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1. About this manual

1.1. Copyrights

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1.2. Trademarks

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1.3. General

This user’s manual provides thorough information on Station Automation COM600 (later referred to as COM600), focusing on giving instructions of how a 3rd party OPC Client can access the OPC servers of COM600.

Information in this user’s manual is intended for application engineers who have to access the OPC servers of COM600 with a 3rd party OPC Client and have to configure the different components. As a prerequisite, you must have basic knowledge of client and server architectures in general.
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.

<table>
<thead>
<tr>
<th>Term</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alarm</td>
<td>An abnormal state of a condition.</td>
</tr>
<tr>
<td>Alarms and Events; AE</td>
<td>An OPC service for providing information about alarms and events to OPC clients.</td>
</tr>
<tr>
<td>Data Access; DA</td>
<td>An OPC service for providing information about process data to OPC clients.</td>
</tr>
<tr>
<td>Data Object; DO</td>
<td>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.</td>
</tr>
<tr>
<td>Data Set</td>
<td>The data set is the content basis for reporting and logging. The data set contains references to the data and data attribute values.</td>
</tr>
<tr>
<td>Device</td>
<td>A physical device that behaves as its own communication node in the network, for example, protection relay.</td>
</tr>
<tr>
<td>Event</td>
<td>Change of process data or an OPC internal value. Normally, an event consists of value, quality, and timestamp.</td>
</tr>
<tr>
<td>Intelligent Electronic Device</td>
<td>A physical IEC 61850 device that behaves as its own communication node in the IEC 61850 protocol.</td>
</tr>
<tr>
<td>Logical Device; LD</td>
<td>Representation of a group of functions. Each function is defined as a logical node. A physical device consists of one or several LDs.</td>
</tr>
</tbody>
</table>
The smallest part of a function that exchanges data. An LN is an object defined by its data and methods.

A communication protocol developed by Echelon.

A proprietary method of ABB on top of the standard LON protocol.

Series of standards specifications aiming at open connectivity in industrial automation and the enterprise systems that support industry.

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.

Named data item.

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.

ABB proprietary communication protocol used in substation automation.

Protection and/or Control Product supporting the SPA protocol version 2.5 or earlier.

XML-based description language for configurations of electrical substation IEDs. Defined in IEC 61850 standard.

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

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AE</td>
<td>Alarms and Events</td>
</tr>
<tr>
<td>ASDU</td>
<td>Application Service Data Unit</td>
</tr>
<tr>
<td>BRCB</td>
<td>Buffered Report Control Block</td>
</tr>
<tr>
<td>DA</td>
<td>Data Access</td>
</tr>
<tr>
<td>DMCD</td>
<td>Data Message Code Definition</td>
</tr>
<tr>
<td>DO</td>
<td>Data Object</td>
</tr>
<tr>
<td>GW</td>
<td>Gateway, component connecting two communication networks together</td>
</tr>
<tr>
<td>HMI</td>
<td>Human Machine Interface</td>
</tr>
<tr>
<td>IEC</td>
<td>International Electrotechnical Commission</td>
</tr>
<tr>
<td>IED</td>
<td>Intelligent Electronic Device</td>
</tr>
</tbody>
</table>
### Abbreviation Table

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>LAG</td>
<td>LON Application Guideline for substation automation</td>
</tr>
<tr>
<td>LAN</td>
<td>Local Area Network</td>
</tr>
<tr>
<td>LD</td>
<td>Logical Device</td>
</tr>
<tr>
<td>LMK</td>
<td>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.</td>
</tr>
<tr>
<td>LN</td>
<td>Logical Node</td>
</tr>
<tr>
<td>LSG</td>
<td>LON SPA Gateway</td>
</tr>
<tr>
<td>NCC</td>
<td>Network Control Center</td>
</tr>
<tr>
<td>NUC</td>
<td>Norwegian User Convention</td>
</tr>
<tr>
<td>NV</td>
<td>Network Variable</td>
</tr>
<tr>
<td>OLE</td>
<td>Object Linking and Embedding</td>
</tr>
<tr>
<td>OPC</td>
<td>OLE for Process Control</td>
</tr>
<tr>
<td>P&amp;C</td>
<td>Protection &amp; Control</td>
</tr>
<tr>
<td>RTS</td>
<td>Request To Send</td>
</tr>
<tr>
<td>SA</td>
<td>Substation Automation</td>
</tr>
<tr>
<td>SAB600</td>
<td>Station Automation Builder 600</td>
</tr>
<tr>
<td>SCL</td>
<td>Substation Configuration Language</td>
</tr>
<tr>
<td>SLD</td>
<td>Single Line Diagram</td>
</tr>
<tr>
<td>SNTP</td>
<td>Simple Network Time Protocol</td>
</tr>
<tr>
<td>SOAP</td>
<td>Simple Object Access Protocol</td>
</tr>
<tr>
<td>RCB</td>
<td>Report Control Block</td>
</tr>
<tr>
<td>URCB</td>
<td>Unbuffered Report Control Block</td>
</tr>
<tr>
<td>XML</td>
<td>eXtended Markup Language</td>
</tr>
</tbody>
</table>

### 1.8. Related documents

<table>
<thead>
<tr>
<th>Name of the manual</th>
<th>MRS number</th>
</tr>
</thead>
<tbody>
<tr>
<td>COM600 User's Manual</td>
<td>1MRS756125</td>
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## 1.9. Document revisions

<table>
<thead>
<tr>
<th>Document version/date</th>
<th>Product revision</th>
<th>History</th>
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<tr>
<td>A/10.3.2005</td>
<td>1.0</td>
<td>Document created</td>
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<tr>
<td>B/16.10.2006</td>
<td>3.0</td>
<td>Document revised</td>
</tr>
<tr>
<td>C/21.12.2007</td>
<td>3.1</td>
<td>Document revised</td>
</tr>
<tr>
<td>D/17.6.2008</td>
<td>3.2</td>
<td>Document revised</td>
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<tr>
<td>E/13.2.2009</td>
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<td>Document revised</td>
</tr>
<tr>
<td>F/06.11.2009</td>
<td>3.4</td>
<td>Document revised</td>
</tr>
</tbody>
</table>
2. **Introduction**

2.1. **About this section**

In this section, you will find an overview of a typical system with COM600 and a 3rd party OPC Client accessing the OPC servers of this gateway.

This section also gives an overview of the internal structure of COM600 as well as of COM600 OPC servers.

2.2. **COM600 with 3rd party OPC Client**

Below you can see an overview of a typical COM600 system with a third party OPC Client.

![System overview](overview.jpg)

*Figure 2.2-1 System overview*

1. Station Automation Builder 600 (SAB600)
2. COM600
3. NCC
4. 3rd party system with an OPC Client
5. Protection and control devices

COM600 uses OPC servers for master/client protocol stacks to provide access to the data in the devices connected to COM600. COM600 slave OPC clients use these OPC
servers internally to provide data for remote systems with a certain communication protocol.

Each slave OPC Client component includes a small OPC Data Access server for diagnostic and control purposes. External OPC Clients can also access the OPC servers of COM600 if enabled in the COM600 license. Third party control systems with OPC Client can therefore easily access data from COM600 without using any conventional communication protocol.

External OPC Clients are connected to COM600 via LAN using DCOM. DCOM must be configured both in the client computer and in COM600 to allow the access. More about DCOM configuration is explained in 3.6, DCOM configuration.

2.3. Common features of OPC servers of COM600

- Supports OPC Data Access 1.0/2.0 specification for process and diagnostic data
- OPC namespace and process data modeled according the IEC61850 standard
- Update rate zero supported on OPC DA for no-loss-of-events based update
- OPC DA items timestamped by the source device when applicable by the protocol and device
- OPC items for system supervision and communication diagnostic and control
- Supports OPC Alarm&Event 1.10 specification for process and diagnostic data
3. **Accessing OPC servers of COM600**

3.1. **About this section**

In this section, there is a list of the requirements that have to be met by the 3rd party OPC Client as well as information on Windows settings (user IDs, DCOM).

This section also gives you an overview of how to access the OPC servers of COM600 with a 3rd party OPC Client.

3.2. **Requirements for the OPC Client**

- Windows 2000 or XP operating system
- Support for OPC Data Access 2.0 Specification
- LAN/DCOM connection to COM600
- Possibility to modify DCOM and possible firewall settings to allow OPC DCOM communication with COM600

3.3. **COM600 OPC servers**

In Figure 3.3-1 and Figure 3.3-2 you can see the difference between viewing the OPC servers and clients of an example project in Station Automation Builder 600 (later referred to as SAB600), and viewing them in a 3rd party browser.

*Figure 3.3-1 Example project as seen in SAB600*
The 3rd party browser shows the separate servers for the Data Access and Alarms and Events. The instance numbers of the servers are embedded in brackets to the name of the server. The diagnostic and control OPC servers for the IEC101 Slave are also shown in the list.

3.4. **Data access**

The OPC server namespace consists of channels, IEDs, logical devices, logical nodes, and data objects.
Figure 3.4-1 LON OPC Server namespace in SAB600
LON OPC Server namespace in SAB600 and 3rd party OPC Client are almost identical with some differences. For example, the scale definitions seen in the SAB600 namespace are not visible in the OPC server namespace, and the attributes appear in the OPC server namespace but not in the SAB600 namespace.

Attributes (Figure 3.4-3) contain OPC items for communication diagnostics and special functions like file transfer and transparent communication access.
Figure 3.4-3 LON OPC Server namespace and the attributes

The OPC items in data objects contain the actual process data. The items are not visible in the SAB600 namespace but they can be monitored online using the Diagnostic Tool in Figure 3.4-4.

Figure 3.4-4 OPC items of Pos data object monitored with SAB600 online diagnostics. Pos object is an instance of DPC (Controllable Double Point) data class.
For the 3rd party OPC Client, the OPC items can be found from the namespace below the data objects in Figure 3.4-5. OPC items of a data object are specified by the data class of the object.

Generally, the names and the usage of these OPC items are protocol independent. Further information about the data classes, their OPC items and mapping to certain protocol can be found from the data object modeling chapter in the technical reference of protocol-specific user’s manuals.

For more information on data modeling according to the IEC 61850 standard, refer to the section IEC 61850 Data modeling in COM600 User’s Manual.

![Figure 3.4-5 OPC server namespace with the OPC items of Pos data object viewed with 3rd party OPC Client](image)

Figure 3.4-6 shows group of OPC items subscribed by 3rd party OPC Client and monitored in a Diagnostic Tool. The figure also shows how the full OPC item name consists of the complete path name to the object with the backslash ‘\’ character as a separator.
3.5. Alarms and Events

The OPC Alarms and Events server interface is available for each master and slave protocol component. For both master and slave components, it can be used for supervising the communication status with diagnostics events. For master protocols, it is also possible to configure alarms and events for process data. Alarms and events are configured by linking the data objects and event definitions. See COM600 User’s Manual for detailed information about the configuration of alarms and events.

The names for alarms and events are based either on the communication structure or substation structure names. If the data is connected to the substation structure, the name is based on the substation structure, otherwise the name is based on the communication structure.

Simple and condition type events can be configured for discrete signals, for example single and double point status as well as for measurement limit value supervision. Control operations can be configured for tracking events. The event area of the OPC servers can be browsed using the browsing interface, see Figure 3.5-1.
Figure 3.5-1 An example view of the area space of an OPC server

Event categories and their vendor-specific attributes are shown in Figure 3.5-2.
Figure 3.5-2 An example view of event categories of an OPC server

Example views of simple and tracking events and condition events are shown in Figure 3.5-3 and Figure 3.5-4.

Figure 3.5-3 An example view of simple and tracking events

Figure 3.5-4 An example view of condition events
3.6. **DCOM configuration**

User authentication is required between the client and the server computer. In practice, this means that the same user account with the same password must exist in the COM600 Computer and in the 3rd party OPC Client computer. The OPC Client must be run within this user account.

OPC servers in COM600 Computer are run within a preconfigured user account named as COM600 (factory default password: aEc2006rs). One possibility is to create the COM600 user to the client computer as well, and run the OPC Client within this user account. Another possibility is to create a new user to the COM600 Computer, the same user that is used in the client computer. In the latter case it is still required to create the COM600 user to the client computer as it is needed for the OPC servers’ access to the client computer.

Note that if you want to change the default COM600 user’s password it must be done using the management tool in SAB600, as the password is configured in the DCOM configuration for each component in COM600.

It is also required to enable the DCOM in the client computer. This can be done using the DCOMCNFG program. If the client computer is running on Windows XP you must note the following: the default installation for XP forces remote users to authenticate as Guest. This means that DCOM clients cannot connect to a server running on an XP computer unless the Guest account is enabled and has enough rights to launch the server.

To adjust the setting from the control panel:

1. Click **Start/Control Panel/Administrative Tools**.
2. Open the **Local Security Settings** window.
3. Expand the tree view and select **Security Options** in the left-hand pane.
4. In the right-hand pane, scroll down and select **Network Access: Sharing and security settings for local accounts**.
5. Right-click and select **Properties**.
6. Select **Classic - local users authenticate as themselves**.

More information about setting up the DCOM can be found from the Microsoft and OPC Foundation internet sites. OPC Foundation has published a number of reports about using OPC via DCOM, which can be downloaded from their internet site (www.opcfoundation.org)
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