

# Tube Analyzer

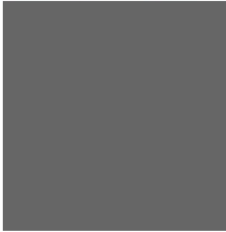
Achieving deeper analysis results with a new generation of devices



LV 124



**WKS**  
Informatik  
Experts in Testing



SELECT  
YOUR  
SOLUTION!



RF /  
Radar



**RT**Stand  
HIL - TEST AND SIMULATION



Industrial  
Automation



**Tube**  
Analyzer  
**µfi** Ultra Fast Interrupter

Speaker(s): Andreea Solomon, Ronald Kaempf - WKS Informatik GmbH

**NATIONAL INSTRUMENTS™ ALLIANCE PARTNER OF 2015/2016**  
**WINNER OF THE NATIONAL INSTRUMENTS™ TECHNICAL INNOVATION AWARD | WINNER OF THE WiR TECHNICAL INNOVATION AWARD!**

# Tube Analyzer

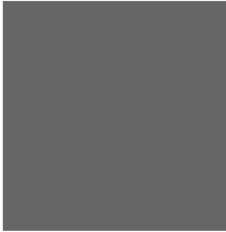
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With over 20 years of expertise  
in automation engineering...



... we provide solutions for  
automated testing needs.



LV 124/LV 148  
Automotive Testing



Industrial Automation




RF / Radar  
Automotive Testing

over 50   
customers worldwide

over 20   
years NI Alliance Partner

over 450   
testing solutions in use

2   
technical innovation  
awards

over 10   
products for automated  
testing

# What did we learn?

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- OEM Norms for validation
- All functions of the DUT must perform as specified before, during and after stimulation.
- Key parameters, e.g. operating currents, voltages etc., must be recorded during each test.

Requires high-resolution measurements to detect disturbances  
on all I/O simultaneously



LV 124/LV 148  
Automotive Testing



Industrial Automation



RF / Radar  
Automotive Testing

# What did we learn?

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Requires high-resolution measurements to detect disturbances on all I/O simultaneously



LV 124/LV 148  
Automotive Testing

- Usual devices do not support higher numbers of pins
- Channel synchronization must be guaranteed
- Reduction of costs for test setups is necessary



Industrial Automation

Reduction of device and cable clutter



RF / Radar  
Automotive Testing

# What did we learn?

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Requires high-resolution measurements to detect disturbances on all I/O simultaneously

Reduction of device and cable clutter



LV 124/LV 148  
Automotive Testing



Industrial Automation

- Dynamic test environments need flexible solutions

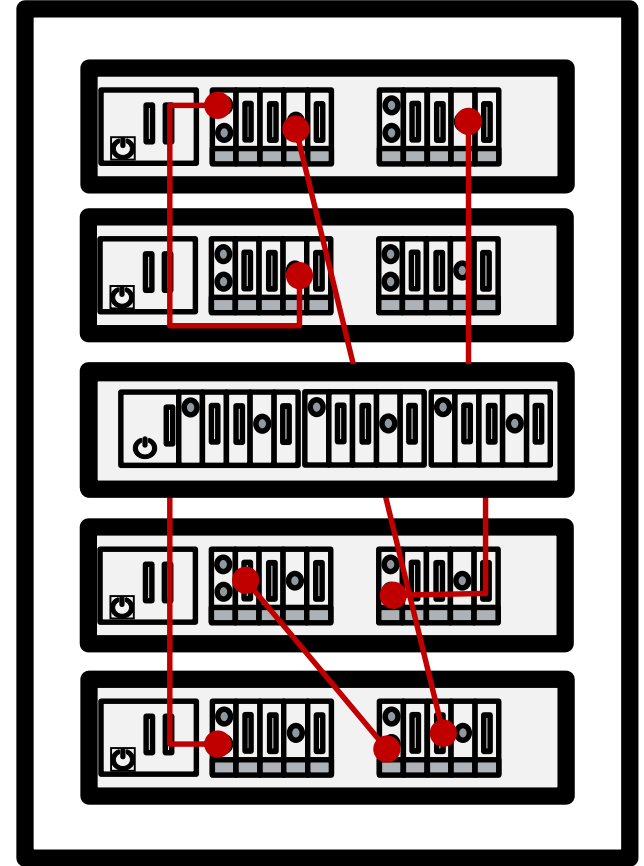
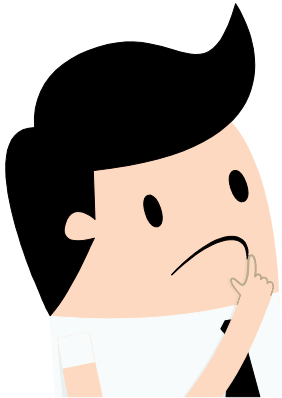
Innovative thinking



RF / Radar  
Automotive Testing

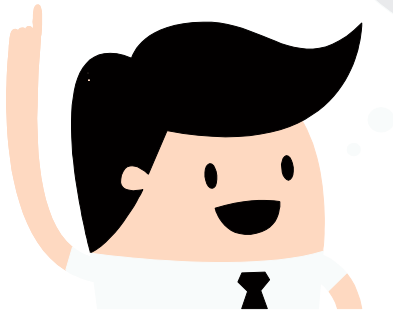
# Our solution

High-resolution measurements to detect disturbances on all I/O simultaneously  
Reduction of device and cable clutter  
Innovative thinking



# Our solution

High-resolution measurements to detect disturbances on all I/O simultaneously  
Reduction of device and cable clutter  
Innovative thinking





# Tube Analyzer

## BUILT TO DETECT



- detects short sporadic errors
- parallel analysis of all pins
- TDMS logging

## FLEXIBLE USE



- stand-alone component
- used in automated test systems
- complete tool chain

## LV 124 READY



- event detection with 100kHz
- continuous monitoring
- import of power supply simulation curves



WINNER OF THE



WiR TECHNICAL INNOVATION AWARD

# Tube Analyzer - Workflow

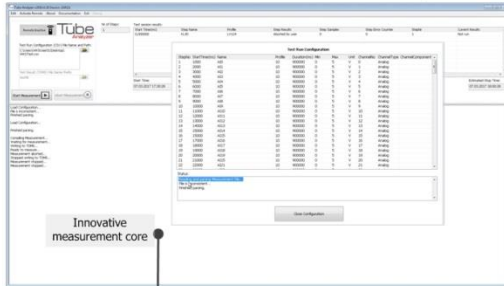
Tube Analyzer  
TestRun Generator



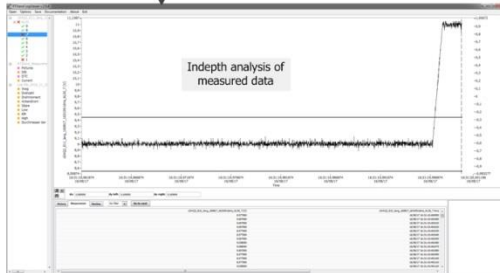
## LV 124 – Limits Generation

- Easy measurement configuration
- Import of (ArbNet) battery supply and TDMS curves
- Editing of existing configurations

Tube  
Analyzer

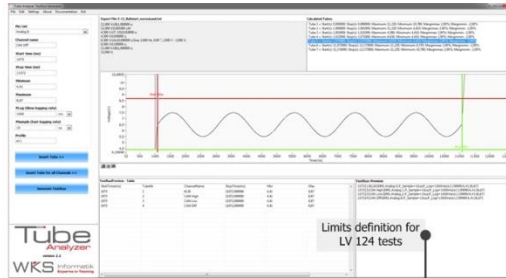


Tube Analyzer  
RTStand Log Viewer



# Tube Analyzer - Workflow

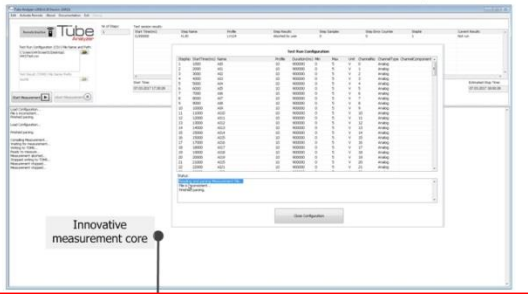
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## LV 124 – Limits Generation

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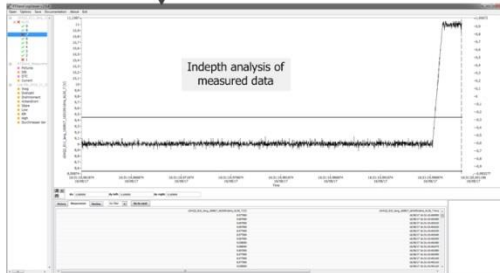
Tube  
Analyzer



## LV 124 – Measurement and online analysis

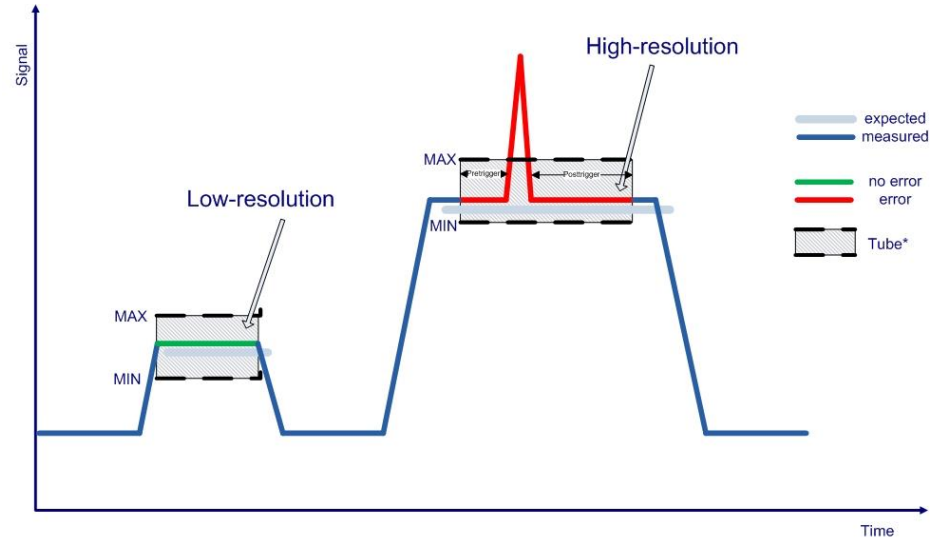
- Overview of the measurement status and error count
- Parallel execution of several instances
- NI TestStand Custom Step Type for remote control
- Adaptive logging for all pins in parallel

Tube Analyzer  
RTStand Log Viewer



## Innovative Monitoring and Analysis Concept

- Signal envelopes – „Tubes”: expected values, corresponding to expected device behaviour
- Continuous, parallel measurement for all configured signals



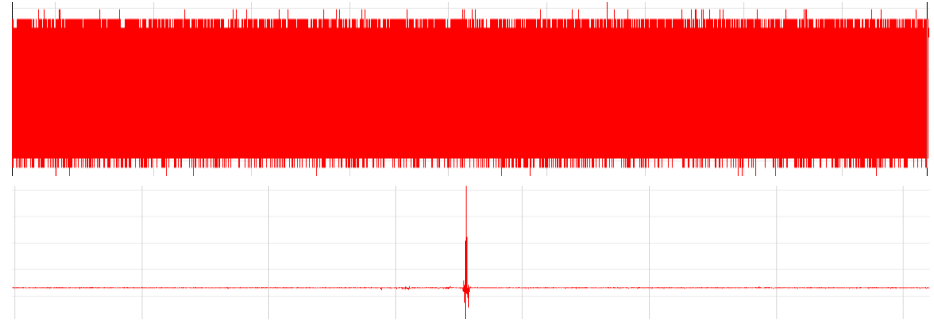
\*Tube = defines the limits and the time interval, during which the limit analysis of the measured signal is performed.

# Tube Analyzer – Adaptive Logging

## ECU – 40 pins

- 15 min – 100KHz -> **27GB**
- 1s – 100KHz , rest – 1KHz -> **275MB**

**100x**



**The amount of data is reduced**



**Failure search is much faster**



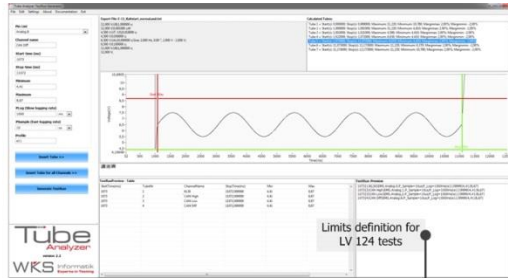
**The analysis depth is increased**



**Analyzers are the future of measurement!**

# Tube Analyzer - Workflow

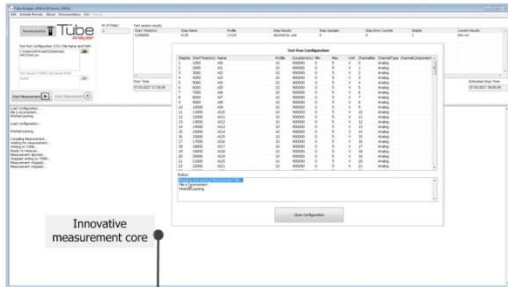
Tube Analyzer  
TestRun Generator



## LV 124 – Limits Generation

- Easy measurement configuration
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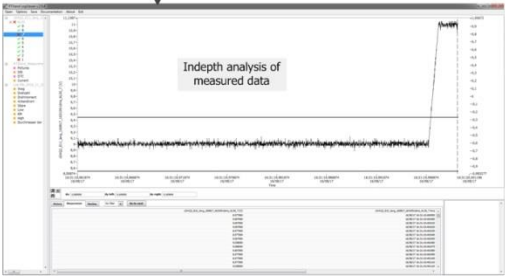
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## LV 124 – Measurement and online analysis

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Tube Analyzer  
RTStand Log Viewer

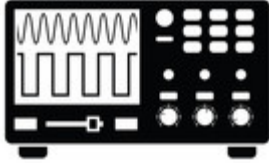


## LV 124 – Data analysis

- Powerful visualization tool for measurement data
- Comfortable comparison of multiple channels
- Default Word reporting

# Tube Analyzer vs. Oscilloscope

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- ✗ Few pins in parallel
- ✗ Only the first error is detected (triggered)
- ✗ Irreproducible test environment
- ✗ Imprecise analysis – visual analysis prone to human failure



- ✓ Up to 96 pins in parallel (per device)
- ✓ All errors are precisely and reliably detected
- ✓ Reproducible test environment
- ✓ Deeper and accurate measurement data analysis

# Tube Analyzer vs. Logger

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- ✗ No online data analysis
- ✗ No log data reduction
- ✗ Usually no tool chain



- ✓ Online data analysis
- ✓ Log data reduction
- ✓ Complete tool chain



# Tube Analyzer – Hardware layouts

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Tube Analyzer F8

8 analog channels  
(one is also used as  
analog trigger)



Tube Analyzer F24

20 analog, 4 PWM  
channels and digital  
triggering



Tube Analyzer F96

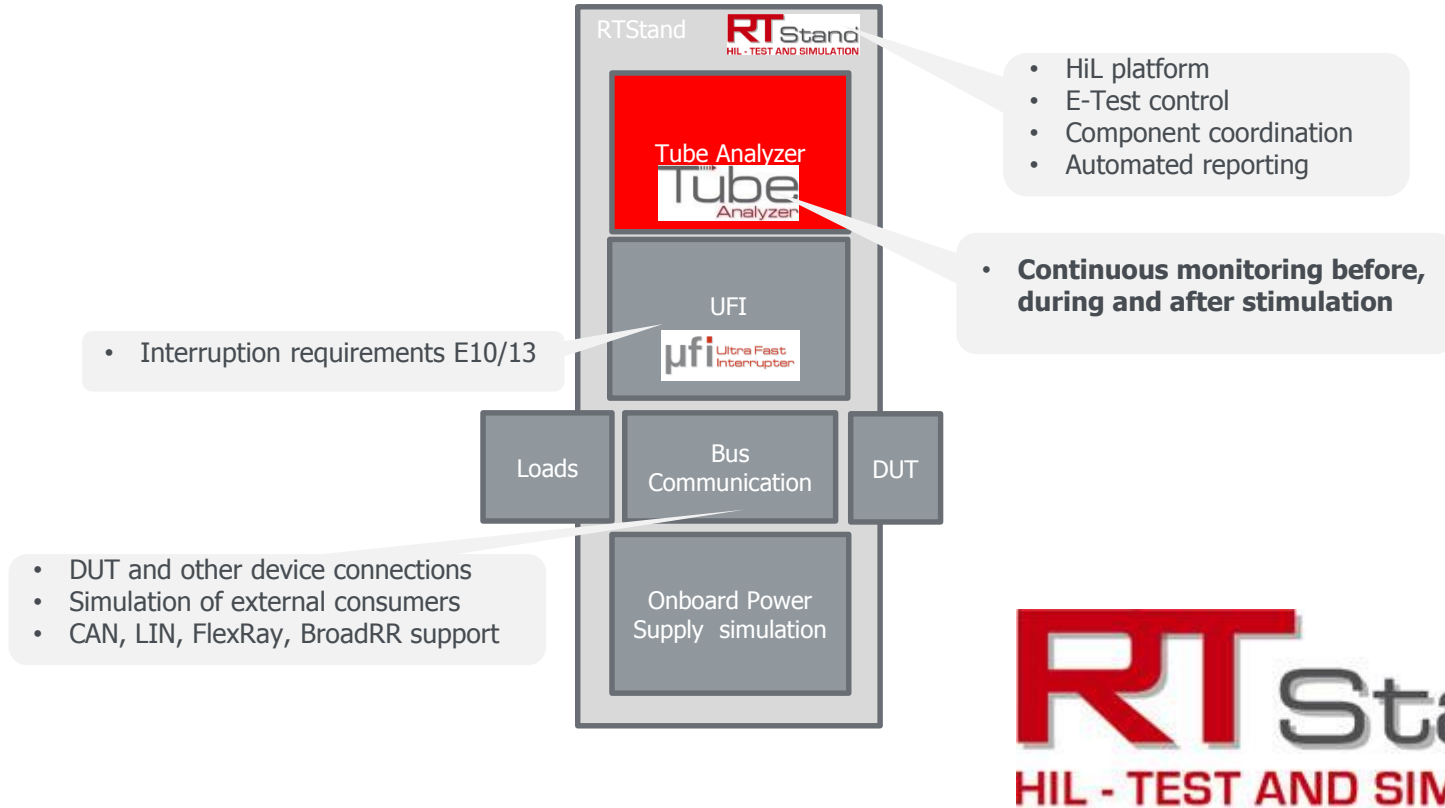
96 configurable analog  
and PWM channels and  
digital triggering



**COMING SOON!**

?

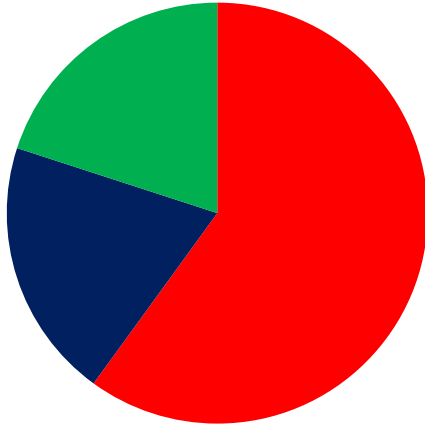
# Fully-automated testing system for LV 124 / LV 148



# Benefits

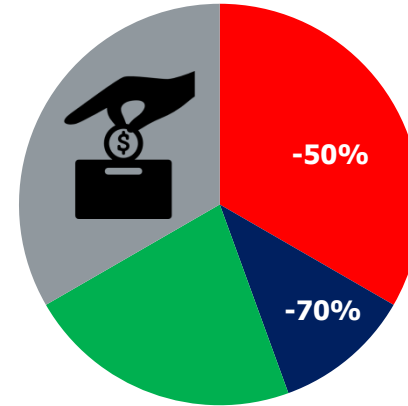
## Usual approach

Testing times



## Tube Analyzer approach

Testing times



- Test analysis
- Test execution
- Test preparation



Reliable testing 24/7



Reproducible test environment



Deeper test insights

# Use cases

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LV 124/LV 148  
Automotive Testing

Requires high-resolution measurements  
to detect disturbances  
on all I/O simultaneously

Sleep / WakeUp tests for ECUs

Bus (e.g. CAN) monitoring



Industrial Automation

Reduction of device and cable clutter

DMM / Oscilloscope replacement

HiL testing of ECUs

**What is YOUR use case?**

AND NOW  
IT'S  
*Show Time*



# Tube Analyzer – Hardware layouts

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8 analog channels  
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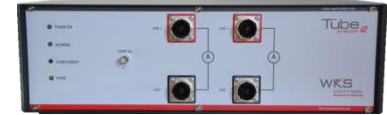
Tube Analyzer F24

20 analog, 4 PWM  
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Tube Analyzer F96

96 configurable analog  
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digital triggering



Tube Analyzer I2

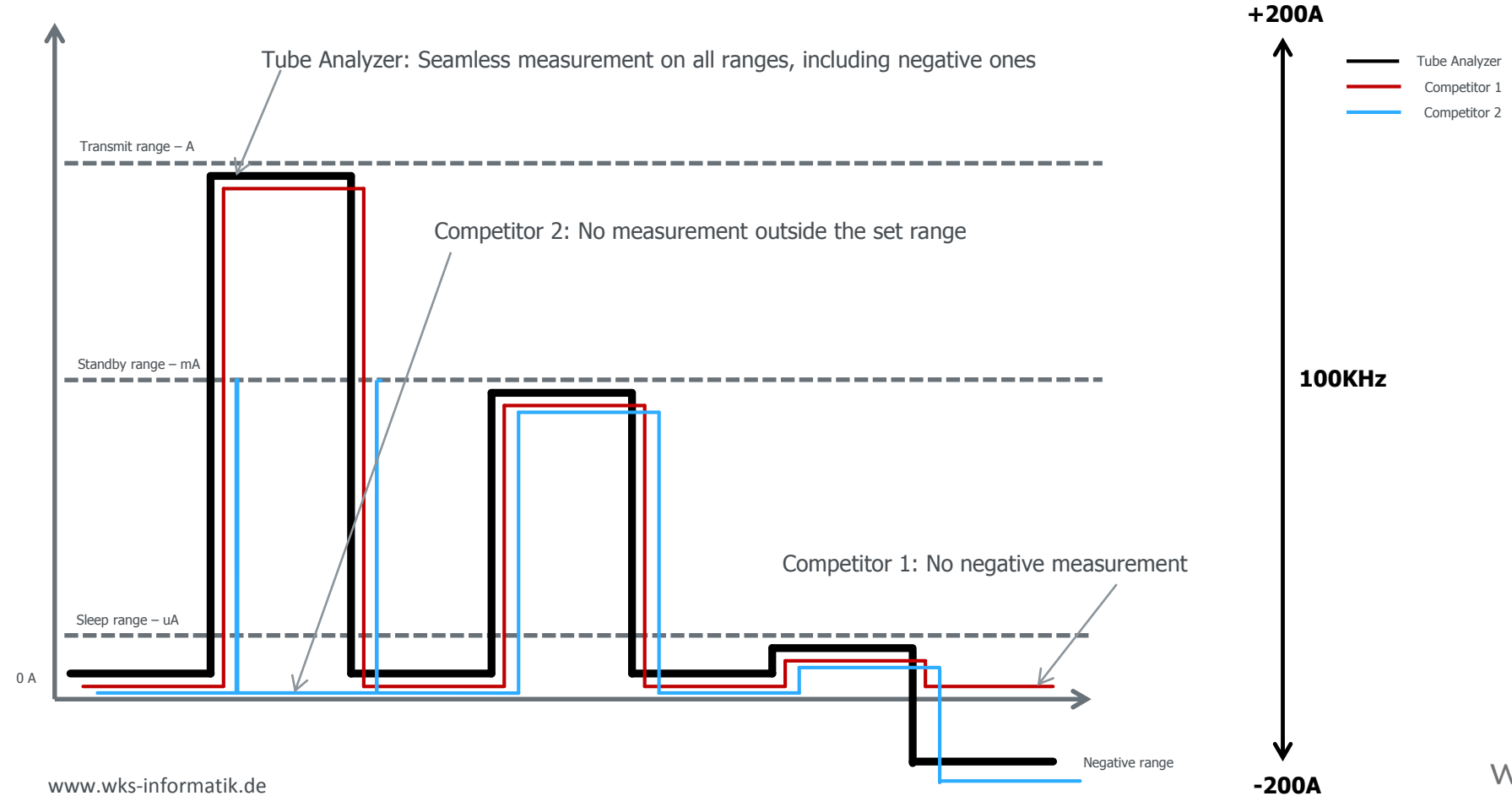
2 current channels

# Tube Analyzer I2

- 2 current channels
- Measurement range: **+/- 200A**
- Parallel measurement and analysis with **100KHz**
- Range switching without interruption in sampling (**seamless measurement**)
- All other native Tube Analyzer features



# Tube Analyzer I2 vs. competition





# Want to learn more?

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## Our websites:

[www.wks-informatik.de](http://www.wks-informatik.de)

[www.rtstand.com](http://www.rtstand.com)

[www.tube-analyzer.com](http://www.tube-analyzer.com)

## Our social channels:



<https://www.linkedin.com/company/wks-informatik-gmbh>

<https://www.youtube.com/user/WKSinformatikTV>

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