinsic safety relays
- resistances
- fuses
- Zener diodes

Like any other intrinsic safety equipment, this device enables short circuits between cables or with grounded metal parts without danger.

The interface through a galvanic insulation barrier is different from other interface modes:
Cables routed through hazardous areas have no common points with those in safe areas. There is therefore no use in grounding such a barrier.

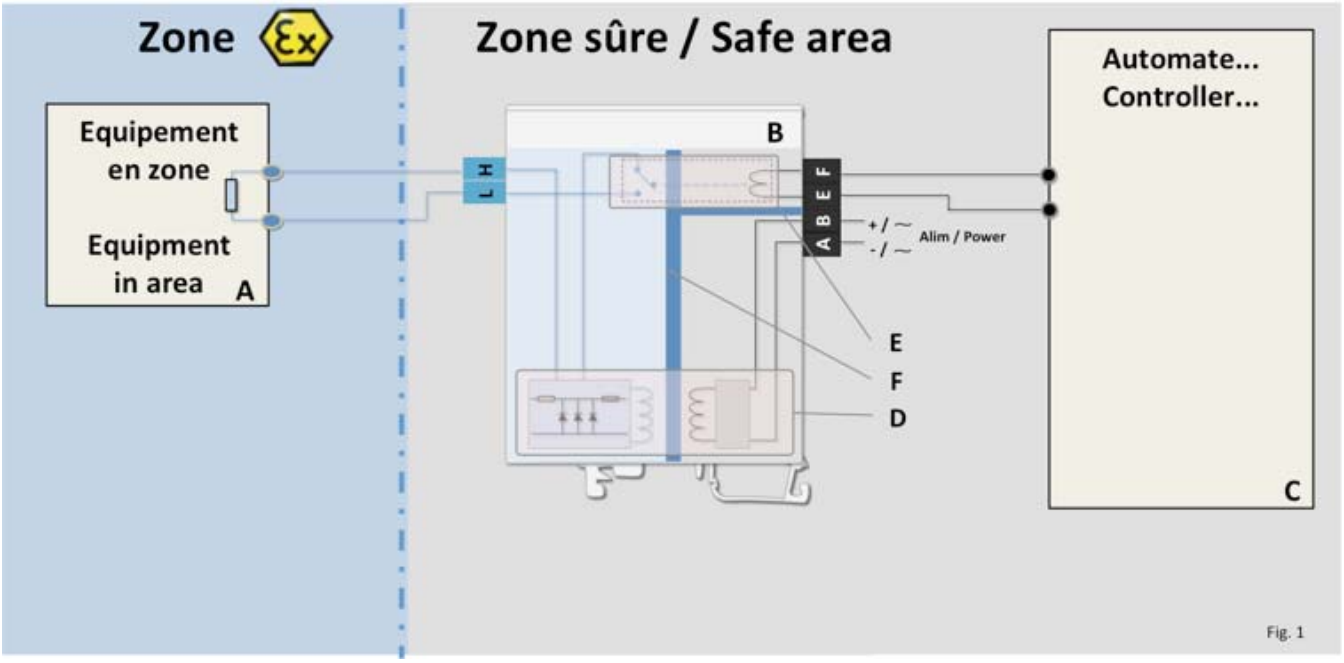


Figure 1 presents a galvanic insulation barrier (B) that feeds any type of equipment. This barrier is controlled by the micro-controller (C).
Details of the components of an intrinsic safety barrier:

- Galvanic insulation

In figure 1 the galvanic insulation of the barrier (F) is represented in blue.
There are no electrical connections between the equipment circuit (A) and the controller (C).

- Safety transformers (D)

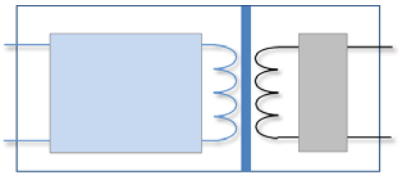


Fig. 2

It is "foolproof" and used to maintain full insulation between the primary and secondary circuits. Useful for powering the intrinsic safety circuit.
For a mains power supply, the electrical insulation is 2500 V AC.

- Energy limitation

The components used to limit energy - Zener diode, resistance and fuse - are located on the safety transformer output (D).
The value of these components define the intrinsic safety parameters of the barrier (see chapter 2. IS parameters).

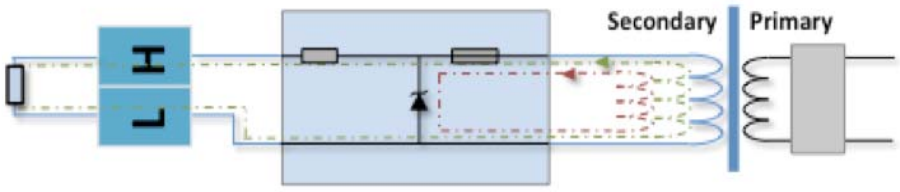


Fig. 3

Current path under normal operations
Current path with overvoltage
The Zener diode becomes conductive
The fuse protects the Zener diodes against destruction

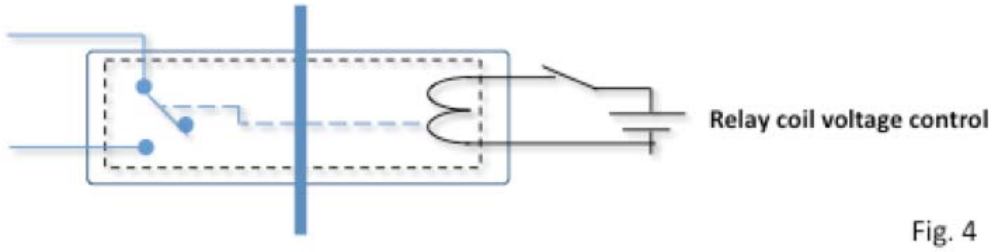


Fig. 4

- Intrinsic safety relay (E)

Controlling the voltage on the relay coil opens and closes the contact. Just like the intrinsic safety transformer, this component conserves the integrity of the galvanic insulation.

- Opto-isolator

This component is not represented on figure 1. It is used to transfer information from the intrinsic safety circuit to the conventional part of the circuit while conserving the integrity of the galvanic insulation.
The opening of the output transistor (EF) is controlled via a photo-sensitive receiver.
When the current passes via (JH), a LED lights up and makes the transistor conductive.

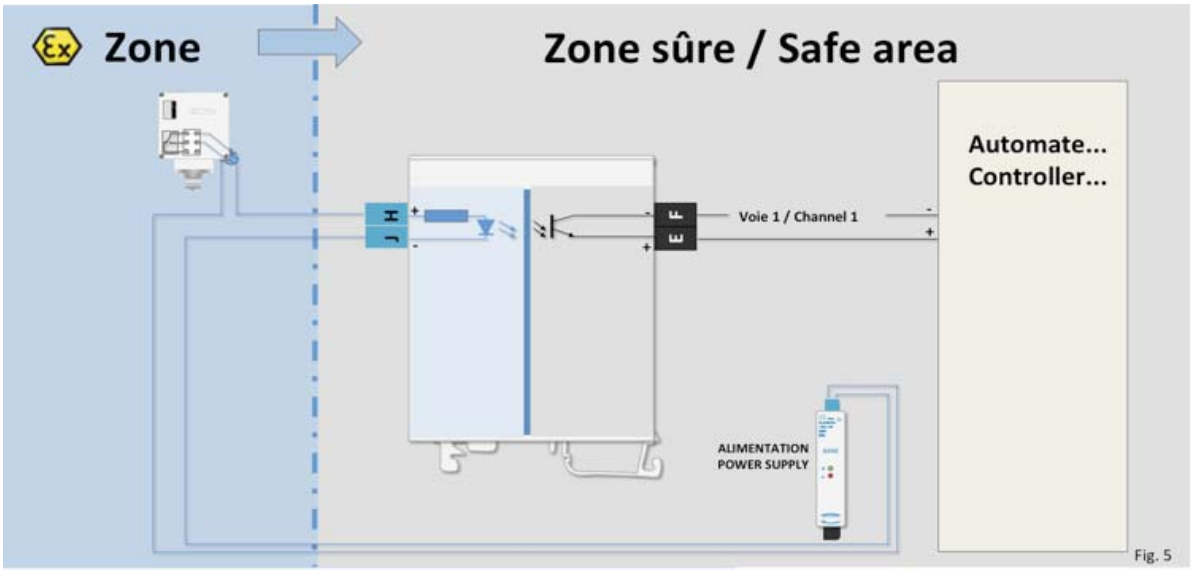


Fig. 5

In addition to their insulation and energy limitation function, active galvanic insulation barriers are useful and employed in different applications:

- Signal conversion
- Analog or digital output repeaters
- Threshold relays
- Alarm functions
- etc.

These functions are described in greater detail in the Selection Guide chapter, page 13.

2. Notions of intrinsic safety

Like any intrinsic safety device connected to a sensor (also an IS device), the whole constitutes what the standard refers to as an "intrinsic safety system", the parameters of which must be compatible in terms of intrinsic safety.

European Directive 1999/92/EC (the ATEX Directive) requires that the compliance of the safety system must be proven.

The definition of a galvanic insulation barrier therefore requires the collection of a certain amount of information concerning its environment, to ensure that the system operates correctly and is reliable.

So to define a suitable barrier, the following information is required:

Full references of the associated equipment and other equipment in the area:
To identify the device in question in the ATEX certificate and the technical data sheet.

Technical data sheet or instruction notice for the interfaces and equipment in the area:
To identify the metrological data of the equipment.

ATEX Certificate for the interfaces and equipment in the area:
To identify the intrinsic safety parameters and the device markings.

An intrinsic safety system generally comprises:
- Intrinsic safety equipment installed in a hazardous area
- Associated equipment installed in the safe area
- Connection cables
- Accessories (junction boxes, power outlets, switches, etc.)

Associated equipment:
Is located in the safe area. In terms of intrinsic safety, it must be considered as an energy source.

This energy source is characterized by three parameters:
- Voltage: U_o
- Current: I_o
- Power: P_o

This signifies that the associated equipment may never supply a voltage greater than U_o, a current greater than I_o or power greater than P_o to an external medium.

Cabling:
For each piece of associated equipment, the limit properties of the external cabling C_o and L_o are defined to ensure that the system remains safe:
- C_o represents the maximum capacity that can be connected to the associated equipment
- L_o represents the maximum inductance that can be connected to the associated equipment
- $\sum C_i$ represents the sum of the capacities of the cable and the intrinsic safety equipment on the loop.
- $\sum L_i$ represents the sum of the inductances of the cable and the intrinsic safety equipment on the loop.

IS interfaces

Intrinsic safety equipment:

Located in a hazardous area, must be considered as a receiver of energy, due to the terminals that are connected to the associated equipment.

This energy receiver is characterized by three parameters that define the maximum limits: U_i, I_i, P_i. This means that as long as the characteristics of the energy supplied to it remain below U_i, I_i and P_i, this intrinsic safety equipment will remain safe.

Each piece of intrinsic safety equipment is also characterized by the values C_i and L_i which are the values of the capacity and internal inductance of the intrinsic safety equipment.

The intrinsic safety parameters in a simple system (Receiver, barrier, equipment in hazardous area) are validated by comparing the intrinsic safety parameters of the barrier and the equipment in the area using the following rule:

- Verification of voltage:
  U_o (barrier) ≤ U_i (equipment in hazardous area)
- Verification of intensity:
  I_o (barrier) ≤ I_i (equipment in hazardous area)
- Verification of power:
  P_o (barrier) ≤ P_i (equipment in hazardous area)
- Verification of capacitance:
  C_c (cable) + C_i (equipment in hazardous area) ≤ C_o (barrier)
- Verification of inductance:
  L_c + L_i (equipment in hazardous area) ≤ L_o (barrier)

Let us consider an example:

System composition:

In hazardous area:

- A: Smart pressure transmitter

Type	FK* - ProcessX family
Reference	FKPT03V52KABY0Y
Manufacturer	Georgin
Marking	II 1 G Ex ia IIC T4 or T5
Installation zones	0, 1 or 2 (Gas)
CE type certification	KEMA 10ATEX0031X
ATEX declaration of confirmity	dc-ceatex-processX-fren Ind A
Commercial data sheet	fc-FK*-fr
Instruction manual	fi-processX-fren

In safe area:

- B: GEORGIN galvanic insulation barrier

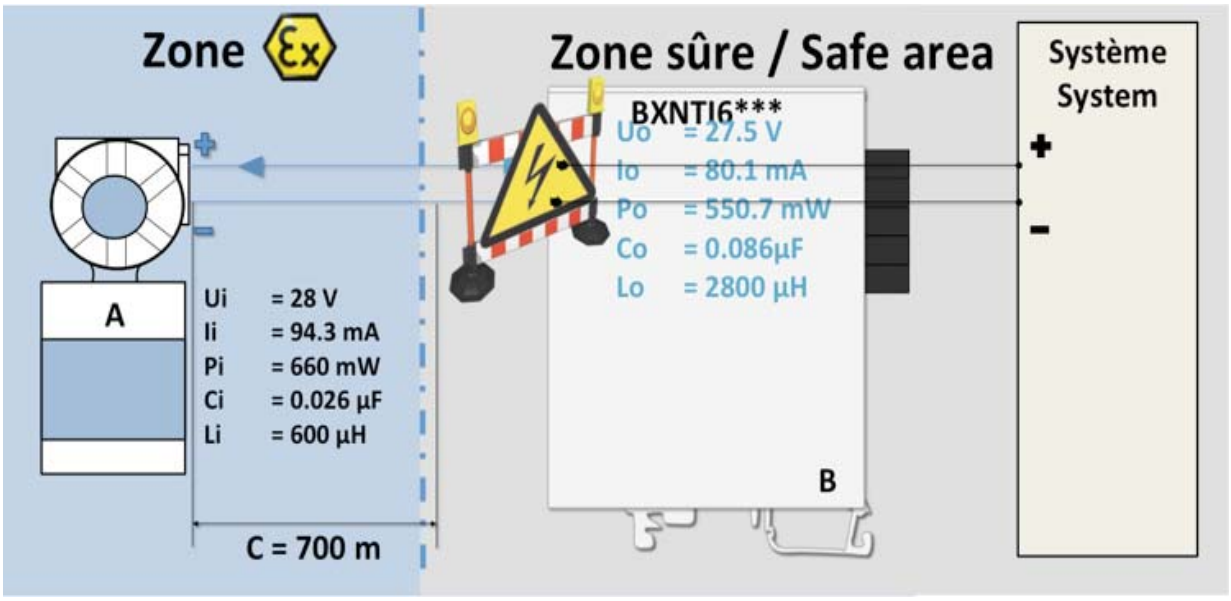
Type	BXNT
Reference	BXNT6***
Manufacturer	Georgin
Marking	II (1) G/D [Ex ia] IIC
Installation areas	Safe area
CE type certification	LCIE 02 ATEX 6104X
ATEX declaration of confirmity	dcceatex-pc-fren
Commercial data sheet	fc-bxlmnt-fren
Instruction notice	fu-bxlmn-fren

- C: Connection cable

Type	Shielded pair
Reference	HIJ
Manufacturer	DURAND
Linear resistance	10 Ohms/Km
Linear capacity	0.02 µF/Km
Linear inductance	1000 µH/Km
Length	700 meters

The (U, I, P) safety parameters for A and B equipment are compatible for classification:
II 1G/D Ex ia IIC T4 to T5 (depending on ambient temperature)

IS interfaces



For zones: 0, 1 and 2 / 20, 21 and 22 as per IEC 60079-10L.

A/ Analysis in terms of U, I and P

- Verification of voltage:

U_o (barrier)	≤	U_i (equipment in hazardous area)
27.5 V	≤	28 V

- Verification of intensity:

I_o (barrier)	≤	I_i (equipment in hazardous area)
80.1 mA	≤	94.3 mA

- Verification of power:

P_o (barrier)	≤	P_i (equipment in hazardous area)
550.7 mW	≤	660 mW

Equipment A limited by the voltages, current and power of equipment B.

B/ Analysis in terms of C and L

- Verification of capacitance:

C_c (cable) + C_i (equipment in hazardous area)	≤	C_o (barrier)
(0.02 µF x 0.7 km) + 0.026 µF	≤	0.083 µF
0.04 µF	≤	0.083 µF

- Verification of inductance:

L_c + L_i (equipment in hazardous area)	≤	L_o (barrier)
(1000 µH x 0.7 km) + 600 µH	≤	5042.58 µH
1300 µH	≤	5042.58 µH

The device in the area has capacity and inductance values that are compatible with the maximum external values of the associated equipment.

2. General specifications for galvanic insulation interfaces

1. Mechanical properties

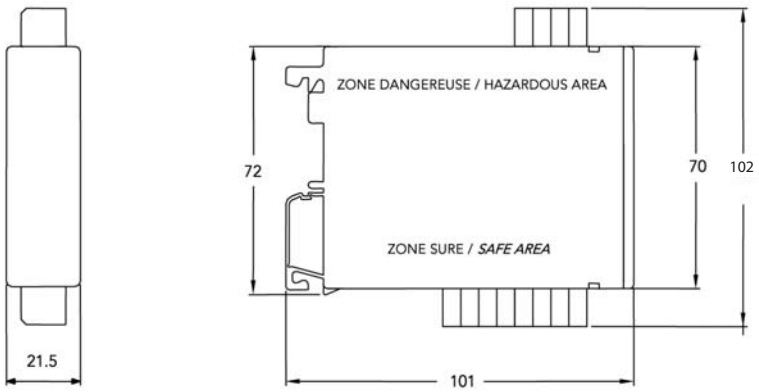
Installation	In safe area
Dimensions	ABS case
Weight	200 g
Storage temperature	-25 to 70 °C
Operating temperature	-10 to 60 °C
Relative humidity	5 to 95% without condensation
Connection	Plug-in cage clamp terminals
Mounting	On rail EN 50022

2. Certifications

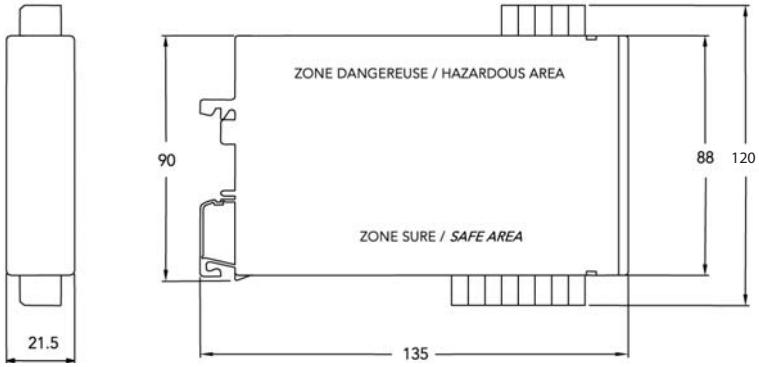
EMC	EN 61326 & IEC 61000-6-2
Low Voltage Directive	IEC 1010-1 Category II (overvoltage)
Intrinsic Safety	EN 60079-11 & EN 61241-11 [Ex ia] I or [Ex ia] IIC or [Ex ia] IIB [Ex iaD] I or [Ex iaD] IIC or [Ex iaD] IIB
LCIE N°	02 ATEX 6104 and LCIE03 ATEX 6469X (for BPX) IEC 60079-0 / IEC 60079-11 / IEC 60079-15 / IEC 61241-11 / IEC 61241-0
ATEX Classification	CE 0081 Ex II (1) G/D NF C 15-100
SIL Classification	SIL 2 according to IEC 61508 (only concerns certain types of equipment, see SIL certificate).

3. Dimensions (mm)

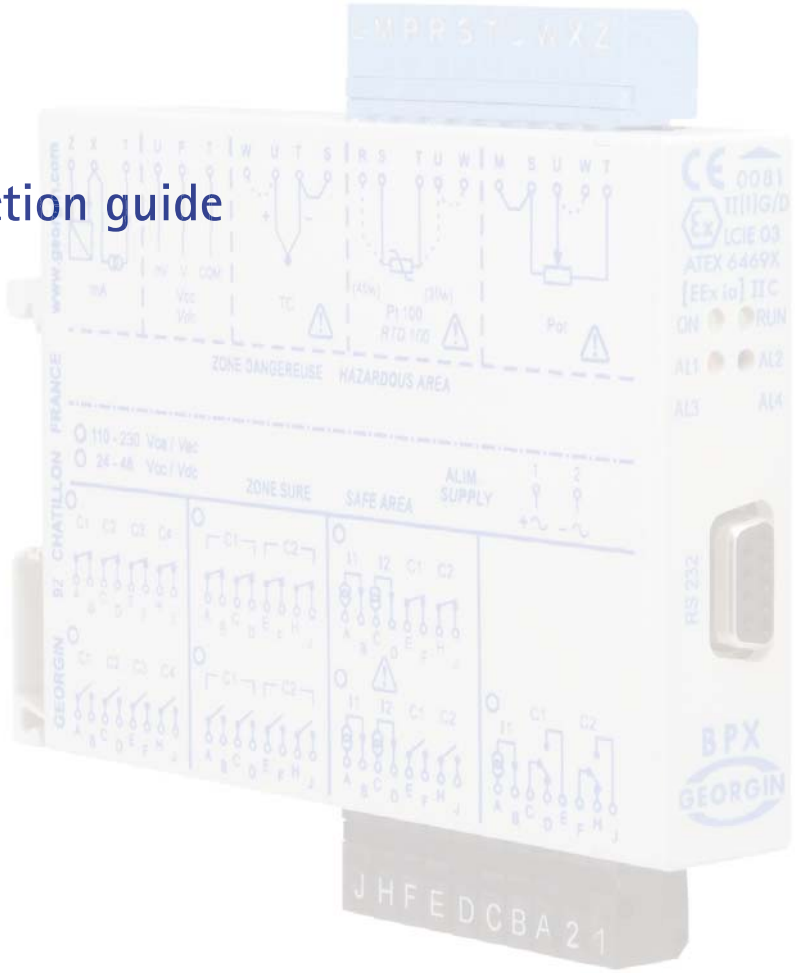
RDN1******
RDN2******



All other equipment



3. Selection guide



1. Analog inputs – standard

BXNT6

The device represented is an intrinsically safe, galvanic-insulated power supply for transmitters.
For the 2-wire transmitter (connection between H+ and J- terminals) the device powers the 4/20 mA sensor (16.5 V at 20 mA).
If the BXNT6 is connected to a current generator (J+ and L-), it does not supply power to the loop.
The 4/20 mA output can be connected as active or passive, depending on whether the controller powers the loop or not. (Terminals E+ and F-: The BXNT6 supplies voltage to the controller input).
The input signal (HJ) is read and transmitted to the safe zone through precise analog processing.
This device is a triple galvanic insulation (Input / Output / Module power supply).

Type	Option		Power supply	
BXNT6	00	No option	E	110/230 V AC
	B0	Screw terminals	2	24/48 V DC

❶ Presence of voltage indicated by a green LED
❷ Adjustment potentiometers for the source and the curve of the 4/20 mA output

HJ terminals:
Uo: 27.5 V
Io: 80.1 mA
Po: 550.72 mA
Co, IIC: 86 nF
Lo, IIC: 2.8 mH

Marking:
II(1)G [Ex ia] IIC
II(1)D [Ex iaD] IIC
Certificate:
02ATEX6104X

SIL APPROVED

BXMT

When space savings are necessary, it is possible to use the two-channel version.
The two channels are independent and each have separate insulation.

Type	Option		Power supply	
BXMT1	00	No option	E	110/230 V AC
	B0	Screw terminals	2	24/48 V DC

❶ Presence of voltage indicated by a green LED. (1 LED per output channel)
❷ Adjustment potentiometers for the source and the curve of the 4/20 mA output. (1 set of potentiometers per channel)

HJ terminals:
Uo: 27.5 V
Io: 80.1 mA
Po: 550.72 mA
Co, IIC: 86 nF
Lo, IIC: 2.8 mH

Marking:
II(1)G [Ex ia] IIC
II(1)D [Ex iaD] IIC
Certificate:
02ATEX6104X

SIL APPROVED

BXLT

To duplicate the 4/20 mA output, it is possible to use this 1-input / 2-output version.
For this version, the two outputs are isolated from each other and from the input.

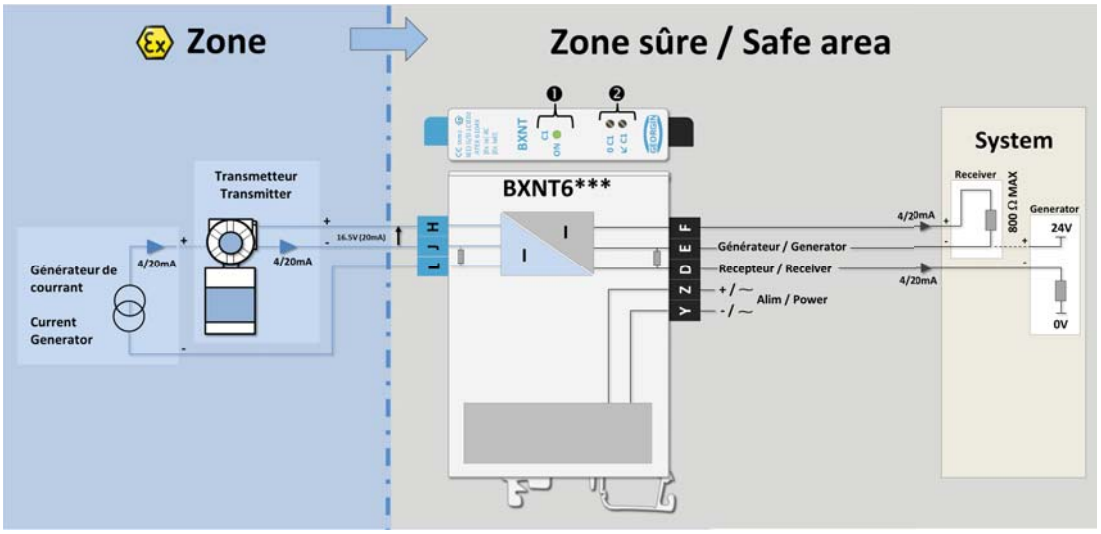
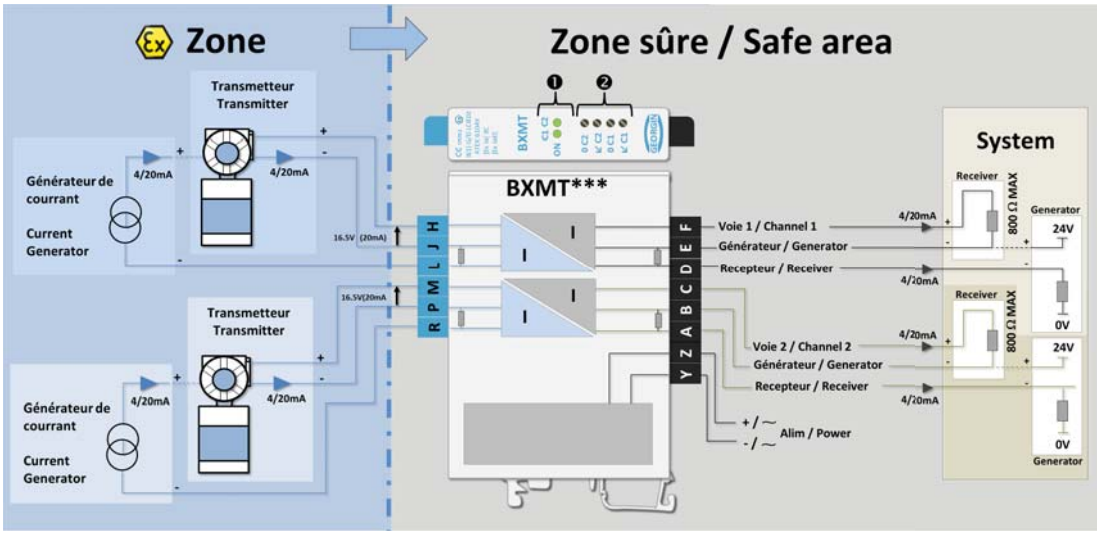
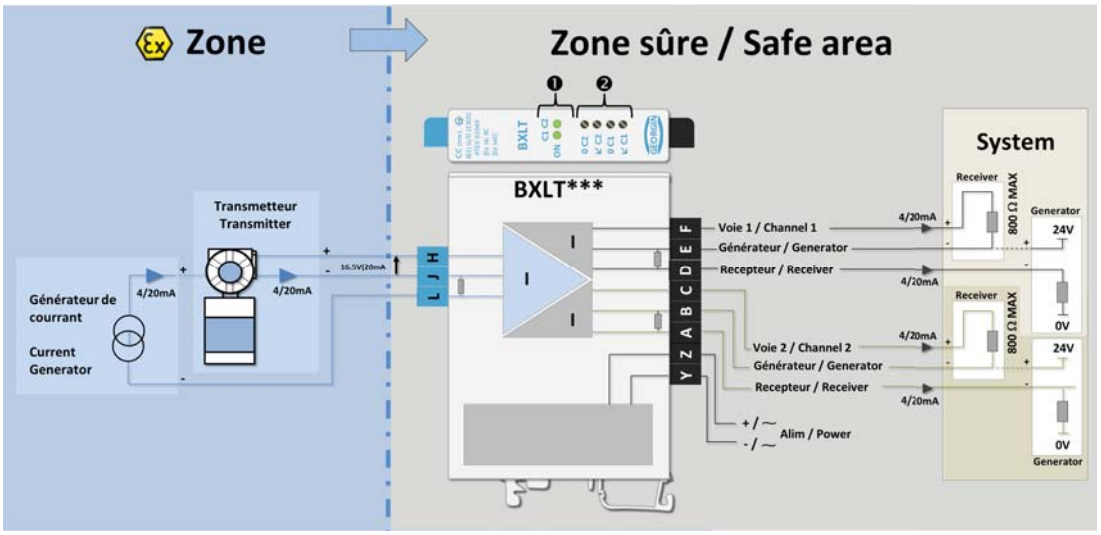
Type	Option		Power supply	
BXLT1	00	No option	E	110/230 V AC
	B0	Screw terminals	2	24/48 V DC

❶ Presence of voltage indicated by a green LED. (1 LED per output channel)
❷ Adjustment potentiometers for the source and the curve of the 4/20 mA output. (1 set of potentiometers per channel)

JL terminals:
Uo: 12.5 V
Io: 2.4 mA
Po: 15 mW
Co, IIC: 1200 nF
Lo, IIC: 1000 mH

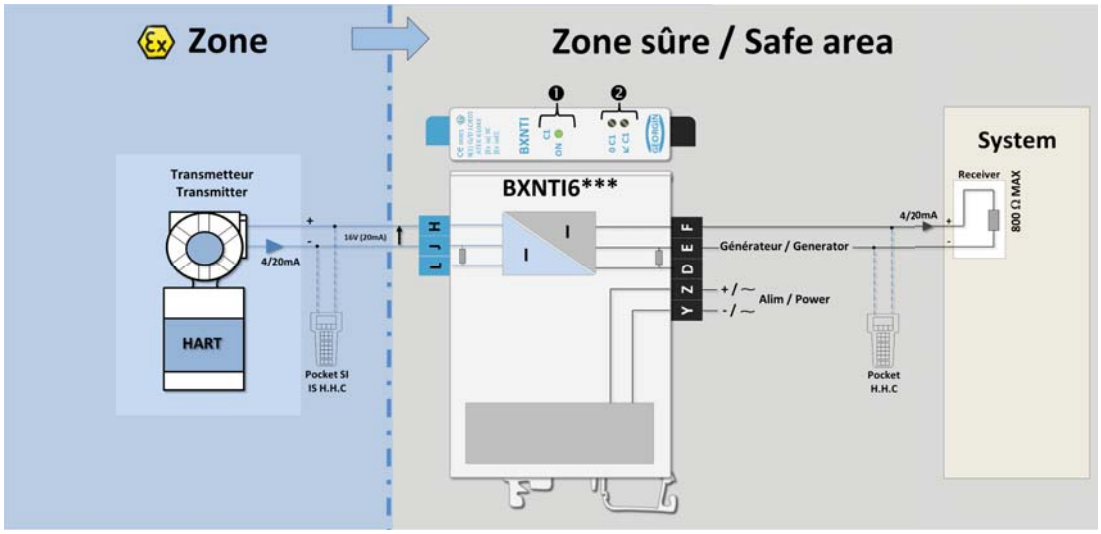
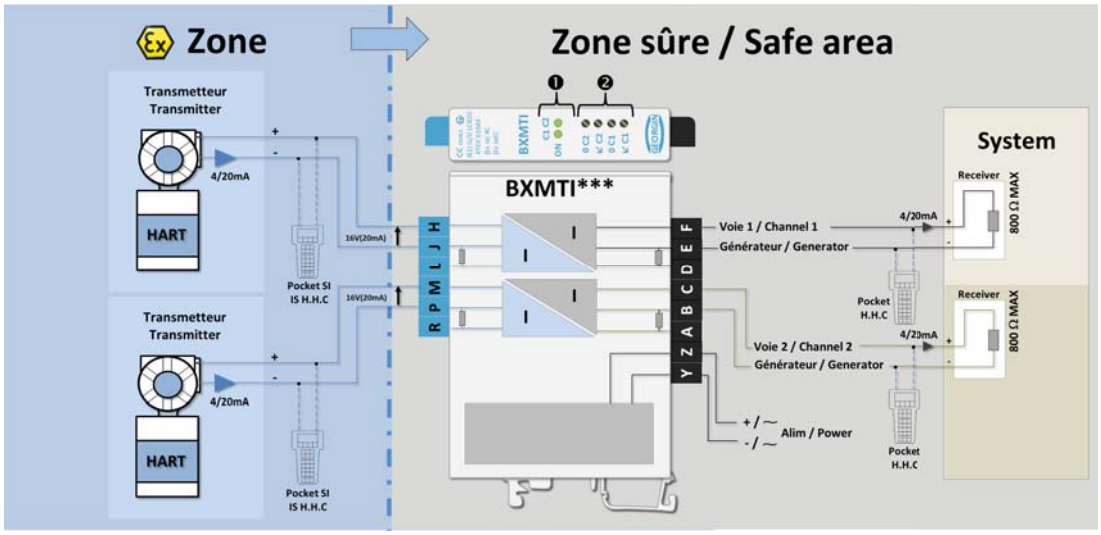
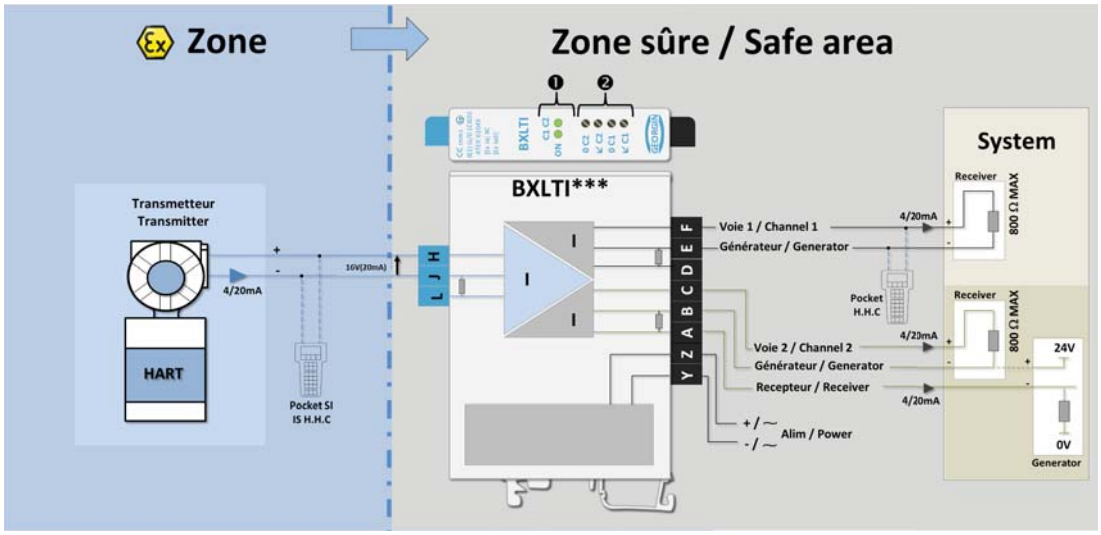
Marking:
II(1)G [Ex ia] IIC
II(1)D [Ex iaD] IIC
Certificate:
02ATEX6104X

SIL APPROVED

Explanatory diagram	I/O
	1 Input / 1 Output
	2 Inputs / 2 Outputs
	1 Input / 2 Output

2. Analog inputs – HART compatible

Ref.	Description (see technical data sheet for further information)	IS parameters ATEX marking
BXNTI6	The most common application using analog inputs is the interface with a 4/20 mA transmitter: The device represented is an intrinsically safe, galvanic-insulated power supply for transmitters. For the 2-wire transmitter (connection between H+ and J- terminals) the device powers the 4/20mA sensor (16.5 V at 20 mA). The 4/20 mA output on the BXNT16 (F+E-) may only be active (the module supplies power to the loop) as the 4/20 mA must be modulated to retranscribe the HART protocol frames read on input. The input signal (HJ) is read and transmitted to the safe zone through precise analog processing. This device is a triple galvanic insulation (Input / Output / Module power supply). Type / Option / Power supply BXNTI6 — 00 No option — E 110/230 V AC; B0 Screw terminals — 2 24/48 V DC ❶ Presence of voltage indicated by a green LED ❷ Adjustment potentiometers for the source and the curve of the 4/20 mA output.	**HJ terminals:** **Uo**: 27.5 V **Io**: 80.1 mA **Po**: 550.72 mA **Co**, IIC: 86 nF **Lo**, IIC: 2.8 mH **Marking:** II(1)G [Ex ia] IIC II(1)D [Ex iaD] IIC Certificate: 02ATEX6104X SIL APPROVED
BXMTI	When space savings are necessary, it is possible to use the two-channel version. The two channels are independent and each have separate insulation. Type / Option / Power supply BXMTI2 — 00 No option — E 110/230 V AC; B0 Screw terminals — 2 24/48 V DC ❶ Presence of voltage indicated by a green LED. (1 LED per output channel) ❷ Adjustment potentiometers for the source and the curve of the 4/20 mA output. (1 set of potentiometers per channel)	**HJ terminals:** **Uo**: 27.5 V **Io**: 80.1 mA **Po**: 550.72 mA **Co**, IIC: 86 nF **Lo**, IIC: 2.8 mH **Marking:** II(1)G [Ex ia] IIC II(1)D [Ex iaD] IIC Certificate: 02ATEX6104X SIL APPROVED
BXLTI	To duplicate the 4/20 mA output, it is possible to use this 1-input / 2-output version. For this version, the two outputs are insulated from each other and from the input. Type / Option / Power supply BXLT12 — 00 No option — E 110/230 V AC; B0 Screw terminals — 2 24/48 V DC ❶ Presence of voltage indicated by a green LED. (1 LED per output channel) ❷ Adjustment potentiometers for the source and the curve of the 4/20 mA output. (1 set of potentiometers per channel)	**HJ terminals:** **Uo**: 27.5 V **Io**: 80.1 mA **Po**: 550.72 mA **Co**, IIC: 86 nF **Lo**, IIC: 2.8 mH **Marking:** II(1)G [Ex ia] IIC II(1)D [Ex iaD] IIC Certificate: 02ATEX6104X SIL APPROVED

Explanatory diagram	I/O
	1 Input / 1 Output
	2 Inputs / 2 Outputs
	1 Input / 2 Output

3. Analog inputs – converter

BXNT1***-00-00 (ex)

The BXNT1 performs the same function as the BXNT6 (see Standard Analog Inputs) with the exception that this version (depending on the model) is capable of converting the input signal (e.g. Voltage 0-5 V) into another type of signal, voltage or current.
In this example it performs a simple 4/20 or 0-20 mA / 4/20 mA insulation.
This device features a different encoding depending on whether it is used on active or passive outputs:

Type	Option		Power supply		Input		Output	
BXNT1	00	No option	0	230 V AC	00	**4/20 mA**	00	**4/20 mA**
	B0	Screw terminals	1	110 V AC	04	0/20 mA	03	0/20 mA
			3	24 V DC	11	0/5 V	08	0/5 V
			4	48 V DC	13	0/10V	09	0/10V
					XX	Other on request	A0	Passive 4/20 mA
							XX	Other on request

❶ Presence of voltage indicated by a green LED
❷ Adjustment potentiometers for the source and the curve of the 4/20 mA output.

HJ terminals:
Uo: 27.5 V
Io: 80.1 mA
Po: 550.72 mA
Co, IIC: 86 nF
Lo, IIC: 2.8 mH

Marking:
II(1)G [Ex ia] IIC
II(1)D [Ex iaD] IIC
Certificate:
02ATEX6104X

BXNT1***-00-A0 (example)

In this example, the device represented is on a passive output (F+E-).

Type	Option		Power supply		Input		Output	
BXNT1	00	No option	0	230 V AC	00	**4/20 mA**	00	4/20 mA
	B0	Screw terminals	1	110 V AC	04	0/20 mA	03	0/20 mA
			3	24 V DC	11	0/5 V	08	0/5 V
			4	48 V DC	13	0/10V	A0	**Passive 4/20 mA**
					XX	Other on request	XX	Other on request

❶ Presence of voltage indicated by a green LED
❷ Adjustment potentiometers for the source and the curve of the 4/20 mA output

HJ terminals:
Uo: 27.5 V
Io: 80.1 mA
Po: 550.72 mA
Co, IIC: 86 nF
Lo, IIC: 2.8 mH

Marking:
II(1)G [Ex ia] IIC
II(1)D [Ex iaD] IIC
Certificate:
02ATEX6104X

BXNT1***-13-08 (example)

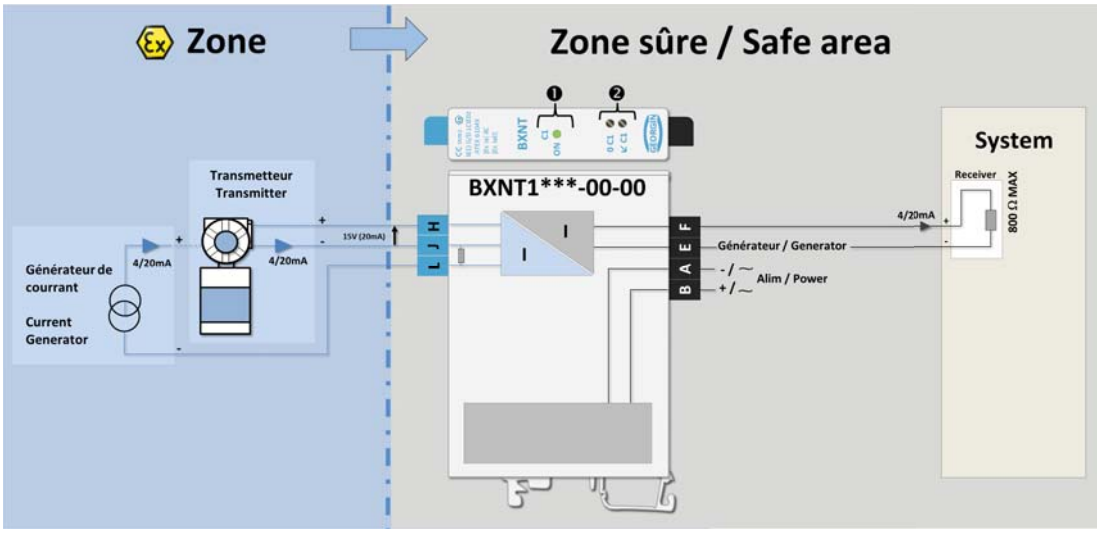
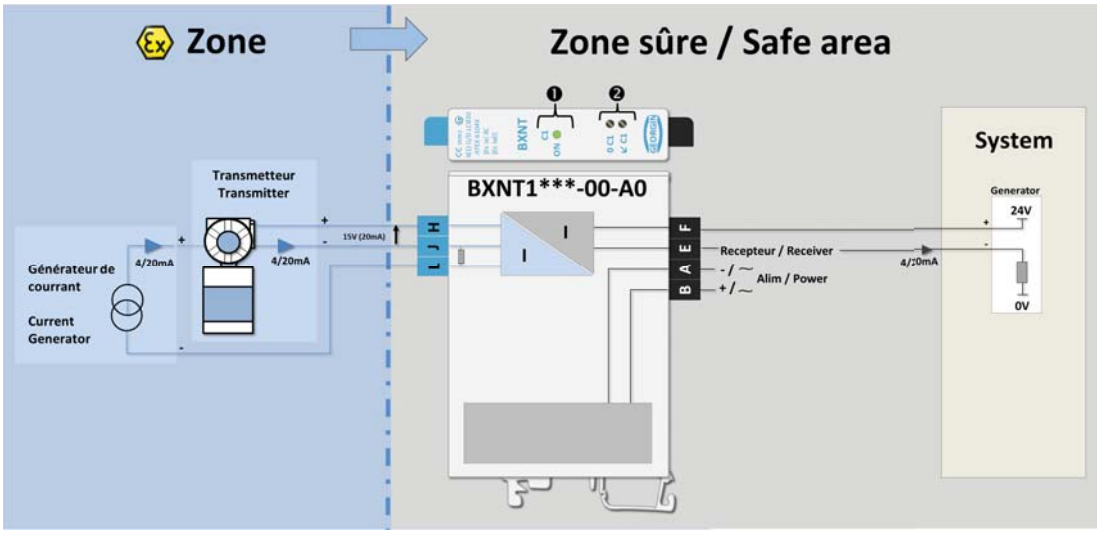
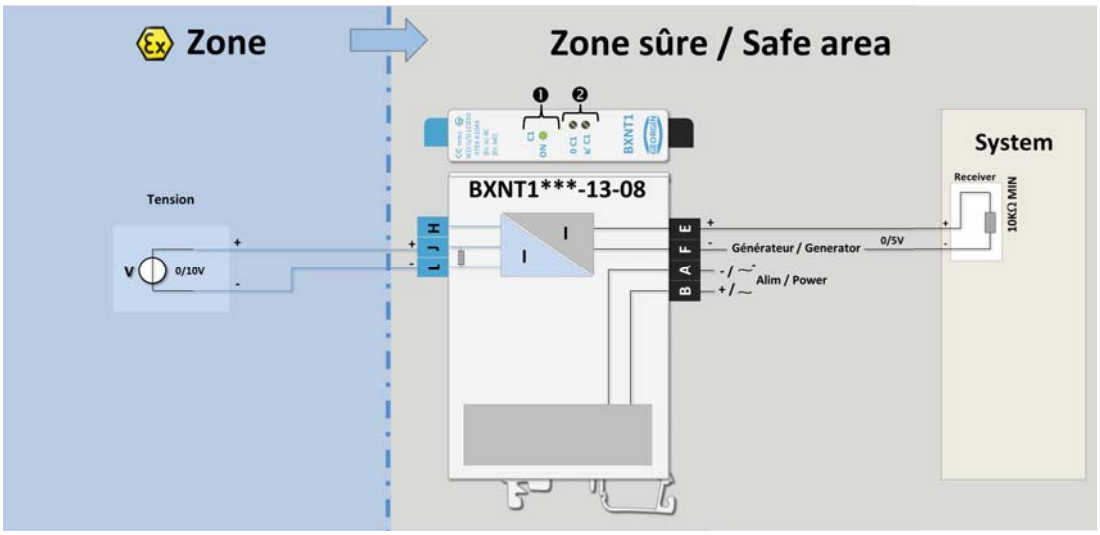
In this example, the device converts a 0/10 V input signal into a 0/5 V output signal.

Type	Option		Power supply		Input		Output	
BXNT1	00	No option	0	230 V AC	00	4/20 mA	00	4/20 mA
	B0	Screw terminals	1	110 V AC	04	0/20 mA	03	0/20 mA
			3	24 V DC	11	0/5 V	08	**0/5 V**
			4	48 V DC	13	**0/10V**	A0	Passive 4/20 mA
					XX	Other on request	XX	Other on request

❶ Presence of voltage indicated by a green LED
❷ Adjustment potentiometers for the source and the curve of the 4/20 mA output

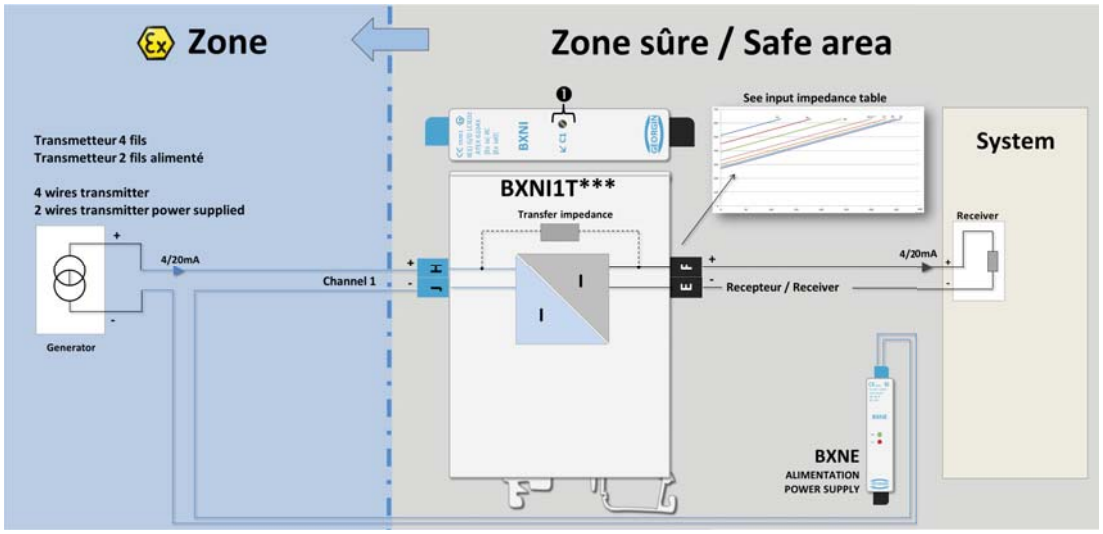
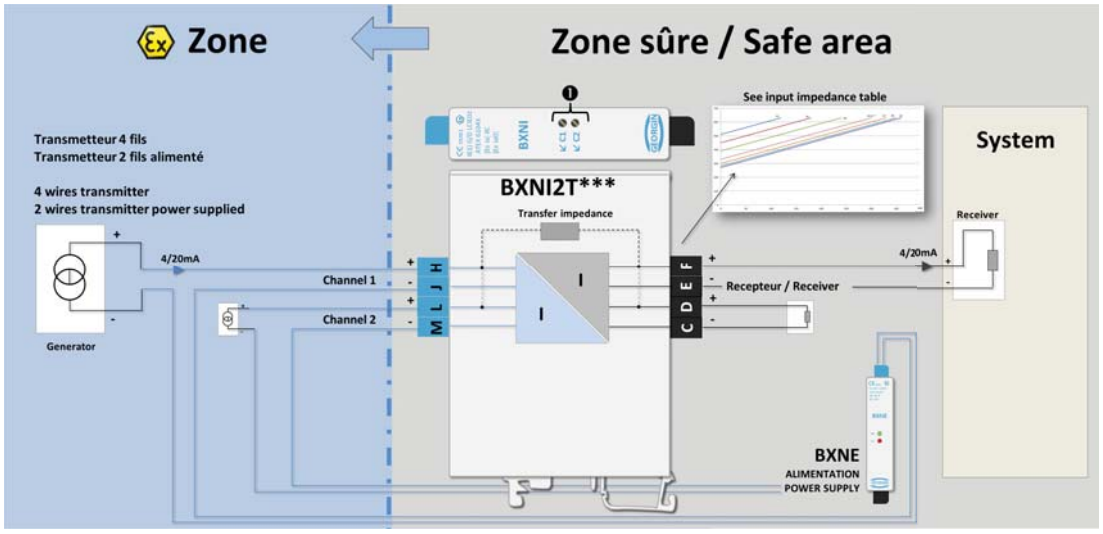
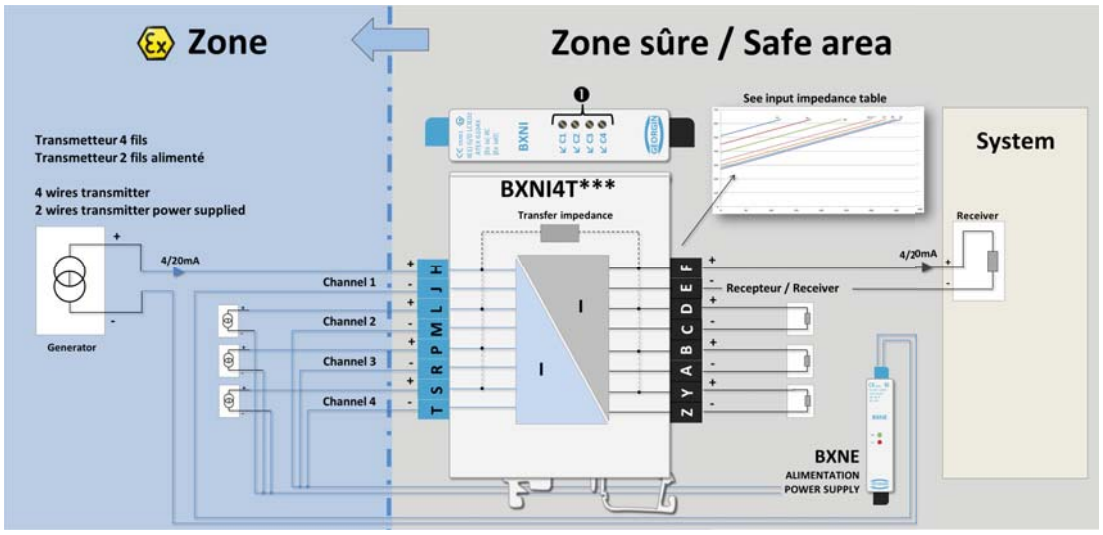
JL terminals:
Uo: 12.5 V
Io: 2.4mA
Po: 15 mW
Co, IIC: 1200 nF
Lo, IIC: 1000 mH

Marking:
II(1)G [Ex ia] IIC
II(1)D [Ex iaD] IIC
Certificate:
02ATEX6104X

Explanatory diagram	I/O
	1 Input / 1 active Output
	1 Input / 1 passive Output
	1 Input / 1 Output (Conversion)

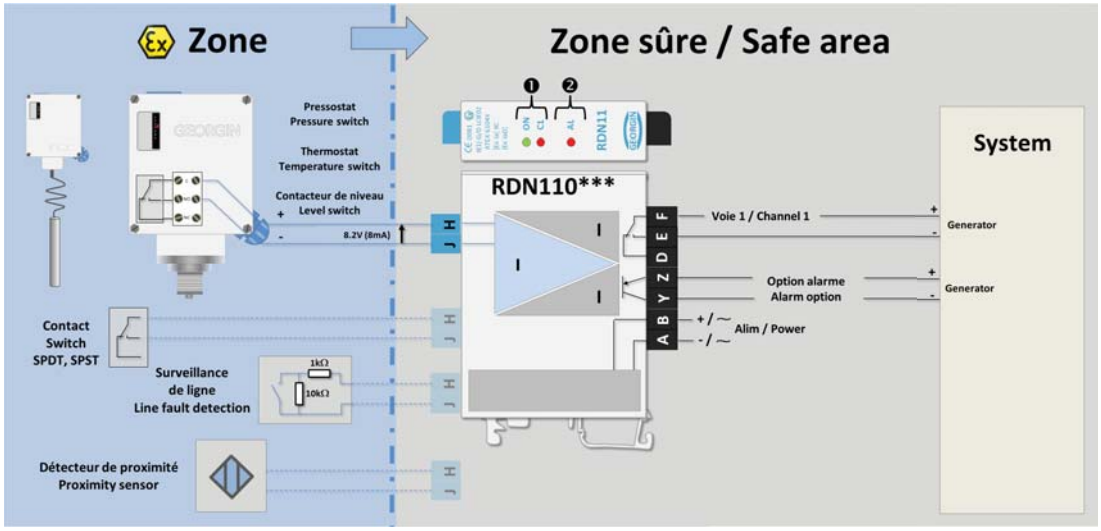
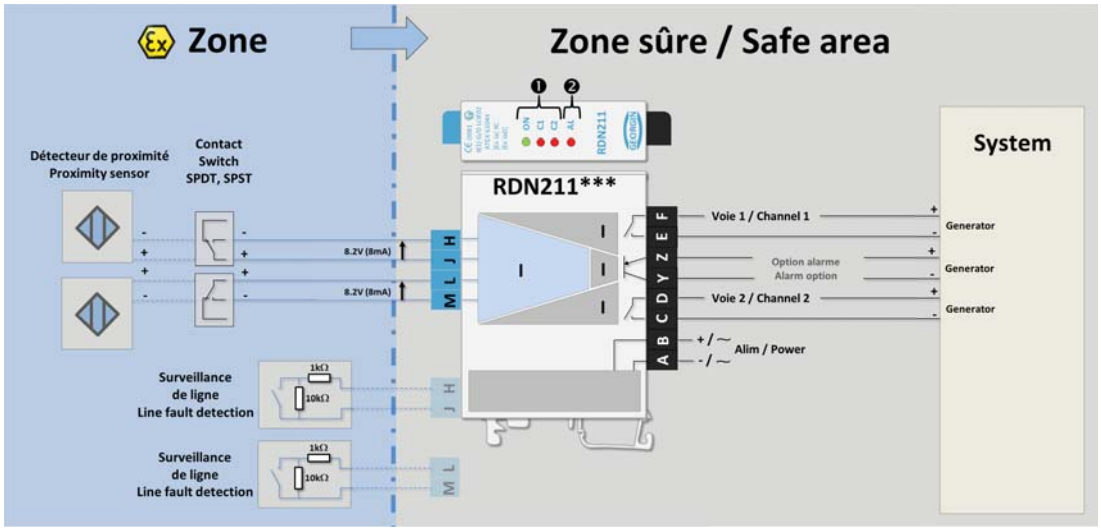
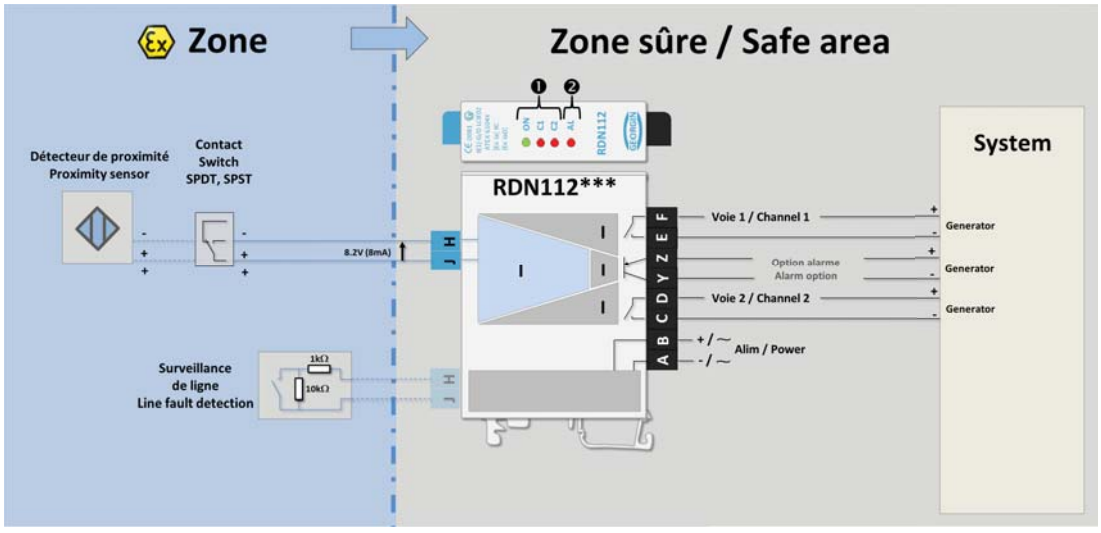
4. Analog inputs – isolator

Ref.	Description (see technical data sheet for further information)	IS parameters ATEX marking
BXNI1T	The BXNIT is a passive 4/20 mA signal isolator (it does not supply power to equipment in a hazardous area). The voltage source is located in the hazardous area: the module isolates the 4/20 input signal (J+H-) and sends it to a passive system in the safe area. When the signal is transferred from the hazardous area to the safe area, the transfer impedance specific to the BXNIT must be taken into account (see example on p. 34-35). Type: BXNI *Number of channels*: 1 — 1 channel Model: T — IS signal towards NIS Option: 00 — No option; B0 — Screw terminals ❶ Adjustment potentiometers of the 4/20 mA output curve (1 per channel).	**HJ terminals**: Ui: 66 V Ii: 100 mA Ci: insignificant Li: insignificant **Marking**: II(1)G [Ex ia] IIC II(1)D [Ex iaD] IIC Certificate: 02ATEX6104X
BXNI2T	2-channel version Type: BXNI *Number of channels*: 2 — 2 channels Model: T — IS signal towards NIS Option: 00 — No option; B0 — Screw terminals ❶ Adjustment potentiometers of the 4/20 mA output curve (1 per channel).	**HJ terminals**: Ui: 66 V Ii: 100 mA Ci: insignificant Li: insignificant **Marking**: II(1)G [Ex ia] IIC II(1)D [Ex iaD] IIC Certificate: 02ATEX6104X
BXNI4T	4-channel version Type: BXNI *Number of channels*: 4 — 4 channels Model: T — IS signal towards NIS Option: 00 — No option; B0 — Screw terminals ❶ Adjustment potentiometers of the 4/20 mA output curve (1 per channel).	**HJ terminals**: Ui: 66 V Ii: 100 mA Ci: insignificant Li: insignificant **Marking**: II(1)G [Ex ia] IIC II(1)D [Ex iaD] IIC Certificate: 02ATEX6104X

Explanatory diagram	I/O
	1 Input / 1 Output
	2 Inputs / 2 Outputs
	4 Inputs / 4 Outputs

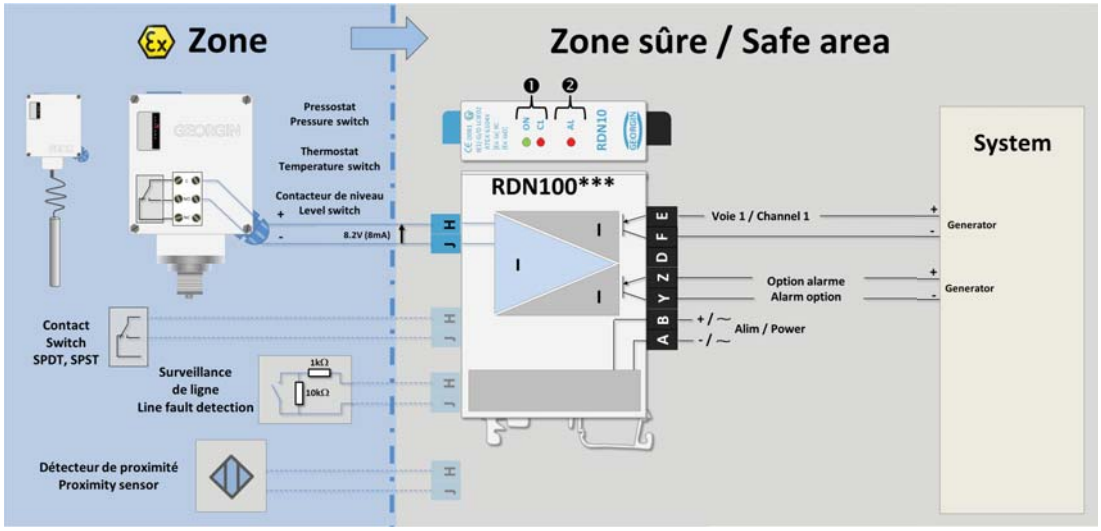
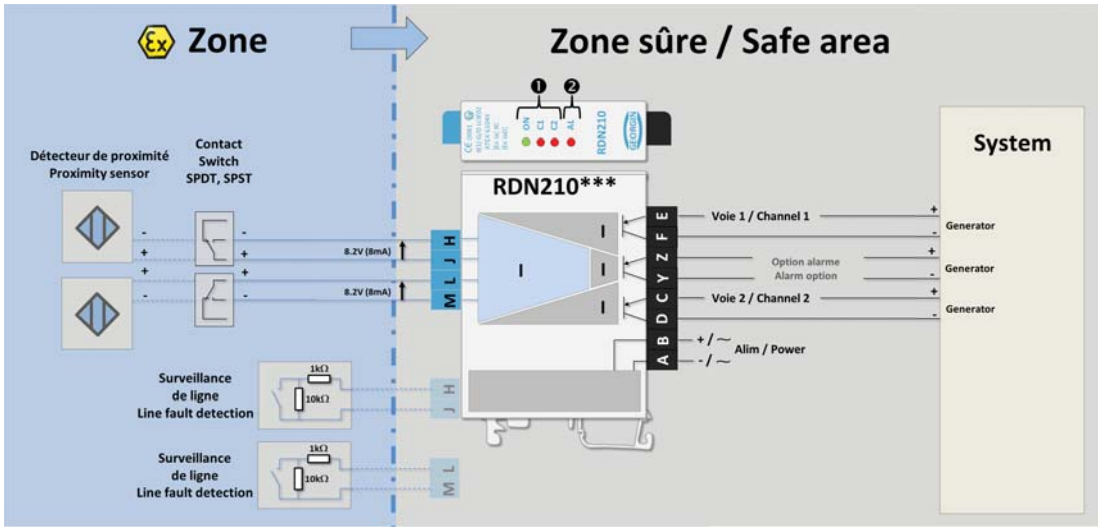
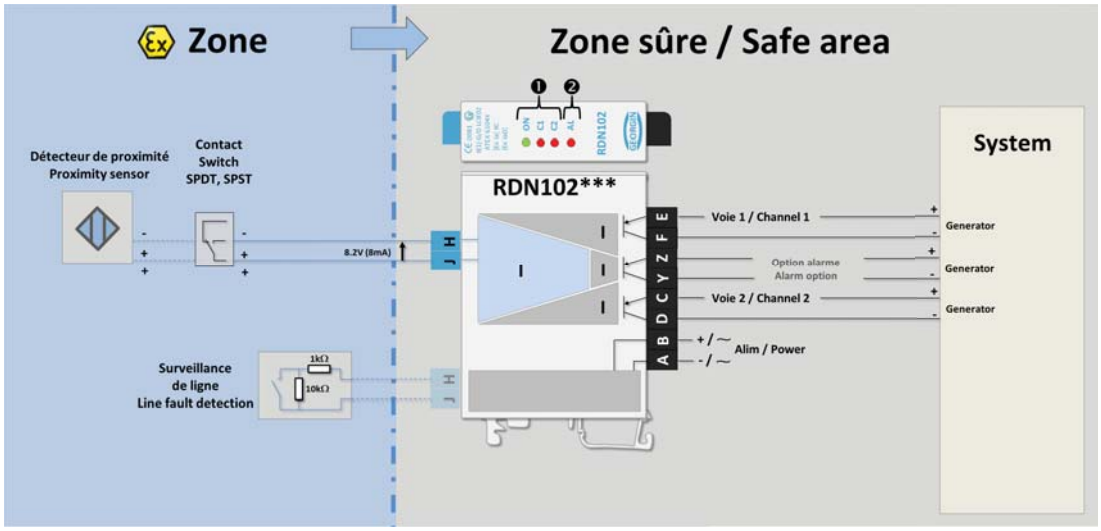
5. Digital inputs – relay outputs

Ref.	Description (see technical data sheet for further information)	IS parameters ATEX marking
RDN110	The RDN is an intrinsically safe, galvanic-isolated relay for contacts or proximity sensors. The RDN supplies the contact in a hazardous area (8.2 V at 8 mA). The relay output (F E) is voltage-free. **Type:** RDN **Number of channels:** 110 – 1 channel, 1 relay output, Inverter contact **Options:** 00 – No alarm AL – With alarm B0 – Screw terminals BL – Alarm + screw terminals - - – Other options (see technical data sheet) **Power supply:** 0 – 230 V AC 1 – 110 V AC 2 – 24/48 V DC 7 – 12 V DC ❶ Green LED to indicate power is supplied to the module. Red LED to indicate activation of the output relay. ❷ Red LED (AL) to indicate that the alarm transistor is conductive. It becomes conductive when the proximity sensor (Namur) input is outside of its operating range.	**HJ terminals**: **Uo**: 12 V **Io**: 25 mA **Po**: 150 mW **Co**: 1410 nF **Lo**: 45 mH **Marking**: II(1)G [Ex ia] IIC II(1)D [Ex iaD] IIC Certificate: 02ATEX6104X SIL APPROVED
RDN211	Identical model to RDN110 but in 2-channel version. **Type:** RDN **Number of channels:** 211 – 2 channels, 2 x 1 relay outputs, Inverter contact **Options:** 00 – No alarm AL – With alarm B0 – Screw terminals BL – Alarm + screw terminals - - – Other options (see technical data sheet) **Power supply:** 0 – 230 V AC 1 – 110 V AC 2 – 24/48 V DC 7 – 12 V DC ❶ Green LED to indicate power is supplied to the module. 2 x red LED to indicate activation of the output relays (C1 and C2). ❷ Red LED (AL) to indicate that the alarm transistor is conductive. The alarm is activated when one of the two proximity sensors (Namur) indicates a fault.	**HJ terminals**: **Uo**: 12 V **Io**: 25 mA **Po**: 150 mW **Co**: 1410 nF **Lo**: 45 mH **Marking**: II(1)G [Ex ia] IIC II(1)D [Ex iaD] IIC Certificate: 02ATEX6104X SIL APPROVED
RDN112	Identical model to the RDN110 but with 1 input and 2 simultaneous outputs. **Type:** RDN **Number of channels:** 112 – 1 channel, 2 x 1 relay outputs, Switch contact **Options:** 00 – No alarm AL – With alarm B0 – Screw terminals BL – Alarm + screw terminals - - – Other options (see technical data sheet) **Power supply:** 0 – 230 V AC 1 – 110 V AC 2 – 24/48 V DC 7 – 12 V DC ❶ Green LED to indicate power is supplied to the module. 2 x red LED to indicate activation of the simultaneous output relays (C1 and C2). ❷ Red LED (AL) to indicate that the alarm transistor is conductive. It becomes conductive when the proximity sensor (Namur) input is outside of its operating range.	**HJ terminals**: **Uo**: 12 V **Io**: 25 mA **Po**: 150 mW **Co**: 1410 nF **Lo**: 45 mH **Marking**: II(1)G [Ex ia] IIC II(1)D [Ex iaD] IIC Certificate: 02ATEX6104X SIL APPROVED

Explanatory diagram	I/O
	1 Input / 1 relay Output
	2 Inputs / 2 relay Outputs
	1 Input / 2 relay Outputs

6. Digital inputs – transistor outputs

Ref.	Description (see technical data sheet for further information)	IS parameters ATEX marking
RDN100	The RDN is an intrinsically safe, galvanic-isolated relay for contacts or proximity sensors. The RDN powers contacts in a hazardous area (8.2 V at 8 mA). Here the relay output (F E) is transistor, in contrast to the RDN110 (equipped with a relay). Type: RDN Number of channels: 100 – 1 channel, 1 transistor output Options: 00 – No alarm; AL – With alarm; B0 – Screw terminals; BL – Alarm + screw terminals; - - – Other options (see technical data sheet) Power supply: 0 – 230 V AC; 1 – 110 V AC; 2 – 24/48 V DC; 7 – 12 V DC ❶ Green LED to indicate power is supplied to the module. Red LED to indicate that the output transistor is conductive. ❷ Red LED (AL) to indicate that the alarm transistor is conductive. It becomes conductive when the proximity sensor (Namur) input is outside of its operating range.	**HJ terminals**: **Uo**: 12 V **Io**: 25 mA **Po**: 150 mW **Co**: 1410 nF **Lo**: 45 mH **Marking**: II(1)G [Ex ia] IIC II(1)D [Ex iaD] IIC Certificate: 02ATEX6104X SIL APPROVED
RDN210	Identical model to the RDN110 but with 1 input and 2 simultaneous outputs. Type: RDN Number of channels: 210 – 2 channels, 2 x 1 transistor outputs Options: 00 – No alarm; AL – With alarm; B0 – Screw terminals; BL – Alarm + screw terminals; - - – Other options (see technical data sheet) Power supply: 0 – 230 V AC; 1 – 110 V AC; 2 – 24/48 V DC; 7 – 12 V DC ❶ Green LED to indicate power is supplied to the module. 2 x red LED to indicate that the output transistors (C1 and C2) are conductive. ❷ Red LED (AL) to indicate that the alarm transistor is conductive. The alarm is activated when one of the two proximity sensors (Namur) indicates a fault.	**HJ terminals**: **Uo**: 12 V **Io**: 25 mA **Po**: 150 mW **Co**: 1410 nF **Lo**: 45 mH **Marking**: II(1)G [Ex ia] IIC II(1)D [Ex iaD] IIC Certificate: 02ATEX6104X SIL APPROVED
RDN102	Identical model to the RDN110 but with 1 input and 2 simultaneous outputs. Type: RDN Number of channels: 102 – 1 channel, 2 x 1 transistor outputs Options: 00 – No alarm; AL – With alarm; B0 – Screw terminals; BL – Alarm + screw terminals; - - – Other options (see technical data sheet) Power supply: 0 – 230 V AC; 1 – 110 V AC; 2 – 24/48 V DC; 7 – 12 V DC ❶ Green LED to indicate power is supplied to the module. 2 x red LED to indicate activation of the simultaneous output relays (C1 and C2). ❷ Red LED (AL) to indicate that the alarm transistor is conductive. It becomes conductive when the proximity sensor (Namur) input is outside of its operating range.	**HJ terminals**: **Uo**: 12V **Io**: 25mA **Po**: 150mW **Co**: 1410 nF **Lo**: 45 mH **Marking**: II(1)G [Ex ia] IIC II(1)D [Ex iaD] IIC Certificate: 02ATEX6104X SIL APPROVED

Explanatory diagram	I/O
	1 Input / 1 transistor Output
	2 Inputs / 2 transistor Outputs
	1 Input / 2 transistor Outputs

7. Digital inputs – output relays with input memory

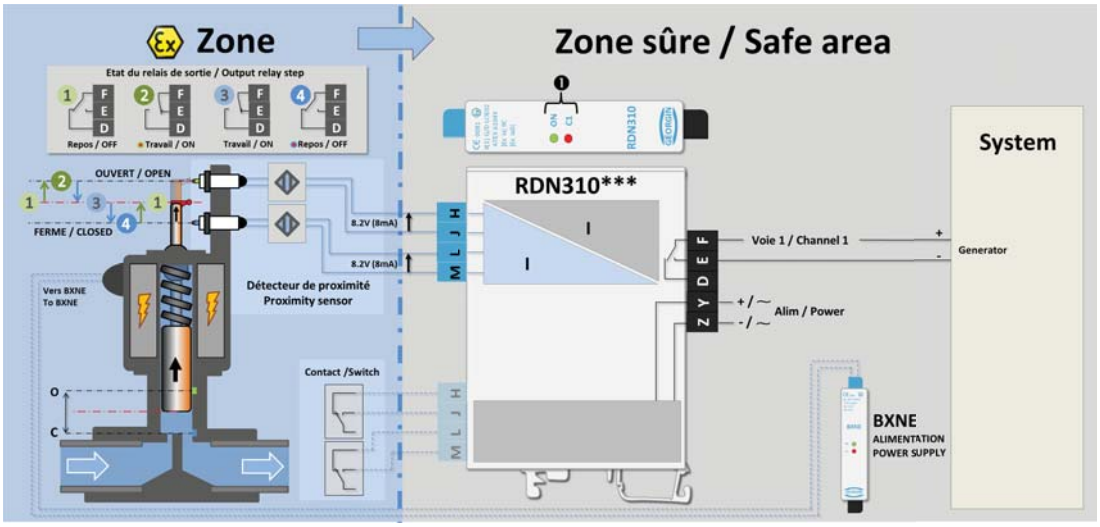
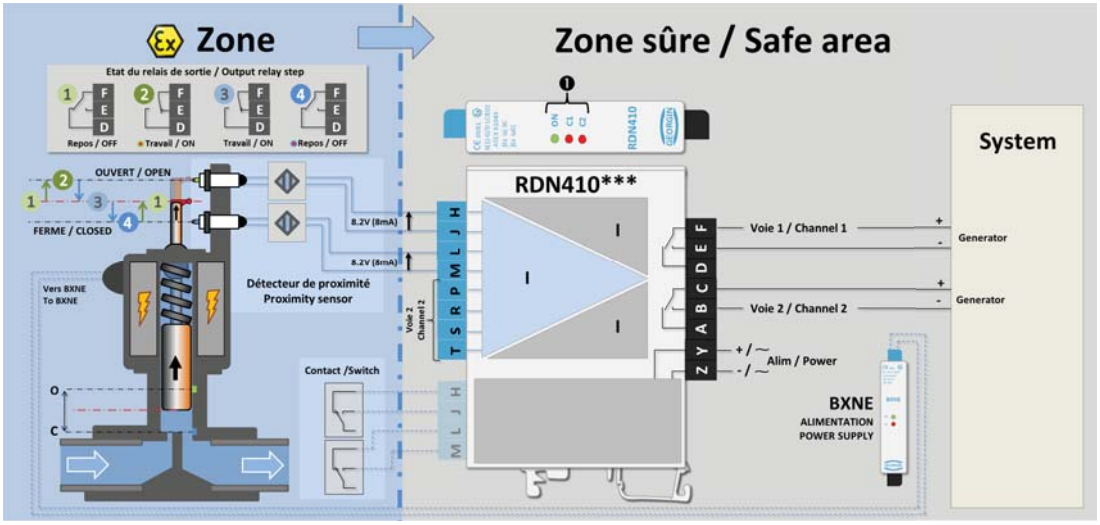
Ref.	Description (see technical data sheet for further information)	IS parameters ATEX marking
RDN310	The RDN310 is an intrinsically safe, galvanic-isolated bistable relay for contacts or proximity sensors. It is used in the example shown opposite to interface stroke-end contacts or proximity sensors on a solenoid valve. The benefit of this device is that it enables the last state detected on the input to be memorised on the output. When the first proximity sensor changes state, the RDN relay input detects this and the output relay also changes state. The output relay retains its state as long as the second RDN input does not detect a change of state by proximity sensor no. 2.	**HJ terminals**: **Uo**: 8.6 V **Io**: 9 mA **Po**: 19 mW **Co**, IIC: 6200 nF **Lo**, IIC: 350 mH **Marking**: II(1)G [Ex ia] IIC II(1)D [Ex iaD] IIC Certificate: 02ATEX6104X
RDN410	The RDN410 is an intrinsically safe, galvanic-isolated bistable relay for contacts or proximity sensors. Identical to the RDN310, it has two channels (i.e. 4 inputs).	**HJ terminals**: **Uo**: 8.6 V **Io**: 9 mA **Po**: 19 mW **Co**, IIC: 6200 nF **Lo**, IIC: 350 mH **Marking**: II(1)G [Ex ia] IIC II(1)D [Ex iaD] IIC Certificate: 02ATEX6104X

Type	Number of channels		Options		Power supply	
RDN	310	2 Inputs - 1 Output	00	No alarm	0	230 V AC
			B0	Screw terminals	1	110 V AC
					2	24/48 V DC

❶ Green LED to indicate power is supplied to the module.
Red LED to indicate that the C1 output relay is excited.

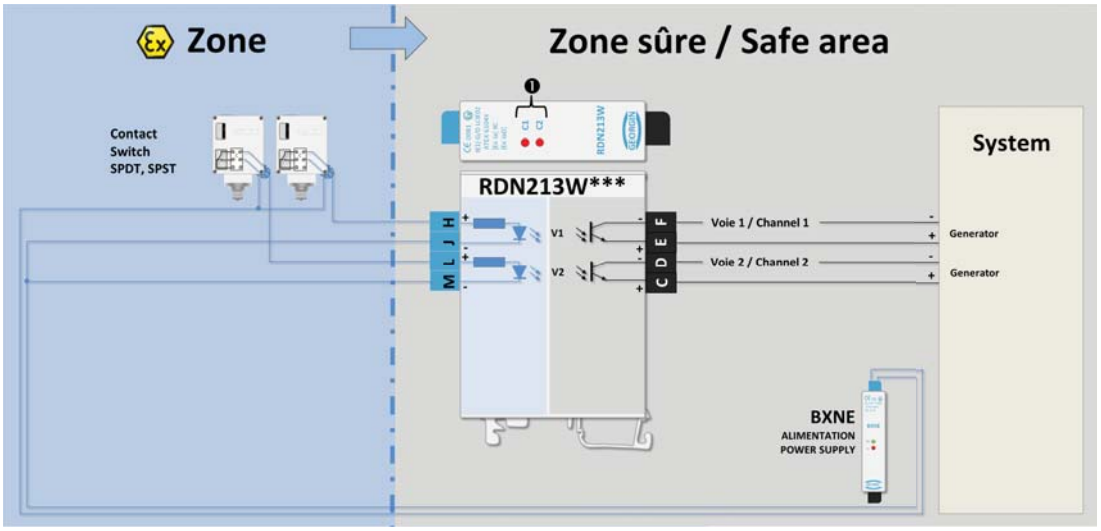
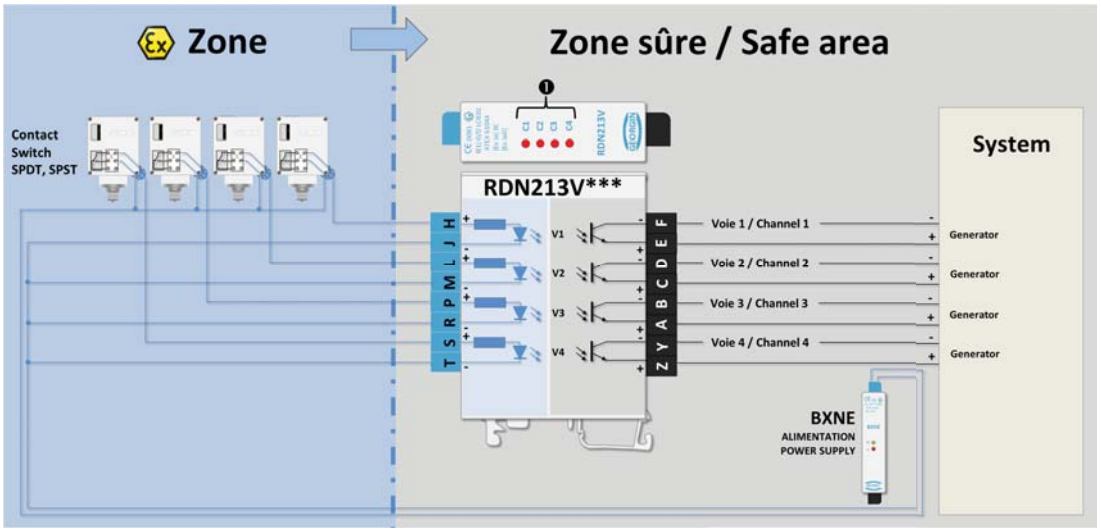
Type	Number of channels		Options		Power supply	
RDN	410	4 Inputs - 2 Outputs	00	No alarm	0	230 V AC
			B0	Screw terminals	1	110 V AC
					2	24/48 V DC

❶ Green LED to indicate power is supplied to the module.
2 x red LED to indicate that the output relays (C1 and C2) are excited.

Explanatory diagram	I/O
	2 Inputs / 1 relay Output
	4 Inputs / 2 relay Outputs

8. Digital inputs – signal isolator

Ref.	Description (see technical data sheet for further information)	IS parameters ATEX marking
RDN310	The RDN213W is a digital signal isolator with two independent channels. This intrinsically safe, galvanic-insulated separator uses opto-isolators to transfer the signal from the hazardous area to the safe area. The module operates without a power supply: the voltage source comes from the hazardous area. Type: RDN Model: 213 – Opto-isolator IS input / NIS output Power supply: W – 2 channels Input: 00 – Cage clamp terminals; B0 – Screw terminals Output: 3 – 24 V DC; 7 – 12 V DC; 8 – 5 V DC ❶ 2 x red LED to indicate that the output transistors (opto-isolators) are conductive.	Maximum current on intrinsic safety circuit: 100 mA Marking: II(1)G [Ex ia] IIC II(1)D [Ex iaD] IIC Certificate: 02ATEX6104X
RDN410	Identical to the RDN213W, the RDN213V has four independent channels. Type: RDN Model: 213 – Opto-isolator IS input / NIS output Power supply: V – 4 channels Input: 00 – Cage clamp terminals; B0 – Screw terminals Output: 3 – 24 V DC; 7 – 12 V DC; 8 – 5 V DC ❶ 4 x red LED to indicate that the output transistors (opto-isolators) are conductive.	Maximum current on intrinsic safety circuit: 100 mA **Marking**: II(1)G [Ex ia] IIC II(1)D [Ex iaD] IIC Certificate: 02ATEX6104X

Explanatory diagram	I/O
	2 Inputs / 2 Opto-isolator Outputs
	4 Inputs / 4 Opto-isolator Outputs

9. Analog outputs – converter

Ref.	Description (see technical data sheet for further information)	IS parameters ATEX marking
BXNA1*-00-00**	The BXNA1 is an intrinsically safe, galvanic insulated converter for actuators. It is used to transmit a 4/20 mA signal (or other depending on the model selected) to a hazardous area.	**HJ terminals**: **Uo**: 23.5 V **Io**: 97 mA **Po**: 560 mW **Co**, IIC: 132 nF **Lo**, IIC: 5 mH **Marking**: II(1)G [Ex ia] IIC II(1)D [Ex iaD] IIC Certificate: 02ATEX6104X

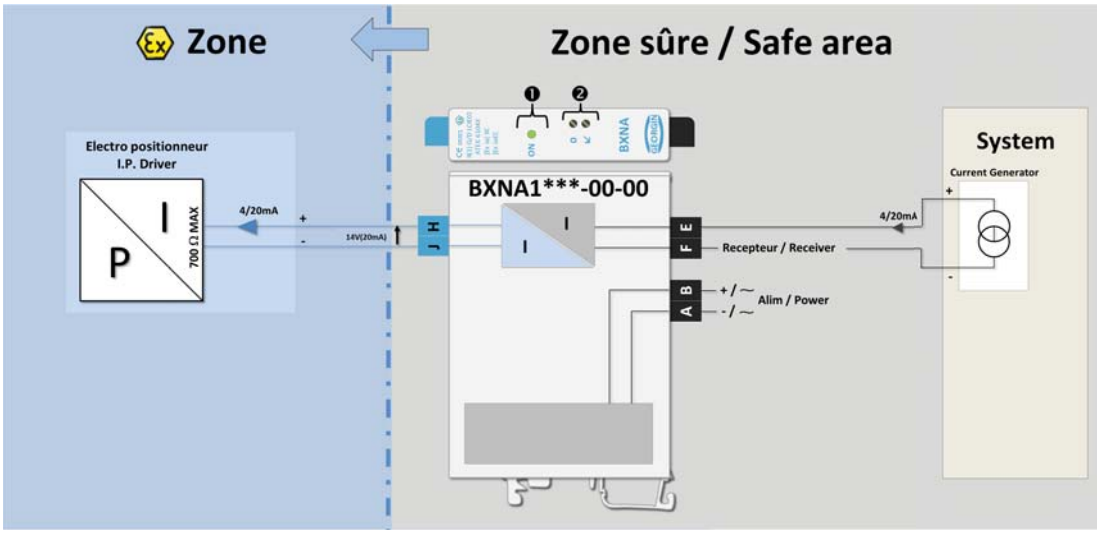
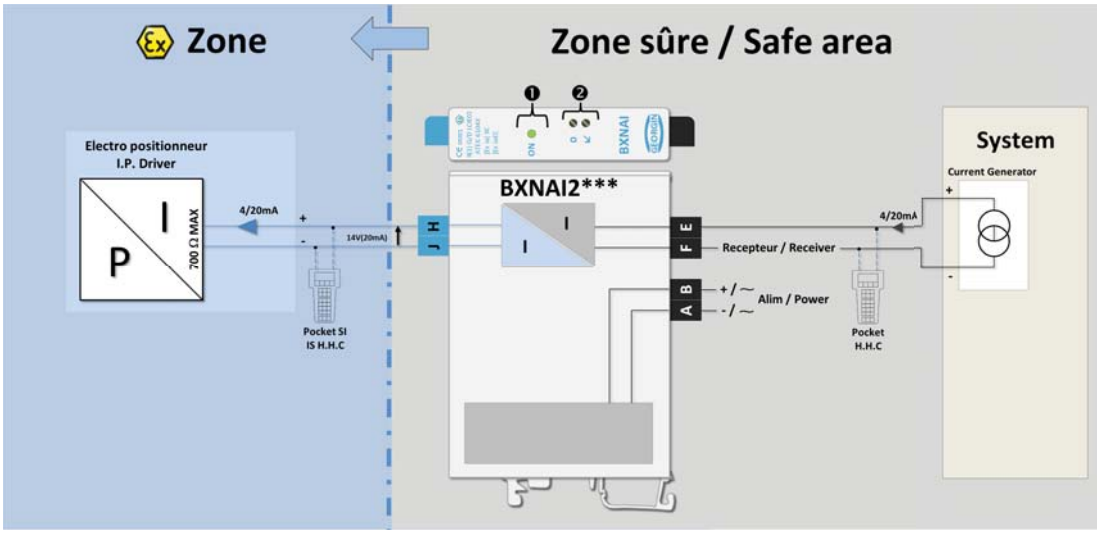
Type	Model		Power supply		Input		Output	
BXNA1	00	No option	0	230 V AC	00	**4/20 mA**	00	**4/20 mA**
	B0	Screw terminals	1	110 V AC	02	0/5 mA		
			3	24 V DC	04	0/20 mA		
			4	48 V DC	08	-10/+10V		
					11	0/5 V		
					13	0/10V		
					XX	Others on request		

❶ Presence of voltage indicated by a green LED
❷ Adjustment potentiometers for the source and the curve of the 4/20 mA output.

BXNAI2*	The BXNAI2 is an intrinsically safe, galvanic-insulated converter for intelligent actuators (HART protocol). Identical to the BXNA1, it is only available in a 4/20 mA / 4/20 mA version as it is dedicated to actuators that use the HART protocol.	**HJ terminals**: **Uo**: 23.5 V **Io**: 97 mA **Po**: 560 mW **Co**, IIC: 132 nF **Lo**, IIC: 5 mH **Marking**: II(1)G [Ex ia] IIC II(1)D [Ex iaD] IIC Certificate: 02ATEX6104X

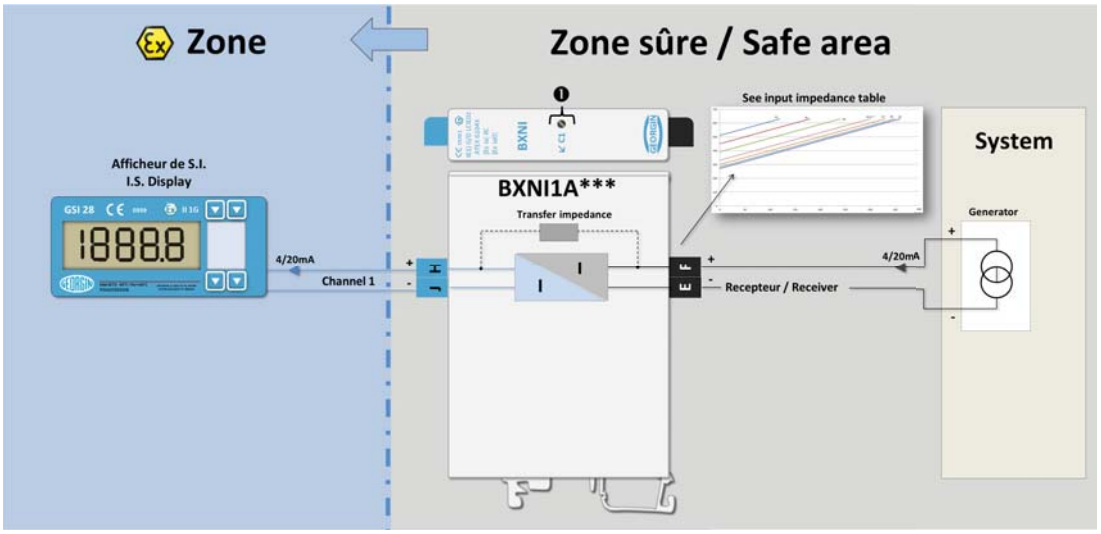
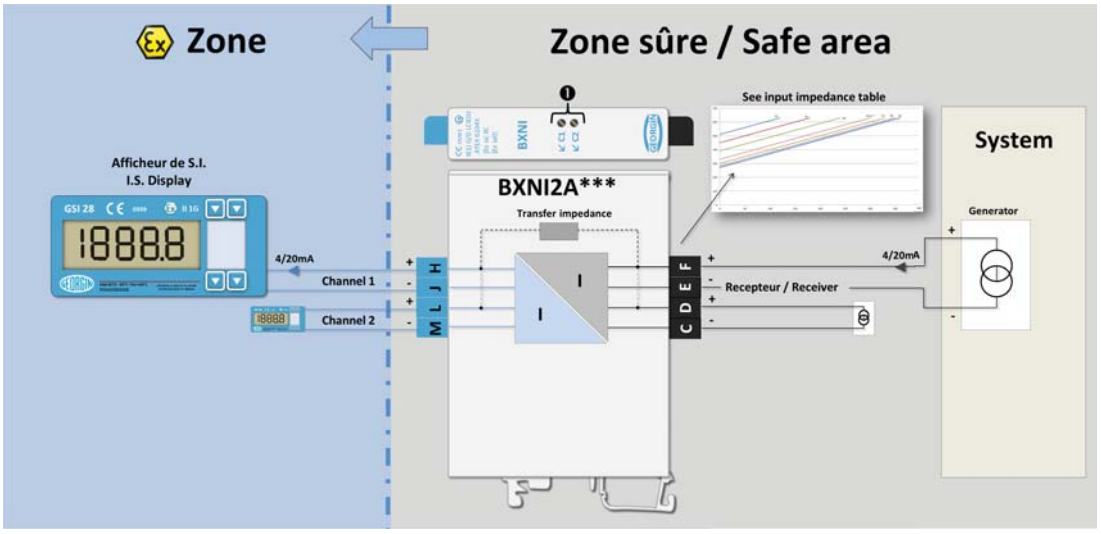
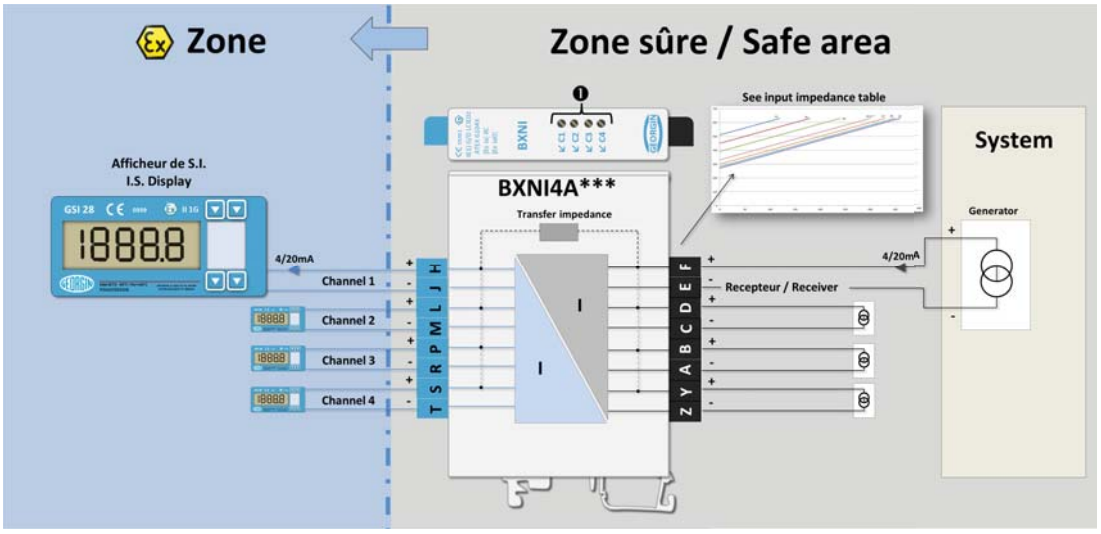
Type	Model		Power supply	
BXNAI2	00	No option	0	230 V AC
	B0	Screw terminals	1	110 V AC
			3	24 V DC
			4	48 V DC

❶ Presence of voltage indicated by a green LED
❷ Adjustment potentiometers for the source and the curve of the 4/20 mA output.

Explanatory diagram	I/O
	1 Input / 1 Output
	1 Input / 1 Output

10. Analog outputs – isolator

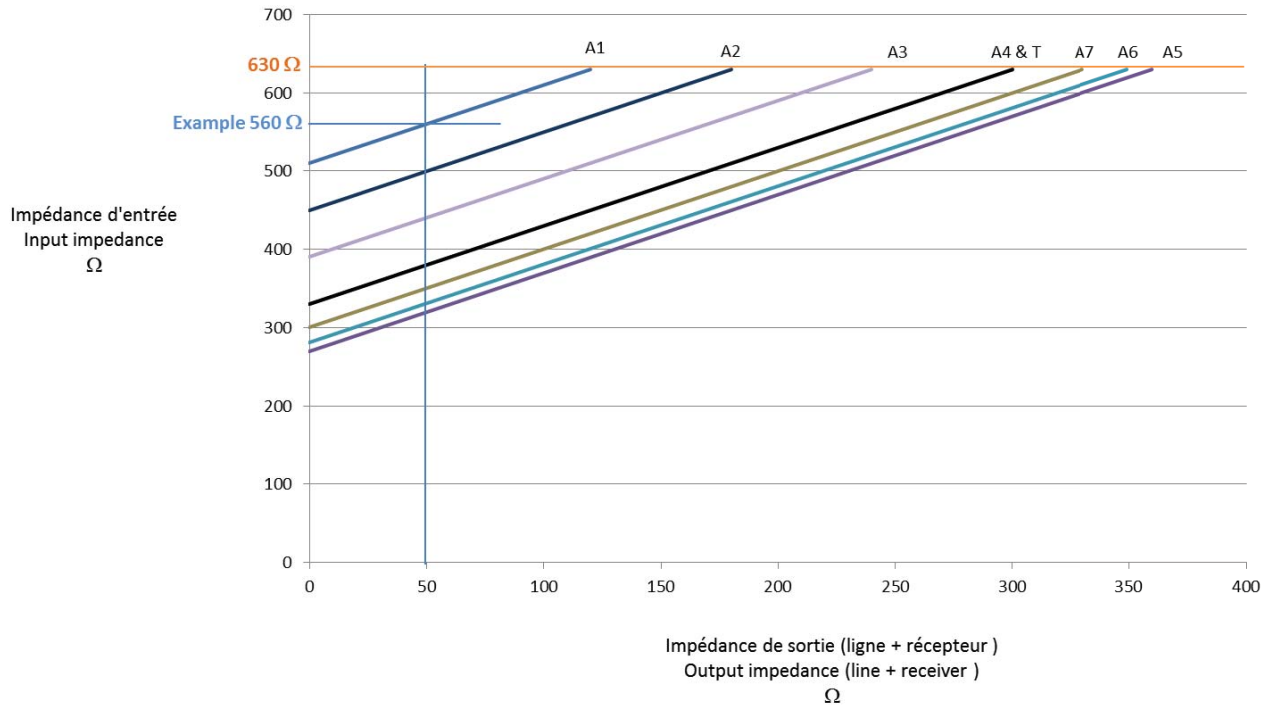
Ref.	Description (see technical data sheet for further information)	IS parameters ATEX marking
BXNI1A	The BXNI1A is a passive, self-powered 4/20 mA signal isolator. It is used to send a 4/20 mA signal generated in a safe area into a hazardous area. When the signal is transferred from the safe area to the hazardous area, the transfer impedance specific to the BXNIA (see example on p. 34-35) must be taken into account. Type: BXNI — *Number of channels*: 1 — 1 channel Model: A1 Impedance: 510Ω; A2 Impedance: 450Ω; A3 Impedance: 390Ω; A4 Impedance: 330Ω; A5 Impedance: 270Ω; A6 Impedance: 281Ω; A7 Impedance: 300Ω Option: 00 No option; B0 Screw terminals ❶ Adjustment potentiometers of the 4/20 mA output curve (1 per channel).	**HJ terminals**: See technical data sheet (depends on the version) **Marking**: II(1)G [Ex ia] IIC II(1)D [Ex iaD] IIC Certificate: 02ATEX6104X
BXNI2A	2-channel version Type: BXNI — *Number of channels*: 2 — 2 channels Model: A1 Impedance: 510Ω; A2 Impedance: 450Ω; A3 Impedance: 390Ω; A4 Impedance: 330Ω; A5 Impedance: 270Ω; A6 Impedance: 281Ω; A7 Impedance: 300Ω Option: 00 No option; B0 Screw terminals ❶ Adjustment potentiometers of the 4/20 mA output curve (1 per channel).	**HJ terminals**: See technical data sheet (depends on the version) **Marking**: II(1)G [Ex ia] IIC II(1)D [Ex iaD] IIC Certificate: 02ATEX6104X
BXNI4A	2-channel version Type: BXNI — *Number of channels*: 4 — 4 channels Model: A1 Impedance: 510Ω; A2 Impedance: 450Ω; A3 Impedance: 390Ω; A4 Impedance: 330Ω; A5 Impedance: 270Ω; A6 Impedance: 281Ω; A7 Impedance: 300Ω Option: 00 No option; B0 Screw terminals ❶ Adjustment potentiometers of the 4/20 mA output curve (1 per channel).	**HJ terminals**: See technical data sheet (depends on the version) **Marking**: II(1)G [Ex ia] IIC II(1)D [Ex iaD] IIC Certificate: 02ATEX6104X

Explanatory diagram	I/O
	1 Input / 1 Output
	2 Inputs / 2 Outputs
	4 Inputs / 4 Outputs

11. Impedance transfer table (BXNI*T and BXNI*A)

- Impedance values for each version of the BXNI

BXNI version	A1		A2		A3		A4		A5		A6		A7		T	
Impedance transfer	510 Ω		450 Ω		390 Ω		330 Ω		270 Ω		281 Ω		300 Ω		330 Ω	
Input impedance vs. output impedance	Out.	In.	Out.	In.	Out.	In.	Out.	In.	Out.	In.	Out.	In.	Out.	In.	Out.	In.
Min Ω	0	510	0	450	0	390	0	330	0	270	0	281	0	300	0	330
Max Ω	120	630	180	630	240	630	300	630	360	630	349	630	330	630	300	630

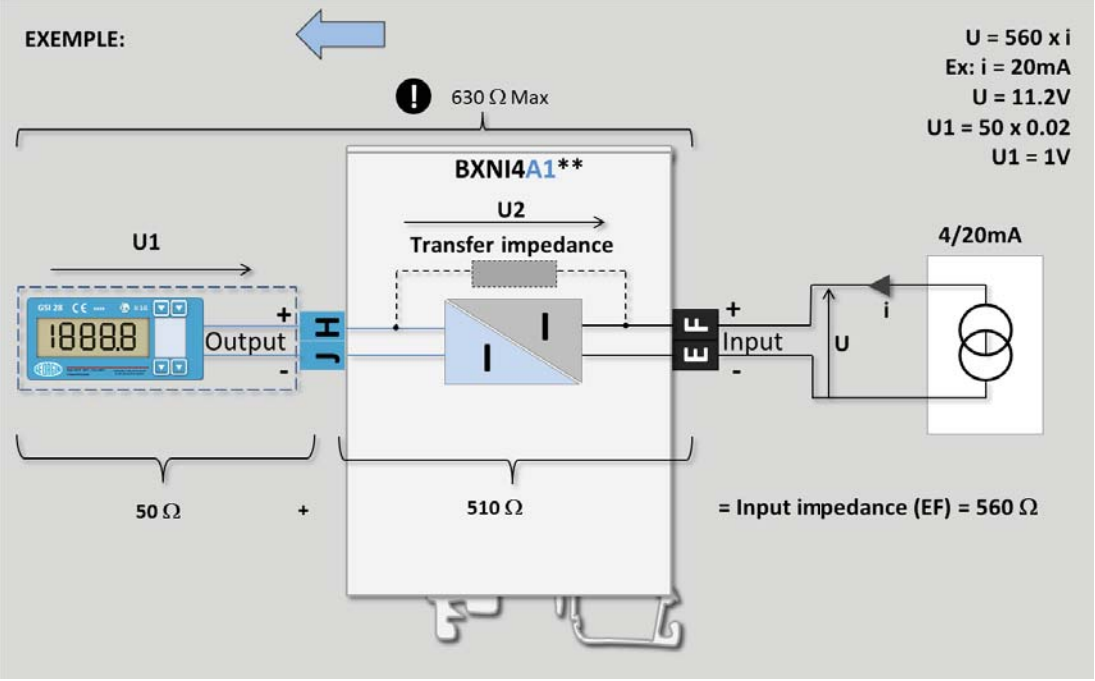


- Example

Each version of the BXNI has its own impedance value (see table of values opposite).

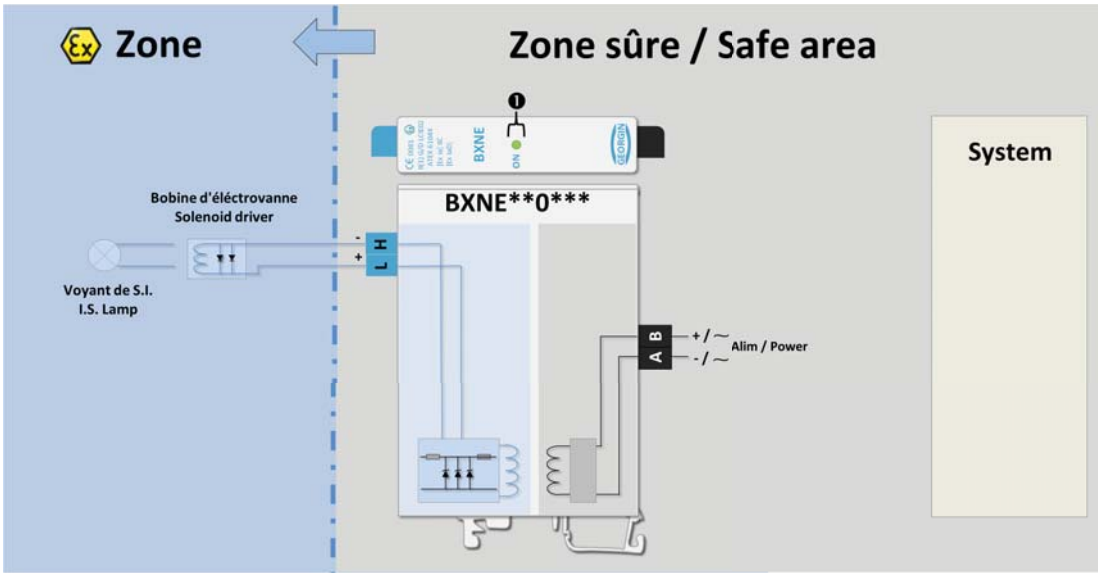
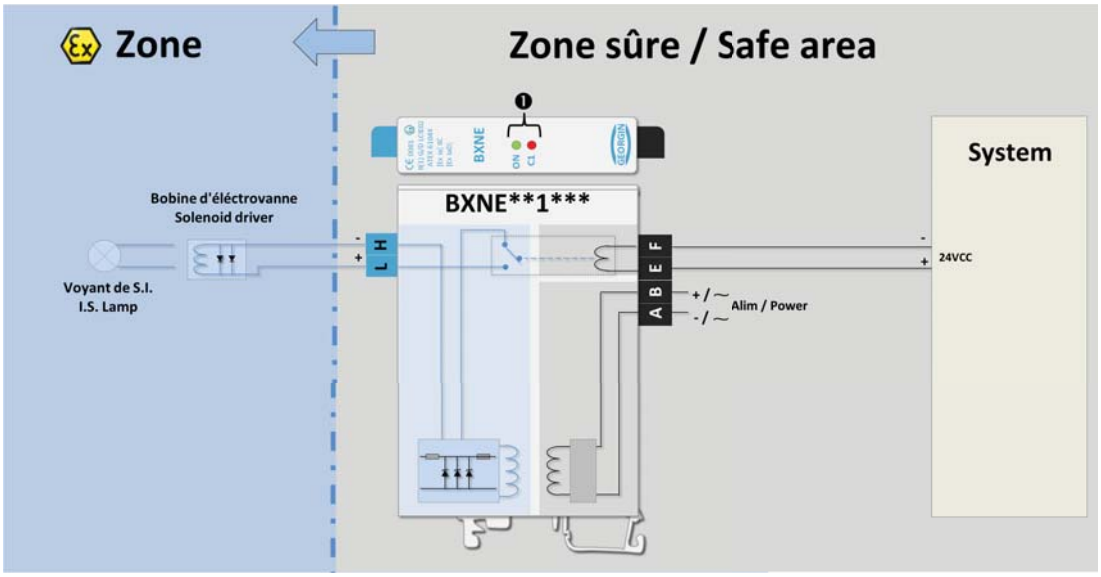
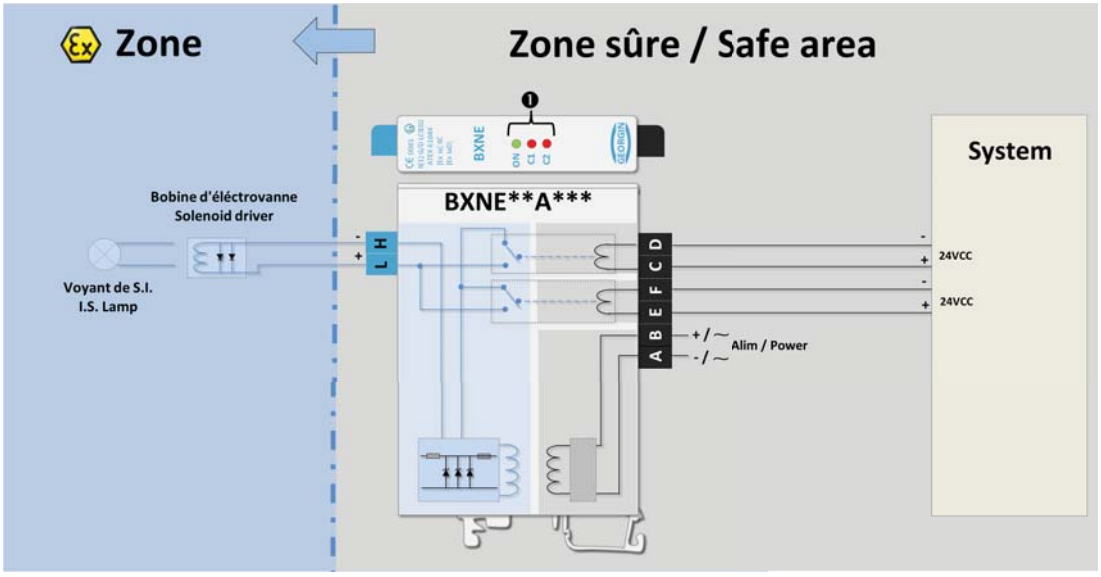
It is imperative to calculate the voltage drop generated by the BXNI to validate that the device behind it will have a sufficient voltage.

Also pay attention to the maximum load of 630Ω (BXNI + equipment)



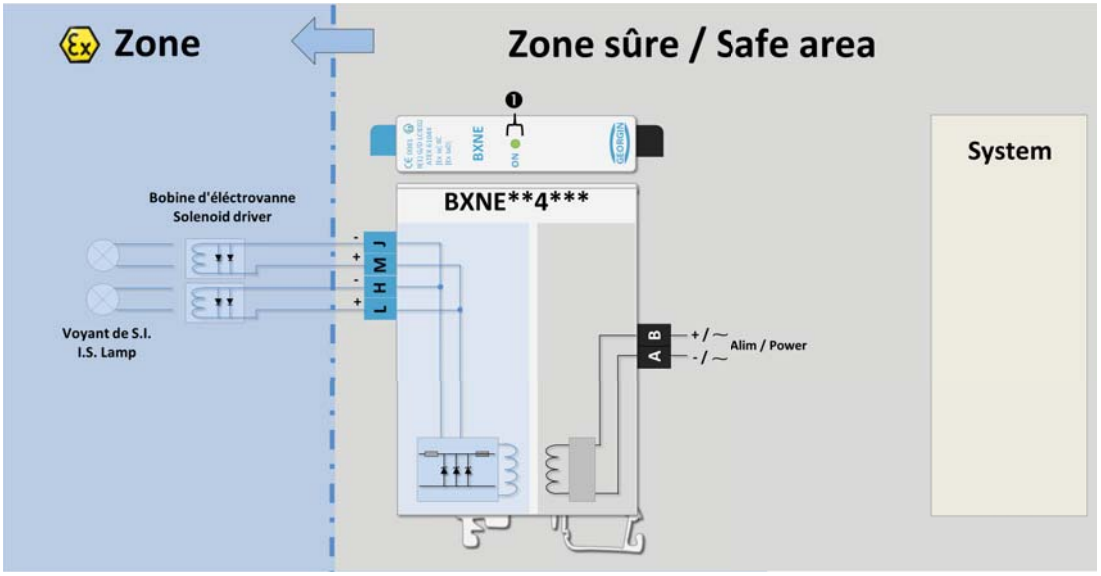
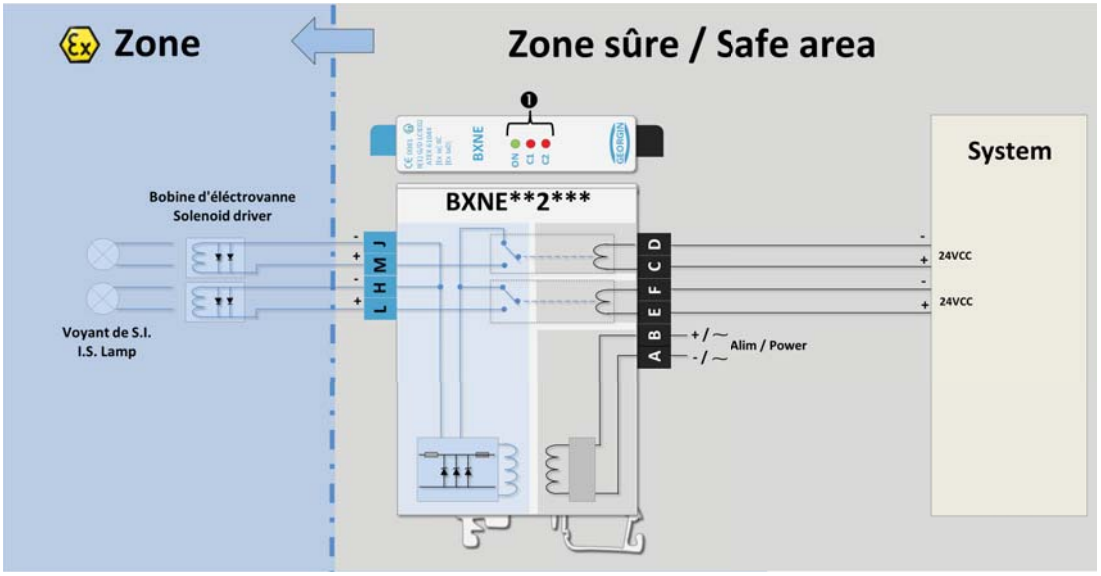
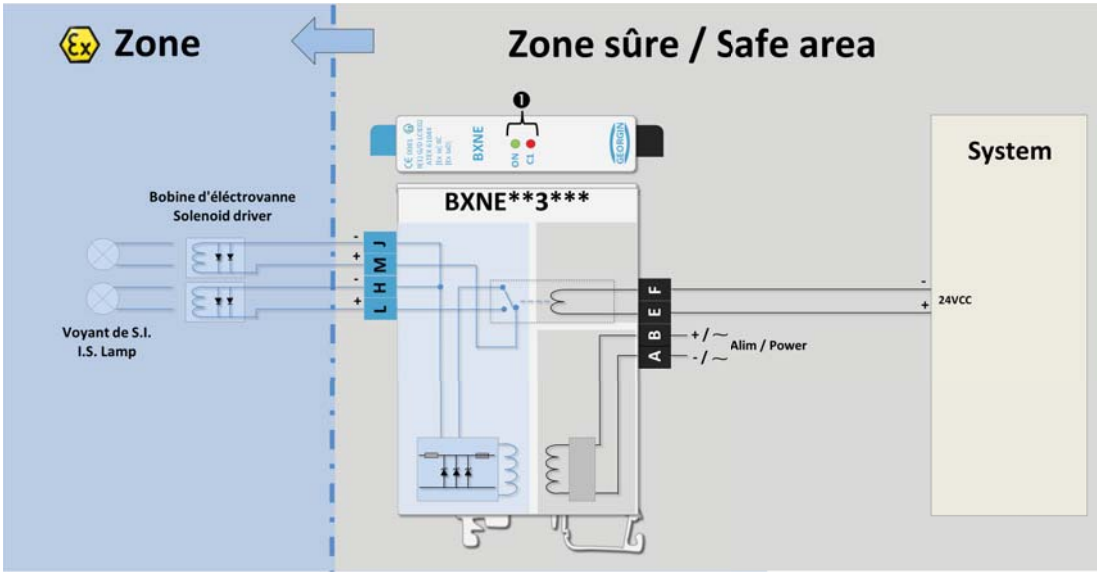
12. Digital outputs – 1 channel power supplies

Ref.	Description (see technical data sheet for further information)	IS parameters ATEX marking
BXNE0***	The BXNE is an intrinsically safe power supply. The BNXE**0 version provides constant power. It is not equipped with a remote control. Type: BXNE Model: ** – Voltage and output current (depending on curve) Number of channels: 0 – 1 channel Without remote control Options: 00 – No option; B0 – Screw terminals Power supply: E – 110 / 230 V AC; 2 – 24/48 V DC ❶ Green LED to indicate power is supplied to the module.	**LH terminals**: See BXNE curves (depends on the version) **Marking**: II(1)G [Ex ia] IIC II(1)D [Ex iaD] IIC Certificate: 02ATEX6104X SIL APPROVED
BXNE1***	The BXNE is an intrinsically safe power supply. The BXNE**1 version is equipped with a 24 V DC remote control (E+F-). A 24 V input voltage (E+F-) therefore actuates the relay, which actuates the output (L+H-). Type: BXNE Model: ** – Voltage and output current (depending on curve) Number of channels: 1 – 1 channel With one 24 V DC remote control Options: 00 – No option; B0 – Screw terminals Power supply: E – 110 / 230 V AC; 2 – 24/48 V DC ❶ Green LED to indicate power is supplied to the module. Red LED to indicate the activation of the 24 V DC remote control (E+F-)	**LH terminals**: See BXNE curves (depends on the version) **Marking**: II(1)G [Ex ia] IIC II(1)D [Ex iaD] IIC Certificate: 02ATEX6104X SIL APPROVED
BXNE A***	The BXNE is an intrinsically safe power supply. The BXNE**A version is equipped with two 24 V DC remote controls (E+F-) and (C+D-). A 24 V DC voltage on (E+F-) or on (C+D-) activates the output (L+H-). Type: BXNE Model: ** – Voltage and output current (depending on curve) Number of channels: A – 1 channel 2 x 24 V DC remote controls (OR function) Options: 00 – No option; B0 – Screw terminals Power supply: E – 110 / 230 V AC; 2 – 24/48 V DC ❶ Green LED to indicate power is supplied to the module. 2 x red LED to indicate activation of the 24 V DC controls (1 LED per control).	**LH terminals**: See BXNE curves (depends on the version) **Marking**: II(1)G [Ex ia] IIC II(1)D [Ex iaD] IIC Certificate: 02ATEX6104X SIL APPROVED

Explanatory diagram	I/O
	1 channel without remote control
	1 channel with 1 x 24 V DC remote control
	1 channel with 2 x 24 V DC remote control (OR function)

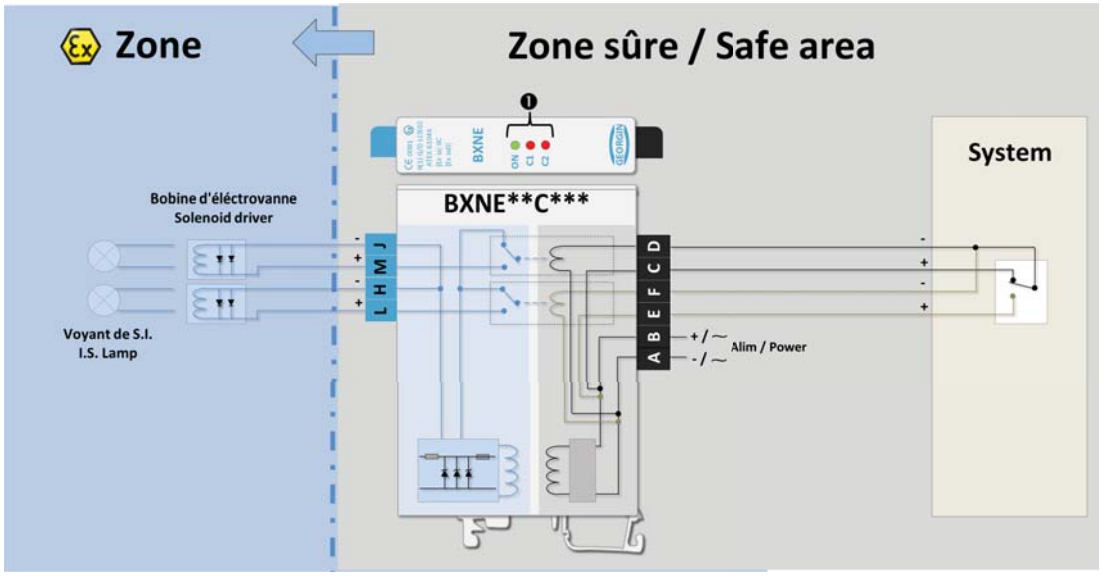
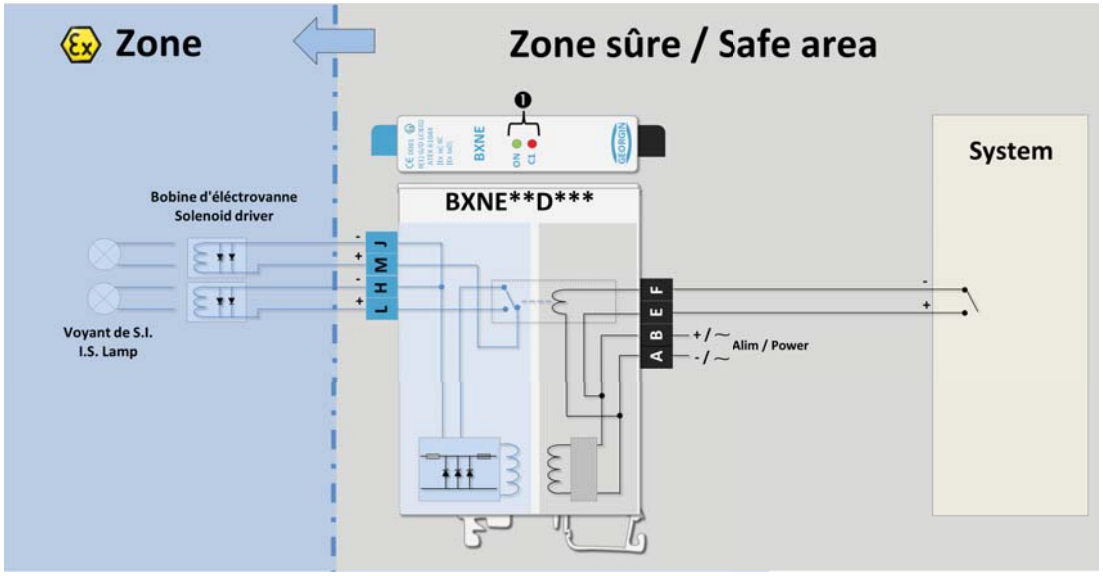
13. Digital outputs – 2-channel power supplies controlled by 24 V DC

Ref.	Description (see technical data sheet for further information)	IS parameters ATEX marking
BXNE4***	The BXNE is an intrinsically safe power supply. The BXNE**4 version provides constant power to both channels (L+H-) and (M+J-). It is not equipped with a remote control. Caution: The same power unit supplies both channels. The power specified on the BXNE curve is therefore shared by both channels. Type: BXNE Model: ** – Voltage and output current (depending on curve) Number of channels: 4 – 2 channels Without remote control Options: 00 – No option; B0 – Screw terminals Power supply: E – 110 / 230 V AC; 2 – 24/48 V DC ❶ Green LED to indicate power is supplied to the module.	**LH terminals**: See BXNE curves (depends on the version) **Marking**: II(1)G [Ex ia] IIC II(1)D [Ex iaD] IIC Certificate: 02ATEX6104X SIL APPROVED
BXNE2***	The BXNE is an intrinsically safe power supply. The BXNE**2 version is equipped with a 24 V DC remote control on each channel. A 24 V voltage on terminals (C+D-) actuates output (M+J-) A 24 V voltage on terminals (E+F-) actuates output (L+H-) Caution: The same power unit supplies both channels. The power specified on the BXNE curve is therefore shared by both channels. Type: BXNE Model: ** – Voltage and output current (depending on curve) Number of channels: 2 – 2 channels With two 24 V DC remote controls Options: 00 – No option; B0 – Screw terminals Power supply: E – 110 / 230 V AC; 2 – 24/48 V DC ❶ Green LED to indicate power is supplied to the module. 2 x red LED to indicate activation of the 24 V DC controls (1 LED per control).	**LH terminals**: See BXNE curves (depends on the version) **Marking**: II(1)G [Ex ia] IIC II(1)D [Ex iaD] IIC Certificate: 02ATEX6104X SIL APPROVED
BXNE 3***	The BXNE is an intrinsically safe power supply. The BXNE**3 version is equipped with a 24V DC remote control that actuates outputs alternately: either (L+H-) or (M+J-). Type: BXNE Model: ** – Voltage and output current (depending on curve) Number of channels: 3 – 2 alternate channels With one 24 V DC remote control Options: 00 – No option; B0 – Screw terminals Power supply: E – 110 / 230 V AC; 2 – 24/48 V DC ❶ Green LED to indicate power is supplied to the module. Red LED to indicate the activation of the 24 V DC remote control (E+F-)	**LH terminals**: See BXNE curves (depends on the version) **Marking**: II(1)G [Ex ia] IIC II(1)D [Ex iaD] IIC Certificate: 02ATEX6104X SIL APPROVED

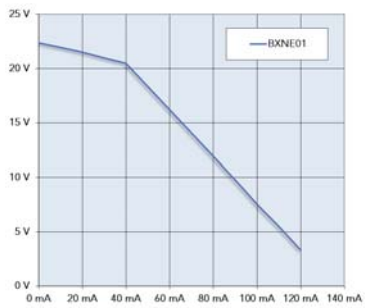
Explanatory diagram	I/O
	2 channels without remote control
	2 channels with 2 x 24 V DC remote control
	2 channels with 1 x 24 V DC remote control 24 V DC

14. Digital outputs - 2-channel power supplies controlled by contact

Ref.	Description (see technical data sheet for further information)	IS parameters ATEX marking
BXNEC***	The BXNE is an intrinsically safe power supply. The BXNE**C version is equipped with a relay remote control on each channel. A contact on terminals (C+D-) actuates output (M+J-) A contact on terminals (E+F-) actuates output (L+H-) Caution: The same power unit supplies both channels. The power specified on the BXNE curve is therefore shared by both channels. Type: BXNE Model: ** Voltage and output current (depending on curve) Number of channels: C 2 channels With two contact remote controls Options: 00 No option; B0 Screw terminals Power supply: 2 24/48 V DC ❶ Green LED to indicate power is supplied to the module. 2 x red LED to indicate activation of the contact controls (1 LED per control).	**LH terminals**: See BXNE curves (depends on the version) **Marking**: II(1)G [Ex ia] IIC II(1)D [Ex iaD] IIC Certificate: 02ATEX6104X SIL APPROVED
BXNED***	The BXNE is an intrinsically safe power supply. The BXNE**D version is equipped with a relay remote control that actuates outputs alternately: either (L+H-) or (M+J-). Type: BXNE Model: ** Voltage and output current (depending on curve) Number of channels: D 2 alternate channels With 1 contact remote control Options: 00 No option; B0 Screw terminals Power supply: 2 24/48 V DC ❶ Green LED to indicate power is supplied to the module. Red LED to indicate the activation of the contact remote control (E+F-)	**LH terminals**: See BXNE curves (depends on the version) **Marking**: II(1)G [Ex ia] IIC II(1)D [Ex iaD] IIC Certificate: 02ATEX6104X SIL APPROVED

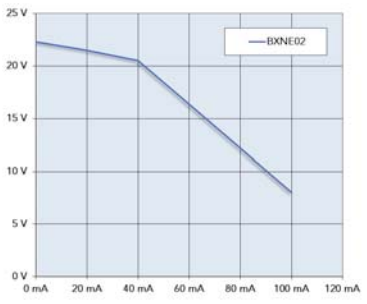
Explanatory diagram	I/O
	2 channels with 2 contact remote controls
	2 alternate channels with 1 contact remote control

15. Power curves and IS parameters (BXNE)



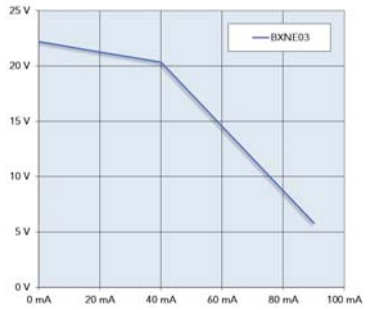
BXNE01

Uo (V):	23.5
Io (mA):	160
Po (mW):	1300
Co II C (nF):	132
Lo II C (mH):	1
Co II B (nF):	980
Lo II B (mH):	5.5



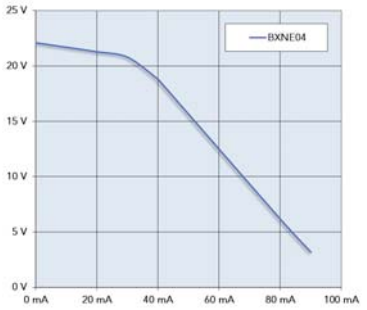
BXNE02

Uo (V):	23.5
Io (mA):	150
Po (mW):	1150
Co II C (nF):	132
Lo II C (mH):	1.5
Co II B (nF):	980
Lo II B (mH):	6.5



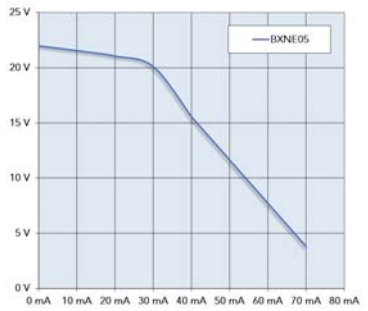
BXNE03

Uo (V):	23.5
Io (mA):	130
Po (mW):	1100
Co II C (nF):	132
Lo II C (mH):	2
Co II B (nF):	980
Lo II B (mH):	8.5



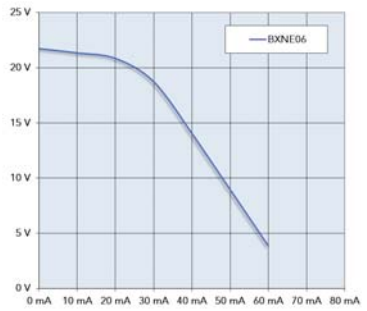
BXNE04

Uo (V):	23.5
Io (mA):	110
Po (mW):	900
Co II C (nF):	132
Lo II C (mH):	3
Co II B (nF):	980
Lo II B (mH):	11



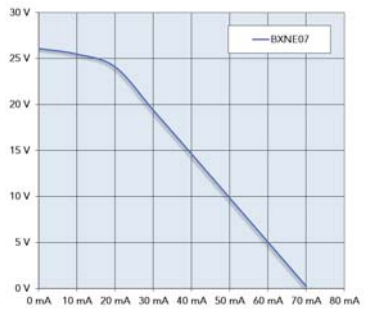
BXNE05

Uo (V):	23.5
Io (mA):	87
Po (mW):	750
Co II C (nF):	132
Lo II C (mH):	4
Co II B (nF):	980
Lo II B (mH):	17



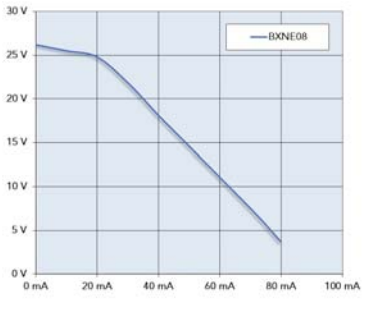
BXNE06

Uo (V):	23.5
Io (mA):	78
Po (mW):	690
Co II C (nF):	132
Lo II C (mH):	6
Co II B (nF):	980
Lo II B (mH):	25



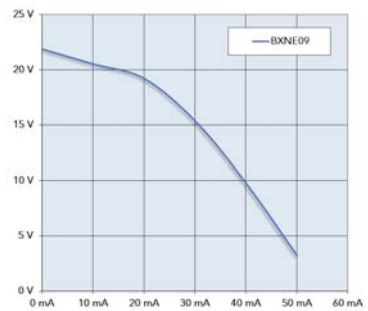
BXNE07

Uo (V):	26.3
Io (mA):	80
Po (mW):	710
Co II C (nF):	97
Lo II C (mH):	5.5
Co II B (nF):	740
Lo II B (mH):	17



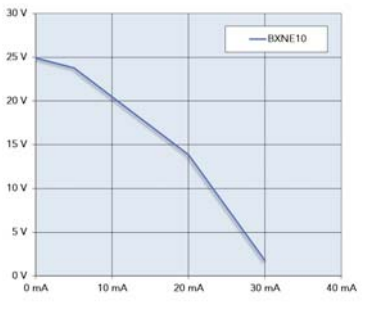
BXNE08

Uo (V):	26.3
Io (mA):	105
Po (mW):	900
Co II C (nF):	97
Lo II C (mH):	3
Co II B (nF):	740
Lo II B (mH):	11



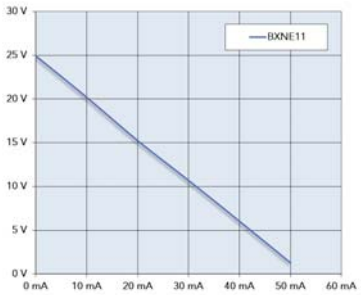
BXNE09

Uo (V):	23.5
Io (mA):	64
Po (mW):	590
Co II C (nF):	132
Lo II C (mH):	9
Co II B (nF):	980
Lo II B (mH):	32



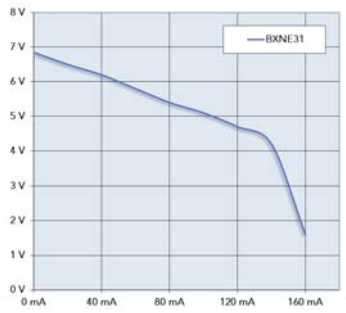
BXNE10

Uo (V):	26.3
Io (mA):	40
Po (mW):	390
Co II C (nF):	97
Lo II C (mH):	25
Co II B (nF):	740
Lo II B (mH):	80



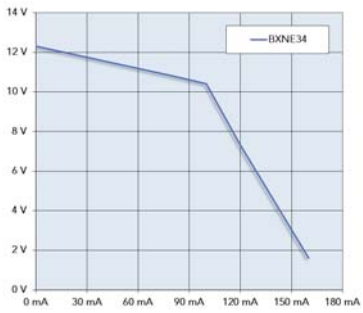
BXNE11

Uo (V):	26.3
Io (mA):	70
Po (mW):	630
Co II C (nF):	97
Lo II C (mH):	9.5
Co II B (nF):	740
Lo II B (mH):	32



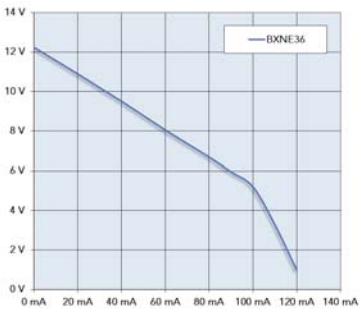
BXNE31

Uo (V):	7.2
Io (mA):	185
Po (mW):	620
Co II C (nF):	14500
Lo II C (mH):	0.9
Co II B (nF):	240000
Lo II B (mH):	4



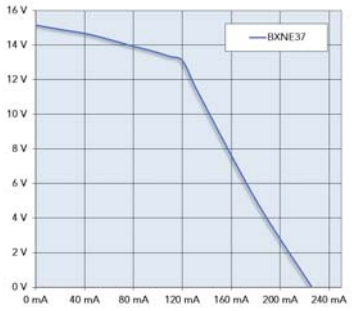
BXNE34

Uo (V):	13
Io (mA):	185
Po (mW):	1250
Co II C (nF):	1000
Lo II C (mH):	0.9
Co II B (nF):	6200
Lo II B (mH):	4



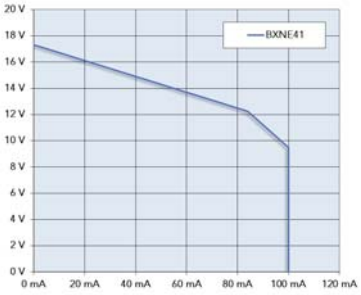
BXNE36

Uo (V):	13.1
Io (mA):	142
Po (mW):	600
Co II C (nF):	970
Lo II C (mH):	3
Co II B (nF):	6000
Lo II B (mH):	10



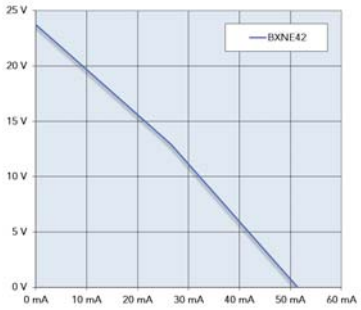
BXNE37

Uo (V):	16.1
Io (mA):	270
Po (mW):	2150
Co II C (nF):	451
Lo II C (mH):	0.9
Co II B (nF):	2690
Lo II B (mH):	3



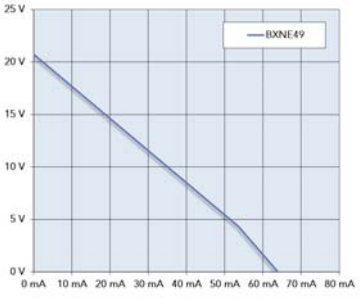
BXNE41

Uo (V):	19.5
Io (mA):	170
Po (mW):	1640
Co II C (nF):	240
Lo II C (mH):	0.1
Co II B (nF):	1490
Lo II B (mH):	0.4



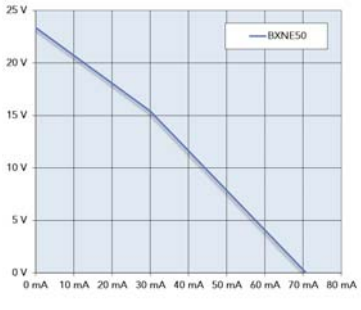
BXNE42

Uo (V):	27.9
Io (mA):	76
Po (mW):	496
Co II C (nF):	84
Lo II C (mH):	5
Co II B (nF):	654
Lo II B (mH):	19



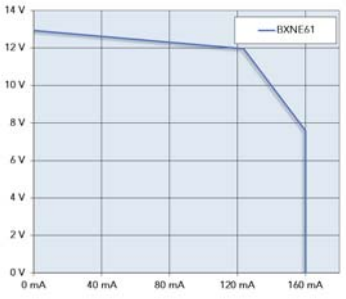
BXNE49

Uo (V):	24.1
Io (mA):	87
Po (mW):	496
Co II C (nF):	124
Lo II C (mH):	5
Co II B (nF):	920
Lo II B (mH):	19



BXNE50

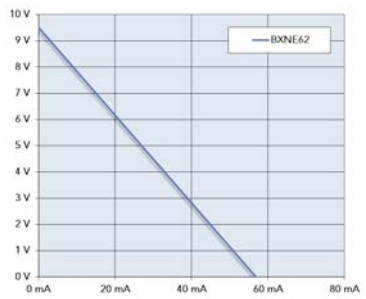
Uo (V):	27.4
Io (mA):	112
Po (mW):	737
Co II C (nF):	87
Lo II C (mH):	2.5
Co II B (nF):	677
Lo II B (mH):	10



BXNE61

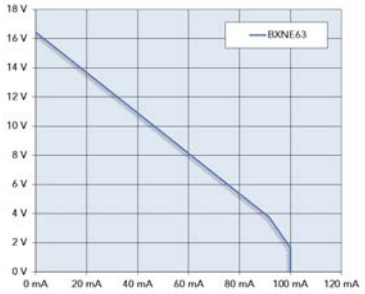
Uo (V):	15
Io (mA):	272
Po (mW):	7473
Co II C (nF):	---
Lo II C (mH):	---
Co II B (nF):	3550
Lo II B (mH):	0.05

IS interfaces



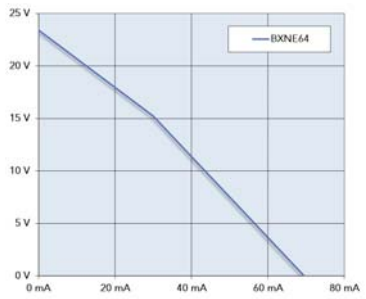
BXNE62

Uo (V):	11.2
Io (mA):	75
Po (mW):	197
Co II C (nF):	1840
Lo II C (mH):	5
Co II B (nF):	12600
Lo II B (mH):	19



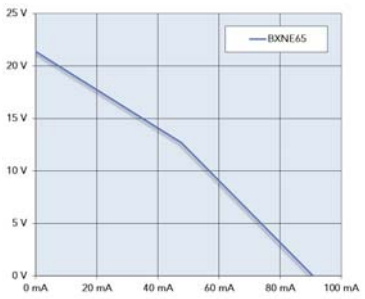
BXNE63

Uo (V):	19.3
Io (mA):	149
Po (mW):	697
Co II C (nF):	248
Lo II C (mH):	0.9
Co II B (nF):	1520
Lo II B (mH):	3.6



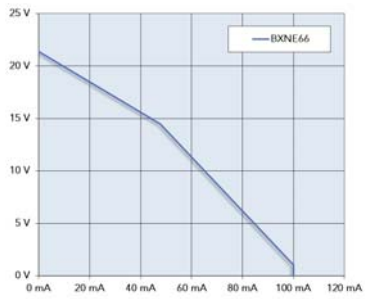
BXNE64

Uo (V):	27.4
Io (mA):	109
Po (mW):	717
Co II C (nF):	87
Lo II C (mH):	2
Co II B (nF):	677
Lo II B (mH):	8



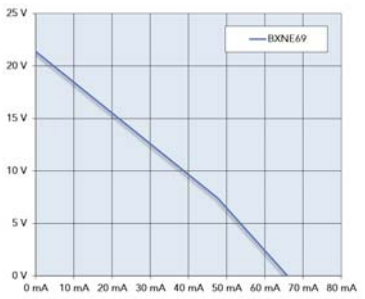
BXNE65

Uo (V):	25
Io (mA):	147
Po (mW):	887
Co II C (nF):	110
Lo II C (mH):	1.5
Co II B (nF):	840
Lo II B (mH):	7



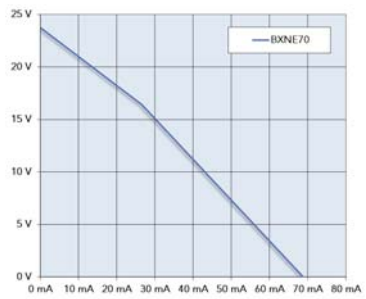
BXNE66

Uo (V):	25
Io (mA):	170
Po (mW):	1119
Co II C (nF):	---
Lo II C (mH):	---
Co II B (nF):	840
Lo II B (mH):	5



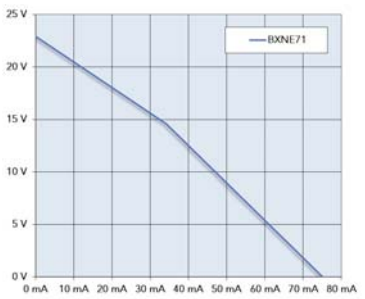
BXNE69

Uo (V):	25
Io (mA):	93
Po (mW):	552
Co II C (nF):	110
Lo II C (mH):	4
Co II B (nF):	840
Lo II B (mH):	16



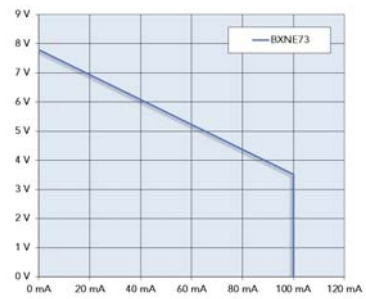
BXNE70

Uo (V):	27.9
Io (mA):	110
Po (mW):	733
Co II C (nF):	84
Lo II C (mH):	2
Co II B (nF):	654
Lo II B (mH):	8



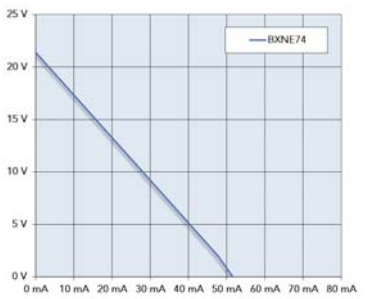
BXNE71

Uo (V):	26.8
Io (mA):	119
Po (mW):	766
Co II C (nF):	92
Lo II C (mH):	1.8
Co II B (nF):	720
Lo II B (mH):	7.2



BXNE73

Uo (V):	8.9
Io (mA):	170
Po (mW):	483
Co II C (nF):	5200
Lo II C (mH):	0.5
Co II B (nF):	43000
Lo II B (mH):	2

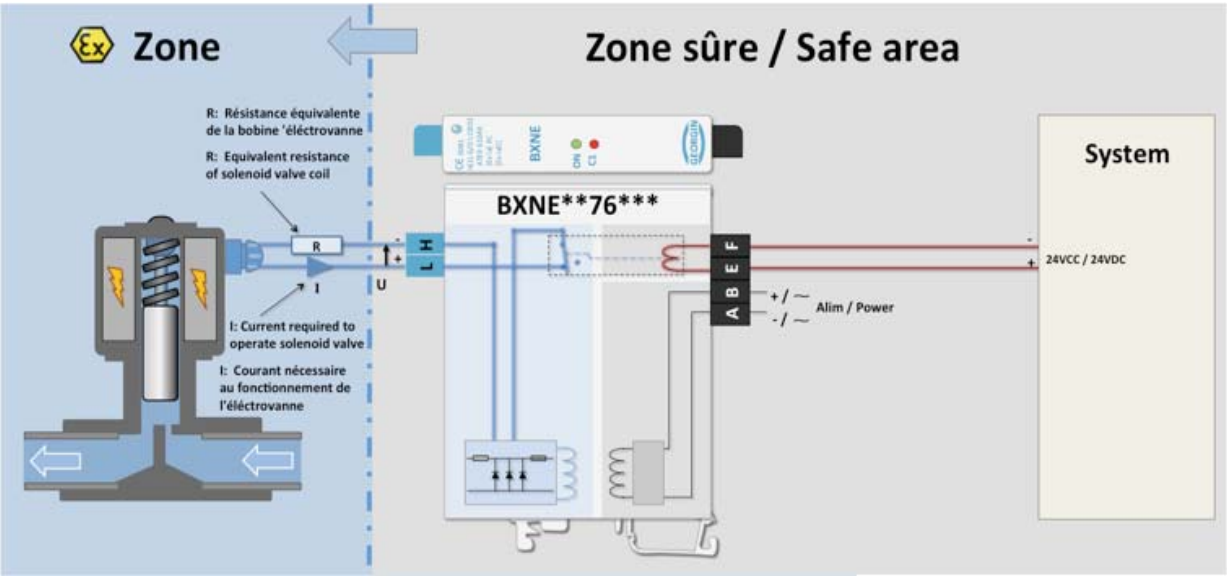


BXNE74

Uo (V):	25
Io (mA):	68
Po (mW):	398
Co II C (nF):	110
Lo II C (mH):	8
Co II B (nF):	840
Lo II B (mH):	30

16. Example of BXNE selection

In this example, the intrinsic safety solenoid valve has an internal resistance **R** of **100Ω**.
And the current **I** required for the solenoid valve to operate correctly is **100 mA**.



Calculation of voltage U required for the solenoid valve to operate:

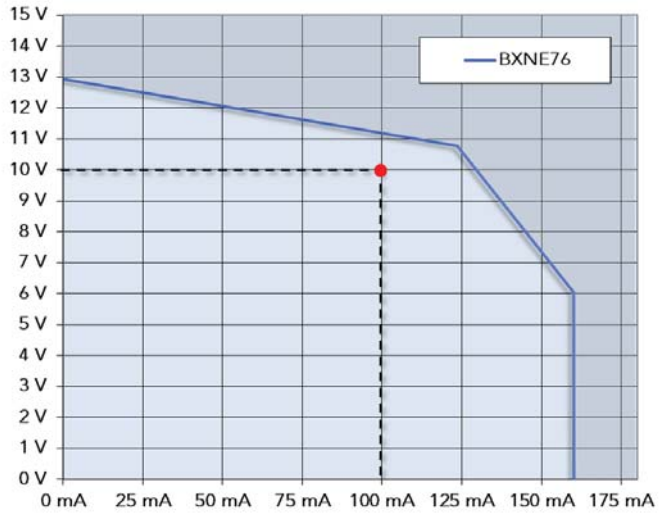
U = R x I

U(V) = 100Ω x 0.1 A

U = 10 V

Therefore, using the power curve below we must verify that the **BXNE76** is suitable for this application:

The **BXNE** must be capable of supplying **10 V at 100 mA**. The point must therefore be located inside the curve.



Intrinsic safety parameters:

BXNE76

Uo (V):	15
Io (mA):	272
Po (mW):	3375
Co II C (nF):	580
Lo II C (mH):	0.3
Co II B (nF):	3550
Lo II B (mH):	3

The solenoid valve must also be compatible with the power supply in terms of intrinsic safety.

See "Notions of intrinsic safety" chapter.

17. Digital inputs - opto-isolator output signal isolator

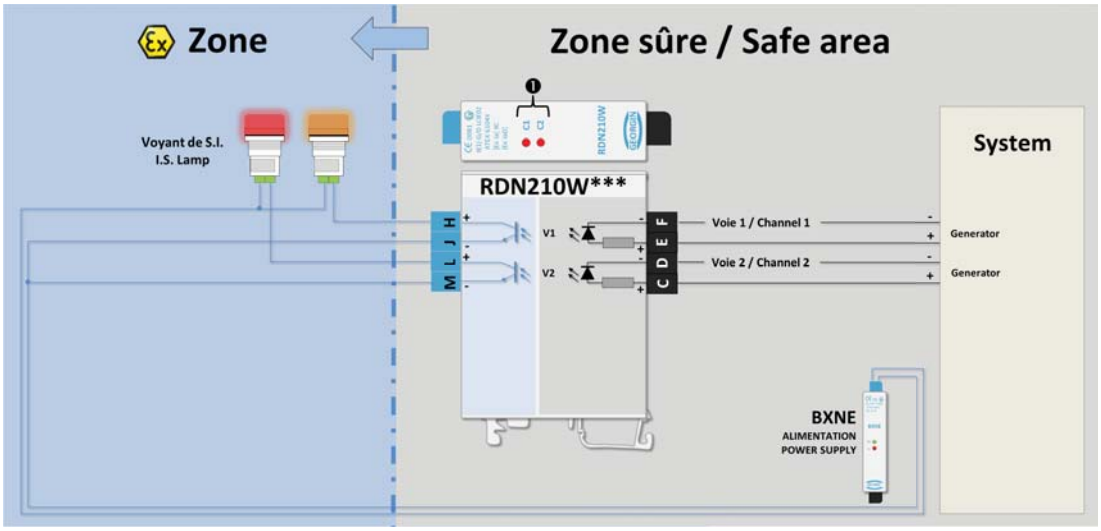
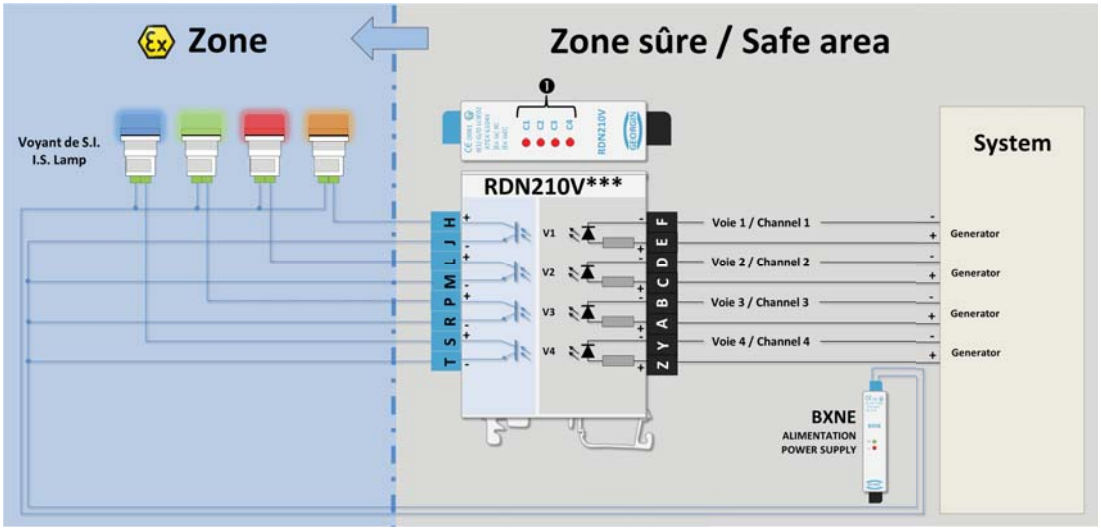
Ref.	Description (see technical data sheet for further information)	IS parameters ATEX marking
RDN210W	The RDN210W is an intrinsically safe, galvanic insulated digital signal separator. This device does not have an external power supply. The opto-isolator output transistors (H+J-) or (L+M-) are controlled by an input voltage (E+F-) for channel 1 and (C+D-) for channel 2.	Maximum current on intrinsic safety circuit: 100 mA **Marking**: II(1)G [Ex ia] IIC II(1)D [Ex iaD] IIC Certificate: 02ATEX6104X
RDN210V	The RDN210V is an intrinsically safe, galvanic insulated digital signal separator. Identical to the RDN210W, the RDN210V has four channels.	Maximum current on intrinsic safety circuit: 100 mA **Marking**: II(1)G [Ex ia] IIC II(1)D [Ex iaD] IIC Certificate: 02ATEX6104X

Type	Model		Number of channels		Options		Power supply	
RDN	210	Opto-isolator IS input / NIS output	W	2 channels	00	Cage clamp terminals	3	24 V DC
					B0	Screw terminals	7	12 V DC
							8	5 V DC

❶ Red LED for each channel indicating if the output transistor is conductive or closed.

Type	Model		Number of channels		Options		Power supply	
RDN	210	Opto-isolator IS input / NIS output	V	4 channels	00	Cage clamp terminals	3	24 V DC
					B0	Screw terminals	7	12 V DC
							8	5 V DC

❶ Red LED for each channel indicating if the output transistor is conductive or closed.

Explanatory diagram	I/O
	2 opto-isolator channels
	4 opto-isolator channels

18. Digital outputs – relay output signal isolator

Ref.	Description (see technical data sheet for further information)	IS parameters ATEX marking
RDN211W	The RDN211W is an intrinsically safe, galvanic insulated digital signal separator. This device does not have an external power supply. The output relays (HJ) or (LM) are controlled by an input voltage (E+F-) for channel 1 and (C+D-) for channel 2.	Maximum voltage on intrinsic safety circuit: 60 V **Marking**: II(1)G [Ex ia] IIC II(1)D [Ex iaD] IIC Certificate: 02ATEX6104X
RDN211V	The RDN211V is an intrinsically safe, galvanic insulated digital signal separator. Identical to the RDN211W, the RDN211V has four channels.	Maximum current on intrinsic safety circuit: 100 mA **Marking**: II(1)G [Ex ia] IIC II(1)D [Ex iaD] IIC Certificate: 02ATEX6104X

RDN211W

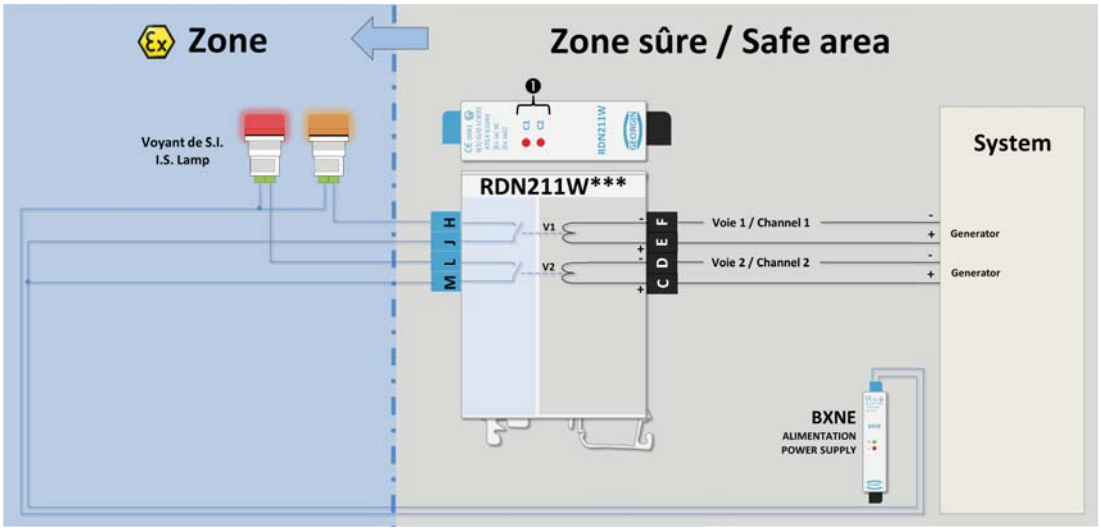
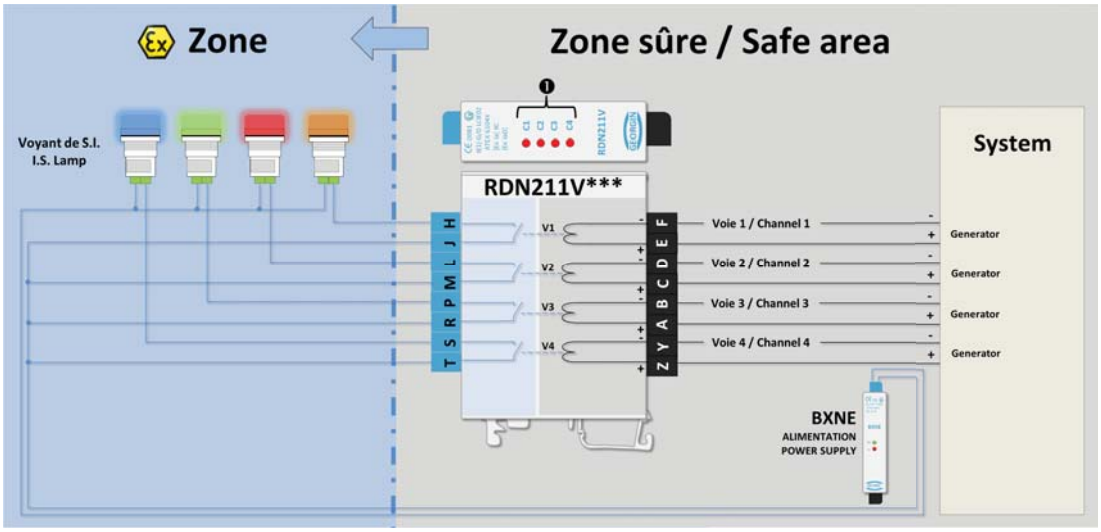
Type	Model		Number of channels		Options		Power supply	
RDN	211	Relay outputs IS input / NIS output	W	2 channels	00	Cage clamp terminals NO contact	0	230 V AC
					B0	Screw terminals NO contact	1	110 V AC
					01	Cage clamp terminals NC contact	3	24 V DC
					B1	Screw terminals NC contact	4	48 V DC

❶ Red LED for each channel indicating if the output relay is active or not.

RDN211V

Type	Model		Number of channels		Options		Power supply	
RDN	211	Relay outputs IS input / NIS output	V	4 channels	00	Cage clamp terminals NO contact	3	24 V DC
					B0	Screw terminals NO contact	4	48 V DC
					01	Cage clamp terminals NC contact		
					B1	Screw terminals NC contact		

❶ Red LED for each channel indicating if the output relay is active or not.

Explanatory diagram	I/O
	2 opto-isolator channels
	4 opto-isolator channels

19. Temperature inputs – converter

Ref.	Description (see technical data sheet for further information)	IS parameters ATEX marking
BXNR	The BXNR is a temperature converter dedicated to RTD100 2-wire or 3-wire probes. When ordering, specify the input scale and output.	**HJ terminals**: **Uo**: 12.5V **Io**: 11mA **Po**: 66mW **Co**, IIC: 1200 nF **Lo**, IIC: 300 mH **JL terminals**: **Uo**: 12.5V **Io**: 12mA **Po**: 75mW **Co**, IIC: 1200 nF **Lo**, IIC: 200 mH **Marking**: II(1)G [Ex ia] IIC II(1)D [Ex iaD] IIC Certificate: 02ATEX6104X
BXNC	The BXNC is a temperature converter dedicated to thermocouple probes. When ordering, specify the input scale and output.	**HJ terminals**: **Uo**: 12.5 V **Io**: 2.4 mA **Po**: 15 mW **Co**, IIC: 1200 nF **Lo**, IIC: 1000 mH **Marking**: II(1)G [Ex ia] IIC II(1)D [Ex iaD] IIC Certificate: 02ATEX6104X

BXNR

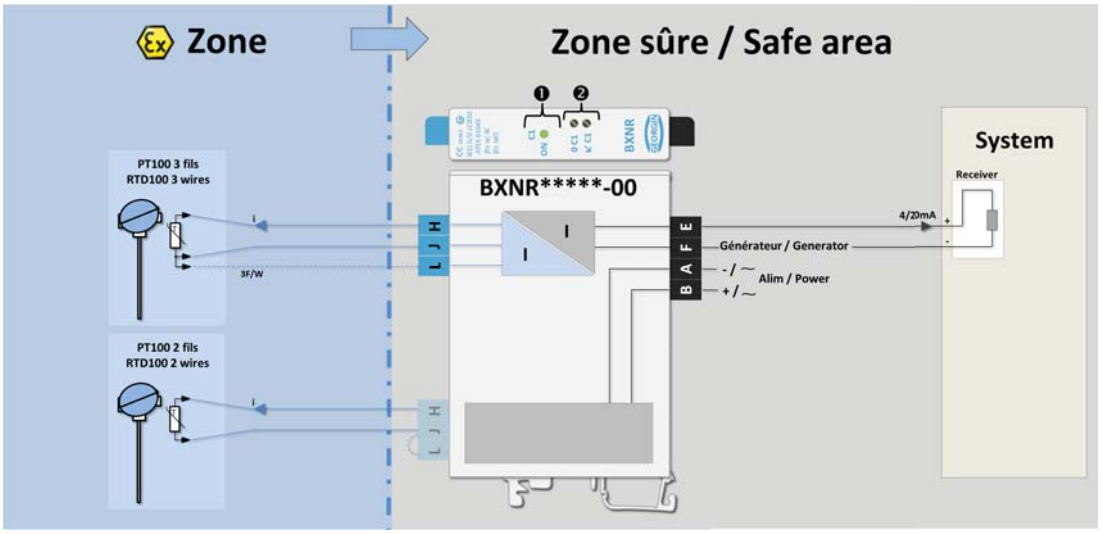
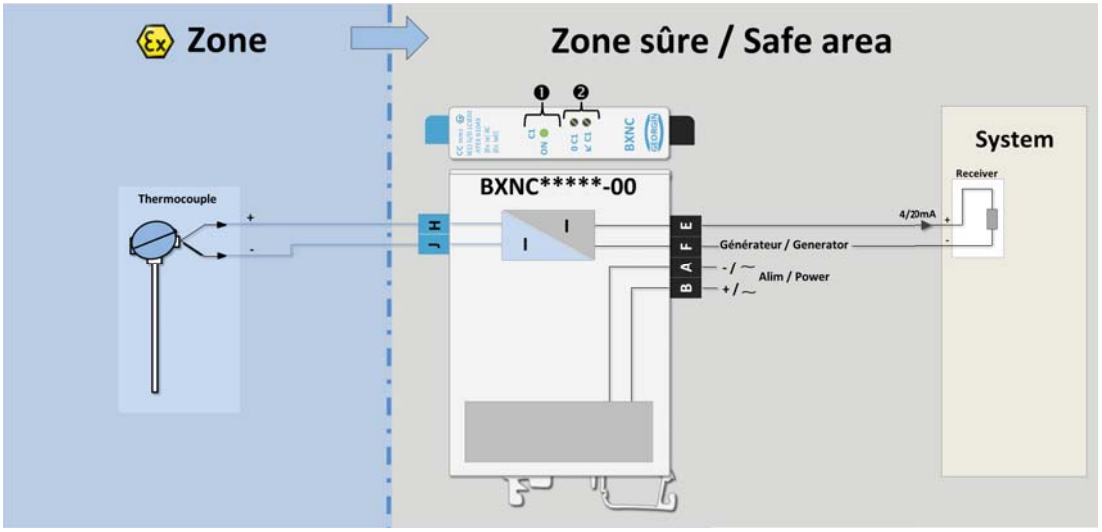
Type	Input		Option		Power supply		Output	
BXNR	**	Input scale See technical data sheet	00	No option	0	230 V AC	00	Active 4/20 mA
			B0	Screw terminals	1	110 V AC	03	Active 0/20mA
					3	24 V DC	08	0/5 V
					4	48 V DC	A0	Passive 4/20 mA
							XX	Others on request

❶ Presence of voltage indicated by a green LED
❷ Adjustment potentiometers for the source and the curve of the 4/20 mA output

BXNC

Type	Input		Option		Power supply		Output	
BXNC	**	Input scale See technical data sheet	00	No option	0	230 V AC	00	Active 4/20 mA
			B0	Screw terminals	1	110 V AC	03	Active 0/20mA
					3	24 V DC	08	0/5 V
					4	48 V DC	A0	Passive 4/20 mA
							XX	Others on request

❶ Presence of voltage indicated by a green LED
❷ Adjustment potentiometers for the source and the curve of the 4/20 mA output

Explanatory diagram	I/O
	1 RTD100 Input / 1 Output
	1 TC Input / 1 Output

20. Potentiometer inputs - resistance-converter

Ref.	Description (see technical data sheet for further information)	IS parameters ATEX marking
BXNP	The BXNP is a converter for potentiometers. When ordering, specify the input scale and output.	**HJ terminals**: **Uo**: 12.5 V **Io**: 80 mA **Po**: 600 mW **Co**, IIC: 1200 nF **Lo**, IIC: 5 mH **JL terminals**: **Uo**: 12.5 V **Io**: 2.4 mA **Po**: 15 mW **Co**, IIC: 1200 nF **Lo**, IIC: 1000 mH **Marking**: II(1)G [Ex ia] IIC II(1)D [Ex iaD] IIC Certificate: 02ATEX6104X
BXNRV	The BXNRV is used to interface a 2-wire variable resistance.	**HJ terminals**: **Uo**: 12.5 V **Io**: 11 mA **Po**: 66 mW **Co**, IIC: 1200 nF **Lo**, IIC: 300 mH **Marking**: II(1)G [Ex ia] IIC II(1)D [Ex iaD] IIC Certificate: 02ATEX6104X

BXNP

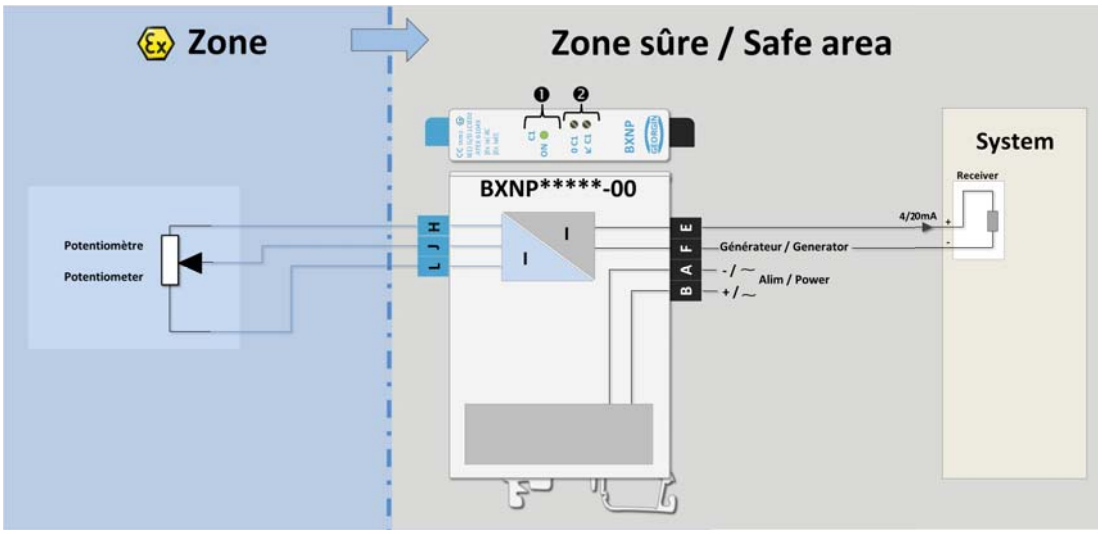
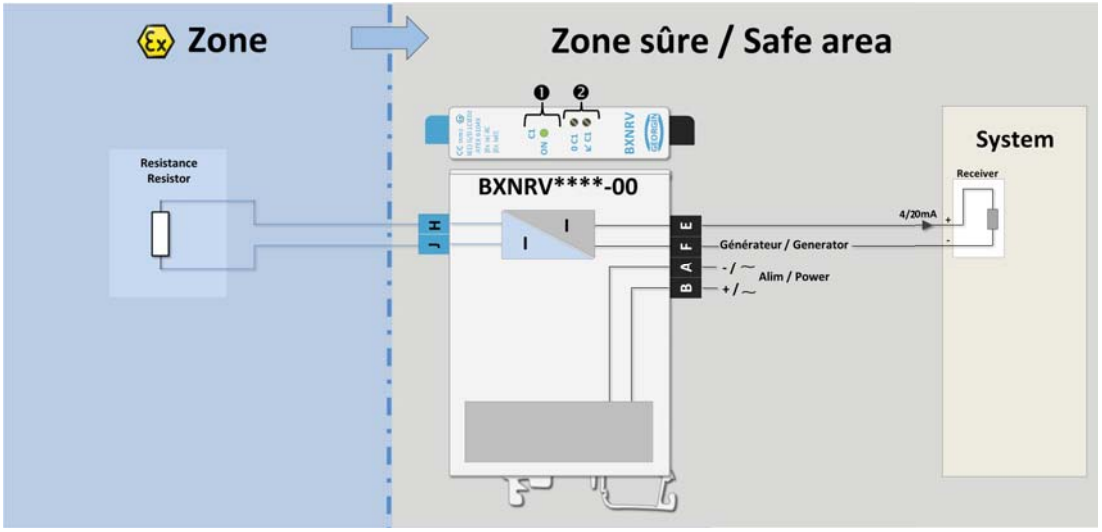
Type	Input		Option		Power supply		Output	
BXNP	**	0-1 KΩ to 0-50 KΩ 4 mA adjustable within 0-30% of the range 20 mA adjustable within 70-100% of the range	00	No option	0	230 V AC	B0	Active 4/20 mA
	**	Other on request	B0	Screw terminals	1	110 V AC		
					3	24 V DC		
					4	48 V DC		

❶ Presence of voltage indicated by a green LED
❷ Adjustment potentiometers for the source and the curve of the 4/20 mA output

BXNRV

Type	Input		Option		Power supply		Output	
BXNRV	V1	4 mA adjustable between 270 and 330Ω 20 mA adjustable between 850 and 1700Ω	00	No option	0	230 V AC	00	Active 4/20 mA
	V5	4 mA adjustable between 3900 and 5500Ω 20 mA adjustable between 8200 and 11200Ω	B0	Screw terminals	1	110 V AC	03	Active 0/20mA
	V6	4 mA adjustable between 0 and 750Ω 20 mA adjustable between 6000 and 7500Ω			3	24 V DC	08	0/5 V
	**	Other on request			4	48 V DC	A0	Passive 4/20 mA
							XX	Others on request

❶ Presence of voltage indicated by a green LED
❷ Adjustment potentiometers for the source and the curve of the 4/20 mA output

Explanatory diagram	I/O
	1 Pot. Input / 1 Output
	1 resistance Input / 1 Output

21. Universal inputs – threshold relays

Ref.	Description (see technical data sheet for further information)	IS parameters ATEX marking
BPX	The BPX is a programmable, galvanic-insulated converter with a universal input. Can be configured via PC using the ProgressX manager software and an RS232 serial cable.	**Transmitter** **Z-X terminals**: **Uo**: 27.9 V **Io**: 78.2 mA **Po**: 545.47 mW **Co**, IIC: 0.084 µF **Lo**, IIC: 2.8 mH **Current** **XT terminals**: **Uo**: 0.057 V **Io**: 2.82 mA **Po**: 0.04 mW **Co**, IIC: 1000 µF **Lo**, IIC: 100 mH **mV-V-TC-RTD100-Pot** **WUSRPT terminals** **Uo**: 7 V **Io**: 5.64 mA **Po**: 9.87 mW **Co**, IIC: 15.70 µF **Lo**, IIC: 100 mH **Marking**: II(1)G [Ex ia] IIC II(1)D [Ex iaD] IIC Certificate: 02ATEX6104X

Type	Model		Optional terminal block		Power supply		Input		Output	
BPX	0	NSI / NIS	00	Cage clamp	E	98 to 255 V AC	10	1 input	10	1 Output 4/20 mA
	1	SI / IS	B0	Screw	2	21 to 53 V DC	11	1 input + HART	1A	1 x 4/20 mA output 2 relays (inverters)
									2D*	2 x 4/20 mA outputs 2 relays (Contact, NO)
									2G*	2 x 4/20 mA outputs 2 relays (Contact, NC)
									0C	2 relays (Contact, NO)
									0F	2 relays (Contact, NC)
									0B	4 relays (Contact, NO)
									0E	4 relays (Contact, NC)

- Inputs:

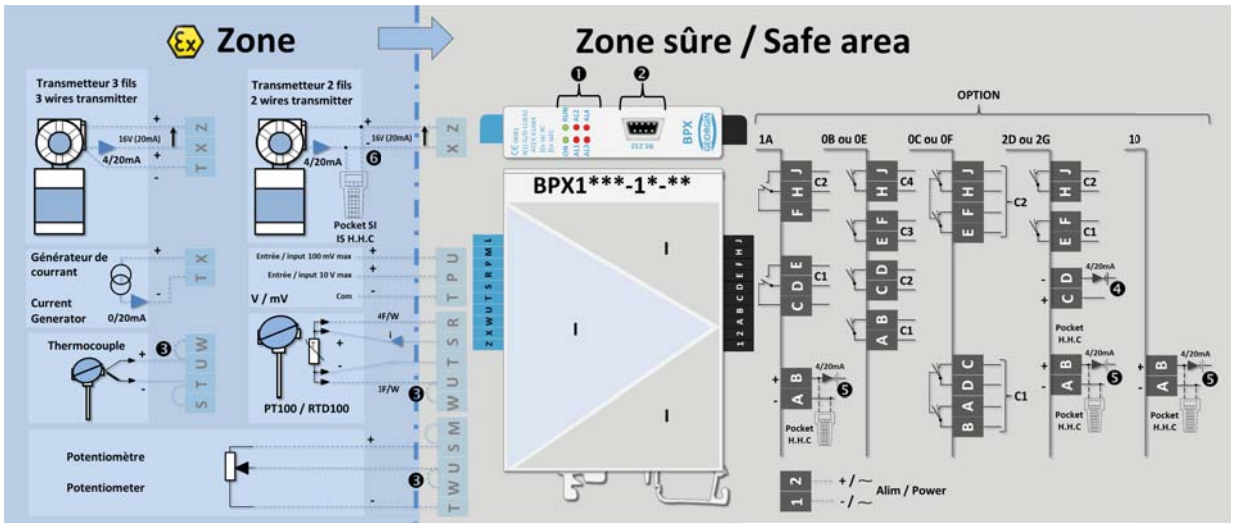
Current (mA) -2.5 to +23 mA
Voltage (mV) -10 to +105 mV
Voltage (V) -1 to +10.5 V
Thermocouple J -210 to +1200 °C
Thermocouple K -250 to +1372 °C
Thermocouple B +400 to +1820 °C
Thermocouple R -50 to +1768 °C
Thermocouple S -50 to +1768 °C
Thermocouple T -250 to +400 °C
Thermocouple E** -270 to +1000 °C
Thermocouple N -240 to +1300 °C
Thermocouple W5 -20 to +2320 °C
2-wire PT 100 resistance
3-wire PT 100 resistance
4-wire PT 100 resistance
2/3/4-wire sensor +3.5 to +23 mA
Potentiometer 0 to 100% of 1 KΩ to 20 KΩ

❶ Presence of voltage indicated by a green LED
Micro-controller operation indicated by flashing green LED.
Red LED to indicate activation of the output relays (depending on option selected).
❷ RS232 connection for configuration of BPX via PC
❸ Shunt to create
❹ Passive output only
❺ Indifferently active or passive output

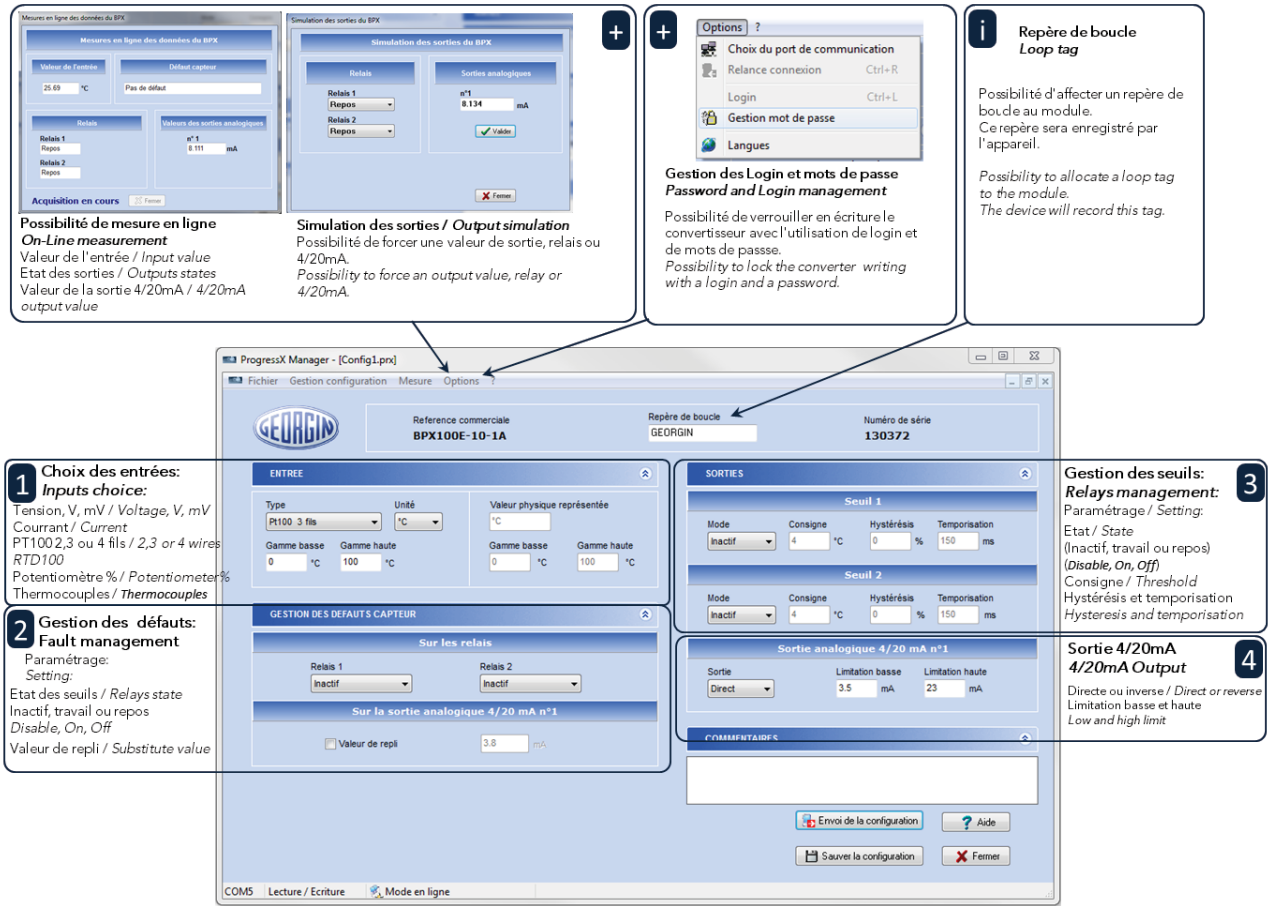
Explanatory diagram

I/O

1 Input / up to 2 x 4/20 mA outputs
up to 4 relay outputs



ProgressX manager software (BPX Configuration)



4. Use of galvanic insulation

IS interfaces

Please ensure you read all the instructions in the individual product manual and only start the installation work when you have understood everything.

This manual is supplied with each product. It is also available on our website: www.georgin.com

These equipment items may receive hazardous voltages on their terminals. If you do not follow the instructions correctly, you may expose yourself and others to serious injury as well as damage to equipment.
Before starting your installation, ensure that the model and power supply are suited to your purpose. This equipment should only be connected in accordance with applicable regulations by qualified personnel.

1. Connection

• Standard: plug-in cage clamp terminals (max. capacity 2.5 mm²)
A flat head screwdriver (0.6 x 3.5 mm) is recommended to open the cage clamp terminal.
• Optional: plug-in screw terminals (max. capacity 2.5 mm²)

2. Installation

The equipment is intended for association in accordance with intrinsic safety; the installation must be in compliance with standard EN 60079-14, in particular paragraph 12.

3. Anchoring and mounting

The equipment is intended for installation on an EN 50022 rail attached horizontally on a vertical plane, in order to respect the direction of natural convection.
Do not block the air vents. Use a screwdriver to insert and remove the equipment as indicated.

4. Installation location

The equipment must be installed in a non-explosive atmosphere, in a sound environment free of condensation and corrosive or conductive dust.
Intrinsic safety is ensured in the operating temperature range specified in paragraph 1.6. However you should remember that the service life of electronic equipment is reduced by half when its temperature is increased by 10°C.
You should therefore install the equipment in suitably ventilated equipment rooms, avoid the proximity of elements that may heat the equipment by radiation or which are likely to generate electromagnetic radiation greater than 10V/m.

5. Electrical connection

Electrical connections must be made when the equipment is DE-ENERGIZED, using wires with a maximum diameter of 2.5 mm².
For connections, refer to the wiring diagram.

6. Mechanical properties

The intrinsic safety terminals must only be connected to intrinsic safety equipment or equipment which is in compliance with paragraph 5.7 of standard EN 60079-11.
Moreover, the association of equipment and the connection cable must be compatible in terms of intrinsic safety.

7. Cable routing

The properties of cables and their routing from the ATEX zone (I.S. cables) must comply with the recommendations set out in paragraphs 6.1, 6.2.1 and 6.3 of standard EN 600079-11.
Full precautions must be taken to prevent electromagnetic disturbance with other cables that may generate dangerous voltages or currents.
The I.S. cables must be clamped in order to prevent random contact with other cables in the event the terminal is shorn.

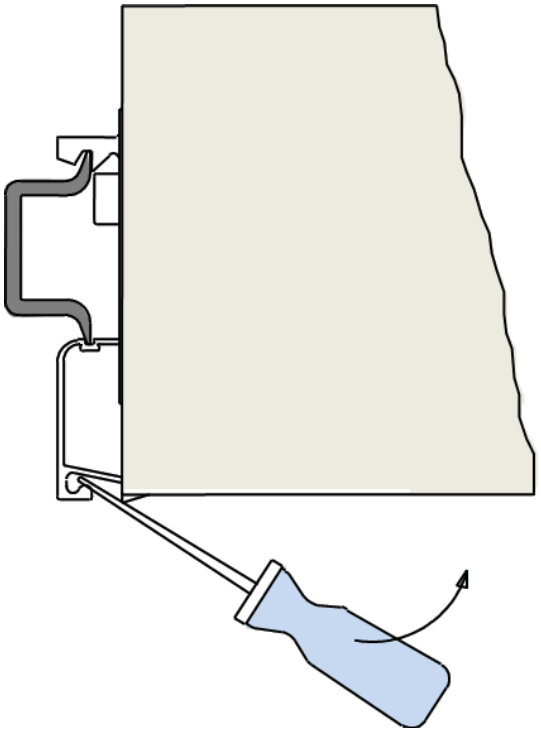
8. Adjustments and configuration

See technical data sheet or instructions for use.

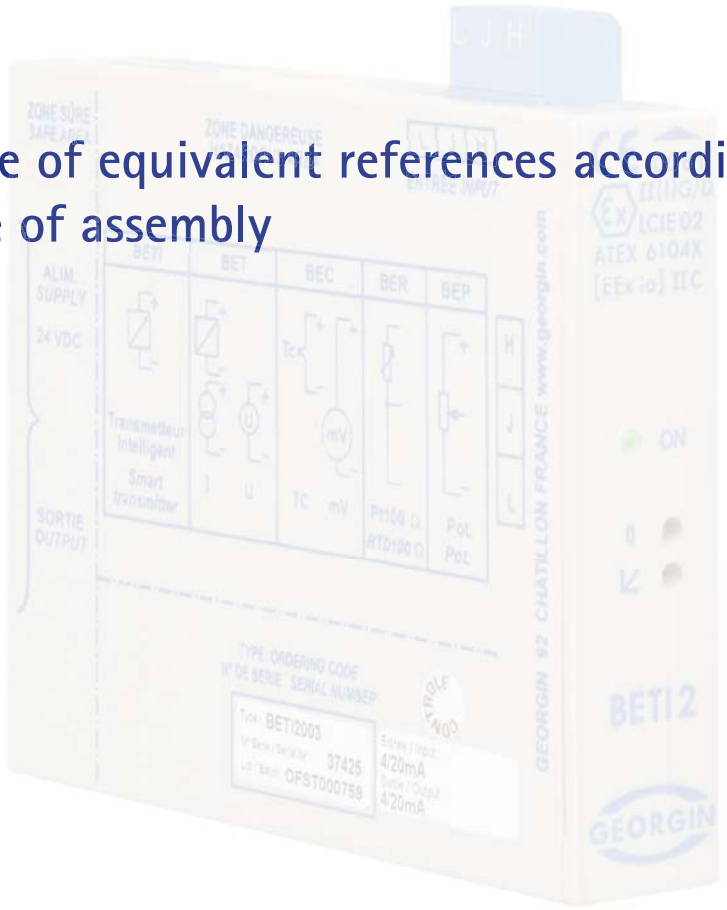
9. Maintenance

Precautions to take during maintenance
Dismounting must be carried out DE-ENERGIZED.
In the event you suspect a failure or permanent fault, return the equipment to our services or representatives, who are the only maintenance providers certified to perform expert assessments or repairs.

10. Dismounting

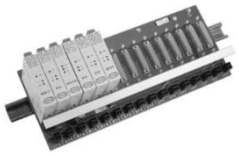


- 5. Table of equivalent references according to type of assembly



1. Assembly methods

Not covered in this guide. Our equipment features other assembly methods. See technical data sheet for further information.

I/O	Mounting DIN I.S. rail (Intrinsic Safety)	Equivalent mounting I.S. plate (Intrinsic Safety)	Equivalent mounting I.S. board (Intrinsic Safety)	Equivalent to mounting on DIN N.I.S rail (Non-Intrinsic Safety)
				
AI	BXNT6	-	-	BVNT
AI	BXMT	-	-	BVMT
AI	BXLT	-	-	BVLT
AI	BXNTI6	BETI	-	BVLTI
AI	BXMTI	-	-	BVMT
AI	BXLTI	-	-	BVMTI
AI	BXNT1	BET	-	BVNS
AI - AO	BXNI	BEI	-	BVNI
DI	RDN110	BED110	CRN	-
DI	RDN211	BED211	CRN	-
DI	RDN112	BED112	CRN	-
DI	RDN100	BED100	-	-
DI	RDN210	BED210	-	-
DI	RDN102	BED102	-	-
DI	RDN310 / 410	BED310 / 410	-	-
DI	RDN213 V/W	-	-	-
AO	BXNA	BEA	LW0	BVNA
AO	BXNAI	BEAI	-	BVNAI
DO	BXNE	BEE	CASI	-
DO	RDN210 V/W	-	-	-
DO	RDN211V/W	-	-	-
TI	BXNR	BER	LXR	BVNR
TI	BXNC	BEC	LXC	BVNC
PI	BXNP	BEP	LXP	BVNP
RI	BXNRV	-	-	BVNRV
UI	BPX1	-	LPX - CPX	BPX0

Safety for Industrial Process

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