CAMILLE BAUER
GMC-INSTRUMENTS GROUP

MONITORING OF THE ELECTRICAL INFRASTRUCTURE

SYSTEM SOLUTION FOR ELECTRICAL NETWORKS

SMARTCOLLECT® | SC²
MEASURED DATA MANAGEMENT | SCADA

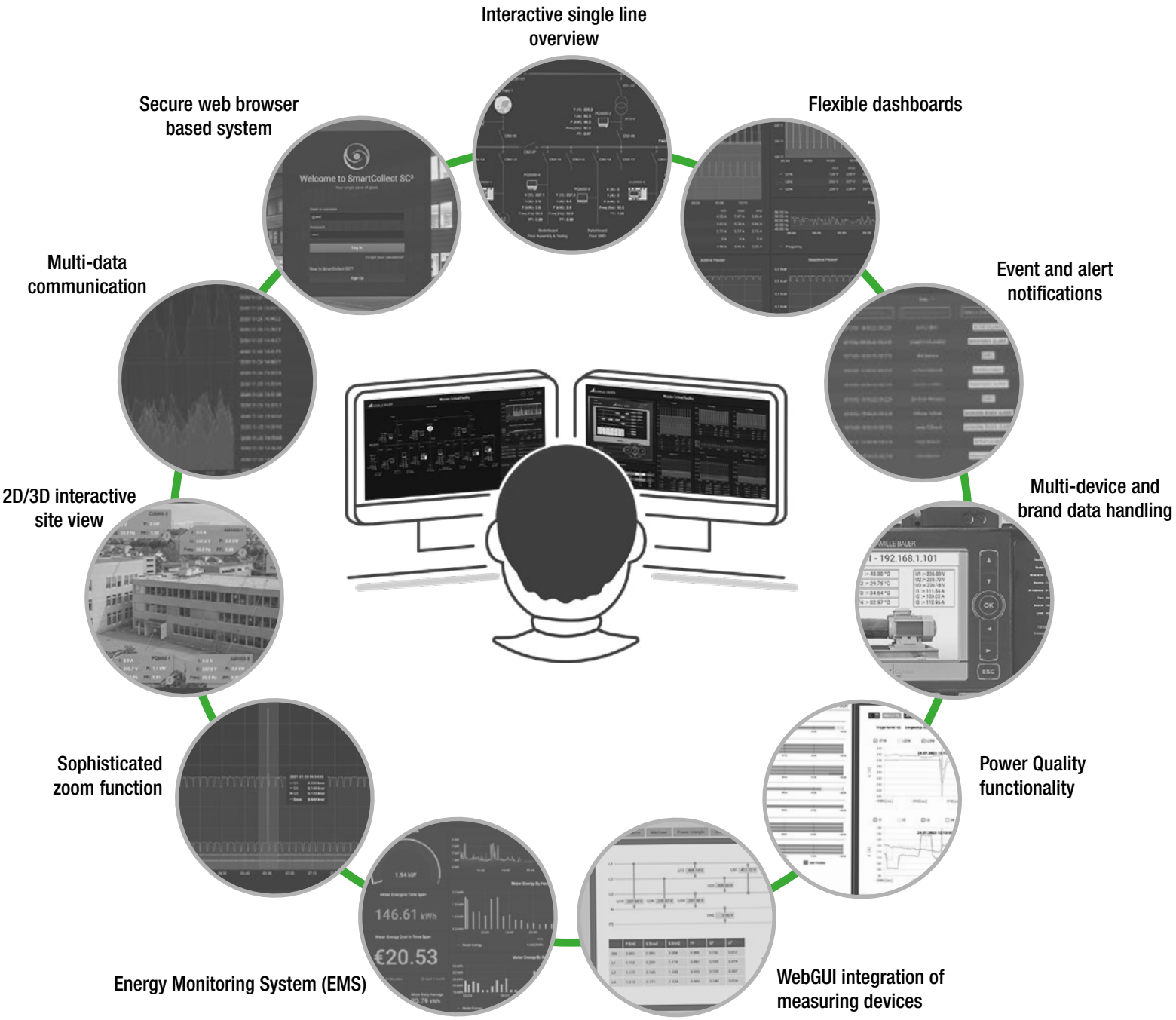
High quality artwork for an optimised HMI experience and full functionality

To see the benefits for yourself, visit our live page:
www.scada-smartcollect.com

Please ask for a demo access at:
info@scada-smartcollect.com

SIMPLICITY AND USER FRIENDLINESS ARE THE KEY

SMARTCOLLECT® SC² SYSTEM OVERVIEW

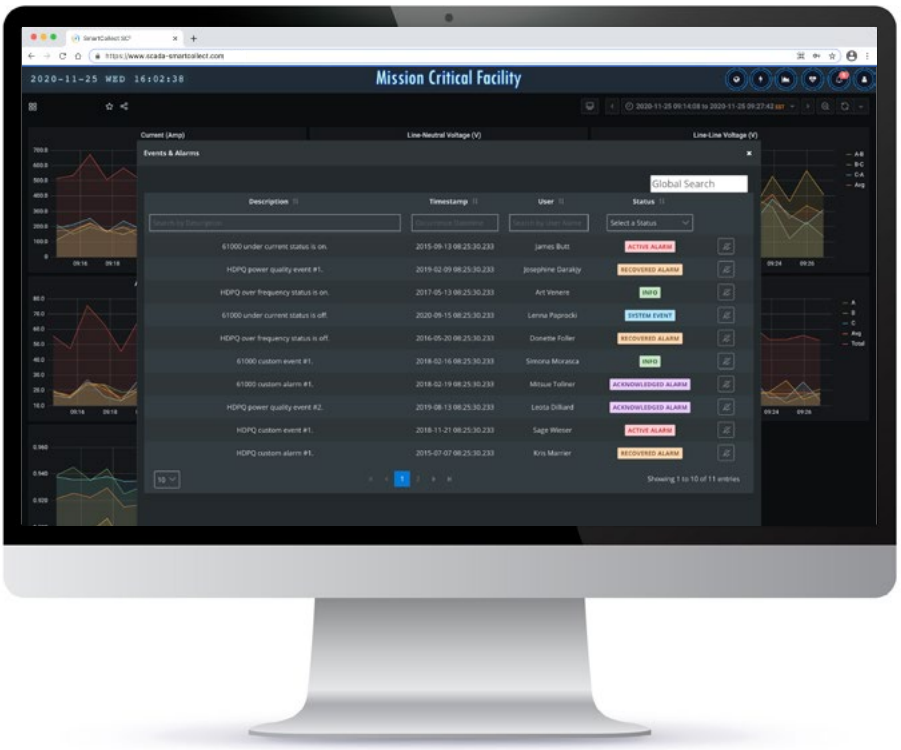


SMARTCOLLECT® SC² is a scalable HMI/SCADA software for the visualization of electrical distribution and other physical parameters. Unlike other SCADA software, SMARTCOLLECT® SC² is built on a new, ultra-modern platform with a visually pleasing 2D/3D web-based graphical user interface. Powerful communications and software interfaces, expansion options, ease of use and an affordable price are just some of the other user benefits of SMARTCOLLECT® SC². Just one look at SMARTCOLLECT® SC² makes you wonder how you used anything else before.

CONSCIOUS SIMPLICITY

Interactive single line overview
Permanent monitoring of all integrated circuits in the infrastructure with a brief overview of instantaneous measurement values. The single line overview is a customized function that is based on the individual application design.

Flexible dashboards
The modern dashboard displays all the necessary information with high fidelity for relevant and critical measures. The data design is customized based on the application and user demand while remaining flexible for future adjustments.

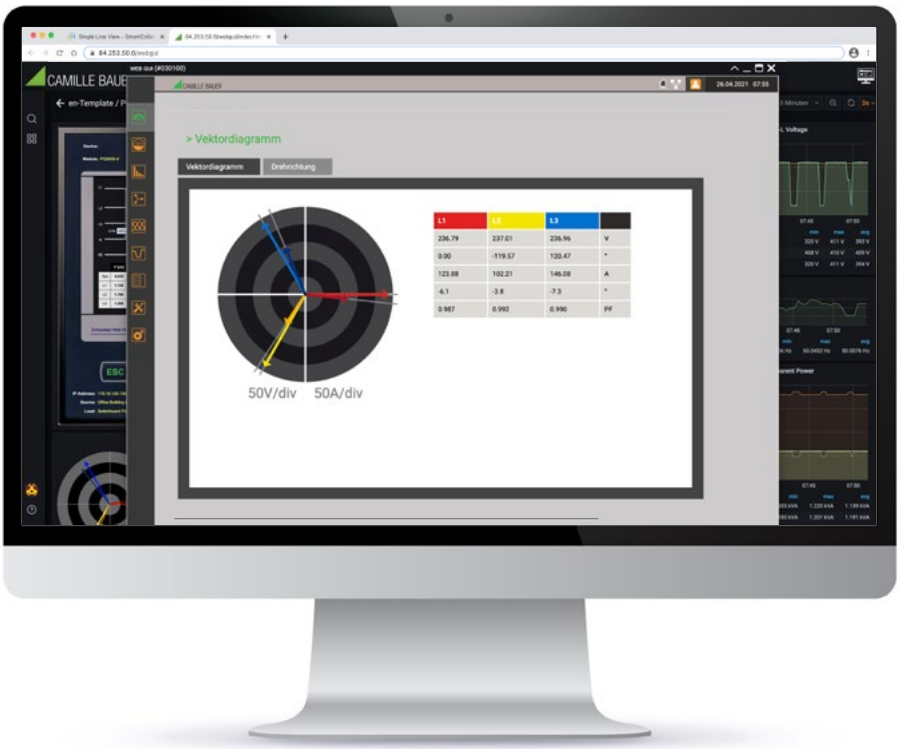


Event and alert notifications
The software has different options for event and alert notifications. For power quality event notifications, details can be read out at standard level for Camille Bauer devices from the integrated webGUI. Status, event and warning messages can be output both visually (e.g. traffic lights, etc.) and acoustically (e.g. internal PC loudspeaker, external signal) or also be issued by e-mail.

Multi-device and brand data handling
The software links with multiple devices and can integrate different measurement devices and sensors of any brand. In addition, other data beside physical parameters can be displayed, including virtual channels.

CONSCIOUS SIMPLICITY

Individual WebGUI integration
The software supports individual integration of device WebGUIs. This gives the user access to additional information and remote configuration options, depending on the device.



Energy Monitoring System (EMS)
The high degree of data acquisition allows full transparency of energy data. For analytic purpose (e.g. reducing CO_2 emission, increasing energy efficiency as well to evaluate potential saving) the EMS supports different panel views inside the EMS dashboard. Various manual or automatic reporting functions supports the individual business intelligence.

Sophisticated zoom function

The dashboard can be used for deep analysis with the zoom function. In the dashboard overview the zoom will synchronize all parameters so that all associated parameters can be viewed in relation to the zoomed-in data.

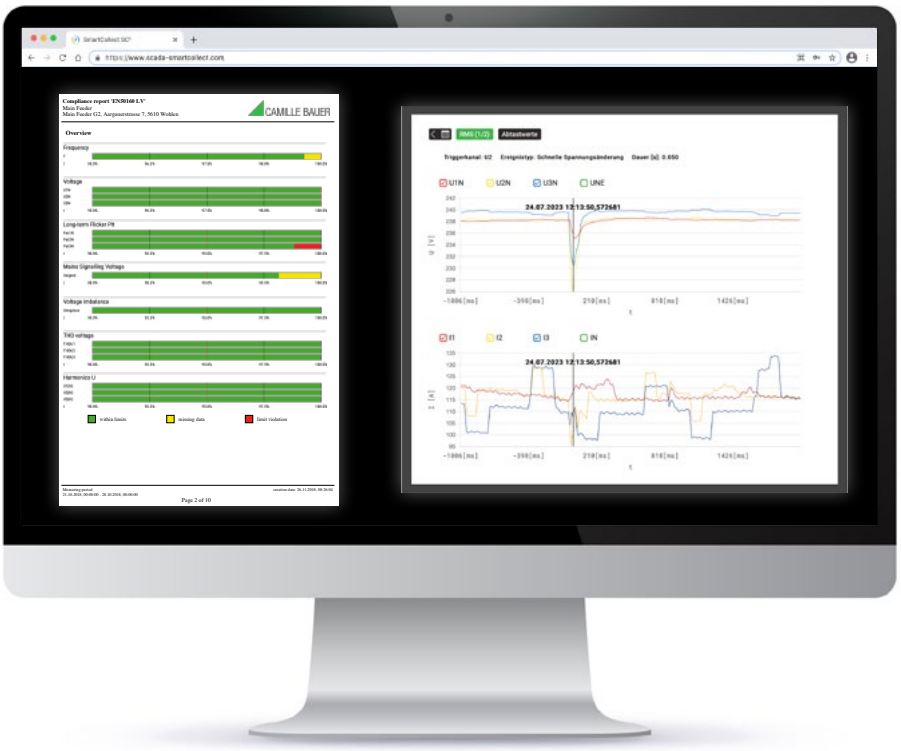
Interactive 2D/3D aerial view

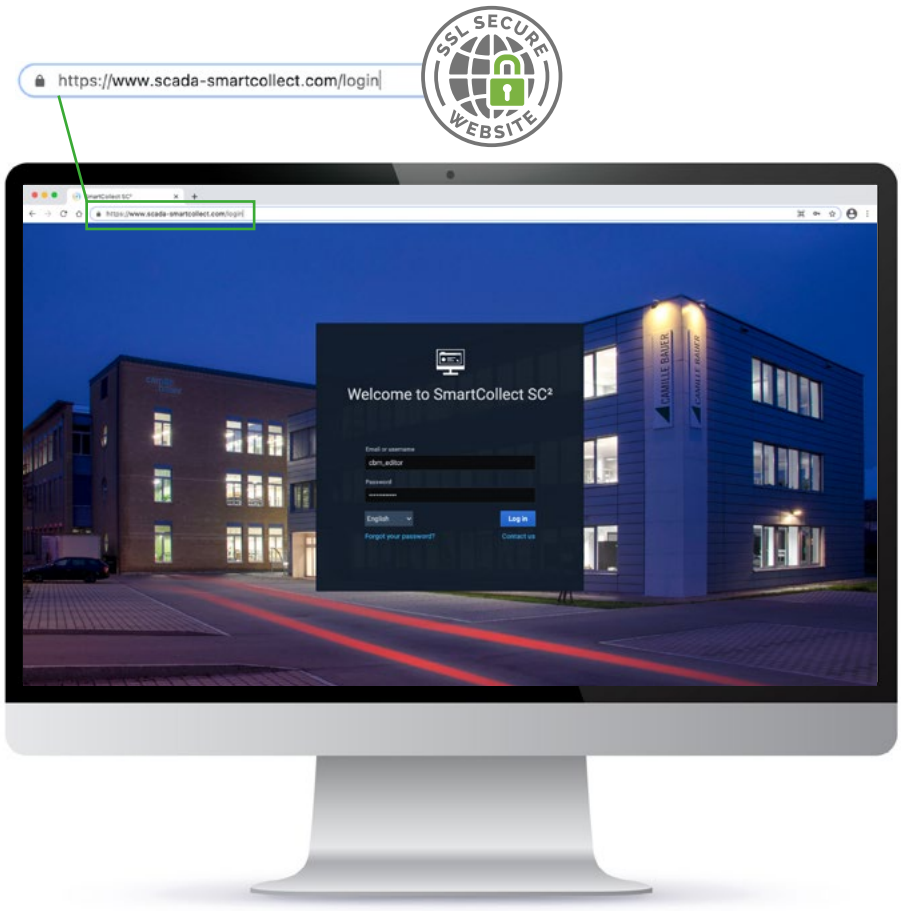
The main feature of the aerial view is the use of an image of the site(s) as the background. Brief info boxes point to locations where the measuring devices are situated. The info box has a specific name and contains a brief overview of the instantaneous measurement values

CONSCIOUS SIMPLICITY

PQEasy functions

The software offers so called PQEasy functions to register, visualize and analyze events. In addition, conformity reports, e.g. EN50160, GB/T, IEEE519, etc. can be generated.

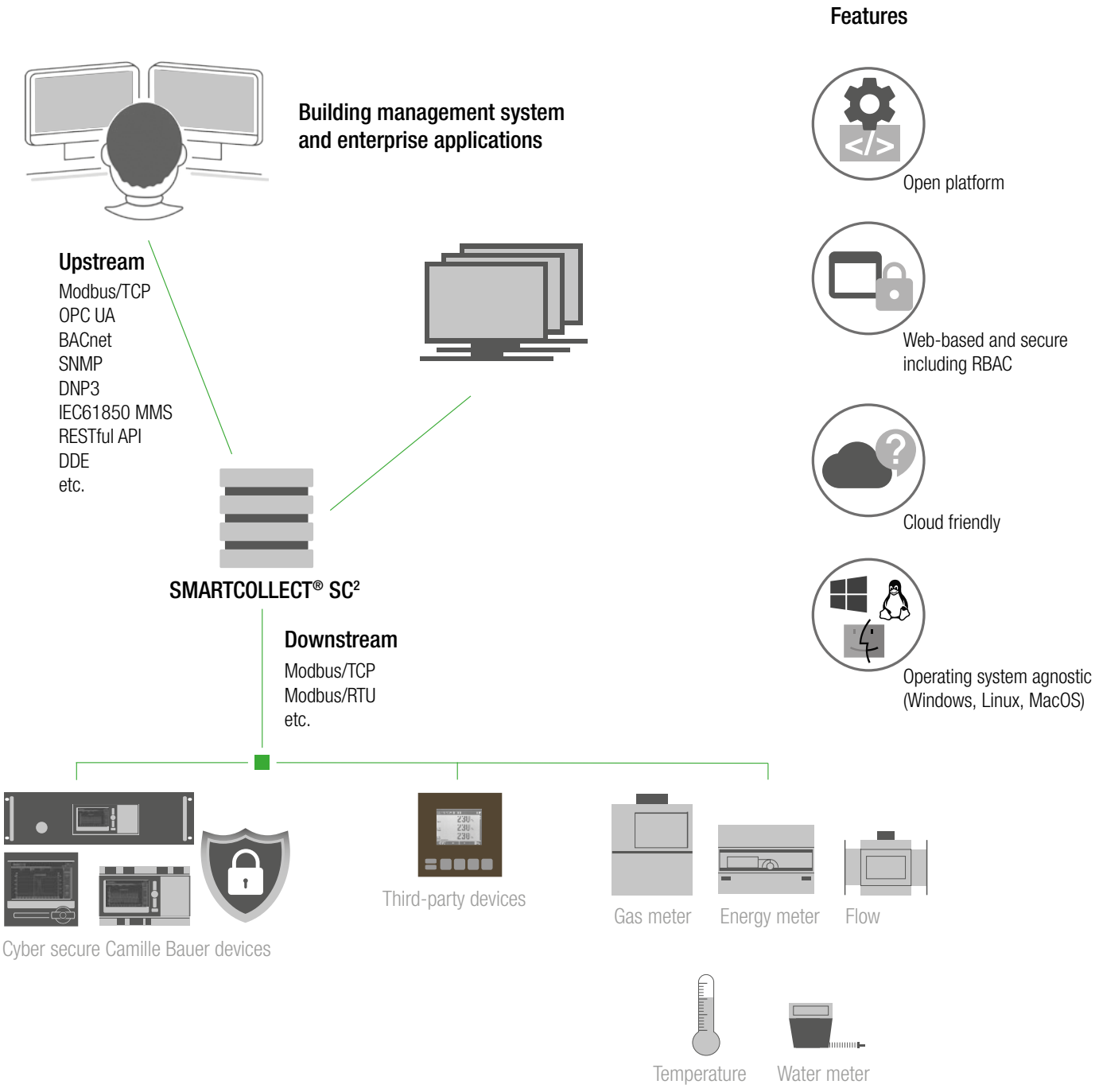




Secure web-based system

The software is based on a modern and intuitive secure web application compatible with most common web browsers.
The application needs no specific client software and runs on most common operating systems (OS) such as Microsoft Windows, Linux and MacOS, and provides intuitive cloud support.

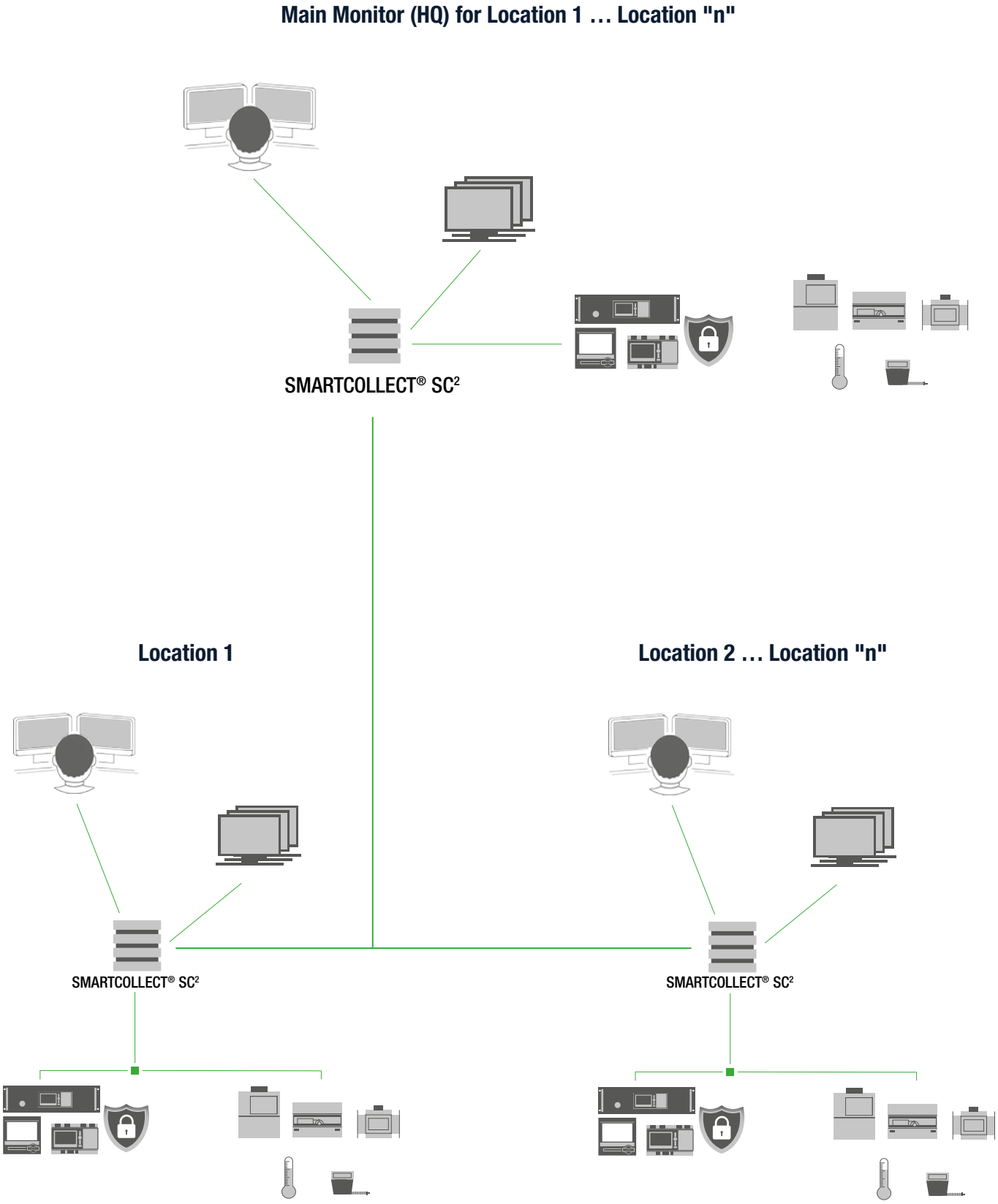
SYSTEM MODE (SINGLE LOCATION / INSTANCE)



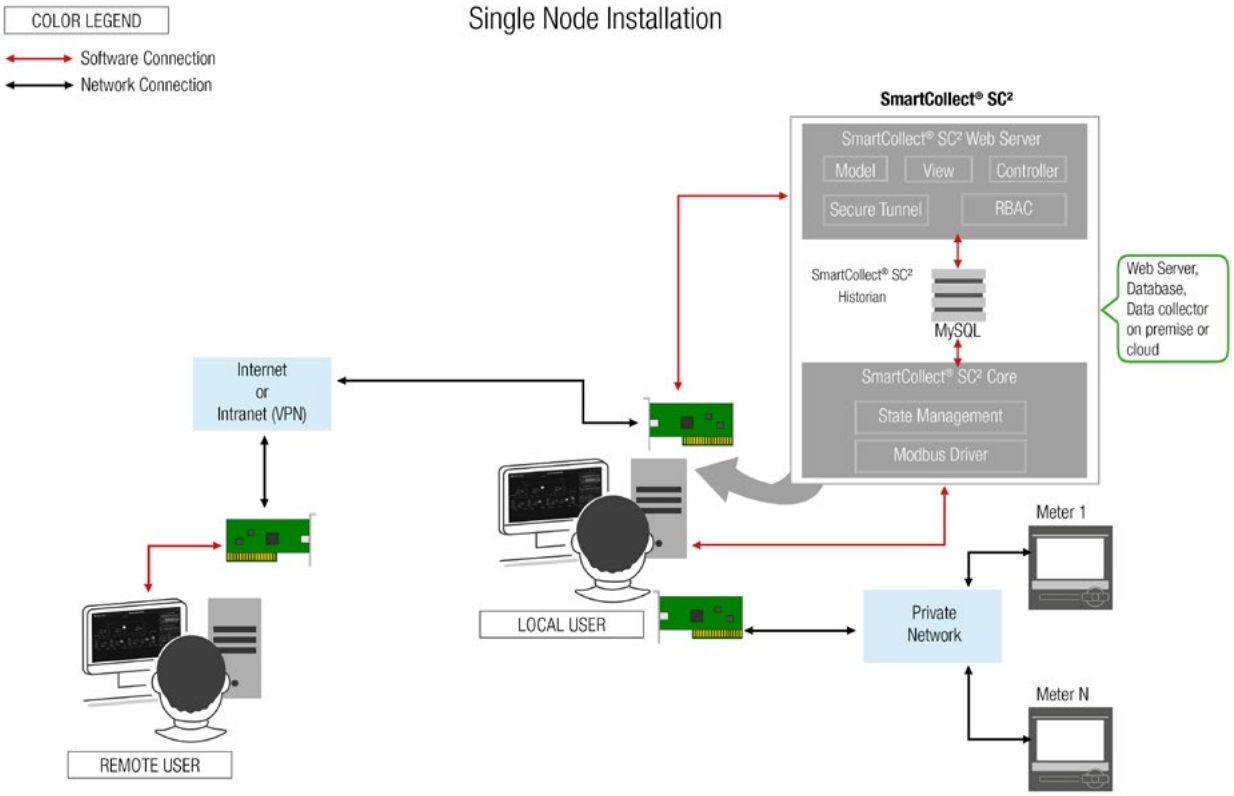
RECOMMENDED SYSTEM REQUIREMENTS:	SYSTEM	CPU	MEMORY	HARD DISK	SCREEN RESOLUTION	BROWSER *
Starter Edition	Windows 10 x64	2 CPU cores	4GB (+4GB with EMS)	250GB	1920x1080	Google Chrome, Mozilla Firefox, Apple Safari, Microsoft Edge
Standard Edition						
Professional Edition		4 CPU cores	12GB (+4GB with EMS)	500GB		
Enterprise Edition			20GB (+4GB with EMS)	1TB		

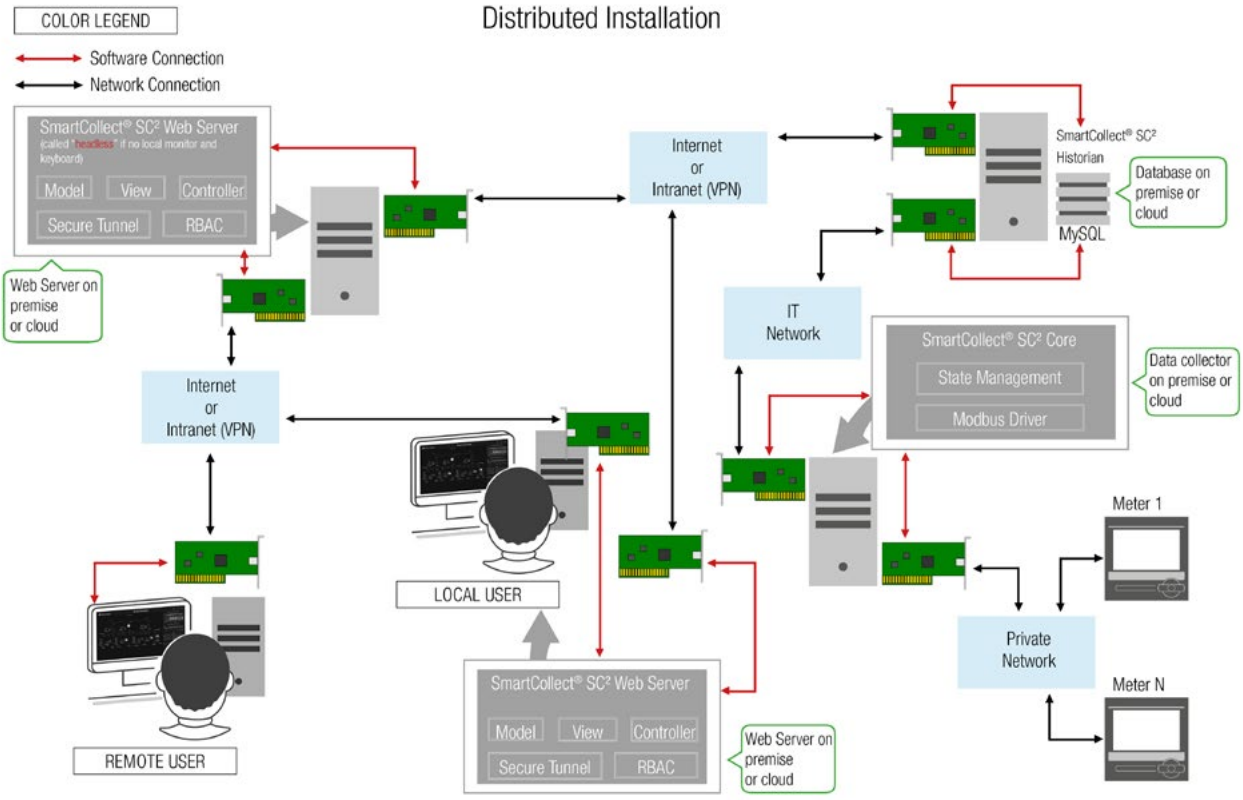
*** Attention:** Please always use latest browser version. Sometimes browser negatively influences the software performance. In case of performance issues please check for a newer version of your browser or try another browser.

SYSTEM MODE (MULTIPLE LOCATIONS / INSTANCES)



INSTALLATION SCENARIOS





OVERVIEW OF SMARTCOLLECT® SC² VERSIONS

Possible system functions	Starter Edition	Standard Edition	Professional Edition	Enterprise Edition	Smart Grid Pilot Edition [1]
Communication driver upstream all server variants					
Modbus/TCP Server [3]			✓	✓	
OPC UA/DA Server			✓	✓	
BACnet Server			✓	✓	
SNMP Server			✓	✓	
DNP3 Server			✓	✓	
IEC60870-5-104			(4)	(4)	
IEC61850 MMS Server			✓	✓	
RESTful API Server			✓	✓	
DDE Server			✓	✓	
Communication driver downstream all client variants					
Modbus/TCP Client [2]	✓	✓	✓	✓	✓
Modbus/RTU over TCP Client [2] [4]		✓	✓	✓	
M-Bus Client over RS-485 or Ethernet			✓	✓	
OPC UA/DA Client			✓	✓	
BACnet Client			✓	✓	
SNMP Client			✓	✓	
DNP3 Client			✓	✓	
IEC60870-5-104			(5)	(5)	
IEC61850 MMS Client			✓	✓	
RESTful API Client			✓	✓	
DDE Client			✓	✓	
Smartcontrol Client (multifunctional datalogger)			✓	✓	
RESTful API Client LINAX PQ3K / PQ5K			✓	✓	
Feature component					
Login screen	✓	✓	✓	✓	✓
Interactive one-line (single line) with live data overlay (SLD)	✓	✓	✓	✓	✓
Display details measuring devices [18]	✓	✓	✓	✓	✓
Measuring device webgui view [6]	✓	✓	✓	✓	✓
Event/alert screen	✓	✓	✓	✓	✓
Role-based access control (RBAC)	✓	✓	✓	✓	✓
Two-factor authentication			(5)	(5)	
Internationalization [7]	✓	✓	✓	✓	✓
HTML online help	✓	✓	✓	✓	✓
Flexible dashboards [8]		✓	✓	✓	
3rd-party device integration [9]		✓	✓	✓	
3rd-party web app (WebGUI) embedding			✓	✓	
Manually export dashboard/report data as CSV [10]	✓	✓	✓	✓	✓
2D-Management View (Areal View)		✓	✓	✓	
3D-Management View				✓	
Interactive one-line (single line) with live animation [12]			✓	✓	
2D imagery background with live animation [12]			✓	✓	
E-mail notification „Standard“	✓	✓	✓	✓	✓
E-mail notification „Enterprise“ [16]				✓	
Export Selected Data to CSV (auto mode)				✓	
SMS notification			(5)	(5)	

Possible system functions	Starter Edition	Standard Edition	Professional Edition	Enterprise Edition	Smart Grid Pilot Edition [1]
CAD import (z. B. dwg, dxf …)			✓	✓	
Task scheduler [17]			(5)	(5)	
EMS (Energy Monitoring System) [19]					
Flexible Dashboards		✓	✓	✓	
Energy Monitoring System (EMS) Screen	✓	✓	✓	✓	
Energy Monitoring System (EMS) PDF Reporting manual		✓	✓	✓	
PDF Reporting automation (Scheduler & E-Mailing)			✓	✓	
PDF Layout Custom Design Engineering				✓	
Power Quality (PQEasy functions)					
Summary PQ Event Notification [11]	✓	✓	✓	✓	✓
Plugin PQ(DIF) Explorer (web based)				✓	
PQDIF File Driver from Camille Bauer PQI			✓	✓	
PQDIF File Driver from 3rd party PQI				✓	
PQDIF File Driver from 3rd party PQI computer software				✓	
PQ data direct reading from 3rd party PQI				✓	
PQ data direct reading from 3rd party computer software				✓	
LINAX PQ Event driver			✓	✓	
LINAX PQEasy Report driver			✓	✓	
Converter PQDIF to CSV				✓	
Converter COMTRADE to CSV				✓	
Architecture/technology					
Browser-server (BS)	✓	✓	✓	✓	✓
HTTPS	✓	✓	✓	✓	✓
Secure WebSocket (wss)	✓	✓	✓	✓	✓
HTML5/CSS3	✓	✓	✓	✓	✓
SVG	✓	✓	✓	✓	✓
WebGL (3D)				✓	✓
Operating system					
Windows 7 SP1 and above	✓	✓	✓	✓	✓
MacOS			✓	✓	
Linux		✓	✓	✓	
Deployment/installation					
On Premise on customer system (server, PC, etc.)	✓	✓	✓	✓	✓
Cloud (Virtual Server, e.g. MS Azure, Google Cloud, Amazon AWS, custom, etc.)			✓	✓	✓
Database integration					
TDengine time series database client for downstream (TSDB integrated standard database)	✓	✓	✓	✓	✓
TDengine time series database server for downstream and upstream (TSDB)		✓	✓	✓	
MySQL client for downstream	✓	✓	✓	✓	✓
MySQL server for downstream and upstream				✓	
Microsoft SQL client for downstream				✓	
Microsoft SQL server for downstream and upstream				✓	
PostgreSQL client for downstream				✓	
PostgreSQL server for downstream and upstream				✓	

Possible system functions	Starter Edition	Standard Edition	Professional Edition	Enterprise Edition	Smart Grid Pilot Edition [1]
Ad-hoc features					
Retrieving, archiving and displaying device's local Data recording / Event log / Waveform capture [13]				✓	
I/O tags [14]					
≤ 250 [6]	✓ [15]				fix
Tier 1 < 500		✓	✓		
Tier 2 < 2,500			✓		
Tier 3 < 5,000				✓	
Tier 4 > 5,000				✓	
Diagnose					
Integrated Health Check on SMARTCOLLECT® SC²: a) Integrated service checker (same machine as SmartCollect® SC² is installed)	✓	✓	✓	✓	✓
Independent Health Check on SMARTCOLLECT® SC²: b) Option of independent hardware and software solution (incl. separate computer, e.g Intel® NUC Mini PC)			✓	✓	
Independent Health Check on SMARTCOLLECT® SC²: c) Option of independent software solution only (separate computer provided by the customer)			✓	✓	
Independent Health Check on SMARTCOLLECT® SC²: d) Option of independent Cloud solution			(5)	(5)	

✓ always inclusive

✓ optional Available

[1] 3 months license, 6 months license or unlimited. Incl. 1 LINAX® PQ5000CL or 2 LINAX® PQ5000CL

[2] also known as Modbus Master. To read data from devices via Modbus protocol

[3] also known as Modbus Slave. To feed data to other hosts via Modbus protocol

[4] also known as Modbus Encapsulated TCP. To read a Modbus/RTU device behind a device server via a generic TCP connection

[5] On request

[6] Camille Bauer products when available and exclusively via https

[7] The GUI will use not more than one language of customer's choice

[8] excl. SLD and Area View

[9] Foreign 3rd-party brands on request

[10] For individual graphics

[11] For connected LINAX PQXXX devices, PQ events are listed and can only be read out and analysed from the Measuring device web page or by means of external software

[12] Changing the color of lines/shapes based on values, blinking texts/lines/shapes based on values, fill color in shapes to certain level based on values, rotation of shapes (like the phasor diagram), Switch positions, etc.

[13] Customer to provide sample device and documentation. Extra 4-8 weeks R&D

[14] Tag = visual value point on the GUI, e. g. U1 = 1 tag, I1 = 1 tag, 1 virtual channel = 1 tag, etc.

[15] Support for up to 10 devices, with each device having the following maximum 25 tags fixed:

- I1, I2, I3, Iavg
- P1, P2, P3, Ptotal
- S1, S2, S3, Stotal
- Frequency
- U1N, U2N, U3N, Unavg
- Q1, Q2, Q3, Qtotal
- PF1, PF2, PF3, Pftotal

[16] Notification system in case of complex infrastructures (aggregation of notifications as well as reduction of individual messages)

[17] "Task scheduler" module in which user can define schedules/conditions (with duration) and actions. The "actions" part can include highly customized business logics

[18] Only Camille Bauer

[19] Also available stand-alone

If you have a request concerning a feature that is not listed here, please contact Camille Bauer Metrawatt AG

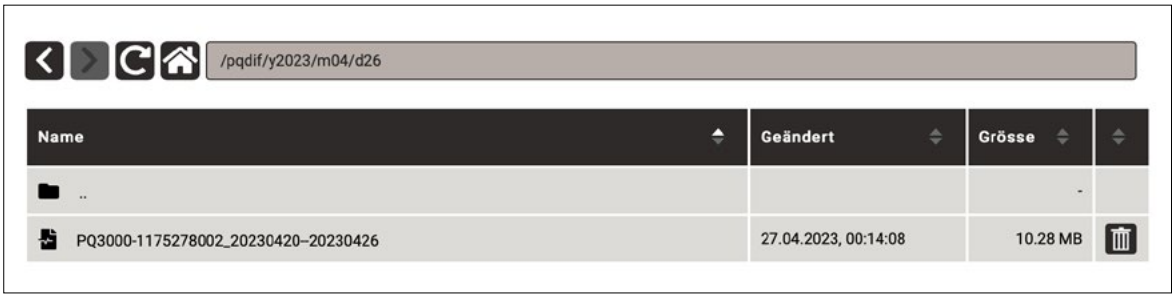
POWER QUALITY FUNCTIONALITY

The **LINAX PQ Event driver** reads (at a configurable interval) the PQ event list of each LINAX PQ measuring device via its REST interface and then stores the PQ events in a special table in the SC2 Historian database. It also reads RMS1/2 records of each event and stores them in a special table within the SC2 Historian database. In the SC2 Viz Web GUI, the user can browse all PQ events and view the RMS1/2 records of each event.

The **LINAX PQEasy Report driver** sends requests to the LINAX PQ meter via its REST interface to generate a compliance report on demand. The driver works in conjunction with the SC2 Viz Web GUI. On the SC2 Viz Web GUI, the user first selects a LINAX PQ meter, specifies the type of PQ report from a drop-down list, and selects a time period. After that, the report is created.

Conformity report e.g. according to EN50160

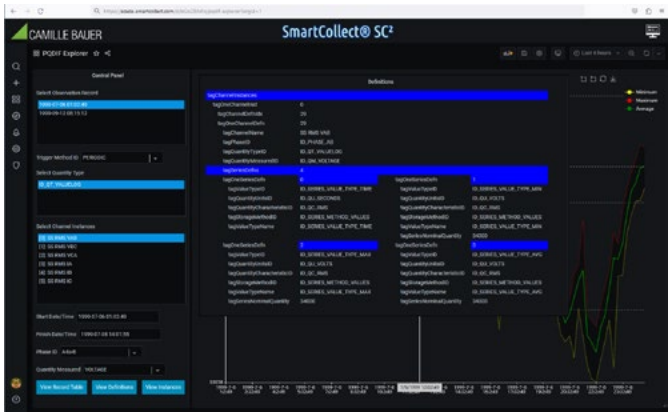
The **LINAX PQDIF driver** reads (at a configurable interval) PQDIF files of each PQ instrument via its REST interface and then downloads these files to the SC2 folder. In the SC2 Viz web GUI, the user can browse this SC2 folder and download the selected PQDIF file(s) and then analyze them with external software or with the SMARTCOLLECT® SC² Plugin PQDIF Explorer.

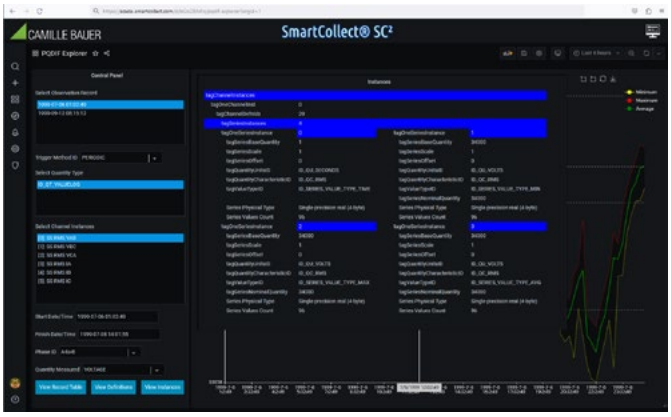


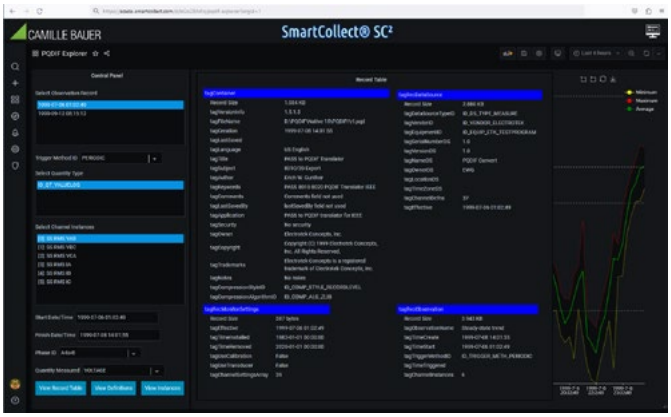
PQDIF Download

POWER QUALITY FUNCTIONALITY

Analyzing with PQDIF Explorer







Options of PQ(DIF) Explorer for Retrieval of Power Quality Data direct from a PQI and from 3rd-party computer software.

a. **PQDIF File Driver from Camille Bauer PQI.** Recommended ways of retrieving PQDIF contents from PQI are: REST API + HTTP

b. **PQDIF File Driver from 3rd party PQI.** Any feasible brand. PQDIF format to be checked in advanced. If format does not fit, R&D on custom driver will be involved for feasibility testing. Recommended ways of retrieving PQDIF contents from PQI are: e. g. SFTP download, FTP download, HTTP download, IEC 61850 file download, REST API

c. **PQDIF File Driver from 3rd-party PQI computer software:** R&D on custom drivers will be involved for feasibility testing. Recommended ways of retrieving PQDIF contents from 3rd-party computer software are: e. g. SFTP download, FTP download, SQL database read, Java/C++/Python API, direct file read.

d. **PQ data direct reading from 3rd party PQI.** R&D on custom drivers will be involved for feasibility testing. One example is a custom Modbus driver that reads waveform captures from a PQI.

e. **PQ data direct reading from 3rd party Computer software.** R&D on custom drivers will be involved for feasibility testing. One example is a custom REST API driver that reads filtered data from a 3rd-party web application. It uses REST APIs of the 3rd-party web application to command the web app to prepare data, then download the file via the file's URL.

EXAMPLES OF EMS DASHBOARDS AND ENERGY REPORTS

The reports reflect the same data from the dashboard in the form of a PDF.
The reports can be generated either manually or via a scheduler.

Display with Sankey diagram and active power graph

Instantaneous values with alert line

Heatmap for displaying the utilization over time

Graphics for individual measurement locations, incl. aggregation of measurement locations via time variable

Graphics for evaluations over day, month and years

MEETING ENERGY MANAGEMENT STANDARDS

SMARTCOLLECT® SC² with EMS can meet the following criteria: [1]

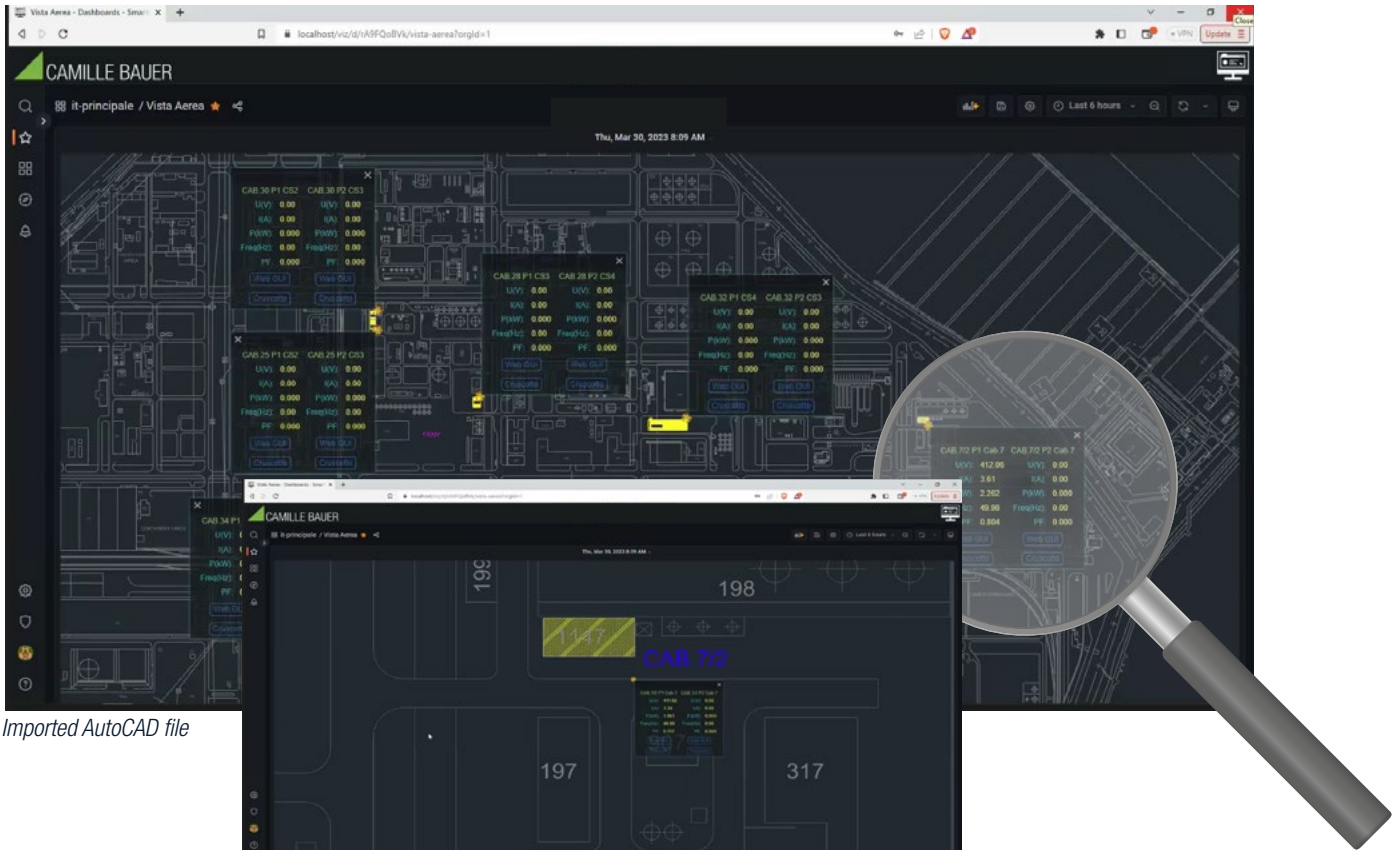
Area	Subsection	Criterion
Data evaluation	Output mathematical quantities	Summations
		Mean values
		Extreme values
	Formation of key figures	Energy consumption (absolute)
		Specific energy consumption
		Power consumption per reference variable
		Fuel consumption per reference size
	Temporal resolution of the data	Predetermined time intervals
		Freely definable
	Cost determination	Energy tariff input function
		Cost center assignment
Visualization	Diagrams	Line diagram (hydrograph)
		Bar diagram
		Sankey diagram
	Individual chart customization	Free choice of time resolution
		Several curves in one diagram
		Showing limit values
Reporting	General energy areas	Scheduled reports (e.g. monthly report)
		Presentation of long-term and short-term consumption development
		Dispatch of reports using digital media
		Output in common format (e.g. PDF / Word)
Alarms	Early warning mechanism	Individual definition of threshold values
		Automatic alarm when threshold values are exceeded
		Transmission of the alarm by means of digital media
Integration into existing systems	Software	Data import for the integration of any measurement data
		Data export to common Office formats (e.g. .xls, .csv)
		Generation data point list
	Control technology	Building management system (BMS)
		Process control technology (PCT)
Other	Support	Support for problems
		Employee training
		Software setup
		Updateservice

[1] for an additional charge

CAD IMPORT

AutoCAD data import

SMARTCOLLECT® SC² is able to read and process AutoCAD data directly.



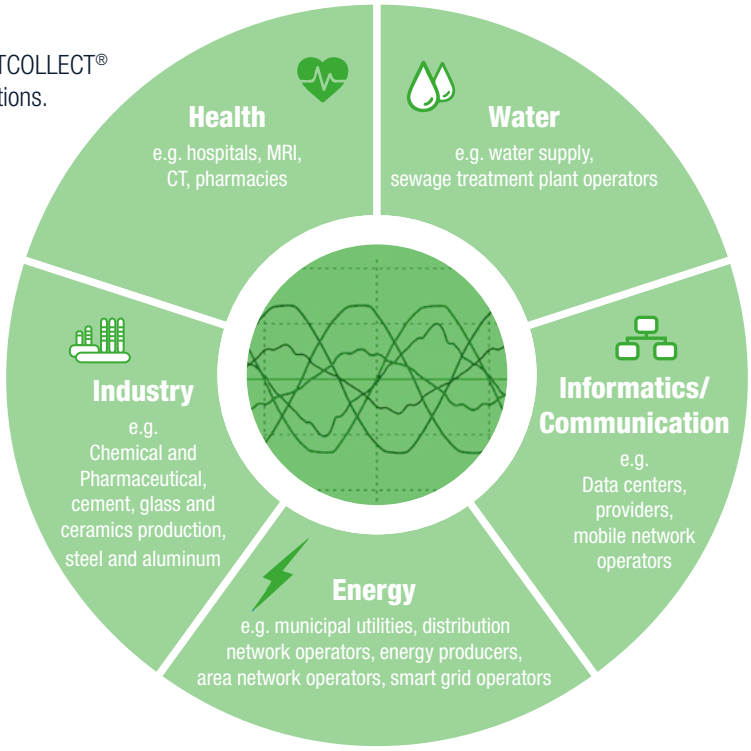
Imported AutoCAD file

Single Line Diagram

SEGMENTS

Core segments of the SMARTCOLLECT® SC²

In addition to the segments mentioned above, the SMARTCOLLECT® SC² is also open for other segments and specific applications.



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