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# COM600S - substation automation, analysis and data management
## Product Guide

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**Conformity**

This product complies with the Directive of the Council of the European Communities on the approximation of the laws of the Member States relating to electromagnetic compatibility (EMC Directive 2014/30/EU). This conformity is the result of tests conducted by ABB in accordance with the product standards EN 55032:2012 and EN 55024:2010. The product is designed in accordance with the international standard IEC 61805-3:2013 and complies with all associated safety, EMC, and environmental standards.

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## 1. General description

ABB COM600 product series offer versatile substation management units that are deployed together with protection and control relays and other substation devices, such as Remote Terminal Units (RTUs), meters and Programmable Logic Controllers (PLCs) in utility and industrial distribution substations. The COM600 manages real-time and historical data and is an all-in-one physical unit that functions as a human machine interface (HMI), a communication gateway and an automation controller.

The COM600 accommodates web technology-based functionality, which provides access to substation devices and processes via a web browser-based HMI. All standard substation monitoring and control aspects can be handled using the WebHMI.

The COM600 integrates substation devices based on the IEC 61850 communication standard, other legacy and de-facto protocols on the substation network. A seamless connectivity can be established with a gateway functionality between the substation devices and external higher-level systems such as Network Control Center (NCC) or a process such as Distributed Control System (DCS) using IEC 60870-5, DNP3, Modbus or OPC-based Ethernet and serial protocols.

The COM600 comprises of application environments that facilitate the development of generic substation automation and also special substation analytics functions.

The COM600 hardware platform is based on ruggedized mechanics with no moving parts subject to wear and tear. The compact and robust design is well adapted for harsh environments.

A faster project execution is enabled by a preinstalled software and an offline configuration performed on a separate computer.

### Distribution Automation Solutions

The COM600 helps realize smart substation and grid automation solutions in utility and industrial distribution networks:

*   using process information and device data to execute specific substation tasks
*   using Ethernet or serial communication based protocols to realize specified objectives

Thus, they are vital building blocks to realize solutions in order to solve diverse customer needs. Advanced/value added functions or applications can also be realized in the COM600 by using process data from the protection relays and its own inherent features. In this manner, more processed information can be made available to higher-level systems such as a Network Control Center (NCC) or a Distributed Control System (DCS) for better decision making and thus creating smarter substations.

An integrated solution approach using a combination of the Relion 610, 611, 615, 620, 630 series of protection relays, RIO600 and

COM600 in medium voltage switchgear or dedicated cabinets is categorized under Compact Distribution Substation Automation (cDSA).

Such solutions are envisaged in utility, industries and infrastructure projects. Some examples are categorized as below:

*   A mix of brownfield and greenfield installations based on IEC 61850 in primary distribution substations
*   In greenfield or brownfield secondary distribution substations
*   In combination with Compact Power Management load-shedding solution, (cPMS from ABB), especially for small or medium sized industries or infrastructure installations.
*   Above solutions could involve running special functions and applications in the COM600 involving multiple feeders' data acquired from their respective protection relays.
*   In grid automation applications communicating from primary substation with intelligent devices along the outgoing feeders.
*   With legacy protection relay installations in primary distribution substations

The COM600 product series comprises of two products:

*   COM600S – COM600 for substation automation, analysis and data management (for IEC markets only)
    *   COM600S is a substation automation, analyzer and data management unit that integrates devices, facilitates operations, manages communication and runs analysis applications pertinent to equipment or operations in utility or industrial distribution substations.

*   COM600F – COM600 for feeder automation and data management (for ANSI/US markets only)
    *   COM600F is a feeder automation and data management unit that runs distributed grid applications in ANSI standard-based utility power networks.

The COM600S version history since COM600S 4.1:

COM600S 5.1

*   new redundant OPC server to support the dual redundant SSC600 configuration
*   stability improvements
*   Usability improvements for WebHMI

COM600S 5.0

*   new high-performance hardware
*   new cyber security features
*   new applications designated for substation analytics
*   new project configuration handling
*   significant usability improvements
*   renewed historian

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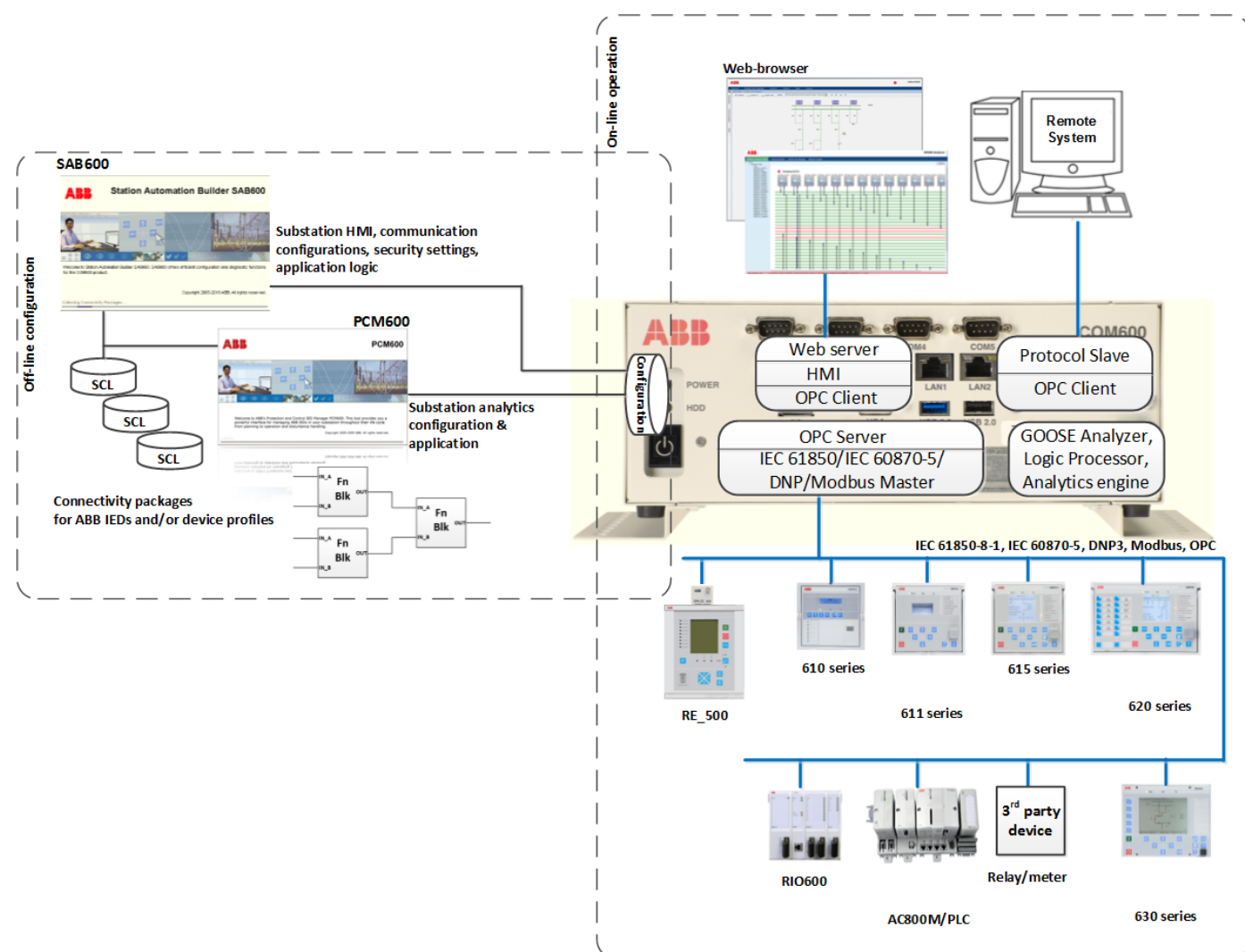
COM600_Block_Diagram.png

Figure 1. Product overview

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## 2. Application

As mentioned earlier, the COM600S has the capability to function as a combined substation WebHMI, communication gateway and automation controller, managing real-time and historical data in a small to medium sized substation automation installation. COM600S contains the following main features:

- WebHMI feature, enabling substation monitoring and operations.
- Integrating various protection relay units based on standard and de-facto protocols, and providing access to real-time data.
- Recording process data in the historian to enable access to past data.
- Logic processor, enabling the implementation of substation-level automation tasks.
- Communication gateway functionality, providing a provision to communicate data from protection and control relays in the substation and COM600S itself to higher-level systems and vice versa.

The envisaged substation installation could comprise of the following components/aspects:

- A medium voltage network in an industrial or utility installation.
- Up to 40-60 feeders with typically one protection and control relay associated with every feeder.
- IEC 61850 Edition 1 or 2 enabled substation devices, such as Relion 630, 620, 615 and 611 series protection relays, Remote IO RIO600 or 3rd party protection relays.
- Non- IEC 61850 devices, such as Relion 610, 605 series, SPACOM series, RE_500 series or 3rd party protection relays enabled with legacy protocols such as IEC 60870-5-103, DNP 3.0, Modbus, and SPAbus.
- Other communicable units, such as meters, RTUs, PLCs, and so on, based on any of the standard protocols mentioned above.
- Data communication based on Ethernet or RS232/422/485 physical standards.
- Non-redundant or redundant communication infrastructure based on IEC 61850. Communication based on IEC 62349 Parallel-Redundancy Protocol (PRP) is supported by COM600. To adapt to a High-availability Seamless Ring (HSR) network, an external 'Redundancy Box' is required.
- Switchgear or panel-based installation
- Connectivity to higher level systems: substation automation units such as MicroSCADA, process DCS such as System 800xA, control center systems such as DMS600 and others using IEC protocols like IEC 60870-5-101/104, DNP 3.0, Modbus or OPC.

Note: For the sake of simplicity, connectivity from COM600S towards NCC, DCS and others using Ethernet protocols is shown directly from the unit in the figures of the document. Actually, this

connectivity will also be through a substation switch and using data communication modems or wireless routers or gateways such as ABB Arctic product series.

The earlier mentioned installation examples set some operational expectations from the COM600S substation level unit, such as:

- Substation monitoring and control:
  - Substation and feeder level single line diagram
  - Switch (circuit breaker and disconnector) control
  - Alarm and Events, Disturbance records handling
  - Trends
- Communication gateway
- Process control applications development
- Disturbance records handling
- Migration of legacy devices' information to IEC 61850, especially in a system augmentation case where the existing protection relay infrastructure needs to co-exist with new IEC 61850 relays.
- Special tools to monitor IEC 61850 network
- Substation cyber-security
- Special feeder functions and applications

It benefits from the potential of the IEC 61850 standard by using the IEC 61850-6 substation configuration language (SCL) and IEC 61850-7 data communications modeling regardless of protocol used. As the IEC 61850 data modeling is used for all communication protocols, the gateway functionality data cross-referencing is done in a similar manner irrespective of the protocol used.

To facilitate the above, the COM600S has a range of rich features that are briefly described in the next sections.

## 3. Process visualization

COM600S includes a web-browser-based user interface (WebHMI). With the optional WebHMI, COM600 can be used for efficient substation visualization, monitoring, and control. The supported browsers are Microsoft Internet Explorer, Mozilla Firefox®, Opera and Google Chrome. Measured values from process devices are displayed on the WebHMI. Single-line diagrams can be used to view real-time substation process information and to initiate switching object control actions.

Note: The WebHMI feature is not enabled, when the COM600S is used as only as communication gateway device.
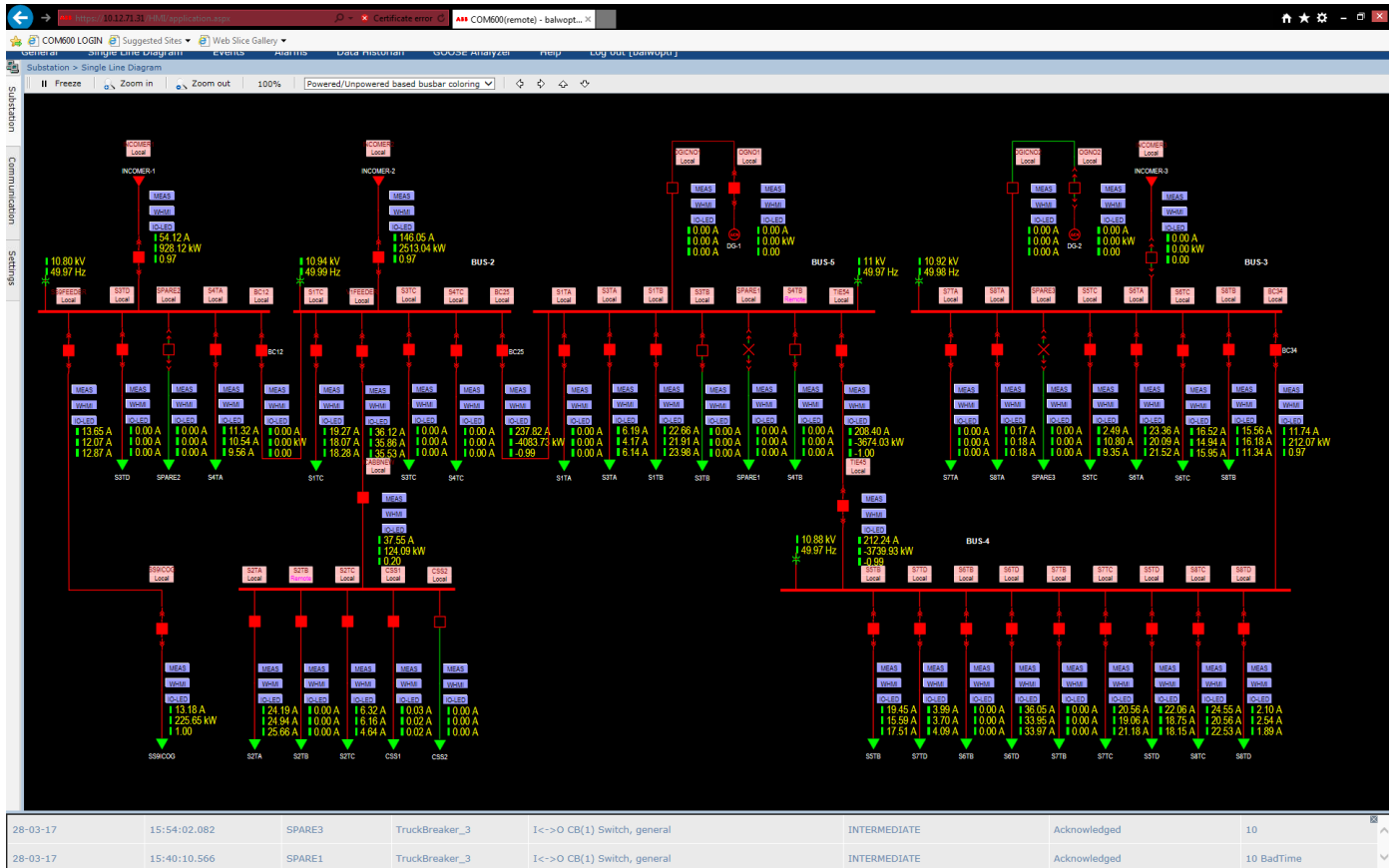


sld_example.png

Figure 2. WebHMI: SLD view

The substation single-line diagram (SLD) can be accessed from the WebHMI menu or the substation tree.

COM600S also supports customized SLD views for substation and bay levels. It is now possible to configure additional custom views in addition to the Master view in the SAB600. These custom views could include specific voltage and bay level objects and can be created at appropriate substation, voltage or bay levels.

The SLD recognizes different voltage levels and busbar systems such as single busbar, double busbar and duplex systems.The four-mode busbar coloring visualizes the busbar status and is user-configurable.

All standard and customized SLD views can be accessed from the Substation views or from the substation hierarchical structure.

Additionally, the user can add arbitrary custom or named views on substation, voltage and bay levels to include specific objects. For example, a 20-bay SLD can be split into two customized views of 10 bays each.

The SLD can be configured to include an indication for the local/remote selection switch. Alarm symbols and generic symbols can be placed in the SLD to give an even better overview of the status. In addition, generic control buttons can be added to control objects. A separate control dialog is used for controlling the switching device. It provides information on switching device identification, reservation status and interlocking conditions. The select-before-execute logic is used to prevent unintended operation. By reserving the switching device for a single user, the risk of controlling the device from two different locations is eliminated.

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COM600S supports the multiple-level control of a circuit breaker or a disconnector according to IEC 61850 Edition 2.

The WebHMI can be accessed locally or remotely to the COM600S unit. While the WebHMI remote connectivity can be accessed using a standard PC with standard web browsers, the local WebHMI connectivity can be facilitated by connecting the Digital Visual Interface (DVI-D) port or the DisplayPort (DP) or the Video Graphics Array (VGA) port to a standard or an industrial grade monitor. While they remain identical in all aspects, the Disturbance Record viewer (WaveWin, see chapter 8) can only be launched from the local WebHMI, as it is a locally installed application on the COM600S unit.



COM600_Brownfield_Greenfield_equipment.png
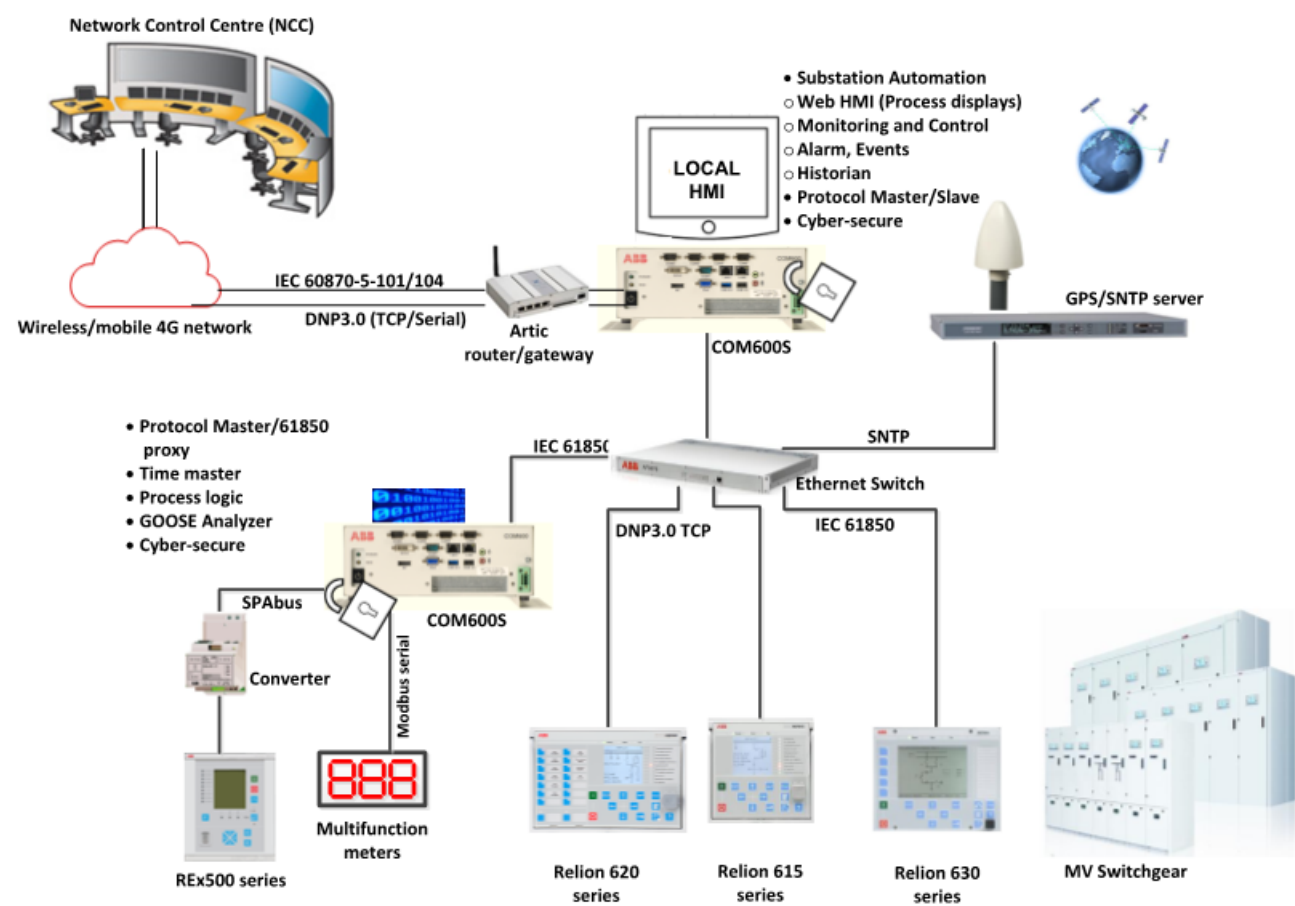
Figure 3. Example of cDSA in brownfield and greenfield equipment based utility substation

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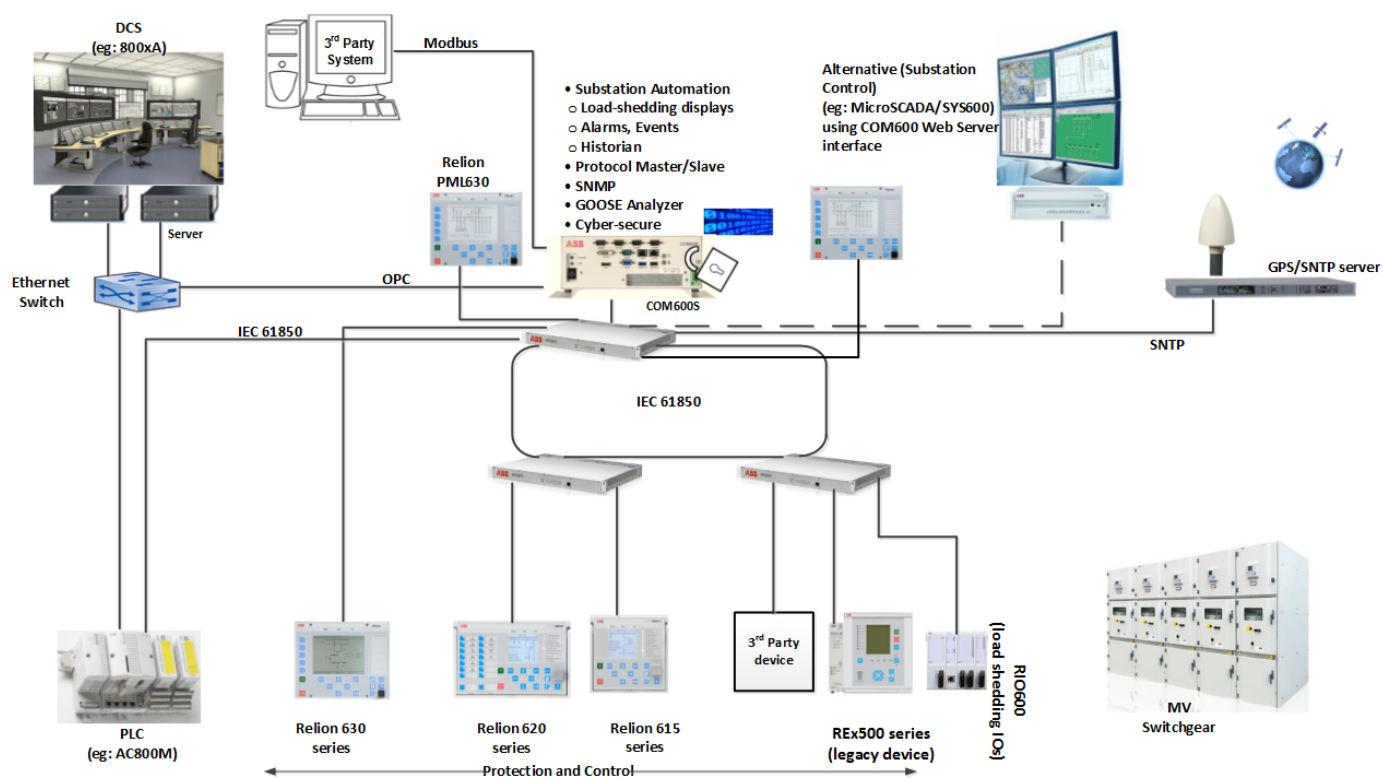
Figure 4. Example of combined cDSA and cPMS for industrial substations

COM600_Industry_medium.png

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## 4. Modular OPC approach

The product architecture of the COM600 series follows a modular approach using OPC.

This architecture facilitates the addition of new product features making the COM600 series versatile and future-proof.



COM600_OPC_Block_Diagram.png

Figure 5. Modular OPC architecture

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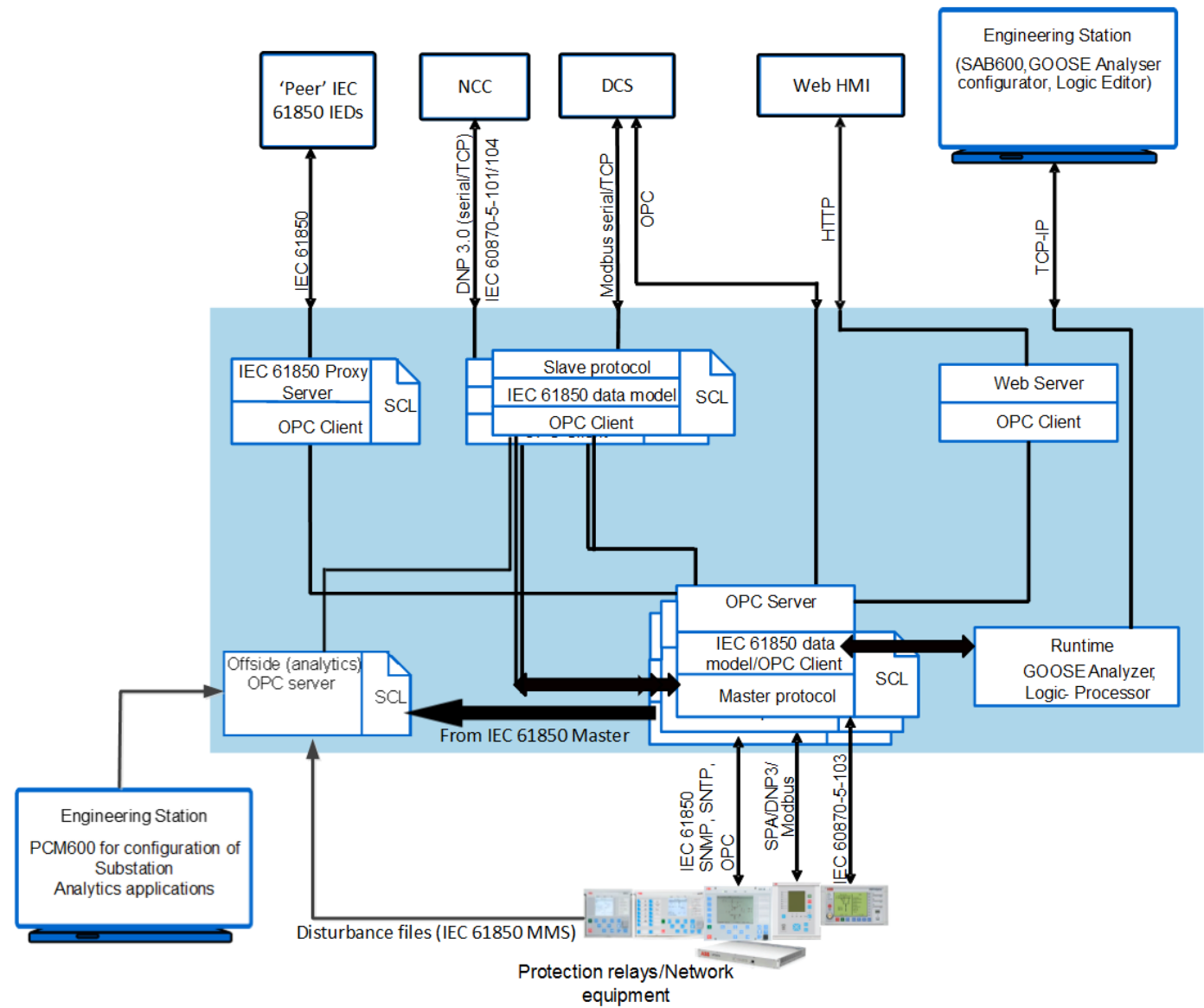## 5. Ease of handling and usability

The improved SCL Import feature for IEC 61850 communication ensures an efficient handling of imported SCL data and COM600S configuration in SAB600.

This improvement is featured especially in the following:

- Configuration wizard importing standard or user-defined templates for alarm/event handling
- Parameter filtering tool configuration
- Protection relay SLD configuration
- Protection relay summary tables
- Project backup and retrieval
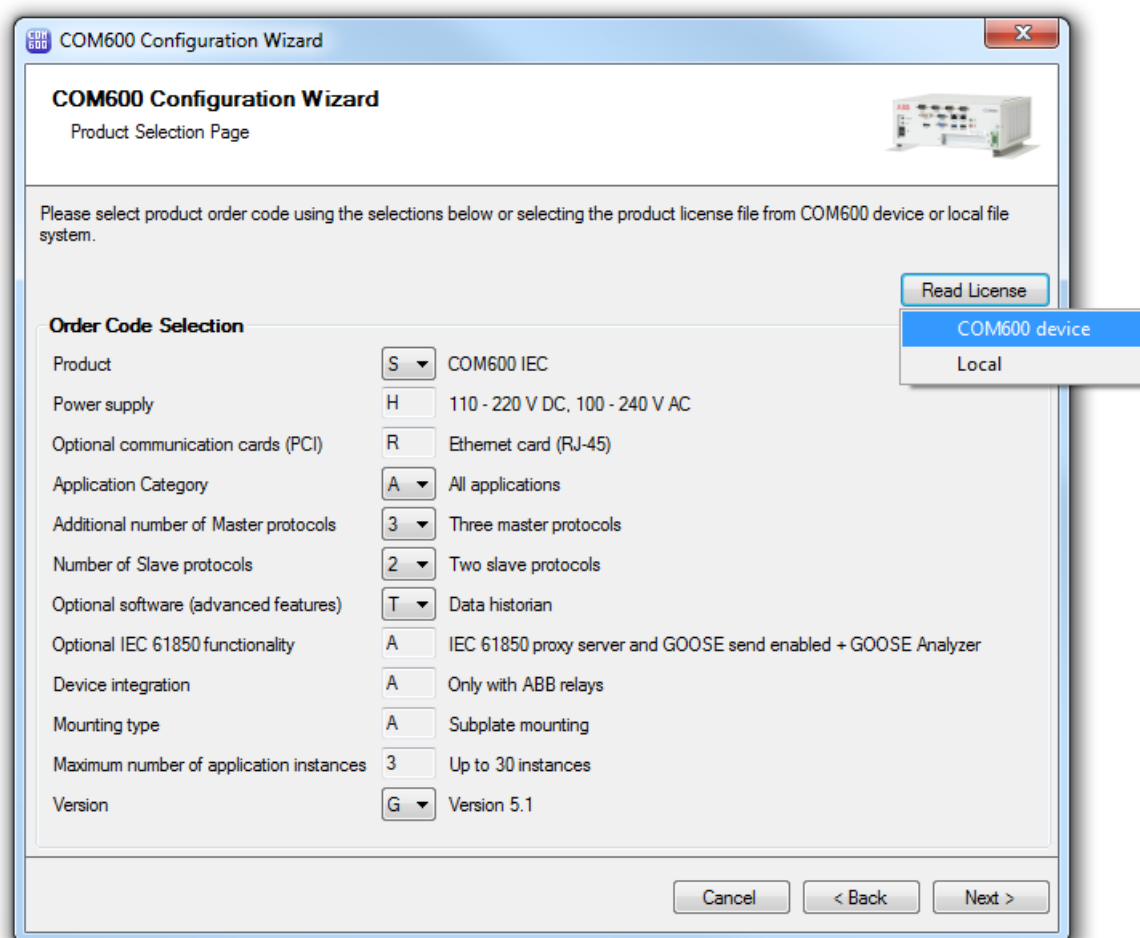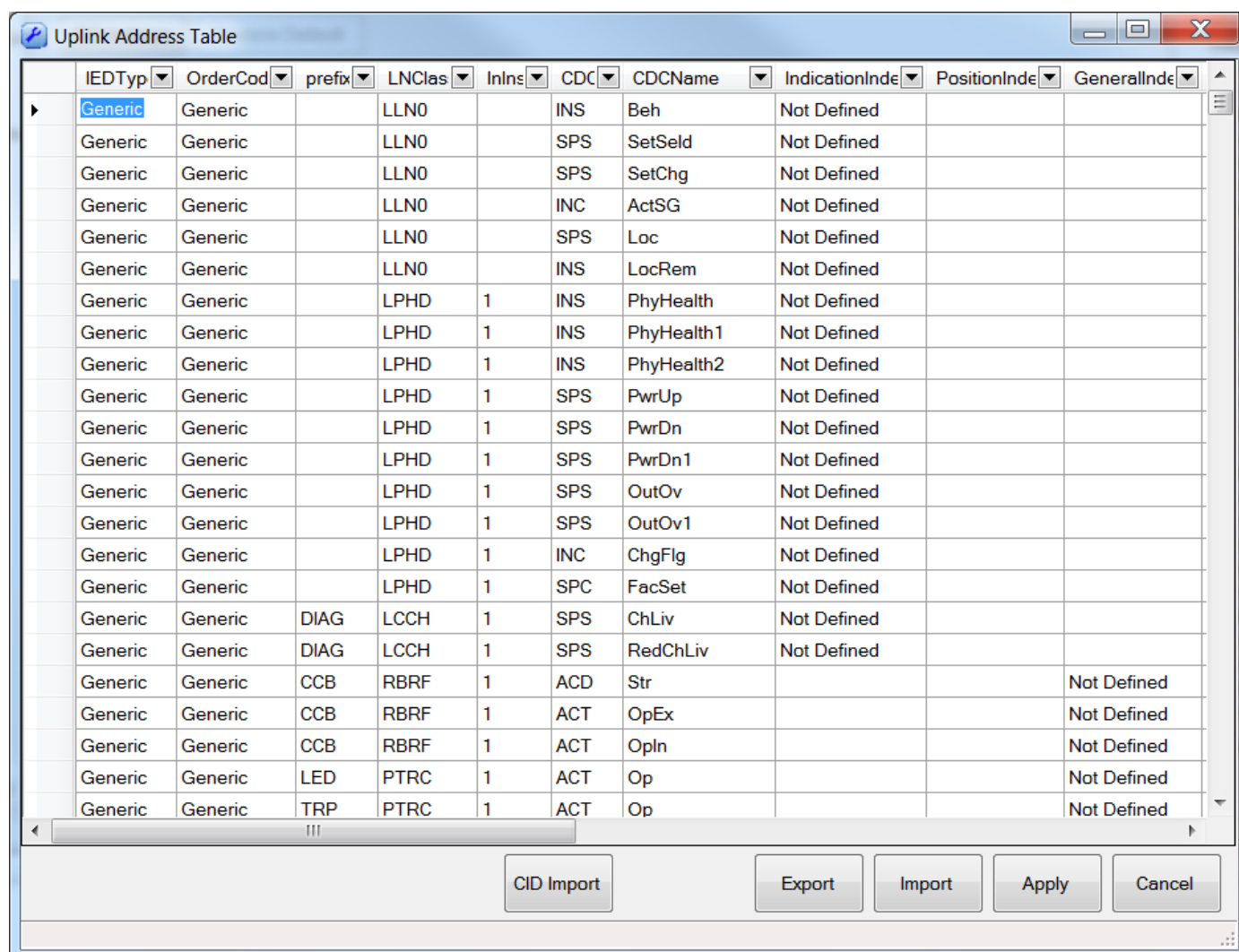


SAB600_Wizard_OrderCode.png

Figure 6. COM600 Configuration Wizard

A new configuration wizard helps the user to run through the steps, similar to configuration of Relion relays, and create the communication structure in the SAB600 automatically.

The cross-reference tool enables the configuration of data point addresses, when COM600S is an IEC 60870-5 or DNP3.0 or Modbus slave to a higher-level system. The user can select the necessary data objects from the communication tree structure in SAB600 and create a project-specific template. Standard or default templates can also be used. The data point addresses are automatically assigned based on Logical Node classes and groups, downstream protection relay index (derived from its IP address).

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| IEDTyp | OrderCod | prefix | LNClas | InIns | CDC | CDCName | IndicationInde | PositionInde | GeneralInde |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Generic | Generic | | LLN0 | | INS | Beh | Not Defined | | |
| Generic | Generic | | LLN0 | | SPS | SetSeld | Not Defined | | |
| Generic | Generic | | LLN0 | | SPS | SetChg | Not Defined | | |
| Generic | Generic | | LLN0 | | INC | ActSG | Not Defined | | |
| Generic | Generic | | LLN0 | | SPS | Loc | Not Defined | | |
| Generic | Generic | | LLN0 | | INS | LocRem | Not Defined | | |
| Generic | Generic | | LPHD | 1 | INS | PhyHealth | Not Defined | | |
| Generic | Generic | | LPHD | 1 | INS | PhyHealth1 | Not Defined | | |
| Generic | Generic | | LPHD | 1 | INS | PhyHealth2 | Not Defined | | |
| Generic | Generic | | LPHD | 1 | SPS | PwrUp | Not Defined | | |
| Generic | Generic | | LPHD | 1 | SPS | PwrDn | Not Defined | | |
| Generic | Generic | | LPHD | 1 | SPS | PwrDn1 | Not Defined | | |
| Generic | Generic | | LPHD | 1 | SPS | OutOv | Not Defined | | |
| Generic | Generic | | LPHD | 1 | SPS | OutOv1 | Not Defined | | |
| Generic | Generic | | LPHD | 1 | INC | ChgFlg | Not Defined | | |
| Generic | Generic | | LPHD | 1 | SPC | FacSet | Not Defined | | |
| Generic | Generic | DIAG | LCCH | 1 | SPS | ChLiv | Not Defined | | |
| Generic | Generic | DIAG | LCCH | 1 | SPS | RedChLiv | Not Defined | | |
| Generic | Generic | CCB | RBRF | 1 | ACD | Str | | | Not Defined |
| Generic | Generic | CCB | RBRF | 1 | ACT | OpEx | | | Not Defined |
| Generic | Generic | CCB | RBRF | 1 | ACT | OpIn | | | Not Defined |
| Generic | Generic | LED | PTRC | 1 | ACT | Op | | | Not Defined |
| Generic | Generic | TRP | PTRC | 1 | ACT | Op | | | Not Defined |

CID Import    Export    Import    Apply    Cancel

uplink_address_table.png

Figure 7. Uplink Address Table

COM600S can be configured and commissioned without a local keyboard and monitor connection. Using the Microsoft® Remote Desktop Protocol (RDP) connectivity, an external computer can be connected to the delivered COM600S on the same network.

The event list entries can be backed up and stored locally in the operational mode of the COM600S local computer. Alternatively, an event list backup can be scheduled as a background process. The security events and Data Historian entries can also be backed up manually or automatically in the same way.

A summary table provides an overview of the selected online data from a single or multiple protection relays. It can be accessed underneath the corresponding protection relay object or underneath the substation object. The table can be spread across multiple pages.

A new project version handling, backup and retrieval feature in the SAB600 ensures the following:

1. An automatic project revision handling that detects any change done to the project.
2. It allows the user to take a backup of the current project and upload it to the COM600S. The project backup can be retrieved later for further use.
3. It is now possible for a Relion relay web server to be accessed from the WebHMI, in other words the relay WebHMI can be launched from the COM600S run time.
4. A language switching feature, independent of the operating system culture settings, ensures adaptability and ease of WebHMI handling. This shifting feature is from English to other languages such as German, Spanish, Chinese and Brazilian Portuguese.
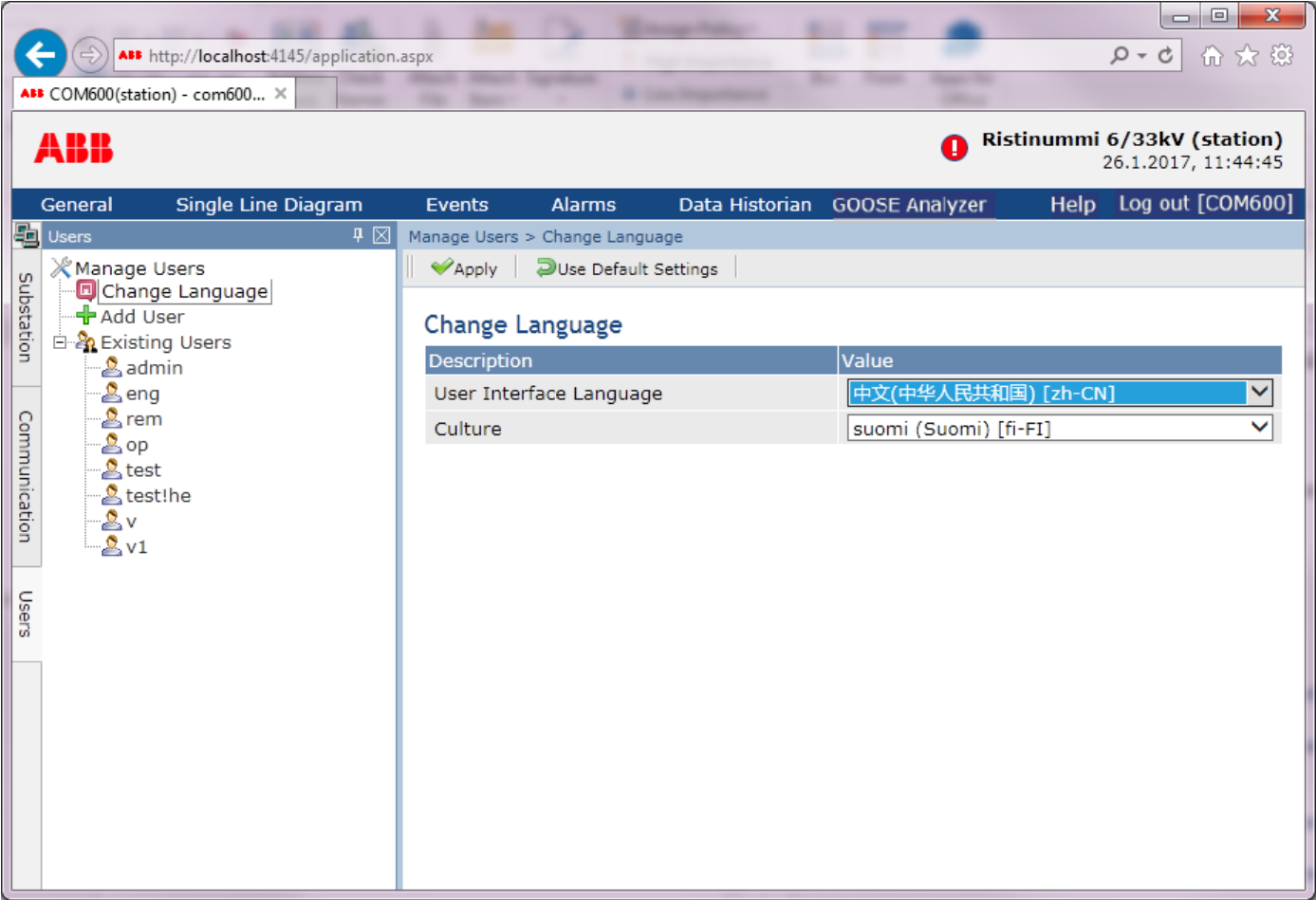
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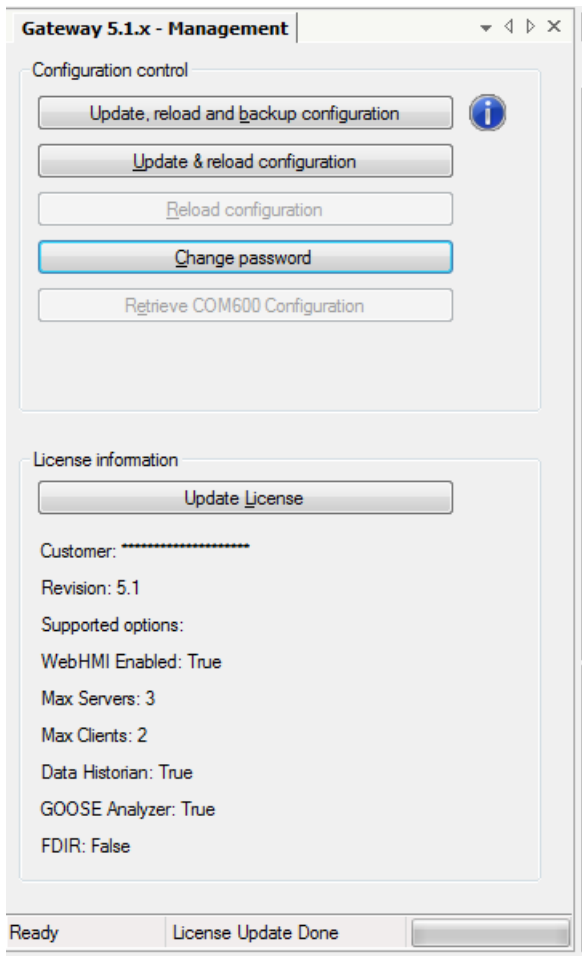
Backup.png

Figure 8. Project Backup

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Figure 9. Language switching (admin)

GAT > 615_50 > Q02

| Measurement | Switches status |
| --- | --- |

| | PhA | PhB | PhC |
| --- | --- | --- | --- |
| CMMXU1 | 41,70825 | 59,57581 | 52,68774 |
| VMMXU1 | 15,15031 | 12,02565 | 16,77307 |

| | High Alarm | High Warning | Low Alarm | Low Warning |
| --- | --- | --- | --- | --- |
| CMMXU1 | False | False | False | False |
| VMMXU1 | False | False | False | False |

| | Status |
| --- | --- |
| X110_Input1 | ●OFF |
| X110_Input2 | ●CB_OFF |
| X110_Input3 | ●OFF |
| X110_Input4 | ●ON |
| X110_Input5 | ●CB_Blocked |

summary table.png

Figure 10. Summary Table

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## 6. Parameter setting

The parameter setting tool (PST) is used for viewing and/or setting parameters in protection relays supporting transparent SPA or IEC 61850 parameterization. The PST enables the activation of the parameter setting function for the selected protection relay. It incorporates a feature that displays only the selected parameters on the COM600S WebHMI, thereby limiting the number of visible parameters considered important for substation operation.

Changes in the settings require engineering or administrator rights in COM600S.
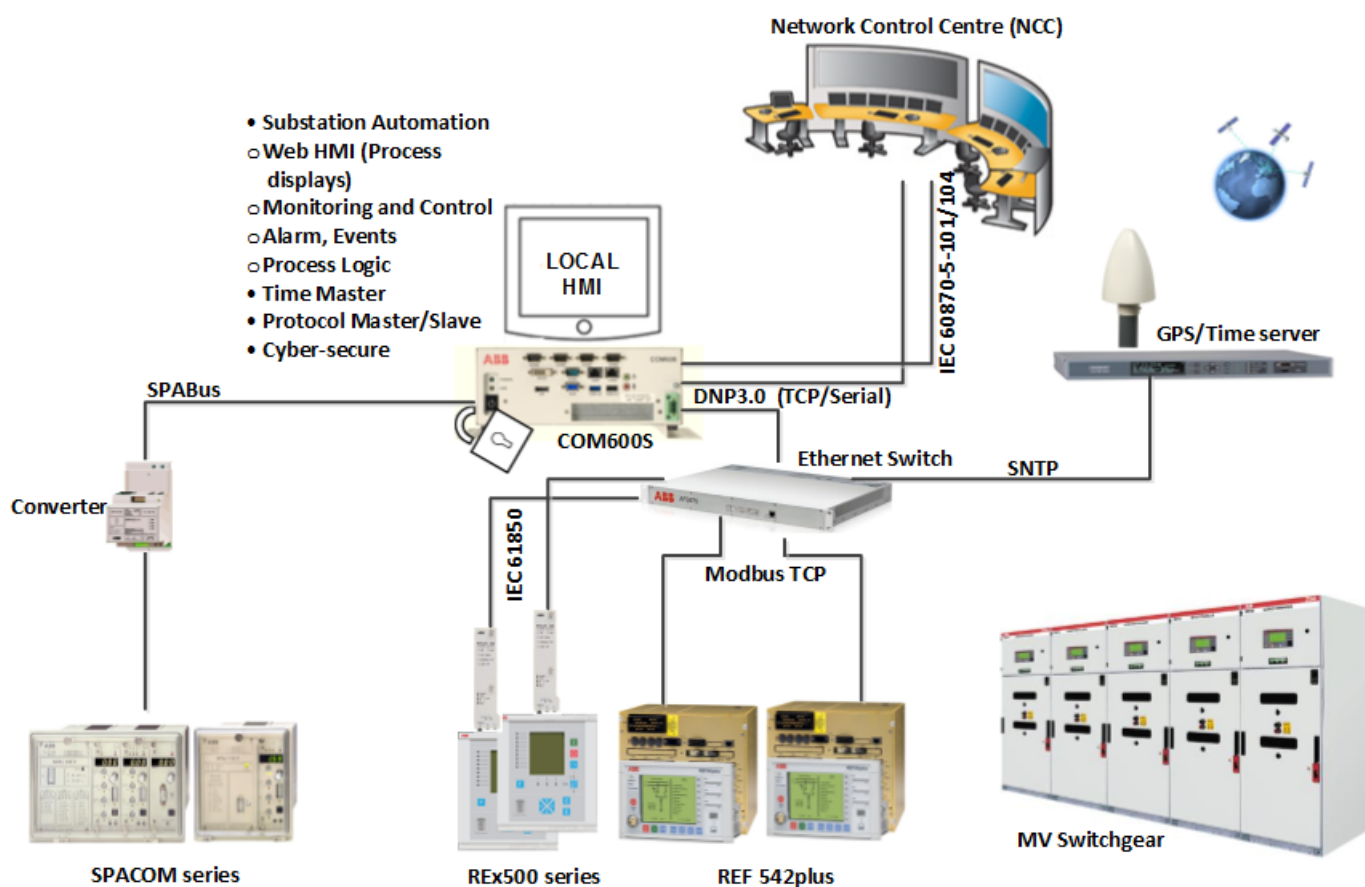


Figure 11. cDSA for substation with legacy protection relays

## 7. Alarm and event lists

Process Alarm and Event list together with audible alarm management is supported. These alarms and events are identified by date, time, bay, device, object description and status. Furthermore, the events and alarms can be automatically filtered according to voltage level or bay criteria. By default, 50 MB of disk space is reserved for storing the events. The storage enables the recording of up to ca. 500 000 events. The amount of disk space reserved for the events can be configured by the user. First-in, first-out logic is used for overwriting events. The user can export an event list to a .csv file for further analysis. COM600S also supports printing of events to an event printer.The COM600S hardware is incorporated with an annunciation feature that can be used for audible process and system alarms.

The SAB600 user can define the signal descriptions, if not available in the IEC 61850 SCL file through the relay configuration process.

## 8. Disturbance and fault record handling

COM600S automatically uploads disturbance records from the connected protection relays. The disturbance records are saved in the standard COMTRADE format. An in-depth analysis is enabled using the WaveWin ABB software disturbance record analyzer supporting the COMTRADE format. The automatic upload of disturbance records uses the IEC 61850 file transfer services or File Transfer Protocol (FTP). The files can be transferred from the COM600S to an external computer using FTP.

COM600S includes an optional WebHMI functionality that supports the viewing of fault records from the 611, 615 and 620 series protection relays. The records enable the user to analyze recent power system events. Each record includes current, voltage and angle values, and so on. The fault records are marked with consecutive fault numbers and time stamps that indicate when the faults were detected.

A new disturbance record summary feature is now available, ensuring the following:

1. Display of the latest recording from each bay's protection relay
2. Sorted list of recordings according to time of occurrence
3. Indication of number of recordings retrieved and stored from every protection relay
4. Automatic update of new/deleted recordings
5. Local view of recordings using WaveWin application
6. All the above in the context of device and bay names, recording description

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## 9. Data historian

The COM600S Data Historian is a real-time database designed and optimized for process information management and extensive history recording.

The Data Historian is based on ABB's cpmPlus Knowledge Manager software. It combines the benefits of an easy-to-use real-time database with industrial reliability, performance, and real-time functionality to provide an excellent platform for process information management. The Data Historian can be used for accurate process performance monitoring by following process and equipment performance calculations with real-time and history values. Better understanding of the process behaviour by joining time-based process measurements with production and maintenance events helps the user to understand the process dynamics. It further provides required information for learning how to keep the process running. High performance and reliability, together with maintenance-free operation, provide a solid platform for trending. The optional Data Historian functionality offers means of storing, analyzing and presenting process data.



Figure8v3.png
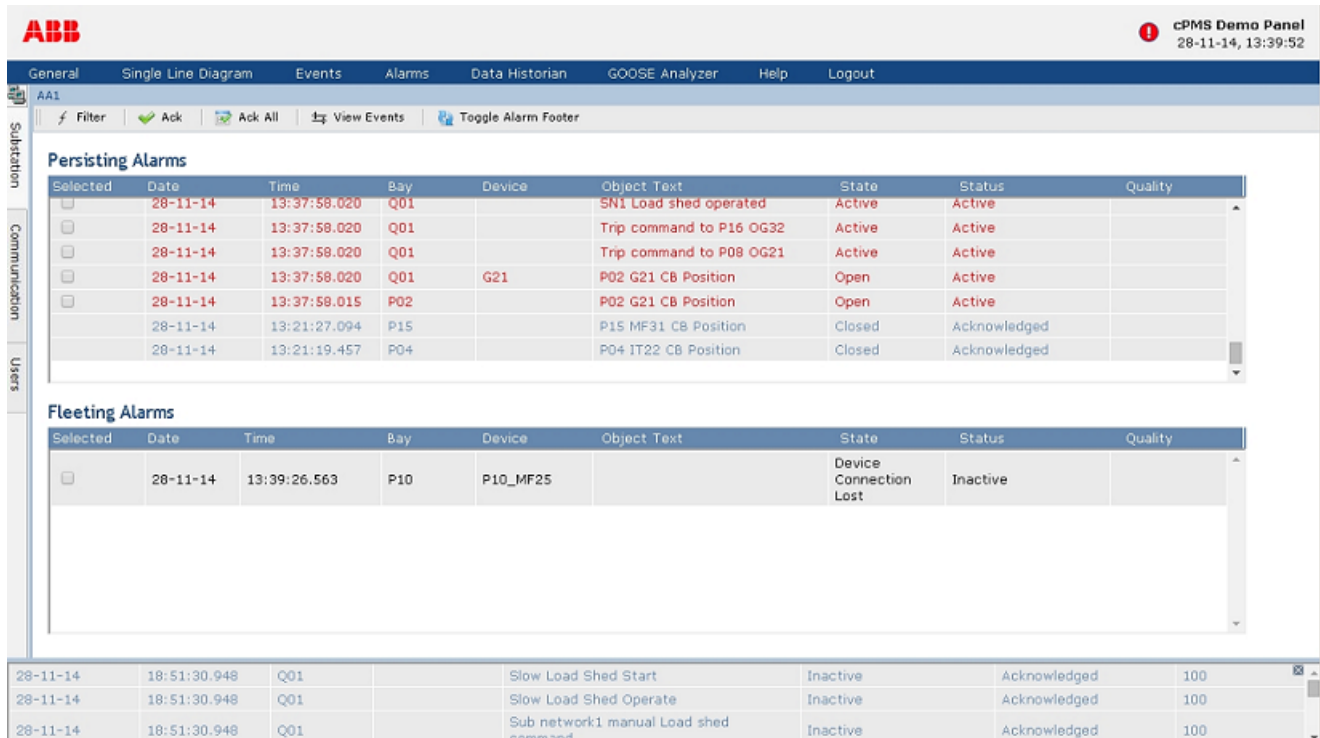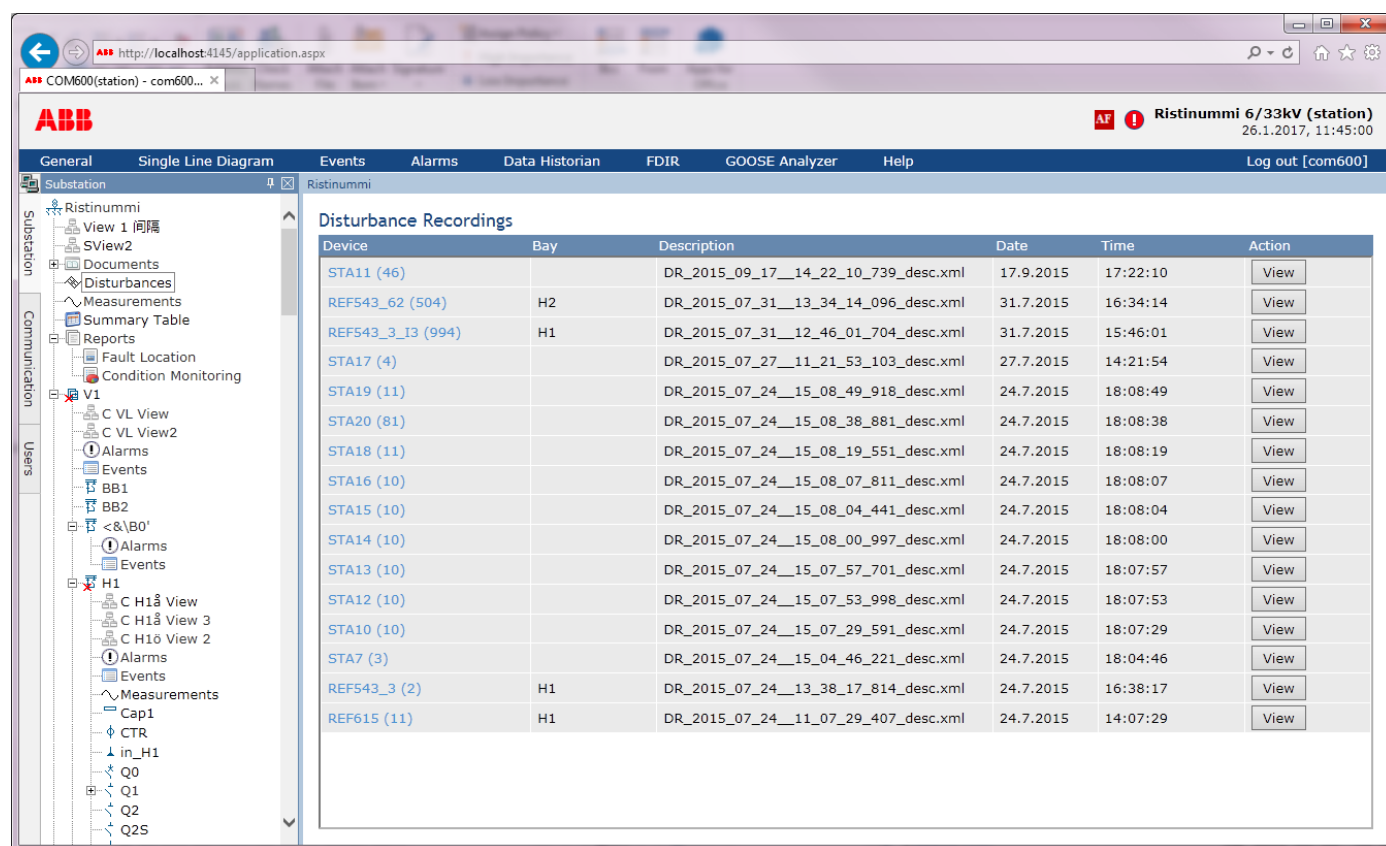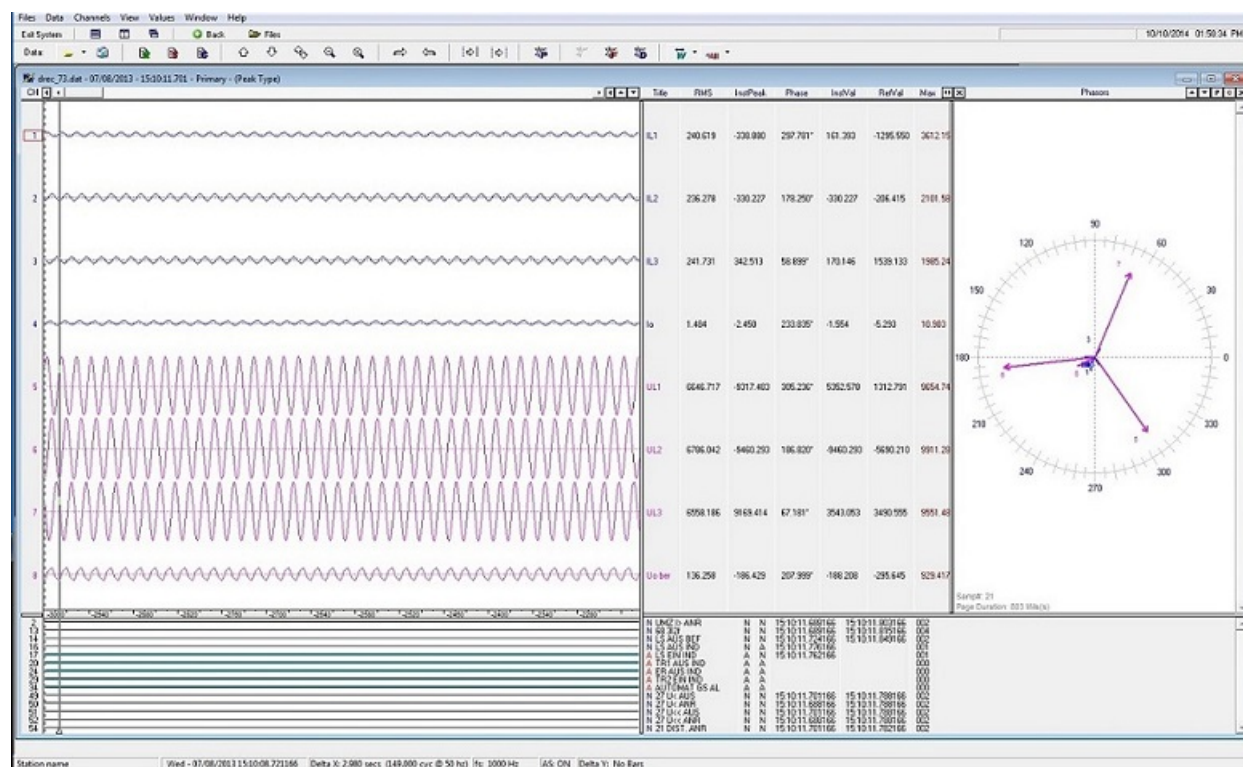
Figure 12. Alarm list showing persisting and fleeting alarms

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DR summary.png

Figure 13. Disturbance Record information access for ABB protection relays



WAVEWINv3.jpg

Figure 14. WaveWin Viewer

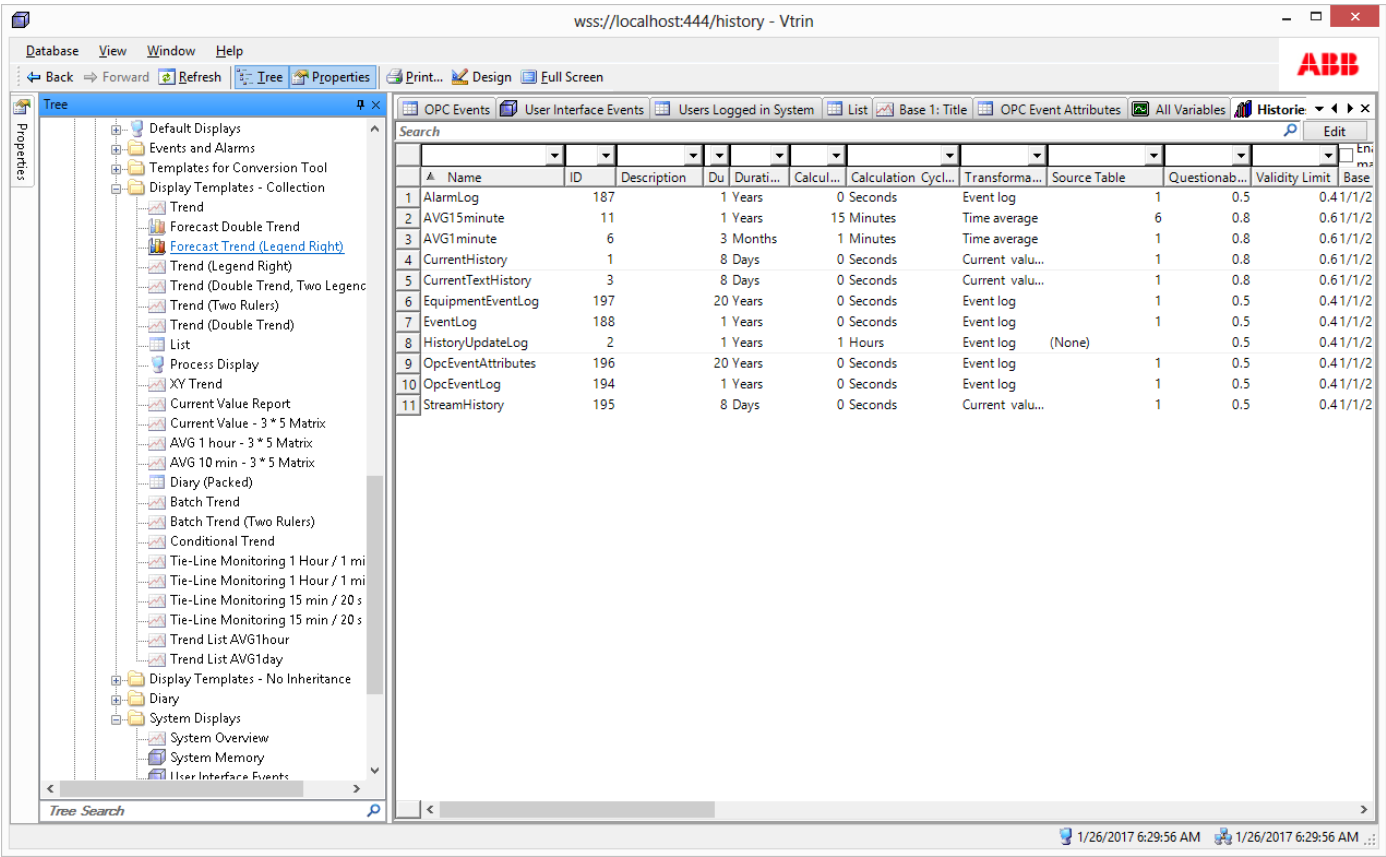ABB

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Figure 15. COM600S Data Historian

## 10. Soft-wiring monitoring with GOOSE Analyzer

The COM600S GOOSE Analyzer (GA) is a professional system-level tool for monitoring and analyzing GOOSE signals exchanged between protection relays over IEC 61850-8-1 substation bus. The analysis of GOOSE signals is based on a System Configuration Description file (SCD). This feature can be made use of during commissioning, operation, maintenance and upgrade phases of the system.

GA consists of a server and a user interface that is integrated with Process Visualization WebHMI. The server incorporates GOOSE Connection Viewer and the GOOSE Test Manager functionality.

The GOOSE Connection Viewer presents graphically the GOOSE signal flow from the publisher to subscriber protection relays on a content page. The Connection Viewer enables real-time diagnosis of the GOOSE signal flow presenting the status of communication between devices such as Relion series protection relays, Remote I/O RIO600, COM600S itself, other ABB IEC 61850 systems and 3rd party IEC 61850 protection relays. Further, the Viewer provides fast and reliable approach to establish a holistic view of all network devices utilizing GOOSE and the status of the communication links between them. It also provides a continuous list of latest sent values and real-time events. Query of historical events is also supported.
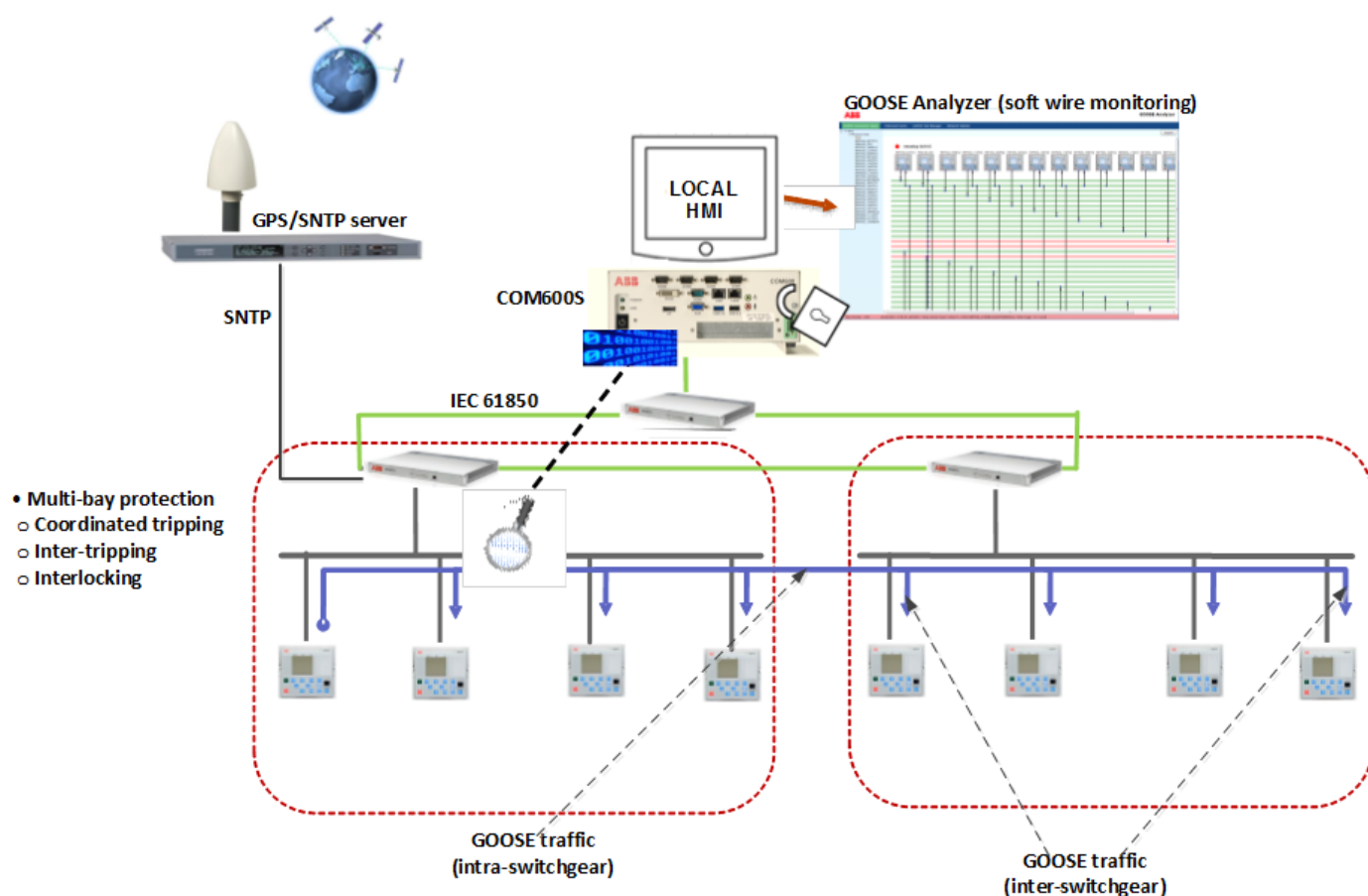


COM600_GOOSE_Analyzer.png

**Figure 16. COM600S GOOSE Analyzer for soft-wiring monitoring**

GA displays the diagnostic events on the COM600S WebHMI events list, together with other process events. A dedicated view of the diagnostic is also available under the GOOSE Connection Viewer/GOOSE Diagnostic Events tab. In this manner, the GA-generated alarms and events can be recorded even when the substation is unmanned or when the GA window is not open.

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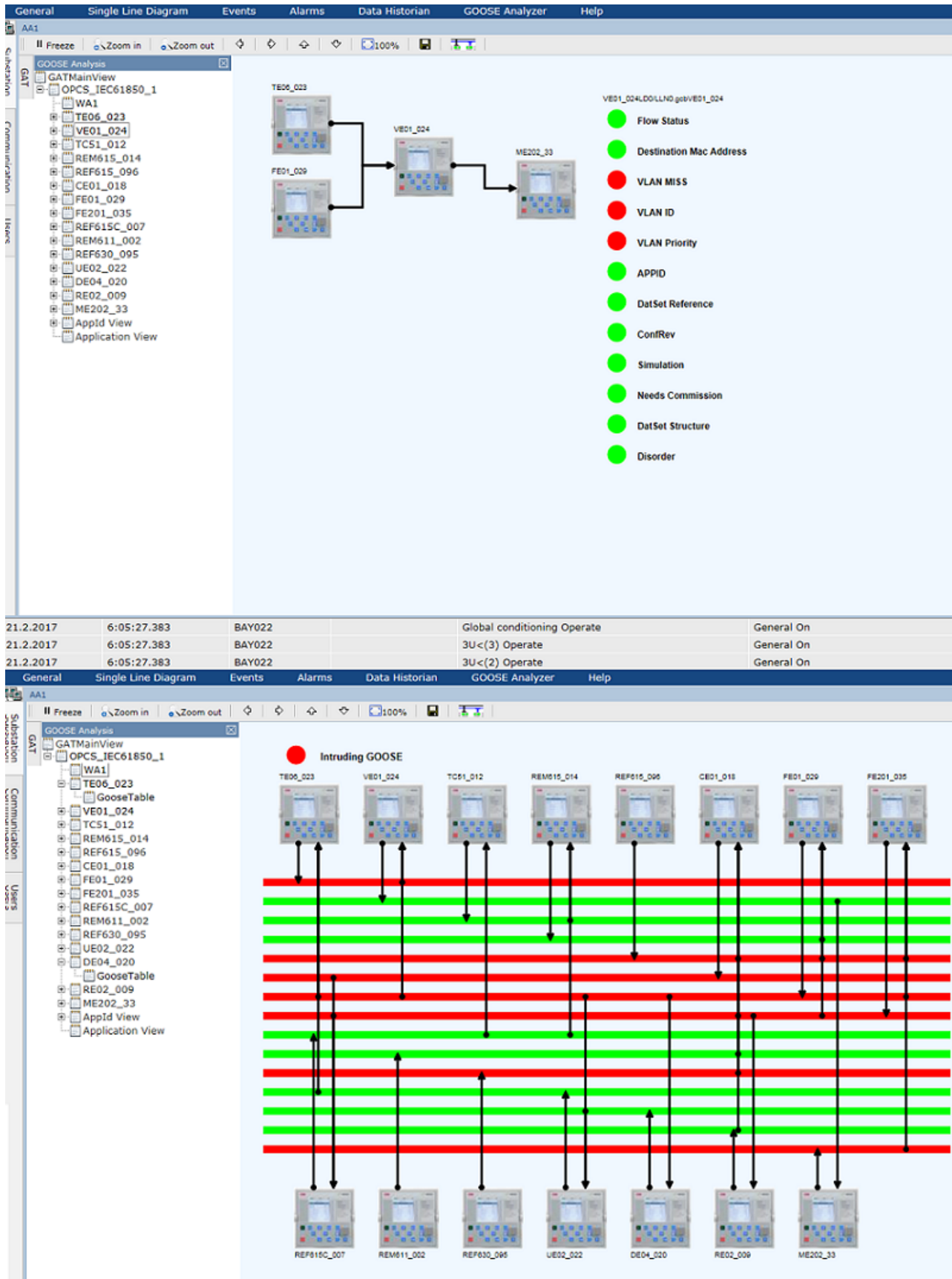
GA_wa2.png

Figure 17. GOOSE Analyzer

**11. Logic processor**

COM600S facilitates the creation and execution of specialized substation automation logic or applications using real time data acquired from connected substation devices, or external systems and activate control actions.

It is also possible to use historical data to execute logic with the help of the Logic Processor feature. This feature supports all five Programmable Logic Controller (PLC) languages specified by IEC 61131-3 standard and is offered as an optional feature.

The Logic Processor has on-line and off-line features for engineering and diagnostics. The result of the application logic can be displayed in the WebHMI and sent as a command to a protection relay or as processed information to an external system, such as an NCC or DCS.

A framework for sequence control application is also available within the Logic Processor. This framework includes WebHMI functions for controlling and monitoring the sequence execution, and a logic processor library for creating the sequence logic. With the help of sequences, the operator can run control sequences to operate multiple switching devices, like circuit breakers, sequentially to a certain state. It is recommended to ensure an optimal usage of the Logic Processor with the overall COM600S run time performance in mind.

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## 12. Substation analytics

Substation analytic functions and applications can be executed in the COM600S similar to protection related and condition monitoring functions in Relion relays. This enables customers to deploy IEC 61850 based protection relays that do not need to host these functions.

Fault location and circuit breaker condition monitoring applications can now be realized for multiple feeders in the substation. Depending on the selected product order code, the user can choose to run as many as 10 or 20 or 30 combined instances of these functions in a COM600S unit.

The fault location function provides an impedance-based fault distance calculation and is designed for ungrounded, radially operated power distribution systems. It is applicable for locating short circuits in all kinds of distribution networks. Earth faults can also be located in effectively earthed and in low-resistance/low-reactance earthed networks. This function is automatically triggered when relay trips circuit breaker on a feeder fault or when it initiates automatic reclosure of the circuit breaker. This function requires Disturbance Record (COMTRADE) and

specific IEC 61850 data from the relay(s) for whose feeders this function/application needs to be run.

The circuit breaker condition monitoring function is used to monitor different parameters of the feeder circuit breaker. The breaker requires maintenance when the number of operations has reached a pre-defined limit. Alarms are generated when the calculated values exceed the threshold settings. It gets triggered by change of circuit breaker or spring charge or gas pressure status changes. Similar to the fault location function, the circuit breaker condition monitoring function too requires COMTRADE and IEC 61850 data from the feeder relay.

Both functions use the Data Historian for storage of real-time process data and COMTRADE file data.

These two functions are configured using PCM600. A Connectivity package for COM600 ensures an easy configuration of these functions together with automatic logic creation.

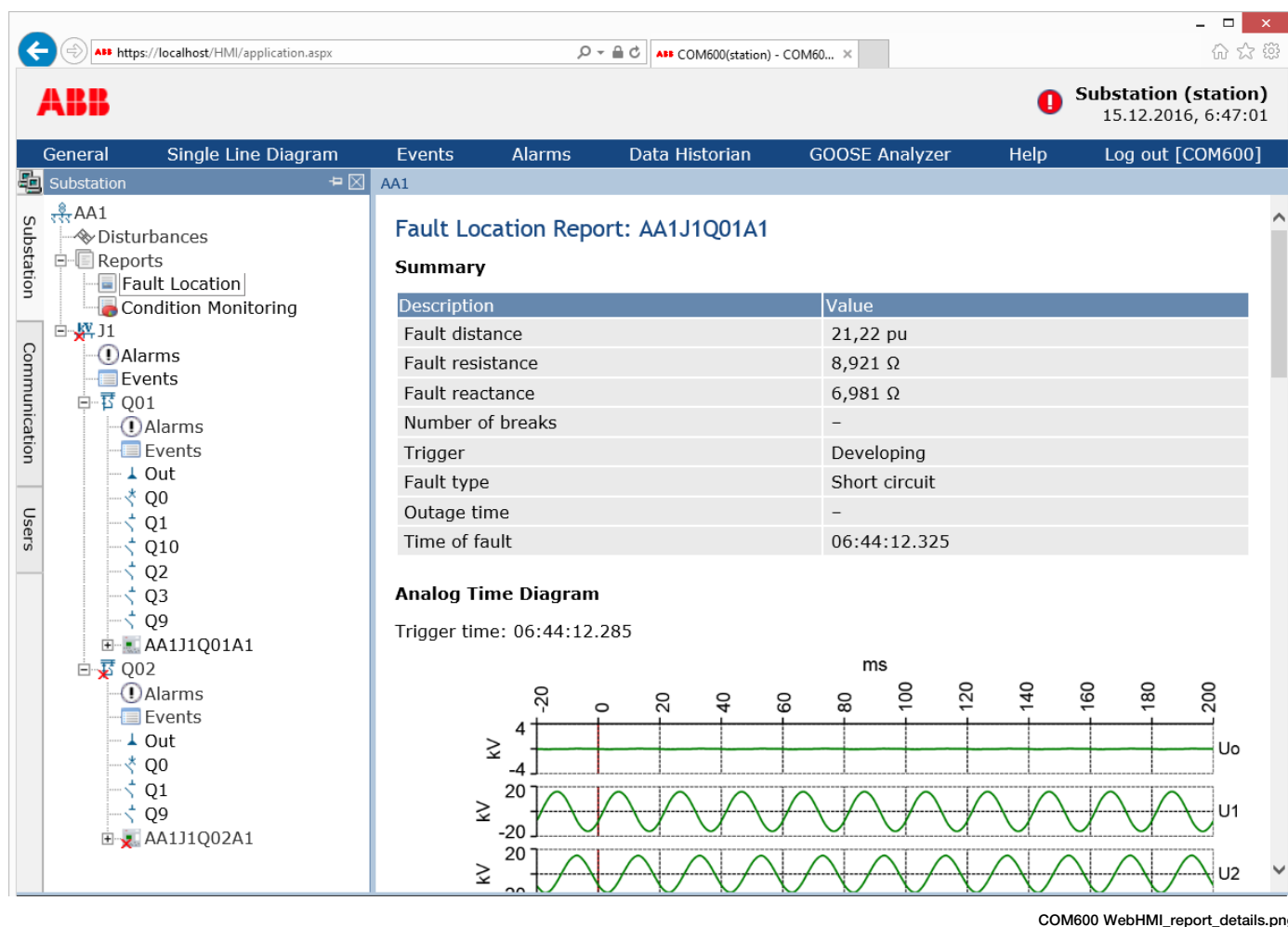The results of the execution of both functions are presented as special reports on the WebHMI.



COM600 WebHMI_report_details.png

**Figure 18. COM600S GOOSE Analyzer for soft-wiring monitoring**

ABB

## 13. Access control and substation security

To protect COM600S from unauthorized access and to maintain information integrity, COM600S is provided with a four-level, role-based authentication system with administrator-programmable individual passwords for viewer, operator, engineer and administrator level. Further, the security features include host-based firewalls and communication encryption using the secure HTTPS (HyperText Transfer Protocol Secure) protocol.

Extensive operational security aspects have been included in COM600S.

This includes the following:

- Generating and storing security events caused by user activity and other software operations.
- Capturing and storing security alarms/events in protection relays connected to COM600S and forwarding them, with the help of the gateway features, to a higher level systems like NCC, DCS or any external subscriber.

A dedicated OPC server called Security Event (SEV) OPC server is included to generate security events on a real time basis. The security events in the SEV OPC server are modeled according to IEC 61850. The security alarms and events can be forwarded using IEC 60870-5-101,104, DNP3.0 (serial/TCP) or Modbus.

The security alarms and events published in Syslog messaging format by the SEV OPC server, are sent to the Centralized Account Logging (CAL) server that performs a centralized log collection, session management and user authentication.

The CAL server presents logged events, Syslog messages, and others also in the process alarm or event lists.
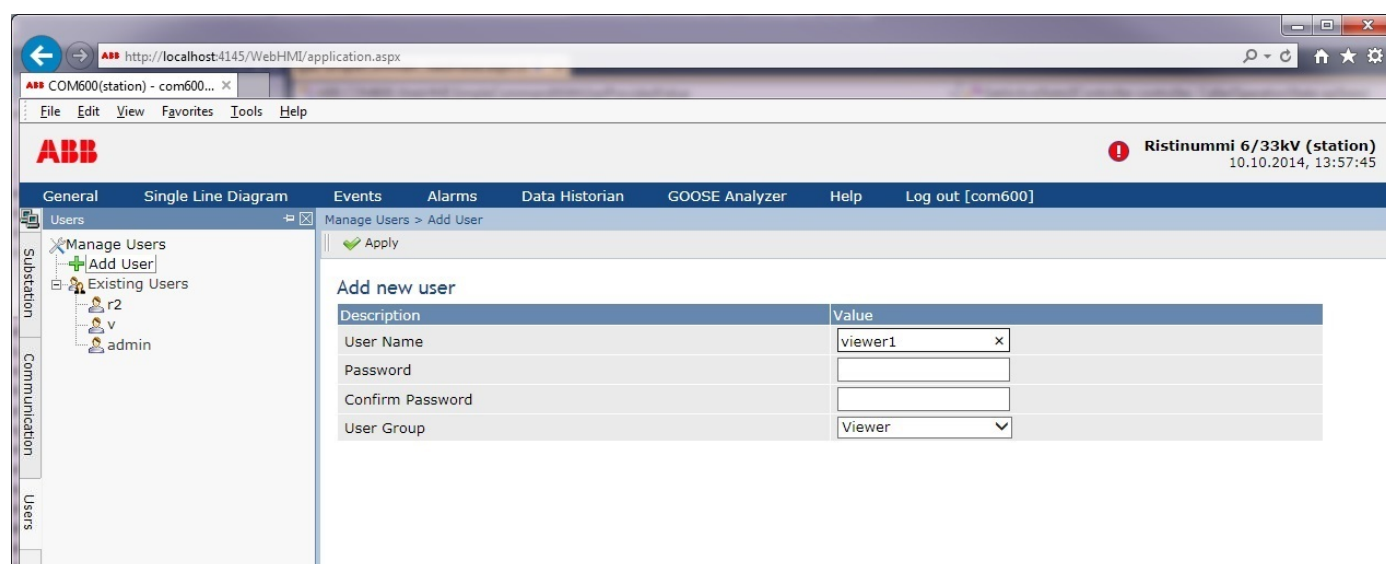


UserManagement.jpg

Figure 19. User access in COM600S

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Figure 20. Handling of system security alarms and events



Figure 21. Handling of system security alarms and events
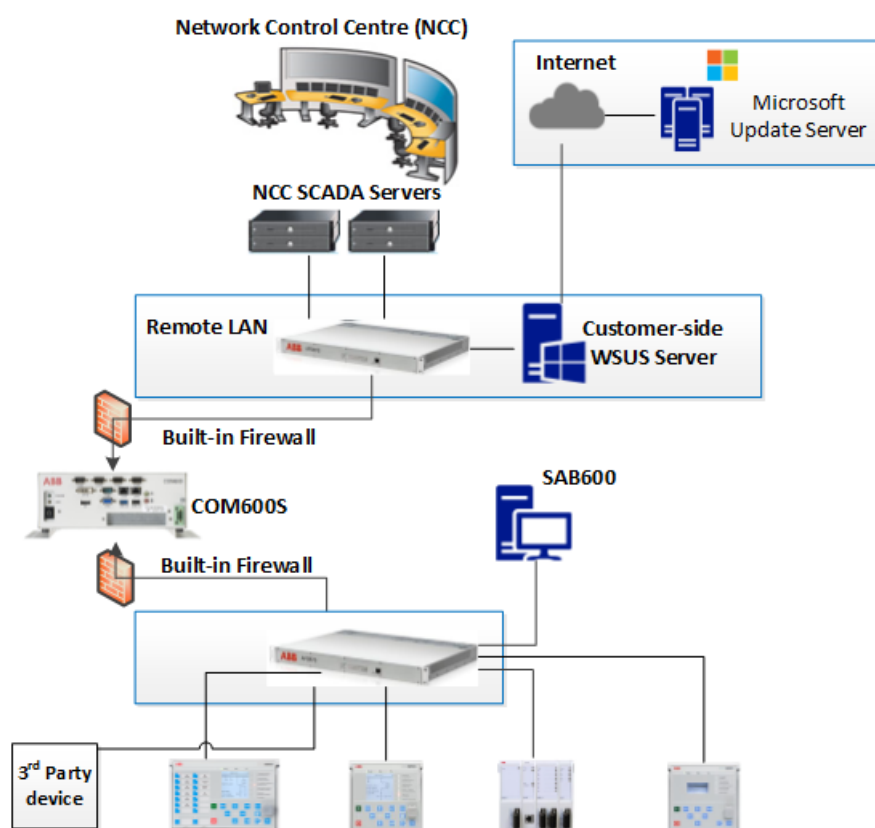
Figure 22. System arrangement for Windows OS patch updates

## Windows patch update management and anti-virus recommendations

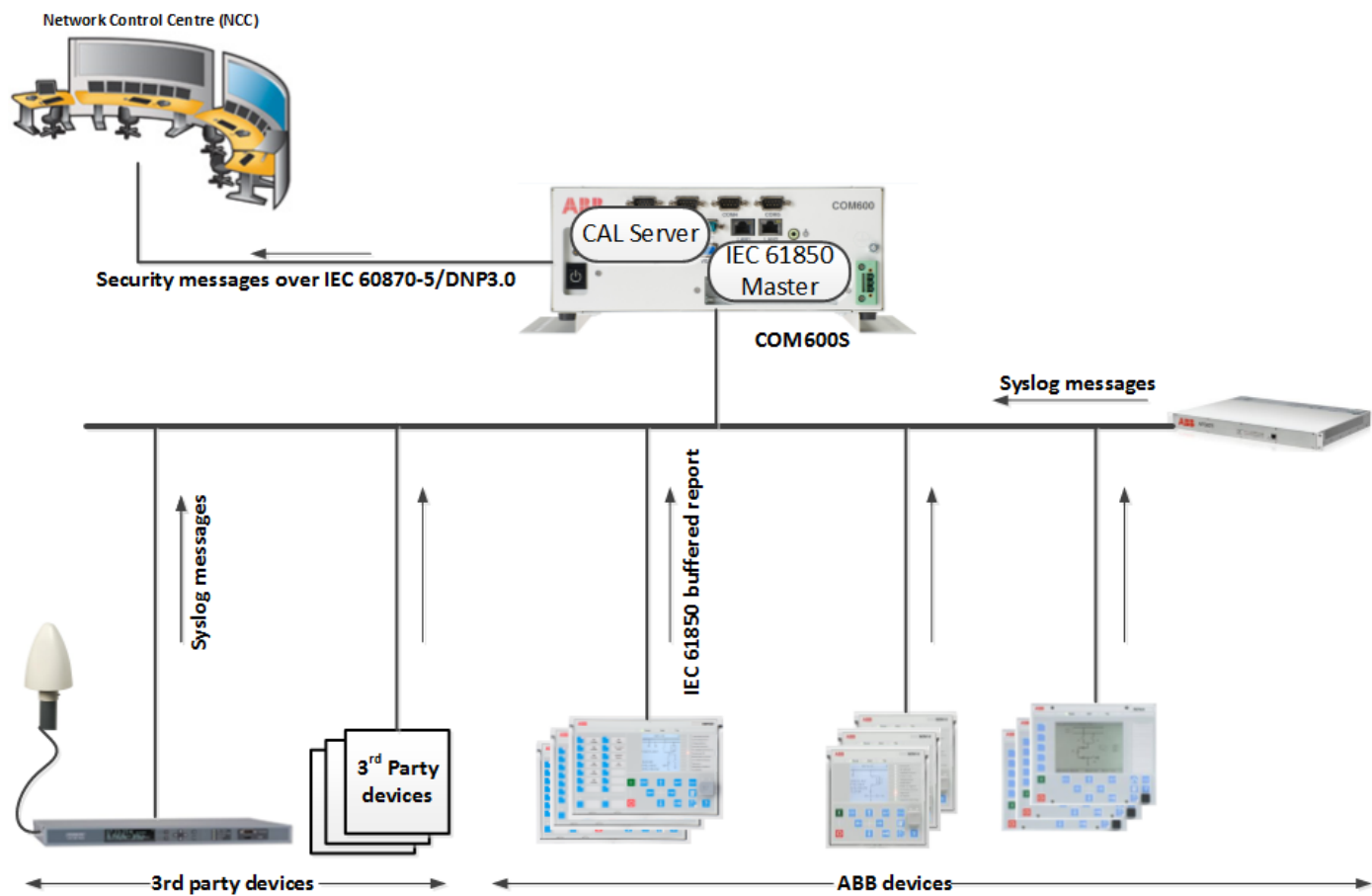In order to counter increased cyber threats and to ensure security of the substation network 'behind' the COM600S, it is essential that the Windows Operating System is also kept updated with certified patches from Microsoft and ABB.

Windows Server Update Services (WSUS) is an infrastructure that allows software updates from Microsoft to be deployed into COM600S device. These updates include OS related critical/security patches for COM600S. It is recommended to update only one unit at a time.

This procedure requires a local server at the customer location that is directly associated with update server in Microsoft premises. Based on ABB's periodic recommendations, only verified patches are deployed in the COM600S.

Another aspect of device cyber security is the deployment of anti-virus software in the COM600S device. As a part of product delivery from ABB, COM600S product would be certified to work standard and well known anti-virus packages like Norton, Kaspersky etc. No anti-virus package would be delivered by ABB together with the COM600S. Customers would be encouraged to install only ABB recommended list of anti-virus packages, which would be periodically updated.

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## 14. Specific support features for other protection relays

COM600S incorporates a few special process displays and status/control dialogs for:

- Capacitor bank protection and control using Relion REV615
- cPMS load-shedding solution using Relion PML630: COM600S can handle load-shedding functionality process displays for 2 PML630 units, configured in a single project.
- COM600S has a redundant OPC server which is dedicated to support dual redundant configuration for Smart Substation Control and Protection product SSC600.

For more information and details please refer to respective product manuals.
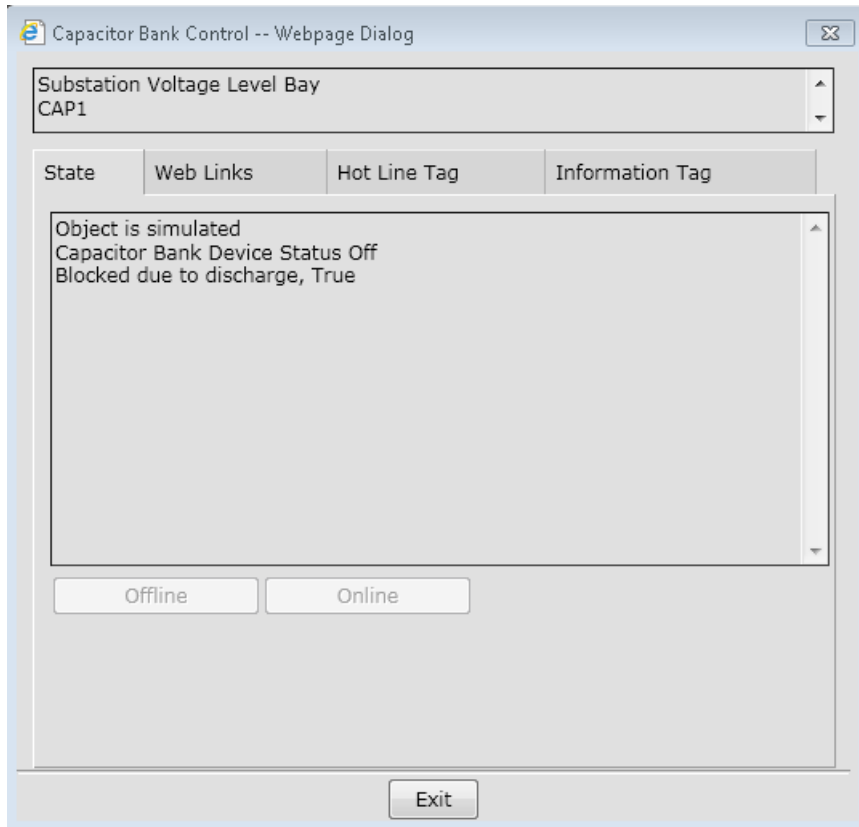


status dialog capacitor bank control.bmp

Figure 23. Status/control dialog: Capacitor bank control

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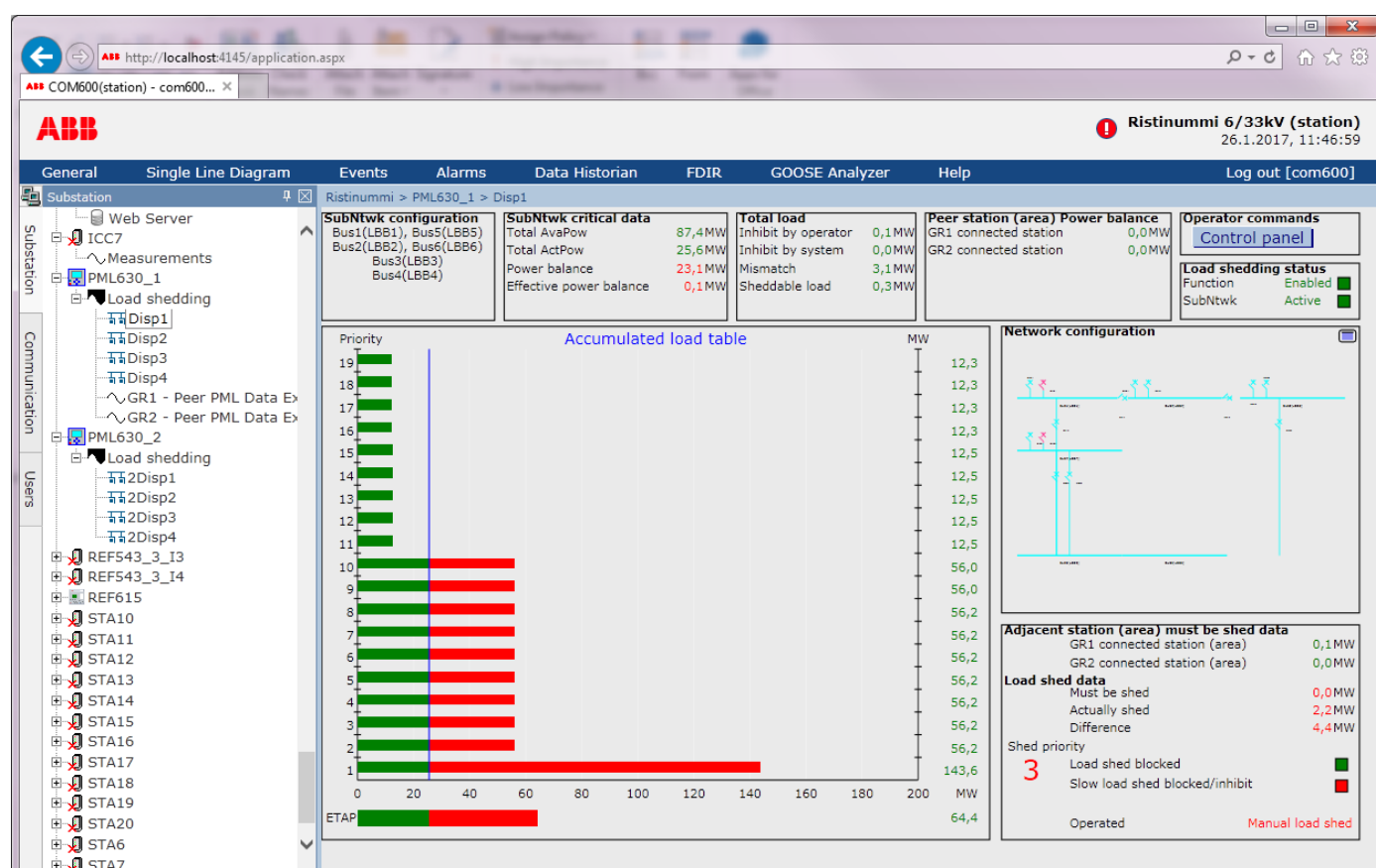
2 PML.png

Figure 24. cPMS load-shedding: Subnetwork display

## 15. Integration of ABB protection relays

COM600S supports ABB's connectivity package concept which simplifies system configuration and the integration of protection relays. A connectivity package is a collection of software and relay-specific information, which enable system products and tools to connect to and interact with the protection relay. The connectivity packages reduce the risk of errors in system integration, minimizing device configuration and set-up times. Engineering in COM600S is done by selecting the connectivity package for the protection relay version and configuration, or by importing the protection relay configuration file.

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## 16. Integration with other ABB and 3rd party systems, protection relays

COM600S offers connectivity to ABB's Automation System 800xA and MicroSCADA by means of OPC or other communication protocols.

Other 3rd party systems/protection relays too can be integrated with COM600S using any of the supported standard protocols mentioned earlier.
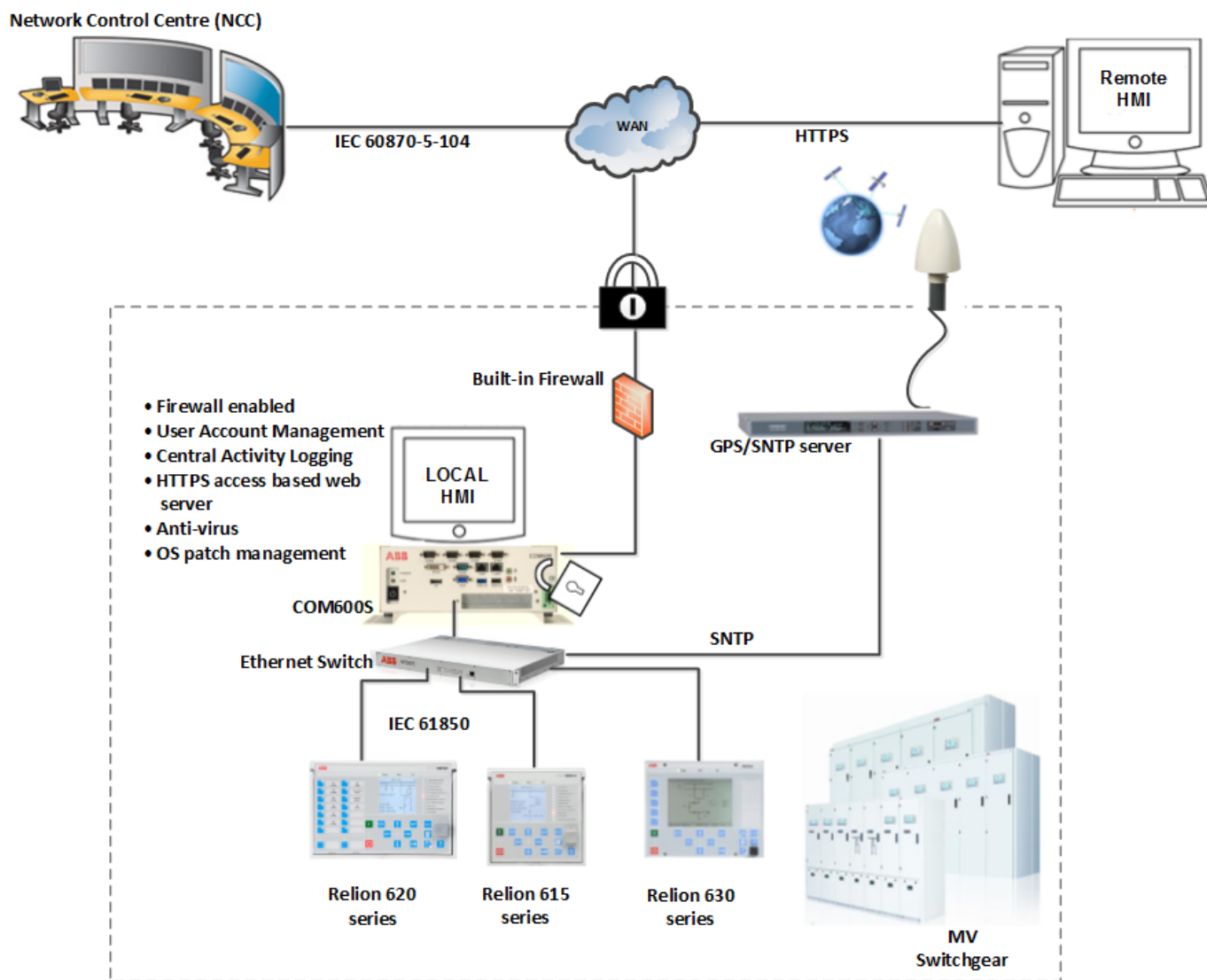


COM600_Security.png

Figure 25. Substation security and secured WebHMI for remote access

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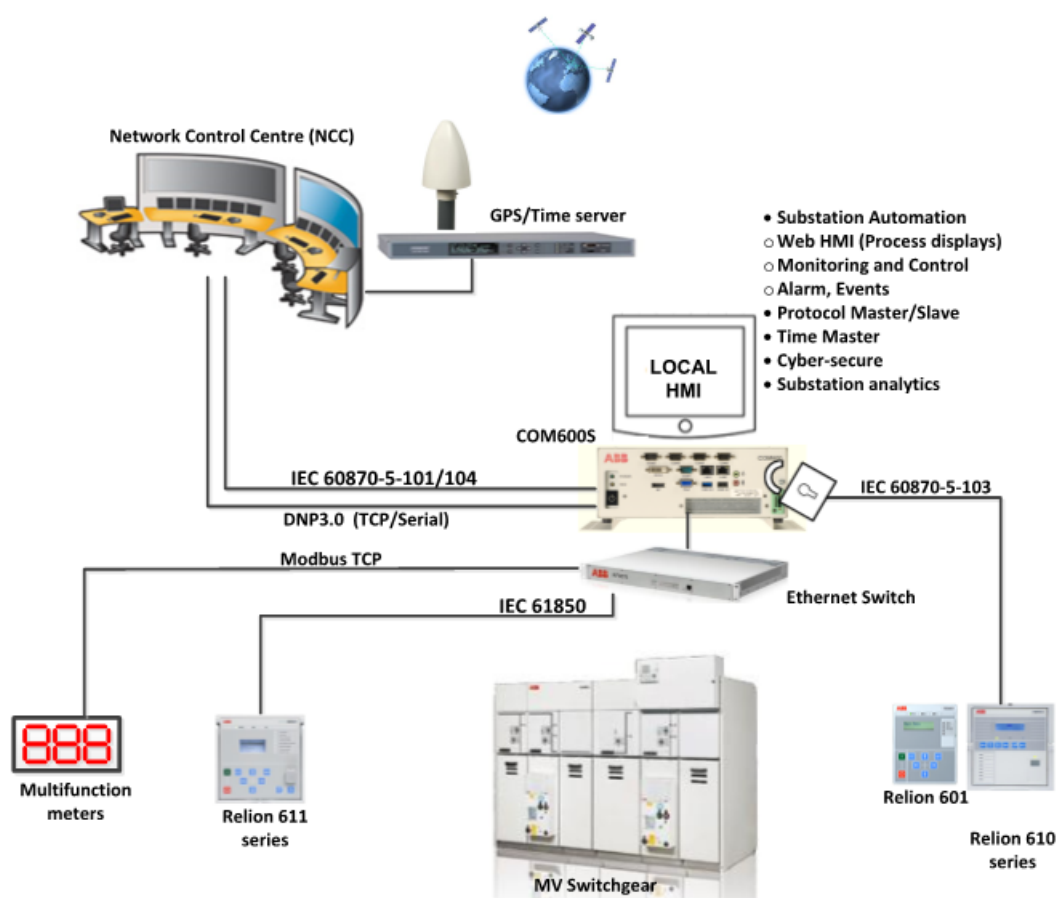
COM600_Sec Substation_Analytics.png

Figure 26. Example of cDSA for secondary distribution substations

## 17. Commissioning and troubleshooting

Besides its GOOSE Analyser feature, COM600S also offers several tools and functions to support efficient commissioning and troubleshooting of the substation. COM600S's built-in protection relay simulation functionality enables the testing and verification of the WebHMI and gateway configuration without any physical connection to protection relays and external systems. Further, communication diagnostic events can be enabled to track all messages being sent or received by COM600S.

Using the Station Automation Builder SAB600 (COM600S configuration tool), on-line diagnostic data, real-time process data and communication channels can be analyzed without the need for separate protocol analyzers.

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## 18. Communication interfaces

By default COM600S is equipped with:

 a) 2 Ethernet interfaces
 b) 5 serial interfaces

The above can be augmented by an additional (optional) plug-in card with 1 fiber optic, 2 Ethernet, or 8 serial interfaces respectively.

In all, COM600S can have a maximum of 4 Ethernet or 13 serial ports:

• 2 Ethernet and 5 serial interfaces
• 4 Ethernet and 5 serial interfaces
• 2 Ethernet and 13 serial interfaces
• 2 Ethernet, 5 serial interfaces and 1 fiber optic interface

### Master and Slave protocols

As the COM600S is inherently designed to support the IEC 61850 standard, it can easily and conveniently be integrated an IEC 61850 based substation automation network. The COM600S supports both IEC 61850-8-1 MMS and GOOSE profiles for vertical and horizontal communication with compliant protection relays.

Apart from IEC 61850, COM600S also supports other standard, de-facto and legacy master communication protocols like IEC 60870-5-101, 103, 104, DNP3.0 (LAN and serial), OPC, Modbus (TCP and serial) and ABB's legacy SPA (LAN and serial). This enables the connectivity of both IEC 61850 and non-IEC 61850 based devices (meters, protection relays, substation controllersm, and so on) to the substation automation network. Besides, the COM600S also supports SNTP (Simple Network Time Protocol) for time synchronization and SNMP (Simple Network Management Protocol) for network management.

In order to adapt non-IEC 61850 devices to a IEC 61850 network, the COM600S can also act as a IEC 61850 proxy server converting incoming and outgoing data from/to the external devices. The IEC 61850 proxy server of COM600S is, thereby, very useful during system extensions. The IEC 61850 proxy server feature can also be used in cases where the COM600S needs to serve as an IEC 61850 data source (protection relay). The COM600S only supports Edition 1, when acting as a proxy server. The proxy server is considered as a slave interface.

Note: When IEC 61850 Proxy server is opted for, only one additional slave protocol can be added.

Typically, IEC 61850 devices generate vast amounts of data. In some cases, it may be necessary to limit the amount of data sent to the SCADA or DCS in order to avoid unnecessary information overflow/handling. The SAB600 cross-reference tool is used to selectively map substation information (from substation devices) or data generated by COM600S itself to slave protocols like IEC 60870-5-101, 104, DNP3.0 (LAN and serial), OPC and Modbus (TCP and serial). Reducing information to higher level systems not only reduces load but also increases operational security. For example, it is possible to disable control actions from a certain higher level system.

The COM600S's OPC client and server connectivity enables data access and data sharing between external systems supporting OPC.

### Redundancy

To maintain and improve the reliability of the communication network and the communication between the protection relays and COM600S, IEC 62439/PRP (Parallel Redundancy Protocol, PRP-1)-based communication is supported. PRP is based on dupli cated networks, where each message is sent via both networks. The first of the received messages is accepted, whereas the duplicate is discarded. Message replication and discarding is done by DuoDriver in COM600S. Further, DuoDriver hides the two networks from upper-level applications. IEC 62439/PRP-based communication requires that COM600S is equipped with an optional LAN card and that the protection relays that are used support PRP.

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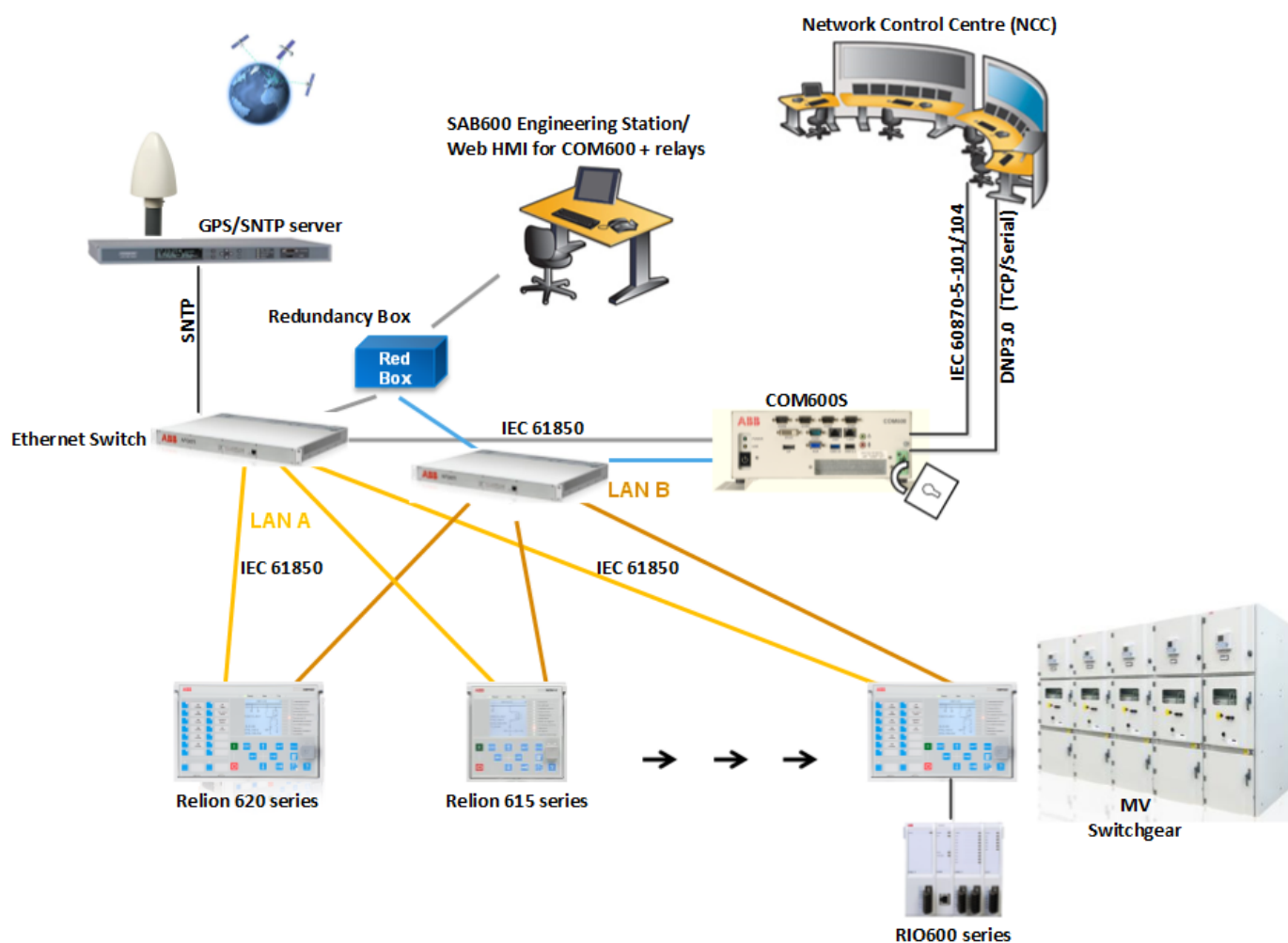
Figure 27. COM600S in PRP configuration with other Relion series protection relays

However, COM600S does not support the High-Speed Redundancy ring (HSR) protocol. In order to adapt itself to work in such a communication network, COM600S needs to be connected to an external redundancy box.

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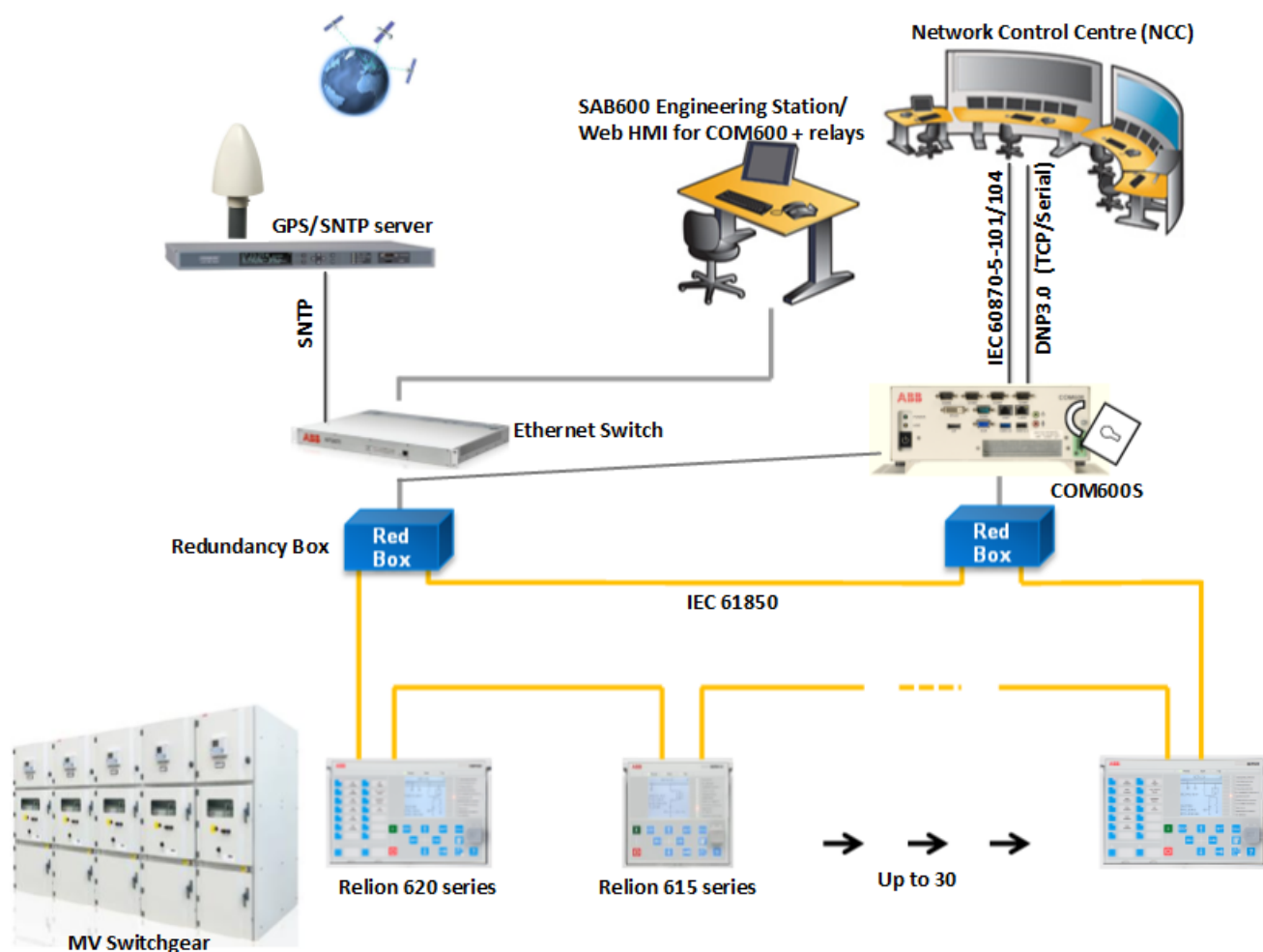
Figure 28. COM600S in HSR configuration with other Relion series protection relays

## 19. IEC 61850 Edition 2 compatibility

The configuration tool of the COM600S, the Station Automation Builder (SAB600) and the realtime data handling part, the IEC 61850 OPC server, can handle SCL files with IEC 61850 Edition 2 rules. These include the following:

- New access point services as defined in IEC 61850-7-2
- Ability to process functions, sub-functions' information for Alarm/Event handling and SLD support
- Support to import Instantiated IED Description (IID) and System Exchange Description (SED) files
- To recognize data from a protection relay with multiple access points
- Data object handling for redundant communication
- Longer data semantics
- Local remote handing including the multiple level control philosophy
- Parameter revision handling and support in Alarm/Event lists
- New Common Data Classes (CDCs)

However, the data models could be based on Edition 1 or 2. This enables interoperability of engineering tools and consequently protection relays (including COM600S) that are based on either edition.

Note: The SAB600 supports necessary rules for data modeling as per Edition 1, when COM600S is used as a gateway or as an IEC 61850 proxy device for legacy protection relays.

It is recommended to have all protection relays and COM600 working either as per Edition 1 or as per Edition 2 in the same network. It is not recommended to mix the two and PCM600 tool ensures this rule.

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## 20. Base product highlights

The product release is based on a new hardware with the following details:

- Intel 4-core processor running Windows Embedded Standard 8.0 operating system
- 8GB system memory
- 128GB solid state hard drive
- IEC 61850-3 certified
- 2 x RJ-45 Ethernet- LAN interfaces
- 3 x RS232 interfaces
- 2 x RS232/422/485 interfaces

- 2 x USB (2.0, 3.0)
- 1 x VGA, DVI-D, HDMI display interface
- 1 additional extension card (8 x RS232/422/485 or 2 x RJ-45 Ethernet- LAN or 1 x FX-LC)

The COM600S WebHMI additionally incorporates the hardware unit's system diagnostics, including:

- CPU usage, core temperatures
- Physical memory consumption
- Disk usage, availability and temperature
- Network card data flow

### System Information

| Description | Value |
| --- | --- |
| Product name | COM600 |
| Product version | 5.0 |
| License version | 5.0 |
| Software version | 5.0.6151.18520 |
| Customer name | ******************* |
| Site | COM600 5.0 HW |

### System Diagnostics

| Description | Value |
| --- | --- |
| CPU Usage | 0,13 % |
| CPU Package Temperature (°C) | 38 |
| CPU Core Temperatures (°C) | 37 \| 37 \| 35 \| 36 |
| Physical Memory Total (MB) | 8 070 |
| Physical Memory Available (MB) | 6 342 |
| Disk Total (MB) | 118 285 |
| Disk Free (MB) | 101 189 |
| Disk Read (B/s) | 0 |
| Disk Write (B/s) | 0 |
| Disk Temperature (°C) | 38 |
| Network Received [Remote] (B/s) | 0 |
| Network Sent [Remote] (B/s) | 0 |
| Network Received [Local] (B/s) | 7 100 |
| Network Sent [Local] (B/s) | 23 872 |

Figure 29. System Diagnostics

## 21. Customer value

The COM600S's WebHMI, communication gateway, automation and protection relay infrastructure integration features will always be available together. As a result the below customer value aspects need to be considered together for value addition.

- Integrated medium voltage switchgear with substation automation
- Easy to add substation automation to existing protection and control installation
- Closer integration with Relion protection relays
- Always IEC 61850 ready with integrated WebHMI

- Easy adaptation of legacy protection relay infrastructure to IEC 61850, without the need to discard them (through IEC 61850 proxy server). GOOSE communication can therefore be enabled between newer IEC 61850 protection relays and older protection relays through COM600S.
- Soft-wiring monitoring and GOOSE based application monitoring (such as load-shedding etc.) using GOOSE Analyzer feature
- If SCADA or DCS connectivity for substation control fails, a quick 'portable' PC can be arranged as WebHMI.
- Centralized automated disturbance record collection, viewing and transfer

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- Digital documentation of all substation drawings and manuals
- Historical data storage could be used to retrieve and represented in trends and to also execute substation functionality with historical data.
- In a packaged solution, customer gets benefits of integrated IEC 61850 substation that brings in combined features of

substation WebHMI, gateway, user access and operational security and substation level applications.



Trends.png

**Figure 30. Real-time and historic trending**

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## 22. Technical data for COM600 series

### Table 1. Dimensions

| Description | Value |
|---|---|
| Width | 10.45in (265.43mm)<br>12.38in (314.45mm) with mounting bracket |
| Height | 4in (101.6mm)<br>4.68in (118.87mm) with mounting bracket |
| Depth | 9in (228.6mm) |
| Weight | 12lbs (5.44kg) |

### Table 2. Power Supply

| Description | Type 1 | Type 2 |
|---|---|---|
| Nominal Input Voltage $U_n$ | 110 - 230 V AC 50 and 60Hz<br>125 - 250 V DC | 24 - 60 V DC |
| Hold-up Time | 50 ms at $U_n$ | |
| Input Voltage Range | 85…264 V AC<br>110…375 V DC | 19…72 V DC |
| Power Consumption | ~45W @ max CPU Load[1] | |
| Fuse type | | 10A/125V |

1) Without optional cards.

### Table 3. Hardware

| Description | Details |
|---|---|
| Processor | Intel Core i5-4590T Haswell Quad-Core 2.0GHz LGA 1150 |
| System Memory | 8 GB DDR3 204-Pin SO-DIMM |
| Hard Drive | 128GB Solid State Drive |
| Real Time Clock Battery | Lithium battery |

### Table 4. Interfaces

| Description | Details |
|---|---|
| Serial Interfaces | 3x RS-232; 2x RS-232/422/485 Configurable |
| Ethernet Interfaces | 2x GbE RJ-45 |
| Display Interfaces | 1x VGA; 1x DVI-D; 1x Display Port |
| USB | 1x USB 2.0; 1x USB 3.0 |
| Audio | 1x Line-out; 1x MIC-in |

### Table 5. Optional PCI Extensions

| Description | Details |
|---|---|
| Serial Interfaces [1] | 8 x RS-232/485 Configurable |
| Ethernet Interfaces [2] | 2 x GbE RJ-45 |
| Fiber Optic Interfaces [3] | 1 x 100FX LC |

1) Operating temperature 0° C - +55° C; Storage temperature = -20°C to 85°C; Relative Humidity = 5 to 95% (non-condensing)

2) Operating temperature 0° C - +55° C; Storage temperature = -40°C to 70°C; Relative Humidity = 90% (non-condensing) at 35°C

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3) Operating temperature 0° C - +50° C; Storage temperature = -25°C to 70°C; Relative Humidity = 5 to 95% (non-condensing)

**Table 6. Operating System**

| Description | Value |
|---|---|
| Operating System | Windows Embedded Standard 8 |

**Table 7. Inspection of Mechanical Structure**

| Description | Reference |
|---|---|
| Markings and Mechanical Structure | IEC 61850-3:2013 6.1 |
| Degree of Protection by Enclosure | IEC 61850-3:2013 6.11, IEC 60529 |
| Clearance and Creepage Distances | IEC 61850-3:2013 6.6.1, IEC 60255-27 |

**Table 8. Insulation Tests**

| Description | Reference |
|---|---|
| Dielectric Test | IEC 61850-3:2013 6.6.4, IEC 60255-27 |
| Impulse Voltage Test | IEC 61850-3:2013 6.6.3, IEC 60255-27 |
| Insulation Resistance | IEC 61850-3:2013 6.6.6, IEC 60255-27 |
| Protective Bonding Impedance | IEC 61850-3:2013 6.6.5, IEC 60255-27 |

**Table 9. Electromagnetic Compatibility Tests**

| Description | Reference |
|---|---|
| Electrostatic discharge test:<br><br>• Contact Discharge<br>• Air Discharge | According to IEC 60601-1-2, IEC 61850-3:2013<br>+/- Volts = 6 kV<br>+/- Volts = 8 kV |
| Radiated Electromagnetic Field Immunity | According to IEC 61000-4-3:2010, IEC 61850-3:2013<br>Severity = 10V/m<br>Start Frequency = 80 MHz<br>Stop Frequency = 3,000 MHz<br>Modulation = 1kHz, 80% |
| Electrical Fast Transient/Burst Immunity<br><br>• Power Supply<br>• RJ-45 Port<br>• Serial Port | According to IEC 61000-4-4:2012, IEC 61850-3:2013<br>Amplitude = 2kV<br>Amplitude = 1kV<br>Amplitude = 1kV |
| Surge Immunity<br><br>• Power Supply<br>• RJ-45 Port<br>• Serial Port | According to IEC 61000-4-5:2005, IEC 61850-3:2013<br>Test Level = 2 kV Line to Ground, 1kV Line to Line<br>Test Level = 1 kV Line to Ground, 0.5kV Line to Line<br>Test Level = 1 kV Line to Ground |
| Conducted Radio Frequency Immunity | According to IEC 61000-4-6:2008, IEC 61850-3:2013<br>Test level = 3 Vrms<br>Frequency Range = 0.15 MHz to 80 MHz |
| Damped Oscillatory Waves<br><br>• Transverse<br>• Common | According to IEC 61000-4-18:2009, IEC 61850-3:2013<br>Test Voltage = 0.5kV<br>Test Voltage = 1kV |
| Voltage Dips, Interruptions an Variations | According to IEC 61000-4-11:2004, IEC 61850-3:2013 |

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Table 9. Electromagnetic Compatibility Tests, continued

| Description | Reference |
|---|---|
| | 30% for 0.1s<br>60% for 0.1s<br>100% for 0.05s |
| Conducted Emissions | According to CISPR 22:2010, IEC 61850-3:2013<br>Class A |
| Radiated Emissions | According to CISPR 22:2010, IEC 61850-3:2013<br>Class A |

Table 10. Environmental Conditions

| Description | Value |
|---|---|
| Operating Temperature Range | -10°C to 55°C[1] |
| Relative Humidity Range, Non-Condensing | 5 to 95%[1] |
| Storage Temperature | -40°C to 85°C[1] |

1) Without any option cards. See table 5 for more information.

Table 11. Environmental Tests

| Description | Reference |
|---|---|
| Dry Heat Test - Operational | According to IEC 60068-2-2:2007, IEC 61850-3:2013<br>16h at 55°C |
| Cold Test - Operational | According to IEC 60068-2-1:2007, IEC 61850-3:2013<br>16h at -10°C |
| Dry Heat Test - Storage | According to IEC 60068-2-2:2007, IEC 61850-3:2013<br>16h at 85°C |
| Cold Test - Storage | According to IEC 60068-2-1:2007, IEC 61850-3:2013<br>16h at -40°C |
| Temperature Change Test | According to IEC 60068-2-2:2007, IEC 60068-2-1:2007, IEC 60068-2-14:2009 IEC 61850-3:2013<br>5 Cycles, 3h Dwells at Upper (55°C) and Lower (-10°C) Temperatures, 1 C/min Ramp Rate |
| Damp Heat Steady State Test | According to IEC 60068-2-78:2001, IEC 61850-3:2013<br>10d at 40°C, 93% Relative Humidity |
| Damp Heat Cyclic Test | According to IEC 60068-2-30:2005, IEC 60068-2-78:2001, IEC 61850-3:2013<br>6 Cycles (12 h + 12 h)<br>Upper Limit = 40°C, 93% Relative Humidity<br>Lower Limit = 25°C, 96% Relative Humidity |

Table 12. Mechanical Tests

| Description | Reference |
|---|---|
| Vibration Tests<br><br>• Vibration Response Test<br>• Vibration Endurance Test | According to IEC 60255-21-1, IEC 61850-3:2013<br>Class 1<br>Class 1 |
| Shock and Bump Tests | According to IEC 60255-21-2, IEC 61850-3:2013<br>Class 1 |

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**Table 12. Mechanical Tests, continued**

| Description | Reference |
|---|---|
| • Shock Response Test<br>• Shock Withstand Test<br>• Bump Test | Class 1<br>Class 1 |
| Seismic Test<br><br>• Single Axis Sine Sweep (Method A) | According to IEC 60255-21-3, IEC 61850-3:2013<br>Class 1 |

**Table 13. EMC Compliance**

| Description | Reference |
|---|---|
| Complies with 61850-3:2013 | 61850-3:2013 – Communication networks and systems for power utility automation – Part 3: General requirements |

**Table 14. Product Safety**

| Description | Reference |
|---|---|
| Complies with 61850-3:2013 | 61850-3:2013 – Communication networks and systems for power utility automation – Part 3: General requirements |

**Table 15. RoHS Compliance**

| Description | Reference |
|---|---|
| Complies with the RoHS directive | 2011/65/EU |

**Table 16. Communication Protocols**

| Master Protocol | Slave Protocol |
|---|---|
| DNP3 LAN/WAN | DNP3 LAN/WAN |
| DNP3 serial | DNP3 serial |
| IEC 60870-5-101 | IEC 60870-5-101 |
| IEC 60870-5-103 | |
| IEC 60870-5-104 | IEC 60870-5-104 |
| IEC 61850-8-1 (MMS & GOOSE) | IEC 61850-8-1 (MMS & GOOSE) |
| Modbus Serial | Modbus Serial |
| Modbus TCP | Modbus TCP |
| SNMP (Simple Network Management Protocol) | |
| SNTP (Simple Network Time Protocol) | SNTP |
| SPA | |

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**Table 17. Protection Relays with Connectivity Packages Supporting COM600 Series (Applies for the IEC 61850 and SPA Protocols)**

| 610 series protection relays | all products |
| --- | --- |
| 611 series protection relays | all products |
| 615 series protection relays | all products |
| 620 series protection relays | all products |
| Recloser Protection and Control RER620 | |
| Feeder Protection Relay REX 521 | |
| SPAJ 140 series relays | Combined Phase and Neutral Overcurrent Relay SPAJ 140 C<br>Combined Phase and Neutral Overcurrent Relay SPAJ 141 C<br>Combined Phase and Neutral Overcurrent Relay SPAJ 142 C |
| Combined Phase and Neutral Overcurrent Relay SPAJ 144 C | |
| Stabilized Differential Relay SPAD 346 C | |
| SACO 16D series units | Digital Annunciator Unit SACO 16D1<br>Digital Annunciator Unit SACO 16D3 |
| Digital Annunciator Unit SACO 64D4 | |
| RE 500 series terminals | Feeder Terminal REF 541 / 543 / 545<br>Transformer Terminal RET 541 / 543 / 545<br>Motor and Generator Terminal REM 543 / 545<br>Feeder Terminal REF 542plus |

## Common Aspects

**Table 18. Hardware Requirements for SAB600**

| Hardware | Minimum | Recommended |
| --- | --- | --- |
| Free hard disk space | 5 Gb | 10 Gb |

**Table 19. Supported Operating Systems for SAB600[1]**

| Description |
| --- |
| Microsoft Windows Server 2008 R2 (64-bit) |
| Microsoft Windows Server 2012 R2 (64-bit) |
| Microsoft Windows Vista (32-bit) SP2 |
| Microsoft Windows 7 (32-bit/64-bit) SP1 |
| Microsoft Windows 8 (32-bit/64-bit) |
| Microsoft Windows 8.1 (32-bit/64-bit) |
| Windows 10 (32-bit/64-bit) |

1) Microsoft® .NET Framework 4.6.1 is required for running SAB600. The software is automatically installed during the installation of SAB600 if not already available on the PC.

**Table 20. Supported Web Browsers for WebHMI**

| Description | Version |
| --- | --- |
| Microsoft Internet Explorer | 10.0 or later |
| Google Chrome | 54.0 or later |
| Mozilla Firefox® | 45.0 or later |

## 23. Tools

The engineering of COM600S is done offline on a separate computer using the Microsoft® .NET-based SAB600 engineering tool supplied with COM600S. The configurability and functionality of COM600S depends on the communication protocol used for communication between COM600S and the protection and control relays. The connectivity packages for ABB's protection and control relays enable an efficient configuration of COM600S. The connectivity packages include descriptions of the data and signals

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available in the relays. The descriptions are used to automatically configure the master communication of COM600S.

At project engineering, SAB600 uses the potential of the IEC 61850 standard by supporting the IEC 61850-based SCL (Substation Configuration Description Language) file import, including the import of the communication and graphical parts of the SCL file. The finalized projects are updated from SAB600 to COM600S at site or remotely provided that a secure Ethernet connection is available.

The substation analytics functions, fault location and circuit breaker condition monitoring, and applications are configured using PCM600, similar to Relion protection relays. An interactive configuration wizard ensures high usability and ease of use for feeder and input data selection and in the end creates automatic logic for these applications.

The user downloads the application configuration from PCM600 directly to the COM600S unit. Subsequently, the exported SCD

(System Configuration Description) file is also used in the SAB600 for gateway and WebHMI engineering. This SCD file has special sections to create automatic cross-referencing of functional data points to the Data Historian. When substation analytics functions are also configured, an additional check is performed by SAB600 while downloading the COM600S gateway and WebHMI configurations, vis-à-vis application configuration downloaded from PCM600.

Additionally, the following features are now available for better SAB600 project handling:

1. Project revision handling for automatic version handling, when configuration changes are made.
2. Project revision verification when configuration is ready to be downloaded into the COM600S unit, vis-à-vis what is available in the unit.
3. Project backup and retrieval handling: This allows user to take backup of current project and store it in the COM600S unit and later on retrieve from the COM600S unit.
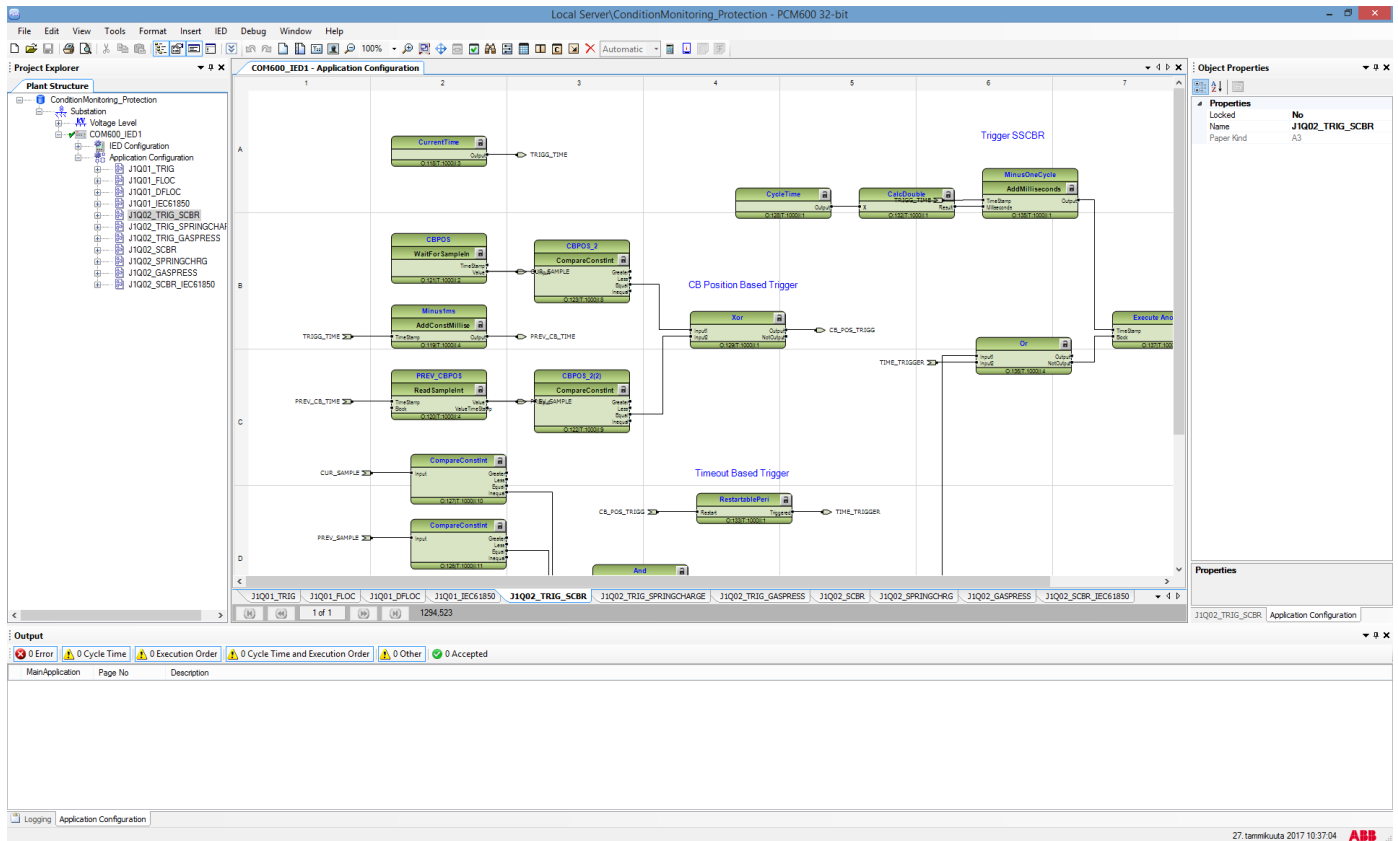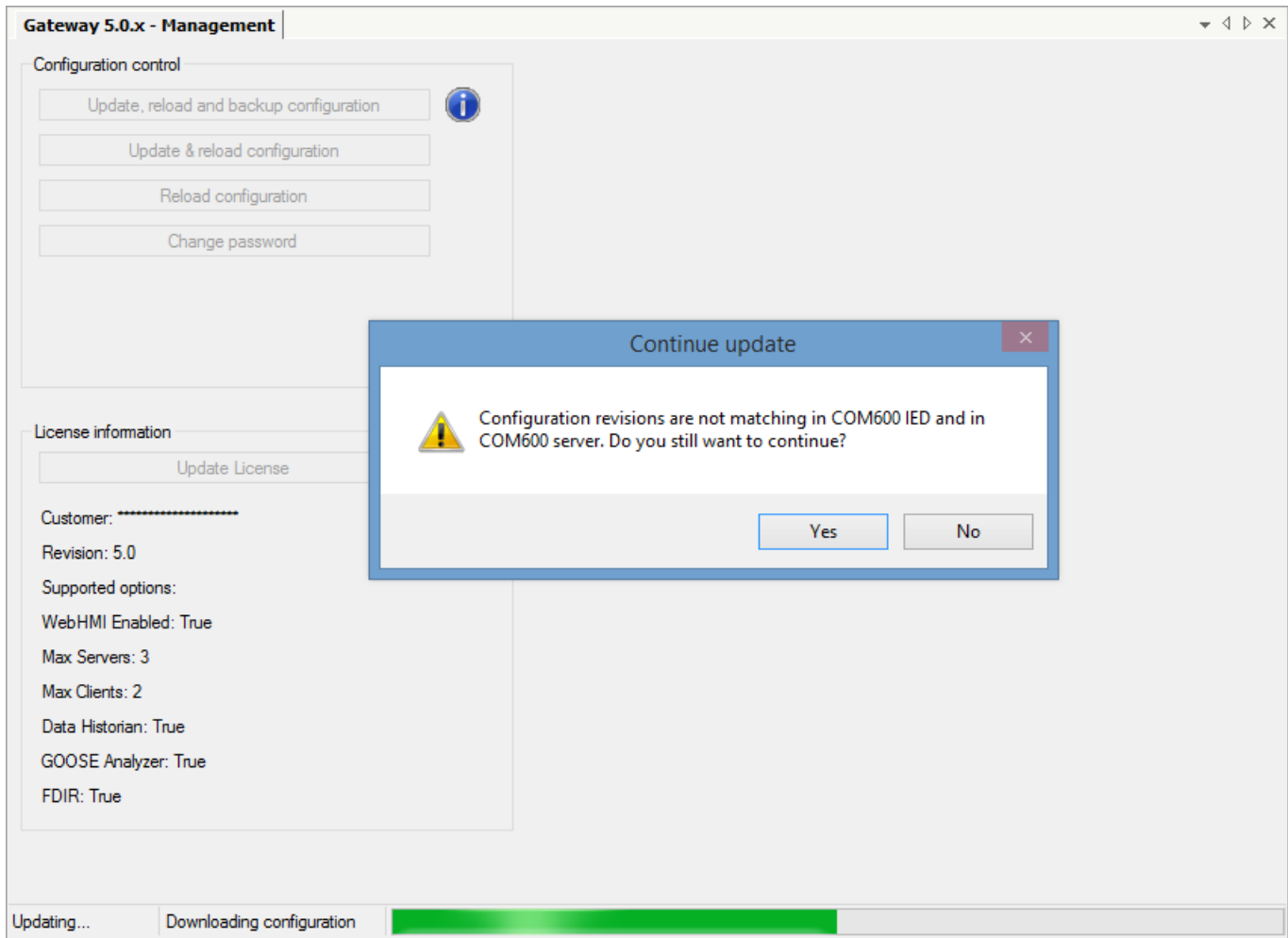


SSCBR_ACT.png

Figure 31. Application Configuration

SAB600_ConsistencyCheck.png

**Figure 32. SAB600 Consistency Check**

**Table 1. Tools**

| Description | Version |
|---|---|
| Station Automation Builder SAB600 | 5.1 (to configure COM600 5.1, COM600 5.0 and COM600 4.1 products) |
| Protection & Control Relay Manager PCM600 | 2.8 + HF1 or later |

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## 24. Mounting

The COM600S computer is designed for mounting both into a control panel or in the low voltage compartment of a switchgear panel by using the included wall-mount kit. COM600S is fastened using the four holes on the unit and four screws.
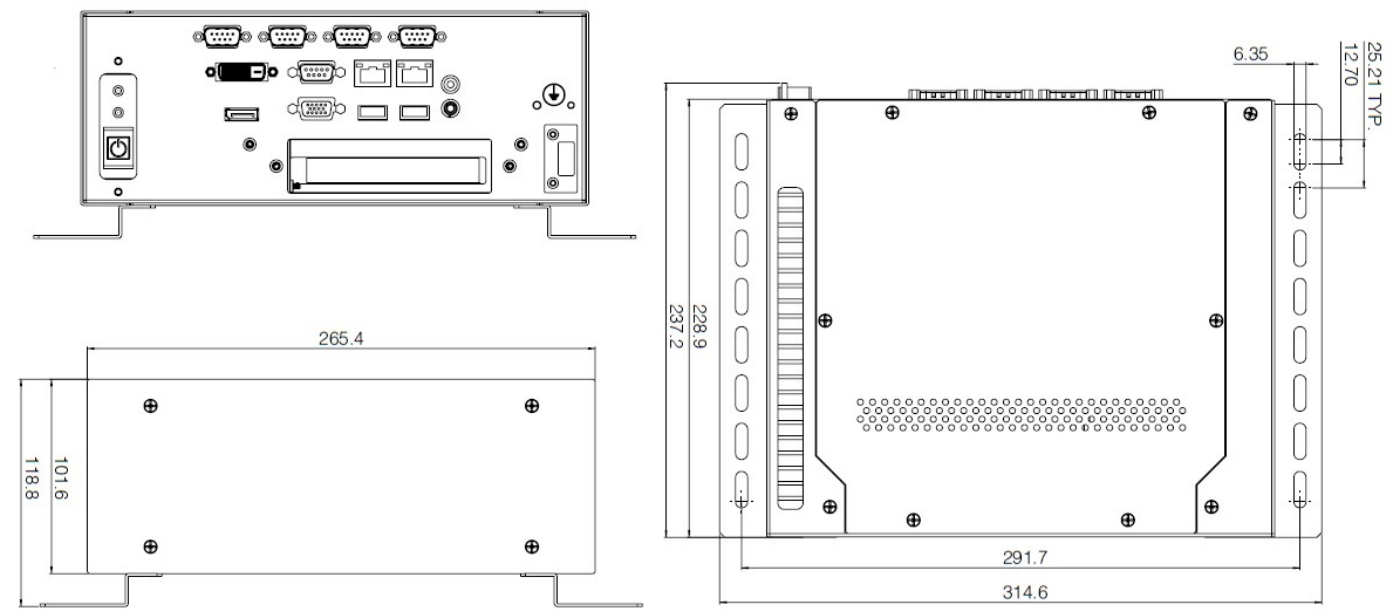


Asset_1_top_front_2.jpg

Figure 33. Top and side view

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## 25. Selection and ordering
## COM600S Order Code

The COM600S order code reflects the new approach that has been described in the chapter General Description.

The intent with the various characters is as follows:

- Digit 7 represents the COM600 product – COM600S.
- Digit 8 represents the 'High Voltage' or 'Low Voltage' power supply, reflecting the installation (switchgear or non-switchgear) environment and the available control power supply.
- Digit 9 represents the requirement to have additional Ethernet, serial, or fiber optic interface cards, reflecting the type and size of the substation automation infrastructure to be integrated with COM600S.
- Digit 10 is assigned to the application type, that is, when the product is used as a dedicated communication gateway or when this feature is combined with WebHMI and substation analytic functions in line with the product type
- Digit 11 is assigned to the number of master protocols.
- Digit 12 is assigned to the number of slave protocols.
- Digit 13 is assigned to the advanced features that are available from the COM600S like Data Historian and Logic Processor (user training is recommended for using these features). Data Historian is a prerequisite, and therefore mandatory when fault location and/or circuit breaker condition monitoring function option is selected against Digit 10.
- Digit 14 is assigned to the optional IEC 61850 functionality, that as a IEC 61850 proxy server˙ and the GOOSE Analyzer features (user training is recommended for using these features).
- Digit 15 is in anticipation of the usage of COM600S in a substation network with predominantly ABB devices OR in a network with mix of some ABB and predominantly non-ABB/3rd party devices.
- Digit 16 describes the mounting type.
- Digit 17 enumerates the total number of substation analytic functions that can be instantiated using the PCM600 Connectivity Package for COM600S analytic functions.

The type and serial number label identifies the COM600S units. The order number consists of a string of code generated from the hardware and software modules of the unit. Use the ordering key information in Figure 34. to generate the order number when ordering.

˙When IEC 61850 Proxy server is selected, only 1 additional slave protocol can be opted for.

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| | | 1-6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | COM600 | S | H | R | P | 1 | 1 | T | P | A | A | 1 | G |

| 7 | Product | |
|---|---|---|
| | COM600S IEC | S |
| **8** | **Power supply** | |
| | 125 - 250 V DC, 110 - 230 V AC 50-60Hz | H |
| | 24 - 60 V DC | L |
| **9** | **Optional communication cards (PCI)** | |
| | Ethernet card (RJ-45) GbE-TX, 2 ports | R |
| | Serial RS-232/422/485 card, 8 ports | S |
| | Ethernet card (LC) 100Base-FX, 1 port | F |
| | None | N |
| **10** | **Application category** | |
| | Substation data management (communication gateway only) | P |
| | Substation control (WebHMI) and communication gateway | H |
| | Substation control (WebHMI) and communication gateway, including circuit breaker condition monitoring (analytic functions) | C |
| | Substation control (WebHMI) and communication gateway, including feeder fault location (analytic functions) | R |
| | Substation control (WebHMI) and communication gateway, including circuit breaker condition monitoring and fault location (analytic functions) | A |
| **11** | **Number of Master protocols** | |
| | One master protocol | 1 |
| | Two master protocols | 2 |
| | Three master protocols | 3 |
| **12** | **Number of Slave protocols** | |
| | One slave protocol | 1 |
| | Two slave protocols | 2 |
| | None | N |
| **13** | **Optional software (advanced features)** | |
| | Data historian | T |
| | IEC 61131-3 Logic processor | L |
| | Data historian and IEC 61131-3 Logic processor | P |
| | None | N |
| **14** | **Optional IEC 61850 functionality** | |
| | IEC 61850 proxy server and GOOSE send enabled | P |
| | GOOSE Analyzer enabled | G |
| | IEC 61850 proxy server and GOOSE send enabled + GOOSE Analyzer enabled | A |
| | None | N |
| **15** | **Device integration** | |
| | System configuration only comprising of ABB relays | A |
| | System configuration comprising of ABB and non-ABB relays/devices | B |
| **16** | **Mounting type** | |
| | Subplate mounting (switchgear or panel) | A |
| **17** | **Total number of permitted function instances under Application category = C/R/A** | |
| | Upto 10 instances of functions (only for analytic functions) | 1 |
| | Upto 20 instances of functions (only for analytic functions) | 2 |
| | Upto 30 instances of functions (only for analytic functions) | 3 |
| | Not used (not for analytic functions) | N |
| **18** | **Version** | |
| | Version 5.1 | G |

FIGURE13_ASEMOINTI2.png

Figure 34. Ordering key for COM600S

Example code:
Your ordering code:

| Digit (#) | 1--6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Code: | COM600 | S | H | F | C | 2 | 1 | T | P | A | A | 2 | G |

COM600 5_0 ordering codes_your code_S.png

Figure 35. Your ordering code

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## 26. References

The www.abb.com/substationautomation portal offers you information about the distribution automation product and service range. You will find the latest relevant information on the COM600 unit on the product page. The download area on the right hand side of the web page contains the latest product documentation, such as user's guide, operator's guide, etc. The Data and Optional features tabs contain product related information in a compact format.

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## 27. Document revision history

| Document revision/date | Product version | History |
|---|---|---|
| A/19. Feb. 2009 | 3.3 | Document was created |
| B/26. Nov. 2009 | 3.4 | Content updated to correspond to the product version |
| C/5. Sep. 2011 | 3.5 | Content updated to correspond to the product version |
| D/31. May 2012 | 4.0 | Content updated to correspond to the product version |
| E/10. Aug. 2012 | 4.0 | Content updated to correspond to the product version |
| F/13. Mar. 2015 | 4.1 | Content updated to correspond to the product version |
| G/24. May 2017 | 5.0 | Content updated to correspond to the product version |
| H/9. June 2017 | 5.0 | Content updated |
| K/5. April 2018 | 5.1 | Content updated to correspond to the product version |

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