# COM600 Station Automation Series COM605 3.2





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# 1. About this manual

## 1.1. Copyrights

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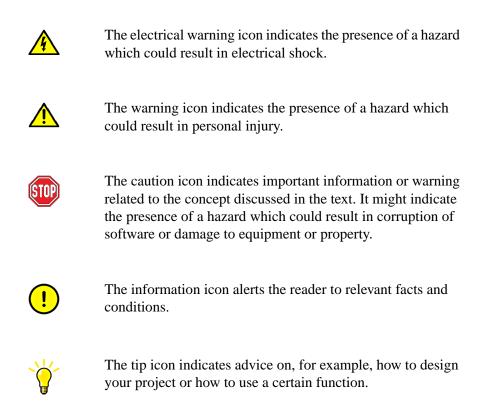
### 1.3. General

This manual provides thorough information on the Control and Monitoring Unit COM605 and the central concepts related to it. For more information on each topic related to a specific protocol, refer to the list of related documents in 1.8, Related documents.

Information in this operator's guide is intended for operators who perform every-day operations.

### 1.4. 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.



## 1.5. 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 > Menu-Item > 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 to 30.

• You may be told 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

## 1.6. Terminology

The following is a list of terms associated with the Control and Monitoring Unit COM605 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.
Device	A physical device that behaves as its own communication node in the network, e.g. 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 commu- nication node in the IEC 61850 protocol.
OPC	Series of standards specifications aiming at open connectivity in industrial automation and the enterprise systems that support industry.
Property	Named data item.

## 1.7. Abbreviations

The following is a list of abbreviations associated with the Control and Monitoring Unit COM605 that you should be familiar with. See also 1.6, Terminology.

Abbreviation	Description
AE	Alarms and Events
CET	Communication Engineering Tool
DO	Data Object
GW	Gateway, component connecting two communication networks together

Abbreviation	Description
HMI	Human Machine Interface
IEC	International Electrotechnical Commission
IED	Intelligent Electronic Device
LAN	Local Area Network
SLD	Single Line Diagram

## 1.8. Related documents

Name of the manual	MRS number
COM600 User's Guide	1MRS756125

## 1.9. Document history

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/17.06.2008	3.2	Document revised

## 2. Introduction

### 2.1. Product overview

Control and Monitoring Unit COM605 allows easy access to the protection and control devices of a substation with HMI functionality. The substation can be accessed either locally or remotely through a built-in web server.

COM605 uses an embedded operating system and runs in a dedicated industrial computer without moving parts.

The products are configured using a separate engineering PC that is connected via the local area network (LAN). For more information, refer to COM600 User's Guide.

## 3. HMI operations

## 3.1. General about HMI

The HMI interface consists of different views, a menu bar and a tool bar.

You can choose between views by clicking the tabs on the left:

- Substation: Shows the substation structure.
- Communication: Shows the communication structure.
- **Users**: (Only administrator) Shows the user information. The administrator can manage users in this view.
- **Settings**: (If not administrator) Shows the user information. The user can change the password in this view.

The Menu bar contains the following functions:

- **General**: Shows device information.
- Single Line Diagram: Shows the Single Line Diagram view.
- **Events**: Shows the events list.
- Alarms: Shows the events list.
- **Help**: Shows the HMI help.
- **Logout**: Logs you out of the window.

## 3.2. 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, you have to change the password before you can proceed using HMI. If you forget the new password, restore the factory settings with the Management tool in CET. After the factory settings have been restored, you can only log in with the predefined administrator password mentioned above.

### 3.3. User management

### 3.3.1. General about managing users

COM605 has the following user levels:

- Viewer = Only allowed to view
- Operator = Authorized to make operations
- Engineer = Allowed to change IED parameters, but no operation rights
- Administrator = Full access

The administrator can add users and define access rights with the User Management tool.

The user levels of the selected user are displayed in the User Information view and they can be modified by the administrator.

The purpose of the user groups is mainly to provide customized user interfaces for different users.

Functionality	Viewers	Operators	Engineers	Administrators
SLD	х	х	x	х
Control Dialogs	view	Х	view	Х
Event list	х	х	x	х
Alarm list	view	Х	view	х
User manage- ment	*1	*1	*1	х
PST	view	view	x	х
Disturbance recording	view	х	х	Х
System supervi- sion	view	х	х	Х

\*1: Can change own password.

view: view-only.

#### 3.3.2. Adding new users

The administrator can add users in the Add User window.

To add a new user:

- 1. Click on the **Users** tab on the left.
- 2. Select Add User.
- 3. Type in a new user name. The length of the user name can be 1 99 characters and it can only contain characters a z and 0 9.
- 4. Type in a password and confirm it. The length of the password can be 9 99 characters and it can only contain characters a z and 0 9.
- 5. Select a user group from the drop-down menu.
- 6. Click **Apply** to save the user information.

#### 3.3.3. Modifying user properties

The administrator can modify user information by using the tool bar on top of the User Information view.

To remove a user:

- 1. Click on the **Users** tab on the left.
- 2. Select the user you want to remove.
- 3. Click **Remove User** and confirm by clicking **OK**.

To change a user's user group:

- 1. Click on the **Users** tab on the left.
- 2. Select the user whose user group you want to change.
- 3. Click Change User Group.
- 4. In the Change User's Group view, select a new group from the drop-down menu.
- 5. Click Apply.

### 3.3.4. Changing user's password

To change the password (administrator):

- 1. Click on the Users tab on the left.
- 2. Select the user whose password you want to change.
- 3. Click Change password.
- 4. Type in a new password and confirm it.
- 5. Click **Apply**.

To change your own password:

- 1. Click on the **Settings** tab on the left.
- 2. Click Change password.
- 3. Type in the old password.
- 4. Type in a new password and confirm it.
- 5. Click Apply.

### 3.4.

## Connecting HMI to the COM600 computer

To connect HMI to the COM600 computer:

- 1. Open Internet Explorer.
- 2. Type in the IP address of the COM600 computer.
- 3. Accept the certificate.
- 4. A login window opens. Type in the password and log in.

## 3.5. Substation and communication structures

#### 3.5.1. Substation structure

You can open the substation view of HMI by clicking on the **Substation** tab on the left. The substation structure displays the substation and voltage level objects, bays and IEDs, and their functions.

You can see the status of the IEDs in the substation structure. If there is a problem in communication, there is a red cross next to the IED.

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substation\_view.jpg

Figure 3.5.1-1 The substation view to HMI

#### Alarm and event information

By clicking on the voltage level and bay objects, you can access their specific alarm lists. To look at a list of events, click on **View Events** above the Persisting Alarms list.

#### **IED** information

By clicking on the IED objects you can view their communication status and information on diagnostic counters. Below each IED in the substation structure you can click on **Disturbances**, **Parameters** or **Measurements** to access the corresponding data.

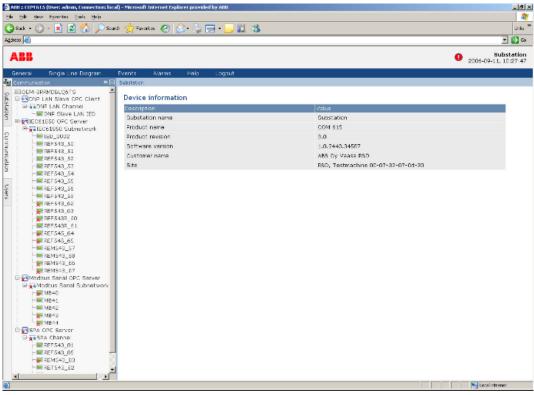


It depends on the IED configuration, whether Disturbances, Parameters or Measurements are shown in the substation structure.

#### 3.5.2. Communication structure

You can open the communication view of HMI by clicking on the **Communication** tab on the left. The communication structure is displayed in the window on the left. In the communication structure you can see the OPC Server, communication channel objects and the IEDs.

You can see the status of the IEDs in the communication structure. If there is a problem in communication, there is a red cross next to the IED.



communication\_view.jpg

Figure 3.5.2-1 The communication view to HMI

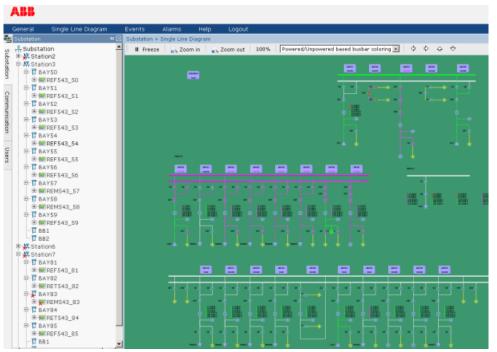
#### **Device and diagnostics information**

By clicking on the computer name at the top of the structure, you can see its device information, such as the hardware and software versions, in the window on the right side of the tree. By clicking on the OPC Server object name, corresponding device information is displayed on the right. You can view device diagnostics information of the whole subnetwork by clicking on the subnetwork object. To see the communication status or diagnostic counter information of individual devices, click on the IED objects.

## 3.6. Single Line Diagram

## 3.6.1. General about Single Line Diagram

A Single Line Diagram (SLD) is a graphical user interface presenting process objects (primary devices) of the substation as graphical symbols. HMI updates the SLD and the substation and communication structures at regular intervals. A sample SLD is shown in Figure 3.6.1-1



SLD\_example.png

Figure 3.6.1-1 An example of the Single Line Diagram

For an explanation of the Single Line Diagram symbols, see Appendix 1, Single Line Diagram symbols.

## 3.6.2. Switch Device Control

Switches (circuit breakers, disconnectors) can be operated using the Switch Device Control dialog.



Only operators and administrators are allowed to control the switches.

The station and bay local/remote switch must be in a position which allows it to be controlled with HMI. The target switch device must also support the operation and it must be configured properly.

To control a switch device (for example circuit breaker), click the object in the single line diagram. The Switch device control dialog opens.

The Switch state tab displays information on the substation, voltage level and bay under operation and the object name of the switch device. Also status information for example on the interlockings and selection state of the object are displayed.

To control a switch:

- 1. Select the control direction by clicking **Open** or **Close**.
- 2. Click **Operate** to activate the selection or **Cancel** to cancel the operation. Note that some of the buttons may be disabled depending on the state of the switch.

It is possible to perform a forced cancel operation. This is necessary for example if HMI is accidentally closed after you have activated a selection. Normally the object would stay in the selected position until timeout, and the object must be released if any operations have to be performed before timeout. To perform a forced operation, select the Forced operation tab of the Switch device control dialog and click **Cancel**.

To add, edit or delete web links, select the Web links tab and click Edit.

To close the Switch device control dialog, click Exit.

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Switch Device Control	Web Page Dialog	? 🔀
Ristinummi.V1.H1.Q1		-
Switch State Forced	operation Web Links	
Switch position is Op	en (off)	
Close	Operate	
Open	Cancel	
	Exit	

switch\_control.bmp

Figure 3.6.2-1 Switch Device Control dialog

## 3.6.3. Tap Changer

Clicking a power transformer with tap changer opens a control dialog. In the dialog you can monitor the voltage and the current tap changer position.

Tap changer	control Web Pag	e Dialog	?	
Ristinummi.T1	.W2.LTC1			
Tap changer	Operation mode	Web Links		
			10.000 144	<u> </u>
Voltage Tap value		Set	10,300 kV 8	-
Tup Value		- Octain	0	
Lower		Raise	]	
			J	
	Exi	t		

tap\_changer\_control.bmp

Figure 3.6.3-1 Tap Changer Control dialog

Depending the device and the configuration, you can manually lower or raise the relative position of the tap changer or assign a specific position by entering a numeric value.



You must have the required user permissions to perform these changes, and local/remote switch must allow the operation. The tap changer must also be in manual operating mode.

The **Operation mode** tab shows the auto/manual and single/parallel operation modes of the tap changer. You can change the modes of the tap if you have the required user permissions. The operation modes must be supported by the IED support and allowed by the local/remote. If they are not, the options are not available in the dialog.

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🕘 Tap changer	control Web Page Dialog	?×
Ristinummi.T1	.W1.LTC1	
Tap changer	Operation mode Web Links	
		<
Operation Mo	ode:	
O Parallel	<ul> <li>Automatic</li> </ul>	
Single	<ul> <li>Manual</li> </ul>	
	Exit	

tap\_changer\_mode.bmp

Figure 3.6.3-2 Tap Changer Mode dialog

#### 3.6.4. Busbar coloring

Busbar coloring can be used to indicate the status of busbar sections in several different ways. It can indicate which busbar sections are powered, unpowered or in certain other states, or which voltage level each busbar section has, see Figure 3.6.4-1. Alternatively, each voltage source or voltage source type can have a color that is used for sections they are connected to. Busbar coloring can also be used to indicate if two or more voltage sources form a loop.

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Figure 3.6.4-1 Busbar coloring drop-down menu

#### **Busbar coloring modes**

Busbar coloring modes can be selected from the drop-down menu on the top of the Single Line Diagram View. There are four modes of busbar coloring:

- 1. No busbar coloring. All sections are displayed in a default color.
- 2. **Powered/Unpowered based busbar coloring.** One color is used for all powered sections.
- 3. Voltage level based busbar coloring. Different voltage levels have different colors.
- 4. **Voltage-source based busbar coloring.** The coloring of powered sections depends on the voltage source.

### 3.7. Alarms

#### 3.7.1. General about alarms

The Alarm List displays a summary of the present alarm situation of the supervised process. Each alarm is presented as an alarm text line, which describes the cause of the alarm in the process. The alarm text line includes date, time, bay, device, object text, state and status.

The blinking symbol in the upper right corner of HMI indicates that there are unacknowledged alarms in the substation. There is also an audio alarm, if it has been enabled on workstation. By clicking the symbol, the Alarm view opens. When all alarms have been acknowledged, the alarm indicator disappears and the audio alarm stops.

## 3.7.2. Monitoring and handling alarms

To monitor and handle alarms in the substation, click **Alarms** in the menu bar at the top of the screen. To view the alarms concerning a specific bay, click on the appropriate object in the substation tree.

You can also filter the alarms concerning a specific voltage level or bay with the **Filter** function.

In the Persisting alarms list you can see active alarms. The Fleeting alarms list displays a list of inactive unacknowledged alarms. The alarm list is continuously updated to present the actual state of the alarm signals.

elected	Date	Time	Bay	Device	Object Text	State	Status	
-	2006-09-11	09:34:26.517	BAY41		3 Phase Current Measurement	Phase A Low Alarm	Active	
	2006-09-11	09:36:55.055	BAY81		31 3-phase current measurement	Phase A Low Alarm	Active	
-	2006-09-11	09:34:44.258	BAY81		CBCM circuit breaker travel time alarm*	Active	Active	
	2006-09-11	09:34:42.666	BAY82	Q3	Disconnector 1 position	Intermediate	Active	
	2006-09-11	09:34:43.367	BAY82	Q01	Circuit breaker 1 position	Intermediate	Active	
	2006-09-11	09:34:36.967	BAY82		Trip circuit TCS 1 alarm	Active	Active	
	2006-09-11	09:34:41.935	BAY82	Q4	Disconnector 2 position	Intermediate	Active	

To view the event list, click View events.

Figure 3.7.2-1 An example view of alarms

### 3.7.3. Acknowledging alarms

Click **Ack** to indicate that you have registered and identified the alarm. Acknowledging an alarm does not remove the alarm, but changes the alarm state. An acknowledged alarm is displayed in blue in the Persisting alarms list. Inactive alarms are displayed in the Fleeting alarms list.

To acknowledge alarms:

- 1. Select the check box of the alarms you want to acknowledge in the Alarms list.
- 2. Click **Ack** on the menu bar.
- 3. To acknowledge all alarms at the same time, click Ack all.

### 3.7.4. Filtering alarms

Filters can be used when you want to display only specific information.

alarms.png

To filter alarms:

- 1. Click **Filter** in the toolbar of the Alarms view. A window displaying the substation structure opens.
- 2. Click on the object whose alarms you want to view. Now the Alarms list displays only the alarms of the object that was selected, and the objects below it.

elected	Date	Time	Bay	Devi	Attp://10.58.125.137 💶 🗙		State	Statu
	2006-09-11	09:34:26.517	BAY41		- # Station ▲ □-뷰 Station2	asurement	Phase A Low Alarm	Active
	2006-09-11	09:36:55.055	BAY81				Phase A Low Alarm	Active
	2006-09-11	09:34:44.258	BAY81			r travel time	Active	Active
	2006-09-11	09:34:42.666	BAY82	Q3	BAY44	tion	Intermediate	Active
	2006-09-11	09:34:43.367	BAY82	Q01	🖻 👯 Station3	sition	Intermediate	Active
	2006-09-11	09:34:36.967	BAY82		BAY50	arm	Active	Active
	2006-09-11	09:34:41.935	BAY82	Q4	BAY52	tion	Intermediate	Active
eeting Ala	arms							
elected	Date	Time	Bay	Devi	-B BAY56 BAY57		State	Statu
	2006-09-11	10:16:58.551	BAY58	REM5	BAY58		Connection OK	Inactiv
	2006-09-11	10:10:16.464	BAY41		BAY59		Inactive	Inactiv

Figure 3.7.4-1 An example view of filtering alarms

### 3.8. Events

#### 3.8.1. General about events

With the Event List you can monitor the information about events that have occurred in the system. Only a certain number of events is visible, and the number of visible events can be configured in the Communication Engineering Tool. You can also receive information about activities carried out by other users, operations of objects, acknowledging of alarms, logging in, and so on. The Events list includes the following information: date, time, bay, device, object text and event.

#### 3.8.2. Monitoring and handling events

You can monitor the events of the substation by clicking **Events** in the command bar at the top of the screen. To monitor the events of specific bays, click on the appropriate object in the substation tree. The event list is updated automatically.

You can filter the events concerning a specific voltage level or bay with the **Filter** function.

You can stop the updating of the event list by clicking **Freeze**. To resume the flow of events, click **Continue**. You can save events locally on your computer by clicking **Save**. The list is saved in .csv format and can be opened in MS Excel.

To view the alarms list, click View alarms.

Save 🗲 f	filter II Freeze	与 View Alarn	ns		
vents					
)ate	Time	Bay	Device	Object Text	Event
2006-09-11	10:10:15.612	BAY54		Ring Event	011
2006-09-11	10:10:15.612	BAY59		Ring Event	Off
2006-09-11	10:10:15.613	BAY52		Ring Event	Off
2006-09-11	10:10:15.613	BAY55		Ring Event	Off
2006-09-11	10:10:15.619	BAY53		Ring Event	Off
2006-09-11	10:10:16.464	BAY41		Ring Event	Off
2006-09-11	10:14:22.533	BAY58	REM543_58		Device Connection I
2006-09-11	10:16:34.526	BAY67	REM543_67		Connection OK
2006-09-11	10:16:52.312	BAY67	REM543_67		Device Connection L
2006-09-11	10:16:58.551	BAY58	REM543_58		Connection OK
2006-09-11	10:19:59.793				User logged in: adm
2006-09-11	10:23:03.502				User logged in: adm
2006-09-11	10:43:08.768	BAY85	Q01	Circuit breaker 1 position	Open Selected
2006-09-11	10:43:11.602	BAY85	Q01	Circuit breaker 1 position	Open Executed
2006-09-11	10:43:11.688	BAY85	Q01	Circuit breaker 1 position	Open
2006-09-11	10:43:23.973	BAY67		Local operation	Remote
2006-09-11	10:43:24.010	BAY67		Ring Event	Off
2006-09-11	10:43:24.058	BAY67		Minute Pulse	Off
2002 00 11	10.10.01.776	DAME T	0.01	Circuit Installer & consistent	0

Figure 3.8.2-1 An example view of events

#### 3.8.3. Filtering events

Filters can be used when you want to display only specific information.

To filter events:

- 1. Click **Filter** in the toolbar of the Events view. A window displaying the substation structure opens.
- 2. Click on the object whose events you want to view. Now the Events list displays only the events of the object that was selected, and the objects below it.

vents							
venus							
ate	Time	Bay	Device	Obje	t Text	Event	
2006-09-11	10:16:52.312	BAY67	REM543_67		Mtp://10.58.125.137	Device Connection Lost	
2006-09-11	10:16:58.551	BAY58	REM543_58			Connection OK	
2006-09-11	10:19:59.793				B-#Station2	User logged in: admin	
2006-09-11	10:23:03.502				- 5 BAY40 - 5 BAY41	User logged in: admin	
2006-09-11	10:43:08.768	BAY85	Q01	Circ	BAY41	Open Selected	
2006-09-11	10:43:11.602	BAY85	Q01	Circ	BAY43	Open Executed	
2006-09-11	10:43:11.688	BAY85	Q01	Circ	- 12 BAY44	Open	
2006-09-11	10:43:23.973	BAY67		LDC-	BB1	Remote	
2006-09-11	10:43:24.010	BAY67		Ring	BAY50	off	
2006-09-11	10:43:24.058	BAY67		Mini	-BAY51	Off	
2006-09-11	10:43:24.776	BAY67	Q01	Circ	BAY52	Open	
2006-09-11	10:43:25.121	BAY67	Q4	Disc	- 12 BAY53 - 13 BAY54	Open	
2006-09-11	10:43:25.350	BAY67	Q91	Eart	BAY55	Open	
2006-09-11	10:43:35.569	BAY67	REM543_67		BAY56	Connection OK	
2006-09-11	10:43:42.449	BAY81	Q01	Circ	-BAY57	Close Selected	
2006-09-11	10:43:45.082	BAY81	Q01	Circ	BAY58	Close Executed	
2006-09-11	10:43:45.151	BAY81	Q01	Circ	BB1	Closed	
2006-09-11	10:43:47.786	BAY81		3I 3	- 13 BB2	Phase A Inactive	
2006-09-11	10:44:29.563	BAY50	REF543_50		🖻 👯 Station6 💽	Device Connection Lost	
2006-09-11	10:47:07.584	BAY50	REF543_50			Connection OK	
2006-09-11	10:47:27.693	BAY58	REM543_58			acknowledged	
2006-09-11	10:47:27.693	BAY67	REM543_67			acknowledged	
2006-09-11	10:47:27.693	BAY50	REF543 50			acknowledged	

HMI\_filtering\_alarms.png

Figure 3.8.3-1 An example view of filtering events

### 3.9. Disturbance data upload

#### 3.9.1. Disturbance recordings

Most of the IEDs are equipped with a Disturbance recording function that locally stores the values of currents, voltages, frequencies and binary signals and so on in a disturbance file before, during and after a protection event. These disturbance files can be copied to the COM600 computer automatically, if the function has been configured in CET.

You can see the list of disturbance recordings by clicking on **Disturbances** below the desired IED in the substation structure.

General	Single Line Diagram	Events #	larms Help	Logout		
Substation		Substation > S	tation6 > BAY61 > RE	EF543R_61 > Disturbances		
B-15 B		🛋 🔚 Save	🗙 Delete			
8-1	REF543_59 &Disturbances	Disturban	ce Recordings			
	-~Measurements	Selected				
- <mark>5</mark> 8			DR_2006_07_1	17_REF543R_61_10_17_43_0362_desc.xml	17.07.06	11:16:0
⊟ Stat B Stat B Z B B Z B B Z B			DR_2006_07_1	19_REF543R_61_00_49_30_0000_desc.xml	17.07.06	11:16:0
Э 🐺 В			DR_2006_09_0	05_REF543R_61_07_38_43_0027_desc.xml	05.09.06	08:38:0
	REF543R_60		DR_2006_09_0	D5_REF543R_61_07_40_43_0814_desc.xml	05.09.06	08:40:0
B-1	REF543R_61		DR_2006_09_0	06_REF543R_61_06_48_22_0768_desc.xml	06.09.06	07:48:0
	Disturbances		DR_2006_09_0	06_REF543R_61_06_52_24_0141_desc.xml	06.09.06	07:50:0
	<ul> <li>Parameters</li> <li>Measurements</li> </ul>		DR_2006_09_0	06_REF543R_61_07_21_49_08B3_desc.xml	06.09.06	08:20:0
🖂 🏄 В	AY62		DR_2006_09_0	06_REF543R_61_07_23_50_0991_desc.xml	06.09.06	08:22:0
E-7 B	REF543_62 AV63	E	DR_2006_09_0	06_REF543R_61_07_27_57_0067_desc.xml	06.09.06	08:26:0
					disturbances	

Figure 3.9.1-1 Example view of disturbance recordings

The disturbance recordings list shows you the description, date and time of the disturbance. When you want to save the list locally on your computer, select it and download it by clicking **Save**. The list is saved in .csv format and can be opened in MS Excel. You can also delete disturbance recordings from the COM600 computer by clicking **Delete**.

### 3.10. Parameter setting

#### 3.10.1. Changing parameters

You can view parameter information by clicking on **Parameters** below the desired IED in the substation structure, if this functionality is supported by the IED. In this view you can also change parameter settings.

Click the *icon* next to the parameter to open the corresponding help text for each parameter.

Substation	Line Diagran + 🖂 🖪	m Events Alarms Ristinummi > REF615	Help Logout				
E ₩ REF543_5	is 🔶	🔆 Disable Write 🛛 😽 Write t	o IED 🔰 🍫 Refresh Values	s 🛛 🔍 Expand all 👘 🔍 Collaps	se all Setting group	1* 💌	
	i4	Parameter Setting					
🗷 🐙 REF543_5	/3	Group/Parameter Name	Current Value	New Value	Unit	Min. Max.	
E RACK		Setting group node id					
□ SPA6		Active setting group					
₽ ICC7		Active Setting Group	1	1		0 60000	
🕂 🎫 REF 543_3_I3		PHIPTOC1					
EF543_3_14		Operation	on	on 💙			
O Parameters		Num of start phases	2 out of 3	2 out of 3 💙			
<ul> <li>Measuremen</li> <li>STA10</li> </ul>	its	Reset delay time	11	11	ms	0 60000	
- STA11		# Start value	22,00	22	xIn	0,1 40	
- STA13		# Start value Mult	1,0	1,0		0,8 10	
- STA14 - STA15		# Operate delay time	20	20	ms	20 200000	1

parameters2.png

Figure 3.10.1-1 An example of the Parameter Setting view

To change parameter settings:

- 1. Click **Enable Write** on the top of the Parameter Setting view.
- Select a new value from the drop down menu or type in a value in the New Value field. To apply changes, click Write to IED.
   If the new values are accepted, the background of the modified parameters turns

green. If the new values are incorrect, a message "Some settings are not in correct range" is displayed and the background of the modified parameters turns red. Type in values that are in the correct value range.

- 3. To manually update the values, click **Refresh Values**.
- 4. After you have made all necessary changes, click **Disable Write**. If the IED has been configured with a store option, a store dialog will appear. In the dialog you can store the parameter changes permanently to the IED non volatile memory. If you click **OK**, the parameter changes are stored permanently. If you

click **Cancel**, the parameter changes are only saved temporarily, and they will be lost after next reset of the IED.



When writing parameters to REF 542plus:

- Parameter value changes are not activated immediately when you click Write to IED, but only after you have stored the values permanently by clicking OK or temporarily by clicking Cancel in the store dialog. The store dialog appears when you click Disable Write or when you close the parameter setting tool while a write session is open.
- Parameter Set selection will restore the old value until the new value has been stored permanently or temporarily.

#### IEC 61850 setting groups and parameters

Certain IEC 61850 parameters are assigned to setting groups. These parameters can have different values in different groups. Parameters belonging to setting group have # character as a prefix in the name. You can view the parameters of each group by selecting the the Setting group number from the drop down menu. The currently active Setting group number in the IED is indicated with an asterix (\*) in the Setting Group selection drop down list.

To change the parameter values in a setting group:

- 1. Select the **Setting Group** to be edited
- 2. Click Enable Write on the top of the Parameter Setting view.
- 3. Enter the new values for the parameters
- 4. Write the changed parameter values to IED by clicking Write to IED.
- 5. Store the parameter changes permanently to IED by clicking disable write or closing the tool. Pop-up dialog will prompt for store or cancel.

The active setting group in the IED is changed with Active Setting Group parameter. To change the parameter follow the steps 2 to 5 above.

General Single Line Dia		Help Logout			
Substation 🕂 🕂	Ristinummi > REF615				
E 👷 REF543_55 Β 🐺 HA6	🍧 📗 💥 Disable Write 🔢 😽 Write to IE	ED 🔰 🍫 Refresh Values	🔒 🔍 Expand all 🛛 🔒 Collapse a	II Setting group 2	2 🖌
B ₩ HA6 REF543_54 B ₩ HA7	Parameter Setting			1 2	
🖻 🐖 REF543_53	Group/Parameter Name	Current Value	New Value	Unit 4	Max.
E- RACK	Setting group node id			5	
E H07_76	Active setting group			7	
E ICC7	Active Setting Group	1	1	8	60000
REF543_3_I3	PHIPTOC1			9	0
₽ ■ REF543_3_14 ₽ ■ REF615	Operation	on	on 💙		
O Parameters	Num of start phases	2 out of 3	2 out of 3 💙		
<ul> <li>Measurements</li> <li>STA10</li> </ul>	Reset delay time	11	11	ms	0 60000
- STA11	# Start value	22,00	22	xIn	0,1 40
- STA12	# Start value Mult	1,0	1,0		0,8 10
- 📰 STA14 - 🔤 STA15	# Operate delay time	20	20	ms	20 200000

parameters3.png

Figure 3.10.1-2 Selecting a parameter group

## 3.11. Measurements

### 3.11.1. Viewing measurements

To view measurement information, click on **Measurements** below the desired IED in the substation structure. HMI updates the measurement information automatically.

General	Single Line Diagram	E	vents	Alarms	Help	Logout		
🔄 Substatio	n	<b>-</b>   L	ynx					
j ⊑ <b>k</b> 33			Measure	ements				
			Descripti	on		Value		
	⊡ॼ REF542plus ⊡छ H2		Current	on phase L1	L	23 A		
9	E				Current	on phase L2	2	22 A
				on phase L3	}	23 A		
bst ⊡⊣	REF542plus		Voltage	U12		6.1 kV		
Substation	Disturbances		Voltage	U23		6.1 kV		
	Measurements		Voltage	U31		6.1 kV		
Use —	Web Server		Frequen	су		50 Hz		
5 E-1			Active p	iower		138 kW		
⊡ <u>₩</u> 6 k	REF542plus		Reactive	e power		3 kVar		
<b></b>	*							

measurements.png

Figure 3.11.1-1 An example view of measurements

# Appendix 1

## Single Line Diagram symbols

Table A1-1 Single Line Diagram symbols

Description	ANSI repres- entation	IEC represent- ation	Remarks
Annotation	Text		
Alarm Indicator			Alarm indicator in a branch of the substation. Use at any level in the structure to indicate alarms generally, or a specific alarm. The indicator is not vis- ible in the web view when there are no active alarms.
Two State Switch	2-State		Binary indicator (on/off, auto- matic/manual, X/not-X, etc.). It can also be used to send a command.
Launch Web Page	Web		Hyperlink to external informa- tion source, such as a web page or a local file on COM600.
			Files should be stored under C:\Program Files\COM610 GW SW\WebHMI\UserDocs\. The total size of the files should not exceed 100 MB. Link syntax for local files is: http:// <com600 IP address&gt;/HMI/User- Docs/<filename></filename></com600 
Push Button	Push		Use to send a single command to one target.
Application Launch	Plarm		Use to launch an application external to COM600
Measurement Text Box	Meas		
ViaPoint	•		
Connectivity Node	00 ABC 00		

Description	ANSI repres- entation	IEC represent- ation	Remarks
Circuit breaker – Intermediate position	×	×	
Circuit breaker – Open position		×	
Circuit breaker – Closed posi- tion		*	
Circuit breaker – Bad (faulty) position	+	∢	
Disconnector – Intermediate position	X	1 -	
Disconnector – Open position	Χ	1	
Disconnector – Closed position		+	
Disconnector – Bad (faulty) position	1	4	
Truck – Intermediate position	X	X	
Truck – Open position	人 个	$\frown$	
Truck – Closed position	*	Ч	
Truck – Bad (faulty) position	+		
Load breaker – Intermediate position	Use IEC rep- resentation	D T	
Load breaker – Open position	Use IEC rep- resentation	2	
Load breaker – Closed position	Use IEC rep- resentation	5	
Load breaker – Bad (faulty) position	Use IEC rep- resentation	V	
Contactor – Intermediate posi- tion	Use IEC rep- resentation	d T	
Contactor – Open position	Use IEC rep- resentation	10	

Description	ANSI repres- entation	IEC represent- ation	Remarks
Contactor – Closed position	Use IEC rep- resentation	٩	
Contactor – Bad (faulty) posi- tion	Use IEC rep- resentation	2	
Power Transformer with two Windings and no Tap Changer	***	8	Primary winding: on top. Sec- ondary winding: below. All composing elements exist as individual symbols.
Power Transformer with two Windings and Tap Changer	***	8	Primary winding: on top. Sec- ondary winding: below. All composing elements exist as individual symbols.
Power Transformer with three Windings and no Tap Changer	₩	B	Primary winding: on top. Sec- ondary winding: below left. Tertiary winding: below right. All composing elements exist as individual symbols.
Power Transformer with three Windings and Tap Changer	<b>}</b> €	Ø	Primary winding: on top. Sec- ondary winding: below left. Tertiary winding: below right. All composing elements exist as individual symbols.
Voltage Transformer (measure- ment)	쌲	8	
Current Transformer (measure- ment)	3	Φ	
Capacitor	Ŧ	+	
Reactor	3	Ф	
Generator	GEN	G	
Motor	MOT	<b>M</b>	
In-feeder		Use ANSI rep- resentation	
Out-feeder		Use ANSI rep- resentation	
Earth symbol	Ŧ	Use ANSI rep- resentation	

Description	ANSI repres- entation	IEC represent- ation	Remarks
Bay Switch Indicator	Bay remote	Use ANSI rep- resentation	
Station Switch Indicator	Station remote	Use ANSI rep- resentation	

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