

Intrinsically safe
Data interface- and power supply module

IPM 300 i



BVS 06 ATEX E 144

Installation and operating manual / Rev. 1.1

Year of manufacture: See type plate

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Attention!

Safety Instructions

Installation, connection, commissioning and maintenance of the IPM 300i must be carried out by trained, qualified specialists authorised to perform such work by the facility's owner-operator. The specialist must have read and understood this Operating Manual and must follow the instruction it contains.

Technical data and connected load values must be observed during installation. It's not allowed to open the housing, otherwise the certification and the guarantee will expires.

Validity of the installation and operating manual

- This installation and operating manual applies to all IPM 300i interface and supply modules.
- Your IBS BatchControl distributor will supply you with the current information and updates to this operating manual.
- The manufacturer shall not be liable for any damage resulting from improper use or deployment contrary to the prescribed purpose.
- Modifications, conversions or changes to the instrument will expire the certification and guarantee.

Operational safety

- The devices are manufactured at our plant certified in accordance with ISO 9001 / ATEX and therefore fulfil the associated requirements.
- The IPM300i module 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 advancement

- The manufacturer reserves the right to modify technical data without prior notice. Your IBS BatchControl distributor will supply you with the current information and updates to this Operating Manual.

Repairs

- Only IBS BatchControl GmbH is allowed to repair the instrument, otherwise the certification and the guarantee will expire.
- Instruments send to IBS for repair need to have an attached detailed failure description..

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1. System description

Die data interface and power supply module IPM 300i was developed for the using with the intrinsically safe process recorder ExTrend 200i. The IPM 300i provides two intrinsically safe power supply circuits and it works as an isolator between the intrinsically safe RS485 interface from the ExTrend 200i to a normal RS485 interface at the safe side. The inputs and outputs are galvanic isolated from each other.

Die IPM 300i was proofed and certified by the EXAM BBG Prüf- und Zertifizier GmbH. The EC type examination certificate has the following number:

BVS 06 ATEX E 144

1.1. Identification according to directive 94/9/EG:

CE 0158  II (2) G

Device group _____

Related equipment with external circuits for connection to devices of category 2 _____

For explosive mixtures of air and flammable gases, vapours or mists _____

1.2. Designation Ex class:

[Ex ib] IIC

European Ex protection corresponds EN 50014ff _____

Protection concept _____

Intrinsic safety _____

Install outside hazardous area parts are intrinsic safety _____

Apparatus group _____

1.3. Safety instructions

If the device no longer appears to operate reliably or safely, it must be deactivated and safeguarded against inadvertent activation. Reasons for this type of situation include:

- Visible damage to the device
- Electrical malfunction
- Extended storage at temperatures over 85°C
- High stress during transport

Before the device is put into operation again, it is absolutely necessary to carry out a proper unit test in accordance with DIN EN 61010, Part 1.

Repairs at Ex-devices have to be done according to §9 of the Ex- directive (Elex V). To ensure safety and adherence to guarantee terms, this test must be performed by the manufacturer.

It's not allowed to connect intrinsically safe units at non intrinsically safe circuits. If this IPM 300i unit was connected to non intrinsically safe circuits, the certification and the guarantee will expires. Then the IPM has to be marked and the Ex symbols at the type plate have to be removed. The repair of the unit can only be done by the manufacturer.

1.4. Areas of application

The data interface- and power supply module IPM 300i provides of two intrinsic safe, galvanic isolated power supplies and it isolates the special RS485 interface of the process recorder ExTrend 300i to the safe area.

The power supply output circuit 1 at the terminals KL5 and KL6 is according to the protection concept intrinsic safety category "ib" and is galvanic isolated from all other circuits.

The power supply output circuit 2 at the terminals KL7 and KL8 is according to the protection concept intrinsic safety category "ib" and is galvanic isolated from all other circuits.

The RS 485 interface circuit at the terminals KL1 and KL2 is according to the protection concept intrinsic safety category "ib" and is galvanic isolated from all other circuits.

The maximum allowed ambient temperature is + 45°C
The minimum allowed ambient temperature is - 20°C

The IPM 300i module is a related equipment with the designation class [Ex ib] IIC only for the installation in the safe area. It is only allowed to connect proofed and certified intrinsic safety circuits at the intrinsic save outputs of the IPM 300. Before the start-up of the system an "intrinsically safe circuit verification" for each interconnection of intrinsically safe circuits has to be done. It attests that all values of the apparatus and also the inductances and the capacities of the cables are kept in the right value.

The EG-type examination certificate and the rules of the directive EN 60079-14: 1996 ff have to be observed.



Attention!

2. Installation and commissioning

2.1. Mounting of the IPM300i

The IPM 300i module has to be mounted in the way that the ventilation slots are at the top and at the bottom side! Only this installation guarantees the necessary heat dissipation of the module.

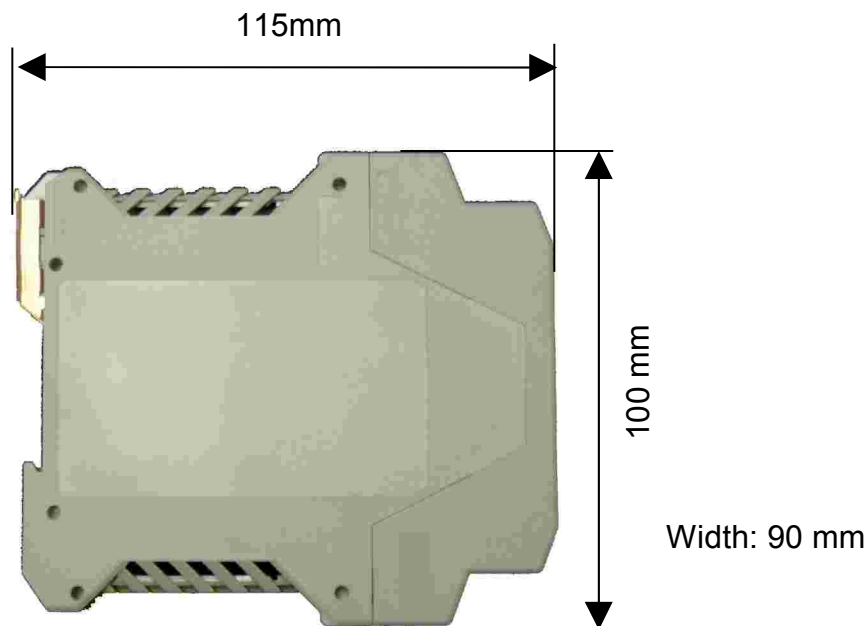
The IPM 300i module is a related equipment with the designation class [Ex ib] IIC only for the installation in the safe area.

Installation, connection, commissioning and maintenance of the IPM 300i must be carried out by trained, qualified specialists authorised to perform such work by the facility's owner-operator.

To guarantee a good heat dissipation it is necessary to keep a minimum distance of 1 cm between the IPM module and the next units, which are mounted on the DIN rail.

2.2. Protection class IP20

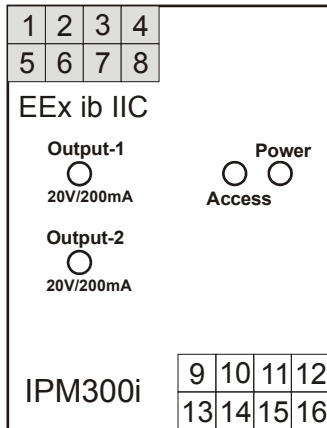
The compact DIN rail housing provides the IP 20 protection class according to IEC publication 144.



2.3. Arrangement of the external circuits

Connecting elements for the external, intrinsically safe circuits have to be arranged in compliance with para 6.3.1 of EN 50020 so that bare components are at least 50 mm away from the connecting elements and bare conductors of not intrinsically safe circuits.

2.4. Front elements



LED Output 1

The LED is lighting if the power supply output 1 is active at the terminals 5 and 6.

LED Output 2

The LED is lighting if the power supply output 2 is active at the terminals 7 and 8.

LED Power

The LED is lighting if the 24 VDC power supply input at the terminals 13 and 14 is active .

LED Access

This LED is flashing, if there is data traffic at the intrinsically safe RS485 interface.

2.5. Connection terminals

Blue terminals are provided for connecting intrinsically safe circuits. These terminals are clearly identified with Ex ib IIC on the front plate.

The terminals provide wiring space for wires with cross-sections up to 2.5 mm².

2.6. Potential equalisation

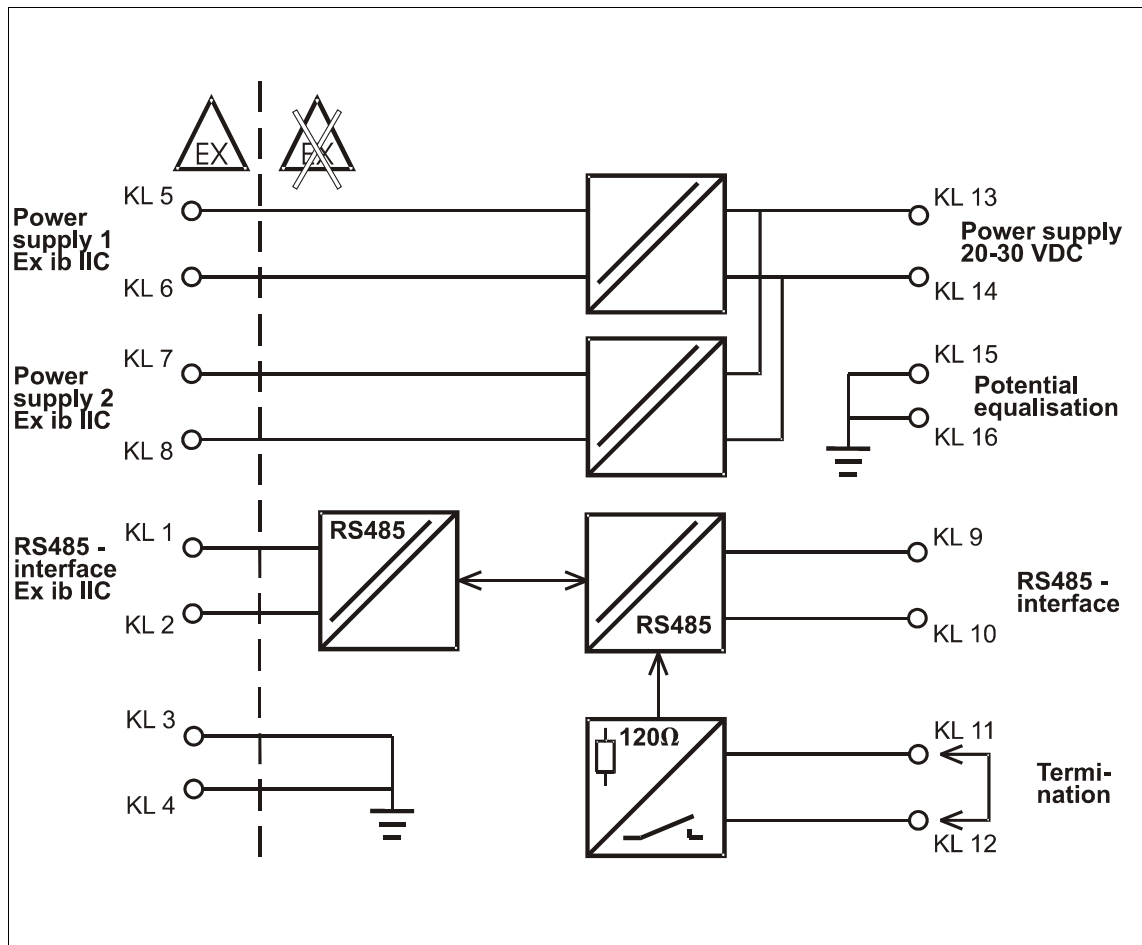
The potential equalisation has to be connected to the Terminals 15 or 16. It is also possible to connect the potential equalisation to the DIN rail. Because the electronic of the IPM 300i is connected to the DIN rail via the spring of the mounting elements.

2.7. Temperature switch-off

If the temperature inside the housing of the IPM 300i becomes higher than 75°C, then the 2 intrinsically safe power supply outputs at the terminals 5/6 and 7/8 will be switched off. This can happen if no process recorder ExTrend 200i is connected at a working IPM. In this case the complete power will be waste inside the IPM 300i instead of inside the ExTrend 200i.

This temperature switch-off can be reset by a short disconnecting of the main 24V power supply of the IPM 300i, terminals .

2.8. Block diagram:



2.9. Inputs and outputs

2.9.1. Power supply

The power supply input at the terminals 13 and 14 powers the complete electronic of the IPM 300i.

Terminal 13	
Terminal 14	

The IPM 300i has to be used with a power supply with a voltage in the following range:

Power supply U = 20 - 30 V DC

The power supply system has to be constructed in the way, that this safety related maximum voltage can not pass over in kind of a failure:

$U_m = 250 \text{ VAC/DC}$

2.9.2. Not intrinsically safe RS 485 Interface

The RS485 - interface of top system has to be connected to the terminals 9 /10

Terminal 9	B
Terminal 10	A

It is allowed to connect interface circuits with the following maximum values:

Maximum voltage **U =** **6 V DC**
Maximum current **I =** **100 mA**

The RS 485 data bus system has to be constructed in the way, that this safety related maximum voltage can not pass over in kind of a failure:

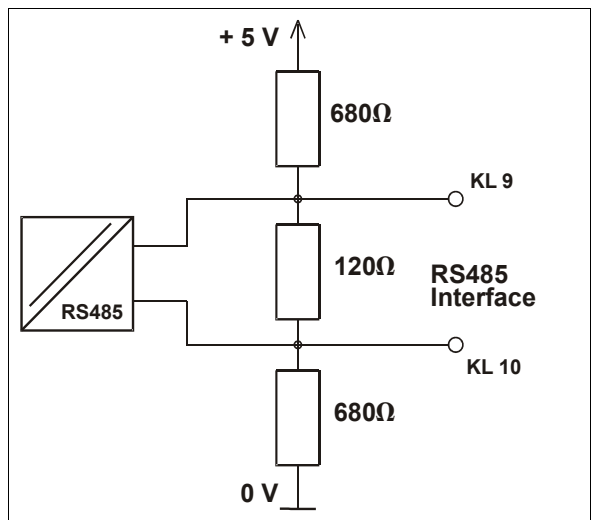
$U_m = 48 \text{ VAC/DC}$

2.9.3. Not intrinsically safe termination input

Via a short circuit wire between the terminals 11 and 12 it is possible to activate an internal termination of the RS 485 interface. These termination keep a defined signal level if the interface is not active and it eliminate the signal reflection at the end of the RS485 bus system.

The resistor combination for the termination is shown in the diagram. This termination has to be done only at the last unit in the RS 485 bus.

Terminal 11	
Terminal 12	



2.9.4. Potential equalisation

Terminal 15	GND
Terminal 16	GND

The potential equalisation has to be connected to the Terminals 15 or 16. Also the DIN rail has to be connect to the potential equalisation. The electronic of the IPM 300i is connected to the DIN rail via the spring of the mounting elements.

2.9.5. Intrinsically safe power supply circuit 1

The intrinsically safe power supply circuit 1 is galvanic isolated from all other circuits.

Terminal 5	+
Terminal 6	GND

Protection class Ex ib IIC:

Maximum output voltage	Uo =	20,6 V DC
maximum output current	Io =	200 mA
maximum output power	Po =	4,12 W
maximum external capacitances	Co =	167 nF
maximum external inductances	Lo =	850 μ H

2.9.6. Intrinsically safe power supply circuit 2

The intrinsically safe power supply circuit 2 is galvanic isolated from all other circuits.

Terminal 7	+
Terminal 8	GND

Protection class Ex ib IIC:

Maximum output voltage	Uo =	20,6 V DC
maximum output current	Io =	200 mA
maximum output power	Po =	4,12 W
maximum external capacitances	Co =	167 nF
maximum external inductances	Lo =	850 μ H

2.9.7. Intrinsically safe RS485 interface circuit

The intrinsically safe RS485 interface circuit is galvanic isolated. This interface is build like a RS485 interface and works with voltage difference signals. At this special intrinsically safe RS485 interface it is only allowed to connect one interface of the process recorder ExTrend 200i. It is not possible to construct a bus system.

IPM	ExTrend
Terminal 1	56
Terminal 2	55

Protection class Ex ib IIC:		
maximum output voltage	U _o =	5,8 V DC
maximum output current	I _o =	55 mA
maximum output power	P _o =	80 mW
effective internal capacitance	C _i =	negligible
effective internal inductance	L _i =	negligible

It is allowed to connect intrinsically safe circuits with the protection class Ex ib IIC with the following maximum values:		
maximum voltage input	U _i =	6 V DC
maximum current input	I _i =	60 mA
maximum power input	P _i =	90 mW
maximum external capacities	C _o =	46 µF
maximum external inductances	L _o =	10 mH

3. Cable recommendations

For the not intrinsic safe RS 485 interface:

Use shielded twist a pair cable with an characteristic wave impedance of 120 Ω .

Intrinsically safe power supply circuit 1 and 2:

Please use a shielded cable with a wire cross selection of 1,5 mm², to minimize the voltage drop in the cable.

Intrinsic safe interface:

Use shielded twist a pair cable with an characteristic wave impedance of 120 Ω .

4. Failure diagnostic and correction

4.1. No power supply outputs at both outputs

1. Please check if the 24V power supply is connected to the terminals 13 and 14.
2. If the 24 V power supply at the terminals 13 and 14 is active it could be that the temperature switch- off system have switched off the two intrinsic safe power supplies, because the temperature inside the housing was higher then 75 °C (See point 2.7)
This temperature switch-off function can be reset by a short disconnecting of the main 24V power supply of the IPM 300i, terminals 13 and 14.

5. Declaration 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

IPM 300i

EG-Baumusterprüfbescheinigung Nummer: **BVS 06 ATEX E 144**
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 60079-0:2004	EN 50081-2 : 1993
IEC 60079-11:2006	EN 50082-1 : 1997
EN 50081-1:1992	EN 50082-2 : 1995

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

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

Kerpen, 15.11.2007


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