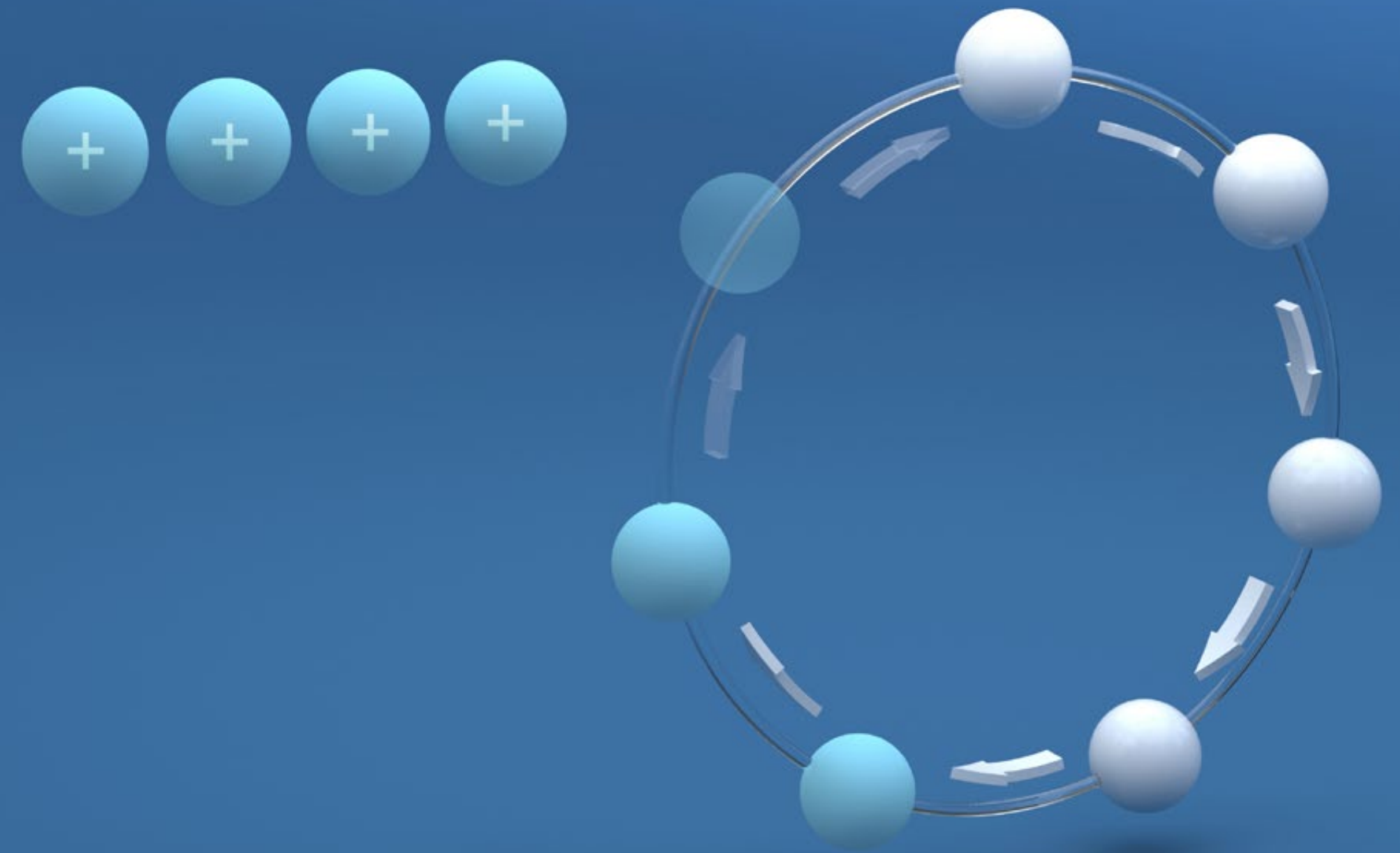


e-Facts:

Powerful tools: Analyser and VEConfig

We drive new energy for a greener future



/ Analyser and VEConfig

Introduction

Analyser:

Display and analyse recorded oscilloscope files from VECTOPOWER inverters and DC/DC converters

- The analyser works as a modern oscilloscope viewer by making measured data visible
- Analyser can post-process the data for deeper analysis
- Analyser 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

- For configuration, parametrization, diagnostics...
- For commissioning, maintenance and testing
- Can be used for automated sequences to operate inverter and DC/DC directly
- Can also be used to co-work with third-party products and as such is your **one-for-all companion**

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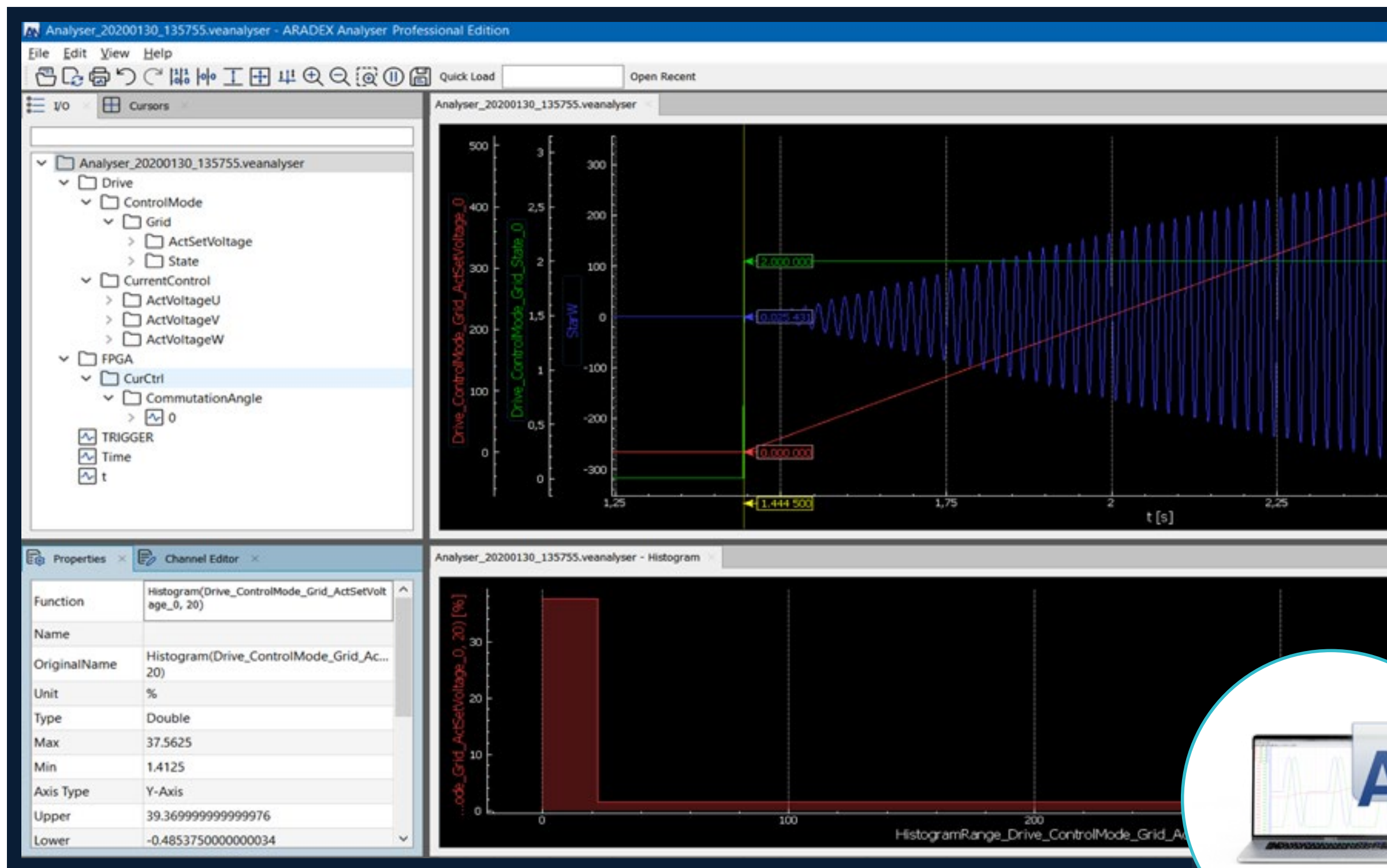


ANALYSER

Strengths, main functions
and your benefits

/ Analyser

Main strengths and benefits



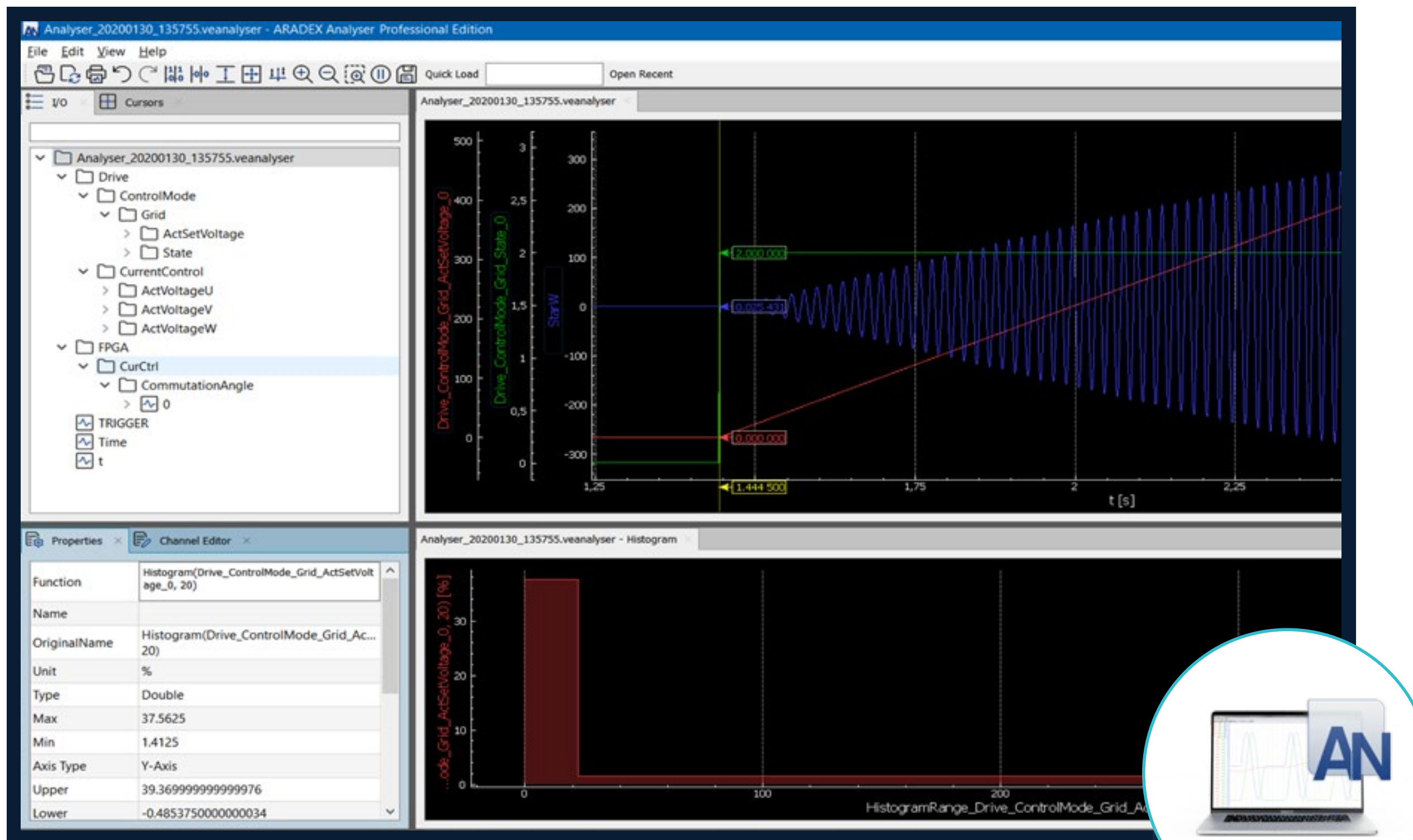
Main benefits:

- Mixed visualization of analogue and digital signals
- Perfectly matched to co-work with VECTOPOWER inverters and DC/DC and VECTOSTUDIO software
- Efficient optimization and fine tuning of VECTOPOWER based drivetrains
- One-for-All-Tool: commissioning, maintenance, after-sales-support, analysis, documentation...
- Powerful library of mathematical functions, integrated for postprocessing of the recorded data. Diverse functions available such as differentiation, integration, Fourier-analysis, histograms and many more.



/ Analyser

Main strengths and benefits

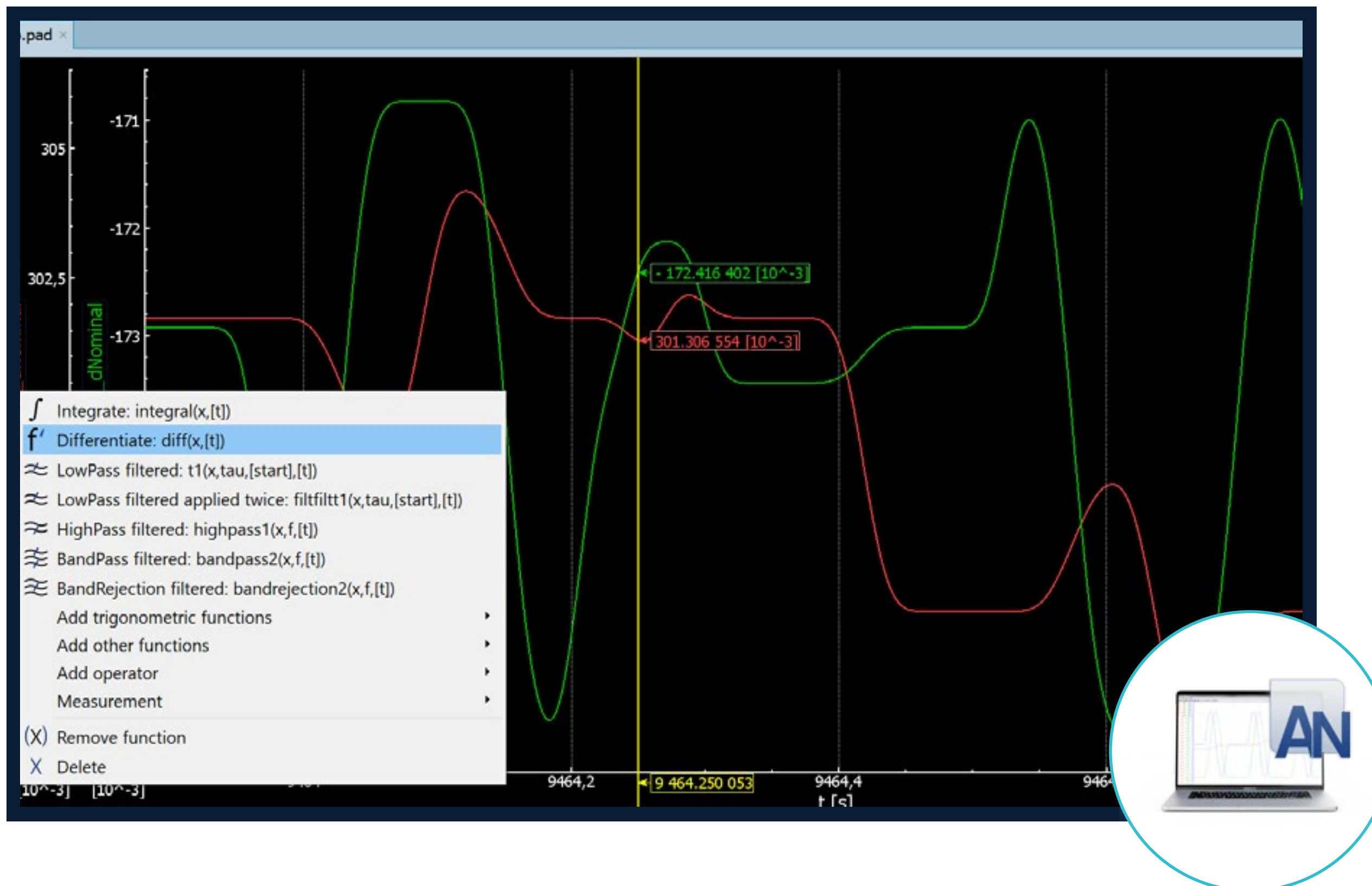


Main benefits:

- You can combine several data channels with formulas such as calculation power by speed and torque
- Even large recorded files can be displayed and processed in short time
- In addition to other variables, you can make CAN-traces visible as time-synchronous signals
- Documentation made easy by export-functions

/ Analyser

Main strengths and benefits

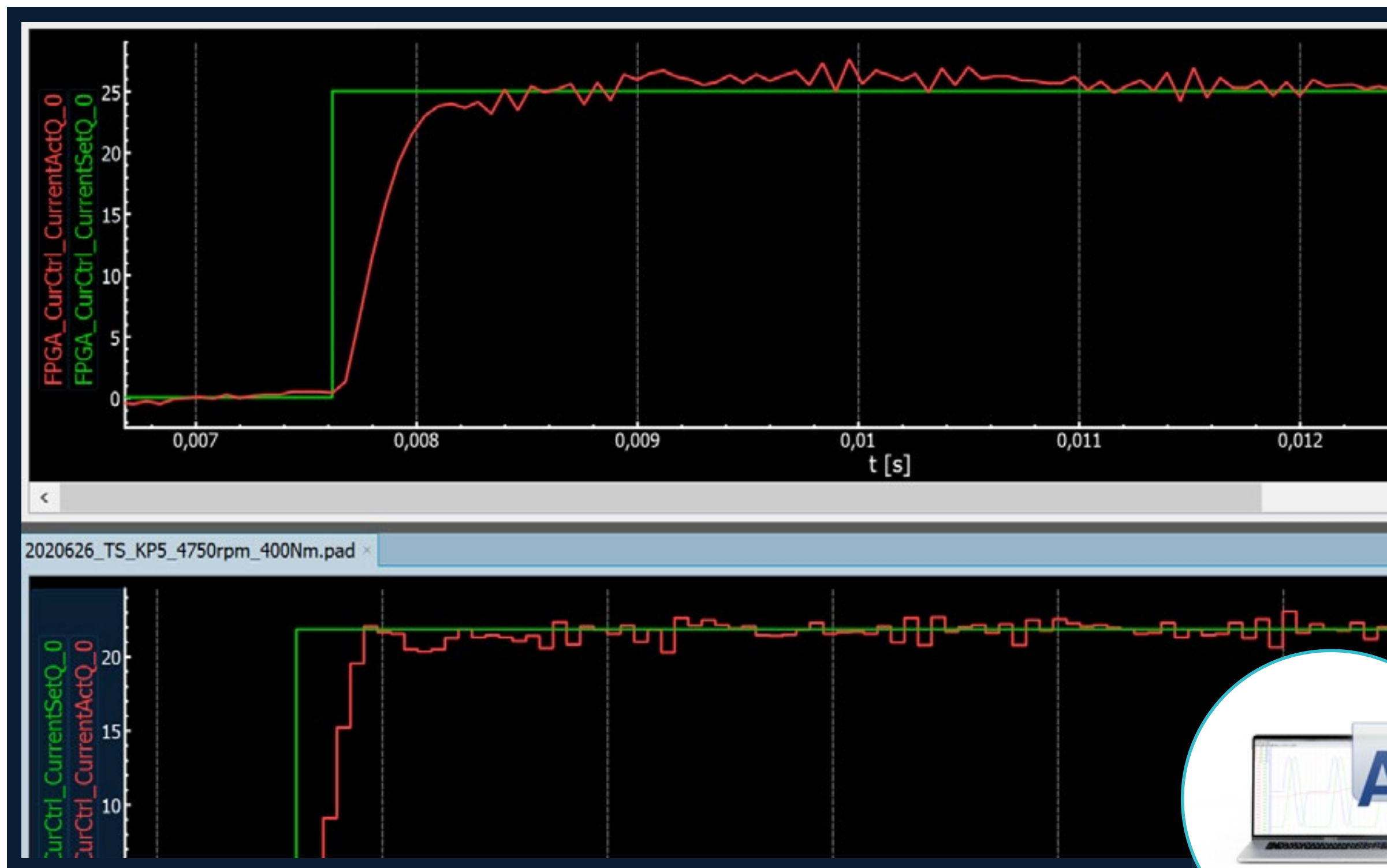


Powerful and intuitive post-processing of recorded data

- Various filters like low-pass, high-pass, band-pass
- Differentiation to derive speed from position
- Integration of external acceleration sensors
- Various Fourier analyses
- Statistical values such as histogram functions

/ Analyser

Main strengths and benefits

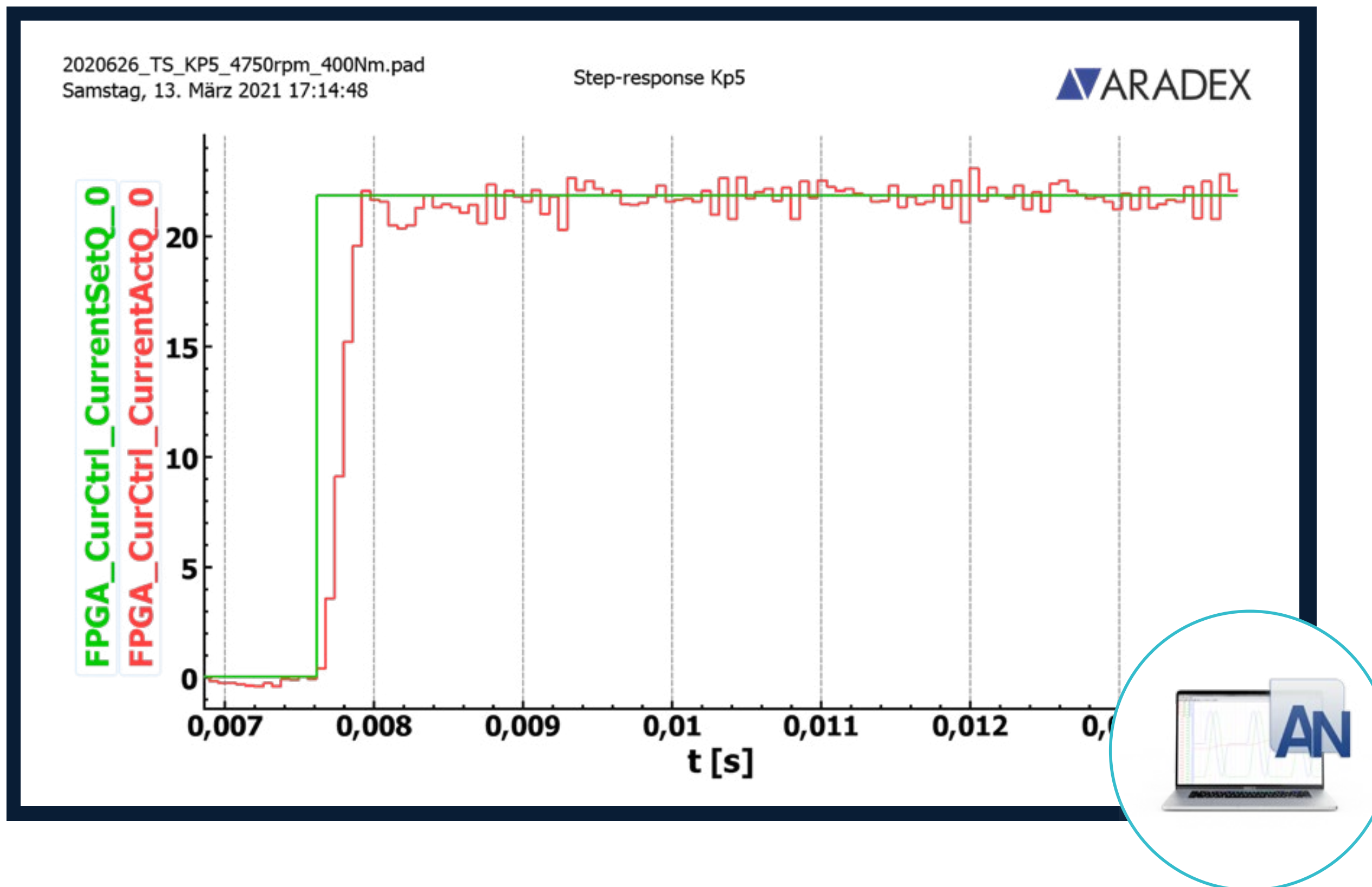


Multi-channel view

- You can analyse 2, 3 or more files in parallel
- And many different coloured curves in one graphic
- For example comparison of drive train behaviour with different parameter settings
- You can set graphics size, colours and more
- The horizontal axis can be time (as shown here) or any other variable, like position, speed,.....

/ Analyser

Main strengths and benefits



Comfortable export and print functions

- Export for example as data for EXCEL
- Print as PNG, SVG

/ **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

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



ANALYSER

Main functions
and versions

/ **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 |

Where is this available?
Download from our website
or contact us!

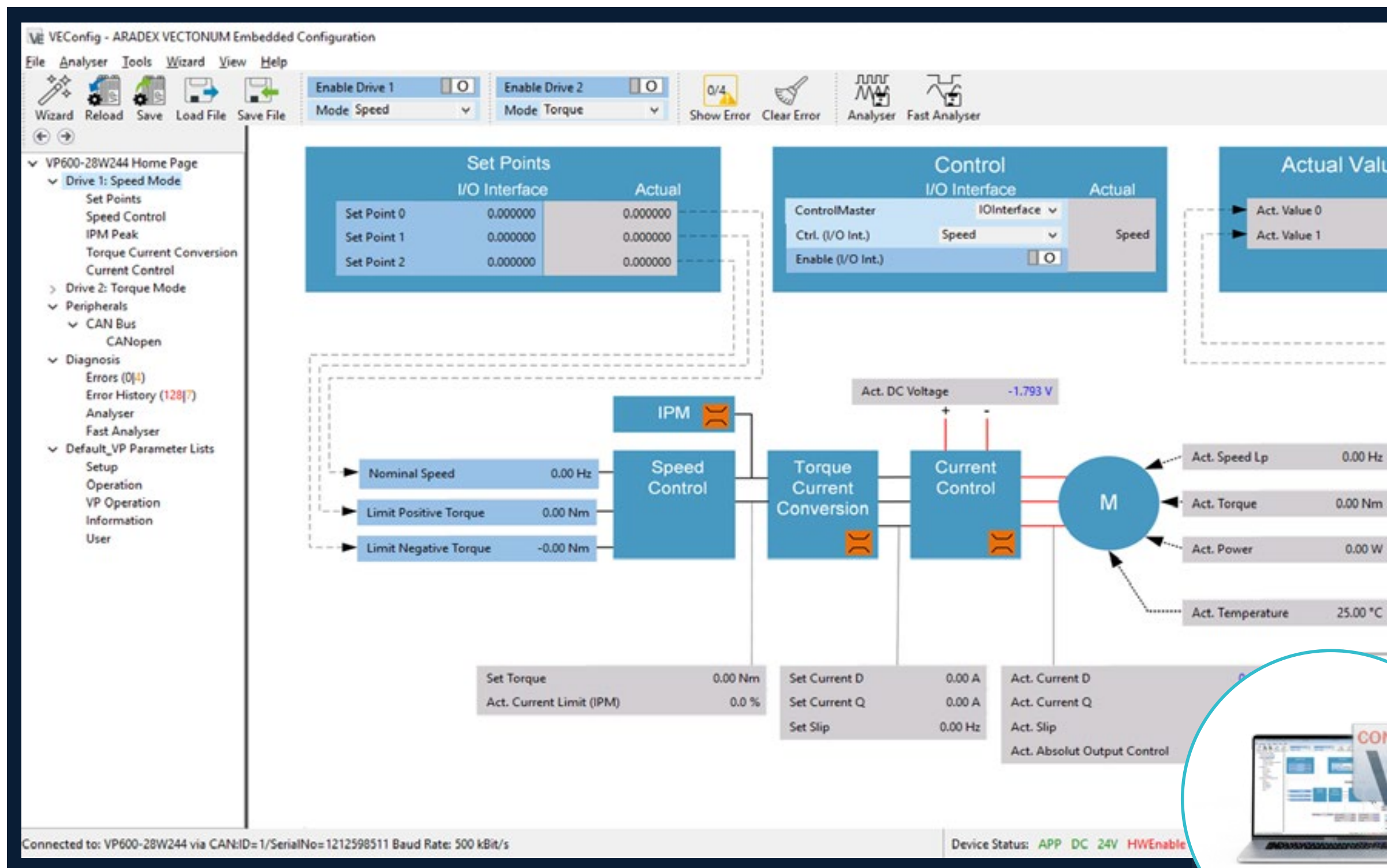


VEConfig

Strengths, main functions
and your benefits

/ VEConfig

Main strengths and benefits



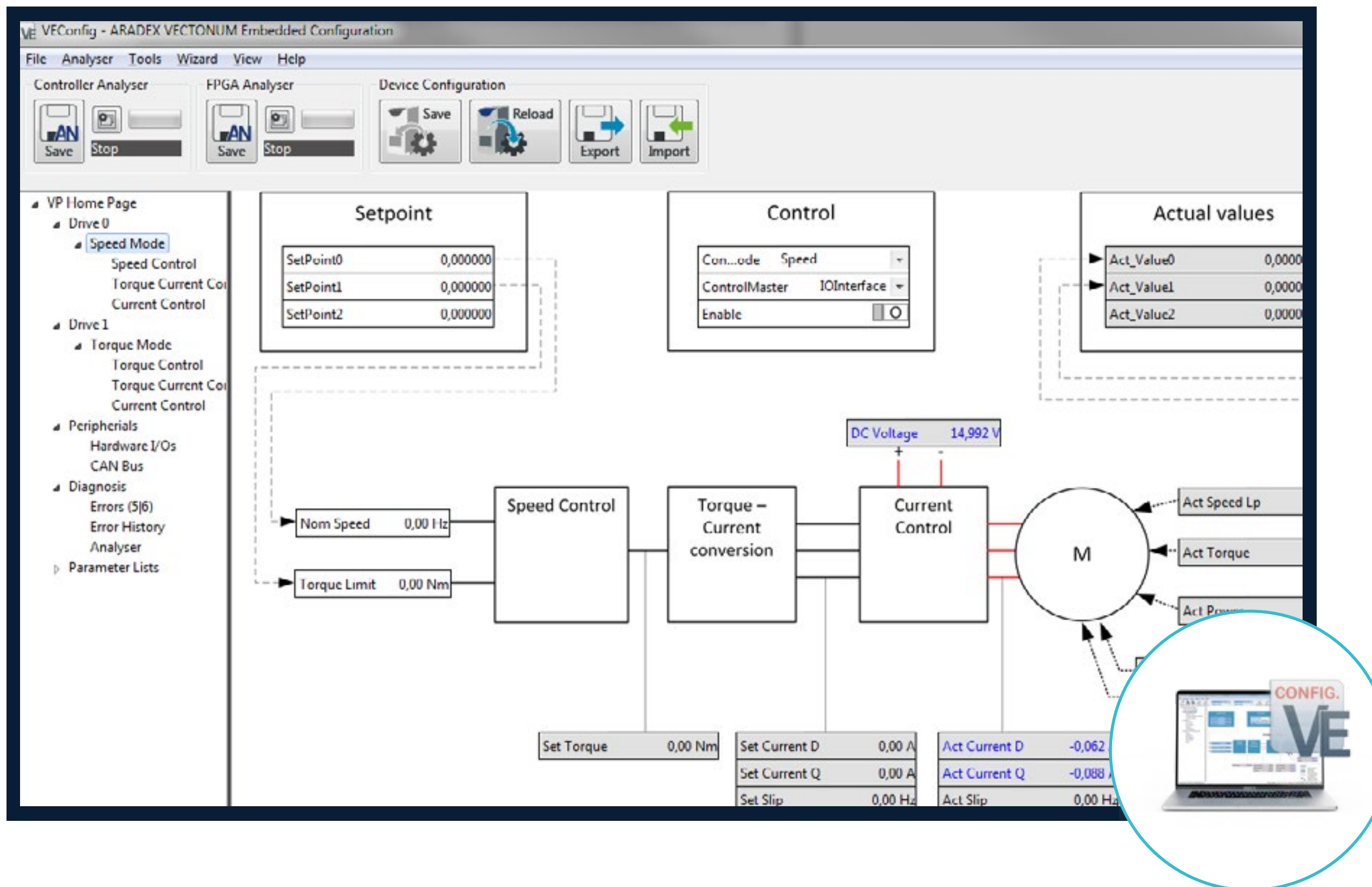
Main benefits

- Made for VP600 inverters, VP5000 DC/DC and more
- Fast commissioning by using guiding wizards
- Perfect for commissioning, diagnostics, maintenance
- You can operate inverter or DC/DC directly and see all variables as values and/or as rolling curves



/ VEConfig

Main strengths and benefits



Main benefits

- You can write parameters, new software or firmware to the inverter or DC/DC
- You can read out and save parameters, all settings, oscilloscope files and logbook files from inverter and DC/DC
- 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="radio"/> O | Load from Database... |
| Pole Pairs | 1 pp | Save to Database... |
| Rated Speed (rpm) | 60.00 rpm | |
| Back EMF | 0.00 Vrms/krpm | |
| Constant Torque | 1.414 Nm/Arms | |
| Max. Peak Current (Motor Peak Current) | 3.00 Arms | |
| Max. Continuous Current (Motor Continuous Current) | 3.00 Arms | |
| Max. Peak Time (Motor Peak Current Time) | 10.00 s | |
| Max. Speed Limit | 1.00 Hz | |

Automatically Adjust Values Below

| | | |
|---|-----------|---|
| Min. Speed Limit (Negative Value, e.g. -100 Hz) | -1.00 Hz | Please enter additional motor information if available or click the "Auto Adjust" button to calculate default values based on the values above. |
| Rated Current | 1.00 Arms | |
| Max. Current (Drive Switching Off) | 100.0 A | |
| Max. Current Time (Drive Switching Off) | 20.0 μs | |
| Max. Sum Current | 10.0 A | |
| Min. Torque (Negative Value, e.g. -100 Nm) | -1.00 Nm | |
| Max. Torque | 1.00 Nm | |

Drive 2

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



Wizard guided commissioning

- Guides you step-by-step through commissioning of VECTOPOWER inverter or DC/DC converter
- Allows fine-tuning of all parameters with same wizard
- 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: 0x0000181

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

type filter text
 Attributes: no
 > > > > > > >

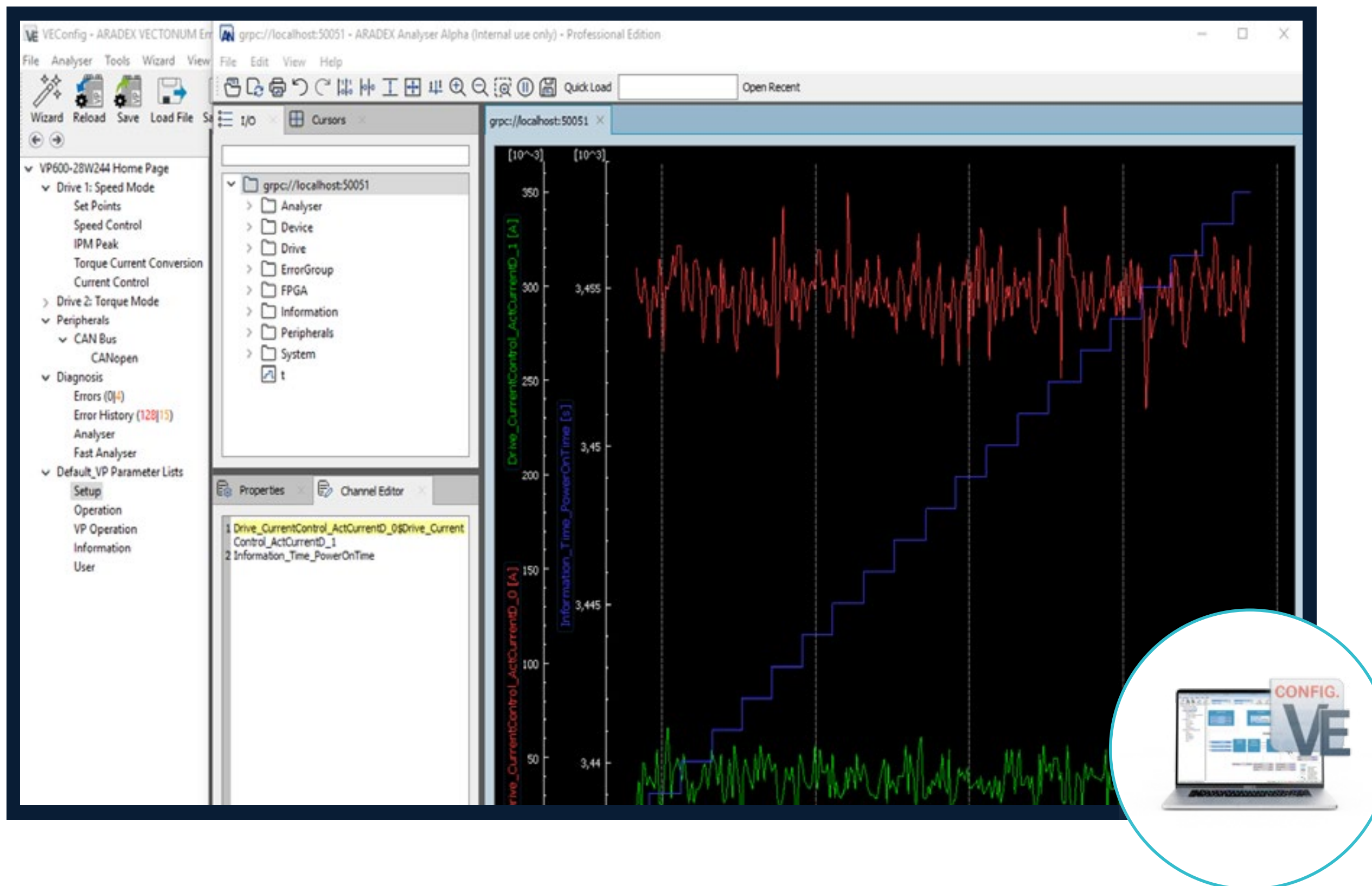


CANplus

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

/ VEConfig

Main strengths and benefits



Analyser integrated

- Offline to show stored data
- Online as rolling curves
- 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.waitAnalyserStop(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

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

IV

VEConfig

Main functions
and versions

/ VEConfig

Main functions and versions

| Function | Standard | XL | CANplus |
|--|----------|----|---------|
| All VP devices connectable via CAN or RS232 | X | X | |
| Read and write parameters | X | X | |
| Download firmware and functions | X | X | |
| Read log files, analyzer data, error messages; including export | X | X | |
| “Snapshot”; complete readout of all data with one click | X | X | |
| CANopen EDS Export | X | X | |
| Macros: Create and execute your own software modules as a sequence | | X | |
| Big Data Logger: Use the online analyzer (rolling mode) as an almost unlimited oscilloscope log file | | X | |
| Enables connection establishment to third-party CANopen devices as well as to Analyser | | | X |
| Displaying and limiting CAN traffic so as not to interfere with elementary communication | | | X |
| Display, change, load and save CAN data from VP (CANopen PDO) | | | X |
| Displaying and limiting CAN traffic so as not to interfere with elementary communication | | | |

/ Challenge us

Review of your application

Challenge us with your application, your demands and your ideas!

- + Our engineers can work out or support the project planning for your application.
- + You receive the result as an electronic document: cornerstones of your project regarding electrification or hybridization including dimensioning done by our experienced project engineers.
- + Contact our sales team for more information.

Thanks for your attention!

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



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