37240C

# GCP-30 Series
# Genset Control


## Application
**Software Version 4.3xxx**

**Manual 37240C**

## WARNING

**Read this entire manual and all other publications pertaining to the work to be performed before installing, operating, or servicing this equipment. Practice all plant and safety instructions and precautions. Failure to follow instructions can cause personal injury and/or property damage.**

**The engine, turbine, or other type of prime mover should be equipped with an overspeed (overtemperature, or overpressure, where applicable) shutdown device(s), that operates totally independently of the prime mover control device(s) to protect against runaway or damage to the engine, turbine, or other type of prime mover with possible personal injury or loss of life should the mechanical-hydraulic governor(s) or electric control(s), the actuator(s), fuel control(s), the driving mechanism(s), the linkage(s), or the controlled device(s) fail.**

**Any unauthorized modifications to or use of this equipment outside its specified mechanical, electrical, or other operating limits may cause personal injury and/or property damage, including damage to the equipment. Any such unauthorized modifications: (i) constitute "misuse" and/or "negligence" within the meaning of the product warranty thereby excluding warranty coverage for any resulting damage, and (ii) invalidate product certifications or listings.**

## CAUTION

**To prevent damage to a control system that uses an alternator or battery-charging device, make sure the charging device is turned off before disconnecting the battery from the system.**

**Electronic controls contain static-sensitive parts. Observe the following precautions to prevent damage to these parts.**

- **Discharge body static before handling the control (with power to the control turned off, contact a grounded surface and maintain contact while handling the control).**
- **Avoid all plastic, vinyl, and Styrofoam (except antistatic versions) around printed circuit boards.**
- **Do not touch the components or conductors on a printed circuit board with your hands or with conductive devices.**

## OUT-OF-DATE PUBLICATION

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## Important definitions

## WARNING

**Indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury.**

## CAUTION

**Indicates a potentially hazardous situation that, if not avoided, could result in damage to equipment.**

## NOTE

**Provides other helpful information that does not fall under the warning or caution categories.**

# Revision History

| Rev. | Date | Editor | Changes |
|---|---|---|---|
| NEW | 04-09-23 | TP | Release |
| A | 06-01-11 | TP | Minor corrections; addition of chapter 3 |
| B | 07-02-07 | TP | Minor corrections; extension of chapter 3 |
| C | 07-05-11 | TP | Minor corrections |

# Content

# Chapter 1.
# General Information

| Type | | English | German |
|---|---|---|---|
| **GCP-31/32 Series** | | | |
| GCP-31/32 Packages - Installation | | 37364 | GR37364 |
| GCP-31/32 Packages - Configuration | | 37365 | GR37365 |
| GCP-31/32 - Function/Operation | | 37238 | GR37238 |
| GCP-31/32 - Application | this manual ⇨ | 37240 | GR37240 |
| Option SB | | 37200 | GR37200 |
| Option SC06/SC07/SC08 | | 37313 | GR37313 |
| Option SC09/SC10 | | 37382 | GR37382 |
| **Additional Manuals** | | | |
| IKD 1 - Manual<br>Discrete expansion board with 8 discrete inputs and 8 relay outputs that can be coupled via the CAN bus to the control unit. Evaluation of the discrete inputs as well as control of the relay outputs is done via the control unit. | | 37135 | GR37135 |
| LeoPC1 - Manual<br>PC program for visualization, for configuration, for remote control, for data logging, for language upload, for alarm and user management and for management of the event recorder. This manual describes the use of the program. | | 37146 | GR37146 |
| LeoPC1 - Manual<br>PC program for visualization, for configuration, for remote control, for data logging, for language upload, for alarm and user management and for management of the event recorder. This manual describes the programming of the program. | | 37164 | GR37164 |
| GW 4 - Manual<br>Gateway for transferring the CAN bus to any other interface or bus. | | 37133 | GR37133 |
| ST 3 - Manual<br>Control to govern the air fuel ratio of a gas engine. The ratio will be directly measured though a Lambda probe and controlled to a configured value. | | 37112 | GR37112 |

Table 1-1: Manuals - Overview

**Intended Use** The unit must only be operated in the manner described by this manual. The prerequisite for a proper and safe operation of the product is correct transportation, storage, and installation as well as careful operation and maintenance.

## NOTE

**This manual has been developed for a unit fitted with all available options. Inputs/outputs, functions, configuration screens, and other details described, which do not exist on your unit, may be ignored.**

**The present manual has been prepared to demonstrate different applications of the unit. The description of the applications assumes that you are familiar with the unit and the described peripheral devices and have read the manuals belonging to them. You can refer to the respective manuals for information about operation and configuration of the unit and the peripheral devices.**

# Chapter 2.
# Applications Interfaces

## Configuration via RS-232


Control
RJ45 socket edgewise

Configuration wire
with galvanic isolation (black box)
DPC-1 P/N 5417-557

Laptop
with Windows operation system
98SE, NT, ME, 2000, XP
LeoPC1 3.1 or higher
configuration possible

### Function

Woodward provides an interface cable and an application software to be able to configure the GCP comfortably with a PC or laptop. The black box isolates the signals galvanically and must to be used absolutely. Otherwise, possible potential shifts may damage the devices involved.

Different applications can be performed using the software LeoPC1. These applications include:

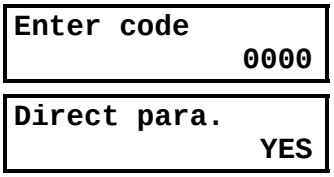
- Configuration
- Read out event logger
- Load language
- Transfer standard values to and from the harddrive

### Preconditions

- GCP with RJ45 jack (software version 3.X and higher)
- DPC-1 interface set (DPC-1 P/N 5417-557)
- PC or laptop with Windows OS 98SE, NT, ME, 2000, XP and free Com port (USB to COM adapter also possible)
- Application software LeoPC1 version 3.1 or higher
- Configuration file available (*.cfg, *.asm, *.opt,...)

## Operation

In order to be able to configure, the following steps have to be performed at the GCP:



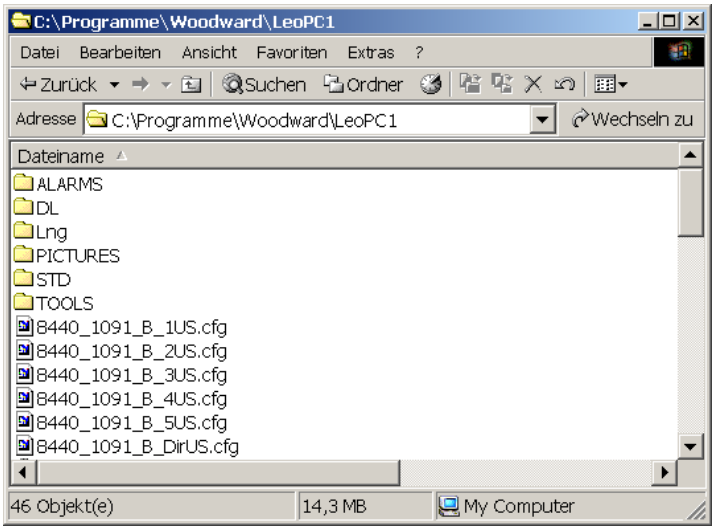

1. Code level 2 has to be entered at the GCP.

2. Direct configuration has to be enabled.

If the GCP is equipped with a CAN bus (X1/X5), the configuration via RS-232 is only possible with stopped engine. The reason for this is, that the unit changes to CAN bus automatically when detecting firing speed and, as a result, the interface RS-232 (RJ45) will be cut off. In this case, the configuration screen "Direct para." is suppressed. It has to be noted, that the code level expires when disconnecting the power supply at the GCP and with that, the parameter "Direct para." returns to NO. It has to be set to YES again.

## Setting in LeoPC1

LeoPC1 will be installed according to the manual.
The configuration files of the device are copied to the PC. With this, the .cfg files are copied to the main path and the other files are copied to the intended folders.




The .cfg file with the contraction "Dir" in the file name is to be used for direct configuration via LeoPC1.

# Conversion CAN to USB

**Conversion USB-CAN:**


## Function

A CAN/USB adapter can be used to configure and visualize the GCP comfortably with a PC or laptop. The Woodward application software LeoPC1 supports the IXXAT adapter for this.

Different applications can be performed using the software LeoPC1. These applications include:

- Configuration
- Visualization with data logging
- Remote control (start and stop, transferring the set values for real power and generator power factor)
- Load language
- Transfer standard values to and from the harddrive

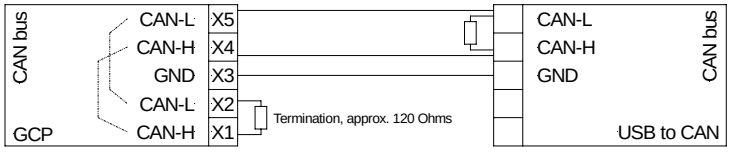
## Preconditions

- GCP with CAN connection (X1/X5)
- IXXAT CAN / USB adapter (P/N 8445-1023; other adapters are not supported)
- PC or laptop with Windows OS 98SE, NT, ME, 2000, XP with USB port
- Application software LeoPC1 version 3.1 or higher
- Configuration file available (*.cfg, *.asm, *.opt,...)

For detailed information about the IXXAT product refer to the website www.ixxat.de

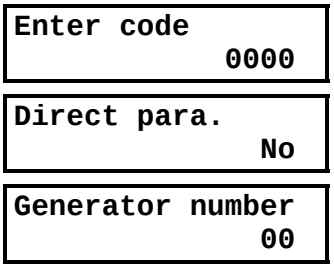
## Connection

The connection for the IXXAT product can be taken from its data sheet. The CAN bus from the adapter is to be connected to the terminals X4/X5. Make sure that the CAN bus is terminated correctly with two termination resistors. Please note the following connection example:



## Operation

In order to establish a connection between the GCP and LeoPC1, the correct entry of the generator number at the GCP has to be observed:




1. Code level 2 has to be entered at the GCP.

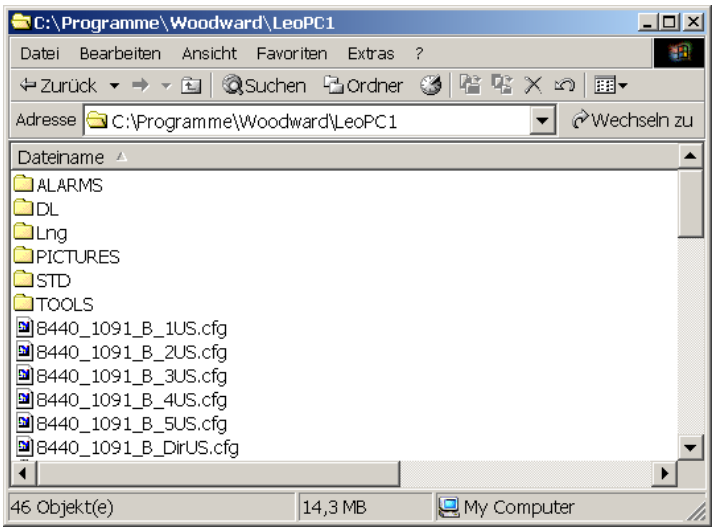
2. The direct configuration has to be disabled if necessary.

The entry for the generator number determines the CAN ID of the unit.

Once connected to the CAN bus, the USB to CAN adapter may serve up to 14 GCPs.

## Settings in LeoPC1

LeoPC1 will be installed according to the manual. The IXXAT driver has to be installed after LeoPC1 has been installed.
The configuration files of the device are copied to the PC. With this, the .cfg files are copied to the main path and the other files are copied to the intended folders.




The .cfg file with the contraction "_xUS" in the file name is to be used for access via CAN.
x stands for the number of parallel generators in the application here.
After LeoPC1 has been started and the configuration file has been called up, the driver has to be controlled. To do this, proceed as follows:

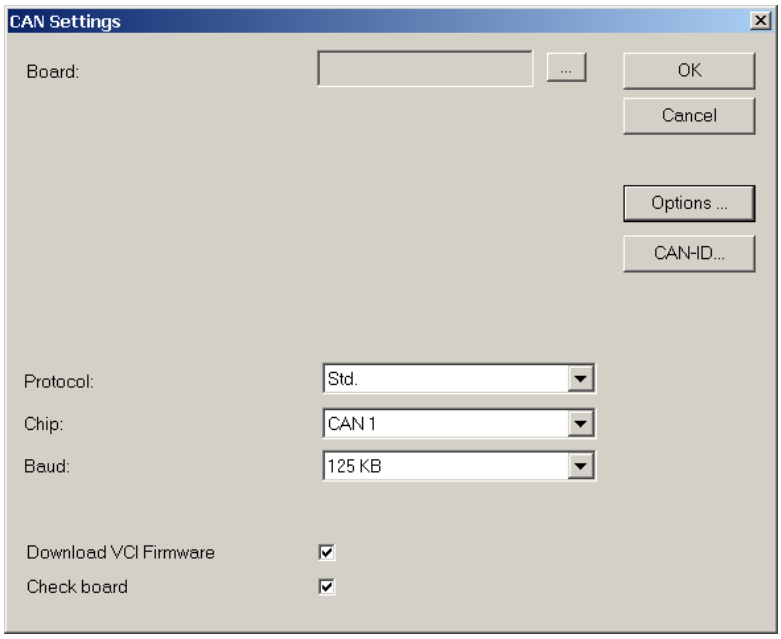
**NOTE**

**LeoPC1 version V2.x is not compatible for USB to CAN of IXXAT.**

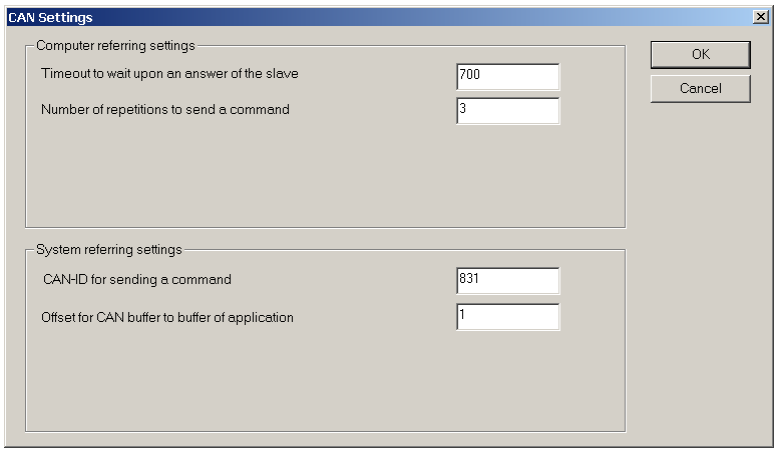
**LeoPC1 software from version 3.1 is recommended since it includes the current driver VCI2.16 for the USB to CAN of IXXAT in the installation.**

**If a VCI driver of IXXAT older than V2.16 is installed, we recommend to update to version V2.16 or higher. To do this, proceed as described by IXXAT.**

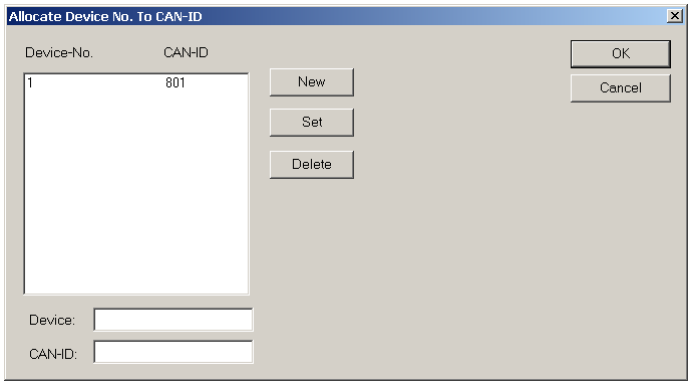
In LeoPC1, select in the menu Devices -> Settings and then in the section Data communication IXXAT VCI2 - CAN as Driver, and click Settings.



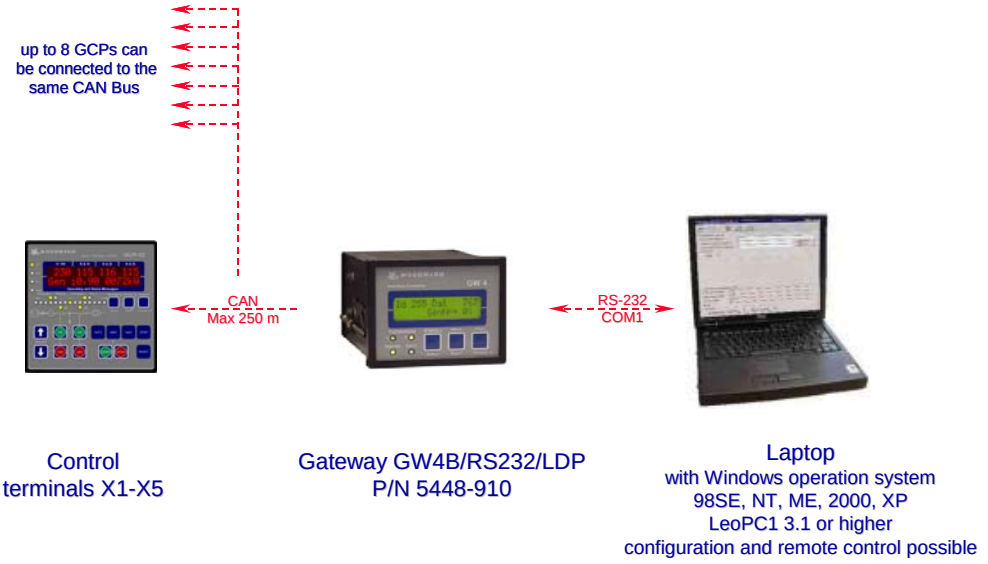

Set up the window CAN Settings like shown on the left.




Check the CAN Settings again by selecting Options and CAN-ID.



## Connection via GW4/RS-232 LDP




## Function

The GW 4 with RS-232 interface and LDP protocol can be used to configure and visualize the GCP comfortably with a PC or laptop. The GW 4 serves as stationary solution with connection to a PC or industrial PC.

Different applications can be performed using the software LeoPC1. These applications include:

- Configuration
- Visualization with data recording
- Remote control (start and stop, transferring the set values for real power and generator power factor)
- Load language
- Transfer standard values to and from the harddrive

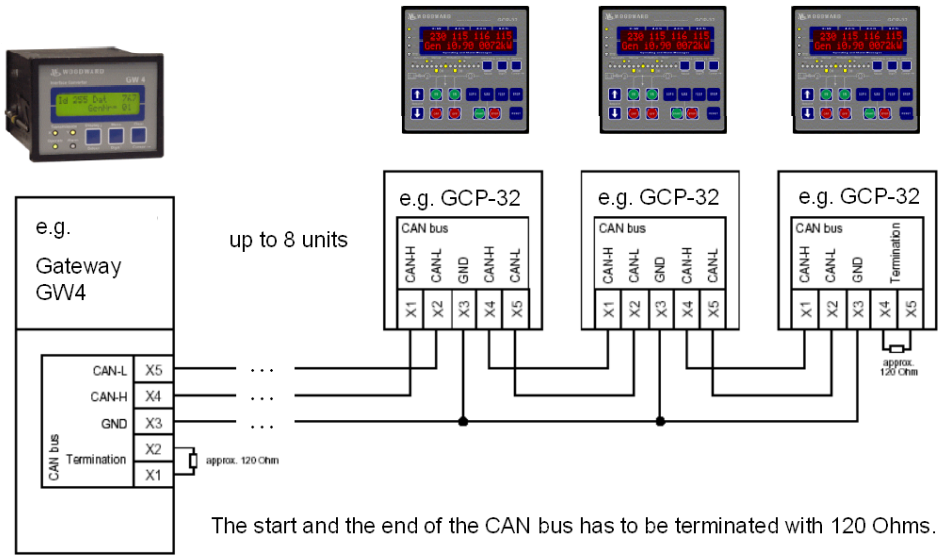
## Preconditions for this example

- GCP with CAN connection (X1/X5)
- GW4B/RS232 LDP
- PC or laptop with Windows OS 98SE, NT, ME, 2000, XP and free Com port (USB to COM adapter also possible)
- Application software LeoPC1 version 3.1 or higher
- Configuration file available (*.cfg, *.asm, *.opt,...)

## Connection

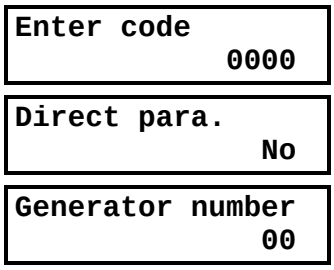
This is an example for the connection of several GCPs with the GW 4.




The PC connection can be taken from the operation manual of the GW 4. Please note that a cable has to be tailored for this.

## Operation

In order to establish a connection between the GCP and LeoPC1, the correct entry of the generator number at the GCP has to be observed:




1. Code level 2 has to be entered at the GCP.

2. The direct configuration has to be disabled if necessary.

The entry for the generator number determines the CAN ID of the unit.

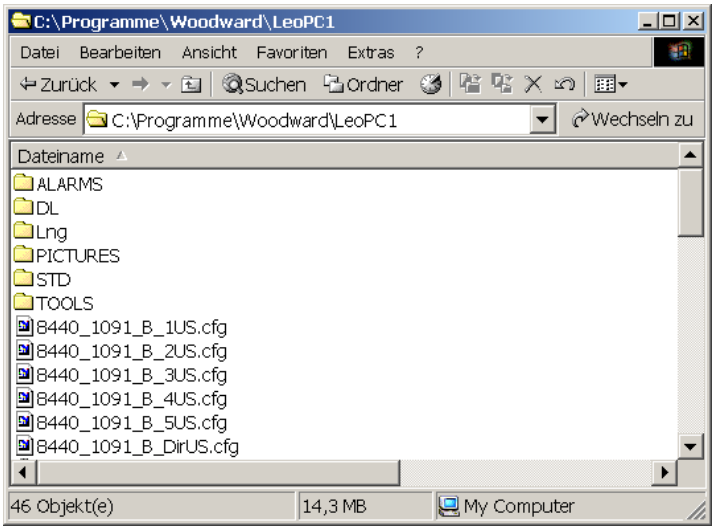
Once connected to the CAN bus, the GW 4 may serve up to 8 GCPs. If the unit includes the options SC09/10 or SB03, only 4 GCPs can be connected if the ECM data is to be visualized as well. Then, the GW 4 has to be configured to extended blocks.

## Settings in LeoPC1

LeoPC1 will be installed according to the manual.
The configuration files of the device are copied to the PC. With this, the .cfg files are copied to the main path and the other files are copied to the intended folders.

**NOTE**

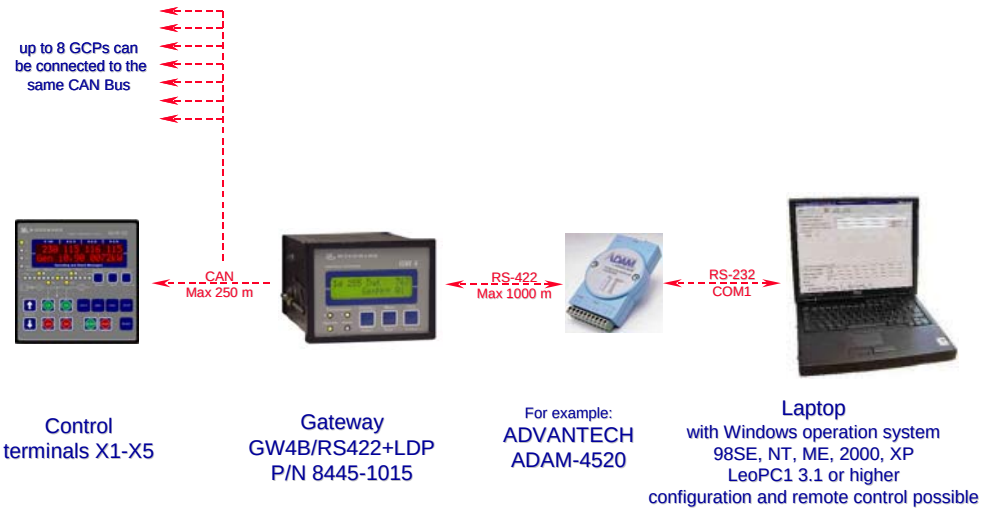
**If more than 8 GCP-30 are to be connected, the utilization of the USB/CAN adapter of IXXAT is recommended.**




The .cfg file with the contraction "_xUS" in the file name is to be used for access via CAN.
x stands for the number of parallel generators in the application here.
The driver Gateway - RS-232 is to be selected under Devices -> Settings -> Driver.

# Connection via GW4/RS-422 LDP




## Function

The GW 4 with RS-422 interface and LDP protocol can be used to configure and visualize the GCP comfortably with a PC or laptop. The GW 4 serves as stationary solution here with connection to a converter, which establishes a connection to a PC or industrial PC over a distance of 1000m. This example shows a solution for establishing a connection over large distances to a control station or visualization system.
Different applications can be performed using the software LeoPC1. These applications include:

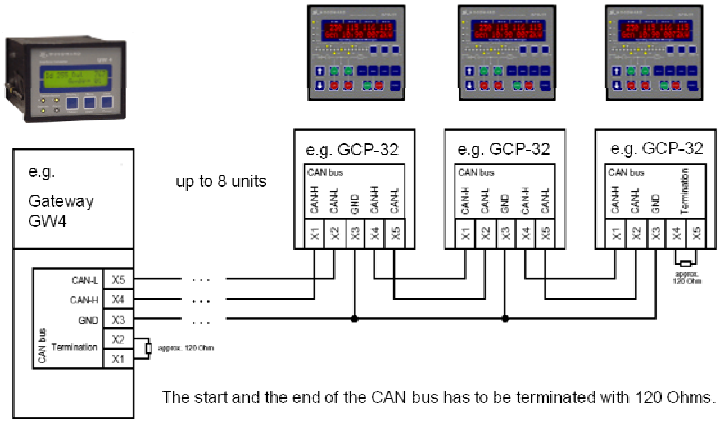
- Configuration
- Visualization with data recording
- Remote control (start and stop, transferring the set values for real power and generator power factor)
- Transfer standard values to and from the harddrive

## Preconditions for this example

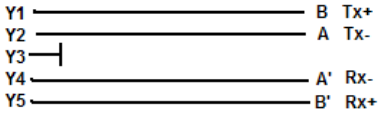
- GCP with CAN connection (X1/X5)
- GW4B/RS422 LDP
- Converter RS-422 to RS-232, e.g. ADVANTECH ADAM-4520 (www.advantech.com)
- or ICSDataCom 485HF9: (www.icsdatacom.com)
- PC or laptop with Windows OS 98SE, NT, ME, 2000, XP and free Com port (USB to COM adapter also possible)
- Application software LeoPC1 version 3.1 or higher
- Configuration file available (*.cfg, *.asm, *.opt,...)

## Connection

This is an example for the connection of several GCPs with the GW 4.




Pin layout GW 4 / RS-422 to converter:




The specifications A, B, A', B', Tx+, Tx-, Rx+, and Rx- refer to the known converter types 485HF9 of ICSDATACOM and ADAM-4520 of ADVANTECH.

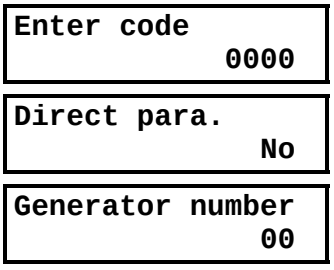
Please note:

485HF9: RS-485 - RS4-22 Conversion has to be performed by re-soldering jumpers (manual)

ADAM-4520: RS-485 - RS-422 Conversion has to be performed by proper setting of the jumpers (manual)
Generally, please refer to the operation manual of the used converter.

## Operation

In order to establish a connection between the GCP and LeoPC1, the correct entry of the generator number at the GCP has to be observed:




1. Code level 2 has to be entered at the GCP.

2. The direct configuration has to be disabled if necessary.

The entry for the generator number determines the CAN ID of the unit.

Once connected to the CAN bus, the GW 4 may serve up to 8 GCPs. If the unit includes the options SC09/10 or SB03, only 4 GCPs can be connected if the ECM data is to be visualized as well. Then, the GW 4 has to be configured to extended blocks.

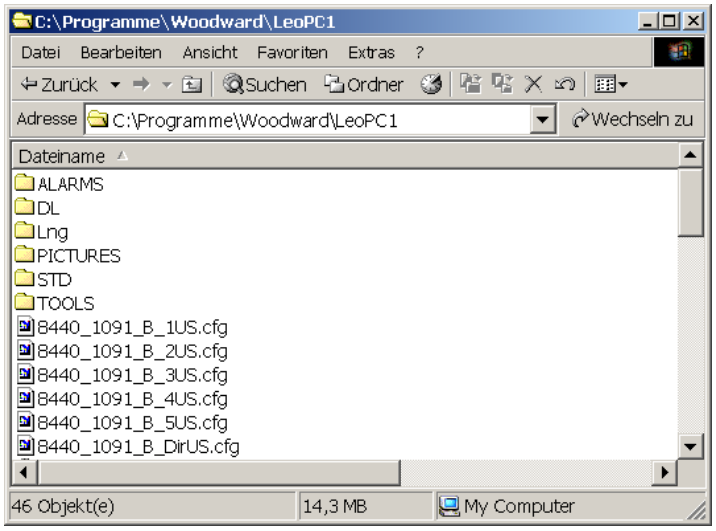
 

## Settings in LeoPC1

LeoPC1 will be installed according to the manual.
The configuration files of the device are copied to the PC. With this, the .cfg files are copied to the main path and the other files are copied to the intended folders.

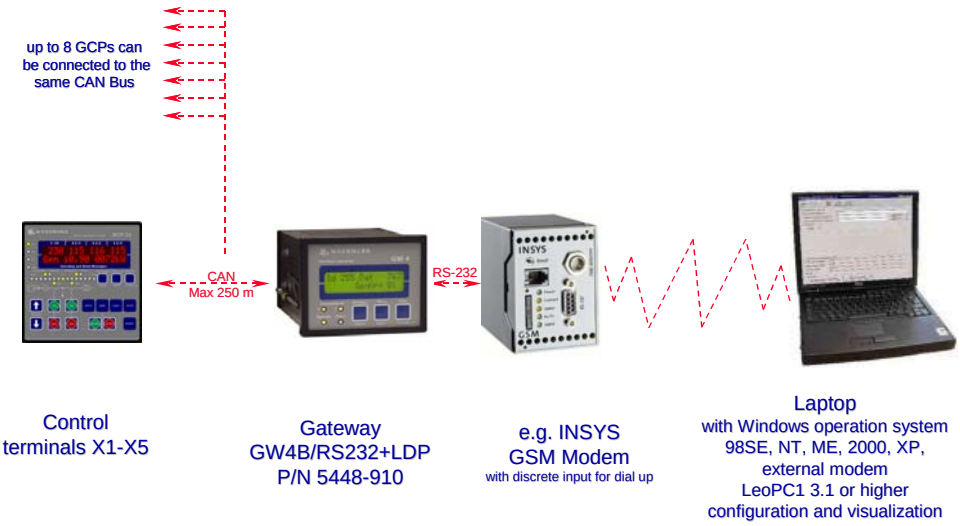
**NOTE**

**This application is limited to 8 GCPs per interface at the moment. Please contact Woodward for bigger plants.**




The .cfg file with the contraction "_xUS" in the file name is to be used for access via CAN.
x stands for the number of parallel generators in the application here.
The driver Gateway - RS-232 is to be selected under Devices -> Settings -> Driver.

# Using a GSM Modem




## Function

It is possible to establish a cellular connection to the system using a GSM modem. This application is intended for mobile use.
It is also interesting to trigger a call in case of an alarm with this application. The GSM modem provides a discrete input for this, which can trigger e.g. a short message (SMS) (depending on the network provider, it can also be possible to send a fax message).

Different applications can be performed using the software LeoPC1. These applications include:

- Configuration
- Visualization with data logging
- Remote control (start and stop, transferring the set values for real power and generator power factor)
- Transfer standard values to and from the harddrive

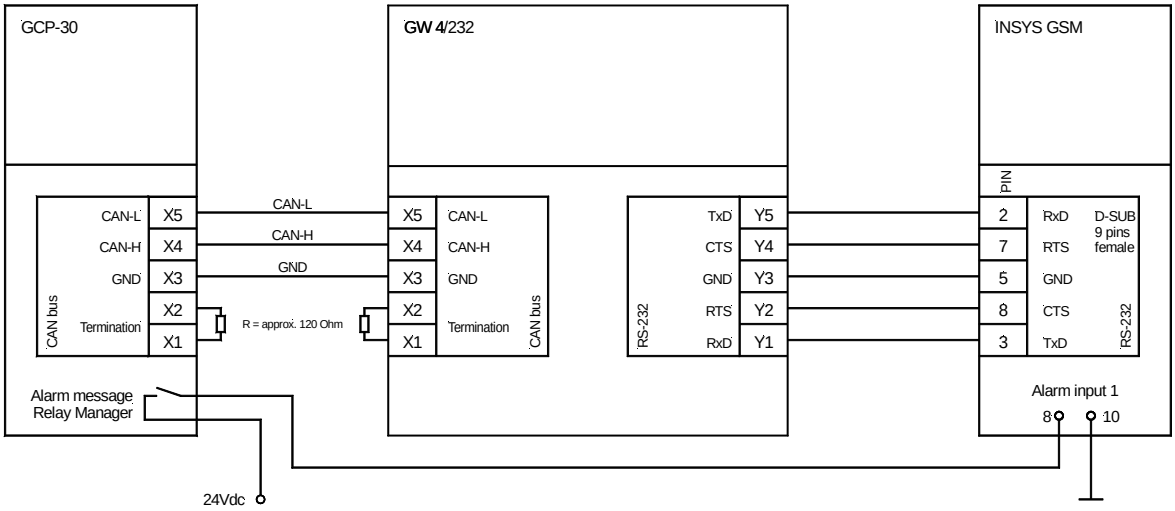
## Preconditions for this Example

- GCP with CAN interface (X1/X5)
- GW4B/RS232 LDP
- Wireless modem INSYS GSM 4.0 with antenna (www.insys@insys-tec.de)
- SIM card with data transfer enabled (to be enabled by the GSM provider)
- PC or notebook with Windows OS 98SE, NT, ME, 2000, XP with external analog modem
- Application software LeoPC1 version 3.1 or higher
- Configuration files available (*.cfg, *.asm, *.opt, ...)
- FAX/SMS receiver for receiving alarm messages

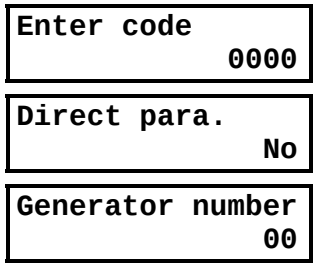
## Connection

The active call in case of an alarm can be triggered by energizing a relay with the relay manager:




## Operation

In order to establish a connection between the GCP and LeoPC1, the correct entry of the generator number at the GCP has to be observed:




1. Code level 2 has to be entered at the GCP.

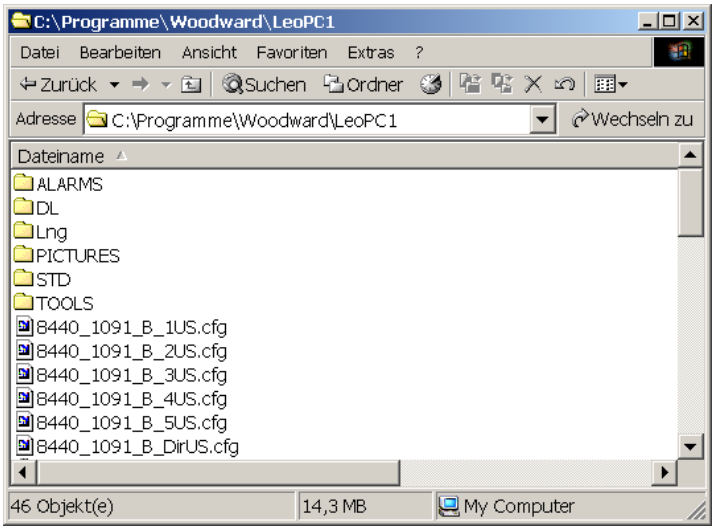
2. The direct configuration has to be disabled if necessary.

The entry for the generator number determines the CAN ID of the unit.

Once connected to the CAN bus, the GW 4 may serve up to 8 GCPs. If the unit includes the options SC09/10 or SB03, only 4 GCPs can be connected if the ECM data is to be visualized as well. Then, the GW 4 has to be configured to extended blocks.

## Setting in LeoPC1

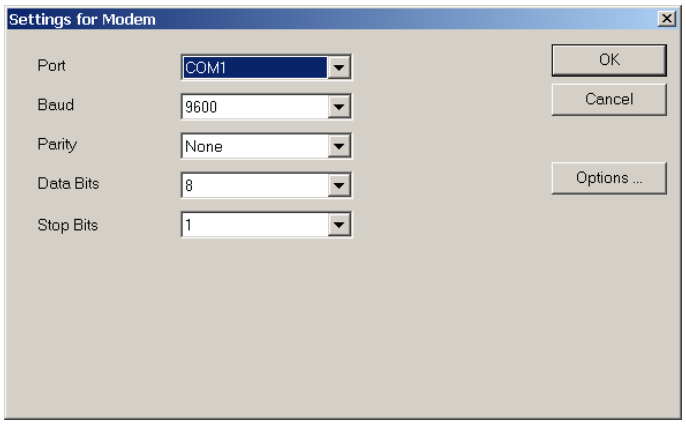
LeoPC1 will be installed according to the manual.
The configuration files of the device are copied to the PC. With this, the .cfg files are copied to the main path and the other files are copied to the intended folders.




The .cfg file with the contraction "_xUS" in the file name is to be used for access via modem.
x stands for the number of parallel generators in the application here.

Proceed now as follows:

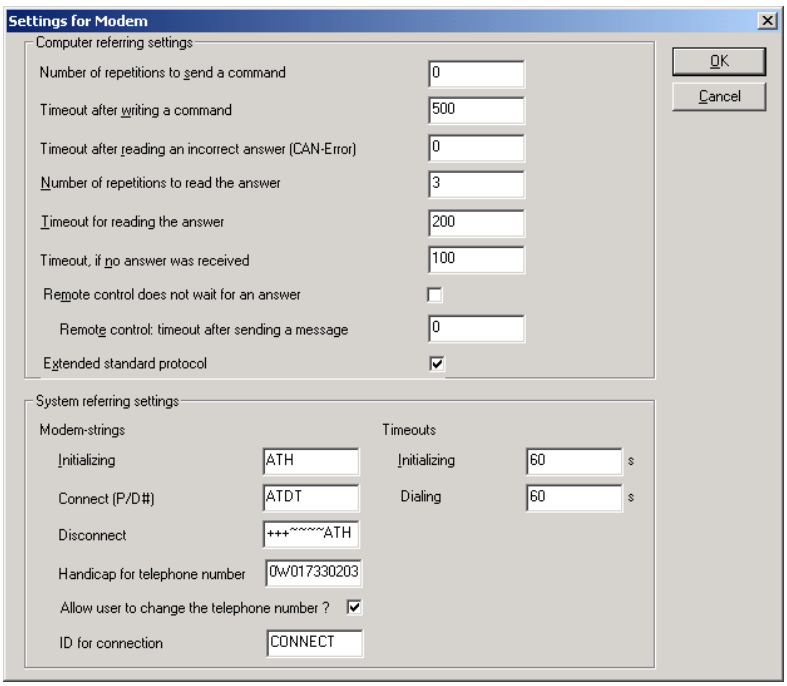
In LeoPC1, select in the menu Devices -> Settings and then in the section Data communication Modem as Driver, and click Settings.




In the Settings for modem dialog, select the COM port to which your modem is connected and click Options.

Make sure that the modem settings are the same for LeoPC1 and the modem.




Set up the window Settings for Modem like shown on the left.

*Note:* If a connection is to be established using an exchange line, the following settings are recommended:

- Initialization
  - ATH&F0 (for internal connections without exchange line)
  - ATH (for external connections with exchange line)
- Establish connection
  - ATX1DT (for internal connections without exchange line)
  - ATDT (for external connections with exchange line)

If no PABX is used, the 0W can be left out.


If you select connect, the field with the phone number appears again.

## NOTE

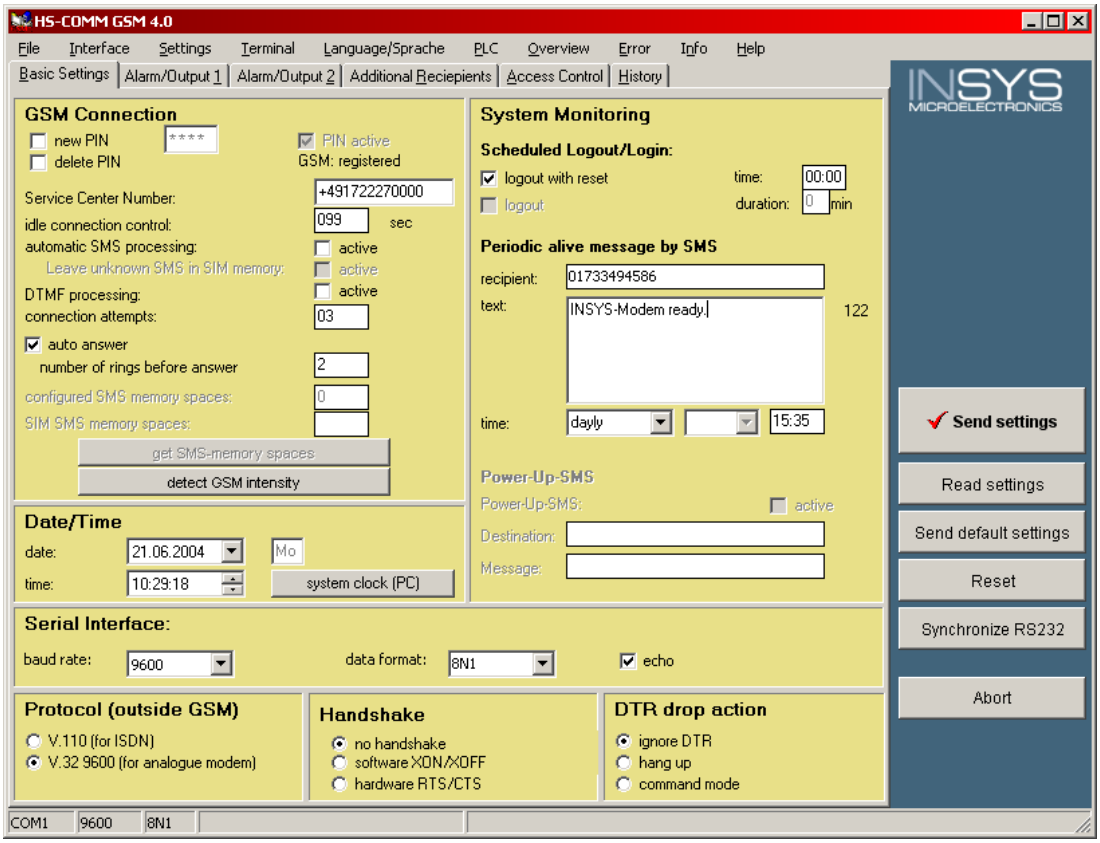
**This application is limited to 8 GCPs per interface at the moment. Please contact Woodward for bigger plants.**

## Settings at the GSM Modem

INSYS Microelectronics provides the application software HS-COMM to configure the GSM modem for the application. Refer to the operation manual of the device for detailed information.
The following settings form an example for sending an alarm message as short message.
Descriptions of the individual parameters can be taken from the operation manual of the modem.

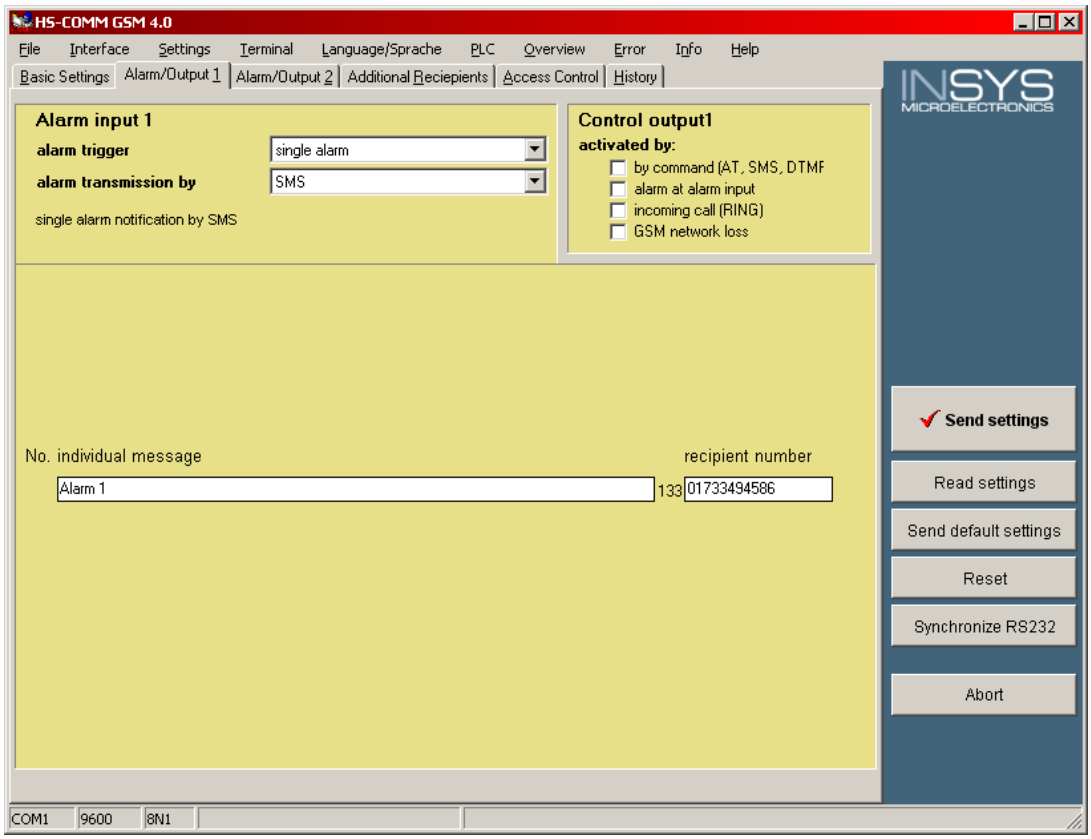
### Settings using the configuration software

Make the following settings on the tab Basic Settings. These settings configure the modem to accept an incoming call for remote configuration. The phone number and the text can be set as required.

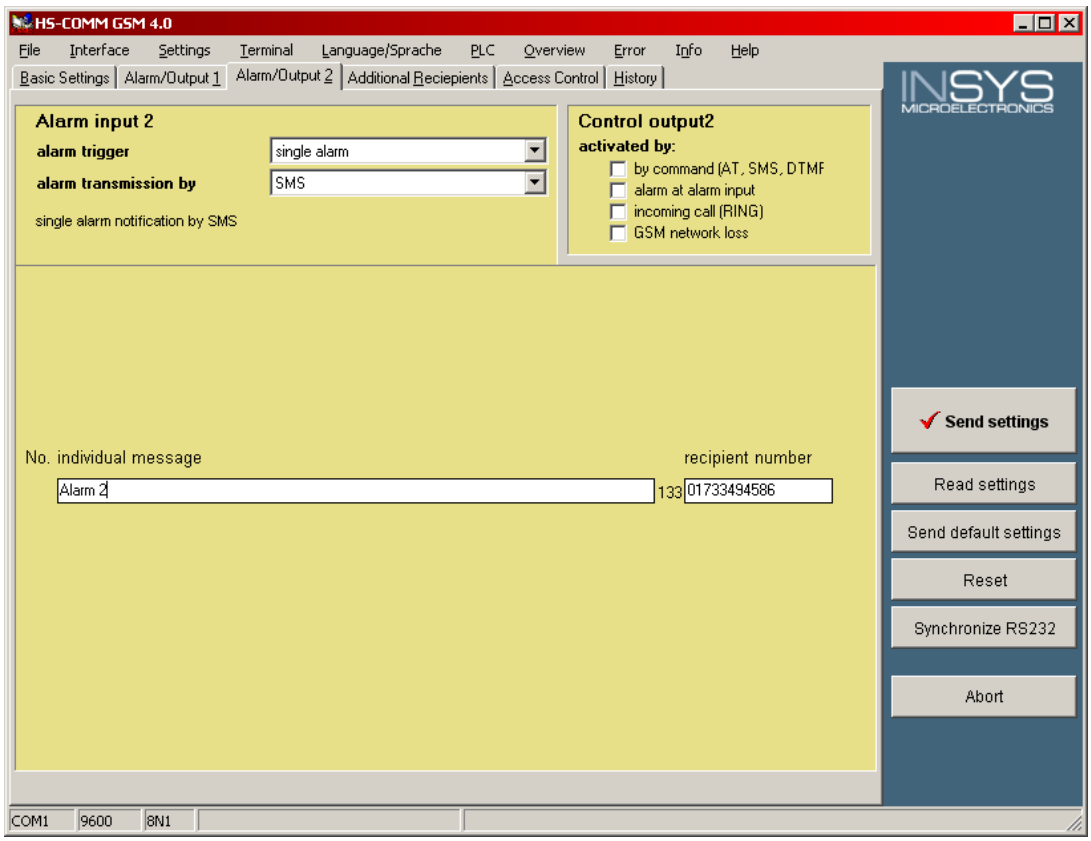


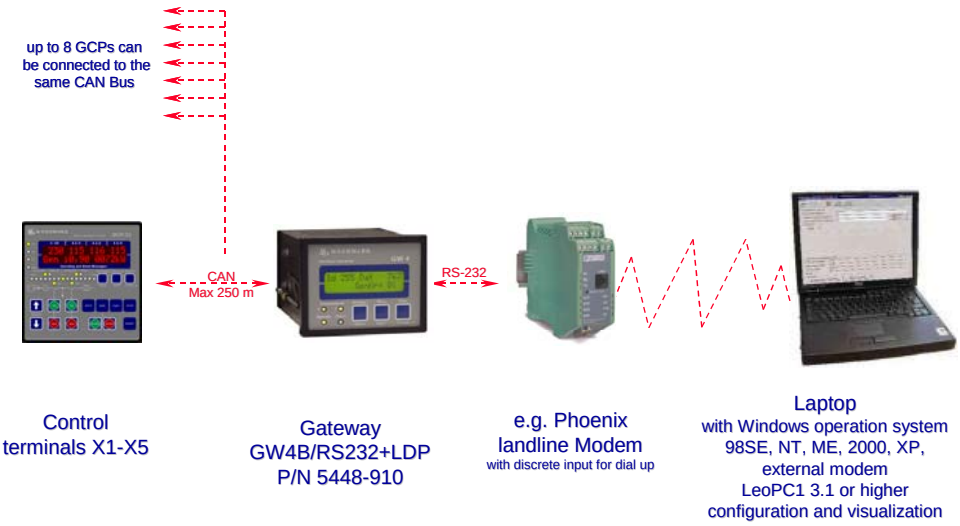
Make the following settings on the tab Alarm/Output 1. The phone number and the text can be set as required.




Make the following settings on the tab Alarm/Output 1. The phone number and the text can be set as required.



# Using a Fixed-Network Modem




## Function

It is possible to establish a phone connection to the system using a modem. This application is intended for stationary use, where a steady remote control is required.
It is also interesting to trigger a call in case of an alarm with this application. The Phoenix modem provides a discrete input for this, which can trigger e.g. a call or a fax message.

Different applications can be performed using the software LeoPC1. These applications include:

- Configuration
- Visualization with data logging
- Remote control (start and stop, transferring the set values for real power and generator power factor)
- Transfer standard values to and from the harddrive

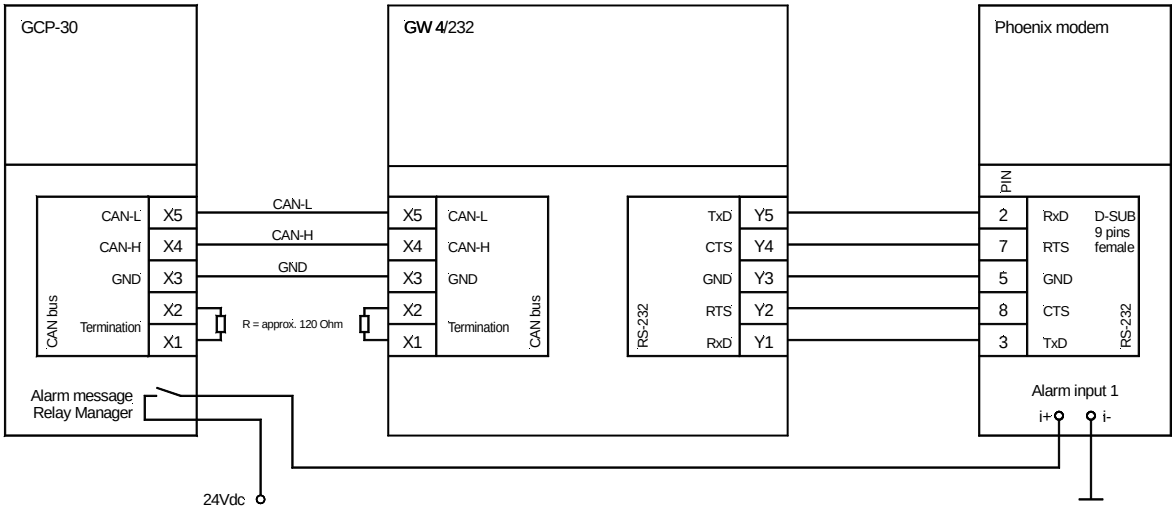
## Preconditions for this Example

- GCP with CAN interface (X1/X5)
- GW4B/RS232 LDP
- Phoenix PSI data/fax modem/RS-232 (www.phoenixcontact.com)
- PC or notebook with Windows OS 98SE x, NT, ME, 2000, XP with external analog modem
- Application software LeoPC1 version 3.1 or higher
- Configuration files available (*.cfg, *.asm, *.opt, ...)
- FAX/SMS receiver for receiving alarm messages

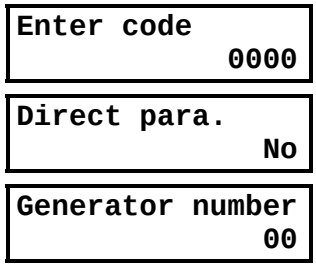
## Connection

The active call in case of an alarm can be triggered by energizing a relay with the relay manager:




## Operation

In order to establish a connection between the GCP and LeoPC1, the correct entry of the generator number at the GCP has to be observed:




1. Code level 2 has to be entered at the GCP.

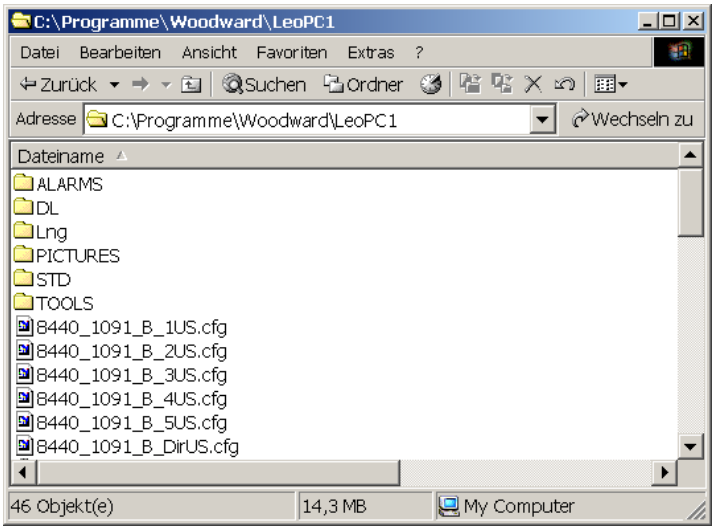
2. The direct configuration has to be disabled if necessary.

The entry for the generator number determines the CAN ID of the unit.

Once connected to the CAN bus, the GW 4 may serve up to 8 GCPs. If the unit includes the options SC09/10 or SB03, only 4 GCPs can be connected if the ECM data is to be visualized as well. Then, the GW 4 has to be configured to extended blocks.

## Setting in LeoPC1

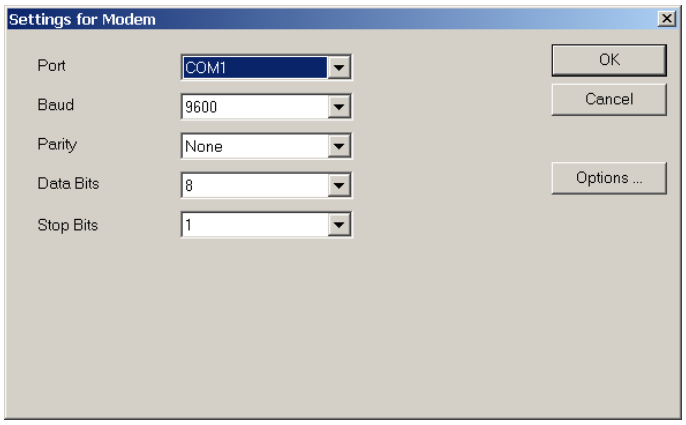
LeoPC1 will be installed according to the manual.
The configuration files of the device are copied to the PC. With this, the .cfg files are copied to the main path and the other files are copied to the intended folders.




The .cfg file with the contraction "_xUS" in the file name is to be used for access via modem.
x stands for the number of parallel generators in the application here.

Proceed now as follows:

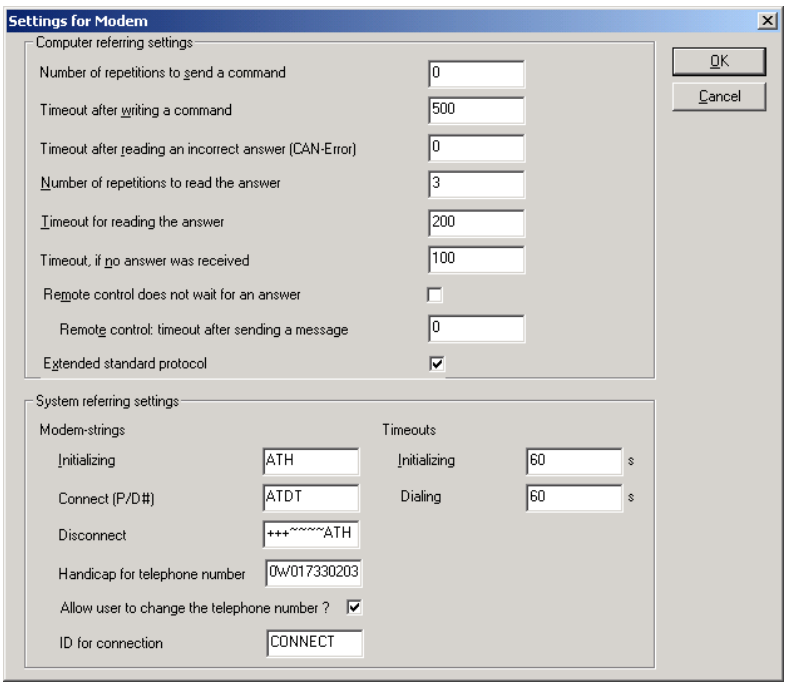
In LeoPC1, select in the menu Devices -> Settings and then in the section Data communication Modem as Driver, and click Settings.




In the Settings for modem dialog, select the COM port to which your modem is connected and click Options.

Make sure that the modem settings are the same for LeoPC1 and the modem.




Set up the window Settings for Modem like shown on the left.

*Note:* If a connection is to be established using an exchange line, the following settings are recommended:

- Initialization
  - ATH&F0 (for internal connections without exchange line)
  - ATH (for external connections with exchange line)
- Establish connection
  - ATX1DT (for internal connections without exchange line)
  - ATDT (for external connections with exchange line)

If no PABX is used, the 0W can be left out.


If you select connect, the field with the phone number appears again.

## NOTE

**This application is limited to 8 GCPs per interface at the moment. Please contact Woodward for bigger plants.**

## Settings at the Phoenix Modem

The settings refer to an example for sending an alarm message via fax.
Descriptions of the individual parameters can be taken from the operation manual of the modem.

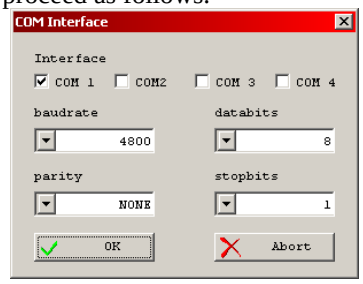
### DIP Switches

All DIP switches are set to OFF (default state).

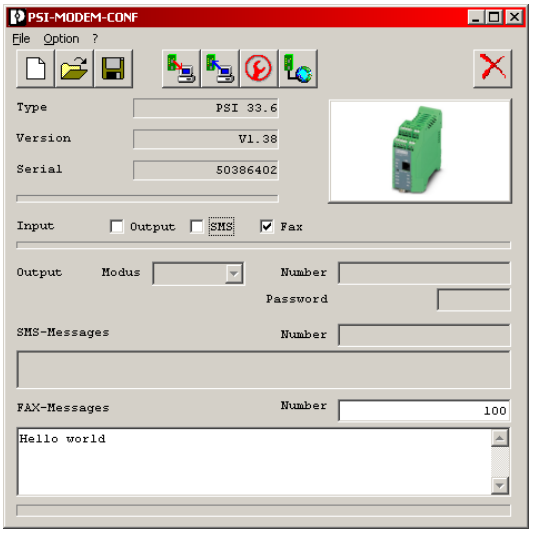
### Settings using the configuration software

Phoenix provides an application software to configure the modem for the application. Refer to the operation manual of the device for detailed information.
The following settings form an example for sending an alarm message via fax.
Descriptions of the individual parameters can be taken from the operation manual of the modem.

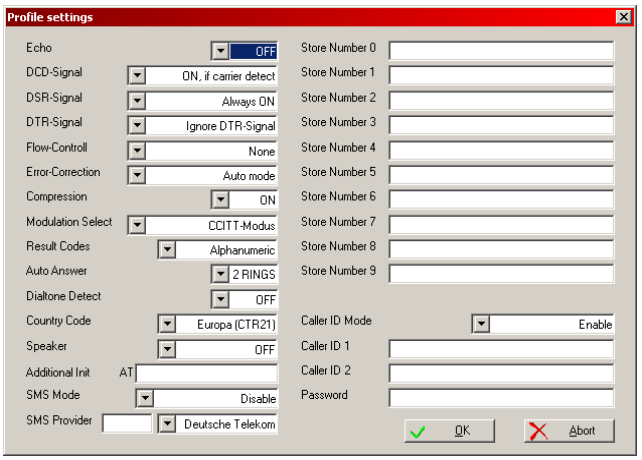
To configure the modem, proceed as follows.




Configure the COM port

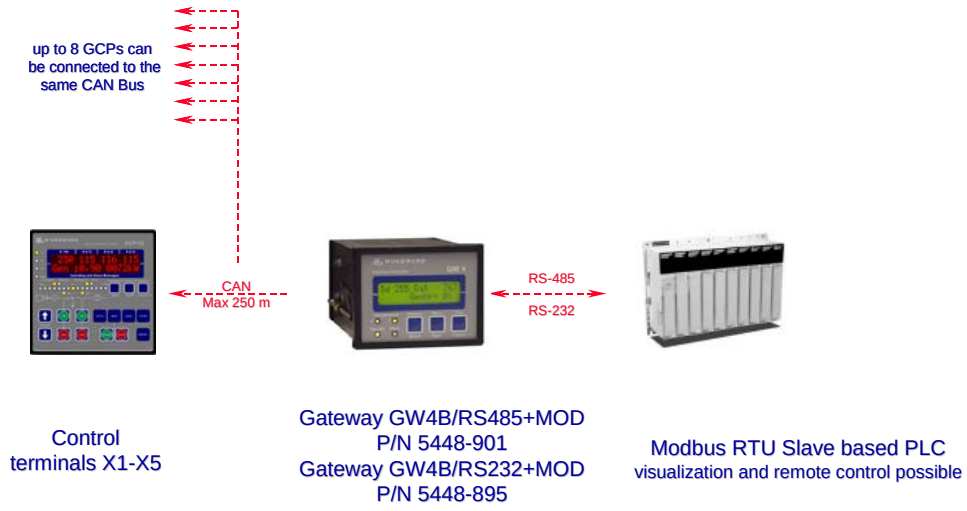



The phone number and the text can be set as required.




These settings configure the modem to accept an incoming call for remote configuration.

## Modbus Connection via GW 4




Using GW 4/RS485 Modbus, a second unit of GW 4 can connected to communicate up to 14 GCP30.

## Function

With this application, it is possible to communicate with the GCP(s) via the Modbus protocol. The GW 4 works as RTU slave here.
While the RS-232 interface is used for the peer to peer connection, a field bus with several participants can also be established with RS-485.

The bi-directional communication allows the following functions:

- Visualization of the process
- Remote control (start and stop, transferring the set values for real power and generator power factor)

## Preconditions for this example

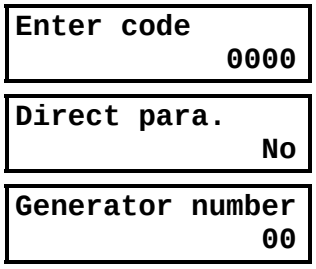
- GCP with CAN connection (X1/X5)
- GW4B/+MOD
- Automation device

## Connection

The connection has to be taken from the GW 4 manual.

## Operation

In order to establish a connection between the GCP and the PLC, the correct entry of the generator number at the GCP has to be observed:




1. Code level 2 has to be entered at the GCP.

2. The direct configuration has to be disabled if necessary.

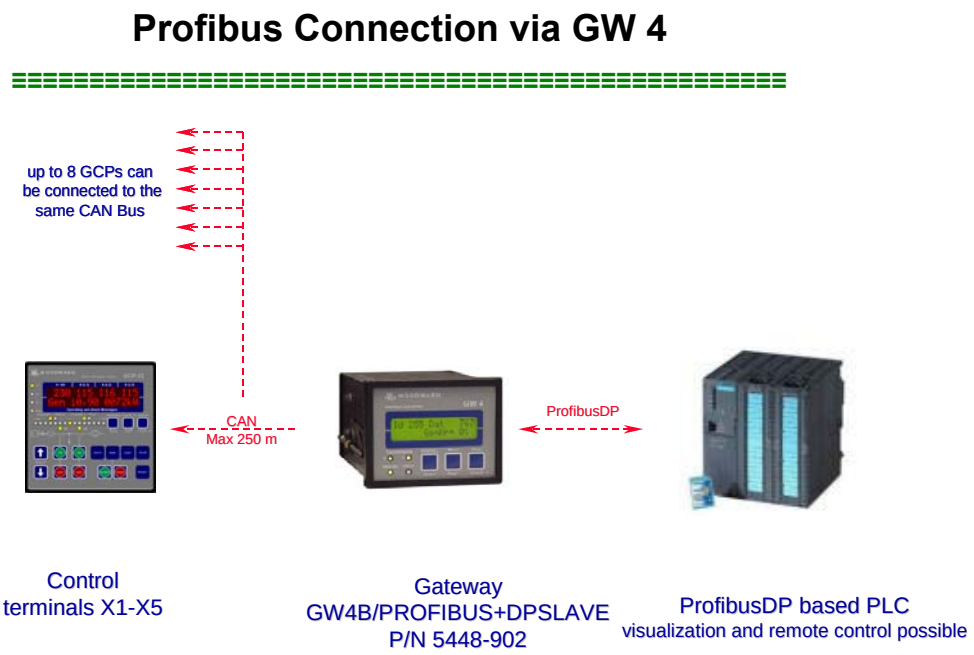
The entry for the generator number determines the CAN ID of the unit.

Once connected to the CAN bus, the GW 4 may serve up to 8 GCPs. If the unit includes the options SC06/07 or SB03, only 4 GCPs can be connected if the ECM data is to be visualized as well. Then, the GW 4 has to be configured to extended blocks.

### NOTE

**This application is limited to 8 GCPs per interface at the moment. If more than 8 generators are to be read out, a second GW 4 has to be used. An RS-485 hardware is recommended at the GW 4 in this case. With this, both GW 4s can be read out with one interface of the automation device.**

**The interface control (start/stop and reset) for more than 8 units can not be performed at the moment because of technical reasons. Please request newer software revisions.**




Using GW 4/Profibus-DP, a second unit of GW 4 can connected to communicate up to 14 GCP30.

## Function

With this application, it is possible to communicate with the GCP(s) via the Profibus DP interface. The GW 4 works as slave here.

The bi-directional communication allows the following functions:

- Visualization of the process
- Remote control (start and stop, transferring the set values for real power and generator power factor)

## Preconditions for this example

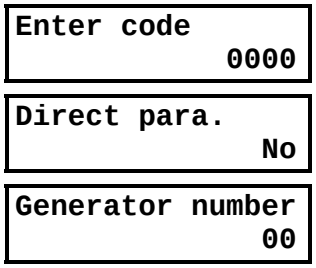
- GCP with CAN connection (X1/X5)
- GW 4B/Profibus+DPSLAVE
- Automation device

## Connection

The connection has to be taken from the GW 4 manual.

## Operation

In order to establish a connection between the GCP and the PLC, the correct entry of the generator number at the GCP has to be observed:




1. Code level 2 has to be entered at the GCP.

2. The direct configuration has to be disabled if necessary.

The entry for the generator number determines the CAN ID of the unit.

Once connected to the CAN bus, the GW 4 may serve up to 8 GCPs. If the unit includes the options SC09/10 or SB03, only 4 GCPs can be connected if the ECM data is to be visualized as well. Then, the GW 4 has to be configured to extended blocks.

### NOTE

**This application is limited to 8 GCPs per interface at the moment. If more than 8 generators are to be read out, a second GW 4 has to be used. An RS-485 hardware is recommended at the GW 4 in this case. With this, both GW 4s can be read out with one interface of the automation device.**

**The interface control (start/stop and reset) for more than 8 units can not be performed at the moment because of technical reasons. Please request newer software revisions.**

# Chapter 3.
# Special Applications

## Disable Emergency Power via Discrete Input

**NOTE**

**This functionality is implemented in all GCP-30s with software version 4.3010 or later.**

This function allows to disable an emergency operation with discrete input 11 (terminal 68). If the discrete input has been configured as control input, an emergency operation may be terminated by energizing this discrete input. Energizing the discrete input has the same effect as the configuration of the parameter "Emergency power" to OFF.

| Emergency OFF by Ter.68 OFF |
|---|

**Prevent an emergency power operation via terminal 68** **ON/OFF**

**OFF**..... This terminal is used as an alarm input.
**ON**..... This terminal is used as control input.

- High signal — If this terminal utilizes a HIGH signal (energized), an emergency power operation is prevented or terminated. The unit operates as if Parameter "Emergency power" is disabled.
- Low signal — If this terminal utilizes a LOW signal (de-energized), the setting of Parameter "Emergency power" is taken over.

If the parameter "Emergency OFF by Ter.68" is configured ON, an emergency operation may be prevented by energizing the discrete input at terminal 68.
If an emergency operation has already been initiated before energizing the discrete input at terminal 68, the emergency operation may also be terminated by energizing the discrete input at terminal 68.

**Exception:** If the breaker logic Parallel, Closed transition, or Interchange is selected and the discrete input at terminal 53 is energized, an emergency operation with already closed GCB may not be terminated by energizing the discrete input at terminal 68.

**Explanation:** When energizing the discrete input at terminal 53 (Enable MCB), a synchronization of the MCB will be achieved before terminating the emergency operation. But this cannot be performed because no mains power is present.

**Solution:** If an emergency operation with already closed GCB is to be terminated, a "GCB open" signal must be generated externally together with energizing the discrete input at terminal 68. If the GCB is opened then and the discrete input at terminal 68 is still activated, the GCP will not try to close the GCB anymore.

# Analog Controller Output Value in Initial Position

**NOTE**

**This functionality is only valid for GCP-30 Packages which are equipped with analog controllers.**

The analog value, which is output from the GCP-30 in initial controller position depends on the setting of various parameters. The following examples show this behavior.

## Parameters

```
F/P contr.output
----------------
```

**f controller: output range** **refer to parameter description for settings**

If the parameter "F/P contr.type" has been configured to "ANALOG", this parameter must be configured to the appropriate type of analog controller. The range of the analog output is configured here. To switch from a current to a voltage or PWM output a jumper must be added to terminals 8/9.

```
Initial state
Frequency   000%
```

**f controller: initial frequency** **0 to 100 %**

Analog controller output setting with disabled controller. The set value in percent refers to the range between minimum and maximum value of the output signal.

```
Stepper sign.frq
(min.)      000%
```

**f controller: minimum value** **0 to 100%**

This parameter permits the operator to clamp or limit the lower analog output value.

```
Stepper sign.frq
(max.)      000%
```

**f controller: maximum value** **0 to 100%**

This parameter permits the operator to clamp or limit the upper analog output value.

# Example Configurations

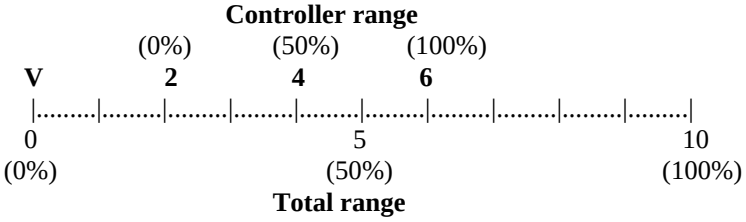
## Example 1

Settings:

- f controller: output range 0 to 20mA (0 to 10V)
- Jumper between terminals 8 and 9 yes
- Initial state frequency 50%
- f controller: minimum value 20%
- f controller: maximum value 60%

Controller output:

- f controller: minimum value 20% from 0 to 10V = **2V**
- f controller: maximum value 60% from 0 to 10V = **6V**
- Initial state frequency 50% from **2V** to **6V** = **4V**



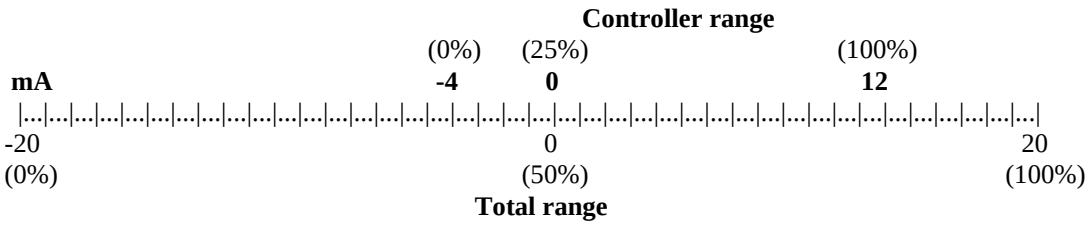

## Example 2

Settings:

- f controller: output range +/- 20mA (+/- 10V)
- Jumper between terminals 8 and 9 no
- Initial state frequency 25%
- f controller: minimum value 40%
- f controller: maximum value 80%

Controller output:

- f controller: minimum value 40% from - 20mA to + 20mA = **- 4mA**
- f controller: maximum value 80% from - 20mA to + 20mA = **+12mA**
- Initial state frequency 25% from **- 4mA** to **+ 12mA** = **0mA**



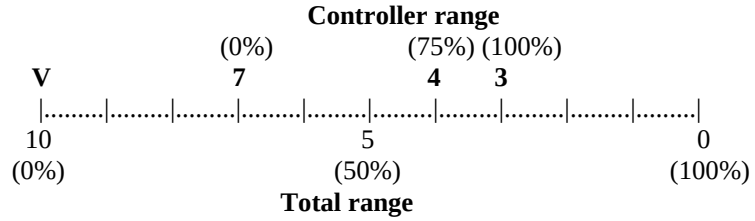
### Example 3

Settings:

- f controller: output range 20 to 0mA (10 to 0V)
- Jumper between terminals 8 and 9 yes
- Initial state frequency 75%
- f controller: minimum value 30%
- f controller: maximum value 70%

Controller output:

- f controller: minimum value 30% from 10 to 0V = **7V**
- f controller: maximum value 70% from 10 to 0V = **3V**
- Initial state frequency 75% from **7V** to **3V** = **4V**



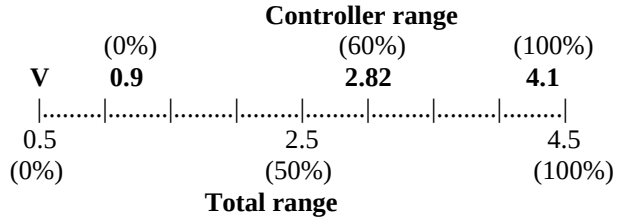

### Example 4

Settings:

- f controller: output range 0.5V to 4.5V
- Jumper between terminals 8 and 9 yes
- Initial state frequency 60%
- f controller: minimum value 10%
- f controller: maximum value 90%

Controller output:

- f controller: minimum value 10% from 10 to 0V = **0.9V**
- f controller: maximum value 90% from 10 to 0V = **4.1V**
- Initial state frequency 60% from **0.9V** to **4.1V** = **2.82V**



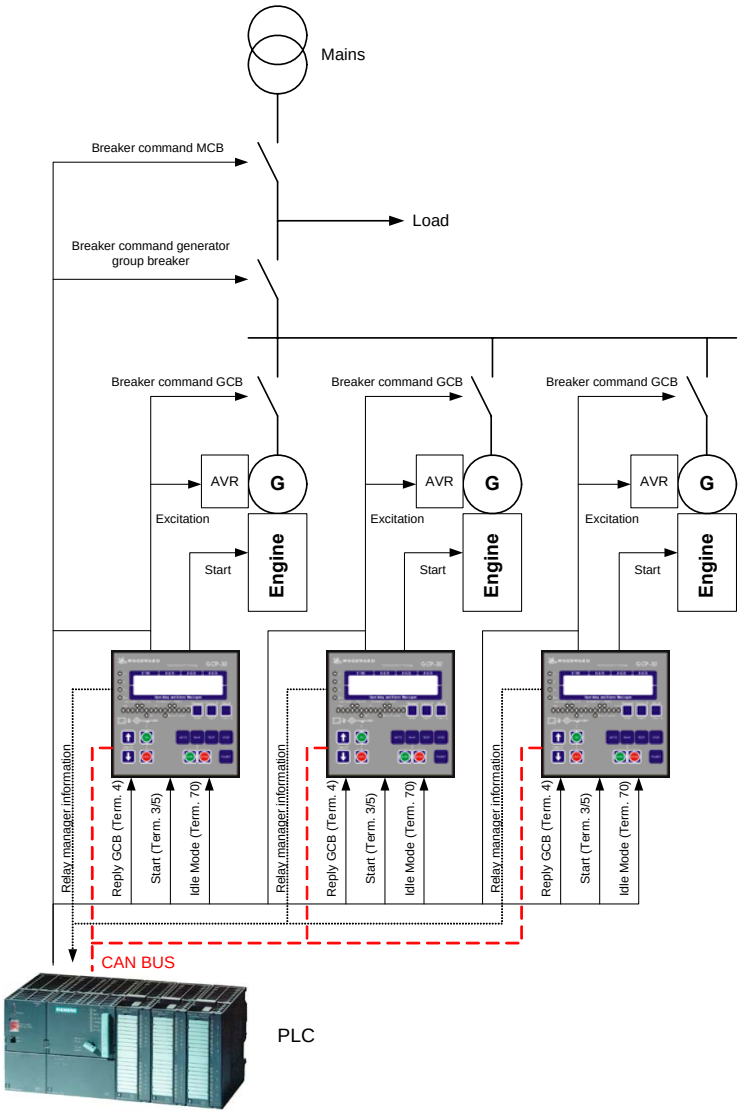
# Start-Up Synchronization / Unexcited Start-Up

It may be necessary for systems with high consumer load to couple multiple gensets for emergency power operation. The start-up synchronization allows to couple the gensets much more quickly than the classical synchronization.
However, the gensets must be unexcited before they are paralleled.

The GCP-30 has no automatic start-up synchronization, because the proceeding depends on the respective application.
The following description explains, which standard functions of the GCP-30 may be used to realize a start-up synchronization.

A separate busbar for the gensets must be present for an operation with start-up synchronization. In addition, a generator group breaker (GGB) for disconnecting the generator busbar and consumer load busbar is required. Moreover, an MPU or an external speed governor with connection to terminal 62 (Firing speed reached) at the GCP-30 must be present.

The process of the start-up synchronization must be controlled externally (e.g. via a PLC).
The PLC may read states like e.g. engine is running, from the GCP-30 via the CAN bus or relay manager output and process this data.



## Usable Standard Functions of the GCP-30

## RelayManager Functions

The following information, which is provided by the GCP-30 via the relay manager, may be important for the master control in association with the start-up synchronization :

- Parameter No. 4 Firing speed reached (engine runs)
- Parameter No. 88 Generator voltage and frequency are NOT available
- Parameter No. 89 Busbar voltage and frequency are NOT available
- Parameter No. 91 Pickup has nominal speed (rated speed +/- 6%)
- Parameter No. 96 Delayed engine monitoring time exceeded
- Parameter No.133 Idle mode active

**NOTE**

**All above mentioned information is also available on the guidance bus (CAN bus terminals X1 to X5).**

## Parameter Enable 'idle mode' via terminal 70

Parameter 1

```
Idle Mode
by term.70   ON
```

**Enable idle mode via terminal 70** **ON/OFF**

**OFF** .....This terminal is used as an alarm input.
**ON**.....This terminal is used as control input. The relay programmed with the relay manager function 133 reacts together with the logical status of terminal 70 according to the configured NO/NC logic and inverting the relay output. This relay must be wired to the "idle input" of the speed governor normally.

- High signal Energizing the terminal 70 discrete input enables the idle mode. The message "Idle Mode" is displayed in all operational modes (except STOP mode) when a start request is initiated and during the postrun time so long as there are no other message with a higher display priority (i.e. preglow). The generator undervoltage and underfrequency protections are disabled while in the idle mode and the warning limit value for the oil pressure VDO input is suppressed. These protections are enabled after terminal 70 is de-energized and the monitored frequency is measured within 1 Hz of the rated generator frequency or after 60 seconds passes, which ever occurs first.
- Low signal The idle mode is disabled and the protections become active again (see above description).

## Realization

There are different methods for the start-up synchronization. Two proceedings are described in the following:

### Method 1

The generator circuit breakers (GCB) will be closed by an external signal (e.g. via PLC).
Together with the start request for the GCP-30, terminal 70 (idle mode) and terminal 4 must be energized. Terminal 70 prevents, that the GCP-30 trips with generator underfrequency or generator undervoltage. Energizing terminal 4 simulates an opened GCB for the GCP-30. Otherwise, the GCP-30 would attempt to open the GCB or no start process would be performed.
The generator excitation will be activated by an external signal (e.g. via PLC) for all gensets, which are in operation (firing speed reached).
If generator frequency and voltage are within the permissible limits, terminal 70 and terminal 4 may be de-energized again.
The mains circuit breaker (MCB) may either be opened by the PLC or the GCP-30 (pre-condition: Emergency power = ON).
The closure of the generator group breaker (GGB) must be performed by an external signal (e.g. via PLC) again.

**NOTE**

**If it is not possible to start a genset successfully, its GCB must be opened. A later synchronization to the busbar is possible.**

### Method 2

Together with the start request for the GCP-30, terminal 70 (idle mode) and terminal 4 must be energized. Terminal 70 prevents, that the GCP-30 trips with generator underfrequency or generator undervoltage. Energizing terminal 4 simulates an opened GCB for the GCP-30. Otherwise, the GCP-30 would attempt to open the GCB or no start process would be performed.
If the gensets are started (firing speed reached), the generator circuit breakers (GCB) will be closed by an external signal (e.g. via PLC).
The generator excitation will be activated for all gensets, which are in operation (firing speed reached).
If generator frequency and voltage are within the permissible limits, terminal 70 and terminal 4 may be de-energized again.
The mains circuit breaker (MCB) may either be opened by the PLC or the GCP-30 (pre-condition: Emergency power = ON).
The closure of the generator group breaker (GGB) must be performed by an external signal (e.g. via PLC) again.

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