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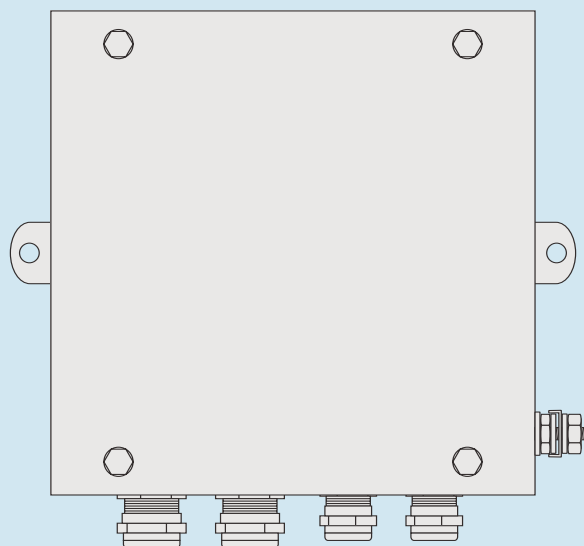
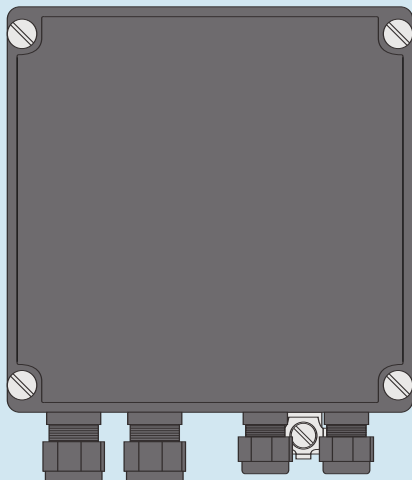
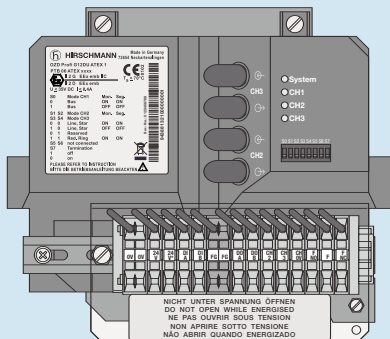
Manual

PROFIBUS Fiberoptic Repeater

OZD Profi G12DU ATEX 1

OZD Profi G12DK ATEX 1

OZD Profi G12DE ATEX 1



Hirschmann. Simply a good Connection.

Order numbers

OZD Profi G12DU ATEX 1	943 881-321
OZD Profi G12DK ATEX 1	943 882-321
OZD Profi G12DE ATEX 1	943 883-321
Manual PROFIBUS Fiberoptic Repeater OZD Profi G12DU ATEX 1 OZD Profi G12DK ATEX 1 OZD Profi G12DE ATEX 1	039 677-001

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Note

We would like to emphasise that the contents of this operating manual are not a part of an earlier or existing agreement, commitment or legal relationship or an amendment thereof. All obligations of Hirschmann arise from the purchase contract, which also include the complete and exclusively applicable guarantee regulations. These contractual warranty agreements are neither extended or limited by the versions of this operating manual.

Moreover, we would like to emphasise that in the interest of clarity in this operating manual, not every imaginable problem related to the use of this device can be described. Should you require more information or should other problems occur, which have not been dealt with in detail in the operating manual, you can get the required information about the Hirschmann partner in your vicinity or directly request the same from Hirschmann (see address in section "information on CE marking").

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1 Safety


1.1 Validity


The safety chapter is applicable as an operating manual. Different procedures and instructions in this operating manual require special precautionary measures for ensuring safety of the involved persons.

1.2 Safety guidelines

This manual contains guidelines, which must be observed for your personal safety and for avoiding property damage. The information is highlighted by a warning triangle and depending upon the degree of risk is presented as follows:

 **Danger!** means death, serious injury or extensive damage to property may **occur**, if the appropriate precautions are not taken.

 **Warning!** means death, serious injury or extensive damage **to property may** occur, if appropriate precautions are not taken.

 **Caution!** means a minor injury or property damage may occur, if appropriate precautions are not taken.

Note: is important information on the product, handling of the product or the respective part of documentation, which must be paid special attention.

1.3 Operator of the system and personnel

Responsibility with respect to planning, assembly, start-up, operation and maintenance is that of the operator of the system.


Assembly, installation, startup, maintenance and operation of all devices must be done by qualified personnel only. The operating manual must be read and understood.

1.4 Relevant laws, standards, guidelines and other documentation

Laws, standards or guidelines applicable for the usage and/or the planned intended use must be complied with just like the appropriate data sheets, declarations of conformity, EC-type examination certificates and certificates where applicable.

Guideline 94/9 EC must be observed for explosive hazardous areas.

1.5 Information on marking

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

89/336/EEC

Council directive for approximation of legal provisions of member states for electromagnetic compatibility (changed by directive 91/263/EEC, 92/31/EEC and 93/68/EEC).

Prerequisite for the compliance of EMC limits is the strict compliance of guidelines specified in the description and operating manual.

Records of the EC declarations of conformity are kept in accordance with the above mentioned EC directive for the competent authorities at:

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Telefon +49 (0)1805 14-1538
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The product is usable in the residential area (residential area, business and commercial areas, small enterprises) as well as in the industrial area.

- Interference immunity:
EN 61000-6-2:2001
- Emitted immunity:
EN 55022:1998+A1:2000+A2:2003 Class A



Note!

This equipment belongs to class A. This may cause radio interference in the residential area. In this case the operator may request execution of appropriate measures and pay for the same.

Marking of devices

OZD Profi G12DU devices are marked as per EU-type examination certificate PTB 09 ATEX 2044 X as follows:



II 2 G Ex e mb op is [ib] IIC T4 Gb

OZD Profi G12DK and OZD Profi G12DE devices are marked as per EU-type examination certificate PTB 09 ATEX 2045 as follows:



II 2 G Ex e mb [ib] op is IIC T4



II 2 D Ex tD A21 IP 66 T 130 °C

1.6 Intended use

The PROFIBUS Fiberoptic Repeater in plastic or stainless steel protective housing is intended for use in explosive hazardous area.

The PROFIBUS Fiberoptic Repeater (DIN-rail module) without plastic or stainless steel protective housing must be used only as a replacement for a defective PROFIBUS Fiberoptic Repeater in plastic or stainless steel protective housing. Another use is possible after joint ATEX approval with an approved protective housing.

The PROFIBUS Fiberoptic Repeater is used as an interface between electrical PROFIBUS signals from the explosive hazardous area (ex-area) and the safe area (non-ex-area). Bus and auxiliary power circuits are isolated galvanically.

PROFIBUS Fiberoptic Repeater are intended for use in the optical PROFIBUS networks. They enable implementation of electrical PROFIBUS interfaces (RS 485 level) in optical PROFIBUS interfaces and vice-versa.

By using the known advantages of the optical transmission technology, the devices can be integrated in the existing PROFIBUS fieldbus networks. Likewise, complete structure of a PROFIBUS fieldbus network with devices in line, star and ring topology is possible in any combination.

Applicable laws, standards or guidelines must be observed for usage or the planned purpose. The devices are approved only for proper and intended use. Any guarantee and producer responsibility becomes void in case of infringement.

The devices are not suitable for separation of signals in power measurement, unless stated specifically in the appropriate data sheet.

Protection of operating personnel and system is not guaranteed if the component is not used in accordance with its intended purpose.

1.7 Assembly

1.7.1 General information on assembly

Familiarise yourself with the device prior to assembly, installation and startup and read this manual carefully. The device must not be installed on places with aggressive vapours.

Observe BGR A3 (the Federal Institute for Geosciences and Natural Resources) when working under voltage. Installation requirements in accordance with IEC/EN 60079-14 / IEC/EN 60079-25 and national deviations must be complied with.

The devices are designed for use in pollution degree 1 and overvoltage category II as per IEC/EN 60664-1 .

If devices are used in general electrical systems, these must not be used thereafter in electrical systems, which are connected to explosive hazardous areas. The in-built PROFIBUS Fiberoptic Repeater in ex-housing contains non-intrinsic circuits. The non-intrinsic circuits must be covered so that the optical fibre connections are accessible during ongoing operation. The cover must attain protection class IP30 as per IEC/EN 60529.

The devices are designed according to protection class encapsulation as per IEC/EN 60079-18. The housing, the seal and the sealing agent must not be damaged.

The equipment must not be operated with dust deposits ≥ 5 mm thickness as per IEC/EN 61241-1. Terminals in increased safety are covered. The cover may be removed any time during assembly in safe area.

The device types can be installed outside the ex-area. The housing cover may be opened for servicing during ongoing operation.

Non-used inlet openings are to be sealed securely with certified sealing plugs in order to comply with the IP protection class. Likewise, seal inserts appropriate for the respective cable diameter must be used.

Excessive force on the glands may endanger the protection class. For ensuring protection class IP 54:

- ▶ all seals must be fitted intact and correctly,
- ▶ all screws of the housing/housing cover must be tightened with the appropriate torque,
- ▶ only cables of appropriate sizes must be used in the cable glands,
- ▶ all cable glands must be tightened with the appropriate torque,

- ▶ all free cable glands must be sealed with sealing plugs.

The PROFIBUS Fiberoptic Repeater are delivered in housings of protection class IP 66. The same provisions are applicable for this.

1.7.2 Assembly in zone 1 or zone 21

The devices must be installed in a housing with minimum protection class IP 54 as per gas-ex in zone 1.

IP 6* must be complied for conductive and non-conductive dust.

Temperature class T4 specified in the EC-type examination certification PTB 04 ATEX 1030 must be maintained at maximum ambient temperature of the housing of ≤ 60 °C.

The housing cover may be opened in zone 1 for servicing during ongoing operation.

Terminals in increased safety are covered.

The cover may be removed only if there is no explosion hazard circuits are switched to zero potential beforehand.

1.7.3 Assembly in zone 2 or zone 22

The devices must be installed in a housing with minimum protection class IP 54 as per gas-ex in zone 2. For the assembly, besides devices in housing design, even DIN rail modules are available as per the data sheet. The modules must be installed as associated equipment in safe area or in suitable housing in zone 2.

IP 6* must be complied for conductive and non-conductive dust.

Temperature class T4 specified in the statement of conformity must be maintained at maximum ambient-temperature of the housing of ≤ 60 °C under normal operating conditions.

The housing cover may be opened in zone 2 for servicing during ongoing operation. In Zone 22 the housing cover may be opened only in the current-free state.

All terminals are covered.

The cover may be removed in zone 2 and also in the safe area for servicing. The terminals are then accessible.

Select the assembly location such that climatic limit values specified in the technical data are maintained.

1.8 Housing

If the device is installed in zone 1, the housing, in which the device is installed, must be suitable for the intended use. Examination certificate as per directive 94/9/EC must be obtained for the housing.

Installation in housing not examined by Hirschmann together with the fibre optic coupler is not permitted. For this, separate certification of a notified body may be obtained. Following points must be observed/ evaluated:

- ▶ IP protection class as per IEC/EN 60529
- ▶ resistance to light as per IEC/EN 60079-0

- ▶ impact strength as per IEC/EN 60079-0
- ▶ chemical resistance as per IEC/EN 60079-0
- ▶ heat resistance as per IEC/EN 60079-04
- ▶ electrostatics as per IEC/EN 60079-0

If the seal of the housing cover or a seal of the cable entry is damaged, it should be replaced with a new housing cover or cable entries of the manufacturer.

1.9 Installation and startup

The device must be zero-potential during installation and maintenance. Voltage must be applied only after complete assembly and connection of all circuits required for the operation.

The devices must be connected only to the supply voltage printed on the type plate. The devices are designed only for operation with the safety low voltage. Accordingly, only PELV circuits or optionally SELV circuits with voltage restrictions as per IEC/EN 60950 must be connected to the supply voltage connections and the signalling contact. In case that you operate the module with external voltage: supply the system only with a safety low voltage as per IEC/EN 60950.

The optical fibres have an inherently safe optical radiation and must be interconnected only with other inherently safe optical equipment. For this, preferably a similar device of type OZD Profi G12D... ATEX 1 must be used.

Installation regulations as per IEC/EN 60079-14 (VDE 0165-1) for zone 1 or IEC/EN 60079-15 for zone 2 as well as directive 99/92 EC must be complied with.

The devices must be installed by a qualified electrician in consensus with the nationally applicable standards in zone 1 or zone 2 or zone 21 and zone 22.

Explosion group specified on the housing, the temperature class and special ambient conditions must be complied with!

Modifications and changes to the device are not permitted.

The device must be operated as per the intended purpose in undamaged and perfect condition!

Only original parts from the manufacturer must be used as spares.

If foreign bodies enter, these must be removed from the device before the initial startup!

When carrying any work on the device, observe the national safety and accident prevention regulations and warnings specially marked in the operating manual!

For installation and operation of associated equipment, comply with the applicable safety regulations as per the ordinance on industrial safety and health and equipment and Product Safety Act and the generally recognised rules of the technology!

Before starting the device with the help of technical data, convince yourself that the operating conditions have been complied with and all polarities of the connections have been selected correctly. Also check the auxiliary power supply and your work area.

1.10 Operation



Warning!

LASER CLASS 1 as per IEC/EN 60825-1 (2001).

The devices must not be repaired, changed or manipulated. In case of defect, the product must be always replaced by an original one.

If the seal of the housing cover or a seal of the cable entry is damaged, it should be replaced with a new housing cover or cable entries of the manufacturer.

The insulation must reach up to the terminal. The conductor itself must not be damaged.

Fine-wired cables must be secured with a cable lug. If two cables must be led to a common terminal, a double cable lug must be used.

Generally only certified cable entries and sealing plugs must be used. Trumpet shaped cable glands or other suitable entries with additional stress relief must be used for flexible cables. Assembly guidelines, which are significant for cable entries, must be observed. When using cable entry with an IP protection class, which is lower than the one applicable for the device, IP protection class of the entire device must be reduced. Non-used inlet openings must be sealed with a certified sealing plug for getting the minimum protection class. When installing the cable entries, ensure that seal inserts suitable for the cable diameter are used during installation. For excisable seal inserts ensure that the insert is suitable for the cable diameter.

All non-used cable entries must be sealed with sealing plugs certified for cable entries. The fibre optic cables are introduced through glands with slotted seals so that

pre-assembled fibre optic cables can be used. Permissible cladding diameter of the fibre optic cable must be complied with.

(for this see technical data, cable glands, page 54).

Cable entries must be tightened for ensuring the required minimum protection class (for this see technical data, test torque, page 55). Excessive tightening may impair the protection class.

When tightening the cap nut of the metal cable entries (type E1WF/e), the gland must be secured against rotation with the help of a suitable tool.

The device must be operated only at the specified ambient temperature and at the specified relative humidity (not condensing).

The housing may be opened under voltage in zone 1. The IP30 cover of the terminals must **not** be opened under voltage. The IP-30 cover must be replaced after repairs or maintenance. All non-covered control elements such as switches may be actuated. The fibre optic cable may be plugged or removed under voltage.

The devices must not be repaired, changed or manipulated. In case of defect, the device must be always replaced by an original one.

For dust explosion protection, safety measures, which are same as gas explosion protection are applicable. The housing must **not** be opened under voltage if there is dust explosion hazard. Before opening the housing, the dust deposits must be removed and electric voltages must be switched off.

1.11 Maintenance

The national regulations are applicable for service, maintenance and testing of associated equipment.

No maintenance is required if the device is operated properly taking into consideration the assembly instructions and ambient conditions.

According to the ordinance on industrial health and safety the operator of the electrical systems in explosion hazard areas is obliged to get these tested from a qualified electrician for their proper condition.

National regulations applicable for the maintenance/ service of electrical equipment in explosion hazard areas must be complied with.

The required maintenance intervals are application-specific and hence must be determined depending upon the operating conditions. As part of maintenance, primarily parts on which the type of ignition protection is dependent, must be tested (e.g. intactness and tightness of the housing, integrity of the seals and the cable entries as well as the required potential equalisation).

If one determines the need for servicing during maintenance, kindly take the "Operation" chapter 1.10, page 10 into consideration.

The devices must not be repaired, changed or manipulated. In case of defect, the device must be always replaced by an original one.

1.12 Delivery, Transport and Storage

Check the packaging and contents for damage. In case of damage, notify the post and/or the forwarding agent and the supplier.

Check the delivery scope based on the order and the delivery documents for completeness and correctness. Preserve the original packaging. The device should always be stored or transported in the original packaging.

Always store the device in dry and clean surroundings. Note the permissible storage temperature (see technical data, page 54).

1.13 Repairs

The devices must not be repaired, changed or manipulated. In case of defect, the product must be always replaced by an original one.

1.14 Disposal

The devices and packaging material must be disposed in accordance with the relevant laws and regulations in the respective country.

Batteries are not included in the devices, these must be disposed off separately.

2 Introduction

PROFIBUS Fiberoptic Repeater

- **OZD Profi G12DU ATEX 1,**
- **OZD Profi G12DK ATEX 1** and
- **OZD Profi G12DE ATEX 1**

are planned for use in optical PROFIBUS fieldbus networks. They enable implementation of electrical PROFIBUS interfaces (RS 485 level) in optical PROFIBUS interfaces and vice-versa.

By using the known advantages of the optical transmission technology, the devices can be integrated in the existing PROFIBUS fieldbus networks. Likewise, complete structure of a PROFIBUS fieldbus network with devices in line, star and ring topology is possible in any combination.

Explosion protection

The devices have been approved for operation in the explosion protection zones 1, 21, 2 and 22 as per AT. They are thus interfaces between electrical Profibus-signals from the explosion hazard areas (ex-area) and the safe area (non-ex-area). The electronic circuits are separated by encapsulation as per EN 50028/VDE 0170/0171 part 9 from the explosive atmosphere. The electrical connections are lead from the electronic circuits through the encapsulation and placed on the

front side of the housing on the terminals of a terminal block.

Device variants

The repeater

- OZD Profi G12DU ATEX 1 has no protective housing
- OZD Profi G12DK ATEX 1 has a plastic protective housing (i. e. it conforms to a OZD Profi G12DU ATEX 1 with plastic protective housing)
- OZD Profi G12DE ATEX 1 has stainless steel protective housing (i. e. it conforms to a OZD Profi G12DU ATEX 1 with stainless steel protective housing)

Application area

The device has electromagnetic compatibility as per EN 61326 and NAMUR recommendation NE21. It is planned for use in the industrial area.

Channels

Each device has three independent channels (ports), which in turn comprise a transmitter and receiver. The electric channel (port 1) is placed on 4 terminals of the terminal block. For types OZD Profi ... DK ... and OZD Profi ... DE ... with connection cables are led outwards via PG cable glands.

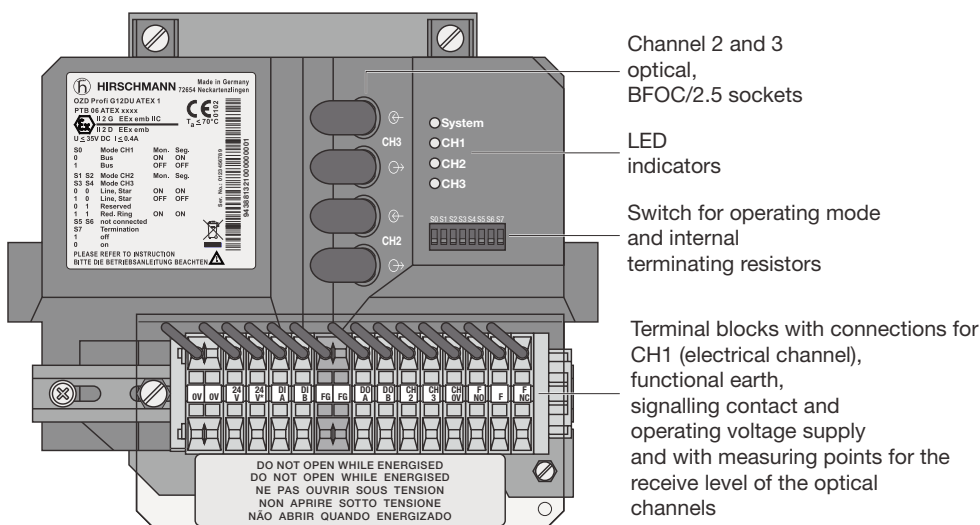


Fig. 1: OZD Profi G12DU ATEX 1 with location of each port, the terminal blocks and the LED indicators

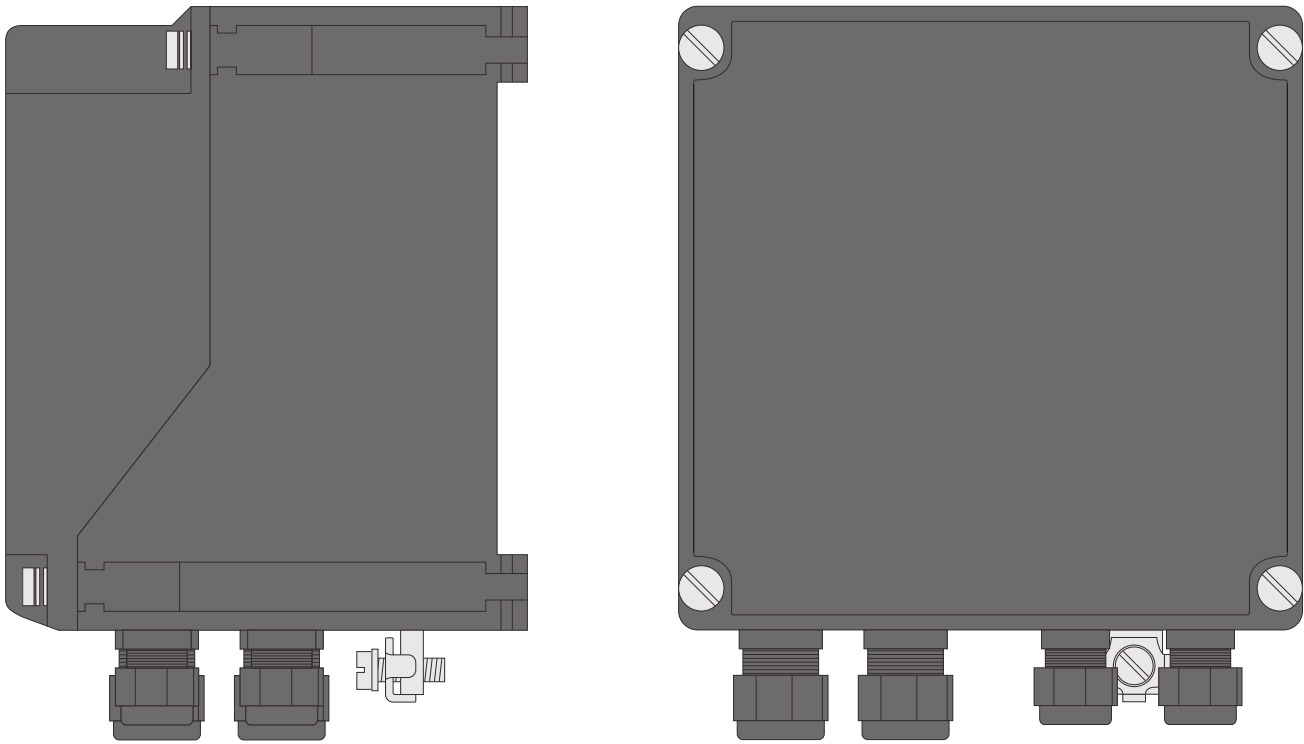


Fig. 2: OZD Profi G12DK ATEX 1 with location of cable entries and grounding screw

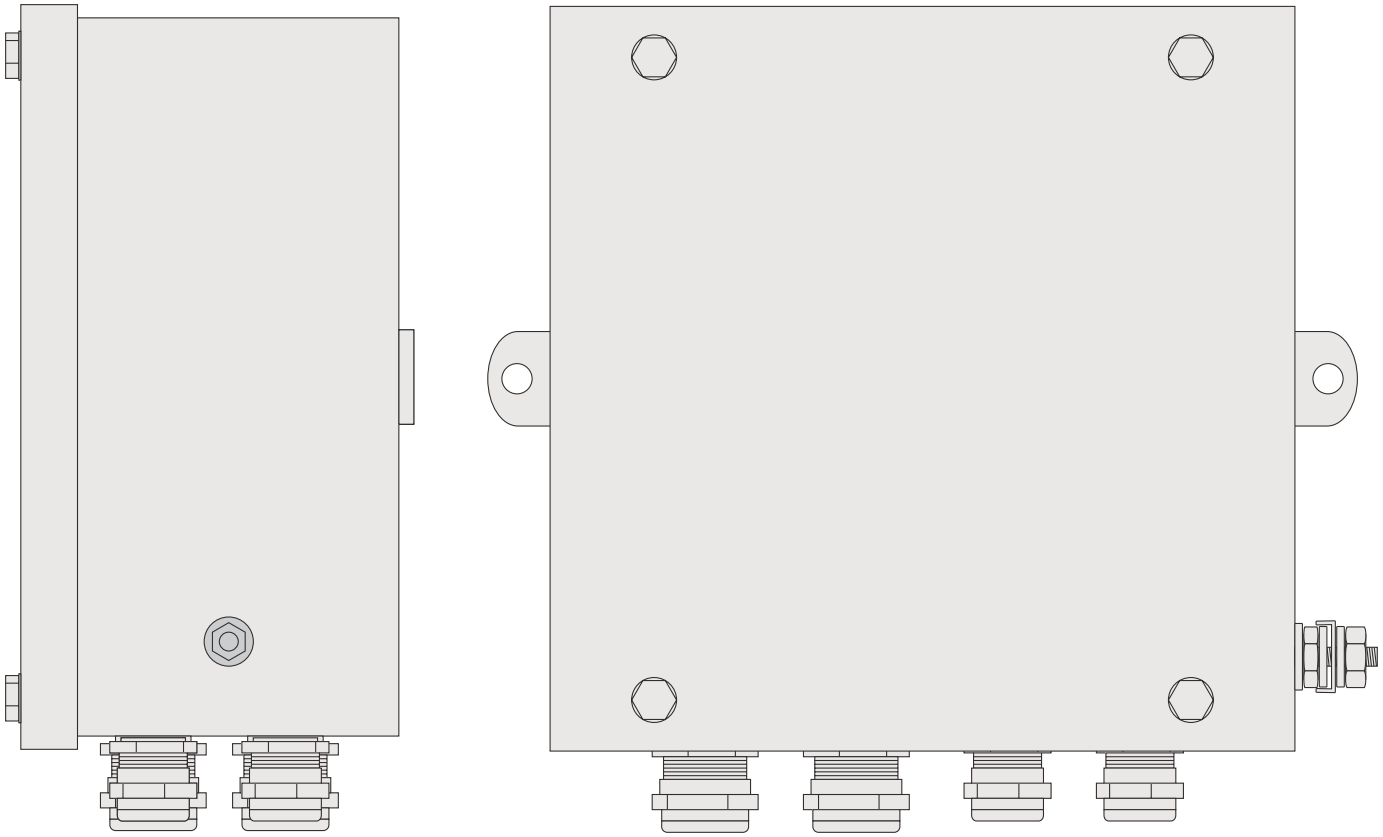


Fig. 3: OZD Profi G12DE ATEX 1 with location of cable entries and grounding screw

A RS 485 bussegment as per PROFIBUS standard EN 50170 can be connected to the electrical channel.

The optical channels (CH2 and 3) are designed as optical BFOC/2.5 (ST[®]) sockets.

For types OZD Profi ... DK ... and OZD Profi ... DE ... the fibre optics are led outwards via the PG cable glands.

A slotted seal enables the installation of fibre optic cables with an add-on connector.

Voltage supply

Operating voltage supply is through the 24 V d.c. voltage. A redundant power feed is available for increasing the operational safety.

The operating voltage supply is placed on 3 terminals of the terminal block. For types OZD Profi ... DK ... and OZD Profi ... DE ... with connection cables, these are led outwards via PG cable glands.

The operating voltage connections are below each other and are galvanically separated from the remaining electrical connections.

Signalling contact

Various interferences of the repeater can be signaled through a signalling contact (relays with potential-free contacts).

The signalling contact is placed on 3 terminals of the terminal block. For types OZD Profi ... DK ... and OZD Profi ... DE ... with connection cables are led outwards via PG cable glands.

The signalling contact connections are below each other and galvanically separated from the remaining electrical connections.

LEDs

Four multi-coloured LEDs signalise the current operating status and possible malfunctions.

Configuration

The device is configured with eight easily accessible switches.

Fibre optics

Use of fibre optics allows very large ranges and ensure optimum protection from EMC influences not only on the transmission paths but also due to electrical isolation on the repeater itself.

Transmission speed

The PROFIBUS Fiberoptic Repeater OZD Profi G12D... ATEX 1 supports data rates of 9.6 kbit/s to 12 MBit/s NRZ.

Network extension

Permissible network extension for the line, ring or star topology is up to 3000 m.

Redundance

Very high transmission security is ensured by the redundant ring. Operational safety can be further increased by redundant operating voltage supply.

Measurement output

A measurement output, on which the optical input power can be determined with a standard voltmeter, is available for every optical channel. For this, a hot work permit is required in the ex-area.

Standards / Directives

OZD Profi G12D... ATEX 1 comply with the standard EN 50170 as well as the technical guideline "optical transmission technology for PROFIBUS" issued by the PROFIBUS user organisation PNO.

3 General functions

3.1 Functions independent of the mode of operation

Transmission speed

OZD Profi G12D... ATEX 1 supports all transmission speeds (transmission rates) defined in EN 50170:

9.6 kBit/s, 19.2 kBit/s, 45.45 kBit/s, 93.75 kBit/s,
187.5 kBit/s, 500 kBit/s, 1.5 MBit/s, 3 MBit/s,
6 MBit/s and 12 MBit/s.

Transmission speed is set automatically once OZD Profi G12D... ATEX 1 telegrams are received. Adjustment or conversion depends upon the transmission speed and the set operating mode and may last up to several seconds for each OZD Profi G12D...ATEX 1 .

If the transmission speed is not recognised, outputs are blocked for all channels. If the transmission speed changes during operation, the repeater recognises it and reconfigures the same.

Brief transmission faults may occur during the changeover time.

Signal regeneration

The repeater regenerates the signal form and amplitude of the received data. It is thus possible to cascade up to 122 OZD Profi G12D... ATEX 1 (limited by the address space for PROFIBUS networks).

Startup aid

During the installation, at least one active bus station is required for checking the fibre optic connections. This bus station is used as a source for telegrams. After switching on, the OZD Profi G12D... ATEX 1 behave passively. You can recognise the transmission speed from the telegrams transmitted by the bus station. Optical startup aid is possible with the help of flashing channel LED.

3.2 Functions dependent on the mode of operation

Operating mode for the

- OZD Profi G12DU ATEX 1 with DIP switches is set on the upper side of the repeater
- for OZD Profi G12DK ATEX 1 and OZD Profi G12DE ATEX 1 after opening the protective housing with DIP switches on the upper side of the repeater

Adjustment help is on the label besides the DIP switches.

Segment monitoring of the RS-485 channel

If the operating mode “electrical channel with segment monitoring” is set, every receiver monitors each RS 485 bus segment connected to it for erroneous telegrams or constant network allocation. If erroneous telegrams arrive at the receiver or allocations exceed the maximum permissible transmitting time,

transfer of received signals is blocked, till error-free telegrams are received again or no signal was received for a period of one second.

In the operating mode “electrical channel without segment monitoring, connected RS 485 bus segments are not monitored. Interferences of the electrical segment affect the entire network.

Kindly observe the installation information in chapter 5.6 “Connect electrical bus cables” on page 37.

Following functions are available only for the optical channels. Activation of the functions is independent of the set operating mode.

Kindly refer to the following chapters for detailed information.

Line monitoring via Echo

The repeater enables active monitoring of the connected optical paths for interruptions of the fibre optic cable through the “send echo”, “monitor echo” and “suppress echo” functions.

Send echo

If the repeater receives a telegram through any channel, the same is sent to all other channels. If the receiver is an optical channel, the repeater sends the telegram back to the related optical transmitter.

Monitor echo

If the repeater transmits a telegram - no echo! – to an optical channel, the Repeater expects an echo. If echo does not arrive after a specified time, echomonitoring error is signalled with a red LED belonging to a channel.

Suppress echo

The relevant receiver is separated from the remaining channels from the start of transmission of the telegram up to complete reception of the echo.

Segmentation

If an echo monitoring error or distortion occurs on an optical channel, the repeater assumes a line fault and blocks this channel for user data. The connected fieldbus subnetwork is thus segmented (detached). Due to this segmentation, the repeater on the opposite side of fibre optic is also segmented.

Both repeaters connected to the segmented fieldbus subnetwork transmit test telegrams to the segmented channel. Both repeaters can check the status of the fieldbus subnetwork through these test telegrams to be received regularly.

Segmentation is automatically cancelled as soon as both the repeaters detect the segmented fieldbus subnetwork with the help of test telegrams.

If all active bus stations in a previously active network are switched off, the repeaters are segmented in cycles for checking the fibre optic paths for neighbouring modules. In the absence of telegram traffic but intact fibre optic paths, the channel LEDs of the optical channels blink yellow in cycles.

4 Network topologies

Following network topologies are possible with OZD Profi G12D... ATEX 1:

- Point to point connection
- Line topology
- Star topology
- Redundant optical ring

Even combinations from these basic types are possible. For building up fibre optic paths of these network topologies lines with two optical fibres are used.

If a fault occurs – e. g. breakage of fibre optic line – high failure safety of the fieldbus network is required, availability of the network is increased by a redundant network configuration.

Kindly note:

- Individual terminal equipments or complete PROFIBUS segments with max. 31 stations can be connected to OZD Profi G12D...ATEX 1.
- Lay only fibre optic cables in severe EMC-risk areas in order to rule out EMC influences in the entire network.
- Optical channels, which are connected to each other via fibre optic cable, must have the same operating mode set.

4.1 Line topology

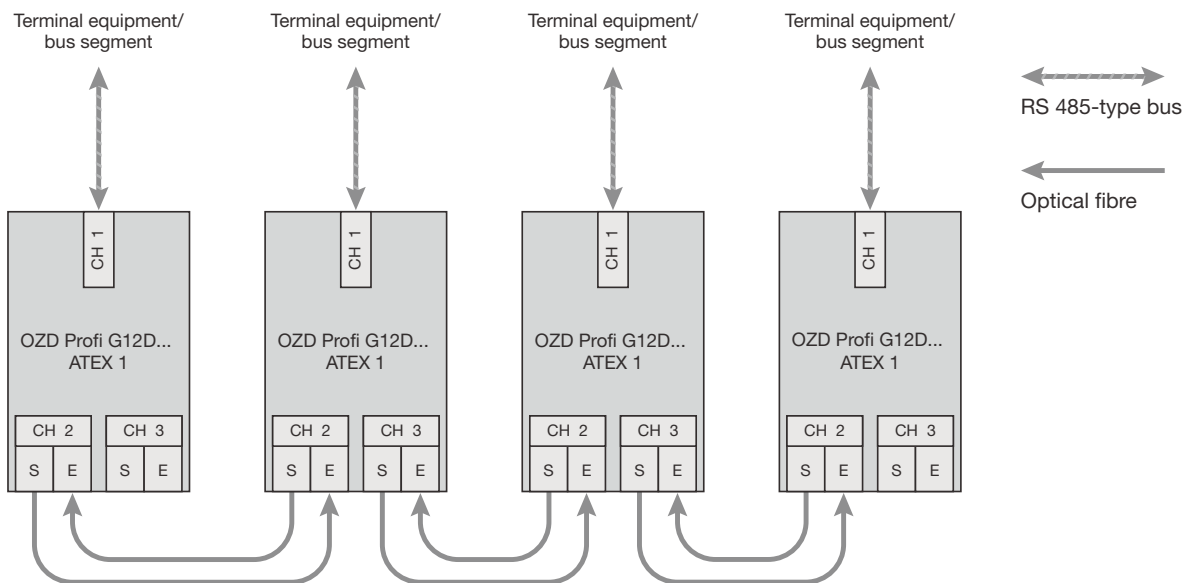


Fig. 4: Network structure in the optical line topology

Line topology can be implemented with and without fibre optic path monitoring. If both operating modes are used within a fibre optic line, the operating mode “line topology without fibre optic path monitoring” determines the availability of this fibre optic line. In homogenous OZD Profi networks, it is recommended to use the fibre optic path monitoring (factory setting).

Kindly note that following basic conditions must be complied with for a proper operation during network configuration:

- Parameters $MIN T_{SDR}$ specified in the PROFIBUS standard EN 50170 must be set at value ≥ 11 for all terminal equipment. This is generally the case, however, it must be checked at occurrence of permanent communication interferences.
- When configuring your network, select possibly low bus station addresses, in order to keep potential master time-outs small.

For changing the settings, kindly refer to the manufacturers documentation related to connected terminal equipment.

4.1.1 Line topology with fibre optic path monitoring and segmentation

Use this operating mode preferably if a faulty fibre optic segment should be separated from the remaining network.

■ Monitoring mechanisms:

Transmit echo:	yes
Monitor echo:	yes
Suppress echo:	yes
Monitor:	yes
Segmentation:	yes

In this operating mode, individual fibre optic paths are monitored by both the modules connected to it.

If a repeater breaks down or an optical fibre breaks or there is a fault in the optical transmission path, fibre optic path between both OZD Profi G12D... ATEX 1 is broken (segmented).

The PROFIBUS network disintegrates into two subnetworks, which each in itself - remains operational. Fault is signalled by switching the channel LED to red and activation of the signalling contact of both OZD Profi

G12D... connected to the faulty fibre optic path. Segmentation is automatically cancelled as soon as both the repeaters detect the uninterrupted segmented fieldbus subnetwork with the help of test telegrams.

Note that in case of fault, two logical token rings are formed for networks with several active bus stations. Each interconnection of the two subnetworks may thus lead to temporary network failure due to double token or telegram collisions.

Note:

If a line repeater with two optical channels is used at the beginning or the end, the non-allocated optical channel must be switched to the operating mode “line without fibre optic path monitoring”, so that it does not lead to a fibre breakage signalling.

Note that optical channels, which are not connected must be always protected with protective caps from external light incidence and dirt.

4.1.2 Line topology without fibre optic path monitoring

Use this operating mode, if you connect a OZD Profi G12D... ATEX 1 with another fibre optic network component as per PROFIBUS directive (optical/electrical converter), which does not transmit a telegram echo and does not expect or take any telegram echo.

■ Monitoring mechanisms:

Transmit echo:	no
Monitor echo:	no
Suppress echo:	no
Monitor:	no
Segmentation:	no

Individual fibre optic paths are not monitored in this operating mode.

4.2 Star topology

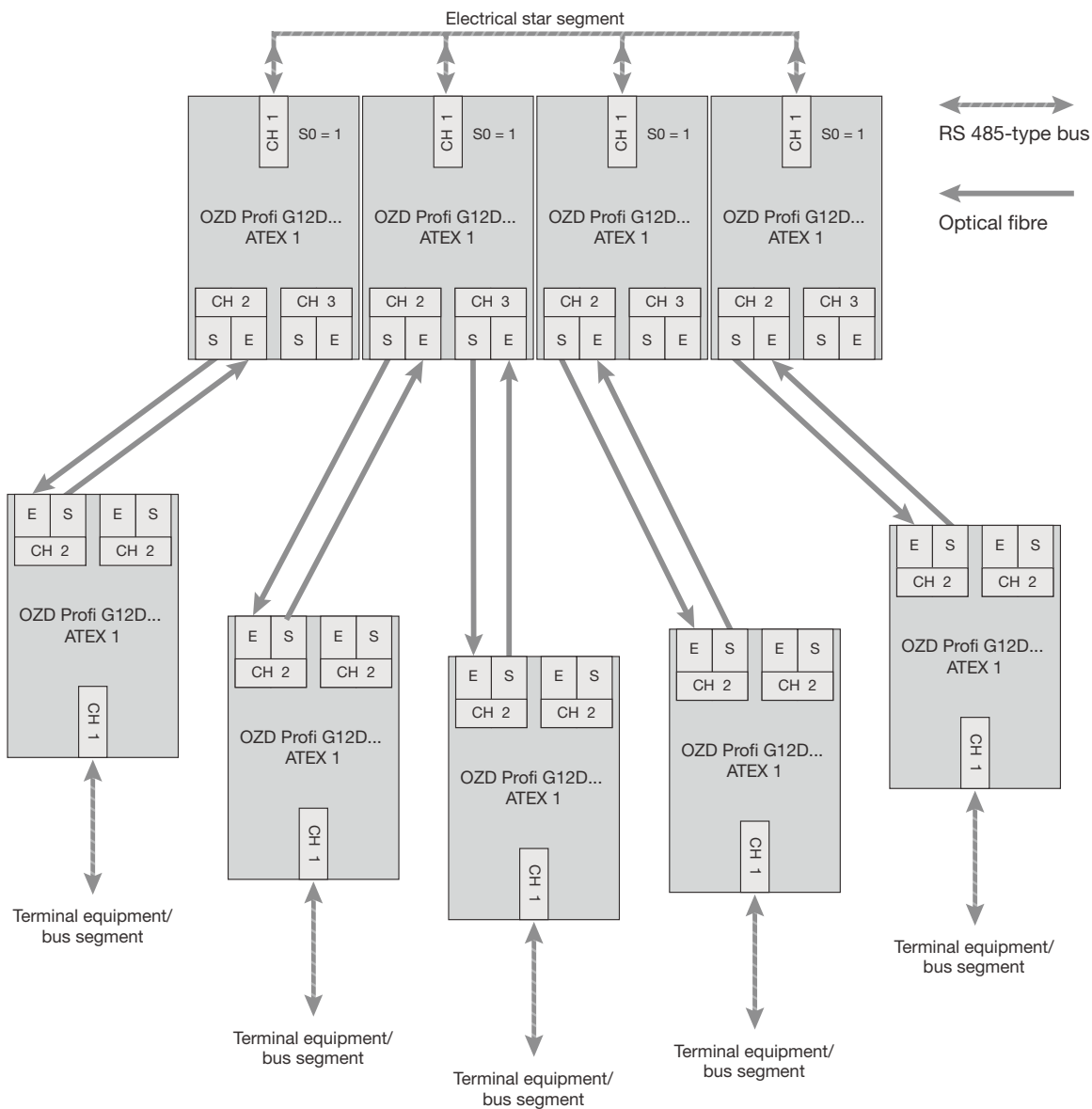


Fig. 5: Network structure in the optical star topology

Several repeaters are combined to form an active PROFIBUS star coupler. Other repeaters are connected to this via double-wire fibre optic lines. The repeaters of the star coupler are connected below each through electrical channels (electrical star segment).

Kindly note:

- For all OZD Profi G12D... ATEX 1, which are connected to the electrical star segment, CH1 must be switched to "Monitor off" mode ($S_0 = 1$). Segmentation function of RS 485 channel is thus switched off for this OZD Profi G12D... ATEX 1, for high availability of the electric star.

- Ensure that the electrical star segment is carefully wired. Keep its extension as short as possible, in order to prevent interferences in the electrical star segment and from there in the entire network. You may attain this by placing the OZD Profi G12D... ATEX 1 in the star segment directly adjacent to each other on a top-hat rail.
- Energise the terminating resistors on both the ends of the electrical star segments (see chapter 5.4.2, “connection/disconnection of internal terminating resistors”, page 35).
- Do not possibly connect any bus station to the electric star segment.

Note:

Non-allocated optical channels, which example are provided for subsequent extensions, lead to fibre optic line signalling during enabled path monitoring. You can avoid this error message, wherein, you switch the non-allocated channels to the operating mode “line without fibre optic path monitoring”. Kindly note that optical channels, which are not connected must be always protected with protection caps against external light incidence and dirt.

For enabled path monitoring on the optical channels, monitoring of fibre optic paths is provided by the respectively connected OZD Profi G12D... ATEX 1.

4.3 Redundant optical ring

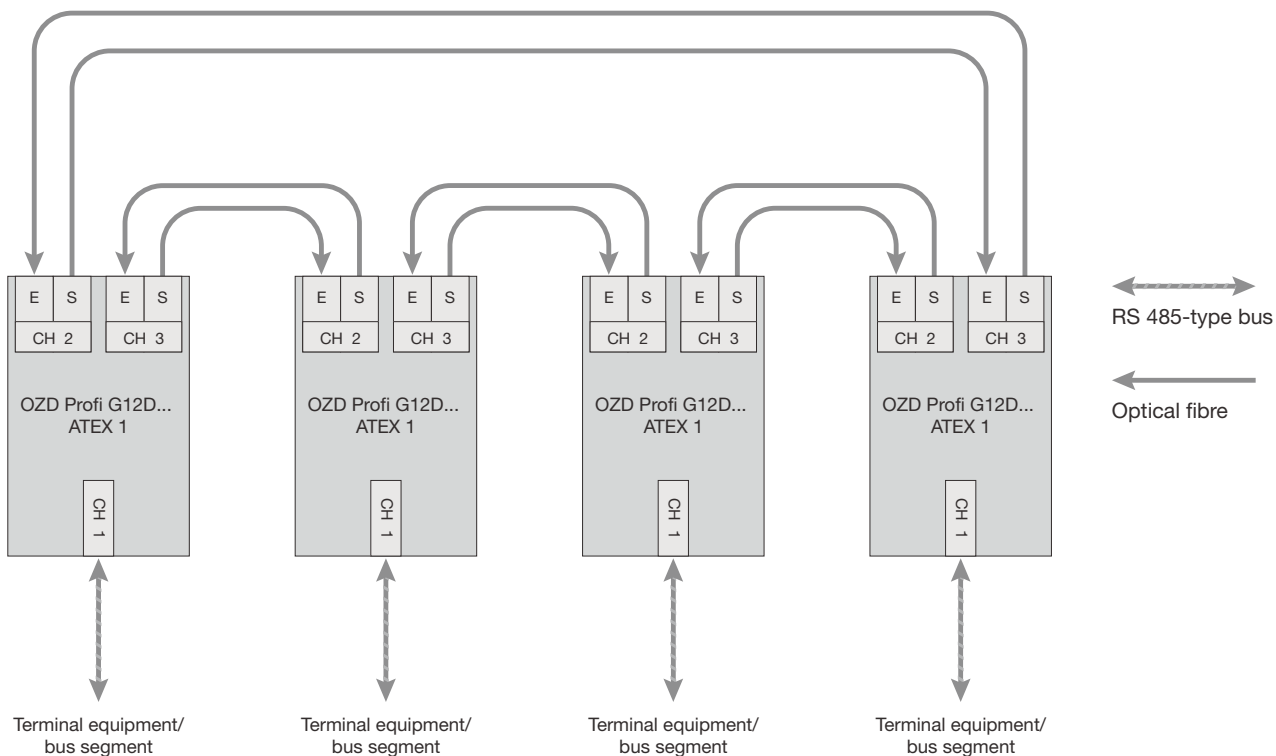


Fig. 6: Network structure in the redundant optical ring topology

This network topology presents a special form of line-topology. High operational safety of the network can be attained by “closing” the optical line.

■ **Monitoring mechanisms:**

Transmit echo:	yes
Monitor echo:	yes
Suppress echo:	yes
Segmentation:	yes

Interruptions of one or both optical fibres between two repeaters is recognised from the OZD Profi G12D... ATEX 1 and the ring becomes an optical line.

If the repeater breaks down, only terminal equipment or the RS 485 segment connected to this repeater are uncoupled from the ring. The rest of the network itself remains functional as a line. Error reporting is done by the LED of both the OZD Profi G12D... ATEX 1 connected to the faulty fibre optic path and through its signalling contact. Segmentation is automatically cancelled as soon as both the repeaters recognise the uninterrupted segmented fieldbus subnetwork with the help of test telegrams. The line again closes to form a ring.

Kindly note:

Following basic conditions must be complied with for proper operation:

- Operating mode “redundant optical ring” must be set on both the optical channels of all OZD Profi G12D... ATEX 1.
- All repeaters in the course of ring must be connected to each other via fibre optic lines. There should be no RS 485 bus cable during the course of a ring.
- Parameter $MIN T_{SDR}$ described in the PROFIBUS standard EN 50170 must be set at value < 11 for all terminal equipment. This is generally the case, however, it must be checked at occurrence of substantial communication interferences.
- When configuring your network, select possibly low bus station addresses, in order to keep potential master time-outs small.

- If there is redundancy (e.g. line breakage), it results into a switching time, during which correct data transmission may not be possible. For ensuring shock-free overbridging of the application, it is recommended to set the number of repetitions (retry) of the telegram at minimum 3 for the PROFIBUS master.

For ensuring shock-free switching back of the optical line to the optical ring after eliminating the fault, there must be no telegram at this point in the network. This state occurs if a master addresses a device, whose address is configured but is not actually available. The master tries to address this device in cycle and waits for a response (“GAP query”) maximum up to expiration of the configured slot time. OZD Profi G12D... ATEX 1 recognises this state and closes the optical line in the middle of this query sequence to the optical ring.

Two configuration requirements are produced for the redundant optical ring:

- The value of parameters **HSA** (Highest Station Address) must be set such for all terminal equipment, that between the bus address 0 and the value HSA at least one address in the network is **not** allocated by a bus station, there is at least one address gap. You can get this address gap simply by setting the value of the parameter HSA by at least one higher than the highest station bus address occurring in the network.

Attention: If this requirement is not and/or cannot be fulfilled any longer, the optical line cannot be closed for a redundant optical ring after a segmentation.

The fault message (LED and signal contact) of the two concerned OZD Profi G12D... ATEX 1 is not taken back after rectification of the fault.

- The **slot time** must be set at double the value than for a non-redundant network. Other information is in chapter 6, “configuration”, page 51. Kindly refer to the manufacturers documentation for change in settings of the terminal equipment or configuration software.

4.4 Combination with network topologies of ex-zone 2, 22

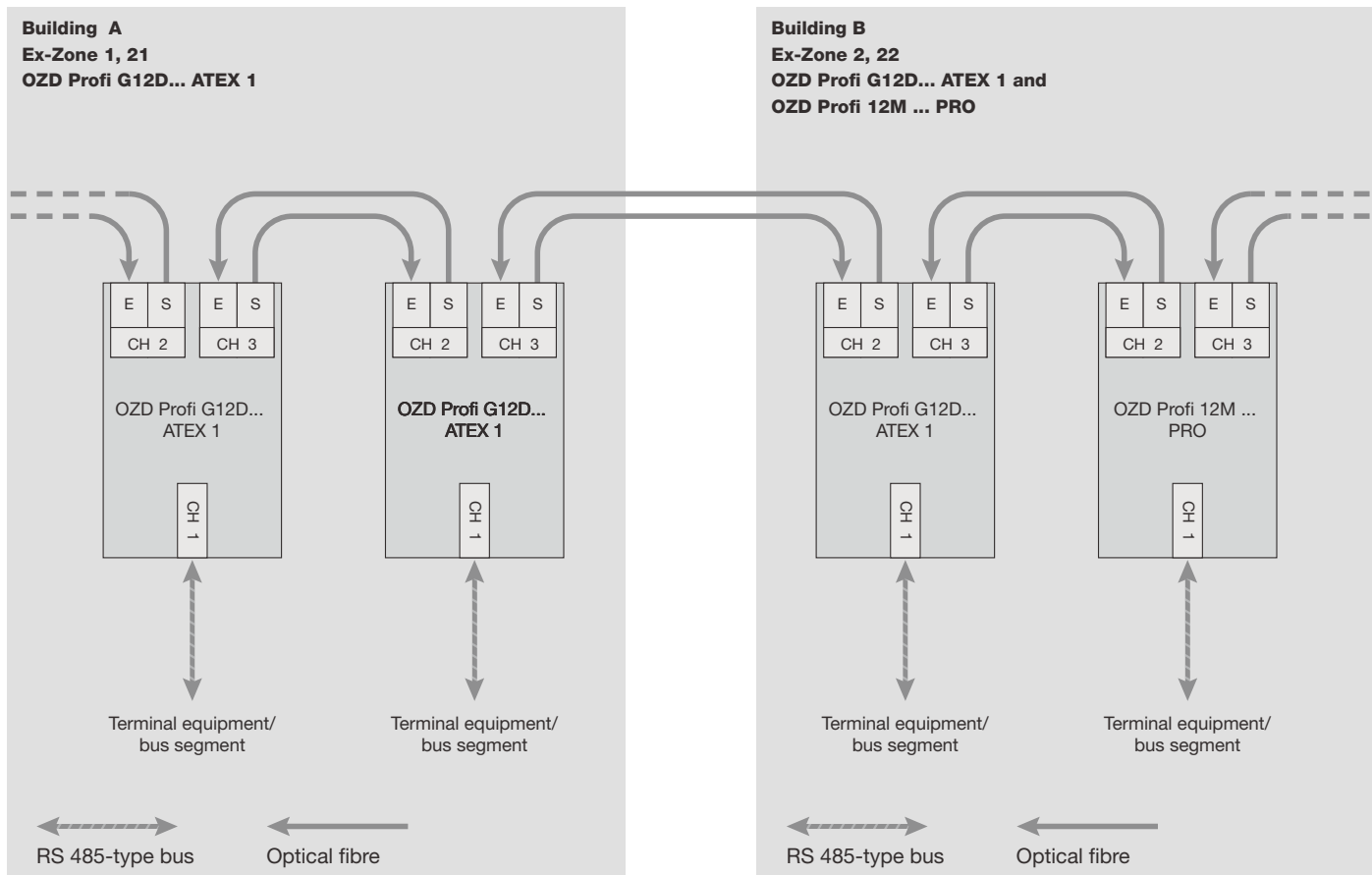


Fig. 7: Example for a transition from the ex-zone 1, 21 to ex-zone 2, 22

For transitions between the ex-zones 1, 21 and 2, 22 an optical cable for ex-zone 1, 21 a repeater OZD Profi G12D... ATEX 1 must be used in the ex-zone 1, 21. Other network segments outside the zone 1, 21 can be implemented through its second optical interface with repeaters OZD Profi 12M G11 (PRO), OZD Profi 12M G12 (PRO) or OZD Profi 12M G12 EEC (PRO). All topologies as per chapter 3.1, 3.2 and 3.3 are applied in the individual networks.

5 Startup

5.1 Design guidelines

5.1.1 Assembly in zone 1

OZD Profi G12DU ATEX 1 devices shall be installed into an enclosure that complies with one of the following types of protection as a minimum according to the respective field of application :

"Increased Safety", "Flameproof Enclosure" or "Protection by Enclosure".

OZD Profi G12DK/DE ATEX 1 devices may be installed in gas-ex in zone 1 or for dust-ex in zone 21.

The housing cover may be opened in zone 1 for servicing during ongoing operation.

The housing cover for dust-ex in zone 21 is opened only in currentless state or with hot work permit.

Terminals in increased safety are covered.

The cover may be removed only if there is no explosion hazard (hot work permit) or circuits are switched to zero potential beforehand.

Non-used inlet openings are to be sealed securely with certified sealing plugs in order to comply with the IP protection class. Likewise, seal inserts appropriate for the respective cable diameter must be used.

Excessive force on the glands may endanger the protection class.

5.1.2 Assembly in zone 2

OZD Profi G12DU ATEX 1 devices shall be installed into an enclosure that complies with one of the following types of protection as a minimum according to the respective field of application :

"Increased Safety", "Flameproof Enclosure" or "Protection by Enclosure".

OZD Profi G12DK/DE ATEX 1 devices may be installed in gas-ex in zone 2 or for dust-ex in zone 22.

IP5* must be complied with for non-conductive dust and IP6* for conductive dust.

The housing cover may be opened for servicing during ongoing operation.

All terminals are covered.

The cover may be removed in zone 2 and also in the safe area for servicing. The terminals are then accessible.

Non-used inlet openings are to be sealed securely with certified sealing plugs in order to comply with the IP protection class. Likewise, seal inserts appropriate for the respective cable diameter must be used.

Excessive force on the glands may endanger the protection class.

5.1.3 Assembly in safe area

The device types can be installed outside the ex-area.

The housing cover may be opened for servicing during ongoing operation.

Terminals in increased safety are covered.

The cover may be removed any time during assembly in safe area.

5.1.4 Electromagnetic Compatibility (EMC)

The electromagnetic compatibility (EMC) comprises all queries of the electrical, magnetic and electromagnetic spinning and spin-off effects.

for avoiding electromagnetic interferences in electrical systems , these effects must be restricted

to a minimum. Limitation measures mainly include design and proper connection of bus cables and the suppression of switched inductors.

5.1.5 Suppression of switched inductors



Warning!

Interference suppressor must comply with the ATEX directives in the explosive hazard area.

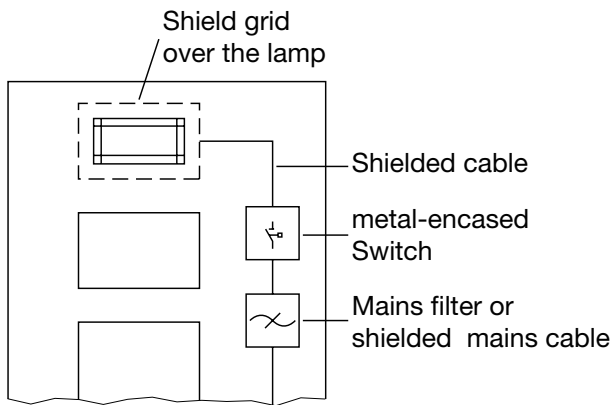


Fig. 8: Measures against suppression of fluorescent lamps in the cabinet

- ▶ Switch switched inductors with suppressors
Switching of inductors e.g in relays and fans causes interference voltages, the amount of which is much more than the switched operating voltage. These interference voltages may affect electronic devices. The interference voltages of inductors must be limited to the emission source by switching with suppressors (diodes or RC wiring). Use only interference suppressors, which are intended for the relays or fans used by you.
- ▶ Cabinet lighting
Use bulbs for cabinet lighting, e. g. LINESTRA lamps. Avoid using fluorescent lamps as these lamps create interference fields. If fluorescent lamps cannot be used, measures shown in figure 8 must be taken.

5.1.6 Spatial arrangement of devices and cables

- ▶ Reduce interference by distance.
Likewise a simple as well as effective alternative for reducing interferences is in the spatial separation of interfering and susceptible devices and cable. Inductive and capacitive interferences decrease in the square of the distance of the involved elements. That means, doubling the distance reduces the effects of the interference by factor 4. If layout considerations right in the planning phase of a building or a control cabinet can generally be very cost-effective.

- ▶ Standard recommendations for spatial arrangement of devices and cables
Recommendations for spatial arrangement of devices and cables with the aim of ensuring a possibly low mutual interference, includes EN 50174-2.

- ▶ Handling sheaths for the bus cables
Follow the following measures when sheathing the cables:
 - Use universally sheathed cables. The sheaths of these cables must feature sufficient coverage density of the sheath, for complying with the legal requirements for interference emissions and interference immunity.
 - Always place the sheaths on both sides of the bus cables. You can fulfill the legal requirements for inter-

ference emission and interference immunity of your device (CE sign) only by connecting both-sided connection of the sheath.

- Remove the insulation of the sheath of the bus cable without interruption and place it on a potential equalisation bar. This in turn must be connected via a short cable with the functional earth of OZD Profi G12D... ATEX 1.

Note:

For potential differences between the grounding points an unauthorised high equalising current may flow through the sheath connected on both sides. Do not in any case separate the sheath of the bus cable for rectifying the fault!

Following solution is permitted:

Lay an additional potential equalisation cable parallel to the bus cable, which accepts the sheath current. For this note "PROFIBUS, technical directive, design guidelines PROFIBUS-DP/FMS" (issuer: PROFIBUS Nutzer organisation e.V.).

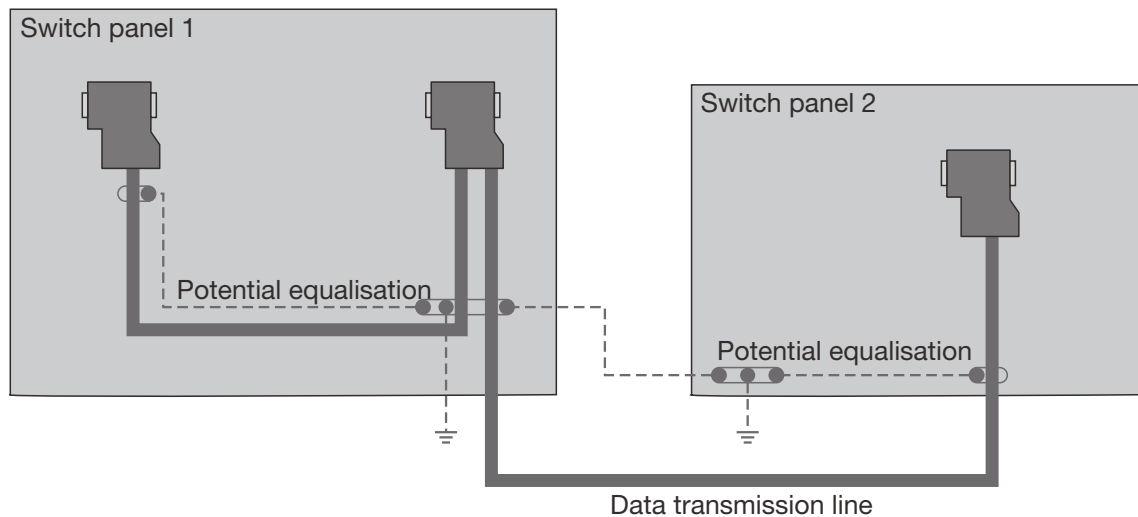


Fig. 9: Laying a potential equalisation cable parallel to the bus cable

5.1.7 Execution of sheath connections

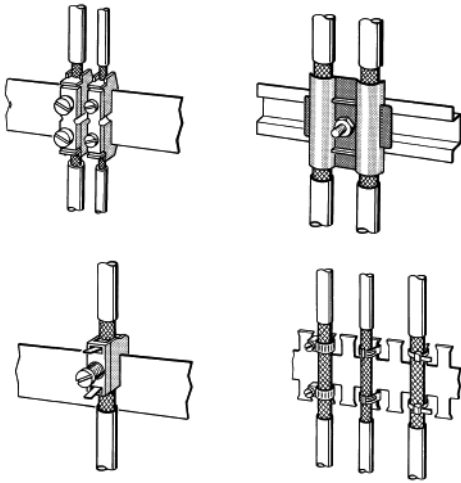


Fig. 10: Fixing sheathed cables with cable clamps and hose clip (schematic presentation)

Kindly consider following points when laying the cable sheaths:

- ▶ Fix braid cable sheath with metal cable clamps.
- ▶ The clamps must extensively enclose the sheath and have a good contact (see Figure 10).
- ▶ Contact the cables only through the copper braid sheath and not through the aluminium foil sheath. The foil sheath is placed on a plastic foil for increasing the tensile strength and thus non-conductive!
- ▶ All cable sheaths leading from outside to the protective housing must be intercepted at the entry point of the protective housing and extensively contacted with the earth of the protective housing.
- ▶ When removing the cable sheaths ensure that the braid sheath of the cables is not damaged. Tinned or galvanically stabilised surfaces are ideal for a good mutual contact of grounding elements. For tinned surfaces, the required contacts must be ensured with a suitable gland. Painted surfaces at the point of contact are not suitable.
- ▶ Sheath catching/contacts must not be used as strain relief. Contact to the shielding bus may deteriorate or tear.

5.2 Startup process

Startup of PROFIBUS Fiberoptic Repeater
OZD Profi G12D... ATEX 1 is done in following steps:

- ▶ Assemble/disassemble repeater
- ▶ Setting the operating mode, connecting/disconnecting the terminating resistors
- ▶ Connect optical bus cables
- ▶ Connect electrical bus cables
- ▶ Connect functional earth
- ▶ Connect signal contact cables (optional)
- ▶ Define reception level of optical channels
- ▶ Connect operating voltage supply
- ▶ Monitor LED indicators

5.3 Assemble/disassemble repeater

5.3.1 Assembly of OZD Profi G12DU ATEX 1

The Fiberoptic Repeater OZD Profi G12DU ATEX 1 can be assembled on

- a 35 mm top-hat rail as per IEC 60715: 1981 + A1: 1995 or
- a flat surface (pre-assembled top-hat rail must be unscrewed beforehand).

Assembly on top-hat rail

- ▶ Select the assembly location such that climatic limit values specified in the technical data are maintained.
- ▶ Consider adequate space for the connection of bus and supply cables.
- ▶ For easy installation of the optical fibre connect this to the repeater before the assembly.
- ▶ Assemble the repeater on the top-hat rail.
For this, mount the top latch of the repeater on the top-hat rail and press the lower side - as shown in figure 11 - on the rail, till the latch engages.

Note:

You may disassemble the repeater from the top-hat rail, wherein, you unlock the snap device as shown in figure 12 with a screwdriver.

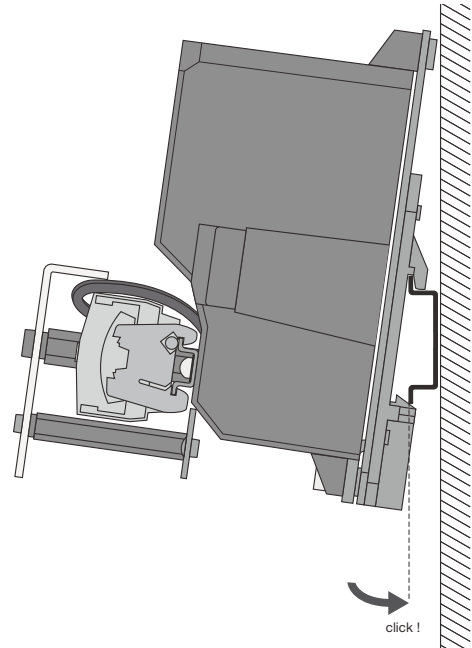


Fig. 11: Assembling the repeater on a top-hat rail

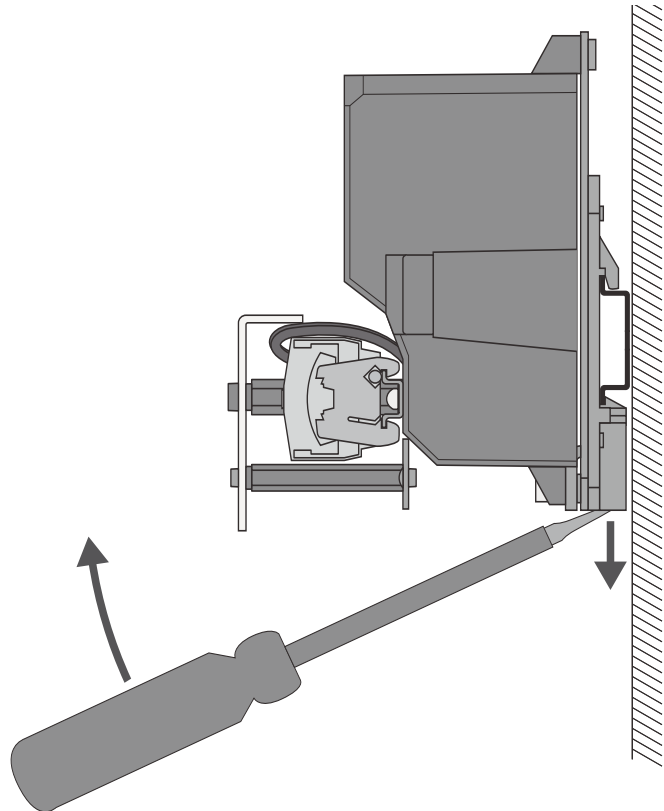


Fig. 12: Disassembling the repeater from a top-hat rail

Assembly on an even base

The repeaters are provided with three mounting brackets. These enable assembly on an even base - e.g. on the assembly plate of a control cabinet. It can be installed horizontally or vertically.

- ▶ Select the assembly location such that climatic limit values specified in the technical data are maintained.
- ▶ Unscrew the pre-assembled top-hat rail adapter.
- ▶ Drill three holes in the assembly plate as per the drilling dimensions in figure 14.
- ▶ Screw the repeater on the base.

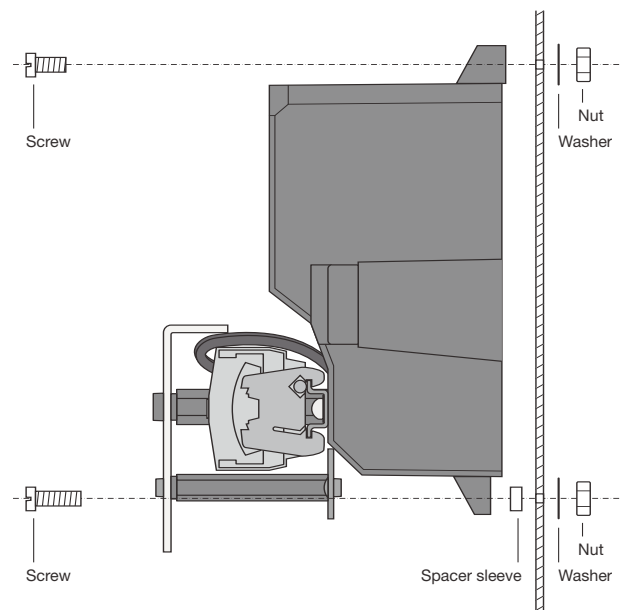


Fig. 13: Assembling the repeater on an assembly plate

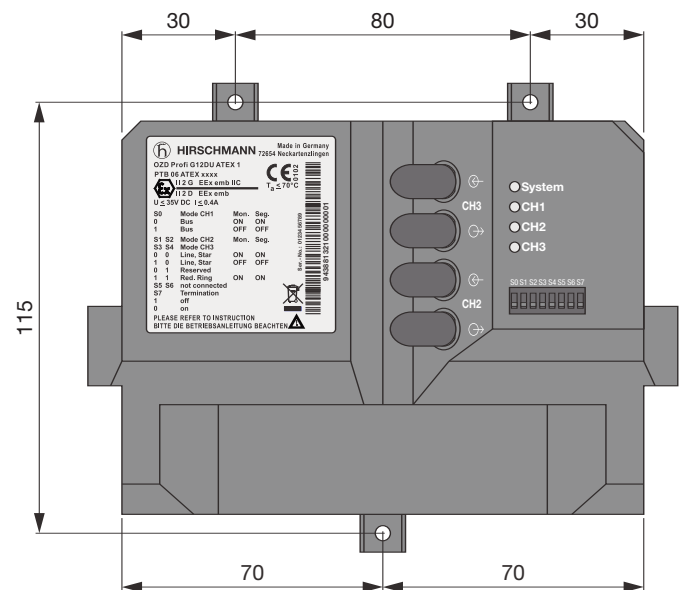


Fig. 14: Drilling dimension OZD Profi G12DU ATEX 1

5.3.2 Assembly of OZD Profi G12DK ATEX 1

The repeater is provided with four semi-circular cutouts at the bottom. These enable assembly on an even base. It can be installed horizontally or vertically.

- ▶ Select the assembly location such that climatic limit values specified in the technical data are maintained.
- ▶ Drill four holes in the assembly plate as per the drilling dimensions in figure 16.
- ▶ Unscrew the housing cover.
- ▶ Remove the four holders for the cover screws.
- ▶ Screw the repeater on the base.
- ▶ Reinstall the four holders for the cover screws.
- ▶ If required, screw on the housing cover again.

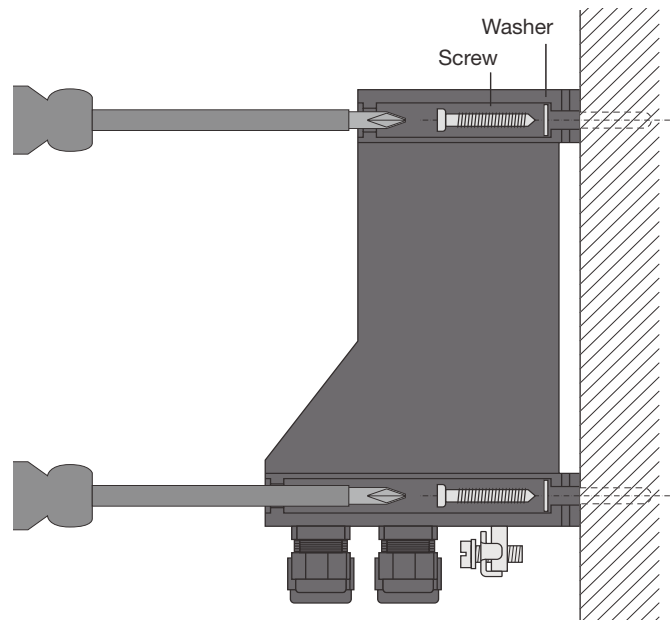


Fig. 15: Assembling the repeater on an even base

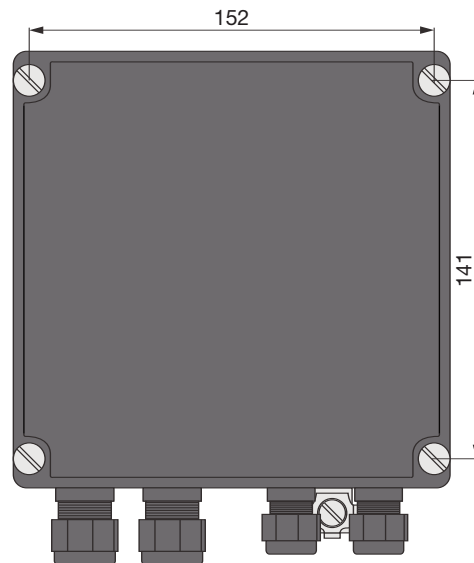


Fig. 16: Drilling dimension OZD Profi G12DK ATEX 1

5.3.3 Assembly OZD Profi G12DE ATEX 1

The repeater is provided with two brackets at the bottom. These enable assembly on an even base. It can be installed horizontally or vertically.

- ▶ Select the assembly location such that climatic limit values specified in the technical data are maintained.
- ▶ Drill two holes in the assembly plate as per the drilling dimensions in figure 18.
- ▶ Screw the repeater on the base.

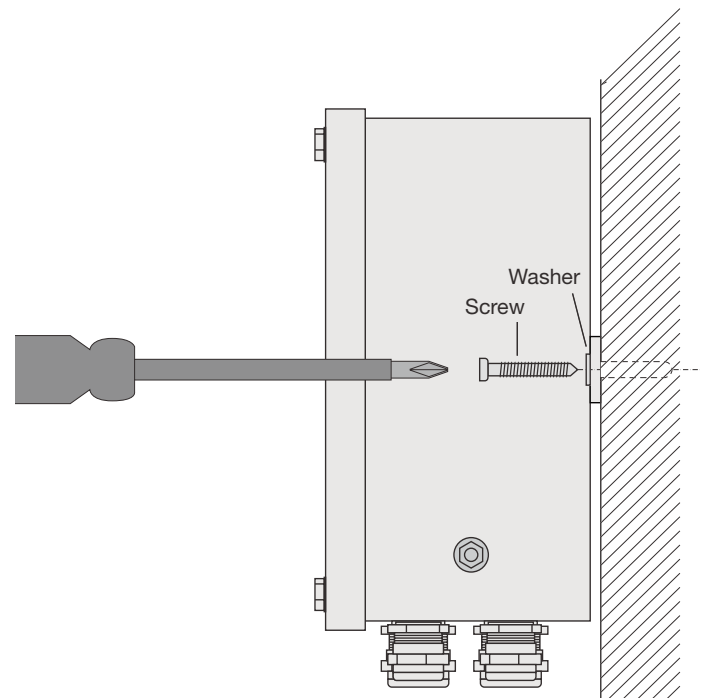


Fig. 17: Assembling the repeater on an even base

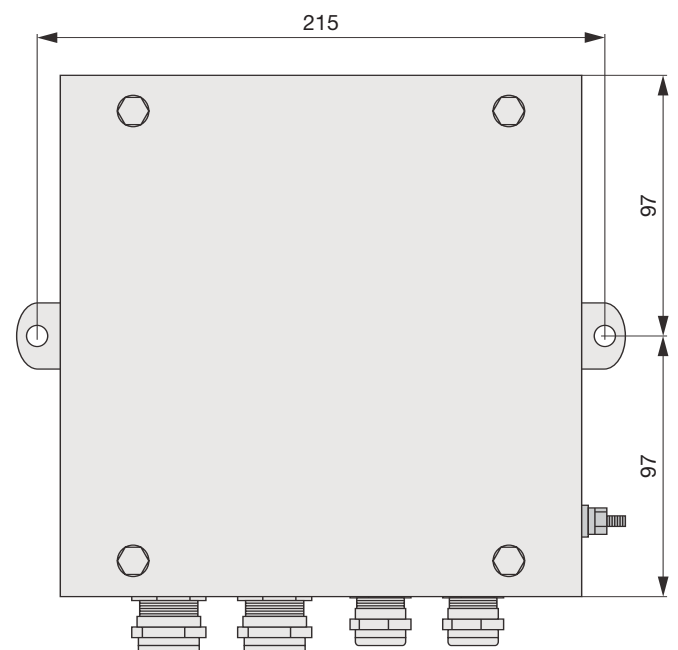


Fig. 18: Drilling dimension OZD Profi G12DE ATEX 1

5.4 Setting the mode, connection/disconnection of terminating resistors

Setting of the operating mode and the connection/disconnection of the terminating resistors is done with the DIP switches. These are on the front side of the OZD Profi G12DU ATEX 1 (see figure 19).

Note:

For OZD Profi G12DK ATEX 1 and OZD Profi G12DE ATEX 1 the DIP switches are accessible after removing the cover.

Note:

The DIP switches **S5** and **S6** are without functions.

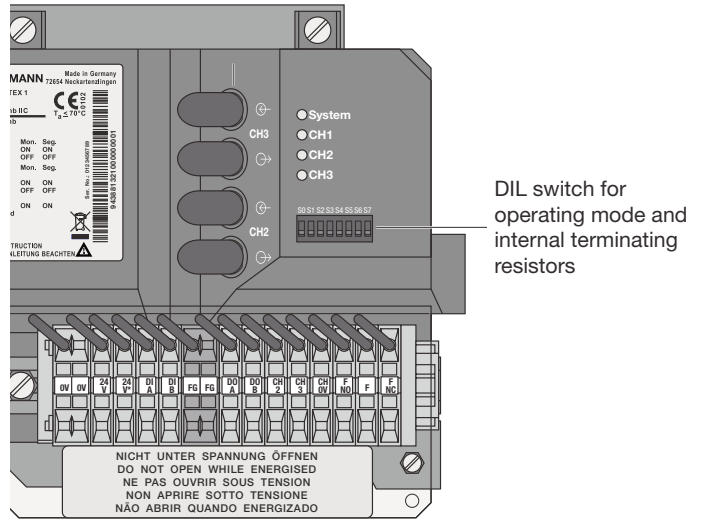


Fig. 19: Location of the DIP switch for OZD Profi G12DU ATEX 1 (OZD Profi ...DK... and OZD Profi ...DE... : after opening the housing)

5.4.1 Setting the mode

Kindly note:

If the operating voltage for the repeater is already applied e.g for subsequent reconfiguration, then the operating voltage must be switched off for setting the operating mode.

With the DIP switch **S0** the **operating mode** of the electrical channel **CH1** is set.

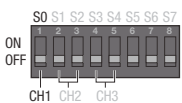
With the DIP switch **S1** and **S2** the **operating mode** of the optical channel **CH2** is set.

With the DIP switch **S3** and **S4** the **operating mode** of the optical channel **CH3** is set.

With the DIP switch **S7** the internal **terminating resistors** are connected and disconnected.

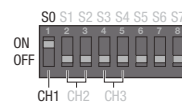
5.4.1.1 Setting the operating mode of the electrical channel (CH1)

Operating mode “electrical channel with segment monitoring“



CH1 is connected in this operating mode, if S0 is in the OFF position.

Operating mode “electrical channel without segment monitoring“



CH1 is connected in this operating mode, if S0 is in the ON position. Kindly note that the operating mode should be set only in the star segment of the star topology.

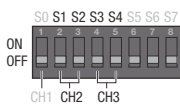
5.4.1.2 Setting the operating mode of the optical channels (CH2, CH3)

Operating mode can be set separately for each optical channel. Combinations of the operating modes “Line with and line without fibre optic path monitoring” are possible.

Kindly note that operating mode of both the optical channels connected to each other via the fibre optic cable must be always set similar!

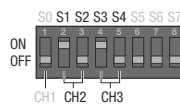
The operating mode “redundant optical ring” must be always set on both the optical channels.

Operating mode “Line with fibre optic path monitoring and segmentation“



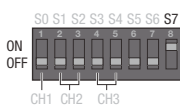
CH3 is connected in this operating mode, if S3 and S4 are in the OFF position.
 CH2 is connected in this operating mode, if S1 and S2 are in the OFF position.

Operating mode “Line without fibre optic path monitoring“



CH3 is connected in this operating mode, if S3 is in the ON position and S4 is in OFF position.
 CH2 is connected in this operating mode, if S1 is in the ON position and S2 is in the OFF position.

Operating mode “redundant optical ring“



CH3 is connected in this operating mode, if S3 and S4 are in the ON position.
 CH2 is connected in this operating mode, if S1 and S2 are in the ON position.

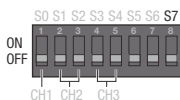
Kindly note that this operating mode must be always set on both optical channels of a module.

5.4.2 Connection/disconnection of internal terminating resistors

If the repeater is at the beginning or end of the bus segment, the internal terminating resistors must be set.

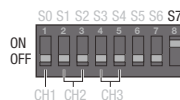
Note: The repeater must not be disconnected when connecting/disconnecting the terminating resistors.

Internal terminating resistors are connected



if S7 is in the OFF position.

Internal terminating resistors are disconnected



if S7 is in the ON position.

5.5 Connect optical bus cables

The repeaters are equipped with two optical ports.

- ▶ Connect the individual repeaters via a duplex fibre optic cable with BFOC/2.5 (ST[®]) plug-in connectors.
- ▶ Note the maximum length of the fibre optic cable and the possible fibre types specified in the technical data.
- ▶ Always ensure that an optical input a and an optical output J are connected to each other (cross connection). Associated BFOC sockets of both the ports are identified on the lateral adhesive label.
- ▶ Lead the fibre optic cable for OZD Profi G12DK ATEX 1 and OZD Profi G12DE ATEX 1 as shown in figure 20 and figure 21 via cable entries (PG glands).

Note: The PG-glands have slotted seals. The fibre optic connector must not be lead through the seal, however, you can bend open the seal and lay it around the fibre optic cable.

- ▶ Ensure adequate stress relief of fibre optic cable and note its minimum bending radii.
- ▶ Do not close the non-allocated BFOC sockets with the provided protective caps. Incident ambient light may interfere with the network, particularly at high ambient light. Penetrating dust may make the optical components unusable.

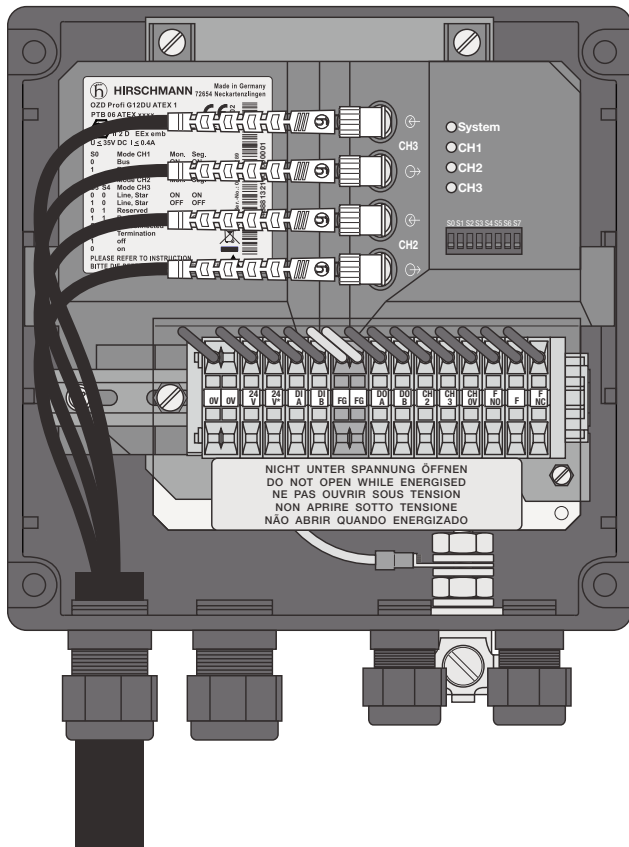


Fig. 20: Cable routing of the fibre optic cable for OZD Profi G12DK ATEX 1

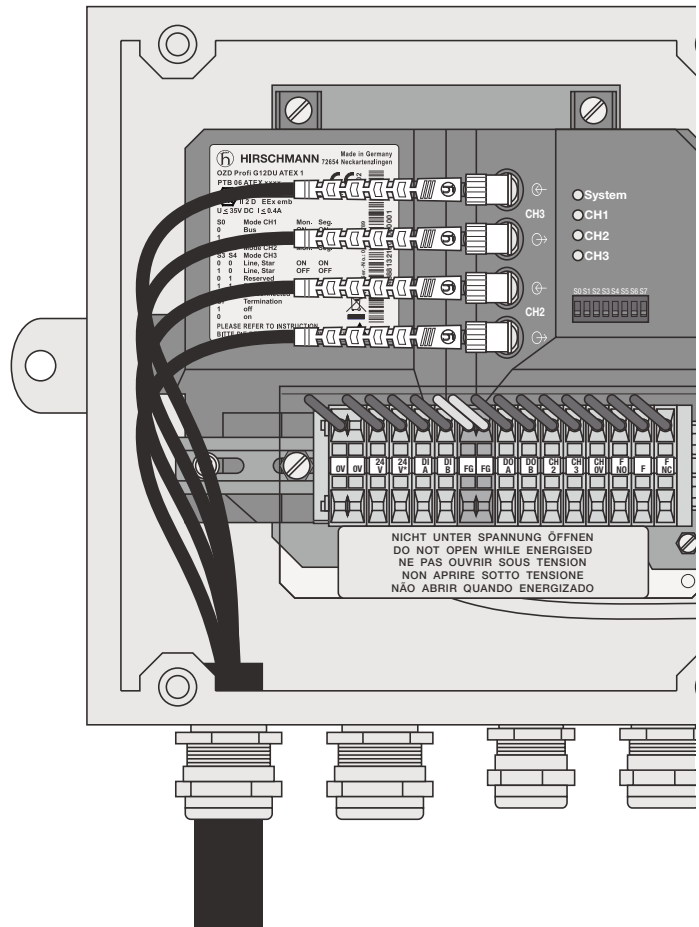


Fig. 21: Cable routing of the fibre optic cable for OZD Profi G12DK ATEX 1

5.6 Connect electrical bus cables

Warning! Work on ex-e cables in zone 1 is permitted only with hot work permit or in the current-free state.

The repeaters are equipped with an electrical port with RS 485 level.

The RS 485 bus cables are designed in the protection class ex-e EN 60079-7:2007. They are placed on the front side of the OZD Profi G12DU ATEX 1 on four separate single terminals (DI A, DI B, DO A and DO B). The terminals have a valid type approval certificate. The connections are in duplicate in order to loop through the bus cable through the device.

Note: The terminals are accessible for OZD Profi ... DK ... and OZD Profi ... DE ... after opening the protective housing.

Note: If the terminating resistors are not connected, data cable is looped through without signal regeneration through the device.

The RS 485 bus cables RxD/TxD-N and RxD/TxD-P are galvanically separated (functional separation) vis-a-vis the 24 V supply voltage within the SELV limits.

The RS 485 interface is galvanically connected to the potential equalisation connection.

- ▶ Connect the RS 485 bus cable and its cable shield to the terminal block, see fig 22.

Note:

Ensure that bus segments connected to the 485 interface are terminated on both the ends.

- ▶ Use only shielded pair cables as RS 485 bus cable
- ▶ Ensure adequate stress relief of RS 485 bus cable and consider its minimum bending radii.

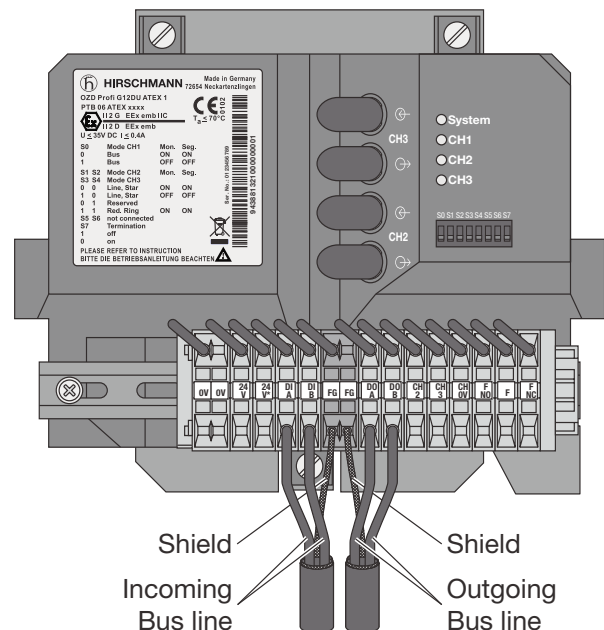


Fig. 22: Terminal block - connections of the electrical bus cables for OZD Profi G12DU ATEX 1 (OZD Profi ...DK ... and OZD Profi ... DE ... : after opening the housing)

- ▶ Remove RS 485 bus cable from OZD Profi, if no device is connected on the other cable-end or the same has been switched currentless. The open cable otherwise works as an antennae and can couple interferences.
- ▶ Follow the following sequence when connecting a RS 485 bus cable to the OZD Profi G12D... ATEX 1 for an active network, in order to minimise the disturbances :
 1. RS 485 bus connector to the device to be connected (e.g. on the programming unit) and screw on tightly.
 2. Install RS 485 bus cables on OZD Profi G12D... ATEX 1 .
 Proceed in the reverse sequence when removing a repeater from the network.

**Warning!**

OZD Profi G12DU ATEX 1: The sheath of the data cable must be connected in the control cabinet together with the functional earth connection to a potential equalisation bar.
 OZD Profi ... DK ... and OZD Profi ... DE ... :
 The connection for the functional earth on the housing must be connected to the potential equalisation bar.
 The potential equalisation bars of the control cabinets, which are mutually connected via an electrical RS 485, must be connected mutually at low-resistance.

**Warning!**

Do not connect any RS 485 bus cables, which are laid wholly or partially outside the building. Otherwise, lightning strikes in the area may destroy the repeater.
 Establish the bus connections, leave the building with fibre optic cable!

**Warning!**

There is no galvanic separation between the bus cables and the functional earth connection. Hence follow the following safety information:

Do not connect the repeater via bus cables with system parts, having a different earth potential. The potential differences may lead to destruction of the repeater!

- ▶ Lead both the RS 485 cables OZD Profi G12DK ATEX 1 and OZD Profi G12DE ATEX as shown in figure 23 through the two cable entries (PG-glands).

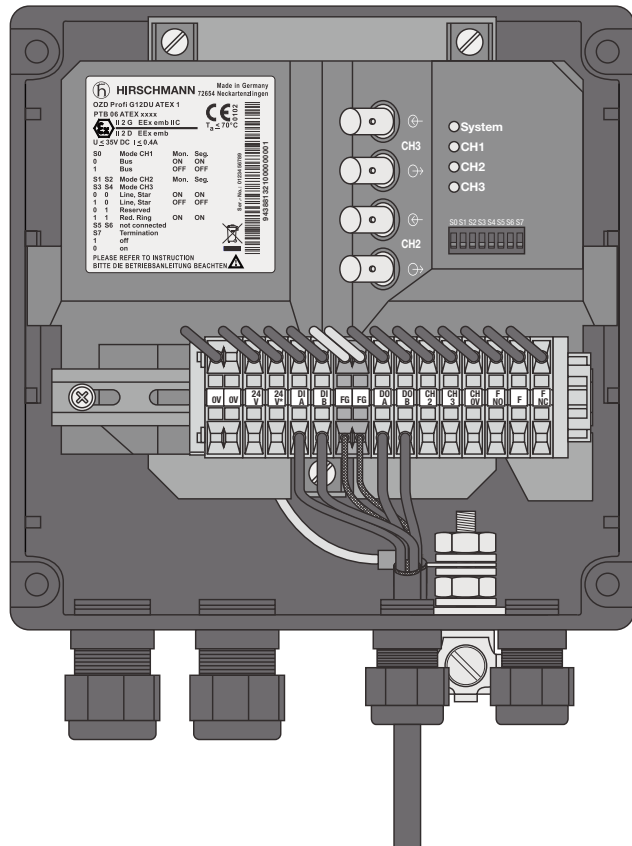


Fig. 23: Cable lead-through of the electrical bus cables for OZD Profi G12DK ATEX 1
 (OZD Profi ... DE ... : analog)

5.7 Connect functional earth

Warning! Work on ex-e cables in zone 1 is permitted only with hot work permit or in the current-free state.

The repeaters are equipped with connection for the functional earth.

The functional earths are designed in the protection class ex-e EN 60079-7:2007. It is placed on the front side of the OZD Profi G12DU ATEX 1 on a separate single terminal (FG). The terminal has a valid type approval certificate.

Note: For OZD Profi ... DK ... and OZD Profi ... DE ... the cables are lead on a terminal accessible from outside (see fig 25).

- ▶ Connect the cable for the functional earth for OZD Profi ... DK ... to the terminal block (see fig 24), for OZD Profi G12DK ATEX 1 and OZD Profi G12DU ATEX 1 (see fig 25) to the terminal accessible from outside.
- ▶ Ensure adequate stress relief of the cables and note its minimum bending radii.

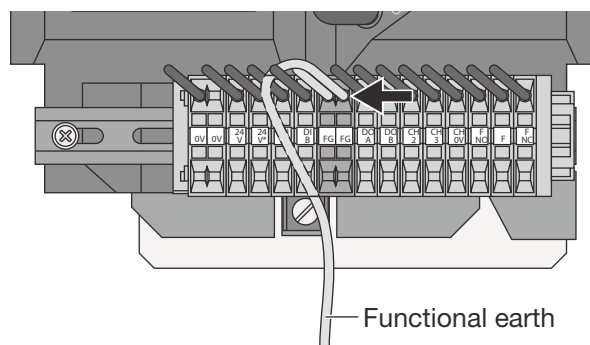


Fig. 24: Terminal block - connection of functional earth for OZD Profi G12DU ATEX 1

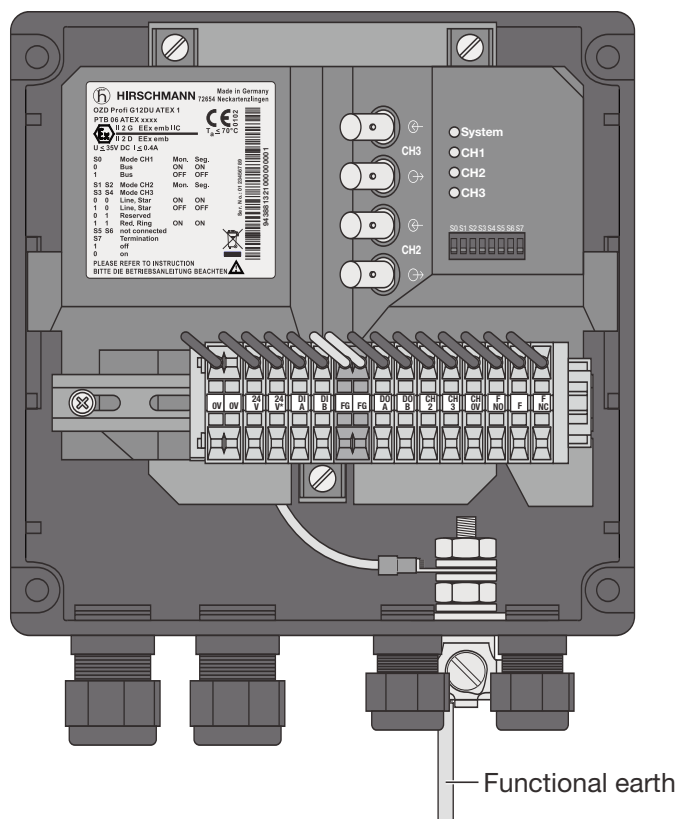


Fig. 25: Connection of the functional earth for OZD Profi G12DK ATEX 1 (OZD Profi ... DE ... : analog)

5.8 Connect signal contact cables (optional)



Warning!

Work on ex-e cables in zone 1 is permitted only with hot work permit or in the current-free state.

The repeaters are equipped with a signalling contact connection.

The signalling contact connection is designed in the ignition protection ex-e EN 60079-7:2007. The connection cables are placed on the front side of the OZD Profi G12DU ATEX 1 on three separate single terminals (F NO, F NC and F). The terminals have a valid type approval certificate.

Note: The terminals are accessible for OZD Profi ... DK ... and OZD Profi ... DE ... after opening the protective housing.

- ▶ Connect the signalling contact cable to the terminal block, see fig 26.
- ▶ Lead the signalling contact cable for OZD Profi G12DK ATEX 1 and OZD Profi G12DE ATEX as shown in figure 27 through the cable entries (PG-glands).
- ▶ Ensure adequate stress relief of the cables and note its minimum bending radii.



Warning!

- Limit values of the relay contact
- maximum switching voltage: 32 V
 - maximum switching current: 1.0 A
 - maximum switching capacity: 30 W

Voltage connected to the relay must be a **safety low voltage** as per IEC 950/EN 60 950/ VDE 0805 and according to the UL/CSA approval must comply with the regulations of NEC, class 2.

Kindly ensure correct connection allocation of the terminal block. Ensure adequate electrical isolation of the connection cables of the signalling contacts. Faulty allocation may destroy the repeater.

Breakdowns of the network and the repeater can be signalled by the signalling contact connection.

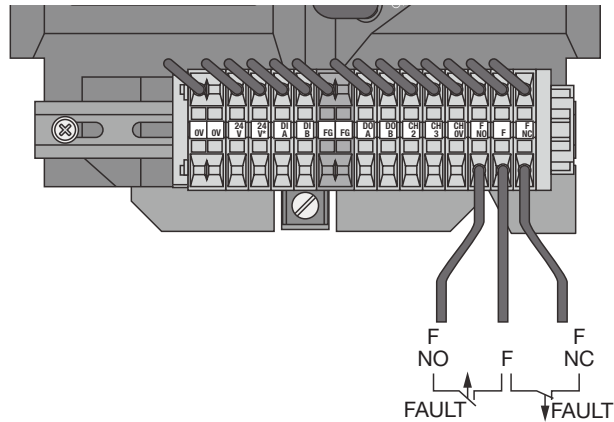


Fig. 26: Terminal block - connection of the signalling contact cables for OZD Profi G12DU ATEX 1 (OZD Profi ...DK ... and OZD Profi ... DE ... : after opening the housing)

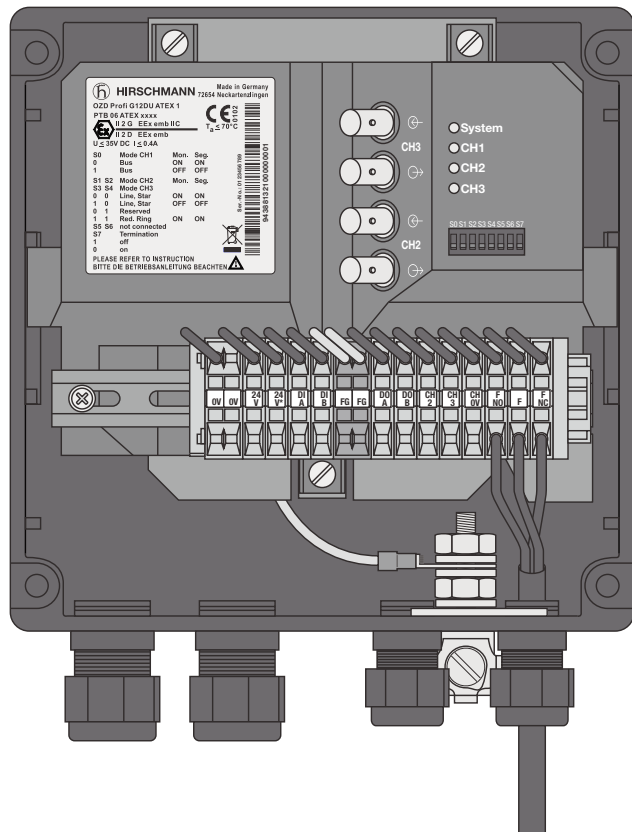


Fig. 27: Cable lead-through of the signalling contact for OZD Profi G12DK ATEX 1 (OZD Profi ... DE ... : analog)

In an error-free operation, the connections F and FNC (NC -> normally connected) are connected mutually by an internal relay contact. At occurrence of an error or disconnected supply voltage, F and FNO (NO -> normally open) are mutually connected.

Kindly refer to chapter 6.1 “LED indicators“, page 45 for breakdowns signalled with the signalling contact.

5.9 Define reception level of optical channels

Warning! Work on ex-e cables in zone 1 is permitted only with hot work permit or in the current-free state.

The repeaters are equipped with measuring points for two analog voltage for diagnosis.

The analog voltage outputs are designed in the protection class ex-e EN 60079-7:2007. They are placed on the front side of the OZD Profi G12DU ATEX 1 on three separate single terminals (CH 2, CH 3 and CH 0V). The terminals have a valid type approval certificate.

Note: The terminals are accessible for OZD Profi ... DK ... and OZD Profi ... DE ... after opening the protective housing.

The reception level of the two optical channels CH 2 and CH 3 can be determined with a standard voltmeter on the terminal block (see fig 27 and 28). The OZD Profi G12D... ATEX 1 is protected against a short-circuit on the terminals, brief interruption of data transmission is however possible*.

With that
 – the incoming optical power is documented, e.g. for subsequent measurements (aging, damage)
 – a good/bad check can be conducted (limit value).

Further information is in appendix A.1, “Determine reception level of the optical channels“ page 57.

* Measurement is done with a floating, high impedance voltmeter.
 The reference potential socket must not be connected to the housing of the OZD Profi 12M

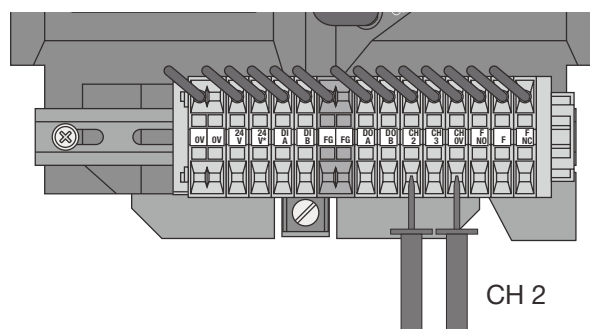


Fig. 28: Terminal block - reception level for CH 2 for OZD Profi G12DU ATEX 1 (OZD Profi ...DK ... and OZD Profi ... DE ... : after opening the housing)

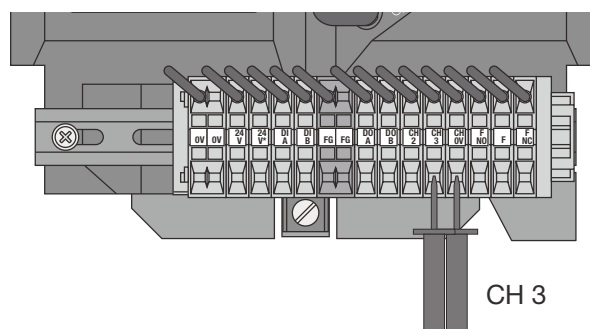


Fig. 29: Terminal block - reception level for CH 3 for OZD Profi G12DU ATEX 1 (OZD Profi ...DK ... and OZD Profi ... DE ... : after opening the housing)

5.10 Connect operating voltage supply

Warning! Work on ex-e cables in zone 1 is permitted only with hot work permit or in the current-free state.

The repeaters are equipped with a connection for two independent operating voltages.

The supply voltage connection is designed in the ignition protection ex-e EN 60079-7:2007. The connection cables are placed on the front side of the OZD Profi G12DU ATEX 1 on three separate single terminals (24 V, 24 V* and 0V). The terminals have a valid type approval certificate.

The 4 connections of the double terminal for the 0V connection are galvanically connected to each other, colour gray, ex-e.

Note: The terminals are accessible for OZD Profi ... DK ... and OZD Profi ... DE ... after opening the protective housing.

- ▶ Connect the cables for the operating voltage supply to the terminal block, see fig 30.
- ▶ Lead the RS cable for the operating voltage for OZD Profi G12DK ATEX 1 and OZD Profi G12DE ATEX as shown in figure 31 through the cable entries (PG glands).
- ▶ Ensure adequate stress relief of the cables and note its minimum bending radii.

Warning! Supply the module only with a stable **safety low voltage** as per IEC 950/EN 60 950/VDE 0805 of maximum +32 VDC (typ. +24 VDC). Voltage source must comply with NEC, class 2 as per the UL/CSA approval.

For increasing the operational safety, the module can be supplied redundant through terminals 0 V and 24 V* . At breakdown of the regular supply voltage the module automatically switches to the redundant operating voltage supply. There is no load distribution between individual supply options.

The signalling contact does not signal the breakdown of an individual 24 V supply. For monitoring, like the signalling contact, both the supplies must be placed on an input module.

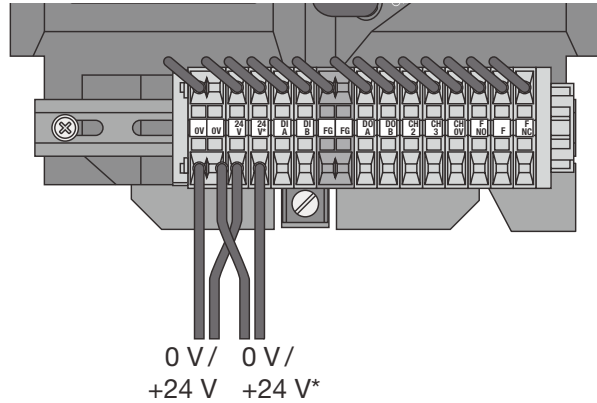


Fig. 30: Terminal block - connection of the supply voltage for OZD Profi G12DU ATEX 1 (OZD Profi ...DK ... and OZD Profi ... DE ... : after opening the housing)

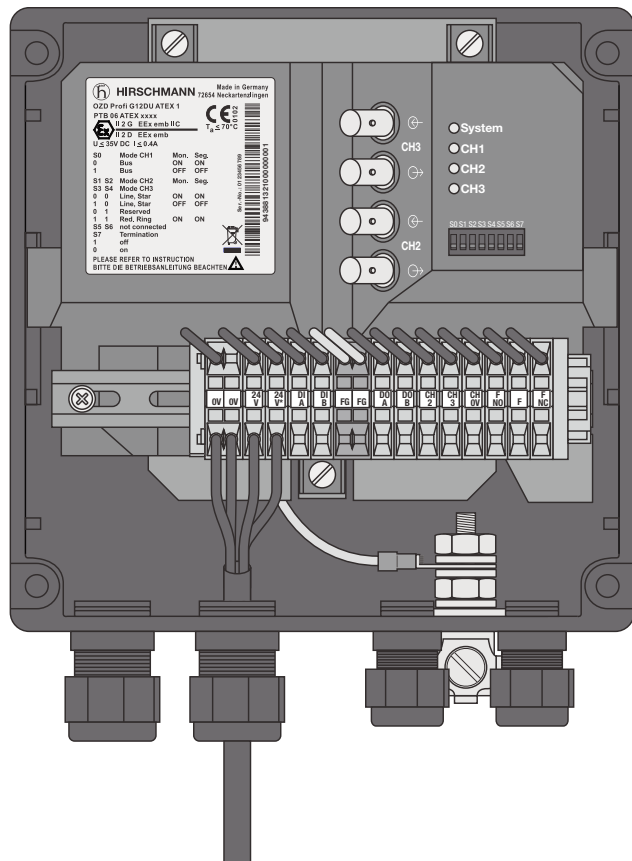


Fig. 31: Cable lead-through of the supply voltage for OZD Profi G12DK ATEX 1 (OZD Profi ... DE ... : analog)

5.11 Monitor LED indicators

- ▶ LEDs for diagnosis are on the front side of the device of OZD Profi G12DU ATEX 1.
You can find the meaning in chapter 6.1, LED-indicators, page 45.

Note: For OZD Profi ... DK ... and OZD Profi ... DU ... the LEDs are visible after opening the protective housing.

Note: For the OZD Profi ... DK ... a housing cover with a window is provided as an accessory, so that the LEDs are always visible.

6 Troubleshooting

6.1 LED indicators

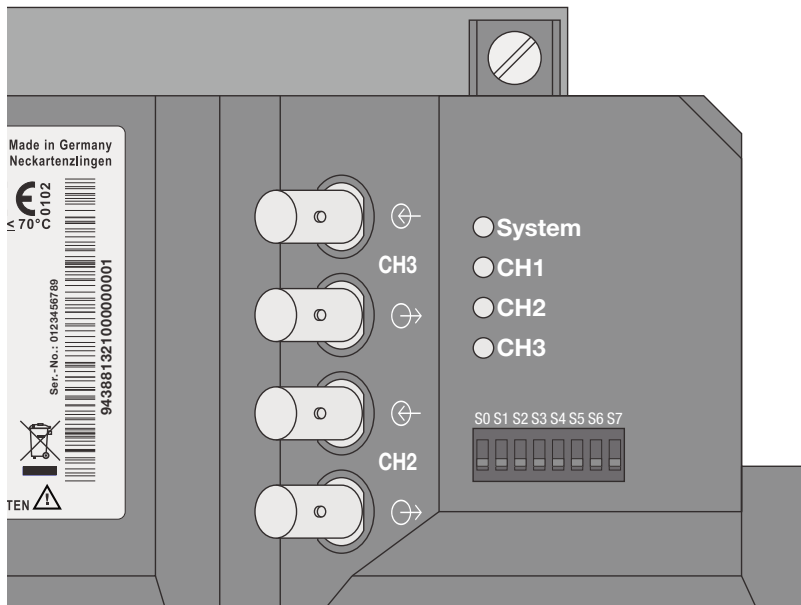


Fig. 32: LED indicators for OZD Profi G12DU ATEX 1
(OZD Profi ...DK ... and OZD Profi ... DE ... : after opening the housing)

LED indicators	Possible reasons	Signalling contact
System <ul style="list-style-type: none"> ■ glows green ■ does not glow 	<ul style="list-style-type: none"> - The transmission speed was detected and the voltage supply is ok - Breakdown of the voltage supply (total breakdown*) - Supply voltage wrongly connected - Defective module 	<ul style="list-style-type: none"> does not respond responds
<ul style="list-style-type: none"> ■ blinks red 	Transmission rate not yet detected <ul style="list-style-type: none"> - No transmitting bus station available - No connection to a telegram transmitting partner module - Transmitting and receiving fibre optics are swapped - Transmission rate does not comply with the PROFIBUS standard - Only one active bus station is connected, which transmits token only to itself. After connecting a second bus station the indicator must change (token telegrams alone are not adequate for setting the transmission rate). - The connected RS 485 segment is closed only on one side 	<ul style="list-style-type: none"> does not respond
<ul style="list-style-type: none"> ■ blinks red/green 	Transmission rate detected but <ul style="list-style-type: none"> - The slot time of the network could not be determined (network parameter HSA set very low, no transmitting bus station available) - An optical channel is set at mode "redundant optical ring", but not the second one (this operating mode must be always set at both optical channels) - The slot time of the network is set at a very low value 	<ul style="list-style-type: none"> does not respond

* for redundant supply breakdown of both supply voltages

LED indicators	Possible reasons	Signalling contact	
CH1 electric	<ul style="list-style-type: none"> ■ glows yellow ■ does not glow 	<p>Signals are received on RS 485 bus cable.</p> <ul style="list-style-type: none"> – Bus station is not connected – Connected bus station is not switched on – Interruption of one or both wires of the RS 485 bus cable 	<p>does not respond</p> <p>does not respond</p>
	<ul style="list-style-type: none"> ■ blinks/glows red 	<p>Sporadic interferences through</p> <ul style="list-style-type: none"> – Inadequate sheathing of the RS 485 bus cable – Open, i.e. RS 485 bus cable connected only on one side to the module – RS 485 segment not connected or connected only on one side – Pull/insert a RS 485 bus terminal or terminal plug <p>Constant interference due to</p> <ul style="list-style-type: none"> – Wires A and B of the RS 485 bus cable are swapped – Short circuit on the RS 485 bus cable – Transmission timeout caused by a bus station, which is in a bus segment connected to channel 1 – Module and a bus station connected through channel 1 transmit simultaneously (e.g. due to duplicate address allocation or very little set slot time or when removing the segmentation in the optical line, see chap. 4.1.1, page 20) – RS 485 driver of the module is defective (e.g. after lightning) 	<p>responds</p> <p>does not respond</p>
		<p>PROFIBUS telegrams are received on the optical channel</p> <p>Operating mode “Line with fibre optic path monitoring“ and “redundant optical ring“</p> <p>Transmission rate is not yet detected - “LED” blinks red</p> <ul style="list-style-type: none"> – No transmitting bus station available – Transmitting and receiving fibre optics are swapped – No partner module connected or partner module is not switched on – Connected partner module defective <p>Transmission rate is detected - LED “system” glows green</p> <ul style="list-style-type: none"> – If operating mode “redundant optical ring“ is set, the optical channel functions as standby channel There is no malfunction in the OZD Profi or on the fibre optic – If one of the operating modes “Line fibre optic path monitoring ...“ is set, no PROFIBUS telegrams are received on the optical channel. There is no malfunction in the OZD Profi or on the fibre optic. 	<p>does not respond</p> <p>does not respond</p>
CH2, CH3 optical	<ul style="list-style-type: none"> ■ glows yellow ■ does not glow 	<p>Transmission rate is detected - LED “system” glows green or blinks red/green</p> <ul style="list-style-type: none"> – There is no transmitting bus station (fibre optic connection is ok) 	<p>does not respond</p> <p>responds</p>
	<ul style="list-style-type: none"> ■ blinks yellow ■ glows red 	<ul style="list-style-type: none"> – Transmitting and receiving fibre optics are swapped – No partner module connected or partner module is not switched on – Connected partner module defective – Transmission timeout of the connected partner module – Interruption of a fibre optic cable – Fibre optic path to partner module is longer than allowed – Loose connection on a fibre optic connector – Optical fibre in the fibre optic connector is loose – If on a redundant optical ring the channel LED glows red even after rectification of fibre optic failure, check whether setting of parameter HSA described in chap. 4.3 page 22 has been complied with. 	<p>does not respond</p> <p>responds</p>
	<ul style="list-style-type: none"> ■ blinks red/yellow 	<ul style="list-style-type: none"> – Periodically occurring error (see above) – Loose connection on a fibre optic connector – Optical fibre in the fibre optic connector is loose – Only one active bus station is connected, which transmits token only to itself. After connecting a second station, no error should be displayed 	<p>responds</p>
	<ul style="list-style-type: none"> ■ glows yellow ■ does not glow 	<p>Operating mode “Line without fibre optic path monitoring“</p> <p>Signals are received on the optical channel</p> <ul style="list-style-type: none"> – No transmitting bus station available – Transmitting and receiving fibre optics are swapped – No partner module connected or partner module is not switched on – Connected partner module defective 	<p>does not respond</p> <p>does not respond</p>

Table 1: Meaning of LED indicators and signalling by signal contact

6.2 Fault finding

This chapter provides you help to locate the location of error after error signalling (LED or signal contact). For this kindly note the description of the LED indicators in chapter 6.1, pag 45.

Error display in the system LED

See description of LED indicators in chapter 6.1, page 45.

Error display on CH1

Check whether

- ▶ the DIP switch is in the ON position, if the OZD Profi on the electric star segment is on a star topology. (see chapter 4.2, "Star topology", page 21)
- ▶ the error pattern can be seen even after disconnecting the electrical bus stations.
Also: device defective".
Replace the OZD Profi.
No longer exists: The interference is from the RS485 bus segment.
Check
 - the structure and the shielding of the RS485 bus segment
 - the RS485 bus segment with a PROFIBUS bus monitor
 - configuration of all bus stations.

* Is not applicable, if the monomaster of a PROFIBUS network is connected to a RS485 bus segment that is to be checked In this case replace the conspicuous OZD profi with another OZD Profi of the network and subsequently execute the above test.

If the error migrates with the OZD Profi, there is a defect in the device. Replace the OZD Profi.

If the error does not migrate with the OZD Profi, then the interference is from the RS485 bus segment. Execute measures as described above.

Error display on CH2 / CH3

1. Check whether
 - ▶ optically only repeaters of the same type are connected mutually (see chapter 4, "network topologies" page 19).
 - ▶ he optical fibre is permitted for the used module type and the permitted length is not exceeded
 - optical channels, which are mutually connected, have the same operating mode set. (see chapter 5.4; "setting the operating mode, connect/disconnect terminating resistors", page 34)
 - ▶ when connecting and laying the optical bus cables, specifications in 5.5 "connect optical bus cables" page 36 were complied with.
2. Determine the optical reception level (see Appendix A.1, "determine reception level of the optical channels", page 57):
 - Level is in the range "Function not guaranteed".
 - ▶ Check the optical fibre attenuation with an optical level measuring device.
 - very high: Replace optical fibre
 - within the One of the two OZD Profi of the
 - valid range: faulty fibre optic segment is defective. First replace the other OZD Profi of the faulty fibre optic segment (i.e. the OZD Profi, which delivers the transmission-signal to the above measurement). If the error persists, instead of this replace the other OZD Profi.
 - Level is in the range "optical system reserve reduced" or "normal operation".
 - ▶ As described above, check the optical reception level of the other OZD Profi of the faulty fibre optic segment on the appropriate channel.

- Level is on **both** OZD Profi of the faulty fibre optic segment in the range “optical system reserve reduced” or “normal operation“: one of the two OZD Profi of the faulty fibre optic segment is defective.
 - ▶ First replace a OZD Profi of the faulty fibre optic segment. If the error persists, instead of this replace the other OZD Profi.

6.3 Problem report

If the transmission in the RS 485 network is not satisfactory even after clarification of points in chapter 6.2 , “fault finding”, page 47, send your replies to the following queries as well as the requested documents to our service hotline (contact address: see chapter 6.4, page 49):

1. Precise type description of OZD Profi G12D... ATEX 1. Kindly specify the 18 digit number printed on the device for clear identification.
2. Does the bus system to be transmitted comply with standard RS 485 in the physical interface?
3. Does the bus access method of the used bus system ensure that only station on the bus can be accessed at any point of time?
Attention! collision-afflicted access methods (e.g. CAN) are not permitted!
4. Does the fieldbus system work in “half duplex-“ or “full duplex“ procedure?
5. Give a possibly detailed error description in your own words.
6. Send a detailed network plan with
 - the fibre type and the fibre length
 - the location and the length of the electrical segments,
 - the values, the type and the position of the termination on the electrical bus segment.
7. Which data rate is used?
8. How are the DIP switches set for the individual OZD Profi G12D... ATEX 1 ?
9. What is the status of the LEDs on the concerned OZD Profi G12D... ATEX 1 ?
10. Specify the voltage value of the analog voltage outputs (terminal Ua2 and Ua3 on the 3 pole terminal block on the front side of the device) of the concerned port.
11. Name and manufacturer of the fieldbus system?

Important!

We cannot process your request without complete details on questions 1 to 11!

Note:

The current version of this manual is on the Internet under <http://www.hirschmann.com/> through the product search for product.
The version of the manual is on every page of the manual at the bottom opposite the page number.

6.4 Contact address

Contact address for technical support

Hirschmann Automation and Control GmbH
Stuttgarter Strasse 45 - 51
72654 Neckartenzlingen
Germany

Tel.: +49 (0)1805 14 1538

E-Mail: HAC.Support@Belden.com

Internet: <http://www.hirschmann.com>

7 Configuration

Due to the telegram delays through cables and network components and through monitoring mechanism in the network components, when configuring the PROFIBUS

network parameter “slot time“ must be adapted to the network extension, network topology and the data rate.

7.1 Configuration of redundant optical rings

In the redundant optical ring following configuration conditions must be fulfilled (details see chapter 4.3, “redundant optical ring“, page 22):

- (1) Configuration of a non-available bus station
- (2) Increase in retry value to minimum value 3
- (3) Reviewing and adjusting the slot time

For setting the parameter under (2) and (3) use user-specific profile of the configuration tools.

Calculate the slot time according to the following equation:

$$\text{Slot time} = a + (b \cdot \text{Length}_{\text{of the fibre optic}}) + (c \cdot \text{number}_{\text{OZD}})$$

- “Slot time“ is the monitoring time in bit times
- “Length_{fibre optic}“ is the total of all fibre optic cables (segment lengths) in the network.
Length specification must in km!
- “Number_{OZD}“ is the number of OZD Profi G12D... ATEX 1 in the network.

Factors a, b and c depend upon the transmission speed and can be inferred from the following table.

Data rate	a	b	c
12 MBit/s ¹⁾	1651	240	28
6 MBit/s ¹⁾	951	120	24
3 MBit/s ¹⁾	551	60	24
1,5 MBit/s	351	30	24
500 kBit/s	251	10	24
187,5 kBit/s	171	3,75	24
93,75 kBit/s	171	1,875	24
45,45 kBit/s	851	0,909	24
19,2 kBit/s	171	0,384	24
9,6 kBit/s	171	0,192	24

Table 2a: Constants for calculating the slot time for DP standard (redundant optical ring)

Data rate	a	b	c
12 MBit/s ¹⁾	1651	240	28
6 MBit/s ¹⁾	951	120	24
3 MBit/s ¹⁾	551	60	24
1,5 MBit/s	2011	30	24
500 kBit/s	771	10	24
187,5 kBit/s	771	3,75	24
93,75 kBit/s	451	1,875	24
45,45 kBit/s	851	0,909	24
19,2 kBit/s	181	0,384	24
9,6 kBit/s	171	0,192	24

Table 2b: Constants for calculating the slot time for DP/FMS (“Universal“) and DP with S595U (redundant optical ring)

The slot time calculation considers only the optical network and the connection of bus stations to the OZD Profi through max. 20 m length RS 485 bus segment. Longer RS 485 bus segments must be calculated additionally, wherein, they are added to the Length_{fibre optic}.

Note:

If the slot time is calculated with a very low value, it may lead to malfunctions and error displays on OZD Profi 12M The system LED blinks red/green.

8 Technical data

OZD Profi G12 ...	DU ATEX 1	DK ATEX 1	DE ATEX 1
power supplies			
Operating voltage	18 V to 32 VDC, typ. 24 VDC, (redundant inputs decoupled), Safety low voltage, galvanically separated		
Power consumption	max. 200 mA		
Power input	5 W		
Signalling contact			
Maximum witching voltage	60 VDC; 42 VAC safety low voltage), galvanically separated from housing and all electric connections		
Maximum switching current	1.0 A		
Signal transmission			
Transmission speed	9.6; 19.2; 45.45; 93.75; 187.5; 500 kBit/s 1.5; 3; 6; 12 Mbit/s		
Adjustment of transmission speed	automatic		
Bit error rate	$< 10^{-9}$		
Signal processing time (any input/output)	$< 6.5 t_{\text{bit}}$		
Retimer			
Input channel 1 to 3			
Signal distortion	$\pm 30 \%$		
Bit length	$\pm 0,12 \%$		
Output channel 1 to 3			
Medium bit length	$\pm 0,01 \%$		
Electric channel			
Input/output signal	RS 485 level		
Input resistance	-10 V to +15 V		
Optical channels			
Wave length	860 nm		
Launchable optical power			
– in glass fibre G 50/125	-15 dBm		
– in glass fibre G 62.5/125	-13 dBm		
Optical input	min. -28 dBm		
Transmission limit receiver	-3 dBm		
Bridgeable distance			
– with glass fibre G 50/125 (860 nm: 3.0 dB/km)	0 - 3000 m ¹⁾		
– with glass fibre G 62.5/125 (860 nm: 3.5 dB/km)	0 - 3000 m ¹⁾		
Plug-in connector	B/2.5		

OZD Profi G12 ...	DU ATEX 1	DK ATEX 1	DE ATEX 1
Electromagnetic Compatibility (EMC)			
Emitted immunity	Limit class A (EN 55022), FCC CFR 47 part 15, Class A		
Interference immunity against static discharge	on shield connection and housing parts: ±4 kV contact discharge (EN 61000-4-2)		
Interference immunity against high frequency radiation	–10 V/m at 80% amplitude modulation with 1 kHz, – 80 MHz - 1 GHz (EN 61000-4-3) –10 V/m with 50% duty cycle at 900 MHz (ENV 50204) –10 V/m at 80% amplitude modulation with 1 kHz, 10 kHz - 80 MHz		
Interference immunity against conducted disturbances (burst)	On power supply lines and sheathed RS 485 bus cables: ±2 kV (EN 61000-4-4)		
Interference immunity against conducted disturbances (surge voltage, surge)	– On power supply lines: ±1 kV symmetric – On sheathed RS 485 bus cables: ±2 kV asymmetric (EN 61000-4-5)		
Climatic ambient conditions			
Ambient temperature	–20 °C to +60 °C (IEC 60068-2-1, IEC 60068-2-2)		
Storage temperature	–40 °C to +70 °C (IEC 60068-2-14)		
Relative humidity	10 % - 100 %		
Air pressure	Operation: to 2000 m (795 hPa) Transport and storage: to 3,000 m (700 hPa)		
Pollution degree	2		
Explosion protection			
EC-type examination certification	PTB 09 ATEX 2044 X	PTB 09 ATEX 2045	PTB 09 ATEX 2045
Fibre optic	inherent safe		
Ignition protection	II 2 (1) G Ex mb e [ia] opis II, IIC, IIB T4/T6		
	-	II 2 (1) D Ex tD A21 IP 66 T 130 °C	II 2 (1) D Ex tD A21 IP 66 T 130 °C
Cable glands			
Supply voltage			
Number of glands	-	2	2
Diameter of gland	-	M 20	M 20
Permissible cable diameter	-	5.5 - 13 mm	5.5 - 13 mm
Signalling contact			
Number of glands	-	1	
Diameter of gland	-	M 16	M 16
Permissible cable diameter	-	5.5 - 10 mm	5.5 - 10 mm
RS 485 bus cable			
Number of glands	-	2	2
Diameter of gland	-	M 16	M 16
Permissible cable diameter	-	5.5 - 10 mm	5.5 - 10 mm
Optical connections			
Number of glands	-	2	2
Diameter of gland	-	M 20	M 20
Permissible cable diameter	-	6.4 - 13 mm	6.4 - 13 mm
Not used			
Number of glands	-	1	1
Diameter of gland	-	M 16	M 16
Permissible cable diameter	-	5.5 - 10 mm	5.5 - 10 mm
Functional earth	-	fixed mount connection	fixed mount connection

OZD Profi G12 ...	DU ATEX 1	DK ATEX 1	DE ATEX 1
Test torques			
Cover screws	-	2.50 Nm	2.50 Nm
Pressure screw of cable entry M12	-	1.65 Nm	-
Pressure screw of cable entry M16 - M20	-	2.50 Nm	-
Pressure screw of cable entry M25	-	3.50 Nm	-
Pressure screw of metal ex-e cable entry M16	-	-	7.5 Nm Type E1WF/e, (ex-e)
Pressure screw of metal ex-e cable entry M20	-	-	10 Nm Type E1WF/e, (ex-e)
Pressure screw of metal ex-e cable entry M25	-	-	15 Nm Type E1WF/e, (ex-e)
Protection class	IP 40	IP 66	IP 66
Dimensions (B x H x T)	see chapter 5.3, page 31		
Housing	Encapsulation cup	Plastic housing	Stainless steel housing
Mass approx. 1.5 kg	approx. 2.4 kg	approx. 3.7 kg	

1) Depending upon the optical performance record, the path length between two OZD Profi must not be exceeded in any case.

9 Accessories

OZD SFK ATEX, Order no. 943 884-001

Housing cover with window for OZD Profi G12DK ATEX 1.

For replacing the housing cover (without window) of
OZD Profi G12 DK ATEX 1.

A Appendix

A.1 Define reception level of optical channels

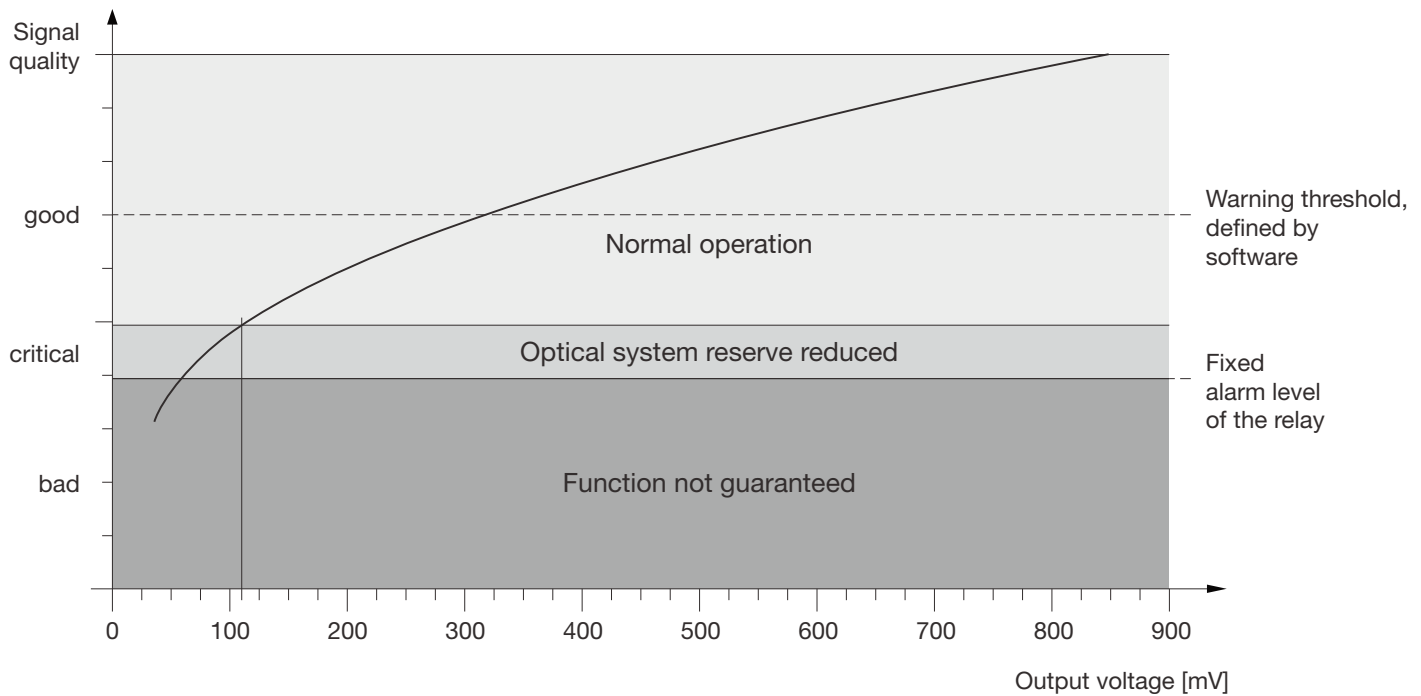


Fig. 33: Relation between the output voltage on the terminals CH2 and CH3 and the signal quality at port 2 or port 3

Note:

For a valid measuring value it is necessary that the partner-OZD Profi transmits regular PROFIBUS telegrams at the other end of fibre optic. This can be recognised from the LED image of the partner-OZD Profi (see chap. 6.1, “LED-indicators“, page 45).

Output voltages on the measuring outlets are influenced by many influence factors like e.g.:

- Strength of the transmission power of the partner OZD Profi
- Ambient temperature of the optical transmitter and the receiver
- Attenuation of the transmission path
- Used transmission rate

The measuring outlets are hence not planned as replacement of calibrated level measuring device with calibrated light. The read-out value is only used for classifying the received optical signal in the 3 classes

- good (Normal operation)
- critical (Optical system reserve reduced)
- bad (Function not guaranteed)

Measurement must be done with a standard floating and high impedance voltmeter. A connection to the housing of OZD Profi G12D... ATEX 1 is permitted neither by the measuring outputs nor the reference potential.



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