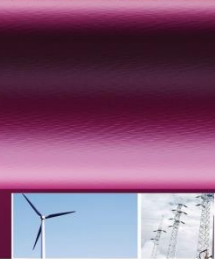
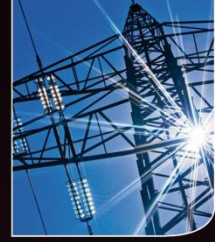


W E L C O M E T O KoCoS

SHERLOG / EPPE

Fault Recording and
Power Quality Measuring Systems

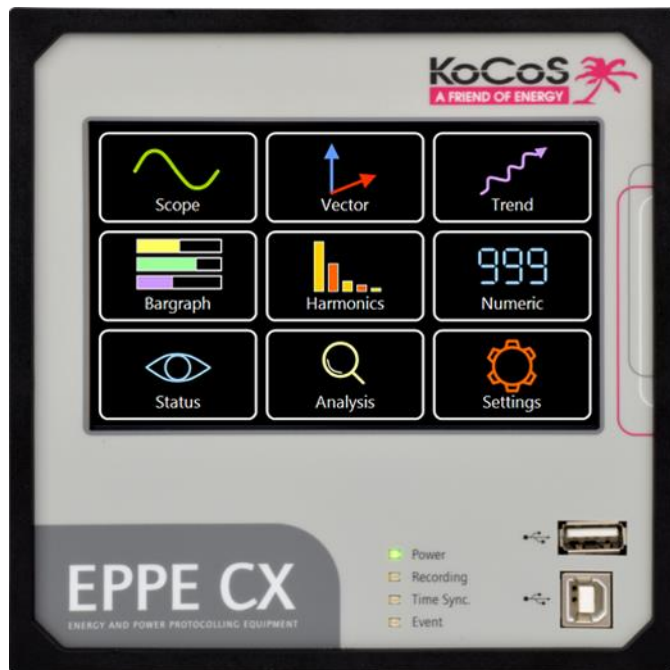




Scope of application

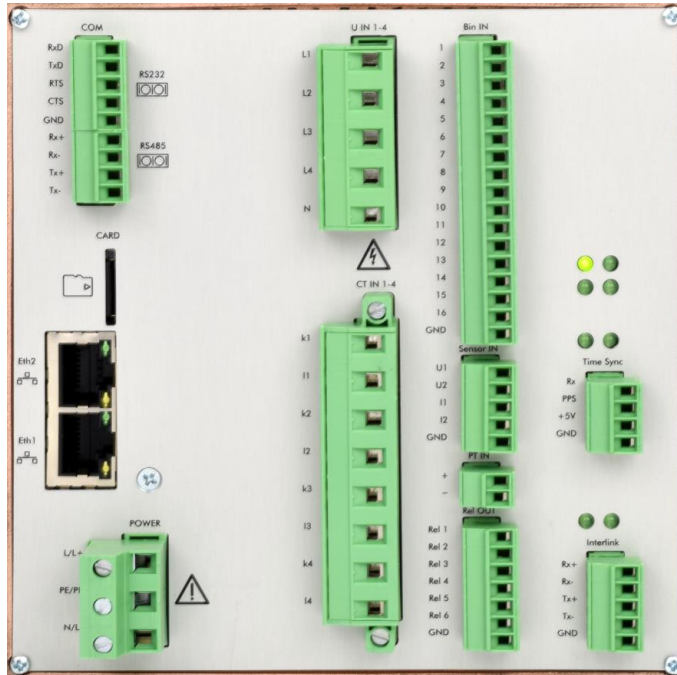
- Digital fault recording
- Fault location
- Disturbance recording
- Continuous recording
- Power quality monitoring
- Event recording
- Synchrophasor measurement
- Sequence of event recording
- Real-time monitoring

EPPE CX



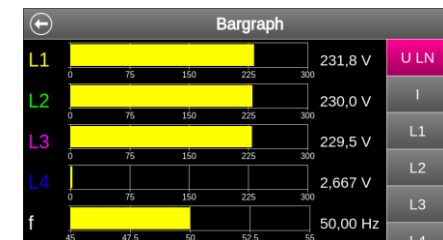
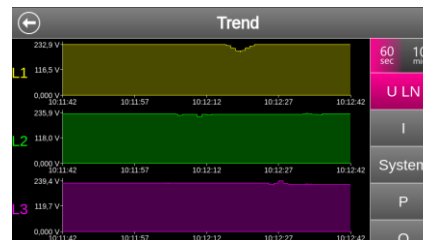
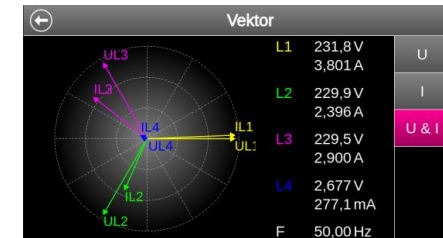
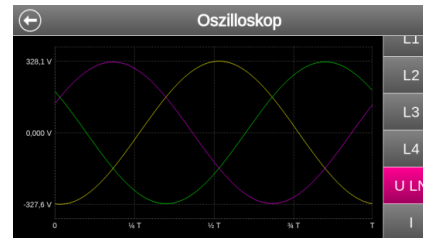
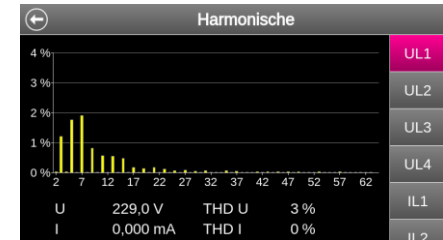
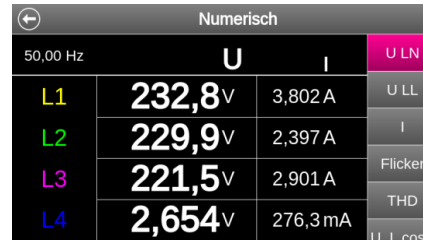
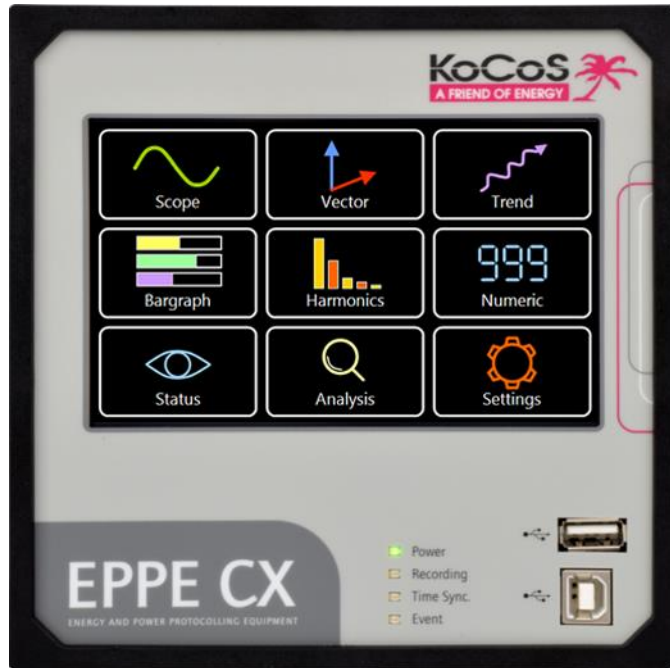
- PQ measurement to EN 50160
- Residual current monitoring
- Professional fault recorder
- Energy meter and power analyser
- Trend and long-term data logger
- Configuration and data download with USB flash drive
- Simultaneous data access by several users
- Replaceable measurement data memory (32 GB)

EPPE CX



- 4 voltage inputs
- 4 direct inputs for current measurement
- 5 sensor inputs for additional measurement transformers (differential current measurement, environmental data, etc.)
- 16 binary inputs, activation range configurable
- 6 switching outputs
- 2 x Ethernet, USB, RS232, RS485
- Replaceable measurement data memory (32 GB)

EPPE CX



SHERLOG CRX - Product range



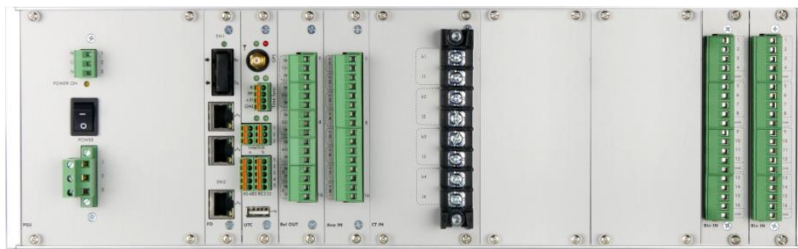
Standard devices:

- SHERLOG CRX 1232
- SHERLOG CRX 2032

Customizable device:

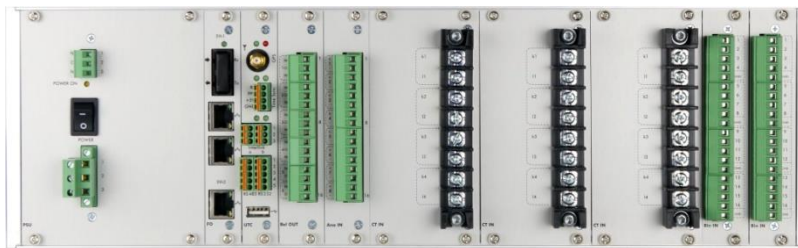
- SHERLOG CRX

SHERLOG CRX - Product range



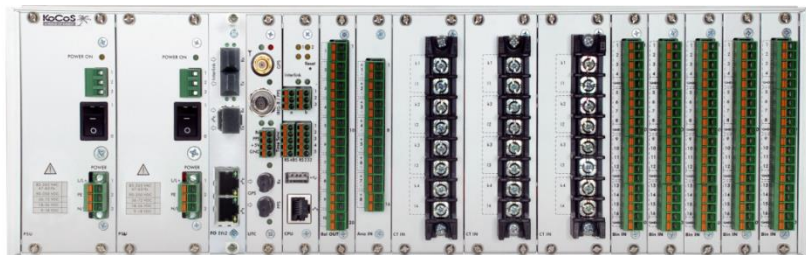
SHERLOG CRX 1232

- 8 voltage inputs
- 4 current inputs
- 32 digital inputs



SHERLOG CRX 2032

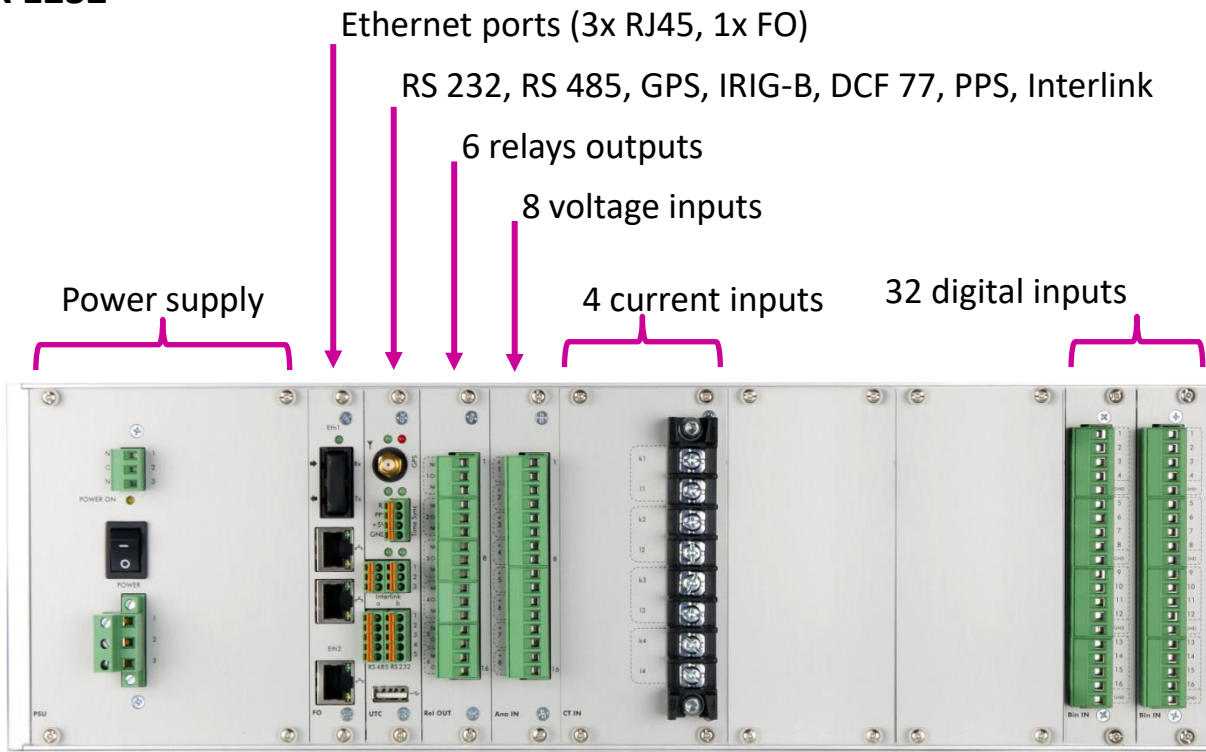
- 8 voltage inputs
- 12 current inputs
- 32 digital inputs



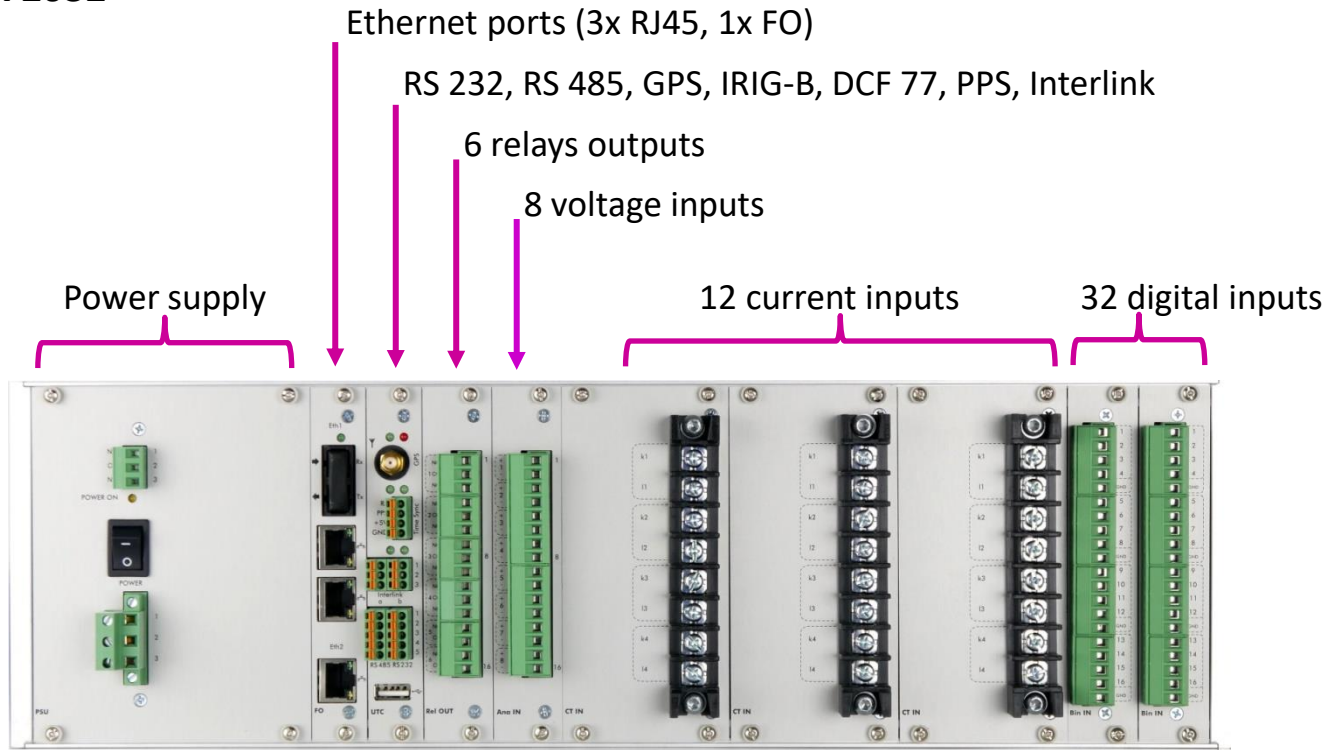
SHERLOG CRX

- Full modular design
- up to 32 analog inputs
- up to 128 digital inputs
- Redundant power supply available

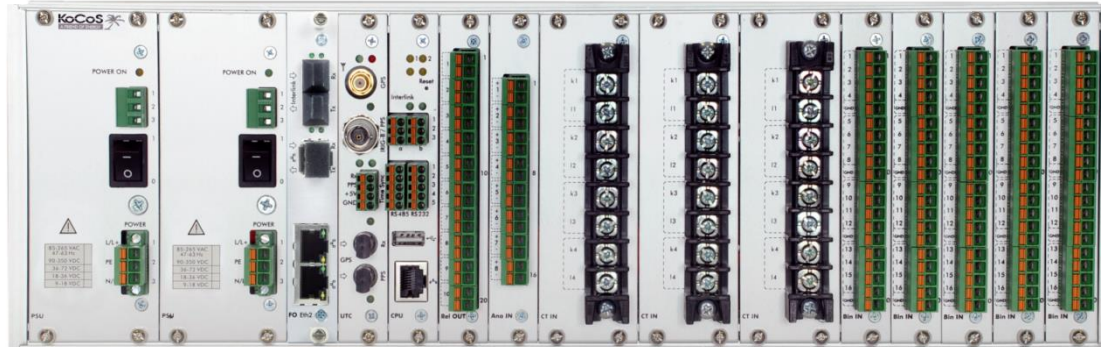
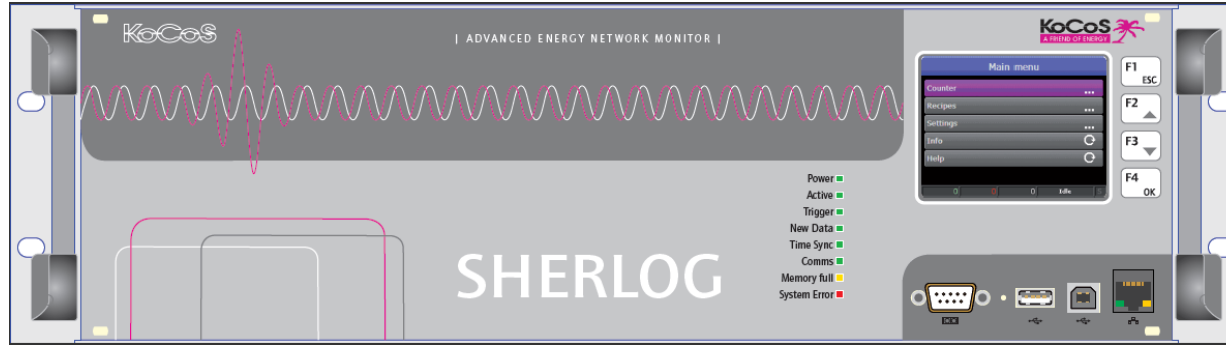
SHERLOG CRX 1232



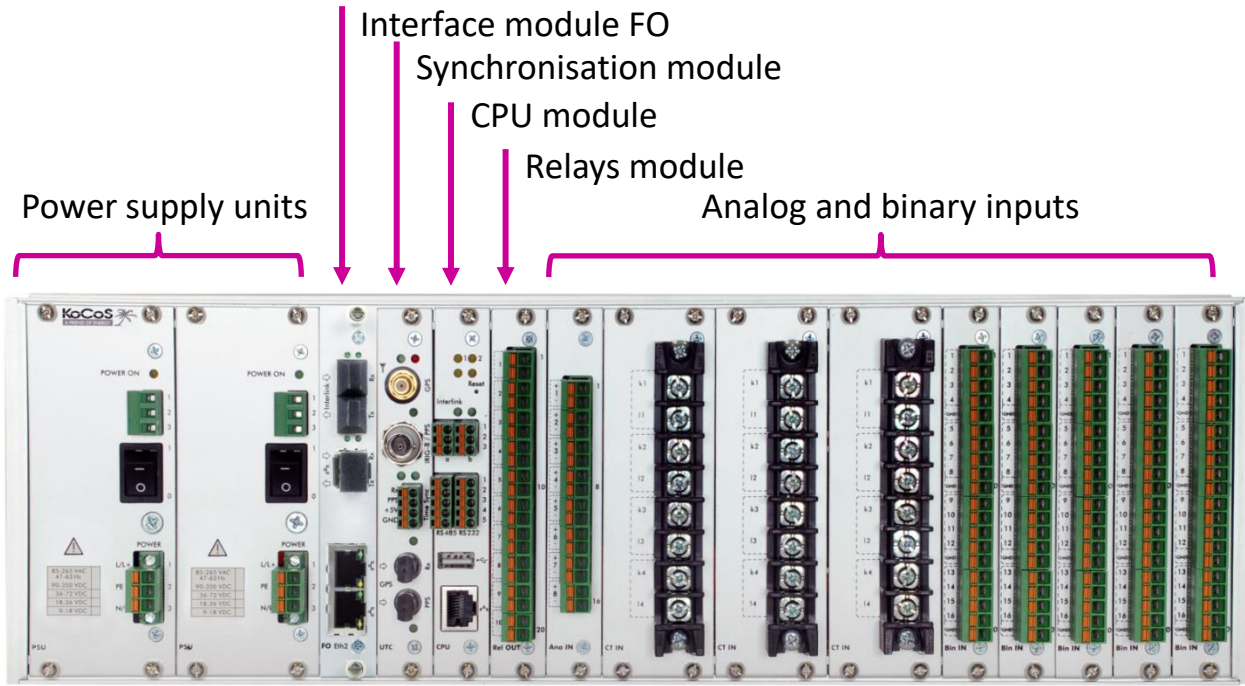
SHERLOG CRX 2032



SHERLOG CRX



SHERLOG CRX - Modular design



Power Supply Module:



Wide-range power supply unit

- (85-265 V 45-65 Hz / 90-350 VDC)

DC power supply units

- 9...18 VDC
- 18...36 VDC
- 36...72 VDC

Properties

- LED status display
- Potential-free monitoring contact
- E-mail alert in case of power failure
- Built-in, maintenance-free UPS
- Redundant operation with 2 independent power supply modules

CPU Module:



Function:

- DSP-processor for real-time signal processing
- NTP / SNTP time synchronisation
- Data communication

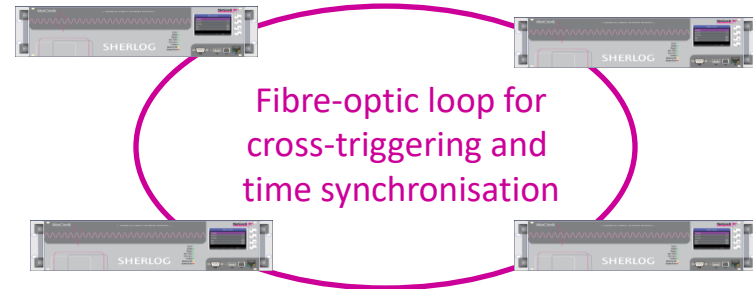
Interfaces

- Ethernet (RJ45)
- RS 232
- RS 485
- USB (Host)
- KoCoS-Interlink interface for networking a number of SHERLOG devices

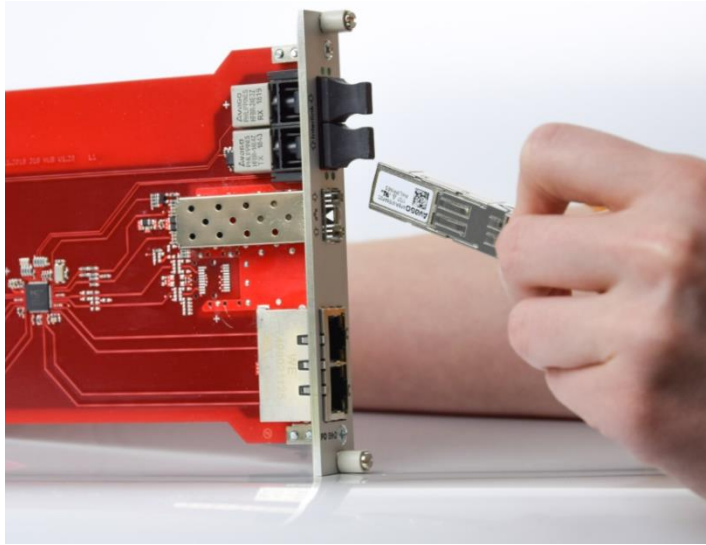
FO Interface Module:



- Second Ethernet port with 2x RJ45 + 1x FO (SFP)
- User selectable SFP port type (SC in standard)
- Optical KoCoS-Interlink port

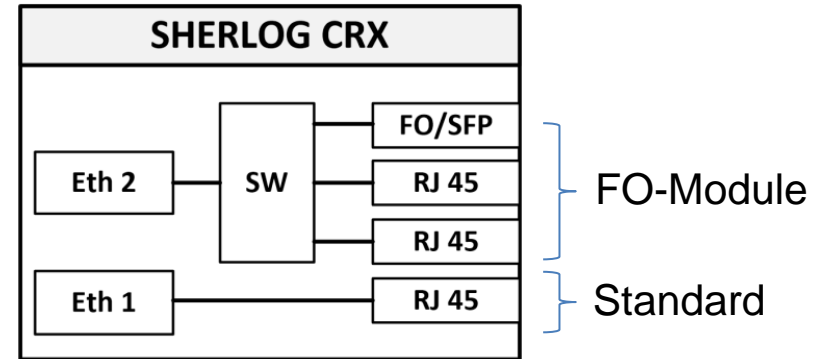


SFP Interface Module (small form-factor pluggable)



SFP-transceiver modules are available as:

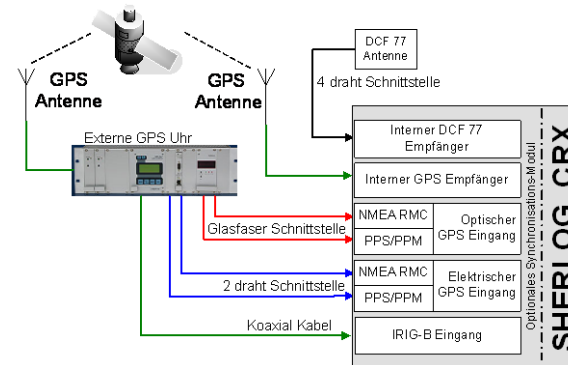
- Fiber-optic or electrical
- Multi-mode or mono-mode

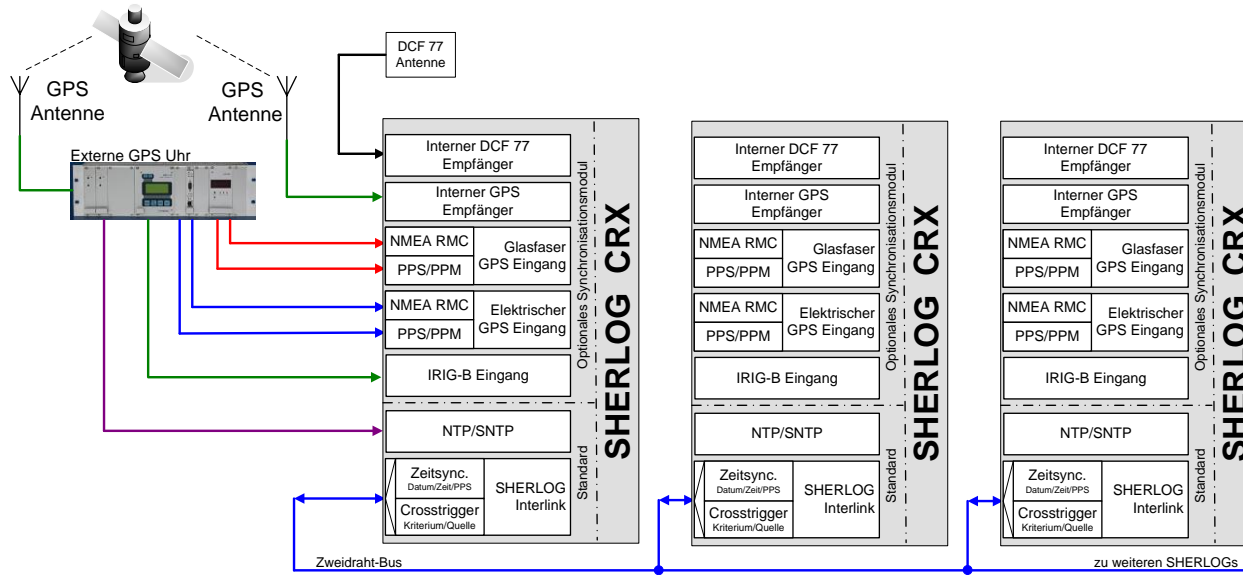


Time Synchronisation Module:



- Internal GPS receiver
- Optical and electrical input for external GPS clocks
- IRIG-B input
- DCF-77 input
- Seconds pulse input (pps)





Relay Module:

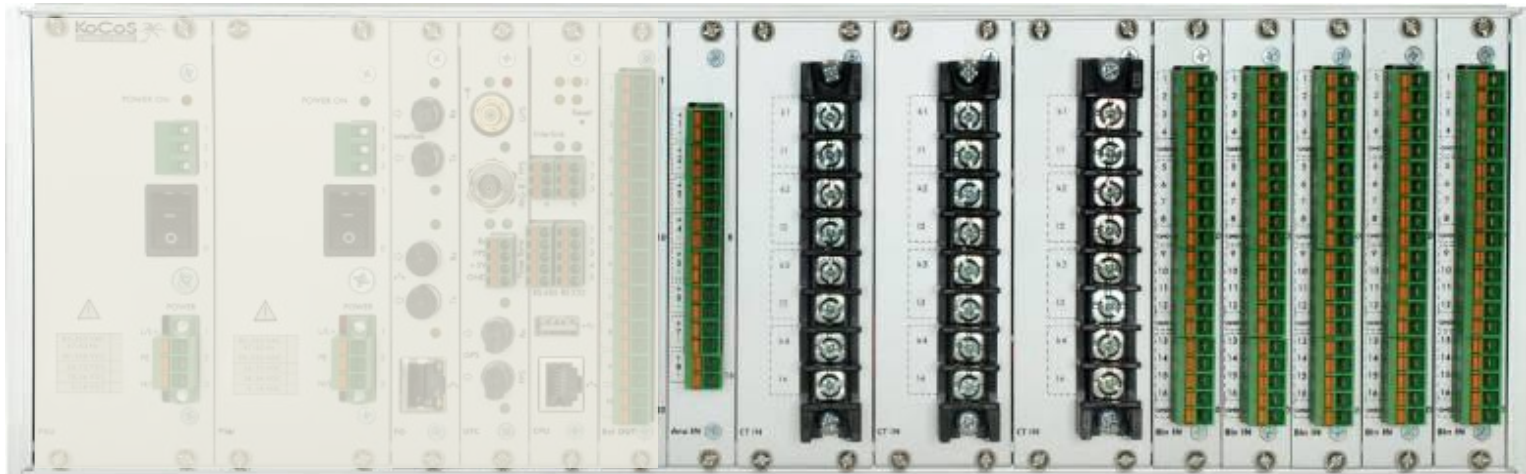


For output and indication of alarm and status signals

- 8 potential-free relay contacts
- 2 electronic relay outputs
- NC/NO configurable
- Configurable functions
- Switching capacity up to 300 V / 8 A / 50 W

Process Inputs:

12 available slots for
analog and binary inputs



Analog Input Module Type 1



8-channel universal module

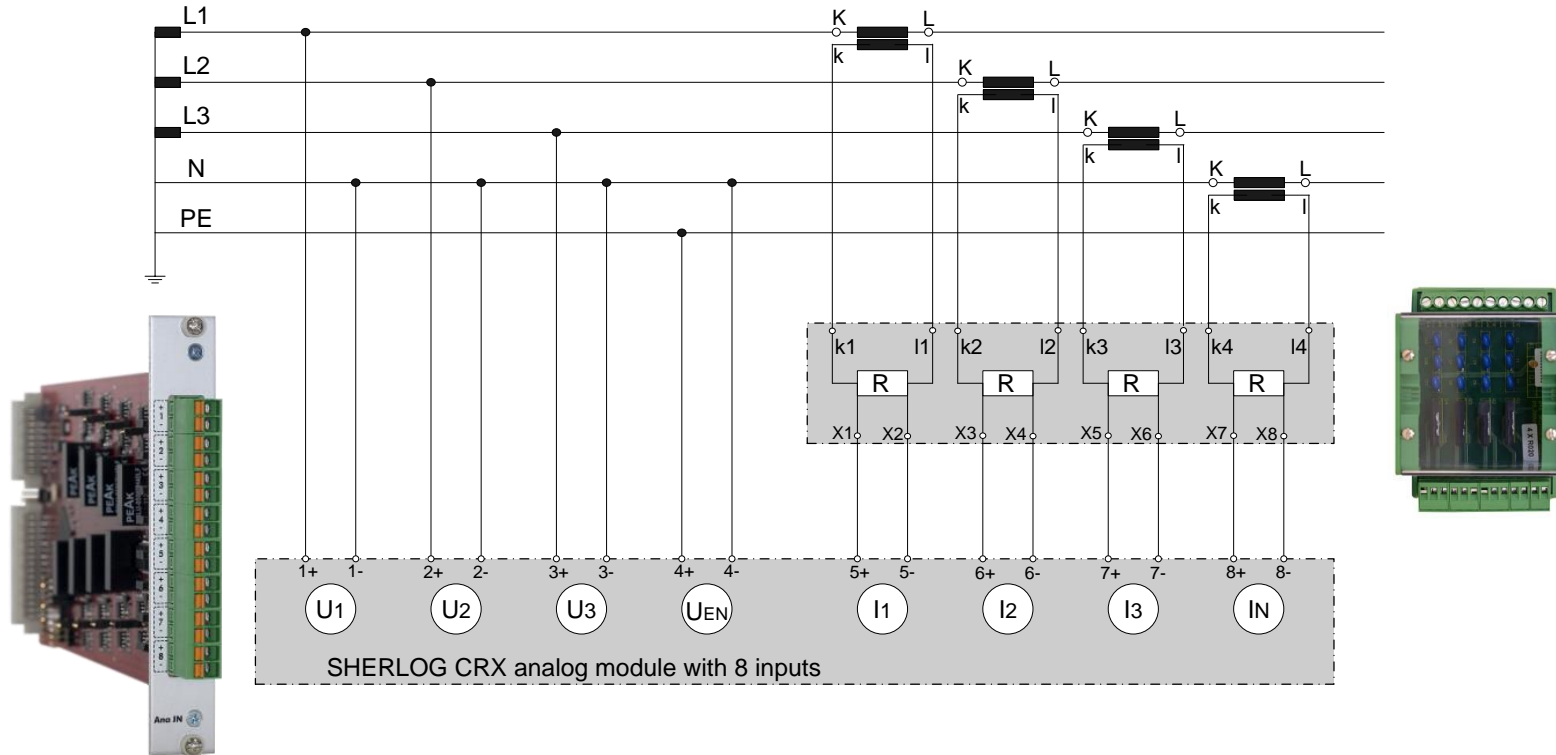
- 8 galvanically isolated analog inputs
- 4 selectable measuring ranges per input

Measuring ranges:

- 300 V
- 700 mV
- 200 mV
- 20 / 100 mA measuring adapters available



Analog Input Module Type 1 – Wiring example



Analog Input Module Type 2



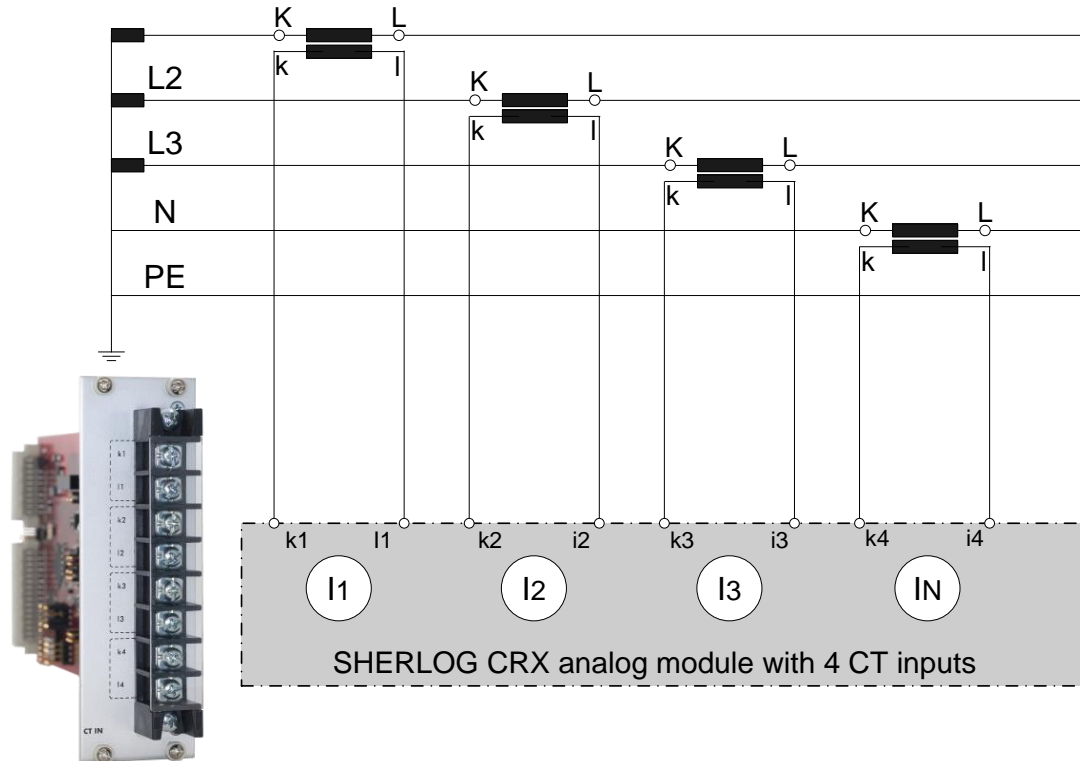
4-channel current module

- 4 high-current inputs
- 3 selectable measuring ranges per input

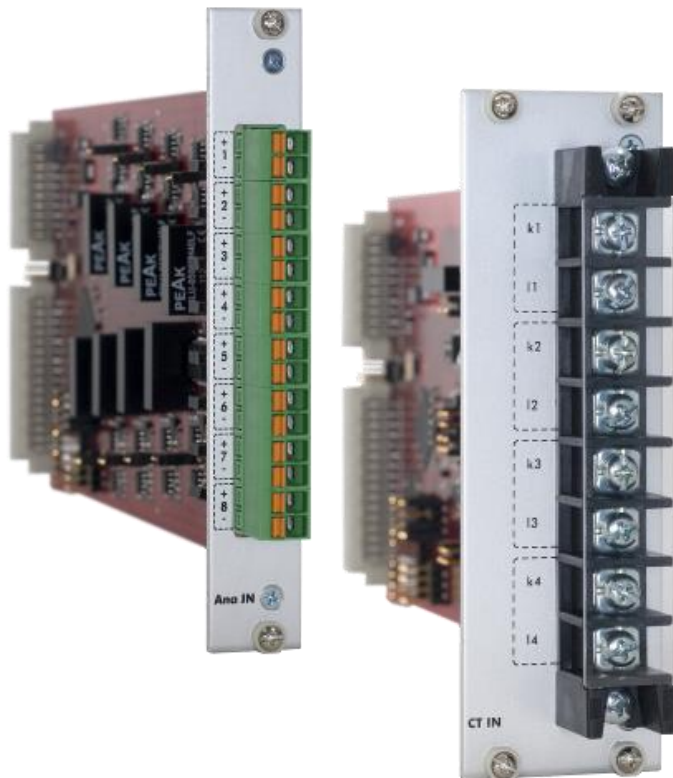
Measuring ranges:

- 10 A
- 40 A
- 200 A

Analog Input Module Type 2 – Wiring example



Analog Modules



Features

- A/D converter and calibration data on board
 - Digital signal output
 - Modules can be replaced without calibration
- Selectable measuring ranges
 - Configurable on site
 - Simple stock and spare parts management
- 200 kHz sampling frequency per channel
- High-quality components for high measurement accuracy and temperature stability
- Recommended calibration cycle: 5 years

Binary Input Module






For acquisition of protection commands, switching status and status signals

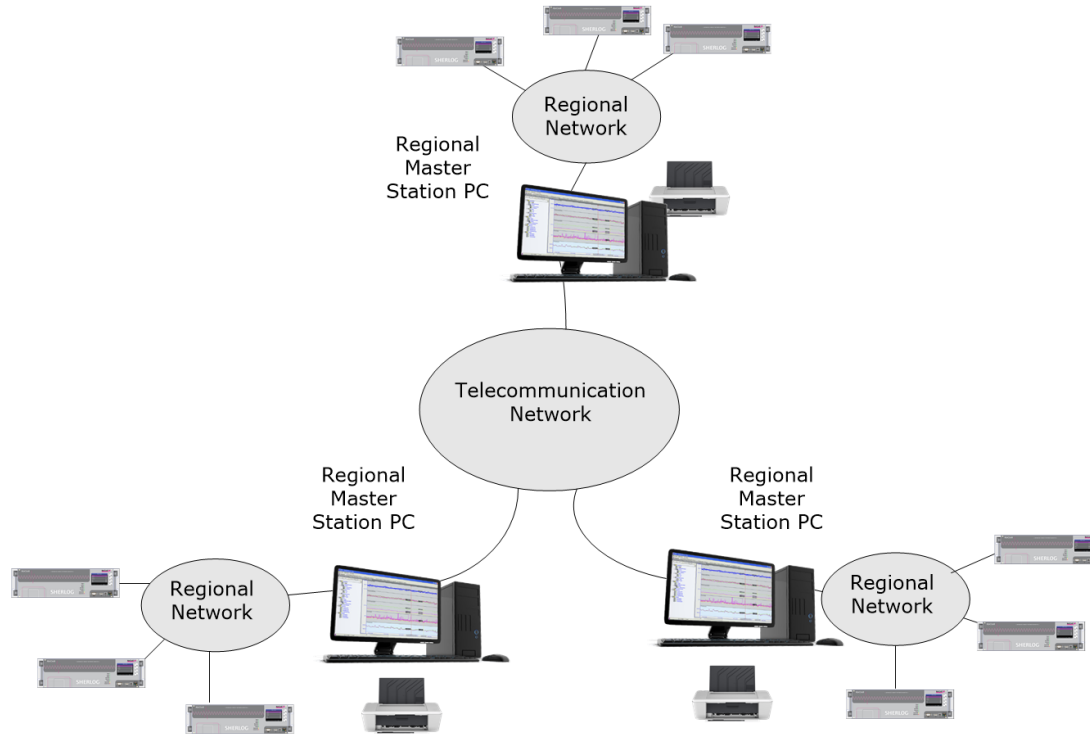
- 16 binary inputs per module
- Max. 128 binary inputs per device
- Activation range from 24 V to 300 V
- Resolution 0.1 ms
- Groups of 4 inputs with a common reference point (GND)

Examples of configuration

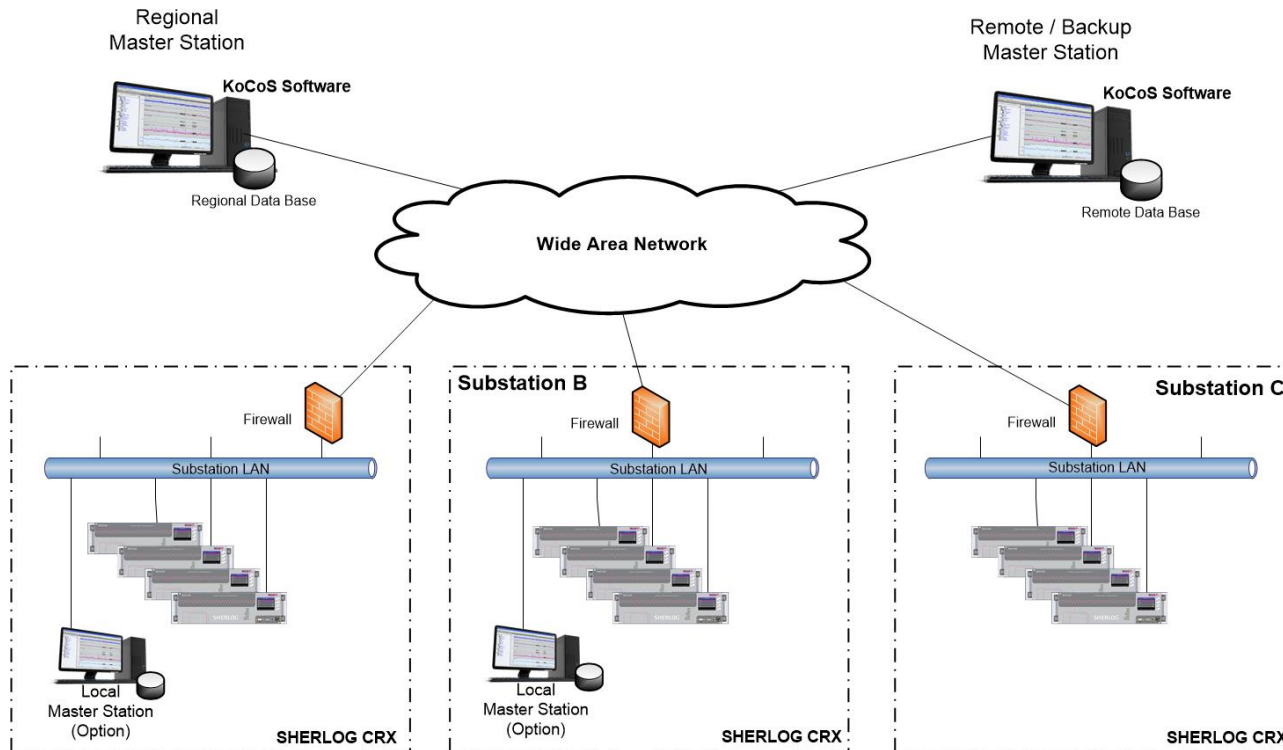
	4	8	12	16	20	24	28	32	36	40	44	48	52	56	60	64	68	72	76	80	84	
Main Power Supply										1..8				16								
Redundant Power Supply																						
F/O Interface Module																						
Timesync Module																						
Main CPU																						
Relay Out																						
Main Power Supply										1..8	9..16	17..24	25..32	16	32	48	64	80	96	112	128	
Main Power Supply										1..8	1..4						16					
Main Power Supply										1..8	1..4	15..8				16	32	48	64			
Main Power Supply										1..8	1..4	15..8	19..12		16	32	48	64	80			
Main Power Supply										1..8	9..16	1..4	1..4	19..12	13..16		16	32				

-  Voltage and low signal inputs
-  High current inputs
-  Binary inputs

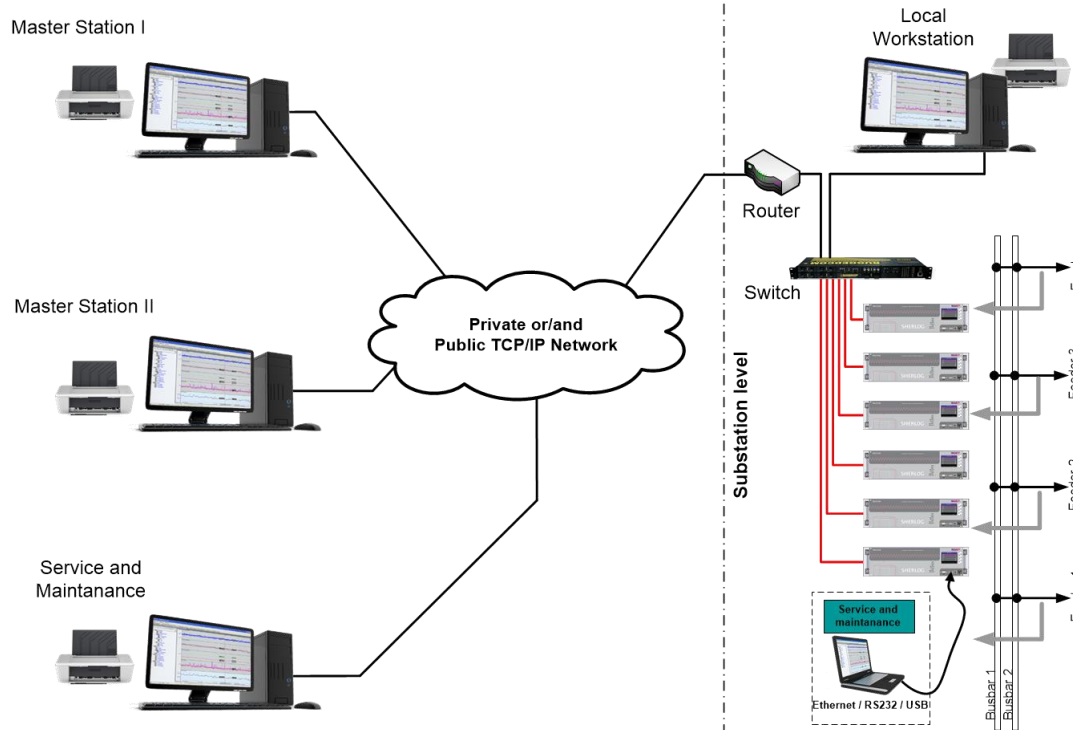
Communication Topology – Different regions



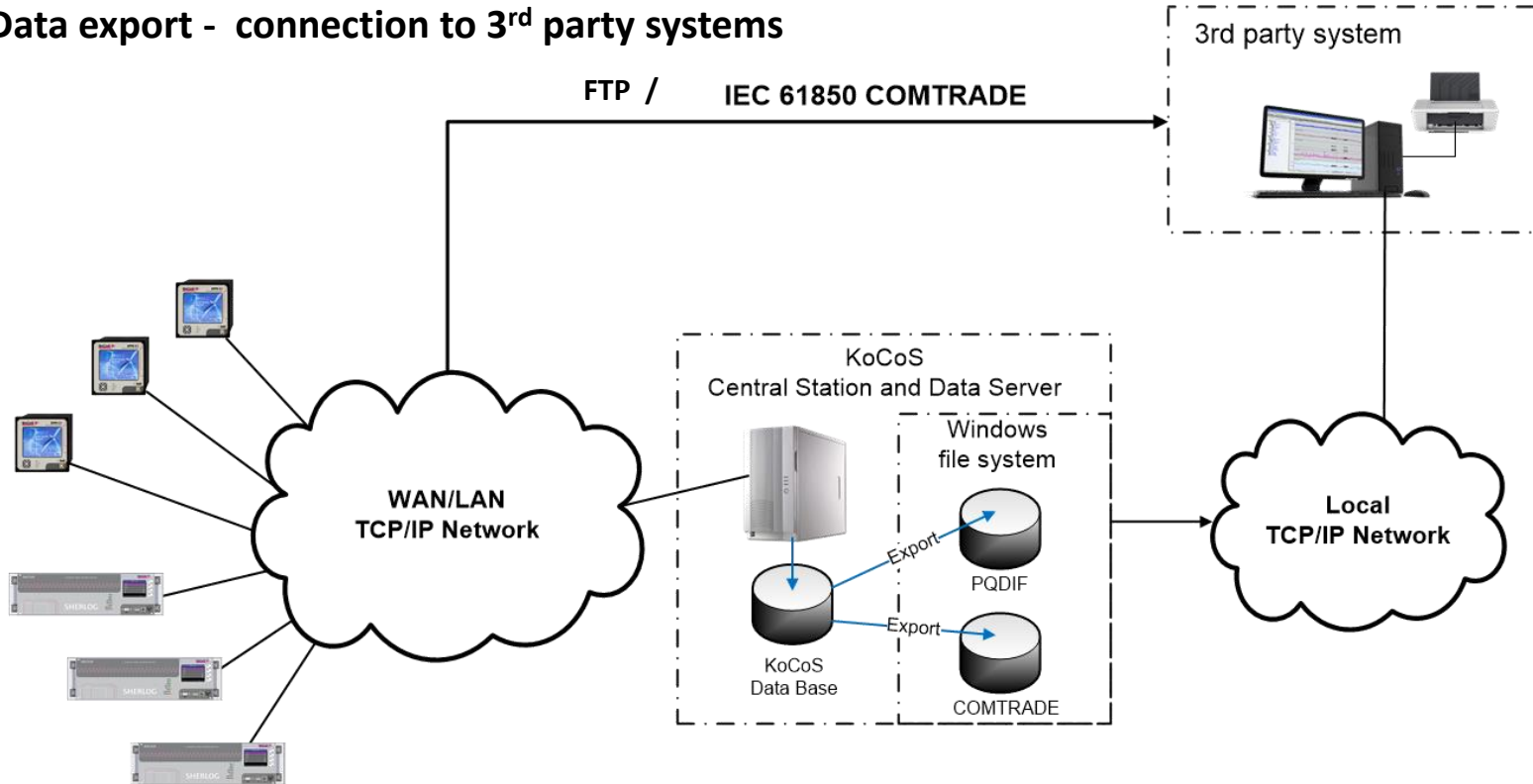
Communication Topology – Local and remote access



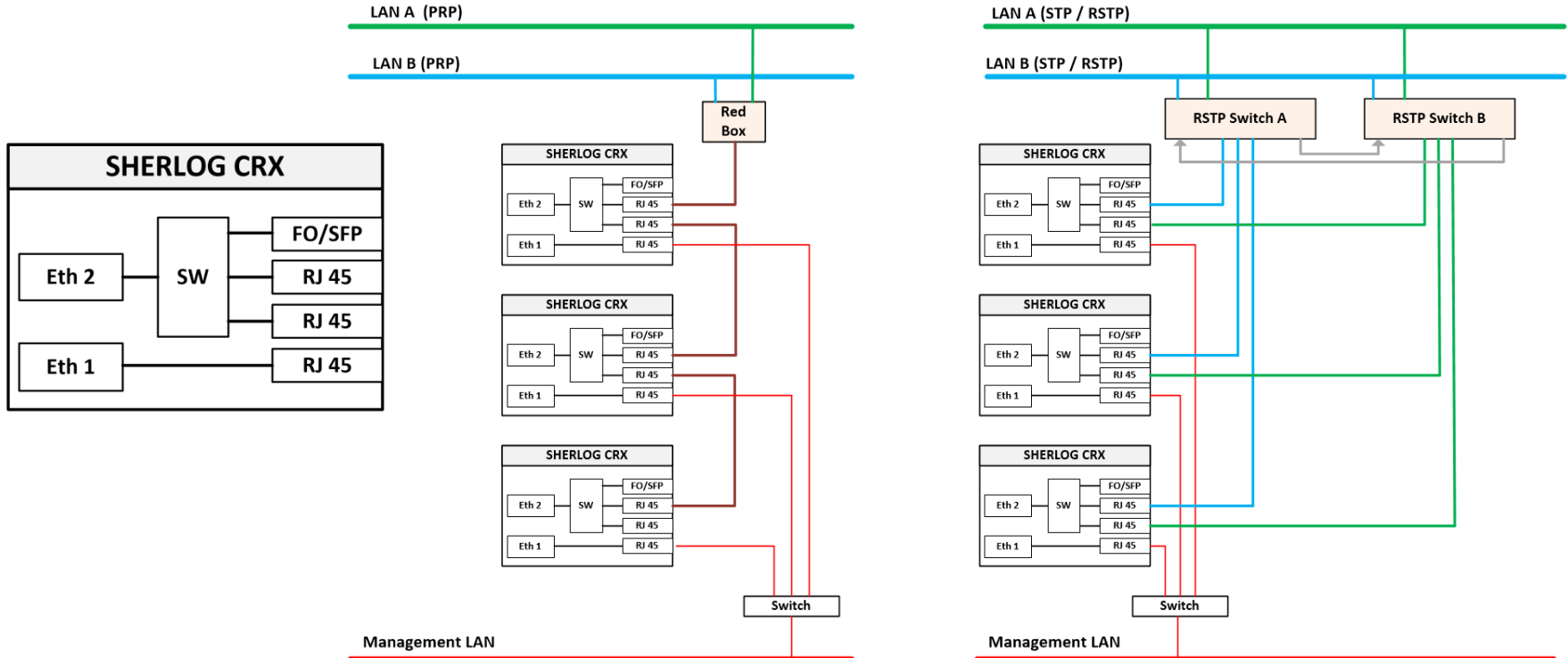
Data link – Parallel access from different locations



Data export - connection to 3rd party systems



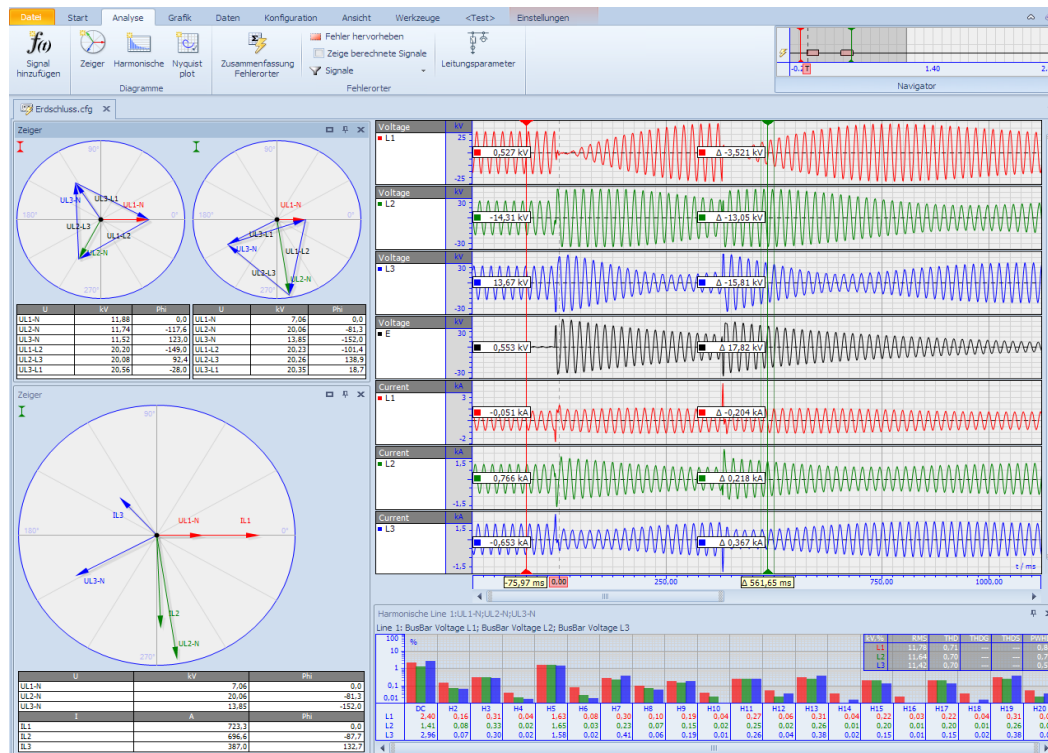
Redundant Network Architecture



Recording examples:



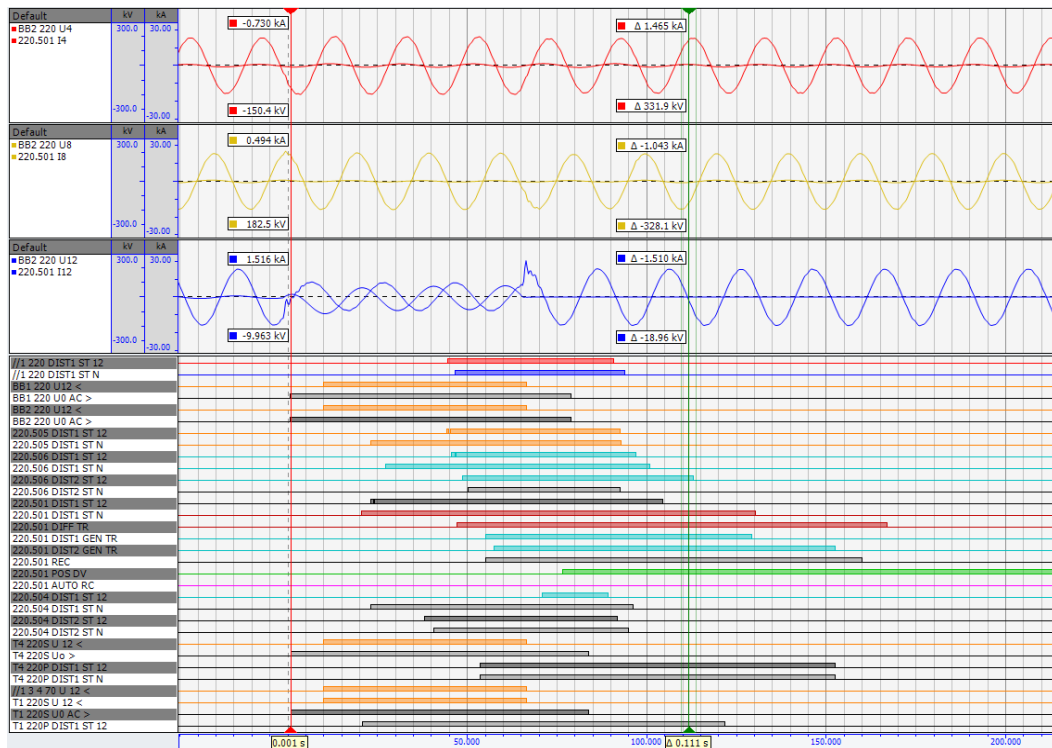
Transient Fault recording:



Evaluation

- Graphical view of the fault characteristic
- Vector analysis
- Harmonic analysis
- Superimposing of multiple records
- Formula editor for mathematical signal analysis
- Typification of power system faults
- Generation of fault reports
- Data export for third-party systems

Transient Fault recording:



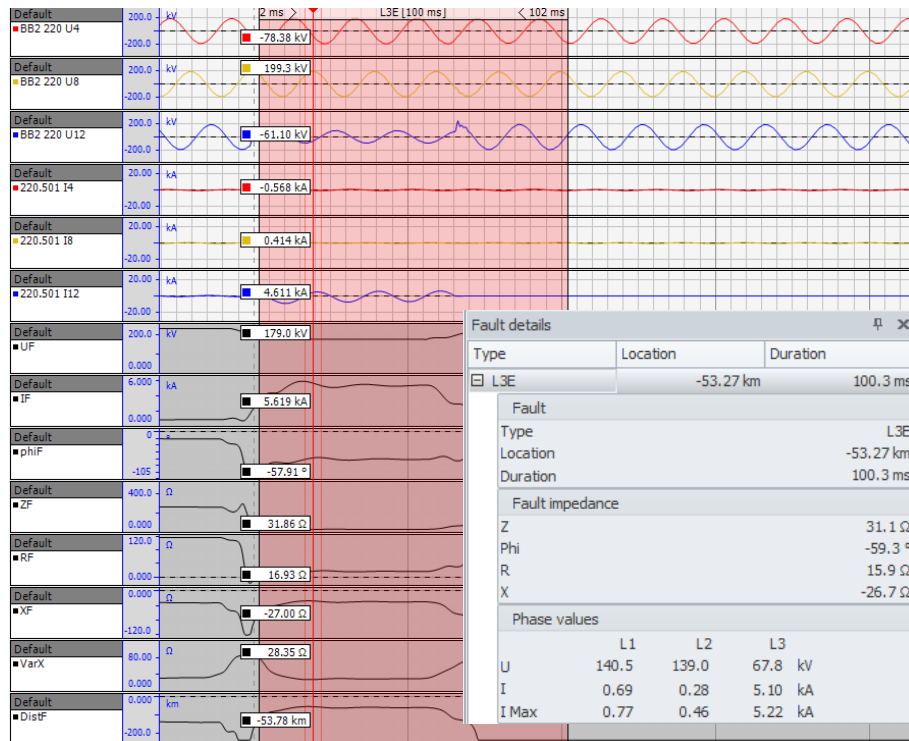
Evaluation

- Detailed sequence analysis of relay operation and breaker status

Binary event summary

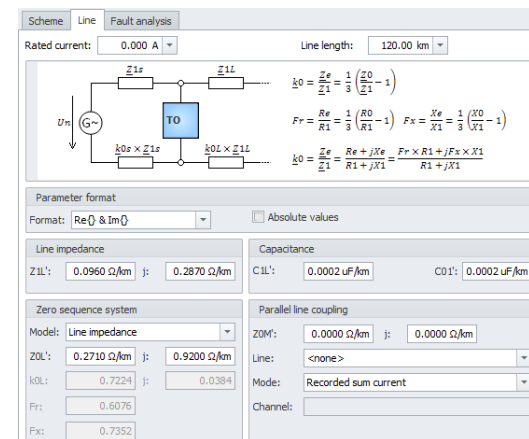
Channel No / Signal description	First change	Last change	No of changes
14 - //I 220 DIST1 ST 12	44.67 ms	91.00 ms	2
15 - //I 220 DIST1 ST N	46.67 ms	94.00 ms	2
25 - BB1 220 U12 <	10.00 ms	66.67 ms	2
26 - BB1 220 U12 AC >	.67 ms	79.00 ms	2
32 - BB2 220 U12 <	10.00 ms	66.67 ms	2
34 - BB2 220 U12 AC >	.67 ms	79.00 ms	2
45 - 220.505 DIST1 ST 12	44.33 ms	92.67 ms	4
46 - 220.505 DIST1 ST N	23.33 ms	93.00 ms	2
60 - 220.506 DIST1 ST 12	45.67 ms	97.00 ms	4
61 - 220.506 DIST1 ST N	27.33 ms	101.00 ms	2
64 - 220.506 DIST2 ST 12	48.67 ms	113.00 ms	2
65 - 220.506 DIST2 ST N	50.33 ms	92.67 ms	2
74 - 220.501 DIST1 ST 12	23.33 ms	104.67 ms	4
75 - 220.501 DIST1 ST N	20.67 ms	130.33 ms	2
76 - 220.501 DIFF TR	47.33 ms	167.00 ms	2
80 - 220.501 DIST1 GEN TR	55.33 ms	129.33 ms	2
81 - 220.501 DIST2 GEN TR	57.67 ms	152.67 ms	2
82 - 220.501 REC	55.33 ms	160.00 ms	2
84 - 220.501 POS DV	76.67 ms	1192.00 ms	2
85 - 220.501 AUTO RC	1066.00 ms	1066.00 ms	1
88 - 220.504 DIST1 ST 12	71.00 ms	89.33 ms	2

Transient Fault recording:

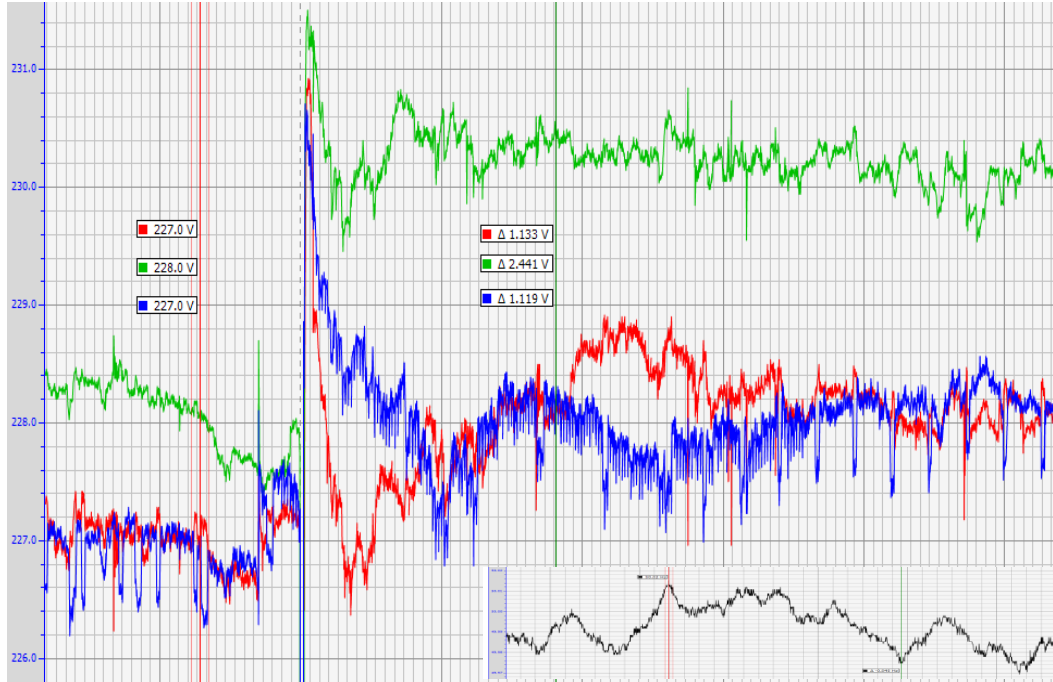


Evaluation

- Fault impedance and duration
- Maximum values
- Distance to fault

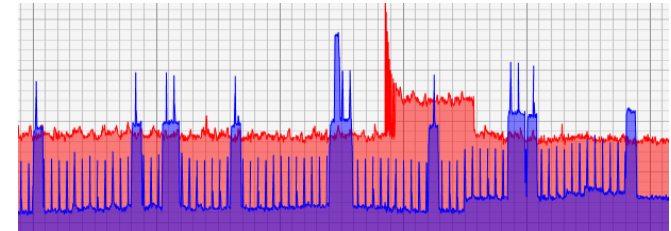


RMS- Fault / Disturbance recording:

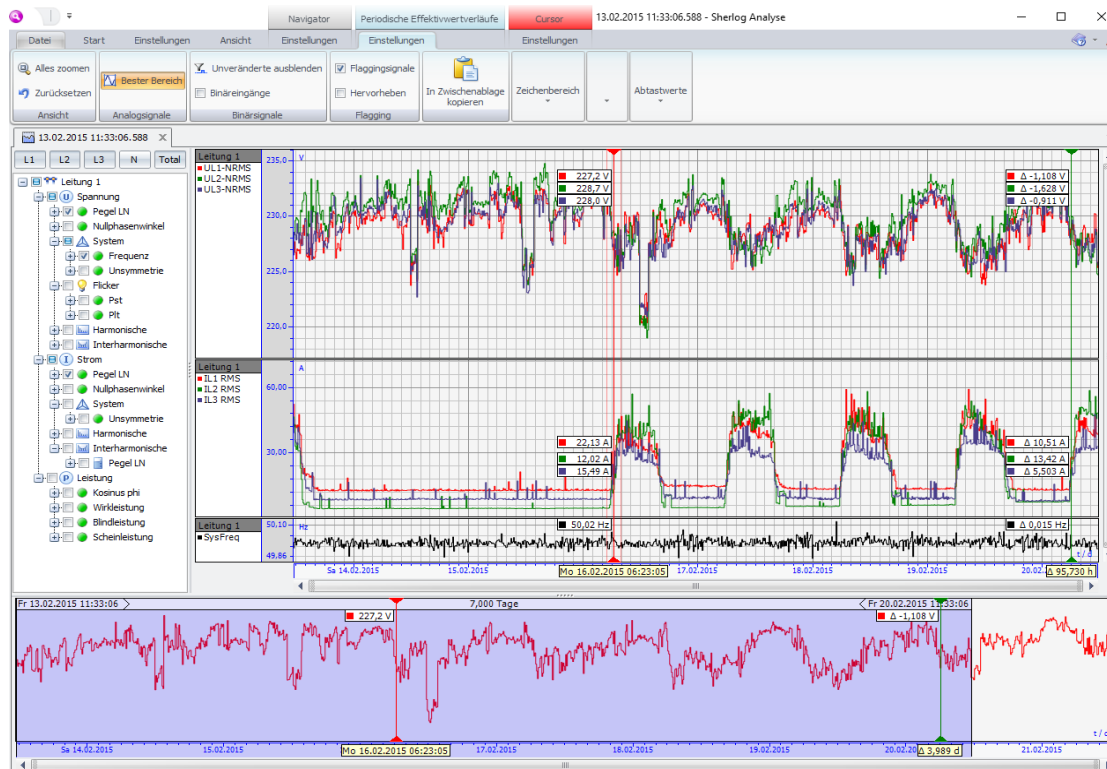


Evaluation

- Triggered RMS event record
- Half cycle RMS-resolution ($RMS_{1/2}$)
- 5 Minutes Pre- and 30 Minutes Post-Fault
- Frequency and Power swing analysis
- Harmonic analysis
- Data export for third-party systems



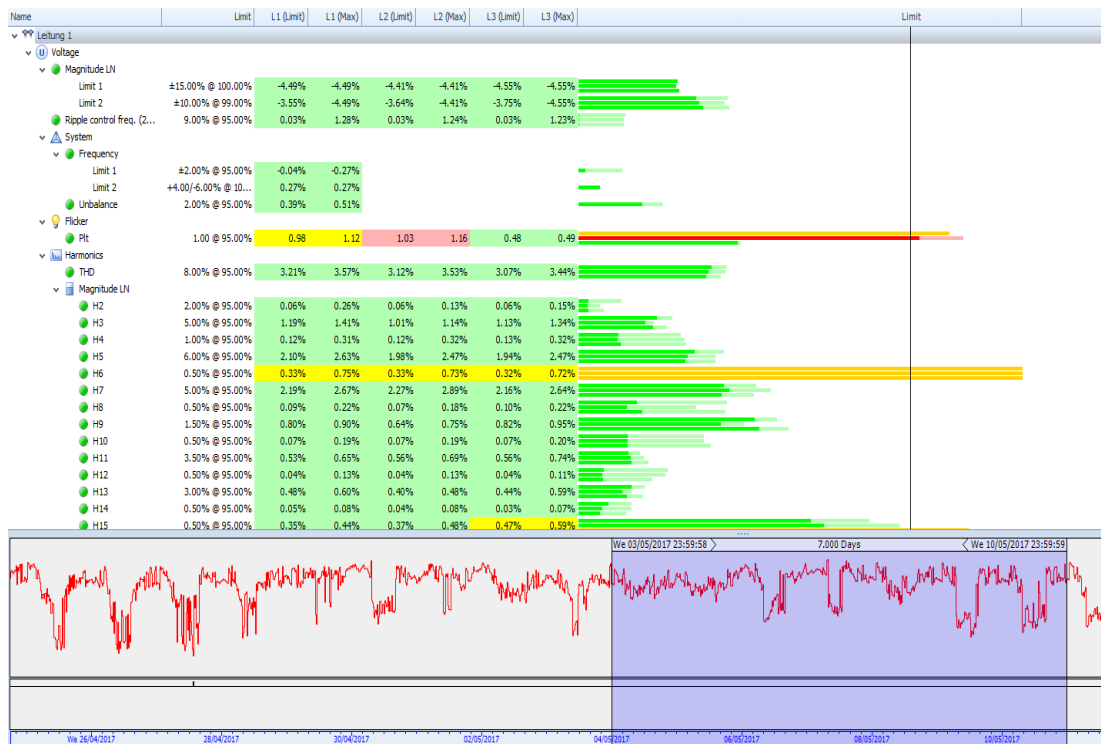
Continuous recording:



Evaluation

- Trend analysis
- Display and superimposition of any measurement quantities
- Frequency distribution of positive and negative deviations
- Automatic creation of PQ reports (e.g. to EN50160)
- Data export for third-party systems (PQDIF, Comtrade, CSV)

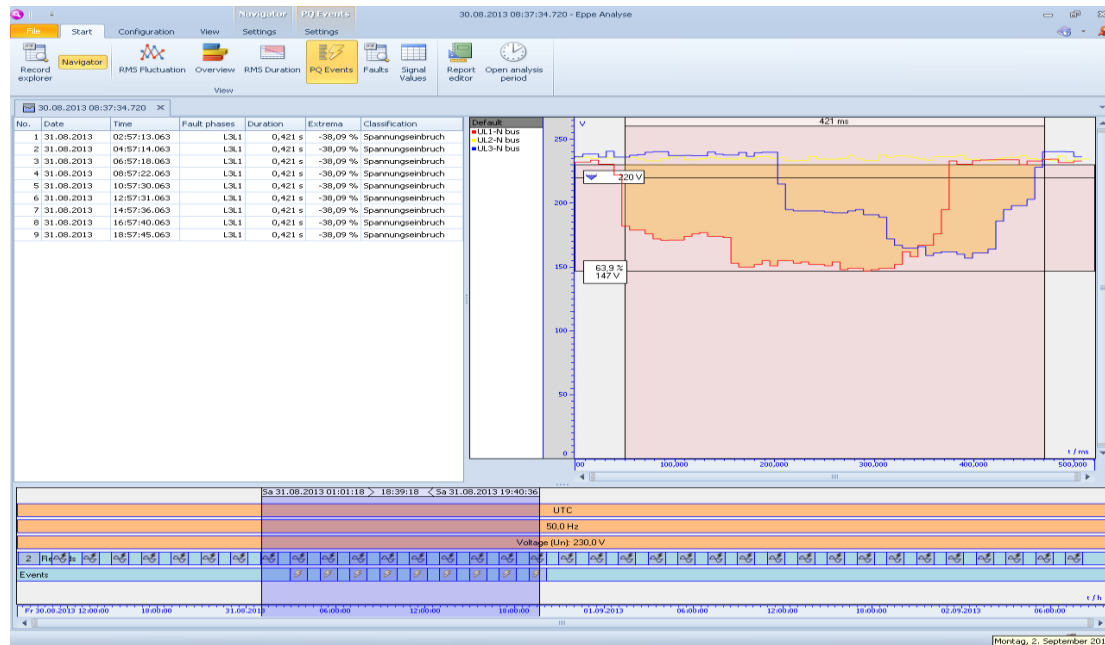
Statistical PQ Analysis:



Evaluation

- Limit value overview
- Automatic evaluation in accordance with standard (e.g. EN 50160)
- Table and graphical overview of limit value violations
- Navigator for a better overview and selection of evaluation period

PQ Event Analysis:



Evaluation

- Event analysis with signature representation
- Event classification
- Graphical analysis tools
- Navigator for a better overview and choice of the time window

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