



We drive new energy — for a greener future

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“**Make things measurable for the best possible solution**” is one of the cornerstones of ARADEX since founding in 1989. Our very first product – a very high speed PC-based CNC controller, launched in 1990 already had a built-in real-time oscilloscope and a preliminary version of ANALYSER to draw the the recorded variables.

In this e-Facts we show the tool **ANALYSER** in the latest version.

Another cornerstone of ARADEX are tools for diagnostics and configuration. And they must follow our internal rule: “One-for-All”.

VEConfig is an “**One-for-All**” tools because it’s the only tool you need to do a lot of things and you can use it for all power conversion products of ARADEX.

ANALYSER an VEConfig: introduction

Analyser: Display and analyze recorded oscilloscope files from VECTOPOWER inverters and DC/DC converters

1. The Analyser makes measured data visible like a modern oscilloscope viewer
2. Analyser can post-process the data for deeper analysis
3. Analyser also can import data from third-party products to be your **one-for-all-tool**

VEConfig: Tool for connection to our VECTOPOWER inverters and DC/DC converters

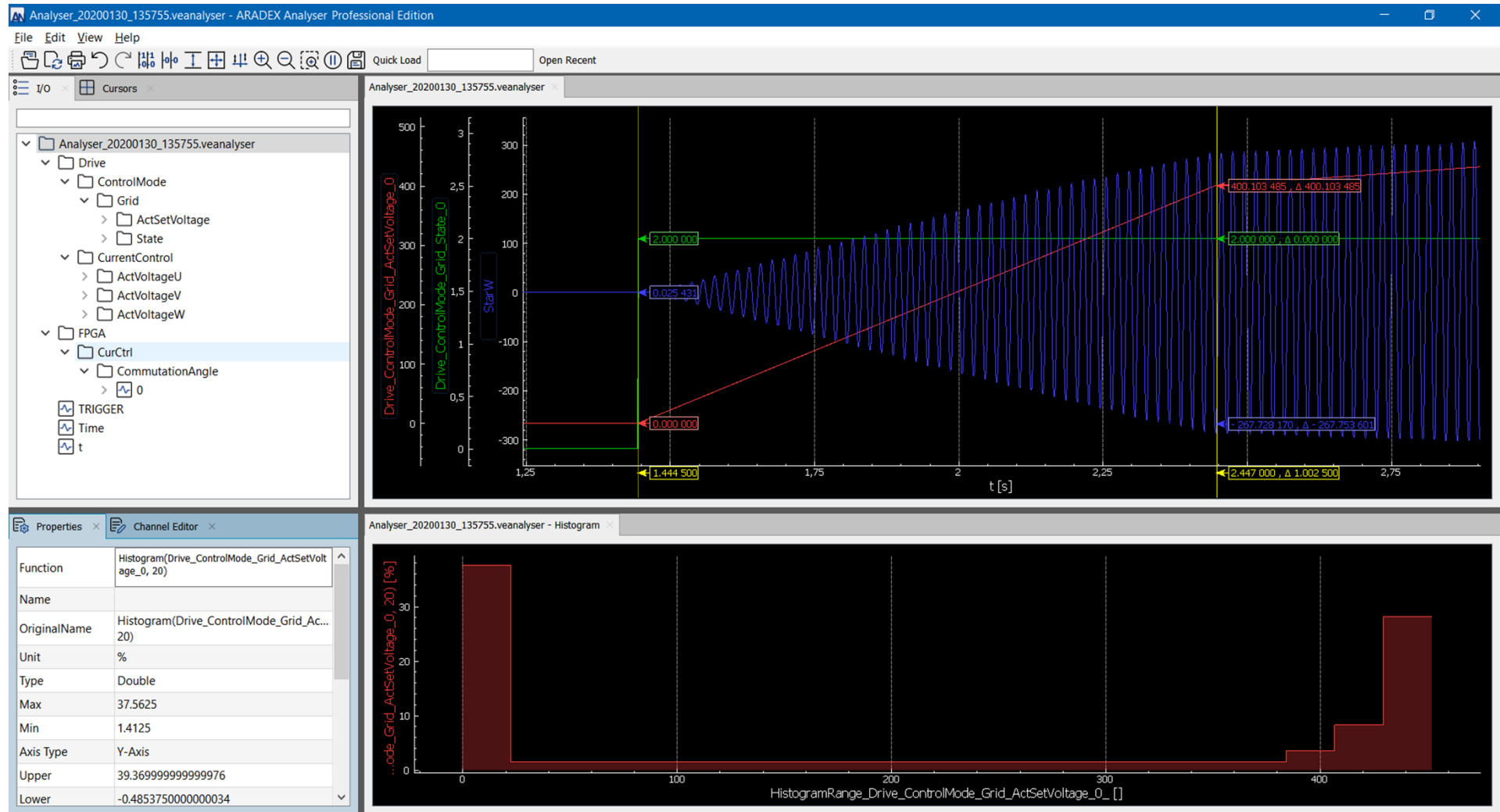
1. For configuration, parametrization, diagnostics....
2. For commissioning, maintenance and any kind of testing
3. Can be used for automated sequences to operate inverter and DC/DC directly
4. And even can be used to co-work with third-party products to be your **one-for-all-companion**

- I **Analyser: strengths, main functions and your benefits**
- II Analyser: versions and functions
- III VEConfig: strengths, main functions and your benefits
- IV VEConfig: versions and functions

“Make things measurable to make them serving your application” is just the kernel of functions like “oscilloscope” which is integrated in all of our power converters. And it’s the kernel of **ANALYSER**, the ARADEX-tool for drawing curves and much deeper analysis.

Let’s have a look at the strengths, the main functions and your benefits

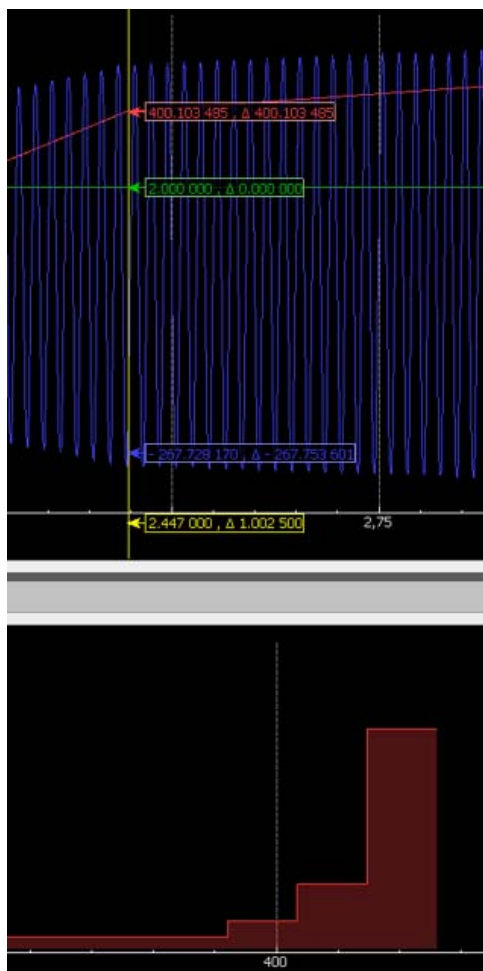
ANALYSER: main strengths and benefits



Typical screen of ANALYSER with mixed visualization of analog and digital variables.

In addition to the graphics you can use cursors to see the value of the variables.

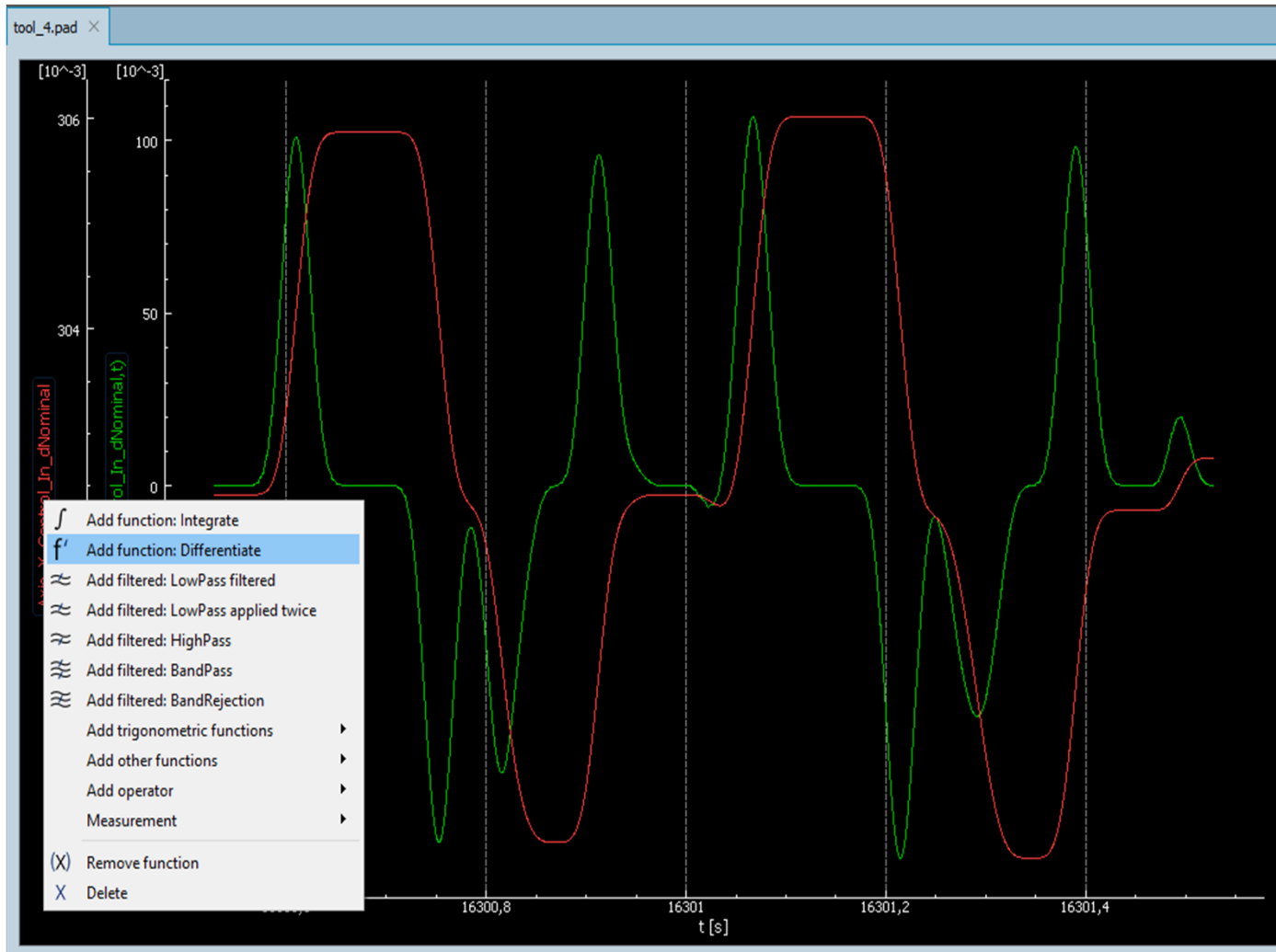
ANALYSER: main strengths and benefits



Main benefits:

1. Mixed visualization of analog and digital signals
2. Perfectly matched to co-work with VECTOPOWER inverters and DC/DC and VECTOSTUDIO software
3. Efficient optimization and fine tuning of VECTOPOWER based drivetrains
4. One-for-All-Tool: commissioning, maintenance, after-sales-support, analysis, documentation.....
5. Powerful library of mathematical functions, integrated for postprocessing of the recorded data. Functions like differentiation, integration, Fourier-Analysis, histograms.....
6. You even can combine several data-channels with formulas... such as calculating power by speed and torque.....
7. Even large recorded files can be displayed and processed in short time
8. In addition to other variables, you can make CAN-traces visible as time-synchronous signals
9. Documentation made easy by export-functions.

ANALYSER: main strengths and benefits



Powerful and intuitive post-processing of recorded data

1. Various filters like low pass, high pass, band-pass.
2. Differentiation to derive speed from position
3. Integration of external acceleration sensors
4. Various Fourier analysis
5. Statistical values like histogram functions

Green: acceleration

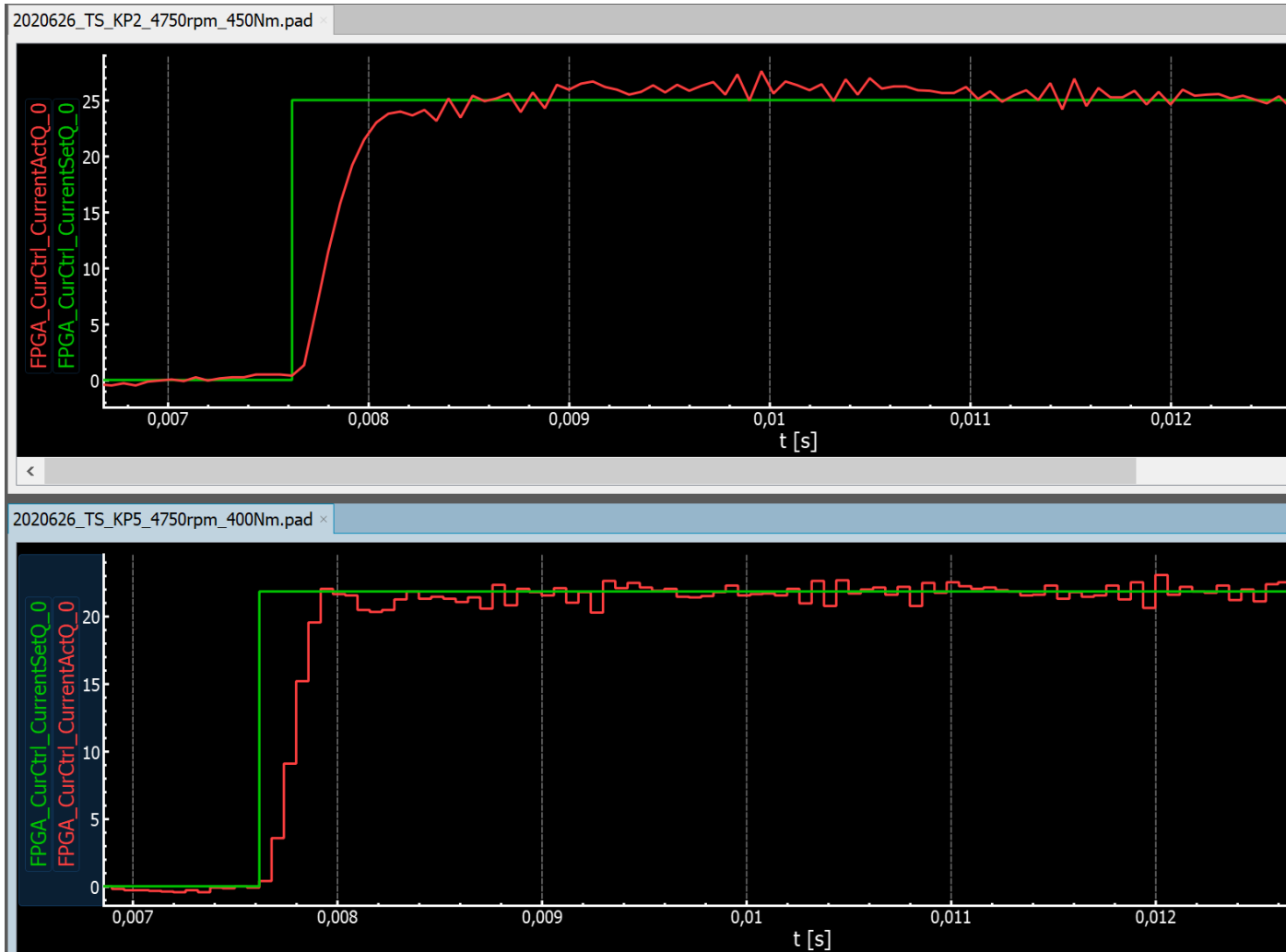
Red: speed

The post-proccession of recorded data can be used:

- To create speed or acceleration, based on position signals
- To find special behavior of a drivetrain
- To find out the possible system reaction by potential usage of filters inside a control strategy

- To find resonance phenomena
- To calculate derived variables like mechanical power, built by torque and speed
- To compare measured values with mathematical functions
-

ANALYSER: main strengths and benefits



Multi-channel view

1. You can analyze 2, 3 or more files in parallel
2. And many different colored curves in one graphic
3. For example, to compare drivetrain behavior with different parameter settings
4. You can set graphics size, colors and more
5. The horizontal axis can be time (as shown here) or any other variable, like position, speed.....

Comparison of behavior of various parameters made easy.

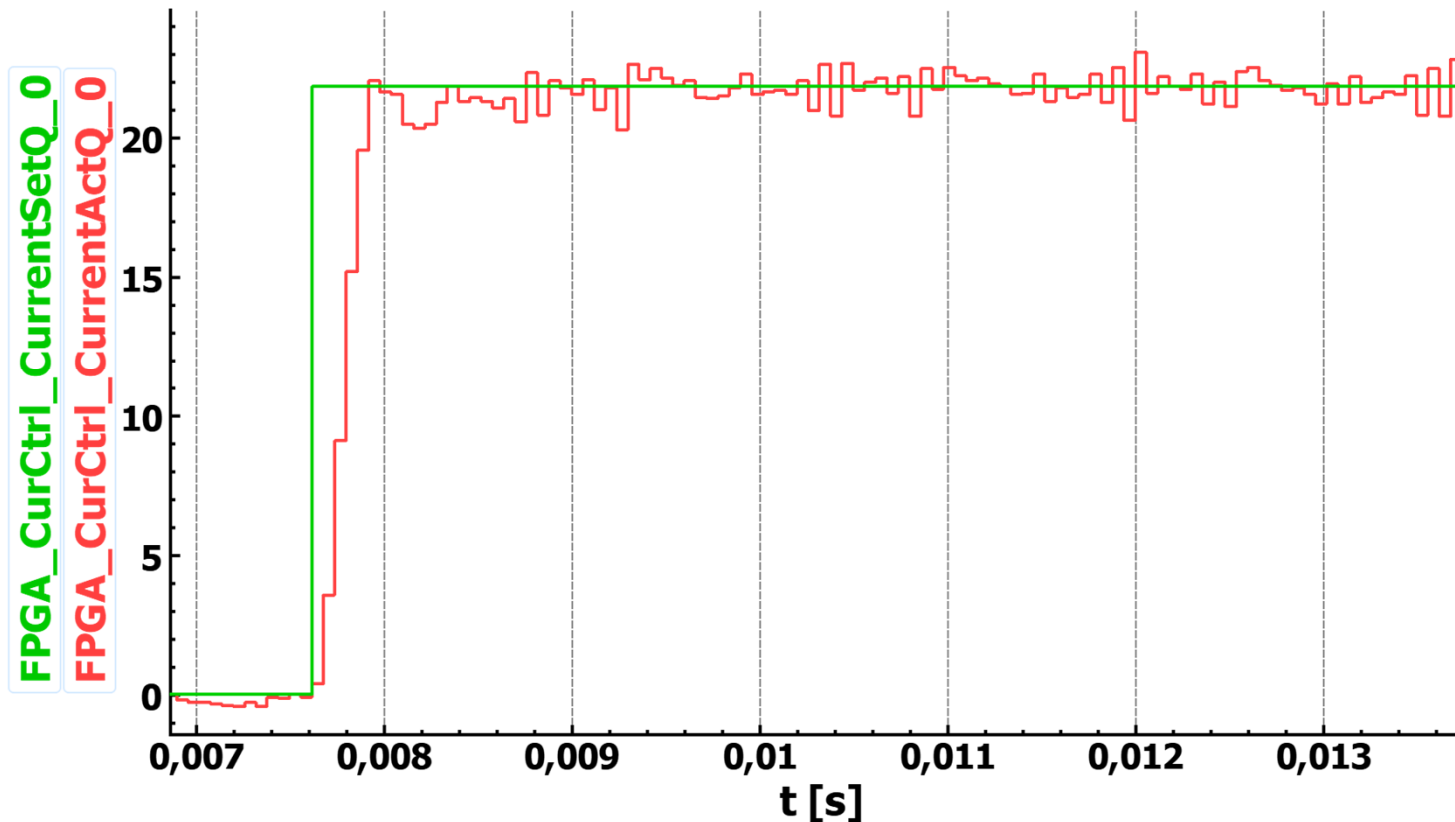
1, 2, 3, 4 curves can be seen in parallel....

ANALYSER: main strengths and benefits

2020626_TS_KP5_4750rpm_400Nm.pad
Samstag, 13. März 2021 17:14:48

Step-response Kp5

▲ ARADEX



Comfortable export and print functions

1. Export for example as data for EXCEL
2. Print as PNG, SVG

Documentation made easy by print as picture or export as data-files.
For example to be used in spreadsheet software...

ANALYSER: main strengths and benefits

All Analyser Files (*.pad *.dat *.csv *.txt *.chs *.veanalyser *.mf4 *.mfc *.trc *.log)
 V8 Analyser Files (*.pad *.dat)
 CSV File (*.csv)
 TXT File (*.txt)
 Channel Selection Files (*.chs)
VE Analyser Files (*.veanalyser)
 CAN Data File (*.mf4 *.mfc *.trc *.log)
 All Files (*.*)

ANALYSER, the One-for-All-Tool

1. Reads data of all oscilloscope-versions of ARADEX products
2. Reads many other data formats

- I Analyser: strengths, main functions and your benefits
- II **Analyser: versions and functions**
- III VEConfig: strengths, main functions and your benefits
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Analyser: versions and functions

Function	Lite	Professional
Open and view of recorded data	X	X
Graphical diagnosis of data	X	X
Online-connection to VEConfig	X	X
Mathematical functions,.....		X
Export and print of graphics		X
Import of non-analyser data		X
Save and export of data		X
Direct reading of CAN data		X
Available at	via Download	Contact us

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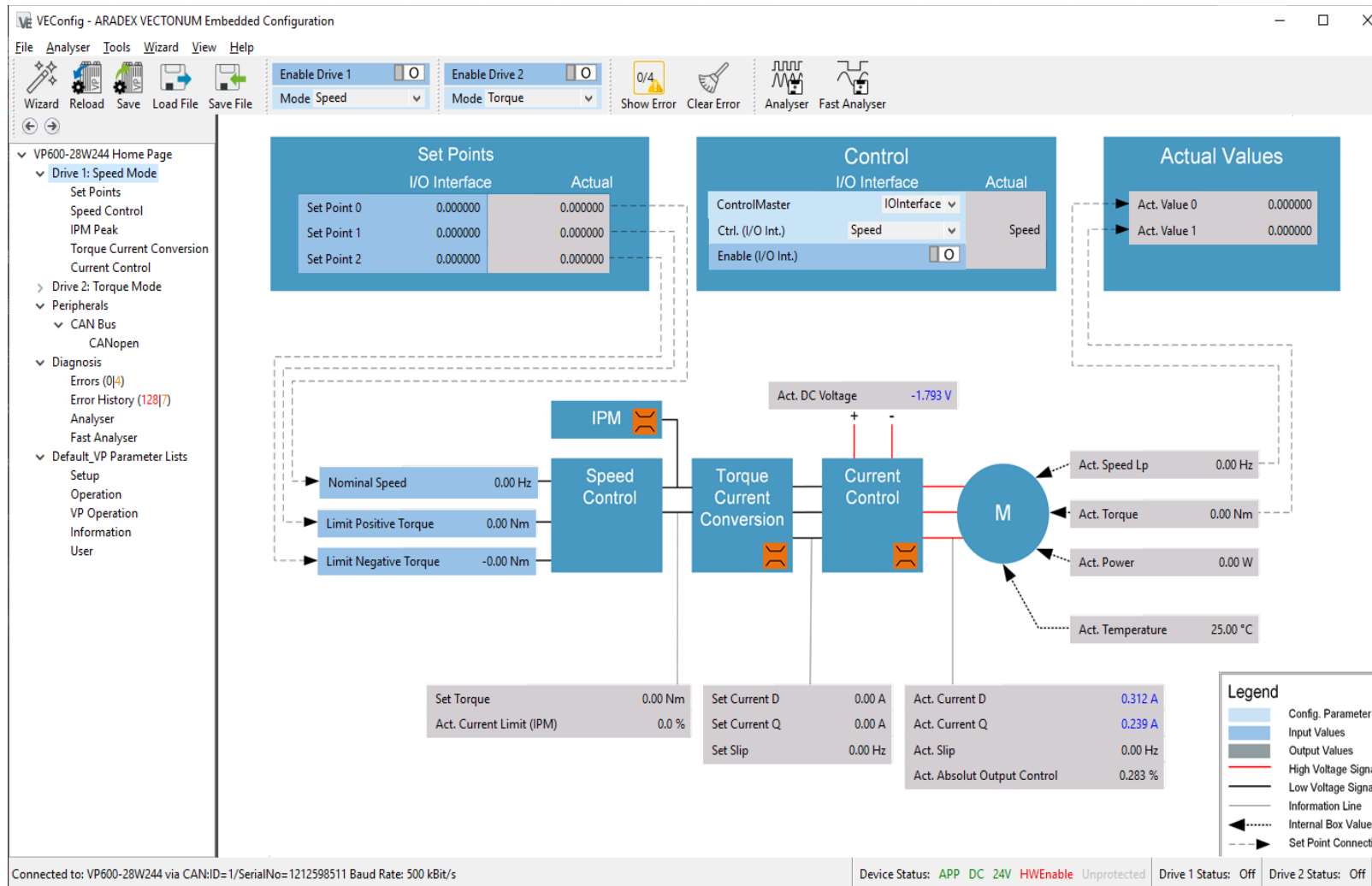
Many years ago, **VEConfig** started just as a tool for configuration and parametrization of our inverters.

The current version covers all VECTOPOWER inverters and DC/DC and as well can be used for third-party controllers with CAN connection.

Besides configuration and parametrization, VEConfig is our tool for diagnostic, maintenance and more.

Let's first have a look the strengths and your main benefits.

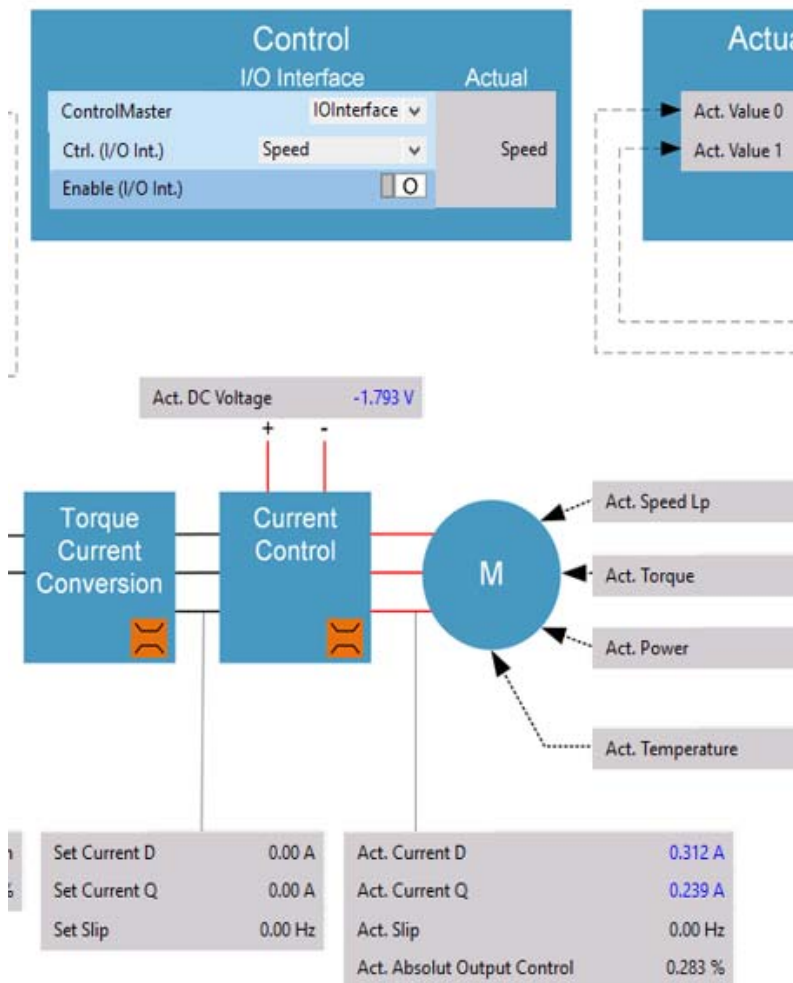
VEConfig: main strengths and benefits



For example: here we see a VECTOPOWER which operates a motor in speed mode. For example for operating hydraulic pumps or for traction for chain drives for dozers.

You can set and change all kind of set points and parameters and you can directly see the reaction of the system. And you can save and see "Analyser" oscilloscope function.

VEConfig: main strengths and benefits



Main benefits:

1. Made for VP600 inverters, VP5000 DC/DC and more
2. Fast commissioning by guiding wizards
3. Perfect for commissioning, diagnostics, maintenance
4. You can operate inverter or DC/DC directly and see all variables as values and/or as rolling curves
5. You can write parameters, new software or firmware to the inverter or DC/DC
6. You can read out and save parameters, all settings, oscilloscope files and logbook files from inverter and DC/DC
7. And you have access to device manuals

VEConfig: main strengths and benefits

Drive 1

- Drive Operation Mode
- Motor Parameters
- Motor Temperature Limits
- Current Control
- Encoder
- Test Wiring
- Commutation
- Speed Control
- Finish

Please enter the motor information as given by the motor manufacturer:

Motor Type	Synchron	
Invert motor direction	<input type="checkbox"/>	Load from Database...
Pole Pairs	4 pp	Save to Database...
Rated Speed (rpm)	60.00 rpm	
Back EMF	0.00 Veff/krpm	
Torque Constant	1.414 Nm/Aeff	
Maximum Peak Current	7.00 Aeff	
Maximum Continuous Current	6.00 Aeff	
Maximum Peak Time	10.00 s	
Maximum Speed Limit	100.00 Hz	

Automatically Adjust Values Below

Rated Current	6.00 Aeff	Please enter additional motor information if available or click the "Auto Adjust" button to calculate default values based on the values above.
Current Max	14.8 A	
Current Max Time	20 μ s	
Current Sum Max	4.5 A	
Minimum Speed (negative value, e.g. -100 Hz)	-100.00 Hz	
Maximum Speed	100.00 Hz	
Minimum Torque (negative value, e.g. -100 Nm)	-9.90 Nm	
Maximum Torque	9.90 Nm	

Wizard guided commissioning

1. Guides you step-by-step through commissioning of VECTOPOWER inverter or DC/DC converter
2. Allows fine-tuning of all parameters with same wizard later
3. Integrated library of inverter and motors

VEConfig: main strengths and benefits

CANopen Configuration

Node ID: 255 Attention: Pre_Operational: No PDOs will be sent in this state. Switch to Operational to activate sending. !PreOp: Changes in the PDO configuration will not be applied. Switch to Pre_Op to apply PDO changes.

Autosetup Node ID: 1

Initial NMT State: Pre_operational

Actual NMT State: Pre_operational

Heart Beat Time: 1000 ms

COB ID: 0x00000181

Extended Frame: ☐

Transmission Type: Cycle time

Cycle Time: 500 ms

I/O Name	I/O Value	Bit size	Telegram Offset
Drive_ControlMaster_0	IOInterface	32	0
Drive_ControlMaster_1	IOInterface	32	32

Receive PDO 1 - 0x00000201

Receive PDO 2 - 0x00000301

Receive PDO 3 - 0x00000401

Receive PDO 4 - 0x00000501

Receive PDO 5 - 0x00000240

Receive PDO 6 - 0x00000340

Receive PDO 7 - 0x00000440

Receive PDO 8 - 0x00000540

Receive PDO 9 - 0x00000241

Receive PDO 10 - 0x00000341

Receive PDO 11 - 0x00000441

Receive PDO 12 - 0x00000541

Transmit PDO 1 - 0x00000181

Transmit PDO 2 - 0x00000281

Transmit PDO 3 - 0x00000381

Transmit PDO 4 - 0x00000481

Transmit PDO 5 - 0x000001C0

Transmit PDO 6 - 0x000002C0

Transmit PDO 7 - 0x000003C0

Transmit PDO 8 - 0x000004C0

Transmit PDO 9 - 0x000001C1

Transmit PDO 10 - 0x000002C1

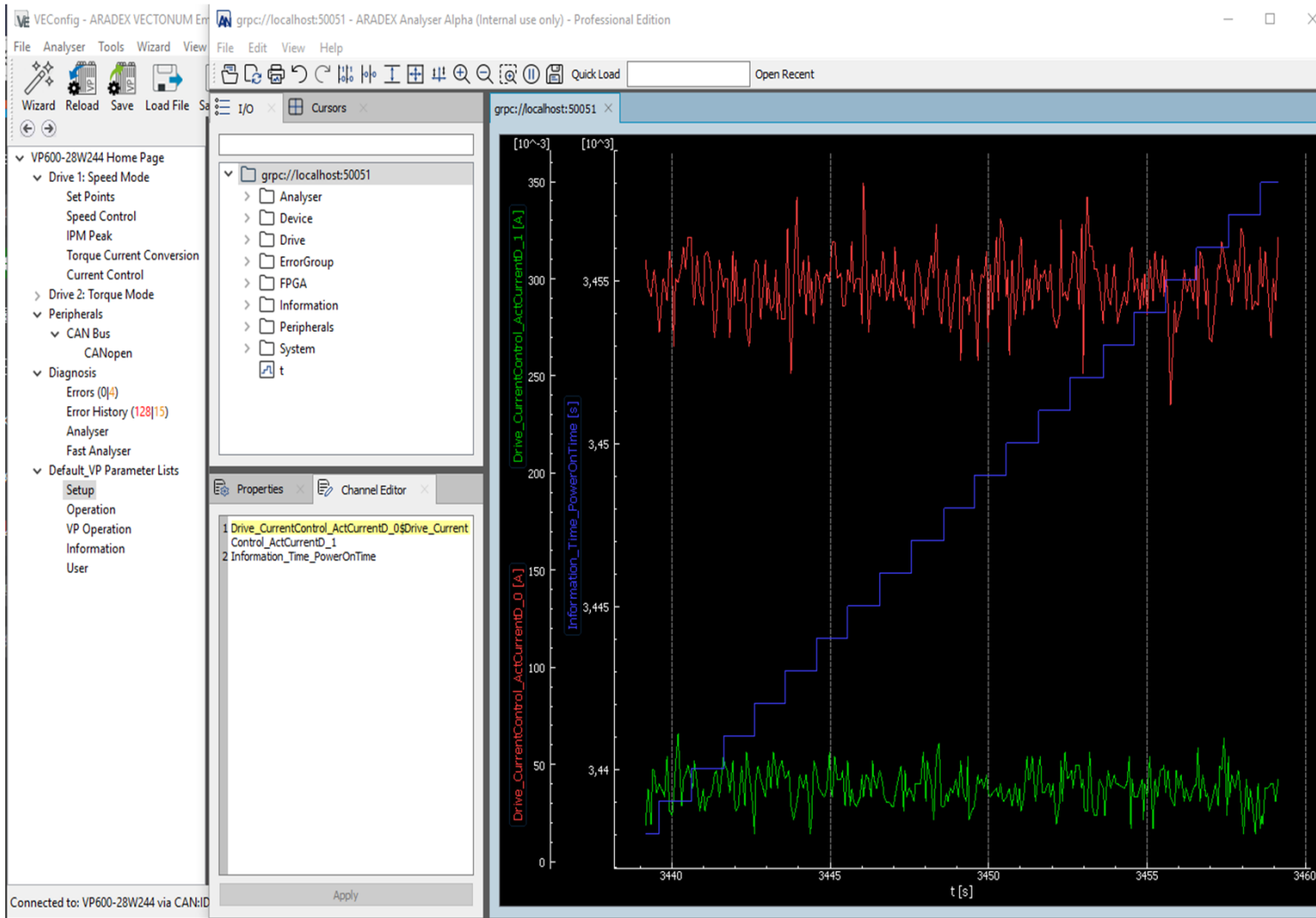
Transmit PDO 11 - 0x000003C1

Transmit PDO 12 - 0x000004C1

CANplus:

1. Parameterize und communicate with third-party **CAN-open** devices
2. Parameters can be set without higher software knowledge
3. To see which data are received and sent by the device

VEConfig: main strengths and benefits



Analyser integrated

1. Offline to show stored data
2. Online as rolling curves
3. Option: expand online-analyser to a big data logger for more than 10 channels and more than 100 000 recorded points

VEConfig: main strengths and benefits

Setup ramp up parameter: parameterize ramp with max torque 200Nm

```
ve.ios.Drive_ControlMode_Torque_MaxPos = 200
ve.ios.Drive_ControlMode_Torque_MaxNeg = -190
ve.ios.Drive_ControlMode_Torque_EnableRamp = True
ve.ios.Drive_ControlMode_Torque_RampUp = true
ve.ios.Drive_ControlMaster_Io_SetPoint0_0 = 0
```

Setup and start analyser: configuration of integrated oscilloscope

```
ve.mcu_analyser.setChannels(["Drive_ControlMode_Torque_Set_0",
"Drive_Motor_ActTorque"])
ve.mcu_analyser.setSamples(8000)
ve.mcu_analyser.setUpdatePeriod(1)
ve.mcu_analyser.setTrigger(TriggerType.Above_Level,
"Drive_ControlMode_Torque_Set_0", 0, 5.0)
ve.mcu_analyser.startAndWaitPreBufferFilled()
```

Start torque ramp up and wait 20 seconds: starts the process

```
with ve.managedIo("Drive_ControlMaster_Io_Enable_0", True, False):
    ve.ios.Drive_ControlMaster_Io_SetPoint0_0 = self.maxTorqueValue
    ve.mcu_analyser.waitForAnalyserStop(timeout=20)
```

Get Analyser data of ramp: downloads oscilloscope-data from inverter

```
measuredData = ve.mcu_analyser.getData()
```

Compare ramp: compare set values and nominal values

```
analyser.compare(measuredData, atol=0.01)
```

Create your own plc-like sequence by using the automation interface

1. You can use your Windows-based Notebook on which you run VEConfig to create automated sequences and directly connect with VEConfig
2. For example, you can use Python, as shown, or Java, C, C++, Dart, Go, Node, Kotlin, Ruby.... It's your choice
3. Example shows Python code for a small sequence for some automated first tests of a drivetrain.

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VEConfig wants to be YOUR companion for all kind of commissioning, diagnostics, maintenance and more.

Wizard guided commissioning, data-collection.. and more.....

VEConfig: versions and functions

Function	Free	Payed Version
Connect all VP devices via CAN or RS232	X	X
Read and write parameters	X	X
Download of firmware and functions	X	X
Read logfiles, Analyser-data, error messages; including export	X	X
“Snapshot“ complete read-out of all data with one click	X	X
CANopen EDS export	X	X
Automation interface: you can create you own sequences	X	X
Big data logger: use the online-Analyser (rolling mode) as an almost unlimited oscilloscope logfile	X	X
Connect to third-party CANopen devices, including Analyser		X
View and limit CAN traffic so as not to disturb elementary communication		X
View, change, load and save CAN-data from VP (CANopen PDO)		X

Thanks for your attention

**Optimized usability
and performance
for the best e-mobility**

30+
YEARS
POWER ELECTRONICS

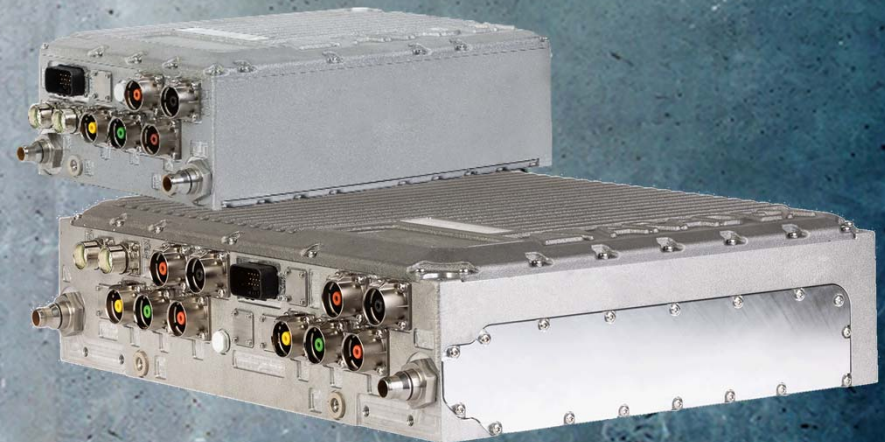
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Please don't hesitate to contact us and challenge us with your application.