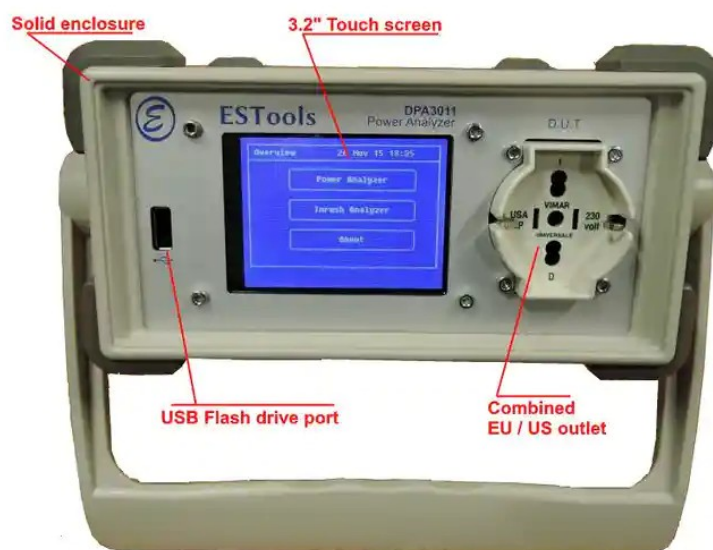


PowerAnalyzer & Inrush measurement

DPA3011 Manual



File:	DPA3011_Manual.odt
Creation date	Dec 16, 2020
Last edited	1-25-22 5:49 PM
Version	1.0
Author	A.J. Kool

engineering *spirit*

Hardware / Software Design

Angstelkade 2a-1.11 3631 NA Nieuwersluis The Netherlands
Tel: (+31)85 2733461 www.engineering-spirit.nl

Table of Contents

1 - Introduction.....	3
1.1 - Features.....	3
2 - Specifications.....	6
3 - Operation.....	7
3.1 - Main Menu.....	7
3.2 - Power Analyzer.....	7
3.3 - Inrush Analyzer.....	7
3.4 - Data Output.....	7
3.5 - Firmware update.....	8

Revision list

Date	Version	Description
Dec 16, 20	1.0	Initial document

1 - Introduction

The Power Analyzer is used to measure Power factor, Harmonics and distortion and create log files of the dynamic behaviour of the power consumption of a device.

Harmonics are analysed according to IEC 61000-3-2 and **inrush current** values can be determined at all phase angles (in an automated sequence)

Long time effects can be evaluated through data logging.

This measurement instrument is targeted at electronic engineers that deal with devices that are connected to the Mains or power supplies.



1.1 - Features

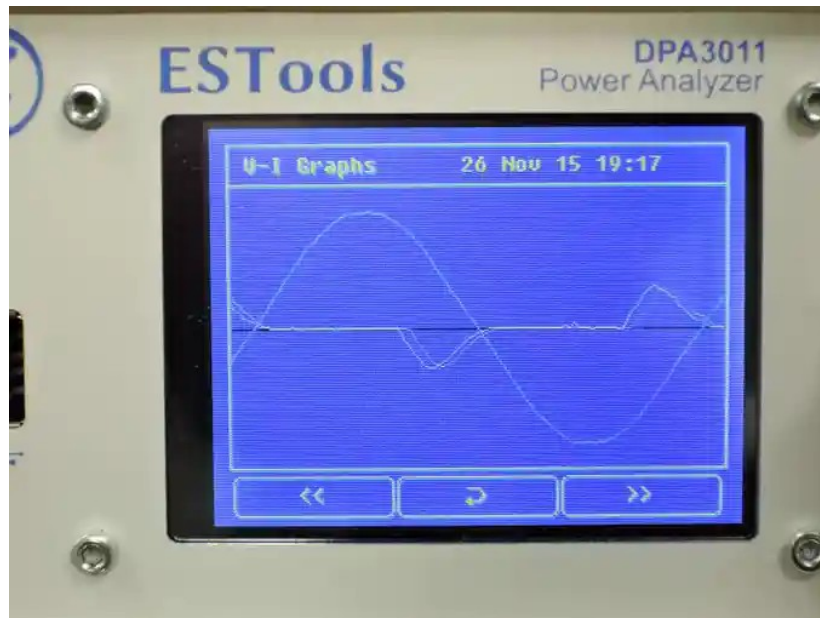
Basic Power Analysis:

Shows the numerical values of 8 signal parameters:

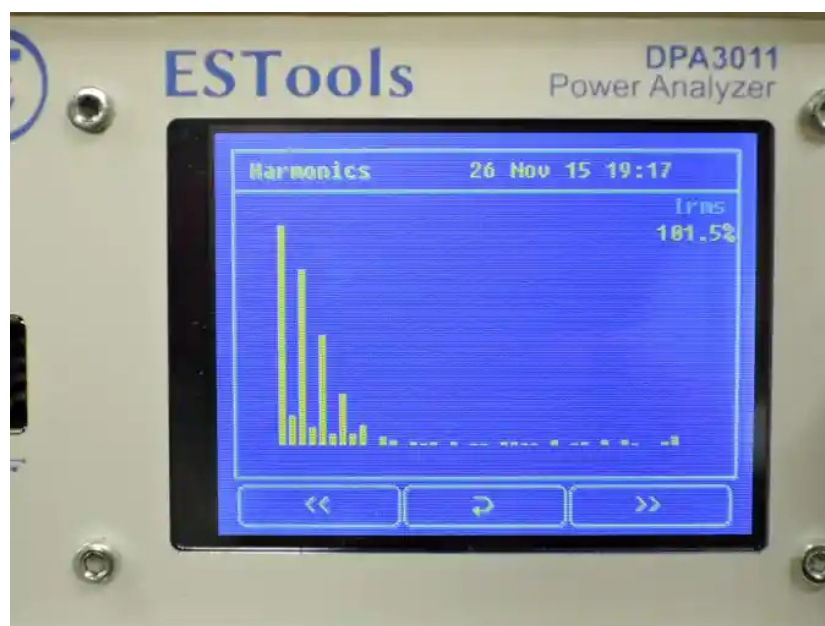
- RMS Voltage (V)
- Current (I)
- True Power (W)
- Aparent Power (VA)
- Reactive Power (VAR)
- Power factor (PF)
- Phase angle (Phi)
- Frequency (Hz)

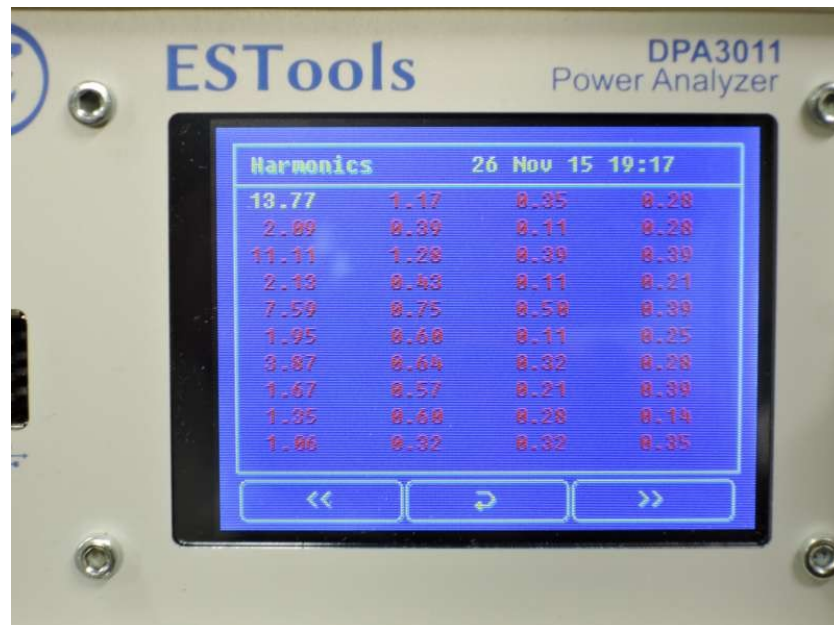
Graphs:

The Graph screen shows a full wave of the Voltage and Current just as an oscilloscope. The amplitude scales automatically to the screen area for optimal visibility.

Harmonic analysis:

Shows a Bar Graph and a Table of the 40 harmonic currents (in accordance with IEC 61000-3-2). Harmonics above the limit are colored red.





Inrush current analysis:

Performs an automatic procedure that turns the connected device ON with a sequence of phase angles and shows the inrush current at all angles (graphically and in a table).

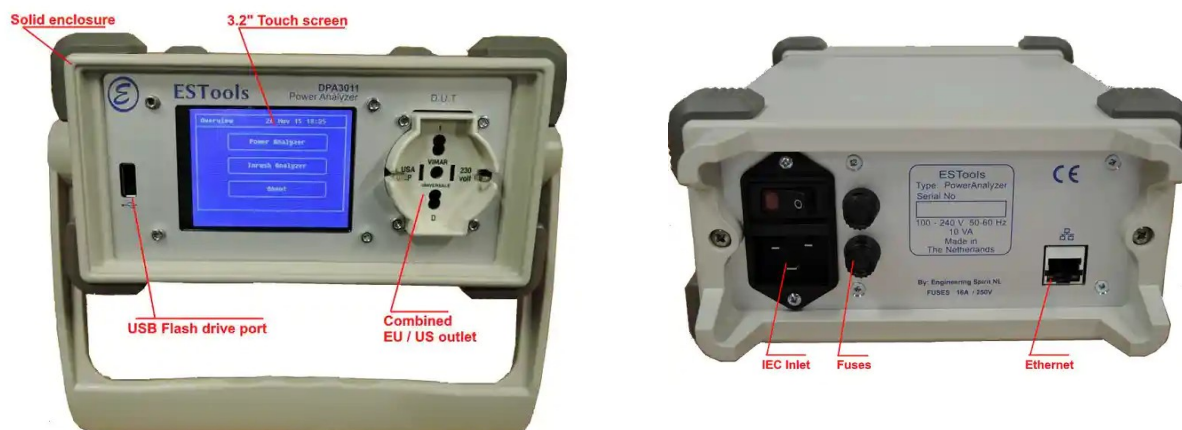
Data logging:

Stores the RMS Values of each 1/2 wave of the Mains voltage and current on a USB Flash drive in CSV format, that can be opened as a spreadsheet.



2 - Specifications

- 3.2 Inch touch color screen
- USB-host connector for Flash memory stick
- Ethernet RJ45
- An IEC inlet
- Combined EU / US outlet
- 1 EU to US converter
- 110 ~ 250Vac (Measurement accuracy: 0.25 %)
- 50 / 60 Hz (accuracy: 0.01 %)
- Harmonics 50Hz ~ 2kHz
- Max cont. current 16 Amp (accuracy: 0.25 %)
- Max Peak current 50 Amp (accuracy: 0.5 %)



3 - Operation

3.1 - Main Menu

The Main menu allows selection of the requested analysis: Power or Inrush.

3.2 - Power Analyzer

For Power analysis, the DUT (Device under test) must be connected and switched on. There are 5 views:

Numerics, showing the results as numerical values

Graphs, showing the Line Voltage vs. DUT current as a wave form.

Harmonics graph, showing a Bar Graph of the harmonic currents.
For 50Hz these are multiples of 50: 50, 100, 150, 200, etc.

For 60Hz these are multiples of 60: 60, 120, 180, 240, etc.

Harmonics table, showing the values of the harmonics.

Recording: Allows recording of the RMS values of each half-cycle (10/8.33ms for 50/60Hz).

3.3 - Inrush Analyzer

When started, the Inrush analyzer automatically switches the DUT On, at a sequence of phase delays from the voltage zero-crossing moment.

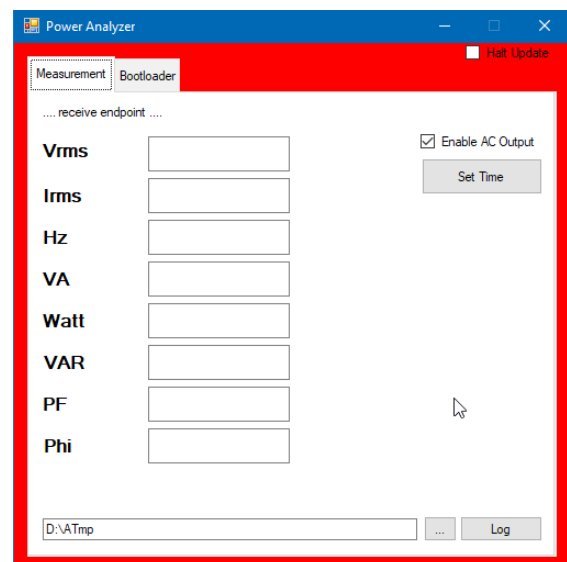
This will take a while. The resulting report shows the current per phase angle numerically and (when stepped through the pages) also graphically.

3.4 - Data Output

The recorded data is continuously sent via the Ethernet port. It may be collected by a UDP receiver program and processed for your purpose.

The program for data logging on Windows is provided.

Program name: DPA3011_App.exe



If special processing is required, a proprietary program may be written that captures the UDP packets.

The data format is a binary (packed) struct:

```
typedef struct __packed __ScreenData
{
    uint32 counter;
    uint32 cpuID[3];
    double Vrms;
    double Irms;
    double Hz;
    double VA;
    double Watt;
    double VAR;
    double PF;
    double Phi;
    uint8 ACEnabled;
} ScreenData;
```

The output on USB mass-storage devices (USB-stick or drive) is in comma separated format.

The duration of the recording is limited by the capacity of the connected device. For very large recordings, the recording is split into multiple files (limitation of the file system).

Format:

Index	V(rms)	I(rms)	VA	Watt	VAR	PF	Phi	Hz
-------	--------	--------	----	------	-----	----	-----	----

3.5 - Firmware update

The Analyzer contains a bootloader to simplify firmware updating without opening the device and without special tooling. The update functionality is included in the data logger program for Windows (DPA3011_App.exe).

