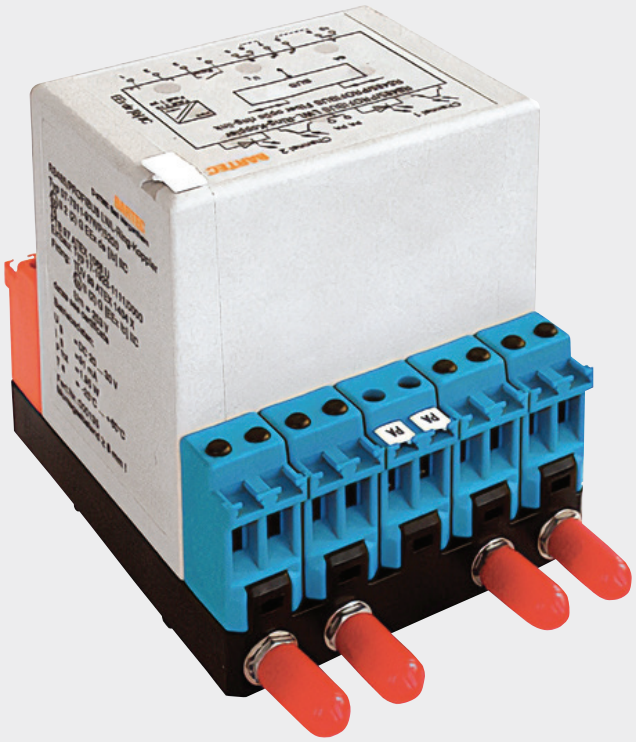
BARTEC

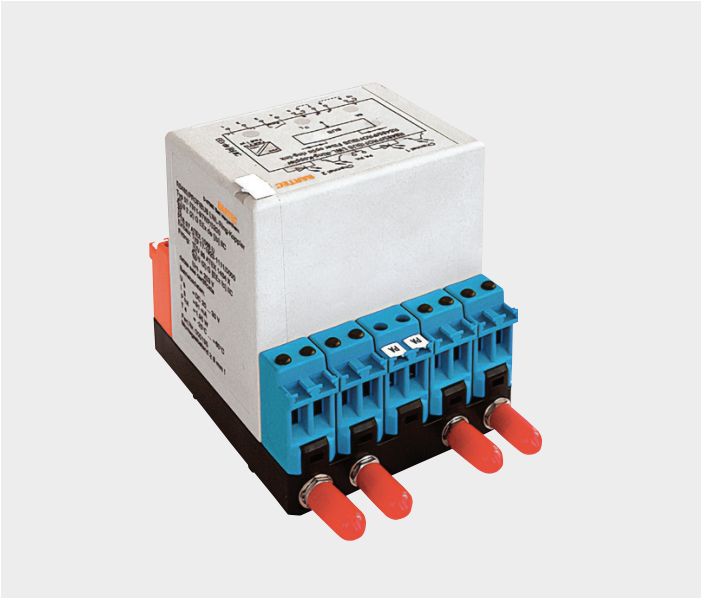
Ethernet / LWL

Coupler - Ethernet version



Control and regulation components MODEX

Ethernet / LWL-coupler. Type 07-7311-97WE



Definition

The Ethernet LWL - coupler reroutes the PROFINET from copper conductors to optical waveguides. The coupler is a passive bus participant and are suitable for hazardous areas of zone 1 and 21. In plants, the LWL - coupler allows the bridging of great distance with PROFINET without noice interference.

- P-P-coupler
- T-coupler

The electronics for the signal conversion are accomodated in the flameproof MODEX enclosure. Transmitter and receiver for the LWL-coupler are intrinsically safe headed. The intrinsically safe control transmitter and receiver of the electronic system guarantee that the transmitter rate does not go beyond maximum value limits.

Configuration

The Ethernet PCB transmits all types of Ethernet data, including Profinet packets.

Order numbers

Ethernet LWL P-P-Coupler	ST	07-7311-97WE2120
Ethernet LWL T-Coupler	ST	07-7311-97WE1120

With applicable documents

- Declaration of EU conformity
- Test certificates

These documents must be retained!

Intended Use

The LWL - coupler are designed to meet the industrial requirements in hazardous (potentially explosive) areas.

Industrial Requirements of Zone 1

The modules are approved as “Ex d flameproof enclosures” with connecting terminals in “Ex e increased safety ex e”. Since the open connecting terminals are Ex e, the modules are given a partial certificate with the “U” marking.

Special note concerning the “U” marking

The modules must be installed in an enclosure that meets the requirements of a recognised type of protection in accordance EN/IEC 60079-0, min. protection type IP54. When installing in an enclosure with “increased safety ‘e’”, the clearance and creep age distances in Tables 1+2 in IEC/EN 60079-7 must be complied with.

Intrinsically safe installed components

If installed components with intrinsically safe circuits are produced as associated apparatus, they undergo their own type examination by a notifed body. These are marked with an “X” after the test number.

The “X” indicates that special conditions apply to this device in the test certificate. These conditions can be read in the test certification.

Use in local control stations

Local control stations may generally be opened for testing and adjustment work.

Work may be carried out on intrinsically safe circuits if all non-intrinsically safe circuits have an internal cover which, when the enclosure is open, corresponds to at least the following protection class IP 30 when the enclosure is open.

Explosionsschutz

Marking ATEX	Ⓔx Zone 1/21
Certification	see bartec.com
Marking IECEx	Zone 1/21
Certification	see bartec.com
Marking CSA	Class I Zone 1
Certification	see bartec.com

Further approvals and test certificates can be found at bartec.com

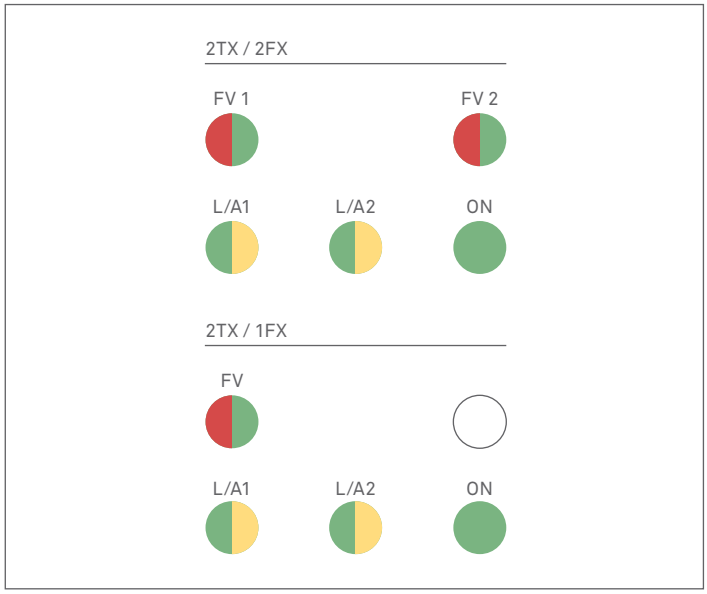
EU Conformity

RoHS Directive	2011/65/EU
Standards in accordance with EMC Directive 2014/30/EU	EN 61000-6-2:2005 EN 61000-6-4:2007 + A1:2011 EN 55011:2009 + A1:2010
Product labelling	0044
Product labelling installation	CE 0044

Technical Data

Physical characteristics	
Construction	flameproof clip-on enclosure
Enclosure material	high-quality thermoplastics
Protection class (EN/IEC 60529) Terminals Electronic module Terminals with cover	IP20 (minimum) IP66 IP30
Attachment onto mounting rail (EN/IEC 60715)	TH 35 x 15 (7.5)
Operating	LED Green: Operation indicator (ON) L/A: LED green: Connection existing LED yellow flashing: Data transmission FV1 and FV2: LED Red: No connection LED Red/green=yellow: Light output borderline LED Green: Connection OK LED green or yellow flashing: Data reception Declaration: FV = Fiberview L/A = Link/Activity
Electric connections	terminals 2.5 mm², fine-stranded
Terminal marking	inscription label
Terminal screws	M 2.5 x 0.45 mm
Terminal screw torque	0.4 Nm
Mounting position	any
Weight	approx. 600 g
Dimensions	94 x 91 x 75 mm

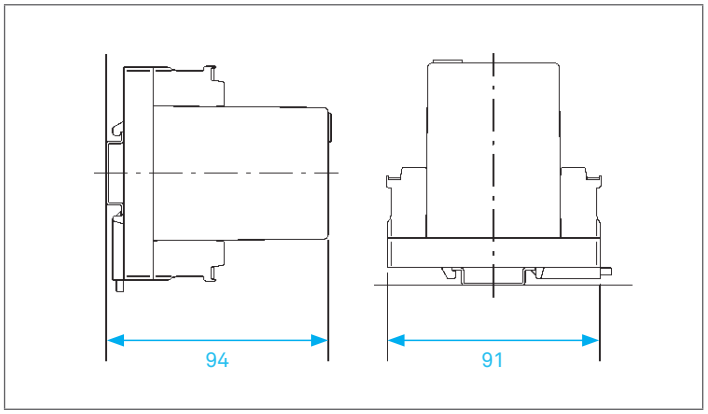
Ethernet



Technical Data

Ambient conditions			
Ambient temperature	-25 °C to +60 °C at T4		
Storage/transport temperature	-40 °C to +60 °C		
Relative air humidity	5 % to 95 % non-condensing		
Vibration (EN 60068-2-6)	2 g/7 mm, 5-200 Hz in all 3 axes		
Shock (EN 60068-2-27)	15 g, 11ms in all 3 axes		
Electrical Data			
Galvanic isolation	Bus//power supply//optical waveguide		
Bus input/output	4 wire ethernet with screw terminals		
Optical waveguide input/output	ST	LWL plug-in connectors	
Supply voltage	L+, L-	DC 20 V to DC 30 V	
Bit distortion	60 ns (max.)		
Power consumption dissipation	Power loss of enclosure 07-7311-97 for temperature class T4 at 65 °C: Adjacent = max. 3.0 W Distance of 8 mm: max. 4.3 W		
Signal delay	max. 4,5 µs/typ. 3.4 µs and 5 ns per meter fibre optic		
Current consumption	approx. 100 mA at DC 24 V		
Distance/Optical budget			
Fiber/glass	approx. 2000 m approx. 3000 m	50/125 µm 62.5/125 µm	4 dB 8 dB
Terminating resistor	via jumpers		

Dimensions / mounting positions



Marking

Particularly important points in these instructions are marked with a symbol:

DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.

WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE is used to address practices not related to personal injury.

NOTE Important instructions and information on effective, economical and environmentally compatible handling.

Transport and storage

NOTICE

Damages due to improper storage!

- Observe storage and transport temperatures.
- Condensation can arise on components in a cold environment.
- Use the original packaging for transport/storage.

Installation

NOTICE

Damage due to improper handling!

- Assembly, disassembly, installation and commissioning may only be performed by qualified personnel who are authorized and trained to assemble electrical components in hazardous areas.

Plugs:

- The plugs are difficult to pull off! Due to the high fitting accuracy of plug and socket, a vacuum is created during removal, which requires higher removal forces. For this reason, the plugs must be pulled off carefully to avoid damaging the plugs and connectors.

DANGER

Improper use, incorrect assembly and operation can operation endanger the explosion protection and can lead to and can lead to serious personal injury or damage to property.

The following special conditions must be heeded!

1. Do not install and commission components that have been stored in a cold environment. Take conden-sation into consideration!
2. The enclosure has been sealed in the factory. The enclosure must not be opened!
3. Before installation, check whether the components are in perfect condition.
4. No conversions are changes to the module may be made.
5. Only work on the module when it is voltage-free.
6. All screws and terminals must be tightened using a torque wrench, taking account of the recommended connection torque for screws and terminals of 0.4 Nm to 0.7 Nm. Suitable measures must be taken to ensure this.
7. Units must be mounted at a distance of 8 mm from the to the nearest unit.
8. Ensure the unit is dead (be aware of consumers with stored energy)
9. Cover any live neighbouring components.
10. The PA connection part must be connected with low impedance to the equipotential bonding conductor of the hazardous area. Since the intrinsically safe circuits are galvanically connected to ground potential, equipotential bonding of the intrinsically safe circuits must be maintained throughout the service life of the system.
11. Decommission the device in the event of a fault.

Installation

Installation and commissioning may only be carried out by qualified personnel who are authorized and trained to install electrical components in potentially explosive atmospheres.

DANGER

Exposed live parts. Danger to life due to electric shock!!

- Only work on the module when it is de-energised state.

CAUTION

Infrared light! Danger to eyesight!

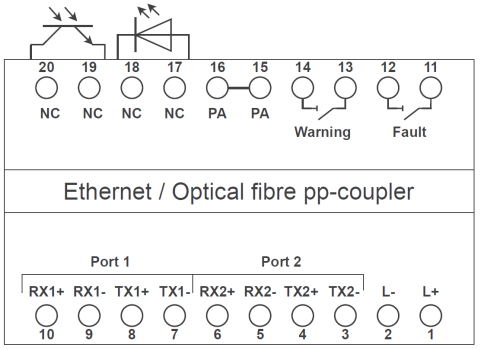
- Do not look into the laser beam of the transmitter
- In the event of a malfunction, put the device out of operation!

Terminal connection

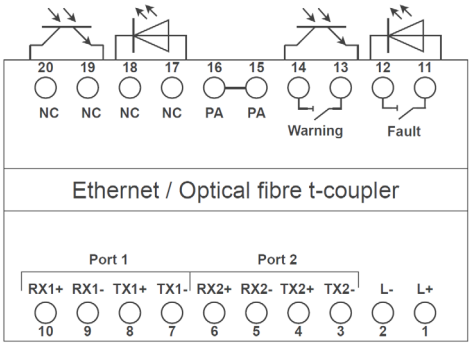
Terminal	Name
1	(+) DC 24 V Power supply
2	(-) DC 24 V Power supply
3	(Port 2) TX2-
4	(Port 2) TX2+
5	(Port 2) RX2-
6	(Port 2) RX2+
7	(Port 1) TX1-
8	(Port 1) TX1+
9	(Port 1) RX1-
10	(Port 1) RX1+
11	Fault relay contact 1
12	Fault relay contact 2
13	Warning relay contact 1
14	Warning relay contact 2
15	PA
16	PA

Wiring diagram / terminal assignment

P-P-Coupler →

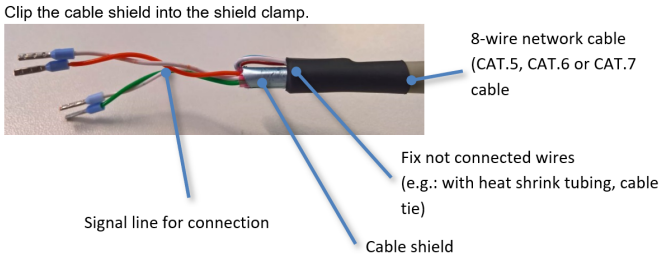


T-Coupler →



The use of 4-core Industrial Ethernet / Profinet cables is recommended, because there are no unused wires after connecting.

Otherwise, the following must be observed:



Work steps

- Check the correct wiring of the fiber optic coupler before commissioning.
- The terminal devices to be connected by means of optical fibers must be switched off and de-energized. Snap the fiber optic coupler onto the TS35 mounting rail and check that the device is held securely.
- Activate the necessary terminating resistors at the beginning and end of the bus.
- Lay the FO cable according to the data sheet. Otherwise, the cable may be damaged and/or the communication between the FO ring couplers may no longer be guaranteed. Observe the routing instructions from your FO manufacturer.

Connection Ethernet cables:

Terminal number Port 1	Terminal number Port 2	Signal designation	Cable CAT5/6/7 (assignment TIA568B) Core colors	Cable Industrial Ethernet/ Profinet Core colors
7	3	TX-	orange	orange
8	4	TX+	white/orange	yellow
9	5	RX-	green	blue
10	6	RX+	white/green	white

Commissioning

Check before commissioning:

1. Has the module been installed correctly?
2. Is the enclosure undamaged?
3. Has the connection been carried out correctly?
4. Have you checked that the wiring is correct?
5. Does the module function correctly?
6. PA properly connected to equipotential bonding conductor.

Operation

After the final inspection has been carried out, the device can be put into operation.

DANGER

There is a danger to life if the device is not used as intended!

- Observe the special conditions for explosion protection.
- Operate only within the permitted temperature range.
- Connect PA properly to equipotential bonding conductor.
- In the event of bus failure (communication error), the outputs go into fail-safe mode (go to 0 and are switched off!).

Troubleshooting

Troubleshooting during connection Establishment

1. Are the FO systems supplied with voltage?
2. Is the correct connection between the FO coupler and the terminal device ensured and has the correct interface been selected?
3. Are all screw terminals correctly tightened?
4. Is one optical transmitter connected to the optical receiver of the opposite device at a time (cross connection)?
5. Are the bus terminating resistors activated and have they been correctly selected and connected?
6. Is the transmission distance not too long?
7. Is the transmission rate correct and was the data rate set according to „Project planning“?
8. Have the guidelines for the individual modules of the software been observed?
9. Has the FO cable been laid correctly?
10. Are FO systems of other manufacturers in the ring? Only use BARTEC systems!
11. Is a module with master wire bridge set at the PROFINETmaster?
12. Is more than one master configured module in the ring?

Maintenance, Inspection, Repair

Only authorised and qualified personnel may do any work on the control and regulating component.

Maintenance

If operated correctly in accordance with the installation instructions and ambient conditions, it does not require maintenance.

Inspection

Under EN/IEC 60079-17 and EN/IEC 60079-19 the owner/ managing operator of electric installations in hazardous areas is obliged to have these installations checked by a qualified electrician to ensure that they are in a proper condition.

Repair

The component cannot be repaired. Please contact BARTEC GmbH if you have any questions.

Disposal

The regulating and control components contain metallic and plastic parts and electronic parts.

NOTE

Our devices involve electrical equipment which is only intended for commercial use (so-called B2B equipment in accordance with the WEEE Directive).

The regulating and control components must be disposed of in accordance with national regulations.

Our customers may return any products procured from us to our company for disposal. The sender must bear the costs for shipping/packing.

Amendments to the Document

BARTEC GmbH reserves the right to change the contents of this document without notification. We assume no guarantee for the correctness of the information. In cases of doubt the German safety instructions apply because it is not possible to rule out errors during printing and translation. The „General Terms and Conditions of Business“ of the BARTEC Group moreover apply in the event of legal disputes.

The current version of data sheets, operating instructions, certificates and EC declarations of conformity can be downloaded from bartec.com or directly requested from BARTEC GmbH.

Order numbers

Ethernet LWL P-P-Coupler	ST	07-7311-97WE2120
Ethernet LWL T-Coupler	ST	07-7311-97WE1120

Serviceadresse

BARTEC GmbH
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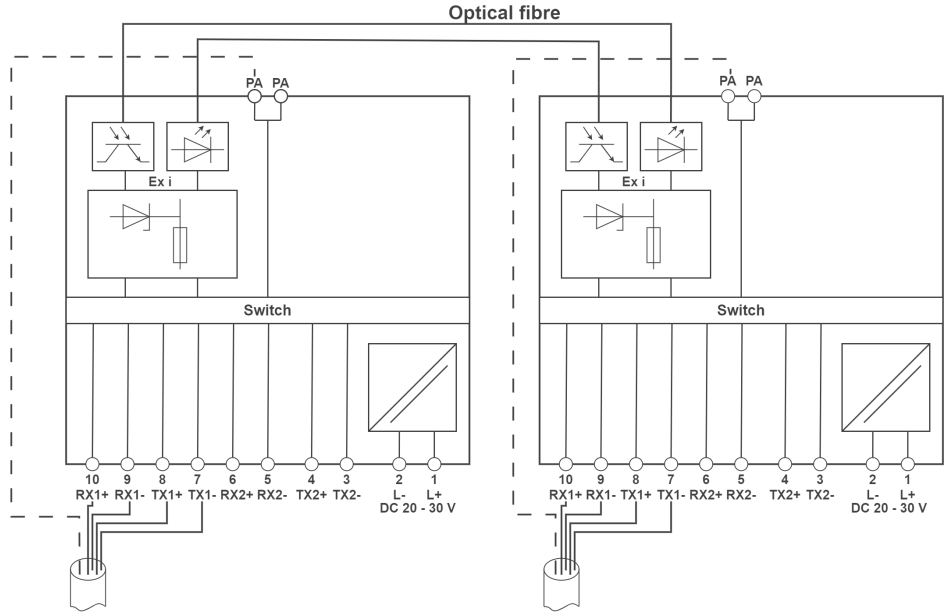
97980 Bad Mergentheim
Germany
Phone: +49 7931 597-0
info@bartec.com

Coupling example

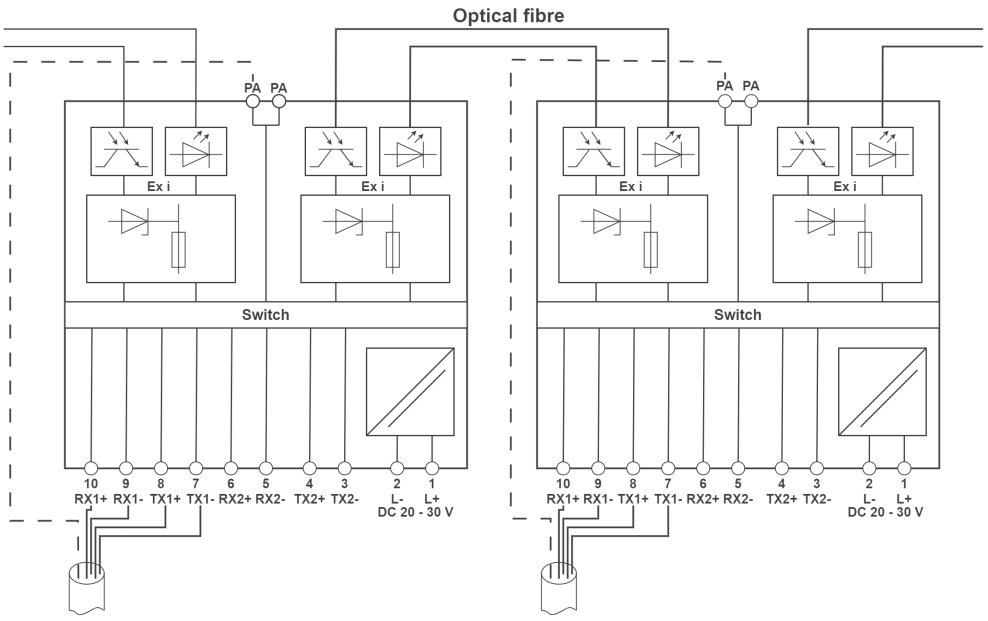
P-P-Coupler →

Connection example of optical fibre / Ethernet pp-coupler



T-Coupler →

Connection example of optical fibre / Ethernet t-coupler



The following values apply:

Fiber	Core/ Cladding	Incoupling power *	Receiver overmodulation limit	Receiver undermodulaltion limit	Typical fiber damping	Typical distance	Optical budget
Glass	50/125 µm	-18.2 dBm	-10 dBm	-32 dBm	-3 dB/km	2000 m	6 dB
Glass	62.5/125 µm	-14.5 dBm	-10 dBm	-32 dBm	-3 dB/km	3000 m	9 dB

* The measured values in the table correspond to the peak values. The pertinent average values amount to -3 dBm.

Konformitätserklärung
Declaration of Conformity
Déclaration de conformité

№ 01-7311-7C0030_C

BARTEC

Wir	We	Nous

BARTEC GmbH
Max-Eyth-Straße 16
97980 Bad Mergentheim
Germany

erklären in alleiniger Verantwortung, dass das Produkt	declare under our sole responsibility that the product	attestons sous notre seule responsabilité que le produit
Steuer- und Regel-Komponente	**Control Component**	**Composants de commande et de regulation**

07-7311-**/******

auf das sich diese Erklärung bezieht den Anforderungen der folgenden **Richtlinien (RL)** entspricht	to which this declaration relates is in accordance with the provision of the following **directives (D)**	se référant à cette attestation correspond aux dispositions des **directives (D)** suivantes
ATEX-Richtlinie 2014/34/EU	**ATEX-Directive 2014/34/EU**	**Directive ATEX 2014/34/UE**
EMV-Richtlinie 2014/30/EU	**EMC-Directive 2014/30/EU**	**Directive CEM 2014/30/UE**
RoHS-Richtlinie 2011/65/EU	**RoHS-Directive 2011/65/EU**	**Directive RoHS 2011/65/UE**
und mit folgenden Normen oder normativen Dokumenten übereinstimmt	and is in conformity with the following standards or other normative documents	et est conforme aux normes ou documents normatifs ci-dessous

EN 60079-0:2018
EN 60079-1:2014
EN 60079-7:2015
EN 60079-11 :2012
EN 61000-6-2:2005
EN 61000-6-4:2007 + A1:2011
EN 60529:1991+A1:2000+ A2:2013

Verfahren der EU-Baumusterprüfung / Benannte Stelle	Procedure of EU-Type Examination / Notified Body	Procédure d'examen UE de type / Organisme Notifié

PTB 97 ATEX 1068 U

0102, PTB, Bundesallee 100, 38116 Braunschweig, DE

0044

Bad Mergentheim, 10.11.2021

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