SICAM PQ Analyzer – Functions

The archived PQ measured data and grid faults are evaluated in the different views of the SICAM PQ Analyzer.

• Incident Explorer

The Incident Explorer allows a time-related analysis and provides a topological or configuration view of:

- Fault events
- Fault records
- Slow-scan records
- Fault location reports
- Transient records
- PQ Violation reports (is generated as soon as a PQ violation against Grid Code happens)
- PDR records (Post Disturbance Review)
- SIPROTEC fault records (high-resolution fault record generated from a 7KE85 device)
- SIPROTEC slow-scan records (slow-scan records generated from a 7KE85 device)

Furthermore, you can export individual fault records. You can reduce the amount of data and select a COMTRADE export format.

• Fault Event Viewer

The Fault Event Viewer is used to visualize a fault event, all the associated fault records, and all the related events for the fault event. A graphical representation of the timeline and trigger information of all the associated fault records enables a better fault event analysis.

Event Viewer

The Event Viewer visualizes the information points that are mapped in SICAM PAS/PQS UI – Configuration. The events are mostly process events that provides an overview of the status of the energy transmission or distribution system. The Event Viewer, therefore, ensures a better system fault analysis.

• PQ Explorer

The PQ Explorer gives access to all PQ data stored in the archive.

It provides a topological view of the measuring points of your station.

The measured and calculated PQ data are evaluated by means of PQ diagrams.

Furthermore, you can create reports of the analysis and preview the reports.

PQ Inspector

The PQ Inspector shows the grid condition over a selectable time range based on the calculated PQ Index.

It selectively provides a status overview of measured value groups which can be arbitrarily combined, as well as user guidance for the creation of PQ reports.

Report Browser

The Report Browser gives an overview of the scheduled reports, which are generated automatically at defined intervals (daily, weekly, monthly, and yearly).

Grid Code Viewer

The Grid Code Viewer displays the Grid Codes defined in SICAM PQS. The Grid Codes contain standardized or customerspecific limiting values for evaluating the grid quality. The PQ Index is determined on the basis of a comparison between the measured values and the limiting values of a Grid Code.

Fields of Application

Incident Explorer

The topological structure of the archive data corresponds to the structure that was defined when the SICAM PAS/PQS station was configured.

The Incident Explorer serves for the following tasks:

- Reading the events (confirm)
- Calling up the analysis programs
- Deleting the events from the archive summary
- Manual fault location

Various filter functions are available for selection of events in the power network

- Selecting the time range in the archive
- Filtering for events
- Commenting events

	cident Explorer PQ Inspec	tor	PC	Explorer	Re	port Browser		Grid Code	Viewer						
		Time	range												
	Region								Franc 01/0	1/2012 🚖 00:0	.00 🚖 🔟	To: 01/01/2013	2 00.	00:00	5
	Nuremberg OBusber 20kV	Select tir Year	re segment	• •						012					
	Altenfurt 20kV1400V	Year	-	• • •	Teb	Mar	Acr	May		3.1 Aug	Sep	Oct	Nov	Dec	
	Fischbach_20kVI400V			- John		1.46	i der	1.400	100		144	10.01	(inter	0.01	
	▼ T Langwasser_20kV/400V	Incid	lents												
	Calculated Channel 01-04														
	Tade-fair-Center	311014	All	-											
	Busbar_110kv		Select	Туре		Date/Ti	me	Fault n	Trigger	Cause		Hierarch	ty path		
6	• 🕖 Busbar_380kV				-					•					
	• 🕐 Busbar_400kV	3339		PQ violation		9/11/2012 20	49.09		Voltage Event	User define	RegionNure	nberg\Busbar	_20kV)Fit	ichbach_2	Jk
Topology vii		3338		PQ violation		9/11/2012 17:	:54:57		Voltage Event	EN 50160 M	RegioniNurer	nberg\Busbar	20kViLa	ngwasser_	2
		3337		PQ violation		9/11/2012 15	35:37		Voltage Event	EN 50160 M	Region/Nurer	nberg\Busbar	20kViLa	ngwasser,	2
		3336		PQ violation		9/11/2012 14	042:06		Voltage Event	EN 50160 M	Region\Nurer	nberg/Busber_	20kV/Lan	gwasser_20	k
		3335		Slow-scen record		9/11/2012 13	52:43	130	Frequency1	6P MIN	RegionINure	mberg\Busbar_	20kVITrac	le-Fair-Cen	.er
		3334		Fault record		9/11/2012 13			Voltage L1 UL1	AR +dMidt	RegionNure				
		3333		Fault record		9/11/2012 13	:48:33	286	Voltage L1 UL1	ARMIN	RegionWure				
		3332		Fault record		9/11/2012 13	043:33	285	Voltage L1 UL1	AR-dMidt	RegionINure	mberg\Busbar_	20kVITrac	le-Fair-Cen	se
		3331		Fault record		9/11/2012 13	42:48	284	Voltage L2 U	AR MAX	RegionNure	mberg\Busbar_	20kVITrac	le-Fair-Cen	3e
		3330		Fault record		9/11/2012 12	:54:28	283	Voltage L1 U	. AR+dM/dt	RegionNure				
		3329		Fault record		9/11/2012 12	:53:43	282	Voltage L1 U.	AR MIN	RegionNure	mberg\Busbar_	20kWlTrac	le-Fair-Cen	201
		3328		Slow-scan record		9/11/2012 12	:03:43	129	Frequency1	f/P MIN	RegionNure				
Topology view Configuration		3327		Fault record		9/11/2012 12		281	Voltage L1 U.		RegionNure				
		3326		PQ violation		9/11/2012 11:				EN 50160 M					
		3325		PQ violation		9/11/2012 07:				EN 50160 M					
		3324		PQ violation		9/11/2012 07:				EN 50160 M					
		3325		PQ violation		9/11/2012 03	:01:00		Voltage Event	EN 50160 M	RegionNurer	nberg\Busbar	20kViLa	ngwasser,	20

[sc_PQ IncidentEx, 1, en_US]

Figure 3.2/3 Incident Explorer

PQ Inspector

The PQ Inspector provides the operator with a quick overview of the plant's power quality based on the PQ index. The archived data is analyzed via any selectable time ranges. Causes of deviations in the measured values for the Grid Codes can thus be detected immediately.

SICAM PQ Analyzer - Functions

PQ Inspector is divided into 3 steps:

- In **Select time range**, define the observation period and identify possible influencing factors for deviations of the power quality.
- In **Select diagrams**, select the properties of a specific measuring point, and define the diagrams in which you want to show these data items.
- In Finalize report, complete your report.

Use the **Select time range** step to view the state of the power quality of the system at a glance. You can set up individual measuring point groups and feature groups so that you can observe critical areas in a targeted manner.

The step **Select diagram** allows the compilation of evaluation diagrams with specific features for a report. The diagrams are represented in a synchronized manner. Hence you can rapidly identify connections in the event of fluctuations in power quality.

The step **Finalize report** allows reports to be prepared and commented upon.

PQ Explorer

PQ Explorer allows access to all PQ data stored in the archive. It offers a topological view of the measuring points in your plant. Measured and calculated PQ data is evaluated via PQ diagrams. Furthermore, you can generate analysis reports and display these in a preview.

Report Browser

The Report Browser provides an overview of the scheduled reports that are created automatically at specified time intervals (daily, weekly, monthly and yearly). You can view the reports with a viewer, print them and store them for future use.



Figure 3.2/4 Report Browser

In Report Browser, the reports are shown for the selected time range – separated into yearly reports, monthly reports, weekly reports and daily reports. If you select the year time grid you cannot open daily reports. However, you can view the status and the time lapses for which infringement reports are available. Scheduled reports are automatically generated by the SICAM PQS system using the set up report templates. If you set up report templates, among other things define the intervals in which the reports are created, and the PQ devices for which the reports are created. The colors of the reports show their status.

Grid Code Viewer

The Grid Code Viewer displays the Grid Codes defined in SICAM PQS. The Grid Codes include normalized or customer-specifically defined limiting values for evaluating the power quality. The PQ Index is determined from a comparison of the measured values with the limiting values of a Grid Code.

The Grid Code Viewer provides the overview required for a supporting analysis:

- Which Grid Codes are available?
- To which elements in the topology have the Grid Codes been assigned?
- What features do the Grid Codes contain?
- What limits have been defined?

SICAM PQ Collector

The SICAM PQ Collector collects the archive data of the individual (source) archives in a central (collector) archive. Depending on the system configuration, the SICAM PQ Analyzer accesses the data of the (source) archives or (collector) archives for its archive evaluation.

In redundant archive systems, 2 SICAM PQ Collectors are connected. In the event of an interruption of the connection to (source) archives or after the failure of a SICAM PQ Collectors, this permits the archives to be matched, thus reaching an identical and complete contents of both (Collector) archives.

Architecture

- SICAM PAS/PQS with (source) archive and SICAM PQ Analyzer
- System with
 - SICAM PAS/PQS with (source) archive
 - SICAM PQ Analyzer clients
- System with
 - SICAM PAS/PQS
 - Archive servers with (collector) archive
 - SICAM PQ Analyzer clients

The number of components which can be used in a system depends on the individual license.

(Source) archive

SICAM PAS/PQS collects the PQ measured data and fault records from the connected devices and stores them in its local (source) archive. This archive data can be directly evaluated by one or more SICAM PQ Analyzer.

(Collector) archive

In distributed systems with one or several SICAM PAS/PQS, the data of the (source) archives is collected by the SICAM PQ Collector and stored in a central (Collector) archive on an archive computer. This archive data is evaluated by one or more SICAM PQ Analyzer.

SICAM PQ Analyzer – Software and Hardware Requirements

Software and Hardware Requirements

One of the following operating systems is required:

- Windows 10 Professional/Enterprise/IoT Enterprise LTSC (64bit)
- Windows Server 2019 Standard with Desktop Experience (64bit)

Computer equipped with:

- Processor:
 - Minimum: Intel Core 2 Duo 1.6 GHz
 - Recommended: Quad Core CPU 3 GHz
- Primary storage capacity:
 - Minimum: 2 GB
 - Recommended: 4 GB
- Hard disk capacity:
 - Minimum: 4 GB
 - (Collector) archive: > 100 GB
- Graphics card:
 - Minimum: 1600 x 1200 pixel
 - Recommended: 1920 x 1200 pixel
- Monitor suitable for graphics card
- DVD drive
- Keyboard
- Mouse
- Network interface
- USB port

SICAM PQ Analyzer is released for computers with multi-core processors. Computers with multi-processor main boards are supported when working in single-processor mode.

SICAM PQ Analyzer - Selection and Ordering Data

Selection and Ordering Data

Description	Versions	Or	de	r no															
		1	2	3	4	5	6	7	8	3 9	1	0	11	12		13	14	15	1/
Incident Explorer for fault-record	analysis	6	M	D	5	5	3	0 ·	. () 🗚	A	`	1	0	-	3			C
Including Fault Event Viewer for dis events	Version 3.1x Use on the SICAM PAS/PQS Full Server Up to 5 clients, archive transfer of 1 Server/ Server Up to 5 clients, archive transfer of up to 5 Servers/Full Servers Up to 5 clients, archive transfer of more tha 5 Servers/Full Servers More than 5 clients, archive transfer of 1 Server/Full Server															•	•	•	
	Version 3.1x															3		Ι	
	Use on the SICAM PAS/PQS Full Server																А	Α	
	Up to 5 clients, archive transfer of 1 Server/Full Server																В	A	
																	В	В	
	Up to 5 clients, archive transfer of more than 5 Servers/Full Servers																В	С	
																	С	A	
	More than 5 clients, archive transfer of up to 5 Servers/Full Servers																С	В	
	More than 5 clients, archive transfer of more than 5 Servers/Full Servers																С	С	

• 2 redundant PAS/PQS Full Servers are counted as 1 Server.

• In addition to fault records, SIMEAS R and SIPROTEC 7KE85 deliver continuous average value reports that are managed in PQ Explorer.

	nded as a minimum for a complete evaluation of SIMEAS R an									_		_	_					-
PQ Basic		7	К	E	9	2	0 0) -	0	В	A	1	0	-	3			0
Including Incident Explorer for faul	t-record analysis and PQ Explorer																	
Server Up to 5 clients, archive transfer of up to 5 Servers/Full Servers Up to 5 clients, archive transfer of more tha 5 Servers/Full Servers																		
	Use on the SICAM PAS/PQS Full Server															А	Α	
	Up to 5 clients, archive transfer of 1 Server/Full Server															В	A	
																В	В	
	Up to 5 clients, archive transfer of more than 5 Servers/Full Servers															В	С	
	More than 5 clients, archive transfer of 1 Server/Full Server															С	A	
	More than 5 clients, archive transfer of up to 5 Servers/Full Servers															С	В	
	More than 5 clients, archive transfer of more than 5 Servers/Full Servers															С	С	

Table 3.2/1 SICAM PQ Analyzer Selection and Ordering Data