

General Operating, Maintenance and Installation Manual

4 kV isolated RS-232 Transceiver

RS-232 Isolator



IPCOMM GmbH
Gundstraße 15
91056 Erlangen
Germany

Phone: +49 9131 92076-0
Fax: +49 9131 92076-10
Internet: <http://www.ipcomm.de>
Email: info@ipcomm.de

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1 Introduction

All technical information, descriptions and illustrations contained in this operating, maintenance and installation manual remain our property and shall not be used otherwise than for operating this system, nor shall they be copied, reproduced or passed on to third parties or brought to their notice without our prior written consent.

The information represented in this manual is in keeping with current standards and is subject to later alterations.

This manual contains important instructions referring to safe installation, commissioning, operation and maintenance.

Read this manual carefully before starting up the isolator and observe the instructions.

Finally, we want to draw your attention to the fact that any warranties with respect to the RS-232 isolator will be invalid in the event that:

- Operation, servicing and maintenance are not carried out accurately according to the instructions; repairs are not carried out by our personnel or without our prior written consent.
- Commissioning is not carried out by our personnel or we have not given our approval for the commissioning or the commissioning is carried out by untrained personnel.
- The unit is used inadequately, incorrectly, negligently or inappropriately or for a purpose other than that originally intended.
- The serial number is removed from the product.

For your protection, observe the following safety precautions when setting up your equipment:

- Follow all cautions and instructions marked on the equipment.
- Ensure that the voltage and frequency of your power source match the voltage and frequency inscribed on the equipment's electrical rating label.
- Never push objects of any kind through openings in the equipment. Dangerous voltages may be present. Conductive foreign objects could produce a short circuit that could cause fire, electric shock, or damage to your equipment.

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2 Hardware Description

2.1 Application

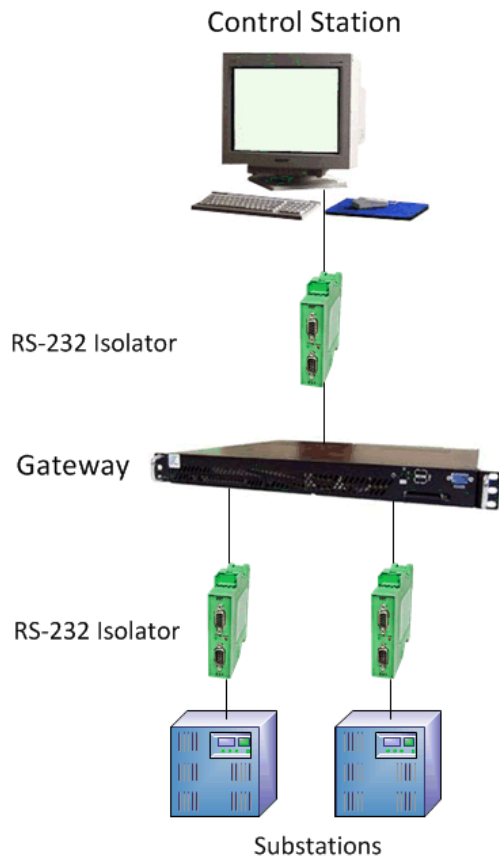


Figure 1: basic structure

The RS-232 isolator protects your equipment against external influences in substations such as ESD, Surge and Burst in compliance with the standard IEC 61850-3. The used RS-232 transceivers have 15 kV ESD protection.

The RS-232 interface is galvanically isolated (up to 4 kV) between interface and telecontrol line (in the direction of RTU or control station). This is implemented with state of the art iCoupler®-technology. The monolithic air core transformers allow significantly higher data rates and insulation voltage than optocoupler, for example.

Operation as well as send and receiving activities are displayed by means of three LEDs. As an active device the RS-232 isolator can also be used as repeater to bridge longer distances. The operating voltage is 24V DC.

The device operates standalone or in series with up to 8 isolators supplied by a common 24 V power connection.

2.2 Operating and Display Elements

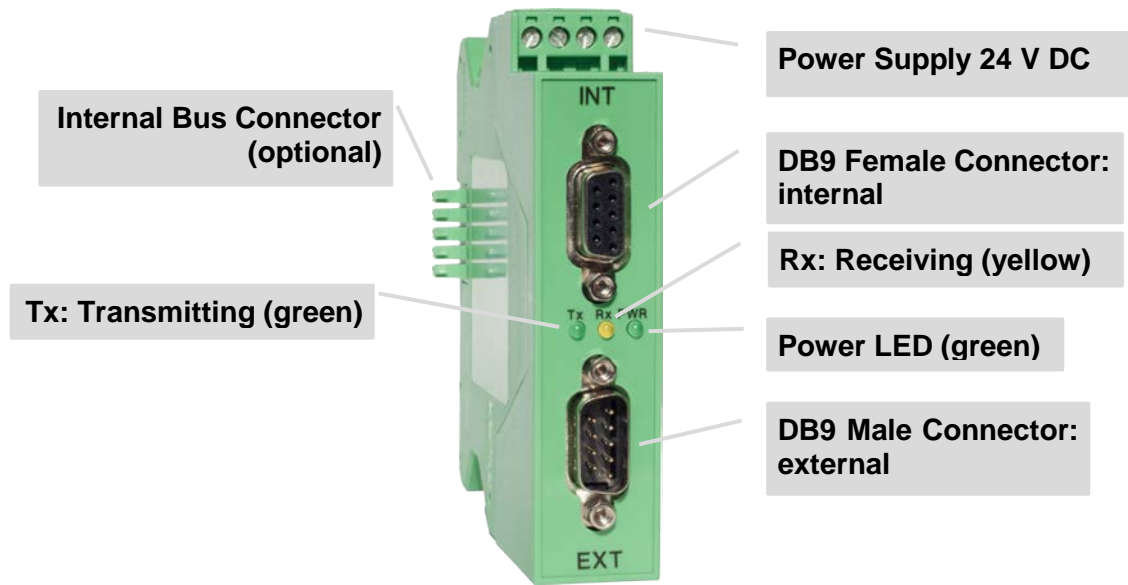


Figure 2: front view



Figure 3: side view - type label

2.3 Hardware Components

2.3.1 RS-232 Interfaces

Figure 4 shows the pin assignment of the serial interfaces. All signals are connected but RI.

In the direction of the PC an RS-232 DCE interface (DB9 female connector) is used. In the direction of data transmission equipment an RS-232 DTE interface (DB9 male connector) is used.

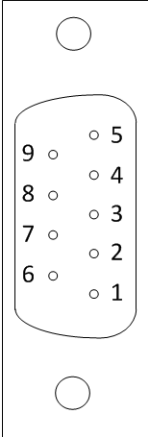
RS-232 DB9 female connector		Pin	Direction	Description
		1	OUTPUT	DCD Data Carrier Detect
		2	OUTPUT	RXD Receive Data
		3	INPUT	TXD Transmit Data
		4	INPUT	DTR Data Terminal Ready
		5		GND Masse
		6	OUTPUT	DSR Data Set Ready
		7	INPUT	RTS Request To Send
		8	OUTPUT	CTS Clear To Send
		9		

Figure 4: DB9 female connector pin assignment of the RS-232 interface

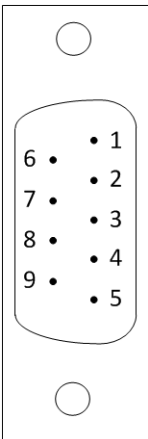
RS-232 DB9 male connector		Pin	Direction	Description
		1	INPUT	DCD Data Carrier Detect
		2	INPUT	RXD Receive Data
		3	OUTPUT	TXD Transmit Data
		4	OUTPUT	DTR Data Terminal Ready
		5		GND Masse
		6	INPUT	DSR Data Set Ready
		7	OUTPUT	RTS Request To Send
		8	INPUT	CTS Clear To Send
		9		

Figure 5: DB9 male connector pin assignment of the RS-232 interface

2.3.2 Power Supply

The RS-232 isolator must be operated with 24 V DC. Please pay attention to the correct polarity and input voltage. The input voltage of the respective device is labeled on the housing (see Figure 3: side view - type label).

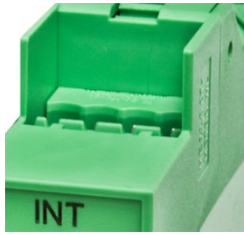


Figure 6: power supply

The supplied female connector has to be used. The cable cross section must be at least 0.5 mm².

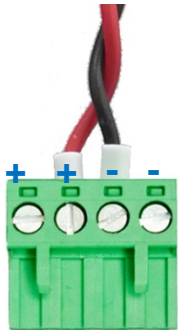


Figure 7: connector for power supply

2.4 Electrical Installation

2.4.1 Connection

The RS-232 isolator is connected according to the following circuit diagram.

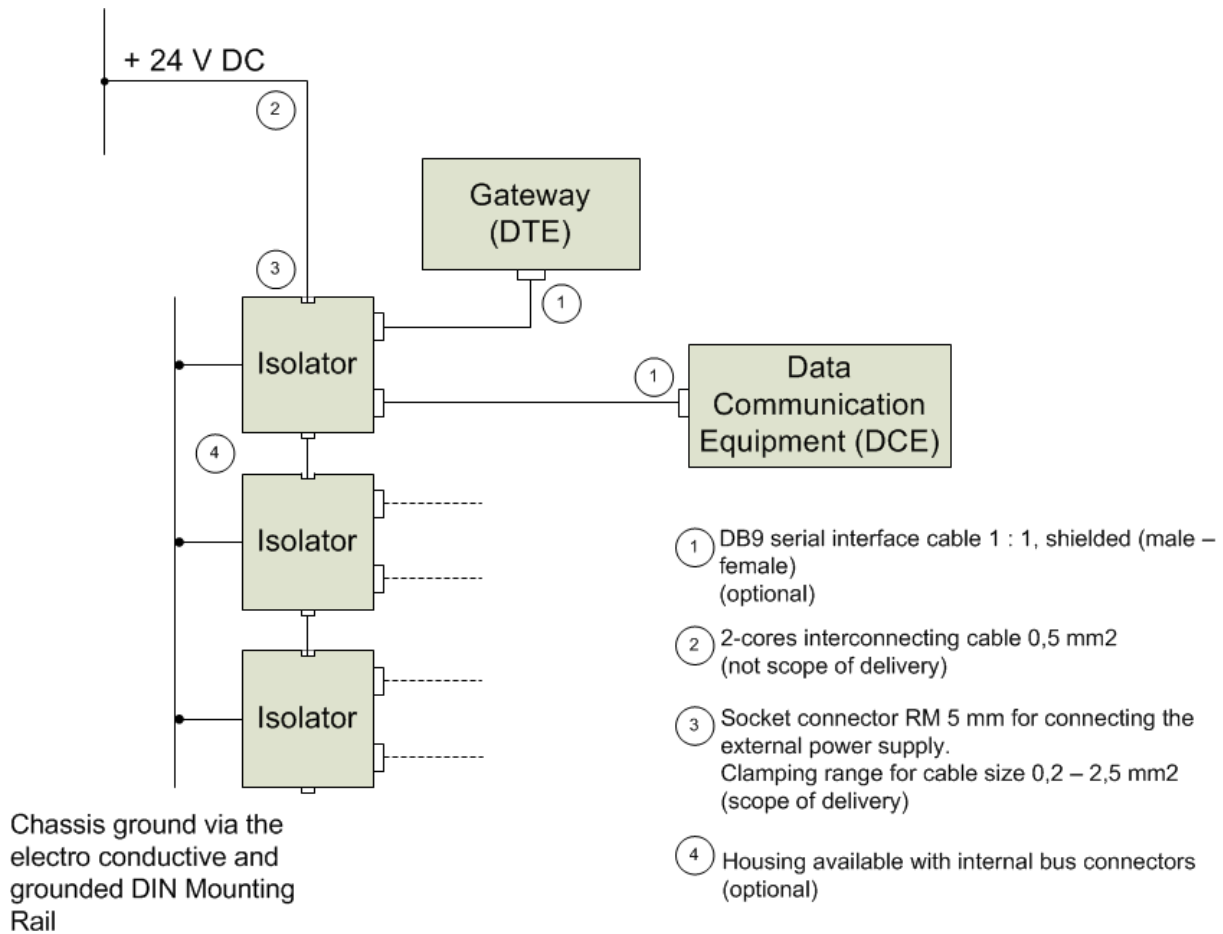


Figure 8: electrical installation

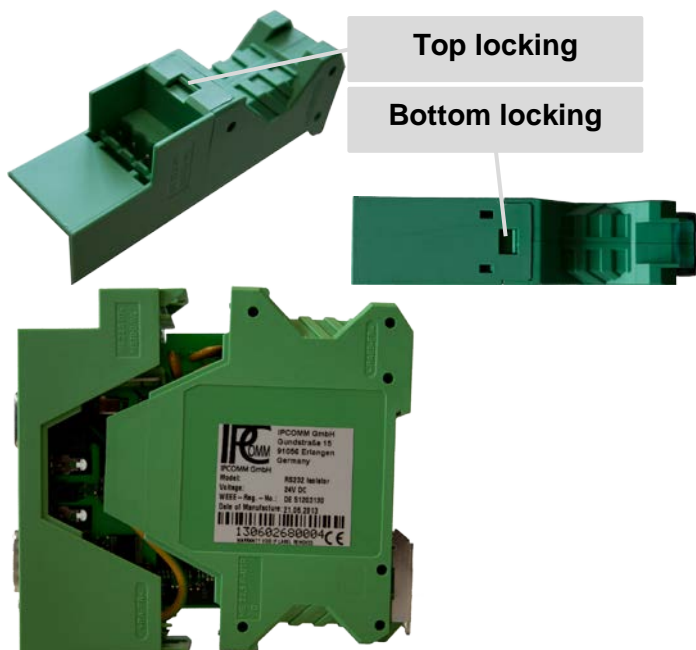
A shielded DB9 serial interface cable[®] must be used!

2.4.2 Removing Ground Cable

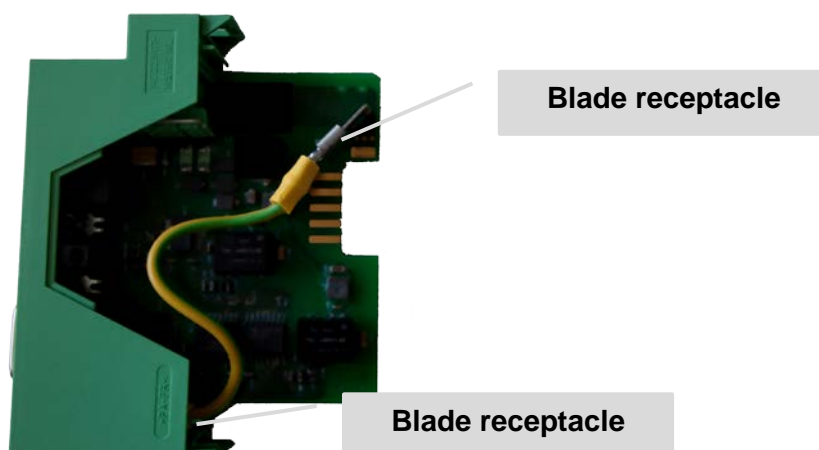
The ground cable shall be removed from the isolator if the shielded serial interface[®] of the data communication equipment (DCE) is already grounded!

ATTENTION! The device must be completely disconnected from any power supply. ESD safety measures are required. Please do this only on an earthed and conductive surface when using an antistatic wrist strap.

1. Disconnect the isolator from mains; disconnect data lines.
2. Remove the device from DIN-rail.
3. Open the housing by pushing in the snap-lock system and pull off the housing part.



4. Remove the ground cable from the board – pull the blade receptacles of the ground cable from the blade terminals on both sides.



5. Put housing together.

2.5 Mounting on a 35 mm DIN-Rail



Clip for mounting on a DIN-rail

No minimum distance D_{\min} needs to be kept if several isolators are to be installed in series.

The function of the isolator is independent of its position and can therefore be mounted in any desired position.

The isolator is mounted on a 35 mm DIN-rail. Place the rear side of the isolator above the upper edge of the DIN-rail and press the device downwards until the clip snaps in.

The ground connection is completed via the clip directly to the DIN-rail. It must be ensured that the DIN-rail is electro conductive and grounded.

For dismounting pull down the clip (possibly with the aid of a screwdriver) and displace the isolator from the track.

2.6 61850-3 Test

EMC Tests
DIN EN
61000-4-3
61000-4-4
61000-4-5
61000-4-6
61000-4-8
61000-4-10
61000-4-12
61000-4-16
61000-4-18
61000-4-29

Mechanical Tests					
DIN EN	Condition / Method	Severity Class A		Duration	Axis
60068-2-66	Vibration, sinusoidal	2-500 Hz	0.3 mm 1 m/s ²	10 Sweeps	X Y Z
60068-2-27	Shocks	Shockform = semisinusoidal Call Duration = 22ms	Acceleration = 40m/s ²	Shocks = 18 3 Shocks in each direction	X Y Z

Climatic Tests			
DIN EN	Condition / Method	Severity T3	Duration
60068-2-1: 2008-01	Cold	-40 °C	6 h
60068-2-2: 2008-05	Dry heat	85 °C	6 h
60068-2-1: 2008-01	Cold	-40 °C	6 h
60068-2-2: 2008-05	Dry heat	85 °C	6 h
60068-2-78	Damp heat	40°C, 95%rH	24 h

The complete test report is available on request.

3 Technical Data

General

- 4 kV RMS galvanic isolation
- 15 kV ESD protection

Serial Interface for the PC

- RS-232 DCE, pin assignment with TxD, RxD, RTS, CTS, DTR, DSR, DCD and GND
- 9-pin D-sub female connector
- Baud rate: up to 230 kbps
- Parity: none, even, odd, mark, space
- Data bits: 5,6,7,8 bits
- Stop bits: 1, 1.5, 2 bits
- Flow control: RTS/CTS, XON/XOFF, none

Serial Interface for the Data Communication Equipment

- RS-232 DTE, pin assignment with TxD, RxD, RTS, CTS, DTR, DSR, DCD and GND
- 9-pin D-sub male connector
- Baud rate: up to 230 kbps
- Parity: none, even, odd, mark, space
- Data bits: 5,6,7,8 bits
- Stop bits: 1, 1.5, 2 bits
- Flow control: RTS/CTS, XON/XOFF, none

Diagnostic LEDs

- Power
- Transmit and receive LEDs for the RS-232 interfaces

Supply Voltage / Power Consumption

- 24 V DC (not scope of delivery)
- 1 W max.

Operating Environment

- Extended temperature range from -40° C to +85° C
- Relative humidity: 5 % to 95 % non-condensing

Standards

- IEC 61850-3

Housing

- Plastic housing, including clip for mounting on a 35 mm DIN-Rail
- Internal bus connector (optional)

Dimensions

- 22,5 x 99 x 92 mm (W/H/D)

Weight

- 0,1 kg

Note: Differences to the delivered type are possible.

Subject to alterations

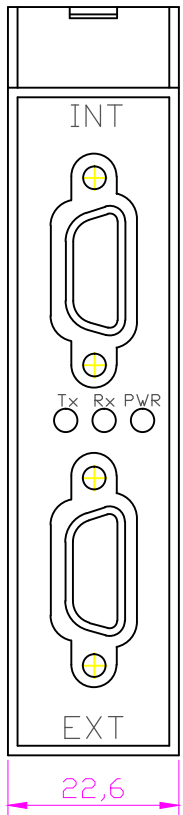
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Gundstraße 15
91056 Erlangen
Germany

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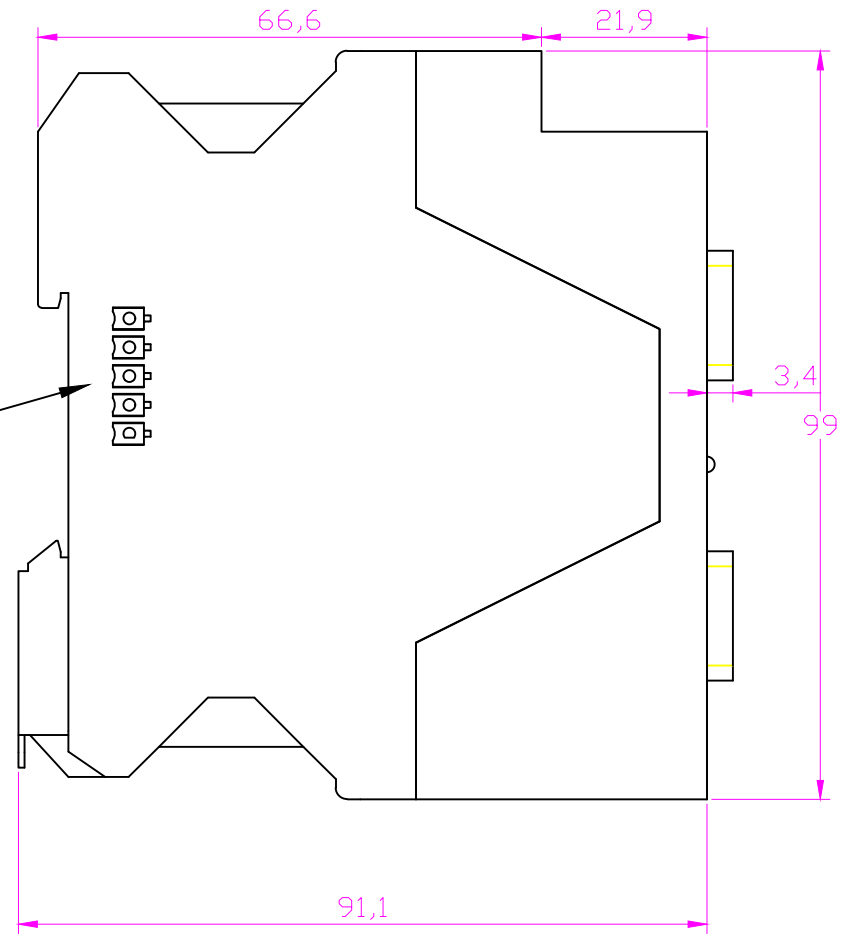
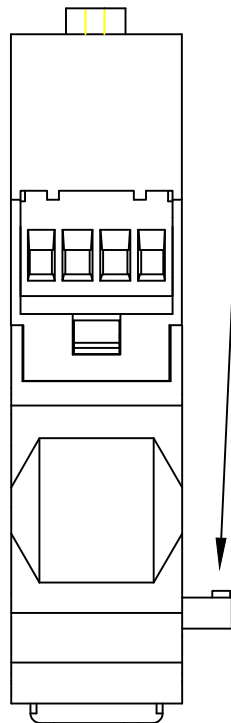
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4 CAD Drawing



BUS-Connector (Optional)



Subject to change without prior notice

General tolerance			Scale: 1 : 1	
Designer	Date		Name	
Checked	11.03.13	M. Ostapovsk		RS232 Isolator
Standard				
IPCOMM GmbH			V 1.0	Page 1
Origin:		Repl. for:	Replaced through:	