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RACOM
RADIO DATA NETWORKS

Operating manual

OPI200, OPI400

version 1.2
4/18/2011

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1. Optoisolators OPI200, OPI400

1.1. Brief description

OPI serve for galvanically isolating RS232 interface signal conductors (OPI200), or for converting RS232 interface signals to RS422 or RS232 to RS485 (OPI400) as well as galvanically isolating them.

1.2. Application

- Galvanic isolation of the interfaces of all MORSE system components, or other devices
- Interface conversion RS232 to RS422, or RS485
- Profibus
- The design and construction of this device allows for long-term loading and for this reason it is primarily determined for continuously running applications.

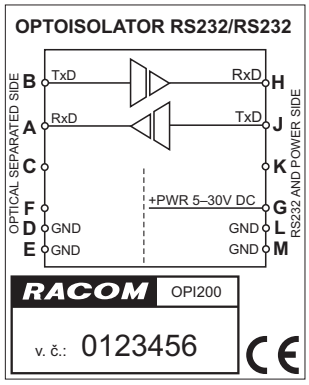
1.3. Benefits

- Profibus compatible
- Supply voltage 5-30 V
- Protection against reversing of supply voltage polarity
- Protection of data lines against over-voltage
- Indication LED for data conductors

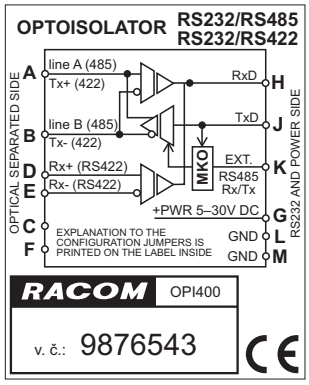
- Indication LED for supply voltage
- Speed up to 250 kbps
- Switching the direction of communication on the RS485 line done automatically or with an external signal with an arbitrary polarity
- Termination (**TERMINATE**) and definition of the idle state of the RS485 line done (**BIAS**) with internal switches
- Minimum dimensions, mounted on a DIN rail

1.4. Connections

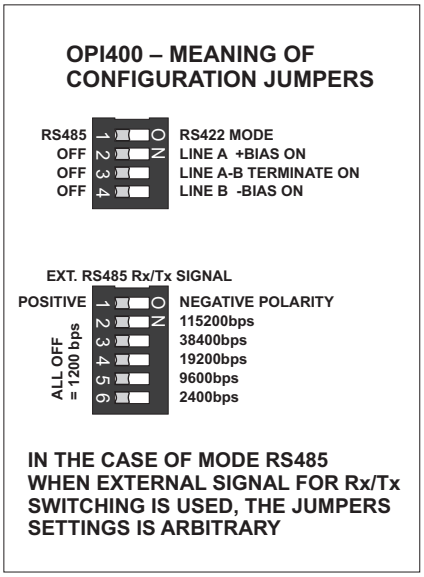
OPI200 provide for a galvanically isolated conversion of RS232/RS232 interfaces. They do not contain any internal switches and they are simple to connect using the instructions on the case.



OPI400 provide for a galvanically isolated conversion of RS232/RS422 or RS485 interfaces.



The type of conversion can be selected using the switch inside the case, after having removed the side panel.



n the case of the RS232/RS485 option it is also possible to choose the following using the switches:

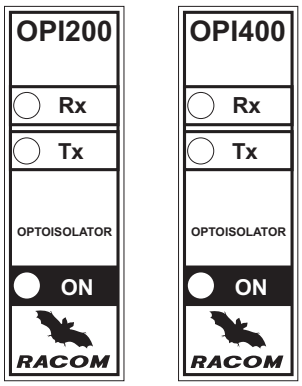
- terminate the RS485 line with a 180R resistor (recommended for long transmission lines)
- set up the idle state of the RS485 line (recommended for environment with interference)
- polarity of the external signal for Rx – Tx switching
- optimum speed for automatic Rx – Tx switching, see the table of technical parameters

Fig. 1.1: Labeling terminals of optoisolators

If an external signal is not applied for Rx - Tx switching OPI400 automatically induces switching from incoming data. If the transfer speed is equal to the speed set using the switches the switching time for switching from the Tx state to Rx is about 2 bytes. If the transfer speed does not match the speeds set in the switches it is necessary to set the switches to the nearest lowest option and count on a proportionately longer Tx - Rx switching time.

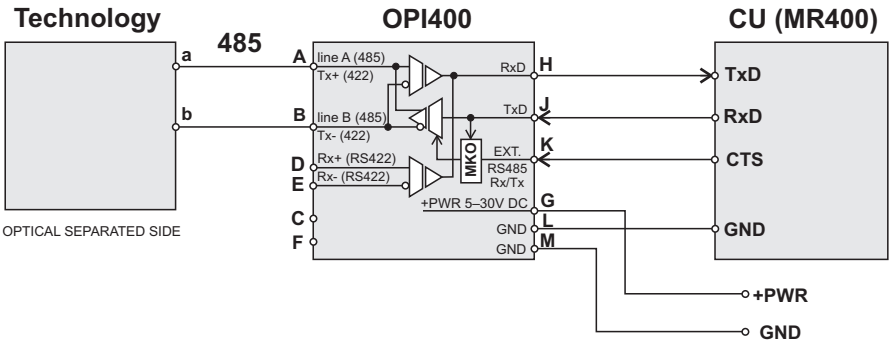
1.5. Informational LED

Received and transmitted data is indicated by LED's for all available convertor options. In the case of short data packets the duration the LED's are lit for is prolonged by approx. 20 ms. A permanently lit LED on data interfaces indicates the presence of a signal with active polarity, i.e. error state during installation.



1.6. Examples of connecting optoisolators

1.6.1. Connection of RS485 – switching by an external CTS signal, arbitrary speed

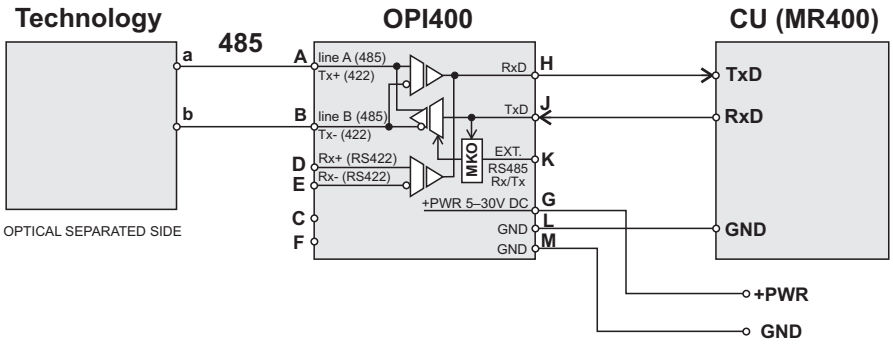


setting up OPI400 switches:

- RS485,
- **LINE**, **BIAS** and **TERMINATE** as necessary
- ext. Rx/Tx signal
- **POSITIVE**

configuration MR400: in menu **Serial Communication channels** set `dia(g) NORM (SPe 2gn)`

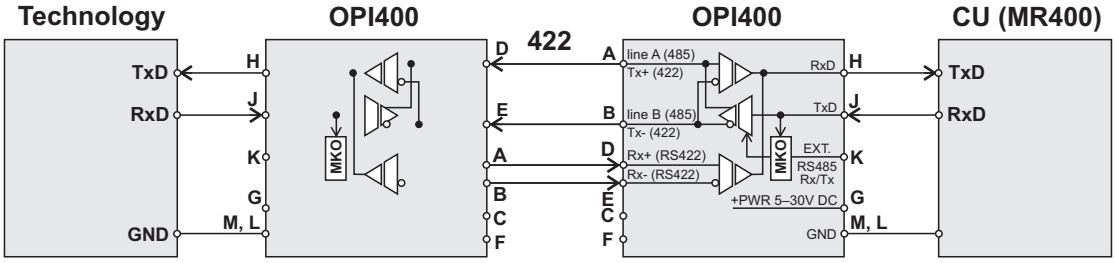
1.6.2. Connection of RS485 – automatic switching, speed 19200



setting up OPI400 switches:

- RS485,
- **LINE**, **BIAS** and **TERMINATE** as necessary
- speed 19200 bps

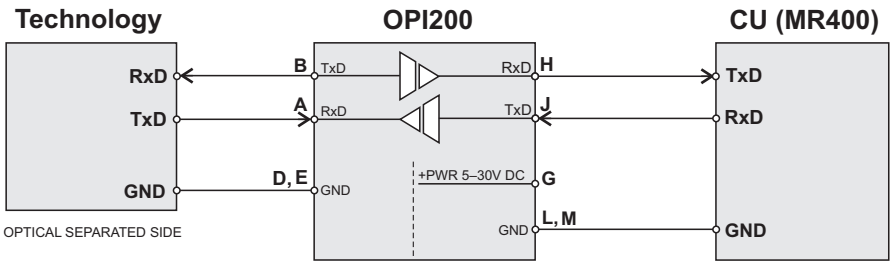
1.6.3. Connection of RS422 – arbitrary speed



setting up OPI400 switches:

- RS422,

1.6.4. Connection of RS232 – arbitrary speed



2. Technical parameters

Transfer speed	max. 250 kbps
Configurable speed for automatic switching of Tx –Rx on RS485	1 200, 2 400, 9 600, 19 200, 38 400, 115 200 bps
MTBF (mean time between failures)	> 100 000 hours
Power supply	5–30 V
Power consumptionn OPI200	max. 30 mA
Power consumption OPI400	50 mA, max. 80 mA
Operating temperatures range	-25 to +55 °C
Storage temperature range	-35 to +85 °C
Dimensions: width × high × depth	23 × 75 × 102 mm
Weight	0.08 kg

2.1. Standards

Railway Safety Appliance Standards Regulations

Electronic appliances in railway vehicles	CSN EN 50155 ed. 2nd: 2002. art. 10.2.8.2 CSN EN 50121 art. 7: tab. 3 and 4
EMC (Electromagnetic Compatibility)	CSN EN 50121-3-2 art. 8
Vibrations and beats	CSN EN 61373

The product complies with the standards on EMC, CSN EN 55022 and CSN EN 50082, and it has been issued with a declaration of confirmity with these standards pursuant to Act No. 22/97 Coll.

3. Declaration of conformity

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Declaration of Conformity – OPI

- in accordance with **89/336/EEC** Directive of the European Parliament and of the Council of 3th of May 1989 on the approximation of the laws of Member States relating to electric compatibility

Producer:	**RACOM s.r.o.**
Adress:	**Mirova 1283, 592 31 Nove Mesto na Morave, Czech Republic**
VAT:	**CZ-46343423**
Product:	**OPI200, OPI400**
Purpose of use:	**Interface converter galvanic isolated**

CE

We, the manufacturer of the above mentioned product, hereby declare that this product:

- conforms to the essential requirements of the European Union directives **89/336/EEC**;
- is safe on condition of usage mentioned in the operating manual.

This Declaration of Conformity is based on the following documents:

Document No.:	Test specification:	Date of issue:	Laboratory:
730-617/2002	EN61000-6-2:2000	17.12. 2002	VUPV Vyskov, CZ

Nove Mesto na Morave, 12th of July 2006
Jiri Hruska, Managing Director

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Fig. 3.1: Declaration of conformity

4. OPI200 and OPI400 Installation Instructions

- The device is designed for industrial use for assembly into premises with limited access (electrical switchboards).
- Wiring up must be carried out by an individual with knowledge of the regulation No. 50/78 Coll. The source is designed for assembly into switchboards by attaching to a mounting plate on to a DIN rail. The mounting plate and DIN rail must be properly grounded in accordance with valid standards. The source must be located in such a way so as not to prevent air circulation necessary for cooling purposes.
- Conductors must be wired into labelled terminals in accordance with valid standards. Terminals are only designed for connecting copper conductors of max. diameter 2.5 mm^2 and do not serve for switching devices under voltage. If there is a larger distance from the optoizolator to the power source, where installation leads longer than 3 m would be required, we recommend wiring in conductors with a greater diameter from the shortest possible distance from the optoisolator in order to limit power losses in the circuit when it is at maximum charging current.
- Colour coding of low voltage conductors must comply with the requirements of respective standards.

4.1. Assembly of the optoisolator

The optoisolator is a special electronic device requiring professional installation.

5. Warranty and Servicing

The manufacturer assumes liability for defects for a period of 24 months. Only the manufacturer, RACOM s.r.o. Mírová 1283, 592 31 Nové Město na Moravě, Czech Republic, Tel.: +420 566 618 578, is entitled to repair any devices.

6. Conditions for OPI200 and OPI400 Operation

6.1. Important Warning

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Under no circumstances is the Racom or any other company or person responsible for incidental, accidental or related damage arising as a result of the use of this product. The manufacturer shall not provide the user with any form of guarantee containing assurance of the suitability and applicability for its application. RACOM products are not developed, designed or tested for use in equipment which directly affects the health and life functions of humans or animals and neither as part of other important equipment, and RACOM does not provide a guarantee if company products are used in such equipment.

6.2. Conditions of Liability for Defects and Instructions for Safe Operation of Equipment

Please read these safety instructions carefully before using the product:

- Liability for defects does not apply to any product that has been used in a manner which conflicts with the instructions contained in this operator manual, or if the case in which the equipment is located has been opened, or if the equipment has been tampered with.
- Equipment mentioned in this operator manual may only be used in accordance with instructions contained in this manual. Error-free and safe operation of this equipment is only guaranteed if this equipment is transported, stored, operated and controlled in the proper manner. The same applies to equipment maintenance.
- Only undermentioned manufacturer is entitled to repair any devices.