



## MULTI-LINE 2



### Application notes Converting PPU-2 to PPU-3

- Parameter conversion
  - Wiring
  - Options
  - I/O list



## 1. General information

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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



##### **DANGER!**

This highlights dangerous situations. If the guidelines are not followed, these situations could result in death, serious personal injury, and equipment damage or destruction.



##### **CAUTION**

This highlights potentially dangerous situations. If the guidelines are not followed, these situations could result in personal injury or damaged equipment.

#### Notes



##### **INFO**

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 or switchgear. If there is any doubt about how to install or operate the engine/generator or switchgear controlled by the Multi-line 2 unit, the company responsible for the installation or the operation of the equipment must be contacted.

**NOTE** 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.



##### **DANGER!**

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 Application Notes

### 1.2.1 General purpose

This document includes application notes for DEIF's Multi-line 2 unit. It mainly includes examples of different applications suitable for the unit.



#### INFO

For functional descriptions, the procedure for parameter setup, parameter lists, and so on, see the Designer's Reference Handbook.

The general purpose of the application notes is to offer the designer information about suitable applications for the Multi-line 2 unit.



#### DANGER!

Make sure to read this document 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

The Application Notes are mainly intended for the person responsible for designing Multi-line 2 systems. In most cases, this would be a panel builder designer. Naturally, other users might also find useful information in this document.

### 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. Application and installation

### 2.1 About the application

#### 2.1.1 General description

This document mainly includes general information (in point form) on how to upgrade a standard PPU-2 to a PPU-3 system, including mounting instructions and wiring descriptions, parameter and general standard conversions. Upgrading of a GPU-2 to a GPU-3 is a similar setup. Contact DEIF support for more details.



**WARNING**

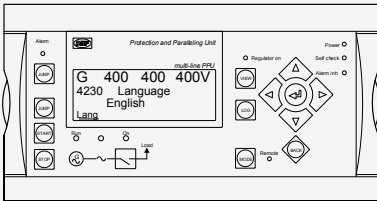
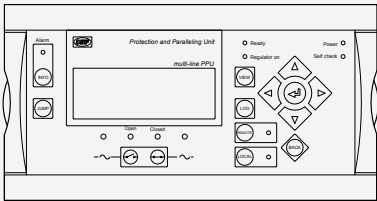
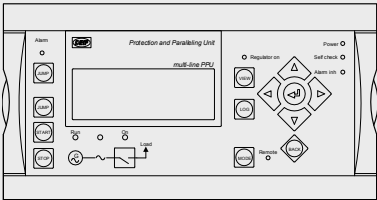
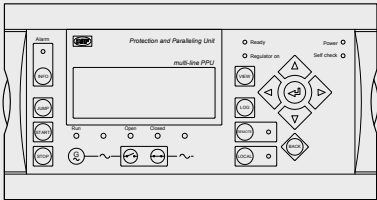
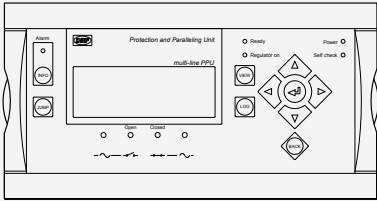
This document only cover GPU/PPU-2 standard software version 2.xx.x.

The general purpose of this document is to help the user with the first steps of upgrading a standard paralleling and protection unit system.

DEIF A/S always recommends to create a full backup parameter file before the old unit is powered down.

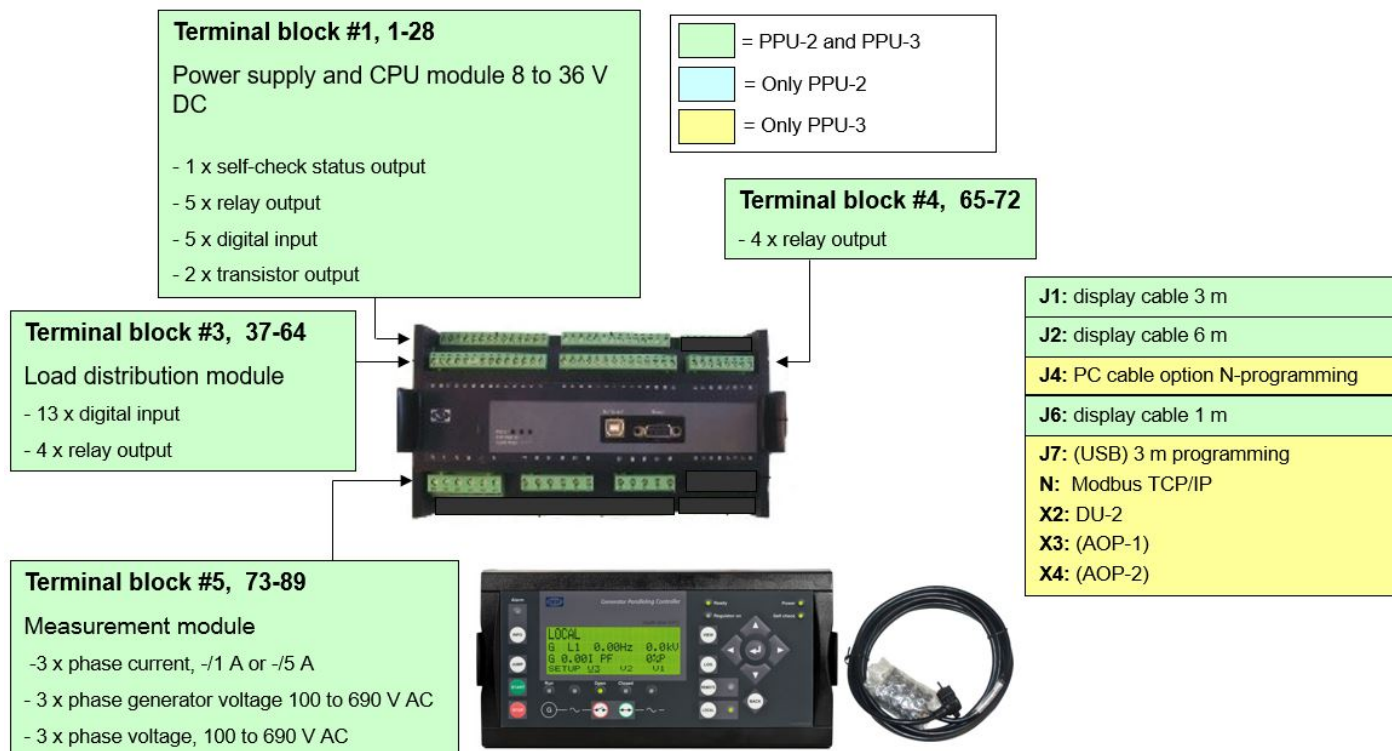
#### 2.1.2 Converting the display

The table below shows an overview of standard displays and the options of converting the displays.

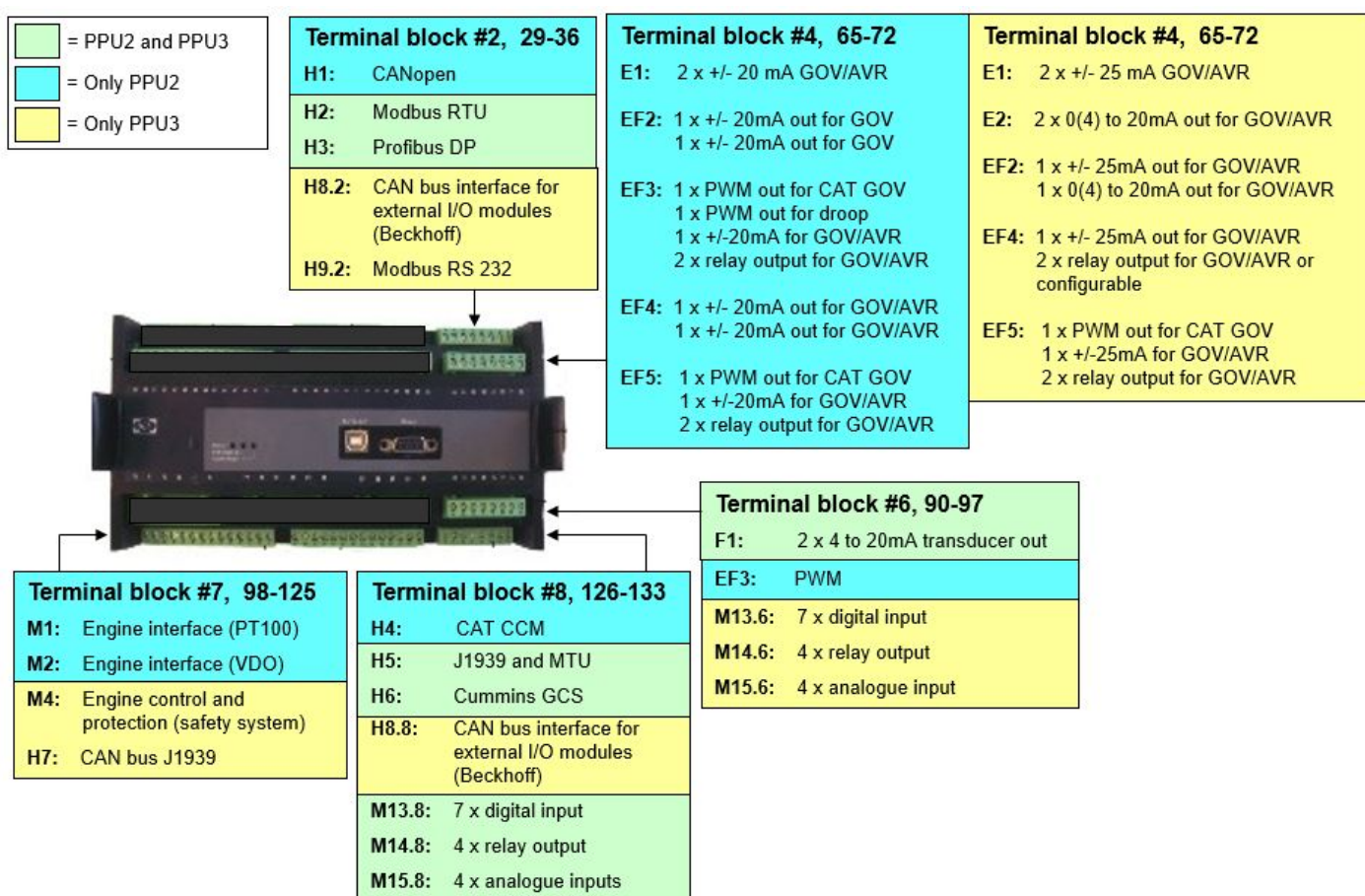
| PPU-2   | PPU-3   | Note                            |
|---|---|---------------------------------|
|   |   | Standard                        |
|  |  | Engine control (option Y1)      |
|   |  | No control buttons (option Y11) |

#### 2.1.3 Description of options

The unit housing is divided into board slot positions. This means that the unit consists of a number of printed circuit boards (PCBs) mounted in numbered slots - #1, 3, 4 and 5. Some of these board slots are standard and some are intended for options. The board slot positions are arranged as illustrated below.



The illustration below shows the location of the various options related to slots #2, 4, 6, 7 and 8.



The table below provides an overview and description of the PPU-2 options and shows which options that can be converted to PPU-3. PPU-2 options B1 and C1 are implemented as standard software in PPU-3.



| PPU-2                  | Description   | PPU-3      | Option type      |
|------------------------|---|------------|------------------|
| Option A1              | Vector jump and df/dt (ROCOF)                                 | Option A1  | Software         |
|                        | Over-/under-voltage (generator and busbar)                    |            |                  |
|                        | Over-/under-frequency (generator and busbar)                  |            |                  |
| Option A2              | Time-dependent under-voltage                                  | Option A1  | Software         |
|                        | Reactive power-dependent under-voltage                        |            |                  |
|                        | Df/dt (ROCOF)   |            |                  |
| Option A3              | Over-/under-voltage (generator and busbar)                    | Option A1  | Software         |
|                        | Over-/under-frequency (generator and busbar)                  |            |                  |
|                        | Vector jump   |            |                  |
| N/A                    | Positive sequence voltage low                                 | Option A4  |                  |
| N/A                    | Directional over-current                                      | Option A5  |                  |
| Option B1              | Over-/under-voltage (generator and busbar)                    | Standard   | Software         |
| Option C1              | Over-/under-frequency (generator)                             | Standard   | Software         |
|                        | Overload  |            |                  |
|                        | Fast over-current (<42 ms, 350 %, 2 levels)                   |            |                  |
| Option C2              | Current/voltage unbalance                                     | Option C2  | Software         |
|                        | Reactive power import (excitation loss)                       |            |                  |
|                        | Reactive power export (over-excitation)                       |            |                  |
| Option D1<br>(GPU/PPU) | Negative seq. voltage/current                                 | Option D1  | Software         |
|                        | Zero Seq. voltage/current                                     |            |                  |
|                        | Power-dependent reactive power import/export                  |            |                  |
| Option E1              | Inverse time over-current                                     | Option E1  | Hardware         |
|                        | Fixed U/Q/PF  |            |                  |
|                        | Q load sharing  |            |                  |
| Option EF2             | Voltage droop   | Option EF2 | Hardware         |
|                        | GPU: voltage matching (requires option G2)                    |            |                  |
|                        |   |            |                  |
| Option EF3             | +/-20 mA for speed governor                                   | Option EF3 | Hardware         |
|                        | +/-20 mA for AVR  |            |                  |
|                        |   |            |                  |
| Option EF4             | +/-20 mA for speed governor                                   | Option EF4 | Hardware         |
|                        | 1 x 0(4) 20 mA transducer output                              |            |                  |
|                        |   |            |                  |
| Option EF5             | 1 x PWM (Pulse Width Modulated) output for CAT speed governor | Option EF5 | Hardware         |
|                        | 1 x PWM (Pulse Width Modulated) output for droop              |            |                  |
|                        | +/-20 mA for speed governor or AVR                            |            |                  |
| Option F1              | 2 x relay outputs for speed governor or AVR                   | Option F1  | Hardware         |
|                        |   |            |                  |
|                        |   |            |                  |
| Option F2 (GPU)        | +/-20 mA for speed governor or AVR                            | Option F2  | Hardware         |
|                        | 2 x relay outputs for speed governor or AVR                   |            |                  |
|                        |   |            |                  |
| Option G1              | 1 x PWM (Pulse Width Modulated) output for CAT speed governor | Option G1  | Hardware         |
|                        | +/-20 mA for speed governor or AVR                            |            |                  |
|                        | 2 x relay outputs for speed governor or AVR                   |            |                  |
| Option G2 (GPU)        | 2 x 0(4) to 20 mA transducer out                              | Option G2  | SW and HW option |
|                        | 4 x 0(4) to 20 mA transducer out                              |            |                  |
|                        |   |            |                  |
| Option H1              | Start/stop of next DG outputs                                 | Option H1  | Hardware         |
|                        | Synchronisation with relay outputs                            |            |                  |
|                        | CANopen   |            |                  |

| PPU-2            | Description   | PPU-3            | Option type |
|------------------|---|------------------|-------------|
| Option H2 and H3 | Modbus and Profibus DP  | Option H2 and H3 | Hardware    |
| Option H4        | CAT CCM   | N/A              | Hardware    |
| Option H5        | Reading of J1939 values   | Option H5        | Hardware    |
|                  | Full J1939 engine   |                  |             |
| Option H6        | Cummins GCS   | Option H6        | Hardware    |
| N/A              | Engine communication - CAN bus J1939  | Option H7        | Hardware    |
| N/A              | CAN bus interface for external I/O modules (Beckhoff) in slot #2 or slot #8 | Option H8.x      | Hardware    |
| N/A              | Modbus RTU/ASCII (RS-232) and GSM modem connection                          | Option H9.2      | Hardware    |
| Option J1        | Display cable, 3 m  | Standard         | Hardware    |
| Option J2        | Display cable, 6 m  | Option J2        | Hardware    |
| Option J3        | PC cable for utility software (RS-232)                                      | N/A              | Hardware    |
| N/A              | PC cable for opiton N-programming   | Option J4        | Hardware    |
| Option J6        | Display cable, 1 m  | Option J6        | Hardware    |
| N/A              | PC cable for utility software (USB), 1 m                                    | Option J7        | Hardware    |
| Option K1 and K2 | Documentation   | Option K1 and K2 | Hardware    |
| Option M1 and M2 | Engine control and protection   | Option M4        |             |
| Option M13       | 7 digital inputs in slot #8   | Option M13.x     | Hardware    |
| Option M14       | 4 relay outputs in slot #8  | Option M14.x     | Hardware    |
| Option M15       | 4 analogue inputs in slot #8  | Option M15.x     | Hardware    |
| Option M20       | Front folio with engine control   | Option Y7 (GPU)  | Hardware    |
| N/A              | Modbus TCP/IP and alarms via SMS or email                                   | Option N         | Hardware    |
| N/A              | Verified class 0.5  | Option Q1        | Hardware    |
| N/A              | Additional standard display on CAN bus                                      | Option X2        | Hardware    |
| N/A              | Additional Operator Panel (AOP-1)   | Option X3        | Hardware    |
| N/A              | Additional Operator Panel (AOP-2)   | Option X4        | Hardware    |
| N/A              | Front folio with engine and GB control                                      | Option Y1        | Hardware    |
| N/A              | Front folio with GB control   | Option Y5 (GPU)  | Hardware    |
| Option Z1        | PNOM >20 MW   |                  |             |

## 2.2 Installation and parameter setup

### 2.2.1 Wiring installation

Terminals for NEL and GB feedback have been changed. The table below shows an overview of the terminals on PPU-2 and PPU-3.

| General description | Terminal PPU-2 | Terminal description | Terminal PPU-3 | Terminal description | Note |
|---------------------|----------------|----------------------|----------------|----------------------|------|
| Power supply        | 1              | 24 V DC (+)          | 1              | 24 V DC (+)          |      |
| Power supply        | 2              | 0 V DC (-)           | 2              | 0 V DC (-)           |      |
| Relay (NO)          | 3 + 4          | Status relay         | 3 + 4          | Status relay         |      |
| Relay (NO + NC)     | 5 + 6 + 7      | Relay 1              | 5 + 6 + 7      | Relay 5              |      |



| General description          | Terminal PPU-2 | Terminal description                                   | Terminal PPU-3 | Terminal description                                   | Note                                |
|------------------------------|----------------|--|----------------|--|-------------------------------------|
| Relay (NO + NC)              | 8 + 9 + 10     | Relay 2  | 8 + 9 + 10     | Relay 8  |                                     |
| Relay (NO + NC)              | 11 + 12 + 13   | Relay 3  | 11 + 12 + 13   | Relay 11   |                                     |
| Relay (NO + NC)              | 14 + 15 + 16   | Relay 4 (open breaker)                                 | 14 + 15 + 16   | Open GB  |                                     |
| Relay (NO + NC)              | 17 + 18 + 19   | Sync relay   | 17 + 18 + 19   | Close GB   |                                     |
| Alarm ack.                   | 24             | Digital input  | 24             | Digital input  |                                     |
| Start sync/control           | 25             | Digital input  | 25             | Digital input  |                                     |
| Common for terminals 23-27   | 28             | Common   | 28             | Common   |                                     |
| Modbus RTU RS-485            | 29<br>30<br>31 | DATA +<br>DATA GND<br>DATA -                           | 29<br>30<br>31 | DATA +<br>DATA GND<br>DATA -                           |                                     |
| Load sharing                 | 37<br>38<br>39 | Active load sharing<br>Common<br>Reactive load sharing | 37<br>38<br>39 | Active load sharing<br>Common<br>Reactive load sharing |                                     |
| External f/P set point       | 40<br>41       | f/P set point<br>Common                                | 40<br>41       | f/P set point<br>Common                                |                                     |
| De-load                      | 43             | Digital input  | 43             | Digital input  |                                     |
| Man. GOV control up          | 44             | Digital input  | 44             | Digital input  |                                     |
| Man. GOV control down        | 45             | Digital input  | 45             | Digital input  |                                     |
| Mode 1                       | 48             | Digital input  | 48             | Digital input  | Fixed frequency/<br>configurable    |
| Mode 2                       | 49             | Digital input  | 49             | Digital input  | P load sharing/<br>configurable     |
| Mode 3                       | 50             | Digital input  | 50             | Digital input  | Ext. GOV set point/<br>configurable |
| Mode 4                       | 51             | Digital input  | 51             | Digital input  | Fixed voltage/<br>configurable      |
| Mode 5                       | 52             | Digital input  | 52             | Digital input  | Q load sharing/<br>configurable     |
| Mode 6                       | 53             | Digital input  | 53             | Digital input  | Ext. AVR set point/<br>configurable |
| Breaker open                 | 54             | Digital input  | 26             | Digital input  | Difference between<br>the terminals |
| Breaker closed               | 55             | Digital input  | 27             | Digital input  | Difference between<br>the terminals |
| Common for terminals 43-55   | 56             | Common   | 56             | Common   |                                     |
| Load-dep. start next DG      | 57 + 58        | Relay 5 (NO)   | 57 + 58        | Relay 57 (NO)  |                                     |
| Load-dep. stop next DG       | 59 + 60        | Relay 6 (NO)   | 59 + 60        | Relay 59 (NO)  |                                     |
| Analogue GOV output +/-20 mA | 66<br>67       | +<br>0   | 66<br>67       | +<br>0   |                                     |

| General description                | Terminal PPU-2 | Terminal description | Terminal PPU-3 | Terminal description | Note |
|------------------------------------|----------------|----------------------|----------------|----------------------|------|
| Analogue transducer output 4-20 mA | 70<br>71       | +<br>0               | 70<br>71       | +<br>0               |      |
| I1                                 | 73 + 74        | Current meas.        | 73 + 74        | Current meas.        |      |
| I2                                 | 75 + 76        | Current meas.        | 75 + 76        | Current meas.        |      |
| I3                                 | 77 + 78        | Current meas.        | 77 + 78        | Current meas.        |      |
| U1                                 | 79             | Volt. meas. Gen      | 79             | Volt. meas. Gen      |      |
| U2                                 | 81             | Volt. meas. Gen      | 81             | Volt. meas. Gen      |      |
| U3                                 | 83             | Volt. meas. Gen      | 83             | Volt. meas. Gen      |      |
| U1                                 | 85             | Volt. meas. BB       | 85             | Volt. meas. BB       |      |
| U2                                 | 87             | Volt. meas. BB       | 87             | Volt. meas. BB       |      |
| U3                                 | 89             | Volt. meas. BB       | 89             | Volt. meas. BB       |      |



#### INFO

Further wiring terminals (if having options added) and wire mounting differences for both units can be seen in manuals *Installation Instructions* and *Description of option* for both PPU-2 and PPU-3 at [www.deif.com](http://www.deif.com).

## 2.2.2 Parameter settings - system setup

The PC utility software is a software program that can be used for configuration of the Multi-line 2 products. There are two versions, 1.x for PPU-2 and 3.x. for PPU-3.

The utility software can be downloaded at [www.deif.com](http://www.deif.com).

Procedure for retrofitting a PPU-2 to a PPU-3 is, besides the physical replacement, in general to retrieve all settings from the PPU-2 and manually set up the same parameters in the PPU-3 through the USW. See how to retrieve settings from PPU-2 in the manual ML-2 application notes Getting started 1x 4189340866 which can be downloaded at [www.deif.com](http://www.deif.com).



#### CAUTION

It's very important to take out these PPU-2 parameters before powering down the unit as there is a certain risk (due to unit age) of resetting all parameters back to factory setup.

The table below shows a direct conversion of the parameters that include nominal settings.

#### Nominal settings

| Parameter PPU-2 | Description     | Address | Value | Parameter PPU-3 | Description  | Address | Value |
|-----------------|-----------------|---------|-------|-----------------|--------------|---------|-------|
| 4011            | Nom. frequency  | 182     | Hz    | 6001            | Nom. f (1)   | 407     | Hz    |
| 4012            | Nom. power      | 183     | kW    | 6002            | Nom. P (1)   | 408     | kW    |
| 4013            | Nom. current    | 184     | A     | 6003            | Nom. I (1)   | 409     | A     |
| 4014            | Nom. voltage    | 185     | V     | 6004            | Nom. U (1)   | 410     | V     |
| N/A             |                 |         |       | 6005            | Nom. RPM (1) | 411     | RPM   |
| 4021            | Volt. prim. GEN | 186     | V     | 6041            | G primary U  | 428     | V     |

| Parameter PPU-2 | Description     | Address | Value | Parameter PPU-3 | Description     | Address | Value |
|-----------------|-----------------|---------|-------|-----------------|-----------------|---------|-------|
| 4022            | Volt. sec. GEN  | 187     | V     | 6042            | G secondary U   | 429     | V     |
| 4023            | Current prim.   | 188     | A     | 6043            | G primary I     | 430     | A     |
| 4024            | Current sec.    | 189     | A     | 6044            | G secondary I   | 431     | A     |
| 4031            | Volt. prim. BUS | 190     | V     | 6051            | BB primary U1   | 432     | V     |
| 4032            | Volt. sec. BUS  | 191     | V     | 6052            | BB secondary U1 | 433     | V     |
| 4033            | Nom. volt. BUS  | 421     | V     | 6053            | BB nominal U1   | 1326    | V     |

## 2.2.3 Parameter setup regulator governor

The table below illustrates the differences in the regulator parameter setup. In PPU-3, the possibility to adjust the differential band in the regulator has been added.

### Parameter setup regulator governor

| Parameter PPU-2 | Description      | Address | Parameter PPU-3 | Description | Address |
|-----------------|------------------|---------|-----------------|-------------|---------|
| 2122            | Freq. control Kp | 92      | 2511            | f Kp        | 122     |
| 2123            | Freq. control Ki | 93      | 2512            | f Ti        | 123     |
|                 |                  |         | 2513            | f Td        | 124     |
| 2132            | Power control Kp | 15      | 2531            | P Kp        | 126     |
| 2133            | Power control Ki | 50      | 2532            | P Ti        | 127     |
|                 |                  |         | 2533            | P Td        | 128     |

## 2.2.4 Parameter setup relay or analogue governor

In PPU-3, it is possible to change between relay and analogue governor setup, see the table below.

### Parameter setup relay or analogue governor

| Controller | Parameter | Description     | Address | Set point         |
|------------|-----------|-----------------|---------|-------------------|
| PPU-2      | N/A       | N/A             | N/A     | N/A               |
| PPU-3      | 2781      | Reg. output GOV | 183     | Relay or analogue |

## 2.2.5 Parameter setup governor relay

The PPU-2 standard unit controls the governor on relay output terminals 65-68, slot #4, these are not configurable. The PPU-3 standard unit has four configurable relay outputs, placed in slot #4, terminals 65-72. The table below shows the differences in the standard parameter settings.

### Parameter setup governor relay

| Controller | Parameter | Description     | Address | Value | Output A    | Output B    |
|------------|-----------|-----------------|---------|-------|-------------|-------------|
| PPU-2      | 2252      | GOV period time | 122     | ms    | N/A         | N/A         |
| PPU-3      | 2602      | GOV period time | 144     | ms    | Terminal 65 | Terminal 67 |

## 2.2.6 Synchronisation setup

The table below shows which parameters that are to be configured when setting the synchronisation.

### Synchronisation setup

| Parameter PPU-2 | Description     | Address | Parameter PPU-3 | Description           | Address |
|-----------------|-----------------|---------|-----------------|-----------------------|---------|
| 2021            | Sync. dfMax     | 71      | 2021            | Sync. dfMax           | 65      |
| 2022            | Sync. dfMin     | 72      | 2022            | Sync. dfMin           | 66      |
| 2023            | Sync. duMax     | 73      | 2023            | Sync. duMax           | 67      |
| 2024            | Sync. t CB      | 74      | 2024            | Sync. t GB            | 68      |
| 2041            | Blackout dfMax  | 80      | 2111            | Blackout dfMax        | 94      |
| 2042            | Blackout duMax  | 81      | 2112            | Blackout duMax        | 95      |
| 2043            | Blackout enable | 82      | 2113            | Sync. blackout enable | 96      |

## 2.2.7 Protection setup

The following adjustment points are available in PPU-2: Set points, delay timer, output A or B. The protection has a commissioning window where live status is shown.

Parameter "Reverse power" (Channel 1010)

**Setpoint :**

-50      -5 %      0

**Timer :**

0,1      10 sec      300,0

**Output A :** Output 2

**Output B :** Output 0

☒ Enable  
☐ High Alarm  
☐ Inverse proportional  
☐ Cable supervision  
☐ Auto acknowledge  
☐ Custom inhibit

**Commissioning**

Actual value : 0 %

Time elapsed : 0 sec (0 %)

0 sec      10 sec

Write      OK      Cancel

In PPU-3, the same adjustment points are present, but "Fail class" is added. Here it is possible to set an alarm to for example Trip of GB, Warning shutdown, and so on. Inhibits are also added in the protection parameter.

Parameter "G -P> 1" (Channel 1000)

**Setpoint :**

-200 -8 % 0

**Timer :**

0.1 5 sec 3200

**Fail class :** Trip GB

**Output A** Not used

**Output B** Not used

**Password level :** customer

☒ Enable  
☐ High Alarm  
☐ Inverse proportional  
☐ Auto acknowledge  
Inhibits...

**Commissioning**

Actual value : 0 %

Actual timer value

0 sec 5 sec

Write OK Cancel

## 2.2.8 Mode selection

The setup for regulation mode has been changed and works differently in PPU-3. In the PPU-2 system, the selection of running modes is a combination of digital inputs, see the table below. In the PPU-3 system, the four different modes can be configured in the utility software - I/O settings.

| PPU-2              |                    | Description     | PPU-3                        |
|--------------------|--------------------|-----------------|------------------------------|
| Digital input (48) | Digital input (49) | Active mode     | Input                        |
| OFF                | OFF                | Fixed frequency | Digital input (configurable) |
| ON                 | OFF                | Fixed power     | Digital input (configurable) |
| OFF                | ON                 | Droop           | Digital input (configurable) |
| ON                 | ON                 | Load sharing    | Digital input (configurable) |
| Mode 4 (51)        | Mode 5 (52)        | AVR mode        | Input                        |
| OFF                | OFF                | Fixed voltage   | ON                           |
| ON                 | OFF                | Fixed Q         | ON                           |
| OFF                | ON                 | Fixed PF        | ON                           |
| ON                 | ON                 | Q load sharing  | ON                           |
|                    |                    | Voltage droop   | ON                           |

For description of the complete mode setup, refer to the Designer's Reference Handbook.

## 2.2.9 External communication - Modbus

The functions and readings on Modbus addresses are not the same from a PPU-2 and a PPU-3 controller.

Parameter 7514 allows to enable PPU-2 Modbus addresses in a PPU-3 controller and has three different settings:

1. Standard: Normal PPU-3 register layout.
2. GPU/PPU-2: GPU/PPU-2 register layout. Only GPU/PPU-2 registers will respond, requests to any other register will result in "ILLEGAL DATA ADDRESS".
3. MIX: GPU/PPU-2 register layout. Requests to GPU/PPU-3 registers that are not occupied by GPU/PPU-2 will respond as in "Standard" mode.

This only applies to the external communication board (options H2 and H3) located in slot #2. The USB service port and Ethernet port (option N) still use the PPU-3 Modbus address list.

Contact DEIF Support for a complete list of available parameters.



#### INFO

The protocol converter is only usable from software version 2.x.x and forward. On units with software below version 2.x.x, alarm bits are not set on the same Modbus addresses. In this situation, the system communicating with PPU-2 will have to be reprogrammed.

## 2.2.10 M-Logic in PPU-3

The M-Logic functionality is included in the PPU-3 unit and is not an option-dependent function.

M-Logic is used to execute different commands at predefined conditions. M-Logic is not a PLC, but substitutes one if only very simple commands are needed.

M-Logic is a simple tool based on logic events. One or more input conditions are defined, and at the activation of those inputs, the defined output will occur. A great variety of inputs can be selected, such as digital inputs, alarm conditions and running conditions. A variety of the outputs can also be selected, such as relay outputs, change of genset modes and change of running modes.

