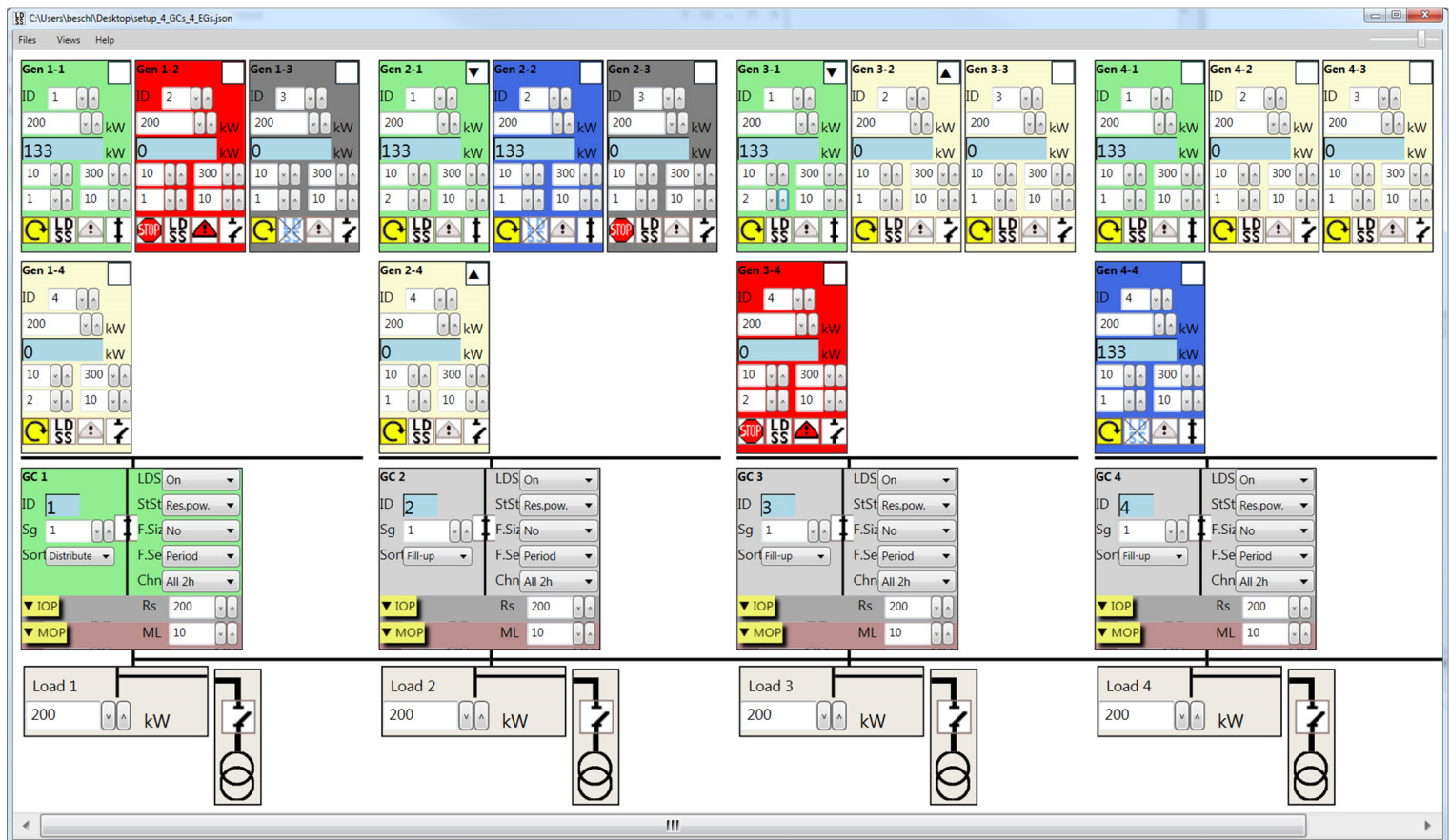


# EmulationBase

Application Note | Software Tool



EmulationBase

Version 1.1 or higher

37898

This is no translation but the original Technical Manual in English.  
Designed in Germany.

**Woodward GmbH**

Handwerkstrasse 29

70565 Stuttgart

Germany

Telephone: +49 (0) 711 789 54-510

Fax: +49 (0) 711 789 54-101

E-mail: [stgt-info@woodward.com](mailto:stgt-info@woodward.com)

Internet: <http://www.woodward.com>

## Brief Overview

EmulationBase is a tool, which allows emulating a number of EG3000XT, GC3000, loads and mains connections and their load dependent start/stop behavior. It will be compiled partially from the original EG3000XT and GC3000 applications. That means that always a version of the tool shall be used which fits to the emulated devices. It is not a full simulation of an actual system and so does not simulate dynamic processes, but concerning the start/stop decisions in such a system, it is accurate.

The tool executes emulation projects to be set up by the user. A project is defined by a JSON file with a definition of to-be-emulated nodes and their connections. Possible nodes are EG3000XT, GC3000, loads or mains. The user can create and edit these JSON files. The tool supports a limited automatic generation of JSON files. It supports up to eight Group Controller nodes, each having attached one load node, one optional mains node and up to 31 genset nodes.

The tool sets up these nodes, executes them independently and lets them communicate between each other. The communication between the nodes uses the original code of the emulated devices. Timing of the emulation is roughly similar to the original application timings.

The tool also emulates (in a simplified way) an electrical network and circuit breakers. It emulates load share in island and mains-parallel modes.

The tool allows that the nodes be accessed by Modbus/TCP and selected parameters of the elements written and read. The Modbus master can be the same PC where the emulation is running or another PC in the same network. This is for embedding the emulation in a larger simulation project.

The tool has an own visualization, which can be switched off for a user defined external visualization via Modbus. However, the internal visualization can be kept switched on; it will not interfere with an external visualization.

The tool allows the transfer of emulation related parameters from and to actual physical Woodward EG3000XT and GC3000.

The tool allows creating parameter sets for Woodward EG3000XT and GC3000 to be used with the Woodward Toolkit configuration tool.

The tool requires a license. When unlicensed it will only visualize systems of up to two group controllers and up to four gensets for each group controller.

## Table of contents

<b>1</b>	<b>General Information.....</b>	<b>5</b>
1.1	About This Manual.....	5
1.1.1	Depiction Of Notes And Instructions.....	5
1.1.2	Copyright And Disclaimer.....	6
1.1.3	Service And Warranty.....	7
1.2	Safety.....	7
1.2.1	Intended Use.....	7
1.2.2	Personnel.....	7
<b>2</b>	<b>Starting the tool.....</b>	<b>9</b>
2.1	Start with parameters.....	9
2.2	Start without parameters.....	9
2.3	Handling of Invalid/missing JSON file.....	9
2.4	Licensing restriction.....	9
<b>3</b>	<b>The main window.....</b>	<b>11</b>
3.1	Elements the user can interact with.....	13
3.2	The Genset node.....	14
3.3	The Group Controller node.....	14
3.4	The Load Node.....	16
3.5	The Mains Node.....	16
<b>4</b>	<b>Modbus access.....</b>	<b>18</b>
<b>5</b>	<b>Support functions.....</b>	<b>19</b>
5.1	Menu item: Files/Create WSET.....	19
5.2	Menu item: Files/Create mappinglist.....	20
5.3	Menu item: Files/Create JSON.....	23
5.4	Menu item: Files/Reload JSON.....	24
5.5	Menu item: Files/Setup.....	24
5.6	Menu item: Files/Transfer settings.....	26
5.7	Menu item: Views/Genset overview.....	27
5.8	Menu item: Help/Help.....	29
5.9	Menu item: Help/Info.....	29
5.10	Menu item: Help/Licensing.....	29
<b>6</b>	<b>Index.....</b>	<b>31</b>

# 1 General Information

## 1.1 About This Manual

### 1.1.1 Depiction Of Notes And Instructions

#### Safety instructions

Safety instructions are marked with symbols in these instructions. The safety instructions are always introduced by signal words that express the extent of the danger.



#### **DANGER!**

This combination of symbol and signal word indicates an immediately-dangerous situation that could cause death or severe injuries if not avoided.



#### **WARNING!**

This combination of symbol and signal word indicates a possibly-dangerous situation that could cause death or severe injuries if it is not avoided.



#### **CAUTION!**

This combination of symbol and signal word indicates a possibly-dangerous situation that could cause slight injuries if it is not avoided.



#### **NOTICE!**

This combination of symbol and signal word indicates a possibly-dangerous situation that could cause property and environmental damage if it is not avoided.





#### Tips and recommendations





*This symbol indicates useful tips and recommendations as well as information for efficient and trouble-free operation.*

#### Additional markings

To emphasize instructions, results, lists, references, and other elements, the following markings are used in these instructions:

Marking	Explanation
	Step-by-step instructions
	Results of action steps
	References to sections of these instructions and to other relevant documents
	Listing without fixed sequence
[Buttons]	Operating elements (e.g. buttons, switches), display elements (e.g. signal lamps)

Marking	Explanation
"Display"	Screen elements (e.g. buttons, programming of function keys)
"Screen xx → Screen xy → Screen xz" ...	Menu path. The following information and setting refer to a page on HMI screen or ToolKit located as described here.
 	Some parameters/settings/screens are available only either in ToolKit or in HMI/display.



### ***Dimensions in Figures***

*All dimensions shown with no units specified are in mm.*

## 1.1.2 Copyright And Disclaimer

### **Disclaimer**

All information and instructions in this manual have been provided under due consideration of applicable guidelines and regulations, the current and known state of the art, as well as our many years of in-house experience. Woodward assumes no liability for damages due to:

- Failure to comply with the instructions in this manual
- Improper use / misuse
- Willful operation by non-authorized persons
- Unauthorized conversions or non-approved technical modifications
- Use of non-approved spare parts

The originator is solely liable to the full extent for damages caused by such conduct. The agreed upon obligations in the delivery contract, the general terms and conditions, the manufacturer's delivery conditions, and the statutory regulations valid at the time the contract was concluded, apply.

### **Copyright**

This manual is protected by copyright. No part of this manual may be reproduced in any form or incorporated into any information retrieval system without written permission of Woodward GmbH.

Delivery of this manual to third parties, duplication in any form - including excerpts - as well as exploitation and/or communication of the content, are not permitted without a written declaration of release by Woodward GmbH.

Actions to the contrary will entitle us to claim compensation for damages. We expressly reserve the right to raise any further accessory claims.

### 1.1.3 Service And Warranty

Our Customer Service is available for technical information.

For regional support, please refer to:

[http://www.woodward.com/Support\\_pgd.aspx](http://www.woodward.com/Support_pgd.aspx).

In addition, our employees are constantly interested in new information and experiences that arise from usage and could be valuable for the improvement of our products.

#### Warranty terms



*Please enquire about the terms of warranty from your nearest Woodward representative.*

*For our contact search webpage please go to:*

*<http://www.woodward.com/Directory.aspx>*

## 1.2 Safety

### 1.2.1 Intended Use

This software has been designed solely for the intended use described in this manual.

**The genset control unit running the files created with this software must be used exclusively for engine-generator system management applications.**



#### **NOTICE!**

##### **Damage due to improper use!**

Files created by using this software in any other than the intended way may cause damage to the connected components.

### 1.2.2 Personnel



#### **WARNING!**

##### **Hazards due to insufficiently qualified personnel!**

If unqualified personnel perform work with software that communicates with the control unit, hazards may arise which can cause serious injury and substantial damage to property.

- Therefore, all work must only be carried out by appropriately qualified personnel.

This manual specifies the personnel qualifications required for the different areas of work, listed below:

- Well-trained for writing genset control communication protocols.
- Skilled and competent and aware of the local safety regulations.

## General Information

---

Safety > Personnel

- Experienced in working on communication and control devices.
- Allowed to manage the controlled (engine/generator) system.

The workforce must only consist of persons who can be expected to carry out their work reliably. Persons with impaired reactions due to, for example, the consumption of drugs, alcohol, or medication are prohibited.

When selecting personnel, the age-related and occupation-related regulations governing the location of operation must be observed.



## 2 Starting the tool

### 2.1 Start with parameters

The tool can be started from a command line with the JSON file name as first parameter and an optional second parameter:

**emulationbase.exe Jsonfile [-novisu].**

Here:

- **Jsonfile** — a file in JSON format describing all nodes to be emulated
- **-novisu** — switches off the Tool's visualization.

When the JSON file is not found, the tool will request the input of a file name. See [🔗 Chapter 2.3 "Handling of Invalid/missing JSON file" on page 9](#) for details. The JSON file name and the -novisu flag will be stored in the application. When the application is later started without parameters, these will be remembered. Please note that this memory is specific for the person logged in into the PC.

An initial JSON file **setup\_8x5.json**, which describes eight groups of five gensets each, is provided in the installation directory, which is usually **C:\Program Files (x86)\Woodward\Emulationbase**. For a start, the user can create a copy of this and adapt it to his/her purposes.

Another JSON file, **setup\_2x4.json**, which describes two groups of four gensets each, is also provided in the installation directory. This can be used with an unlicensed copy of the tool, as it is inside the functionality restriction, when there is no license.

### 2.2 Start without parameters

When the tool is started without parameters, it will use the parameters stored internally, from the previous session. If there are no parameters stored or the JSON file is not found, it will request the input of a file name. See [🔗 Chapter 2.3 "Handling of Invalid/missing JSON file" on page 9](#) for details.

### 2.3 Handling of Invalid/missing JSON file

When the selected or stored JSON file does not exist at startup, the tool will open a dialog to request it. This is the setup dialog described in [🔗 Chapter 5.1 "Menu item: Files/Create WSET" on page 19](#), but with the "Restart button removed. It allows setting the JSON file and some system parameters and allows selecting whether visualization is wished. It will then store these values for later sessions and proceed with the selected settings.

When the user presses "Cancel" in that screen, the tool will abort.

### 2.4 Licensing restriction

The tool requires a license. When unlicensed it will only visualize systems of up to two group controllers and up to four gensets for each group controller. When a JSON file for a larger system is selected, the visualization will not show up but a warning text will be shown instead.

## Starting the tool

### Licensing restriction

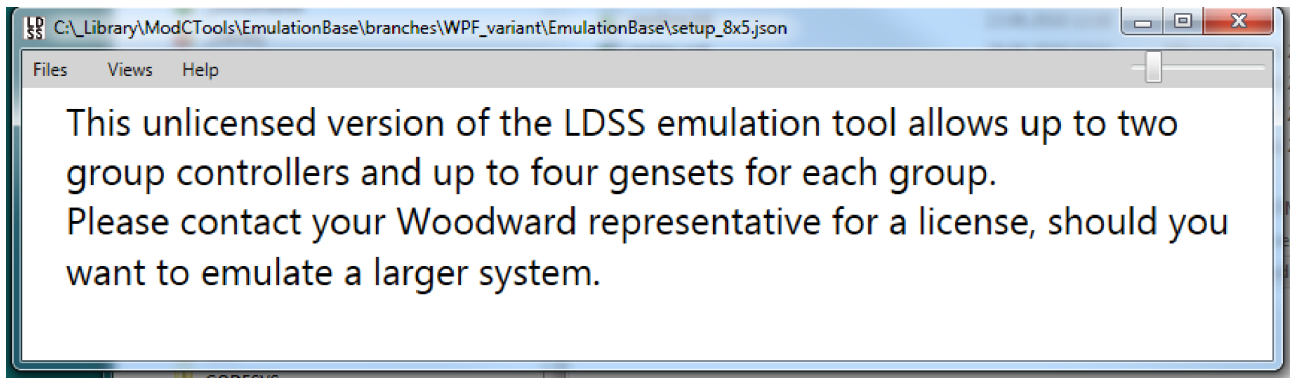
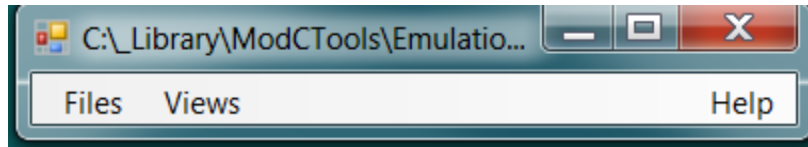


Fig. 1: Licensing restriction

JSON files for smaller setups are not affected. After acquiring a license (see [Chapter 5.10 "Menu item: Help/Licensing" on page 29](#)) and restart, this will disappear.

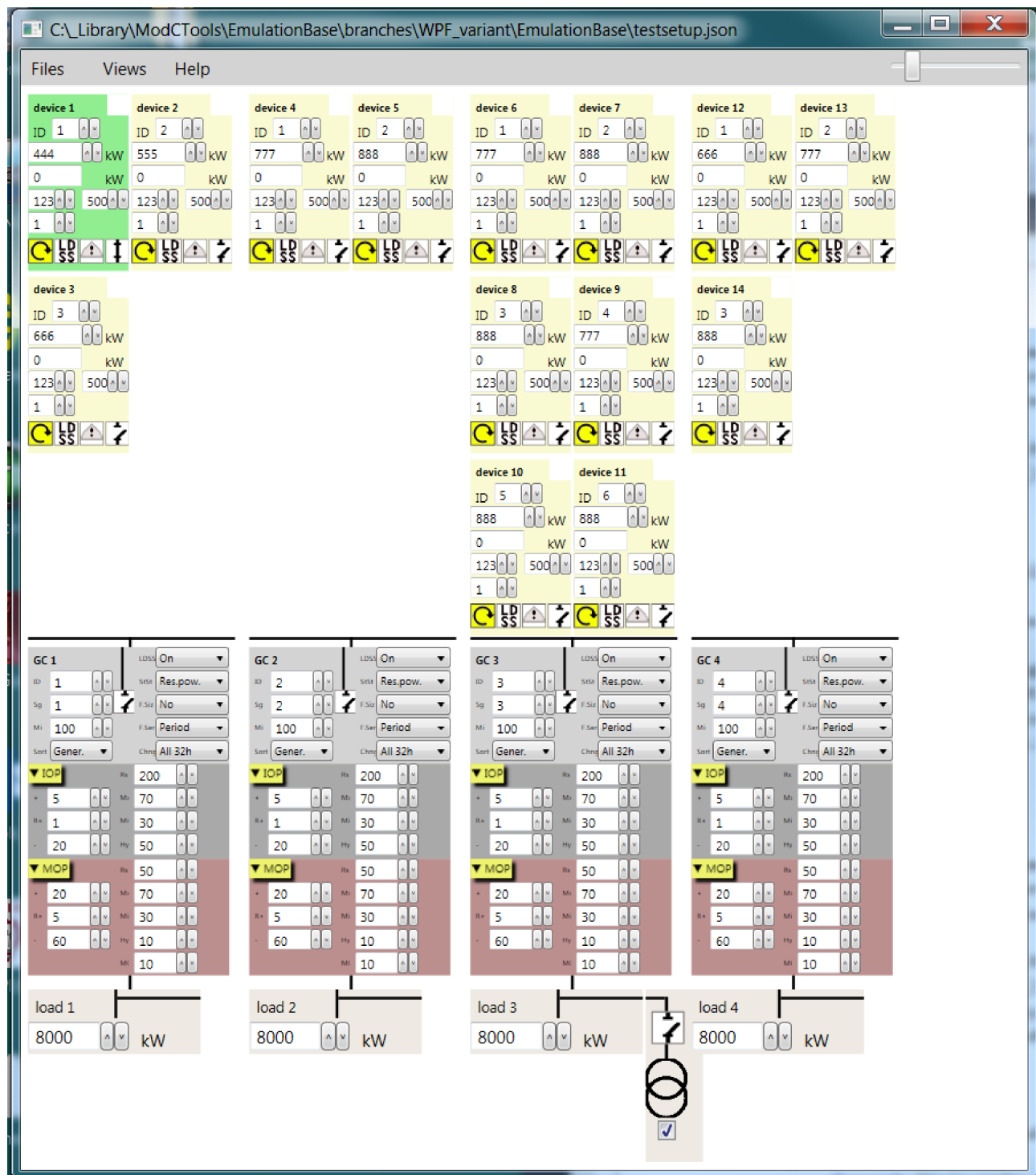
### 3 The main window

When started with a correct JSON file and the `-novisu` parameter the tool comes up as a small window like:



*Fig. 2: LDSS small window*

When started with a correct JSON file and without the `-novisu` parameter, the tool comes up with a visualization window like:



*Fig. 3: LDSS visualisation window*

EmulationBase automatically arranges the nodes defined in the JSON in its window and dimensions the window to fit. Grouping of the nodes is done following their associated group controllers. Each group controller group consisting of a group controller, a load, optional mains and the associated gensets is arranged with the gensets on top, below that — the group controller, and below that — the load and mains.

With the slider on top-right, the visualization can be zoomed in or zoomed out. The same can be done with Ctrl-mousewheel. The zoom factor is stored and will be used at next startup of the tool.

Depending on the configured values and breaker settings, the tool will do the active load sharing and calculate the electrical loads. Most values and parameters for all nodes can be changed, either by Modbus or by mouse and keyboard. Hovering the mouse over these controls will show a name of the associated parameters, identical to the name in the JSON definition file.

### 3.1 Elements the user can interact with

The user can change parameters and flags of the emulation in the visualization. When changed, they will be immediately recognized by the emulation. Hovering over a parameter with a mouse will show the name of the parameter as a little explanation. When a parameter is changed externally by Modbus communication (chapter 3), it will be changed automatically in the visualization.

#### Types of changeable elements

##### Numeric inputs

These represent integer values. Some have implicit minimum and maximum settings and do not allow values out of their range.

There are different ways to edit these values:

- They can be incremented/decremented with the up/down buttons. The change comes immediately into effect.
- Values can also be typed in. The input will then change its background to grey. This indicates that the value is temporary. To apply the value there are the following ways:
  - Once “Return” key has been pressed, the system will check validity and possible minimum/maximum limits. It will then either accept the value or replace it by a corrected value and the background will change back to white.
  - After pressing “ESC” the system will restore the value from before the change and the background will change back to white.

Right click on such an element opens a context menu with two selectable alternatives:

- “Send to all”: Activating this will write the current value to all corresponding parameters of all nodes of the same type.
- “Send to same ID”: Activating this has only effect for genset nodes. Here it will copy the current value to all genset nodes with the same node-ID.





##### Combo boxess

These represent enumeration values in a predefined range.

Right click on such an element opens a context menu with the selectable text “Send to all”. Activating that will write the current value to all corresponding parameters of all nodes of the same type.

##### Buttons

These are two-state buttons, describing a current value and will change appearance when clicked on. Currently there are:

-  - switches between auto/stop modes;
-  - activates/deactivates the LDSS node;
-  - deactivates/activates a stopping alarm;
-  - opens/closes a breaker.

## The main window

### The Group Controller node

### 3.2 The Genset node

This represents a genset and some emulation relevant parameters for this.





Name of the node	<b>Gen 1-1</b>	State indication
Node ID of the genset. Unique in this group	ID 1 ^ v	
Rated active power	100 ^ v kW	
Actual active power	0 kW	
Running hours	10 ^ v 300 ^ v	Hours until maintenance
Priority LDSS	1 ^ v 10 ^ v	Minimum running time
Switches between STOP and AUTO	   	GCB Open/Close
	LDSS ON/OFF	Shut down alarm active/inactive

Fig. 4: The genset node

The background color of the element indicates status of the genset.

- Pale yellow ⇒ genset is available in LDSS but not running.
- Green ⇒ genset is available in LDSS and running and GCB closed.
- Red ⇒ genset is stopped with an alarm.
- Blue ⇒ genset is not available in LDSS but running and GCB closed.
- Grey ⇒ genset is not available in LDSS and not running.

The state indication box on the top right can have the following content

- ▲: The engine is scheduled to start and is starting up but is in start delay, the breaker is still not closed. This emulates a normal start procedure of a genset.
- ▼: The engine is scheduled to stop and is in stop delay, the breaker is still closed. This emulates a normal stop procedure of a genset.
- A red background indicates that the “minimum running time” has not elapsed.

### 3.3 The Group Controller node

This represents a group controller and some emulation-relevant parameters for this. The parameters there are very detailed and explanation of these details is not part of this document.

The representation is grouped in three parts. The top one are generic parameters, the other two deal with island paralleling operation (IOP) and with mains paralleling operation (MOP). By clicking on the IOP and MOP marker, these parts can be collapsed in the visualization.

The screenshot shows the 'Group Controller' node interface. A green box labeled 'Group breaker' points to a switch icon in the top section. The interface is divided into three main colored sections: a green top section for generic parameters, a grey middle section for IOP (Island Paralleling Operation) parameters, and a red bottom section for MOP (Mains Paralleling Operation) parameters. Each section has a corresponding label on the left (IOP, MOP) and a list of parameters on the right. The 'Exported power' field is at the bottom.

Section	Parameter	Value
Generic Parameters (Green)	Name of the node	GC 3
	Node ID. Unique and automatically assigned	ID 3
	Segment number	Sg 3
	Basic sorting	Sort Fill-up
	LDSS on	LDS On
	Start/Stop mode	StSt Res.pow.
	Fit size of engine	F.Siz No
	Fit service hours	F.Se Period
	Changes of engine	Chn All 2h
	Reserve power	Rs 200
IOP (Grey)	Add On delay	+ 5
	Add On delay at rated	R+ 1
	Add Off delay	- 20
	Hysteresis	Hy 50
	Max. generator load	Mx 70
	Min generator load	Mi 30
MOP (Red)	Add On delay	+ 20
	Add On delay at rated	R+ 5
	Add Off delay	- 60
	Hysteresis	Hy 10
	Max. generator load	Mx 70
	Min. generator load	Mi 30
Export power setpoint	Exp 0	
Exported power	0	

Fig. 5: The group controller node

The top third coloring depends on the segmenting. When group controllers have the same segment number and their group breaker is closed, the one with the lowest node ID will be the group master. The top third of this master is then colored green and the others in the same group will be colored grey.

If two adjacent group controller nodes have the same segment number, then the system assumes an electrical connection between the groups. It will then draw a connection line. If not adjacent group controllers have the same segment number, however, no connection line will be drawn.

## The main window

### The Mains Node

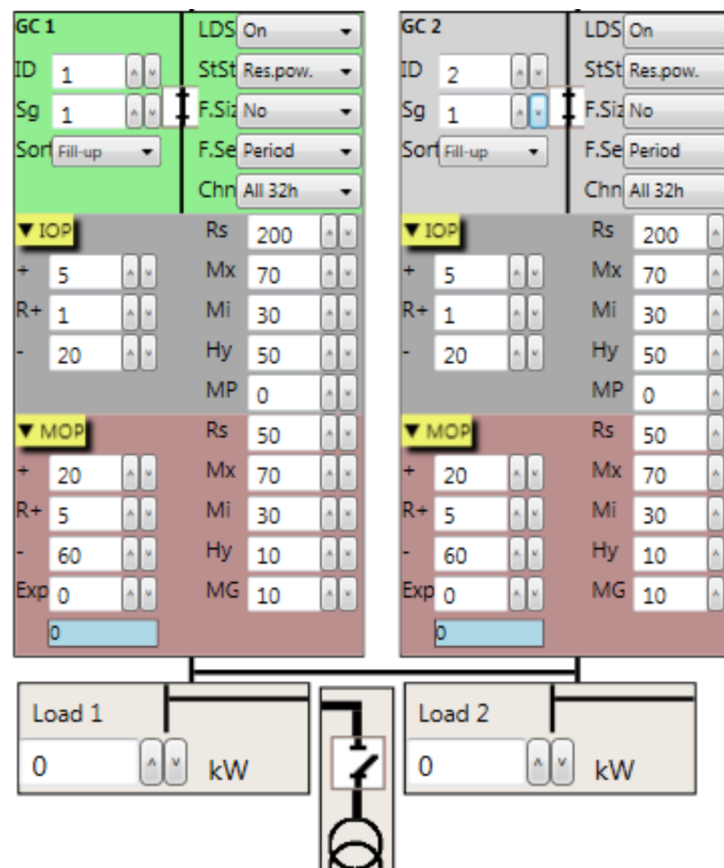


Fig. 6: Paralleled group controller nodes

## 3.4 The Load Node

This represents a load and some emulation-relevant parameters for this.

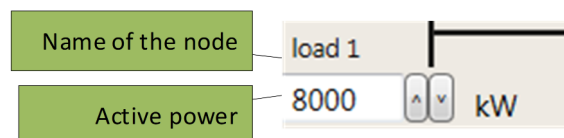
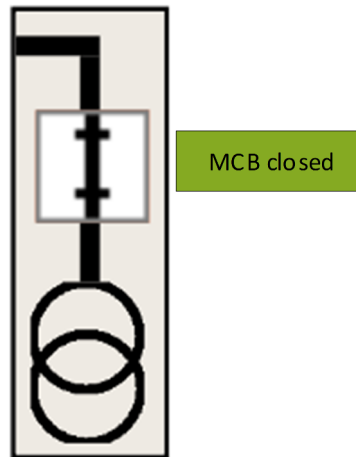


Fig. 7: The load node representation

## 3.5 The Mains Node

This represents a mains connection. The breaker symbol there indicates the status of the mains breaker.





*Fig. 8: The mains node representation*

## 4 Modbus access

This is to access the emulation values via Modbus, so that the tool can be used without the visualization and values can be changed without manual intervention. This functionality is independent whether the visualization is activated or not.

- All values of all nodes can be accessed by Modbus /TCP.
- The IP address is selectable with the Setup window, see chapter ↗ *Chapter 5.5 "Menu item: Files/Setup" on page 24.* The port is 502.
- The selected IP address is, when selected once, retained for further sessions.
- The Modbus master can be on the same PC the emulation is running or on another PC on the same network.
- Function codes 3 and 16 are supported.
- All addresses can be written or read. There is no security mechanism.
- Modbus mapping depends on the loaded JSON. A mapping list is dynamically created for each project and can be exported. See ↗ *Chapter 5.2 "Menu item: Files/Create mappinglist" on page 20.*
- Unmapped addresses will return the value of zero. Writing to them has no effect.
- Some mapped addresses are not for writing. The system will allow writing but it has no effect.
- When writing values to a mapped address, the visualization will be immediately updated with the new value. In addition, when values are changed in the visualization, the Modbus data will also be immediately changed. Write conflicts will be dealt with by the rule that the last write wins.

## 5 Support functions

With the menu in the main window, a couple of supporting functions can be activated.

### 5.1 Menu item: Files/Create WSET

This starts a dialog to create Toolkit setting files (\*.wset) from the currently loaded emulation setup to use in actual devices or simulations. For the applications, it needs so called package files, which are part of the deployment of Woodward GC3000 and EG3000 application. It will then create multiple settings files. A progress bar will show the status of the generation.

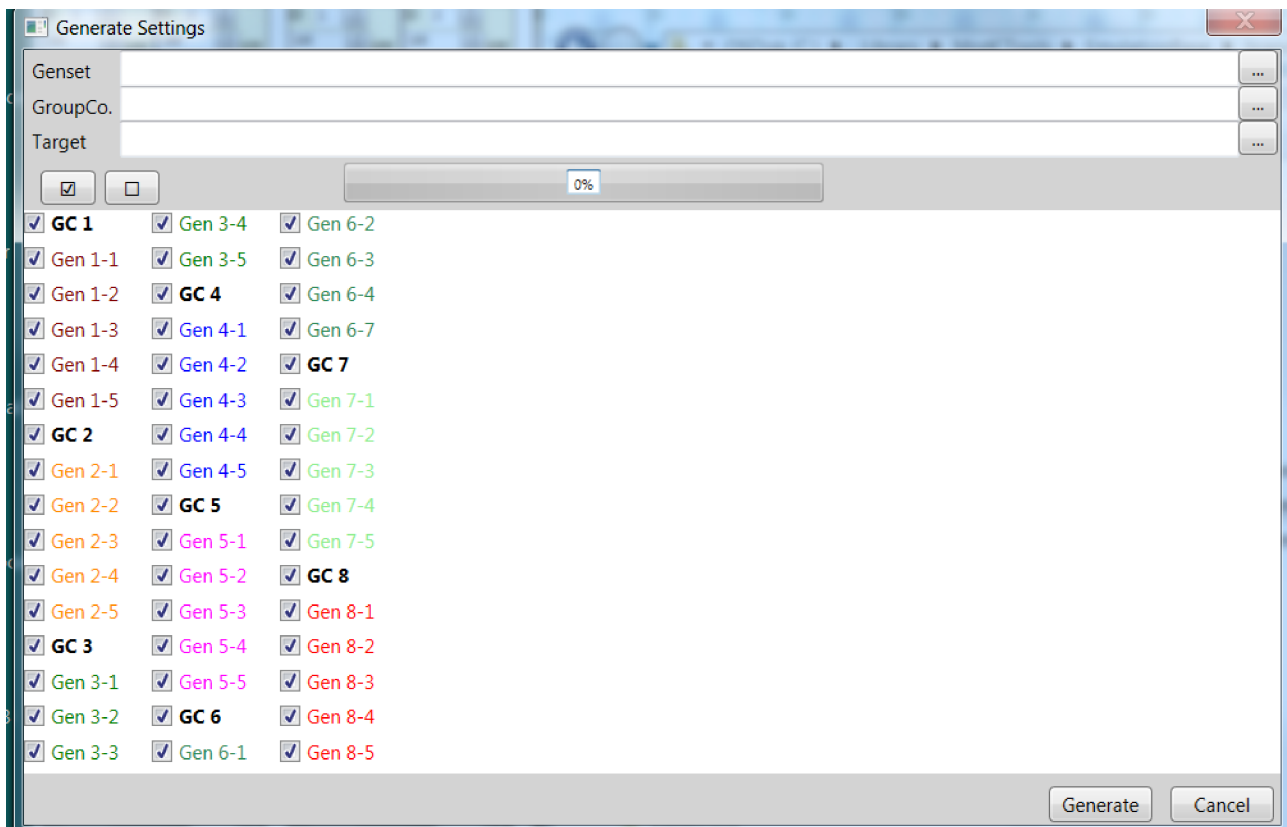


Fig. 9: Create WSET window

- **Genset:** here a package file for the target EG3000 application shall be entered.
- **GroupCo.:** here a package file for the target GC3000 application shall be entered.
- **Target:** here a directory where the \*.wset files will be stored in, shall be entered.
- ☒ ☐: select/unselect all.
- **Device list:** all groupcontrollers and associated gensets are listed here. When the associated checkbox is activated, the tool will create a \*.wset for this.
- **Generate:** this button starts generating \*.wset files. A progress bar will appear to inform about the status.
- **Cancel:** this buttons cancels the operation and closes the dialog.

## 5.2 Menu item: Files/Create mappinglist

When activating this, the tool prompts for a file and will then create a list of Modbus address mappings for this JSON setup. A mapping file looks like:

```

---- internal parameters -----
00001 , "Application handoff hi word"
00002 , "Application handoff lo word"
00003 , "command for control (internal)"
00004 , "reserved"
00005 , "library module 0 name"
00006 , "library module 0 handoff hi word"
00007 , "library module 0 handoff lo word"
00008 , "library module 0 name"
00009 , "library module 0 handoff hi word"
00010 , "library module 0 handoff lo word"
00011 , "...continued until module name 0 is
encountered ..."
00091 , "setup parameter Start time"
00092 , "setup parameter Stop time"
---- Name = GC 1 ----- Type = Groupcontroller
00101 , "NodeId"
00102 , "Segmentnumber"
00103 , "GGB is closed"
00104 , "MCB is closed"
---- Name = load 1 ----- Type = Load
00151 , "ActiveLoad"
---- Name = device 1 ----- Type = Genset
00191 , "NodeId"
00192 , "Generator active power proportion" ,
[0.1]
00193 , "Generator reactive power proportion" ,
[0.1]
00194 , "Active load share switched ON"
00195 , "Reactive load share switched ON"
00196 , "GCB is closed"
00197 , "Shut down alarm is latched"
00198 , "Generator active power" , [1000]
00199 , "Operation mode"
00200 , "Generator is requested"
00201 , "1752 Gen. rated active power"
00202 , "1758 Gen. rated react. power"
00203 , "RunningHours"
00204 , "Priority LDSS"

```

```

00205 , "Hours until Maintenance"
---- Name = device 2 ----- Type = Genset
00241 , "NodeId"
00242 , "Generator active power proportion" ,
[0.1]
00243 , "Generator reactive power proportion" ,
[0.1]
00244 , "Active load share switched ON"
00245 , "Reactive load share switched ON"
00246 , "GCB is closed"
00247 , "Shut down alarm is latched"
00248 , "Generator active power" , [1000]
00249 , "Operation mode"
00250 , "Generator is requested"
00251 , "1752 Gen. rated active power"
00252 , "1758 Gen. rated react. power"
00253 , "RunningHours"
00254 , "Priority LDSS"
00255 , "Hours until Maintenance"

```

### Table syntax

- The first column is the Modbus address. There are two Modbus addressing schemes around, zero-based and one-based; this is the one-based one.
- Second column is a description text
- All elements are single words data points.
- Third column is a factor.
  - [1000] means that when a value x is written by Modbus, the system will receive  $x \cdot 1000$ , and when a value is read here the value will be divided by 1000.
  - [0.1] means that when a value x is written by Modbus, the system will receive  $x/10$ , and when a value is read here the value will be multiplied by 10.
  - If this is empty, the value is read/written unchanged.
- Boolean values will be written and read as 0=FALSE, 1=TRUE.
- The addresses have gaps. This is for future expansions. It is possible to read and write into these addresses, but reading always yields zero and writing has no effect.

### Mapping areas

The Modbus mapping is predefined and it will not change. The created mapping file always shows a subset of the predefined area, depending on how many nodes are defined in the JSON. The address locations are independent of the loaded JSON file. We will try to keep the local addresses of the node parameters backwards compatible. So when new parameters will be added to nodes, they will be added at the end.

The maximum mapping is:

- **1..100: internal parameters**
  - 1: the handoff identification number of the application, hi word, see [Chapter 5.4 “Menu item: Files/Reload JSON” on page 24](#)
  - 2: the handoff identification number of the application, lo word
  - 3: command parameter. Currently it has two functions:
    - When writing 1 to it, the system will reset all nodes' parameters to the original JSON values.
    - When writing 2 to it, the system will reset the system parameters Starttime and Stoptime (see [Chapter 5.5 “Menu item: Files/Setup” on page 24](#)).
  - 4: reserved
  - 5..90: show the all library names and handoffs, see [Chapter 5.4 “Menu item: Files/Reload JSON” on page 24](#). This is for internal purposes
    - 5: identification number of library module 0
    - 6: handoff identification number of library module 0, hi word
    - 8: identification number of library module 1
    - 9: handoff identification number of library module 1, hi word,
    - 10: handoff identification number of library module 1, lo word,
    - etc.
  - 91: the setup parameter “Start time”, see [Chapter 5.5 “Menu item: Files/Setup” on page 24](#).
  - 92: the setup parameter “Stop time”, see [Chapter 5.5 “Menu item: Files/Setup” on page 24](#).
- **101..1800: group 1**
  - 101..150: parameters for group controller 1
  - 151..170: parameters for load node 1
  - 171..190: parameters for mains node 1
  - 191..240: parameters for genset 1 in group 1
  - 241..290: parameters for genset 2 in group 1
  - ...similar
  - 1691..1740: parameters for genset 31 in group 1
- **1801...3500: group 2**
  - 1801..1850: parameters for group controller 2
  - 1851..1870: parameters for load node 2
  - 1871..1890: parameters for mains node 2
  - 1891..1940: parameters for genset 1 in group 2
  - 1941..1990: parameters for genset 2 in group 2
  - ...similar
  - 3391..3440: parameters for genset 31 in group 1
- **3501...5200: group 3**
  - ...similar
- **5201...6900: group 4**
  - ...similar
- **6901...8600: group 5**
  - ...similar
- **8601...10300: group 6**
  - ...similar

- 10301...12000: group 7
  - ...similar
- 12001...13700: group 8
  - ...similar

### 5.3 Menu item: Files/Create JSON

This opens a dialog to create a new JSON file, based on the JSON file the application was started with.

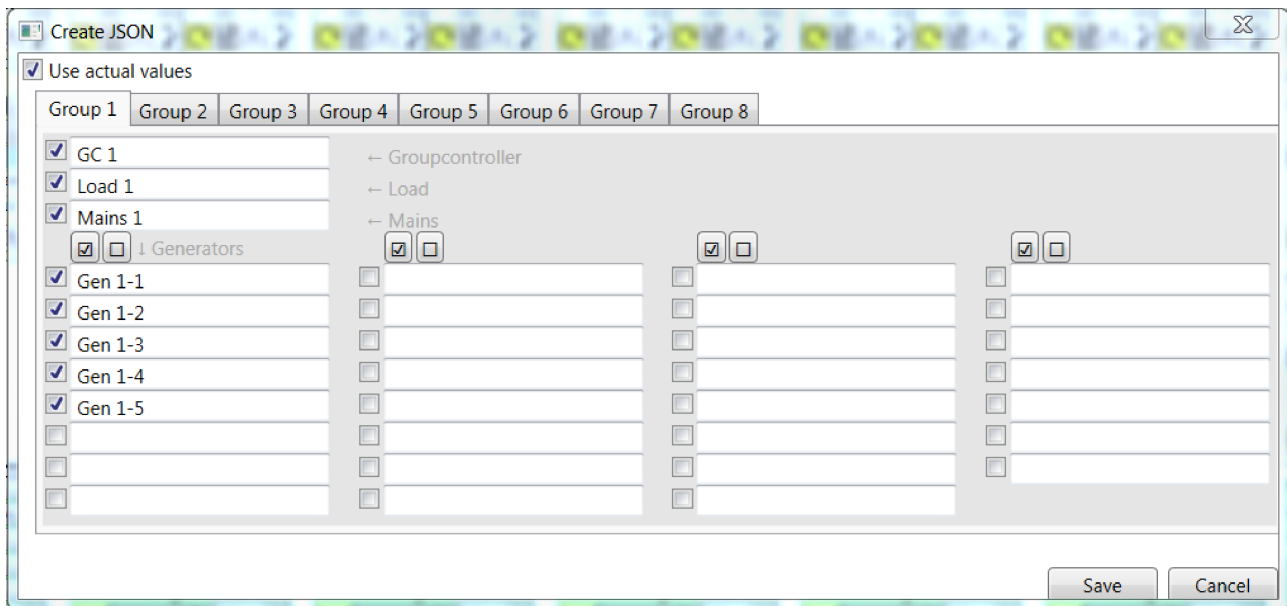


Fig. 10: Create JSON window

It allows defining up to eight groups with up to 31 gensets each, group controller, load and mains. For each node it can be defined whether the node shall be in the system and its name can be defined. Only entries with a checked checkbox and a valid name will be added to the JSON.

The dialog will do a couple of plausibility checks:

- If there is a group controller defined, there must be also a load and at least one genset
- If there is at least one genset or mains or load, there must be a group controller
- All names of elements must be different and they must be not blank

Only if the plausibility check is passed, the dialog will accept the settings.

The buttons ☒ and ☐ are helpers for quicker work, which select/unselect the corresponding column of gensets and populate with default names.

With the checkbox "Use actual values" the tool will populate the JSON with the values currently active in the visualization. Therefore, when they were set manually or by Modbus, they will be in the created JSON. If this checkbox is disabled, default values will be set.

With the button “Save” the setup can be stored as a \*.JSON file. The file can have the same name as the JSON file the application was started with, but this will have no influence on the running application. The changes will only be loaded when the application is restarted.

## 5.4 Menu item: Files/Reload JSON

This sets all parameters of all nodes back to the value in the initially loaded JSON file. If the JSON was changed with Files/Create JSON (see [Chapter 5.3 “Menu item: Files/Create JSON” on page 23](#)) in the same session, the changed values will not be taken into account. For that, the application has to be restarted with the changed JSON file.

## 5.5 Menu item: Files/Setup

This starts the Setup screen, which is to change general system parameters. All these values are stored in the project and are available at all following sessions. The Setup screen also allows restarting the application with the new settings. When parameters marked red are changed, the system has to be restarted for these parameters to take effect.

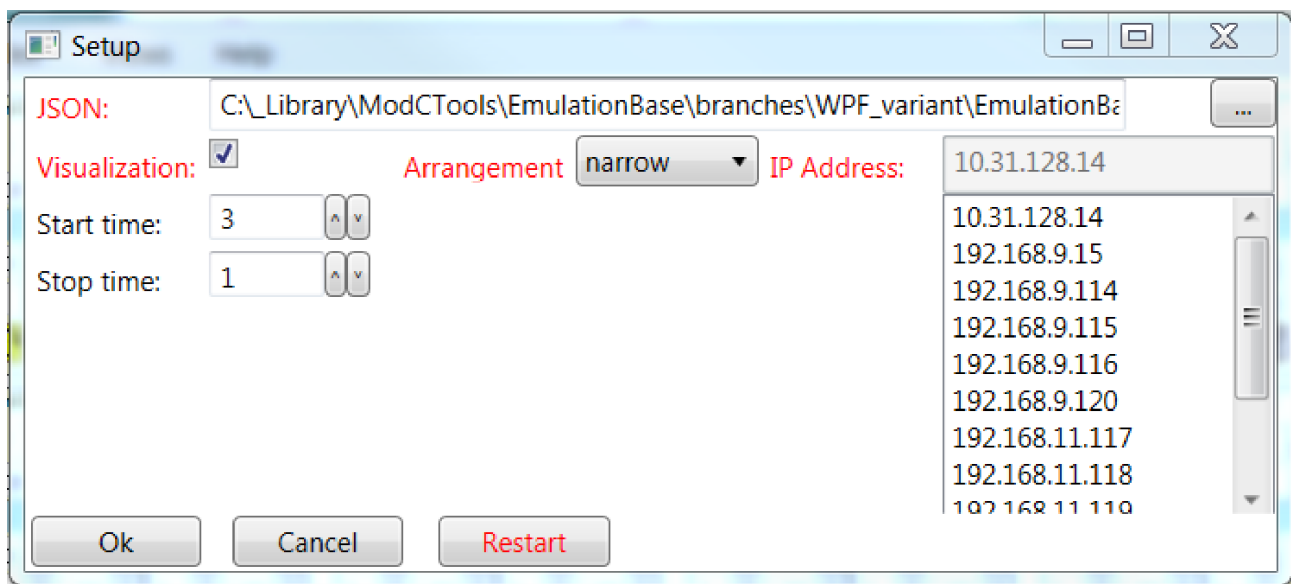


Fig. 11: The Setup screen

Values:

- JSON:
  - This is the \*.JSON file which describes the project to be emulated, consisting of gensets, group controllers, loads and mains. Changing this has no immediate effect. Only after restarting the application this will be active.
- Visualization :
  - This enables/disables the tool’s visualization. When the visualization is off, the communication and parameter setting can only be set by Modbus (see [Further information on page 18](#)), Changing this has no immediate effect. Only after restarting the application this will be active.



- Arrangement:
  - This defines the arrangement of the genset nodes in the visualization. It allows the following alternatives:
    - narrow — gensets in a group will be arranged in two columns. This is the default and in most cases the best selection;
    - quad — gensets in a group will be arranged so that the number of columns and number of rows is the same;
    - halfquad — gensets in a group will be arranged so that the number of rows is half of the number of columns.
- IP Address
  - This allows selecting the IP address for Modbus access (see [🔗 Further information on page 18](#)). The field on the top is the actually selected value
  - The list below is an enumeration of all IP addresses the system has detected on the PC. A double click on an item in this list will select this IP address and replace the previously selected one.
  - Selecting a new IP address has no immediate effect. Only after restarting the application will this be active.
- Start time
  - This sets up a genset start time in seconds, which is the time the genset takes after having received a start command from its associated group controller until it actually has closed its breaker.
  - This value can be reset to 1 s by Modbus, by writing the value “2” into the control address “3”. See [🔗 “Mapping areas” on page 21](#).
  - It was tested and is recommended to set it to 1 s or higher.
- Stop time
  - This sets up a genset stop time in seconds, which is the time the genset takes after having received a stop command from its associated group controller until it actually has opened its breaker.
  - This value can be reset to 1 s by Modbus, by writing the value “2” into the control address “3”. See [🔗 “Mapping areas” on page 21](#).
  - It was tested and is recommended to set it to 1 s or higher.

#### Buttons:

- With the “...”-button on the top-right corner, a JSON file can be selected.
- The “Visualization” checkbox selects whether the visualization shall be activated.
- When “OK” is pressed, the values will be stored for later sessions, but some values (the ones marked red) will not immediately take effect.
- When “Restart” is pressed, the tool will store the selected values for later sessions and then will reset the whole application with the new values.
- When “Cancel” is pressed, the tool will do nothing.

## 5.6 Menu item: Files/Transfer settings

This allows transferring emulation parameters from or to actual devices via Modbus/TCP. Only the parameters used by the tool and contained in the JSON will be transferred. Only transfer to group controllers is possible. The group controllers have to be connected to the PC's by network.

The following window will open:

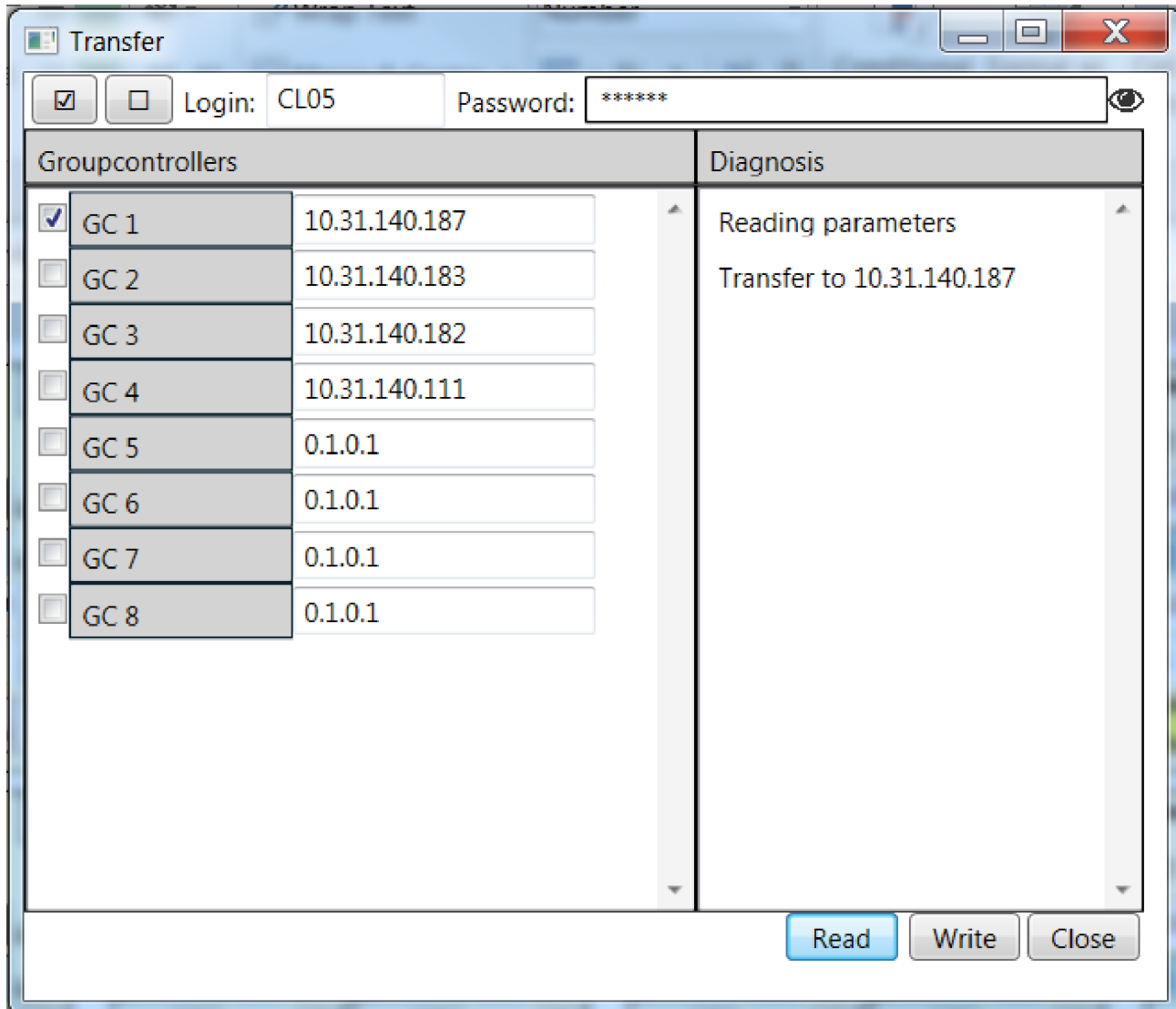


Fig. 12: The Transfer settings window

The elements here are:

- Groupcontrollers
  - This is a list of all group controllers defined in the current project (by the \*.JSON file) with associated IP addresses.
  - The IP addresses are defined in the JSON file. They can be edited and later, with "Files/Create JSON" they can be permanently stored.
  - The checkboxes select the group controllers to or from where the data shall be transferred.
- Diagnosis
  - This shows the progress of the data transfer to/from the group controllers and possible warning messages.

- Login
  - This is the login for the device. It is prepopulated with the default “CL05”.
- Password
  - Allows inputting a password for writing data to group controllers. It has to be the password for the login defined above. This input is prepopulated with the password for login “CL05” which is “CL0500”, which is the Woodward default password.
  - Only with a correct password will the “Write” transfer be successful.
  - The password used will be the same for all selected group controllers.
  - Clicking on the “eye” icon will make the password temporarily readable.
  - After a write or after closing the window, the password will be reset to “CL0500”.
- ☒ ☐:
  - Selects/unselects all group controllers for data transfer.
- Read
  - This reads parameters from the selected group controllers and updates the visualization accordingly. The read values can later be transferred into the JSON with “Files/Create JSON”.
- Write
  - This writes parameters from the emulation to the selected group controllers. This will work only when the password was set correctly.
- Close
  - Closes the windows and aborts. IP addresses, if they were changed, will be stored and will be available when opening the window again. With “Files/Create JSON” in the main window, they can be permanently stored.

## 5.7 Menu item: Views/Genset overview

This opens a compact overview of all gensets defined in the \*.json file, together with their status indication. Up to 8x31 gensets can be displayed.

## Support functions

Menu item: Views/Genset over...

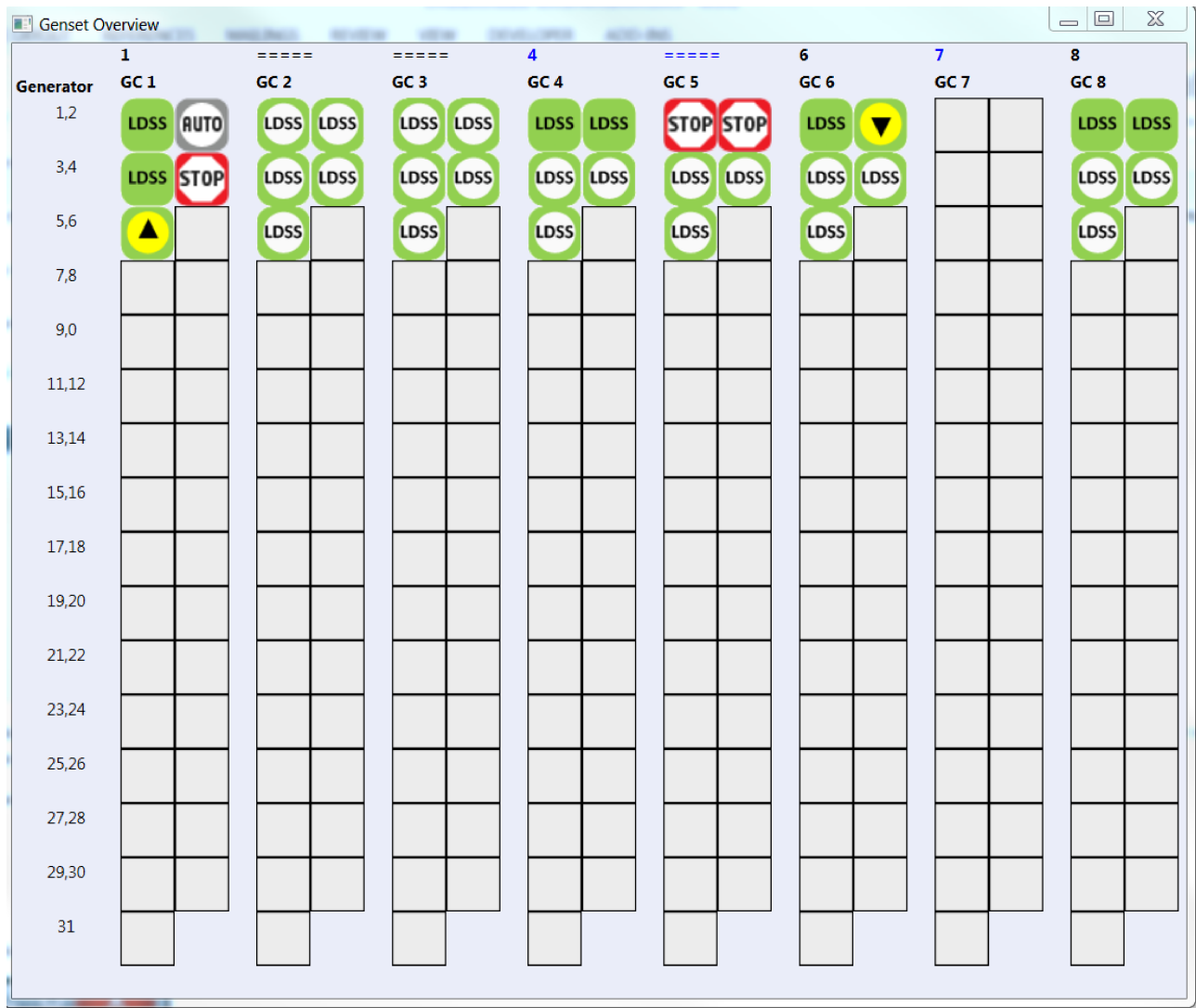









Fig. 13: Genset overview window

The view is arranged in a tabular form with double columns of gensets sorted by the corresponding group controller.

On the first line, there is the segment number of the group controller. When adjacent group controllers have the same segment, this is indicated by a "====" there.

On the second line, there are the names of the group controllers, as defined in the \*.json file.

Below that, there are pairs of two gensets per line with symbolic state indications. The following states are shown:

-  Genset does not exist in the \*.JSON or the group breaker for this group is not closed.
-  Genset is in operating mode "Stop".
-  Genset is in operating mode "Auto" and not available for LDSS.
-  Genset is available for LDSS but not running.
-  Genset is available for LDSS and running with breaker closed.
-  Genset has received a start wish from the LDSS.
-  Genset has received a stop wish from the LDSS.

## 5.8 Menu item: Help/Help

This shows the help document.

## 5.9 Menu item: Help/Info

This shows an information screen about revision of this application and revisions of used modules in it.

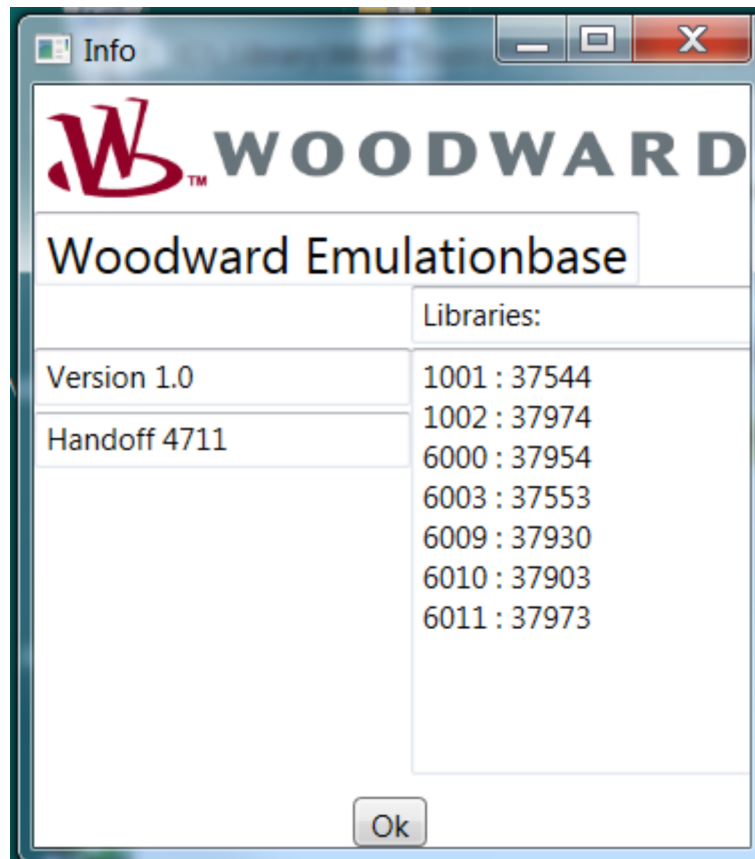


Fig. 14: Revision information screen

- Version This is the software version of the application.
- Handoff This is a unique Woodward identification number of this application. This number suffices identifying the application completely.
- Libraries This is a list of library names (numbers like 1001, 1002, 6000 ...) and handoff numbers describing the EG3000XT and GC3000XT code used in this emulation. These numbers are for internal usage and have not much use for the customer.

## 5.10 Menu item: Help/Licensing

The tool requires licensing and will, when unlicensed only visualize systems of up to two group controllers and up to four gensets for each group controller.

When activated, the following dialog will appear:

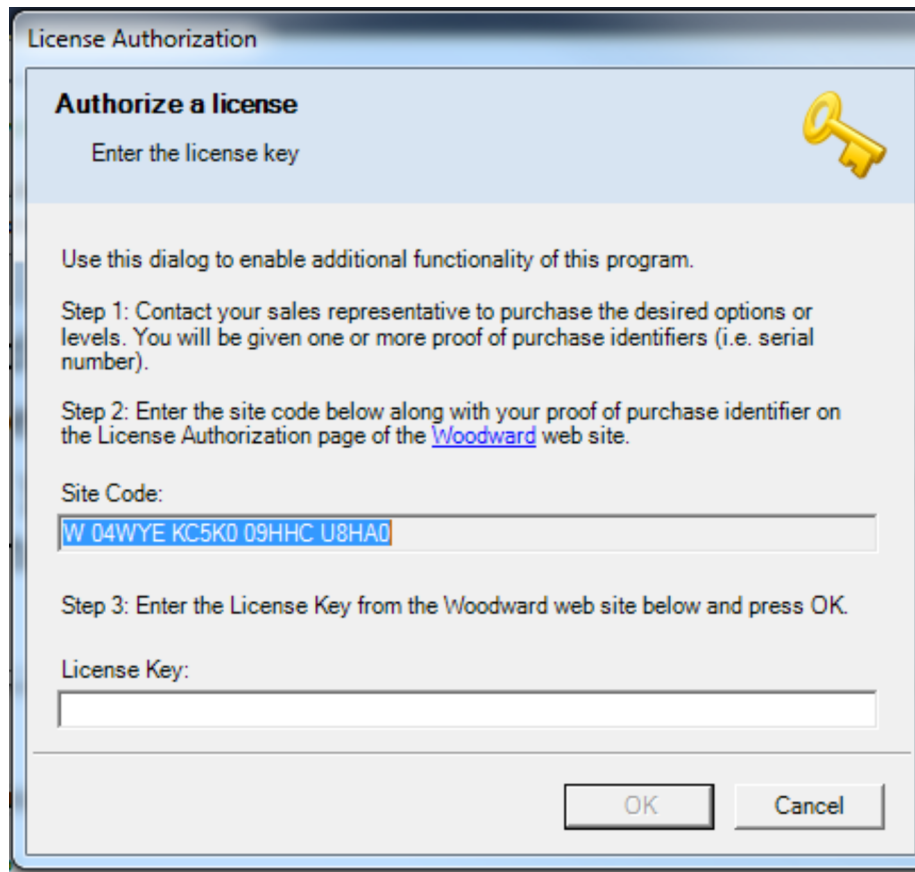


Fig. 15: License authorization window

Copy the "Site Code" text, which is a description of your local machine and transmit it to a Woodward sales representative. You will receive a License Key, which shall be input into the "License Key" field and confirmed with "ok". This will license the software and after a restart, it will run without restrictions.

The menu item Help/Licensing will disappear in a licensed software.

## 6 Index

### B

Buttons . . . . . 13

### C

Contact person . . . . . 7

Customer Service . . . . . 7

### G

Genset node . . . . . 14

Group Controller node . . . . . 14

### I

Intended use . . . . . 7

### L

Licensing . . . . . 9

Load Node . . . . . 16

### M

Mains Node . . . . . 16

Modbus access . . . . . 18

### P

Personnel . . . . . 7

### S

Service . . . . . 7

Symbols  
    in the instructions . . . . . 5

### U

Use . . . . . 7

### W

Warranty . . . . . 7









**Woodward GmbH**

Handwerkstrasse 29 - 70565 Stuttgart - Germany

Phone +49 (0) 711 789 54-510

Fax +49 (0) 711 789 54-101

[stgt-info@woodward.com](mailto:stgt-info@woodward.com)