



ExConnection Rail²⁰²³

To4  - Ex Installation Manual

 **SAMCON**
Prozessleittechnik GmbH

Table of Contents

1	Introduction	4
2	General Safety Instructions.....	5
3	Area of application	6
4	Technical data	7
4.1	Characteristic values for explosion protection	7
4.2	Optional marking	7
4.3	Standards basis and certificate	8
4.4	Ex-d housing made of light metal (GUBox series 8265).....	9
4.4.1	<i>Brief description</i>	<i>9</i>
4.4.2	<i>Material</i>	<i>9</i>
4.4.3	<i>Electrical parameters</i>	<i>9</i>
4.4.4	<i>Outer dimensions and empty housing weight</i>	<i>10</i>
4.4.5	<i>Power dissipation and temperature class.....</i>	<i>11</i>
4.4.6	<i>Maximum number of threaded holes.....</i>	<i>11</i>
4.4.7	<i>Dimension drawings of the GUBox series 8265.....</i>	<i>12</i>
5	Transportation, Storage and Recycling.....	15
6	Installation	15
6.1	Housing dimensions, drilling holes and fastening distances.....	15
6.2	Installation requirements	16
6.3	Assembly and Use	16
6.4	Installation in dust-explosive areas!.....	17
6.5	Opening the Ex-d housing cover	17
6.6	Closing the Ex-d housing cover.....	19
6.7	Electrical interface	20
6.7.1	<i>External Wiring.....</i>	<i>20</i>
6.7.2	<i>High Frequency Emitting Interface</i>	<i>23</i>
6.8	Optical Interface	25
6.9	Making additional through-holes	26
7	Starting the device operation	27
8	Operation	28
9	Service, maintenance and troubleshooting	29
9.1	Specification of lubrication and protective materials.....	29
9.2	Required Accessories	31
9.3	Maintenance and regular servicing.....	32
9.4	Cleaning	32
9.5	Repair instructions.....	32
10	Recycling.....	33
11	Technical drawings.....	33
12	Certificates of the ExConnection Rails (T04)	34
12.1	EU Declaration of Conformity	34
12.2	EU Certificate of Conformity (ATEX)	35
12.3	IECEX Certificate of Conformity.....	35
12.4	EAC-Ex Certificate of Conformity	35

Table of figures

Tab.4.1 Ex-d outer dimensions and empty housing weight	10
Tab.4.2 Ex-d Power dissipation and temperature class.....	11
Tab.4.3 Number of metric holes	11
Fig.4.1 Dimension drawings of the GUBox series 8265	14
Fig. 6.1 Mounting of the housing	15
Fig. 6.2 Opening.....	18
Fig. 6.3 Closing.....	19
Tab.6.1 Tightening torques for various types of screws	22
Fig.6.4 Connecting the protective conductor	23
Tab.6.2 Power limit levels for HF emitters	24
Tab.6.3 Energy limit levels for HF emitters	24
Tab.6.4 Safe optical radiation power and irradiation intensity.....	26
Fig.9.1 Breathers against condensation	31

Records of revisions

Product: T04 - ExConnection Rail® Series
 Project: T04 Ex-Installation Manual - ExConnection Rail
 Title: Ex Installation Instructions for Type 04 – ExConnection Rail
 Doc. -Id.: 170213-PT04BAU-TG-Ex-Installation-Manual_rev.07.docx
 Authors: Steffen Seibert, Grad. Engr., Thiemo Gruber, Grad. Engr.
 Issue date: April 12, 2011
 Update: June 19, 2023

Rev. Index	Date	Name	Note	Release Person appointed for ATEX/ IECEx
1	04.05.2011	Tobias Haberzettl	Various corrections	
2	14.03.2012	S.Seibert	Integration of certificates	
3	24.04.2014	Thiemo Gruber	Reviews/ addenda acc. to Explosion Protection Concept, rev.05 (1st addition)	
4	03.12.2015	Thiemo Gruber	Reviews/ addenda acc. To the T04 Explosion Protection Concept _rev.07 (to the 1st Addition), re-structuring	
5	13.02.2017	S.Seibert	Various reviews	
6	05.11.2018	S.Seibert	Various reviews	
7	19.06.2023	E.Schneider	Norm Update	

1 Introduction

The ExConnection Rail (type 04) is a connecting and transmission unit for audio, video and process signals. It is intended for a direct installation and applications in areas exposed to gas and dust explosion. The core ignition protection category is based on the principle of pressure-resistant encapsulation (Ex d acc. to DIN EN 60079-1).

The ExConnection Rail, hereinafter called ExCR, can convert, for instance, digital video streams (IP/TCP/RTSP, 3G HD-SDI, etc.) and analogue camera signals (FBAS, etc.), as well as audio and process signals (MSR) into signals of other transmission methods and media (copper conductors, optical wave-guides, WLAN, DECT, RFID, UMTS etc.). It can manage these signals, radially or annularly distribute them in an explosion-endangered area and transport them into a safe area (not Ex).

The T04 ExConnection Rail series can be used very flexibly and for very different industrial applications, preferably in chemical and petrochemical industry, offshore installations, fire-damp-endangered pits and bio-gas plants.

The ExConnection Rail series belongs to electrical equipment of device group II in accordance with ATEX Product Directive 2014/34/EU and can be used in the Ex zones 1, 2, 21 and 22 including explosion groups IIC (e.g. acetylene) and IIIC (conductive dust and combustible fluffing) without risk and danger. Its resistance to extreme environmental conditions is improved by a die-cast aluminium housing with optional surface protection coating. The housing can be optionally equipped with a borosilicate sight-glass. So the staff in the Ex area can e.g. capture status LEDs or visualizations of monitoring, as well as control and analyse the devices directly on site.

2 General Safety Instructions



Attention!

ExConnection Rail is not suitable for zone 0 and zone 20. Heed the temperature class and explosion group given on the name plate of ExConnection Rail! Never modify or change anything in ExConnection Rail! Use ExConnection Rail in an undamaged and proper condition only!



Attention!!

ExConnection Rail is not approved for device group I, category M1 and M2 (firedamp-endangered pits)!



Attention!

For repair purposes, only use original parts from Samcon Prozessleittechnik GmbH! Repairs affecting explosion protection and safety may only be done by Samcon Prozessleittechnik GmbH in accordance with applicable national rules.



Attention!

During installation and assembly, please pay attention to external heat and/or cold sources (radiation and convection). Observe the ranges of permissible temperatures!



Attention!

For more information and individual provisions, please see the attached papers and product-specific device documentation.



Attention!

**Unauthorized work on the device is prohibited!
Installation, service, maintenance and troubleshooting must be carried out by authorized and qualified staff only!**

When installing and operating the device, observe the following points:

- Damaging the device can cause failures of explosion protection.
- Adhere to national and local safety regulations.
- Adhere to national and local regulations for prevention of accidents.
- Adhere to national and local regulations for assembly and erection.
- Adhere to generally recognized rules of technology.
- Adhere to the safety Instructions given in the Ex Installation Instructions.
- Heed the characteristic values and rated operating conditions given on the nameplates and data plates.
- Observe the additional warning signs on the device.
- Never do any modifications or changes to the device!

3 Area of application

ExConnection Rail is suitable for use in explosion-endangered areas of zones 1 and 2, as well as zones 21 and 22 in accordance with DIN EN 60079-10. The units may only be used within the respectively approved ignition protection category and temperature class.



Please note!



Heed the information on the name plate and the warnings!

4 Technical data

4.1 Characteristic values for explosion protection

Identification marks

acc. to Directive 2014/34/EU:

 II 2G (zone 1 and 2)
 II 2D (zone 21 and 22)

Explosion protection (gas):

Ex db IIC T6 Gb¹

Explosion protection (dust):

Ex tb IIIC T80°C Db IP66¹

Ambient temperature range:

see type plate

Protection level:

IP66 (IEC/EN 60529)

Date of manufacture (Prod. Year):

see type plate

4.2 Optional marking

The explosion group can be downgraded, if necessary. **

The ambient temperature range can be downgraded, if necessary. **

The temperature class/value (gas or dust) can be downgraded, if necessary. **

[op is]	= for models with inherent safe opt. radiation [op is Gx/Dx] **
[op pr]	= for models with protected optical radiation [op pr Gx/Dx]. **
mb	= for models with HF barriers. **
eb	= for models with Ex-e terminal box
[ia Ga/Da]	= for models with [ia Ga/Da] intrinsically safe circuits
[ib Gb/Db]	= for models with [ib Gb/Db] intrinsically safe circuits

** Please observe the markings on the type plate, the model key, as well as the operating instructions for the device. In addition, the following warnings are stated on the identification plate:

WARNUNG:

NICHT INNERHALB EINES EXPLOSIONSGEFÄHRDETEN BEREICHS ÖFFNEN
Sicherheitshinweise in der Installationsanleitung beachten!

WARNING:

DO NOT OPEN IN POTENTIALLY EXPLOSIVE ATMOSPHERES
Observe the safety instructions in the installation guide!

¹ See optional/additional marking

ВНИМАНИЕ:

НЕ ОТКРЫВАТЬ в потенциально взрывоопасных средах

Соблюдайте инструкции по технике безопасности в руководстве по установке!

AVERTISSEMENT:

NE PAS OUVRIR EN ATMOSPHERES EXPLOSIBLES

Respectez les consignes de sécurité dans le guide d'installation!

Note:

If the EPLs or temperature classes of the used secondary ignition protection classes (ix, op is, etc.) are lower than the ones for the primary protection class, the identification of the secondary protection class shall be used, or the effect shall be shown in square brackets. For example: II 2G Ex db op is [op is Ga T4] IIC T6 Gb.

Note:

IECEx marking is always an integral part of the identification plate.

EAC-Ex marking and other affiliated certificates are marked depending on the approval status.

4.3 Standards basis and certificate

T04 ExConnection Rail is in conformity with the following directives and standards:

Related EX Standards	
EN IEC 60079-0:	2018
EN 60079-1:	2014
EN 60079-7:	2015
EN 60079-11:	2012
EN 60079-18:	2015
EN 60079-28:	2015
EN 60079-31:	2014

Directives	
ATEX	2014/34/EU
ROHS	2011/65/EU
LVD	2014/35/EU
EMV	2014/30/EU

Named testing laboratory:

TÜV Rheinland (number 0035)

EU type approval certificates:

TÜV 10 ATEX 7969 X (2011)

TÜV 10 ATEX 7969 X 1st suppl. (2016)

TÜV 10 A TEX 7969 X 2nd suppl. (2023)

Supplement / Rev. Index:

02

ATEX test report:

557 / Ex 969.00/10

4.4 Ex-d housing made of light metal (GUBox series 8265)

4.4.1 Brief description

The explosion-proof enclosures (Ex-d) made of light metal in 6 basic sizes for direct and indirect cable and wiring entries, can be combined with various Ex-e terminal boxes of series 8146, 8125 and 8150. A large cover opening allows an efficient use of the mounting space and easy maintenance.

Several perforated bars and threaded holes in the housing base allow flexible and vibration-resistant assembly of units to be installed by means of multi-storey mounting plate structures, spacer bolts and DIN mounting rails, e.g.

4.4.2 Material

Aluminium, copper-free (seawater-proof) AL Si7Mg03 T6 acc. to EN 13195, in the case of direct contact with seawater, an appropriate lacquering is recommended!

Optional sight glass made of borosilicate according to DIN7080

Protective coating (optional) with epoxy primer, RAL7032/ 7035

4.4.3 Electrical parameters

$U_e = 1000 \text{ V}$ (standard)

$U_e = 10 \text{ kV}$ (special)

$I_e = \text{max. } 160 \text{ A}$ (T04.1 ... T04.4)

$I_e = \text{max. } 250 \text{ A}$ (T04.5 ... T04.6)

4.4.4 Outer dimensions and empty housing weight

ExCR model	Ex-d external dimensions ²					Borosili- cate	Ex-d weight (empty hous- ing, net weight)
	LR	LG	BR	BG	HG	Ø effec- tively ³	
	[mm]						[kg]
T04.1	125	150	125	150	132	<i>n.a.</i>	2.750
T04.1* (<i>borosilicate sight glass</i>)	125	150	125	150	132	68	2.750
T04.2	155	192	155	192	132	<i>n.a.</i>	3.850
T04.2* (<i>borosilicate sight glass</i>)	155	192	155	192	132	105	4.100
T04.3	195	234	195	234	172	<i>n.a.</i>	6.580
T04.3* (<i>borosilicate sight glass</i>)	195	234	195	234	172	141	6.630
T04.4	236	289	236	289	227	<i>n.a.</i>	10.640
T04.4* (<i>borosilicate sight glass</i>)	236	289	236	289	227	186	11.130
T04.5	285	348	285	348	230	<i>n.a.</i>	18.300
T04.5* (<i>borosilicate sight glass</i>)	285	348	285	348	230	186	18.300
T04.6	335	410	335	410	281	<i>n.a.</i>	27.800
T04.6* (<i>borosilicate sight glass</i>)	335	410	335	410	281	186	28.800

Tab.4.1 Ex-d outer dimensions and empty housing weight

² Dimension parameters "X_R" are referred to the square area of the fuselage (the circular cover is not included. Dimension parameters "X_G" are referred to the overall dimensions incl. circular cylindrical screw cap (absolute dimensions).

³ Visible/effective cut-out for the borosilicate glass, external circular area (glued-in area/compound is not included)

4.4.5 Power dissipation⁴ and temperature class

ExCR model	T6 / T80°		T5 / T95°	
	T _{AMB}		T _{AMB}	
	40°C	60°C	40°C	60°C
T04.1	27 W	13 W	38 W	22 W
T04.1* (protective coating)	35 W	16 W	49 W	28 W
T04.2	40 W	18 W	58 W	35 W
T04.2* (protective coating)	52 W	23 W	75 W	45 W
T04.3	58 W	23 W	85 W	52 W
T04.3* (protective coating)	75 W	26 W	110 W	67 W
T04.4	85 W	38 W	130 W	72 W
T04.4* (protective coating)	110 W	49 W	169 W	93 W
T04.5	117 W	49 W	190 W	96 W
T04.5* (protective coating)	152 W	63 W	247 W	124 W
T04.6	138 W	58 W	205 W	115 W
T04.6* (protective coating)	179 W	75 W	266 W	149 W

Tab.4.2 Ex-d Power dissipation and temperature class

4.4.6 Maximum number of threaded holes

(ignition-puncture-proof gaps!)

ExCR model	Metric holes ⁵ per side of the housing								
	M20 x1.5	M25 x1.5	M32 x1.5	M40 x1.5	M50 x1.5	M63 x1.5	M75 x1.5	M90 x1.5	M105 x1.5
T04.1	3	1	1	1	-	-	-	-	-
T04.2	3	2	2	1	-	-	-	-	-
T04.3	8	4	3	2	1	1	1	-	-
T04.4	16	9	6	4	3	1	1	-	-
T04.5	18	9	8	5	3	2	1	1	-
T04.6	28	16	12	8	5	3	2	1	1

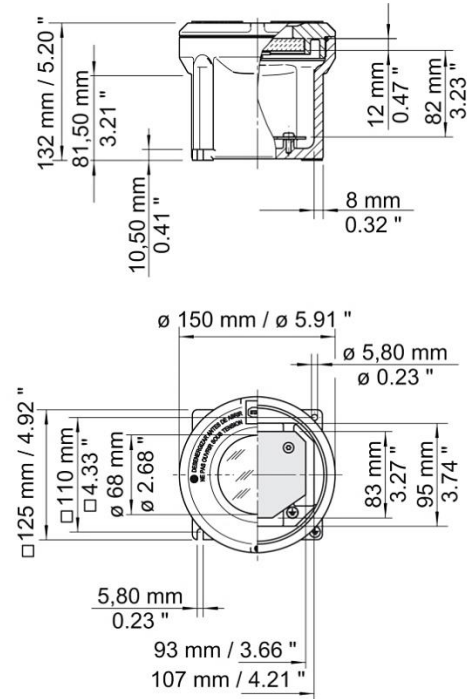
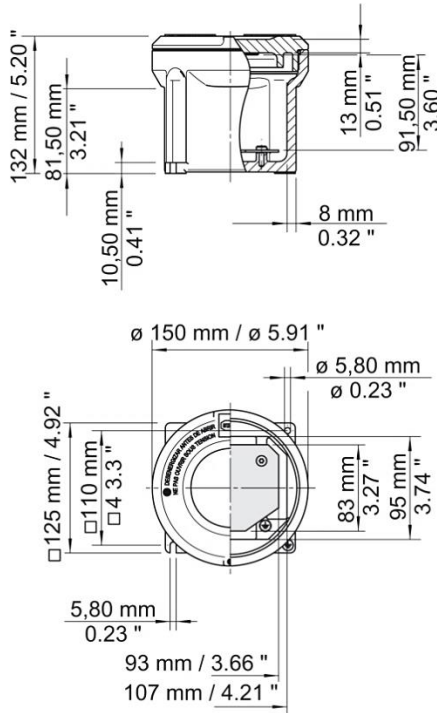
Tab.4.3 Number of metric holes

⁴ In the case of a lower ambient temperature declaration, the power dissipation of the next higher ambient temperature from Tab.6.2 shall apply. In the case of Ex-d e combinations, the permissible power dissipation input may be less than the values in the table above! In the built-in and built-on components of the ExCRs (Ex [ia], Ex-mb, etc.) that are relevant to explosion protection, the permissible thermal power dissipation can be reduced, if necessary (-> temperature coefficients $\Delta T_{Ex-d in}$ [K/W])

⁵ Thread acc. to ISO 965-1/-3, tolerance class "medium" or better. Other thread types complying with IEC/EN 60079-1, Table 3 and 4 are also possible. For thread dimensions within the ranges specified in the table below, the maximum number depends on the next larger thread size given in the table.

4.4.7 Dimension drawings of the GUBox series 8265

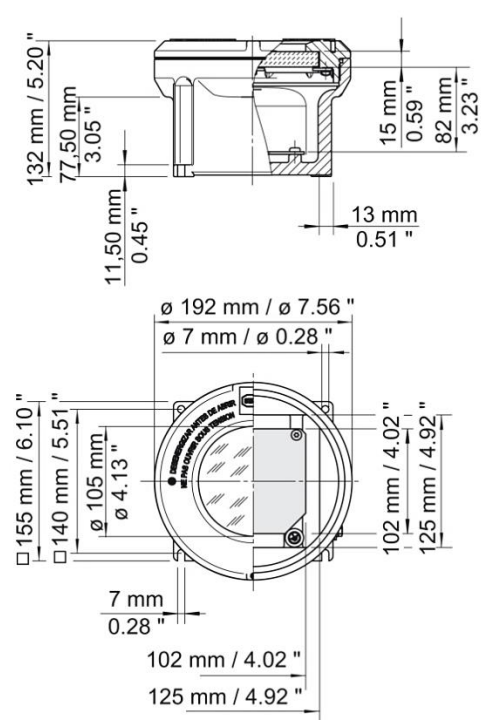
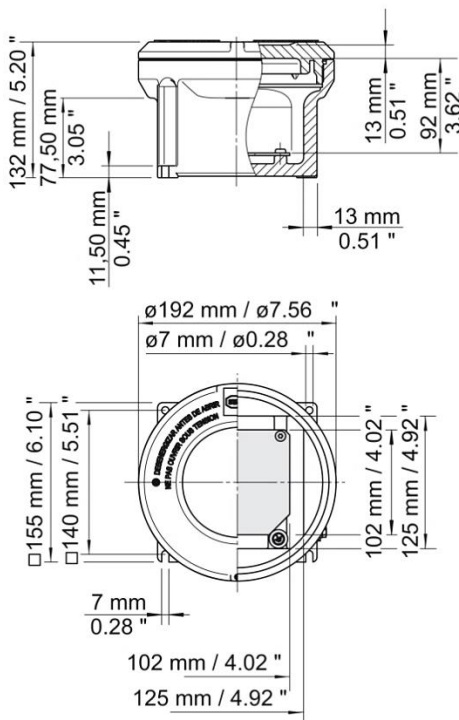
(Installation dimensions and gross weights of the T04 ExCRs at the assembly and installation location must be observed!)



11396E00

Gehäuse Größe 1
8265/1-000,
ohne Schauglas

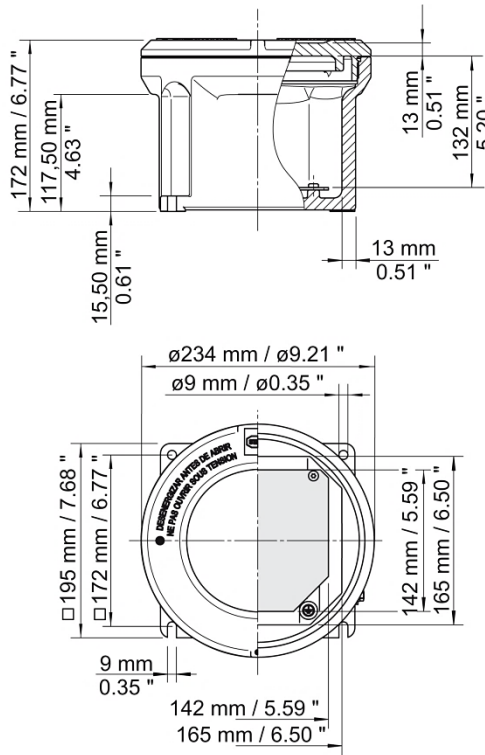
Gehäuse Größe 1
8265/1-001,
mit Schauglas



05575E00

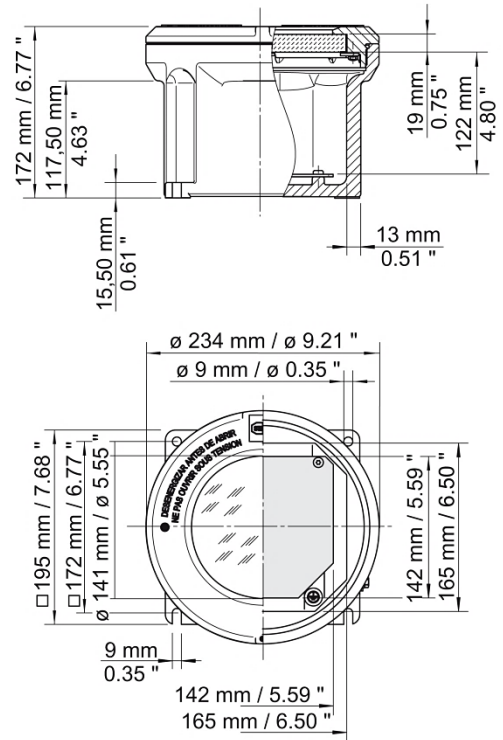
Gehäuse Größe 2
8265/2-000,
ohne Schauglas

Gehäuse Größe 2
8265/2-001,
mit Schauglas

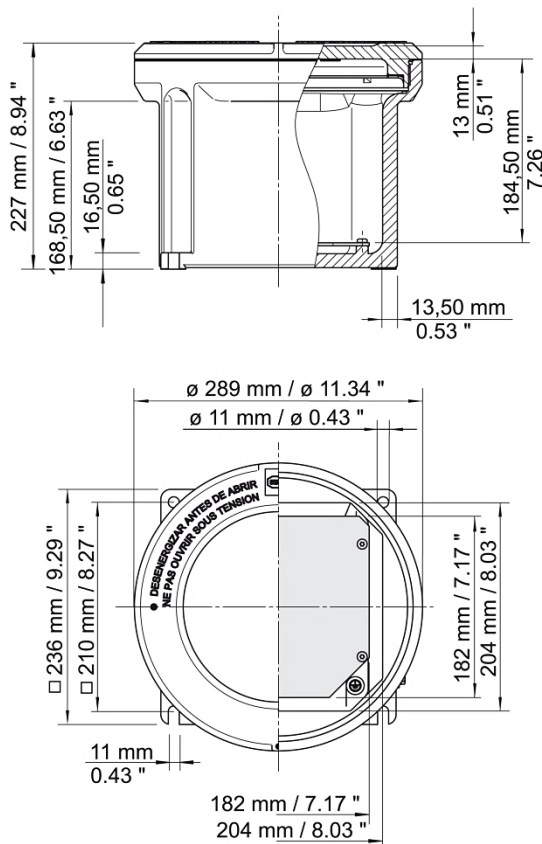


Gehäuse Größe 3
8265/.3-000,
ohne Schauglas

05580E00

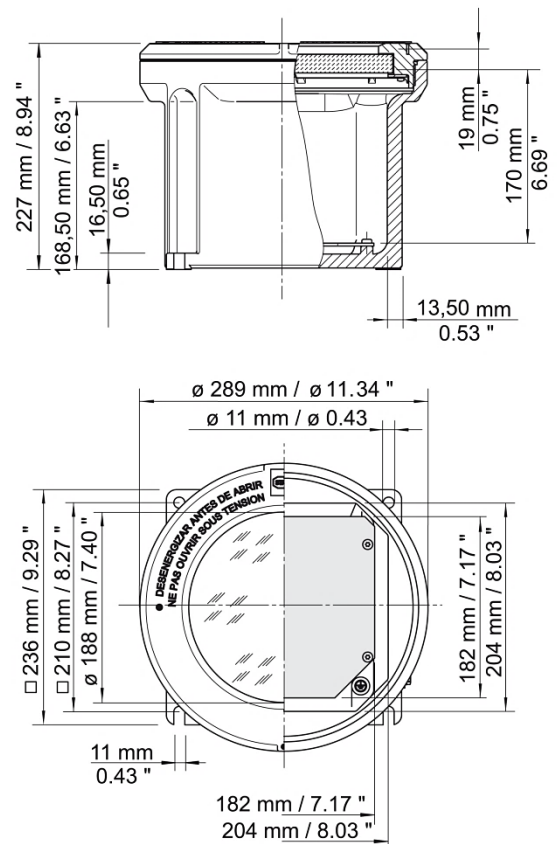


Gehäuse Größe 3
8265/.3-001,
mit Schauglas

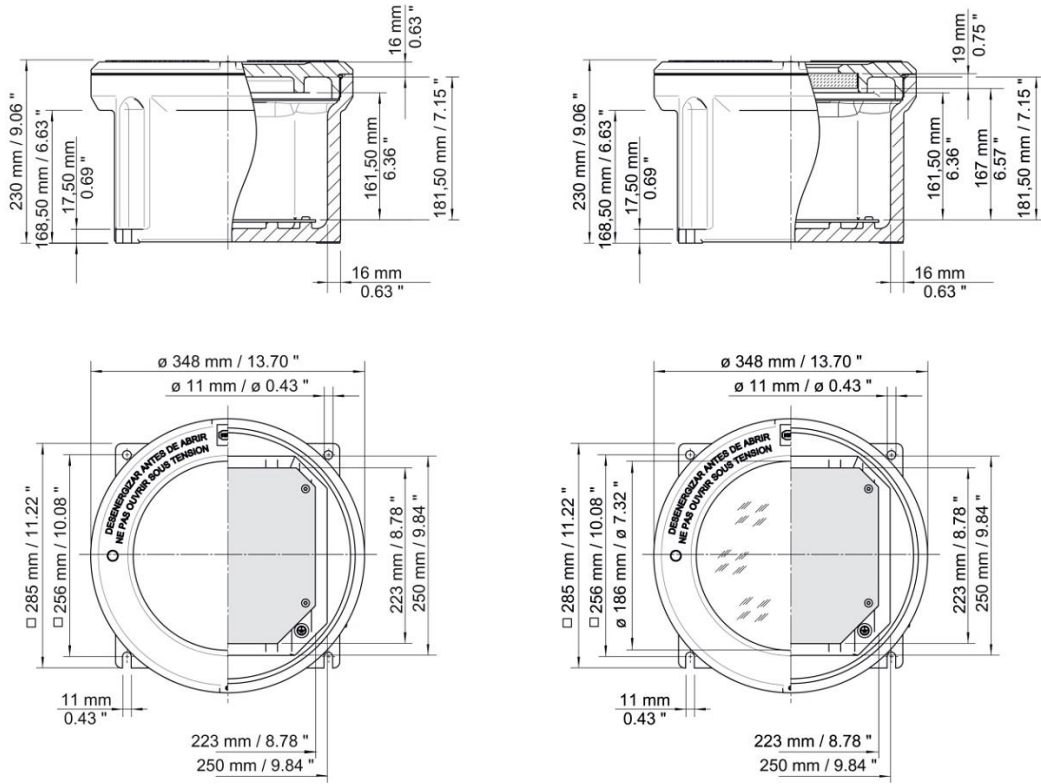


Gehäuse Größe 4
8265/.4-000,
ohne Schauglas

05584E00

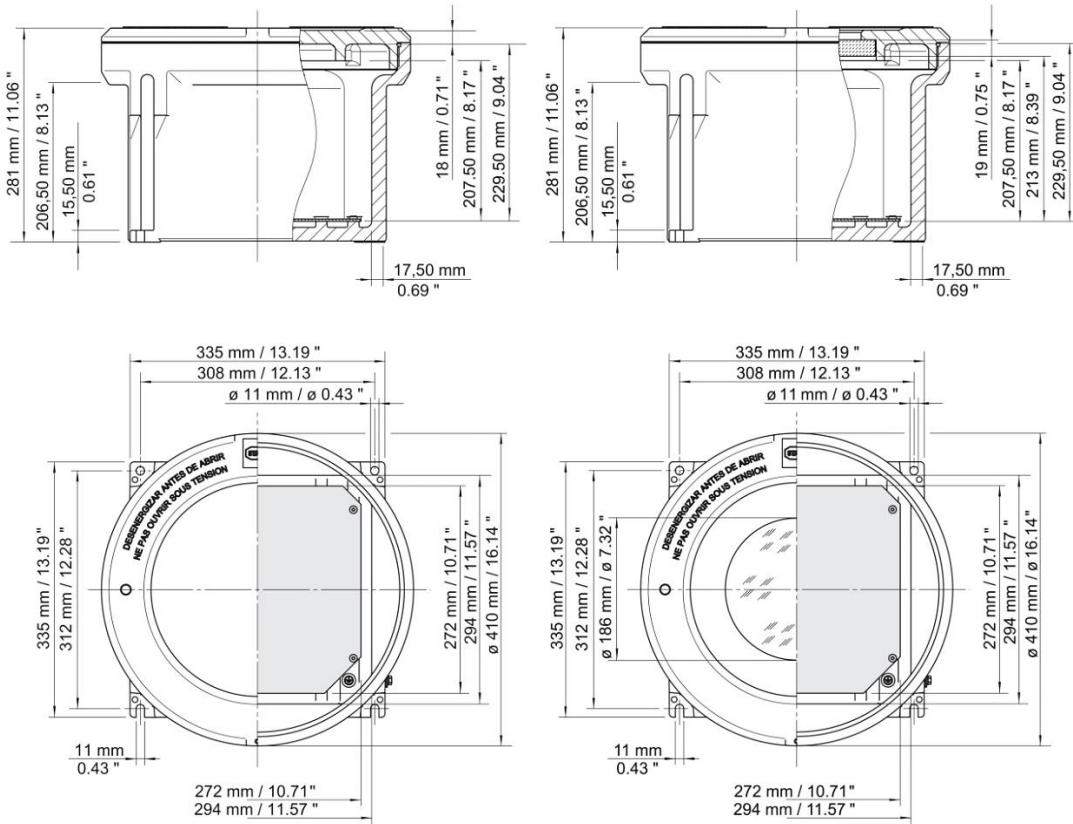


Gehäuse Größe 4
8265/.4-001,
mit Schauglas



Gehäuse Größe 5
 8265/5-000,
 ohne Schauglas

Gehäuse Größe 5
 8265/5-001,
 mit Schauglas



Gehäuse Größe 6
 8265/6-000,
 ohne Schauglas

Gehäuse Größe 6
 8265/6-001,
 mit Schauglas

Fig.4.1 Dimension drawings of the GUBox series 8265

5 Transportation, Storage and Recycling

- Transportation: Avoid vibrations, transport in the original carton and handle it carefully!
- Storage: Keep dry and away of vibrations, in original packaging!
- Recycling: Ensure an environmentally friendly disposal of all components in accordance with the national regulations for waste disposal!

6 Installation

6.1 Housing dimensions, drilling holes and fastening distances

During assembly, absolutely adhere to the dimension parameters and fastening dimensions/ requirements at the place of the device use. Check them in advance!

The T04 ExConnection Rail has four mounting bases (T04.1 has only two, diagonally!) arranged in a square for fixing them with screws, threaded rods or studs and nuts.

Fixing positions "A1"/ "A2" are designed as boreholes, and "B1"/"B2" are designed as long holes. Thus, when assembling, you can place the T04 ExConnection Rail onto pre-installed screws or pins. This makes the device assembly so comfortable and easy that it can be done by a single person!

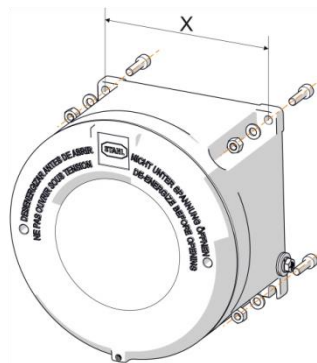


Fig. 6.1 Mounting of the housing

The maximum opening width for hexagonal head screws ISO4014/ DIN931 may vary between 13 ... 27 [mm] (T04.1 ... T04.6), but the cap thickness is flexible.

Usually the fastening screws should be identical and tightened in a cross-diagonal pattern! Tightening torques in accordance with Table 6.1. Ideally, T04 ExConnection Rail should be installed in the horizontal position and should not be exposed to long-time vibrations or shaking at the place of its use.

The T04 ExConnection Rail should be mounted with four screws or threaded bolts with nuts and washers. It is recommended to use e.g. hexagon screws for dowel mounting acc. to DIN 571 or hexagon screws with shank and metric coarse or fine thread (DIN13-1/-2) according to ISO 4014, which are made of stainless steel material A4 (material no. 1.4401

[X5CrNiMo17-12-2], 1.4432 [X2CrNiMo17-12-3], 1.4435 [X2CrNiMo18-14-3], 1.4436 [X3CrNiMo17-13-3] or 1.4571 [X6CrNiMoTi17-12-2] (A5))

6.2 Installation requirements

- Protect the device against mechanical stresses!
- The device is suitable for use in indoor and outdoor areas!
- In the case of free weathering, it is recommended to equip the ExConnection Rail with a protective roof or protective wall!
- If direct contacts with seawater are expected, the external surfaces of the Ex-d housing should be provided with a protective lacquering coat!
- At the place of use, absolutely pay attention to the Ex d housing GUBox's resistance against chemical substances and other media. See the General Specification for GUBox aluminium alloy "Al Si7Mg03 T6" according to EN 13195" or ask the Samcon company!
- Internal wiring shall be exclusively made by Samcon. The wiring must never be modified or supplemented!
- Lines (in particular, wire and cable penetrations of Ex-d<->Ex-e of series 8174, etc.) are designed for existing potential temperatures and for the minimum current carrying capacity (e.g. of type "H0 7G-K", "S0 7G-K", "NSGAFÖU" or "AWM UL 1015")
- At the place of the installation, absolutely pay attention to the installation weight of and mechanical load from the ExConnection Rail and from the mounting medium and check it (cf. also Tab.6.1, 6.4 and 6.6). Consider a safety margin of min. 20% in the device weights!
- Use only the recommended erection bolts (cf. Tab.8.2)! The bolts are not included in delivery!
- Heed the bending radii of the cables and supply lines!
- For optional wireless connections via "Solexy Wireless AXF Antenna Coupler", heed the antenna dimensions and antenna alignments (omni spotlights, directional radio, polarization, local miniature rod aerials with type 2.15 dBi or, possibly, external antennas up to 15 dBi etc.) at the place of use with regard to the radio wave propagation, as well as sending and receiving quality!

6.3 Assembly and Use



- Not correctly performed installation can cause severe injuries!
- The service line must comply with the currently applicable regulations and should be of the required cross section!
- The diameter must match the dimensions given on the cable bushing!

- Ensure by an appropriate configuration of the used lines and their kind of routing that the maximum permissible conductor temperature is not exceeded.
- Heed the permissible ambient temperature stated on the name plate of the respective device!

6.4 Installation in dust-explosive areas!



- The ExConnectionRail must not be used in areas where high electrical charges are generated, mechanical friction and separation processes are carried out, or electrons are sprayed (e.g. in the environment of electrostatic painting equipment), or there is pneumatically conveyed dust.
- Heed the respective note on the nameplate and/or warning sign of the ExConnectionRail!
- If you select a connecting cable which causes a temperature higher than +70 °C at the cable entries, you should respectively lay out the cable entries for such a temperature!



- Mount the device with suitable screws, lock washers, accessories etc. in the provided fixing holes (cf. section 8.1)!
- Pay attention to the weight of the housing!
- If necessary, use suitable auxiliary aids for the transportation!
- When mounting the device, ensure that the base under the device is even!
- You can fasten the device in any position which is allowed in the device documentation or given on its name plate!

6.5 Opening the Ex-d housing cover



Attention!

Depending on the product and model type, there are different rules applicable for opening and closing the Ex-d housing, in particular in hazardous areas!

Absolutely observe the instructions given on the nameplate and in the device documentation!

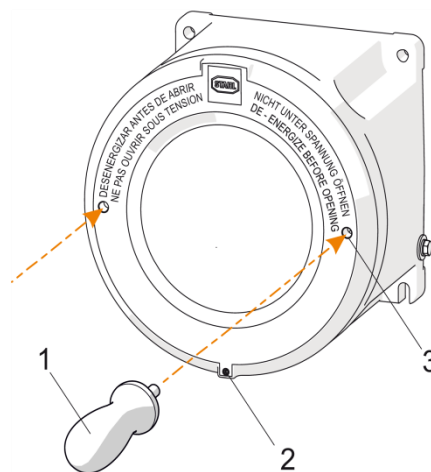


Fig. 6.2 Opening

- Loosen the headless screw / stop bar "M5x16-A2" (with crest) (2).
- Insert the socket wrench (1) into the borehole (3) and carefully unscrew the housing cover counter-clockwise.

Caution: Danger of damage to the ignition-puncture-proof gap (DIN 13-2 /grade min. 6H)!

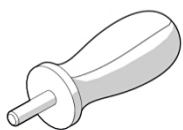
- Carefully put the housing cover onto a clean place. Be careful! Do not touch the screw connection of the cover with your hand or clothes! The screw connection is coated with fat "OKS 403" or "Molykote® P-40" against mechanical stresses.

Caution: risk of contamination of the ignition-puncture-proof thread by lints, fluffs or metal chips sticking to the fatty coat!

Important note:

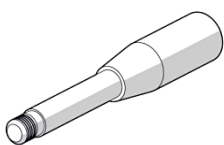
To open the ExConnectionRail T4.1, T4.2 and T4.4, T4.3, two socket wrenches of type „142059“ are recommended!

(← see the figure on the left)



To open the ExConnectionRail T4.5 and T4.6, two screw keys of type "221927" are required!

(← see the figure on the left)



For each T04 device, two suitable tools for opening the housing cover are delivered!



Please note!

Never leave foreign bodies in the Ex-d housing and never do any constructive changes!

6.6 Closing the Ex-d housing cover

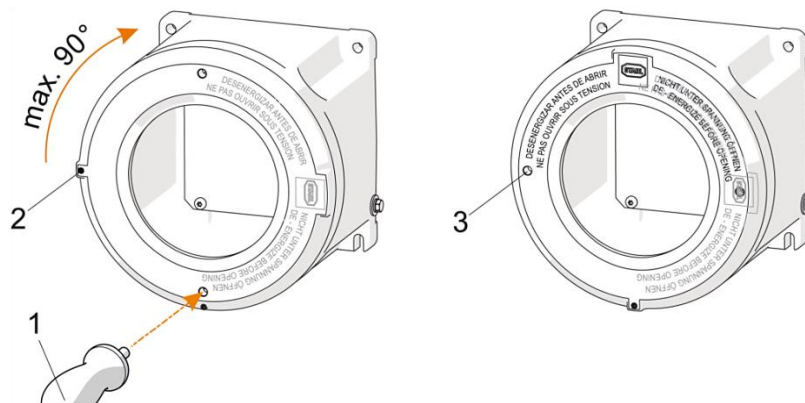


Fig. 6.3 Closing

- Check the fine thread of the Ex-d cover screw connection and see that there is no contamination or damage! If necessary, clean the thread with nitro-thinner, acetone or similar fat solvents and re-grease it with "OKS 403" or "Molykote® P-40"!
- Carefully and evenly put the housing cover with its external thread onto the internal thread of the housing body!
- Plug the recommended special socket wrench (1/type 142059 or type 221927) into blind holes (3) and evenly screw the housing cover screw in a clockwise direction.
- Screw the housing cover completely (the end position is reached with a slight force resistance; there is no defined tightening torque). Turn the housing cover by maximum of 90° back, so that the Samcon logo on the housing top can be vertically plumb, if desired (**load-bearing threads ≥ 5**)!

Information: DIN EN 60079-1:20102008 (ignition-puncture-proof threaded gap):



In accordance with *Table 3 "Cylindrical Thread Gaps"*, for the threads with thread pitches ≥ 0.7 mm and of thread shapes and grades "medium" and "fine", tolerances according to ISO 965-1 and ISO 965-3, the number of engaged thread fillets should be more than 5.

Please observe: For Ex-d housings of volumes less than 100 cm³, the screw-in depth has to be at least 5 mm; for housing volumes exceeding 100 cm³, the screw-in depth must be minimum 8.0 [mm] (T04 ExConnection Rail).

!!! The pressure chamber empty volume of the T04 ExConnection Rail series may be from 800 cm³ (\pm 0.8 L) to 19500 cm³ (\pm 19.5 L), depending on its type and version!!!

6.7 Electrical interface



Caution!!!

Only qualified specialists are allowed to connect the equipment to the electrical power supply!

- Absolutely observe the information in the chapter "Technical Data", as well as in the device-specific operating instructions and in the accompanying documentation, wiring diagrams, etc.
- When connecting a conductor, apply a particular care and thoroughness.
- The conductor insulation must reach up to the clamping points.
- Make sure that you do not damage or score the conductor when stripping it.
- By selection of suitable conductors and types of wiring, ensure that the maximum permissible conductor temperature and the maximum permissible surface temperatures are not exceeded.



Warning!

- If the conductors are not correctly laid in the Ex-e terminal compartment, the explosion protection is no longer guaranteed!
- Observe the required creeping distances and clearances.
- Support rails and elements are properly fastened by Samcon and must not be loosened, disconnected or modified.



- Incorrect laying the cables or lines is dangerous! Danger of severe injuries!

6.7.1 External Wiring

Connection cables of the T04 ExConnection Rail can be analogue, digital or hybrid system cables, as well as power cables from Samcon (e.g. "SKA02", "Ska03-T", "SKD01", "SKAD02", "SSKA01", "ÖLFLEX® ROBUST 210", etc.), or cables which the user or system integrator selects and supplies himself.

In this case, the plant operator is explicitly pointed out and obliged to ensure that all the connection cables of the T04 ExConnection Rail must comply with all applicable regulations of DIN EN 60079-14:2014 (IEC 60079-14:2013) "*Design, Selection and Erection of Electrical Systems*" and with the data of the integrated cable entries and have the required conductor cross-sections!



Attention!

Connection cables in the explosion-endangered areas must fulfil the following important requirements of DIN EN 60079-14:2014:

- *Jackets have to be: Halogen- free, UV-resistant and, as far as possible, resistant to chemicals (various materials, e.g. PUR, FEP, PTFE, PE, except PVC as it releases chlorine in the case of fire).*
- *Requirements on non-inflammability according to IEC 60332-1-2*
- *In accordance with Section [9.3.2] "Cables and Wires for the Fixed Laying" must be:*
 - a) *clad with a thermoplastic, thermosetting-plastic or elastomer material. They must be circular and compact. All embedding or claddings must be extruded. If there are fillers: the fillers must not be hygroscopic; or*
 - b) *mineral-insulated metal-sheathed; or*
 - c) *special cable, e.g. flat cable with a suitable cable entries. They must be compact. All embedding and claddings must be extruded. Fillers, if any, must not be hygroscopic!*
 - d) *Moreover, the outer cladding should be flame-retardant according to IEC 60322-1-2 (regarding 1KW flame) and UV-resistant!*
- Configuration and design of connection cables and cable glands in the explosive area are to be carried out by Samcon in full accordance with the strict requirements of DIN EN 60079-14. In accordance with DIN EN 60079-14:2014 **[Section 10.6.2)]**⁶, the plant operator should especially observe the following points:
 - a) for connecting cable lengths $\geq 3\text{m}$, the cable gland can be made without integrated pressure barrier and with elastomer seal on the outer sheath and additional strain relief.
 - b) for connecting cable length $< 3\text{m}$, the cable gland **must be** made with integrated pressure barrier/ epoxy compound encapsulation of the individual wires and thermosetting-plastic elastomer seal on the outer sheath!
- The user may only connect electric potentials on the output side in the Ex-e terminal compartment (in the direction of the Ex zone)!
- Connections and interventions on the terminal strip on the Ex-e <-> Ex-d side are prohibited!

⁶ In accordance with current standard DIN EN 60079-14:2014, the dimensioning does not longer depend on the designated gas explosion group (IIB, IIC) or the Ex-d pressure chamber volume ($< 2000\text{cm}^3$, $\geq 2000\text{cm}^3$), no matter if the cable glands have integrated pressure barriers/compounds or not. It is only a criterion of the used connection cable lengths ($< 3\text{m}$, $\geq 3\text{m}$).

- When designing and assembly the wiring, absolutely heed the permissible minimum and maximum conductor cross-sections and AWG size for rigid and flexible wires (according to IEC 60947-7-1" and "IEC/EN 60079-7").
- It is only permitted to connect a single conductor to each terminal point. The user is not allowed to do any later bridging!
- Partition walls must not be impaired!
- For additionally necessary protection against fanning out, use wire end sleeves or cable shoes!
- The cross-section of the fanning protection must comply with the conductor cross-section!
- Lay the connecting cables with their entire outer insulation into the connection area through the cable gland (e.g. cable inlets of type "8161/7-M20 1307" manufactured from polyamide by R.STAHL)!
Ensure that the cable diameter match the terminal cross-section on the cable entry.
- Please note! Unused cable entries must absolutely be provided with appropriate plugs (included in the delivery)!
- Before you start to operate the device, make sure that the hex jam nuts (with or without claws) of the cable glands are firmly seated. For tightening torques, see the device-specific documentation. The torques had been already checked before the device was shipped. So the tightness (IP protection class) of the Ex-e connection compartment and the strain relief protection of connection points are ensured!
- When laying the connecting cables in the terminal compartment, pay attention to the following:
 - Ensure the bending radii minimum permissible for the respective conductor cross-sections;
 - Exclude any mechanical damaging the conductor by sharp edges or by moving metal parts.

Connection terminals

Secure the slotted screws (not required for push-in or tensioning-spring connection) by using the specified tightening torques (see Table 6.3).

Specification (coarse thread ⁷)	M3	M4	M5	M6	M8	M10
Torque [Nm]	0.8	2.0	3.5	5.0	10.0	17.0

Tab.6.1 Tightening torques for various types of screws

⁷ Tightening torques for metric screws (e.g. hex socket head, cylinder head, DIN912) with coarse threads according to DIN 13-1. Pre-stressing forces [kN] [Nm] and tightening torques for metric screws with ISO-fine threads (DIN 13-2) are different and slightly higher!

Protective earth conductor (PE/ PA)

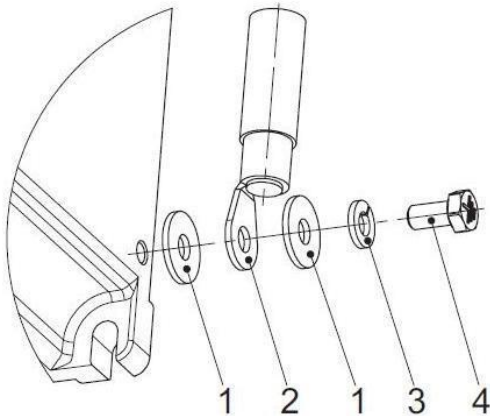


Fig.6.4 Connecting the protective conductor

- Always connect the protective conductor (PE and/or PA) with a cable lug (2) on the housing. In front of and behind the cable lug, use a washer (1) and secure the bolt (4) with a screw lock (3) against loosening.
- Integrate all the bare non-live metal parts into the protective conductor system, irrespective of the operating voltage.
- The outer protective conductor connection is intended for the for cable lug. The cable must be routed close to the housing in such a way that any rotating and loosening of the cable is excluded.
- The protective conductor must have the following properties:

- a) colour coding of the sheathing: **GN/YE (IEC 60757)**
- b) conductor cross-section: **$\geq 4\text{mm}^2$**
- c) Type of conductor: **rigid**

6.7.2 High Frequency Emitting Interface



The T04 ExConnection Rail can be equipped with explosion-protected antenna couplers Ex-d MB [ja] (SOLEXY SRL). In this case, adhere to the particular operating conditions given in the enclosed Device Documentation or in the circuit diagrams. The antenna coupler dampens and limits the RF transmit power to a harmless level. At the same time, the signal side placed in the explosion-endangered area is isolated from the critical low-frequency voltages and DC voltages. The device technology and the specification of the HF transmitting source (radio) within the T04 ExConnection rails are flexible.

In this context, the following points must be observed:

- a) Antenna cable and rod aerials can be connected and disconnected under voltage in the Ex-area!
- b) Observe the maximum permissible antenna gain/ directional radio effect [dBi] or the specified attenuation values of the coaxial cable. Isotropic omnidirectional performance [dBm] for each sending device within the operating frequency range is evaluated separately and must not be exceeded (cf. limit values in Tab 6.4 and Tab. 6.5)!
- c) Be careful when connecting the RF antenna cable and the rod aerials to the RP-SMA or N-plug of the AX antenna coupler.
 When doing installation work, pay attention to the forces, torques and point loads which the explosion-proof HF-barriers are exposed to, as well as the antenna alignment and the cable marshalling! Heed the bending radii and strain relieves by means of cable clamps or cable ties. Provide them, if necessary!

Information:

According to DIN EN 60079-0: 2012 [6.6.1], the following power limits are applicable for devices which radiate electromagnetic and ultrasound energy: high- frequencies from 9 kHz to 60 GHz and continuous and pulsed radiation!

Geräte der	Ausgangs-Strahlungsleistung W	Zündinduktionszeit µs
Gruppe I	6	200
Gruppe IIA	6	100
Gruppe IIB	3,5	80
Gruppe IIC	2	20
Gruppe III	6	200

Tab.6.2 Power limit levels for HF emitters

For pulsed radiation and other radiation kinds in which the pulses are short compared to the impulse duration, the values of the output radiation energy Z_{th} should not exceed the values listed in the table below!

Geräte der	Ausgangs-Strahlungsenergie Z_{th} µJ
Gruppe I	1500
Gruppe IIA	950
Gruppe IIB	250
Gruppe IIC	50
Gruppe III	1500

Tab.6.3 Energy limit levels for HF emitters

6.8 Optical Interface



If the T04 ExConnection Rail contains optical data interface (OWG), special conditions shall apply for the cables, optical wave-guides, patches and couplings in the Ex-area, as well as for the connecting of the remote station (FX transmitting / receiving device).

The connection and transmission technology intended for large ranges is very flexible (e.g. ST, SC, MTRJ, LC connector, SFP module, 1310 nm multi-mode and single-mode fibres, GI/ graded-index, 100BASE-FX via G50(62.5)/125µm, 1000BASE-LX, Fibre Channel '1GFC', HD-SDI fibre 1485 Gbps, etc.).

For optical sources within the T04 ExConnection Rail, the current requirements and conditions of EN 6007 9-28:2007 and of the Supplement 1 "IEC 6007 9-28:2006/ISH1.2014" must be adhered to.

The following efficient protection mechanisms can be used for optical radiation sources within ExConnection Rail.

- | | | |
|-----------|---|-------------------|
| a) | protected optical radiation | [Ex op pr] |
| b) | intrinsically-safe optical radiation | [Ex op is] |

ExConnection Rail can also contain status or infra-red LEDs, which need not to be evaluated according to DIN EN 6007 9-28: 2007 Explanation Sheet 1:2014-09 or need an additional explosion protection. In this case, the optical source should fulfil the following requirement:

- c) LEDs with diffuse radiation,
low power/energy emission,
not designed in the "matrix arrangement" [Not Ex]**

!!! Attention: When dealing with the optical interfaces, absolutely observe and adhere to the instructions given on the nameplate and in the device-specific documentation, circuit diagrams, etc.

Information on "optical radiation in the Ex-area":

According to DIN EN 60079-28: 2007 [5.2.2], the radiation power rates and intensity of irradiation from unprotected continuous radiation sources (optical intrinsic safety Ex op is) shall not exceed the limits given below.

Betriebsmittelgruppe	I	IIA	IIA	IIB	IIC	
Temperaturklasse		T3	T4	T4	T4	T6
Temperaturklasse (°C)	< 150	< 200	< 135	< 135	< 135	< 85
Leistung (mW)	150	150	35	35	35	15
Bestrahlungsstärke (mW/mm ²) (Oberfläche bis 400 mm ²)	20 ^a	20 ^a	5	5	5	5
^a Für bestrahlte Flächen größer als 30 mm ² , bei denen brennbare Materialien in den Strahl gelangen können, gilt ein Grenzwert der Bestrahlungsstärke von 5 mW/mm ² .						

Tab.6.4 Safe optical radiation power and irradiation intensity

6.9 Making additional through-holes



Attention: It is strictly forbidden to make additional holes in the Ex-e control boxes, as well as to modify the Ex-d housing and make other thread holes or blind holes, etc.!

Unauthorised and not permitted actions will lead to immediate exclusion of the guarantee for the device and for its protection against explosion!!!!

7 Starting the device operation

Prior to the device starting, you should carry out all the required tests which are mentioned in the national regulations. Moreover, before starting the device, check the correct function and installation of the equipment in accordance with this Operating Instructions and other applicable rules.

Improper installation and operation of the T04 ExConnection Rail can result in the loss of the guarantee and of the explosion protection!

- Make sure that the product and its components are not damaged.
- Make sure that the device is properly installed.
- Remove the foreign bodies from the device and clean the connection area.
- Check the cable guides and closing plugs for proper fit.
- Check the screws and nuts for proper tightness.
- Make sure that all other connections are tightened firmly.
- On the pressure-resistant encapsulation (ignition-puncture-proof threaded gap), check whether there is no contamination or damage on the cable guides and fine threads (DIN 13-2) of “medium or “fine” tolerance classes / grade "6G" or "5G" (ISO 965-1/-3).
- Check the tightening torques (see Tab.6.3)
- Make sure that unused cable entries in the Ex-e terminal box are sealed with the plugs certified by Directive 2014/34/EU (e.g. type 8161) and open holes are sealed with the closing plugs certified by Directive 2014/34/EU (e.g. Type 8290).
- Make sure that the connection was performed properly.
- Make sure that the minimum connecting cable lengths comply with the built-in pressure-resistant cable glands in accordance with DIN EN 60079-14:2014 [**Section 10.6.2**]! (cf. Chapter 8.4).
- Make sure that the nameplate is clearly recognisable, readable and not dirty!

(Please note:

Device nameplates ("X") are usually made of metal sheet or acetone-resistant thermal script foil and placed on the screwed cover in the middle. In GUBoxes of size 1.2, the name plate can also be placed on the lateral side of the device. The identification labels ("U") of Ex-d and Ex-e components are always located on a housing inner surface. Thus they are separated from the device identification marking and cannot be mixed up with them!)

8 Operation

The function is individual and depends on the installed components.

For technical information on use and configuration of built-in devices, as well as on the system integration of the device, please see the device-specific documentation (operating instructions, circuit diagrams, function diagrams, additional instructions for safety and assembly).

On the attached USB data carrier, you may find more information, software tools/ firmware, as well as customised configuration profiles (e.g. *.ini* files) of network devices and video servers available at the time of delivery.

9 Service, maintenance and troubleshooting



Adhere to the national regulations applicable to maintenance and servicing of electrical equipment in hazardous explosion-endangered areas. Other regulations, intervals and scopes of the tests are set in DIN EN 60079-17: 2014 -10 101150.



Please note!

The ignition-puncture-proof thread gap of the GUBox Ex-d housing should be provided with a sufficient and clean oil/grease protective layer between the screwed cover and the housing fuselage!

The T04 ExConnection Rail is delivered with sufficiently greased screw cover!

Because of mechanical stresses resulting from frequent opening and closing or from impurities and wear caused by environmental conditions at the place of use, it may be necessary to re-grease the ignition-puncture-proof thread.

At first, carefully clean the fine thread with a suitable kind of grease solvent (e.g. nitro-thinner, acetone, etc..)!

Before doing that, remove the silicone O-ring seal!

9.1 Specification of lubrication and protective materials

The ignition-proof fine threads (DIN 13-2) of the Ex-d housing are coated with thin layers of different lubricants and protective materials.

The goal is to protect the T04 ExConnection Rail against corrosion and mechanical stresses, as well as to prevent the bolted connections from loosening by impacts, vibrations etc.. In addition, these substances improve sealing properties.

"Molykote® P-40" is a suitable and recommended lubricant for the pressure-resistant screw cover of the GUBox housing. This metal-free and adhesive paste consists of substrate oil with low evaporation rate and of heat-resistant solid lubricants.

The lubricating paste is ideally suitable for assembly and permanent lubrication of components which are exposed to extremely high temperatures and corrosive influences.

For offshore applications or permanent wet areas with salt water influence, we recommend **grease "OKS 403"** as protection of threads. The OKS 403 special grease for coastal and marine areas is standard lubricant for the screwed cover.



Be careful and do not touch the threads of the pressure-resistant cover with your skin or clothes!
Heed to the safety data sheets for dealing with hazardous substances in the attached documentation!

Specification MOLYKOTE P-40:

Temperature:	-40°C ... +230°C (as paste) -40°C ... +1200°C (as solid lubricant)
Drop point:	...°C (none) DIN 21176
Intrinsic viscosity (40°C):	360 mm ² /s DIN 51562
Friction oxidation:	25x10 ⁶
Interference fit:	0.12 µ (friction coefficient)
Bolt thread:	0.10 µ (friction coefficient)
Vibration resistance:	0.13 µ (300N, 50Hz, Amp.0.5mm, 2hours)
Salt spray test:	500 hours
Degree of corrosion:	0 (DIN 51802)

Specification of OKS-403 (for seawater influence):

Identification (DIN 51825):	KP1-2E-20 (DIN 51502)
Temperature:	-25°C ... +80°C
Dropping point:	>100 °C (IP 396)
Viscosity (+40°C):	100 [mm ² /S] (DIN 51562-1)
Viscosity (+100°C):	9 [mm ² /S] (DIN 51562-1)
Corrosion protection (3% NaCl):	Degree of corrosion 0..1 (DIN 51802)
Weld load (tested with a four-ball apparatus):	3000 N (DIN 51350-4)
Water resistance (+40°C):	0 ... 40 degrees (DIN 51807)
DN value:	350.000 mm/min
Colour:	brownish
Density (+20°C):	0.94 [g/cm ³] (DIN 51757)

The fine threads (according to DIN13-2 with good degree 6G/5G according to ISO 965-1/-3) of through holes in the pressure-resistant encapsulation contain the acrylate **LOCTITE® 243™**. It is used in the case of pressure-resistant cable glands (e.g. of type Peppers UB-20S M20, ADE 4F MsNi Type5-M20x1.5, etc.), Ex d plug contacts (e.g. of type Cooper Crouse-Hinds eXLink series), Ex-d closing plug (e.g. R.Stahl, series 8292), Ex-d mb HF barriers (e.g. of type Solexy AXF/ AXN), not for wire cable penetrations (e.g. R.STAHL, series 8174).

The LOCTITE® 243™ bolt locking prevents the bolted connections from both intentional and not intentional loosening by shocks, vibration and improper use, etc. It is additionally used for better sealing. The product cures under exclusion of air between the tight-fitting metal surfaces.



Be careful and do not touch the threads of the pressure-resistant cable glands and aerial guides with your skin or clothes!
Heed to the safety data sheets for dealing with hazardous substances in the attached documentation!

Specification LOCTITE® 243™:

Application:	bolt locking
Technology:	acrylate
Chemical base:	dimethacrylatester
Appearance (not hardened):	blue, liquid, fluorescent
Components:	one-component, no mixing required
Viscosity:	medium, thixotropic
Curing:	anaerobic
Secondary hardening:	activator
Hardness:	medium

9.2 Required Accessories

Breathers

If during starting or maintenance of the device you see moisture or drops in the pressure chamber, it may be necessary to install a suitable breather!

The breathers provide permanent pressure equalization between the pressure-resistant housing interior space of the T04 ExConnection Rail and atmosphere surrounding the housing. This prevents the moisture from its penetration through the seals into the housing and its condensing there.



If condensation occurs, we absolutely recommend a vent and drain nozzle of type "107998" (with R 3/8" thread) or of type "107999" (with R 1/2" thread).

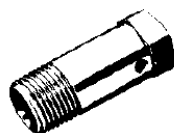


Fig.9.1 Breathers against condensation

9.3 Maintenance and regular servicing

The required maintenance intervals depend on the application. Therefore, they are to be set by the plant operator depending on the conditions of use. In the course of the maintenance, the most important is to check the components on which the type of ignition protection depends.

The following tests should be done in the course of the maintenance:

- Checking the cables for secure seating
- Checking the device for visible damage
- Compliance with the permissible temperatures according to IEC/EN 60079-0
- Checking for proper functionality



It is recommended to use a wrist cuff or a similar aid with electric potential bonding/protective earthing, when doing maintenance and installation in the internal area of the pressure-resistant encapsulation. Voltage surges as a result of electrostatic charging can damage the built-in devices!

9.4 Cleaning

- Cleaning the device with a damp cloth, a hand broom, electric industrial vacuum cleaner or similar.
- For wet cleaning, use water or mild, non-abrasive detergents.
- Never use aggressive cleaning agents or solvents.
- Ensure potential bonding and protection against overvoltage!

9.5 Repair instructions

Never try to repair the device yourself. De-energize the device and return it to Samcon!

10 Recycling

Observe the national regulations for waste disposal and recycling.

11 Technical drawings

Detailed technical drawings of the devices are contained in the product-specific documentation. For DXF files, 3D models in PDF format and other diverse file formats and drawings of accessories, please visit <http://www.samcon.eu>

If something is missing, please send us a message by e-mail to <mailto:support@samcon.eu>

12 Certificates of the ExConnection Rails (T04)

12.1 EU Declaration of Conformity

EU - Konformitätserklärung

EU – Declaration of Conformity / UE – Déclaration de Conformité

Der Hersteller / The manufacturer / Le fabricant




**Schillerstrasse 17
35102 Lohra-Altenvers**

erklärt in alleiniger Verantwortung, dass sein Produkt / declares under his sole responsibility, that his product /
déclare sous sa seule responsabilité, que son produit

ExConnection Rail - T04...

gekennzeichnet mit / marked with / marqué avec

Gas:

 II 2G Ex db IIC T6 Gb

Dust:

 II 2D Ex tb IIIC T80°C Db IP66

Optional and additional type of Protection markings for all Types:

[op is]	= for models with [op is] FOC connectors,	[op pr]	= for models with [op pr] FOC Connectors
mb	= for models with HF Barrier	[ia Ga/Da]	= for models with [ia Ga/Da] intrinsically safe circuits
eb	= for models with Ex-e terminal box	[ib Gb/Db]	= for models with [ib Gb/Db] intrinsically safe circuits

The explosion group can be downgraded to IIB if required
 The ambient temperature range can be downgraded if required
 The temperature class (gas) and the temperature value (dust) can be downgraded if required.


bescheinigt mit EG-Baumusterprüfbescheinigung / certified by EC type examination certificate /
ayant fait l'objet de l'attestation CE de type

TÜV 10 ATEX 7969 X

auf das sich diese Erklärung bezieht, mit der/den folgenden Richtlinien, Normen oder normativen Dokumenten übereinstimmt:
referred to by this declaration is in conformity with the following directives, standards or normative documents:
auquel se rapporte la présente déclaration, est conforme aux directives, normes ou aux documents normatifs suivants:

Directives	
ATEX	2014/34/EU
ROHS	2011/65/EU
LVD	2014/35/EU
EMV	2014/30/EU

Related Ex Standards	
EN IEC 60079-0:	2018
EN 60079-1:	2014
EN 60079-7:	2015
EN 60079-11:	2012
EN 60079-18:	2015
EN 60079-28:	2015
EN 60079-31:	2014



Digital unterschrieben von Steffen Seibert
 DN: cn=Steffen Seibert, o=SAMCON Prozessleittechnik GmbH, ou, email=s.seibert@samcon.eu, c=DE
 Datum: 2023.06.16 10:17:00 +02'00'

SAMCON Prozessleittechnik GmbH
 Schillerstraße 17
 D-35102 Lohra-Altenvers
 www.samcon.eu
 T: +49 6426-9231 0 / F: +49 6426-9231 31

Dipl.-Ing. Steffen Seibert
 Geschäftsführer

Altenvers, den / the / le 16.06.2023

Doc. - Id.: 230616-PT04BAU-SS-EU Konformitätserklärung.docx

12.2 EU Certificate of Conformity (ATEX)

see <http://samcon.eu>

12.3 IECEx Certificate of Conformity

see <http://samcon.eu>

12.4 EAC-Ex Certificate of Conformity

see <http://samcon.eu>

Further Certificates

see <http://samcon.eu>



SAMCON

Schillerstraße 17, 35102 Lohra-Altenvers

www.samcon.eu, info@samcon.eu

fon: +49 6426 9231-0, fax: - 31