Station Automation COM600
COM600 3.3

User's Manual

Contents:

1. About this manual

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1.3. General

This manual provides thorough information on Station Automation COM600 (later referred to as COM600) and the central concepts related to it. The manual provides information about COM600 features, installation and unistallation instructions for the Station Automation Builder 600 (SAB600), and configuration and operation instructions for SAB600. For more information on each topic related to a specific protocol, refer to the list of related documents in 1.8, Related documents.

1.4. Document conventions

The following conventions are used for the presentation of material:

- The words in names of screen elements (for example, the title in the title bar of a window, the label for a field of a dialog box) are initially capitalized.

- Capital letters are used for the name of a keyboard key if it is labeled on the keyboard. For example, press the ENTER key.
- Lowercase letters are used for the name of a keyboard key that is not labeled on the keyboard. For example, the space bar, comma key, and so on.
- Press CTRL+C indicates that you must hold down the CTRL key while pressing the C key (to copy a selected object in this case).
- Press ESC E C indicates that you press and release each key in sequence (to copy a selected object in this case).
- The names of push and toggle buttons are boldfaced. For example, click **OK**.
- The names of menus and menu items are boldfaced. For example, the **File** menu.
  - The following convention is used for menu operations: **MenuName** > **MenuItem** > **CascadedMenuItem**. For example: select **File** > **New** > **Type**.
  - The **Start** menu name always refers to the **Start** menu on the Windows taskbar.
- System prompts/messages and user responses/input are shown in the Courier font. For example, if you enter a value out of range, the following message is displayed:

```
Entered value is not valid. The value must be 0 - 30  .
```

- You can be asked to enter the string MIF349 in a field. The string is shown as follows in the procedure:

  MIF349
- Variables are shown using lowercase letters:

  sequence name

1.5. Use of symbols

This publication includes warning, caution, and information icons that point out safety-related conditions or other important information. It also includes tip icons to point out useful information to the reader. The corresponding icons should be interpreted as follows.

The electrical warning icon indicates the presence of a hazard which could result in electrical shock.

The warning icon indicates the presence of a hazard which could result in personal injury.

The caution icon indicates important information or warning related to the concept discussed in the text. It may indicate the presence of a hazard which could result in corruption of software or damage to equipment or property.

The information icon alerts the reader to relevant facts and conditions.

The tip icon indicates advice on, for example, how to design your project or how to use a certain function.

1.6. Terminology

The following is a list of terms associated with COM600 that you should be familiar with. The list contains terms that are unique to ABB or have a usage or definition that is different from standard industry usage.

Term	Description
Alarm	An abnormal state of a condition.
Alarms and Events; AE	An OPC service for providing information about alarms and events to OPC clients.
Data Access; DA	An OPC service for providing information about process data to OPC clients.
Data Object; DO	Part of a logical node object representing specific information, for example, status, or measurement. From an object-oriented point of view, a data object is an instance of a class data object. DOs are normally used as transaction objects; that is, they are data structures.
Data Set	The data set is the content basis for reporting and logging. The data set contains references to the data and data attribute values.
Device	A physical device that behaves as its own communication node in the network, for example, protection relay.
Event	Change of process data or an OPC internal value. Normally, an event consists of value, quality, and timestamp.
Intelligent Electronic Device	A physical IEC 61850 device that behaves as its own communication node in the IEC 61850 protocol.
Logical Device; LD	Representation of a group of functions. Each function is defined as a logical node. A physical device consists of one or several LDs.
Logical Node; LN	The smallest part of a function that exchanges data. An LN is an object defined by its data and methods.
LON	A communication protocol developed by Echelon.
LON Application Guideline for substation automation; LAG	A proprietary method of ABB on top of the standard LON protocol.

Term	Description
OPC	Series of standards specifications aiming at open connectivity in industrial automation and the enterprise systems that support industry.
OPC item	Representation of a connection to the data source within the OPC server. An OPC item is identified by a string <object path>:<property name>. Associated with each OPC item are Value, Quality, and Time Stamp.
Property	Named data item.
Report Control Block	The report control block controls the reporting processes for event data as they occur. The reporting process continues as long as the communication is available.
SPA	ABB proprietary communication protocol used in substation automation.
SPA device	Protection and/or Control Product supporting the SPA protocol version 2.5 or earlier.
Substation Configuration Language; SCL	XML-based description language for configurations of electrical substation IEDs. Defined in IEC 61850 standard.

1.7. Abbreviations

The following is a list of abbreviations associated with COM600 that you should be familiar with. See also 1.6, Terminology.

Abbreviation	Description
AE	Alarms and Events
ASDU	Application Service Data Unit
BRCB	Buffered Report Control Block
DA	Data Access
DMCD	Data Message Code Definition
DO	Data Object
GW	Gateway, component connecting two communication networks together
HMI	Human Machine Interface
IEC	International Electrotechnical Commission
IED	Intelligent Electronic Device
LAG	LON Application Guideline for substation automation
LAN	Local Area Network
LD	Logical Device

Abbreviation	Description
LMK	LonMark interoperable device communicating in LonWorks network. In this document, the term is used for devices that do not support the ABB LON/LAG communication.
LN	Logical Node
LSG	LON SPA Gateway
NCC	Network Control Center
NV	Network Variable
OLE	Object Linking and Embedding
OPC	OLE for Process Control
P&C	Protection & Control
RTS	Request To Send
SA	Substation Automation
SAB600	Station Automation Builder 600
SCL	Substation Configuration Language
SLD	Single Line Diagram
SNTP	Simple Network Time Protocol
SOAP	Simple Object Access Protocol
RCB	Report Control Block
URCB	Unbuffered Report Control Block
XML	eXtended Markup Language

1.8. Related documents

Name of the manual	MRS number
COM600 User’s Manual	1MRS756125
COM600 Operator's Manual	1MRS756705
COM600 HMI Configuration Manual	1MRS756740
COM600 Data Historian Operator's Manual	1MRS756739
DNP LAN/WAN Master (OPC)	1MRS756566
DNP Serial Master (OPC)	1MRS756567
DNP LAN/WAN Slave (OPC)	1MRS755496
DNP Serial Slave (OPC)	1MRS755495
External OPC Client Access	1MRS755564
IEC 60870-5-101 Slave (OPC)	1MRS755382

Name of the manual	MRS number
IEC 60870-5-101 Master (OPC)	1MRS756703
IEC 60870-5-103 Master (OPC)	1MRS752278
IEC 60870-5-104 Slave (OPC)	1MRS755384
IEC 60870-5-104 Master (OPC)	1MRS756704
IEC 61850 Master (OPC)	1MRS755321
Logic Processor User's Manual	1MRS756738
LON-LAG Master (OPC)	1MRS755284
MNS *i*S Connectivity (OPC)	1MRS756569
Modbus Serial Master (OPC)	1MRS756126
Modbus TCP Master (OPC)	1MRS756445
SPA Master (OPC)	1MRS752275
SPA Router (OPC)	1MRS755497

1.9. Document revisions

Document version/date	Product revision	History
A/16.10.2006	3.0	Document created
B/22.1.2007	3.0	Document revised
C/8.6.2007	3.0	Document revised
D/21.12.2007	3.1	Document revised
E/17.6.2008	3.2	Document revised
F/13.2.1009	3.3	Document revised

2. Introduction

2.1. Overview of COM600

COM600 provides gateway functions for mapping signals between protection and control IEDs in industrial or utility substations and higher-level systems. It further includes an optional HMI that provides data and information from the substation to the users.

COM600 gathers data from protection and control IEDs and from process devices using different communication protocols. The supported protocols can be combined freely in one station computer, limited only by the number of hardware interfaces and the license. COM600 uses web technology to display data to different users in a professional and user-friendly manner. The web technology is further used to transfer information to a network control centre (NCC) or distributed control system (DCS).

COM600 benefits from the potential of the IEC 61850 standard by using the IEC 61850-6 substation configuration language (SCL) and IEC 61850 -7 communications modeling regardless of protocol used. As the IEC 61850 data modeling is used for all communication protocols the gateway cross-reference is done in the same way regardless of the protocol, for example IEC 61850-8-1 or DNP3.

COM600 can by using the optional web HMI (requires Microsoft Internet Explorer with Adobe SVG viewer 3.03) be used for efficient substation visualization, monitoring and control. Measured values from process devices are displayed on the HMI. Single-line diagrams can be used to view any available measured values from the process devices.

Product ordering codes

COM600HRH32PA

#	DESCRIPTION	
1	**Power supply**	
	110 - 220 V DC, 100 - 240 V AC	H
2	**Optional communication cards (PCI)**	
	LON card, PCLTA-20, plastic fibre, 1 port	P
	LON card, PCLTA-20, glass fibre, 1 port	G
	Ethernet card (RJ-45) 10Base-T, 100Base-TX, 1000Base-T, 2 ports	R
	Serial RS-232/RS-485 card, 8 ports	S
	None	N
3	**HMI**	
	Web HMI	H
	None	N
4	**Master protocols**	
	One master protocol	1
	Two master protocols	2
	Three master protocols	3
5	**Slave protocols**	
	One slave protocol	1
	Two slave protocols	2
	None	N
6	**Optional software**	
	Data historian [1]	T
	Logic processor	L
	Data historian and Logic processor [1]	P
	None	N
7	**Version**	
	Version 3.3	A

[1] Requires Web HMI

COM600_product_codes.jpg

Figure 2.1-1 COM600 product ordering codes

3. Features

3.1. Gateway functionality

The Gateway functionality provides a framework that enables the use of OPC server and client components, such as OPC Client for IEC 60870-5-101 and OPC Server for LON LAG 1.4. This manual presents the principles that are common to the protocols available at the moment as well as to those that will be applicable in the future. For protocol-specific information , refer to the respective client and server user's manuals.

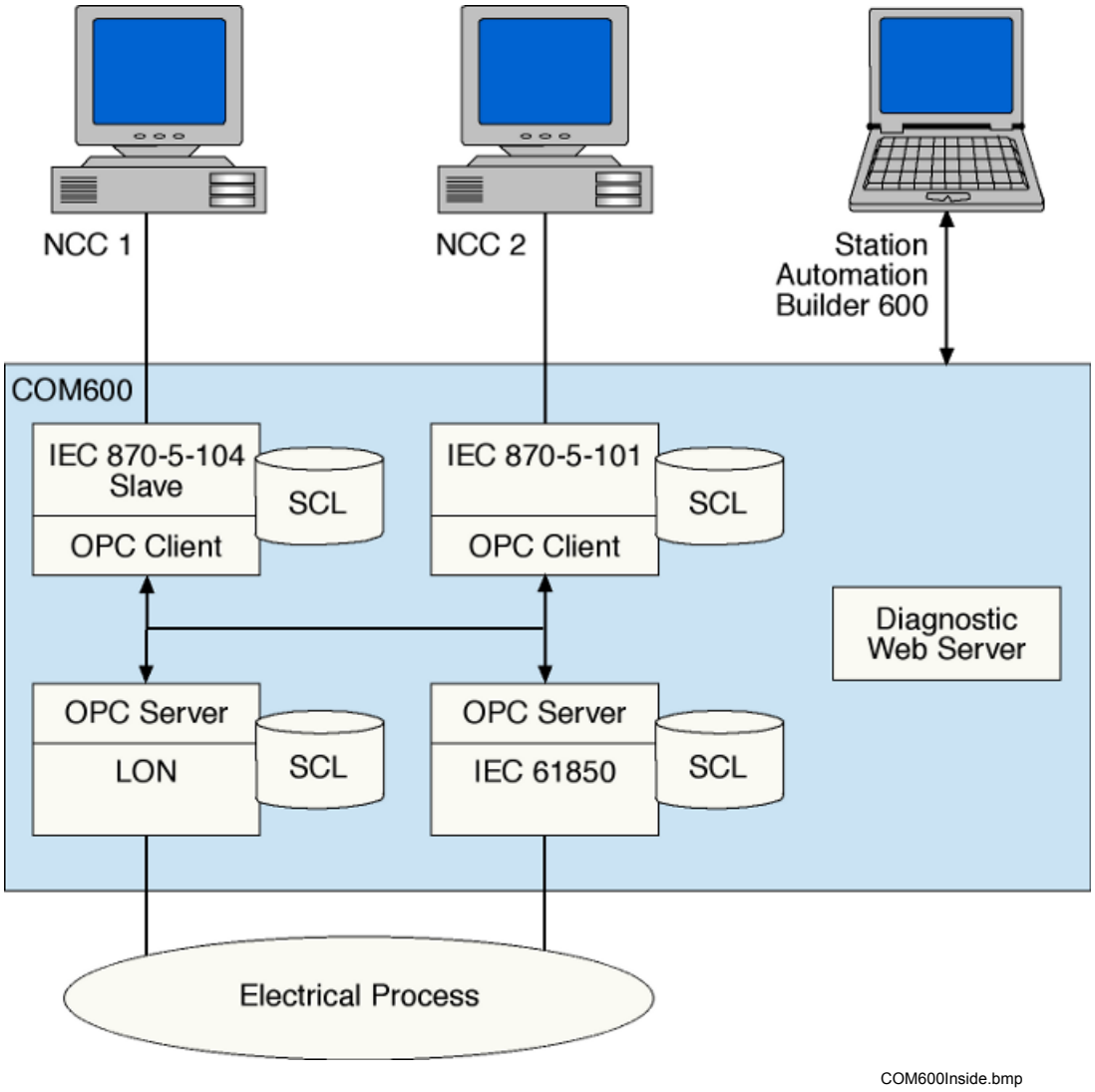


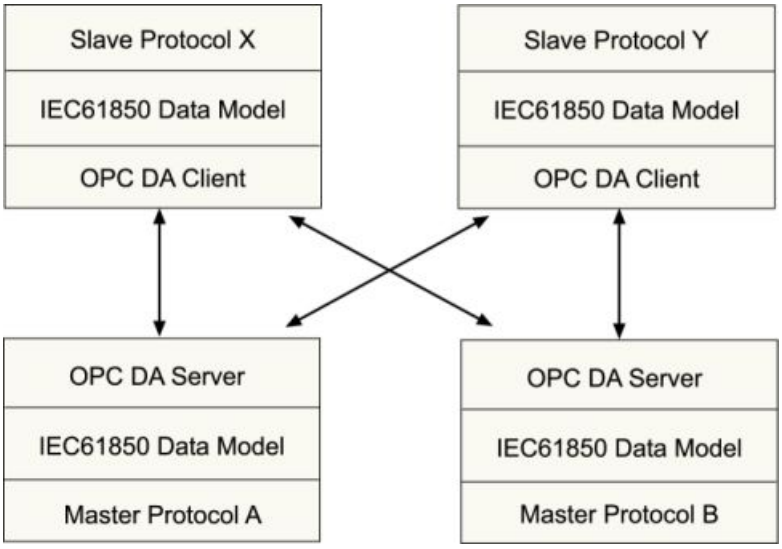
Figure 3.1-1 Conceptual view of COM600 Gateway

1. Network Control Center (NCC)
2. Engineering PC with Station Automation Builder 600 (SAB600)

3. COM600 with embedded operation system, OPC client(s) for NCC connection(s), OPC server(s) for process connection
4. Protection and control devices

Normally, there is one OPC client per NCC connection. If you want to create several NCC connections with the same protocol, use multiple instances.

COM600 consists of OPC Data Access (DA) server and client components. OPC Servers are used mainly for master/client protocol stacks to provide access to the data in the devices in the protocol. OPC Clients are used for slave/server protocol stacks to enable external systems to access data available in the OPC Servers.



GWComponents.jpg

Figure 3.1-2 Example of COM600 Gateway components

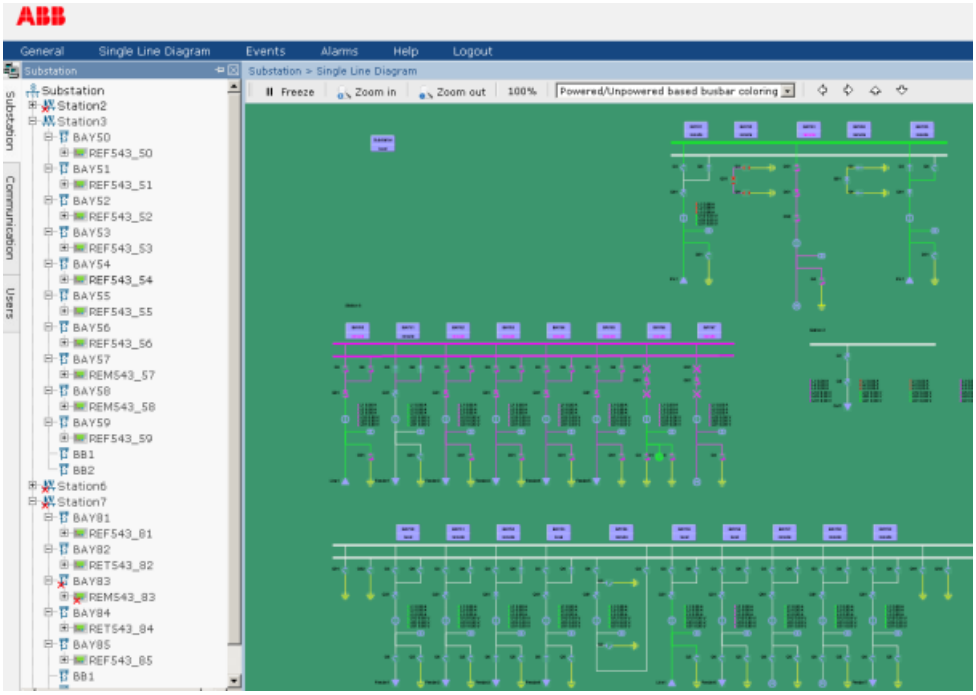
3.2. HMI

3.2.1. HMI functions

The HMI enables the user to access the COM600 computer via a web browser.

The features of HMI include:
- Single Line Diagram
- Busbar coloring
- Event lists
- Alarm lists
- Parameter settings
- Disturbance data upload
- System supervision
- Breaker and switch control

- Measurement display
- User management
- Data historian (optional feature)



sld_example.png

Figure 3.2.1-1 Example view of the COM600 HMI

The HMI can be accessed:

- locally via an optional local HMI screen
- locally by connecting your laptop to COM600 via LAN
- remotely through the internet or over LAN/WAN

3.2.2. Predefined user account

HMI has a predefined user account with administrator rights.

- User name: admin
- Password: adminadmin

When you log in for the first time as an administrator, change the password before you proceed using HMI. If you forget the new password, restore the factory settings with the Management tool in SAB600. After the factory settings have been restored, you can only log in with the predefined administrator password mentioned above.

3.3. OPC server

The OPC server component consists of a Master/Client Protocol Stack, OPC DA/AE Server, and Configuration SCL.

The protocol stack component implements the protocol functions, such as handshaking signal handling, message coding/decoding, check sum calculations, polling logic, protocol level timers, and so on. The OPC server/protocol handler implements the functionality for publishing and updating data on the OPC interfaces and protocol conversion between the OPC and the protocol stack using the common IEC 61850 data model.

The configuration of the OPC server and the protocol stack is handled using a configuration parser. The OPC server is configured using SAB600. The configuration information is exported to an SCL/XML configuration file according to the IEC 61850 SCL specification. When the OPC server is started, the configuration information is read from the file.

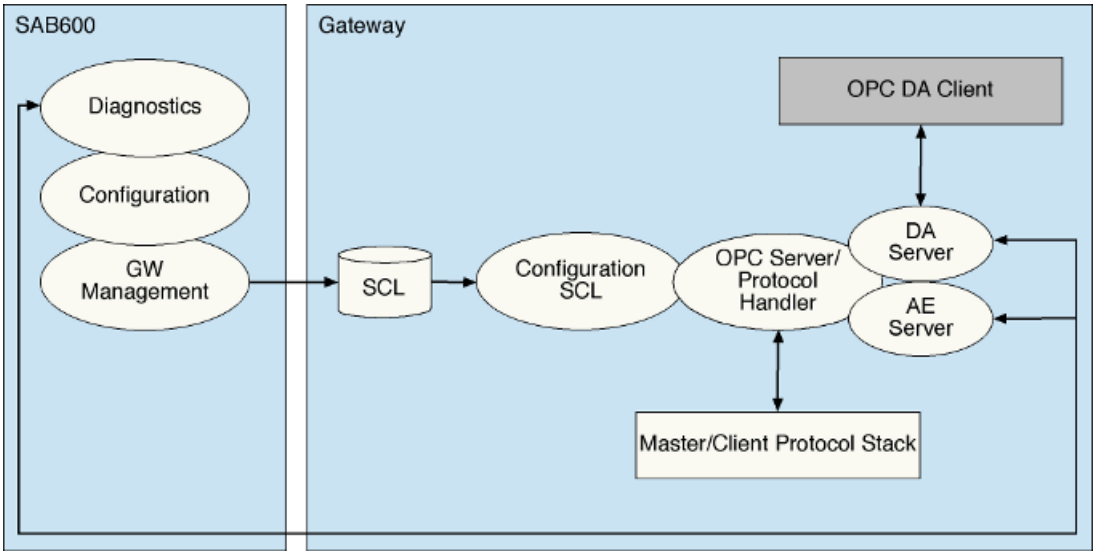


Figure 3.3-1 Conceptual view of OPC server

3.4. OPC client

The OPC client software consists of a Slave/Server Protocol Stack, OPC DA Client, Configuration SCL, OPC Data Access Server and Alarm&Event server components for diagnostic and control.

The protocol stack component implements the protocol functions, such as handshaking signal handling, message coding/decoding, check sum calculations, polling logic, protocol level timers, and so on. The OPC client/protocol handler implements the functionality

for data subscription from the OPC servers and protocol conversion between the OPC and the protocol stack using the common IEC 61850 data model.

The configuration of the OPC client and the protocol stack is handled using a configuration SCL. The OPC server is configured using SAB600. The configuration information is exported to the SCL/XML configuration file according to the IEC 61850 SCL specification. When the OPC client is started the configuration information is read from the file.

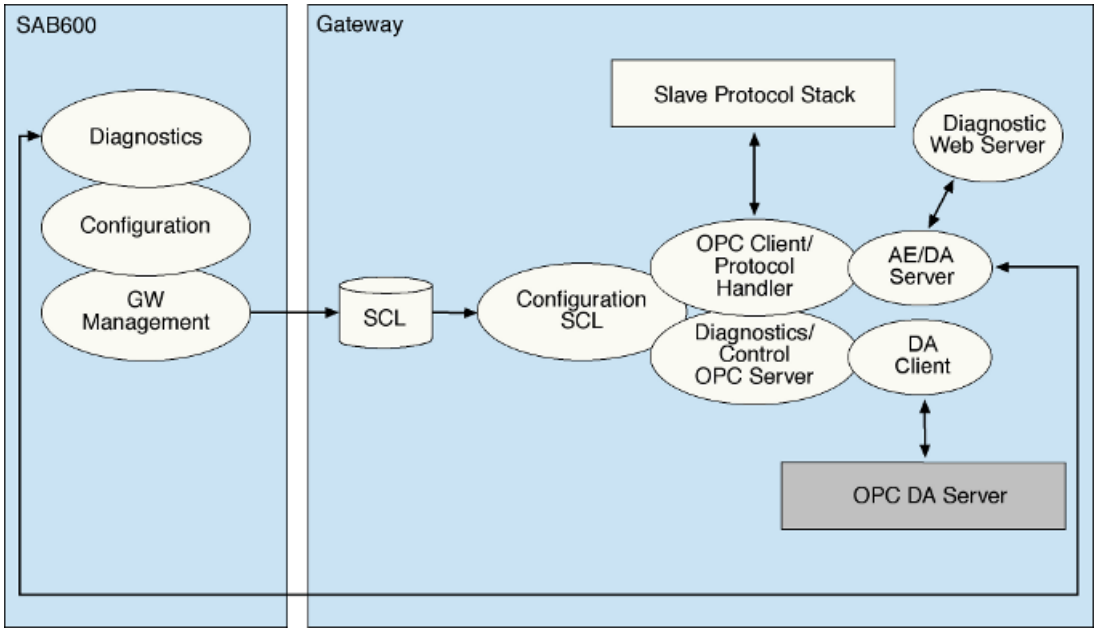


Figure 3.4-1 Conceptual view of OPC client

3.5. Logic Processor

COM600 offers an straightforward approach to the languages specified by the IEC 61131-3 standard for programmable logic controllers (PLC). The programmable logic processor in COM600 is offered as a selectable software option. The PLC programming system enables programming and execution of automation tasks. In addition, the IEC 61131-3 programming in COM600 offers on-line and off-line functionality for engineering and diagnostics.

The Logic Processor OPC Server transfers information between CodeSys SP runtime and other COM600 components, such as OPC servers, slave clients, and Web HMI.

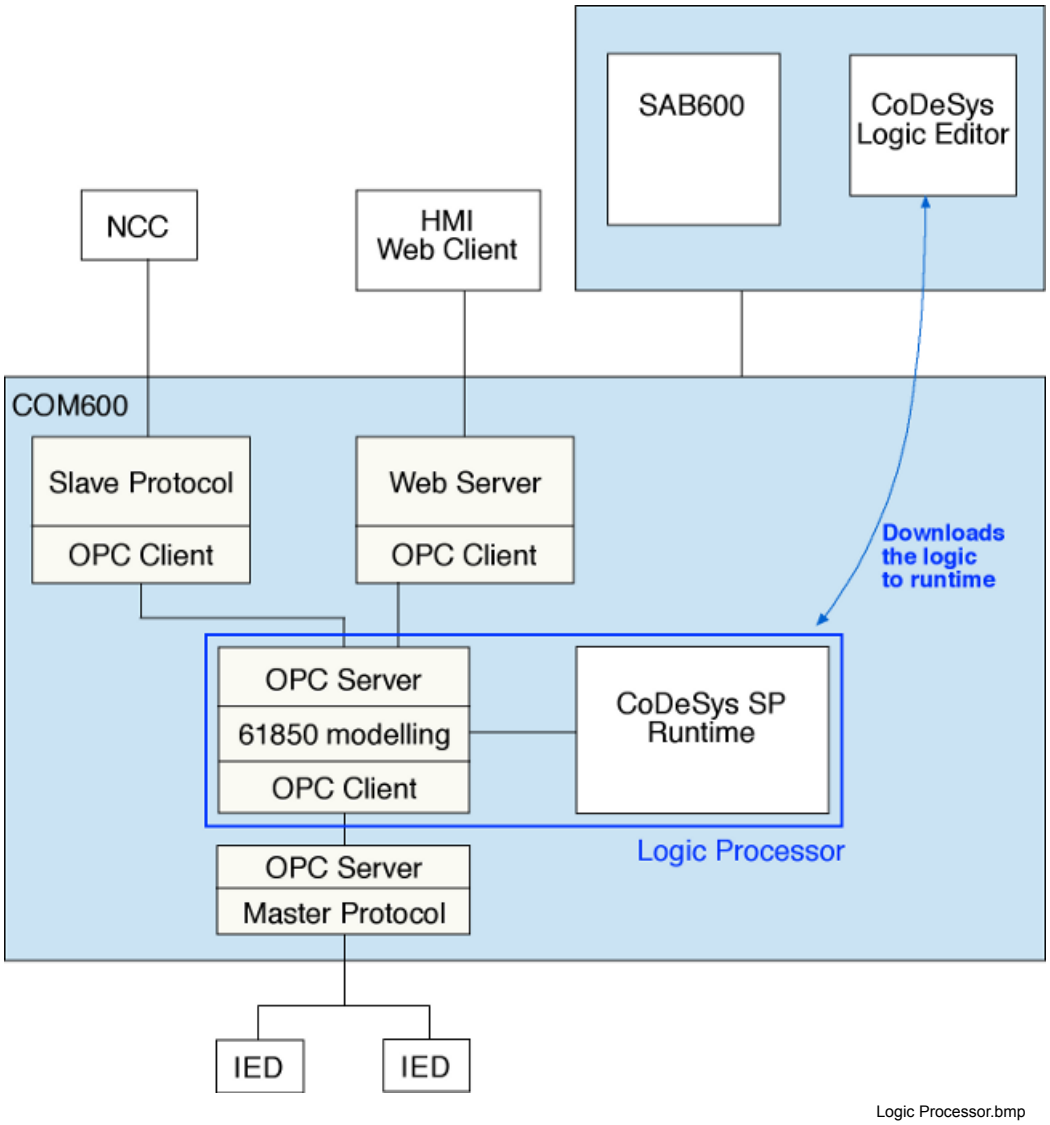


Figure 3.5-1 Functional overview of Logic Processor

CoDeSys SP runtime system is manufactured by 3S-Smart Software Solutions GmbH (www.3s-software.com).

3.6. Data Historian

The COM600 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.

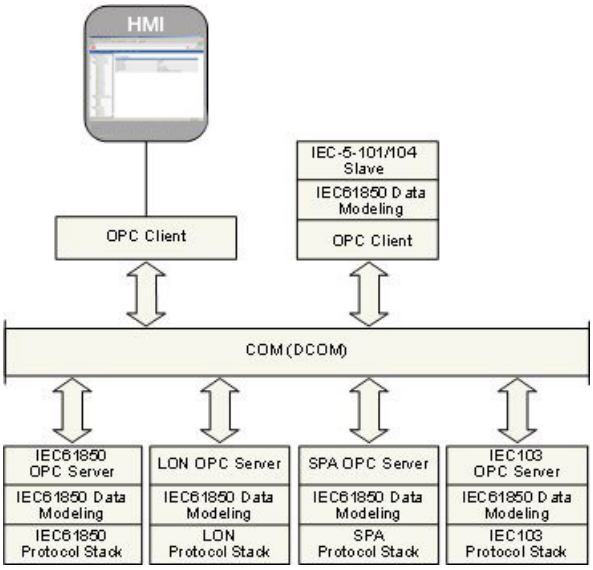
The optional data historian functionality offers means of storing, analyzing and presenting process data.

3.7. IEC 61850 data modeling

To simplify protocol conversion and signal mapping in the gateway, each component uses a common data model. The data model is based on common data classes and services specified in the IEC 61850 standard. Each client and server component is a separate program. The components interact with each other only via OPC interfaces. This means that they can be developed and used independently as a part of the gateway as long as they conform with the OPC DA and common data model specifications.

Protection and control products are connected to the gateway via OPC interfaces. Although OPC provides means to access data on devices, it does not specify the semantics of the data. This means that the same information is available in different formats depending on which device and communication protocol is used. In addition, services, such as breaker operation, vary among devices and protocols.

These differences complicate the reuse of gateway applications. To overcome this problem, all the applicable data and services are remodeled in OPC servers according to the data and service model specified in the IEC 61850 standard. This provides a protocol and device independent interface between the applications and the process. Figure 3.7-1 presents an overview of the IEC 61850 model usage.



IECmodelling.jpg

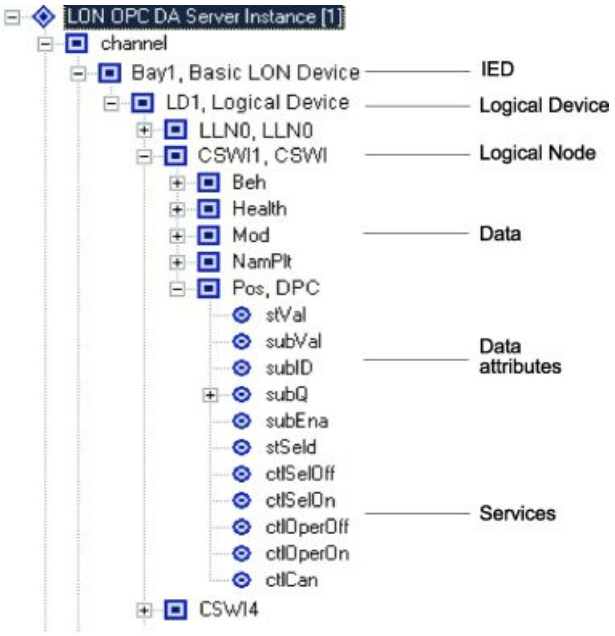
Figure 3.7-1 Overview of IEC 61850 model usage

The smallest unit in the IEC 61850 modeling is a data attribute which is linked to an OPC item in the OPC server. A data attribute can be, for instance, the state value of a double point object (stVal), quality information (q), or timestamp (t). In the OPC server, some of the services are also mapped to the same level as the attributes. This means that, for example, control services (such as ctlOperOn, ctlOperOff) for operating a double point object are available as OPC items.

For different types of data, the IEC 61850 standard defines over 30 common data classes including a set of mandatory and optional attributes and services. For example, common data classes are defined for Controllable double point (DPC), Single point status (SPS) and Measured value (MV).

Furthermore, the standard defines approximately 90 functional groups of data, based on common data classes. These groups are called logical nodes. Examples of logical nodes are controllable switch (CSWI) and distance protection (PDIS).

Logical nodes can be further grouped under logical devices (LD), forming logical groups within a physical device (IED), see Figure 3.7-2.



LONNamespace.jpg

Figure 3.7-2 LON OPC Server name space in relation to IEC 61850 model

3.8. Station/Remote switch function

The COM600 gateway provides a common Station/Remote (S/R) switch functionality for OPC servers and clients. The S/R switch is used to determine whether the objects in a logical device of an IED can be controlled within the station, or remotely via a gateway.

A station can have one or more S/R switches. The switches are either physical switches or software switches in a simulated IED of an OPC server. The S/R switches are modeled using the IEC 61850 SPS, SPC, DPS, DPC, INS, or INC data class.

Each IED or logical device in an IED is linked with an S/R switch during the configuration process. If a logical device has no linking information configured, the linking information of the IED is used instead. At runtime, an OPC server publishes the logical device S/R switch linking information for the OPC clients of the COM600 gateway. Each time an OPC client sends a command to a device, it first checks the S/R switch position to determine whether the operation is allowed or not. The COM600 gateway OPC client is allowed to operate only if the S/R switch is in remote position.

A COM600 gateway OPC client has the operation modes disabled and enabled for S/R switch handling. When the switch is in the enabled mode, the values for S/R switch position failures are **Allow controls if position unknown** and **Reject controls if position unknown**.

HMI is considered a local station HMI, if it uses the local display of the COM600 computer, or if the IP address of the HMI client is in the range specified with a Station IP

Address Filter property in the Gateway object. Otherwise HMI is considered a remote HMI. The state of the station/remote switch controls whether the operations are allowed from HMI or not.

The station/remote switch for the HMI is configured with the SLD editor by inserting the Station Switch Indicator symbol to the substation SLD and specifying the data object for the position information. If a real switch indication is not available, it is possible to use a simulated data from a virtual IED. This can be done by creating an IED configuration in the communication structure and setting the simulation mode of the IED to true.

3.9. COM600 Watchdog

The COM600 computer has a built-in hardware watchdog function. The function can be enabled with SAB600 from the Gateway object properties. When enabled, the watchdog monitors the COM600 software. If the COM600 software fails to send the keep-alive triggering to the watchdog within a certain time, the watchdog restarts the COM600 computer.

3.10. External watchdog for COM600

COM600 can be configured to send periodically a command to an IED connected to COM600. This function can be used to monitor the health of COM600. For example, SACO 16D2 can be connected with SPA protocol to COM600 and configured to create an alarm if no command from COM600 is received within specified time. Configuration of an external watchdog device is described in 6.7, Configuring external watchdog for COM600.

3.11. Network Fault Tolerance for COM600

COM600 can be configured to provide a certain level of tolerance against network failure by using either the ABB DuoDriver feature or the Intel Teaming Feature, Switch Fault Tolerance. These features are available when the optional dual port PCI Ethernet network adapter is used.

DuoDriver

DuoDriver implements the Parallel Redundancy Protocol (PRP) for Ethernet as specified in IEC 62439 DIS. PRP is based on duplicated networks, where each message is sent via both networks, the receiver node accepts the first received message and discard the duplicate. Message replication and discard function is done by the DuoDriver and it hides the two networks from the upper level applications. In PRP there is practically no switch over time in the case of one of the network fails as every message is always sent to both networks. DuoDriver has diagnostic data, which can be read with IEC61850 OPC

server. The diagnostic data can be further used on COM600 HMI and gateway applications. See 6.8, Installing and configuring Duo Driver for installation and configuration details.

Switch Fault Tolerance

The Switch Fault Tolerance feature of the Intel network adapter requires the Teaming Feature to be enabled.

Teaming Features include Failover protection, increased bandwidth through aggregation, and balancing of traffic among team members. Teaming Modes are AFT, SFT, ALB, RLB, and EtherChannel*/3ad (LA/FEC/GEC/3ad). Only Failover protection using SFT is supported by ABB.

3.12. Queuing of Process Data Updates

This section describes the common queue mechanism for OPC Clients (slave protocols) in COM600. There can be additional queuing mechanisms on different levels of the protocol stacks, that are specific for the protocol, which are not described here.

Process data updates are queued in the OPC Clients of COM600. Each OPC Client has its own queues independent from other clients, which prevents disturbances on one client connection from interfering with other connections. There are four separate queues for different type of data with configurable length.

- High Priority
  - command replies/confirms
  - internal protocol stack control commands
  - protocol stack database initialization commands
- State Indications
  - binary data and other state indications
- Measurements
  - analog data
- Interrogated
  - interrogation-related data and commands

Queue logic

For high priority and interrogated queues the oldest message is skipped when the queues fill up. Generally these queues should never fill up since they contain a limited number of updates (proportional to the number of OPC items).

When the state indication queue is full, the new updates are always skipped until there is free space in the queue.

When the measurement queue is full, an older update is always skipped when a new update is pushed the queue.

The updates are skipped according to the following logic:
- If an item has two or more updates, the oldest update is skipped
- If no item has two or more updates, the oldest update in the queue is skipped.

For measurements, older updates for an item are also skipped when the queue reaches a configurable percent of the maximum capacity (but only if there is an item with multiple outstanding updates to send).

Queue priorities

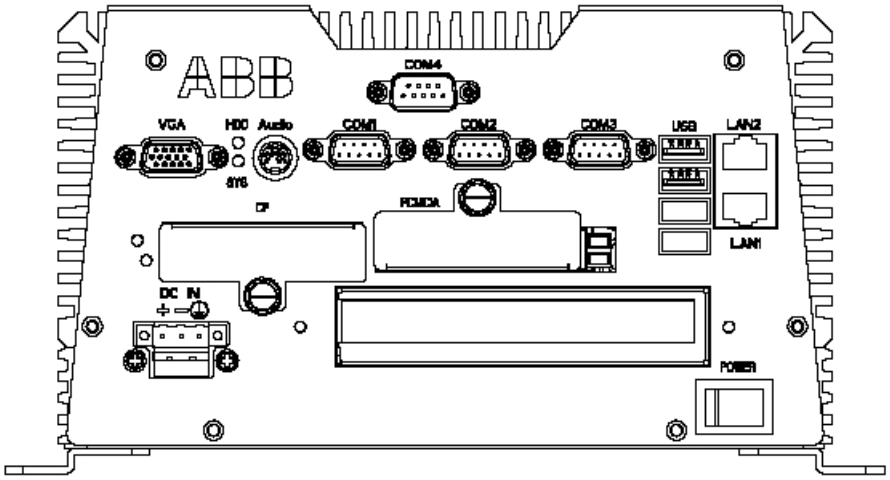
If a high priority queue contains an update, it is always sent first. After that, the interrogated queue is checked. If none of these queues has updates, the state indications and measurements are checked in round-robin fashion.

Queue capacities

The capacity (maximum size) of each queue is independently configured. If one queue fills up, capacity from another, possibly non-full queue is not used.

4. Technical data

4.1. Mechanical properties



COM600_connectors.jpg

Figure 4.1-1 COM600 interfaces

The technical data of COM600 is presented in the following tables.

Table 4.1-1 Dimensions

Description	Value
Width	214 mm (243 mm with mounting kit)
Height	122.4 mm (129.4 mm with mounting kit)
Depth	313 mm
Weight	6.8 kg

Table 4.1-2 Power supply

Description	Value
U_{aux} nominal	110...220 V DC 100... 240 V AC (50...60 Hz)
U_{aux} variation	80...120% of U_n (88...264 V DC) 90...110% of U_n (90...264 V AC)
Power consumption	37 W (with 264 V DC)
Power consumption at start-up	220 W

Table 4.1-3 Hardware

Description	Value
Processor	Intel® Pentium M 1.6 GHz
System memory	1 GB SDRAM
Compact flash memory	8 GB industrial SSD

Table 4.1-4 Interfaces

Description	Value
Serial interfaces	3 x RS-232 interfaces
Serial interface	1 x RS-232/485 serial interface
Ethernet interfaces	2 x 10/100Base-TX RJ-45 interfaces
USB	4 x USB 2.0 interfaces

Table 4.1-5 Optional PCI extensions

Description	Value
LON interface [1)]	1 x 1 LON interface
Serial interfaces [2)]	8 x RS-232/485 serial interfaces
Ethernet interfaces [3)]	2 x 10BASE-T/100BASE-TX/1000BASE-T RJ-45 interfaces

1) Operating temperature 0° C - +70° C

2) Operating temperature 0° C - +55° C

3) Operating temperature 0° C - +55° C

Table 4.1-6 Inspection of mechanical structure

Description	Standard
Markings and mechanical structure	According to IEC 60255-5, -6
Degree of protection by enclosure	According to IEC 60529
Clearance and creepage distances	According to IEC 60255-5

Table 4.1-7 Power supply and module tests

Description	Standard
Auxiliary voltage	According to IEC 60255-6
Aux. voltage interruptions	According to IEC 60255-11
Ripple in auxiliary DC voltage	According to IEC 60255-11 12%, f = 2 x fn
Power consumption	According to CE EN 61010

Table 4.1-8 Insulation tests

Description	Standard
Dielectric test	According to IEC 60255-5 2 kV, 50 Hz for 1 minute
Impulse voltage test	According to IEC 60255-5 5 kV, 1.2/50 µs, 0.5 J
Insulation resistance	According to IEC 60255-5 >100 MΩ, 500 Vdc
Protective bonding impedance	According to IEC 60255-27 <0.1 Ω.

The EMC immunity test level meets the requirements listed below:

Table 4.1-9 Electromagnetic compatibility tests

Description	Standard
1 MHz burst disturbance test • Common mode • Differential mode	According to IEC 61000-4-18 and IEC 60255-22-1 • 2.5 kV • 1.0 kV
Electrostatic discharge test • Contact discharge • Air discharge	According to IEC 61000-4-2, IEC 60255-22-2 • 6 kV • 8 kV
Radio frequency field immunity	According to IEC 61000-4-3 and IEC 60255-22-3 • 10 V/m (80% amp.mod.) • f=80...1000 MHz • 10 V/m (pulse mod.) f=900 MHz
Fast transient • Power supply • RJ-45 port	According to IEC 61000-4-4 and IEC 60255-22-4 • 2 kV • 1 kV
Surge immunity • Power supply	According to IEC 61000-4-5 and IEC 60255-22-5 • 2 kV line-to-earth, 1 kV line-to-line
Conducted radio frequency disturbance	According to IEC 61000-4-6 and IEC 60255-22-6 • 10 V (80% ampl. mod.) • f= 150 kHz...80 MHz
Power frequency (50 Hz) magnetic field	According to IEC 61000-4-8, 300 A/m, continuous
Voltage dips and short interruptions	According to IEC 61000-4-11 • 30% reduction for 10 ms • 60% reduction for 100 ms • 60% reduction for 1000 ms • >95% reduction for 5000 ms
Emission tests	According to EN 55011, and IEC60255-25, class A

Table 4.1-10 Environmental conditions

Description	Value
Operating temperature range	-25...+70ºC [1) 2)]
Relative humidity range, non-condensing	5...95% at +40ºC
Storage temperature	-40...+70ºC

1) Without any option cards

2) With Ethernet option card: 0…+55°C, with Serial option card: 0…+55°C, with LON option card: 0…+70°C

Table 4.1-11 Environmental tests

Description	Standard
Dry heat test	According to IEC 60068-2-2 Test values: • 96 h at +55ºC • 4 h at +70ºC
Cold test	According to IEC 60068-2-1 Test values: • 96 h at -10ºC • 4 h at -25ºC
Damp heat test, cyclic	According to IEC 60068-2-30 Test values: • 6 cycles (12+12h) at +25…55°C, humidity >93%
Storage test	According to IEC 60068-2-48 Test values: • 72 h at +70ºC • 72 h at -40ºC

Table 4.1-12 Mechanical tests

Description	Standard
Vibration tests • Vibration response test • Vibration endurance test	According to IEC 60068-2-6 and IEC 60255-21-1 • f = 10...150 Hz, ± 0.035 mm, 10…58 Hz, 5 m/s2 58…150 Hz • f = 10...150 Hz, ± 0.075 mm, 10…58 Hz, 10 m/s2 58…150 Hz

Description	Standard
Shock and bump tests • Shock response test • Shock withstand test • Bump test	According to IEC 60068-2-27 , IEC 60068-2-29 and IEC 60255-21-2 • peak acceleration = 5 x gn, pulse duration = 11 ms, numbers of pulses in each diretion = 3 • peak acceleration = 15 x gn, pulse duration = 11 ms, number of pulses in each direction = 3 • peak acceleration = 10 x gn, pulse duration = 16 ms, number of pulses in each direction = 1000
Seismic test • biaxial multi-frequency random seismic test	According to IEC 60255-21-3 test method B • 2 x gn in horizontal direction, 1 x gn in vertical direction

Table 4.1-13 EMC compliance

Complies with the EMC directive 2004/108/EC	
Standards	EN 50263 (2000), EN 60255-26 (2007), EN 61000-6-2 (2005), EN 61000-6-4 (2007)

Table 4.1-14 Product safety

Complies with the LV directive 2006/95/EC	
Standards	EN 60255-27 (2005), EN 60255-6 (1994)

Table 4.1-15 RoHS compliance

Complies with the RoHS directive 2002/95/EC

1) Microsoft® .NET Framework 2.0 is required for running SAB600. The software is automatically installed during the installation of SAB600 if not already available on the PC.

4.2. Software properties

The software properties of COM600 are presented in the following tables.

Table 4.2-1 Communication protocols

Master protocol	Slave protocol
DNP3 LAN/WAN	DNP3 LAN/WAN
DNP3 serial	DNP3 serial
IEC 61850-8-1	IEC 60870-5-101

Master protocol	Slave protocol
IEC 60870-5-101	IEC 60870-5-104
IEC 60870-5-103	External OPC
IEC 60870-5-104	SPA router
LON – LAG	
MNS iS Connectivity	
Modbus serial	
Modbus TCP	
SPA	

Table 4.2-2 IEDs with connectivity packages supporting COM600

615 series IEDs
610 series relays
Feeder Protection Relay REF 610
Motor Protection Relay REM 610
Voltage Protection Relay REU 610
Feeder Protection Relay REX 521
SPAJ 140 series relays
Combined Overcurrent and Earth-fault Relay SPAJ 140 C
Combined Overcurrent and Earth-fault Relay SPAJ 141 C
Combined Overcurrent and Earth-fault 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
Digital Annunciator Unit SACO 16D3
Digital Annunciator Unit SACO 64D4
RE 500 series terminals
Feeder Terminal REF 541 / 543 / 545
Transformer Terminal RET 541/ 543 / 545
Motor and Generator Terminal REM 543 / 545
Feeder Terminal REF 542plus

Table 4.2-3 Hardware requirements for SAB600

Hardware	Minimum	Recommended
Free hard disk space	1 Gb	1 .5Gb

Table 4.2-4 Supported operating systems [1)]

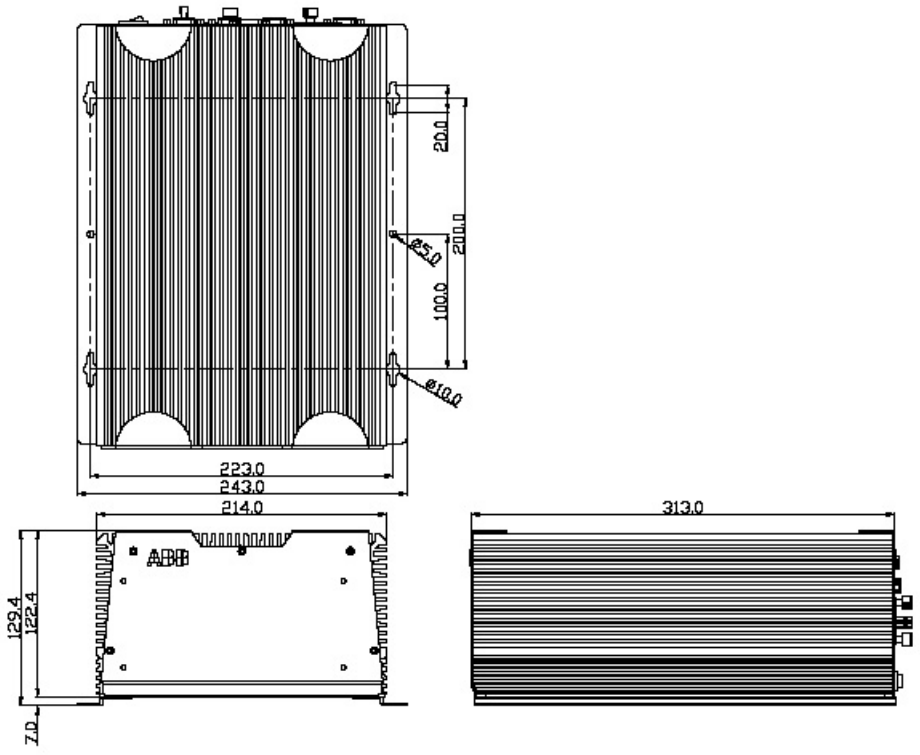
Description
Microsoft XP Professional Edition, SP2 or later

1) Microsoft® .NET Framework 2.0 is required for running SAB600. The software is automatically installed during the installation of SAB600 if not already available on the PC.

4.3. Mounting of COM600 computer

The COM600 computer is designed for mounting at a control panel.

To mount the COM600 computer to the wall-mount kit:
1. See Figure 4.3-1 for mounting instructions.
2. After the brackets have been installed, fasten four screws on each bracket.
3. After fastening the two brackets on the bottom lid of COM600 computer, the wall-mount kit installation is finished.



COM600_mounting.jpg

Figure 4.3-1 Mounting diagram of the COM600 computer

For mechanical properties of the COM600 computer, see 4.1, Mechanical properties.

4.4. Setting up the COM2 port for RS-232/RS-485

By default the COM2 port is configured to RS-232 mode. The mode of the port (RS-232/RS-485) can be changed via the BIOS setup of the computer.

COM2 port in RS-485 mode can only be used with Modbus protocol. For more information on configuration settings, see Modbus Master User's Manual.

To change the mode of the port:

1. Connect a local keyboard and display to the COM600 computer.
2. Restart the computer and press the **Del** key during restart to access the BIOS setup.
3. Select **Integrated Peripherals** from the main SETUP menu. Use the cursor keys for moving and enter key for selection.
4. Select **SuperIO Device** from the next menu.
5. On the **SuperIO Device** configuration page, go to the **COM2 Select parameter** and press ENTER. Now you can choose between RS-232 and RS-485.
6. Press the F10 key to save the changes and exit the BIOS setup.

Pinout of COM2 port when RS-485 mode is used:

DB9 connector:

1. TX-/RX-
2. N/A
3. TX+/RX+
4. N/A
5. GND
6. N/A
7. N/A
8. N/A
9. N/A

5. Installation

5.1. About this section

This section describes the installation and uninstallation of SAB600, the installation of the touch screen, and modifying and setting up of the COM600 computer. For more detailed instructions on installation of the gateway components, refer to the 1.8, Related documents.

5.2. Requirements for SAB600

The hardware requirements for SAB600 and supported operating systems are listed in 4.2, Software properties.

5.3. Installing SAB600

The SAB600 installation CD includes both SAB600 software and CoDeSys V3.2 SP2 software. In the installation wizard you can select, which software you want to install or select both. For installation of CoDeSYs V3.2 SP2 software, see Installing CoDeSys V3.2 SP2.

To install SAB600:

1. Close all open programs and insert the SAB600 installation CD to the CD-ROM drive of your PC.
2. The installation program should start automatically. If the installation does not start, open the program by browsing to the CD drive, and start COM_600.exe. The installation wizard includes the options to install both the SAB600 software and CoDeSys V3.2 SP2 software. If you want to install both, select both. CoDeSYs is not installed by default.
3. Wait for the Wise Installation Wizard to extract the installation files to your PC.
4. The SAB600 installation program opens. Click **Next**.
   At any stage of the installation, you can return to the previous window by clicking **Back**, or exit the Installation Wizard by clicking **Cancel**.
5. Read the License Agreement, then check the option **I accept the license agreement** and click **Next** to continue the installation.
   If you check the option **I do not accept the license agreement**, the **Next** button is not available and you cannot continue the installation.
6. Select the folder where you want to install SAB600.
   - To select the default folder shown at the bottom of the window, click **Next**.
   - To select another folder, click **Browse**, select a new the folder, and click **Next**. The default installation folder is C:\Program Files\ABB\COM600.
7. Select the desired installation type.

- **Typical**: This option is recommended for most users.
- **Complete**: All SAB600 features are installed.
- **Custom**: Use this option to choose which SAB600 features you want to be installed.

8. Click **Next** to start the installation.
   You can follow the progress of the installation in a window that also shows the directory path where the files are copied. At this point, you can still cancel the installation by clicking **Cancel**.
9. A window opens showing that SAB600 has been successfully installed. Close the window and finish the installation by clicking **Finish**.
10. The installation wizard will next install the Microsoft SQL Server, if it is not already installed on your PC.
11. Restart your computer.

Start SAB600 by selecting **Start > Programs > ABB > Station Automation Builder 600 > SAB600** from the Windows task bar.

Installing CoDeSys V3.2 SP2

The SAB600 installation CD includes also the CoDeSys V3.2 SP2 software. In the installation wizard you can select, which software you want to install or select both.

1. Close all open programs and insert the SAB600 installation CD to the CD-ROM drive of your PC.
2. The installation wizard includes the options to install both the SAB600 software and CoDeSys V3.2 SP2 software. To install CoDeSys, select it and continue with the installation by clicking **Next**.
   The installation program should start automatically. If the installation does not start, open the program by browsing to the CD drive, and start setup.exe.
3. Continue with the installation by clicking **Next** on every page of the wizard.
4. When the installation wizard asks for the folder where to install CoDeSys, select C:\Program Files\3S CoDeSys.
5. It is recommended to install all the features listed on the opening page.
6. Continue the installation and when completed, click **Finish**.

5.4. Updating SAB600

If you have replaced an old COM600 with newer version, update your project that contains that Gateway object. The project is updated by a conversion wizard. The conversion can be activated in two ways after you have installed the latest SAB600 software.

Converting a project

1. Open the old project in the new SAB600. The conversion wizard is launched automatically. Follow the wizard instructions.

2. If the conversion wizard was canceled, you can run the conversion by right-clicking on the Gateway object and selecting **Convert project**. Follow the wizard instructions.
3. Check the Gateway object properties to see if the COM600 version is the latest version to confirm the conversion.

You can use the new SAB600 software with old COM600 versions. In this case, do not upgrade the Gateway object. The project conversion wizard is automatically started when the old project is opened. Simply cancel the wizard.

5.5. Setting up the COM600 computer

5.5.1. Accessing the COM600 computer

Local and Remote LAN ports

The COM600 computer has by default two LAN ports, a local (LAN 1) and a remote port (LAN 2). See Figure 4.1-1. The local port is used for local connection in a secure network within the substation, for example for engineering and process communication with the IEDs. The local port has no firewall configured and it allows complete access to the COM600 computer. The remote port is used for communication outside the substation. It has a firewall pre-configured to allow communication only with web clients and remote communication using protocols for example IEC 870-5-104 and DNP 3.0 LAN/WAN.

Table 5.5.1-1 shows the default IP addresses for the LAN ports.

Table 5.5.1-1 Default IP addresses for the LAN ports

LAN Port	Gateway	Mask	IP Address	
LAN 1	Not defined	255.255.255.0	192.168.2.11	Local Area Connection (Local)
LAN 2	Not defined	255.255.255.0	10.0.0.11	Local Area Connection (Remote)

Some tasks, for example changing the IP addresses or adding users, require access directly to the COM600 computer either locally or via the remote desktop software.

Accessing the COM600 computer:
- Locally by connecting a USB keyboard, a USB mouse, and a display to the computer.
- Remotely with the remote desktop program via LAN. By default the security settings allow the remote desktop connection only via the interface reserved for the local use.

Regional settings

The default regional setting is English (United States).

Remote desktop

You can use the COM600 computer as a local console from an engineering computer with remote desktop.

The COM600 computer can be restarted remotely by running restart.bat command from the root of C drive.

Built-in user accounts

Two user accounts are predefined in the COM600 computer:
- Username: Administrator
- Password: pwd2004

This account is disabled by default for security reasons. If the COM600 password is lost, you can enable the account temporarily during the configuration phase to enable access to the COM600 computer. It is recommended that you disable the Administrator account later when the COM600 computer is connected to the actual network.

- Username: COM600
- Password: aEc2006rs

This is the main account of the COM600 computer. It is used for configuration purposes. Processes of the COM600 computer are run under this account.

Connecting configuration computer with SAB600 to COM600 computer

1. Configure the network settings of the configuration computer and the COM600 computer to allow them to communicate with each other. This is done by configuring the IP addresses of the computers into the same subnetwork. Configure (or disable) the possible firewall in the configuration computer to pass DCOM.
2. Connect either a crossover LAN cable between the computers or connect both computers to a network switch. Use the LAN port used for local use in COM600 computer.
3. Create a COM600 user account with administrator rights to the configuration computer. The password must be the same as in the COM600 computer.
4. Log in to the configuration computer as a COM600 user and launch SAB600.
5. Create a project and add the Gateway object to the communication structure.

6. Type the IP address of the COM600 computer LAN port used for configuration to the IP address property of the Gateway object.
7. Right-click the Gateway object and select **Management**. Verify that the communication with the COM600 computer is working properly. The first time you open the management tool, you are required to change the COM600 user password. Click **Change password** to change the password both in the COM600 computer and in the configuration computer.
   Close SAB600 and log in to windows to activate the new password.

The COM600 user password must always be changed as described above to ensure that the password is changed correctly for each component in the COM600 computer.

If you lose the password you cannot access the COM600 computer anymore either locally or remotely.

If you want to run SAB600 using a different user account than COM600 in the configuration computer, do the following. If you use the COM600 user, you can skip the phases below.

To run SAB600 using a different user account than COM600 in the configuration computer:
1. Add the COM600 user to the configuration computer as described above.
2. Add the new configuration user to COM600 computer with administrator rights and with the same password as in the configuration computer.
3. Configure the DCOM permissions for the new user in the COM600 computer as described below.

DCOM settings are used to define permissions to use the COM600 computer.

To start the DCOM configuration:
1. Select **Start > Settings > Control Panel > Administrator Tools > Component Services** or run the command dcomcnfg. The Component Services dialog opens.
2. Browse to My Computer and right-click the My Computer icon. Select **Properties** from the shortcut menu.
3. Select Default COM Security tab from the My Computer Properties dialog.
4. Created user account must be added to both access permissions and launch permissions.

To add permission:
1. Click **Edit Default**. The permission dialog opens.
2. Select the user you want to give a permission to use the COM600 computer.
3. Click **Add** and then **OK**.
4. Mark the check boxes for local and remote access, launch, and activation.

After changing the settings restart both computers to activate the changes.

5.6. Uninstalling SAB600

To uninstall SAB600:

1. Open the Add or Remove Programs dialog by selecting **Start** > **Settings** > **Control Panel** > **Add or Remove Programs** in the Windows task bar.
2. Select SAB600 and click **Remove**.

The uninstallation only removes SAB600 so that you can install a new version and update the software. It does not remove the Microsoft SQL Server and .Net Framework. Removing these programs may infect the functionality of other ABB applications installed on your PC.

Uninstalling CoDeSys v3.2 SP2

1. To open the Add or Remove Programs dialog, select **Start** > **Settings** > **Control Panel** > **Add or Remove Programs** in the Windows task bar.
2. Select CoDeSys and click **Remove**.

5.7. Turning off COM600 computer

If a local display, keyboard, and mouse are connected to the COM600 computer:

1. If COM600 browser is used, login as a user that has administrator privileges to the COM600 HMI.
2. Press CTRL+ALT+DEL and choose **Shutdown** from the dialog.
3. Wait until the following message appears in the display:**It is now safe to turn off your computer**.
4. Press and hold the front panel power button for a few seconds until the SYS led on the front panel turns off.

If the remote desktop session is active:

1. Run the shutdown.bat located in the C:\ of the COM600 computer.
2. Wait for about 30 s. Then keep the front panel power button pressed for a few seconds until the SYS led on the front panel turns off.

If no desktop is available, keep the front panel power button pressed for a few seconds until the SYS led on the front panel turns off.

To turn on the COM600 computer, press the power button briefly.

6. Configuration

6.1. Opening a project in Station Automation Builder 600

This section describes the configuration tasks common to all OPC servers, and gives an overview of the configuration tasks related to OPC clients.

All the possible configuration scenarios are not included in this manual. Refer to the corresponding user's manuals listed in 1.8, Related documents for more detailed instructions.

6.2. Configuration and maintenance

SAB600 is used to configure and maintain COM600. Communication networks are described in the Communication structure of the Project Explorer window. The structure is built using OPC server/client, communication channel/subnetwork, and device objects. These objects have communication properties that can be accessed via the Object Properties window. The properties define for example the communication port, bit rate, timing parameters, unit addresses, and so on .

The substation structure of SAB600 is used to configure the HMI functions of the COM600 products. The substation structure presents the functional view of the substation. It includes substation, voltage level, bay, busbar, and conducting equipment objects.

The Single line diagram is a graphical presentation of the process objects in the substation. The Single line diagram can be edited on different levels. The bay layout can be configured by opening the SLD Editor from a bay object. When the SLD Editor is opened from a voltage level object, it is possible to assign the positions of the bays within a voltage level. The position of the voltage levels in the complete substation single line diagram is done by opening the SLD editor from the substation object.

Substation objects are linked to communication structure objects by using the Data Connection tool. For example, the circuit breaker object in the substation structure is linked to the CSWI logical node in the communication structure. The link between the structures is also used on the event list, to present the events using the names according the substation structure.

Process data accessible on the devices is modeled according to the IEC 61850 standard. In the communication structure this is seen as logical devices (LD), logical nodes (LN) and data objects (DO). It is possible to insert an empty device into the structure and then manually add and configure LD, LN, and DO objects. It is also possible to use pre-configured object types of the devices, which have the objects defined and configured to add efficiency. The device configuration can also be imported from an IED SCL

description. Data objects include configuration properties, that contain cross-referencing information between protocol and the OPC/IEC 61850.

Process data is connected to a Gateway client using a Cross-References function available in the client IED object. Data objects that are transferred to the client are dragged from the servers on the structure to the function tool. Cross-referencing information is filled in the function window. The Cross-References function supports import and export with Microsoft Excel.

When the structure is complete and all the objects have been set up properly the configuration is downloaded to COM600 using the Gateway Management function available on the Gateway object.

The Logic Processor function is programmed with a separate programming editor.

6.3. Configuration process

6.3.1. Overview of configuration process

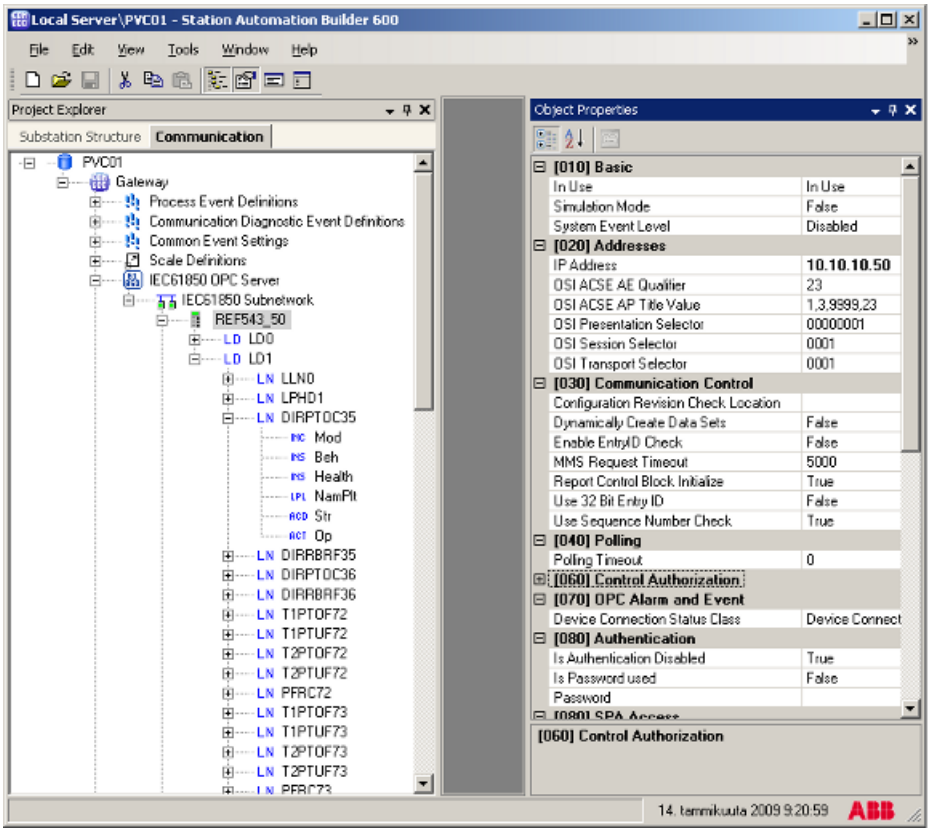
Before you can start using COM600, build and configure the communication and substation structure of your project in SAB600.

Start SAB600 and open and name a project.

1. Select **File** > **Open/Manage Project...**.
2. In the Open/Manage Project dialog, select the required location for the project:
   - Projects on my computer
   - Projects on network
3. Select **New Project** on the left.
   - Enter a Project Name. The **Description** is optional.
4. Click **Create**.
5. Click **Open Project**.

A project can have only one COM600 configuration.

Figure 6.3.1-1 shows an example view of SAB600 including an object tree in the Communication structure on the left and property window displaying the object properties on the right.



IECSAB600Main.bmp

Figure 6.3.1-1 Example view of SAB600

The configuration can be divided into three tasks:

1. Building the object tree and configuring the object properties for OPC servers (process communication).
2. Building the substation object tree and configuring the object properties for HMI functions.
3. Activating COM600 with a new configuration.

First, build an object tree by adding objects to the object tree. For more information refer to the respective user's manual listed in 1.8, Related documents. Connectivity packages for certain protection and control products usually contain preconfigurations and tools to facilitate the building of the object tree.

6.3.2. Building and configuring object structures

6.3.2.1. OPC servers

Start the configuration work from the server objects. Before an OPC client can be taken into use, configure an OPC server for the process communication.

The object tree is built in the communication tab of SAB600. There are several possible ways to build an object tree. One of them is to build the object tree by adding objects in logical order starting from the OPC server object. You can either use basic or pre-defined objects. Using basic objects means that you have to configure the objects manually. If objects are pre-defined, they are preliminary configured and all the necessary child objects are automatically added.

Add the objects in the following order:
1. OPC server object
2. Channel/Subnetwork object depending on protocol
3. Device object
4. Logical device object(s)
5. Logical node object(s)
6. Data objects.

If you want to connect events or scales to data objects or device connection status event classes to device objects at this point, make sure that you have already created and configured the event and scale objects.

For more detailed information on adding objects to the object tree, refer to the appropriate protocol manual (see 1.8, Related documents).

6.3.2.2. Substation structure for HMI

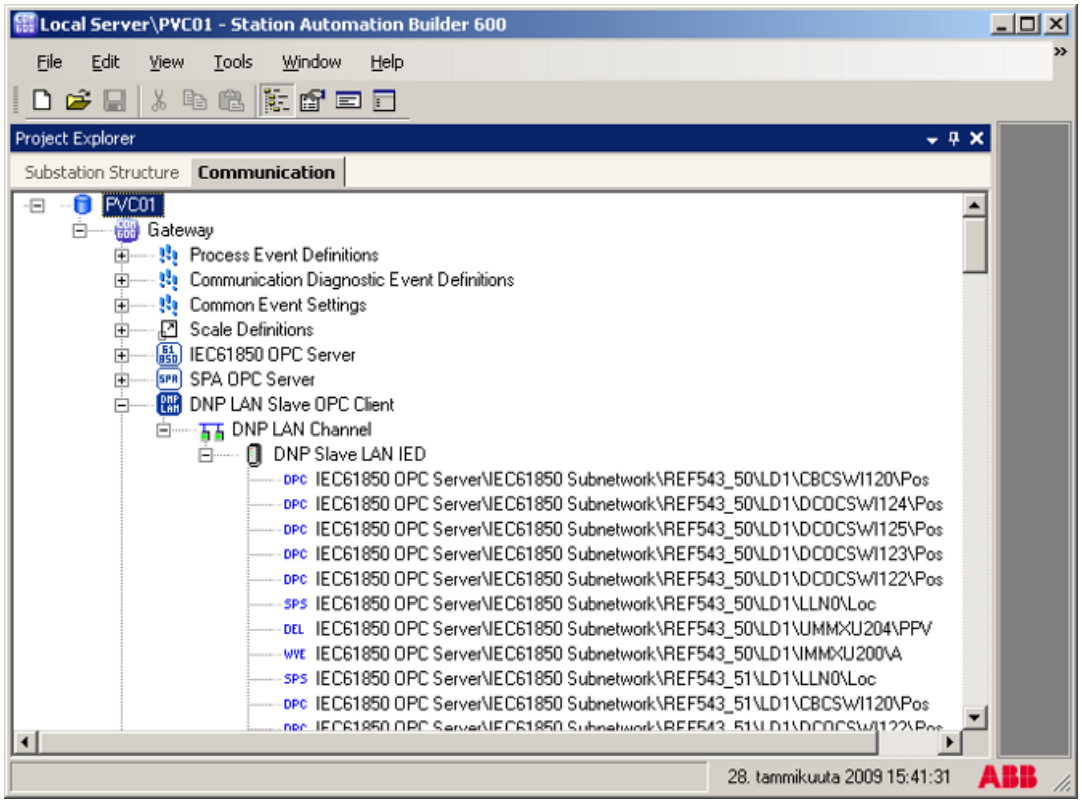
Configuring the substation is the main task in configuring HMI functionality. If connectivity packages or IED SCL description files with substation structure information are used, most of the substation structure can be built automatically when the IEDs are added to the communication structure. If no substation structure information is available the structure must be built manually.

Before you can create a substation structure, you have to create a communication structure with OPC Server and communication channel objects, IEDs, Logical Devices, Logical Nodes and Data objects.

For more detailed information, see COM600 HMI Configuration Manual.

6.3.2.3. OPC clients

The object tree is built in the communication structure. Before an OPC client can be taken into use, confgure an OPC server for the process communication.



ClientComStruc.jpg

Figure 6.3.2.3-1 Example of OPC client communication structure

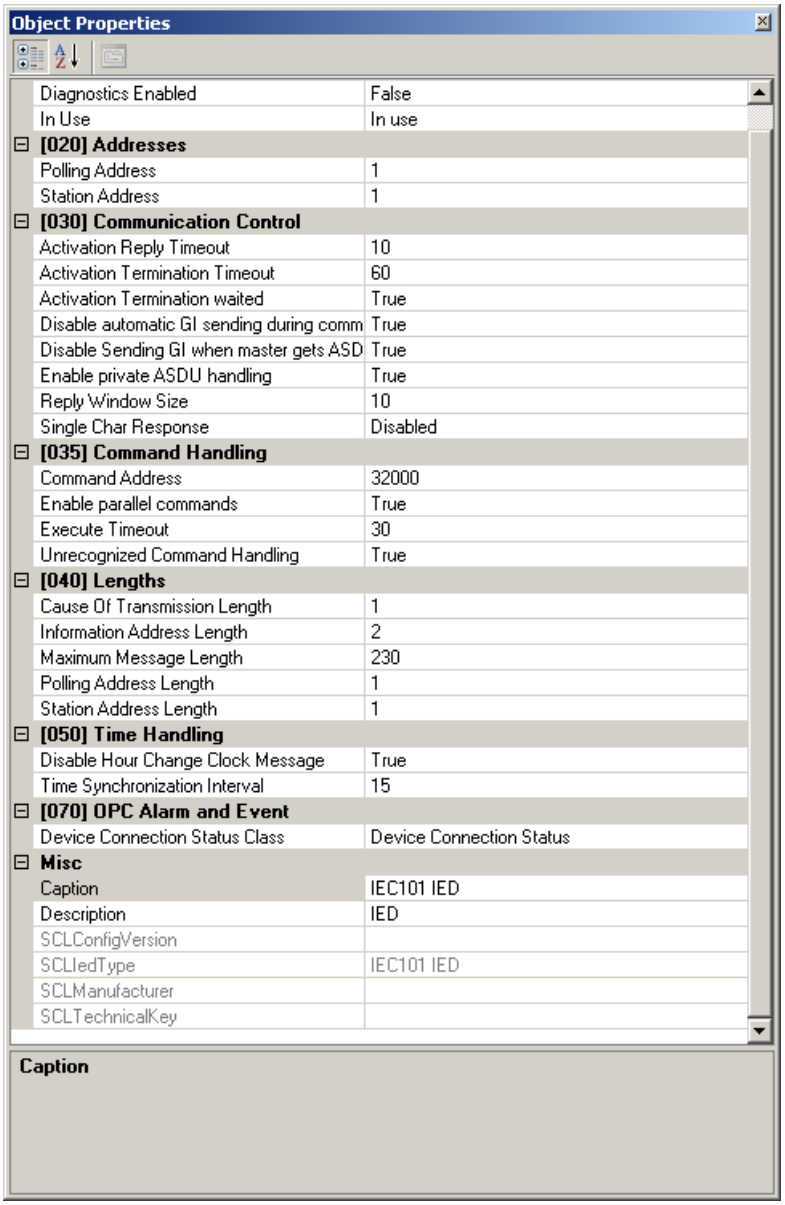
The OPC client object is added to the same hierarchy level as the OPC server, see Figure 6.3.2.3-1. Below the OPC client object, you can add only channel and device objects. The data objects are linked using the **Cross-References** function from the servers to the client and further to the NCC. The **Cross-References** function can be also used to configure the parameters of the data objects.

Add the objects in the following order:
1. OPC client object
2. Channel/Subnetwork object depending on protocol
3. Device object.

6.3.2.4. Configuring object properties

After the objects have been added, configure the object properties.

To configure an object:
1. Select an object in the object tree of the Communication structure.
2. The object properties appear now in the Object Properties window, see Figure 6.3.2.4-1. You can see the selected object on the left and the available properties on the right.



IECObjProp.jpg

Figure 6.3.2.4-1 Example of object properties

3. Select the property you want to configure. Depending on the property value type, configuring is always done either by
   - selecting a predefined value from a drop-down combo box, or
   - entering a text string or a numerical value in a text field.

With SCL import function, you can import new objects with configurations from an existing file. Right-click the device and select **SCL Import** from the shortcut menu.

To import a new configuration file:

1. Click **Choose File**.

2. Browse to a new configuration file from the appearing dialog.
3. Select the file and click **Open**.
4. Select the device to import from the drop-down list. You can preview the configuration on the right.
5. Click **Import**.

The new preconfigured objects appear in the object tree. If the configuration file is large the import can take time. To import a configuration file for a different device, right-click the device, select **SCL Import** again and repeat the steps.

For detailed information about the SCL Import function, see 6.3.2.5, SCL Import function.

6.3.2.5. SCL Import function

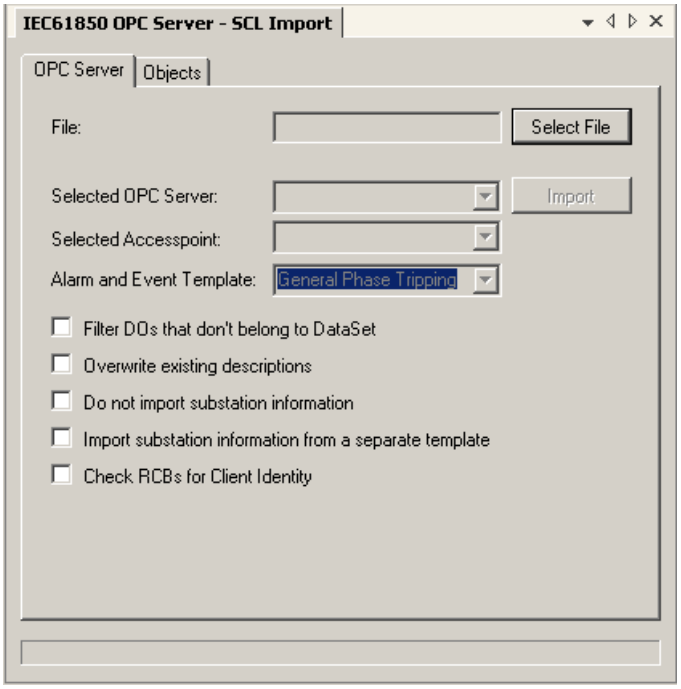
You can import the communication structure under a Gateway, OPC Server or OPC Client, and IED object with configurations from an existing file. Using the SCL import function to import the structure. If an OPC Server or client configuration file is used, then the whole communication structure is imported. Configurations can be imported for single IEDs by selecting an IED object.

The file extensions for the import files can be .icd, .cid, .scd or .xml.

To import a configuration file:
1. Right-click the OPC Server or IED and select **SCL Import** from the shortcut menu.
2. Click **Select File**.
3. Browse for a new configuration file from the opening dialog.
4. Select the file and click **Open**.
5. Select the device to import from the drop-down menu. You can preview the configuration from the **Objects** tab.
6. Click **Import**.

The new preconfigured objects appear in the object tree. If the configuration file is large, the import may take time.

All options in the **SCL Import** function are not available for all protocols.



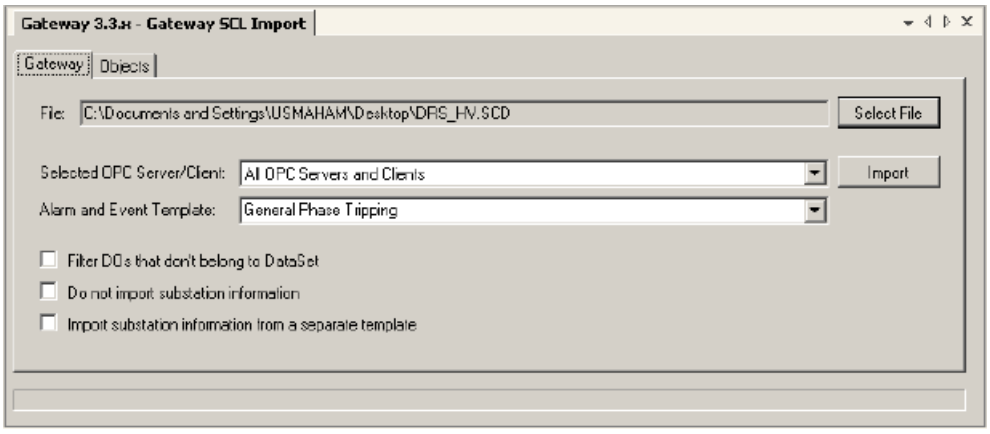
SCL_Import.bmp

Figure 6.3.2.5-1 Example of IEC 61850 OPC Server SCL Import

SCL Import options from the Gateway, OPC Server or OPC Client, and IED level are presented in the following.

SCL Import from Gateway level

The Gateway level import creates configurations for OPC Servers and OPC Clients according to the importable SCL file.

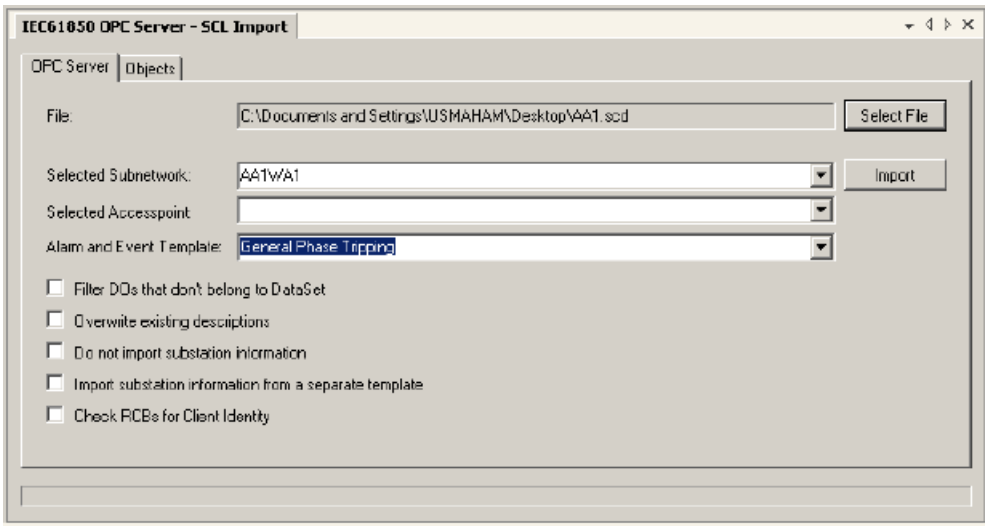


SCLImportGW.bmp

Figure 6.3.2.5-2 SCL Import from the Gateway level

SCL Import from OPC Server level

The OPC Server level import creates configurations for the selected OPC Server according to the importable SCL file.



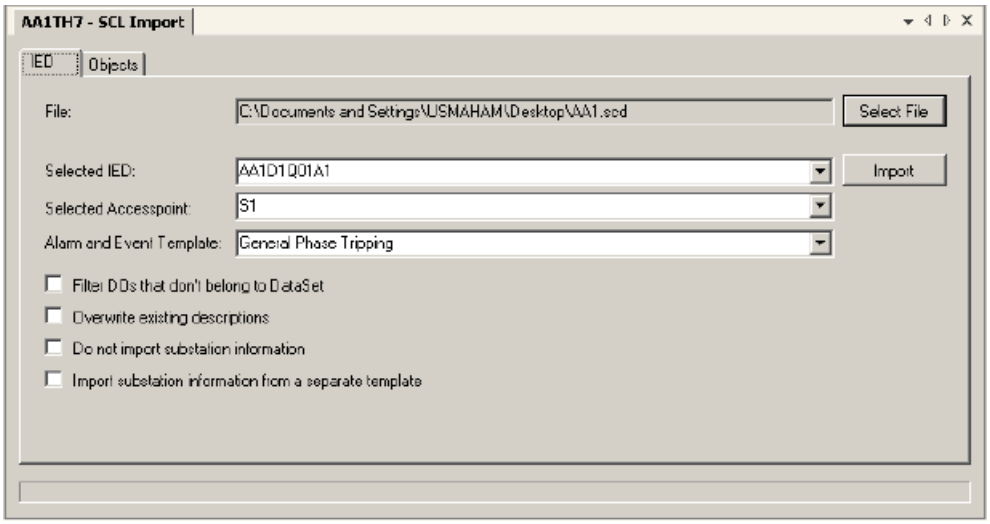
SCLImportServer.bmp

Figure 6.3.2.5-3 SCL Import from the OPC Server level

Check RCBs for Client Identity: Imports IEDs from the given file where Report Control Blocks client identity matches the selected OPC Server.

SCL Import from IED level

The IED level import creates configurations for the selected IED according to the importable SCL file.



SCLImportIED.bmp

Figure 6.3.2.5-4 SCL Import from the IED level

Description for the different options:

- Alarm and Event Template: Select one of the predefined templates for setting Alarm and Event handling for the objects that the import operation affects. There are two template options:
  - General Phase Tripping: by selecting this template, protection functions are configured to send general alarms and events, regardless on whichever phase is activated. It depends on the device, whether phase-specific information is provided.
  - Single Phase Tripping: by selecting this template, protection functions are configured to send phase A-, B-, or C-specific alarms and events, if the device provides phase-specific information.
    If you are familiar with the issue, you can also create your own template by copy-pasting existing templates. Browse to the current SAB600 installation directory and find the \bin\Tools\SCLImport directory underneath it. Copy the phasetrippingmapping.xml file and paste it to the directory and give it a meaningful name. Open the file with an XML editor. Enter the name of the new template to the AETemplateName element. Add or modify mappings in the LNClass and DO elements. Use the information in the file as a guide.
- Filter DOs that don’t belong to the DataSet: This option limits the amount of data objects being imported. If a data object does not belong to any data set, it is not imported. Some IEDs can provide huge amounts of data that is not reported, that is, not updated in COM600 HMI. Performance can be enhanced by checking this option.
- Overwrite existing descriptions: This option overwrites all existing descriptions on objects affected by the import operation. Check this option only if you know that the importable file contains better descriptions than your current configuration.

- Do not import substation information: This option does not update the substation structure. It can be used if you only must update the communication configuration.
- Import substation information from a separate template: This option allows you to select a template that provides the substation configuration. It is useful, if there are several identical configurations and you have created a good template for the substation information.

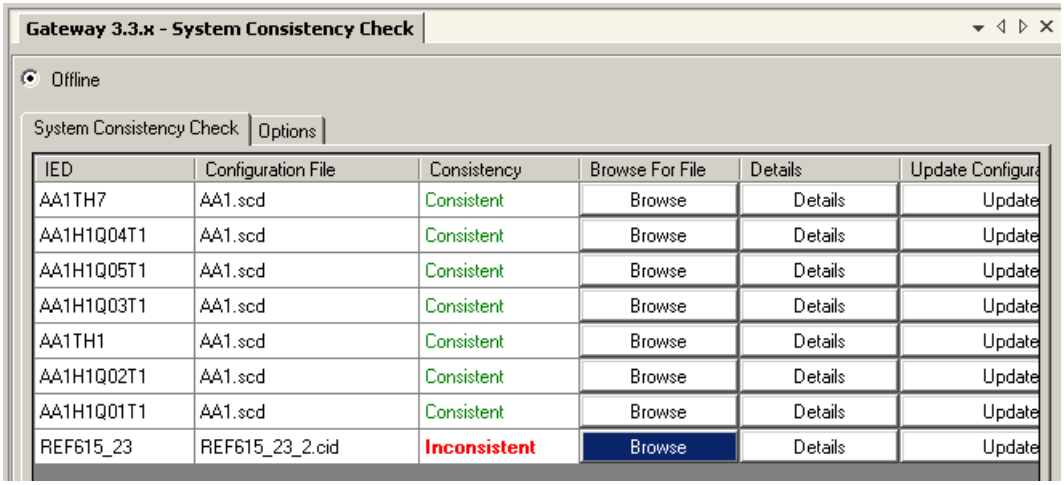
These options are not available for OPC Client level or OPC Client IED level imports.

6.3.2.6. System Consistency Check

System Consistency Check is intended to be used with IEC 61850 protocol to check that the IED configurations currently used in the COM600 project are consistent with the compared IED configuration files. If inconsistencies are found, the COM600 project configuration can be updated. According to the IEC61850 standard, IEDs can have two configuration revisions: one for data model and one for reporting. Configuration revision for data model is modeled on the LD0\LLN0\NamPlt\configRev object. It is the most important indicator of the configuration revision. Additionally each Report Control block has a confRev attribute that defines the revision of RCB and the DataSet of RCB. System Consistency Check checks each LDs LLN0\NamPlt\configRev and confRev of each RCB.

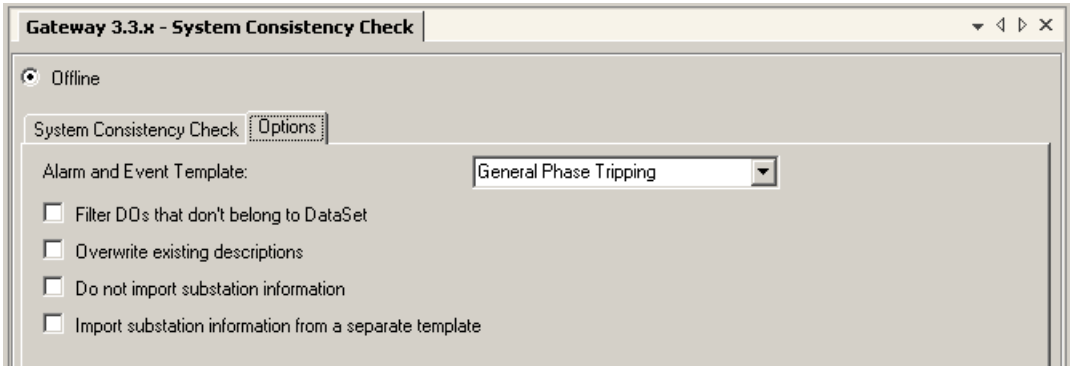
The GUI tool is divided into two tabs: one for giving overview on the project with configuration consistency status of IEDs, and another for setting options for the update procedure. Additionally, by clicking **Details**, a dialog on consistency differences is shown.

Always store the configurations with the same name to the same location. When you save the configuration with an IED or system tool to the same location with the same name and launch SCC Consistency, the column is automatically updated according to the configuration changes. If you have not saved the configurations as instructed, point the tool to the correct location and file by using the **Browse** button. If the configuration is inconsistent, click the **Details** button for more detailed information. Finally, an individual configuration can be updated using the **Update** button. The **Update All** button updates all inconsistent configurations.



SCC GUI.bmp

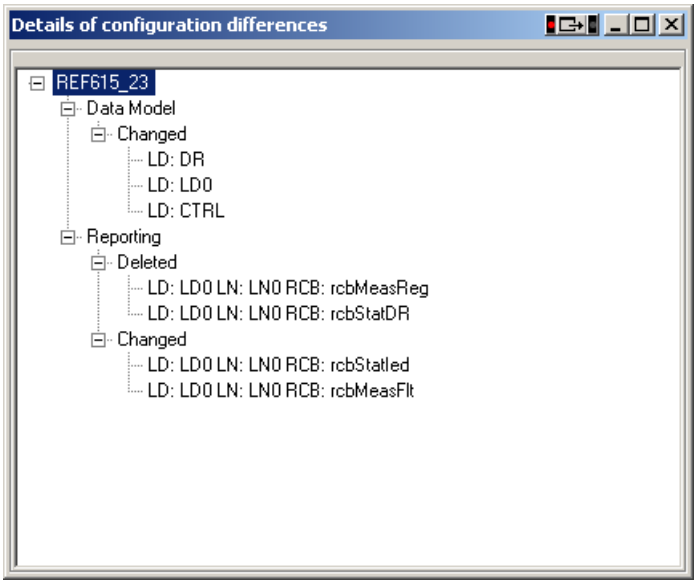
Figure 6.3.2.6-1 System Consistency Check view



SCC Options.bmp

Figure 6.3.2.6-2 Options view

The **Options** view allows you to select same importing options that are available in the **SCL Import** tool. It is recommended that same options are used with both functions.



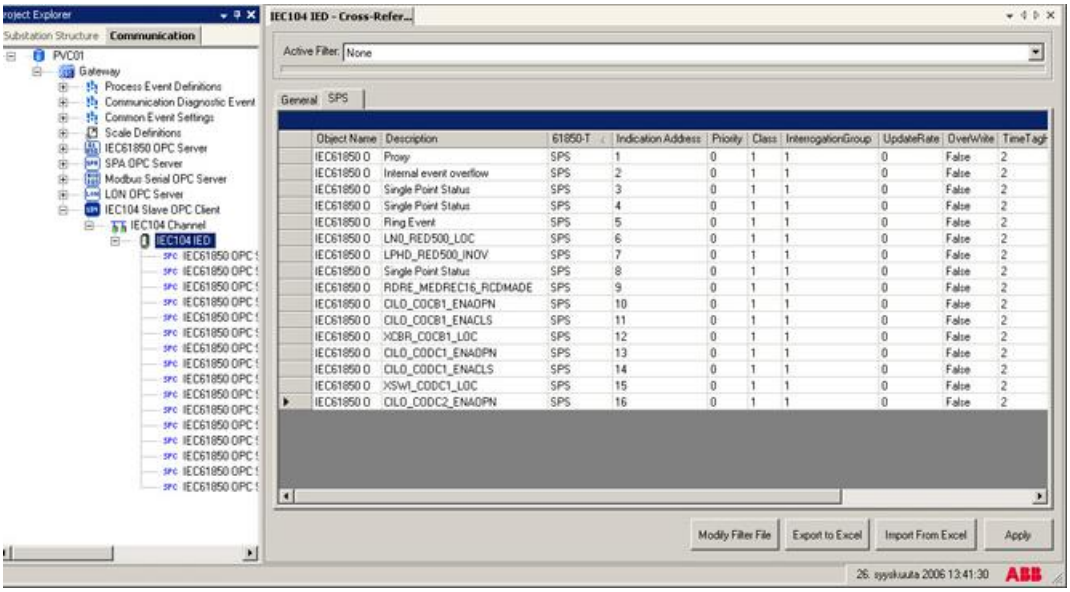
SCC details.bmp

Figure 6.3.2.6-3 Details view

The **Details** view shows added or deleted LDs and RCBs. Additionally, it shows the modifications to the content of LD or RCB.

6.3.2.7. Cross-References function

Data objects are added differently for OPC clients than for the upper level objects. Drag and drop the data objects you need from an OPC server to the slave. You also can select an upper level (server, channel, and so on) object and drag and drop it into the **Cross-References** function. As a result, all the data objects within the selected object appear in the Cross-References function and can be connected to the slave OPC client.



CrossReferencesFunction.jpg

Figure 6.3.2.7-1 Cross-References function

In the **Cross-References** function, you can use a filter file to leave out some of the data objects to be connected to the Slave Device. Select the filter file from the drop-down menu under **Active Filter**. If there are no filter files listed in the drop-down menu, you can create your own filter file by clicking **Modify Filter File**.

You can also modify an existing filter file to meet your needs. The **Cross-References** table allows you to view the data objects by type. Use the tabs in the upper part of the table to do this. Under the General tab, you can see all the data objects and their property values. Here you can sort the data objects by clicking the column heading (Object Name, Description, 61850-Type, and so on).

There is a possibility to export the cross-references table to Microsoft Excel and to import the table from Microsoft Excel. Clicking **Apply** connects the data objects to the Slave Device. After that you can change the data object values either in the Object Properties function or in the **Cross-References** function. For more detailed instructions on configuring the data object properties in the Cross-References function, refer to the slave protocol user's manuals listed in 1.8, Related documents.

6.3.3. Configuration of Station/Remote switch

Each IED and logical device in the OPC Server has a configuration parameter defining the OPC node path for the S/R switch that is used for that IED/logical device. If a logical device does not have an S/R switch path configured, the path defined in the IED is used instead. At run-time, the S/R path of a logical device can be read from the OPC Server; the LD S/R switch path is located in the LD node. The OPC server that has the S/R switch

position information must have at least one signal mapped to the OPC client using this information.

The S/R switch OPC path points to an OPC node modeled according to one of the supported IEC 61850 data classes. The stVal OPC item of the S/R object presents the state of the S/R switch, 1 = station and 0 = remote. If the stVal item has the vartype VT_BOOL, VARIANT_TRUE is interpreted as 1 and VARIANT_FALSE as 0.

Several IEDs/LDs can share the same S/R switch OPC path, or each IED/LD can have an own S/R switch OPC path. The OPC node pointed by the path can be located in an OPC server providing the S/R information from a physical switch or from a simulated software switch.

The web HMI is considered to be local or remote based on the IP-address of the web client. The gateway object has a configuration property which defines the addresses that are handled as local. It can be either a single IP address or using wild cards a range of IP addresses.

6.3.4. Event definitions

6.3.4.1. Creating event definitions

To create event classes:

1. Right-click the Events group in SAB600, see Figure 6.3.4.1-1.
2. Select **New -> Event classes**.
3. Select the event class you want to add.
4. The new event class appears in the Process Definitions below the selected event group. Enter a unique name for the event class by right-clicking it and selecting **Rename**. The new event class can be configured and connected to a data object.

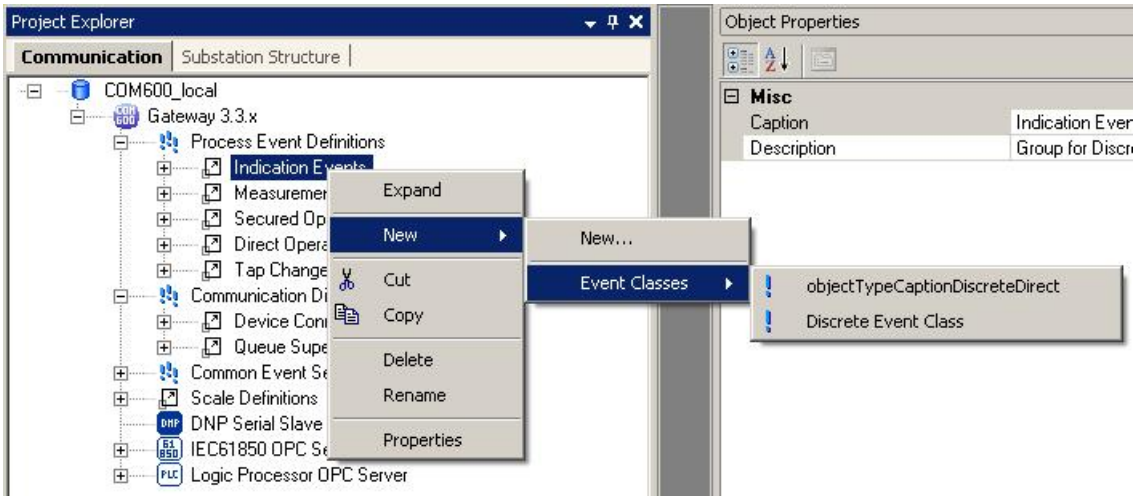


Figure 6.3.4.1-1 An example of creating event classes

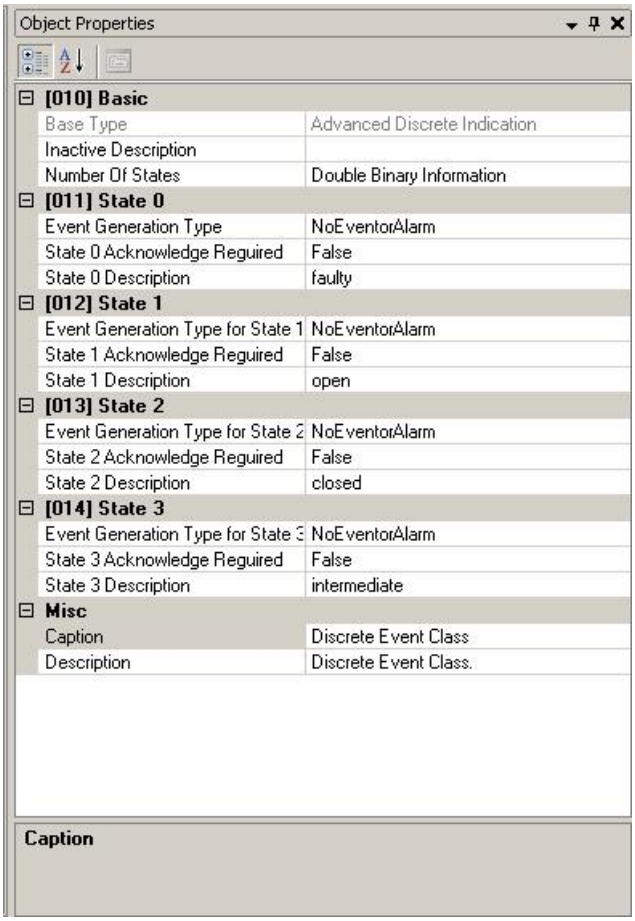
6.3.4.2. Configuring event definitions

You can configure event definitions in SAB600. Event definitions specify the type of events that are created for HMI event and alarm lists. You can specify whether an event appears only on the event list, on both event and alarm lists, or whether it is displayed at all. You can also add event texts for the events and specify whether alarms must be acknowledged by the user.

Event definitions are linked to data objects by configuring the event properties available for data objects. When importing IED configurations from connectivity packages or IED SCL description files, event definitions are linked to data objects by default. For example switch position data object CSWIx.Pos is linked by default to switch position event definition. The default linking rules are specified in a DOParamsDefaults.xml file located in the \Program files\ABB\COM600\bin\Tools\SCLImport in the computer where SAB600 is installed.

To configure event definitions:

1. Select the event you want to configure in the object tree.
2. The object properties appear now in the Object Properties window, see Figure 6.3.4.2-1.
3. You can assign the event with parameter values.



EventDefObjProp.jpg

Figure 6.3.4.2-1 An example of object properties of events

6.3.5. Configuring Alarm groups

Alarms can be grouped using the Group Alarm Configurator tool.

To create an alarm group:

1. Create virtual Application OPC server.
2. Create Virtual Subnetwork.
3. Create Virtual IED.
4. Create Virtual LD.
5. Create LN.
6. Create GroupAlarm SPS object
   If you are going to create several Group Alarm objects, rename each object with a unique name within LN.
7. Open Group Alarm Configurator.

Drag and drop the data objects, which shall belong to the alarm group to Group Alarm Configurator tool. You can use data objects from any of the OPC servers of COM600. The data objects of following types can be used as a member of alarm group: ACD, ACT, SPS, SPC, DPS, DPC, INS, or INC. When the objects are inserted to the tool, they have by default the alarming states configured according the event definition linked to the object. If no event definition is linked to an object, it does not have any of the states as alarming. Alarming states can be manually specified in the tool by checking the corresponding check box of the state.

When the objects have been added and the alarm states are configured, accept the configuration by clicking apply.

The logic of the alarm group is configured with the Group Alarm Logic Property of the object. There are three choices:

- AND
  Alarm group is active if all signals belonging to the alarm group are active. Signal changes which does not change alarm group state or quality does not cause an update in the alarm group object.
- Dynamic OR
  Group alarm is active if any of the signals belonging to the alarm group is active. Any signal state change causes an update of the alarm group object even if the state or quality of the alarm group does not change.
- Static OR
  Group alarm is active if any of the signals belonging to the alarm group is active. Signal changes, which do not change the alarm group state or quality, does not cause an update in the alarm group object.

The handling of the source signal quality is configured with the Signal Handling property. There are three choices:

- Group Quality Follows Signal Quality
  Group alarm is calculated using only the signals with good/known quality. The group alarm has the quality of the signal with the worst quality in the group.
- Unknown Signal StatesTreated As Alarming
  If the alarm group contains any signal with bad or unknown quality then the alarm group is active. The quality of the group alarm is always good.
- Unknown Signal States Ignored
  Group alarm is calculated using only the signals with good/known quality. If no signals have good/known quality then the group alarm is inactive. The quality of the group alarm is always good.

Group Alarm object is an SPS data object, which has value true when the group alarm is active and value false when it is inactive. The object can be further used in the COM600 HMI or it can be forwarded to external systems using the slave protocol cross-reference tool.

6.3.6. Using scales

6.3.6.1. General about using scales

You have to use scaling if a measurement value provided by the device is not as such suitable for the applications, and you need to change the provided value to another.

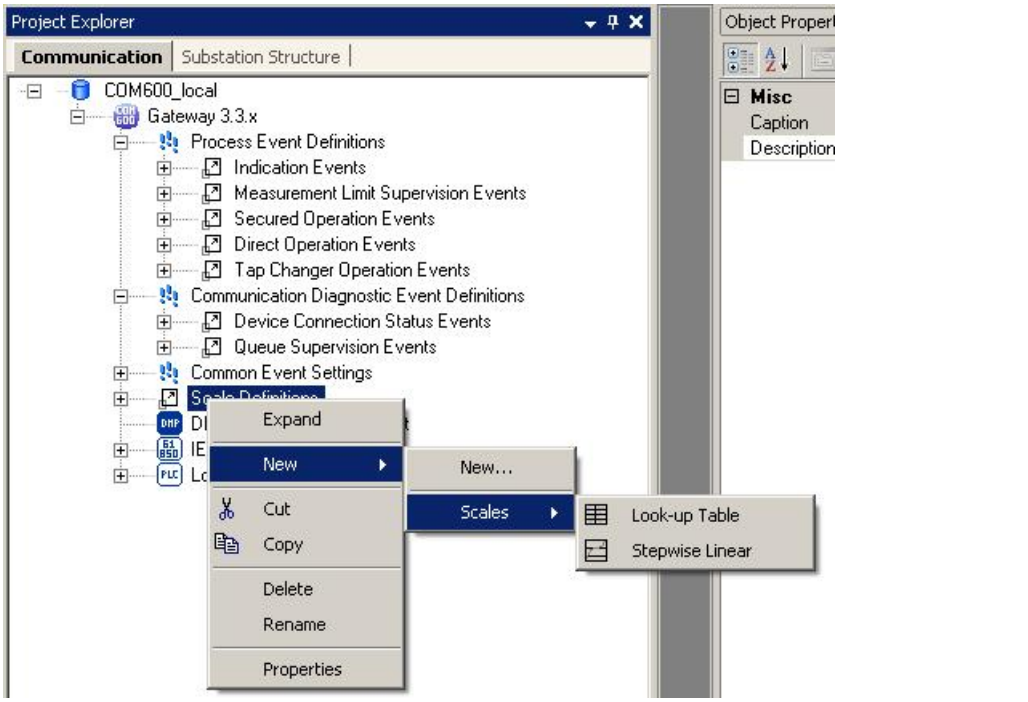
With a scale you can convert one value to another by using a scaling algorithm. OPC servers support two types of scales: Stepwise Linear and Look-up Table. The Stepwise Linear scale multiplies the value to be converted with a scale factor and adds an offset value to the result, and the Look-up Table scale uses a look-up table to find the required value.

Before you can connect a scale to a data object, add and configure the scale in SAB600. Add and configure the scales before adding and configuring any other objects.

6.3.6.2. Creating scales

To create scales:

1. Right-click Scale Definitions in SAB600, see Figure 6.3.6.2-1.
2. Select **New -> Scales.**
3. Select the scale to add (a Look-up Table or Stepwise Linear).
4. The new scale appears in the Scale Definitions. Enter a unique name for the scale by right-clicking it and selecting **Rename**. It can be configured and connected to a data object.



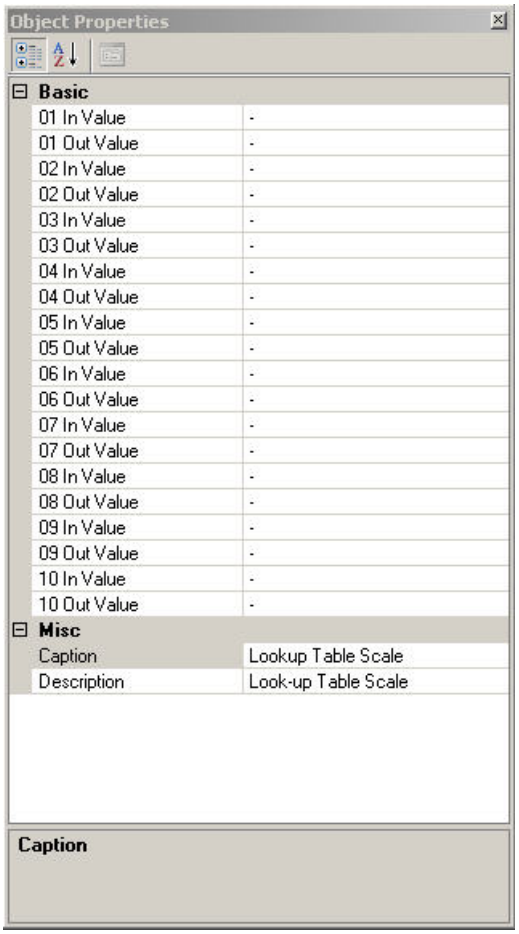
creating_scales.jpg

Figure 6.3.6.2-1 Creating scales

6.3.6.3. Configuring scales

To configure scales:

1. Select the scale you want to configure in the object tree.
2. The object properties appear now in the Object Properties window, see Figure 6.3.4.2-1.
3. You can assign the scale with parameter values.



ScaleDefObjProp.jpg

Figure 6.3.6.3-1 Object properties of the scales

Table 6.3.6.3-1 Scales

Property/Para-meter	Value or value range/ Default	Description
Basic		
Look-up Table and Stepwise Linear		
01 In Value	-	Value to be scaled
01 Out Value	-	Scaled value
02 In Value	-	Value to be scaled
02 Out Value	-	Scaled value
03 In Value	-	Value to be scaled
03 Out Value	-	Scaled value
04 In Value	-	Value to be scaled

Property/Parameter	Value or value range/ Default	Description
04 Out Value	-	Scaled value
05 In Value	-	Value to be scaled
05 Out Value	-	Scaled value
06 In Value	-	Value to be scaled
06 Out Value	-	Scaled value
07 In Value	-	Value to be scaled
07 Out Value	-	Scaled value
08 In Value	-	Value to be scaled
08 Out Value	-	Scaled value
09 In Value	-	Value to be scaled
09 Out Value	-	Scaled value
10 In Value	-	Value to be scaled
10 Out Value	-	Scaled value

After you have performed all the necessary configurations, see 7.1, Activating COM600 with new configurations.

6.4. Backing up and restoring

To back up the SAB600 project:
1. Select **File** > **Open/Manage Project**.
2. Select the project you want to back up.
3. Select **Export Project** on the left.
4. The File dialog opens. Select the location where to export the database.

To restore your backup:
1. Select **File** > **Open/Manage Project**.
2. Select **Projects on my computer**.
3. Select **Import Project** on the left.
4. The File dialog opens. Choose the exported database you want to import.

6.5. Retrieving previous configuration

An existing configuration can be downloaded from COM600 to SAB600 using the Management tool under the Communication view.

To retrieve and existing configuration:
1. Right click the Gateway object in the **Communication** view.
2. Select **Management**.

3. From **Configuration control**, click **Retrieve COM600 Configuration**.
4. In the file view, browse to the location of the required configuration file.
5. Click **Open**.

This functionality can only be used with an empty Gateway object of version 3.2 or newer. For older versions of the Gateway object, or if there are server or client objects under the Gateway object, the functionality is disabled.

6.6. SCL Export

Export the configuration files of the COM600 OPC Servers and Clients in SCL format using the SCL Export function in the Gateway object. This function can be used to transfer the configuration information to other systems and tools.

To export configuration files in SCL format:
1. Right-click the server object in the Communication tree and select **SCD Export**.
2. The **SCD Export** window opens.
3. Click **Export** and select the location where you want to save the SCL file. Click **OK**.

Both the communication view and substation view configurations are exported.

To export just the communication view:
1. Right-click the Gateway object in the Communication tree and select **SCL Export**.
2. The **SCL Export** window opens. Select whether you want to export all configurations or a certain OPC Server or Client configuration.
3. Click **Export** and select the location where you want to save the SCL file. Click **OK**.

CID Export

Export the configuration files of IEDs in CID format.

To export configuration files in CID format:
1. Right-click the IED in the Communication tree and select **CID Export**.
2. A Windows **Explorer** window opens. Rename the file, if necessary, and browse to the location where you want to save to file.
3. Click **Save**.

Both the communication view and substation view configurations are exported.

6.7. Configuring external watchdog for COM600

The communication to the IED used as a watchdog is configured as with any IEDs using SAB600. The IED is configured with SPC or INC type of data object to which the cyclical command is sent.

To configure COM600 to use an IED as an external watchdog:

1. Right-click on the Gateway object and select **Properties**.
2. Enter the **Command OPC Item Path** in the following format:
   Node#ProgID For OPC Server#Channel Name\IED Name\Logical Device Name\Logical Node Name\Data Object Name\Data Attribute Name

Other properties are set according to the preference of the user, but they can be left as they are by default. These are:

- Command Write Value
  The value that is written to the command OPC item. The default value is 1.
- Command Write Interval
  How often the command is sent. The default value is 5 seconds.

6.8. Installing and configuring Duo Driver

Duo Driver is available when the optional LAN card is installed in COM600.

Before the installation, it is recommended to rename Intel(R) PRO/1000 MT Dual Port Server Adapter ports to **DUO Line A** and **DUO Line B**. Open the **Network Connections** dialog and select the **Properties** for the Duo Driver devices. Configure static IP address on **DUO Line A** and disable the TCP/IP stack on **DUO Line B**.

To install the Duo Driver:

1. Run the **Duo Driver Setup Wizard** file, **`C:\DuoDriver\setup.exe`** (in the COM600 computer)
2. Click **Next**.
3. In the **Select Installation Folder** dialog, select **Everyone**.
   Click **Next**.
4. Before the installation is completed, a notice stating that the software has not passed Windows Logo testing is displayed. This is normal.
   Click **Continue Anyway**.
5. During the installation process, the file virtualnic.sys is required. Browse to the location C:\Program Files\DuoDriver.
   Click **OK**.
6. When the installation is completed, the following message is displayed:
   Driver not yet ready! All parameters are ignored until initial Pairing is done.
   Click **OK**.

After the installation, the **Duo Driver Management and Supervision Interface** will open.

Configure the following:

1. Set **Line A/Primary** to Duo Line A and **Line B/Secondary** to Duo Line B
   Click **Apply**.
   The MAC address for each line is shown.
2. Enter a valid MAC address for **MAC Address A** or leave as default.
   Click **Apply**.
3. For **MAC Address B**, enter the same value as used for **MAC Address A**.
   Click **Apply**.
4. To complete the configuration, click **OK**.

The Duo Driver installation is now complete.

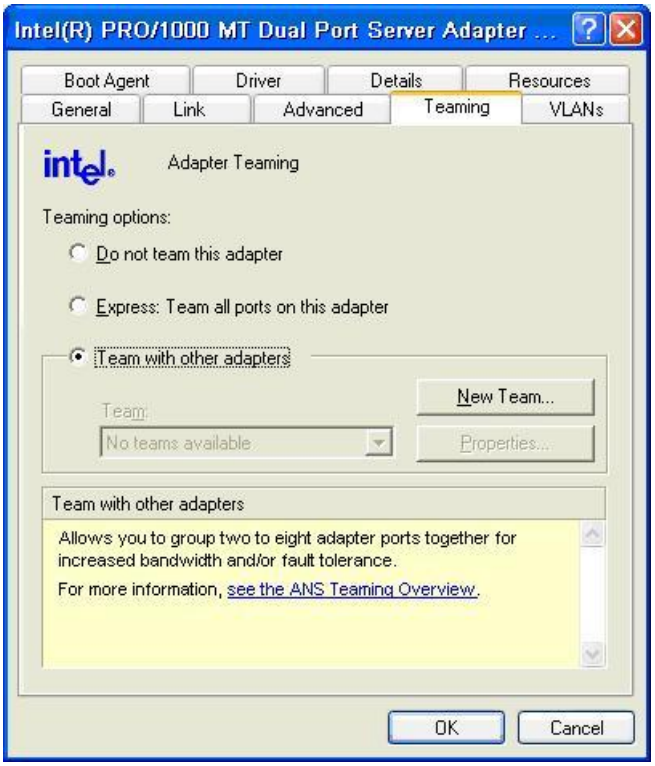
6.9. Installing Intel Teaming feature to COM600

The Teaming feature is available only if a LAN optional card has been installed in COM600.

Teaming Features include Failover protection, increased bandwidth through aggregation, and balancing of traffic among team members. Teaming Modes are AFT, SFT, ALB, RLB, and EtherChannel*/3ad (LA/FEC/GEC/3ad). However, only Failover protection using SFT is supported by ABB. SFT uses two (total) adapters connected to two devices (that is, switches) to provide a fault tolerant network connection if the first adapter, its cabling or the device (switch) fail. This is determined by a link failure.

To use the SFT connect Intel(R) PRO/1000 MT Dual Port Server Adapter network ports to two devices (that is, switches). Spanning tree protocol must be switched on in the devices (switches). Do not put clients on the link partner switches, as they do not pass to the partner switch at fail.

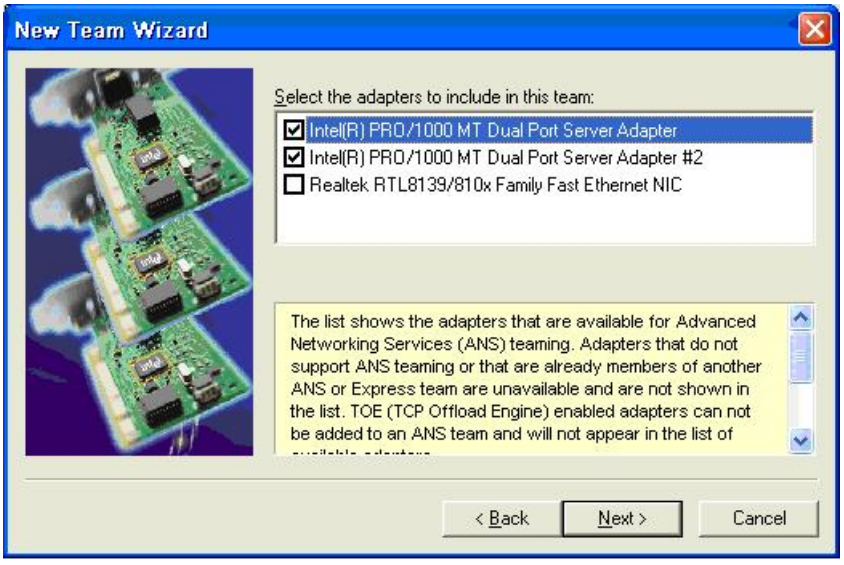
To install the Intel(R) PRO/1000 MT Dual Port Server Adapter:
1. Open **Control Panel**.
2. Double-click **System**.
3. Click the **Hardware** tab and select **Device Manager**.
4. Expand **Network adapters** and double-click **Intel(R) PRO/1000 MT Dual Port Server Adapter**.
   There are two adapters with the same name, select one of them.
5. The **Properties** windows appear. Select the **Teaming** tab.



Intel_Pro_Port_Server_Adapter.JPG

Figure 6.9-1 Opening the Teaming tab

6. Select **Team with other adapters** and click **New Team…**.
7. Specify a name for the team and click **Next**.

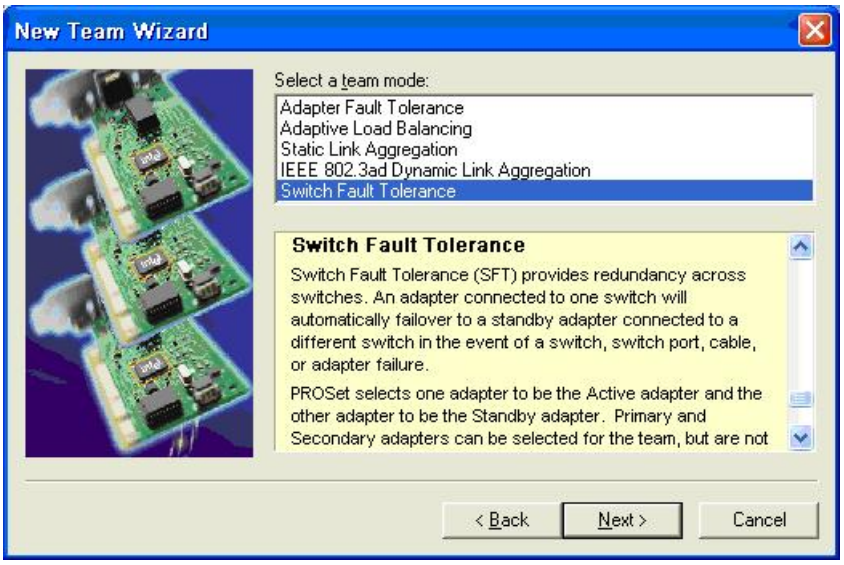


New_Team_Wizard.JPG

Figure 6.9-2 New Team Wizard

8. Select both **Intel(R) PRO/1000 MT Dual Port Server Adapters** and click **Next**.

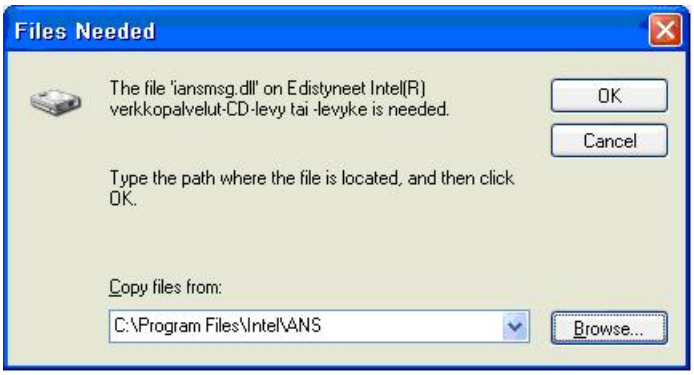
9. Select **Switch Fault Tolerance** to a team mode and click **Next**.



Switch_Fault_Tolerance.JPG

Figure 6.9-3 Switch Fault Tolerance selection

10. Click **Finish** to start installation
11. During the installation setup asks for location of the iansmsg.dll file. It can be found under C:\Program Files\Intel\Ans. Browse the location and click **OK**.



Files_Needed_Dialog.JPG

Figure 6.9-4 Files Needed dialog

12. Configure the Team. Click **OK** to close the **Properties** dialogs.

The Team is now made. One virtual network adapter (named “Local Area Connection 3”) appears into **Control Panel > Network connections**. Configure the IP address for this adapter.

For more information about Intel Teaming feature, see Intel documentation.

6.10. Configuring Data historian

6.10.1. Preparing COM600 for Data Historian

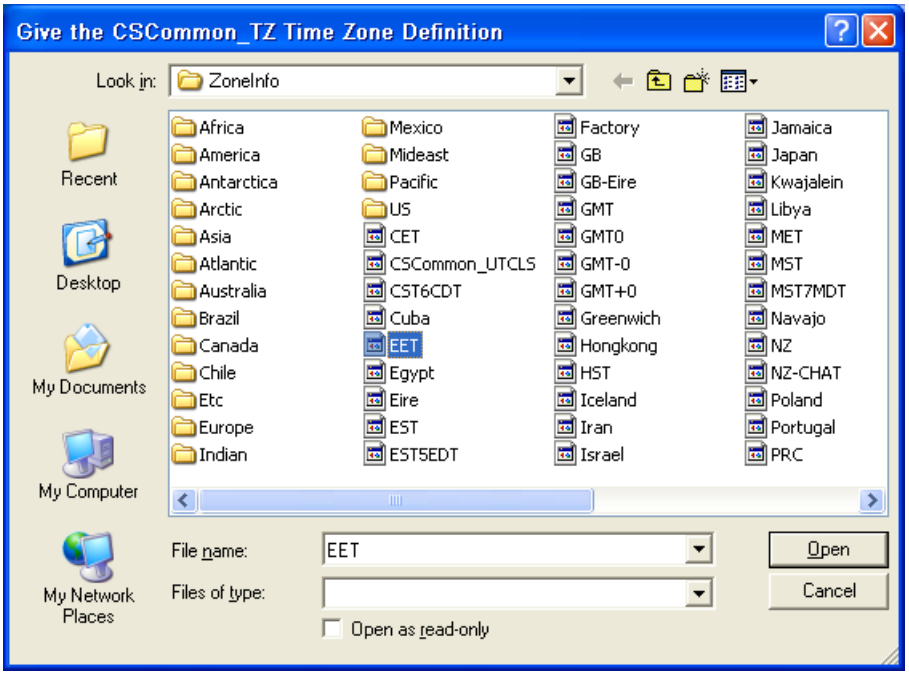
The following operations must be performed in the COM600 computer as the administrator user to prepare COM600 for Data Historian feature.

Setting the time zone of RTDB

The time zone of the RTDB is by default GMT and it must be set before taking the Data Historian feature into use.

To set the time zone:

1. Select **Start -> All Programs -> Data Historian -> Change Time Zone**.
2. The following file browser dialog opens.



rtdbtimezone.bmp

Figure 6.10.1-1 Time Zone Definition

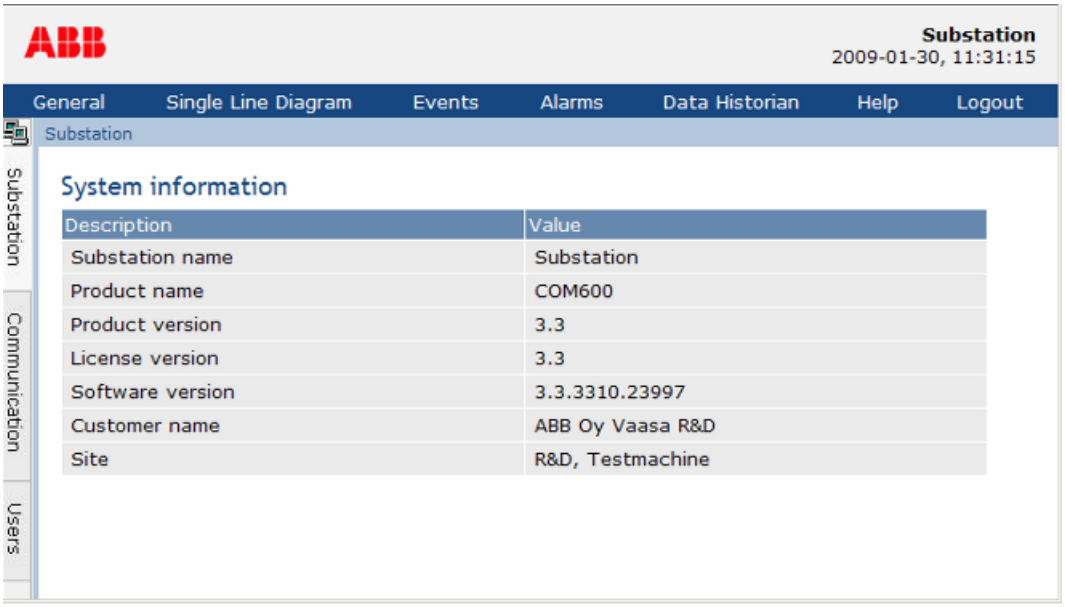
3. Select the time zone from the list and click **Open**.
4. Reboot the computer so that the service processes notice the new setting. The setting is stored in a system environment variable.

Preconfiguring Vtrin Client Environment

To change the default layout and views for Vtrin users, log in to Vtrin with the COM600 HMI administrator user name and password. The administrator user has full access to Vtrin functions and objects.

Enabling Vtrin into use

To be able to use the Data Historian Vtrin tool, Vtrin must be installed on the client computer. When clicking the **Data Historian** menu item in HMI for the first time, the Vtrin client is installed.



HMI_Data_Historian_menu.bmp

Figure 6.10.1-2 Data Historian menu item shown in Web HMI

To enable the Vtrin installation to client computers, specify the IP address of the COM600 computer, which is used for the Vtrin connections.

1. From the COM600 computer start menu, select **Start -> All Programs -> Data Historian -> Change Vtrin IP Address**.
   The program prompts you for the IP address of the COM600 computer.
2. Enter the IP Address and press enter.

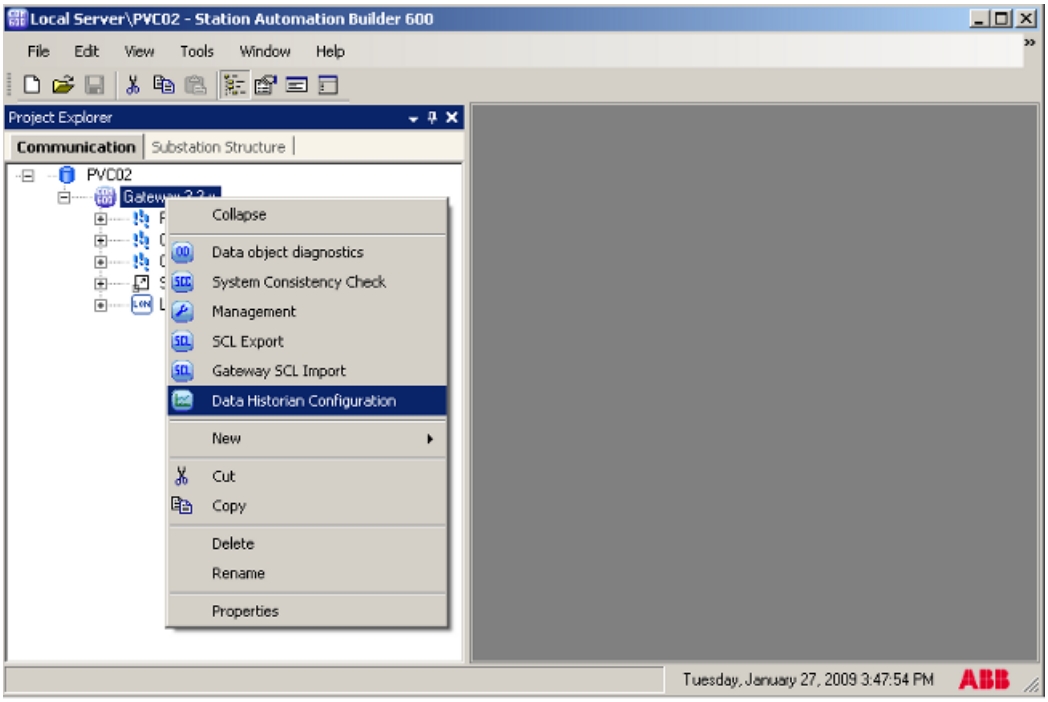
If the IP address of the COM600 computer is changed, change the Vtrin IP Address again.

6.10.2. Configuring Data Historian measurements and signals

In Data historian configuration measurements and signals from devices are selected for history information. The trends can then be investigated in COM600 HMI. The function includes several configuration parameters.

To configure Data historian:

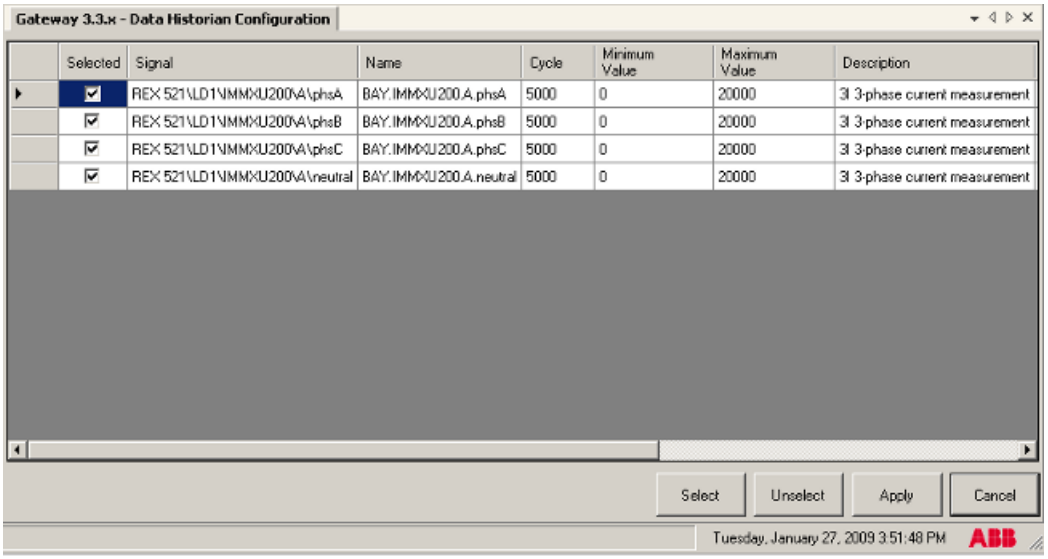
1. Right-click the Gateway object and select **Data Historian Configuration** from the shortcut menu.



DataHistorianConfiguration.bmp

Figure 6.10.2-1 Opening Data Historian Configuration tool

2. The Trend Configuration dialog opens.



DataHistorianConfigurationTool.bmp

Figure 6.10.2-2 Data Historian Configuration tool

3. Drag and drop data objects to the Data Historian Configuration tool, where they are displayed as rows. Some of the rows are write-protected. You can modify the values in the **Cycle**, **Minimum Value**, **Maximum Value**, **Description**, **Unit**, and **History Levels** columns, although the values are set according to the values defined for the data object.
4. You can modify the editable values. Check the values for the **History Levels** column from COM600 Data Historian Operator's Manual.
5. Select the desired signals for the configuration with the checkboxes in the **Selected** column. With **Select** and **Unselect** you can select or unselect multiple rows at the same time.
6. Save the configuration in the SAB600 project by clicking **Apply**.

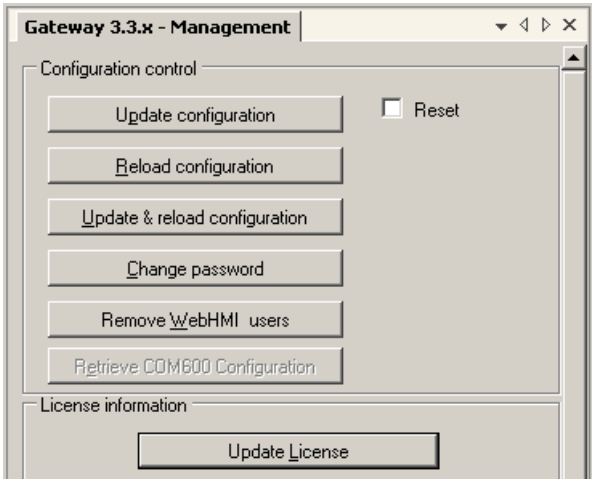
The configuration is activated to COM600 as described in 7.1, Activating COM600 with new configurations.

7. Operation

7.1. Activating COM600 with new configurations

After the configurable objects in the object tree have been created, the configuration must be transferred to the COM600 computer. This is done by using the **Management** function.

To activate the COM600 configuration
1. Right-click the Gateway object in SAB600 and select **Management**.
2. The Management dialog opens.



Management.jpg

Figure 7.1-1 Management function

- To copy the configurations of all servers and clients to the COM600 computer, click **Update configuration**.
- To transfer only the changed configurations and to restart only the changed server or client with new configurations, click **Update & reload configuration**.
- To force a complete configuration reset of COM600, mark the **Reset** check box before updating the configuration. All instances of OPC servers and clients are recreated in COM600. This normally must be done only if the same COM600 computer is configured using several engineering computers with different projects, for example during training or testing.

7.2. License handling

The COM600 Management tool displays the license information for COM600 under License Information. The license and the protocols it supports have been predefined before the COM600 computer has been handed over by ABB.

The following information is shown in the window:
- owner of the license
- product revision
- protocols supported by the license.
- number of servers supported by the license.
- number of clients supported by the license.
- if WebHMI is enabled.

To update the license with a new set of protocols, order a new license from ABB and update it to COM600 with SAB600.

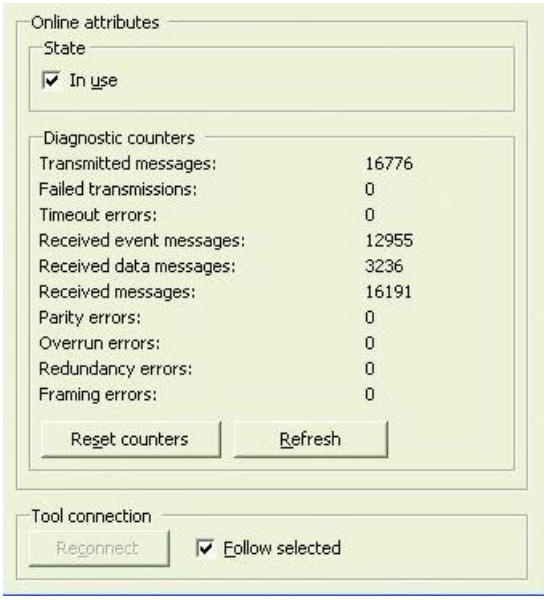
To update the license:
1. Open the Management tool from the Gateway object in SAB600.
2. Click **Update License**.
3. Browse for the new license file and click **Open**.

The license is COM600 specific and the COM600 computer verifies the compatibility of the license. Also the servers and clients verify the license.

7.3. Diagnostics

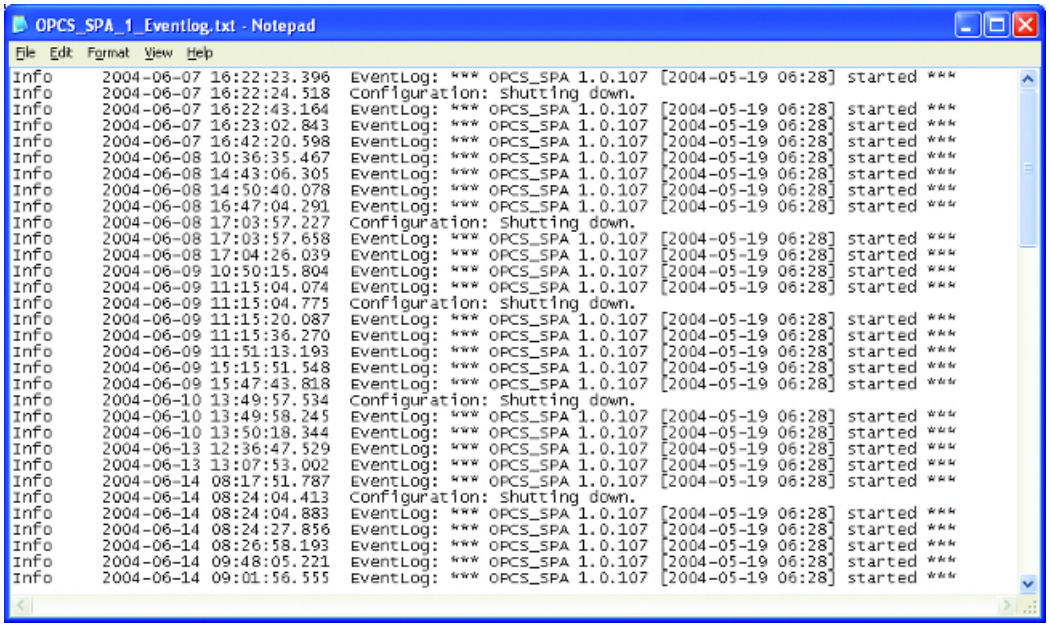
7.3.1. General about diagnostics

SAB600 provides comprehensive functions for diagnosing the operation of the Gateway. This includes communication diagnostics with monitoring the communication channel, diagnostic counters, and IED-specific communication status and diagnostic counters. It is also possible to monitor and control process data and follow the data flow on the Gateway using diagnostic functions of SAB600. Figure 7.3.1-1 displays a sample view of a diagnostic counter dialog. An example of an event log file is displayed in Figure 7.3.1-2.



SPAChnlDiag.jpg

Figure 7.3.1-1 An example of a SPA channel diagnostic counter dialog



EventDial.jpg

Figure 7.3.1-2 An example of a SPA event log file

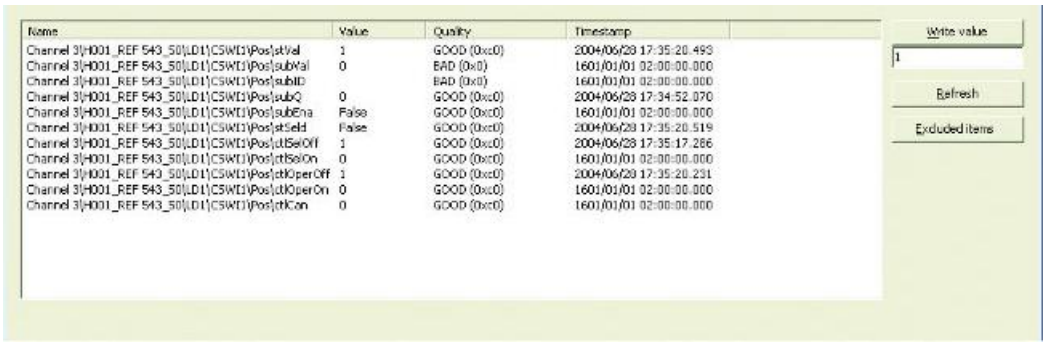
7.3.2. Data object diagnostics

You can monitor and control the data objects under the Gateway object tree with Data object diagnostics.

To monitor and control the data objects:
1. Right-click the Gateway object in SAB600.
2. Select **Data object diagnostics** from the shortcut menu, see Figure 7.3.2-1. The Data object diagnostic dialog opens.
3. Drag and drop data objects from the object tree to the Data object diagnostics.

Or

1. Select a specific data object from the object tree.
2. Select **Tools > Online diagnostics**.



DataObjDiagnos.jpg

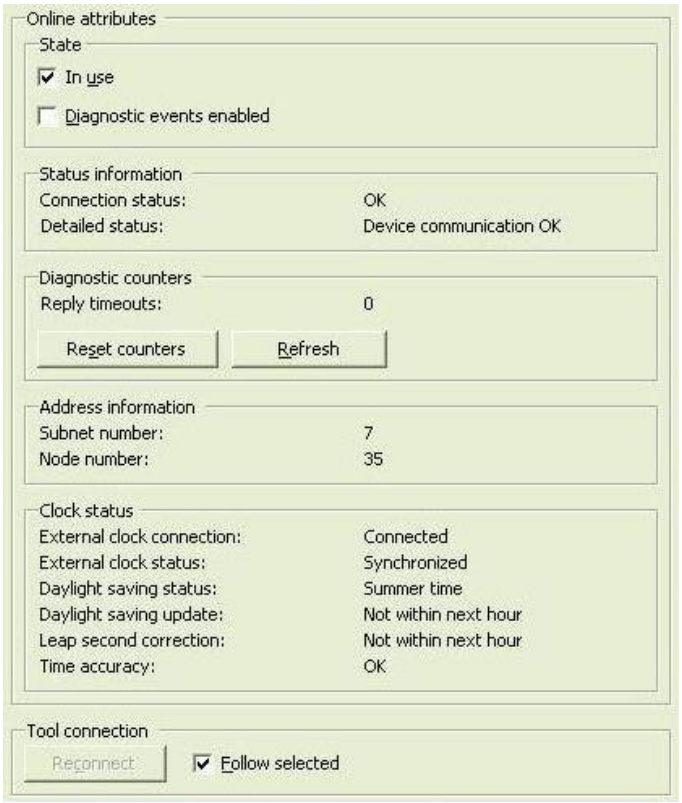
Figure 7.3.2-1 Data object diagnostics

To change the value of a data object attribute:
1. Select a specific attribute.
2. Write a new value to the text box under the **Write value** button.
3. Click **Write value** to change the value.

To filter the displayed data object:
1. Click **Excluded items**.
2. Notepad opens. Write to Notepad the data object types you want to exclude from the Data object diagnostics view.
3. Save the file as a .txt file by selecting **File > Save**.

7.3.3. Diagnostic services of OPC servers and clients

You can control and monitor the server and client channel and device communication in the communication structure of the Project Explorer. You can take channels/subnetworks and devices into use or out of use via the respective diagnostics function. You can also monitor the channel/subnetwork and device communication with the help of various diagnostic counters, and check the device status information, see Figure 7.3.3-1.



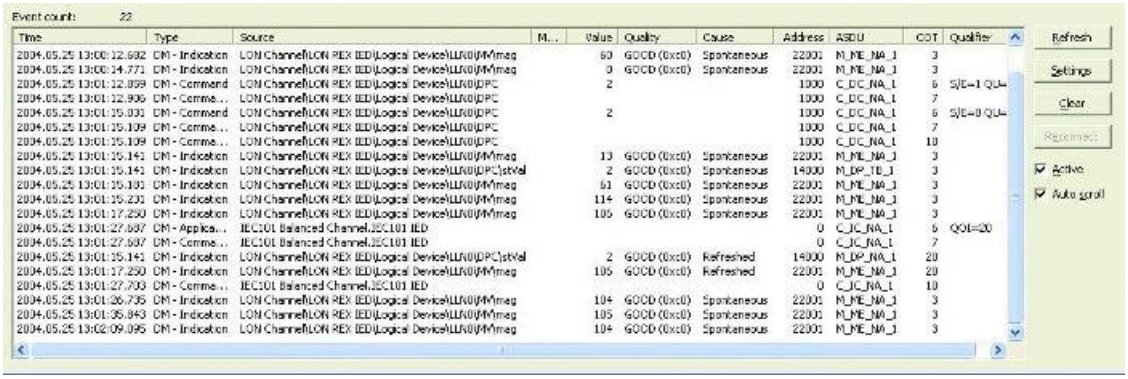
LON_Clock_Master_Online_diagnostics.jpg

Figure 7.3.3-1 An example of LON Clock Master online diagnostics

For more detailed information and instructions on controlling and monitoring channel and device communication, refer to the respective user's manual for the client or server (see 1.8, Related documents).

7.3.4. Signal diagnostics

OPC clients have a diagnostics function which makes it possible to monitor the flow of process data changes and commands. Activate the function by marking the **Diagnostic Events Enabled** check box, located in the Online diagnostics function of the IEC101/IEC104 Device. When the diagnostics function is activated, the IEC101 OPC Client Alarm & Event server generates events with information about data changes and commands.



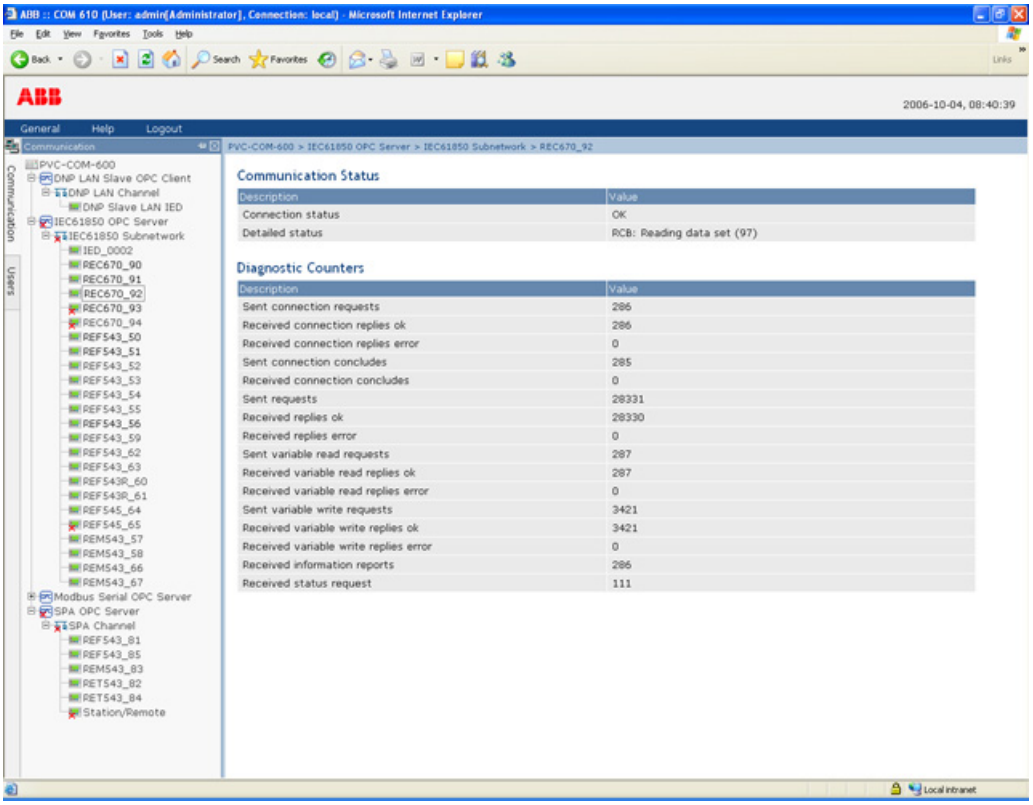
IEC101AEClient.jpg

Figure 7.3.4-1 IEC101 Slave OPC Client Diagnostic AE client

7.3.5. Diagnostic Web Server

The Diagnostic Web Server of the Gateway provides an overall view of the communication status of the Gateway and the possibility to monitor the diagnostic counters of the communication channels/subnetworks and IED communication. Figure 7.3.5-1 displays the gateway objects in a tree view.

A red cross over the Gateway icon in the object tree indicates that there is a fault in the communication structure. Expand the tree to view the hierarchy deeper and to identify the device with a missing configuration or causing the error. The properties of a certain object in the communication structure can be seen on the right when clicking the object in the tree view.



Webserver_a.jpg

Figure 7.3.5-1 An example of a web page from the Gateway diagnostic web server

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