QUICK START GUIDE

Generator Paralleling Controller, GPC-3
Generator Protection Unit, GPU-3/GPU-3 Hydro
Paralleling and Protection Unit, PPU-3

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- Getting started
- The first steps
- PC utility software
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1. General information

1.1 Warnings, legal information and safety

1.1.1 Warnings and notes
Throughout this document, a number of warnings and notes with helpful user information will be presented. To ensure that these are noticed, they will be highlighted as follows in order to separate them from the general text.

Warnings

⚠️ Warnings indicate a potentially dangerous situation, which could result in death, personal injury or damaged equipment, if certain guidelines are not followed.

Notes

ℹ️ Notes provide general information, which will be helpful for the reader to bear in mind.

1.1.2 Legal information and disclaimer
DEIF takes no responsibility for installation or operation of the generator set. If there is any doubt about how to install or operate the engine/generator controlled by the Multi-line 2 unit, the company responsible for the installation or the operation of the set must be contacted.

⚠️ The Multi-line 2 unit is not to be opened by unauthorised personnel. If opened anyway, the warranty will be lost.

Disclaimer
DEIF A/S reserves the right to change any of the contents of this document without prior notice.

The English version of this document always contains the most recent and up-to-date information about the product. DEIF does not take responsibility for the accuracy of translations, and translations might not be updated at the same time as the English document. If there is a discrepancy, the English version prevails.

1.1.3 Safety issues
Installing and operating the Multi-line 2 unit may imply work with dangerous currents and voltages. Therefore, the installation should only be carried out by authorised personnel who understand the risks involved in working with live electrical equipment.

⚠️ Be aware of the hazardous live currents and voltages. Do not touch any AC measurement inputs as this could lead to injury or death.

1.1.4 Electrostatic discharge awareness
Sufficient care must be taken to protect the terminal against static discharges during the installation. Once the unit is installed and connected, these precautions are no longer necessary.
1.1.5 Factory settings
The Multi-line 2 unit is delivered from factory with certain factory settings. These are based on average values and are not necessarily the correct settings for matching the engine/generator set in question. Precautions must be taken to check the settings before running the engine/generator set.

1.2 About the Quick Start Guide

1.2.1 General purpose
This Quick Start Guide mainly includes general product information, mounting instructions and wiring descriptions.

The general purpose of this document is to help the user with the first steps of installing and using the Multi-line 2 system.

Please make sure that you also read the Installation Instructions before starting to work with the Multi-line 2 unit and the genset to be controlled. Failure to do this could result in human injury or damage to the equipment.

1.2.2 Intended users
This Quick Start Guide is mainly intended for the panel builder in charge. On the basis of this document, the panel builder designer will give the electrician the information he needs in order to get started with the installation. For detailed electrical drawings, please see the Installation Instructions.

1.2.3 Contents and overall structure
This document is divided into chapters, and in order to make the structure simple and easy to use, each chapter will begin from the top of a new page.
2. What's in the delivery?

2.1 Standard delivery

The main unit

Standard display unit, DU-2

Layout is option-dependent

Display cable, 3 m

Installation instructions
2.2 Optional delivery

- **Display cable with plugs, 6 m (option J2)**
- **PC cable for option N programming - Ethernet cable crossed (option J4)**
- **Display cable with plugs, 1 m (option J6)**
- **PC cable for utility software (option J7)**
- **Additional standard display, DU-2 (option X2)**
- **Display unit, DU-2**
- **DC/DC converter and 2 × CAN bus cable 3 m**
Additional operator panel, AOP-1 (option X3)

AOP-1

0.5 m cable

Additional operator panel, AOP-2 (option X4)

AOP-2

DC/DC converter and 2 × CAN bus cable 3 m
3. Getting started

3.1 Connecting the devices

3.1.1 Connecting the display with the main unit
Connect the SUB-D display cable to the main unit and the display unit as shown in the picture below.

No use of tools or brute force when tightening finger-screws on display cable.
3.1.2 Connecting the power supply to the main unit

1. Terminal 1: +24 V DC
2. Terminal 2: 0 V DC
3. **Option M4** - terminal 98: +24 V DC
4. **Option M4** - terminal 99: 0 V DC

3.1.3 Connecting the additional operator panel, AOP-1 (optional)
3.1.4 Connecting the additional operator panel, AOP-2 (optional)
The CAN cable for the CAN bus communication between the display unit of main unit no. 1 and the AOP-2 must be connected to the CAN port (CAN 2) of the display unit (DU-2) and the CAN port (CAN 1) of the AOP-2 as shown in the drawing below.

The AOP-2 can be placed up to 200 m from the main display. The AOP-2 requires a separate power supply unit, while the display receives the power supply through the display cable from the main unit.

For further information about the installation of multiple displays and AOP-2s, see the document "Description of Option X".
3.2 Wiring

3.2.1 Basic wiring for GPU-3 and GPU-3 Hydro

AC wiring
3.2.2 Basic wiring for GPC-3 and PPU-3

AC wiring

For further information, see the document "Installation Instructions".
DC wiring

To other unit
39 – Q load sharing
38 – Common
37 – P load sharing

Start
sync./ctrl.
Deload

Up
Down
Speed

governor

DC supply

Remote alarm acknowledge (pulse)
Alarm inhibit
Alarm horn
Trip GB
Status OK

24 VDC
0 VDC

4. The first steps

4.1 Basic AC values

This chapter guides you through the most essential parameters which must be adjusted before you can start using the unit.

The set points can either be adjusted from the display unit or by using the DEIF utility software. The following examples will show how to adjust the parameters from the display unit.

All settings are reached by placing the cursor under SETUP (in the main page) and pressing ENTER.

Place the cursor under SYST and press ENTER.
Place the cursor under GEN and press ENTER.

**Paralleling and Protection Unit**

<table>
<thead>
<tr>
<th>multi-line PPU</th>
</tr>
</thead>
<tbody>
<tr>
<td>G 400 400 400V</td>
</tr>
<tr>
<td>SYSTEM SETUP</td>
</tr>
<tr>
<td>GENERAL SETUP</td>
</tr>
<tr>
<td>GEN MAINS COMM</td>
</tr>
</tbody>
</table>

Place the cursor under the setting you require and press ENTER.

**Paralleling and Protection Unit**

<table>
<thead>
<tr>
<th>multi-line PPU</th>
</tr>
</thead>
<tbody>
<tr>
<td>G 400 400 400V</td>
</tr>
<tr>
<td>6000 Nom. Setting 1 Frequency 50.0Hz</td>
</tr>
<tr>
<td>F P I U Rpm Set</td>
</tr>
</tbody>
</table>

**Generator nominal settings 1**

<table>
<thead>
<tr>
<th>No.</th>
<th>Setting</th>
<th>Min. Max.</th>
<th>Factory setting</th>
<th>Notes</th>
<th>Ref.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>6000 nominal settings 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6001</td>
<td>Nom. settings 1</td>
<td>Frequency</td>
<td>48.0 Hz</td>
<td>62.0 Hz</td>
<td>50.0 Hz</td>
<td>Designer's Reference Handbook</td>
</tr>
<tr>
<td>6002</td>
<td>Nom. settings 1</td>
<td>Power</td>
<td>10 kW</td>
<td>20000 kW</td>
<td>480 kW</td>
<td></td>
</tr>
<tr>
<td>6003</td>
<td>Nom. settings 1</td>
<td>Current</td>
<td>0 A</td>
<td>9000 A</td>
<td>867 A</td>
<td></td>
</tr>
<tr>
<td>6004</td>
<td>Nom. settings 1</td>
<td>Voltage</td>
<td>100 V</td>
<td>25000 V</td>
<td>400 V</td>
<td></td>
</tr>
<tr>
<td>6005</td>
<td>Nom. settings 1</td>
<td>RPM</td>
<td>100 RMP</td>
<td>4000 RPM</td>
<td>1500 RPM</td>
<td></td>
</tr>
<tr>
<td>6006</td>
<td>Nom. settings 1</td>
<td>Set</td>
<td>1</td>
<td>4</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

To adjust the transformer settings, use the or push-button to get to the transformer page.
VT and CT settings

<table>
<thead>
<tr>
<th>No.</th>
<th>Setting</th>
<th>Min. Max.</th>
<th>Factory setting</th>
<th>Notes</th>
<th>Ref.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>6040</td>
<td>G transformer</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6041</td>
<td>G transformer</td>
<td>U primary</td>
<td>100 V</td>
<td>25000 V</td>
<td>400 V</td>
<td>If no voltage transformer is present, the primary and secondary side values are set to generator nominal value.</td>
</tr>
<tr>
<td>6042</td>
<td>G transformer</td>
<td>U secondary</td>
<td>100 V</td>
<td>690 V</td>
<td>400 V</td>
<td></td>
</tr>
<tr>
<td>6043</td>
<td>G transformer</td>
<td>I primary</td>
<td>5 A</td>
<td>9000 A</td>
<td>1000 A</td>
<td></td>
</tr>
<tr>
<td>6044</td>
<td>G transformer</td>
<td>I secondary</td>
<td>1 A</td>
<td>5 A</td>
<td>5 A</td>
<td></td>
</tr>
<tr>
<td>6050</td>
<td>Busbar settings</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6051</td>
<td>BB settings</td>
<td>U primary</td>
<td>100 V</td>
<td>25000 V</td>
<td>400 V</td>
<td>If no voltage transformer is present, the primary and secondary side values are set to generator nominal value.</td>
</tr>
<tr>
<td>6052</td>
<td>BB settings</td>
<td>U secondary</td>
<td>100 V</td>
<td>690 V</td>
<td>400 V</td>
<td></td>
</tr>
<tr>
<td>6053</td>
<td>BB settings</td>
<td>U BB nom.</td>
<td>100 V</td>
<td>25000 V</td>
<td>400 V</td>
<td></td>
</tr>
</tbody>
</table>

4.2 Getting started with the DEIF utility software (USW)

4.2.1 Downloading the software
1. Go to www.deif.com
2. Select Software in the top menu bar
3. Scroll to the Software downloads list
4. Select Multi-line 2 Utility Software v.3.x in the list
5. Fill in your email address and click "Submit"

You will then receive an email with a link. Click the link and follow the instructions.

The USW is now installed on your computer.

4.2.2 Installation of USB drivers
On Windows Vista machines, the USB drivers are installed automatically.

This is the procedure on Windows XP machines:

When you connect the DEIF product, Windows XP will launch two "Hardware Wizards". Two drivers are installed, so please let Windows execute both "Found new Hardware Wizard"s.

We recommend letting the Hardware Wizard install the software automatically by choosing the "Recommended" option. If the "Advanced" option is chosen, the needed files are available from the USW3 installation folder (default: C:\Program Files\DEIF\USW3\) in the "USB driver files/source PreInstaller" folder.

Select "Continue Anyway" if a "Hardware Installation" warning (see screenshot below) appears during the installation.
4.2.3 Getting connected
Connect the service port to the USB on the computer (option J7 or option J3).

Click the Utility Software 3 icon on the desktop or in the Windows Start menu.

Desktop icon: Utility Software 3

Quick launch and Start menu icon: Utility Software 3

The below window appears.

Open the application settings by clicking this icon.
Open "Windows device manager".

Check the COM port used for communication, and make sure the settings correspond to the application settings.

Click the "Connect" icon.

You are now online with the unit.
4.2.4 Read parameters from the device

Open the "Parameters" list.

Click the "Read parameters from the device" icon.

After retrieving all the parameters, the device is ready to be configured.

4.2.5 Basic configuration of a device using the utility software

When the parameters have been uploaded, the options below will be available.

Click the "Gen" tab.

The parameters can be configured as follows:

Click a parameter and the dialogue box below will appear.
Click this or use the bar to adjust the set point, then click "Write" and "OK".

The parameter set point has now been changed and downloaded to the device.

For further information, see the "General Guidelines for Commissioning".
5. Configuring the speed governor and AVR outputs

5.1 Settings for speed governor and AVR control

Dependent on the hardware configuration, relays or analogue outputs can be used for speed governor and AVR control.

The settings used for this are the following:

<table>
<thead>
<tr>
<th>No.</th>
<th>Setting</th>
<th>Min.</th>
<th>Max.</th>
<th>Factory setting</th>
<th>Notes</th>
<th>Ref.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2600</td>
<td>Relay control</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2601</td>
<td>Relay control GOV ON time</td>
<td>10 ms</td>
<td>6500 ms</td>
<td>500 ms</td>
<td></td>
<td></td>
<td>Designer’s Reference Handbook</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>This menu is only available if “Relay” is selected in menu 2781.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Normally used: Relay 65 for increase and relay 67 for decrease.</td>
</tr>
<tr>
<td>2602</td>
<td>Relay control GOV period time</td>
<td>50 ms</td>
<td>32500 ms</td>
<td>2500 ms</td>
<td></td>
<td></td>
<td>GPU: Option G2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2603</td>
<td>Relay control Increase relay</td>
<td>Not used</td>
<td></td>
<td>Relay 65</td>
<td></td>
<td></td>
<td>Normally used: Relay 65 for increase and relay 67 for decrease.</td>
</tr>
<tr>
<td>2604</td>
<td>Relay control Decrease relay</td>
<td>Not used</td>
<td></td>
<td>Relay 67</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2720</td>
<td>Relay control (AVR)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2721</td>
<td>Relay control AVR ON time</td>
<td>10 ms</td>
<td>3000 ms</td>
<td>100 ms</td>
<td>Option: AVR control (D1)</td>
<td></td>
<td>Relay outputs for voltage/var/power factor control. This menu is only available if “Relay” is selected in menu 2782.</td>
</tr>
<tr>
<td>2722</td>
<td>Relay control AVR period time</td>
<td>50 ms</td>
<td>1500 ms</td>
<td>500 ms</td>
<td></td>
<td></td>
<td>Normally used: Relay 69 for increase and relay 71 for decrease.</td>
</tr>
<tr>
<td>2723</td>
<td>Relay control U increase</td>
<td>Not used</td>
<td></td>
<td>Relay 69</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2724</td>
<td>Relay control U decrease</td>
<td>Not used</td>
<td></td>
<td>Relay 71</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2780</td>
<td>Regulator output</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2781</td>
<td>Reg. output GOV</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Designers Reference Handbook</td>
<td>Selection of the speed output: Relay, analogue or engine interface communication. Analogue and EIC are option-dependent.</td>
</tr>
<tr>
<td>No.</td>
<td>Setting</td>
<td>Min. Max.</td>
<td>Factory setting</td>
<td>Notes</td>
<td>Ref.</td>
<td>Description</td>
<td></td>
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<td>-------</td>
<td>------</td>
<td>-------------</td>
<td></td>
</tr>
<tr>
<td>2782</td>
<td>Reg. output</td>
<td>AVR</td>
<td>Relay Analogue</td>
<td>Relay</td>
<td></td>
<td>Generator voltage control based on relay or analogue output signals. Analogue selection is only available if option E1, E2, EF2, EF4 or F2 is present.</td>
<td></td>
</tr>
</tbody>
</table>

### 5980 Governor output

| 5981 | Governor output | Output A | Disabled AO66 AO71 | Disab. | Option E and F | Normally used: Analogue output 66 |

### 5990 AVR output

| 5991 | AVR output | Output A | Disabled AO66 AO71 | Disab. | Option D | Normally used: Analogue output 71 |

AVR control requires option D1.

Analogue outputs require option E1, E2, EF2, EF4 or EF5.

For further information, see the document "General Guidelines for Commissioning".

For further information, check the following documents:

- GPC-3 Designer’s Reference Handbook Document no. 4189340587
- GPU-3 Designer’s Reference Handbook Document no. 4189340584
- GPU-3 Hydro Designer’s Reference Handbook Document no. 4189340588
- PPU-3 Designer’s Reference Handbook Document no. 4189340583
- GPC-3/GPU-3/GPU-3 Hydro/PPU-3 Installation Instructions Document no. 4189340582