

Intrinsically Safe Compact Controller

CTR 210i

Intrinsically Safe Bargraph Indicator

BGI 210i



DMT 02 ATEX E 148 2. Supplement
also graphics display

Revision 4.1

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Safety informations



The CTR 210i /BGI 210i has to be installed by process electronics engineers or qualified electricians who are authorised by the plant operator to carry out these tasks. Only staff trained and authorised by the plant operator are allowed for usage.

The CTR 210i /BGI 210i is to be connected as specified in the electrical data. Do not open the housing, otherwise maintenance of the electrical data is not ensured and the guarantee expires immediately.

For commissioning, refer to the operation and programming manual.

Validity of Installation and Operating Instructions

- These Installation and Operating Instructions apply to all CTR 210i and BGI 210i models.
- Your IBS agent will be able to give you information about any improvements or modifications.
- The manufacturer will not be liable for any defects caused by incorrect or unauthorised usage. Modifications / Conversions or changes to the instrument will expire the certification and guarantee.

Operating safety

- The instruments are manufactured in our ISO/ATEX certified factory. They comply with the requirements laid down in this standard.
- The CTR / BGI 210i meets the requirements of protection class IP54. The backside is only IP20.
- It will be dangerous to use the instrument incorrectly or not authorised. All information in this manual has to be adhered strictly.

Technical Developments

- Modifications or changes to the technical data do not require a notice by the manufacturer.

Repairs, dangerous chemicals

Only the IBS BatchControl GmbH is allowed to repair the instruments because the intrinsically safe is at risk.

Instruments sent to IBS BatchControl GmbH for repair must have an attached fault description.

Warning!

Please adhere to the following procedure before sending an instrument for repair:

- Clean the instrument by removing all residues and deposits. Pay special attention to the gasket grooves and crevices.
- If to health dangerous materials are not completely removed the instrument will not be accept for repair or the owner will have to pay for professional cleaning.
- He will also be made responsible for any damage to health (e.g. acid burns, etc.) of our personnel.




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1. System Description

The microprocessor-controlled CTR 210i / BGI 210i are a simple to use controller or indicator in hazardous production areas.

1.1. Type Codes

Designation according to Directive 2014/34/EU: **C** **€** **0158**  **II 2 G**

Designation Ex class: **Ex ib IIC T4 Gb** or **Ex ib IIC T4**

1.1.1. Type Codes (CTR 210i)

The following types can be supplied:

Compact Controller Type	Type for input 1-3
CTR 210i	
.*	1 = mA, 2 = Pt100
.*	1 = mA, 2 = Pt100
.*	1 = mA, 2 = Pt100

1.1.2. Type Codes (BGI 210i)

The following types can be supplied:

Bargraph Indicator Type	Type for input 1-3
BGI 210i	
.*	1 = mA, 2 = Pt100
.*	1 = mA, 2 = Pt100
.*	1 = mA, 2 = Pt100

1.2. Areas of application

The units are explosion protected in accordance with EN 60079-0 and EN 60079-11. They can be operated in hazardous areas in zone 1, group IIC, temperature class T4 up to a maximum ambient temperature of 60°C. All incoming and outgoing circuits including the power supply are in accordance with Ex class “intrinsically safe”, category “ib”.

The maximum permissible ambient temperature is +60 °C.

The minimum permissible ambient temperature is -20 °C.

Two current outputs (4-20 mA) and six contacts are controlled depending several functions. Up to six control signals can be fed to the controller.

As input variants are current input (4-20 mA) or Pt100 input available. The input variant must be given by the order and is prepared by the manufacturer.

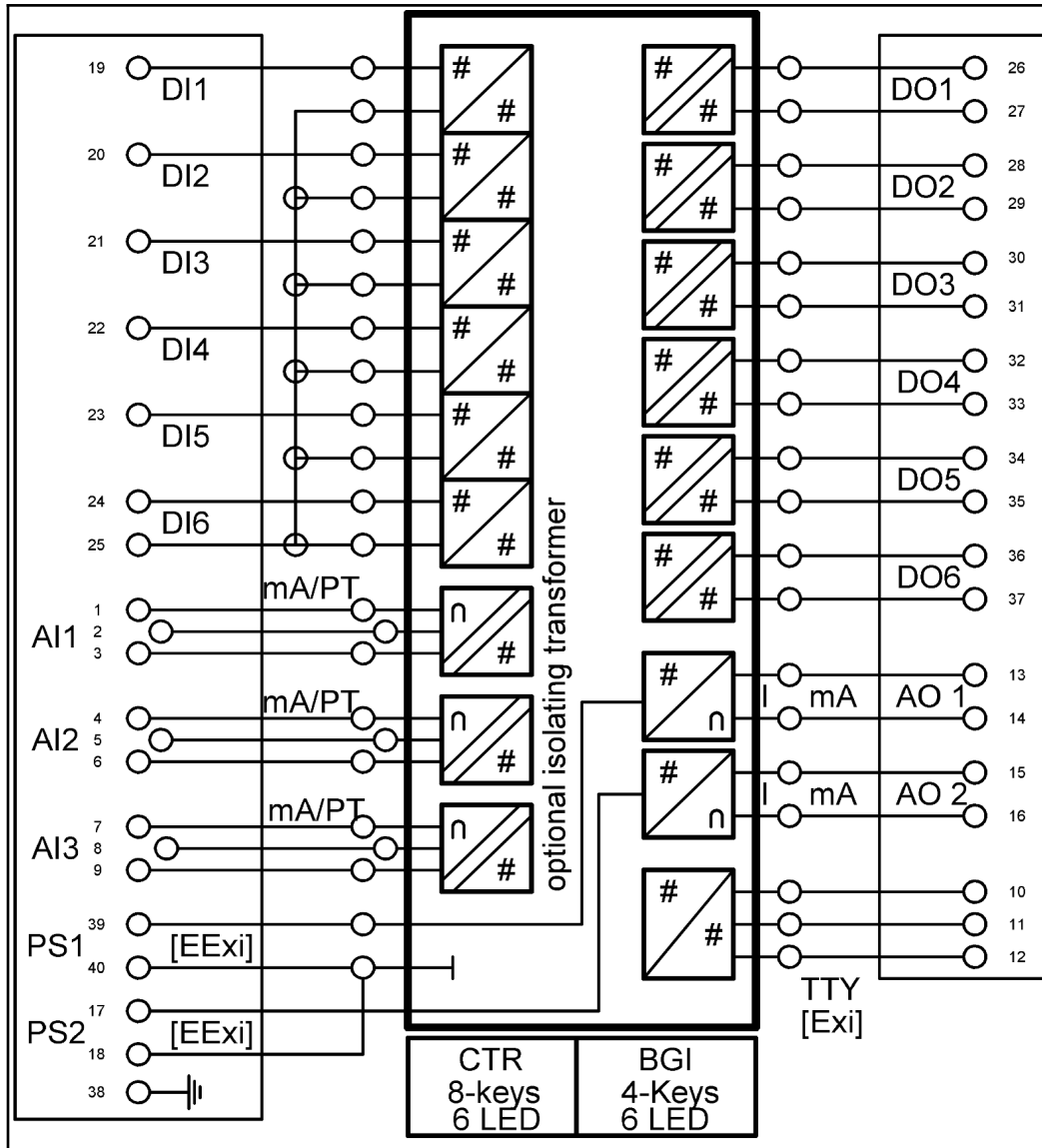
The input can be linearised by the software.

The units can be configured and controlled via a serial interface (MODBUS).
The IPC 300i isolation cards are available for this purpose.

Access to the various program levels can be protected by a numerical code.

The units are supplied in a panel mount housing (IP20) with external dimensions of 72 mm x 144 mm.

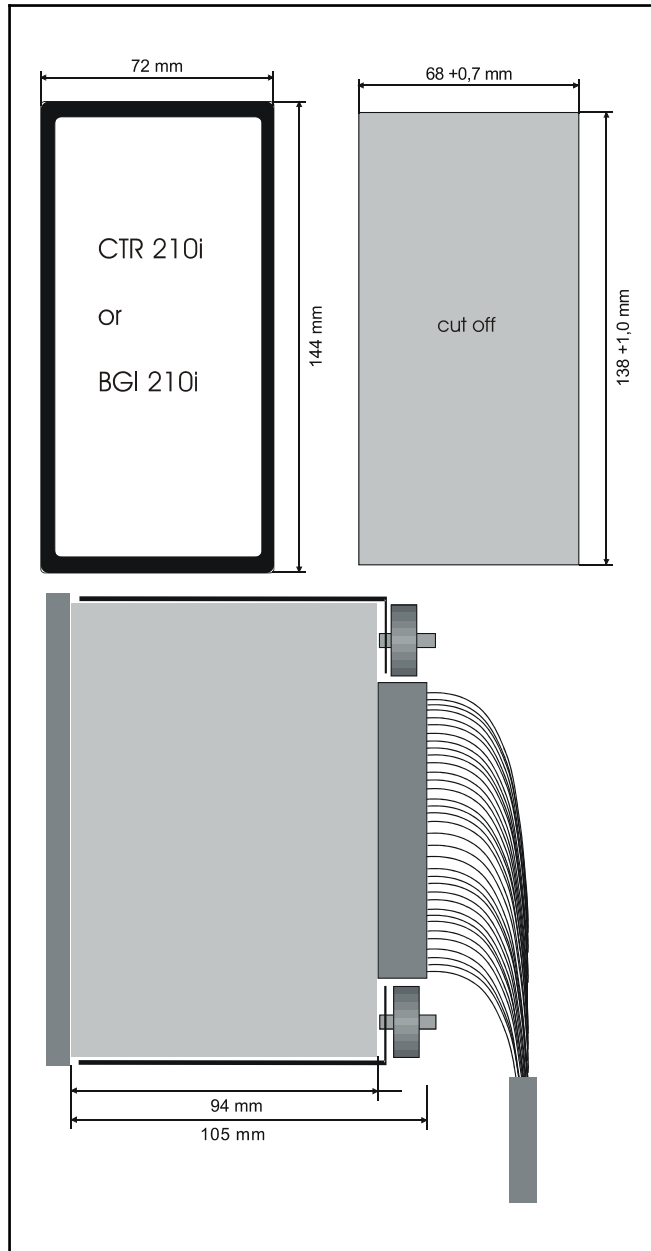
1.3. Block Diagram



2. Fitting and Installation

This information in this section is important and must be observed during fitting and installation. The units must be fitted to use.

2.1. Fitting the CTR 210i / BGI 210i



The CTR 210i / BGI 210i has external dimensions of 144 mm x 72 mm.

You need a cut off in the panel mount with the dimensions of 138 +1,0 mm x 68 +0,7 mm (DIN43700). The depth is 105 mm.

Release the two screws from the mounting profile. You move the CTR 210i / BGI 210i from the front through the panel mount.

Hold the unit horizontal and move the mounting profile to the intent screws where are they removed before.

Please track the nut from the mounting profile consistently good tight.

2.2. Protection Class IP20

The CTR 210i / BGI 210i conforms to protection class IP20. The front conforms IP54.

2.3. Temperature ranges

The CTR 210i / BGI 210i can be operated in the range $-20\text{ }^{\circ}\text{C}$ to $+60\text{ }^{\circ}\text{C}$.

2.4. Cable and PE

Only shielded cable may be used. The shield must be connected in the casing or the EMC clamps. The PE must be connected to the PE terminal and the PE screw at the CTR 210i / BGI 210i housing.

2.5. Terminal assignment

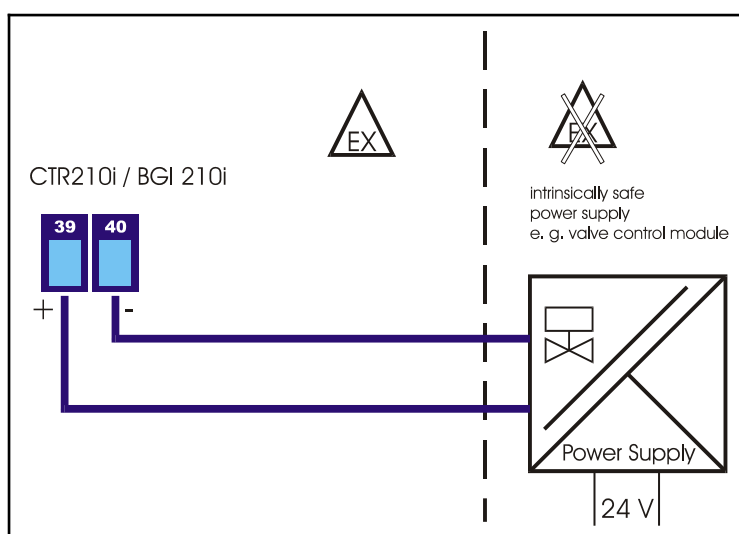
The technical data in the Certificate of Conformance must be observed at all times. A CTR 210i / BGI 210i may only be operated with intrinsically safe circuits if the certified maximum values are observed.

2.5.1. Power Supply 1

The power supply provides power for all the electronics, the first analogue output and the digital inputs and outputs. The second power supply provides power for the second analogue output.

Terminal 39 (+) Terminal 40 (-)	
An intrinsically safe power supply with the following maximum values can be connected:	
Voltage U_i	DC 28.5 V
Current I_i	190 mA
Power P_i	1.4 W
effective internal inductance	negligible
effective internal capacitance	negligible

We recommend the PSC 300i or IPC 300i supply module for use with this instrument.

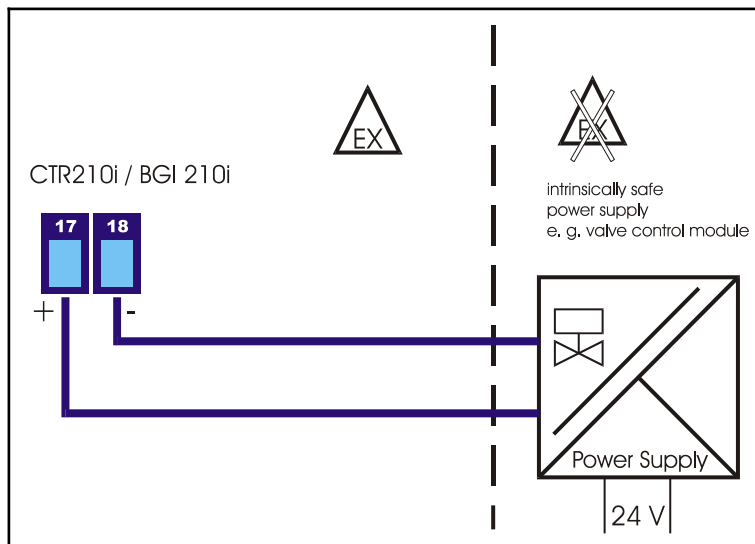


Power Supply Voltage	Current	maximum load at analogue output 1
21 V	37 mA	800 Ω
19 V	39 mA	750 Ω
16 V	42 mA	550 Ω
11 V	54 mA	300 Ω

2.5.2. Power Supply 2

The second power supply is necessary, if the second current output is used.

Terminal 17 (+) Terminal 18 (-)	
An intrinsically safe power supply with the following maximum values can be connected:	
Voltage U_i	DC 28.5 V
Current I_i	190 mA
Power P_i	1.4 W
effective internal inductance L_i	negligible
effective internal capacitance C_i	negligible



This power supply could be weaker than the first one. In order to drive a load of 20 mA to the second output, we need maximum 22 mA. The maximum load is reached at a power supply voltage from 21 V.

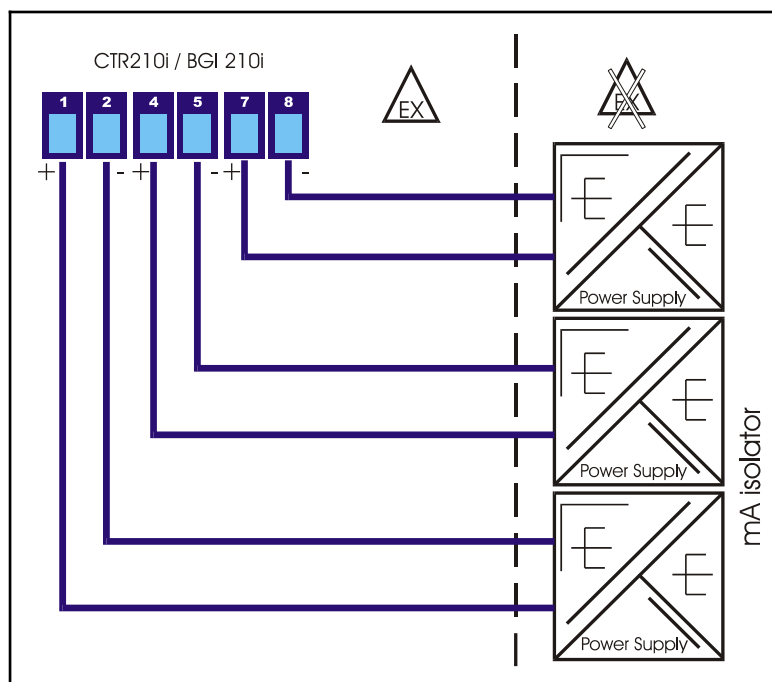
Power Supply	maximum load at analogue output 2
21 V	800 Ω
19 V	750 Ω
14 V	500 Ω
11 V	340 Ω

2.5.3. Analogue inputs

There are 3 analogue inputs (4-20 mA) at the CTR 210i / BGI 210i available.

The analogue inputs are not voltage-free, i.e. the minus is at instrument ground potential.

Current input 1:	Terminal 1 (+) Terminal 2 (-)
Current input 2:	Terminal 4 (+) Terminal 5 (-)
Current input 3:	Terminal 7 (+) Terminal 8 (-)
Voltage U_i	DC 30 V
Current I_i	170 mA
Power P_i	0.7 W
effective internal inductance L_i	negligible
effective internal capacitance C_i	24nF



Load: 25 Ω

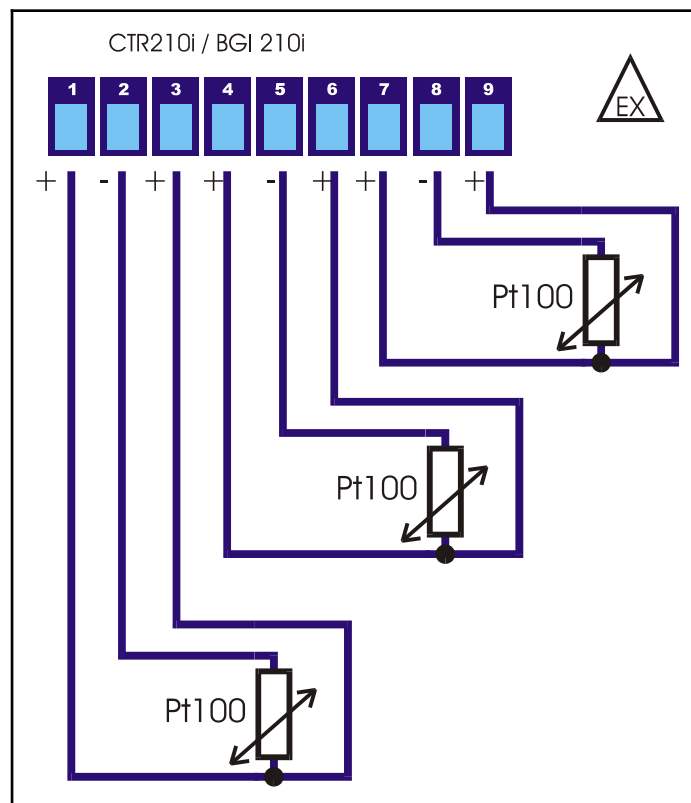
Failure: < 0,05 % from end value

2.5.4. Analogue input Pt100

Each analogue input can be provided with a Pt100 input module as an option.

Pt100-inputs are not voltage-free, i.e. the minus is at instrument ground potential.

Pt100 1:	Terminal 1 (+) Terminal 2 (-)
Pt100 2:	Terminal 4 (+) Terminal 5 (-)
Pt100 3:	Terminal 7 (+) Terminal 8 (-)
Voltage U_i	DC 5.45 V
Current I_i	2 mA
Power P_i	0.7 W
effective internal inductance L_i	negligible
effective internal capacitance C_i	137 nF
max. external inductance L_o	1 mH
max. external capacitance C_o	50 μ F



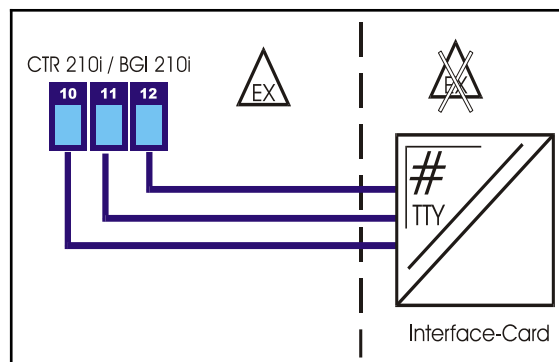
Temperature range: -200 °C to +800 °C

Error: < 0,1 % from end value

2.5.5. Interface TTY

Please use a IPC 3x0i for using the interface.

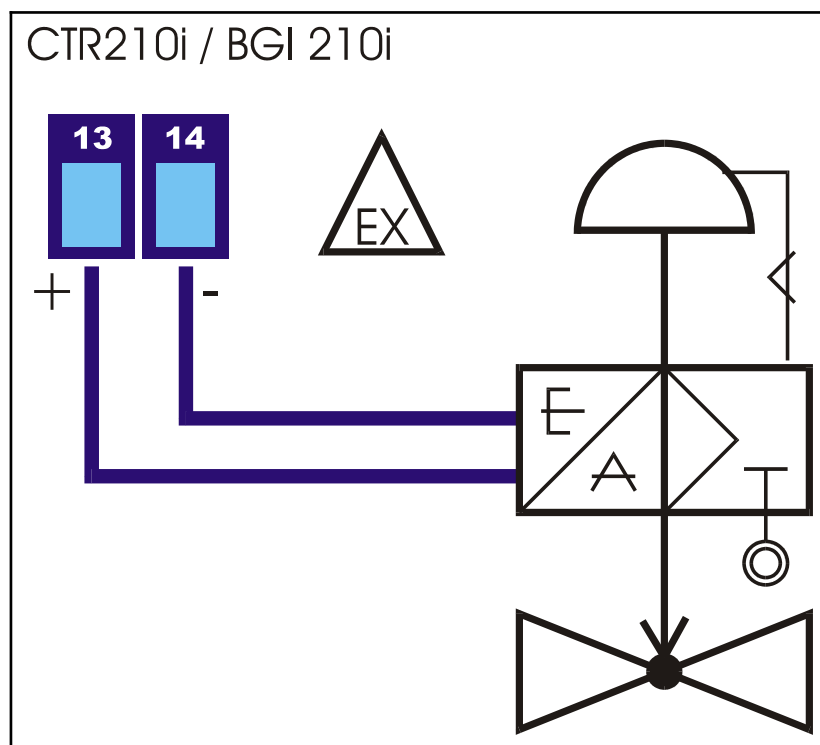
Current input TxD Terminal 10 (GND) Terminal 11 (TxD)	
Voltage U_o	DC 5.45 V
Current I_o	3.3 mA
effective internal inductance L_o	1 mH
effective internal capacitance C_o	50 μ F
Intrinsically safe supply circuits with the following maximum values can be connected:	
Voltage U_i	DC 14 V
Current I_i	60 mA
Power P_i	0.52 W
effective internal inductance L_i	negligible
effective internal capacitance C_i	2.4 nF
Current Input RxD Terminal 12 (Rx) Terminal 10 (GND)	
The following values may occur for each circuit:	
Voltage U_o	DC 5.45 V
Current I_o	3.3 mA
effective internal inductance L_o	1 mH
effective internal capacitance C_o	50 μ F
Intrinsically safe supply circuits with the following maximum values can be connected:	
Voltage U_i	DC 14 V
Current I_i	60 mA
Power P_i	0.52 W
effective internal inductance L_i	negligible
effective internal capacitance C_i	2.4 nF



2.5.6. Analogue output 1

The analogue output is not electrically isolated. The minus is at ground potential.

Analogue output 1: Terminal 13 (+) Terminal 14 (GND)	
Voltage U_o	DC 18 V
Current I_o	95 mA
Power P_o	690 mW
max. external inductance L_o	3 mH
max. external capacitance C_o	256 nF

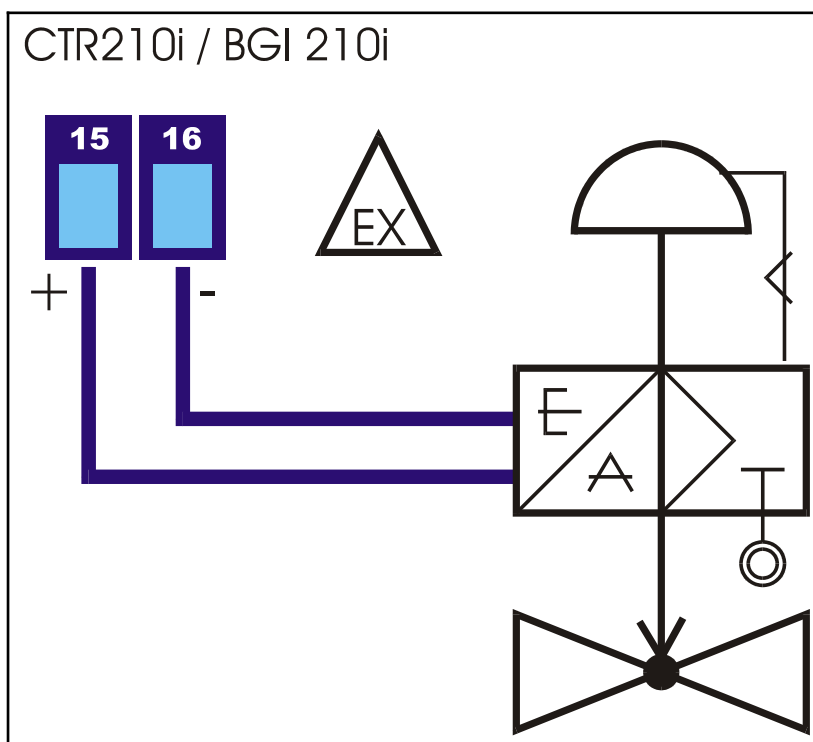


Current: 4–20 mA
 Load: depends from Input Voltage
 see section 2.5.1

2.5.7. Analogue output 2

The analogue output is not electrically isolated. The minus is at ground potential.

Analogue output 2: Terminal 15 (+) Terminal 16 (GND)	
Voltage U_o	DC 19.8 V
Current I_o	88 mA
Power P_o	436 mW
max. external inductance L_o	3 mH
max. external capacitance C_o	174 nF



Current: 4–20 mA

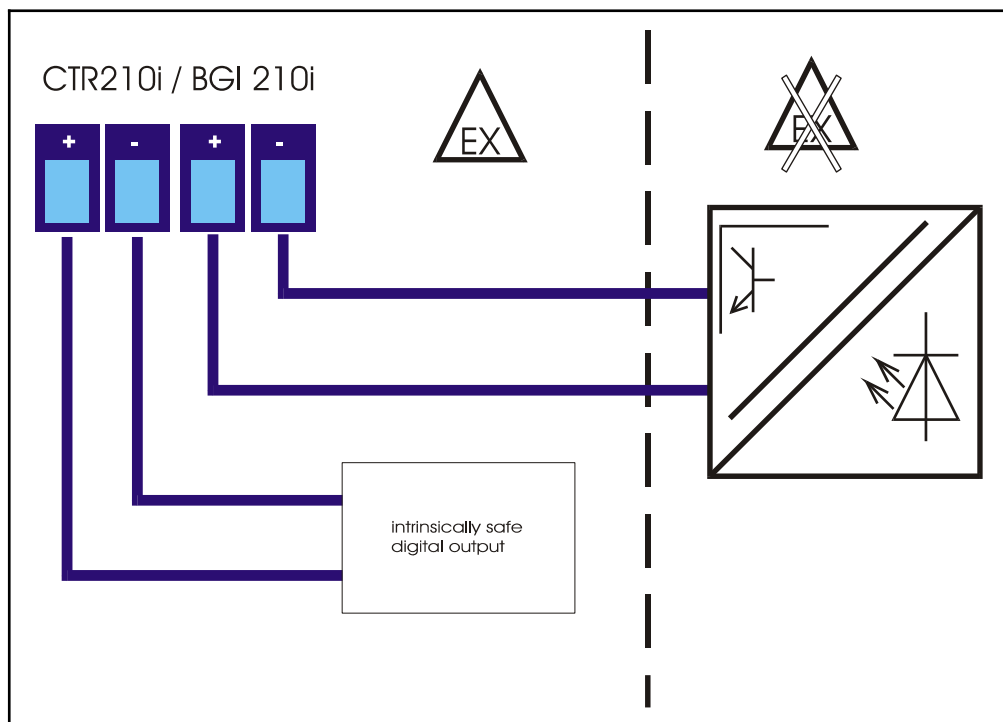
Load: see table section 2.5.2

2.5.8. Digital inputs

There are six digital inputs at the CTR 210i / BGI 210i available.

The digital inputs are active (approx. 100 μ A/5 V). Passive switches or optical couplers can be connected.

Digital input 1: Terminal 19 (+) Terminal 25 (GND)	
Digital input 2: Terminal 20 (+) Terminal 25 (GND)	
Digital input 3: Terminal 21 (+) Terminal 25 (GND)	
Digital input 4: Terminal 22 (+) Terminal 25 (GND)	
Digital input 5: Terminal 23 (+) Terminal 25 (GND)	
Digital input 6: Terminal 24 (+) Terminal 25 (GND)	
The following values may occur for each circuit:	
Voltage U_o	DC 5.45 V
Current I_o	0.16 mA
max. external inductance L_o	2 mH
max. external capacitance C_o	50 μ F
Intrinsically safe supply circuits with the following maximum values can be connected to each circuit:	
Voltage U_i	DC 36 V
Current I_i	100 mA
Power P_i	1.35 W
effective internal inductance L_i	negligible
effective internal capacitance C_i	negligible

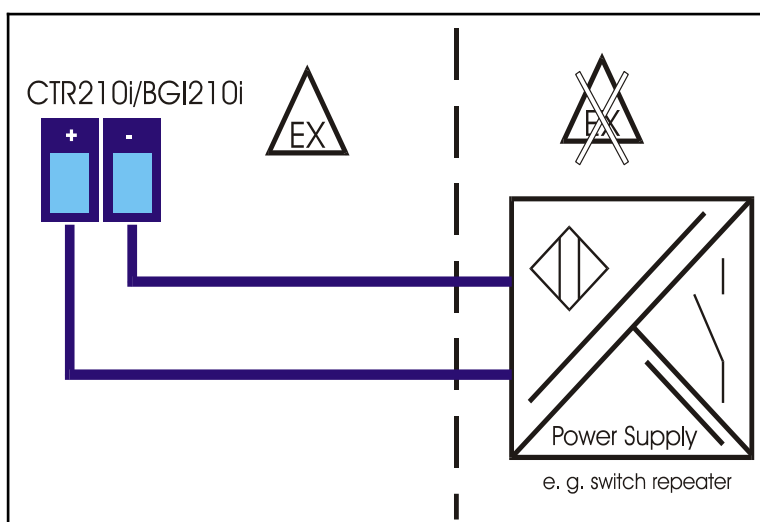


2.5.9. Digital outputs

There are six digital outputs at the CTR200i / BGI200i available.

The control outputs are electrically isolated and passive. Please note the potential direction of the outputs.

Digital output 1: Terminal 26 (+) Terminal 27 (GND)	
Digital output 2: Terminal 28 (+) Terminal 29 (GND)	
Digital output 3: Terminal 30 (+) Terminal 31 (GND)	
Digital output 4: Terminal 32 (+) Terminal 33 (GND)	
Digital output 5: Terminal 34 (+) Terminal 35 (GND)	
Digital output 6: Terminal 36 (+) Terminal 37 (GND)	
The following values may occur for each circuit:	
Voltage U_o	DC 5.45 V
Current I_o	1.7 mA
max. external inductance L_o	1 mH
max. external capacitance C_o	50 μ F
Intrinsically safe supply circuits with the following maximum values can be connected to each circuit:	
Voltage U_i	DC 36 V
Current I_i	150 mA
Power P_i	1.35 W
effective internal inductance L_i	negligible
effective internal capacitance C_i	negligible



2.5.10. Potential equalisation

The PE must be connected to the PE terminal 38 and simultaneously on the PE-screw.