Communication Unit CU 900

OPERATING INSTRUCTIONS

Reliable Measurement of Gas

STATUS JANUARY 2016

Note:

Unfortunately, paperwork does not automatically update itself but technical developments are constantly being made. Therefore, we reserve the right to change the descriptions and statements contained in our operating instructions without prior notice. However, you can conveniently download the most recent version of this manual (and those of other devices) from our website **www.rmg.com**.

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Description of the CU 900

Communication unit for the EC 900 volume corrector family

The following pages describe the Communication Unit CU for the EC 900 volume corrector family, namely its function and role.

Overview of the EC 900 family

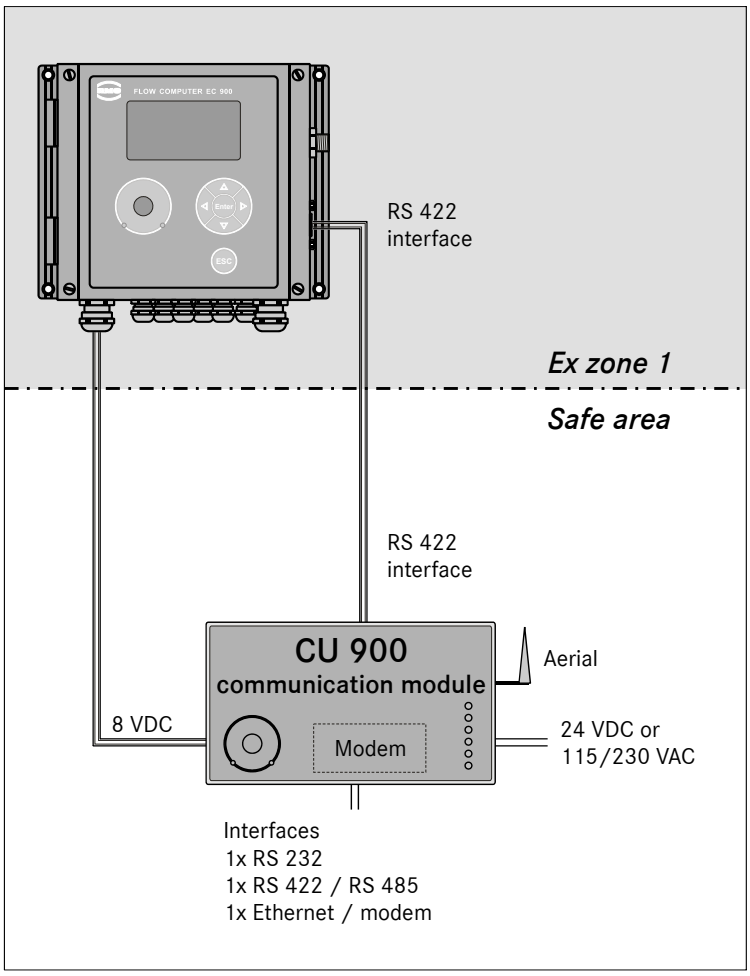
EC 911= battery-powered device for Ex zone 1 **without CU**
EC 912= externally powered device for Ex zone 1 **without CU**
EC 921= battery-powered device for Ex zone 2 **with CU**
EC 922= Ex zone 2 device with direct 24 VDC or 230 VAC power supply **with CU**

The CU is a second arithmetic logic unit which is integrated into the volume corrector and runs in parallel to the gas volume corrector. Owing to its ratings and connection options, this CU cannot be operated in Ex zone 1. It is part of the Ex zone 2 devices, namely the EC 921 and EC 922. With Ex zone 2 devices, the necessary hardware is located on the bottom side of the connection board. If it is intended to use the functions of the CU in Ex zone 1 applications as well, the internal CU has to be taken out of the volume corrector and installed outside the Ex zone. The originally internal CU will then become an independent device (CU 900); this means that apart from its communication tasks, the CU 900 will perform additional tasks and functions, such as the intrinsically safe power supply of the corrector, up to 4 current outputs and other interface functions.

Then the typical application will be the following one:
Take an Ex zone 1 corrector = EC 911 = a battery-powered standalone device and connect it to a CU 900. Then make a few changes of parameters and you'll have an EC 912.

Type	Ex zone	Equipment
EC 911	1	Volume corrector with data-logging function without CU
EC 912	1	with the **external CU 900** communication module
EC 921	2	with the **internal** CU communication module
EC 922	2	with the **internal** CU communication module

Typical configuration of the EC 912 with the CU 900

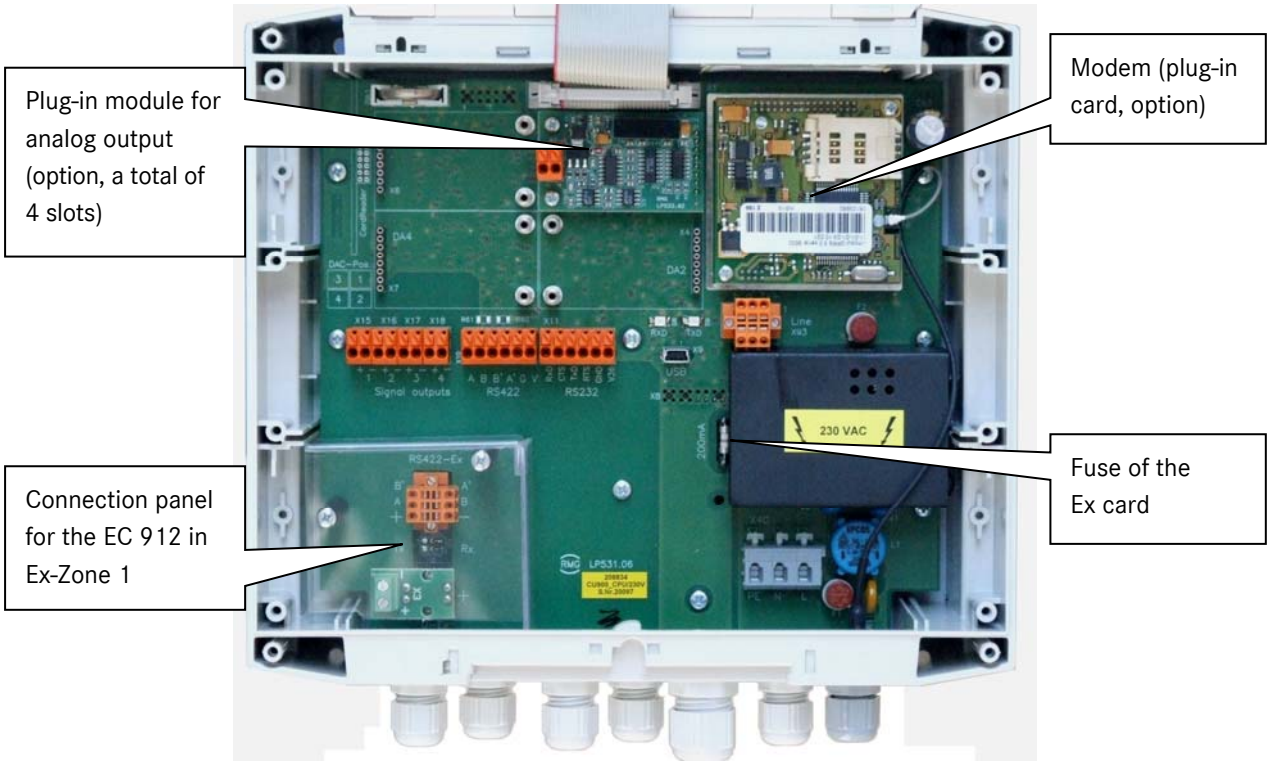


If power supply and decoupling of the interface are required for MODBUS applications only (not for DSfG-B), it is also possible to use the ISS 900 instead of the CU 900 which is less expensive than the CU 900. The kernel is in both cases identical with regard to safety and explosion protection; this means the same power supply isolator is used in the ISS 900 and the CU 900, and therefore, the ISS 900 and the CU 900 have the same ATEX number.

Functions of the CU 900

1. Intrinsically safe power supply for using the EC 912 in Ex zone 1.
   The power supply isolator from the ISS 900 has been integrated into the CU 900. This component supplies the EC 912 with 8 VDC in an explosion-protected way. Thus, the EC 912 can be operated in Ex zone 1. The build-in battery is retained and will start to operate as an emergency battery in the case of a power failure so that the corrector can keep on running even if the CU 900 may be without power supply for some time.

   Fig.: Internal structure of the CU 900



2. Decoupling the COM 1 data interface.
   On the power supply isolator module, there is a decoupling element for isolating the RS 422 data interface to the EC 912 for explosion protection purposes. The internal data traffic between the two devices is handled through this interface using an RMG-specific MODBUS protocol.

3. Converting the internal data structure of the EC 912 to DSfG formats and forwarding the internal data structure of the EC 912 to MODBUS formats.
   The two devices EC 912 and CU 900 exchange their data on the internal interface. The EC 912 operates as a MODBUS slave, while the CU 900 operates as the MODBUS master. The CU 900 cyclically calls all required data from the EC 912 or depending on its current demand. One of the most important functions of the CU 900 is to call the measured values and archives being generated in the EC 912 volume corrector, process them into a form required by the user and make this data available via various interfaces with appropriate protocols.
   Available hardware:
   RS 232 / RS 485 interface
   communication modules of a great variety of types
   optical interface as per IEC 62056-21
   Ethernet TCP/IP interface
   USB interface (optionally fitted on the connection board, another one can be provided as a plug-in module)
   current interfaces (max. 4 modules) with 0/4-20 mA output
   Software and protocols:
   DSfG-B
   MODBUS
   DIALOG 900 operating program

4. There is one slot available which can alternatively be fitted with the following modules:
   GSM module
   GSM/GPRS module
   Ethernet module
   PSTN module
   ISDN module
   USB module

The CU 900 is parameterized in the factory. Subsequent modifications can be made via the Modbus service program or optionally, the DIALOG 900 operating program by RMG's service staff.

All the other data, such as memory size, DSfG-B, etc., are identical to the information contained in the manual of the EC 900 family with the integrated CU.

Protection class of the case: IP 65 with use of the lid gasket according to regulations.

Operation

Parameterizing current outputs

The CU 900 can be fitted with a maximum of 4 current output modules. The volume corrector connected is to be used to parameterize the 4 outputs. The following pages, which are an excerpt from the manual of the volume corrector, describe how the outputs are to be parameterized:

Screen: 8.2.0.0 (analog outputs)

	+Analogue output 1	Press Enter to continue. See screen **8.2.1.0.**
	+Analogue output 2	Press Enter to continue. See screen **8.2.2.0.**
	+Analogue output 3	Press Enter to continue. See screen **8.2.3.0.**
	+Analogue output 4	Press Enter to continue. See screen **8.2.4.0.**
	<OUTPUTS CU >	"OUTPUTS" book

Screen: 8.2.1.0 (analog output 1)

		+Display values	Press Enter to continue. See screen **8.2.1.1.**
		+Parameters	Press Enter to continue. See screen **8.2.1.2.**
		<OUTPUTS >	"OUTPUTS" book

Screen: 8.2.1.1 (analog output 1 - display values)

	>A1 phys 0.000	Analog output 1, physical value
	>A1 mA 4.000 mA	Analog output 1, current (mA)
	<OUTPUTS CU >	"OUTPUTS" book

Screen: 8.2.1.2 (analog output 1 - parameters)

	✲ A1 type 4-20mA	Selection of the type of analog output 1 {Off | 0-20mA | 4-20mA | Cal. cur.on}
	✲ A1 src Qb	Selection of the source for analog output 1 {Pressure | Temperat. | Conv. fact. | K coeff. | Qm | Qb | Freq. chan1 | Freq. chan2}
	✲ A1 min 0.000	Analog output 1, minimum range value
	✲ A1 max 2000.000	Analog output 1, maximum range value
	✲ A1 af 1	Analog output 1, averaging factor
	✲ A1 cc 12.000 mA	Analog output 1, calibration current (mA)
	✲ A1 cor 0.000	Analog output 1, correction factor
	<OUTPUTS CU >	"OUTPUTS" book

Screen: 8.2.2.0 (analog output 2)

		+Display values	Press Enter to continue. See screen **8.2.2.1.**
		+Parameters	Press Enter to continue. See screen **8.2.2.2.**
		<OUTPUTS CU >	"OUTPUTS" book

Screen: 8.2.2.1 (analog output 2 - display values)

	>A2 phys 0.000	Analog output 2, physical value
	>A2 mA 4.000 mA	Analog output 2, current (mA)
	<OUTPUTS CU >	"OUTPUTS" book

Screen: 8.2.2.2 (analog output 2 - parameters)

	✲ A2 type 4-20mA	Selection of the type of analog output 2 {Off|0-20mA|4-20mA|Cal. cur.on}
	✲ A2 src Qm	Selection of the source for analog output 2 {Pressure|Temperat.|Conv. fact.|K coeff.| Qm|Qb|Freq. chan1|Freq. chan2}
	✲ A2 min 0.000	Analog output 2, minimum range value
	✲ A2 max 1000.000	Analog output 2, maximum range value
	✲ A2 af 1	Analog output 2, averaging factor
	✲ A2 cc 12.000 mA	Analog output 2, calibration current (mA)
	✲ A2 cor 0.000	Analog output 2, correction factor
	<OUTPUTS CU >	"OUTPUTS" book

Screen: 8.2.3.0 (analog output 3)

		+Display values	Press Enter to continue. See screen **8.2.3.1.**
		+Parameters	Press Enter to continue. See screen **8.2.3.2.**
		<OUTPUTS CU >	"OUTPUTS" book

Screen: 8.2.3.1 (analog output 3 - display values)

	>A3 phys 1.018	Analog output 3, physical value
	>A3 mA 7.908 mA	Analog output 3, current (mA)
	<OUTPUTS CU >	"OUTPUTS" book

Screen: 8.2.3.2 (analog output 3 - parameters)

	✲ A3 type 4-20mA	Selection of the type of analog output 3 {Off|0-20mA|4-20mA|Cal. cur.on}
	✲ A3 src Pressure	Selection of the source for analog output 3 {Pressure|Temperat.|Conv. fact.|K coeff.| Qm|Qb|Freq. chan1|Freq. chan2}
	✲ A3 min 0.700	Analog output 3, minimum range value
	✲ A3 max 2.000	Analog output 3, maximum range value
	✲ A3 af 1	Analog output 3, averaging factor
	✲ A3 cc 12.000 mA	Analog output 3, calibration current (mA)
	✲ A3 cor 0.000	Analog output 3, correction factor
	<OUTPUTS CU >	"OUTPUTS" book

Screen: 8.2.4.0 (analog output 4)

	+Display values	Press Enter to continue. See screen **8.2.4.1.**
	+Parameters	Press Enter to continue. See screen **8.2.4.2.**
	<OUTPUTS CU >	"OUTPUTS" book

Screen: 8.2.4.1 (analog output 4 - display values)

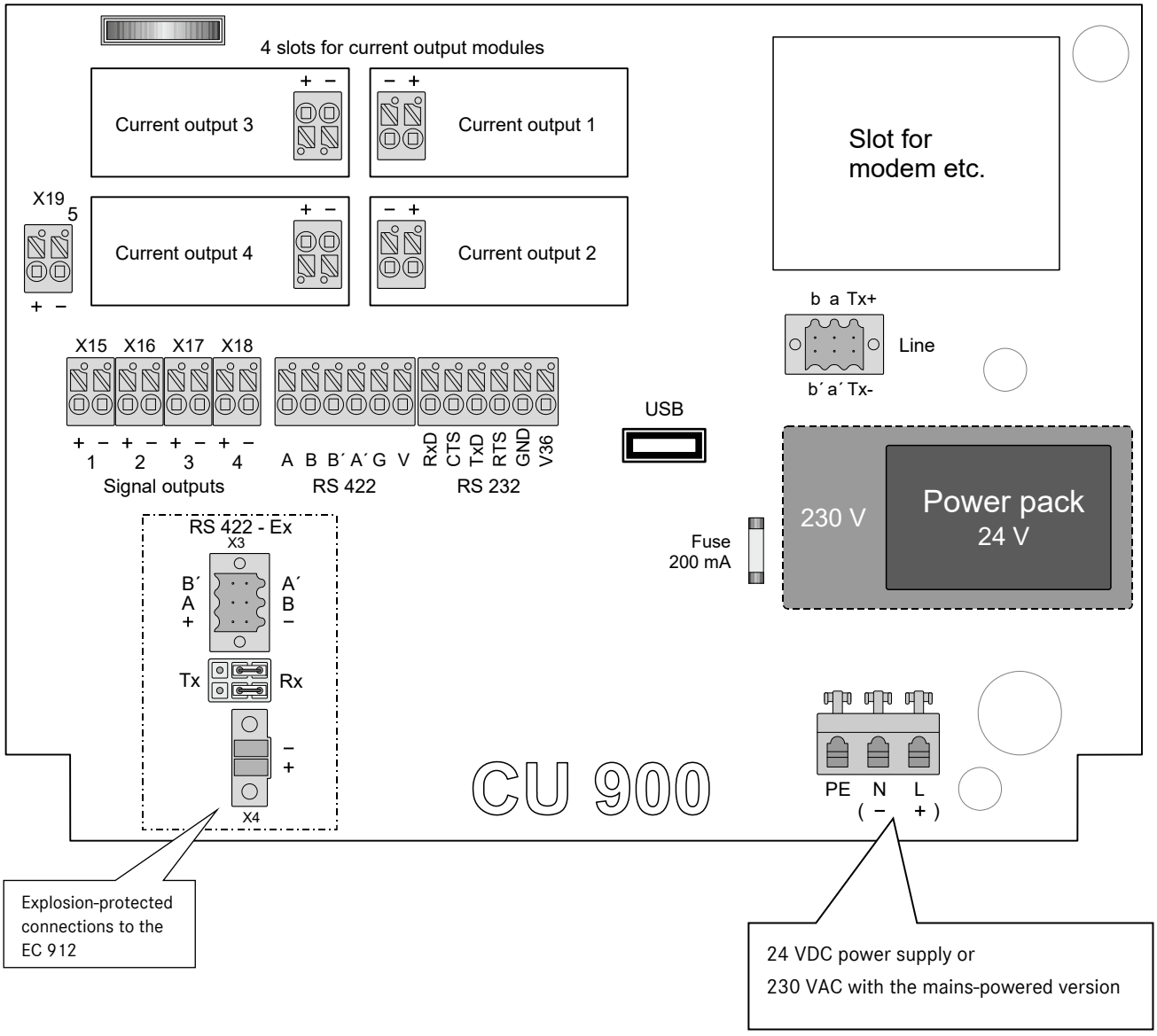
	>A4 phys 25.718	Analog output 4, physical value
	>A4 mA 13.145 mA	Analog output 4, current (mA)
	<OUTPUTS CU >	"OUTPUTS" book

Screen: 8.2.4.2 (analog output 4 - parameters)

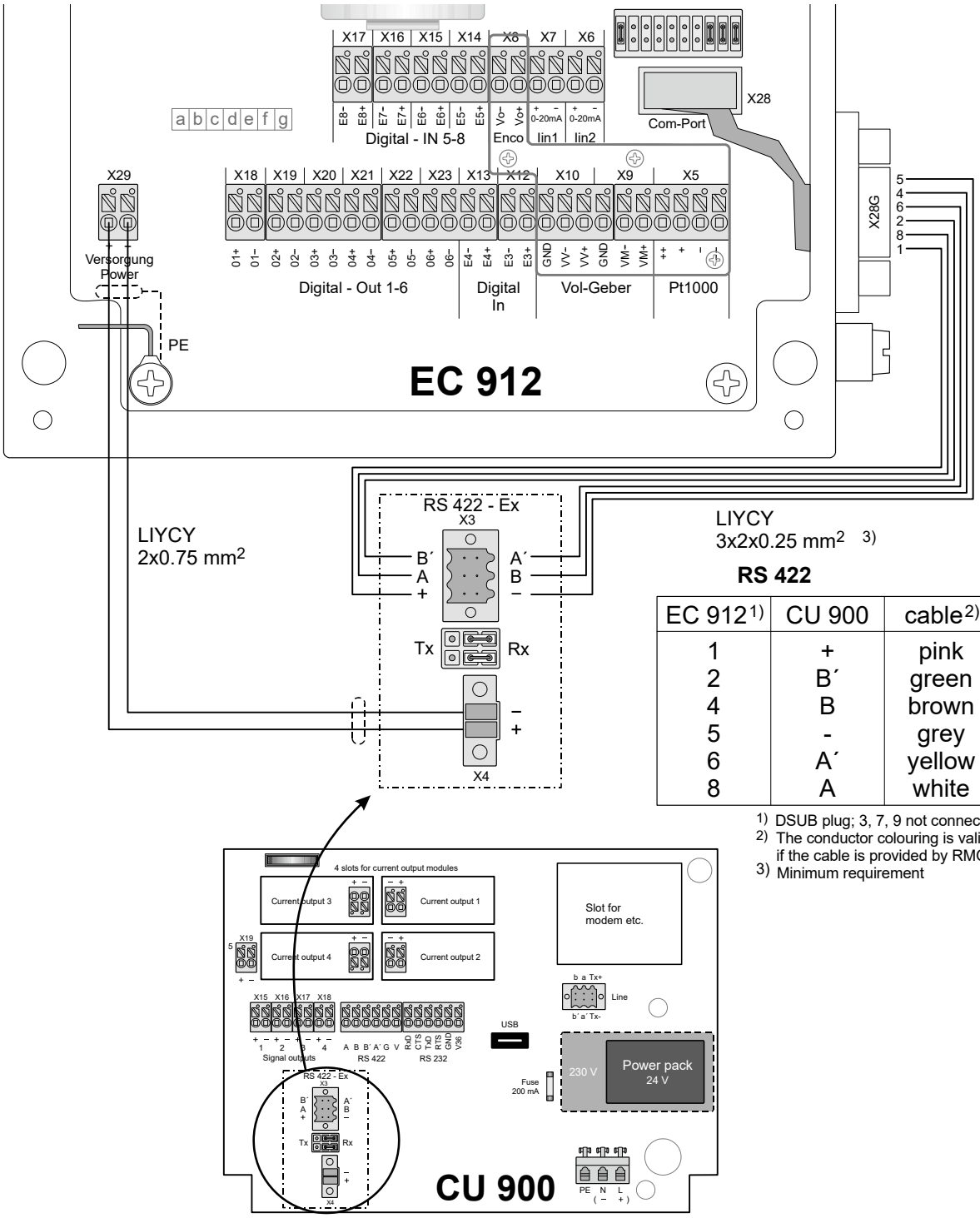
	✲ A4 type 4-20mA	Selection of the type of analog output 4 {Off|0-20mA|4-20mA|Cal. cur.on}
	✲ A4 src Temperat.	Selection of the source for analog output 4 {Pressure|Temperat.|Conv. fact.|K coeff.| Qm|Qb|Freq. chan1|Freq. chan2}
	✲ A4 min -20.000	Analog output 4, minimum range value
	✲ A4 max 60.000	Analog output 4, maximum range value
	✲ A4 af 1	Analog output 4, averaging factor
	✲ A4 cc 12.000 mA	Analog output 4, calibration current (mA)
	✲ A4 cor 0.000	Analog output 4, correction factor
	<OUTPUTS CU >	"OUTPUTS" book

Electrical connections

Connection board of the CU 900



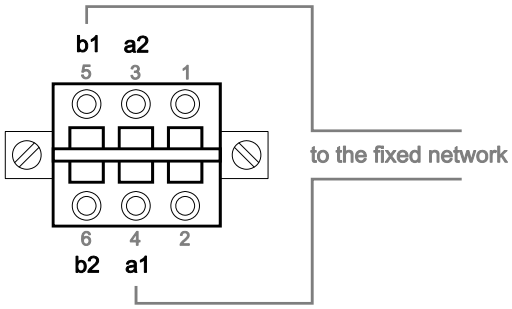
Example of an explosion-protected connection to the EC 912



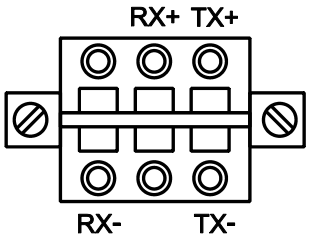
1) DSUB plug; 3, 7, 9 not connected
2) The conductor colouring is valid if the cable is provided by RMG
3) Minimum requirement

Pin assignments - modem/Ethernet

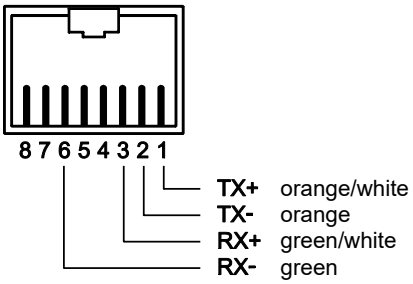
Fixed-line connection:



Ethernet:



For comparison: RJ 45 socket



Safety instructions

The CU 900 communication unit is used to expand the functions provided by the EC 912 volume corrector.

The CU 900 complies with the currently available standards and regulations. However, failure to operate it properly may cause hazards.

Persons who install or operate the EC 912 PTZ corrector in areas subject to explosion hazards must be familiar with the currently applicable explosion protection standards and regulations.

Please follow the instructions below:

Danger of explosion
In the manual, this symbol warns you of an explosion hazard. Please follow the instructions given next to this symbol. As to the danger of explosion, please note the following in particular:

- The device for Ex zone 1 is intrinsically safe and may only be connected to certified intrinsically safe circuits.
- The approval of the device for use in areas subject to explosion hazards will expire if the device is changed impermissibly.
- Communication between the EC 912 and ISS 900 or CU 900 is permissible only via the RS 422 interface.

Damage to property
In the manual, this symbol warns you of possible damage to property. The instructions given next to this symbol inform you about what you can do to avoid damage to the EC 912 PTZ corrector.

It is essential to observe the warning information in these operating instructions and the generally applicable safety rules.
No warranty claims can be asserted if there is unauthorized interference with the device!

Explosion protection

Inside the CU 900, the hardware of the ISS 900 power supply isolator provides the required safety measures to power the volume corrector in Ex zone 1. Therefore, the approval documents below refer to the ISS 900. The ATEX approval refers to both devices; see chapter 15 of the type-examination certificate.

Instructions for the installer

Marking

Type: **ISS 900**

 II (2) G [Ex ia] IIC

CE 0158 TÜV 08 ATEX 554647
Ta = -25°C to +55°C
For data, see the EC type examination certificate (see annex).

Use

This module is intended for use in conjunction with the EC 900 and/or CU 900. The module itself is used for electrical isolation of the interface signal and for power supply. The various intrinsically safe circuits are used to operate intrinsically safe field devices in areas subject to explosion hazards.
The applicable laws or regulations concerning the use or intended use of the device have to be complied with.
The data sheets of the ISS 900 include the electrical data of the EC type examination certificate and shall be deemed parts of the operating instructions.

Installation and commissioning in areas subject to explosion hazards

Installation and commissioning are to be carried out by specially trained and qualified staff only.
The device has been designed in accordance with the IP 66 degree of protection as per EN 60529.
External heating up due to solar radiation or other sources of heat must be avoided.
The workmanship of the installation of the intrinsically safe circuits has to comply with the installation regulations in accordance with EN 60079-14.
When other intrinsically safe field devices are interconnected with the intrinsically safe circuits of the associated EC 900 devices, the relevant maximum values of the field devices and associated devices have to be observed with regard to explosion protection.

The EC certificate of conformity and/or EC type examination certificate have to be observed. It is of particular importance that the "Particular conditions" possibly contained therein are complied with.

Note: If the ISS 900 is not in the original case, but is mounted as a component in the CU 900 case like here, then the IP protection classes of the CU 900 case apply.

Commissioning

Installation and commissioning are to be carried out by specially trained and qualified staff only.

For cabling, the applicable standards have to be observed.
The plug is to be installed properly on the appropriate mating socket and secured mechanically.
Operation is only permitted if the casing is completely closed.

Servicing, maintenance and troubleshooting

Devices which are operated in conjunction with areas subject to explosion hazards must not be changed. Any repairs of the equipment may only be carried out by specially trained and authorized qualified staff from RMG Messtechnik.

Removal

When removing the device, make sure that the sensor cable does not come into contact with other live parts.
Make sure that you take appropriate safety precautions.

Annex

EC type examination certificate

The EC type examination certificate **TÜV 08 ATEX 554647** as per Directive 94/9/EC shall apply to the **ISS 900** power supply isolator even if the latter is installed in the **CU 900** communication module.
Type of protection: II (2) G [Ex ia] IIC.

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