



HIRSCHMANN

A **BELDEN** BRAND

Startup Information

OZD 485 G12 PRO FIRMWARE INVENSYS TRICONEX

General Safety Instructions

- ▶ This device is electrically operated. Adhere strictly to the safety requirements relating to voltages applied to the device as described in the operating instructions!
- ▶ Make sure that the electrical installation meets local or nationally applicable safety regulations.



Warning!

Failure to observe the information given in the warnings could result in serious injury and/or major damage. Only personnel that have received appropriate training should operate this device or work in its immediate vicinity. The personnel must be fully familiar with all of the warnings and maintenance measures in these operating instructions.

Correct transport, storage, and assembly as well as careful operation and maintenance are essential in ensuring safe and reliable operation of this device.

Never start operation with damaged components!



Warning!

Any work that may have to be performed on the electrical installation should be performed by fully qualified technicians only.



Warning!

CLASS 1 LASER PRODUCT in accordance with IEC 60825-1 (2014).

Certified Usage

Please observe the following:



Warning!

The device may only be employed for the purposes described in the catalog and technical description, and only in conjunction with external devices and components recommended or approved by Hirschmann. The product can only be operated correctly and safely if it is transported, stored, installed and assembled properly and correctly. Furthermore, it must be operated and serviced carefully.

Safety Guidelines Power Supply

- ▶ Switch the basic devices on only when the housing is closed.



Warning!

The devices may only be connected to the supply voltage shown on the type plate. The devices are designed for operation with a safety extra-low voltage. Thus, they may only be connected to the supply voltage connections and to the signal contact with PELV circuits or alternatively SELV circuits with the voltage restrictions in accordance with IEC950/ EN60950/ VDE0805.

Relevant for North America:

- ▶ The subject unit is to be supplied by a Class 2 power source complying with the requirements of the National Electrical Code, table 11(b). If power is redundant supplied (two individual power sources) the power sources together should comply with the requirements of the National Electrical Code, table 11(b).
- ▶ Use 90 or 90°C copper (Cu) wire only.



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Safety Guidelines Environment



Warning!

The device may only be operated in the listed ambient temperature range at the listed relative air humidity (non-condensing).

- ▶ The installation location is to be selected so as to ensure compliance with the climatic limits listed in the Technical Data (see page 7).
- ▶ To be used in a Pollution Degree 2 environment only (IEC 60664-1).

Note on CE Identification



The devices comply with the regulations of the following European directive:

89/336/EEC

Council Directive on the harmonization of the legal regulations of member states on electromagnetic compatibility (amended by Directives 91/263/EEC, 92/31/EEC and 93/68/EEC).

The EU declaration of conformity is kept available for the responsible authorities in accordance with the above-mentioned EU directives at:

Hirschmann Automation and Control GmbH

Stuttgarter Strasse 45 – 51

72654 Neckartenzlingen

Germany

Telephone +49 (0) 1805 14-1538

Email HAC.Support@Belden.com

FCC RULES

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference, and
- (2) this device must accept any interference received, including interference that may cause undesired operation.

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

C-Tick

Australia/New Zealand



This product meets the requirements of the AS/NZS 3548 standard.

N1337

Approvals

cUL508

Please note the important information in: "Relevant information for North America", below.

ISA12.12.01

Hazardous Locations Class1 Div 2 Groups A, B, C und D

Please note the important information in: "Relevant information for North America", below.

ATEX RL 94/9EG Zone 2 3G

Please note the important information in: "Relevant information for use in Ex zone 2 according to ATEX 94/9/EC" – see page 4.

Note:

Only the certifications indicated on the label attached to each device are applicable.

Relevant information for North America:

- ▶ Only for connection with a Class 2 power supply.
- ▶ For use in Class 2 Circuits.
- ▶ Use 90 or 90°C copper(CU) wire only.

Additional Information for Use in Hazardous Locations:

**This product may be operated in hazardous locations only if the product label is marked accordingly.
The following information applies when operating this equipment in hazardous locations:**

Products marked "Class I, DIV 2, Group A, B, C and D" are suitable for use in Class I Division 2 Groups A, B, C, D, Hazardous Locations and nonhazardous locations only. Each product is supplied with markings on the rating nameplate indicating the hazardous location temperature code. When combining products within a system, the most adverse temperature code (lowest "T" number) may be used to help determine the overall temperature code of the system. - Wiring must be in accordance with Class I Div. 2 wiring methods and in accordance with the authority having jurisdiction.

- ▶ The peripheral equipment must be suitable for the location in which it is used.
- ▶ These devices must be installed as non-incendive according to the Control Drawing No. 000100622DNR / Class 1 Div 2 in this document.
- ▶ These devices are open-type devices that are to be installed in an enclosure according to ANSI/UL50, suitable for the environment in which it is used.

Relevant information for use in Ex zone 2 according to ATEX 94/9/EG:

This product may be operated in EX zone 2 only if the product label is marked accordingly.
The following information applies when operating this equipment in EX zone 2:



II 3G
Ex nA ic IIC T4 Gc

DEMKO 07 ATEX 142156X

Temperature Code T4 Ta: -25 ... +70 °C

List of Standards EN 60079-15: 2010, EN 60079-0: 2012
EN 60079-11:2012

Optical power emission 5 mW max. (820 nm)

DO NOT OPEN WHEN ENERGIZED
7 POLE CONNECTOR: DO NOT SEPERATE WHEN ENERGIZED

Installation instructions:

The OZD 485 G12 PRO modules shall be used in an area with a classification of no more than pollution degree 2 and conforming to IEC 60664-1.

The OZD 485 G12 PRO modules shall be installed in an enclosure with a tool-removable cover that complies with the relevant requirements of EN 60079-15, rated at least IP54.

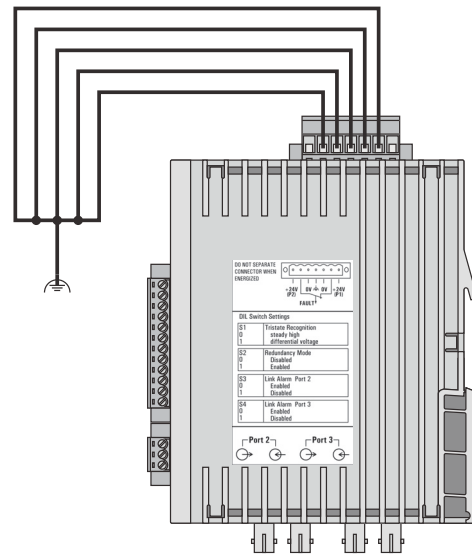
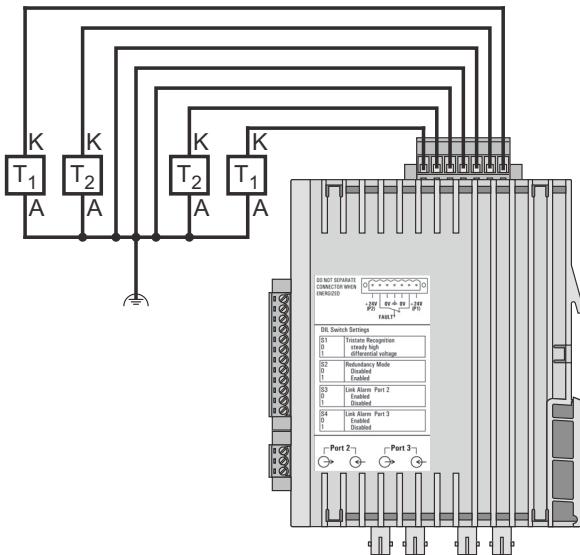
The Fault contacts shall be installed as non-incendive in accordance with the Control Drawing No. 000100622DNR for ATEX Zone 2 – see the next pages in this document.

The modules shall be connected to supply circuits where the rated voltage cannot exceed the threshold of 119 V due to transient disturbances.

The pictures show two alternatives by external installation.

Max. line length, depending on cross section area:

200 mm at 0.5 mm²
400 mm at 1.0 mm²
800 mm at 2.0 mm²

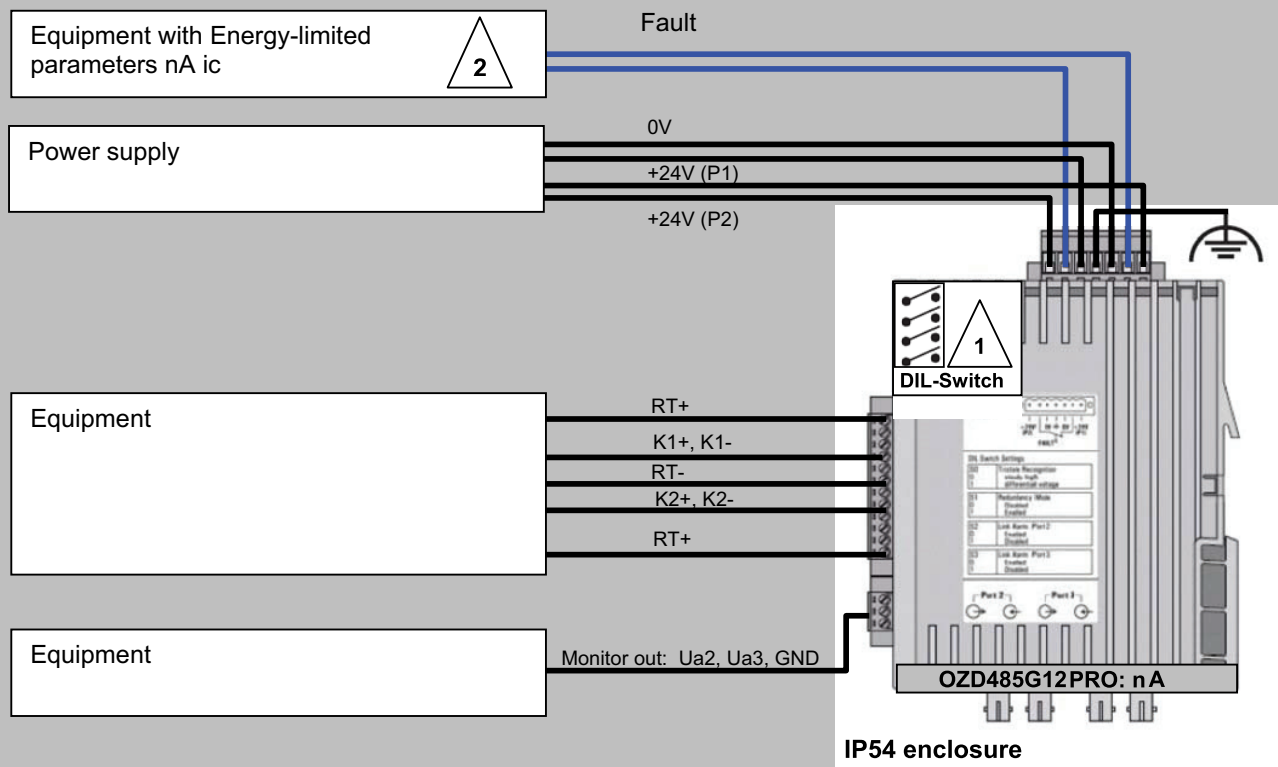


T₁: Transient voltage protection, not exceeding 119 V, shall be provided at the power supply terminal of the apparatus.

Example: for 24 V power supply you can use P4KE30A or P6KE30A.

T₂: Prevent between 0 V pin or fault pins of 7 pole connector and earth/frame transient voltages greater than 119 V peak, e.g. by overvoltage limiters (T2) or short circuits (see pictures).

CONTROL DRAWING: ATEX Zone 2, IIC explosive atmosphere



Notes:



DIL-Switches are classified as nA ic.



The Energy-limited circuit concept allows interconnection of Energy-limited apparatus and associated Energy-limited apparatus using any of the wiring methods permitted for unclassified locations when certain parametric conditions are met.

$$U_i \geq U_o$$

$$I_i \geq I_o$$

$$C_i + C_{\text{Cable}} \leq C_o$$

$$L_i + L_{\text{Cable}} \leq L_o$$

Energy-limited Parameters:

Entity Parameters ... for ATEX II 3G, Zone 2, IIC =>		U_o	I_o	C_o	L_o	U_i	I_i	C_i	L_i
connector: 7 pole,	contacts: Fault contacts	-	-	-	-	30V	90mA	200nF	5mH

WARNING – EXPLOSION HAZARD – SUBSTITUTION OF ANY COMPONENTS MAY IMPAIR SUITABILITY FOR HAZARDOUS LOCATIONS OR EXPLOSIVE ATMOSPHERES.

WARNING – EXPLOSION HAZARD – DO NOT DISCONNECT EQUIPMENT UNLESS POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOWN TO BE NON-HAZARDOUS.

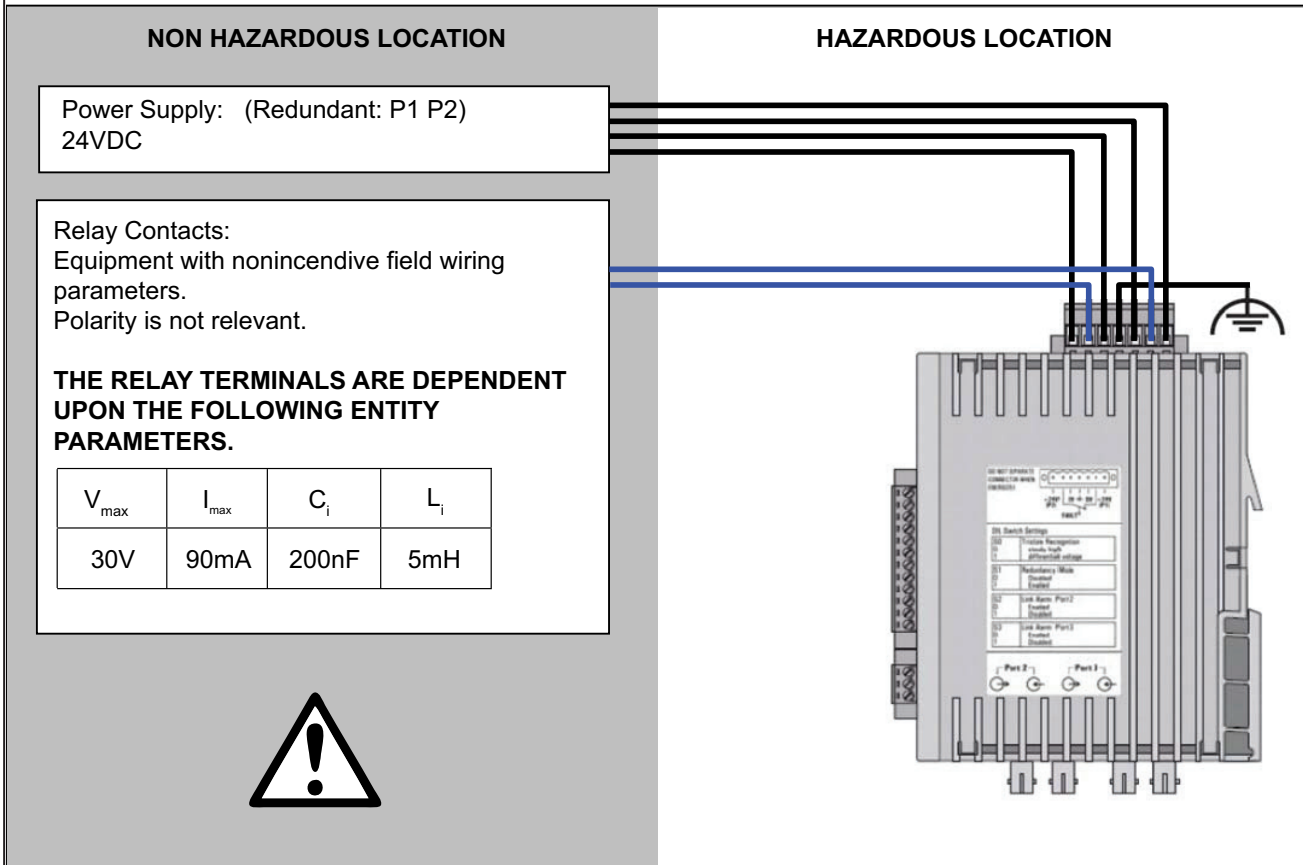
DO NOT OPEN WHEN ENERGIZED.



Title: Control Drawing for OZD 485 G12 Pro		
Size A4	Document No.: 000100622DNR	Rev. 3
Date: 2014-04-02		Page 1/1

Notes for OZD 485 G12 PRO FIRMWARE INVENSYS TRICONEX: RT+ and Ua3 are not available, RT- is replaced by GND.

CONTROL DRAWING: Hazardous Locations Class I Division 2 Groups A, B, C, D



Notes:

The nonincendive field wiring circuit concept allows interconnection of nonincendive field wiring apparatus and associated nonincendive field wiring apparatus using any of the wiring methods permitted for unclassified locations when certain parametric conditions are met.

Capacity: $C_a \geq C_i + C_{Cable}$

Inductivity: $L_a \geq L_i + L_{Cable}$

The maximum cable length has to be determined as follows:

(a) max. Cable Length $< (L_a - L_i) / Cable_L$ **and (b) max. Cable Length** $< (C_a - C_i) / Cable_c$

The lower value of (a) and (b) is to apply.

Cable_L: inductance per unit length of used cable.

Cable_c: capacitance per unit length of used cable.

Other C-parameters and L-parameters are according to ANSI / ISA 12.12.01 2011 section 7.

Nonincendive field wiring circuits must be wired in accordance with the National Electrical Code (NEC), NFPA 70, article 501.

WARNING – EXPLOSION HAZARD – SUBSTITUTION OF ANY COMPONENTS MAY IMPAIR SUITABILITY FOR HAZARDOUS LOCATIONS OR EXPLOSIVE ATMOSPHERES.

WARNING – EXPLOSION HAZARD – DO NOT DISCONNECT EQUIPMENT UNLESS POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOWN TO BE NON-HAZARDOUS.

DO NOT OPEN WHEN ENERGIZED.

CONTROL DRAWING for OZD 485 G12 Pro

According to ANSI / ISA 12.12.01-2011



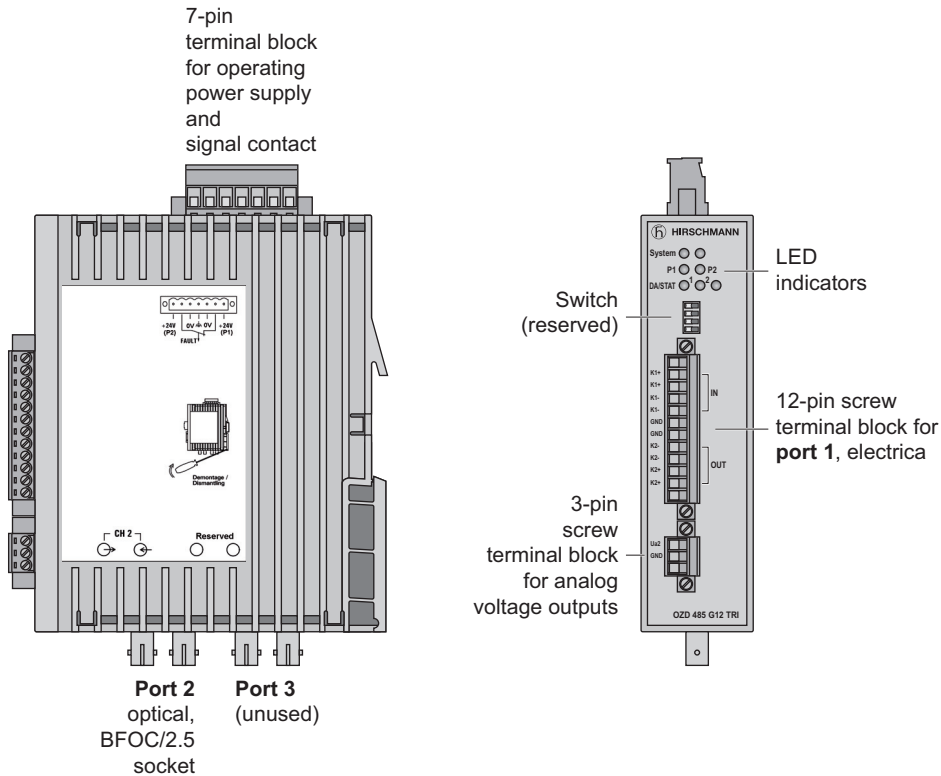
Rev.: 3 | Date: 2013-12-03 | Document No.: 000100622DNR

Introduction

The RS 485 Fiberoptic Repeater is intended for use in optical RS 485 fieldbus networks. It enables you to convert electrical RS 485 signals to optical ones, and the reverse.

With the OZD 485 ... Repeaters, you can

- construct universal full duplex (4-wire) transmission systems with RS 485 interfaces,
- transmit all data rates from 0 - 2 Mbit/s (if the data signal is NRZ coded).



Fiberoptic Repeater OZD 485 ... with location of individual ports, terminal blocks and LED displays

Operating modes

The OZD 485 ... supports full-duplex operation with a 4wire interface.

Thereby the channel 1 of the electrical interface of the OZD 485 ... is always a pure receiver and channel 2 is a pure transmitter. The data received at channel 1 will be coded and sent at the optical transmitter. The data received at the optical receiver will be decoded and sent at channel 2. Data received at channel 2 will not be transmitted.

The electrical receiver of channel 1 is working always in the operating mode "tristate recognition through differential voltage".

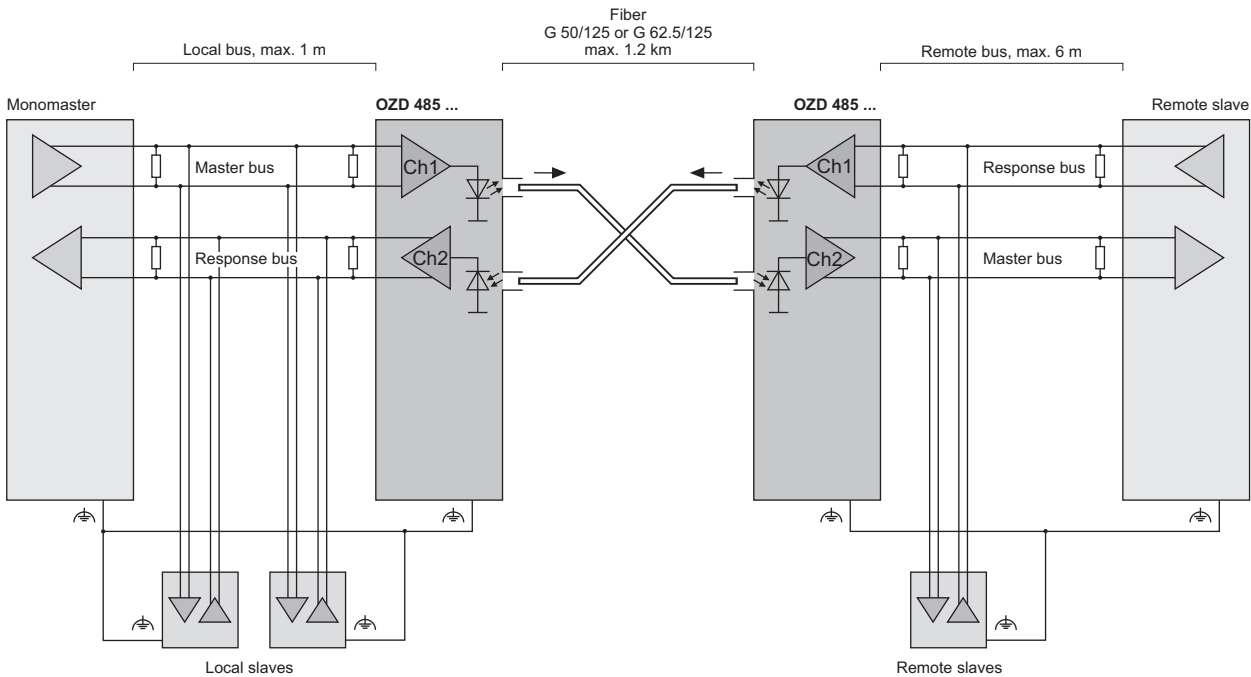
A tristate signal (idle state on the bus at this input) will be recognized, if the absolute value of the differential voltage is low enough (threshold: see Technical Data).

Installation guidelines

The power supply wires and the bus lines for the OZD 485 ... must not be laid in the same cable duct as cables for load circuits. Between an OZD 485 ... and a power switching element (e.g. contractor, relay, temperature regulator, switch, etc.) a minimum separation of 15 cm is to be maintained.

Permissible network topology

The OZD 485 ... supports only point-to-point connections. Thereby the optical transmitter of the repeater's port 2 is connected with glass fibers (G 50/125 or G 62.5/125) to the optical receiver of the other repeater's port 2, and vice versa. The length of the glass fiber may be from 0 to 1.2 km.



Point-to-point connection

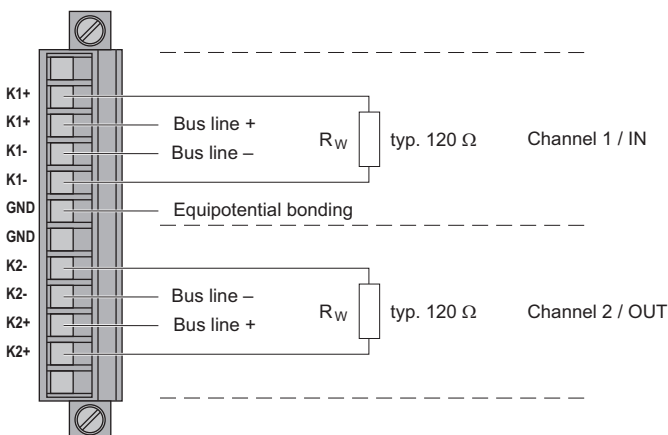
Termination and equipotential bonding

The electrical bus cables must be terminated at the start and end of the line – even for short electrical bus cables – with the characteristic impedance (typically 120 ohm)

If there is an OZD 485 ...I at the start or end of a data line, then the terminating resistors can be mounted directly on the repeater.


At one of the two GND connections an equipotential bonding to the electrically connected participants must be set up.

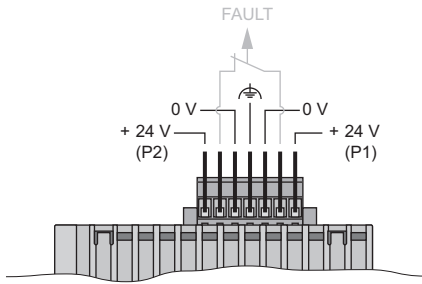
If a shielded data cable is used, the shield has to be connected to the ground potential of the switch cabinet.



Connection of the terminating resistors at the 12-pin screw terminal block

Operating voltage and function ground

- ▶ The repeater should only be supplied with a regulated **safety extra-low voltage** in accordance with IEC/EN 60950-1/ VDE 0805 with a maximum of +24 VDC (for non-hazardous locations only: 32 VDC max.). It can be fed in using the 7-pin screw-type terminal block on the upper side of the repeater.
- ▶ Connect the function ground of the 7-pin terminal block  to the ground of the switch cabinet.



Connection of the operating voltage and the function ground at the 7-pin screw terminal block

Signaling Contacts

At the 7-pin screw-type terminal block on the upper side of the repeater, floating contacts of a relay are provided as a signaling contact.

If the OZD 485 ... is functioning correctly the contact is closed.

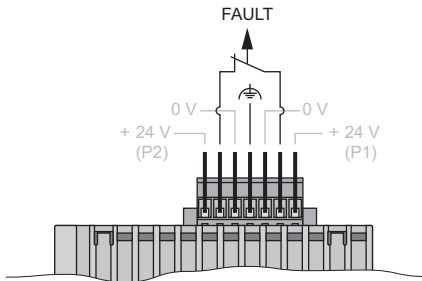
If a fault or power failure occurs, the contact is opened.

- ▶ Always ensure that the correct assignment is provided for the 7-pole terminal block. Make sure that the connecting leads of the signaling contacts are adequately insulated. Incorrect assignment can result in destruction of the repeater.

Limit values of relay contact

- Max. switching voltage: 32 V
- Max. switching current: 90 mA (for non-hazardous locations only: 1 A, max switching capacity 30 W)









- ▶ The voltage connected to the relay must correspond to a **safety extra-low voltage** to IEC/EN 60950-1.



Connection of the signal contact at the 7-pin screw terminal block

DIL switches

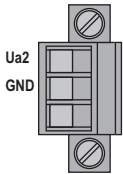
The DIL switches of the OZD 485 ... are reserved, they must be in the "0" position.

	0	1	
S1			reserved
S2			reserved
S3			reserved
S4			reserved

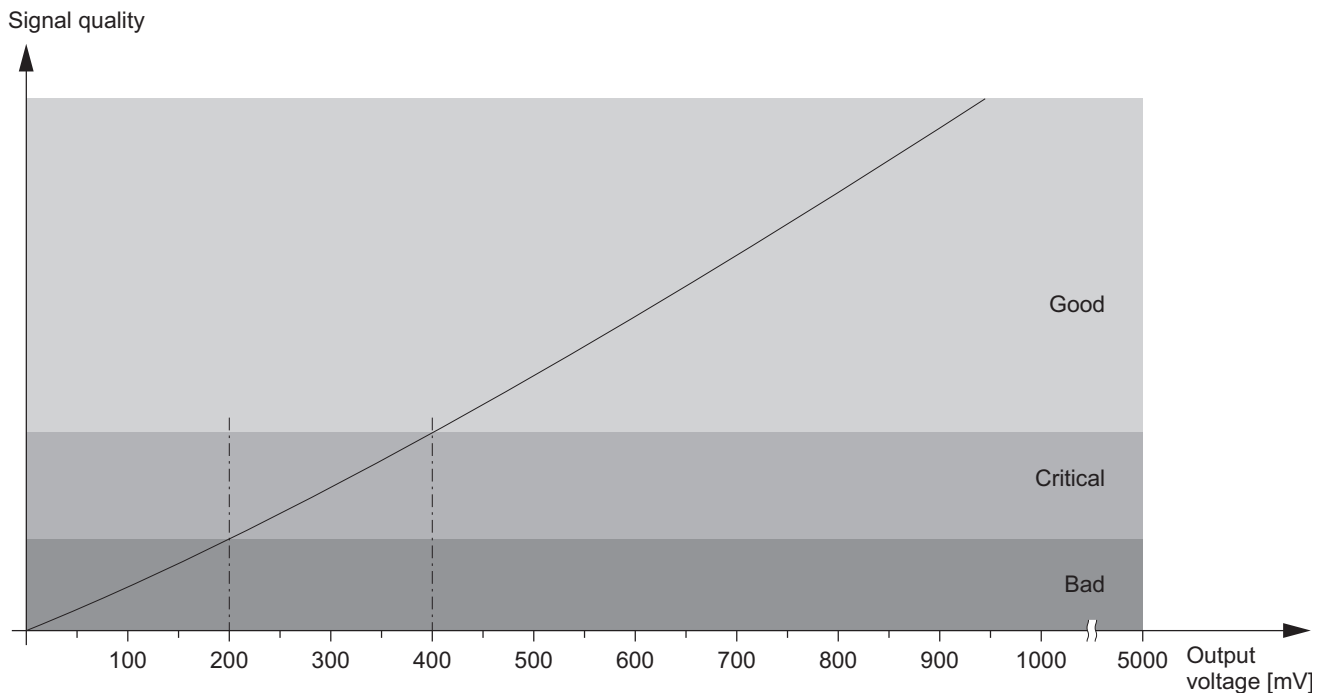
Analog voltage outputs

The device has one analog voltage output Ua2. This supplies a short-circuit-proof output voltage for diagnosis purposes e.g. for predictive maintenance in the range from 0 - 5 V (with reference to "GND" of the 3-pin terminal block) dependent on the optical power input at port 2.

- ▶ These voltage outputs are connected using a 3-pin screw terminal on the front side of the repeater.
- ▶ The screw terminal is suitable for cable leads that have a cross section between 0.2 - 2.5 mm².



Analog voltage outputs – connections for 3-pin terminal block



Relationship between the output voltage at the terminals Ua2 and the optical input power at port 2

LED displays

LED	Indication	Possible causes	Signal contact
System	Green	- Repeater in fault-free operation	No signal
	Red	- Signal contact signals malfunction	Signal
	Not lit	- No voltage supply - Internal device fault	Signal
P 1	Green	- Supply voltage 1 ok	No signal
	Not lit	- Supply voltage 1 low	Signal
P 2	Green	- Supply voltage 2 ok	No signal
	Not lit	- Supply voltage 2 low	Signal
DA/STAT 1	Yellow	- Data receiving at port 1 (channel 1)	No signal
	Not lit	- No input signal at port 1	No signal
DA/STAT 2	Green	- Input power at port 2 ok	No signal
	Yellow	- Optical data receiving at port 2	No signal
	Not lit	- No input signal at port 2	Signal

Technical Data

Voltage/power supply

Operating voltage	NEC Class 2 power source 18 ... 24 VDC safety extra-low voltage (SELV/PELV); (for non-hazardous locations only: 18 ... 32 VDC), redundant inputs decoupled, buffer time min. 10 ms at 24 VDC
Current consumption	at +18 VDC 180 mA at +32 VDC 110 mA Inrush peak value 200 mA
Power consumption	3.5 W
Signal contact	
Maximum switching voltage	32 V (safety extra-low voltage), electrically isolated from the housing and all electrical connections
Maximum switching current	90 mA (for non-hazardous locations only: 1 A, max switching capacity 30 W, resistive load)

Electrical port

Transmitting level channel 2 (differential voltage)	min. 1.5 V; max. 5 V
Transmitting offset voltage channel 2 ¹⁾	min -1 V; max. +3 V
Input level channel 1 ²⁾	
Low	< -0.7 V
Tristate	-0.1 V to +0.1 V
High	> +0.7 V
Input voltage range channel 1 ³⁾	min. -7 V; max. +12 V
Line length	
local bus	max. 1 m
remote bus	max. 6 m

Optical interface

Wavelength typ.	860 nm
Launchable optical power	
- in fiber G 50/125	-20 dBm
- in fiber G 62.5/125	-16 dBm
Receiver sensitivity	-30 dBm
Transmission distance with 3 dB ⁴⁾ system reserve / line attenuation	
- with fiber G 50/125 (3.0 dB/km)	0 - 1.2 km/10 dB
- with fiber G 62,5/125 (3.5 dB/km)	0 - 1.2 km/14 dB
Overload limit ⁵⁾	-5 dBm
Optical connector	BFOC/2.5 (ST [®])

Timing parameters

Data rate (NRZ)	2 Mbit/s
Signal processing time for a system with two repeaters from the electrical receiver of the one repeater to the electrical transmitter of the other repeater with 1m of fiber	max. 2 µs
Jitter for a system with two repeaters from the electrical receiver of the one repeater to the electrical transmitter of the other repeater	30 ns
Static bit duration distortion at the electrical output	10 ns

Security

Protection class	Class III Equipment; the repeater may only be supplied with SELV/PELV according IEC/EN 60950, EN 61131-2
Protection against laser radiation	Class 1 Laser protection, according to IEC/EN 60825-1

Electromagnetic compatibility (EMC)

Interference immunity for industry in accordance with EN 61000-6-2:2001

Electrostatic discharging (ESD)	conforms to EN 61000-4-2; 4 kV contact discharge, 8 kV air discharge
Electromagnetic field	conforms to N 61000-4-3; 10 V/m (80 MHz - 2700 MHz),
Fast transients (burst)	conforms to EN 61000-4-4; 2 kV power line, 1 kV data line
Voltage surge	conforms to EN 61000-4-5; 1 kV data line, 1 kV power line symmetrical, 1 kV power line asymmetrical
Line-conducted interference voltages	conforms to EN 61000-4-6; 10 V (150 kHz - 80 MHz);
Emitted interference	conforms to EN 55022; Class A conforms to FCC CFR47 Part 15; Class A

Ambient conditions during operation

Ambient temperature	-25 °C to +70 °C (IEC 60068-2-1, IEC 60068-2-2)
Relative humidity	<95 %, non-condensing (IEC 60068-2-30)
Pollution degree	2
Air pressure	up to 2000 m (795 hPa)
Vibrations	3 to 9 Hz, 3,5 mm amplitude (IEC 61131-2); 9 to 150 Hz, 1 g acceleration (IEC 61131-2) Frequency change range: 1 octave/min 10 sweeps per axis in all 3 axes Pursuant to IEC 60068-2-6, test Fc
Shock	15 g half sine for 11ms; 3 shocks in pos. and neg. direction in all 3 axes Pursuant to IEC 60068-2-27, Test Ea

Ambient conditions during transport and storage

Storage temperature	-25 °C to +80 °C (IEC 60068-2-1, IEC 60068-2-2)
Relative humidity	<95 %, non-condensing (IEC 60068-2-30)
Air pressure	up to 3000 m (700 hPa)

Housing

Protection class	IP 20
Weight	194 g
Dimensions (W x H x D, with connections)	35 x 156 x 119 mm

- 1) Voltage between the function ground and the average on the signal lines
- 2) Differential voltage K1+ - K1-
- 3) Offset voltage for each individual signal line relating to the function ground
- 4) Because of processing time limitations the lines may not be longer - irrespective of the optical budget
- 5) maximal optical power without bit errors

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