Physikalisch-Technische Bundesanstalt
Braunschweig und Berlin
Nationales Metrologieinstitut

(1) # EU-TYPE EXAMINATION CERTIFICATE

(Translation)

(2) Component Intended for Use in Potentially Explosive Atmospheres
Directive 2014/34/EU

(3) EU-Type Examination Certificate Number:

PTB 00 ATEX 2156 U **Issue: 1**

(4) Component: Termination Unit, type TU921S

(5) Manufacturer: ABB AB, Control Technologies

(6) Address: Tvärleden 2, B357, 721 59 Västerås, Sweden

(7) This component and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

(8) The Physikalisch-Technische Bundesanstalt, notified body No. 0102 in accordance with Article 17 of the Directive 2014/34/EU of the European Parliament and of the Council, dated 26 February 2014, certifies that this component has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of products intended for use in potentially explosive atmospheres, given in Annex II to the Directive.

The examination and test results are recorded in the confidential test report PTB Ex 20-20027.

(9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

EN IEC 60079-0:2018 EN IEC 60079-7:2015 + A1:2018 EN 60079-11:2012

(10) The sign "U" placed behind the certificate number indicates that this certificate should not be confounded with certificates issued for equipment or protective systems. This partial certification may be used as a basis for certification of an equipment or protective systems.

(11) This EU-Type Examination Certificate relates only to the design and construction of the specified component in accordance to the Directive 2014/34/EU. Further requirements of the Directive apply to the manufacturing process and supply of this component. These are not covered by this certificate.

(12) The marking of the component shall include the following:

II 2 (1) G Ex eb ib [ia Ga] IIC T4 Gb or II (1) D [Ex ia IIIC Da]

Konformitätsbewertungsstelle, Sektor Explosionsschutz Braunschweig, June 22, 2020
On behalf of PTB:

Dr.-Ing. F. Lienesch
Direktor und Professor

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(13) # SCHEDULE

(14) **EU-Type Examination Certificate Number PTB 00 ATEX 2156, Issue: 1**

(15) Description of Product

The Termination Unit TU921S, as a module rack with backplane, forms the platform for accommodating max. 2 power supply units, max. 2 Communication Interfaces and up to 16 I/O modules of the explosion-proof S900 Remote I/O fieldbus system. The Termination Unit shall only be operated within this system. The Communication Interfaces (gateways) and the modules shall only be supplied from the power supply units certified for this system. A system description applicable to all components of the system is part of the test documents of the Termination Unit. The system description defines the basic conditions for connection and operation for all components of the S900 system inside the hazardous area.

The Termination Unit exclusively consists of a backplane (8-layer multilayer printed circuit board), the actual carrier system made of extruded aluminium profile, connectors and terminals. It is used to accommodate a maximum of two communication interfaces and two power supply units as well as 16 I/O modules. Up to 128 binary inputs/outputs or 64 analog inputs/outputs or an arbitrary combination can be connected to a module carrier. The Termination Unit is considered a purely passive device, as there are no electrical components apart from plug connections, connection terminals and two terminating resistors.

By limiting the energy (Ex i) and maintaining the safety-related distances and track arrangements (Ex i and Ex e) on the backplane as well as electrical interlocking the Ex e-circuits it is ensured that the generation of sparks, short circuits and impermissible temperatures are excluded. This allows the power supply unit, Communication Interface and all modules of the S900 system to be plugged and unplugged during operation.

The carrier system made of extruded aluminium profile takes up the backplane via guide rails. Mounting brackets are attached to the side for mounting the carrier system in the housing. The connection of the equipotential bonding system between the extruded profile and the backplane is carried out by means of a 4 mm^2 copper strip by the factory. The connection between the extruded profile and the metal housing is realized by the four fastening screws of the module carrier.

Since the housing is not part of the examination, the Termination Unit TU921S (including all integrated S900 modules) shall be installed in a housing suitable for safety (at least IP54 according to EN 60529).

The permissible ambient temperature range is: -20 °C ... +70 °C
Modules with lower permissible ambient temperature lead to a reduction of the ambient temperature range.

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Electrical data

1. Auxiliary power circuit (power supply)

   U_m = 250 V

   Terminals for 1st power supply unit:

L (+)	1.1	and	1.2
N(-)	1.3	and	1.4
PE	1.5	and	1.6

   Terminals for 2nd power supply unit (if applicable):

L (+)	2.1	and	2.2
N(-)	2.3	and	2.4
PE	2.5	and	2.6

   Type of protection Increased Safety Ex eb IIC

   U_{in} = 250 V (AC / DC)
   I_{in} = 11 A (AC / DC)
   P_{in} = 100 W (AC / DC)

   All connection values can be taken from the EU type examination certificates of the power supplies approved for the S900 system, e.g. type PS 24-Ex with PTB 00 ATEX 2199.

2. Plug connector Power Supply Unit

   There are no external connection options. Intended only for connection of power supply units approved within the S900 system, e.g. type PS 24-Ex with PTB 00 ATEX 2199.

3. Plug connector Communication Interface

   Intended only for connection of Communication Interfaces approved within the S900 system, e.g. type CIPB-Ex with PTB 00 ATEX 2201.

   External connection (fieldbus coupling)

   Type of protection Intrinsic Safety Ex ib IIC

   D-Sub connector PB1 (X17) or PB2 (X18) for a second Communication Interface:

   PB1 (X17) Pin 8 : Data-line A and PB1 (X17) Pin 3 : Data-line B or
   PB2 (X18) Pin 8 : Data-line A and PB2 (X18) Pin 3 : Data-line B

Fieldbus connectors (external fieldbus circuits):
The electrical data and all other intrinsically safe connection values for the external fieldbus circuit and for the auxiliary voltage are specified in the type examination certificate of the Communication Interfaces, e.g. type CIPB-Ex with PTB 00 ATEX 2201.

4. Modules 1 to 16

Only for modules approved within the S900 system e.g.
type AI4H-Ex with PTB 00 ATEX 2058 X

Externe Anbindung

Type of protection Intrinsic Safety Ex ia IIC
4 connection terminals per channel below each module with the following assignments:

Terminal 11, 12, 13, 14	Channel 1
Terminal 21, 22, 23, 24	Channel 2
Terminal 31, 32, 33, 34	Channel 3
Terminal 41, 42, 43, 44	Channel 4

Labeling 1 to 16 on the backplane specifies the assignment of the modules to the connection terminals.
All intrinsically safe connection values can be taken from the EU-Type Examination Certificates of the modules certified in this system.

5. CAN bus

(only effective on the backplane within the S900 system)

This bus is used exclusively for internal communication between Communication Interfaces and modules. There are no external connection options.

Changes with respect to previous issues

- Adaption to the current state of standards
- Revision of the safety description and the operating manual
- Introduction of a safety-related data sheet as a supplement to the operating manual
- Adaptation of the marking with regard to the type of protection Increased safety
- Revision of the type label ('Ex e' to 'Ex eb')
- Reduction of the type options and change of the type designation

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(16) Test report PTB Ex 20-20027

(17) Notes for manufacture, installation and operation

System

The Termination Unit type TU... is part of the explosion proof remote I/O fieldbus system S900 and shall only be operated in connection with certified components of this system.

Field housing and ambient temperature

For use inside the hazardous area, the Termination Unit shall be installed by the user or the manufacturer in an approved field housing. The installation in an "Ex e" enclosure shall be in compliance with the regulations (see operating manual); the enclosure shall meet the requirements of the standards listed above.

The relationship between size of the field housing, power consumption inside the housing and permissible ambient temperature shall be observed according to the operating manual.

Modules with lower permissible ambient temperature lead to a reduction of the ambient temperature range.

Internal CAN-bus

When the Termination Unit is mounted, the maximum values for internal inductance and capacitance are not exceeded due to the specification of the respective maximum permissible values per module. The maximum permissible total values (see note) are also complied with when fully assembled with 18 modules, as the following maximum values per module are not exceeded:

maximum permissible internal capacitance per module: C_i = 2.2 µF
maximum permissible internal inductance per module: $L_i \approx 0$

Note: To ensure the type of protection Intrinsic Safety, the following maximum values for internal inductance and capacitance as total values of all modules and communication interfaces of the system-internal CAN bus shall not be exceeded with the installation of the Termination Unit (compare system description):

permissible total capacity: ΣC_i = 40 µF
permissible total inductance: ΣL_i = 1 µH

Fieldbus Connections (e. g. Profibus)

All connection values can be taken from the respective EU-Type Examination Certificate for the Communication Interface, e.g. CIPB-Ex with PTB 00 ATEX 2201. This also applies to a possible interconnection of the entire intrinsically safe fieldbus circuits.
The connection is made via approved plug connectors in accordance with the EU-Type Examination Certificate, e.g. plug connector type BP 910S in accordance with CIPB-Ex with PTB 00 ATEX 2201.
The fieldbus circuit (D-Sub connector) shall be the only electrical connection of the bus participants, even under fault conditions and including connection to earth. Concentrated inductances and capacitances in the run of the fieldbus circuit are not permitted.

Field circuits (module connectors)

For possible interconnections of field circuits, the rules for the interconnection of non-linear and linear intrinsically safe circuits shall be observed.

Terminals power supply

The IP30 cover above the terminals of the power supply shall be provided with the following factory-assembled label:

"Do not open when energized!"

Installation outside the hazardous area

If a non-intrinsically safe fieldbus is used instead of an intrinsically safe fieldbus, safe isolation between non-intrinsically safe and intrinsically safe circuits shall be ensured for $U_m \geq 40$ V in an approved communication interface. The IP-20 protection is ensured by the design of the modules, the communication interfaces and the power supply units when fully assembled. If the modules are not fully assembled, the IP-20 protection of the Termination Unit shall be ensured by suitable measures, e.g. empty module housings.

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(18) Essential health and safety requirements

Met by compliance with the aforementioned standards.

According to Article 41 of Directive 2014/34/EU, EC-type examination certificates which have been issued according to Directive 94/9/EC prior to the date of coming into force of Directive 2014/34/EU (April 20, 2016) may be considered as if they were issued already in compliance with Directive 2014/34/EU. By permission of the European Commission supplements to such EC-type examination certificates and new issues of such certificates may continue to hold the original certificate number issued before April 20, 2016.

Konformitätsbewertungsstelle, Sektor Explosionsschutz
On behalf of PTB:

Braunschweig, June 22, 2020

Dr.-Ing. F. Lienesch
Direktor und Professor