

How do you log tags and messages with WinCC Advanced V11 in an SQL database?

WinCC Advanced V11 SP2

FAQ • October 2012



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Caution

The functions and solutions described in this article confine themselves predominantly to the realization of the automation task. Furthermore, please take into account that corresponding protective measures have to be taken in the context of Industrial Security when connecting your equipment to other parts of the plant, the enterprise network or the internet. Further information can be found in Entry ID: !50203404!

<http://support.automation.siemens.com/WW/view/en/50203404>

Question

How do you log tags and messages with WinCC Advanced V11 in an SQL database?

Answer

Follow the instructions and notes listed in this document for a detailed answer to the above question.

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1 Configuration Notes

This entry includes the principal configuration steps for

- Creating a Microsoft SQL database.
- Archiving tags in a Microsoft SQL database.
- Creating and processing a user-defined database from WinCC Runtime Advanced.

Note

There are numerous parameters and possible settings in a Microsoft SQL database. The entry can only deal with the settings required for this example.

SQL database and WinCC Advanced V11

When you install WinCC Advanced V11, you can disable/enable the "Project migration for WinCC flexible 2008 SP2, SQL Installation".

If the option is enabled, the "Microsoft SQL Server 2005 Express Edition" is also installed. This SQL Server is need for migrating WinCC flexible 2008 SP2 projects. Furthermore, data can be archived in this SQL Server.

Alternatively, you can download the "Microsoft SQL Server 2005 Express Edition" from the Microsoft Support site and install it separately on a PC, for example. This would be the case, for example, if you wanted to store the data to be archived on an external PC.

In this case, check which database is released for WinCC (TIA Portal).

Microsoft SQL Server Management Studio Express

The "Microsoft SQL Server Management Studio Express" (SSMSE) provides a graphical management tool for the "MS SQL Server 2005 Express Edition".

The "Microsoft SQL Server Management Studio Express" is not included in the WinCC Advanced delivery package.

If required, you can download the "Microsoft SQL Server Management Studio Express" from the Microsoft Support site.

When do you need the SQL Management Studio Express?

If you want to enter, edit and view data in the "Microsoft SQL Server 2005 Express Edition", you need the "Microsoft SQL Server Management Studio Express".

When do you need the SQL Management Studio?

You need "SQL Server Management Studio" to create a new database instance, for example. You cannot do this with "Microsoft SQL Server Management Studio Express".

Note

When "MS SQL Server" is mentioned in the documentation, this always refers to the "Microsoft SQL Server 2005 Express Edition".

2 SQL Database

In order to write and read data to/from an MS SQL database with WinCC Advanced, a database must be available on the PC on which the data is to be stored.

2.1 Create a Database on the Local Computer

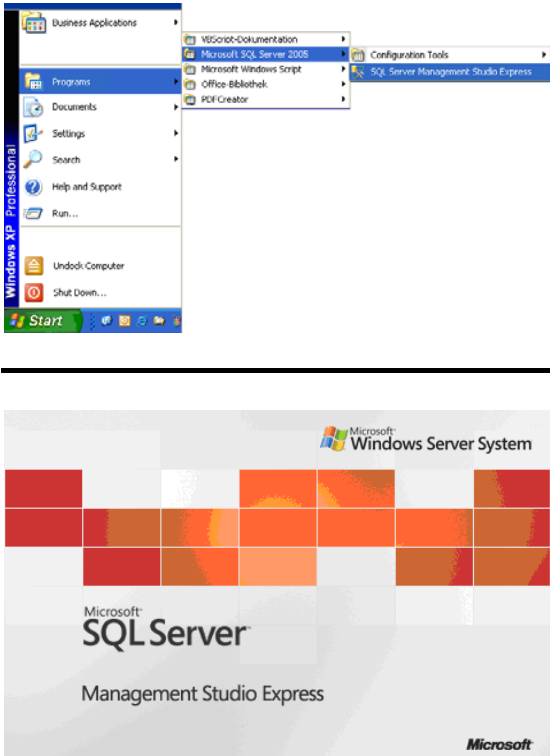
Creating the database with the "MS SQL Management Studio"

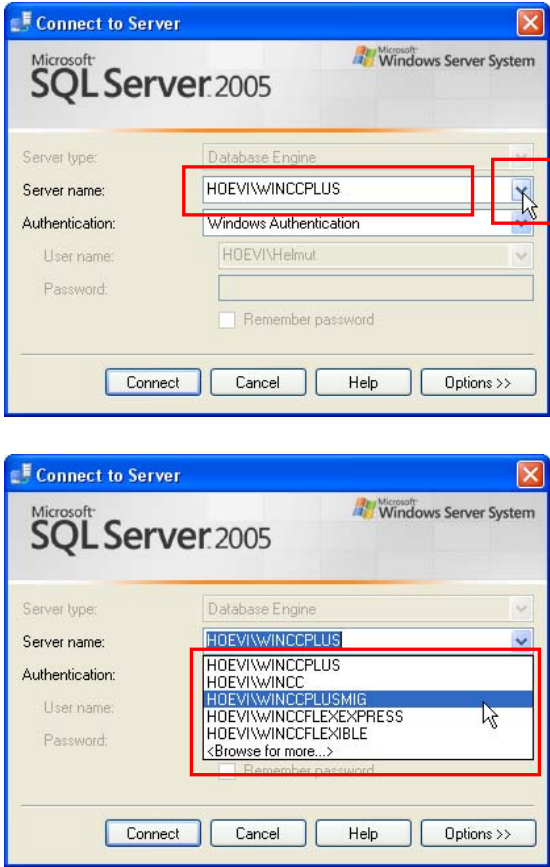
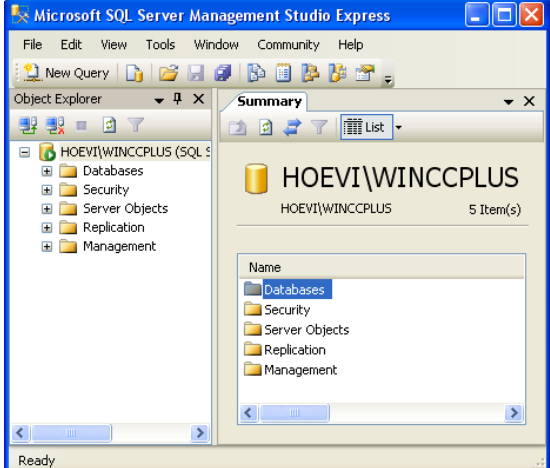
Below is an example of how to create an "MS SQL database" with the "Microsoft SQL Management Studio".

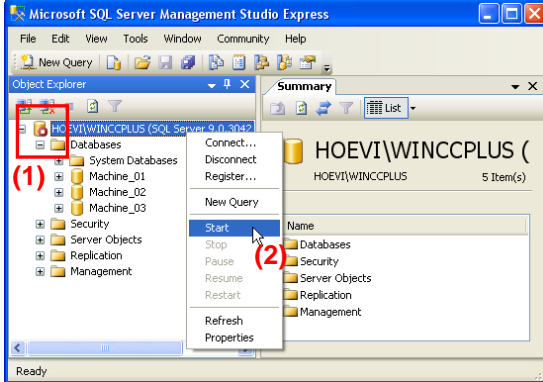
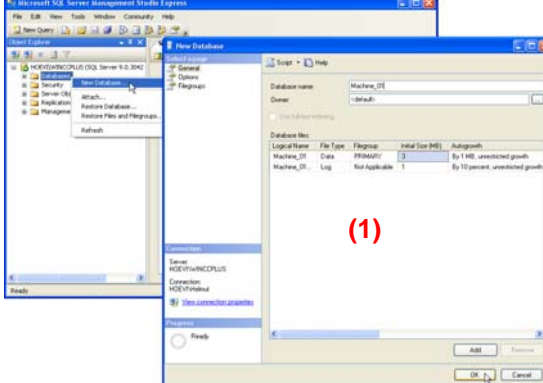
Requirements:

- Windows XP or Windows 7 operating system
- Microsoft SQL database available (Microsoft SQL Server 2005, for example)
- Microsoft SQL Management Studio is installed.

Table 2-1

No.	Description	Screen
1.	<p>Starting the "SQL Management Studio"</p> <p>Start the "Microsoft SQL Management Studio" on your PC. "Start > Programs > Microsoft SQL Server 2005 > SQL Server Management Studio".</p> <p>"Microsoft SQL Server Management Studio Express" starts.</p>	

No.	Description	Screen
<p>2.</p> <p>Setting up connection to the local server</p> <p>Specify the server name The server name consists of the following elements: "Computer name \ Instance name".</p> <p>In this example: "HOEVI\WINCCPLUS".</p> <p>You can specify the server name and instance name "manually" or over the drop-down list (1).</p> <p>From the drop-down list you select the local server on which you want to store the data (2).</p> <p>Notes:</p> <ul style="list-style-type: none"> • The number of server names presented depends on the installation. • You cannot create a new instance with "Microsoft SQL Server Management Studio Express". You need "Microsoft SQL Server Management Studio" for this. <p>Authentication Here you select the authentication. In this example "Windows Authentication"</p> <p>After specifying the server name and authentication, click on the "Connect" button. The connection to the server is set up.</p>		
<p>3.</p> <p>Database view</p> <p>Overview of the "Microsoft SQL Server Management Studio Express" with the server connected.</p>		

No.	Description	Screen
4.	<p>Start the SQL server</p> <p>If the server has not already been started, indicated by the "red" icon (1), then start the server manually.</p> <ul style="list-style-type: none"> In the "Object Explorer", you right-click the instance name of the connection and in the pop-menu that opens you select the "Start" item (2). You are then asked if you really want to restart the SQL server. Acknowledge the message with "Yes". <p>The SQL server starts.</p> <p>Note: If the SQL Server is not started, you cannot create a new database.</p>	 <p>The screenshot shows the Microsoft SQL Server Management Studio Express interface. In the Object Explorer on the left, the 'Databases' folder is expanded, and the server instance 'HOEVI\WINCCPLUS (SQL Server 9.0.3042)' is selected. A red box (1) highlights the instance name. A right-click context menu is open, and the 'Start' option is highlighted with a red box (2). The main window shows the 'Summary' tab for the selected instance, displaying its name and various server properties.</p>
5.	<p>Creating a new database</p> <ul style="list-style-type: none"> Right-click the "Databases" folder. In the pop-up menu you select the "New Database..." item. <p>A new dialog window opens (1).</p> <ul style="list-style-type: none"> Select the "General" folder and enter the new name of the database in the "Database Name" field. In this example: „Machine_01" <p>Note: The name you assign here will be used in due course when the "ODBC data source" is created. See Link.</p> <ul style="list-style-type: none"> Close the dialog via the "OK" button. The dialog window closes and you can see the newly created database in the "Databases" folder. <p>Repeat the points described above to create more databases as required.</p> <p>If you do not want to make any more entries, you can close the "Microsoft SQL Management Studio Express".</p> <p>Note: You can create a new database using a script. Refer here to the entry at this link: Link.</p>	 <p>The screenshot shows the Microsoft SQL Server Management Studio Express interface with the 'New Database' dialog box open. The 'General' tab is selected, and the 'Database name' field contains 'Machine_01'. A red box (1) highlights the dialog box. The background shows the Object Explorer with the 'Databases' folder expanded and the 'New Database...' option selected in the context menu.</p>

2.2 Remote Access to the SQL database

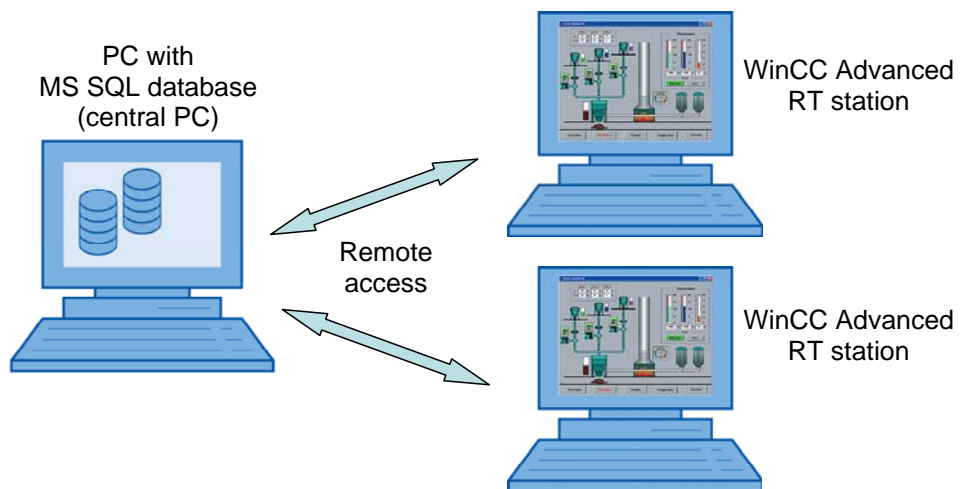
Section 2.1 describes how to create a database.

In the constellation described, the SQL server and the WinCC Runtime Advanced are installed together on one PC.

In this section, SQL Server and WinCC Runtime Advanced are each installed on a different computer.

The PC with SQL Server serves as the "central PC" on which the data management is conducted. All the WinCC Runtime Advanced stations store their data there centrally.

Figure 2-1



Note

Make sure that all the computers are in the same network.

For data communication between the RT stations and the "central PC" you must ensure that you are logged on to all the computers with the identical user name and password.

Remote access

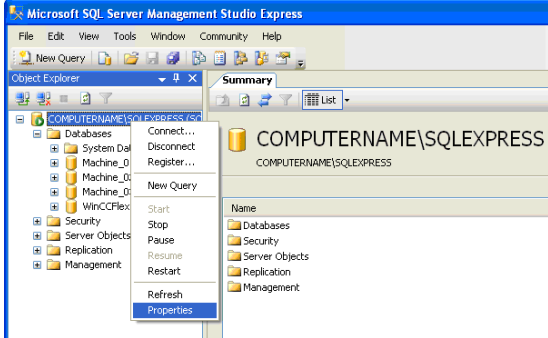
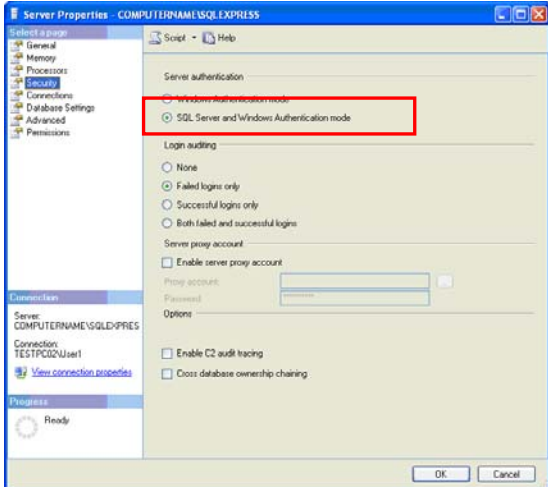
The default setting of the "Microsoft SQL Server 2005 Express Edition" does not permit "Remote Access".

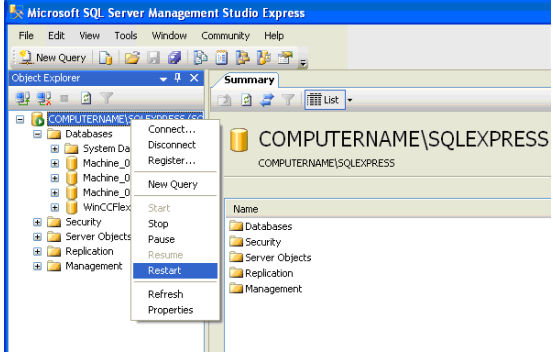
Below are the settings to be made to enable "Remote Access".

2.2.1 Enable remote access

The settings are to be made on the PC on which the SQL server is installed.

Table 2-2

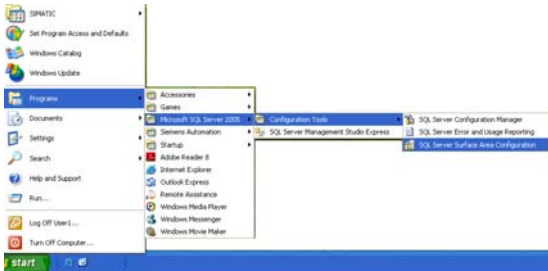
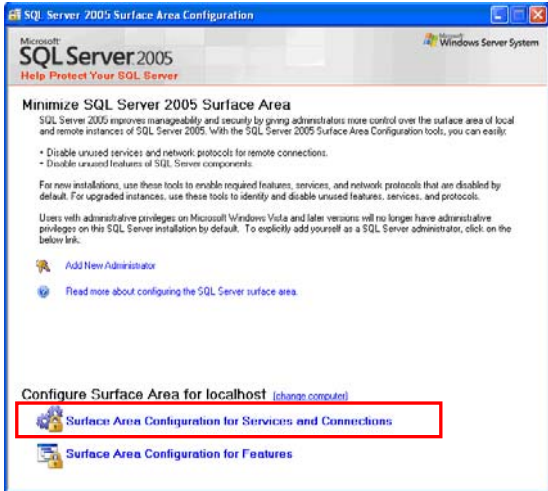
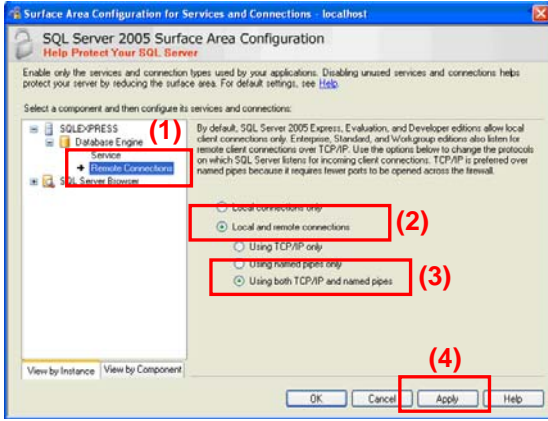
No.	Description	Screen
1.	<p>Requirements</p> <p>First, execute the steps described in section 2.1.</p> <p>Note: In this case, the instance name is now not "...WINCCPLUS", but "...SQLEXPRESS". (With the SQL Server 2005, the name for the default instance is "SQLEXPRESS".)</p>	
2.	<p>Edit server properties</p> <p>In the "Object Explorer", you right-click the instance name of the connection and via the pop-menu that opens you open the "Properties" of the server connection. The "Server Properties" dialog box opens.</p>	
3.	<p>"Server Properties" dialog box</p> <ul style="list-style-type: none"> In the "Select a page" list you select the "Security" item. Then, under "Server authentication", you select the "SQL Server and Windows Authentication mode" option. Confirm the entries with "OK". You then get a message informing you that the changes only become effective after restarting the SQL server. Acknowledge the message with "OK". This closes the dialog box. 	

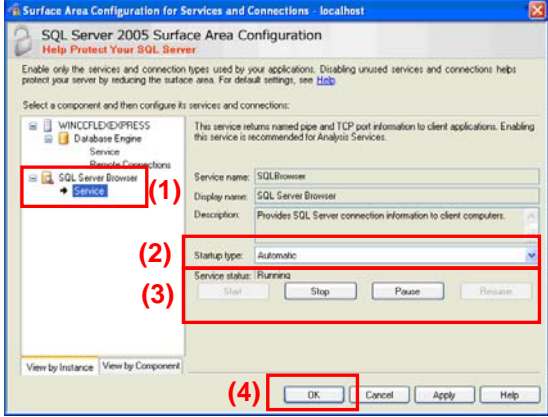
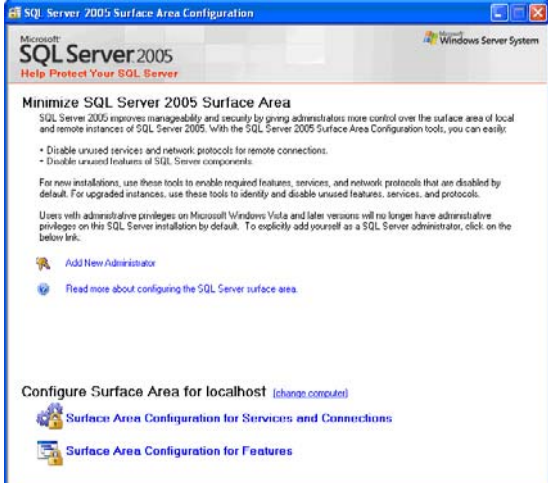
No.	Description	Screen
4.	<p>Restarting the SQL server</p> <ul style="list-style-type: none"> In the "Object Explorer", you right-click the instance name of the connection and in the pop-up menu that opens you select the "Restart" item. You are then asked if you really want to restart the SQL server. Acknowledge the message with "Yes". <p>The SQL server shuts down and then restarts.</p> <p>If you do not want to make any more entries, you can close the "Microsoft SQL Management Studio".</p>	 <p>The screenshot shows the Microsoft SQL Server Management Studio Express interface. The Object Explorer on the left displays a tree view of server objects, including Databases, System Databases, and Machine Groups. A context menu is open over the 'COMPUTERNAME\SQLEXPRESS' instance, with the 'Restart' option highlighted. The main window shows the 'Summary' tab for the selected instance, displaying its name and various server properties like Databases, Security, Server Objects, Replication, and Management.</p>

2.2.2 SQL Server Surface Area Configuration

You can use this service to edit the SQL server surface area configuration. The settings required for **"Remote Access"** are described below. The settings are to be made on the PC on which the SQL server is installed.

Table 2-3

No.	Description	Screen
1.	<p>Calling the "SQL server surface area configuration"</p> <p>Start the "SQL server surface area configuration" on your PC. "Start > Programs > Microsoft SQL Server 2005 > Configuration Tools > SQL Server Surface Area Configuration".</p> <p>The "SQL Server 2005 Surface Area Configuration" dialog box opens.</p>	
2.	<p>"SQL Server 2005 Surface Area Configuration" dialog box</p> <p>In the dialog box you select the configuration "Surface Area Configuration for Services and Connections".</p> <p>The "Surface Area Configuration for Services and Connections" dialog box opens.</p>	
3.	<p>The "Surface Area Configuration for Services and Connections" dialog box</p> <ul style="list-style-type: none"> In the list, you select the component "Your SQL server instance (SQLEXPRESS) > Database Engine > Remote Connections" (1). Now, on the right, you select the options "Local and remote connections" (2) and "Using both TCP/IP and named pipes" (3). Click on "Apply" (4) to confirm the selection. <p>You then get a message informing you that the changes only become effective after restarting the SQL server. Acknowledge the message with "OK".</p>	

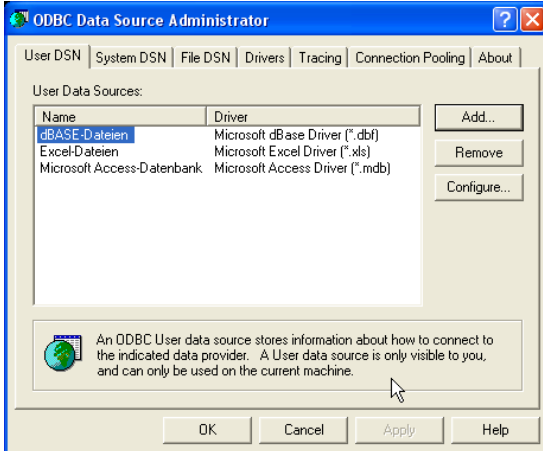
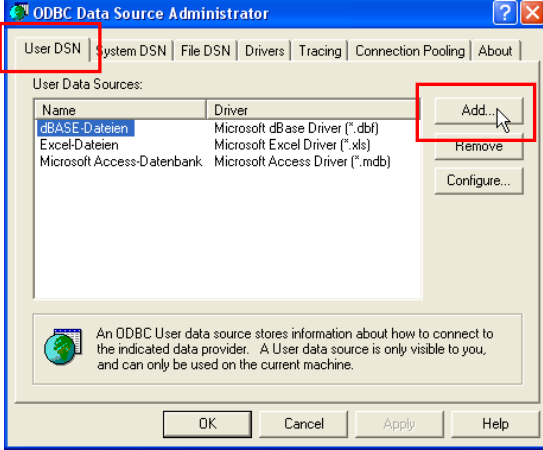
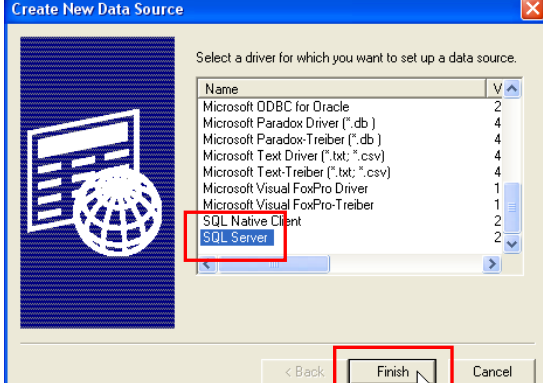
No.	Description	Screen
<p>4.</p> <p>The "Surface Area Configuration for Services and Connections" dialog box.</p> <ul style="list-style-type: none"> In the list, you select the component "SQL Server Browser > Service" (1). Then, on the right-hand side, open the "Startup type" drop-down list and select the "Automatic" option (2). If the "Service status" is set to "Running", confirm once with the "Stop" button and then with the "Start" button. If the "Service status" is set to "Stopped", then click on the "Start" button. Confirm the entry with the "OK" button (4). <p>This closes the dialog box.</p>		
<p>5.</p> <p>The "SQL Server 2005 Surface Area Configuration" dialog box is displayed again.</p> <p>Close this dialog box again.</p> <p>This completes the settings for "Remote Access".</p> <p>Now you can access the SQL database from the "WinCC flexible RT stations".</p>		

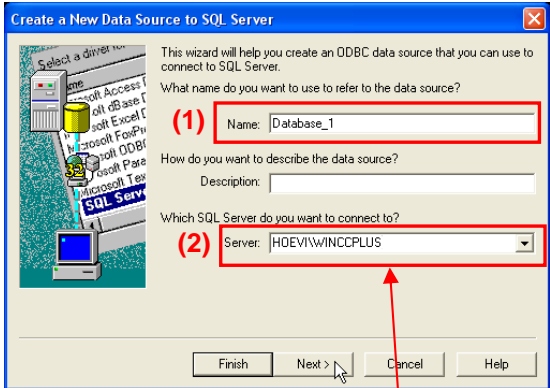
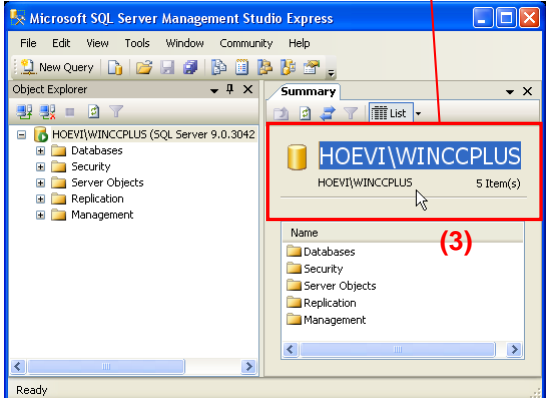
2.3 Configure the ODBC Data Source

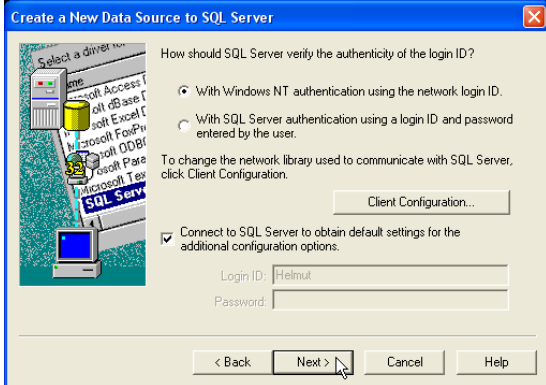
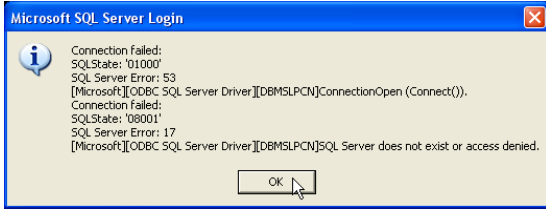
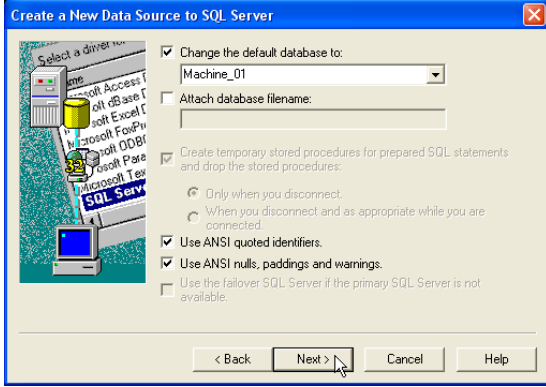
Using an ODBC application you create an ODBC data source by means of which you set up a connection to a Microsoft SQL server.

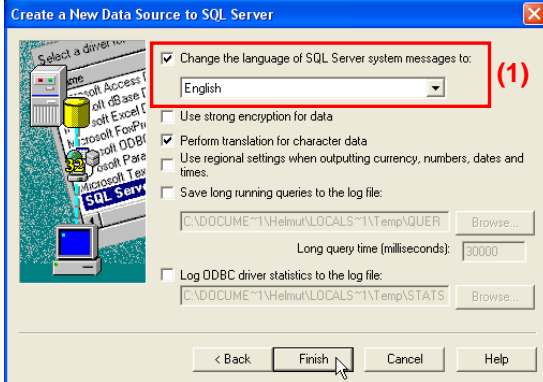
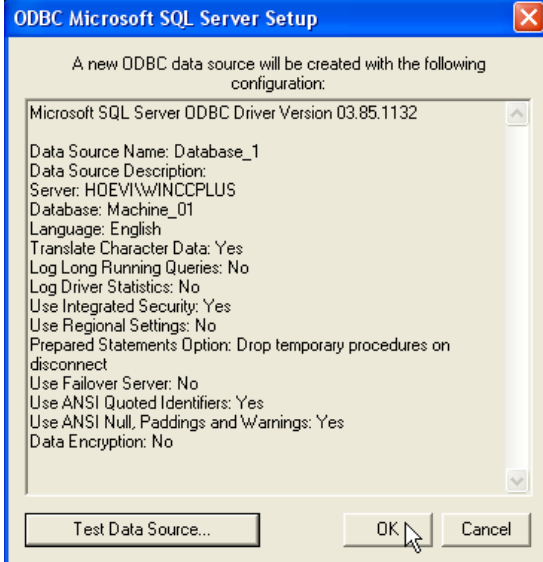
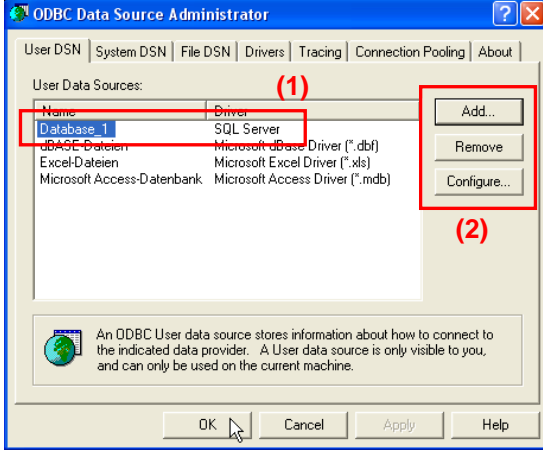
The ODBC settings must be made on the PC on which WinCC Advanced Runtime is installed.

Table 2-4

No.	Description	Screen
1.	<p>Calling the "ODBC Data Source Administrator"</p> <p>Open the "ODBC Data Source Administrator" on your PC. "Start > Settings > Control Panel > Administration > Databases (ODBC)". The dialog box shown on the right opens.</p> <p>Note: There might already be entries from user data sources. You do not need to pay attention to these.</p>	
2.	<p>Adding a data source</p> <p>Select the "User DSN" tab and then click on the "Add..." button. The "Create New Data Source" dialog box opens.</p>	
3.	<p>Selecting an SQL server</p> <p>In the drop-down list you select the "SQL Server" item and then click the "Finish" button. The "Create a New Data Source to SQL Server" dialog box opens.</p>	

No.	Description	Screen
<p>4.</p> <p>Defining reference name and server</p> <p>Specify a data source name in the "Name" dialog box (1). The name refers to the database and the storage location. The name you use here must match the name that you use to identify the "DSN" (Data Source Name) in WinCC Advanced. The "Data Source Name" here is used for parameterizing the data log (Link).</p> <p>In this example: Database_1</p> <p>Note: In the FAQ response entitled "How do you access an SQL database in WinCC Runtime Advanced using a script?" (Link) the "Data Source Name" used is stored in multiple scripts, for example.</p> <p>Specify a server in the "Server" dialog box (2). Select the server on which the data is to be stored and called. This can be your "local PC" on which WinCC Runtime Advanced is running or a "Central PC" (Remote Connection) on which all the data is stored.</p> <p>In this example: HOEVIWINCCPLUS</p> <p>TIP: You can select available servers from the drop-down list. If your server is not displayed, open the "SQL Management Studio" (see section 2.1). Copy the name of the "Instance" (3) and add this name to the "Server" input field.</p> <p>Then click the "Next>" button.</p>		 

No.	Description	Screen
5.	<p>Login settings</p> <p>Select a login option for the SQL data source. If you are in a domain, you can then use your domain account.</p> <p>In this example, the options selected in the figure were applied.</p> <p>Then click the "Next>" button.</p> <p>Note: When you click the "Next>" button, the system attempts to set up a connection to the SQL server. If this does not succeed, you get an error message (see next point).</p>	
6.	<p>Possible error message</p> <p>If connection setup to the SQL server has failed, check the "Server name" specified. Use the "<Back" button to return to the previous screen.</p> <p>Remote Access If you do not want to access the "local server" but the "remote server" (central PC), then check the points below.</p> <ul style="list-style-type: none"> • Is the PC to be reached over a "PING" or the "computer name"? • Is the "login data" correct? • Check the cable connection between the PCs. • See section 2.2. 	
7.	<p>Select the database</p> <p>Select the "Change the default database to" option by checking the check box. Open the drop-down list and select the database you have created - in this example "Machine_01" (Link).</p> <p>Then click the "Next>" button.</p>	

No.	Description	Screen
8.	<p>Complete the user data source</p> <p>On this page you can make a few more settings. It is useful to change the language of the SQL server system messages to the relevant "local language" (1).</p> <p>Complete the user data source by clicking on the "Finish" button.</p> <p>When you click on the "Finish" button, the "ODBC Microsoft SQL Server Setup" window opens. All the settings you have made are displayed once again in this window.</p>	
9.	<p>ODBC Microsoft SQL server setup</p> <p>All the settings you have made are displayed once again in this window. Furthermore, you can test the connection via the "Test Data Source..." button. Close the dialog by clicking on the "OK".</p> <p>When you click on the "OK" button, the "ODBC Data Source Administrator" window opens.</p>	
10.	<p>Viewing the newly created user data source</p> <p>The "ODBC Data Source Administrator" dialog box displays your defined user data source (1).</p> <p>With the buttons (2) you can</p> <ul style="list-style-type: none"> • Add other user data sources. • Delete a user data source. • Edit a user data source. <p>Mark the associated user data source.</p> <p>If you do not want to make any more entries, close the window with the "OK" button.</p>	

3 WinCC Advanced ES

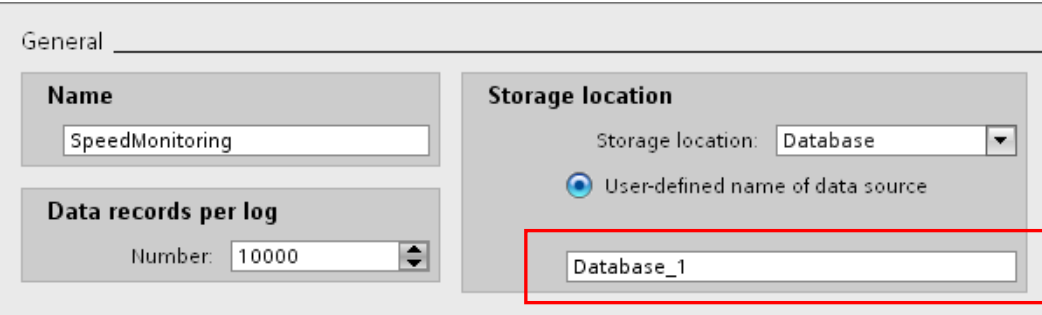
This chapter describes how to configure and make various settings for logging data in an SQL database. Please refer to the attached project for details.

Note All the settings already described have been made in the attached configuration.

3.1 Define the Properties of the Tag and Message Log

The settings below are to be made regardless of whether it is a message or tag log.

Table 3-1

No.	Description
1.	<p>Create a tag log</p> <ul style="list-style-type: none"> In the project navigation, open the "Archives" menu with a double-click. Select the "Tag logs" tab and add a new log with "<Add>". Mark the tag created and open the "Properties" tab. Select the "General" item and make the settings below. <ul style="list-style-type: none"> Name: here you assign a name for the tag. In this case "Speed_Monitoring". Data records per log: Here you specify the number of entries the log is to have. In this case 10,000 (pay attention here to the system limits). Storage location: Here you specify the storage location of the log. In this case "Database". Enter the "Instance name" of the database in the text field below. In this case "Database_1". <p>Note: The "Instance name" must match the name you used when parameterizing the ODBC (Link).</p> <p>Detailed information on the other menus like "Logging Method" is available in the Online Help of WinCC Advanced.</p> 

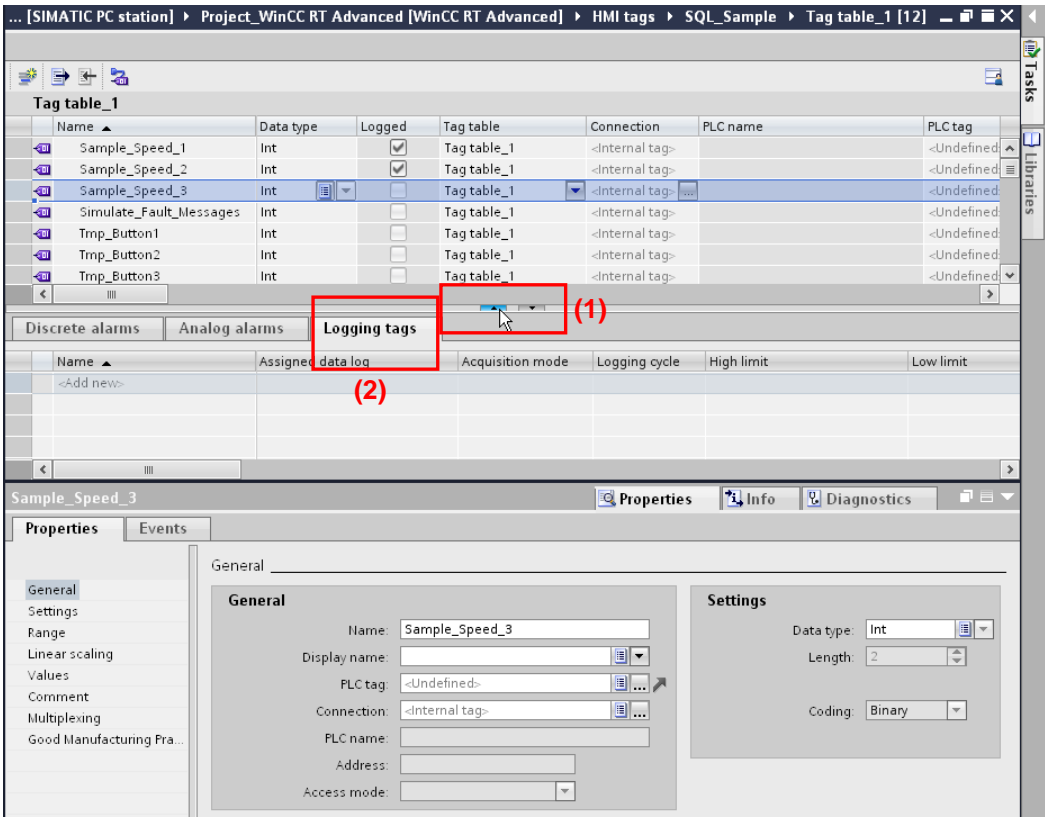
No.	Description
2.	<p data-bbox="317 309 564 338">Creating an alarm log</p> <ul data-bbox="317 376 1134 510" style="list-style-type: none"><li data-bbox="317 376 1134 405">• In the project navigation, open the "Archives" menu with a double-click.<li data-bbox="317 409 1134 439">• Select the "Message logs" tab and add a new log with "<Add>".<li data-bbox="317 443 1134 472">• Mark the tag created and open the "Properties" tab.<li data-bbox="317 477 1134 506">• The settings below are the same as you made in table section "1".

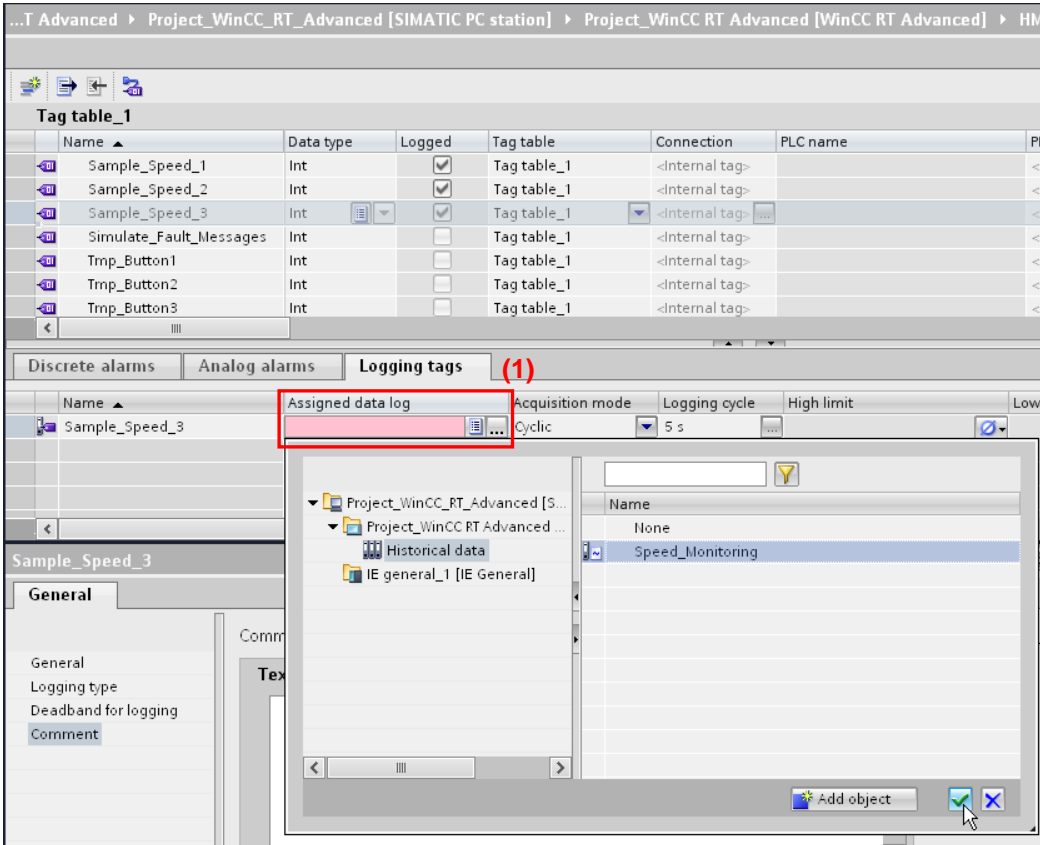
3.2 Logging Tags

This chapter describes how to log tags in an SQL database.
 How to create a tag log is described in section 3.1.

Note You cannot log tags of the "STRING" type.

Table 3-2

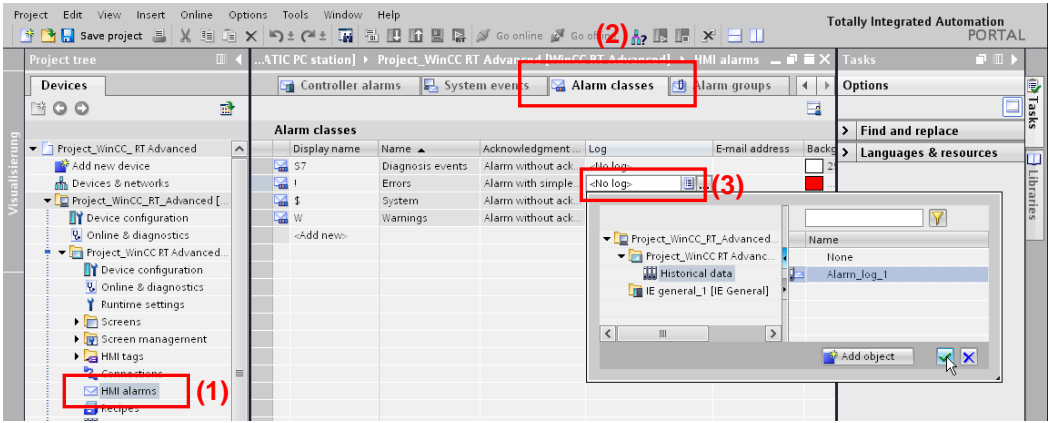
No.	Description
1.	<p>Open the overview navigation</p> <ul style="list-style-type: none"> Open the Tag Editor. Mark the tags that are to be logged. In this case "Sample_Speed_3". Open the overview navigation (1). Select the "Logging tags" tab (2). 

No.	Description
2.	<p>Logging properties</p> <ul style="list-style-type: none"> • Name: Use <Add> to assign the tag to a tag log. The name of the tag is applied automatically. • Assigned data log (1): Click the "... " icon. A window opens in which you can select your previously created data log. In this case, "Speed_Monitoring". • Acquisition mode Set the acquisition mode: <ul style="list-style-type: none"> - On demand - On change - Cyclic In this case "On change" (not visible in figure). Specify more properties as required. 
3.	<p>Log more tags</p> <p>Execute the steps described in table sections 1 and 2 to log more tags.</p>

3.3 Log Messages

This chapter describes how to log messages in an SQL database.
How to create a message log is described in section 3.1.

Table 3-3

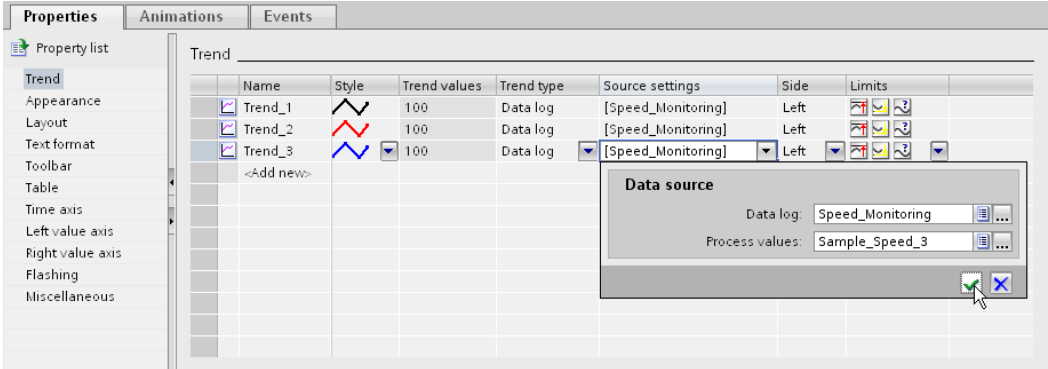
No.	Description
1.	<p>Open message log</p> <ul style="list-style-type: none"> In the project navigation, open the "HMI alarms" menu (1). Select the "Alarm classes" tab (2). Mark the "Errors" alarm class, for example. Double-click in the table cell under the "Log" item. A window opens (3) displaying a selection of alarm logs. Mark the relevant log. In this example it is "Alarm_log_1". Then apply the settings made. <p>Result: All the messages of the selected alarm class ("Errors" in this case) are archived in the selected log.</p> 
2.	<p>Log more messages</p> <p>Execute the steps described in table section 1 to log more messages.</p>

3.4 Output Logged Tag Values

This chapter describes how to output logged entries by means of a trend display.

If you want to output and subsequently edit logged entries over "IO fields" instead of a trend display, you need a script. In this case, refer to this FAQ entry ([Link](#)).

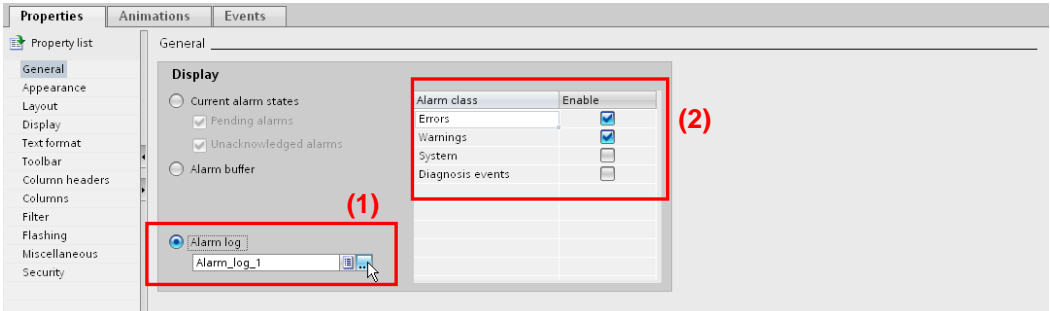
Table 3-4

No.	Description
1.	<p>Output Logged Tag Values</p> <ul style="list-style-type: none"> • Add a trend display in a screen and open the Properties window of the trend display. • Select the "Trend" menu from the Properties list. • Name: Add a new trend using "<Add>". • Trend type: Here you specify the type of curve from the drop-down list box. In this case "Data log". • Source settings: Click the drop-down list box. The "Data source" window opens. <ul style="list-style-type: none"> - Under the "Data log" item you, in the drop-down list you select the log in which the tag to be displayed is located. - For the "Process values" item you select from the log the tag that you want to output through the trend display. • Then apply the settings made. <p>Make more settings if necessary. Details about the individual parameters are available in the information system (Online Help).</p> 
2.	<p>Output more values</p> <p>Execute the steps described in table section 1 to output more tags through the trend display.</p>

3.5 Output Logged Message Values

This chapter describes how to output logged message values by means of an alarm display.

Table 3-5

No.	Description										
1.	<p>Output logged message values</p> <ul style="list-style-type: none"> • Add an alarm display in a screen and open the Properties window of the alarm display. • Select the "General" menu from the Property list. • Enable the "Alarm log" (1) option and from the list select the log in which the logged alarms are located. In this example it is "Alarm_log_1". • Enable the "Alarm classes" (2) to be output through the alarm display. In this case "Errors" and "Warnings". <p>Make more settings if necessary. Details about the individual parameters are available in the information system (Online Help).</p>  <table border="1" data-bbox="730 967 986 1079"> <thead> <tr> <th>Alarm class</th> <th>Enable</th> </tr> </thead> <tbody> <tr> <td>Errors</td> <td><input checked="" type="checkbox"/></td> </tr> <tr> <td>Warnings</td> <td><input checked="" type="checkbox"/></td> </tr> <tr> <td>System</td> <td><input type="checkbox"/></td> </tr> <tr> <td>Diagnosis events</td> <td><input type="checkbox"/></td> </tr> </tbody> </table>	Alarm class	Enable	Errors	<input checked="" type="checkbox"/>	Warnings	<input checked="" type="checkbox"/>	System	<input type="checkbox"/>	Diagnosis events	<input type="checkbox"/>
Alarm class	Enable										
Errors	<input checked="" type="checkbox"/>										
Warnings	<input checked="" type="checkbox"/>										
System	<input type="checkbox"/>										
Diagnosis events	<input type="checkbox"/>										

4 Operating the Sample Project

The attached project is for demonstrating the functions. Please refer to the project for details on configuration.

4.1 Requirements

To test the sample configuration you need an established connection to an SQL server.

Refer here to section 2.

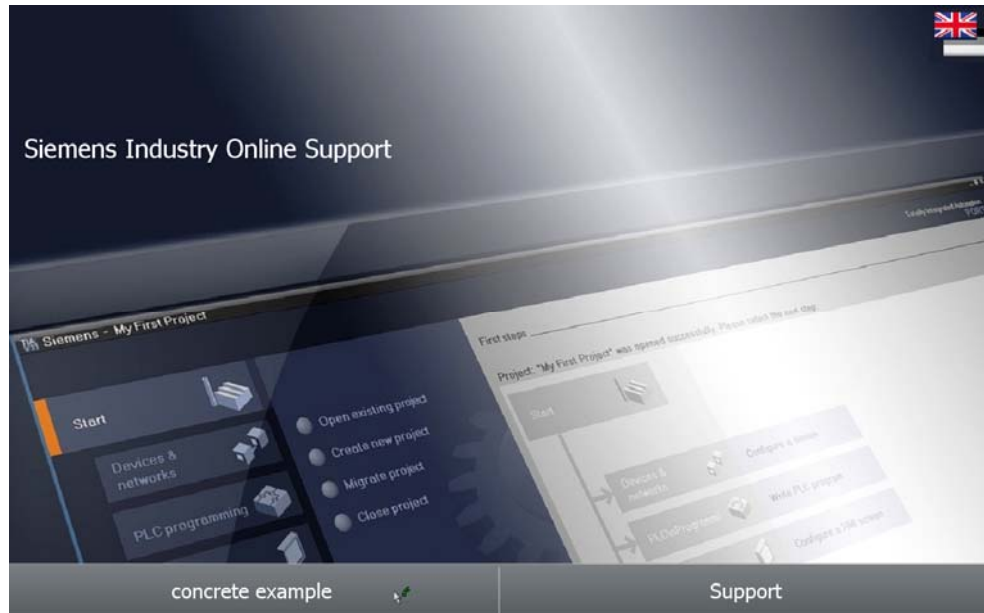
The "**WINCCPLUS**" server is used as SQL server.

The data source name (DSN) is "**Database_1**".

4.2 Start Screen

After start-up of the sample project, the following page opens. Use this to call the configured screens with the "Sample Project > Topic A or Topic B" button.

Figure 4-1



4.3 Configured Screens

4.3.1 Topic A, Logging and Output of Logged Tags

Writing tag values to an SQL database

The figure shows three drives whose values are logged in the configure SQL database at a "Change of value" event.

The values are specified by the "Simulate Tag" function.

With the ">>" button you get to the trend display in which the logged values are output.

Figure 4-2



Writing tag values to an SQL database

The figure shows a trend display in which three logged tag values from the SQL database are output. The values originate from the drives shown previously.

Using the "<<" button you can return to the screen showing the three drives.

Use the "Refresh page" button to update the values shown.

Figure 4-3



4.3.2 Topic B, Output of Logged Message Values

Output of logged message values

The figure shows an alarm display for the output of logged error messages. You can use the buttons "F1 to F8" to simulate error messages for test purposes. Click one or more of these buttons to trigger an error message. You acknowledge the error messages by clicking the selected buttons again. Use the "Refresh page" button to update the alarm display.

Figure 4-4

