Operation Instructions

Compact Gas Volume Corrector EC 900

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Note Unfortunately, paper is not updated automatically, whereas technical development continuously advances. Therefore, we reserve the right to make technical changes in regard to the representations and specifications of these operating instructions. The latest version of this manual (and other devices) can be downloaded at your convenience from our Internet home-page

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Notice

The manual is valid for version 8 of the hardware development since 2014. However, older hardware versions are also described in this manual.

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Introduction

Description and variants

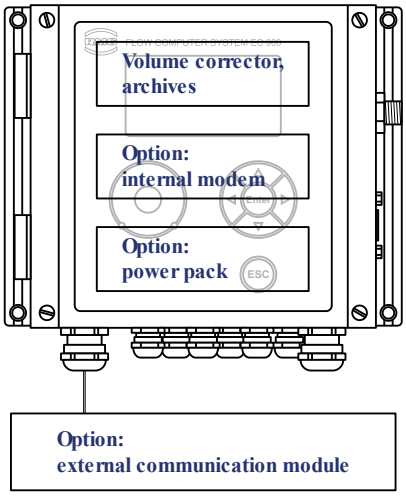
Thanks to its many variants and configuration options, the EC 900 PTZ corrector offers a multitude of functions and possible uses, ranging from a small solution to a complex one. From a simple battery-powered device processing LF volume pulses up to an externally supplied device fitted with an internal radio modem or connected to an external communication module, the type series satisfies all current requirements for volume correction, archiving and communication.

The EC 900 PTZ corrector has been approved for custody transfer metering in compliance with the European Measuring Instruments Directive (MID).

The integrated tariff memory can store hourly values for more than six months. Furthermore, there are archives for daily and monthly values and events as well as logbooks. There is also a legal metrological logbook as per PTB-A 50.7 which allows parameters under legal control to be changed without an inspector from the Weights and Measures Office being present.

The device can be operated either via keys on the device or through an interactive program from RMG. An electrical interface and an optical interface enable the device to be connected to a PC.

The EC 900 can be used in hazardous areas of Ex zone 1 or 2, depending on its version and equipment. An external communication module with electrical isolation allows the device to be used in Ex zone 1, while using the communication functions at the same time.



The device variants basically differ in their explosion protection and power supply (lithium battery or external power supply). Apart from that, it is also possible to fit the device (depending on its explosion protection) with an internal or external communication module (with modem). The individual variants and combination options are shown in the table below.

Type	Ex zone	Equipment	Functions and features
EC 911	1	Volume corrector with data-logging function	Supplied by 1 internal battery Volume pulses: 2 x reed or Wiegand
EC 912	1	+ **external** CU 900 communication module (or external ISS 900 power supply module)	Externally supplied plus emergency battery Volume pulses: 2 x reed, NAMUR or Wiegand Modem and interfaces in the external CU 900 communication module
EC 921	2	+ **internal** communication module + optional external ISS Batt battery module	Supplied by 2 internal batteries Volume pulses: 2 x reed or Wiegand Internal modem
EC 922	2	+ **internal** communication module + power pack (24 VDC or 230 VAC)	Externally supplied plus emergency battery for the volume corrector Volume pulses: 2 x reed, NAMUR or Wiegand Internal modem

There are the following external modules available:

Type	Designation	Functions and features
CU 900	Communication module	Intrinsically safe power supply of the EC 900 4 analogue outputs 2 data interfaces (1x RS 232, 1x RS 422/485 or Ethernet)
ISS 900	Power supply module	Intrinsically safe power supply of the EC 900 Electrical isolation for the interface (RS 232/422)
ISS Batt	Battery module	Supplying the EC 900 for Ex zone 2 (12–20 VDC)

New symbols as per EN 12405

The EC 900 has been designed in such a way that it is not only possible to display the new symbols as per EN 12405 but also the old symbols. Switching is done in the book “OPER.” under the item “Setup Symbols”. Here please note that the new symbolism uses "m", for example in Vm, for "measurement conditions" (old: Vb for "measurement conditions") and "b", for example in Vb, for "base conditions" (old: Vn for "base conditions").

Value	Symbol		Unit
	New	Old	
Volume totalizer at base conditions	Vb	Vn	m³
Volume totalizer at measurement conditions	Vm	Vb	m³
Disturbing quantity totalizer at base conditions	VbD	VnD	m³
Disturbing quantity totalizer at measurement conditions	VmD	VbD	m³
Volume totalizer at measurement conditions, customer	VmC	VbC	m³
Flow rate at measurement conditions	Qm	Qb	m³/h
Flow rate at base conditions	Qb	Qn	m³/h
Conversion factor	C	Z	-
Compressibility factor of the gas at base conditions	Zb	Zn	-
Absolute pressure	p	p	bar or MPa
Absolute pressure at base conditions	pb	pn	bar or MPa
Absolute temperature at measurement conditions	T	T	K
Absolute temperature at base conditions	Tb	Tn	K
Gas temperature	t	t	°C
Compressibility factor of the gas at base conditions	Zb	Zn	
Compressibility factor of the gas at measurement conditions	Z	Z	

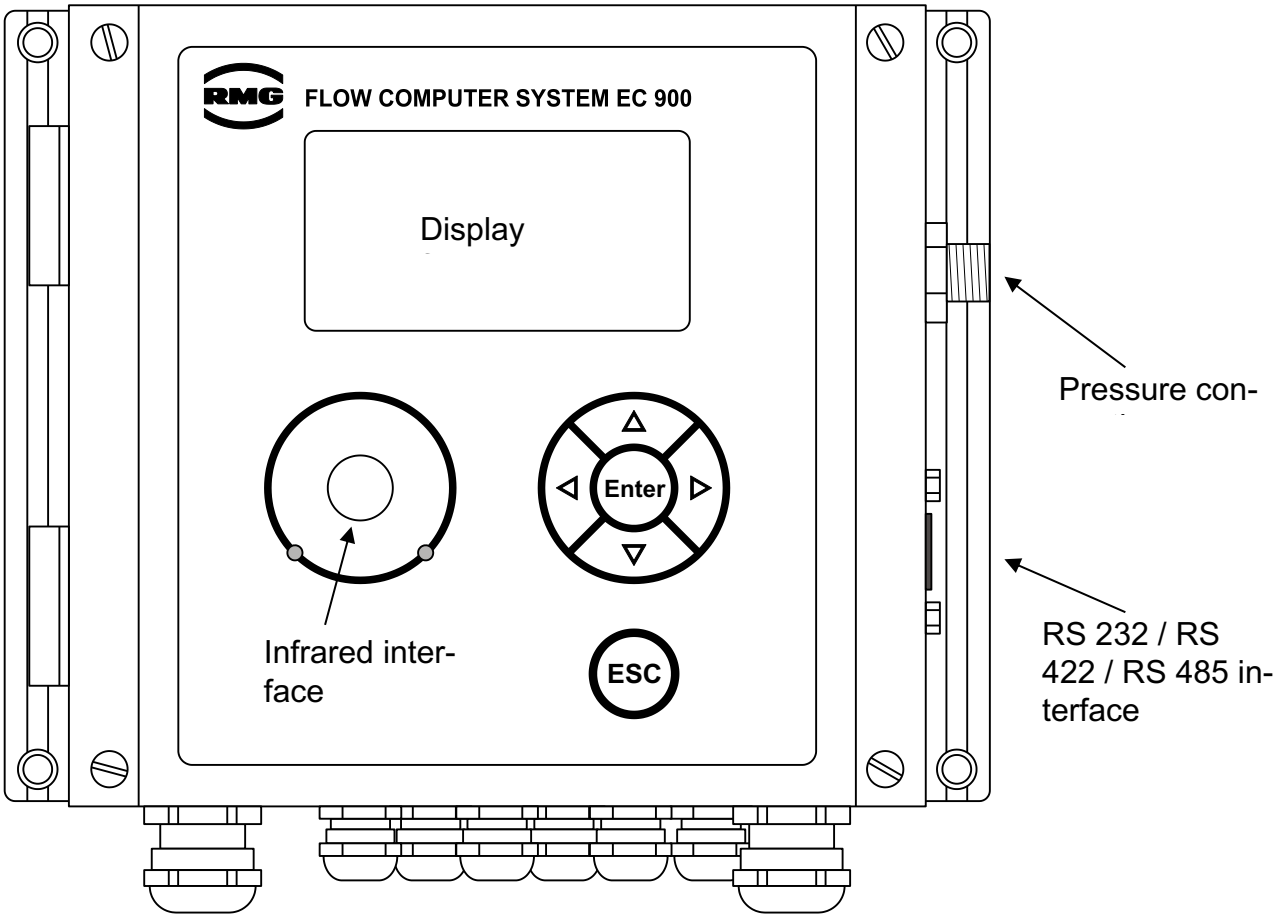
Changed symbols due to the new symbolism in EN 12405 where it is not possible to switch between "New" and "Old".	**New**	Old	Unit
Temperature at base conditions, GERG 88 S	t1	t1	°C
Temperature at base conditions, superior calorific value, GERG 88 S	t2	t2	°C

The symbolism used in these operating instructions is in line with the new symbols as per EN 12405.

Construction and function

Gas volume corrector

Casing and control panel



The electronic system and pressure transmitter of the EC 900 are fitted into an aluminium casing. On the front, there is a 128 x 64 dot matrix display where alphanumeric characters can be displayed in 6 lines with 20 characters each.
To operate the device, there are 4 arrow keys, an Enter key and an Esc key. The arrow keys are mainly used to navigate within the operating menu; the Enter key will take the user to lower menu levels or initiate a parameter change; pressing the Esc key will cause the user to jump back to higher menu levels.

The display of mains-powered devices is lit. The lighting will automatically turn itself on after a key has been pressed and will turn itself off 30 seconds after the last key has been pressed. If no key is pressed during two minutes, the display will automatically return to displaying totalizers.

Electronic components

The EC 900 comprises two boards in each case:

1. The main unit is fixed to the casing cover. It performs the measurement, correction and display functions. The calibration switch is also located on this board.
2. The connection board inside the casing fulfils the communication functions (for the EC 92x) among other things. It includes the terminals and batteries. There are two variants: one for Ex zone 1 (EC 911 and EC 912) and another one for Ex zone 2 (EC 921 with a second battery and EC 922 with a power pack).

Ex zone 1

Type EC 911

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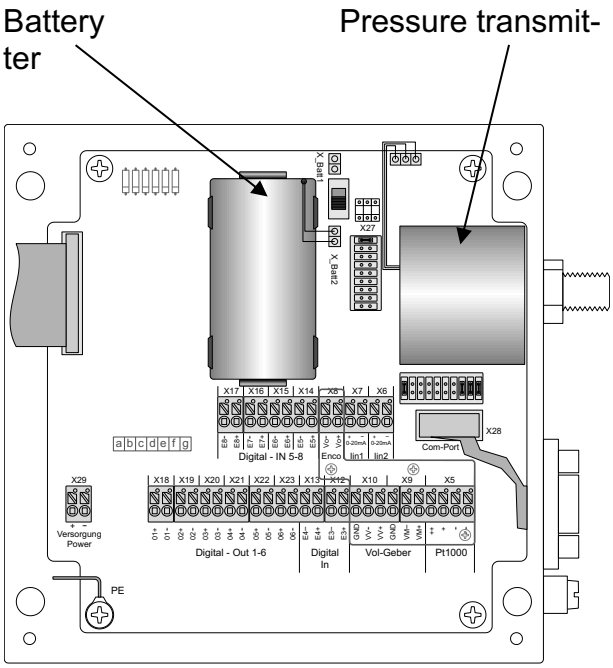
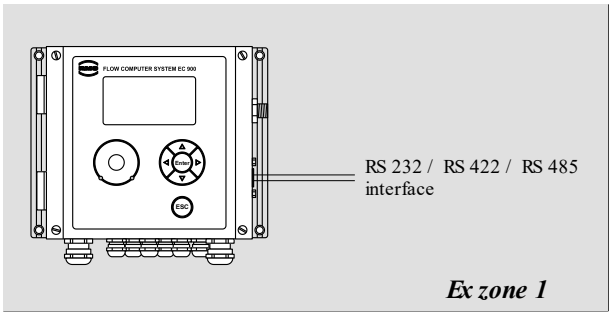




The EC 911 version is exclusively powered by a lithium battery and has been approved for Ex zone 1 as an intrinsically safe device.

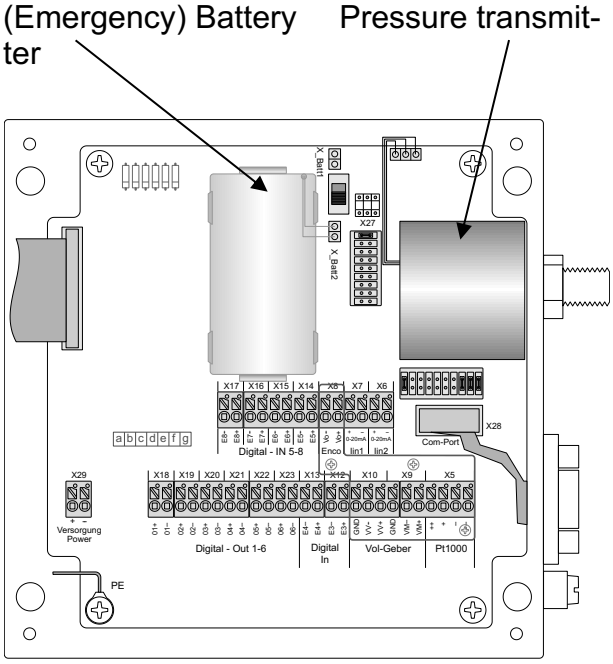
The EC 911 has two volume pulse inputs (reed or Wiegand), one encoder input, one tamper alarm input and six digital outputs.

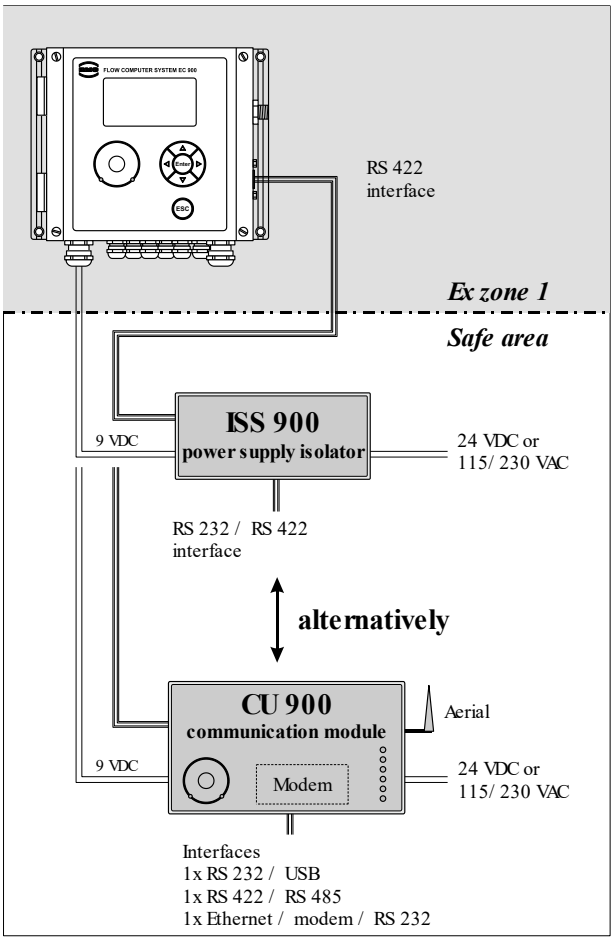
The device has an optical interface and an electrical interface. The electrical interface can be configured as an RS 232, RS 422 or RS 485 interface using jumpers in the casing. **RS 422 is the default configuration, because only this interface has Ex approval** (see also pages 21 and 37).

The connection of NAMUR sensors to the volume inputs VV and VM is not allowed for the EC 911. The necessary settings for this purpose are blocked by the software of the EC 911.

It is possible to upgrade the EC 911 to an EC 912 without any problem. However, it can only be converted into an EC 921 or EC 922 after the connection board has been exchanged.

Type EC 912





The EC 912 version has been approved for Ex zone 1 as an intrinsically safe device. The boards of the EC 911 and EC 912 are identical to each other; they differ in that the battery of the externally supplied EC 912 serves only as an emergency battery.

The EC 912 has two volume pulse inputs (reed or Wiegand), one encoder input, one tamper alarm input, and six digital outputs.

The device has an optical interface and an electrical interface. The electrical interface can be configured as an RS 232, RS 422 or RS 485 interface using jumpers in the casing. RS 422 is the default configuration (see also page 37). Connection to the ISS 900 or CU 900 via RS 422.

Depending on the power supply, there are different additional functions available:

ISS 900 power supply isolator:
The connection to the EC 912 serves not only to power the device but also to transfer data. The serial interface is now available on the ISS 900 outside the Ex zone.

CU 900 communication module:
The serial interface is now available on the CU 900. There is also another electrical interface and an optical interface. The CU 900 can be fitted with a fixed-line or radio modem; alternatively, one of the interfaces can be configured as a TCP/IP or USB interface. Furthermore, there may be up to 4 analogue outputs.

Type EC 921

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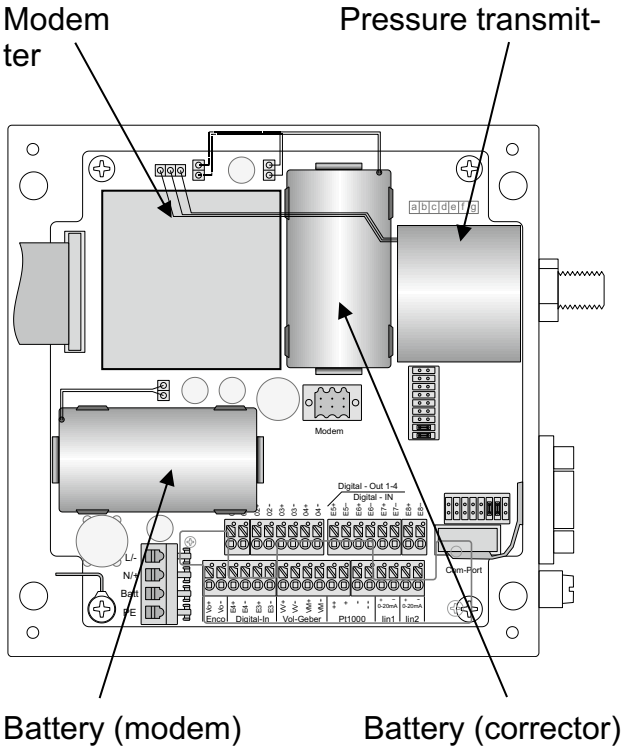
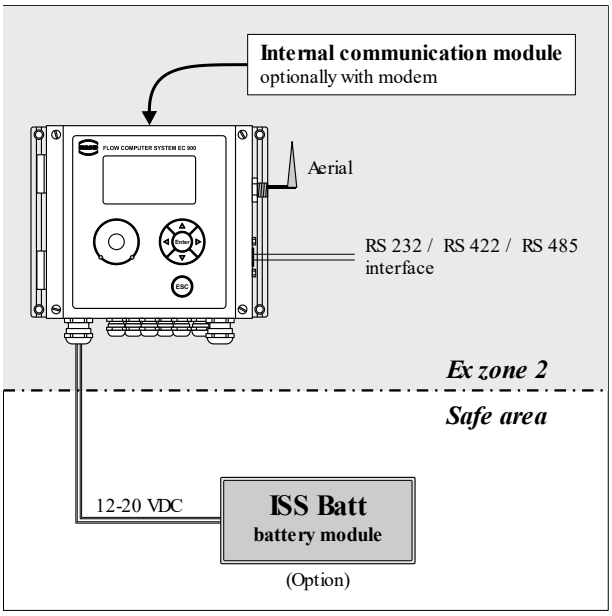




The EC 921 version is intended for use in Ex zone 2; it is not permissible to operate this device in Ex zone 1. It is powered by two lithium batteries as standard: one for the corrector and the other for the internal communication module.

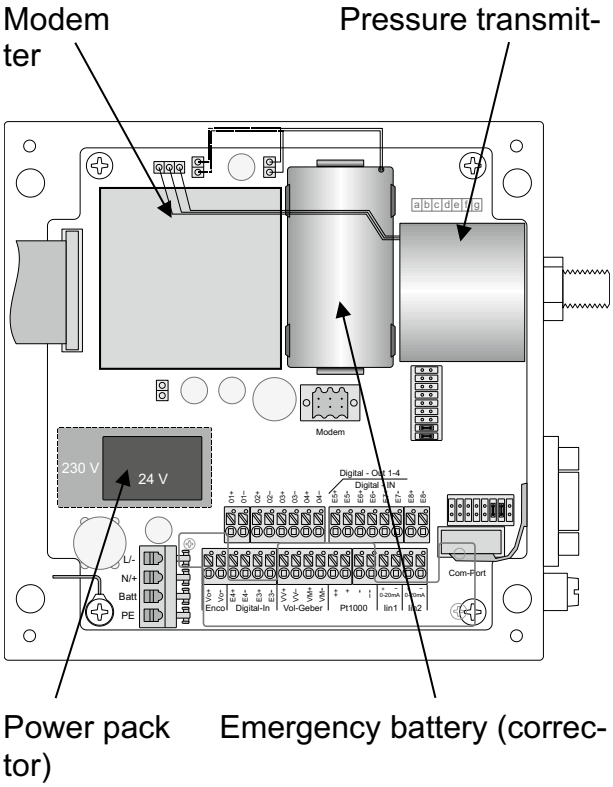
Note: The wiring compartment has been reworked in the meantime. You can see the current version on page 28.

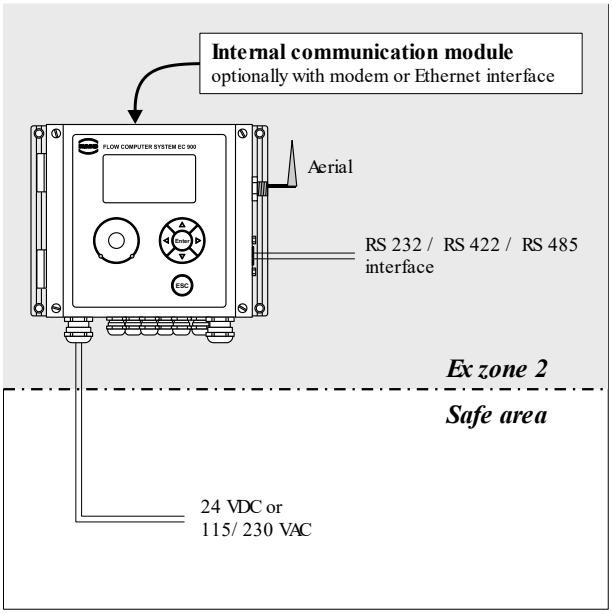
The device has an optical interface and an electrical interface. The electrical interface can be configured as an RS 232, RS 422 or RS 485 interface using jumpers in the casing. RS 485 is the default configuration (see also page 37).

Apart from the fact that the external CU 900 communication module can also be fitted with current outputs, the internal and external modules have the same range of functions. So the communication module can be fitted with a fixed-line or radio modem. Alternatively, the "modem" socket provides another interface, e.g. TCP/IP or USB.

Power can optionally be supplied by an external **ISS Batt** battery module. With this module, it is also possible to operate a GSM modem. This module is used for power supply only and has no interface.

Type EC 922





The EC 922 version is intended for use in Ex zone 2; it is not permissible to operate this device in Ex zone 1. It is externally powered and includes a power pack (24 VDC or 115/230 VAC). A lithium cell serves as an emergency battery to supply the volume corrector. However, it does not supply the internal communication module.

The device has an optical interface and an electrical interface. The electrical interface can be configured as an RS 232, RS 422 or RS 485 interface using jumpers in the casing. RS 485 is the default configuration (see also page 37).

Apart from the fact that the external CU 900 communication module can also be fitted with current outputs, the internal and external modules have the same range of functions. So the communication module can be fitted with a fixed-line or radio modem. Alternatively, the "modem" socket provides another interface, e.g. TCP/IP or USB.

Note: The wiring compartment has been reworked in the meantime. You can see the current version on page 28.

Calculation of the volume at base conditions

The volume at base conditions is calculated from the volume at measurement conditions, pressure, temperature and compressibility in accordance with the following equation:

$$V_b = V_m \cdot \frac{p_{abs}}{p_b} \cdot \frac{273.15 + t_b}{273.15 + t} \cdot \frac{1}{K}; \qquad K = \frac{Z}{Z_b}$$

where

V_m	volume at measurement conditions	[m³]
V_b	volume at base conditions	[m³]
P	pressure at measurement conditions	[bar]
P_b	pressure at base conditions	[bar]
t	temperature	[°C]
t_b	temperature at base conditions	[°C]
K	K coefficient	[1]
Z_m/Z_b	Compressibility factors	[1]

These are the international designations as per EN 12405. Alternatively, you can also use the indices "b" for quantities at measurement conditions and

In Germany, the pressure at base conditions is legally fixed at 1.01325 bar and the temperature at base conditions at 273.15 K (= 0°C).

The following methods are available for calculating the K coefficient:
GERG 88S, AGA-NX-19, AGA-NX-19 corr. and AGA Gross 1 for natural gas.

Totalizers

Overview

The EC 900 has three types of volume totalizers:

- Totalizer for the original volume at measurement conditions V_o
- Totalizers for the volume at measurement conditions V_m and V_{mD}
- Totalizers for the volume at base conditions V_b and V_{bD}

The V_o totalizer either shows the original reading of the encoder index or is supplied in parallel to the basic totalizer for the volume at measurement conditions V_m as an accumulative totalizer via an LF or HF input. Furthermore, the V_o totalizer can also be operated as a copy of the V_m totalizer. It differs from the V_m totalizer in that its reading automatically accepts the value from the encoder index or can be set in the case of the LF input and that the totalizer continues to run if there is a fault.
The volume at base conditions can be calculated on the basis of either V_m or V_o. The user can select the method to be used. V_o may only be used for the formation of V_b if an encoder index has actually been connected to this totalizer, but not if an original reading is simulated via an LF input. If Vo is used for the formation of Vb, the Vm totalizer will add up the increments from one Vo reading to the next Vo reading.
In compliance with MID, the Vm totalizer continues to run if there is a fault. The Vm disturbance totalizer runs as long as there is a fault. Then only the V_b totalizer can be stopped via a fault mode.

Disturbance totalizers
Disturbance totalizers (V_{mD} and V_{bD}) are available for V_m and V_b. There is no disturbance totalizer available for V_o. These disturbance totalizers run as long as the gas volume corrector is under fault conditions. During this time, the main Vb totalizer is at a standstill. When "Alarm run" mode has been activated, the main totalizers will always run and the disturbance totalizers will start to run if there is an alarm.

Time system

General
The EC 900 has been equipped with a time system which fulfils not only PTB requirements but also international requirements.
This includes in particular a programmable change to summer or standard time.

Rules for changing time
The rules for changing the date and time are stipulated in PTB Requirement PTB-A 50.7.

PTB telephone time service
In Germany, time synchronization through the PTB telephone time service is required in conjunction with remote data transmission.
In other European countries, comparable authorities offer equivalent services.
If there is no telephone time service available, time synchronization has to be performed via an alternative synchronization input (alternatively: software/serial interface or contact input).

Operating parameters for controlling time and date
The following operating parameters are required for the time system:
1. Length of the measuring period
2. End of the billing day (e.g. 6 o'clock)
3. End of the billing year (e.g. September)
4. Time change yes/no
5. Time zone

Data protection

The program of the EC 900 is protected by a checksum. The checksum of the program version can be read under "CS displd" in the "TYPE" book. On the same screen, the user can initiate a manual check of the checksum via "Calc CS" mode.

Parameters are stored twice and are compared with each other continuously. Another copy of the parameters is saved in an F-RAM. When a parameter is changed, the new value will be directly saved in the F-RAM. When a comparison error has been detected, a fault message will be generated.

Totalizers are stored three times and are compared with each other and also saved continuously in the F-RAM. When a comparison error has been detected, a fault message will be generated.

In the case of devices with an internal or external communication unit, there is a continuous data exchange between the main unit (MU) and the communication unit (CU). All parameters, measured values and archive entries are transferred to the communication unit. A password is absolutely necessary to read or write via one of the various interfaces. However, in order to read data, entering the password may be disabled. If the user tries to change a parameter of the main unit through one of the interfaces, it will first be checked whether the password required for the relevant parameter has been transmitted. Then it will be checked whether the new value is within the permissible limits before it is stored in the appropriate memory. The transmission of the password together with its source, date and time will be stored in an archive. This also applies for the parameter to be changed which is recorded at least in one of the logbooks.

Each data record in the various archives has its own checksum (CRC). If the archives are read via a PC program, the program reading the data must be able to generate this checksum on its own and compare it with the checksum transferred. If an error is detected, the PC program will have to generate a fault message.

Data logger

Maximum values (maximum load)

In order to enable the gas volume corrector to be approved as a maximum-load recording device, it is necessary to calculate and store the maximum values of a measuring period (hourly values) and the maximum daily values for the V_b and V_n channels.

In detail, the following maximum values are formed:

1. Maximum value of the measuring period within a day
2. Maximum value of the measuring period within a month
3. Maximum daily value within a month

The maximum values of the measuring period for the day are stored in the daily archive. The maximum values of the measuring period and the maximum daily values for the month are stored in the monthly archive. For this purpose, the archive groups of the daily and monthly values are extended by the necessary channels. The current values of the measuring period and the maximum daily values and the values of the previous period are additionally available as a data element and can be displayed at any time.

Archives and logbooks

Archive structure

The DSfG terminology differentiates between archives and logbooks. In order to be able to transfer data in compliance with the DSfG-B protocol, the archives and logbooks must have a particular structure.

Archive group	Name	Function	Memory depth
1	Periodic archive	Event-oriented recording of all relevant totalizer readings and measured values	6 months, equivalent to a minimum of 4,442 entries
2	Disturbance archive	Event-oriented recording of totalizer readings under fault conditions	600 entries
3	Daily archive	Totalizer readings at the end of a day as well as mean and maximum values	731 days (24 months)
4	Monthly archive	Totalizer readings at the end of the month as well as mean and maximum values	24 entries
5	Legal metrological logbook	An entry is made every time a parameter under legal control is changed.	600 entries
6	Parameter change archive	An entry is made every time any parameter is changed.	600 entries
7	Event logbook	Events with a fault number	600 entries
8	Event archive	Events in clear text as well as measured values and totalizer readings	600 entries
9	Load archive	As the periodic archive, but with its own time interval	600 entries

Periodic archive

In the periodic archive, the data is stored in an event-oriented way at the end of the measuring period and if there is a particular event. Particular events include for instance coming or going alarms or warnings, or changes of the date or time. The measuring period may be any value from a minimum of 1 minute to a maximum of 600 minutes; an interval of 60 minutes is the default setting (see also screen 4.3.0.0).

The following data is stored:

- Archive index
- Time stamp
- Running number
- Totalizer readings for Vo, Vm and Vb and the relevant statuses of these totalizers
- Disturbance totalizer readings for VmD and VbD and the relevant statuses of these totalizers

- Mean values for pressure, temperature, K coefficient, C and the relevant statuses of these measured values
- Overview of status (bit string)
- Checksum for the data record (CRC)

The memory depth is 4,442 entries.

Disturbance archive
In addition to the periodic archive, there is an independent disturbance archive. Contrary to the periodic archive, the disturbance archive is filled only if the corrector is under fault conditions.

The following data is stored:
- Archive index
- Time stamp
- Running number
- Disturbance totalizer readings for V_{mD} and V_{bD}
- The relevant statuses of the above totalizers
- Overview of status (bit string)
- Checksum for the data record (CRC)

The memory depth is 600 entries.

Daily archive
In the daily archive, the following values are stored at the end of a day (adjustable parameter, e.g. 06:00 o'clock):
- Archive index
- Time stamp
- Running number
- Totalizer readings for V_o, V_m and V_b
- The relevant statuses of the above totalizers
- Disturbance totalizer readings for V_{mD} and V_{bD}
- The relevant statuses of the above totalizers
- Mean values for pressure, temperature, K coefficient and C
- The relevant statuses of the above measured values
- Maximum periodic quantity of the day for V_m and V_b (date/time information)
- Maximum periodic quantity of the day for V_m and V_b (value)
- Overview of status (bit string)
- Checksum for the data record (CRC)

The daily record is written at the end of a gas day. When the daily record is written, the formation of the mean and maximum values is initialized.

If the date is adjusted, two daily records are written: the first record with the old date and the second record with the new date. The totalizer readings recorded, and the mean values are identical in both records, while a zero (0) is entered for the maximum values in the second record.

Two daily records are also written if the clock is set beyond the turn of the gas day. Example: The turn of the gas day is 6 o'clock and the clock is set from 5:58 to 6:07.

The memory depth is 731 entries.

Monthly archive

In the monthly archive, the following values are stored at the end of a month:

- Archive index
- Time stamp
- Running number
- Totalizer readings for V_o, V_m and V_b
- The relevant statuses of the above totalizers
- Disturbance totalizer readings for V_{mD} and V_{bD}
- The relevant statuses of the above totalizers
- Mean values for pressure, temperature, K coefficient and C
- The relevant statuses of the above measured values
- Maximum periodic quantity of the day for V_m and V_b (date/time information)
- Maximum periodic quantity of the day for V_m and V_b (value)
- Maximum daily quantity of the month for V_m and V_b (date/time information)
- Maximum daily quantity of the month for V_m and V_b (value)
- Overview of status (bit string)
- Checksum for the data record (CRC)

The monthly record is written at the end of the billing month. If the end of the gas day is 6 o'clock for instance, the record for the end of the month is written on the first day of the following month at 6 o'clock. When the monthly record is written, the formation of the mean and maximum values is initialized.

If the date is adjusted beyond the turn of the month, two monthly records are written: the first record with the old date and the second record with the new date. The totalizer readings recorded and the mean values are identical in both records, while a zero (0) is entered for the maximum values in the second record. Example: The time is put forward from July 31 (31.07.) to August 2 (02.08.).

The memory depth is 24 entries.

Legal metrological logbook as per PTB-A 50.7

All changes of the parameters under legal control are entered chronologically in the legal metrological logbook. The entries in this logbook can be deleted via a separate mode if the calibration switch is open. If the logbook is full, you cannot change any parameters under legal control. Then you will first have to delete the contents of this logbook before you can make further changes. To do this, open the calibration switch and set the appropriate mode. A first new entry will automatically be made which documents the erasing procedure.

The legal metrological logbook has the following structure:

- Archive index
- Time stamp
- Running number
- Parameter number (= data element address*)
- Old value
- New value

- Information (clear text, only transmitted via Modbus)
- Source of change (e.g. keyboard, COM1, optical interface)
- Checksum for the data record (CRC)

* The device itself will display the address of the Modbus register. When calling data via DSfG-B, the data element identifier will be transferred with the relevant parameter.

Source of change:
0 Change via control panel
1 Change via data interface 1 (optical interface on the front)
2 Change via data interface 2 (RS 232 or RS 485)

The memory depth is 600 entries.

Parameter change logbook
All parameter changes are recorded in this logbook. It is organized as a circulating buffer as usual: new entries overwrite older ones. The structure is identical to that of the legal metrological logbook. Entries made in the legal metrological logbook are once again archived here.

- Archive index
- Time stamp
- Running number
- Parameter number (= data element address)
- Old value
- New value
- Source of change (e.g. keyboard, COM1, optical interface or modem)
- Checksum for the data record (CRC)

The memory depth is 600 entries.

Event logbook
Device-internal messages and events are stored in the event logbook. This is not done in clear text but by using message numbers (see table "Fault messages"). Positive numbers stand for coming events, while negative numbers stand for going events.

- Archive index
- Time stamp
- Running number
- DSfG fault number
- Checksum for the data record (CRC)

The memory depth is 600 entries.

Event archive

The event archive records all events. As regards its contents, it is a combination of the parameter logbook, event logbook and load archive. Here not only disturbance events but also other events (e.g. opening the calibration code or changing a parameter) are recorded. The following data is stored for each event:

- Archive index
- Time stamp
- Running number
- When appropriate, fault number
- When appropriate, the address of a field changed (Modbus register or M900 address)
- Totalizer readings for V_o, V_m and V_b
- Disturbance totalizer readings for V_{mD} and V_{bD}
- Mean values for pressure, temperature, K coefficient, C, Q_m and Q_b
- Overview of status (bit string)
- Checksum for the data record (CRC)

The memory depth is 600 entries.

Load archive

The load archive is another archive which can be operated independently of the periodic archive with its own periodic setting of a minimum of 1 minute and a maximum of 120 minutes (default: 3 minutes).

The following data is stored:

- Archive index
- Time stamp
- Running number
- Totalizer readings for V_o, V_m and V_b
- Disturbance totalizer readings for V_{mD} and V_{bD}
- Mean values for pressure, temperature, K coefficient and C
- Overview of status (bit string)
- Checksum for the data record (CRC)

The memory depth is 600 entries.

Communication

Interfaces

Optical interface as per IEC 62056-21 on the front panel
The M900 (default setting, required for the Dialog 900 operating software), Modbus RTU and Modbus ASCII protocols have been implemented for the optical interface. This interface is mainly used to parameterize the corrector. In addition, all archive data can also be read out (Dialog program or MDA). The interface is available in identical form on the corrector and the communication unit. If the data is called via a PC, the PC program must be able to enable the RTS or DTR control line in order to establish communication with the EC 900 via the read head.

Electrical interface
Alternatively, an RS 232, RS 422 or RS 485 interface is available as interface for remote data transmission. In the case of devices for Ex zone 1, this interface is provided by the main unit (MU). In the case of devices for Ex zone 2, the internal communication unit (CU) provides this interface. The MU and CU exchange their data via an internal bus. Moreover, an external CU can be connected to the devices for Ex zone 1 which will also exchange its data with the MU via the internal bus.
A modem can be installed either internally or externally. The internal modem version is connected via the RS 232 interface. However, it is basically also possible to connect an external third-party modem through this interface.
The RS 485 interface can also be used as a direct Modbus interface for point-to-point connections.

Modems

Modems can be operated as follows in conjunction with the EC 900:

- Internal mode
  This variant is only possible for Ex zone 2 and also conditional on an internal power pack being used.
- External mode via RS 232 (intended), separate device required
  This variant is also possible for Ex zone 2; it is necessary to connect third-party modems.
- The standard solution for Ex zone 1 provides for applications with an external modem.

Transmission protocols

M900 protocol

The M900 protocol (MRG 910/EC 694 protocol) has been implemented (enhanced functionality) so that the Dialog 900 service program can be used.

DSfG-B protocol

The DSfG-B protocol is implemented in the CU as standard. The device has been prepared to implement SELMA in conjunction with DSfG-B. For DSfG data element identifiers, see the separate documentation for data transmission.

Modbus protocol

The Modbus protocol can be used directly via the RS 485 interface of the MU or via the CU (point-to-point connection also via RS 232 or the optical interface).
The Modbus implemented directly via the RS 485 interface allows the corrector to be connected, for example, to a telecontrol substation (no telecontrol protocol).
For Modbus addresses, see the separate documentation for data transmission.

Communication unit (CU)

The corrector can be fitted with a communication unit. This communication unit is connected via the internal Modbus and is used not only for transmitting data but also for outputting measured values (current and pulse outputs).

For remote data transmission, it supports all common modems and transmission paths:

- Analogue
- ISDN
- GSM
- GPRS
- Ethernet
- RS 485 / RS 232

Safety instructions

The EC 900 PTZ corrector is used to calculate the volume at base conditions of gases from the volume at measurement conditions, pressure and temperature as well as to transfer measured or calculated values via digital interfaces and pulse or analogue outputs.

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

Persons who install or operate the EC 900 PTZ corrector in areas subject to explosion hazards must be familiar with the currently applicable explosion protection standards and regulations.

The EC 900 PTZ corrector has been approved for use in areas subject to explosion hazards. **You must not fail to check the marking on the device** since there are different device versions for Ex zones 1 and 2! Devices which are only approved for Ex zone 2 must not under any circumstances be used in Ex zone 1!

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 EC 900 may only be used in the Ex zone for which it has been approved.
- The device for Ex zone 1 is intrinsically safe and may only be connected to certified intrinsically safe circuits.
- The device for Ex zone 2 must not be opened during operation. Prior to opening the device, you have to check the atmosphere.
- 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 900 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 900 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!

Instructions for the installer

Marking

Type: **EC 911 / EC 912**	Type: **EC 921 / EC 922**
II 2 G Ex ia IIC CE 0158 TÜV 08 ATEX 554643 Ta = -25°C ..... +55°C For data, see the EC type examination certificate (see annex).	II 3 G Ex nA[nL] IIB T4 Ta = -25°C ..... +55°C
Applicable in Ex zone **1 or 2**	Applicable in Ex zone **2**

Use

The EC 911, EC 912, EC 921 and EC 922 devices from the EC 900 series are apparatus for areas subject to explosion hazards. The volume corrector is used in measuring and control engineering for measuring pressure, temperature and volume pulses. The applicable laws or regulations concerning the use or intended use of the device have to be complied with.
The manual of the volume corrector includes the electrical data (**EC 911 / EC 912:** from the EC type examination certificate) and shall be deemed part of the operating instructions.

EC 921 / EC 922: The device may only be opened when the power supply is switched off or if there is no danger of ignition.

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 65 degree of protection as per EN 60529. External heating up due to solar radiation or other sources of heat must be avoided.

EC 911 / EC 912	EC 921 / EC 922
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.	The workmanship of the installation has to comply with the installation regulations in accordance with **EN 60079-14 and EN60079-15**. When other intrinsically safe field devices are interconnected with the EC 900 devices, the rules of explosion protection have to be observed.

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.

Changing the battery

When changing the battery, only the specially manufactured main batteries from RMG Messtechnik may be used. These must **not** be changed when the equipment is in operation. The same conditions apply for the B1 back-up battery (button cell) which powers the clock.

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.

Special condition for EC 921 / EC 922

The D-Sub connector mounted laterally to the case must not be plugged or pulled under voltage. If it remains unused, it has to be covered with a protective cap.
All signal circuits must be kept potential free.

Connection value limits for EC 921 / EC 922

The following connection value limits are valid for the zone 2 devices EC 921 and EC 922 only. For the zone 1 devices EC 911 and EC 912 these values have to be taken from the EC type examination certificate in the annex of this manual!

Electrical data

Note: The following data is only valid for the operation of the EC900 in Ex zone 2. The values valid for operation in Ex zone 1 can be found in the approval from page 133 to page 136.

Power supply	U = 100…240 V/AC, 50…60 Hz, approx. 7 W or
Terminal X4	U = 9 …. 28 V/DC, approx. 7 W
Terminal – L, + N, PE	
Data circuit 1	RS232 / RS422
D-Sub connector right at the case	
Data circuit 2	Analogue modem, ISDN modem, Ethernet
Terminal X40	
6-pin	
Digital outputs	U_{max} = 28 V
Terminal X19	I_{max} = 50 mA
O1+, O1-	P_{max} = 80 mW
Terminal X20	U_{ce} 2 V
O2+, O2-	
Terminal X21	
O3+, O3-	
Terminal X22	
O4+, O4-	

Energy limited signal circuits

Volume pulse input

Reed/Namur/Wiegand	Energy limited
Terminal X2	Maximum values per circuit
M+, M-	U_o = 10.6 V
Terminal X3	I_o = 12.5 mA
V+, V-	Characteristic line: linear
	C_i and L_i are negligible

Signal input

Reed/Namur	Energy limited
Terminal X5	Maximum values per circuit
E3+, E3-	U_o = 10.6 V
Terminal X6	I_o = 12.5 mA
E4+, E4-	Characteristic line: linear
Terminal X7	C_i and L_i are negligible
E5+, E5-	
Terminal X8	
E6+, E6-	
Terminal X9	
E7+, E7-	
Terminal X10	
E8+, E8-	

Vo – Encoder input

Namur	Energy limited
Terminal X11	Maximum values
Vo+, Vo-	U_o = 10.6 V
	I_o = 15 mA
	Characteristic line: linear
	C_i and L_i are negligible

Temperature input PT 1000

Reed/Namur/Wiegand	Energy limited
Terminal X2	Maximum values
M+, M-	U_o = 10.5 V
Terminal X3	I_o = 11 mA
V+, V-	Characteristic line: linear
	C_i = 21 nF, L_i is negligible

Analogue circuit lin1, 2	0 - 20 mA, R_i < 120 Ohm
Terminal X12	U_i <= 30 V
+lin1, -lin1	I_i <= 110 mA
Terminal X13	P_i <= 1.2 W
+lin2, -lin2	C_i = 21 nF

Installation

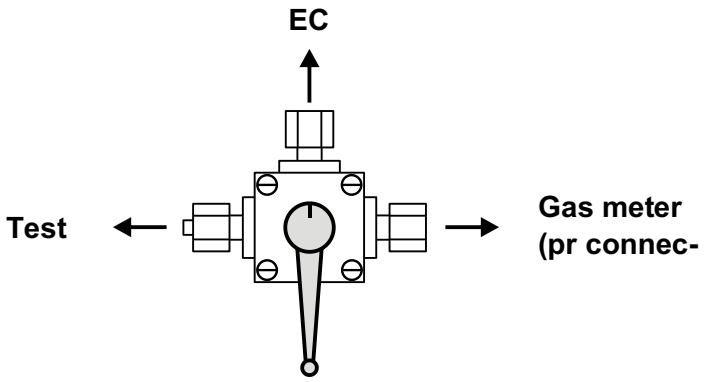
Connecting the pressure transmitter

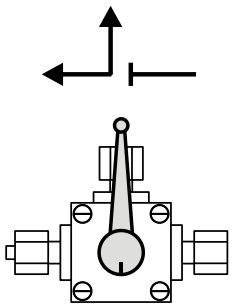
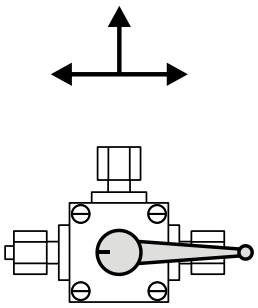
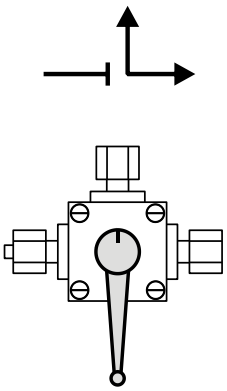
The pressure transmitter has to be connected to a 6 mm piping via the joint (M12 x 1.5 for ERMETO 6L) on the right of the device. A three-way check valve can be installed between the gas meter and the EC 900 to check the pressure transmitter (e.g. in the event of follow-up verifications).

During installation you must make sure that the piping from the pressure transmitter to the three-way check valve is installed with an inclination towards the check valve and that the piping from the check valve or pressure transmitter to the gas meter is installed with an inclination towards the gas meter!

When an external pressure transmitter is connected, the length of the cable must not exceed 3 m.

Three-way check valve



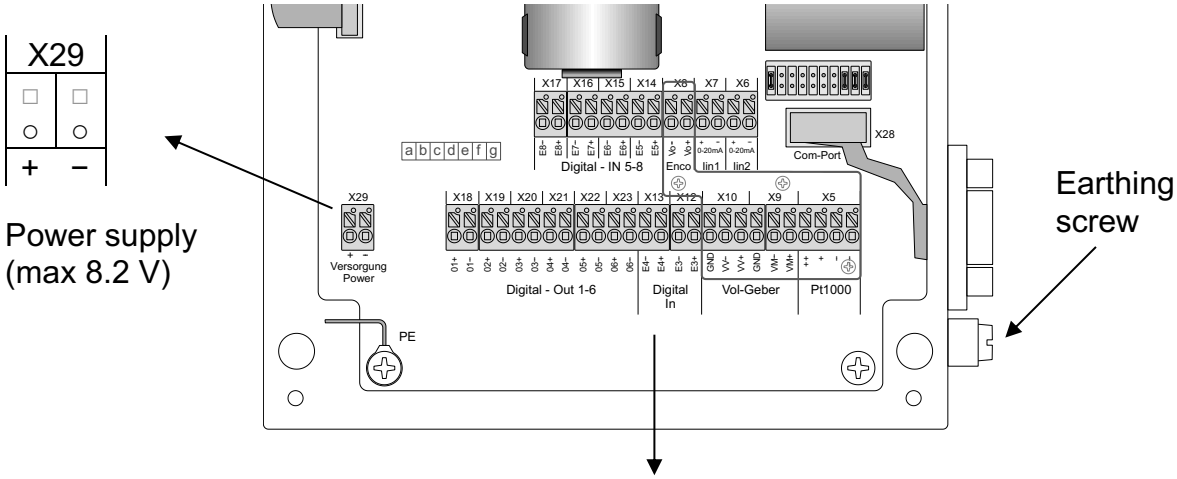
		
Testing with external pressure The test gas connection is put through to the corrector.	**Testing with operating pressure** The pressure of the gas meter is put through to the	**Service settings** The pressure of the gas meter is put through to the corrector.

	corrector and the test gas connection.	

Electrical connections

Devices for Ex zone 1 (EC 911 and EC 912)

The versions for Ex zone 1 may only be connected to certified intrinsically safe circuits. Further equipment may only be connected if the relevant explosion protection conditions such as the permissible capacitance and inductance have been complied with (see the separate ATEX approval documentation).
In the case of external power supply, the approved ISS 900 or CU 900 device is to be used. Here you must only make sure that the cables and the length of the line are correct (external inductances and capacitances).



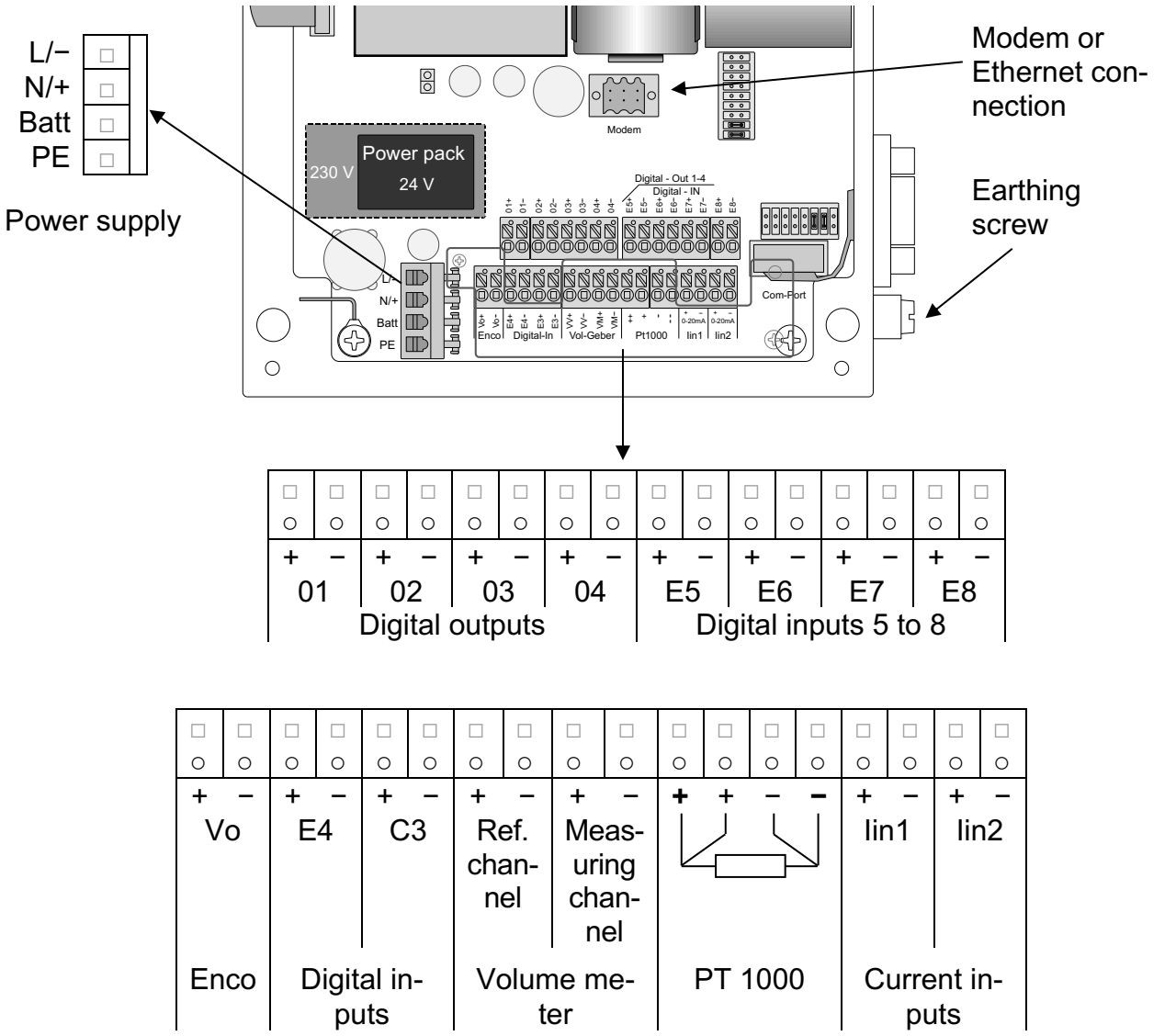
X17	X16	X15	X14	X8	X7	X6
− +	− +	− +	− +	− +	+ −	+ −
E8	E7	E6	E5	Vo	Iin1	Iin2
Digital **in**puts 5 to 8				Enco	Current inputs	

X18	X19	X20	X21	X22	X23	X13	X12	X10	X9	X5
+ −	+ −	+ −	+ −	+ −	+ −	− +	− +	0 − +	0 − +	+ + − −
01	02	03	04	05	06	E4	C3	Reference channel	Measuring channel	
Digital **out**puts						Digital **in**puts		Volume meter		PT 1000

Make sure that the device is earthed (earthing screw on the right side)! In order to connect the device to the equipotential bonding, use a wire diameter of ≥ 4 mm².

Devices for Ex zone 2 (EC 921 and EC 922)

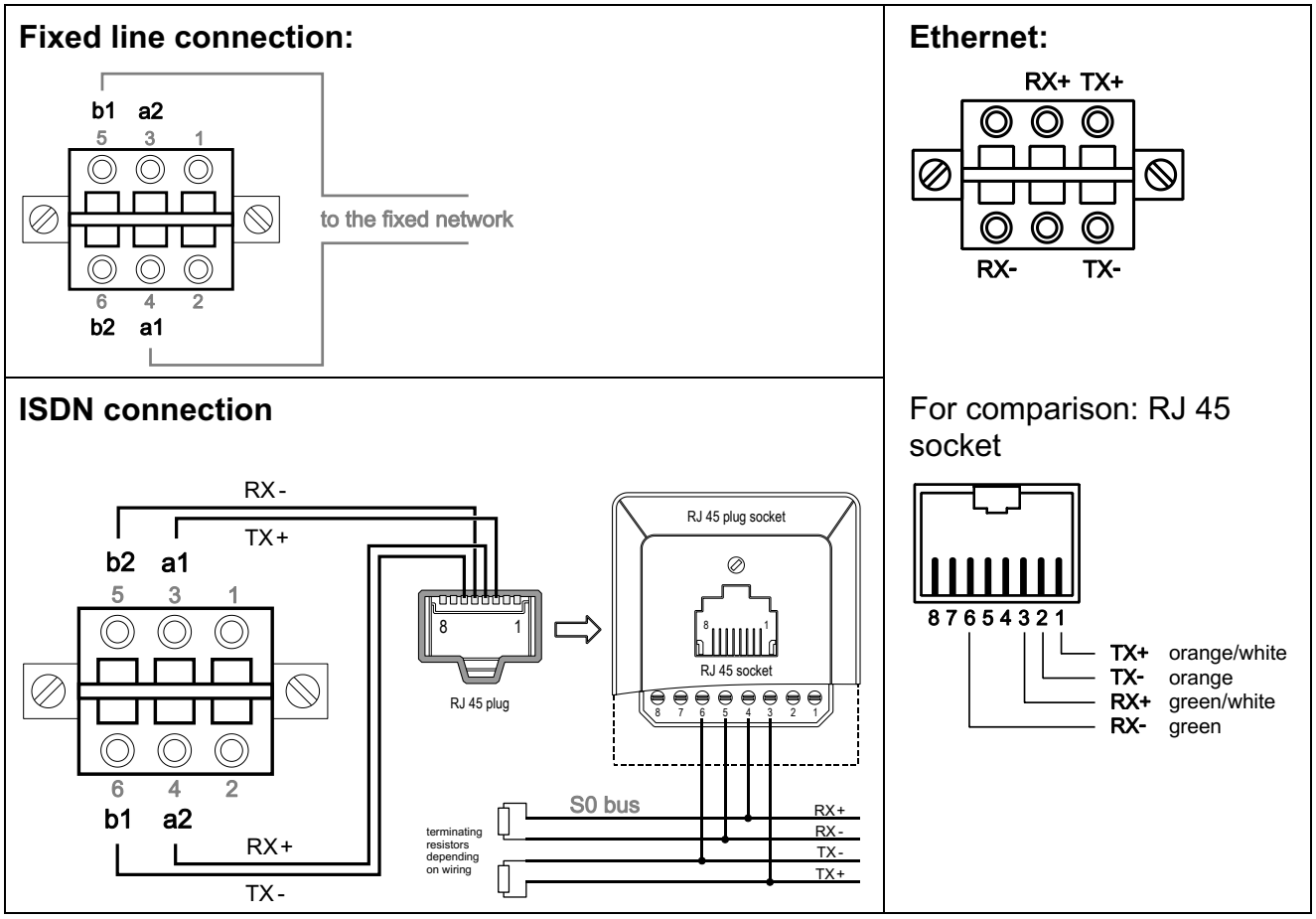
The versions for Ex zone 2 may not be operated in Ex zone 1. In Ex zone 2 it is not necessary to provide electrical isolation in order to connect other equipment. If the devices are powered externally, make sure that the power supply is correct. A device with a 24 V power pack may not be connected to 230 V. The connection schema shown in the figure below corresponds to the latest revision 8.



Make sure that the device is earthed (earthing screw on the right side)! In order to connect the device to the equipotential bonding, use a wire diameter of ≥ 4 mm².

Pin assignments - modem/Ethernet

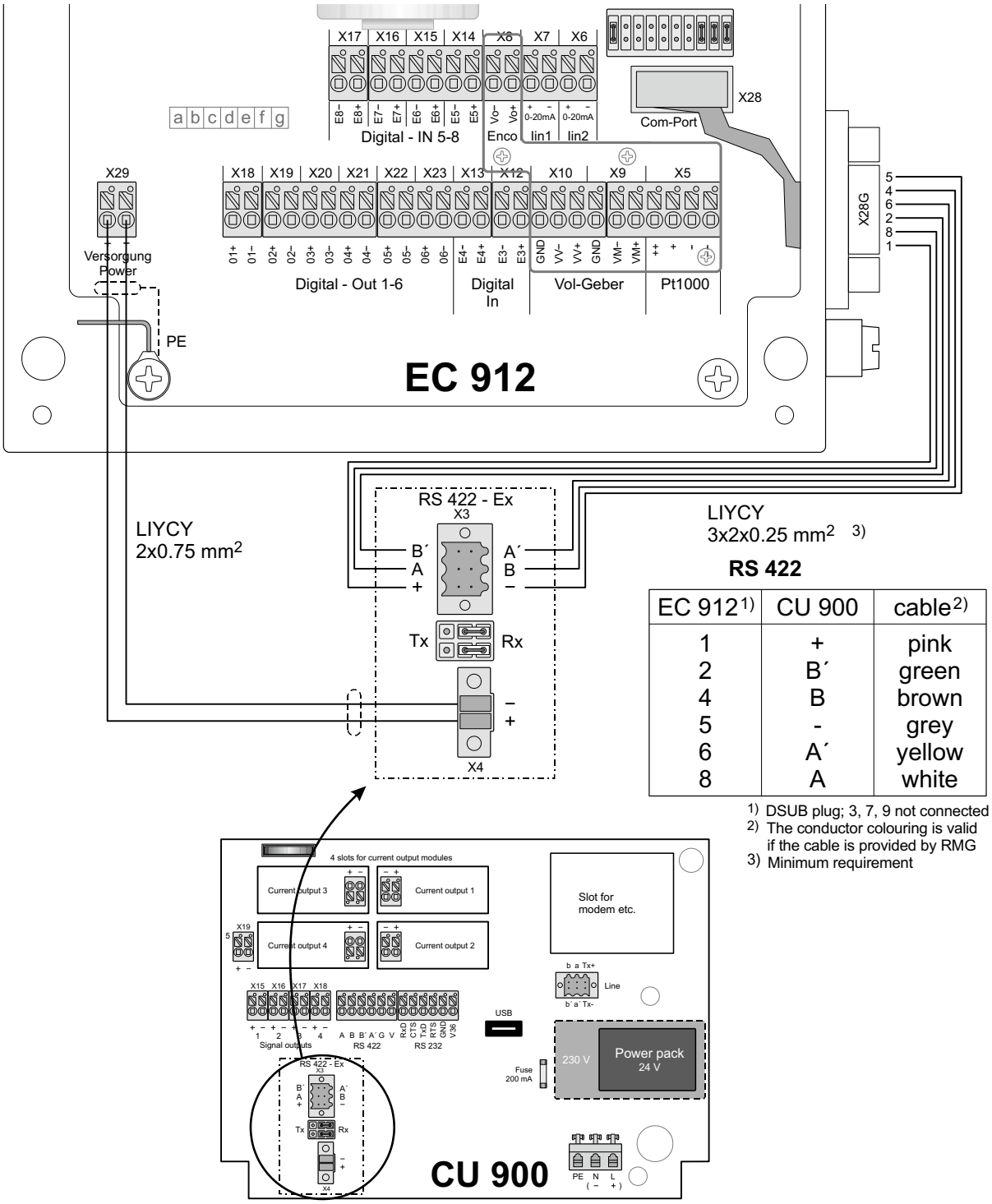
The EC 921 and EC 922 versions have a modem connection on the connection board (see previous page). In this way, (depending on whether the device is equipped with an analogue modem or a TCP/IP module), it can be connected to the telephone network or a computer network (Ethernet).



Pin assignments of the serial interface

Pin	RS 232	RS 422 (to CU 900)	RS 485
1	-	+Vdc (+)	+Vdc
2	RxD	TxD A (B´)	-
3	TxD	-	A
4	-	RxD A (B)	-
5	GND	GND (-)	GND
6	DSR	TxD B (A´)	-
7	-	-	-
8	CTS	RxD B (A)	B
9	-	-	-

Connection of an external CU 900 communication module



EC 912 1)	CU 900	cable 2)
1	+	pink
2	B´	green
4	B	brown
5	-	grey
6	A´	yellow
8	A	white

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

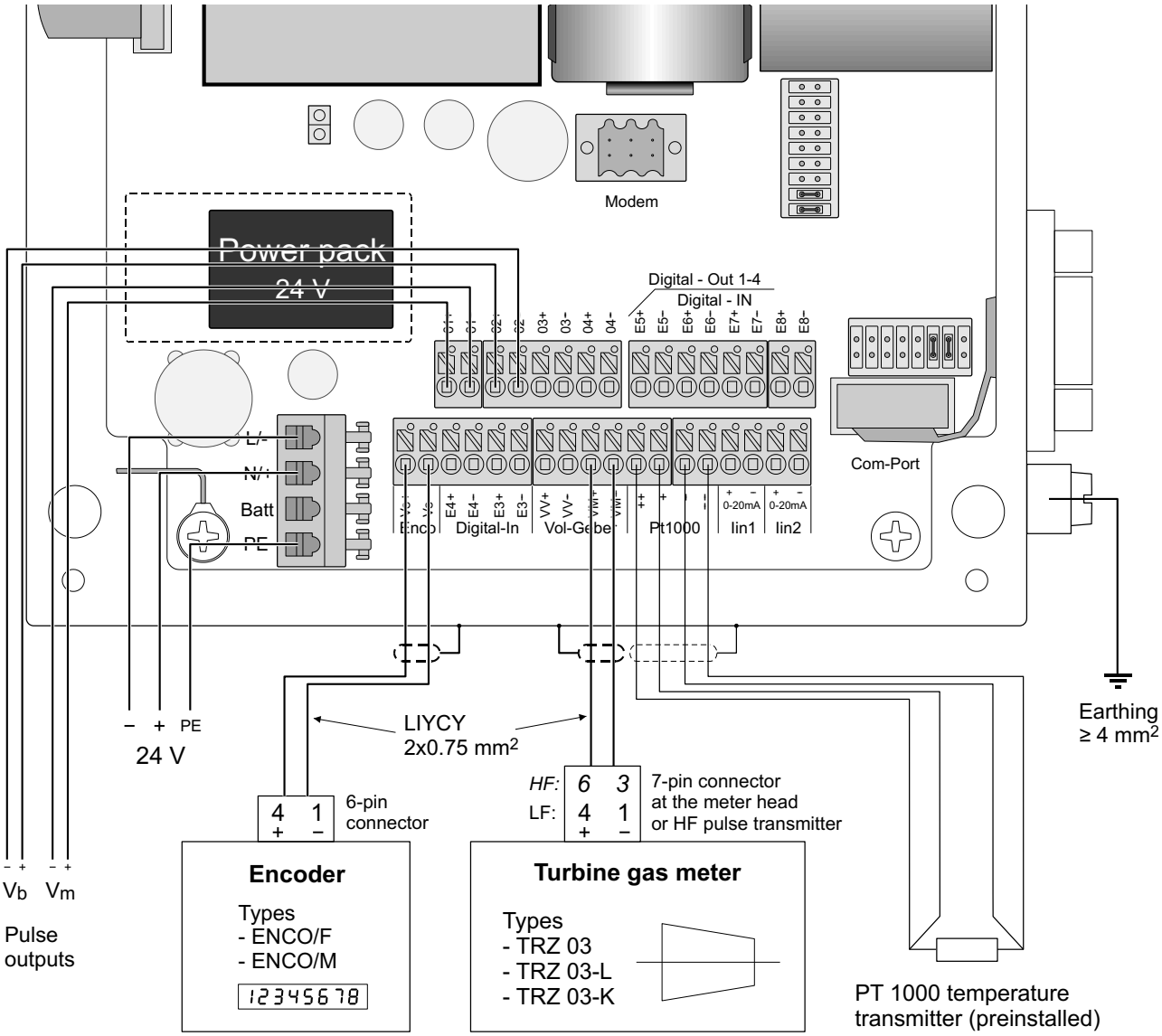
Use connectors with a degree of protection of IP65 or higher to connect the communication module to the interface of the EC 912. Recommendation: D-Sub connector element of type

CD-DB9FEZBR with protective hood of type FWAF1GAE, both from FCT/BTX Technologies (with screw terminals to avoid soldering in the hazardous area).

Requirements for the protection class IP65

To guarantee the IP65 protection class, the permissible outer diameter of the connecting cables has to be ensured, in addition to the use of appropriate sub-D connectors (see previous page):
Cable glands of type **M12:** clamping range **3 to 6.5 mm**, type **M16:** clamping range **5 to 10 mm**.
The clamping range for the Sub-D connector (type: FWAF1GAE) is 6-8 mm.

Example of connection



The example above shows an EC 922 supplied with 24 V which is connected to a turbine meter with encoder index. The preset values have been used to allocate pulse outputs 1

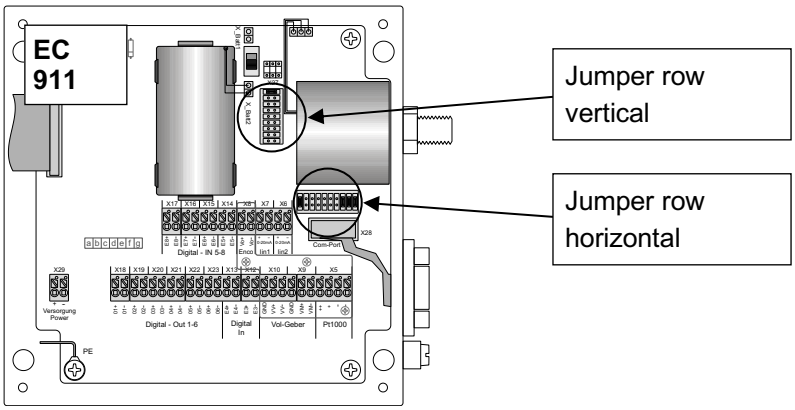
and 2. In the case of a EC 921 or a 230 V device, the terminal assignment is the same with the exception of the power supply.

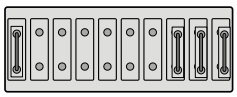
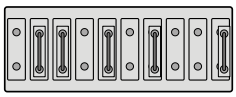
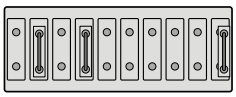
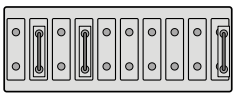
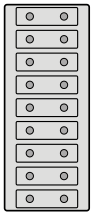
Commissioning

Configuring the interface

The electrical interface of the EC 900 can be configured as an RS 232, RS 422 or RS 485 interface using jumpers. In the case of the RS 485 interface, termination is recommended.

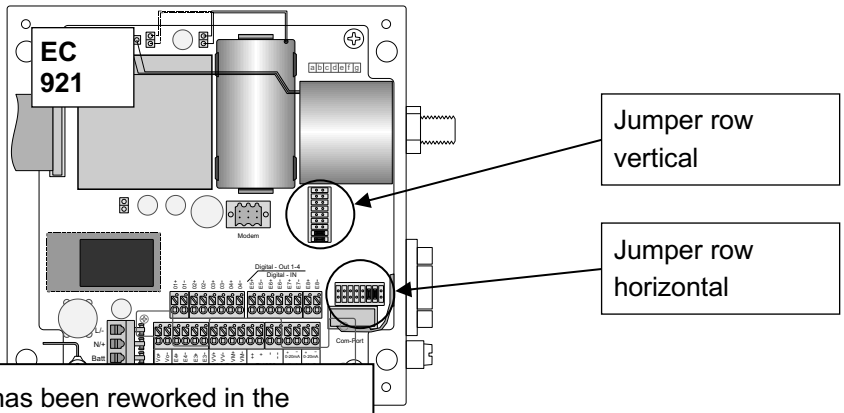
EC 911 and EC 912



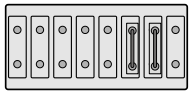
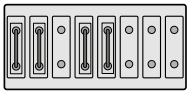
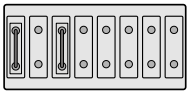
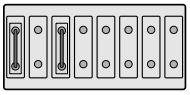
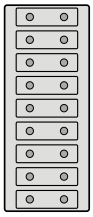
Interface mode	RS 232	RS 422	RS 485 without termination	RS 485 with termination
Jumper row horizontal				
Jumper row vertical				

If an ISS 900 or a CU 900 is connected, the interface is to be set to RS 422.

EC 921 and EC 922



compartment has been reworked in the
an see the current version on page 28.

Interface mode	RS 232	RS 422	RS 485 without termina-tion	RS 485 with termination
Jumper row horizontal				
Jumper row vertical				

Other jumpers must not be changed!

Defining codes

On delivery of the device, the codes are set to defaults, i.e. every person who knows these defaults or has the operating instructions on hand can change parameters, even those under legal control. Therefore, it is essential that you change these codes before you start to use the device for measurements. To do this, it is necessary to first input the current and then the new code. If you want to change the C2 code, for example, first type "22222222" and then the desired new code for C2. If you now want to change C3, for example, you have to type the current C3 code first.
NOTE: If you input a code in order to enable parameter changes, you have to press the ® key to terminate your inputs. If you want to change the code, you have to press Enter to terminate inputting the new code (as with changes of parameters).

See page 43 where you can find a table with the various codes and their defaults. See "OPER. / Changing parameters" for a description of how to enter them.

Code "M" has been permanently specified and cannot be changed or made visible. It enables the factory settings to be changed by RMG's service engineers.

Setting the contrast

The contrast of the LCD display is set in the factory in such a way that the texts can be read easily when you look vertically at the device. However, it may be necessary to reset the contrast depending on the reading angle, brightness and temperature prevailing on site.

To do this, first press the "-" key to activate the display. The "Contrast" parameter is to be found in the first line of the start window ("CUSTOMIZED DISPLAY" book). If necessary, you might have to press Esc several times until the start window appears.
To **increase** the contrast, first press the "¬" key and hold it depressed. Then press the "®" key so many times until the contrast is high enough.
To **reduce** the contrast, first press the "-" key and hold it depressed. Then press the "¯" key so many times until the contrast is low enough.

Operation

How to operate the EC 900

The EC 900 can be operated by using the keys of the device or via the Dialog 900 readout and parameterization program. While you can display and change only the most important parameters by using the keys of the device, you can view all parameters which can be read or changed if you use the Dialog 900 program.

Structural design

The data structure of the device can be thought of as a series of books with chapters, paragraphs and lines.

Available keys: „¬“, „®“, „-“, „¯“, „Enter“, „Esc“.

Book 1

```
information line

   book
     chapter
       paragraph(s)
         line(s)

<book1    book2    book3>
```

Book 2

```
information line

   book
     chapter
       paragraph(s)
         line(s)

<book2    book3    book4>
```

if required, actual information is placed in the first line of the display. If there are no events, the first line is empty. The lines 2 to 6 contain, depending on the level in which one moves within the structure shown above, chapters, paragraphs or lines. In 7th line of the display the books are shown, where the current book is always placed at the beginning of the line. The next possible "books" are placed on the right of it. The arrows "<" and ">" at the beginning and end of the 7th line indicate that more "books" are available and can be reached via the buttons "¬" and "®". Within chapters, paragraphs and lines the single screen lines can be accessed using by "¯" and "-" keys. If more content lines are available than screen lines, all higher rows are shifted one line up when the last line at the bottom of display is reached.

For example the device has a book "PTZ," which in turn contains the chapters "p" for pressure, "t" for temperature, "C" for conversion factor, "K" for compressibility factor and "SC" for supercompressibility. If a "+" (plus) sign stands before the symbol, this means that further scrolling in this "chapter" is possible. With "+p" for example you are forwarded after pressing the "Enter" button to the paragraphs "Measured values", "Limits", "Default values", "Parameters" and "Modes of operation". Again, a "+" (plus) - character before the paragraph, e.g. "+Limits", points out that more lines are found under this paragraph which

also are accessed by pressing the "Enter" key. In this case there are two lines which are named "pmin" and "pmax". The lines represent the final level in our structure. They may be lines that serve only to display data or there are lines for entering data. With the "Escape" button you scroll back one level in the structure. Being in the "chapters" level and pressing the "Esc" button, you get to the first book, the "CUSTOMIZED DISPLAY".

The top level consists of the following 9 books:

CUSTOMIZED DISPLAY:	Customer-specific display. The operator can choose the quantities to be displayed here.
TOT:	Totalizers including setting fields, associated operating modes, and on-the-fly calibration.
PTZ:	Measured values of pressure and temperature as well as the K coefficient with its associated parameters.
OPER.:	Operating parameters, e.g. messages, time system and access codes.
TARIFF:	Archives and logbooks.
FLOW:	Flow rates and parameters for the pulse inputs.
TYPE:	ID display (corrector and transmitters).
COMM:	Interface parameters, such as the baud rate or parity.
OUTPUTS:	Parameters for the inputs and outputs.
CU	**Main menu for the communication module**

The display shows the following, for example:

```
+ Pressure transm.
  Temperature transm.
  Volume meter
  Device data
  Checksum
< TYPE  COMM  OUTPUTS >
```

Lines 1 to 5 show the menu within the selected book with cursor "+". The last line shows the books; the leftmost book is always the current one (in the display above, the current book is "TYPE").
If an event (e.g. an error) has occurred, this will be indicated by the text "Event occurred" above line 1.

Keys

The six control buttons located on the front of the device have the following functions:

Key	In the menu	In input mode
¬	To switch over between the individual books.	To jump to the previous or following position of the number to be changed.
®		
-	To move between the menu items of lines 1 to 5.	To increase or reduce the digit of the current position.
-		
Enter	To jump to the next level down of the user menu or to input mode.	To terminate inputting a new value.
Esc	To jump to the next level up of the user menu.	To abort inputting a new value or return to the menu.

You will always return to input mode if the cursor is not located in front of a menu item but in front of a parameter which can be changed.

The cursor will change its appearance depending on the parameter or menu item in front of which it is located and also depending on whether the parameter concerned can be changed with the code inputted or not. The table below shows the symbols in parentheses which are displayed when the user is not authorized to make such a change.

+	Menu item, branching out into a submenu (even if a jump to the submenu is not possible because a code was not entered)
>	Value displayed
( )	User parameter which can be changed with code U1 or U2
( )	Parameter under legal control which can be changed with code C1, C2 or C3
( )	Factory settings which can be changed with code M
⁄	Free parameter where no code is required and which is not locked in any way
–	Marking of a 2-line value.
#	Scrolling is done in a value that is longer than the line.
▶	Enter will start a service program.
▪	Cursor in service programs. Enter may open another service program if necessary.

Accessing device data

With the exception of a few specially locked parameters, you can change all values after you have inputted a code. Every change of parameters under legal control is entered in the "legal metrological logbook" with a memory depth of 600 entries. When this logbook is full, the oldest value is not overwritten, but an alarm message is outputted. You will not be able to change any other parameters until the entries of this logbook have been deleted. To do this, you have to open the calibration switch which is located on the main unit.

Data categories

The data can be divided into the following categories:

A - **Values displayed:** Values which are only displayed but cannot be changed as a rule.

B - **User data:** Data which can be changed after the user code has been entered; they are not entered in the legal metrological logbook.

E - **Data under legal control:** Such data can only be changed after a calibration code has been entered. They are entered in the legal metrological logbook.

N - **Free parameters:** Here changes can be made as standard without entering a code (but there may be exceptions).

W- **Factory settings:** These can be changed with the service code and are entered in the legal metrological logbook. These parameters are hidden in normal operation and will only be displayed after the service code has been entered. Using the Dialog 900 operating software, you can see these parameters even without entering the code.

Codes

Accessing the data of the EC 900 is made possible via eight different codes. They stand for different authorization levels.

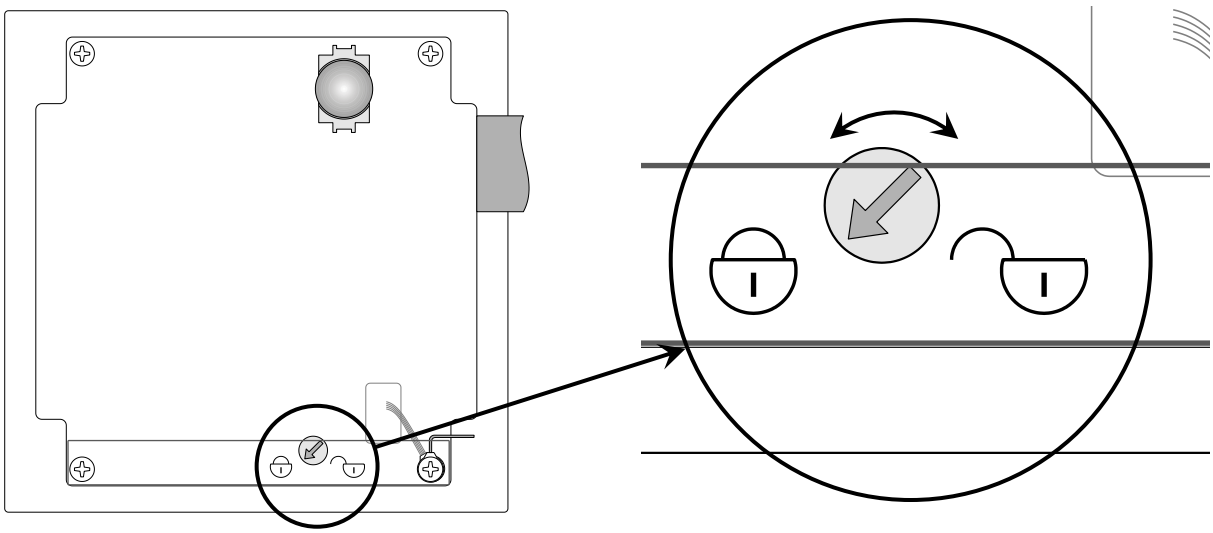
Designation	Default	Authorization
C1	11111111	Enables changes of data either under legal control or not to be made by user 1.
C2	22222222	As C1, but by user 2.
C3	33333333	As C1, but by user 3.
M	Only for RMG service engineers	Enables hidden factory parameters to be displayed and changed.
U1	55555555	Enables changes of data not under legal control to be made by user 4.
U2	66666666	As U1, but by user 5.

Changes of parameters are entered in the appropriate logbooks together with the relevant code. So the changes are traceable. You enter a code in the same way as a parameter, but after inputting the last digit you have to press "®" instead of Enter in order to terminate your entry.

Calibration switch

In order to make several changes (for example, to delete the legal metrological logbook), you have not only to enter the M code, but also open the calibration switch. It is located at the bottom of the main unit on the casing cover (below a plastic strip) and is protected by a seal for custody transfer metering.

With opening the calibration switch also the calibration code 1 is automatically released. Opening the calibration switch thus allows to change the parameters protected by calibration code or user code.



Preconditions for important operations

Setting totalizers
Book: TOT, menu: *Totalizer*/Setting totalizers/
Set VmL: **U** code
Set Vb: **C** code and **calibration switch**
Set Vm: **C** code
Set VO: **C** code

Resetting totalizers
Book: TOT, menu: *Totalizer*/Totalizer mode/
Reset: **C** code
for {Dist. total.|Main totaliz.|Totalizers}
(Totalizers: Resetting main and disturbance totalizers).

Resetting archives
Book: TARIFF, menu: Archive modes/
Archive reset: **C** code
for {All arch|Last|Event|Dist|Months|Days|Period}.

Resetting logbooks
Book: TARIFF, menu: Logbook modes/
Logbook reset: **C** code
for {All logb|Event log|Param log}
(All logb: resetting all logbooks except for the calibration log).
For {Cal log}: **Calibration switch**

Changing the U1 code (Proceed in the same way to change the U2 code.)
Book: OPER., menu: CodeU1/
Enter old U1 code (e.g. 55555555) ➔ User lock is open.
Enter new U1 code (e.g. 12345678) ➔ New U1 code is now valid.

Changing the C1 code (Proceed in the same way to change the C2 and C3 codes.)
Book: OPER., menu: CodeC1/
Enter old C1 code (e.g. 11111111) ➔ Calibration lock is open.
Enter new C1 code (e.g. 99999997) ➔ New C1 code is now valid.

The permissible numeric range for all codes is from 11111111 to 99999998. Numbers, which are lower than 11111111 (e.g. 10111111), are not permissible.

Changing parameters

Follow the steps below in order to change a parameter:

1. In the menu, go to the desired parameter so that the cursor is located in front of the name of the parameter.
2. Press Enter. The cursor (underscore) is now located below the first digit of the number.
3. Press the "-" or "¯" key to increase or decrease this digit by 1. You can also select the ".", "-" and "E" (exponent) characters.
4. Then press "®" to jump to the next position.
5. After you have changed the last position, press Enter (or "®" in the case of codes) to terminate your programming.

If you want to change an operating mode instead of a parameter, you have to proceed in the same way. Instead of changing a digital place, press "-" or "¯" to browse through the individual operating modes.

Examples of programming

The following examples describe frequent or less frequent but important programming work on the EC 900. In these examples (with the exception of the first one), it is assumed that the code has already been entered.

The examples start with the customized display screen. Usually, the cursor is located somewhere in the menu. Press Esc more than once to reach the start window in the "CUSTOMIZED DISPLAY" book.

Inputting a code

```
+ Contrast                30
  p              2.348  bar a
  t                12.35 °C
  C                 2.26751
  K                 0.97880
 CUSTOMIZED DISPLAY   >
```

1. You are on the customized display screen (if not, press Esc more than once). Press "®" three times to access the "OPER." book.

```
>     No messages
  Time              12:46:54
  Date              10.07.08
  Code C1        * * * * * * * *
  Code C2        * * * * * * * *
< OPER.  TARIFF  FLOW >
```

2. The "+" cursor is now located in the first line (message line). Press "¯" three times to reach the "CodeC1" line. Press Enter to access the input mask for code C1.

```
  CODE LOCKED
  Password please
   . . . . . . . .  ®

  19:27:44    15.04.08
< OPER.  TARIFF  FLOW >
```

3. Use the "-" or "¯" cursor key to set the appropriate digit on the first position of the code. Press "®" to move to the second position. Now the digit previously set will be hidden. Proceed in the same way until you reach the last digit. After you have entered the last digit and pressed "®", the code entered will be checked and access will be enabled if the input is correct. Access will be enabled in a time-controlled way and automatically disabled after an adjustable period X.

Enablement of all the other codes is performed in the same way. Time-controlled enablement is performed separately for each code. This applies also for the origin of the code entered.

Codes C1, C2 and C3 have the same priority. This also applies for codes U1 and U2. Enablement of the relevant code can also be performed via the interfaces.

The manufacturer's code (code M) is to be used only by RMG's service engineers.

All entries of codes are recorded in the appropriate archives.

Displaying and changing parameters for calculating the K coefficient

In the following example of programming, the superior calorific value is to be changed from 9.23 to 10.41 in order to calculate the K coefficient in compliance with GERG-88S, and the standard density and CO_2 content are to be displayed. The user code has already been entered beforehand.

```
+ Contrast                30
  Current load
  p              2.348  bara
  t                12.35 °C
  C                 2.26751
 CUSTOMIZED DISPLAY   >
```

1. You are on the customized display screen (if not, press Esc more than once).

```
  p              2.348  bara
  t                12.35 °C
  C                 2.26751
+ K                 0.97880
  SC                1.02166
< PTZ  OPER.  TARIFF    >
```

2. Press "®" twice to jump to the "PTZ" book.
3. Press "⁻" three times. The cursor (+) will now be in front of "K".

```
  Measured values
  Default values
+ Parameters
  Modes of operation

< PTZ  OPER.  TARIFF    >
```

4. Press Enter to jump to the submenu.
5. The cursor is now located in front of "Measured values"; press "⁻" twice to place it in front of "Parameters".

```
⚙ Hs          9.23  kWh/m3
  sd          0.8475  kg/m3
  rd                 0.6726
  H2                0.000 %
  N2                2.342 %
< PTZ  OPER.  TARIFF    >
```

6. Press Enter to jump to the list of parameters one level down. The cursor (⚙) will be in front of "Hs" which is the symbol for the superior calorific value. You will now be able to read the standard density (sd) which is displayed under the superior calorific value.

```
                    9.23  kWh/m3
  New value
    9.23
(5.00  …  15.00)
19:27:44    15.04.08
< PTZ  OPER.  TARIFF    >
```

7. Press Enter again. Now the window will open where you can change the superior calorific value. You can change the numerical value under the "New value" text. The cursor will be on the first position.
   Below that, there is the permissible range for the superior calorific value; and one line under that, there is the time of the last change.

8. Now press "-" six times to set the first position at "1"; then press "®" once to move to the second position.
9. Proceed in the same way with the remaining positions. Please note that the decimal point will shift if you change the numerical value to 10.41. So you have to set the 3rd position at ".". After you have changed the 4th position, press "®" again to generate a new 5th position.
10. After you have changed all positions, press Enter to save the new value.

```
  sd            0.8475  kg/m3
  rd                 0.6726
  H2                0.000 %
  N2                2.342 %
  CO2               1.631 %
< PTZ  OPER.  TARIFF    >
```

11. Last but not least, the CO_2 content remains to be read. To do this, first jump back by one level with „Esc“ and then press "-" so many times until the value appears in the bottom-most line.

Displaying and changing pressure parameters

```
+ Contrast          30
  p          2.348 bara
  t          12.35 °C
  C          2.26751
  K          0.97880
 CUSTOMIZED DISPLAY  >
```

1. You are on the customized display screen. Press "®" twice to access the "PTZ" book.

```
+ p          2.348 bara
  t          12.35 °C
  C          2.26751
  K          0.97880
  SC         1.02166
< PTZ  OPER.  TARIFF  >
```

2. In order to proceed, it is necessary to have the calibration code entered (code C1, C2 or C3)!

3. The "+" cursor is in the first line. Press Enter to reach the first chapter of pressure measurement.

```
  Measured values
+ Limits
  Default values
  Parameters
  Modes of operation
< PTZ  OPER.  TARIFF  >
```

4. Press "⁻" to go to the second line of the chapter; press Enter again to move to the screen with the limit parameters.

```
  pmin        2.00 bara
  pmax       10.00 bara

< PTZ  OPER.  TARIFF  >
```

5. Now press Enter to display the input mask for the parameter and change its value.

```
                    2.00  bara
  New value
    2.00
(0.01  …  1100.00)
15:27:44   22.04.08
< PTZ  OPER.  TARIFF   >
```

6. The first line of the input mask shows the old value. In the third line, you can change the old value using the "¯" or "-" cursor key for the digit and "¬" or "®" for the input position. Complete your entry by pressing Enter. Line 4 shows the permissible input range, and line 5 the current time and date.
7. If the new value is accepted, the old value in line 1 will be replaced by the new value. Press Esc to close the input mask.

```
 pdef              6.00  bara


< PTZ  OPER.  TARIFF   >
```

8. First jump back by one level with Esc. Then press "¯" and Enter to jump to the default value. It is used as a replacement value if a fault occurs or as a fixed value if it is set appropriately in the operating mode of the pressure transmitter.

```
 poffs            0.50000
 Upmin          0.50000  V
 Upmax          4.50000  V
 %Upmin             0.000
 %Upmax           100.000
< PTZ  OPER.  TARIFF   >
```

9. Under “Parameters” the data (Upmin, Upmax, %Upmin, %Upmax) are to be found. They depend on the pressure transmitter and have to be changed when the pressure transmitter is replaced. Other adjusted values of the pressure transmitter input were specified in the factory and are not to be changed when the pressure transmitter is replaced.

```
 p type           DA-0910
 p SN                9212
 p<                2.0  bar
 p>               10.0  bar

< TYPE  COMM  OUTPUTS  >
```

In addition, you will have to adjust the type of the pressure transmitter in the ID display ("TYPE" book) in the "Pressure transm." chapter (see white box on the left). Fields p< and p> will be adjusted automatically when the type of the pressure transmitter is changed

```
punit          bara
pmode        0-4.5V

< PTZ  OPER.  TARIFF   >
```

10. On the Modes of operation screen, you can set the unit and operating mode of the pressure transmitter. Press "¯" and Enter to access the following input mask:

```
  0-4.5 V
New value
 0-4.5 V

15:27:44   22.04.08
< PTZ  OPER.  TARIFF   >
```

11. In this mask, press "¯" or "-" to browse through fixed texts for selection. Press Enter to complete your entry and save the new operating mode which will then appear in line 1.

```
>Up          1.297  V
p         0.98831  bara
pb        1.01325  bara
pC        0.00000  bara

< PTZ  OPER.  TARIFF   >
```

12. In the "Measured values" chapter for pressure, press Enter to access the display screen where additional measured or calculated values will be displayed.

All entries will be recorded in the parameter logbook and, if appropriate, also in the legal metrological logbook.

The way of how to proceed in order to display or change parameters which is described above by the example of pressure parameters can basically be applied to all the other books as well.

Adjusting interface parameters

```
+ Com opt
  Com int
  Com filter
  CU-Status
  Com test
< COMM  OUTPUTS  >
```

1. Make your optical interface settings in the "Com opt" chapter of the "COMM" book.

```
Op type          Slave
Op baud           9600
Op bits              8
Op parity         None
Op stop              1
< COMM  OUTPUTS  >
```

2. The data shown in the illustration on the left correspond to the basic settings for operating the optical interface via Modbus.

```
Op prot       Modb. RTU
Op fmt             4321
Op test             Off
Op addr               1
Op offset             0
< COMM  OUTPUTS  >
```

3. Press "¯" to display also the lower values which are not visible.

```
Op Tout               5
Op btime              1
Op code              No
Op M900crc          Yes
Op except           Yes
< COMM  OUTPUTS  >
```

Changing the pulse value of the gas meter

```
  Pressure transm.
  Temperature transm.
+ Volume meter
  Device data
  Checksum
< TYPE  COMM  OUTPUTS  >
```

1. On the customized display screen press "®" to access the "TYPE" book; then press "¯" twice to access the Volume meter chapter. Press Enter to access the Volume meter screen.

```
  fmax            Reed 50 Hz
  M type                 TRZ
  M SN                345789
  Size        METER  G-250
  M Qmin          20.000 m3
< TYPE  COMM  OUTPUTS  >
```

2. Then press "¯" to reach the parameters for the volume meter.
3. This overview shows all the relevant parameters. The calibration code is required to change the individual parameters.

```
  M Qmax       1000.000 m3
  M1m3          10.00000 imp
  R1m3       3600.00000 imp
  Tot. chan.      Channel  M
  VO chan.              Off
< TYPE  COMM  OUTPUTS
```

4. In the lines two and three, enter the pulse value for the two meter inputs M and (if available) R.
5. In line 4, select the input which will count the volume at measurement conditions.
6. In line 5, select the source for the VO totalizer.

7. If encoder has been selected as source of the VO totalizer, select "Encoder" for the VO channel. Then all you have to do is set the selected read-out cycle of the encoder index (VO cycle) in the next line. You need not change other parameters in order to receive the encoder protocol. The baud rate and the start, stop and data bits as well as the parity will be set automatically. Standby power supply will ensure continuous operation of the encoder index even in the case of a power failure of the EC 921 and EC 922.

Setting or resetting totalizers

```
+ Vb        00000242.56  m3
  Vm        00000065.10  m3
  VO        00000000.00  m3
  VbD       00000065.10  m3
  VmD       00000000.25  m3
< TOT  PTZ  OPER.     >
```

1. In the "Totalizers" ("TOT") book, press Enter in any line to reach the next chapter.

```
  On-the-fly calibr.
+ Setting totalizers
  Totalizer mode
  Load limits

< TOT  PTZ  OPER.     >
```

2. Press "¯" to reach the "Setting totalizers" line, and then press Enter to move to the next screen.

```
  Set VmL                0
  Set Vb                 0
  Set Vm                 0
  Set VO                 0

< TOT  PTZ  OPER.     >
```

3. Now use "¯" to select the totalizer to be set and press Enter. You can set the Vb totalizer if you have entered a calibration code (C1, C2 or C3) and set the calibration switch to its "input" position (see figure on page 44). To set the Vm and VO totalizers, it is sufficient to use one of the calibration codes; and one of the user codes for the customer's VmL totalizer.

```
  New value
     . . . . . . . .  ®
  (00000000 . . . 99999999)
  15:27:44    22.04.08
< TOT  PTZ  OPER.     >
```

4. Use the "¯" or "-" key to set the desired totalizer reading digit by digit.

```
  Stop              Alarm stop
  Reset                    Off
  Vm unit                  m3
  Vb unit                  m3
  Vm per                  MID
< TOT  PTZ  OPER.     >
```

5. If you select "Totalizer mode" instead of "Setting totalizers" under item 2, you will reach the menu shown on the left. Press "¯" once and then Enter in the "Reset" line and you will reach a selection option where you can reset totalizers. Set the selection text to "Totalizers" and press Enter. All totalizers will then be set at 0. Afterwards, the selection text will automatically switch back to "Off".

Device data

```
  Pressure transm.
  Temperature transm.
  Volume meter
+ Device data
  Checksum
< TYPE  COMM  OUTPUTS
```

1. For general information about the EC 900, see the "Device data" chapter in the "TYPE" book. Select Device data and press Enter to access the Device data screen.

```
  YOC                    2008
  ID          00000000000001
  Ver-EC900_V11.00  D-E
  SN                     4327
  Comm. day          01.07.08
< TYPE  COMM  OUTPUTS
```

2. Here all information about the device are shown, e.g. year of construction, version, serial number, date of commissioning, device type and checksum. The checksum[1)] can be recalculated anytime if the "Calc CS" parameter is set to "Yes".

```
  Type                 EC911
  Gas1            Natural gas
  Gas2                   Off
  Calc CS                 No
  CS displd             C8BE
< TYPE  COMM  OUTPUTS
```

3. Press "⁻" more than once to reach the lower lines.

[1)] The checksum of the EC 900 is calculated according to CRC-CCITT (CRC16).

Deleting an event

```
    Event occurred
>  11-2 p max range
   Time              12:46:54
   Date              10.07.08
   Code C1        * * * * * * * *
   Code C2        * * * * * * * *
< OPER.  TARIFF  FLOW>
```

1. The first line of a screen (info line) indicates if an event has occurred. The message(s) itself/themselves can be seen in the overview of the "Operating data" ("OPER.") book. Here all events are outputted by number in line 2.

```
    Event acknowledged
>  11-2 p max range
   Time              12:46:54
   Date              10.07.08
   Code C1        * * * * * * * *
   Code C2        * * * * * * * *
< OPER.  TARIFF  FLOW>
```

2. If the "Event acknowledged" message is displayed in the first line, you can delete the messages by pressing Enter provided that the cursor is located in line 2 and one of the calibration or user codes has been entered beforehand.

The events are mostly alarms (when the measuring or computational result is being affected), warnings or other events such as the opening of the calibration switch.

On-the-fly calibration

```
+ Vb        00000242.56  m3
  Vm        00000065.10  m3
  VO        00000000.00  m3
  VbD       00000065.10  m3
  VmD       00000000.25  m3
< TOT  PTZ  OPER.     >
```

1. Press "®" to jump to the totalizer display and select any totalizer.

```
+ On-the-fly calibr.
  Setting totalizers
  Totalizer mode
  Load limits

< TOT  PTZ  OPER.     >
```

2. The visible window will open even if another totalizer is selected. Now select "On-the-fly calibr.".

```
> OTFC start w. enter
  TVb         0000.0000  m3
  TVm         0000.0000  m3
  Test time         0.00  s
  Test ext.          Off
< TOT  PTZ  OPER.     >
```

3. Press Enter to start on-the-fly calibration. Now the TVm and TVb totalizers will start to run together with a stopwatch (Test time). If you press Enter once again, this will stop on-the-fly calibration, and if you press Enter another time, the totalizers will be cleared again. "Test time" will show the duration of on-the-fly calibration, and "Test ext." can trigger on-the-fly calibration by transmitting a control code in Modbus format via an interface. This, however, is conditional on the fact that manual on-the-fly calibration has been switched off (this is indicated by the text ">OTFC start w. enter" in the first line).

Viewing archive entries (example: periodic archive)

```
+ Archives
  Logbooks
  Archive parameters
  Archive modes
  Logbook modes
< TARIFF    FLOW    TYPE
```

1. Use "®" or "¬" to jump to the "TARIFF" book and select "Archives". Viewing the periodic archive, which is described below, functions in the same way for all the other archives and the logbooks.

```
+ Periodic archive
  Daily archive
  Monthly archive
  Disturbance archive
  Event archive
< TARIFF    FLOW    TYPE
```

2. Now select the "Periodic archive" menu item.

```
+ Periodic archive
  Read rec.                0
  Level                 1720
  Run. No               1720
  TS      13:31:00   30.09.08
< TARIFF    FLOW    TYPE
```

3. The cursor is at "Periodic archive". Press Enter to jump to the archive.
   In line Read rec. the number of the data record is displayed which is to be read via the protocol (Omni). The level indicates the index of the last data record written before an overflow of the archive occurred. In the case of an overflow of the archive, the level remains on the maximum index for the archive (e.g. 4442 in the case of the periodic archive). The Run. No. is the running number associated with the last data record (counter running beyond the overflow of the archive).
   TS is the time stamp associated with the last data record.

```
   Cur level              1720
   Opt read                  0
   COM1 read                 0
   ST     21:00:00    20.09.08
   AG1                     AG1
< TARIFF    FLOW    TYPE
```

4. Press "¯" to reach further lines below TS:
   "Cur level" shows the index of the last archive entry. Since the archives are circular archives with the exception of the legal metrological log-book, the index will again start at 1 after an ar-chive overflow.
   "Opt read" points to the last index of the data record read through the optical interface of the corrector.
   "COM1 read" points to the last index of the data record read read via the COM1 (MU) interface of the corrector. In the case of purely battery-powered devices, this is the interface located on the side. In the case of devices with an internal or external CU, these are the data records transmitted via the internal bus between the MU and CU.
   Using "ST", you can search the archive for an entry with a particular time. If the entry is found, the display will switch over at once to show the content of the entry.
   "AG1" shows the text of the DSfG archive des-ignation. This text can only be changed with an external program.

```
   Periodic archive
   Index / CRC:   1234 / 47A1
   Time stamp
     14:00:00     01.09.08
   Running No.:
                          1720
Last index No.:           1720
```

```
   Periodic archive
       10:00:00    27.08.13
   VO            00009870  m3
   Vb            00123400  m3
   Vm            00005566  m3
   VbD           00000000  m3
   VmD           00000000  m3
```

5. Now you can see the number (index) of the cur-rent entry to which the pointer points (and which can now be displayed) together with the check-sum (CRC) of this entry, the time stamp and the running number of the entry and the index of the last entry.
   The index is the running number of the entries in the archive (maximum index = memory depth). The running number is the absolute number corresponding to the index since the ar-chives were deleted for the last time and it can be higher than the memory depth if an overflow of the memory occurred).
   Press Enter to toggle between the current, most recent and oldest entry; use "®" or "" to browse upwards or downwards in time. Use "¯" and "-" to browse through the values of the current ar-chive entry.

Viewing maximum load values

Description

The EC 900 includes a maximum-load display feature which records and stores the maximum quantity supplied during a supply period and the maximum quantity supplied during a day (gas day).

The supply period can be set to a value between 1 and 600 minutes. In the factory, the supply period has been preset at 60 minutes. The daily supply is calculated for one gas day. Usually, a gas day starts and ends at 6 o'clock. This time can also be adjusted. Within a gas day, it is checked at the end of each supply period whether the quantity of gas supplied during this period has exceeded the previous maximum value. If this is the case, the appropriate value will be saved to a particular memory. There are the following archives for storing such values: periodic, daily and monthly archives. At the end of a gas day, the maximum quantity determined for the past day will be reset so that a new maximum quantity can be determined for the current day. Also daily quantities within a month are being treated in the same way. A month ends on the first day of the next month at the end of the gas day (e.g. 01.12.2008 06:00 o'clock).

Thus, in normal operation, 24 periodic entries are generated in the course of a gas day. However, disturbances might cause other entries to be made in the course of a supply period. If this is the case, such entries will be identified by an asterisk (*). Further options to generate additional entries include e.g. a restart of the device or changing the clock. Such disturbances of the normal supply period are also recorded in separate logbooks and event archives. Therefore, all entries in the periodic, daily and monthly archives which are identified by an asterisk (*) because an event has occurred have to be checked for the appropriate maximum load. All archives can be read out at any time (see page 60).

If a restart is made or the clock is changed, the new start of the period will automatically synchronize to the next supply period, the next gas day and the next month. During the time of synchronization, the current maximum load will not be displayed.

The maximum load displays for the maximum values stored and the current loads for the volumes at measurement and base conditions comprise a display with 6 positions before and 2 after the decimal point. This enables maximum load values to be recorded even in the case of low flow rates. However, the meter readings of the periodic, daily and monthly archives are stored without decimal places. Therefore, a comparison of maximum load values with meter readings stored is possible only to a limited extent.

A customized display has been integrated into the device especially for gas consumers; here the operator can display all relevant data. The sequence and choice of the values displayed can be adjusted. The contrast setting and the current load of the customized display cannot be changed.
(The basic handling of the device is described on page 40 of this documentation.)

Maximum load display

```
   Contrast                  30
+  Current load
   p                2.348  bara
   t                  12.35 °C
   C                  2.26751
 CUSTOMIZED DISPLAY   >
```

If you select "Current load" in the customized display and press Enter, you will reach another selection screen.

```
+  Period > cur.day
   Period > cur.month
   Day val. > cur.month


     LOAD              >
```

Here you can select to display the current supply quantity of the current supply period within the current gas day, the current supply quantity of the current supply period within the current month and the current supply quantity of the current gas day within the current month.

Current supply quantity within the current gas day

```
Maximum:  17:24 12.11.
Per. end in 057 sec
Vb   maximum  000016.38
Vm   maximum  000004.49
Vb   current     000007.42
Vm   current     000002.17   >
```

This picture shows under "Maximum:" the time indicated in "Hour:Minute" and "Day.Month" when the last maximum value of the gas day occurred (this always refers to the time of the maximum value for the volume at base conditions).
The line below shows the time (in the case of periods exceeding 3 minutes in minutes; in the case of periods of less than 3 minutes in seconds) until the next end of period. The next two lines show the last maximum supply quantities for the volumes at base and measurement conditions. Further below, the current quantities for the volumes at base and measurement conditions appear. At the end of the supply period, the remaining time is reset and the current volume meters restart at zero. If the previous maximum quantity is exceeded, this will be transferred at once to the maximum value display.
These displays allow the current consumption to be determined.

The structure and mode of operation are identical for the displays showing the supply period per month and the gas day per month. The remaining time for the gas day per month will always be indicated in minutes.

Monitoring the supply period

Under "Totalizer functions" (page 69) you can reach two input fields under "Load limits" where the maximum value of the current supply period or the maximum value of the gas day can be entered. If these limits are exceeded, an entry will be made in the event archive (see page 18). You can also set an output contact in case these limits are exceeded (see page 119 et seqq.). If the load limits are set at zero, no entry will be made in the event archive.

Archive displays

In the periodic archive, the totalizer readings at the end of the relevant period or at the beginning or end of an event are stored among other things. The periodic archive has a depth of more than 4,400 entries; this corresponds to a period of time of 6 months with a periodic duration of 60 minutes.
In the daily archive, the totalizer readings at the end of a gas day, the maximum periodic values for the volumes at base and measurement conditions of a month and the maximum daily values for the volumes at base and measurement conditions of a month are stored among other things.
The archive has a depth of 731 entries; this corresponds to a period of time of 2 years.
In the monthly archive, the totalizer readings at the end of a month and the maximum periodic values for the volumes at base and measurement conditions of a day are stored among other things.
This archive has a depth of 24 entries; this corresponds to a period of time of 2 years.
All archives have a circular structure which means that if there is an archive overflow, the new entry will overwrite the oldest one in the archive. For further details about archives, see the description in this manual from page 13 onwards.

List of parameters and operating modes

The following tables show the setting options for the operating modes in parentheses and separated with vertical lines, e.g. {Off|0-4.5V|4-20mA|Default}.
If the relevant fields are addressed by an external program, appropriate numerical values (position) are to be assigned to the texts. In the example above this would be:
0 = Off, 1 = 0-4.5V, 2 = 4-20mA, 3 = Default

Screen: CUSTOMIZED DISPLAY

+Contrast >Current load >p >t >C	Extended customized display (contrast setting see page 39). Quantities for the current measuring period and the current day Customized value 1 displayed (default: p) Customized value 2 displayed (default: tm) Customized value 3 displayed (default: C)
>K >Vm >Vb >VmD < CUSTOMIZED DISPLAY>	Customized value 5 displayed (default: K) Customized value 5 displayed (default: Vm) Customized value 6 displayed (default: Vb) Customized value 7 displayed (default: VmD) "CUSTOMIZED DISPLAY" book

The customized display comprises a total of 9 possible displays. The display lines for the contrast and the current load are permanently set. The operator can select the other 7 display lines in any order from a list of maximum 14 values. The following values are available for selection:

- Totalizer for the volume at base conditions (Vb)
- Totalizer for the volume at measurement conditions (Vm)
- VO totalizer
- Totalizer for the volume at measurement conditions - customer (VmL)
- Totalizer for the volume at base conditions - disturbance quantity (VbD)
- Totalizer for the volume at measurement conditions - disturbance quantity (VmD)
- Pressure (p)
- Temperature (t)
- Conversion factor (C)
- K coefficient
- Supercompressibility
- Flow rate at measurement conditions
- Flow rate at base conditions
- Time

In order to set the customized display, see screen **3.5.0.0.**

Screen: Extended customized display

+System values	Manufacturer's code (M code) required to continue
+Pressure measurem.	Manufacturer's code (M code) required to continue
+Temperature meas.	Manufacturer's code (M code) required to continue
+Analogue input 1	Manufacturer's code (M code) required to continue
+Analogue input 2	Manufacturer's code (M code) required to continue
+Case temperature	Manufacturer's code (M code) required to continue
+Digital inputs	Press Enter to go to screen: **1.0.0.0**
+Frequency meas.	Manufacturer's code (M code) required to continue
+Encoder	Manufacturer's code (M code) required to continue
+Debug values	Manufacturer's code (M code) required to continue
< CUSTOMIZED DISPLAY>	"CUSTOMIZED DISPLAY" book

Screen: 1.0.0.0 (Digital inputs)

	+Digital inp. values	Press Enter to go to screen **1.0.1.0**
	+Digital inp. modes	Press Enter to go to screen **1.0.2.0**
	+Filter inp. modes	Press Enter to go to screen **1.0.3.0**
	<DIGITAL INPUTS >	"DIGITAL INPUTS" in the "CUSTOMIZED DISPLAY" book

Screen: 1.0.1.0 (Counter for incoming pulses)

		>Pulse meas	Measuring pulses
		>Pulse ref	Reference pulses
		>Pulse miss	Pulse comparison fault
		>Pulse inp3	Pulses from digital input 3
		>Pulse inp4	Pulses from digital input 4
		>Pulse inp5	Pulses from digital input 5
		>Pulse inp6	Pulses from digital input 6
		>Pulse inp7	Pulses from digital input 7
		>Pulse inp8	Pulses from digital input 8
		<INC. PULSE COUNTER >	"INC. PULSE COUNTER" in the "CUSTOMIZED DISPLAY" book

Screen: 1.0.2.0 (Use of the digital inputs)

		Mod M Mod R Mod 3 Mod 4 Mod 5	Volume input VM {Off|Totalizer} Volume input VR {Off|Totalizer} Digital input 3 {Off|Totalizer|Tamper c. C|Tamper c. O| Time sync|Fault res.} 1) Digital input 4 {Off|Totalizer|Tamper c. C|Tamper c. O| Time sync|Fault res.} 1) Digital input 5 {Off|Limit contact} 2)
		Mod 6 Mod 7 Mod 8 <MODE INPUTS >	Digital input 6 {Off|Limit contact|Totalizer|Fault res.} 1) 2) Digital input 7 {Off|Limit contact|Totalizer|Fault res.} 1) 2) Digital input 8 {Off|Limit contact|Totalizer|Fault res.} 1) 2) "MODE INPUTS" in the "CUSTOMIZED DISPLAY" book

Default values are underlined.

1) The possible selection items Totalizer, Time sync und Fault Res. are reserved for a later version of the EC9xx and are actually not supported by the software.
Tamper c. C= anti-manipulation contact active
Tamper c. O= anti-manipulation contact as closed-circuit contact

2) Via the selection Limit contact the message "valve closed" can be transferred to the EC9xx . If a flow rate above the creeping quantity limit is measured and the signal contact shows, that the valve is closed, a warning is generated by the corrector.

Screen: 1.0.3.0 (Selection of sensor type and filter for the digital inputs)

		Filter M Filter R Filter 3 Filter 4 Filter 5	Frequency filter for volume input VM {Low. 50Hz|Hig. 5kHz| Hig. 5kHz} Frequency filter for volume input VR {Low. 50Hz|Hig. 5kHz| Hig. 5kHz} Filter for digital input 3 {Off|On} Filter for digital input 4 {Off|On} Filter for digital input 5 {Off|On}
		Filter 6 Filter 7 Filter 8 Input M Input R Input 3 Input 4 <INPUT FILTERS >	Filter for digital input 6 {Off|On} 3) Filter for digital input 7 {Off|On} 3) Filter for digital input 8 {Off|On} 3) Selection of signal type for volume input VM {Reed|Namur} Selection of signal type for volume input VR {Reed|Namur} Selection of signal type for digital input 3 {Reed|Namur} Selection of signal type for digital input 4 {Reed|Namur} "INPUT FILTERS" in the "CUSTOMIZED DISPLAY" book

Default values are underlined.

[3)] The selection of the filters for the digital inputs 6 to 8 is not relevant, because these inputs are actually not supported by the software.

Screen: TOT

+Vb 00123400.00 m3	Press Enter to go to screen **1.1.0.0**
+Vm 00005566.00 m3	Press Enter to go to screen **1.1.0.0**
+VO 00009870.00 m3	Press Enter to go to screen **1.1.0.0**
+VbD 00000000.00 m3	Press Enter to go to screen **1.1.0.0**
+VmD 00000000.00 m3	Press Enter to go to screen **1.1.0.0**
+VmL 00000321.00 m3	Press Enter to go to screen **1.1.0.0**
< TOT PTZ OPER.>	"TOT" book

Screen: 1.1.0.0 (totalizer functions)

	+On-the-fly calibr.	Press Enter to go to screen **1.1.1.0**
	+Setting totalizers	Press Enter to go to screen **1.1.2.0**
	+Totalizer mode	Press Enter to go to screen **1.1.3.0**
	+Load limits	Press Enter to go to screen **1.1.4.0**
	<TOT PTZ OPER.>	"TOT" book

Screen: 1.1.1.0 (on-the-fly calibration)

		>OTFC off with enter	On-the-fly calibration
		>T Vb 0000.0000 m3	On-the-fly calibration, volume at measurement conditions
		>T Vm 0000.0000 m3	On-the-fly calibration, volume at base conditions
		>Test time 0.00 s	Duration of on-the-fly calibration (s)
		Test ext. Off	Controlling on-the-fly calibration {Off|OTFC start|OTFC stop|OTFC reset}
		<TOT PTZ OPER. >	"TOT" book

Press Enter to start, stop, reset or switch off on-the-fly calibration. If on-the-fly calibration is to be operated externally, manual on-the-fly calibration has to be switched off (see also page 59).

Screen: 1.1.2.0 (setting totalizers)

		Set VmL 00000000	Setting the customer's Vm (Vb) totalizer
		Set Vb 00000000	Setting the Vb (Vn) totalizer
		Set Vm 00000000	Setting the Vm (Vb) totalizer
		Set VO 00000000	Setting the VO totalizer
		<TOT PTZ OPER. >	"TOT" book

In order to set the customer's VmL totalizer, it is sufficient to enter one of the user codes, whereas one of the calibration codes can be used to set the Vm and VO totalizers. For the Vb totalizer, a calibration code has to be entered **and** the calibration switch must have been opened.

Screen: 1.1.3.0 (totalizer mode)

		Stop Alarm stop	Totalizer mode {Alarm stop|Alarm run}
		Reset Off	Clearing totalizers {Off|Dispatcher|Dist. total.|Totalizers| Main totaliz.}
		Vm unit m3	Unit for the volume at measurement conditions {m3|ft3|yd3|gal}
		Vb unit m3	Unit for the volume at base conditions {m3|ft3|yd3|gal}
		Vm per National	Vm mode {MID|National}
		<TOT PTZ OPER. >	"TOT" book

The **"Vm per"** mode describes how the Vm totalizer is used:

MID: The Vm totalizer continues to run in the case of a fault, while the Vb totalizer is at a standstill during the period of the fault, and during this time, both VmD and VbD disturbance quantity totalizers are running. The "Alarm stop/Alarm run" mode has no effect on the totalizers.

National: In the case of an alarm, the Vm and Vb totalizers stop and the VmD and VbD totalizers run as long as the alarm persists. You can change the behaviour of the main totalizers via the "Stop" mode.

Screen: 1.1.4.0 (load limits)

		Per.max 00000000 m3	Upper limit for the maximum periodic value
		Day max 00000000 m3	Upper limit for the maximum daily value
		<TOT PTZ OPER. >	"TOT" book

If these limits are exceeded (if > 0), an entry will be made in the event archive. It is also possible to activate an output contact if these limits are exceeded.

Screen: PTZ

+p 1.008 bara +t 27.30 °C >C 0.903516 +K 1.00068 >SC 0.99932	Press Enter to go to screen **2.1.0.0** Press Enter to go to screen 2.2.0.0 Conversion factor Press Enter to go to screen **2.3.0.0** Supercompressibility
+AGA 8 Components <PTZ OPER. TARIFF>	Press Enter to go to screen **2.4.0.0** "PTZ" book

Screen: 2.1.0.0 (pressure)

	+Measured values +Limits +Default values +Parameters +Modes of operation <PTZ OPER. TARIFF>	Press Enter to go to screen **2.1.1.0** Press Enter to go to screen **2.1.2.0** Press Enter to go to screen **2.1.3.0** Press Enter to go to screen **2.1.4.0** Press Enter to go to screen **2.1.5.0** "PTZ" book

Screen: 2.1.1.0 (pressure values displayed)

		>Up 2.515 V >p 1.00774 bara >pb 1.01325 bara >pC 0.00000 bara <PTZ OPER. TARIFF>	Pressure input voltage (V) Current pressure at measurement conditions Pressure at base conditions (bara) Calibration pressure "PTZ" book

Screen: 2.1.2.0 (pressure limits)

		pmin 0.77 bara pmax 2.00 bara <PTZ OPER. TARIFF>	Lower range and alarm limit for pressure Upper range and alarm limit for pressure "PTZ" book

Screen: 2.1.3.0 (pressure default)

		pdef 1.00000 bara <PTZ OPER. TARIFF>	Replacement value for the pressure at meas. cond. "PTZ" book

Screen: 2.1.4.0 (pressure parameters)

		poffs 0.00000	Correction value for the pressure at measurement conditions
		Upmin 0.50000 V	Voltage Umin (V)
		Upmax 4.50000 V	Voltage Umax (V)
		%Upmin 0.00000	Per cent Umin
		%Upmax 100.000	Per cent Umax
		<PTZ OPER. TARIFF>	"PTZ" book

Screen: 2.1.5.0 (pressure modes)

		punit	Unit for the press. at meas. cond. {bara|kg/cm2a|psia|MPaa}
		pmode	Mode for the pressure at measurement conditions {0-4.5V|4-20mA|Default|Calibrate}
		<PTZ OPER. TARIFF>	"PTZ" book

Note: The "4-20mA" mode is currently not yet available; in these cases, the default value will be used.
In "Calibrate" mode, the last measured value is frozen and used for further calculations. During this time, a calibration device can be connected and the value measured by this device will be shown in field pC (see screen 2.1.1.0). Now the adjustment parameters can be adjusted. Such adjustment is not permissible for custody transfer metering.

Screen: 2.2.0.0 (temperature)

	+Measured values	Press Enter to go to screen **2.2.1.0**
	+Limits	Press Enter to go to screen **2.2.2.0**
	+Default values	Press Enter to go to screen **2.2.3.0**
	+Parameters	Press Enter to go to screen **2.2.4.0**
	+Modes of operation	Press Enter to go to screen **2.2.5.0**
	<PTZ OPER. TARIFF>	"PTZ" book

Screen: 2.2.1.0 (temperature values displayed)

		>Rt 1102.148 Ohm	Resistance value for temperature (ohm)
		>t 26.272 °C	Current temperature at measurement conditions
		>T 299.457 K	Temperature (K)
		>tb 0.000 °C	Temperature at base conditions (°C)
		>Tb 273.150 K	Temperature at base conditions (K)
		>tC 0.000 °C	Calibration temperature (°C)
		<PTZ OPER. TARIFF>	"PTZ" book

Screen: 2.2.2.0 (temperature limits)

		tmin -20.00 °C tmax 60.00 °C <PTZ OPER. TARIFF>	Lower alarm limit for temperature Upper alarm limit for temperature "PTZ" book

Screen: 2.2.3.0 (temperature default)

		tdef 10.00 °C <PTZ OPER. TARIFF>	Replacement value for temperature "PTZ" book

Screen: 2.2.4.0 (temperature parameters)

		toffs 0.000 <PTZ OPER. TARIFF>	Temperature offset "PTZ" book

Screen: 2.2.5.0 (temperature modes)

		tunit tmode <PTZ OPER. TARIFF>	Selection of the unit for temperature {°C|°F|K} Selection of the temperature mode {PT1000|4-20mA|Default|Calibrate} "PTZ" book

Note: The "4-20mA" mode is currently not yet available; in these cases, the default value will be used.
In "Calibrate" mode, the last measured value is frozen and used for further calculations. During this time, a calibration device can be connected and the value measured by this device will be shown in field tC (see screen 2.2.1.0). Now the adjustment parameters can be adjusted. Such adjustment is not permissible for custody transfer metering.

Screen: 2.3.0.0 (compressibility factor)

	+Measured values +Default values +Parameters +Modes of operation <PTZ OPER. TARIFF>	Press Enter to go to screen **2.3.1.0** Press Enter to go to screen **2.3.2.0** Press Enter to go to screen **2.3.3.0** Press Enter to go to screen **2.3.4.0** "PTZ" book

Screen: 2.3.1.0 (values displayed for the compressibility factor)

		>Zm 0.99833 >Zb 0.99771 >dm calc 0.726 kg/m3 >db calc 0.8000 kg/m3 >rd calc 0.6187 <PTZ OPER. TARIFF>	Compressibility factor (measurement conditions) Compressibility factor (base conditions) Calculated density from GERG (kg/m3) Calculated standard density for GERG Calculated relative density for GERG "PTZ" book

Screen: 2.3.2.0 (K coefficient default)

		Kdef 1.00000 <PTZ OPER. TARIFF>	K coefficient default "PTZ" book

Screen: 2.3.3.0 (fixed values for the gas quality)

		Hs 10.101 kWh/m3 sd 0.8000 kg/m3 rd 0.6187 H2 0.000 % N2 10.000 %	Tabular value for the superior calorific value Tabular value for the standard density (kg/m3) Tabular value for the relative density Tabular value for hydrogen (%) Tabular value for nitrogen (%)
		CO2 1.000 % <PTZ OPER. TARIFF>	Tabular value for carbon dioxide (%) "PTZ" book

Screen: 2.3.4.0 (base conditions)

		>pb 1.013250 bara >tb 0.000000 °C t1(ISO) 0°C t2(ISO) 25°C Kmode GERG-88-S	Pressure at base conditions (bara) Temperature at base conditions (°C) Sel. of country-spec. temp. at base cond. (°C) - GERG-88S {0°C|15°C|15.56°C|20°C|25°C} Country-specific temperature (°C) {0°C|15°C|20°C|25°C} K coefficient calculation methods {K=const.|GERG-88-S|GERG-88-S+|AGA8-Gross1| AGA8-Gross1+|AGA-NX-19|NX-19 corr.|AGA8_92DC}
		sd-rd With sd Hs unit kWh/m3 R.Cel.Offset 492 <PTZ OPER. TARIFF>	Selection of sd/rd for GERG {With sd|With rd} Unit for the superior calorific value {kWh/m3|MWh/m3| BTU/ft3|MJ/m3|kcal/m3|Mcal/m3} Selection of Rankine-Celsius offset {492|491,67} "PTZ" book

Screen: 2.4.0.0 (components for K coefficient calculation using AGA 8-92DC)

		Oper.Mode: DSfG_Modbus	Source of gas components {Off|DSfG_Modbus|Set value}
		+CO2: 0.5000 Mol%	Value for calculation, press Enter to go to screen 2.4.1.0
		+H2: 0.0000 Mol%	Value for calculation, press Enter to go to screen 2.4.2.0
		+N2: 6.0000 Mol%	Value for calculation, press Enter to go to screen 2.4.3.0
		+Methane: 84.5000 Mol%	Value for calculation, press Enter to go to screen 2.4.4.0
		+Ethane: 0.0000 Mol%	Value for calculation, press Enter to go to screen 2.4.5.0
		+Propane: 0.0000 Mol%	Value for calculation, press Enter to go to screen 2.4.6.0
		+N-butane: 0.0000 Mol%	Value for calculation, press Enter to go to screen 2.4.7.0
		+I-butane: 0.0000 Mol%	Value for calculation, press Enter to go to screen 2.4.8.0
		+N-pentane: 0.0000 Mol%	Value for calculation, press Enter to go to screen 2.4.9.0
		+I-pentane: 0.0000 Mol%	Value for calculation, press Enter to go to screen 2.4.10.0
		+NeoPentan: 0.0000 Mol%	Value for calculation, press Enter to go to screen 2.4.11.0
		+Hexan/C6+: 0.0000 Mol%	Value for calculation, press Enter to go to screen 2.4.12.0
		+Heptane/0: 0.0000 Mol%	Value for calculation, press Enter to go to screen 2.4.13.0
		+Octane/0: 0.0000 Mol%	Value for calculation, press Enter to go to screen 2.4.14.0
		+Nonane/0: 0.0000 Mol%	Value for calculation, press Enter to go to screen 2.4.15.0
		+Decane/0: 0.0000 Mol%	Value for calculation, press Enter to go to screen 2.4.16.0
		+H2S: 0.0000 Mol%	Value for calculation, press Enter to go to screen 2.4.17.0
		+Water: 0.0000 Mol%	Value for calculation, press Enter to go to screen 2.4.18.0
		+Helium: 0.0000 Mol%	Value for calculation, press Enter to go to screen 2.4.19.0
		+O2: 0.0000 Mol%	Value for calculation, press Enter to go to screen 2.4.20.0
		+CO: 0.0000 Mol%	Value for calculation, press Enter to go to screen 2.4.21.0
		+Ethene: 0.0000 Mol%	Value for calculation, press Enter to go to screen 2.4.22.0
		+Propene: 0.0000 Mol%	Value for calculation, press Enter to go to screen 2.4.23.0
		+Argon: 0.0000 Mol%	Value for calculation, press Enter to go to screen 2.4.24.0
		<PTZ OPER. TARIFF>	"PTZ" book

Important note

The following conditions must be fulfilled to use the input values for the components with the K coefficient calculation method AGA 8-92DC:

- K coefficient calculation method *Kmode = AGA8_92DC* is selected.
- Components mode *Oper.Mode = Set value* is selected.
- The sum of the components must be equal to 100% (± 0.01).

Screen: 2.4.1.0 (CO_2 source)

		Default: 0.5000 Mol%	CO_2 default value
		CO2: 0.0000 Mol%	CO_2 bus value
		<PTZ OPER. TARIFF>	"PTZ" book

The screens 2.4.2.0 (H_2 source) to 2.4.24.0 (argon source) have the same structure as the screen 2.4.1.0 and are therefore not listet in particular.

Screen: OPER.

> No messages Time 11:10:05 +Date 27.08.13 CodeC1 ******** CodeC2 ******** CodeC3 ******** CodeM ******** CodeU1 ******** CodeU2 ******** CodeI1 ******** CodeI2 ******** >Enter display test +Setup battery +Setup time adjust +Setup cust display +Setup symbols +Setup language +Setup power supply <OPER. TARIFF FLOW>	Fault message(s) Display and setting of time and date Press Enter to go to screen **3.2.0.0** Calibration code 1 (for changing parameters under legal control) Calibration code 2 (for changing parameters under legal control) Calibration code 3 (for changing parameters under legal control) Meter code 1 (for changing totalizer readings) User code 1 (for changing operating parameters) User code 2 (for changing operating parameters) Reading code 1 (for reading all parameters via external access) Reading code 2 (for reading all parameters via external access) Start display test Press Enter to go to screen **3.3.0.0** Press Enter to go to screen **3.4.0.0** Press Enter to go to screen **3.5.0.0** Press Enter to go to screen **3.6.0.0** Press Enter to go to screen **3.7.0.0** Press Enter to go to screen **3.8.0.0** "OPER." book

Screen: 3.2.0.0 (date and time)

	+Time values +Time parameters < OPER. TARIFF FLOW >	Press Enter to go to screen **3.2.1.0** Press Enter to go to screen **3.2.2.0** "OPER." book

Screen: 3.2.1.0 (time values)

		Op. hours 2 h LC00:00:00 01.11.07 >Batt change 7 Mon BC00:00:00 01.11.07 >Us13:49:58 30.09.13	Counter for operating hours (h) Time of the last calibration Next battery change (month) Time of the last battery change Unix time in seconds (s)
		>Uc13:49:58 30.09.13	Date and time from Unix seconds Day of the week

		>Day 0 >UT12:24:00 30.09.13 >CE13:24:00 30.09.13 >CE13:24:00 30.09.13 < OPER. TARIFF FLOW >	UTC time Central European Time Central European Summer Time "OPER." book

Screen: 3.2.2.0 (time parameters)

		Cc03:00:00 27.10.13 Nc02:00:00 30.03.14 Zone 0 TZ00:00:00 01.11.07 RTCcor 2.000000	Switching over to summer time Switching over to standard time Displaying standard time (0) or summer time (1) Time of the last time change (standard/summer time) Correction factor, clock
		Tswitch D.s.t off Sec Off Code lock 15 min <OPER. TARIFF FLOW >	Selection for time change {D.s.t off|D.s.t on} Selection for time change {Off|On input 1|On input 2|On input 3|On input 4} Release time of the access codes (min) "OPER." book

Screen: 3.3.0.0 (battery)

	>Batt time 2 h Batt reset Off Event Reset Off < OPER. TARIFF FLOW >	Displaying the hours in emergency power mode Battery life reset {On|Off} External event reset {On|Off} "OPER." book

Screen: 3.4.0.0 (time synchronization)

	A-Tset 0 >D-Tack 0 TS10:51:23 04.10.13 SBase Loc. time UTC loc 60 min	Announcement flag of time synchronization Status flag for performing time synchronization Specified value for date/time of time synchronization Time base of synchronization time {Loc. time|UTC} Difference between local time and UTC (minutes)
	Zone 0 <OPER. TARIFF FLOW >	Setting of the time zone (0: MEZ, 1: MESZ = daylight saving time) "OPER." book

Screen: 3.5.0.0 (customized display)

	C disp3 1022 C disp4 4910 C disp5 4912 C disp6 1412 C disp7 1410	Modbus address to show customized line 3 Modbus address to show customized line 4 Modbus address to show customized line 5 Modbus address to show customized line 6 Modbus address to show customized line 7
	C disp8 1420 C disp9 1418 <OPER. TARIFF FLOW >	Modbus address to show customized line 8 Modbus address to show customized line 9 "OPER." book

In the input field concerned, the number of the appropriate Modbus register has to be entered for the desired value.

Register No. 1410 = Totalizer for the volume at base conditions
Register No. 1412 = Totalizer for the volume at measurement conditions
Register No. 1414 = VO totalizer
Register No. 1416 = Totalizer for the volume at measurement conditions (customer)
Register No. 1418 = Totalizer for the volume at base conditions - disturbance quantity
Register No. 1420 = Totalizer for the volume at measurement conditions - disturbance quantity
Register No. 1020 = Pressure
Register No. 1022 = Temperature
Register No. 4910 = Conversion factor
Register No. 4912 = K coefficient
Register No. 4918 = Supercompressibility
Register No. 1010 = Flow rate at measurement conditions
Register No. 1012 = Flow rate at base conditions
Register No. 7528 = Time

Screen: 3.6.0.0 (symbols)

	Symbols <OPER. TARIFF FLOW >	Sel. of symbols for quantities measured & totalizers {New|Old} "OPER." book

Screen: 3.7.0.0 (language)

	Language <OPER. TARIFF FLOW >	Selection of language {German|English} "OPER." book

Screen: 3.8.0.0 (power supply)

	➘ Setup power supply <OPER. TARIFF FLOW >	Sel. of standby power supply {Battery|24V|110/230V|8.2V} "OPER." book

NOTE! After the power supply has been changed, the device will be rebooted automatically, since this requires a new system initialization. The parameters of the device will remain unaffected thereby and will be retained.

If the test for PTZ measurements is set at 10 or 15 seconds, one counter each will be incremented for every pressure or temperature measurement, and for every calculation of the K coefficient. The whole test will run over a maximum of 3 minutes and start as soon as the display is off. During this time, a total of 18 or 12 measurements and calculations have to be taken or made.
When a key is pressed, the display will be switched on and the test will be aborted. It will start anew as soon as the display is off again. For the number of measurements taken, see under "Checksum" (screen 6.5.0.0) in the "TYPE" book. After the 3-minute period has elapsed, the display will switch on automatically and the test will be terminated.
This will make it possible to check and prove in the case of the battery-powered devices EC 911 and EC 921 whether the measuring cycle can be modified in "sleep mode".

Screen: TARIFF

+ Archives +Logbooks +Archive parameters +Archive modes +Logbook modes	Press Enter to go to screen **4.1.0.0** Press Enter to go to screen **4.2.0.0** Press Enter to go to screen **4.3.0.0** Press Enter to go to screen **4.4.0.0** Press Enter to go to screen **4.5.0.0**
+Maximum load test < TARIFF FLOW TYPE >	Press Enter to go to screen **4.6.0.0** "TARIFF" book

Screen: 4.1.0.0 (archives)

	+ Periodic archive +Daily archive +Monthly archive +Disturbance archive +Event archive	Press Enter to go to screen **4.1.1.0** Press Enter to go to screen **4.1.2.0** Press Enter to go to screen **4.1.3.0** Press Enter to go to screen **4.1.4.0** Press Enter to go to screen **4.1.5.0**
	+Load archive < TARIFF FLOW TYPE >	Press Enter to go to screen **4.1.6.0** "TARIFF" book

Screen: 4.1.1.0 (periodic archive)

		+Periodic archive Read rec. 0 Level 617 >Run.No 617 >TS10:00:00 27.08.13	Press Enter to go to screen **4.1.1.1** Input of the read record No. xxxx (Modbus Omni) Display of the level (max. 4442 entries). Reset only by deleting the archive. Last running number Last time stamp
		>Cur level 617 >Opt read 0 >COM1 read 617 ST09:00:00 01.11.07 AG1 AG1 < TARIFF FLOW TYPE >	Current write index Read index, opt. interface Read index, COM1 interface Time as a search criterion for archives Name of archive group 1 "TARIFF" book

Note:
The filling level of the archive starts after resetting the archives with 1 and counts the entries in the archive until it reaches the maximum filling level of each archive. In case of an overflow of an archive, the filling level remains at the maximum filling level. Simultaneously with the filling level a second counter runs in the field "Current". Up to the maximum filling level, both counters are equal. If the maximum filling level is exceeded, the counter

"Current" starts again with 1 and then counts up to the next maximum. The running number ("Run. No"), however, is continuously incremented even after reaching the maximum. Additional to the running number also the time stamp of the last running number is indicated ("TS"). "Opt read" indicates how many entries have been read via the optical interface of the corrector. "Com1 read" indicates how many entries have been read via the COM1 port of the EC 911 or EC 912 with ISS 900. If it is an EC 912 with external CU or an EC 922, then here is displayed, how many entries have been read via the internal connection between ECxx and CU.

Screen: 4.1.1.1 (periodic archive - entries)

		Periodic archive Index/CRC: 699/4809 Time stamp: 14:00:00 06.11.13 Running No.: 699 Last index no.: 699	Headline: Periodic archive Memory positions of the entry / checksum of the entry Time stamp of the entry Time and date Running number of the displayed entry Memory position of the last entry
		Periodic archive 14:00:00 06.11.13 VO 00009870 m3 Vb 00123400 m3 Vm 00005566 m3 VbD 00000000 m3 VmD 00000000 m3	Headline: Periodic archive Time stamp: Time and date Totalizer reading original totalizer Totalizer reading volume at base conditions Totalizer reading volume at measurement conditions Totalizer reading disturbance quantity volume at base cond. Totalizer reading disturbance quantity volume at meas. cond.
		Periodic archive 14:00:00 06.11.13 p 0.999 bara t 24.04 °C K 1.00066 C 0.905765 VO status: 0	Headline: Periodic archive Time stamp: Time and date Mean value of pressure Mean value of temperature Mean value of compressibility factor Mean value of conversion factor Totalizer status: (0: running, 1: stopped)
		Periodic archive 14:00:00 06.11.13 Vb status: 0 Vm status: 0 VbD status: 1 VmD status: 1 p status: 0	Headline: Periodic archive Time stamp: Time and date Totalizer status: (0: running, 1: stopped) Totalizer status: (0: running, 1: stopped) Totalizer status: (0: running, 1: stopped) Totalizer status: (0: running, 1: stopped) Measured value status (0: ok, 2: default value, 3: fixed value, 4: holding value)
		Periodic archive	Headline: Periodic archive Time stamp: Time and date

		14:00:00 06.11.13 t status: 0 K status: 0 C status: 0 Condition: 00000000000000	Meas. val. status (0: ok, 2: def. value, 3: fixed value, 4: holding value) Meas. val. status (0: ok, 2: def. value, 3: fixed value, 4: holding value) Meas. val. status (0: ok, 2: def. value, 3: fixed value, 4: holding value) Status overview volume corrector *Description of bit string see below*

Status bit string:

Bit0: Alarm collective message
Bit1: Error measured value volume at measurement conditions
Bit2: Error measured value pressure or density at measurement conditions
Bit3: Error measured value temperature or density at base conditions
Bit4: Minimum warning limit value Vb, P, T, rb or rn
Bit5: Min. measuring range limit value Vb, P, T, rb or rn
Bit6: Maximum warning limit value Vb, P, T, rb or rn
Bit7: Max. measuring range limit value Vb, P, T, rb or rn
Bit8: 0=Direction1, 1=Direction2
Bit9: Revision note
Bit10: Parameter changed
Bit11: Error measured value superior calorific value
Bit12: Error measured value carbon dioxide

Screen: 4.1.2.0 (daily archive)

		+Daily archive Read rec. 0 Level 225 >Run.No 225 >TS07:00:00 27.08.13	Press Enter to go to screen **4.1.2.1** Input of the read record No. xxxx (Modbus Omni) Display of the level (max. 731 entries). Reset only by deleting the archive. Last running number Last time stamp
		>Cur level 225 >Opt read 0 >COM1 read 225 ST00:00:00 01.11.07 AG2 AG2 < TARIFF FLOW TYPE >	Current write index Read index, opt. interface Read index, COM1 interface Time as a search criterion for archives Name of archive group 2 "TARIFF" book

Screen: 4.1.2.1 (daily archive - entries)

		Daily archive Index/CRC: 269/2FED Time stamp: 06:00:00 06.11.13 Running No.: 268 Last index no.: 269	Headline: Daily archive Memory position of the entry / checksum of the entry Time stamp of the entry Time and date Running number of the displayed entry Memory position of the last entry
		Daily archive 06:00:00 06.11.13 VO 00009870 m3 VO status: 0	Headline: Daily archive Time stamp: Time and date Totalizer reading original totalizer Totalizer status: (0: running, 1: stopped) Totalizer reading volume at base conditions

		Vb 00123400 m3 Vb status: 0 Vm 00005566 m3	Totalizer status: (0: running, 1: stopped) Totalizer reading volume at measurement conditions
		Daily archive 06:00:00 06.11.13 Vm status: 0 VbD 00000000 m3 VbD status: 1 VmD 00000000 m3 VmD status: 1	Headline: Daily archive Time stamp: Time and date Totalizer status: (0: running, 1: stopped) Totalizer reading disturbance quantity volume at base cond. Totalizer status: (0: running, 1: stopped) Totalizer reading disturbance quantity volume at meas. cond. Totalizer status: (0: running, 1: stopped)
		Daily archive 06:00:00 06.11.13 p 0.999 bara p status: 0 t 24.04 °C t status: 0 K 1.00066	Headline: Daily archive Time stamp: Time and date Mean value of pressure Meas. val. status (0: ok, 2: def. value, 3: fixed value, 4: holding value) Mean value of temperature Meas. val. status (0: ok, 2: def. value, 3: fixed value, 4: holding value) Mean value of compressibility factor
		Daily archive 06:00:00 06.11.13 K status: 0 C 0.905765 C status: 0 Condition: 10000000000000	Headline: Daily archive Time stamp: Time and date Meas. val. status (0: ok, 2: def. value, 3: fixed value, 4: holding value) Mean value of conversion factor Meas. val. status (0: ok, 2: def. value, 3: fixed value, 4: holding value) Status overview volume corrector *Description of the bit string see periodic archive*
		Daily archive permax 06:00:00 06.11.13 Vb quantit 000123.45 11:00:00 05.11.13 Vm quantit 000067.89 11:00:00 05.11.13	Headline: Daily archive, maximum period of the day Time stamp: Time and date Quantity volume at base conditions in period with maximum Time and date of the maximum period Quantity volume at measurement cond. in period with maximum Time and date of the maximum period
		Daily archive permax Maximum: 00:00 01.01. Per. end in 049 min. Vb maximum 000123.45 Vm maximum 000067.89 Vb current 000052.34	Headline: Daily archive, maximum period of the day Time stamp of the maximum period of the current day End of the current period Quantity Vb of the maximum period of the current day Quantity Vm of the maximum period of the current day Quantity Vb of the current period Quantity Vm of the current period

		Vm current 000023.45	

Screen: 4.1.3.0 (monthly archive)

		+Monthly archive Read rec. 0 Level 24 >Run.No 51 >TS07:00:00 27.08.13	Press Enter to go to screen **4.1.3.1** Input of the read record No. xxxx (Modbus Omni) Display of the level (max. 24 entries). Reset only by deleting the archive. Last running number Last time stamp
		>Cur level 5 >Opt read 0 >COM1 read 5 ST00:00:00 01.11.07 AG3 AG3 < TARIFF FLOW TYPE >	Current write index Read index, opt. interface Read index, COM1 interface Time as a search criterion for archives Name of archive group 3 "TARIFF" book

Screen: 4.1.3.1 (monthly archive - entries)

		Monthly archive Index/CRC: 2/CBAB Time stamp: 06:00:00 01.11.13 Running No.: 14 Last index no.: 2	Headline: Monthly archive Memory position of the entry / checksum of the entry Time stamp of the entry Time and date Running number of the displayed entry Memory position of the last entry
		Monthly archive 06:00:00 01.11.13 VO 00009870 m3 VO status: 0 Vb 00123400 m3 Vb status: 0 Vm 00005566 m3	Headline: Monthly archive Time stamp: Time and date Totalizer reading original totalizer Totalizer status: (0: running, 1: stopped) Totalizer reading volume at base conditions Totalizer status: (0: running, 1: stopped) Totalizer reading volume at measurement conditions
		Monthly archive 06:00:00 01.11.13 Vm status: 0 VbD 00000000 m3 VbD status: 1 VmD 00000000 m3 VmD status: 1	Headline: Monthly archive Time stamp: Time and date Totalizer status: (0: running, 1: stopped) Totalizer reading disturbance quantity volume at base cond. Totalizer status: (0: running, 1: stopped) Totalizer reading disturbance quantity volume at meas. cond. Totalizer status: (0: running, 1: stopped)
		Monthly archive 06:00:00 01.11.13	Headline: Monthly archive Time stamp: Time and date Mean value of pressure

		p 0.999 bara p status: 0 t 24.04 °C t status: 0 K 1.00066	Meas. val. status (0: ok, 2: def. value, 3: fixed value, 4: holding value) Mean value of temperature Meas. val. status (0: ok, 2: def. value, 3: fixed value, 4: holding value) Mean value of compressibility factor
		Monthly archive 06:00:00 01.11.13 K status: 0 C 0.905765 C status: 0 Condition: 10000000000000	Headline: Monthly archive Time stamp: Time and date Meas. val. status (0: ok, 2: def. value, 3: fixed value, 4: holding value) Mean value of conversion factor Meas. val. status (0: ok, 2: def. value, 3: fixed value, 4: holding value) Status overview volume corrector *Description of the bit string see periodic archive*
		Monthly arch. permax 06:00:00 01.11.13 Vb quantit 000123.45 11:00:00 05.10.13 Vm quantit 000067.89 11:00:00 05.10.13	Headline: Monthly archive, maximum period of the month Time stamp: Time and date Quantity volume at base conditions in period with maximum Time and date of the maximum period Quantity volume at measurement cond. in period with maximum Time and date of the maximum period
		Monthly arch. permax Maximum: 00:00 01.01. Per. end in 049 min. Vb maximum000123.45 Vm maximum 000067.89 Vb current 000052.34 Vm current 000023.45	Headline: Monthly archive, maximum period of the month Time stamp of the maximum period of the current month End of the current period Quantity Vb of the maximum period of the current month Quantity Vm of the maximum period of the current month Quantity Vb of the current period Quantity Vm of the current period
		Monthly arch. daymax 06:00:00 01.11.13 Vb quantit 001230.45 11:00:00 05.10.13 Vm quantit 000670.89 11:00:00 05.10.13	Headline: Monthly archive, maximum day of the month Time stamp: Time and date Quantity volume at base conditions on the day with maximum Time and date of the maximum day Quantity volume at measurement cond. on the day with maximum Time and date of the maximum day
		Monthly arch. daymax Maximum: 00:00 01.01. Day end in 0949 min. Vb maximum000123.45	Headline: Monthly archive, maximum day of the month Time stamp of the maximum day of the current month End of the current day Quantity Vb of the maximum day of the current month Quantity Vm of the maximum day of the current month

		Vm maximum 000067.89 Vb current 000052.34 Vm current 000023.45	Quantity Vb of the current day Quantity Vm of the current day

Screen: 4.1.4.0 (disturbance archive)

		+Disturbance archive Read rec. 0 Level 158 >Run.No 158 >TS12:00:15 01.07.13	Press Enter to go to screen **4.1.4.1** Input of the read record No. xxxx (Modbus Omni) Display of the level (max. 600 entries). Reset only by deleting the archive. Last running number Last time stamp
		>Cur level 158 >Opt read 0 >COM1 read 158 ST00:00:00 01.11.07 AG4 AG4 < TARIFF FLOW TYPE >	Current write index Read index, opt. interface Read index, COM1 interface Time as a search criterion for archives Name of archive group 4 "TARIFF" book

Screen: 4.1.4.1 (disturbance archive - entries)

		Disturbance archive Index/CRC: 235/E0F2 Time stamp: 07:00:00 06.11.13 Running No.: 234 Last index no.: 235	Headline: Disturbance archive Memory position of the entry / checksum of the entry Time stamp of the entry Time and date Running number of the displayed entry Memory position of the last entry
		Disturbance archive 07:00:00 06.11.13 VbD 00000000 m3 VbD status: 1 VmD 00000000 m3 VmD status: 1	Headline: Disturbance archive Time stamp: Time and date Totalizer reading disturbance quantity volume at base cond. Totalizer status: (0: running, 1: stopped) Totalizer reading disturbance quantity volume at meas. cond. Totalizer status: (0: running, 1: stopped)

Screen: 4.1.5.0 (event archive)

		+Event archive Read rec. 0 Level 141 >Run.No 141 >TS07:36:55 27.08.13	Press Enter to go to screen **4.1.5.1** Input of the read record No. xxxx (Modbus Omni) Display of the level (max. 600 entries). Reset only by deleting the archive. Last running number Last time stamp
		>Cur level 141 >Opt read 0 >COM1 read 141	Current write index Read index, opt. interface Read index, COM1 interface

		ST00:00:00 01.11.07 AG5 AG5 < TARIFF FLOW TYPE >	Time as a search criterion for archives Name of archive group 5 "TARIFF" book

Screen: 4.1.5.1 (event archive - entries)

		Event archive Index/CRC: 478/5981 Time stamp: 07:57:13 07.11.13 Running No.: All faults reset Last index no.: 478	Headline: Event archive Memory position of the entry / checksum of the entry Time stamp of the entry Time and date Running number of the displayed entry Name of the event Memory position of the last entry
		Event archive 07:57:13 07.11.13 Vb 00123400 m3 Vm 00005566 m3 VO 00009870 m3 VbD 00000000 m3 VmD 00000000 m3	Headline: Event archive Time stamp: Time and date Totalizer reading volume at base conditions Totalizer reading volume at measurement conditions Totalizer reading original totalizer Totalizer reading disturbance quantity volume at base cond. Totalizer reading disturbance quantity volume at meas. cond.
		Event archive 07:57:13 07.11.13 p 0.999 bara t 24.04 °C K 1.00066 C 0.905765	Headline: Event archive Time stamp: Time and date Mean value of pressure Mean value of temperature Mean value of compressibility factor Mean value of conversion factor
		Event archive 07:57:13 07.11.13 Qb 0.000 m3/h Qm 0.000 m3/h	Headline: Event archive Time stamp: Time and date Mean value of volume flow rate at base conditions Mean value of volume flow rate at measurement conditions

Screen: 4.1.6.0 (load archive)

		+Load archive Read rec. 0 Level 600 >Run.No 1221 >TS12:48:00 27.08.13	Press Enter to go to screen **4.1.6.1** Input of the read record No. xxxx (Modbus Omni) Display of the level (max. 600 entries). Reset only by deleting the archive. Last running number Last time stamp
		>Cur level 42 >Opt read 0 >COM1 read 42 ST00:00:00 01.11.07 AG6 AG6	Current write index Read index, opt. interface Read index, COM1 interface Time as a search criterion for archives Name of archive group 6 "TARIFF" book

		< TARIFF FLOW TYPE >	

Screen: 4.1.6.1 (load archive - entries)

		Load archive Index/CRC: 549/CF0B Time stamp: 13:00:00 07.11.13 Running No.: 2346 Last index no.: 551	Headline: Load archive Memory position of the entry / checksum of the entry Time stamp of the entry Time and date Running number of the displayed entry Memory position of the last entry
		Load archive 13:00:00 07.11.13 VO 00009870 m3 VO status: 0 Vb 00123400 m3 Vb status: 0 Vm 00005566 m3	Headline: Load archive Time stamp: Time and date Totalizer reading original totalizer Totalizer status: (0: running, 1: stopped) Totalizer reading volume at base conditions Totalizer status: (0: running, 1: stopped) Totalizer reading volume at measurement conditions
		Load archive 13:00:00 07.11.13 Vm status: 0 VbD 00000000 m3 VmD status: 1 VmD 00000000 m3 VbD status: 1	Headline: Load archive Time stamp: Time and date Totalizer status: (0: running, 1: stopped) Totalizer reading disturbance quantity volume at base cond. Totalizer status: (0: running, 1: stopped) Totalizer reading disturbance quantity volume at meas. cond. Totalizer status: (0: running, 1: stopped)
		Load archive 13:00:00 07.11.13 p 0.999 bara p status: 0 t 24.04 °C t status: 0 K 1.00066	Headline: Load archive Time stamp: Time and date Mean value of pressure Meas. val. status (0: ok, 2: def. value, 3: fixed value, 4: holding value) Mean value of temperature Meas. val. status (0: ok, 2: def. value, 3: fixed value, 4: holding value) Mean value of compressibility factor
		Load archive 13:00:00 07.11.13 K status: 0 C 0.905765 C status: 0 Condition: 00000000000000	Headline: Load archive Time stamp: Time and date Meas. val. status (0: ok, 2: def. value, 3: fixed value, 4: holding value) Mean value of conversion factor Meas. val. status (0: ok, 2: def. value, 3: fixed value, 4: holding value) Status overview volume corrector *Description of the bit string see periodic archive*

Screen: 4.2.0.0 (logbooks)

	+Legal metr. logbook +Parameter logbook +Event logbuch < TARIFF FLOW TYPE >	Press Enter to go to screen **4.2.1.0** Press Enter to go to screen **4.2.2.0** Press Enter to go to screen **4.2.3.0** "TARIFF" book

Screen: 4.2.1.0 (legal metrological logbook)

		+Legal metr. logbook Read rec. 0 Level 47 >Run.No 47 >TS07:34:46 27.08.13	Press Enter to go to screen **4.2.1.1** Input of the read record No. xxxx (Modbus Omni) Display of the level (max. 600 entries). Reset only by deleting the archive. Last running number Last time stamp
		>Cur level 47 >Opt read 0 >COM1 read 47 ST00:00:00 01.11.07 AG7 AG7 < TARIFF FLOW TYPE >	Current write index Read index, opt. interface Read index, COM1 interface Time as a search criterion for archives Name of archive group 7 "TARIFF" book

Screen: 4.2.1.1 (legal metrological logbook - entries)

		Legal metr. logbook Index/CRC: 444/4C14 Time stamp: 07:57:13 07.11.13 Running No.: 444 Last index no.: 445	Headline: Legal metrological logbook Memory position of the entry / checksum of the entry Time stamp of the entry Time and date Running number of the displayed entry Memory position of the last entry
		Legal metr. logbook 07:57:13 07.11.13 Index: 444/ 445 PNo: 310 Changing RS… Info: PI	Headline: Legal metrological logbook Time stamp: Time and date Memory position of the entry / position of the last entry Modbus address of the changed parameter Channel of the parameter change (keyboard, RS… or opt.) Changed parameter: *Parameter name*
		Old: NO MODEM New: SIEMENS|TC63|RE	Value before parameter change: *Old value* Value after parameter change: *New value*

Screen: 4.2.2.0 (parameter logbook)

		+Logbook parameters Read rec. 0 Level 248 >Run.No 248 >TS07:34:46 27.08.13	Press Enter to go to screen **4.2.2.1** Input of the read record No. xxxx (Modbus Omni) Display of the level (max. 600 entries). Reset only by deleting the archive. Last running number Last time stamp
		>Cur level 248 >Opt read 0 >COM1 read 248 ST00:00:00 01.11.07 AG8 AG8 < TARIFF FLOW TYPE >	Current write index Read index, opt. interface Read index, COM1 interface Time as a search criterion for archives Name of archive group 8 "TARIFF" book

Screen: 4.2.2.1 (parameter logbook - entries)

		Logbook parameters Index/CRC: 156/B73E Time stamp: 07:58:34 08.11.13 Running No.: 155 Last index no.: 156	Headline: Parameter logbook Memory position of the entry / checksum of the entry Time stamp of the entry Time and date Running number of the displayed entry Memory position of the last entry
		Logbook parameters 07:58:34 08.11.13 Index: 155/ 156 PNo: 2214 Changing RS…	Headline: Parameter logbook Time stamp: Time and date Memory position of the entry / position of the last entry Modbus address of the changed parameter Channel of the parameter change (keyboard, RS… or opt.)
		Old: 2.1 New: 2.0	Value before parameter change: *Old value* Value after parameter change: *New value*

Screen: 4.2.3.0 (event logbook)

		+Event logbook Read rec. 0 Level 600 >Run.No 671 >TS08:48:28 27.08.13	Press Enter to go to screen **4.2.3.1** Input of the read record No. xxxx (Modbus Omni) Display of the level (max. 600 entries). Reset only by deleting the archive. Last running number Last time stamp
		>Cur level 250 >Opt read 0 >COM1 read 250 ST00:00:00 01.11.07 AG9 AG9 < TARIFF FLOW TYPE >	Current write index Read index, opt. interface Read index, COM1 interface Time as a search criterion for archives Name of archive group 9 "TARIFF" book

Screen: 4.2.3.1 (event logbook - entries)

		Logbook events Index/CRC: 508/38A5 Time stamp: 07:58:34 08.11.13 Running No.: 8532 Laszt index no.: 508	Headline: Event logbook Memory position of the entry / checksum of the entry Time stamp of the entry Time and date Running number of the displayed entry Memory position of the last entry
		Logbook events 07:58:34 08.11.13 Index: 508/ 508 Fault No: - 409 10-3 Power failure	Headline: Event logbook Time stamp: Time and date Memory position of the entry / position of the last entry Fault number according to DSfG standard Internal fault number and fault name

Screen: 4.3.0.0 (archive parameters)

	T hour 6 Uhr T.00:00:00 01.11.07 Arc. cycle 60 min Load cycle 3 min Protocol RMG1	Time at the end of a tariff day (clock) Date of the end of a tariff year Default for the archive cycle (min) Default for the load cycle (min) Sel. for reading the tariff memory {RMG1|Omni}
	Break search to <TARIFF FLOW TYPE >	Termination mode for the search for archive entries via the Dialog 900 readout program {search to|no break} "TARIFF" book

Screen: 4.4.0.0 (archive modes)

	Archives On Profile DSfG Period Without event Arc res. Off Add evt. Off	Archive displays {Off|On|Test} Archive configuration for Modbus export {Standard|DSFG} Configuration of the periodic archive {Without event|With event} Reset of archives {Off|Period|Days|Months|Dis-turb|Event|Load|All arch.} Additional recording in the event archive {Off|OPWork| RSWork|SetClk|Last|Month|Day|Period|RTCInt}
	Arch max 0 <TARIFF FLOW TYPE >	Level limitation for all archives "TARIFF" book

Screen: 4.5.0.0 (logbook modes)

	Logbooks On Logb reset Off <TARIFF FLOW TYPE >	Selection of logbook modes {Off|On} Resetting logbooks {Off|Legal log|Param log|Event log|All logb} "TARIFF" book

Screen: 4.6.0.0 (maximum load test)

	Set-Tpulse 0 P >TT-Vb 00000052 m3 >TT-Vm 00000057 m3 >TTM-Vb 00000000 m3 >TTM-Vm00000000 m3	Default for tariff pulses for tariff-memory test (pulses) Tariff test, volume at base conditions Tariff test, volume at measurement conditions Tariff test, max. volume at base conditions Tariff test, max. volume at measurement conditions
	LOPD 633 LP09:54:01 02.10.13 LOPM 633 LP09:54:01 02.10.13 LOD 232 LD12:01:39 01.01.07 LOM 0 LM00:00:00 01.01.07 LOL 1303 LL09:54:01 02.10.13 <TARIFF FLOW TYPE >	Last running number of the period of the day Last time stamp of the period of the day Last running number of the period of the month Last time stamp of the period of the day Last running number of the day of the month Last time stamp of the period of the day Last running number of the month of the year Last time stamp of the month of the year Last running number of the load of the day Last time stamp of the load of the day "TARIFF" book

The maximum load value is used to check the maximum-load memory. The maximum-load test only affects the periodic archive. During the duration of the test, all maximum-value

memories are checked and recorded in the periodic archive. However, the contents of these memories are displayed in the daily or monthly archive. For the test, the maximum periodic value appears under >TTM Vb and >TTM Vm in screen 4.6.0.0.

The test is disabled 10 minutes on the hour until 2 minutes after the hour and may only be performed if the flow rate is zero.

In order to start the test, you have to set "Archives" mode at "Test" in screen 4.4.0.0. This will cause the totalizer readings and the first 10 entries of the periodic archive to be saved and the contents to be set at zero. The period duration will be changed to one minute. Now you can preset pulses via Set Tpulse (screen 4.6.0.0). The pulses will be fed in the measuring chain at 1-second intervals immediately after the downstream hardware input. The pulses fed in will be counted in fields TT Vb and TT Vm. The main totalizers will count the same pulses in this time. After one minute, an entry is made in the periodic archive and the pulses counted will be compared to the maximum-value entries. If the pulses counted exceed the previous maximum value, they are copied to the maximum value (>TTM Vb and >TTM Vm). The maximum load can be checked by means of other (more or less preset) pulses. A maximum of 10 entries can be generated in the periodic archive.

If you set "Archives" mode in screen 4.4.0.0 back at "On", the original totalizer readings and periodic archive entries saved will be copied back. Pulses received at the counting input in the meantime will be added to the real totalizer reading.

This test option of the maximum-load memory allows a check to be performed without changing the hardware or allows pulses to be fed in via external pulse transmitters if there is no gas flow.

Screen: FLOW

+Qm 0.000 m3/h +Qb 0.000 m3/h <FLOW TYPE COMM >	Press Enter to go to screen **5.1.0.0** Press Enter to go to screen **5.1.0.0** "FLOW" book

Screen: 5.1.0.0 (flow rate)

	+Measured values +Limits +Parameters +Modes of operation <FLOW TYPE COMM >	Press Enter to go to screen **5.1.1.0** Press Enter to go to screen **5.1.2.0** Press Enter to go to screen **5.1.3.0** Press Enter to go to screen **5.1.4.0** "FLOW" book

Screen: 5.1.1.0 (measured values for the flow rate)

		>fchanM 12.800 Hz >fchanR 12.700 Hz >Qb> 54.512 m3/h >TQ13:54:30 02.10.13 >Qm> 39.913 m3/h	Frequency input 1 (Hz) Frequency input 2 (Hz) Qb maximum value Time of the Qb (Qn) maximum value Qm maximum value
		>TQ21:15:32 01.01.13 >Inp chanM 45 >Inp chanR 46 >Inp Vo 0 <FLOW TYPE COMM >	Time of the Qm maximum value Pulses of the measuring channel Pulses of the reference channel VO pulses "FLOW" book

Screen: 5.1.2.0 (flow rate limits)

		Qmmin 50.0 m3/h Qmmax 1000.0 m3/h tQm<min 1000 min QmLL 12.5 m3/h <FLOW TYPE COMM >	Lower alarm limit for the flow rate Upper alarm limit for the flow rate Max. time of starting-up/slowing-down the meter (minutes) Creeping quantity limit "FLOW" book

Screen: 5.1.3.0 (flow rate parameters)

		DQm 1.0 DQb 1.0 <FLOW TYPE COMM >	Damping of the Qm flow rate displayed Damping of the Qb flow rate displayed "FLOW" book

Screen: 5.1.4.0 (flow rate modes)

		Q mode Qm unit Qb unit <FLOW TYPE COMM >	Selection of the flow rate {Off|flow m+ll|flow v+ll|flow m| flow v} Selection of the unit for the flow rate at measurement conditions {m3/h|ft3/h|yd3/h|gal/h} Selection of the unit for the flow rate at base conditions {m3/h|ft3/h|yd3/h|gal/h} "FLOW" book

Options for Q mode have the following meaning:

- flow m+ll: Flow rate metering via the sensor signal at the VM terminals. Monitoring of the creeping quantity limit is switched on.
- flow v+ll: Flow rate metering via the sensor signal at the VV terminals. Monitoring of the creeping quantity limit is switched on.
- flow m: Flow rate metering via the sensor signal at the VM terminals. Monitoring of the creeping quantity limit is switched off.
- flow v: Flow rate metering via the sensor signal at the VV terminals. Monitoring of the creeping quantity limit is switched off.

Note:

A two-channel volume metering is not possible in this configuration of the EC900.

In the EC 911 or a different version of the EC 900, in which the supply of the device is set to battery, the flow rate measurement is blocked.

The flow rate measurement of the EC 900 is not necessarily combined with the pulse counting of the volume sensor from the program version 11:25. Pulse counting and flow measurement can be implemented completely independently. However, there is the possibility of creeping quantity suppression and thus the influence on pulse counting and consequently on the totalizer calculation.

If the creeping quantity suppression is activated together with the flow rate measurement, alarms are generated when the upper or lower alarm limit for the flow rate is underrun or exceeded. Without the creeping quantity suppression an alarm is only generated if the maximum flow limit is exceeded.

When creeping quantity suppression is activated, an exclamation mark is attached to the short text "Qm" ("Qm!") in the flow rate display (Screen Flow, page 103) if the flow rate is below the lower limit "QmMin" (Screen 5.1.2.0). After expiration of the maximum

permissible duration of the flow below "QmMin" ("tQm<Min", Screen 5.1.2.0), an alarm is triggered (depending on the mode of the totalizers, the main totalizers stop and the disturbing quantity totalizers start).

If the flow rate drops below the creeping quantity limit, all totalizers stop. An arrow is shown in the flow rate display after the short text "Qm": "Qm<". The flow rate display is maintained to the extent permitted by the frequency measurement. The display of the standard volume flow rate is set to zero.

For the volume metering decoupled from the flow rate measurement, the following connection options of the volume sensor can be implemented:

Operating options

EC 911 and EC 921

These devices have the following options for volume metering or flow rate measurement:

	volume totalizer	extra flow measurement	additional check totalizer	output pulses
1	1 x Reed	no	1 x Encoder	from volume
2	1 x Encoder	no	no	from volume

EC 912 and EC 922

These devices have the following options for volume metering or flow rate measurement:

	volume totalizer	extra flow measurement	additional check totalizer	output pulses
1	1 x Reed	1 x Namur 1)	1 x Encoder	from volume and/ or flow rate
2	1 x Namur	1 x Namur 1)	no	from volume and/ or flow rate
3	1 x Encoder	1 x Namur 1)	no	from volume and/ or flow rate
3	1 x Namur 1)	no	1 x Encoder	from volume and/ or flow rate

1) Flow rate measurement with or without consideration of the creeping quantity limit. If the flow rate is used in this mode to generate the output pulses, these are dependent on the creeping quantity limit.
2) If the flow rate is used in this mode to generate the output pulses, these are dependent on the counting of the encoder.

For devices operated in "start-stop" mode the creeping quantity limit should be activated in case of a volume meter with Namur HF sensor.

In addition to the setting options mentioned above, it is possible to apply a signal "valve closed" to the digital input 6. Then in the EC 900 a warning message is generated, if the

flow rate measurement is activated with creeping quantity suppression as soon as the flow rate exceeds the creeping quantity limit and the signal "valve closed" is switched on.

Screen: TYPE

+Pressure transm. +Temperature transm. +Volume meter +Device data +Checksum	Press Enter to go to screen **6.1.0.0** Press Enter to go to screen **6.2.0.0** Press Enter to go to screen **6.3.0.0** Press Enter to go to screen **6.4.0.0** Press Enter to go to screen **6.5.0.0**
+Customer data +RMG data <TYPE COMM OUT-PUTS>	Press Enter to go to screen **6.6.0.0** Press Enter to go to screen **6.7.0.0** "TYPE" book

Screen: 6.1.0.0 (type of pressure transmitter)

	p type	Selection of the type of pressure transmitter {DA-092|DA-095|DA-0910|DA-0920|DA-0940|DA-0970}
	p SN	Serial number of the pressure transmitter
	p<	Minimum range value of the pressure transmitter
	p>	Maximum range value of the pressure transmitter
	<TYPE COMM OUT-PUTS>	"TYPE" book

Screen: 6.2.0.0 (type of temperature transmitter)

	t type	Sel. of the type of temperature transmitter {PT1000|PT100}
	t SN	Serial number of the temperature transmitter
	t<	Minimum range value of the temperature transmitter
	t>	Maximum range value of the temperature transmitter
	<TYPE COMM OUT-PUTS>	"TYPE" book

Screen: 6.3.0.0 (type of the volume meter)

	>fmax Reed 50 Hz	Maximum possible pulse frequency from the volume meter
	M type TRZ	Meter type {TRZ|US|DKZ|VOL|TERZ}
	>M SN TRZ 348512-01	Serial number of the meter
	>Size G-650	Meter size
	M Qmin 50.000 m3	Qmin of the meter
	M Qmax1000.000 m3	Qmax of the meter
	M1m3= 1.00000 imp	Meter factor of the measuring channel
	R1m3= 1.00000 imp	Meter factor of the reference channel
	Tot.chan.Channel M	Sel. of the counting channel {Channel M|Channel R|Chan. Vo}
	VO chan. Aus	Selection of the Vo (original totalizer) input {Off|Software|Channel M|Channel R|Encoder}
	VO cycle 30 sec	Query cycle of the encoder index {5 sec|10 sec|15 sec|30 sec}
	<TYPE COMM OUT-PUTS>	"TYPE" book

NOTE! With battery-powered devices, VO cycle has to be at "30 sec".

Screen: 6.4.0.0 (device data)

	YOC 2013	Year of construction of the EC 900
	>ID 00000000000001	Device identification
	>Ver-EC900-V11.30 DE	Software version
	SN 210000	Serial number of the EC 900
	Co10:45:53 20.02.2013	Commissioning date
	Type EC922	Device type {EC911|EC912|EC921|EC922}
	Gas1 Natural gas	Selection-1 gas type {Off|Natural gas|Hydrogen|Nitrogen| Oxygen|Air|Ammonia|Carbon diox.|Helium}
	Gas2 Off	Selection-2 gas type {Off|Neon|Argon|Ethane|Methane| Ethylene|Propane|n-butane|Krypton|Xenon}
	Calc CS Nein	Selection of the checksum calculation {Yes|No}
	>CS displd C2DA	Program code of checksum
	<TYPE COMM OUT-PUTS>	"TYPE" book

NOTE! After you have changed the device type, the device will be rebooted automatically, since this requires a new system initialization. The parameters of the device will remain unaffected thereby and will be retained.

Screen: 6.5.0.0 (checksum)

	>CS calib CB55 >CS user E596 >CS manuf 4796 <TYPE COMM OUT-PUTS>	Checksum of the parameters protected by the calibration code Checksum of the parameters protected by the user code Checksum of the parameters protected by code M "TYPE" book

Screen: 6.6.0.0 (customer data)

	Kunden-Nummer Kunden-Name Messstellen-Nummer Messstellenbezeichng Stations-Nummer	Customer number Customer name Measuring point number Name of measuring point Station number
	Stations-Name Anlagen-Nummer Eigent.-Nr. Umwerter Eigent.-Nr. Zähler Land User ZIP Section Messpunkt-Bezeichn. IdN <TYPE COMM OUT-PUTS >	Station name Installation number Owner's No. of corrector Owner's No. of meter Country Operator Postal code Section Measuring point Identification number "TYPE" book

Customer data comprise 9 texts without designations. You can enter up to 20 alphanumeric characters per field as text in each case. The preset texts are shown in grey in the table above. They will be replaced by the texts entered and will no longer be visible after the customer data have been inputted.
Country (2 characters), operator (6-digit number), zip code (5-digit number), section (1-digit number) and measuring point (19-character alphanumeric field) make up a 33-digit identifier that can be used for device identification. Also for this purpose, the identification number can be used, which consists of section, manufacturer, year and serial number.

Screen: 6.7.0.0 (RMG data)

	Order-No 3556 PiSIEMENS|TC63|RE Pi-s 900260109 R-MU 1101-06034b R-CU 1101-060514a	RMG order number under which the device is managed. Device type of the plugged-in expansion module Serial number of the expansion module Manufacturer number of the corrector board Manufacturer number of the CU board (internal or external)
	SW-CU 002 01.01 No of DA None No of puls 1 >MNo 00000368 <TYPE COMM OUTPUTS >	Software version of the CU Number of plugged-in analogue outputs of the CU 900 (external) Number of pulse outputs of the CU 900 (external) Manufacturer's number "TYPE" book

Screen: COMM

+Com opt	Press Enter to go to screen **7.1.0.0**
+Com int	Press Enter to go to screen **7.2.0.0**
+Com filter	Press Enter to go to screen **7.3.0.0**
+CU status	Press Enter to go to screen **7.4.0.0**
+Com test	Press Enter to go to screen **7.5.0.0**
<COMM OUTPUTS CU >	"COMM" book

Screen: 7.1.0.0 (optical interface)

	Op type Slave	Selection of the type of optical interface MU {Off|Slave}
	Op baud 9600	Selection of the baud rate of the opt. interface MU {1200|2400|4800|9600}
	Op bits 8	Selection of the data bits for the optical interface (fixed 8 bit)
	Op parity Even	Sel. of the parity of the opt. interface MU {None|Even|Odd}
	Op stop 1	Selection of stop bits for the opt. interface MU {1|2}
	Op prot Modb. RTU	Selection of the protocol for the opt. interface MU {Modb. ASCII|Modb. RTU|M900}
	Op fmt 4321	Selection of the Modbus format for the opt. interface MU {4321|2143|1234}
	Op test Off	Selection of the Modbus test for the opt. interface MU {Off|Test float|Test double|Test int|Test mode|Test long| Test string|Test archive}
	Op addr 1	Modbus address of the opt. interface MU
	Op offset 0	Modbus offset for the opt. interface MU
	Op Tout 5	Modbus timeout for the opt. interface MU
	Op btime 1	Modbus bit time for the opt. interface MU
	Op code No	Code required for access {No|Yes}
	Op-M900crc Yes	M900 protocol with CRC {No|Yes}
	Op except Yes	"Exception" message due to a wrong Modbus address {No|Yes}
	<COMM OUTPUTS CU >	"COMM" book

Screen: 7.2.0.0 (COM1 interface)

	MU type Modb. Intern	Selection of the type of COM1 interface MU {Off|Modb. intern|Slave|Test rep.}
	MU baud 19200	Sel. of the baud rate for COM1 interface MU {9600|19200|38400}
		Selection of data bits for COM1 interface MU {7|8}
	MU bits 8	Sel. of the parity for COM1 interface MU {None|Even|Odd}
	MU parity None	Selection of stop bits for COM1 interface MU {1|2}
	MU stop 1	
	MU prot Modb. RTU	Selection of the protocol for COM2 interface MU {Modb. ASCII|Modb. RTU|M900}
	MU fmt 4321	Selection of the Modbus format for COM1 interface MU {4321|2143|1234}
	MU test Off	Selection of the Modbus test for COM1 interface MU {Off|Test float|Test double|Test int|Test mode|Test long| Test string|Test archive}
	MU addr 1	Modbus address for COM1 interface MU
	MU offset 0	Modbus offset for COM1 interface MU
	MU Tout 5	Modbus timeout for COM1 interface MU
	MU btime 1	Modbus bit time for COM1 interface MU
	MU code Yes	Code required for access {No|Yes}
	MU M900crc Yes	M900 protocol with CRC {No|Yes}
	MU except Yes	"Exception" message due to a wrong Modbus address {No|Yes}
	<COMM OUTPUTS CU >	"COMM" book

IMPORTANT:
The factory settings of this interface must not be changed for the device types EC 912 and EC 922!

Screen: 7.3.0.0 (Com filters)

	F reg1 0	Transfer filter 1
	F reg2 0	Transfer filter 2
	F reg3 0	Transfer filter 3
	F reg4 0	Transfer filter 4
	F reg5 0	Transfer filter 5
	F reg6 0	Transfer filter 6
	F reg7 0	Transfer filter 7
	F reg8 0	Transfer filter 8
	F reg9 0	Transfer filter 9
	F reg10 0	Transfer filter 10
	F reg11 0	Transfer filter 11
	F reg12 0	Transfer filter 12
	F reg13 0	Transfer filter 13
	F reg14 0	Transfer filter 14
	F reg15 0	Transfer filter 15
	F reg16 0	Transfer filter 16
	F reg17 0	Transfer filter 17
	F reg18 0	Transfer filter 18
	<COMM OUTPUTS CU >	"COMM" book

The filters are designed for a future functionality and are not yet supported.

Screen: 7.4.0.0 (Status display of important CU parameters)

	>CUS 00000000	Status display of the CU communication (8 digits)
	>Signal 00000	Strength of the radio signal
	>Login -0000	Login status with built-in GSM/GPRS modem
	>Pin 00000	PIN status with built-in GSM/GPRS modem
	>Connect 00000	Number of successful transmissions
	>Mod fault 0000	Number of module faults for the installed module (e.g. GSM)
	>RS232 fault 0000	Counts the faults in the scope of a RS 232/USB connection
	>RS4xx fault 0000	Counts the faults in the scope of a RS 422/485 connection
	>Net fault 0000	Counts the faults in the scope of a Ethernet connection
	>ISB fault 0000	Counts the protocol faults in the ISB, registered by the CU
	>CUC D0000000	CUC
	>CUTS 00000	CUTS
	CUCommand 00000	Command for parameter changes of the int. or ext. CU
	CUComP1 00000	Command parameter 1, passed to the CU
	CUComP2 00000	Command parameter 2, passed to the CU
	CUComP3 00000	Command parameter 3, passed to the CU
	CUComP4 00000	Command parameter 4, passed to the CU
	>CUD	Display of data retrieved via CU command
	<COMM OUTPUTS CU>	"COMM" book

Explanation of the status displays

CUS

After a reboot of the CU first the archives of the corrector are read. Here in the first 4 digits from the left, the archive number is displayed (e.g. 98200000, 98400000). Then all necessary parameters are read. This is done using a matrix, where the column stands in the first digit, the next three digits are reserved for the rows and the last 4 digits indicate the Modbus address of the parameter specified. Since the transmission is faster than the display output, displaying occurs in jumps (eg 20734938, 20784940).
If this transfer was successful, then 00000002 will be displayed. This means that now the standard transfer begins between corrector and CU and the restart was successful. Now in the first 4 digits a counter runs that counts the number of transfers (circular from 1 to 8888), so that the display might look as follows: e.g. 12450002, 12510002. Here again, the transfer is faster than the display output.

If now an archive entry is generated and then retrieved by the CU, the number of archive is visible in the display for a short time (e.g. 99200002). Thereafter, the counter of the standard transfer is reset and begins to count again.

If an error is detected during restart, the display will remain for a short time at the point where the error occurred. This is followed by a reset of the CU and the start sequence begins again.

Signal

Strength of the radio signal: <12= critical signal strength, use any external antenna if necessary, strength 12-21= satisfactory to good signal strength, strength >21= good to very good signal strength.

Login

Displays the Login status with a built-in GSM / GPRS modem:

0	Ring
1	Successful
100	Modem Reset
-1	PIN is missing
-2	PIN not numerical
-3	Command echo on
-4	Error in the AT sequence "AT+CPIN?"-> PIN query
-5	After AT sequence "AT+CPIN=pin" -> PIN not OK
-6	PIN or PUK incorrect less than three times.
-7	PIN or PUK incorrect three times (PIN and PUK are no longer accepted.). If the PIN has been entered incorrectly three times, now the PUK must be entered to release the PIN.
-8	PUK, PIN incorrectly more three times (entries will not be executed.). If PUK has been entered incorrectly more than three times and the PIN has been entered incorrectly more than three times, the release of the SIM card must be requested from the network provider.
-9	After AT sequence "AT+CPIN=PIN" an error message is generated (PIN not accepted)
-10	After AT sequence "AT+CPIN=PIN" unknown response (PIN not accepted)
-11	PIN information faulty in connection with GPRS3
-100	After AT sequence "AT+CREG?" query failed

Pin Here, each digit has its own meaning:
00001 -> PIN successfully transferred
00010 -> logged in the home network
00100 -> roaming
01000 -> query response OK
10000 -> error in the PIN dialog

CUCommand With the CU Command the most important parameters of the internal or external CU can be changed via the optical interface of the corrector. With the command parameters up to four additional parameters (CUBef.Px) can be passed to the CU in addition to the command. The corresponding commands and parameters can be found in the annex.

General: The specified indicators are also available via Modbus or via the Dialog 900 program. Because the query speed may be lower than the update the display speed of the EC 900, reading the display on the EC 900 is preferable.

Controlling the CU via the optical interface of the corrector (MU): There is a command parameter for this purpose. With the command parameters complex functions such as resetting the CU or deleting one of the CU archives can be started in the CU. Besides the complex functions parameter contents of the CU can be retrieved, where the retrieved values are represented as text with a maximum of 16 characters. To change a parameter of the CU, the address of the parameter must be entered into the command register and, if required, the additional options into the command parameters. For all transfers to the CU it is to make sure that the command is entered last. Once the command is entered, it will be sent to the CU during next data exchange between MU and CU. Command and command parameters are checked before the transmission. If the values are illegal, the command is not executed. In any case, the command register and the 4 command parameters are deleted when the command is passed to the CU or in case of an incorrect command. If the command is executed, the acknowledgment of the command is visible in the display field CUA.

Screen: 7.5.0.0 (Com test)

	>Rec1 8006	Receive info from CU
	>R cnt 3451	Receive counter for transfer from CU to MU
	>Send1 8155	Send info to CU
	>S cnt 3682	Send counter for transfer from MU to CU
	<COMM OUTPUTS CU >	"COMM" book

This screen can only be accessed if the M code is entered!
Here you can check communications between the main unit (MU) and the communication module (CU).
>R cnt and >S cnt are counters which continue to run with every data exchange. If both counters are at a standstill, there is no communication on the internal bus.

Screen: OUTPUTS

+Digital outputs +Analogue outputs < OUTPUTS CU >	Press Enter to go to screen **8.1.0.0** Press Enter to go to screen **8.2.0.0** "OUTPUTS" book

Screen: 8.1.0.0 (digital outputs)

	+Digital output 1 +Digital output 2 +Digital output 3 +Digital output 4 +Digital output 5	Press Enter to go to screen **8.1.1.0** Press Enter to go to screen **8.1.2.0** Press Enter to go to screen **8.1.3.0** Press Enter to go to screen **8.1.4.0** Press Enter to go to screen **8.1.5.0**
	+Digital output 6 <OUTPUTS CU >	Press Enter to go to screen **8.1.6.0** "OUTPUTS" book

Screen: 8.1.1.0 (digital output 1)

		+Display values +Parameters <OUTPUTS CU >	Press Enter to go to screen **8.1.1.1** Press Enter to go to screen **8.1.1.2** "OUTPUTS" book

Screen: 8.1.1.1 (digital output 1 – display values)

	>DA1 set 0 >DA1 act 0 >DA1 freq 0.000 Hz <OUTPUTS CU >	Counter for spec. output pulses (no. of pulses to be output-ted) Counter for actual output pulses (number of pulses output-ted) Current frequency of output pulses "OUTPUTS" book

Under certain circumstances, it is possible that a flow rate measurement can be used for the generation of output pulses. But the output pulses can be used for control purposes only. This function is only possible for the device type EC 912 in connection with CU 900 and for the EC 922.

In principle the precondition for this is that the metering of the volume at measurement conditions is performed via an encoder input. The pulse factor for the encoder must be chosen so that a continuous progress is generated in the encoder to enable a conversion of the corresponding flow rate into pulses.

The flow rate must be measured without creeping quantity suppression. So the flow rate is measured, but has no effect on the volume metering. Conversely, output pulses are only generated, if the encoder totalizer moves forward and the volume metering is performed.

The maximum output frequency is 1 Hz.

Settings:

see 6.3.0.0	Tot. chan.	=	Chan. Vo
	VO chan.	=	Encoder
see 5.1.4.0	Q mode	=	flow m or flow v
see 8.1.1.2	DA1 src	=	Flow or Flow bcond
	DA1 type	=	Dispat. LF CU
see 8.1.2.2	DA2 src	=	Flow or Flow bcond
	DA2 type	=	Dispat. LF CU

Screen: 8.1.1.2 (digital output 1 – parameters)

	DA1 src Vm	Selection of the source for digital output 1 {Vm|Vb|Vo|Flow|Flow bcond}
	DA1 type Dispat. LF	Selection of the type of digital output 1 {Off|Tot. LF|Dispat. LF|Dispat. LF CU|Dispat. HF}
	DA1 sfac 1.000000	Scaling factor for the type of pulse output
	DA1 pulse 50 ms	Sel. of pulse duration for LF pulse output {10ms|25ms| 50ms|75ms|100ms|150ms|200ms|250ms|500ms}
	DA1 ipp 50 ms	Sel. of the interpulse period for LF pulse output {10ms|25ms| 50ms|75ms|100ms|150ms|200ms|250ms|500ms}
	DA1 HF 0.1 ms	Selection {0.05 ms|0.1 ms|0.2 ms|0.5 ms|1.0 ms}
	DA1 test 0	Test of output pulses (only if *DA1 type = Tot. LF*)
	<OUTPUTS CU >	"OUTPUTS" book

Through the DA1 test parameter, you can set a number of pulses which will then have to be outputted. The number of pulses outputted will be shown in field DA1 act (screen 8.1.1.1).
"Dispat. LF CU" under DA1 type means that pulse output 1 is switched off. The value selected under DA1 src is digitally transmitted to the CU 900 from where it is outputted via pulse output 1. NOTE: It is possible that delays occur. As a result, pulse output 1 of the CU 900 can no longer be used as digital output 3 of the EC 900.

Screen: 8.1.2.0 (digital output 2)

	+Display values	Press Enter to go to screen **8.1.2.1**
	+Parameters	Press Enter to go to screen **8.1.2.2**
	<OUTPUTS CU >	"OUTPUTS" book

Screen: 8.1.2.1 (digital output 2 – display values)

	>DA2 set 0 >DA2 act 0 >DA2 freq 0.000 Hz <OUTPUTS CU >	Counter for spec. output pulses (no. of pulses to be outputted) Counter for actual output pulses (number of pulses outputted) Current frequency of output pulses "OUTPUTS" book

Screen: 8.1.2.2 (digital output 2 – parameters)

	DA2 src Vb DA2 type Dispat. LF DA2 sfac 1.000000 DA2 pulse 50 ms DA2 ipp 50 ms	Selection of the source for digital output 2 {Vm|Vb|Vo|Flow|Flow bcond} Selection of the type of digital output 2 {Off|Tot. LF|Dispat. LF|Dispat. LF CU|Dispat. HF} Scaling factor for the type of pulse output Selection of the pulse duration for LF pulse output {10ms| 25ms|50ms|75ms|100ms|150ms|200ms|250ms|500ms} Selection of the interpulse period for LF pulse output {10ms| 25ms|50ms|75ms|100ms|150ms|200ms|250ms|500ms}
	DA2 HF 0.1 ms DA2 test 0 <OUTPUTS CU >	Selection {0.05 ms|0.1 ms|0.2 ms|0.5 ms|1.0 ms} Test of output pulses (only if *DA2 type = Tot. LF*) "OUTPUTS" book

Through the DA2 test parameter, you can set a number of pulses which will then have to be outputted. The number of pulses outputted will be shown in field DA2 act (screen 8.1.2.1).
"Dispat. LF CU" under DA2 type means that pulse output 2 is switched off. The value selected under DA2 src is digitally transmitted to the CU 900 from where it is outputted via pulse output 2. NOTE: It is possible that delays occur. As a result, pulse output 2 of the CU 900 can no longer be used as digital output 4 of the EC 900.

Screen: 8.1.3.0 (digital output 3)

		+Display values +Parameters <OUTPUTS CU >	Press Enter to go to screen **8.1.3.1** Press Enter to go to screen **8.1.3.2** "OUTPUTS" book

Screen: 8.1.3.1 (digital output 3 – display values)

	>DA3 set 0 <OUTPUTS CU >	Status of the output contact "OUTPUTS" book

Screen: 8.1.3.2 (digital output 3 – parameters)

	DA3 src Pressure	Selection of the source for digital output 3 {Pressure|Temperat.|Conv. fact.|K coeff.| Flow|Flow bcond|Input 3|Input 4|Input 5}
	DA3 type Mi/Ma. co.	Selection of the type of digital output 3 {Off|Per. pulse|Alarm co.|Warn co.|C sw. code|Code on|Min cont.|Max cont.|Mi/Ma. co.|In to Out}
	DA3 min 0.700	Minimum limit
	DA3 max 40.000	Maximum limit
	DA3 test Low	Test of signal output {Low|High}
	<OUTPUTS CU >	"OUTPUTS" book

In order to test the static outputs, first set DA3 type mode at "Off". Via DA3 test mode, you can then set the output at "Low" or "High". Afterwards, the signal status will be shown in field DA3 set (screen 8.1.3.1).

Screen: 8.1.4.0 (digital output 4)

	+Display values	Press Enter to go to screen **8.1.4.1**
	+Parameters	Press Enter to go to screen **8.1.4.2**
	<OUTPUTS CU >	"OUTPUTS" book

Screen: 8.1.4.1 (digital output 4 – display values)

	>DA4 set 0	Status of the output contact
	<OUTPUTS CU >	"OUTPUTS" book

Screen: 8.1.4.2 (digital output 4 – parameters)

	DA4 src Temperat.	Selection of the source for digital output 4 {Pressure|Temperat.|Conv. fact.|K coeff.| Flow|Flow bcond|Input 3|Input 4|Input 5}
	DA4 type Mi/Ma. co.	Selection of the type of digital output 4 {Off|Load pulse|Alarm co.|Warn co.|C sw. code|Code On|Min cont.|Max cont.|Mi/Ma. co.|In to Out}
	DA4 min -10.000	Minimum limit
	DA4 max 50.000	Maximum limit
	DA4 test Low	Test of signal output {Low|High}
	<OUTPUTS CU >	"OUTPUTS" book

In order to test the static outputs, first set DA4 type mode at "Off". Via DA4 test mode, you can then set the output at "Low" or "High". Afterwards, the signal status will be shown in field DA4 set (screen 8.1.4.1).

Screen: 8.1.5.0 (digital output 5)

		+Display values +Parameters <OUTPUTS CU >	Press Enter to go to screen **8.1.5.1** Press Enter to go to screen **8.1.5.2** "OUTPUTS" book

Screen: 8.1.5.1 (digital output 5 – display values)

	>DA5 set 0 <OUTPUTS CU >	Status of the output contact "OUTPUTS" book

Screen: 8.1.5.2 (digital output 5 – parameters)

	DA5 src Conv. fact.	Selection of the source for digital output 5 {Pressure|Temperat.|Conv. fact.|K coeff.| Flow|Flow bcond|Input 6|Input 7|Input 8}
	DA5 type Mi/Ma. co.	Selection of the type of digital output 5 {Off|Per. max.|Alarm co.|Warn co.|C sw. code|Battery|Min cont.|Max cont.|Mi/Ma. co.|In to Out}
	DA5 min 0.700	Minimum limit
	DA5 max 40.000	Maximum limit
	DA5 test Low	Test of signal output {Low|High}
	<OUTPUTS CU >	"OUTPUTS" book

In order to test the static outputs, first set DA5 type mode at "Off". Via DA5 test mode, you can then set the output at "Low" or "High". Afterwards, the signal status will be shown in field DA5 set (screen 8.1.5.1).

If the type is set to "Alarm co." for this output, the contact is designed as a break contact ("Off" in case of alarm, "On" if no alarm is present). This contact is also imaged in the CU 900 as external output 5 as break contact.

Screen: 8.1.6.0 (digital output 6)

		+Display values +Parameters <OUTPUTS CU >	Press Enter to go to screen **8.1.6.1** Press Enter to go to screen **8.1.6.2** "OUTPUTS" book

Screen: 8.1.6.1 (digital output 6 – display values)

	>DA6 set 0 <OUTPUTS CU >	Status of the output contact "OUTPUTS" book

Screen: 8.1.6.2 (digital output 6 – parameters)

	DA6 src K coeff.	Selection of the source for digital output 6 {Pressure|Temperat.|Conv. fact.|K coeff.| Flow|Flow bcond|Input 6|Input 7|Input 8}
	DA6 type Mi/Ma. co.	Selection of the type of digital output 6 {Off|Day max.|Alarm co.|Warn co.|C sw. code|Mains|Min cont.|Max cont.|Mi/Ma. co.|In to Out}
	DA6 min 0.500	Minimum limit
	DA6 max 1.500	Maximum limit
	DA6 test Low	Test of signal output {Low|High}
	<OUTPUTS CU >	"OUTPUTS" book

In order to test the static outputs, first set DA6 type mode at "Off". Via DA6 test mode, you can then set the output at "Low" or "High". Afterwards, the signal status will be shown in field DA6 set (screen 8.1.6.1).

Screen: 8.2.0.0 (analogue outputs)

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

The analogue outputs can only be used in conjunction with the external CU 900 communication unit.

Screen: 8.2.1.0 (analogue output 1)

		+Display values	Press Enter to go to screen **8.2.1.1**
		+Parameters	Press Enter to go to screen **8.2.1.2**
		<OUTPUTS CU >	"OUTPUTS" book

Screen: 8.2.1.1 (analogue output 1 - display values)

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

Screen: 8.2.1.2 (analogue output 1 - parameters)

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

Screen: 8.2.2.0 (analogue output 2)

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

Screen: 8.2.2.1 (analogue output 2 - display values)

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

Screen: 8.2.2.2 (analogue output 2 - parameters)

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

Screen: 8.2.3.0 (analogue output 3)

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

Screen: 8.2.3.1 (analogue output 3 - display values)

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

Screen: 8.2.3.2 (analogue output 3 - parameters)

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

Screen: 8.2.4.0 (analogue output 4)

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

Screen: 8.2.4.1 (analogue output 4 - display values)

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

Screen: 8.2.4.2 (analogue output 4 - parameters)

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

Screen: CU

16.07.13 12:00:23	Date / time
>Version	Device type and program version
Ident: 12345678901234	Identification, can be changed
+Communication	Press Enter to go to screen **9.1.0.0**
+Time	Press Enter to go to screen **9.2.0.0**
+DSfG	Press Enter to go to screen 9.3.0.0
+System	Press Enter to go to screen 9.4.0.0
+Serviceprograms	Press Enter to go to screen 9.5.0.0
<CU-MAINMENU >	"CU" book

Screen: 9.1.0.0 (communication parameters)

	+Modem	Press Enter to go to screen 9.1.1.0
	+USB	Press Enter to go to screen 9.1.2.0
	+Serial	Press Enter to go to screen 9.1.3.0
	+Plug	Press Enter to go to screen 9.1.4.0
	+TCP/IP	Press Enter to go to screen 9.1.5.0
	<CU COMMUNICA-TION >	"CU" book

Screen: 9.1.1.0 (modem: GSM / GPRS / ISDN)

		>Type: 65	Recognized communication module (modem)
		Modemrings: 1	Number of ring tones until the modem picks up
		Center: 0809220979	Phone number of the switchboard
		+GSM	Press Enter to go to screen 9.1.1.1
		+GPRS	Press Enter to go to screen 9.1.1.2
		+Protocol	Press Enter to go to screen 9.1.1.3
		+Services	Press Enter to go to screen 9.1.1.4
		▶ Modem-Info	Further information about the communication module
		<CU COM. MODEM >	"CU" book

Screen: 9.1.1.1 (parameters for radio module GSM)

		>Level: 19 >Operator: !COPS: 0 PIN: 0000 PUK: 00000000 >SIM: 894920211250772	Strength of the radio signal Service provider (t-mobile etc.) Personal ident number to release the SIM card Personal unblocking code for blocked SIM card ICCID, identification number of the SIM card
		▶ GSM-Info ▶ Signallevel <CU COM. MODEM GSM >	Further information about the GSM modem Further information about level measurement "CU" book

Screen: 9.1.1.2 (parameters for GPRS modem)

		Mode: GSM (CSD) Provider: D1 DN: rmg-ebe0.dynds. APN: * Password: *	GSM/GPRS {0·GSM (CSD)|1·GPRS-M900} Radio network operator {0·D1|1·D2|2·E+|3·O2} Domain name of the switchboard Access point name – access GPRS Password – access GPRS
		User: * KeepAlive: 0 >GPRS-Flag: 1 +TCP-Listen <CU COM.MODEM GPRS >	User name – access GPRS Keep-alive time in seconds Status when in GPRS mode Press Enter to go to screen 9.1.1.2.1 "CU" book

Screen: 9.1.1.2.1 (TCP lists)

		TCP-Listen: 0 TCP-Blocktime: 200 TCP-Block: 512 AIP1: 192.168.103.103 AIP2: 192.168.103.104 <CU GPRS TCP-LISTEN >	Activated/deactivated TCP lists(1/0) Time monitoring TCP block formation (ms) Maximum TCP block size Auto-IP1 – control IP for TCP lists Auto-IP2 – control IP for TCP lists "CU" book

Screen: 9.1.1.3 (parameters modem interface, protocols)

		Baudrate: 9600	Transmission speed {0·300|1·600|2·1200| 3·2400|4·4800|5·9600|6·19200|7·38400|8·57600| 9·115200}
		Databits: 8	Number data bits radio network operator {7|8}
		Parity: N	Parity None (N), Odd (O), Even (E) {N|O|E}
		Stopbits: 1	Number of stop bits {1|2}
		Handshake:RTS/CTS	{0·none|1·RTS/CTS|2·Xon/Xoff}
		Protocol: M900/DS	{0·none|1·M900/DSfG|2·MB-RTU|3·MB-ASCII|4·MB-TCP}
		Timeout: 60	Monitoring time in seconds
		Modbus-address: 240	Modbus address
		MB-ByteOrder: big	Byte sequence big/little Endian {0·big|1·little}
		M900-Options: CRC+PW	{0·none|1·CRC|2·PW|3·CRC+PW|4·SBRK|5·CRC+SBRK| 6·PW+SBRK|7·CRC+PW+SBRK}
		−ISDN-Ini	Alternative modem initialization: ↳ Use alternative modem initialization Y/N (1/0)
		b0n4&k3%b0&s1s0=0	{0·No|1·Yes}
		Use ISDN-Ini: No	
		<CU MODEM PROTO-COL>	"CU" book

Screen: 9.1.1.4 (service programs)

		Modem-Reset: 24	Interval (in hours) in which modem reset is carried out
		−Last Mo-Reset:	Execution of the last modem reset
		> 15.06.13 04:45:23	↳ Date and time
		▶ Modemreset	Execute modem reset
		▶ Call Server	Prepare call switchboard
		<CU MODEM SER-VICES >	"CU" book

Screen: 9.1.2.0 (USB: internal in EC 900 / external in CU 900)

		Baudrate: 9600	Transmission speed {0·300|1·600|2·1200| 3·2400|4·4800|5·9600|6·19200|7·38400|8·57600| 9·115200}
		Databits: 8	Number data bits radio network operator {7|8}
		Parity: E	Parity None (N), Odd (O), Even (E) {N|O|E}
		Stopbits: 1	Number stop bits {1|2}
		Handshake: none	{0·none|1·RTS/CTS|2·Xon/Xoff}
		Protocol: M900/DSfG	{0·none|1·M900/DSfG|2·MB-RTU|3·MB-ASCII}
		Timeout: 60	Monitoring time in seconds
		Modbus-address: 240	Modbus address
		MB-ByteOrder: big	Byte sequence big/little Endian {0·big|1·little}

		M900-Options: CRC+PW <CU COM. USB > 	{0·none|1·CRC|2·PW|3·CRC+PW|4·SBRK|5·CRC+SBRK|6·PW+SBRK|7·CRC+PW+SBRK} "CU" book

Screen: 9.1.3.0 (serial: DB9 on the right side of EC 900 case)

		Baudrate: 9600 Databits: 8 Parity: E Stopbits: 1 Handshake: none	Transmission speed {0·300|1·600|2·1200|3·2400|4·4800|5·9600|6·19200|7·38400|8·57600|9·115200} Number data bits radio network operator {7|8} Parity None (N), Odd (O), Even (E) {N|O|E} Number stop bits {1|2} {0·none|1·RTS/CTS|2·Xon/Xoff}
		Protocol: M900/DSfG Timeout: 60 Modbus-address: 240 MB-ByteOrder: big M900-Options:CRC+PW <CU COM. SERIAL >	{0·none|1·M900/DSfG|2·MB-RTU|3·MB-ASCII} Monitoring time in seconds Modbus address Byte sequence big/little Endian {0·big|1·little} {0·none|1·CRC|2·PW|3·CRC+PW|4·SBRK|5·CRC+SBRK|6·PW+SBRK|7·CRC+PW+SBRK} "CU" book

Screen: 9.1.4.0 (plug: interface on internal multi-pin connector for service)

		Baudrate: 9600 Databits: 8 Parity: E Stopbits: 1 Handshake: none	Transmission speed {0·300|1·600|2·1200|3·2400|4·4800|5·9600|6·19200|7·38400|8·57600|9·115200} Number data bits radio network operator {7|8} Parity None (N), Odd (O), Even (E) {N|O|E} Number stop bits {1|2} {0·none|1·RTS/CTS|2·Xon/Xoff}
		Protokoll: M900/DSfG Timeout: 60 Modbus-address: 240 MB-ByteOrder: big M900-Options:CRC+PW <CU COM. PLUG >	{0·none|1·M900/DSfG|2·MB-RTU|3·MB-ASCII} Monitoring time in seconds Modbus address Byte sequence big/little Endian {0·big|1·little} {0·none|1·CRC|2·PW|3·CRC+PW|4·SBRK|5·CRC+SBRK|6·PW+SBRK|7·CRC+PW+SBRK} "CU" book

Screen: 9.1.5.0 (TCP/IP: ethernet)

		IP: 192.168.130.165 NM: 255.255.255.000 GW: 192.168.130.001 Port: 8000 DNS: 192.168.130.001	Own network address Network mask Gateway Port used to connect IP of the Domain Name Servers
		Host: 192.168.130.165 DTC: 12 BBT: 50 MSS: 50 ▶ PING	IP of the switchboard sec, idle connection control (DataTransmitController) msec, block building time (BlockBuildingTime) Maximum segment size (MaximumSegmentSize), 1-1460 Execute PING

		<CU COM. TCP/IP >	"CU" book

Screen: 9.2.0.0 (time parameters)

	Time: 12:00:23 Date: 16.07.13 >Time-zone S −Last Time-set: > 15.07.13 14:02:53	Current time CU Current date CU Current time zone (M: normal time, S: daylight saving time) Last setting of CU time: ↳ Date and time
	−Calc.TZ-Shift: > 27.10.13 03:00:00 −Last TZ-shift: > 31.03.13 02:00:00 +Timeserver <CU TIME >	Calculated (next) time zone change: ↳ Date and time Last time zone change: ↳ Date and time Press Enter to go to screen 9.2.1.0 "CU" book

Screen: 9.2.1.0 (time server parameters)

		TZ-Shifting: auto TS-Cycle: 24 TS-Number: 0531512038 NTP: 192.053.103.103 NTP-Port: 37	Time zone correction {0·none|1·auto} Interval (in hours) in which the time server is called up Phone number of the telephone time server IP of the time server Port of the time server (37: Time, 123: NTP)
		UTC-Difference: 60 Summertime char: S Wintertime char: M −TS-TZ-Shift: > 27.10.13 03:00:00 −Last TZ-shift: > 31.03.13 02:00:00 >TS status: 5 −Last TS call: > 15.07.13 14:02:11 ▶ Call Timeserver ▶ Call-repeats <CU ZEIT TIME-SERVER >	Difference to UTC in minutes Identification for daylight saving time Identification for normal time Time zone change from server: ↳ Date and time Last time zone change: ↳ Date and time Status of the last time server call-up (5: successful) Last time zone call attempt: ↳ Date and time Call up time server Show/delete call repeats "CU" book

Screen: 9.3.0.0 (DSfG parameters)

	Ident: 000000000000 ID1: 1111111111111111 ID2: 2222222222222222 ID3: 3333333333333333 ID4: 4444444444444444	12-digit station identification for login 16-digit password-1 for login 16-digit password-2 for login 16-digit password-3 for login 16-digit password-4 for login

	+EADRs +Dial numbers +Archive-names +ada-Identification <CU DSFG >	Press Enter to go to screen 9.3.1.0 Press Enter to go to screen 9.3.2.0 Press Enter to go to screen 9.3.3.0 Press Enter to go to screen 9.3.4.0 "CU" book

Screen: 9.3.1.0 (EADRs)

		EADR-DFUe 1: _ EADR-DFUe 2: 0 EADR-DFUe 3: 0 EADR-DFUe 4: 0 EADR-Wieser: M	DSfG recipient address remote transfer entity 1 DSfG recipient address remote transfer entity 2 DSfG recipient address remote transfer entity 3 DSfG recipient address remote transfer entity 4 DSfG recipient address Wieser entity
		EADR-Corrector: A EADR-Reg-MU: I EADR-Reg-CU: N <CU DSfG EADRS >	DSfG recipient address volume corrector entity Registration entity in volume corrector Registration entity in CU "CU" book

Screen: 9.3.2.0 (dial numbers)

		C1: 017254321909 C2: N C3: N C4: N IP1: 192.168.123.124	Phone number of the 1st switchboard Phone number of the 2nd switchboard Phone number of the 3rd switchboard Phone number of the 4th switchboard IP of the 1 st switchboard
		Port Server 1: 8000 IP2: 192.168.123.124 Port Server 2: 8000 IP3: 192.168.123.124 Port Server 3: 8000 IP4: 192.168.123.124 Port Server 4: 8000 Call-delay 1: 1 Call-delay 2: 30 Call-delay 3: 60 Call-delay 4: 120 Call-delay 5: 1800 Call-delay 6: 3600 ▶ Call-repeats <CU DSfG NUMBERS >	Corresponding port IP of the 2nd switchboard Corresponding port IP of the 3rd switchboard Corresponding port IP of the 4th switchboard Corresponding port Call delay after unsuccessful call 1 Call delay after unsuccessful call 2 Call delay after unsuccessful call 3 Call delay after unsuccessful call 4 Call delay after unsuccessful call 5 Call delay after unsuccessful call 6 Show/delete call repeats "CU" book

Screen: 9.3.3.0 (archive names)

		AG1: AuditTrail AG2: SysAlarms AG3: ModemLog <CU DSfG ARCH-NAMES >	Freely selectable name for archive group 1 Freely selectable name for archive group 2 Freely selectable name for archive group 3 "CU" book

Screen: 9.3.4.0 (ada identification)

		ada-ID: Ident Country: DE User: 123456 Zip code: 85560 Branche: 1	Type of identification (information for identification according to OBIS) {0·Ident|1·Ident&Location|2·Country-Ident} Country code Identification for operator Zip code measuring location Medium: 1 gas, 2 water
		Identifier: Meas.point Location:IdN 7RMG09I <CU DSfG ada-IDENT. >	Name measuring point Name measuring location "CU" book

Screen: 9.4.0.0 (system)

	Language: en +ISB ▶ System-Info ▶ Warmstart ▶ Standardparameter <CU SYSTEM >	Language setting {0·de|1·en} Press Enter to go to screen 9.4.1.0 Further information about the system System warm start (reset) Activate standard parameters "CU" book

Screen: 9.4.1.0 (ISB)

		SyncMode: MU->CU Timedifference: 2 ▶ ISB-Info <CU SYSTEM ISB >	Master/slave of the synchronization {0· MU->CU|1· CU->MU} Difference in seconds from when synchronizing starts Further information about ISB "CU" book

Screen: 9.6.0.0 (service programs)

	▶ Modem-Info ▶ Call Server ▶ Modemreset ▶ GSM-Info ▶ Signallevel	Information about the communication module Prepare call switchboard Execute modem reset Information about GSM Level measuring
	▶ PING ▶ Call Timeserver ▶ ISB-Info ▶ Archives ▶ System-Info ▶ Warmstart ▶ Standardparameter	Execute PING Call up time server Information about ISB Info/read/delete archive Information about the system System warm start (reset) Activate standard parameters

	<CU SERVICEAPPS >	"CU" book

Fault messages

Alarms

No.	DSfG No.		Display of the EC 900		Explanation
1	783	A	10-1	MU restart	Watchdog or short power failure of the EC 900
2	30	A	11-0	p failure	Failure of the pressure transmitter
3	31	A	11-1	p min range	Minimum pressure range value violated downwards
4	32	A	11-2	p max range	Maximum pressure range value exceeded
5	1	A	15-0	t failure	Failure of the temperature transmitter
6	2	A	15-1	t min range	Minimum temperature range value violated down-wards
7	3	A	15-2	t max range	Maximum temperature range value exceeded
8	104	A	17-4	Qb min range	Min. range val. of flow rate at meas. cond. violated downw.
9	105	A	17-5	Qb max range	Max. range val. of flow rate at meas. cond. exceeded
10	416	A	21-5	1 out of 3 Vb1	1-out-of-3 comparison error, Vb1 totalizer
11	427	A	21-6	1 out of 3 VmL1	1-out-of-3 comparison error, VmLocal1 totalizer
12	415	A	21-7	1 out of 3 Vm1	1-out-of-3 comparison error, Vm1 totalizer
13	429	A	23-1	1 out of 3 Vb1D	1-out-of-3 comparison error, Vb1D totalizer
14	428	A	23-3	1 out of 3 Vm1D	1-out-of-3 comparison error, Vm1D totalizer
15	405	A	31-0	RAM error C	Error during RAM check, calibration parameters
16	409	A	31-1	RAM error F	Error during RAM check, factory parameters
17	406	A	31-2	RAM error O	Error during RAM check, operating parameters
18	424	A	31-3	RAM error N	Error during RAM check, general parameters
19	410	A	32-0	Float error	Error of floating-point arithmetic
20	414	A	32-1	Mathem. error	Error in mathematics
21	4400	A	37-0	Tamper contact	Tamper contact has been initiated
22	409	A	10-3	Power failure	Power failure

Warnings

No.	DSfG No.		Display of the EC 900		Explanation
35	812	W	10-7	Time synchron.	Time synchronization failed
42	4431	W	55-0	MB function OP	Illegal function Modbus OP
43	4432	W	55-1	MB dat addr. OP	Illegal data address Modbus OP
45	4434	W	55-3	MB slavedev. OP	Slave device fault Modbus OP
46	4435	W	56-0	MB function C1	Illegal function Modbus C1
47	4436	W	56-1	MB dat addr. C1	Illegal data address Modbus C1
51	800	W	57-0	Calibr. switch	Calibration switch open
52	801	W	57-1	Code input	Enabling a code to be entered
65	422	W	10-4	Battery cap.	Battery life under 6 months
66	4401	W	40-0	Periodic archive	Periodic archive
67	4402	W	40-1	Daily archive	Daily archive
68	4403	W	40-2	Monthly archive	Monthly archive
69	4404	W	40-3	Event archive	Event archive
70	4405	W	40-4	Load archive	Load archive
71	4406	W	40-5	Disturb.archive	Disturbance archive
72	4407	W	40-6	Leg.metr.logb.	Legal metrological logbook
73	4408	W	40-7	Param. logbook	Parameter logbook
74	4420	W	41-0	Event logbook	Event logbook
75	4440	W	17-1	Flow at closed line	Flow rate in closed metering line
76	4441	W	10-2	Emergancy power activ	Device runs with backup power supply
78	4443	W	90-0	Fault ISB bus	Failure ISB bus
79	4444	W	57-3	Daylight saving time changed	Summer / winter time switching
80	803	W	57-2	Enable calibration code	Release calibration code 1, 2 or 3
81	810	W	57-4	Time changed old time	Change of time (old time)
82	811	W	57-5	Time changed new	Change of time (new time)

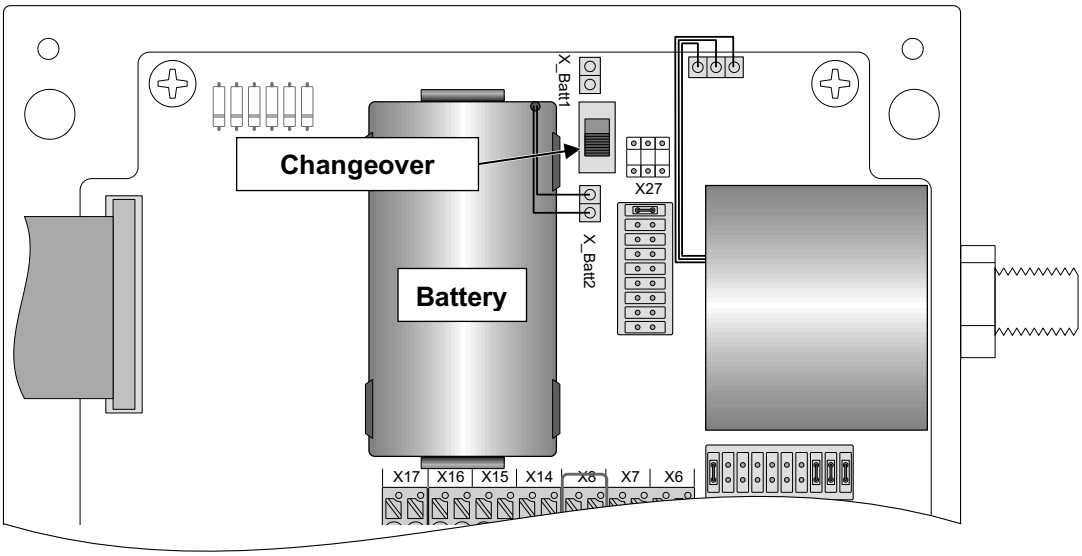
Maintenance

Changing the battery

Devices for Ex zone 1 (EC 911 and EC 912)

The battery can be changed in Ex zone 1 or 2 without any problem. A current-limiting resistor located on the battery ensures that the electrical limits for intrinsically safe circuits are not exceeded.

Use only batteries from RMG with connecting cables and connectors. If you use other batteries, explosion protection will not be guaranteed after you have changed the battery!

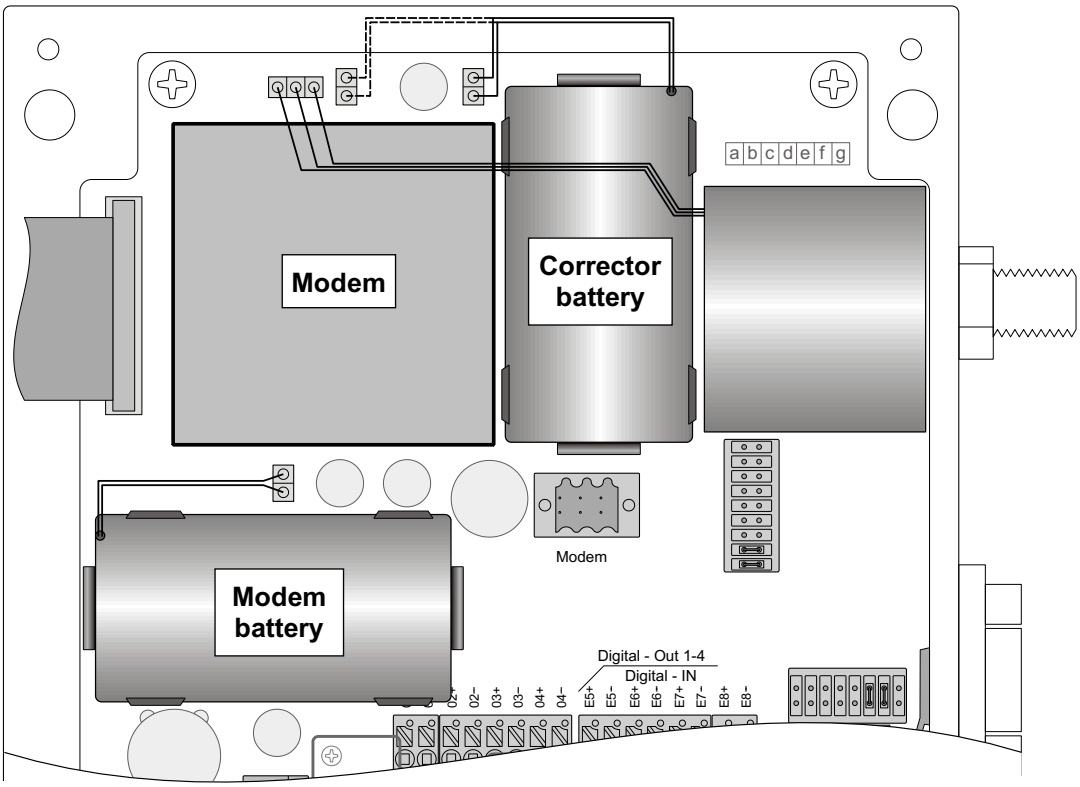


The battery is to be connected to the upper (X_Batt1) or lower (X_Batt2) pair of pins to the right of the battery holder using the connecting cable with connector. The contacts of the battery holder do not have any function.

The battery can be changed without interrupting volume correction. To do this, plug the connector of the new battery on the unoccupied pair of pins and actuate the battery changeover switch. Now the new battery is working and you can remove the old battery and insert the new one into the battery holder.

Devices for Ex zone 2 (EC 921 and EC 922)

Note: In the case of the EC 921 and EC 922 device types, it is not permissible to open the device in Ex zone 2. Therefore, prior to changing the battery, check the atmosphere with a gas alarm device!



If a modem is built in a battery-powered device (EC 921), one battery powers the corrector and the other the modem. Even in this case, it is possible to change a battery without interrupting volume correction. Plug the connector of the new battery on the unoccupied pair of pins. There is no battery changeover switch. Now remove the old battery and insert the new one into the battery holder. There is only one pair of pins for the modem battery, i.e. remove the old battery and insert the new one.

The EC 922 is powered externally but can include an emergency battery for the corrector; there is no modem battery.

Note: The wiring compartment has been reworked in the meantime. You can see the current version on page 28.

Notes on the use of batteries

Lithium batteries retain their voltage until they are almost completely discharged so that the voltage cannot be monitored with an appropriate indicator until the next battery change is necessary. You can enter the months until the next battery change is necessary under "Time values / Batt change" in the "OPER." book. On delivery, the devices are programmed with 81 months; this is the mandatory interval for follow-up verification in Germany. The battery change indicator has been designed as a down counter; apart from the operating hours, also the loading of the device is taken into account for calculation. When 6 months are over, a warning which serves as a reminder to change the battery will be generated each month. After the battery has been changed, the warning will be cancelled and can be deleted.

Battery life

EC 911:
The battery life for the EC 911 is designed with a minimum period of six years under the following conditions:

- 1-channel volume sensor with reed contact and a maximum of 0.5 Hz
- Display ON time of 5 minutes maximum per week
- Data transfer time of 5 minutes maximum per week
- At an ambient temperature of the corrector of 20° Celsius

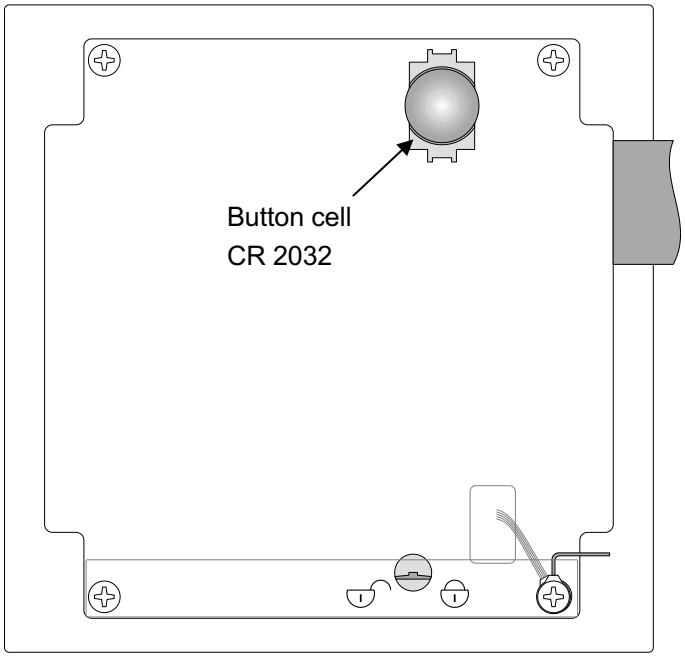
The battery life is also reduced when the device is continuously operated at temperatures below zero degrees. At an ambient temperature of -20°C, the battery capacity is sufficient for the EC 911 in the operating mode described above for a maximum of 3 years.

When using an encoder as a volume sensor, the battery life is reduced to a maximum of 5 years depending on the encoder type.

EC 912 and EC 922
If the battery is needed as a pure emergency battery only those contacts should be connected which are really needed. The battery life is, depending on the operating mode and the connected signals, at least 28 days.

Back-up battery

The main unit has been fitted with a button cell which serves as a back-up battery. This battery is only required to keep the clock running if there is a power failure. The data will be retained even after this battery has been removed.



Technical data

Casing

Wall-mounting device	
Protection class	IP 65 (suitable for outdoor installation)
Ambient temperature range	-25°C to 55°C
Protection class	Ex zone 1 / zone 2

Power supply

Lithium battery	Battery life > 6 years
Connection for external power supply (EC 922)	
with DC power pack:	10 - 36 VDC
with AC power pack:	100 - 250 VAC

Operating panel

Keyboard	Cursor block (as with the ERZ 2000) with 1 additional key (Esc)
Display	LCD, graphical 128 x 64 dots 6x20 characters, alphanumeric formatted
alternatively	Graphic visualization

Digital inputs

Number (total)	8
User-parameterizable as	
LF input ([max. 50 Hz] reed or NAMUR)	
HF input ([max. 10 kHz] NAMUR)	
Message input	
Tamper contact (reed)	1

Encoder input

Number	1 (NAMUR, clocked/ battery-powered)

Pressure transmitter

integrated into the casing	Measuring range up to 40 bar, digital

Temperature transmitter

PT1000	4-wire design Measuring range: -20°C to +60°C

Digital outputs

Number	4
Characteristics	Digital transistor outputs potential-free
Permanently assigned	Pulse outputs Vm, Vb
User-parameterizable	Message output for alarms, warnings Optional HF output for Vm

Current outputs

Number	4 on the communication unit	Option, daughter board

Data interfaces

Optical interface as per IEC1107

Use	Local access to data elements and archives
Protocols	M900 / Modbus

RS 232 / RS 485

Use	Connection of a modem Telecontrol substation
Protocols	DSfG-B Modbus
SELMA functionality	Implementation via daughter board

Compressibility

Fixed value
Table
S-GERG 88
AGA 8 /G1,G2
AGA NX 19

Operating program

Upgrade
- locally via data interface
- remotely via modem

Data logger

Characteristics

Memory	Ferro RAM 512

All data can be displayed.
All data can be read out via the data interfaces.

Archives

Main archive – Measuring period

Contents	Event-oriented storage DSfG archive structure Additionally, K coefficient, conversion factor (C)
Memory depth	> 5 months with hourly recording

Disturbance quantity archive

Characteristics	Recording only in the case of faults DSfG archive structure
Memory depth	600 entries

Daily archive

Contents	Totalizer reading at the end of the day Daily means for pressure, temperature, K coefficient and conversion factor (C) Maximum periodic values
Memory depth	731 days

Monthly archive

Contents	Totalizer reading at the end of the month Monthly means for pressure, temperature, K coefficient and conversion factor (C) Maximum MP values per month Maximum daily values per month
Memory depth	24 months

Logbooks

Event logbook

Contents	All events when they are coming or going
Number of entries	600

Parameter logbook

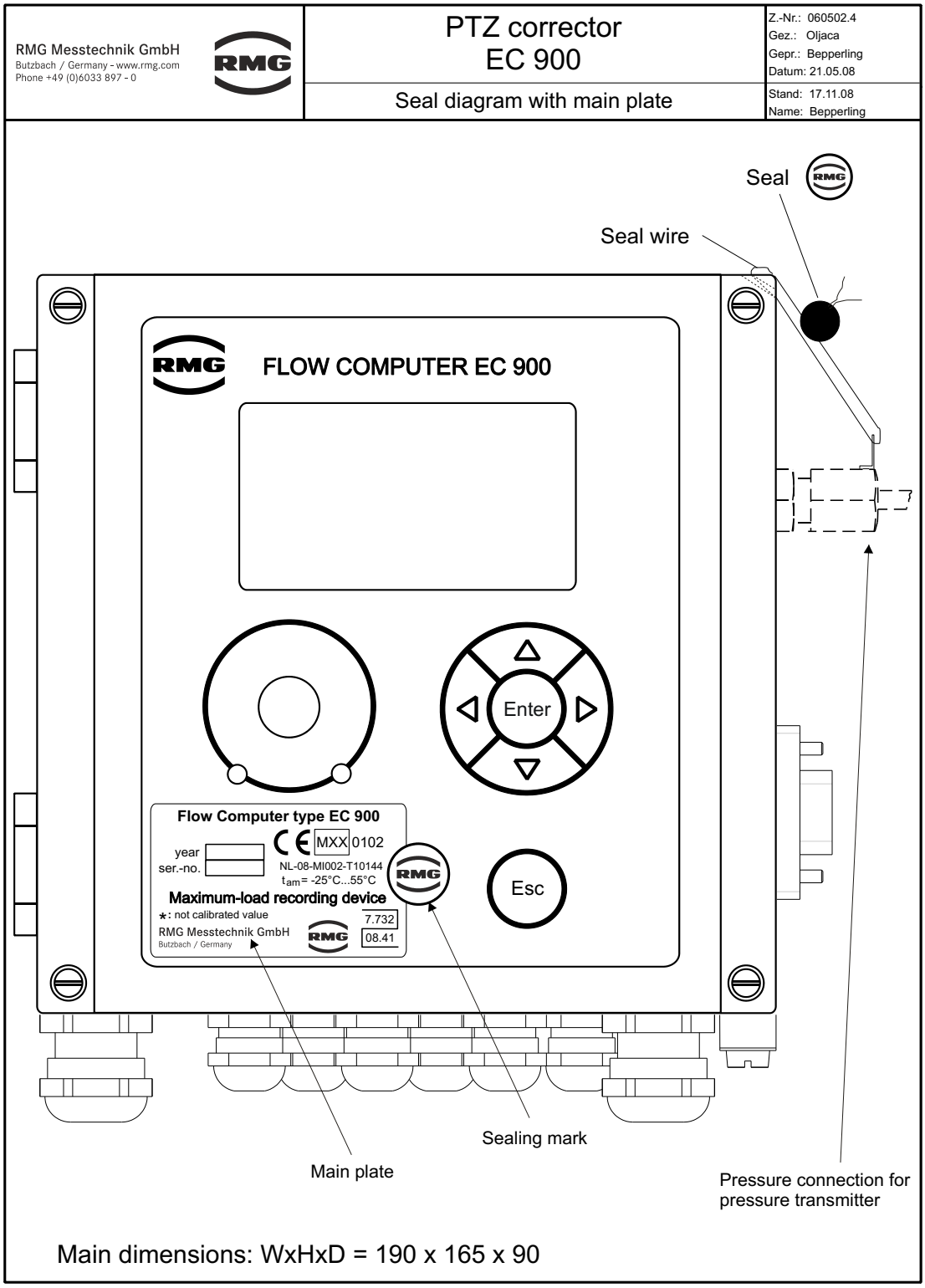
Contents	All changes of parameters with old and new values
Number of entries	600

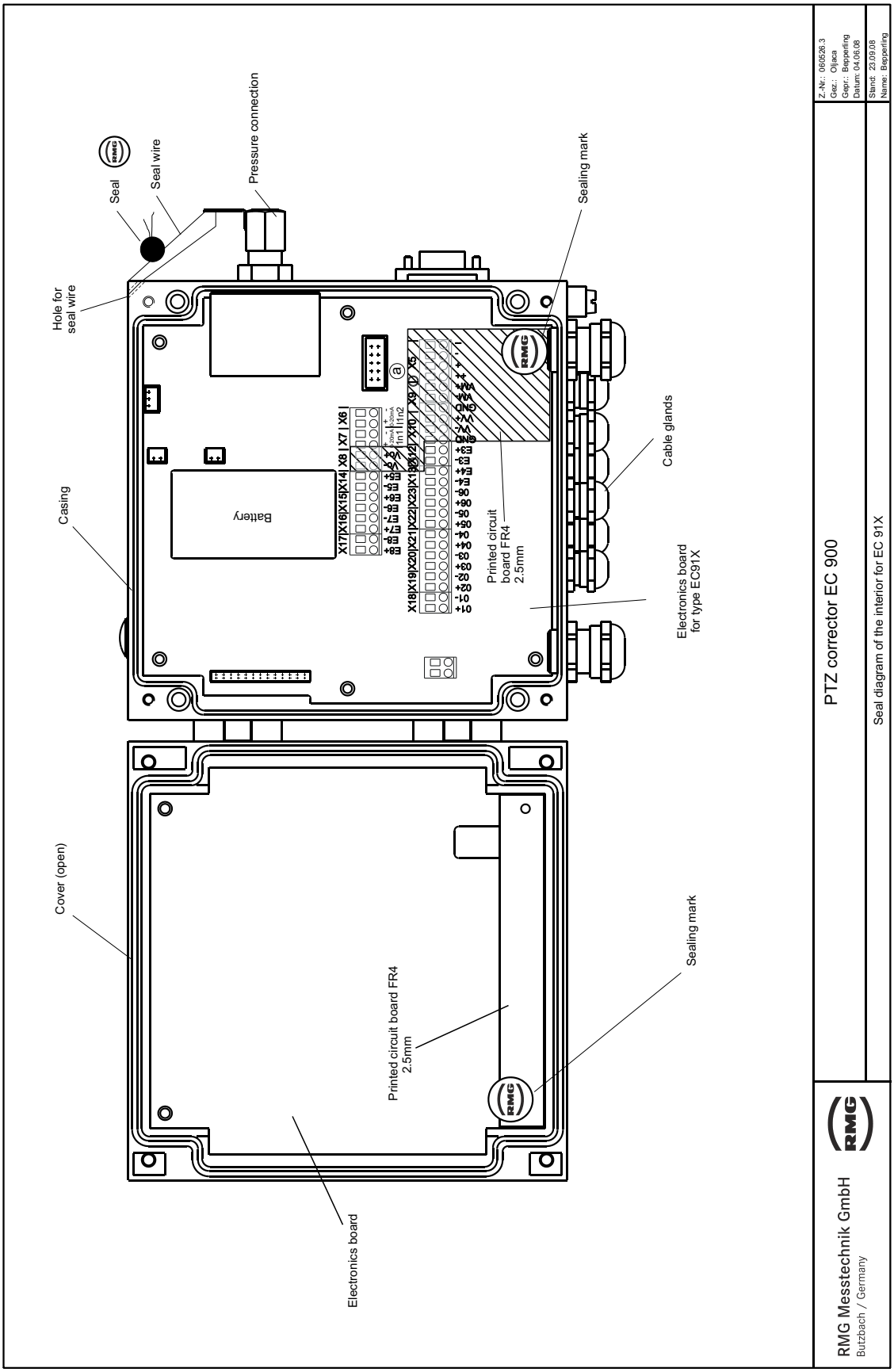
Legal metrological logbook

Contents	All changes of parameters under legal control
Number of entries	600

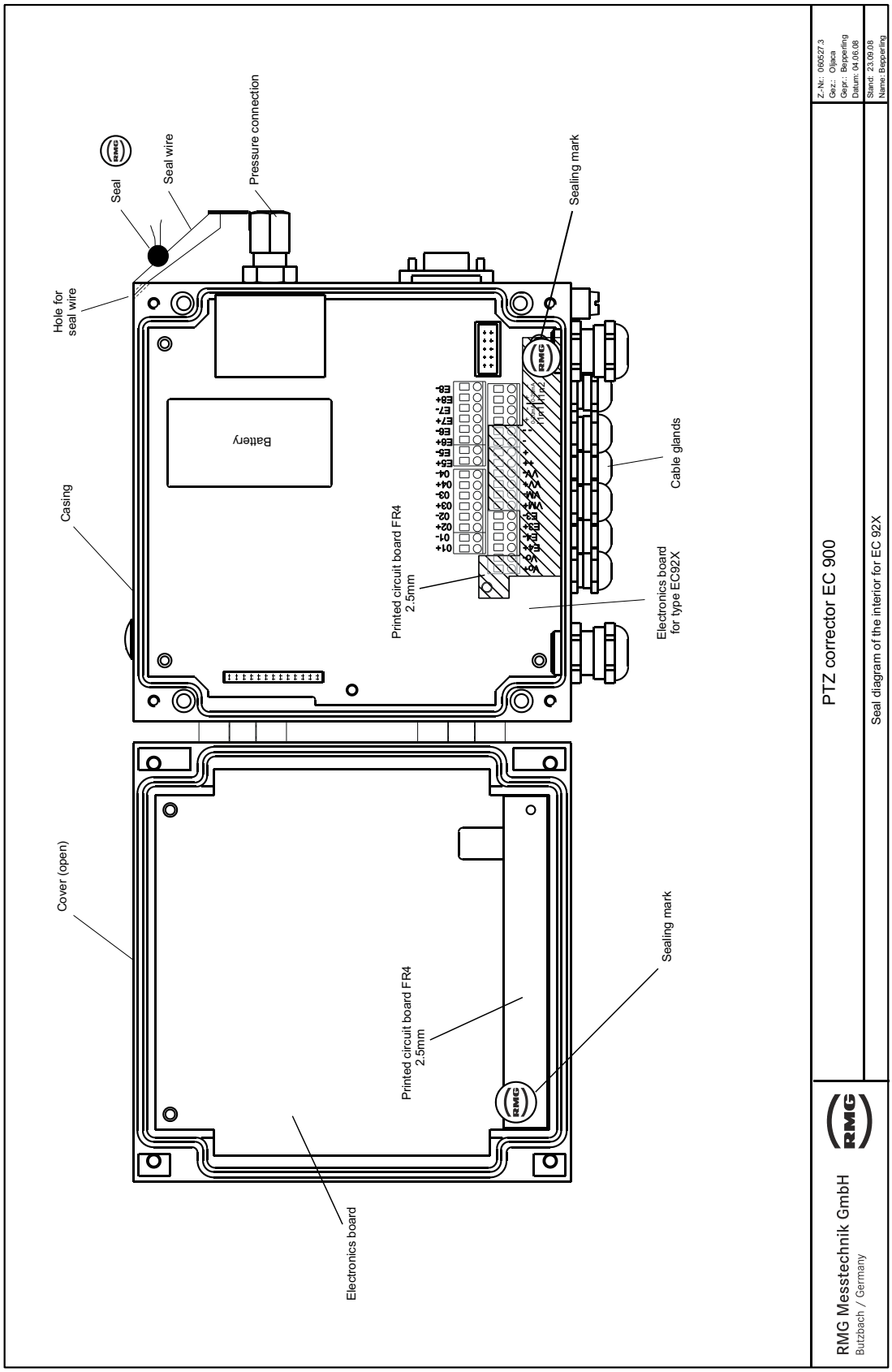
Annex

Seal diagrams

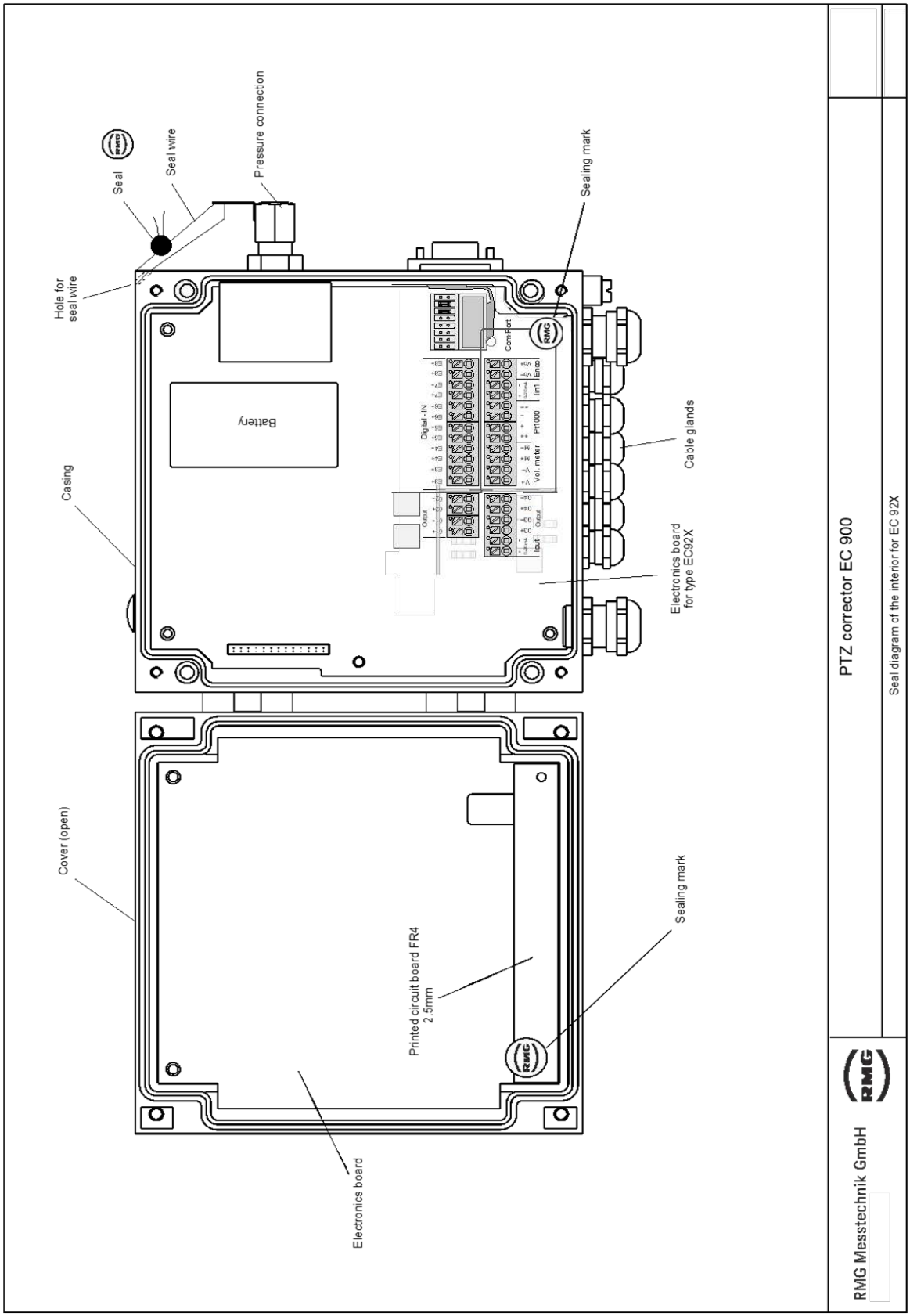



Seal
Seal wire
Pressure connection
Hole for seal wire
Sealing mark
Casing
Battery
Cable glands
Printed circuit board FR4 2.5mm
Electronics board for type EC91X
Cover (open)
Sealing mark
Printed circuit board FR4 2.5mm
Electronics board
PTZ corrector EC 900
Seal diagram of the interior for EC 91X
RMG Messtechnik GmbH
Butzbach / Germany

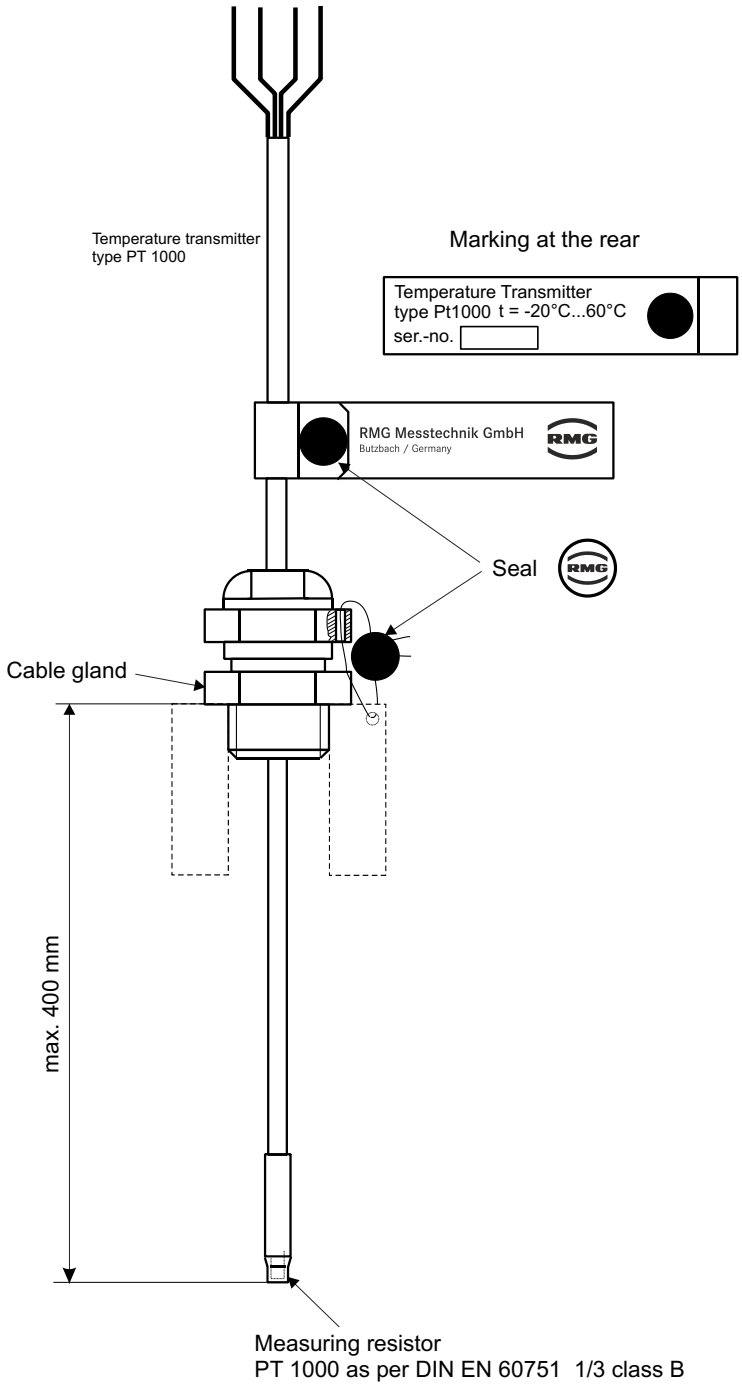
Sealing plan of the electronics before revision 8



Sealing plan of the electronics revision 8

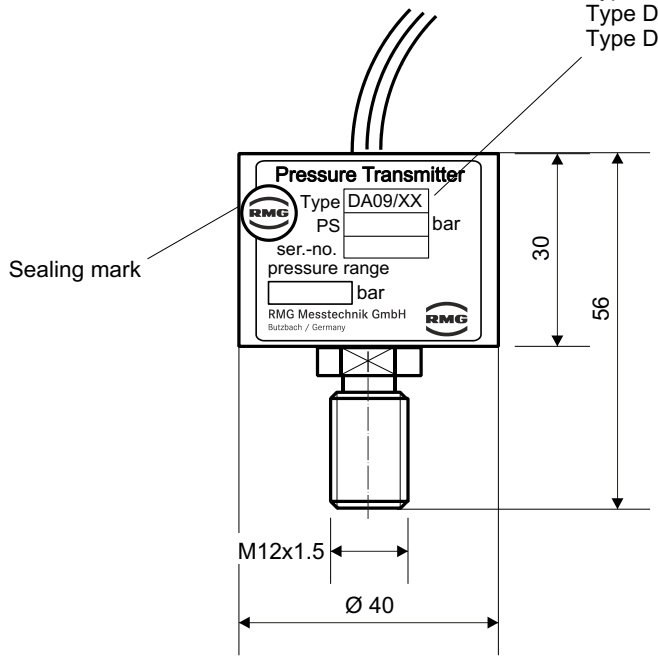


RMG Messtechnik GmbH Butzbach / Germany - www.rmg.com Phone +49 (0)6033 897 - 0	Temperature transmitter Type PT 1000 for EC 900	Z.-Nr.: 060722.4 Gez.: Bepperling Gepr.: Grexa Datum: 10.09.08 Stand: 21.10.08 Name: Bepperling

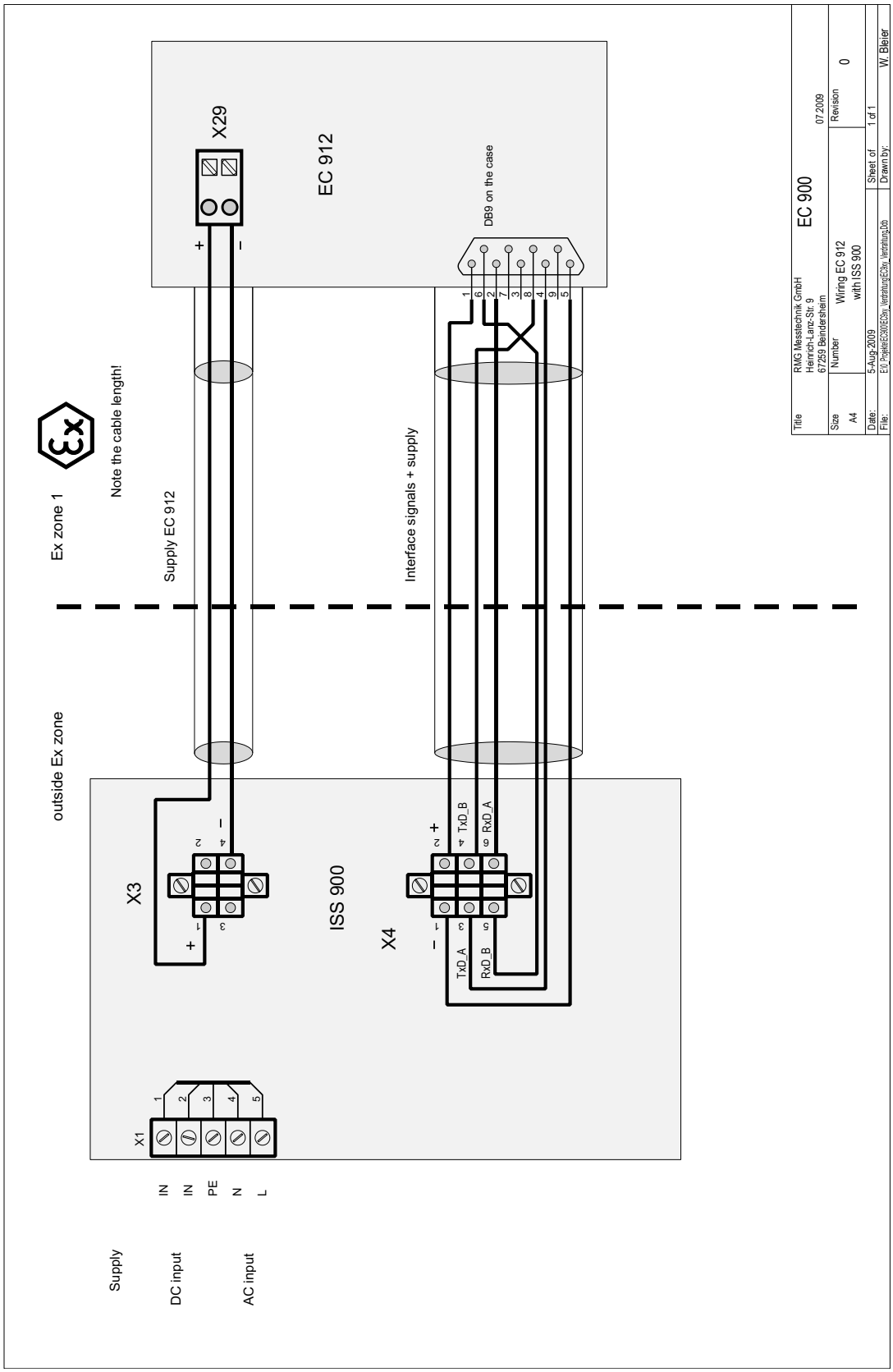


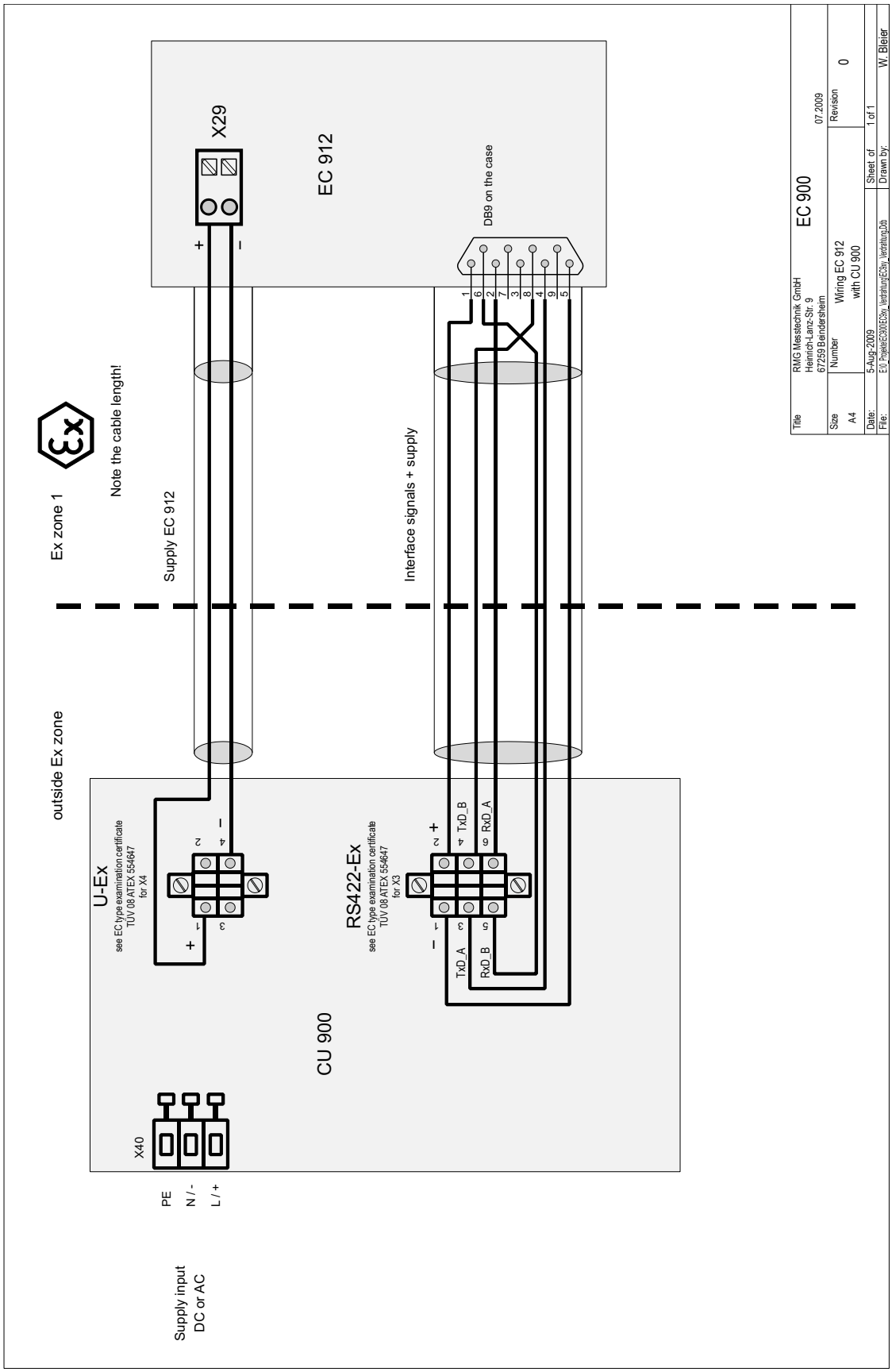
RMG Messtechnik GmbH Butzbach / Germany - www.rmg.com Phone +49 (0)6033 897 - 0	Pressure transmitter Type DA 09/...	Z.-Nr.: 060720.4 Gez.: Eckert Gepr.: Bepperling Datum: 10.09.08
	Installation in the EC 900	Stand: 19.09.08 Name: Oljaca

Type DA09/2 (pressure range 0.7-2 bar)
Type DA09/5 (pressure range 0.8-5 bar)
Type DA09/10 (pressure range 2-10 bar)
Type DA09/20 (pressure range 4-20 bar)
Type DA09/40 (pressure range 8-40 bar)



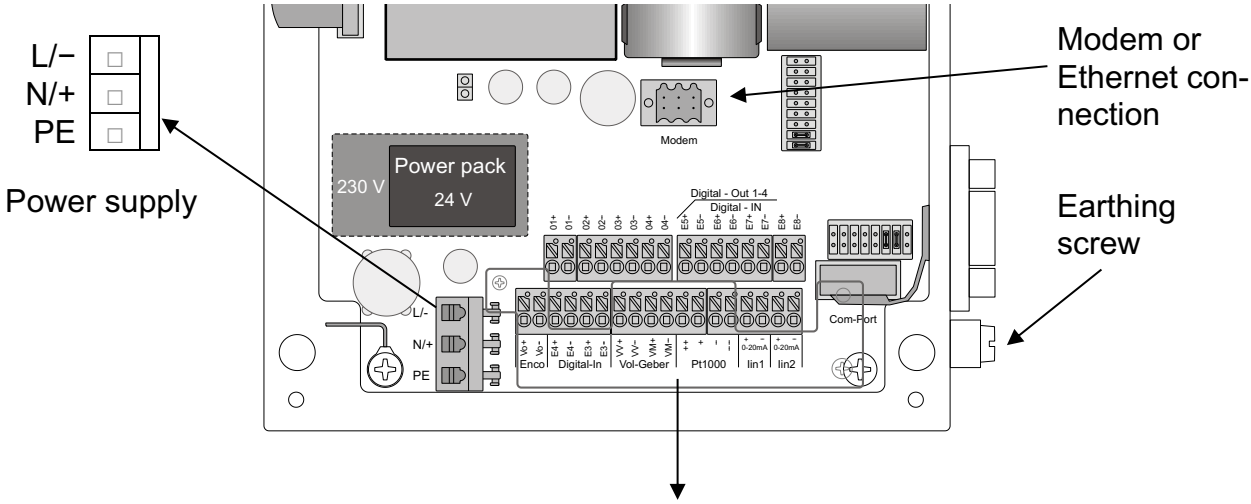
Wiring diagrams

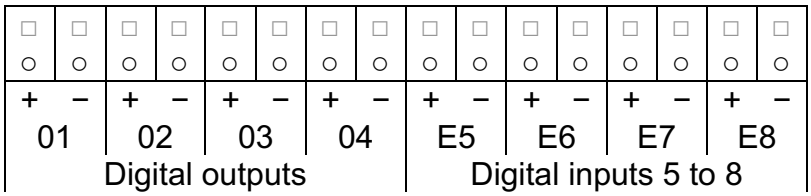


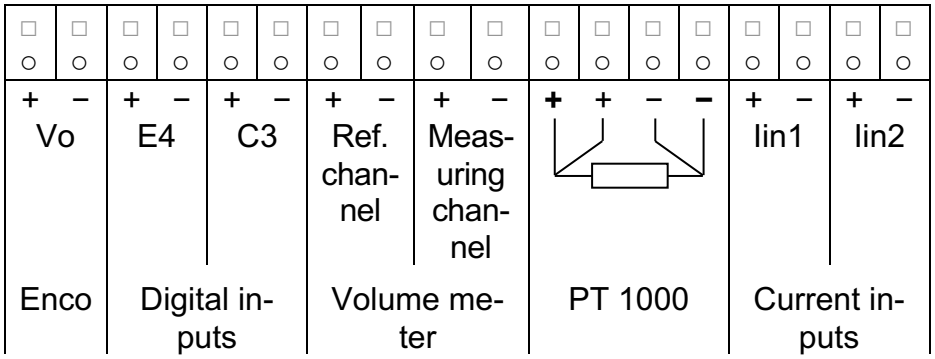

Ex zone 1
Note the cable length!
Supply EC 912
Interface signals + supply
outside Ex zone
X29
EC 912
DB9 on the case
U-Ex
see EC type examination certificate
TÜV 08 ATEX 554647
for X4
RS422-Ex
see EC type examination certificate
TÜV 08 ATEX 554647
for X3
TxD_B
RxD_A
TxD_A
RxD_B
CU 900
X40
PE
N / -
L / +
Supply input
DC or AC
Title
RMG Messtechnik GmbH
Heinrich-Lanz-Str. 9
67259 Beindersheim
EC 900
07.2009
Size
A4
Number
Wiring EC 912
with CU 900
Revision
0
Date:
5-Aug-2009
Sheet of
1 of 1
File:
Drawn by:
W. Bleier

Older version of EC 921 and EC 922

The pin assignment for devices manufactured before 2010 has to be taken from the following illustration.







Make sure that the device is earthed (earthing screw on the right side)! In order to connect the device to the equipotential bonding, use a wire diameter of ≥ 4 mm².

EC type examination certificates

The EC type examination certificate **TÜV 08 ATEX 554643** as per Directive 94/9/EC applies to the intrinsically safe device types **EC 911** and **EC 912**.
Type of protection: II 2 G Ex ia IIC T4.

The EC type examination certificate **TÜV 08 ATEX 554647** as per Directive 94/9/EC applies 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.

Contact

the approvals of device types **EC 911**, **EC 912**, **EC 921** and **EC 922** for PTB correction under legal control within the European Union.

Subject to technical modification

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or contact your local sales support office
to learn more about the RMG products.
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ONE STEP AHEAD