# **Printed Documentation**

# Introduction

### GridVis network visualisation software

Software version 2.2.0 Alpha 1 Date: 08.12.2010 Document no. 1.047.002.0 - Rev. 0007

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## **Applications**

The visualisation software GridVis is designed for the management of measurement devices and the measurement values they capture.

GridVis currently supports the following measurement devices made by Janitza electronics GmbH:

- UMG 96S
- UMG 96RM
- UMG 103
- UMG 104
- UMG 503
- UMG 505
- UMG 507
- UMG 508
- UMG 510
- UMG 511
- UMG 604
- UMG 605
- UMG 605US
- ProData
- Prophi
- EM series energy meters

#### What GridVis can do

- Manage measurement devices.
- Show measurement devices in a topology.
- Program measurement devices.
- Provide direct graphic representation of measurement values from different measurement devices.
- Read out measurement values saved in measurement devices and save these to a database.
- Read out measurement values saved in a database and display these graphically.
- Read out measurement values saved in a database and search these for transients.
- Read out measurement values saved in a database and search these for events.
- Program customer-specific applications.
- Update measurement device firmware.

Please note: Some of the listed functions are not available for every measurement device!

### Supported operating systems

The visualisation software GridVis can be installed on computers/PCs with a resolution of 1280 x 960 pixels and with the following operating systems:

- Windows XP® (from Service Pack 3)
- Windows Vista® (from Service Pack 1)
- Windows 7® (32Bit, 64Bit)
- Windows Server® (from Version 2003 R1)
- MAC OS\_X® (from Version 10.5)
- Linux (x86, x64) from Java 6

# **System Requirements**

#### Devices:

Device	Required firmware	Notes
UMG 96RM	0.50 or higher	No GridVis review.
UMG 96	No restriction	
UMG 96S	1.20 or higher	No GridVis 2.2 review.
UMG 103	No restriction	
UMG 104	1.268 oder neuer	
UMG 503	3.102 or higher	Devices up to hardware version 0.40 (Firmware Vers. 2.004) must be replaced.
UMG 505	No restriction	Series 2, Series 3.
UMG 507	0.993	No GridVis review.
UMG 508	1.218 or higher	
UMG 510	1.037	
UMG 511	1.218 or higher	
UMG 604	1.218 or higher	Devices with a firmware <1.048 must be upgraded by the manufacturer.
UMG 605	1.218 or higher	
Prophi	No restriction	

Computer:

Recommendation	Notes
Screen resolution	1280 x 960 px
Memory with Derby	2 GB
Memory with MySQL/MS SQL server	4GB
Processor	all modern processors

### Licence administration

Some of the functions available for GridVis must be purchased.

- You need a licence for functions that have to be purchased.
- You can only install **one** licence.
- Several functions can be activated with a single licence.
- Licences are recorded in our database using the name of the licencee and the project.
- You can install a licence for a single project as many times as you like.
- We supply licences as binary files.
- You can receive the binary files by email, on a CD/DVD and on a USB flash drive.
- In GridVis, the licences can be imported via Extras/Licence administration.

Licences available for purchase:

- Graphic Modbus Master Programming Module (Item no. 5100117) The Modbus Master Programming Module enables the graphic programming of the UMG604 as a Modbus master.
- Database driver for Microsoft SQL Server (Item no. 5100118) Makes the exchange of data between GridVis and a Microsoft SQL Server possible. Requires at least MS SQL Server 2005 (no Express Edition).
- Database driver for MySQL Server (Item no. 5100119) Makes the exchange of data between GridVis and a MySQL Server possible (from Version 5.0).
- Device driver for generic Modbus devices (51.00.120) Makes it possible when using Modbus to read from third-party devices.

Please note: Without a database driver, GridVis uses the Derby database included in the scope of delivery.

## Working with databases

GridVis currently supports the following databases:

- Derby (no access to shared folders in the network)
- MySQL (option)
- Microsoft SQL (option)

Please note: For smaller projects with only a few devices and little data, you can use the Derby database included in the scope of delivery.

- For larger quantities of data, access to the data stored in the Derby database is very slow.
- We recommend Microsoft SQL Server or MySQL Server databases for this reason.
- Licences for the Microsoft SQL Server and MySQL Server database drivers can be purchased as options.

# Installation Installing GridVis

- Start the installation program and follow the instructions
- Close all open programs and select Next.



- Use Browse... to select an installation location or confirm the default path.
- Confirm the selection with Next

😸 Setup - GridVis 2.2.0-Alpha-1	- • ×
Select Destination Directory Where should GridVis be installed?	
Select the folder where you would like GridVis to be installed, then click Ne	ext.
Destination directory	
C:\GridVis	Browse
Required disk space: 149.8 MB	
Free disk space: 234,687 MB	
install di	
< Back Next	> Cancel

- Select the location for the start link in the Windows start menu
- Confirm the selection with Next

😹 Setup - GridVis 2.2.0-Alpha-1
Select Start Menu Folder Where should Setup place the program's shortcuts?
Select the Start Menu folder in which you would like Setup to create the program's shortcuts, then click Next.
GridVis Accessories Administrative Tools GridVis
Maintenance Mozilla Thunderbird
Don't create a Start Menu folder
install4j                

• Confirm the installation with Finish



# **Getting started**

### Welcome window

The Welcome window can be opened under the menu item Window/Welcome and provides support to initial steps when working with GridVis.

• Licence (optional)

Some optional features require a licence. Licences can be imported via the Licence manager.

- Importing licences via the Licence manager
- Creating a project

To be able to work with GridVis, at least one project must be open

- <u>Creating a new project</u>
- Opening an existing project
- Importing a project from an older GridVis
- Adding devices

One or more devices can be added once a project has been opened.

- Creating a new device
- Importing a device list from a CSV file



• If the Welcome window does not appear when starting, it can be opened using the menu item *Window/Welcome*.

# Licence manager window

The different types of licences are displayed in the Licence manager window. Purchased <u>licences</u> can be imported using the <u>Import licence</u> button.

- Select Licence management under the menu item Extra
- Using the Import licence button the licence file can then be imported

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File Edit View Tools Window Help		
🖴 🖨 🔊 🍳 💁 📽 🔎 🦢 🗸		
LicenseManager Window 88		
A 🖄		
E-Mail Licenseinformation Import license		
License number 00-000000		
Licensee Free license		
Modules No modules licensed		

## Importing a licence file

A new <u>licence file</u> can be imported into GridVis using the *Import licence* button under <u>Licence</u> <u>manager</u>.

- Using the button, select the path to the licence file and confirm the selection with *Open*
- Clicking on the OK button imports the licence file.

import li	cense		x
Licensefile			
New Licens	e		
License nu	umber		
Licensee			
Modules			
		OK Cancel	

### Creating a new project

- New projects are created under the menu item File/New project.
- Under Projects, select either *GridVis database project* to create a new project or *Import GridVis project* to import an existing GridVis project (from Version 2.2.x) and confirm the selection with *Continue*.

Mew Project		
Steps	Choose Project	
1. Choose Project 2	Categories:	Projects:           Database Project
	Description: Database Project Project using a Database	<b>t</b>
	< Back	Next > Finish Cancel Help

### Creating the selected project

- Give the project a name and identify the location it is to be saved to. The *Browse* button can also be used to find and specify the location the project is to be saved to.
- The *Derby* database included in the scope of delivery can be used for smaller projects with only a few devices and little data.
- When using the standard database (Derby DB), clicking on Finish saves the project.

#### Attention!

- For larger quantities of data, access to the data stored in the **Derby database** is very slow.
- We recommend **Microsoft SQL Server** or **MySQL Server** databases for this reason.
- Licences for the Microsoft SQL Server and MySQL Server database drivers can be purchased from us.

Mew Project		×
Steps 1. Choose Project 2. Project location	Project location	Project
	Project location	C:\Projects Browse
	Project folder	C: \Projects \Project
	I Use default	database(Derby DB)
	🕕 Project locatio	n is not a directory
		<back next=""> Finish Cancel Help</back>

## Importing the selected project (from Version 2.2)

- Specify the location the imported project is to be saved to. The *Browse* button can also be used to find and specify the location the project is to be saved to.
- Confirm this step with Continue.
- Give the project a new name and identify the new location it is to be saved to. The *Browse* button can also be used to find and specify the location the project is to be saved to.
- The *Derby* database included in the scope of delivery can be used for smaller projects with only a few devices and little data.
- When using the standard database (Derby DB), clicking on Finish saves the project.

#### Attention!

- For larger quantities of data, access to the data stored in the **Derby database** is very slow.
- We recommend Microsoft SQL Server or MySQL Server databases for this reason.
- Licences for the Microsoft SQL Server and MySQL Server database drivers can be purchased from us.

# **Opening a project**

- Use the menu item *File/Open project* to select and open an existing GridVis project (projects from Version 2.x).
- Select the desired project in the selection window and open it by clicking on the *Open project* button.

Dpen Project			x
Look in:	📗 Temp	- 🥠 🕫 🖽 📰	
Zuletzt verwendet		Project Name:	
Desktop		Open Required Projects:	
Eigene Dokumente			
Computer			
Netzwerk	File name: Files of type:	C:\TMP\Temp Open Pr Project Folder	oject el

# Creating a new device

- If a project has been created, a device can be added for example using the menu item *File/New file*.
- Select the type of device, listed under the device category, and confirm the selection with *Continue.*

🌆 New File	
Steps	Choose File Type
1. Choose File Type	Project: 🔜 Project
	Categories: File Types:
999991010	Janitza UMG Janitza EM Series Janitza EM Series UMG96S UMG104 UMG503 UMG505 UMG507 UMG510 UMG511
	Description:
	< Back Next > Finish Cancel Help

• Different types of connections will be offered depending on the type of device. Depending on the type of connection, once the appropriate connection has been selected and any address inputs have been entered, communication with the device can be tested using the *Connection test* button.

#### Getting started

Mew File	<b>×</b>
Steps	Configure connection
1. Configure connection	Connection type TCP/IP UMG604 [TCP/IP] Host 192.168.2.1 time out [millisec.] 5,000 Connection test
	< Back Next > Finish Cancel Help

## Importing a project from an older GridVis

- Older GridVis projects (to Version 2) can be imported using the menu item *File/Import* project
- Projects are selected in the *Import project window* by selecting the project name.

Please note: Because paths for older GridVis projects cannot be changed, project directories cannot be selected!

 Identifying the location to which the project is to be saved follows once the project has been selected

Import project		
Steps	Select project to import	
<ol> <li>Select project to import</li> <li>Select destination</li> </ol>	Directory Project name Project description	C:\Users
	Database type Database	edi
	< Back	Next > Finish Cancel Help

### **Overview window**

The navigation window provides a clearly organised overview of the most important device actions and information about the devices organised by the types of devices/device groups selected in the project window.

- To open the navigation window, select the menu item Window/Navigation
- To open the project window, select the menu item Window/Projects
- Selecting a device in the project window facilitates displaying and changing the information in the navigation window
- Selecting the group by device type displays an overview of all of the devices incl. their current status





#### **Connection statuses:**

- A connection to a device exists
- No connection to a device could be established
- A connection test has not yet been carried out

## **Displaying graphs**

Selected measurement values can be visualised in a <u>graph window</u> by selecting *Graphs* in the project window.

- Measurement values from devices can be displayed directly in a graph.
- Measurement values from different devices can be displayed in a single graph.
- No more than two different kinds of measured value types (e.g. current and voltage) can be displayed in a single graph.
- Select the menu item *Window/Projects* to open the project window.
- Select the menu item Window/Values Explorer to open the Value Explorer.
- Select the item *Graphs* in the project window.
- Then select the item *Devices* in the project window to select the device.

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Project	2			
🖻 🛃 Devices	Save graph settings to file	Cascade	Tile	Stack
By Type ▮				
Graph				
🕀 间 Reports				
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< <b>Ⅲ</b> ►				
: Value tre 18				
Online Historical values				
💫 Device-1 🔺				
🖶 🕖 Voltage 👘				
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Frequency     Bewer				
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Refresh				

• Using Open groups in the Value Explorer, select and highlight the desired measurement values.

(holding the <Ctrl> key down allows the selection of more than one measurement value).

- Using the mouse, drag the highlighted measurement value into the graph window.
- GridVis imports the measurement values directly from the device and displays these in a graph.
- The button Save graph setting to a file saves the current view which can be opened again under Graphs in the project window.
- To be able to display *Historic values,* the respective device must first have been read.

🚂 GridVis-2.2.0-Beta-3-PRE(2011-05-05_10-03-39)					
File Edit View Tools	Window Help				
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Project 🔺	2				
- 🛃 Devices	Save graph settings to file	Cascade	Tile	Stack	
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Negative	Voltage effective L1	(0s) [Device-2]			
🕀 🚺 Positive r	Totage enceave er				
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### Topology

A new topology page, used to visualise devices and measurements, can be created by selecting and right clicking on *Topology* in the project window.

- Devices can be incorporated in a single topology page.
- Measurement values from different devices can be incorporated in one topology page.
- Select the menu item *Window/Projects* to open the project window.
- Select the menu item *Window/Values Explorer* to open the Value Explorer.
- Right click on *Topology* in the project window to create a new topology page, then click on the Edit button to activate the *edit mode*.
- Select a device in the project window.
- Using the mouse, drag the device from the project window to the topology window. Pulling the object's corner in or out makes it smaller or larger.
- Highlight a device in the project window. Select one or more measurement values in the Value Explorer and, using the mouse, drag these to the topology window.
- The *Change background* button can be used to place a background image (e.g. a building plan in JPG format) into the window's background.
- Using the Display button, switch into *display mode*.

GridVis-2.2.0-Beta-3-PRE(2011-05-05_10-03-39) [Project]						
File Edit View Tools Window Help						
1	l 🙆 🚳 🏹	2				
: Projects 💷 🛚	newPage_1 [Project]	88				
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	View mode	Edit mode	Change background	clear background	Save	
UMG511	•			•		*
lasic Templates	UMG 511					
Graph	Phaze Peacen	Data Fine				
Topology 👻	L2 dette	2011 Jun 20 15:02 15:007 2011 Jun 20 15:02 15:007	Dentine 2	1		
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# The menu

## File menu

#### File menu



<u>New project...</u>

Selection used to create a new project file.

- <u>New file...</u>
- Add new devices to the current project.
- Open project...
- Load existing projects (from Version 2.2.x) to GridVis
- Most recently used projects
- Select the most recently used projects
- Close project (name)
- Close the project currently selected in the project window
- Open file
- Open external Jasic file
- Project group
- Create and load project groups with different dependencies
  - Available group with any projects
  - Project with all required sub-projects
  - Projects directory with all projects in a directory to be selected
- Project properties (name)
- Description of and settings for the project currently selected in the project window with
  - project description

- project password
- project planning
- project importing
- Importing older GridVis projects (up to Version 1.6)
- Save
- Save the current Jasic program
- Save as...
- Save the current Jasic program under a new name
- Save all
- Save all opened Jasic programs
- Set up page...
- Page setup (page format...)
- Print...
- Print as HTML...
- Exit
- Exits the GridVis software.

### Creating a new project

- New projects are created under the menu item File/New project.
- Under Projects, select either *GridVis database project* to create a new project or *Import GridVis project* to import an existing GridVis project (from Version 2.2.x) and confirm the selection with *Continue*.

Mew Project		
Steps	Choose Project	
1. Choose Project 2	Categories: Desktop Description:	Projects:          Database Project
	Database Project	t
	< Back	Next > Finish Cancel Help

### Creating the selected project

- Give the project a name and identify the location it is to be saved to. The *Browse* button can also be used to find and specify the location the project is to be saved to.
- The *Derby* database included in the scope of delivery can be used for smaller projects with only a few devices and little data.
- When using the standard database (Derby DB), clicking on Finish saves the project.

#### Attention!

- For larger quantities of data, access to the data stored in the **Derby database** is very slow.
- We recommend **Microsoft SQL Server** or **MySQL Server** databases for this reason.
- Licences for the Microsoft SQL Server and MySQL Server database drivers can be purchased from us.

💹 New Project		×
Steps	Project location	ı
2. Project location	Project name	Project
	Project location	C:\Projects Browse
	Project folder	C:\Projects\Project
	🔽 Use default	database(Derby DB)
	Desire the set is	
	Project locatio	n is not a directory
		<back next=""> Finish Cancel Help</back>

### Importing the selected project (from Version 2.2)

- Specify the location the imported project is to be saved to. The *Browse* button can also be used to find and specify the location the project is to be saved to.
- Confirm this step with *Continue*.
- Give the project a new name and identify the new location it is to be saved to. The *Browse* button can also be used to find and specify the location the project is to be saved to.
- The *Derby* database included in the scope of delivery can be used for smaller projects with only a few devices and little data.
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### Creating a new device

- If a project has been created, a device can be added for example using the menu item *File/New file*.
- Select the type of device, listed under the device category, and confirm the selection with *Continue*.

🚂 New File			×
Steps	Choose File Type		
1. Choose File Type	Project: 💹 Project		•
	Categories:	File Types:	
	Initza LIMG	UMG96S	
	lanitza EM Series	UMG96RM	
	Junica Lin Series	UMG103	
		UMG104	
		UMG503	
		UMG505	=
		UMG507	
		UMG511	
		UMG604	
		0MG605	-
	Description:		
	<	Back Next > Finish Can	icel Help

• Different types of connections will be offered depending on the type of device. Depending on the type of connection, once the appropriate connection has been selected and any address inputs have been entered, communication with the device can be tested using the *Connection test* button.

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🌆 New File		x
Steps	Configure connection	
1. Configure connection	Connection type TCP/IP UMG604 [TCP/IP] Host [192.168.2.1] time out [millisec.] 5,000	
	<back next=""> Finish Cancel Help</back>	

### **Opening a project**

- Use the menu item *File/Open project* to select and open an existing GridVis project (projects from Version 2.x).
- Select the desired project in the selection window and open it by clicking on the *Open project* button.

Dpen Project			X
Look in:	🔒 Temp		- 👌 📂 💷 📰
Zuletzt verwendet		Projec	t Name: pen as Main Project
Desktop			pen Required Projects:
Eigene Dokumente			
Computer			
Netzwerk	File name: Files of type:	C:\TMP\Temp Proiect Folder	Open Project Cancel
		(·····································	

### **Project group**

#### New group...

A project group is a combination of several projects that can be presented together in GridVis. Project groups can be managed under the menu item *File/Project group.* 

• To create a new group, select New group...

Create New Group
Name: Project
Free Group
Contains any projects you like. Can be updated manually or automatically.
☑ Use Currently Open Projects
Automatically Save Project List
Project and All Required Projects
Contains a master project and all projects it requires, recursively.
Master Project: Browse
Folder of Projects
Contains any projects found beneath a given folder on disk.
Folder: Browse
Create Group Cancel Help

- Give the new group a name.
- Select from among the available options with:
  - Available group
  - Includes any project.
  - Project and all required projects

Includes the primary project and all of the projects related to it. By selecting this option and using *Browse* a primary project can be selected. The group integrates the primary project and all of the projects that are related to it.

• Project directory

Includes all projects found in a given directory. By selecting this option and using Browse, a directory can be selected. The group integrates all of the projects in this directory.

• Confirm the selection with *Create group*.
#### Group properties

Automatic saving can be selected for the current project list under the menu item *File/Project group/Group properties*. Entering a name gives the group a unique identification.

🌆 Proje	ct Group Properties		X
Name:	Gruppe1		
V Auto	matically Save Project List		
Save	Current Project List Now		
		OK Cancel	Help

#### Deleting the group

The current group can be deleted under the menu item *File/Project group/Delete group*.

### **Project properties**

#### **Project description**

Using the menu item *File/Project properties(Name)*, an individual description can be provided for the current project.

- Under Category, select *Description*.
- Click with the mouse on the area for Project description to activate it.
- Then confirm with OK once the description has been entered.

Project	
Categories:	Project description
	OK Cancel

#### **Project password**

Using the menu item *File/Project properties/Name*, an individual password can be created for the current project to protect the project.

- Under Category, select Password.
- Click with the mouse button on the input area to activate it, create a *Password* and check off the option *Used password*.
- Confirm this process with OK.

Project	×
Categories: Description Password Scheduling Schedules Device synchronization Online recording Device time synchronization Watchdog	Password ••••• Use password Note: Password is not set
	OK Cancel

#### Planning

Certain events can be set up and planned using the menu item *File/Project properties/Name*:

Schedules

Reports, for example, can be prepared at regular intervals by creating a schedule to manage them.

• Inputting online

Measurement values read from GridVis can also be saved to the database (useful for devices not equipped with their own memory).

• Read out the device

To ensure that a device's memory does not "overflow" and that the data in the database is always current, the device can be set up to be read out automatically.

- Time setting Activating this option is recommended to facilitate comparing certain events from different measurement locations.
- Watchdog

🚂 Project		×
Categories:		
Description		
···· • Password		
🖕 🔍 Scheduling		
····   Schedules		
····   Device synchronization		
····  Online recording		
····   Device time synchronization		
Watchdog		
	ОК	Cancel

#### Schedules

Schedules can be added, changed and deleted under *Project properties* under the File menu.

- Adding a schedule
  - Give the schedule a unique name.
  - Using the default buttons, select a profile or set up a custom time profile by entering the weekdays, hours and minutes.
  - Confirm the configuration with OK.

Schedule configuration					×
Name Plan Presets Monatlich Weekly	Daily	Every four hours	Every two hours	Hourly	
Weekdays      Use day of week      Use day of month      Sunday      Monday      Tuesday      Wednesday      Thursday      Friday      Saturday	Hours 0h 1h 2h 3h 4h 5h 6h 7h 8h 9h 10h	E Minute			0
					OK Cancel

- Changing a schedule
  - Select a schedule and change it as explained under Adding a schedule.
  - Deleting a schedule

•

• Select a schedule and delete it using *Delete schedule*.

### Importing a project from an older GridVis

- Older GridVis projects (to Version 2) can be imported using the menu item *File/Import* project
- Projects are selected in the *Import project window* by selecting the project name.

Please note: Because paths for older GridVis projects cannot be changed, project directories cannot be selected!

 Identifying the location to which the project is to be saved follows once the project has been selected

Import project			×
Steps	Select project to i	mport	
<ol> <li>Select project to import</li> <li>Select destination</li> </ol>	Directory Project name Project description	C:\Users	
	Database type Database	ed!	
	< Back	Next > Finish	Cancel Help

## Edit menu

#### Edit menu

<u></u>	📓 GridVis-2.2.0-Beta-3-PRE(2011-05-05_10-03-39) [Project]								
File	File Edit) View Tools Window Help								
2	5	Undo	G	l 💁 🔏 🍹	] 🦧				
: Pr	e	Redo	88	Overview Window	/ 88				
	8	Cut		直		٦	1	1	<b>2</b>
¢	- <b>D</b>	Сору	LI	Download memor	y Configure	e Configure d	connection Conne	ection test A	dd new device
	Ê	Paste	ate	Number of device	es: 2				
	Ī	Delete		Device Name	Device Type	Device descrip	Connection	Connection state	Last synced v
6	- 🛂 🛛	Topology		····· Device-1	UMG508		TCPIP Adress:	۲	
		newPa	ge_	Device-2	UMG511	Device-2	TCPIP Adress:	۲	
		Reports Database I	Der						
		Jatabase							
•		111	•						

- Cancel
- Cancel the last action
- Repeat

Repeat the last action

- Cut
- Move highlighted texts, objects, etc. to the clipboard
- *Copy*
- Copy highlighted texts, objects, etc. to the clipboard
- Delete

Delete highlighted texts, objects, etc.

### View menu

#### View menu

🌆 Grid	GridVis-2.2.0-Beta-3-PRE(2011-05-05_10-03-39) [Project]							
File Ed	lit View	Tools Window Help						
		Editors	Þ					
: Proje	cts	GridVis Log						
P	roj   (     /     /	Toolbars Show Editor Toolbar Show Line Numbers	Þ	Configure o	onnection Conn	ection test A	dd new device	
		Synchronize Editor with Views		descrip	Connection	Connection state	Last synced v	
- <b>2</b>		-,		-	TCPIP Adress:	٢		
	<mark>-2</mark>	Full Screen	Alt+Shift+Enter	2	TCPIP Adress:	0		
	Datab	ase [Der						

Editors

Switching between the graphic and editor views in the Jasic environment.

- GridVis log
- Opens the GridVis log window
- Toolbars
- Opening and customising the toolbars
- Show the editor toolbars Open/close the editor toolbar in the Jasic environment.
- Show line numbers
- Shows the line numbers in the editor in the Jasic environment
- Synchronise the editor with the views
- Synchronise the editor with the view in the Jasic environment
- Full screen
- Full screen GridVis display

## **Tools menu**

#### Extras menu

GridVis-2.2.0-Beta	GridVis-2.2.0-Beta-3-PRE(2011-05-05_10-03-39) [Project]							
File Edit View Tools Window Help								
Projects Projects Project Devices Devices Devices	Export device list Import device list Upgrade devices Install app Add to Favorites	Configure 2	e Configure c	onnection Conne	ection test A	dd new device		
- 💌 Graph	Plugins	ce Type	Device descrip	Connection	Connection state	Last synced v		
	Options	508		TCPIP Adress:	۲			
Henorts	Licensemanagement	511	Device-2	TCPIP Adress:				
Report     Circensemanagement     Database [Der								

Export device list

Export devices incorporated in the current project.

Import device list

Import a device list into the current project.

Update devices

Update firmware for the selected devices.

- Install app
- Installation of external applications to add functions for selected devices.
- Add to favourites

Enables quick switching of saved views.

- <u>Plug-ins</u>
- Plug-in administration and installation
- <u>Options</u>

Setting GridVis-specific options with

- proxy settings
  - appearance and memory depth of the graphs
  - customising the keyboard
  - file assignments
  - appearance
- topology settings
- Licence administration

Licence overview with the ability to import a licence file and automatically generated licence information by email.

#### Exporting the device list

Project devices with their addresses etc. can be exported to a text file by selecting *Export device list* in the *Extras* menu. Using *Import device list*, this device file can be integrated into other projects. It can also be imported into other programs.

Export device list	
Steps	Select file for export
1. Select file for export	Source project
	File C:\TMP\Temp\List.txt
	W No project selected!
	< Back Next > Finish Cancel Help

- To export the device list, select the menu item Extras/Export device list.
- Select the source project in the selection field.
- The path and filename can be entered by selecting

🌆 Save			×
Save in:	🕕 Temp	- 🥠 📂 🖽 📾	
Zuletzt verwendet	鷆 Project		
Desktop			
Eigene Dokumente			
Computer	File name: Files of type:	List Sa Text File Ca	ave

• Give the file a unique name and select a file type.

- Save returns you to the previous window. Finish the action with *Finish*. •
- •

#### Import device list

A project device list can be added by selecting *Import device list* under the *Extras* menu.

Import device list				×
Steps	Select file for i	import		
1. Select file for import	Target project			-
2001	File	C:\TMP\Temp\List		
	No project se	elected!		
	-			
		<back next=""></back>	Finish Cancel	Help

- To import the device list, select the menu item Extras/Import device list.
- In the selection field, select the project in which the device is to be integrated.

💹 Open			×
Look in:	🕕 Temp	- 🦻 📂 📰 📰	
Zuletzt verwendet Desktop	\mu Project		
Eigene Dokumente	File name: Files of type:	CSV File	ipen ancel

- Select an existing device list.
- Selecting Open returns you to the previous window.

• Selecting *Finish* starts the importing of the device list.

A message window shows how much of the list has been imported and notifies you about possible errors, warnings and information you should be aware of. You can find more information under *Please show me*.

🚂 Messages overv	iew[Import device list]	×
Messages overvi Here you can get	iew t an overview of the messages	
C Error Warning Information	0 2 1 0	Show Show Show
		ОК

...

#### Upgrade devices

Project devices can be updated with new firmware under Updating devices in the Extras menu.

Magnetice upgrade	×	
Steps	Select upgrade file	
<ol> <li>Select upgrade file</li> <li>Select devices for upgrade</li> <li>Execute upgrade</li> </ol>	Upgrade file  Type Firmware version	
	< Back Next > Finish Cancel Help	

- A path and filename for the update file can be entered by selecting Then select the devices to be updated with firmware. •
- •

#### Installing the App

An add-on that adds functions for certain devices made by Janitza electronics GmbH. This software add-on can be included in a Jasic module or in an HTML file (homepage expansion) and is transferred by GridVis to the device (e.g. UMG 604). Typical add-ons are the apps used for EMAX, for the reactive power controller and for cost centre accounting.

- Using the button, select and open the desired app.
- Using the *Continue* button, the device can then be selected.

🜆 Install app	
Steps 1. Select app file 2. Select device	Select app file (1. from 2)         File         Name         Description
	No app file selected!       

#### Add to favorites

Saved graphs and topology views can be managed in a separate window using the *Add to favorites* function in the *Extras* menu. This enables rapid switching between multiple views.

- Highlight a saved object in the project window under graphs or topology.
- If a favorite does not exits for this page, a new link can be set up in the *Extras* menu under *Add to favorites*.
- Using the menu item Window/Favorites open the Favorites window.
- Double-clicking on an entry opens the page.

#### **Plug-ins**

This additional expansion module provides further functions in GridVis and can be managed by selecting Plug-ins under the Extras menu.

Magins Plugins		
Updates Available Plugins Downloaded	Installed (48) Settings	
Reload Catalog		Search:
Update Name	Category ₹	
Update		
		Close Help

#### Updates

Using the *Reload catalogue* button, a current list of the plug-ins to be updated can be loaded.

Available plug-ins

Using the *Reload catalogue* button, a list of the plug-ins which might be installed can be loaded.

Selecting a plug-in in the list and then selecting Install installs the plug-in.

Downloading

Using *Add plug-in*, saved plug-ins can be added to GridVis. Using the displayed list and *Install*, these can be integrated.

Installed (x)

Plug-ins integrated into GridVis can be activated, deactivated or deinstalled in the list.

ATTENTION: Only deinstall plug-ins if your are sure that they are no longer required!

Settings

For the automatic updating of plug-ins, new update providers can be added, edited and deleted. The interval at which the availability of updates is checked and installed in common directories can be customised.

#### Options

Montions									×
O S B	$\sim$	G W A S	100	2					
General	Graph	Keymap	Miscellaneous	Topology					
Online histor	ry 2000								
Background	color							Change color	
Foreground	color							Change color	
Default Co	olor								
Nodes						4097			
-1					<b>_</b> _	(	Click to ch	nange color	
E Vo	ltage								
	Voltage effective								
•	L1								
•	L2				E				
•	L3								
•	L4								
Export	Import						ОК	Cancel	Help

#### General

Configuration of proxy settings for Internet access.

- Graphs
- Graph properties settings for memory depth, background and graph colour.
- Background colours for graphs can be selected in the colour palette using the *Change colour* button.
- The colour can be customised by selecting a graph in the node structure and then selecting the corresponding colour field with *Click to change colour*.
- The changes will not appear until a new graph is added.
- Keyboard layout

Assignment of specific program functions to individual keyboard shortcuts.

- Select an action in the list.
- In the shortcuts column, double-click on the corresponding cell.
- Use the keyboard to set up your own shortcuts.
- Using the *Manage profile button*, the individual keyboard profile can be exported, imported or duplicated. Changed keyboard profiles can be reset to the standard profile by selecting *Restore standard*.
- Miscellaneous

File handling settings and window appearance

Topology

Basic value scale settings with an optional view of the device screen in the topology window.

Export / Import

Exports settings, e.g. toolbars, keyboard layout, graph colours, templates and favourites.

Select Options to Export	×
Target zip file:	Browse
Select Options for Export:	
Available Options	
🗆 📄 🔍 All	
🗄 🥅 🍳 General	
\rm Please, select a valid target zip file	
OK	Cancel

### Licence manager window

The different types of licences are displayed in the Licence manager window. Purchased <u>licences</u> can be imported using the <u>Import licence</u> button.

- Select Licence management under the menu item Extra
- Using the Import licence button the licence file can then be imported

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File Edit View Tools Window Help		
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LicenseManager Window 28		
A 🖄		
E-Mail Licenseinformation Import license		
License number 00-000000		
Licensee Free license		
Modules No modules licensed		

## Window menu

#### Window menu

	GridVis-2.2.0-Beta-3	3-PRE	(2011-05-05_10-03-39)		_ <b>D</b> _ X
	File Edit View Tools	Win	dow Help		
	LicenseManager Window E-Mail Licenseinformati License number 00-000 Licensee Free license Modules No modules li		Preview Overview Value tree Welcome Projects Files Favorites Palette Properties	Ctrl+1 Ctrl+2	
			Output Close Window Maximize Window Undock Window Clone Document Close All Documents Close Other Documents	► Alt+Shift+D	
Ľ			Documents		
			Reset Windows		

Overview

Opens the navigation window and provides specific information relevant to the selected device group or device.

Devices can be added, deleted, synchronised, configured and their links tested in the navigation window.

Value Tree

Opens the Value tree window with the value graph options relevant to the respective devices.

Welcome

Opens a support window that provides an introduction to working with GridVis.

Projects

Opens the project window in which projects with all categories are shown in a tree structure.

Files

Opens a window with the project-specific file structure.

Favorites

Opens a window with the saved favorites

Palette

Opens a window with the Jasic component palette.

Properties

Opens an information window in the project window relevant to the selected device.

Output

Opens the GridVis log window.

- Navigating
- Close window

Closes the current window

- Maximise window / Restore window
   Maximises the view of the current window. Selecting the Restore window menu option restores the previous view.
- Undock window / Pin window

The Unpin / Pin commands pin or unpin the current window to or from the main GridVis window. Unpinned windows can be moved on the Windows desktop as desired.

- Clone document
- Close all documents

Closes all of the document windows such as the navigation window and the graphic and topology windows.

• Close other documents.

Closes all of the document windows except for the current window.

Documents...

Opens the document window manager used to administer the document windows.

## Help menu

Help menu



- Check for updates
- The software and installed plug-ins are checked for updates.
- Info
- Shows system and software information.

# Windows

#### Window controls in GridVis

Control window		Documents navigation ba	r	Document window contro	I
GridVis-2.2.0-Beta-3-PR	E(2011-05-05_10-03-39)				×
File Edit View Tools Win					
	lo 🗐 🏹 🥖				
: Projects - Gru 🖉 🕺	🔛 Welcome Window 🛛 🕸	GraphDesktop Window[Project]	86		
Project	2				
🕀 🗗 Devices	Save graph settings to file	Cascade	Tile	Stack	
Graph					
Topology					
🕀 间 Reports					
🛄 🐻 Database [Derb					

- Control window
  - Minimise window
  - Close window
  - Fit window into the GridVis template
- Documents navigation bar Menu tab view of all open document windows
- Document window control

Scroll the document tab to the right/left

- List view of all open document windows
- Maximise the document window view
- Restore the previous view of the document window

The current window in the GridVis user interface can be unpinned using the menu item *Window/Unpin window* or by dragging the window to the Windows desktop (unpinning). Unpinned windows can be moved on the Windows desktop as desired. If

active, unpinned windows can be reintegrated in the GridVis user interface using the menu item *Window/Pin window*.

## Welcome window

The Welcome window can be opened under the menu item Window/Welcome and provides support to initial steps when working with GridVis.

• Licence (optional)

Some optional features require a licence. Licences can be imported via the Licence manager.

- Importing licences via the Licence manager
- Creating a project

To be able to work with GridVis, at least one project must be open

- <u>Creating a new project</u>
- Opening an existing project
- Importing a project from an older GridVis
- Adding devices

One or more devices can be added once a project has been opened.

- Creating a new device
- Importing a device list from a CSV file



• If the Welcome window does not appear when starting, it can be opened using the menu item *Window/Welcome*.

#### **Project window**

Display of the open projects incl. the corresponding tree structure.



Devices

List of all devices used in the project. Further devices can be added to the project (<u>Creating a new device</u>) using the menu item *File/New file*. Double-clicking on a subnode opens the *document navigation window* with additional information.

• Jasic Templates

List of all Jasic programs used in the project. New Jasic files can be added to the project by right-clicking.

Jasic templates can be edited by double-clicking on the Jasic file nodes.

Graphs

Selecting graphic document windows opens them. Using the Values Explorer (Values tree window), the measurement values for the active device can be displayed in this window (<u>Adding graphs</u>). Saved views are visible as subnodes in the graphic nodes.

<u>Reports</u>

Quality control and cost reports must be prepared using this node. Saved reports are visible as subnodes and can be controlled using <u>Time plans</u>.

Topology

The graphic representation of devices and measurement values in a project must be created using the node topology. Saved topology pages appear as subnodes (Topology view).

Database

Configuration, administration and optimisation of the connected database.

#### Value tree window (Value Explorer)

Display in a tree structure of possible measurement values for the current device.

By opening a branch, measurement values can be highlighted using the mouse and dragged, for example, to a graph or topology window for visualisation (<u>Adding graphs</u>, <u>Topology view</u>).



### **Overview window**

View of the most important device actions/information, depending on the types of devices/device groups selected in the project window (<u>First steps</u>).

- Adding new device
- Synchronising (loading device measurement values)
- Configuring device
- Displaying device information
- Configuring connection
- Connection test
- Resetting (resetting device values)
- Printing a report

1	GridVis-2.2.0-Beta-3-PRE(2	011-05-05_10-03	-39) [Project]					X
File	Edit View Tools Windo	w Help						
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ee Wind	Project	Download memor	y Configure	e Configure c	onnection Conn	ection test Ar	dd new device	[ Print
alue tr	i → UMG508	Number of device	es: 2					
	⊕- 🛄 UMG511	Device Name	Device Type	Device descrip	Connection	Connection state	Last synced v	Automa
ľ	🕀 🤳 Jasic Templates	Device-1	UMG508		TCPIP Adress:	۲		No timer
	Graph	Device-2	UMG511	Device-2	TCPIP Adress:	۲		No timer
	Reports Database [Derby]							
	· · · · · · · · · · · · · · · · · · ·							

#### **File window**

The file window shows the project-specific file structure in a tree structure.



#### **Favorites window**

Favorites establish links to saved graphs and to Jasic and topology pages. Favorites are selected and managed (right click) in the Favorites window (<u>Add to favorites</u>)

GridVis-2.2.0-Beta-3	3-PRE(2	011-05-05_10-03-39)	
File Edit View Tools	Windo	w Help	
Favorites	∕0 %	GraphDesktop Window[Project] 🛛 🖇	
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#### Palette window

Providing for additional functions (e.g. within the graphic view or in the Jasic programming). The palette functions can be used by selecting a function module and then by "pulling" the icon onto the graphic or Jasic interface.

GridVis-2.2.0-B	eta-3-PRE(2011-05-05_10-	03-39)				
File Edit View T	ools Window Help					
: Project 🐠 🛚	erview Window			; Palette	•	
🖃 🌆 Project	22			🗆 Graph		Pale
🕀 🧬 Devices	Save graph settings to file	Cascade	Tile	🖉 Graph Window		te
🕒 🤳 Jasic Te				Browser window		
				🛞 Phasor Graph		
				Statistics		
Ene				~		
🗄 🛒 Pov						
🔤 🐻 Databa						
۰ III >						

#### Palette windows in the Jasic programming:

File Edit View Tools Window Help         Projects - Gru Image: Single [Template] Image	GridVis-2.2.0-Beta-3-PI	RE(2011-05-05_10-03	-39) [Project]			2	×
Projects - Gru ① ※       Image: Save Transmit to Load from file Save a       Image: Const. (boolean type)         Devices       Graph       Editor       Save Transmit to Load from file Save a       C Const. (boolean type)       E         Image: Save Transmit to Load from file Save a       C Const. (boolean type)       C Const. (numeric)       E         Image: Save Transmit to Load from file Save a       C Const. (string)       Digital input       E         Image: Save Transmit to Load from file Save a       C Const. (String)       Digital input       E         Image: Save Transmit to Load from file Save a       C Const. (String)       Digital input       E         Image: Save Transmit to Load from file Save a       C Const. (String)       Digital input       E         Image: Save Transmit to Load from file Save a       C Const. (String)       Digital input       E         Image: Save Transmit to Load from file Save a       C Const. (String)       Digital input       E         Image: Save Transmit to Load from file Save a       C Const. (String)       Digital input       E         Image: Save Transmit to Load from file Save a       C Const. (String)       Digital input       E         Image: Save Transmit to Load from file Save a       C Timestring       User variable (numeric)       Digital output       E <t< th=""><th>File Edit View Tools Wi</th><th>ndow Help</th><th></th><th></th><th></th><th></th><th></th></t<>	File Edit View Tools Wi	ndow Help					
Project   Bevices   Jasic Templates   Graph   Editor   Save   Transmit to Load from file   Save a   C Const. (boolean type)   C Const. (numeric)   C Const. (string)   Digital input   read modbus   read Profibus   system variable   C Timestring   User variable (boolean)   User variable (numeric)   Out   Digital output   Log   Printing (multiple values)   Recording	: Projects - Gru 🖉 🕸	J single [Template]	86		Palette	] 88	
Image: Content of Content o	Project Devices Jasic Templates Graph Complete Project Jasic Templates Reports Database [Derb	Graph Editor	Save Transmit to Load from file	Save a	In     Const. (boolean type)     Const. (numeric)     Const. (numeric)     Const. (String)     Digital input     read modbus     read Profibus     system variable     C Timestring     User variable (boolean)     User variable (numeric)	- III	Palette
	< +	•			Out     Digital output     Log     Printing (multiple values)     Recording	Ŧ	

Windows

#### **Properties window**

Display of selected object properties (e.g. of the <u>device properties</u>) as a function of the selection made in a project window (e.g. of a device).

Device-2 - Properties					
Device Information		-			
Device Type	UMG511				
Device Name	Device-2				
Device description	Device-2				
This instance is owner of device	Yes				
Device Type					
Device Type	UMG511	Ξ			
Supports EN61000-4-15	Supported				
EN61000-4-15 Class	000-4-15 Class A				
EN61000-4-7 Class	Class 1 👻				
Details					
Device Type UMG511					
Device description	Device-2				
Connection	TCPIP Adress: 192.168.3.190				
Connection state		Ŧ			
Device-2					
	Close				
## **Configuration window**

Device configuration overview, e.g. IP configuration and device name (<u>Navigation</u> <u>window</u>).

• Transfer to device

The set configuration has been transferred to the current device.

- Transfer to devices
- The set configuration has been transferred to several devices.
- Load again

Read the device configuration from the device.

Factory settings

Reset the configuration to standard values.

- Save in file Save the set configuration to a file.
- Load from file

Load the saved configuration file to GridVis.

	🚂 GridVis-2.2.0-Beta-3-PRE(2011-05-05_10-03-39) [Project]						
File	File Edit View Tools Window Help						
š	Projects - Gruppe1 🛛 🕸 🕷	🔁 Configuratio	on[Device-2] %				◀▶ ◄ ₽
S Value tree Window	Projects - Gruppe1           Project       Devices         UMG508       UMG511         Jasic Templates       Graph         Project       Reports         Database [Derby]	Configurations Transmit Identit Transfor Phase may Measuringv. Nominalva Ripple con Event Event reco Transient re Averaging in Recording confi memory confi time Timezo Input Digital out Serial po field bus pr ip configur	on[Device-2] % Transmit to  y mer pping Descr ariants alues ntrol s cording nts cording figuration guration guration s tputs orfiles ation	Reload	Factory default	Save to file	Load from file
		I/O nam Online reco	ning prding				

#### Jasic template

View of the Jasic environment used to program and manage Jasic templates. Jasic is similar to the programming language Basic and is supported by various devices. Programs can be programmed in GridVis in text mode or graphically.

- View of the Graph / Editor
- Graphic or editor-based view of the Jasic environment.
- Save in file
- Saves the current Jasic template
- Transfer to device(s)
- Transfer the current Jasic template to one or more devices.
- Load from file
- Load Jasic template to GridVis.
- Save as

Save the current Jasic template to a file.

Objects in the graphic programming interface can be moved with the mouse and set by double-clicking. Using the palette window, commands, actions and variables can be selected and, using the mouse, integrated in the graphic interface.



# The graph window

Displays measurement values that were retrieved via an online connection or from a database in a graph (<u>Adding graphs</u>). *Save graph settings to a file* saves the created views and lists them as an additional node under *Graphs*.

- The measurement values can derive from different devices.
- No more than two different kinds of measured value types (e.g. current and voltage) can be displayed in a single graph.
- More than one graph can be opened at a time.

#### Graph list

• <u>Zoom</u>

Enlarges a selected area of the graph. Select the area by holding the left mouse button and pulling the mouse from the upper left to the lower right to highlight the area. Shrink a selected area by proceeding as explained above but in reverse (by holding the left mouse button and pulling the mouse from the lower right to the upper left).

Measure

Measures time and amplitude spectrum differences. Using the left mouse button, highlight an area within the graph. This displays the measured amplitude spectrum difference relative to the time difference in the highlighted area.

<u>Centre on zero</u>

Alignment of the amplitude spectrum centre with a centred zero baseline within the graphs.

- Edit the lower axis Sets the visible time interval on the x axis.
- Edit the left axis

Sets the amplitude spectrum display using a minimum and a maximum value.

Edit the right axis

Using two different measurement value types, the view of the right axis can be controlled using a minimum and a maximum value.

• <u>Print</u>

Prints the selected graph window.



Additional settings can be implemented using the displayed graph's legend:

- Select the graph colour using the ..... button in the legend
- Changing advanced graph properties is performed by right-clicking on the name of the graph
  - Change the colour of the graph
  - Show or hide the graph
  - Move the graph into the foreground or into the background
  - Cut and remove the graph from the window
  - Display graphs using different graph types (e.g. line or bar chart)
  - Switch between minimum and maximum display
  - Restore graphs (restart)
  - Graph displaying the time based mean value within the graph window
  - Export the graphed measurement values to a CSV file
  - Filter legend lines

#### **Report overview**

Representation of saved tasks used in the preparation of reports. Reports can be prepared, saved and planned in the project window with the selection of a report group.

• Preparing a report

A report preparation assistant starts after a quality control or cost report is selected in the project window using *Preparing a report*. The report is displayed in a PDF preview window.

Saving a report

A report preparation assistant starts after a quality control or cost report is selected in the project window using *Saving a report*. The task is then saved under any chosen name and appears under the report group in the project window.

Planning a report

Saved report tasks can be automated using a time plan with the *Planning a report* button (<u>Time plans</u>).

Please note: Saved reports can be viewed using the <u>File window</u> in the *Reports* folder.



# **Topology windows**

Representation of topology structures. Added (<u>Adding a topology</u>) and saved topology views appear as additional nodes below *Topology* in the project window.

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# **Functions**

# Add a new device

#### How:

- Menu item *File/New file.*
- With a right-click on a device group in the project window.
- With the selection of a device group in the project window using the *Add a new device* button in the navigation window.

#### Brief description:

• Incorporation of a new device into the current project.

- Select the type of device, listed under the device category, and confirm the selection with *Continue*.
- Configure the connection for the type of device. Depending on the type of connection, the Connection test button can be used to perform a <u>connection test</u>.
- The device appears under the *Devices* node in the project window when the wizard closes.

Mew File				
Steps	Choose File Type			
1. Choose File Type	Project: 🔜 Project 🔹			
2	Categories:       File Types:         Image: Source of the series       UMG96S         UMG103       UMG104         UMG505       UMG505         UMG507       UMG508         UMG510       UMG511         UMG604       UMG605         UMG605       UMG604			
	< Back Next > Finish Cancel Help			

## **Download memory**

How:

- Right-click to select a device in the project window.
- With the selection of a device in the project window using the *Download memory* button in the navigation window.
- With the selection of a device group in the project window and the selection of at least one device in the navigation window using the *Download memory* button.

Brief description:

• Depending on the type of device (device memory), the measurement data is loaded from the device memory to GridVis.

- Select a suitable device in the project window.
- Start the measurement value transmission from the device using the *Download memory* button in the navigation window.
- This starts the transmission. A status bar shows the progress of the transmission. GridVis can still be worked with during the transmission.



# Configuring the device

How:

- Right-click to select a device in the project window.
- Use the *Configure* button in the navigation window to select a device in the project window.

Brief description:

• Different parameters can be changed depending on the type of device.

- Select a suitable device in the project window.
- Start the configuration of the device using the *Configure* button in the navigation window.

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		I/O naming Online recording					

# **Connection test**

How:

- Right-click to select a device in the project window.
- With the selection of a device in the project window using the *Connection test* button in the navigation window.
- With the selection of at least one device in the navigation window.

Brief description:

• Attempts to establish a connection with the selected device

Steps:

- Select a suitable device in the project window.
- Start the device connection test using the *Connection test* button in the navigation window.
- An attempt will be made to establish a connection to the device. A window will inform you whether a connection was established.

#### A list of possible conditions

- No connection to the device could be established (  $\bigotimes$  ).
- A connection to the device has not yet been established (  $\cancel{5}$  ).
- A connection to the device exists (  $\overset{()}{\gg}$  )

La Connection test	×
Device-2	Ø ^
	-

## **Display device information**

#### How:

• With the selection of a device in the project window using the *Show device information* button in the navigation window.

Brief description:

• Display of some device information. Depending on the type of device, display of minimum and maximum values.

- Select a suitable device in the project window.
- Access the device information using the *Show device information* button in the navigation window.

Show device info (Device-2)						
Device information	Min/Max Values					
Value	Value type	Value	Time		Reset Min/Max Values	
Voltage effectiv	Average	218.60V				
Voltage effectiv	Minimum	182.93V	6/4/11 10:48:34			
Voltage effectiv	Maximum Average	233.13V	6/13/11 5:28:01			
Voltage effectiv	Maximum	235.76V	6/19/11 11:25:5			
Voltage effectiv	Average	218.64V				
Voltage effectiv	Minimum	182.96V	6/4/11 10:48:34			
Voltage effectiv	Maximum Average	233.17V	6/13/11 5:28:01			
Voltage effectiv	Maximum	235.81V	6/19/11 11:25:5			
				Ŧ		

# **Configuring a connection**

How:

- With the selection of a device in the project window using the *Configure a connection* button in the navigation window.
- With the selection of a device in the navigation window.

Brief description:

• Make changes to the device connection

- Select a suitable device in the project window.
- Start the device connection using the *Configure a connection* button in the navigation window.
- Select the type of connection and input the remaining parameters as necessary.
- Perform a <u>connection test</u>

Mage Configure conne	ection (Device-2)					
Connection type TCP/IP  UMG511 [TCP/IP]						
Host	192.168.3.190					
time out [millisec.]	5,000 🛒					
	Connection test					
	OK Cancel					

# **Reset values**

How:

- Right-click to select a device in the project window.
- With the selection of a device in the project window using the *Reset values* button in the navigation window.

Brief description:

• Deletes selected measurement values from the memory

- Select a suitable device in the project window.
- Initiate the delete action using the Reset values button in the navigation window.
- Select the values to be deleted and confirm the selection with OK.

Reset values
Select items to reset  reset minima and maxima reset active energy and apparent e reset reactive energy clear historical data on device
OK Cancel

## **Print device report**

#### How:

- With the selection of a device group in the project window and the selection of at least one device in the navigation window using the *Print report* button.
- By pressing the <Ctrl> key or the <Shift> key, the mouse can be used to select more than one device at a time in the navigation window.

Brief description:

• Generates a report for the selected devices with the most important parameters (serial number, firmware version, connection type, address ...).

- Select a device group in the project window (e.g. group by the type of group).
- Select at least one device in the navigation window.
- Generate a report using the *Print report* button.
- Complete the customer/inspector information and confirm the action with OK.
- Select a suitable printer and initiate printing with OK.

<u>.</u>	Print report
Γ	Customer
	Name
	Company
	Location
	Tester
	Name
	Company
	OK Cancel

# **Device properties**

#### How:

- Using the menu item *Windows/Properties* (<u>Properties window</u>).
- With a right-click on a device in the project window under *Properties*.

Brief description:

• Shows the selected device's properties (e.g. type of device and name, class, connection type and status).

- Select a device by right-clicking on it in the project window and select *Properties* in the pop-up menu.
- Or open the properties window and select a device in the project window.

Device Information		
Device Type	UMG511	
Device Name	Device-2	
Device description	Device-2	
This instance is owner of device	Yes	
Device Type		
Device Type	UMG511	Ξ
Supports EN61000-4-15	Supported	
EN61000-4-15 Class	Class A 👻	
EN61000-4-7 Class	Class 1 👻	
⊡ Details		
Device Type	UMG511	
Device description	Device-2	
Connection	TCPIP Adress: 192.168.3.190	
Connection state		Ŧ
Device-2	(	0
	Close	

# Delete a device

How:

- Right-click to select a device in the project window.
- Select a device in the project window and choose the menu item Edit/Delete.

Brief description:

• The selected device is highlighted in the database as deleted.

Steps:

• Select a device by right-clicking on it in the project window and select *Delete device* in the pop-up menu.

# Vector diagram

How:

- By right-clicking on a device in the project window under *Show phasor graph* in the pop-up menu.
- In the Palette window, with selection of the *Graphs* node in the project window.

Brief description:

- Shows the phase angle and the rotary field direction of the selected device in a vector diagram.
- The rotary field usually rotates to the "right".

Steps:

- Select a device in the project window by right-clicking on it and open *Show phasor* graph in the pop-up menu.
- Or select the *Graphs* node in the project window. Open the Palette window (menu item *Windows/Palette*) and drag the *vector diagram* icon into the Graphs window. Drag a device from the project window to the empty vector diagram.

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# Example 1: Predominantly ohmic load

- Current and voltage only have a minor deviation in the phase length.
- The current measuring input is assigned to the correct voltage measuring input.



# Example 2: Predominantly ohmic load

- Current and voltage have a deviation of about 180° in the phase length.
- The current measuring input is assigned to the correct voltage measuring input.
- In the current measurement considered here, the k and I connections are reversed or there is a return feed in mains power supply.



# Configure time setting

How:

- By right-clicking on a device in the project window under *Configure time synchronisation* in the pop-up menu.
- With the selection of a device group in the project window and the selection of at least one device in the navigation window by right clicking on *Configure time synchronisation* in the pop-up menu.
- By pressing the <Ctrl> key or the <Shift> key, the mouse can be used to select more than one device at a time in the navigation window.

Brief description:

• Synchronises the time in the selected device with the time in the PC.

- Select a device group in the project window.
- Select at least one device in the navigation window.
- Right-click on *Configure time synchronisation* in the pop-up menu.
- If a schedule does not yet exist, this can be configured by selecting *Add a schedule* (<u>Schedules</u>).
- Select a schedule and confirm the time setting with OK.

# Configure automatic synchronisation

## How:

- With a device selected in the project window, right click on *Configure automatic synchronisation* in the pop-up menu.
- With a device group selected in the project window and selection of at least one device in the navigation window, right click on *Configure automatic synchronisation* in the pop-up menu.
- By pressing the <Ctrl> key or the <Shift> key, the mouse can be used to select more than one device at a time in the navigation window.

#### Brief description:

• Depending on the type of device (device memory), measurement data is loaded from the device memory to GridVis in accordance with a set schedule.

- Select a device group in the project window.
- Select at least one device in the navigation window.
- Select Configure automatic synchronisation by right-clicking on the pop-up menu.
- If a schedule does not yet exist, this can be configured by selecting Add a schedule (Project properties/Planning/Schedules).
- Select a schedule and confirm the time setting with OK.

# Creating a graph

How:

- By selecting the *Graphs* node in the project window and dragging at least one measurement value from the Value Tree into the graph window.
- Through the selection of at least one measurement value in the Value Tree and by right-clicking on *Show in graph* button in the pop-up window.

Brief description:

• Displays selected current and historic measurement values in a diagram (Adding graphs, graph window).

- Select the *Graphs* node in the project window.
- Using the menu item *Windows/Value Explorer*,open the <u>Value tree window</u>.
- Using the plus sign, open a branch in the Value tree window, continuing until measurement values appear.
- Highlight a subordinate value group (e.g. effective voltage) or at least one measurement value and drag this to the graph window with the mouse button held down.

# Save graph settings to a file

#### How:

• By selecting the *Graph* node in the project window using the *Save graph* settings to a file button in the Graphs window.

## Brief description:

• Saves the currently selected graph with its window position to a file. This can be opened again under the *Graphs* node in the project window. (Adding graphs, Graphs window).

- Create a graph (<u>Creating graphs</u>).
- Select the Save graph settings to a file button, then give the file a configuration name.
- Confirm with *OK*. The saved graph setting appears under the Graphs node in the project window and can be opened directly.

# Zoom in and out of a graph

## How:

• Using the *Zoom* button in the <u>graph window</u>.

Brief description:

• This function enlarges / shrinks a selected section of the graph.

- Create a graph (<u>Creating graphs</u>).
- To enlarge the selected area, select the *Zoom* button and highlight an area by holding down the left mouse button and pulling the mouse from the upper left to the lower right.
- To reset the zoom level, proceed as explained above but pull the mouse from the lower right to the upper left.

# Measuring a graph

## How:

• Using the *Measure* button in the graph window.

Brief description:

• Measurement of the time and amplitude spectrum differences in a graph.

- Create a graph (<u>Creating graphs</u>).
- In order to measure, select the *Measure* button and highlight an area by holding down the left mouse button and pulling the mouse, for example, from the upper left to the lower right.
- This displays the time and amplitude spectrum differences within the highlighted area.
- Select Zoom graph to enlarge the graph, if this is desired.

# Centre graph on zero

How:

• Using the Centre graph on zero button in the graph window.

Brief description:

• Alignment of the amplitude spectrum centre with a determined zero baseline within the graphs.

- Create a graph (<u>Creating graphs</u>).
- Select the Centre graph on zero button to centre on zero.

# **Editing axes**

How:

• Whilst viewing a graph, use the respective button to ... Edit the axis in the graph window.

Brief description:

- Editing the lower axis: Sets the visible time interval on the x axis
- Editing the left axis: Sets the amplitude spectrum display using a minimum and a maximum value.
- Editing the right axis: Sets the right axis using a minimum and a maximum value (only with two different measurement value types).

- Create a graph (<u>Creating graphs</u>).
- Select the corresponding buttons in the graph window to edit the axes.

# Changing graph settings

How:

• By right-clicking on the respective graph legend to show a graph in the <u>graph</u> window.

Brief description:

- This function changes various graph and diagram properties
- and saves graphed values to a CSV file.

Steps:

- Create a graph (<u>Creating graphs</u>).
- Select a graph in the legend and right-click to open the pop-up menu.
- Select one of the following graph functions.

#### **Graph functions**

- Change colour
- Selecting a colour changes the colour of the graph.
- Show or hide graph

This shows or hides the selected graph.

- Move forward / back
- This moves the selected graph into the foreground or background.
- Remove

This cuts and removes the selected graph out of a diagram.

Type of graph

This provides of a selection of graph types (e.g. pie, line, cubic, differential, bar chart).

- Switch between minimum and maximum display
- This switches between the minimum and maximum display.
- Restore graph

This restores the selected graph within the diagram.

Mean value

The selected graph illustrates the mean value (e.g. hourly mean value).

• Export data to a CSV file

This facilitates exporting the graphed values to a CSV file.

Show only lines in which

lines in a legend can be shown or hidden using a certain filter.

# Print graphs

## How:

• Using the *Print* button in the <u>graph window</u>.

## Brief description:

• Prints the graph on a selected printer.

- Create a graph (<u>Creating graphs</u>).
- Select the Print button to print.

# Execute a report

How:

- By selecting the Report node under *Reports* in the project window using the *Execute* button in the <u>Report navigation window</u>.
- With a right-click on a selected report node in the project window.

Brief description:

• Issues a corresponding device report in accordance with the selected report class.

- Select a report class under the Report node in the project window (e.g. *Report in accordance with DIN 50 160*).
- Using the *Execute* button in the report navigation window, open the Create a report wizard.
- Select a device from the devices available.
- Set the relevant voltage and nominal values.
- Select the input and then the desired report time window.
- Identify the customer and the auditor, then close the wizard.
- The created report will be shown in a preview window. Using the buttons in the window bar, the report can for example be printed, saved or reviewed.

# Save report

How:

- By selecting nodes under *Reports* in the project window using the *Save report* button in the <u>Report navigation window</u>.
- With a right-click on a selected report node in the project window.

Brief description:

- Saves the report task displayed under the selected report class in the project window.
- The report task can be started by selecting the report task in the project window using the *Issue a report* button or via a <u>schedule</u>.

- Select a report class under the Report node in the project window (e.g. *Report in accordance with DIN 50 160*).
- Using the *Save report* button in the report navigation window, open the Create a report wizard.
- Select a device from the devices available.
- Set the relevant voltage and nominal values.
- Select the input and then the desired report time window.
- Identify the customer and the auditor, then given the report a name.
- The created report task appears as an additional node under the report class in the project window.

# Plan a report

How:

- By selecting a saved report task (<u>Save report</u>) under Report class in the project window using the *Schedule* button in the Report navigation window.
- With a right-click on a selected report node in the project window.

Brief description:

• Starts a saved report task in accordance with an existing <u>schedule</u>.

- Under the *Reports* node in the project window, select a previously saved report task from (Save report).
- Using the *Schedule* button in the report navigation window, open the schedule selection.
- Select a saved <u>schedule</u> and confirm the selection with OK.
- The report task will be performed in accordance with the schedule and saved.

# Add new topology page

#### How:

• With a right-click to select a *topology* node in the project window.

Brief description:

• Visualisation of a topology structure with devices and measurement values.

- Select the topology node in the project window.
- Select Add new topology page by right-clicking on Topology in the pop-up menu.
- Give the new topology page a name.
- The new topology page then appears as a node under *Topology*.
- Using the devices and values, create a topology (Adding a topology)

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## Configure the database

How:

• Right-click to select the database node in the project window.

Brief description:

• Configuration of the database by providing database type, address, port, username, password and path to the database.

- Select the database node in the project window.
- Select Configure database by right-clicking on database in the pop-up menu.
- Set the parameters for your system and conclude the action with the *Finish* button.

La Database configuration		×
Steps	Database configuration	
1. Database configuration	Type Apache Derby Database	
	Host	
	Port	
	Username	
	Password	
	Database C:\TMP\Temp\Project\db	
	<back next=""> Finish Cancel</back>	lelp

## Optimizing the database

How:

• Right-click to select the database node in the project window.

Brief description:

• Optimizing the database in order to improve its performance for example.

Steps:

- Select the database node in the project window.
- Select Optimize database by right-clicking on database in the pop-up menu.

Please note: Depending on the system and on the database, this process can take several hours to complete and will affect your system.

Marn	ing 💽
<u> </u>	This process can take several hours and can influence system performance negatively. Start optimizing process?
	Yes No

# Managing data

How:

• Right-click to select the database node in the project window.

Brief description:

 Deletes certain data (e.g. devices highlighted for deleting) permanently from the database and by doing so improves its performance by <u>optimising the</u> <u>database</u>.

- Select the database node in the project window.
- Select *Manage data* by right-clicking on database in the pop-up menu.
- Select the data to be deleted and observe the instructions that appear when the *Continue* button is clicked.

Select option		
Steps 1. Select option 2. Select device 3. Overview	<ul> <li>Select option</li> <li>Delete device</li> <li>Delete all values from all devices in given time span</li> <li>Delete all values from given device in given time span</li> <li>Delete all values from given device and value type in given time span</li> </ul>	
< Back Next > Finish Cancel Help		

# Add a new Jasic file

How:

• With a right-click on the Jasic templates node in the project window.

Brief description:

• Enables a start of the Jasic programming environment

Steps:

See <u>Starting Jasic</u>

Input name for new file	×
Name for file single_1	
	OK Cancel
# Export project

How:

• With a right-click on the project in the project window to select it.

Brief description:

• Exports the selected project to a ZIP file.

Steps:

- Select the project node in the project window.
- Select *Export project* by right-clicking on the project in the pop-up menu.
- Select the storage location and finish the action with Save.

# **Graphical programming**

# Jasic templates

The Jasic environment provides the interface for the programming and administration of Jasic templates.

- Jasic is similar to the programming language Basic and can be processed by various devices made by Janitza electronics GmbH.
- Jasic templates are programmed either graphically or with text in GridVis.
- The *Graph* or *Editor* buttons in the <u>Jasic environment</u> are used to switch between the views.

Accessibility:

- Select the node Jasic templates in the project window.
- Right-click on Jasic templates and select Add new Jasic file then select the sub item repeater.jas
- Give the file a name.
- Using the menu item *Window/Palette*, open the <u>Palette window</u>.



#### Graphic programming basics:

- Jasic programs are assembled by "dragging" the Jasic modules from the Palette window to the graphic programming window.
- A connection between the components is made by "dragging" the coloured triangles in the modules to another triangle until these noticeably "click

together". The type of connection (<u>Colour</u>) and the direction in which the connection is made must be taken into account.

- Additional parameters can be set by double-clicking on a module.
- Components can be copied or removed by right-clicking on them. Connecting lines are deleted in this way.
- Brief information appears when the mouse cursor is briefly held on a component.

Establishing a connection

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<tägliches arbeit="" der="" rücksetzen=""></tägliches>	
	<u></u>
	TIT
Brief information	
1	
*	
outTrue	

#### Repeater

The repeater provides the framework for the Jasic program, i.e. once the delay has run its course, the repeater's program code (function modules) is executed and processed again. Program modules external to the repeater are processed only once. Repeaters cannot be interconnected and may only be used once in the program.



# Group

A group identifies a module with which programming can be managed more easily. A group module has only one input and one output.

• Repeaters have two group modules which are processed one after the other.



 Repeaters have two group modules of which only one is processed, as a function of the status of the digital input 1.



#### Variables

Three groups of variables are available for programming: The user variables (global or local), the constants (Boolean, numeric) and the system variables (measurement values).

#### User variables:

User variables are variables which are personally set up and can be maintained locally or globally. A local variable is only retrievable again in the written program and can therefore only be used locally. If a variable has been declared a global variable, it can be retrieved in another program code and can be read out or written using the Modbus register. The auto save function saves the value if a power failure occurs (persistence). User variables can be set up as Boolean variables (digital 1/0) or as numeric variables.

#### Constants:

Constants are fixed values with which it is possible to work in program code. The fixed value can be input by double-clicking (the left mouse button) on the variable box. Here too, variables can be set up as Boolean variables or as numeric values. The exception is the string variable, with which text can be saved.

#### System variables:

System variables are measurement values provided by the device. All measurement data and calculated values, such as consumption, can be retrieved with these variables and can be processed in the program code.



# Repeater processing time

The following processing times (repetitions) can be set by double-clicking on a free area in the repeater module:

- No delay (default setting)
- Measurement interval (200ms)
- Second
- Minute
- Hour
- Day

		Repeater Minute		
Í	🌆 Repeater		×	
	Repeat interval	MeassuringValue None MeassuringValue Second Minute Hour Day		

# **Colour definition**

Colours have the following meanings when used in the graphic programming (e.g. module inputs/outputs):

- red numeric type,
- green Boolean type,
- yellow string type,
- black numeric, Boolean or string type,
- blue program flows.

**Printed Documentation** 

# Log function

The log function can be used for:

- Error searches
- Commissioning programs

Program example: The result at digital input 1 is to be output in a log file.



The log target can be set by double-clicking on the log module and can, for example, be checked in the <u>Debug log</u>.

×
Logdatei 👻
Debugdatei RS232

#### **Debug record**

In debug mode, a Jasic program which has been transferred to the device can record and output debugging information, using the log function for example.

Example:

- Create a program in the graphic Jasic environment using Log function.
- Transfer the program in the Jasic environment using the <u>Transmit to</u> <u>device(s)</u> button.
- Select an active device and an available location in the program and end the action with *Finish*.
- Open the <u>navigation window</u> and select the device in the <u>project window</u>.
- Selecting the program just transferred, under *Jasic information*, loads the program to GridVis and displays it in another program window.



• Activate the *Debug log* button in the program window and start the debugging information by highlighting *Enable debug log*.

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alue tr	Enable debug log	Clear
0	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.0	~
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Debug buttons

- *Clear* : This deletes the contents of the Debug window.
- *Enable debug log*: Highlighting either outputs the debugging information or disables it.

#### Switch on/off delay, pulse generator and slip contact

• Starting scheduled procedures

#### • Switch on delay

A switch in accordance with the set switch on delay occurs once an input event has started - which in turn switches the status. Using Start or End, additional procedures can be initiated when starting or when finishing a switching event. If the input is switched off during the delay (T), the active delay will be deleted.



#### Example: Switch on delay control



#### • Switch off delay

A switch to the Status and Start outputs occurs when an input event starts. Once the input event has finished, the set delay starts and switches the Status and End outputs once the delay has run its course. If the input is switched again during the delay, the active delay will be deleted and started again.



#### Pulse generator

An output switch occurs when an input event starts. Once the pulse time (T1) has run its course, a switch occurs again and the duration set for the length of the interruption (T2) starts. The outputs switch again once the duration set for

the interruption has run its course. The pulse activity continues for as long as there is an input event.



#### • Slip contact

An output switch occurs when an input event starts. If there is an input event, the outputs will be switched again once the duration set for the slip contact has run its course.



# **Example: Deleting work**



Deleting the effective and the apparent consumption meters using the time switch.

The "Reset" function provides the following selections, for example for a UMG604:

- Resetting all effective and apparent consumption meters.
- Resetting all reactive consumption meters.
- Resetting all minimum and maximum values.
- Resetting the measurement period for EMAX.

w reset
▼ reset Wh/VAh
📄 reset VArh
🔲 reset Min/Max
🔲 timer
OK Cancel

## Example: Sending an email with the UMG 604

Sending an email in the event of an undervoltage of less than 200V in the phases L1, L2 or L3.

Recipient's address : martin.musterman@server.de Sender's address: umg604@gmx.de Additional information: Voltage values from the 3 phases at the time of the undervoltage

• Create the Jasic program (see <u>Starting Jasic</u>).

• Required components provided in the Palette window: Repeater, group, system variables, constants (numeric), comparator above the threshold value, Boolean OR links 4xOn, flank trigger sequence control and email outbox.

- Assign the respective voltages to the system variables and assign the constants (200V).
- Establish the connections between the components.
- Open and configure the "Sending an email" function.

🚂 send email		
Comment		
Low voltage		
Email		
Server*	mail.server.de	
Authentification mode*	Login 👻	
User account	login@server.de	
Password	login	
Mail to*	martin.mustermann@server.de	
Mail from*		
Subject	Low voltage in NSPHV3	
Message		
	Add meas.value	
* = required input		
	OK Cancel	

• Using the Adding measurement values button, select the voltages L1, L2 and L3 for the email attachment.

Value selection	×
2	A
🗄 🖓 Voltage	
🗄 🖓 Current	
🗄 🖟 🚺 Frequency	
🖶 🕖 Power	
🖶 🕖 Emax	-
4 n -	
	OK Cancel

• Drag the selected measurement values to the email messages field.

Message	<rep _uln[0]=""><rep _uln[1]=""><rep _uln[2]=""></rep></rep></rep>

• You can now insert further text in the message.

Message	measured voltage U L 1 = <rep _uln[0]=""> V U L 2 = <rep _uln[1]=""> V U L 3 = <rep _uln[2]=""> V</rep></rep></rep>
---------	--

- Using the Transfer to device(s) button, save the program to the UMG 604.
- Using Save in file or Save as, save the program on your computer.
- Please note:

Server: information about your outgoing mail server and the authentication mode is provided by your mail provider or by your system administrator. mail from: The sender's email address. Recipient: The recipient's email address.

# Example: Reading out the Modbus slave

Reading out from a UMG 103 using a UMG 604 with GridVis.



- Create the Jasic program (see <u>Starting Jasic</u>).
  - Required components provided in the Palette window: *Repeater, group, read Modbus* (the "Communication programming element" module is required), user variable (numeric)
- ATTENTION:
  - The "Communication programming element" module is required for the graphic programming of Modbus devices.
  - The module must be licensed.



• Configuring the "read Modbus" function.

#### Modbus function

We use the Modbus function "Read holding registers (fc=3)" to read a value.

- Slave address
- Device address for the slave. In this case, the address for the UMG103.
- Modbus address

Every measurement value has a corresponding Modbus address in the Modbus address list for the UMG103.

• Variables

Give the variable a name and select a format for the variable in accordance with the

Modbus address list.

Expand the variable list accordingly if other required variables follow the selected Modbus address directly.

A new "read Modbus" function has to be added and configured for variables that do not come directly after the following variable addresses.

Attention! The Modbus functions used must be supported by both devices!

🚂 read modbus				<b>X</b>
Protocol type Moo	lbus/RS485			<b></b> ]
Modbus parameter				
Modbus function	Read Holding Registers (fo	:=3)		•
slave address				1
modbus address				1,000 🚔
Variables	N	ame for value	Format of value at modbus-slave	Addustus
	1 10	3_ULN1	Floating Point (32 bit,Big-Endian)	
				Remove value
				OK Cancel

- Configuring the "User variable" function.
  - Variable name

The variable name must start with "\_gbl" if this variable is to be used as a "Global variable".

• Variable type

The variable must be a "Global variable" type, in order to facilitate its access by other programs.

Accessible to Modbus

In the UMG604, the Modbus address range 20000-32000 is reserved for user-defined variables.

We have assigned the variable \_gbl\_ULN1 used in our example to the available address 20000.

The next available address is 20004.

🜆 User variable (i	numeric)
variable name	_gbl_ULN1 Select variable
Variable type	Local variable 🔹
Ínitialization value	0
Autosave	
Options for globa	al variables
Value type Flo	ating point 👻
Usable f	or modbus
Modbus add	ress 20,000 2000032000
Modbus byte	e count 4
Unit/Descrip	tion
	OK Cancel

# **UMG 96S**

# Integrate into the GridVis

# Connection

Connection PC - UMG 96S

Example 1:

The UMG96S has an RS485 interface and the PC has an RS232 interface. An interface converter is required.



# Example 2:

The UMG96S has an M bus interface and the PC has an RS232 interface. An interface converter is required.



Example 3:

The UMG96S has an RS485 interface and the PC has an Ethernet interface. A gateway is required.

The UMG 604/605, the UMG 508 and the UMG 511 can be used as gateways.



**Printed Documentation** 

# Adding a UMG96S

• The UMG96S must be connected to the PC over a gateway (device type) or over an interface converter (<u>Connection example</u>).

Create a new UMG96S in the GridVis and determine the type of connection (<u>First steps</u>, <u>Adding</u> <u>new device</u>).

# **Connection types**

- Ethernet gateway (e.g. for devices connected to the RS485)
  A gateway is required to be able to connect the UMG96S via Ethernet to the PC and to be able to configure it and read it with the GridVis.
  - The UMG96S has an RS485 interface.
  - The gateway must have both an RS485 and an Ethernet interface (e.g. a UMG604 with the appropriate options).
  - The gateway address (e.g. 192.168.1.1) must be set under the connection settings (see Fig. Configuring the connection).
  - Because more than one UMG96S can be connected to the gateway, the device address set in the UMG96S must also be set under the connection settings (see Fig. Configuring the connection).
  - If no connection could be established to the UMG96S, an attempt will be repeated following the set Timeout.
  - When attempting to read data from the UMG96S, the number of attempted connections will be limited by the number set under *Max. no.* of attempts.
  - The connection protocol must be set via the *Modbus protocol*. TCP/IP packets are used when connecting via Modbus TCP. The TCP port 502 is reserved for Modbus TCP.
  - When measuring online, the GridVis will repeatedly attempt to establish a connection to the UMG96S.

Configure conne	ection (Device-3)
Connection type Et UMG96S [Ethernet g	hernet gateway (eg. for devices over RS485) 🔹 👻
Host	192.168.1.1
Port	8,000 🚔
Device address	1
Time out [millisec.]	5,000 🚔
Max. no. retries	3 🚖
modbus protocol Modbus-TCP Modbus-RTU	(Ethernet encapsulated)
	Connection test
	OK Cancel

• Modbus RTU (RS485/RS232)

An interface converter is required to be able to connect the UMG96S to the PC's RS232 interface and to be able to configure it and read it with the GridVis.

- The UMG96S has an RS485 interface.
- An interface converter from RS485 (UMG96S) to RS232 (PC) is required.
- Adapt the PC's RS232 interface (e.g. COM1) to be used as the interface.
- The interface converter is also connected to this interface (e.g. COM1).
- Baud rate; the baud rate is the speed at which the data is to be transmitted between the PC, the interface converter and the UMG96S.
- Because more than one UMG96S can be connected, the device address set in the UMG96S must also be set under the connection settings.
- If no connection could be established to the UMG96S, an attempt will be repeated following the set Timeout.
- When attempting to read data from the UMG96S, the number of attempted connections will be limited by the number set under *Max. no.* of attempts.
- When measuring online, the GridVis will repeatedly attempt to establish a connection to the UMG96S.

#### UMG96S - Available selection for the type of connection

Device	Modbus	Modbus over Ethernet	М
--------	--------	----------------------	---

type/gateway	RTU (RS485)	Modbus TCP	Modbus RTU	bus
UMG604	-	X	x	-
UMG 507	-	-	x	-
UMG510	-	х	-	-
Interface converter RS232/RS485	х	-	-	-
Interface converter RS232/M bus	-	-	-	x

# Configuration

# Identity

- The name is used, among other things, to identify the device in the device list.
- Additional information can be saved under Description.



# Transformer

- Voltage converter
  - The voltage measurement inputs are designed for the measurement of low voltages in which rated voltages (L-N/PE) of up to 300V against earth can occur.
  - Voltage converters are necessary in networks with higher rated voltages.
  - Outer voltage L-L must be input for the primary voltage.
  - Set the transformer requirements for the current measurement inputs.

#### • Transformers

- Currents up to 5A can be measured directly. Observe the installation guide when doing this.
- Transformers are used when measuring currents greater than 5A.
- Set the transformer requirements for the current measurement input.

<u>.</u>	G	irid Vis-2.2.0-Beta-3-PRE	2011-05-05_10-03-39)		
Fi	le	Edit View Tools Wine	ow Help		
3		E Configuration[Device-	] 🕺		
Vind		S S	<b>S</b>	r 🔁	
lee		Transmit Transmit	to Reload Factory d	efault Save to file Load from file	
et		Identity	General		
2 I		Transformer	Primary	Secondary	
8		Nominalvalues	Voltage transformer 400.0	V 🥥 / 400.0 V 🥥	
		Averaging intervals	Current transformer 5.0		
		Recording configuration			
		time			
		inputs/outputs			
		Analogue output			
		Comparators			
		Usplay configuration			
		Online recording			
		online recording			
					22 1 INS
					22   1   IN

# **Nominal values**

- ٠
- The rated frequency applies for all 3 measurement channels. Select the mains frequency in accordance with the existing mains. •

<u></u> (	Grid Vis-2.2.0-Beta-3-PRE	(2011-05-05_10-03-39)	- • ×
File	Edit View Tools Win	dow Help	
š	[ Configuration [Device-	3] 🕺	
Vind	S S	S 🗌 🔚 🛁	
ee	Transmit Transmi	t to Reload Factory default Save to file Load from file	
Le L	Identity	General	
Sal	Transformer	Nominal frequency 50Hz -	
0	Nominalvalues		
	Averaging intervals		
	Recording configuration		
	time		
	inputs/outputs		
	Analogue output		
	Comparators		
	display configuration		
	I/O naming		
	Online recording		
			22   1   INS

# Reporting (messaging) times

- The applied exponential messaging method reaches at least 95% of the measurement value once the reporting time has run its course.
- A reporting time of 15 minutes is set in the factory.

<b>M</b> 0	irid Vis-2.2.0-Beta-3-PRE	(2011-05-05_10-03-3	(9)						
File	File Edit View Tools Window Help								
3	E Configuration[Device-	3] 🕺							
Vinde	5 5	0		<b>F</b>	<b>_</b>				
ee.	Transmit Transmit	t to Reload	Factory default	Save to file	Load from file				
Value ti	Identity Transformer	Avg. interval voltage	15 min.	<b>-</b>	maybe not for this device availab no information about firmware-re	ole elease available			
0	Nominalvalues				Only for firmware-release at leas	t 1.09			
	Averaging intervals	Avg. interval current	15 min.						
	Recording configuration		r						
	time	Avg. interval power	15 min.						
	inputs/outputs								
	Analogue output								
	Comparators								
	display configuration								
	I/O naming								
	Online recording								
L									
						22   1   INS			

#### **Recording configuration**

- The UMG 96S saves the configuration data, the minimum and maximum values and the measurement values for the effective power and for the inductive reactive power to the EEPROM memory. Devices with flash memory (option) can also record mean values for current, voltage and power.
- The reporting times for current, voltage and power can be customised.
- The recording intervals reflect the reporting times for the measurement values for current, voltage and power.
- Mean values also identify the saving time in UTC time as additional information.
- Effective power and inductive reactive power can be saved every 60 minutes.
- A threshold event is recorded when it occurs.
- The maximum saving time cannot be calculated when saving threshold events.

<u></u> (	GridVis-2.2.0-Beta-3-PRE(2011-05-05_10-03-39)								
File	File Edit View Tools Window Help								
≥ E Configuration[Device-3] 8									
Vinde	S S	0		<b></b>	<u>_</u>				
ee	Transmit Transmit	t to Reload	Factory default	Save to file	Load from file				
Le t	Identity	no information if de	evice contains intern	al memory			*		
Val	Transformer	📃 P(L1L3) / Q Si	um / S Sum	🥥 15 min.					
0	Nominalvalues								
	Averaging intervals	📃 I(L1L3) / I sur	m / cos phi sum	🔵 15 min.					
	Recording configuration			-			E		
	time	U(L1-N,L2-N,L3	3-N) / P sum / Q sum	🏉 15 min.		maybe not for this	device availa		
	inputs/outputs					Only for firmware-	release at lea		
	Analogue output								
	Comparators	U(L1-L2,L2-L3,	L3-L1) / P sum / Q su	ım 🥥 15 min.		maybe not for this	device availa		
	display configuration			-		no information abo	out firmware-r		
	I/O naming					Only for firmware-	release at lea		
	Online recording		(reactive energy ind	<b>60</b> min					
		Acuve energy /	reacuve energy ind	. <b>9</b> 60 min.			+		
		•					4		
							22   1   INS		

# Time

- The UMG96S is available with a clock with a battery backup (option).
- The clock is programmed in the factory for local time.
- During configuration, the clock can be aligned to UTC time in the connected PC.

<b>M</b>	GridVis-2.2.0-Beta-3-PRE(2011-05-05_10-03-39)							
File	File Edit View Tools Window Help							
ß	E Configuration[Device-3	3] 🐹						
N	S S	S 🗌 🖬 🄄						
ee	Transmit Transmit	to Reload Factory default Save to file Load from file						
Le Le	Identity	Set time						
Identity    Set time      Transformer    no information about availability of hardware option clock      Averaging intervals    enable time setting (device time will be synchronized with UTC-Time of PC)      Recording configuration    time      time    inputs/outputs      Analogue output    Comparators      display configuration    I/O naming      Online recording    Online recording								
			22   1   INS					

# Inputs / outputs

- The UMG 96S has two connections that can be configured. Various configurations are possible.
  - Connection terminal 11/12
    - Pulse output for reactive power pulse output for the supplied effective power
    - Comparator 1 output comparator 1
    - Analogue output 1 output 1 as an analogue output (option)
    - Profibus remote off 1 Profibus output 1 (option)
    - HT/LT switching for effective power high-rate tariff/low-rate tariff switching for the effective power.
    - HT/LT switching for reactive power high-rate tariff/low-rate tariff switching for the reactive power.
    - HT/LT switching for effective and reactive power high-rate tariff/lowrate tariff switching for the effective and reactive power.
  - Connection terminal 11/13
    - Pulse output for reactive power pulse output for the inductive reactive power
    - Comparator 2 output comparator 2
    - Analogue output 2 output 2 as an analogue output (option)
    - Profibus remote off 2 Profibus output 2 (option)
    - HT/LT switching for effective power high-rate tariff/low-rate tariff switching for the effective power.
    - HT/LT switching for reactive power high-rate tariff/low-rate tariff switching for the reactive power.
    - HT/LT switching for effective and reactive power high-rate tariff/low-rate tariff switching for the effective and reactive power.
- If a connection is used as a pulse output, the pulse value (Wh/pulse) and the minimum pulse width can be programmed.

	GridVis-2.2.0-Beta-3-PRE(2011-05-05_10-03-39)						
File	Edit View Tools Win	dow Help					
3	E Configuration[Device-	3] 🐹					
Vinde	S S	0 🗌 🖬 🖕					
lee	Transmit Transmi	t to Reload Factory default Save to file Load from file					
Let	Identity	PulseOut1	A				
No.	Transformer	pulse valence 1.0 🕜 Wh/pulse					
S	Nominalvalues	- PulceOut7					
	Averaging intervals						
	time	puise valence 1.0 Vam/puise					
	inputs/outputs	All Pulse Out					
	Analogue output	pulse width 5 🖉 🖉 x10 msec.					
	Comparators	Terminal 11/12	E				
	display configuration						
	I/O naming	terminal assignment pulse out active energy 🔹 🗸 🥥					
	Online recording						
		Terminal 11/13					
		terminal assignment pulse out reactive energy					
			-				
			22   1   INS				

# Analogue outputs (option)

• For versions with analogue outputs, the outputs can either be configured as analogue outputs, as pulse outputs or as switching outputs.

	Grid Vis-2.2.0-Beta-3-PR	RE(2011-05-05_10-0	)3-39)				x
File	Edit View Tools Wir	ndow Help					
3	E Configuration[Device	2-3] 🕺				4 >	
Vinde	S 9	3 3		<b>F</b>	<b>_</b>		
ee <	Transmit Transm	nit to Reload	Factory default	Save to file	Load from file		
ue tr	Identity	maybe not for this	device available				-
Val	Transformer	no information abo	ut availability of analo	gue outputs			
0	Nominalvalues	- Analogue output	1				
	Averaging intervals						
	Recording configuration	enable outp	ut 🥥				
	inputs/outputs	Assigned value	Notset			Select value	
	Analogue output					- 0	
	Comparators						
	display configuration	starting value	0.0				
	I/O naming	end value	100.0			۲	
	Online recording	output range	4 - 20 mA			-	Ξ
		Analogue output	2				
		enable outp	ut 🥥				
		Assigned value	Notset			Select value	
		starting value	0.0			۲	
		end value	100.0			۲	
		output range	4 - 20 mA			~ 🖉	-
						22   1	INS

# Comparator

- 2 comparator groups, each with 3 comparators (A,B,C), are provided for the monitoring of threshold values.
- The results of the comparators can be AND or OR linked and the result inverted if desired.
- The overall linked result for the comparator group 1 can be allocated to the digital output 1 and the overall linked result for the comparator group 2 can be allocated to the digital output 2.

	Grid Vis-2.2.0-Beta-3-PRE	(2011-05-05_10-03-39	)		_ <b>D</b> _ X
File	Edit View Tools Wind	low Help			
3	Configuration[Device-3	3] 88			
inde		0			
ee	Transmit Transmit	to Reload I	actory default Save to file Lo	oad from file	
le tr	Identity				
Valt	Transformer	select comparator	nparator group 1		
0	Nominalvalues	Comparator A			
	Averaging intervals	Comparator A	[		
	Recording configuration	mode	not used		
	time	Assigned value	Not set	(a)	select value
	Inputs/outputs				- 0
	Comparators	threshold	0.0		
	display configuration	lead time	1		sec
	I/O naming	minimal activity time	1		595
	Online recording	minimal activity time	1		Bec
		Comparator B			
		mode	not used		
		Assigned value	Not set		select value
					-
		threshold	0.0		
		lead time	1		sec
		minimal activity time	1		sec
		Comparator C			
		mode	not used		<b>-</b>
		Assigned value	Not set		select value
					- 0
		threshold	0.0		۲
		lead time	1		sec
		minimal activity time	1		sec
		result			
		result operation	2		- 0
		invert result			0
					22   1   TNE
					22 1 1115

# **Display configuration**

- Following a power resumption, the UMG96S displays the first measurement value table in the current display profile.
- To keep the selection to a manageable size, only a fraction of the available measurement values was preprogrammed in the factory for retrieval in the measurement value display.
- Select another display profile if the display of other measurement values in the UMG96S is desired.
- 3 fixed and prepopulated display profiles and a customer specific display profile are available for selection.
  - Profile 1, fixed prepopulated
  - Profile 2, fixed prepopulated
  - Profile 3, fixed prepopulated
  - User defined


#### Inputting online

- Changing the report times for the online inputting of the measurement values.
- Drag the desired measurement value from the <u>Value tree window</u> to the online inputting configuration window.
- Set the desired report times.



# **Connection examples**

# **Connection example: Measuring**

• Measuring an isolating transformer with centre tap.



# Modbus

# **Modbus functions**

- Modbus functions supported by the UMG96S: •
  - 03 Read holding registers06 Preset single register

  - 16 Preset multiple registers

# UMG 103

# Integrate into the GridVis

# Connection

Connection PC - UMG 103

Example 1:

The UMG103 has an RS485 interface and the PC has an RS232 interface. An interface converter is required.



Example 2:

The UMG103 has an RS485 interface and the PC has an Ethernet interface. A gateway is required. The following devices can be used as gateways: UMG 604, UMG 605, UMG 511, UMG 510, UMG 508 and UMG 507



# Adding a UMG103

The UMG103 must be connected to the PC via a gateway (device type) or over an interface converter (<u>Connection example</u>).

• Create a new UMG103 in GridVis and determine the type of connection (<u>First steps</u>, <u>Adding new device</u>).

### **Connection types**

- Ethernet gateway (e.g. for devices connected to the RS485)
   A gateway is required in order to connect the UMG103 via Ethernet to the PC and to configure it and read it with the GridVis.
  - The UMG103 has an RS485 interface.
  - The gateway must have both an RS485 and an Ethernet interface (e.g. a UMG604 with the appropriate options).
  - The gateway address (e.g. 192.168.1.1) must be set under the connection settings (see Fig. Configuring the connection).
  - Because more than one UMG103 can be connected to the gateway, the device address set in the UMG103 must also be set under the connection settings (see Fig. *Configuring the connection*).
  - If no connection could be established to the UMG103, an attempt will be repeated following the set Timeout.
  - When attempting to read data from the UMG103, the number of attempted connections will be limited by the number set under *Max. no.* of attempts.
  - The connection protocol must be set via the *Modbus protocol*. TCP/IP packets are used when connecting via Modbus TCP. The TCP port 502 is reserved for Modbus TCP.
  - With online measurements, GridVis will repeatedly attempt to establish a connection to the UMG103.

Configure connection (Device-3)					
Connection type Et	hernet gateway (eg. for devices over RS485) 🛛 👻				
UMG96S [Ethernet g	ateway (eg. for devices over RS485)]				
Host	192.168.1.1				
Port	8,000 🚔				
Device address	1				
Time out [millisec.]	5,000 🚔				
Max. no. retries	3 🚖				
modbus protocol Modbus-TCP Modbus-RTU (	Ethernet encapsulated)				
	OK Cancel				

• Modbus RTU (RS485/RS232)

An interface converter is required in order to connect the UMG103 to the PC's RS232 interface and to configure it and read it with GridVis.

- The UMG103 has an RS485 interface.
- An interface converter from RS485 (UMG103) to RS232 (PC) is required.
- Set the PC's RS232 interface (e.g. COM1) to be used as the interface.
- Also connect the interface converter to this interface (e.g. COM1).
- Baud rate: Is the speed at which the data is to be transmitted between the PC, the interface converter and the UMG103.
- Because more than one UMG103 can be connected to the interface converter, the device address set in the UMG103 must also be set under the connection settings.
- If no connection could be established to the UMG103, an attempt will be repeated following the set Timeout.
- When attempting to read data from the UMG103, the number of attempted connections will be limited by the number set under *Max. no.* of attempts.
- With online measurements, GridVis will repeatedly attempt to establish a connection to the UMG103.

# Configuration

# Identity

- The name is used, among other things, to identify the device in the device list.
- Additional information can be saved under Description.

GridVis-2.2.0-Bet	GridVis-2.2.0-Beta-3-PRE(2011-05-05_10-03-39)						x
File Edit View Too	ls Window	Help					
Configuration[Dev	ice-4] 🕺					4	
6	6	0		12			
Transmit Tran	nsmit to	Reload	Factory default	Save to file	Load from file		
Identity	Namo	Doutico 4					
Transformer	Name	Device-4					
Phase mapping	Description						
Nominalvalues							
Averaging intervals							
Comparators							
Serial ports							
I/O naming							
Online recording							
						22   1	INS

## Transformers

- Voltage converter
  - The voltage measurement inputs are designed for the measurement of low voltages, in which rated voltages (L-NPE) of up to 300V against earth can occur. Voltage converters are necessary in networks with higher rated voltages.
  - The outer conductor voltage L-L must be input for the primary voltage.
  - Set the converter requirements for the current measurement inputs.

#### • Current converter

- Currents up to 5A can be measured directly. Observe the installation guide when doing this.
- Converters are used when measuring currents greater than 5A.
- Set the current converter requirements for the current measurement input.

GridVis-2.2.	🚂 GridVis-2.2.0-Beta-3-PRE(2011-05-05_10-03-39) [Project]							
File Edit View	Tools Windo	w Help						
🗧 Configuratio	n[Device-4] 🛛 🕅	]					• •	
<b>S</b>	<b>S</b>	0			<b>_</b>			
Transmit	Transmit to	Reload	Factory default	Save to file	Load from file			
Identity	General							
Transforme	r		Primary	Secondary				
Phase mappi	ng Voltage	e transformer	400.0 V 🥥	/ 400.0	v 🥥			
Nominalvalue	es							
Averaging inter	rvals Curren	it transformer	5.0 A 😈	5.0	~ 🖌			
Comparator	S							
Serial ports	3							
I/O naming	1							
Online record	ing							
							22.1.1	TNIC
							22 1	INS

# Phase assignment

• The phase wiring and the electricity consumer wiring can be redefined by the phase assignments.

GridVis-2.2.0-Beta-3-PRE(2011-05-05_10-03-39) [Project]							
File Edit View Too	File Edit View Tools Window Help						
E Configuration[Dev	/ice-4] 🕺						
<b>S</b>	S 0		1	<b>_</b>			
Transmit Tran	nsmit to Reloa	ad Factory default	Save to file	Load from file			
Identity	Voltage						
Transformer							
Phase mapping	Should state	Is state					
Nominalvalues	11	L1					
Averaging intervals	L2	L2			<b>↓</b>		
Comparators	L3	L3			- @		
Serial ports							
I/O naming							
Online recording	Current						
	concin						
	Should state	Is state					
	11	L1					
		Change s1(k) and s	2(l)				
	L2	L2			- O		
		Change s1(k) and s	2(l)		<b>@</b>		
	L3	L3					
		Change s1(k) and s	2(l)				
·					22   1   INS		

# **Nominal values**

- The rated frequency applies for all 3 measurement channels.
- Select the mains frequency in accordance with the existing mains.

🛄 GridVis-2.2.0-B	GridVis-2.2.0-Beta-3-PRE(2011-05-05_10-03-39) [Project]							x	
File Edit View To	ools Windov	v Help							
Configuration[D	evice-4] 🛛							4 ▶	- 0
1	5	0		<b>1</b>	<b>_</b>				
Transmit Tr	ansmit to	Reload	Factory default	Save to file	Load from file				
Identity	General								
Transformer	Nomi	nal frequency	50Hz	<b>-</b>					
Phase mapping									
Nominalvalues	_								
Averaging interval	s								
Comparators	_								
Serial ports	_								
I/O naming	_								
Online recording	-								
								22   1	INS

# Reporting (messaging) times

- The applied exponential messaging method reaches at least 95% of the measurement value once the reporting time has run its course.
- A reporting time of 15 minutes is set in the factory.

GridVis-2.2.0-Bet	GridVis-2.2.0-Beta-3-PRE(2011-05-05_10-03-39) [Project]						
File Edit View Too	ols Window Help						
Configuration[Dev	vice-4] 🕺						
<b>S</b>	S 0			<b>_</b>			
Transmit Tran	nsmit to Reloa	d Factory default	Save to file	Load from file			
Identity	Avg. interval voltage	15 min.			_ @		
Transformer							
Phase mapping	Avg. interval current	15 min.					
Nominalvalues	Aug. interval neuron	1E min					
Averaging intervals	Avg. Interval power	15 min.			<b>_</b> _		
Comparators							
Serial ports							
I/O naming							
Online recording	-						
	L						
					22   1   INS		

### Comparator

- 2 comparator groups, each with 3 comparators (A,B,C), are provided for the monitoring of threshold values.
- The results of the comparators can be AND or OR linked and the result inverted if desired.
- The overall linked result for the comparator group 1 can be allocated to the digital output 1 and the overall linked result for the comparator group 2 can be allocated to the digital output 2.

GridVis-2.2.0-Beta-3-PR	E(2011-05-05_1	0-03-39) [Project]				x	
File Edit View Tools Win	dow Help						
E Configuration[Device-4] 🗱							
8 8	0			<b>_</b>			
Transmit Transmit to	Reload	Factory default Sav	ve to file Lo	oad from file			
Identity	comparator Co	mparator group 1			•		
Transformer							
Phase mapping Com	parator A						
Averaging intervals mod	e	not used					
Comparators Assi	gned value	Not set			select value		
Serial ports							
I/O naming	shold						
Online recording	Shou	0.0					
leau	ume				sec		
minir	nal activity time	1			sec		
Com	parator B						
mod	e	not used					
Assi	gned value	Not set			Select value		
					- 0		
thre	shold	0.0					
lead	time	1			sec	E	
minir	mal activity time	1			sec		
Com	narator C	L					
mod	-	potused					
Assi	gned value	Not set			Select value		
thre	shold	0.0					
lead	time	1			sec		
minir	mal activity time	1			sec		
resu	lt						
	di ana di ana						
res	uit operation O	×				·	
	invert result				0		
						-	
					22   1	TNS	
					22 1	END -	

#### Serial outputs

An interface converter is required in order to establish a direct connection between the PC (RS232 interface) and the UMG103 (RS485 interface). The UMG103 can only function as a Modbus slave. Because more than one UMG103 can be connected to an interface converter, each UMG103 must be set with its own <u>device address</u>. Note that the device address 0 is reserved for servicing. Two rotary switches on the device are used to set the device address.

- RS485 in the Modus Modbus slave,
- baud rate selection from 9600bps, 19200bps, 38400bps, 115200bps and auto detect. The baud rate is the speed at which the data is to be transmitted between the PC, the interface converter and the UMG604. The UMG103 is set in the factory to the automatic baud rate recognition feature, "auto detect".

If a fixed baud rate is selected in the UMG103, it must also be programmed in the remote station (PC, UMG604). The auto detect setting in the UMG103 attempts to establish the baud rate in the remote station with a maximum of 8 attempts.

GridVis-2.2.0-Be	GridVis-2.2.0-Beta-3-PRE(2011-05-05_10-03-39) [Project]							
File Edit View To	ols Windov	v Help						
🔁 Configuration[De	vice-4] 🛛							J
S	<b>S</b>	0		<b>E</b>	<b>_</b>			
Transmit Tra	insmit to	Reload	Factory default	Save to file	Load from file			
Identity	RS485							
Transformer	Mode	Modbus-Slave						
Phase mapping	Developmenter							
Nominalvalues	baudrate	Autodetect						
Averaging intervals								4
Comparators								
Serial ports								
I/O naming								
Online recording								
								╝
							22   1   IN	IS

### Inputting online

- Changing the report times for the online inputting of the measurement values.
- Drag the desired measurement value from the <u>Value tree window</u> to the online inputting configuration window.
- Set the desired report times.



#### Setting the device address

- Two rotary switches on the device are used to set the device address from 1 to 99.
- When using more than one UMG103, for example with an interface converter, each device must be set with its own address.



# Modbus

# **Modbus functions**

- Modbus functions supported by the UMG103: •
  - 03 Read holding registers 04 Read input registers •
  - •
  - 06 Preset single register
  - 16 Preset multiple registers

# UMG 104

# Integrate into the GridVis

# Connection

Connection PC - UMG 104

Example 1:

The UMG104 and the PC each have an RS232 interface.



Example 2:

The UMG104 has an RS485 interface and the PC has an Ethernet interface. A gateway is required. The following devices can be used as gateways: UMG 604, UMG 605, UMG 511, UMG 510 and UMG 508



### Example 3:

The UMG104 has an RS485 interface and the PC has an Ethernet interface. A gateway is required. The following devices can be used as gateways: UMG 604, UMG 605, UMG 511, UMG 510 and UMG 508



# Adding a UMG104

Create a new UMG104 in the GridVis and determine the appropriate type of connection for your device (<u>First steps</u>, <u>Adding new device</u>).

### **Connection types**

Ethernet gateway (e.g. for devices connected to the RS485)

A gateway is required to be able to connect the UMG104 via Ethernet to the PC and to be able to configure it and read it with the GridVis.

- The UMG104 has an RS485 interface.
- The gateway must have both an RS485 and an Ethernet interface (e.g. a UMG604 with the appropriate options).
- The gateway address (e.g. 192.168.1.1) must be set under the connection settings (see Fig. Configuring the connection).
- Because more than one UMG104 can be connected to the gateway, the device address set in the UMG103 must also be set under the connection settings (see Fig. *Configuring the connection*).
- If no connection could be established to the UMG104, an attempt will be repeated following the set Timeout.
- When attempting to read data from the UMG104, the number of attempted connections will be limited by the number set under *Max. no.* of attempts.
- The connection protocol must be set via the *Modbus protocol*. TCP/IP packets are used when connecting via Modbus TCP. The TCP port 502 is reserved for Modbus TCP.
- When measuring online, the GridVis will repeatedly attempt to establish a connection to the UMG103.

Configure connection (Device-3)						
Connection type Et	Connection type Ethernet gateway (eg. for devices over RS485)					
UMG96S [Ethernet g	ateway (eg. for devices over RS485)]					
Host	192.168.1.1					
Port	8,000					
Device address	1					
Time out [millisec.]	5,000 🔦					
Max. no. retries	3					
modbus protocol Modbus-TCP Modbus-RTU (	Ethernet encapsulated)					
	OK Cancel					

#### • Modbus RTU (RS485/RS232)

Using an RS485 connection, a direct connection can be established over an interface converter between the UMG104 and the PC's RS232 interface (<u>Connection</u>).

#### RS232-RS232 connection

- The UMG104 has an RS232 interface.
- Adapt the PC's RS232 interface (e.g. COM1) to be used as the interface.
- Baud rate: the baud rate is the speed at which the data is to be transmitted between the PC, the interface converter and the UMG104.
- Device address: set the set UMG104 device address.
- If no connection could be established to the UMG104, an attempt will be repeated following the set Timeout.
- When attempting to read data from the UMG104, the number of attempted connections will be limited by the number set under *Max. no.* of attempts.
- When measuring online, the GridVis will repeatedly attempt to establish a connection to the UMG104.

#### RS232-RS485 connection

- The UMG103 has an RS485 interface.
- An interface converter from RS485 (UMG104) to RS232 (PC) is required.
- Adapt the PC's RS232 interface (e.g. COM1) to be used as the interface.
- The interface converter is also connected to this interface (e.g. COM1).
- Baud rate: the baud rate is the speed at which the data is to be transmitted between the PC, the interface converter and the UMG96S.

- Because more than one UMG104 can be connected to the interface converter, the device address set in the UMG104 must also be set under the connection settings.
- If no connection could be established to the UMG104, an attempt will be repeated following the set Timeout.
- When attempting to read data from the UMG104, the number of attempted connections will be limited by the number set under *Max. no.* of attempts.
- When measuring online, the GridVis will repeatedly attempt to establish a connection to the UMG104.

# Configuration

# Identity

- The name is used, among other things, to identify the device in the device list.
- Additional information can be saved under Description.

GridVis-2.2.0-Beta-3-I	📓 GridVis-2.2.0-Beta-3-PRE(2011-05-05_10-03-39)						
File Edit View Tools V	File Edit View Tools Window Help						
E Configuration[Device-5	] 88						
6 6			12 m				
Transmit Transmit	to Re	oad Factory default S	Save to file	Load from file			
Identity							
Transformer	Name	UMG104					•
Phase mapping	Description	UMG104					●
Measuringvariants							
Nominalvalues							
Averaging intervals							
Recording configuration							
time							
Timezone							
Inputs							
Digital outputs							
Comparators							
Serial ports							
field bus profiles							
I/O naming							
Online recording							
						22   1	INS

### Transformer

- Voltage converter
  - The UMG104's voltage measurement inputs are designed for the measurement of low voltages in which rated voltages (L-N/PE) of up to 300V against earth can occur.
  - Voltage converters are necessary in networks with higher rated voltages.
  - The converter requirements for each voltage input must be determined separately.
- Transformers
  - Currents up to 5A can be measured directly. Observe the installation guide when doing this.
  - Transformers are used when measuring currents greater than 5A.
  - The transformer requirements for each current measurement input must be determined separately.

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File Edit View Tools \	Window Help			
E Configuration[Device-	5] 88			
S S	0		<b>E</b> 🔊	
Transmit Transmit	to Reload F	Factory default	Save to file Load from file	
Identity	L1			
Transformer		Primary	Secondary	
Phase mapping	Voltage transformer	400.0 V	🕘 / 400.0 V 🕥	
Measuringvariants	Current transformer	50 A	A A	
Nominalvalues	current a anatomici	5.0	· /	
Averaging intervals	L2			
time		Primary	Secondary	
Timezone	Voltage transformer	400.0 V	🥥 / 400.0 V 🥥	
Inputs	Current transformer	5.0 A	🕥 / 5.0 A 🕥	
Digital outputs				
Comparators	L3			
Serial ports		Primary	Secondary	
field bus profiles	Voltage transformer	400.0 V	🕘 / 400.0 V 🕘	
I/O naming	Current transformer	5.0 A	🕘 / 5.0 A 🕘	
Unline recording				
	L4			
		Primary	Secondary	
	Voltage transformer	400.0 V	400.0 V	
	Current transformer	5.0 A	🥥 / 5.0 A 🥥	
				22   1   INS

# Phase assignment

• The phase wiring and the electricity consumer wiring can be redefined by the phase assignments.

GridVis-2.2.0-Beta-3-	PRE(2011-05-05_10	)-03-39) [Project]						
File Edit View Tools V	ile Edit View Tools Window Help							
E Configuration[Device-5	5] 🕺							
S S	0	📃 🖬 🔄						
Transmit Transmit	to Reload	Factory default Save to file Load from file						
Identity	Voltage							
Transformer	-							
Phase mapping	Should state	Is state						
Measuringvariants	11	L1						
Nominalvalues	L2	L2						
Averaging intervals	13	12						
Recording configuration	13							
time	L4	L4						
Timezone								
Inputs								
Digital outputs	Current							
Comparators								
Serial ports	Should state	Is state						
field bus profiles	L1							
I/O naming		Change s1(k) and s2(l)	9					
Online recording	L2	L2						
		Change s1(k) and s2(l)	0					
	L3	L3	- 0					
		Change s1(k) and s2(l)	ă					
	14	14						
	24	Change s1(k) and s2(l)						
			•					
			22   1   TNS					
			22 1 1105					

# **Connection variants**

• Set the device's connection variant for the voltage and current measurements (operating manual).

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File Edit View Tools \	Window Help					
E Configuration[Device-S	5] 🕺					- 0
S S	0			<b>_</b>		
Transmit Transmit	to Reload	Factory default	Save to file	Load from file		
Identity		r				
Transformer	Voltagemeasuring	Four wire			•	
Phase mapping	Currentmoneuring	Three wire			 	
Measuringvariants	Currentmeasuring	Three wire			•	
Nominalvalues						
Averaging intervals						
Recording configuration						
time						
Timezone						
Inputs						
Digital outputs						
Comparators						
Serial ports						
Teld bus profiles						
1/O naming						
Online recording						
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#### **Nominal values**

- All 4 of the measurement channels are addressed via the rated frequency. Select the mains frequency in accordance with the existing mains.
- Nominal values are required as a reference to identify events (over/undervoltage and overcurrent).
- The rated current of the transformer at the supply is required in order to calculate the K factor.

GridVis-2.2.0-Beta-3	PRE(2011-05-05_10-03-39) [Projec	t]	
File Edit View Tools	Window Help		
E Configuration[Device-	5] 🕺		
S S	0	E 🔄	
Transmit Transmi	to Reload Factory defau	It Save to file Load from file	
Identity	General		
Transformer	Nominal frequency Auto	· · · ·	
Phase mapping			
Measuringvariants	-11		
Nominalvalues	Nominal voltage	230.0 V 🥥	
Averaging intervals	Nominal current	5.0 A 🥥	
time	Nominal current for K-factor	5.0 A 🥥	
Timezone	L2		
Inputs	Nominal voltage	230.0 V 🦱	
Digital outputs	Naminal a mant		
Comparators	Nominal current	5.0 A 🖉	
Serial ports	Nominal current for K-factor	5.0 A 🏈	
field bus profiles	L3		
I/O naming Online recording	Nominal voltage	230.0 V 🥥	
	Nominal current	5.0 A 🥥	
	Nominal current for K-factor	5.0 A 🕥	
	L4		
	Nominal voltage	230.0 V 🥥	
	Nominal current	5.0 A 🎱	
	Nominal current for K-factor	50	
	Nominal current for K 1600	5.0 h V	
			22   1   INS

#### **Recording configuration**

- Up to 16 records can be configured when configuring recording.
- A record can have a maximum of 1000 values.
- A record holds a measurement value or the mean value of the measurement value.
- Mean value records can also include the minimum and the maximum values.
- Mean values, minimum values and maximum values are derived from the measurement values in the measurement timeframe.
- The mean value measurement timeframe is established by the time set under "Time basis".
- Measurement values are saved once the time set under "Time basis" has run its course (<u>Calculation of required storage capacity</u>).

GridVis-2.2.0-Beta-3-	PRE(2011-05-05_10-03-39) [Project]	
File Edit View Tools V	Vindow Help	
Configuration[Device-5	] 🐹	
S S	o 📃 🖬 📦	
Transmit Transmit	to Reload Factory default Save to file Load from f	île
Identity Transformer	Voltage effective L1 Recording type ValuesOverTime	New
Phase mapping	Timebase IUm	Edit
Measuringvariants	Number recorded values 1	
Nominalvalues		Delete
Averaging intervais		Preset recordings
time		EN50160
Timezone		EN61000.2.4
Inputs		LIN01000-2-4
Digital outputs		
Comparators		
Serial ports		
field bus profiles		
I/O naming		
Unline recording		
		22   1   INS

### Setting up / editing a recording configuration

- An individual recording instance can be set up using the New or Edit buttons.
- Measurement values are selected in the recording window using the *Add values* button.
- To do so drag the desired measurement value (measurement value group) over the value field. This saves and displays the measurement values.
- Using the Delete values button, selected measurement values can be deleted.

Values types     Voltage effective L1   Voltage effective L2     Minimum   Maximum   Maximum   Maximum   Maximum   Maximum   Samples   Timebase   10   11   12   13   14   12   13	
L3+2     L1+3     Sum L1+3     Sum L1+3     Frequency     Add values     OK Cancel     OK Cancel	

# Time

- The UMG104 has a clock with a battery backup.
- The fault in the clock's quartz is aligned to room temperature during production so that the clock only deviates by +- 1 minute/month.
- The clock is programmed in the factory for local time.
- During configuration, the clock can be aligned to UTC time in the connected PC.

🌆 GridVis-2.2.0-Beta-3-	PRE(2011-05-05_10-03-39) [Project]
File Edit View Tools	Window Help
E Configuration[Device-	5] 🐹
S S	S 🗌 🖬 🔄
Transmit Transmit	to Reload Factory default Save to file Load from file
Identity Transformer Phase mapping Measuringvariants	Set time Attention! This option should only be activated in case there is no external time synchronisation (e.g. NTP) a means in the setting (device time will be synchronized with UTC-Time of PC)
Averaging intervals	current time difference against UTC(PC) 0 seconds
Recording configuration	
time	
Timezone	
Inputs	
Digital outputs	
Comparators	
Serial ports	
field bus profiles	
I/O naming	
Online recording	
	< III >>
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### Time zone

All time information with regard to measurement values, events and transients are made relative to UTC time (Coordinated Universal Time). The GridVis converts UTC time to Central European Time (CET) when it displays measurement results. Central European Time (CET) is the applicable time zone in central Europe and therefore also in Germany.

- Winter time time offset from Central European Winter Time relative to UTC time.
- Summer time time offset from Central European Summer Time relative to UTC time.
- Start of daylight savings time start of daylight savings time.
- End of daylight savings time end of daylight savings time.

GridVis-2.2.0-Beta-3-	PRE(2011-05-05_10-0	3-39) [Project]						-	x
File Edit View Tools V	Window Help								
Configuration[Device-5	5] 88							< > ·	- 0
6 6				2	5				
Transmit Transmit	to Reload I	actory default	Save	■ to file Load	from t	file			
Identity Transformer		Time offset							
Phase mapping	Standard time	3600 se	c						
Measuringvariants	Daylight saving	7200 se	ec 🕘						
Nominalvalues		Month	F	Earliest day of n	nonth	Day of week		Hour	
Averaging intervals						la i		-	
Recording configuration	Start day light saving	March		25	•	Sunday	- 🥥	2	
time	End day light saving	October	- 🥥	25	۲	Sunday	-	3	
Timezone									
Inputs									
Digital outputs									
Comparators									
Serial ports									
field bus profiles									
I/O naming									
Online recording									
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								22   1	INS

### Inputs

The UMG104 has two digital outputs and an input used to measure temperature. Both digital inputs can be used as digital inputs and as input pulse meters.

A pulse value can be assigned to every pulse input.

Various temperature sensors can be connected to the input used to measure temperature:

- PT100 temperature range -55°C .. +175°C
- PT1000 temperature range -40°C .. +300°C
- KTY83 temperature range -99°C .. +500°C
- KTY84 temperature range -99°C .. +500°C

GridVis-2.2.0-Beta-3-	-PRE(2011-05-05_10-03-39) [Project]	_ 🗆 X
File Edit View Tools	Window Help	
E Configuration[Device-	5] 🕿	
S S	o 🗌 🖬 🚽	
Transmit Transmit	t to Reload Factory default Save to file Load from file	
Identity		A
Transformer	External temperature 1	<b></b>
Phase mapping	External temperature 1	
Measuringvariants	Temperature measurement PT100	
Nominalvalues	renperature measurement. Pri 100	
Averaging intervals		
Recording configuration		
time		E
Timezone		
Inputs		
Digital outputs		
Comparators		
Serial ports		
field bus profiles		
I/O naming		
Online recording		
		<b>•</b>
		22   1   INS

# **Digital outputs**

The UMG104 has two digital outputs. Both of these digital outputs can be programmed as a pulse output (S0 output) or as a comparator group output.

• Each digital output can be programmed as a NC or NO contact.

GridVis-2.2.0-Beta-3-	PRE(2011-05-05	_10-03-39) [Project]				x
File Edit View Tools \	Window Help					
Configuration[Device-5	5] 88					
6 6	0		<b>F</b>	<b>_</b>		
Transmit Transmit	to Reload	d Factory default	Save to file	Load from file		
Identity	S0-outputs					
Transformer	_					
Phase mapping	Pulse width 5	0			milli seconds 🥥	
Measuringvariants						
Nominalvalues	Dia Output 1				_	
Averaging intervals	big.output I				•	
Recording configuration	Dig.Output 1					-
time	Output polarity	current flow if active (	NOC)			=
Timezone	Type of output	Notused				
Inputs		Notused			<b>v</b>	
Digital outputs						
Comparators						
Serial ports						
field bus profiles						
I/O naming						
Online recording						
						Ŧ
					22   1	INS

#### Comparator

- 2 comparator groups, each with 4 comparators (A,B,C,D), are provided for the monitoring of threshold values.
- The results of the comparators can be AND or OR linked and the result inverted if desired.
- The overall linked result for the comparator group 1 can be allocated to the digital output 1 and the overall linked result for the comparator group 2 can be allocated to the digital output 2.

GridVis-2.2.0-Beta-3-F	PRE(2011-05-05_1	0-03-39) [Project]	
File Edit View Tools W	Vindow Help		
Configuration[Device-5	] 26		
8 8	0		
Transmit Transmit	to Reload	Factory default Save to file Load from file	
Identity	select comparator	Comparator group 1	
Transformer			
Phase mapping Measuringvariants	Comparator A		
Nominalvalues	mode	not used	O
Averaging intervals	Assigned value	Not set	Select value
Recording configuration	threshold	0.0	
time	u i esticiu		
Timezone	lead time	1	sec
Inputs	follow-up time	1	sec
	Comparator B		
Serial ports	mode	not used	- 0
field bus profiles	Assigned value	Not set	Select value
I/O naming	ileaded		
Online recording	threshold	0.0	
	lead time	1	sec
	follow-up time	1	sec
	Comparator C		
	mode	not used	- <b>()</b> =
	Assigned value	Notset	Select value
	threshold	0.0	۲
	lead time	1	sec
	follow-up time	1	sec
	Comparator D		
	mode	not used	- 0
	Assigned value	Not set	Select value
	threshold	0.0	
	lead time	1	sec
	follow-up time	1	sec
	result		
		r	
	result operation	OR	<b>→</b>
	invert result		۲
			22   1   INS

UMG 104

### Serial outputs

Device ID

The device ID (device address) is required for Modbus communication and for the Profibus.

• RS485

Modbus setting: Modbus slave

baud rate selection from 9600bps, 19200bps, 38400bps, 76800bps and 115200bps • RS232

- Modbus settings: Modbus slave and SLIP
- Profibus (version P)

Important! Additional Profibus settings are performed under Fieldbus profiles.

GridVis-2.2.0-Beta-3-	-PRE(2011-05-05_10-03-39) [Project]	. 🗆 🗙
File Edit View Tools \	Window Help	
Configuration[Device-	5] 🕺	
S S	S 🗌 🖾 🚽	
Transmit Transmit	t to Reload Factory default Save to file Load from file	
Identity	Device ID	
Transformer	Device ID 1 Used for RS232(Modbus), RS485(Modbus) and Profibus	
Phase mapping	DS495	
Measuringvariants		
Nominalvalues	Mode Modbus-Slave	<b>-</b>
Averaging intervals	Baudrate 38400 Baud	- 0
Recording configuration		
time	RS232	
Timezone	Mode Modbuc-Slave	
Inputs		
Digital outputs	Baudrate 38400 Baud	<b>(</b>
Comparators		
Serial ports		
field bus profiles		
I/O naming		
Online recording		
		22   1   INS
### **Fieldbus profiles**

Fieldbus profiles hold a list of values which can be read or written by a PLC over the Profibus.

- Using GridVis, 16 fieldbus profiles can be configured.
- The UMG104 is pre-programmed in the factory with 4 fieldbus profiles.

GridVis-2.2.0-Beta-3-PRE(2011-05-05_10-03-39) [Project]						
File Edit View Tools Wi	ndow Help					
E Configuration[Device-5]	86					
S S	0		<u>_</u>			
Transmit Transmit to	Reload Factory	default Save to file	Load from file			
Identity	Profiles for Profibus-access			•		
Transformer	·					
Phase mapping	Profile nr. 0	Voltage effective L1		Edit		
Measuringvariants	Comment 20 / 127 Bytes	Voltage effective L3		=		
Nominalvalues	Byte order big endian	Voltage effective L4				
Averaging intervals	byte order big endorr	Voltage effective L2-L1				
Recording configuration		Current effective L1	Current effecti			
time	Profile nr. 1	Current effective L2				
Timezone	Comment 24 / 127 Bytes	Current effective L3				
Inputs	Byte order big endian	Current effective L4				
Digital outputs		Current effective Sum L	1-L3			
Comparators	Drofilo pr D	Active Power L1	Active Power Sum I			
Serial ports	Promerin, 2	Active Power L2				
field bus profiles	Comment 24 / 127 Bytes	Active Power L3				
I/O naming	Byte order big endian	Active Power L4				
Online recording		Acuve Power Sum L1-L3		÷		
	•		•			
				22   1   INS		

- Using the *Edit* button, the preconfigured fieldbus profiles can be retrospectively changed.
- To do so drag the desired measurement value (measurement value group) over the value field. This saves and displays the measurement values.
- Using the *Delete values* button, selected measurement values can be deleted.
- The measurement value sequence can be determined with the position buttons.

By	teindex	Valuetype	Valueformat	Scaling	Add values
1	1	Voltage effective L1	Float	1	Remove values
2	5	Voltage effective L2	Float	1	
3	9	Voltage effective L3	Float	1	
4	13	Voltage effective L4	Float	1	move to top
				Î	Ten positions up
					One position up
					One position down
					Ten positions down
					Move to bottom
					<ul> <li>Byte order big endian</li> </ul>
					🔘 Byte order little endian
					Value selection tree (field bus pr
					Voltage Voltage effective Voltage effective L2 L3 L4 L2-L1 L3-L2 L1-L3 L1-L2 L3-L2 L1-L3 L3-L2 L1-L3 L1-L2 L1-L3 L3-L2 L1-L3 L1-L2 L3-L2 L1-L3 L3-L2 L1-L3 L3-L3-L3 L3-

#### Inputting online

- Changing the report times for the online inputting of the measurement values.
- Drag the desired measurement value from the <u>Value tree window</u> to the online inputting configuration window.
- Set the desired report times.



# UMG 604

# General

# Data memory

- The UMG604 has a flash memory of 128 Mbyte.
- Of this, approx. 112 MByte are available to the user as data memory.
- Homepage add-ons or files loaded to the UMG604 via FTP reduce the available data memory.

In its delivery condition, with the factory default <u>data memory configuration</u> settings, the UMG can save the following quantities of data:

	Available memo	Available memory capacity in the factory configuration (112)				
r	Memory capacity in %	Memory capacity in Mbyte	The r			
Records (standard configuration)	40	44,8	a			
Transients	22,5	25,2	1			
Recording of events	10	11,2	8			
Full wave effective values	22,5	25,2	1,000 ful			
Flagging	5	5,6				

#### Estimated memory capacity for records

- Measured value, mean value, minimum value and maximum value each requires 4 bytes of memory.
- A dataset without measurement values requires 24 bytes of memory.
  - A dataset with one measurement value requires the following per record: 24 bytes + 4 bytes = 28 bytes.
  - A dataset with one mean value requires the following per record: 24 bytes + 4 bytes = 28 bytes.
  - A dataset for a mean value with minimum and maximum values requires the following per record: 24 bytes + 4 bytes + 4 bytes + 4 bytes = 36 bytes.
- Example: Measurement value records for the voltage in L1. Time basis = 60 seconds.
  - Dataset = 24 bytes + 4 bytes measurement value, i.e.: Dataset = 28 bytes
  - Required memory per day (86400 seconds):
    - Per day, 86400: 60 = 1440 datasets are saved.
    - 1440 datasets \* 28 bytes = 40320 bytes of memory required per day.
  - Required memory per month:
  - 40320 bytes \* 31 days = 1249.92 KB required memory per month.

- Required memory per year:
  1249.92 KB \* 12 months = approx. 15 MB required memory per year.

# Jasic

- 7 Jasic programs can be carried out simultaneously in the UMG604.
- 128 kByte of memory is available for each program.
- Jasic programs are easily created with the <u>graphic programming</u> integrated into GridVis.

# Error message

- The UMG604 display shows the error message "Error CF".
- Cause
  - The calibration data cannot be read from the memory without error.
- Remedy
  - Send the device to the manufacturer for inspection and testing.

# Measurement

#### **Measurement value**

- A measurement value (in the UMG604) is an effective value generated over a 200ms period (measurement window).
- A measurement window has 10 periods in the 50Hz network and 12 periods in the 60Hz network.
- A measurement window has a starting point and an end point.
- There are approx. 2ns between the starting point and end point.
- The precision of the starting and end points depends on the precision of the internal clock. (Typically +- 1minute/month)
- Comparing and aligning the time in the device with that of a time server is recommended in order to improve the internal clock's precision (<u>Time</u>).

#### Full wave effective value

- A full wave effective value is a measurement value that corresponds with the formation of a full wave over a measurement period.
- For full wave effective values, measurement results are generated every 20ms (50Hz) or every 16.7Hz (60Hz).
- Full wave effective values can be used in Jasic programs.
- Calculated full wave effective values
  - Voltage, UL1-N, UL2-N, UL3-N, UL4-N
  - Current, IL1, IL2, IL3, IL4
  - Effective power, PL1, PL2, PL3, PL4
  - Fundamental wave-reactive power compensation Q0L1, Q0L2, Q0L3, Q0L4

The fundamental wave-reactive power compensation has a measurement error of as much as 0.2% due to a constant phase shift of 1.5° and a ripple of 0.1%.

- Processing time (calculation)
  - Typically 5ms
  - maximum 10ms

Processing time variables: Number and run-time of the Jasic programs; homepage accesses.

- Transmission to the interfaces
  - Typical latency period 1ms
  - maximum 7ms
- Calculation of the full wave effective values



# **Fixed frequency**

A frequency in the range 40Hz – 70 Hz can be selected .. for the network analysis. Modbus address: 10248; type: float; number range: 0, 40 .. 70; Hz

- Selectable in GridVis:
- 50Hz fixed frequency
   Measurement values are calculated on the basis of

Measurement values are calculated on the basis of 10 periods (200ms measurement window).

60Hz fixed frequency

Measurement values are calculated on the basis of 12 periods (200ms measurement window).

 0 automatic frequency determination Frequency range: 40Hz – 70Hz Measurement values can be formed from the number of periods that best reflect a 200ms measurement window.

#### Attention:

- 1. If a fixed frequency of e.g. 50Hz or 60Hz is selected, currents can be measured even if a measurement voltage has not been applied.
- 2. Other fixed frequencies in the range 40Hz 70Hz can only be set via the Modbus address.
- 3. The network frequency can also be calculated and for example displayed by GridVis only if automatic frequency determination has been selected. Otherwise, only the selected fixed frequency will be displayed as the network frequency.

# Highlighting concept - Flagging

- The identification of unreliable measurement values is call flagging.
- During voltage drops or increases or during an interruption, the measuring process can provide unreliable values for other variables (e.g. frequency measurement). It indicates that an extrapolated value can be unreliable.
- The UMG604 applies the highlighting concept in accordance with DIN EN 61000-4-30.

#### **Deleting consumption meters**

- Consumption meters can be deleted in the Modbus address list or in a Jasic program. • •
  - The UMG604 uses the following consumption meters:
    - Effective and apparent consumption meters Reactive consumption meters •
- Table: Possibility of resetting meters in the UMG604 ٠

	Parameter list	Modbus address list	Jasic program
Can be used to reset all effective and apparent consumption meters	Yes	Yes	Yes
Can be used to reset all reactive consumption meters	Yes	Yes	Yes
Can be used to reset all minimum and maximum values	Yes	Yes	Yes
Can be used to reset the measurement period for EMAX	No	No	Yes

The addresses used to reset the consumption meters and the min./max values can be found

in the Modbus address list and the parameter list.

#### Recording

You can define your own values to be used when recording. These values are saved in the device (e.g. UMG 604) (<u>Recording configuration</u>).

- Only numeric values can be recorded.
- Records can be read out by GridVis and saved in the database.
- Records can be used in the device's homepage (e.g. UMG 604).

The following recording methods are available:

Mean values

Mean values provided from the measurement values in a time window which can be selected, with the time window's start and end times. The corresponding min./max. values can also be recorded.

Measurement values

Record measurement values with the corresponding start and end times.

Associated measurement values

Measurement values with the corresponding end time and with the end time of the last measurement value as the start time.

Advantage: The graphic representation shows no gaps.

**Please note:** The selected recording method applies for all of the value names set up in the icon.

#### Jasic recording icon



Connections:

• update

Inputting *update* starts the calculation of the min., max. and mean values from the saved measurement values in the measurement buffer.

reset

Reset deletes the measurement buffer content.

save

Inputting *save* saves the pending measurement values (e.g. burner period) in the corresponding measurement value buffer.

"Value name"

At least one value name must be set up (e.g. burner period).

Please note: It is necessary to at least link the save input and a "value input".

#### **Defining recording in Jasic**

Double-clicking on the Jasic *recording* module (<u>Jasic start</u>) defines the recording method with a value name.

- Select the recording type.
- Use the Add button to assign a name to the measurement value.
- Establish the value unit by double-clicking on the respective field under value unit.

F 🔤	Recording		X
Г	ypes Average values Build Maximum Build Minimum Samples Close Timeframes		
V	alues Valuename	Value unit	Add values
	burnerperiod	second	Remove values
			OK Cancel

Graphic programming example:



### **Residual current monitoring (RCM)**

Monitoring residual current by measuring residual current in electric systems is a precaution used in preventative maintenance. Insulation faults caused by fault currents can be recognised early using residual current monitors (RCM) as specified in DIN EN 62020 (VDE 0663).

- Residual current monitoring is **not** a substitute for the recurring inspections to be carried out in accordance with DIN VDE 0105!
- Alternating currents and pulsing direct currents are monitored in accordance with EN62020:1998+A1:2005.

#### Application

Protection and monitoring of systems in which fault currents form, e.g. as a result of:

- Dust deposits or moisture,
- Porous cables and wires,
- Capacitive fault currents,
- Insulation faults.

#### Measuring current in the UMG640D

Measurement range:

- Current measuring input I1 .. I3 : via transformer ../5A or ../1A (0.001A .. 7.5A AC)
- Current measuring input I4 : via residual transformer ../30mA (0.03mA .. 30mA AC)

# Example: UMG604D with residual current monitor via the current measuring input (I4)



# Attention!

Direct current cannot be monitored.

#### Attention!

In no way does measuring in this way relieve the user from the obligation to carry out recurring inspections of permanently installed electrical systems in accordance with DIN VDE 0105-100, Section 5.3.

# Integrate into the GridVis

#### Connection

Connection PC - UMG 604

Example 1 (RS232-RS485 connection):

The PC has an RS232 interface and the UMG604 an RS485 interface. An interface converter is required.



Example 2 (direct Ethernet connection):

The PC and the UMG604 have an Ethernet interface. Because there is a direct connection, a "twisted" patch cable must be used.



Example 3 (Ethernet connection):

The PC and the UMG604 have an Ethernet interface. The connection is established in a network via a switch or a hub.



Example 4 (BACnet gateway connection):

The UMG604 is used as a BACnet gateway with which to connect RS485 devices (e.g. UMG96S). The UMG604 is the Modbus master (RS485) and the UMG96S the Modbus slave, whereby the BACnet shows the UMG96S as the UMG604's virtual device. A Jasic program queries the measurement values for the connected devices and provides the values to the BACnet.



Example 5 (Modbus gateway connection):

The UMG604 is used as a gateway with which to connect RS485 devices (e.g. UMG96S). The UMG604 is the Modbus master (RS485) and the UMG96S the Modbus slave, whereby the baud rate to be set for both devices must concur. A Jasic program queries the measurement values for the connected UMG96S and makes them available for further processing.



#### Adding a UMG604

Create a new UMG604 in GridVis and determine the appropriate type of connection for your device (First steps, Adding new device).

- Ethernet interface (option) with the connection types TCP/IP and Modbus via Ethernet
- RS485 interface with the connection type Modbus RTU (RS485)

#### **Connection types**

TCP/IP connection

A "twisted" patch cable is required in order to establish a direct connection between a PC and a UMG604 via the Ethernet interface. A normal patch cable is used when establishing a connection in a network (a hub/switch is present).

- The UMG604 address can be pulled via DHCP from a server or a fixed address set directly in the UMG604.
- The address can be input as an address or as a name
- Using Timeout it is possible to limit the time in which to attempt to establish a connection, when no connection exists.

#### Modbus RTU (RS485/RS232)

An interface converter is required in order to connect the UMG604 to the PC's RS232 interface and to configure it and read it with GridVis.

- An interface converter from RS485 (UMG604) to RS232 (PC) is required.
- Set the PC's RS232 interface (e.g. COM1) to be used as the interface.
- Also connect the interface converter to this interface (e.g. COM1).
- The baud rate is the speed at which the data is to be transmitted between the PC, the interface converter and the UMG604.
- Because more than one UMG604 can be connected to the interface converter, the device address set in the UMG604 must also be set in the interface converter.
- If it is not possible to establish a connection with the UMG604, an attempt will be repeated following the set Timeout.
- When attempting to read data from the UMG604, the number of attempted connections will be limited by the number set under Max. no. of attempts.
- With online measurements, GridVis will repeatedly attempt to establish a connection to the UMG604.

• Ethernet gateway (e.g. for devices connected to the RS485) A gateway is required in order to connect a UMG96S via Ethernet to the PC and to configure it and read it with GridVis. A UMG604 can be used to establish this gateway function (<u>Connection example 5</u>).

- The gateway address (e.g. 192.168.1.1) must be set under the connection settings (see Fig. Configuring the connection).
- Because more than one device (e.g. UMG96S) can be connected to the gateway, the device address set in the UMG96S must also be set under the connection settings (see Fig. *Configuring the connection*).
- If it is not possible to establish a connection with the UMG96S, an attempt will be repeated following the set Timeout.
- When attempting to read data from the UMG96S, the number of attempted connections will be limited by the number set under *Max. no.* of attempts.

- The connection protocol must be set via the *Modbus protocol*. TCP/IP packets are used when connecting via Modbus TCP. The TCP port 502 is reserved for Modbus TCP.
- With online measurements, GridVis will repeatedly attempt to establish a connection to the UMG96S.

Configure conne	ection (Device-3)					
Connection type Et	hernet gateway (eg. for devices over RS485) 🔹 👻					
UMG96S [Ethernet g	UMG96S [Ethernet gateway (eg. for devices over RS485)]					
Host	192.168.1.1					
Port	8,000 🚔					
Device address	1					
Time out [millisec.]	5,000 🚔					
Max. no. retries	3 荣					
modbus protocol Modbus-TCP Modbus-RTU	(Ethernet encapsulated)					
	Connection test					
	OK Cancel					

#### Secured TCP

A connection between a PC and a UMG604 via TCP/IP connection with secured access data.

- The UMG604 address can be pulled via DHCP from a server or a fixed address set directly in the UMG604.
- Using Timeout it is possible to limit the time in which to attempt to establish a connection, when no connection exists.
- Enter your access data (username, password) for a secured connection.

# Configuration

# Identity

- The name is used, among other things, to identify the device in the device list.
- Additional information can be saved under Description.

GridVis-2.2.0-Beta-3-PRE(2011-05-05_10-03-39) [Project]							
File Edit View Tools V	/indow Help						
Configuration[Device-6	Configuration[Device-6] 🔉						
6 6	0						
Transmit Transmit	to Reload Factor	y default Save to file	Load from file				
Identity							
Transformer	Name Device 1			<b>I</b>			
Phase mapping	Description			۵			
Measuringvariants							
Nominalvalues							
Events							
Event recording							
Transients							
Transient recording							
Averaging intervals							
Recording configuration							
memory configuration							
time							
Timezone							
Inputs							
Digital outputs							
Serial ports							
field bus profiles							
ip configuration							
I/O naming							
Online recording							

### Transformers

- Voltage converter
  - The UMG604 voltage measurement inputs are designed for the measurement of low voltages, in which rated voltages (L-NPE) of up to 300V against earth can occur.
  - Voltage converters are necessary in networks with higher rated voltages.
  - The converter requirements for each voltage measurement input must be determined separately.

#### • Current converter

- Currents up to 5A can be measured directly. Observe the installation guide when doing this.
- Converters are used when measuring currents greater than 5A.
- The converter requirements for each current measurement input must be determined separately.

GridVis-2.2.0-Beta-3-PRE(2011-05-05_10-03-39) [Project]					
File Edit View Tools \	Window Help				
Configuration[Device-6	5] 28				
6 6			<b>F </b>		
Transmit Transmit	to Reload I	Factory default	Save to file Load from file		
Identity	d1				
Transformer		Primary	Secondary		
Phase mapping	Voltage transformer	400.0 V	A ( 400 0 V A		
Measuringvariants	vortage transformer	100.0			
Nominalvalues	Current transformer	5.0 A	🥥 / 5.0 A 🌑		
Events					
Event recording	12				
Transients		Primary	Secondary		
Transient recording	Voltage transformer	400.0 V	🕘 / 400.0 V 🕥		
Averaging intervals	Current transformer	5.0 A	🕥 / 5.0 A 🕥		
Recording configuration					
memory configuration	L3				
time		Primary	Secondary		
Timezone	Voltage transformer	400.0 V	A 1 400 0 V A		
Inputs	voltage transformer	400.0	• 7 +00.0		
Digital outputs	Current transformer	5.0 A	🕗 / 5.0 A 🎱		
Serial ports					
field bus profiles	L4				
Ip configuration		Primary	Secondary		
I/O naming	Voltage transformer	400.0 V	🕥 / 400.0 V 🕥		
Online recording	Current transformer	5.0 A	🔿 / 5.0 A 🥥		

# Phase assignment

• The phase wiring and the electricity consumer wiring can be redefined by the phase assignments.

🚂 GridVis-2.2.0-Beta-3-PRE(2011-05-05_10-03-39) [Project]						
File Edit View Tools Window Help						
[] Configuration[Device-6]	28					
	0					
Transmit Transmit to	o Reload	Factory default	Save to file	Load from file		
Identity		,				
Transformer	voitage					
Phase mapping	Should state	Is state				
Measuringvariants	LI	L1				<b></b>
Nominalvalues	L2	L2				- 0
Events	12	12				
Event recording	1.5					
Transients	L4	L4				<b></b>
Transient recording						
Averaging intervals						
Recording configuration	Current					
memory configuration						
time	Should state	Is state				
Timezone	11		4.50			
Digital outputs		Change S1(K) an	a s2(I)			<b></b>
Serial ports	L2	L2				
field bus profiles		Change s1(k) an	d s2(l)			
ip configuration	L3	L3				<b>_</b> ]
I/O naming		Change s1(k) an	d s2(l)			٠
Online recording	L4	L4				
		Change s1(k) an	d s2(l)			0

# **Connection variants**

• Set the device's connection variant for the voltage and current measurements (operating manual).

🌆 GridVis-2.2.0-Beta-3-PR	RE(2011-05-05_10-0	3-39) [Project]			- 🗆 🗙
File Edit View Tools Wir	ndow Help				
E Configuration[Device-6]	86				
S S	<b>O</b>			<b>_</b>	
Transmit Transmit to	Reload	Factory default	Save to file	Load from file	
Identity		r			
Transformer	Voltagemeasuring	Four wire			
Phase mapping	Companyation	Three wine			 
Measuringvariants	Currentmeasuring	Three wire			
Nominalvalues					
Events					
Event recording					
Transients					
Transient recording					
Averaging intervals					
Recording configuration					
memory configuration					
time					
Timezone					
Inputs					
Digital outputs					
Serial ports					
field bus profiles					
ip configuration					
I/O naming					
Online recording					

#### **Nominal values**

- All 4 of the measurement channels are addressed via the rated frequency. Select the mains frequency in accordance with the existing mains.
- Nominal values are required as a reference to identify events (over/undervoltage and overcurrent).
- The rated current of the transformer at the supply is required in order to calculate the K factor.

GridVis-2.2.0-Beta-3-PRE(2011-05-05_10-03-39) [Project]							
File Edit View Tools \	File Edit View Tools Window Help						
Configuration[Device-6	5] 🕺						
S S	<u>o</u>	<b>E</b>					
Transmit Transmit	to Reload Factory defaul	t Save to file Load f	rom file				
Identity	General						
Transformer	Nominal frequency Auto	_					
Phase mapping	noninal nequency	•	-				
Measuringvariants	LI						
Nominalvalues	Nominal voltage	230.0 V	<b>@</b>				
Events	Nominal current	5.0 A	٢				
Event recording	Nominal current for K-factor	E.0					
Transients	Nominal current for K-factor	5.0	•				
Transient recording	L2						
Averaging intervals	Nominal voltage	230.0 V					
Recording configuration	Nominal current	5.0 A					
memory configuration	Nextinal arrest for K forter	5.0					
time	Nominal current for K-factor	5.0 A					
Toputs	L3						
Digital outputs	Nominal voltage	230.0 V	۲				
Serial ports	Nominal current	5.0					
field bus profiles		5.0					
ip configuration	Nominal current for K-factor	5.0 A					
I/O naming	L4						
Online recording	Nominal voltage	230.0 V	•				
	Nominal current	5.0 A	•				
	Nominal current for K-factor	5.0 A	•				
L			1				

#### Events

- An event occurs if threshold values set for the current and the voltage are violated.
- An event has a mean value, a minimum or maximum value, a start time and an end time.
- The GridVis event browser can display recorded events.
- Threshold values are set per measurement channel (L1 .. L4) for excess voltage, undervoltage and overcurrent as a percentage of the nominal values.
- Threshold values can be switched off by switching the Manual/Off button to Off.

GridVis-2.2.0-Beta-3-PRE	(2011-05-05	_10-03-39) [Project]				<b>- D X</b>
File Edit View Tools Wind	dow Help					
Configuration[Device-6]	86					
S S	0			<b>a</b>		
Transmit Transmit to .	. Reload	Factory default	Save to file	Load from file		
Identity L1	1					]
Transformer	ver voltage	Manual 🗸	110		%	( 253.00V)
Phase mapping Ur	nder voltage	Manual 🗸	90		%	( 207.00V)
Measuringvariants	ver current	Manual –	A 110		04	(
Nominalvalues	ver current	Manuai 🗸	110		<i>///</i>	( 5.50A)
Event recording	2					
Transients	ver voltage	Manual 👻	110		%	( 253.00V)
Transient recording Ur	nder voltage	Manual 🗸	90		%	( 207.00V)
Averaging intervals	ver current	Manual –	110		%	( 5 503)
Recording configuration	ver current		110		~	( 5.50A)
memory configuration	3					
time	ver voltage	Manual 🗸	110		%	( 253.00V)
Timezone	nder voltage	Manual 🚽	00		%	( 207 007)
Digital outputs	nder vortage	Manual	<b>9</b>			( 207.000)
Serial ports	ver current	Manuai 👻	110		%	( 5.50A)
field bus profiles	1					
ip configuration	ver voltage	Manual 🗸	110		%@	( 253,00V)
I/O naming	nder voltage	Manual –	A 00		%	( 207.007)
Online recording	nuer vortage	Manual •	90			( 207.000)
0	ver current	Manuai 🔻	110		%	( 5.50A)
Ru	un-in / After-ri	un				
F	Run-in 0					Full wave 🕘
	After-run 0					Full wave 🕘
						1

- Only changes to threshold values that persist over the entire pre-run period (lead time) are considered the start time of an event.
- The event's end time has been reached only if there are no further threshold violations for the duration of the run-on period (run-down).
- Pre-run/run-on setting range: 0 .. 1000 full waves
- For an event, additional information can be selected from other measurement channels and saved. (Effective value record/full waves).

Event diagram



#### **Recording events**

- Effective values recorded in the UMG604 describe the trend of full wave effective values.
- Effective value recording can be started by an event or by a Jasic program.
- Various recording modes can be selected to record effective values triggered by an event.
- Only the value in which the event was found.
  - Only voltage and current in the phase in which the event was found.
  - All of the inputs of the value in which the event was found.
  - All of the values in all of the inputs
- The length of the effective value record is determined by the number of full wave effective values up to the beginning of the event (pre-run) and by the number of full wave effective values after the beginning of the event (after-run).
  - Pre-run setting range: 64 .. 8192 full waves (up to firmware rel. 1.1: 64..6144 full waves)
  - After-run setting range: 64 .. 8192 full waves (up to firmware rel. 1.1: 64..6144 full waves)



File Edit View Tools Window Help         Overview Window %       Configuration[Device-6] %         Transmit Transmit to       Reload Factory default Save to file Load from file         Identity       Transformer         Phase mapping       Eventmode Voltage and Current of the phase where the event was found         Nominalvalues       Full wave         Events       Events         Events       Full wave         Posttrigger 100       Full wave         Posttrigger 200       Full wave         Posttrigger 100       Full wave         Posttrigger 100       Full wave         Posttrigger 200       Full wave         Posttrigger 100       Full wave         Posttrigger 200       Full wave         Posttrigger 100       Full wave         Posttrigger 200       Full wave         Posttrigger 100       Posttrigger 200         Posttrigger 200       Full wave         Postgration       Full wave         Inputs       Postgration         I/O naming       Online recording	GridVis-2.2.0-Beta-3-	PRE(2011-05-05_10-03-39) [Project]	
Overview Window       Image: Configuration[Device-6]       Image:	File Edit View Tools	Window Help	
Transmit Transmit to       Reload       Factory default       Save to file       Load from file         Identity       Transformer       Eventmode       Voltage and Current of the phase where the event was found       Image: Control of the phase where the ev	Overview Window 🛛 🕷	Configuration[Device-6] 🛛 🛛	
Transmit       Transmit to       Reload       Factory default       Save to file       Load from file         Identity       Transformer       Eventmode       Voltage and Current of the phase where the event was found       Image: Control of the pha	S S	o 🗌 🖬 🚽	
Identity       Eventmode       Voltage and Current of the phase where the event was found         Phase mapping       Recording Length         Measuringvariants       Pretrigger       100         Nominalvalues       Posttrigger       200         Events       Posttrigger       200         Event recording       Full wave       Posttrigger         Averaging intervals       Recording configuration       Full wave         Timezone       Inputs       Digital outputs         Serial ports       field bus profiles       ip configuration         I/O naming       Online recording       I/O naming	Transmit Transmit	to Reload Factory default Save to file Load from file	
Transformer       Eventmode       Voltage and Current of the phase where the event was found         Phase mapping       Recording Length         Measuringvariants       Pretrigger       100         Nominalvalues       Posttrigger       200         Events       Posttrigger       200         Events       Full wave       Full wave         Posttrigger       200       Full wave         Image: Transients       Full wave       Full wave         Transient recording       Averaging intervals       Full wave         Recording configuration       Timezone       Inputs         Digital outputs       Serial ports       Field bus profiles         ip configuration       I/O naming       Online recording	Identity		
Phase mapping       Recording Length         Measuringvariants       Pretrigger         Nominalvalues       Posttrigger         Events       Posttrigger         Event recording       Full wave         Transients       Full wave         Transient recording       Averaging intervals         Recording configuration       memory configuration         Timezone       Inputs         Digital outputs       Serial ports         field bus profiles       ip configuration         I/O naming       Online recording	Transformer	Eventmode Voltage and Current of the phase where the event was found	
Measuringvariants       Pretrigger       100       Full wave         Nominalvalues       Posttrigger       200       Full wave         Events       Posttrigger       200       Full wave         Event recording       Transients       Full wave         Transient recording       Averaging intervals       Full wave         Recording configuration       memory configuration       Ime         Timezone       Inputs       Digital outputs         Serial ports       field bus profiles       ip configuration         I/O naming       Online recording       Ime	Phase mapping	Recording Length	
Nominal/values       Posttrigger       200         Events       Event recording         Transients       Transient recording         Averaging intervals       Recording configuration         memory configuration       time         Timezone       Inputs         Digital outputs       Serial ports         field bus profiles       ip configuration         I/O naming       Online recording	Measuringvariants	Pretrigger 100	Full wave 🕘
Events     Fostulgger 200       Event recording       Transients       Transient recording       Averaging intervals       Recording configuration       memory configuration       Time 2       Inputs       Digital outputs       Serial ports       field bus profiles       ip configuration       I/O naming       Online recording	Nominalvalues	Poettrieger 200	Full wave
Event recording Transients Transient recording Averaging intervals Recording configuration memory configuration time Timezone Inputs Digital outputs Serial ports field bus profiles ip configuration I/O naming Online recording	Events	Postingger 200	
Transients         Transient recording         Averaging intervals         Recording configuration         memory configuration         time         Timezone         Inputs         Digital outputs         Serial ports         field bus profiles         ip configuration         I/O naming         Online recording	Event recording		
Transient recording Averaging intervals Recording configuration memory configuration time Timezone Inputs Digital outputs Serial ports field bus profiles ip configuration I/O naming Online recording	Transients		
Averaging intervals         Recording configuration         memory configuration         time         Timezone         Inputs         Digital outputs         Serial ports         field bus profiles         ip configuration         I/O naming         Online recording	Transient recording		
Recording configuration         memory configuration         time         Timezone         Inputs         Digital outputs         Serial ports         field bus profiles         ip configuration         I/O naming         Online recording	Averaging intervals		
memory configuration       time       Timezone       Inputs       Digital outputs       Serial ports       field bus profiles       ip configuration       I/O naming       Online recording	Recording configuration		
time         Timezone         Inputs         Digital outputs         Serial ports         field bus profiles         ip configuration         I/O naming         Online recording	memory configuration		
Timezone         Inputs         Digital outputs         Serial ports         field bus profiles         ip configuration         I/O naming         Online recording	time		
Inputs Digital outputs Serial ports field bus profiles ip configuration I/O naming Online recording	Timezone		
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field bus profiles ip configuration I/O naming Online recording	Digital outputs		
ip configuration I/O naming Online recording	field bus profiles		
I/O naming Online recording	in configuration		
Online recording	I/O naming		
	Online recording		
	on the recording		

# Transients

- Transients are fast voltage changes.
- The UMG604 recognises transients if they are longer than 50µs, although it only monitors the four voltage measurement inputs.
- There are two independent criteria by which transients are recognised.
  - Absolute: If a sampled value exceeds the set threshold, a transient is recognised.

Available settings:

- Off transient monitoring has been switched off
- Automatic the threshold value is calculated automatically and comes to 110% of the current 200ms effective value.
- Manual the transient monitoring uses the set threshold values.
- Fast increase: If the difference between two neighbouring sampled points exceeds the set threshold, a transient is recognised.

Available settings:

- Off transient monitoring has been switched off
- Automatic the threshold value is calculated automatically and comes to 0.2175 times the current 200ms effective value.
- Manual the transient monitoring uses the set threshold values.
- If a transient has been recognised, the threshold value increases by 20V, both in automatic and in manual mode. This automatic increase of the threshold value switches off within 10 minutes.
- If a transient has been recognised, the wave form will be saved to a transient record.
- If a further transient is recognised within the next 60 seconds, it will be recorded with 512 points.

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Identity	L1					A
Transformer	Voltage					
Phase mapping	Absolute	Automatic		0	%	
Measuringvariants	Absolute	Automatic			//	
Nominalvalues	Slope	Automatic		0	%	
Events	C					
Event recording	L2					
Transients	Voltage					
Transient recording	Absolute	Automatic		0	%	
Averaging intervals	Sione	Automatic		0	%	
Recording configuration	Sibbe	Automotic				
memory configuration	L3					
time	Voltage					
Timezone	ronage					
Inputs	Absolute	Automatic		0	%@	
Digital outputs	Slope	Automatic		0	%	
Serial ports		-				
field bus profiles	L4					
ip configuration	Voltage					
I/O naming	Absolute	Automatic	- I	0	%	
Online recording				-	~	
	Slope	Automatic		0	70	

#### **Recording transients**

- If a transient has occurred, the wave shape can be saved in a transient record with an adjustable number of sampled points before and after the transient.
- The distance between two sample points is always 50µs.
- You can choose between the following measurement channels for recording in the transient record:
  - The phase voltage will be recorded with the transient.
  - The phase voltage and current will be recorded with the transient.
  - All currents will be recorded.
  - All voltages and all currents will be recorded.

#### **Record length**

The number of sample points to be saved before the transient occurred:

- Pre-run setting range: 64 .. 8192 points (up to firmware rel. 1.1: 64..6144 points)
- After-run setting range: 64 .. 8192 points (up to firmware rel. 1.1: 64..6144 points)

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6 6						
Transmit Transmit	t to Reload Factory default Save to file Load from file					
Identity						
Transformer	All Voltages are recorded.					
Phase mapping	Recording length					
Measuringvariants						
Nominalvalues	Pretrigger 800	Points				
Events						
Event recording	This equals 40.000ms					
Transients	Posttrigger 3200	Points				
Transient recording						
Averaging intervals	This equals 160.000ms					
Recording configuration						
memory configuration						
time						
Timezone						
Inputs						
Digital outputs						
Serial ports						
field bus profiles						
ip configuration						
I/O naming						
Online recording						
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### Averaging intervals

- Setting of parameters for the floated average value for the individual measuring values.
- The average measuring values are indicated on the display with an over line.
- The values can be used as well for operators or comparators (Jasic).
- The adjustment ranges of the averaging time of the selected group (L1-L4) are 10, 15, 30, 60 seconds and 5, 8, 10, 15 minutes.
   The settings of different averaging intervals for each phase has to be done in the device.

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File Edit View Tools Window Help						
Configuration[Device-13] 🕺						
6 6	0					
Transmit Transmit	t to Reload Fact	tory default Save to file Load from file				
Identity						
Transformer	Only for firmware-release	at least 1.2xx				
Phase mapping	Avg. interval voltage	10 min.				
Measuringvariants	Ava interval auropt	10 min				
Nominalvalues	Avg. Interval current	10 mm.	<b>_</b> _			
Events	Avg. interval frequency	10 min.				
Event recording	Ave interval					
Transients	Avg. Interval power	10 min.				
	Avg. interval THD U	10 min.	- 🥥			
Recording configuration	Ave. interval TUD I	10 min				
memory configuration	Avg. interval InD I	10 mm.	<b>_</b> _			
time	Avg. interval harmonics U	10 min.	<b>-</b>			
Timezone	Ava interval barmanica I	10 min				
Inputs	Avg. Interval harmonics I	10 mm.				
Digital outputs	Avg. interval temperature	10 min.	<b>-</b>			
Serial ports						
field bus profiles						
ip configuration						
I/O naming						
Online recording						

 In case that different averaging intervals were selected within one group on the device, then the group field will be indicated red after reading out the configuration. A new selection of the averaging time and the data transfer afterwards will set the group (L1-L4) to the selected value.

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File Edit View Tools Window Help							
The Configuration [Device-13] 28							
6 6							
Transmit Transmit	t to Reload Fact	ory default	Save to file	Load from file			
Identity Transformer	Only for firmware-release	at least 1.2x	x				
Phase mapping	Avg. interval voltage	10 min.					
Measuringvariants		·					
Nominalvalues	Avg. interval current						<b>_</b>
Events	Avg. interval frequency	10 min.					
Event recording		r					
Transients	Avg. interval power	10 min.				•	
Transient recording	Avg. interval THD U	10 min.					
Averaging intervals	1						
Recording configuration	Avg. interval THD I	10 min.					
memory configuration	Ava. interval barmonica II	10 min					
time	Avg. Interval harmonics o	10 mm.					
Timezone	Avg. interval harmonics I	10 min.					
Inputs							
Digital outputs	Avg. Interval temperature	10 min.					
Serial ports							
neid bus pronies							
Ip configuration							
1/U naming							
Unline recording							
	L					1	
#### **Recording configuration**

- Default profiles can be loaded or up to 16 records configured in recording configuration.
- A record can have a maximum of 1000 values.
- A record holds a measurement value or the mean value of the measurement value.
- Mean value records can also include the minimum and the maximum values.
- Mean values, minimum values and maximum values are derived from the measurement values in the measurement timeframe.
- The mean value measurement timeframe is established by the time set under "Time basis".
- Measurement values are saved once the time set under "Time basis" has run its course (<u>Calculation of required storage capacity</u>).

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File Edit View Tools V	Vindow Help				
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S S	🛐 to Reload Fac	tory default Sa	ve to file Load from	ı file	
Identity Transformer Phase mapping Measuringvariants	Recording type Timebase Number recorded values	ValuesOverTime 10m 5	Voltage effective L1 Voltage effective L2 Voltage effective L3 Voltage effective L4	Voltage ef	New Edit
Nominalvalues Events Event recording Transients Transient recording	Recording type Timebase Number recorded values	ValuesOverTime 10m 6	Active Power L1 Active Power L2 Active Power L3 Active Power L4	Active Por Active Por	Delete Preset recordings EN50160
Averaging intervals Recording configuration memory configuration time	Recording type Timebase Number recorded values	ValuesOverTime 10m 5	Current effective L1 Current effective L2 Current effective L3 Current effective L4	Curre	EN61000-2-4
Timezone Inputs Digital outputs					
Serial ports field bus profiles ip configuration I/O naming					
Online recording	•	m		Þ	

#### Setting up / editing a recording configuration

- An individual recording instance can be set up using the New or Edit buttons.
- Measurement values are selected in the recording window using the *Add values* button.
- Drag the desired measurement value (measurement value group) over the value field. This saves and displays the measurement values.
- Using the Delete values button, selected measurement values can be deleted.



#### Configuring data memory

- The UMG604 has a storage capacity of approx. 112Mbyte.
- The data memory has been partitioned as follows in the factory:
- 40% for user-defined recording.
- 22.5% for the recording of transients.
- 22.5% for the recording of full wave effective values.
- 10% for the recording of events.
- 5% for the recording of flags (flagging).

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File Edit View Tools \	Window Help			
Overview Window 🛛 🛚 🚪	Configuration[Device-6] 🛛			
S S			<b>a</b>	
Transmit Transmit	to Reload Factory default	save to file	Load from file	
Identity	partition of memory for recordings			
Transformer	user defined recordings	40.0 %	6 🥥	
Phase mapping	transient recordings	22.5 %	6 🥝	
Measuringvariants	full wave effective values recordings	22.5 %	6 🕘	
Nominalvalues	event recordings	10.0 %		
Events	A	1010 N		
Event recording	nag recordings	5.0 %	•	
Transients				
Transient recording				
Averaging intervals				
Recording configuration				
memory configuration				
time				
Timezone				
Inputs				
Digital outputs				
Serial ports				
field bus profiles				
ip configuration				
I/O naming				
Online recording				
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#### Time

The UMG604 has a clock with a battery backup. The fault in the clock's quartz is aligned with room temperature during production so that the clock only deviates by +- 1 minute/month. If transient records and event records are to be compared with other measurement records, it is recommended that the time indicated by the UMG604 be compared and aligned with that in a time server. For this purpose, the UMG604 requires the Ethernet interface (option). The network time protocol (NTP) is used for synchronisation.

• Mode

Off - synchronisation of the clock with an external time server is switched off. Lists - the UMG604 is waiting for time information from a time server. Active - the UMG604 automatically requests time information from an NTP server every 64 seconds.

• NTP server - this is where the time server's address is input.

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File Edit View Tools Window Help							
Configuration[Device-	6] 🛪 🔳 💌 📼						
Transmit Transmit	t to Reload Factory default Save to file Load from file						
Identity	NTP						
Transformer							
Phase mapping	Mode Listen						
Measuringvariants	NTP Server						
Nominalvalues							
Events							
Event recording							
Transients							
Transient recording							
Averaging intervals							
Recording configuration	Set time						
memory configuration							
time	Attention! This option should only be activated in case there is no external time synchronisation (e.g. NTP) avalaible!						
Timezone	enable time setting (device time will be synchronized with UTC-Time of PC)						
Inputs	airrent time difference against LITC(PC) asconds						
Digital outputs							
Serial ports							
field bus profiles							
ip configuration							
I/O naming							
Online recording							

#### Time zone

All time information with regard to measurement values, events and transients relate to UTC time (Coordinated Universal Time). GridVis converts UTC time to Central European Time (CET) when it displays measurement results. Central European Time (CET) is the applicable time zone in central Europe and therefore also in Germany.

- Winter time time offset from Central European Winter Time relative to UTC time.
- Summer time time offset from Central European Summer Time relative to UTC time.
- Start of daylight saving time start of daylight saving time.
- End of daylight saving time end of daylight saving time.

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File Edit View Tools	Window Help					
Configuration[Device-	6] %					
6 6			<b>F</b>			
Transmit Transmit	t to Reload I	Factory default Save	to file Load from f	file		
Identity Transformer		Time offset				
Phase mapping	Standard time	3600 sec				
Measuringvariants	Daylight saving	7200 sec				
Nominalvalues		Month	Earliest day of month	Day of week	Hour	Minute
Events	Start day light saving	March -	25	Sunday _ @	2	0
Event recording	Start day light barring				-	
Transients	End day light saving	October 👻 🌑	25	Sunday 🚽 🥥	3	0
Transient recording						
Averaging intervals						
Recording configuration						
memory configuration						
time						
Timezone	1					
Inputs Disital subsubs						
Ligital outputs						
fold hus profiles						
in configuration						
I/O naming						
Online recording						
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#### Inputs

The UMG604 has two digital outputs and an input used to measure temperature. Both digital inputs can be used as digital inputs and as input pulse meters

A pulse value can be assigned to every pulse input.

Various temperature sensors can be connected to the input used to measure temperature:

- PT100 temperature range -55°C .. +175°C
- PT1000 temperature range -40°C .. +300°C
- KTY83 temperature range -99°C .. +500°C
- KTY84 temperature range -99°C .. +500°C

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File Edit View Tools V	/indow Help	
Configuration[Device-6	] 22	
S S	Ø 📕 🖬 📦	
Transmit Transmit	to Reload Factory default Save to file Load from file	
Identity		
Transformer	External temperature 1	<b>•</b>
Phase mapping	External temperature 1	
Measuringvariants	T	
Nominalvalues	remperature measurement P1100	
Events		
Event recording		
Transients		
Transient recording		
Averaging intervals		
Recording configuration		
memory configuration		
time		
Timezone		
Inputs		
Digital outputs		
Serial ports		
field bus profiles		
ip configuration		
1/O naming		

#### **Digital outputs**

The UMG604 has two digital outputs. Both of these digital outputs can be programmed for event messages or as a pulse output (S0 output).

- Each digital output can be programmed as a NC or NO contact.
- One or more events can be allocated to an output if it is programmed for event updates.
- The event output activates if a selected event occurs.

GridVis-2.2.0-Beta-3-	PRE(2011-05-05	_10-03-39)		
File Edit View Tools \	Window Help			
Configuration[Device-6	5] 88			
6 6	0		<u>_</u>	
Transmit Transmit	to Reload	Factory default Save to file	Load from file	
Identity	S0-outputs			
Transformer				
Phase mapping	Pulse width 50	o		milli seconds 🥥
Measuringvariants				
Nominalvalues	Dia Output 1			
Events	Dig.Output 1			•
Event recording	Dig.Output 1			
Transients	Output polarity	current flow if active (NOC)		
Transient recording	Type of output	Notused		
Averaging intervals		Nordacu		
Recording configuration				
memory configuration				
time				
Timezone				
Inputs				
Digital outputs				
Serial ports				
field bus profiles				
ip configuration				
I/O naming				
Online recording				
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#### Serial outputs

Device ID

The device ID (device address) is required for Modbus communication and for the Profibus.

• RS485

Setting the Modbus selection between Modbus master, Modbus slave, transparent gateway and BACnet MS/TP.

Baud rate selection from 9600bps, 19200bps, 38400bps, 76800bps, 115200bps and 921600bps

• RS232

Setting the Modbus selection between Modbus slave, Debug protocol and SLIP • Profibus (option)

Attention! Additional Profibus settings are performed under fieldbus profiles.

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File Edit View Tools \	Window Help	
Configuration[Device-6	5] 🐹	
S S	o 🗌 🖬 🔄	
Transmit Transmit	to Reload Factory default Save to file Load from file	
Identity	Device ID	
Transformer	Device ID 1 Used for RS232(Modbus), RS485(Modbus) and Profibus	
Phase mapping		'
Measuringvariants		
Nominalvalues	Mode Modbus-Slave	<b></b>
Events	Baudrate 38400 Baud	
Event recording	5	
Transients	RS232	
Transient recording	Mode Modbus-Slave	
Averaging intervals		
Recording configuration	Baudrate 38400 Baud	
memory configuration		
time		
Timezone		
Inputs		
Digital outputs		
Serial ports		
field bus profiles		
ip configuration		
I/O naming		
Online recording		
	1	

#### **Fieldbus profiles**

Fieldbus profiles contain a list of values that can be read or written by a PLC via the Profibus.

- Using GridVis,16 fieldbus profiles can be configured.
- In the UMG604, with firmware from 1.095, 4 fieldbus profiles were preconfigured in the factory.

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File Edit View Tools Wi	ndow Help	
Configuration[Device-6]	22	
Transmit Transmit to	Reload Factory default Save to file Load from file	
Identity	Profiles for Profibus-access	
Transformer		
Phase mapping	Voltage effective L1 Current effective L1	Edit
Measuringvariants	Voltage effective L2 Current effective L2 Comment 36 / 127 Bytes Voltage effective L3 Ourcent effective L3	Luit
Nominalvalues	Byte order big endian Voltage effective L4 Current effective L4	
Events	Voltage effective L2-L1	
Event recording	Voltage effective L1 Current effective L1	
Transients	Profile nr. 1 Voltage effective L2 Current effective L2	
Transient recording	Comment 36 / 127 Bytes Voltage effective L3 Current effective L3	
Averaging intervals	Byte order big endian Voltage effective L2-L1 Current effective L4	
Recording configuration	Voltage effective L3-L2	
memory configuration	Active Power Sum L1-L3 Apparent Power	
time	Comment 44 / 127 Bytes Reactive Power L1 Apparent Power	
Timezone	Byte order big endian Reactive Power L3 Apparent Power	
Inputs	Apparent Power L1 Reactive Power	
Digital outputs	Supplied Active Energy L1 Supplied /	
Serial ports	Profile nr. 3 Supplied Active Energy L2	
Tield bus profiles	Comment 24 / 127 Bytes Supplied Active Energy L3	
I/O pageing	Byte order big endian Supplied Active Energy L4	
1/0 naming Opline recording	Supplied Active Energy Sum L1-L3	
Online recording	4	
		]

- Using the *Edit* button, the preconfigured fieldbus profiles can be retrospectively changed.
- To do so drag the desired measurement value (measurement value group) over the value field. This saves and displays the measurement values.
- Using the *Delete values* button, selected measurement values can be deleted.
- The measurement value sequence can be determined with the position buttons.

Byte	eindex	Valuetype	Valueformat	Scaling	Add values
1	1	Voltage effective L1	Float	1	Remove values
2	5	Voltage effective L2	Float	1	
3	9	Voltage effective L3	Float	1	
4	13	Voltage effective L4	Float	1	move to top
				Î	Ten positions up
					One position up
					One position down
					Ten positions down
					Move to bottom
					Ø Byte order big endian
					O Byte order little endian
					Value selection tree (field bus pr
					Voltage Voltage effective Voltage effective L2 L3 L4 L2-L1 L3-L2 L1-L3 L1-L3

#### **IP** configuration

- For devices with the Ethernet option, it is necessary to set at least the IP address and the subnet mask.
- In the UMG604, it is possible to choose between the options *fixed IP address*, *BootP* and *DHCP mode*.

Fixed IP address

All settings are undertaken by the user.

BootP

BootP allows for the fully automatic integration of a UMG604 into an existing network.

DHCP mode

When started, the UMG604 pulls all of its settings from the DHCP server.

IMPORTANT: Setting should only be undertaken after these have been discussed with the administrator.

File Edit View Tools Window Help							
E Configuration[Device-6]							
S S I I I							
Transmit Transmit to Reload Factory default Save to file Load from file							
Identity settings IP							
Transformer							
Phase mapping Mode Fixed IP Adress	- 🥥						
Measuringvariants							
Nominalvalues							
Events IP-address preset 192.168.1/1.92	<u> </u>						
Event recording subnet mask 255.255.255.0							
Iransients default gateway 192, 168, 171, 1							
Iransient recording							
Averaging intervals Reservation conformation Settings DNS							
memory configuration							
DNS server 192.168.171. 1							
Timotopo							
Topute							
Digital outputs							
Serial ports							
field bus profiles							
ip configuration							
I/O naming							
Online recording							

#### Inputting online

- Changing the report times for the online inputting of the measurement values.
- Drag the desired measurement value from the <u>Value tree window</u> to the online inputting configuration window.
- Set the desired report times.



### Interfaces

#### Connection

Connection PC - UMG 604

Example 1 (RS232-RS485 connection): The PC has an RS232 interface and the UMG604 an RS485 interface. An

interface converter is required.



Example 2 (direct Ethernet connection):

The PC and the UMG604 have an Ethernet interface. Because there is a direct connection, a "twisted" patch cable must be used.



Example 3 (Ethernet connection):

The PC and the UMG604 have an Ethernet interface. The connection is established in a network via a switch or a hub.



Example 4 (BACnet gateway connection):

The UMG604 is used as a BACnet gateway with which to connect RS485 devices (e.g. UMG96S). The UMG604 is the Modbus master (RS485) and the UMG96S the Modbus slave, whereby the BACnet shows the UMG96S as the UMG604's virtual device. A Jasic program queries the measurement values for the connected devices and provides the values to the BACnet.



Example 5 (Modbus gateway connection):

The UMG604 is used as a gateway with which to connect RS485 devices (e.g. UMG96S). The UMG604 is the Modbus master (RS485) and the UMG96S the Modbus slave, whereby the baud rate to be set for both devices must concur. A Jasic program queries the measurement values for the connected UMG96S and makes them available for further processing.



### Ethernet

#### **Ethernet: General**

To be able to operate the UMG604 in the Ethernet, the UMG604 requires an Ethernet address. There are three options here:

• Fixed IP address

In networks without a DHCP server, the network address has to be set directly in the UMG604.

BootP

BootP allows for the fully automatic integration of a UMG604 in an existing network. However, BootP is an older protocol and does not provide the scope of functions provided by DHCP.

DHCP mode

DHCP allows for the fully automatic integration of a UMG604 into an existing network without additional configuration.

When started, the UMG604 automatically pulls the IP address, the network mask and the gateway from the DHCP server.

The respective settings can be programmed into the UMG604 under the parameter address 205.

0 = fixed IP

1 = BootP2 = DHCP

#### **Ethernet: Fixed IP address**

In networks without a DHCP server, the network address must be set directly in the UMG604. To do this, the following settings must be carried out:

- 1. Set up the UMG604 for a *fixed IP* address.
- 2. Set the desired IP address, IP mask and IP gateway.

Put the UMG604 into programming mode as explained in the operating manual and, using the keys 1 and 2, input the following addresses:

Address 300 = xxx --- (IP address) 301 = --- xxx --- (IP address) 302 = --- xxx --- (IP address) 303 = --- xxx (IP address) 304 = xxx --- (IP mask) 305 = --- xxx --- (IP mask) 306 = --- xxx --- (IP mask) 307 = --- xxx (IP mask) 310 = xxx --- (IP gateway) 311 = --- xxx --- (IP gateway) 312 = --- xxx --- (IP gateway) 313 = --- xxx (IP gateway)

#### **Ethernet: Ports**

Devices equipped with the Ethernet option can use the following ports:

- UDP
  - TFTP 1201
  - Modbus/TCP 502
  - DHCP 68
  - NTP 123
  - BaCnet 47808
  - Nameservice 1200
- TCP
  - HTTP 80 (can be amended in the ini.jas)
  - FTP command port 21, (data port 1024, 1025, 1026, 1027)
  - Modbus/TCP 502 (4 ports)
  - Modbus RTU via Ethernet 8000 (1 port)

### Modbus

#### Modbus address list

A list of the measurement values available in the UMG604 with the corresponding addresses and formats can be found on the CD/DVD provided with GridVis.

#### Modbus status

The Modbus functions, *Write Modbus* and *Read Modbus*, provided in the programming language *Jasic* deliver status messages. These can be written to a *Log* file or displayed directly in the <u>Debug log</u>



#### Modbus status messages

- 0 (there are no faults)
- -1 (request submitted incorrectly)
  - There is a serious fault. This should not occur in the graphic programming.
- -2 (CRC fault)
  - Checksum fault
- -3 (device does not respond)
  - The device is not connected. The baud rate does not match up.
- -4 (device in Modbus slave mode)
  - For the Modbus functions, *Write Modbus* and *Read Modbus* in theprogramming language *Jasic*, the UMG604's RS485 interface must be switched to Modbus master.
- 1(illegal function)
  - The function code received in the query is not an allowable action for the slave. If a Poll Program Complete command was issued, this code indicates that no program function preceded it.
- 2 (illegal data address)
  - The data address received in the query is not an allowable address for the slave.
- 3 (illegal data value)
  - A value contained in the query data field is not an allowable value for the slave.
- 4 (slave device failure)
  - An unrecoverable error occurred while the slave was attempting to perform the requested action.
- 5 (acknowledge)
  - The slave has accepted the request and is processing it, but a long duration of time will be required to do so. This response is returned to prevent a timeout error from occurring in the master. The master can next issue a Poll Program Complete message to determine if processing is completed.
- 6 (slave device busy)
  - The slave is engaged in processing a long–duration program command. The master should retransmit the message later when the slave is free.
- 7 (negative acknowledge)
  - The slave cannot perform the program function received in the query. This code is returned for an unsuccessful programming request using function code 13 or 14 decimal. The master should request diagnostic or error information from the slave.
- 8 (memory parity error)
  - The slave attempted to read extended memory, but detected a parity error in the memory. The master can retry the request, but service may be required on the slave device.

**Printed Documentation** 

#### Modbus functions

As a **master**, the UMG604 supports the following Modbus functions:

- 01 Read coil status
  - Reads the ON/OFF status of discrete outputs (0X references, coils) in the slave. Broadcast is not supported.
- 02 Read input status
  - Reads the ON/OFF status of discrete inputs (0X references) in the slave. Broadcast is not supported.
- 03 Read holding registers
  - Reads the binary contents of holding registers (4X references) in the slave.
- 04 Read input registers
  - Reads the binary contents of input registers (3X references) in the slave.
- 05 Force single coil
  - Forces a single coil (0X references) to either ON or OFF. When broadcast, the function forces the same coil reference in all attached slaves.
- 06 Preset single register
  - Presets a value into a single holding register (4X reference). When broadcast, the function presets the same register reference in all attached slaves.
- 15 (0F Hex) Force multiple coils
  - Forces each coil (0X references) in a sequence of coils to either ON or OFF. When broadcast, the function forces the same coil reference in all attached slaves.
- 16 (10Hex) Preset multiple registers
  - Presets values into a sequence of holding registers (4X references). When broadcast, the function presets the same register references in all attached slaves.
- 23 (17Hex) Read/write 4X registers
  - Performs a combination of one read and one write operation in a single Modbus transaction. The function can write new contents to a group of 4XXXX registers, and then return the contents of another group of 4XXXX registers. Broadcast is not supported.
  - ٠

As a **slave** the UMG604 supports the following Modbus functions:

- 03 Read holding registers
  - Reads the binary contents of holding registers (4X references) in the slave.
- 04 Read input registers
  - Reads the binary contents of input registers (3X references) in the slave.
- 06 Preset single register
  - Presets a value into a single holding register (4X reference). When broadcast, the function presets the same register reference in all attached slaves.
- 16 (10Hex) Preset multiple registers
  - Presets values into a sequence of holding registers (4X references). When broadcast, the function presets the same register references in all attached slaves.
- 23 (17Hex) Read/write 4X registers
  - Performs a combination of one read and one write operation in a single Modbus transaction. The function can write new contents to a group of 4XXXX registers, and then return the contents of another group of 4XXXX registers. Broadcast is not supported.

### BACnet

#### **BACnet: General**

**BACnet** = **B**uilding **A**utomation and **C**ontrol **Net**works is network protocol used in building automation.

BACnet ensures that devices made by different manufacturers can operate together as long as the partners involved in a project agree on certain BIBB standards. A BIBB (BACnet Interoperability Building Block) defines which services and procedures must be supported on the server and client sides in order to realise certain system requirements.

The UMG604 supports the **Device type B-SA** with the DS-RP-B and DS-WP-B BIBBs. The DS-WP-B, DS-WPM-B, AE-N-B and AE-N-B BIBBs are also supported.

A Jasic program provides the interface between the BACnet protocol in the UMG604 and external devices (GLT, UMG 96S, devices from third parties, etc.).

- BACnet is a software add-on subject to purchase and must be activated.
- The BACnet can only be activated directly on the device.
- The two 4-digit codes which comprise the activation code must be entered on the device under the addresses 520 and 521.
- The user can customise the interface (Jasic program).
- Jasic programs are accessible to the user, who is able to amend them.
- Amending or writing Jasic programs requires only basic programming knowledge.
- BACnet knowledge is necessary to be able to customise the BACnet interface in a Jasic program.
- Janitza electronics GmbH has the BACnet vendor ID number: 316.

**BACnet: Jasic example 1** 

Programming example (Jasic program) for the transfer of data from one UMG604 to the BACnet.

The name of the program in GridVis: "Program 1"

```
Create REM-structured variables (BACnet headers)
record main_dev = (int,error) (string,name$)(string,desc$)(string,location$) (int,mac)
(int,instance)
```

Add measurement values to the REM structure. REM all of the available measurement values are described in the system variables list. The list can be opened under Help in Jasic. addrecord main\_dev = (system,\_uln[0..3]) (system,\_iln[0..3]) (system,\_sln[0..3]) (system,\_freq)

REM fill structure REM mac = 0 -> local network dev.mac =0

REM identify entity / name / description / location main\_dev.mac =0; main\_dev.instance=102; main\_dev.name\$="UMG604" main\_dev.desc\$="Netzanalyse" main\_dev.location\$="Fertigung"

REM login structrure in the system call init\_bacnet\_device main\_dev



Fig.: Example of the operation of a UMG 604 via Ethernet in the BACnet.

#### BACnet: Jasic example 2

# Programming example (Jasic program) for the transfer of data from a UMG604 and a UMG103 to the BACnet.

- A UMG604 is connected to a PC by the Ethernet. The BACnet protocol is selected for this connection.
- An additional device, in this case a UMG103, is connected to the UMG604 via an RS485 interface. This connection uses the MODBUS protocol.
- The UMG604 reads out the UMG103 measurement values via the RS485 interface.

A Jasic program reads out measurement values from the UMG103 and configures the UMG604 for the BACnet. With GridVis it is possible to generate the Jasic program, which runs on the UMG604.

The name of the program in GridVis: "Program 2"

```
REM - Attention! BACnet only works with global variables.
global (FLOAT,_spannung_103a[0..2],0,0,"Volt",0)
global (FLOAT,_strom_103a[0..2],0,0,"A",0)
global (FLOAT,_leistung_103a[0..2],0,0,"W",0)
```

REM The UMG604 sends "Iam" every 5 seconds \_bacnet\_sendIam\_time = 5 REM baud rate 0=9600 baud \_baud485=0 REM 1= Master \_mode485=1 REM UMG604, Modbus address = 10 mbusaddr=10

```
REM measurement values from the UMG103 via RS485 (MODBUS)
record umg103_modbus = (int,error) (int,addr) (int,fcode) (int,index) (hfloat,uln[0..2])
(hfloat,ull[0..2]) (hfloat,i[0..3]) (hfloat,p[0..3]) (hfloat,q[0..3])
```

```
REM measurement values from the UMG103 and from the UMG604 for BACnet.
record main_dev = (int,error) (string,name$)(string,desc$)(string,location$) (int,mac)
(int,instance)
addrecord main_dev = (system,_uln[0..3]) (system,_iln[0..3]) (system,_sln[0..3]) (system,_freq)
record umg103_0 = (int,error) (string,name$)(string,desc$)(string,location$) (int,mac)
(int,instance)
addrecord umg103_0 = (system,_spannung_103a[0..2]) (system,_strom_103a[0..2])
(system,_leistung_103a[0..2])
```

```
REM UMG604, BACnet settings
main_dev.mac =0
main_dev.instance=123
main_dev.name$="UMG604"
main_dev.desc$="Netzanalyse"
main_dev.location$="Fertigung"
```

REM UMG103, BACnet settings umg103\_0.mac =10 umg103\_0.instance=1 umg103\_0.name\$="UMG103"

```
umg103_0.desc$="Netzanalyse"
umg103_0.location$="Büro"
```

call init\_bacnet\_device main\_dev call init\_bacnet\_device umg103\_0

REM UMG103, MODBUS settings umg103\_modbus.addr = 1 umg103\_modbus.fcode = 3 umg103\_modbus.index = 1000

loop:

```
REM get measurement values from the Modbus device.

call read_modbus_485 umg103_modbus

for i=0 to 2 do

REM transfer measurement values from MODBUS to BACnet.

_spannung_103a[i] = umg103_modbus.uln[i]

_strom_103a[i] = umg103_modbus.i[i]

_leistung_103a[i] = umg103_modbus.p[i]

next i

REM msync = 200ms

wait(msync)

goto loop
```



Fig.: Example of the operation of a UMG 604 with a UMG103 via Ethernet in the BACnet.

#### BACnet: Jasic example 3

# Programming example (Jasic program) for the transfer of data from one UMG604 and two UMG103 to the BACnet.

- A UMG604 is connected to a PC by the Ethernet. The BACnet protocol is selected for this connection.
- Two additional devices (UMG103) are connected to the UMG604 via an RS485 interface. This connection uses the MODBUS protocol.
- The UMG604 reads out the devices' measurement values via the RS485 interface.

A Jasic program reads out measurement values from the devices and configures the UMG604 for BACnet.

GridVis can generate the Jasic program, which runs on the UMG604.

The name of the program in GridVis: "Program 3"

REM - Attention! BACnet only works with global variables. global (FLOAT,\_spannung[0..5],0,0,"Volt",0) global (FLOAT,\_strom[0..5],0,0,"A",0) global (FLOAT,\_leistung[0..5],0,0,"W",0)

REM The UMG604 sends "Iam" every 5 seconds \_bacnet\_sendIam\_time = 5 REM baud rate 0=9600 baud \_baud485=0 REM 1= Master \_mode485=1 REM UMG604, Modbus address = 10 \_mbusaddr=10

```
REM measurement values from the UMG103s via RS485 (MODBUS)
record umg103_modbus = (int,error) (int,addr) (int,fcode) (int,index) (hfloat,uln[0..2])
(hfloat,ull[0..2]) (hfloat,i[0..3]) (hfloat,p[0..3]) (hfloat,q[0..3])
```

```
REM measurement values from the UMG103s and the UMG604 for BACnet
record main_dev = (int,error) (string,name$)(string,desc$)(string,location$) (int,mac)
(int,instance)
addrecord main_dev = (system,_uln[0..3]) (system,_iln[0..3]) (system,_sln[0..3]) (system,_freq)
record umg103_0 = (int,error) (string,name$)(string,desc$)(string,location$) (int,mac)
(int,instance)
addrecord umg103_0 = (system,_spannung[0..2]) (system,_strom[0..2]) (system,_leistung[0..2])
record umg103_1 = (int,error) (string,name$)(string,desc$)(string,location$) (int,mac)
(int,instance)
addrecord umg103_1 = (system, spannung[3..5]) (system, strom[3..5]) (system, leistung[3..5])
```

REM UMG604, BACnet settings main\_dev.mac =0 main\_dev.instance=123 main\_dev.name\$="UMG604" main\_dev.desc\$="Netzanalyse" main\_dev.location\$="Fertigung"

REM UMG103, BACnet settings umg103\_0.mac =10 umg103\_0.instance=1 umg103\_0.name\$="UMG103"

```
umg103 0.desc$="Kostenerfassung"
umg103_0.location$="Halle 1"
umg103_1.mac =10
umg103_1.instance=2
umg103_1.name$="UMG103_a"
umg103_1.desc$="Kostenerfassung"
umg103_1.location$="Halle 2"
call init_bacnet_device main_dev
call init_bacnet_device umg103_0
call init_bacnet_device umg103_1
REM UMG103, MODBUS start address and settings
umg103_modbus.addr = 1
umg103 modbus.fcode = 3
umg103_modbus.index = 1000
loop:
 for j=0 to 1 do
REM get measurement values from the MODBUS devices.
  umg103_modbus.addr=j+1
  call read_modbus_485 umg103_modbus
  if umg103_modbus.error=0 then
   for i=0 to 2 do
REM transfer measurement values from MODBUS to BACnet.
    _spannung[i+j*3] = umg103_modbus.uln[i]
    _strom[i+j*3] = umg103_modbus.i[i]
    _leistung[i+j*3] = umg103_modbus.p[i]
   next i
  else
   print "Error read device Nr",j+1,"\r\n"
  endif
 next j
REM msync = 200ms
 wait(msync)
goto loop
```



Fig.: Example of the operation of a UMG 604 with two UMG103 via Ethernet in the BACnet.

#### UMG604 in the BACnet

An Ethernet network connects one PC and two UMG604. The RS485 interface connects two UMG103 to a single UMG604.

- A UMG604 can manage a max. 90 dedicated objects of its own.
- A UMG604 can manage a max. 40 objects per connected device (e.g. UMG103).
- A Jasic program is used to assign measurement values to the respective device.
- The UMG604 can manage a max of 32 virtual devices (0..31), each with 40 dedicated objects of its own.
- One measurement value in the UMG604 corresponds with the "analogue input" in the BACnet.
- All of the remaining float values correspond with the "analogues values" in the BACnet.



Fig.: Example of the operation of 2 UMG604 and 2 UMG103 in the BACnet.

### Profibus

#### Profibus profiles

A Profibus profile contains the data to be exchanged between a UMG and a PLC. A Profibus profile can:

- Retrieve measurement values from the UMG,
- Set the digital outputs in the UMG and
- Query the status of the digital inputs in the UMG.

A Profibus profile can hold a maximum of 127 bytes of data. If more data has to be transferred, simply create additional Profibus profiles.

- Every Profibus profile has a profile number. The profile number is sent by the PLC to the UMG.
- Using GridVis, 16 Profibus profiles (profile numbers 0..15) can be edited.
- Additional Profibus profiles (profile numbers 16..255) can be created using Jasic programs.
- Four Profibus profiles have been preconfigured in the factory.

Profibus profiles preconfigured in the factory:

	Byte		Value	Scaling
	Index	Value type	format	
1	1	Voltage I 1-N	float	1
2	5	Voltage L2-N	float	1
3	ğ	Voltage L3-N	float	1
4	13	Voltage L4-N	float	1
5	17	Voltage L2-L1	float	1
6	21	Voltage L3-L2	float	1
7	25	Voltage L1-L3	float	1
8	29	Current L1	float	1
9	33	Current L2	float	1
10	37	Current L3	float	1
11	41	Current I 4	float	1
12	45	Effective power L1	float	1
13	49	Effective power L2	float	1
14	53	Effective power L3	float	1
15	57	Effective power L4	float	1
16	61	Cosphi (math.) L1	float	1
17	65	Cosphi (math.) L2	float	1
18	69	Cosphi (math.) L3	float	1
19	73	Cosphi (math.) L4	float	1
20	77	Frequency	float	1
21	81	Effective power total L1-L4	float	1
22	85	Reactive power L1-L4	float	1
23	89	Apparent power total L1-L4	float	1
24	93	Cosphi (math.) total L1-L4	float	1
25	97	Effective current total L1-L4	float	1
26	101	Effective consumption total L1-L4	float	1
27	105	Ind. reactive consum. total L1-L4	float	1
28	109	THD voltage L1	float	1
29	113	THD voltage L2	float	1
30	117	THD voltage L3	float	1
31	121	THD voltage L4	float	1

# Profibus profile number 0

# Profibus profile number 1

	Byte- Index	Value type	Values- format	Scaling
1	1	Voltage L1-N	Float	1
2	5	Voltage L2-N	Float	1
3	9	Voltage L3-N	Float	1
4	13	Voltage L2-L1	Float	1
5	17	Voltage L3-L2	Float	1
6	21	Voltage L1-L3	Float	1
7	25	Current L1	Float	1
8	29	Current L2	Float	1
9	33	Current L3	Float	1
10	37	Effective power L1	Float	1
11	41	Effective power L2	Float	1
12	45	Effective power L3	Float	1
13	49	Cosphi (math.) L1	Float	1
14	53	Cosphi (math.) L2	Float	1
15	57	Cosphi (math.) L3	Float	1
16	61	Frequency	Float	1
17	65	Effective power total L1-L3	Float	1
18	69	Reactive power total L1-L3	Float	1
19	73	Apparent power total L1-L3	Float	1
20	77	Cosphi (math.) total L1-L3	Float	1
21	81	Effective current total L1-L3	Float	1
22	85	Effective consumption total L1-L3	Float	1
23	89	Ind. Reactive consum. total L1-L3	Float	1
24	93	THD voltage L1	Float	1
25	97	THD voltage L2	Float	1
26	101	THD voltage L3	Float	1
27	105	THD current L1	Float	1
28	109	THD current L2	Float	1
29	113	THD current L3	Float	1

# Profibus profile number 2

	Byte- Index	Value type	Values- Format	Scaling
1 2 3 4 5 6 7 8 9 10 11	1 5 9 13 17 21 25 29 33 37 41 45	Effective consumption total L1-L3 Drawn eff. consum. total L1-L3 Supplied eff. consum. total L1-L3 Reactive consumption total L1-L3 Ind. reactive consum. total L1-L3 Cap. reactive consum. total L1-L3 Apparent consumption total L1-L3 Effective consumption L1 Effective consumption L2 Effective reactive consumption L1 Inductive reactive consumption L2	Float Float Float Float Float Float Float Float Float Float Float Float	1 1 1 1 1 1 1 1

	Byte- Index	Value type	Values- Format	Scaling
1	1	Effective power L1	Float	1
2	5	Effective power L2	Float	1
3	9	Effective power L3	Float	1
4	13	Effective power total L1-L3	Float	1
5	17	Current L1	Float	1
6	21	Current L2	Float	1
7	25	Current L3	Float	1
8	29	Current total L1-L3	Float	1
9	33	Effective consumption total L1-L3	Float	1
10	37	CosPhi (math.) L1	Float	1
11	41	CosPhi (math.) L2	Float	1
12	45	CosPhi (math.) L3	Float	1
13	49	CosPhi (math.) total L1-L3	Float	1
14	53	Reactive power L1	Float	1
15	53	Reactive power L2	Float	1
16	53	Reactive power L3	Float	1
17	53	Reactive power total L1-L3	Float	1
18	53	Apparent power L1	Float	1
19	53	Apparent power L2	Float	1
20	53	Apparent power L3	Float	1
21	53	Apparent power total L1-L3	Float	1

# Profibus profile number 3

#### Using Profibus to retrieve measurement values (example)

- At least one <u>Profibus profile</u> must be set up with GridVis and transferred to the UMG604.
- A Jasic program is not required.



#### Programming the Profibus profile with GridVis

- Open the device configuration window and select fieldbus profile.
- Select a profile number.
- Select "Edit" and drag the desired measurement values into the Profibus profile.
- In this example, only frequency was selected for the Profibus profile with the profile number 0.

Please note: Once created, Profibus profiles can be changed but not deleted.

🔛 GridVis-2.2.0-Beta-3-PRE(2011-05-05_10-03-39) [Project]								
File Edit View Tools Window Help								
Configuration[Device-6]	Configuration[Device-6] 8							
S S Transmit Transmit to	Reload Factory default Save to file Load from file							
Identity	Identity Profiles for Profibus-access							
Transformer		4						
Phase mapping	Profile nr. 0	Edit						
Measuringvariants	Comment 4 / 127 Bytes							
Nominalvalues	Byte order big endian							
Events								
Event recording	Voltage effective L1 Voltage effectiv							
Transients	Profile nr. 1 Voltage effective L2 Voltage effectiv							
Transient recording	Comment 32 / 127 Bytes Voltage effective L3 Voltage effectiv							
Averaging intervals	Byte order big endian Voltage effective L4							
Recording configuration	Voltage effective L2-L1							
memory configuration	Profile nr. 2 Current effective L1 Current effectiv							
time	Current effective L2							
Timezone	Rute order big endian Ourrent effective L4							
Inputs	Current effective Sum L1-L3							
Digital outputs	Active Power L1 Active Power Sum L							
Serial ports	Profile nr. 3 Active Power L2							
field bus profiles	Comment 24 / 127 Bytes Active Power L3							
ip configuration	Byte order big endian Active Power L4							
I/O naming	Active Power Sum L1-L3							
Online recording								
		]						

#### Display of the variables in the PLC

- PAB 0 : The <u>Profibus profile</u> (profile number 0) requested by the UMG604 is input here
- PAB 1 : Data transferred to the UMG604. This data can only be analysed using a customer-specific Jasic program.
- PEB 272 : Return signal from the profile number. In this example, the profile number =0.
- PED 273 : Data provided by the UMG604. In this example, the frequency.

🔛 Var - @VAT1 📃 🗆 🗙							
<u>I</u> abelle <u>B</u> earbeiten <u>E</u> infügen <u>Z</u> ielsystem <u>V</u> ariable <u>A</u> nsicht E <u>x</u> tras <u>F</u> enster <u>H</u> ilfe							
Ope:	rand	Symbol	Statusformat	Statuswert	Steuerwert		
PAB	0		DEZ	Kein Statuswert vorhanden!	0		
РАВ	1		BIN	Kein Statuswert vorhanden!	2#0000_0001		
PEB	272		DEZ	0			
PED	273		GLEITPUNKT	49.99206			
MPI = 2 (direkt) EF Online Beobachten							

#### Example: Set digital output 1 and digital output 2 using Profibus.

- A customer-specific Jasic program is required.
- Programming can be carried out with graphic components.



Jasic program (customer-specific)



The content in bit 0 from byte 2 is transferred to digital output 1 of the UMG604. The content in bit 1 from byte 2 is transferred to digital output 2 of the UMG604.
#### Example: Processing data as required by the customer.

- All data in the PLC process output box is transferred to a customer-specific Jasic program in the UMG604.
- The customer-specific Jasic program provides the data for the PLC process output box.
- A Jasic program uses Profibus profiles with the profile numbers 16 to 255.
- The <u>Profibus profiles</u> with the profile numbers 0 to 15 are reserved for GridVis.



## Security

### File permissions

- Read and write permissions are identical and depend on the login (FTP).
- Read permissions for data files and logs can be configured.
- ADMINISTRATORS can write and delete.

#### **Directory permissions**

Directories created by the system cannot be deleted.

• /

- This can be read by GUESTS and written and deleted by the SYSTEM.
- /data

This and the subdirectories can be read by the USER and written and deleted by the  $\ensuremath{\mathsf{SYSTEM}}$  .

/sys

This and the subdirectories can be read by the USER and written and deleted by ADMIN.

• /basic

This and the subdirectories can be read, written and deleted by the USER.

/http

This and the subdirectories can be read by GUESTS and written and deleted by the USER.

#### Encryption

- Files between GridVis and the UMG604 can be encrypted for transmission.
- Files can be AES encrypted.
- AES stands for Advanced Encryption Standard. AES is a symmetrical encryption technology.

#### Authentication procedure

- The UMG604 can use the CRAM-MD5 authentication procedure when connecting to GridVis.
- With this process, the password is not transferred in plain text.
- The process is explained in the RFC2195.

#### Password

## FTP password (admin)

- Allows access to all of the values listed in the *Modbus address list*in the device.
- Allows access to all of the Jasic programs in the device.
- Allows the device's homepage to be updated.
- Factory default setting
- Username: admin
- Password: Janitza
- Password forgotten-

## FTP password (user)

- Allows access to all of the values listed in the *Modbus address list*in the device.
- Allows access to all of the Jasic programs in the device.
- Allows the device's homepage to be updated.
- Factory default setting
- Username: user
- Password: Janitza
- **Password forgotten** Using GridVis, establish a secure connection to the device and log in as admin.

## • FTP password (guest)

- Allows access to all of the values listed in the *Modbus address list*in the device.
- Allows access to all of the Jasic programs in the device.
- Allows the device's homepage to be updated.
- Factory default setting
- Username: guest
- Password: Janitza
- Password forgotten-

## Homepage password

- The homepage password (Modbus address 502) provides administrator rights for the device homepage.
- The homepage password enables loading and starting Jasic programs on the device homepage.
- Password mode (Modbus address 501). The UMG604 uses three different password modes to access the homepage:
  - 0 The homepage password is not requested at all. (Factory default setting)
  - 2 The ability to change the configuration and to display measurement values requires the password to be entered once.
  - 128 Every change in the configuration requires that the password be entered again.
- The factory default setting for the homepage password is 0.
- The homepage password has 4 digits.
- The homepage password is requested every time the homepage is opened.

- The homepage password is requested again after 5 minutes of inactivity.
- **Password forgotten** Using GridVis, establish a secure connection to the device and log in as admin.

## Display password

- To make it difficult for program files to be changed accidentally on the device, the UMG604 can be programmed with a 4-digit display password (Modbus address 500).
- The factory default setting does not request a display password.
- A forgotten display password can only be deleted using GridVis together with the FTP password.
- The display password has 4 digits.
- The display password can be input directly in the UMG604.
- **Password forgotten** Using GridVis, establish a secure connection to the device and log in as admin.

## GridVis and FTP programs

- The FTP password is required.
- The FTP password is required in order to transfer files between GridVis and the device via *Modbus TCP*.
- The FTP password is required in order to transfer files between GridVis and the device via *Modbus RTU over Ethernet*.

## • Modbus TCP, Modbus RTU

- No password protection is provided for, in order to enable retrieving measurement values (Modbus address list) using the *Modbus RTU protocol*.
- The FTP password is required in order to transfer files between GridVis and the device via *Modbus TCP*.
- The FTP password is required in order to transfer files between GridVis and the device via *Modbus RTU over Ethernet*.

### • Profibus

• Profibus does not require a password.

## **Extensions with apps**

#### Cost centre accounting

Cost centre accounting provides a quick overview of the energy consumption and the associated costs.

- Cost centre accounting is a demonstration program for which no guarantee is assumed. The program is not subject to purchase and does not require activation.
- Cost centre accounting can be installed as an <u>app</u> with GridVis. This <u>app</u> can be loaded from the data carrier included in the scope of delivery.

#### **Reactive consumption controller**

Gradual adjustment of the phase shift angle cos(phi) together with externally aligned capacitor units.

Together with additional external components such as capacitor contactors and power capacitors, the reactive consumption controller function is used to maintain a default target cos(phi).

- The reactive consumption controller function is a software add-on, subject to purchase, and requires both activation on the UMG604 and installation of an <u>app</u> with GridVis.
- The two 4-digit codes which comprise the activation code must be entered on the device under the addresses 510 and 511 to activate the reactive consumption controller function.
- The reactive consumption controller function <u>app</u> comprises a Jasic inline code and a homepage add-on.
- Measurement values for the reactive consumption controller function are selected and the assignment of the inputs and outputs are made by a Jasic program.
- The reactive consumption controller function is available four times.
- Each reactive consumption controller function can switch up to 16 outputs.
- An output can switch up to 5 times per second.
- The switches and the measurement values are shown on the UMG604 homepage.
- The default target cos(phi), the discharge times for the capacitors, the capacitor power output, etc. can be set on UMG604 homepage.
- The reactive consumption controller function can also be used to:
  - Compensate for individual phases,
  - Compensate for unevenly loaded networks so that all of the phases reach approximately the same actual cost(phi).

#### EMAX add-on

The EMAX add-on is used to maintain a preset mean output within a given measurement period when drawing electricity.

- The EMAX is a software add-on, subject to purchase, and requires both activation on the UMG604 and installation of an <u>app</u> with GridVis.
- The two 4-digit codes which comprise the activation code must be entered on the device under the addresses 510 and 511 to activate the EMAX function.
- The EMAX function <u>app</u> comprises a Jasic inline code and a homepage add-on.
- Output values for the EMAX calculations are selected and the assignment of the inputs and outputs are made by a Jasic program.
- The EMAX measurement values are shown on the UMG604 homepage.
- Inputting the target values, the duration of the measurement period and the consumer properties can take place on UMG604 homepage.

#### **EMAX** functions

- Duration of the measurement period
- Resetting the measurement period
- Target value
- Trend value
- Trend calculation
- Actual value
- Involved consumers
- Consumers, digital consumer control
  - Priority
  - Connected load
  - Minimum switch on-time
  - Minimum switch off-time
  - Maximum switch off-time
  - Availability
- Consumers, analogue consumer control
  - Priority
  - Maximum connected load
  - Minimum connected load
  - Maximum savings
  - Run-up period
- Consumers, generator control
  - Priority
  - Maximum connected load
  - Minimum connected load
  - Lead time
  - Minimum run-time
- Off-time
- Interval-time
- Priority
- Connected load
- Minimum switch off-time
- Minimum switch on-time
- Maximum switch off-time
- Availability
- Rate conversion
- Capture period

UMG 604

# UMG 511

## General

#### Measuring

The UMG511 has 4 measurement channels used to measure the current (I1..I4) and 4 measurement channels used to measure the voltage (V1..V4 against Vref). Measured voltage and measured current for the measurement channels 1-4 must derive from the same network.

- Baseline measurement
  - The baseline measurement uses the measurement channels 1-3.
  - Use the measurement channels 1-3 in three-phase systems.
- Supporting measurement
  - The supporting measurement only uses measurement channel 4.
  - Use measurement channel 4 when measuring in single-phase systems or in three-phase systems with symmetrical loads.
  - The frequency setting and the setting for the relevant voltage are pulled automatically from the baseline measurement settings.

#### Half wave effective value

- A half wave effective value is a measurement value that corresponds with the formation of a full wave over a measurement period.
- For half wave effective values, measurement results are generated every 10ms (50Hz) or every 8.3Hz (60Hz).
- Half wave effective values CANNOT be used in Jasic programs.
- Calculated full wave effective values
  - Voltage, UL1-N, UL2-N, UL3-N, UL4-N
  - Current, IL1, IL2, IL3, IL4
- Calculation of the half wave effective values



#### **Base frequency**

- The UMG511 works in networks with base frequencies from 15 to 440Hz.
- If a fixed base frequency of 50Hz or 60Hz has been set in the UMG511,
  - the voltage quality will be measured in accordance with EN61000-4-30 Class A,
  - and flicker calculated in accordance with EN61000-4-15.
- If automatic frequency recognition has been selected,
  - voltage quality will be measured in accordance with EN61000-4-30 Class S (because there is no synchronisation of the 10 minute measurement windows),
  - and no flicker is calculated in accordance with EN61000-4-15.

#### Jasic

- 7 Jasic programs can be carried out simultaneously in the UMG511.
- 128 kByte of memory is available for each program.
- Jasic programs are easily created with the <u>graphic programming</u> integrated into GridVis.

#### **Relevant voltage**

In three-phase systems, measurements can be carried out between the outer conductors and between the outer conductors and the star point.

The relevant voltage indicates whether a measurement is to be made between the

- outer conductors (mesh voltage) L-L or between
- the outer conductors and the star point (star voltage) L-N

Establishing the relevant voltage is required in order to calculate

- Transients,
- Events and
- Flicker

.

#### Measuring mean voltage flicker

Example of a flicker measurement in a mean voltage network.



The relevant voltage indicates whether a measurement is to be made between the

- outer conductors (mesh voltage) L-L or between
- the outer conductors and the star point (star voltage) L-N

Establishing the relevant voltage is required in order to calculate

- Transients,
- Events and
- Flicker

## Integrate into the GridVis

#### Adding a UMG511

Create a new UMG511 in GridVis and determine the appropriate type of connection for your device (First steps, Adding new device).

- Ethernet interface with the connection types TCP/IP and Modbus via Ethernet
- RS485 interface with the connection type Modbus RTU (RS485)

#### **Connection types**

TCP/IP connection

A "twisted" patch cable is required in order to establish a direct connection between a PC and a UMG511 via the Ethernet interface. A normal patch cable is used when establishing a connection in a network (a hub/switch is present).

- The UMG511 address can be pulled via DHCP from a server or a fixed address set directly in the UMG604.
- The address can be input as an address or as a name.
- Using Timeout it is possible to limit the time in which to attempt to establish a connection, when no connection exists.

#### • Modbus RTU (RS485/RS232)

An interface converter is required in order to connect the UMG511 to the PC's RS232 interface and to configure it and read it with GridVis.

- An interface converter from RS485 (UMG511) to RS232 (PC) is required.
- Set the PC's RS232 interface (e.g. COM1) to be used as the interface.
- Also connect the interface converter to this interface (e.g. COM1).
- The baud rate is the speed at which the data is to be transmitted between the PC, the interface converter and the UMG511.
- Because more than one UMG511 can be connected to the interface converter, the device address set in the UMG511 must also be set in the interface converter.
- If no connection could be established to the UMG511, an attempt will be repeated following the set Timeout.
- When attempting to read data from the UMG511, the number of attempted connections will be limited by the number set under Max. no. of attempts.
- With online measurements, GridVis will repeatedly attempt to establish a connection to the UMG511.

• Ethernet gateway (e.g. for devices connected to the RS485) A gateway is required in order to connect a UMG96S via Ethernet to the PC and to configure it and read it with GridVis. A UMG511 can be used to establish this gateway function (<u>Connection example 5</u>).

- The gateway address (e.g. 192.168.1.1) must be set under the connection settings (see Fig. Configuring the connection).
- Because more than one device (e.g. UMG96S) can be connected to the gateway, the device address set in the UMG96S must also be set under the connection settings (see Fig. *Configuring the connection*).
- If it is not possible to establish a connection with the UMG96S, an attempt will be repeated following the set Timeout.

- When attempting to read data from the UMG96S, the number of attempted connections will be limited by the number set under *Max. no.* of attempts.
- The connection protocol must be set via the *Modbus protocol*. TCP/IP packets are used when connecting via Modbus TCP. The TCP port 502 is reserved for Modbus TCP.
- With online measurements, GridVis will repeatedly attempt to establish a connection to the UMG96S.

Configure conne	ection (Device-3)					
Connection type Et	Connection type Ethernet gateway (eg. for devices over RS485)					
UMG96S [Ethernet g	UMG96S [Ethernet gateway (eg. for devices over RS485)]					
Host	192.168.1.1					
Port	8,000 🛋					
Device address	1					
Time out [millisec.]	5,000 🚔					
Max. no. retries	3 🜩					
modbus protocol O Modbus-TCP O Modbus-RTU (	Ethernet encapsulated)					
	Connection test					
	OK Cancel					

Secured TCP

A connection between a PC and a UMG604 via TCP/IP connection with secured access data.

- The UMG511 address can be pulled via DHCP from a server or a fixed address set directly in the UMG511.
- Using Timeout it is possible to limit the time in which to attempt to establish a connection, when no connection exists.
- Enter your access data (username, password) for a secured connection.

#### Connection

Connection PC - UMG 511

Example 1 (RS232-RS485 connection):

The PC has an RS232 interface and the UMG511 an RS485 interface. An interface converter is required.



Example 2 (direct Ethernet connection):

The PC and the UMG511 have an Ethernet interface. Because there is a direct connection, a "twisted" patch cable must be used.



Example 3 (Ethernet connection):

The PC and the UMG511 have an Ethernet interface. The connection is established in a network via a switch or a hub.



Example 4 (BACnet gateway connection):

The UMG511 is used as a BACnet gateway with which to connect RS485 devices (e.g. UMG96S). The UMG604 is the Modbus master (RS485) and the UMG96S the Modbus slave, whereby the BACnet shows the UMG96S as the UMG511's virtual device. A Jasic program queries the measurement values for the connected devices and provides the values to the BACnet.



Example 5 (Modbus gateway connection):

The UMG511 is used as a gateway with which to connect RS485 devices (e.g. UMG96S). The UMG511 is the Modbus master (RS485) and the UMG96S the Modbus slave, whereby the baud rate to be set for both devices must concur. A Jasic program queries the measurement values for the connected UMG96S and makes them available for further processing.



## Configuration

#### Identity

- The name is used, among other things, to identify the device in the device list.
- Additional information can be saved under Description.

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Identity	Name Devic	e-2			
Dhase magning	Description Desci	- 9			
Measuringuariante	Description Devic	e-2			
Nominalvaluer					
Ripple control					
Events					
Event recording					
Transients					
Transient recording					
Averaging intervals					
Recording configuration					
memory configuration					
time					
Timezone					
Inputs					
Digital outputs					
Serial ports					
field bus profiles					
ip configuration					
Flicker					
I/O naming					
Online recording					

#### Transformers

- Measuring voltage
  - Three-phase, 4-conductor networks with earthed neutral line
    - Rated voltages (L-N/PE) to a maximum of 417V
    - Rated voltages (L-N/PE) to a maximum of 277V in accordance with UL
  - Three-phase, 3-conductor networks, not earthed
    - Rated voltages (L-L) to a maximum of 480V
  - Voltage converters are necessary in networks with higher rated voltages
- Voltage converter
  - The converter requirements for the <u>baseline measurement</u> and <u>supporting</u> <u>measurement</u> must be determined separately.
  - Select the 400/400V setting when measuring without a voltage converter.
- Measuring current
  - The UMG511 can measure currents up to 5A directly. Observe the installation guide when doing this.
  - Converters are used when measuring currents greater than 5A.
- Current converter
  - The converter requirements for the <u>baseline measurement</u> and <u>supporting</u> <u>measurement</u> must be determined separately.
  - Select the 5/5A setting when measuring currents directly.

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6 6	0			<b>_</b>	
Transmit Transmit	to Reload F	actory default	Save to file	Load from file	
Identity	Main input				
Transformer		Primary	Seconda	ry	
Phase mapping	Voltage transformer	400 ol V	400.0	v 🔿	
Measuringvariants	voltage transformer	100.0	• 100.0		
Nominalvalues	Current transformer	5.0 A	/ 5.0	Α 🌑	
Ripple control					
Events					
Event recording					
Transients					
Transient recording					
Averaging intervals					
Recording configuration	Austilians innut				
memory configuration	Auxiliary input	Deimanu	Conneda		
time		Primary	Seconda	ry	
Timezone	Voltage transformer	400.0 V	400.0	V 🍊	
Digital outputs	Current transformer	5.0 A	🥥 / 5.0	Α 🥥	
Serial ports					
field bus profiles					
ip configuration					
Flicker					
I/O naming					
Online recording					

### Phase assignment

• The phase wiring and the electricity consumer wiring can be redefined by the phase assignments.

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File Edit View Tools V	Window Help				
Configuration[Device-2	2] 88				
	0		<b>T</b>		
Transmit Transmit	to Reload	Factory default	Save to file	Load from file	
Identity	Voltage				
Transformer	voltage				
Phase mapping	Should state	Is state			
Measuringvariants	L1	L1			
Nominalvalues	L2	L2			- 🥥
Ripple control	13	13			
Events	25				
Event recording	L4	L4			<b></b>
Transients					
Transient recording					
Averaging intervals	Current				
Recording configuration	chauld at the	T			
memory configuration	Should state	Is state			
Timezone		Change s1(k) an	d s2(l)		
Inputs	13	12			
Digital outputs	LZ	Change s1(k) an	d s2(l)		
Serial ports			0.02(0)		
field bus profiles	13	L3	d e2/l)		
ip configuration		Change SI(k) an	a sz()		
Flicker	L4	L4	1 - 10		
I/O naming		Change s1(k) an	d s2(l)		•
Online recording					

#### **Connection variants**

• Set the device's connection variant for the baseline and supporting measurements (operating manual).

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File Edit View Tools	Window Help		
E Configuration[Device-	2] 🐹	< > -	]0
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Transmit Transmit	t to Reload Factory default Save to file Load from file		
Identity	Main input		
Transformer			
Phase mapping	4w3m		
Measuringvariants	(i) LN	۲	
Nominalvalues			
Ripple control	<u>© ц</u>	0	
Events			
Event recording			
Transients			Ξ
Transient recording			
Averaging intervals			
Recording configuration			
memory configuration			
time			
Timezone	V1 V2 V3 Vief 11 12 13 4w 3m V1 V2 V3 Vief 11 12 13		
Inputs	4WSHI VI-3 11-5 NV VI-3 11-5		
Digital outputs			
Serial ports			
field bus profiles	Auxiliary input		
ip configuration	Auxiliar y input		
Flicker	4w im	- 0	
I/O naming			
Online recording			
	Li — 🛉 🔤		Ţ.

#### **Nominal values**

- The measurement channels are addressed via the rated frequency. Select the mains frequency in accordance with the existing mains.
- Nominal values are required as a reference to identify events (over/undervoltage and overcurrent).
- The rated current of the transformer at the supply is required in order to calculate the K factor.

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File Edit View Tools \	Window Help			
Configuration[Device-2	2] 🕺			
6 6	<u>0</u>	<b>F</b>		
Transmit Transmit	to Reload Factory default	Save to file	Load from file	
Identity	General			
Transformer	Naminal fraguency			
Phase mapping	Nominal frequency	· • •		
Measuringvariants	Main input			
Nominalvalues	Nominal voltage	230.0	V 🥥	
Ripple control	Nominal current	5.0	A 🕗	
Events	Nominal current for K-factor	E O		
Event recording		5.0		
Transients	Nominal Current TDD	0.0	Α 🏉	
Transient recording	Auxiliary input			
Averaging intervals	Nominal voltage	230.0	v 🥥	
Recording configuration	Nominal current	5.0		
time	Nominal current	5.0		
Timezone	Nominal current for K-factor	5.0	A 🏉	
Inputs	Nominal Current TDD	0.0	А 🕗	
Digital outputs				
Serial ports				
field bus profiles				
ip configuration				
Flicker				
I/O naming				
Online recording				

### Ripple control voltage

• The ripple control voltage is a voltage measured with a carrier frequency established by the user. Only frequencies below 3kHz are taken into consideration.

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File Edit View Tools	Window Help				
Configuration[Device-	-2] 🕺				
	0		<b>T</b>	<u>_</u>	
Transmit Transmi	t to Reload	Factory default	Save to file	Load from file	
Identity					
Transformer	Frequency 0.0				Hz 🥥
Phase mapping					
Measuringvariants					
Nominalvalues					
Ripple control					
Events					
Event recording					
Transients					
Transient recording					
Averaging intervals					
Recording configuration					
memory configuration					
time					
Timezone	-				
Inputs	-				
Digital outputs	-				
Serial ports	-				
field bus profiles	-				
ip configuration	-				
Flicker	-				
I/O naming	-				

#### Events

- An event occurs if threshold values set for the current and the voltage are violated.
- An event has a mean value, a minimum or maximum value, a start time and an end time.
- The GridVis event browser can display recorded events.
- The threshold values are set for excess voltage, undervoltage, voltage interruption and overcurrent as a percentage of the nominal values.
- Threshold values can be switched off by switching the Manual/Off button to Off.

File Edit View Tools Window Help			
E Configuration[Device-2] 🛛			
Transmit Transmit to Reload Factory default Save to file Load from file			
Identity Main input			
Transformer Over voltage Manual V 110	%	Ċ	253.00V)
Phase mapping	%	,	207.0077
Measuringvariants	/	C	207.000)
Nominalvalues Voltage outage Manual  Voltage Manual  Volta	%	(	11.50V)
Ripple control Over current Manual 🗸 🕥 110	%🔵	(	5.50A)
Events			
Event recording			
Transients			
Transient recording			
Averaging intervals			
Recording configuration			
memory configuration	-		
time Over voltage Manual VIII0	%🔵	(	253.00V)
Timezone Under voltage Manual V 90	%🔵	(	207.00V)
Inputs Voltage outage Manual Voltage 5	%	(	11.50V)
Digital outputs	~	,	E E033
Serial ports Over content Manada V 110		(	3.30A)
in conformation			
Elider			
I/O naming			
Online recording			

- Only changes to threshold values that persist over the entire pre-run period (lead time) are considered the start time of an event.
- The event's end time has been reached only if there are no further threshold violations for the duration of the run-on period (run-down).
- Pre-run/run-on setting range: 0.. 1000 full waves
- For an event, additional information can be selected from other measurement channels and saved. (Effective value record/full waves).

Event diagram



#### **Recording of events**

- Effective values recorded in the UMG511 describe the trend of half wave effective values.
- Effective value recording can be started by an event.
- Various recording modes can be selected to record effective values triggered by an event.
  - Only the value in which the event was found.
  - Only voltage and current in the phase in which the event was found.
  - All of the inputs of the value in which the event was found.
  - All of the values in all of the inputs
- The length of the effective value record is determined by the number of half wave effective values up to the beginning of the event (pre-run) and by the number of half wave effective values after the beginning of the event (after-run).



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File Edit View Tools	Vindow Help			
Configuration[Device-	] 88			
S S	0		<b>a</b>	
Transmit Transmit	to Reload Facto	y default Save to file	Load from file	
Identity				
Transformer	Eventmode Voltage and C	rrent of the phase where	e the event was found	
Phase mapping	Recording Length			
Measuringvariants	Pretrigger 100			Half wave 🕘
Nominalvalues	Posttrigger 200			Halfwaye
Ripple control	Postulgger 200			
Events				
Event recording				
Transients				
Transient recording				
Averaging intervais				
memory configuration				
time				
Timezone				
Inputs				
Digital outputs				
Serial ports				
field bus profiles				
ip configuration				
Flicker				
I/O naming				
Online recording				

#### Transients

- Transients are fast voltage changes.
- The UMG511 recognises transients if they are longer than 50µs, although it only monitors voltage measurement inputs.
- There are three independent criteria by which transients are recognised.
  - Absolute: If a sampled value exceeds the set threshold, a transient is recognised.
  - Available settings:
    - Off transient monitoring has been switched off
    - Automatic the threshold value is calculated automatically and comes to 110% of the current 200ms effective value.
    - Manual the transient monitoring uses the set threshold values.
  - Fast increase: If the difference between two neighbouring sampled points exceeds the set threshold, a transient is recognised.
  - Available settings:
    - Off transient monitoring has been switched off.
      - Automatic the threshold value is calculated automatically and comes to 0.2175 times the current 200ms effective value.
      - Manual the transient monitoring uses the set threshold values.
  - Envelope: If a set threshold value has been exceeded, a transient is recognised.

Available settings:

- Off transient monitoring has been switched off.
- Automatic the threshold value is calculated automatically.
- Manual the transient monitoring uses the set threshold values.
- If a transient has been recognised, the threshold value increases by 20V, both in automatic and in manual mode. This automatic increase of the threshold value switches off within 10 minutes.
- If a transient has been recognised, the wave form will be saved to a transient record.
- If a further transient is recognised within the next 60 seconds, it will be recorded with 512 points.

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File Edit View Tools \	Window Help					
Configuration[Device-2	2] 86					
6 6	0			<b>_</b>		
Transmit Transmit	to Reload	Factory default	Save to file	Load from file		
Identity	Main input					
Transformer	Voltage					
Phase mapping						
Measuringvariants	Absolute	Automatic	•	0	%	
Nominalvalues	Slope	Automatic	-	0	%	
Ripple control	Envelope	Automatic	_		%	
Events	Livelope	Automatic	•	U	/5	
Event recording	Current					
Transients	current					
Transient recording	Absolute	Automatic	•	0	%	
Averaging intervals		<u> </u>				
Recording configuration	Auxiliary input					
memory configuration	Auxiliary input					
time	voitage					
Timezone	Absolute	Automatic	•	0	%@	
Inputs	0					
Digital outputs	Siope	Automatic	•		700	
Serial ports	Envelope	Automatic	•	0	%	
in configuration						
Elicker	Current					
I/O naming	Absoluto	Automatic			%	
Online recording	Ausoidle	Automatic	•	•	/8	
onincrecording						

#### **Recording transients**

- If a transient has occurred, the wave shape can be saved in a transient record with an adjustable number of sampled points before and after the transient.
- The distance between two sample points is always 50µs.
- You can choose between the following measurement channels for recording in the transient record:
  - The phase voltage will be recorded with the transient.
  - The phase voltage and current will be recorded with the transient.
  - All currents will be recorded.
  - All voltages and all currents will be recorded.

#### **Record length**

The number of sample points that are to be saved before the transient occurred.

GridVis-2.2.0-Beta-3-	PRE(2011-05-05_10-03-39) [Project]	_ <b>D</b> _ X
File Edit View Tools	Nindow Help	
Configuration[Device-2	2] 88	
6 6		
Transmit Transmit	to Reload Factory default Save to file Load from file	
Identity		
Transformer	All Voltages are recorded.	
Phase mapping	Recording length	
Measuringvariants		
Nominalvalues	Pretrigger 800	Points
Ripple control	This equals 40 000ms	
Events		
Event recording	Posttrigger 3200	Points
Transients	T1: 1 (00.000	
Transient recording	This equals 160.000ms	
Averaging intervals		
Recording configuration		
memory configuration		
Timezono		
Topute		
Digital outputs		
Serial ports		
field bus profiles		
ip configuration		
Flicker		
I/O naming		
Online recording	4	h
#### Averaging intervals

- Setting of parameters for the floated average value for the individual measuring values.
- The values can be used as well for operators or comparators (Jasic).
- The adjustment ranges of the averaging time of the selected group (L1-L4) are 10, 15, 30, 60 seconds and 5, 8, 10, 15 minutes. The settings of different averaging intervals for each phase has to be done in the device.

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File Edit View Tools	File Edit View Tools Window Help						
Overview Window 🛛 🖇	Overview Window 🛭 🗧 Configuration[umg511 support] 🖇						
6 6	 						
Transmit Transmit	t to Reload Fact	tory default Save to file Load from file					
Identity Transformer	Only for firmware-release	at least 1.2xx					
Phase mapping	Avg. interval voltage	5 min.	- 0				
Measuringvariants							
Nominalvalues	Avg. interval current	5 min.					
Ripple control	Avg. interval frequency	10 min.					
Events	and the real requercy						
Event recording	Avg. interval power	10 min.					
Transients	Aug. interval TUD II	10					
Transient recording	Avg. Interval THD U	10 min.	<b></b>				
Averaging intervals	Avg. interval THD I	10 min.					
Recording configuration							
memory configuration	Avg. interval temperature	10 min.					
time							
Timezone							
Inputs							
Digital outputs							
Serial ports							
field bus profiles							
ip configuration							
Flicker							
I/O naming							
Online recording							

• In case that different averaging intervals were selected within one group on the device, then the group field will be indicated red after reading out the configuration. A new selection of the averaging time and the data transfer afterwards will set the group (L1-L4) to the selected value.

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File Edit View Tools	File Edit View Tools Window Help					
Overview Window 🛛 🖁	Overview Window 🛭 🗧 Configuration[umg511 support] 🖇					
S S	0			<b>_</b>		
Transmit Transmi	t to Reload Fac	tory default	Save to file	Load from file		
Identity						
Transformer	Only for firmware-release	e at least 1.2	CX .			
Phase mapping	Avg. interval voltage	5 min.				<b>-</b>
Measuringvariants						
Nominalvalues	Avg. interval current					- <b>v</b>
Ripple control	Avg. interval frequency	10 min.				- 🥥
Events						
Event recording	Avg. interval power	10 min.				<del>-</del>
Transients	Avg. interval THD LL	10 min				
Transient recording	Rig. Interval mib o	10 1101.				
Averaging intervals	Avg. interval THD I	10 min.				
Recording configuration		40				
memory configuration	Avg. Interval temperature	10 min.				
time						
Timezone						
Inputs						
Digital outputs						
Serial ports						
field bus profiles						
ip configuration						
Flicker						
1/O naming						
Unline recording						
	L					]

#### **Recording configuration**

- Default profiles can be loaded or up to 16 records configured in recording configuration.
- A record can have a maximum of 1000 values.
- A record holds a measurement value or the mean value of the measurement value.
- Mean value records can also include the minimum and the maximum values.
- Mean values, minimum values and maximum values are derived from the measurement values in the measurement timeframe.
- The mean value measurement timeframe is established by the time set under "Time basis".
- Measurement values are saved once the time set under "Time basis" has run its course (<u>Calculating data memory as done for UMG604</u>).

GridVis-2.2.0-Beta-3-PRE(2011-05-05_10-03-39) [Project]						
File Edit View Tools V	File Edit View Tools Window Help					
E Configuration [Device-2	] ==					
	0			<b>_</b>		
Transmit Transmit	to Reload Fac	tory default Sa	ve to file	Load from file		
Identity Transformer Phase mapping Measuringvariants Nominalvalues Ripple control Events Event recording Transients Transient recording Averaging intervals Recording configuration	Recording type Timebase Number recorded values Recording type Timebase Number recorded values Recording type Timebase	ValuesOverTime 10m 1 ValuesOverTime 10m 4 ValuesOverTime 10m	Actual Flic Actual Flic Actual Flic Actual Flic Actual Flic Long term Long term	luency ker L1 ker L2 ker L3 ker L4 flicker L1 flicker L2 flicker L3	New         Edit         Delete         Preset recordings         EN50160         EN61000-2-4	
memory configuration time Timezone Inputs Digital outputs Secial ports	Recording type Timebase Number recorded values	4 ValuesOverTime 10m 4	Voltage ef Voltage ef Voltage ef Voltage ef	fective L1 fective L2 fective L3 fective L4		
field bus profiles ip configuration Flicker I/O naming Online recording	Recording type Timebase Number recorded values	ValuesOverTime 10m 4	Active Pov Active Pov Active Pov Active Pov	ver L1 ver L2 ver L3 ver L4		

#### Setting up / editing a recording configuration

- An individual recording instance can be set up using the New or Edit buttons.
- Measurement values are selected in the recording window using the *Add values* button.
- To do so drag the desired measurement value (measurement value group) over the value field. This saves and displays the measurement values.
- Using the Delete values button, selected measurement values can be deleted.



#### Configuring data memory

- The UMG511 has a storage capacity of 256 Mbyte.
- The data memory has been partitioned as follows in the factory:
- 40% for user-defined recording.
- 22.5% for the recording of transients.
- 22.5% for the recording of full wave effective values.
- 10% for the recording of events.
- 5% for the recording of flags (flagging).

GridVis-2.2.0-Beta-3-	PRE(2011-05-05_10-03-39) [Project]	]		- 0 ×
File Edit View Tools	Window Help			
Configuration[Device-3	2] 🕺			
		5	5	
Transmit Transmit	t to Reload Eactory default	t Save to file	Load from file	
T-Jan Kite	partition of memory for recordings	bure to me		
Transformer	user defined recordings	40.0l % 🧉	2	
Dhase mapping	transient recordings	0.0		
Phase mapping Measuring variants	a ansient recordings	22.5 70		
Nominalvalues	full wave effective values recordings	22.5 % 🤇	0	
Dipple control	event recordings	10.0 % 🤇	0	
Events	flag recordings	5.0 % 🧉	2	
Event recording			-	
Transients				
Transient recording				
Averaging intervals				
Recording configuration				
memory configuration	1			
time	1			
Timezone				
Inputs				
Digital outputs				
Serial ports				
field bus profiles				
ip configuration				
Flicker				
I/O naming				
Online recording				

#### Time

The device has a clock with a battery backup. The fault in the clock's quartz is aligned with room temperature during production so that the clock only deviates by +- 1 minute/month. If transient records and event records are to be compared with other measurement records, it is recommended that the time indicated by the device be compared and aligned with that in a time server. For this purpose, the device requires the Ethernet interface. The network time protocol (NTP) is used for synchronisation.

Mode

Off - synchronisation of the clock with an external time server is switched off. Lists - the UMG604 is waiting for time information from a time server. Active - the UMG604 automatically requests time information from an NTP server every 64 seconds.

• NTP server - this is where the time server's address is input.

GridVis-2.2.0-Beta-3-	-PRE(2011-05-	05_10-03-39) [Project]			
File Edit View Tools	Window Help	)			
Configuration[Device-	2] 😹				
6 6	6	3			
Transmit Transmit	tto Rela	oad Factory default	Save to file	Load from file	
Identity	NTP				
Transformer					
Phase mapping	Mode	Listen			
Measuringvariants	MTD Server	·			
Nominalvalues					
Ripple control					
Events	1				
Event recording					
Transients					
Transient recording					
Averaging intervals	Set time				
Recording configuration	Securic				
memory configuration	Attention! 1	This option should only be ac	tivated in cas	e there is no external time s	/nchronisation (e.g. NTP) a\
time	enable	time setting (device time will	be synchroni	zed with UTC-Time of PC)	
Timezone				1-	
Inputs	current time	e difference against UTC(PC)	-112 secon	ds	
Digital outputs					
Serial ports	-				
in configuration					
Flicker					
I/O naming					
Online recording					
	•				•

#### Time zone

All time information with regard to measurement values, events and transients relate to UTC time (Coordinated Universal Time). GridVis converts UTC time to Central European Time (CET) when it displays measurement results. Central European Time (CET) is the applicable time zone in central Europe and therefore also in Germany.

- Winter time time offset from Central European Winter Time relative to UTC time.
- Summer time time offset from Central European Summer Time relative to UTC time.
- Start of daylight saving time start of daylight saving time.
- End of daylight saving time end of daylight saving time.

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File Edit View Tools V	Window Help				
E Configuration[Device-2	2] 🕺				
S S	0		n 🚽		
Transmit Transmit	to Reload	Factory default Save	to file Load from f	île	
Identity					
Transformer		lime offset			
Phase mapping	Standard time	3600 sec			
Measuringvariants	Daylight saving	7200 sec			
Nominalvalues		Month	Earliest day of month	Day of week	Hour
Ripple control	Start day light gaving	March	25	Sunday	
Events	Start day light saving	March 👻 😈	25	sunday 👻 🐨	
Event recording	End day light saving	October 🛛 👻 🥥	25	Sunday 🚽 🥝	3 🥥
Transients					
Transient recording					
Averaging intervals					
Recording configuration					
memory configuration					
time					
Timezone					
Inputs					
Digital outputs					
Serial ports					
field bus profiles					
ip configuration					
Flicker					
1/O naming					
Unline recording	•				۱.

#### Inputs

The UMG511 has eight digital inputs. These inputs can be used as digital inputs and as input pulse meters

A pulse value can be assigned to every pulse input.

GridVis-2.2.	GridVis-2.2.0-Beta-3-PRE(2011-05-05_10-03-39) [Project]						
File Edit View	/ Tools Wi	indow Help					
🔁 Configuratio	n[Device-2]	86					
S	<b>S</b>	0		x.	<u>_</u>		
Transmit	Transmit to	o Reload	Factory default	Save to file	Load from file		
Identit	y						
Transform	mer	Digital Input 1					-
Phase map	ping	Digital Ipput 1					
Measuringva	ariants	Digital Input 1					
Nominalva	lues	S0 pulse weight	1.000			v	vh/Imp 🅘
Ripple cor	ntrol						
Events	s						
Event reco	rding						
Transien	nts						
Transient red	cording						
Averaging in	tervals						
Recording conf	figuration						
memory config	guration						
time							
Timezor	ne						
Inputs							
Digital out	puts						
Serial po	rts						
field bus pr	ofiles						
ip configura	ation						
Flicker							
I/O nami	ing						
Online reco	ording						

#### **Digital outputs**

The UMG511 has five digital outputs. Both of these digital outputs can be programmed for event messages or as a pulse output (S0 output).

- Each digital output can be programmed as a NC or NO contact.
- One or more events can be allocated to an output if it is programmed for event updates.
- The event output activates if a selected event occurs.

GridVis-2.2.0-Beta-3-	GridVis-2.2.0-Beta-3-PRE(2011-05-05_10-03-39) [Project]					
File Edit View Tools \	File Edit View Tools Window Help					
Configuration[Device-2	2] 🔉					
S S	0					
Transmit Transmit	to Reload	Factory default Save to file Load from	file			
Identity	S0-outputs					
Transformer	_					
Phase mapping	Pulse width 5	)	milli seconds 🥥			
Measuringvariants						
Nominalvalues	Dia Output 1					
Ripple control	Dig.Output 1		• • •			
Events	Dig.Output 1					
Event recording	Output polarity	current flow if active (NOC)	O			
Transients	Type of output	Notused	_			
Transient recording	.,,	Not used	<b>_</b> _			
Averaging intervals						
Recording configuration						
memory configuration						
time						
Timezone						
Inputs						
Digital outputs						
Serial ports						
field bus profiles						
ip configuration						
Flicker						
I/O naming						
Online recording						

#### Serial outputs

Device ID

The device ID (device address) is required for Modbus communication and for the Profibus.

• RS485

Setting the Modbus selection between Modbus master (gateway), Modbus slave or Profibus

Baud rate selection from 9600bps, 19200bps, 38400bps, 76800bps, 115200bps and 921600bps

GridVis-2.2.0-Beta-3-	PRE(2011-05-05_10-03-39)	. 🗆 🗙
File Edit View Tools \	Nindow Help	
Configuration[Device-6	i] 🐹	
S S	S 🗌 🖬 📦	
Transmit Transmit	to Reload Factory default Save to file Load from file	
Identity	Device ID	
Transformer	Device ID 1 Used for RS232(Modbus), RS485(Modbus) and Profibus	
Phase mapping	DC/0E	'  .
Measuringvariants	K5405	
Nominalvalues	Mode Modbus-Slave	<b>(</b>
Events	Baudrate 38400 Baud	
Event recording		
Transients	R\$232	
Transient recording	Mada Madhua Chua	
Averaging intervals	Hode	<b>– –</b>
Recording configuration	Baudrate 38400 Baud	
memory configuration		
time		
Timezone		
Inputs		
Digital outputs		
Serial ports		
field bus profiles		
ip configuration		
I/O naming		
Online recording		

#### **Fieldbus profiles**

Fieldbus profiles hold a list of values which can be read or written by a PLC over the Profibus.

• Using GridVis, 16 fieldbus profiles can be configured.

GridVis-2.2.0-Beta-3-PR	E(2011-05-05_10-03-39) [Project]	
File Edit View Tools Wi	ndow Help	
E Configuration[Device-2]	82	
S S	o 🗌 🖬 🛁	
Transmit Transmit to	Reload Factory default Save to file Load from file	
Identity	Profiles for Profibus-access	<b>~</b> ]
Transformer	Malana affective (d. Malan	
Phase mapping	Profile nr. 0 Voltage effective L1 Volta	Edit
Measuringvariants	Comment 124 / 127 Bytes Voltage effective L3 Curre	
Nominalvalues	Byte order big endian Voltage effective L4 Curre	
Ripple control	Voltage effective L2-L1 Curre	
Events	Voltage effective L1 Volta	
Event recording	Voltage effective L2 Curre	
Transients	Comment 116 / 127 Bytes Voltage effective L3 Curre	
Transient recording	Byte order big endian Voltage effective L2-L1 Curre	
Averaging intervals	voltage effective L3-L2 Activ	
Recording configuration	Active Energy Sum L1-L3 Capa Profile nr. 2 Capacity Sum L1-L3 Capa	
memory configuration	Comment 52 / 127 Bytes Supplied Active Energy Sum L1-L3 Active	
time	Byte order big endian Reactive Energy Sum L1-L3 Activ	
Timezone	Inductive Reactive Energy Sum L1-L3 Activ	
Inputs	Active Power L1 Current effectiv	
Digital outputs	Profile nr. 3 Active Power L2 Current effectiv	
Serial ports	Comment 84 / 127 Bytes Active Power L3 Current effectiv	
field bus profiles	Byte order big endian Active Power Sum L1-L3 Active Energy 5	
ip configuration	Current effective L1 cos phi(math.) I	
Flicker	Profile nr. 4	
1/O naming	Comment 0/127Bytes	
	Pute order, big opdian	
	<	

- Profiles can be created or changed using the *Edit* button.
- To do so drag the desired measurement value (measurement value group) over the value field. This saves and displays the measurement values.
- Using the *Delete values* button, selected measurement values can be deleted.
- The measurement value sequence can be determined with the position buttons.

By	teindev	Valuetype	Valueformat	Scaling	Add values
1	1	Voltage effective L1	Float	1	Demousture
2	5	Voltage effective L2	Float	1	Kemove values
3	9	Voltage effective L3	Float	1	
4	13	Voltage effective L4	Float	1	
<u> </u>		Tottage encested a			move to top
					Ten positions up
					One position up
					One position down
					Ten positions down
					Move to bottom
					Byte order big chain     Byte order little endian
					Value selection tree (field bus pr U
					<ul> <li>↓ Voltage</li> <li>↓ Voltage effective</li> <li>↓ 1</li> <li>↓ L2</li> <li>↓ L3</li> <li>↓ L4</li> <li>↓ L2-L1</li> <li>↓ L3-L2</li> <li>↓ L1-L3</li> </ul>

#### **IP** configuration

- For devices with the Ethernet option, it is necessary to set at least the IP address and the subnet mask.
- In the UMG511, it is possible to choose between the options fixed *IP address*, *BootP* and *DHCP mode*.

Fixed IP address

All settings are undertaken by the user.

BootP

BootP allows for the fully automatic integration of a UMG511 into an existing network.

DHCP mode

When started, the UMG511 pulls all of its settings from the DHCP server.

IMPORTANT: Setting should only be undertaken after these have been discussed with the administrator.

GridVis-2.2.0-Beta-3-PR	RE(2011-05-05_10-03-39) [Pro	ject]	
File Edit View Tools Wir	ndow Help		
Configuration[Device-2]	*		
S (S	0	<b>E</b> 🔊	
Transmit Transmit to	Reload Factory de	fault Save to file Load from file	
Identity	actions ID		
Transformer	Setungs IP		
Phase mapping	Mode	Fixed IP Adress	- 🥘
Measuringvariants	idenfication for DHCP-server	NAME-5110-1480	
Nominalvalues	identication for Drice-server	NAME-5110-1460	
Ripple control	IP-address preset	192.168. 3.190	<b>(</b>
Events	subnet mask	255.255.255. 0	
	default gateway	192, 168, 3, 4	
Transient recording	action goterray		
Averaging intervals	settings DNS		
Recording configuration	Securgs Divo		
memory configuration	DNS server 192.168.171.1		
time			
Timezone			
Inputs			
Digital outputs			
Serial ports			
field bus profiles			
Flicker			
I/O naming			
Online recording			

#### Flicker

To record the voltage quality parameter *Flicker* in accordance with DIN 61000-4-15, the *flicker mode* can be set.

📓 GridVis-2.2.0-Beta-3-PRE(2011-05-05_10-03-39) [Project]							
File Edit View Tools Window Help							
E Configuration[Device-	-2] 🕺						
S S	0			9			
Transmit Transmi	it to Reload	Factory default	Save to file	Load from file			
Identity							
Transformer	Flicker mode 23	0 V / 50 Hz					
Phase mapping	1						
Measuringvariants	1						
Nominalvalues	1						
Ripple control							
Events							
Event recording							
Transients							
Transient recording							
Averaging intervals							
Recording configuration							
memory configuration							
time							
Timezone							
Inputs							
Digital outputs							
Serial ports							
field bus profiles							
ip configuration							
Flicker	-						
I/O naming							
Online recording							

#### Inputting online

- Changing the report times for the online inputting of the measurement values.
- Drag the desired measurement value from the <u>Value tree window</u> to the online inputting configuration window.
- Set the desired report times.



## Interfaces

### Modbus

#### • Modbus functions

• Modbus functions (master) As a master, the UMG511 supports the following Modbus functions:

• 01 Read coil status

Reads the ON/OFF status of discrete outputs (0X references, coils) in the slave. Broadcast is not supported.

• 02 Read input status

Reads the ON/OFF status of discrete inputs (0X references) in the slave. Broadcast is not supported.

• 03 Read holding registers

Reads the binary contents of holding registers (4X references) in the slave.

• 04 Read input registers

Reads the binary contents of input registers (3X references) in the slave.

• 05 Force single coil

Forces a single coil (0X references) to either ON or OFF. When broadcast, the function forces the same coil reference in all attached slaves.

• 06 Preset single register

Presets a value into a single holding register (4X reference). When broadcast, the function presets the same register reference in all attached slaves.

• 15 (0F Hex) Force multiple coils

Forces each coil (0X references) in a sequence of coils to either ON or OFF. When broadcast, the function forces the same coil reference in all attached slaves.

• 16 (10Hex) Preset multiple registers

Presets values into a sequence of holding registers (4X references). When broadcast, the function presets the same register references in all attached slaves.

• 23 (17Hex) Read/write 4X registers

Performs a combination of one read and one write operation in a single Modbus transaction. The function can write new contents to a group of 4XXXX registers, and then return the contents of another group of 4XXXX registers. Broadcast is not supported.

• Modbus functions (slave)

As a slave, the UMG511 supports the following Modbus functions:

• 03 Read holding registers

Reads the binary contents of holding registers (4X references) in the slave.

• 04 Read input registers

Reads the binary contents of input registers (3X references) in the slave. \*

• 06 Preset single register

Presets a value into a single holding register (4X reference). When broadcast, the function presets the same register reference in all attached slaves.

• 16 (10Hex) Preset multiple registers

Presets values into a sequence of holding registers (4X references). When broadcast, the function presets the same register references in all attached slaves.

• 23 (17Hex) Read/write 4X registers

Performs a combination of one read and one write operation in a single Modbus transaction. The function can write new contents to a group of 4XXXX registers, and then return the contents of another group of 4XXXX registers. Broadcast is not supported.

### Ethernet

#### **Ethernet: General**

To be able to operate the UMG511 in the Ethernet, the UMG511 requires an Ethernet address. There are three options here:

• Fixed IP address

In networks without a DHCP server, the network address has to be set directly in the UMG604.

BootP

BootP allows for the fully automatic integration of a UMG604 in an existing network. However, BootP is an older protocol and does not provide the scope of functions provided by DHCP.

DHCP mode

DHCP allows for the fully automatic integration of a UMG604 into an existing network without additional configuration.

When started, the UMG604 automatically pulls the IP address, the network mask and the gateway from the DHCP server.

#### **Ethernet: Ports**

Devices equipped with the Ethernet option can use the following ports:

- UDP
  - TFTP 1201
  - Modbus/TCP 502
  - DHCP 68
  - NTP 123
  - BaCnet 47808
  - Nameservice 1200
- TCP
  - HTTP 80 (can be amended in the ini.jas)
  - FTP command port 21, (data port 1024, 1025, 1026, 1027)
  - Modbus/TCP 502 (4 ports)
  - Modbus RTU via Ethernet 8000 (1 port)

#### **Ethernet: Fixed IP address**

In networks without a DHCP server, the network address must be set directly in the UMG511. To do this, the following settings must be carried out:

- 1. Set up the UMG511 for a *fixed IP* address.
- 2. Set the desired IP address, IP mask and IP gateway.

Put the UMG511 into parameterisation mode as explained in the operating manual and set the Ethernet address under Communication.

# **Virtual device**

## Integrate into the GridVis

#### Add a virtual device

Measurement values from other devices incorporated into GridVis can integrated in a virtual device. Inside the software it is possible to manage the virtual device in the same way as a real device.

• Create a new virtual device in GridVis. The type of connection remains "Without a connection" and cannot be configured (First steps, Adding a new device).

# Configuration

#### Identity

- The name is used, among other things, to identify the device in the device list.
- Additional information can be saved under Description.

U GridVis-2.2.0-Beta-3-PRE(2011-05-05_10-03-39) [Project]								x
File Edit View	Tools Windo	w Help						
🔁 Configuration	[Device-7] 🛛 🕅							
S Transmit	😴 Transmit to	3 Reload	Eactory default	Save to file	) Load from file			
Identity Values Online recording	Name Description	Virtual_Device	001					•

#### Values

- Using the <u>Palette window</u>, the desired measurement values and operators for the virtual device can be set using the modules (e.g. input measurement values and output values).
- "Drag" the Source value icon from the Palette window to the configuration area.
- Set the device and the desired measurement value by double-clicking on the module.
- "Drag" the *Target* icon from the Palette window to the configuration area.
- Set the output measurement value for the virtual device by double-clicking on the module.

Walue source	
Device Device-1 Value type <voltage effective="" l1=""></voltage>	Select device Select value type
	OK Cancel

• Connect the two modules and then, using the *Transfer to device* button, transfer the configuration to the virtual device.

A connection between the components is made by "dragging" the coloured triangles in the modules to another triangle until these noticeably "click together".



• Example of a virtual device with different input values and two virtual output values.

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File Edit View Tools Window Help	
E Configuration[Device-7] 8	: Palette 🔳 🕺 📷
6 6 0 2 2 4	⊡ In 🍟
Transmit Transmit to Reload Factory default Save to file Load from file	C Const. (numeric)
Identity	Value source
Values	Target
Online recording	
Source	+ Add
Device-1	/ Divide
Voltage effective L1	* Multiply
Voltage effective L1	- Substract
Source	
Device-2	
Voltage effective L1	
Voltage effective L2	
۲	

#### **Online recording**

- •
- Changing the report times for the online inputting of the measurement values. Drag the desired measurement value from the <u>Value tree window</u> to the online • inputting configuration window.
- Set the desired report times. •

	GridVis-2.2.0-Beta	a-3-PRE(2011-0	)5-05_10-03·	-39) [Project]				x
File	Edit View Too	ls Window H	elp					
E.	🔁 Configuration	Device-7] 🕺					4 >	
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0	Transmit	Transmit to	Reload	Factory default	Save to file	Load from file		
oject	Identity	Warning						^
à	Values	These va	alues are av	eraged on your co	mputer. If v	ou choose to use	e online values vou'll have	
4	Online recording	the softw	are open al	I the time.				Ξ
		Messuring val	ue		Ave	eraging time(Secon	ds)	_
		Voltage effe	ctive L1				90	0
		Voltage effe	ctive L2				90	0
								-
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# FAQ

### Port and protocols

Devices and software: Communication protocols and the required ports.

Device	Protocols	Ports
UMG 604/605	TFTP	1201
	Modbus/TCP - Modbus/UDP	502, 4 Ports
	DHCP	68
	NTP	123
	Bacnet	47808
	Nameservice	1200
	HTTP	80
	FTP	21
	FTP data port	1024, 1025
	FTP data port	1026, 1027
	Modbus over Ethernet	8000, 1 Port
	Service port (telnet)	1239
	SNMP	161 / 162 (TRAP)
	Email port (current)	25
	Email port (in preparation)	587
UMG 511	TFTP	1201
	Modbus/TCP - Modbus/UDP	502, 4 Ports
	DHCP	68
	NTP	123
	Bacnet	47808
	Nameservice	1200
	HTTP	80
	FTP	21
	FTP data port	1024, 1025
	FTP data port	1026, 1027
	Modbus over Ethernet	8000, 1 Port
	Service port (telnet)	1239
	SNMP	161 / 162 (TRAP)
	Email port (current)	25
	Email port (in preparation)	587
UMG 510	Modbus/TCP	502
	Modbus over Ethernet	8000

	UMG510 command language	1234, 1235	
UMG 508	TFTP	1201	
	Modbus/TCP - Modbus/UDP	502, 4 Ports	
	DHCP	68	
	NTP	123	
	Bacnet	47808	
	Nameservice	1200	
	HTTP	80	
	FTP	21	
	FTP data port	1024, 1025	
	FTP data port	1026, 1027	
	Modbus over Ethernet	8000, 1 Port	
	Service port (telnet)	1239	
	SNMP	161 / 162 (TRAP)	
	Email port (current)	25	
	Email port (in preparation)	587	
UMG 507	Modbus/TCP	502	
	Modbus over Ethernet	8000	
	Read out telnet data port	1239	
	Update telnet data port	1236, 1237	
1			
UMG 103/104	The device does not have an Etherne	t connection	
1			
GridVis	Modbus/TCP - Modbus UDP	502	
	HTTP	80	
	FTP	21	
	FTP data port	1024, 1025	
2	FTP data port	1026, 1027	
1	Modbus/TCP	502	
	Modbus over Ethernet	8000	
	UMG510 command language	1234	
	Read out telnet data port	1239	
	Update telnet data port	1236, 1237	
	Email port (in preparation)	25	
	Email port (in preparation)	587	
PCAnywhere	UDP, TCP/IP	5631, 5632	

#### Number of TCP/UTP connections (UMG 604/605/508/511/96RM-E)

- Maximum of 24 connections on the TCP group.
  - Port 21 (FTP): Max. 4 connections
  - Port 25/587 (E-Mail): Max. 8 connections
  - Port 1024-1027 (an FTP port requires a data port): Max. 4 connections
  - Port 80 (HTTP): Max. 24 connections:
  - Port 502 (Modbus TCP/IP): Max. 4 connections
  - Port 1239 (Debug): Max. 1 connection
  - Port 8000 (Modbus oder TCP/IP): Max. 1 connection
- Connectionless communication on the UTP group
  - Port 68 (DHCP)
  - Port 123 (NTP)
  - Port 161/162 (SNMP)
  - Port 1200 (Nameservice)
  - Port 1201 (TFTP)
  - Port 47808 (BACnet)

#### TCP group: max. 24 connections (queue scheduling):







#### RS485 network topology

- Devices are connected in a bus structure (in a line).
- Up to 32 subscribers can be connected together in a single segment.
- The cable is terminated with resistors (bus termination) at the beginning and at the end of a segment.
- With more that 32 subscribers, repeaters (amplifiers) must be used to connect the individual segments.
- Devices for which the bus connection is switched on must be under current.
- It is recommended that the master be placed at the end of a segment.
- If the master is replaced with a bus connection, the bus must be switched off.
- Replacing a slave with a bus connection that is either switched on or deenergised can destabilise the bus.
- Devices that are not connected to the bus can be replaced without destabilising the bus.



Fig.: Master and the last slave with a bus connection.

#### Changing user directory (e.g. for automatic software distribution)

Additional program-specific data are stored in the current user directory. You can select a new location with the parameter "--userdir \Pfad".

Example: Storage of additional files into the GridVis install directory

- For example: The software GridVis has been installed in the Windows directory C:\Program Files\GridVis
- Login as administrator
- Choose in the startmenu the shortcut GridVis with the right mouse button
- Select properties from the flyout menu
- Add in the line "Target" the parameter "--userdir C:\Program Files\GridVis"
- Start the software GridVis. The additional program-specific data are stored in the new directories *config* and *var*
- Create a new project

GridVis-GB							
Security         Details         Previous Versions           General         Shortcut         Compatibility							
GridVis-GB							
Target type: Application							
Target location: bin							
Target: Vis.exe"userdir "C:\Program Files\GridVis"							
Start in: "C:\Program Files\GridVis\bin"							
Shortcut key: None	None						
Run: Normal window							
Comment: None							
Open File Location Change Icon Advanced							
OK Cancel Apply							
"C\\ Braamme Files\ Grid\As\ bis\ Grid\As ave"   userdir "C\\ Praamme Files\ Grid\As"							
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H Half wave effective value Help menu I Identity	35 264 58 310 47 294, 313 7 299 99 266 109 72 5, 14
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H Half wave effective value Help menu I Identity	35 264 58 310 47 294, 313 7 299 99 266 109 72 5, 14 116
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