

*gas-net* 

**Flow Computer**  
**gas-net F1**  
**Series 2**

**Technical Documentation**  
**Volume 2**

**Commissioning and Maintenance,**  
**Technical Data and Documents**



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## Safety and Warning Notes



Attention! The following safety and warning notes must be observed at any rate:

- The *gas-net* flow computer F1 must neither be stored at temperatures below  $-20^{\circ}\text{C}$  nor above  $+50^{\circ}\text{C}$ .
- A temperature between  $0^{\circ}\text{C}$  und  $+40^{\circ}\text{C}$  must be guaranteed during operation.
- The electronic flow computer must be installed outside ex-zone 2.
- The *gas-net* devices are equipped with hardware modules that are approved as *associated electrical apparatus* of category *ib* according to DIN EN 50020 with intrinsically safe circuits. The flow computer F1 is therefore suitable for being connected to sensors and pulse generators (and encoder totalizers, respectively) that are located in hazardous areas (e.g. zone 1).  
It is not permitted to connect intrinsically safe and non-intrinsically safe circuits to these modules together.
- Only intrinsically safe temperature and pressure sensors of protection class EEx ib II C should be connected. If flameproof pressure and temperature sensors (Ex-d) are used, the connection of the gas meter to the EXMFE5 board must be implemented via suitable isolating switching amplifiers!
- The power supply of the *gas-net* devices is implemented via 24 V DC and must be secured externally by 1 A.
- The earthing is connected to PE of the power supply socket for equipotential bonding.
- Observe the regulations of the relevant standards, in particular the regulations of DIN EN 50014, DIN EN 50020 and DIN EN 50029.
- Observe the limit values stated in the respective certificates of conformity of the boards to be connected.

## **General Notes on the Structure of this Manual**

The second volume of the *Flow Computer gas-net F1* documentation on hand deals with the subjects *Commissioning, Maintenance* and *Technical Data*. It contains important documents, such as certificates of conformity and ATEX certificates.

The first volume of this Technical Documentation describes the function and operation of the flow computer *gas-net F1*.

Both volumes of the Technical Documentation should always be at hand in the station.



# 1 Parameterizing with GW-GNET+

*gas-net* devices are parameterized with a PC or laptop computer and the GAS-WORKS software system.

All *gas-net* devices are parameterized with the same GAS-WORKS module called GW-GNET+.<sup>1</sup>

The next two chapters explain in general terms how to create or edit a complete *gas-net* parameterization using GW-GNET+ and how to export it to the device. It is rather easy to learn how to work with the parameterization program. As soon as you have mastered the techniques, you only need to know the meaning and effect of each adjustable parameter – no matter which *gas-net* device type is actually concerned. We therefore have enclosed a complete parameter list with additional information in the annex to the first volume of this documentation.

For a detailed description of the parameterization program, please refer to the context-sensitive online help of GW-GNET+ which is activated by the F1 key. It describes other editing methods the parameterization program offers as well.<sup>2</sup>

**Important Note:** Parameters protected by the calibration lock can only be edited via a computer and not at the operator panel, even if the calibration switch is open.

The following brief description particularly refers to a parameterization that changes parameters protected by the calibration lock.

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<sup>1</sup> Please refer to the GAS-WORKS CD-ROM, which is part of the delivery scope of each device of Elster, for further information on the GAS-WORKS program system with all the possibilities it provides. All GAS-WORKS components can be installed from this CD.

<sup>2</sup> It is possible to change the device parameterization or single parameters via an established data connection between the computer and the device. This is advantageous with respect to different situations: For instance, you may exchange operational parts of the parameterization in the GW-GNET+ **Edit parameterization** mode, even if the calibration switch is closed. In the **Change parameters** mode, parameters characterized as *online-changeable* can be edited without restarting the device.

## 1.1 Creating and Exporting a *gas-net* Parameter Data Record: Brief Description

To create a completely new *gas-net* parameterization, proceed as follows:



1. Start GW-BASE from the Windows environment by double-clicking the lantern icon.



2. Invoke the GW-GNET+ module by clicking the **New – Create gas-net parameterization** tool in the toolbar. Alternatively, select the **Tools – New – Create gas-net parameterization** menu item from the main menu.
3. Select the device type you would like to parameterize in the appearing dialog and the version number of the device software in the next step. Choose the existing standard parameterization on which the new parameter data record shall be based in the following dialog.

After you have confirmed your selection by clicking **OK**, the GW-GNET+ interface is activated.

4. The **Modules and Linkages** window contains a white box with a name and icon for each module included in the device software. By double-clicking this box you activate a dialog listing all parameters that belong to the module concerned.

Adjust the settings according to your requirements.

### Important Note:

When completing the parameterization, you have to ensure the consistency of the data record. *gas-net* devices are equipped with functional groups, or modules, that are largely independent of one another. In some cases modules provide other modules with the values to be processed. For this reason it is important to ensure that the respective cross-references are correct each time a parameter is edited. Examples of such linkages are the cross-references in the correction module to the input channels for pressure, temperature and gas meter information. These input channels are defined in the system module.

An example: The type of a gas meter input is initially a feature of the input channel via which the meter is connected and is thus parameterized in the *System* module. However, the input information must be forwarded to the *Correction* module to enable this module to create the totalizers. For this, for instance, the correction module needs to know which input value it shall evaluate as gas meter input for stream 1.

When creating a new parameterization with GW-GNET+, you are offered several standard parameterization options. These standard parameterizations are consistent and contain all necessary references. This, of course, also applies to the parameterization preset by the manufacturer before delivery.

If you delete or fundamentally change an input value being used in a different context within a parameterization, all linkages to this value become invalid and are automatically deleted by the parameterization program. You will receive a corresponding message indicating which linkages you have to set up again afterwards to render the parameterization consistent again.

For example: You would like to change in the parameterization the input type of the gas meter for correction 1 from *single-channel LF* to *single-channel encoder totalizer*. For this, change the operating mode of the first channel of the EXMFE5 board concerned to *encoder totalizer*, the operating mode of the second channel from *LF* to *unassigned*. Afterwards, the parameterization program will tell you this: *Module correction 1. The following linkage has been deleted: gas meter, I/O link transmitter 1.* When changing to the correction module, you will see that the *Transmitter 1* parameter in the *Gas meter – I/O link* parameterization branch has been set to *unassigned*. Change the transmitter type from *pulsar* to *encoder*. Select under *protocol channel* the newly defined encoder input. The linkage to the gas meter input is now correctly assigned.

Detailed information is available in the GW-GNET+ online help.

5. Go through all modules in this way until all adjustments meet your requirements.
6. Select **File – Save as** and enter the file name under which the parameter data record shall be saved in GAS-WORKS. Close GW-GNET+; for instance via **File – Exit**.
7. The parameter data record is now in the worksheet of GW-BASE. Before exporting it to the device, you have to drag it into a suitable hierarchy of the GAS-WORKS data management<sup>3</sup>.

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<sup>3</sup> To drag a data record from the worksheet into a hierarchy, proceed as described below:

1. Mark the target hierarchy (which must possibly be created before).
2. Drag the data record with the mouse from the worksheet into the right half of the configuration window.

Alternatively, drag the data record directly to a folder in the hierarchy (on the left side of the configuration window).

Refer to the GW-BASE User's Guide or online help for more detailed information.

8. Connect the DSS data interface at the device to a COM interface of the computer using a parameterization cable.
9. Turn the calibration switch at the device to “open”.
10. Mark the parameter data record and select the **Data – Export** menu item from the main or context menu of GAS-WORKS.
11. The communication program starts.

The window appearing on your screen shows the information **Data transfer into *gas-net* device**.

As soon as the transmission has been completed, the device will be re-started. The message **Data transfer into *gas-net* device** vanishes from the communication window, and the type plate of the connected *gas-net* device is indicated instead, stating the most important device data.

Close the communication program now.

## 1.2 Importing and Editing a Parameterization: Brief Description

You may read out the current parameterization of a *gas-net* device via the data interface and edit it afterwards.

The reading in is accomplished as follows:

1. Connect the PC and the flow computer by connecting the COM interface of the computer to the DSS interface at the *gas-net* device using a parameterization cable.
2. Start GAS-WORKS on your computer if you haven't done so before. Activate the communication program by clicking the **Import – Data interface** tool in the GW-BASE toolbar.



After having successfully started the communication program, you are connected to the device as regards data technology. The window appearing on your screen contains some important basic device information.

3. Change to the **Content** tab.
4. Mark the **Parameterization** data record and click the lantern icon.



A **Save as** dialog box appears asking for the file name under which the data record shall be saved in GAS-WORKS.

After you have entered the name and confirmed your entry by clicking OK, the reading in of the data starts.

5. As soon as the reading in has been finished, close the communication program via the **File – Exit** main menu item.

The parameter data record is filed in the GAS-WORKS worksheet under the specified file name. Before starting GW-GNET+, you have to file this data record away in the hierarchy, as worksheet data records cannot be processed further.<sup>4</sup>

This is how to edit an existing parameter data record:

1. Mark the parameter data record in the configuration window of GW-BASE.
2. Select **Data – Edit** from the main or context menu.  
GW-GNET+ starts.
3. Edit the parameterization according to your requirements. Please observe the notes in Chapter 1.1, page 1-2.
4. Save your adjustments:  
By clicking **Save** you save the data record under its old name.  
If you select **Save As**, you may enter a new file name. The created data record is saved in the GW-BASE worksheet in this case and must be filed away in a suitable hierarchy.
5. Close GW-GNET+ and export the modified parameterization as described in Chapter 1.1, steps 8-11.

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<sup>4</sup> For brief instructions see Footnote 3, page 6-1.

### 1.3 Extras: GW-GNET+ Service Programs

The GW-GNET+ program includes some additional service programs fulfilling different tasks relating to *gas-net* devices. The range of available service programs depends on the *gas-net* device type.

For instance, the following tools are available for flow computers:



#### **Edit parameterization**

for changing the parameterization during an established data connection to the device.

Purely operational parts of the parameterization can be changed this way, even though the calibration switch is closed.

**Note:** For instructions, please refer to the GW-GNET+ online help.



#### **Change parameters**

for changing individual parameters during an established data connection to the device.

**Note:** For instructions, please refer to the GW-GNET+ online help.



#### **Totalizer setting**

Facilitates the setting of totalizers of the *gas-net* device if the calibration switch is open.



#### **Delete archives**

Facilitates the deletion of archives of the *gas-net* device if the calibration switch is open.



#### **DSfG bus access**

Starts GW-REMOTE+ via the data interface, if installed. Facilitates the data access to all devices connected via DSfG; for instance, for reading out archive data and viewing current data.

In particular, GW-REMOTE+ provides a comfortable freeze function.

These programs may only be activated if a data connection is established via the DSS data interface.

Proceed as usual:

1. Start GW-BASE on your laptop computer.
2. Connect the DSS interface of the *gas-net* device to a COM interface of the laptop using a parameterization cable.



3. Start the communication program by clicking the **Import – Data interface** tool in the GW-BASE toolbar. After the data connection to the device has been established, the type plate of the connected device appears on the screen.
4. Select the **Tools** tab. The appearing tab lists all available service programs.
5. Start the desired program by double-clicking.

The functional range of the service programs is manageable and practical. The operation is thus rather easy. A comprehensive online help is also available for each program. It can be activated via the **Help – Content** menu item or by pressing the **F1** key.



## 2 Installation

### 2.1 Mounting the *gas-net* F1

The *gas-net* F1 device is designed for mounting in a 19"-cabinet and is available with mounting widths of 1/3 or 1/2. Please pay attention to a mounting depth of 170 mm (with connectors: approximately 220 mm) to guarantee the accessibility of the terminals on the back. We recommend mounting the device in a swing frame.

***gas-net* devices must be installed in an ex-free installation area (electrical operating area) according to protection class IP 20.**

### 2.2 Connecting the Lines

Ensure that the device is in de-energized conditions before connecting the transmitter, supply, signal and data lines.

**Any modification of the wiring is only permitted if the supply is disconnected!**

Connect the transmitter and signal lines to the *gas-net* device using plug-in screw terminals, each of which is located in a cable terminal box. Connect the power supply via fixed screw terminals. Data lines have to be connected to the corresponding SUB-DB9 connector housings.

Please pay special attention to intrinsically safe circuits. Before switching on the supply, make sure that the connectors for the *Gas meter*, *Pressure* and *Temperature* inputs are plugged in as only then a thread measure of 50 mm can be guaranteed, which is required by the relevant guidelines.

The connector for the connection of these sensor lines may be secured by official stickers or, alternatively, by a seal wire and a seal for the billing-relevant transfer.

Please consider the relevant installation regulations when arranging the wiring. The lines must be tensile stress-free and must be provided with a bend protection if the *gas-net* device is mounted in a swing frame. Dimension the cable length in such a way that there is no tensile stress on the cable during the swinging of the swing frame.

We recommend conducting the lines coming from the transmitters on transfer terminals in a control cabinet and connecting them from there to the *gas-net*

device. However, these terminals have to comply in part with the Ex-regulations and must possibly also be sealable.

## 2.2.1 Power Supply and Earthing

Operate the *gas-net* F1 device with a nominal voltage of 24 V DC.

The connection of 24 V is implemented via the terminals + and – on the back of the device and must be protected externally against short circuits with 1 A. The internal device protection is guaranteed by a self-resetting overcurrent protector. Connect the protective earth to **PE** of the power supply socket for equipotential bonding.

## 2.2.2 Process Boards

The process board equipment of a *gas-net* F1 depends on the tasks the device is supposed to accomplish. Generally, the maximum number of boards depends on the mounting width of the device housing: Housings with a mounting width of 1/3 accommodate up to four process boards whereas housings with a mounting width of 1/2 mounting accommodate up to seven process boards.

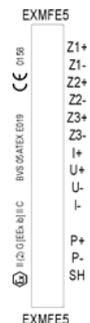
**Altogether, only up to four boards of the types EXMFE5, EXDE6 and MSER2 can be employed in one device.**

### 2.2.2.1 EXMFE5 Input Board

**Important Note:** The EXMFE5 input board is approved as an *associated electrical apparatus* of category *ib* according to DIN EN 50020 with intrinsically safe circuits. This is why sensors and signal transmitters located in hazardous areas (e.g. zone 1) can be connected to this board. A mixed operation of intrinsically safe and non-intrinsically safe circuits is not permissible for such an input board.

To the first three channels of an explosion-proof EXMFE5 input board, intrinsically safe pulsers in NAMUR technique can be connected. The channels of the EXMFE5 can also be used as message input channels. Alternatively, it is also possible to connect an encoder totalizer to the first one of these input channels for a digital transmission of original meter readings.

Connect the signals for channels 1 to 3 to terminals **Z1+**, **Z1-**, **Z2+**, **Z2-**, and **Z3+**, **Z3-**.



The inputs are intrinsically safe. Use shielded cables for a better interference suppression. The maximum cable length is 100 m at a cross section of 1.5 square mm. If the cables are longer, you have to ensure that the lines are installed separately from other conducting lines to avoid interferences.

Moreover, each EXMFE5 board has one intrinsically safe temperature sensor input in 4-wire technique to be connected to terminals **I+**, **U+**, **U-** and **I-** according to the Pt100 Specification.

The board is also equipped with an intrinsically safe input for measuring sensors (e.g. a pressure sensor) in 4..20 mA-two wire-technique (terminals **P+** and **P-**). This fifth channel of the EXMFE5 input board can also be used for the parallel connection of up to 4 measuring sensors using a HART interface (multi-drop procedure).<sup>5</sup> For the sensors, only the HART polling addresses from 1 to 4 are allowed; make sure that the address assignment is unambiguous and corresponds to the assignment in the parameterization of the *gas-net* device.

**Important Note:** In general, each modification of the wiring is only permitted after the supply has been disconnected. This means in particular in case of HART sensors that the HART polling addresses must be adjusted individually in the sensors *before* connecting them together to the corresponding input channel at the *gas-net* device in de-energized conditions. When the device starts up again afterwards, all connected HART sensors are polled once for the device to find out the current polling addresses.

If you would change the polling addresses later, the *gas-net* device would not be able to identify the individual sensors correctly.

The device supplies the measuring sensors with power. For this, shielded cables must be used with the shielding being fitted only at the device but not at the sensor. If the line cross section is 1.5 square mm, the line should not be longer than 100 m; otherwise, it must be guaranteed that the lines are installed separately from other conducting lines to avoid interferences.

The cable shielding for all transmitter lines is placed on the **SH** terminal at the EXMFE5 input board.

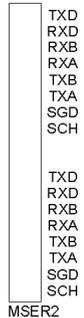
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<sup>5</sup> Please consult Elster if you would like to connect sensors via HART protocol and the cable is longer than 50 m.

### 2.2.2.2 MSER2 Serial Process Board

The MSER2 serial process board provides two interfaces supporting V24 (RS232) as well as RS422 and RS485. The table below shows the assignment of the individual pins:

Signal	Assignment
TXD	RS232: Transmitted data
RXD	RS232: Received data
RXB	RS422/RS485: Received data (B)
RXA	RS422/RS485: Received data (A)
TXB	RS422/RS485: Transmitted data (B)
TXA	RS422/RS485: Transmitted data (A)
SGD	Signal ground
SCH	Shield



An MSER2 board must always be installed in the device if an ultrasonic gas flow meter (type Q.Sonic or FLOWSIC) is connected via RS485. Another application of an MSER2 board is the connection of a host computer via RK512/3964R or MODBUS protocol or the connection of a GPS receiver for the time synchronization.

#### Notes:

- When RS422 and RS485 are used, a terminating resistor of 120 ohms may be required in the receiver between RXB and RXA, depending on the cable length.
- In case of RS485, you have to externally connect RXB to TXB and RXA to TXA.
- Please pay attention to the specification of the individual protocols. For instance, there are protocols that render a connection via RS485 impossible (e.g. in case of RK512).

### 2.2.2.3 EXDE6 Input Board

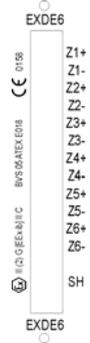
**Important note:** The EXDE6 input board is approved as an *associated electrical apparatus* of category *ib* according to DIN EN 50020 with intrinsically safe circuits. This is why signal transmitters located in hazardous areas (e.g. zone 1) can be connected to this board. A mixed operation of intrinsically safe and non-intrinsically safe circuits is not permissible for such an input board.

To the channels of an explosion-proof EXDE6 input board, intrinsically safe pulsers in NAMUR technique can be connected, but the channels may also be used as message input channels. Alternatively, it is also possible to connect an encoder totalizer to the first one of these input channels for the digital transmission of original meter readings.

Connect the signals for channels 1 to 6 to terminals **Z1+**, **Z1-** to **Z6+**, **Z6-**.

The inputs are intrinsically safe. Use shielded cables for a better interference suppression. The maximum cable length is 100 m at a cross section of 1.5 square mm. If the cables are longer, you have to ensure that the lines are installed separately from other conducting lines to avoid interferences.

The cable shielding for all transmitter lines is placed on the **SH** terminal at the EXDE6 input board.

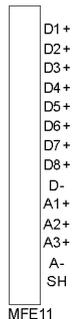


### 2.2.2.4 MFE11 Input Board

The multi-functional MFE11 input board is equipped with eight digital message inputs 0/24 V DC. However, it is also possible to use these channels as pulse inputs with a maximum input frequency of 25 Hz. Connect the inputs at terminals **D1+** to **D8+** with the common ground **D-**.

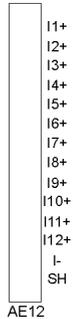
In addition, the MFE11 input board provides three analog inputs for the connection of measuring sensors with 0/4 to 20 mA output signals. Connect the inputs via terminals **A1+** / **A2+** / **A3+** with the common ground **A-**.

The analog inputs of the MFE11 board are electrically isolated from the digital inputs. Besides, all channels are electrically isolated from the rest of the system. Connect the cable shielding for the inputs to the **SH** terminal.



### 2.2.2.5 AE12 Input Board

The AE12 input board offers twelve analog inputs for the connection of measuring sensors with 0/4..20 mA output signals. Connect the inputs via terminals **I1+** to **I12+** with the common ground **I-**. Connect the cable shielding to the **SH** terminal.



### 2.2.2.6 MFA6 Output Board

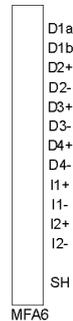
The multi-functional MFA6 output board contains one relay contact for the output of a message as break contact (**D1a/D1b**). In addition, there are three transistor outputs for the output of additional messages or volume pulses (**D2+/D2-**, **D3+/D3-**, **D4+/D4-**). The output assignment can be parameterized as desired within a certain range.

The MFA6 output board also provides two analog outputs for the output of measurements. The current limits can be parameterized in a range of 0 to 20 mA. The associated terminals are marked **I1+/I1-** or **I2+/I2-**.

The outputs are electrically isolated from each other and from the rest of the system.

The analog output assignment can be parameterized as desired.

Connect the cable shielding for the outputs to the **SH** terminal of the board.



### 2.2.2.7 MFA8 Output Board

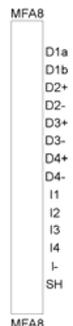
The multi-functional MFA8 output board contains one PhotoMos output for the output of a message as break contact (**D1a/D1b**). In addition, there are three PhotoMos outputs for the output of additional messages or volume pulses (**D2+/D2-**, **D3+/D3-**, **D4+/D4-**). The output assignment can be parameterized as desired within a certain range.

The MFA8 output board also provides four analog outputs for the output of measurements. Current limits can be parameterized in a range of 0 to 20 mA. The corresponding terminals are marked **I1** to **I4**, with common ground **I-**.

The message and pulse outputs are electrically isolated from each other and from the rest of the system; the analog outputs are electrically isolated from the rest of the system but not from each other.

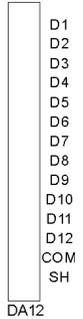
Connect the cable shielding for the outputs to the **SH** terminal of the board.

The analog output assignment can be parameterized as desired.



### 2.2.2.8 DA12 Output Board

The digital DA12 output board has 12 transistor outputs for the output of messages or volume pulses (to be connected to terminals **D1**,...,**D12** with the common reference point **COM**). Connect the cable shielding for the outputs to the **SH** terminal.



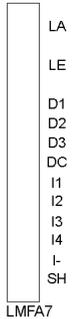
### 2.2.2.9 LMFA7 Output Board

The LMFA7 output board offers 3 digital outputs: one relay output (active break contact) for the output of a message and two transistor outputs for the output of messages or pulses. Connect the outputs via terminals **D1**, **D2**, **D3** with the common ground **DC**.

Furthermore, the LMFA7 board is equipped with 4 analog outputs 0/4..20 mA (terminals **I1**, **I2**, **I3**, **I4** with common ground **I-**).

The terminals named **LA** and **LE** right at the top of the board are reserved for later expansions (LA = fiber-optics output, LE = fiber-optics input).

Connect the cable shielding to the **SH** terminal of the board.



## 2.2.3 Further Connection Possibilities

### 2.2.3.1 Serial Interface DSS

The serial interface DSS in form of a SUB-DB 9 female connector on the front panel serves the connection of the *gas-net* F1 to other devices, such as a laptop computer or PC. The technical data is stated in the annex. An interconnecting cable to the computer can be delivered as accessory. A standard COM connection (one-to-one connection) is not permissible.

### 2.2.3.2 DSfG Interface (optional)

The DSfG protocol is an internal protocol for gas meters for data transmission between devices of the *gas-net* series.

The DSfG interface is a SUB-DB 9 male connector located on the back of the device. Secure the connector with screws.

### 2.2.3.3 TCP/IP Interface (optional)

The TCP/IP interface is an RJ45 socket at the back of the device. It facilitates the communication via Ethernet with 10/100 MBit/s and thereby integrates the device in a standard network installation. In addition to time synchronization based on the NTP protocol, remote inquiries and the Modbus-TCP protocol for exchanging data with external devices are also possible via the TCP/IP interface.

The IP address, subnet mask and gateway address must be parameterized for an adequate integration in the existing network infrastructure. Please pay attention to the fact that the IP address must be unambiguous in the subnet. Please ask the network administrator for the subnet mask and gateway address. The use of an STP CAT5 network cable (not transposed) is mandatory.

The pin assignment of the RJ45 socket corresponds to the general Ethernet standard.

The TCP/IP interface adjusts itself automatically to the network transmission rate.

### 2.2.3.4 COM2 Interface (optional)

The COM2 interface is a serial interface to RS232 and may be used as protocol interface for the connection of a host computer.

The corresponding pin assignment is as follows:

Pin no.	Signal	Signal name	9-pin rectangular connector
1	DCD	Data Carrier Detect	--
2	RXD	Receive Data	for RK512/3964R and MODBUS
3	TXD	Transmit Data	for RK512/3964R and MODBUS
4	DTR	Data Terminal Ready	--
5	GND	Signal Ground	for RK512/3964R and MODBUS
6	DSR	Data Set Ready	--
7	RTS	Request to Send	--
8	CTS	Clear to Send	--
9	RI	Ring indicator	--
Shield	--	Chassis	Same potential as protective earth

If the functionality of the integrated RDT shall be used, connect the modem or null-modem cable to the interface named **COM2**.

The connection of a wireless modem requires special attention and thus some preparations that must be accomplished before you may actually commission the device:

### **Provider Selection / Preparation for Antenna Selection**

The first step is the selection of a suitable provider for the usage of the wireless network, with consideration of area coverage and service rates. The provider's data service has to use the RLP protocol for data backup. The converter (gateway) of the provider has to offer an error protocol conversion according to MNP4 and V42, respectively.

In order to be able to select the correct antenna, check the data signal quality on site; for instance, check the field strength by means of a normal mobile phone.

Also check the installation possibilities for the antenna. Especially consider the characteristics of the building. An external installation is always preferable. Attention is to be paid to the station's environment. In case of stations located within built-up areas an antenna that can be protected against vandalism might be useful.

It is also important to measure the distance between antenna and modem to be able to order the antenna cable in the required length.

### **Component Composition**

As soon as you have finalized the contract with the provider you have to apply for the data service. Furthermore, make sure that the data service will be released by the scheduled commissioning date and that the chip card will be available, too.

Select the antenna depending on the determined data signal quality and preferably after consultation with Elster.

The following specifications are guidelines:

<b>Field strength</b>	<b>Suitable antenna</b>
High	omnidirectional dipole antenna with mounting base
Medium to low	flat omnidirectional antenna, also for external mounting and for mounting on metal surfaces
Low	directional antenna for pole mounting

The length of the antenna cable to be ordered depends on the distance between modem and antenna.

### **Commissioning of Wireless Modem**

Have the PIN number at hand, if required.

After having installed the antenna, connect it to the modem using the antenna cable. The antenna must be aligned to the maximum receiving level, except for the case that the antenna is an omnidirectional one.

**Note:** The further commissioning of the integrated RDT with wireless modem is described in Chapter 3.3 from page 3-7.

It is especially important for the further proceeding to enter the correct PIN number of the SIM card in the parameterization data record of the *gas-net* device.

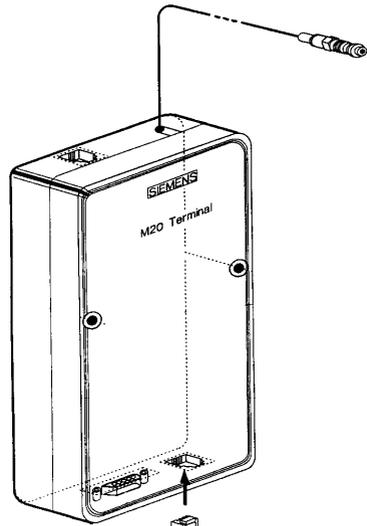
Please also observe the following notes on the correct voltage connection of a Siemens M20 or TC35 wireless modem:

**Connection of the Siemens M20 / TC35 Wireless Modem to 24 V**

Unfortunately, no generally valid color-coding details can be given for the connection of the M20 or TC35 wireless modem to 24 V DC. Due to the variety of different cables supplied, it is not possible to guarantee a uniform color coding.

Therefore, please proceed as follows: Position the Western plug of the connecting cable in such a way that the locking catch is at the front and pointing upwards. Look at the clamped cable: There are 6 wires. The assignment of the wires from left to right can be seen from the illustration on the right.<sup>6</sup>

In this way it is also possible to assign the color coding correctly at the open end of the cable and to connect the voltage supply correctly.



From left to right:

- 1: Earth
- 2: not assigned
- 3: +24 V
- 4: not assigned
- 5: not assigned
- 6: +24V



**Note:** Wires 3 and 6 must both be connected to +24 V! These are monitoring and supply signals.

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<sup>6</sup> The illustration shows a Siemens M20 wireless modem, but holds by analogy for the Siemens modem type TC35.



## 3 Commissioning

This chapter briefly describes the most important aspects of commissioning *gas-net* flow computers.

All parameters are listed in the annex to the first volume of the *Flow Computer gas-net F1* documentation.

### 3.1 Parameter Protection against Unauthorized Access

The functionality of a *gas-net* F1 can be completely configured via a parameter data record. Unauthorized persons must therefore be prevented from changing these parameters. In order to guarantee this protection, the device is provided with a two-level security system consisting of the *Calibration lock* (official safeguarding) and the *Locks* (user locks, password protection).

#### 3.1.1 Calibration Lock

The calibration lock physically consists of a sealable rotary switch on the front of the device. Open the calibration switch by turning it anticlockwise as far as it will go. For additional safeguarding, the device generates hint *H800: Calibration lock open* when the calibration switch is open.

Opening the calibration switch enables the operator to access all device parameters.

#### 3.1.2 User Lock

The user lock consists of one (numerical) lock for each of the two contract parties and is implemented via the software. This means that the locks are defined by the device parameterization and opened or closed via the operator panel. Open locks allow the user to access specific parameters or actions that are editable directly at the device. All parameters being subject to the user locks can be modified when both locks are or the calibration switch is open.

## 3.2 Parameterization

Use a PC or laptop computer to create a complete parameterization or to modify existing parameters (except for a few). Create the parameter data record with the GW-GNET+ parameterization software. The calibration switch has to be open during the import of a complete parameterization via DSS data interface.

**Note:** Please refer to Chapter 1 for brief instructions on the parameterization by means of GW-GNET+. For a comprehensive description of the parameterization program, the detailed GW-NET+ online help is available.

Parameters that are not protected by the calibration lock can also be changed by means of GW-GNET+ via the data interface, even if the calibration switch is closed. In case of password-protected parameters, however, the user locks must be open.

### Checking the Settings

It is possible to check the complete set of parameter settings of *gas-net* devices by means of the GW-GNET+ parameterization program.

Brief instructions on how to check the parameterization:

1. Connect the COM interface at the PC to the DSS interface at the *gas-net* device using a parameterization cable.
2. Start GAS-WORKS on your computer. Activate the communication program by clicking the **Import – Data interface** tool in the GW-BASE toolbar.
3. After having successfully started the communication program, you are linked with the connected device as regards data transmission. The window appearing on your screen shows some important basic device information.
4. Select the **Tools** tab now. Double-click the **Change parameters** or the **Edit parameterization** entry. The GW-GNET+ interface will appear on the screen. This is where you can invoke and check the parameter listings of the individual modules.



The billing-relevant parameters of the *gas-net* flow computers are very important. These parameters can be invoked at the operator panel to facilitate an effective supervision of the device configuration.

Brief instructions on how to check the device configuration:

When being in the basic display, invoke the module listing by pressing the Menu key twice.



1) Press the rightward arrow key until you have selected the *System* entry.

2) Press the Enter key. The main display of the *System* module is invoked, showing device identification data (software variant, software version, serial number, check sum...).



3) Press the Menu key again and select the *Device configuration* submenu.

The saved parameters are presented according to the modules they belong to for a better overview. Choose the desired module in the *Device configuration* display: Press the Enter key, select the module via the arrow keys and press the Enter key again. Then activate the *View* submenu, and the saved parameter listing of the module you have selected before will be invoked.

You may observe the currently incoming measurements of the connected pulse generators as well as the analogously connected measuring sensors in a special menu at the device.

Brief instructions on how to check the input signals:

1) Change to the display of the *System* module: While in the basic display, press the Menu key twice, then move to the *System* entry using the rightward arrow key and press the Enter key.



2) Press the Menu key again and move to the *Inputs* entry using the rightward arrow key. Then press the Enter key. The *Inputs* display will be invoked. At first, it shows information on the first channel of the input board on board location 1.



3) To move to the display of a different channel, change to the edit mode (by pressing the Enter key) and select the name of the desired input value in the appearing listing. After you have confirmed your selection by pressing the Enter key, the display for the chosen board will be invoked.

The output signals supplied via the MFA6 and MFA8 output board(s) may also be indicated for each channel via a special menu. This way, the operational capability and reliability of the outputs can be easily checked by comparison with the physical data.

Brief instructions on how to check the output signals:

- 1) Change to the display of the *System* module: While in the basic display press the Menu key twice, then move to the *System* entry using the rightward arrow key and press the Enter key.  

- 2) Press the Menu key again and move to the *Outputs* entry using the rightward arrow key. Then press the Enter key. The *Outputs* display will be invoked.  
  

- 3) Information on the first defined output channel is indicated. To move to the display of a different channel, get into to the edit mode (by pressing the Enter key). A listing with the names of all parameterized output channels appears. After you have chosen the desired output channel and pressed the Enter key, the display for the chosen board will be invoked.

### 3.3 Commissioning the Integrated RDT

Parameterize the settings for the integrated RDT (together with all other parameters of the *gas-net* device) using the GAS-WORKS module GW-GNET+. Please pay attention to the consistency of the parameter data record; it is especially important to choose the correct modem.

Different procedures are necessary for commissioning the integrated RDT, depending on the operating mode (dial-up line, GSM modem or TCP/IP network).



Dial-up line



GSM wireless  
modem



TCP/IP network

#### Dial-up Line:



- 1) Remove the DSfG connector on the back of the *gas-net* device if a local DSfG bus exists.
- 2) Connect the modem and COM2 interface at the *gas-net* device using the supplied V24 cable. Pull the telephone plug out of the TAE socket outlet.
- 3) Switch the supply voltage of the *gas-net* device off and on again. Switch to the basic display of the *Integrated RDT* module.  
The current status of the RDT is visible here. The device will try to initialize the modem directly after start-up.  
If the initialization fails, you will regularly receive *No modem* status messages between the individual initialization attempts. Check the modem settings of your parameterization in this case.  
Once the initialization has been successful, the status indication will change from *Modem initialization* to *Basic status*.
- 4) If there is a local DSfG bus, plug in the connector marked **DSfG** on the back of the *gas-net* device.  
Perform a general polling at the device representing the bus master, i.e. which contains the entity with the EADR “\_”.<sup>7</sup>

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<sup>7</sup> If an entity of the *gas-net* device is the bus master, initiate the general polling via the operator panel at the device:

- Switch to the main display of the *System* module.
- Invoke the menu and select the subordinate menu item *DSfG*.

Invoke the *DSfG* menu (*System* module) at the *gas-net* device, if this hasn't happened yet. You may view the station list here and compare it with the planned bus configuration to check.

- 5) Call your center and verbally announce the connection test. Switch the device off and immediately on again; this way you avoid the call delay times that may have been activated already and thus a waiting period. Then plug the cable into the TAE socket outlet.

If a routing job has already been pending, the RDT establishes the connection to the center. If this is not the case, you have to trigger an event that induces the RDT to call first; for instance, a correction module alarm.

The main menu of the *Integrated RDT* module indicates the RDT's status change. Once a data connection has been established and data has been exchanged, the **RX** and **TX** LEDs keep blinking irregularly on the back of the device.

- 6) After the connection to the center has been terminated successfully, check the telephone connection in the other direction. This means that the call has to originate in the center. The connection is implemented as described above. The employee at the center should formally release the telephone connection from his point of view.

- 
- Press the Menu key again and confirm the subordinate menu item *General polling*.

**GSM Wireless Modem:**

**Important note:** Before starting with the commissioning of the integrated RDT, make sure the accurate PIN number of the SIM card has been set in the parameterization of the *gas-net* device (*Integrated RDT* module). The reason is that the entry of a wrong PIN is only possible twice; if you enter the wrong number a third time, the SIM card will be deactivated.



- 1) Remove the DSfG connector on the back of the *gas-net* device if a local DSfG bus exists.
- 2) Disconnect the wireless modem from the supply and pull the V24 cable off the *gas-net* device.

Check whether the V24 cable is plugged in the modem. Test the antenna installation (has the antenna been connected?).

Insert the chip card in the modem if you haven't done it yet.

- 3) Switch off the *gas-net* device and plug in the V24 cable at the **COM2** interface. Switch the GSM modem and *gas-net* device on again.
- 4) Change to the basic display of the *Integrated RDT* module. The current status of the RDT is visible here. The device will try to initialize the modem directly after start-up.

If the initialization fails, you will regularly receive *No modem* status messages between the individual initialization attempts. Check the modem settings of your parameterization in this case.

Once the initialization has been successful, the status indication will change from *Modem initialization* to *Basic status*.

If the status indication shows the text *RDT not in operation*, the SIM card could not be recognized (for instance, because the card is defective or the PIN is not parameterized correctly). In such a case, the integrated RDT remains deactivated until the next start-up of the device will take place.

- 5) Check the modem's data signal quality via the *Integrated RDT – GSM* menu (cf. description in Volume 1 under *Integrated RDT Module, Display and Operation*).
- 6) If there is a local DSfG bus, plug in the connector marked **DSfG** on the back of the *gas-net* device. Perform a general polling at the device representing the bus master, i.e. which contains the entity with the EADR " " <sup>8</sup>.

Invoke the *DSfG* menu (*System* module) at the *gas-net* device. You can

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<sup>8</sup> If an entity of the *gas-net* device is the master, please refer to Footnote 7, Page 8-1, for information on how to perform a general polling.

view the station list here and compare it with the planned bus configuration to check.

- 7) Call your center now and announce the connection test.
- 8) If a routing job has already been pending, the RDT establishes the connection to the center. If this is not the case, you have to trigger an event that induces the RDT to call first; for instance, a correction module alarm.

The main menu of the *Integrated RDT* module indicates the RDT's status change. Once a data connection has been established and data has been exchanged, the **RX** and **TX** LEDs keep blinking irregularly on the back of the device.

- 9) After the connection to the center has been terminated successfully, check the telephone connection in the other direction. This means that the call has to originate in the center. The connection is implemented as described above. The employee at the center should formally release the telephone connection from his point of view.

### TCP/IP Network:



- 1) Remove the DSfG connector on the back of the *gas-net* device if a local DSfG bus exists.
- 2) Remove the network connector from the respective socket at the *gas-net* device.

Go to the main display of the *Integrated RDT* module.

It shows the current status of the RDT. The device will try to initialize the integrated network module directly after start-up.

If the initialization fails, you will regularly receive *Module error* status messages between the individual initialization attempts. Check whether your *gas-net* device is actually equipped with a network module.

Once the initialization has been successful, the status indication will change from *Initialization* to *Basic status*.

- 3) If there is a local DSfG bus, plug in the connector marked **DSfG** on the back of the *gas-net* device. Perform a general polling at the device representing the bus master, i.e. which contains the entity with the EADR " " <sup>9</sup>  
" " <sup>9</sup>

Invoke the *DSfG* menu (*System* module) at the *gas-net* device if this has not happened yet. It is possible to view the station list here and compare it

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<sup>9</sup> See Footnote 7.

with the planned bus configuration to check.

- 4) Now plug the network connector in the corresponding socket at the *gas-net* device. Call your center and ask for the connection test. The center staff now have to establish a connection to the IP address of your RDT with their data polling tools (which must support DSfG connections via network) and check the data polling. Once the connection has been successful, the main menu of the *Integrated RDT* module indicates the status change of the RDT. Afterwards, the center staff should release the connection.
- 5) After the connection has been successfully established by the center, the network connection has possibly to be checked in the other direction afterwards. This step has only to be taken if DSfG-related events shall spontaneously be signalized to another center via the network. This center must be able to receive DSfG calls via network. In this case the RDT wants to establish the connection. To initiate such a connection request, you first have to trigger an event that induces the RDT to call; e.g. an alarm at the flow computer. The connection will then be established as described above.



## 4 Maintenance

*gas-net* devices do not require much maintenance.

### 4.1 Battery Replacement

The device battery mainly runs down when the device is switched off. The battery consumption can be neglected as long as the device is switched on.

The battery should therefore be replaced after 5 years when in the meantime the device has been switched off for a longer period of time. Otherwise it is sufficient to replace the battery after 10 years at the latest.

If the battery must be replaced, this should only be executed by a service engineer or trained expert for safety reasons.

Important: The old battery must be disposed properly; i.e. it must either be returned to the distributor (Elster) or handed in at special battery take-back facilities.

To exchange the battery, you need to open the housing of the *gas-net* device.

Proceed as described below:

- A battery of the following type is required: lithium 3V CR ½ AA.
- Save the device parameterization by reading it out with GAS-WORKS, to be on the safe side. Read out the archives, too.
- Disconnect the supply voltage.
- Loosen the 4 fixing screws on the back of the device.
- Slightly withdraw the mounting rail.

**Attention:** The boards are sensitive! Avoid any contact with other components!

- The battery compartment is (seen from behind) on the board located back at the top on the far right side. Detach the cover strap of the battery compartment with a screwdriver. Remove the old battery. Now you have 15 minutes for the battery exchange. During these 15 minutes a data backup is guaranteed by a capacitor. Insert the new battery.

**Note:** When inserting the battery, pay attention to the correct polarity: The positive pole (+) must point downwards! A wrong polarity will not be noticed at first, but during the next power failure that lasts more than 15 minutes the device data will be lost.

- Re-assemble the device and connect the supply voltage.

## 5 Technical Data: *gas-net* F1

### Device Type

Electronic flow computer.

The device considers the compressibility ratio (k) according to SGERG-88 under ISO 12213-3 or to AGA-NX-19 or to AGA8-92 DC under ISO 12213-2.

Inclusion of the gas quality data as online data (via DSfG or Modbus protocol as standard) or fixed tabular values.

Alternatively, the correction method with  $k=\text{constant}$  may be used.

The *gas-net* F1 may also be operated with two or three streams and is capable of keeping totalizers for two flow directions for each corrected stream.

### Housing

Plug-in unit in 19" design, 3 height units, 1/3 or 1/2 mounting width for swing frame mounting.

Mounting depth is about 170 mm without connectors and about 220 mm with connectors.

Process interfacing is on the back; operator panel, on the front.

### Power Supply

24 V DC +/- 20 %; power input: up to 12 W. As an option: 230 V AC via external power supply.

### Operation

16 input keys (12 for numerical entry and 4 for navigation) and one calibration switch. Easy-to-learn operation via invokable menus. The GAS-WORKS program system provides a remote control function via modem and COM2 or DSS data interface.

### Display

Illuminated LCD; 8 lines with 32 characters each; status LED for the indication of mains/alarm/warning.

## Board Array

The board array depends on the tasks of the device and type of the input signals. The maximum number of boards depends on the housing size: Housings with a 1/3 mounting width accommodate up to four process boards whereas housings with a 1/2 mounting width accommodate up to seven process boards.

The following board types are currently available:

### EXMFE5 input board:

- Three pulse or message inputs [EEx ib] IIC. When being used as pulse input, the board is suitable for the connection of LF and HF pulsers similar to DIN 19234 for gas meters, with max. 10 kHz; automatic level adaptation by channel. The first channel is also suitable for connecting an encoder totalizer.
- Temperature sensor input for a PT100 in 4-wire technique; [EEx ib] IIC; the maximum measuring error is  $\pm 0.05$  % of the measurement in a range of -10 to +60°C and at an ambient temperature of 0 to 40°C.
- Measuring sensor input from 4 to 20 mA; [EEx ib] IIC; the maximum measuring error is  $\pm 0.05$  % of the measurement in a range of 4 to 20 mA and at an ambient temperature of 0 to 40°C.  
This channel can alternatively be used for the connection of up to 4 measuring sensors with HART interfaces (multi-drop).

### EXDE6 input board:

Six pulse or message inputs [EEx ib] IIC. When being used as pulse input, the board is suitable for connecting NF and HF pulsers similar to DIN 19234 for gas meters, with max. 5 kHz; automatic level adaptation per channel. The first channel is also suitable for connecting an encoder totalizer.

### MSER2 process board:

- Two serial interfaces for one protocol channel each.
- Each interface may be configured to RS232, RS485 or RS422 by a suitable assignment of the interface terminals.
- Implemented protocols: Modbus RTU, Modbus ASCII, Siemens 3964R, Q.Sonic ultrasonic gas meter protocol of Elster. Furthermore, it is possible to connect a FLOWSIC ultrasonic gas meter of SICK/MAIHAK or a GPS receiver for time synchronization.

MFE11 input board:

- Eight digital inputs that can be used as message inputs 0/24V DC or pulse inputs with a maximum input frequency of 20 Hz.
- Three measurement inputs 0/4 to 20 mA; the maximum measuring error is  $\pm 0.1$  % of the measurement in a range of 0 to 20 mA and at an ambient temperature of 0 to 40°C.

AE12 input board:

- Twelve analog inputs (0/4 to 20 mA).

MFA6 output board:

- One relay output (break contact, max. 28.8 V 120 mA).
- Three transistor outputs (max. 28.8 V DC 90 mA) for messages or pulses of max. 25 Hz.
- Two analog outputs 0/4 to 20 mA for measurements; max. load impedance: 300 ohms. The error is  $\pm 0.1$  % of the output value in a range of 4 to 20 mA and at an ambient temperature of 0 to 40°C.

MFA8 output board:

- One PhotoMos output (break contact, max. 28.8 V 120 mA).
- Three PhotoMos outputs (max. 28,8 VDC 120 mA) for messages or pulses of max. 25 Hz.
- Four analog outputs 0/4 to 20 mA for measurements; max. load impedance: 300 ohms. The error is  $\pm 0.1$  % of the output value in a range of 4 to 20 mA and at an ambient temperature of 0 to 40°C.

DA12 output board:

- Twelve transistor outputs (max. 28.8 V DC 150 mA) for messages or pulses of max. 25 Hz.

LMFA7 output board:

- One relay output (break contact, max. 28.8 V 120 mA).
- Two transistor outputs (max. 28.8 V DC 90 mA) for messages or pulses of max. 25 Hz.
- Four analog outputs 0/4 to 20mA.

**Other Interfaces**

Optional DSfG interface for data transmission between *gas-net* devices. Correction and data logging archives pollable via DSfG.

DSS data interface for the connection to the COM interface of a PC or laptop (for parameterization when commissioning and for archive polling).

Optional COM2 interface (serial interface to RS232C): Intended for connecting a modem with a maximum transmission rate to V.34 bis (33600 baud) and data compression to V.42 or NMP5 when the integrated RDT is used. An integrated RDT is also possible via a serial direct connection (null-modem cable at COM2). Alternatively, the COM2 interface may be used as protocol channel for connecting a host computer.

Optional TCP/IP interface in form of an RJ45 socket; facilitates data communication via Ethernet with 10/100 MBit/s and thereby integrates the device in a standard network installation. In addition to time synchronization based on the NTP protocol, remote inquiries and the Modbus-TCP protocol for exchanging data with external devices are also possible via the TCP/IP interface.

## 6 Annex

### 6.1 ATEX Certificate EXMFE5

- English translation of the German original certificate –

EX

**EXAM  
BBG Prüf- und Zertifizier GmbH**

(1)

### EC Type Examination Certificate

(2)

- Council Directive 94/9/EC -  
Protective devices and systems intended for use  
in potentially explosive atmospheres

(3)

**BVS 05 ATEX E 019**

(4)

**Device:** Process Board Type EXMFE5

(5)

**Manufacturer:** FLOW COMP Systemtechnik GmbH

(6)

**Address:** D – 44357 Dortmund

(7)

This device type and its various permissible versions are specified in the appendix to this Type Examination Certificate.

(8)

The EXAM BBG Prüf- und Zertifizier GmbH certification body, notified body no. 0158 in accordance with Article 9 of the European Parliament and Council Directive 94/9/EC of 23 March 1994, certifies that this device has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of protective devices and systems intended for use in potentially explosive atmospheres according to Annex II to the Directive. The test results are recorded in the test report BVS PP 05.2005 EC.

(9)

The compliance of the device with the Essential Health and Safety Requirements has been assured by compliance with

EN 50014:1997 + A1 – A2                      General Requirements  
EN 50020:2002                                  Intrinsic Safety 'i'

(10)

If the character "X" is placed after the certificate number, it indicates that the device is subject to special requirements for safe use as referenced in the appendix to this certificate.

(11)

This EC type examination certificate refers only to the design and construction of the specified device in accordance with Council Directive 94/9/EC. Further requirements of this Directive, which are not covered by this certificate, apply to the manufacture and supply of this device.

(12)

The marking of the device shall include the following details:

**Ex II (2)G [EEx ib] IIC**

**EXAM BBG Prüf- und Zertifizier GmbH**  
Bochum, 31 January 2005

\_\_\_\_\_  
Certification Body

\_\_\_\_\_  
Head of Unit

- English translation of the German original certificate –

**EXAM**  
**BBG Prüf- und Zertifizier GmbH**

(13) Appendix to

(14) **EC Type Examination Certificate**

**BVS 05 ATEX E 019**

(15) 15.1 Object and Type

Process Board Type EXMFE5

15.2 Description

The process board that will be installed outside potentially explosive atmospheres serves as power supply and for processing the signals of up to five sensors being installed in potentially explosive atmospheres.

15.3 Characteristics

15.3.1 Non-intrinsically safe supply and signal circuits (connector ST1)

Nominal voltage		DC	24	V
Maximum voltage	Um	AC	250	V

15.3.2 Intrinsically safe output circuits (terminal strip connections)

15.3.2.1 Channel 1 (terminals Z1+, Z1-)

Channel 2 (terminals Z2+, Z2-)

Channel 3 (terminals Z3+, Z3-)

Values per circuit

Voltage	Uo	DC	8.6	V
Current	Io		14.9	mA
Power	Po		32	mW

Linear output characteristic

Max. external inductivity	Lo		10	mH
Max. external capacitance	Co		0.5	µF

15.3.2.2 Channel 4 (terminals I+, I-, U+, U-)

Voltage	Uo	DC	5.9	V
Current	Io		14.4	mA
Power	Po		21	mW

Linear output characteristic

Max. external inductivity	Lo		10	mH
Max. external capacitance	Co		0.5	µF

15.3.2.3 Channel 5 (terminals P+, P-)

Voltage	Uo	DC	21	V
Current	Io		73.9	mA
Power	Po		388	mW

Linear output characteristic

Max. external inductivity	Lo		5	mH
Max. external capacitance	Co		0.18	µF

15.3.3 Ambient temperature range      Ta      -20°C to +70°C

- English translation of the German original certificate -

**EXAM**  
**BBG Prüf- und Zertifizier GmbH**

- (16) Test report  
BVS PP 05.2005 EC, as of 31 January 2005
- (17) Special conditions for safe use  
None





- (1) **EG-Baumusterprüfbescheinigung**
- (2) **- Richtlinie 94/9/EG -  
Geräte und Schutzsysteme zur bestimmungsgemäßen Verwendung  
in explosionsgefährdeten Bereichen**
- (3) **BVS 05 ATEX E 019**
- (4) **Gerät: Prozesskarte Typ EXMF5**
- (5) **Hersteller: FLOW COMP Systemtechnik GmbH**
- (6) **Anschrift: D 44357 Dortmund**
- (7) Die Bauart dieses Gerätes sowie die verschiedenen zulässigen Ausführungen sind in der Anlage zu dieser Baumusterprüfbescheinigung festgelegt.
- (8) Die Zertifizierungsstelle der EXAM BBG Prüf- und Zertifizier GmbH, benannte Stelle Nr. 0158 gemäß Artikel 9 der Richtlinie 94/9/EG des Europäischen Parlaments und des Rates vom 23. März 1994, bescheinigt, dass das Gerät die grundlegenden Sicherheits- und Gesundheitsanforderungen für die Konzeption und den Bau von Geräten und Schutzsystemen zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen gemäß Anhang II der Richtlinie erfüllt.  
Die Ergebnisse der Prüfung sind in dem Prüfprotokoll BVS PP 05.2005 EG niedergelegt.
- (9) Die grundlegenden Sicherheits- und Gesundheitsanforderungen werden erfüllt durch Übereinstimmung mit  
EN 50014:1997 + A1 – A2 Allgemeine Bestimmungen  
EN 50020:2002 Eigensicherheit 'I'
- (10) Falls das Zeichen „X“ hinter der Bescheinigungsnummer steht, wird in der Anlage zu dieser Bescheinigung auf besondere Bedingungen für die sichere Anwendung des Gerätes hingewiesen.
- (11) Diese EG-Baumusterprüfbescheinigung bezieht sich nur auf die Konzeption und die Baumusterprüfung des beschriebenen Gerätes in Übereinstimmung mit der Richtlinie 94/9/EG.  
Für Herstellung und in Verkehr bringen des Gerätes sind weitere Anforderungen der Richtlinie zu erfüllen, die nicht durch diese Bescheinigung abgedeckt sind.
- (12) Die Kennzeichnung des Gerätes muss die folgenden Angaben enthalten:

**Ex** II (2)G [EEEx ib] IIC

**EXAM BBG Prüf- und Zertifizier GmbH**  
Bochum, den 31. Januar 2005

Zertifizierungsstelle

Fachbereich



(13) Anlage zur

(14) **EG-Baumusterprüfbescheinigung****BVS 05 ATEX E 019**(15) 15.1 Gegenstand und Typ

Prozesskarte Typ EXMFE5

15.2 Beschreibung

Die Prozesskarte, die außerhalb des explosionsgefährdeten Bereiches errichtet wird, dient zur Energieversorgung und Verarbeitung der Signale von bis zu fünf Sensoren, die im explosionsgefährdeten Bereich installiert sind.

15.3 Kenngrößen

15.3.1	nicht-eigensichere Versorgungs- und Signalstromkreise (Stecker ST1)				
	Nennspannung		DC	24	V
	max. Spannung	Um	AC	250	V
15.3.2	eigensichere Ausgangsstromkreise (Anschl. Stiflleiste)				
15.3.2.1	Kanal 1 (Anschl. Z1+, Z1-)				
	Kanal 2 (Anschl. Z2+, Z2-)				
	Kanal 3 (Anschl. Z3+, Z3-)				
	Werte je Kreis				
	Spannung	U <sub>o</sub>	DC	8,6	V
	Stromstärke	I <sub>o</sub>		14,9	mA
	Leistung	P <sub>o</sub>		32	mW
	linearere Ausgangskennlinie				
	max. äußere Induktivität	Lo		10	mH
	max. äußere Kapazität	Co		0,5	µF
15.3.2.2	Kanal 4 (Anschl. I+, I-, U+, U-)				
	Spannung	U <sub>o</sub>	DC	5,9	V
	Stromstärke	I <sub>o</sub>		14,4	mA
	Leistung	P <sub>o</sub>		21	mW
	linearere Ausgangskennlinie				
	max. äußere Induktivität	Lo		10	mH
	max. äußere Kapazität	Co		0,5	µF
15.3.2.3	Kanal 5 (Anschl. P+, P-)				
	Spannung	U <sub>o</sub>	DC	21	V
	Stromstärke	I <sub>o</sub>		73,9	mA
	Leistung	P <sub>o</sub>		388	mW
	linearere Ausgangskennlinie				
	max. äußere Induktivität	Lo		5	mH
	max. äußere Kapazität	Co		0,18	µF
15.3.3	Umgebungstemperaturbereich	Ta		-20 °C bis +70 °C	



- (16) Prüfprotokoll  
BVS PP 05.2005 EG, Stand 31.01.2005
  
- (17) Besondere Bedingungen für die sichere Anwendung  
Entfällt



## 6.2 ATEX Certificate EXDE6

- English translation of the German original certificate -

EX

EXAM  
BBG Prüf- und Zertifizier GmbH

(1)

### EC Type Examination Certificate

(2)

- Council Directive 94/9/EC -  
Protective devices and systems intended for use  
in potentially explosive atmospheres

(3)

**BVS 05 ATEX E 018**

(4)

**Device:** Process Board Type EXDE6

(5)

**Manufacturer:** FLOW COMP Systemtechnik GmbH

(6)

**Address:** D – 44357 Dortmund

(7)

This device type and its various permissible versions are specified in the appendix to this Type Examination Certificate.

(8)

The EXAM BBG Prüf- und Zertifizier GmbH certification body, notified body no. 0158 in accordance with Article 9 of the European Parliament and Council Directive 94/9/EC of 23 March 1994, certifies that this device has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of protective devices and systems intended for use in potentially explosive atmospheres according to Annex II to the Directive. The test results are recorded in the test report BVS PP 05.2004 EC.

(9)

The compliance of the device with the Essential Health and Safety Requirements has been assured by compliance with

EN 50014:1997 + A1 – A2	General Requirements
EN 50020:2002	Intrinsic Safety 'i'

(10)

If the character "X" is placed after the certificate number, it indicates that the device is subject to special requirements for safe use as referenced in the appendix to this certificate.

(11)

This EC type examination certificate refers only to the design and construction of the specified device in accordance with Council Directive 94/9/EC. Further requirements of this Directive, which are not covered by this certificate, apply to the manufacture and supply of this device.

(12)

The marking of the device shall include the following details:

**Ex II (2)G [EEx ib] IIC**

EXAM BBG Prüf- und Zertifizier GmbH  
Bochum, 31 January 2005

\_\_\_\_\_  
Certification Body

\_\_\_\_\_  
Head of Unit

- English translation of the German original certificate -

**EXAM**  
**BBG Prüf- und Zertifizier GmbH**

(13) Appendix to

(14) **EC Type Examination Certificate**

**BVS 05 ATEX E 018**

(15) 15.1 Object and Type

Process Board Type EXDE6

15.2 Description

The process board that will be installed outside potentially explosive atmospheres serves as power supply and for processing the signals of up to six sensors being installed in potentially explosive atmospheres.

15.3 Characteristics

15.3.1 Non-intrinsically safe supply and signal circuits (connector ST1)

Nominal voltage		DC	24	V
Maximum voltage	Um	AC	250	V

15.3.2 Intrinsically safe output circuits (terminal strip connections)

Channel 1 (terminals Z1+, Z1-)

Channel 2 (terminals Z2+, Z2-)

Channel 3 (terminals Z3+, Z3-)

Channel 4 (terminals Z4+, Z4-)

Channel 5 (terminals Z5+, Z5-)

Channel 6 (terminals Z6+, Z6-)

Values per circuit

Voltage	Uo	DC	9.6	V
Current	Io		9.8	mA
Power	Po		24	mW
Linear output characteristic				

Max. external inductivity	Lo		10	mH
Max. external capacitance	Co		0.5	µF

15.3.3 Ambient temperature range      Ta      -20°C to +70°C

(16) Test report

BVS PP 05.2004 EC, as of 31 January 2005

(17) Special conditions for safe use

None

Page 2 of 2 of BVS 05 ATEX E 018

This certificate may only be circulated without alteration.

Dinnendahlstrasse 9 44809 Bochum      Tel. +49 (201) 172 3947      Fax +49 (201) 172 3948



## (1) EG-Baumusterprüfbescheinigung

- (2) **- Richtlinie 94/9/EG -**  
Geräte und Schutzsysteme zur bestimmungsgemäßen Verwendung  
in explosionsgefährdeten Bereichen

(3) **BVS 05 ATEX E 018**

(4) **Gerät:** Prozesskarte Typ EXDE6

(5) **Hersteller:** FLOW COMP Systemtechnik GmbH

(6) **Anschrift:** D - 44357 Dortmund

(7) Die Bauart dieses Gerätes sowie die verschiedenen zulässigen Ausführungen sind in der Anlage zu dieser Baumusterprüfbescheinigung festgelegt.

(8) Die Zertifizierungsstelle der EXAM BBG Prüf- und Zertifizier GmbH, benannte Stelle Nr. 0158 gemäß Artikel 9 der Richtlinie 94/9/EG des Europäischen Parlaments und des Rates vom 23. März 1994, bescheinigt, dass das Gerät die grundlegenden Sicherheits- und Gesundheitsanforderungen für die Konzeption und den Bau von Geräten und Schutzsystemen zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen gemäß Anhang II der Richtlinie erfüllt.  
Die Ergebnisse der Prüfung sind in dem Prüfprotokoll BVS PP 05.2004 EG niedergelegt.

(9) Die grundlegenden Sicherheits- und Gesundheitsanforderungen werden erfüllt durch Übereinstimmung mit

EN 50014:1997 + A1 – A2 Allgemeine Bestimmungen  
EN 50020:2002 Eigensicherheit 'I'

(10) Falls das Zeichen „X“ hinter der Bescheinigungsnummer steht, wird in der Anlage zu dieser Bescheinigung auf besondere Bedingungen für die sichere Anwendung des Gerätes hingewiesen.

(11) Diese EG-Baumusterprüfbescheinigung bezieht sich nur auf die Konzeption und die Baumusterprüfung des beschriebenen Gerätes in Übereinstimmung mit der Richtlinie 94/9/EG.  
Für Herstellung und in Verkehr bringen des Gerätes sind weitere Anforderungen der Richtlinie zu erfüllen, die nicht durch diese Bescheinigung abgedeckt sind.

(12) Die Kennzeichnung des Gerätes muss die folgenden Angaben enthalten:

 **II (2)G [EEEx ib] IIC**

**EXAM BBG Prüf- und Zertifizier GmbH**

Bochum, den 31. Januar 2005

  
Zertifizierungsstelle

  
Fachbereich



(13) Anlage zur

(14) **EG-Baumusterprüfbescheinigung**

**BVS 05 ATEX E 018**

(15) 15.1 Gegenstand und Typ

Prozesskarte Typ EXDE6

15.2 Beschreibung

Die Prozesskarte, die außerhalb des explosionsgefährdeten Bereiches errichtet wird, dient zur Energieversorgung und Verarbeitung der Signale von bis zu sechs Sensoren, die im explosionsgefährdeten Bereich installiert sind.

15.3 Kenngrößen

15.3.1 nicht-eigensichere Versorgungs- und Signalstromkreise (Stecker ST1)

Nennspannung		DC	24	V
max. Spannung	Um	AC	250	V

15.3.2 eigensichere Ausgangstromkreise (Anschl. Stiffliste)

Kanal 1 (Anschl. Z1+, Z1-)

Kanal 2 (Anschl. Z2+, Z2-)

Kanal 3 (Anschl. Z3+, Z3-)

Kanal 4 (Anschl. Z4+, Z4-)

Kanal 5 (Anschl. Z5+, Z5-)

Kanal 6 (Anschl. Z6+, Z6-)

Werte je Kreis

Spannung	Uo	DC	9,6	V
----------	----	----	-----	---

Stromstärke	Io		9,8	mA
-------------	----	--	-----	----

Leistung	Po		24	mW
----------	----	--	----	----

linearere Ausgangskennlinie

max. äußere Induktivität	Lo		10	mH
--------------------------	----	--	----	----

max. äußere Kapazität	Co		0,5	µF
-----------------------	----	--	-----	----

15.3.3 Umgebungstemperaturbereich	Ta		-20 °C bis +70 °C	
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(16) Prüfprotokoll

BVS PP 05.2004 EG, Stand 31.01.2005

(17) Besondere Bedingungen für die sichere Anwendung

Entfällt

## 6.3 Certificate of Conformity

### EC Declaration of Conformity

**Manufacturer:** Elster-Instromet Systems GmbH  
**Address:** Schlossstraße 95a, D-44357 Dortmund  
**Product family:** *gas-net Series II, device names Z0, Z1, M1, F1, C1, C2, D1, EnCal3000*

The described product is in conformity with the provisions of the following European directive:

**Council Directive 89/336/EC of 3 May 1989 on the approximation of the laws of the member states relating to electromagnetic compatibility**

The conformity of the described product for usage in domestic and industrial environment to the provisions of above directive is proven by complete conformity to the following harmonised European standards:

- EN 61000-6-3:2005 (interference emission)
- EN 61000-6-2:2001 (interference immunity)

If the product provides process-cards for connecting electrical equipment residing in potentially explosive atmospheres, the product additionally is in conformity with the provisions of the European directive

**Council Directive 94/9/EC Equipment and protective systems intended for use in potentially explosive atmospheres.**

This is proven by complete conformity to the following harmonised European standards:

- EN 50014:1997 +A1+A2 (general requirements)
- EN 50020:2002 (intrinsic safety)

This declaration certifies the conformity of the product to the mentioned directives. However, it does not imply any assurance of properties. The safety and installation instructions given in the attached product documentation must be observed.

**Dortmund, 20.08.2006**

Dr.-Ing. Dieter Stimberg  
(Geschäftsführung)



Dipl.-Ing. Ulrich Ewerlin  
(Hardware-Entwicklung)



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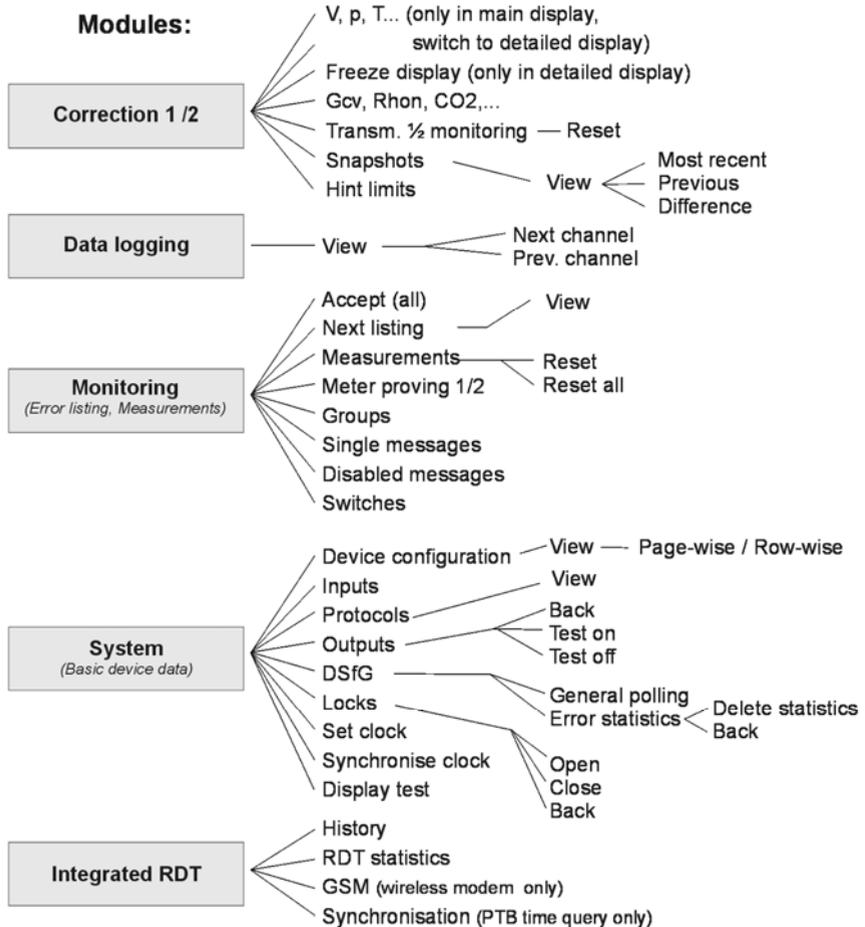
09.2006

EIS / UE



## 6.4 Menu Structure

Within the main display of a module, you may open the listing of the subordinate menu items by pressing the menu button . By pressing the button  again, the menu with the listing of all available modules is opened.



Menu items for functionalities that are not parameterised are not displayed.

Following modules are not listed in the menu overview shown above:

- **GQ Import** (Display for incoming gas quality values without any subordinate menu items)
- **DSfG(-Requester)** and **Data exchange** (Host communication) for the gateway functionality (this display is meant for diagnosis by experts only)



## 7 Bibliography

- ISO 12213-3: Natural gas – Calculation of compression factor
- DIN EN 50014, DIN EN 50020 and DIN EN 50029
- DIN 19 235: Measurement and control; signalling of operating conditions



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