ifm electronic

CE

Device manual

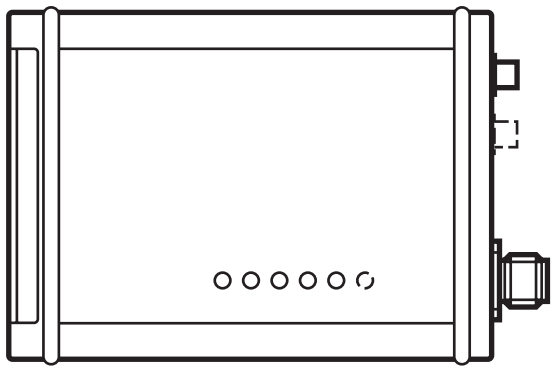
UK

CANremote
GSM quad-band modem
for CANopen networks
(without/with GPS receiver)

ecomat100®

CR3105
CR3106

7390697 / 01 09 / 2014



Contents

This document is the original instructions.

Licences and trademarks

1 Preliminary note

1.1 Symbols used

► Instruction
> Reaction, result
[…] Designation of pushbuttons, buttons or indications
→ Cross-reference

Important note
Non-compliance can result in malfunction or interference.

Information
Supplementary note

1.2 Warning signs used

⚠ WARNING
Warning of serious personal injury.
Death or serious irreversible injuries may result.

⚠ CAUTION
Warning of personal injury.
Slight reversible injuries may result.

NOTICE
Warning of damage to property.

1.3 Further documentation

If the device is operated using the control program CoDeSys 2.3 and an ifm controller, further documentation is available on the internet.

- Programming manual CoDeSys 2.3:
  www.ifm.com → data sheet search → e.g. CR0020 → Download/Software[1]
- System manual R360 (CoDeSys 2.3):
  www.ifm.com → data sheet search→ e.g. CR0020 → Additional data
- NMEA protocol with the structure of the supported GPS datasets and structure of the possible SMS commands:
  www.ifm.com → data sheet search → e.g. CR3106 → Additional data

[1]) Download area with registration

2 Safety instructions

These instructions are part of the device. They contain information and illustrations about the correct handling of the device and must be read before installation or use.

2.1 General

Follow the operating instructions. Non-observance of the instructions, operation which is not in accordance with use as prescribed below, wrong installation or incorrect handling can affect the safety of operators and machinery.
The device must only be installed, connected and put into operation by a qualified electrician.
Disconnect the device externally before handling it.

In case of malfunction of the device or queries please contact the manufacturer. Tampering with the device can seriously affect the safety of operators and machinery. This is not permitted and leads to an exclusion of liability and warranty.

2.2 Air traffic

The device must not be operated on board of aircraft.
Using it in an aircraft can affect the navigation and communication systems. An offence can lead to legal action against the offender.

2.3 Explosive substances

In general, radio equipment must not be used in the vicinity of petrol stations, fuel depots, chemical plants or blasting operations.
Do not transport and store any flammable gases, liquids or explosive substances in the part of the vehicle where the device is installed.

2.4 Electronic devices

Operation can affect the function of electronic devices that are not correctly shielded.
Disconnect the unit in the vicinity of medical equipment. Please contact the manufacturer of the corresponding device or equipment in case of problems.

2.5 Antenna(s)

Operation without antenna(s) can lead to destruction of the device.

2.6 Loss/theft of the SIM card

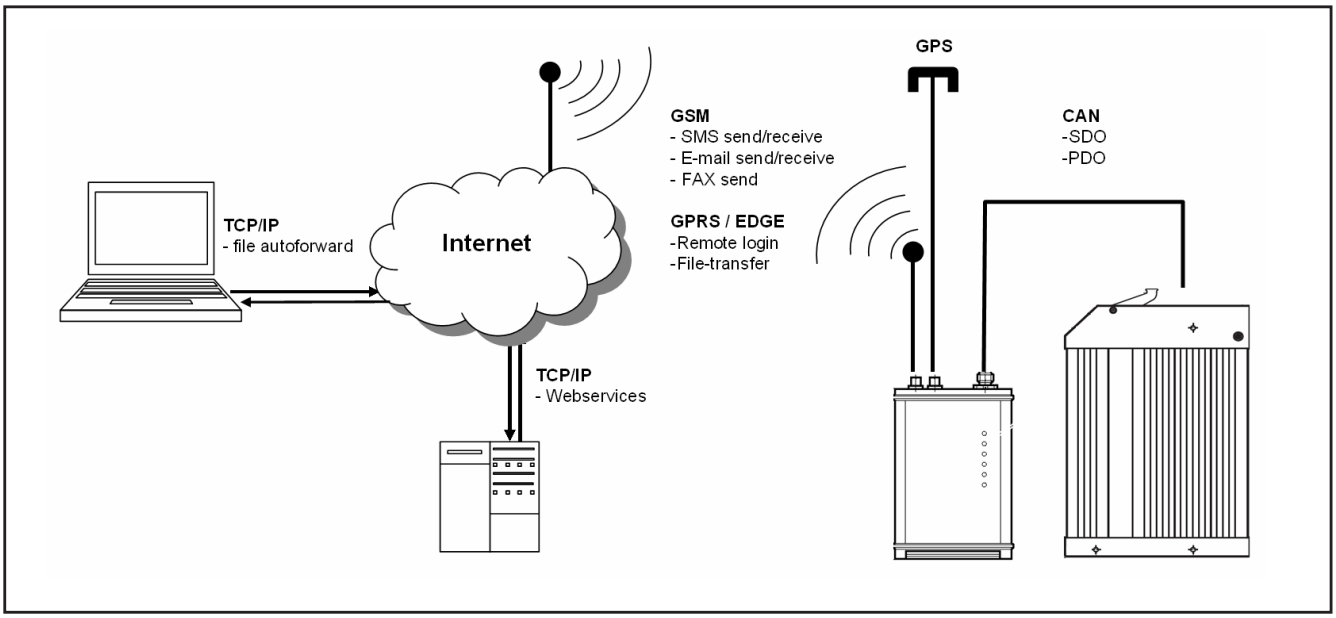
To prevent misuse, immediately inform your network operator in case of loss or theft of the SIM card or the device.

3 Functions and features

The device is a GSM modem with integrated CAN gateway for the direct connection to the controller. The data is transmitted via the CAN bus according to the CANopen specification.

The device can be directly integrated into the machine or the mobile equipment.

A 5-pole M12 connector is used for the CAN connection and voltage supply.



Operating principle

3.1 Applications

- Remote diagnosis of system states of the connected actuators
- Alarm messages as SMS, e-mail or fax (only unidirectional)
- Reading operational data of the system
- Location tracking of mobile machines (only possible with CR3106)
- Receiving and sending files via the ifm remote maintenance portal

To implement the applications ifm provides different chargeable communication packages.

3.2 Products of the ifm remote maintenance portfolio

Communication packages (chargeable)	Order no.
Real-time access / internet portal / GPS [1] (Europe)	ZC0029 [2]
Real-time access	ZC0030 [2]
Internet portal	ZC0031
Internet portal / GPS [1] (Europe)	ZC0032
Real-time access for device pool	ZC0033 [2]
Real-time access / portal on demand	ZC0034 [2]
Customer-specific set-up	ZC0035

Communication packages (chargeable)	Order no.
File transfer (CANremoteWebClient)	ZC0036

[1]) The GPS coordinates are graphically represented in Google Maps.

[2]) For real-time access a CoDeSys add-on (CANremote_Client) is necessary.
It is part of the DVD "ecomat*mobile* Software, tools and documentation" or can be downloaded.

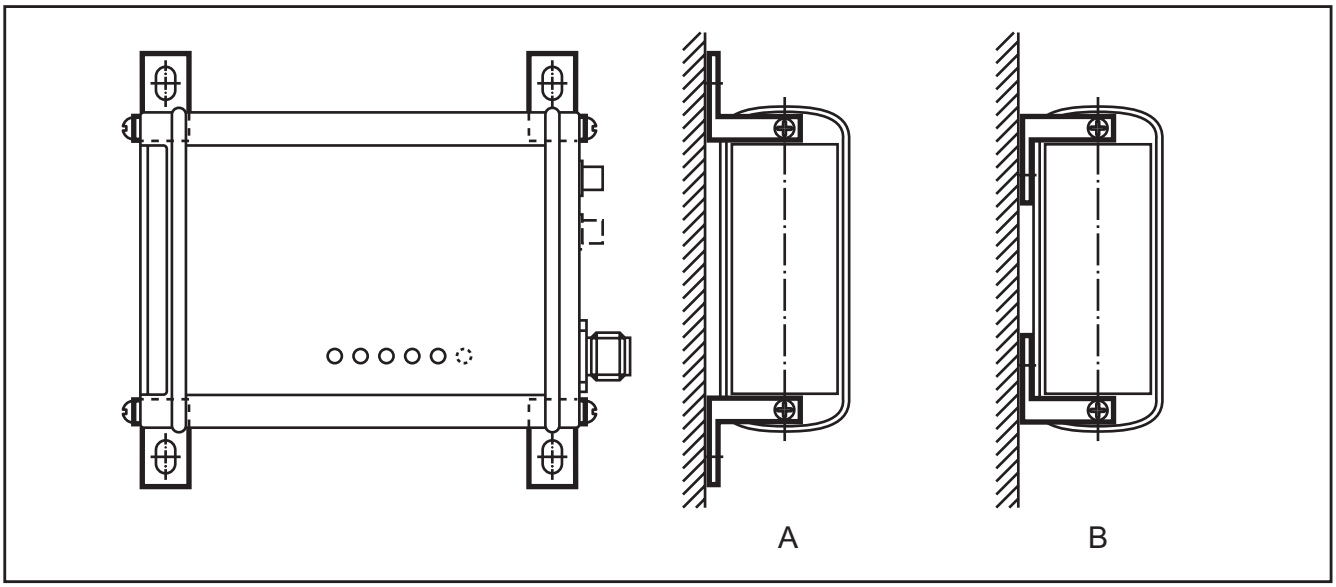
Information about the available software tools at:
www.ifm.com → data sheet search → e.g. CR3106 → Download/Software*

*) Download area with registration

4 Installation

To ensure that the device is protected against electrical interference the housing must be connected to the ground of the vehicle.
This is, for example, guaranteed when the device is fixed to the conductive parts of the vehicle using the supplied brackets.

The screws under the 4 caps are used to fix the brackets.



Fixing variants

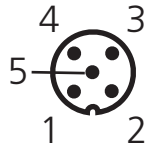
► Remove the 4 caps on the side of the device to fix the brackets.

► Choose the suitable mounting variant A or B depending on available space.

► Observe the safety instructions (→ 2 Safety instructions).

5 Electrical connection

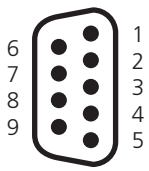
5.1 Operating voltage and CAN interface

M12 connector (5 poles)		Pin	Potential
	Operating voltage	1	GND
		2	10...30 V DC
	CAN interface	3	CAN_GND
		4	CAN_H
		5	CAN_L

NOTICE

Since the CAN interface of the device is electrically separated the potential CAN_GND of all CAN participants must be linked.
Otherwise a safe device function is not ensured or the CAN interface can be destroyed.

5.2 Serial interface

SUB-D plug (9 poles)		Pin	Potential
		1	n.c.
	GSM modem → PC	2	TxD
	GSM modem ← PC	3	RxD
	Dataset ready	4	DSR
	Signal ground	5	GND
		6...9	n.c.

The serial interface is only used for configuring the device using the software tool "CANremote_Configurator".

Information about the available software tools at:
www.ifm.com → data sheet search → e.g. CR3106 → Download/Software*

*) Download area with registration

5.3 Antenna(s)

► When mounting the antenna(s) in vehicles avoid the vicinity of fuel tanks, vessels with explosives or insufficiently screened electronic components (→ 2 Safety instructions).

► Do not install the antenna(s) in enclosed metal constructions such as driver's cabs (screening Faraday effect).

► Do not extend or shorten the cable of the antenna(s)!

NOTICE

Operation without antenna(s) can lead to destruction of the device.

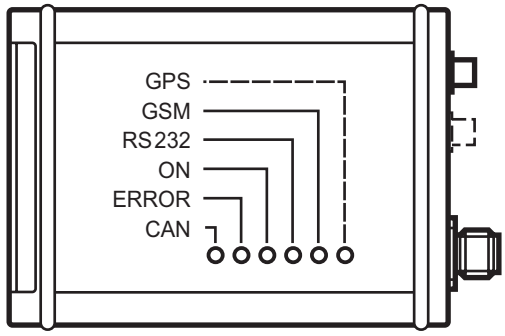
UK

A good antenna signal is the prerequisite for a stable direct online transmission. In case of problems change the position of the antennas or the mobile equipment if necessary. A loosely tightened antenna connector also causes signal loss!

► Please observe the notes of the antenna manufacturer.

6 Operating and display elements

6.1 LEDs



LED	Permanently lit		Flashing		Off
CAN	green	operational	green	preoperational	portal mode
		configurator			
	yellow	downloader			
ERROR	red	error during operation	red	error after power on	no error
		downloader			programming mode
ON	green	operating voltage	green	portal mode	power off
		configurator			
		downloader			
RS-232	green	RS-232 connection	green	RS-232 or connecting to portal	portal mode
		configurator			
	orange	downloader			
GSM	green	GSM connection / programming mode	yellow	real-time mode	–
	orange	downloader	green	file transfer mode	
GPS*	green	GPS signal	green	finding GPS signal	–
		downloader			

Configurator = CANremote_Configurator
Downloader = CANmem_com_Downloader

In the initialisation phase (about 5 s) the LEDs indicate no defined status.

*) only CR3106

If all LEDs flash simultaneously, the device is in the configuration mode (switch the device off/on (reset) = back in normal operation).

If all LEDs are constantly "On" simultaneously, the device is in the firmware update mode (switch the device off/on (reset) = back in normal operation).

7 Set-up

7.1 SIM card

The device can only be operated with a valid SIM card (Subscriber Identity Module). You obtain this card as well as your personal identification number (PIN) from your network operator or GSM service provider.

The PIN enables access to the device and the GSM network. With the card you can also save messages (SMS) and telephone numbers.

The SIM card only functions with a valid PIN.The PIN is an integral part of the device configuration. If the SIM card PIN does not match the PIN saved in the device, the SIM card is blocked after 3 unsuccessful dial-up attempts in the GSM network.

For the direct transmission via modem (online mode) you require a SIM card which supports the GSM data service.

If you want to use the SIM card only in conjunction with the device, it is in some cases possible to make 'data only' contracts with the provider.
In that case the online costs may be lower.

NOTICE

The SIM card and its contacts can be easily damaged by scratching or bending. Therefore use the card carefully and avoid touching the contacts.

NOTICE

Always disconnect the device before you insert or remove the card.

7.1.1 SIM card for the direct online data transmission

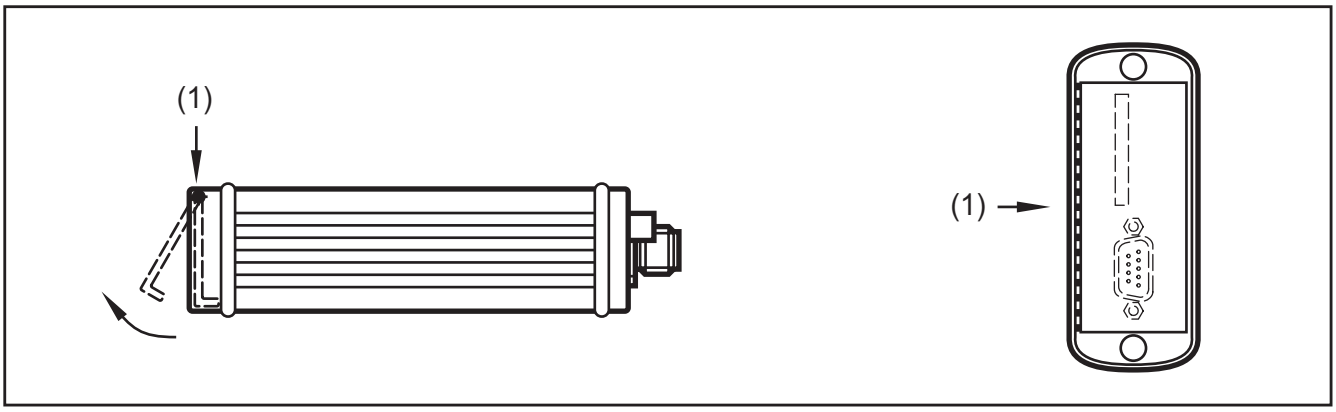
The SIM card and the internet service provider for the direct online data transmission must meet the following criteria:

- Global roaming active
- GPRS data transfer active
- Volume-based cost tariff
- The internet service provider (ISP) must supply the data for setting up the device (→ 7.5.4 GPRS parameters).

Some telecommunication providers of prepaid contracts do not support the direct online data transmission.

7.2 Opening the lid

The lid of the device is equipped with a special spring hinge.

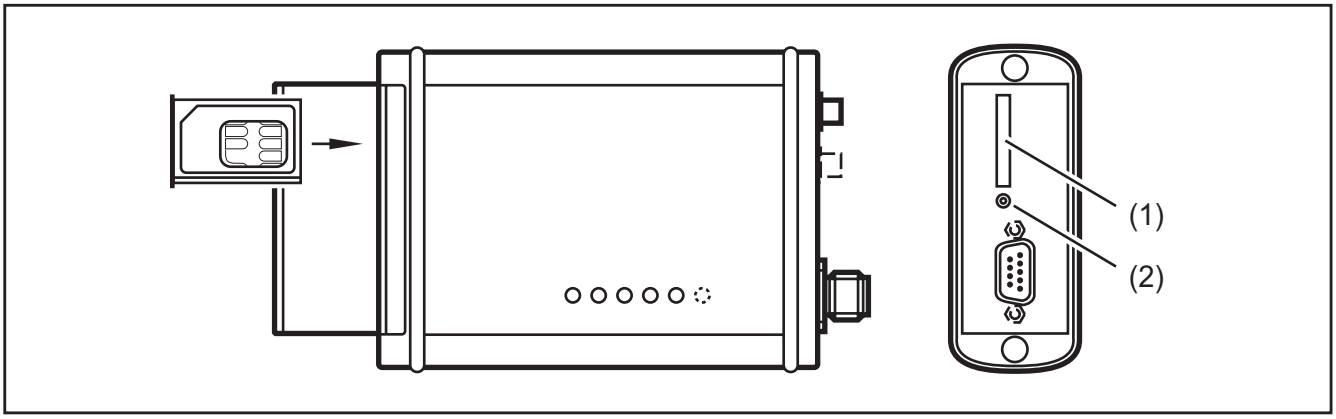


1. Direction of pressure

► To open the lid slight pressure must be applied to the hinge.
When the device is mounted, use a screwdriver or a similar flat object to do so.

7.3 Inserting the SIM card

► Disconnect the device.
► Press the SIM eject button using a pointed object (e.g. ballpen).
> The SIM card holder will then slightly protrude from the slot and can be removed.
► Insert the SIM card of the network operator or of the GSM service provider into the slot of the card holder.



1. Slot (SIM card holder)
2. SIM eject button

► Insert the card holder with the SIM card into the slot without much pressure until you feel a stop.

NOTICE

When inserting the card, make sure that the SIM card holder is exactly in the guides of the slot and that it is not jammed.

7.4 Removing the SIM card

► Disconnect the device.
► Open the lid (→ 7.2 Opening the lid).
► Press the SIM eject button using a pointed object.
► Remove the card holder.
► Remove the SIM card from the card holder.

7.5 Setting up the device with the CANremote_Configurator

7.5.1 Connection

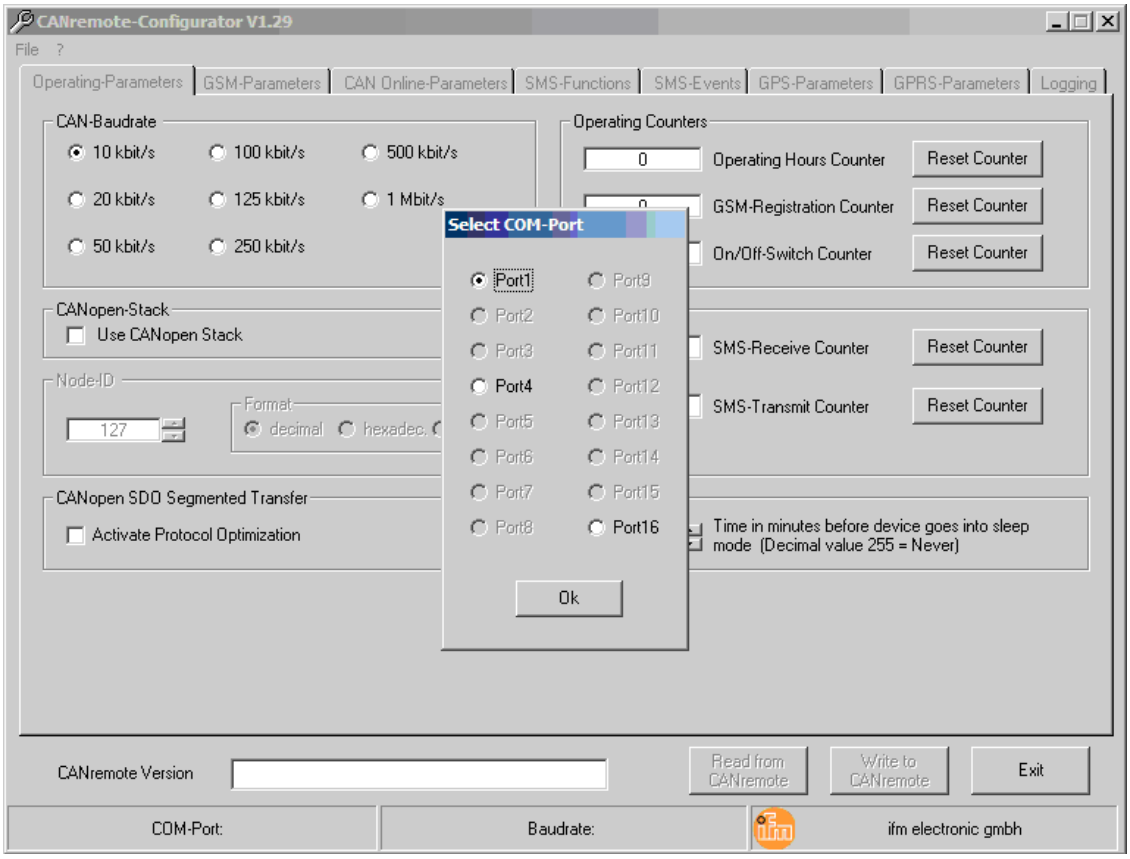
► Switch off the device.

► Connect the device to the serial interface of the PC or notebook via the SUB-D connector.

► Start the software tool "CANremote_Configurator".

> The window "Select COM-Port" opens automatically.

► Select the interface to be used for communicating with the device in the window "Select COM-Port".

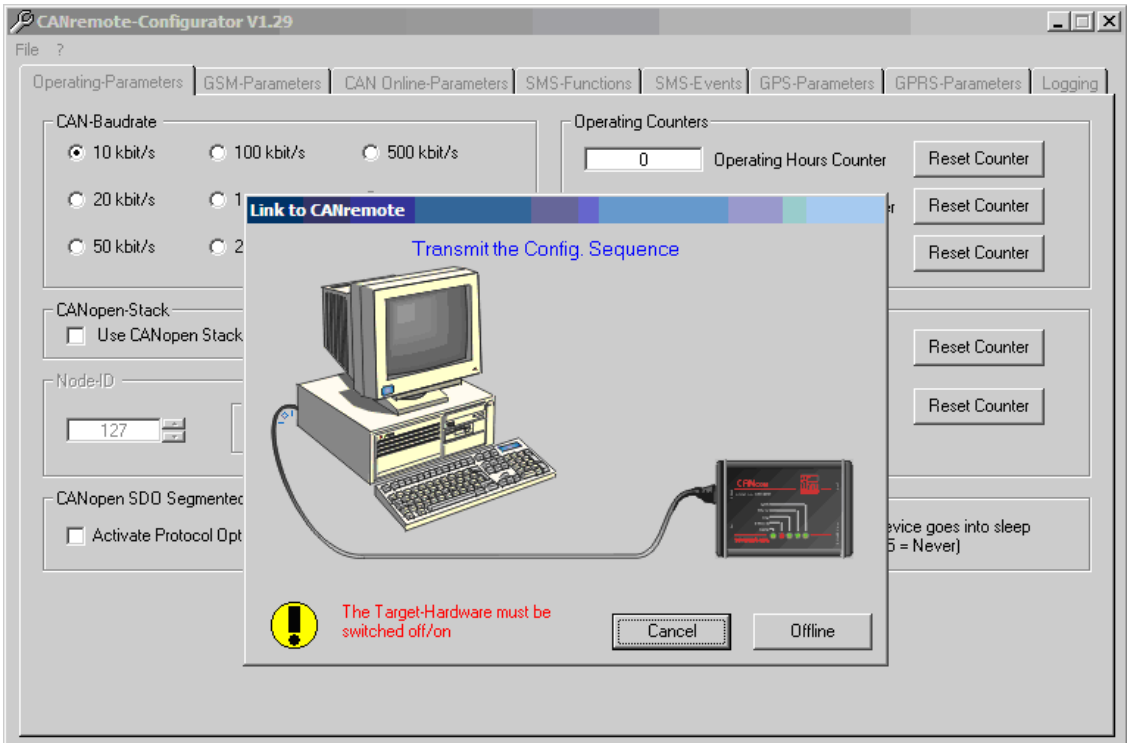


Selection of the serial interface

► Acknowledge with [OK].

> In the window "Link to CANremote" you are requested to switch on the device.

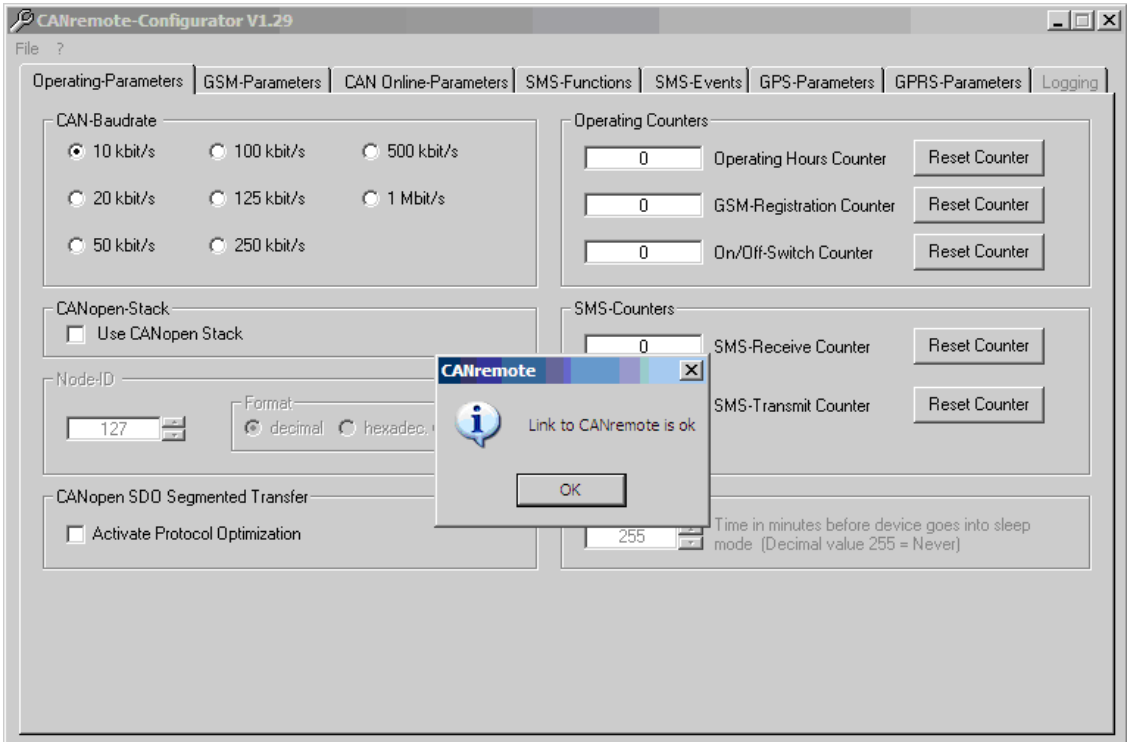
► Switch on the device.



Request to switch on the device

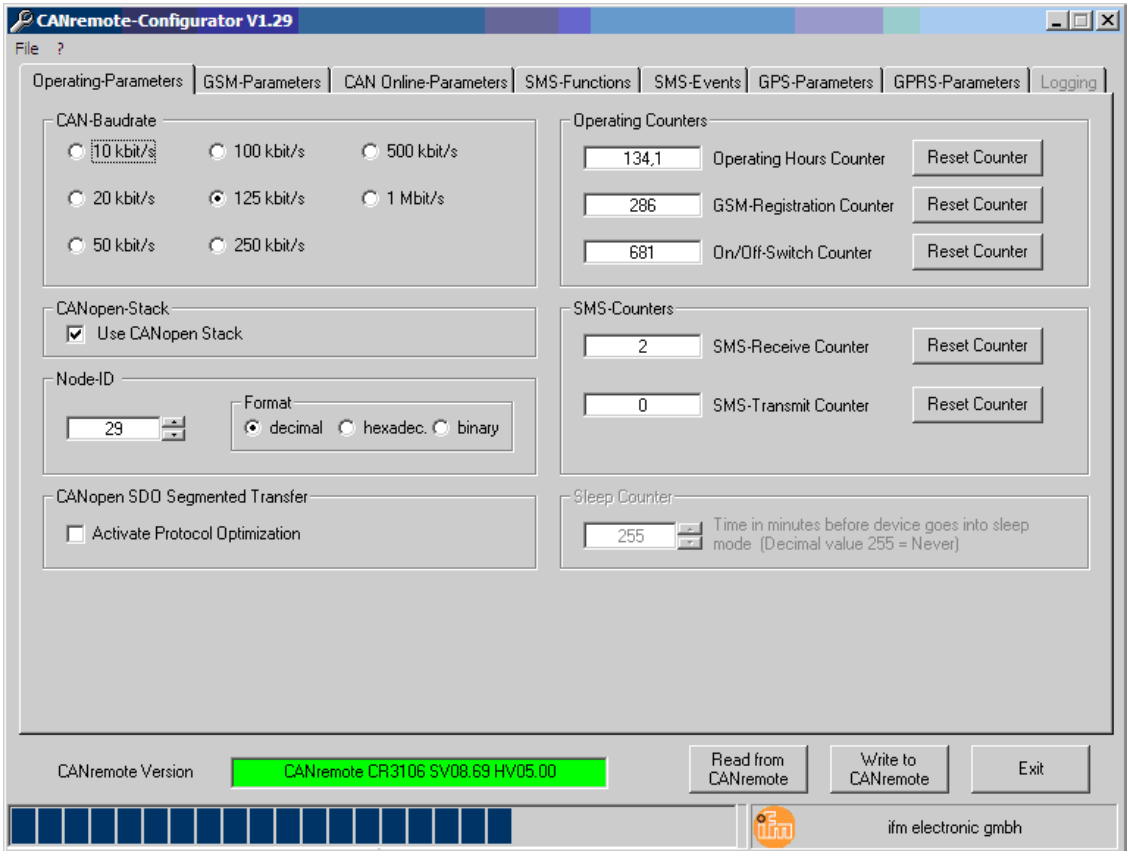
> Connecting to the CANremote_Configurator.
> The message "Link to CANremote is ok" appears.

► Acknowledge with [OK].



Successful connection

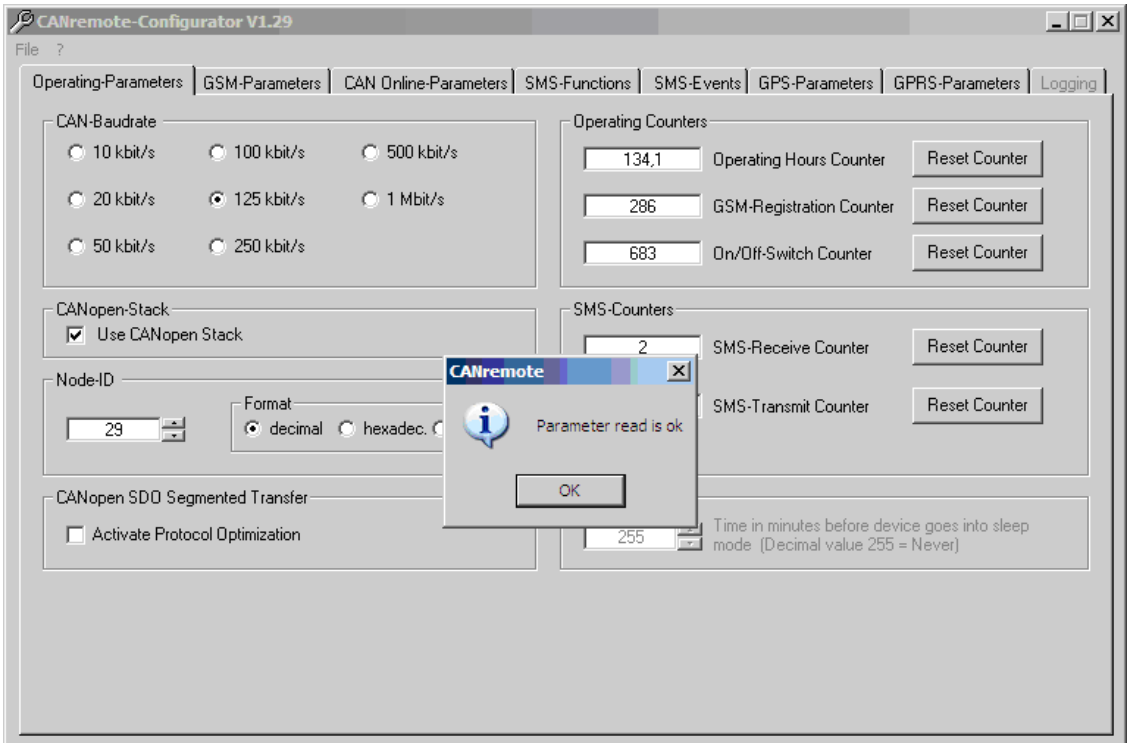
> Operating parameters are automatically read and shown in the tabs.



Automatic reading of the operating parameters

> The message "Parameter read is ok" appears.

► Acknowledge with [OK].



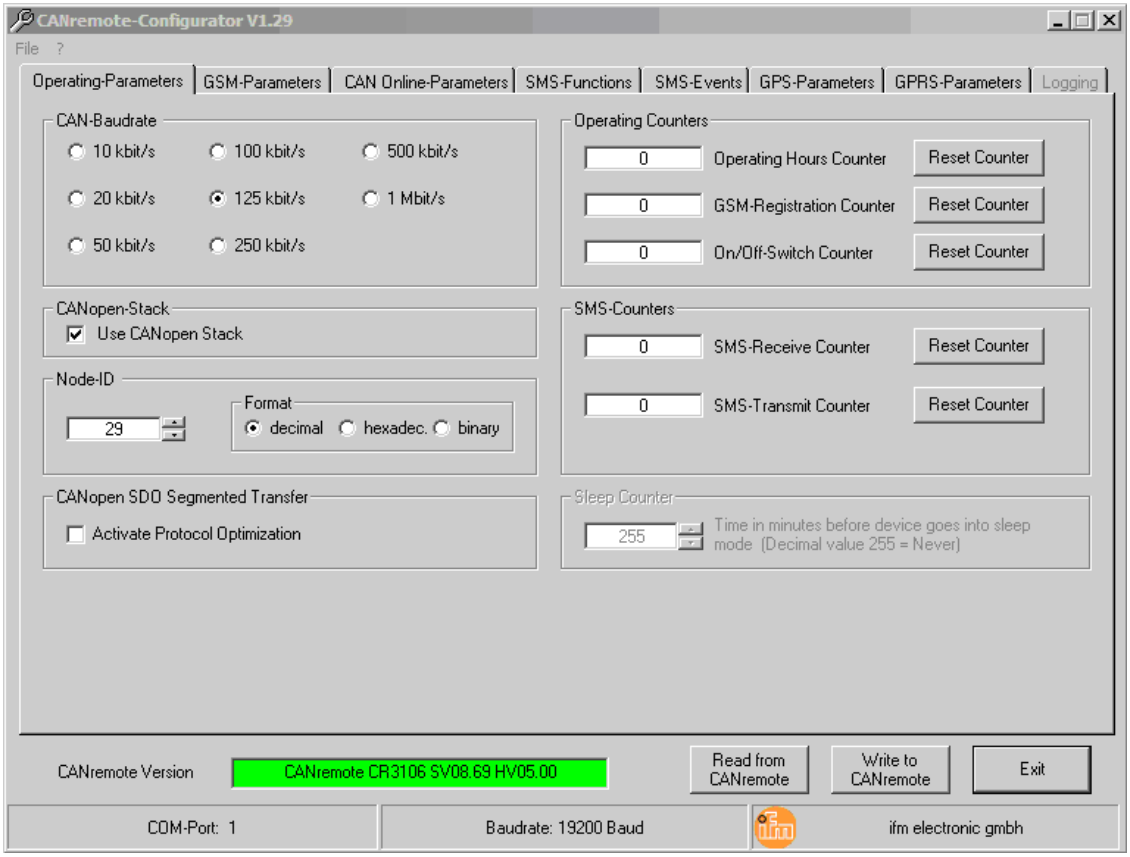
Reading of the parameters successful

To set further parameters the following tabs are needed:

- Operating-Parameters (→ 7.5.2)
- GSM-Parameters (→ 7.5.3)
- GPRS-Parameters (→ 7.5.4)

No changes are allowed in the other tabs.

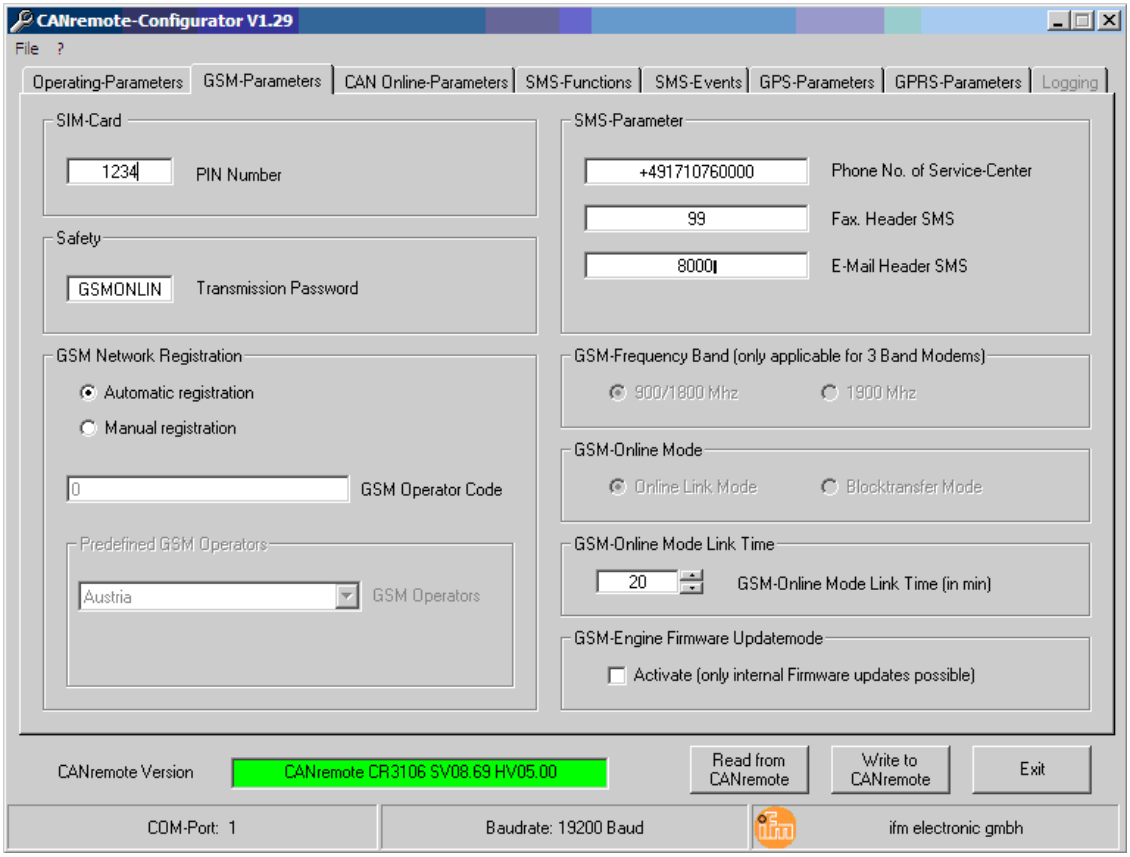
7.5.2 Operating parameters



Tab Operating-Parameters

Parameters	Description
CAN-Baudrate	Baud rate of the CAN bus system where the device is operated
CANopen-Stack	[Use CANopen Stack] Must be selected to enable the CANopen communication with the controller. If the modem operates in the transparent mode, the selection is not necessary
Node-ID	Node ID of the device. For the Node ID (default) see the technical data (→ 9)
CANopen SDO Segmented Transfer	[Activate Protocol Optimization] Must be selected if the device is only to be operated in the real-time mode (remote access with CoDeSys). Otherwise, no debugging is possible with CoDeSys or the CoDeSys OPC server in the real-time mode.
Operating Counters	Counter for statistical evaluations. On delivery normally < 10.
SMS-Counters	Counter for statistical evaluations. On delivery normally < 10.
Sleep Counter	Settings are not relevant for the device.

7.5.3 GSM parameters



Tab GSM-Parameters

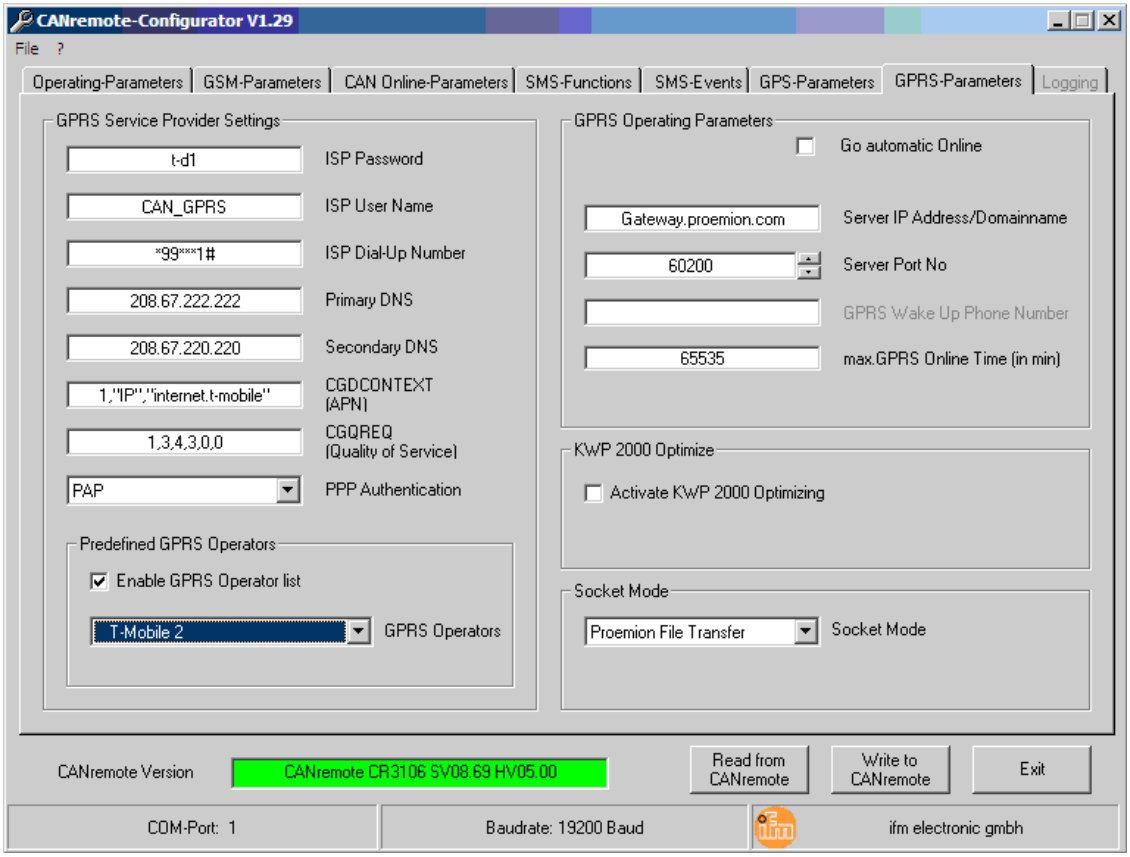
Parameters	Description
SIM-Card	Enter the PIN of the SIM card. NOTE Observe the notes on the SIM card (→ 7.1)
Safety	Enter a password, if needed. On delivery the password is "GSMONLIN".
GSM Network Registration	[Automatic registration] After power on again the device automatically logs in to an available GSM network. NOTE: In border regions the device may also log in to foreign networks. Roaming charges may apply. [Manual registration] After power on again, the device tries to log in to the GSM network defined under "Predefined GSM Operators". The code number of the provider is entered in the input field or selected from the drop-down list of the providers. When the CANremote_Configurator is installed for the first time the drop-down list is empty. Load the current provider list from the internet: 1. Open the menu "File". 2. With an active internet connection of the computer click on [Check for operator list updates]. The list is then automatically updated from the internet.

UK

Parameters	Description
SMS-Parameter	The requested data is usually supplied by the telecommunication provider. The format for the number of the SMS centre must correspond to that shown in the screenshot. Only numbers are entered in the other input fields.

All other input fields of this tab are not relevant and must not be activated.

7.5.4 GPRS parameters



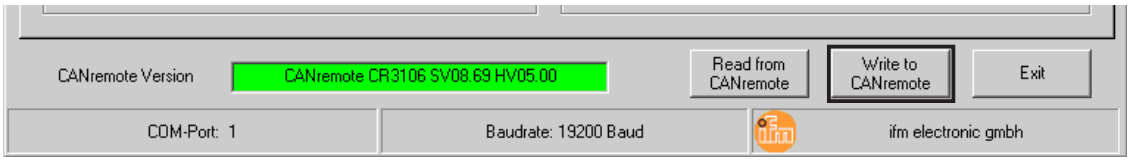
Tab GPRS-Parameters

Parameters	Description
ISP password	This entry is optional. It should, however, be used when specified by the internet service provider (ISP).
ISP User Name	This entry is optional. It should, however, be used when specified by the internet service provider (ISP).
ISP Dial-Up Number	Is specified by the internet service provider (ISP).The number/ character combination *99***1# is often used abroad.
Primary DNS	Is specified by the internet service provider (ISP).
Secondary DNS	Is specified by the internet service provider (ISP).
CGDCONTEXT (APN)	Is specified by the internet service provider (ISP). APN = Access Point Name
CGQREQ (Quality of service)	Is specified by the internet service provider (ISP).
PPP Authentication	Is specified by the internet service provider (ISP). CHAP = Challenge Handshake Authentication Protocol PAP = Password Authentication Protocol
Predefined GPRS Operators	The APN data of the respective providers is also supplied via the previously loaded operator list. However, this list is not intended to be complete.

Parameters	Description
GPRS Operating Parameters	[Go Automatic Online] Is selected if after power on again the device is to log in to the ifm portal automatically. Do not select if the device is switched to the online mode from the application program.
Server IP Address/Domainname	The domain is specified as: "gateway.proemion.com" NOTE Some ISPs cannot correctly convert this DNS name into the corresponding IP address. In this case, the IP address can be directly entered. Only proceed this way if connecting to the server is not possible. At present the IP address is: 62.206.129.131
Server Port No.	Specified port number: 60200
max. GPRS Online Time (in min)	Enter the maximum value: 65535
KWP 2000 Optimize	Not relevant. Make no entry.
Socket Mode	[Proemion File Transfer] Portal mode to send and receive files. [Realtime Mode] For debugging with CoDeSys or CoDeSys-OPC with activated test pin. NOTE With an existing server connection the GSM data services SMS, e-mail and fax cannot be used.

7.5.5 Transferring parameters to the connected device

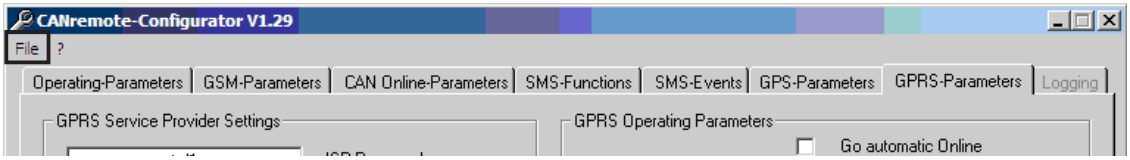
► Transfer the parameter settings to the connected device with [Write to CANremote].



Transfer parameters

7.5.6 Saving parameters on the hard disk

► In the menu "File" save the parameter settings on the hard disk with [Save Configuration].



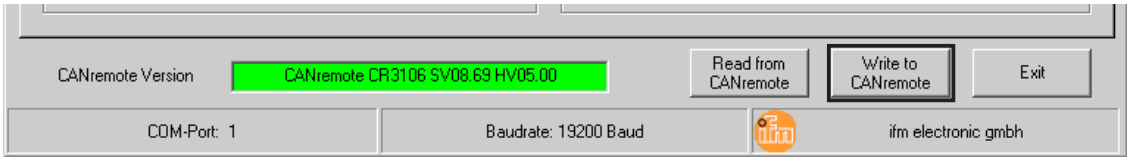
Menu File

7.5.7 Transferring the saved parameters to another device

► Connect the device to the PC/notebook and the software tool "CANremote_ Configurator" (→ 7.5.1 Connection)

► In the menu "File" load a parameter setting with [Load Configuration].

► Transfer the parameters to the device with [Write to CANremote].



Transfer parameters

8 Operating modes and programming

8.1 Preliminary notes

When the device has been set up successfully with the CANremote_Configurator it can be operated without an additional application program. This is, however, not useful because important functionalities, e.g. GPS mapping, real-time access or file transfer cannot be used without the indicated GPRS services (→ 3.2 Products of the ifm remote maintenance portfolio).

The GSM services are available without restrictions and can be used by means of the software libraries supplied by ifm.

For the ecomat*mobile* devices "BasicController" and "PDM360NG" no libraries are currently available.

8.2 Switch-on behaviour

After power on the device logs in to the GSM network.

If in the parameter settings the automatic server dial-up has been selected, the device will log in to the ifm server. As an alternative, this selection can also be made from the application.

8.3 CANremote process data objects (PDOs)

The CAN communication is based on the communication profile CiA-DS 301.

Since there is at present no device profile for CAN modems, a manufacturer-specific communication protocol based on process data objects (PDOs) is used.

In the CANopen network the device always operates as a slave.

In the operating state "Operational", the device sends 3 process data objects to the CAN network which can be received by all connected participants. This enables their evaluation via a network variable or Layer 2 using the function block CAN_x_RECEIVE.

8.3.1 PDO1 – modem status (CR3105 and CR3106)

Transfer type: asynchronous, manufacturer-specific
COB-ID: 180 + node ID
DLC: 7

Data byte	Contents	Value (dec)	Description
1	current GSM network status	0 1 2 3 4 5	not connected connected to the home network not connected / network search connection not accepted by the provider unknown connected to a foreign network (roaming charges!)
2	GSM signal quality	0 1 2...30 31 99	≤ -113 dBm -111 dBm -109...-53 dBm ≥ -51 dBm unknown
3	modem status	0 1 2 3 4 5 10 11 255	ok modem connected to receiver calling modem no connection unknown command no dial tone / dial-up not possible GPRS internet connection active connected via TCP socket modem timeout
4	file reception	0 1	no new file available new file for download available
5	send command for file transfer	0 1 129	ready for transfer file remains open on the server file closed after the transfer This value must be acknowledged on the server side to send again.
6	SMS command	1 2 3	sends SMS as text sends SMS as fax sends SMS as e-mail This value is automatically set to zero after the transmission
7	SMS reception	0 1	no new SMS available new SMS received

8.3.2 PDO2 – GPS longitude and latitude (only CR3106)

Transfer type: asynchronous, manufacturer-specific
COB-ID: 280 + node ID
DLC: 8

Data byte	Contents	Type	Description
0...3	longitude	DWORD	e.g. 514432128 = 51.4430180°
4...7	latitude	DWORD	e.g. 70059241 = 7.0059241°

8.3.3 PDO3 – UTC time (CR3105 and CR3106)

Transfer type: asynchronous, manufacturer-specific
COB-ID: 380 + node ID
DLC: 5

Data byte	Contents	Type	Description
0...4	UTC time	DT	e.g. . DT#2011-01-24-12:00:00

The UTC time is not evaluated until the device has connected to the ifm remote maintenance server. Only then is the PDO3 sent by the device.

8.4 Software libraries for CoDeSys 2.3

► Integrate the following library into the application program so that the GSM and server services can be used in the ecomat*mobile* control system:

IFM_CANx_CR310x_Vxxxxxx.lib

Some server services do not need this library once the device has been configured accordingly.(In the real-time mode no library is needed.)

GSM services:

- SMS
- e-mail
- fax

Server services:

- File transfer upload
- File transfer download
- Modem control via the application

The library (.lib) currently contains the following function blocks:

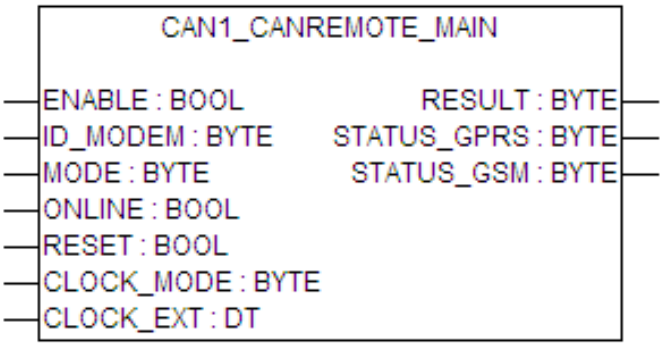
- CAN1_CANREMOTE_MAIN (→ 8.4.1)
- CAN1_CANREMOTE_rxFILE (FB) (→ 8.4.2)
- CAN1_CANREMOTE_txFILE (FB) (→ 8.4.3)
- CAN1_CANREMOTE_SMS (FB) (→ 8.4.4)
- CAN1_DATA_CACHE (PRG) (→ 8.4.5)

Additional library

An additional library (IFM_CANx_CR310x_CLF_Vxxxxxx.lib) to represent process data in the ifm remote maintenance portal is part of a demo program. It can be loaded via the ifm download area.

This library ensures the conversion of the process data into the portal-specific file format CLF (CAN-LINK-FILE).

8.4.1 Function block CAN1_CANREMOTE_MAIN



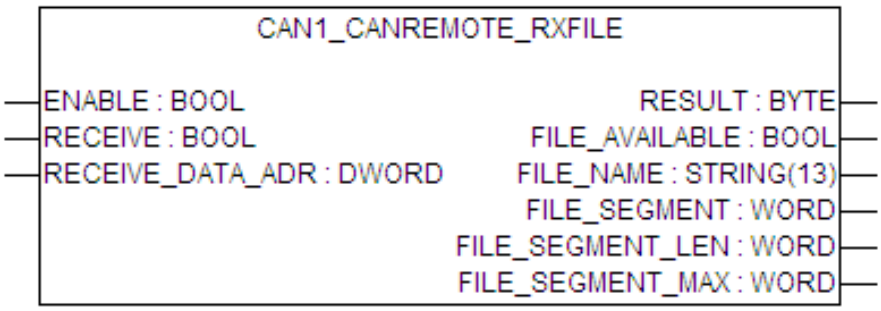
- Library:
  IFM_CANx_CR310x_Vxxxxxx
- Purpose:
  This block must be integrated for all operating modes (e.g. for direct transmission)
- Parameters:

Input	Data type	Value	Description
ENABLE	BOOL	TRUE FALSE	processing the instance no processing
ID_MODEM	BYTE	...	node number set via the CANremote_Configurator
MODE	BYTE	00 02 12	portal mode real-time mode CoDeSys optimised real-time mode transparent
ONLINE	BOOL	TRUE	switches the modem ONLINE with the rising edge and OFFLINE with the falling edge
RESET	BOOL	TRUE	resets the modem and restarts it after 30 s
CLOCK_MODE	BYTE	0 1 2 3 4	no clock Proemion time GPS time external time auto server or GPS
CLOCK_EXT	DT	...	For CLOCK_MODE 4 the current time is read in as DT

Output	Data type	Value	Description
RESULT	BYTE	0 1 2 3	ready done busy error
STATUS_GPRS	BYTE	0 1 2 3 4 5 10 11 255	Ok modem connected to receiver calling modem no connection unknown command no call tone or dial up not possible GPRS internet connection TCP connected to server modem time out
STATUS_GSM	BYTE	0 1 2 3 4 5	not connected connected to the home network not connected / network search connection not accepted by the provider unknown connected to a foreign network (roaming charges!)

The UTC time is not evaluated until the device has connected to the ifm remote maintenance server or received a GPS signal. Only then is the PDO3 sent by the device.

8.4.2 Function block CAN1_CANREMOTE_RXFILE



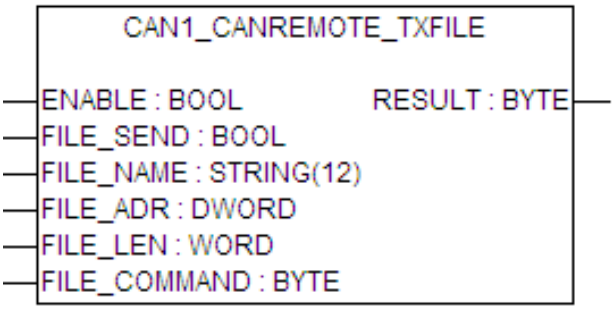
- Library:
  IFM_CANx_CR310x_Vxxxxxx
- Purpose:
  This block is integrated if files are to be received from the ifm remote maintenance portal.
- Parameters:

Input	Data type	Value	Description
ENABLE	BOOL	TRUE FALSE	processing the instance no processing
RECEIVE	BOOL	...	A rising edge fetches the data from the receive buffer. Max. size of the receive buffer: 1024 bytes
RECEIVE_DATA_ADR	DWORD	...	indication of the address in the PLC memory where the received data is stored.

Output	Data type	Value	Description
RESULT	BYTE	0 1 2 3	ready done busy error
FILE_AVAILABLE	BOOL	TRUE FALSE	ready new data available in the receive buffer
FILE_NAME	STRING (13)	...	name of a file on the server from where the data bytes were sent
FILE_SEGMENT	WORD	...	file reception: number of the file segment
FILE_SEGMENT_LEN	WORD	...	file reception: file segment length
FILE_SEGMENT_MAX	WORD	...	file reception: maximum number of the file segments

Files can only be sent/received if there is an online connection to the ifm remote maintenance portal in the portal mode.

8.4.3 Function block CAN1_CANREMOTE_TXFILE



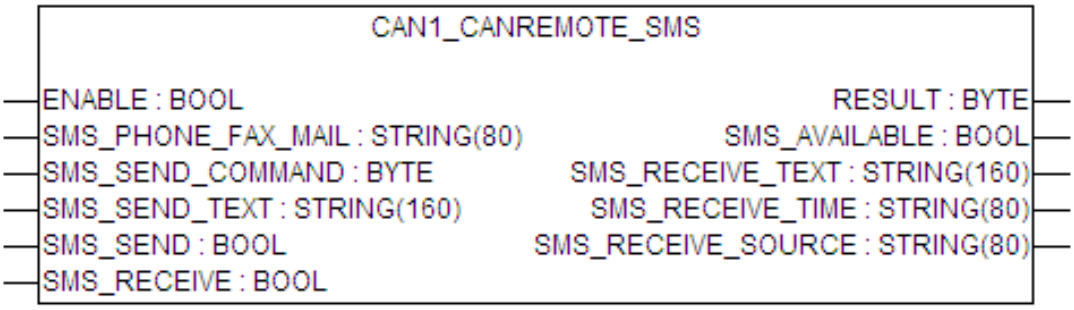
- Library:
  ifm_CANCOM_Vxxxxx.lib
- Purpose:
  This block is integrated if files are to be sent to the ifm remote maintenance portal.
- Parameters:

Input	Data type	Value	Description
ENABLE	BOOL	TRUE FALSE	processing the instance no processing
FILE_SEND	BOOL	...	A rising edge initialises a new transmission.
FILE_NAME	STRING (12)	...	name of the file which is to receive the data bytes to be sent on the server.(e.g. "datafile.dat")
FILE_ADR	DWORD	...	indication of the address in the PLC memory where the sent data bytes are stored.
FILE_LEN	WORD	...	length of the data string to be sent or number of the data bytes
FILE_COMMAND	BYTE	0x01	The file is opened for write access on the server and remains open for receiving further data bytes.
		0x81	The file is opened for write access on the server and data is written to it. The file is then closed.

Output	Data type	Value	Description
RESULT	BYTE	0 1 2 3	ready transmission finished transmission not finished error

Files can only be sent/received if there is an online connection to the ifm remote maintenance portal in the portal mode.

8.4.4 Function block CAN1_CANREMOTE_SMS



- Library:
  ifm_CANCOM_Vxxxxx.lib
- Purpose:
  Enables reception/sending of SMS, e-mail and fax.
- Parameters:

Input	Data type	Value	Description
ENABLE	BOOL	TRUE FALSE	processing the instance no processing
SMS_PHONE_FAX_MAIL	STRING (80)	...	entry of the target call number or e-mail address formats: SMS: +49123123456789 fax: +49123123456789 e-mail: name@server.xyz
SMS_SEND_COMMAND	BYTE	1 2 3	sends a text message as SMS to the target call number sends a text message as fax to the target call number sends a text message as e-mail to the e-mail address
SMS_SEND_TEXT	STRING (160)	...	data bytes to be sent maximum 160 data bytes can be sent
SMS_SEND	BOOL	TRUE	A rising edge sends the data bytes as SMS, fax or e-mail to the entered target.
SMS_RECEIVE	BOOL	TRUE	A rising edge fetches the data bytes from the receive buffer of the SIM card.

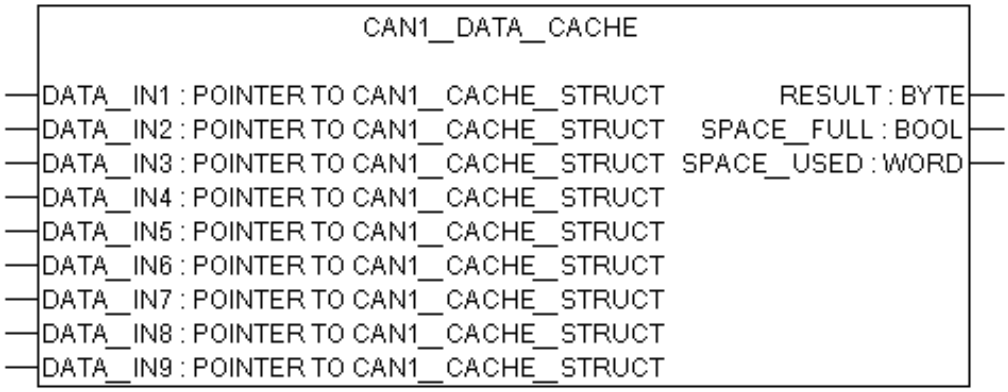
Output	Data type	Value	Description
RESULT	BYTE	0 1 2 3	ready data bytes received successfully fetching data bytes from the receive buffer error
SMS_AVAILABLE	BOOL	TRUE FALSE	ready messages in the receive buffer available
SMS_RECEIVE_TEXT	STRING (160)	...	SMS text of the received message
SMS_RECEIVE_TIME	STRING (80)	...	SMS time stamp

Output	Data type	Value	Description
SMS_RECEIVE_ SOURCE	STRING (80)	...	SMS source

If the modem has connected to the server, receiving/sending SMS is not possible.

In case of invalid or corrupted data there will be no automatic repetition. This has to be carried out by the user.
To find out whether CAN objects were lost or rejected, one byte, for example, should be used as "message counter".

8.4.5 Function block CAN1_DATA_CACHE



- Library:
  ifm_CANCOM_Vxxxxx.lib
- Purpose:
  Enables to send several files to the ifm remote maintenance portal.
- Parameters:

Input	Data type	Value	Description
DATA_IN1	POINTER	...	address dataset 1, determined via ADR operator
DATA_IN2	POINTER	...	address dataset 2, determined via ADR operator
DATA_IN3	POINTER	...	address dataset 3, determined via ADR operator
DATA_IN4	POINTER	...	address dataset 4, determined via ADR operator
DATA_IN5	POINTER	...	address dataset 5, determined via ADR operator
DATA_IN6	POINTER	...	address dataset 6, determined via ADR operator
DATA_IN7	POINTER	...	address dataset 7, determined via ADR operator
DATA_IN8	POINTER	...	address dataset 8, determined via ADR operator

Output	Data type	Value	Description
RESULT	BYTE	0 1 2 3	ready transmission finished busy error
SPACE_FULL	BOOL	...	not enough space to save more data
SPACE_USED	WORD	...	number of the datasets in the memory

The data at DATA_IN1 to IN9 is not simultaneously sent. The send buffer in the controller is processed until there are no more messages in the buffer. In the offline state, datasets are buffered. This block contains the function block CAN1_CANREMOTE_TXFILE. The larger the data volume, the more memory has to be reserved.

For an error-free compilation of the library the following declarations must be made by the programmer.

```
VAR_GLOBAL CONSTANT
    FRAM_ENABLE             : BOOL
    FRAM_BEGINN_ADRESS      : INT     = a;     (*not yet used*)
    FRAM_MAX_SPACE          : INT     = abc;   (*not yet used*)
    RAM_BUFFER_MAX          : WORD    = xyz;
END_VAR
```

```
VAR_GLOBAL
    CAN1_CAN_REMOTE: CANx_CANREMOTE_MAIN;
END_VAR
```

These declarations must also be made if the block is not used. Otherwise, the compiler reacts with an error message.

The constant RAM_BUFFER_MAX indicates a multiple of the total data volume which is written to the internal memory of the controller via the inputs DATA_INx. The value depends on the size of the available RAM memory in the controller and on how much memory space can be made available for this function. If not used, the value can be set to 0.

8.5 Real-time access to CoDeSys

⚠ WARNING

Loading an application program to a controller and forcing variables in real-time mode can put an installation into non controllable states.

For safety reasons the remote access to a controller and/or installation is only allowed to specially skilled commissioning personnel.

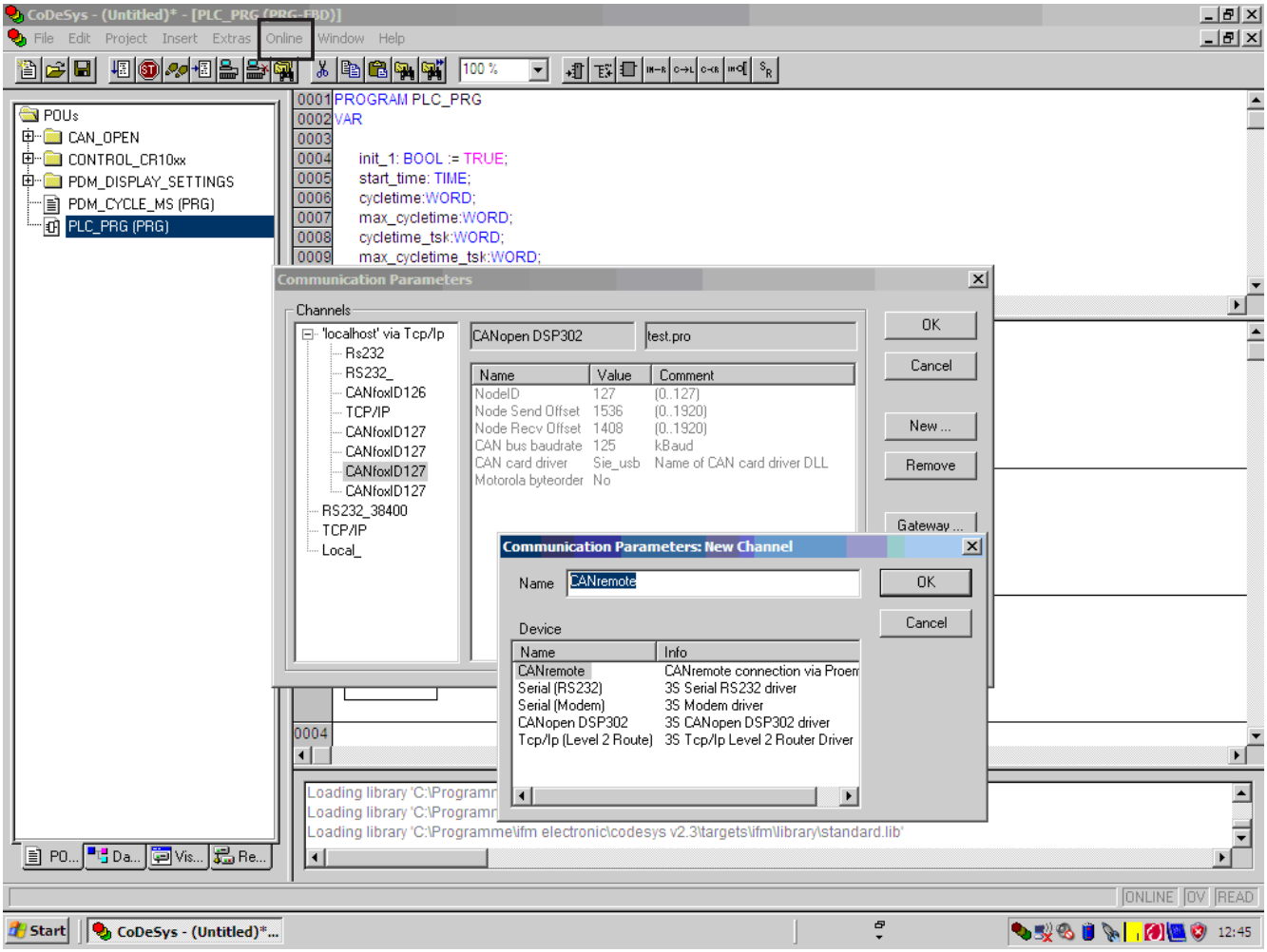
Contact your ifm sales partner for a training seminar.

8.5.1 Requirements for real-time access with CoDeSys

Real-time access with CoDeSys is only possible if the test pin of the controller is connected to the operating voltage and the debug mode is active.(System manual on the controller → Chapter 6, DEBUG mode)

Real-time access is supported for targets from version 5b.

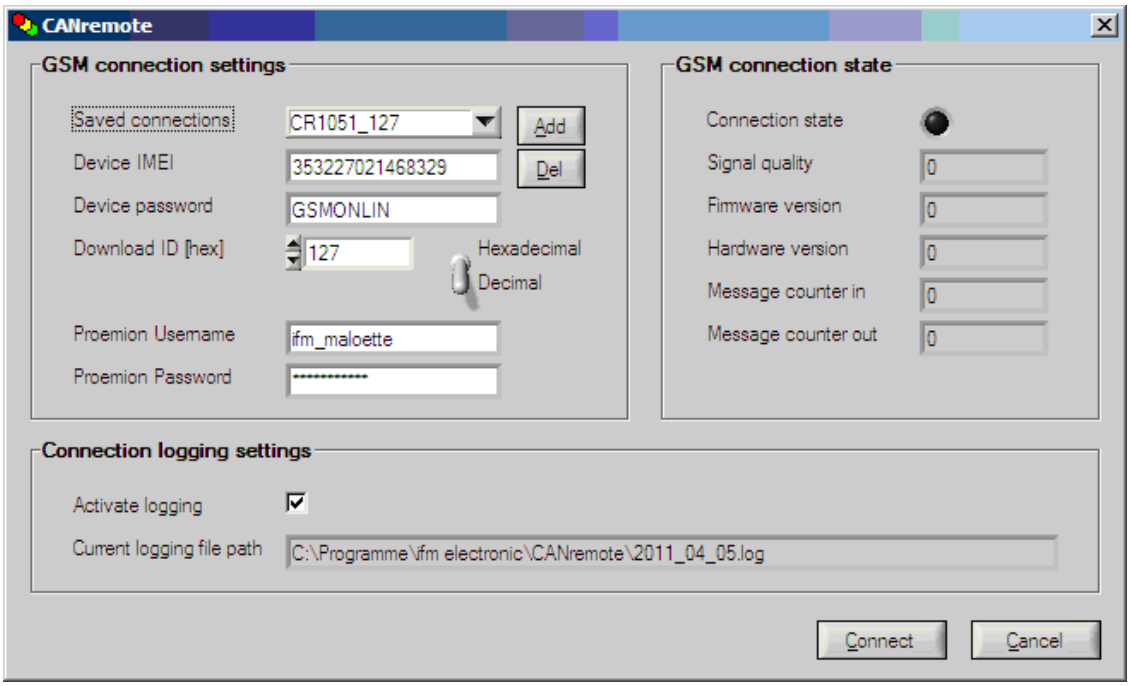
- ► Configure the device with the software tool "CANremote_Configurator". As an alternative, switch the device to the real-time mode via the application program (library IFM_CANx_CR310x_Vxxxxxx.lib).
- ► Install the add-on tool "CANremote_Client".
  www.ifm.com → Service → Download
- ► Specify the communication channel in CoDeSys. To do so, select [Communication Parameters] in the menu "Online".
  Open the window "Communication Parameters: New Channel" with [New ...], enter the name "CANremote" and acknowledge with [OK].



Specify the communication channel in CoDeSys

> For the next login the window "CANremote" is automatically opened.

► Enter the GSM connection parameters of the device under "GSM connection settings".



GSM connection parameters of the add-on tool "CANremote_Client"

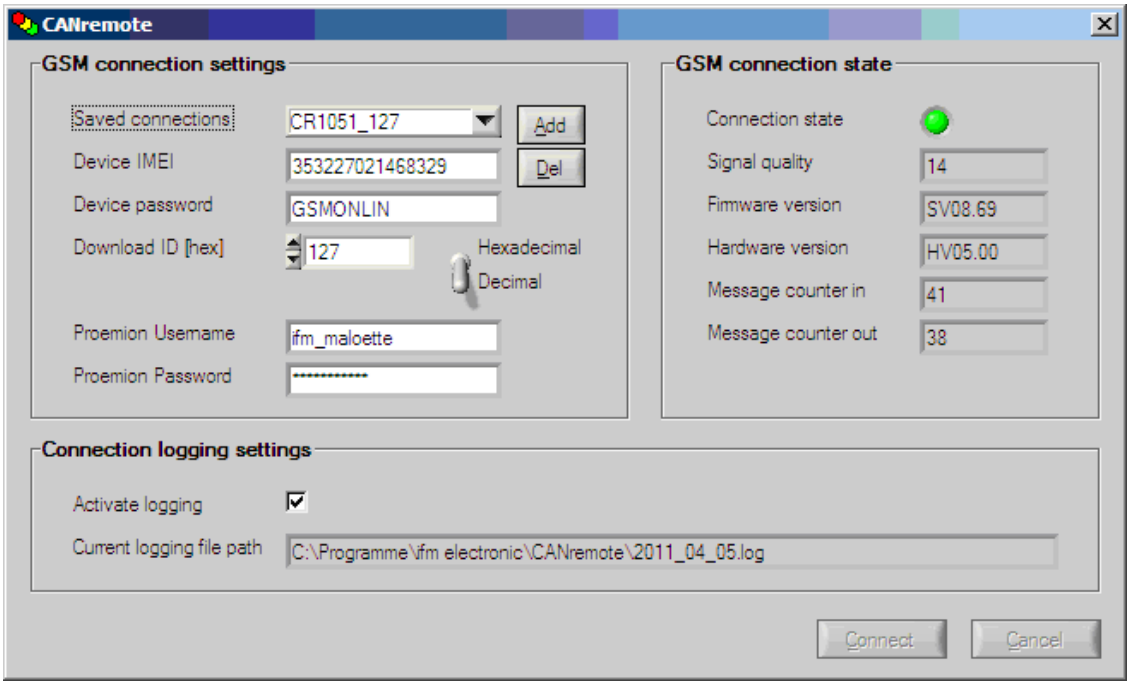
Parameters	Description
Device IMEI	Enter the IMEI device identification.
Device password	Enter the device password.On delivery the password is "GSMONLIN". (→ 7.5.3 GSM parameters)
Download ID	Enter the download ID of the CAN controller.
Proemion Username *	Proemion username Assigned when a remote maintenance contract is concluded.
Proemion Password *	Proemion password Assigned when a remote maintenance contract is concluded.
Activate Logging	Activate to save the connection in a protocol file (.log) for diagnosis.
Current logging file path	Directory path for the protocol file

*) Please first contact your local ifm sales partner.

► Save the entered connection parameters with [Add].

8.5.2 Initialising the connection

► Initialise the connection with [Connect].



GSM connection state

> If the connection is successful, the empty fields in the space "GSM connection state" are filled with data.

> In CoDeSys the variable lists can be observed online in real-time mode.

The signal quality must at least have the value 14. Otherwise, no stable connection is ensured.

If the connection was not successful, the log file can be opened for diagnosis. (→ Current logging file path)

The window "CANremote" hides all CoDeSys messages. Therefore it is useful to minimise the window immediately when the connection is successful.

UK

9 Technical data

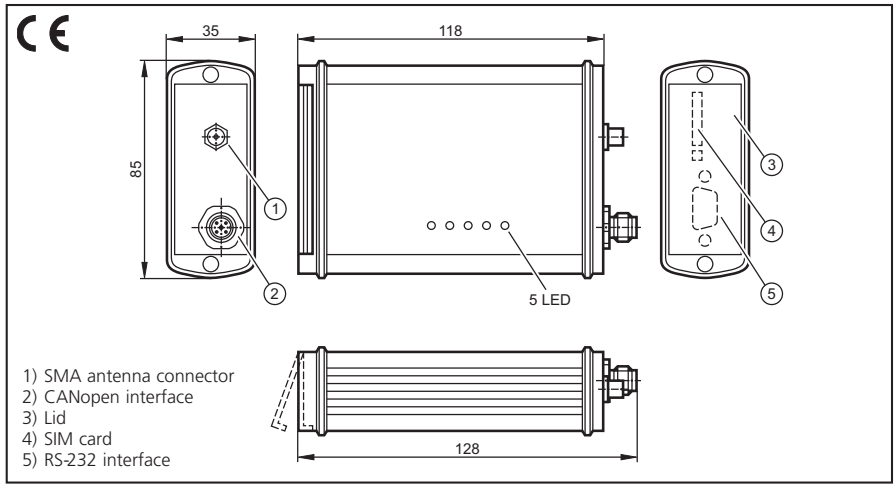
9.1 CR3105

CR3105

CANremote
GSM quad-band modem
for the transfer of
SMS messages
and data packets

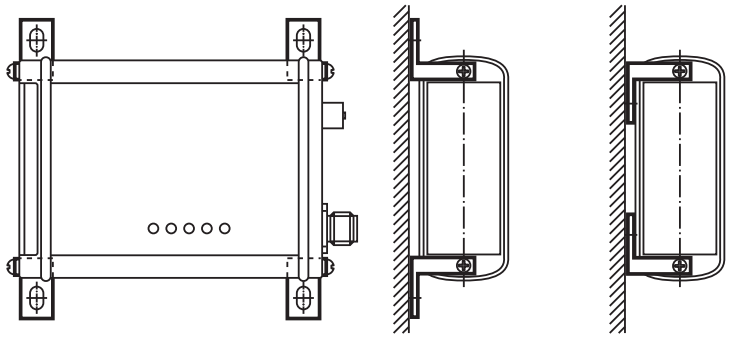
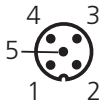
CAN gateway
with CANopen interface

Operating voltage
10...30 V DC

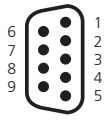


Mechanical data	
Housing	aluminium
Dimensions (W x H x D)	128 x 85 x 35 mm
Installation	with brackets (prepared mounting holes on the sides, see mounting variants)
Protection rating	IP 65
Operating temperature	-30...65 °C
Storage temperature	-40...80 °C
Weight	290 g
Electrical data	
Operating voltage	10...30 V DC
Current consumption (at 24 V DC)	95 mA (standard operation), 170 mA (transmission)
Transmitter power	2 W
Frequency band	850/900/1800/1900 MHz
Transmission rate	max. 9,600 bits/s (real value depends on the network provider)
EMC	89/336/EC
Interfaces	
CAN interface	CAN interface 2.0 B, ISO 11898 M12 plug for operating voltage and CAN bus, 5 pins (type Lumberg) CAN electrically separated
Baud rate	20 Kbits/s...1 Mbit/s (default setting 125 Kbits/s)
Communication profile	CANopen, CiA DS 301 version 3.0
Node ID (default)	hex 1D (= 29 dec)
Serial interface	RS-232, 9-pole Sub-D plug (pin)
Antenna terminals	type SMA connector (adapter SMA/FME enclosed)
GSM modem	
GSM profile	GSM 850/900/1800/1900
SMS class (Short Message Service)	text mode
SMS character length	max. 160 characters (corresp. to 7 bits/character)
Size of data packet	max. 16 Kbytes
Safety	V.42 data compression RLP

UK

CE marking	Electromagnetic compatibility (EMC), Immunity for industrial environments (EN 61000-6-2) Electromagnetic compatibility (EMC), Emission standard for residential, commercial and light-industrial environments (EN 61000-6-3)
Electrical tests	
Electrostatic discharge immunity	4 kV / 8 kV (EN 61000-4-2)
Electromagnetic field immunity	10 V/m (EN 61000-4-3, ENV 50204)
Electrical fast transient/burst immunity	1 kV / 2 kV (EN 61000-4-4)
Surge immunity	0.5 kV (EN 61000-4-5)
Conducted disturbance immunity	10 V (EN 61000-4-6)
Magnetic field immunity	30 A/m (EN 61000-4-8)
Conducted Emissions	Class B (CISPR 16-2)
Radiated Emissions	Class B (CISPR 16-2)
FCC Part 15/47	Class A (CFR Ch.1)
Mechanical tests	
Vibration (sinusoidal)	22...500 Hz: 3 g (EN 60068-2-6, Test Fc)
Shock	30 g: 18 ms (EN 60068-2-27, Test Ea)
Vibration (broadband random)	10 Hz: 20 m^2/s^3 (EN 60068-2-64, Test Fh) 20...30 Hz: 36 m^2/s^3 180...2000 Hz: 1 m^2/s^3
Mounting variants	 variant A variant B
Display (status LED)	CAN mode (CAN) Data transmission error (ERROR), Operating voltage (ON), Serial interface (RS 232), GSM mode (GSM)
Wiring (CAN)	

Description	Pin	Potential
Operating voltage	1	GND
	2	10...30 [V DC]
CAN interface	3	CAN_GND
	4	CAN_H
	5	CAN_L

Wiring (RS 232)	

Pin	Potential
1	n.c.
2	TxD
3	RxD
4	DSR
5	GND
6	n.c.
7	n.c.
8	n.c.
9	n.c.

9.2 CR3106

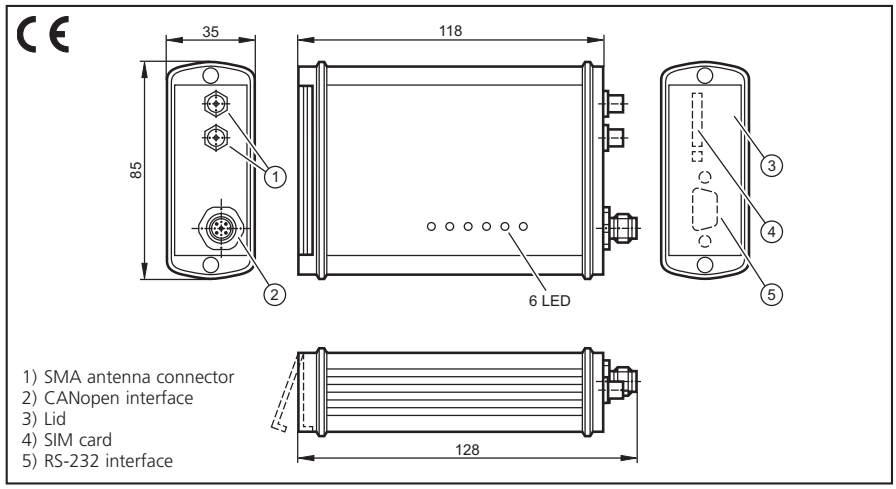
CR3106

CANremote
GSM/GPS quad-band modem
for the transfer of
SMS messages
and data packets

CAN gateway
with CANopen interface

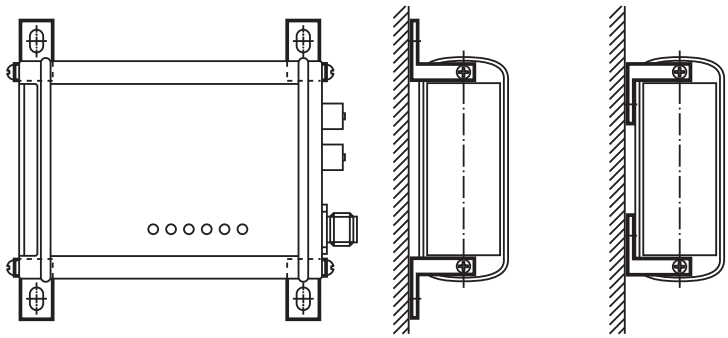
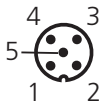
GPS receiver

10...30 V DC



Mechanical data	
Housing	aluminium
Dimensions (W x H x D)	128 x 85 x 35 mm
Installation	with brackets (prepared mounting holes on the sides, see mounting variants)
Protection rating	IP 65
Operating temperature	-30...65 °C
Storage temperature	-40...80 °C
Weight	290 g
Electrical data	
Operating voltage	10...30 V DC
Current consumption (at 24 V DC)	95 mA (standard operation), 170 mA (transmission)
Transmitter power	2 W
Frequency band	850/900/1800/1900 MHz
Transmission rate	max. 9,600 bits/s (real value depends on the network provider)
EMC	89/336/EC
Interfaces	
CAN interface	CAN interface 2.0 B, ISO 11898 M12 plug for operating voltage and CAN bus, 5 pins (type Lumberg) CAN electrically separated
Baud rate	20 Kbits/s...1 Mbit/s (default setting 125 Kbits/s)
Communication profile	CANopen, CiA DS 301 version 3.0
Node ID (default)	hex 1D (= 29 dec)
Serial interface	RS-232, 9-pole Sub-D plug (pin)
Antenna terminals (GSM/GPS)	type SMA connector (adapter SMA/FME enclosed)
GSM modem	
GSM profile	GSM 850/900/1800/1900
SMS class (Short Message Service)	text mode
SMS character length	max. 160 characters (corresp. to 7 bits/character)
Size of data packet	max. 16 Kbytes
Safety	V.42 data compression RLP
GPS receiver	16 channels, NMEA 0183 compatible

UK

CE marking	Electromagnetic compatibility (EMC), Immunity for industrial environments (EN 61000-6-2) Electromagnetic compatibility (EMC), Emission standard for residential, commercial and light-industrial environments (EN 61000-6-3)
Electrical tests	
Electrostatic discharge immunity	4 kV / 8 kV (EN 61000-4-2)
Electromagnetic field immunity	10 V/m (EN 61000-4-3, ENV 50204)
Electrical fast transient/burst immunity	1 kV / 2 kV (EN 61000-4-4)
Surge immunity	0.5 kV (EN 61000-4-5)
Conducted disturbance immunity	10 V (EN 61000-4-6)
Magnetic field immunity	30 A/m (EN 61000-4-8)
Conducted Emissions	Class B (CISPR 16-2)
Radiated Emissions	Class B (CISPR 16-2)
FCC Part 15/47	Class A (CFR Ch.1)
Mechanical tests	
Vibration (sinusoidal)	22...500 Hz: 3 g (EN 60068-2-6, Test Fc)
Shock	30 g: 18 ms (EN 60068-2-27, Test Ea)
Vibration (broadband random)	10 Hz: 20 m^2/s^3 (EN 60068-2-64, Test Fh) 20...30 Hz: 36 m^2/s^3 180...2000 Hz: 1 m^2/s^3
Mounting variants	 variant A variant B
Display (status LED)	CAN mode (CAN) Data transmission error (ERROR), Operating voltage (ON), Serial interface (RS 232), GSM mode (GSM) GPS communication (GPS)
Wiring (CAN)	

Description	Pin	Potential
Operating voltage	1	GND
	2	10...30 V DC
CAN interface	3	CAN_GND
	4	CAN_H
	5	CAN_L

Wiring (RS 232)	

Pin	Potential
1	n.c.
2	TxD
3	RxD
4	DSR
5	GND
6	n.c.
7	n.c.
8	n.c.
9	n.c.

10 Troubleshooting

10.1 GSM network search and troubleshooting

The device can be put into operation without CAN bus, controller or communication with other software.

As soon as the device is supplied with voltage it automatically starts to search for a GSM network. CR3105 should have found a network after 30 seconds at the latest, CR3106 after approx. 60 seconds.

If the network search was successful, the GSM LED is constantly lit green. If this is not the case there may be the following error sources:

Error source	Possible cause
SIM card	● not inserted ● jammed ● contacts soiled ● does not support the available GSM network ● PIN no. not correctly configured (→ 7.5.3 GSM parameters)
GSM antenna	● not connected ● antenna connector only tightened loosely ● field intensity too low
CAN master	master resets the device again and again (to test operate the device without CAN master)
GSM network	no network available
RS-232 cable	● The device is connected to the PC via the serial interface and passes into the configuration mode (all LEDs flash simultaneously) ● Pin 4 (DSR) of the serial interface is set to logic "high" and the device is in the update mode (all LEDs are permanently "on" at the same time) ● The device does not boot if the serial interface is connected to the PC and the configuration software is not active (all LEDs are "off")

Avoid change of position in the online mode!

The passing on of a network connection from one radio cell to the next ("handover") during a direct modem connection may lead to faulty transmissions. So it is possible in some cases that the handover cannot be carried out correctly and the connection is interrupted.

This may be connected to the fact that no capacities are available on the "new" transmitter or that the handover is not carried out fast enough and the contact to the "old" transmitter is interrupted.

Therefore a change of position during a direct modem connection should be avoided.

11 Maintenance, repair and disposal

► Do not open the housing as the device does not contain any components which must be maintained by the user. The device must only be repaired by the manufacturer.

► Dispose of the device in accordance with the national environmental regulations.

12 Approvals/standards

Test standards and regulations (→ 9 Technical data)

The CE declaration of conformity is available at:
www.ifm.com → Data sheet search → CR310… → More information