

Intrinsically Safe Compact Controller

CTR 210 i

Intrinsically Safe Bargraph Indicator

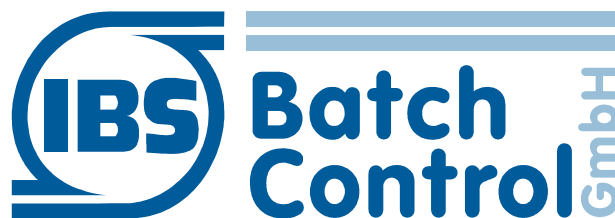
BGI 210 i



DMT 02 ATEX E 148 1. Supplement
also graphics display

Revision 3.1

Year of manufacture: see type plate



Marie-Curie-Str. 8
50170 Kerpen
Germany

Tel.: +49 22 73 / 60 37 0
Fax : +49 22 73 / 60 37 22



Safety informations

The CTR 210 i /BGI 210 i 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 210 i /BGI 210 i 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.

Validity of Installation and Operating Instructions

- These Installation and Operating Instructions apply to all CTR 210 i and BGI 210 i 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 certified factory. They comply with the requirements laid down in this standard.
- The CTR / BGI 210i meets the requirements of protection class 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 210 i / BGI 210 i are a simple to use controller or indicator in hazardous production areas.

1.1. Type Codes

Designation according to Directive 94/9/EG: **C** **€0158**  **II 2 G**

Designation Ex class: **EEx ib IIC T4**

1.1.1. Type Codes (CTR 210 i)

The following types can be supplied:

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

1.1.2. Type Codes (BGI 210 i)

The following types can be supplied:

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

1.2. Areas of application

The units are explosion protected in accordance with EN 50014 and EN 50020. 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.

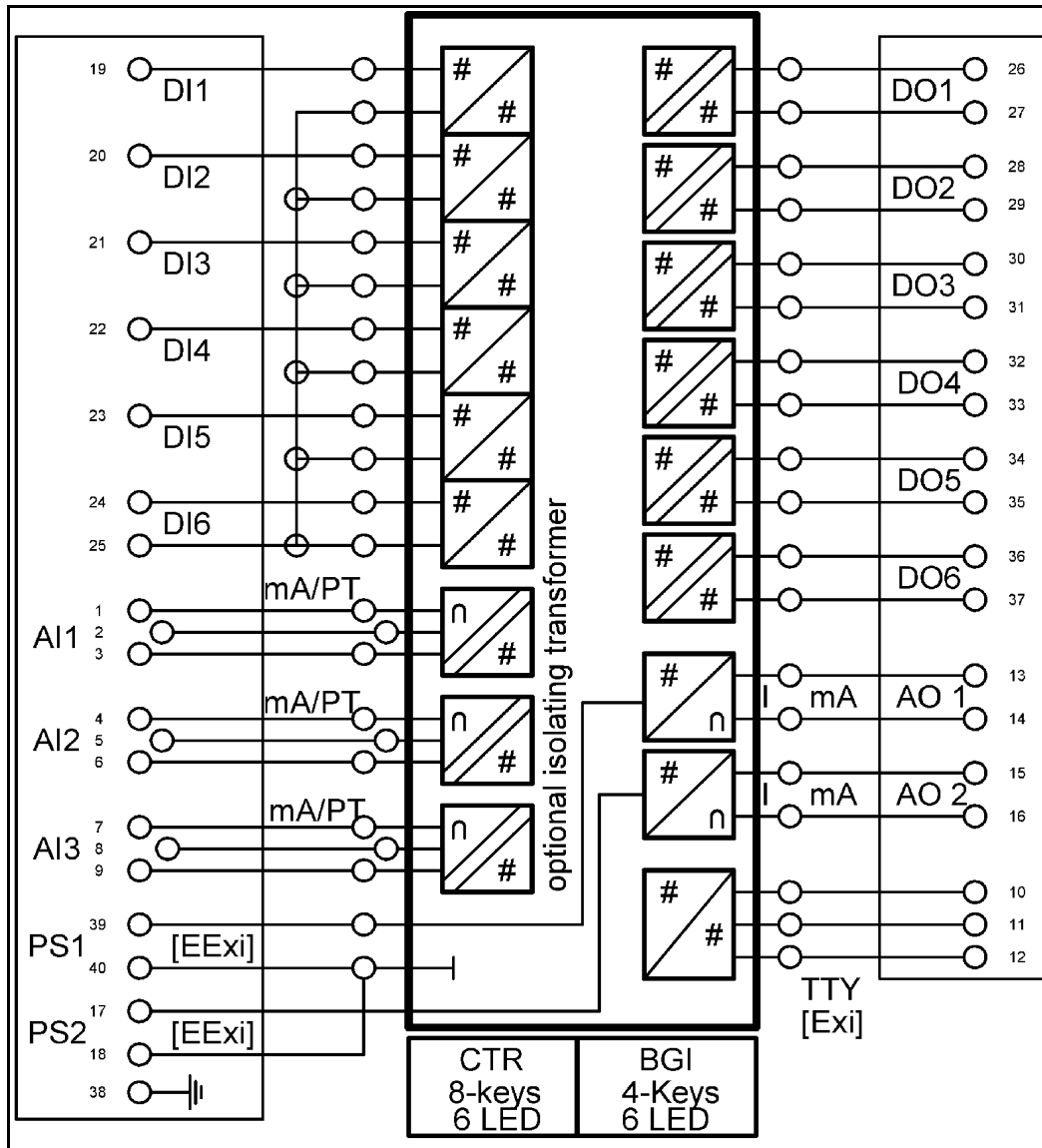
As input variants are current input or Pt 100 input available. The current input could be electrically isolated. The input variant must be given by the order and is prepared by the manufacturer. The input can be linearised by the software.

The units can be configured and controlled via a serial interface (MODBUS).
The IPC 300 i 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.

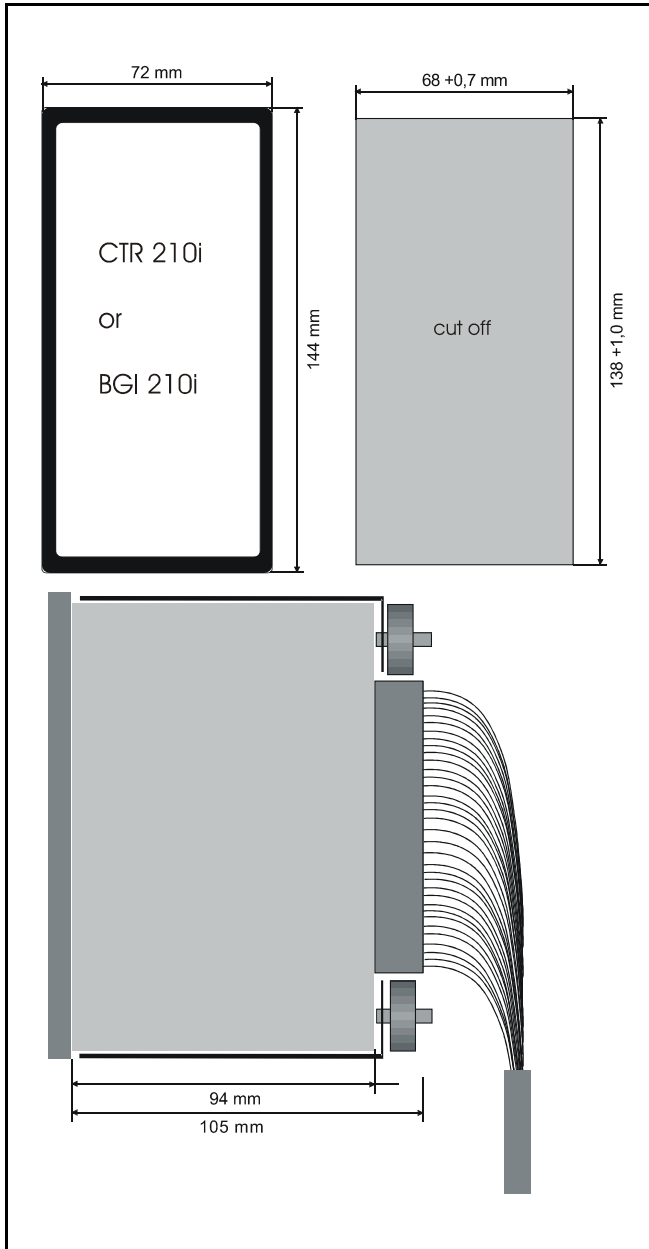
1.3. Block Diagram



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 105mm.

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

2.3. Temperature ranges

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



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 210 i / BGI 210 i housing.

2.5. Terminal assignment

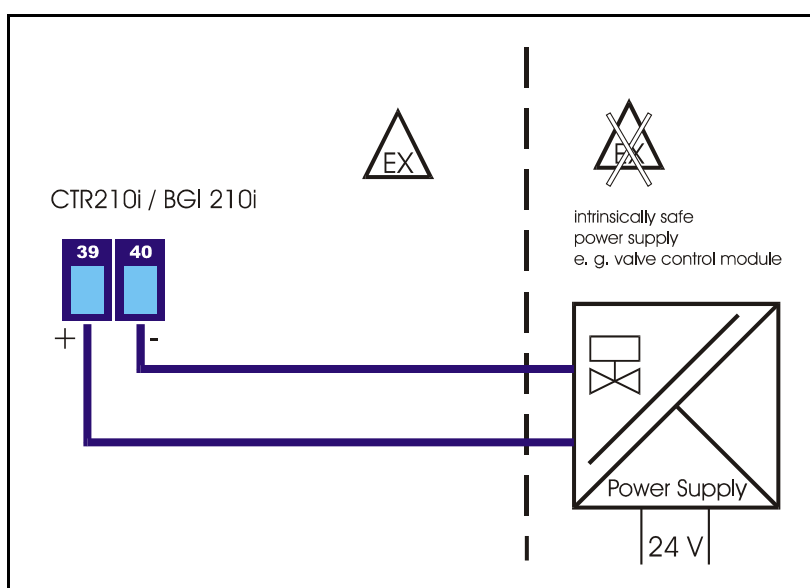
The technical data in the Certificate of Conformance must be observed at all times. A CTR 210 i / BGI 210 i may only be operated with intrinsically safe circuits if the certified maximum values are observed.

2.5.1. Power Supply 1

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

Terminal 39	+
Terminal 40	-

Parameters:		
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



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

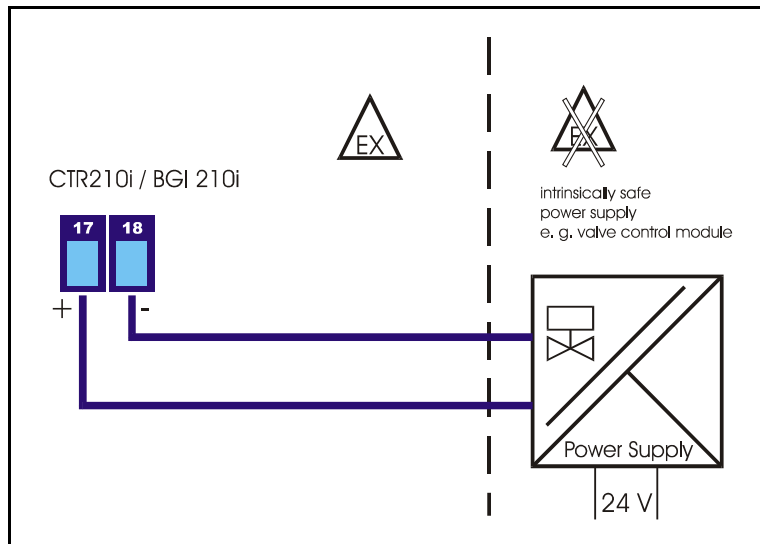
Power Supply Voltage	Current	maximum load at analog output 1
21 V	37 mA	800 Ω
19 V	39 mA	750 Ω
16 V	42 mA	550 Ω
11 V	54 mA	300 Ω

2.5.2. Power Supply 2

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

Terminal 17	+
Terminal 18	-

Parameters:			
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. To drive 20 mA to the second output, we need maximum 22 mA. The maximum load is reached at a power supply voltage from 21 V.

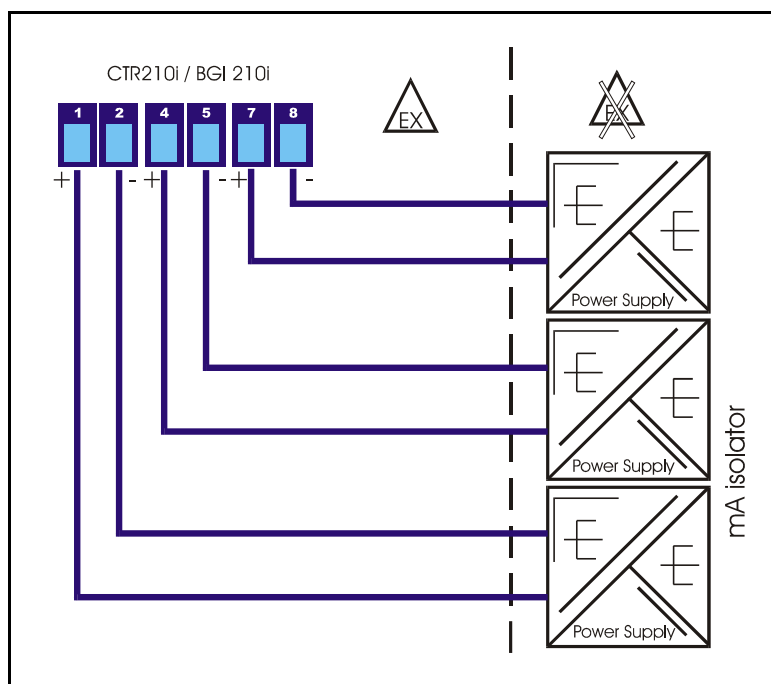
Power Supply	maximum load at analog output 2
21 V	800 Ω
19 V	750 Ω
14 V	500 Ω
11 V	340 Ω

2.5.3. Analog inputs

The CTR 210 i / BGI 210 i has 3 analog inputs (4 - 20 mA).

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

Terminal 1	+	Current input 1	Parameters:		
Terminal 2	-	Current input 1	Voltage	U _i	DC 30 V
			Current	i _i	170 mA
Terminal 4	+	Current input 1	Power	P _i	0,7 W
Terminal 5	-	Current input 1	effective internal inductance	L _i	negligible
Terminal 7	+	Current input 1	effective internal capacitance	C _i	24 nF
Terminal 8	-	Current input 1			



On request, each input can be provided with an isolating transformer module as an option. The input is then galvanically isolated. These have to be specified when ordering. The electrical values remain unchanged.

Load: 25 Ω (with isolating transformer dynamic load about 250 Ω)

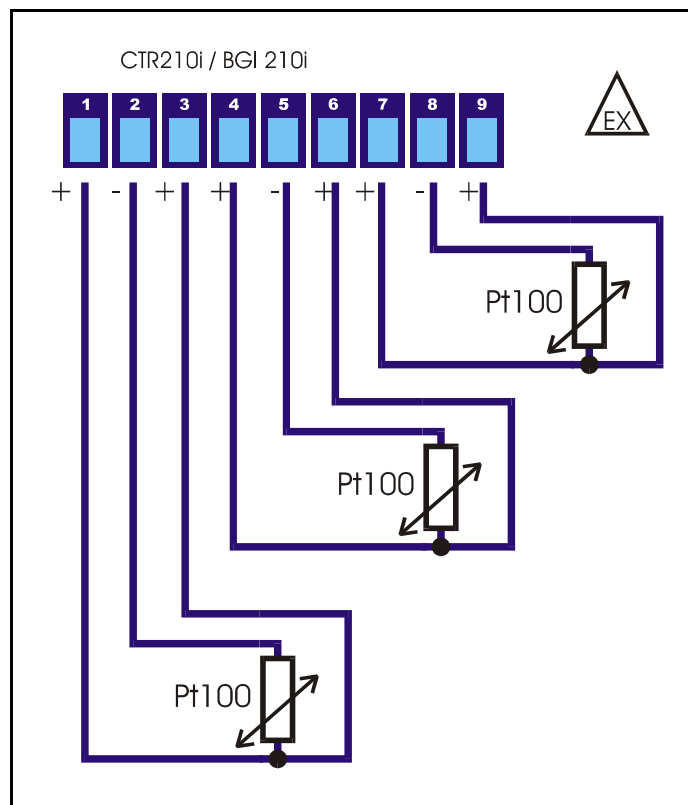
Failure: < 0,05 % from end value

2.5.4. Analog input Pt100

Each 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.

Terminal 1	+	Pt100 input 1
Terminal 2	-	Pt100 input 1
Terminal 3	+	Pt100 input 1
Terminal 4	+	Pt100 input 2
Terminal 5	-	Pt100 input 2
Terminal 6	+	Pt100 input 2
Terminal 7	+	Pt100 input 3
Terminal 8	-	Pt100 input 3
Terminal 9	+	Pt100 input 3

Parameters:		
Voltage	Uo	DC 5,45 V
Current	Io	2 mA
effective internal inductance	Li	negligible
effective internal capacitance	Ci	137 nF
max. external inductance	Lo	1 mH
max. external capacitance	Co	50 μF



Temperature range: -200 °C to +800 °C

Error: < 0,1 % from end value

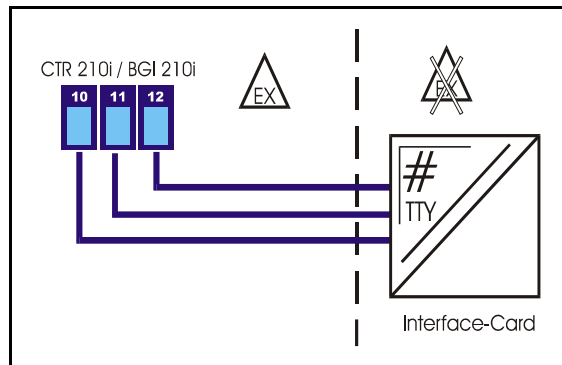
2.5.5. Interface TTY

Terminal 10	GND	GND
Terminal 11	TxD	Transmit Data

Parameters:		
Voltage	Uo	DC 5,45 V
Current	Io	3,3 mA
max. external capacitance	Co	50 µF
max. external inductance	Lo	1 mH
for the connection of an intrinsically safe circuit with the following values:		
Voltage	Ui	DC 14 V
Current	Ii	60 mA
Power	Pi	520 mW
max. internal inductance	Li	negligible
max. internal capacitance	Ci	2,4 nF

Terminal 10	GND	GND
Terminal 12	RxD	Receive Data

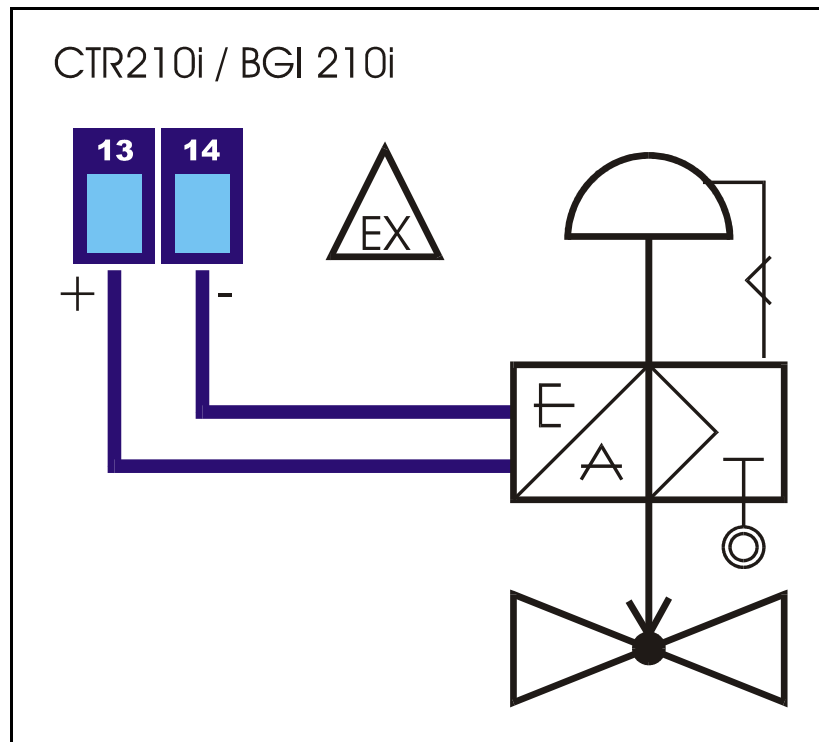
Parameters:		
Voltage	Uo	DC 5,45 V
max. external capacitance	Co	50 µF
max. external inductance	Lo	1 mH
for the connection of an intrinsically safe circuit with the following values:		
Voltage	Ui	DC 14 V
Current	Ii	60 mA
Power	Pi	520 mW
max. internal inductance	Li	negligible
max. internal capacitance	Ci	2,4 nF



2.5.6. Analog output 1

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

			Parameters:		
Terminal 13	+	Current output	Voltage	Uo	DC 18 V
			Current	Io	95 mA
Terminal 14	GND	Current output	Power	Po	690 mW
			max. external inductance	Lo	3 mH
			max. external capacitance	Co	256 nF

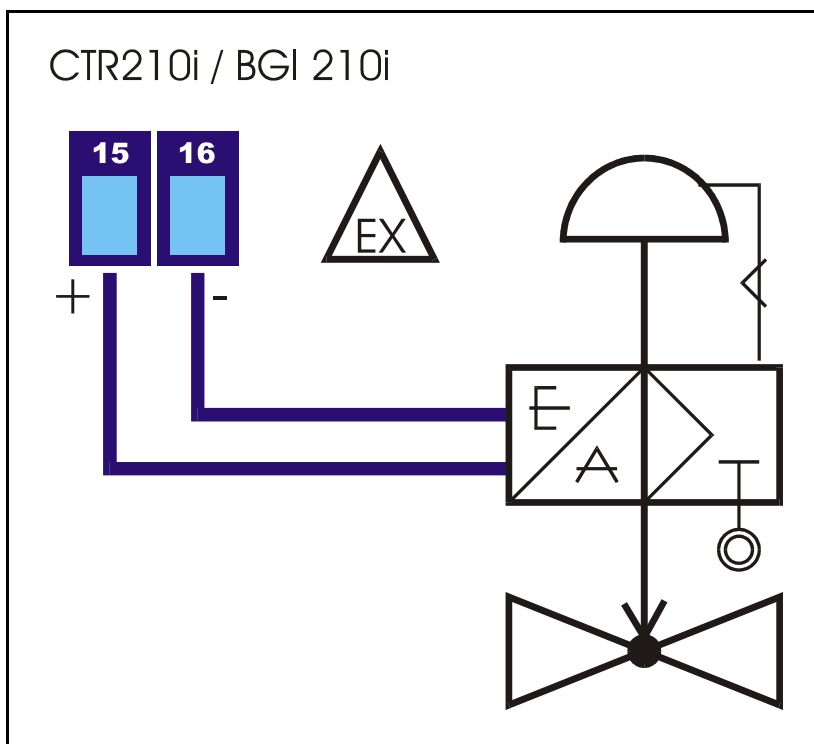


Current: 4 – 20 mA
 Load: depends from Input Voltage
 see section 2.5.1

2.5.7. Analog output 2

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

			Parameters:	
Terminal 15	+	Current output	Voltage	U _o DC 19,8 V
			Current	I _o 88 mA
Terminal 16	GND	Current output	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 Abschnitt 2.5.2

2.5.8. Digital inputs

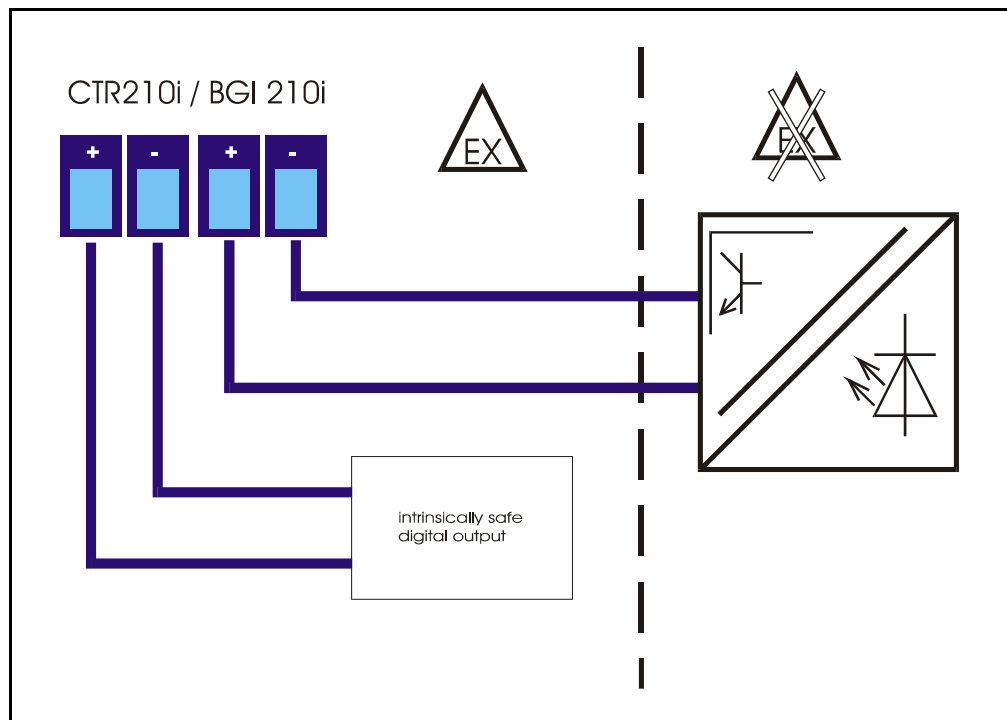
The CTR 210 i / BGI 210 i has six digital inputs.

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

Terminal 19	+	Digital input 1
Terminal 25	GND	Digital input 1
Terminal 20	+	Digital input 2
Terminal 25	GND	Digital input 2
Terminal 21	+	Digital input 3
Terminal 25	GND	Digital input 3
Terminal 22	+	Digital input 4
Terminal 25	GND	Digital input 4
Terminal 23	+	Digital input 5
Terminal 25	GND	Digital input 5
Terminal 24	+	Digital input 6
Terminal 25	GND	Digital input 6

Parameters:		
Voltage	Uo	DC 5,45 V
Current	Io	0,16 mA
max. external inductance	Lo	2 mH
max. external capacitance	Co	50 μ F

for the connection of an intrinsically safe circuit with the following values:		
Voltage	Ui	DC 36 V
Current	Ii	150 mA
Power	Pi	1,35 W
max. internal inductance	Li	negligible
max. internal capacitance	Ci	negligible

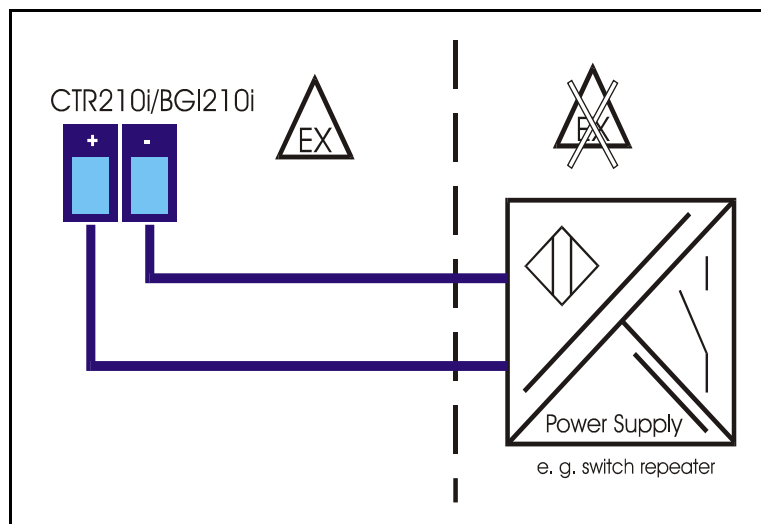


2.5.9. Digital outputs

The CTR200i / BGI200i has six digital outputs.

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

Terminal 26	+	Digital output 1	Parameters:		
Terminal 27	GND	Digital output 1	Voltage	U _o	DC 5,45 V
			Current	I _o	1,7 mA
Terminal 28	+	Digital output 2	max. external inductance	L _o	1 mH
Terminal 29	GND	Digital output 2	max. external capacitance	C _o	50 µF
Terminal 30	+	Digital output 3	for the connection of an intrinsically safe circuit with the following values:		
Terminal 31	GND	Digital output 3			
Terminal 32	+	Digital output 4	Voltage	U _i	DC 36 V
Terminal 33	GND	Digital output 4	Current	I _i	150 mA
Terminal 34	+	Digital output 5	Power	P _i	1,35 W
Terminal 35	GND	Digital output 5	max. internal inductance	L _i	negligible
Terminal 36	+	Digital output 6	max. internal capacitance	C _i	negligible
Terminal 37	GND	Digital output 6			



2.5.10. Potential equalisation

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

3. Certification of Conformity

Konformitätserklärung *Declaration of Conformity*

IBS BatchControl GmbH
Marie-Curie-Str. 8
50170 Kerpen

erklärt in alleiniger Verantwortung, dass das Produkt
assumes sole responsibility in stating that the product

CTR 210i ***
BGI 210i ***

EG-Baumusterprüfbescheinigung Nummer: **DMT 02 ATEX E 148**
EC-Type Examination Certificate Number:

mit den Vorschriften folgender europäischer Richtlinien übereinstimmt:
conform with the prescription of following european directives:

EMV-Richtlinie / *EMC-Directive* 92/31/EWG
Ex-Richtlinie / *Ex-Directive* 94/9/EG

Die Übereinstimmung wird nachgewiesen durch die Einhaltung folgender Normen oder normativer Dokumente:

The conformity are verified under observance of following standards or standard documents:

EN 50014 : 2000	EN 50081-2 : 1993
EN 50020 : 2003	EN 50082-1 : 1997
EN 50081-1 : 1992	EN 50082-2 : 1995

Benannte Stelle für QS-Überwachung:
Notified body for Q-Control: **EXAM**

Kenn-Nummer:
Identification Number: **0158**

Kerpen, 01.12.2004


Entwicklung / Development
i. V. Karl Fasen