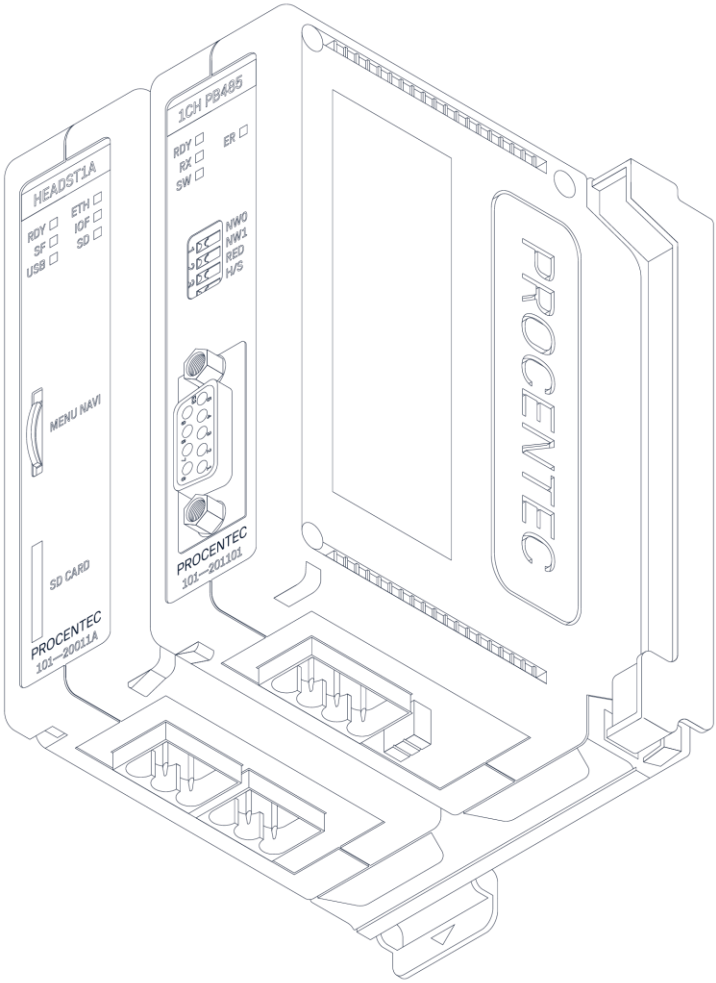


PROCENTEC®

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ComBricks

Technical Manual RS-485IS Barrier


- NL** Veiligheidsinstructies voor elektrisch materieel in explosiegevaarlijke omgeving.
- EN** Safety instructions for electrical apparatus certified for use in explosion-hazardous areas.
- FR** Conseils de sécurité pour matériels électriques destinés aux zones explosibles.
Si vous ne pouvez pas lire ce manuel, vous pouvez commander un en votre langue gratuitement.
- DE** Sicherheitshinweise für elektrische Betriebsmittel für explosionsgefährdete Bereiche.
Wenn Sie dieses Handbuch nicht lesen können, können Sie ein in Ihrer Sprache kostenlos bestellen.
- ES** Instrucciones de seguridad de aparatos eléctricos homologados para su utilización en áreas expuestas a riesgos de deflagración. Si no entiende este manual, puede pedir un ejemplar en su idioma.
- IT** Istruzioni di sicurezza per apparecchiature elettriche certificate per l'utilizzo in aree con pericolo di esplosione. Se il presente manuale non risulta comprensibile potete ordinare una copia tradotta nella vostra lingua.
- FI** Turvallisuusohjeita sähkölaitteille, jotka on vahvistettu käytettäväksi räjähdysvaarallisilla alueilla.
Jos et ymmärrä tätä käsikirjaa, voit tilata meiltä käännöksen omalla kansallisella kielelläsi.
- SV** Säkerhetsföreskrifter för elektrisk utrustning certifierad för användning i explosionsfarliga områden.
Om du inte förstår denna manual, kan en översatt kopia på ditt eget språk beställas från oss.
- DA** Sikkerhedsforskrifter for elektriske apparater certificeret til brug i eksplosionsfarlige områder.
Hvis du ikke forstår denne manual, kan en oversat kopi af den på dit eget sprog bestilles fra os.
- PT** Instruções de segurança para dispositivos eléctricos certificados para utilização em áreas de risco de incêndio. Se não compreender este manual, pode encomendar-nos directamente uma cópia na sua língua.

EU Verklaring van overeenstemming

EU declaration of conformity

Déclaration UE de conformité

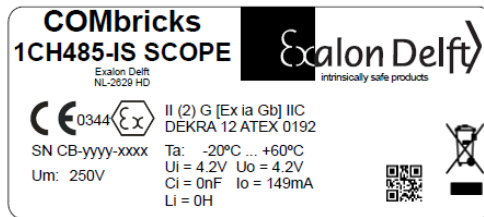
EU-Konformitätserklärung

ES	Declaración de conformidad Por la presente declaración y la inclusión de la marca CE, el fabricante Exalon Delft, Delft, Nederland, garantiza que el producto cumple lo estipulado por la Directiva CEM 2004/108/CEE y la Directiva 94/9/CE. La prueba de conformidad se presenta según las normas expuestas.	Exalon Delft, Rotterdamseweg 183C, 2629 HD, Delft verklaart als enig verantwoordelijke, dat het product declares in sole responsibility, that the product déclare sous sa seule responsabilité que le produit erklärt in alleiniger Verantwortung, dass das Produkt 1CH485-IS SCOPE <i>(Profibus RS485-IS bus coupler ComBricks 1CH485-IS with SCOPE option)</i> Met serienummer: With serial number Avec numéro de série Mit Seriennummer CB-2021-xxxx
IT	Dichiarazione di conformità Con questa dichiarazione e con l'applicazione del marchio CE, il costruttore Exalon Delft, Delft, Nederland, assicura che il prodotto è conforme ai regolamenti della direttiva CEM 2004/108/CEE e della direttiva 94/9/CE. Prova della conformità è fornita dall'osservanza degli standard elencati.	overeenstemt met de voorschriften van de volgende Europese richtlijnen: conforms with the following European Directives: est conforme aux prescriptions et directives Européennes suivantes: mit dem Vorschriften folgender Europäischer Richtlinien übereinstimmt: ATEX Richtlijn 2014/34/EU EMC Richtlijn 2014/30/EU
FI	Varmennustodistus Tällä varmennustodistuksella sekä CE-merkillä, valmistaja Exalon Delft, Delft, Nederland, vakuuttaa, että tuote on direktiivien EMC 2004/108/EY ja 94/9/EU mukainen. Näyttö vastaavuudesta on annettu asiakirjoissa, jotka on listattu varmennustodistukseen.	Toegepaste geharmoniseerde normen of normatieve documenten: Applied harmonized standards or normative documents: Normes harmonisées ou documents normatifs appliqués Angewandte harmonisierte Normen oder normative Dokumente: EN-IEC 60079-0:2012* EN 55016-2-3:2010 + A1:2010 EN 61000-4-4:2004 + A1:2010 EN-IEC 60079-11:2012 EN 61000-4-2:2009 EN 61000-4-5:2007 EN 55022:2010 EN 61000-4-3:2006 + A1:2008 + A2:2010 EN 61000-4-6:2009 * Een vergelijking tegen de geharmoniseerde normen in de publicatie PB L 302 – 26/8/2021 toont geen significante wijzigingen die relevant zijn voor de "State of the Art". A review against harmonized standards in publication OJ L 302 – 26/8/2021 shows no significant changes relevant to the "State of the Art". / Un examen des normes harmonisées dans la publication JO L 302 – 26/8/2021 ne montre aucune modification importante de l'état de l'Art". / Eine Überprüfung gegen die harmonisierten Normen im Veröffentlichung ABl. L 302 – 26/8/2021 zeigt keine wesentlichen Veränderungen, die für die "State of the Art "
SV	Försäkrän om överensstämmelse Exalon Delft, Delft, Nederland försäkrar med denna försäkrän om överensstämmelse och med CE-märkningen att produkten uppfyller bestämmelserna i EMC-direktivet 2004/108/EEG och direktiv 94/9/EG. Överensstämmelsen påvisas genom givna standarder.	ATEX marking: ATEX marking: Marquage ATEX: ATEX Kennzeichnung: II (2) G [Ex ia Gb] IIC
DA	Overensstemmelseserklæring Med denne overensstemmelseserklæring og tilføjelsen af CE-mærket, sikrer producenten Exalon Delft, Delft, Nederland, at produktet er i overensstemmelse med bestemmelserne i det EMC-regulativ 2004/108/EEC og Direktiv 94/9/EC. Dokumentation for overensstemmelsen gives i de anførte standarder.	EG Typecertificaat Nr. / Aangewezen instelling EC-Type Examination Certificate No. / Notified body: Numéro de l'attestation d'examen CE de type / Organisme notifié: EG- Baumusterprüfbescheinigung Nr. / Benannte Stelle.: DEKRA 12ATEX0192 / 0344 DEKRA Certification BV Meander 1051, 6825 MJ Arnhem, Nederland
PT	Declaração de Conformidade Com esta Declaração de Conformidade e o anexo do CE-Mark, o fabricante Exalon Delft, Delft, Nederland, garante que o produto obedece aos regulamentos da Directiva EMC 2004/108/EEC e Directiva 94/9/EC. A prova da conformidade é apresentada segundo os padrões indicadas.	Eerste aanbrenging van de CE marking: CE-mark first affixed: Année de mise en conformité CE: Erstmalige Anbringung des CE-Zeichens: 2021  Kwaliteitsmanager Quality assurance manager Delft, 10. Jan. 2022

1CH485-IS SCOPE Installation Guide

PROFIBUS RS485-IS bus coupler ComBricks 1CH485-IS with SCOPE option

COMbricks 1CH485-IS marking, type identification plates:



Designation according to Directive 94/9/EC:

CE 0344 Ex II (2) G

- Notified body performing the QA surveillance _____
- Equipment Group II (Surface Industries) _____
- Equipment Category 2 with a high level of protection for installation in the safe area with wiring running into Zone 1 _____
- For explosive mixtures of gases, mists, or vapors in air _____

Ex marking:

[Ex ia Gb] IIC

- Electrical apparatus with explosion protection acc. to EN-IEC standard _____
- Type of protection (intrinsic safety, associated apparatus) _____
- For installation in the safe area with wiring running into Zone 1 _____
- Apparatus group / Gas group _____

EC-Type Examination Certificate Number:

DEKRA 12 ATEX0192

- No Special conditions for safe use are required

SN: Serial number: yyyy = year of placing on the market, xxxx = serial number

European Standards applied for explosion protection:

EN-IEC60079-0 :2012
EN-IEC60079-11:2012

1. General

1.1 Document conventions

Warnings, Cautions and **Notes** are used throughout this installation guide to bring special matters to the immediate attention of the reader.

- A Warning concerns danger to the safety of the technician or user.
- A Caution draws the attention to an action which may damage the equipment.
- A Note points out a statement deserving more emphasis than the general text.

1.2 Preface

This installation guide is intended for system integrators involved in the mechanical and electrical installation and operation of the **1CH485-IS SCOPE**. The technician must have basic technical skills and knowledge of safety regulations and explosion proof equipment in hazardous areas and must work in accordance with the (local) requirements for electrical equipment in hazardous areas. It must be insured that the technician is able to read the language in this manual, otherwise a translation must be obtained or additional training must be provided.

<p style="text-align: center;">Warning</p> <p>In hazardous areas it is mandatory to use personal protection and safety gear such as: hard hat, fire-resistive overall, safety shoes, safety glasses and working gloves.</p> <p>Avoid possible generation of static electricity. Use non-sparking tools and explosion-proof testers. Make sure no dangerous quantities of combustible gas mixtures are present in the working area. Never start working before the work permit has been signed by all parties. Pay attention to the kind of product in the tank. If any danger for health, wear a gas mask and take all necessary precautions.</p>
--

The **1CH485-IS SCOPE** can provide Intrinsically Safe [Ex ia] power and control signals to Zone 1 areas. The **1CH485-IS SCOPE** provides the required voltage and current limiting required for Intrinsic Safety but is itself not Intrinsically Safe.

This manual provides instruction for installing, operating and repairing the **1CH485-IS SCOPE** only.

<p style="text-align: center;">Warning</p> <p>Do not use the instrument for anything else than its intended purpose.</p>

Caution

The **1CH485-IS SCOPE** has Intrinsically Safe output/input circuits. Do not connect non-Intrinsically Safe equipment or Intrinsically Safe equipment with non-matching parameters to the Intrinsically Safe Profibus connector as this will invalidate the Intrinsically Safe protection and may cause irreparable damage to the **1CH485-IS SCOPE** or other Intrinsically Safe equipment on the bus.

Modifications to the instrument may only be carried out by trained personnel with written authorization from Exalon Delft. Unauthorized modifications will invalidate the approval certificate and may impair safety.

1.3 Legal aspects

The mechanical and electrical installation shall only be carried out by trained personnel with knowledge of the requirements for installation of explosion proof equipment in hazardous areas.

The information in this installation guide is the copyright property of Exalon Delft B.V., Netherlands. Exalon Delft B.V. disclaims any responsibility for personal injury or damage to equipment caused by:

- Deviation from any of the prescribed procedures.
- Execution of activities that are not prescribed.
- Neglect of the general safety precautions for handling tools, use of electricity and microwave radiation.

The contents, descriptions and specifications are subject to change without notice. Exalon Delft B.V. accepts no responsibility for any errors that may appear in this installation guide.

1.4 Additional information

Please do not hesitate to contact Exalon Delft or its representative if you require additional information. Specifications:

1.4.1 Environmental conditions:

Ambient Temperature Ta	-20 °C < Ta < +60 °C
Ambient Pressure	Atmospheric
Ambient Humidity	0 – 95%RH (non-condensing)
Ingress Protection	IP20

1.5 Electrical data:

1.5.1 Non-intrinsically safe circuits

Backplane circuits	Un = 5.75V VDC Um = 250V
Maximum power dissipation (normal operation)	3W

1.5.2 Intrinsically safe circuits

RS485-IS connector (DN9)	
Type of protection	Ex ia IIC
Output parameters per circuit:	<p>Uo = 4.2 V Io = 149 mA Ui = 4.2V Ci = 0uF Li = 0uH</p>

1.6 RS 485-IS intrinsically safe concept (basic requirements)

(for details see "PROFIBUS Guideline, Order No. 2.262" and/or IEC61158-2:2010)

When interconnecting multiple Intrinsically Safe devices to a cable an Intrinsically Safe system is formed. Such a system should be evaluated for Intrinsic Safe against EN-IEC60079-25:2010 (Intrinsically Safe systems). Furthermore EN-IEC60079-14 and local regulations should be followed for the installation of such a system.

Each device on the cable will have a set of input and output parameters that must match will the input and output parameters of ALL other devices on the cable. Further the combined input capacitances and input inductances together with the cable form a distributed capacitance and inductance which must match the maximum voltage and peak current on the cable.

To simply this work for Profibus buses in the Hazardous area, "RS 485-IS User and Installation Guideline", Version 1.1, June 2003, PNO and/or IEC61158-2:2008 or IEC61158-2:2010 define a set of compatible input and output parameters that EACH of the maximum communication device on the bus must conform to.

This is called RS485-IS:

Communication device:

Maximum output voltage	$U_o = 4.2 \text{ V}$
Maximum output current	$I_o = 149 \text{ mA}$
Maximum input voltage	$U_i \geq 4.2 \text{ V}$
Maximum internal inductance	$L_i \approx 0 \text{ } \mu\text{H}$
Maximum internal capacitance	$C_i = \text{Negligibly small}$
Output characteristic:	Linear

A similar set of parameters for Active Bus Termination devices are defined:

External active bus termination

Maximum output voltage	$U_o = 4.2 \text{ V}$
Maximum output current	$I_o = I_{SC} = 16 \text{ mA}$
Maximum input voltage	$U_i = V_{MAX} \geq 4.2 \text{ V}$
Maximum internal inductance	$L_i \approx 0 \text{ } \mu\text{H}$
Maximum internal capacitance	$C_i = \text{Negligibly small}$

The cable used to interconnect the devices shall be cable type A in accordance with IEC 61158-2 / IEC 61784:

Cable:

Wire diameter	$> 0.64 \text{ mm}$
(stranded wire must be protected against separation of the strands)	
Core cross-sectional area	$> 0.34 \text{ mm}^2$
capacitance per unit length	$C': \leq 30 \text{ pF/m}$
ratio L' / R' :	$\leq 15 \text{ } \mu\text{H}/\Omega$
Color of sheath	Light blue (or marking labels)
Total cable length	$< 1200\text{m}$

Up to 32 communication devices and 2 external active bus terminators may be interconnected.

In set-up at least one fieldbus isolating repeater is (usually) located in the "nonhazardous area" for the safe separation of the intrinsically-safe bus segment from the non-intrinsically-safe bus segment. Other connected communications devices (field devices) are located in the "hazardous area". The bus cable is terminated at both ends by means of an external active bus termination or a bus termination integrated in a communication device as well as in a bus connector. All communications devices are supplied by external voltage sources and possess the means of safely limiting the current and voltage on the bus. For this each device must be certified at least [Ex ib Gb] IIC.

It must be noted that for the type of protection (ia or ib) and the gas group (IIA, IIB or IIC) the lowest rating of

all devices applies to the RS485-IS system as a whole.

When the above requirements are satisfied the RS 485-IS fieldbus system is intrinsically safe.

The maximum safety values of RS 485-IS are defined as follows.

Maximum input voltage between the signal wires	$U_i = 4.2 \text{ V}$
Maximum input current in the signal wires	$I_i = 4.8 \text{ A}$
The characteristic of the circuit is linear.	
Maximum L/R ratio of the cable	$L'/R' \ 15\mu\text{H}/\text{Ohm}$

1.7 Installation

The **1CH485-IS SCOPE** may only be mounted in a matching ComBricks backplane module.

RS485-IS bus connection should preferably be made using a ATEX certified Profibus RS485-IS connector.

Warning

Care must be taken to protect the metal parts of the connector from contact with other Intrinsically Safe or non-Intrinsically Safe wires, even when wiring would loosen from their terminals. This will be achieved by proper wiring according to EN-IEC60079-14 and for instance restricting the movement of wire ends using for instance tie wraps.

1.8 Grounding of the 1CH485-IS SCOPE

Warning

The **1CH485-IS SCOPE** must be grounded using the earth terminal to a reliable potential equalization point according to EN-IEC60079-14 using 4 mm² wire. Improper grounding will invalidate the Intrinsic Safety of the **1CH485-IS SCOPE**.

Note

A M3 screw and suitable serrated washer should be used to create a reliable connection. Place the washer between the earth terminal and the ring terminal to prevent movement of the ring terminal with respect to the earth terminal.

Caution

Do not exert excessive force while tightening the screw to prevent damage to the earth terminal soldering.

The RS485-IS bus is Intrinsically Safe galvanically isolated from the non-Intrinsically Safe circuits with an isolation voltage of 500V.

The RS485-IS bus is Intrinsically Safe isolated from earth with an isolation voltage of 500V. However a high reliability 2000V/2.2nF capacitor is provided to decouple the bus to earth according to EN-IEC60079-14.

1.9 Shielding of the RS485-IS cables

EN-IEC60079-14 must be followed.

As required according to IEC61158-2:2010 the 1CH485-IS DN9 connector is D.C. isolated from ground using a high reliability 2000V/2.2nF capacitor.

1.10 Lightning protection

The **1CH485-IS SCOPE** does not contain lightning protection. The installation must provide adequate protection. We recommend to obtain expert advice to properly ascertain lightning protection in Intrinsically Safe installations.

1.11 Instructions for maintenance

The earthing connecting to the potential equalization system should be regularly verified. Follow EN-IEC 60079-17 or local regulations.

Repair to the 1CH485-IS or 1CH485-IS SCOPE may only be done by using original parts. It shall be carried out by qualified skilled workers who have been trained in accordance with EN-IEC 60079-19 or other codes of practice valid on the place of installation.

Applying of non-original parts may lead to injury to persons and damage to equipment.

1.12 Repair

If non-original parts are used or repair has been carried out in an incompetent manner the ATEX certificate may no longer be valid and all warranties are void. Therefore it is advised to return the equipment to the manufacturer in cases repair is demanded.

Technical Data – RS 485-IS Barrier (101-201410)

Backplane	
PROFIBUS networks	4 (set by dipswitches or web server)
Modules	10 (positioned in the first 10 slots)
Power supply	Provided through the backplane
Current consumption at 5.72 VDC	± 450 mA (750 mA max) At this current consumption the module is switched OFF from backplane. Occurs when module is faulty, e.g. internal short circuit.
Compatible backplane units	101-200011, 101-200012, 101-200023, 101-200024, 101-200027
Protocol specifications	
Supported Protocols	DP-V0, DP- V1, DP-V2, FDL, MPI, FMS, PROFIsafe, PROFIdrive and any other FDL based protocol
Address	No bus address required
Transmission speed	9.6 kbps .. 1.5 Mbps (including 45.45 kbps)
Transmission speed detection	Auto detect (< 10 s detection and 50 s lost time)
Data delay time (normal mode)	2.0 TBit
Data delay time (redundant mode)	12.0 TBit
Delay time jitter	Max. ¼ TBit
Oscilloscope specifications	
Frequency	192 MS/s
Resolution	27 mV
Differential range	-3.49..+3.49 V
PROFIBUS cable specifications	
Cable lengths	1200 m at 9.6 kbps .. 93.75 kbps 1000 m at 187.5 kbps 400 m at 500 kbps 200 m at 1.5 Mbps
Wire diameter (for the screw terminals)	< 1.5 mm ²
Wire type	Stranded or solid core
Number of devices	Maximum 31 devices per channel (busloads)
Required termination	DB9-IS connector with internal 200Ω only
Redundancy	Yes, maximum 10 cables activated by switch

Dipswitches											
<table border="0"> <tr> <td>NW0</td> <td>NW1</td> </tr> <tr> <td>LEFT</td> <td>LEFT</td> </tr> <tr> <td>RIGHT</td> <td>LEFT</td> </tr> <tr> <td>LEFT</td> <td>RIGHT</td> </tr> <tr> <td>RIGHT</td> <td>RIGHT</td> </tr> </table> <p><u>RED</u> LEFT / RIGHT</p> <p><u>H/S</u> LEFT / RIGHT</p>	NW0	NW1	LEFT	LEFT	RIGHT	LEFT	LEFT	RIGHT	RIGHT	RIGHT	<p><u>PROFIBUS Network</u></p> <p>1 2 3 4</p> <p><u>Redundancy</u> OFF / ON</p> <p><u>Settings</u> Hardware / Software</p> <p>Repeater Module status Data received The idle voltage when no node is sending is too low Dipswitches or web server settings Redundancy for the current network Communication error or bad telegrams Repeater internal failure Signal amplitude is too low Network 1: NW0=L, NW1=L Network 2: NW0=R, NW1=L Network 3: NW0=L, NW1=R Network 4: NW0=R, NW1=R</p>
NW0	NW1										
LEFT	LEFT										
RIGHT	LEFT										
LEFT	RIGHT										
RIGHT	RIGHT										
ATEX (electrical)											
Uo	4.2 V										
Io	149 mA										
Ui	≥ 4.2										
Li	≈ 0 μH V										
Ci	Negligibly small										
Output characteristic	Linear										
ATEX (compliance):											
<p>II (2) G [Ex ia Gb] IIC EN-IEC60079-0: 2009 / EN-IEC60079-11: 2012 / EN-IEC60079-25: 2010 PROFIBUS International IS Installation Guidelines Certification number: DEKRA 12ATEX0192</p>											
LEDs											
RDY	Module is ready for operation (ON)										
RX	Receiving telegrams (blinking)										
HWE	Internal repeater error (contact PROCENTEC)										
ER	No or bad telegrams detected										
MIN	Signal amplitude of the telegrams too low (< 1.64 V)										
TERM	Idle voltage too low (<0.35 V .. >0.75 V)										
<i>Alarm values can be changed through the web server.</i>											
Others											
Head Station firmware Operating temperature Weight											
PROCENTEC® Klopperman 16 2292 JD WATERINGEN (NL)	Tel.: +31(0) 174 671 800 Email: info@procentec.com										