Appendix for Diehl AKO inverters

PLATINUM protocol

WebdynSun

The monitoring gateway for your solar installation

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1 Introduction

The present document describes the operations of the WebdynSun gateway in conjunction with Diehl AKO inverters.

The gateway can handle a maximum of 100 inverters, but the PLATINUM protocol is limited to 64 inverters.

The number of inverters may be limited by the characteristics of your RS485 bus. The EIA/TIA-485 standard specifies a maximum of 32 peripherals and a total bus length of 1200 metres. Beyond this, it may prove necessary to use repeaters.

2 Connecting the gateway to Diehl AKO inverters via the RS485(A) communications bus

⚠	All wiring must be carried out only by a specialised qualified electrician. Prior to installation, all equipment connected to the corresponding communications bus must be disconnected on both sides (DC and AC). Respect all safety recommendations appearing in inverter documentation.

Connecting inverters to the RS485 bus:

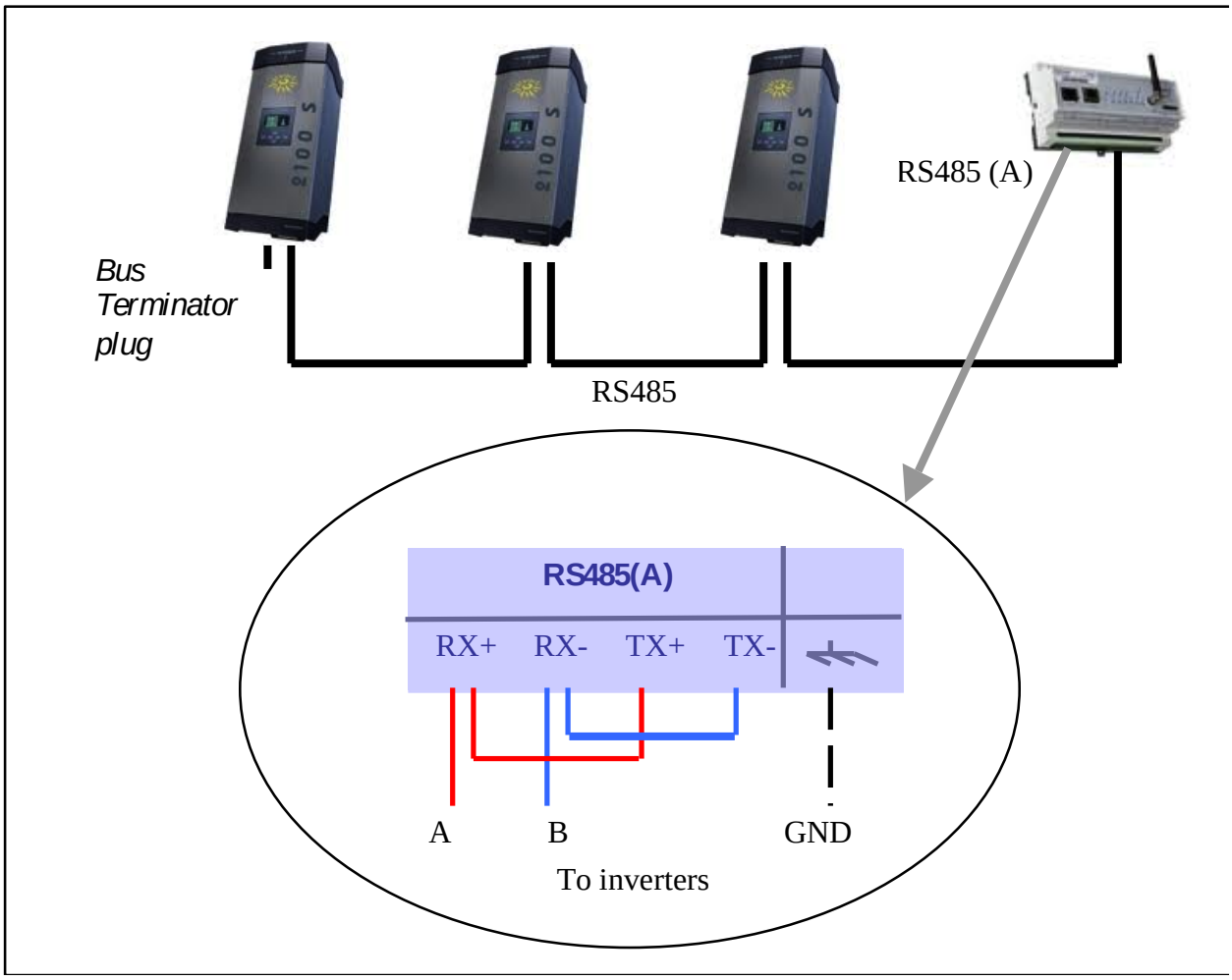
Consult the inverter documentation regarding the principles governing RS485 connection and wiring.

Once the RS485 cable has been brought up to the gateway:

1. Strip around 4 cm of the outer sheath from the RS485 communications cable.
2. Trim the shielding back to match the cable sheath.
3. Bare around 6 mm of the wires.
4. Connect the conductors to the connector marked RS485(A), respecting the allocations in your RS485 communications bus.

The gateway may be connected at the end of the RS485 communications bus or in the middle of the bus.

2.1 Connecting at the end of the bus



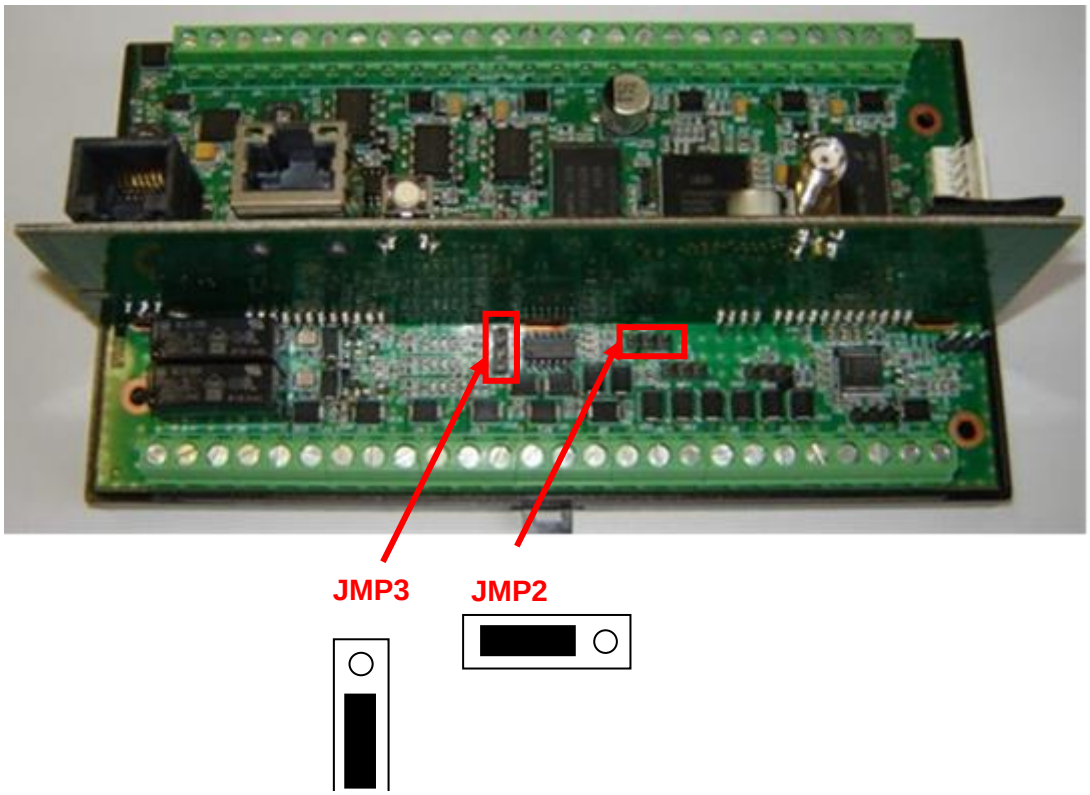
To ensure correct operation of the RS485 data bus, it must be fitted with a 120 ohm termination resistor at both ends.

Please refer to the inverter manufacturer's documentation to see how to provide termination on the inverter end. At the WebdynSun end, this function is provided by configuring the jumpers JMP2 and JMP3.

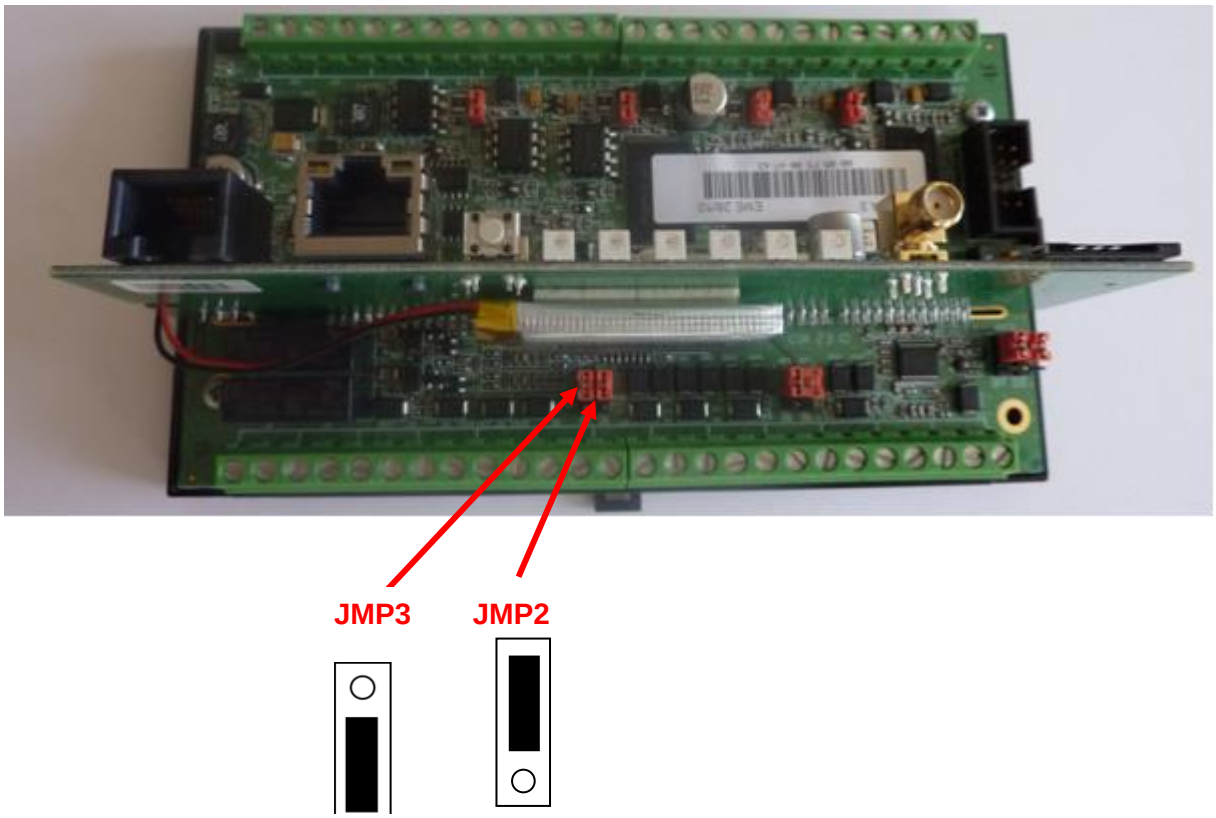
Positions of the JMP2 and JMP3 jumpers on the gateway:
Only the JMP2 jumper inside the casing needs to be set to activate the 120 ohm bus terminator plug.

	By default, the gateway is configured to be located at the end of a 4–wire RS485 bus. Consequently, the jumpers are plugged into the "Activation" position of the 120 ohm terminator. As the Diehl AKO bus is a 2–wire bus, the JMP3 jumper must be removed.

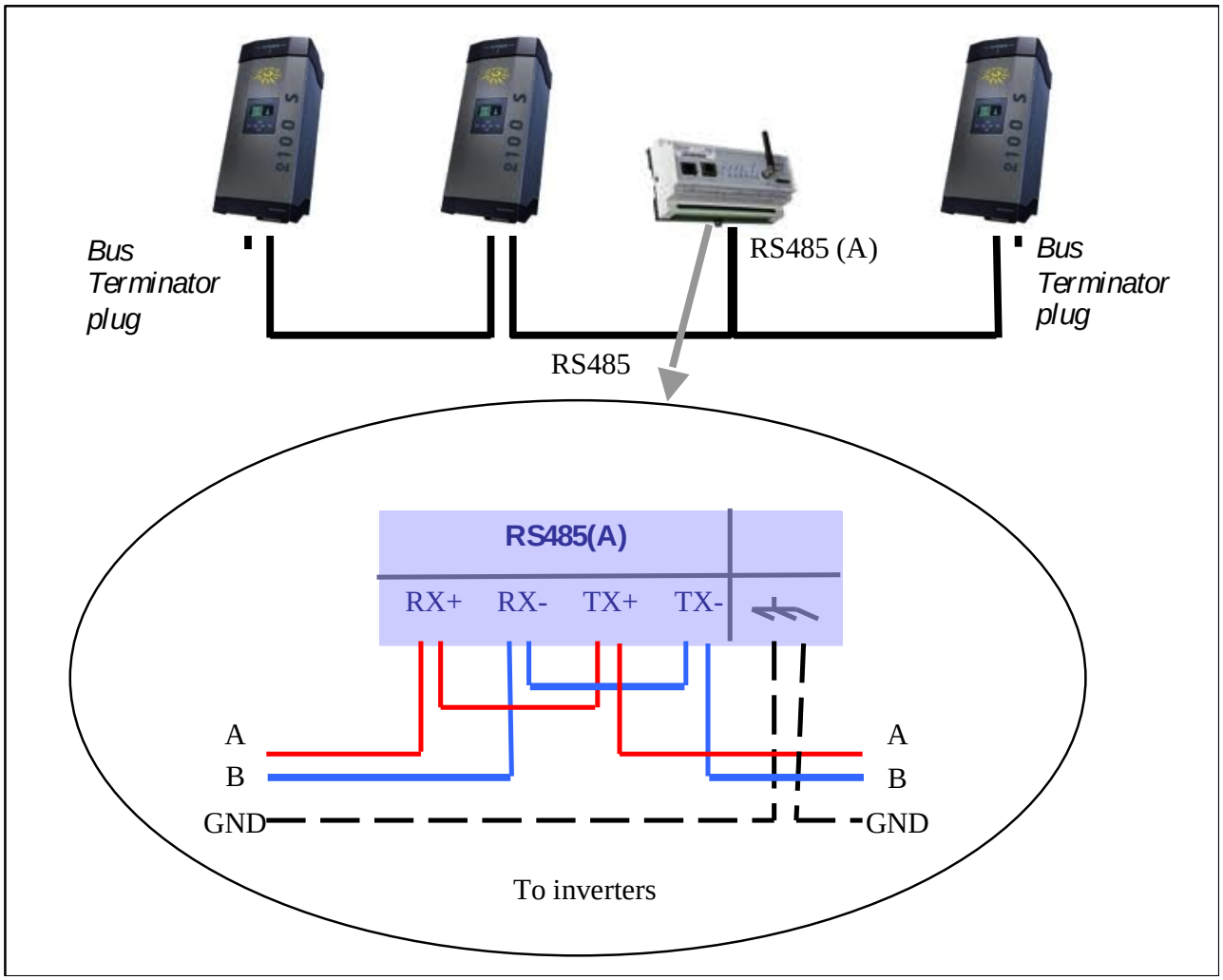
Hardware version 1:



Hardware version 2:

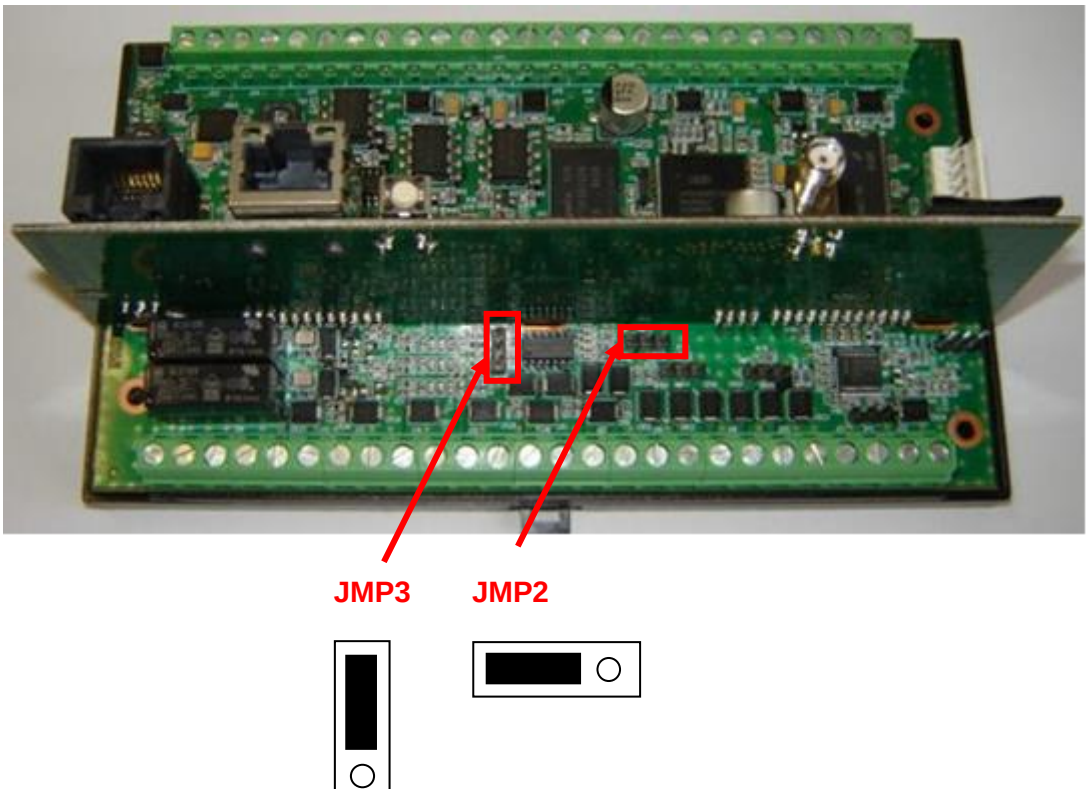


2.2 Connecting in the middle of the bus

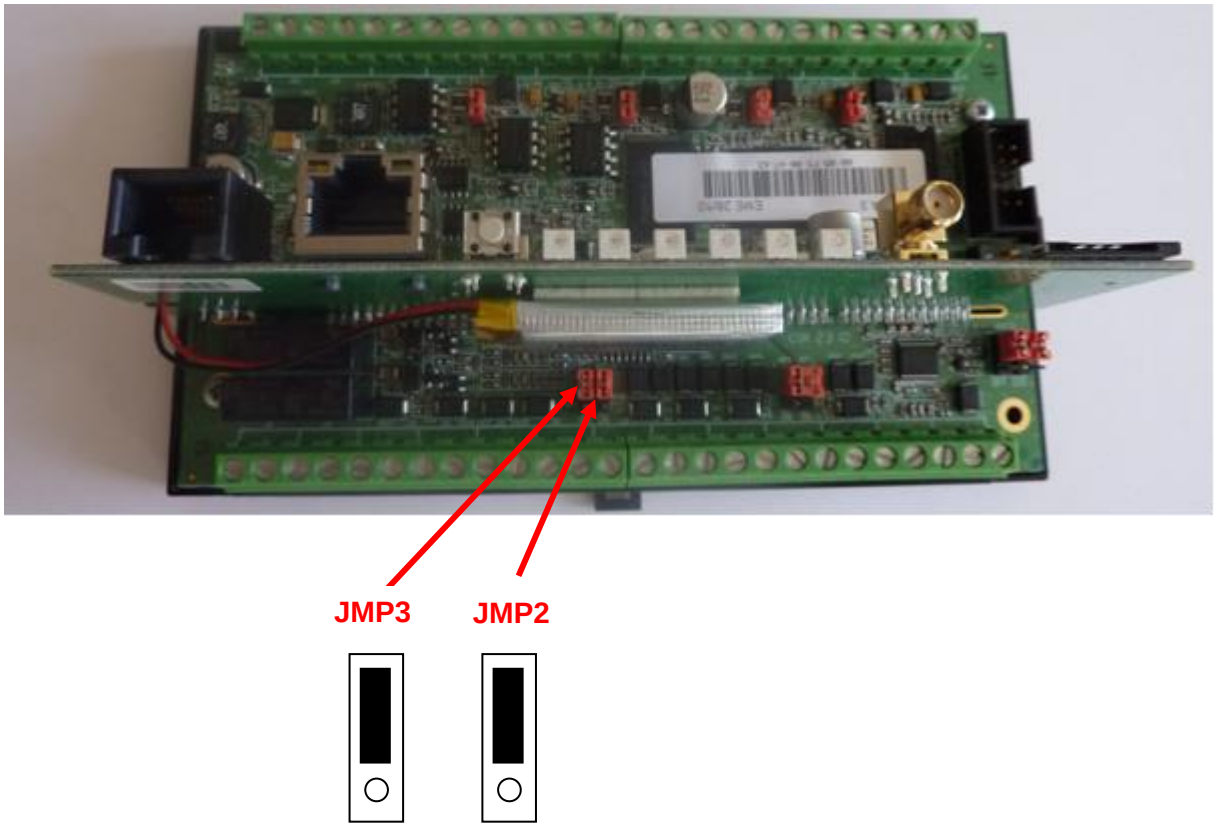


Positions of the JMP2 and JMP3 jumpers on the gateway:
Both the JMP2 and the JMP3 jumpers inside the casing must be positioned so as to deactivate the 120 ohm bus terminator plug.

Hardware version 1:



Hardware version 2:



3 Configuring the inverters

No specific configuration is required for Diehl AKO inverters. Each inverter has a unique serial number. This serial number enables the WebdynSun to identify and address each inverter present on the bus. A discovery phase is therefore necessary for data acquisition to be possible.

3.1 Discovering inverters

The PLATINUM protocol from Diehl AKO allows for discovery of inverters via the built-in Web server or via a command file. The discovery process can provide the server with the list of the inverters available on the bus, but is not sufficient for data acquisition. For this purpose, it is imperative that the FTP server and the gateway be synchronised. For further details, please refer to the “Operating Manual” for the WebdynSun.

3.2 Inverter definition file

The role of this file is to describe the full set of variables available for an inverter.

For each variable, it describes:
- its retrieval method: used by the gateway to capture the data idem within the inverter;
- its processing method: average, instantaneous, parameter or alarm;
- its formatting: name, units and scaling coefficient.

This file is uploaded by the gateway after an inverter discovery phase. Some fields may be modified by the user.

The PLATINUM protocol allows each variable to be captured individually. On installation, the gateway uploads a default definition file containing the set of all variables available for each inverter. If you do not wish to collect all the variables from the inverter, it is advisable to select those you do want via this file. This is to reduce the volume of the uploaded data, and the collection time per inverter.

Filename format:
*IDSite*_ INV_*Family*.ini

Example of the description of a Diehl AKO variable:

21;0;0020;0006;AC Power;W;1;0;4

- 4: action: instantaneous variable
- 0: scaling coefficient B
- 1: scaling coefficient A
- W: units of the variable
- AC Power: variable name
- 0006: Information on the variable capture request
- 0020: Information on the variable capture request
- 0: Information on the variable capture request
- 21: Variable index

XXXX: Parameter not user modifiable

The action to be applied to each variable is specified at the end of the line:

- ***Action=0***: Variable not collected.
- ***Action=1***: Variable treated as read-only parameter.
- ***Action=2***: Min/max/avg values.
- ***Action=4***: Instantaneous value.
- ***Action=8***: Variable treated as an alarm.

Details of the definition file for an inverter:

```
1;0;0028;0009;Plant Name;;1;0;1
2;0;0029;0009;Plant Description;;1;0;1
3;0;000A;0005;Inverter Number;;1;0;1
4;0;0002;0005;Language;;1;0;1
5;0;0003;0005;Country;;1;0;1
6;0;0004;0009;Currency;;1;0;1
7;0;0005;0007;Compensation;;0.001;0;1
8;0;0006;0006;CO2-Factor;g/kWh;1;0;1
9;0;0007;0006;Constant Voltage;V;1;0;1
10;0;0009;0002;Timezone;h;1;0;1
11;0;0067;0005;Daylight Saving;;1;0;1
12;0;006F;0005;Time/Date Format;;1;0;4
13;0;000B;0005;Status;;1;0;4
14;0;000C;0006;Event;;1;0;4
15;0;080C;0006;Event 2;;1;0;4
16;0;0011;0006;DC Voltage;V;1;0;4
17;0;0014;0006;DC Current;A;0.1;0;4
18;0;0017;0006;DC Power;W;1;0;4
19;0;001A;0006;AC Voltage;V;1;0;4
```

```
20;0;001D;0006;AC Current;A;0.1;0;4
21;0;0020;0006;AC Power;W;1;0;4
22;0;0024;0007;Energy Today;Wh;1;0;4
23;0;0025;0007;Energy Total;Wh;1;0;4
24;0;100E;0003;Temperature 1;°C;0.1;0;4
25;0;200E;0003;Temperature 2;°C;0.1;0;4
26;0;300E;0003;Temperature 3;°C;0.1;0;4
27;0;400E;0003;Temperature 4;°C;0.1;0;4
28;0;002B;0006;Insulation Resistor;Ohm;1000;0;4
29;0;0023;0006;Frequency;Hz;0.1;0;4
30;0;0031;0003;AFI Value;A;0.001;0;4
31;0;0035;0003;Current DC on AC;A;0.001;0;4
32;0;0026;0006;Day Operating Time;min;1;0;4
33;0;0027;0007;Total Operating Time;min;1;0;4
34;0;0042;0009;Device Family;;1;0;1
35;0;0044;0009;Device Identifier;;1;0;1
36;0;0043;0009;Device Type;;1;0;1
37;0;0045;0006;Device Power Class;W;1;0;1
38;0;0046;0005;Device Phasing;;1;0;1
39;0;0080;0005;PowerReduction Type;;1;0;4
40;0;0081;0006;PowerReduction abolute;W;1;0;4
41;0;0082;0005;PowerReduction relative;%;1;0;4
42;0;0083;0006;PowerReduction Timeout;s;1;0;4
43;0;0084;0006;PowerReduction Reduce Time;s;1;0;4
44;0;0069;0007;SWV UI Application;;1;0;1
45;0;006B;0007;SWV ICU Application;;1;0;1
46;0;006D;0007;SWV GMU Application;;1;0;1
47;0;006A;0007;SWV UI Bootloader;;1;0;1
48;0;006C;0007;SWV ICU Bootloader;;1;0;1
49;0;006E;0007;SWV GMU Bootloader;;1;0;1
```

On the server side, the following columns should be used:

- *Name*: variable name.
- *Units*: variable units.
- *A and B*:
    - The coefficients A and B enable scaling of the collected data item. These coefficients should be applied by the server according to the following method:

  Let x be the reported value, and y the converted value:
  y=A.x+B

Example:

Scaling the variable “Temperature 1”, No. 24:

24;0;100E;0003;Temperature 1;°C;0.1;0;4

Reported value =200
Units=°C
Coefficients: A=0.1, B=0
Temperature 1 = (200 x 0.1) + 0=20 °C.

4 Inverter parameter files

The parameters of the inverters present on the network are sent to the FTP server in two cases:

- During the installation phase triggered by pressing the push-button on the gateway;
- Via a command file of the type GATEWAY: Send inverter parameters (*see chapter on managing command files in the Operating Manual*).

Filename format:

*IDSite*_INV_P _*YYMMDD*_*hhmmss*.csv.gz

Where: *IDSite*: gateway identifier.

The file format is as follows: (fields in green are optional data that can be enabled or disabled in *IDSite_daq.ini*.

```
SNINV;1001.110204005;1
TypeINV;AXUN_INV_7200TL.ini
22;1;2;3;4;5;6;7;8;9;10;11;34;35;36;37;38;44;45;46;47;48;49
17/02/12-13:09:36;PV-SYSTEM;PLATINUM;13;4;4;EUR;600;700;65535;1;1;7200 TL;…
SNINV;1003.101027097;2
TypeINV;AXUN_INV_7200TL.ini
22;1;2;3;4;5;6;7;8;9;10;11;34;35;36;37;38;44;45;46;47;48;49
17/02/12-13:09:40;PV-SYSTEM;PLATINUM;3;4;4;EUR;600;700;65535;1;1;7200 TL;…
```

For each inverter, this file details the variables defined as parameters in the file *IDSite*_INV_*family*.ini (see chapter on the format of definition files for inverter families).

In this example, the ellipses (…) correspond to the variables beyond 12 for ease of display.

SNINV = Serial number of inverter n (n=0 à 99 max).
TypeINV = Family of inverter n.

The column heading “22;1;2;3;4;5;6;7;8;9;10;11;34;35;36;37;38;44;45;46;47;48;49” is added if the option (DAQ_HeaderOption) is enabled in *IDSite*_daq.ini (see *7.3.Declaring and configuring inverters* in the *User Manual*).

	To minimise the sizes of transmitted files, the parameter file is compressed in .gz format.

5 Inverter alarm files

An alarm is generated, then transmitted to the remote server in the form of a file on the FTP server (*IDSite_ IDSite_AL_YYMMDD_hhmmss.csv.gz*).
The data stored are also uploaded at the same time as an alarm.

Alarm of the INV type:
This type of alarm is uploaded on a change in the status of a variable defined as an alarm in the associated definition file.

Date–Time	Type	Field 1	Field 2	Field 3	Field 4

Where:

Date–Time	Timestamp when alarm triggered, in format YY/MM/DD-hh:mm:ss
Type	INV: Alarm type is Inverter
Field 1	*IDsite*_INV_*type*.ini: Name of reference definition file
Field 2	Serial number of the triggering inverter
Field 3	1 to N: Index of the triggering data item in the associated definition file.
Field 4	Status of the trigger item: 0 to n => Code corresponding to status messages or to messages indicating inverter malfunction.

Example:

12/02/12-16:54:08;INV; WD0047EC_INV_7200TL.ini; 1001.110204005;14;90

Variable “Event” of inverter 1001.110204005 switched to a value of 90.
Please see the manufacturer’s documentation for details of any variable.

6 Inverter command files

The PLATINUM protocol does not enable modification of the parameters of Diehl AKO inverters via a command file.