

Data interface and power supply module

IPM 300i



Installation Guide

Version 13

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Safety Instructions

The personnel for installation, commissioning, diagnostics and maintenance must fulfil the following requirements:

- Trained, qualified specialists must have a relevant qualification for this specific function and task
- Are authorised by the plant owner/operator
- Are familiar with federal/national regulations
- Before beginning work, the specialist staff must have read and understood the instructions in the User Manual and supplementary documentation as well as in the certificates (depending on the application)
- Following instructions and basic conditions

Validity of Installation Instructions

- These installation guide apply to all interface and power supply modules IPM 300i.
- Your IBS agent will be able to give you information about any improvements or modifications.
- The manufacturer is not responsible for damage caused by incorrect or unauthorised use. Conversions and changes to the instrument must not be made, otherwise the certification and guarantee become invalid

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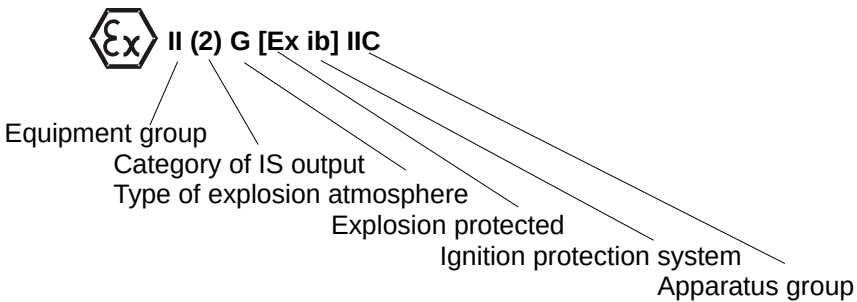
1 System description

The 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



1.2 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 IEC 61010, Part 1. To ensure safety and adherence to guarantee terms, this test must be performed by the manufacturer.

1.3 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 200i 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 safe 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.

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.

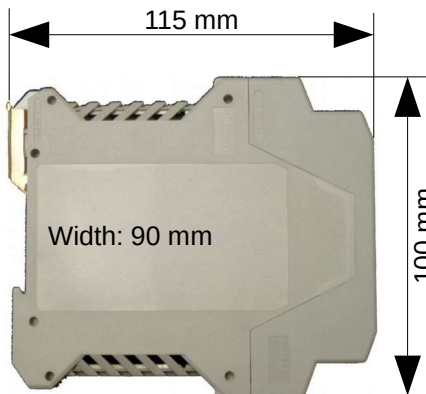
To guarantee a good heat dissipation it is necessary to keep a minimum distance of 1 cm between the IPM module and the next units, which are mounted on the DIN rail.

2.2 Protection class IP20

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

2.3 Mounting position

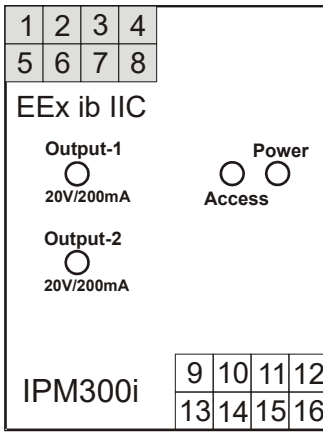
The module is installed on a horizontal DIN rail.



2.4 Arrangement of the external circuits

Connecting elements for the external, intrinsically safe circuits have to be arranged in compliance with para 6.2.1 of EN 60079-11 so that bare components are at least 50 mm away from the connecting elements and bare conductors of not intrinsically safe circuits.

2.5 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.

2.6 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.

2.7 Potential equalisation

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

2.8 Temperature switch-off

If the temperature inside the housing of the IPM 300i becomes higher than 70°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 to the IPM.

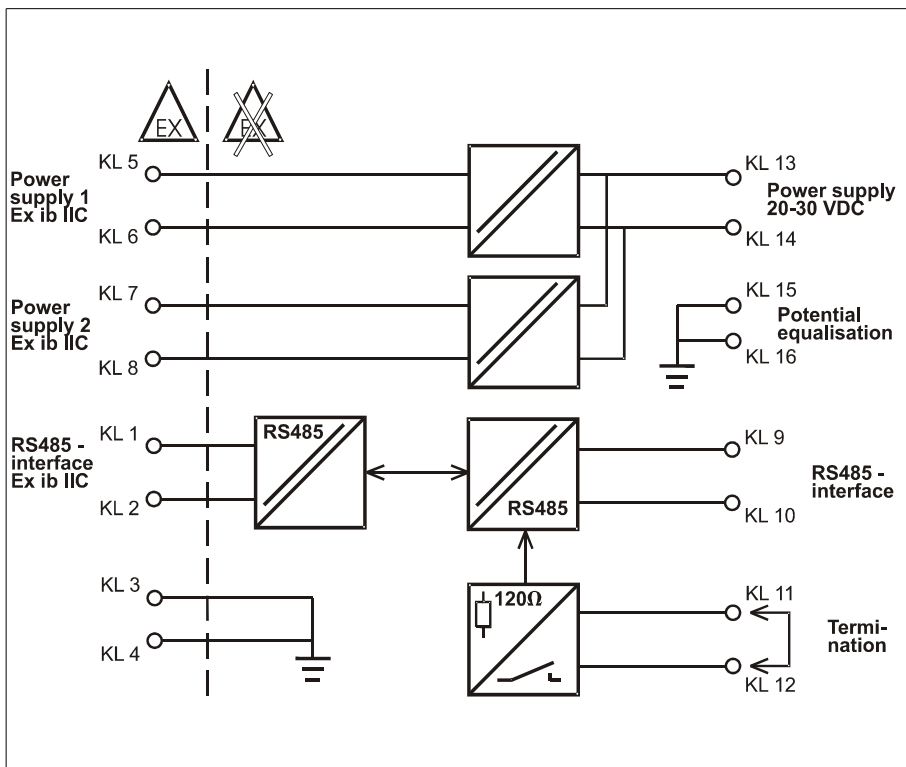
If the device has cooled down, this temperature shutdown can be released by briefly disconnecting the power supply.

2.9 Ambient temperature range

The permissible ambient temperature range is -20 °C to +60 °C.

For safe operation, the temperature must be below +60 °C, otherwise the IPM is switched off very fast.

2.10 Block diagram IPM 300i



2.11 Inputs and outputs

2.11.1 Power supply

The IPM 300i is powered by a supply at the terminals 13 and 14.

Terminal 13 and Terminal 14

The following maximum supply voltages may be applied:

Nominal voltage:	$U =$	DC 20–30 V
Maximum voltage for safety reasons:	$U_m =$	AC/DC 250V
Maximum power consumption:	$P_{max} =$	10 W

2.11.2 Not intrinsically safe RS485 interface

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

Terminal 9 and Terminal 10

The following maximum supply voltages may be applied:

Nominal voltage:	$U =$	DC 6 V
Maximum voltage for safety reasons:	$I =$	100 mA
Maximum power consumption:	$U_m =$	48V DC

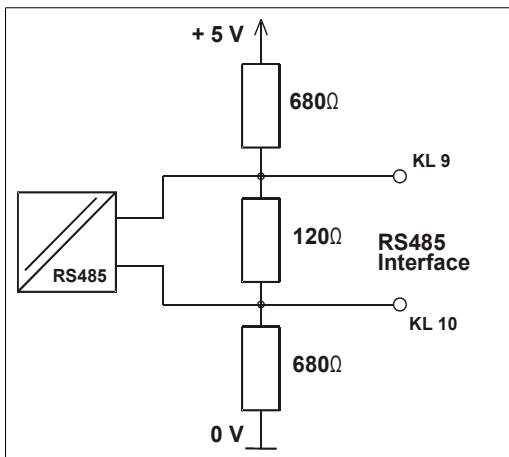
2.11.3 Not intrinsically safe termination input

A short circuit wire between the terminals 11 and 12 activates an internal termination of the RS485 interface. These termination keep a defined signal level if the interface is not active and eliminates the signal reflection from the signal.

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 and Terminal 12

Short circuit wire



2.11.4 Potential equalisation

Terminal 15 und Terminal 16 PE

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

2.11.5 Intrinsically safe power supplies 1 and 2

The intrinsically safe power supplies are galvanic isolated.

PS1: Terminal 5 (+) and Terminal 6 (-)		
PS2: Terminal 7 (+) and Terminal 8 (-)		
Ignition protection system Ex ib IIC intrinsic safety: trapezoid output characteristics values for each circuit		
Voltage	U_0	DC 20.6 V
Current	I_0	200 mA
Power	P_0	4.12 W
	C_0	167 nF
	L_0	850 μ H
Effective internal inductance: Negligible Effective internal capacitance: Negligible		

2.11.6 Intrinsically safe 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.

Terminal 1 and Terminal 2		
Ignition protection system Ex ib IIC intrinsic safety: trapezoid output characteristics		
	Werte je Kreis:	
Voltage	U_0	DC 5.8 V
Current	I_0	55 mA
Power	P_0	80 mW
maximum external capacities	C_0	46 μ F
maximum external inductance	L_0	10 mH
It is allowed to connect intrinsically safe circuits with the protection class Ex ib IIC with the following maximum values:		
Voltage	U_i	DC 6 V
Current	I_i	60 mA
Power	P_i	90 mW
effective internal capacitance:	C_i	negligible
effective internal inductance:	L_i	negligible
connect IPM terminal 1 to ExTrend terminal 56 and IPM terminal 2 to ExTrend terminal 55		

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

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 24V power supply at the terminals 13 and 14 is active it could be that the temperature switch-off system switched off the two intrinsic safe power supplies, because the temperature inside the housing was higher than 75 °C (See point 2.8)

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

