# PC Tool CU 3

GB Installation and operating instructions

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# Introduction

**PC Tool CU 3 kit**    The PC Tool CU 3 kit you have just opened consists of:

- 1 CD ROM containing PC Tool CU 3 software, these installation and operating instructions and documents mentioned under references.
- 1 RS-485 plug-in Module Board for CU 3,
- 1 RS-232 cable (null-modem) for a direct connection of a PC to G100 service port or G100 R/M/P Port 1,
- 1 Registration card,
- These Installation and operating instructions.

To connect your PC directly to a CU3/SM100 network you need the Grundfos PC Tool Link adapter (with RS-232/RS-485 conversion), which must be ordered separately, order No. 96472084

**System requirements**    The minimum system requirements of the PC Tool CU 3 software are as follows:

- Windows 95/98/NT/ME/2000/XP.
- Pentium 100 MHz or higher.
- 16 Mb RAM memory.
- 12 Mb hard disk space.
- Monitor resolution 800 x 600 or higher.
- Mouse or other pointing device.
- RS-232 COM port

**Contents**    These Installation and operating instructions cover the following topics:

**References**    For further information, please refer to...

- Sensor Module SM 100 Product Information, FB-050/D.
- CU 3 Installation and operating instructions, 96413294 0302.
- G100 Installation and operation instructions, 96428779 0302.
- Grundfos PC Tool Link instructions, 96475749 0202.

# Description

**Purpose**            PC Tool CU 3 can be used for...

- configuration of CU 3 and SM 100 (e.g. during installation),
- interactive operation and monitoring of installations with CU 3 and SM 100,
- troubleshooting CU 3 and SM 100 units,
- demonstration of CU 3 and SM 100 functionality for education or sales purposes,
- showing perspectives in networks with CU 3 and SM 100 units and SCADA system applications.

**User interface**     PC Tool CU 3 uses a graphics based user interface with active zones (hot spots) giving the user a visual impression of control actions and the relation between the data information and the physical pump application.

**Possibilities**      Via the interactive graphics the user can operate and monitor complete GENIbus networks of up to 32 CU 3 and SM 100 units.
Using the Grundfos gateway G100 the PC Tool CU 3 can operate distant networks via modem or radio communication.

**Optional connections**   There are three main options for connection of GENIbus to a PC:

1. Direct connection, see fig. 1 (pos. 1).

2. Via G100 Service port (using any G100 version), see fig. 1 (pos. 2).

3. Via G100 port 1 (using the G100 Radio/Modem/PLC version in the following referred to as the R/M/P version), see fig. 1 (pos. 3).
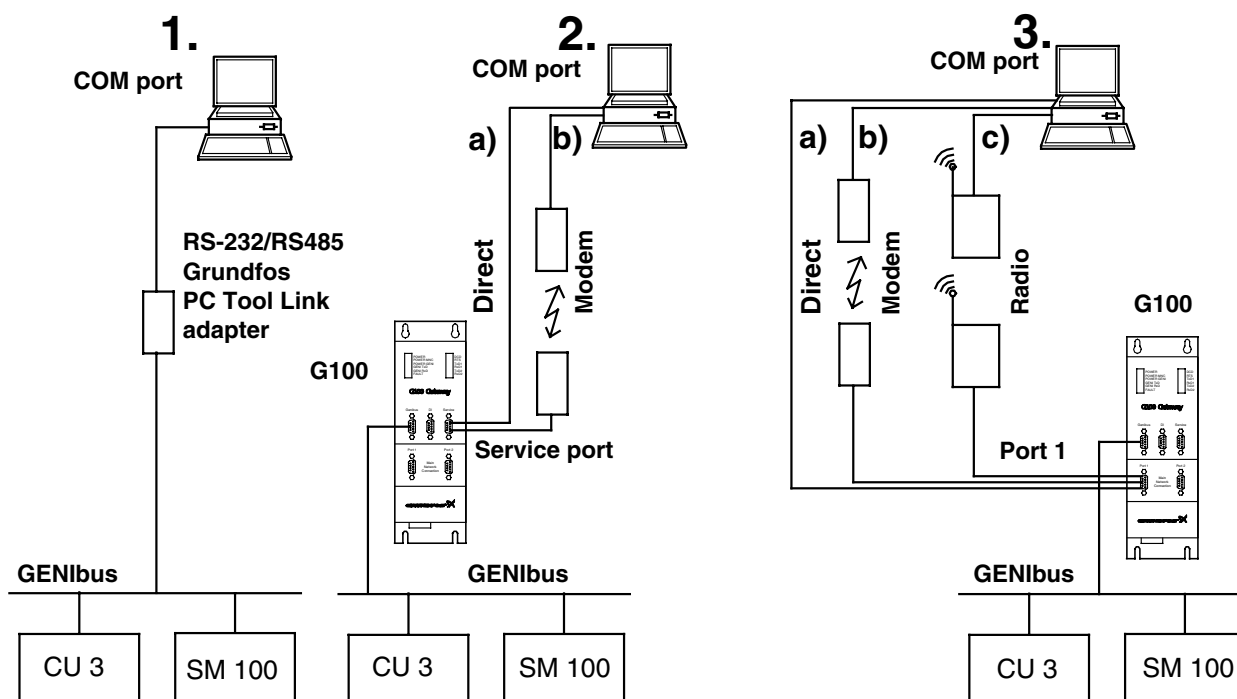


**Fig. 1.** Different network connection options.

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**Description of all the connection possibilities**

The table below describes the different connections shown in fig. 1.

**Note:** The PC Tool CU 3 kit does not include modems, radios, bus cable or D-sub connectors. Nor does Grundfos supply these parts. To make a direct GENIbus connection to a CU3/SM100 network from a PC you need to order the special Grundfos PC Tool Link adapter. To communicate via GENIbus each CU3 device needs a RS-485 plug-in module board of which one is included with the tool kit. Additional modules can be ordered.

| Connection | Description | Requirements |
|---|---|---|
| **1. Direct connection** | Direct connection to GENIbus. | • 1 Grundfos PC Tool Link adapter.<br>• Twisted pair bus cable with shield. |
| **2.a G100 Service port direct** | The G100 service port (RS-232) can be used to connect direct to a PC COM port. | • The RS-232 null-modem supplied with the tool can be used. |
| **2.b G100 Service port via modem** | The G100 service port (RS-232) can be used to connect to a PC COM port via modem. | • 1 G100.<br>• 2 modems.<br>• 2 modem cables.<br>• Twisted pair bus cable with shield.<br>• 1 Sub-D, 9-pin connector to G100. |
| **3.a G100 R/M/P direct** | Direct connection via G100 to a network of up to 32 CU 3 units. | • 1 G100<br>• The RS-232 null-modem supplied with the tool. |
| **3.b G100 R/M/P via modem** | Modem connection via G100 to a network of up to 32 CU 3 units. | • 1 G100 R/M/P version.<br>• 2 modems.<br>• 2 modem cables.<br>• Twisted pair bus cable with shield.<br>• 1 Sub-D, 9 pin connector to G100. |
| **3.c G100 R/M/P via radio** | Radio connection via G100 to a network of up to 32 CU 3 units. | • 1 G100 R/M/P version.<br>• 2 radios.<br>• 2 RS-232 cables to radio.<br>• Twisted pair bus cable with shield.<br>• 1 Sub-D, 9 pin connector to G100. |

**List of products**

| Product | Product No. |
|---|---|
| G100 R/M/P | 96 41 11 36 |
| RS-485 plug-in Module Board for CU 3 | 62 61 59 |
| Grundfos PC Tool Link adapter | 96 47 20 84 |

# Installation

**Installation of RS-485 communications module in CU 3**

The RS-485 communication module board (Prod. No. 62 61 59) is necessary when communicating with a CU 3 via the Grundfos fieldbus GENIbus.

Follow the steps in below table and look at fig. 2 to install the RS-485 communications module board inside the CU 3.

| Step | Action |
|------|--------|
| 1 | Unscrew and remove the CU 3 front cover. |
| 2 | • Plug the RS-485 communication module into the socket JP106. Be sure to get the orientation right.<br>• Mount the CU 3 front cover again. |
| 3 | Connect A, B and Y wires of GENIbus to the corresponding CU 3 terminals marked A and B. The Y terminal is used for connection of the cable screen. |

**Note:** The SM 100 device has GENIbus hardware from the factory and no extra hardware installation is needed.

**Installation sketch**

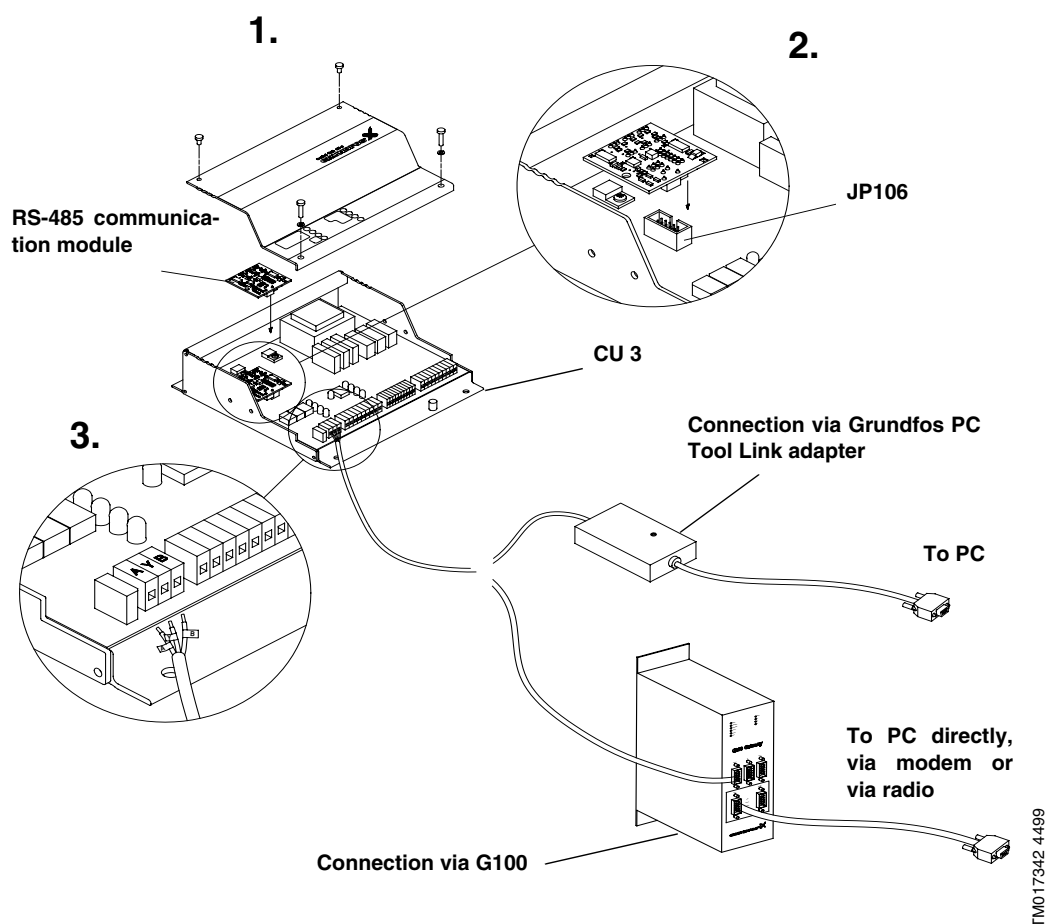Follow the steps 1 - 3 in the installation sketch:



**Fig. 2.** Installation of the RS-485/RS-232 communication module board inside the CU 3.

Note: The sketch shows two ways of connecting to GENIbus, i.e. either via PC Adapter or via G100 are both shown.

**G100 hardware configuration**

Accessing G100 via the **Service Port** requires no changes in the hardware configuration. A communication speed of 9600 baud is the factory setting.

Accessing the G100 R/M/P version via Port 1 to communicate with CU 3 requires the setting of Port 1 DIP switches on the R/M/P board, see table below. You need to dismantle the front cover of the G100. The DIP switch is located at the edge of the circuit board close to the middle. See also G100 Installation and operating instructions.

| G100 R/M/P Port 1 DIP switch setting | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Function | | DIP switch No. | | | | | | | | |
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| IO type | Direct * | 0 | 0 | - | - | - | - | - | - |
| | Modem | 1 | 0 | - | - | - | - | - | - |
| | Radio | 0 | 1 | - | - | - | - | - | - |
| Protocol | Auto detect * | - | - | 0 | 0 | 0 | - | - | - |
| Speed of communication | 1200 baud | - | - | - | - | - | 0 | 0 | 0 |
| | 2400 baud | - | - | - | - | - | 1 | 0 | 0 |
| | 4800 baud | - | - | - | - | - | 0 | 1 | 0 |
| | 9600 baud * | - | - | - | - | - | 1 | 1 | 0 |
| | 19200 baud | - | - | - | - | - | 0 | 0 | 1 |

* Factory setting.

**Software installation**

Use the following procedure when the PC Tool CU 3 software is installed on a PC:

| Step | Action |
|---|---|
| 1 | Place the CD ROM in the CD drive. |
| 2 | With the Windows Explorer locate the file setup.exe on the CD ROM and double click it. |
| 3 | From here the program will guide you through the installation. |

When you have completed the installation, the PC Tool CU 3 program can be launched via the start menu:

**Start | Programs | Grundfos PC Tools | PC Tool CU 3**.

**Hint**

Use the following procedure if you want to make a shortcut PC Tool CU 3 icon on your desktop:

| Step | Action |
|---|---|
| 1 | Open the Windows explorer by right clicking the Start icon and select 'Explore'. |
| 2 | Open the folder: **Windows \ Start Menu \ Programs \ Grundfos PC Tools**. |
| 3 | Right click the PC Tool CU 3 menu item and select 'Create Shortcut'. |
| 4 | Right click the created shortcut and select 'Rename'. |
| 5 | Name it "PC Tool CU 3" and drag the item to the desktop with your mouse. |

# Getting started

**Introduction**

Locate the PC Tool CU 3 in **Start | Programs | Grundfos PC Tools** and launch it. The screen you will see depends on the tool setup chosen the last time the tool was started. If you have just installed the tool it has the Standard Tool Setup. The Standard Tool Setup will work right away if you are using the COM 1 port of your PC and your network connection is a GENIbus connection, see fig. 1, pos. 1. In this case a screen image as shown in fig. 4 will appear (the number of CU 3 icons may differ from your system), and you can skip to section "The main window".

**Tool setup for a GENIbus connection**

If your Operation Window wrongly shows no CU 3 icons or you get the warning message: "No contact to selected CU 3" then it is likely that the setup of your tool doesn't match your physical connection (e.g. the COM port you are using).

Check the setup by opening the window **File | Tool Setup | General Setup**. Your setup should be as shown below in fig. 3, but remember to select the COM port you are actually using.

Click 'Save' to save your tool setup to the hard disk. After a few seconds the icons of the connected units should appear. Consult section 'Fault finding' if it doesn't work.

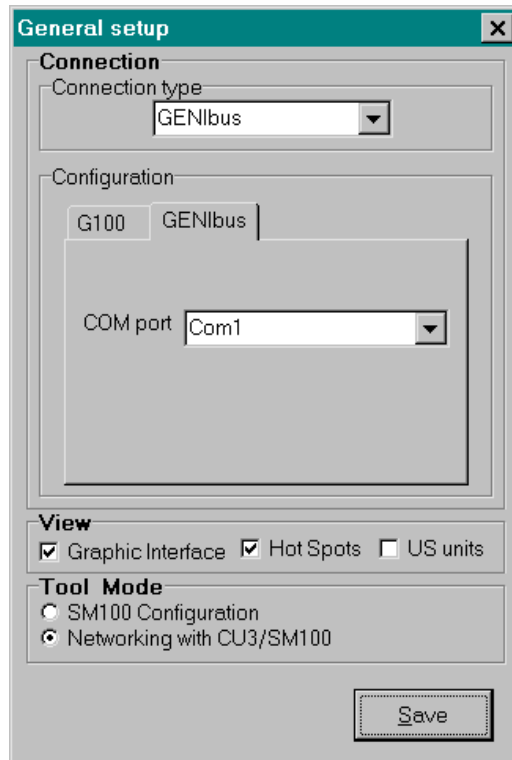Note: If connection type is changed from G100 to GENIbus the tool must be restarted.



**Fig. 3.** General Setup Window with Standard Tool setup.

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**Tool setup for a G100 connection**

If you have connected a G100 and your Operation Window doesn't shown any G100 icon or it becomes red or you get the warning message: "No G100 connected" then it is likely that the setup of your tool doesn't match your physical connection (e.g. the COM port or network connection type).
Check this by opening the window **File | Tool Setup | General Setup**.

Follow the steps in below table:

| Step | Action |
|------|--------|
| 1 | Select the Connection Type G100. |
| 2 | Select the correct COM port. |
| 3 | Select the baud rate at the G100 Tap. |
| 4 | Click the **[Save]** button to save your tool setup to the hard disk. |

**Note:**

• The baud rate must match the G100 baud rate.
• If you are using a modem, fill in the modem initialisation string: AT.
  Select the View and the Tool Mode as in fig. 3.
  Click **[Save]**, to save your tool setup to the hard disk.
• If your network connection is G100 Direct or G100 Radio, communication should be established after a few seconds. Consult section 'Fault finding' if it doesn't work.
• If your network connection is G100 Modem use Dial from the Menu Bar to add phone numbers to the phone book or to make a dial to the G100 site.
• If connection type is changed from GENIbus to G100 the tool must be restarted.

# The main window

**Introduction**

We now assume that your network connection works and you are ready to take a short tour of your screen to get an explanation of what you see and what you can do.

The things explained are independent of the type of network connection you use - you can even go through this tour if you haven't connected anything to the PC.

**Description**

The background picture shows a bore hole with an SP pump, pipes, power cables, control cabinet and a CU 3 Control Unit.

The picture is interactive, and the animations in the picture will give you a visual feedback of the system response to your control actions. Clicking on the objects marked with arrows will open windows showing status values from the system or give you control buttons to operate the system. Interactive objects or zones in the picture are called Hot Spots. When you position the mouse pointer on top a Hot Spot a yellow Hint Label will explain what the Hot Spot can be used for.

The Operation Window is always opened automatically when the tool is started. It shows you an overview of the network connected to your PC with the connected units displayed as small icons. This is called the Network List.

The Operation Window below shows...

• The PC connected directly to GENIbus.
  If a connection via G100 is used, a G100 icon is shown between the PC and GENIbus.

• Two CU 3 units connected - one of them operating with an SM 100 sensor module, see section "CU 3 installation configuration".

**The Operation Window**
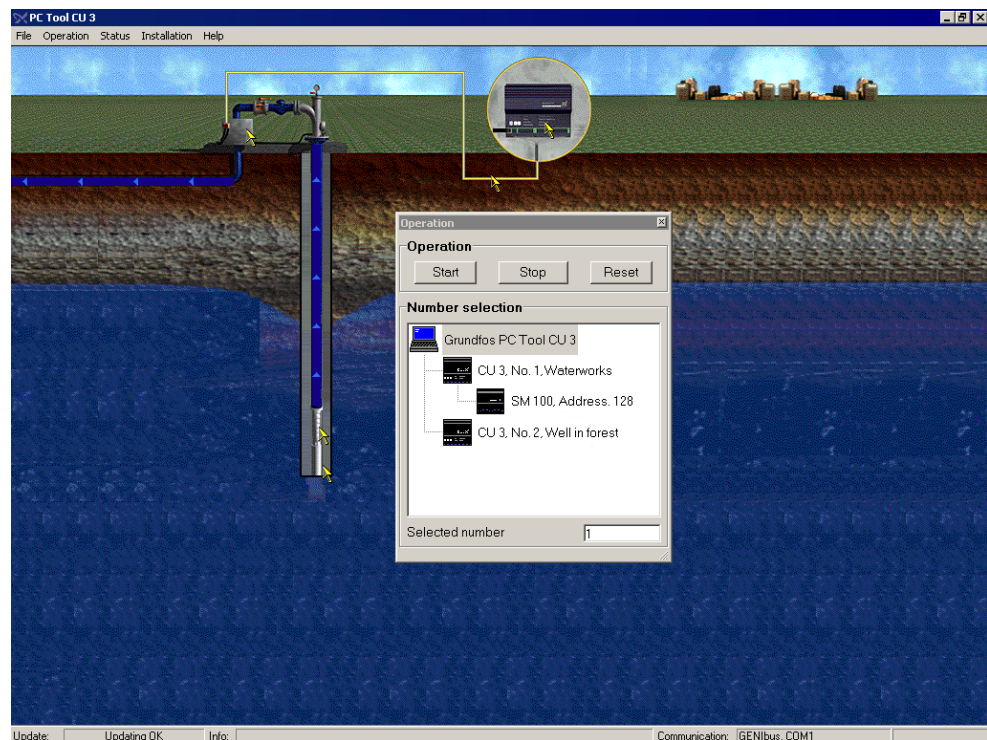


**Fig. 4.** Screen image example when starting the tool with the Standard Tool Setup and a connection directly to GENIbus. In this example two CU 3 and one SM 100 are connected to GENIbus.

**Further information**    If more than one CU 3 is connected to GENIbus, the tool automatically picks one of them to be the Active Unit. The Active Unit is the one you currently interact with. You change to another unit by clicking on its icon.

At the top of the tool screen you see the Menu Bar. This bar has drop down menus which give you access to all tool windows.

At the bottom of the tool screen, just above the Windows Task Bar is the Status Bar. This bar shows miscellaneous status information of the tool itself and the network connection. This can often give a hint to the solution of problems if the tool is not acting as expected.

**Tool setup for external sensors**    Having established your connection and having familiarised yourself with the main window, you can now continue by learning how to customise the tool to the use of one or more external sensors.

**Sensor input options**    The CU 3 has the following sensor input options:
- 1 analogue input connected the CU 3 (terminals 1: Common, 2: Signal, 3: 24 VDC).
- 1 pulse counter input connected the CU 3 (terminals 6-7) for flow/volume measurements.
- 8 analogue inputs from Sensor Module SM 100 via GENIbus.

If you are using one or more of the sensor options you can make the graphical background adapt to this to make it look more like your real application.

**Sensor Setup**    The procedure for setting up a sensor should be:

| Step | Action |
|------|--------|
| 1 | Open the window **File | Tool Setup | Sensor Setup**. |
| 2 | To each of the sensor options to be shown in the tool display you select a Graphic appearance different from "None". Result: If "View Hot Spots" is enabled, se fig. 3, an interactive Hot Spot marked with a yellow arrow will be created for that sensor. |
| 3 | Click the **[Save]** button to save your tool setup to the hard disk. |

The following graphical sensor options can be made active:

| Sensor | Optional units | Adds an interactive... |
|--------|----------------|------------------------|
| Flow | m³/h, gpm | flow sensor to the water pipe |
| Pressure | m, ft | pressure sensor at the top of the bore hole. |
| Water level - tank | m, ft | water tank to the background graphics. |
| Water level - well | m, ft | sensor in the bore hole to the background graphics. |
| Conductivity | % | sensor in the bore hole to the background graphics. |

**Example of active Hot Spots**

Fig. 5 shows an example, where the following Hot Spots are active:

1. The Flow Sensor input is taken from the CU 3 digital sensor (Pulse Input).

2. The Pressure Sensor input is taken from the CU 3 external sensor (Analogue Input).

3. The Water Level Well input is taken from the SM 100 Analogue Input 0.
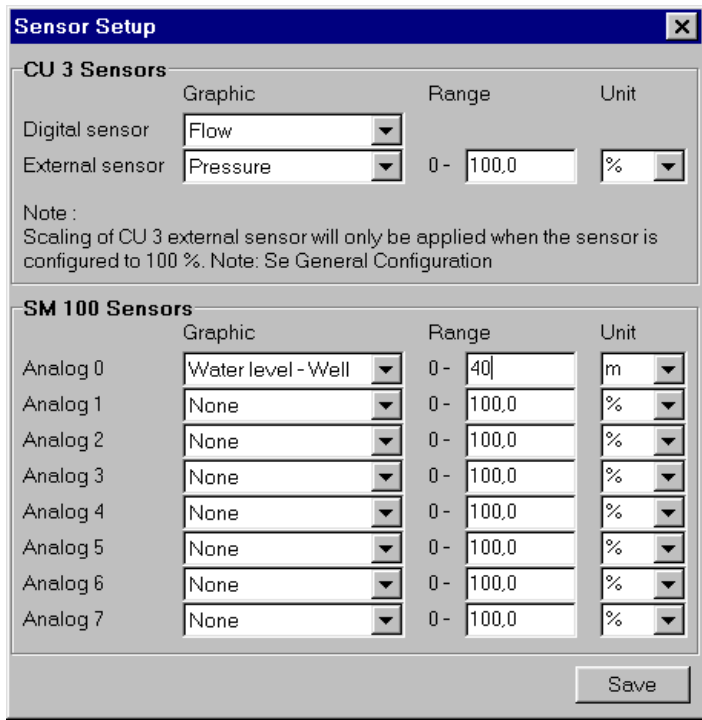


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**Fig. 5.** The window **File | Tool Setup | Sensor Setup** for customising the graphics to the use of external sensors.
For the two CU 3 sensors the tool uses the scaling configured in the CU 3 (selected in Installation | General Configuration). If the configured scaling of the external (analogue) sensor is 0-100%, the tool will use the range and unit from the Sensor Setup window to display any sensor scaling you enter.

**SM 100 measurements**

The 8 analogue readings from the SM 100 module are raw 8 bit sensor measurements.

The measurements can be scaled and presented by the tool in real physical units. The range and unit for each analogue input from SM 100 can be selected. The unit is not limited to the options given in the drop down menu. You can click in the field and enter whatever unit you want. Analogue 5-7 in the fig. 6 below are examples of that. Click the Save button when you have made your adjustments to save your SM 100 scaling to the hard disk.

**Fig. 6.** Example of the window **File | Tool Setup | Sensor Setup** where some of the SM 100 analogue inputs use customised scaling.

**Overview of tool menus**

All information is available via the Menu Bar. The two figures below provide an overview of the complete menu system in PC Tool CU 3 for the two possible Tool Modes, see fig. 3.

| File | | Operation | Status | Installation | Dial[#)] | Help |
|---|---|---|---|---|---|---|
| Print | | Operation | Supply | Max current Conf. | Dial | Help |
| Tool Setup | Print | | Motor Temperature | General Conf. | Dial from phone book | Readme.txt |
| Exit | Print from file | | Alarm Log | Limits Conf. | | References |
| | | | CU 3 Panel | | | About |
| | General Setup | | Pump Data | | | |
| | Sensor Setup | | SM 100 Data | | | |
| | | | Flow Sensor*) | | | |
| | | | Pressure Sensor*) | | | |
| | | | Water Level Tank*) | | | |
| | | | Water Level Well*) | | | |
| | | | Conductivity Sensor*) | | | |

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**Fig. 7.** The tool menu in Tool Mode 'Networking with CU 3/SM 100'.
#) This menu column is only present if Connection Type is G100 with modem.
*) This menu item is only present if the corresponding sensor has been selected in

| File | Operation | SM 100 | Help |
|---|---|---|---|
| Print | Operation | Status | Help |
| Tool Setup | | Configuration | Readme.txt |
| Exit | Print | | References |
| | Print from file | | About |
| | General Setup | | |
| | Sensor Setup | | |

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**Fig. 8.** The tool menu in Tool Mode "SM 100 Configuration".

# CU 3 operation and status reading

**General**

In this section we will take a tour of the interactive background.

All windows from the interactive background refreshes their contents continuously, making it possible to dynamically follow changes in values.

**The Operation Window**

You open this window by clicking on the control cabinet in the picture or by selecting **Status | Operation** from the Menu Bar. This window opens automatically when the tool is started. Options in the Operation Window:

| Option | Function |
|--------|----------|
| **[Start]** | Manual start.<br>It has the same result as using the Start command from the remote control R100 or activating the digital Start/Stop input on the CU 3. |
| **[Stop]** | Manual stop<br>It has the same result as using the Stop command from the remote control R100 or activating the digital Start/Stop input on the CU 3. |
| **[Reset]** | Acknowledges alarms and make the CU 3 attempt a restart of the pump. It has the same function as...<br>• pressing the reset button on the front of the CU 3,<br>• using the Reset command from R100 or<br>• activating the digital reset input on the CU 3. |

In the Operation Window you use the mouse to select with which CU 3 you want to communicate. All data you see in the different windows refer to the CU 3 selected. When another CU 3 is selected by clicking its icon all status windows which are opened refresh their data contents with data from the new CU 3 in a few seconds. If a CU 3 has an alarm, the CU 3 icon will be shown with a red frame around it.
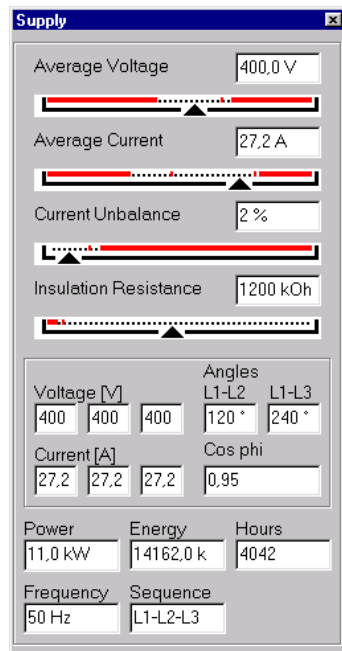
**The Supply Window**

You open this window by clicking on the motor cable in the picture or by selecting **Status | Supply** from the Menu Bar. Below is a table describing all the Data Items which are displayed in this window. Like all status windows the values are continuously updated.

| Data Item | Description | Range | Accuracy *) |
|-----------|-------------|-------|-------------|
| Average voltage | Average value of the three line voltages. | 0 - 720 V | +/-2% |
| Average current | Average value of the three line currents. | 0 - 12/120/400 A | +/-2% |
| Current unbalance | Difference between most deviating line current and average current relative to the average current. | 0 - 100% | +/-2% |
| Insulation resistance | Resistance between motor phase and earth. | 0 - 2 MΩ | +/-10% |
| Line currents | The 3 line currents. | 0 - 12/120/400 A | +/-2% |
| Line voltages | The 3 line voltages. | 0 - 720 V | +/-2% |
| Power | Power consumption. | 0 - 5/100/400 kW | +/-10% of value |
| Energy | Total energy consumed. | 0 - 25500 MWh | +/-10% of value |
| Hours | Running hours. | 0 - 130558 h | +/-2 h |
| Frequency | Frequency from the mains. | 45 - 65 Hz | +/-1 Hz |
| Sequence | Phase sequence. | - | - |
| Voltage angles | Angles between line voltages. | 0 - 360° | +/-5° |
| Cos φ | Cos to the angle between line current and corresponding line voltage. | 0 - 1 | +/-0.03 |

*) Percentage specifications are related to full range unless otherwise stated.

Fig. 9. Example of a Supply Window.

The four horizontal bar indicators show where the corresponding value is positioned relative to its configured stop limits and warning limits.

The red parts of the bar are the intervals which will trigger a stop of the pump followed by a corresponding red alarm indication on the CU 3 front and an activation of the CU 3 alarm relay. If the value of warning limits are outside the alarm stop intervals, the warning limits will be shown as small red spots. Excess of a warning limit will not lead to any action in CU 3 exept a recording of the event in the alarm log.

Pump operation will not be influenced.

However it is possible to program the CU 3 to activate the alarm relay on selected warning events, see section "CU 3 installation configuration".

**The Motor Temperature Window**

The Motor Temperature Window is opened by clicking on the submersible motor in the interactive background or by selecting **Status | Motor Temperature** from the Menu Bar. The motor temperature is measured by a Temperature transmitter unit inside the motor called a "Tempcon". The temperature signal is transmitted from the motor via the submersible drop cable (power line communication) to the CU 3 unit.

If no temperature value is shown in the window, the reason may be one of the following:

- The CU 3 cannot pick up any temperature signal from the motor. This is the case if the motor is a non-Grundfos motor without Tempcon.

- The temperature measurement has been disabled in the CU 3 (can be enabled with R100 or with this tool in the **Installation | General Configuration** window).

- The CU 3 has switched off (stopped) the motor.

- The Tempcon may be defective.

**NOTE:** In case the motor temperature measurement takes place via a PT100 sensor connected to the CU 3 external input (selected in **Installation | General Configuration**) then this reading is automatically shown in the Motor Temperature Window (in stead of the Tempcon reading). In this case it is the max. limit for the external input (and not the max. temperature limit) that applies to the CU 3 motor temperature protection

| Data Item | Description | Range | Accuracy |
|-----------|-------------|-------|----------|
| Motor Temperature | Temperature of windings in the submersible motor. | 0 - 100 °C | +/-3 °C |

**The Sensor Windows**  The sensor windows are only active if the corresponding sensor has been selected in **File | Tool Setup | Sensor Setup**. The active sensors are marked with a yellow Hot Spot arrow. You can also open each of the Sensor Windows via the Status Menu in the Menu Bar. The sensor input has an accuracy of +/- 2 %.

| Data Item | Description | Scaling according to... | |
|---|---|---|---|
| Flow sensor (volume) | Displays the flow and energy consumption per volume unit. If the pulse input is used the accumulated flow value (volume) will also be displayed. | CU 3 Analogue | **Installation | General Configuration** |
| | | CU 3 pulse | |
| | | SM 100 input | **File | Tool Setup | Sensor Setup** |
| Pressure sensor | Displays the pressure. | CU 3 Analogue | **Installation | General Configuration** |
| | | SM 100 input | **File | Tool Setup | Sensor Setup** |
| Water Level Tank sensor | Displays the water level in the tank. | CU 3 Analogue | **Installation | General Configuration** |
| | | SM 100 input | **File | Tool Setup | Sensor Setup** |
| Water Level Well sensor | Displays the water level in the well. | CU 3 Analogue | **Installation | General Configuration** |
| | | SM 100 input | **File | Tool Setup | Sensor Setup** |
| Conductivity | Displays the conductivity value of the water in the well. | CU 3 Analogue | **Installation | General Configuration** |
| | | SM 100 input | **File | Tool Setup | Sensor Setup** |

**The CU 3 Panel Window**  The CU 3 Panel Window is opened by clicking on the CU 3 in the picture or by selecting **Status | CU 3 Panel** from the Menu Bar. The window shows the CU 3 panel with text and status diodes. The state of the diodes is an image of their actual state (off or on) on location. Clicking on the CU 3 panel opens the Alarm Log Window, see fig. 10.

**The CU 3 Alarm Log Window**  The CU 3 Alarm Log Window is opened by clicking on the bitmap picture in the CU 3 Panel Window or by selecting **Status | Alarm Log** from the Menu Bar.
The Alarm Log shows the actual alarm, and the 5 latest logged alarms. Logged alarm "Log 1" is the newest and the date-time stamp in the top left corner refers to this alarm. Also actual warnings and a single logged warning is shown.

When a new alarm arrives to the Alarm Log it will push all the older alarms one position to the right. Logged alarm "Log 5" will be pushed out.
The Alarm Log cannot be cleared.



**Fig. 10.** Alarm Log Window. Logging of SM 100 input alarms is not provided (graytoned).

**The Pump Data Window**

The Pump Data Window is opened by selecting **Status | Pump Data** from the Menu Bar or by clicking on the pump. The fields are input fields for you to fill in. Here information about the pump and the well can be recorded for easy lookup when needed.

| Field name | Description |
|---|---|
| CU 3 No. | Number of selected CU 3. The field is filled int automatically. |
| Name | The name you choose for this installation. |
| Pump type | From pump/motor nameplate or data sheet. |
| Model | From pump/motor nameplate or data sheet. |
| Motor type | From pump/motor nameplate or data sheet. |
| Production number | From pump/motor nameplate or data sheet. |
| Motor protection | If extra motor protection device is used. |
| Flow | From pump/motor nameplate or data sheet. |
| Head | From pump/motor nameplate or data sheet. |
| Power | From pump/motor nameplate or data sheet. |
| Current | From pump/motor nameplate or data sheet. |
| Comment | If you want to add some extra information about this installation. |



**Fig. 11.** Pump Data Window. You fill in the fields yourself.

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**The CU 3 Version Information window**

You open this window by double clicking on the CU 3 icon in the Operation Window. Three text strings describing CU 3 version information will be displayed.

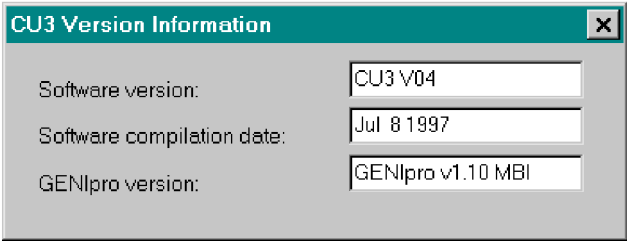| Field name | Description |
|---|---|
| Software version | Version of the CU 3 software. |
| Software compilation date | Date of CU 3 software compilation. |
| GENIpro version | Version of the GENIbus communication protocol software (GENIpro). |



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**Fig. 12.** CU 3 Version Information Window.

# CU 3 installation configuration

**General**
The Configuration windows are updated with the actual values in the selected CU 3 as soon as they are opened. Contrary to Status Windows, open Configuration Windows are not updated dynamically as this would prevent the user from entering in new configuration values.

**The Max. Current Configuration Window**
Configuration of the Max. Current should always be done before configuring anything else because the internal scaling of current and power in CU 3 is adjusted accordingly. The current value is taken from the motor nameplate. The value is used by the CU 3 to protect the motor from overload.

- Open the window **Installation | Max. Current Configuration.**
- enter the current value and click **[Program].**

The tool automatically limits the value to the range of the current transformer used.

**The General Configuration Window**
You open this window by selecting **Installation | General Configuration** from the Menu Bar. Below is a table of all the configuration parameters which can be programmed via this window. Some of them cannot be read or programmed via R100. They are marked with an asterisk

| Configuration Parameter | Value range | Factory setting | Description |
|---|---|---|---|
| **Alarm** | | | |
| Alarm Resetting | [0 - 254] | 3 | Maximum No. of auto restarts within 10 h. If exceeded a manual reset is required. |
| Alarm Delay | [0 - 20 s] | 4.5 s | Time delay between alarm event and stop of pump. |
| Auto Reset *) | Enable, Disable | Enable | Enable or disable the auto resetting of an alarm (auto restart). If disabled, manual alarm reset is needed to restart pump. |
| Max. Auto Reset *) | Enable, Disable | Enable | Enable or disable the limitation in the number of auto restarts. |
| **Start** | | | |
| Star-Delta Timer | [0 - 19 s] | 0.5 s | Timer for star delta starting. |
| Power on Delay | [0 - 127 s] | 0 s | Delay from power on of CU 3 until CU 3 switches the pump on. |
| Min Start Cyc. Time | [0 - 29 min] | 0 s | Minimum time before CU 3 switches on the pump after a stop from the Run/Stop control or the sensor control function. |
| **External Sensor** | | | |
| Unit | None, m, ft, m³/h, gpm, %, PT100 | None | Select unit of the sensor signal. |
| Range | [1 - 600] [1- 2000] | 100 | Range of sensor signal. |
| Signal Offset | Enable, Disable | Disable | Current or voltage offset in the sensor signal (e.g. 4-20 mA). |
| Control Function | None, Fill, Empty | None | Explained in External sensor as control input, page 20. |
| Flow measuring (pulse) | None, 1/m³, 10/m³ | None | Configuration of pulse flow sensor. |
| **Run/stop Control** | | | |
| Dewater | Enable, Disable | Disable | Enables or disables the CU 3 dewatering (on/off) function which is based on the dry-run detection. |
| Max. Run Time | 60 min | 42 min. | Run time according to the Run/Stop diagram. |
| Max. Stop Time | 60 min | 42 min. | Stop time according to the Run/Stop diagram. |
| Alarm Relay when Warning *) | Enable, Disable | All enable | Which warnings should activate the alarm relay. |
| **Power Calculation** | | | |
| Enable *) | Enable, Disable | Disable | $P = FCorr \times \sqrt{3} \times V \times I \times \cos(\varphi)$. |
| Correction Factor *) | [0 - 1.27] | 1.0 | FCorr can be used to obtain a more precise measure. |
| Cos(phi) *) | Measured, Equals 1 | Measured | On supplies with voltage asymmetry the cos(phi) measure might be too unreliable. |
| **Networking** | | | |
| CU 3 Number | [1 - 64] | (-) | No. of the CU 3 (as read/programmed with R100). |
| Use SM 100 *) | Enable (Bound) or Disable (Unbound) | Disable (Unbound) | Makes CU 3 request data from a SM 100 module (CU 3 becomes bound to SM 100). IMPORTANT! The CU 3 must be switched off and on again before a change in this special setting will take effect |
| SM 100 Address *) | [100 - 128] | 128 | The GENIbus address of the SM 100 module. |
| **Motor Temperature** | | | |
| Temperature Measurement | Enable, Disable | Enable | Use disable when CU 3 is connected to a motor without built in Grundfos temperature measuring electronics. |
| Temperature in Display | Enable, Disable | Disable | Motor temperature measurement (if enabled) can be shown in CU 3 display. |
| CU 3 Time *) | Any time after 1989 | 01.01.89 | Date/time value in CU 3, used to show time of the latest alarm. |

| Action Buttons | | | Description |
|---|---|---|---|
| Apply PC Time +) | - | | Programs the CU 3 date/time value with the value of the PC date/time |
| Reset kWh +) | - | | Clears the value of the kWh counter in CU 3 |
| Reset Pulse Cnt +) | - | | Clears the value of the pulse counter in CU 3 |

\* The parameter cannot be read or programmed via R100.

+ The action cannot be performed via R100.

**External sensor as control input**    The table below describes the use of the CU 3 external sensor for control and alarm stop.

| External sensor | | Description |
|---|---|---|
| **Unit** | **Control function** | |
| None | indifferent | External sensor not used for anything. |
| <unit> | None | Alarms from excess of max. sensor stop limit or min sensor stop limit is active. |
| <unit> | Fill | Max. sensor stop limit and min sensor stop limit is used for the control of "tank filling": Excess of max. stop limit stops the pump, excess of min stop limit starts the pump. Stop limit alarms from external sensor is not active, but warning limit can be used for triggering the CU 3 alarm relay. |
| <unit> | Empty | Max. sensor stop limit and min sensor stop limit is used for the control of "tank/well emptying": Excess of max. stop limit starts the pump, excess of min stop limit stops the pump. Stop limit alarms from external sensor are not active, but warning limit can be used for triggering the CU 3 alarm relay. |

**The Limit Configuration Window**

Open the Limit Configuration Window by selecting **Installation | Limit Configuration** from the Menu Bar. Below is a table of all the configuration parameters which can be programmed via this window. Apart from the SM 100 related limits all of them can also be read or programmed via R100.

| Configuration limit | Value range | Accuracy*) | Factory setting | Description |
|---|---|---|---|---|
| Min. insulation resistance | [0 - 2500 MΩ] | +/-10 % | 20 kΩ | Minimum insulation resistance value for CU 3 to start the motor. |
| Max. motor temperature | [0 - 100 °C] | 3 °C | 75 °C | Maximum allowed motor temperature. |
| Max. current | [0 - 12 A] [10 - 120 A] [100 - 400 A] | +/- 2% | 0 A | Maximum allowed motor current. Use value from motor nameplate. |
| Min. current | [0 - 12 A] [10 - 120 A] [100 - 400 A] | +/- 2% | 0 A | Minimum allowed motor current This is used for dry running protection. If the box "Min current else 60%" is checked, the programmed min current value is used for protection, otherwise 60% of the max. current is used. |
| Max. voltage | [0 - 720 V] | +/- 2% | +10% | Maximum allowed line voltage. |
| Min. voltage | [0 - 720 V] | +/- 2% | -10% | Minimum allowed line voltage. |
| Max. current unbalance | [0 - 100%] | +/- 2% | 10% | Maximum allowed current unbalance. |
| Max. sensor input | [0 - Range*Unit] | +/- 2% | Full range | Maximum and minimum limits for the CU 3 analogue sensor input. The Range and Unit are the values from the **Installation | General Configuration** window. |
| Min. sensor input | [0 - Range*Unit] | +/- 2% | 0 | |
| Max. SM 100 sensor input (0-7) | [0; Range*Unit] | +/- 2% | Full range | Maximum and minimum limits for the 8 SM 100 analogue sensor inputs. The Range and Unit are the values from the **File | Tool Setup | SM 100 Sensor Range** window. |
| Min. SM 100 sensor input (0-7) | [0; Range*Unit] | +/- 2% | 0 | |

*) Percentage specifications are related to full range unless otherwise stated.

# Networking with SM 100

**Introduction**  By using the sensor module SM 100, 8 analogue inputs and 8 digital inputs can be measured and presented by the tool. Moreover, the 8 analogue inputs can be read by a CU 3 and used as alarm indication when programmed alarm limits are exceeded. The values from a single SM 100 can even be read by several CU 3 units. All the different possibilities will be explained in the following.

**SM 100 configuration**  Before using the SM 100 inputs you need to configure the following:

- SM 100 unit address, recommended range [100 - 135].
- Signal type for the 8 analogue inputs: 0-10 V, 2-10 V, 0-20 mA, 4-20 mA.
- SM 100 hidden or not hidden, see page 24).

**Note:** When you configure SM 100 only one SM 100 must be connected to the PC and nothing else. Configuration of SM 100 cannot take place via G100!

Use the following procedure to configure an SM 100 unit:

| Step | Action |
|------|--------|
| 1 | Open the **File | Tool Setup | General** window, fig. 3. |
| 2 | Select the Tool Mode "SM 100 Configuration". |
| 3 | Click the [**Save**] button.<br>Result: The background picture disappears and the Menu Bar changes, displaying only the menus "File", "SM 100" and "Help". |
| 4 | Open the **SM 100 | Configuration** window, fig. 13.<br>**Result:** You will get a warning not to connect anything but a single SM 100. |
| 5 | Acknowledge the dialogue box with [OK]. |
| 6 | Make your changes. |
| 7 | Click [Program].<br>Result: The shown configuration will now be programmed into the memory of the connected SM 100.<br>IMPORTANT! If the check box "SM 100 is hidden" has been changed, SM 100 must be switched off and on for this special setting to take effekt. |
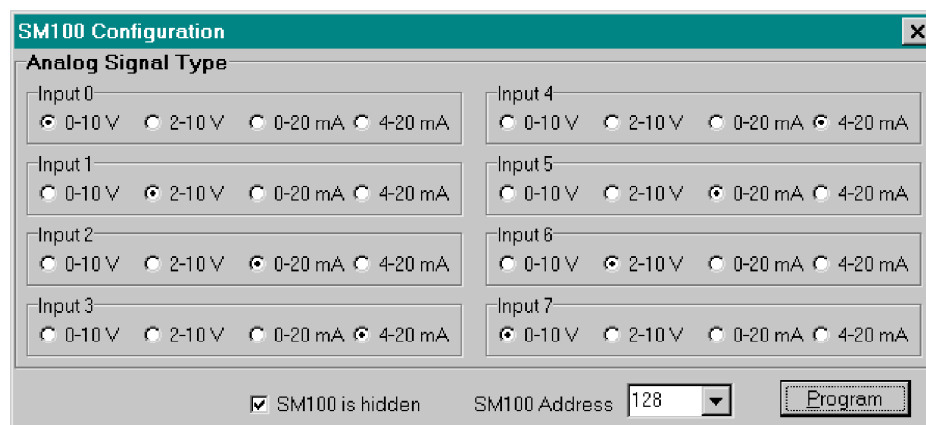


**Fig. 13.** The **SM 100 Configuration** window.

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**The SM 100 | Status window**

When opening the **SM 100 | Status** window, you can see the actual values of the 8 analogue inputs and the 8 digital inputs. If signal sources are connected to the SM 100 inputs you can use this window to verify that SM 100 (and the signal source) works as expected.

**Note:** The analogue values you see are unscaled values [0; 255] directly from the SM 100 analogue to digital conversion.



**Fig. 14.** The SM 100 | Configuration window.

If at any time when operating in "SM 100 Configuration" mode, the tool recognises another unit (e.g. CU 3) on the bus, operation will be halted and a dialogue box telling you to disconnect this unit will pop up.

**Making CU 3 read SM 100 inputs**

It is possible to make CU 3 read all the analogue and digital inputs from SM 100 cyclically. If the analogue values exceeds the corresponding min/max limits configured in the CU3 the display on the CU3 will show AL. The Alarm Log Window (fig. 10) will also show the alarm, but the CU3 does not automatically react to it. If there should be a reaction it has to come from the operator. From a SCADA system the values can be requested from both CU 3 as well as from SM 100 directly.

**Procedure**

To make the 'communication binding' between CU 3 and SM 100, use the following procedure:

| Step | Action |
|------|--------|
| 1 | Connect an SM 100 unit to the bus (and nothing else). |
| 2 | Open **File | Tool Setup | General** and select Tool Mode "SM 100 Configuration". |
| 3 | Check the box "SM 100 is hidden" in the SM 100 | Configuration window and select an SM 100 Address. |
| 4 | Click **[Program]**. |
| 5 | Switch off the SM 100 wait 10 seconds and switch it on again. Reason: This setting only takes effect after a power off/on). |
| 6 | Open File | Tool Setup | General and select Tool Mode 'Networking with CU 3/SM 100'. |
| 7 | Connect a CU 3 to the bus together with the SM 100. Select it when it appears in the network. |
| 8 | In the Installation | General Configuration window enable 'Networking with SM 100' and select the address of the SM 100 to communicate with (the address you have chosen under step 3). |
| 9 | Click [Program]. |
| 10 | Power off the CU 3 wait 10 seconds and switch it on again. Reason: This setting only takes effect after a power off/on). |

The Operation Window should now look like fig. 15. CU 3 and SM 100 constitute a pair.

**Note:** For a CU 3/SM 100 pair it is only the CU 3 unit which can be selected with the mouse - the SM 100 cannot. However the data values from the SM 100 are displayed in the window **Status | SM 100** selectable from the Menu Bar.

If the SM 100 icon turns red, this means that the CU 3 cannot establish communication with the SM 100 it is paired with.
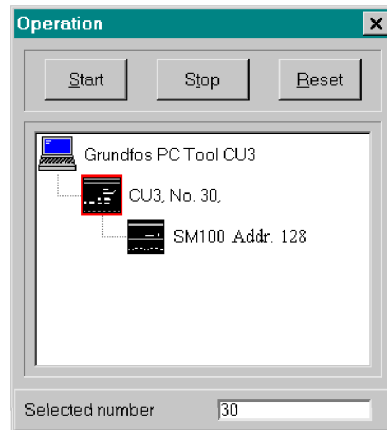


**Fig. 15.** Operation window when a CU 3/SM 100 pair is connected To GENIbus. SM 100 is "hidden".

**SM 100 hidden**

The tool visualises the "communication binding" ("pairing") between CU 3 and SM 100 by drawing SM 100 as a kind of "subunit" to the CU 3, see fig. 15.

Physically SM 100 is connected to GENIbus of course, but communication-wise it is handled by the CU 3. It appears in other words as a "hidden" unit to the network.

**SM 100 not hidden**

SM 100 can be connected to the bus without being "paired" with any CU 3. This only means that no CU 3 unit makes use of the SM 100 sensor inputs, but these inputs can of course be requested from SM 100 directly from a SCADA system. Then the situation could be as shown in fig. 16 (compare to fig. 15).

Figure 16 shows this second way of setting up a network using CU 3 and SM 100. In this case they are not paired. This means that the CU 3 is not using the SM 100 values, but they can be requested directly from SM 100 by a SCADA system.

In this configuration it is also possible to click on SM 100 making it the active unit. The Menu Bar will adapt accordingly.



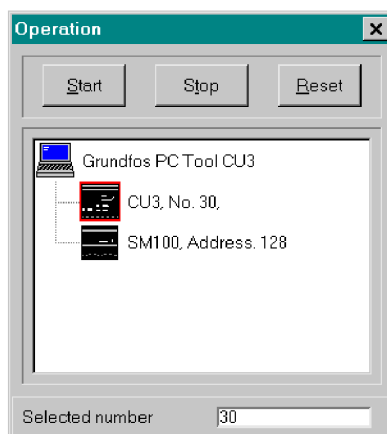**Fig. 16.** : A CU 3 and an SM 100 is connected to the bus but not paired and SM 100 is not "hidden".

**Define the analog input limits**

If the CU 3 in a CU 3/SM 100 pair is to use the analogue input values from SM 100 for alarm purposes, the input limits can be defined and enabled in the **Installation | Limits Configuration** Window.

# Application example

**Description**
The application example consists of two wells A and B with Grundfos SP pumps to be monitored and controlled from a G100 R/M/P connection with the PC Tool CU 3 software.

| Part | Description |
|------|-------------|
| Well A | Equipped with:<br>• CU 3 (No. 1) with a level sensor connected.<br>• SM 100 (address 127) with a flow sensor and a conductivity sensor connected |
| Well B | Equipped with:<br>• CU 3 (No. 2) with a level sensor connected.<br>• SM 100 (address 128) with a flow sensor and a conductivity sensor connected |
| G100 | G100-R/M/P version connected to the following GENIbus units...<br>• CU 3 (No. 1)<br>• SM 100 (address 127)<br>• CU 3 (No. 2)<br>• SM 100 (address 128).<br><br>G100 Port 1 is connected to a modem. |
| PC | The PC has installed the PC Tool CU 3 software and is connected to a modem. |

**Note:**
• All sensors used are analog sensors 4-20 mA
• Fig. 17 shows the planned GENIbus addresses.
• Furthermore it is planned that each CU 3 should be paired with the SM 100 from the same well.
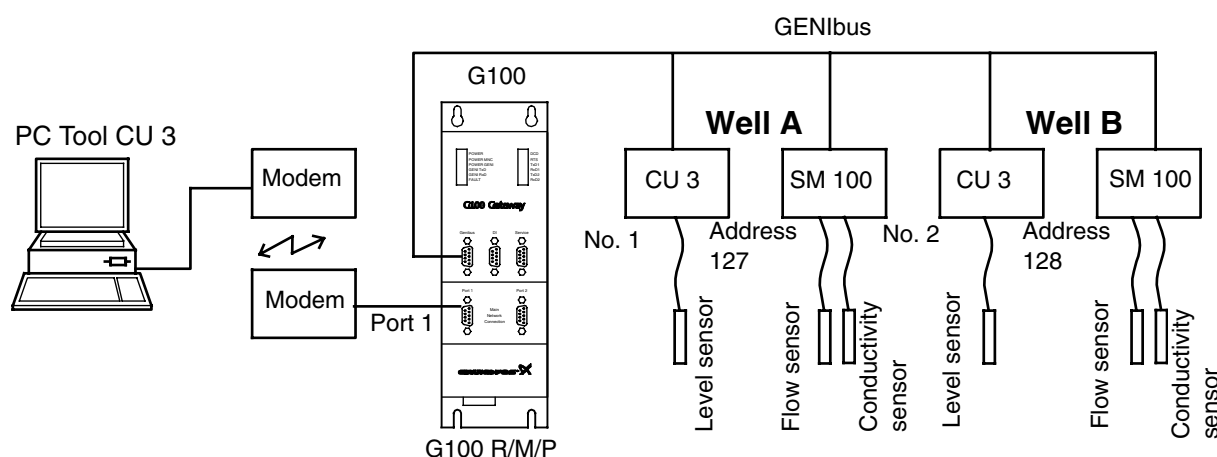


**Fig. 17.** Two wells each with CU 3 and SM 100.

**Off-site preparations**
The CU 3 and SM 100 devices are configured from PC Tool CU 3 by being connected one at a time to the PC via the RS-232/RS-485 adapter. All configuration of CU 3 not related to SM 100 can also be done via the remote control R100.

**Hint!**
If 3-phase supply is not available, connecting 230 V/110 V to terminals 11 and 13 can be used to switch on CU 3 for off-site configuration. CU 3 will be in an alarm condition but configuration is possible anyway.

**What to do**                    Follow the steps in below table to make the off-site preparations:

| Step | Action |
|------|--------|
| 1 | Connect the CU 3 planned to have No. 1 to PC Tool CU 3. Be sure to select Connection Type GENIbus in the **File \| Tool Setup \| General Setup** window. |
| 2 | In **Installation \| Max. Current Configuration** fill in the motor nameplate current and click **[Program]** |
| 3 | In I**nstallation \| General Configuration** window, fill in the required changes to functionality and parameter values.<br><br>In the networking frame the following must be filled in:<br>• CU 3 number: 1.<br>• Use SM 100: checked.<br>• SM 100 address: 127.<br><br>In the external sensor frame the following must be filled in:<br>• Unit: m or feet.<br>• Range: <full range of connected level sensor>.<br>• Signal offset: Enable.<br>• Control Function: Fill.<br><br>Click **[Program]**.<br>Remember to place the CU 3 sensor jumper in position "mA". |
| 4 | In the **Installation \| Limit Configuration** window, fill in all the relevant stop and warning limits.<br>Click **[Program]**. |
| 5 | Disconnect CU 3 No. 1 and connect the CU 3 planned to have No. 2. Repeat step 1 to 3, but in the network frame under step 2 you fill in:<br>• CU 3 number: 2.<br>• Use SM 100: checked.<br>• SM 100 address: 128. |
| 6 | Disconnect the CU 3. Select the Tool Mode SM 100 Configuration from the File \| Tool Setup \| General Setup. |
| 7 | Now connect the SM 100 planned to have address 127. In **SM 100 \| Installation** window, fill in the required changes:<br>• Select 4-20 mA for the two inputs in question.<br>• The box 'SM 100 is hidden' must be checked.<br>  Select 127 for SM 100 address.<br>• Click **[Program]**. |
| 8 | Repeat step 6 for the second SM 100, but remember to give it address 128. |
| 9 | Prepare the G100-R/M/P hardware according to the description in section G100 hardware configuration, page 7. |

**Hint!**          It is adviseable to make an off-site verification of the complete GENIbus network. Connect all the units to G100 and connect the PC to the G100 Service Port. In **File | Tool Setup | General Setup** window, choose Connection Type G100, I/O Type=Direct, 9600 baud and **[save]**. Close the tool and open it again. After a few seconds you should see an Operation window like the one below.
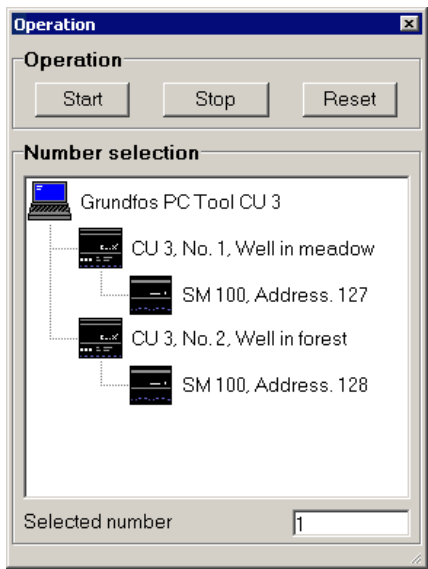


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**Fig. 18.** PC Tool CU 3 Operation window when all the devices in the example has been correctly configured.

**On-site installation**          When the off-site preparation has taken place successfully the installation of the devices in the real application can be done without further configuration.

On location the remote control R100 can be used to modify parameters in the CU 3 if necessary. The PC Tool CU 3 can at any time be used via the G100 modem connection (or locally via the service port) to...

- modify CU 3 parameters,
- control all the CU 3 units and
- monitor all the data from the application.

**Note:** Configuration of SM 100 cannot take place via the G100.

**Make the tool fit the installation**          Use the following procedure:

| Step | Action |
|------|--------|
| **1** | Go into the window **File | Tool Setup | Sensor Setup.** |
| **2** | Select the appropriate SM 100 input for Flow and for Conductivity. |
| **3** | For Water Level Well select CU 3 analog. |
| **4** | Click **[Save]** to save the sensor setup to hard disk. |
| **5** | Go into the window **File | Tool Setup | Sensor Setup.** |
| **6** | Fill in the flow sensor scaling and the conductivity sensor scaling for the appropriate SM 100 inputs. |
|  | Click **[Save]** to save the SM 100 sensor setup to the hard disk |

# Fault finding

**Direct communication with a CU 3/SM 100 Network**

The figure below shows the situation where PC Tool CU 3 communicates with a GENIbus network consisting of two CU 3 units and one SM 100. In this application we assume that no "binding" between SM 100 and any of the CU 3 units has been established, and that SM 100 is "not hidden". It might be, that your application is different. However, the procedure in checking the system is general.
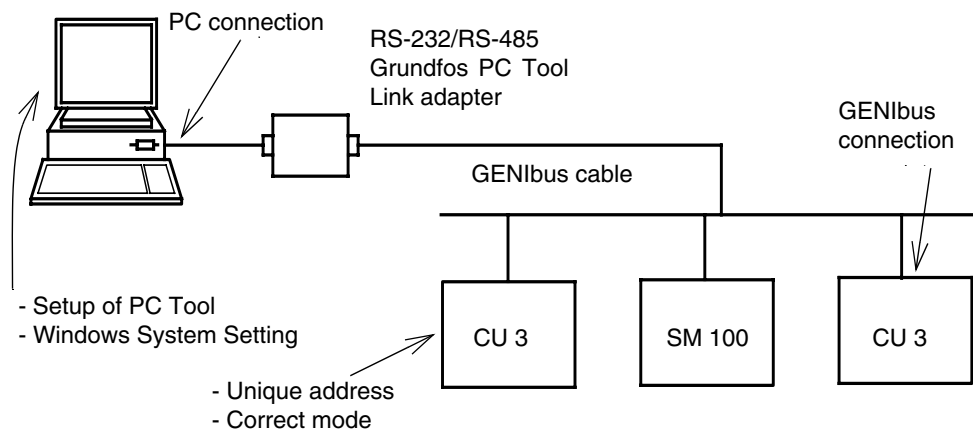
**Fig. 19.** GENIbus network example. The arrows indicate typical causes of communication problems.

**Fig. 20.** PC Tool CU 3 Operation window for the GENIbus network shown above.

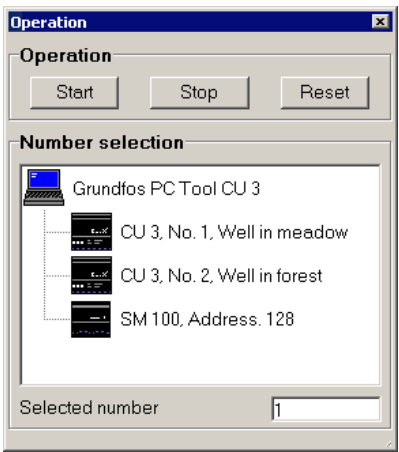If you do not see the correct image of your network in the Operation window - one or more units might be missing, units appear and disappear or you might not see any units at all - then go through the following checks:

**Bus Units**

| Bus Units | |
|---|---|
| **Step** | **Check that...** |
| 1 | all the bus units are switched on. |
| 2 | each bus unit has a unique address. (e.g. number programmed with R100 or with the tool). |
| 3 | the CU 3 have are not bound to any SM 100. Check **Installation I General Configuration** if the box "Use SM 100" is checked or not. From the factory the box is not checked ("unbound"). |
| 4 | Whether the SM 100's are "hidden" or "not hidden". If "not hidden" an SM 100 appears in the Operation window network tree as connected to the bus. If "hidden" it must be "bound" to a CU 3 to appear, and it will appear as connected to that CU 3. From the factory SM 100 is "hidden". |

**GENIbus Connections**

| | GENIbus Connections | |
|---|---|---|
| **Step** | **Check that...** | |
| **1** | the bus cable is connected to the right terminals on the bus unit. The signal wires to A and B and the shield to Y. | |
| **2** | the connection to A and B are not reversed. | |
| **3** | the connection is not short circuited.<br>This does not harm the electronics but prevents communication. | |

**GENIbus Cable**

| | GENIbus Cable | |
|---|---|---|
| **Step** | **Check that...** | |
| **1** | the cable is not damaged.<br>Try e.g. to make ohmic measurements to check that the cable is intact. | |

**PC Connection**

| | PC Connection | |
|---|---|---|
| **Step** | **Check that...** | |
| **1** | the adapter is connected to the correct COM Port. | |

**Tool Setup**

| | Tool Setup | |
|---|---|---|
| **Step** | **Check that...** | |
| **1** | you are using GENIbus Connection Type and the right COM Port In:<br>**File | Tool Setup | General Setup** | |

**Windows**

| | Windows | |
|---|---|---|
| **Step** | **Check that...** | |
| **1** | the COM port you use is not disabled or configured to a special use in Windows System Settings. | |
| **2** | there is not another active program on the PC using the same COM Port. | |

**RS-232/RS-485 Grundfos PC Tool Link adapter**   Study the Grundfos PC Tool Link adapter instructions.

**Communication with a CU 3/SM 100 Network via G100**

The table below describes some of the most common problems when trying to establish communication between PC Tool CU 3 and the G100 Gateway.

| Connection to G100 | | Fault indication | Cause and remedy |
|---|---|---|---|
| **Connection to service port** | **Direct access** | G100 icon is red, and the status bar reads: 'Error'. | No communication between PC and G100.<br>Check that...<br>• the cable is correct (Standard 0-modem cable),<br>• you are using the correct COM port in your PC,<br>  the baud rate selection in the PC tool is 9600. |
| | **Access via modem** | Modem connection cannot be established.<br>A message box with the text: 'No carrier found on remote modem' appears. | G100 modem is not properly connected to telephone line, or G100 modem is not in auto answer mode.<br>• Check that the cable between G100 and modem is correct (standard modem cable = all pins straight through).<br>• To activate auto answer mode use a terminal program (e.g. Procomm). |
| | | Modem connection has been established but the G100 icon turns red and the status bar reads: 'Error'. | No communication between PC and G100. This could be due to a bad telephone line.<br>• Hang up and try again.<br>  If this does not help, check that...<br>• the cable between G100 and modem is correct (Standard modem cable = all pins straight through),<br>• the modem can work without DTR being present. Use a terminal program (e.g. Procomm) to send the following AT-command: "AT&D0". |
| **Connection to R/M/P version Port 1** | **Direct access** | G100 icon is red, and the status bar reads: 'Error'. | No communication between PC and G100. Check that...<br>• the cable is correct (Standard 0-modem cable),<br>• you are using the correct COM port in your PC, in the window **File | Tool Setup | General Setup**<br>• the baud rate selected in the window File | Tool Setup | General Setup matches the hardware selection on the Radio/Modem/PLC board,<br>• the I/O type on the Radio/Modem/PLC board is set to 'Direct'. |
| | **Access via modem** | Modem connection cannot be established. | G100 modem is not properly connected to the telephone line, or G100 modem is not in auto answer mode.<br>• Check that the cable between G100 and modem is correct.<br>  Standard modem cable = all pins straight through).<br>If the I/O type on R/M/P board is set to 'Modem', G100 itself is able to initialise the modem. The initialisation string can be set up from PC Tool G100 in the following way:<br>• Connect the PC to G100 Service port and start PC Tool G100.<br>• Click the G100 icon.<br>• Select the **[R/M/P  board...]** button.<br>• Select the **[Alarm setup...]** button.<br>• In the Modem initialisation field write: 'ATS0=1'.<br>• Close the menu with **[OK]**.<br>• Confirm writing data to G100 with **[Yes]**.<br>• Exit PC Tool G100 and switch off/on G100 to initialise modem. |
| | | Modem connection has been established but after a while the G100 icon turns red and the status bar shows: 'Error' | No communication between PC and G100 is taking place. This could be due to a bad telephone line. Hang up and try again.<br>NOTE! After 8 hours G100 will by itself terminate a modem communication. |
| | **Acess via radio** | The G100 icon is red and the status bar reads: 'Error' | No communication between PC and G100.<br>• Check that the cable is correct (consult your Radio User Manual and G100 Product Information to match the pin connections)<br>• You are using the correct COM port in your PC<br>• The baud rate selected in the PC tool matches the dip switch selection on R/M/P board<br>• The I/O type on R/M/P board is set to 'Radio' ('Direct' if your radio operates in transparent mode) |

*Table continues on the next page*

Table continued

| Connection to G100 | | Fault indication | Cause and remedy |
|---|---|---|---|
| **Connection to service port** | **Direct access** | G100 icon is red, and the status bar reads: 'Error'. | No communication between PC and G100. Check that... <br> • the cable is correct (Standard 0-modem cable), <br> • you are using the correct COM port in your PC, <br> the baud rate selection in the PC tool is 9600. |
| | **Access via modem** | Modem connection cannot be established. | G100 modem is not properly connected to the telephone line, or G100 modem is not in auto answer mode. <br> • Check that the cable between G100 and modem is correct (standard modem cable = all pins straight through). <br> • To activate auto answer mode use a terminal program (e.g. procomm) to send the following AT-command: 'ATSO=1'. |
| | | Modem connection has been established but the G100 icon turns red and the status bar reads: 'Error'. | No communication between PC and G100. This could be due to a bad telephone line. <br> • Hang up and try again. <br> If this does not help, check that... <br> • the modem can work without DTR being present. Use a terminal program (e.g. Procomm) to send the following AT-command: 'AT&D0'. |
| **Common to all connections** | | The communication between PC tool and G100 seems to be OK. Several CU 3/SM 100 units are connected to G100, but none or only some are shown in the PC tool. | No communication is taking place between G100 and the CU 3/SM 100 units. <br> • Check that the connection between G100 GENIbus port and GENIbus is correct (see G100 Installation and operating instructions <br> • Go through the checks of Bus units, GENIbus connections and GENIbus cable as described in preceding section. |

Subject to alterations.

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