

User's Manual



How to design DEIF components on the Pro-face GP-3500 touch screen

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- *DEIF design objects*
- *Documentation for programming and setup in GP-Pro Ex*
- *Primarily for using a Pro-face GP-3500 display with DEIF A/S systems*



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1. Introduction

This document is intended for customers who wish to use the Pro-face GP-3500 display to communicate with DEIF A/S PPM or AGC Rel.3 systems. The purpose of the Pro-face display is to provide an M-Vision interface in areas where it is not possible to have a PC with M-Vision running. The Pro-face provides the essential features which are required to observe, control and interface with a PPM or AGC Rel.3 system.

The system consists of 2 components. The GP-3500 touch screen display and the GP-Pro EX programming software. The GP-3500 is a 640x480 display with USB, Ethernet and COM ports for external communication and software upload. The GP-Pro EX is the programming software that allows the user to design his own pages with the fitting contents.

This document and all its components are meant as a guide to designing a Pro-face simulated M-Vision environment. It does not offer a complete solution that can be implemented directly in any PPM or AGC Rel.3 system, so use it at your own discretion.

2. Restrictions

When programming DEIF components in the GP-Pro EX software, there are some restrictions which force us to use scripts as a way to achieve a satisfying result.

- **Meters**

The meters in the GP-Pro EX design tool are not equipped with indicators that inform the user of the scale he is watching. This means that the designer has to equip the meter with numbers manually.

- **Active components**

When you place a component, e.g. a 90 degrees meter, and allocate a memory address for it, the meter will always become the top layer item when it receives data, consequently anything placed in front of it will be pushed behind it.

- **Scaling switches with pictures**

When scaling a lamp/switch with a picture, you may experience that the view in the editor does not correspond with the view on the GP-3500 display. This may become a problem when connecting DeifBusbar lamps.

- **Trending information from different sources**

When creating a trend graph in the GP-Pro software, you are forced to receive the input to the graph from a sampling group. The sampling group is a collection of information with a date and time attached to it. The problem occurs when you want to load information from different sources (e.g. three generators) because the sampling group only allows you to fetch several data from one source.

- **Updating information from several sources**

When updating information from 40-50 items on the same slide, the latency between the Pro-face and the PPM or AGC Rel.3 system becomes noticeable.

Most of the restrictions have been solved, please read under the specific item in chapter 5 to find a solution.

3. Setting up the system

First you must install the GP-Pro EX software and connect the GP-3500 display to your computer with either an Ethernet RJ45 cable or a male/male USB cable.

If you choose the Ethernet connection, you should set up the IP on the GP-3500 unit for your network.

Setting up the devices in GP-Pro EX

When you have installed the GP-Pro EX design software and connected the GP-3500, it is time to set up the PLC for the PPM/AGC Rel.3 system. First access the 'System Settings' tab in the upper left corner of the design tool, then click the Device/PLC link. Change the device to: *Maker: 'Schneider Electric Industries' Device: 'MODBUS SIO Master' on COM1* and apply the settings as shown in figure 1.

These settings are imported directly from the PPM project, therefore there are also 3 generators, a tie breaker and a shaft generator under 'Device-Specific Settings'; these settings may not correspond to your system.

The screenshot displays the 'Device/PLC Settings' window in GP-Pro EX. The 'Device/PLC 1' tab is selected, showing the following configuration:

- Display Type:** GP3000 Series, Model: AGP-3500T, Installation Method: Horizontal
- Device/PLC Settings:** Add Device/PLC, Delete Device/PLC
- Device/PLC 1:** Summary, Change Device/PLC
- Text Data Mode:** 1, Change
- Communication Settings:**
 - SIO Type: RS232C (selected), RS422/485(2wire), RS422/485(4wire)
 - Speed: 19200
 - Data Length: 7, 8
 - Parity: NONE (selected), EVEN, ODD
 - Stop Bit: 1 (selected), 2
 - Flow Control: NONE (selected), ER(DTR/CTS), XON/XOFF
 - Timeout: 3 (sec)
 - Retry: 2
 - Wait To Send: 2 (ms), Default Value
- RI / VCC:** RI (selected), VCC. Note: In the case of RS232C, you can select the 9th pin to RI (Input) or VCC (5V Power Supply). If you use the Digital's RS232C Isolation Unit, please select it to VCC.
- Device-Specific Settings:** Allowable No. of Device/PLCs: 16 Unit(s). A table lists 5 devices: Gen1, Gen2, Gen3, TB, and SG, each with a 'Settings' button.

The 'Individual Device Settings' dialog box for 'Gen1' is also open, showing:

- Equipment Address:** Slave Equipment Address: 1
- Max Query:** A table with columns: Address, Function Codes, Max Query.

Address	Function Codes	Max Query
Coil (0)	Read (01H)	2000 bits
Coil (0)	Write (0FH)	800 bits
Discrete Input (1)	Read (02H)	2000 bits
Input Register (3)	Read (03H)	125 words
Holding Register (4)	Read (04H)	125 words
Holding Register (4)	Write (10H)	100 words
- Variables:** IEC61131 Syntax (unchecked), Double Word word order: Low word first(L/H).
- Buttons: Default, OK (O), Cancel

Figure 1 - Device settings

Connecting the PPU/PPM/AGC Rel.3 system to the Pro-face

In order to connect the Modbus on the PPM system to the Pro-face display, you need to make a customised serial cable as shown in figure 2. The Pro-face input is on COM1, so you need a female DSUB-9 connector for your cable.

- 1:1 Connection

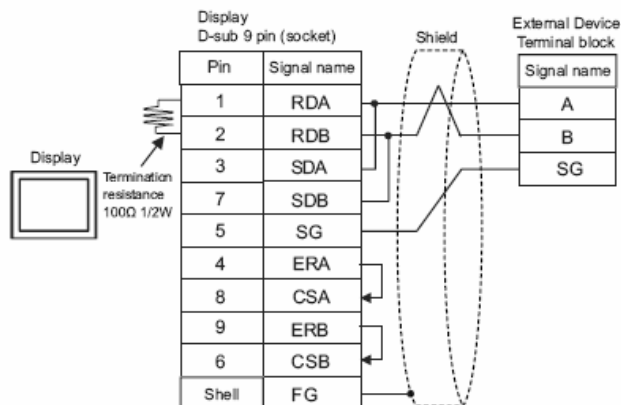


Figure 2 - Cable from Modbus to Pro-face

If you are customising a standard 10 wire serial cable with a female connector on it, you can try the following method:

1. Loop green and gray wire together
2. Loop orange and purple wire together
3. White and yellow are not used
4. Brown and blue should be connected to port 31 on one of the Modbus modules
5. Black and red should be connected to port 29 on one of the Modbus modules

4. DEIF components import file

The 'Deif_Components_import_file.pdx' is a palette file that can be imported into the GP-Pro EX software and allows the designer to use the DeifBus objects from M-Vision.

How to install

Installation is done by copying the 'Deif_Components_import_file.pdx' file into your PG-Pro EX's pdx directory. E.g. 'C:\Program Files\Pro-face\GP-Pro EX\pdx'.

How to use

The palette file can be used when designing switches/lamps. Create a switch/lamp and select 'Select Shape' under the change attributes menu, mark the 'Deif_Components_import_file.pdx' as your selected part palette and choose the object you need. If you only need the standard parts, please use the 'DEIF components project file'.

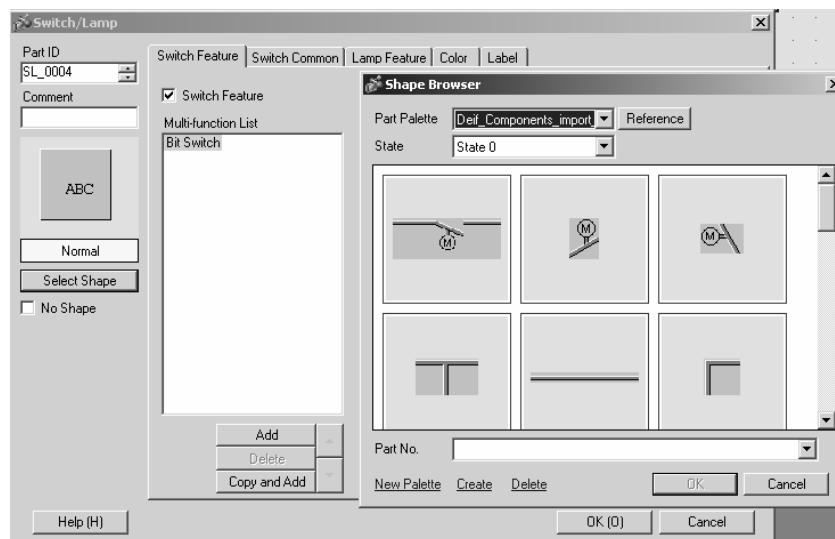


Figure 3 - DeifBus components

5. DEIF components project file

The component project file contains all the DEIF components from M-Vision and allows the designer to copy them into his own project. All items in the project file are grouped, which means that you cannot move the individual objects. If you want to change the design of the object, you have to ungroup them.

DeifMeter 90

The DeifMeter 90 slide contains 7x90 degrees meters that can be modified by the designer without any problems. The meters cover: Voltage, current, frequency (50Hz), frequency (60Hz), kW produced, kVAR and the cos phi. If you wish to change the display range, double click on the meter and change the min. and max. values. Because of the restriction in GP-Pro, you have to change the number indicators on the graph manually. This is done by double clicking on the number and changing the register message under the display settings tab. Remember to change the message for both states (ON/OFF).

To avoid the meter covering up the indicators, you need to create a script that runs the following code every second: `toggle ( [b: [#INTERNAL] LS000000] )`.

This makes the indicator numbers switch between ON and OFF state and forces the GP-3500 to keep the numbers on top of the active meter.

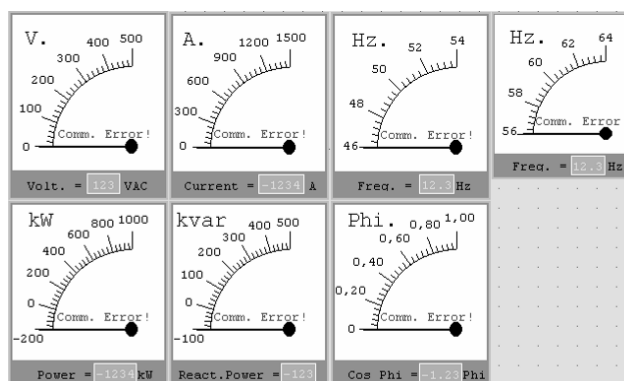


Figure 4 - 90 degrees DeifMeters

If you wish to print a small blue dot that can be placed at the nominal value, you can insert the following code in a script that updates each second:

```
//kW
dsp_dot (243, 284, 0x0000 + 1)
dsp_dot (242, 284, 0x0000 + 1)
dsp_dot (241, 284, 0x0000 + 1)
dsp_dot (243, 283, 0x0000 + 1)
dsp_dot (242, 283, 0x0000 + 1)
dsp_dot (241, 283, 0x0000 + 1)
dsp_dot (243, 282, 0x0000 + 1)
dsp_dot (242, 282, 0x0000 + 1)
dsp_dot (241, 282, 0x0000 + 1)
```

This would force a 9 pixel blue dot at the coordinates 242,283 which is at 800kW. This method only draws a spot, it has no communication with the PPUs whatsoever.

DeifMeter 240

The DeifMeter 240 is built the same way as the 90 meters and functions the same way.

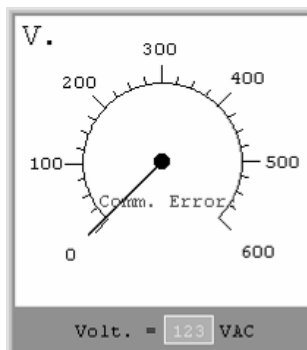


Figure 5 - 240 degree DeifMeter

DeifMeterVertical

The vertical meter slide contains several meters varying in size and shape, but they are all built the same way. You only have to set up the Modbus address in the monitor address and define your minimum and maximum values to make it work.

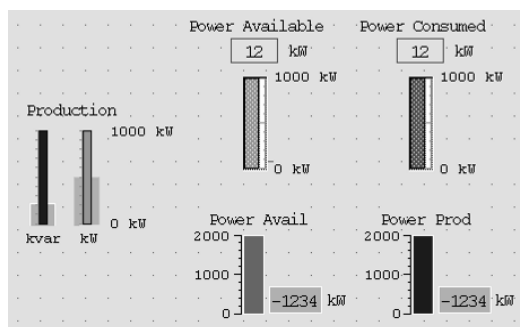


Figure 6 - Vertical meters

DeifBus – setup

The DeifBus slide contains a predefined bus setup with 2 generators, tie breaker and a shaft generator. The slide is constructed as an example of how to build a bus setup.

All the objects are created by a switch/lamp button with the DEIF components import file. They should all have a monitoring bit on the bus, so the button can switch between on and off state. You can see all the states under the top menu → View → No. of states.

Remember to add a rectangle with the E10 fill colour and send it to the back, so you have a background for your setup.

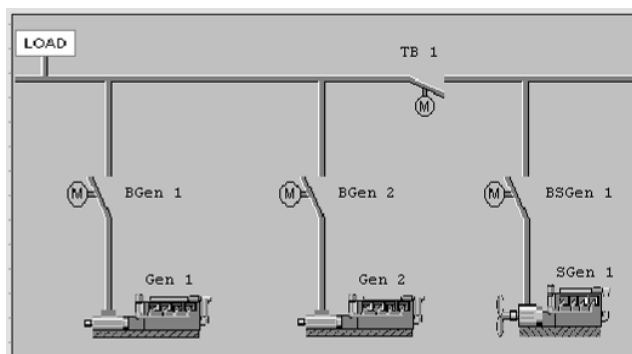


Figure 7 - Bus setup

DeifBus - components

This slide contains almost all the components from the import file. The components are sized, grouped and ready to drag into your project. All you have to do is assign the monitoring address for the active components.

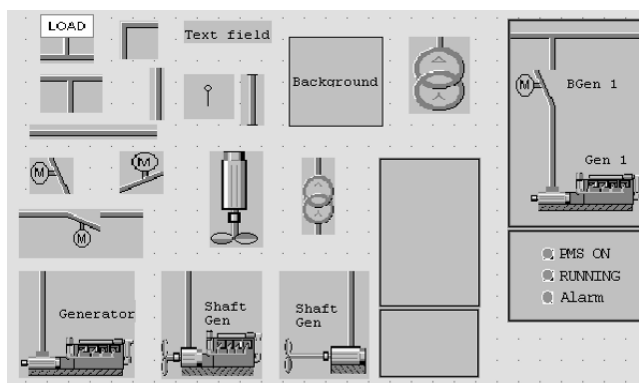


Figure 8 - Bus components

DeifTrends

The DeifTrend slide consists of 3 elements; a graph, a script and a table.

- Trend graph

The graph is loading information from a sampling group which runs 3600 times in 1 second intervals. The sampling group is getting information on the 4 generators from four values in the internal memory, e.g. [#INTERNAL]LS0101 to [#INTERNAL]LS0104. The graph is equipped with historical display that allows the user to scroll 30 forward or backwards in the trend curve.

- Trend script

One of the flaws in the standard Pro-face trend curves was the problem with getting information from different sources. This is solved by using a script that copies the trend values from each generator into the internal memory, and by doing so we have gathered information from 4 sources into one.

```
//Runs each second
//Effect
memcpy([w:INT_Pgen], [w:P_Gen], 1)
memcpy([w:INT_Pgen(0)], [w:P_Gen(0)], 1)
memcpy([w:INT_Pgen(0)(0)], [w:P_Gen(0)(0)], 1)
memcpy([w:INT_Pgen(SG)], [w:P_Gen(SG)], 1)
```

This shows the script code for the effect curve. INT_Pgen and P_Gen are defined in the symbol variable list. INT_Pgen is at [#INTERNAL]LS0101, INT_Pgen(0) is at [#INTERNAL]LS0102 and so on. P_Gen is at [Gen1]400013, P_Gen(0) is at [Gen2]400013 and so on.

- Trend table

The trend table shows the last 3 measurements with the time stamp attached to them; this is the only way to show the time of the measurement in a sampling group on the Pro-face display.

The trend table's sampling group is different from the one loaded by the trend graph, because it only runs 3 times in 1 second intervals.

Trend tables should only be used in minor projects, because it takes a lot of memory/processor power to maintain the sampling groups.

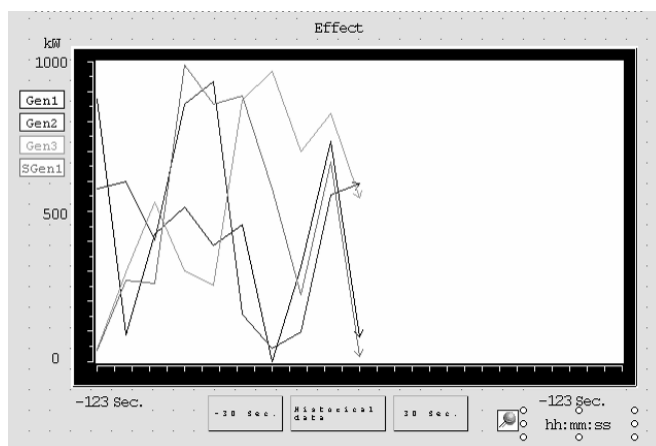


Figure 9 - Trend diagram

DeifButtons

The DeifButtons slide defines the standard buttons used to control the generators, tie breakers, priority and user controls in the PPM/AGC Rel.3 system. All you have to do is assign the Modbus address you want each button affiliated with. But you must remember the script for the priority controls.

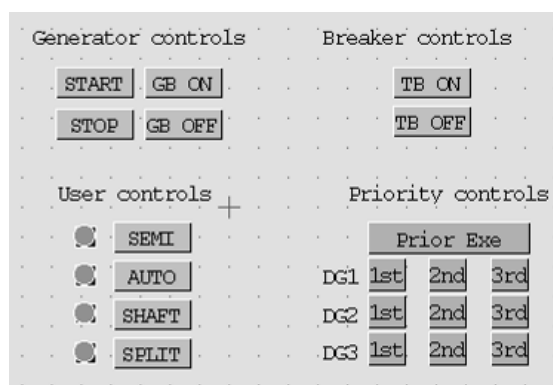


Figure 10 - Buttons

DeifAlarm

The DeifAlarm is a graphical representation of a historical alarm log. If one of the PPUs sends an alarm on the Modbus, the alarm will be registered in the DeifAlarm log. From the log you can acknowledge that the alarm has occurred by using the control interface to the right. If you acknowledge an alarm, the message will turn from red to yellow. To recover from the alarm, you have to press the accept button on the PPU unit itself, which will turn the bar in the log from red or yellow to green.

To use the alarm slide, you have to set up the alarm list, which listens to the alarm bits on the Modbus. Each bit must be defined with a text you want to show in the DeifAlarm when a bit is turned on. In the DEIF project components file, the DeifAlarm and the alarm list are imported from the PPM example. If you wish to use the DeifAlarm, it is recommended that you make your own alarm list, customised to your system.

No.	Bit Address	trigger	Condition	Message	Level	Sub Display Screen No.
1	[Gen1]400021.00	ON		1: Reverse Power 1	0	
2	[Gen1]400021.01	ON		2: Reverse Power 2	0	
3	[Gen1]400021.02	ON		3: Reverse Power inv	0	
4	[Gen1]400021.03	ON		4: Overcurrent step 1	0	
5	[Gen1]400021.04	ON		5: Overcurrent step 2	0	
6	[Gen1]400021.05	ON		6: Overcurrent step 3	0	
7	[Gen1]400021.06	ON		7: Overcurrent step 4	0	
8						
9						
10	[Gen1]400021.09	ON		8: F Overcurrent step 1	0	
11	[Gen1]400021.10	ON		9: F Overcurrent step 2	0	
12	[Gen1]400021.11	ON		10: U-DG High Step 1	0	
13	[Gen1]400021.12	ON		11: U-DG High Step 2	0	
14	[Gen1]400021.13	ON		12: U-DG Low Step 1	0	
15	[Gen1]400021.14	ON		13: U-DG Low Step 2	0	
16	[Gen1]400021.15	ON		14: U-DG Low Step 3	0	
17	[Gen1]400022.00	ON		15: F-DG High Step 1	0	
18	[Gen1]400022.01	ON		16: F-DG High Step 2	0	
19	[Gen1]400022.02	ON		17: F-DG High Step 3	0	
20	[Gen1]400022.03	ON		18: F-DG Low Step 1	0	
21	[Gen1]400022.04	ON		19: F-DG High Step 2	0	
22	[Gen1]400022.05	ON		20: F-DG High Step 3	0	
23	[Gen1]400022.06	ON		21: U-BB High Step 1	0	
24	[Gen1]400022.07	ON		22: U-BB High Step 2	0	
25	[Gen1]400022.08	ON		23: U-BB High Step 3	0	
26	[Gen1]400022.09	ON		24: U-BB Low Step 1	0	
27	[Gen1]400022.10	ON		25: U-BB Low Step 2	0	
28	[Gen1]400022.11	ON		26: U-BB Low Step 3	0	
29	[Gen1]400022.12	ON		27: U-BB Low Step 4	0	

Figure 11 - Alarm log

6. PPM example project file

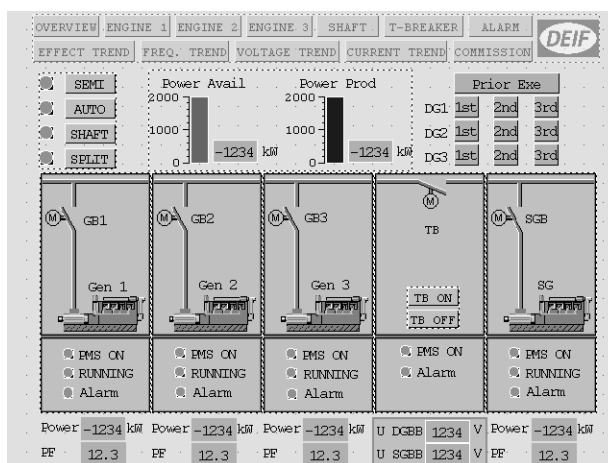
Description

The PPM project file is meant as a complete and working Pro-face software package that has been thoroughly tested on DEIF's PPM board. The PPM board consists mainly of 3 generators with PPU units, a tie breaker and a shaft generator. The project is currently being used on the PPM Pro-face display, as system surveillance module for the entire PPM system.

Using the example

If you wish to implement this project directly on your own PPM system, we recommend that you at least make the following control/modifications:

- Make sure that each generator corresponds to the generator name on the Pro-face display. The easiest way to change this is by changing the Modbus ID for each generator in the GP-Pro EX software.
- The project was built for 3 generators, a tie breaker and a shaft generator, just as the overview page shows it. Should your system vary in any way, we recommend that you design a new project to make sure that no conflict occurs.



7. AGC Rel.3 example project file

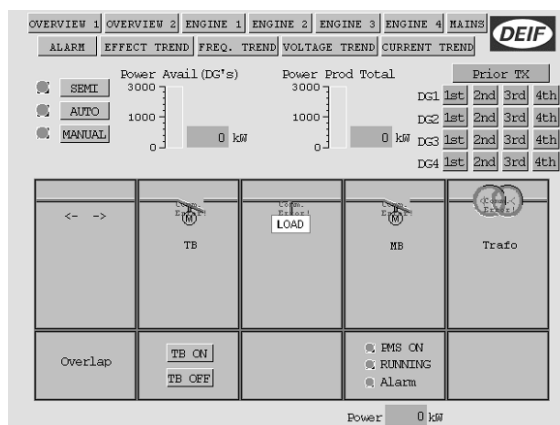
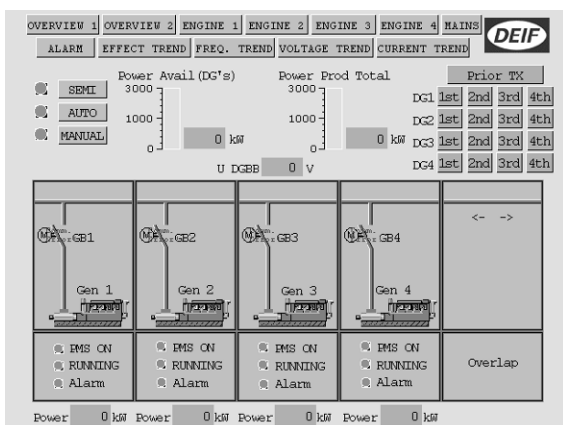
Description

The AGC Rel.3 project file is meant as a complete and working Pro-face software package that has been thoroughly tested on DEIF's G5 test system. The G5 board system consists mainly of 4 generators with AGC Rel.3 units, a tie breaker and a mains unit.

Using the example

If you wish to implement this project directly on your own G5 system, we recommend that you at least make the following control/modifications:

- Make sure that each generator corresponds to the generator name on the Pro-face display. The easiest way to change this is by changing the Modbus ID for each generator in the GP-Pro EX software.
- The project was built for the 4 generator G5 system, a tie breaker and a mains unit, just as the overview page below shows it. Should your system vary in any way, we recommend that you design a new project to make sure that no conflict occurs.



DEIF A/S reserves the right to change any of the above